TOYOTA MOTOR CORPORATION
FOREWORD

This supplement has been prepared to provide information covering general service repairs for COROLLA which underwent changes in May, 2004.

Applicable models: ZZE120, 121, 123 series
CDE120 series

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For the service specifications and repair procedures of the above model other than those listed in the supplement, refer to the following manuals.

Manual Name	Pub. No.
• COROLLA Repair Manual	RM925E
• COROLLA Repair Manual Supplement (Jan., 2002)	RM939E
• COROLLA Repair Manual Supplement (Jan., 2003)	RM1028E
• COROLLA Repair Manual Supplement (May., 2003)	RM1039E
• 3ZZ-FE, 4ZZ-FE Engine Repair Manual	RM928E
• 2ZZ-GE Engine Repair Manual	RM929E
• 1CD-FTV Engine Repair Manual	RM927E
• C51, C52 Manual Transaxle Repair Manual	RM826E
• C150 Manual Transaxle Repair Manual	RM827E
• C64 Manual Transaxle Repair Manual	RM930E
• E355, E356 Manual Transaxle Repair Manual	RM867E
• A245E, A246E Automatic Transaxle Repair Manual	RM847E
• COROLLA Electrical Wiring Diagram (May., 2004)	EWD582E
• COROLLA New Car Featurer (May., 2004)	NCF266E

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

CAUTION

This manual does not include all the necessary items about repair and service. This manual is made for the purpose of the use for the persons who have special techniques and certifications. In the cases that non-specialized or uncertified technicians perform repair or service only using this manual or without proper equipment or tool, that may cause severe injury to you or other people around and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damages to your customer's vehicle, be sure to follow the instruction shown below.

- Must read this manual thoroughly. It is especially important to have a good understanding of all the contents written in the PRECAUTION of "INTRODUCTION" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non-specified or recommended tools and service method, be sure to confirm safety of the technicians and any possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, must replace the part with the same part number or equivalent part. Do not replace it with inferior quality.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is important to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

TOYOTA COROLLA
REPAIR MANUAL SUPPLEMENT 1106E
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HOW TO USE THIS MANUAL

010XJ-01

GENERAL INFORMATION

1. GENERAL DESCRIPTION

(a) This manual is written in accordance with SAE J2008.

(b) Repair operations can be separated into 3 main processes:
  (1) Diagnosis
  (2) Removing/Installing, Replacing, Disassembling/Reassembling, Checking and Adjusting
  (3) Final Inspection

(c) This manual explains (1) (see ”Diagnostics” section) and (2). (3) is omitted.

(d) The following procedures are omitted from this manual. However, these procedures are essential and must be performed when applicable.
  (1) Using a jack or lift to perform operations
  (2) Cleaning a removed part
  (3) Performing a visual check

2. INDEX

(a) An alphabetical INDEX section is provided at the end of the book as a reference to help you find the item to be repaired.

3. PREPARATION

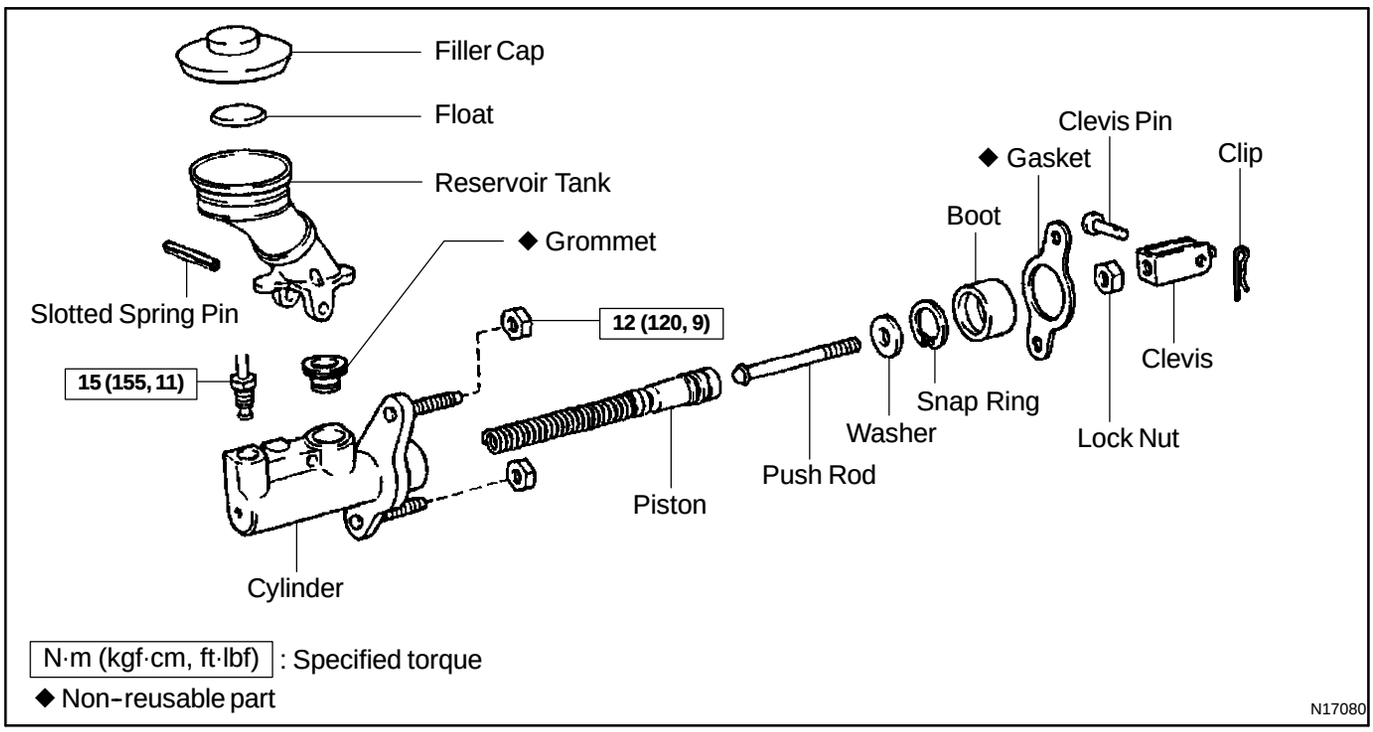
(a) Use of Special Service Tools (SST) and Special Service Materials (SSM) may be required, depending on the repair procedure. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the ”Preparation” section of this manual.

4. REPAIR PROCEDURES

(a) A component illustration is placed under the title where necessary.

(b) Non–reusable parts, grease application areas, precoated parts and torque specifications are noted in the component illustrations.

Example:



(c) Torque specifications, grease application areas and non–reusable parts are emphasized in the procedures.

NOTICE:

There are cases where such information can only be explained by using an illustration. In these cases, all the information such as torque, oil, etc. are described in the illustration.

(d) The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.

(e) Only items with key points are described in the text. What to do and other details are placed in illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.

(f) Illustrations of similar vehicle models are sometimes used. In those cases, specific details may be different from the actual vehicle.

(g) Procedures are presented in a step–by–step format:

(1) The illustration shows what to do and where to do it.

(2) The task heading tells what to do.

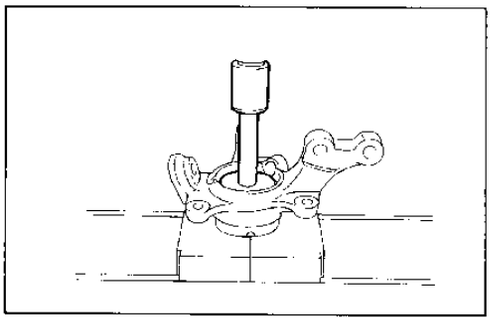
(3) The explanation text tells how to perform the task. It also has information such as specifications and warnings.

Example:

Illustration:

what to do and where

Task heading: what you will be doing



14. INSTALL FRONT AXLE HUB BEARING

(a) Using SST and a press, install a new bearing to the steering knuckle. ← *Detailed text: how to perform task*

SST 09950–60020 (09951–00720), 09950–70010 (09951–07100)

Set part No.

Component part No.

D32545

HINT:

This format provides an experienced technician with a FAST TRACK to the necessary information. The task headings are easy to read and the text below the task heading provides detailed information. Important specifications and warnings are always written in bold type.

5. SERVICE SPECIFICATIONS

(a) SPECIFICATIONS are presented in bold–faced text throughout the manual. The specifications are also found in the ”Service Specifications” section for quick reference.

6. TERMS DEFINITION

CAUTION	Possibility of injury to you or other people.
NOTICE	Possibility of damage to the components being repaired.
HINT	Provides additional information to help you perform repairs.

7. SI UNIT

(a) The units used in this manual comply with the SI UNIT (International System of Units) standard. Units from the metric system and the English system are also provided.

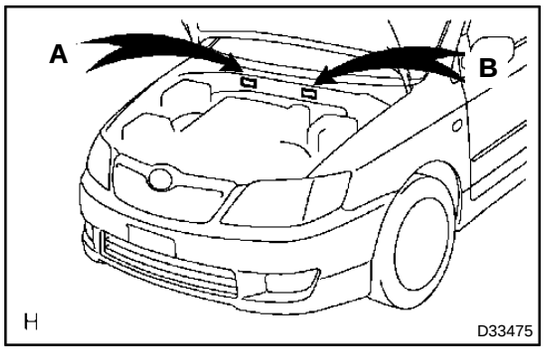
Example:

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

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION AND SERIAL NUMBERS

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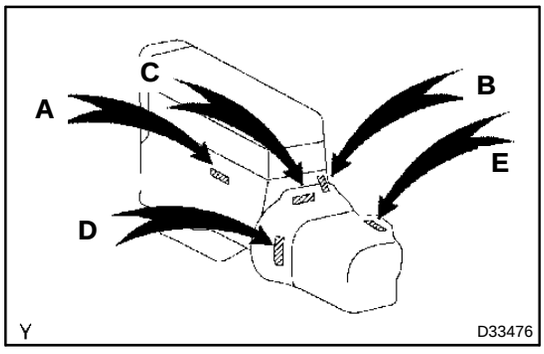


1. VEHICLE IDENTIFICATION NUMBER

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

A: Vehicle Identification Number Plate

B: Certification Label



2. ENGINE SERIAL NUMBER AND TRANSAXLE SERIAL NUMBER

(a) The engine serial number is stamped on the cylinder block of the engine and the transaxle serial number is stamped on the housing as shown in the illustration.

A: 1CD-FTV

B: 2ZZ-GE, 3ZZ-FE, 4ZZ-FE

C: C50, C64, C150

D: E351, E357

E: A246E

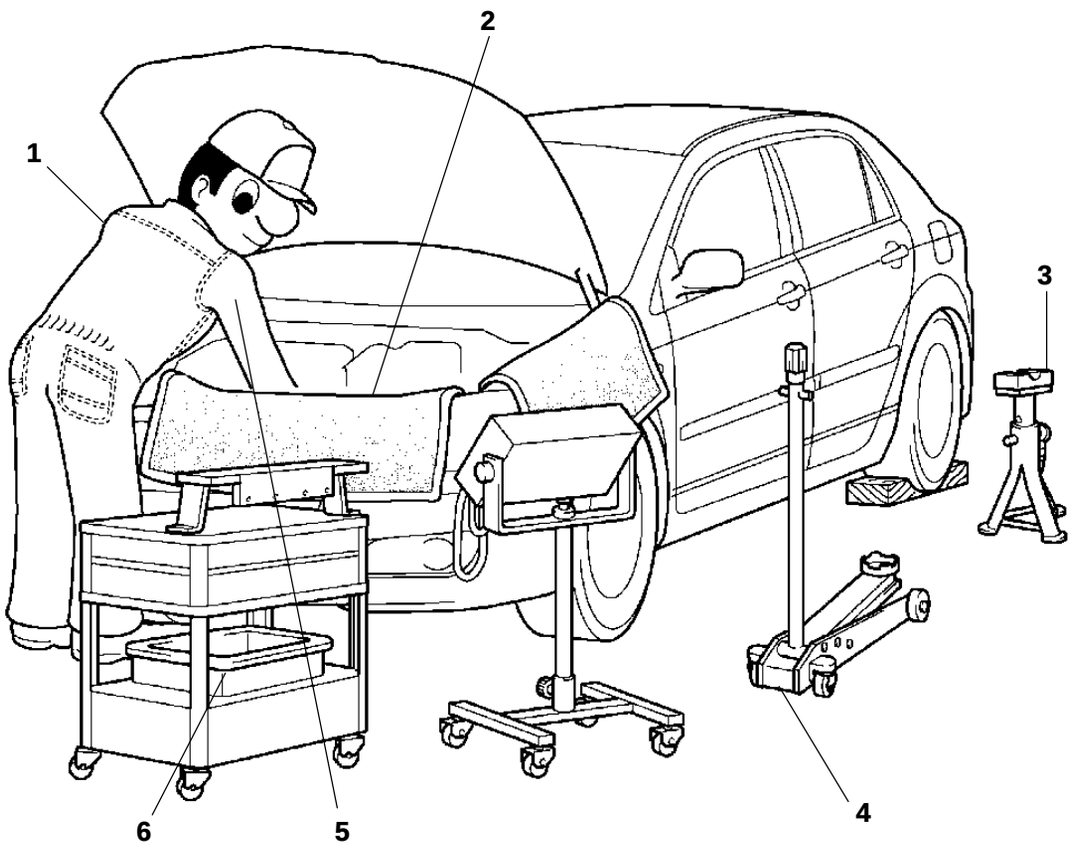
REPAIR INSTRUCTION

PRECAUTION

010XL-01

1. BASIC REPAIR HINT

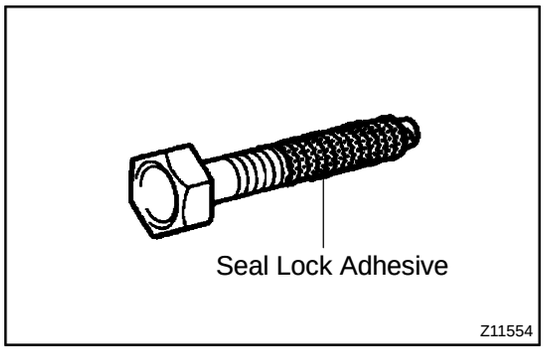
(a) HINTS ON OPERATIONS



1	Looks	• Always wear a clean uniform. • Hat and safety shoes must be worn.
2	Vehicle protection	Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.
3	Safe operation	• When working with 2 or more persons, be sure to check safety for one another. • When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop. • If working on high temperature, high pressure, rotating, moving, or vibrating parts, wear appropriate safety equipment and take extra care not to injure yourself or others. • When jacking up the vehicle, be sure to support the specified location with a safety stand. • When lifting up the vehicle, use appropriate safety equipment.
4	Preparation of tools and measuring gauge	Before starting operation, prepare a tool stand, SST, gauge, oil and parts for replacement.
5	Removal and installation, disassembly and assembly operations	• Diagnose with a thorough understanding of proper procedures and of the reported problem. • Before removing the parts, check the general condition of the assembly and for deformation and damage. • When the assembly is complicated, take notes. For example, note the total number of electrical connections, bolts, or hoses removed. Add matchmarks to insure re-assembly of components in the original positions. Temporarily mark hoses and their fittings if needed. • Clean and wash the removed parts if necessary and assemble them after a thorough check.
6	Removed parts	• Place the removed parts in a separate box to avoid mixing them up with the new parts or contaminating the new parts. • For non-reusable parts such as gaskets, O-rings, and self-locking nuts, replace them with new ones as instructed in this manual. • Retain the removed parts for customer inspection, if requested.

(b) JACKING UP AND SUPPORTING VEHICLE

(1) 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 01–18).



(c) PRECOATED PARTS

(1) Precoated parts are bolts and nuts that are coated with a seal lock adhesive at the factory.

(2) If a precoated part is retightened, loosened or moved in any way, it must be recoated with the specified adhesive.

(3) When reusing a precoated part, clean off the old adhesive and dry the part with compressed air. Then apply new seal lock adhesive appropriate to that part.

(4) Some seal lock agents harden slowly. You may have to wait for the seal lock agent to harden.

(d) GASKETS

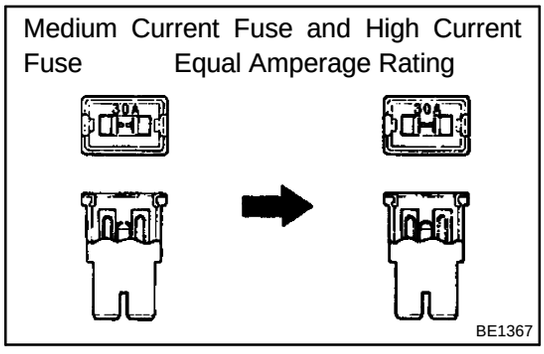
(1) When necessary, use a sealer on gaskets to prevent leaks.

(e) BOLTS, NUTS AND SCREWS

(1) Carefully follow all the specifications for tightening torques. Always use a torque wrench.

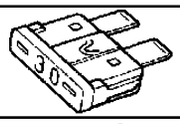
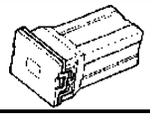
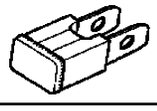
NOTICE:

Perform the torque with the lower limit value of the torque tolerance.



(f) FUSES

(1) When replacing fuses, be sure that 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
 D27353	 IN0367	HIGH CURRENT FUSE	H–FUSE

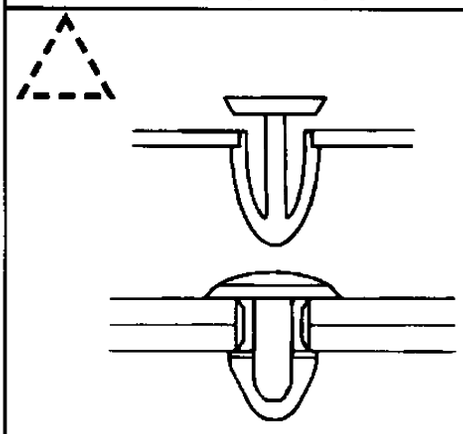
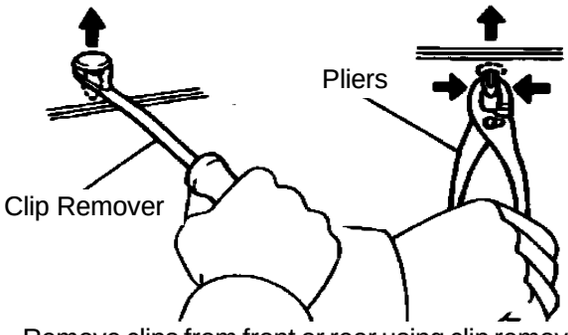
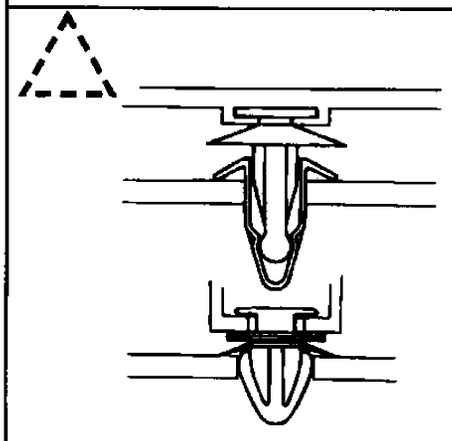
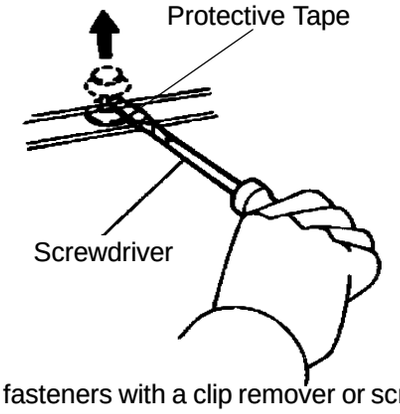
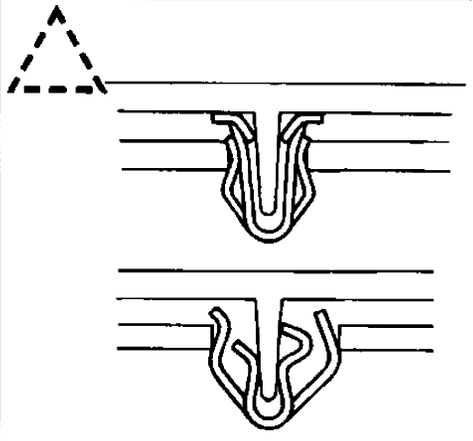
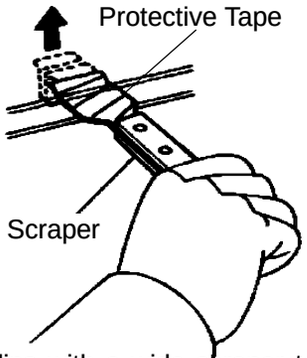
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(g) CLIPS

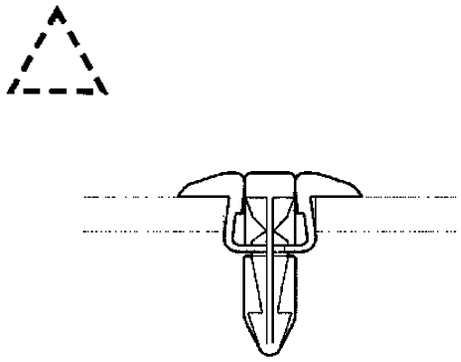
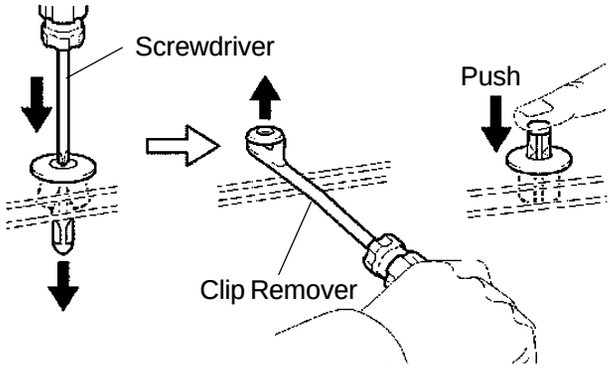
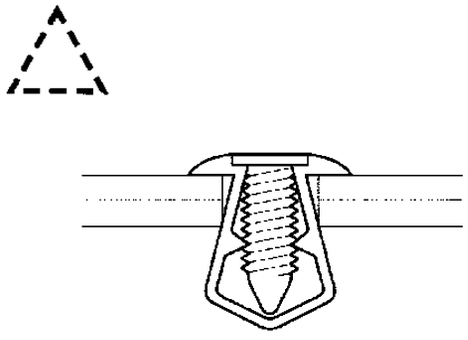
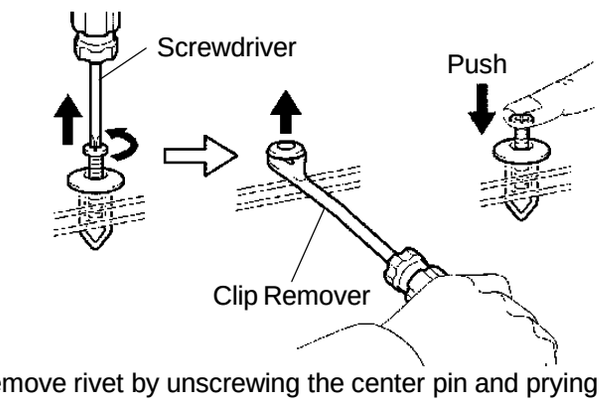
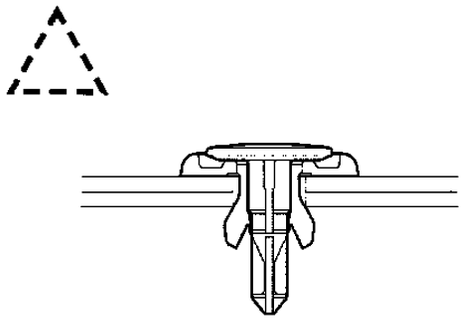
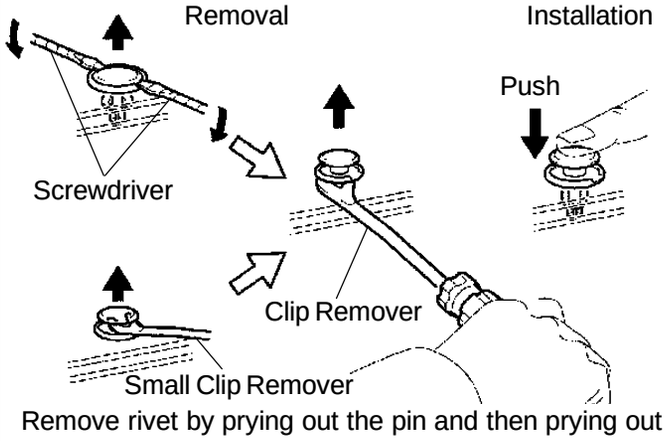
(1) The removal and installation methods of typical clips used in body parts are shown in the table below.

HINT:

If clips are damaged during a procedure, always replace the damaged clip with a new clip.

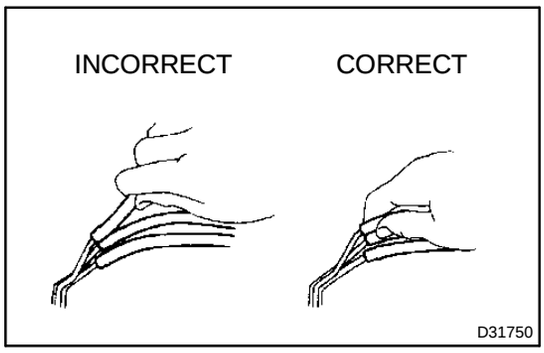
Shape (Example)	Removal/Installation
	 Remove clips from front or rear using clip remover or pliers.
	 Remove fasteners with a clip remover or screwdriver.
	 Remove clips with a wide scraper to prevent panel damage.

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Shape (Example)	Removal/Installation
	 Remove rivet by pushing the center pin through and prying out the rivet shell.
	 Remove rivet by unscrewing the center pin and prying out the rivet shell.
	 Remove rivet by prying out the pin and then prying out the rivet shell.

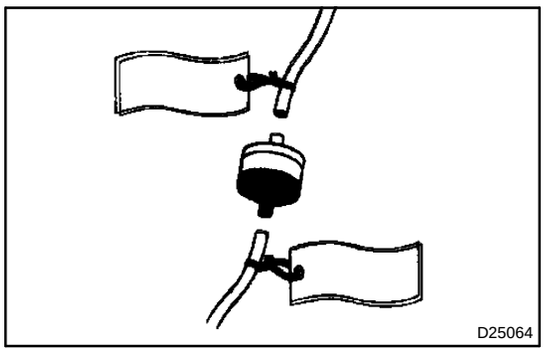
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(h) REMOVAL AND INSTALLATION OF VACUUM HOSES

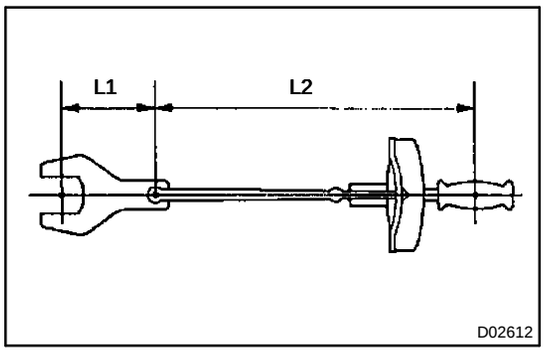
(1) To disconnect vacuum hose, pull and twist from the end of the hose. Do not pull from the middle of the hose as this may cause damage.



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

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

(4) 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.

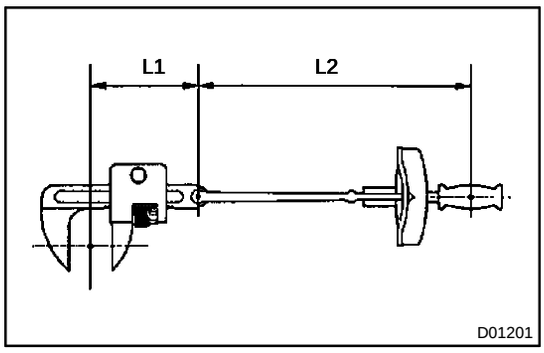


(i) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL

(1) If SST or an extension tool is combined with the torque wrench to extend its length, do not tighten the torque wrench to the specified torque values in this manual. The actual torque will be excessive.

(2) Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with the torque wrench.

Formula: T' = T x L2/(L1 + L2)



T'	Reading of torque wrench {N·m (kgf·cm, ft·lbf)}
T	Torque {N·m (kgf·cm, ft·lbf)}
L1	Length of SST or extension tool {cm (in.)}
L2	Length of torque wrench {cm (in.)}

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

HINT:

The COROLLA is equipped with a Supplemental Restraint System (SRS) and seat belt pretensioner. Failure to carry out the service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing and lead to serious injury.

Furthermore, if a mistake is made when servicing the SRS, it is possible that the SRS may fail to operate properly. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following section carefully.

(a) GENERAL NOTICE

(1) As the malfunction symptoms of the SRS are difficult to confirm, the Diagnostic Trouble Codes (DTCs) become the most important source of information when troubleshooting. When troubleshooting the SRS, always check the DTCs before disconnecting the battery (see page 05–727).

(2) Work must be started at least 90 seconds after the ignition switch is turned OFF and the negative (–) terminal cable is disconnected from the battery.

(The SRS is equipped with a back–up power source. If work is started within 90 seconds after turning the ignition switch OFF and disconnecting the negative (–) terminal cable from the battery, the SRS may deploy).

When the negative (–) terminal cable is disconnected from the battery, clock and audio system memory is erased. Before starting work, make a note of the settings of each memory system. When work is finished, reset the clock and audio systems as before.

CAUTION:

Never use a back–up power source (battery or other) to avoid erasing system memory. The back–up power source may inadvertently power the SRS and cause it to deploy.

(3) In minor collisions where the SRS does not deploy, the horn button assembly, instrument panel passenger airbag assembly, front seat airbag assembly, curtain shield airbag assembly and seat belt pretensioner should be inspected before further use of the vehicle (see pages 60–23, 60–33, 60–45, See Pub. No. RM925E on 60–32, 60–68, and see Pub. No. RM925E on 61–12).

(4) Never use SRS parts from another vehicle. When replacing parts, use new parts.

(5) Before repairs, remove the airbag sensor if impacts are likely to be applied to the sensor during repairs.

(6) Never disassemble and attempt to repair the airbag sensor assembly, horn button assembly, instrument panel passenger airbag assembly, curtain shield airbag assembly, front seat airbag assembly or seat belt pretensioner.

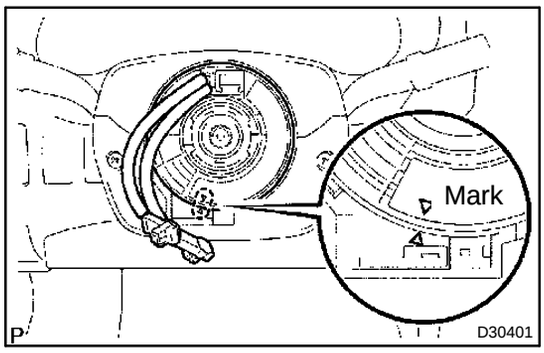
(7) Replace the center airbag sensor assembly, side airbag sensor assembly, horn button assembly the instrument panel passenger airbag assembly, curtain shield airbag assembly or front seat airbag assembly or instrument panel lower airbag assembly if: 1) damage has occurred from being dropped, or 2) cracks, dents or other defects in the case, bracket or connector are present.

(8) Do not directly expose the airbag sensor assembly, horn button assembly, instrument panel passenger airbag assembly, front seat airbag assembly, curtain shield airbag assembly or seat belt pretensioner to hot air or flames.

(9) Use a voltmeter/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting electrical circuits.

(10) Information labels are attached to the SRS components. Follow the instructions on the labels.

(11) After work on the SRS is completed, check the SRS warning lamp (see page 05–719).



(b) SPIRAL CABLE (in Combination Switch)

(1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other problems may occur. Refer to page 60–40 for information about correct installation of the steering wheel.

(c) HORN BUTTON ASSEMBLY (with Airbag)

(1) When removing the horn button assembly or handling a new horn button, it should be placed with the pad surface facing up. See the illustration below.
Placing the horn button with the pad surface facing down may lead to a serious accident if the airbag accidently inflates. Also, do not place anything on top of the horn button.

(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

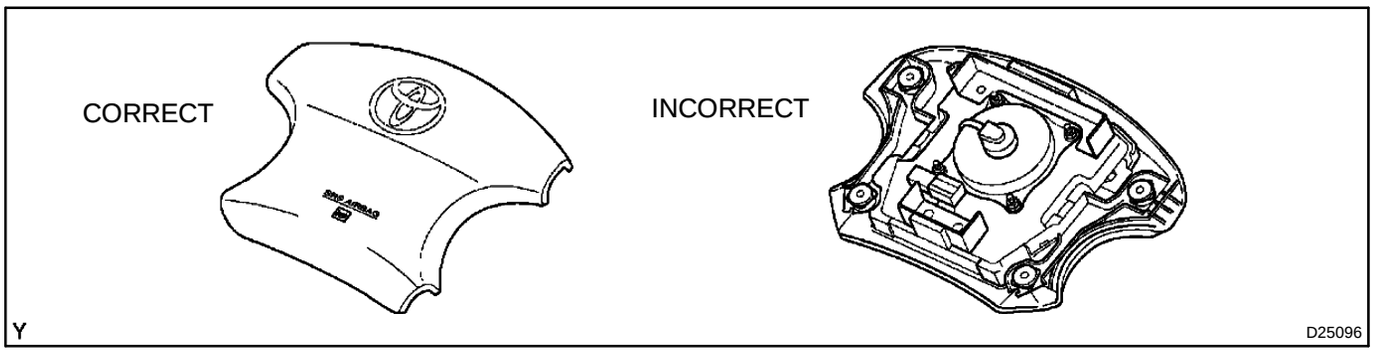
(3) Grease or detergents of any kind should not be applied to the steering wheel pad.

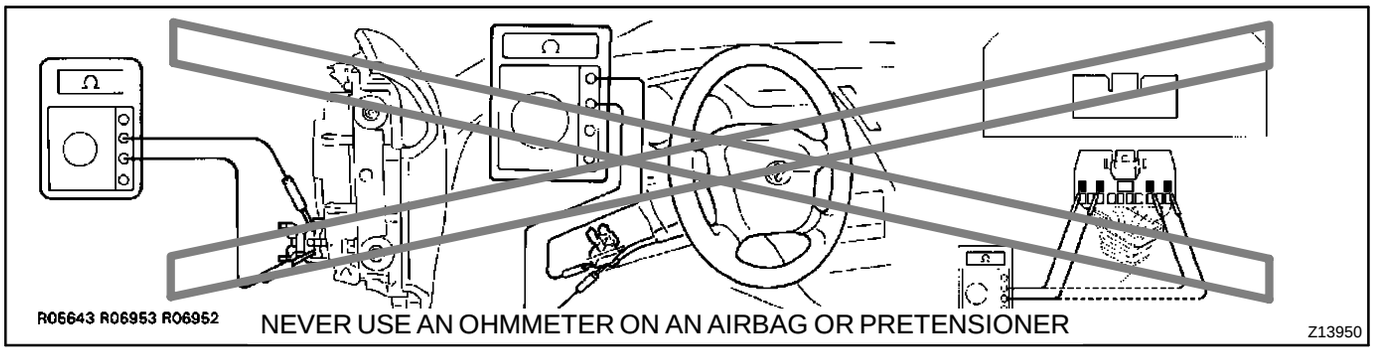
(4) Store the horn button assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag or seat belt pretensioner deploying due to currents entering the squib wiring.

(6) When disposing of the vehicle or the horn button assembly by itself, the airbag should be inflated using an SST before disposal (see page 60–23, 60–33). Activate in a safe place away from electrical noise.

Example:





(d) INSTRUMENT PANEL PASSENGER AIRBAG ASSY

(1) Always place a removed or new instrument panel passenger airbag assembly with the airbag inflation direction facing up.
Placing the airbag assembly with the airbag inflation direction facing down could cause a serious accident if the airbag inflates.

(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

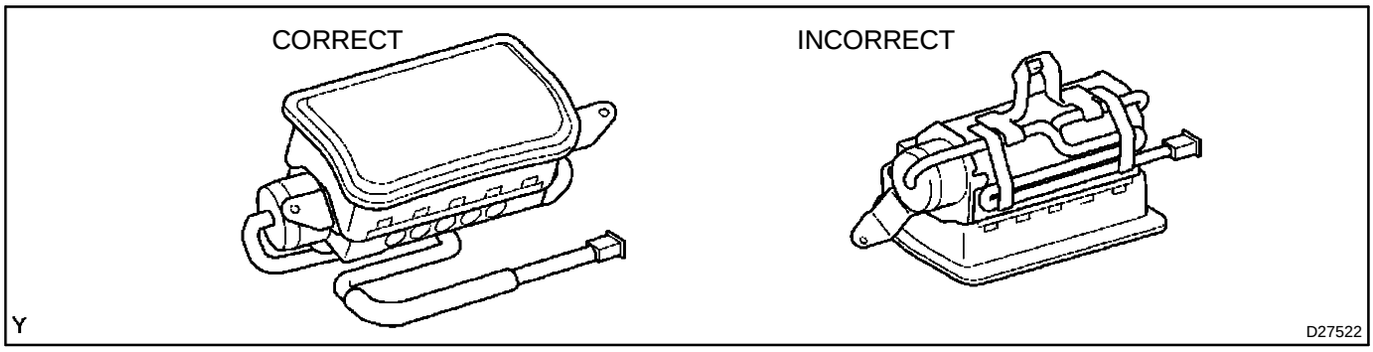
(3) Grease or detergents of any kind should not be applied to the instrument panel passenger airbag assembly.

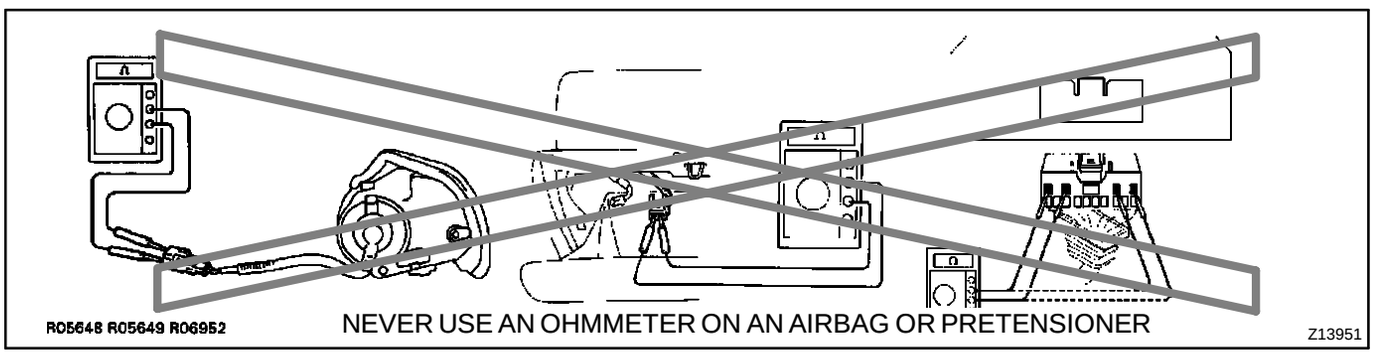
(4) Store the airbag assembly in an area where the ambient temperature is below 93˚C (200˚F), the humidity is not high and electrical noise is not nearby.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (see page 60–45).
Activate in a safe place away from electrical noise.

Example:





(e) CURTAIN SHIELD AIRBAG ASSEMBLY

(1) Always place the removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

NOTICE:
Plastic bag is not re-useable.
CAUTION:
Never disassemble the curtain shield airbag assembly.

(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

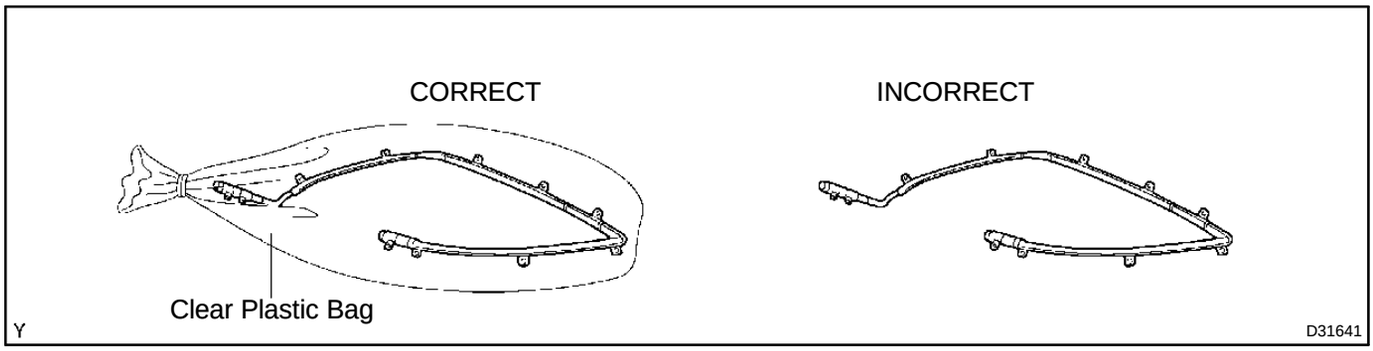
(3) Grease or detergents of any kind should not be applied to the curtain shield airbag assembly.

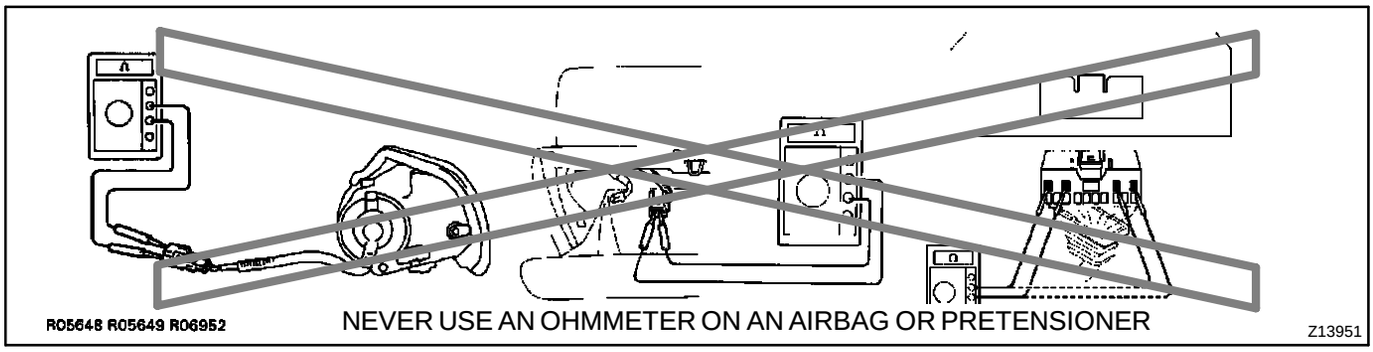
(4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (see page 60–68).
Activate in a safe place away from electrical noise.

Example:





(f) FRONT SEAT AIRBAG ASSEMBLY

(1) Always place a removed or new front seat airbag assembly with the airbag inflation direction facing up.
Placing the airbag assembly with the airbag inflation direction facing down could cause a serious accident if the airbag deploys.

(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

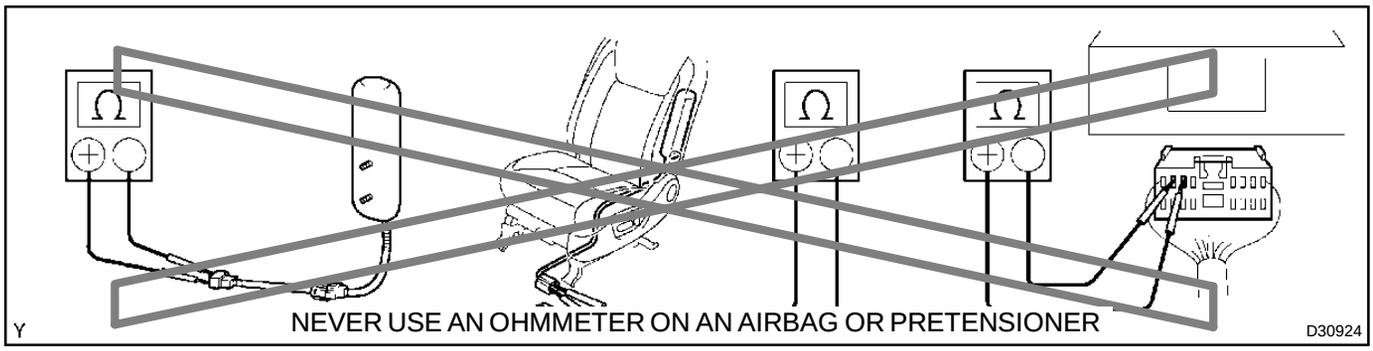
(3) Grease or detergents of any kind should not be applied to the front airbag assembly.

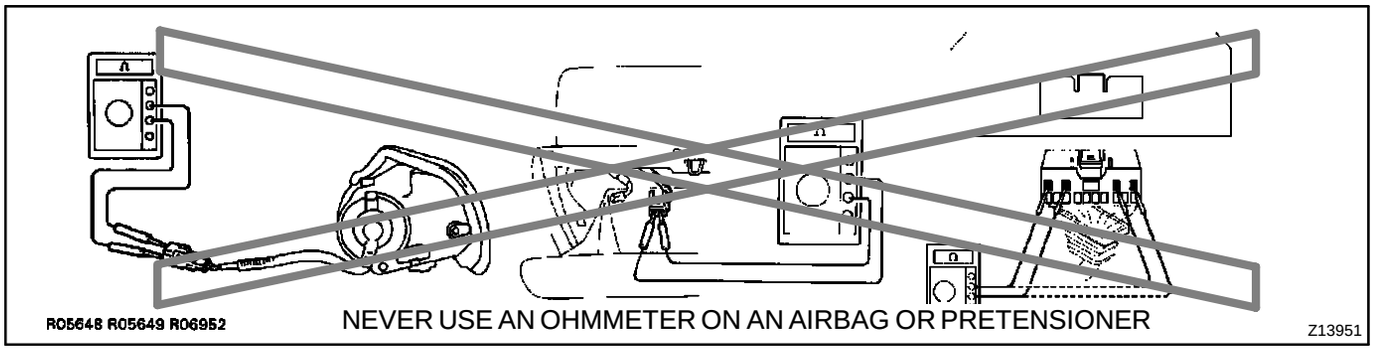
(4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (See Pub. No. RM925E on 60–32).
Activate in a safe place away from electrical noise.

Example:





(g) SEAT BELT PRETENSIONER

(1) Never measure the resistance of the seat belt pretensioner. This may cause the seat belt pretensioner to activate, which could cause serious injury.

(2) Never disassemble the seat belt pretensioner.

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

(4) Store the seat belt pretensioner in an area where the ambient temperature is below 80˚C (176˚F), the humidity is not high and electrical noise is not nearby.

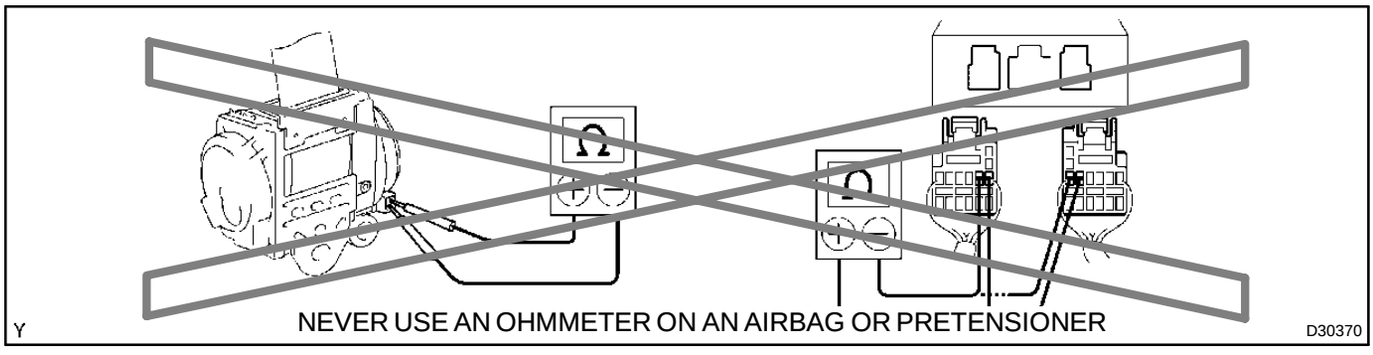
(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or the seat belt pretensioner unit by itself, the seat belt pretensioner should be activated before disposal (see Pub. No. RM925E on 61–12). Activate in a safe place away from electrical noise.

(7) As the seat belt pretensioner is hot after being activated, allow some time for it to cool down sufficiently before disposal. Never apply water to try to cool down the seat belt pretensioner.

(8) Grease, detergents, oil or water should not be applied to the front seat outer belt.

Example:



(h) AIRBAG SENSOR ASSEMBLY

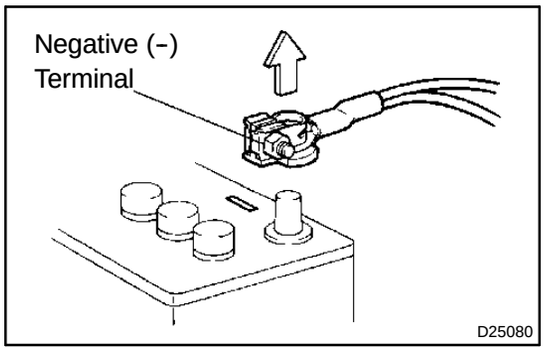
(1) Never reuse an airbag sensor assembly that has been involved in a collision where the SRS has deployed.

(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, the SRS may activate.

(3) Work must be started at least 90 seconds after the ignition switch is turned OFF 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

(1) 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, repair or replace it.



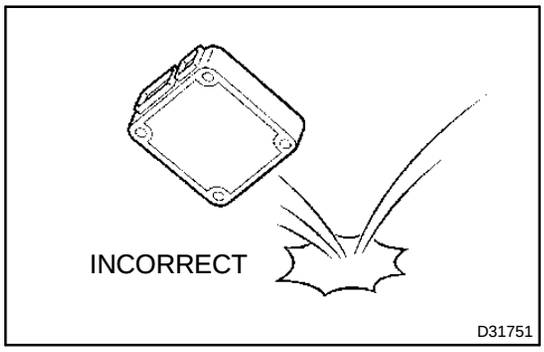
3. ELECTRONIC CONTROL

(a) REMOVAL AND INSTALLATION OF BATTERY TERMINAL

(1) Before performing electronic work, disconnect the cable from the battery's negative (–) terminal to prevent component and wire damage caused by accidental short circuits.

(2) When disconnecting the terminal cable, turn the ignition switch and head light dimmer switch OFF and loosen the terminal nut completely. Perform these operations without twisting or prying the terminal. Remove the battery cable from the battery post.

(3) Clock settings, radio settings, audio system memory, DTCs and other data are erased when the battery cable is disconnected. write down any necessary data before disconnecting the battery cable.



(b) HANDLING OF ELECTRONIC 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 rendered inoperative by static electricity.

(2) To disconnect electronic connectors, pull the connector itself, not the wires.

(3) Be careful not to drop electronic components, such as sensors or relays. If they are dropped on a hard surface, they should be replaced.

(4) When cleaning the engine with steam, protect the electronic components, air filter and emission–related components from water.

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

4. REMOVAL AND INSTALLATION OF FUEL SYSTEM PARTS

(a) PLACE FOR REMOVING AND INSTALLING OF FUEL SYSTEM PARTS

(1) Work in a location with good air ventilation that does not have welders, grinders, drills, electric motors, stoves, or any other ignition sources.

(2) Never work in a pit or near a pit as vaporized fuel will collect in those places.

(b) REMOVING AND INSTALLING OF FUEL SYSTEM PARTS

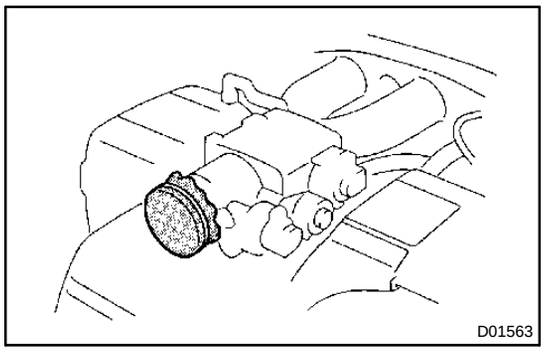
(1) Prepare a fire extinguisher before starting operation.

(2) To avoid static electricity, install a ground wire to the fuel changer, vehicle and fuel tank, and do not spray the surrounding area with water. Be careful when performing work in this area, as the work surface will become slippery. Do not clean up gasoline spills with water, as this may cause the gasoiine to spread, and possibly create a fire hazard.

(3) Avoid using electric motors, work lights and other electric equipment that can cause sparks or high temperatures.

(4) Avoid using iron hammers as they may create sparks.

(5) Dispose of fuel–contaminated cloth separately using a fire resistant container.

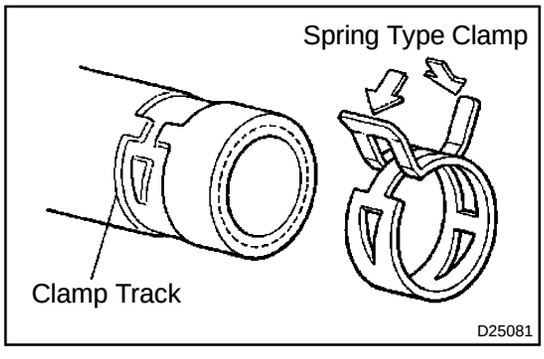

D01563

5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

(a) If any metal particles enter the inlet pass, this may damage the engine.

(b) When removing and installing the inlet system parts, cover the openings of the removed parts and engine openings. Use gummed tape or other suitable materials.

(c) When installing the inlet system parts, check that no metal particles have entered the engine or the installed part.



D25081

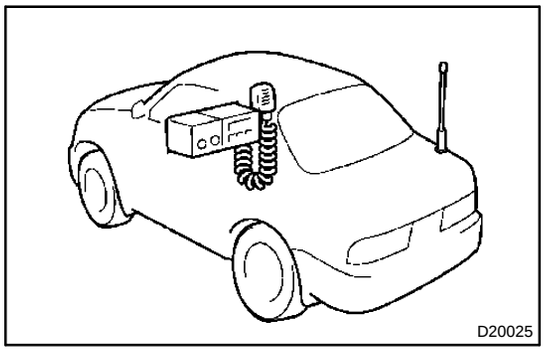
6. HANDLING OF HOSE CLAMPS

(a) Before removing the hose, check the clamp position so that it can be reinstalled in the same position.

(b) Replace any deformed or dented clamps with new ones.

(c) When reusing a hose, attach the clamp on the clamp track portion of the hose.

(d) For a spring type clamp, you may want to spread the tabs slightly after installation by pushing in the direction of the arrow marks as shown in the illustration.


D20025

7. FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEMS

(a) Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.

(b) Install an antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle electronic systems. For details of the ECU and sensors locations, refer to the section on applicable components.

(c) Keep the antenna and feeder separate from other wirings as much as possible. This will prevent signals from the communication equipment from affecting vehicle equipment and vice–versa.

(d) Check that the antenna and feeder are correctly adjusted.

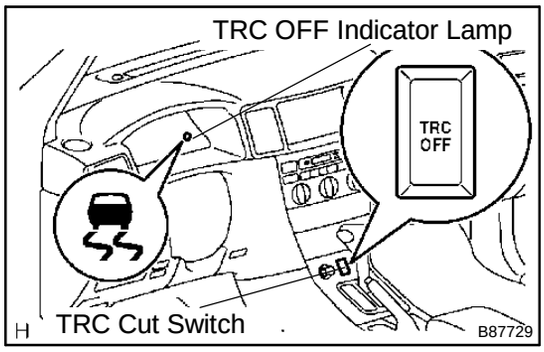
(e) Do not install any high–powered mobile communication system.

8. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRC) SYSTEM

When testing with a 2–wheel drum tester such as a speedometer tester, a combination tester of the speedometer and brake, a chassis dynamometer, or when jacking up the front wheels and driving the wheels, always turn the TRC system OFF via the TRC cut (TRC OFF) switch before testing.

NOTICE:

TRC system OFF condition can be confirmed by the TRC OFF warning indicator in the combination meter.



(a) Confirm TRC system is OFF

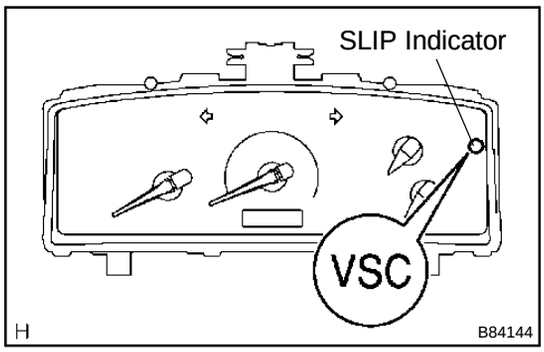
(1) Press the TRC cut (TRC OFF) switch to turn off the TRC system.

(2) Check that the TRC OFF indicator illuminates.

HINT:

The SLIP indicator should always operate right after the engine is restarted.

(3) Begin testing.

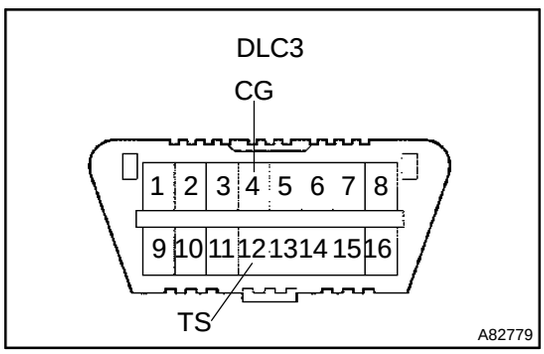


(4) Press the TRC cut (TRC OFF) switch to turn on the TRC system and check that the TRC OFF indicator turns off.

HINT:

The SLIP indicator lamp blinks when the TRC system is operating.

(5) Be sure to follow the instructions for work preparation and final confirmation of proper operation of the VSC system.



9. FOR VEHICLES EQUIPPED WITH VEHICLE STABILITY CONTROL (VSC) SYSTEM

(a) NOTICES WHEN USING DRUM TESTER

(1) Before beginning testing, disable the Vehicle Stability Control (VSC) system. To disable the VSC, turn the ignition switch OFF and connect SST to terminals TS and CG of the DLC3.

SST 09843–18040

NOTICE:

- **Confirm that the VSC warning lamp blinks.**
- **VSC system will be reset when the engine is restarted.**
- **For safety, secure the vehicle with restraint chains while using a wheel dynamometer.**

(b) NOTICES OF RELATED OPERATIONS TO VSC

(1) Do not carry out unnecessary installation and removal as it might affect the adjustment of the VSC related parts.

(2) Be sure to follow the instructions for work preparation and final confirmation of proper operation of the VSC system.

10. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

CAUTION:

If a large amount of unburned gasoline or gasoline vapors flow into the converter, it may cause overheating and create a fire hazard. To prevent this, observe the following precautions.

(a) Use only unleaded gasoline.

(b) Avoid prolonged idling.
Avoid idling the engine for more than 20 minutes.

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

(d) Avoid a prolonged engine compression measurement.
Engine compression measurements must be performed as rapidly as possible.

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

010XM-01

VEHICLE LIFT AND SUPPORT LOCATIONS

1. NOTICE ABOUT VEHICLE CONDITION WHEN JACKING UP

(a) The vehicle must be unloaded before jacking up the vehicle. Never jack up/lift up a heavily loaded vehicle.

(b) When removing heavy equipment such as the engine and transmission, the center of gravity of the vehicle may shift. To stabilize the vehicle: place a balance weight in a location where it will not roll or shift; or use a mission jack to hold the jacking support.

2. NOTICE FOR USING 4 POST LIFT

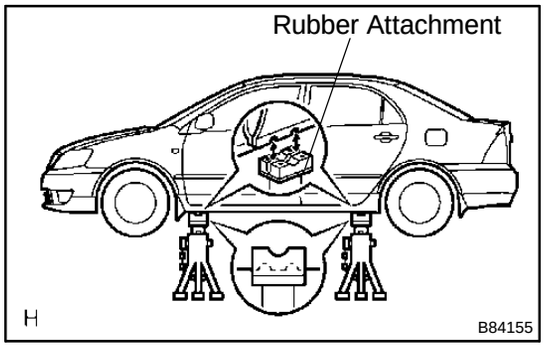
(a) Follow the safety procedures outlined in its instruction manual.

(b) Use precautionary measures to prevent the free beam from damaging tires or wheels.

(c) Use wheel chocks to secure the vehicle.

3. NOTICE FOR USING JACK AND SAFETY STAND

(a) Work in a flat area using wheel chocks at all times.



(b) Use a safety stand with a rubber attachment, as shown in the illustration.

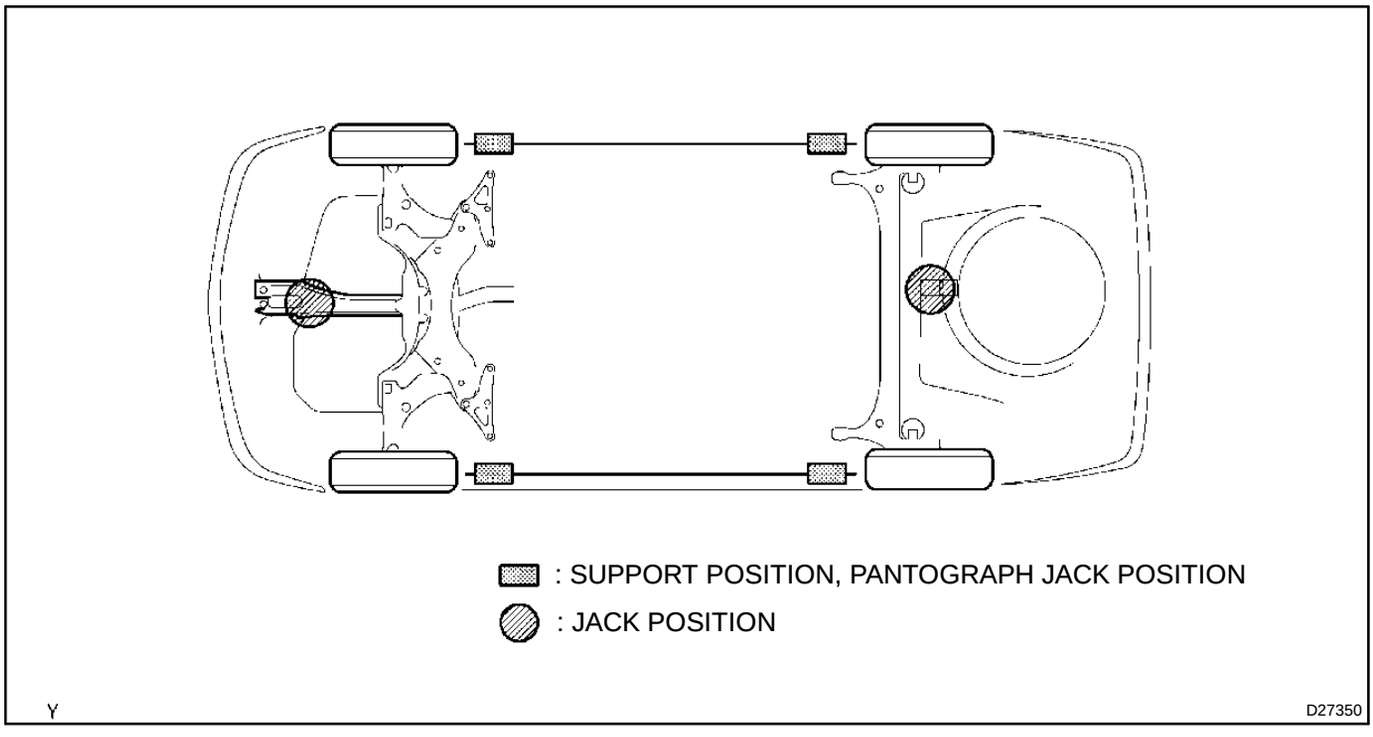
(c) Apply the jack and rigid rack to the specified location on the vehicle.

(d) When jacking up the front wheels, release the parking brake and place wheel chocks only behind the rear wheels. When jacking up the rear wheels, place wheel chocks only in front of the front wheels.

(e) The jack should not be used without the rigid rack.

(f) When jacking up only the front wheels or only the rear wheels, place wheel chocks on both sides of the wheels touching the ground.

(g) When lowering the vehicle with its front wheels jacked up, release the parking brake and place wheel chocks only in front of the rear wheels. When lowering a vehicle with its rear wheels jacked up, place wheel chocks only behind the front wheels.



4. NOTICE FOR USING SWING ARM TYPE LIFT

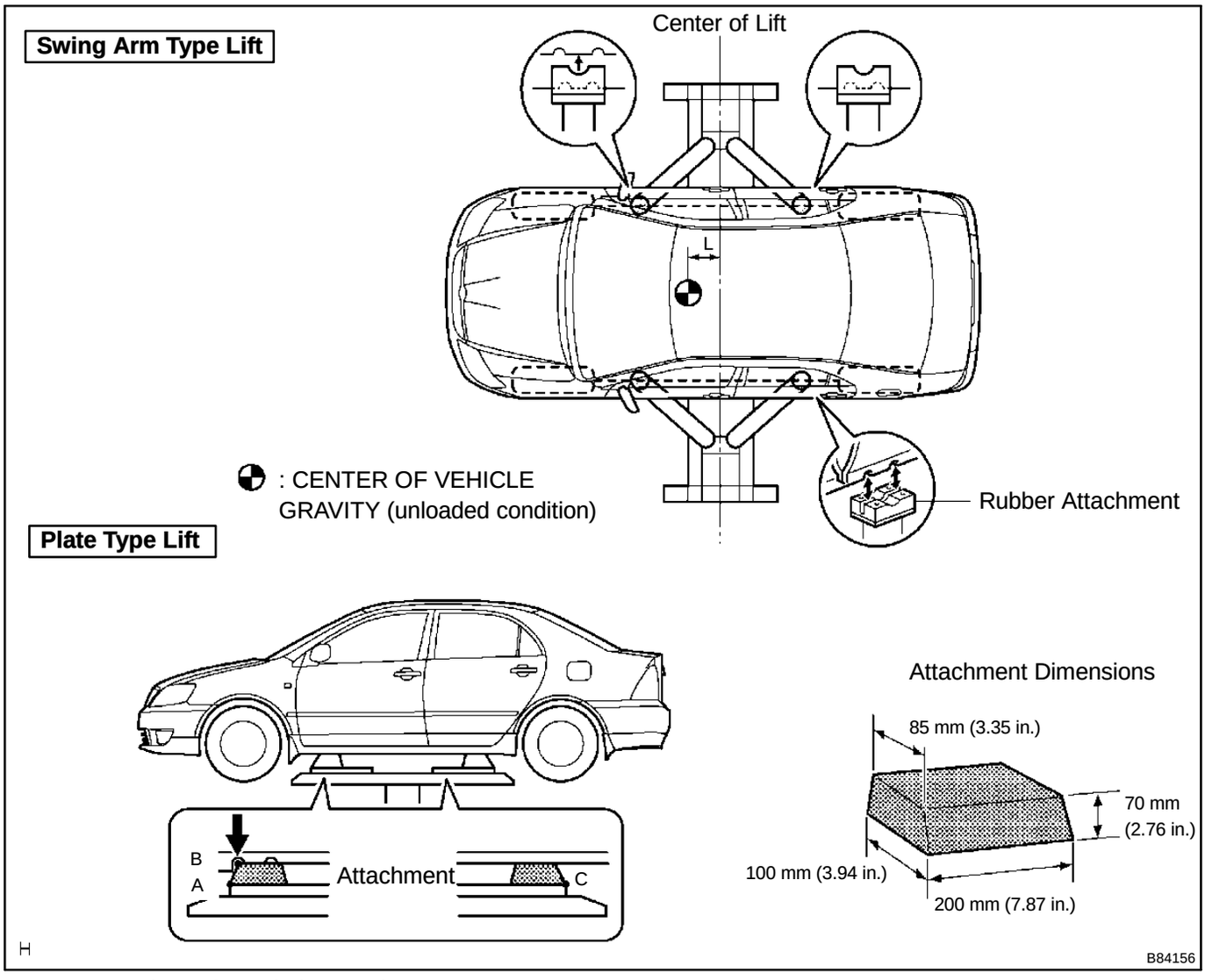
(a) Follow safety procedures outlined in its instruction manual.
(b) Use a swing arm equipped with a rubber attachment, as shown in the illustration.
(c) When using the lift, make sure that the vehicle is stablized so that it will not tilt while work is being performed. Stablilize the vehicle by adjusting the lift arm's length and vehicle's position.
(d) When using the lift, its center should be as close to the vehicle's center of gravity as possible (length of "L" should be as short as possible)
(e) Set the vehicle on the lift as level as possible. Then match the groove of the cradle to the rigid rack support location.
(f) Be sure to lock the swing arms before lifting and during work (if equipped with arm locks).
(g) Lift the vehicle up off the ground. Stand at a safe distance and shake the vehicle to check its stability.

5. NOTICE FOR USING PLATE TYPE LIFT

(a) Follow the safety procedures outlined in its instruction manual.
(b) Use plate lift attachments (rubber lifting blocks) on top of the plate surface.
(c) Refer to the table below to determine how to properly set the vehicle.
(d) Refer to the table below to determine how to properly set the vehicle.

Right and left set position	Place the vehicle over the center of the lift.
Front and rear set position	Place the attachments at the ends of the rubber plate surface, under the vehicle lift pad (A and C in the illustration). Raise the plate slightly and reposition the vehicle so the top of the attachment (B in the illustration) is aligned with the front side notch in the vehicle rocker flange.

(e) Lift the vehicle up off the ground, and shake it to make sure that it is stable.



HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

010XN-01

GENERAL INFORMATION

A large number of ECU controlled systems are used in the COROLLA. In general, ECU controlled systems are considered to be very intricate, requiring a high level of technical knowledge to troubleshoot. However, most problem checking procedures only involve inspecting the ECU controlled system's circuits one by one. An adequate understanding of the system and a basic knowledge of electricity is enough to perform effective troubleshooting, accurate diagnoses and necessary repairs. Detailed information and troubleshooting procedures on major ECU controlled systems in this vehicle are outlined below:

System	See Page
1. SFI System [3ZZ-FE]	05-1
2. SFI System [4ZZ-FE]	05-208
3. ECD System [1CD-FTV]	05-363
4. Electronically Controlled Automatic Transaxle [ECT]	05-634
5. Supplemental Restraint System	05-707
6. Audio System	05-952
7. Navigation System	05-997
8. Combination Meter	05-1100
9. Engine Immobilizer System [3ZZ-FE]	05-1107
10.Cruise Control System	05-1142

FOR USING INTELLIGENT TESTER II

HINT:

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

010XO-01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

Perform troubleshooting in accordance with the procedures below. The following is an outline of basic troubleshooting procedures. Details in the ”Diagnostics” section show the most effective methods for each circuit. Confirm the troubleshooting procedures for the circuit you are working on before beginning troubleshooting.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

(a) Ask the customer about the conditions and environment when the problem occurred.

NEXT

3 SYMPTOM CONFIRMATION AND DTC (AND FREEZE FRAME DATA) CHECK

(a) Measure the battery positive voltage.
Standard: 11 to 14 V (Engine stopped)

(b) Visually check the wire harness, connectors and fuses for open and short circuits.

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

(d) Confirm the problem symptoms and conditions, and check for DTCs.

Result	Proceed to
DTC is output	A
DTC is not output	B

B → **Go to step 5**

A

4 DTC CHART

(a) Reconfirm the results obtained in step 3. Then confirm the inspection procedures for the system or part using the DTC chart.

→ **Go to step 6**

5 PROBLEM SYMPTOMS CHART

(a) Reconfirm the results obtained in step 3. Then confirm the inspection procedures for the system or part using the problem symptoms table.

NEXT

6 CIRCUIT INSPECTION OR PARTS INSPECTION

(a) Confirm the circuit or part that should be checked using the problem symptoms table or DTC chart.

NEXT

7	REPAIR

(a) Repair the affected system or part according to the problem symptoms table or DTC chart.

NEXT

8	CONFIRMATION TEST

(a) After completing repairs, confirm that the malfunction no longer exists. If the malfunction does not reoccur, perform a confirmation test under the same conditions and in the same environment as when it occurred the first time.

NEXT

END

CUSTOMER PROBLEM ANALYSIS

HINT:

- In troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to give an accurate judgement. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.
- As much information as possible should be gathered for reference. Past problems that seem unrelated may also help in some cases. In the ”Diagnostics” section, a Customer Problem Analysis Check sheet is provided for each system.
- 5 items are important points in the problem analysis:

Important Points with 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) Supplemental Restraint System check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK

SUPPLEMENTAL RESTRAINT SYSTEM Check Sheet

Inspector’s Name _____

Customer’s Name		**VIN**	
		Production Date	/ /
		License Plate No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.

Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]

SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

The diagnostic system in the COROLLA has various functions.

- The first function is the Diagnostic Trouble Code (DTC) check. A DTC is a code stored in the ECU memory whenever a malfunction in the signal circuits to the ECU occurs. In a DTC check, a previous malfunction's DTC can be checked by a 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 functions, the problem areas can be narrowed down and troubleshooting is more effective. Diagnostic functions are incorporated in the following systems in the COROLLA:

System	DTC Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
EFI System	(with Check Mode)		
ECD System	(with Check Mode)		
Electronically Controlled Automatic Transaxle [ECT]	(with Check Mode)		
Supplemental Restraint System			
Audio System			
Navigation System			
Engine Immobilizer System			
Cruise Control System			

- In the DTC check, it is very important to determine whether the problem indicated by the DTC is: 1) still occurring, or 2) occurred in the past but has since returned to normal. In addition, the DTC should be compared to the problem symptom to see if they are related. For this reason, DTCs should be checked before and after confirmation of symptoms (i.e., whether or not problem symptoms exist) to determine current system conditions, as shown in the flowchart below.
  Never skip the DTC check. Failing to check DTCs may, depending on the case, result in unnecessary troubleshooting for systems operating normally or lead to repairs not pertinent to the problem. Follow the procedures listed in the flowchart in the correct order.
- A flowchart showing how to proceed with troubleshooting using the DTC check is shown below. Directions from the flowchart will indicate how to proceed either to DTC troubleshooting or to the troubleshooting of each problem symptom.

1 DTC CHECK

2 MAKE A NOTE OF DTCS DISPLAYED AND THEN CLEAR MEMORY

3 SYMPTOM CONFIRMATION

	Symptoms exist
	No symptoms exist

a → **Go to step 5**

b

4	SIMULATION TEST USING SYMPTOM SIMULATION METHODS

5	DTC CHECK

	DTC displayed
	No DTC displayed

a → **TROUBLESHOOTING OF PROBLEM INDICATED BY DTC**

b

6	SYMPTOM CONFIRMATION

	No symptoms exist
	Symptoms exist

If a DTC was displayed in the initial DTC check, the problem may have occurred in a wire harness or connector in that circuit in the past. Check the wire harness and connectors (See page 01–31).

a → **SYSTEM NORMAL**

b

TROUBLESHOOTING OF EACH PROBLEM SYMPTOM

The problem is still occurring in a place other than the diagnostic circuit (the DTC displayed first is either for a past problem or a secondary problem).

SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no problem symptoms occur. In such cases, a thorough problem analysis must be carried out. A simulation of the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be carried out. No matter how much skill or experience a technician has, troubleshooting without confirming the problem symptoms will lead to important repairs being overlooked and mistakes or delays.

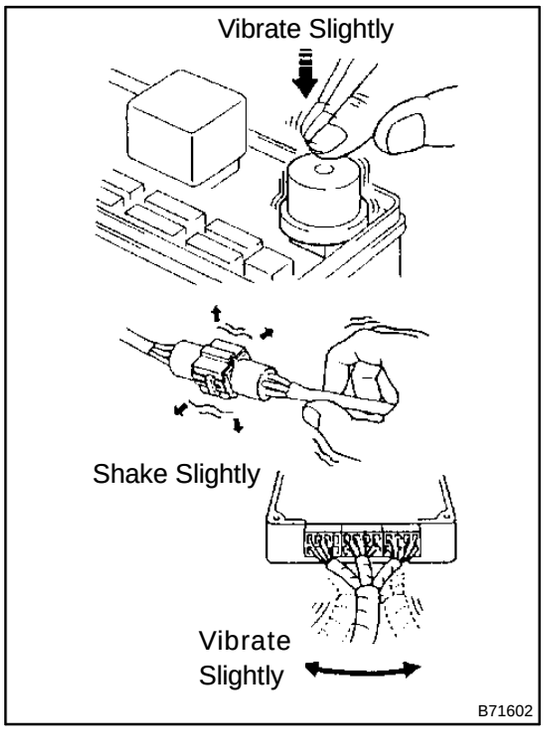
For example:

With a problem that only occurs when the engine is cold or occurs as a result of vibration caused by the road during driving, the problem can never be determined if the symptoms are being checked on a stationary vehicle or a vehicle with a warmed-up engine.

Vibration, heat or water penetration (moisture) is difficult to reproduce. The symptom simulation tests below are effective substitutes for the conditions and can be applied on a stationary vehicle.

Important points in the symptom simulation test:

In the symptom simulation test, the problem symptoms as well as the problem area or parts must be confirmed. First, narrow down the possible problem circuits according to the symptoms. Then, connect the tester and carry out the symptom simulation test, judging whether the circuit being tested is defective or normal. Also, confirm the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes.



1. VIBRATION METHOD: When vibration seems to be the major cause.

(a) PART AND SENSOR

(1) Apply slight vibration with a finger to the part of the sensor considered to be the cause of the problem and check whether or not the malfunction occurs.

HINT:

Applying strong vibration to relays may open relays.

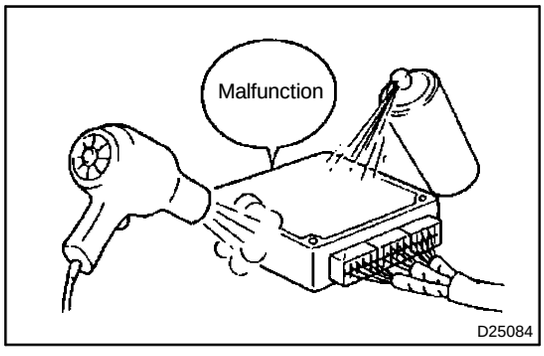
(b) CONNECTORS

(1) Slightly shake the connector vertically and horizontally.

(c) WIRE HARNESS

(1) Slightly shake the wire harness vertically and horizontally.

The connector joint and fulcrum of the vibration are the major areas that should be checked thoroughly.

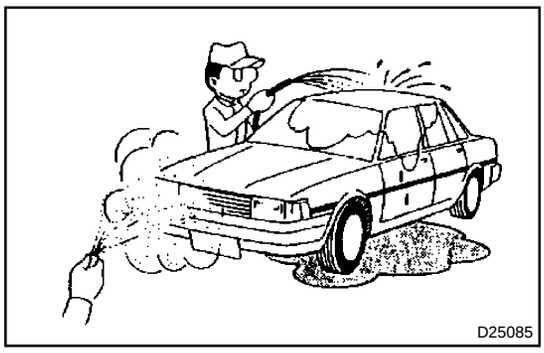


2. HEAT METHOD: If the problem seems to occur when the area in question is heated.

(a) Heat the component that is the possible cause of the malfunction with a hair dryer or similar device. Check if the malfunction occurs.

NOTICE:

- **Do not heat to more than 60°C (140°F). Exceeding this temperature may damage components.**
- **Do not apply heat directly to the parts in the ECU.**



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

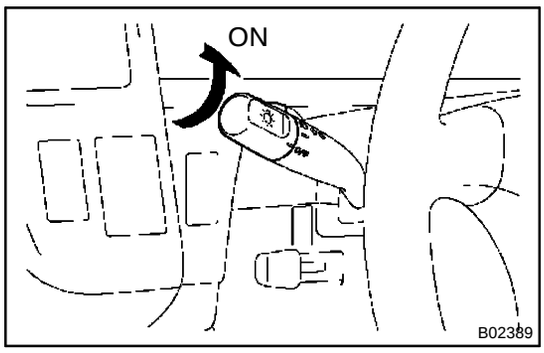
(a) Sprinkle water onto the vehicle and check if the malfunction occurs.

HINT:

If the vehicle has or had a water leakage problem, the leakage may have damaged the ECU or connections. Look for evidence of corrosion or short circuits. Proceed with caution during water tests.

NOTICE:

- **Never sprinkle water directly into the engine compartment. Indirectly change the temperature and humidity by applying water spray onto the front of the radiator.**
- **Never apply water directly onto the electronic components.**



4. HIGH ELECTRICAL LOAD METHOD: When a malfunction seems to occur when electrical load is excessive.

(a) Turn on the heater blower, headlamps, rear window defogger and all other electrical loads. Check if the malfunction reoccurs.

DIAGNOSTIC TROUBLE CODE CHART

Use Diagnostic Trouble Codes (DTCs) (from the DTC checks) in the table below to determine the trouble area and proper inspection procedure. The Supplemental Restraint System (SRS) DTC chart is shown below as an example.

- DTC No.
  Indicates the DTC.
- Page or Instructions
  Indicates the page where you can find either the inspection procedures for each circuit, or the instructions for checking and repairs.

- Trouble Area
  Indicates the suspected problem areas.

- Detection Item
  Indicates the system or details of the problem.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit for that code listed in the table below. Proceed to the page given for that circuit.

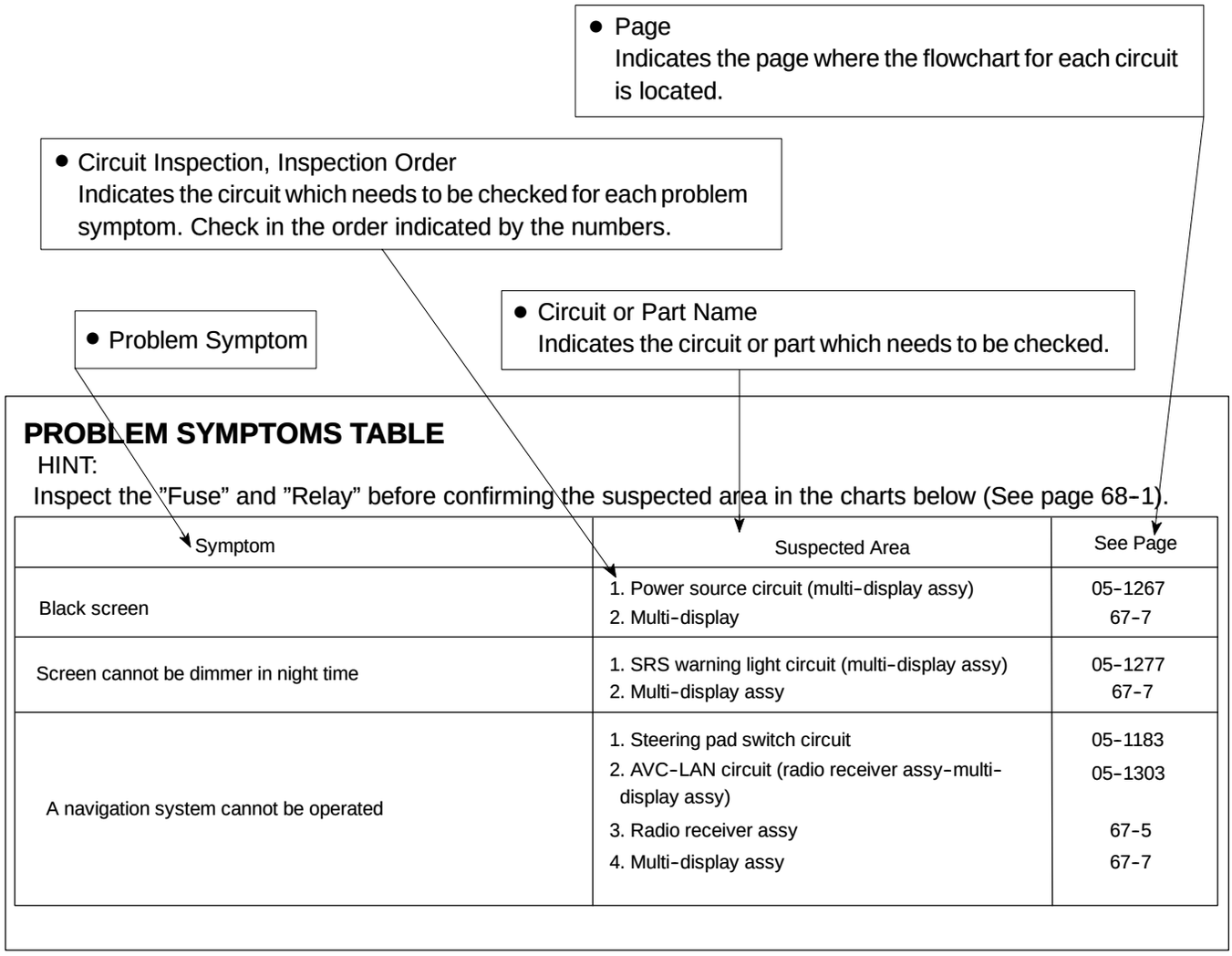
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Lamp
B0100/13 (05-119)	Short in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0101/14 (05-124)	Open in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0102/11 (05-128)	Short in D squib circuit (to ground)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0103/12 (05-132)	Short in D squib circuit (to B+)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0105/53 (05-136)	Short in P squib circuit	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	ON
B0106/54	Open in P squib circuit	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	
	o circuit (to Ground)	● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	

PROBLEM SYMPTOMS TABLE

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

HINT:

In some cases, the problem is not detected by the diagnostic system even though a problem symptom is present. It is possible that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a completely different system.



PROBLEM SYMPTOMS TABLE

HINT:

Inspect the "Fuse" and "Relay" before confirming the suspected area in the charts below (See page 68-1).

Symptom	Suspected Area	See Page
Black screen	1. Power source circuit (multi-display assy) 2. Multi-display	05-1267 67-7
Screen cannot be dimmer in night time	1. SRS warning light circuit (multi-display assy) 2. Multi-display assy	05-1277 67-7
A navigation system cannot be operated	1. Steering pad switch circuit 2. AVC-LAN circuit (radio receiver assy-multi-display assy) 3. Radio receiver assy 4. Multi-display assy	05-1183 05-1303 67-5 67-7

CIRCUIT INSPECTION

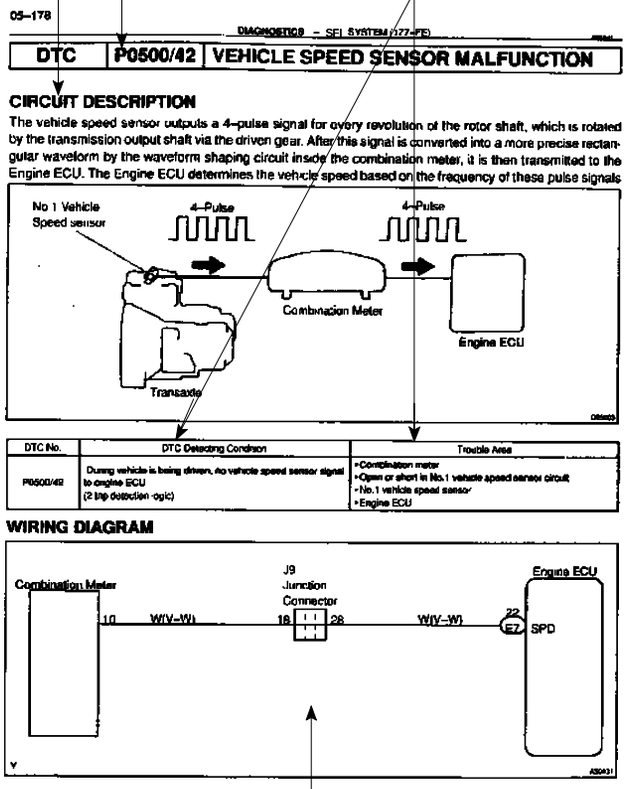
How to read and use each page is shown below.

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

● DTC No. and Detection Item

● Indicates DTCs, DTC settings and suspected problem.

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


05–178

DIAGNOSTICS – SFI SYSTEM (1ZZ–FE)

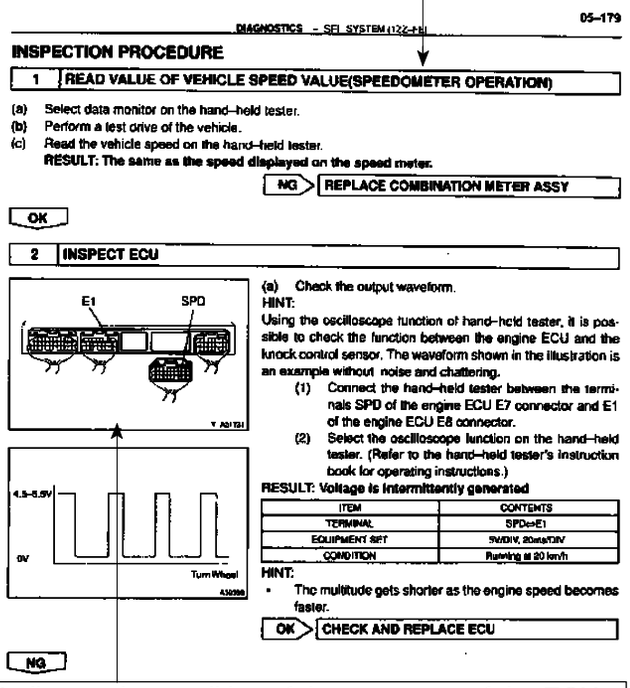
DTC	P0500/42	VEHICLE SPEED SENSOR MALFUNCTION

CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4–pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the Engine ECU. The Engine ECU determines the vehicle speed based on the frequency of these pulse signals

DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	During vehicle is being driven, no vehicle speed sensor signal to engine ECU (2 trip detection logic)	• Combination meter • Open or short in No.1 vehicle speed sensor circuit • No.1 vehicle speed sensor • Engine ECU

WIRING DIAGRAM


05–179

DIAGNOSTICS – SFI SYSTEM (1ZZ–FE)

INSPECTION PROCEDURE

1 READ VALUE OF VEHICLE SPEED VALUE(SPEEDOMETER OPERATION)

(a) Select data monitor on the hand–held tester.
(b) Perform a test drive of the vehicle.
(c) Read the vehicle speed on the hand–held tester.
RESULT: The same as the speed displayed on the speed meter.

NG → REPLACE COMBINATION METER ASSY

OK

2 INSPECT ECU

(a) Check the output waveform.
HINT:
Using the oscilloscope function of hand–held tester, it is possible to check the function between the engine ECU and the knock control sensor. The waveform shown in the illustration is an example without noise and chattering.
(1) Connect the hand–held tester between the terminals SPD of the engine ECU E7 connector and E1 of the engine ECU E8 connector.
(2) Select the oscilloscope function on the hand–held tester. (Refer to the hand–held tester's instruction book for operating instructions.)
RESULT: Voltage is intermittently generated

ITEM	CONTENTS
TERMINAL	SPD–E1
EQUIPMENT SET	5V/DIV, 20ms/DIV
CONDITION	Running at 20 km/h

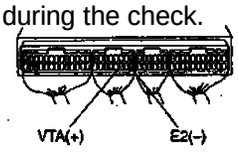
HINT:
- The multitude gets shorter as the engine speed becomes faster.

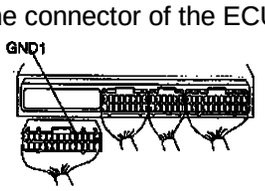
OK → CHECK AND REPLACE ECU

NG

● 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.

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





Connector being checked is connected.
Connections of tester are indicated by (+), (–) after terminals name.

Connector being checked is disconnected.
For inspection of connector with body ground, there is nothing about the body ground written down.

D25842

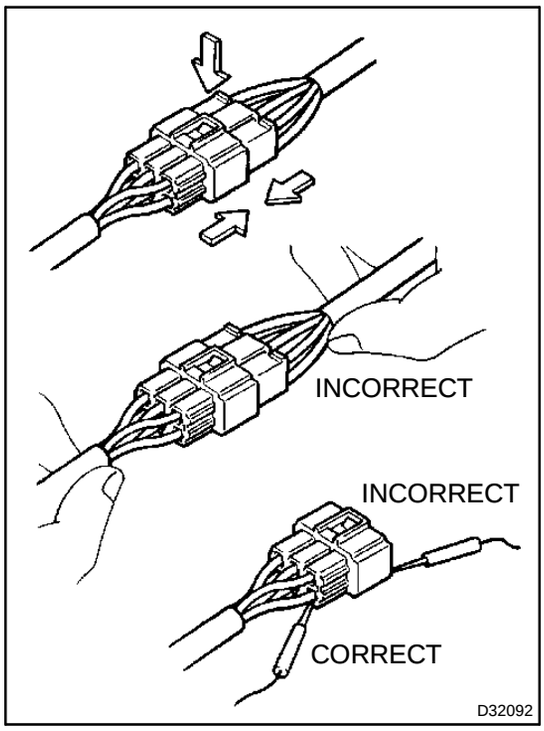
010XP-01

ELECTRONIC CIRCUIT INSPECTION PROCEDURE

1. BASIC INSPECTION

(a) WHEN MEASURING RESISTANCE OF ELECTRONIC PARTS

(1) Unless stated, all resistance measurements should be made at an ambient temperature of 20°C (68°F). Resistance measurements may be outside the specifications if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled down.



(b) HANDLING CONNECTORS

(1) When disconnecting a connector, first squeeze the mating halves tightly together to release the lock, then press the lock claw and separate the connector.

(2) When disconnecting a connector, do not pull on the harnesses. Grasp the connector directly and separate it.

(3) Before connecting a connector, check that there are no deformed, damaged, loose or missing terminals.

(4) When connecting a connector, press firmly until you hear the lock close with a ”click” sound.

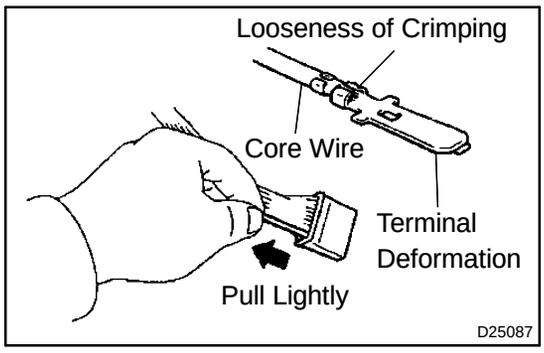
(5) If checking a connector with a TOYOTA electrical tester, check the connector from the backside (harness side) using a mini test lead.

NOTICE:

- **As a waterproof connector cannot be checked from the backside, check by connecting a sub-harness.**
- **Do not damage the terminals by moving the inserted tester needle.**

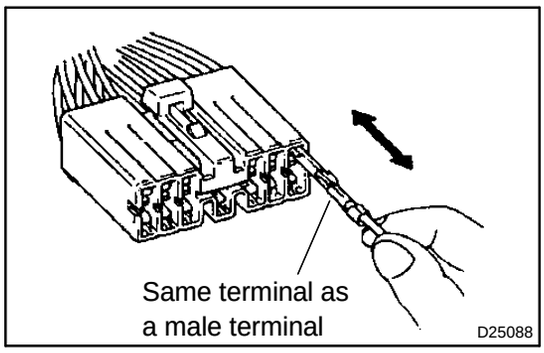
(c) CHECKING CONNECTORS

(1) Checking when a connector is connected:
Squeeze the connector together to confirm that it is fully connected and locked.

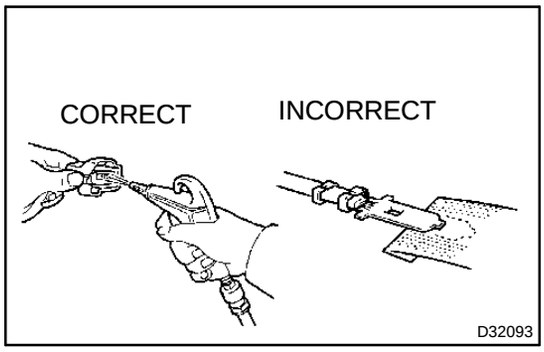


(2) Checking when a connector is disconnected:
Check by pulling the wire harness lightly from the backside of the connector. Look for unlatched terminals, missing terminals, loose crimps or broken conductor wires.
Check visually for corrosion, metallic or foreign objects and water; and bent, rusted, overheated, contaminated, and deformed terminals.

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



(3) Checking the contact pressure of the terminal:
Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

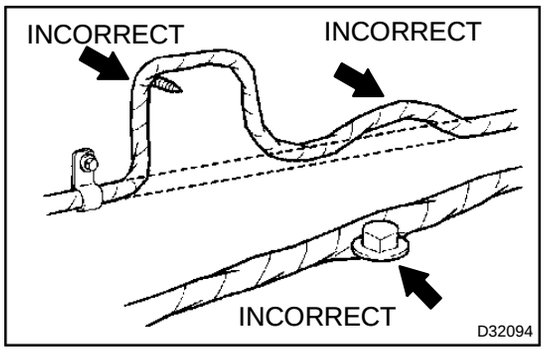


(d) REPAIR METHOD OF CONNECTOR TERMINAL

(1) If there is any dirt on the terminal, clean the contact point using an air gun or cloth. Never rub the contact point using sandpaper as the plating may come off.

(2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold–plated (gold color), use a gold–plated female terminal; if it is silver–plated (silver color), use a silver–plated female terminal.

(3) Damaged, deformed, or corroded terminals should be replaced. If the terminal will not lock into the housing, the housing may have to be replaced.



(e) HANDLING OF WIRE HARNESS

(1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.

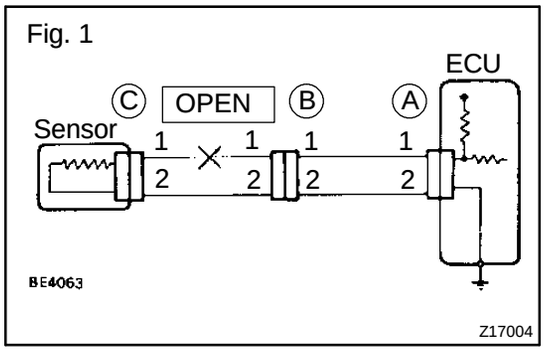
(2) Never twist, pull or slacken the wire harness more than necessary.

(3) The wire harness should never come into contact with a high temperature part, or rotating, moving, vibrating or sharp–edged parts. Avoid contact with panel edges, screw tips and other sharp items.

(4) When installing parts, never pinch the wire harness.

(5) Never cut or break the cover of the wire harness. If it is cut or broken, replace it or securely repair it with vinyl tape.

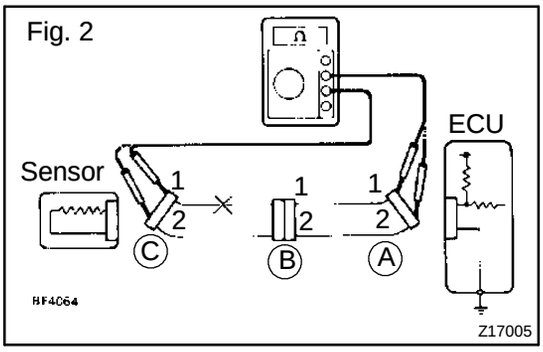
Fig. 1



2. CHECK OPEN CIRCUIT

(a) For an open circuit in the wire harness in Fig. 1, perform a resistance check (step b) or a voltage check (step c).

Fig. 2



(b) Check the resistance.

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

Standard (Fig. 2):

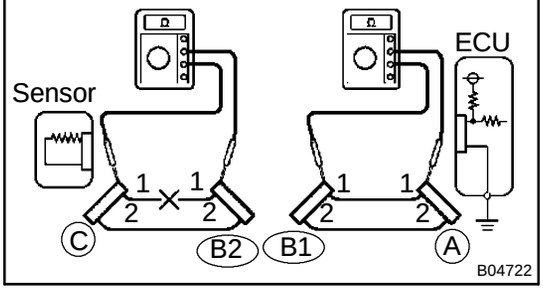
Tester Connection	Specified Condition
Connector A terminal 1 – Connector C terminal 1	10 kΩ or higher
Connector A terminal 2 – Connector C terminal 2	Below 1 Ω

HINT:

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

If your results match the examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

Fig. 3



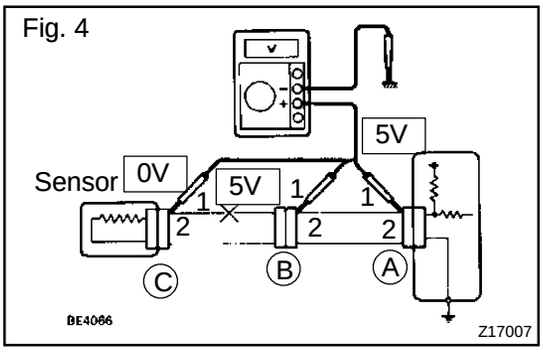
(2) Disconnect connector B and measure the resistance between the connectors.

Standard (Fig. 3):

Tester Connection	Specified Condition
Connector A terminal 1 – Connector B1 terminal 1	Below 1 Ω
Connector B2 terminal 1 – Connector C terminal 1	10 kΩ or higher

If your results match the examples above, an open circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

Fig. 4



(c) Check the voltage.

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

Fig. 4:

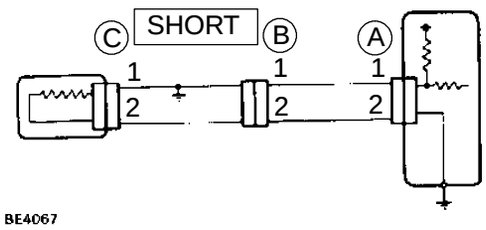
With each connector still connected, measure the voltage between the body ground and these terminals (in this order): 1) terminal 1 of connector A, 2) terminal 1 of connector B, and 3) terminal 1 of connector C.

Example results:

Tester Connection	Specified Condition
Connector A terminal 1 – Body ground	5 V
Connector B terminal 1 – Body ground	5 V
Connector C terminal 1 – Body ground	0 V

If your results match the examples above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.

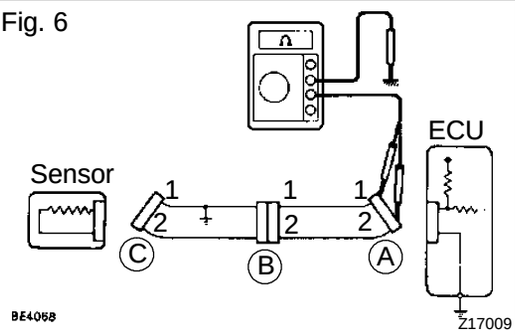
Fig. 5



3. CHECK SHORT CIRCUIT

(a) If the wire harness is ground shorted (Fig. 5), locate the section by conducting a resistance check with the body ground (below).

Fig. 6



(b) Check the resistance with the body ground.

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

Standard (Fig. 6):

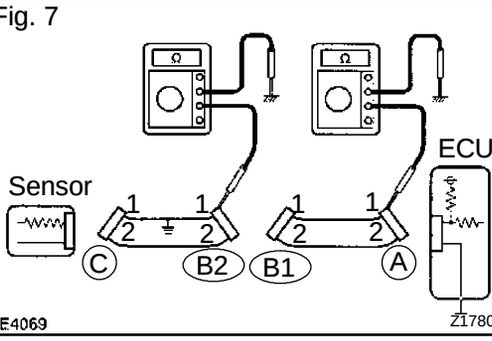
Tester Connection	Specified Condition
Connector A terminal 1 – Body ground	Below 1 Ω
Connector A terminal 2 – Body ground	10 kΩ or higher

HINT:

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

If your results match the examples above, a short circuit exists between terminal 1 of connector A and terminal 1 of connector C.

Fig. 7



(2) Disconnect connectors A and B and measure the resistance.

Standard (Fig. 7):

Tester Connection	Specified Condition
Connector A terminal 1 – Body ground	10 kΩ or higher
Connector B2 terminal 1 – Body ground	Below 1 Ω

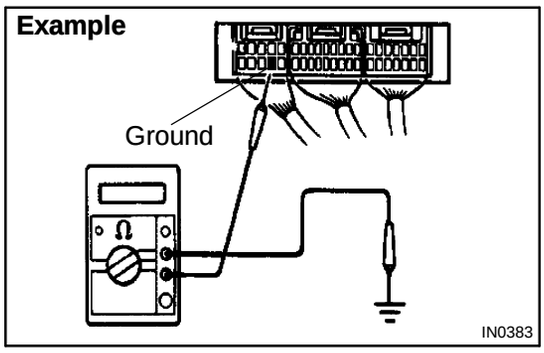
If your results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

4. CHECK AND REPLACE ECU

NOTICE:

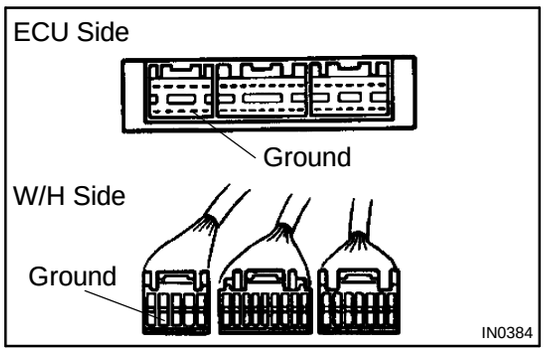
- **The connector should not be disconnected from the ECU. Perform the inspection from the backside of the connector on the wire harness side.**
- **When no measuring condition is specified, perform the inspection with the engine stopped and the ignition switch ON.**
- **Check that the connectors are fully seated. Check for loose, corroded or broken wires.**

(a) First, check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty. Replace the ECU with a functioning one and check if the symptoms occur. If the trouble symptoms stop, replace the ECU.



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

Standard: Below 1 Ω



(2) Disconnect the ECU connector. Check the ground terminals (on the ECU side and wire harness side) for evidence of bending, corrosion or foreign material. Lastly, check the contact pressure of the female terminals.

TERMS

ABBREVIATIONS USED IN MANUAL

010XQ-01

Abbreviations	Meaning
ABS	Anti-Lock Brake System
A/C	Air Conditioner
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACM	Active Control Engine Mount
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
ASSY	Assembly
A/T, ATM	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
B+	Battery Voltage
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
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CCV	Canister Closed Valve
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
CKD	Complete Knock Down
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

Abbreviations	Meaning
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLC	Data Link Connector
DLI	Distributorless Ignition
DOHC	Double Overhead Camshaft
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
DTC	Diagnostic Trouble Code
DVD	Digital Versatible Disc
EBD	Electric Brake Force Distribution
EC	Electrochoromic
ECAM	Engine Control And Measurement System
ECD	Electronically Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Control Transmission
ECU	Electronic Control Unit
ED	Electro–Deposited Coating
EDU	Electronic Driving Unit
EDIC	Electric Diesel Injection Control
EFI	Electronic Fuel Injection
E/G	Engine
EGR	Exhaust Gas Recirculation
EGR–VM	EGR–Vacuum Modulator
ELR	Emergency Locking Retractor
EMPS	Electric Motor Power Steering
ENG	Engine
ESA	Electronic Spark Advance
ETCS–i	Electronic Throttle Control System–intelligent
EVAP	Evaporative Emission Control
EVP	Evaporator
E–VRV	Electric Vacuum Regulating Valve
EX	Exhaust
FE	Fuel Economy
FF	Front–Engine Front–Wheel–Drive
F/G	Fuel Gauge
FIPG	Formed In Place Gasket
FL	Fusible Link
F/P	Fuel Pump
FPU	Fuel Pressure Up
FR	Front
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front–Wheel–Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System

Abbreviations	Meaning
HAC	High Altitude Compensator
H/B	Hatchback
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
HSG	Housing
HT	Hard Top
HWS	Heated Windshield System
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
ISC	Idle Speed Control
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
MAP	Manifold Absolute Pressure
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MG1	Motor Generator No.1
MG2	Motor Generator No.2
MP	Multipurpose
MPI	Multipoint Electronic Injection
MPX	Multiplex Communication System
M/T, MTM	Manual Transmission (Transaxle)
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
NO.	Number

Abbreviations	Meaning
O2S	Oxygen Sensor
O/D	Overdrive
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
ORVR	On-board Refilling Vapor Recovery
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
P/W	Power Window
R & P	Rack And Pinion
RAM	Random Access Memory
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
RRS	Rigid Front 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
TEMP.	Temperature





Abbreviations	Meaning
TEMS	TOYOTA Electronic Modulated Suspension
TFT	TOYOTA Free-Tronic
TIS	Total Information System For Vehicle Development
T/M	Transmission
TMC	TOYOTA Motor Corporation
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TRC	Traction Control System
TURBO	Turbocharge
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Skid Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/	With
WGN	Wagon
W/H	Wire Harness
W/O	Without
1ST	First
2ND	Second
2WD	Two Wheel Drive Vehicle (4 x 2)
3RD	Third
4TH	Fourth
4WD	Four Wheel Drive Vehicle (4 x 4)
4WS	Four Wheel Steering System
5TH	Fifth





010XR-01

GLOSSARY OF SAE AND TOYOTA TERMS

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

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner, A/CL
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	–
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	HAC
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	–
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	–
CTOX	Continuous Trap Oxidizer	–
CTP	Closed Throttle Position	LL ON, Idle ON
DFI	Direct Fuel Injection	Direct Injection (DI/INJ)
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 Trouble Code
DTM	Diagnostic Test Mode	–
ECL	Engine Coolant 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	Distributorless Ignition (DLI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	–
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	–
FEPROM	Flash Erasable Programmable Read Only Memory	–
FF	Flexible Fuel	–
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)

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

TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CC_{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Airflow	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	-

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REFER TO FLLOWING REPAIR MANUALS

Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM939E
COROLLA Repair Manual Supplement	RM1028E
COROLLA Repair Manual Supplement	RM1039E

NOTE: The above pages contain only the points which differ from the above listed manual.

DIAGNOSTICS

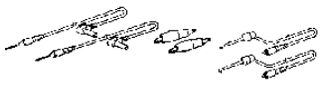
PREPARATION

0243D-01

SST

	09843-18040	Diagnosis Check Wire No.2	SUPPLEMENTAL RESTRAINT SYSTEM

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	ELECTRONIC CONTROLLED AUTOMATIC TRANSAXLE [ECT] ECD SYSTEM(1CD-FTV) SFI SYSTEM(3ZZ-FE) SFI SYSTEM(4ZZ-FE)
	(09083-00150)	Test Lead Set	ELECTRONIC CONTROLLED AUTOMATIC TRANSAXLE [ECT] ECD SYSTEM(1CD-FTV) ENGINE IMMOBILIZER SYSTEM(3ZZ-FE) SFI SYSTEM(3ZZ-FE) SFI SYSTEM(4ZZ-FE)

ENGINE CONTROL SYSTEM

02428-01

PREPARATION

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	SFI SYSTEM(3ZZ-FE) (From May, 2004)
	(09083-00150)	Test Lead Set	SFI SYSTEM(3ZZ-FE) (From May, 2004)

Equipment

Ohmmeter	
Torque wrench	
Radiator cap tester	

EMISSION CONTROL

PREPARATION

0241M-01

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	EMISSION CONTROL SYSTEM(2ZZ-GE) EMISSION CONTROL SYSTEM(3ZZ-FE/4ZZ-FE)
	(09083-00150)	Test Lead Set	EMISSION CONTROL SYSTEM(2ZZ-GE) EMISSION CONTROL SYSTEM(3ZZ-FE/4ZZ-FE)

Equipment

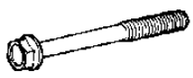
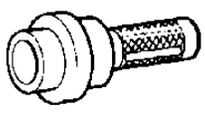
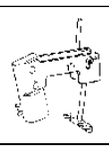
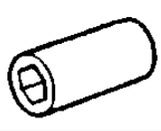
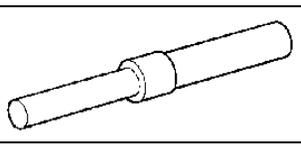
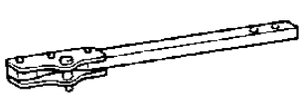
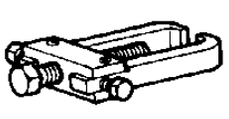
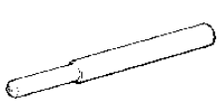
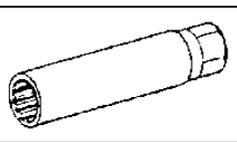
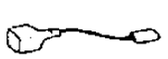
Intelligent tester II	
Voltmeter	
Ohmmeter	
Service wire harness	
Hand-held vacuum pump	

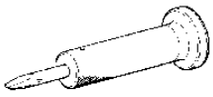
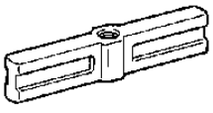
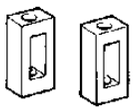
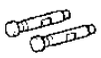
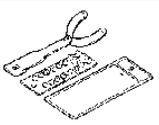
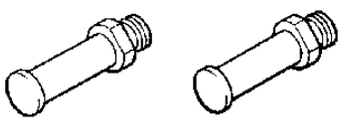
ENGINE MECHANICAL

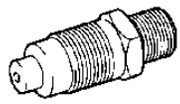
PREPARATION

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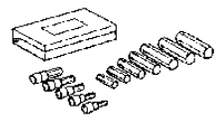
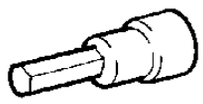
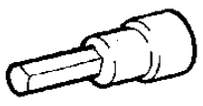
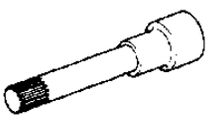
SST

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	(09213-70020)	Bolt	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	09223-22010	Crankshaft Front Oil Seal Replacer	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)
	09248-77010	Valve Clearance Adjusting Compressor Set	CAMSHAFT(2ZZ-GE) VALVE CLEARANCE(2ZZ-GE)
	(09248-07010)	Valve Clearance Adjusting Compressor	CAMSHAFT(2ZZ-GE) VALVE CLEARANCE(2ZZ-GE)
	09268-46021	Nozzle Holder Retaining Nut Wrench	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09301-00210	Clutch Guide Tool	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09330-00021	Companion Flange Holding Tool	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE) PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09628-62011	Ball Joint Puller	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09670-00010	Front Crossmember Guide Tool	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09817-33190	Sensor Socket Wrench	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09843-18030	Tacho-pulse Pickup Wire No.2	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)

	09843-18040 Diagnosis Check Wire No.2	CYLINDER HEAD GASKET(2ZZ-GE) PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)
	09930-00010 Drive Shaft Nut Chisel	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09950-50013 Puller C Set	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09951-05010) Hanger 150	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09952-05010) Slide Arm	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09953-05020) Center Bolt 150	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09954-05021) Claw No.2	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09957-04010) Attachment	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	09960-10010 Variable Pin Wrench Set	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE) PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)
	(09962-01000) Variable Pin Wrench Arm Assy	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE) PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)
	(09963-00600) Pin 6	CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE)
	(09963-01000) Pin 10	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)

	09992-00500	Compression Gauge Attachment	CYLINDER HEAD GASKET(2ZZ-GE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)

Recommended Tools

	09040-00011	Hexagon Wrench Set	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	(09043-20050)	Socket Hexagon Wrench 5	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	(09043-20100)	Socket Hexagon Wrench 10	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)
	09043-50100	Bi-hexagon Wrench 10 mm	CYLINDER HEAD GASKET(2ZZ-GE)
	09090-04020	Engine Sling Device	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)

SSM

	08826-00080	Seal Packing Black or equivalent (FIPG)	CAMSHAFT(2ZZ-GE) VALVE CLEARANCE(2ZZ-GE) CHAIN SUB-ASSY(2ZZ-GE) CYLINDER HEAD GASKET(2ZZ-GE) CYLINDER HEAD GASKET(3ZZ-FE/4ZZ-FE)
	08826-00100	"Seal Packing 1282B," THREE BOND 1282B or equivalent (FIPG)	CYLINDER HEAD GASKET(2ZZ-GE)
	08833-00070	"Adhesive 1324," THREE BOND 1324 or equivalent	PARTIAL ENGINE ASSY(3ZZ-FE/4ZZ-FE)

Equipment

CO/HC meter	
Dial indicator	
Feeler gauge	
Radiator cap tester	
Straight edge	
Torque wrench	
Vernier calipers	
Tire pressure gauge	
Alignment tester	
Toe-in gauge	

Slide calipers	
Wooden block	

COOLING

PREPARATION

0241L-01

Equipment

Ohmmeter	
Radiator cap tester	
Thermometer	
Torque wrench	
Slide calipers	
Heater	

Coolant

Item	Capacity	Classification
Engine coolant 2ZZ-GE 3ZZ-FE/4ZZ-FE	 6.7 liters (7.1 US qts, 5.9 lmp. qts) 6.5 liters (6.9 US qts, 5.7 lmp. qts)	Use only "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology consists of the combination of low phosphates and organic acids)

FRONT SUSPENSION

0240M-02

PREPARATION

Equipment

Torque wrench	
Dial indicator with magnetic base	
Tire pressure gauge	
Alignment tester	
Toe-in gauge	
Angle gauge	
Camber-caster-kingpin gauge	

REAR SUSPENSION

PREPARATION

0241N-01

Equipment

Torque wrench	
Dial indicator with magnetic base	
Wheel balancer	
Tire pressure gauge	
Alignment tester	
Toe-in gauge	
Camber-caster-kingpin gauge	
Drill (Safety equipment: protective goggles, etc.)	Suspension tower damper disposal

TIRE & WHEEL

PREPARATION

0240N-01

Equipment

Tire pressure gauge	
Dial indicator with magnetic base	
Wheel balancer	

PARKING BRAKE

PREPARATION

0240A-01

Equipment

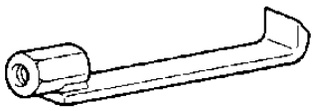
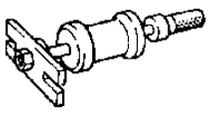
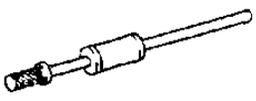
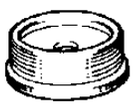
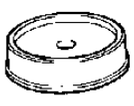
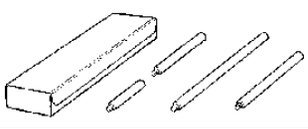
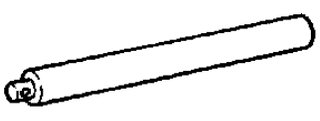
Torque wrench	

MANUAL TRANSMISSION/TRANSAXLE

PREPARATION

0241G-01

SST

	09308-00010	Oil Seal Puller	FRONT DIFFERENTIAL OIL SEAL(E357)
	09520-01010	Drive Shaft Remover Attachment	MANUAL TRANSAXLE ASSY(E357) FRONT DIFFERENTIAL OIL SEAL(E357)
	09520-24010	Differential Side Gear Shaft Puller	MANUAL TRANSAXLE ASSY(E357) FRONT DIFFERENTIAL OIL SEAL(E357)
	(09520-32040)	Shocker Set	MANUAL TRANSAXLE ASSY(E357) FRONT DIFFERENTIAL OIL SEAL(E357)
	09608-10010	Steering Knuckle Oil Seal Replacer	FRONT DIFFERENTIAL OIL SEAL(E357)
	09608-32010	Steering Knuckle Oil Seal Replacer	FRONT DIFFERENTIAL OIL SEAL(E357)
	09950-70010	Handle Set	FRONT DIFFERENTIAL OIL SEAL(E357)
	(09951-07200)	Handle 200	FRONT DIFFERENTIAL OIL SEAL(E357)

Equipment

Torque wrench	

Lubricant

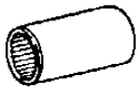
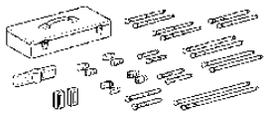
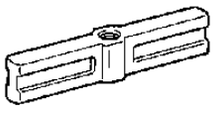
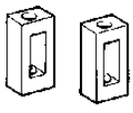
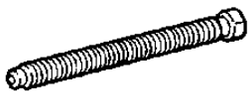
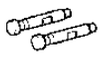
Item	Capacity	Classification
Manual transaxle oil (w/ Differential oil)	2.5 liters (2.6 US qts, 2.2 lmp. qts)	API GL-4 or GL-5 SAE 75W-90

STEERING COLUMN

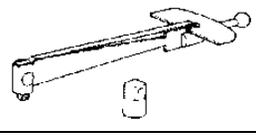
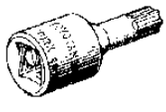
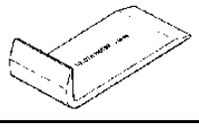
PREPARATION

0240Q-01

SST

	09616-00011	Steering Worm Bearing Adjusting Socket	STEERING COLUMN ASSY
	09950-50013	Puller C Set	STEERING COLUMN ASSY
	(09951-05010)	Hanger 150	STEERING COLUMN ASSY
	(09952-05010)	Slide Arm	STEERING COLUMN ASSY
	(09953-05020)	Center Bolt 150	STEERING COLUMN ASSY
	(09954-05021)	Claw No.2	STEERING COLUMN ASSY

Recommended Tools

	09025-00010	Torque Wrench (30 kgf-cm)	STEERING COLUMN ASSY
	09042-00010	Torx Socket T30	STEERING COLUMN ASSY
	09070-20010	Moulding Remover	STEERING COLUMN ASSY POWER STEERING ECU ASSY

EQUIPMENT

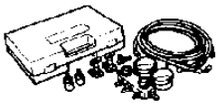
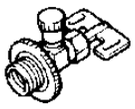
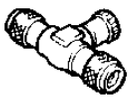
Torque wrench	

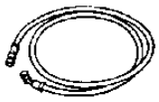
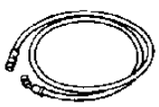
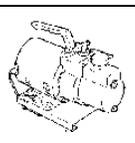
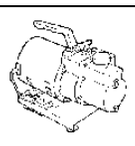
HEATER & AIR CONDITIONER

PREPARATION

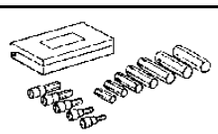
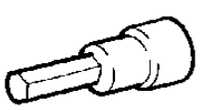
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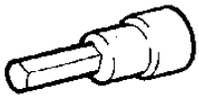
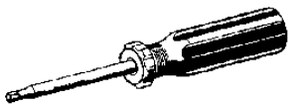
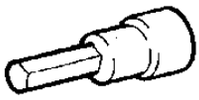
SST

	07110-58060	Air Conditioner Service Tool Set	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-58060)	Refrigerant Drain Service Valve	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-58070)	T-Joint	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-58080)	Quick Disconnect Adapter	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-58090)	Quick Disconnect Adapter	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-78050)	Refrigerant Charging Gauge	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)

	(07117-88060)	Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-88070)	Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(07117-88080)	Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	07117-48130	Vacuum Pump (220 V)	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	07117-48140	Vacuum Pump (240 V)	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD-FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	09870-00015	A/C Quick Joint Puller No.1	AIR CONDITIONING RADIATOR ASSY
	09870-00025	A/C Quick Joint Puller No.2	AIR CONDITIONING RADIATOR ASSY

Recommended Tools

	09040-00011	Hexagon Wrench Set	AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY
	(09043-20050)	Socket Hexagon Wrench 5	AIR CONDITIONING RADIATOR ASSY

	(09043–20100)	Socket Hexagon Wrench 10	W/RECEIVER CONDENSER ASSY
	09041–00010	Torx Driver T20	W/RECEIVER CONDENSER ASSY
	(09043–20100)	Socket Hexagon Wrench 10	W/RECEIVER CONDENSER ASSY
	09904–00010	Expander Set	COOLER COMPRESSOR ASSY(1CD–FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	(09904–00050)	No. 4 Claw	COOLER COMPRESSOR ASSY(1CD–FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)
	95416–00140	Gas Leak Detector (Halogen Leak Detector) (DENSO Part No.)	REFRIGERANT AIR CONDITIONING RADIATOR ASSY W/RECEIVER CONDENSER ASSY COOLER COMPRESSOR ASSY(1CD–FTV) COOLER COMPRESSOR ASSY(ZZ E/G Series)

Equipment

Vinyl tape	
Hexagon wrench 14 mm (0.55 in.)	
Hexagon wrench 5 mm (0.20 in.)	
Hexagon wrench 4 mm (0.16 in.)	
Vise pliers	
Gas leak detector	
Belt tension gauge	
Dial indicator	
Torque wrench	

Lubricant

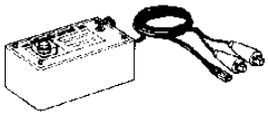
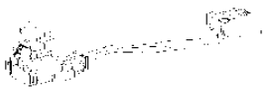
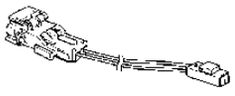
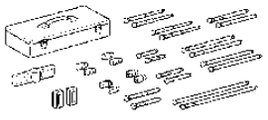
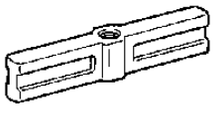
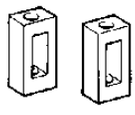
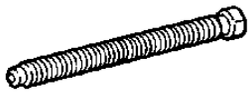
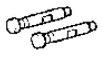
Item	Capacity	Classification
Compressor oil	–	ND–OIL 8 or equivalent

SUPPLEMENTAL RESTRAINT SYSTEM

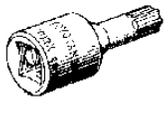
PREPARATION

0241H-01

SST

	09082-00700	SRS Airbag Deployment Tool	FRONT PASSENGER AIRBAG ASSY CURTAIN SHIELD AIR BAG ASSY LH HORN BUTTON ASSY(TMC MADE) HORN BUTTON ASSY(TMMT/TMUK MADE)
	09082-00780	Airbag Deployment Wire Sub-harness No.6	FRONT PASSENGER AIRBAG ASSY HORN BUTTON ASSY(TMC MADE) HORN BUTTON ASSY(TMMT/TMUK MADE)
	09082-00802	Airbag Deployment Wire Sub-Harness No. 8	CURTAIN SHIELD AIR BAG ASSY LH HORN BUTTON ASSY(TMC MADE) HORN BUTTON ASSY(TMMT/TMUK MADE)
	(09082-10801)	Wire A	CURTAIN SHIELD AIR BAG ASSY LH HORN BUTTON ASSY(TMC MADE) HORN BUTTON ASSY(TMMT/TMUK MADE)
	(09082-20801)	Wire B	CURTAIN SHIELD AIR BAG ASSY LH
	(09082-30801)	Wire C	HORN BUTTON ASSY(TMC MADE) HORN BUTTON ASSY(TMMT/TMUK MADE)
	09950-50013	Puller C Set	FRONT PASSENGER AIRBAG ASSY SPIRAL CABLE SUB-ASSY
	(09951-05010)	Hanger 150	FRONT PASSENGER AIRBAG ASSY SPIRAL CABLE SUB-ASSY
	(09952-05010)	Slide Arm	FRONT PASSENGER AIRBAG ASSY SPIRAL CABLE SUB-ASSY
	(09953-05020)	Center Bolt 150	FRONT PASSENGER AIRBAG ASSY SPIRAL CABLE SUB-ASSY
	(09954-05021)	Claw No.2	FRONT PASSENGER AIRBAG ASSY SPIRAL CABLE SUB-ASSY

Recommended Tools

	09042-00010	Torx Socket T30	FRONT PASSENGER AIRBAG ASSY SEAT POSITION AIR BAG SENSOR SPIRAL CABLE SUB-ASSY HORN BUTTON ASSY(TMC MADE)

Equipment

Torque wrench	
Bolt Length: 35.0 mm (1.378 in.) Pitch: 1.0 mm (0.039 in.) Diameter: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Plastic bag	Airbag disposal

SEAT BELT

PREPARATION

0241D-01

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	SEAT BELT WARNING SYSTEM(From May, 2004)
	(09083-00150)	Test Lead Set	SEAT BELT WARNING SYSTEM(From May, 2004)

LIGHTING

PREPARATION

0241R-01

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	LIGHTING SYSTEM
	(09083-00150)	Test Lead Set	LIGHTING SYSTEM

Equipment

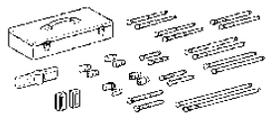
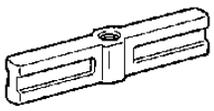
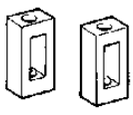
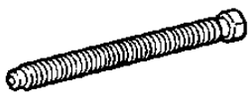
Sandpaper (#100,#400)	
Sandpaper (#500-#1000)	
White paper	
Clip remover	

WIPER & WASHER

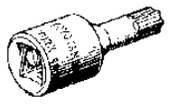
PREPARATION

0241Q-01

SST

	09950-50013	Puller C Set	WINDSHIELD WIPER RELAY ASSY
	(09951-05010)	Hanger 150	WINDSHIELD WIPER RELAY ASSY
	(09952-05010)	Slide Arm	WINDSHIELD WIPER RELAY ASSY
	(09953-05020)	Center Bolt 150	WINDSHIELD WIPER RELAY ASSY
	(09954-05021)	Claw No.2	WINDSHIELD WIPER RELAY ASSY

Recommended Tools

	09042-00010	Torx Socket T30	WINDSHIELD WIPER RELAY ASSY
	09070-20010	Moulding Remover	WINDSHIELD WIPER RELAY ASSY
	09082-00040	TOYOTA Electrical Tester	WIPER AND WASHER SYSTEM
	(09083-00150)	Test Lead Set	WIPER AND WASHER SYSTEM

Equipment

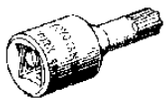
Torque Wrench	

AUDIO & VISUAL SYSTEM

0240W-01

PREPARATION

Recommended Tools

	09042-00010	Torx Socket T30	STEERING PAD SWITCH LH

Equipment

Torque wrench	

WINDSHIELD/WINDOWGLASS/MIRROR

0241I-01

PREPARATION

Equipment

Knife	
Piano wire	Windshield
Plastic sheet	To avoid surface damage
Sealer gun	
Tape	To avoid surface damage
Torque wrench	
Wooden block or similar object	For tying both piano wire ends

SSM

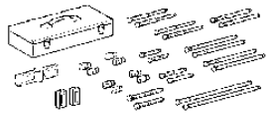
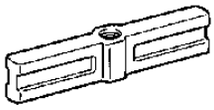
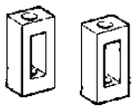
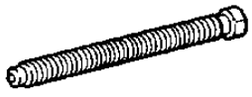
08833-00030	Three cement black or equivalent	WINDSHIELD GLASS(From May, 2004)
08850-00801	Windshield Glass Adhesive Set or equivalent	WINDSHIELD GLASS(From May, 2004)

INSTRUMENT PANEL/METER

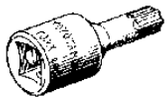
02418-01

PREPARATION

SST

	09950-50013	Puller C Set	INSTRUMENT PANEL SUB-ASSY LOWER
	(09951-05010)	Hanger 150	INSTRUMENT PANEL SUB-ASSY LOWER
	(09952-05010)	Slide Arm	INSTRUMENT PANEL SUB-ASSY LOWER
	(09953-05020)	Center Bolt 150	INSTRUMENT PANEL SUB-ASSY LOWER
	(09954-05021)	Claw No.2	INSTRUMENT PANEL SUB-ASSY LOWER

Recomended Tools

	09042-00010	Torx Socket T30	INSTRUMENT PANEL SUB-ASSY LOWER
	09070-20010	Moulding Remover	INSTRUMENT PANEL SUB-ASSY LOWER

Equipment

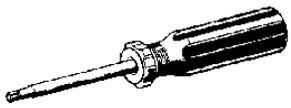
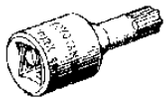
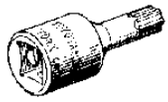
Torque wrench	
Tape	To avoid surface damage

SEAT

PREPARATION

0241E-01

Recommended Tools

	09041-00020	Torx Driver T25	FRONT SEAT ASSY(From May, 2004)
	09042-00010	Torx Socket T30	FRONT SEAT ASSY(From May, 2004)
	09042-00020	Torx Socket T40	FRONT SEAT ASSY(From May, 2004)

Equipment

Tacker	
Tack pin	
Hog ring pliers	
Hog ring	
Tape	To avoid surface damage
Torque wrench	

EXTERIOR/INTERIOR TRIM

0241S-01

PREPARATION

Equipment

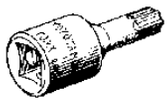
Adhesive tape	To avoid surface damage.
Clip remover	
Protective tape	To avoid surface damage.
Torque wrench	

CRUISE CONTROL

PREPARATION

02419-01

Recomended Tools

	09042-00010	Torx Socket T30	CRUISE CONTROL MAIN SWITCH

Equipment

Torque wrench	

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REFER TO FLLOWING REPAIR MANUALS

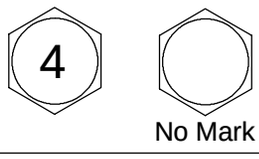
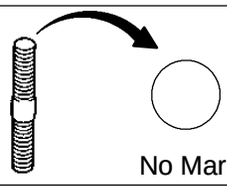
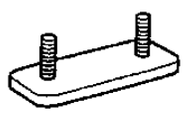
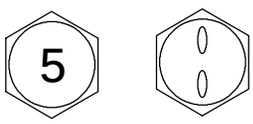
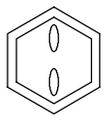
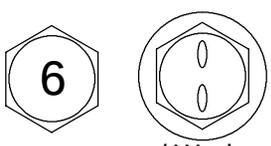
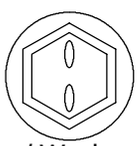
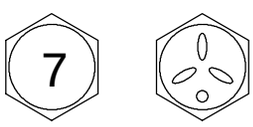
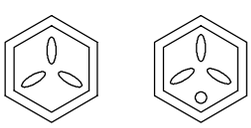
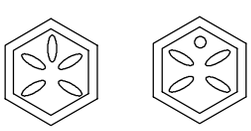
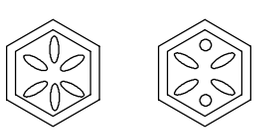
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COROLLA Repair Manual Supplement	RM939E
COROLLA Repair Manual Supplement	RM1028E
COROLLA Repair Manual Supplement	RM1039E

NOTE: The above pages contain only the points which differ from the above listed manual.

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

032AI-01

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

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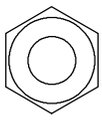
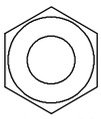
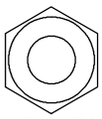
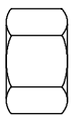
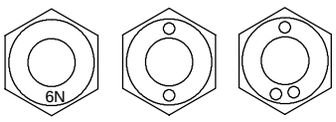
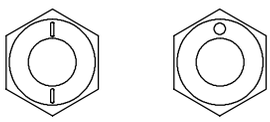
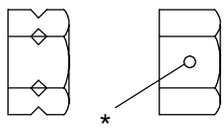
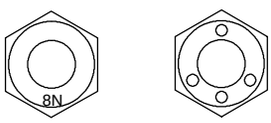
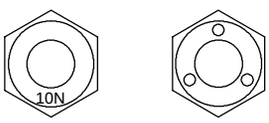
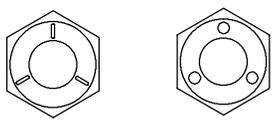
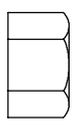
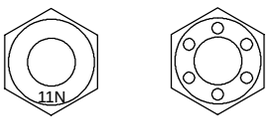
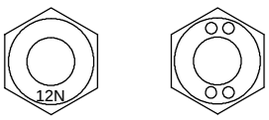
032AJ-01

SPECIFIED TORQUE FOR STANDARD BOLTS

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

032AK-01

HOW TO DETERMINE NUT STRENGTH

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

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

B06432

HINT:

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

Example: Bolt = 4T

Nut = 4N or more

ENGINE CONTROL SYSTEM

032AF-01

SERVICE DATA

3ZZ-FE:

Throttle body assy		
Throttle position sensor	Standard	60 % or more
Resistance (1 (M-) - 2 (M+))	Standard	0.3 to 100 Ω at 20°C (68° F)
Resistance (3 (E2) - 5 (VC))	Standard	2.0 to 4.0 kΩ at 20°C (68° F)
Accelerator pedal assy		
Voltage (No. 1)	Standard	0.5 to 1.1 V at accelerator pedal is released
		2.6 to 4.5 V at accelerator pedal is depressed
Voltage (No. 2)	Standard	1.2 to 2.0 V at accelerator pedal is released
		3.4 to 5.0 V at accelerator pedal is depressed
Resistance (LHD: 3 (EP1) - 6 (VCP1), RHD: 1 (EP1) - 4 (VCP1))	Standard	1.5 to 6.0 kΩ
Resistance (LHD: 1 (EP2) - 4 (VCP2), RHD: 3 (EP2) - 6 (VCP2))	Standard	1.5 to 6.0 kΩ

032AG-01

TORQUE SPECIFICATION

3ZZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle body assy x Intake manifold	9.0	90	80 in.·lbf
Air cleaner hose No. 1 x Throttle body assy	2.0	20	18 in.·lbf
Battery negative terminal x Battery	5.4	55	48 in.·lbf
Cylinder head cover No. 2 x Cylinder head cover sub-assy	7.0	70	62 in.·lbf
Accelerator pedal assy x Body	5.4	55	48 in.·lbf

EMISSION CONTROL

032AL-01

SERVICE DATA

3ZZ-FE/4ZZ-FE:

Vacuum switching valve assy No.1		
Resistance	1 – 2	26 to 30 Ω at 20°C (68°F)
	1 – Body	10 MΩ or higher
	2 – Body	10 MΩ or higher

3ZZ-FE:

Heated oxygen sensor		
Resistance	Bank 1 sensor 1	
	1 (HT) – 2 (+B)	5 to 10 Ω at 20°C (68°F)
	1 (HT) – 4 (E1)	10 kΩ or higher
Heated oxygen sensor		
Resistance	Bank 1 sensor 2	
	1 (+B) – 2 (HT)	11 to 16 Ω at 20°C (68°F)
	2 (HT) – 4 (E)	10 kΩ or higher

4ZZ-FE:

Heated oxygen sensor		
Resistance	Bank 1 sensor 1	
	1 (HT) – 2 (+B)	5 to 30 Ω at 25°C (77°F)
	1 (HT) – 4 (E1)	10 kΩ or higher
Heated oxygen sensor		
Resistance	Bank 1 sensor 2	
	1 (+B) – 2 (HT2)	5 to 30 Ω at 25°C (77°F)
	2 (HT2) – 3 (E1)	10 kΩ or higher

ENGINE MECHANICAL

0329T-01

SERVICE DATA

3ZZ-FE/4ZZ-FE:

Cylinder head set bolt		
Length	Standard	146.8 to 148.2 mm (5.780 to 5.835 in.)
	Maximum	148.5 mm (5.846 in.)

2ZZ-GE:

Valve clearance at cold	Intake	0.08 to 0.18 mm (0.0031 to 0.0071 in.)
	Exhaust	0.22 to 0.32 mm (0.0087 to 0.0126 in.)
Cylinder head set bolt length	Standard	146.8 to 148.2 mm (5.780 to 5.835 in.)
	Maximum	148.5 mm (5.846 in.)

0329U-01

TORQUE SPECIFICATION

3ZZ-FE/4ZZ-FE:

Part Tightened		N·m	kgf·cm	ft·lbf
Cylinder head cover No. 2 x Cylinder head cover sub-assy		7.0	71	62 in.·lbf
Camshaft bearing cap No. 3 x Cylinder head sub-assy		13	133	10
Camshaft bearing cap No. 1 x Cylinder head sub-assy		23	235	17
Chain tensioner assy No. 1 x Timing chain or belt cover sub-assy		9.0	92	80 in.·lbf
V-ribbed belt tensioner assy x Cylinder block sub-assy	for bolt	69	704	51
V-ribbed belt tensioner assy x Cylinder head sub-assy	for nut	29	296	21
Engine mounting insulator RH x Body		52	530	38
Engine mounting insulator RH x Transverse engine engine mounting bracket		52	530	38
Cylinder head cover sub-assy x Cylinder head sub-assy	w/o washer w/ washer	11 9.0	112 92	8 80 in.·lbf
Cylinder head cover sub-assy x Timing chain or belt cover sub-assy		11	112	8
Engine wire x Cylinder head cover sub-assy		9.0	92	80 in.·lbf
Ignition coil assy x Cylinder head cover sub-assy		9.0	92	80 in.·lbf
Engine hanger x Cylinder head cover sub-assy		38	387	28
Engine coolant temperature sensor x Cylinder head sub-assy		20	204	15
Exhaust manifold x Cylinder head sub-assy		37	377	27
Exhaust manifold heat insulator No. 1 x Exhaust manifold	for bolt for nut	18 12	184 122	13 9
Manifold stay No. 2 x Exhaust manifold		49	500	36
Manifold stay No. 2 x Cylinder block sub-assy		49	500	36
Transverse engine engine mounting bracket x Timing chain or belt cover sub-assy		47	479	35
Knock sensor x Cylinder block sub-assy		20	204	15
Crankshaft position sensor No. 1 x Cylinder head sub-assy		9.0	92	80 in.·lbf
Water inlet x Cylinder block sub-assy		11	112	8
Water by-pass pipe No. 1 x Cylinder block sub-assy		9.0	92	80 in.·lbf
Water by-pass pipe No. 1 x Cylinder head sub-assy		9.0	92	80 in.·lbf
Oil level gage guide x Water by-pass pipe No. 1		13	133	10
Intake manifold x Cylinder head sub-assy		30	306	22
Flywheel sub-assy x Crankshaft	1st 2nd	49 Turn 90°	500 Turn 90°	36 Turn 90°
Drive plate & ring gear sub-assy x Crankshaft		88	897	65
Transverse engine engine mounting bracket front x Transverse engine engine mounting insulator front		52	530	38
Transverse engine engine mounting bracket rear x Transverse engine engine mounting insulator rear		87	887	64
V-ribbed idler assy No. 1 x Cylinder block sub-assy		39	400	29
Transverse engine engine mounting bracket LH x Transverse engine engine mounting insulator LH		80	816	59
Transverse engine engine mounting bracket RH x Transverse engine engine mounting insulator RH		52	530	38
Front suspension crossmember sub-assy x Body (TMC MADE)	for bolt A for bolt B	157 113	1,601 1,152	116 83
Front suspension crossmember sub-assy x Body (TMUK, TMMT MADE)		133	1,356	98
Front suspension member brace x Front suspension crossmember sub-assy (TMUK, TMMT MADE)		133	1,356	98
Front suspension member brace x Body (TMUK, TMMT MADE)		80	816	59
Engine mounting member sub-assy center x Body		39	398	29
Floor panel brace front x Body		30	306	22
Air cleaner case x Body		7.0	71	62 in.·lbf

Part Tightened		N·m	kgf·cm	ft·lbf
Air cleaner case x Transverse engine engine mounting bracket LH		7.0	71	62 in.·lbf
Battery carrier x Body		13	133	10
Battery clamp sub-assy x Body		5.0	51	44 in.·lbf
Battery clamp sub-assy x Battery clamp bolt		3.5	36	31 in.·lbf
Front wheel RH & LH x Front axle hub sub-assy RH & LH		103	1,050	76
Chain tensioner slipper x Cylinder block sub-assy		19	194	14
Timing chain or belt cover sub-assy x Cylinder head sub-assy		13	133	10
Timing chain or belt cover sub-assy x Cylinder block sub-assy	M6 M8	13 19	133 194	10 14
Crankshaft pulley x Crankshaft		138	1,407	102
Cylinder head sub-assy x Cylinder block sub-assy	1st 2nd	49 Turn 90°	500 Turn 90°	36 Turn 90°
Camshaft timing oil control valve assy x Cylinder head sub-assy		9.0	92	80 in.·lbf
Chain vibration damper No. 1 x Cylinder head sub-assy		9.0	92	80 in.·lbf
Chain vibration damper No. 1 x Cylinder block sub-assy		9.0	92	80 in.·lbf
Radio setting condenser x Cylinder head		10	102	7
Manifold stay x Exhaust manifold		49	500	36
Manifold stay x Cylinder block		37	377	27
Camshaft position sensor x Cylinder head		9.0	92	80 in.·lbf
Air cleaner hose x Air cleaner cap		2.0	20	18 in.·lbf
Stud bolt x Cylinder head		9.5	97	84 in.·lbf

2ZZ-GE:

Part Tightened		N·m	kgf·cm	ft·lbf
Cylinder head cover No. 2 x Cylinder head cover sub-assy		7.0	71	62 in.·lbf
Suction hose bracket x Body		9.8	100	87 in.·lbf
Cylinder head cover sub-assy x Cylinder head sub-assy		10	102	7
Union to connector tube hose clamp x Cylinder head cover sub-assy		7.0	71	62 in.·lbf
Fuel tube clamp x Cylinder head cover sub-assy		7.5	76	66 in.·lbf
Wire harness protector x Cylinder head cover sub-assy		9.0	92	80 in.·lbf
Ventilation No. 1 tube x Cylinder head cover sub-assy		10	102	7
Ventilation No. 1 tube x Intake manifold		24	245	18
Ignition coil assy x Cylinder head cover sub-assy		9.0	92	80 in.·lbf
Crankshaft position sensor x Timing chain or belt cover sub-assy		9.0	92	80 in.·lbf
Intake manifold x Cylinder head sub-assy		34	347	25
Intake manifold x Cylinder block sub-assy		46	469	34
Surge tank stay No. 1 x Intake manifold		24	245	18
Surge tank stay No. 1 x Cylinder head sub-assy		24	245	18
Exhaust manifold x Cylinder head sub-assy	A B	50 21	510 214	37 16
Exhaust manifold heat insulator No. 1 x Exhaust manifold		20	204	15
Manifold stay x Exhaust manifold		50	510	37
Manifold stay x Cylinder block sub-assy		50	510	37
V-ribbed belt tensioner assy x Timing chain or belt cover sub-assy	Bolt Nut	100 29	1,020 296	74 21
Transverse engine engine mounting bracket RH x Transverse engine engine mounting insulator RH		52	530	38
Cylinder head sub-assy x Cylinder block sub-assy	1st 2nd	35 Turn 180°	357 Turn 180°	26 Turn 180°
Valve rocker shaft sub-assy x Cylinder head sub-assy		10	102	7
Camshaft timing oil control valve assy x Cylinder head sub-assy		9.0	92	80 in.·lbf
Camshaft timing gear assy x Camshaft		54	551	40
Camshaft timing gear or sprocket x No. 2 Camshaft		54	551	40





SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Part Tightened	N·m	kgf·cm	ft·lbf
Camshaft bearing cap x Cylinder head sub-assy	19	194	14
Chain vibration damper No. 1 x Cylinder head sub-assy	21	214	15
Chain vibration damper No. 1 x Cylinder block sub-assy	21	214	15
Chain tensioner slipper x Cylinder block sub-assy	21	214	15
Timing chain or belt cover sub-assy x Cylinder head sub-assy	11	112	8
Timing chain or belt cover sub-assy x Cylinder block sub-assy	21	214	15
Chain tensioner assy No. 1 x Timing chain or belt cover sub-assy	9.0	92	80 in.·lbf
Crankshaft pulley x Crankshaft	120	1,224	89
Transverse engine engine mounting bracket x Timing chain or belt cover sub-assy	49	500	36
Water pump assy x Timing chain or belt cover sub-assy	9.0	92	80 in.·lbf
Water pump assy x Cylinder block sub-assy	9.0	92	80 in.·lbf
Water pump pulley x Water pump assy	15	153	11





COOLING

0329V-01

SERVICE DATA

2ZZ-GE/3ZZ-FE/4ZZ-FE:

Thermostat		
Valve opening temperature		80 to 84 °C (176 to 183°F)
Valve lift	at 95°C (203°F)	10 mm (0.394 in.) or more
Radiator cap sub-assy		
Standard opening pressure		74 to 103 kPa (0.75 to 1.05 kgf/cm2, 10.7 to 14.9 psi)
Minimum opening pressure		59 kPa (0.6 kgf/cm2, 8.5 psi)
Cooling fan		
Standard amperage	at 20°C (68°F)	7.6 to 10.9 A
Cooling fan		
Resistarce	at 20°C (68°F)	1.17 to 1.43 Ω
Cooling fan relay		
Resistance	3 – 5	10 kΩ or higher
	3 – 5 (Apply battery voltage to terminals 1 and 2)	Below 1 Ω
Cooling fan relay No. 2		
Resistance	3 – 4	Below 1 Ω
	3 – 4 (Apply battery voltage to terminals 1 and 2)	10 kΩ or higher
	3 – 5	10 kΩ or higher
	3 – 5 (Apply battery voltage to terminals 1 and 2)	Below 1 Ω

0329W-01

TORQUE SPECIFICATION

2ZZ-GE/3ZZ-FE/4ZZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Water drain cock x Water drain cock plug	13	129	9.4

LUBRICATION

TORQUE SPECIFICATION

032AO-01

2ZZ-GE:

Part Tightened		N·m	kgf·cm	ft·lbf
Oil pump assy x Cylinder block sub-assy		9.0	92	80 in.·lbf
Oil pan drain plug x Oil pan sub-assy		37	377	27
Cylinder head cover No. 2 x Cylinder head cover sub-assy		7.0	71	62 in.·lbf
Suction hose bracket x Body		9.8	100	87 in.·lbf
Ignition coil assy x Cylinder head cover sub-assy		9.0	92	80 in.·lbf
Crankshaft position sensor x Timing chain or belt cover sub-assy		9.0	92	80 in.·lbf
Exhaust manifold heat insulator No. 1 x Exhaust manifold		20	204	15
V-ribbed belt tensioner assy x Timing chain or belt cover sub-assy	Bolt	100	1,020	74
	Nut	29	296	21
Chain vibration damper No. 1 x Cylinder head sub-assy		21	214	15
Chain vibration damper No. 1 x Cylinder block sub-assy		21	214	15

FRONT SUSPENSION

SERVICE DATA

0329O-01

Front wheel alignmwnt	Vehicle height Tire size: 175/70R14 Engine type: 4ZZ-FE (Normal package) (Rough road package) 	 Front: A *1 - B *2 Rear: D *4 - C *3 Front: A *1 - B *2 Rear: D *4 - C *3	 88 mm (4.36 in.) 44 mm (1.73 in.) 69 mm (2.72 in.) 26 mm (1.02 in.)
	Vehicle height Tire size: 195/60R15 Engine type: 3ZZ-FE, 4ZZ-FE (Normal package) (Rough road package) 	 Front: A *1 - B *2 Rear: D *4 - C *3 Front: A *1 - B *2 Rear: D *4 - C *3	 87 mm (3.43 in.) 44 mm (1.73 in.) 68 mm (2.68 in.) 25 mm (0.98 in.)
	Vehicle height Tire size: 195/60R15 Engine type: 1CD-FTV 	 Front: A *1 - B *2 Rear: D *4 - C *3	 90 mm (3.54 in.) 45 mm (1.77 in.)
	Vehicle height Tire size: 195/55R16 Engine type: 2ZZ-GE 	 Front: A *1 - B *2 Rear: D *4 - C *3	 85 mm (3.35 in.) 41 mm (1.61 in.)
	Toe-in (total) 	 Rack end length difference	6' ± 12' (0.1° ± 0.2°, 1 ± 2 mm, 0.04 ± 0.08 in.) 1.5 mm (0.059 in.) or less
	Wheel angle Tire size: 175/70R14 Engine type: 4ZZ-FE (Normal package) (Rough road package) 	 Inside wheel Outside wheel: Reference Inside wheel Outside wheel: Reference	 38°44' ± 2° (38.73° ± 2°) 32°50' (32.83°) 39°05' ± 2° (39.08° ± 2°) 33°11' (33.17°)
	Wheel angle Tire size: 195/60R15 Engine type: 3ZZ-FE, 4ZZ-FE (Normal package) (Rough road package) 	 Inside wheel Outside wheel: Reference Inside wheel Outside wheel: Reference	 38°45' ± 2° (38.75° ± 2°) 32°50' (32.83°) 39°06' ± 2° (39.10° ± 2°) 33°11' (33.18°)
	Wheel angle Tire size: 195/60R15 Engine type: 1CD-FTV 	 Inside wheel Outside wheel: Reference	 38°41' ± 2° (38.68° ± 2°) 32°47' (32.78°)
	Wheel angle Tire size: 195/55R16 Engine type: 2ZZ-GE 	 Inside wheel Outside wheel: Reference	 38°20' ± 2° (38.33° ± 2°) 32°28' (32.47°)
	Camber Tire size: 175/70R14 Engine type: 4ZZ-FE 	 Normal package Rough road package Right-left error	 -0°30' ± 45' (-0.50° ± 0.75°) -0°16' ± 45' (-0.27° ± 0.75°) 45' (0.75°) or less

Front wheel alignmwnt	Camber Tire size: 195/60R15 Engine type: 3ZZ-FE, 4ZZ-FE Normal package Rough road package Right-left error	 -0°31' ± 45' (-0.52° ± 0.75°) -0°17' ± 45' (-0.28° ± 0.75°) 45' (0.75°) or less
	Camber Tire size: 195/60R15 Engine type: 1CD-FTV Right-left error	 -0°33' ± 45' (-0.55° ± 0.75°) 45' (0.75°) or less
	Camber Tire size: 195/55R16 Engine type: 2ZZ-GE Right-left error	 -0°31' ± 45' (-0.52° ± 0.75°) 45' (0.75°) or less
	Caster Tire size: 175/70R14 Engine type: 4ZZ-FE Normal package Rough road package Right-left error	 2°51' ± 45' (2.85° ± 0.75°) 2°40' ± 45' (2.67° ± 0.75°) 45' (0.75°) or less
	Caster Tire size: 195/60R15 Engine type: 3ZZ-FE, 4ZZ-FE Normal package Rough road package Right-left error	 2°53' ± 45' (2.88° ± 0.75°) 2°41' ± 45' (2.68° ± 0.75°) 45' (0.75°) or less
	Caster Tire size: 195/60R15 Engine type: 1CD-FTV Right-left error	 2°46' ± 45' (2.77° ± 0.75°) 45' (0.75°) or less
	Caster Tire size: 195/55R16 Engine type: 2ZZ-GE Right-left error	 2°52' ± 45' (2.87° ± 0.75°) 45' (0.75°) or less
	Steering axis inclination Tire size: 175/70R14 Engine type: 4ZZ-FE Normal package Rough road package Right-left error	 11°19' (11.32°) 10°50' (10.83°) 45' (0.75°) or less
	Steering axis inclination Tire size: 195/60R15 Engine type: 3ZZ-FE, 4ZZ-FE Normal package Rough road package Right-left error	 11°19' (11.32°) 10°50' (10.83°) 45' (0.75°) or less
	Steering axis inclination Tire size: 195/60R15 Engine type: 1CD-FTV Right-left error	 11°23' (11.38°) 45' (0.75°) or less





Front wheel alignmwnt	Steering axis inclination Tire size: 195/55R16 Engine type: 2ZZ–GE	11°19' (11.32°)
	Right–left error	45' (0.75°) or less
Front suspension	Lower ball joint turning torque	1.0 – 5.0 N·m (10 – 51 kgf·cm, 8.7 – 44 in.·lbf)
	Stabilizer bar link ball joint turning torque	0.05 – 2.0 N·m (0.5 – 20 kgf·cm, 0.4 – 17.7 in.·lbf)

***1: Ground clearance of front wheel center**
***2: Ground clearance of lower suspension arm front bolt center**
***3: Ground clearance of axle beam set bolt center**
***4: Ground clearance of rear wheel center**





0329P-01

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Tie rod end lock nut	74	755	55
Steering knuckle x Shock absorber	153	1,560	113

REAR SUSPENSION

SERVICE DATA

032AM-01

Rear wheel alignment	Toe–in (total)		
	Normal package	175/70R14	0°13’ ± 14’ (0.21° ± 0.24°), 2.2 ± 2.5 mm (0.09 ± 0.10 in.)
		195/60R15	0°14’ ± 14’ (0.23° ± 0.23°), 2.5 ± 2.5 mm (0.10 ± 0.10 in.)
		195/55R16	0°22’ ± 14’ (0.37° ± 0.23°), 4.0 ± 2.5 mm (0.16 ± 0.10 in.)
	Rough road package	175/70R14	0°06’ ± 14’ (0.10° ± 0.24°), 1.0 ± 2.5 mm (0.04 ± 0.10 in.)
		195/60R15	0°06’ ± 14’ (0.09° ± 0.23°), 1.0 ± 2.5 mm (0.04 ± 0.10 in.)
	Camber		
	Normal package	175/70R14, 195/60R15	–1°28’ ± 30’ (–1.47° ± 0.50°)
		195/55R16	–1°30’ ± 30’ (–1.50° ± 0.50°)
	Rough road package	175/70R14, 195/60R15	–1°26’ ± 30’ (–1.43° ± 0.50°)
		Right–left error	30’ (0.5°) or less

032AN-01

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Suspension tower damper x Child restraint seat anchor bracket	31	316	23
Suspension tower damper x Rear shock absorber with coil spring	80	816	59

TIRE & WHEEL

SERVICE DATA

0329Q-01

Cold tire inflation pressure	For driving at 160 km/h (100 mph) or over		
	Engine type (Body type)	Tire size	Front, Rear kPa (kgf/cm^2, psi)
	4ZZ-FE	175/70R14 84H	270 (2.7, 39) *1,*2
		195/60R15 88V	260 (2.6, 37) *1,*2
	3ZZ-FE	195/60R15 88V	270 (2.7, 39) *1,*2
	1CD-FTV	195/60R15 88V	290 (2.9, 42) *1,*2
	For driving under 160 km/h (100 mph)		
	Engine type (Body type)	Tire size	Front, Rear kPa (kgf/cm^2, psi)
	4ZZ-FE	175/70R14 84H	220 (2.2, 32) *1,*2
		195/60R15 88V	220 (2.2, 32) *1,*2
	3ZZ-FE	195/60R15 88V	220 (2.2, 32) *1,*2
	1CD-FTV	195/60R15 88V	240 (2.4, 35) *1,*2
Tire runout	1.4 mm (0.055 in.) or less		
Imbalance after adjustment	8.0 g (0.018 lb) or less		

***1: For driving under 160 km/h (100 mph)**

***2: For driving at 160 km/h (100 mph) or over**

PARKING BRAKE

TORQUE SPECIFICATION

0329E-01

Part Tightened	N·m	kgf·cm	ft·lbf
Parking brake lock nut	5.0	55	44 in.·lbf
Parking brake lever sub–assy x Body (TMUK/TMMT made)	14.0	143	10
Parking brake lever sub–assy x Body (TMC made)	12.5	130	9
Front floor heat insulator No.2 x Body	5.5	55	48 in.·lbf
Front floor heat insulator No.1 x Body	5.5	55	48 in.·lbf
Exhaust pipe installation bolt	43	440	32
Front floor panel brace x Body	29.6	302	21

AUTOMATIC TRANSMISSION / TRANSAXLE

SERVICE DATA

030A9-16

A246E (RHD)		
Line pressure (Wheel locked)		
	Engine idling	
	D range	382 – 422 kPa (3.9 – 4.3 kgf·cm^2, 55 – 61 psi)
	R range	647 – 760 kPa (6.6 – 7.8 kgf·cm^2, 94 – 111 psi)
	AT stall (Throttle valve fully opened)	
	D range	728 – 859 kPa (7.42 – 8.76 kgf·cm^2, 106 – 125 psi)
	R range	1,511 – 1,755 kPa (15.4 – 17.9 kgf·cm^2, 219 – 254 psi)
Engine stall revolution	D and R range	2,450 ± 150 rpm
Time lag	N → D range	Less than 1.2 seconds
	N → R range	Less than 1.5 seconds
Engine idle speed		
(A/C OFF)	N range	650 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch runout	Max.	0.30 mm (0.0118 in.)
Differential oil seal drive in depth	LH side	5.3 ± 0.5 mm (0.209 ± 0.020 in.)
	RH side	2.0 ± 0.5 mm (0.079 ± 0.020 in.)
Shift schedule		
D range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	2 → 3	94 – 106 km/h (58 – 66 mph)
	3 → 4	139 – 157 km/h (86 – 98 mph)
	4 → 3	133 – 151 km/h (83 – 94 mph)
	3 → 2	85 – 96 km/h (53 – 60 mph)
	2 → 1	39 – 47 km/h (24 – 29 mph)
(Throttle valve fully closed)	3 → 4	30 – 37 km/h (19 – 23 mph)
	4 → 3	14 – 20 km/h (9 – 12 mph)
2 range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	3 → 2	91 – 102 km/h (57 – 63 mph)
	2 → 1	39 – 47 km/h (24 – 29 mph)
L range		
(Throttle valve fully opened)	2 → 1	43 – 51 km/h (27 – 32 mph)
Lock-up point	Throttle valve opening 5%	
O/D gear	Lock-up ON	60 – 69 km/h (37 – 43 mph)
	Lock-up OFF	55 – 63 km/h (34 – 39 mph)
3rd gear	Lock-up ON	60 – 69 km/h (37 – 43 mph)
	Lock-up OFF	55 – 63 km/h (34 – 39 mph)
A246E (LHD)		
Line pressure (Wheel locked)		
	Engine idling	
	D range	382 – 422 kPa (3.9 – 4.3 kgf·cm^2, 55 – 61 psi)
	R range	647 – 760 kPa (6.6 – 7.8 kgf·cm^2, 94 – 111 psi)
	AT stall (Throttle valve fully opened)	
	D range	728 – 859 kPa (7.42 – 8.76 kgf·cm^2, 106 – 125 psi)
	R range	1,511 – 1,755 kPa (15.4 – 17.9 kgf·cm^2, 219 – 254 psi)
Engine stall revolution	D and R range	2,450 ± 150 rpm
Time lag	N → D range	Less than 1.2 seconds
	N → R range	Less than 1.5 seconds
Engine idle speed		
(A/C OFF)	N range	650 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch runout	Max.	0.30 mm (0.0118 in.)
Differential oil seal drive in depth	LH side	5.3 ± 0.5 mm (0.209 ± 0.020 in.)
	RH side	2.0 ± 0.5 mm (0.079 ± 0.020 in.)

Shift schedule		
D range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	2 → 3	94 – 106 km/h (58 – 66 mph)
	3 → 4	139 – 157 km/h (86 – 98 mph)
	4 → 3	111 – 127 km/h (69 – 79 mph)
	3 → 2	70 – 79 km/h (43 – 49 mph)
	2 → 1	26 – 32 km/h (16 – 20 mph)
(Throttle valve fully closed)	3 → 4	30 – 37 km/h (19 – 23 mph)
	4 → 3	14 – 20 km/h (9 – 12 mph)
2 range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	3 → 2	91 – 102 km/h (57 – 63 mph)
	2 → 1	26 – 32 km/h (16 – 20 mph)
L range		
(Throttle valve fully opened)	2 → 1	43 – 51 km/h (27 – 32 mph)
Shift schedule(When kick down switch turns ON)		
D range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	2 → 3	94 – 106 km/h (58 – 66 mph)
	3 → 4	139 – 157 km/h (86 – 98 mph)
	4 → 3	133 – 151 km/h (83 – 94 mph)
	3 → 2	85 – 96 km/h (53 – 60 mph)
	2 → 1	39 – 47 km/h (24 – 29 mph)
2 range		
(Throttle valve fully opened)	1 → 2	49 – 58 km/h (30 – 36 mph)
	3 → 2	91 – 102 km/h (57 – 63 mph)
	2 → 1	39 – 47 km/h (24 – 29 mph)
Lock-up point	Throttle valve opening 5%	
O/D gear	Lock-up ON	60 – 69 km/h (37 – 43 mph)
	Lock-up OFF	55 – 63 km/h (34 – 39 mph)
3rd gear	Lock-up ON	60 – 69 km/h (37 – 43 mph)
	Lock-up OFF	55 – 63 km/h (34 – 39 mph)

030AA-17

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Park/neutral position switch x Transaxle	Bolt	5.5	56	49 in.·lbf
	Nut	5.5	56	49 in.·lbf
Control shaft lever x Park/neutral position switch		13	130	9
Battery carrier x Body		13	132	10
Engine hanger x Engine		38	387	28
Drain plug x Oil pan		17.2	175	13
Transaxle x Engine	Bolt A:	64	650	47
	Bolt B:	46	470	34
	Bolt C:	23	230	17
Torque converter clutch x Drive plate		28	285	20
Engine mounting bracket RR x Transaxle		64	652	47
Engine mounting bracket FR x Transaxle		64	652	47
Center member x Body	Bolt A:	39	398	29
	Bolt B:	52	530	38
Engine mounting insulator RR x Engine mounting bracket RR		87	887	64
Engine mounting insulator RR x Suspension member		52	530	38
Engine mounting insulator FR x Engine mounting bracket FR		52	530	38
Engine mounting bracket LH x Transaxle		52	530	38
Engine mounting insulator LH x Body	Bolt A:	52	530	38
	Nut B:	80	815	59
Starter x Transaxle		39	400	29
Starter wire x Starter		9.8	100	87 in.·lbf
Transmission case protector x Transaxle		23	230	17
Oil filler tube x Transaxle		5.5	56	49 in.·lbf
Oil cooler tube clamp x Oil filler tube		5.5	56	49 in.·lbf
Oil cooler outlet tube x Transaxle		34.5	350	25
Oil cooler inlet tube x Transaxle		34.5	350	25
Wire harness clamp bracket x Transaxle		13	132	10
Wire harness x Transaxle	Bolt A:	13	132	10
	Bolt B:	10	102	7
Control cable bracket x Transaxle		12	122	9
Control cable support x Transaxle		12	122	9
Air cleaner assy x Body		7.0	71	62 in.·lbf
Cylinder head cover No.2 x Engine		7.0	71	62 in.·lbf
Transmission wire x Transaxle		5.4	55	48
Solenoid valve x Valve body	Bolt A:	11	110	8
	Bolt B:	11	110	8
	Bolt C:	6.5	66	58 in.·lbf
Valve body x Transaxle		10	100	7
Manual detent spring x Valve body		10	100	7
Oil strainer x Valve body		10	100	7
Oil pan x Transaxle		5.3	55	48 in.·lbf
Floor shift assy x Body		12	122	9
Control cable x Control shaft lever		12	122	9
Control cable x Body	Bolt	5.0	50	43 in.·lbf
	Nut	12	122	9

MANUAL TRANSMISSION / TRANSAXLE

030NC-03

SERVICE DATA

MANUAL TRANSAXLE ASSY (E357)	
Transmission case oil seal drive in depth	3.0 to 4.0 mm (0.120 to 0.157 in.)
Transaxle case cover oil seal drive in depth	-0.5 to 0.5 mm (-0.020 to 0.020 in.)

030ND-03

TORQUE SPECIFICATION

MANUAL TRANSAXLE ASSY (E357)				
Part Tightened		N·m	kgf·cm	ft·lbf
Filler and drain plugs		49	500	36
Engine hanger x Engine		37	375	27
Transmission case protector x Transaxle		18	185	13
Engine mounting bracket RR x Transaxle		64	653	47
Engine mounting bracket RR x Engine mounting insulator RR		87	887	64
Engine mounting bracket FR x Transaxle		64	653	47
Engine mounting bracket FR x Engine mounting insulator FR		52	530	38
Manual transaxle assy x Engine	Bolt A: Bolt B: Bolt C: Bolt D: Bolt E:	64 46 40 20 8.0	653 470 409 200 82	47 34 30 14 71in.·lbf
Transverse engine engine mounting bracket LH x Transaxle		52	530	38
Engine mounting bracket LH x Engine mounting insulator LH	Bolt A: Nut B:	52 80	530 816	38 59
Accumulator to flexible hose tube x Transaxle	Bolt A: Bolt B:	5.0 9.0	51 92	44 in.·lbf 80 in.·lbf
Manual transaxle assy x Ground cable		13	131	9
Air tube No.2 (w/ intercooler) x Transaxle		25	255	18
Starter assy x Transaxle		37	378	27
Starter wire set nut		13	131	9
Air tube No.1 x Pressure control assembly		18	184	13
Air tube No.1 hose clamp		6.0	61	53 in.·lbf
Air tube No.1 x Engine		25	255	18
Battery clamp sub-assy x Body	Bolt: Nut:	5.0 3.5	51 36	44 in.·lbf 31 in.·lbf
Air cleaner assy x Body		7.0	71	62 in.·lbf
Engine cover sub-assy No.1 x Engine		8.0	82	71 in.·lbf
Hood set bolt		13	133	10

STEERING COLUMN

SERVICE DATA

0329X-01

Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering column shaft rotating torque	1 turn for 2 sec.	0.4 to 1.1 N·m (4 to 11 kgf·cm, 3.5 to 9.5 in.·lbf)

0329Y-01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Steering intermediate shaft assy No.2 x Steering sliding yoke sub-assy	35	360	26
Steering intermediate shaft assy No.2 x Steering column assy (LHD)	35	360	26
Steering sliding yoke sub-assy x Steering column assy (RHD)	35	360	26
Steering sliding yoke sub-assy x Steering intermediate shaft (LHD)	35	360	26
Steering intermediate shaft assy No.2 x Steering intermediate shaft (RHD)	35	360	26
Steering column assembly set bolt and nut	25	255	18
Steering column protector x Steering column assy (RHD, M/T)	25	255	18
Steering wheel set nut	50	510	37
Power steering ECU assy set bolt	5.0	50	44 in.·lbf

HEATER & AIR CONDITIONER

SERVICE DATA

032AQ-01

Refrigerant charge volume	Standard:	450 ± 30 g (15.9 ± 1.1 oz.)
Magnetic clutch clearance	(ZZ E/G Series)	0.20 - 0.45 mm (0.008 - 0.018 in.)
Magnetic clutch clearance	(1CD-FTV)	0.20 - 0.45 mm (0.008 - 0.018 in.)

032AR-01

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
AIR CONDITIONING RADIATOR ASSY			
Air conditioning tube assy x Cooler evaporator sub-assy No. 1	3.5	35	30 in.·lbf
Air conditioner unit assy x Body	9.8	100	87 in.·lbf
PTC earth wire x Body	8.0	82	71 in.·lbf
BLOWER ASSY			
Blower assy x Body Bolt:	9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (ZZ E/G Series)			
Magnet clutch hub x Cooler compressor assy	13	134	9.7
Compressor and magnetic clutch x Engine	29	295	21
Cooler refrigerant discharge hose No.1 x Compressor and magnetic clutch	9.8	100	87 in.·lbf
Cooler refrigerant suction hose No.1 x Compressor and magnetic clutch	9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (1CD-FTV)			
Magnet clutch hub x Cooler compressor assy	13	134	9.7
Compressor and magnetic clutch x Engine	29	295	21
Cooler refrigerant discharge hose No.1 x Compressor and magnetic clutch	9.8	100	87 in.·lbf
Cooler refrigerant suction hose No.1 x Compressor and magnetic clutch	9.8	100	87 in.·lbf
W/ RECEIVER CONDENSER ASSY			
Cap x W/ receiver condenser assy	2.9	29	25 in.·lbf
W/ receiver condenser assy x Body	9.8	100	87 in.·lbf
Cooler refrigerant discharge hose No. 1 x W/ receiver condenser assy	5.4	55	48 in.·lbf
Cooler refrigerant liquid pipe A x W/ receiver condenser assy	5.4	55	48 in.·lbf
HEATER ASSY			
Heater assy x Body	7.5	76	66 in.·lbf

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

031DI-02

Part Tightened	N·m	kgf·cm	ft·lbf
Horn button assy x Steering wheel assy	8.8	90	78 in.·lbf
Front passenger airbag assy x Instrument panel reinforcement assy	20	204	15
Curtain shield airbag assy x Body	3.5	36	31 in. lbf
Curtain shield airbag assy x Body	9.8	100	7.0
Airbag sensor assy center x Body	17.5	179	13
Airbag sensor front x Body	9.0	92	80 in. lbf
Side airbag sensor assy x Body	9.0	92	80 in. lbf
Seat position airbag sensor x Front seat assy	8.0	82	71 in. lbf

INSTRUMENT PANEL/METER

TORQUE SPECIFICATION

0325X-02

Part Tightened	N·m	kgf·cm	ft·lbf
Instrument Panel Reinforcement × Front Passenger Airbag	20	204	15

SEAT

TORQUE SPECIFICATION

032AE-01

Part Tightened	N·m	kgf·cm	ft·lbf
FRONT SEAT ASSY			
Seatback spring x Seat adjuster	25	255	18
Seat position airbag sensor x Seat adjuster	8	82	71 in.·lbf
Inner belt x Seat adjuster	42	428	31
Reclining control lever x Reclining housing	6.7	68	59 in.·lbf
Reclining housing x Seatback spring	6.7	68	59 in.·lbf
Seat x Body	37	375	27

EXTERIOR/INTERIOR TRIM

TORQUE SPECIFICATION

032AP-01

Part Tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER (SEDAN/WAGON)			
Front bumper reinforcement x Body	11	112	8
Radiator grille x Body	5.0	51	44 in.·lbf
FRONT BUMPER (HATCH BACK)			
Front bumper reinforcement x Body	52	521	38
Front bumper x Body	5.0	51	44 in.·lbf
Front bumper x Headlamp washer actuator	13	133	10

CRUISE CONTROL

TORQUE SPECIFICATION

032AD-01

Part Tightened	N·m	kgf·cm	ft·lbf
Clutch Pedal Sub-assy × Clutch Switch Assy	16	163	12

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REFER TO FLLOWING REPAIR MANUALS

Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM939E
COROLLA Repair Manual Supplement	RM1028E
COROLLA Repair Manual Supplement	RM1039E

NOTE: The above pages contain only the points which differ from the above listed manual.

SFI SYSTEM (3ZZ-FE)

05KNQ-04

PRECAUTION

NOTICE:

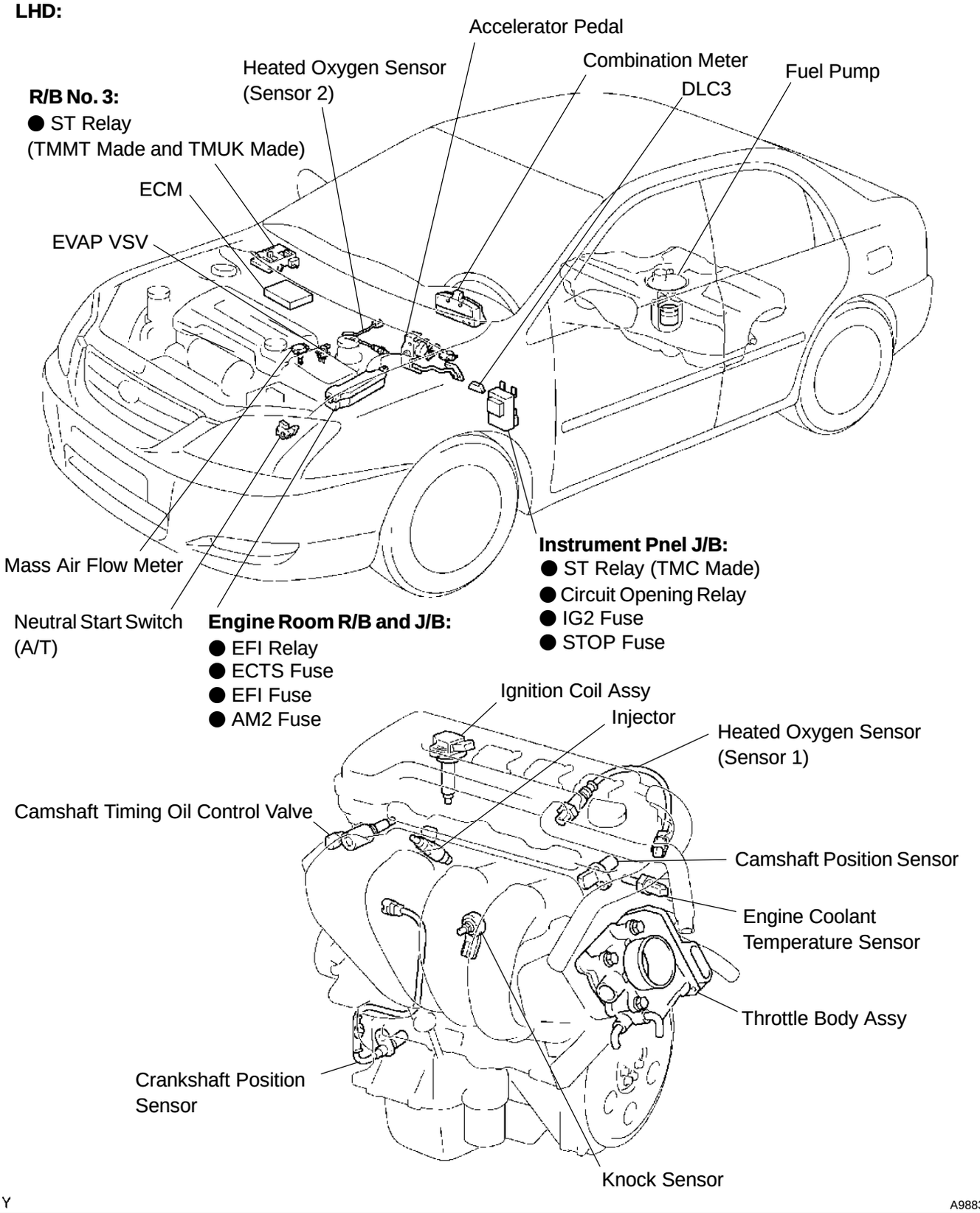
Perform the RESET MEMORY (AT initialization) operation after replacing the automatic transaxle assembly, engine assembly or ECM.

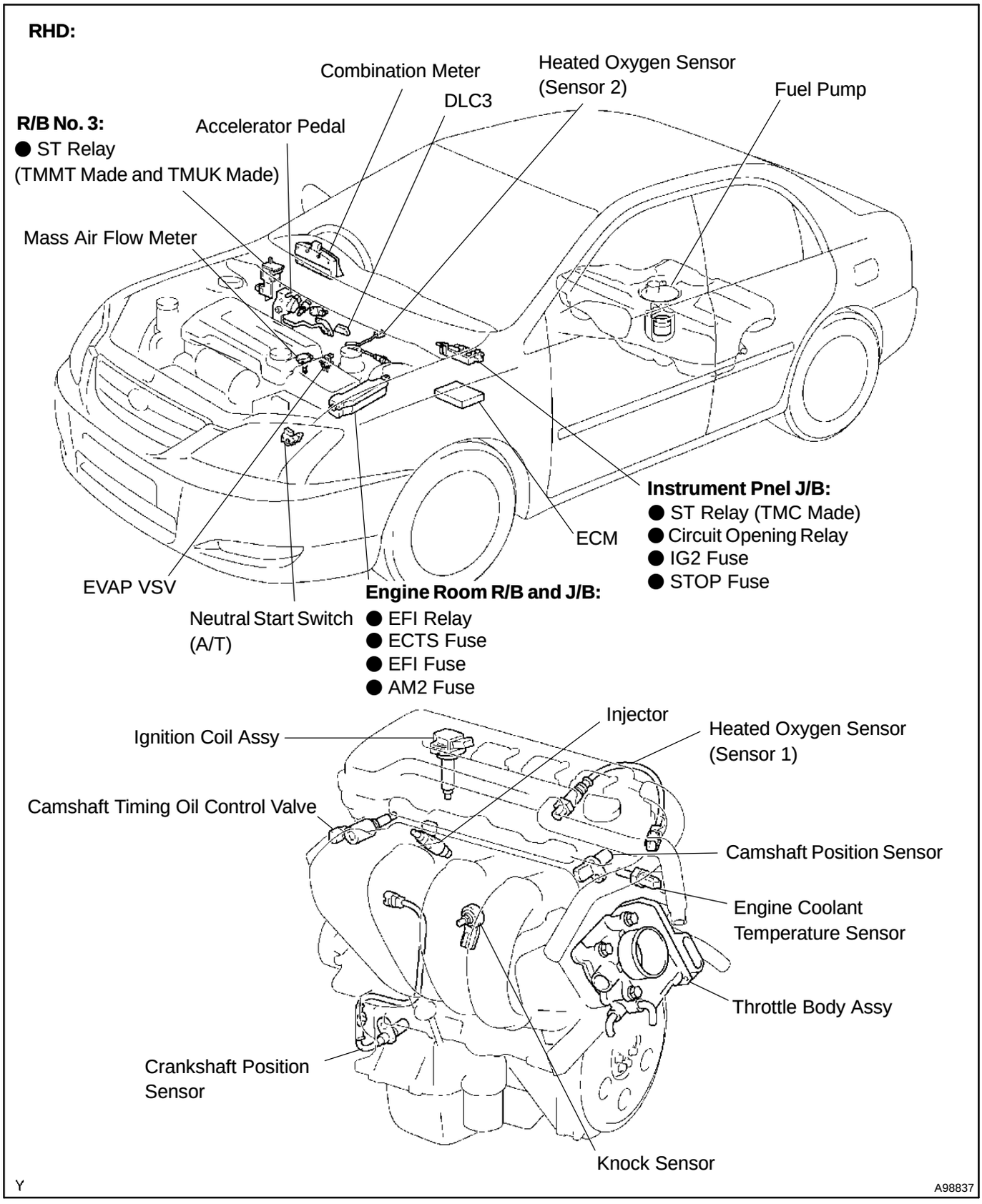
HINT:

Initialization cannot be completed by only removing the battery cable.

05LU9-01

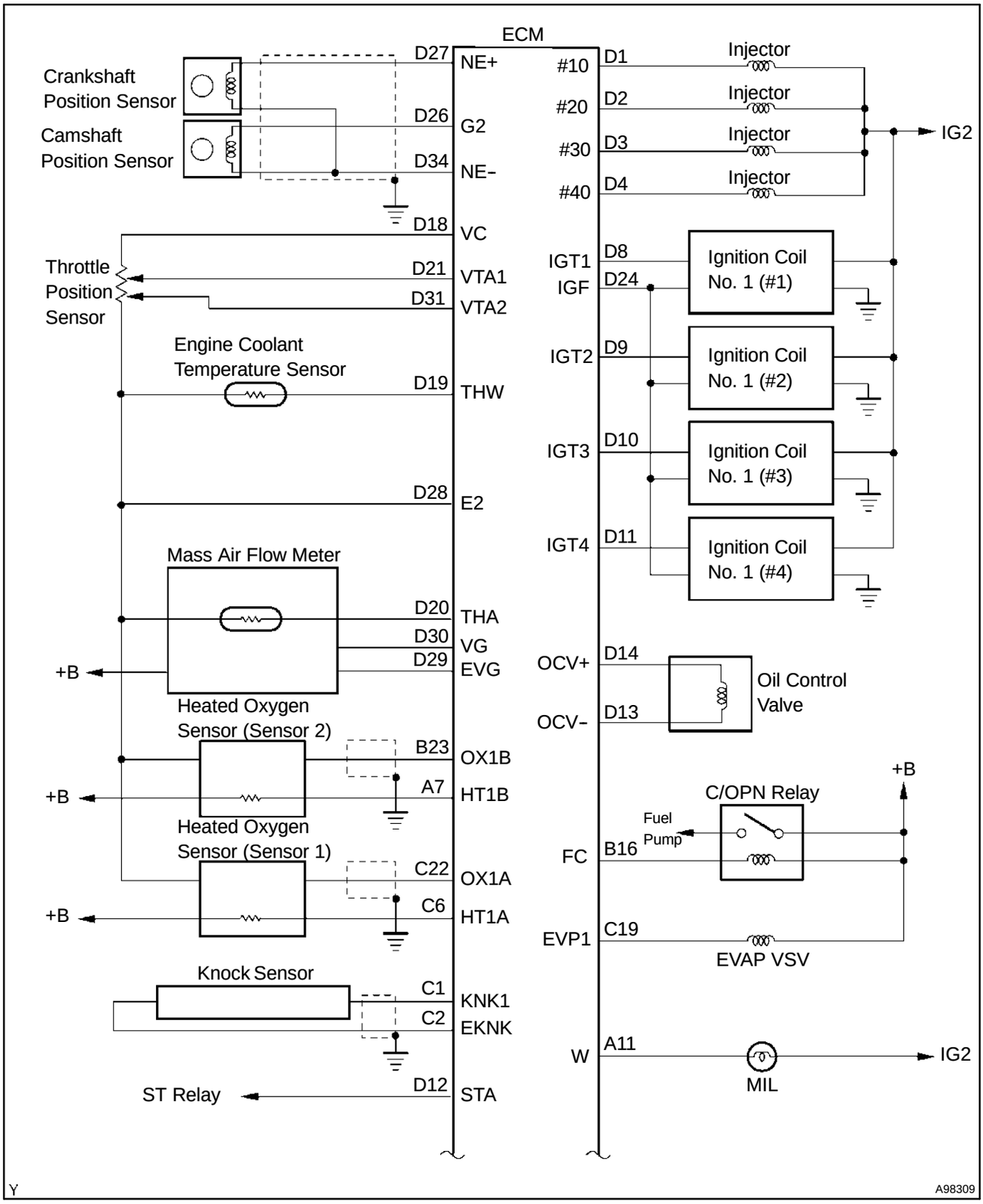
LOCATION

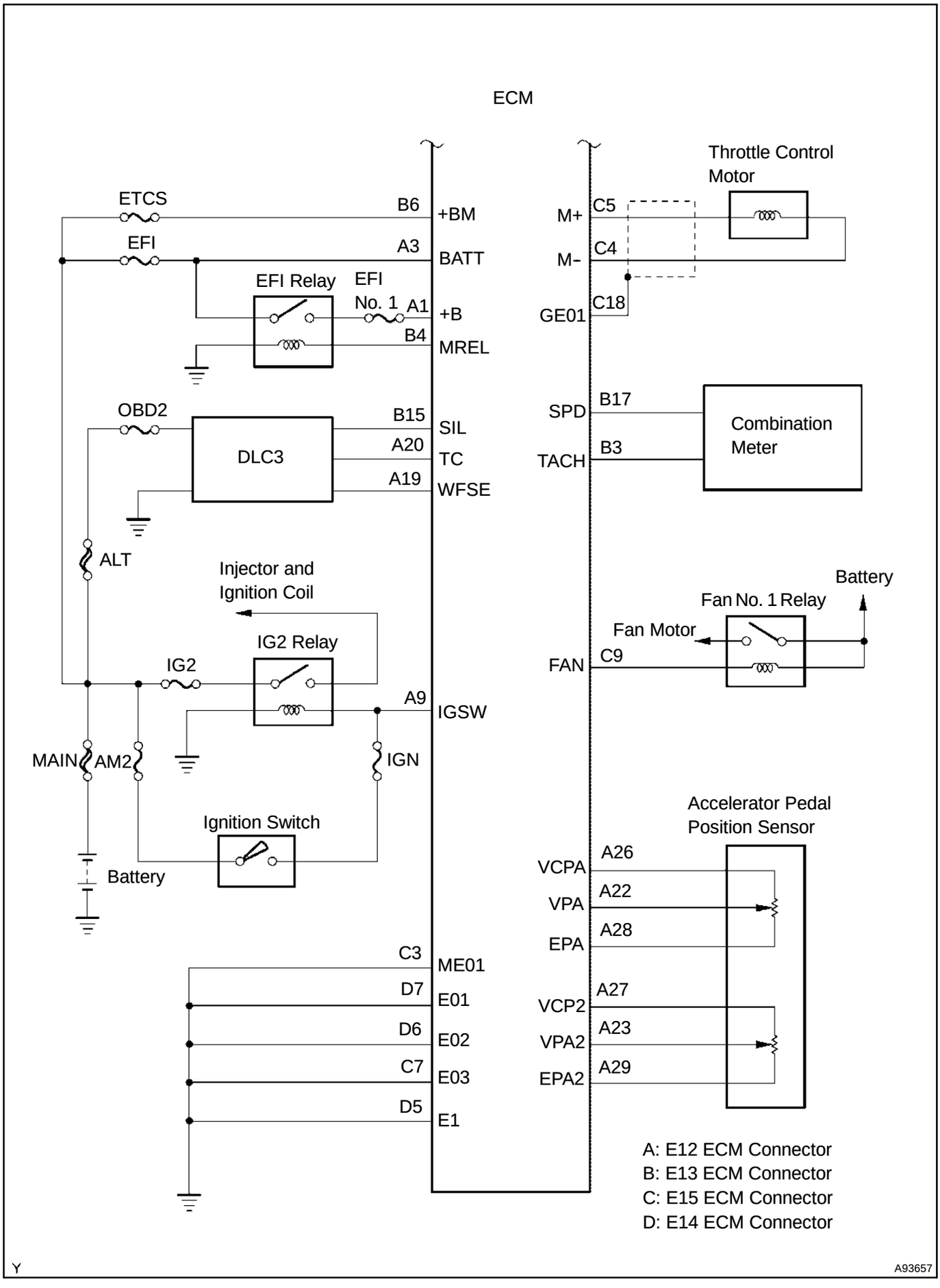



RHD:
Combination Meter
Heated Oxygen Sensor (Sensor 2)
DLC3
Fuel Pump
R/B No. 3:
● ST Relay
(TMMT Made and TMUK Made)
Accelerator Pedal
Mass Air Flow Meter
Instrument Pnel J/B:
● ST Relay (TMC Made)
● Circuit Opening Relay
● IG2 Fuse
● STOP Fuse
ECM
EVAP VSV
Engine Room R/B and J/B:
● EFI Relay
● ECTS Fuse
● EFI Fuse
● AM2 Fuse
Neutral Start Switch (A/T)
Injector
Ignition Coil Assy
Heated Oxygen Sensor (Sensor 1)
Camshaft Timing Oil Control Valve
Camshaft Position Sensor
Engine Coolant Temperature Sensor
Throttle Body Assy
Crankshaft Position Sensor
Knock Sensor
Y
A98837

05KNR-04

SYSTEM DIAGRAM




ECM
ETCS
B6
+BM
EFI
A3
BATT
EFI Relay
EFI No. 1
A1
+B
B4
MREL
OBD2
B15
SIL
DLC3
A20
TC
A19
WFSE
ALT
Injector and Ignition Coil
IG2 Relay
IG2
A9
IGSW
MAIN
AM2
IGN
Ignition Switch
Battery
C3
ME01
D7
E01
D6
E02
C7
E03
D5
E1
Throttle Control Motor
M+
C5
M-
C4
GE01
C18
SPD
B17
Combination Meter
TACH
B3
Battery
Fan No. 1 Relay
Fan Motor
FAN
C9
Accelerator Pedal Position Sensor
VCPA
A26
VPA
A22
EPA
A28
VCP2
A27
VPA2
A23
EPA2
A29
A: E12 ECM Connector
B: E13 ECM Connector
C: E15 ECM Connector
D: E14 ECM Connector
Y
A93657

054JB-28

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester II can be used in steps 3, 4, 5, 7 and 10.

1	VEHICLE BROUGHT TO WORKSHOP

2	CUSTOMER PROBLEM ANALYSIS (See page 05-9)

3	CONNECT INTELLIGENT TESTER II TO DLC3

HINT:
If the display indicates a communication fault in the tester, inspect the DLC3.

4	CHECK DTC AND FREEZE FRAME DATA (See page 05-19)

HINT:
Record or print DTCs and freeze frame data, if necessary.

5	CLEAR DTC AND FREEZE FRAME DATA (See page 05-19)

6	CONDUCT VISUAL INSPECTION

7	SET CHECK MODE DIAGNOSIS (See page 05-21)

8	CONFIRM PROBLEM SYMPTOMS

HINT:
If the engine does not start, perform steps 10 and 12 first.

Result	Proceed To
Malfunction does not occur	A
Malfunction occurs	B

B → GO TO STEP 10

A

9	SIMULATE SYMPTOMS

10	CHECK DTC (See page 05-19)

Result	Proceed To
Malfunction code	A
No code	B

B → GO TO STEP 12

A

11	REFER TO DTC CHART (See page 05-28)

GO TO STEP 14

12	CONDUCT BASIC INSPECTION (See page 05-11)

Result	Proceed To
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

13	REFER TO PROBLEM SYMPTOMS TABLE (See page 05-13)

Result	Proceed To
Malfunctioning circuit confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

14	CHECK ECM POWER SOURCE CIRCUIT (See page 05-194)

15	CONDUCT CIRCUIT INSPECTION

Result	Proceed To
Malfunction not confirmed	A
Malfunction confirmed	B

B → GO TO STEP 18

A

16	CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

GO TO STEP 18

17	CONDUCT PARTS INSPECTION

18	IDENTIFY PROBLEM

19	ADJUST AND/OR REPAIR

20	CONDUCT CONFIRMATION TEST

END

054JC-30

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Driver's Name		VIN	
Date Vehicle Brought in		Production Date	
License Plate No.		Odometer Reading	km miles

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

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

Condition of MIL (Malfunction Indicator Lamp)		☐ Remains on ☐ Sometimes lights up ☐ Does not light up
DTC Inspection	Normal mode (Pre-check)	☐ Normal ☐ Malfunction code(s) (code) ☐ Freeze frame data ( )
	Check Mode	☐ Normal ☐ Malfunction code(s) (code) ☐ Freeze frame data ( )

05JO6–05

CHECK FOR INTERMITTENT PROBLEMS

HINT:

Intelligent tester II only:

Inspect the vehicle's ECM using check mode. Intermittent problems are easier to detect with the intelligent tester II when the ECM is in check mode. In check mode, the ECM uses 1 trip detection logic, which is more sensitive to malfunctions than normal mode (default), that uses 2 trip detection logic.

(a) Clear DTCs (see page 05–19).

(b) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05–21).

(c) Perform a simulation test (see page 01–21).

(d) Check the connector(s) and terminal(s) (see page 01–31).

(e) Wiggle the harness(es) and connector(s) (see page 01–31).

05JO7-05

BASIC INSPECTION

When a malfunction is not confirmed by the DTC check, troubleshooting should be carried out in all circuits considered to be possible causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location of the problem can be found quickly and efficiently. Therefore, using this check is essential when engine troubleshooting.

1	CHECK BATTERY VOLTAGE

NOTICE:
Carry out this check with the engine stopped and ignition switch OFF.

Result	Proceed To
11 V or more	OK
Below 11 V	NG

NG → **CHARGE OR REPLACE BATTERY**

OK →

2	CHECK IF ENGINE WILL CRANK

NG → **PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-13**

OK →

3	CHECK IF ENGINE STARTS

NG → **GO TO STEP 6**

OK →

4	CHECK AIR FILTER

(a) Visually check that the air filter is not contaminated with dirt or oil.

NG → **REPLACE AIR FILTER**

OK →

5	CHECK IDLING SPEED (See page 14-82 of Pub. No. RM925E COROLLA)

NG → **PROCEED TO PAGE 14-82 OF PUB. NO. RM925E COROLLA AND CONTINUE TO TROUBLESHOOT**

OK →

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-13

6	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

NG → PROCEED TO PAGE 11-5 OF PUB. NO. RM925E COROLLA AND CONTINUE TROUBLESHOOTING

OK

7	CHECK FOR SPARK (See page 18-5 of Pub. No. RM925E COROLLA)

NG → PROCEED TO PAGE 18-5 OF PUB. NO. RM925E COROLLA AND CONTINUE TROUBLESHOOTING

OK

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-13

054JF-30

PROBLEM SYMPTOMS TABLE

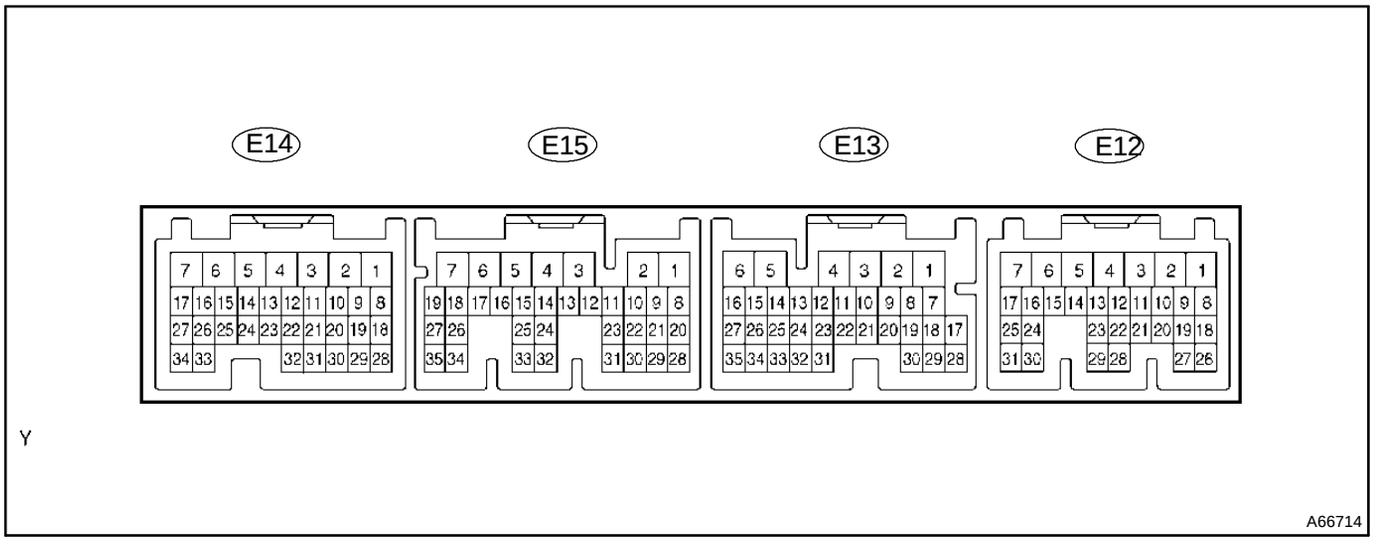
When a malfunction is not confirmed by a DTC (Diagnostic Trouble Code) check and the cause of problem cannot be identified through a basic inspection, troubleshoot according to the priority order indicated in the table below.

Symptom	Suspect Area	See Page
Engine does not crank (Does not start)	1. Starter signal circuit 2. Starter 3. ST relay	05-170 *1 *1
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	05-194 05-200 05-14
Incomplete combustion (Does not start)	1. Fuel pump control circuit	05-200
Engine cranks normally but difficult to start	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	05-170 05-200 *2
Difficult to start with cold engine	1. Starter signal circuit 2. Fuel pump control circuit	05-170 05-200
Difficult to start with hot engine	1. Starter signal circuit 2. Fuel pump control circuit	05-170 05-200
High engine idling speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	*3 05-194
Low engine idling speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	*3 05-200
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	*2 05-200
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	05-194 05-200
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. Automatic transmission assembly	05-200 05-655
Surging (Poor driveability)	1. Fuel pump control circuit	05-200
Engine stalls soon after starting	1. Fuel pump control circuit	05-200
Engine stalls during A/C operation	1. A/C signal circuit (Compressor circuit) 2. ECM	*3 05-14

*1: See page 19-11 of Pub. No. RM925E COROLLA
*2: See page 14-82 of Pub. No. RM925E COROLLA
*3: See page 55-4 of Pub. No. RM925E COROLLA

054KK-27

TERMINALS OF ECM



HINT:
Each ECM terminal's standard normal voltage is shown in the table below.
In the table, first follow the information under "Condition." Look under "Symbols (Terminals No.)" for the terminals to be inspected. The standard normal voltage between the terminals is shown under "STD Voltage."
Use the illustration above as a reference for the ECM terminals.

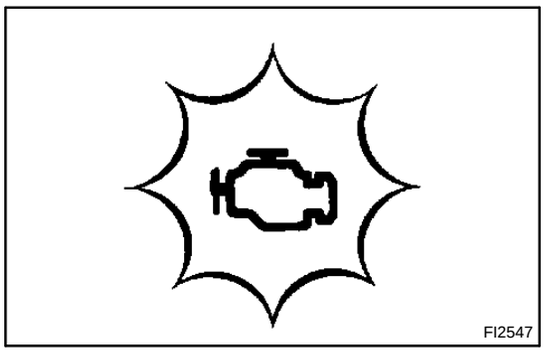
Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
BATT (E12-3) - E1 (E14-5)	R-W - BR	Battery (for measuring battery voltage and for ECM memory)	Always	9 to 14 V
+BM (E13-6) - ME01 (E15-3)	B - W-B	Power source of throttle motor	Always	9 to 14 V
IGSW (E12-9) - E1 (E14-5)	SB (B-O) - BR	Ignition switch	Ignition switch ON	9 to 14 V
+B (E12-1) - E1 (E14-5)	B - BR	Power source of ECM	Ignition switch ON	9 to 14 V
MREL (E13-4) - E01 (E14-7)	SB (B-W) - W-B	EFI relay	Ignition switch ON	9 to 14 V
VC (E14-18) - E2 (E14-28)	Y - BR	Power source of sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
VTA1 (E14-21) - E2 (E14-28)	LG - BR	Throttle position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully released	0.4 to 1.0 V
VTA1 (E14-21) - E2 (E14-28)	LG - BR	Throttle position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully depressed	3.2 to 4.8 V
VTA2 (E14-31) - E2 (E14-28)	L - BR	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, Accelerator pedal fully released	2.1 to 3.1 V
VTA2 (E14-31) - E2 (E14-28)	L - BR	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, Accelerator pedal fully depressed	4.5 to 5.0 V
VPA (E12-22) - EPA (E12-28)	G - Y	Accelerator pedal position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully released	0.5 to 1.1 V
VPA (E12-22) - EPA (E12-28)	G - Y	Accelerator pedal position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully depressed	2.6 to 4.5 V
VPA2 (E12-23) - EPA2 (E12-29)	W *4 - Y L *5 - L	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, Accelerator pedal fully released	1.2 to 2.0 V
VPA2 (E12-23) - EPA2 (E12-29)	W *4 - Y L *5 - L	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, Accelerator pedal fully depressed	3.4 to 5.0 V

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
VCPA (E12-26) - EPA (E12-28)	B *4 - Y W *5 - Y	Power source of accelerator pedal position sensor (for VPA)	Ignition switch ON	4.5 to 5.0 V
VCP2 (E12-27) - EPA2 (E12-29)	B *4 - Y B *5 - L	Power source of accelerator pedal position sensor (for VPA2)	Ignition switch ON	4.5 to 5.0 V
VG (E14-30) - EVG (E14-29)	G - L-W	Mass air flow meter	Idling, Shift position P or N, A/C switch OFF	0.5 to 3.0 V
THA (E14-20) - E2 (E14-28)	Y-B - BR	Intake air temperature sensor	Idling, Intake air temperature 20°C (68°F)	0.5 to 3.4 V
THW (E14-19) - E2 (E14-28)	W - BR	Engine coolant temperature sensor	Idling, Engine coolant temperature 80°C (176°F)	0.2 to 1.0 V
#10 (E14-1) - E01 (E14-7) #20 (E14-2) - E01 (E14-7) #30 (E14-3) - E01 (E14-7) #40 (E14-4) - E01 (E14-7)	Y - W-B B - W-B W - W-B L - W-B	Injector	Ignition switch ON	9 to 14 V
#10 (E14-1) - E01 (E14-7) #20 (E14-2) - E01 (E14-7) #30 (E14-3) - E01 (E14-7) #40 (E14-4) - E01 (E14-7)	Y - W-B B - W-B W - W-B L - W-B	Injector	Idling	Pulse generation (See page 05-117)
IGT1 (E14-8) - E1 (E14-5) IGT2 (E14-9) - E1 (E14-5) IGT3 (E14-10) - E1 (E14-5) IGT4 (E14-11) - E1 (E14-5)	R-L - BR Y-G - BR GR - BR W - BR	Ignition coil with igniter (ignition signal)	Idling	Pulse generation (See page 05-142)
IGF (E14-24) - E1 (E14-5)	L-Y - BR	Ignition coil with igniter (ignition confirmation signal)	Ignition switch ON	4.5 to 5.5 V
IGF (E14-24) - E1 (E14-5)	L-Y - BR	Ignition coil with igniter (ignition confirmation signal)	Idling	Pulse generation (See page 05-142)
G2 (E14-26) - NE- (E14-34)	B - W	Camshaft position sensor	Idling	Pulse generation (See page 05-139)
NE+ (E14-27) - NE- (E14-34)	B - W	Crankshaft position sensor	Idling	Pulse generation (See page 05-135)
FC (E13-16) - E01 (E14-7)	SB (G-R) - W-B	Fuel pump control	Ignition switch ON	9 to 14 V
M+ (E15-5) - E01 (E14-7) M- (E15-4) - E01 (E14-7)	B - W-B W - W-B	Throttle actuator	Idling	Pulse generation
OX1A (E15-22) - E2 (E14-28)	R - BR	Heated oxygen sensor	Maintain engine speed at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation (See page 05-73)
OX1B (E13-23) - E2- (E14-28)	W - BR	Heated oxygen sensor	Maintain engine speed at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation (See page 05-99)
HT1A (E15-6) - E03 (E15-7) HT1B (E12-7) - E03 (E15-7)	P - W-B P-L - W-B	Heated oxygen sensor heater	Idling	Below 3.0 V
HT1A (E15-6) - E03 (E15-7) HT1B (E12-7) - E03 (E15-7)	P - W-B P-L - W-B	Heated oxygen sensor heater	Ignition switch ON	9 to 14 V
KNK1 (E15-1) - EKNK (E15-2)	B - W	Knock sensor	Maintain engine speed at 4,000 rpm after warming up engine	Pulse generation (See page 05-131)
OCV+ (E14-14) - OCV- (E14-13)	Y - B-Y	Camshaft timing oil control valve	Ignition switch ON	Pulse generation (See page 05-34)
EVP1 (E15-19) - E01 (E14-7)	L-B - W-B	EVAP VSV	Ignition switch ON	9 to 14 V
EVP1 (E15-19) - E01 (E14-7)	L-G - W-B	EVAP VSV	Idling	Pulse generation
STA (E14-12) - E1 (E14-5)	B-R *1 - BR B *2 - BR	Starter signal	Shift position N, Ignition switch START	6.0 V or more

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
STP (E13-19) - E1 (E14-5)	SB (G-W) - BR	Stop lamp switch	Brake pedal depressed	9 to 14 V
STP (E13-19) - E1 (E14-5)	SB (G-W) - BR	Stop lamp switch	Brake pedal released	Below 1.5 V
ST1- (E13-12) - E1 (E14-5)	G-R - BR	Stop lamp switch	Ignition switch ON, Brake pedal depressed	Below 1.5 V
ST1- (E13-12) - E1 (E14-5)	G-R - BR	Stop lamp switch	Ignition switch ON, Brake pedal released	7.5 to 14 V
W (E12-11) - E01 (E14-7)	W (R-Y) - W-B	MIL	Idling	9 to 14 V
W (E12-11) - E01 (E14-7)	W (R-Y) - W-B	MIL	Ignition switch ON	Below 3.0 V
TACH (E13-3) - E1 (E14-5)	W (B) - BR	Engine speed	Idling	Pulse generation
SPD (E13-17) - E01 (E14-7)	W (V-W) - W-B	Speed signal from combination meter	Ignition switch ON, Rotate driving wheel slowly	Pulse generation (See page 05-157)
TC (E12-20) - E1 (E14-5)	W (P-B) - BR	Terminal TC of DLC3	Ignition switch ON	9 to 14 V
SIL (E13-15) - E1 (E14-5)	W (L-R) - BR	Terminal SIL of DLC3	Connect intelligent tester II to DLC3	Pulse generation
ELS (E12-12) - E1 (E14-5)	G *4 - BR SB (G) *5 - BR	Electric load	Taillamp switch OFF	0 to 1.5 V
ELS (E12-12) - E1 (E14-5)	G *4 - BR SB (G) *5 - BR	Electric load	Taillamp switch ON	9 to 14 V
F/PS (E12-14) - E1 (E14-5)	SB (Y) - BR	Airbag sensor assembly	Ignition switch ON	Below 1.5 V

*1: TMC Made
*2: TMUK and TMMT Made
*3: A/T Only
*4: LHD
*5: RHD

05JO8–05

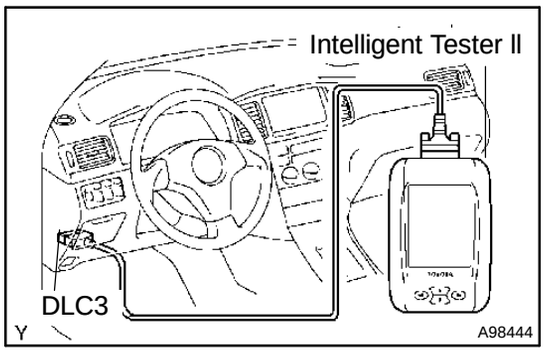

FI2547

DIAGNOSIS SYSTEM

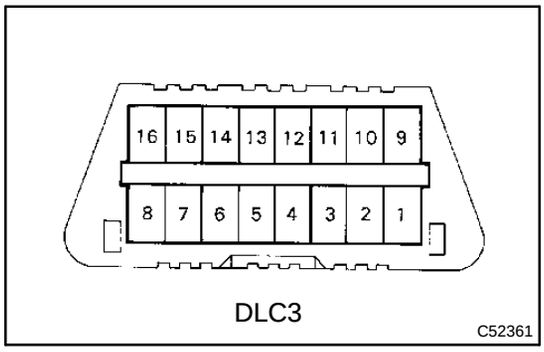
1. DESCRIPTION

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect an OBD scan tool (complying with ISO 15031–4) or an intelligent tester II to the vehicle, and read the various data output from the vehicle's ECM.
- Euro–OBD regulations require that the vehicle's on–board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in: 1) the emission control systems and components, or 2) the powertrain control components (which affect vehicle emissions), or 3) the computer. In addition, the applicable DTCs (Diagnostic Trouble Codes) prescribed by ISO 15031–4 are recorded in the ECM memory (see page 05–28).

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



- To check the DTCs, connect the OBD scan tool or intelligent tester II to the DLC3 (Data Link Connector 3) on the vehicle. The OBD scan tool or intelligent tester II also enables you to erase the DTCs and check the freeze frame data and various forms of engine data. (See the instruction manual for the OBD scan tool or intelligent tester II.)
- The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic* is used to ensure accurate detection of malfunctions. Check mode is also available to technicians as an option. In check mode, 1 trip detection logic is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (intelligent tester II only) (see page 05–21).
- *2 trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the ignition switch is turned to OFF and then to ON again, and the same malfunction is detected again, the MIL illuminates (2nd trip).
- Freeze frame data:
  Freeze frame data record the engine conditions (fuel system, calculated engine load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when malfunctions are detected. When troubleshooting, the freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data, from the time the malfunction occurred.



2. CHECK DLC3

(a) The vehicle's ECM uses the ISO 9141-2 (Euro-OBD) communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031-03 and matches the ISO 9141-2 format.

Symbol	Terminal No.	Name	Reference Terminal	Result	Condition
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always

HINT:

When you use the intelligent tester II, first connect the cable of the tester to the DLC3. Next, turn the ignition switch to ON. Finally turn the tester ON. If the screen displays NO INFORMATION AVAILABLE and bus check also fails, a problem exists in the vehicle, the tester or the tester cable.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester or the cable, so consult the Service Department listed in its instruction manual.

3. INSPECT BATTERY VOLTAGE

Standard: 11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

4. CHECK MIL

(a) The MIL illuminates when the ignition switch is turned to ON and the engine is not running.

HINT:

If the MIL does not illuminate, check the MIL circuit
(See page 05-205).

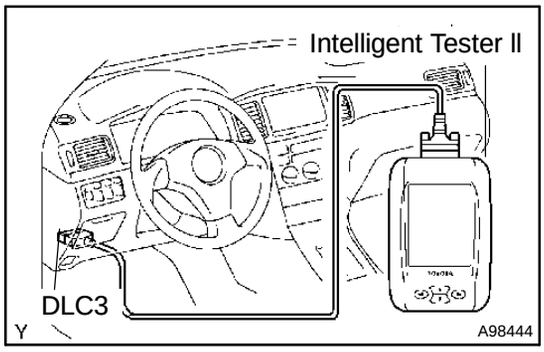
(b) The MIL should turn off when the engine is started. If the MIL remains on, the diagnosis system has detected a malfunction or abnormality in the system.

05KNS-04

DTC CHECK/CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode will be erased. Before changing modes, always check and make a note of DTCs and freeze frame data.



1. CHECK DTC (using the intelligent tester II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON and turn the intelligent tester II ON.

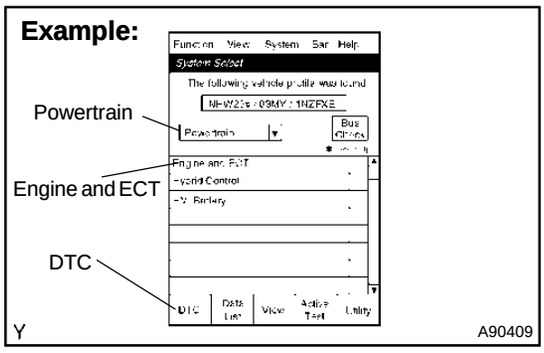
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.

(d) Check DTCs and freeze frame data, and then write them down.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.

(e) See page 05–28 to confirm the details of the DTCs.



2. FREEZE FRAME DATA

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON and turn the intelligent tester II ON.

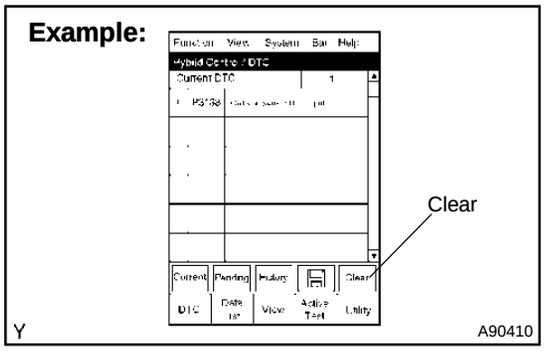
(c) Read DTCs by selecting the following menu items: Powertrain / Engine and ECT / DTC.

(d) Select a parameter(s) to check the freeze frame data.

(e) Note down the DTC(s) and freeze frame data.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.



3. CLEAR DTCs AND FREEZE FRAME DATA (using the intelligent tester II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON (do not start the engine) and turn the intelligent tester II ON.

(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.

(d) Erase DTCs and freeze frame data by pressing the YES button on the tester.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.

4. CLEAR DTCs AND FREEZE FRAME DATA (not using the intelligent tester II)

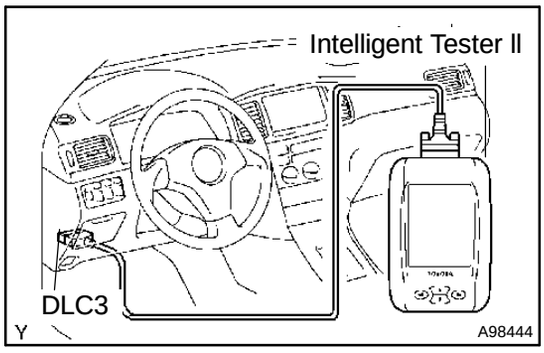
(a) Remove the EFI and ETCS fuses from the engine room R/B for more than 60 seconds, or disconnect the battery cable for more than 60 seconds. When disconnecting the battery cable, perform the ”INITIALIZE” procedure (see page 05–1).

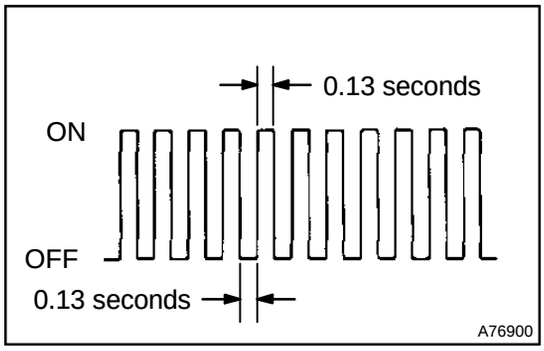
05JOA-05

CHECK MODE PROCEDURE

HINT:

Compared to normal mode, check mode is more sensitive to malfunctions. Therefore, check mode can detect the malfunctions that cannot be detected by normal mode.





1. CHECK MODE PROCEDURE

(a) Check and ensure the following conditions:
  (1) Battery voltage 11 V or more.
  (2) Throttle valve fully closed.
  (3) Transmission in the P or N position.
  (4) A/C switched OFF.

(b) Turn the ignition switch to OFF.

(c) Connect the intelligent tester II to the DLC3.

(d) Turn the ignition switch to ON and turn the intelligent tester II ON.

(e) Select the following menu items: Powertrain / Engine and ECT / Utility / Check Mode.

(f) Make sure that the MIL flashes as shown in the illustration.

NOTICE:

All the stored DTCs and freeze frame data are erased if: 1) the ECM is changed from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or OFF.

(g) Start the engine. (Make sure the MIL turns off).

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

(i) Check DTCs, freeze frame data using the tester.

(j) After checking the DTCs, inspect the applicable circuits (see page 05–13).

05JOB-05

FAIL-SAFE CHART

If any of the following DTCs are recorded, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily.

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Condition
P0031 P0032	Heated oxygen sensor (Sensor 1) heater is turned off	Ignition switch turned to OFF
P0037 P0038	Heated oxygen sensor (Sensor 2) heater is turned off	Ignition switch turned to OFF
P0100 P0102 P0103	Ignition timing is calculated from engine RPM and Throttle Position (TP)	"Pass" condition detected
P0110 P0112 P0113	Intake Air Temperature (IAT) is fixed at 20°C (68°F)	"Pass" condition detected
P0115 P0117 P0118	Engine Coolant Temperature (ECT) is fixed at 80°C (176°F)	"Pass" condition detected
P0120 P0122 P0123 P0220 P0222 P0223 P2102 P2103 P2111 P2112 P2118 P2119 P2135	When Electronic Throttle Control System (ETCS) is malfunctioning, electric current to throttle actuator is cut off and throttle valve returns to Throttle Position (TP) 16° by its spring. Then, required engine power is calculated using ignition timing and Accelerator Pedal Position (APP). Engine is controlled by intermittent fuel-cut. As a result, fully slowly depressing accelerator pedal enables driving at minimum speed. However, quickly depressing pedal would vary vehicle speed remarkably.	"Pass" condition detected followed by ignition switch being turned to OFF
P0121	Fuel is cut intermittently	"Pass" condition detected followed by ignition switch being turned to OFF
P0325 P0327 P0328	Maximum ignition timing retardation	Ignition switch turned to OFF
P0351 P0352 P0353 P0354	Fuel is cut	"Pass" condition detected
P2120 P2121 P2122 P2123 P2125 P2127 P2128 P2138	Accelerator Pedal Position (APP) sensor has main circuit and associate circuit. When one of circuits is malfunctioning, APP is calculated by output of other circuit. When both of circuits are malfunctioning, it is interpreted that accelerator pedal is releasing. As a result, throttle valve is closed and engine idles.	"Pass" condition detected followed by ignition switch being turned to OFF

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

By reading the Data List displayed on the intelligent tester II, you can check values, including those of the switches, sensors, and actuators, without removing any parts. Reading the Data List as the first step of troubleshooting is one method of shortening diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when determining whether or not a part is faulty.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List.
(g) Check the values by referring to the table below.

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Injector (INJECTOR)	Injection period of No. 1 cylinder/ Min.: 0 ms, Max.: 32.6 ms	Idling: 1.92 to 3.37 ms	—
IGN Advance (IGN ADVANCE)	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	Idling: BTDC 10 to 18 deg. (N position)	—
CALC Load (CALC LOAD)	Calculated load by ECM/ Min.: 0 %, Max.: 100 %	• Idling: 27.5 to 46.4 % • Running without load (2,500 rpm): 19.7 to 40.5 %	—
AMF (AMF)	Air flow rate from MAF meter/ Min.: 0 g/s, Max.: 665 g/s	Idling: 3 to 7 g/s (1,500 rpm)	If value is approximately 0.0 g/s: • Mass air flow meter power source circuit is open • VG circuit is open or shorted If value is 160.0 g/s or more: • E2G circuit is open
Engine SPD (ENGINE SPD)	Engine speed/ Min.: 0 rpm, Max.: 16,383 rpm	Idling: 650 to 750 rpm (N position)	—
Coolant Temp (COOLANT TEMP)	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 140°C (248°F)	After warming up engine: 80° to 95°C (176° to 203°F)	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F): sensor circuit is shorted
Intake Air (INTAKE AIR)	Intake air temperature/ Min.: -40°C (-40°F) Max.: 140°C (248°F)	Equivalent to ambient air temperature	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F): sensor circuit is shorted
Throttle POS (THROTTLE POS)	Absolute throttle position sensor/ Min.: 0 %, Max.: 100 %	• Throttle fully closed: 8 to 20 % • Throttle fully open: 64 to 96 %	Read value with ignition switch ON (Do not start engine)
Vehicle SPD (VEHICLE SPD)	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on speedometer
Accelerator POS No.1 (ACCEL POS #1)	Accelerator pedal position sensor No.1 output voltage/ Min.: 0 V, Max.: 5 V	• Accelerator pedal released: 0.5 to 1.1 V • Accelerator pedal depressed: 2.6 to 4.5 V	Read value with ignition switch ON (Do not start engine)

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Accelerator POS No.2 (ACCEL POS #2)	Accelerator pedal position sensor No.2 output voltage/ Min.: 0 V, Max.: 5 V	• Accelerator pedal released: 1.2 to 2.0 V • Accelerator pedal depressed: 3.4 to 5.0 V	Read value with ignition switch ON (Do not start engine)
Throttle POS No.2 (THROTTLE POS #2)	Throttle position sensor No. 2 output voltage/ Min.: 0 V, Max.: 5 V	• Throttle fully closed: 2.1 to 3.1 V • Throttle fully open: 4.5 to 5.0 V	Read value with ignition switch ON (Do not start engine)
Throttle Request POS (THROTTLE TARGT)	Throttle requirement position Min.: 0 V, Max.: 5 V	Idling: 0.4 to 1.1 V	—
Throttle Motor Open Duty (THROTL OPN DUTY)	Throttle motor opening duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully closed: 0 %	• When accelerator pedal is depressed, duty ratio is increased • Read value with ignition switch ON (Do not start engine)
Throttle Motor Close Duty (THROTL CLS DUTY)	Throttle motor closed duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully open: 0 %	• When accelerator pedal is released quickly, duty ratio is increased • Read value with ignition switch ON (Do not start engine)
Throttle Motor (THROTTLE MOT)	Whether or not throttle motor control is permitted/ ON or OFF	Idling: ON	Read value with ignition switch ON (Do not start engine)
ETCS Actuator Power (+BM)	Whether or not Electronic Throttle Control System (ETCS) power is applied/ ON or OFF	Idling: ON	—
Accelerator IDL POS (ACCEL IDL POS)	Whether or not accelerator pedal position sensor is detecting engine idling/ ON or OFF	Idling: ON	—
Throttle IDL POS (THROTTL IDL POS)	Whether or not throttle position sensor is detecting engine idling/ ON or OFF	Idling: ON	—
Fail Safe Drive (FAIL #1)	Whether or not fail-safe function is executed/ ON or OFF	ETCS has failed: ON	—
Fail Safe Drive (Main CPU) (FAIL #2)	Whether or not fail-safe function is executed/ ON or OFF	ETCS has failed: ON	—
Throttle Closed Initial Value (THROTTL INITIAL)	Throttle fully closed (learned value) Min.: 0 V, Max.: 5 V	0.5 to 0.9 V	—
Accelerator Learned Value (ACCEL LEARN VAL)	Accelerator fully closed (learned value) Min.: 0 V, Max.: 5 V	0.4 to 0.8 V	—
Throttle Motor Current (THROTTLE MOT)	Throttle motor current Min.: 0 A, Max.: 20 A	Idling: 0 to 3.0 A	—
O2S B1 S1 (O2S B1 S1)	Heated oxygen sensor output voltage for bank 1 sensor 1/ Min.: 0 V, Max.: 1.275 V	Driving (50 km/h, 31 mph): 0.1 to 0.9 V	Performing A/F Control function of Active Test enables technician to check voltage output of sensor
O2S B1 S2 (O2S B1 S2)	Heated oxygen sensor output voltage for bank 1 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving (50 km/h, 31 mph): 0.1 to 0.9 V	Performing A/F Control function of Active Test enables technician to check voltage output of sensor
Short FT #1 (SHORT FT #1)	Short-term fuel trim of bank 1/ Min.: -100 %, Max.: 100 %	0 ± 20 %	This item is short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Long FT #1 (LONG FT #1)	Long-term fuel trim of bank 1/ Min.: -100 %, Max.: 99.2 %	0 ± 20 %	This item is overall long-term fuel compensation that helps to maintain air-fuel ratio at stoichiometric air-fuel ratio (steadies long term deviations of short-term fuel trim from central value)
TOTAL FT#1 (TOTAL FT#1)	Total fuel trim of bank 1: Average value for fuel trim system of bank 1/ Min.: -0.5, Max.: 1.496	Idling: 0.5 to 1.4	—
O2 FT B1 S1 (O2 FT B1 S1)	Short-term fuel trim associated with bank 1 sensor 1/ Min.: -100 %, Max.: 100 %	0 ± 20 %	Same as Short FT #1
O2FT B1 S2 (O2FT B1 S2)	Short-term fuel trim associated with bank 1 sensor 2/ Min.: -100 %, Max.: 100 %	0 ± 20 %	Same as Short FT #1
FUEL SYS #1 (FUEL SYS #1)	Fuel system status (Bank1) / OL or CL or OL DRIVE or OL FAULT or CL FAULT	Idling after warming up: CL	• OL (Open Loop): Has not yet satisfied conditions for closed loop • CL (Closed Loop): Using heated oxygen sensor as feed back for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but heated oxygen sensor used for fuel control is malfunctioning
FC IDL (FC IDL)	Fuel cut idle/ ON or OFF	Fuel cut operation: ON	Fuel cut idle = "ON" when throttle valve is fully closed and engine speed is over 1,500 rpm
MIL Status (MIL/WARN LIGHT)	MIL status/ ON or OFF	MIL ON: ON	—
Starter SIG (STARTER SIG)	Starter signal/ ON or OFF	Cranking: ON	—
A/C SIG (A/C SIG)	A/C signal/ ON or OFF	A/C ON: ON	—
PNP SW (PNP SW [NSW])	Park/Neutral position switch signal/ ON or OFF	P or N position: ON	—
Elect Load SIG (ELECT LOAD SIG)	Electrical load signal/ ON or OFF	• Taillamp switch ON: ON • Defogger switch ON: ON	—
Stop Light SW (STOP LIGHT SW)	Stop lamp switch/ ON or OFF	• Brake pedal depressed: ON • Brake pedal released: OFF	—
PS Oil Press SW (PS OIL PRESS SW)	Power steering oil pressure switch signal/ ON or OFF	• While turning steering wheel: ON • While not turning steering wheel: OFF	Idle-up control is performed when power steering is ON
PS Signal (PS SIGNAL)	Power steering signal/ ON or OFF	When steering wheel is turned	This signal is usually ON until ignition switch is turned to OFF
Fuel Pump (FUEL PUMP / SPD)	Fuel pump/speed status/ ON/H or OFF/M, L	Idling: ON	—
EVAP VSV (EVAP VSV)	EVAP VSV/ ON or OFF	VSV operating: ON	EVAP VSV is controlled by ECM (ground side duty control)

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
VVT CTRL B1 (VVT CTRL B1)	VVT control status (bank 1)/ ON or OFF	VVT system in operation: ON	—
IGNITION (IGNITION)	Ignition counter/ Min.: 0, Max.: 400	0 to 400	—
Cylinder #1,#2,#3,#4 Misfire Rate (Cyl #1, #2, #3, #4)	Misfire ratio of cylinder 1 to 4/ Min.: 0, Max.: 255	0 %	This item is displayed only when idling
MISFIRE RPM (MISFIRE RPM)	Engine RPM for first misfire range/ Min.: 0 rpm, Max.: 6,375 rpm	Misfire 0: 0 rpm	—
MISFIRE LOAD (MISFIRE LOAD)	Engine load for first misfire range/ Min.: 0 g/rev, Max.: 3.98 g/rev	Misfire 0: 0 g/rev	—
FC TAU (FC TAU)	Fuel cut TAU: Fuel cut during very light load/ ON or OFF	Fuel cut operating: ON	Fuel cut is being performed under very light load to prevent engine combustion from becoming incomplete
Check Mode (CHECK MODE)	Check mode/ ON or OFF	Check mode ON: ON	See page 05-21

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

2. ACTIVE TEST

HINT:

Performing an Active Test using the intelligent tester II enables components including the relay, VSV, and actuator to be operated without removing any parts. Performing the Active Test as the first step of trouble-shooting is one method of shortening diagnostic time.

Data List is displayed during an Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / Active Test.
(g) Perform the Active Test by referring to the table below.

Intelligent Tester II Display (Abbreviation)	Test Details	Diagnostic Note
Injector Volume (INJ VOL)	[Test Details] Control injection volume Min.: –12 %, Max.: 25 % [Vehicle Condition] Engine speed: 3,000 rpm or less	• All injectors are tested at once • Injection volume is gradually changed between –12 % and 25 %
A/F Control (A/F CONTROL)	[Test Details] Control injection volume –12.5 or 25 % (Change injection volume by 12.5 % or 25 %) [Vehicle Condition] Engine speed: 3,000 rpm or less	Following A/F Control procedure enables technician to check and graph voltage outputs of both heated oxygen sensors To display graph, select following menu items: View / Line graph 1 or Line graph 2
Fuel Pump Relay (FUEL PMP SP CTL)	[Test Details] Control fuel pump speed ON or OFF	—
Purge VSV (EVAP (PURGE) VSV)	[Test Details] Activate EVAP VSV control ON or OFF	—
VVT Control (Bank 1) (VVT CTRL B1)	[Test Details] Activate VVT system (Bank 1) ON or OFF	• ON: Rough idling or engine stalling • OFF: Normal engine speed
FC IDL Prohibit (FC IDL PROHBT)	[Test Details] Control idle fuel cut prohibition ON or OFF	During idling
TE1 (TC) (TC/TE1)	[Test Details] Connect TC and TE1 ON or OFF	—

054JD-27

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may not be exactly the same as your readings due to factors such as the type of instrument.

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

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0010 (05-34)	Camshaft Position "A" Actuator Circuit (Bank 1)	• Open or short in Oil Control Valve (OCV) circuit • OCV • ECM	○	○
P0011 (05-38)	Camshaft Position "A" -Timing Over-Advanced or System Performance (Bank 1)	• Valve timing • OCV • Camshaft timing gear assy • ECM	○	○
P0012 (05-38)	Camshaft Position "A" -Timing Over- Retarded (Bank 1)	• Valve timing • OCV • Camshaft timing gear assy • ECM	○	○
P0016 (05-42)	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)	• Mechanical system (Jumped tooth of timing chain or chain stretched) • ECM	—	○
P0031 (05-43)	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 1)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM	○	○
P0032 (05-43)	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 1)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM	○	○
P0037 (05-46)	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)	• Open in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM	○	○
P0038 (05-46)	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)	• Short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM	○	○
P0100 (05-49)	Mass or Volume Air Flow Circuit	• Open or short in Mass Air Flow (MAF) meter circuit • MAF meter • ECM	○	○
P0102 (05-49)	Mass or Volume Air Flow Circuit Low Input	• Open in MAF meter circuit • MAF meter • ECM	○	○
P0103 (05-49)	Mass or Volume Air Flow Circuit High Input	• Short in MAF meter circuit • MAF meter • ECM	○	○
P0110 (05-55)	Intake Air Temperature Circuit	• Open or short in Intake Air Temperature (IAT) sensor circuit • IAT sensor (built into MAF meter) • ECM	○	○
P0112 (05-55)	Intake Air Temperature Circuit Low Input	• Short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM	○	○
P0113 (05-55)	Intake Air Temperature Circuit High Input	• Open in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0115 (05-60)	Engine Coolant Temperature Circuit	• Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM	○	○
P0116 (05-64)	Engine Coolant Temperature Circuit Range/Performance Problem	• Engine coolant temperature sensor	○	○
P0117 (05-60)	Engine Coolant Temperature Circuit Low Input	• Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM	○	○
P0118 (05-60)	Engine Coolant Temperature Circuit High Input	• Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM	○	○
P0120 (05-65)	Throttle/Pedal Position Sensor/ Switch "A" Circuit	• Throttle position sensor (built into throttle body) • ECM	○	○
P0121 (05-72)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Range/Performance Problem	• Throttle position sensor (built into throttle body)	○	○
P0122 (05-65)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Low Input	• Throttle position sensor (built into throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM	○	○
P0123 (05-65)	Throttle/Pedal Position Sensor/ Switch "A" Circuit High Input	• Throttle position sensor (built into throttle body) • Open in VTA1 circuit • Open in E2 circuit • VC and VTA1 circuits are short-circuited • ECM	○	○
P0130 *3 (05-73)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM	○	○
P0133 *3 (05-83)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM	○	○
P0134 (05-90)	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • EFI relay • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust system • ECM	○	○
P0136 (05-99)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0171 *3 (05-105)	System Too Lean (Bank 1)	• Air induction system • Injector blockage • Mass Air Flow (MAF) meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • PCV hose connection • ECM	○	○
P0172 *3 (05-105)	System Too Rich (Bank 1)	• Injector leakage or blockage • MAF meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM	○	○
P0220 (05-65)	Throttle/Pedal Position Sensor/ Switch "B" Circuit	• Throttle position sensor (built into throttle body) • ECM	○	○
P0222 (05-65)	Throttle/Pedal Position Sensor/ Switch "B" Circuit Low Input	• Throttle position sensor (built into throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM	○	○
P0223 (05-65)	Throttle/Pedal Position Sensor/ Switch "B" Circuit High Input	• Throttle position sensor (built into throttle body) • Open in VTA2 circuit • Open in E2 circuit • VC and VTA2 circuits are short-circuited • ECM	○	○
P0300 *3 (05-117)	Random/Multiple Cylinder Misfire Detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • MAF meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM	○ *2	○
P0301 *3 (05-117)	Cylinder 1 Misfire Detected	• Same as DTC P0300	○ *2	○
P0302 *3 (05-117)	Cylinder 2 Misfire Detected	• Same as DTC P0300	○ *2	○
P0303 *3 (05-117)	Cylinder 3 Misfire Detected	• Same as DTC P0300	○ *2	○
P0304 *3 (05-117)	Cylinder 4 Misfire Detected	• Same as DTC P0300	○ *2	○
P0325 (05-131)	Knock Sensor 1 Circuit (Bank 1 or Single Sensor)	• Open or short in knock sensor circuit • Knock sensor (under-torqued or looseness) • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0327 (05-131)	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	• Short in knock sensor circuit • Knock sensor • ECM	○	○
P0328 (05-131)	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)	• Open in knock sensor circuit • Knock sensor • ECM	○	○
P0335 (05-135)	Crankshaft Position Sensor "A" Circuit	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Sensor plate (crankshaft) • ECM	○	○
P0339 (05-135)	Crankshaft Position Sensor "A" Circuit Intermittent	• Same as DTC P0335	—	○
P0340 (05-139)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Camshaft • Jumped tooth of timing chain • ECM	○	○
P0341 (05-139)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	• Same as DTC P0340	○	○
P0351 (05-142)	Ignition Coil "A" Primary/Secondary Circuit	• Ignition system • Open or short in IGF or IGT1 to 4 circuit from ignition coil with igniter to ECM • No. 1 to No. 4 ignition coil with igniter • ECM	○	○
P0352 (05-142)	Ignition Coil "B" Primary/Secondary Circuit	• Same as DTC P0351	○	○
P0353 (05-142)	Ignition Coil "C" Primary/Secondary Circuit	• Same as DTC P0351	○	○
P0354 (05-142)	Ignition Coil "D" Primary/Secondary Circuit	• Same as DTC P0351	○	○
P0420 *3 (05-149)	Catalyst System Efficiency Below Threshold (Bank 1)	• Gas leakage from exhaust system • Heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 2) • Three-way catalytic converter	○	○
P0443 (05-154)	Evaporative Emission Control System Purge Control Valve Circuit	• Open or short in EVAP VSV circuit • EVAP VSV • ECM	○	○
P0500 (05-157)	Vehicle Speed Sensor "A"	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM • Skid control ECU	○	○
P0504 (05-160)	Brake Switch "A"/"B" Correlation	• Short in stop lamp switch signal circuit • Stop lamp fuse • Stop lamp switch • ECM	—	○
P0505 (05-164)	Idle Air Control System	• Electronic throttle control system • Air induction system • PCV hose connection	○	○
P0560 (05-166)	System Voltage	• Open in backup power source circuit • ECM	○	○
P0571 (05-1163)	Stop Light Switch Circuit	• Cruise control system	○	○
P0604 (05-169)	Internal Control Module Random Access Memory (RAM) Error	• ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0606 (05-169)	ECM/PCM Processor	• ECM	○	○
P0607 (05-169)	Control Module Performance	• ECM	○	○
P0617 (05-170)	Starter Relay Circuit High	• Short in park/neutral position switch circuit (A/T) • Short in STA circuit • Park/neutral position switch (A/T) • ECM	○	○
P0657 (05-169)	Actuator Supply Voltage Circuit / Open	• ECM	○	○
P0705 (05-670)	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	• Electronic controlled automatic transmission (ECT)	○	○
P0724 (05-676)	Brake Switch "B" Circuit High	• ECT	○	○
P0741 (05-679)	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)	• ECT	○	○
P0751 (05-683)	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	• ECT	○	○
P0756 (05-686)	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	• ECT	○	○
P0850 (05-670)	Park/Neutral Switch Input Circuit	• ECT	○	○
P0973 (05-689)	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	• ECT	○	○
P0974 (05-689)	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)	• ECT	○	○
P0976 (05-692)	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	• ECT	○	○
P0977 (05-692)	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)	• ECT	○	○
P2102 (05-174)	Throttle Actuator Control Motor Circuit Low	• Open in throttle control actuator circuit • Throttle actuator • ECM	○	○
P2103 (05-174)	Throttle Actuator Control Motor Circuit High	• Short in throttle control actuator circuit • Throttle actuator • Throttle valve • Throttle body assembly • ECM	○	○
P2111 (05-177)	Throttle Actuator Control System - Stuck Open	• Throttle actuator • Throttle body assembly • Throttle valve	○	○
P2112 (05-177)	Throttle Actuator Control System - Stuck Closed	• Same as DTC P2111	○	○
P2118 (05-179)	Throttle Actuator Control Motor Current Range/Performance	• Open in ETCS (Electronic Throttle Control System) power source circuit • ETCS fuse • ECM	○	○
P2119 (05-182)	Throttle Actuator Control Throttle Body Range/Performance	• ETCS • ECM	○	○
P2120 (05-184)	Throttle/Pedal Position Sensor/ Switch "D" Circuit	• Accelerator pedal position sensor • ECM	○	○
P2121 (05-191)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Range/Performance	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P2122 (05-184)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Low Input	• Accelerator pedal position sensor • Open in VCP1 circuit • Open or ground short in VPA1 circuit • ECM	○	○
P2123 (05-184)	Throttle/Pedal Position Sensor/ Switch "D" Circuit High Input	• Accelerator pedal position sensor • Open in EPA circuit • ECM	○	○
P2125 (05-184)	Throttle/Pedal Position Sensor/ Switch "E" Circuit	• Accelerator pedal position sensor • ECM	○	○
P2127 (05-184)	Throttle/Pedal Position Sensor/ Switch "E" Circuit Low Input	• Accelerator pedal position sensor • Open in VCP2 circuit • Open or ground short in VPA2 circuit • ECM	○	○
P2128 (05-184)	Throttle/Pedal Position Sensor/ Switch "E" Circuit High Input	• Accelerator pedal position sensor • Open in EPA2 circuit • ECM	○	○
P2135 (05-65)	Throttle/Pedal Position Sensor/ Switch "A"/"B" Voltage Correlation	• VTA1 and VTA2 circuits are short-circuited • Throttle position sensor (built into throttle body) • ECM	○	○
P2138 (05-184)	Throttle/Pedal Position Sensor/ Switch "D"/"E" Voltage Correlation	• VPA1 and VPA2 circuits are short-circuited • Accelerator pedal position sensor • ECM	○	○
P2195 *3 (05-73)	Oxygen Sensor Signal Stuck Lean (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM	○	○
P2196 *3 (05-73)	Oxygen Sensor Signal Stuck Rich (Bank 1 Sensor 1)	• Same as DTC P2195	○	○
P2716 (05-695)	Pressure Control Solenoid "D" Electrical (Shift Solenoid SLT)	• Electronic controlled automatic transmission (ECT)	○	○
P2769 (05-698)	Torque Converter Clutch Solenoid Circuit Low (Shift Solenoid Valve SL)	• ECT	○	○
P2770 (05-698)	Torque Converter Clutch Solenoid Circuit High (Shift Solenoid Valve SL)	• ECT	○	○
B2799 (05-1121)	Engine Immobilizer System Malfunction	• Immobilizer system	—	○

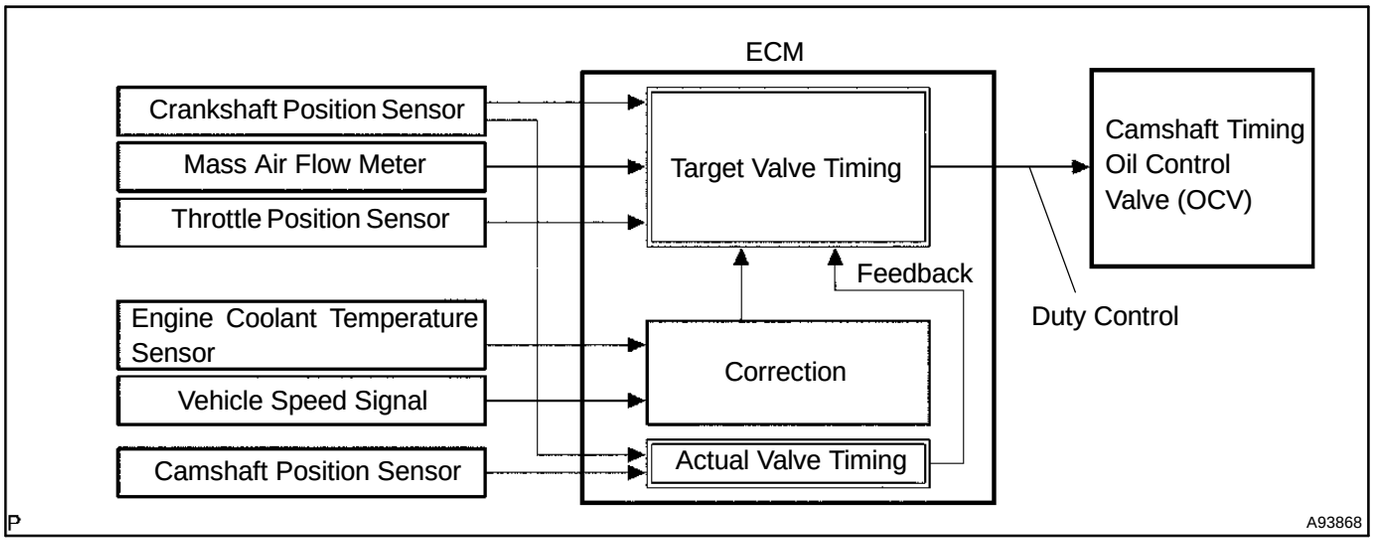
*1: MIL (Malfunction Indicator Lamp) illuminates.
*2: MIL illuminates or flashes continuously.
*3: Euro-OBD vehicles

DTC	P0010	CAMSHAFT POSITION "A" ACTUATOR CIRCUIT (BANK 1)

CIRCUIT DESCRIPTION

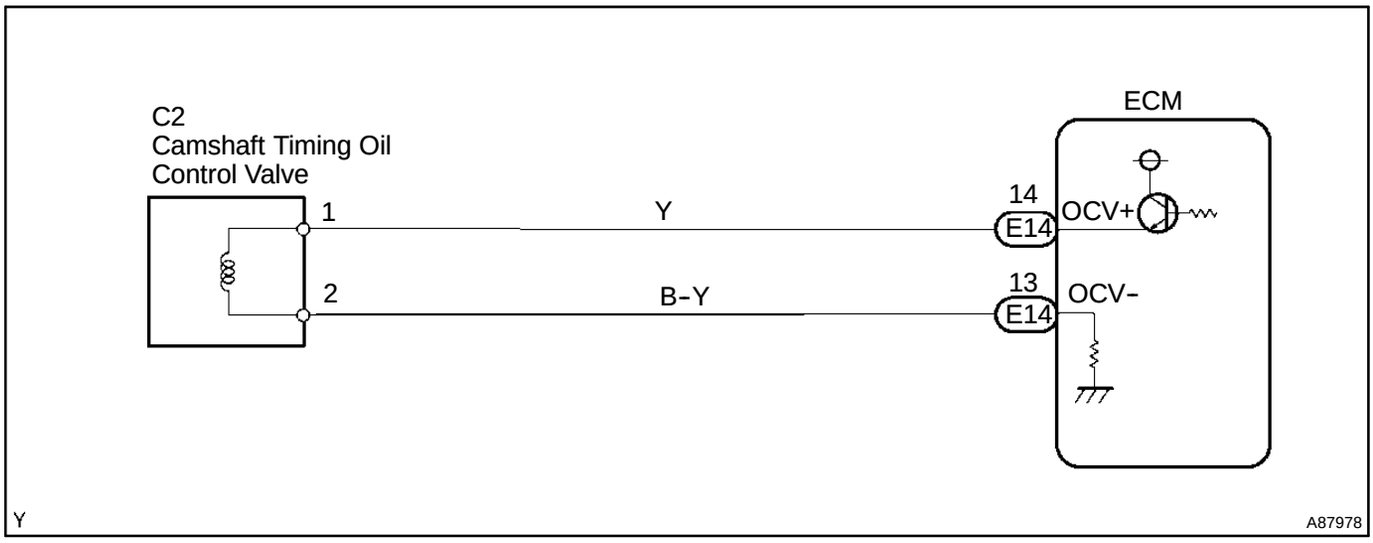
The Variable Valve Timing (VVT) system includes the ECM, Oil Control Valve (OCV) and VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed based on engine operating conditions such as intake air volume, throttle position and engine coolant temperature.

The ECM controls the OCV based on the signals from several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As a result, the relative position between the camshaft and crankshaft is optimized, the engine torque and the fuel economy improve, and the exhaust emission drops. The ECM detects the actual valve timing using signals from the camshaft and crankshaft position sensors. The ECM performs feedback control and verifies target valve timing.



DTC No.	DTC Detection Condition	Trouble Area
P0010	Open or short in OCV circuit (1 trip detection logic)	• Open or short in OCV circuit • OCV • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE OCV)

(a) Start the engine and warm it up.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Active Test / VVT Control (Bank 1).
(f) Check the engine speed when operating the OCV using the intelligent tester II.

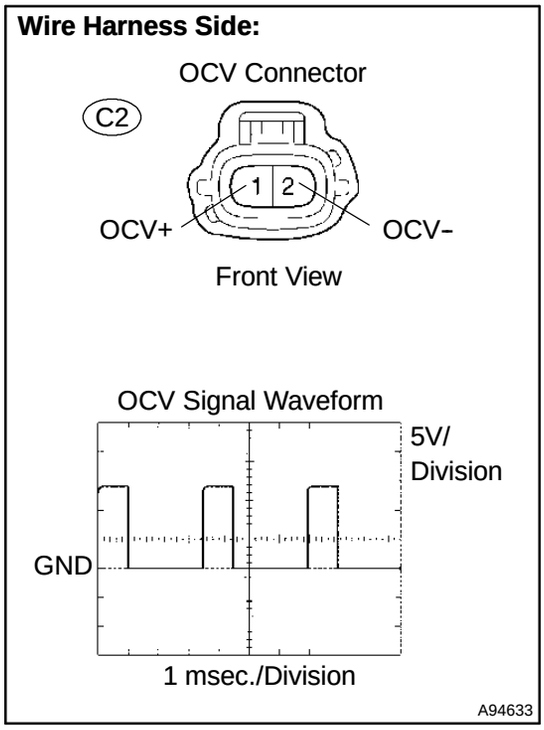
OK:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idling or engine stalling

OK → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-10)**

NG

2 INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV)



(a) Disconnect the C2 OCV connector.
(b) While idling, check the waveform between the terminals of the C2 OCV wire harness side connector using the oscilloscope.
Standard:

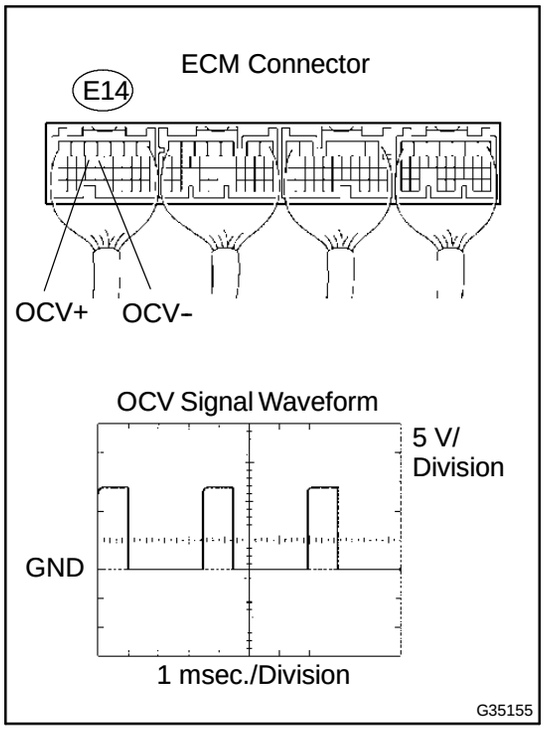
Tester Connection	Specified Condition
OCV+ (C2-1) - OCV- (C2-2)	Correct waveform is as shown

(c) Reconnect the OCV connector.

NG → **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY**

OK

3 INSPECT ECM(OCV SIGNAL)



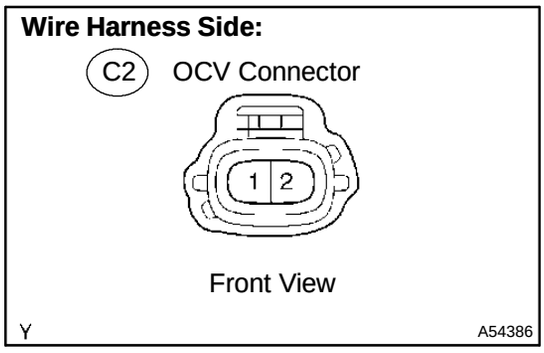
(a) Inspect the ECM using the oscilloscope.
(b) While idling, check the waveform between the terminals of the E14 ECM connector.
OK:

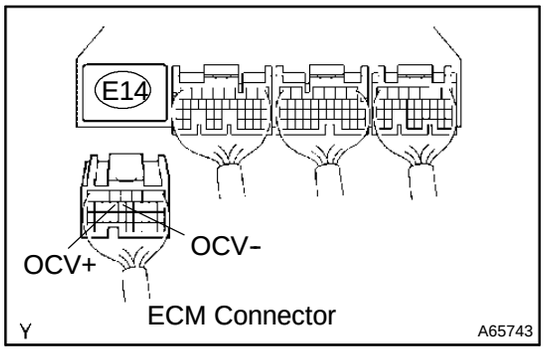
Tester Connection	Specified Condition
OCV+ (E14-14) - OCV- (E14-13)	Correct waveform is as shown

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

4	CHECK HARNESS AND CONNECTOR(CAMSHAFT TIMING OIL CONTROL VALVE (OCV) - ECM)





(a) Disconnect the C2 OCV connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
OCV (C2-1) - OCV+ (E14-14)	Below 1 Ω
OCV (C2-2) - OCV- (E14-13)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OCV (C2-1) or OCV+ (E14-14) - Body ground	10 kΩ or higher
OCV (C2-1) or OCV- (E14-13) - Body ground	10 kΩ or higher

(d) Reconnect the OCV connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-10)**

DTC	P0011	CAMSHAFT POSITION "A" -TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1)

DTC	P0012	CAMSHAFT POSITION "A" -TIMING OVER-RETARDED (BANK 1)

CIRCUIT DESCRIPTION

Refer to DTC P0010 on page 05-34.

DTC No.	DTC Detection Condition	Trouble Area
P0011	Advanced cam timing: After engine is warmed up, valve timing does not change from current valve timing while driving at engine speed of 500 to 4,000 rpm (1 trip detection logic)	• Valve timing • Oil Control Valve (OCV) • Camshaft timing gear assy • ECM
P0012	Retarded cam timing: After engine is warmed up, valve timing does not change from current valve timing while driving at engine speed of 500 to 4,000 rpm (2 trip detection logic)	• Valve timing • OCV • Camshaft timing gear assy • ECM

WIRING DIAGRAM

Refer to DTC P0010 on page 05-35.

INSPECTION PROCEDURE

HINT:

Advanced timing over (Valve timing is out of specified range)	P0011
Retarded timing over (Valve timing is out of specified range)	P0012

- If DTC P0011 or P0012 is displayed, check the VVT system circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK VALVE TIMING (See page 14-87 of Pub. No. RM925E COROLLA)

(a) Check for looseness or a jumped tooth of the timing chain.
OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → ADJUST VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA)

OK

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE OCV)

(a) Start the engine and warm it up.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Active Test / VVT Control (Bank 1).
(f) Check the engine speed when operating the OCV using the intelligent tester II.
OK:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idling or engine stalling

NG → **Go to step 4**

OK

3	CHECK IF DTC OUTPUT RECURS(DTC P0011 OR P0012)

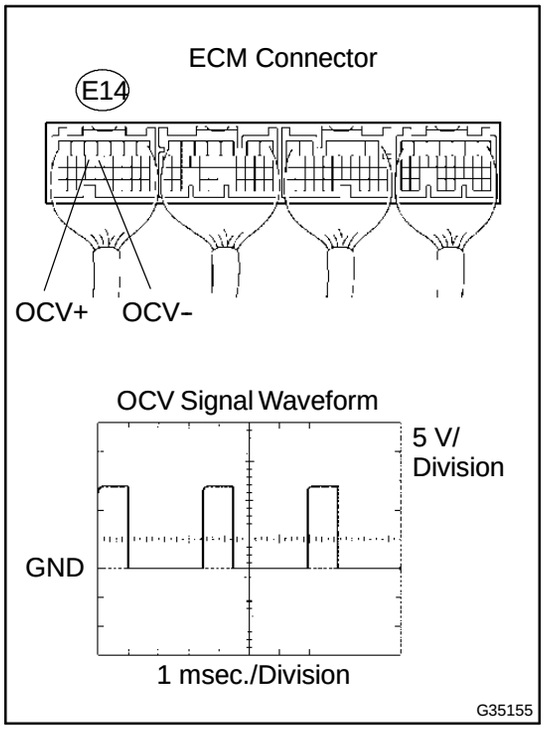
(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Clear DTCs using the intelligent tester II (see page 05-19).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05-21).
(f) Drive the vehicle for 10 minutes or more.
(g) Read output DTCs using the intelligent tester II.
OK: No DTC output.

HINT:
DTC P0011 or P0012 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

OK → **VVT SYSTEM OK**

NG

4	INSPECT ECM(OCV SIGNAL)



(a) Inspect the ECM using the oscilloscope.
(b) While idling, check the waveform between the terminals of the E14 ECM connector.
OK:

Tester Connection	Specified Condition
OCV+ (E14-14) - OCV- (E14-13)	Correct waveform is as shown

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

5	INSPECT OIL CONTROL VALVE FILTER

OK: The filter is not clogged.

NG → **REPLACE OIL CONTROL VALVE FILTER**

OK

6	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV) (See page 10-3)

OK: The OCV has no contamination and moves smoothly.

OK → **Go to step 8**

NG

7	REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV)

GO

8	**INSPECT CAMSHAFT TIMING GEAR ASSY (See page 14-136 of Pub. No. RM925E COROLLA)**

OK: The camshaft timing gear rotates smoothly when applying pressure.

OK	**Go to step 10**

NG

9	**REPLACE CAMSHAFT TIMING GEAR ASSY**

GO

10	**CHECK FOR BLOCKAGE(OCV, OIL CHECK VALVE AND OIL HOLE)**

OK: No blockage.

NG	**REPAIR OR REPLACE**

OK

11	**CHECK IF DTC OUTPUT RECURS(DTC P0011 OR P0012)**

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Clear DTCs using the intelligent tester II (see page 05-19).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05-21).
(f) Drive the vehicle for 10 minutes or more.
(g) Read output DTCs using the intelligent tester II.
OK: No DTC output.

OK	**VVT SYSTEM OK**

HINT:
DTC P0011 or P0012 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

NG

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK 1 SENSOR A)

CIRCUIT DESCRIPTION

Refer to DTCs P0335 and P0339 on page 05-135.

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviation in crankshaft position sensor signal and camshaft position sensor signal (2 trip detection logic)	• Mechanical system (Jumped tooth of timing chain or chain stretched) • ECM

WIRING DIAGRAM

Refer to DTCs P0335 and P0339 on page 05-136.

INSPECTION PROCEDURE

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK VALVE TIMING(CHECK FOR LOOSENESS AND JUMPED TEETH ON TIMING CHAIN) (See page 14-123 of Pub. No. RM925E COROLLA)

(a) Check for looseness or a jumped tooth of the timing chain.
OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → **ADJUST VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA) (REPAIR OR REPLACE TIMING CHAIN)**

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0031	OXYGEN SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1)

DTC	P0032	OXYGEN SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1)

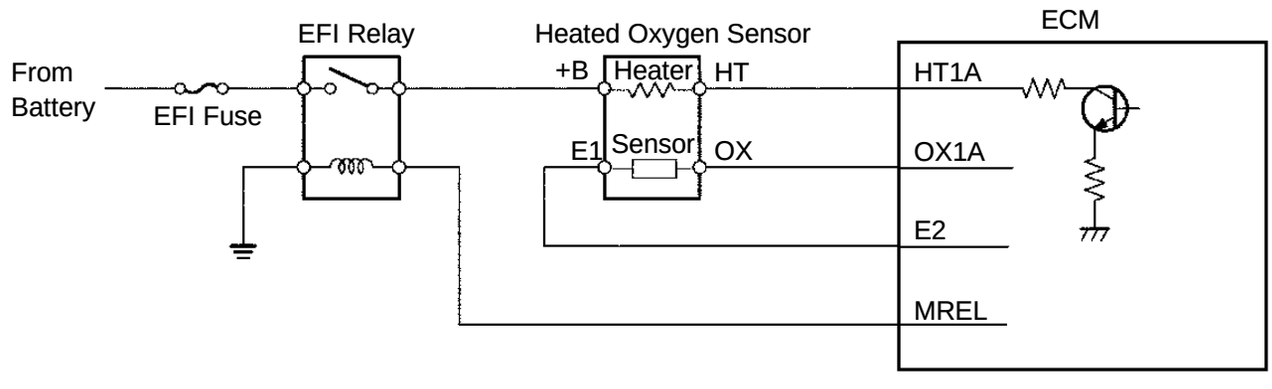
CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-73.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the +B side of the circuit.

Reference (Sensor 1 System Diagram):



DTC No.	DTC Detection Condition	Trouble Area
P0031	Heated current is 0.8 A or less when heater operates (1 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM
P0032	Heated current exceeds 10 A when the heater operates (1 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM

HINT:

- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- Sensor 2 refers to the sensor mounted behind the TWC and located far from the engine assembly.

WIRING DIAGRAM

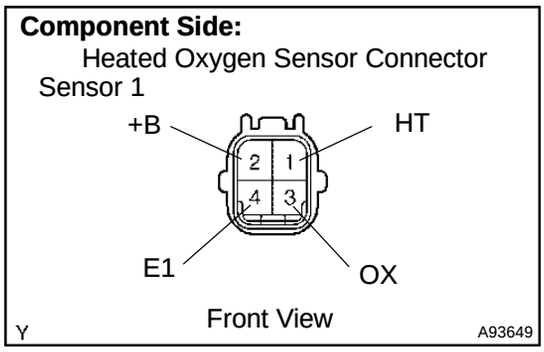
Refer to DTC P0130 on page 05-75.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



(a) Disconnect the H11 heated oxygen sensor connector.

(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard (Sensor 1):

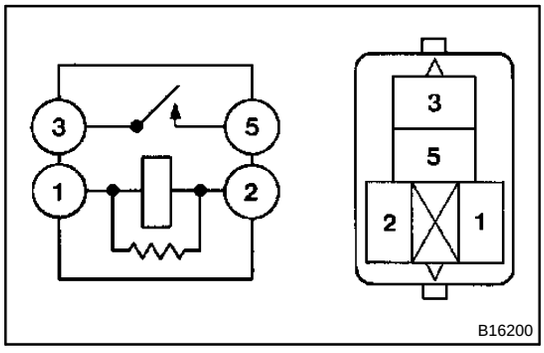
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

2 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.

(b) Check the EFI relay resistance.

Standard:

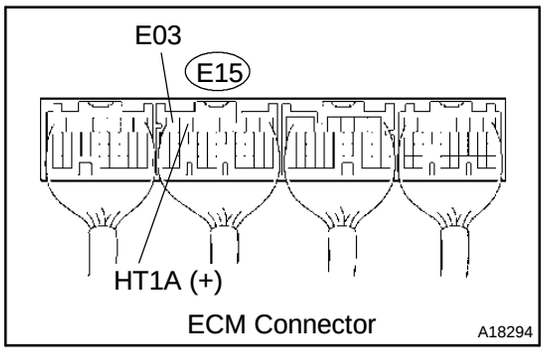
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

3 INSPECT ECM(HT1A VOLTAGE)



(a) Turn the ignition switch to ON.

(b) Measure the voltage between the terminals of the E15 ECM connectors.

Standard:

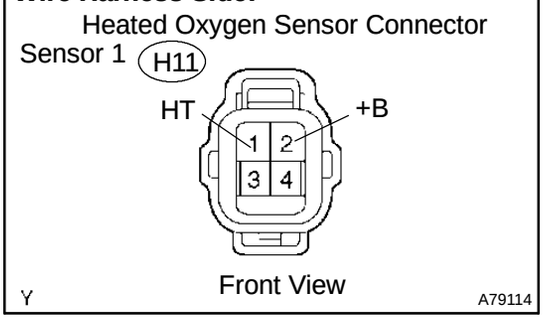
Tester Connection	Specified Condition
HT1A (E15-6) - E03 (E15-7)	9 to 14 V

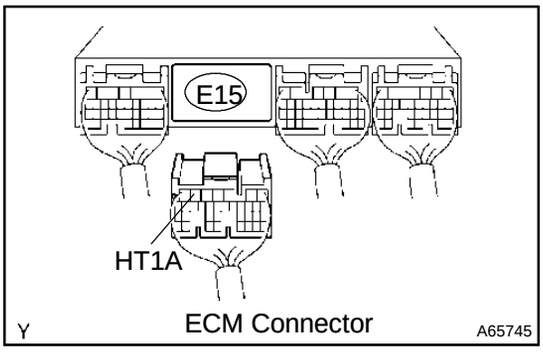
OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

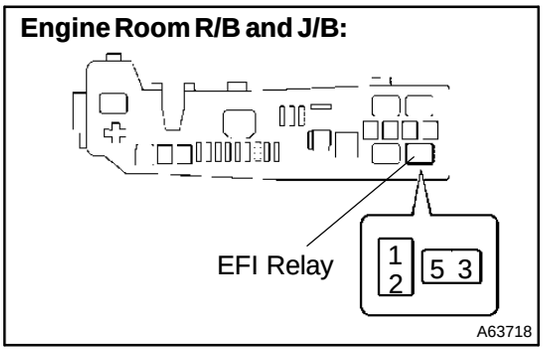
4	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM, HEATED OXYGEN SENSOR - EFI RELAY)

Wire Harness Side:





Engine Room R/B and J/B:



(a) Check the harness and the connectors between the ECM and the heated oxygen sensor.

(1) Disconnect the H11 heated oxygen sensor connector.

(2) Disconnect the E15 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
HT (H11-1) - HT1A (E15-6)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (H11-1) or HT1A (E15-6) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the heated oxygen sensor and EFI relay.

(1) Disconnect the H11 heated oxygen sensor connector.

(2) Remove the EFI relay from the engine room R/B and J/B.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (H11-2) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (H11-2) or EFI relay (3) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0037	OXYGEN SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2)

DTC	P0038	OXYGEN SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2)

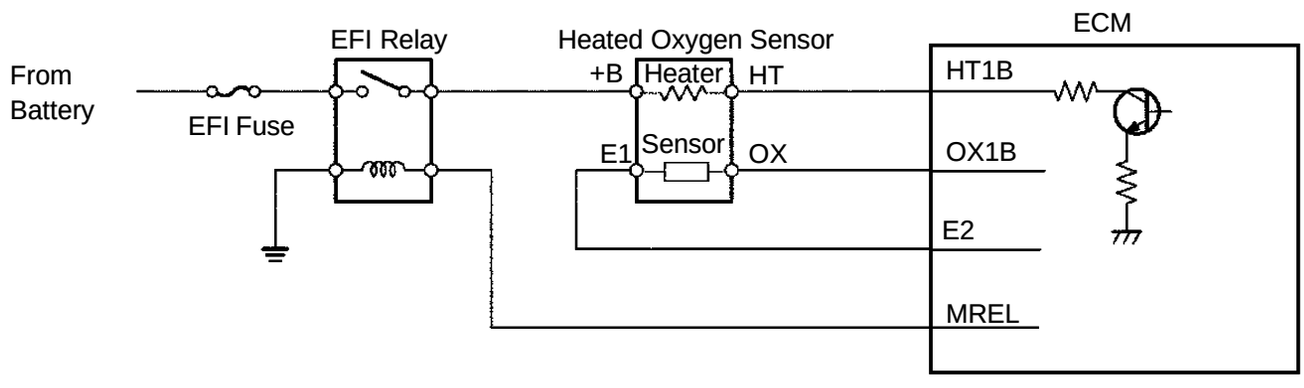
CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-73.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the +B side of the circuit.

Reference (Sensor 2 System Diagram):



DTC No.	DTC Detection Condition	Trouble Area
P0037	Heated current is 0.25 A or less when heater operates (1 trip detection logic)	• Open in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM
P0038	Heater current exceeds 2 A when heater operates (1 trip detection logic)	• Short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM

HINT:

- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- Sensor 2 refers to the sensor mounted behind the TWC and located far from the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-75.

INSPECTION PROCEDURE

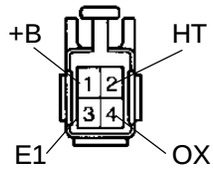
HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)

Component Side:

Heated Oxygen Sensor Connector
Sensor 2



Front View

A61079

(a) Disconnect the H18 heated oxygen sensor connector.

(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

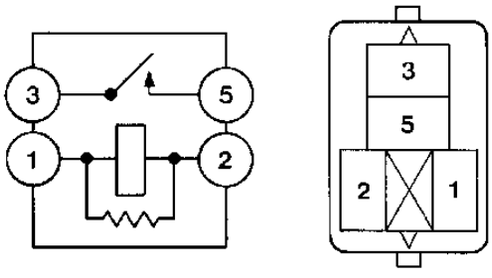
Tester Connection	Specified Condition
2 (HT) - 1 (+B)	11 to 16 Ω at 20°C (68°F)
2 (HT) - 3 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

2 INSPECT EFI RELAY



B16200

(a) Remove the EFI relay from the engine room R/B and J/B.

(b) Check the EFI relay resistance.

Standard:

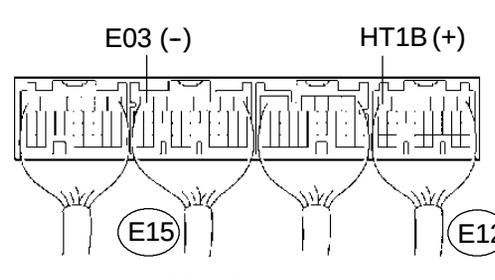
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

3 INSPECT ECM(HT1B VOLTAGE)



ECM Connector

A18294

(a) Turn the ignition switch to ON.

(b) Measure the voltage between the terminals of the E12 and E15 ECM connectors.

Standard:

Tester Connection	Specified Condition
HT1B (E12-7) - E03 (E15-7)	9 to 14 V

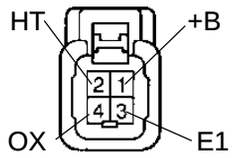
OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

4	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM, HEATED OXYGEN SENSOR - EFI RELAY)

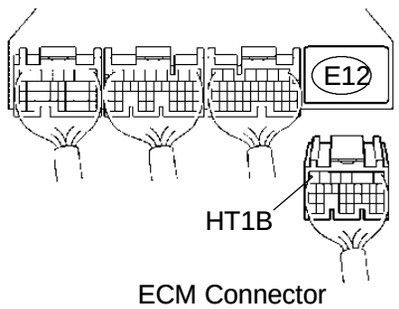
Wire Harness Side:

H18 Heated Oxygen Sensor Connector



Front View

A61078

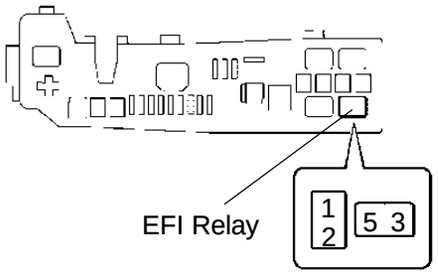


ECM Connector

Y

A65008

Engine Room R/B and J/B:



A63718

(a) Check the harness and the connectors between the ECM and heated oxygen sensor.

(1) Disconnect the H18 heated oxygen sensor connector.

(2) Disconnect the E12 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
HT (H18-2) - HT1B (E12-7)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (H18-2) or HT1B (E12-7) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the heated oxygen sensor and EFI relay.

(1) Disconnect the H18 heated oxygen sensor connector.

(2) Remove the EFI relay from the engine room R/B and J/B.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (H18-1) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (H18-1) or EFI relay (3) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.

(5) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0100	MASS OR VOLUME AIR FLOW CIRCUIT

DTC	P0102	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

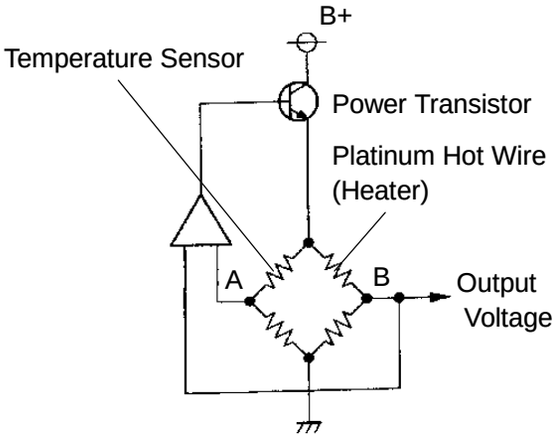
DTC	P0103	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

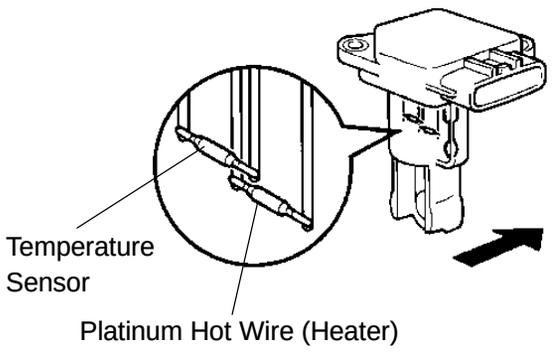
The Mass Air Flow (MAF) meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provides a proper air-fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the flow of the air passing through the sensor. The ECM interprets this voltage as the intake air amount.

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



FI6929
A09074



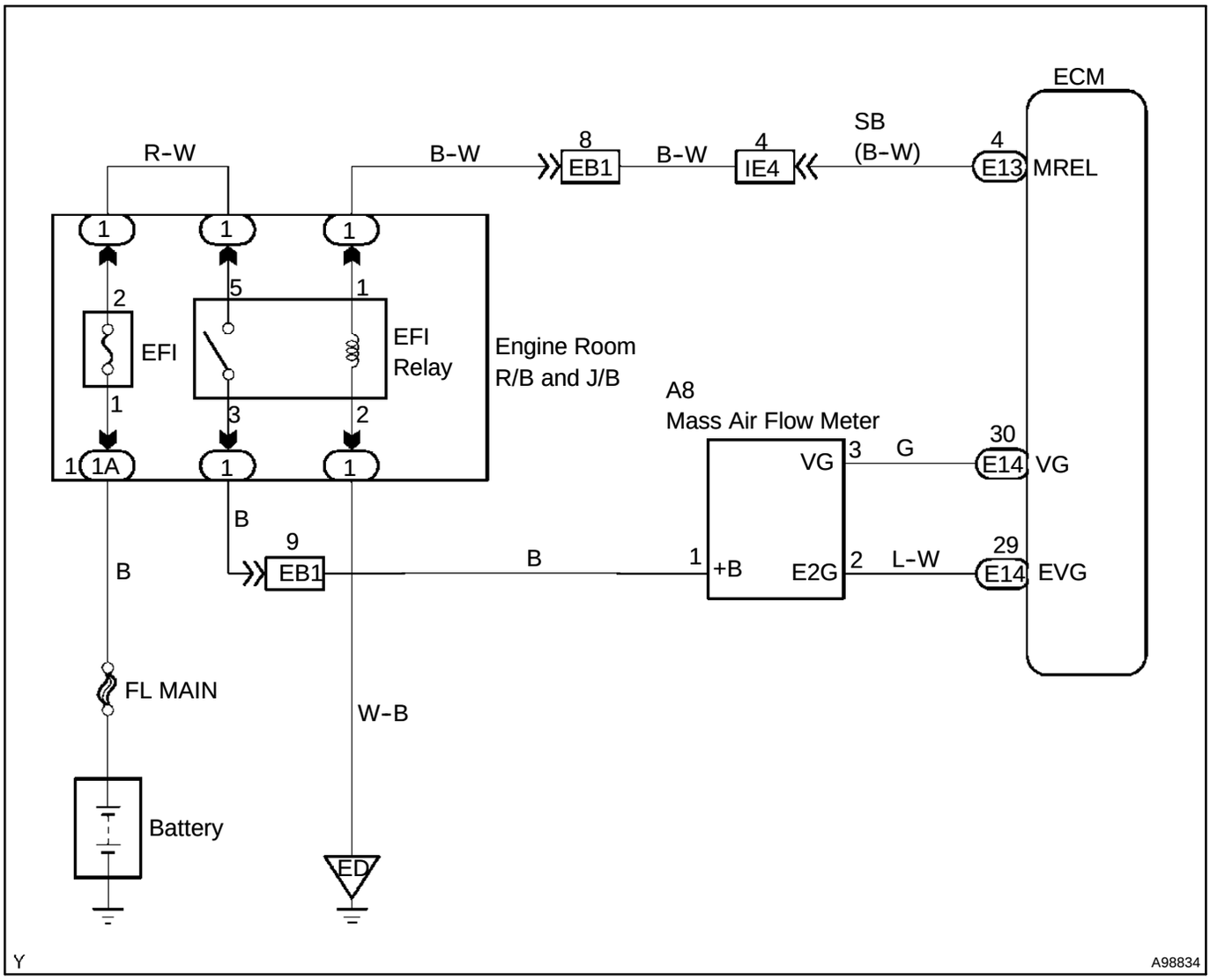
A94508

DTC No.	DTC Detection Condition	Trouble Area
P0100	When MAF meter circuit has an open or a short for more than 3 seconds	• Open or short in MAF meter circuit • MAF meter • ECM
P0102	When MAF meter circuit has an open for more than 3 seconds	• Open in MAF meter circuit • MAF meter • ECM
P0103	When MAF meter circuit has a short for more than 3 seconds	• Short in MAF meter circuit • MAF meter • ECM

HINT:
When DTC P0100, P0102 or P0103 is detected, check the air flow ratio by selecting Powertrain / Engine and ECT / Data List / AFM on the intelligent tester II.

Air Flow Value (g/second)	Malfunction
Approximately 0.0	• Open in MAF meter power source circuit • Open or short in VG circuit
271.0 or more	• Open in EVG circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF INTELLIGENT TESTER II(MASS AIR FLOW RATE)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine.
(c) Turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / AFM.
(e) Read the value.

Result:

Mass Air Flow Rate (g/second)	Proceed To
0.0	A
271.0 or more	B
Between 1.0 and 270.0 (*1)	C

*1: The value must be changed when the throttle valve is open or closed.

B → **Go to step 6**

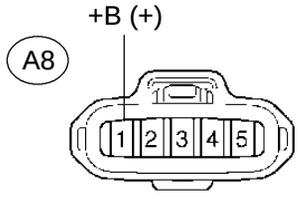
C → **CHECK FOR INTERMITTENT PROBLEMS**

A

2 INSPECT MASS AIR FLOW METER(POWER SOURCE)

Wire Harness Side:

Mass Air Flow Meter Connector



Front View

A84809

(a) Disconnect the A8 MAF meter connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminal of the wire harness side connector and body ground.

Standard:

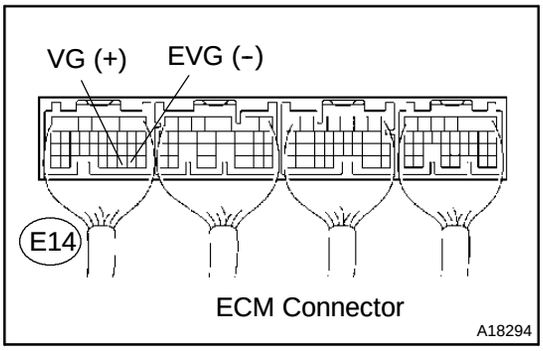
Tester Connection	Specified Condition
+B (A8-1) - Body ground	9 to 14 V

(d) Reconnect the MAF meter connector.

NG → **Go to step 5**

OK

3 INSPECT ECM(VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E14 ECM connector.

HINT:
The shift position should be P or N and the A/C switch should be turned OFF.

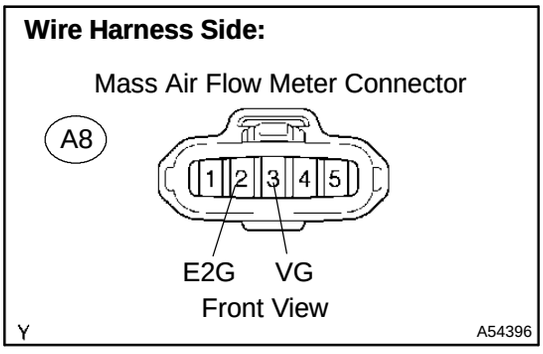
Standard:

Tester Connection	Condition	Specified Condition
VG (E14-30) - EVG (E14-29)	Engine is idling	0.5 to 3.0 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

4 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



(a) Disconnect the A8 MAF meter connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

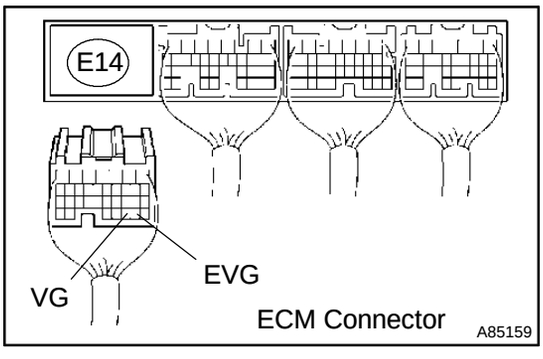
Standard (Check for open):

Tester Connection	Specified Condition
VG (A8-3) - VG (E14-30)	Below 1 Ω
E2G (A8-2) - EVG (E14-29)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A8-3) or VG (E14-30) - Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reconnect the ECM connector.



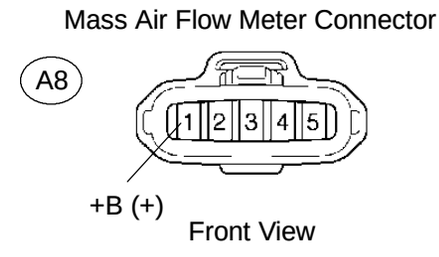
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

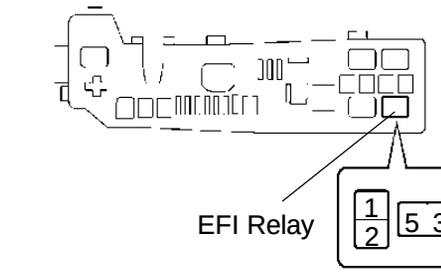
REPLACE MASS AIR FLOW METER

5 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - EFI RELAY)

Wire Harness Side:



Engine Room R/B and J/B:



(a) Disconnect the A8 MAF meter connector.
(b) Remove the EFI relay from the engine room R/B and J/B.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (A8-1) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A8-1) or EFI relay (3) - Body ground	10 kΩ or higher

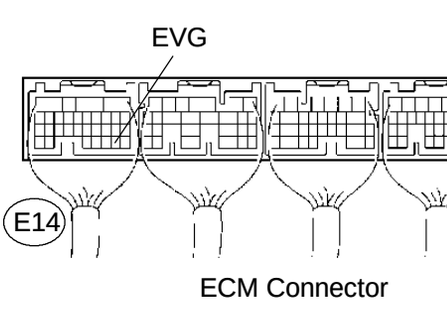
(d) Reconnect the MAF meter connector.
(e) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

INSPECT ECM POWER SOURCE CIRCUIT (See page 05-194)

6 INSPECT ECM(SENSOR GROUND)



(a) Check the resistance between the terminal of the E14 ECM connector and body ground.

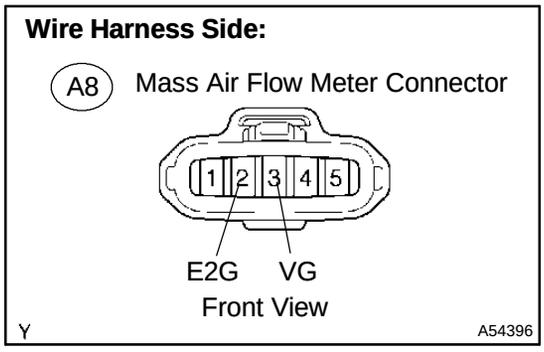
Standard:

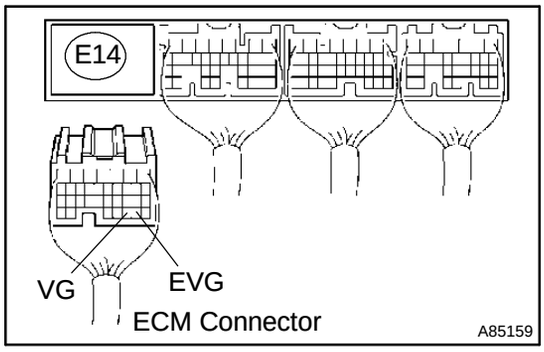
Tester Connection	Specified Condition
EVG (E14-29) - Body ground	Below 1 Ω

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

7 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)





(a) Disconnect the A8 MAF meter connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VG (A8-3) - VG (E14-30)	Below 1 Ω
E2G (A8-2) - EVG (E14-29)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A8-3) or VG (E14-30) - Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

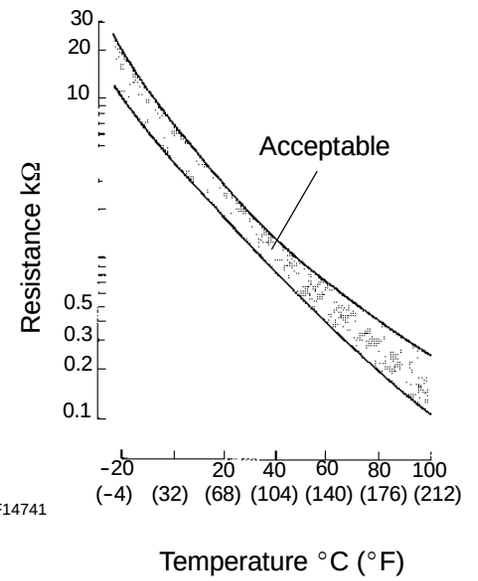
DTC	P0110	INTAKE AIR TEMPERATURE CIRCUIT

DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT

DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

(Figure 1)



The Intake Air Temperature (IAT) sensor is built into the Mass Air Flow (MAF) meter, and monitors the intake air temperature. The IAT sensor has a built-in thermistor that varies its resistance depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected as voltage changes to the ECM terminal (see figure 1).

The IAT sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the IAT sensor from terminal THA via resistor R.

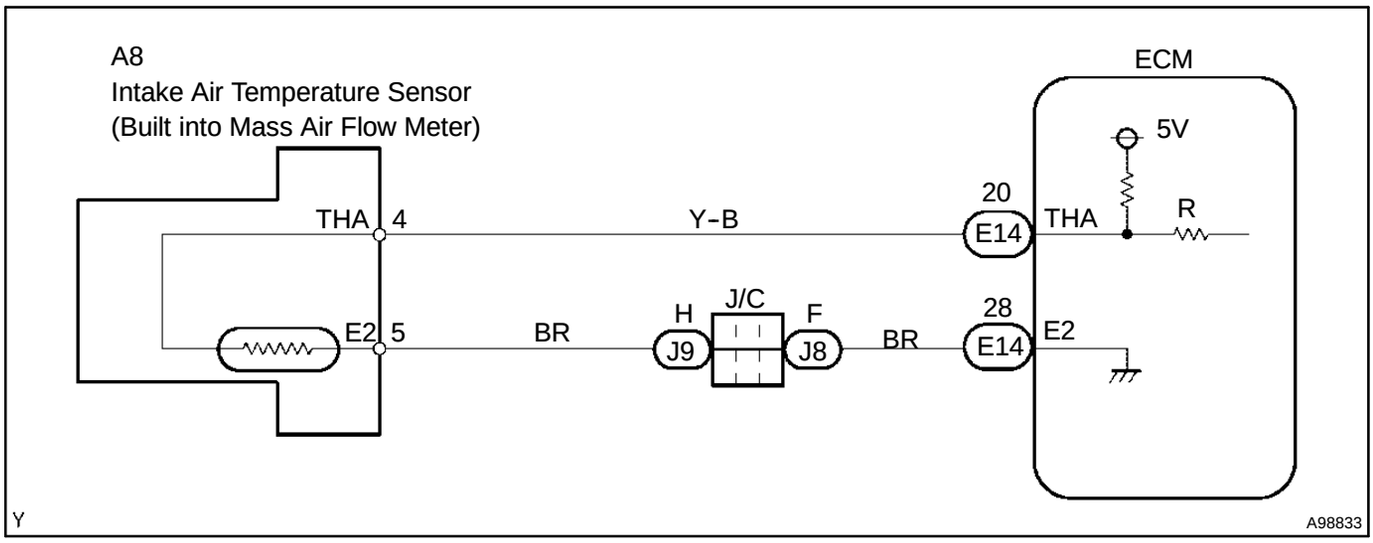
Resistor R and the IAT sensor are connected in series. When the resistance value of the IAT sensor changes in accordance with changes in the intake air temperature, the voltage at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM
P0112	Step 4	Short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM
P0113	Step 2	Open in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM

HINT:
When DTC P0110, P0112 or P0113 is detected, check the intake air temperature by selecting Powertrain / Engine and ECT / Data List / Intake Air on the intelligent tester ll.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(d) Read the value.

OK:

Temperature value: Same as the actual intake air temperature.

Result:

Temperature Displayed	Proceed To
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as actual intake air temperature)	C

HINT:

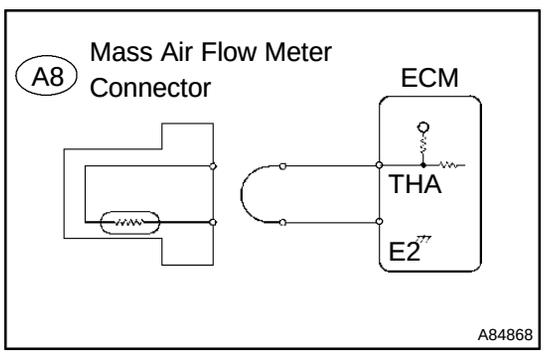
- If there is an open circuit, the intelligent tester II indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester II indicates 140°C (284°F) or more.

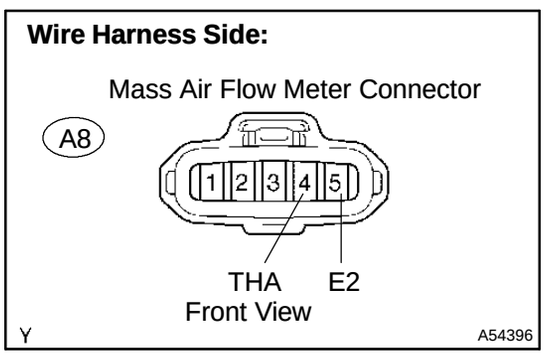
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-10)**

A

2	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)





(a) Disconnect the A8 MAF meter connector.
(b) Connect terminals THA and E2 of the MAF meter wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.

OK:

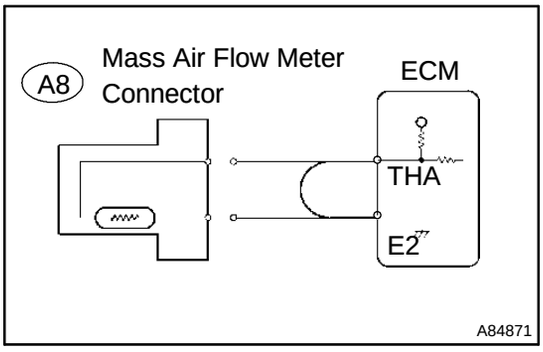
Temperature value: 140°C (284°F) or more

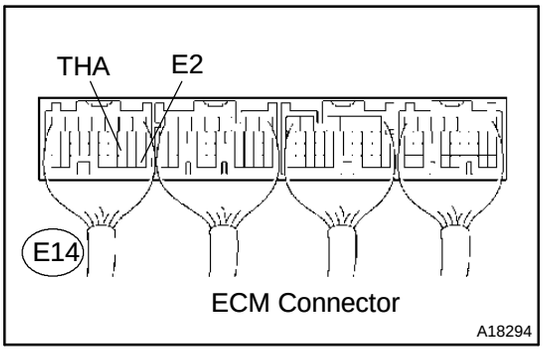
(g) Reconnect the MAF meter connector.

OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW METER**

NG

3 READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)





(a) Disconnect the A8 MAF meter connector.
(b) Connect terminals THA and E2 of the E14 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

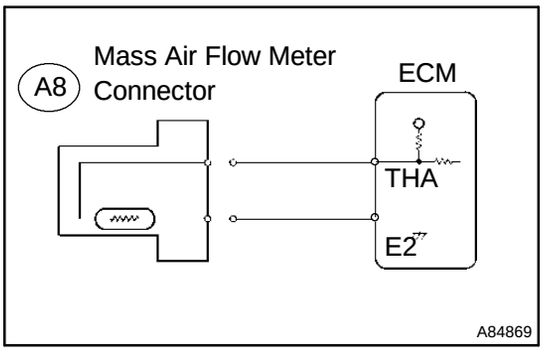
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.
OK:
Temperature value: 140°C (284°F) or more
(g) Reconnect the MAF meter connector.

OK	**REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM
(See page 10-8 of Pub. No. RM1039E COROLLA)

4 READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

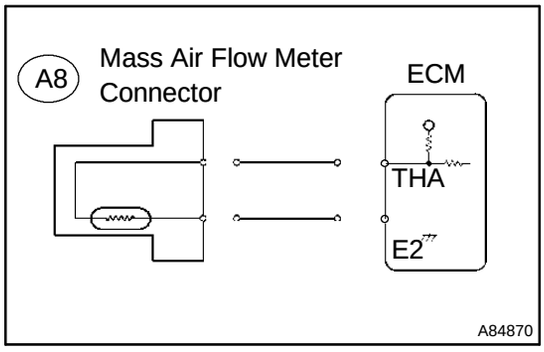


(a) Disconnect the A8 MAF meter connector.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the value.
OK:
Temperature value: -40°C (-40°F)
(f) Reconnect the MAF meter connector.

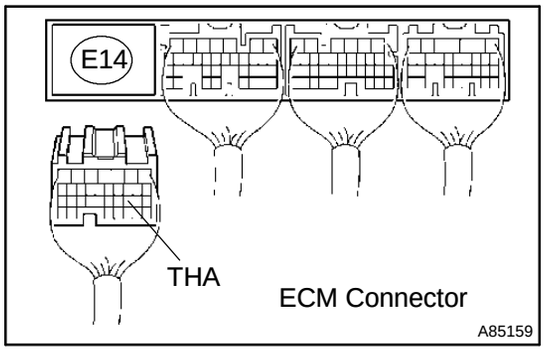
OK	**REPLACE MASS AIR FLOW METER**

NG

5	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)



(a) Disconnect the E14 ECM connector.
(b) Disconnect the A8 MAF meter connector.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the value.
OK:
Temperature value: -40°C (-40°F)
(f) Reconnect the ECM sensor connector.
(g) Reconnect the MAF meter connector.



OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0115	ENGINE COOLANT TEMPERATURE CIRCUIT

DTC	P0117	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT

DTC	P0118	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

A thermistor is built into the engine coolant temperature sensor and changes its resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as those of the intake air temperature sensor.

HINT:

If the ECM detects DTC P0115, P0117 or P0118, the ECM enters fail-safe mode in which the engine coolant temperature is assumed to be 80°C (176°F).

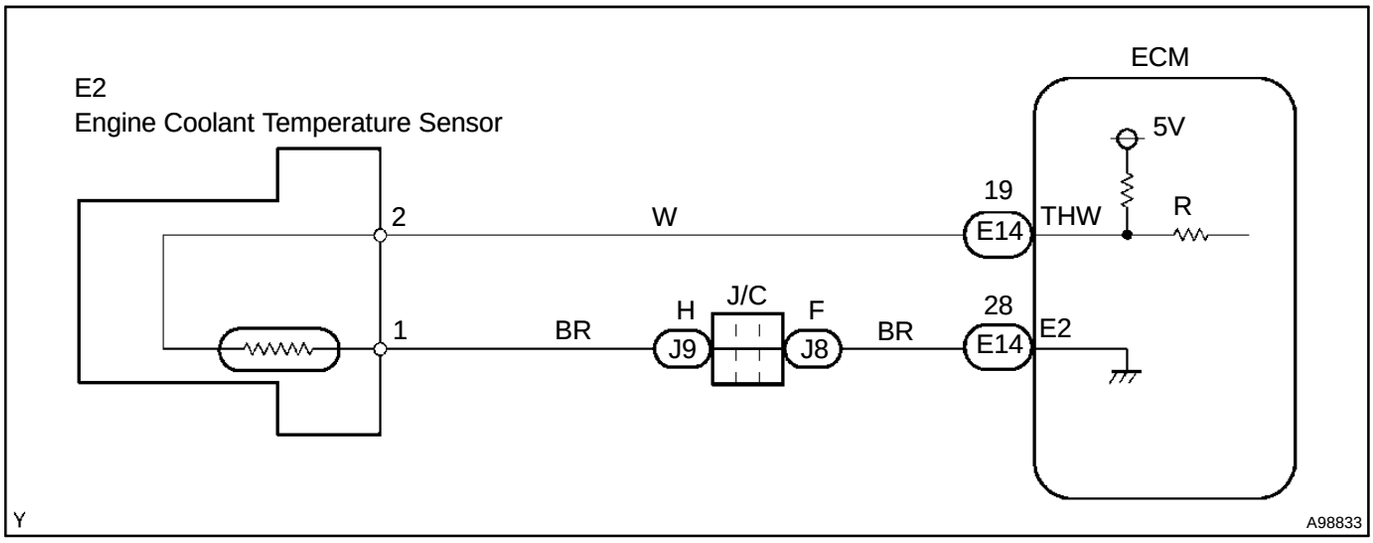
DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0117	Step 4	Short in engine coolant temperature sensor circuit for 0.5 seconds (Sensor resistance value is less than 79 Ω) (1 trip detection logic)	• Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0118	Step 2	Open in engine coolant temperature sensor circuit for 0.5 seconds (Sensor resistance value is more than 156 kΩ) (1 trip detection logic)	• Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM

HINT:

When DTC P0115, P0117 or P0118 is detected, check the engine coolant temperature by selecting Powertrain / Engine and ECT / Data List / Coolant Temp on the intelligent tester II.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF INTELLIGENT TESTER II(ENGINE COOLANT TEMPERATURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(d) Read the value.

Standard:

Temperature value: 80° to 97°C (176° to 207°F) after warming up the engine.

Result:

Temperature Displayed	Proceed To
-40°C(-40°F)	A
140°C(284°F) or more	B
OK (Same as actual engine coolant temperature)	C

HINT:

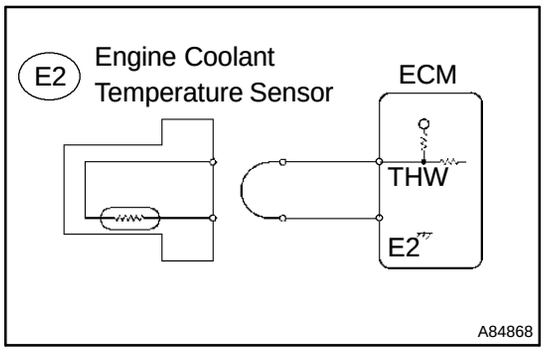
- If there is an open circuit, the intelligent tester ll indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester ll indicates 140°C (284°F) or more.

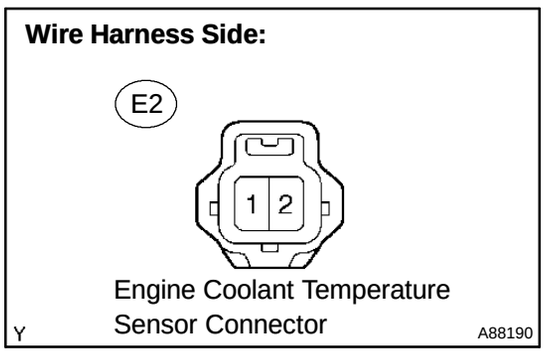
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-10)**

A

2	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



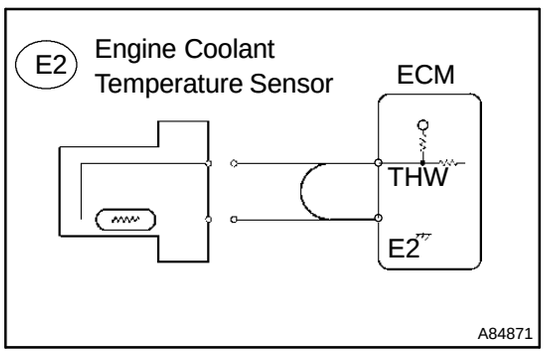


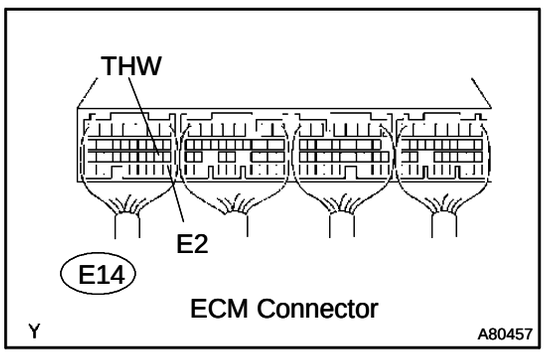
(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: 140°C (284°F) or more
(g) Reconnect the engine coolant temperature sensor connector.

OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

3	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)





(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Connect terminals THW and E2 of the E14 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

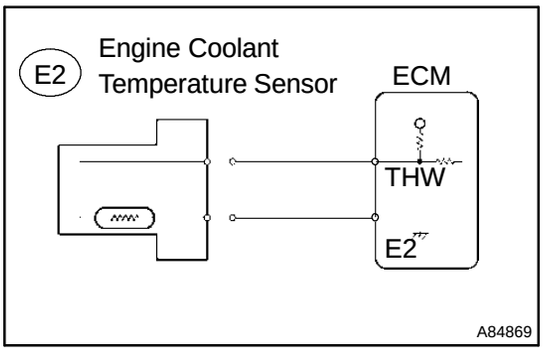
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: 140°C (284°F) or more
(g) Reconnect the engine coolant temperature sensor connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM
(See page 10-8 of Pub. No. RM1039E COROLLA)

4	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

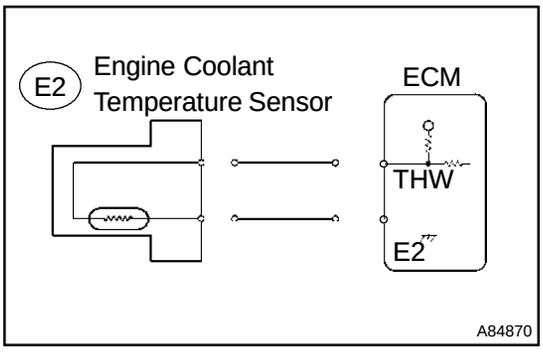


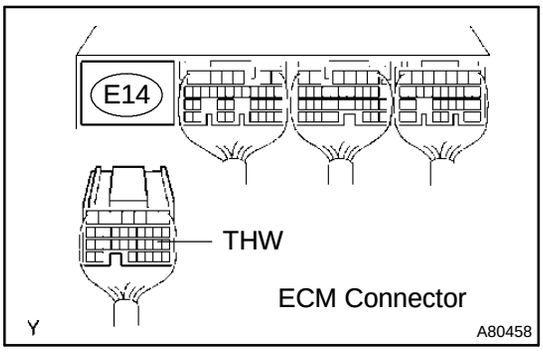
(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(e) Read the value.
Standard:
Temperature value: -40°C (-40°F)
(f) Reconnect the engine coolant temperature sensor connector.

OK	REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

5	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Disconnect the E14 ECM connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: -40°C (-40°F)
(g) Reconnect the engine coolant temperature sensor connector.
(h) Reconnect the ECM connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0116	ENGINE COOLANT TEMPERATURE CIRCUIT RANGE/PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page 05-60.

DTC No.	DTC Detection Condition	Trouble Area
P0116	If engine coolant temperature was between 35°C (95°F) and 60°C (140°F) at engine start, and conditions (a) and (b) are met (2 trip detection logic): (a) Vehicle is driven at varying speeds (under acceleration and deceleration) (b) Engine coolant temperature remains within 3°C (5.4°F) of engine starting temperature	• Engine coolant temperature sensor
P0116	If engine coolant temperature was more than 60°C (140°F) at engine start, and conditions (a) and (b) are met (6 trip detection logic): (a) Vehicle is driven at varying speeds (under acceleration and deceleration) (b) Engine coolant temperature remains within 1°C (1.8°F) of engine starting temperature, and this is successively recorded 6 times	• Engine coolant temperature sensor

WIRING DIAGRAM

Refer to DTC P0115 on page 05-61.

INSPECTION PROCEDURE

HINT:

- If DTC P0115, P0117 and/or P0118 is output simultaneously with P0116, the engine coolant temperature sensor may have an open or short circuit. Troubleshoot DTC P0115, P0117 and/or P0118 first.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE ENGINE COOLANT TEMPERATURE SENSOR

DTC	P0120	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT
DTC	P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW INPUT
DTC	P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH INPUT
DTC	P0220	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT
DTC	P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW INPUT
DTC	P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH INPUT
DTC	P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION

HINT:
These DTCs relate to the throttle position sensor.

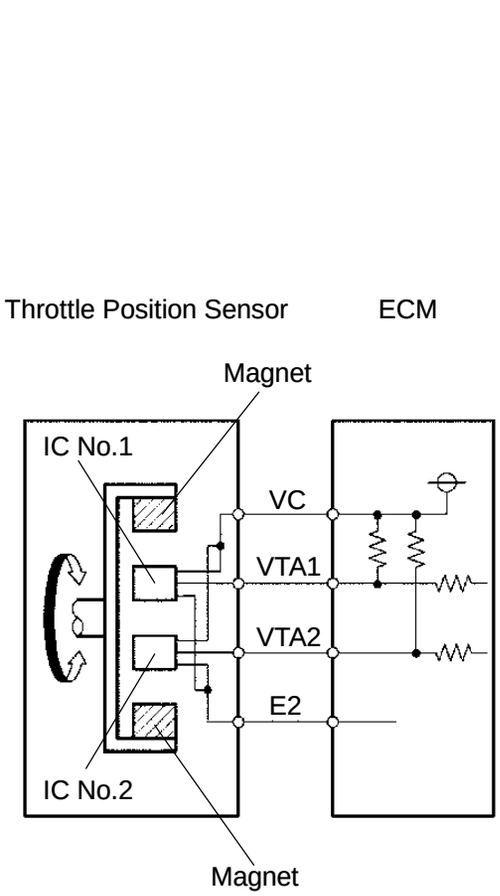
CIRCUIT DESCRIPTION

HINT:

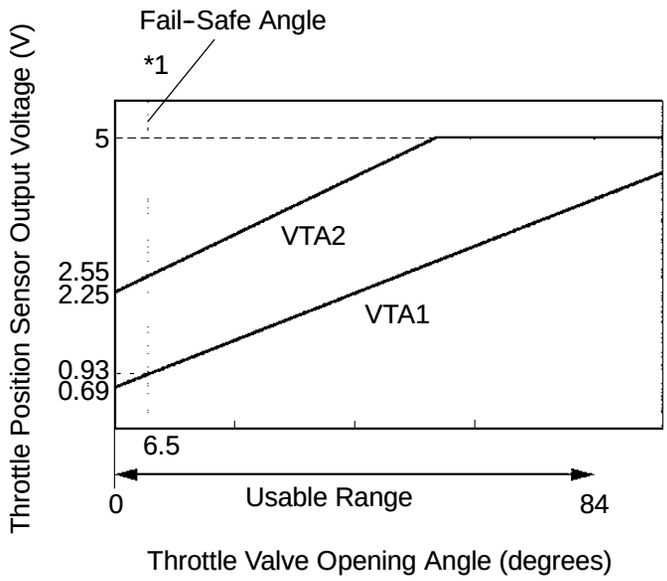
- This ETCS (Electronic Throttle Control System) does not use a throttle cable.
- This throttle position sensor is a non-contact type.

The throttle position sensor is mounted on the throttle body and it detects the opening angle of the throttle valve. This sensor is electronically controlled and uses Hall-effect elements, so that accurate control and reliability can be obtained. The throttle position sensor has 2 sensor elements and signal outputs: VTA1 and VTA2. VTA1 is used to detect the throttle opening angle and VTA2 is used to detect a malfunction in VTA1. Voltage applied to VTA1 and VTA2 changes between 0V and 5V in proportion to the opening angle of the throttle valve. There are several checks that the ECM performs to confirm proper operation of the throttle position sensor and VTA1.

The ECM judges the actual opening angle of the throttle valve from these signals input from terminals VTA1 and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driver input.



A19755



A19802

Throttle Valve Fully Closed, VTA1 is 10 to 24 %

Throttle Valve Fully Open, VTA1 is 64 to 96 %

*1: Fail-Safe Angle (6.5˚), VTA1 is approximately 16 %

NOTE: Throttle valve opening angle detected by the sensor terminal VTA1 is expressed as percentages.

DTC No.	DTC Detection Condition	Trouble Area
P0120	Output voltage of VTA1 quickly fluctuates up and down beyond lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • ECM
P0122	VTA1 is 0.2 V or less for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM
P0123	VTA1 is 4.8 V or more for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • Open in VTA1 circuit • Open in E2 circuit • VC and VTA1 circuits are short-circuited • ECM
P0220	Output voltages of VTA1 and VTA2 quickly fluctuate up and down beyond their respective lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • ECM
P0222	VTA2 is 0.5 V or less for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM
P0223	VTA2 is 4.8 V or more, VTA1 is between 0.2 V and 1.8 V for 2 seconds (1 trip detection logic)	• Throttle position sensor (built into throttle body) • Open in VTA2 circuit • Open in E2 circuit • VC and VTA2 circuits are short-circuited • ECM
P2135	Condition (a) continues for 0.5 seconds or more, or condition (b) continues for 0.4 seconds or more (1 trip detection logic): (a) Difference between VTA1 and VTA2 is 0.02 V or less (b) VTA1 is 0.2 V or less and VTA2 is 0.5 V or less	• VTA1 and VTA2 circuits are short-circuited • Throttle position sensor (built into throttle body) • ECM

NOTICE:

When a malfunction is detected, the throttle valve is locked at a certain opening angle. Also, the whole electronically controlled throttle operation is cancelled until the system returns to normal and the ignition switch is turned to OFF.

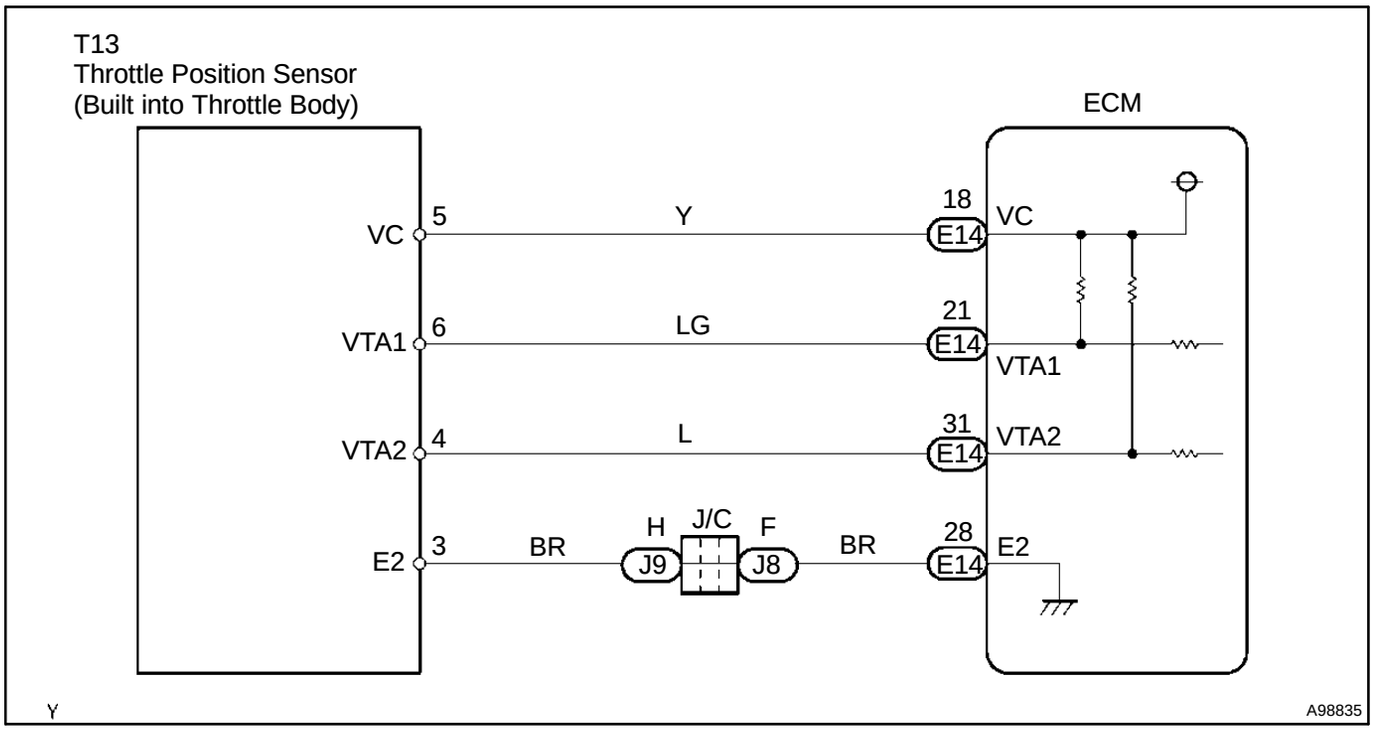
HINT:

- When any of these DTCs is detected, check the throttle valve opening angle (Throttle POS and Throttle POS No. 2) using the intelligent tester II.
- The Throttle POS means VTA1 signal (expressed as percentages), and Throttle POS No. 2 means the VTA2 signal (expressed as voltages).

  Reference (Normal condition):

Tester Display	Accelerator Pedal Fully Released	Accelerator Pedal Fully Depressed
Throttle POS	10 to 24 %	64 to 96 %
Throttle POS No. 2	2.1 to 3.1 V	4.5 to 5.0 V

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF INTELLIGENT TESTER II(THROTTLE POS AND THROTTLE POS NO.2)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Throttle POS and Throttle POS No. 2.
(d) Check the values displayed on the intelligent tester II.

Result:

TP (VTA1) When AP Released	TP No. 2 (VTA2) When AP Released	TP (VTA1) When AP Depressed	TP No. 2 (VTA2) When AP Depressed	Trouble Area	Proceed To
0 %	0 to 0.2 V	0 %	0 to 0.2 V	VC circuit open	A
100 %	4.5 to 5.0 V	100 %	4.5 to 5.0 V	E2 circuit open	A
0 or 100 %	2.1 to 3.1 V (Fail-safe)	0 % or 100 %	2.1 to 3.1 V (Fail-safe)	VTA1 circuit open or ground short	A
10 to 24 % (Fail-safe)	0 to 0.2 V or 4.5 to 5.0 V	10 to 24 % (Fail-safe)	0 to 0.2 V or 4.5 to 5.0 V	VTA2 circuit open or ground short	A
10 to 24 %	2.1 to 3.1 V	64 to 96 % (Not fail-safe)	4.5 to 5.0 V (Not fail-safe)	Throttle position sensor circuit is normal	B

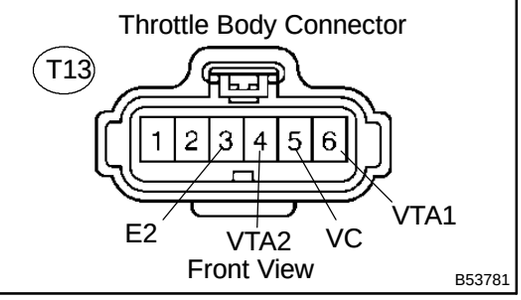
HINT:

- TP stands for Throttle Position, and AP stands for Accelerator Pedal.
- VTA1 is expressed as percentages, and VTA2 is expressed as voltages.

B → **Go to step 5**

A

2 CHECK HARNESS AND CONNECTOR(THROTTLE POSITION SENSOR - ECM)



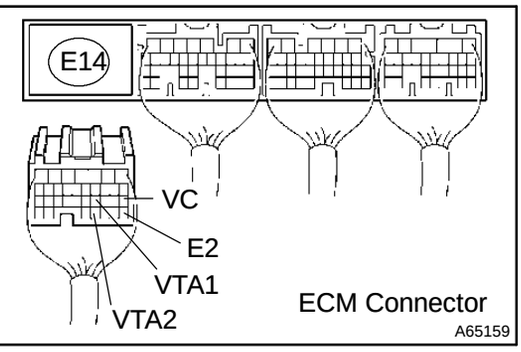
(a) Disconnect the T13 throttle body connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VC (T13-5) - VC (E14-18)	Below 1 Ω
VTA1 (T13-6) - VTA1 (E14-21)	Below 1 Ω
VTA2 (T13-4) - VTA2 (E14-31)	Below 1 Ω
E2 (T13-3) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VC (T13-5) or VC (E14-18) - Body ground	10 kΩ or higher
VTA1 (T13-6) or VTA1 (E14-21) - Body ground	10 kΩ or higher
VTA2 (T13-4) or VTA2 (E14-31) - Body ground	10 kΩ or higher

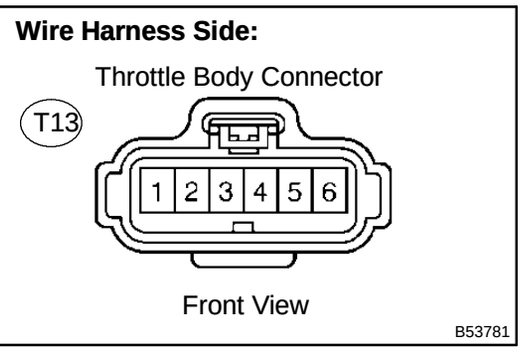


(d) Reconnect the throttle body connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM(VC VOLTAGE)

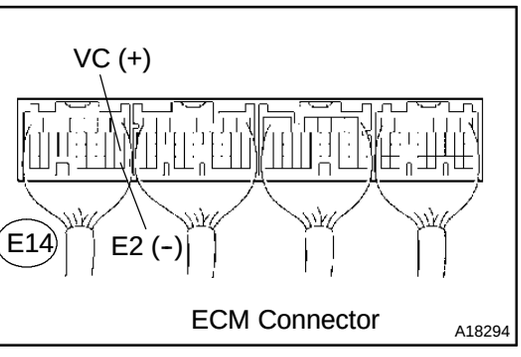


(a) Disconnect the T13 throttle body connector.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Measure the voltage between the terminals of the E14 ECM connector.

Standard:

Tester Connection	Specified Condition
VC (E14-18) - E2 (E14-28)	4.5 to 5.5 V

(d) Reconnect the throttle body connector.



NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

4	REPLACE THROTTLE BODY ASSY (See page 10-13)

GO

5	CHECK IF DTC OUTPUT RECURS(THROTTLE POSITION SENSOR DTCS)

(a) Clear DTCs (see page 05-19).
(b) Start the engine.
(c) Run the engine in idling for 15 seconds or more.
(d) Connect the intelligent tester II to the DLC3.
(e) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0120, P0122, P0123, P0220, P0222, P0223 and/or P2135	A
No output	B

B → **SYSTEM OK**

A

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0121	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE PROBLEM

HINT:
This DTC relates to the throttle position sensor.

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page 05-65.

DTC No.	DTC Detection Condition	Trouble Area
P0121	Difference between VTA and VTA2 voltages exceeds malfunction threshold (1 trip detection logic)	• Throttle position sensor (built into throttle body)

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE THROTTLE BODY ASSY **(See page 10-13)**

DTC	P0130	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 1)

DTC	P2195	OXYGEN SENSOR SIGNAL STUCK LEAN (BANK 1 SENSOR 1)

DTC	P2196	OXYGEN SENSOR SIGNAL STUCK RICH (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

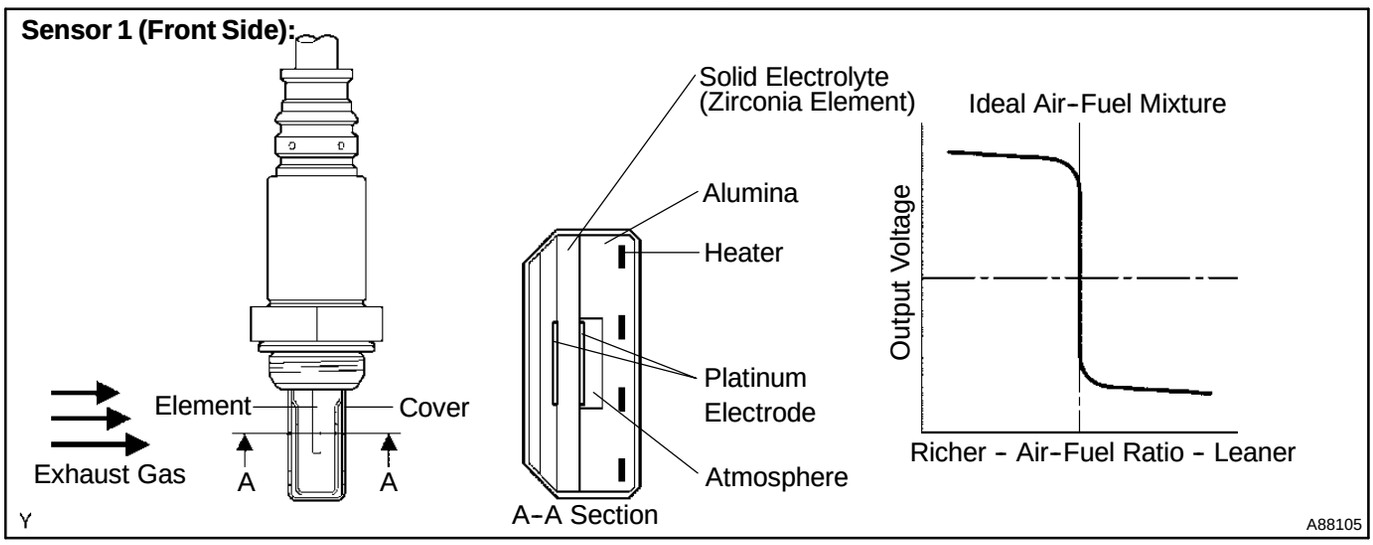
In order to obtain a high purification rate for the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a Three-Way Catalytic Converter (TWC) is used. For the most efficient use of the TWC, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio.

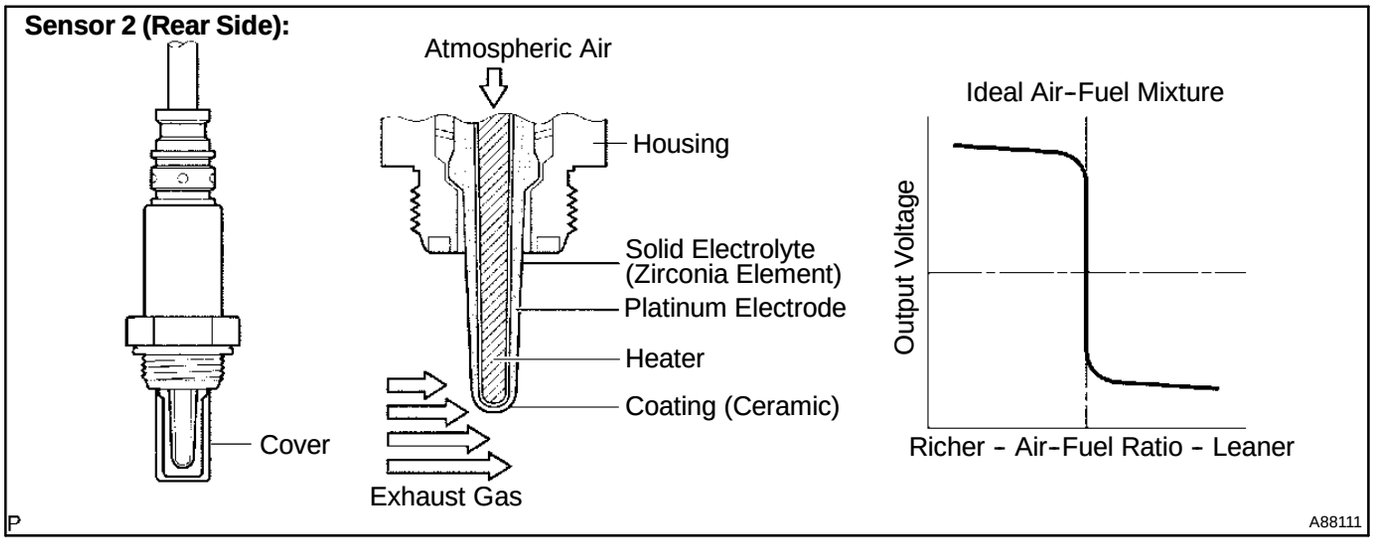
The heated oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. This is used to detect the oxygen concentration in the exhaust gas and provide the ECM with feedback to control the air-fuel ratio.

When the air-fuel ratio becomes lean, the oxygen concentration in the exhaust gas increases. The heated oxygen sensor informs the ECM of the lean condition (low voltage, i.e. less than 0.45 V).

When the air-fuel ratio is richer than the stoichiometric air-fuel level, the oxygen concentration in the exhaust gas is reduced. And the heated oxygen sensor informs the ECM of the rich condition (high voltage, i.e. more than 0.45 V). The ECM judges by the voltage output of the heated oxygen sensor whether the air-fuel ratio is rich or lean and controls the injection time accordingly. If a malfunction of the heated oxygen sensor causes an output of abnormal voltage, the ECM is unable to perform accurate air-fuel ratio control.

The heated oxygen sensor includes a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low), a current flows to the heater in order to heat the sensor for accurate oxygen concentration detection.



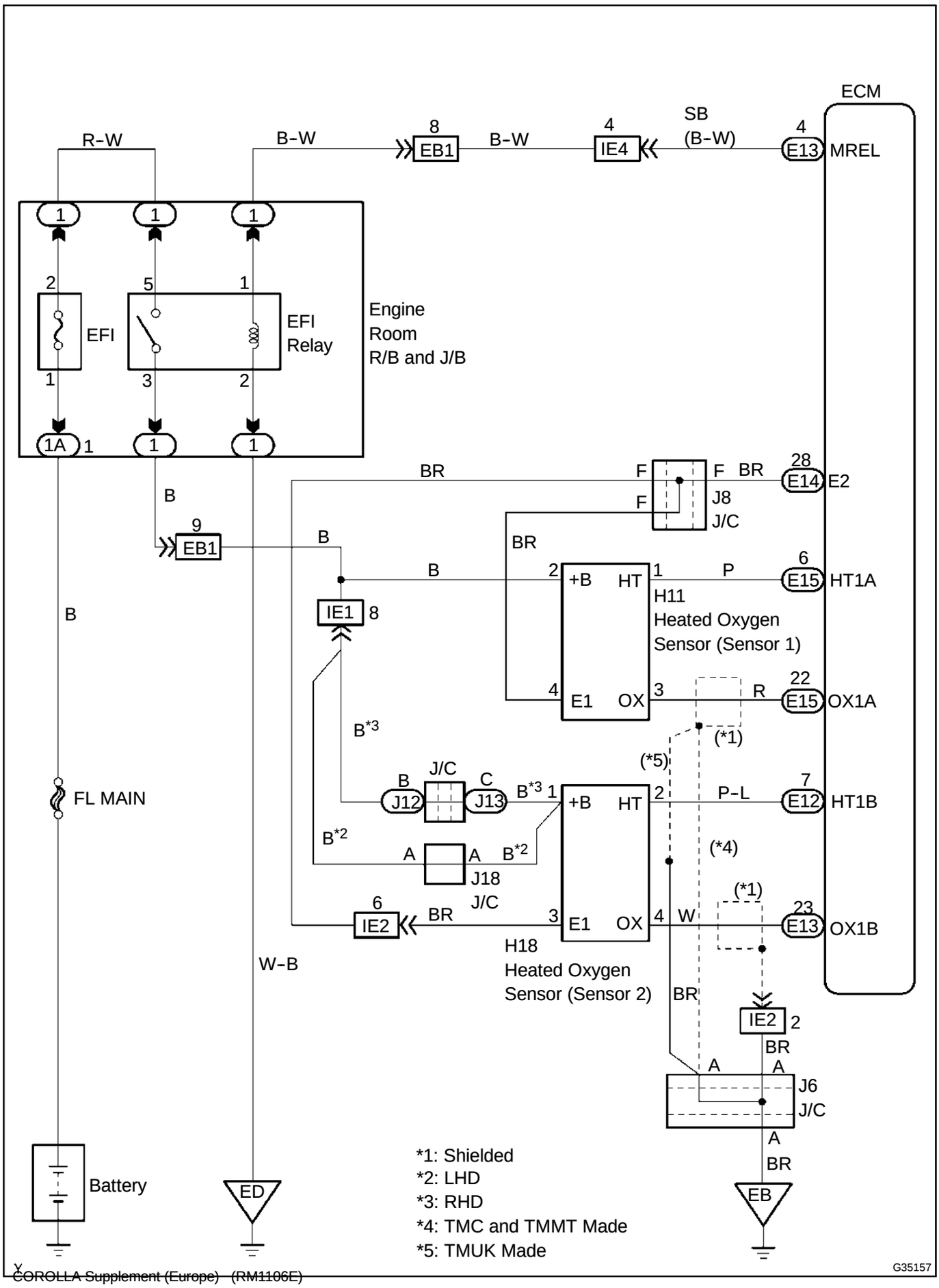


DTC No.	DTC Detection Condition	Trouble Area
P0130	After engine is warmed up, output voltage of heated oxygen sensor remains at 0.4 V or more, or 0.5 V or less, during engine idling (2 trip detection logic)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM
P2195	Following conditions are met (2 trip detection logic): • Heated oxygen sensor (sensor 1) voltage remains at below 0.5 V (stuck in lean condition) • Engine is idling after engine warm-up	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM
P2196	Following conditions are met (2 trip detection logic): • Heated oxygen sensor (sensor 1) voltage remains at 0.4 V or more (stuck in rich condition) • Engine is idling after engine warm-up	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM

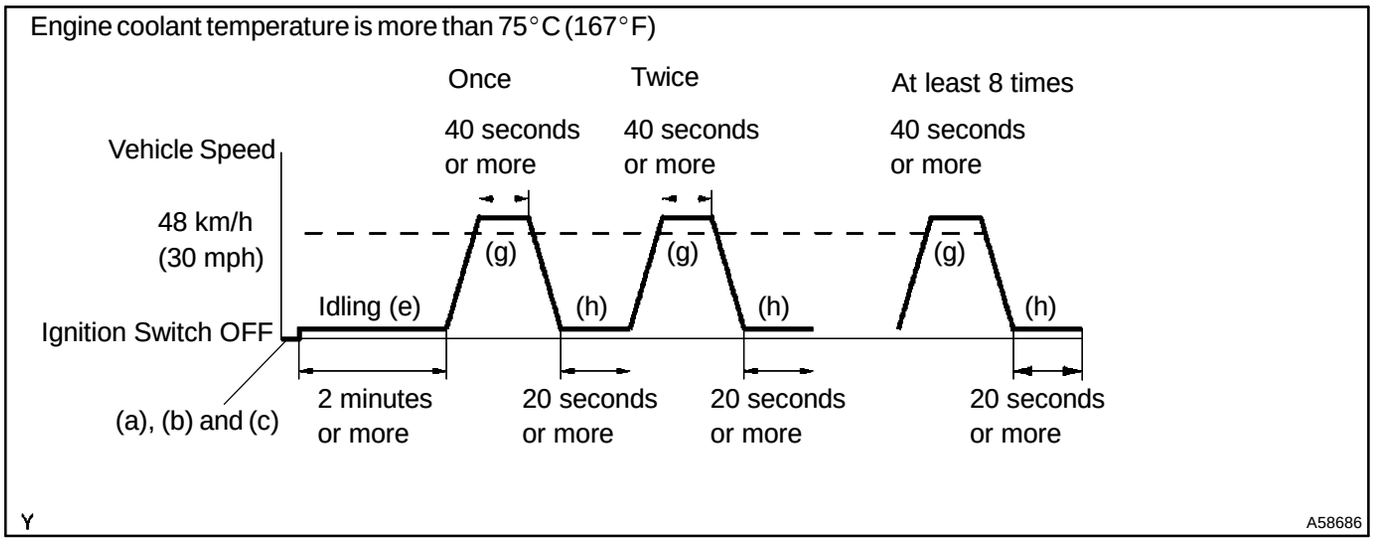
HINT:

- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- The output voltage of the heated oxygen sensor and the short-term fuel trim value can be read using the intelligent tester II.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05-21).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 48 km/h (30 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:

If a malfunction exists, the MIL is illuminated during step (i).

NOTICE:

If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

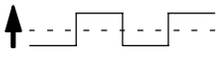
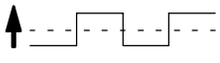
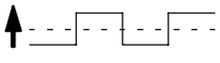
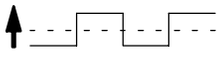
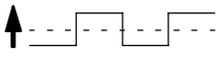
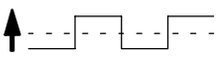
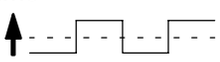
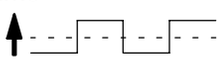
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs are be recorded, and the MIL then illuminates.

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTCS P0130, P2195 AND P2196)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0130 and/or P2195 or P2196	A
P0130 and/or P2195 or P2196 and other DTCs	B

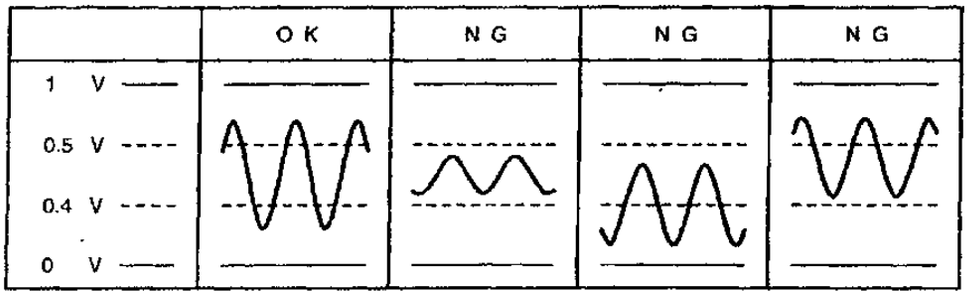
HINT:
If any DTCs other than P0130 and/or P2195 or P2196 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-28)

A

2	READ VALUE OF INTELLIGENT TESTER II(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1.
(d) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 90 seconds.
(e) Read the output voltage of the heated oxygen sensor during engine idling.
Standard:
Fluctuates between less than 0.4 V and more than 0.5 V (see the following figure).

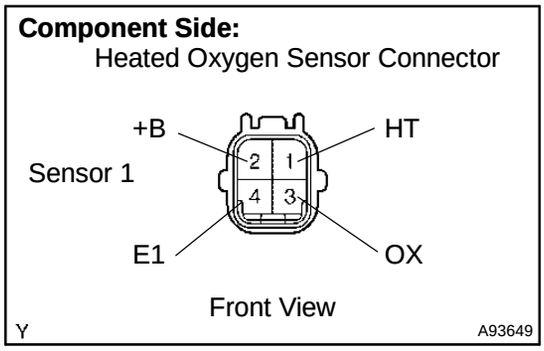


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OK → **Go to step 9**

NG

3 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

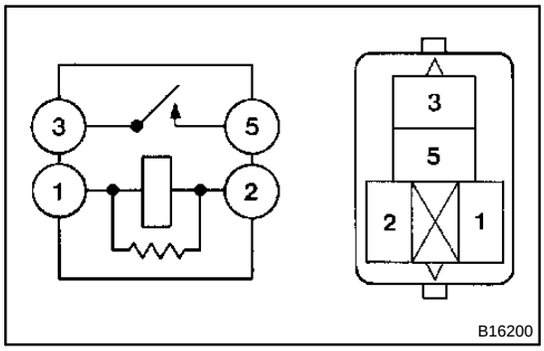
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

4 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Check the EFI relay resistance.

Standard:

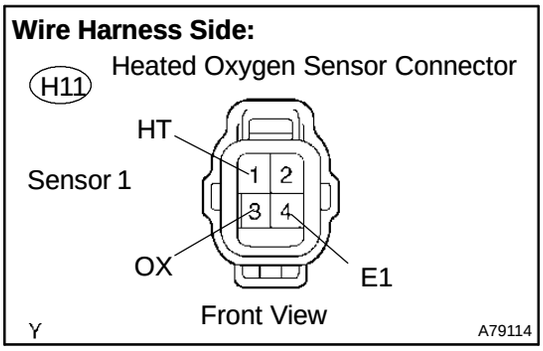
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

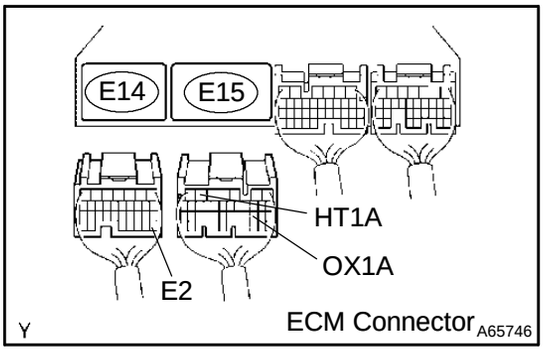
(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

5 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)





(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E14 and E15 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

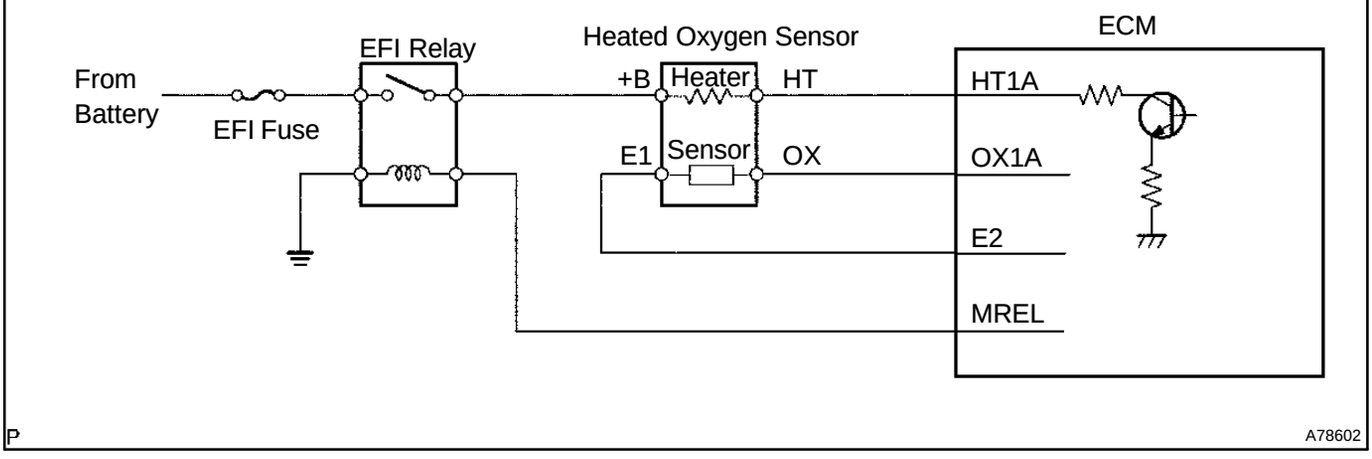
Tester Connection	Specified Condition
OX (H11-3) - OX1A (E15-22)	Below 1 Ω
HT (H11-1) - HT1A (E15-6)	Below 1 Ω
E1 (H11-4) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX1A (E15-22) - Body ground	10 kΩ or higher
HT (H11-1) or HT1A (E15-6) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 1 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

7	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

8	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-5 of Pub. No. RM925E COROLLA)

NG → REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)

OK

REPLACE HEATED OXYGEN SENSOR

9	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

10	CHECK IF DTC OUTPUT RECURS(DTCS P0130, P2195 AND P2196)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0130 and/or P2195 or P2196	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

A

REPLACE HEATED OXYGEN SENSOR

DTC	P0133	OXYGEN SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-73.

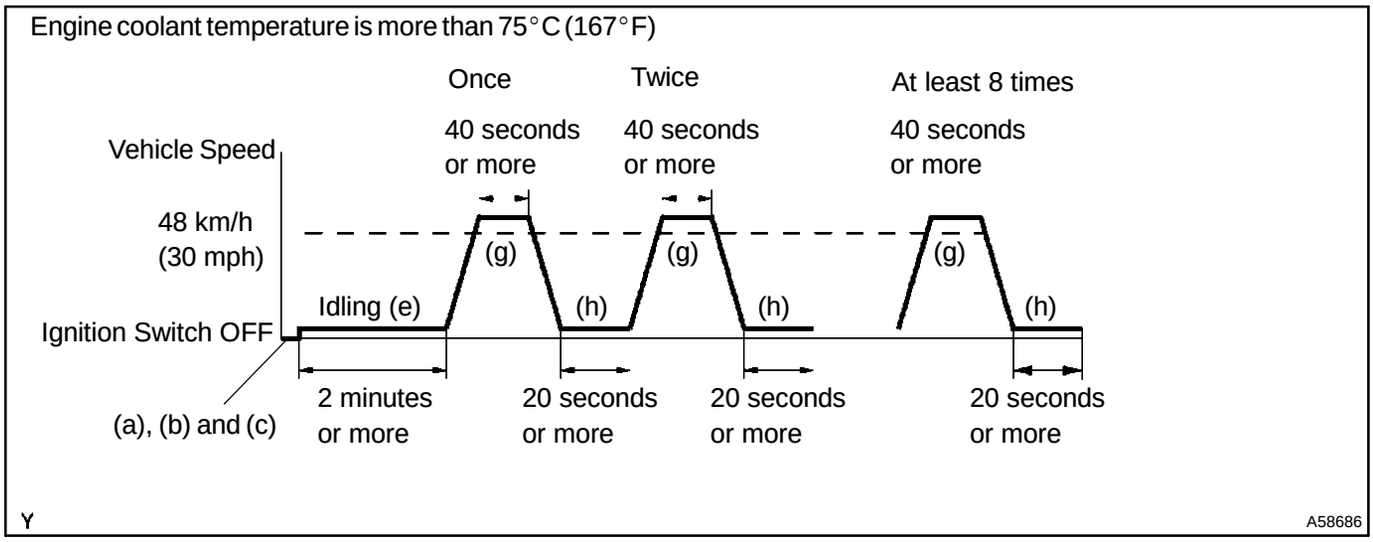
DTC No.	DTC Detection Condition	Trouble Area
P0133	Voltage of heated oxygen sensor (sensor 1) does not fluctuate between lean and rich for 0.8 seconds (2 trip detection logic) Lean: 0.35 V or less Rich: 0.45 V or more	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Heated oxygen sensor heater (sensor 1) • EFI relay • Air induction system • Fuel pressure • Injector • ECM

HINT:
Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-75.

CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05-21).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 48 km/h (30 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:
If a malfunction exists, the MIL is illuminated during step (i).

NOTICE:

If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

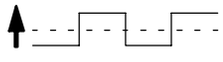
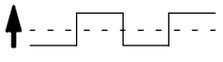
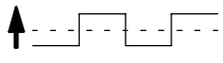
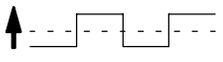
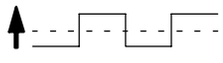
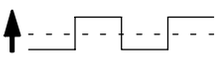
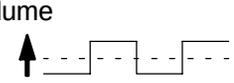
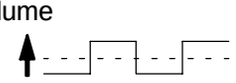
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs are recorded, and the MIL then illuminates.

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0133)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0133	A
P0133 and other DTCs	B

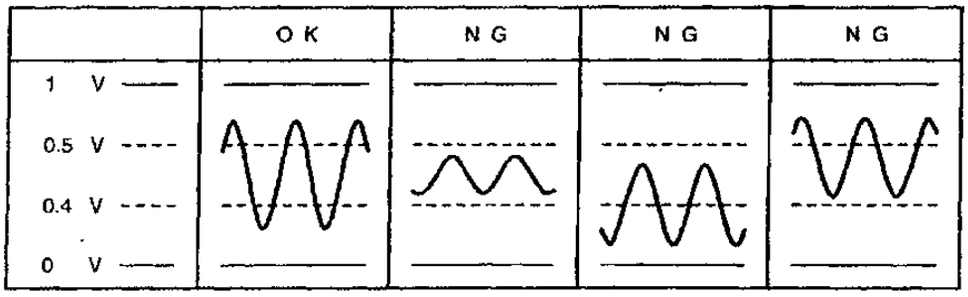
HINT:
If any DTCs other than P0133 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-28)

A

2	READ VALUE OF INTELLIGENT TESTER II(HEATED OXYGEN SENSOR DURING IDLING)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1.
(d) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 90 seconds.
(e) Read the output voltage of the heated oxygen sensor during engine idling.
Standard:
Fluctuates between less than 0.4 V and more than 0.5 V (see the following figure).

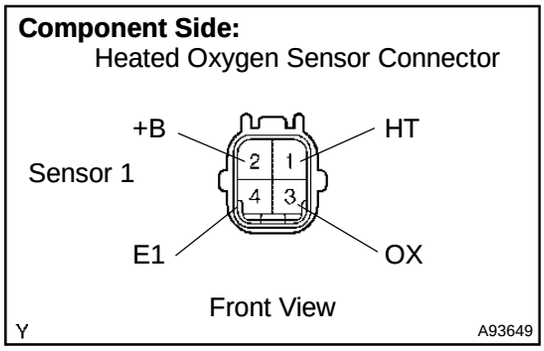


A97090

OK → **Go to step 9**

NG

3 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

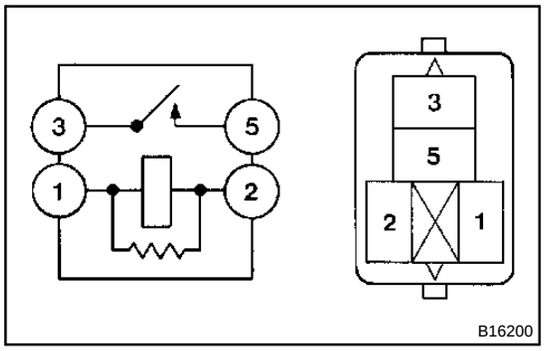
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

4 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Check the EFI relay resistance.

Standard:

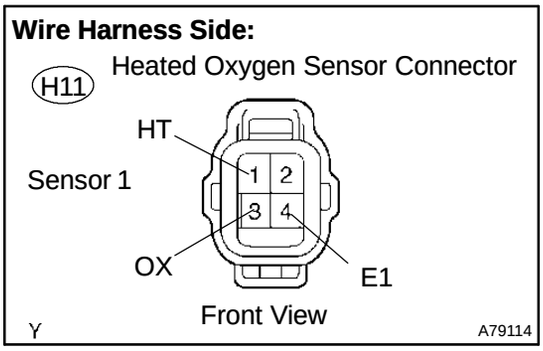
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

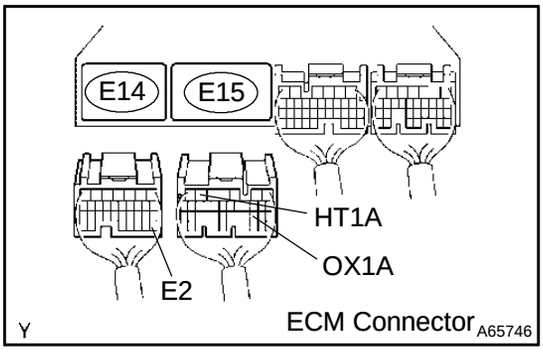
(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

5 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)





(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E14 and E15 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

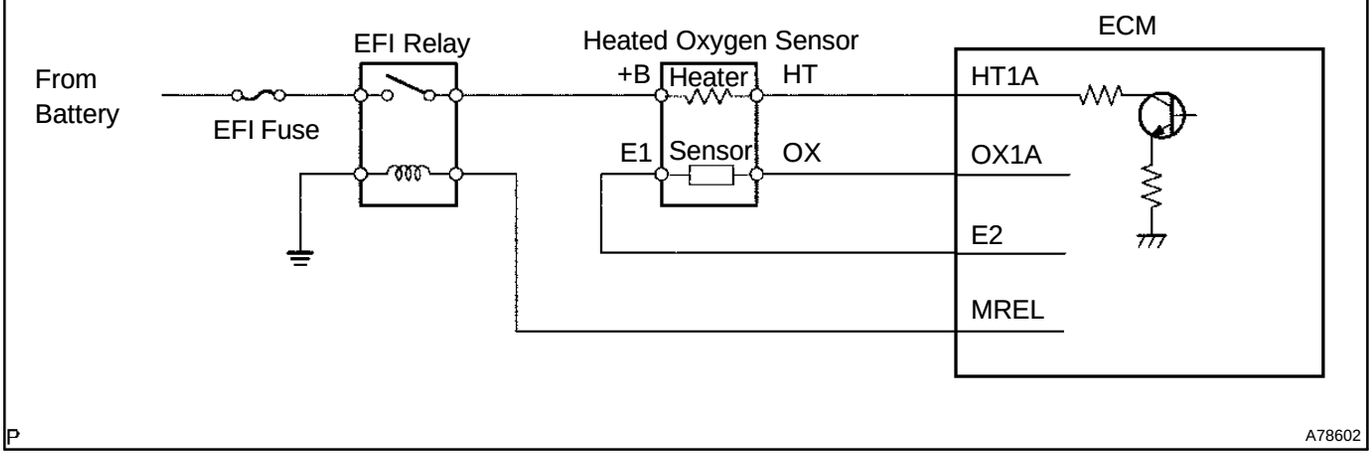
Tester Connection	Specified Condition
OX (H11-3) - OX1A (E15-22)	Below 1 Ω
HT (H11-1) - HT1A (E15-6)	Below 1 Ω
E1 (H11-4) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX1A (E15-22) - Body ground	10 kΩ or higher
HT (H11-1) or HT1A (E15-6) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 1 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6 CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

7	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

8	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-5 of Pub. No. RM925E COROLLA)

NG → REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)

OK

REPLACE HEATED OXYGEN SENSOR

9	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

10	CHECK IF DTC OUTPUT RECURS(DTC P0133)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0133	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

A

REPLACE HEATED OXYGEN SENSOR

DTC	P0134	OXYGEN SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-73.

DTC No.	DTC Detection Condition	Trouble Area
P0134	After engine is warmed up, voltage of heated oxygen sensor (sensor 1) does not become rich (greater than 0.45 V) even once when conditions (a), (b), (c), (d) and (e) continue for more than 50 seconds (1 trip detection logic): (a) Engine speed: 1,400 rpm or more (b) Vehicle speed: 40 km/h (25 mph) or more (c) Throttle valve is not fully closed (d) 180 seconds or more after starting engine (e) Engine coolant temperature is more than 40°C (104°F)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • EFI relay • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust system • ECM

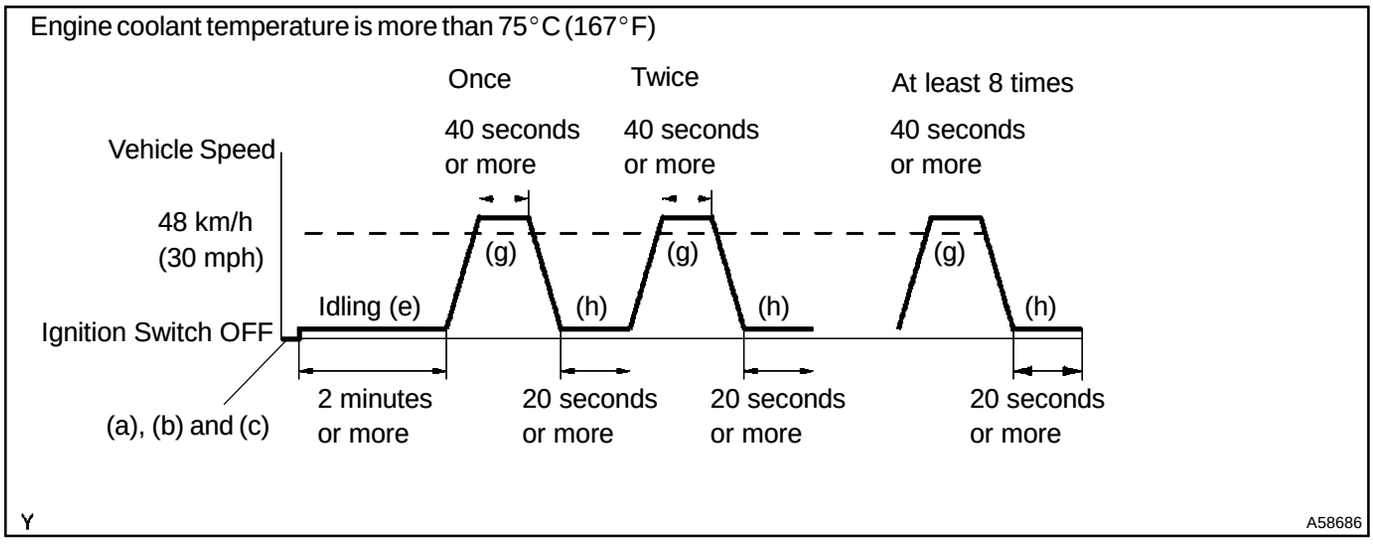
HINT:

- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- When DTC P0134 is detected, confirm the output voltage of the heated oxygen sensor (sensor 1) in the Data List using the intelligent tester II.
  If the voltage output of the heated oxygen sensor is less than 0.1 V, the heated oxygen sensor circuit may be open or short.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-75.

CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05-21).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 48 km/h (30 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:

If a malfunction exists, the MIL is illuminated during step (i).

NOTICE:

If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

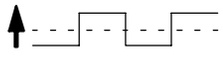
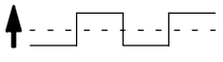
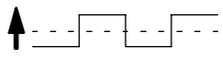
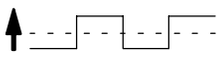
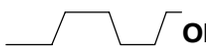
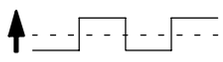
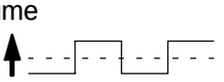
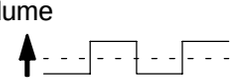
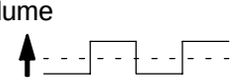
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs are recorded, and the MIL then illuminates.

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0134)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0134	A
P0134 and other DTCs	B

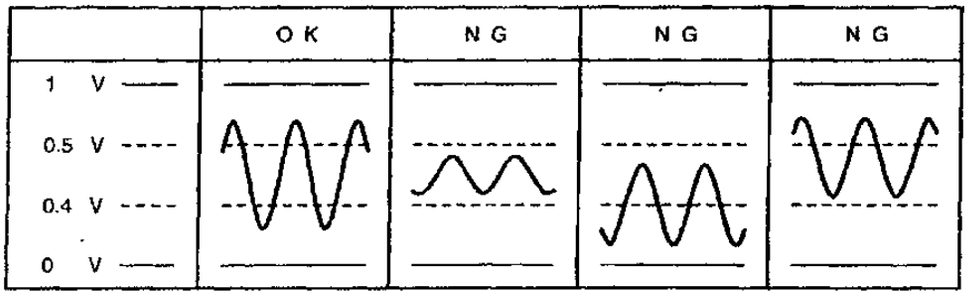
HINT:
If any DTCs other than P0134 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-28)**

A

2	READ VALUE OF INTELLIGENT TESTER II(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1.
(d) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 90 seconds.
(e) Read the output voltage of the heated oxygen sensor during engine idling.
Standard:
Fluctuates between less than 0.4 V and more than 0.5 V (see the following figure).



A97090

OK → **Go to step 12**

NG

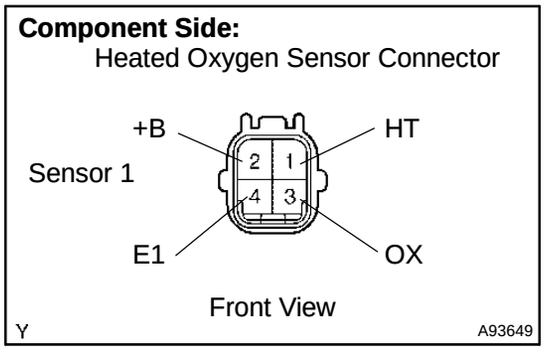
3	CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

4 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

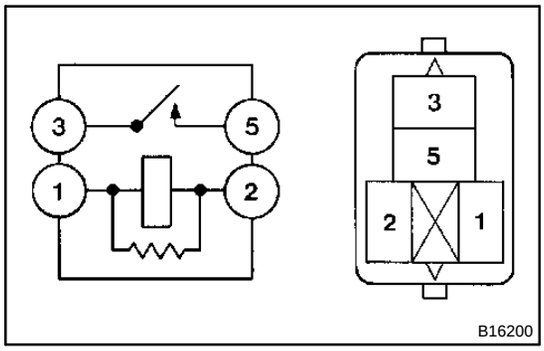
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

5 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Check the EFI relay resistance.

Standard:

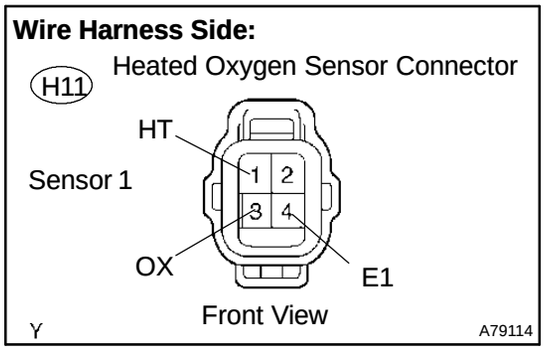
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

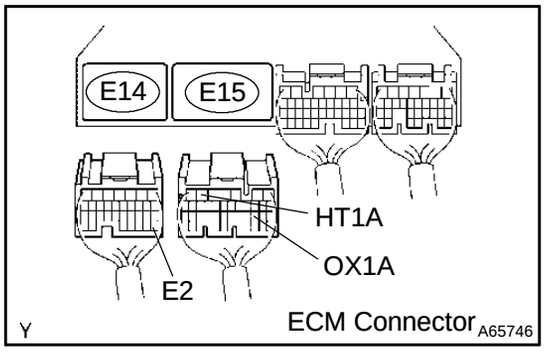
(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

6 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)





(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E14 and E15 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

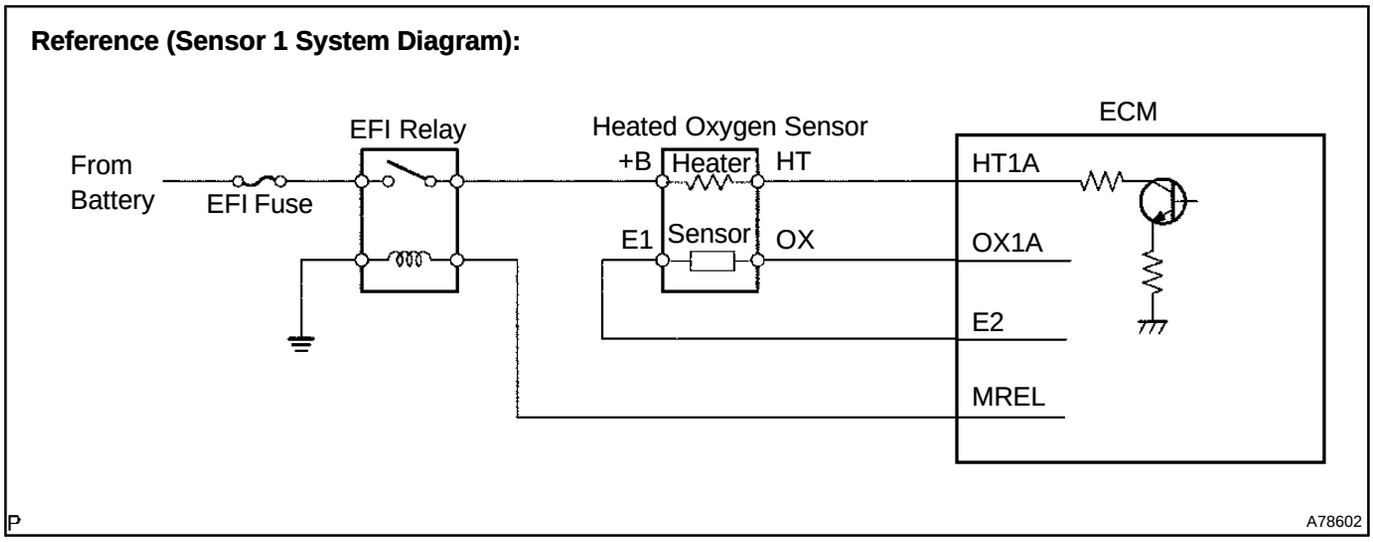
Tester Connection	Specified Condition
OX (H11-3) - OX1A (E15-22)	Below 1 Ω
HT (H11-1) - HT1A (E15-6)	Below 1 Ω
E1 (H11-4) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX1A (E15-22) - Body ground	10 kΩ or higher
HT (H11-1) or HT1A (E15-6) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 1 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

7	CHECK WHETHER MISFIRE OCCURS OR NOT BY MONITORING DTC AND DATA LIST

NG → TROUBLESHOOT MISFIRES

OK

8	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.
OK: No leak in the air induction system.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

9	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

10	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-5 of Pub. No. RM925E COROLLA)

NG → REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)

OK

11	CHECK FOR EXHAUST GAS LEAKS

NG → REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT

OK

12	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

13	CHECK IF DTC OUTPUT RECURS(DTC P0134)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
No output	A
P0134	B

B → **REPLACE ECM**
(See page 10-8 of Pub. No. RM1039E COROLLA)

A

14	CONFIRM IF VEHICLE HAS RUN OUT OF FUEL IN PAST

NO → **CHECK FOR INTERMITTENT PROBLEMS**
(See page 05-10)

YES

DTC IS CAUSED BY RUNNING OUT OF FUEL

DTC	P0136	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-73.

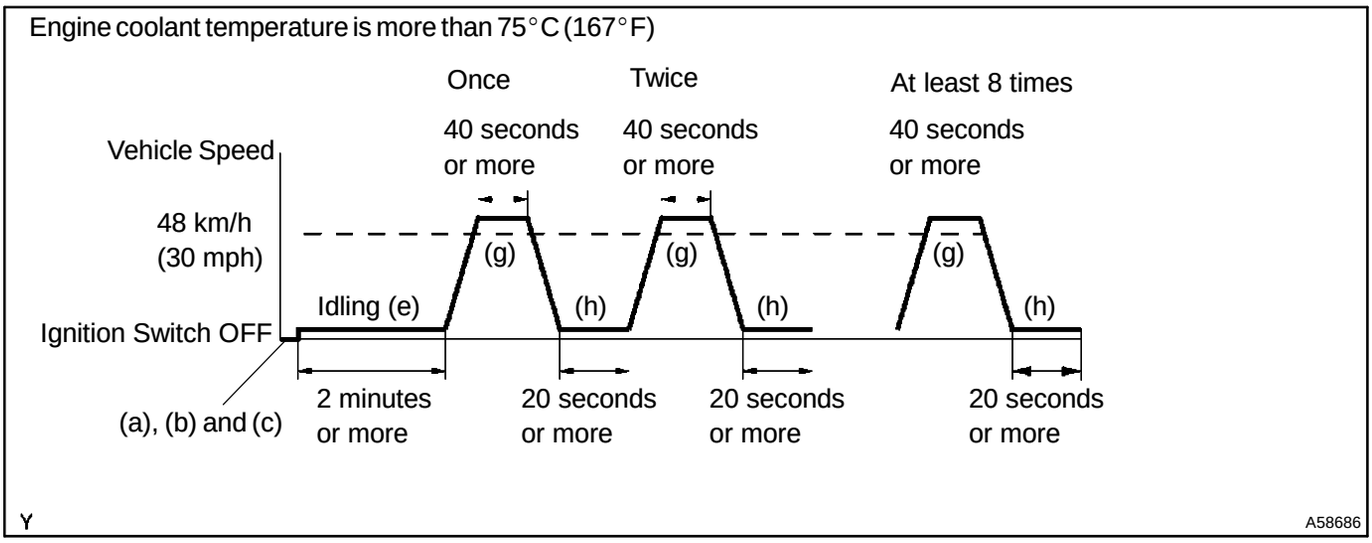
DTC No	DTC Detection Condition	Trouble Area
P0136	Heated oxygen sensor voltage does not change while driving (1 trip detection logic)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay

HINT:
Sensor 2 refers to the sensor mounted behind the Three-Way Catalytic Converter and located far from the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-75.

CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05-21).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 48 km/h (30 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:
If a malfunction exists, the MIL is will be illuminated during step (i).

NOTICE:
If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

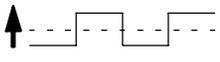
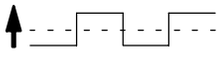
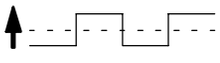
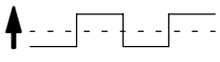
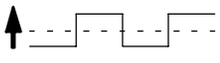
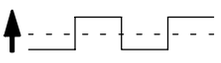
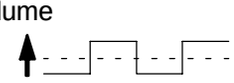
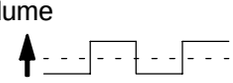
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air–fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air–fuel ratio becomes lean and the heated oxygen sensor DTCs are recorded, and the MIL then illuminates.

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air–fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air–fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0136)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0136	A
P0136 and other DTCs	B

HINT:
If any DTCs other than P0136 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-28)**

A

2	READ VALUE OF INTELLIGENT TESTER II(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) After warming up the engine, run the engine at 2,500 rpm for 3 minutes.
(e) Read the output voltage of the heated oxygen sensor when the engine speed is suddenly increased.

HINT:
Quickly accelerate the engine to 4,000 rpm 3 times by using the accelerator pedal.

Standard: Fluctuates between 0.4 V or less and 0.5 V or more.

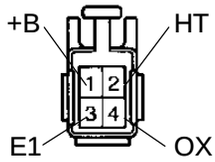
OK → **Go to step 6**

NG

3	INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)

Component Side:

Heated Oxygen Sensor Connector
Sensor 2



Front View

A61079

(a) Disconnect the H18 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

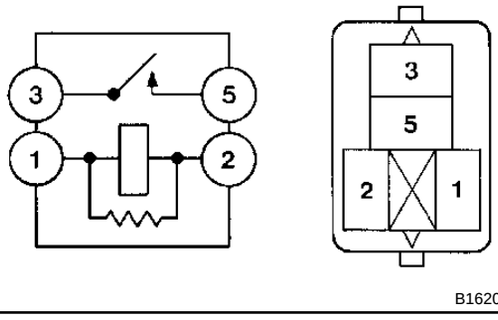
Tester Connection	Specified Condition
2 (HT) - 1 (+B)	11 to 16 Ω at 20°C (68°F)
2 (HT) - 3 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

4 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Check the EFI relay resistance.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

(c) Reinstall the EFI relay.

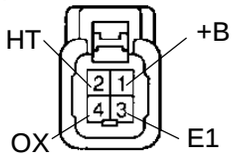
NG → **REPLACE EFI RELAY**

OK

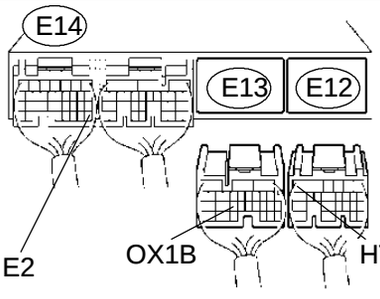
5 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)

Wire Harness Side:

H18 Heated Oxygen Sensor Connector Sensor 2



Front View A61078



(a) Disconnect the H18 heated oxygen sensor connector.
(b) Disconnect the E12 and E13 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

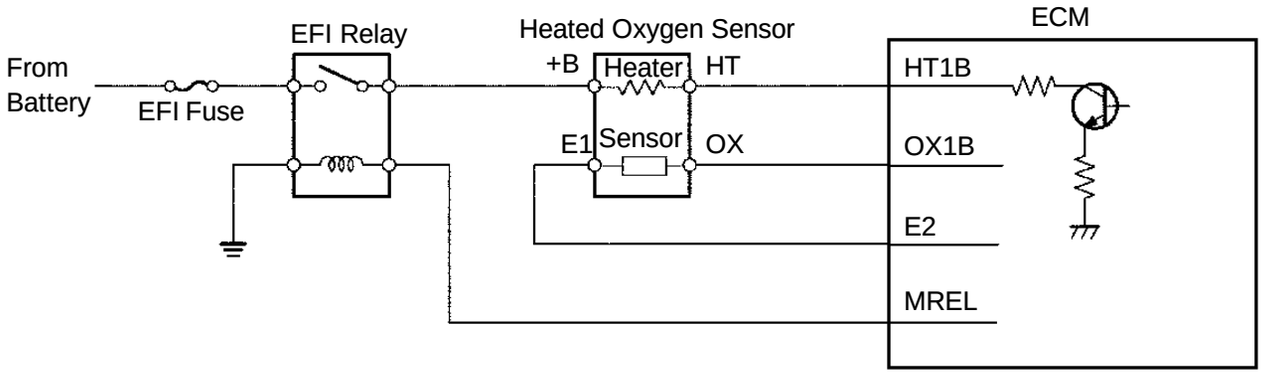
Tester Connection	Specified Condition
OX (H18-4) - OX1B (E13-23)	Below 1 Ω
HT (H18-2) - HT1B (E12-7)	Below 1 Ω
E1 (H18-3) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H18-4) or OX1B (E13-23) - Body ground	10 kΩ or higher
HT (H18-2) or HT1B (E12-7) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 2 System Diagram):



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE HEATED OXYGEN SENSOR

6	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

7	CHECK IF DTC OUTPUT RECURS(DTC P0136)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
No output	A
P0136	B

B	REPLACE HEATED OXYGEN SENSOR

A

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-10)**

DTC	P0171	SYSTEM TOO LEAN (BANK 1)

DTC	P0172	SYSTEM TOO RICH (BANK 1)

CIRCUIT DESCRIPTION

The fuel trim relates to the feedback compensation value, not to the basic injection time. The fuel trim includes the short-term fuel trim and the long-term fuel trim.

The short-term fuel trim is the short-term fuel compensation used to maintain the air-fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air-fuel ratio is rich or lean compared to the ideal theoretical value, triggering a reduction in the fuel volume if the air-fuel ratio is rich, and an increase in the fuel volume if it is lean.

The long-term fuel trim is the overall fuel compensation in order to balance the short-term fuel trim for a continual deviation from the central value by individual engine differences, operating environment and age deterioration.

If both the short-term fuel trim and the long-term fuel trim are lean or rich beyond the standard level, it is detected as a malfunction in the SFI system. The ECM illuminates the MIL and sets a DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0171	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on lean side (2 trip detection logic)	• Air induction system • Injector blockage • Mass air flow (MAF) meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • PCV hose connection • ECM
P0172	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on rich side (2 trip detection logic)	• Injector leakage or blockage • MAF meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM

HINT:

- When DTC P0171 is set, the actual air-fuel ratio is lean. When DTC P0172 is set, the actual air-fuel ratio is rich.
- If the vehicle runs out of fuel, the air-fuel ratio is lean and DTC P0171 may be set. The MIL then illuminates.
- If the total of the short-term fuel trim value and long-term fuel trim value is within ± 20 %, the system is functioning normally.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-75.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

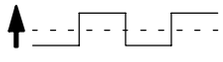
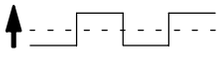
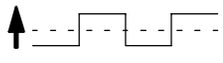
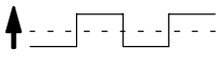
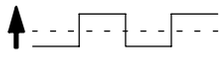
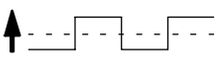
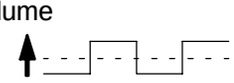
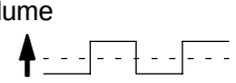
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air–fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air–fuel ratio becomes lean and the heated oxygen sensor DTCs are recorded, and the MIL then illuminates.

HINT:

- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air–fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air–fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.
OK: No vacuum leak.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

2	CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

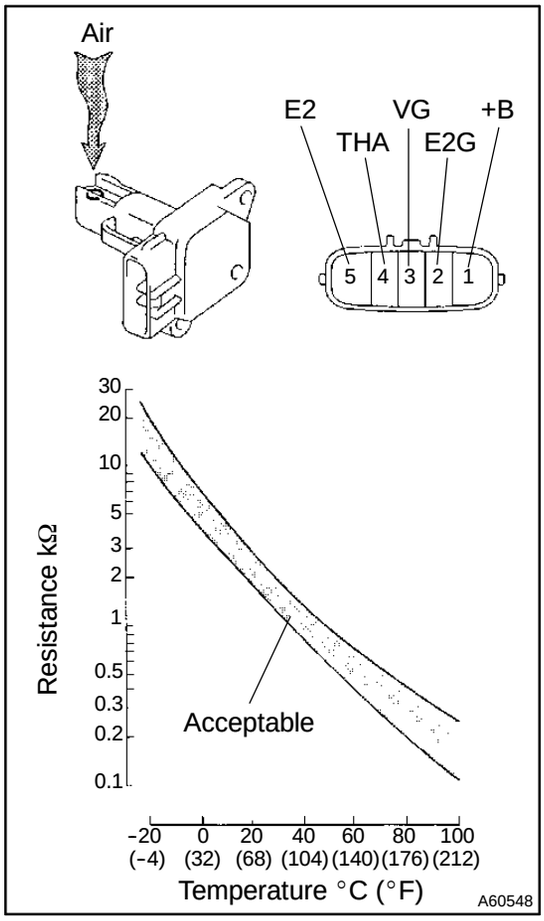
OK

3	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-5 of Pub. No. RM925E COROLLA)

NG → **REPLACE FUEL INJECTOR ASSY**
(See page 11-24 of Pub. No. RM925E COROLLA)

OK

4 INSPECT MASS AIR FLOW METER



(a) Remove the MAF meter.

(b) Inspect output voltage.

(1) Apply the battery voltage across terminals +B and E2G.

(2) Connect the positive (+) tester probe to terminal VG, and negative (-) tester probe to terminal E2G.

(3) Blow air into the mass air flow meter, and check that the voltage fluctuates.

(c) Inspect the resistance.

(1) Measure the resistance between the terminals of the intake air temperature sensor.

Standard:

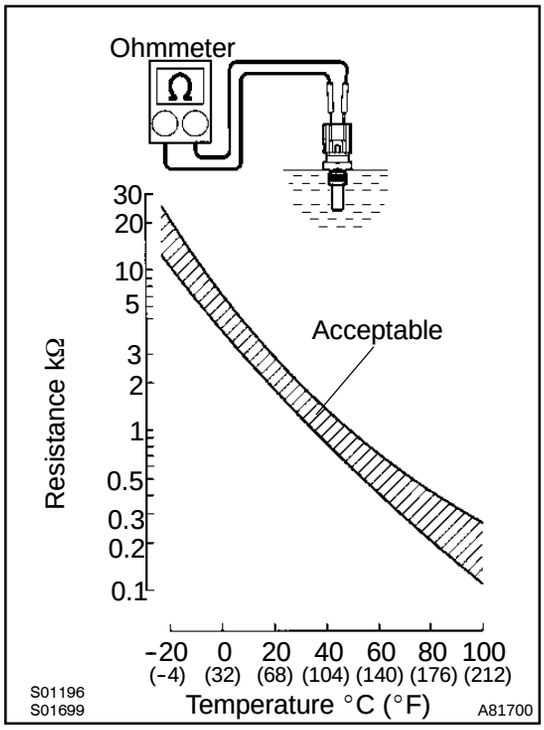
Tester Connection	Specified Condition
THA (4) - E2 (5)	13.6 to 18.4 kΩ at -20°C (-4°F)
THA (4) - E2 (5)	2.21 to 2.69 kΩ at 20°C (68°F)
THA (4) - E2 (5)	0.49 to 0.67 kΩ at 60°C (140°F)

(d) Reinstall the MAF meter.

NG → **REPLACE MASS AIR FLOW METER**

OK

5	INSPECT ENGINE COOLANT TEMPERATURE SENSOR(RESISTANCE)



(a) Remove the engine coolant temperature sensor.
(b) Measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	2.32 to 2.59 kΩ at 20°C (68°F)
1 - 2	0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:

When checking the engine coolant temperature sensor in water, be careful not to allow water to get in contact with the terminals. After checking, dry the sensor.

HINT:

Alternative procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values against the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

6	CHECK FOR SPARK AND IGNITION (See page 18-5 of Pub. No. RM925E COROLLA)

OK: The spark occurs.

NG → **REPAIR OR REPLACE**

OK

7	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → **CHECK AND REPLACE FUEL SYSTEM**

OK

8	CHECK FOR EXHAUST GAS LEAKAGE

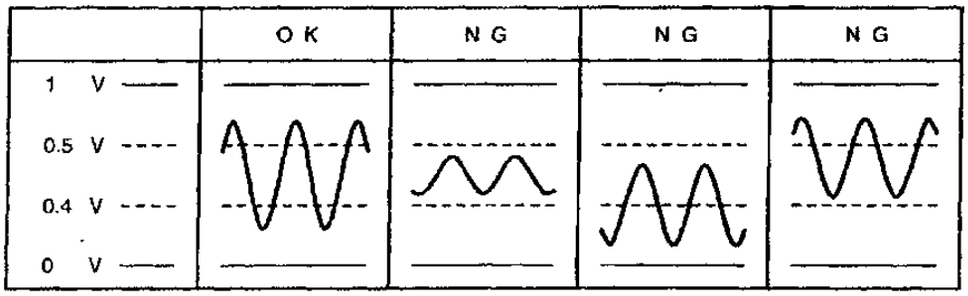
OK: No gas leak.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

9	READ VALUE OF INTELLIGENT TESTER II(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1.
(d) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 90 seconds.
(e) Read the output voltage of the heated oxygen sensor during engine idling.
Standard:
Fluctuates between less than 0.4 V and more than 0.5 V (see the following figure).



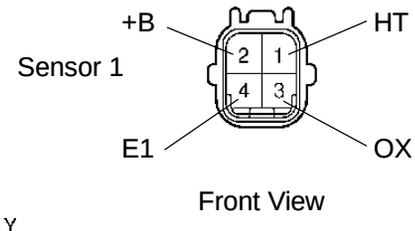
A97090

OK → **Go to step 17**

NG

10	INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)

Component Side:
Heated Oxygen Sensor Connector



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.
Standard:

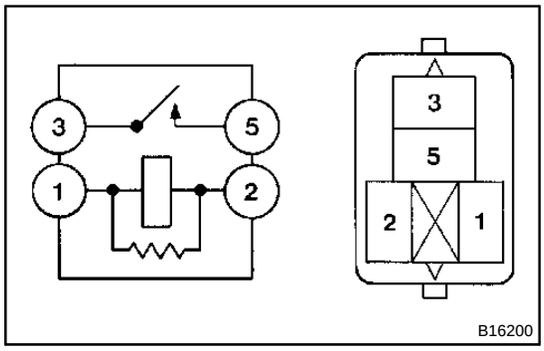
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

(c) Reconnect the heated oxygen sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

11	INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B and J/B.

(b) Check the EFI relay resistance.

Standard:

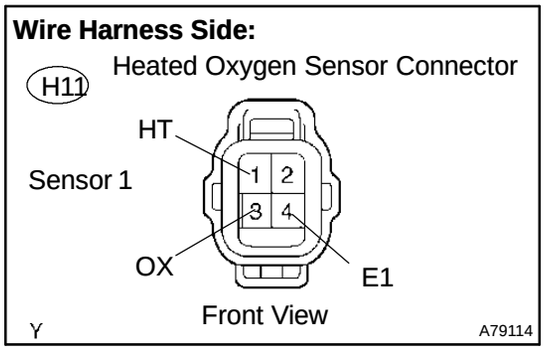
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

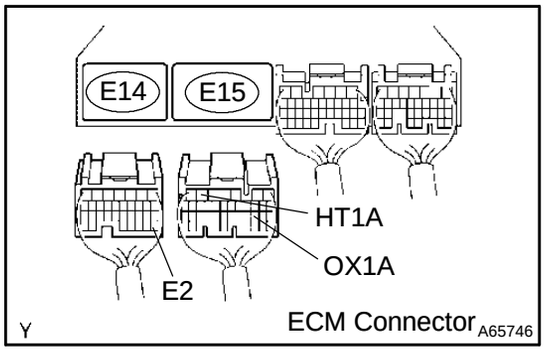
(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

12	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)





(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E14 and E15 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

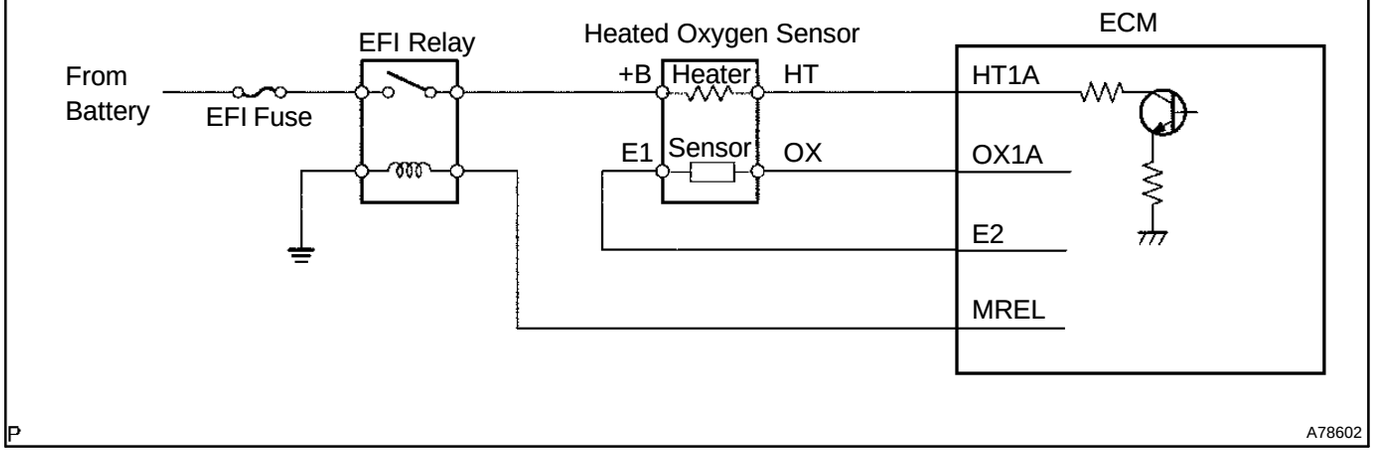
Tester Connection	Specified Condition
OX (H11-3) - OX1A (E15-22)	Below 1 Ω
HT (H11-1) - HT1A (E15-6)	Below 1 Ω
E1 (H11-4) - E2 (E14-28)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX1A (E15-22) - Body ground	10 kΩ or higher
HT (H11-1) or HT1A (E15-6) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 1 System Diagram):



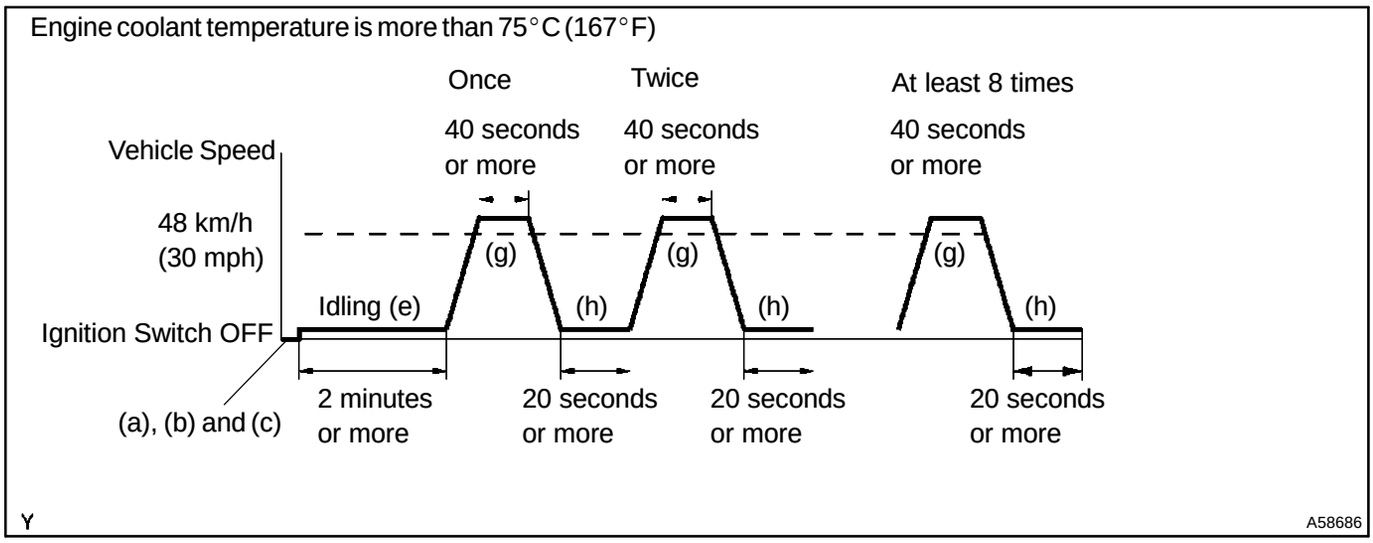
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

13	REPLACE HEATED OXYGEN SENSOR

GO

14	PERFORM CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05-21).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 48 km/h (30 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:
If a malfunction exists, the MIL is illuminated during step (i).

NOTICE:
If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

GO

15	CHECK IF DTC OUTPUT RECURS(DTC P0171 AND/OR P0172)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
No output	A
P0171 and/or P0172	B

B → **REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN**
(Refer to step 14)

A

16	CONFIRM IF VEHICLE HAS RUN OUT OF FUEL IN PAST

NO → **CHECK FOR INTERMITTENT PROBLEMS**
(See page 05–10)

YES

DTCS ARE CAUSED BY RUNNING OUT OF FUEL (DTC P0171 AND/OR P0172)

17	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern (refer to step 14).

GO

18	CHECK IF DTC OUTPUT RECURS(DTC P0171 AND/OR P0172)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0171 and/or P0172	A
No output	B

B → **Go to step 22**

A

19	REPLACE HEATED OXYGEN SENSOR

GO

20	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern (refer to step 14).

GO

21	CHECK IF DTC OUTPUT RECURS(DTC P0171 AND/OR P0172)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
No output	A
P0171 and/or P0172	B

B → **REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN (Refer to step 14)**

A

22	CONFIRM IF VEHICLE HAS RUN OUT OF FUEL IN PAST

NO → **CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)**

YES

DTCS ARE CAUSED BY RUNNING OUT OF FUEL (DTCS P0171 AND/OR P0172)

DTC	P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC	P0301	CYLINDER 1 MISFIRE DETECTED

DTC	P0302	CYLINDER 2 MISFIRE DETECTED

DTC	P0303	CYLINDER 3 MISFIRE DETECTED

DTC	P0304	CYLINDER 4 MISFIRE DETECTED

CIRCUIT DESCRIPTION

When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust gas in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emission levels. High concentrations of HC can also cause temperature of the Three–Way Catalytic Converter (TWC) to increase, possibly damaging the TWC. To prevent this increase in emissions and limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the TWC reaches a point of thermal degradation, the ECM blinks the MIL. For monitoring misfire, the ECM uses both the camshaft position sensor and the crankshaft position sensor. The camshaft position sensor is used to identify misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. The misfire counter increments when crankshaft rotation speed variations exceed the threshold values.

If the misfiring rate exceeds the threshold and could cause emission deterioration, the ECM illuminates the MIL.

HINT:

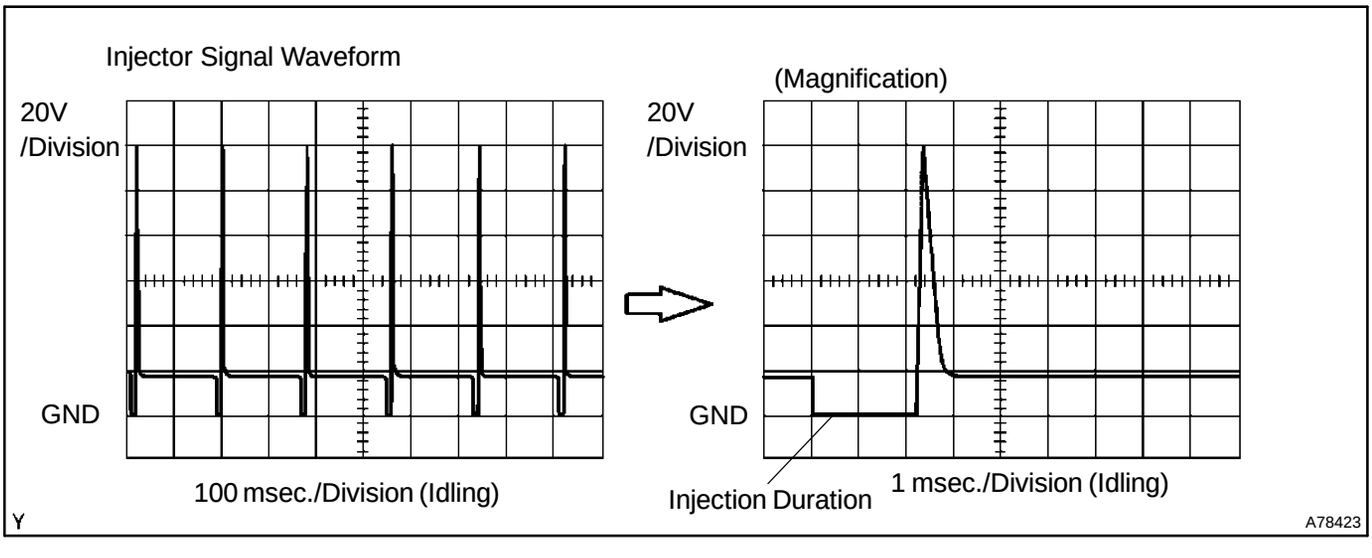
- For any particular 200 revolutions of the engine, misfiring which could result in overheating of the TWC is detected. This causes the MIL to blink (1 trip detection logic).
- For any particular 1,000 revolutions of the engine, misfiring which could result in emission deterioration is detected. This cause the MIL to illuminate (2 trip detection logic).

DTC No.	DTC Detection Condition	Trouble Area
P0300	Misfiring of random cylinders is detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass Air Flow (MAF) meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM
P0301 P0302 P0303 P0304	Misfiring of each cylinder is detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • MAF meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM

HINT:
When the DTCs for misfiring cylinders are recorded repeatedly but no random misfire DTC is recorded, it indicates that the misfires have been set and recorded at different times.
Reference: Inspection using the oscilloscope
With the engine idling, check the waveform between terminals #10 to #40 and E01 of the ECM connectors.

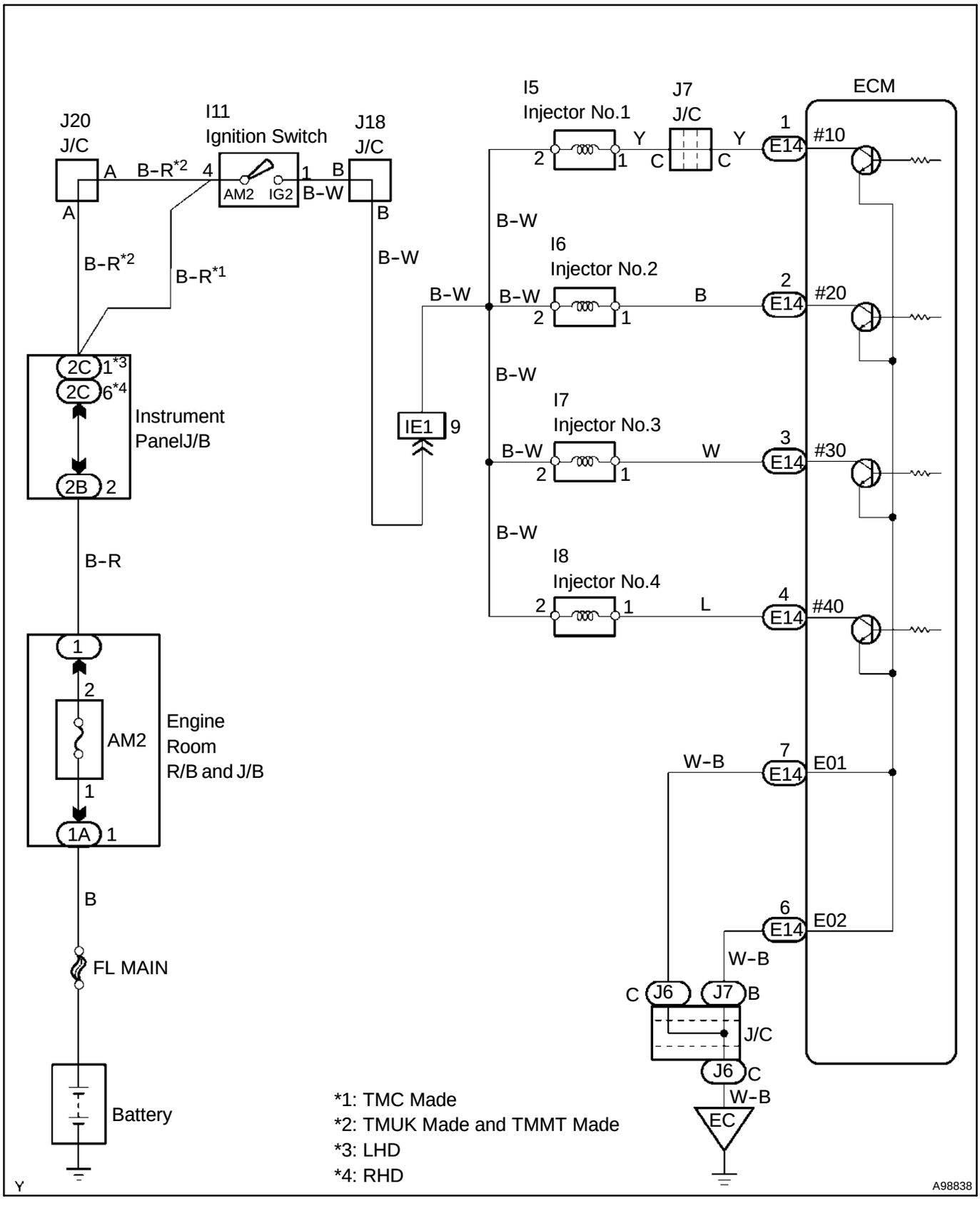
Item	Contents
Terminal	#10 to #40 - E01
Equipment Setting	20V/Division, 100 or 1 ms/Division
Condition	Idling

HINT:
The correct waveform is as shown.



WIRING DIAGRAM

Refer to DTC P0335 on page 05-142.



CONFIRMATION DRIVING PATTERN

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Note down the DTC(s) and freeze frame data.
(d) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05–21).
(e) Check the misfire counter values for each cylinder when idling. If the misfire counter value indicates 0, perform the following procedure of the confirmation driving pattern.
(f) Drive the vehicle several times using an engine speed (Engine Speed), engine load (Calculate Load) and other data stored in the freeze frame data.

If you do not have the intelligent tester II, turn the ignition switch to OFF after the symptom is simulated once. Then repeat the simulation process again.

HINT:

In order to record the misfire DTCs, it is necessary to drive around Misfire RPM and Misfire Load in the Data List for the following period of time. Do not turn the ignition switch to OFF. Turning the ignition switch to OFF switches the diagnosis system from check mode to normal mode. So all DTCs and other data will be erased.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

(g) Check if there is the DTC(s) to verify whether misfires have occurred. If the DTC(s) is present, record the DTC and freeze frame data.
(h) Turn the ignition switch to OFF and wait for at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If any DTCs other than the misfire DTCs are set simultaneously, first troubleshoot them.
- If a misfire does not occur when the vehicle is brought to the workshop, a misfire can be confirmed by reproducing the condition of the freeze frame data. Also, after finishing repairs, confirm that misfires do not recur (see the confirmation driving pattern).
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- On 6 and 8 cylinder engines, misfiring cylinders cannot be identified at high engine speed and only a general misfire DTC P0300 is stored instead of the individual misfiring cylinder DTCs (P0301 to P0308).
  If a misfire starts in a high engine speed area or a misfire occurs only in a high engine speed area, only DTC P0300 may be stored.

  When only a general misfire DTC P0300 is stored:
- Erase the general misfire DTC P0300 from the ECM using the intelligent tester II.
- Start the engine and perform the confirmation driving pattern.
- Check the value of the misfire ratio for each cylinder. Or check the DTC(s).
- Perform repairs on the cylinder that has a high misfire ratio. Or repair the cylinder indicated by the DTC.
- After finishing repairs, perform the confirmation driving pattern again and confirm that no misfire occurs.
- When either of Short FT #1 and Long FT #1 in the freeze frame data is over the range of ±20 %, there is a possibility that the air-fuel ratio is becoming rich (-20 % or less) or lean (+20 % or more).
- When Coolant Temp in the freeze frame data is less than 80°C (176°F), there is a possibility that misfires occur only during engine warm-up.
- If a misfire cannot be reproduced, the following reasons may apply: 1) the vehicle has low fuel, 2) improper fuel is being used, and 3) the ignition plug has been contaminated.
- Be sure to check the misfire counter value after repairs.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO MISFIRE DTCS)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0300, P0301, P0302, P0303 and/or P0304	A
P0300, P0301, P0302, P0303 and/or P0304 and other DTCs	B

HINT:

If DTC P0300, P0301, P0302, P0303 and/or P0304 is output simultaneously with any DTCs which relate to the throttle position sensor, troubleshoot the throttle position sensor DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-28)

A

2	CHECK WIRE HARNESS, CONNECTOR AND VACUUM HOSE IN ENGINE ROOM

(a) Check the connection condition of the wire harnesses and connector.
(b) Check the piping of the vacuum hose.
(c) Check the vacuum hose for disconnection or breakage.

OK: Connected correctly and no damage on the wire harnesses.

NG → **REPAIR OR REPLACE, THEN CONFIRM THAT THERE IS NO MISFIRE**

OK

3	CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

4	READ VALUE OF INTELLIGENT TESTER II(NUMBER OF MISFIRING CYLINDERS)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Start the engine.
(d) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Cylinder #1 Misfire Rate – Cylinder #4 Misfire Rate.
(e) Check the number of misfiring cylinders on the intelligent tester II.

HINT:
When a misfire is not reproduced, be sure to proceed according to the table below based on the stored DTC.

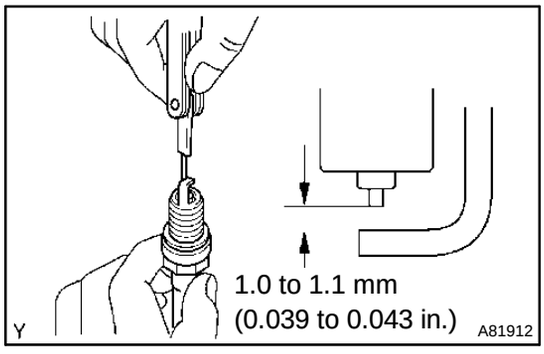
Result:

High Misfire Rate Cylinder	Proceed To
1 or 2 cylinders	A
3 cylinders or more	B

B → **Go to step 15**

A

5	CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER



(a) Remove the ignition coil assembly.
(b) Remove the spark plug.
(c) Check the spark plug type.
Recommended spark plug:

Supplier	Type
DENSO	K16R-U11
NGK	BKR5EYA11

(d) Check the spark plug electrode gap.
Standard: 1.0 to 1.1 mm (0.039 to 0.043 in.)
Maximum: 1.3 mm (0.047 in.)

NOTICE:
If adjusting the gap of a new spark plug, bend only the ground electrode. Do not touch the tip. Never attempt to adjust the gap of a used plug.

(e) Check the electrode for carbon deposits.
(f) Perform a spark test.

NOTICE:
Do not crank the engine for more than 5 to 10 seconds.

(1) Install the spark plug to the ignition coil, and connect the ignition coil connector.

CAUTION:
Completely disconnect each injector connector.

(2) Disconnect the injector connector.
(3) Ground the spark plug.
(4) Check if a spark occurs while the engine is being cranked.

OK: A spark jumps across the electrode gap.

(g) Reinstall the spark plug.
(h) Reinstall the ignition coil assembly.

OK	Go to step 8

NG

6	CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

(a) Replace the spark plug with the normally functioning spark plug.
(b) Perform a spark test.

NOTICE:

Do not crank the engine for more than 5 to 10 seconds.

(1) Install the spark plug to the ignition coil, and connect the ignition coil connector.
(2) Disconnect the injector connector.

CAUTION:

Completely disconnect each injector connector.

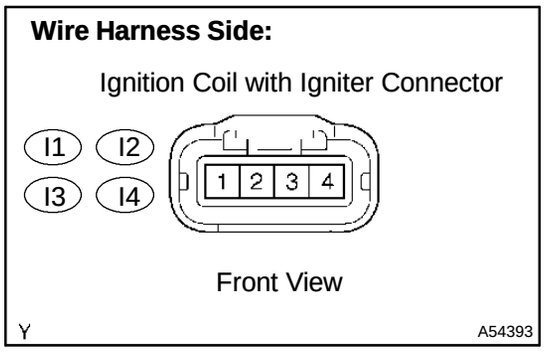
(3) Ground the spark plug.
(4) Check if a spark occurs while the engine is being cranked.

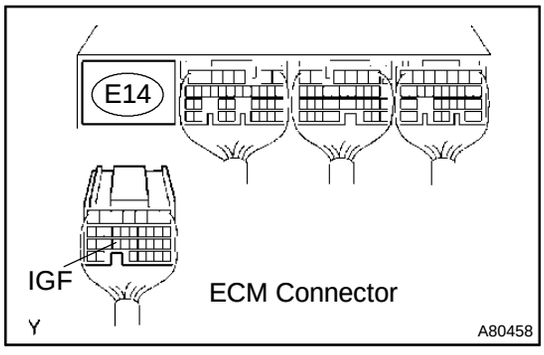
OK: A spark jumps across the electrode gap.

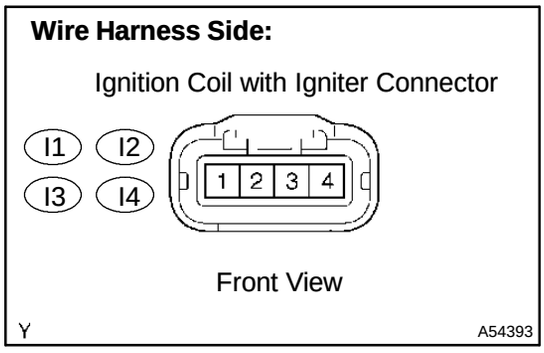
OK → **REPLACE SPARK PLUG**

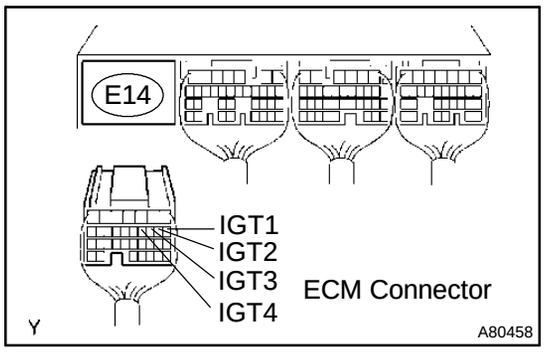
NG

7	CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(IGNITION COIL ASSY - ECM)









(a) Check the harness and the connectors between the ignition coil with igniter and ECM (IGF terminal).

(1) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.

(2) Disconnect the E14 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I2-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I3-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I4-2) - IGF (E14-24)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I2-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I3-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I4-2) or IGF (E14-24) - Body ground	10 kΩ or higher

(4) Reconnect the ignition coil with igniter connector.

(5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the ignition coil with igniter and ECM (IGT terminal).

(1) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.

(2) Disconnect the E14 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-3) - IGT1 (E14-8)	Below 1 Ω
Ignition coil (I2-3) - IGT2 (E14-9)	Below 1 Ω
Ignition coil (I3-3) - IGT3 (E14-10)	Below 1 Ω
Ignition coil (I4-3) - IGT4 (E14-11)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-3) or IGT1 (E14-8) - Body ground	10 kΩ or higher
Ignition coil (I2-3) or IGT2 (E14-9) - Body ground	10 kΩ or higher
Ignition coil (I3-3) or IGT3 (E14-10) - Body ground	10 kΩ or higher
Ignition coil (I4-3) or IGT4 (E14-11) - Body ground	10 kΩ or higher

(4) Reconnect the ignition coil with igniter connector.

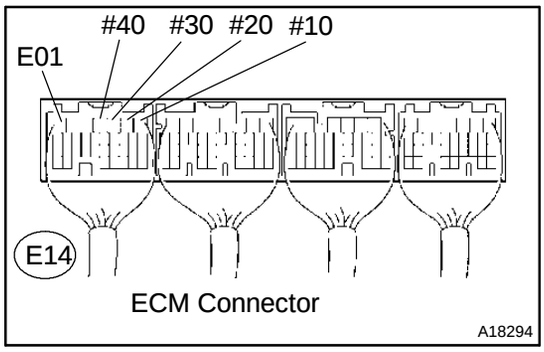
(5) Reconnect the ECM connector.

OK → **REPLACE IGNITION COIL ASSY**

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

8	INSPECT ECM TERMINAL OF MISFIRING CYLINDER(#10, #20, #30 OR #40 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E14 ECM connector.

Standard:

Tester Connection	Specified Condition
#10 (E14-1) - E01 (E14-7)	9 to 14 V
#20 (E14-2) - E01 (E14-7)	9 to 14 V
#30 (E14-3) - E01 (E14-7)	9 to 14 V
#40 (E14-4) - E01 (E14-7)	9 to 14 V

OK → **Go to step 11**

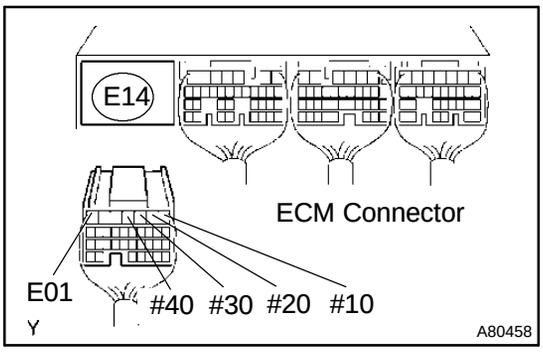
NG

9	INSPECT FUEL INJECTOR RESISTANCE OF MISFIRING CYLINDER (See page 11-5 of Pub. No. RM925E COROLLA)

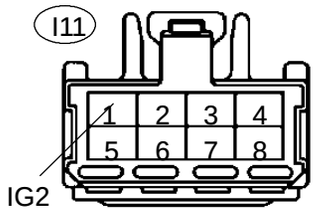
NG → **REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)**

OK

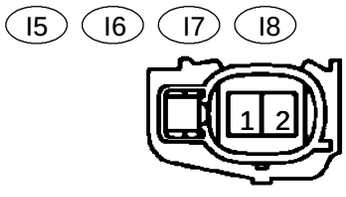
10	CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(INJECTOR - ECM, INJECTOR - IGNITION SWITCH)



Wire Harness Side: Ignition Switch



Wire Harness Side:



(a) Check the harness and connectors between the injector and ECM.

(1) Disconnect the I5, I6, I7 and/or I8 injector connector.

(2) Disconnect the E14 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-1) - #10 (E14-1)	Below 1 Ω
Injector (I6-1) - #20 (E14-2)	Below 1 Ω
Injector (I7-1) - #30 (E14-3)	Below 1 Ω
Injector (I8-1) - #40 (E14-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-1) or #10 (E14-1) - Body ground	10 kΩ or higher
Injector (I6-1) or #20 (E14-2) - Body ground	10 kΩ or higher
Injector (I7-1) or #30 (E14-3) - Body ground	10 kΩ or higher
Injector (I8-1) or #40 (E14-4) - Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reconnect the ECM connector.

(b) Check the harness and connectors between the injector and IG2 relay.

(1) Disconnect the I5, I6, I7 and/or I8 injector connector.

(2) Disconnect the I11 ignition switch connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-2) - IG2 (I11-1)	Below 1 Ω
Injector (I6-2) - IG2 (I11-1)	Below 1 Ω
Injector (I7-2) - IG2 (I11-1)	Below 1 Ω
Injector (I8-2) - IG2 (I11-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-2) or IG2 (I11-1) - Body ground	10 kΩ or higher
Injector (I6-2) or IG2 (I11-1) - Body ground	10 kΩ or higher
Injector (I7-2) or IG2 (I11-1) - Body ground	10 kΩ or higher
Injector (I8-2) or IG2 (I11-1) - Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reconnect the ignition switch connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

11	INSPECT FUEL INJECTOR INJECTION AND INJECTION VOLUME OF MISFIRING CYLINDER (See page 11-7 of Pub. No. RM925E COROLLA)

NG → REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)

OK

12	CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER (See page 14-82 of Pub. No. RM925E COROLLA)

NG → REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA

OK

13	CHECK VALVE CLEARANCE OF MISFIRING CYLINDER (See page 14-87 of Pub. No. RM925E COROLLA)

NG → ADJUST VALVE CLEARANCE (See page 14-87 of Pub. No. RM925E COROLLA)

OK

14	PROCEED TO STEP APPROPRIATE FOR NUMBER OF MISFIRING CYLINDERS(REFER TO RESULT OF STEP 4)

HINT:

- If the result of step 4 is ”1 or 2 cylinders,” proceed to A.
- If the result of step 4 is ” 3 cylinders or more,” proceed to B.

B → CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

A

15	CHECK VALVE TIMING(CHECK FOR LOOSENESS AND JUMPED TEETH ON TIMING CHAIN) (See page 14-123 of Pub. No. RM925E COROLLA)

OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → ADJUST VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA)

OK

16	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

NG	CHECK AND REPLACE FUEL PUMP, PRESSURE REGULATOR, FUEL PIPE LINE AND FILTER

OK

17	READ VALUE OF INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE AND MASS AIR FLOW RATE)

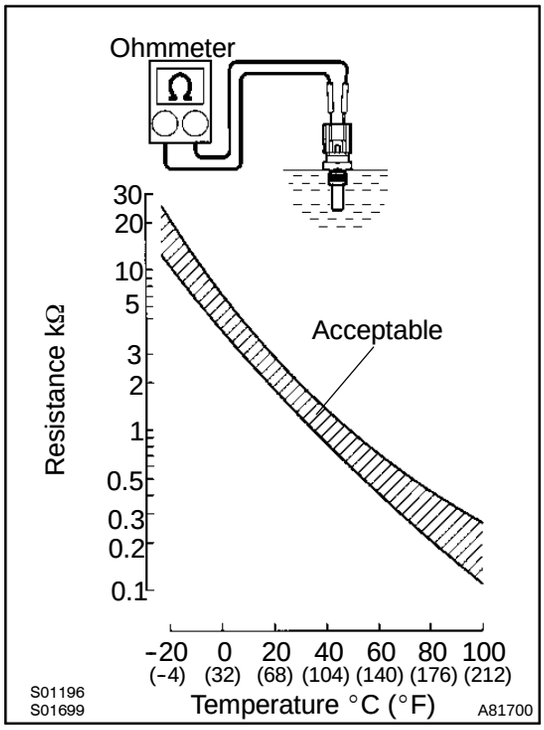
(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Check the intake air temperature.
  (1) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
  (2) Read the value.
  OK: Equivalent to the ambient air temperature.
(d) Check the mass air flow rate.
(e) Start the engine.
  (1) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
  (2) Read the values.
  Standard:

Condition	Mass Air Flow Rate (g/s)
Ignition switch ON (do not start engine)	0
Idling	4 to 6
Revving up without load (2,500 rpm)	12 to 13
Idling – Revving up	Mass air flow rate fluctuates

NG	REPLACE MASS AIR FLOW METER

OK

18	INSPECT ENGINE COOLANT TEMPERATURE SENSOR(RESISTANCE)



(a) Remove the engine coolant temperature sensor.
(b) Measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	2.32 to 2.59 kΩ at 20°C (68°F)
1 - 2	0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:

When checking the engine coolant temperature sensor in water, be careful not to allow water to get in contact with the terminals. After the check, dry the sensor.

HINT:

Alternative procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values against the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

19	PROCEED TO STEP APPROPRIATE FOR NUMBER OF MISFIRING CYLINDERS(REFER TO RESULT OF STEP 4)

HINT:

- If the result of step 4 is "1 or 2 cylinders," proceed to A.
- If the result of step 4 is "3 cylinders or more," proceed to B.

B → **GO BACK TO STEP 4**

A

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-10)**

DTC	P0325	KNOCK SENSOR 1 CIRCUIT (BANK 1 OR SINGLE SENSOR)

DTC	P0327	KNOCK SENSOR 1 CIRCUIT LOW INPUT (BANK 1 OR SINGLE SENSOR)

DTC	P0328	KNOCK SENSOR 1 CIRCUIT HIGH INPUT (BANK 1 OR SINGLE SENSOR)

CIRCUIT DESCRIPTION

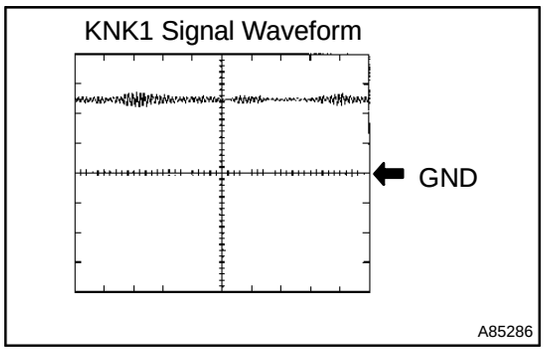
The flat type knock sensor (non–resonant type) has a structure that can detect vibration in a wider band of frequency, from approximately 6 to 15 kHz, and has the following features:

- The knock sensor is fitted on the cylinder block to detect engine knocking.
- The sensor contains a piezoelectric element which generates voltage when it becomes deformed. This occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, the ignition timing is retarded to suppress it.

DTC No.	DTC Detection Condition	Trouble Area
P0325	Knock sensor signal level remains at low for more than 10 seconds	• Open or short in knock sensor circuit • Knock sensor (under–torqued or looseness) • ECM
P0327	Output voltage of knock sensor is 0.5 V or less	• Short in knock sensor circuit • Knock sensor • ECM
P0328	Output voltage of knock sensor is 4.5 V or more	• Open in knock sensor circuit • Knock sensor • ECM

HINT:

If the ECM detects DTC P0325, P0327 and/or P0328, it enters fail–safe mode in which the corrective retarded angle value is set to the maximum value.

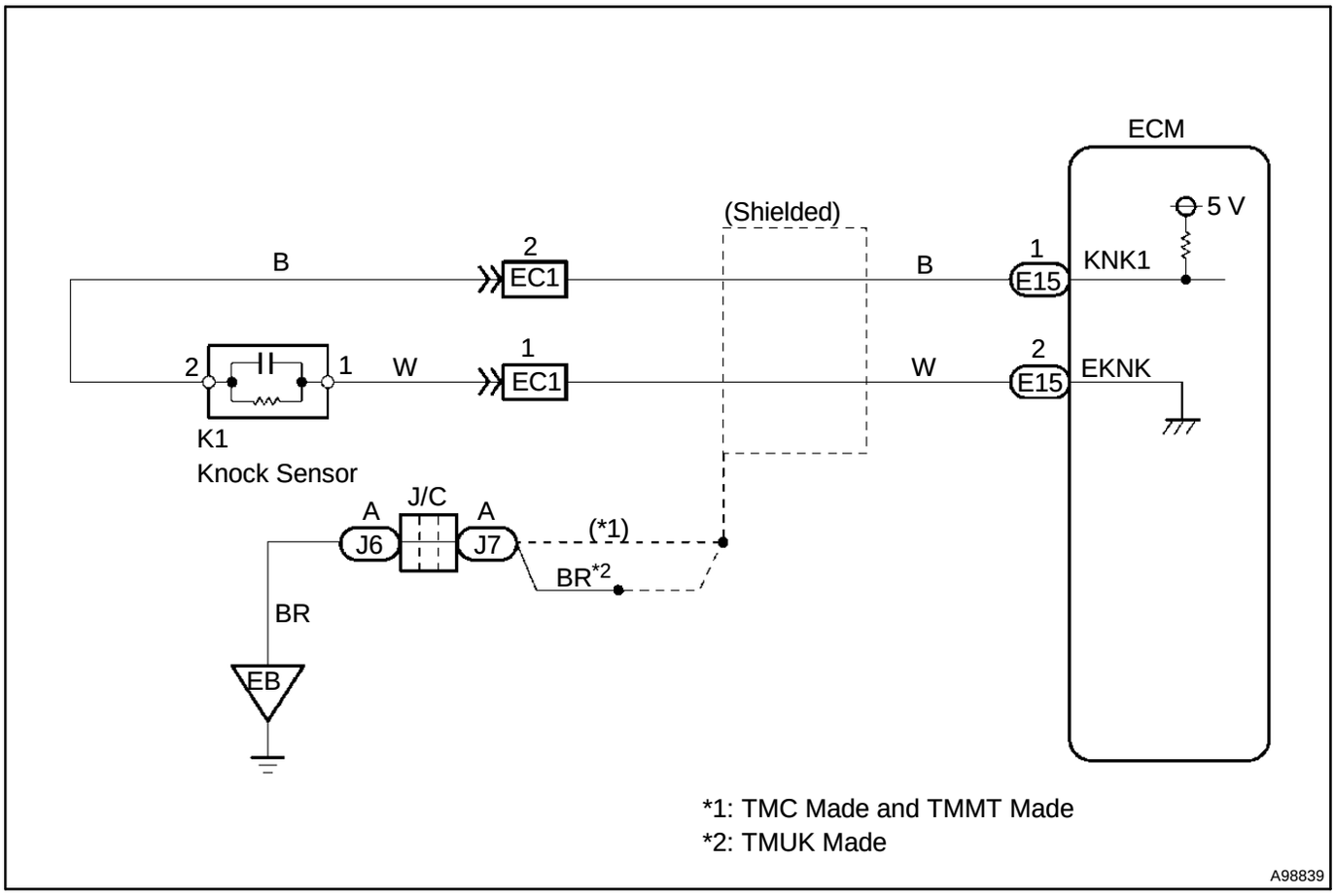


Reference: Inspection using the oscilloscope.

The correct waveform is as shown on the left.

Item	Contents
Terminal	KNK1 – EKNK
Equipment Setting	0.01 to 10 V/Division, 0.01 to 10 msec./Division
Condition	After warming up engine, keep engine speed at 4,000 rpm

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ OUTPUT DTC

(a) Clear DTCs (see page 05–19).
(b) Warm up the engine.
(c) Run the engine at 3,000 rpm for 10 seconds or more.
(d) Connect the intelligent tester II to the DLC3.
(e) Turn the ignition switch to ON and turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs.

Result :

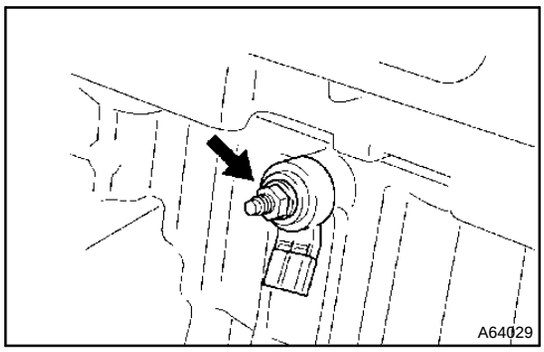
Display (DTC Output)	Proceed To
P0325	A
P0325 and/or P0327 or P0328	B
No output	C

B → **Go to step 3**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05–10)**

A

2 INSPECT KNOCK SENSOR



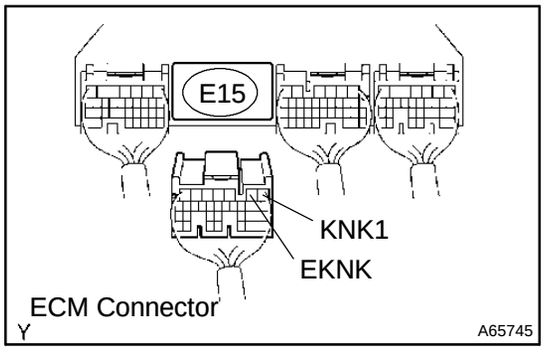
(a) Check the knock sensor installation.
Standard:
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

NG → **SECURELY REINSTALL SENSOR**

OK

REPLACE KNOCK SENSOR

3 CHECK HARNESS AND CONNECTOR(ECM - KNOCK SENSOR)



(a) Disconnect the E15 ECM connector.
(b) Measure the resistance between the terminals of the E15 ECM connector.
Standard:

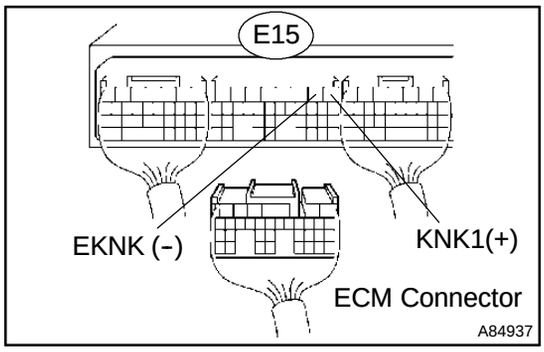
Tester Connection	Specified Condition
KNK1 (E15-1) - EKNK (E15-2)	120 to 280 kΩ at 20°C (68°F)

(c) Reconnect the ECM connector.

NG → **Go to step 5**

OK

4 INSPECT ECM(KNK1 VOLTAGE)



(a) Disconnect the E15 ECM connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminals of the E15 ECM terminal.
Standard:

Tester Connection	Specified Condition
KNK1 (E15-1) - EKNK (E15-2)	4.5 to 5.5 V

(d) Reconnect the ECM connector.

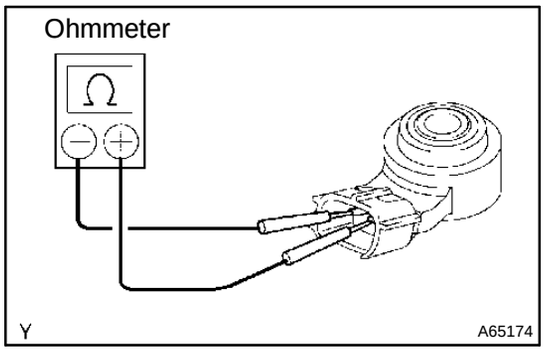
NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

NOTICE:
The fault may be intermittent. Check the wire harness and connectors carefully.

5 INSPECT KNOCK SENSOR



(a) Remove the knock sensor.
(b) Measure the resistance between the terminals.
Standard:

Tester Connection	Specified Condition
KNK1 (K1-1) - EKNK (K1-2)	120 to 280 kΩ at 20°C (68°F)

(c) Reinstall the knock sensor.

NG → **REPLACE KNOCK SENSOR**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

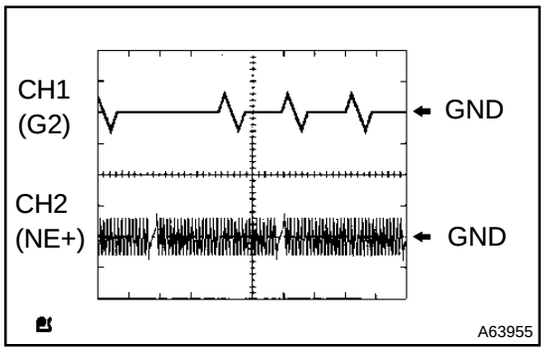
DTC	P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC	P0339	CRANKSHAFT POSITION SENSOR "A" CIRCUIT INTERMITTENT

CIRCUIT DESCRIPTION

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pickup coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pickup coil is made of an iron core and magnet. The sensor plate rotates and as each tooth passes through the pickup coil, a pulse signal is created. The pickup coil generates 34 signals per engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine speed. Using these calculations, the fuel injection time and ignition timing are controlled.

DTC No.	DTC Detection Condition	Trouble Area
P0335	• No crankshaft position sensor signal to ECM while cranking (2 trip detection logic) • No crankshaft position sensor signal to ECM at engine speed of 600 rpm or more (2 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Sensor plate (crankshaft) • ECM
P0339	In conditions (a), (b) and (c), no crankshaft position sensor (NE) signal is input for 0.05 seconds or more. (a) Engine speed 1,000 rpm or more (b) Starter signal is OFF (c) 3 seconds or more have elapsed after starter signal was switched from ON to OFF	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Sensor plate (crankshaft) • ECM



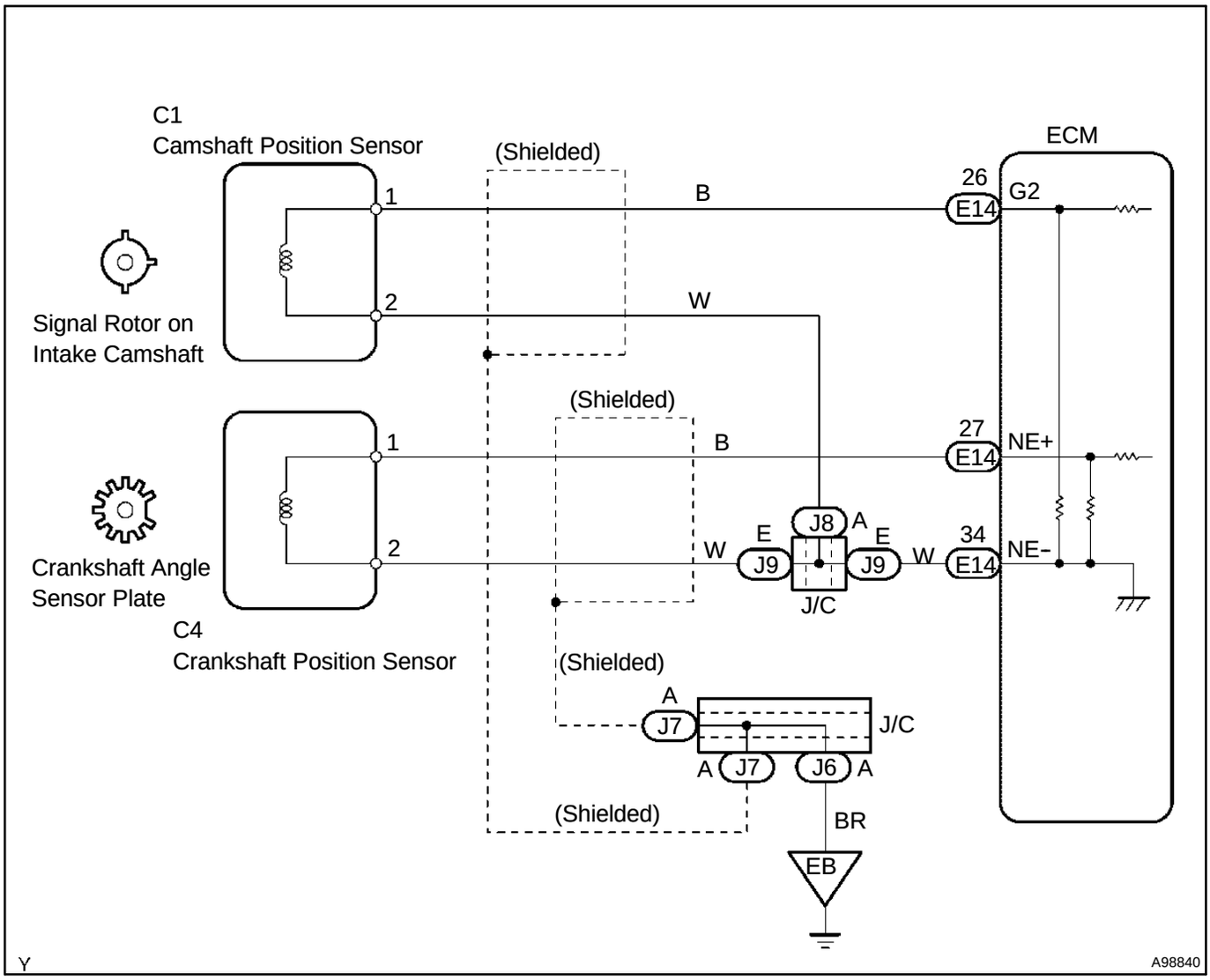
Reference: Inspection using the oscilloscope.

HINT:

- The correct waveform is as shown on the left.
- G2 stands for the camshaft position sensor signal, and NE+ stands for the crankshaft position sensor signal.

Item	Contents
Terminal	CH1: G2 - NE- CH2: NE+ - NE-
Equipment Setting	5V/Division, 20ms/Division
Condition	While cranking or idling

WIRING DIAGRAM



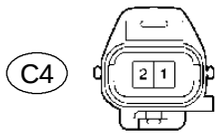
INSPECTION PROCEDURE

HINT:

- If no problem is found in the diagnostic troubleshooting procedure of DTC P0335, troubleshoot the engine mechanical systems.
- Check the value on the intelligent tester II.
  (a) Connect the intelligent tester II to the DLC3.
  (b) Start the engine and turn the intelligent tester II ON.
  (c) Select the following menu items: Powertrain / Engine and ECT / Data List / Engine SPD.
- The engine speed can be confirmed in the Data List using the intelligent tester II. If there are no NE signals from the crankshaft position sensor despite the engine revolving, the engine speed will be indicated as zero. If the voltage output of the crankshaft position sensor is insufficient, the engine speed will be indicated as lower than the actual engine rpm.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT CRANKSHAFT POSITION SENSOR(RESISTANCE)

Component Side:



Crankshaft Position Sensor

Y A73303

(a) Disconnect the C4 crankshaft position sensor connector.
(b) Measure the resistance between terminals 1 and 2.

Standard:

Tester Connection	Specified Condition
1 – 2	1,630 to 2,740 Ω at cold
1 – 2	2,065 to 3,225 Ω at hot

HINT:
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately –10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

(c) Reconnect the crankshaft position sensor connector.

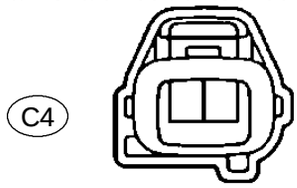
NG → **REPLACE CRANKSHAFT POSITION SENSOR (See page 14–95 of Pub. No. RM925E COROLLA)**

OK

2 CHECK HARNESS AND CONNECTOR(CRANKSHAFT POSITION SENSOR – ECM)

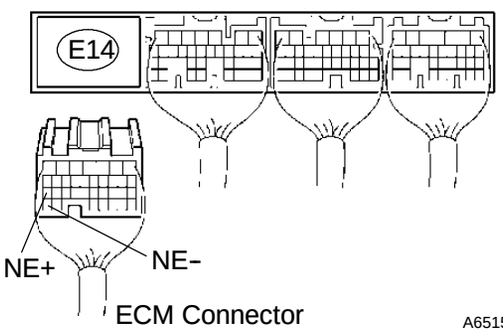
Wire Harness Side:

Crankshaft Position Sensor Connector



Front View

A66132



ECM Connector

A65159

(a) Disconnect the C4 crankshaft position sensor connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Crankshaft position sensor (C4–1) – NE+ (E14–27)	Below 1 Ω
Crankshaft position sensor (C4–2) – NE– (E14–34)	Below 1 Ω

Standard (Check for short):

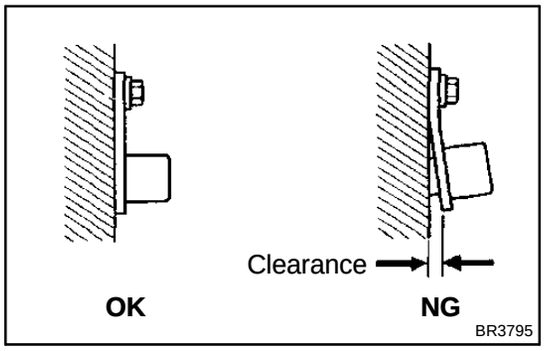
Tester Connection	Specified Condition
Crankshaft position sensor (C4–1) or NE+ (E14–27) – Body ground	10 kΩ or higher
Crankshaft position sensor (C4–2) or NE– (E14–34) – Body ground	10 kΩ or higher

(d) Reconnect the crankshaft position sensor connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK SENSOR INSTALLATION(CRANKSHAFT POSITION SENSOR)



(a) Check the crankshaft position sensor installation.
OK: The crankshaft position sensor is installed properly.

NG → **SECURELY REINSTALL SENSOR**

OK

4	CHECK CRANKSHAFT POSITION SENSOR PLATE(TEETH OF SENSOR PLATE(CRANKSHAFT))

(a) Check the teeth of the sensor plate.
OK: The plate does not have any cracks or deformation.

NG → **REPLACE CRANKSHAFT POSITION SENSOR PLATE (CRANKSHAFT)**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0340	CAMSHAFT POSITION SENSOR ”A” CIRCUIT (BANK 1 OR SINGLE SENSOR)

DTC	P0341	CAMSHAFT POSITION SENSOR ”A” CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)

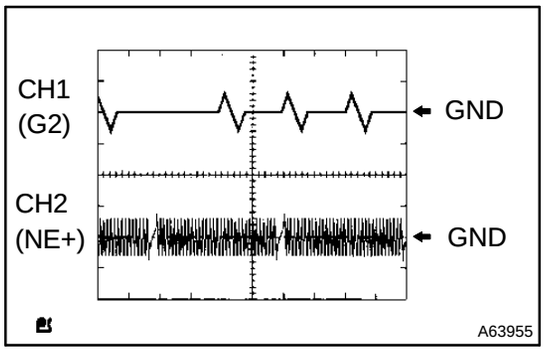
CIRCUIT DESCRIPTION

The camshaft position sensor consists of a magnet and an iron core which is wrapped with copper wire, and is installed on the cylinder head. When the camshaft rotates, each of 3 teeth on the camshaft passes through the camshaft position sensor. This activates the internal magnet in the sensor, generating a voltage in the copper wire. The camshaft rotation is synchronized with the crankshaft rotation. When the crankshaft turns twice the voltage is generated 3 times in the camshaft position sensor. The generated voltage in the sensor acts as a signal, allowing the ECM to locate the camshaft position. This signal is then used to control ignition timing, fuel injection timing, and the VVT system.

DTC No.	DTC Detection Condition	Trouble Area
P0340	• No camshaft position sensor signal to ECM during cranking (2 trip detection logic) • No camshaft position sensor signal to ECM at engine speed of 600 rpm or more (1 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Camshaft • Jumped tooth of timing chain • ECM
P0341	While crankshaft rotates twice, camshaft position sensor signal is input to ECM 12 times or more (1 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Camshaft • Jumped tooth of timing chain • ECM

HINT:

- DTC P0340 indicates a malfunction related to the camshaft position sensor (+) circuit (the wire harness between the ECM and camshaft position sensor, and the camshaft position sensor itself).
- DTC P0341 indicates a malfunction related to the camshaft position sensor (–) circuit (the wire harness between the ECM and camshaft position sensor, and the camshaft position sensor itself).



Reference: Inspection using the oscilloscope.

HINT:

- The correct waveform is as shown on the left.
- G2 stands for the camshaft position sensor signal, and NE+ stands for the crankshaft position sensor signal.

Item	Contents
Terminal	CH1: G2 – NE– CH2: NE+ – NE–
Equipment Setting	5V/Division, 20ms/Division
Condition	While cranking or idling

WIRING DIAGRAM

Refer to DTC P0335 on page 05–136.

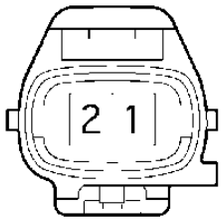
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	INSPECT CAMSHAFT POSITION SENSOR(RESISTANCE)

Component Side:



Camshaft Position Sensor

A64984

(a) Disconnect the C1 camshaft position sensor connector.

(b) Measure the resistance between the terminals of the camshaft position sensor.

Standard:

Tester Connection	Specified Condition
1 – 2	835 to 1,400 Ω at cold
1 – 2	1,060 to 1,645 Ω at hot

HINT:

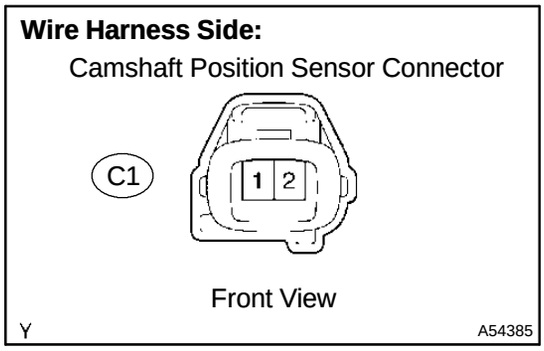
Terms ”cold” and ”hot” refer to the temperature of the coils. ”Cold” means approximately –10° to 50°C (14° to 122°F). ”Hot” means approximately 50° to 100°C (122° to 212°F).

(c) Reconnect the camshaft position sensor connector.

NG → **REPLACE CAMSHAFT POSITION SENSOR (See page 14–95 of Pub. No. RM925E COROLLA)**

OK

2 CHECK HARNESS AND CONNECTOR(CAMSHAFT POSITION SENSOR - ECM)



(a) Disconnect the C1 camshaft position sensor connector.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.

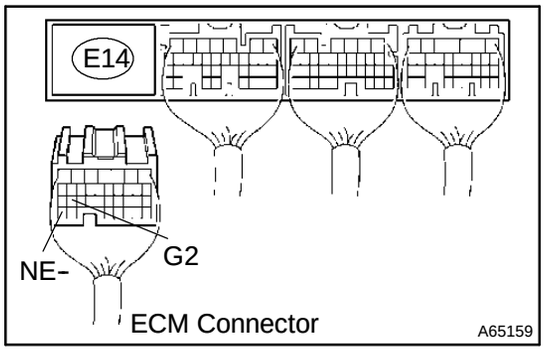
Standard (Check for open):

Tester Connection	Specified Condition
Camshaft position sensor (C1-1) - G2 (E14-26)	Below 1 Ω
Camshaft position sensor (C1-2) - NE- (E14-34)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Camshaft position sensor (C1-1) or G2 (E14-26) - Body ground	10 kΩ or higher
Camshaft position sensor (C1-2) or NE- (E14-34) - Body ground	10 kΩ or higher

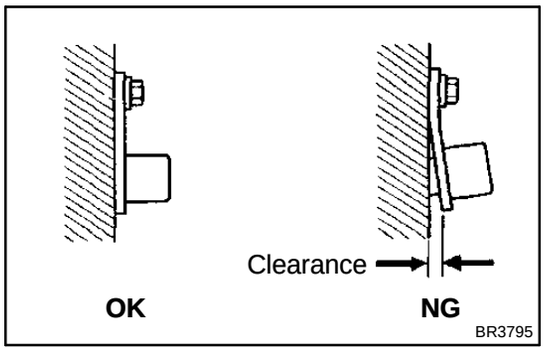
(d) Reconnect the camshaft position sensor connector.
(e) Reconnect the ECM connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 CHECK SENSOR INSTALLATION(CAMSHAFT POSITION SENSOR)



(a) Check the sensor installation.
OK: The sensor is installed properly.

NG → **SECURELY REINSTALL SENSOR**

OK

4 CHECK CAMSHAFT

(a) Check the teeth of the camshaft timing rotor.
OK: The teeth do not have any cracks or deformation.

NG → **REPLACE CAMSHAFT**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0351	IGNITION COIL "A" PRIMARY/SECONDARY CIRCUIT

DTC	P0352	IGNITION COIL "B" PRIMARY/SECONDARY CIRCUIT

DTC	P0353	IGNITION COIL "C" PRIMARY/SECONDARY CIRCUIT

DTC	P0354	IGNITION COIL "D" PRIMARY/SECONDARY CIRCUIT

CIRCUIT DESCRIPTION

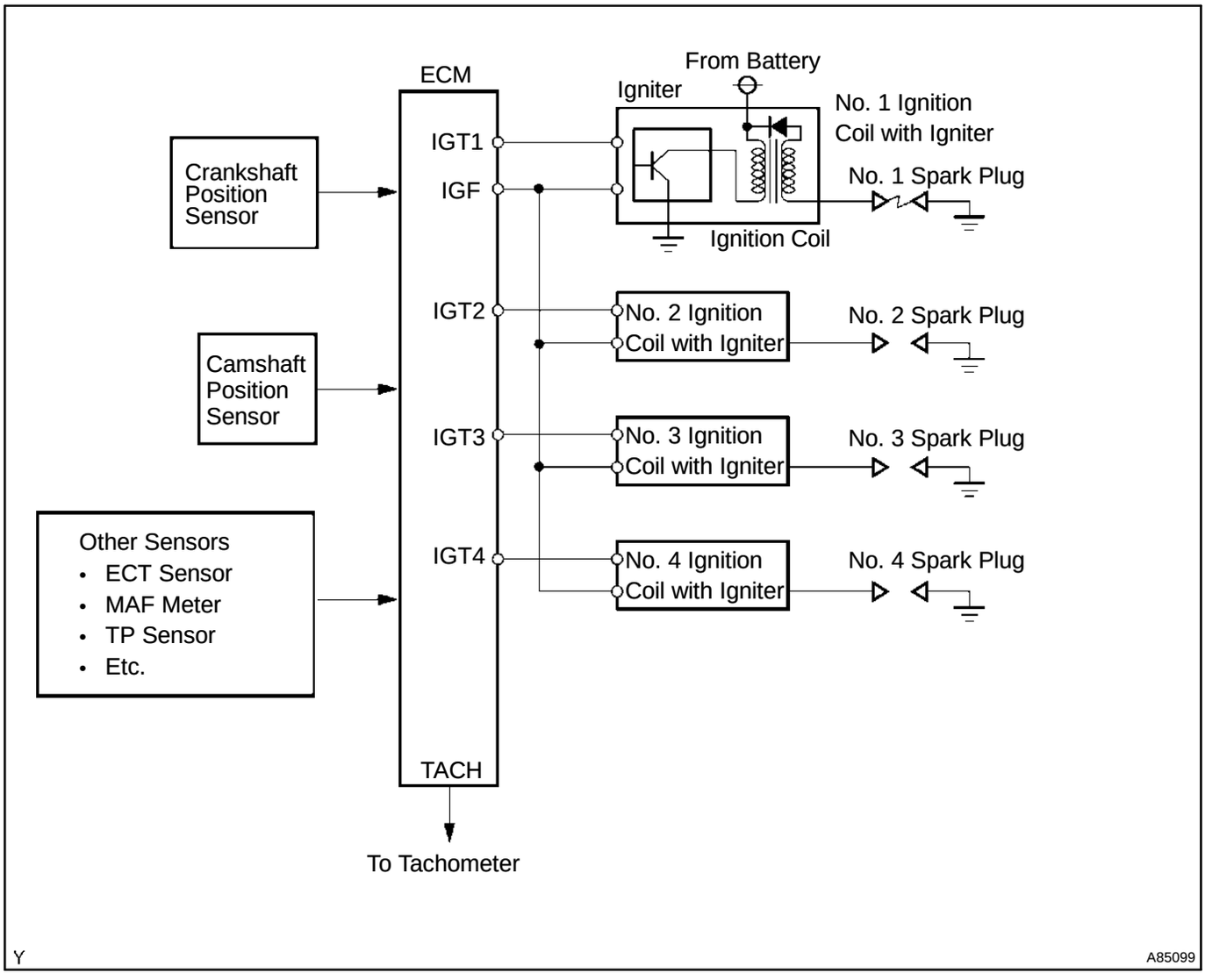
HINT:

- These DTCs indicate a malfunction related to the primary circuit.
- If DTC P0351 is displayed, check No. 1 ignition coil with igniter circuit.
- If DTC P0352 is displayed, check No. 2 ignition coil with igniter circuit.
- If DTC P0353 is displayed, check No. 3 ignition coil with igniter circuit.
- If DTC P0354 is displayed, check No. 4 ignition coil with igniter circuit.

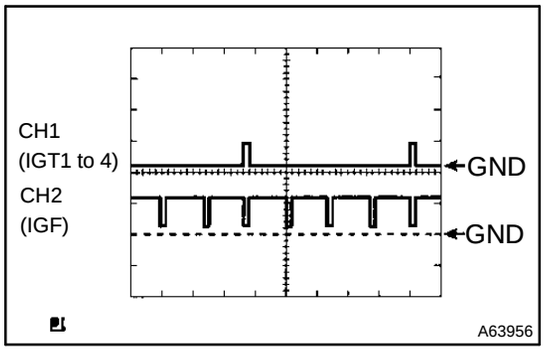
A Direct Ignition System (DIS) is used on this vehicle.

The DIS is a 1-cylinder ignition system which ignites one cylinder with one ignition coil. In the 1-cylinder ignition system, one spark plug is connected to the end of the secondary winding. High-voltage is generated in the secondary winding and is applied directly to the spark plug. The spark of the spark plug passes from the center electrode to the ground electrode.

The ECM determines the ignition timing and transmits the ignition (IGT) signals for each cylinder. Using the IGT signals, the ECM turns ON and OFF the power transistor inside the igniter, which switches ON and OFF a current to the primary coil. When the current to the primary coil is cut off, high-voltage is generated in the secondary coil and this voltage is applied to the spark plugs to create sparks inside the cylinders. As the ECM cuts the current to the primary coil, the igniter sends back the ignition confirmation (IGF) signal to the ECM.



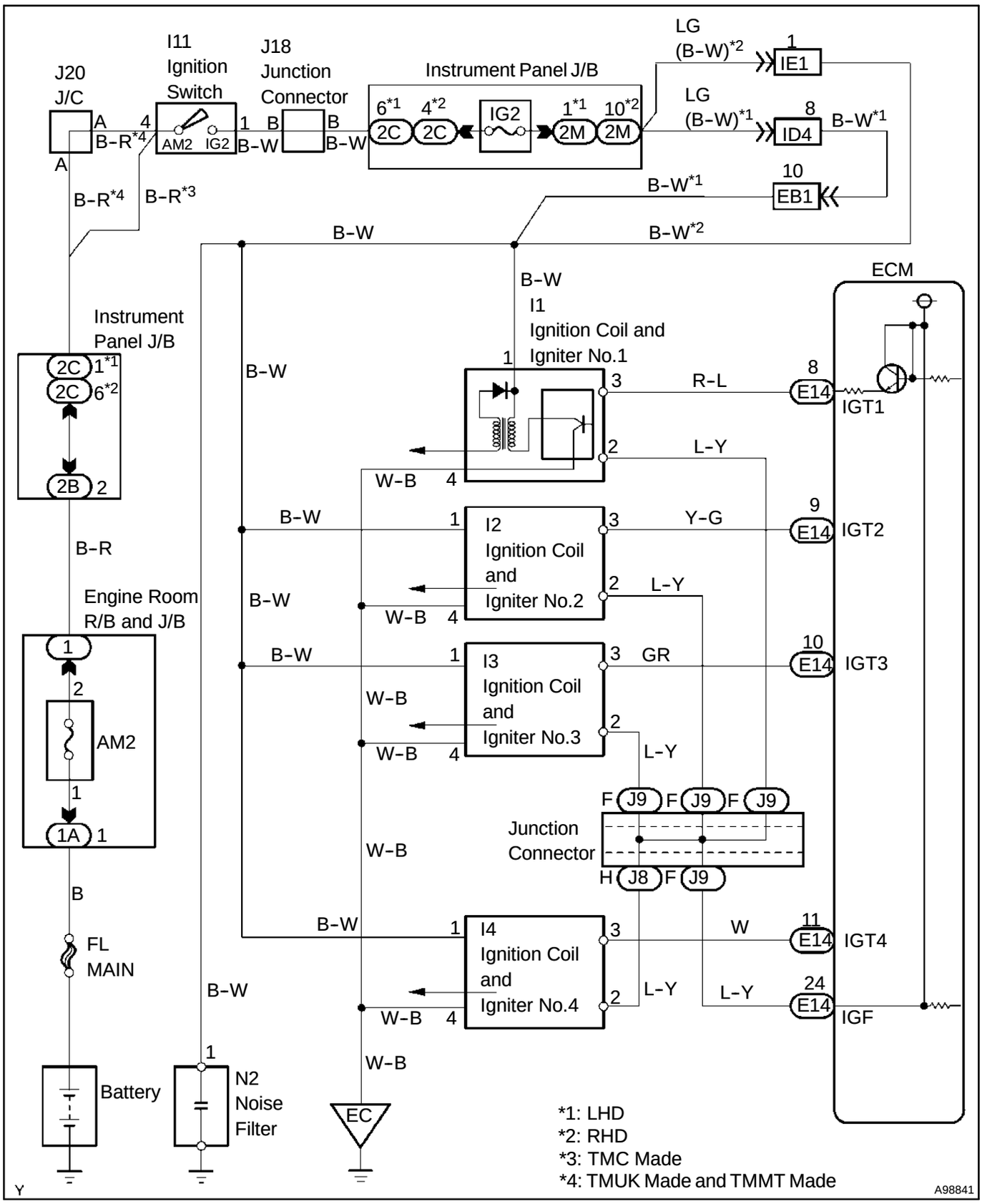
DTC No.	DTC Detection Condition	Trouble Area
P0351 P0352 P0353 P0354	No IGF signal to ECM while engine is running	• Ignition system • Open or short in IGF or IGT1 to 4 circuit from ignition coil with igniter to ECM • No. 1 to No. 4 ignition coil with igniter • ECM



Reference: Inspection using the oscilloscope.
While cranking or idling, check the waveform between terminals IGT1 to IGT4 and E1, and IGF and E1 of the E14 ECM connector.

Item	Contents
Terminal	CH1: IGT1, IGT2, IGT3, IGT4 - E1 CH2: IGF1 - E1
Equipment Setting	2 V/Division, 20 ms/Division
Condition	While cranking or idling

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	PERFORM SIMULATION TEST

(a) Clear DTCs (see page 05-19).

(b) Shuffle arrangement of the ignition coils with igniters.

NOTICE:

Do not shuffle the connectors.

(c) Perform the simulation test.

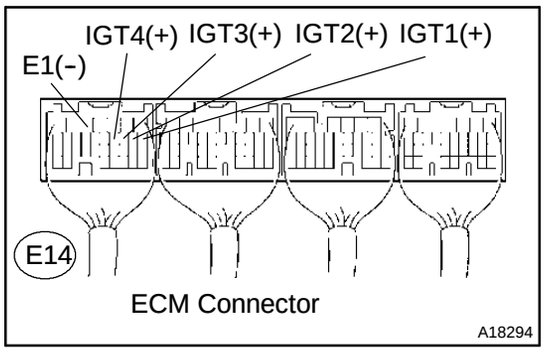
Result:

Display (DTC Output)	Proceed To
Same DTCs (that have been erased)	A
Other DTCs	B

B → **REPLACE IGNITION COIL ASSY**

A

2	INSPECT ECM(IGT1, IGT2, IGT3, IGT4 AND IGF1 SIGNAL)

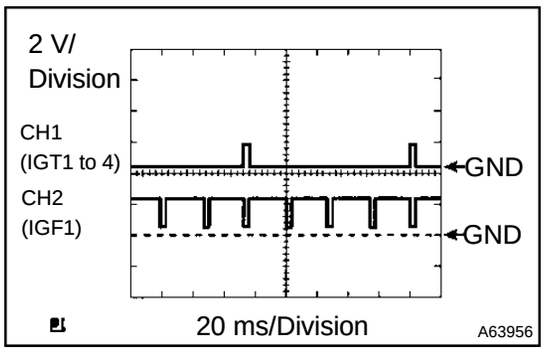


(a) Inspect the ECM waveform using the oscilloscope.

(1) While cranking or idling, check the waveform between the terminals of the E14 ECM connector.

OK:

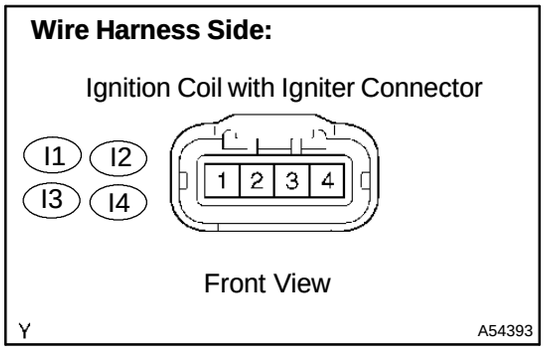
Tester Connection	Specified Condition
IGT1 (E14-8) - E1 (E14-5)	Correct waveform is as shown
IGT2 (E14-9) - E1 (E14-5)	Correct waveform is as shown
IGT3 (E14-10) - E1 (E14-5)	Correct waveform is as shown
IGT4 (E14-11) - E1 (E14-5)	Correct waveform is as shown

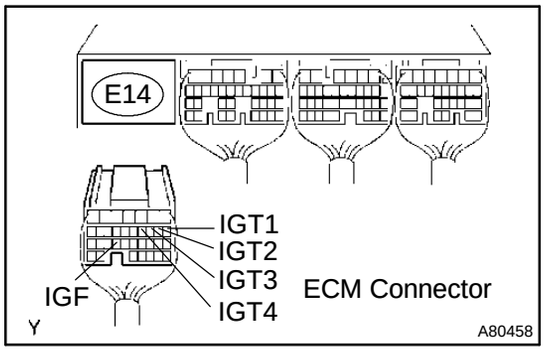


NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

3 CHECK HARNESS AND CONNECTOR(IGNITION COIL ASSY - ECM)





(a) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.

(b) Disconnect the E14 ECM connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I2-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I3-2) - IGF (E14-24)	Below 1 Ω
Ignition coil (I4-2) - IGF (E14-24)	Below 1 Ω

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-3) - IGT1 (E14-8)	Below 1 Ω
Ignition coil (I2-3) - IGT2 (E14-9)	Below 1 Ω
Ignition coil (I3-3) - IGT3 (E14-10)	Below 1 Ω
Ignition coil (I4-3) - IGT4 (E14-11)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I2-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I3-2) or IGF (E14-24) - Body ground	10 kΩ or higher
Ignition coil (I4-2) or IGF (E14-24) - Body ground	10 kΩ or higher

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-3) or IGT1 (E14-8) - Body ground	10 kΩ or higher
Ignition coil (I2-3) or IGT2 (E14-9) - Body ground	10 kΩ or higher
Ignition coil (I3-3) or IGT3 (E14-10) - Body ground	10 kΩ or higher
Ignition coil (I4-3) or IGT4 (E14-11) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.

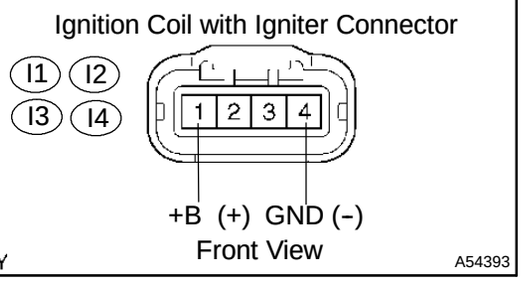
(e) Reconnect the ignition coil with igniter connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT SPARK PLUG(POWER SOURCE)

Wire Harness Side:



(a) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.

(b) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
GND (I1–4) – Body ground	Below 1 Ω
GND (I2–4) – Body ground	Below 1 Ω
GND (I3–4) – Body ground	Below 1 Ω
GND (I4–4) – Body ground	Below 1 Ω

(c) Turn the ignition switch to ON.

(d) Measure the voltage between the terminals of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
+B (I1–1) – GND (I1–4)	9 to 14 V
+B (I2–1) – GND (I2–4)	9 to 14 V
+B (I3–1) – GND (I3–4)	9 to 14 V
+B (I4–1) – GND (I4–4)	9 to 14 V

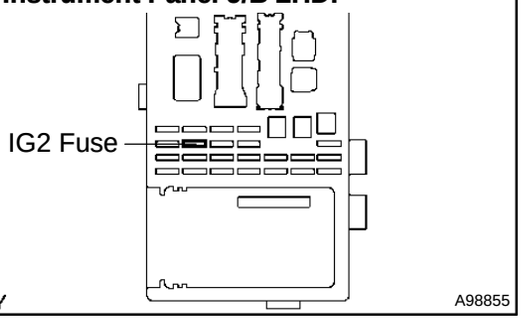
(e) Reconnect the ignition coil with igniter connector.

OK → **REPLACE IGNITION COIL ASSY**

NG

5 CHECK FUSE(IG2 FUSE)

Instrument Panel J/B LHD:



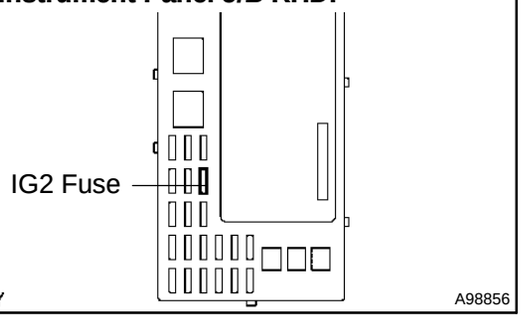
(a) Remove the IG2 fuse from the instrument panel J/B.

(b) Check the IG2 fuse resistance.

Standard: Below 1 Ω

(c) Reinstall the IG2 fuse.

Instrument Panel J/B RHD:



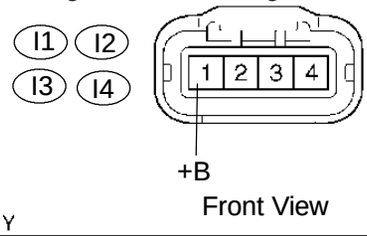
NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

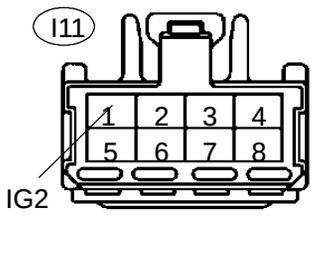
6	CHECK HARNESS AND CONNECTOR(IGNITION COIL ASSY - IGNITION SWITCH)

Wire Harness Side:

Ignition Coil with Igniter Connector



Wire Harness Side: Ignition Switch



(a) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.

(b) Disconnect the I11 ignition switch connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-1) - IG2 (I11-1)	Below 1 Ω
Ignition coil (I2-1) - IG2 (I11-1)	Below 1 Ω
Ignition coil (I3-1) - IG2 (I11-1)	Below 1 Ω
Ignition coil (I4-1) - IG2 (I11-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-1) or IG2 (I11-1) - Body ground	10 kΩ or higher
Ignition coil (I2-1) or IG2 (I11-1) - Body ground	10 kΩ or higher
Ignition coil (I3-1) or IG2 (I11-1) - Body ground	10 kΩ or higher
Ignition coil (I4-1) or IG2 (I11-1) - Body ground	10 kΩ or higher

(d) Reconnect the ignition coil with igniter connector.

(e) Reconnect the ignition switch connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

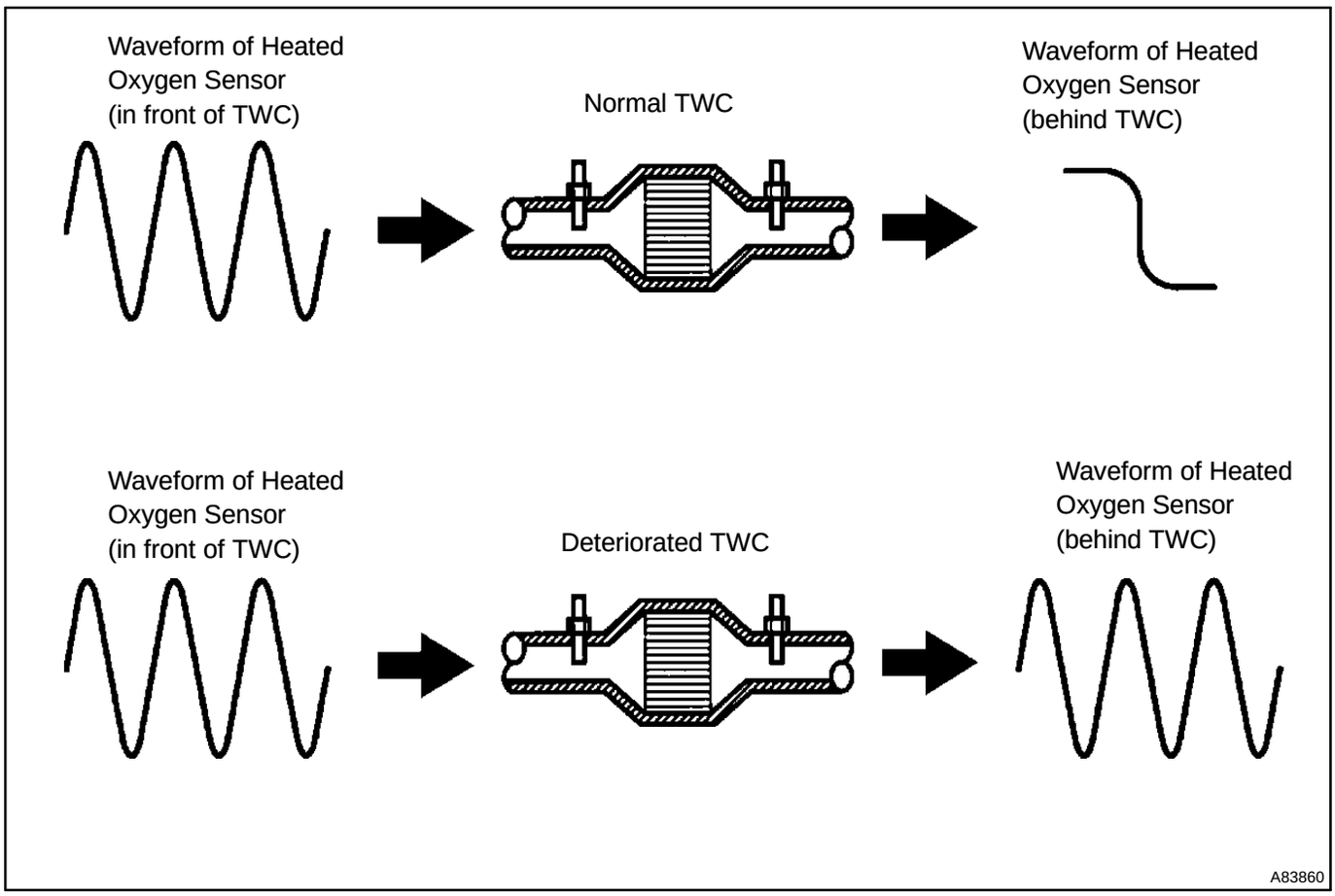
OK

REPLACE IGNITION COIL ASSY

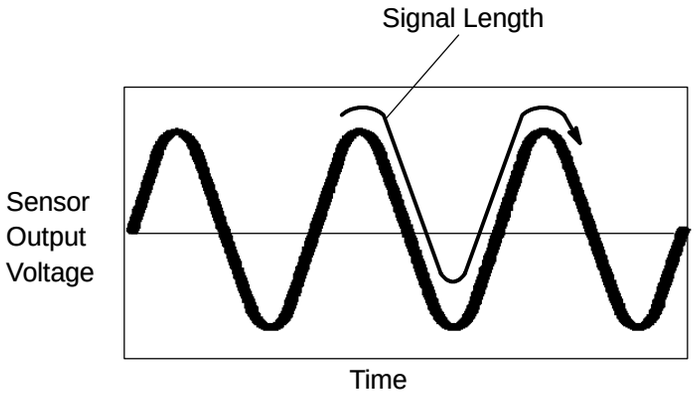
DTC	P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)

CIRCUIT DESCRIPTION

This vehicle has two heated oxygen sensors. One is located in front of the Three-Way Catalyst Converter (TWC), and the other is mounted behind the TWC. Each signal output of the sensors is converted into a waveform inside the ECM. The front heated oxygen sensor is used to monitor the air-fuel ratio by the ECM, and whose signal prompts the ECM to perform air-fuel ratio feedback control. As a result, the air-fuel ratio is balanced, and the waveform of the front heated oxygen sensor oscillates between rich and lean regularly. To determine whether or not the TWC performance has deteriorated, the ECM compares the waveforms of the front and rear heated oxygen sensors. While the TWC is functioning normally, the waveform of the rear heated oxygen sensor fluctuates between rich and lean more slowly than the front heated oxygen sensor waveform. When the rear heated oxygen sensor waveform frequently fluctuates, it indicates that the TWC performance deteriorates.



Heated Oxygen Sensor Signal Length:

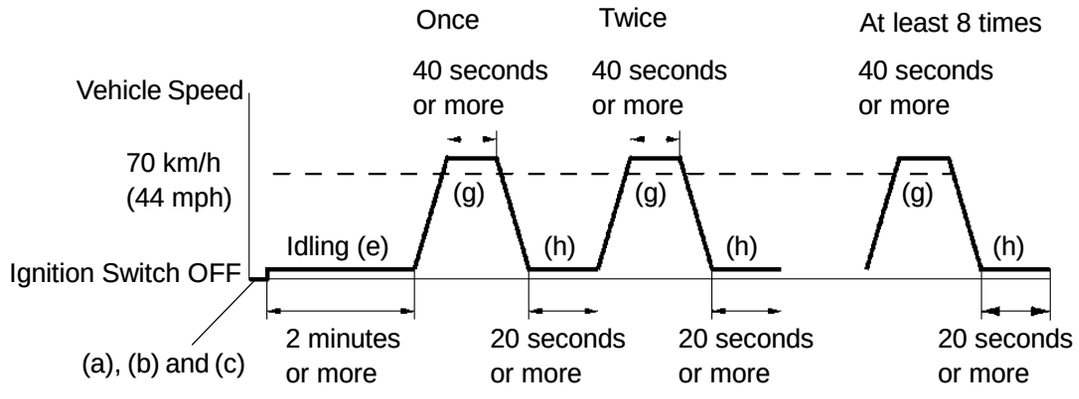


A82718

DTC No.	DTC Detection Condition	Trouble Area
P0420	After engine and TWC are warmed up, and while vehicle is driven within predetermined vehicle speed and engine speed range: Waveform of heated oxygen sensor (sensor 2) frequently fluctuates between rich and lean (2 trip detection logic)	• Gas leakage from exhaust system • Heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 2) • TWC

CONFIRMATION DRIVING PATTERN

Engine coolant temperature is more than 75°C (167°F)



Y

A58686

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Switch the ECM from normal mode to check mode using the intelligent tester ll (see page 05–19).
(d) Start the engine.
(e) Allow the engine to idle for 2 minutes.
(f) Warm up the engine until the engine coolant temperature reaches more than 75°C (167°F).
(g) Drive the vehicle at 70 km/h (44 mph) or more for 40 seconds or more.
(h) Stop the vehicle and allow the engine to idle for 20 seconds or more.
(i) Repeat the steps (g) and (h) at least 8 more times in one driving cycle.

HINT:
If a malfunction exists, the MIL is illuminated during step (i).

NOTICE:

If the conditions in this test are not strictly followed, no malfunction will be detected. If you do not have the intelligent tester II, turn the ignition switch to OFF after performing steps from (d) to (i), then perform steps (d) to (i) again.

WIRING DIAGRAM

Refer to DTC P0130 on page 05–75.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can help to determine whether the heated oxygen sensor and other potential trouble areas are malfunctioning.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine by running the engine at 2,500 rpm for approximately 3 minutes.
(4) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(5) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(6) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

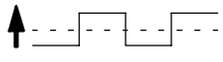
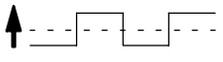
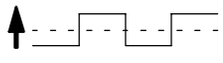
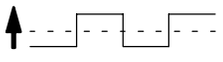
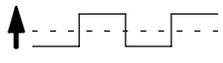
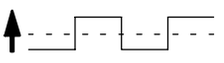
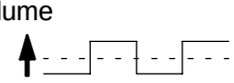
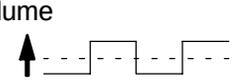
The heated oxygen sensor reacts in accordance with increases and decreases in fuel injection volume:

+25 % → Rich output: More than 0.5 V

–12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % –12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % –12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air–fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0420)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0420	A
P0420 and other DTCs	B

HINT:
If any DTCs other than P0420 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-28)**

A

2	CHECK FOR EXHAUST GAS LEAKAGE

OK: No gas leakage.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

3	INSPECT HEATED OXYGEN SENSOR(SENSOR 1) (See page 05-73)

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

4	INSPECT HEATED OXYGEN SENSOR(SENSOR 2) (See page 05-99)

OK: During air-fuel ratio feedback, the oxygen sensor output fluctuates between rich and lean.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

REPLACE THREE-WAY CATALYTIC CONVERTER (BOTH FRONT AND REAR TWC)

NOTICE:
On the damaged bank, replace both the front and rear catalysts.

DTC	P0443	EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT

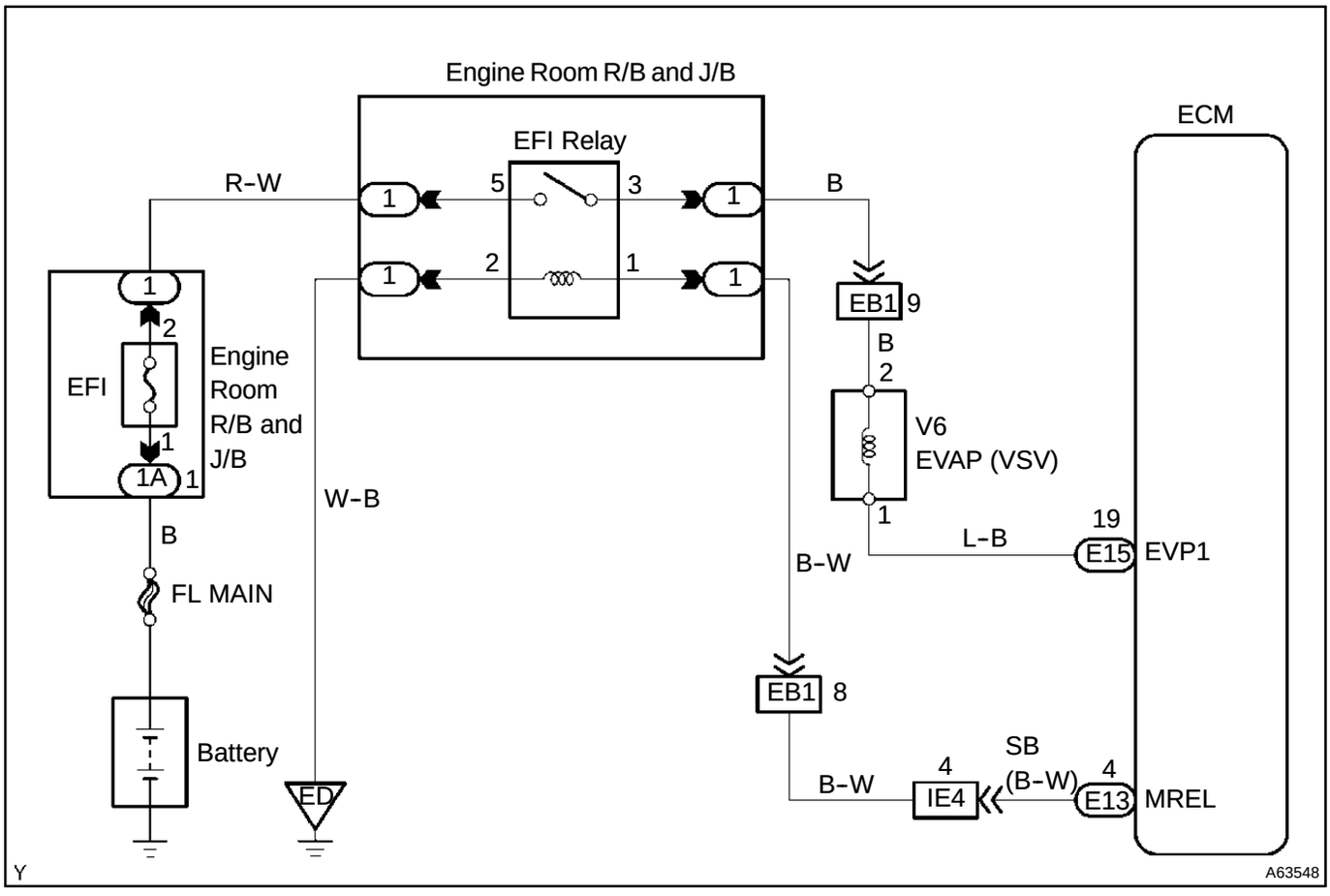
CIRCUIT DESCRIPTION

In order to reduce hydrocarbon (HC) emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

The ECM changes the duty signal to the EVAP VSV so that the intake of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is warmed up.

DTC No.	DTC Detection Condition	Trouble Area
P0443	Proper response to ECM command does not occur (1 trip detection logic)	• Open or short in EVAP VSV circuit • EVAP VSV • ECM

WIRING DIAGRAM

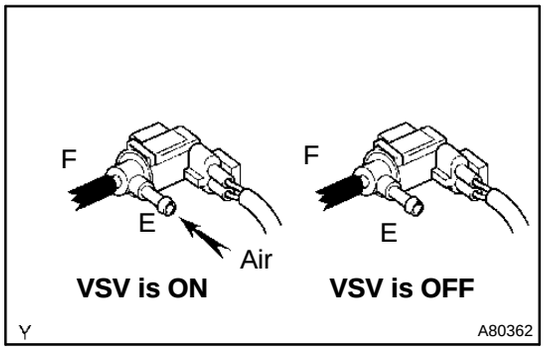


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(EVAP VSV)



(a) Disconnect the vacuum hose of the EVAP VSV.
(b) Connect the intelligent tester II to the DLC3.
(c) Start the engine and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Active Test / Purge VSV. Press the right or left button.
(e) Check if the disconnected port applies suction to your finger when operating the EVAP VSV using the intelligent tester II.

Standard:

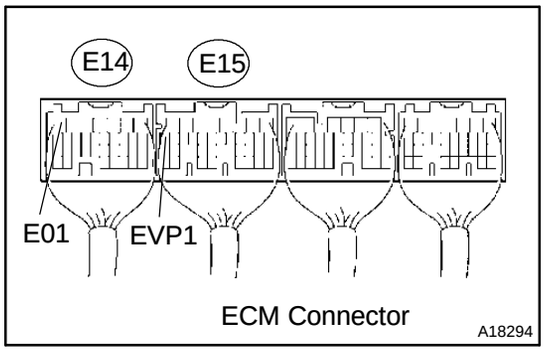
Tester Operation	Specified Condition
VSV is ON	Applies suction to your finger
VSV is OFF	Applies no suction to your finger

(f) Reconnect the vacuum hose.

OK → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-10)**

NG

2 INSPECT ECM(CHECK VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E14 and E15 ECM connectors.

Standard:

Tester Connection	Specified Condition
EVP1 (E15-19) - E01 (E14-7)	9 to 14 V

OK → **REPLACE ECM** **(See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

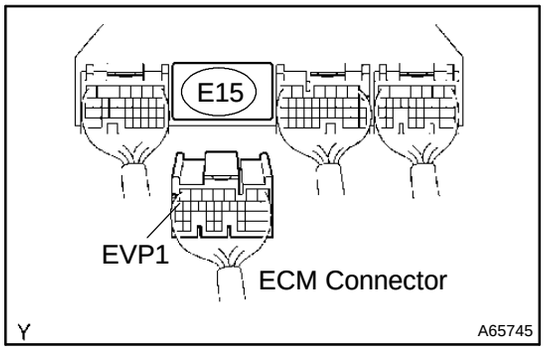
3 INSPECT VACUUM SWITCHING VALVE(OPERATION OF EVAP VSV) (See page12-3)

OK: Air flows when the battery voltage is applied to the EVAP VSV.

NG → **REPLACE VACUUM SWITCHING VALVE**

OK

4 CHECK HARNESS AND CONNECTOR(ECM - EVAP VSV)



(a) Disconnect the E15 ECM connector.
(b) Disconnect the V6 EVAP VSV connector.
(c) Check the resistance.

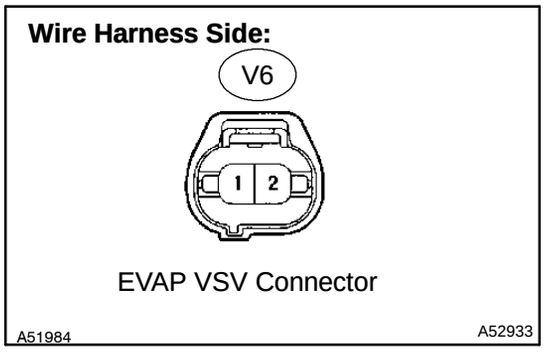
Standard (Check for open):

Tester Connection	Specified Condition
EVAP VSV (V6-1) - EVP1 (E15-19)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EVAP VSV (V6-1) or PRG (E15-19) - Body ground	10 kΩ or higher

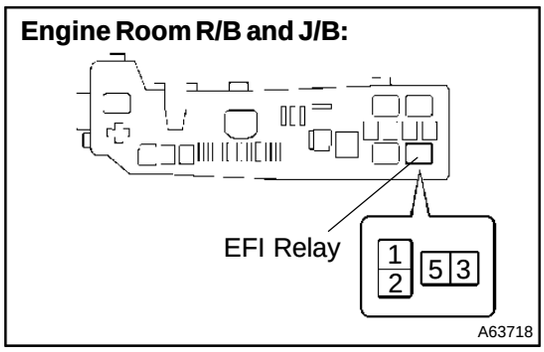
(d) Reconnect the ECM connector.
(e) Reconnect the EVAP VSV connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK HARNESS AND CONNECTOR(EFI RELAY - EVAP VSV)



(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Disconnect the V6 EVAP VSV connector.
(c) Check the resistance.

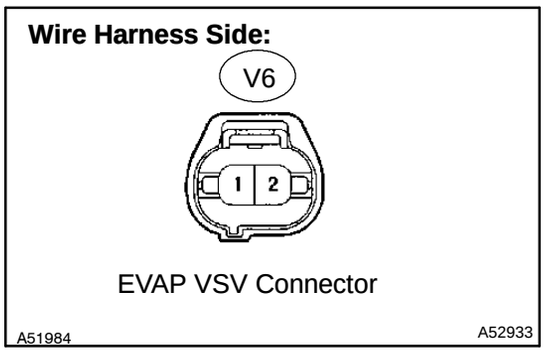
Standard (Check for open):

Tester Connection	Specified Condition
EVAP VSV (V6-2) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EVAP VSV (V6-2) or EFI relay (3) - Body ground	10 kΩ or higher

(d) Reinstall the EFI relay.
(e) Reconnect the EVAP VSV connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

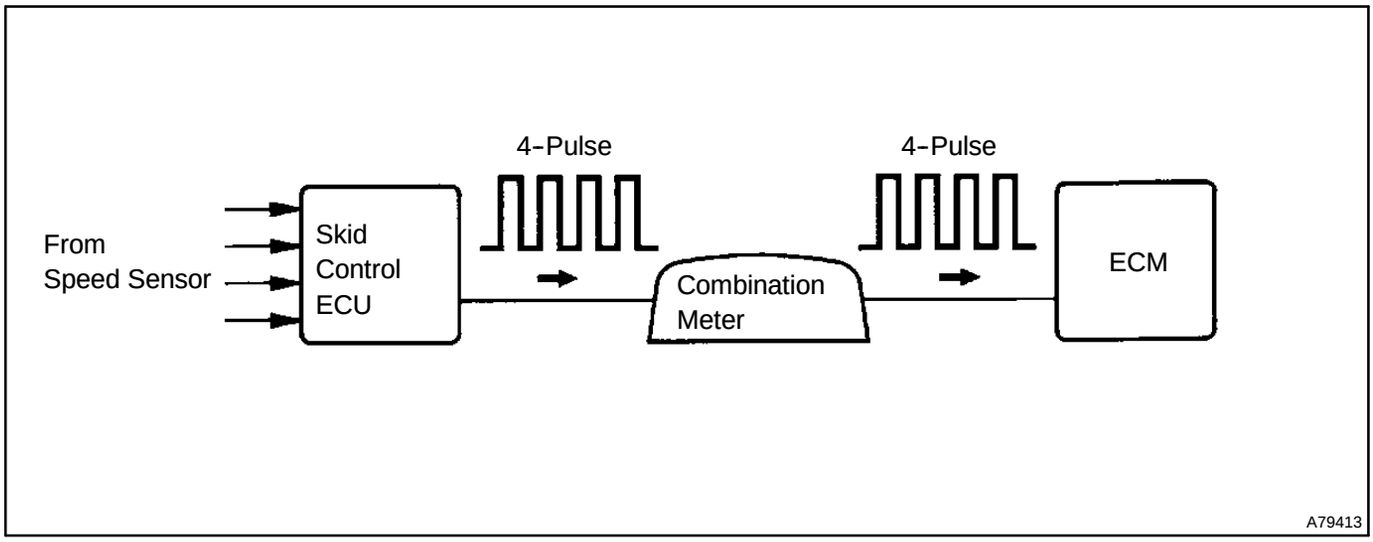
OK

INSPECT ECM POWER SOURCE CIRCUIT **(See page 05-194)**

DTC	P0500	VEHICLE SPEED SENSOR "A"

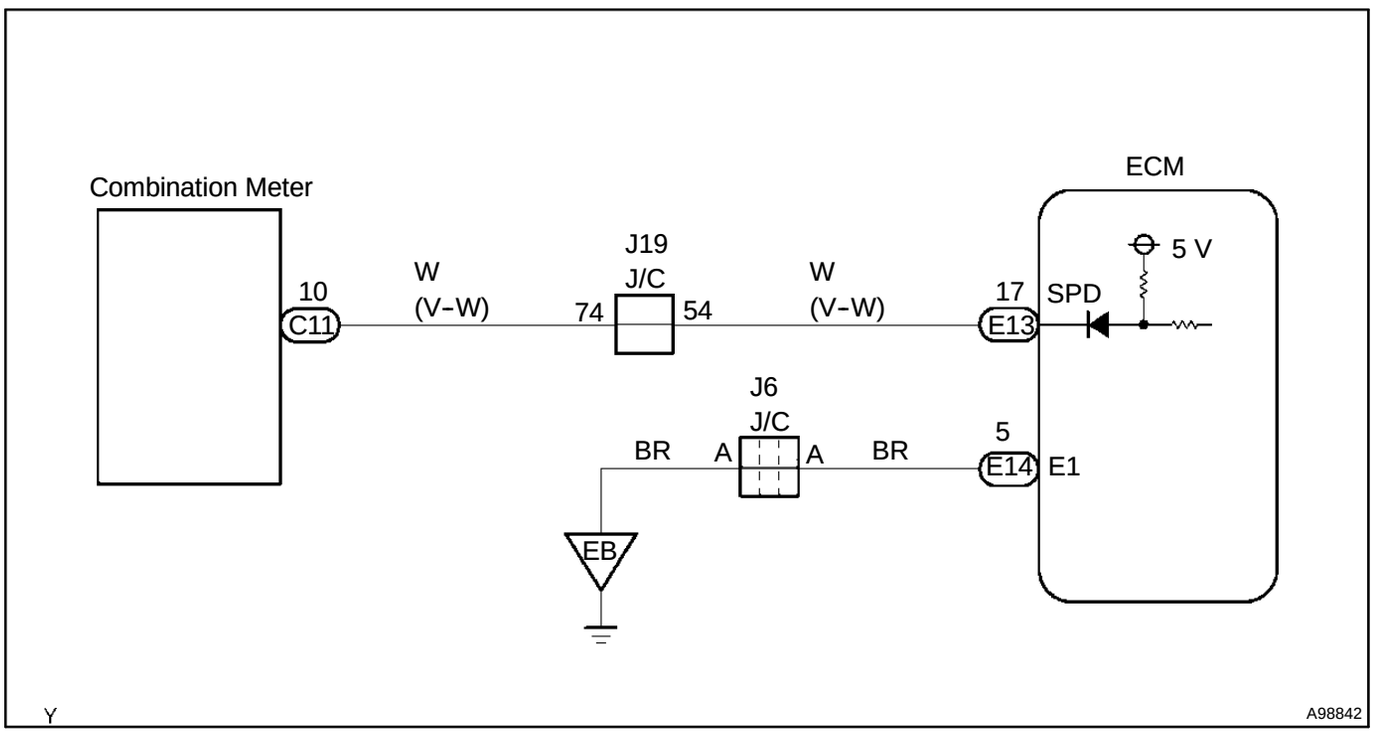
CIRCUIT DESCRIPTION

The speed sensor detects the wheel speed and sends appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a 4-pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detection Condition	Trouble Area
P0500	Conditions (a), (b) and (c) continue for 8 seconds or more (2 trip detection logic): (a) Engine coolant temperature is more than 60°C (140°F) (b) Engine speed is between 2,000 rpm and 3,000 rpm (c) No speed signal is input to ECM	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OPERATION OF SPEEDOMETER

(a) Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
HINT:
The vehicle speed sensor is operating normally if the speedometer reading is normal.

NG → **CHECK SPEEDOMETER CIRCUIT**
(See page 05-1293 of Pub. No. RM925E COROLLA)

OK

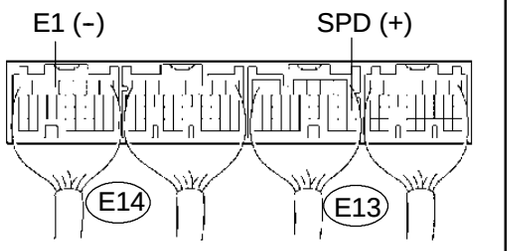
2	READ VALUE OF INTELLIGENT TESTER II(VEHICLE SPEED)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Vehicle SPD.
(d) Check the vehicle speed at the engine speed of 2,000 rpm or more when the vehicle is running.
Standard: Same value as the actual vehicle speed.

OK → **CHECK FOR INTERMITTENT PROBLEMS**
(See page 05-10)

NG

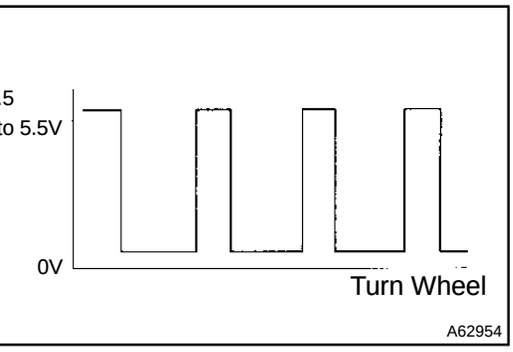
3 INSPECT ECM(SPD VOLTAGE)



(a) Shift the transmission gear selector lever to the neutral position.
(b) Jack up the vehicle.
(c) Turn the ignition switch to ON.
(d) Measure the voltage between the terminals of the E13 and E14 ECM connectors as the wheel is turned slowly.
Standard:

Tester Connection	Specified Condition
SPD (E13-17) - E1 (E14-5)	Generated intermittently

HINT:
The output voltage should fluctuate up and down similarly to the diagram on the left when the wheel is turned slowly.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0504	BRAKE SWITCH "A"/"B" CORRELATION

CIRCUIT DESCRIPTION

In this system, the signal of the stop lamp switch is used to judge whether the brake system is abnormal or not.

The stop lamp switch has a duplex system (signals STP and ST1-) to detect abnormalities. When the signals of depressing and releasing the brake pedal are detected simultaneously, the ECM interprets this as a malfunction of the stop lamp switch.

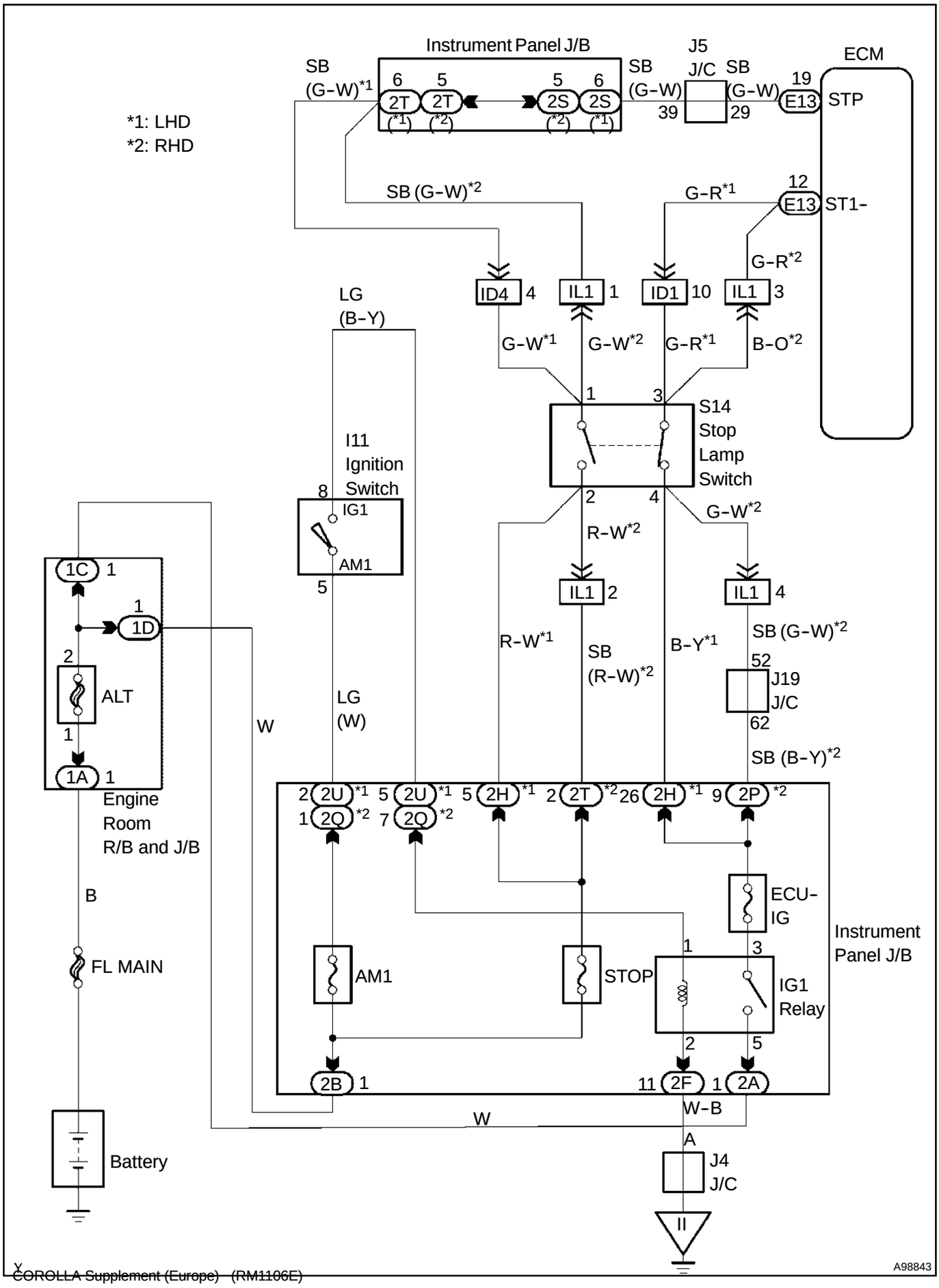
HINT:

Normal condition is as shown in the table.

Signal	Brake Pedal Released	In Transition	Brake Pedal Depressed
STP	OFF	ON	ON
ST1-	ON	ON	OFF

DTC No.	DTC Detection Condition	Trouble Area
P0504	Conditions (a), (b) and (c) continue for 0.5 seconds or more: (a) Ignition switch ON (b) Brake pedal released (c) STP signal is OFF when ST1- signal is OFF	• Short in stop lamp switch signal circuit • Stop lamp fuse • Stop lamp switch • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

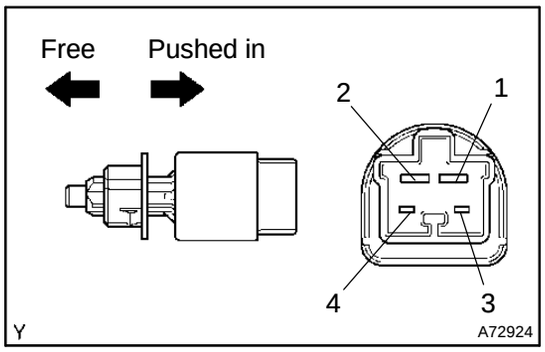
1 CHECK OPERATION OF STOP LAMP

(a) Check if the stop lamps go on and off normally when the brake pedal is depressed and released.
OK: The stop lamps turn ON when you depress the brake pedal.

NG → **REPAIR OR REPLACE STOP LAMP SWITCH CIRCUIT**

OK

2 INSPECT STOP LAMP SWITCH ASSY



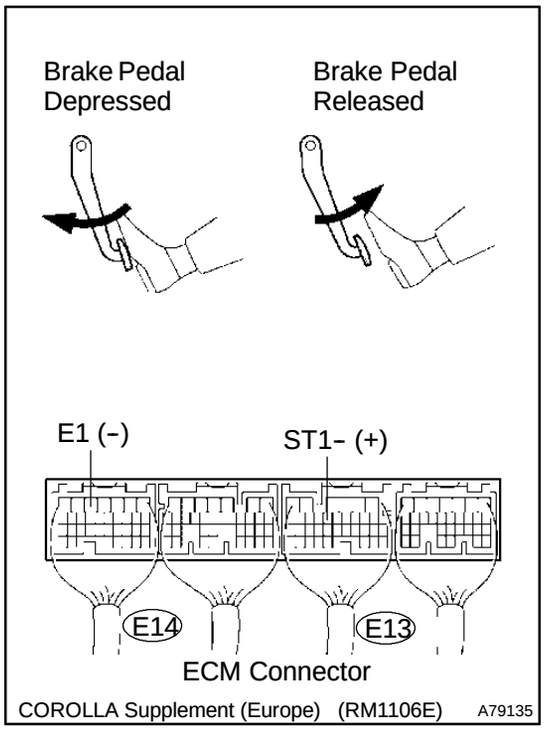
(a) Check the resistance between each pair of terminals.
Standard:

Switch Position	Tester Connection	Specified Condition
Switch pin free	3 - 4	10 kΩ or higher
Switch pin pushed in	3 - 4	Below 1 Ω

NG → **REPLACE STOP LAMP SWITCH ASSY**

OK

3 READ VALUE OF INTELLIGENT TESTER II(STP SIGNAL AND ST1- VOLTAGE)



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Stop Light SW.
(d) Check the result.
Standard:

Brake Pedal	Specified Condition
Depressed	STP Signal ON
Released	STP Signal OFF

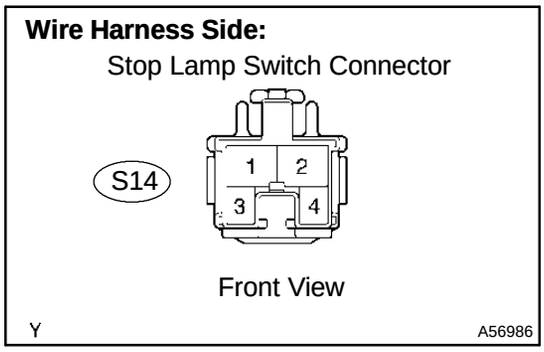
(e) Measure the voltage between the terminals of the E13 and E14 ECM connectors.
Standard:

Tester Connection	Brake Pedal	Specified Condition
ST1- (E13-12) - E1 (E14-5)	Depressed	Below 1.5 V
ST1- (E13-12) - E1 (E14-5)	Released	7.5 to 14 V

OK	CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

NG

4 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH - ECM)

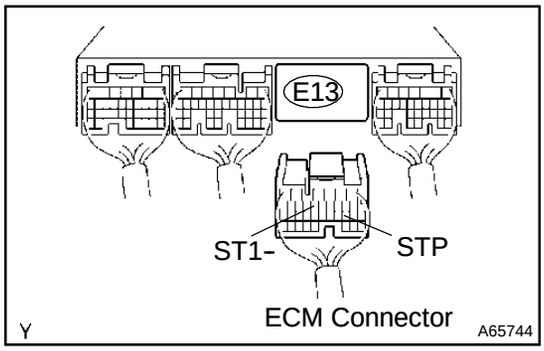


(a) Disconnect the S14 stop lamp switch connector.
(b) Disconnect the E13 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Stop lamp switch (S14-1) - STP (E13-19)	Below 1 Ω
Stop lamp switch (S14-3) - ST1- (E13-12)	Below 1 Ω

(d) Reconnect the stop lamp switch connector.
(e) Reconnect the ECM connector.



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC P0505 IDLE AIR CONTROL SYSTEM

CIRCUIT DESCRIPTION

The idle speed is controlled by the ETCS (Electronic Throttle Control System).
The ETCS is composed of the throttle actuator which operates the throttle valve, and the throttle position sensor which detects an opening angle of the throttle valve.
The ECM controls the throttle motor to provide the proper throttle valve opening angle to obtain the target idling speed.

DTC No.	DTC Detection Condition	Trouble Area
P0505	Idling speed continues to vary greatly from target speed (2 trip detection logic)	• ETCS • Air induction system • PCV hose connection

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0505)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0505	A
P0505 and other DTCs	B

HINT:
If any DTCs other than P0505 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-28)**

A

2 CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

3	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.
OK: No leak in the air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

CHECK ELECTRONIC THROTTLE CONTROL SYSTEM **(See page 10–1)**

DTC	P0560	SYSTEM VOLTAGE

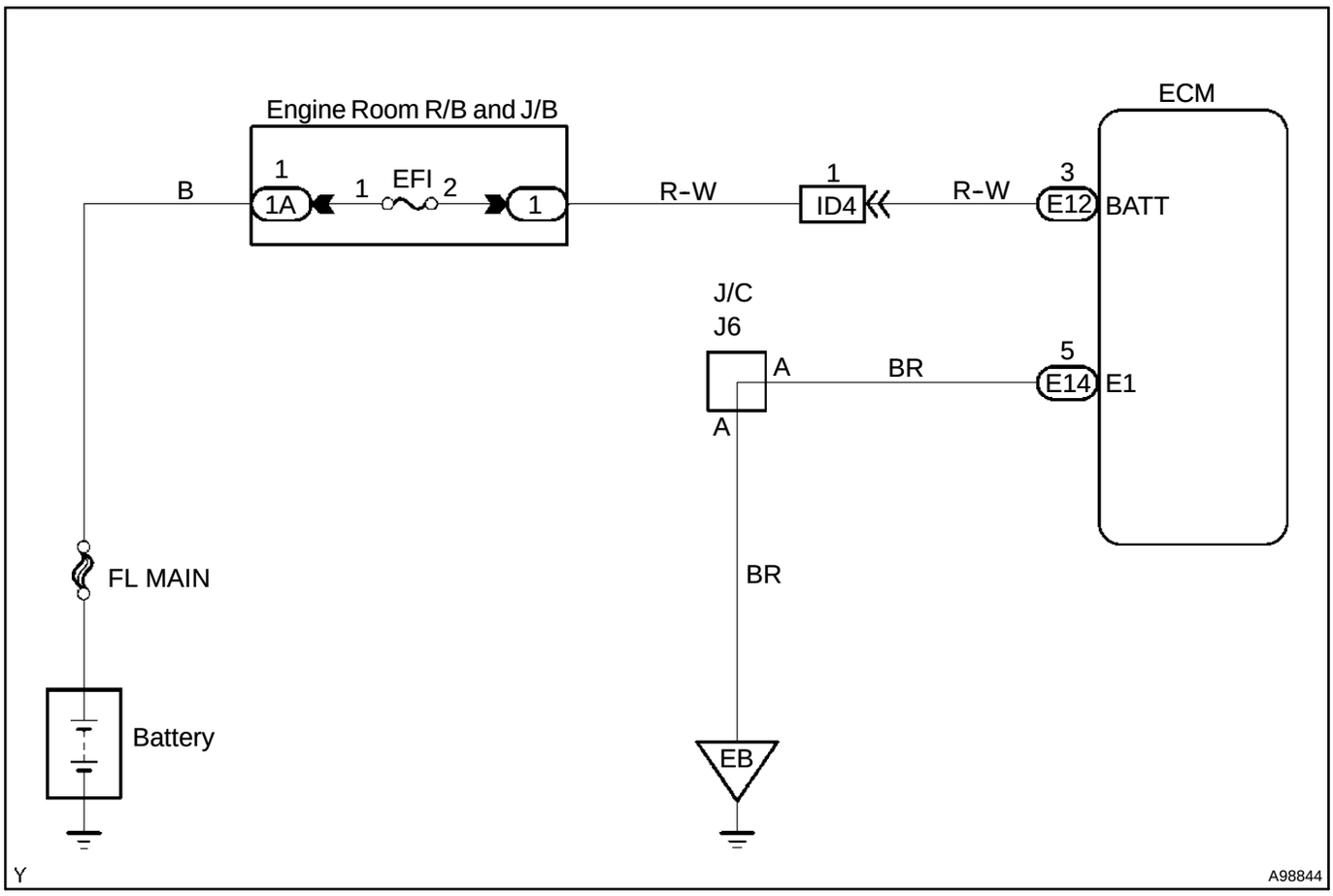
CIRCUIT DESCRIPTION

The battery supplies electricity to terminal BATT of the ECM even when the ignition switch is OFF. This electricity allows the ECM to store DTC histories, freeze frame data, fuel trim values, and other data.

DTC No.	DTC Detection Condition	Trouble Area
P0560	Open in backup power source circuit	• Open in backup power source circuit • ECM

HINT:
If DTC P0560 is set, the ECM does not store other DTCs.

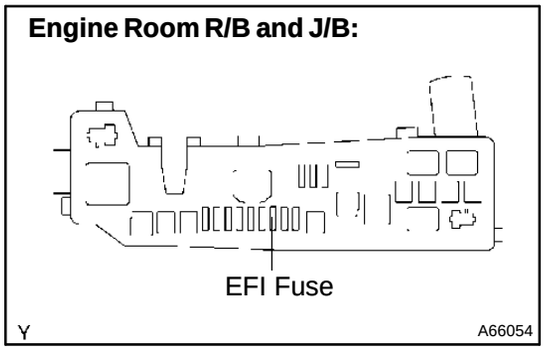
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK FUSE(EFI FUSE)

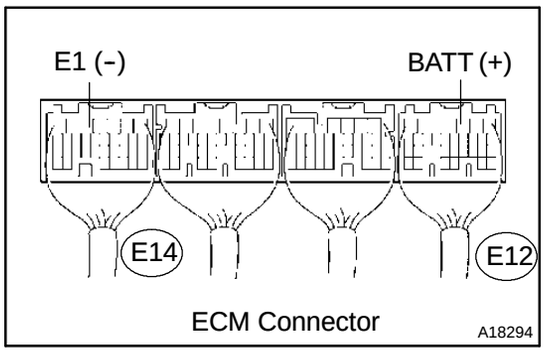


(a) Remove the EFI fuse from the engine room R/B and J/B.
(b) Check the EFI fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

2 INSPECT ECM(BATT VOLTAGE)



(a) Measure the voltage between the terminals of the E12 and E14 ECM connectors.
Standard:

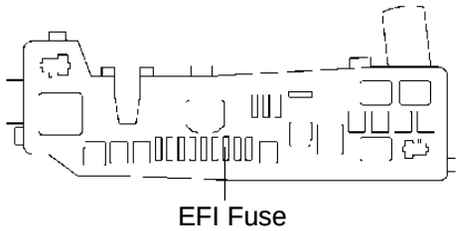
Tester Connection	Specified Condition
BATT (E12–3) – E1 (E14–5)	9 to 14 V

OK → **REPLACE ECM (See page 10–8 of Pub. No. RM1039E COROLLA)**

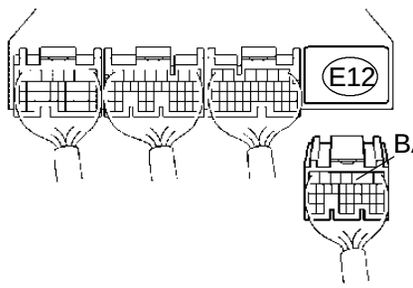
NG

3	CHECK HARNESS AND CONNECTOR(ECM - EFI FUSE, EFI FUSE - BATTERY)

Engine Room R/B and J/B:



Y A66054



Y ECM Connector A65748

(a) Check the harness and the connectors between the EFI fuse and ECM.

(1) Remove the EFI fuse from the engine room R/B and J/B.

(2) Disconnect the E12 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI fuse (2) - BATT (E12-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI fuse (2) or BATT (E12-3) - Body ground	10 kΩ or higher

(4) Reinstall the EFI fuse.

(5) Reconnect the ECM connector.

(b) Check the harness and the connector between the EFI fuse and battery.

(1) Remove the EFI fuse from the engine room R/B and J/B.

(2) Disconnect the battery cable.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Battery cable terminal - EFI fuse (1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Battery cable terminal or EFI fuse (1) - Body ground	10 kΩ or higher

(4) Reinstall the EFI fuse.

(5) Reconnect the battery cable.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ENGINE ROOM RELAY BLOCK

DTC	P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC	P0606	ECM/PCM PROCESSOR

DTC	P0607	CONTROL MODULE PERFORMANCE

DTC	P0657	ACTUATOR SUPPLY VOLTAGE CIRCUIT/OPEN

CIRCUIT DESCRIPTION

The ECM continuously monitors its internal memory status, internal circuits, and output signals to the throttle actuator. This self-check ensures that the ECM is functioning properly. If any malfunction is detected, the ECM sets appropriate DTCs and illuminates the MIL.

The ECM memory status is diagnosed by internal "mirroring" of the main CPU and the sub CPU to detect Random Access Memory (RAM) errors. The two CPUs also perform continuous mutual monitoring.

DTC No.	DTC Detection Condition	Trouble Area
P0604 P0606 P0607 P0657	ECM internal error	• ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0617	STARTER RELAY CIRCUIT HIGH

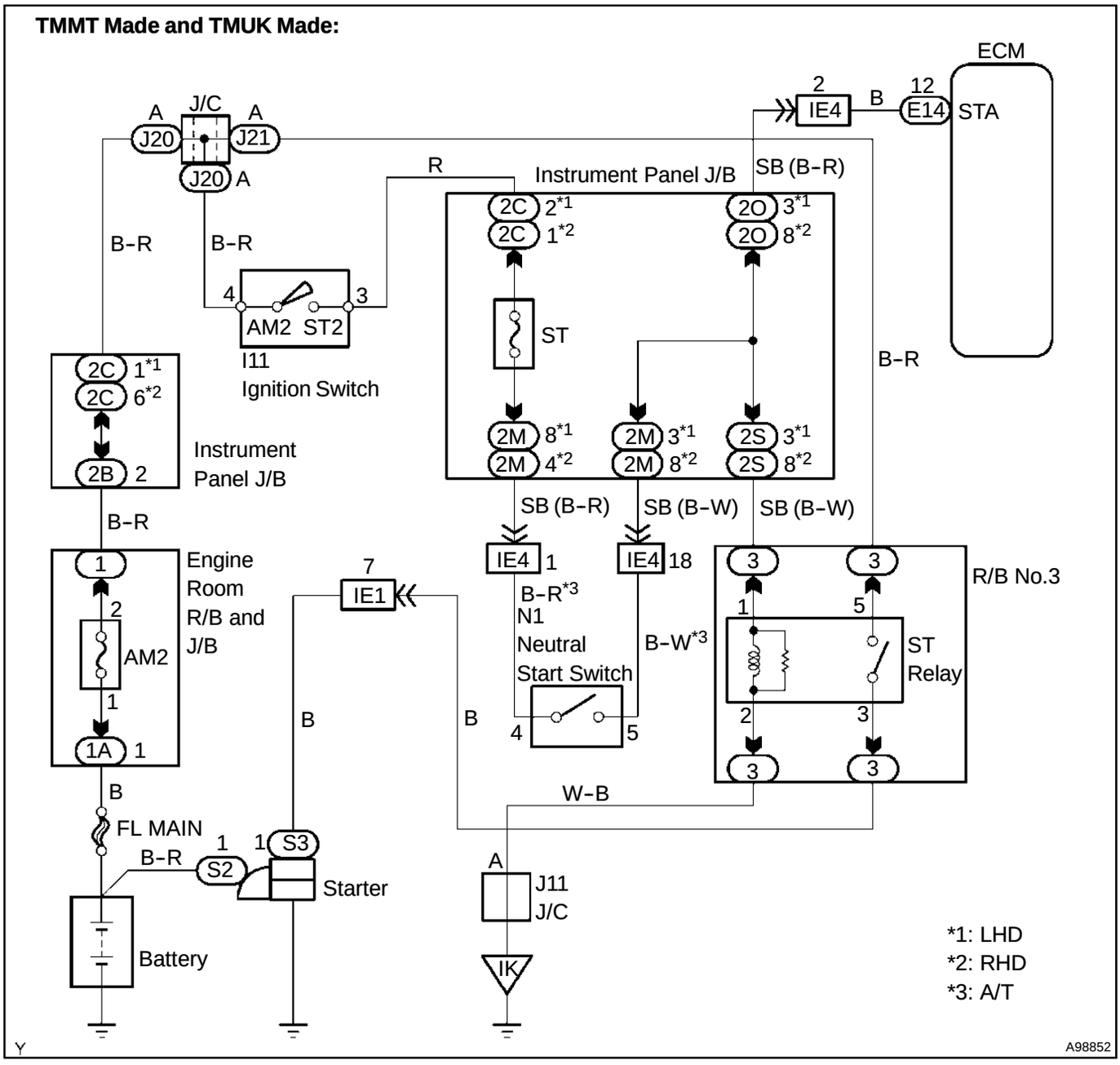
CIRCUIT DESCRIPTION

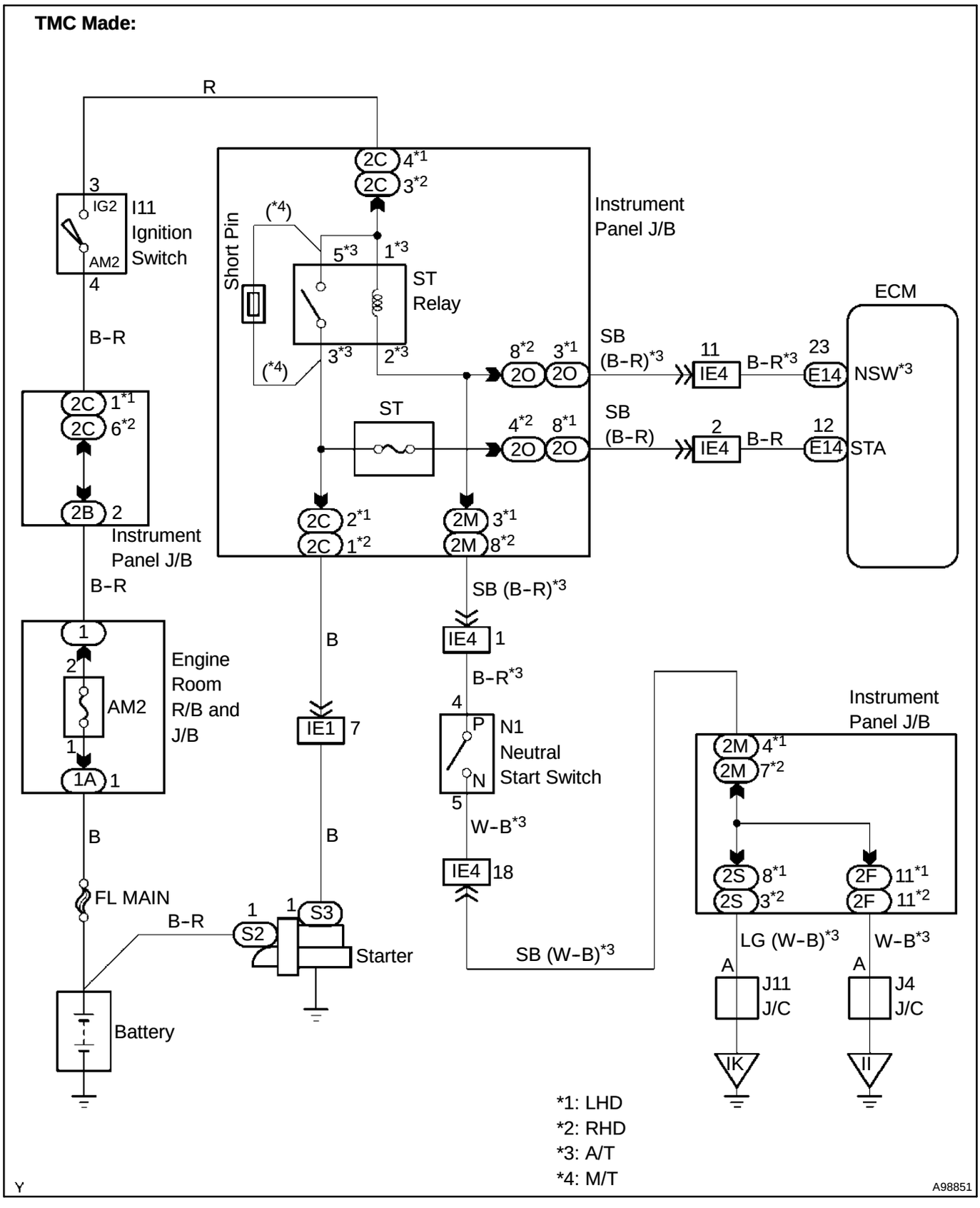
While the engine is being cranked, the battery voltage is applied to terminal STA of the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0617	When conditions (a), (b) and (c) are met when battery voltage of 10.5 V or more is applied for 20 seconds (a) Vehicle speed greater than 20 km/h (12 mph) (b) Engine speed greater than 1,000 rpm (c) STA signal ON	• Short in park/neutral position switch circuit (A/T) • Short in STA circuit • Park/neutral position switch (A/T) • ECM

WIRING DIAGRAM

TMMT Made and TMUK Made:




TMC Made:
R
3
IG2
I11
Ignition
Switch
AM2
4
B-R
2C 1*1
2C 6*2
2B 2
Instrument
Panel J/B
B-R
1
2
AM2
1
1A 1
Engine
Room
R/B and
J/B
B
FL MAIN
B-R
Battery
Short Pin
(*4)
5*3
1*3
ST
Relay
3*3
2*3
(*4)
2C 4*1
2C 3*2
Instrument
Panel J/B
ST
2C 2*1
2C 1*2
2M 3*1
2M 8*2
B
IE1 7
1
1
S3
S2
Starter
8*2 3*1
2O 2O
SB
(B-R)*3
11
IE4
B-R*3
23
E14
NSW*3
ECM
4*2 8*1
2O 2O
SB
(B-R)
2
IE4
B-R
12
E14
STA
SB (B-R)*3
IE4 1
B-R*3
4
P
N1
Neutral
Start Switch
N
5
W-B*3
IE4 18
SB (W-B)*3
Instrument
Panel J/B
2M 4*1
2M 7*2
2S 8*1
2S 3*2
2F 11*1
2F 11*2
LG (W-B)*3
W-B*3
A
J11
J/C
A
J4
J/C
IK
II
*1: LHD
*2: RHD
*3: A/T
*4: M/T
Y
A98851

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF INTELLIGENT TESTER II(STA SIGNAL)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Starter SIG.
(d) Check the result when the ignition switch is turned to the ON and START positions.

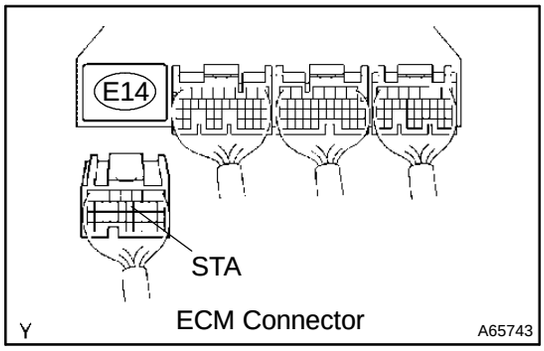
Standard:

Ignition Switch Position	ON	START
STARTER SIG	OFF	ON

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE** **(See page 05–13)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - ST RELAY)



(a) Disconnect the E14 ECM connector.
(b) Remove the ST relay from the R/B No.3 (TMMT and TMUK made) or instrument panel J/B (TMC made).
(c) Check the resistance.

Standard (Check for open):

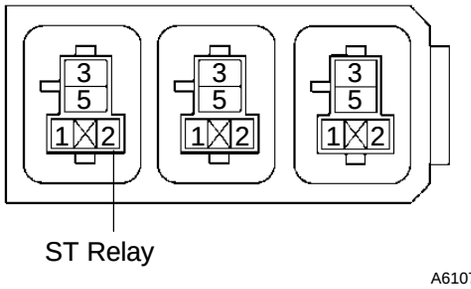
Tester Connection	Specified Condition
ST relay (1) – STA (E14–12)	Below 1 Ω

Standard (Check for short):

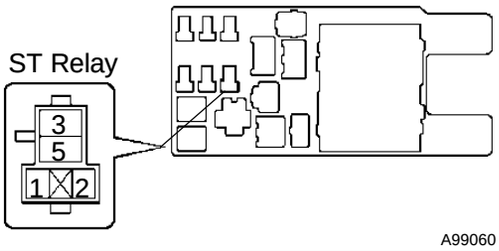
Tester Connection	Specified Condition
ST relay (1) or STA (E14–12) – Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reinstall the ST relay.

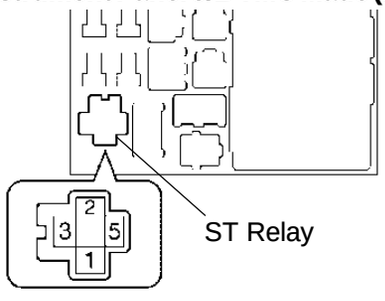
R/B No.3 TMMT Made, TMUK Made:



Instrument Panel J/B TMC Made (LHD):



Instrument Panel J/B TMC Made (RHD):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK →

REPLACE ECM **(See page 10–8 of Pub. No. RM1039E COROLLA)**

DTC	P2102	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW

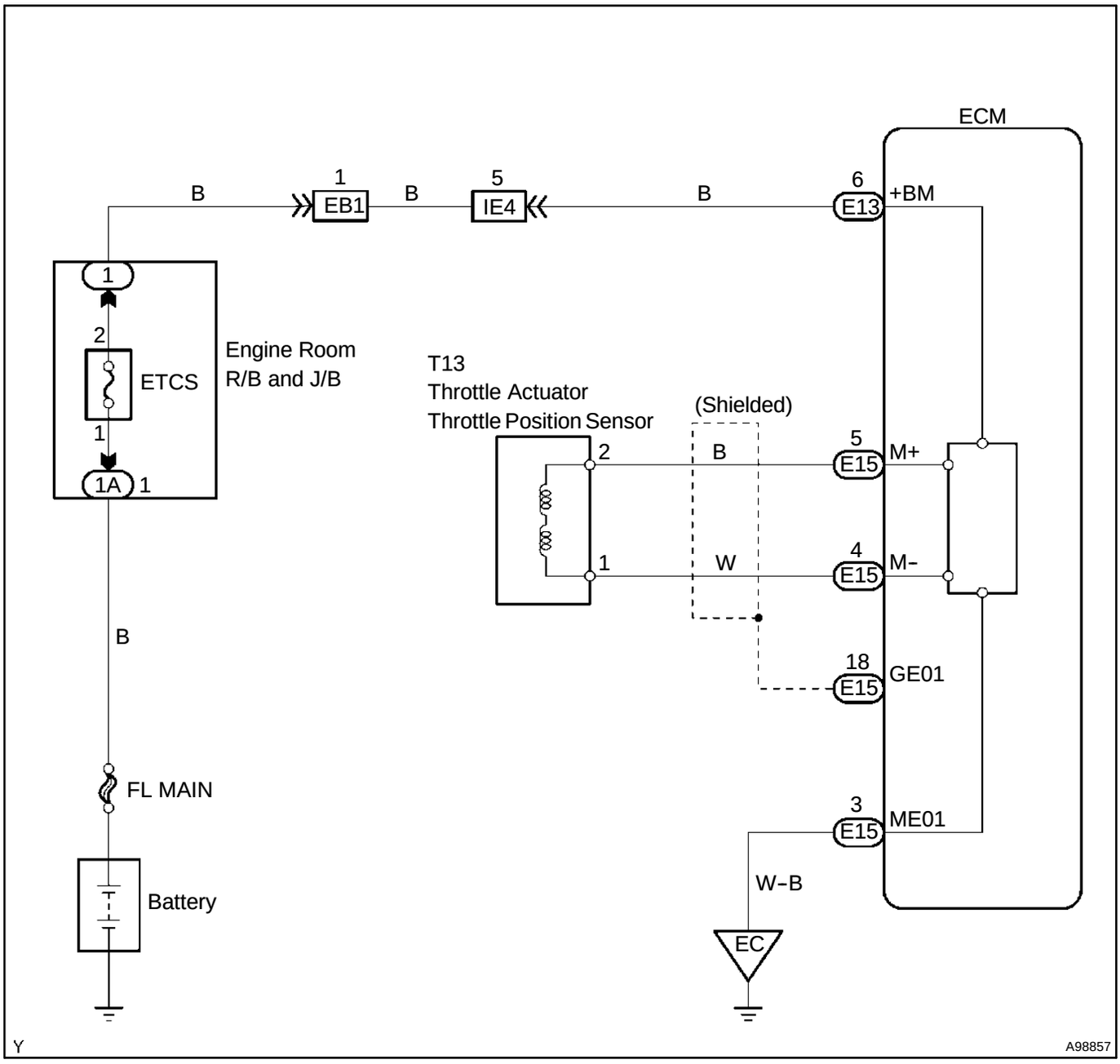
DTC	P2103	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

CIRCUIT DESCRIPTION

The throttle actuator is operated by the ECM and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body. It provides feedback to the ECM to control the throttle actuator in order to control the throttle valve opening angle properly in response to the driving condition.
If these malfunctions are detected, the ECM shuts down the power for the throttle actuator, and the throttle valve is locked at a certain angle by the return spring. Also, the whole electronically controlled throttle operation is cancelled until the system returns to normal and the ignition switch is turned to OFF.
HINT:
This ETCS (Electronic Throttle Control System) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds (1 trip detection logic): (a) Throttle actuator output duty ratio is 80 % or more (b) Throttle actuator current is 0.5 A or less	• Open in throttle actuator circuit • Throttle actuator • ECM
P2103	Either of following conditions is met (1 trip detection logic): • Throttle actuator current is 10 A or more for 0.1 seconds • Throttle actuator current is 7A or more for 0.6 seconds	• Short in throttle actuator circuit • Throttle actuator • Throttle valve • Throttle body assembly • ECM

WIRING DIAGRAM

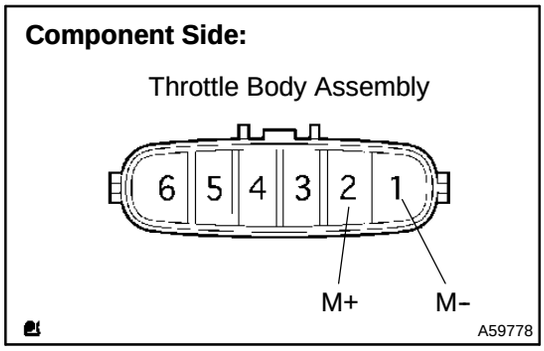


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT THROTTLE BODY ASSY(RESISTANCE OF THROTTLE ACTUATOR)



(a) Disconnect the T13 throttle body connector.
(b) Measure the resistance between the terminals of the throttle actuator.
Standard:

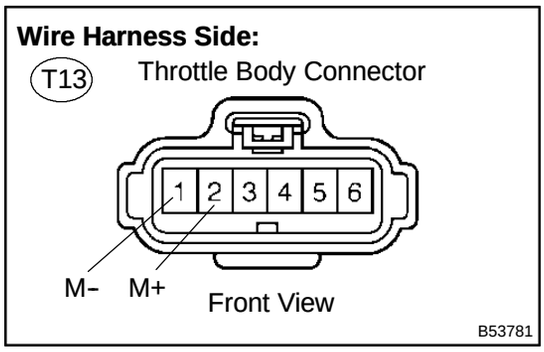
Tester Connection	Specified Condition
M+ (T13-2) - M- (T13-1)	0.3 to 100 Ω at 20°C (68°F)

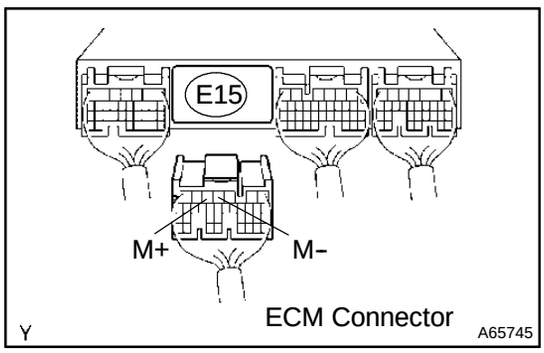
(c) Reconnect the throttle body connector.

NG → **REPLACE THROTTLE BODY ASSY (See page 10-6)**

OK

2 CHECK HARNESS AND CONNECTOR(THROTTLE ACTUATOR - ECM)





(a) Disconnect the T13 throttle body connector.
(b) Disconnect the E15 ECM connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
M+ (T13-2) - M+ (E15-5)	Below 1 Ω
M- (T13-1) - M- (E15-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
M+ (T13-2) or M+ (E15-5) - Body ground	10 kΩ or higher
M- (T13-1) or M- (E15-4) - Body ground	10 kΩ or higher

(d) Reconnect the throttle body connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT THROTTLE BODY ASSY

(a) Visually check for foreign objects between the throttle valve and the housing.
Also, check if the valve can open and close smoothly.
OK: The throttle valve is not contaminated with foreign objects and can move smoothly.

NG → **REMOVE FOREIGN OBJECT AND CLEAN THROTTLE BODY**

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P2111	THROTTLE ACTUATOR CONTROL SYSTEM – STUCK OPEN

DTC	P2112	THROTTLE ACTUATOR CONTROL SYSTEM – STUCK CLOSED

CIRCUIT DESCRIPTION

The throttle actuator is operated by the ECM and it opens and closes the throttle valve using gears. The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body. It provides feedback to the ECM to control the throttle actuator in order to control the throttle valve opening angle properly in response to the driving condition. If these malfunctions are detected, the ECM shuts down the power for the throttle actuator, and the throttle valve is locked at a certain angle by the return spring. Also, the whole electronically controlled throttle operation is cancelled until the system returns to normal and the ignition switch is turned to OFF.

HINT:

This ETCS (Electronic Throttle Control System) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2111	Throttle actuator locked during ECM ordering it to close (1 trip detection logic)	• Throttle actuator • Throttle body assembly • Throttle valve
P2112	Throttle actuator locked during ECM ordering it to open (1 trip detection logic)	• Throttle actuator • Throttle body assembly • Throttle valve

WIRING DIAGRAM

Refer to DTC P2102 on page 05–175.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P2111 AND/OR P2112)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2111 and/or P2112	A
P2111 and/or P2112 and other DTCs	B

HINT:

If any DTCs other than P2111 and/or P2112 are output, troubleshoot those DTCs first.

B → GO TO RELEVANT DTC CHART (See page 05-28)

A

2 INSPECT THROTTLE BODY ASSY(VISUALLY CHECK THROTTLE VALVE)

(a) Check for contamination between the throttle valve and the housing. If necessary, clean the throttle body. And check that the throttle valve moves smoothly.
OK: The throttle valve is not contaminated with foreign objects and can move smoothly.

NG → REPLACE THROTTLE BODY ASSY (See page 10-6)

OK

3 CHECK IF DTC OUTPUT RECURS(DTC P2111 AND/OR P2112)

(a) Clear DTCs (see page 05-19).
(b) Start the engine, and depress and release the accelerator pedal quickly (to fully open and fully close the throttle valve).
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC.
(f) Read DTCs.
Result:

Display (DTC Output)	Proceed To
No DTC	A
P2111 and/or P2112	B

B → REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

A

CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)

DTC	P2118	THROTTLE ACTUATOR CONTROL MOTOR CURRENT RANGE/PERFORMANCE

CIRCUIT DESCRIPTION

The ETCS (Electronic Throttle Control System) has a dedicated power supply circuit. The voltage (+BM) is monitored and when the voltage is low (less than 4 V), the ECM concludes that the ETCS has a fault and a current to the throttle actuator is cut.
When the voltage becomes unstable, the ETCS becomes unstable. For this reason, when the voltage is low, the current to the actuator is cut. If repairs are made and the system has returned to normal, turn the ignition switch to OFF. The ECM then allows the current to flow to the actuator and the actuator can be restarted.
HINT:
This ETCS does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2118	Open in ETCS power source circuit	• Open in ETCS power source circuit • ETCS fuse • ECM

WIRING DIAGRAM

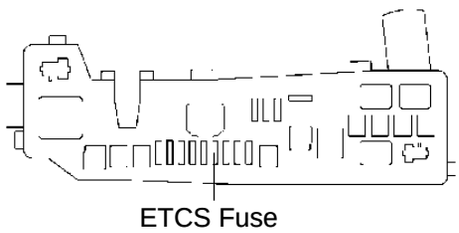
Refer to DTC P2102 on page 05–175.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK FUSE(ETCS FUSE)

Engine Room R/B and J/B:

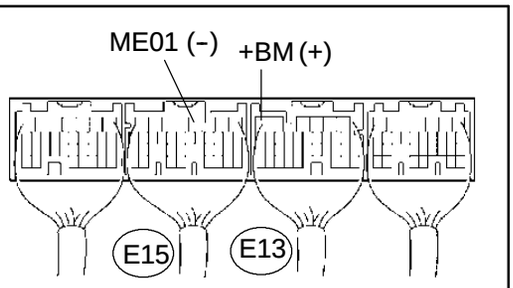


(a) Remove the ETCS fuse from the engine room R/B and J/B.
(b) Check the ETCS fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the ETCS fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

2	INSPECT ECM(+BM VOLTAGE)



ECM Connector
A18294

(a) Measure the voltage between the terminals of the E13 and E15 ECM connectors.

Standard:

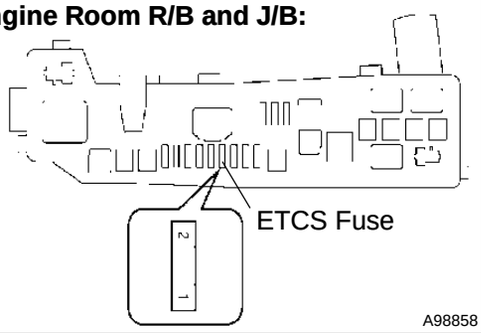
Tester Connection	Specified Condition
+BM (E13-6) - ME01 (E15-3)	9 to 14 V

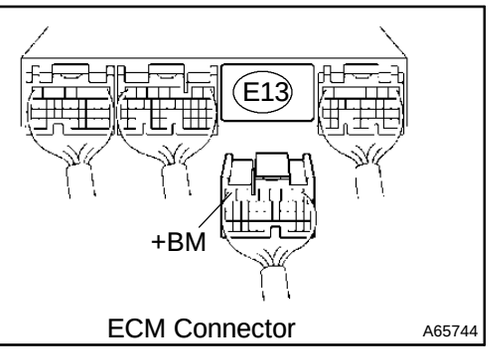
OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

3	CHECK HARNESS AND CONNECTOR(ECM - ETCS FUSE, ETCS FUSE - BATTERY)

Engine Room R/B and J/B:





(a) Check the harness and connectors between the ETCS fuse and ECM.

(1) Remove the ETCS fuse from the engine room R/B and J/B.

(2) Disconnect the E13 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
ETCS fuse (2) - +BM (E13-6)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
ETCS fuse (2) or +BM (E13-6) - Body ground	10 kΩ or higher

(4) Reinstall the ETCS fuse.

(5) Reconnect the ECM connector.

(b) Check the harness and connector between the ETCS fuse and battery cable.

(1) Remove the ETCS fuse from the engine room R/B and J/B.

(2) Disconnect the battery cable.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Battery cable terminal - ETCS fuse (1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Battery cable terminal or ETCS fuse (1) - Body ground	10 kΩ or higher

(4) Reinstall the ETCS fuse.

(5) Reconnect the battery cable.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ENGINE ROOM RELAY BLOCK

DTC	P2119	THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE

CIRCUIT DESCRIPTION

The ETCS (Electronic Throttle Control System) is composed of the throttle actuator, the Throttle Position (TP) sensor, the Accelerator Pedal Position (APP) sensor, and the ECM. This system is the one valve type throttle body. In order to deliver the proper opening angle of the throttle valve in response to the driving condition, the TP sensor mounted on the throttle body detects the actual throttle valve opening angle, and provides feedback to the ECM in order that the ECM controls the actuator.
If the ETCS has a malfunction, the ECM shuts down the power for the actuator, and the throttle valve is locked at a certain angle by the return spring. Also, the whole electronically controlled throttle operation is cancelled until the system returns to normal and the ignition switch is turned to OFF.

DTC No.	DTC Detection Condition	Trouble Area
P2119	Throttle valve opening angle continues to vary greatly from target opening angle	• ETCS • ECM

WIRING DIAGRAM

Refer to DTC P2102 on page 05-175.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P2119)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2119	A
P2119 and other DTCs	B

HINT:
If any DTCs other than P2119 are output, troubleshoot those DTCs first.

B → GO TO RELEVANT DTC CHART (See page 05-28)

A

2	CHECK IF DTC OUTPUT RECURS(DTC P2119)

(a) Clear DTC (see page 05–19).
(b) Allow the engine to idle for 15 seconds.
(c) Securely apply the parking brake, and place the shift position in D.
(d) Depress the brake pedal securely and the accelerator pedal fully for 5 seconds.
(e) Connect the intelligent tester II to the DLC3.
(f) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(g) Select the following menu items: Powertrain / Engine and ECT / DTC.
(h) Read DTCs.

HINT:

Actual throttle valve angle can be confirmed in Throttle POS under the Data List menus on the intelligent tester II.

OK: No DTC output.

NG → **REPLACE THROTTLE BODY ASSY (See page 10–6)**

OK

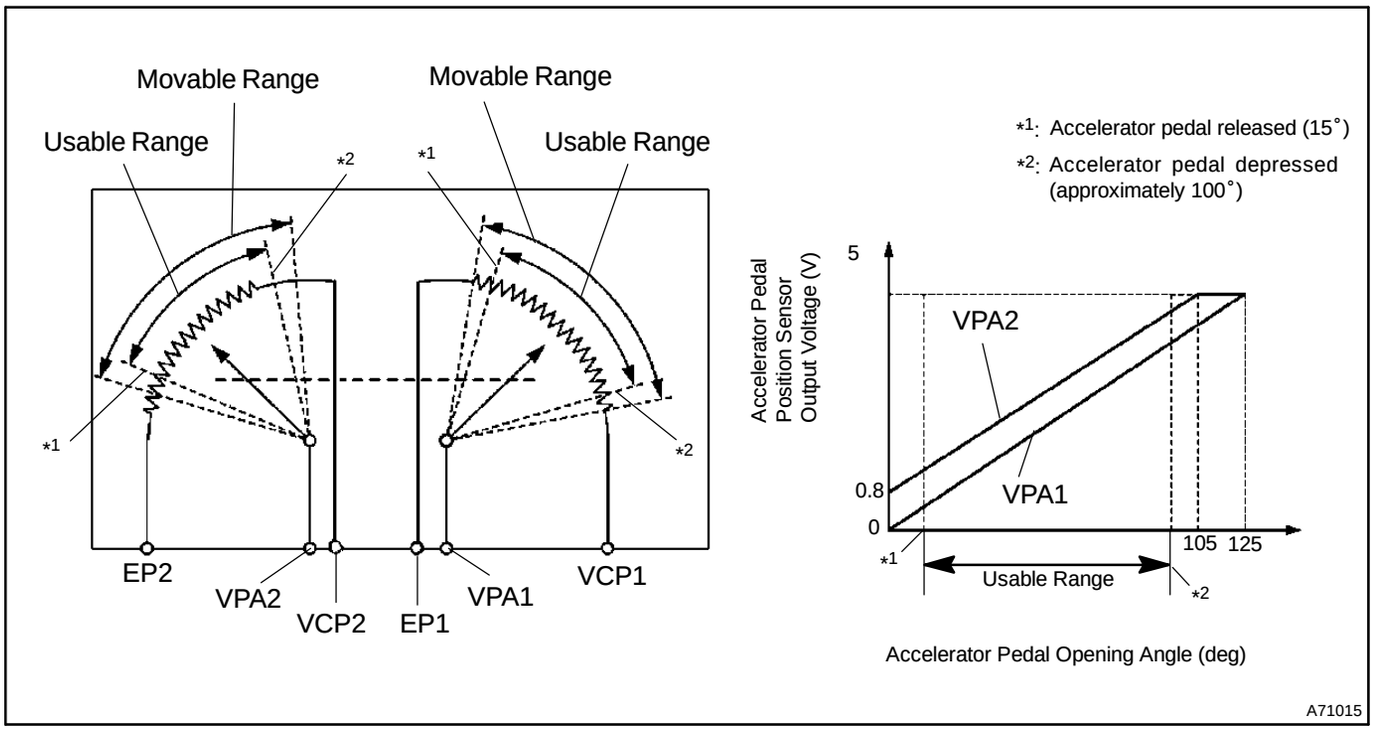
NORMAL

DTC	P2120	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT
DTC	P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT LOW INPUT
DTC	P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT HIGH INPUT
DTC	P2125	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT
DTC	P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT LOW INPUT
DTC	P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT HIGH INPUT
DTC	P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D”/”E” VOLTAGE CORRELATION

HINT:
These DTCs relate to the accelerator pedal position sensor.

CIRCUIT DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal bracket and it has the 2 sensors to detect the accelerator pedal position and malfunctions of the accelerator pedal position sensor itself.
In the accelerator pedal position sensor, the voltage applied to pedal terminals VPA1 and VPA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal. The VPA1 is a signal to indicate the actual accelerator pedal opening angle which is used for engine control, and the VPA2 is a signal to indicate the information about the opening angle which is used for detecting a malfunction in the sensor itself.
The ECM judges the current accelerator pedal opening angle with the signals from pedal terminals VPA1 and VPA2, and the ECM controls the throttle motor based on these signals.
HINT:
This ETCS (Electronic Throttle Control System) does not use a throttle cable.



DTC No.	DTC Detection Condition	Trouble Area
P2120	VPA1 quickly fluctuates up and down beyond upper and lower malfunction thresholds for 0.5 seconds or more	• Accelerator pedal position sensor • ECM
P2122	Condition (a) continues for 0.5 seconds or more when accelerator pedal is fully released: (a) VPA1 is 0.2 V or less	• Accelerator pedal position sensor • Open in VCP1 circuit • Open or ground short in VPA1 circuit • ECM
P2123	Condition (a) continues for 2.0 seconds or more: (a) VPA1 is 4.8 V or more	• Accelerator pedal position sensor • Open in EPA circuit • ECM
P2125	VPA2 quickly fluctuates up and down beyond upper and lower malfunction thresholds for 0.5 seconds or more	• Accelerator pedal position sensor • ECM
P2127	Condition (a) continues for 0.5 seconds or more when accelerator pedal is fully released: (a) VPA2 is 0.5 V or less	• Accelerator pedal position sensor • Open in VCP2 circuit • Open or ground short in VPA2 circuit • ECM
P2128	Conditions (a) and (b) continue for 2.0 seconds or more: (a) VPA2 is 4.8 V or more (b) VPA1 is 0.2 V or more and VPA1 is 3.45 V or less	• Accelerator pedal position sensor • Open in EPA2 circuit • ECM
P2138	Condition (a) or (b) continues for 2.0 seconds or more: (a) Difference between VPA1 and VPA2 is 0.02 V or less (b) VPA1 is 0.2 V or less and VPA2 is 0.5 V or less	• VPA1 and VPA2 circuits are short-circuited • Accelerator pedal position sensor • ECM

HINT:

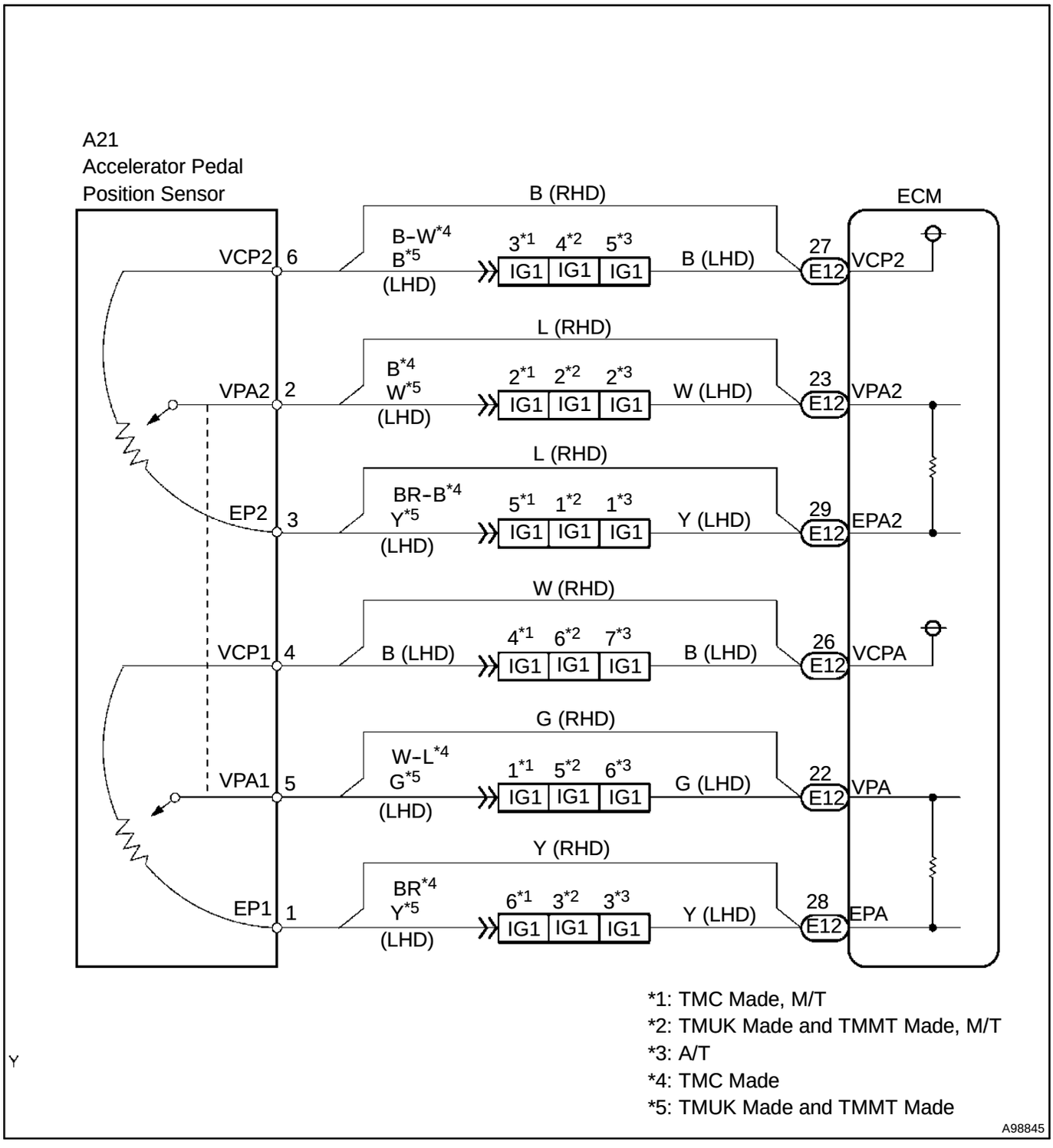
When DTC P2120, P2122, P2123, P2125, P2127, P2128 and/or P2138 is detected, check the output voltage of the accelerator pedal position sensor by selecting Powertrain / Engine and ECT / Data List / Accelerator POS No. 1 and Accelerator POS No. 2 on the intelligent tester II.

Reference:

Trouble Area	Accelerator Pedal Position (Voltage Output)			
	Accelerator Pedal Released		Accelerator Pedal Depressed	
	Accelerator POS No. 1	Accelerator POS No. 2	Accelerator POS No. 1	Accelerator POS No. 2
Normal condition	0.5 to 1.1 V	1.2 to 2.0 V	2.6 to 4.5 V	3.4 to 5.0 V
VCP circuit open	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V
Open or ground short in VPA1 circuit	0 to 0.2 V	1.2 to 2.0 V	0 to 0.2 V	3.4 to 5.0 V
Open or ground short in VPA2 circuit	0.5 to 1.1 V	0 to 0.2 V	2.6 to 4.5 V	0 to 0.2 V
EPA circuit open	4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V

Accelerator pedal position is expressed as voltages.

WIRING DIAGRAM

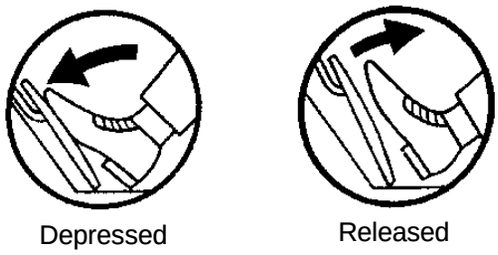


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF INTELLIGENT TESTER II(ACCELERATOR POS NO.1 AND ACCELERATOR POS NO.2)



(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Accelerator POS No. 1 and Accelerator POS No. 2.
(d) Read the value.

Standard:

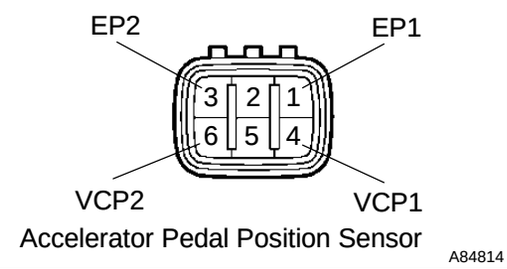
Accelerator Pedal	Accelerator POS No. 1	Accelerator POS No. 2
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.0 V

OK → **Go to step 6**

NG

2	INSPECT ACCELERATOR PEDAL ASSY(ACCELERATOR PEDAL POSITION SENSOR)

Component Side:



(a) Disconnect the A21 accelerator pedal position sensor connector.
(b) Measure the resistance between each pair of terminals.

Standard:

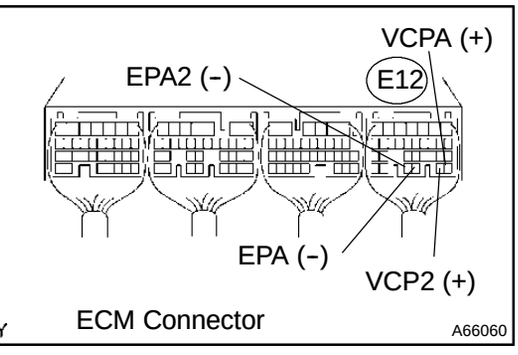
Tester Connection	Specified Condition
EP1 (1) - VCP1 (4)	2.25 to 4.75 kΩ at 20°C (68°F)
EP2 (3) - VCP2 (6)	2.25 to 4.75 kΩ at 20°C (68°F)

(c) Reconnect the accelerator pedal position sensor connector.

NG → **REPLACE ACCELERATOR PEDAL ASSY** **(See page 10-13)**

OK

3	INSPECT ECM(VCPA AND VCP2 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E12 ECM connector.

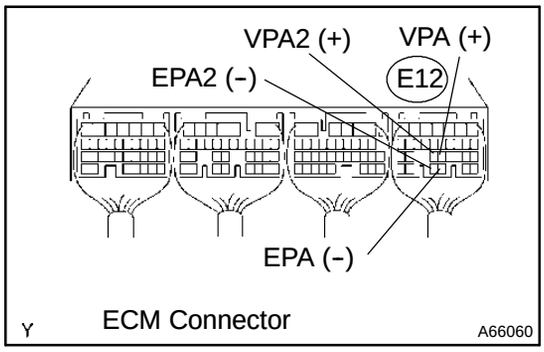
Standard:

Tester Connection	Specified Condition
VCPA (E12-26) - EPA (E12-28)	4.5 to 5.0 V
VCP2 (E12-27) - EPA2 (E12-29)	4.5 to 5.0 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

4 INSPECT ECM(VPA AND VPA2 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E12 ECM connector.

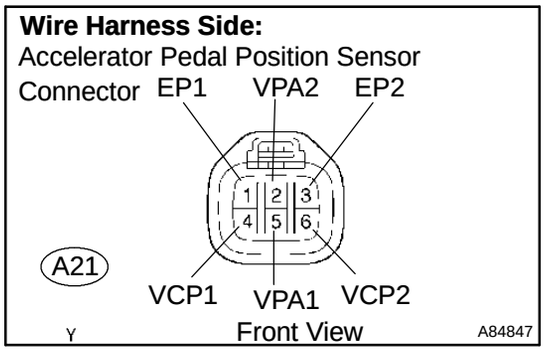
Standard:

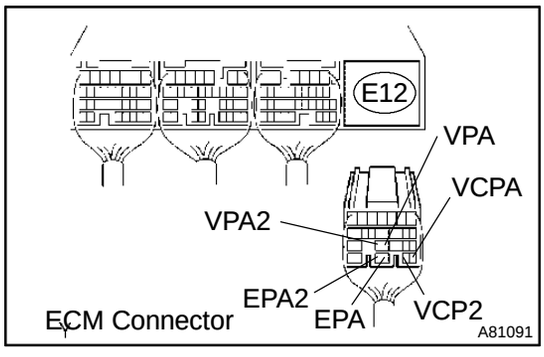
Accelerator Pedal Position	Tester Connection	Specified Condition
Released	VPA (E12-22) - EPA (E12-28)	0.5 to 1.1 V
Depressed	VPA (E12-22) - EPA (E12-28)	2.6 to 4.5 V
Released	VPA2 (E12-23) - EPA2 (E12-29)	1.2 to 2.0 V
Depressed	VPA2 (E12-23) - EPA2 (E12-29)	3.4 to 5.0 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

5 CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)





(a) Disconnect the A21 accelerator pedal position sensor connector.
(b) Disconnect the E12 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A21-5) - VPA (E12-22)	Below 1 Ω
EP1 (A21-1) - EPA (E12-28)	Below 1 Ω
VCP1 (A21-4) - VCPA (E12-26)	Below 1 Ω
VPA2 (A21-2) - VPA2 (E12-23)	Below 1 Ω
EP2 (A21-3) - EPA2 (E12-29)	Below 1 Ω
VCP2 (A21-6) - VCP2 (E12-27)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A21-5) or VPA (E12-22) - Body ground	10 kΩ or higher
EP1 (A21-1) or EPA (E12-28) - Body ground	10 kΩ or higher
VCP1 (A21-4) or VCPA (E12-26) - Body ground	10 kΩ or higher
VPA2 (A21-2) or VPA2 (E12-23) - Body ground	10 kΩ or higher
EP2 (A21-3) or EPA2 (E12-29) - Body ground	10 kΩ or higher
VCP2 (A21-6) or VCP2 (E12-27) - Body ground	10 kΩ or higher

(d) Reconnect the accelerator pedal position sensor connector.
(e) Reconnect the ECM connector.

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6	CHECK IF DTC OUTPUT RECURS(ACCELERATOR PEDAL POSITION SENSOR DTCS)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Clear DTCs (see page 05–19).
(d) Start the engine.
(e) Run the engine at idling speed for 15 seconds or more.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs (see page 05–19).

Result:

Display (DTC Output)	Proceed To
P2120, P2122, P2123, P2125, P2127, P2128 and/or P2138	A
No output	B

B	NORMAL

A

REPLACE ECM (See page 10–8 of Pub. No. RM1039E COROLLA)

DTC	P2121	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT RANGE/PERFORMANCE

HINT:
This DTC relates to the accelerator pedal position sensor.

CIRCUIT DESCRIPTION

Refer to DTC P2120 on page 05–185.

DTC No.	DTC Detection Condition	Trouble Area
P2121	Conditions (a) and (b) continue for 0.5 seconds: (a) Difference between VPA1 and VPA2 exceeds threshold (b) IDL is OFF	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM

HINT:
When DTC P2121 is detected, check the output voltage of the accelerator pedal position sensor by selecting Powertrain / Engine and ECT / Data List / Accelerator POS No. 1 and Accelerator POS No. 2 on the intelligent tester Ⅱ.

Reference:

Trouble Area	Accelerator Pedal Position (Voltage Output)			
	Accelerator Pedal Released		Accelerator Pedal Depressed	
	Accelerator POS No. 1	Accelerator POS No. 2	Accelerator POS No. 1	Accelerator POS No. 2
Normal condition	0.5 to 1.1 V	1.2 to 2.0 V	2.6 to 4.5 V	3.4 to 5.0 V
VCP circuit open	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V
Open or ground short in VPA1 circuit	0 to 0.2 V	1.2 to 2.0 V	0 to 0.2 V	3.4 to 5.0 V
Open or ground short in VPA2 circuit	0.5 to 1.1 V	0 to 0.2 V	2.6 to 4.5 V	0 to 0.2 V
EPA circuit open	4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V

Accelerator pedal position is expressed as voltages.

WIRING DIAGRAM

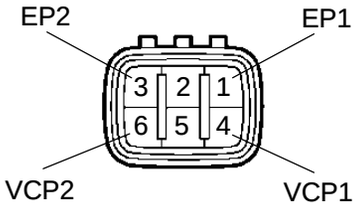
Refer to DTC P2120 on page 05–187.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT ACCELERATOR PEDAL ASSY(ACCELERATOR PEDAL POSITION SENSOR)

Component Side:



Accelerator Pedal Position Sensor

A84814

(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Measure the resistance between each pair of terminals.

Standard:

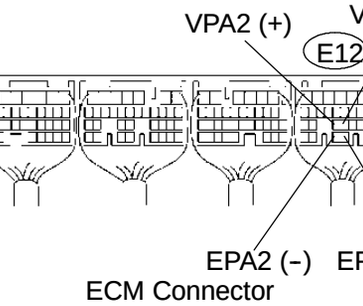
Tester Connection	Specified Condition
EP1 (1) - VCP1 (4)	2.25 to 4.75 kΩ at 20°C (68°F)
EP2 (3) - VCP2 (6)	2.25 to 4.75 kΩ at 20°C (68°F)

(c) Reconnect the accelerator pedal position sensor connector.

NG → **REPLACE ACCELERATOR PEDAL ASSY (See page 10-13)**

OK

2 INSPECT ECM(VPA AND VPA2 VOLTAGE)



ECM Connector

A66060

(a) Turn the ignition switch to ON.

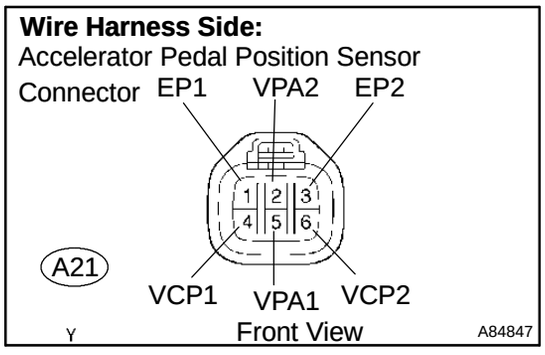
(b) Measure the voltage between the terminals of the E12 ECM connector.

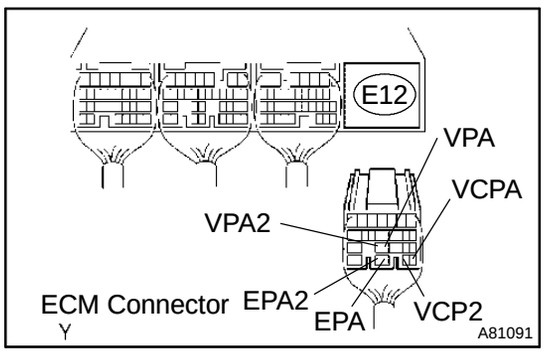
Accelerator Pedal Position	Tester Connection	Specified Condition
Released	VPA (E12-22) - EPA (E12-28)	0.5 to 1.1 V
Depressed	VPA (E12-22) - EPA (E12-28)	2.6 to 4.5 V
Released	VPA2 (E12-23) - EPA2 (E12-29)	1.2 to 2.0 V
Depressed	VPA2 (E12-23) - EPA2 (E12-29)	3.4 to 5.0 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

3	CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)





(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Disconnect the E12 ECM connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A21-5) - VPA (E12-22)	Below 1 Ω
EP1 (A21-1) - EPA (E12-28)	Below 1 Ω
VCP1 (A21-4) - VCPA (E12-26)	Below 1 Ω
VPA2 (A21-2) - VPA2 (E12-23)	Below 1 Ω
EP2 (A21-3) - EPA2 (E12-29)	Below 1 Ω
VCP2 (A21-6) - VCP2 (E12-27)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A21-5) or VPA (E12-22) - Body ground	10 kΩ or higher
EP1 (A21-1) or EPA (E12-28) - Body ground	10 kΩ or higher
VCP1 (A21-4) or VCPA (E12-26) - Body ground	10 kΩ or higher
VPA2 (A21-2) or VPA2 (E12-23) - Body ground	10 kΩ or higher
EP2 (A21-3) or EPA2 (E12-29) - Body ground	10 kΩ or higher
VCP2 (A21-6) or VCP2 (E12-27) - Body ground	10 kΩ or higher

(d) Reconnect the accelerator pedal position sensor connector.

(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

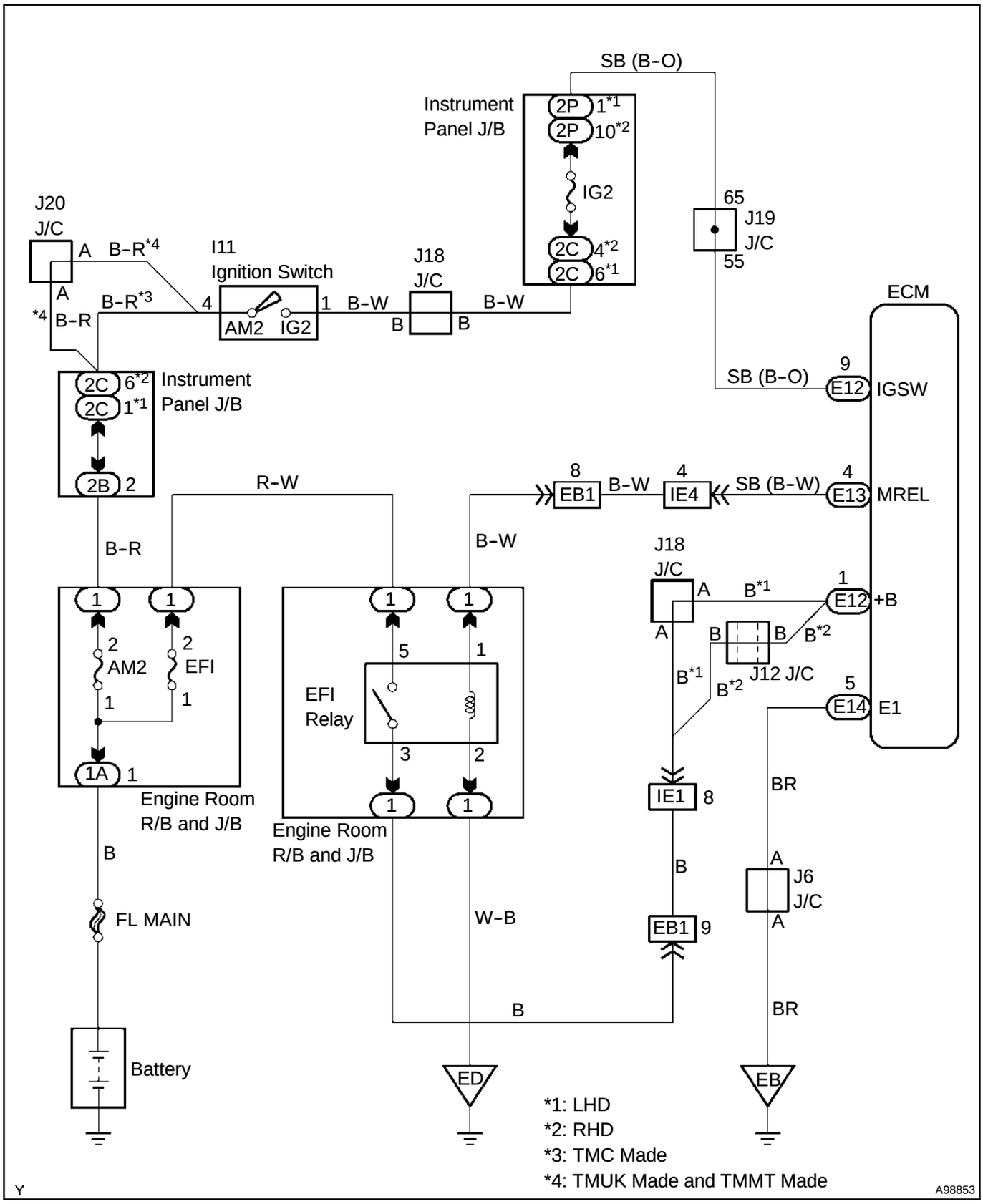
REPLACE ACCELERATOR PEDAL ASSY **(See page 10-13)**

ECM POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

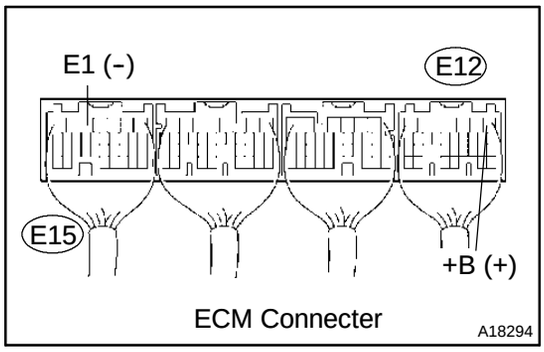
When the ignition switch is turned to ON, the battery voltage is applied to terminal IGSW of the ECM. The ECM "MREL" output signal causes a current to flow to the coil, closing the contacts of the EFI relay and supplying power to terminal +B of the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT ECM(+B VOLTAGE)



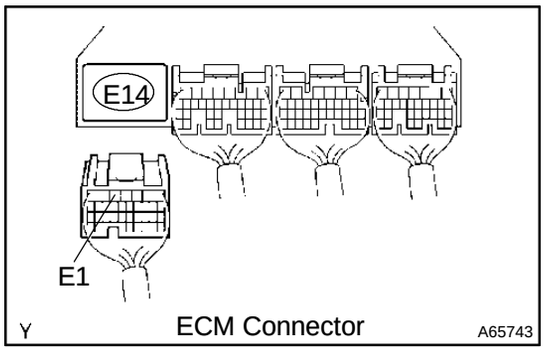
(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E12 and E15 ECM connectors.
Standard:

Tester Connection	Specified Condition
+B (E12-1) - E1 (E15-5)	9 to 14 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE** **(See page 05-13)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - BODY GROUND)



(a) Disconnect the battery cable.
(b) Disconnect the E14 ECM connector.
(c) Check the resistance.
Standard (Check for open):

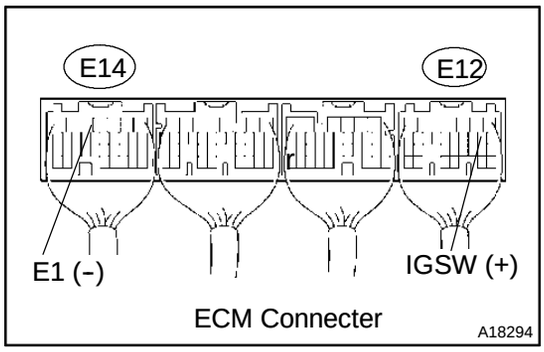
Tester Connection	Specified Condition
E1 (E14-5) - Body ground	Below 1 Ω

(d) Reconnect the ECM connector.
(e) Reconnect the battery cable.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM(IGSW VOLTAGE)



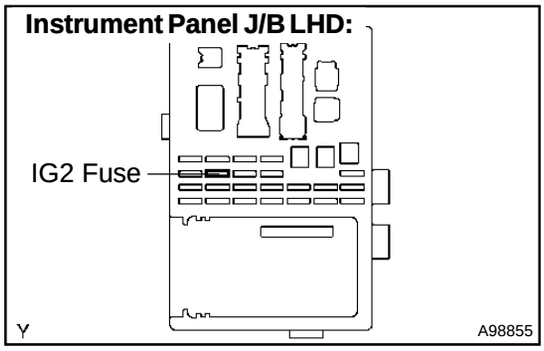
(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E12 and E14 ECM connectors.
Standard:

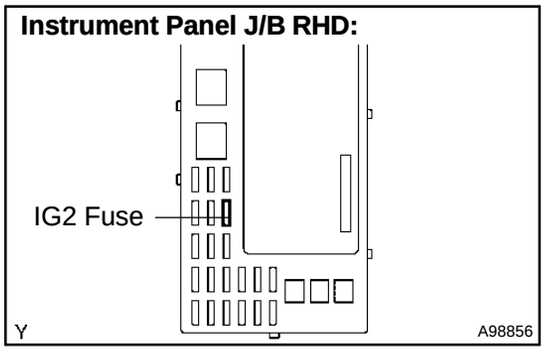
Tester Connection	Specified Condition
IGSW (E12-9) - E1 (E14-5)	9 to 14 V

OK → **Go to step 5**

NG

4 CHECK FUSE(IG2 FUSE)





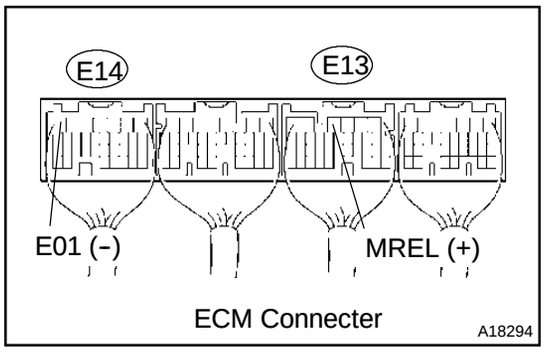
(a) Remove the IG2 fuse from the instrument panel J/B.
(b) Check the IG2 fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the IG2 fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (BATTERY - ECM)

5 INSPECT ECM(MREL VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E13 and E14 ECM connectors.
Standard:

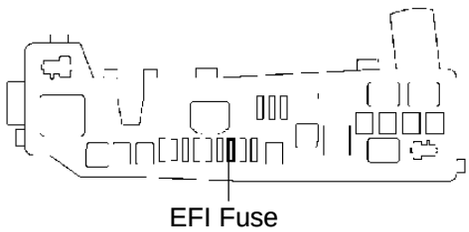
Tester Connection	Specified Condition
MREL (E13-4) - E01 (E14-7)	9 to 14 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

OK

6	CHECK FUSE(EFI FUSE)

Engine Room R/B and J/B:



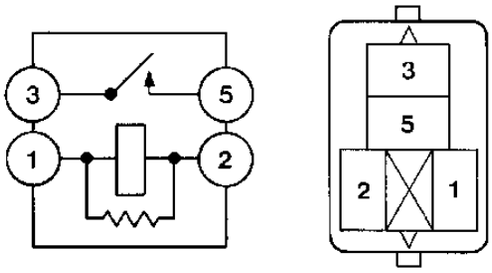
Y A96024

(a) Remove the EFI fuse from the engine room R/B and J/B.
(b) Check the EFI fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

7	INSPECT EFI RELAY



B16200

(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Check the EFI relay resistance.
Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

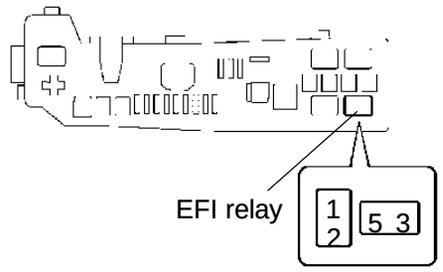
(c) Reinstall the EFI relay.

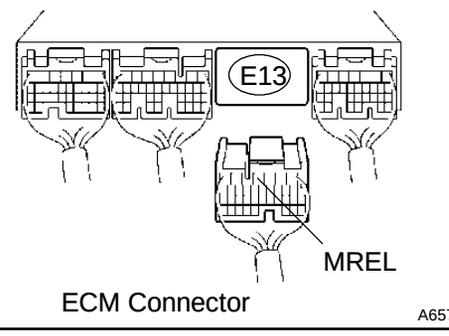
NG → **REPLACE EFI RELAY**

OK

8	CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM, EFI RELAY - BODY GROUND)

Engine Room R/B and J/B:





(a) Check the harness and connectors between the EFI relay and the ECM.

(1) Remove the EFI relay from the engine room R/B and J/B.

(2) Disconnect the E13 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI relay (1) - MREL (E13-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI relay (1) or MREL (E13-4) - Body ground	10 kΩ or higher

(4) Reinstall the EFI relay.

(5) Reconnect the ECM connector.

(b) Check the harness and connector between the EFI relay and the body ground.

(1) Remove the EFI relay from the engine room R/B and J/B.

(2) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI relay (2) - Body ground	Below 1 Ω

(3) Reinstall the EFI relay.

OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

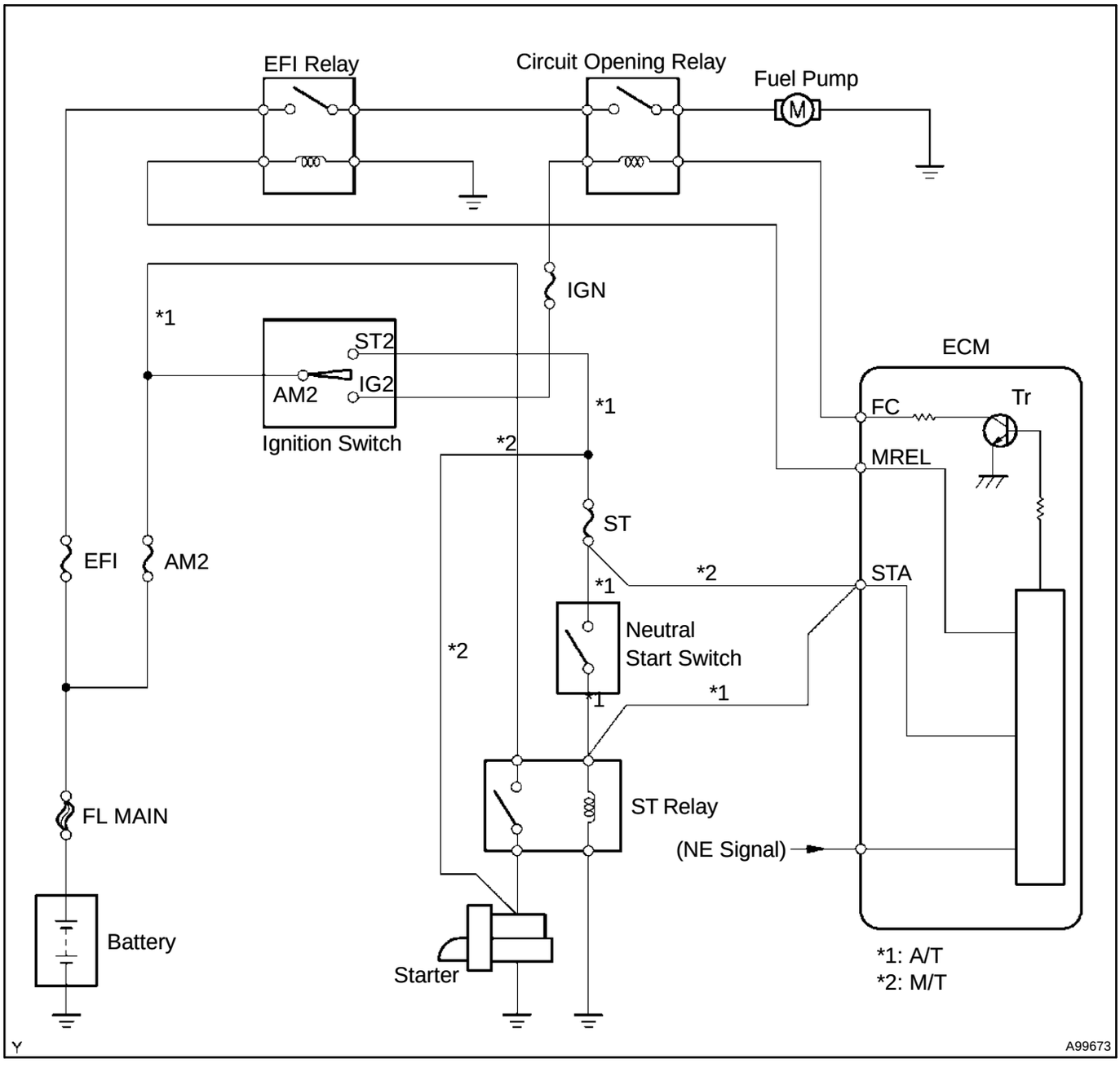
NG

CHECK AND REPAIR HARNESS AND CONNECTOR (TERMINAL +B OF ECM - BATTERY TERMINAL)

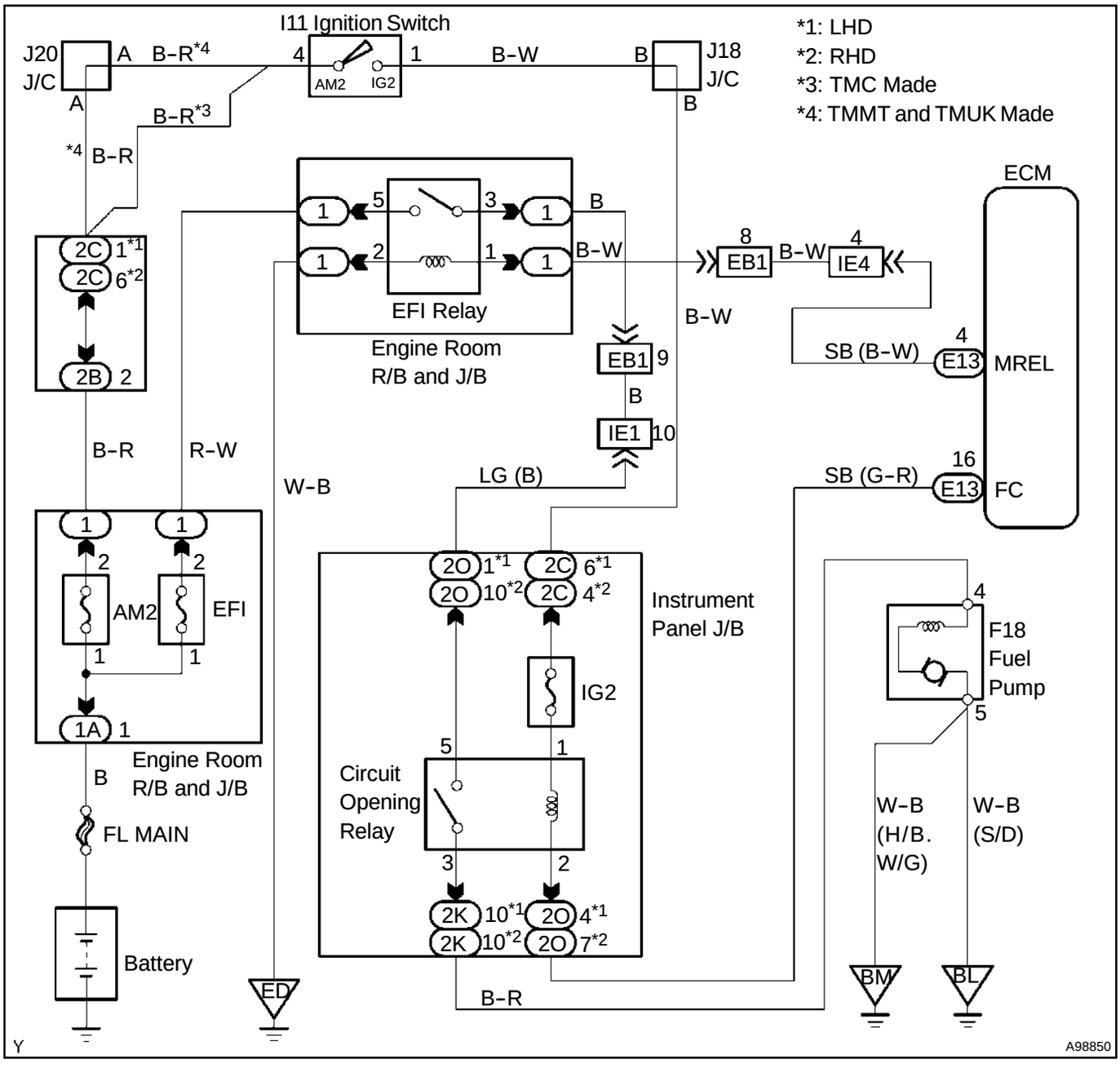
FUEL PUMP CONTROL CIRCUIT

CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, a current flows from terminal IG2 of the ignition switch to the ST relay coil and also a current flows to terminal STA of the ECM (STA signal).
When the STA signal and NE signal are transmitted to the ECM, the power transistor (Tr) is turned ON, a current flows to the coil of the circuit opening relay, the relay switches on, the power is supplied to the fuel pump and the fuel pump operates.
While the NE signal is generated (when engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE CIRCUIT OPENING RELAY)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel Pump Relay.
(d) Check the operation of the relay while operating it using the intelligent tester II.
OK: Operating sounds can be heard from the relay.

OK	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-13)

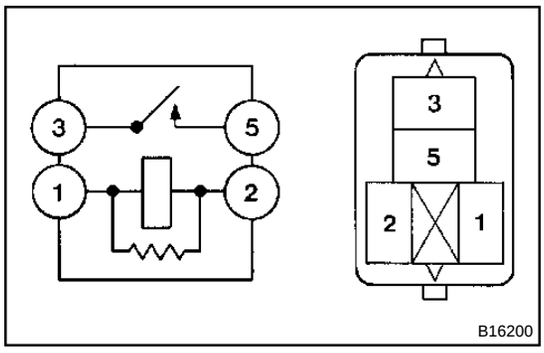
NG

2	CHECK ECM POWER SOURCE CIRCUIT (See page 05-194)

NG	REPAIR OR REPLACE POWER SOURCE CIRCUIT

OK

3	INSPECT CIRCUIT OPENING RELAY



(a) Remove the circuit opening relay from the instrument panel J/B.
(b) Check the circuit opening relay resistance.
Standard:

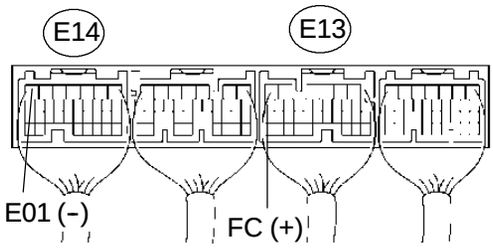
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

(c) Reinstall the circuit opening relay.

NG	REPLACE CIRCUIT OPENING RELAY

OK

4 INSPECT ECM(FC VOLTAGE)



ECM Connector
A18294

(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E13 and E14 ECM connectors.

Standard:

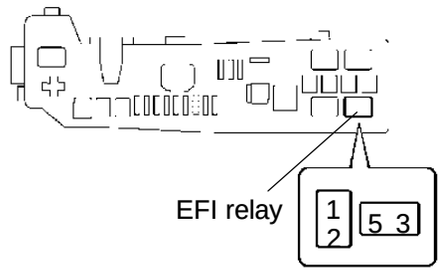
Tester Connection	Specified Condition
FC (E13-16) - E01 (E14-7)	9 to 14 V

OK → **Go to step 6**

NG

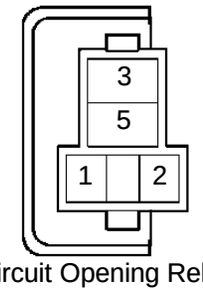
5 CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM, CIRCUIT OPENING RELAY - ECM, EFI RELAY - CIRCUIT OPENING RELAY)

Engine Room R/B and J/B:

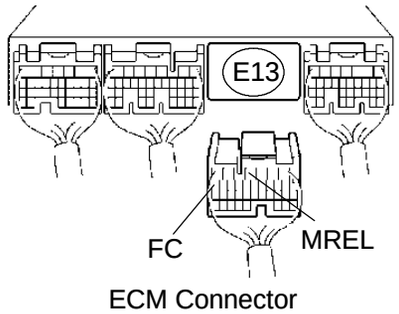


A63718

Instrument Panel J/B:



Circuit Opening Relay
A79099



Y
ECM Connector
A65744

(a) Remove the EFI relay from the engine room R/B and J/B.
(b) Remove the circuit opening relay from the instrument panel J/B.
(c) Disconnect the E13 ECM connector.
(d) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B and J/B (EFI relay terminal 1) - MREL (E13-4)	Below 1 Ω
Instrument panel J/B (Circuit opening relay terminal 2) - FC (E13-16)	Below 1 Ω
Engine room R/B and J/B (EFI relay terminal 3) - Instrument panel J/B (Circuit opening relay terminal 5)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B and J/B (EFI relay terminal 1) or MREL (E13-4) - Body ground	10 kΩ or higher
Instrument panel J/B (Circuit opening relay terminal 2) or FC (E13-16) - Body ground	10 kΩ or higher
Engine room R/B and J/B (EFI relay terminal 3) or Instrument panel J/B (Circuit opening relay terminal 5) - Body ground	10 kΩ or higher

(e) Reinstall the EFI relay.
(f) Reinstall the circuit opening relay.
(g) Reconnect the ECM connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

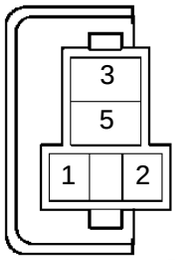
6	INSPECT FUEL PUMP (See page 11-7 of Pub. No. RM925E COROLLA)

NG → REPAIR OR REPLACE FUEL PUMP

OK

7	CHECK HARNESS AND CONNECTOR(CIRCUIT OPENING RELAY - FUEL PUMP, FUEL PUMP - BODY GROUND)

Instrument Panel J/B:



Circuit Opening Relay

A79099

(a) Remove the circuit opening relay from the instrument panel J/B.
(b) Disconnect the F18 fuel pump connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Instrument panel J/B (Circuit opening relay terminal 3) - Fuel pump (F18-4)	Below 1 Ω
Fuel pump (F18-5) - Body ground	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Instrument panel J/B (Circuit opening relay terminal 3) or Fuel pump (F18-4) - Body ground	10 kΩ or higher

(d) Reinstall the circuit opening relay.
(e) Reconnect the fuel pump connector.

Wire Harness Side:

F18 Fuel Pump Connector



Front View

A66276

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

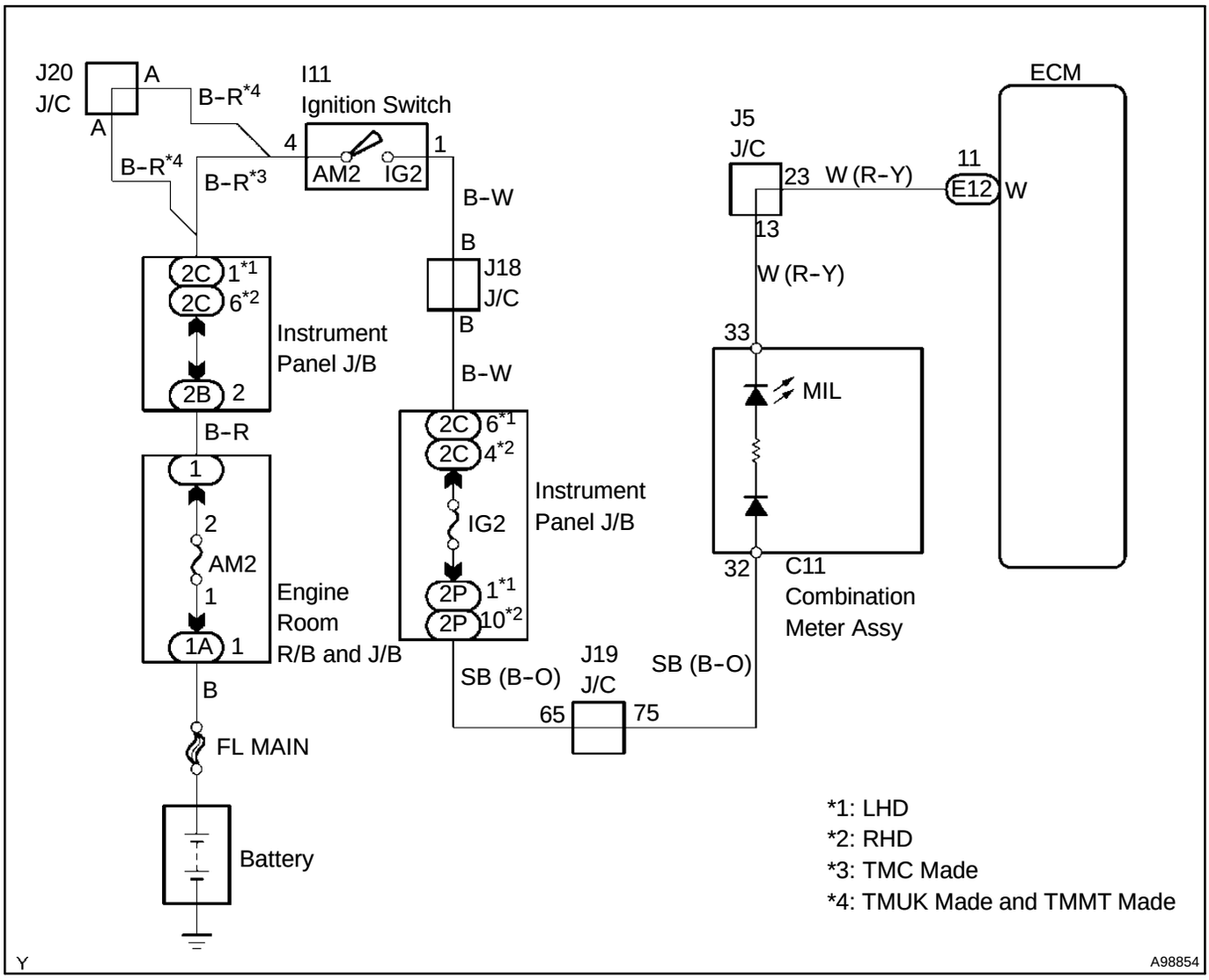
REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

MIL CIRCUIT

CIRCUIT DESCRIPTION

The MIL (Malfunction Indicator Lamp) is used to indicate vehicle malfunction detections by the ECM.
By turning the ignition switch to ON, the power is supplied to the MIL circuit, and the ECM provides the circuit ground that illuminates the MIL.
Operation of the MIL should be checked visually:
When the ignition switch is first turned to ON, the MIL should be illuminated. If it is always OFF or ON, use the intelligent tester II and follow the procedure below to determine cause of the problem.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Troubleshoot each trouble symptom in accordance with the table below.

Reference:

Result	Proceed To
MIL remains on	Start inspection from step 1
MIL is not illuminated	Start inspection from step 3

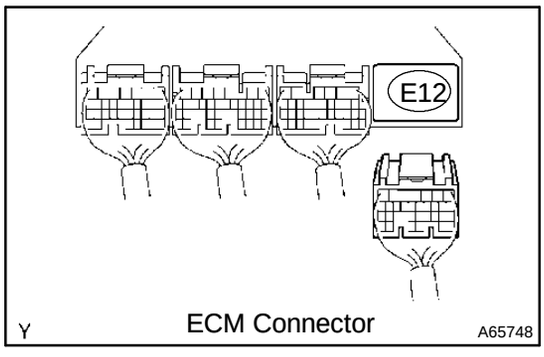
1	CHECK IF MIL TURNS OFF

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Check if DTCs have been stored. Note down if there are DTCs.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(f) Clear DTCs.
(g) Check if the MIL turns off.
OK: The MIL should turn off.

OK → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC** **(See page 05-10)**

NG

2	CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT IN WIRE HARNESS)



(a) Disconnect the E12 ECM connector.
(b) Turn the ignition switch to ON.
(c) Check that the MIL is not illuminated.
OK: The MIL is not illuminated.
(d) Reconnect the ECM connector.

OK → **REPLACE ECM** **(See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

3	CHECK IF MIL ILLUMINATES

(a) Check if the MIL illuminates when turning the ignition switch to ON.
OK: The MIL should illuminate.

OK → **NORMAL**

NG

4	INSPECT COMBINATION METER ASSY(MIL CIRCUIT)

(a) See the combination meter troubleshooting procedure on page 05-1293 of Pub. No. RM925E COROLLA.

NG → REPAIR OR REPLACE BULB OR COMBINATION METER ASSEMBLY

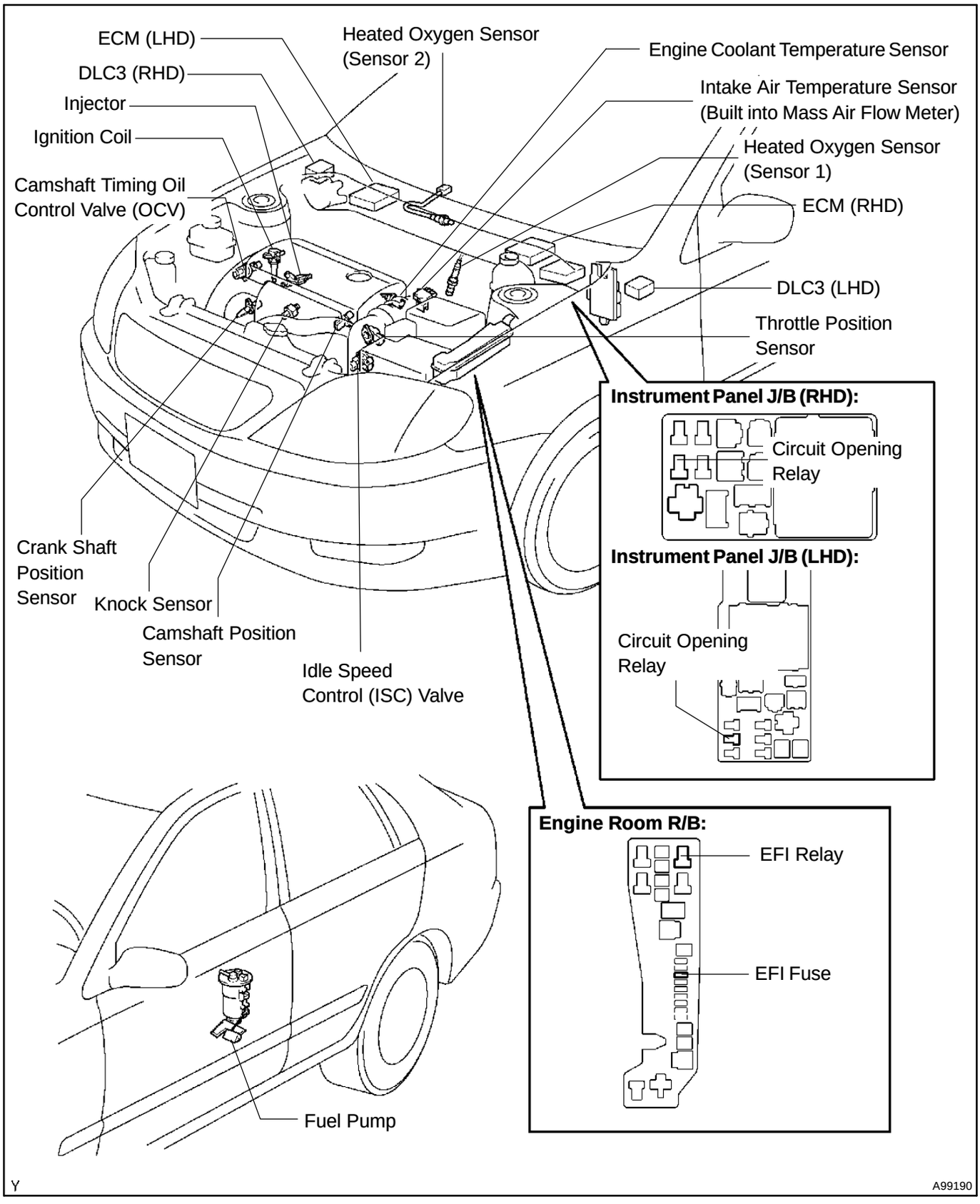
OK

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER – ECM)

SFI SYSTEM (4ZZ-FE)

LOCATION

054JE-25



054JB-30

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester II can be used in steps 3, 4, 5 and 9.

1 VEHICLE BROUGHT TO WORKSHOP

2 CUSTOMER PROBLEM ANALYSIS **(See page 05-212)**

3 CONNECT INTELLIGENT TESTER II TO DLC3

HINT:
If the display indicates a communication fault in the tester, inspect the DLC3.

4 CHECK DTC AND FREEZE FRAME DATA **(See page 05-220)**

HINT:
Record or print DTCs and freeze frame data, if necessary.

5 CLEAR DTC AND FREEZE FRAME DATA **(See page 05-220)**

6 CONDUCT VISUAL INSPECTION

7 CONFIRM PROBLEM SYMPTOMS

HINT:
If the engine does not start, perform steps 9 and 10 first.

Result	Proceed To
Malfunction does not occur	A
Malfunction occurs	B

B → **GO TO STEP 9**

A

8 SIMULATE SYMPTOMS

9	CHECK DTC (See page 05-220)

Result	Proceed To
Malfunction code	A
No code	B

B → GO TO STEP 11

A

10	REFER TO DTC CHART (See page 05-226)

GO TO STEP 13

11	CONDUCT BASIC INSPECTION (See page 05-213)

Result	Proceed To
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 16

A

12	REFER TO PROBLEM SYMPTOMS TABLE (See page 05-215)

Result	Proceed To
Malfunctioning circuit confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 16

A

13	CHECK ECM POWER SOURCE CIRCUIT (See page 05-357)

14	CONDUCT CIRCUIT INSPECTION

Result	Proceed To
Malfunction not confirmed	A
Malfunction confirmed	B

B → GO TO STEP 17

A

15	CHECK FOR INTERMITTENT PROBLEMS

GO TO STEP 17

16	CONDUCT PARTS INSPECTION

17	IDENTIFY PROBLEM

18	ADJUST AND/OR REPAIR

19	CONDUCT CONFIRMATION TEST

END

054JC-32

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Driver's Name		VIN	
Date Vehicle Brought in		Production Date	
License Plate No.		Odometer Reading	km / miles

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

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

Condition of MIL (Malfunction Indicator Lamp)		☐ Remains on	☐ Sometimes lights up ☐ Does not light up
DTC Inspection	Normal mode (Pre-check)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freeze frame data ( )
	Check Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freeze frame data ( )

05JO7-06

BASIC INSPECTION

When a malfunction is not confirmed by the DTC check, troubleshooting should be carried out in all circuits considered to be possible causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location of the problem can be found quickly and efficiently. Therefore, using this check is essential when engine troubleshooting.

1	CHECK BATTERY VOLTAGE

NOTICE:
Carry out this check with the engine stopped and ignition switch OFF.

Result	Proceed To
11 V or more	OK
Below 11 V	NG

NG → **CHARGE OR REPLACE BATTERY**

OK

2	CHECK IF ENGINE WILL CRANK

NG → **PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-215**

OK

3	CHECK IF ENGINE STARTS

NG → **GO TO STEP 7**

OK

4	CHECK AIR FILTER

(a) Visually check that the air filter is not contaminated with dirt or oil.

NG → **REPLACE AIR FILTER**

OK

5	CHECK IDLING SPEED (See page 14-82 of Pub. No. RM925E COROLLA)

NG → **PROCEED TO PAGE 14-82 of Pub. No. RM925E COROLLA AND CONTINUE TO TROUBLE-SHOOT**

OK

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-215

6	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

NG → PROCEED TO PAGE 11-5 of Pub. No. RM925E COROLLA AND CONTINUE TO TROUBLE-SHOOT

OK

7	CHECK FOR SPARK (See page 18-5 of Pub. No. RM925E COROLLA)

NG → PROCEED TO PAGE 18-5 of Pub. No. RM925E COROLLA AND CONTINUE TO TROUBLE-SHOOT

OK

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-215

054JF-32

PROBLEM SYMPTOMS TABLE

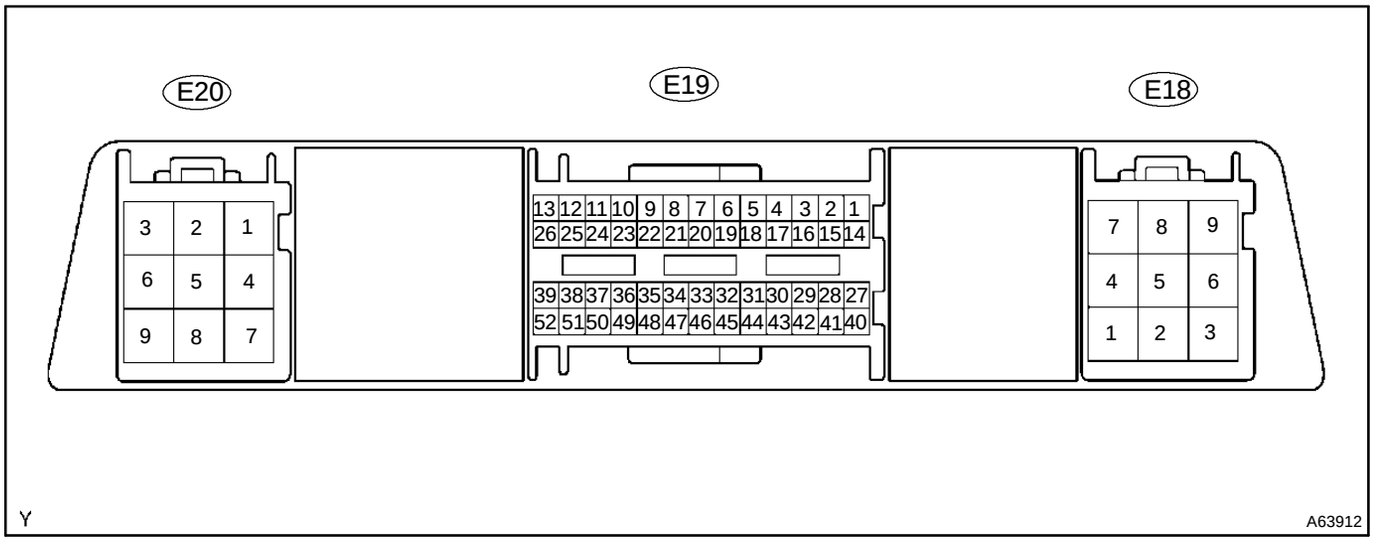
When a malfunction is not confirmed by a DTC (Diagnostic Trouble Code) check and the cause of problem cannot be identified through a basic inspection, troubleshoot according to the priority order indicated in the table below.

Symptom	Suspect Area	See Page
Engine does not crank (Does not start)	1. Starter signal circuit 2. Starter 3. ST relay	05-347 *1 *1
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	05-357 05-350 *2
Incomplete combustion (Does not start)	1. Fuel pump control circuit	05-350
Engine cranks normally but difficult to start	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	05-347 05-350 *3
Difficult to start with cold engine	1. Starter signal circuit 2. Fuel pump control circuit	05-347 05-350
Difficult to start with hot engine	1. Starter signal circuit 2. Fuel pump control circuit	05-347 05-350
High engine idling speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	— 05-357
Low engine idling speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	— 05-350
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	*3 05-350
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	05-357 05-350
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit	05-350
Surging (Poor driveability)	1. Fuel pump control circuit	05-350
Engine stalls soon after starting	1. Fuel pump control circuit	05-350
Engine stalls during A/C operation	1. A/C signal circuit (Compressor circuit) 2. ECM	— *2

*1: See page 19-11 of Pub. No. RM925E COROLLA
*2: See page 10-8 of Pub. No. RM1039E COROLLA
*3: See page 14-82 of Pub. No. RM925E COROLLA

054KK-28

TERMINALS OF ECM



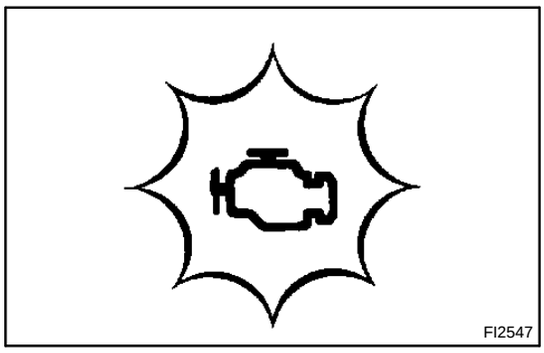
HINT:
Each ECM terminal's standard normal voltage is shown in the table below.
In the table, first follow the information under "Condition." Look under "Symbols (Terminals No.)" for the terminals to be inspected. The standard normal voltage between the terminals is shown under "STD Voltage."
Use the illustration above as a reference for the ECM terminals.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
BATT (E20-1) - E1 (E20-7)	R-W - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	9 to 14 V
IGSW (E19-39) - E1 (E20-7)	B-W - W-B	Ignition switch	Ignition switch ON	9 to 14 V
+B (E20-4) - E1 (E20-7)	B - W-B	Power source of ECM	Ignition switch ON	9 to 14 V
MREL (E19-49) - E1 (E20-7)	B-W - W-B	EFI relay	Ignition switch ON	9 to 14 V
VC (E19-52) - E2 (E19-20)	P-L - BR	Power source of sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
VG (E19-6) - EVG (E19-19)	G - L-W	Mass air flow meter	Idling	Approximately 1 V
VTA (E19-21) - E2 (E19-20)	LG - BR	Throttle position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully released	0.4 to 1.0 V
VTA (E19-21) - E2 (E19-20)	LG - BR	Throttle position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully depressed	3.2 to 4.8 V
THA (E19-7) - E2 (E19-20)	Y-B - BR	Intake air temperature sensor	Idling, Intake air temperature 20°C (68°F)	0.5 to 3.4 V
THW (E19-8) - E2 (E19-20)	W - BR	Engine coolant temperature sensor	Idling, Engine coolant temperature 80°C (176°F)	0.2 to 1.0 V
#1 (E20-9) - E01 (E18-1) #2 (E20-6) - E01 (E18-1) #3 (E20-8) - E01 (E18-1) #4 (E20-5) - E01 (E18-1)	Y - W-B B-R - W-B W - W-B L - W-B	Injector	Ignition switch ON	9 to 14 V
IGT1 (E18-6) - E1 (E20-7) IGT2 (E18-8) - E1 (E20-7) IGT3 (E18-5) - E1 (E20-7) IGT4 (E18-9) - E1 (E20-7)	R-L - W-B Y-G - W-B GR - W-B W - W-B	Ignition coil with igniter (ignition signal)	Idling	Pulse generation
G1 (E19-29) - E1 (E20-7)	W - W-B (*1) B-Y - W-B (*2)	Camshaft position sensor	Idling	Pulse generation (See page 05-311)
NE+ (E19-14) - NE- (E19-15)	B - W	Crankshaft position sensor	Idling	Pulse generation (See page 05-311)
RSO (E19-46) - E1 (E20-7)	B-L - W-B (*1) B-R - W-B (*2)	Idle speed control valve	Idling	Pulse generation

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
STA (E19-33) - E1 (E20-7)	B-R - W-B (*3) B - W-B (*4)	Starter signal	Cranking	5.5 V or more
FC (E19-47) - E1 (E20-7)	G-R - W-B	Fuel pump control	Ignition switch ON	9 to 14 V
OX (E19-11) - E1 (E20-7)	B - W-B	Heated oxygen sensor	Maintain engine speed at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation
OX2 (E19-12) - E1- (E20-7)	W - W-B (*1) R - W-B (*2)	Heated oxygen sensor	Maintain engine speed at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation
HT (E20-3) - E1 (E20-7)	P - W-B	Heated oxygen sensor heater	Ignition switch ON	9 to 14 V
HT2 (E20-2) - E1 (E20-7)	P - W-B	Heated oxygen sensor heater	Ignition switch ON	9 to 14 V
KNK1 (E19-5) - KNK2 (E19-4)	W - B	Knock sensor	Maintain engine speed at 4,000 rpm after warming up engine	Pulse generation (See page 05-308)
OCV+ (E18-4) - OCV- (E18-3)	Y - B-Y	Camshaft timing oil control valve	Ignition switch ON	Pulse generation (See page 05-338)
EVP1 (E19-51) - E1 (E20-7)	L-B - W-B	EVAP VSV	Ignition switch ON	9 to 14 V
STP (E19-3) - E1 (E20-7)	G-W - W-B	Stop lamp switch	Brake pedal depressed	9 to 14 V
STP (E19-3) - E1 (E20-7)	G-W - W-B	Stop lamp switch	Brake pedal released	Below 1.5 V
W (E19-48) - E1 (E20-7)	R-Y - W-B	MIL	Ignition switch ON	Below 3.0 V
TACH (E19-50) - E1 (E20-7)	B - W-B	Engine speed	Idling	Pulse generation
SPD (E19-30) - E1 (E20-7)	V-W - W-B	Speed signal from combination meter	Ignition switch ON, Rotate driving wheel slowly	Pulse generation

*1: TMC and TMMT Made
*2: TMUK Made
*3: TMC Made
*4: TMMT and TMUK Made

05JO8-06

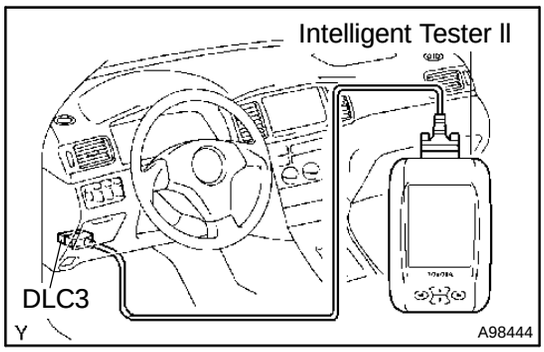

FI2547

DIAGNOSIS SYSTEM

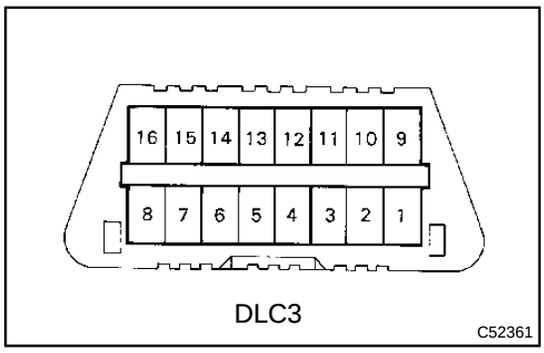
1. DESCRIPTION

- When troubleshooting Euro-OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect an OBD scan tool (complying with ISO 15031-4) or an intelligent tester II to the vehicle, and read the various data output from the vehicle's ECM.
- Euro-OBD regulations require that the vehicle's on-board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in: 1) the emission control systems and components, or 2) the powertrain control components (which affect vehicle emissions), or 3) the computer. In addition, the applicable DTCs (Diagnostic Trouble Codes) prescribed by ISO 15031-4 are recorded in the ECM memory (see page 05-226).

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



- To check the DTCs, connect the OBD scan tool or intelligent tester II to the DLC3 (Data Link Connector 3) on the vehicle. The OBD scan tool or intelligent tester II also enables you to erase the DTCs and check the freeze frame data and various forms of engine data. (See the instruction manual for the OBD scan tool or intelligent tester II.)
- *2 trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the ignition switch is turned to OFF and then to ON again, and the same malfunction is detected again, the MIL illuminates (2nd trip).
- Freeze frame data:
  Freeze frame data record the engine conditions (fuel system, calculated engine load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when malfunctions are detected. When troubleshooting, the freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.



2. CHECK DLC3

(a) The vehicle's ECM uses the ISO 9141–2 (Euro–OBD) communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031–03 and matches the ISO 9141–2 format.

Symbol	Terminal No.	Name	Reference Terminal	Result	Condition
SIL	7	Bus "+" line	5 – Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always

HINT:

When you use the intelligent tester II, first connect the cable of the tester to the DLC3. Next, turn the ignition switch to ON. Finally turn the tester ON. If the screen displays NO INFORMATION AVAILABLE and bus check also fails, a problem exists in the vehicle, the tester or the tester cable.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester or the cable, so consult the Service Department listed in its instruction manual.

3. INSPECT BATTERY VOLTAGE

Standard: 11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

4. CHECK MIL

(a) The MIL illuminates when the ignition switch is turned to ON and the engine is not running.

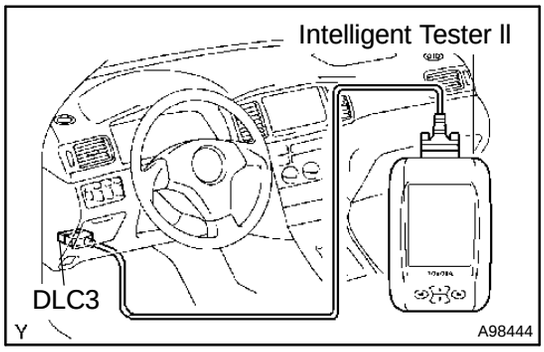
HINT:

If the MIL does not illuminate, check the MIL circuit (see page 05–361).

(b) The MIL should turn off when the engine is started. If the MIL remains on, the diagnosis system has detected a malfunction or abnormality in the system.

05KNS-05

DTC CHECK/CLEAR



1. CHECK DTC (using the intelligent tester II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON and turn the intelligent tester II ON.

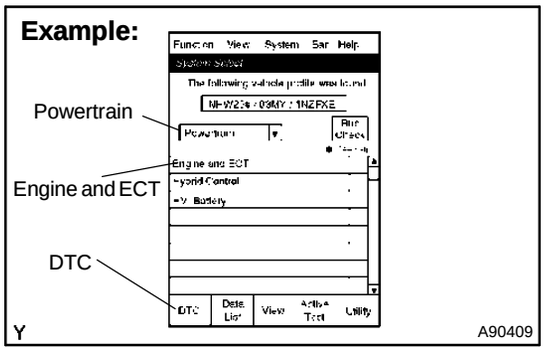
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.

(d) Check DTCs and freeze frame data, and then write them down.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.

(e) See page 05-226 to confirm the details of the DTCs.



2. FREEZE FRAME DATA

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON and turn the intelligent tester II ON.

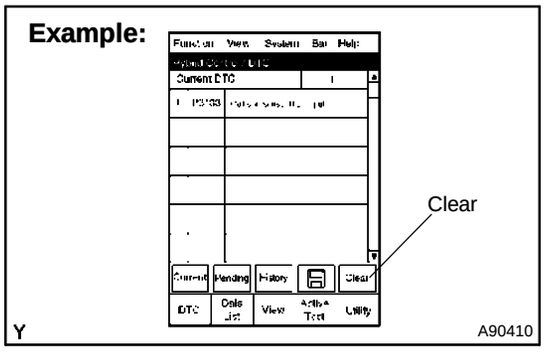
(c) Read DTCs by selecting the following menu items: Powertrain / Engine and ECT / DTC.

(d) Select a parameter(s) to check the freeze frame data.

(e) Note down the DTC(s) and freeze frame data.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.



3. CLEAR DTCs AND FREEZE FRAME DATA (using the intelligent tester II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON (do not start the engine) and turn the intelligent tester II ON.

(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.

(d) Erase DTCs and freeze frame data by pressing the YES button on the tester.

HINT:

If you need help using the intelligent tester II, refer to the instruction manual.

4. CLEAR DTCs AND FREEZE FRAME DATA (not using the intelligent tester II)

(a) Remove the EFI fuse from the engine room R/B for more than 60 seconds, or disconnect the negative battery cable for more than 60 seconds. When disconnecting the negative battery cable, perform the "INITIALIZE" procedure.

05JOB-06

FAIL-SAFE CHART

If any of the following DTCs are recorded, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily.

DTC	Item	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0102 and P0103	Mass Air Flow (MAF) meter	Air flow is calculated from engine speed and Throttle Position (TP)	"Pass" condition detected
P0112 and P0113	Intake Air Temperature (IAT) sensor	ECM assumes that IAT is 20°C (68°F)	"Pass" condition detected
P0117 and P0118	Engine Coolant Temperature (ECT) sensor	ECM performs engine control using estimated ECT calculated from IAT at time of engine start and intake air volume	"Pass" condition detected
P0122 and P0123	Throttle Position (TP) sensor	ECM performs engine control using TP calculated from engine speed	"Pass" condition detected
P0135 and P0141	Heated Oxygen Sensor (HO2S) heater	If engine load is specific value or more, heater operates after specified length of time has elapsed	"Pass" condition detected
P0301, P0302, P0303 and P0304	Misfire detected	If misfire rate of cylinder exceeds catalytic damage misfire rate, fuel supply to that cylinder is suspended	"Pass" condition detected
P0327	Knock sensor	ECM sets ignition timing to maximum retard	"Pass" condition detected

05JOC-06

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

By reading the Data List displayed on the intelligent tester II, you can check values, including those of the switches, sensors, and actuators, without removing any parts. Reading the Data List as the first step of troubleshooting is one method of shortening diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when determining whether or not a part is faulty.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List.
(g) Check the values by referring to the table below.

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Injector (INJECTOR)	Injection period of No. 1 cylinder/ Min.: 0 ms, Max.: 32.6 ms	Idling: 1.92 to 3.37 ms	—
IGN Advance (IGN ADVANCE)	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	Idling: BTDC 3 to 13 deg.	—
IAC Duty Ratio (IAC DUTY RATIO)	IAC duty ratio/ Min.: 0 %, Max.: 99.6 %	Idling: 25 % to 45 %	—
CALC Load (CALC LOAD)	Calculated load by ECM/ Min.: 0 %, Max.: 100 %	• Idling: 1.5 to 3.0 % • Running without load (2,500 rpm): 4.0 to 10.0 %	—
AFM (AFM)	Air flow rate from MAF meter/ Min.: 0 g/s, Max.: 665.35 g/s	Idling: Approximately 0.3 g/s	If value is approximately 0.0 g/s: • Mass air flow meter power source circuit is open • VG circuit is open or shorted If value is 222 g/s or more: • EVG circuit is open
Engine SPD (ENGINE SPD)	Engine speed/ Min.: 0 rpm, Max.: 16,383 rpm	Idling: 600 to 700 rpm	—
Coolant Temp (COOLANT TEMP)	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	After warming up engine: 80° to 95°C (176° to 203°F)	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F): sensor circuit is shorted
Intake Air (INTAKE AIR)	Intake air temperature/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	Equivalent to ambient air temperature	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F): sensor circuit is shorted
Throttle POS (THROTTLE POS)	Absolute throttle position sensor/ Min.: 0 %, Max.: 100 %	• Value vary with throttle valve opening angle: 0 to 70 % • Throttle fully open: Approximately 78 %	Read value with ignition switch ON (Do not start engine)
IDL SIG (IDL SIG)	IDL signal/ ON or OFF	IDL ON: ON	—
Vehicle SPD (VEHICLE SPD)	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on speedometer

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
O2S B1 S1 (O2S B1 S1)	Heated oxygen sensor output voltage for bank 1 sensor 1/ Min.: 0 V, Max.: 1.275 V	Driving (50 km/h, 31 mph): 0.1 to 0.9 V	Performing A/F Control function of Active Test enables technician to check voltage output of sensor
O2S B1 S2 (O2S B1 S2)	Heated oxygen sensor output voltage for bank 1 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving (50 km/h, 31 mph): 0.1 to 0.9 V	Performing A/F Control function of Active Test enables technician to check voltage output of sensor
Short FT #1 (SHORT FT #1)	Short-term fuel trim of bank 1/ Min.: -100 %, Max.: 100 %	0 ± 20 %	This item is short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
Long FT #1 (LONG FT #1)	Long-term fuel trim of bank 1/ Min.: -100 %, Max.: 99.2 %	0 ± 20 %	This item is overall long-term fuel compensation that helps to maintain air-fuel ratio at stoichiometric air-fuel ratio (steadies long term deviations of short-term fuel trim from central value)
O2 FT B1 S1 (O2 FT B1 S1)	Short-term fuel trim associated with the bank 1 sensor 1/ Min.: -100 %, Max.: 100 %	0 ± 20 %	Same as Short FT #1
FUEL SYS #1 (FUEL SYS #1)	Fuel system status (Bank1) / OL or CL or OL DRIVE or OL FAULT or CL FAULT	Idling after warming up: CL	• OL (Open Loop): Has not yet satisfied conditions for closed loop • CL (Closed Loop): Using heated oxygen sensor as feedback for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but heated oxygen sensor used for fuel control is malfunctioning
FC IDL (FC IDL)	Fuel cut idle/ ON or OFF	Fuel cut operation: ON	Fuel cut idle = "ON" when throttle valve is fully closed and engine speed is over 1,500 rpm
MIL Status (MIL/WARN LIGHT)	MIL status/ ON or OFF	MIL ON: ON	—
Starter SIG (STARTER SIG)	Starter signal/ ON or OFF	Cranking: ON	—
A/C SIG (A/C SIG)	A/C signal/ ON or OFF	A/C ON: ON	—
Elect Load SIG (ELECT LOAD SIG)	Electrical load signal/ ON or OFF	• Taillamp switch ON: ON • Defogger switch ON: ON	—
Stop Light SW (STOP LIGHT SW)	Stop lamp switch/ ON or OFF	• Brake pedal depressed: ON • Brake pedal released: OFF	—
Fuel Pump (FUEL PUMP / SPD)	Fuel pump/ ON or OFF	Idling: ON	—
EVAP VSV (EVAP VSV)	EVAP VSV/ ON or OFF	VSV operating: ON	EVAP VSV is controlled by ECM (ground side duty control)
VVT CTRL B1 (VVT CTRL B1)	VVT control status (bank 1)/ ON or OFF	VVT system in operation: ON	—

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
FC TAU (FC TAU)	Fuel cut TAU: Fuel cut during very light load/ ON or OFF	Fuel cut operating: ON	Fuel cut is being performed under very light load to prevent engine combustion from becoming incomplete
# Codes (# CODES)	#Codes/ Min.: 0, Max.: 255	—	Number of detected DTCs

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

2. ACTIVE TEST

HINT:

Performing an Active Test using the intelligent tester II enables components including the relay, VSV, and actuator to be operated without removing any parts. Performing the Active Test as the first step of trouble-shooting is one method of shortening diagnostic time.

Data List is displayed during an Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / Active Test.
(g) Perform the Active Test by referring to the table below.

Intelligent Tester II Display (Abbreviation)	Test Details	Diagnostic Note
Injector Volume (INJ VOL)	[Test Details] Control injection volume Min.: -12 %, Max.: 25 % [Vehicle Condition] Engine speed: 3,000 rpm or less	• All injectors are tested at once • Injection volume is gradually changed between -12 % and 25 %
A/F Control (A/F CONTROL)	[Test Details] Control injection volume -12.5 or 25 % (Change injection volume by 12.5 % or 25 %) [Vehicle Condition] Engine speed: 3,000 rpm or less	Following A/F Control procedure enables technician to check and graph voltage outputs of both heated oxygen sensors To display graph, select following menu items: View / Line graph 1 or Line graph 2
IAC Duty (IAC DUTY RATIO)	[Test Details] Change IAC duty ratio IAC duty ratio 0 % to 90 %	—
A/C Cut Signal (A/C CUT SIG)	A/C Cut Signal ON or OFF	—
VVT Control (Bank 1) (VVT CTRL B1)	[Test Details] Activate VVT system (Bank 1) ON or OFF	• ON: Rough idling or engine stalling • OFF: Normal engine speed
Fuel Pump (FUEL PMP SP CTL)	[Test Details] Control fuel pump speed ON or OFF	—
Purge VSV (EVAP (PURGE) VSV)	[Test Details] Activate EVAP VSV control ON or OFF	—
FC IDL Prohibit (FC IDL PROHBT)	[Test Details] Control idle fuel cut prohibition ON or OFF	During idling
TE1 (TC) (TC/TE1)	[Test Details] Connect TC and TE1 ON or OFF	—

054JD-29

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may not be exactly the same as your readings due to factors such as the type of instrument.

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

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0102 (05-230)	Mass or Volume Air Flow Circuit Low Input	• Open or short in mass air flow meter circuit • Mass air flow meter • Contamination in mass air flow meter • ECM	○	○
P0103 (05-230)	Mass or Volume Air Flow Circuit High Input	• Open or short in intake air flow meter circuit • Mass air flow meter • Contamination in mass air flow meter • ECM	○	○
P0112 (05-236)	Intake Air Temperature Circuit Low Input	• Open or short in intake air temperature sensor circuit • Short to power source circuit • Intake air temperature sensor (built into intake air flow meter) • ECM	○	○
P0113 (05-236)	Intake Air Temperature Circuit High Input	• Short in intake air temperature sensor circuit • Intake air temperature sensor (built into intake air flow meter) • ECM	○	○
P0117 (05-240)	Engine Coolant Temperature Circuit Low Input	• Open in engine coolant temperature sensor circuit • Short to power source circuit • Engine coolant temperature sensor • ECM	○	○
P0118 (05-240)	Engine Coolant Temperature Circuit High Input	• Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM	○	○
P0122 (05-245)	Throttle Position Sensor Circuit Low Input	• Throttle position sensor (built in throttle body) • Short in VTA circuit and E2 circuit • Open in VC circuit • ECM	○	○
P0123 (05-245)	Throttle Position Sensor Circuit High Input	• Throttle position sensor (built in throttle body) • Open in E2 circuit • VC and VTA circuit are short-circuited • ECM	○	○
P0125 (05-250)	Insufficient Coolant Temperature For Closed Loop Fuel Control	• Engine coolant temperature sensor • Thermostat • Cooling system	○	○
P0130 (05-252)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM	○	○
P0132 (05-258)	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 1)	• Short in signal output circuit and power source circuit of heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 1) • ECM	○	○
P0133 (05-260)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust system • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0134 (05-252)	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	• Open in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1)	○	○
P0135 (05-268)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open in heated oxygen sensor (sensor 1) heater circuit • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM	○	○
P0136 (05-272)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay	○	○
P0138 (05-274)	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)	• Short in signal output circuit and power source circuit of heated oxygen sensor (sensor 2) • Heated oxygen sensor (sensor 2) • ECM	○	○
P0139 (05-276)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 2)	• Open or short in heated oxygen sensor (sensor 2) • Heated oxygen sensor (sensor 2) • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust • ECM	○	○
P0140 (05-272)	Heated Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 2)	• Open or short in heated oxygen sensor (sensor 2) circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay	○	○
P0141 (05-283)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Open in heated oxygen sensor (sensor 2) heater circuit • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM	○	○
P0171 (05-287)	System Too Lean (Bank 1)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • PCV hose connection • ECM	○	○
P0172 (05-287)	System Too Rich (Bank 1)	• Injector leakage or blockage • Mass air flow meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM	○	○
P0261 (05-295)	Cylinder 1 Injector Circuit Low	• Open or short in injector circuit • Injector • ECM	○	○
P0262 (05-295)	Cylinder 1 Injector Circuit High	• Short in injector power source circuit • Injector • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0264 (05-295)	Cylinder 2 Injector Circuit Low	• Open or short in injector circuit • Injector • ECM	○	○
P0265 (05-295)	Cylinder 2 Injector Circuit High	• Short in injector power source circuit • Injector • ECM	○	○
P0267 (05-295)	Cylinder 3 Injector Circuit Low	• Open or short in injector circuit • Injector • ECM	○	○
P0268 (05-295)	Cylinder 3 Injector Circuit High	• Short in injector power source circuit • Injector • ECM	○	○
P0270 (05-295)	Cylinder 4 Injector Circuit Low	• Open or short in injector circuit • Injector • ECM	○	○
P0271 (05-295)	Cylinder 4 Injector Circuit High	• Short in injector power source circuit • Injector • ECM	○	○
P0300 (05-298)	Random/Multiple Cylinder Misfire Detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM	○*2	○
P0301 (05-298)	Cylinder 1 Misfire Detected	• Same as DTC P0300	○*2	○
P0302 (05-298)	Cylinder 2 Misfire Detected	• Same as DTC P0300	○*2	○
P0303 (05-298)	Cylinder 3 Misfire Detected	• Same as DTC P0300	○*2	○
P0304 (05-298)	Cylinder 4 Misfire Detected	• Same as DTC P0300	○*2	○
P0327 (05-308)	Knock Sensor 1 Circuit Low Input (Bank1 or Single Sensor)	• Open or short in knock sensor circuit • Knock sensor • Knock sensor looseness • ECM	○	○
P0335 (05-311)	Crankshaft Position Sensor "A" Circuit	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft position sensor plate • ECM	○	○
P0336 (05-311)	Crankshaft Position Sensor "A" Circuit Range/Performance	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft position sensor plate • ECM	○	○
P0340 (05-315)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	• Mechanical system malfunction (jumped teeth of timing chain, chain stretched) • ECM	○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	Memory
P0341 (05-316)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • ECM	○	○
P0342 (05-316)	Camshaft Position Sensor Circuit Low Input	• Short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • ECM	○	○
P0343 (05-316)	Camshaft Position Sensor Circuit High Input	• Open in camshaft position sensor circuit • Short in power source circuit • Camshaft position sensor • Intake camshaft • ECM	○	○
P0420 (05-319)	Catalyst System Efficiency Below Threshold (Bank 1)	• Gas leakage from exhaust system • Heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 2) • Three-Way Catalytic Converter (TWC)	○	○
P0443 (05-324)	Evaporative Emission Control System Purge Control Valve Circuit	• Open or short in EVAP VSV circuit • EVAP VSV • ECM	○	○
P0501 (05-327)	Vehicle Speed Sensor Range/ Performance	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM	○	○
P0505 (05-329)	Idle Air Control System	• Open or short in ISC valve circuit • ISC valve • ECM	○	○
P0561 (05-333)	System Voltage Unstable	• ECM	○	○
P0562 (05-334)	System Voltage Low	• Open or short in backup power source circuit • Tired battery • Electrical over work • Generator • ECM	○	○
P0563 (05-334)	System Voltage High	• Generator • Battery (If 24 V battery is fitted, DTC P0563 is output) • ECM	○	○
P0601 (05-337)	Internal Control Module Memory Check Sum Error	• ECM	○	○
P1340 (05-338)	Camshaft Position Sensor "A" (Bank 1 Sensor 2)	• Valve timing (jumped teeth of timing chain, chain stretched) • Camshaft timing oil control valve (OCV) • VVT controller assembly • ECM	○	○
P1345 (05-338)	VVT System Stick Detected	• Valve timing • Camshaft timing oil control valve (OCV) • VVT controller assembly • ECM	○	○
P1346 (05-344)	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)	• Open or short in oil control valve circuit • Oil control valve • ECM	○	○
P1605 (05-346)	Knock Control CPU Malfunction	• ECM	○	○

*1: ○ ... CHK ENG (MIL) lights up.

*2: If a misfire occurs, which results in damage to the TWC, the CHK ENG (MIL) blinks.

DTC	P0102	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

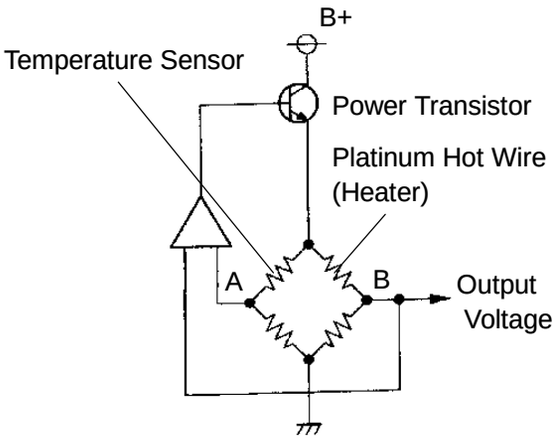
DTC	P0103	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

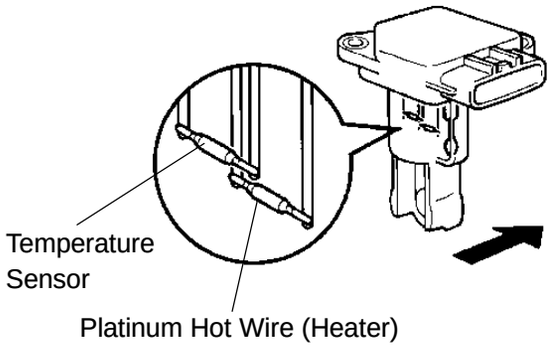
The Mass Air Flow (MAF) meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provides a proper air-fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the flow of the air passing through the sensor. The ECM interprets this voltage as the intake air amount.

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



FI6929
A09074



A94508

HINT:

When the mass air flow meter output is outside the normal range, the ECM determines this as a malfunction.

DTC No.	DTC Detection Condition	Trouble Area
P0102	Mass air flow meter output is equal to or less than threshold value for 2 seconds or more (3 trip detection logic) Example: Air flow value is 0.3 g/s or less while idling after warm-up (normal range is 1.4 to 1.7 g/s) (voltage is approximately 1 V)	• Open or short in mass air flow meter circuit • Mass air flow meter • Contamination in mass air flow meter • ECM
P0103	Mass air flow meter output is 222 g/s (4.9 V) for 2 seconds or more (3 trip detection logic) Example: Air flow value is 222 g/s while idling	• Open or short in intake air flow meter circuit • Mass air flow meter • Contamination in mass air flow meter • ECM

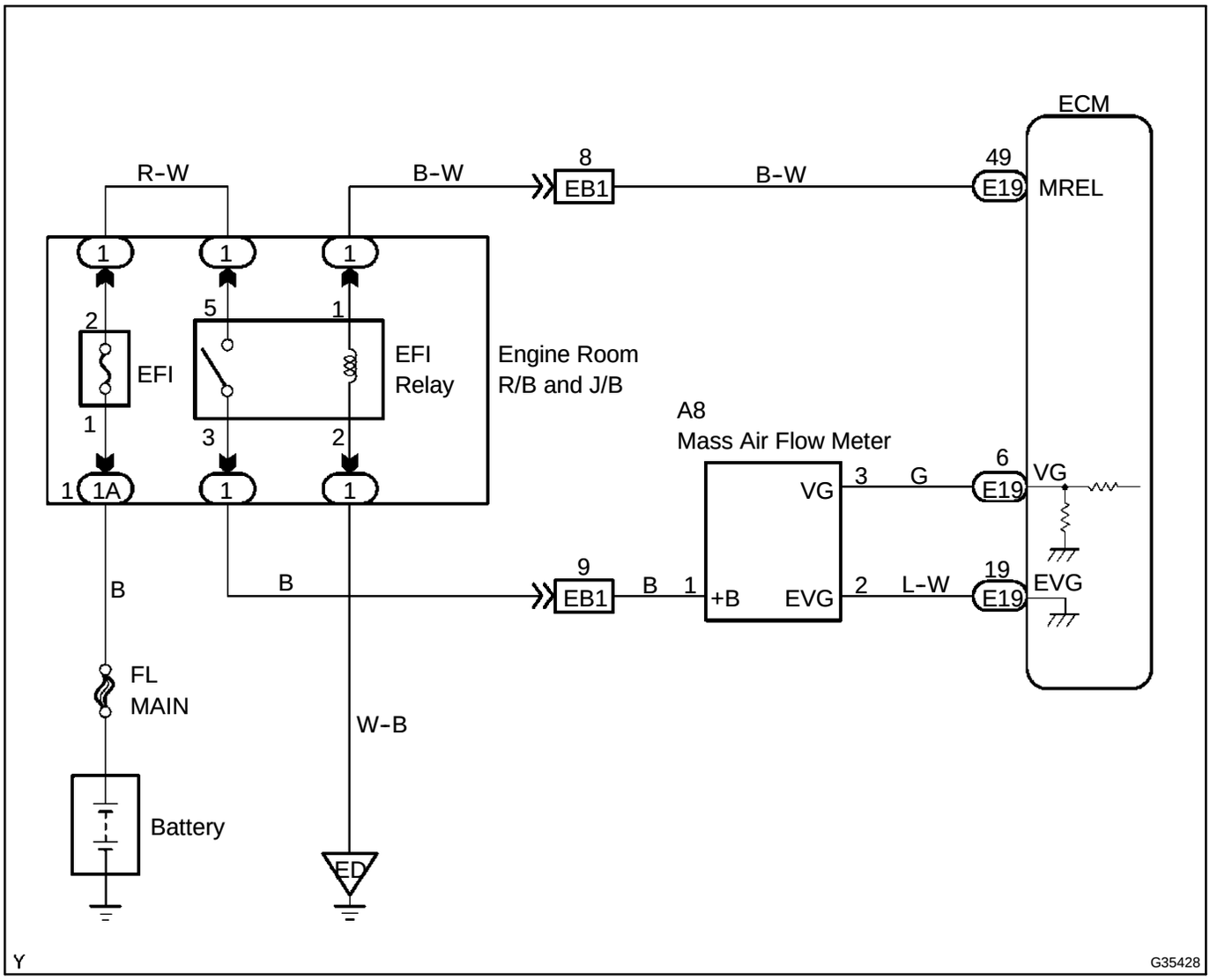
HINT:

Detection is performed when the engine idles for approximately 15 seconds.

HINT:
When DTC P0102 or P0103 is detected, check the air-flow ratio by selecting Powertrain / Engine and ECT / Data List / AFM on the intelligent tester II.

Air Flow Value (g/second)	Malfunction
Always Approximately 0.3 or less	• Open in mass air flow meter power source circuit • Open or short in VG circuit
Always 222 or more	• Open in EVG circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE USING INTELLIGENT TESTER II(MASS AIR FLOW RATE)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine.
(c) Turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / AFM.
(e) Read the value.

Result:

Mass Air Flow Rate (g/second)	Proceed To
0.3 or less	A
222 or more	B
Between 1.0 and 221 (*1)	C

*1: The value must be changed when the throttle valve is open or closed.

B → **Go to step 7**

C → **CHECK FOR INTERMITTENT PROBLEMS**

A

2 INSPECT MASS AIR FLOW METER(VISUAL INSPECTION)

OK: The sensor area of the mass air flow meter has not been contaminated.

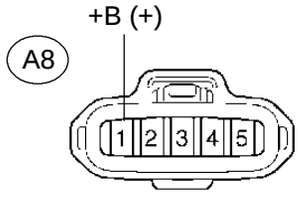
NG → **REPLACE MASS AIR FLOW METER**

OK

3 INSPECT MASS AIR FLOW METER(POWER SOURCE)

Wire Harness Side:

Mass Air Flow Meter Connector



Front View

A84809

(a) Disconnect the A8 mass air flow meter connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminal of the wire harness side connector and body ground.

Standard:

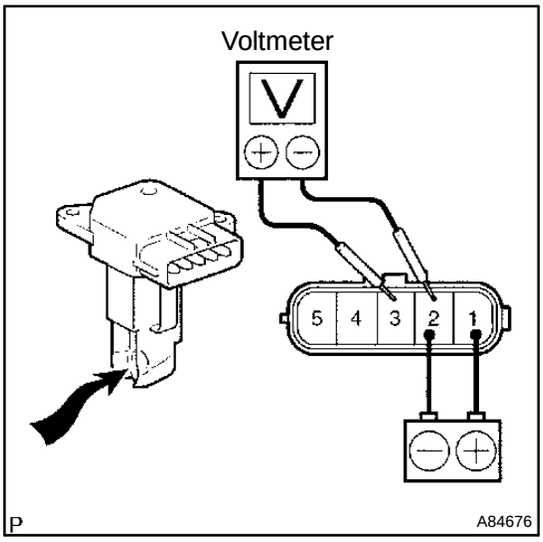
Tester Connection	Specified Condition
+B (A8-1) - Body ground	9 to 14 V

(d) Reconnect the mass air flow meter connector.

NG → **Go to step 6**

OK

4 INSPECT MASS AIR FLOW METER

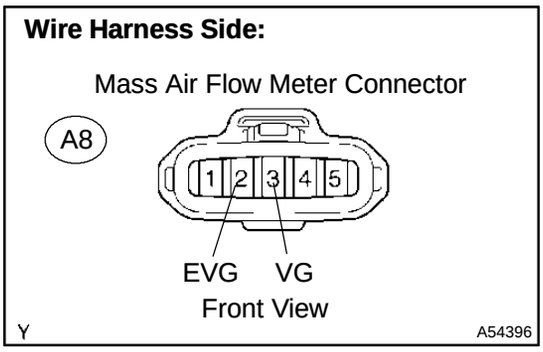


(a) Remove the mass air flow meter.
(b) Apply battery voltage across terminals 1 (+B) and 2 (EVG).
(c) Using a voltmeter, connect the positive (+) tester probe to terminal 3 (VG), and negative (-) tester probe to terminal 2 (EVG).
(d) Blow air into the mass air flow meter.
OK: The voltage fluctuates.
(e) Reinstall the mass air flow meter.

NG → **REPLACE MASS AIR FLOW METER**

OK

5 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)

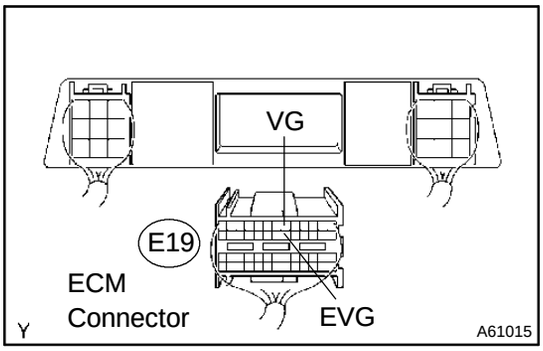


(a) Disconnect the A8 mass air flow meter connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
VG (A8-3) - VG (E19-6)	Below 1 Ω
EVG (A8-2) - EVG (E19-19)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A8-3) or VG (E19-6) - Body ground	10 kΩ or higher



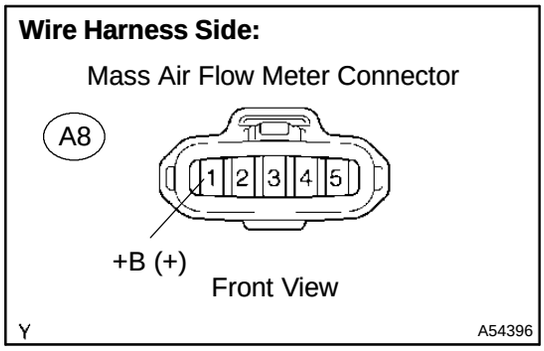
(d) Reconnect the mass air flow meter connector.
(e) Reconnect the ECM connector.

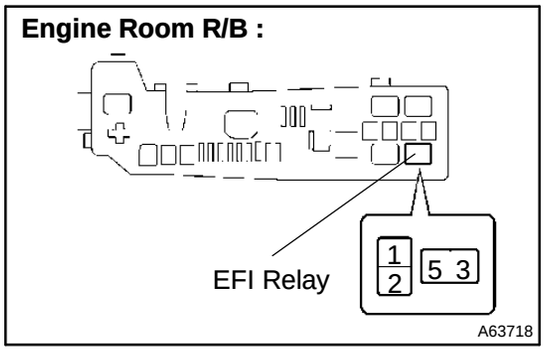
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

6 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - EFI RELAY)





(a) Disconnect the A8 mass air flow meter connector.
(b) Remove the EFI relay from the engine room R/B.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (A8-1) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A8-1) or EFI relay (3) - Body ground	10 kΩ or higher

(d) Reconnect the mass air flow meter connector.
(e) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

INSPECT ECM POWER SOURCE CIRCUIT **(See page 05-357)**

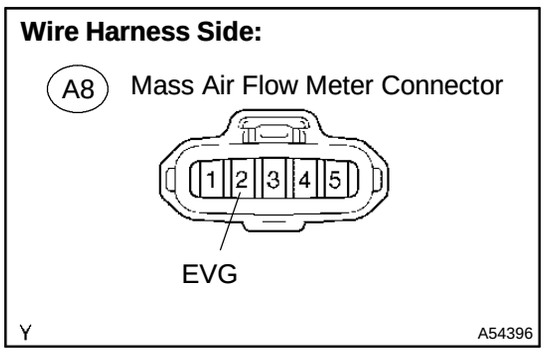
7 INSPECT MASS AIR FLOW METER(VISUAL INSPECTION)

OK: The sensor area of the mass air flow meter has not been contaminated.

NG → **REPLACE MASS AIR FLOW METER**

OK

8 CHECK HARNESS AND CONNECTOR(SENSOR GROUND)



(a) Disconnect the A8 mass air flow meter connector.
(b) Check the resistance.

Standard (Check for open):

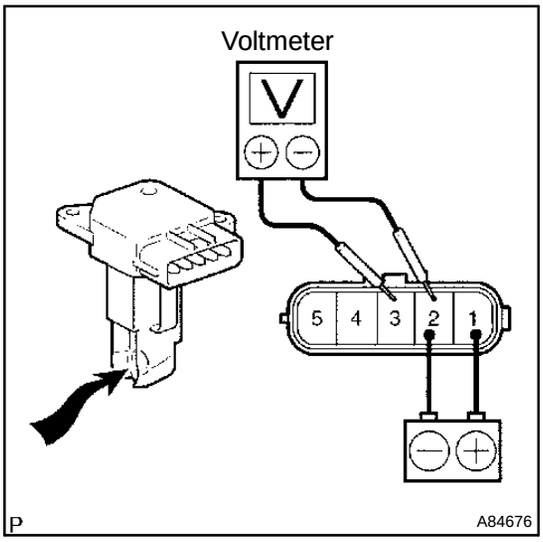
Tester Connection	Specified Condition
EVG (A8-2) - Body ground	Below 1 Ω

(c) Reconnect the mass air flow meter connector.

NG → **Go to step 10**

OK

9 INSPECT MASS AIR FLOW METER



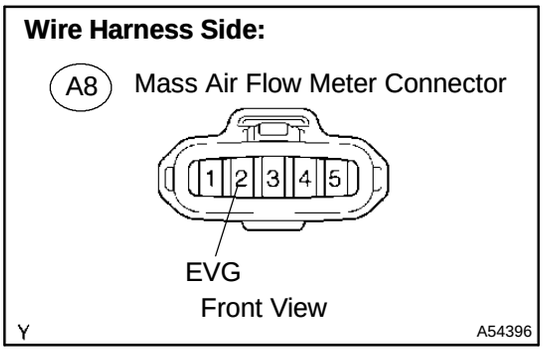
(a) Remove the mass air flow meter.
(b) Apply battery voltage across terminals 1 (+B) and 2 (EVG).
(c) Using a voltmeter, connect the positive (+) tester probe to terminal 3 (VG), and negative (-) tester probe to terminal 2 (EVG).
(d) Blow air into the mass air flow meter.
OK: The voltage fluctuates.
(e) Reinstall the mass air flow meter.

NG → **REPLACE MASS AIR FLOW METER**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

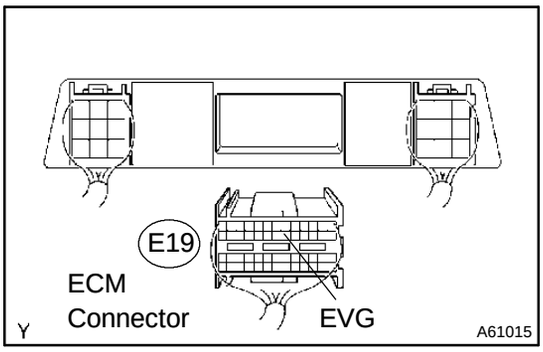
10 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



(a) Disconnect the A8 mass air flow meter connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
EVG (A8-2) - EVG (E19-19)	Below 1 Ω

(d) Reconnect the mass air flow meter connector.
(e) Reconnect the ECM connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

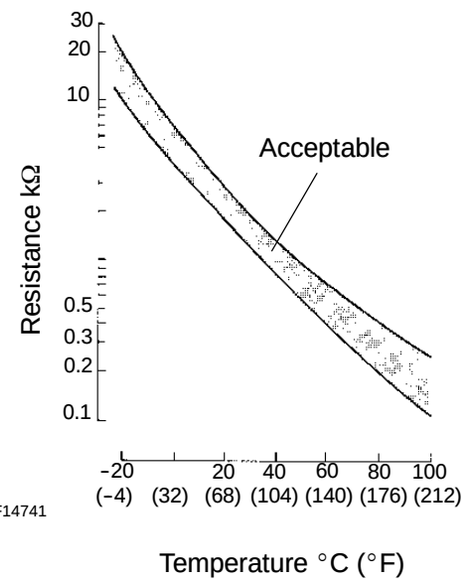
REPLACE MASS AIR FLOW METER

DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT

DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

(Figure 1)



The Intake Air Temperature (IAT) sensor is built into the Mass Air Flow (MAF) meter, and monitors the intake air temperature. The IAT sensor has a built-in thermistor that varies its resistance depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected as voltage changes to the ECM terminal (see figure 1).

The IAT sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the IAT sensor from terminal THA via resistor R.

Resistor R and the IAT sensor are connected in series. When the resistance value of the IAT sensor changes in accordance with changes in the intake air temperature, the voltage at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

HINT:

When the IAT sensor output is outside the normal range, the ECM determines this as a malfunction.

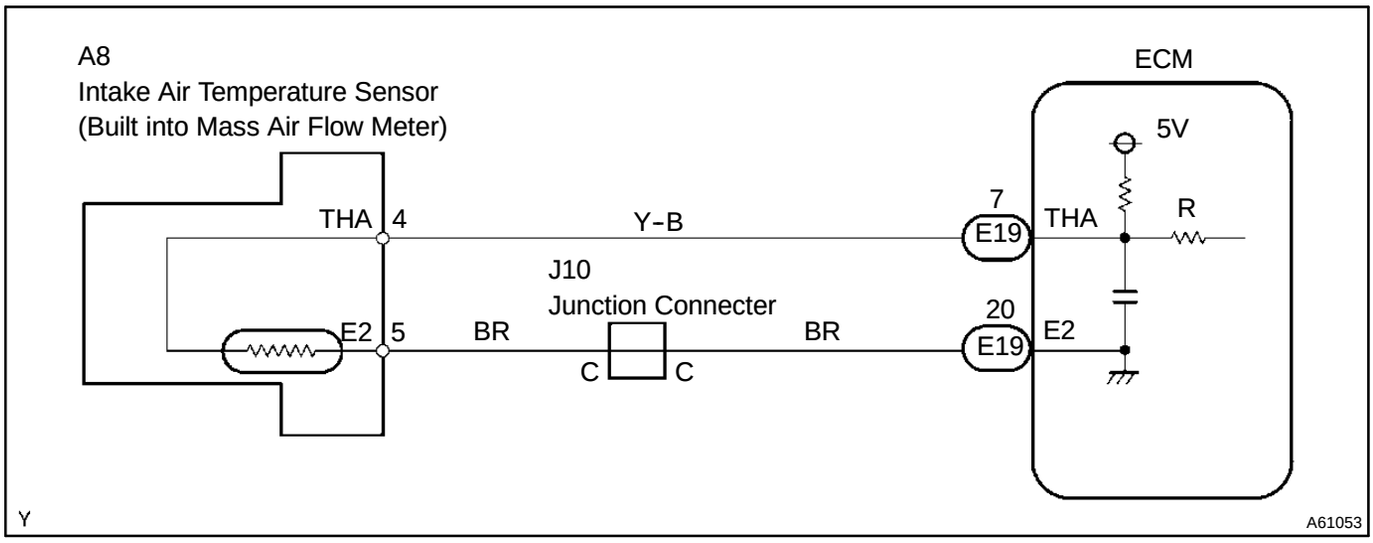
DTC No.	DTC Detecting Condition	Trouble Area
P0112	IAT sensor output is less than -38°C (-36°F) for 0.2 seconds (3 trip detection logic)	• Open or short in intake air temperature sensor circuit • Short to power source circuit • Intake air temperature sensor (built into mass air flow meter) • ECM
P0113	IAT sensor output is more than 138°C (280°F) for 0.2 seconds (3 trip detection logic)	• Short in intake air temperature sensor circuit • Intake air temperature sensor (built into mass air flow meter) • ECM

HINT:

- DTC P0112 is detected when the engine idles for approximately 5 minutes.
- DTC P0113 is detected when the ignition switch is in the ON position or the engine is running.
- When DTC P0112 or P0113 is detected, check the intake air temperature by selecting Powertrain / Engine and ECT / Data List / Intake Air on the intelligent tester II.

Temperature Displayed	Malfunction
Less than -38˚C (-36˚F)	Open circuit or short +B circuit
More than 138˚C (280˚F)	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(d) Read the value.

OK:

Temperature value: Same as the actual intake air temperature.

Result:

Temperature Displayed	Proceed To
Less than -38°C (-36°F)	A
More than 138°C (280°F)	B
OK (Same as actual intake air temperature)	C

HINT:

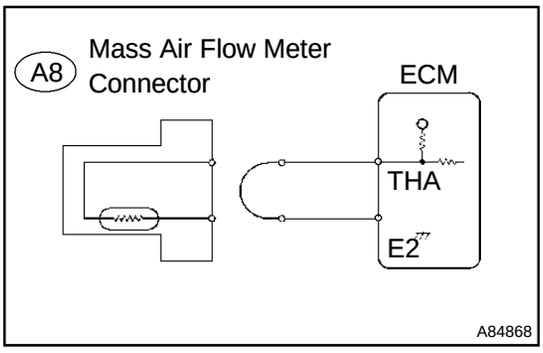
- If there is an open circuit, the intelligent tester ll indicates less than -38°C (-36°F).
- If there is a short circuit, the intelligent tester ll indicates more than 138°C (280°F).

B → **Go to step 4**

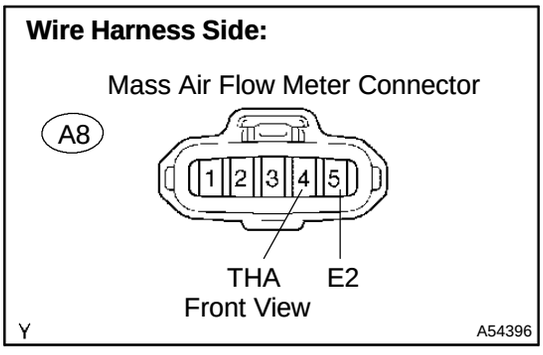
C → **CHECK FOR INTERMITTENT PROBLEMS**

A

2 READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



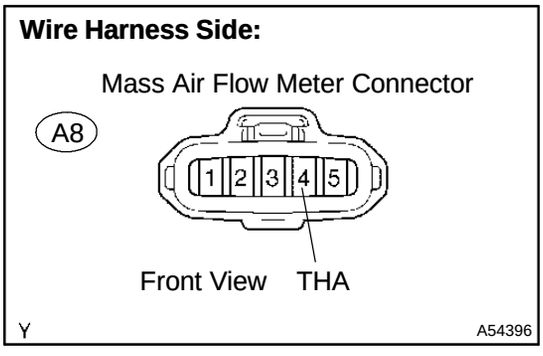
(a) Disconnect the A8 mass air flow meter connector.
(b) Connect terminals THA and E2 of the mass air flow meter wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.
Standard:
Temperature value: 138°C (280°F) or more
(g) Reconnect the mass air flow meter connector.



OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW METER**

NG

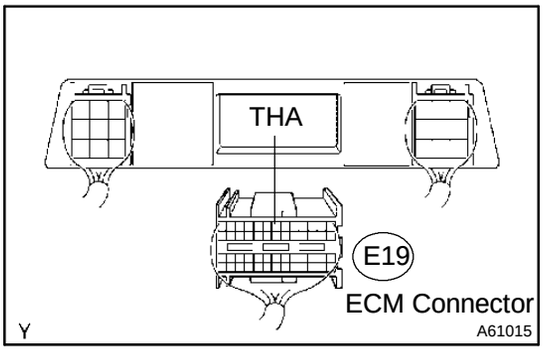
3 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



(a) Disconnect the A8 mass air flow meter connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
THA (A8-4) - THA (E19-7)	Below 1 Ω

(d) Reconnect the mass air flow meter connector.
(e) Reconnect the ECM connector.

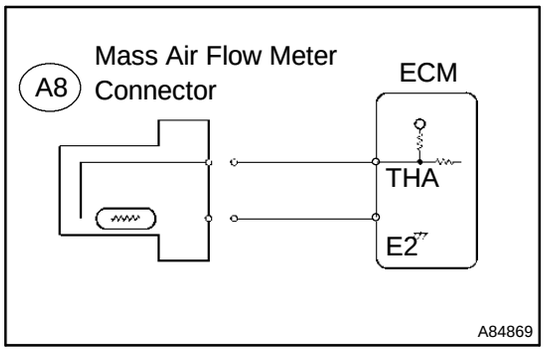


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

4	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

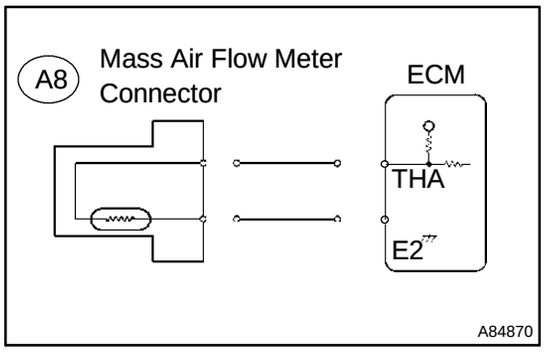


(a) Disconnect the A8 mass air flow meter connector.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the value.
Standard:
Temperature value: Less than -40°C (-40°F)
(f) Reconnect the mass air flow meter connector.

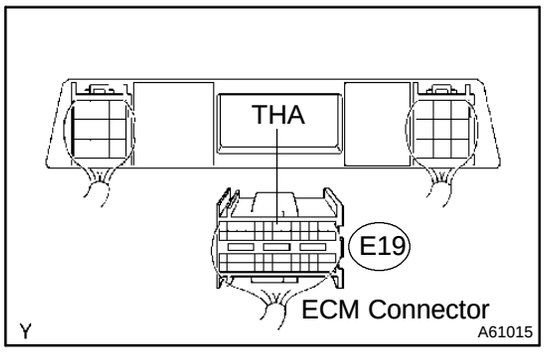
OK → **REPLACE MASS AIR FLOW METER**

NG

5	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)



(a) Disconnect the E19 ECM connector.
(b) Disconnect the A8 mass air flow meter connector.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the value.
Standard:
Temperature value: Less than -40°C (-40°F)
(f) Reconnect the ECM sensor connector.
(g) Reconnect the mass air flow meter connector.



OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0117	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT

DTC	P0118	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

A thermistor is built into the engine coolant temperature sensor and changes its resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as those of the intake air temperature sensor.

HINT:

- When the engine coolant temperature sensor output is outside the normal range, the ECM determines this as a malfunction.
- If DTC P0117 or P0118 is detected, the ECM performs engine control using an estimated engine coolant temperature calculated from the intake air temperature at the time of engine start and the intake air volume.

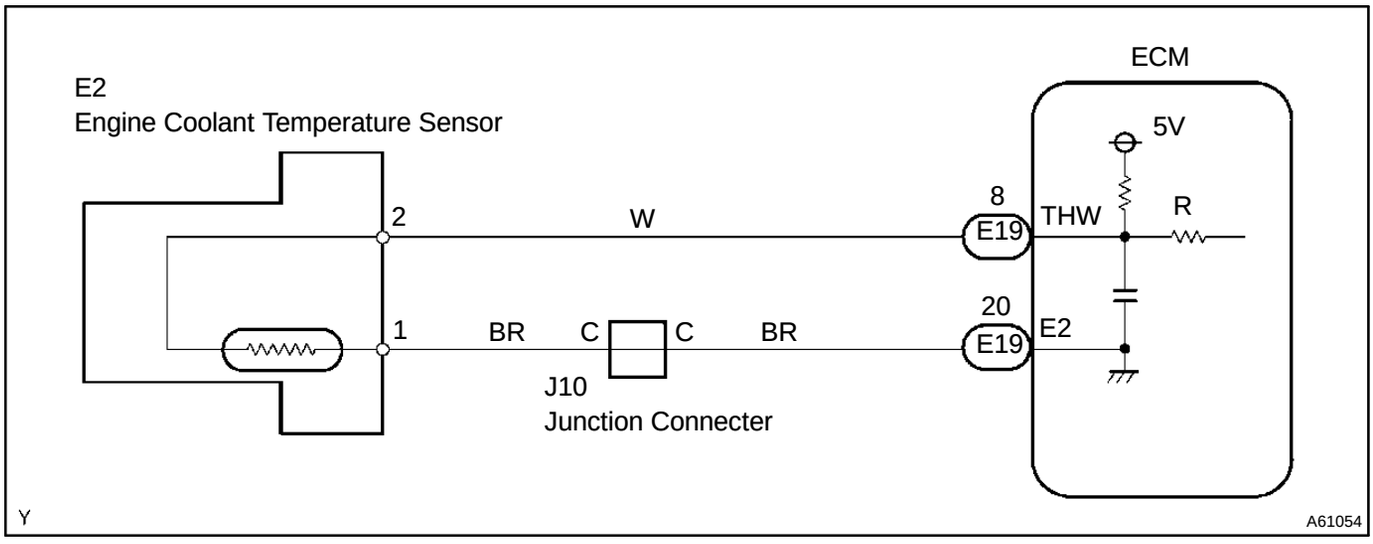
DTC No.	DTC Detection Condition	Trouble Area
P0117	Engine coolant temperature sensor output is less than -38°C (-36°F) for 0.5 seconds when ignition switch is in ON position or engine is running (3 trip detection logic)	• Open in engine coolant temperature sensor circuit • Short to power source circuit • Engine coolant temperature sensor • ECM
P0118	Engine coolant temperature sensor output is more than 136°C (277°F) for 0.5 seconds when ignition switch is in ON position or engine is running (3 trip detection logic)	• Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM

HINT:

- When DTC P0117 or P0118 is detected, check the engine coolant temperature by selecting Powertrain / Engine and ECT / Data List / Coolant Temp on the intelligent tester II.

Temperature Displayed	Malfunction
Less than -38˚C (-36˚F)	Open or short to +B circuit
More than 136˚C (277˚F)	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(ENGINE COOLANT TEMPERATURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(d) Read the value.

OK:

Temperature value: 80° to 97°C (176° to 207°F) after warming up the engine.

Result:

Temperature Displayed	Proceed To
Less than -38°C(-36°F)	A
More than 136°C(277°F)	B
OK (Same as actual engine coolant temperature)	C

HINT:

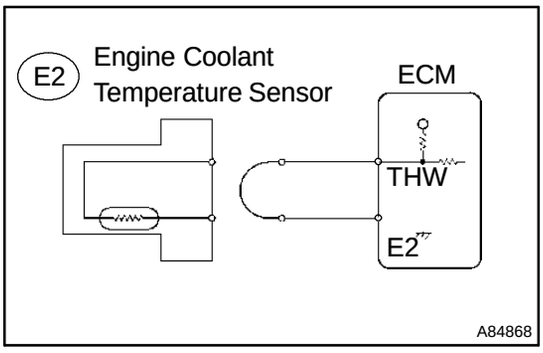
- If there is an open circuit, the intelligent tester ll indicates less than -38°C (-36°F).
- If there is a short circuit, the intelligent tester ll indicates more than 136°C (277°F).

B → Go to step 4

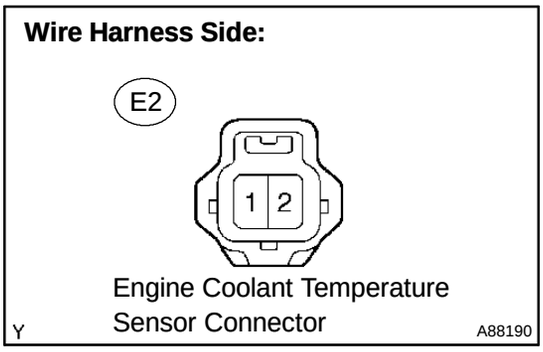
C → CHECK FOR INTERMITTENT PROBLEMS

A

2	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



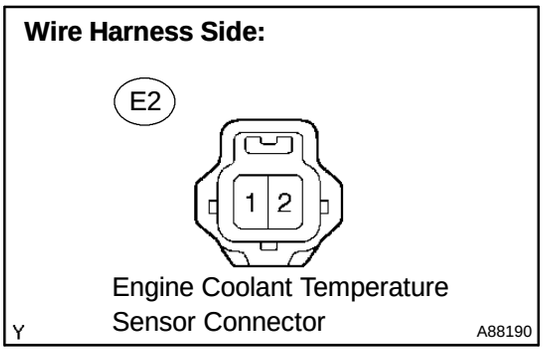
(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: More than 138°C (280°F)
(g) Reconnect the engine coolant temperature sensor connector.



OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

NG

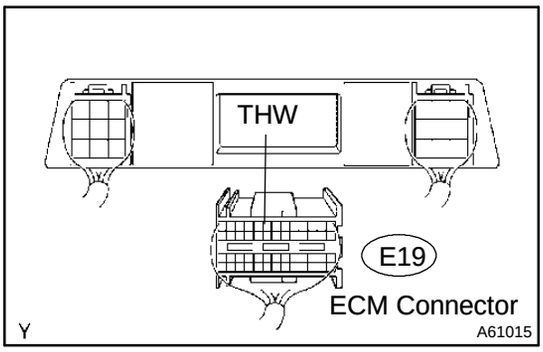
3	CHECK HARNESS AND CONNECTOR(ENGINE COOLANT TEMPERATURE SENSOR - ECM)



(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
THW (E2-2) - THW (E19-8)	Below 1 Ω

(d) Reconnect the engine coolant temperature sensor connector.
(e) Reconnect the ECM connector.

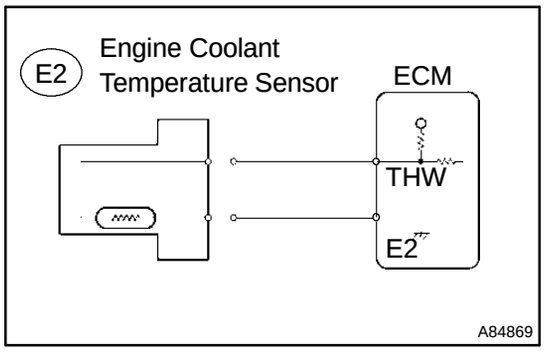


NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

4	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

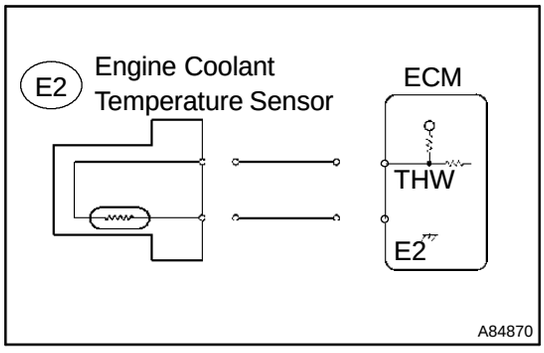


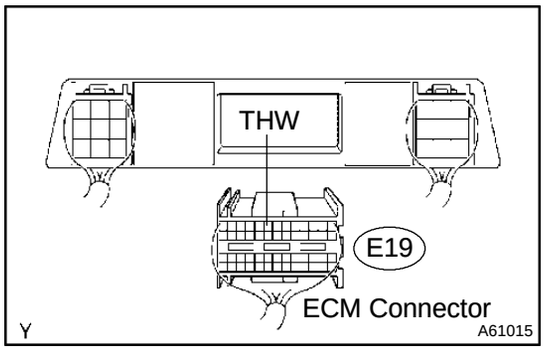
(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(d) Read the value.
Standard:
Temperature value: Less than -40°C (-40°F)
(e) Reconnect the engine coolant temperature sensor connector.

OK	REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

5	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the E2 engine coolant temperature sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: Less than -40°C (-40°F)
(g) Reconnect the engine coolant temperature sensor connector.
(h) Reconnect the ECM connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

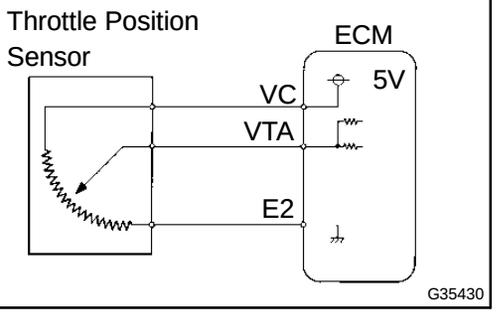
NG

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0122	THROTTLE POSITION SENSOR CIRCUIT LOW INPUT

DTC	P0123	THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION



The throttle position sensor is mounted on the throttle body and detects the throttle valve opening angle.
When the throttle valve is fully closed, a voltage of approximately 0.3 to 1.0 V is applied to terminal VTA of the ECM. The voltage applied to terminal VTA of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 3.2 to 4.9 V when the throttle valve is fully open. The ECM monitors the vehicle driving conditions through these signals, input from terminal VTA, and uses them as one of the conditions for determining the air-fuel ratio correction, power increase correction and fuel-cut control, etc.

HINT:
When the throttle position sensor output voltage is outside the normal range, the ECM determines this as a malfunction.

DTC No.	DTC Detection Condition	Trouble Area
P0122	VTA stays less than 0.1 V for 0.08 seconds or more (3 trip detection logic)	• Throttle position sensor (built in throttle body) • Short in VTA circuit and E2 circuit • Open in VC circuit • ECM
P0123	VTA stays more than 4.9 V for 0.08 seconds or more (3 trip detection logic)	• Throttle position sensor (built in throttle body) • Open in E2 circuit • VC and VTA circuit are short-circuited • ECM

HINT:

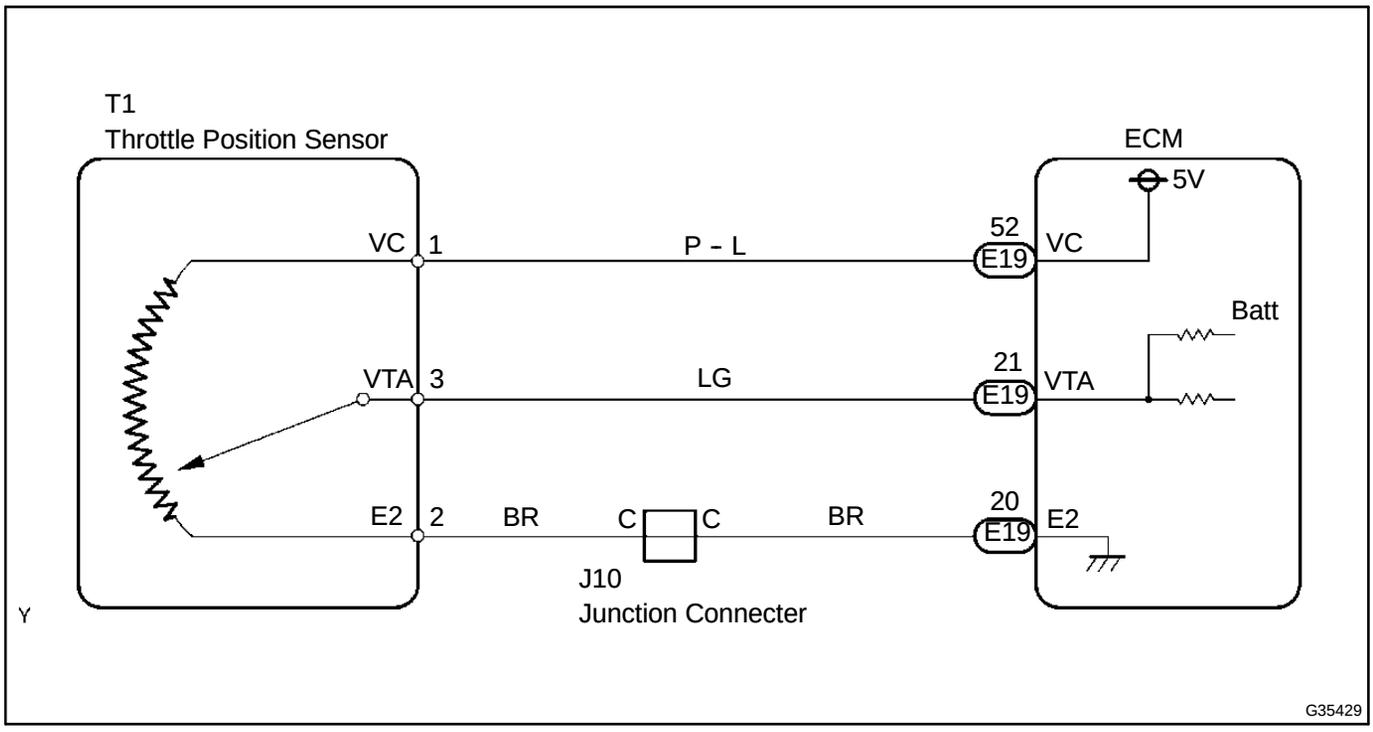
- These DTCs are detected when the engine idles for approximately 15 seconds.
- After confirming DTCs, confirm the throttle valve opening percentage and closed throttle position switch condition using the intelligent tester II.

Throttle Valve Fully Closed	Throttle Valve Fully Open	Trouble Area
0 %	Approximately 78 %	— (Normal)
0 %	0 %	VC circuit open VTA circuit open or short
Approximately 100 %	Approximately 100 %	E2 circuit open

FAIL-SAFE

If DTC P0122 or P0123 is detected, the ECM performs engine control using a throttle position calculated from the engine speed.

WIRING DIAGRAM

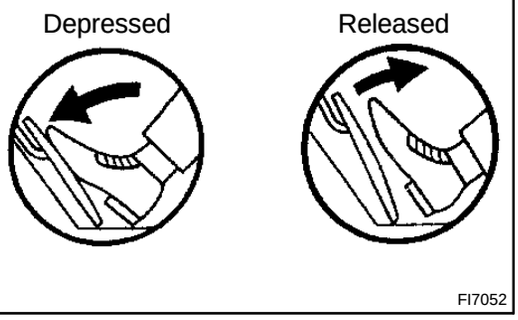


INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(THROTTLE VALVE OPENING PERCENTAGE)



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON (do not start the engine).
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Throttle POS.
(d) Read the value displayed on the intelligent tester II when the accelerator pedal is operated (releasing and depressing).

Result:

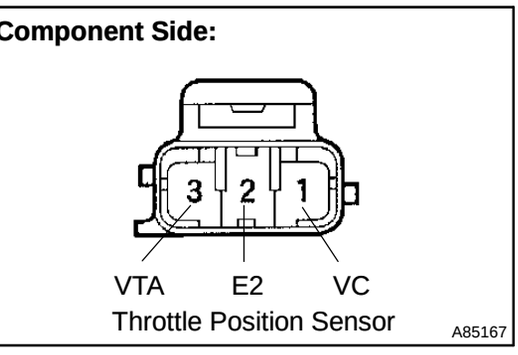
Throttle Valve Opening Position (%)	Proceed To
0	A
Approximately 0 to 70 (Varies according to accelerator pedal opening position)	B
Approximately 100	C

B → **CHECK FOR INTERMITTENT PROBLEMS**

C → **Go to step 4**

A

2	INSPECT THROTTLE POSITION SENSOR



(a) Disconnect the T1 throttle position sensor connector.
(b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

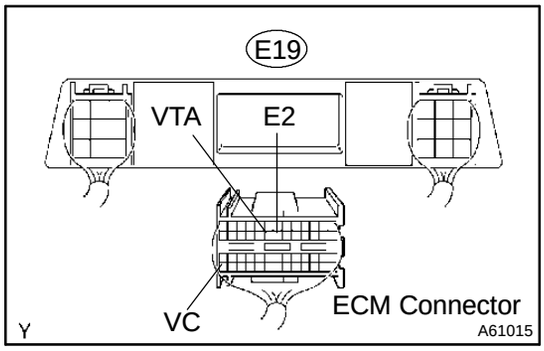
Tester Connection	Throttle Valve	Specified Condition
VC (T1-1) - E2 (T1-2)	—	2.5 to 6.0 kΩ
VTA (T1-3) - E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
VTA (T1-3) - E2 (T1-2)	Fully open	2.0 to 10.2 kΩ

(c) Reconnect the throttle position sensor connector.

NG → **REPLACE THROTTLE POSITION SENSOR**

OK

3 CHECK HARNESS AND CONNECTOR(ECM - THROTTLE POSITION SENSOR)



(a) Disconnect the E19 ECM connector.

(b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

Tester Connection	Throttle Valve	Specified Condition
VC (E19-52) - E2 (E19-20)	—	2.5 to 6.0 kΩ
VTA (E19-21) - E2 (E19-20)	Fully closed	0.2 to 5.7 kΩ
VTA (E19-21) - E2 (E19-20)	Fully open	2.0 to 10.2 kΩ

(c) Check the resistance.

Standard (Check for short):

Tester Connection	Specified Condition
VC (E19-52) - Body ground	10 kΩ or higher
VTA (E19-21) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.

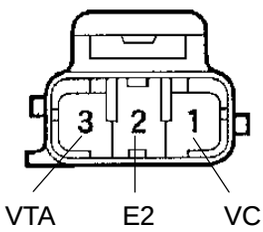
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

4 INSPECT THROTTLE POSITION SENSOR

Component Side:



(a) Disconnect the T1 throttle position sensor connector.

(b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

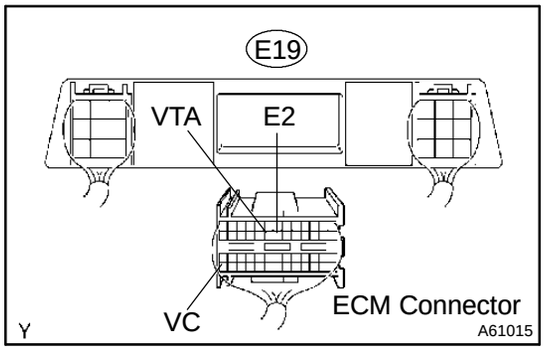
Tester Connection	Throttle Valve	Specified Condition
VC (T1-1) - E2 (T1-2)	—	2.5 to 6.0 kΩ
VTA (T1-3) - E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
VTA (T1-3) - E2 (T1-2)	Fully open	2.0 to 10.2 kΩ

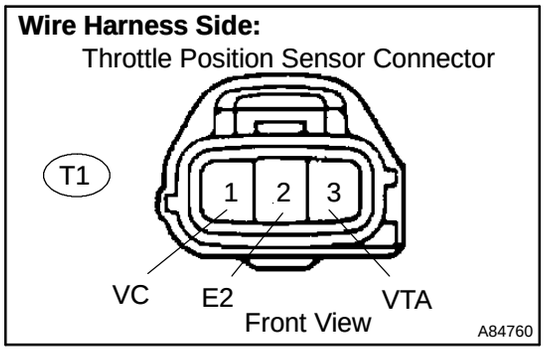
(c) Reconnect the throttle position sensor connector.

NG → **REPLACE THROTTLE POSITION SENSOR**

OK

5 CHECK HARNESS AND CONNECTOR(ECM - THROTTLE POSITION SENSOR)





(a) Disconnect the E19 ECM connector.
(b) Disconnect the T1 throttle position sensor connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VC (T1-1) - VC (E19-52)	Below 1 Ω
VTA (T1-3) - VTA (E19-21)	Below 1 Ω
E2 (T1-2) - E2 (E19-20)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VC (T1-1) or VC (E19-52) - Body ground	10 kΩ or higher
VTA (T1-3) or VTA (E19-21) - Body ground	10 kΩ or higher

(d) Reconnect the throttle position sensor connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE THROTTLE POSITION SENSOR

DTC	P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL

CIRCUIT DESCRIPTION

Refer to DTCs P0117 and P0118 on page 05-240.

DTC No.	DTC Detection Condition	Trouble Area
P0125	Engine coolant temperature does not reach 0°C, temperature at which feedback starts, despite specified length of time* having elapsed since engine start (3 trip detection logic)	• Engine coolant temperature sensor • Thermostat • Cooling system

*: If the engine coolant temperature at the time of engine start was approximately 25°C, 80 seconds with the engine idling.
If the engine coolant temperature at the time of engine start was approximately -30°C, 300 seconds with the engine idling.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0125)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0125	A
P0125 and other DTCs	B

HINT:
If any DTCs other than P0125 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-226)

A

2	INSPECT THERMOSTAT

(a) Remove the thermostat.
(b) Check the valve opening temperature of the thermostat.
OK: The valve opening temperature is 80° to 84°C (176° to 183°F)

HINT:
Also check that the valve is completely closed at temperatures under the opening temperature shown above.
(c) Reinstall the thermostat.

NG → REPLACE THERMOSTAT

OK

3	CHECK COOLING SYSTEM

(a) Check for detects in the cooling system that might cause the system to be too cold, such as abnormal radiator fan operation or any modification.

NG → REPAIR OR REPLACE COOLING SYSTEM

OK

REPLACE ENGINE COOLANT TEMPERATURE SENSOR

DTC	P0130	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 1)

DTC	P0134	OXYGEN SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

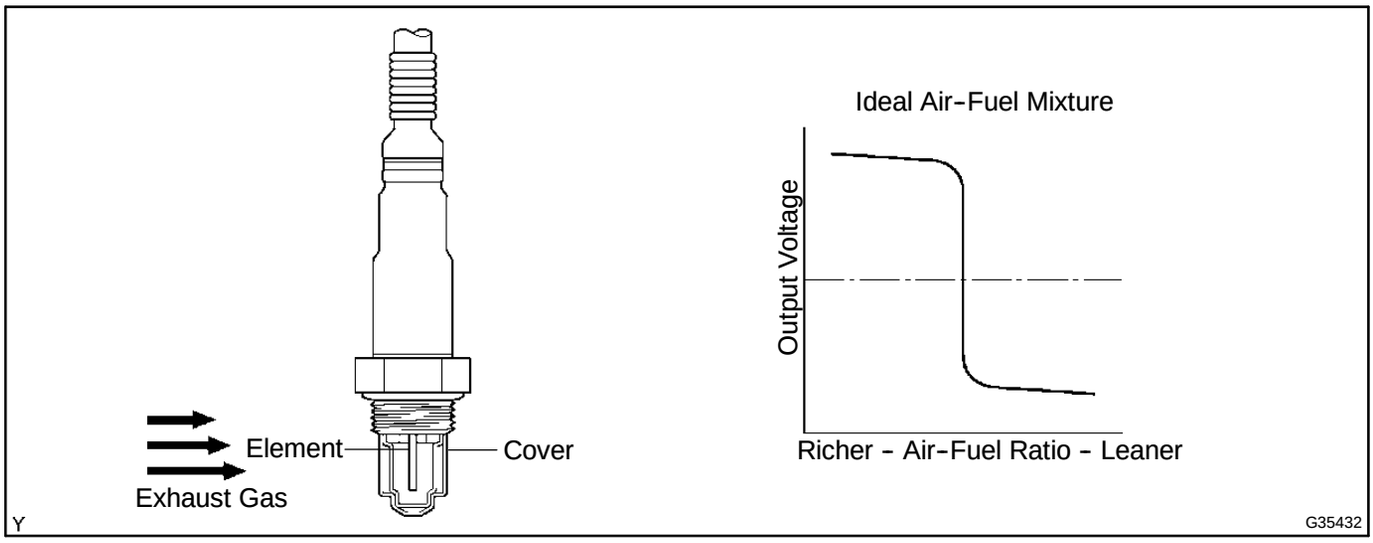
In order to obtain a high purification rate for the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a Three-Way Catalytic Converter (TWC) is used. For the most efficient use of the TWC, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio.

The heated oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. This is used to detect the oxygen concentration in the exhaust gas and provide the ECM with feedback to control the air-fuel ratio.

When the air-fuel ratio becomes lean, the oxygen concentration in the exhaust gas increases. The heated oxygen sensor informs the ECM of the lean condition (low voltage, i.e. less than 0.45 V).

When the air-fuel ratio is richer than the stoichiometric air-fuel level, the oxygen concentration in the exhaust gas is reduced. And the heated oxygen sensor informs the ECM of the rich condition (high voltage, i.e. more than 0.45 V). The ECM judges by the voltage output of the heated oxygen sensor whether the air-fuel ratio is rich or lean and controls the injection time accordingly. If a malfunction of the heated oxygen sensor causes an output of abnormal voltage, the ECM is unable to perform accurate air-fuel ratio control.

The heated oxygen sensor includes a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low), a current flows to the heater in order to heat the sensor for accurate oxygen concentration detection.

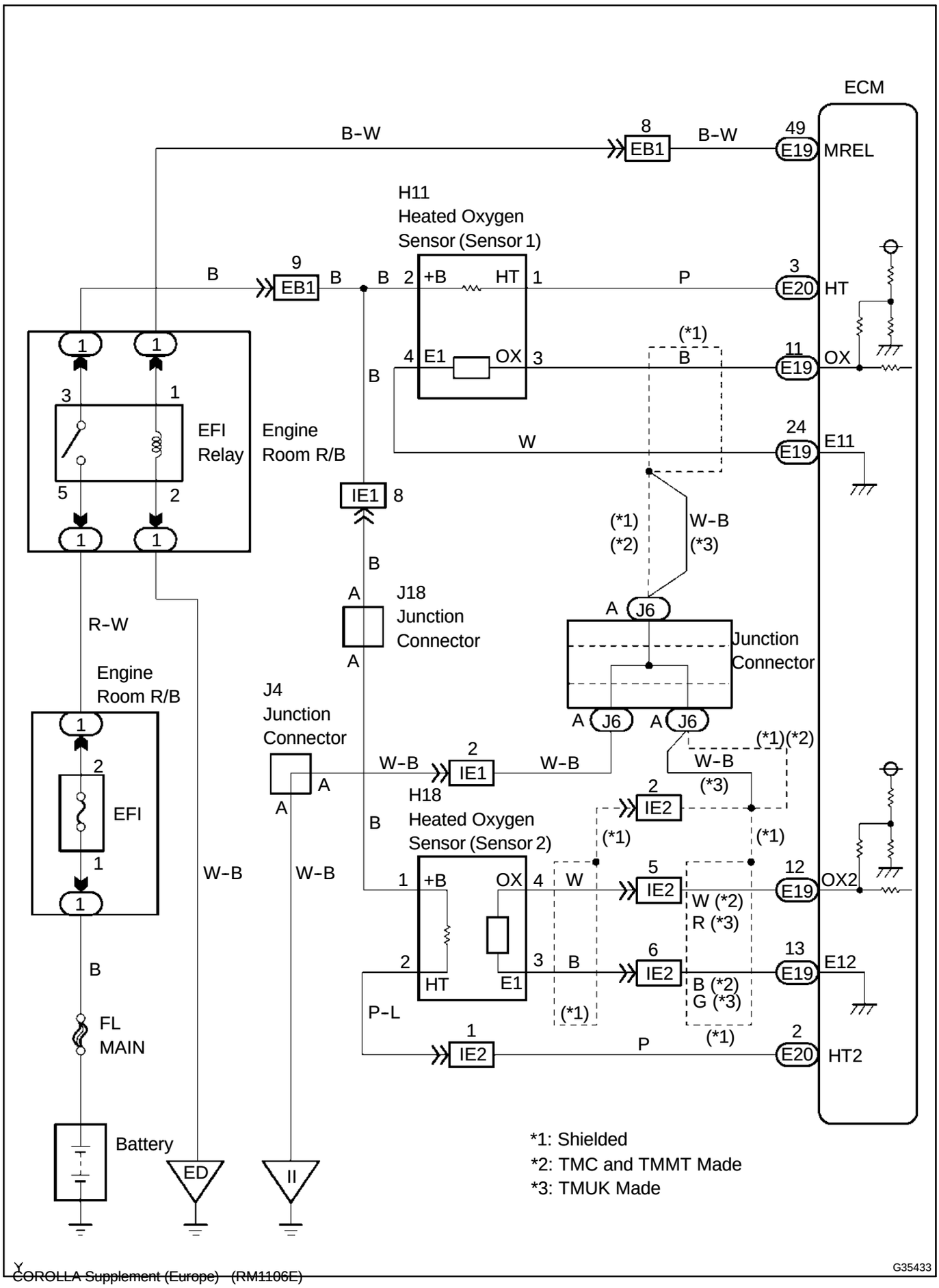


DTC No.	DTC Detection Condition	Trouble Area
P0130	• Case 1. Conditions (a) and (b) continue for 20 seconds during air-fuel ratio feedback control (c) Heated oxygen sensor (sensor 1) output voltage is less than 0.4 V (d) Heated oxygen sensor (sensor 2) output voltage is 0.5 V or more • Case 2. Heated oxygen sensor (sensor 1) output voltage is less than 0.06 V within 1 second after engine was started with engine coolant temperature 42°C or less (last engine operation was stopped after warm-up) • Case 3. Conditions (a) and (b) continue for 10 seconds during air-fuel ratio feedback control (a) Heated oxygen sensor (sensor 2) output voltage is less than 0.1 V (b) Heated oxygen sensor (sensor 1) output voltage is between 0.6 V and 1.5 V	• Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM
P0134	• Case 1. Heated oxygen sensor (sensor 1) output voltage remains between 0.4 V and 0.6 V for 5 seconds or more • Case 2. Condition (a), (b) and (c) met (a) Heated oxygen sensor (sensor 1) output voltage is 0.2 V or more (b) Heated oxygen sensor (sensor 2) output voltage is 0.2 V or more (c) Fuel cut is performed for 3 seconds or more • Case 3. ECM determines that internal resistance of heated oxygen sensor (sensor 1) is 20 kΩ or more	• Open in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1)

HINT:

- The internal resistance of the heated oxygen sensor (sensor 1) cannot be measured using a tester.
- Sensor 1 refers to the sensor near the engine assembly.
- The output voltage of the heated oxygen sensor and the short-term fuel trim value can be read using the intelligent tester II.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

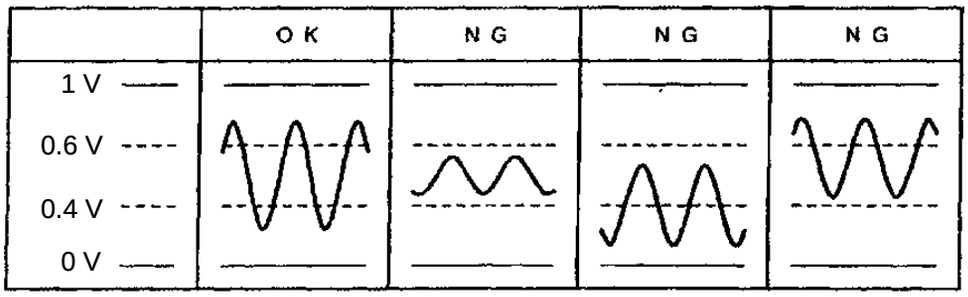
These DTCs are detected when the vehicle is driven in the city at an average vehicle speed of approximately 50km/h for approximately 30 minutes.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	**READ VALUE USING INTELLIGENT TESTER II(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)**

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1.
(d) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 90 seconds.
(e) Read the output voltage of the heated oxygen sensor during engine idling.
Standard:
Fluctuates between less than 0.4 V and more than 0.6 V (see the following figure).

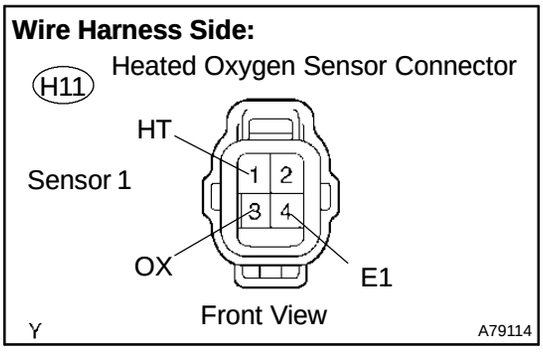


A99192

OK → **Go to step 3**

NG

2 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E19 and E20 ECM connectors.
(c) Check the resistance.

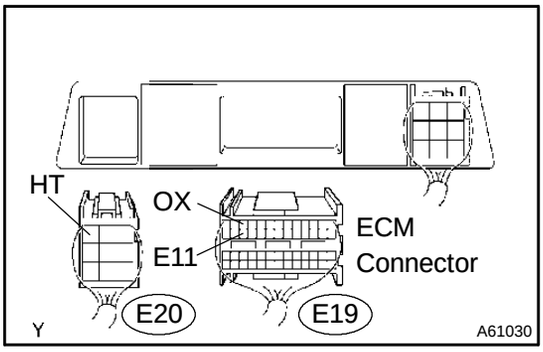
Standard (Check for open):

Tester Connection	Specified Condition
OX (H11-3) - OX (E19-11)	Below 1 Ω
HT (H11-1) - HT (E20-3)	Below 1 Ω
E1 (H11-4) - E11 (E19-24)	Below 1 Ω

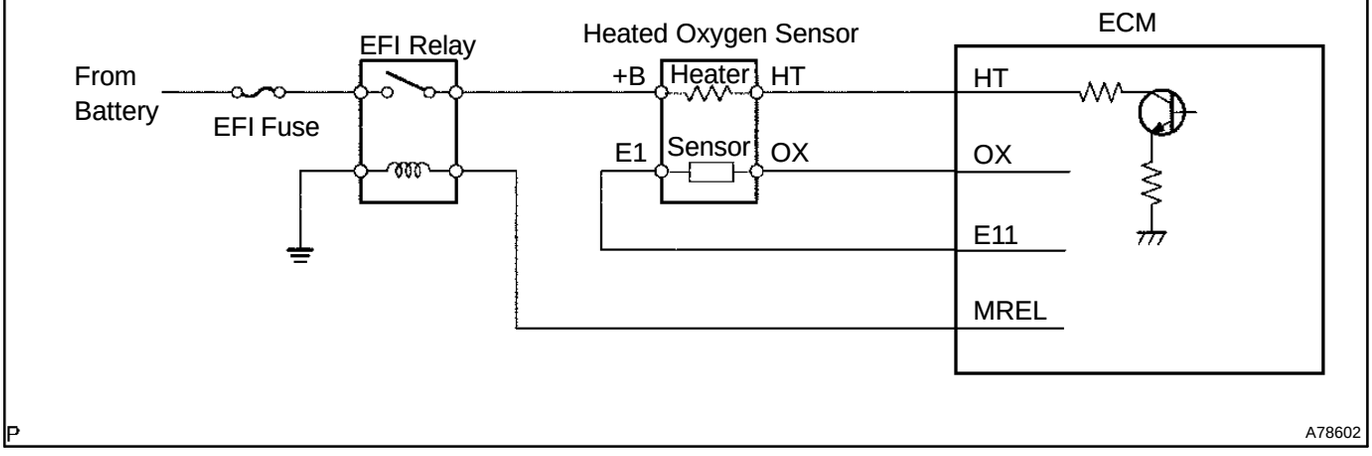
Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX (E19-11) - Body ground	10 kΩ or higher
HT (H11-1) or HT (E20-3) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.



Reference (Sensor 1 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK →

REPLACE HEATED OXYGEN SENSOR

3	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

4	CHECK IF DTC OUTPUT RECURS(DTC P0130 AND P0134)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0130 and/or P0134	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE HEATED OXYGEN SENSOR

DTC	P0132	OXYGEN SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

DTC No.	DTC Detection Condition	Trouble Area
P0132	Heated oxygen sensor (sensor 1) output voltage is 1.5 V or more for 1 second or more (3 trip detection logic)	• Short in signal output circuit and power source circuit of heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 1) • ECM

HINT:
Sensor 1 refers to the sensor near the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

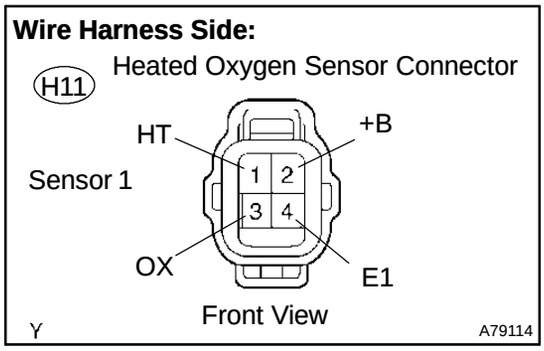
CONFIRMATION DRIVING PATTERN

DTC P0132 is detected when the vehicle is driven in the city at an average vehicle speed of approximately 50km/h in an inner city for approximately 30 minutes.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)

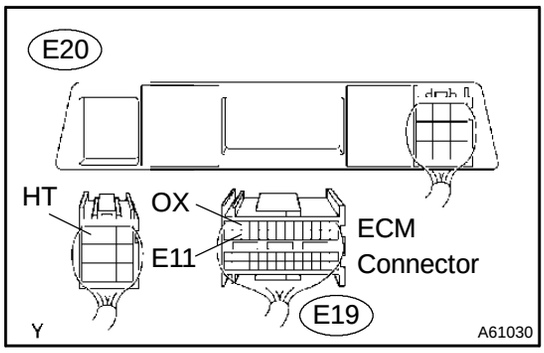


(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E19 and E20 ECM connectors.
(c) Check the resistance.

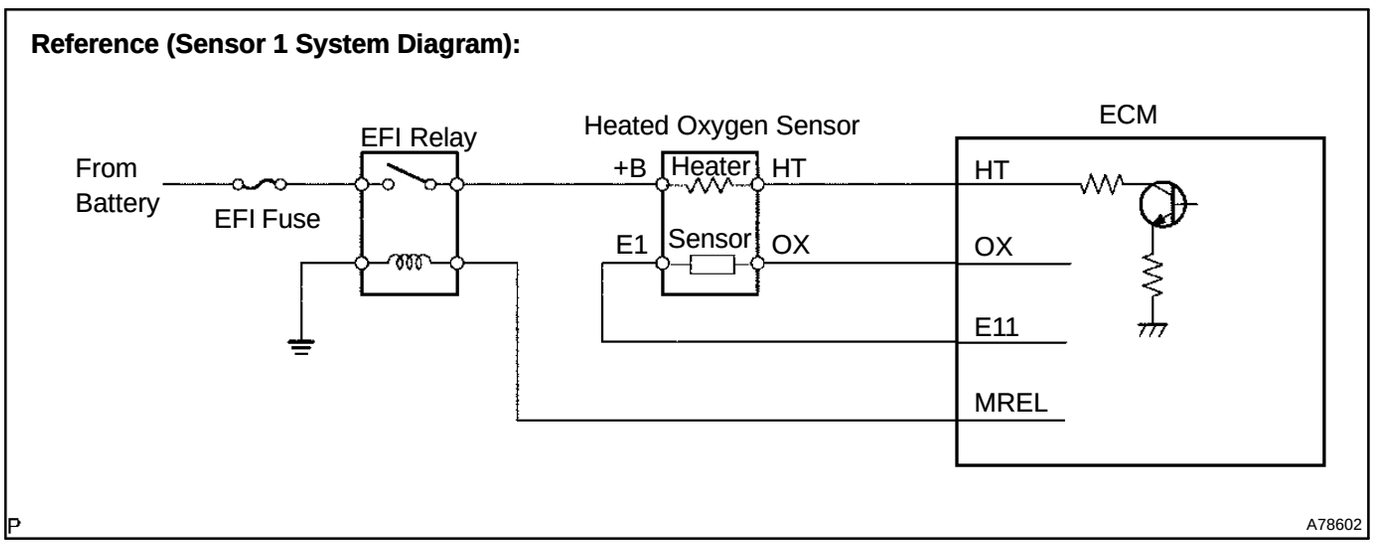
Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX (E19-11) - HT (H11-1) or HT (E20-3)	10 kΩ or higher
OX (H11-3) - +B (H11-2)	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.



Reference (Sensor 1 System Diagram):



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE HEATED OXYGEN SENSOR

DTC	P0133	OXYGEN SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

DTC No.	DTC Detection Condition	Trouble Area
P0133	Condition (a), (b) and (c) met (3 trip detection logic): (a) Engine speed 2,000 to 3,000 rpm (b) Engine load 20 to 50 % (vehicle speed at 60 to 90 km/h (37.5 to 56 mph) and transmission in 5th) (c) Signal cycle of heated oxygen sensor (sensor 1) 2.0 seconds or more	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust system • ECM

HINT:

- When DTC P0133 is present, the heated oxygen sensor heaters (sensors 1 and 2) are normal.
- Sensor 1 refers to the sensor near the engine assembly.
- When DTC P0133 is detected, confirm the output voltage of the heated oxygen sensor (sensor 1) in the Data List using the intelligent tester II.
  If the voltage output of the heated oxygen sensor is less than 0.1 V, the heated oxygen sensor circuit may be open or short.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

CONFIRMATION DRIVING PATTERN

Drive the vehicle at an average vehicle speed of approximately 50 km/h (31 mph) in the city for approximately 30 minutes, and then drive for 5 minutes or more at a vehicle speed between 60 km/h to 90 km/h (37.5 to 56 mph) with the transmission gear selector lever in the 5th position.

INSPECTION PROCEDURE

HINT:

Intelligent tester II only:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can determine if the heated oxygen sensor or other potential trouble areas are malfunctioning or not.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine.
(4) Run the engine at 2,500 rpm for approximately 3 minutes.
(5) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(6) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(7) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

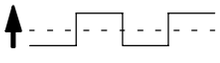
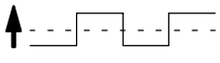
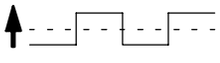
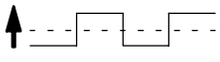
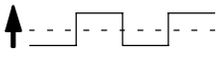
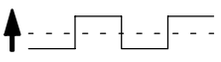
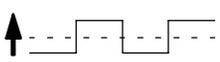
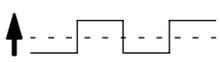
The heated oxygen sensor reacts in accordance with increases and decreases of the fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum output delay of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  OK	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  OK	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction NG	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  OK	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  OK	Injection volume +25 % -12.5 %  Output voltage Almost no reaction NG	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction NG	Injection volume +25 % -12.5 %  Output voltage Almost no reaction NG	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs will be recorded, and the MIL then illuminates.

HINT:

- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0133)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0133	A
P0133 and other DTCs	B

HINT:
If any DTCs other than P0133 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-226)

A

2 PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(A/F CONTROL)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the tester ON.
(c) Warm up the engine at an engine speed of 2,500 rpm for approximately 3 minutes.
(d) On the tester, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(e) Perform the A/F Control operation with the engine in an idling condition (press the right or left button to change the fuel injection volume).
(f) Monitor the voltage output of the heated oxygen sensors (O2S B1S1 and O2S B1S2) displayed on the tester.

HINT:
- The A/F Control operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	+25 %	Rich	More than 0.5
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	-12.5 %	Lean	Less than 0.4
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	+25 %	Rich	More than 0.5
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	-12.5 %	Lean	Less than 0.4

Result:

Status O2S B1S1	Status O2S B1S2	A/F Condition and HO2 Sensor Condition	Misfires	Suspected Trouble Areas	Proceed To
Lean/Rich	Lean/Rich	Normal	—	—	C
Lean	Lean	Actual air-fuel ratio lean	May occur	• PCV valve and hose • PCV hose connections • Injector blockage • Gas leakage from exhaust system • Air induction system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	B
Rich	Rich	Actual air-fuel ratio rich	—	• Injector leakage or blockage • Gas leakage from exhaust system • Ignition system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	B
Lean	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	A
Rich	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	A

Lean: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently less than 0.4 V.

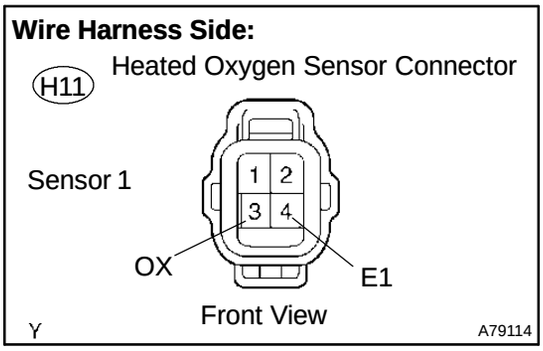
Rich: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently more than 0.5 V.

B → **Go to step 6**

C → **Go to step 10**

A

3 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

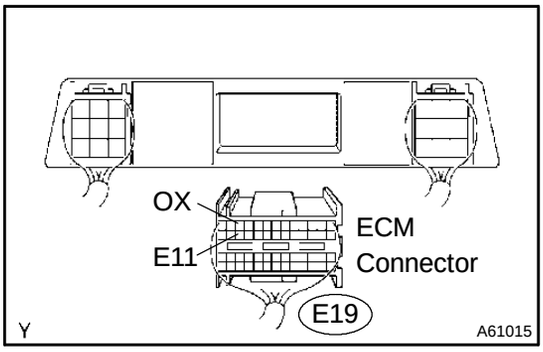
Standard (Check for open):

Tester Connection	Specified Condition
OX (H11-3) - OX (E19-11)	Below 1 Ω
E1 (H11-4) - E11 (E19-24)	Below 1 Ω

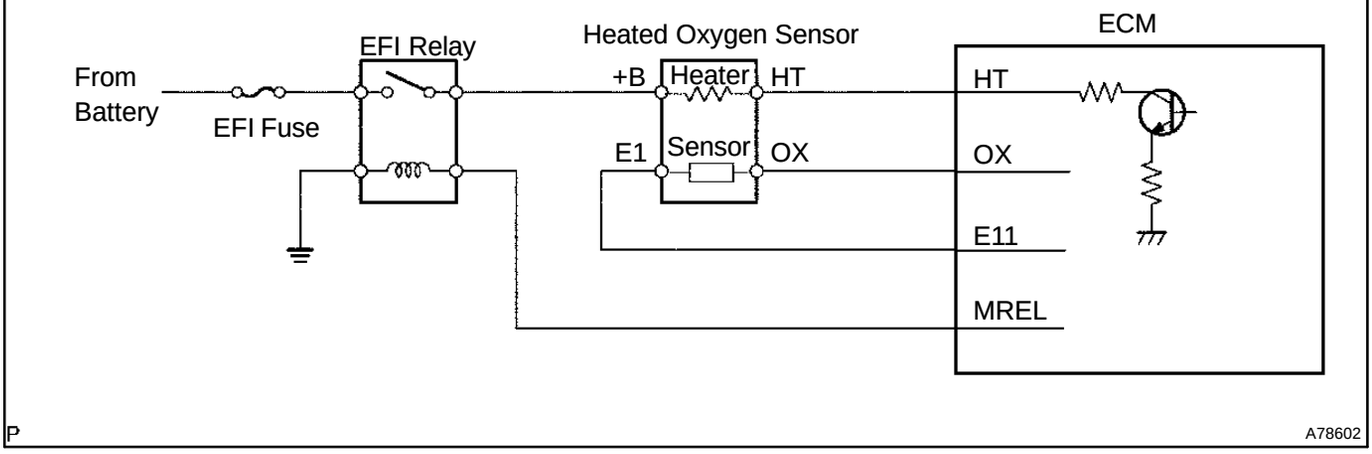
Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX (E19-11) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connector.



Reference (Sensor 1 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 REPLACE HEATED OXYGEN SENSOR

GO

5	CHECK IF DTC OUTPUT RECURS(DTC P0133)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
No output	A
P0133	B

B → **Go to step 6**

A

END

6	CHECK WHETHER MISFIRE OCCURS OR NOT BY MONITORING DTC AND DATA LIST

NG → **TROUBLESHOOT MISFIRES**

OK

7	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

8	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → **REPAIR OR REPLACE FUEL SYSTEM**

OK

9	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-17 of Pub. No. RM925E COROLLA)

NG → **REPLACE FUEL INJECTOR ASSY (See Page 11-24 of Pub. No. RM925E COROLLA)**

OK

CHECK FOR EXHAUST GAS LEAKS

10	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

11	CHECK IF DTC OUTPUT RECURS(DTC P0133)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0133	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE HEATED OXYGEN SENSOR

DTC	P0135	OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION (BANK 1 SENSOR 1)

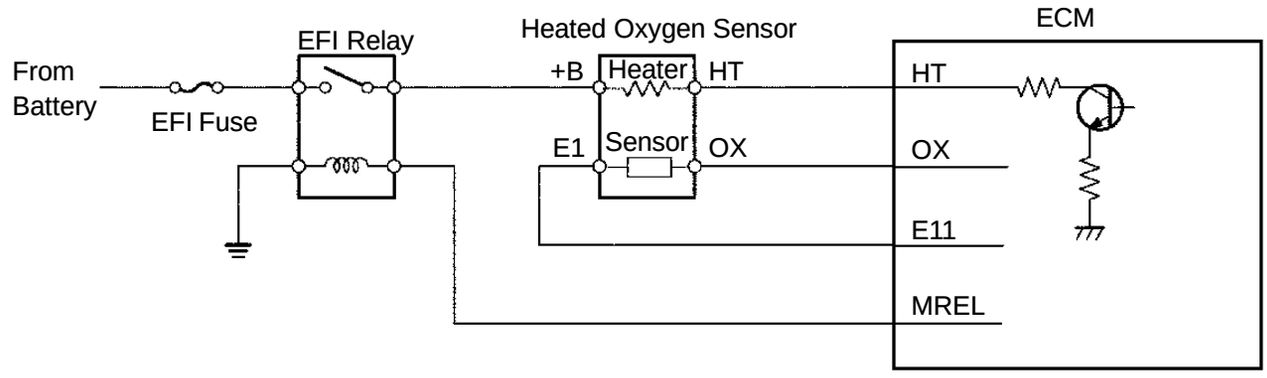
CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the +B side of the circuit.

Reference (Sensor 1 System Diagram):



HINT:

The ECM determines that the resistance of the heated oxygen sensor (sensor 1) heater is high while the engine is running.

DTC No.	DTC Detection Condition	Trouble Area
P0135	Resistance of heated oxygen sensor (sensor 1) heater is high (3 trip detection logic)	• Open in heated oxygen sensor (sensor 1) heater circuit • Heated oxygen sensor heater (sensor 1) • EFI relay • ECM

HINT:

- DTC P0135 is detected when the engine idles for approximately 15 seconds.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- Sensor 2 refers to the sensor mounted behind the TWC and located far from the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

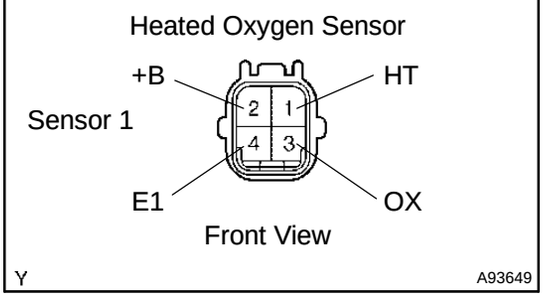
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)

Component Side:



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.
Standard:

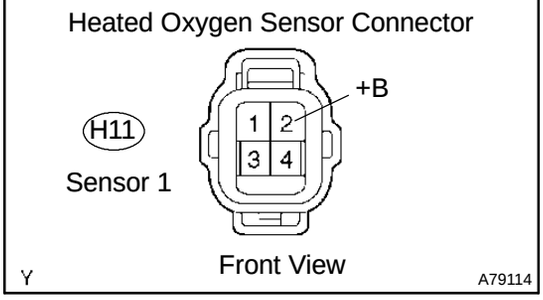
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 30 Ω at 25°C (77°F)
1 (HT) - 4 (E1)	10 kΩ or higher

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

2 CHECK HARNESS AND CONNECTOR(+B VOLTAGE)

Wire Harness Side:



(a) Disconnect the H11 heated oxygen sensor connector.
(b) Measure the voltage between the terminals of the H11 heated oxygen sensor connector and body ground.
Standard:

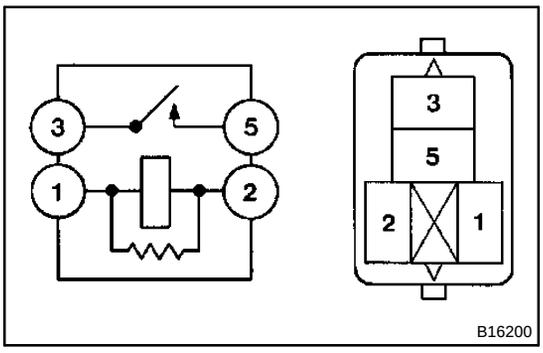
Tester Connection	Specified Condition
+B (H11-2) - Body ground	9 to 14 V

(c) Reconnect the heated oxygen sensor.

OK → **Go to step 4**

NG

3 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room R/B.
(b) Check the EFI relay resistance.
Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

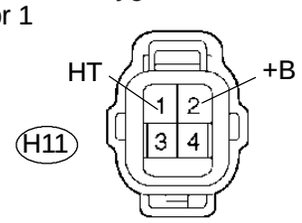
(c) Reinstall the EFI relay.

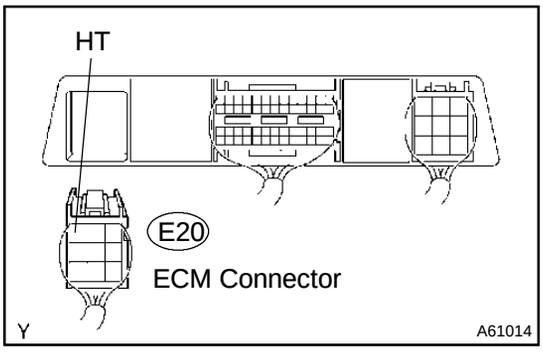
NG → **REPLACE EFI RELAY**

OK

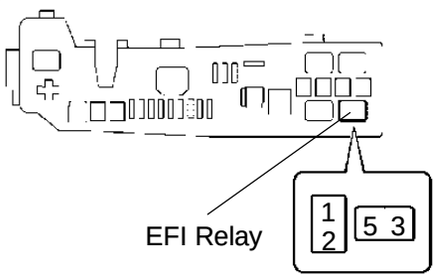
4 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM, HEATED OXYGEN SENSOR - EFI RELAY)

Wire Harness Side:
Heated Oxygen Sensor Connector
Sensor 1





Engine Room R/B:



(a) Check the harness and the connectors between the ECM and the heated oxygen sensor.
(1) Disconnect the H11 heated oxygen sensor connector.
(2) Disconnect the E20 ECM connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
HT (H11-1) - HT (E20-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (H11-1) or HT (E20-3) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.
(5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the heated oxygen sensor and EFI relay.
(1) Disconnect the H11 heated oxygen sensor connector.
(2) Remove the EFI relay from the engine room R/B.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (H11-2) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (H11-2) or EFI relay holder (3) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.
(5) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK IF DTC OUTPUT RECURS(DTC P0135)

(a) Start the engine.
(b) Allow the engine to idle for 15 seconds or more, and then stop the engine. Leave it for 10 seconds or more.
(c) Connect the intelligent tester II to the DLC3.
(d) Select the following menu item: Powertrain / Engine and ECT / DTC / Pending codes.

Result:

Display (DTC Output)	Proceed To
No output	A
P0135	B

B → REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

A

CHECK FOR INTERMITTENT PROBLEMS

DTC	P0136	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 2)

DTC	P0140	HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

DTC No	DTC Detection Condition	Trouble Area
P0136	• Engine coolant temperature was 60°C or more when last engine operation was terminated Engine coolant temperature at engine start was less than 40°C, and heated oxygen sensor (sensor 2) output voltage is 0.06 V within 1 second after engine started cranking • While driving at vehicle speed of 70 to 100 km/h with transmission in 5 th After warm-up, heated oxygen sensor (sensor 2) output voltage continuously remains 0.06 V or less for 80 seconds (3 trip detection logic)	• Short in heated oxygen sensor circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay
P0140	Condition (a) or (b) met: (a) Heated oxygen sensor (sensor 2) voltage is between 0.4 V and 0.5 V continuously for 600 seconds (b) ECM determines that internal resistance of heated oxygen sensor (sensor 2) is 40kΩ or more after warm-up (3 trip detection logic)	• Open or short in heated oxygen sensor (sensor 2) circuit • Heated oxygen sensor (sensor 2) • Heated oxygen sensor heater (sensor 2) • EFI relay

HINT:

- The internal resistance of the heated oxygen sensor (sensor 2) cannot be measured using a tester.
- Sensor 2 refers to the sensor farthest away from the engine assembly.

WIRING DIAGRAM

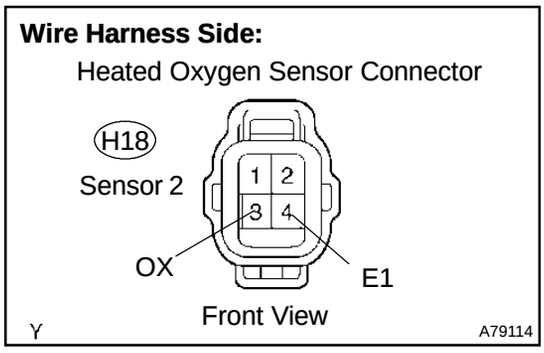
Refer to DTC P0130 on page 05-254.

CONFIRMATION DRIVING PATTERN

These DTCs are detected when the vehicle is driven at an average vehicle speed of approximately 50km/h in the city for approximately 30 minutes.

INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)



(a) Disconnect the H18 heated oxygen sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

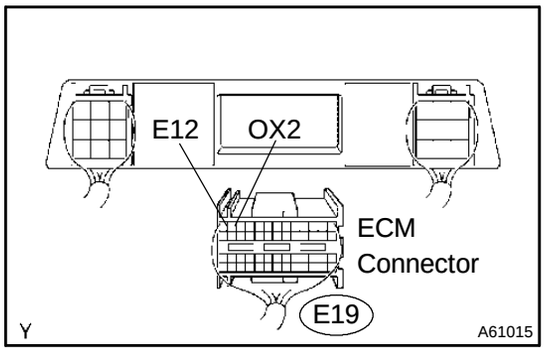
Standard (Check for open):

Tester Connection	Specified Condition
OX (H18-3) - OX2 (E19-12)	Below 1 Ω
E1 (H18-4) - E12 (E19-13)	Below 1 Ω

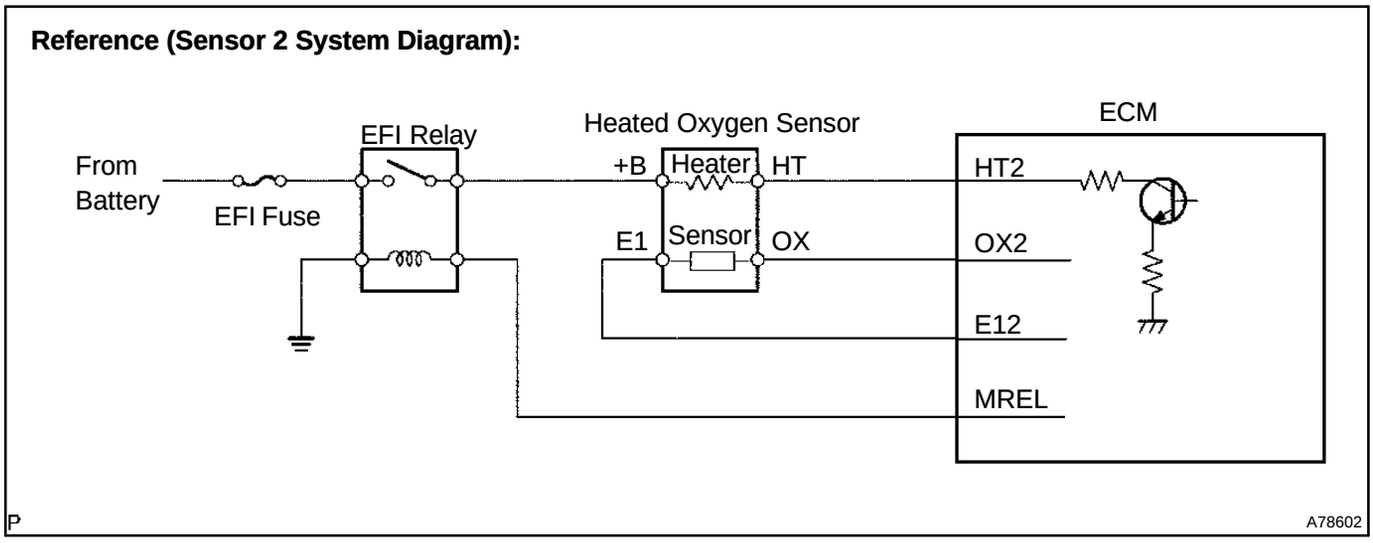
Standard (Check for short):

Tester Connection	Specified Condition
OX (H18-3) or OX2 (E19-12) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connector.



Reference (Sensor 2 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK →

REPLACE HEATED OXYGEN SENSOR

DTC	P0138	OXYGEN SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

DTC No.	DTC Detection Condition	Trouble Area
P0138	Heated oxygen sensor (sensor 2) output voltage is 1.5 V or more continuously for 5 seconds (3 trip detection logic)	• Short in signal output circuit and power source circuit of heated oxygen sensor (sensor 2) • Heated oxygen sensor (sensor 2) • ECM

HINT:
Sensor 2 refers to the sensor farthest away from the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

CONFIRMATION DRIVING PATTERN

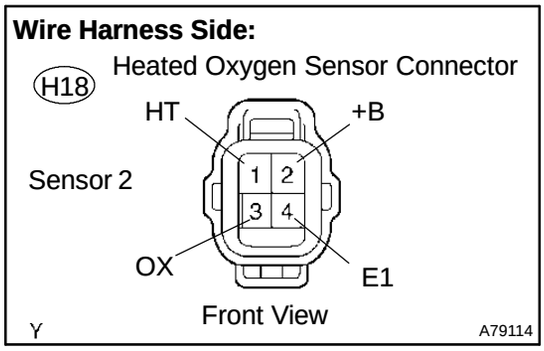
DTC P0138 is detected when the vehicle is driven at an average vehicle speed of approximately 50 km/h in the city for approximately 30 minutes.

INSPECTION PROCEDURE

HINT:
Read the heated oxygen sensor (sensor 2) output voltage using the intelligent tester ll.
(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) After warming up the engine, run the engine at 2,500 rpm for 3 minutes.
(e) Read the output voltage of the heated oxygen sensor when the engine speed is suddenly increased.
HINT:
Quickly accelerate the engine to 4,000 rpm 3 times by using the accelerator pedal.

Standard: Fluctuates between 0.4 V or less and 0.5 V or more.

1 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)

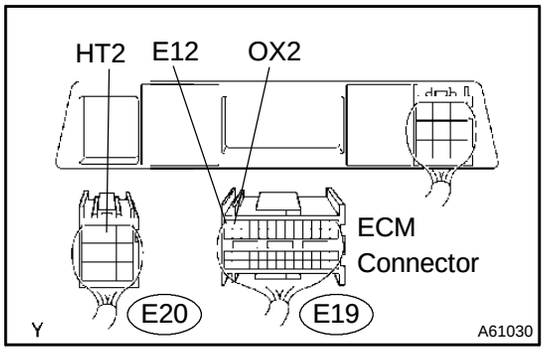


(a) Disconnect the H18 heated oxygen sensor connector.
(b) Disconnect the E19 and E20 ECM connectors.
(c) Check the resistance.

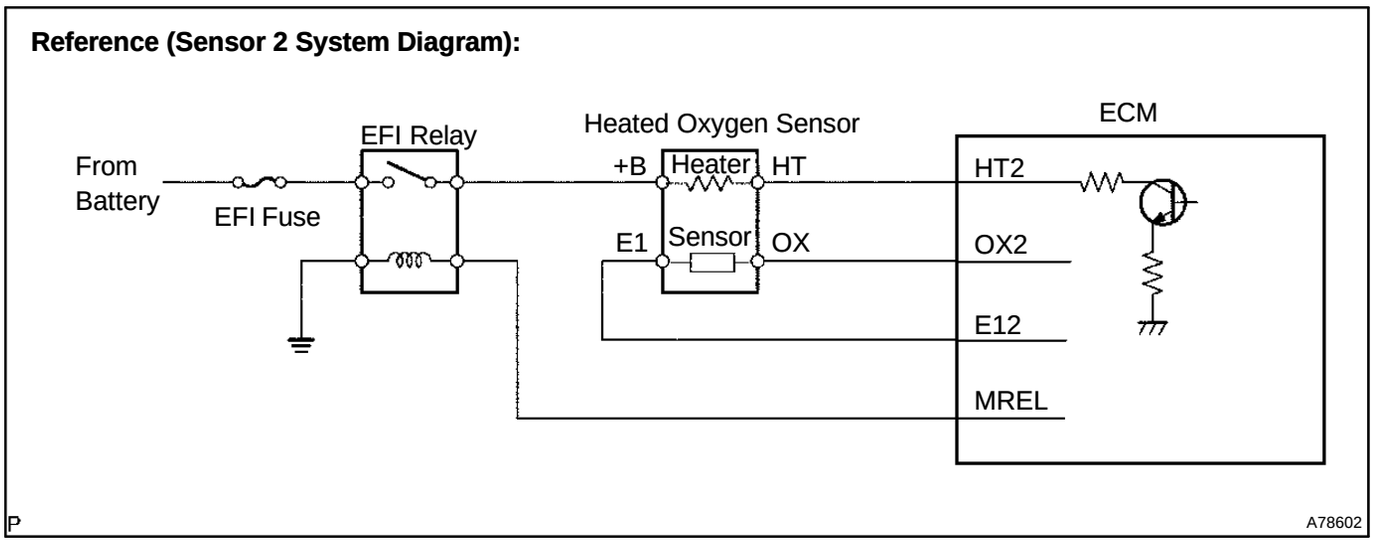
Standard (Check for short):

Tester Connection	Specified Condition
OX (H18-3) or OX2 (E19-12) - HT (H18-1) or HT2 (E19-2)	10 kΩ or higher
OX (H18-3) - +B (H12-2)	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.



Reference (Sensor 2 System Diagram):



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK →

REPLACE HEATED OXYGEN SENSOR

DTC	P0139	OXYGEN SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

DTC No.	DTC Detection Condition	Trouble Area
P0139	After driving for 10 minutes or more at vehicle speed of 70 to 110 km/h (44 to 63 mph) with transmission in 5 th, heated oxygen sensor (sensor 2) signal does not switch from rich to lean or vice versa for 100 seconds at vehicle speed of 70 to 100 km/h (44 to 63 mph) and with transmission in 5 th	• Open or short in heated oxygen sensor (sensor 2) • Heated oxygen sensor (sensor 2) • Air induction system • Fuel pressure • Injector • Gas leakage from exhaust • ECM

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

CONFIRMATION DRIVING PATTERN

DTC P0139 is detected when the vehicle is driven for 10 minutes or more at a vehicle speed between 70 km/h and 100 km/h with the transmission gear selector leave in the 5 th position.

INSPECTION PROCEDURE

HINT:
Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can determine if the heated oxygen sensor or other potential trouble areas are malfunctioning or not.

(a) Perform the Active Test using the intelligent tester II.

HINT:
The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine.
(4) Run the engine at 2,500 rpm for approximately 3 minutes.
(5) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(6) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(7) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

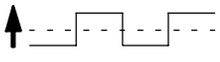
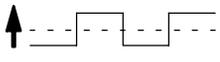
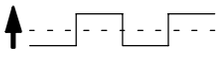
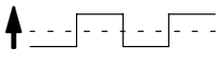
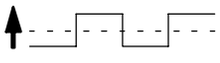
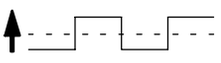
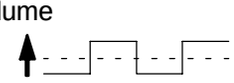
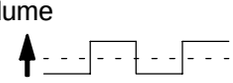
The heated oxygen sensor reacts in accordance with increases and decreases of the fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum output delay of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs will be recorded, and the MIL then illuminates.

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0139)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read the DTCs.
Result:

Display (DTC Output)	Proceed To
P0139	A
P0139 and other DTCs	B

HINT:
If any DTCs than P0139 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-226)

A

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(A/F CONTROL)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the tester ON.
(c) Warm up the engine.
(d) Run the engine at 2,500 rpm for approximately 3 minutes.
(e) On the tester, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(f) Perform the A/F Control operation with the engine in an idling condition (press the right or left button to change the fuel injection volume).
(g) Monitor the voltage output of the heated oxygen sensors (O2S B1S1 and O2S B1S2) displayed on the tester.

HINT:
- The A/F Control operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	+25 %	Rich	More than 0.5
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	-12.5 %	Lean	Less than 0.4
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	+25 %	Rich	More than 0.5
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	-12.5 %	Lean	Less than 0.4

Result:

Status O2S B1S1	Status O2S B1S2	A/F Condition and HO2 Sensor Condition	Misfires	Suspected Trouble Areas	Proceed To
Lean/Rich	Lean/Rich	Normal	—	—	C
Lean	Lean	Actual air-fuel ratio lean	May occur	• PCV valve and hose • PCV hose connections • Injector blockage • Gas leakage from exhaust system • Air induction system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	B
Rich	Rich	Actual air-fuel ratio rich	—	• Injector leakage or blockage • Gas leakage from exhaust system • Ignition system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	B
Lean	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	A
Rich	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	A

Lean: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently less than 0.4 V.
Rich: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently more than 0.5 V.

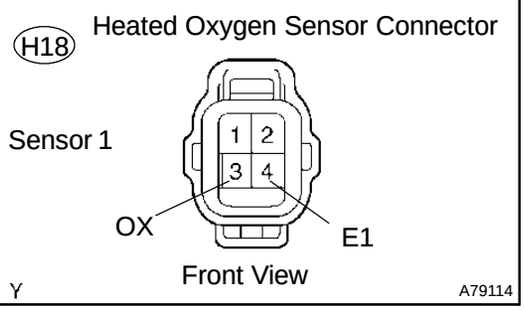
B → Go to step 6

C → Go to step 10

A

3	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)

Wire Harness Side:



(a) Disconnect the H18 heated oxygen sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

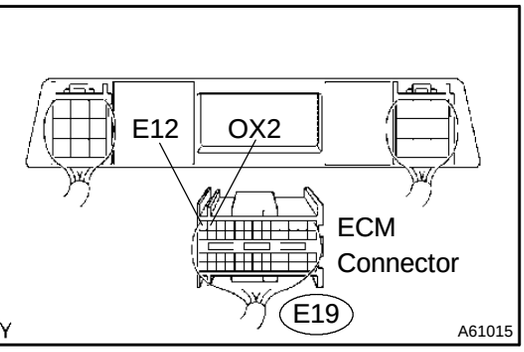
Standard (Check for open):

Tester Connection	Specified Condition
OX (H18-3) - OX (E19-12)	Below 1 Ω
E1 (H18-4) - E12 (E19-13)	Below 1 Ω

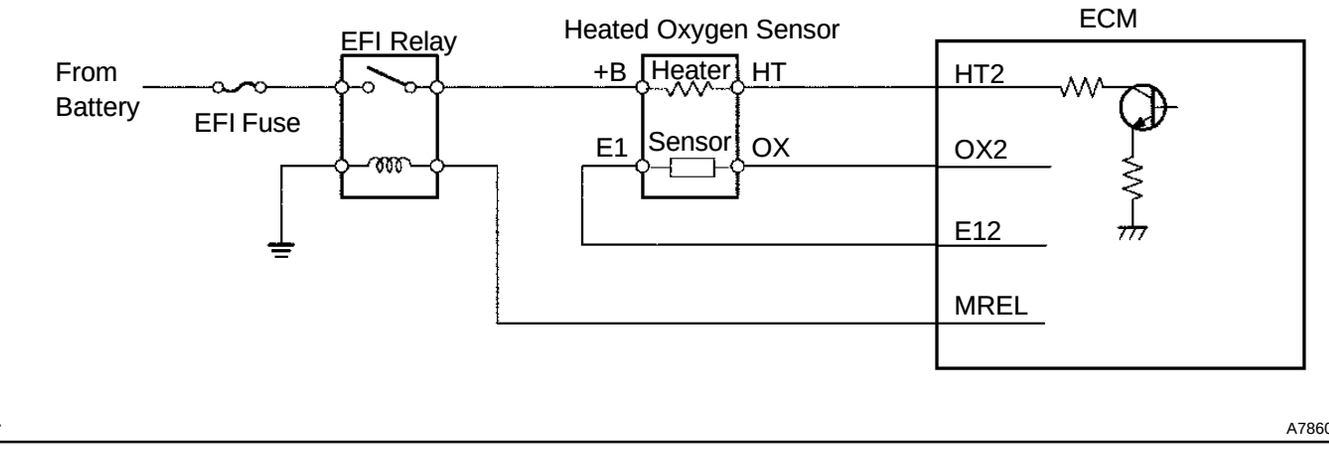
Standard (Check for short):

Tester Connection	Specified Condition
OX (H18-3) or OX (E19-12) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connector.



Reference (Sensor 2 System Diagram):



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	REPLACE HEATED OXYGEN SENSOR

GO

5	CHECK IF DTC OUTPUT RECURS(DTC P0139)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
No output	A
P0139	B

B → **Go to step 6**

A

END

6	CHECK WHETHER MISFIRE OCCURS OR NOT BY MONITORING DTC AND DATA LIST

NG → **TROUBLESHOOT MISFIRES**

OK

7	CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

8	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → **REPAIR OR REPLACE FUEL SYSTEM**

OK

9	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-17 of Pub. No. RM925E COROLLA)

NG → **REPLACE FUEL INJECTOR ASSY** (See page 11-24 of Pub. No. RM925E COROLLA)

OK

CHECK FOR EXHAUST GAS LEAKS

10	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

GO

11	CHECK IF DTC OUTPUT RECURS(DTC P0139)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(d) Read the DTCs.

Result:

Display (DTC Output)	Proceed To
P0139	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE HEATED OXYGEN SENSOR

DTC	P0141	OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION (BANK 1 SENSOR 2)

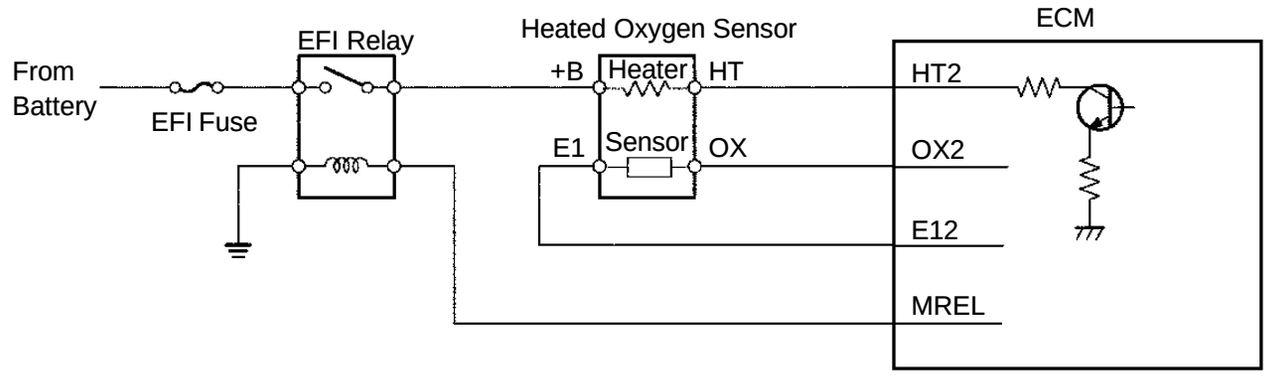
CIRCUIT DESCRIPTION

Refer to DTC P0130 on page 05-252.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the +B side of the circuit.

Reference (Sensor 2 System Diagram):



HINT:

The ECM determines that the resistance of the heated oxygen sensor (sensor 2) heater is high while the engine is running.

DTC No.	DTC Detection Condition	Trouble Area
P0141	Resistance of heated oxygen sensor (sensor 2) heater is high (3 trip detection logic)	• Open in heated oxygen sensor (sensor 2) heater circuit • Heated oxygen sensor heater (sensor 2) • EFI relay • ECM

HINT:

- DTC P0141 is detected when the engine idles for approximately 1 minute after warm-up.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- Sensor 2 refers to the sensor mounted behind the TWC and located far from the engine assembly.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

INSPECTION PROCEDURE

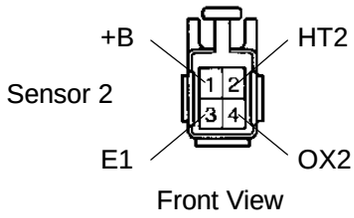
HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)

Component Side:

Heated Oxygen Sensor



Front View

A61079

(a) Disconnect the H18 heated oxygen sensor connector.
(b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard:

Tester Connection	Specified Condition
2 (HT2) - 1 (+B)	5 to 30 Ω at 25°C (77°F)
2 (HT2) - 3 (E1)	No Continuity

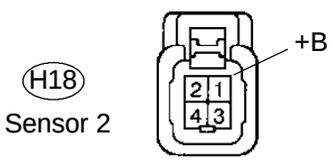
NG → **REPLACE HEATED OXYGEN SENSOR**

OK

2 CHECK HARNESS AND CONNECTOR(+B VOLTAGE)

Wire Harness Side:

Heated Oxygen Sensor Connector



Front View

A61078

(a) Disconnect the H18 heated oxygen sensor connector.
(b) Measure the voltage between the terminals of the H18 heated oxygen sensor connector and body ground.

Standard:

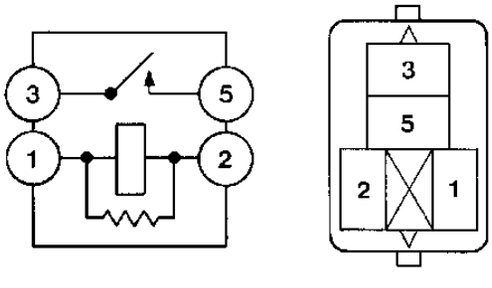
Tester Connection	Specified Condition
+B (H18-1) - Body ground	9 to 14 V

(c) Reconnect the heated oxygen sensor.

OK → **Go to step 4**

NG

3 INSPECT EFI RELAY



B16200

(a) Remove the EFI relay from the engine room R/B.
(b) Check the EFI relay resistance.

Standard:

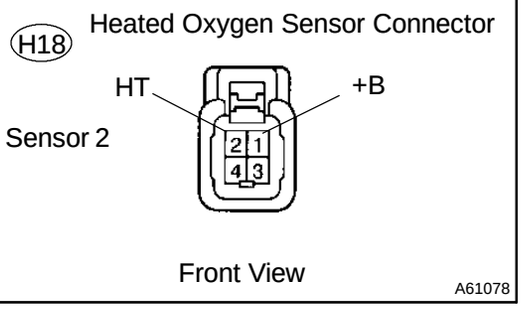
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

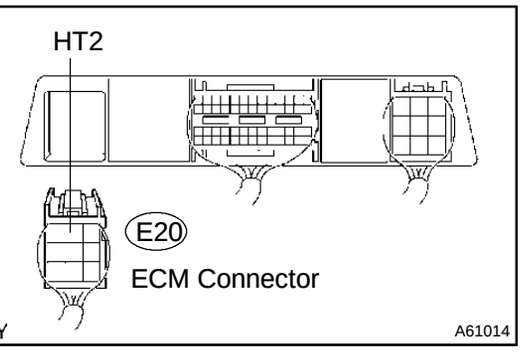
(c) Reinstall the EFI relay.

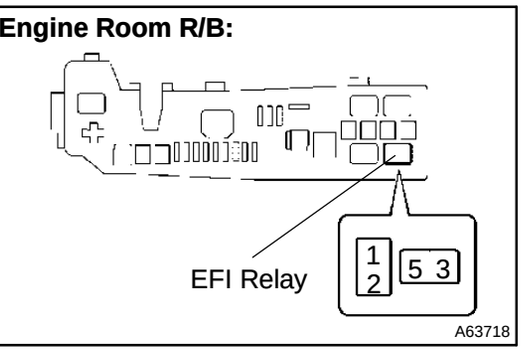
NG → **REPLACE EFI RELAY**

OK

4	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM, HEATED OXYGEN SENSOR - EFI RELAY)







(a) Check the harness and the connectors between the ECM and heated oxygen sensor.
(1) Disconnect the H18 heated oxygen sensor connector.
(2) Disconnect the E20 ECM connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
HT (H18-2) - HT2 (E20-2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
HT (H18-2) or HT2 (E20-2) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.
(5) Reconnect the ECM connector.

(b) Check the harness and the connectors between the heated oxygen sensor and EFI relay.
(1) Disconnect the H18 heated oxygen sensor connector.
(2) Remove the EFI relay from the engine room R/B.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
+B (H18-1) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (H18-1) or EFI relay holder (3) - Body ground	10 kΩ or higher

(4) Reconnect the heated oxygen sensor connector.
(5) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5	CHECK IF DTC OUTPUT RECURS(DTC P0141)

(a) Start the engine.
(b) Allow the engine to idle for 15 seconds or more, and then stop the engine. Leave it for 10 seconds or more.
(c) Connect the intelligent tester II to the DLC3.
(d) Select the following menu item: Powertrain / Engine and ECT / DTC / Pending codes.

Result:

Display (DTC Output)	Proceed To
No output	A
P0141	B

B

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

A

CHECK FOR INTERMITTENT PROBLEMS

DTC	P0171	SYSTEM TOO LEAN (BANK 1)

DTC	P0172	SYSTEM TOO RICH (BANK 1)

CIRCUIT DESCRIPTION

The fuel trim relates to the feedback compensation value, not to the basic injection time. The fuel trim includes the short-term fuel trim and the long-term fuel trim.

The short-term fuel trim is the short-term fuel compensation used to maintain the air-fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air-fuel ratio is rich or lean compared to the ideal theoretical value, triggering a reduction in the fuel volume if the air-fuel ratio is rich, and an increase in the fuel volume if it is lean.

The long-term fuel trim is the overall fuel compensation in order to balance the short-term fuel trim for a continual deviation from the central value by individual engine differences, operating environment and age deterioration.

If both the short-term fuel trim and the long-term fuel trim are lean or rich beyond the standard level, it is detected as a malfunction in the SFI system. The ECM illuminates the MIL and sets a DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0171	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on lean side (3 trip detection logic)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • PCV valve and hose • PCV hose connection • ECM
P0172	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on rich side (3 trip detection logic)	• Injector leakage or blockage • Mass air flow meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage from exhaust system • Open or short in heated oxygen sensor (sensor 1) circuit • Heated oxygen sensor (sensor 1) • ECM

HINT:

- These DTCs are detected when the vehicle is driven for approximately 20 minutes at a constant vehicle speed of between 70 km/h and 100 km/h with the transmission gear selector lever in the 5th position (a malfunction is detected if the learning value of the driving range deviates by 25 %). Followed by the engine idling for approximately 20 minutes (a malfunction is detected if the learning value while idling deviates by approximately 10 %).
- When DTC P0171 is set, the actual air-fuel ratio is lean. When DTC P0172 is set, the actual air-fuel ratio is rich.
- If the vehicle runs out of fuel, the air-fuel ratio is lean and DTC P0171 may be set. The MIL then illuminates.
- If the total of the short-term fuel trim value and long-term fuel trim value is within ± 20 %, the system is functioning normally.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be found using the Active Test / A/F Control operation. The A/F Control operation can determine if the heated oxygen sensor or other potential trouble areas are malfunctioning or not.

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine.
(4) Run the engine at 2,500 rpm for approximately 3 minutes.
(5) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(6) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(7) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

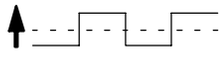
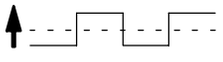
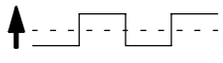
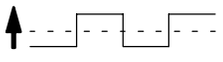
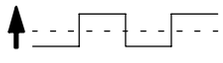
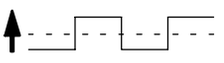
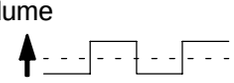
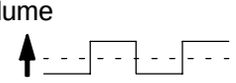
The heated oxygen sensor reacts in accordance with increases and decreases of the fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum output delay of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	—
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

NOTICE:

If the vehicle is short of fuel, the air-fuel ratio becomes lean and the heated oxygen sensor DTCs will be recorded, and the MIL then illuminates.

HINT:

- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTCS P0171 AND P0172)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result :

Display (DTC Output)	Proceed To
P0171 or P0172	A
P0171 or P0172 and other DTCs	B

HINT:
If any DTCs other than P0171 or P0172 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-226)

A

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(A/F CONTROL)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the tester ON.
(c) Warm up the engine.
(d) Run the engine at 2,500 rpm for approximately 3 minutes.
(e) On the tester, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(f) Perform the A/F Control operation with the engine in an idling condition (press the right or left button to change the fuel injection volume).
(g) Monitor the voltage output of the heated oxygen sensors (O2S B1S1 and O2S B1S2) displayed on the tester.

HINT:
- The A/F Control operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	+25 %	Rich	More than 0.5
O2S B1S1 (Heated Oxygen Sensor (Sensor 1))	-12.5 %	Lean	Less than 0.4
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	+25 %	Rich	More than 0.5
O2S B1S2 (Heated Oxygen Sensor (Sensor 2))	-12.5 %	Lean	Less than 0.4

Result:

Status O2S B1S1	Status O2S B1S2	A/F Condition and HO2 Sensor Condition	Misfires	Suspected Trouble Areas	Proceed To
Lean/Rich	Lean/Rich	Normal	—	—	C
Lean	Lean	Actual air-fuel ratio lean	May occur	• PCV valve and hose • PCV hose connections • Injector blockage • Gas leakage from exhaust system • Air induction system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	A
Rich	Rich	Actual air-fuel ratio rich	—	• Injector leakage or blockage • Gas leakage from exhaust system • Ignition system • Fuel pressure • Mass Air Flow meter • Engine Coolant Temperature sensor	A
Lean	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	B
Rich	Lean/Rich	Heated oxygen sensor malfunction	—	• Heated oxygen sensor	B

Lean: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently less than 0.4 V.
Rich: During Active Test A/F Control, both the heated oxygen sensor (sensor 1 and 2) output voltages are consistently more than 0.5 V.

B → Go to step 11

C → Go to step 13

A

3 CHECK AIR INDUCTION SYSTEM

(a) Check for vacuum leaks in the air induction system.
OK: No vacuum leak.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

4 CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → REPAIR OR REPLACE PCV HOSE

OK

5	READ VALUE USING INTELLIGENT TESTER II(AFM)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Date List / AFM and Coolant Temp.
(d) Allow the engine to idle until the Coolant Temp reaches 75°C (167°F).
(e) Read the AFM value at idling rpm and 2,500 rpm.

Standard:
Mass air flow rate at idling rpm: 1.4 to 1.7 g/s (shift position in N and A/C OFF)
Mass air flow rate at 2,500 rpm: 5.4 to 7.9 g/s (shift position in N and A/C OFF)

NG → **REPLACE MASS AIR FLOW METER**

OK

6	READ VALUE USING INTELLIGENT TESTER II(COOLANT TEMP)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Date List / Coolant Temp.
(d) Read the Coolant Temp value when the engine is cold and warmed up.

Standard:
Engine coolant temperature when the engine is cold: Same as the ambient temperature
Engine coolant temperature when the engine is warmed up: 75° to 95°C (167° to 203°F)

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

7	CHECK FOR SPARK AND IGNITION (See page 18-7 of Pub. No. RM925E COROLLA)

OK: The spark occurs.

NG → **REPAIR OR REPLACE IGNITION SYSTEM**

OK

8	CHECK FOR EXHAUST GAS LEAKAGE

OK: No gas leak.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

9	CHECK FUEL PRESSURE (See page 11-5 of Pub. No. RM925E COROLLA)

(a) Check the fuel pressure (high or low pressure).

NG → CHECK AND REPLACE FUEL SYSTEM

OK

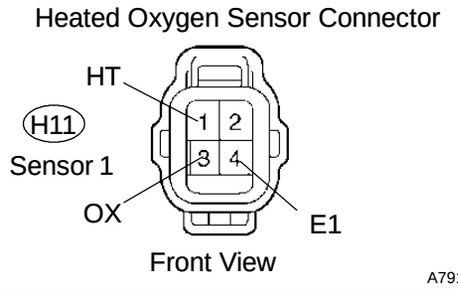
10	INSPECT FUEL INJECTOR ASSY(INJECTION AND VOLUME) (See page 11-7 of Pub. No. RM925E COROLLA)

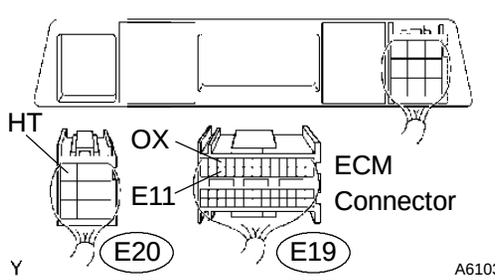
NG → REPLACE FUEL INJECTOR ASSY
(See page 11-24 of Pub. No. RM925E COROLLA)

OK

11	CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM)

Wire Harness Side:





(a) Disconnect the H11 heated oxygen sensor connector.
(b) Disconnect the E19 and E20 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

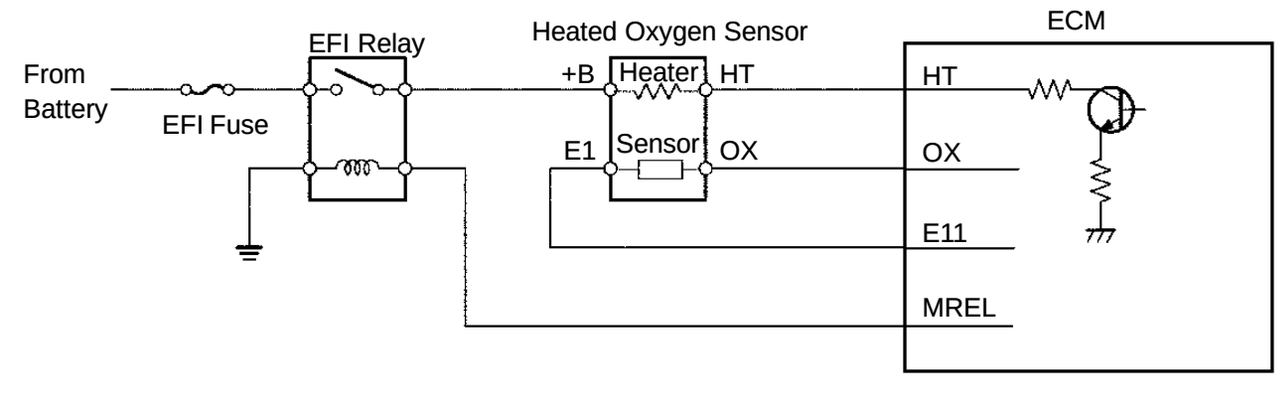
Tester Connection	Specified Condition
OX (H11-3) - OX (E19-11)	Below 1 Ω
HT (H11-1) - HT (E20-3)	Below 1 Ω
E1 (H11-4) - E11 (E19-24)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OX (H11-3) or OX (E19-11) - Body ground	10 kΩ or higher
HT (H11-1) or HT (E20-3) - Body ground	10 kΩ or higher

(d) Reconnect the heated oxygen sensor connector.
(e) Reconnect the ECM connectors.

Reference (Sensor 1 System Diagram):



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

12	REPLACE HEATED OXYGEN SENSOR

GO

13	PERFORM CONFIRMATION DRIVING PATTERN

(a) Start the engine and allow it to idle for approximately 20 minutes.
(b) Drive the vehicle for approximately 20 minutes at a vehicle speed between 70 km/h and 100 km/h (between 43 mph and 62 mph) with the transmission gear selector lever in the 5 th position.

GO

14	CHECK IF DTC OUTPUT RECURS(DTCS P0171 AND P0172)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
No output	A
P0171 and/or P0172	B

B	Go to step 3

A

END

DTC	P0261	CYLINDER 1 INJECTOR CIRCUIT LOW

DTC	P0262	CYLINDER 1 INJECTOR CIRCUIT HIGH

DTC	P0264	CYLINDER 2 INJECTOR CIRCUIT LOW

DTC	P0265	CYLINDER 2 INJECTOR CIRCUIT HIGH

DTC	P0267	CYLINDER 3 INJECTOR CIRCUIT LOW

DTC	P0268	CYLINDER 3 INJECTOR CIRCUIT HIGH

DTC	P0270	CYLINDER 4 INJECTOR CIRCUIT LOW

DTC	P0271	CYLINDER 4 INJECTOR CIRCUIT HIGH

CIRCUIT DESCRIPTION

The injectors are installed in the intake manifold, and inject fuel into the cylinders based on the signals from the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0261 P0264 P0267 P0270	Open or short in injector circuit (3 trip detection logic)	• Open or short in injector circuit • Injector • ECM
P0262 P0265 P0268 P0271	Short in power source circuit (3 trip detection logic)	• Short in injector power source circuit • Injector • ECM

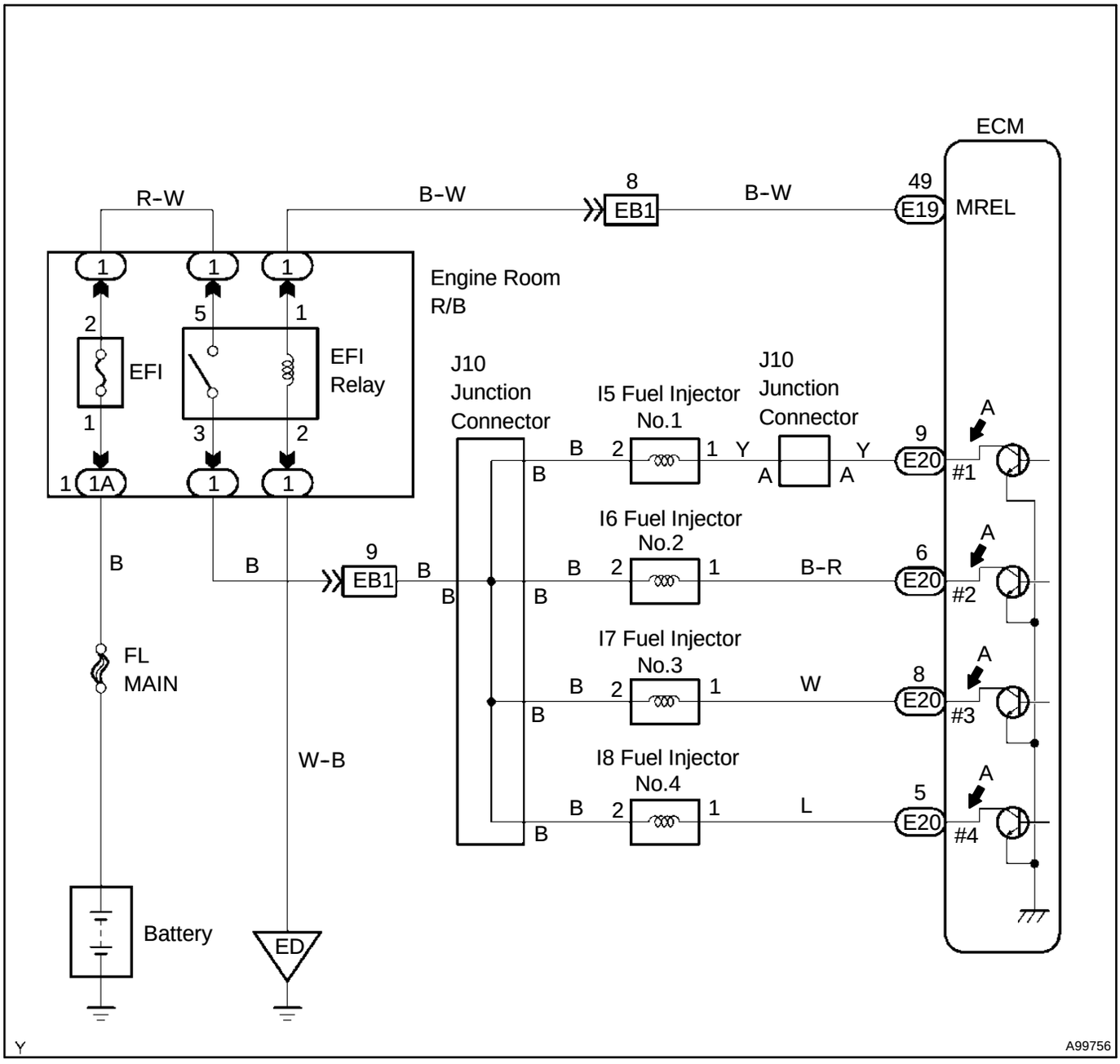
HINT:

- These DTCs are detected when the engine idles for approximately 15 seconds.
- If DTC P0261 or P0262 is displayed, check No. 1 injector circuit.
- If DTC P0264 or P0265 is displayed, check No. 2 injector circuit.
- If DTC P0267 or P0268 is displayed, check No. 3 injector circuit.
- If DTC P0270 or P0271 is displayed, check No. 4 injector circuit.

WIRING DIAGRAM

HINT:

These DTCs are detected by measuring the voltage in area A inside the ECM as shown in WIRING DIAGRAM.

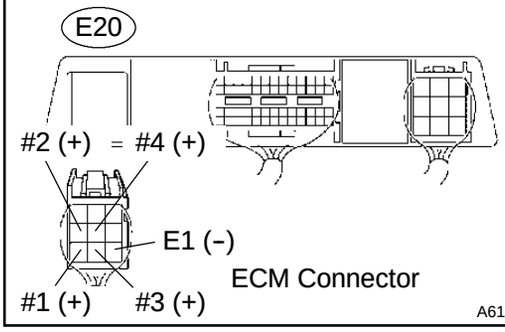


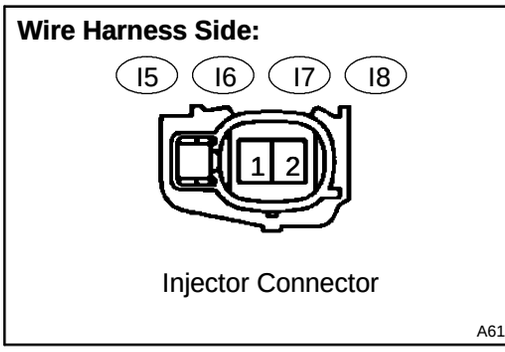
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK HARNESS AND CONNECTOR(ECM - INJECTOR)





(a) Disconnect the I5, I6, I7 and/or I8 injector connector.
(b) Disconnect the E20 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
#1 (E20-9) - E1 (E20-7)	Below 1 Ω
#2 (E20-6) - E1 (E20-7)	Below 1 Ω
#3 (E20-8) - E1 (E20-7)	Below 1 Ω
#4 (E20-5) - E1 (E20-7)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
#1 (E20-9) - Body ground	10 kΩ or higher
#2 (E20-6) - Body ground	10 kΩ or higher
#3 (E20-8) - Body ground	10 kΩ or higher
#4 (E20-5) - Body ground	10 kΩ or higher

(d) Reconnect the injector connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 INSPECT FUEL INJECTOR ASSY (See page 11-17 of Pub. No. RM925E COROLLA)

(a) Inspect the injector resistance.
(1) Using an ohmmeter, measure the resistance between the terminals.
Standard: 1.3 to 14.2 Ω at 20°C (68°F)

NG → **REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)**

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC	P0301	CYLINDER 1 MISFIRE DETECTED

DTC	P0302	CYLINDER 2 MISFIRE DETECTED

DTC	P0303	CYLINDER 3 MISFIRE DETECTED

DTC	P0304	CYLINDER 4 MISFIRE DETECTED

CIRCUIT DESCRIPTION

When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust gas in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emission levels. High concentrations of HC can also cause temperature of the Three-Way Catalytic Converter (TWC) to increase, possibly damaging the TWC. To prevent this increase in emissions and limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the TWC reaches a point of thermal degradation, the ECM blinks the MIL. For monitoring misfire, the ECM uses both the camshaft position sensor and the crankshaft position sensor. The camshaft position sensor is used to identify misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. The misfire counter increments when crankshaft rotation speed variations exceed the threshold values.

If the misfiring rate exceeds the threshold and could cause emission deterioration, the ECM illuminates the MIL.

HINT:

- When a misfire occurs, which results in damage to the TWC, the MIL blinks during the first 200 engine revolutions. If more misfires occur during the subsequent 200 revolutions, misfire detection is suspended and the MIL illuminates.
- For any particular 1,000 revolutions of the engine, misfiring which could result in emission deterioration is detected. This causes the MIL to illuminate.

DTC No.	DTC Detection Condition	Trouble Area
P0300	Misfiring of random cylinders is detected (2 trip detection logic) (MIL blinks immediately)	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM
P0301 P0302 P0303 P0304	Misfiring of each cylinder is detected (2 trip detection logic) (MIL blinks immediately)	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM

HINT:

These DTCs are detected when the engine idles for approximately 10 minutes after warm-up.

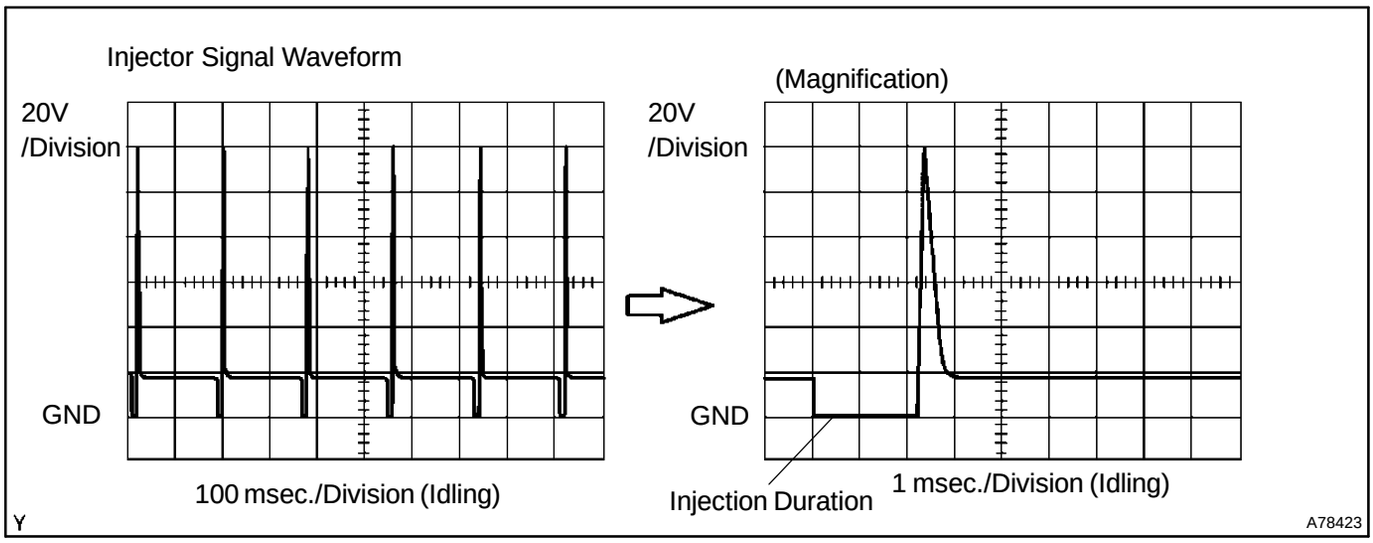
Reference: Inspection using the oscilloscope

With the engine idling, check the waveform between terminals #1 to #4 and E01 of the ECM connectors.

Item	Contents
Terminal	#1 to #4 - E01
Equipment Setting	20V/Division, 100 or 1 ms/Division
Condition	Idling

HINT:

The correct waveform is as shown.



WIRING DIAGRAM

Refer to DTC P0261 on page 05-296.

CONFIRMATION DRIVING PATTERN

Allow the engine to idle for 10 minutes or more.

INSPECTION PROCEDURE

HINT:

- If any DTCs other than the misfire DTCs are set simultaneously, first troubleshoot them.
- If a misfire does not occur when the vehicle is brought to the workshop, a misfire can be confirmed by reproducing the condition of the freeze frame data. Also, after finishing repairs, confirm that misfires do not recur (see the confirmation driving pattern).
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- After finishing repairs, perform the confirmation driving pattern again and confirm that no misfire occurs.
- When either of Short FT #1 and Long FT #1 in the freeze frame data is over the range of ±20 %, there is a possibility that the air-fuel ratio is becoming rich (-20 % or less) or lean (+20 % or more).
- When Coolant Temp in the freeze frame data is less than 80°C (176°F), there is a possibility that misfires occur only during engine warm-up.
- If a misfire cannot be reproduced, the following reasons may apply: 1) the vehicle has low fuel, 2) improper fuel is being used, and 3) the ignition plug has been contaminated.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO MISFIRE DTCS)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0300, P0301, P0302, P0303 and/or P0304	A
P0300, P0301, P0302, P0303 and/or P0304 and other DTCs	B

HINT:

If any DTCs other than P0300, P0301, P0302, P0303 and P0304 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-226)

A

2	CHECK WIRE HARNESS, CONNECTOR AND VACUUM HOSE IN ENGINE ROOM

(a) Check the connection condition of the wire harnesses and connector.
(b) Check the piping of the vacuum hose.
(c) Check the vacuum hose for disconnection or breakage.

OK: Connected correctly and no damage on the wire harnesses.

NG → **REPAIR OR REPLACE, THEN CONFIRM THAT THERE IS NO MISFIRE**

OK

3	CHECK CONNECTION OF PCV HOSE

OK: The PCV hose is connected correctly and not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

4	READ OUTPUT DTCS(DTC OF MISFIRING CYLINDERS)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Start the engine.
(d) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / DTC.

HINT:

Read the output DTCs and proceed to the appropriate step shown in the table below.

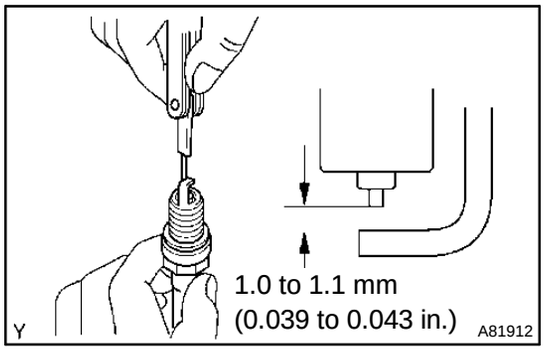
Result:

Number of Misfire Cylinder DTC	Proceed To
1 or 2 DTCs (other than DTC P0300)	A
3 DTCs or more (other than DTC P0300)	B

B → **Go to step 15**

A

5	CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER



(a) Remove the ignition coil assembly.
(b) Remove the spark plug.
(c) Check the spark plug type.
Recommended spark plug:

Supplier	Type
BOSCH	FR8KCU

(d) Check the spark plug electrode gap.
Standard: 0.9 to 1.0 mm (0.039 to 0.043 in.)
Maximum: 1.2 mm (0.047 in.)

NOTICE:
If adjusting the gap of a new spark plug, bend only the ground electrode. Do not touch the tip. Never attempt to adjust the gap of a used plug.

(e) Check the electrode for carbon deposits.
(f) Perform a spark test.

CAUTION:
Completely disconnect each injector connector.

NOTICE:
Do not crank the engine for more than 5 to 10 seconds.

(1) Install the spark plug to the ignition coil, and connect the ignition coil connector.
(2) Disconnect the injector connector.
(3) Ground the spark plug.
(4) Check if a spark occurs while the engine is being cranked.

OK: A spark jumps across the electrode gap.

(g) Reinstall the spark plug.
(h) Reinstall the ignition coil assembly.

OK	Go to step 8

NG

6	CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

(a) Replace the spark plug with the normally functioning spark plug.
(b) Perform a spark test.

CAUTION:
Completely disconnect each injector connector.
NOTICE:
Do not crank the engine for more than 5 to 10 seconds.

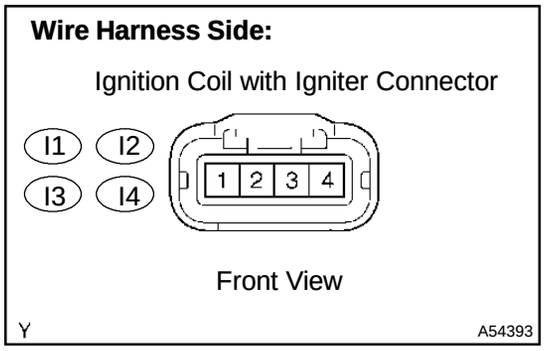
(1) Install the spark plug to the ignition coil, and connect the ignition coil connector.
(2) Disconnect the injector connector.
(3) Ground the spark plug.
(4) Check if a spark occurs while the engine is being cranked.

OK: A spark jumps across the electrode gap.

OK → **REPLACE IGNITION COIL ASSY**

NG

7	CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(IGNITION COIL ASSY - ECM)



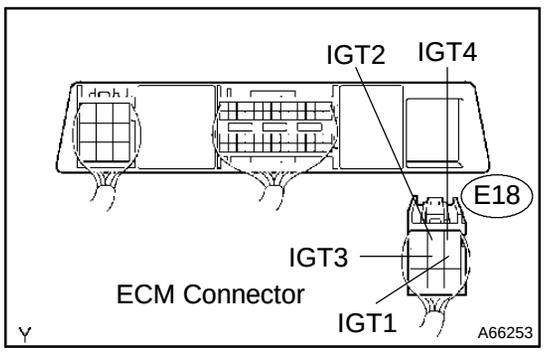
(a) Disconnect the I1, I2, I3 and/or I4 ignition coil with igniter connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (I1-3) - IGT1 (E18-6)	Below 1 Ω
Ignition coil (I2-3) - IGT2 (E18-8)	Below 1 Ω
Ignition coil (I3-3) - IGT3 (E18-5)	Below 1 Ω
Ignition coil (I4-3) - IGT4 (E18-9)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (I1-3) or IGT1 (E18-6) - Body ground	10 kΩ or higher
Ignition coil (I2-3) or IGT2 (E18-8) - Body ground	10 kΩ or higher
Ignition coil (I3-3) or IGT3 (E18-5) - Body ground	10 kΩ or higher
Ignition coil (I4-3) or IGT4 (E18-9) - Body ground	10 kΩ or higher



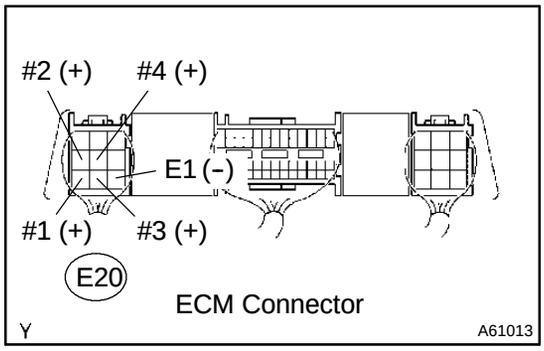
(d) Reconnect the ignition coil with igniter connector.
(e) Reconnect the ECM connector.

OK → **REPLACE IGNITION COIL ASSY**

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

8	INSPECT ECM TERMINAL OF MISFIRING CYLINDER(#1, #2, #3 OR #4 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E20 ECM connector.

Standard:

Tester Connection	Specified Condition
#1 (E20-9) - E1 (E20-7)	9 to 14 V
#2 (E20-6) - E1 (E20-7)	9 to 14 V
#3 (E20-8) - E1 (E20-7)	9 to 14 V
#4 (E20-5) - E1 (E20-7)	9 to 14 V

OK → Go to step 11

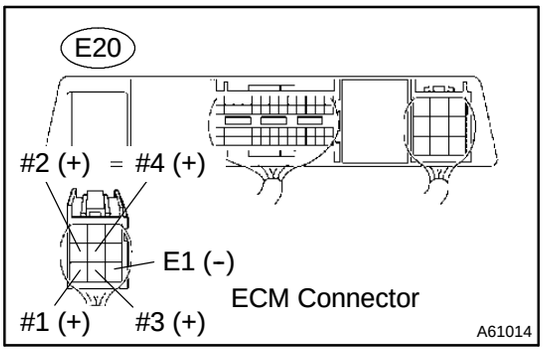
NG

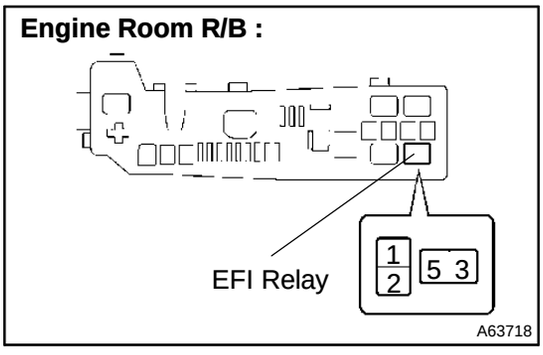
9	INSPECT FUEL INJECTOR RESISTANCE OF MISFIRING CYLINDER (See page 11-7 of Pub. No. RM925E COROLLA)

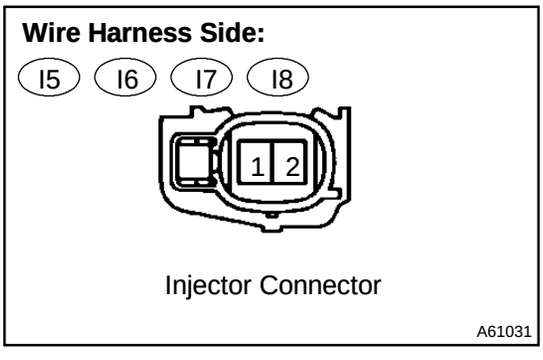
NG → REPLACE FUEL INJECTOR ASSY
(See page 11-24 of Pub. No. RM925E COROLLA)

OK

10	CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(INJECTOR - ECM, INJECTOR - EFI RELAY)







(a) Check the harness and connectors between the injector and ECM.

(1) Disconnect the I5, I6, I7 and/or I8 injector connector.

(2) Disconnect the E20 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-1) - #1 (E20-9)	Below 1 Ω
Injector (I6-1) - #2 (E20-6)	Below 1 Ω
Injector (I7-1) - #3 (E20-8)	Below 1 Ω
Injector (I8-1) - #4 (E20-5)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-1) or #1 (E20-9) - Body ground	10 kΩ or higher
Injector (I6-1) or #2 (E20-6) - Body ground	10 kΩ or higher
Injector (I7-1) or #3 (E20-8) - Body ground	10 kΩ or higher
Injector (I8-1) or #4 (E20-5) - Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reconnect the ECM connector.

(b) Check the harness and connectors between the injector and EFI relay.

(1) Disconnect the I5, I6, I7 and/or I8 injector connector.

(2) Remove the EFI relay from the engine room R/B.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-2) - EFI relay holder (3)	Below 1 Ω
Injector (I6-2) - EFI relay holder (3)	Below 1 Ω
Injector (I7-2) - EFI relay holder (3)	Below 1 Ω
Injector (I8-2) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-2) or EFI relay holder (3) - Body ground	10 kΩ or higher
Injector (I6-2) or EFI relay holder (3) - Body ground	10 kΩ or higher
Injector (I7-2) or EFI relay holder (3) - Body ground	10 kΩ or higher
Injector (I8-2) or EFI relay holder (3) - Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

11	INSPECT FUEL INJECTOR INJECTION AND INJECTION VOLUME OF MISFIRING CYLINDER (See page 11-15 of Pub. No. RM925E COROLLA)

NG → REPLACE FUEL INJECTOR ASSY (See page 11-24 of Pub. No. RM925E COROLLA)

OK

12	CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER (See page 14-82 of Pub. No. RM925E COROLLA)

NG → REPAIR OR REPLACE

OK

13	CHECK VALVE CLEARANCE OF MISFIRING CYLINDER (See page 14-87 of Pub. No. RM925E COROLLA)

NG → ADJUST VALVE CLEARANCE (See page 14-87 of Pub. No. RM925E COROLLA)

OK

14	READ OUTPUT DTCS(REFER TO RESULT OF STEP 4)

HINT:

- If the result of step 4 is "1 or 2 DTCs," proceed to A.
- If the result of step 4 is " 3 DTCs or more," proceed to B.

B → CHECK FOR INTERMITTENT PROBLEMS

A

15	CHECK VALVE TIMING(CHECK FOR LOOSENESS AND JUMPED TEETH ON TIMING CHAIN) (See page 14-123 of Pub. No. RM925E COROLLA)

OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → ADJUST VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA)

OK

16	CHECK FUEL PRESSURE (See page 11-17 of Pub. No. RM925E COROLLA)

NG → CHECK AND REPLACE FUEL PUMP, PRESSURE REGULATOR, FUEL PIPE LINE AND FILTER

OK

17	READ VALUE USING INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE AND MASS AIR FLOW RATE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Check the intake air temperature.
  (1) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
  (2) Read the value.
  Standard: Equivalent to the ambient air temperature.
(d) Check the mass air flow rate.
  (1) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / AFM.
  (2) Read the values.
  Standard:

Condition	Mass Air Flow Rate (g/s)
Ignition switch ON (do not start engine)	0
Idling	1.4 to 1.7
Revving up without load (2,500 rpm)	5.4 to 7.9
Idling - Revving up	Mass air flow rate fluctuates

NG → **REPLACE MASS AIR FLOW METER**

OK

18	INSPECT ENGINE COOLANT TEMPERATURE SENSOR(RESISTANCE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Date List / Coolant Temp.
(d) Read the Coolant Temp value when the engine is cold and warmed up.
  Standard:
  Engine coolant temperature when the engine is cold: Same as the ambient temperature
  Engine coolant temperature when the engine is warmed up: 75° to 95°C (167° to 203°F)

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

19	READ OUTPUT DTCS(REFER TO RESULT OF STEP 4)

HINT:
- If the result of step 4 is "1 or 2 DTCs," proceed to A.
- If the result of step 4 is "3 DTCs or more," proceed to B.

B → **GO BACK TO STEP 4**

A

CHECK FOR INTERMITTENT PROBLEMS

DTC	P0327	KNOCK SENSOR 1 CIRCUIT LOW INPUT (BANK 1 OR SINGLE SENSOR)

CIRCUIT DESCRIPTION

The flat type knock sensor (non-resonant type) has a structure that can detect vibration in a wider band of frequency, from approximately 5 to 15 kHz, and has the following features:

- The knock sensor is fitted on the cylinder block to detect engine knocking.
- The sensor contains a piezoelectric element which generates voltage when it becomes deformed. This occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, the ignition timing is retarded to suppress it.

DTC No.	DTC Detection Condition	Trouble Area
P0327	Knock sensor output voltage is below normal range (3 trip detection logic)	• Open or short in knock sensor circuit • Knock sensor • Knock sensor looseness • ECM

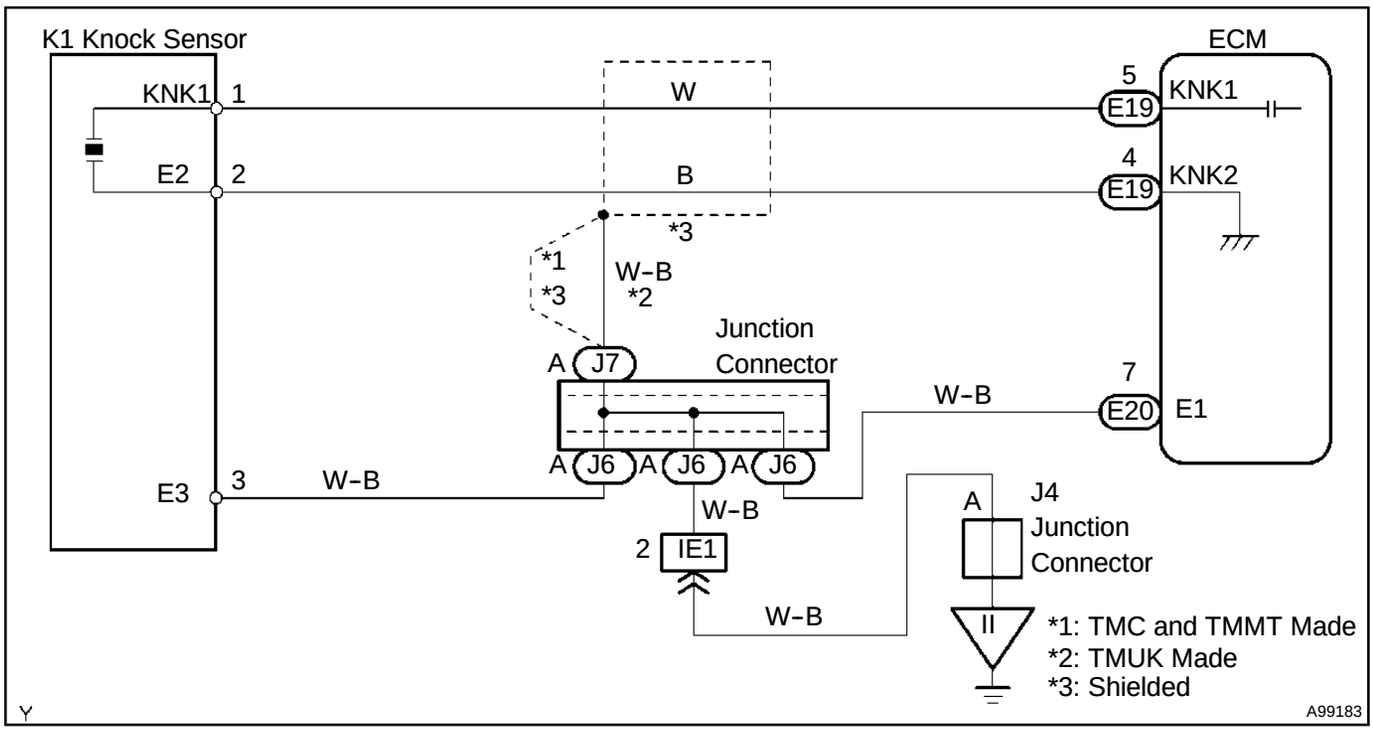
HINT:

- DTC P0327 is detected when the vehicle is driven at approximately 120 km/h for 1 minute or more (at an engine speed of 2,000 rpm or more, with an engine load of 40 % or more, and the transaxle gear selector lever in the 5 th position) after warm-up.
- If the ECM detects DTC P0327, it enters fail-safe mode in which the corrective retard angle value is set to the maximum value.

CAUTION:

Strictly observe traffic laws when performing the confirmation driving pattern.

WIRING DIAGRAM



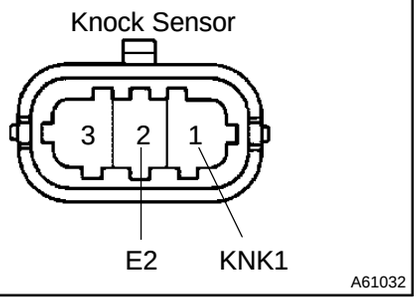
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT KNOCK SENSOR

Component Side:



(a) Remove the knock sensor.

(b) Check the resistance.

Standard:

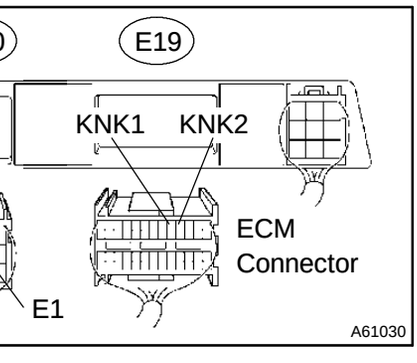
Tester Connection	Specified Condition
KNK1 (K1-1) - E2 (K1-2)	1 MΩ or more

(c) Reinstall the knock sensor.

NG → **REPLACE KNOCK SENSOR**

OK

2 CHECK HARNESS AND CONNECTOR(ECM - KNOCK SENSOR)



(a) Disconnect the E19 and E20 ECM connectors.

(b) Disconnect the K1 knock sensor connector.

(c) Check the resistance.

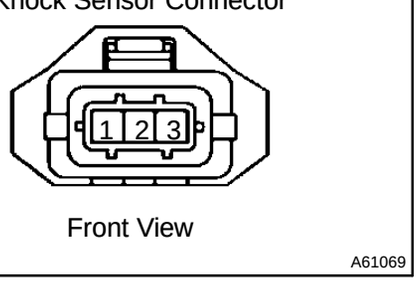
Standard (Check for open):

Tester Connection	Specified Condition
KNK1 (E19-5) - Knock sensor (K1-1)	Below 1 Ω
KNK2 (E19-4) - Knock sensor (K1-2)	Below 1 Ω
E1 (E20-7) - Knock sensor (K1-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
KNK1 (E19-5) or Knock sensor (K1-1) - Body ground	10 kΩ or higher
KNK2 (E19-4) or Knock sensor (K1-2) - Body ground	10 kΩ or higher
KNK1 (E19-5) or Knock sensor (K1-1) - KNK2 (E19-4) or Knock sensor (K1-2)	10 kΩ or higher

Wire Harness Side:



(d) Reconnect the ECM connectors.

(e) Reconnect the knock sensor connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	INSPECT KNOCK SENSOR

(a) Check the knock sensor installation.
Standard:
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

NG → **TIGHTEN SENSOR**

OK

4	CONFIRM MALFUNCTION DISAPPEARS WHEN A GOOD KNOCK SENSOR IS INSTALLED

(a) Change the knock sensor to a new one.
(1) Remove the knock sensor.
(2) Install the knock sensor.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
(b) Perform the driving test.
(1) Drive the vehicle at approximately 120 km/h for 1 minute or move with the transmission gear selector lever in the 5 th position. And then stop the engine.
(2) Wait for approximately 10 minutes or more, and then start the engine.
(c) Connect the intelligent tester II to the DLC3.
(d) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending Codes.
(e) Read DTC.
Result :

Display (DTC Output)	Proceed To
P0327	A
No output	B

B → **REPLACE KNOCK SENSOR**

A

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC	P0336	CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE

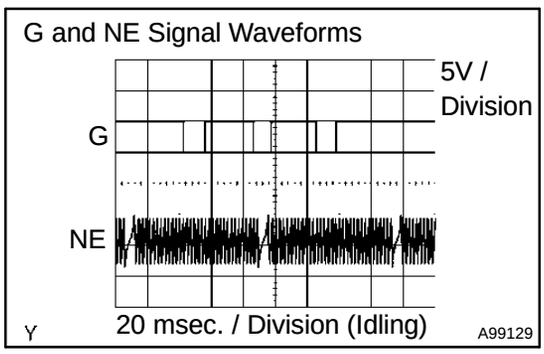
CIRCUIT DESCRIPTION

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pickup coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pickup coil is made of an iron core and magnet. The sensor plate rotates and as each tooth passes through the pickup coil, a pulse signal is created. The pickup coil generates 34 signals per engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine speed. Using these calculations, the fuel injection time and ignition timing are controlled.

DTC No.	DTC Detection Condition	Trouble Area
P0335	No crankshaft position sensor signal to ECM while cranking (1 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft position sensor plate • ECM
P0336	Condition (a) or (b) met during cranking and engine revolution (3 trip detection logic): (a) No missing teeth detected (34 teeth plus 2 missing teeth on crankshaft position sensor) (b) Number of wave peaks of crankshaft position sensor signal is successively 1 more or 1 less	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft position sensor plate • ECM

HINT:

- DTC P0335 is detected when the engine cranks 8 revolutions or more.
- DTC P0336 is detected when the engine cranks 20 revolutions or more.



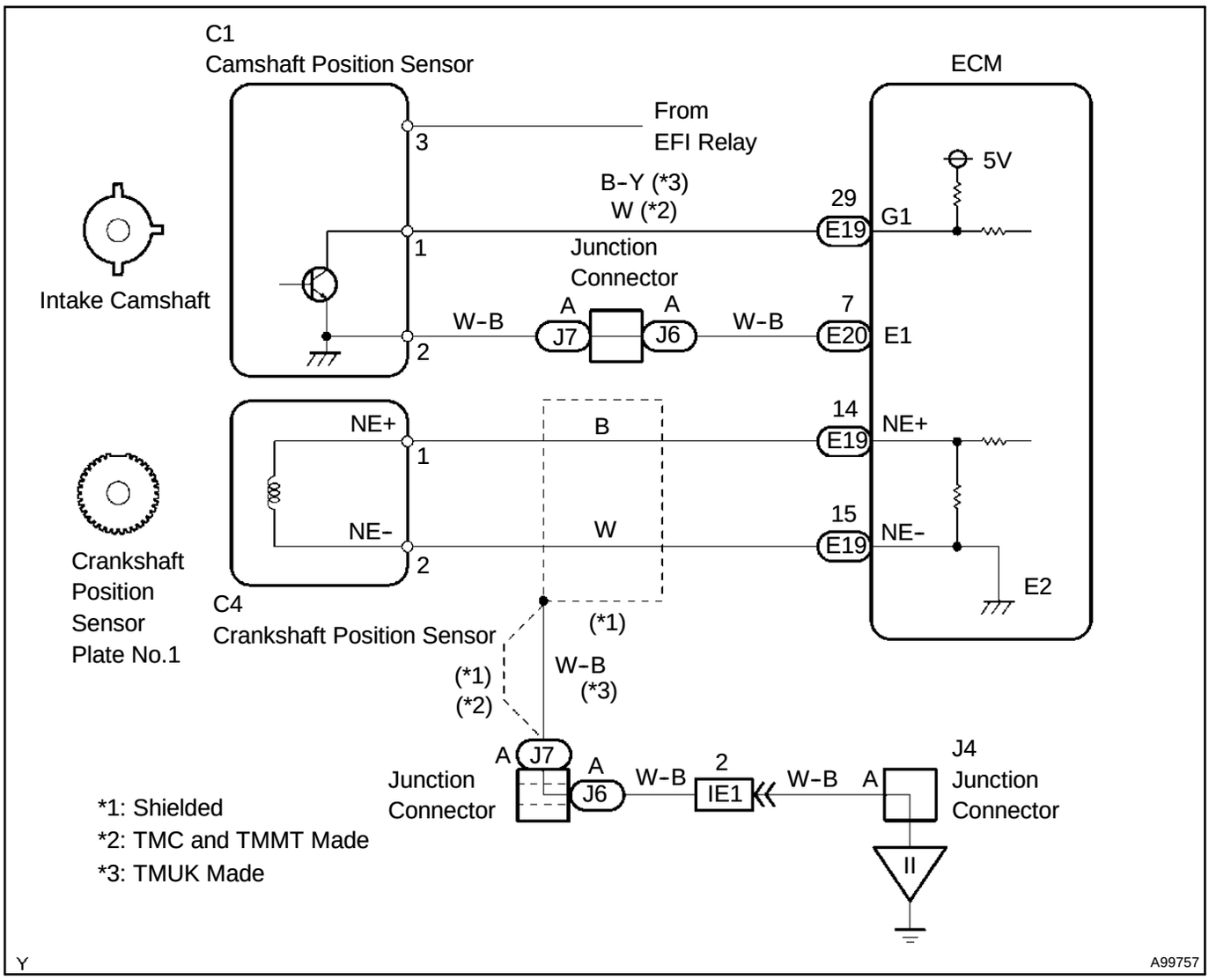
Reference: Inspection using the oscilloscope.

HINT:

- The correct waveform is as shown on the left.
- G1 stands for the camshaft position sensor signal, and NE+ stands for the crankshaft position sensor signal.

Item	Contents
Terminal	CH1: G1 - E1 CH2: NE+ - NE-
Equipment Setting	5V/Division, 20ms/Division
Condition	While cranking or idling

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Check the value on the intelligent tester II.
  (a) Connect the intelligent tester II to the DLC3.
  (b) Start the engine and turn the intelligent tester II ON.
  (c) Select the following menu items: Powertrain / Engine and ECT / Data List / Engine SPD.
- The engine speed can be confirmed in the Data List using the intelligent tester II. If there are no NE signals from the crankshaft position sensor despite the engine revolving, the engine speed will be indicated as zero. If the voltage output of the crankshaft position sensor is insufficient, the engine speed will be indicated as lower than the actual engine rpm.

1 INSPECT CRANKSHAFT POSITION SENSOR(RESISTANCE)

Component Side:



Crankshaft Position Sensor

Y A73303

(a) Disconnect the C4 crankshaft position sensor connector.
(b) Measure the resistance between terminals 1 and 2.

Standard:

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
1 - 2	2,065 to 3,225 Ω at hot

HINT:
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

(c) Reconnect the crankshaft position sensor connector.

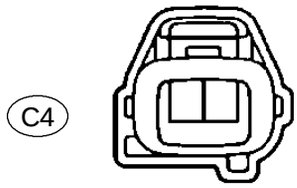
NG → **REPLACE CRANKSHAFT POSITION SENSOR (See page 14-95 of Pub. No. RM925E COROLLA)**

OK

2 CHECK HARNESS AND CONNECTOR(CRANKSHAFT POSITION SENSOR - ECM)

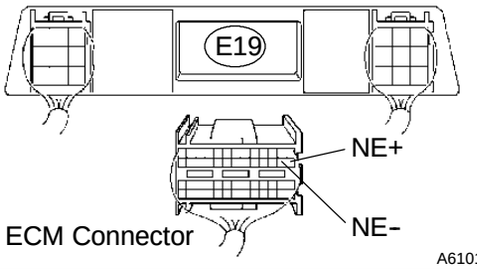
Wire Harness Side:

Crankshaft Position Sensor Connector



Front View

A66132



ECM Connector

Y A61015

(a) Disconnect the C4 crankshaft position sensor connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Crankshaft position sensor (C4-1) - NE+ (E19-14)	Below 1 Ω
Crankshaft position sensor (C4-2) - NE- (E19-15)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Crankshaft position sensor (C4-1) or NE+ (E19-14) - Body ground	10 kΩ or higher
Crankshaft position sensor (C4-2) or NE- (E19-15) - Body ground	10 kΩ or higher

(d) Reconnect the crankshaft position sensor connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK SENSOR INSTALLATION(CRANKSHAFT POSITION SENSOR)

(a) Check the crankshaft position sensor installation.
OK: The sensor is installed correctly.

NG → **SECURELY REINSTALL SENSOR**

OK

4	CHECK CRANKSHAFT POSITION SENSOR PLATE(TEETH OF SENSOR PLATE(CRANKSHAFT))

(a) Check the teeth of the sensor plate.
OK: The plate does not have any cracks or deformation.

NG → **REPLACE CRANKSHAFT POSITION SENSOR PLATE (CRANKSHAFT)**

OK

5	REPLACE CRANKSHAFT POSITION SENSOR

GO

6	CHECK IF DTC OUTPUT RECURS(DTCS P0335 AND P0336)

(a) Start the engine.
(b) Connect the intelligent tester II to the DLC3.
(c) Select the following menu item: Powertrain / Engine and ECT / DTC / Pending codes.
Result :

Display (DTC Output)	Proceed To
No output	A
P0335 or P0336	B

HINT:
If the engine does not start, replace the ECM.

B → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

A

END

DTC	P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR)

CIRCUIT DESCRIPTION

Refer to DTCs P0335 and P0336 on page 05-311.

DTC No.	DTC Detection Condition	Trouble Area
P0340	Deviation in camshaft position sensor signal and crank position sensor signal (3 trip detection logic)	• Mechanical system malfunction (jumped teeth of timing chain, chain stretched) • ECM

HINT:

DTC P0340 is detected when the engine cranks 12 revolutions or more.

WIRING DIAGRAM

Refer to DTCs P0335 and P0336 on page 05-312.

INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Troubleshoot DTCs P0341, P0342 and P0343 first. If no trouble is found, troubleshoot the following mechanical systems.

1	CHECK VALVE TIMING

NG → ADJUST VALVE TIMING

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)

DTC	P0342	CAMSHAFT POSITION SENSOR CIRCUIT LOW INPUT

DTC	P0343	CAMSHAFT POSITION SENSOR CIRCUIT HIGH INPUT

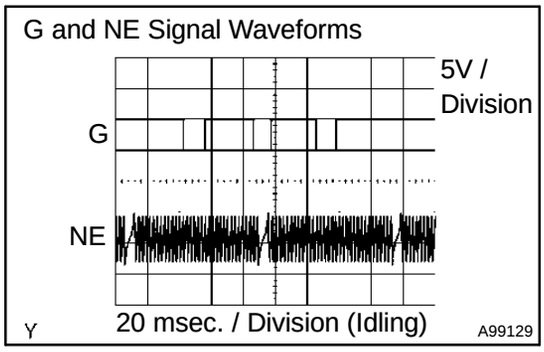
CIRCUIT DESCRIPTION

The camshaft position sensor consists of a magnet and an iron core which is wrapped with copper wire, and is installed on the cylinder head. When the camshaft rotates, each of 3 teeth on the camshaft passes through the camshaft position sensor. This activates the internal magnet in the sensor, generating a voltage in the copper wire. The camshaft rotation is synchronized with the crankshaft rotation. When the crankshaft turns twice the voltage is generated 3 times in the camshaft position sensor. The generated voltage in the sensor acts as a signal, allowing the ECM to locate the camshaft position. This signal is then used to control ignition timing, fuel injection timing, and the VVT system.

DTC No.	DTC Detection Condition	Trouble Area
P0341	Abnormal pulse of camshaft position sensor occurs 12 times or more totally in 1 driving cycle (3 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • ECM
P0342	Camshaft position sensor output stays high (3 trip detection logic)	• Short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • ECM
P0343	Camshaft position sensor output stays low (3 trip detection logic)	• Open in camshaft position sensor circuit • Short in power source circuit • Camshaft position sensor • Intake camshaft • ECM

HINT:

These DTCs detected when the engine is running or the engine cranks 12 revolutions or more.



Reference: Inspection using the oscilloscope.

HINT:

- The correct waveform is as shown on the left.
- G1 stands for the camshaft position sensor signal, and NE+ stands for the crankshaft position sensor signal.

Item	Contents
Terminal	CH1: G1 - E1 CH2: NE+ - NE-
Equipment Setting	5V/Division, 20ms/Division
Condition	While cranking or idling

WIRING DIAGRAM

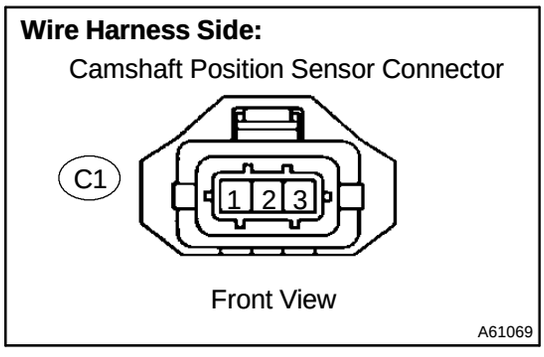
Refer to DTC P0335 on page 05-312.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK HARNESS AND CONNECTOR(CAMSHAFT POSITION SENSOR - ECM)



(a) Disconnect the C1 camshaft position sensor connector.

(b) Disconnect the E19 and E20 ECM connectors.

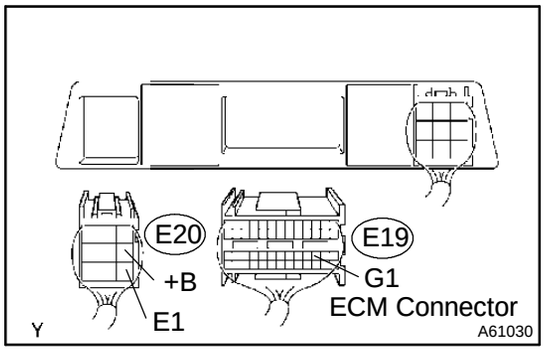
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Camshaft position sensor (C1-1) - G1 (E19-29)	Below 1 Ω
Camshaft position sensor (C1-2) - E1 (E20-7)	Below 1 Ω
Camshaft position sensor (C1-3) - +B (E20-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Camshaft position sensor (C1-1) or G1 (E19-29) - Body ground	10 kΩ or higher
Camshaft position sensor (C1-3) or +B (E20-4) - Body ground	10 kΩ or higher



(d) Reconnect the camshaft position sensor connector.

(e) Reconnect the ECM connectors.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	CHECK SENSOR INSTALLATION(CAMSHAFT POSITION SENSOR)

(a) Check the sensor installation.
OK: The sensor is installed correctly.

NG → **SECURELY REINSTALL SENSOR**

OK

3	CHECK CAMSHAFT

(a) Check the teeth of the camshaft.
OK: The teeth do not have any cracks or deformation.

NG → **REPLACE CAMSHAFT**

OK

4	REPLACE CAMSHAFT POSITION SENSOR

GO

5	CHECK IF DTC OUTPUT RECURS(DTCS P0341, P0342 AND P0343)

(a) Start the engine.
(b) Stop the engine and wait for at least 10 seconds.
(c) Connect the intelligent tester II to the DLC3.
(d) Select the following menu item: Powertrain / Engine and ECT / DTC / Pending codes.
Result :

Display (DTC Output)	Proceed To
No output	A
P0341, P0342 or P0343	B

B → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

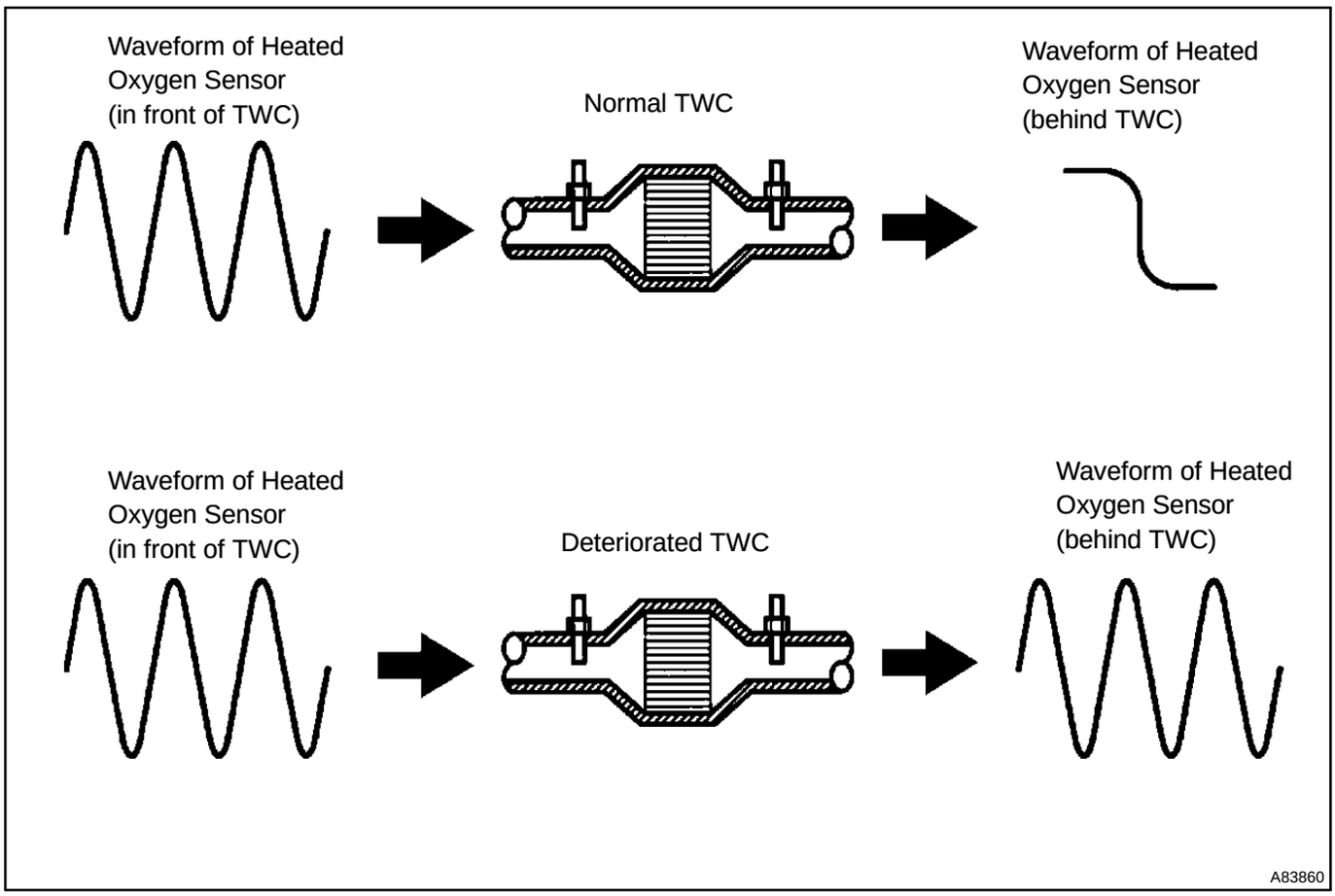
A

END

DTC	P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)

CIRCUIT DESCRIPTION

This vehicle has two heated oxygen sensors. One is located in front of the Three-Way Catalyst Converter (TWC), and the other is mounted behind the TWC. Each signal output of the sensors is converted into a waveform inside the ECM. The front heated oxygen sensor is used to monitor the air-fuel ratio by the ECM, and whose signal prompts the ECM to perform air-fuel ratio feedback control. As a result, the air-fuel ratio is balanced, and the waveform of the front heated oxygen sensor oscillates between rich and lean regularly. To determine whether or not the TWC performance has deteriorated, the ECM compares the waveforms of the front and rear heated oxygen sensors. While the TWC is functioning normally, the waveform of the rear heated oxygen sensor fluctuates between rich and lean more slowly than the front heated oxygen sensor's waveform. When the rear heated oxygen sensor's waveform frequently fluctuates, it indicates that the TWC performance deteriorates.



DTC No.	DTC Detection Condition	Trouble Area
P0420	After engine and TWC are warmed up, and while vehicle is driven within predetermined engine speed: Waveform of heated oxygen sensor (sensor 2) frequently fluctuates between rich and lean according to heated oxygen sensor (sensor 1) output (3 trip detection logic)	• Gas leakage from exhaust system • Heated oxygen sensor (sensor 1) • Heated oxygen sensor (sensor 2) • TWC

HINT:
DTC P0420 is detected when the vehicle is driven at an average vehicle speed of approximately 50 km/h in the city for approximately 30 minutes, and then driven for approximately 15 minutes at a constant vehicle speed between 70 km/h and 90 km/h with the transmission gear selector lever in the 5 th position.

WIRING DIAGRAM

Refer to DTC P0130 on page 05-254.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0420)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0420	A
P0420 and other DTCs	B

HINT:
If any DTCs other than P0420 are output, troubleshoot those DTCs first.

B → GO TO RELEVANT DTC CHART (See page 05-226)

A

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(A/F CONTROL)

(a) Perform the Active Test using the intelligent tester II.

HINT:

The A/F Control operation lowers the injection volume by 12.5 % or increases the injection volume by 25 %.

(1) Connect the intelligent tester II to the DLC3.
(2) Start the engine and turn the intelligent tester II ON.
(3) Warm up the engine.
(4) Run the engine at 2,500 rpm for approximately 3 minutes.
(5) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Active Test / A/F Control.
(6) Select the following monitor items: O2S B1 S1 and O2S B1 S2.
(7) Perform the A/F Control operation with the engine in an idling condition (press the right or left button).

Result:

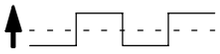
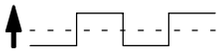
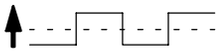
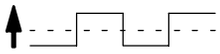
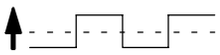
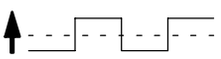
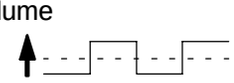
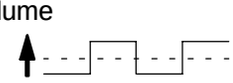
The heated oxygen sensor reacts in accordance with increases and decreases of the fuel injection volume:

+25 % → Rich output: More than 0.5 V

-12.5 % → Lean output: Less than 0.4 V

NOTICE:

Sensor 1 (front sensor) has an output delay of a few seconds. Sensor 2 (rear sensor) has a maximum output delay of approximately 20 seconds.

	Output Voltage of Heated Oxygen Sensor (sensor 1: front sensor)	Output Voltage of Heated Oxygen Sensor (sensor 2: rear sensor)	Main Suspect Trouble Area
Case 1	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Catalyst, Exhaust gas leakage
Case 2	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Sensor 1: front sensor (Sensor 1, sensor heater, sensor 1 circuit)
Case 3	Injection volume +25 % -12.5 %  Output voltage More than 0.5 V Less than 0.4V  **OK**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Sensor 2: rear sensor (Sensor 2, sensor heater, sensor 2 circuit)
Case 4	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Injection volume +25 % -12.5 %  Output voltage Almost no reaction **NG**	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage from exhaust system, etc.)

The following A/F Control procedure enables the technician to check and graph the voltage output of both the heated oxygen sensors.

To display the graph, select the following menu items on the tester: View / Line Graph.

Result:

Result	Proceed To
Case 1	A
Case 2	B
Case 3	C
Case 4	A

B → **CHECK AND REPLACE HEATED OXYGEN SENSOR (SENSOR 1)**

C → **CHECK AND REPLACE HEATED OXYGEN SENSOR (SENSOR 2), OR CHECK AND REPAIR EXHAUST GAS LEAKAGE**

A

3	INSPECT HEATED OXYGEN SENSOR(SENSOR 2) (See page 05-276)

NG → REPLACE HEATED OXYGEN SENSOR (SENSOR 2)

OK

4	CHECK FOR EXHAUST GAS LEAKAGE

OK: No leak from the exhaust system.

NG → REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT

OK

REPLACE THREE-WAY CATALYTIC CONVERTER (EXHAUST MANIFOLD)

DTC	P0443	EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT

CIRCUIT DESCRIPTION

In order to reduce hydrocarbon (HC) emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

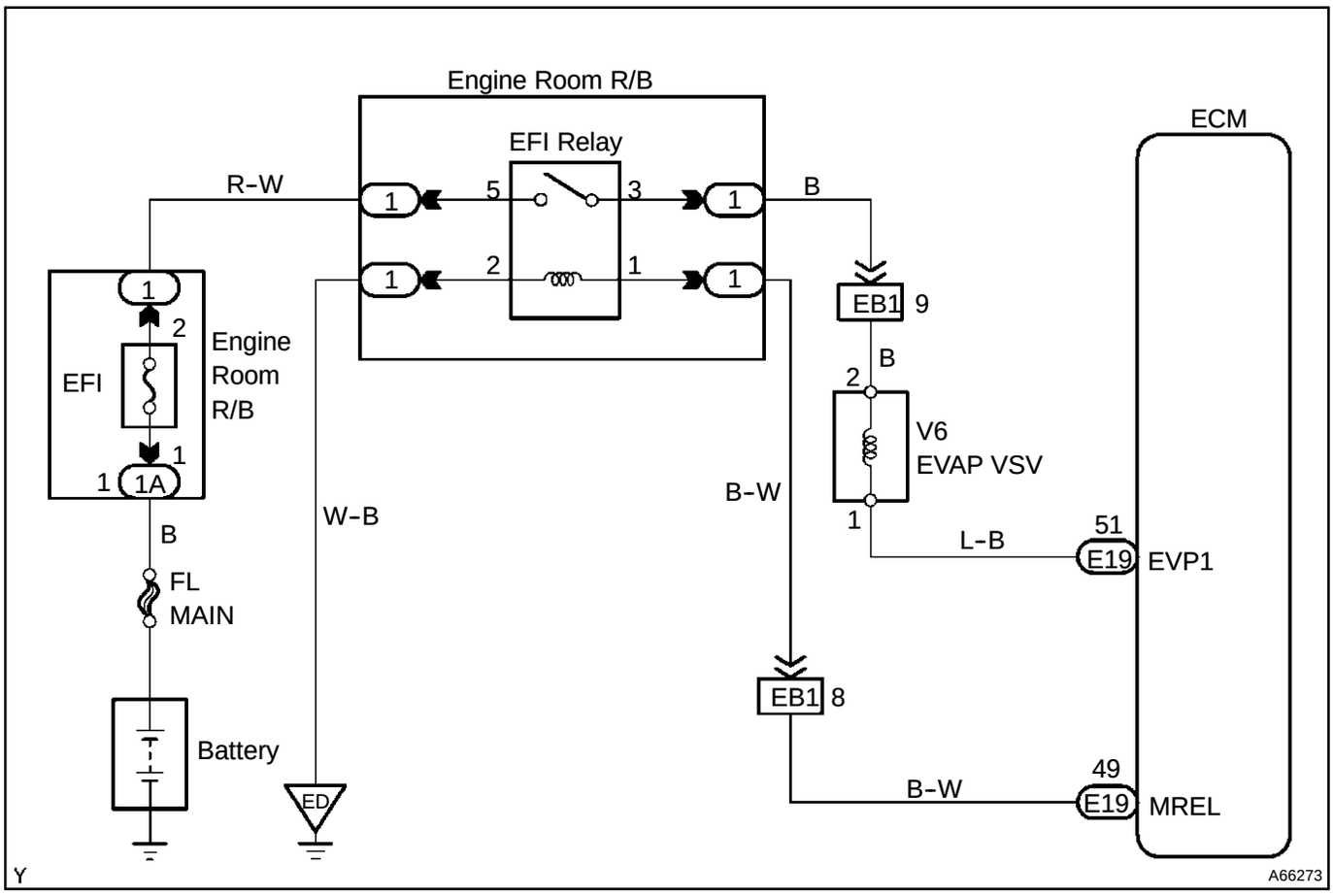
The ECM changes the duty signal to the EVAP VSV so that the intake of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is warmed up.

DTC No.	DTC Detection Condition	Trouble Area
P0443	• Open or short in EVAP VSV circuit (3 trip detection logic) • Short between EVP1 circuit and power source circuit (3 trip detection logic) • Short between EVP1 and ground circuit (3 trip detection logic)	• Open or short in EVAP VSV circuit • EVAP VSV • ECM

HINT:

DTC P0443 is detected when the vehicle is driven at an average vehicle speed of approximately 50 km/h in the city for approximately 30 minutes.

WIRING DIAGRAM

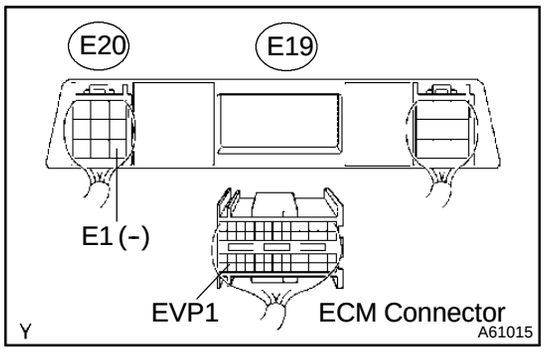


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	INSPECT ECM(CHECK VOLTAGE)



(a) Turn the ignition switch to ON.

(b) Measure the voltage between the terminals of the E19 and E20 ECM connectors.

Standard:

Tester Connection	Specified Condition
EVP1 (E19-51) - E1 (E20-7)	9 to 14 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)**

NG

2	INSPECT VACUUM SWITCHING VALVE(EVAP VSV RESISTANCE)

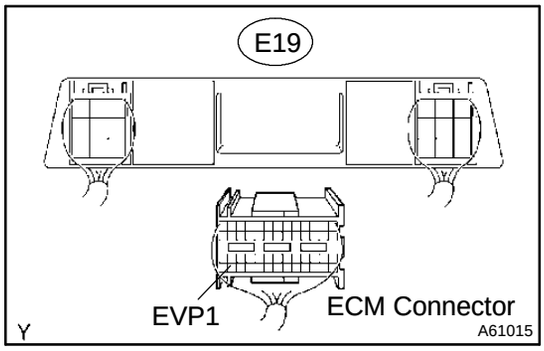
(a) Measure the EVAP VSV resistance.

Standard: 26 to 30 Ω

NG → **REPLACE VACUUM SWITCHING VALVE**

OK

3 CHECK HARNESS AND CONNECTOR(ECM - EVAP VSV)



(a) Disconnect the E19 ECM connector.
(b) Disconnect the V6 EVAP VSV connector.
(c) Check the resistance.

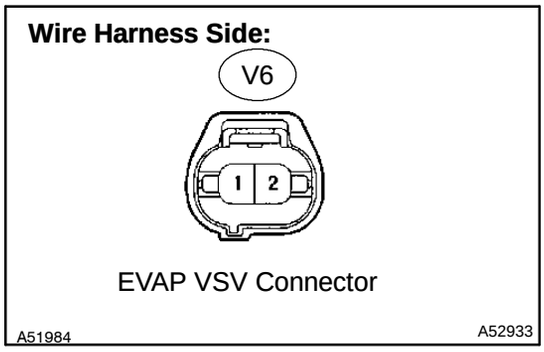
Standard (Check for open):

Tester Connection	Specified Condition
EVAP VSV (V6-1) - EVP1 (E19-51)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EVAP VSV (V6-1) or EVP1 (E19-51) - Body ground	10 kΩ or higher

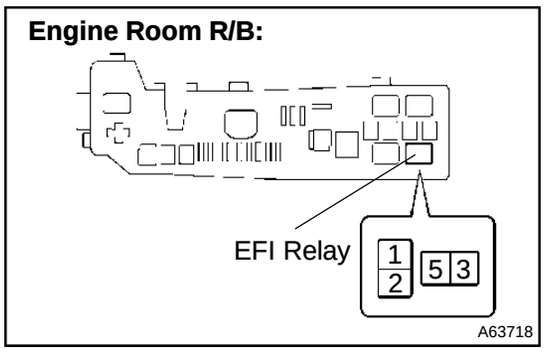
(d) Reconnect the ECM connector.
(e) Reconnect the EVAP VSV connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 CHECK HARNESS AND CONNECTOR(EFI RELAY - EVAP VSV)



(a) Remove the EFI relay from the engine room R/B.
(b) Disconnect the V6 EVAP VSV connector.
(c) Check the resistance.

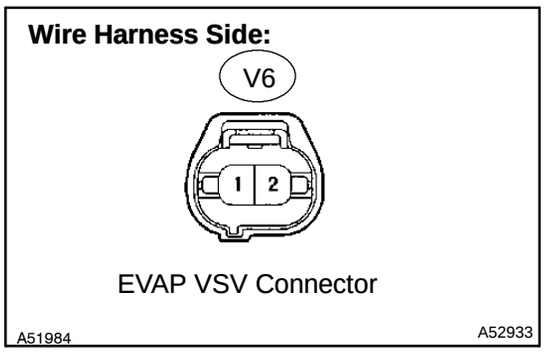
Standard (Check for open):

Tester Connection	Specified Condition
EVAP VSV (V6-2) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EVAP VSV (V6-2) or EFI relay holder (3) - Body ground	10 kΩ or higher

(d) Reinstall the EFI relay.
(e) Reconnect the EVAP VSV connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

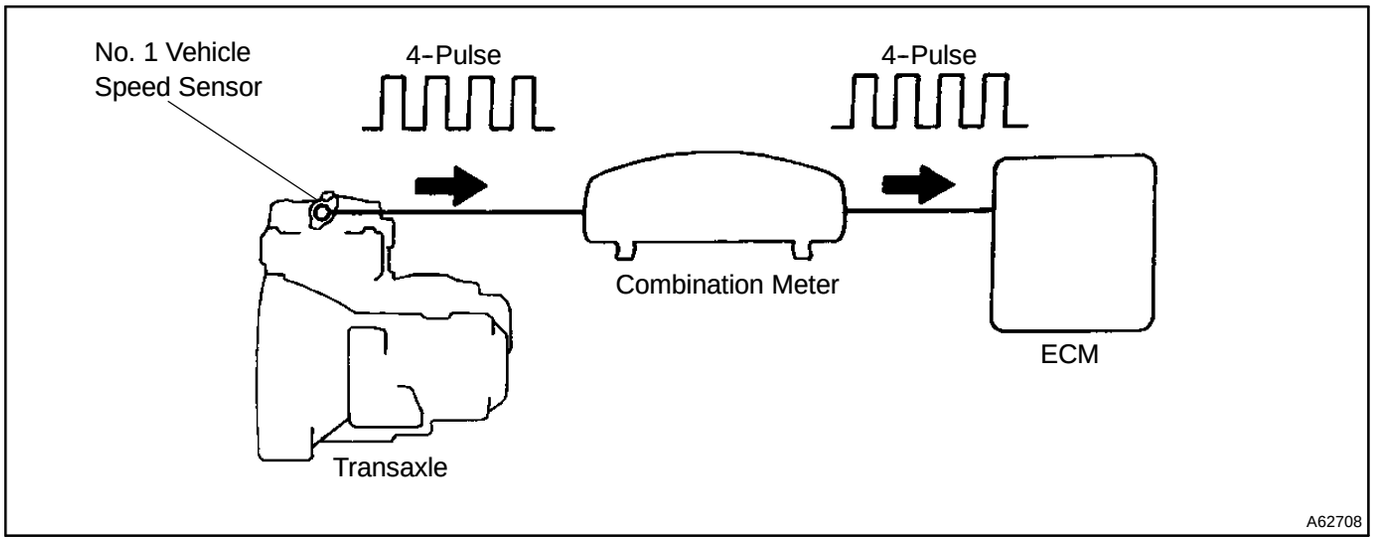
OK

INSPECT ECM POWER SOURCE CIRCUIT (See page 05-357)

DTC	P0501	VEHICLE SPEED SENSOR RANGE/PERFORMANCE

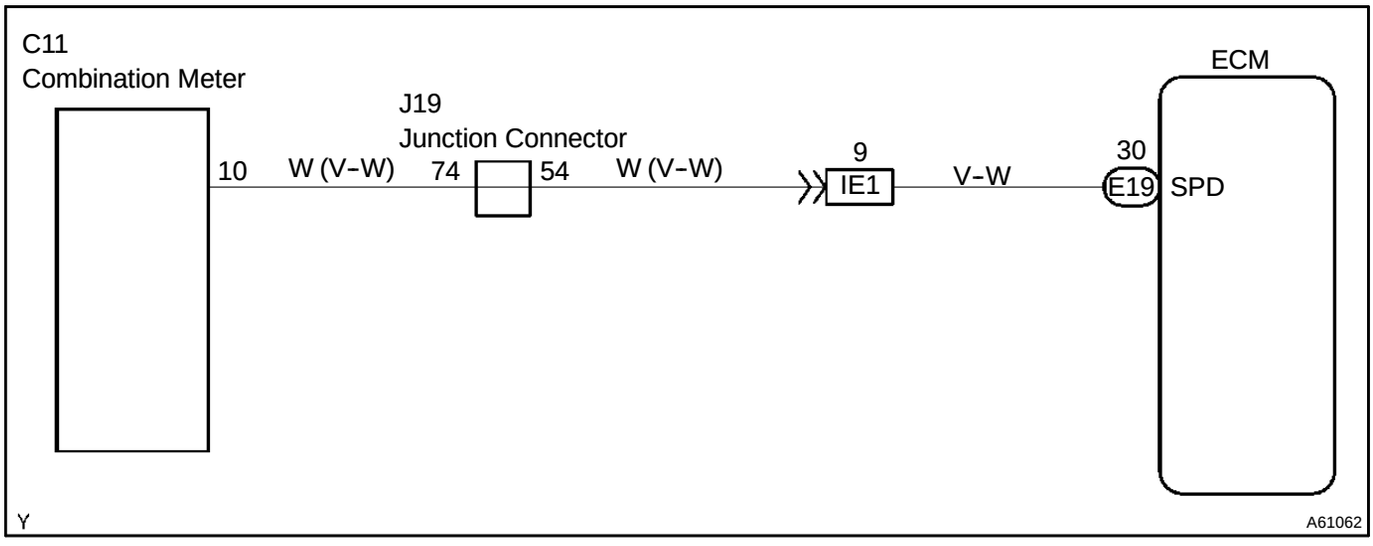
CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detection Condition	Trouble Area
P0500	While vehicle is driven, no vehicle speed sensor signal to ECM (3 trip detection logic)	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OPERATION OF SPEEDOMETER

(a) Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
HINT:
The vehicle speed sensor is operating normally if the speedometer reading is normal.

NG → **CHECK SPEEDOMETER CIRCUIT**
(See page 05-1293 of Pub. No. RM925E COROLLA)

OK

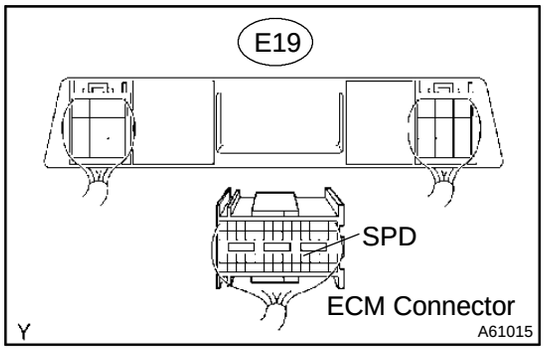
2	READ VALUE USING INTELLIGENT TESTER II(VEHICLE SPEED)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Vehicle SPD.
(d) Check the vehicle speed at the engine speed of 2,000 rpm or more when the vehicle is running.
OK: Same value as the actual vehicle speed.

YES → **CHECK FOR INTERMITTENT PROBLEMS**

NO

3	CHECK HARNESS AND CONNECTOR(ECM - COMBINATION METER)



(a) Disconnect the E19 ECM connector.
(b) Disconnect the C11 combination meter connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
SPD (E19-30) - Combination meter (C11-10)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
SPD (E19-30) or Combination meter (C11-10) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the combination meter connector.

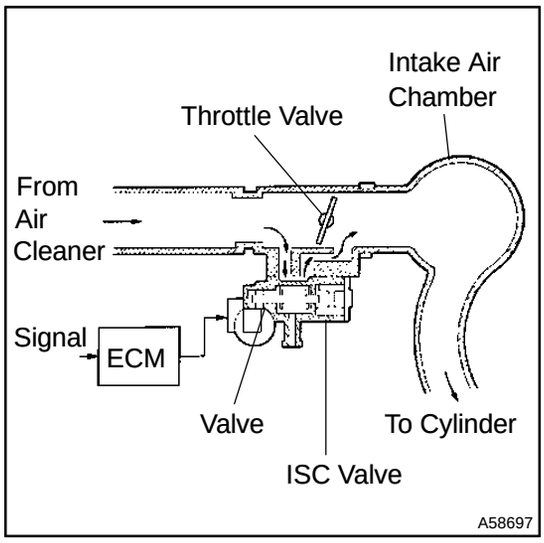
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC P0505 IDLE AIR CONTROL SYSTEM

CIRCUIT DESCRIPTION

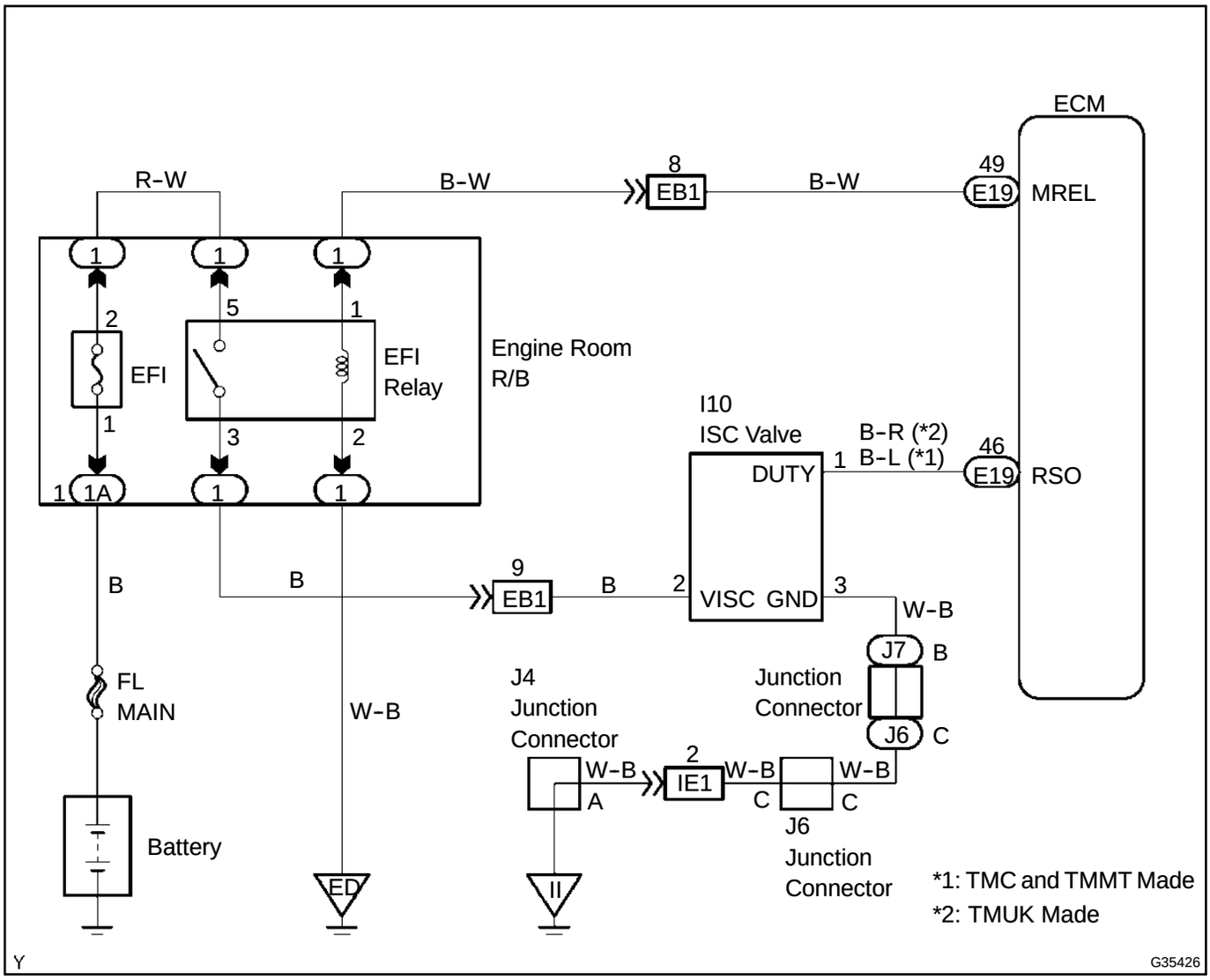


The rotary solenoid type ISC valve is located under the throttle body and intake air bypassing the throttle valve is directed to the ISC valve through the passage.
In this way, the intake air volume bypassing the throttle valve is regulated, controlling the engine speed.
The ECM operates the ISC valve only to perform idle-up and provide feedback for the target idling speed.

DTC No.	DTC Detection Condition	Trouble Area
P0505	• Open or short in ISC valve circuit (3 trip detection logic) • Short in power source circuit (3 trip detection logic)	• Open or short in ISC valve circuit • ISC valve • ECM

HINT:
DTC P0505 is detected when the engine idles for approximately 15 seconds.

WIRING DIAGRAM



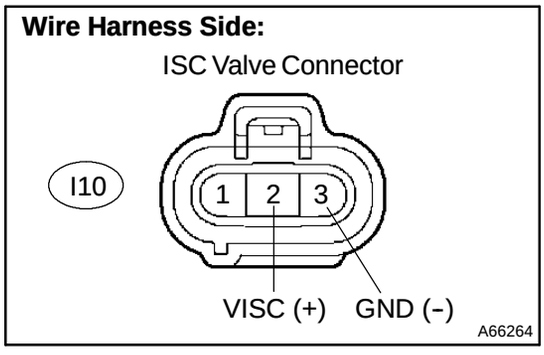
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK HARNESS AND CONNECTOR

Wire Harness Side:



(a) Disconnect the I10 ISC valve connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage between terminals VISC and GND of the ISC valve connector.

Standard:

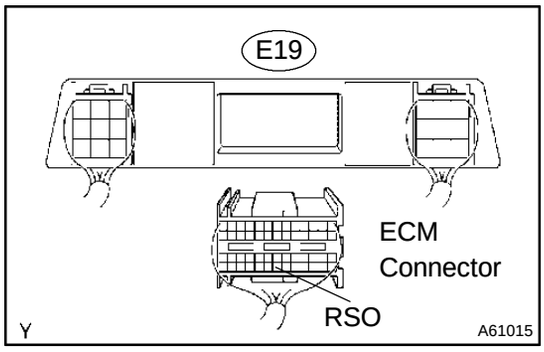
Tester Connection	Specified Condition
VISC (I10-2) - GND (I10-3)	9 to 14 V

(d) Reconnect the ISC valve connector.

NG → Go to step 4

OK

2 CHECK HARNESS AND CONNECTOR(ECM - ISC VALVE)



(a) Disconnect the E19 ECM connector.
(b) Disconnect the I10 ISC valve connector.
(c) Check the resistance.

Standard (Check for open):

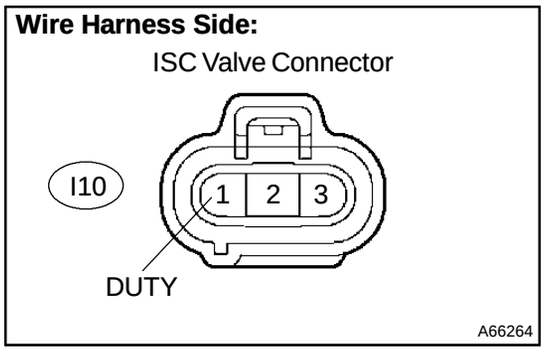
Tester Connection	Specified Condition
RSO (E19-46) - DUTY (I10-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
RSO (E19-46) or DUTY (I10-1) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the ISC valve connector.

Wire Harness Side:



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

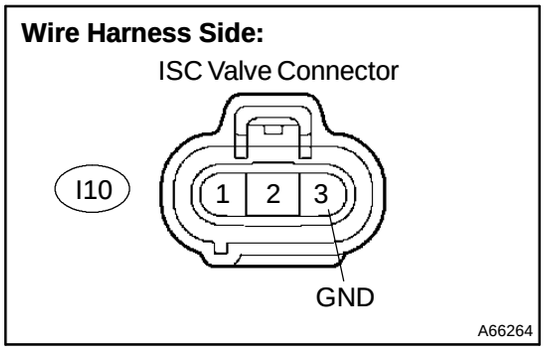
3 CHECK THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

NG → REPLACE THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

4 CHECK HARNESS AND CONNECTOR(ISC VALVE - BODY GROUND)

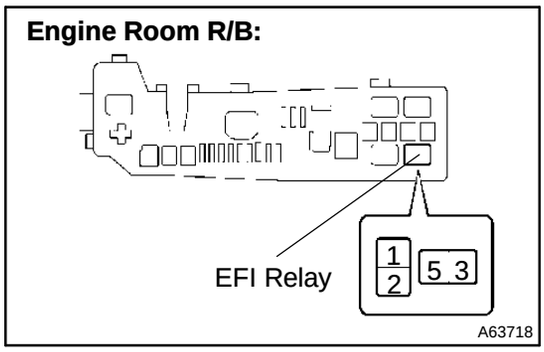


(a) Disconnect the ISC valve connector.
(b) Measure the resistance between terminal GND of the ISC valve connector and body ground.
Resistance: 1 Ω or less
(c) Reconnect the ISC valve connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK HARNESS AND CONNECTOR(EFI RELAY - ISC VALVE)



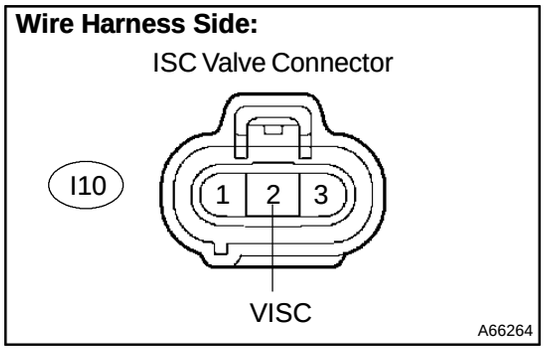
(a) Remove EFI relay from the engine room R/B.
(b) Disconnect the I10 ISC valve connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
ISC valve (I10-2) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
ISC valve (I10-2) or EFI relay holder (3) - Body ground	10 kΩ or higher

(d) Reinstall the EFI relay.
(e) Reconnect the ISC valve connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK FOR ECM POWER SOURCE CIRCUIT **(See page 05-357)**

DTC	P0561	SYSTEM VOLTAGE UNSTABLE

CIRCUIT DESCRIPTION

When the ignition switch is turned to ON, the battery voltage is applied to terminal +B of the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0561	Even though 6 V or more of electrical power is supplied to ECM, ECM recognizes voltage as 2.5 V or less (3 trip detection logic)	• ECM

HINT:

DTC P0561 is detected when the ignition switch is in the ON position.

INSPECTION PROCEDURE

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P0562	SYSTEM VOLTAGE LOW

DTC	P0563	SYSTEM VOLTAGE HIGH

CIRCUIT DESCRIPTION

Refer to DTC P0561 on page 05-333.

DTC No.	DTC Detection Condition	Trouble Area
P0562	Battery voltage is between 2.5 V and 10 V when 120 seconds or more have elapsed since engine start (3 trip detection logic)	• Open or short in backup power source circuit • Tired battery • Electrical over work • Generator • ECM
P0563	Battery voltage is 17 V or more when vehicle speed is 25 km/h or more (3 trip detection logic)	• Generator • Battery (If 24 V battery is fitted, DTC P0563 is output) • ECM

HINT:

- DTC P0562 is detected when the engine idles for 120 seconds or more.
- DTC P0563 is detected when the vehicle speed is approximately 25 km/h or more and 120 seconds or more have elapsed since engine start.

WIRING DIAGRAM

Refer to DTC P0561 on page 05-333.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ OUTPUT DTCS

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

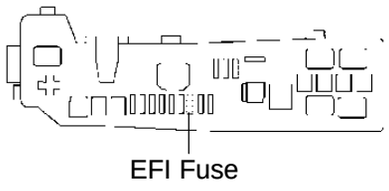
Display (DTC Output)	Proceed To
P0562	A
P0563	B

B → Go to step 4

A

2 CHECK FUSE(EFI FUSE)

Engine Room R/B:



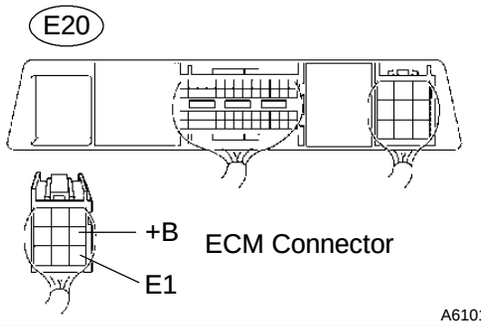
A63745

(a) Remove the EFI fuse from the engine room R/B.
(b) Check the EFI fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

3 CHECK HARNESS AND CONNECTOR(ECM - EFI FUSE, EFI FUSE - BATTERY)



A61014

(a) Disconnect the battery cable.
(b) Disconnect the E20 ECM connector.
(c) Remove the EFI fuse.
(d) Check the resistance.
Standard (Check for open):

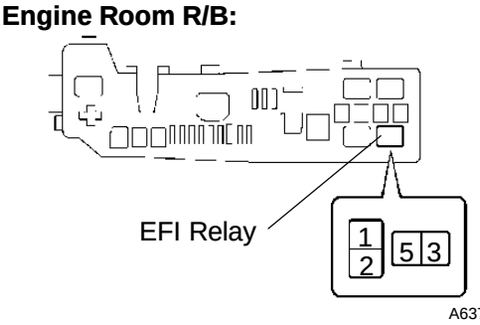
Tester Connection	Specified Condition
+B (E20-4) - EFI relay holder (3)	Below 1 Ω
EFI relay holder (5) - Battery cable	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (E20-4) or EFI relay holder (3) and (5) - Body ground	10 kΩ or higher

(e) Reconnect the battery cable.
(f) Reconnect the ECM connector.
(g) Install the EFI fuse.

Engine Room R/B:



A63718

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT GENERATOR ASSY (See page 19-17 of Pub. No. RM925E COROLLA)

HINT:
If +B voltage drop is caused by generator malfunctions, the charge lamp illuminates.

NG → **REPAIR OR REPLACE GENERATOR ASSY**

OK

5	CHECK BATTERY (See page 19-17 of Pub. No. RM925E COROLLA)

NG → REPAIR OR REPLACE BATTERY

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

DTC	P0601	INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR

CIRCUIT DESCRIPTION

The ECM continuously monitors its internal memory status, internal circuits, and output signals to the throttle actuator. This self-check ensures that the ECM is functioning properly. If any malfunction is detected, the ECM sets appropriate DTCs and illuminates the MIL.

The ECM memory status is diagnosed by internal "mirroring" of the main CPU and the sub CPU to detect Random Access Memory (RAM) errors. The two CPUs also perform continuous mutual monitoring.

DTC No.	DTC Detection Condition	Trouble Area
P0601	ECM internal error (3 trip detection logic)	• ECM

INSPECTION PROCEDURE

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

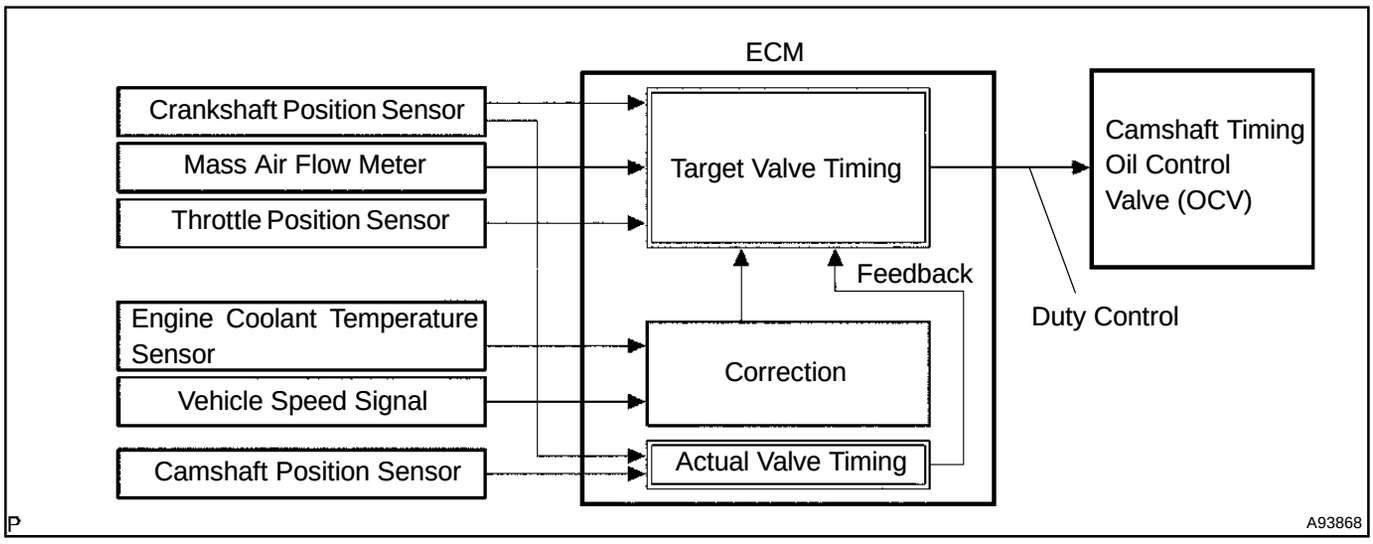
DTC	P1340	CAMSHAFT POSITION SENSOR "A" (BANK 1 SENSOR 2)

DTC	P1345	VVT SYSTEM STICK DETECTED

CIRCUIT DESCRIPTION

The Variable Valve Timing (VVT) system includes the ECM, Oil Control Valve (OCV) and VVT controller. The ECM sends a target "duty-cycle" control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed based on engine operating conditions such as intake air volume, throttle position and engine coolant temperature.

The ECM controls the OCV based on the signals from several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As a result, the relative position between the camshaft and crankshaft is optimized, the engine torque and the fuel economy improve, and the exhaust emission drops. The ECM detects the actual valve timing using signals from the camshaft and crankshaft position sensors. The ECM performs feedback control and verifies target valve timing.

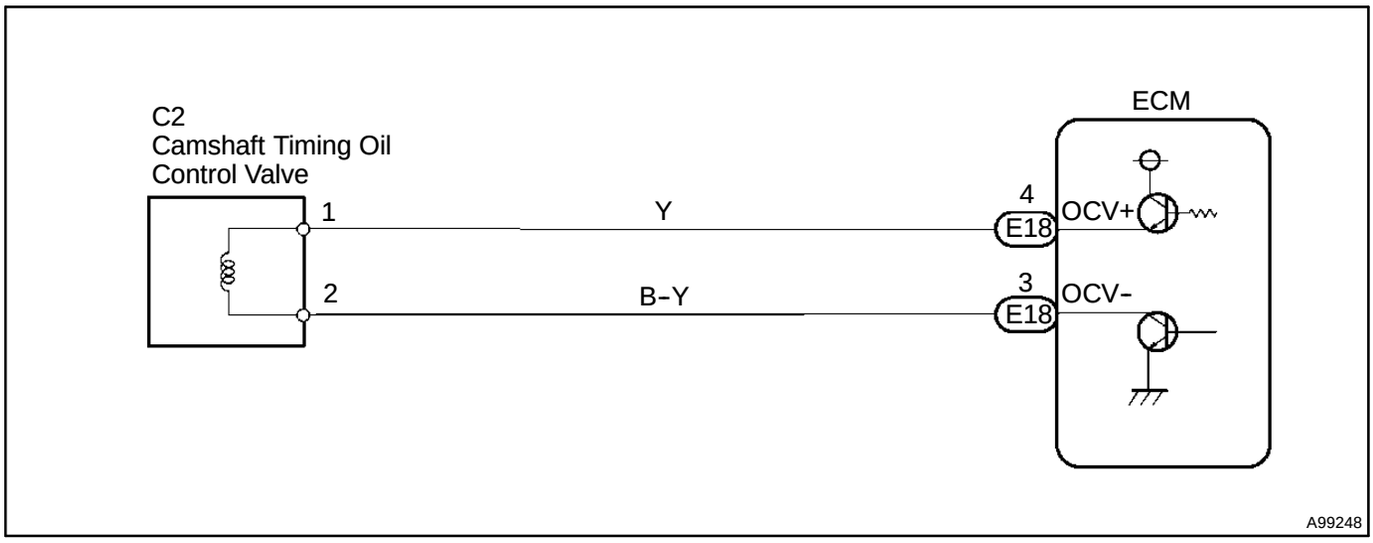


DTC No.	DTC Detection Condition	Trouble Area
P1340	Relative angle of the camshaft and crankshaft has deviated by 9°CA (camshaft angle) from the standard angle at the advanced VVT side Relative angle of the camshaft and crankshaft has deviated by 14°CA from the standard angle at the retarded VVT side (3 trip detection logic)	• Valve timing (jumped teeth of timing chain, chain stretched) • Camshaft timing oil control valve (OCV) • VVT controller assembly • ECM
P1345	Difference between the target camshaft angle and the actual camshaft angle is more then 10° after foreign object removing activation operated (1 trip detection logic)	• Valve timing • Camshaft timing oil control valve (OCV) • VVT controller assembly • ECM

HINT:

- DTC P1340 is detected when the engine idles for approximately 1 minute after warm-up. If not detected, rev up the engine and let it idle for approximately 1 minute again.
- DTC P1345 is detected when the vehicle is driven in the city for approximately 20 minutes after warm-up (repetitive acceleration and deceleration).

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION P1340 OR P1345)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P1340 or P1345	A
P1340 or P1345 and other DTCs	B

HINT:

If any DTCs other than P1340 or P1345 are output, troubleshoot those DTCs first.

B → GO TO RELEVANT DTC CHART (See page 05-226)

A

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE OCV)

(a) Start the engine and warm it up.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Start the engine and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Active Test / VVT Control (Bank 1).
(f) Check the engine speed when operating the OCV using the intelligent tester II.
Standard:

Tester Operation	Specified Condition	Proceed To
OCV is ON	Rough idling or engine stalling	A
OCV is ON	No change in engine speed	B

B → **Go to step 5**

A

3	CHECK VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA)

(a) Check for looseness or a jumped tooth of the timing chain.
OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → **ADJUST VALVE TIMING (See page 14-123 of Pub. No. RM925E COROLLA)**

OK

4	CHECK IF DTC OUTPUT RECURS(DTC P1340 OR P1345)

(a) Clear DTC using the intelligent tester II (see page 05-220).
(b) Start the engine and warm it up.
(c) Drive the vehicle for 10 minutes or more.
(d) Connect the intelligent tester ll to the DLC3.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending codes.
(f) Read DTCs.
OK: No DTC output.

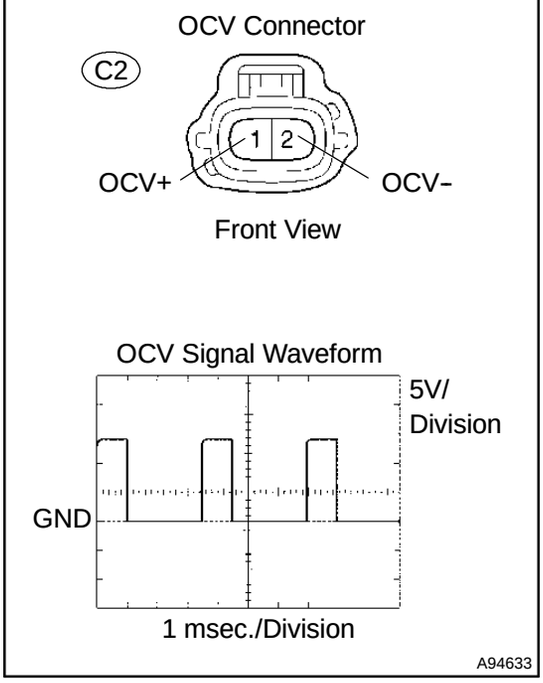
OK → **VVT SYSTEM OK**

HINT:
DTC P1340 or P1345 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

NG

5	INSPECT ECM(OCV SIGNAL)

Wire Harness Side:



(a) Disconnect the C2 OCV connector.

(b) While running the engine at 2,000 rpm, check the waveform between the terminals of the C2 OCV connector using the oscilloscope.

Standard:

Tester Connection	Specified Condition
OCV+ (C2-1) - OCV- (C2-2)	Correct waveform is as shown

(c) Reconnect the OCV connector.

NG → **Go to step 13**

OK

6	INSPECT OIL CONTROL VALVE FILTER

OK: The filter is not clogged.

NG → **REPLACE OIL CONTROL VALVE FILTER**

OK

7	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV) **(See page 10-8 of Pub. No. RM925E COROLLA)**

OK: The OCV has no contamination and moves smoothly.

OK → **Go to step 9**

NG

8	REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV)

GO

9	INSPECT CAMSHAFT TIMING GEAR ASSY (See page 14-136 of Pub. No. RM925E COROLLA)

OK: The camshaft timing gear rotates smoothly when applying pressure.

OK	Go to step 11

NG

10	REPLACE CAMSHAFT TIMING GEAR ASSY

GO

11	CHECK FOR BLOCKAGE(OCV, OIL CHECK VALVE AND OIL HOLE)

OK: No blockage.

NG	REPAIR OR REPLACE

OK

12	CHECK IF DTC OUTPUT RECURS(DTC P1340 OR P1345)

(a) Clear DTC using the intelligent tester II (see page 05-220).
(b) Start the engine and warm it up.
(c) Drive the vehicle for 10 minutes or more.
(d) Connect the intelligent tester ll to the DLC3.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC / Pending codes.
(f) Read DTCs.

Standard: No DTC output.

OK	VVT SYSTEM OK

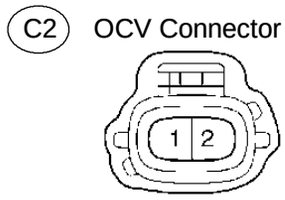
HINT:
DTC P1340 or P1345 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

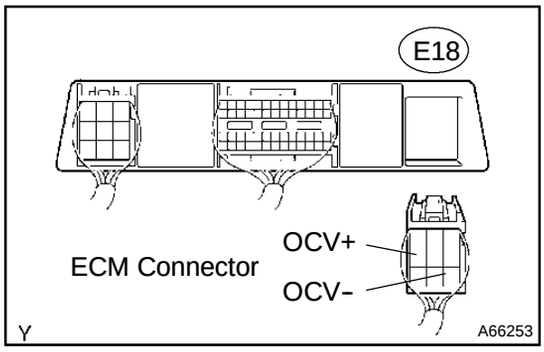
NG

CHECK FOR INTERMITTENT PROBLEMS

13	CHECK HARNESS AND CONNECTOR(CAMSHAFT TIMING OIL CONTROL VALVE (OCV) - ECM)

Wire Harness Side:





(a) Disconnect the C2 OCV connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
OCV (C2-1) - OCV+ (E18-4)	Below 1 Ω
OCV (C2-2) - OCV- (E18-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OCV (C2-1) or OCV+ (E18-4) - Body ground	10 kΩ or higher
OCV (C2-1) or OCV- (E18-3) - Body ground	10 kΩ or higher

(d) Reconnect the OCV connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P1346	VVT SENSOR/CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (BANK 1)

CIRCUIT DESCRIPTION

Refer to DTCs P1340 and P1345 on page 05-338.

DTC No.	DTC Detection Condition	Trouble Area
P1346	Open or short in Oil Control Valve (OCV) circuit (3 trip detection logic)	• Open or short in oil control valve circuit • Oil control valve • ECM

HINT:
This DTC is detected when the engine idles for approximately 2 minutes.

WIRING DIAGRAM

Refer to DTCs P1340 and P1345 on page 05-339.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE OCV)

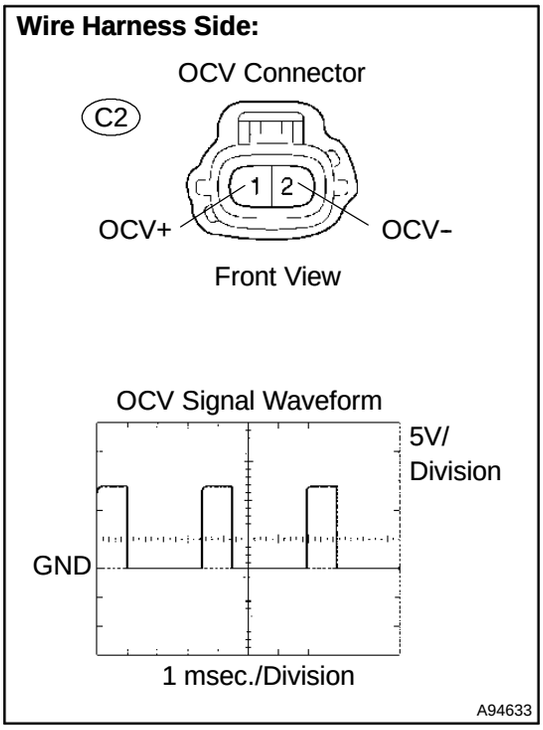
(a) Start the engine and warm it up.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Active Test / VVT Control (Bank 1).
(f) Check the engine speed when operating the OCV using the intelligent tester II.
Standard:

Tester Operation	Specified Condition	Proceed To
OCV is ON	Rough idling or engine stalling	A
OCV is ON	No change in engine speed	B

A → CHECK FOR INTERMITTENT PROBLEMS

B

2 INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV)



(a) Disconnect the C2 OCV connector.
(b) While running the engine at 2,000 rpm, check the waveform between the terminals of the C2 OCV connector using the oscilloscope.

Standard:

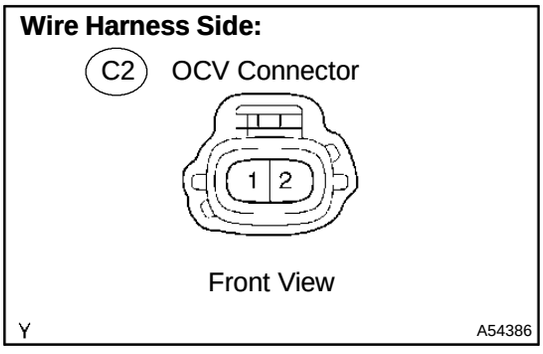
Tester Connection	Specified Condition
OCV+ (C2-1) - OCV- (C2-2)	Correct waveform is as shown

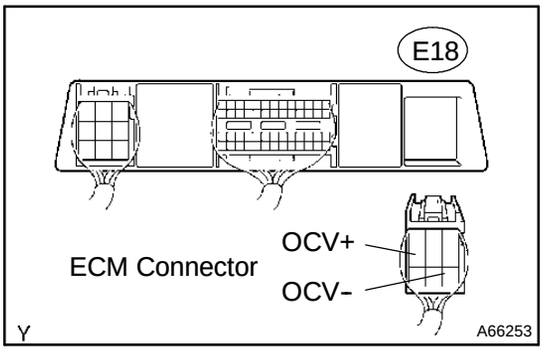
(c) Reconnect the OCV connector.

OK → **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY**

NG

3 CHECK HARNESS AND CONNECTOR(CAMSHAFT TIMING OIL CONTROL VALVE (OCV) - ECM)





(a) Disconnect the C2 OCV connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
OCV (C2-1) - OCV+ (E18-4)	Below 1 Ω
OCV (C2-2) - OCV- (E18-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OCV (C2-1) or OCV+ (E18-4) - Body ground	10 kΩ or higher
OCV (C2-1) or OCV- (E18-3) - Body ground	10 kΩ or higher

(d) Reconnect the OCV connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA)**

DTC	P1605	KNOCK CONTROL CPU MALFUNCTION

CIRCUIT DESCRIPTION

Refer to DTC P0327 on page 05-308.

DTC No.	DTC Detection Condition	Trouble Area
P1605	Knock control IC malfunction (3 trip detection logic)	• ECM

HINT:

DTC P1605 is detected when the vehicle is driven at approximately 120 km/h for approximately 1 minute or more (at an engine speed of 2,000 rpm or more, with an engine load of 40 % or more, and the transmission gear selector lever in the 5th position) after warm-up.

INSPECTION PROCEDURE

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

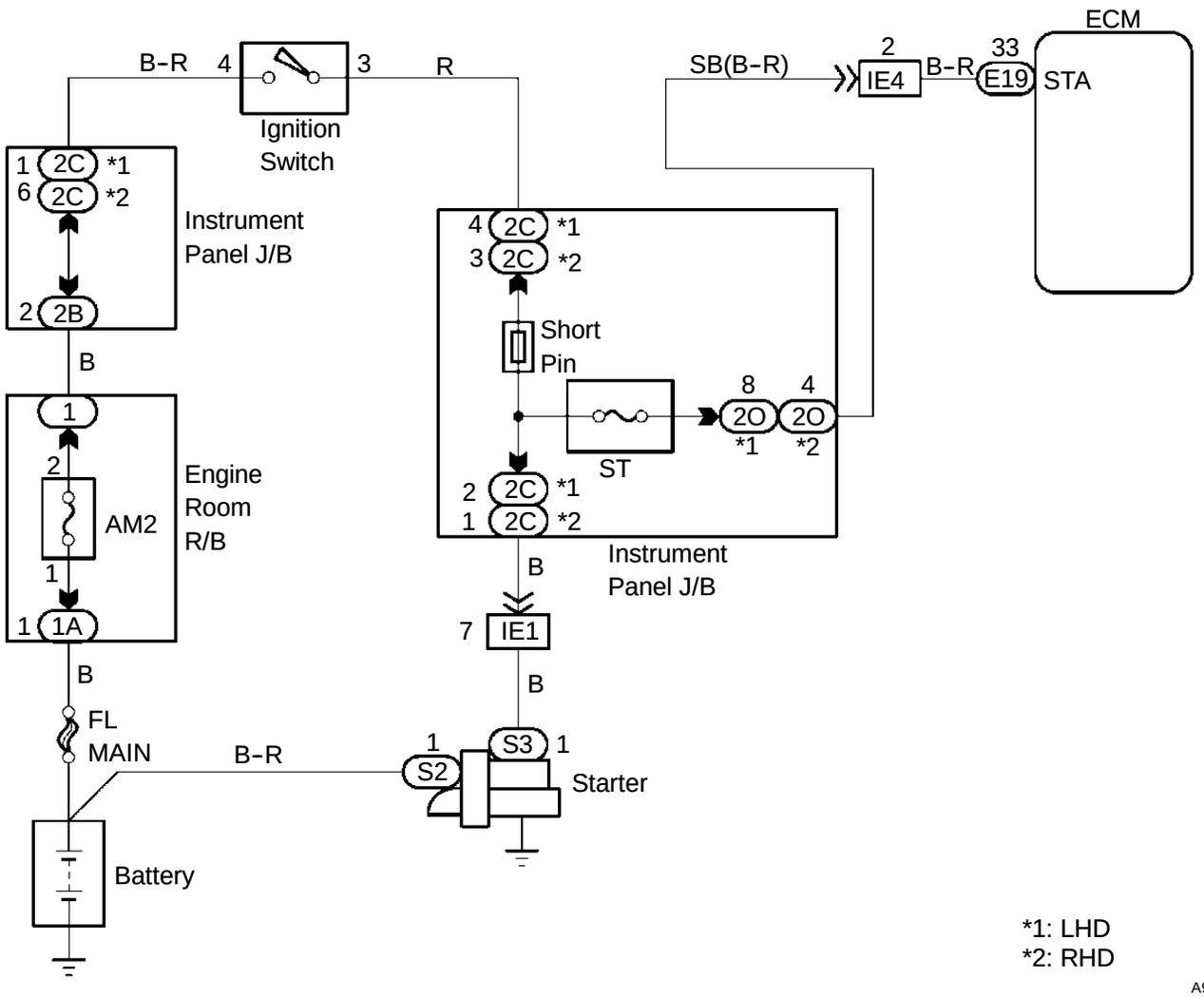
STARTER SIGNAL CIRCUIT

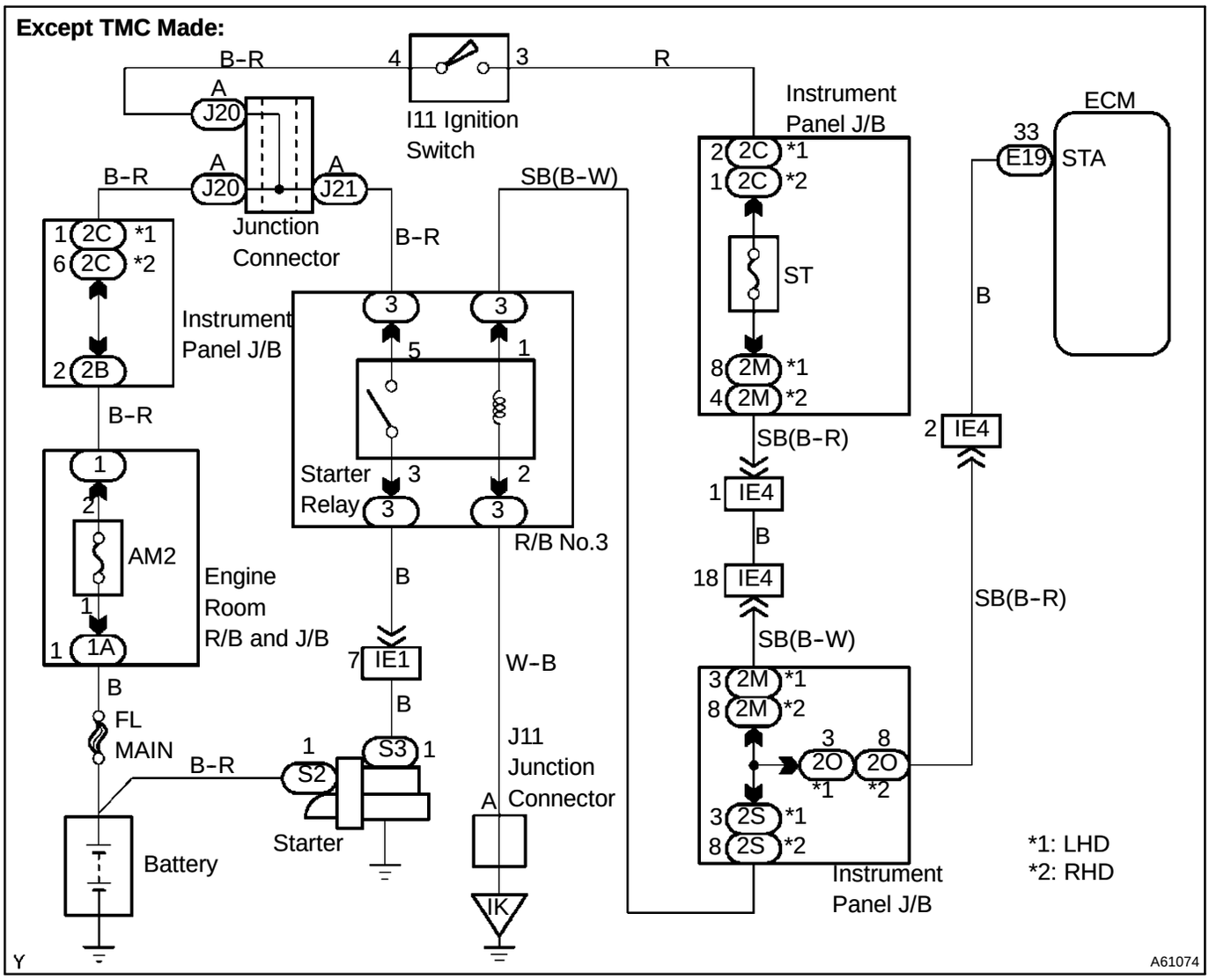
CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after-start injection control.

WIRING DIAGRAM

TMC Made:





INSPECTION PROCEDURE

1	READ VALUE USING INTELLIGENT TESTER II(STA SIGNAL)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Starter SIG.
(d) Check the result when the ignition switch is turned to the ON and START positions.

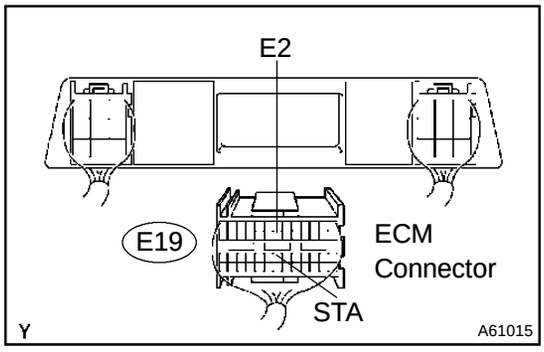
Standard:

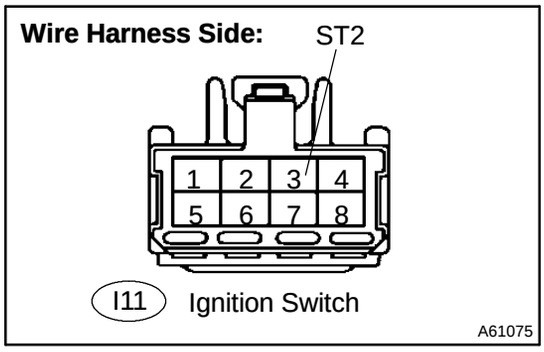
Ignition Switch Position	ON	START
STARTER SIG	OFF	ON

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE** **(See page 05-215)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - ST RELAY)





(a) Disconnect the E19 ECM connector.
(b) Disconnect the I11 ignition switch connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
STA (E19-33) - Ignition switch connector ST2 (I11-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
STA (E19-33) or Ignition switch connector ST2 (I11-3) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the ignition switch connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

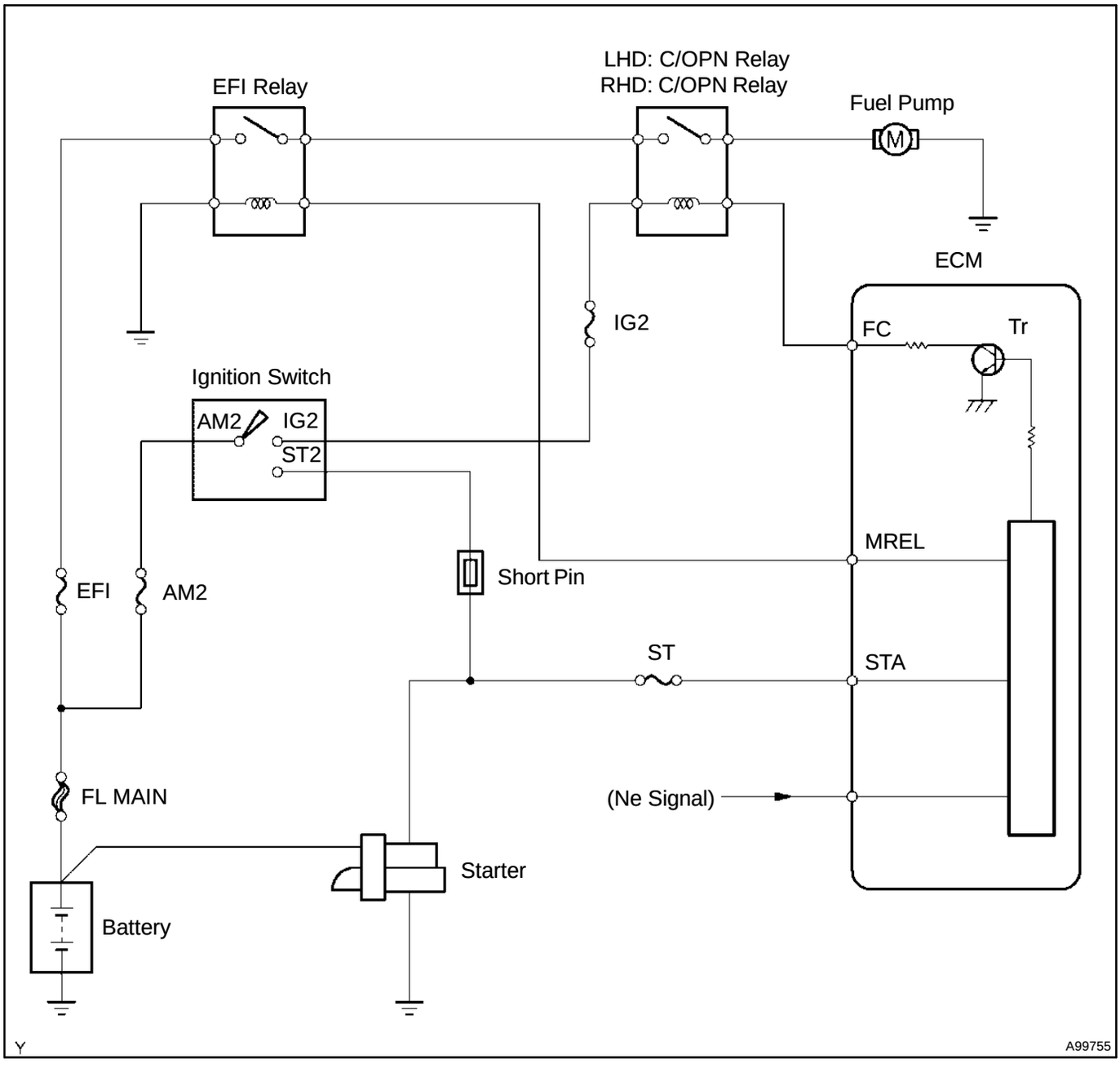
OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

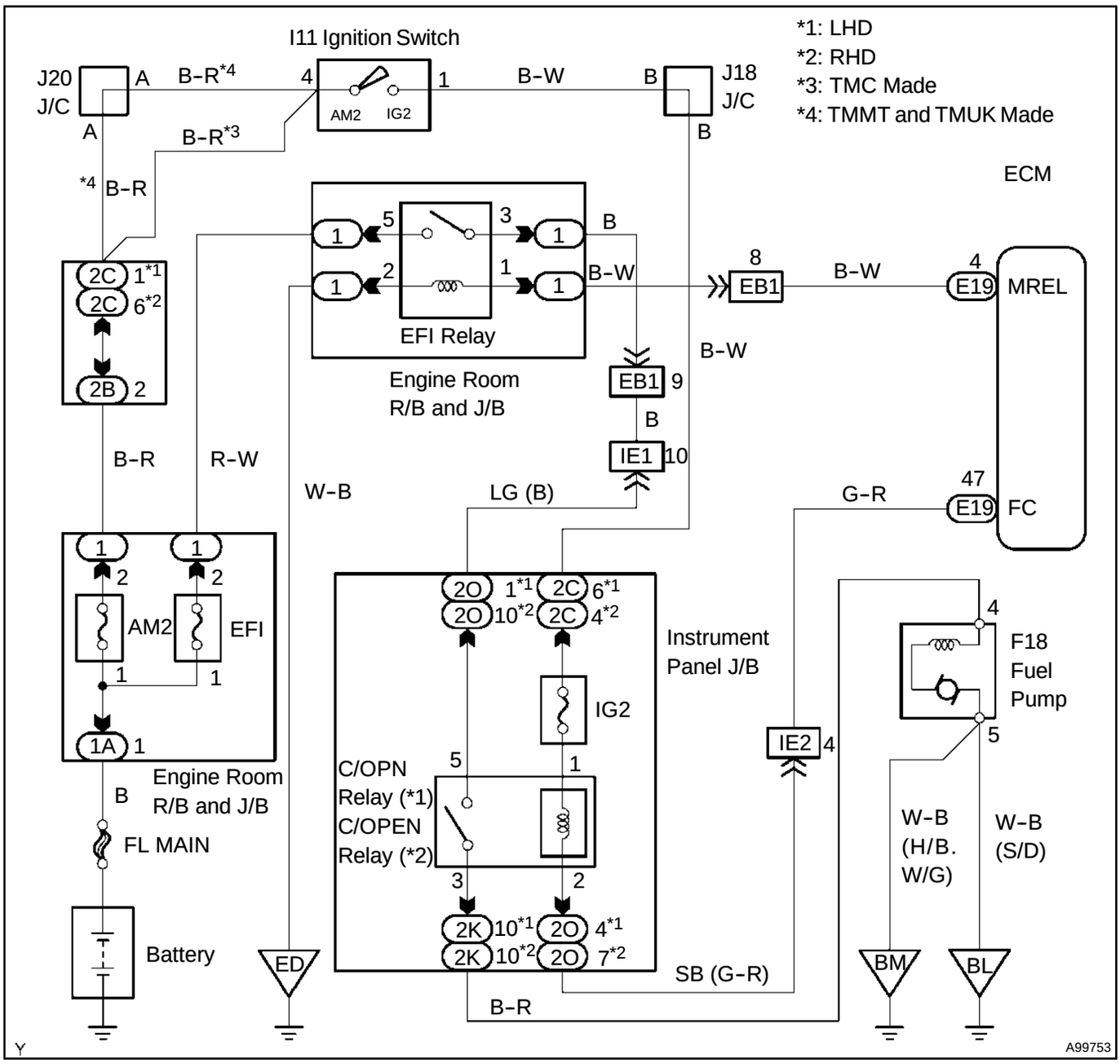
FUEL PUMP CONTROL CIRCUIT

CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, a current flows from terminal ST2 of the ignition switch to the starter relay coil and also a current flows to terminal STA of the ECM (STA signal).
When the STA signal and NE signal are transmitted to the ECM, the power transistor (Tr) is turned ON, a current flows to the coil of the circuit opening relay, the relay switches on, the power is supplied to the fuel pump and the fuel pump operates.
While the NE signal is generated (when engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE CIRCUIT OPENING RELAY)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel Pump Relay.
(d) Check the operation of the relay while operating it using the intelligent tester II.
Standard: Operating sounds can be heard from the relay.

OK	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-215)

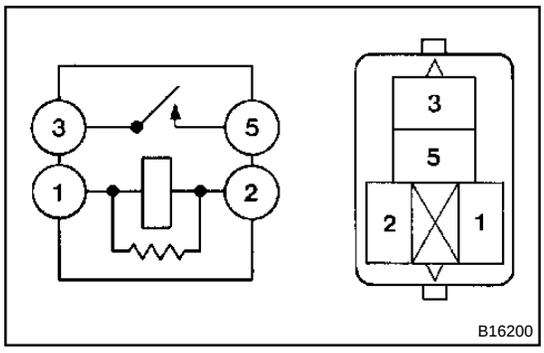
NG

2	CHECK ECM POWER SOURCE CIRCUIT (See page 05-357)

NG	REPAIR OR REPLACE POWER SOURCE CIRCUIT

OK

3	INSPECT CIRCUIT OPENING RELAY



(a) Remove the C8 circuit opening relay.
(b) Check the circuit opening relay resistance.
Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

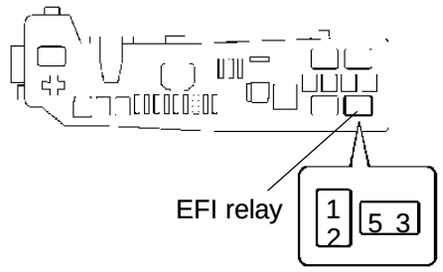
(c) Reinstall the circuit opening relay.

NG	REPLACE CIRCUIT OPENING RELAY

OK

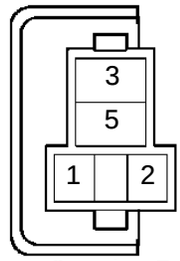
4	CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM, CIRCUIT OPENING RELAY - ECM, EFI RELAY - CIRCUIT OPENING RELAY)

Engine Room R/B:



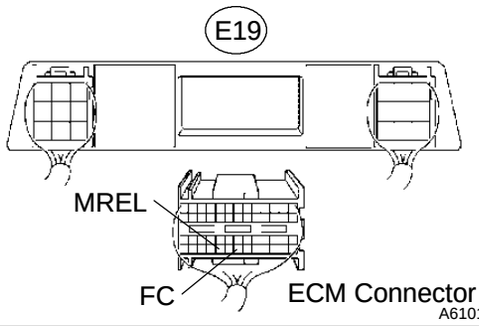
A63718

Instrument Panel J/B:



Circuit Opening Relay

A79099



A61015

(a) Remove the EFI relay from the engine room R/B.
(b) Remove the circuit opening relay from the instrument panel J/B.
(c) Disconnect the E19 ECM connector.
(d) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI relay holder (1) - MREL (E19-49)	Below 1 Ω
Circuit opening relay holder (2) - FC (E19-47)	Below 1 Ω
EFI relay holder (3) - Circuit opening relay holder (5)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI relay holder (1) or MREL (E19-49) - Body ground	10 kΩ or higher
Circuit opening relay holder (2) or FC (E19-47) - Body ground	10 kΩ or higher
EFI relay holder (3) or Circuit opening relay holder (5) - Body ground	10 kΩ or higher

(e) Reinstall the EFI relay.
(f) Reinstall the circuit opening relay.
(g) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

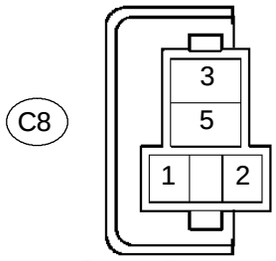
5	INSPECT FUEL PUMP (See page 11-7 of Pub. No. RM925E COROLLA)

NG → **REPAIR OR REPLACE FUEL PUMP**

OK

6	CHECK HARNESS AND CONNECTOR(CIRCUIT OPENING RELAY - FUEL PUMP, FUEL PUMP - BODY GROUND)

Instrument Panel J/B:



Circuit Opening Relay

A79099

Wire Harness Side:

F18 Fuel Pump Connector



Front View

A66276

(a) Remove the circuit opening relay from the instrument panel J/B.
(b) Disconnect the F18 fuel pump connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Circuit opening relay holder (C8-3) - Fuel pump (F18-4)	Below 1 Ω
Fuel pump (F18-5) - Body ground	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Circuit opening relay holder (C8-3) or Fuel pump (F18-4) - Body ground	10 kΩ or higher

(d) Reinstall the circuit opening relay.
(e) Reconnect the fuel pump connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

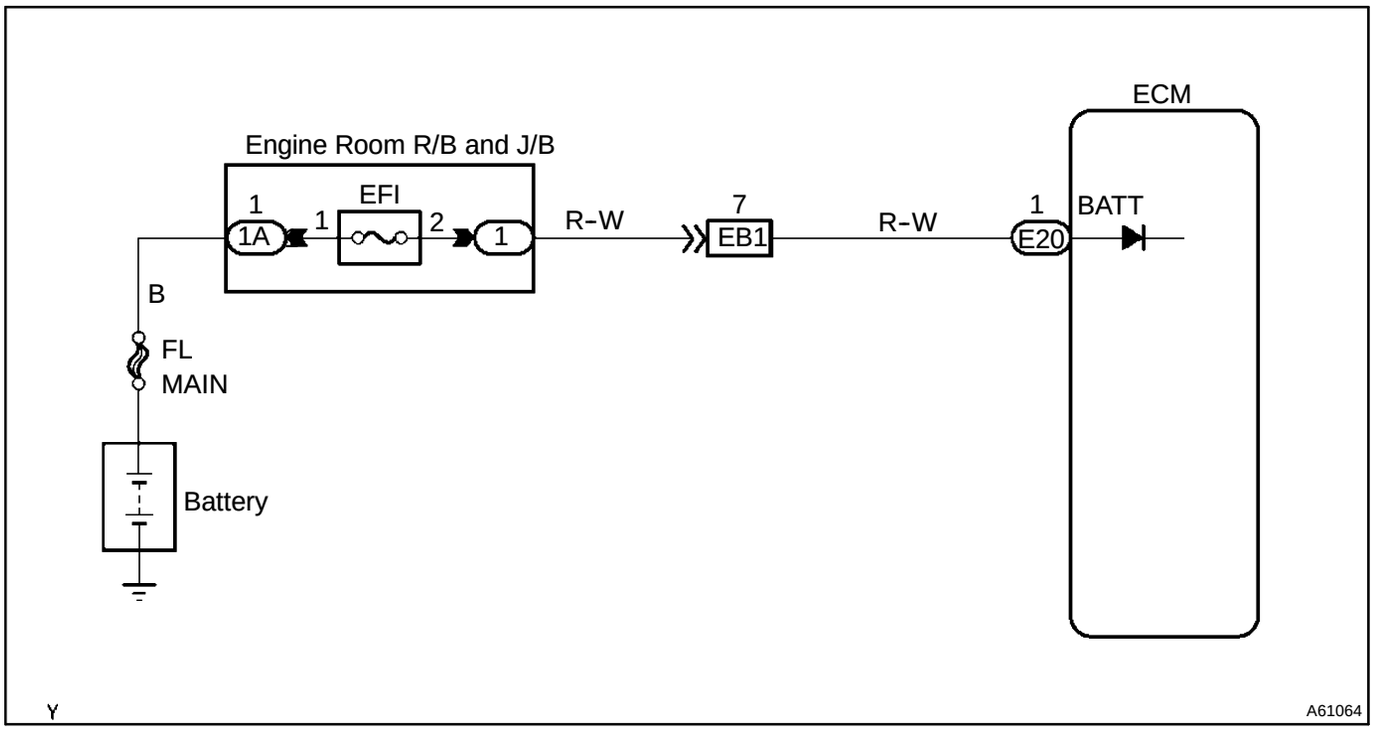
REPLACE ECM (See page 11-8 of Pub No. RM1039E COROLLA)

ECM BACK-UP POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

The battery supplies electricity to terminal BATT of the ECM even when the ignition switch is OFF. This electricity allows the ECM to store DTC histories, freeze frame data, fuel trim values, and other data.

WIRING DIAGRAM



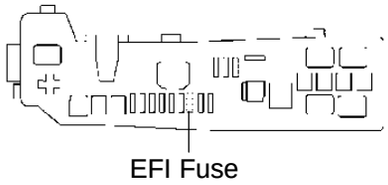
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK FUSE

Engine Room R/B:



(a) Remove the EFI fuse from the engine room R/B.

(b) Check the EFI fuse resistance.

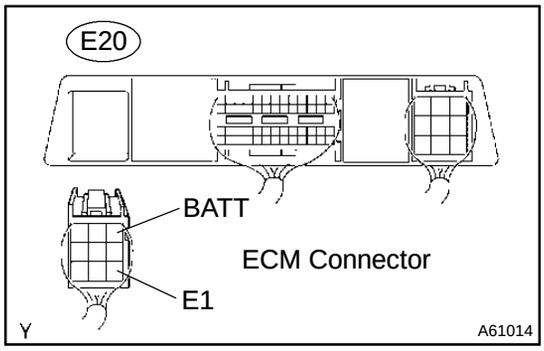
Standard: Below 1 Ω

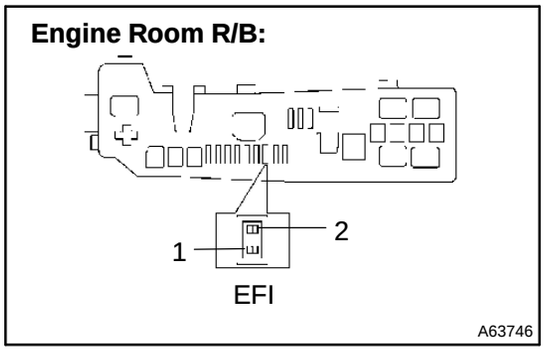
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED TO FUSE**

OK

2 CHECK HARNESS AND CONNECTOR





(a) Disconnect the battery cable.
(b) Disconnect the E20 ECM connector.
(c) Remove the EFI fuse.
(d) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
BATT (E20-1) - EFI fuse holder (2)	Below 1 Ω
EFI fuse holder (1) - Battery positive cable	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
BATT (E20-1) or EFI fuse holder (2) - Body ground	10 kΩ or higher

(e) Reconnect the battery cable.
(f) Reconnect the ECM connector.
(g) Install the EFI fuse.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

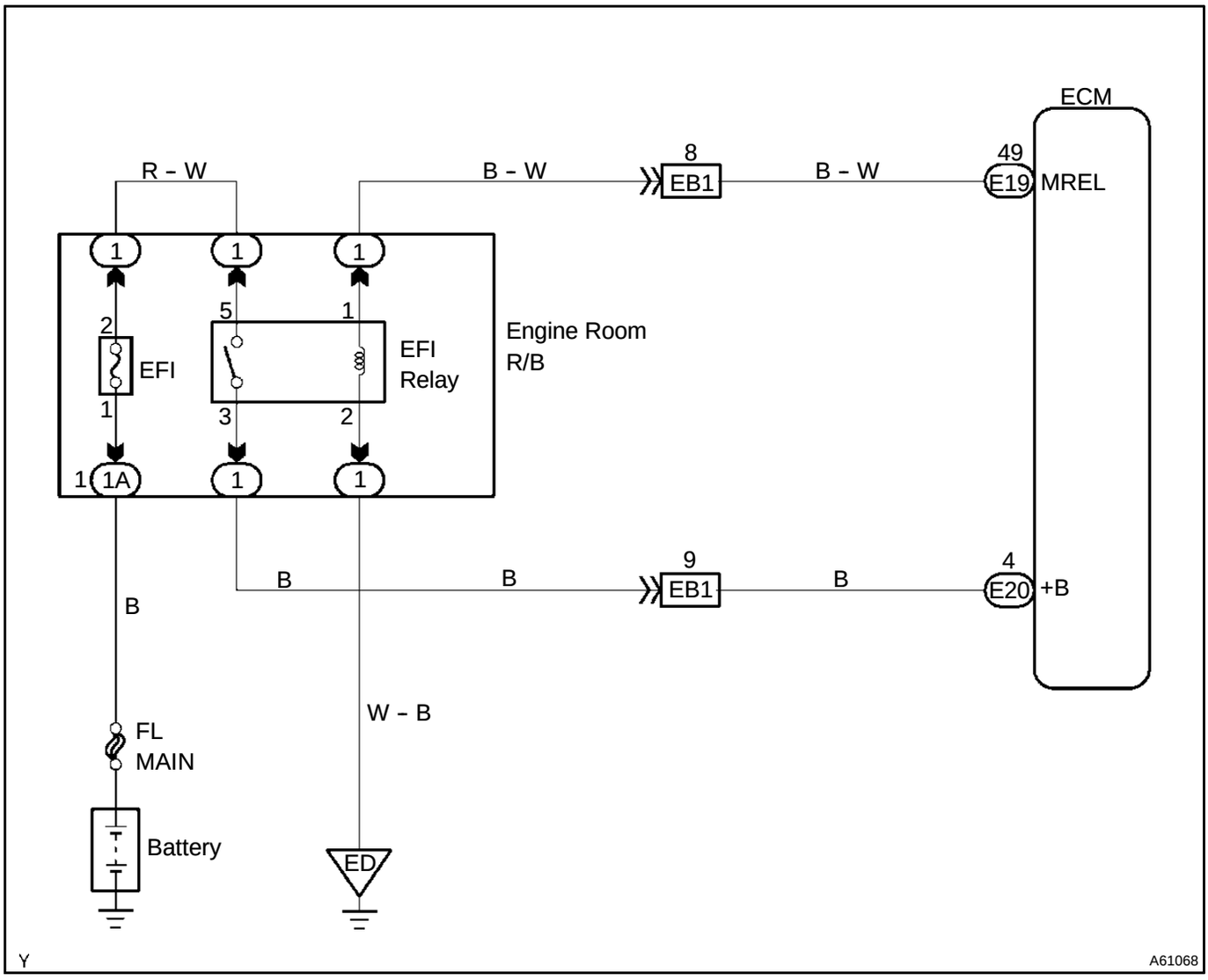
CHECK AND REPLACE ENGINE ROOM RELAY BLOCK

ECM POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

When the ignition switch is turned to ON, the battery voltage is applied to terminal IGSW of the ECM. The ECM "MREL" output signal causes a current to flow to the coil, closing the contacts of the EFI relay and supplying power to terminal +B of the ECM.

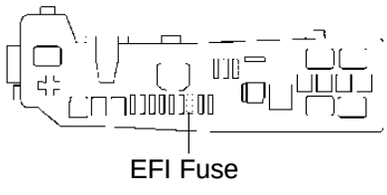
WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK FUSE(EFI FUSE)

Engine Room R/B:



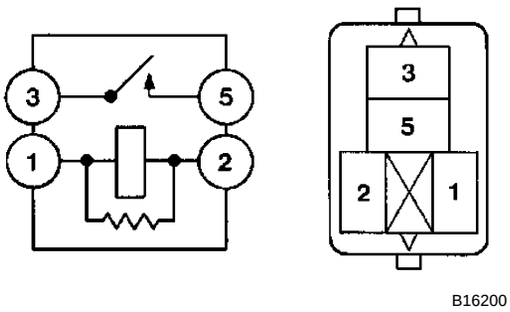
A63745

(a) Remove the EFI fuse from the engine room R/B.
(b) Check the EFI fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED TO FUSE**

OK

2 INSPECT EFI RELAY



B16200

(a) Remove the EFI relay from the engine room R/B.
(b) Check the EFI relay resistance.
Standard:

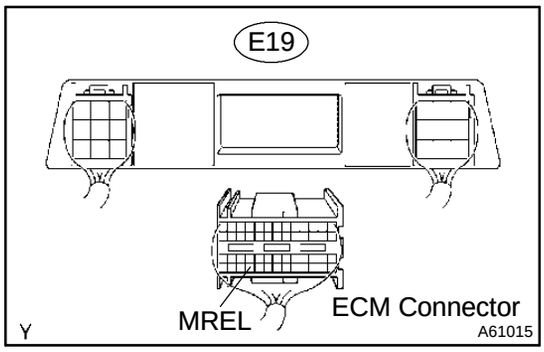
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

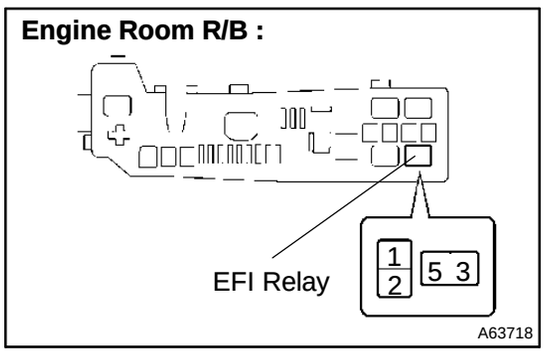
(c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

3	CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM, EFI RELAY - BODY GROUND)





(a) Check the harness and connectors between the ECM and the EFI relay.
(1) Remove the EFI relay from the engine room R/B.
(2) Disconnect the E19 ECM connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
MREL (E19-49) - EFI relay holder (1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
MREL (E19-49) or EFI relay holder (1) - Body ground	10 kΩ or higher

(4) Reinstall the EFI relay.
(5) Reconnect the ECM connector.

(b) Check the harness and connector between the EFI relay and the body ground.
(1) Remove the EFI relay from the engine room R/B.
(2) Check the resistance.

Standard (Check for open):

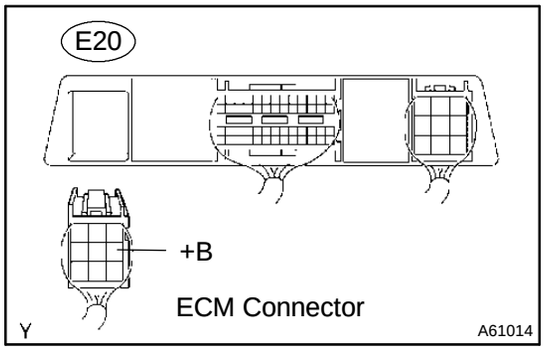
Tester Connection	Specified Condition
EFI relay holder (2) - Body ground	Below 1 Ω

(3) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM)



(a) Disconnect the E20 ECM connector.
(b) Remove the EFI relay from the engine room R/B.
(c) Check the resistance.

Standard (Check for open):

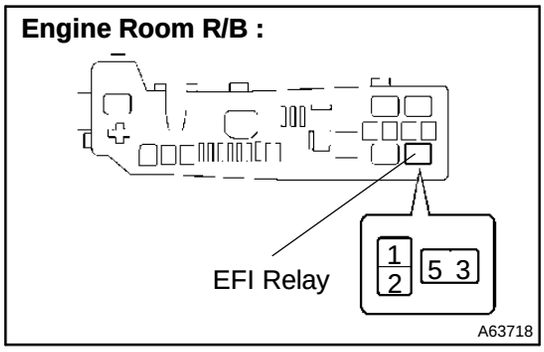
Tester Connection	Specified Condition
+B (E20-4) - EFI relay holder (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (E20-4) or EFI relay holder (3) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reinstall the EFI relay.

Engine Room R/B :



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

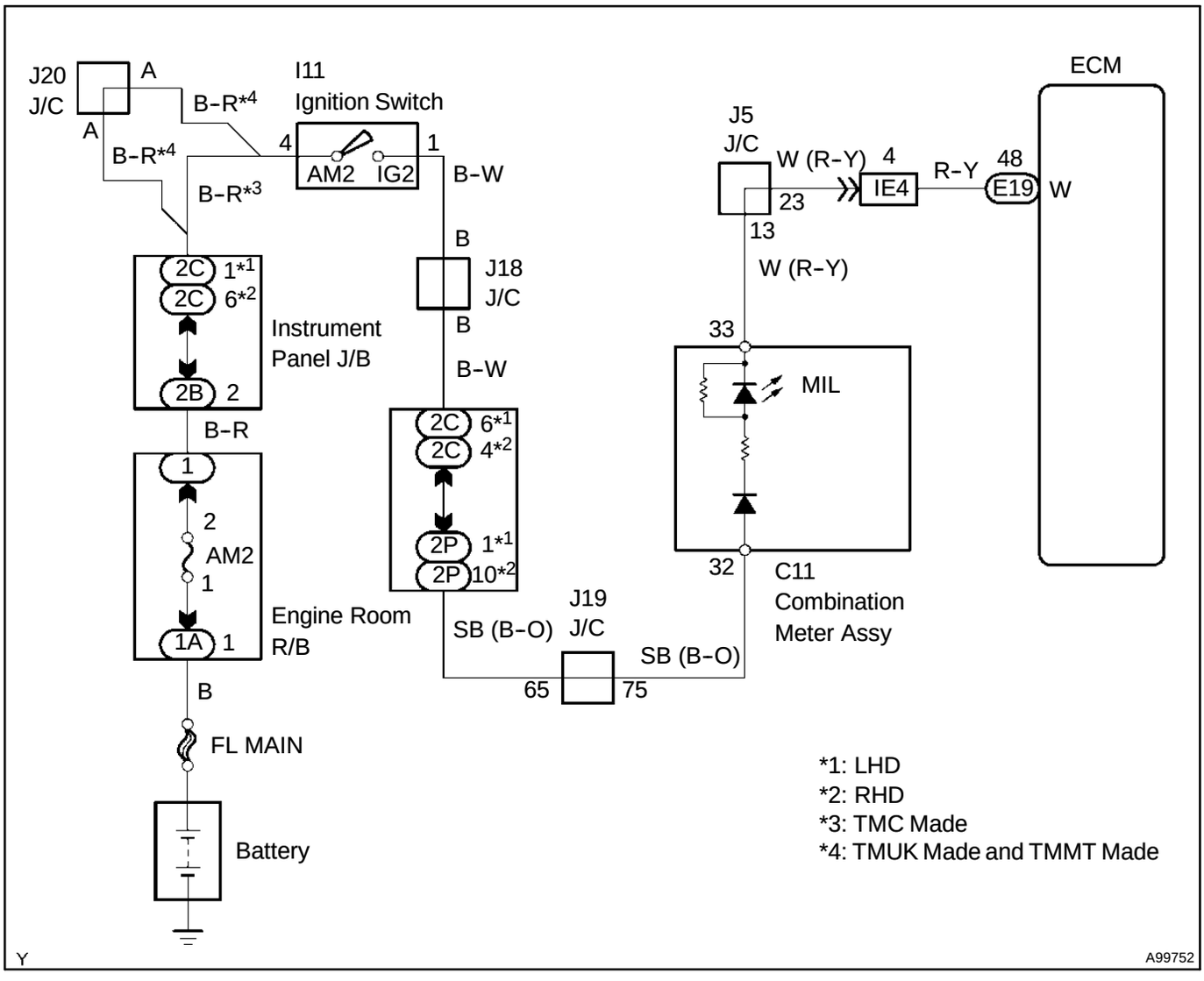
CHECK AND REPAIR HARNESS AND CONNECTOR (TERMINAL +B OF ECM - BATTERY TERMINAL)

MIL CIRCUIT

CIRCUIT DESCRIPTION

The MIL (Malfunction Indicator Lamp) is used to indicate vehicle malfunction detections by the ECM.
By turning the ignition switch to ON, the power is supplied to the MIL circuit, and the ECM provides the circuit ground that illuminates the MIL.
Operation of the MIL should be checked visually:
When the ignition switch is first turned to ON, the MIL should be illuminated. If it is always OFF or ON, use the intelligent tester II and follow the procedure below to determine cause of the problem.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Troubleshoot each trouble symptom in accordance with the table below.

Reference:

Result	Proceed To
MIL remains on	Start inspection from step 1
MIL is not illuminated	Start inspection from step 3

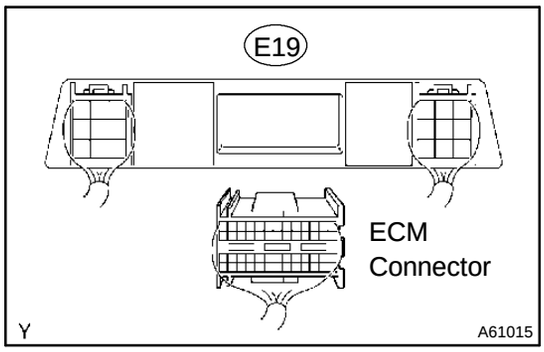
1	CHECK IF MIL TURNS OFF

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Check if DTCs have been stored. Note down if there are DTCs.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(f) Clear DTC.
(g) Check if the MIL turns off.
Standard: The MIL should turn off.

OK	REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page 05-226)

NG

2	CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT IN WIRE HARNESS)



(a) Disconnect the E19 ECM connector.
(b) Turn the ignition switch to ON.
(c) Check that the MIL is not illuminated.
Standard: The MIL is not illuminated.
(d) Reconnect the ECM connector.

OK	REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA)

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

3	CHECK IF MIL ILLUMINATES

(a) Check if the MIL illuminates when turning the ignition switch to ON.
Standard: The MIL should illuminate.

OK	NORMAL

NG

4	INSPECT COMBINATION METER ASSY(MIL CIRCUIT)

(a) See the combination meter troubleshooting procedure on page.

NG	REPAIR OR REPLACE BULB OR COMBINATION METER ASSEMBLY

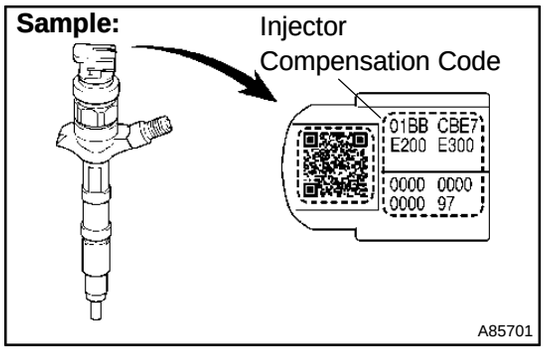
OK

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)

ECD SYSTEM (1CD-FTV)

PRECAUTION

05DVP-06



1. INJECTOR COMPENSATION CODE

(a) Each injector has different fuel injection characteristics. In order to optimize fuel injection performance, the ECM compensates for these differences by adjusting the fuel injection duration of each injector according to its compensation code. Injector compensation codes are unique, 30-digit-alphanumeric codes printed on the head portion of each injector.

(b) When an injector is replaced, the injector's compensation code must be input into the ECM. When the ECM is changed, all of the existing injector compensation codes must be input into the new ECM (see page 05-384, 05-389).

(c) If an incorrect injector compensation code is input into the ECM, the engine assembly may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

2. PROBLEM SYMPTOMS TROUBLESHOOT

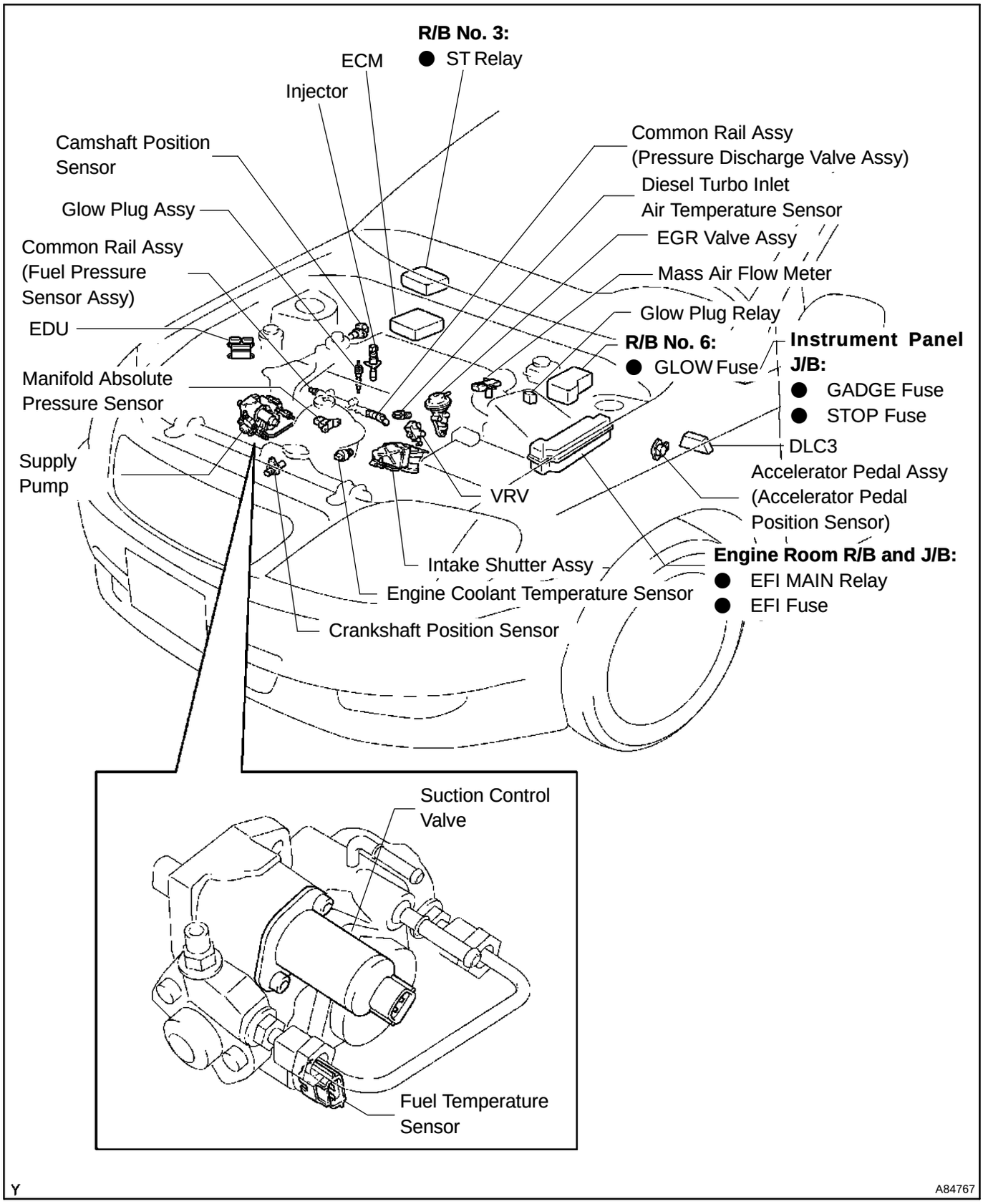
HINT:

If the customer's problem description is applicable to one of the following problems, refer to the troubleshooting on the pages shown below:

Symptoms	Conditions	See Page
Engine difficult to start or stalling	• Engine difficult to start with cold engine • Engine difficult to start with warm engine • Engine stalls soon after starting • Any condition other than those listed above	05-566
Black smoke emitted	• When idling • When driving	05-576
Rough idling or excessive engine vibration	• Abnormal initial idling • High engine idling speed • Low engine idling speed	05-589
Lack of power or hesitation	• Hunting with cold engine • Hunting with warm engine • Surging with cold engine • Surging with warm engine • Poor acceleration • Poor driveability	05-602
Engine knocking or rattling	• When idling • When driving	05-620

054JE-24

LOCATION

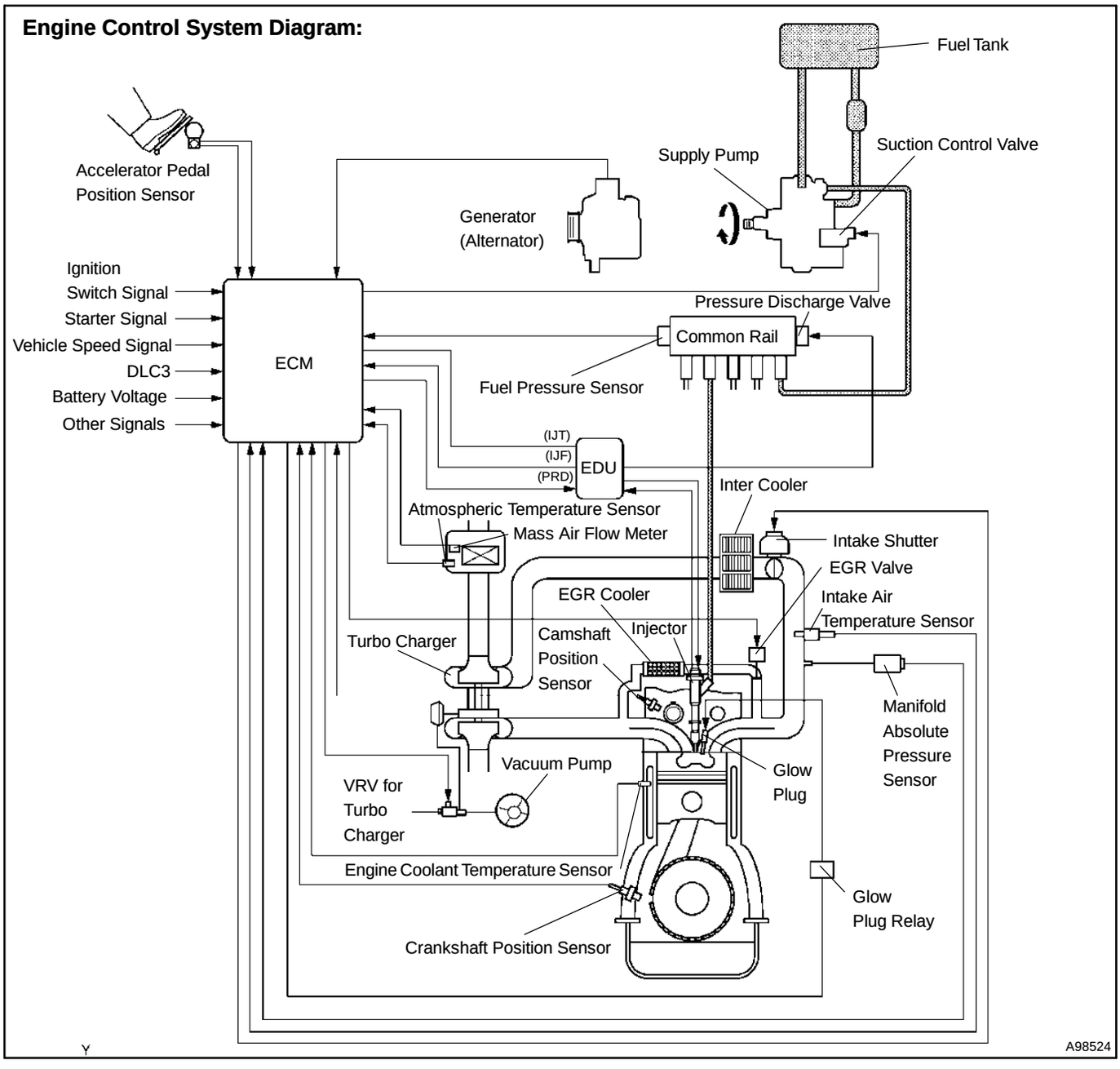


05LG4-02

SYSTEM DESCRIPTION

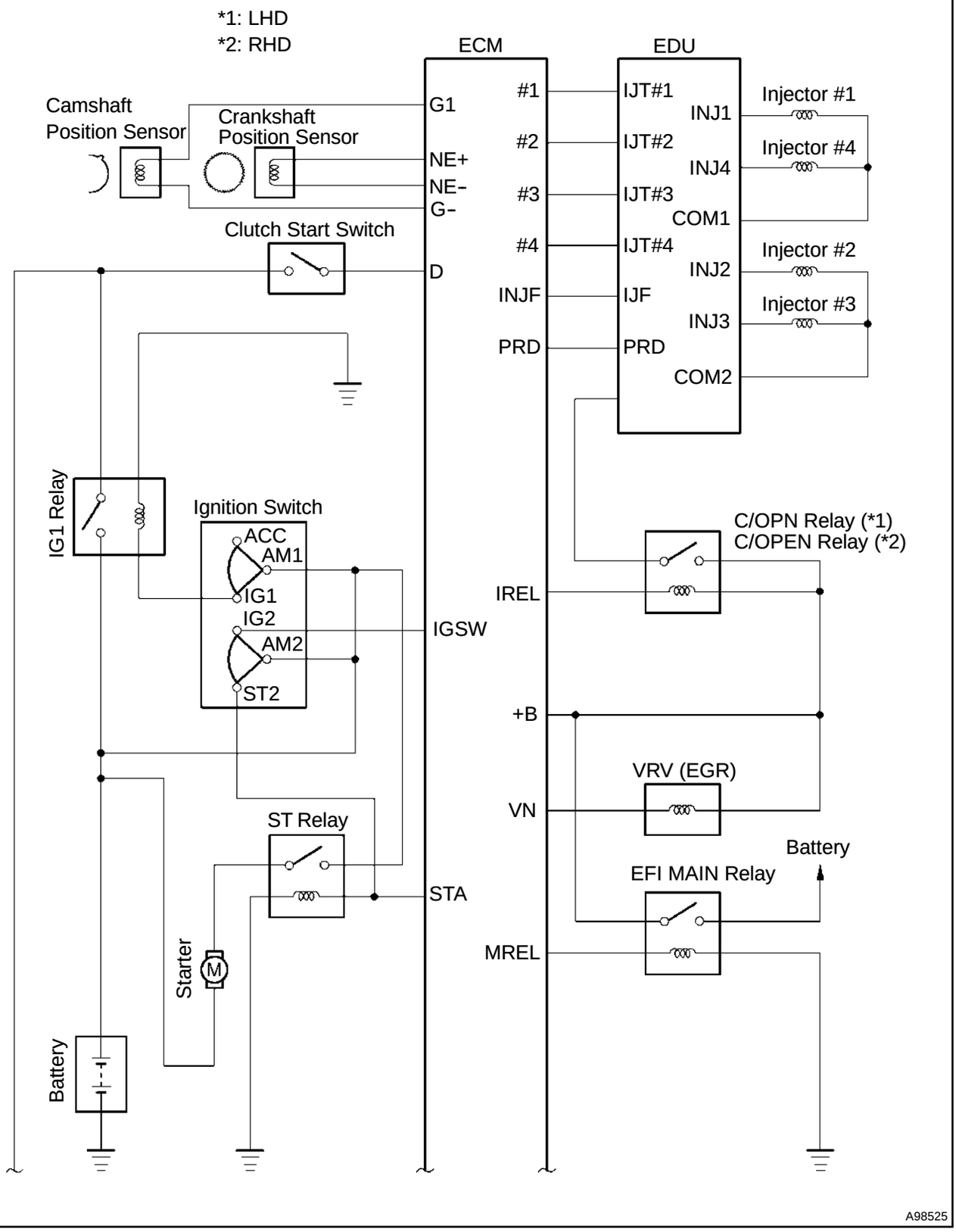
1. ENGINE CONTROL SYSTEM

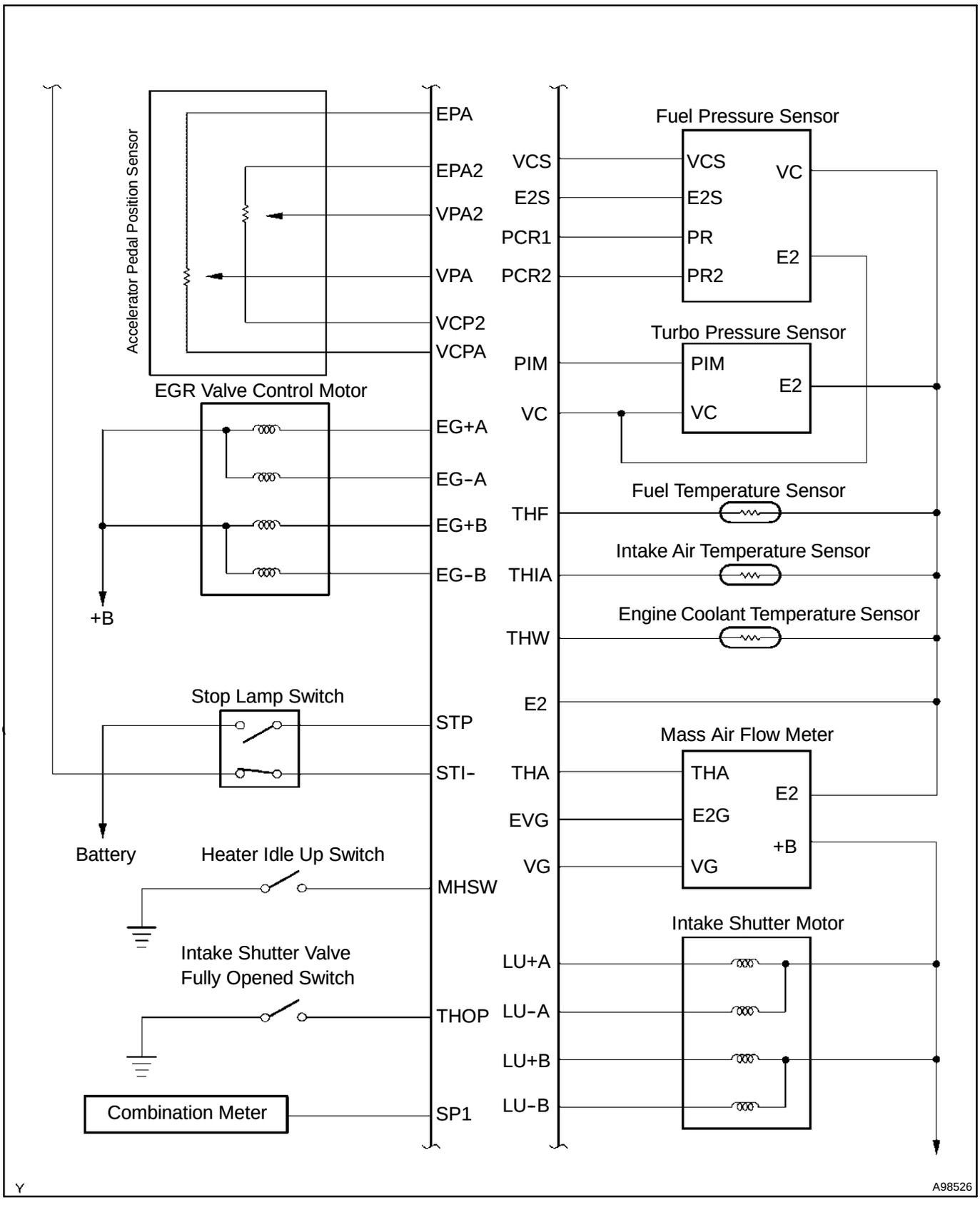
Engine Control System Diagram:

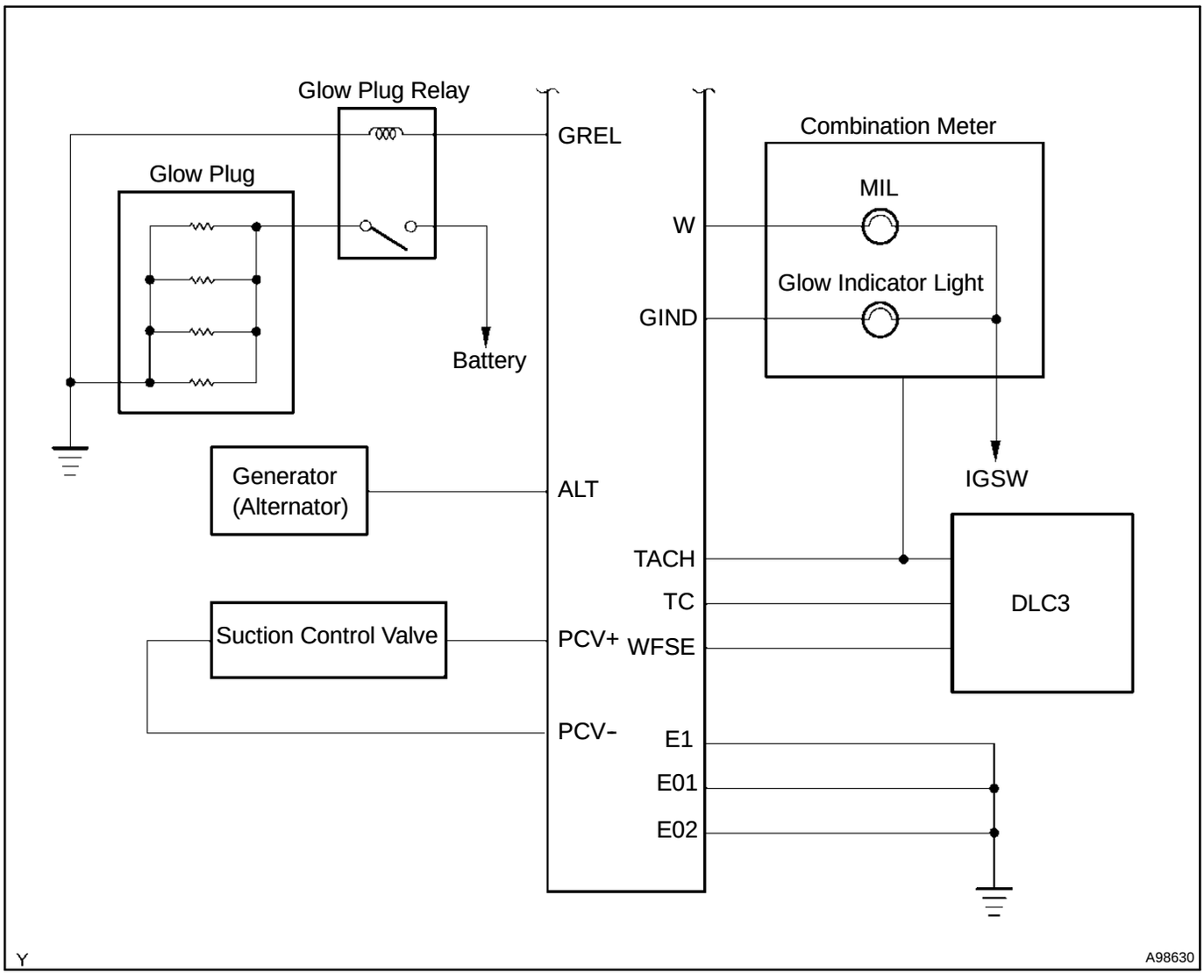


2. ECM WIRING DIAGRAM

ECM Wiring Diagram:




Accelerator Pedal Position Sensor
EPA
EPA2
VPA2
VPA
VCP2
VCPA
EGR Valve Control Motor
EG+A
EG-A
EG+B
EG-B
+B
Stop Lamp Switch
STP
STI-
Battery
Heater Idle Up Switch
MHSW
Intake Shutter Valve
Fully Opened Switch
THOP
Combination Meter
SP1
Fuel Pressure Sensor
VCS
E2S
PCR1
PCR2
VC
E2
PR
PR2
Turbo Pressure Sensor
PIM
VC
E2
Fuel Temperature Sensor
THF
Intake Air Temperature Sensor
THIA
Engine Coolant Temperature Sensor
THW
E2
Mass Air Flow Meter
THA
EVG
VG
E2G
+B
Intake Shutter Motor
LU+A
LU-A
LU+B
LU-B
Y
A98526


Glow Plug Relay
Glow Plug
Battery
GREL
Combination Meter
MIL
W
Glow Indicator Light
GIND
IGSW
Generator
(Alternator)
ALT
TACH
TC
WFSE
DLC3
Suction Control Valve
PCV+
PCV-
E1
E01
E02
Y
A98630

3. COMMON RAIL SYSTEM DESCRIPTION

(a) COMMON RAIL SYSTEM:

The common rail system uses highly-pressurized fuel for improved fuel economy and to provide robust engine power, while suppressing engine vibration and noise.

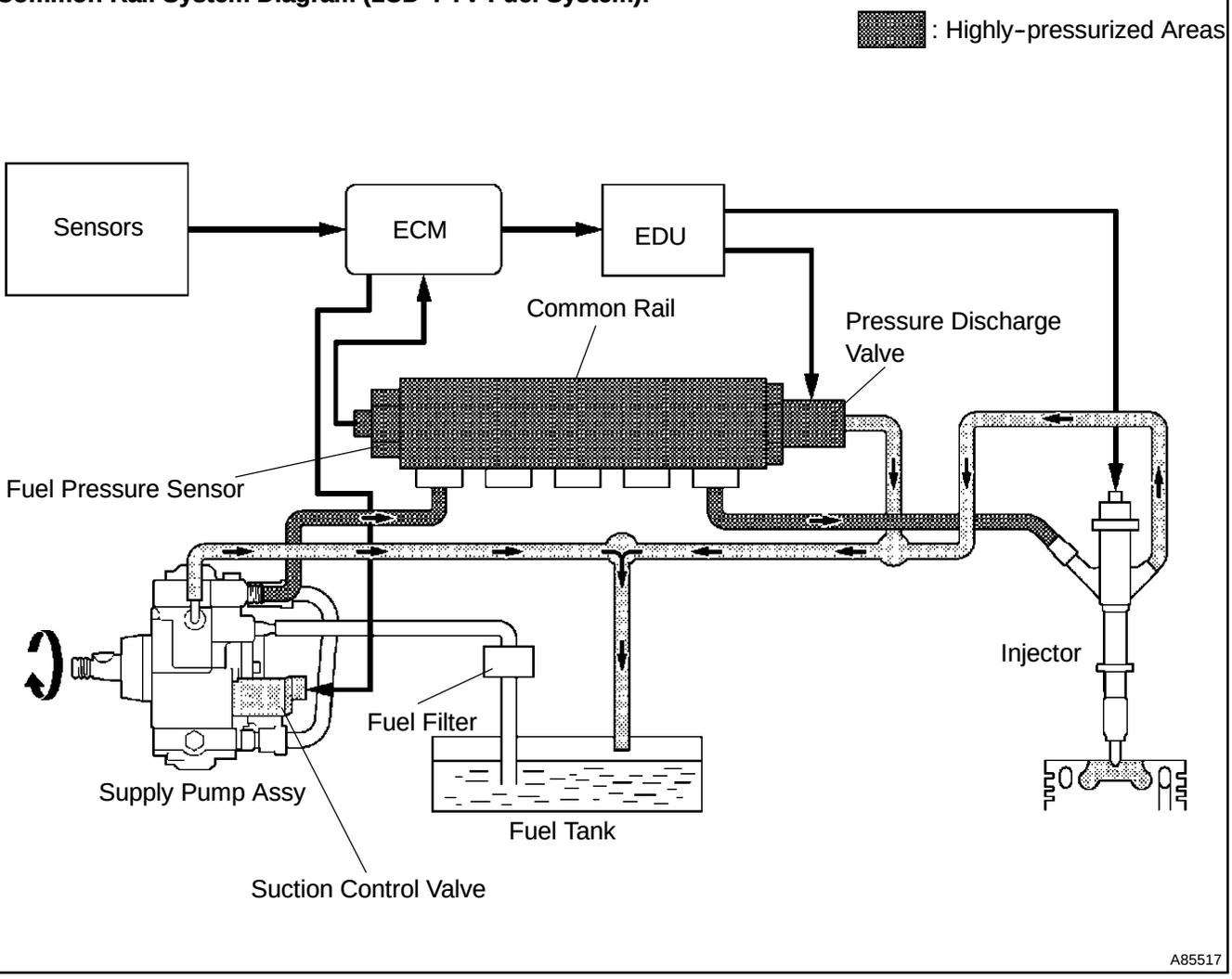
This system stores fuel, which has been pressurized and supplied by the supply pump, in the common rail. By storing fuel at high-pressure, the common rail system can provide fuel at stable fuel injection pressures, regardless of engine speed or engine load.

The ECM provides an electric current to the solenoid valve in the injector, using the EDU, to regulate the fuel injection timing and volume, and also monitors the internal fuel pressure of the common rail using the fuel pressure sensor. The ECM causes the supply pump to supply the fuel necessary to obtain the target fuel pressure, approximately 30 to 180 MPa (306 to 1,835 kgf/cm^2, 4,351 to 26,106 psi).

In addition, this system uses the Two-Way Valve (TWV) inside the injector to open and close the fuel passage. Therefore, both fuel injection time and fuel injection volume can be precisely regulated by the ECM.

The common rail system provides two split fuel injections. In order to soften combustion shock, this system performs "pilot-injection" as the subsidiary fuel injection prior to the main fuel injection. This helps to reduce engine vibration and noise.

Common Rail System Diagram (1CD-FTV Fuel System):



(b) COMMON RAIL SYSTEM COMPONENTS:

Component	Description
Common rail	Stores high-pressure fuel produced by supply pump
Supply pump	Operated by crankshaft. Supplies high-pressure fuel to common rail
Injector	Injects fuel to combustion chamber based on signals from ECM
Fuel pressure sensor	Monitors internal fuel pressure of common rail and sends signals to ECM
Pressure discharge valve	Based on signals from ECM, opens valve when sudden deceleration is occurred, or when ignition switch is to OFF to prevent fuel pressure from becoming too high
Suction control valve	Based on signals from ECM, adjusts fuel volume supplied to common rail and regulates internal fuel pressure

(c) DIAGNOSTICS TROUBLE CODES (DTCS) TABLE FOR COMMON RAIL SYSTEM:

HINT:

This table indicates typical DTC combinations for each malfunction occurrence.

( ): Potential DTCs

DTC No.	A	B	C	D	E	F	G	H	I	J	K	L
P0087 (See page 05-420)				●								
P0088 (See page 05-427)					(●)		(●)	(●)	(●)			
P0093 (See page 05-434)	(●)	●			(●)	●					(●)	●
P0190 (See page 05-420)				●								
P0191 (See page 05-470)				●								
P0192 (See page 05-420)				●								
P0193 (See page 05-420)				●								
P0200 (See page 05-471)	●										(●)	
P0627 (See page 05-522)								●				
P1229 (See page 05-427)					(●)			●	●			
P1238 (See page 05-525)	●	●	●								(●)	
P1271 (See page 05-529)					●						(●)	
P1272 (See page 05-529)					●		●				(●)	

Trouble Area	Malfunction	Refer To
Injector	Open or short in injector circuit	A
	Stuck open	B
	Stuck closed	C
Fuel pressure sensor	Open or short in fuel pressure sensor circuit or pressure sensor output fixed	D
Pressure discharge valve	Open or short in pressure discharge valve circuit	E
	Stuck open	F
	Stuck closed	G
Suction control valve	Open or short in suction control valve circuit	H
	Stuck open	I
	Stuck closed	J
EDU	Faulty EDU	K
Common rail system (Fuel system)	Fuel leaks from high-pressure areas	L

(d) DIAGNOSTICS TROUBLE CODE DESCRIPTION FOR COMMON RAIL SYSTEM:

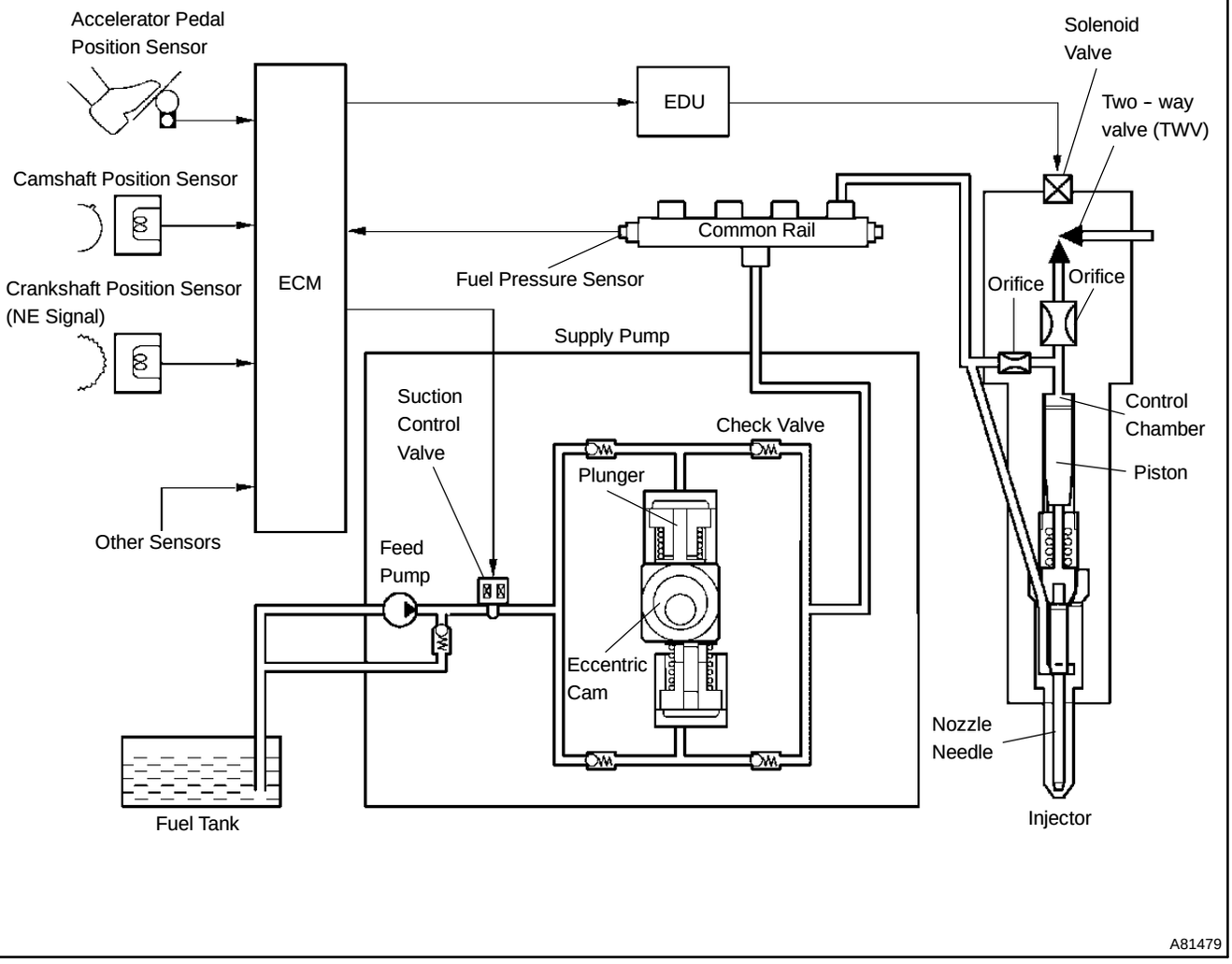
DTC No.	Description
P0087	Fuel pressure sensor output does not change
P0088	Internal fuel pressure too high (200 MPa [2,039 kgf/cm^2, 29,007 psi] or more)
P0093	Fuel leaks from high-pressure areas
P0190	Open or short in fuel pressure sensor circuit (Low or high output)
P0191	Fuel pressure sensor output out of range (Low output)
P0192	Open or short in fuel pressure sensor circuit (High output)
P0193	Open or short in fuel pressure sensor circuit (Sensor 1 and/or 2 relation)
P0200	Open or short in EDU or injector circuit
P0627	Open or short in suction control valve circuit
P1229	Fuel over-feed
P1238	Injection malfunction, other than open or short in injector circuit
P1271	Open or short in pressure discharge valve circuit
P1272	Closed malfunction of pressure discharge valve

4. INJECTION CONTROL SYSTEM DESCRIPTION

The ECM controls the fuel injection system by using the injectors and supply pump. The ECM regulates the fuel injection volume and fuel injection timing by controlling both the duration and timing of energization to the solenoid valve in the injector. The ECM regulates injection pressure by controlling the suction control valve located in the supply pump.

The feed pump is used to pump fuel from the fuel tank to the supply pump.

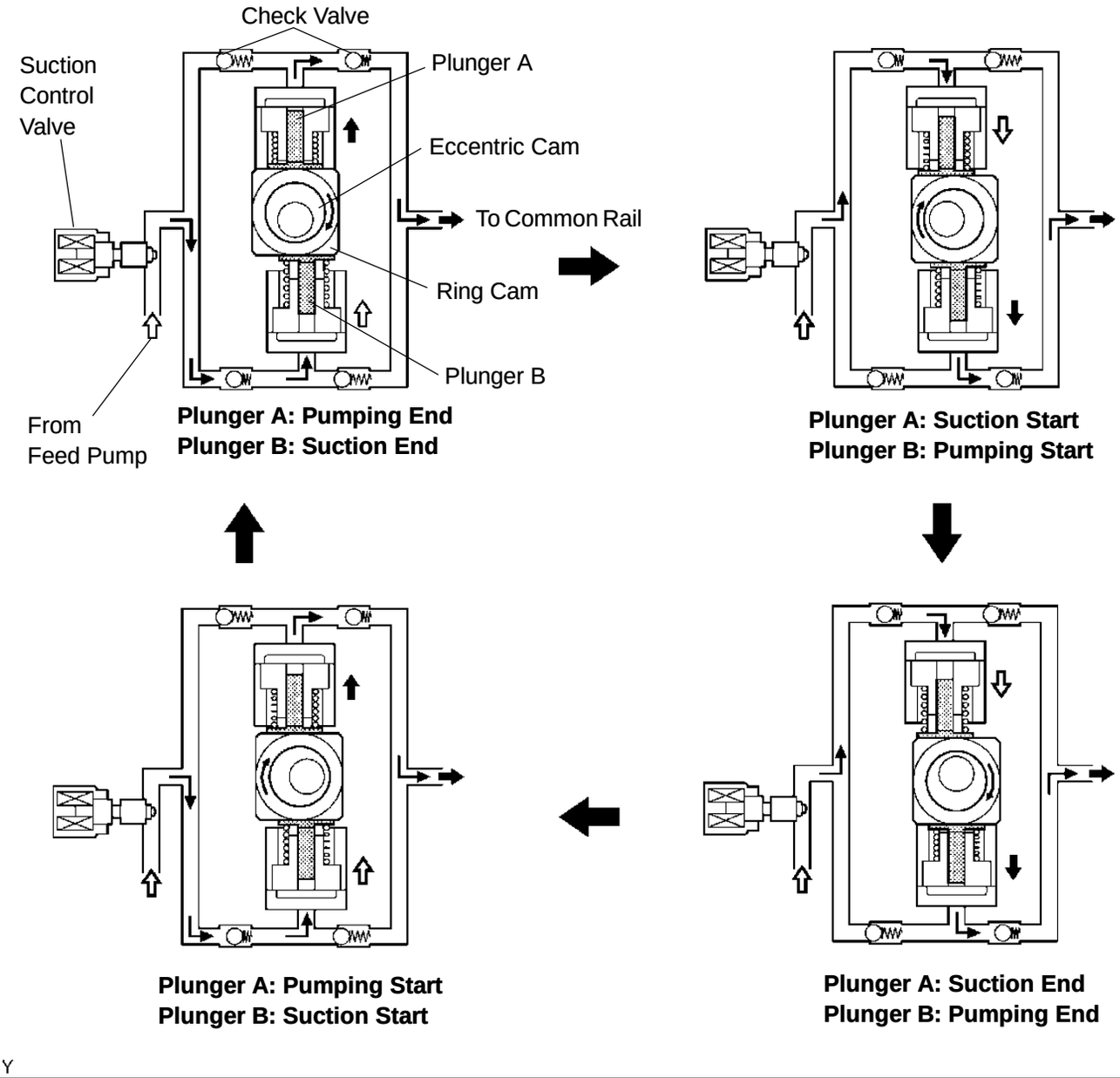
Injection Control Diagram:



5. SUPPLY PUMP OPERATION SYSTEM DESCRIPTION

The rotation of the eccentric cam causes the ring cam to push plunger A upward as illustrated below. The spring force pulls plunger B (located opposite plunger A) upward. As a result, plunger B draws the fuel in, and plunger A pumps the fuel out at the same time.

Supply Pump Operation Diagram:



6. SUCTION CONTROL VALVE OPERATION SYSTEM DESCRIPTION

HINT:

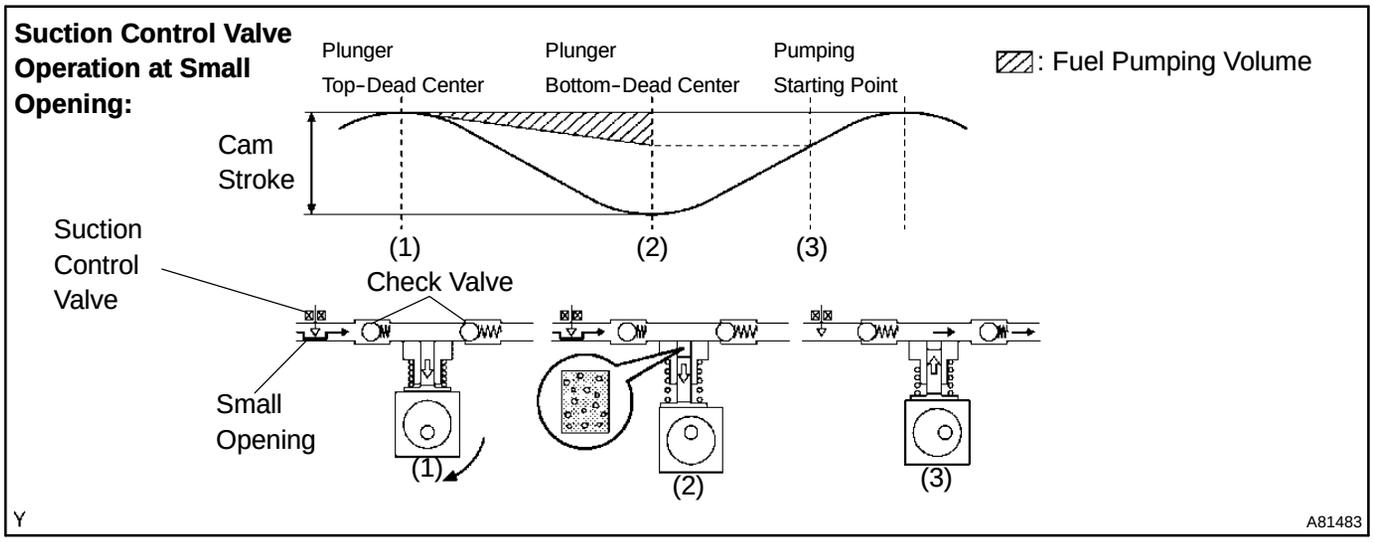
The ECM controls the suction control valve operation to regulate the fuel volume that is pumped by the supply pump to the common rail. This control is performed to adjust the internal fuel pressure of the common rail to the targeted injection pressure.

(a) Small opening of the suction control valve:

(1) When the opening of the suction control valve is small, the fuel suction path is kept narrow. Therefore the transferable fuel volume is reduced.

(2) The suction volume becomes small due to the narrow path despite the plunger stroke being full. The difference between the geometrical volume and suction volume creates a vacuum.

(3) Pumping will start at the time when the fuel pressure becomes higher than the common rail pressure.

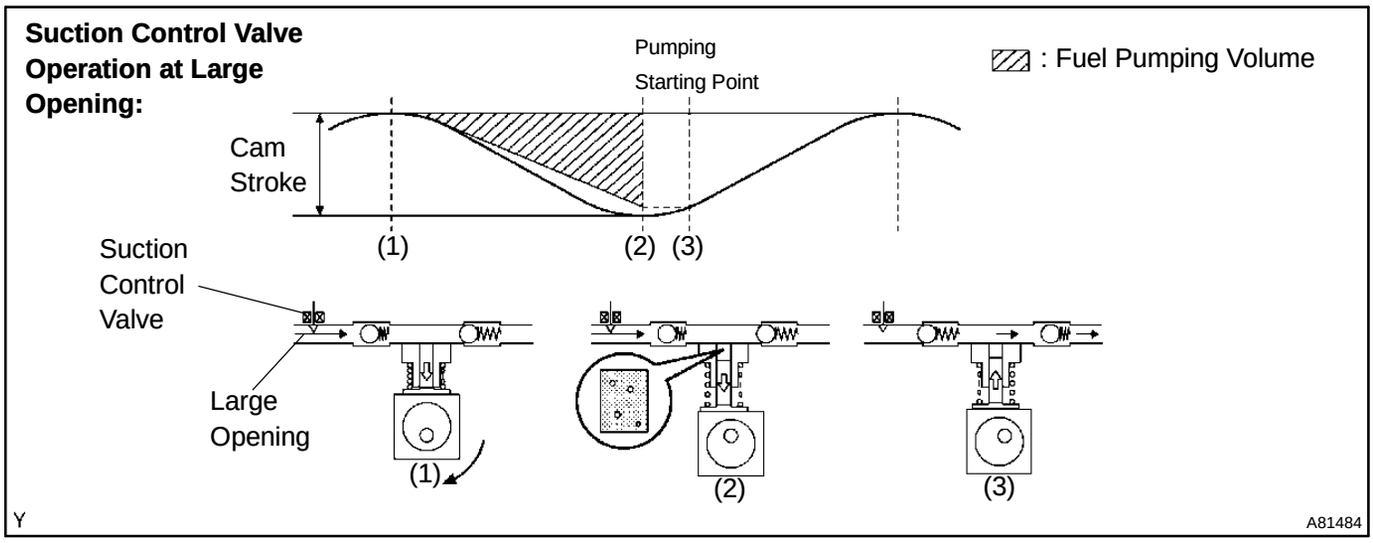


(b) Large opening of the suction control valve:

(1) When the opening of the suction control valve is large, the fuel suction path is kept wide. Therefore the transferable fuel volume is increased.

(2) If the plunger stroke is full, the suction volume becomes large because of the wide path.

(3) Pumping will start at the time when the fuel pressure becomes higher than the common rail pressure.



054JB-29

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester II can be used at steps 3, 4, 5, 7 and 10.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS (See page 05-379)

NEXT

3	CONNECT INTELLIGENT TESTER II TO DLC3

HINT:
If the display indicates a communication fault in the tester, inspect the DLC3.

NEXT

4	CHECK DTC AND FREEZE FRAME DATA (See page 05-404)

HINT:
Record or print DTCs and freeze frame data, if necessary.

NEXT

5	CLEAR DTC AND FREEZE FRAME DATA (See page 05-404)

NEXT

6	CONDUCT VISUAL INSPECTION

NEXT

7	SET CHECK MODE DIAGNOSIS (See page 05-405)

NEXT

8	CONFIRM PROBLEM SYMPTOMS

HINT:
If the engine does not start, perform steps 10 and 12 first.

Result	Proceed To
Malfunction does not occur	A
Malfunction occurs	B

B → GO TO STEP 10

A

9	SIMULATE SYMPTOMS

NEXT

10	CHECK DTC (See page 05-404)

Result	Proceed To
Malfunction code	A
No code	B

B → GO TO STEP 12

A

11	REFER TO DTC CHART (See page 05-412)

NEXT

GO TO STEP 14

12	CONDUCT BASIC INSPECTION (See page 05-381)

Result	Proceed To
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

13	REFER TO PROBLEM SYMPTOMS TABLE (See page 05-395)

HINT:
If the customer's problem description is applicable to one of the following problems, refer to the troubleshooting on the pages shown below:

Symptoms	Conditions	See Page
Engine difficult to start or stalling	• Engine difficult to start with cold engine • Engine difficult to start with warm engine • Engine stalls soon after starting • Any condition other than those listed above	05-566
Black smoke emitted	• When idling • When driving	05-576
Rough idling or excessive engine vibration	• Abnormal initial idling • High engine idling speed • Low engine idling speed	05-589
Lack of power or hesitation	• Hunting with cold engine • Hunting with warm engine • Surging with cold engine • Surging with warm engine • Poor acceleration • Poor driveability	05-602
Engine knocking or rattling	• When idling • When driving	05-620

Result	Proceed To
Malfunctioning circuit confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

14	CHECK ECM POWER SOURCE CIRCUIT (See page 05-552)

NEXT

15	CONDUCT CIRCUIT INSPECTION

Result	Proceed To
Malfunction not confirmed	A
Malfunction confirmed	B

B → GO TO STEP 18

A

16	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

NEXT

GO TO STEP 18

17	CONDUCT PARTS INSPECTION

NEXT

18	IDENTIFY PROBLEM

NEXT

19	ADJUST AND/OR REPAIR

NEXT

20	CONDUCT CONFIRMATION TEST

NEXT

END

054JC-31

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Driver's Name		VIN	
Date Vehicle Brought in		Production Date	
License Plate No.		Odometer Reading	km miles

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

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

Condition of MIL (Malfunction Indicator Lamp)		☐ Remains on	☐ Sometimes lights up ☐ Does not light up
DTC Inspection	Normal mode (Pre-check)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freeze frame data ( )
	Check Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freeze frame data ( )

05DVY-07

CHECK FOR INTERMITTENT PROBLEMS

HINT:

Inspect the vehicle's ECM using check mode. Intermittent problems are easier to detect with an intelligent tester II when the ECM is in check mode. In check mode, the ECM uses 1 trip detection logic, which is more sensitive to malfunctions than normal mode (default), that uses 2 trip detection logic.

(a) Clear DTCs (see page 05-404).

(b) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05-405).

(c) Perform a simulation test (see page 01-21).

(d) Check and wiggle the harness(es), connector(s) and terminal(s) (see page 01-31).

05I7H-06

BASIC INSPECTION

When a malfunction is not confirmed by the DTC (Diagnostic Trouble Code) check, troubleshooting should be carried out in all circuits considered to be possible causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location of the problem can be found quickly and efficiently. Therefore, using this check is essential when engine troubleshooting.

1	CHECK BATTERY VOLTAGE

NOTICE:
Carry out this check with the engine stopped and ignition switch OFF.

	OK	NG
Voltage	11 V or more	Less than 11 V

NG → **CHARGE OR REPLACE BATTERY**

OK

2	CHECK IF ENGINE WILL CRANK

NG → **PROCEED TO PROBLEM SYMPTOMS TABLE** **ON PAGE 05-395**

OK

3	CHECK AIR FILTER

(a) Visually check that the air filter is not excessively contaminated with dirt or oil.

NG → **CLEAN OR REPLACE**

OK

4	CHECK FUEL QUALITY

(a) Check that only diesel fuel has been used.
(b) Check that the fuel does not contain any impurities.

NG → **REPLACE FUEL**

OK

5	CHECK FUEL FOR AIR

NG → **BLEED FUEL OF AIR**

OK

6	CHECK FUEL PIPES AND HOSES

(a) Check that the fuel pipes and fuel hoses are not blocked, damaged, disconnected and bent.

NG → REPAIR OR REPLACE

OK

7	CHECK FUEL FILTER FOR BLOCKAGE

NG → REPAIR OR REPLACE

OK

8	CHECK ENGINE OIL (See page 17-10 of Pub. No. RM925E COROLLA)

NG → ADD OR REPLACE

OK

9	CHECK ENGINE COOLANT (See page 16-3 of Pub. No. RM1039E COROLLA Supplement)

NG → ADD OR REPLACE ENGINE COOLANT (See page 16-3 of Pub. No. RM1039E COROLLA Supplement)

OK

10	CHECK IDLING SPEED AND MAXIMUM SPEED (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE INJECTION OR SUPPLY PUMP ASSY (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)

OK

11	CHECK DIAGNOSTIC CIRCUIT

NG → REPAIR OR REPLACE

OK

12	CHECK VACUUM PUMP

NG → REPAIR OR REPLACE VACUUM PUMP

OK

PROCEED TO PROBLEM SYMPTOMS TABLE (See page 05-395)

05L6N-03

READING REGISTERED DATA

NOTICE:

- **When an injector is replaced, the injector's compensation code must be input into the ECM. When the ECM is changed, all of the existing injector compensation codes must be input into the new ECM.**
- **An injector compensation code is unique. The 30-digit alphanumeric code imprinted on the head portion of an injector is its compensation code. If an incorrect injector compensation code is input into the ECM, the engine assembly may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.**

1. After replacing the injector(s) with a new one(s), input the compensation code(s) of the injector(s) into the ECM as follows:

(a) Input the compensation code(s), which is/are imprinted on the head portion(s) of the new injector(s), to the intelligent tester II.
(b) Input the new compensation code(s) into the ECM using the tester (see page 05-389).
(c) Turn the tester OFF and then turn the ignition switch to OFF.
(d) Wait for at least 30 seconds.
(e) Turn the ignition switch to ON and then turn the tester ON.
(f) Clear DTC P1601 stored in the ECM using the tester (see page 05-404).

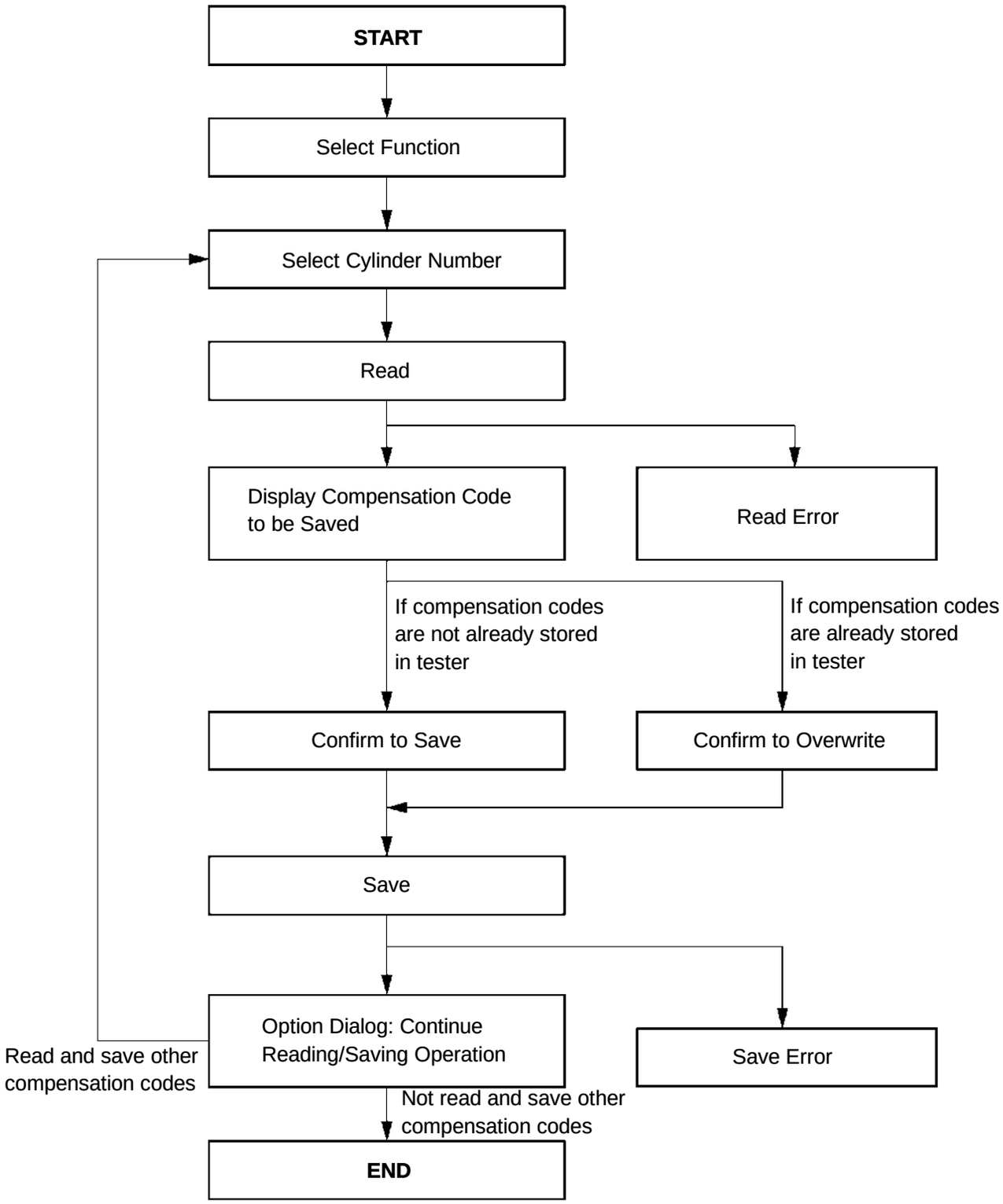
2. When you replace the ECM with a new one, input all the injectors' compensation codes into the new ECM as follows:

(a) Prior to replacing the ECM, read and save each injector's compensation code, stored in the original ECM, using the intelligent tester II (see page 05-385).
(b) After installing a new ECM, input the saved compensation codes into the new ECM using the tester (see page 05-389).
(c) Turn the tester OFF and then turn the ignition switch to OFF.
(d) Wait for at least 30 seconds.
(e) Turn the ignition switch to ON and then turn the tester ON.
(f) Clear DTC P1601 stored in the ECM using the tester (see page 05-404).

HINT:

- Each injector has different fuel injection characteristics. In order to optimize the fuel injections, the ECM uses the compensation codes to balance the different fuel injections between each injector.
- When you first turn the ignition switch to ON after replacing the ECM or an injector(s), DTC P1601 is set. This is to inform you that an injector compensation code(s) is/are required to be registered. Manually clear the DTC upon completion of the compensation code registration.

How to Read and Save Injector Compensation Codes Using Intelligent Tester II (Conduct prior to replacing ECM)

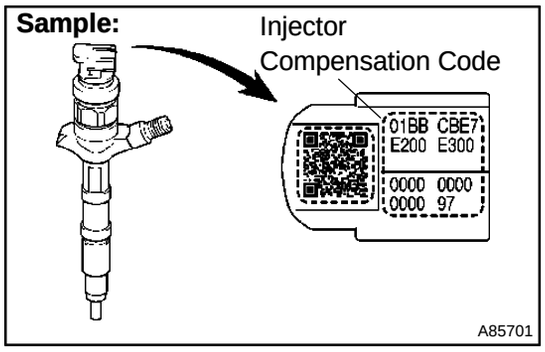


Proceed to Registration Procedure **(see page 05-389)**

Y

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HINT:
The following operation is available with ECMs that can transmit the registered injector compensation codes to the intelligent tester II.



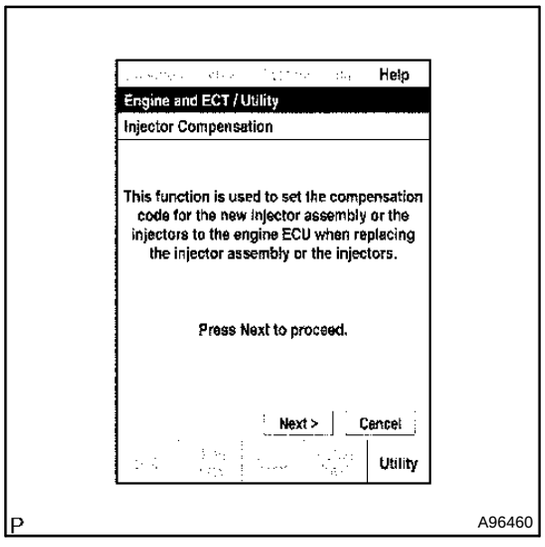
3. READ AND SAVE INJECTOR COMPENSATION CODES

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the tester ON.

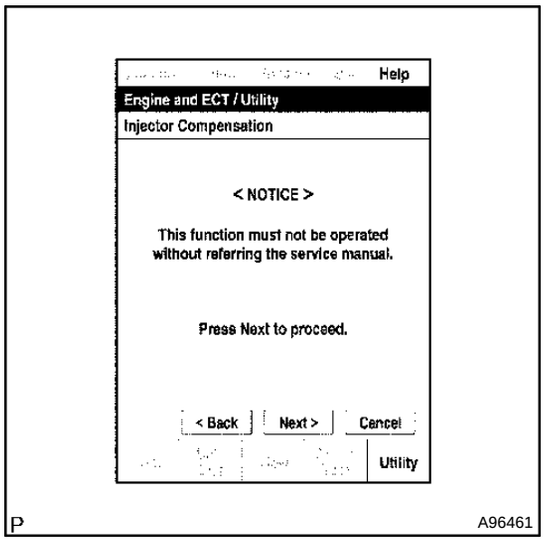
NOTICE:
Do not start the engine during this operation.

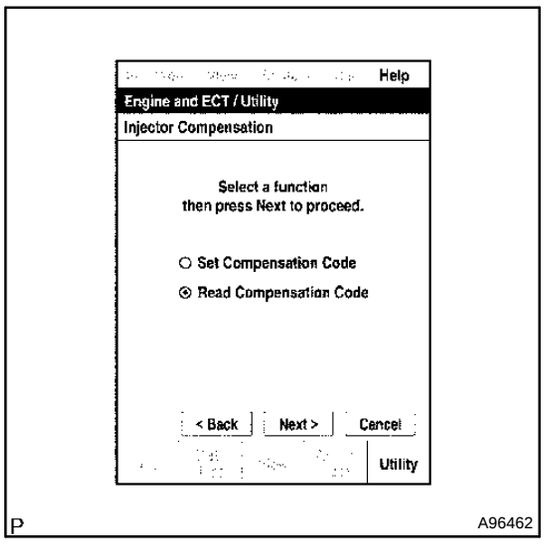
HINT:
An injector compensation code is imprinted on the head portion of each injector.

(d) Select the following menu items: Enter / Powertrain / Engine and ECT / Utility/Injector Compensation.
(e) Press the Next button on the tester screen.



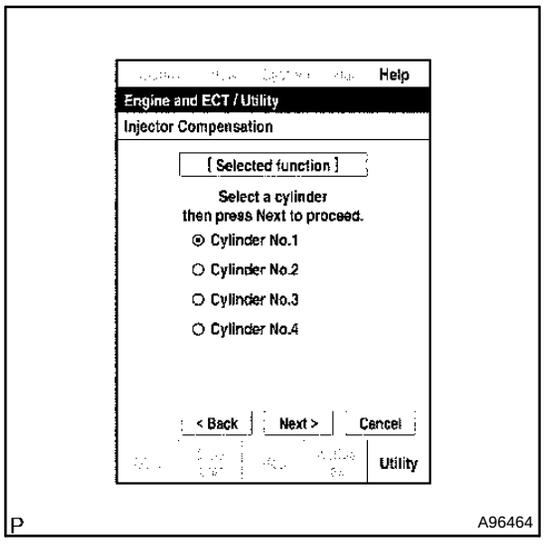
(f) Press the Next button again to proceed.





(g) Select the following menu items: Read Compensation Code.

(h) Press the Next button.

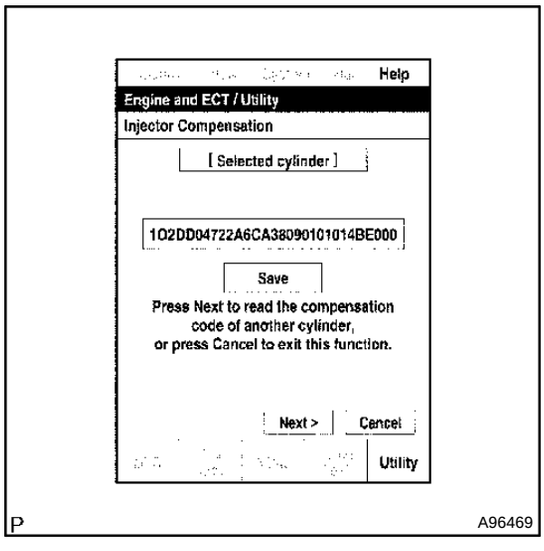


(i) Select the number of the cylinder corresponding to the injector compensation code that you want to read.

(j) Press the Next button.

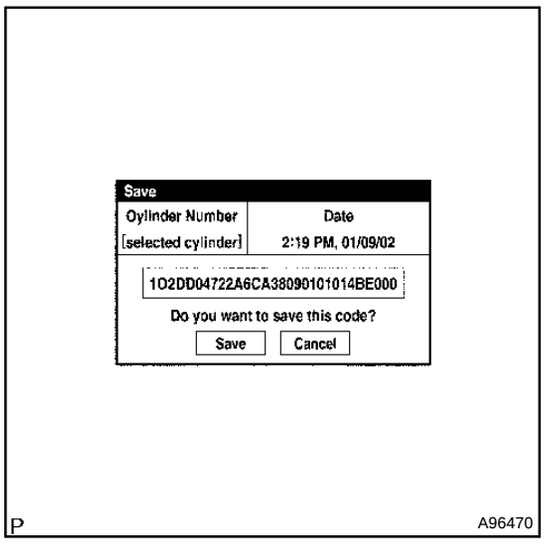
HINT:

The reading process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and the DLC3 connection. If no problem is found with either, it is supposed that the ECM is malfunctioning. Check the ECM and restart this operation.



(k) Check the injector compensation code in the form of a 30-digit alphanumeric code, which is displayed on the tester screen.

(l) Press the Save button on the screen.



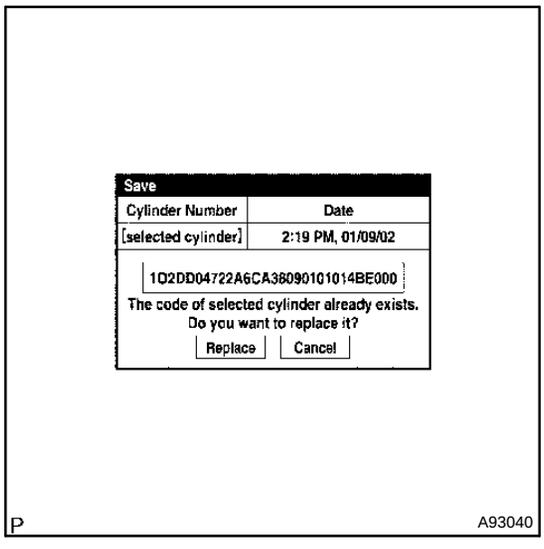
(m) If no injector compensation code for the cylinder exists in the tester:

(1) Ascertain that the compensation code displayed on the tester screen is correct.

(2) Press the Save button (proceed to step "o").

HINT:

The saving process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and the DLC3 connection. If no problem is found with either, it is supposed that the ECM is malfunctioning. Check the ECM and restart this operation.



(n) If another injector compensation code already exists in the tester:

(1) Ascertain that the compensation code displayed on the tester screen is correct.

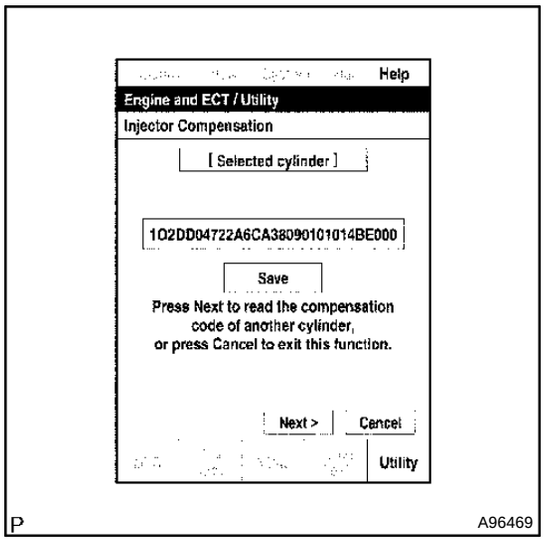
HINT:

The existing compensation code is overwritten with the new compensation code and deleted from the tester.

(2) Press the Replace button on the screen.

HINT:

The saving process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and the DLC3 connection. If no problem is found with either, it is supposed that the ECM is malfunctioning. Check the ECM and restart this operation.



(o) If you want to read and save other injector compensation codes for other cylinders, press the Next button to continue. To finish this operation, press the Cancel button.

05L6O-03

REGISTRATION

NOTICE:

- **When an injector is replaced, the injector's compensation code must be input into the ECM. When the ECM is changed, all of the existing injector compensation codes must be input into the new ECM.**
- **An injector compensation code is unique. The 30-digit alphanumeric code imprinted on the head portion of an injector is its compensation code. If an incorrect injector compensation code is input into the ECM, the engine assembly may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.**

1. When you replace the ECM with a new one, input all the injectors' compensation codes into the new ECM as follows:

(a) Prior to replacing the ECM, read and save each injector's compensation code, stored in the original ECM, using the intelligent tester II (see page 05-385).

(b) After installing a new ECM, input the saved compensation codes into the new ECM using the tester (see page 05-389).

(c) Turn the tester OFF and then turn the ignition switch to OFF.

(d) Wait for at least 30 seconds.

(e) Turn the ignition switch to ON and then turn the tester ON.

(f) Clear DTC P1601 stored in the ECM using the tester (see page 05-404).

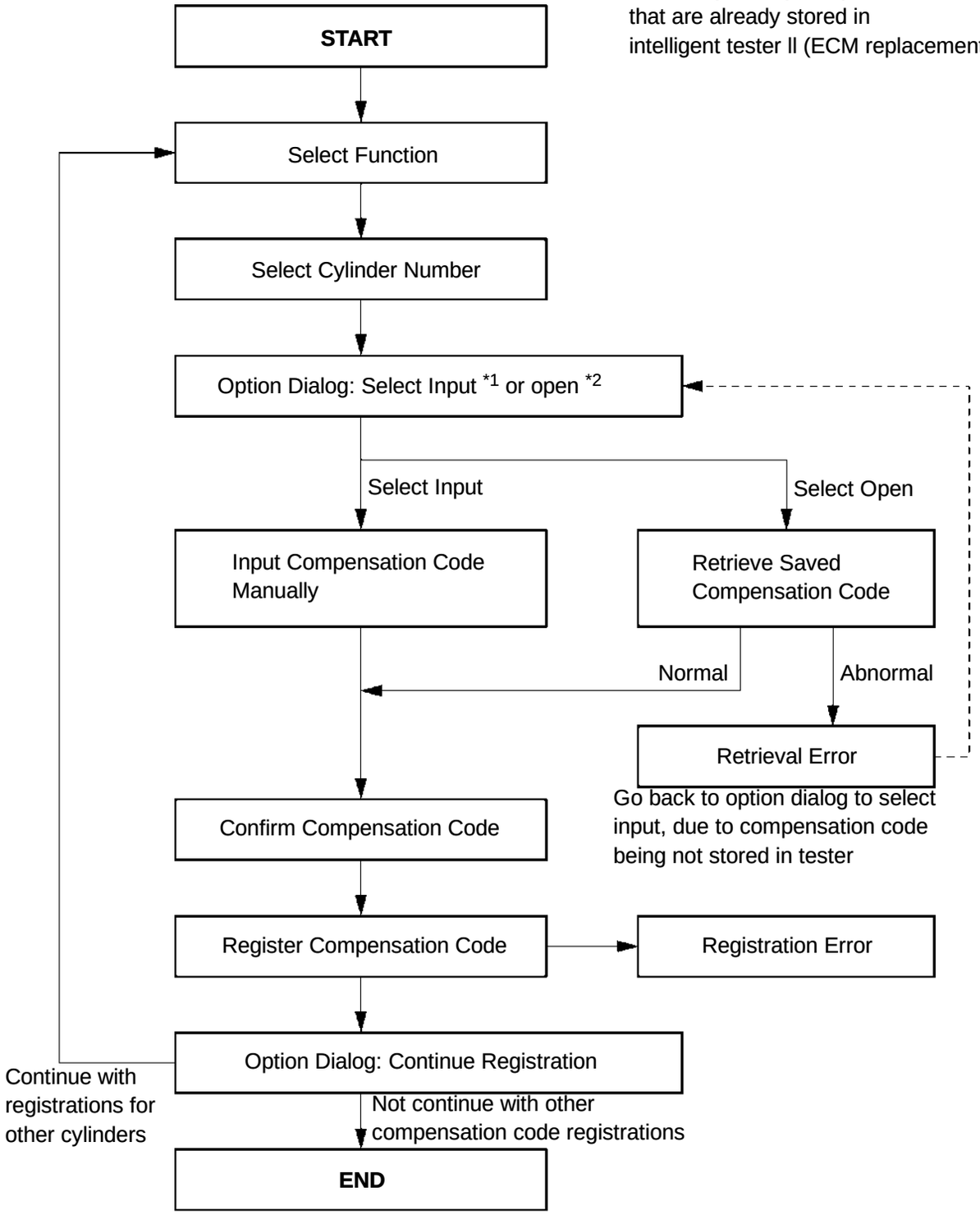
HINT:

- Each injector has different fuel injection characteristics. In order to optimize the fuel injections, the ECM uses the compensation codes to balance the different fuel injections between each injector.
- When you first turn the ignition switch to ON after replacing the ECM or an injector(s), DTC P1601 is set. This is to inform you that an injector compensation code(s) is/are required to be registered. Manually clear the DTC upon completion of the compensation code registration.

How to Register Injector Compensation Codes Using Intelligent Tester II
(Conduct prior to replacing injector)

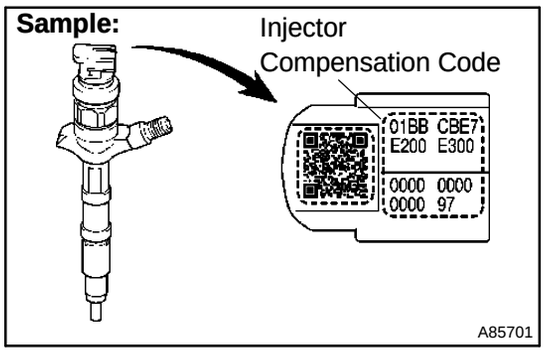
*1: When registering compensation codes by manual input (Injector replacement etc)

*2: When registering compensation codes that are already stored in intelligent tester II (ECM replacement etc)



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2. REGISTER COMPENSATION CODES

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON.

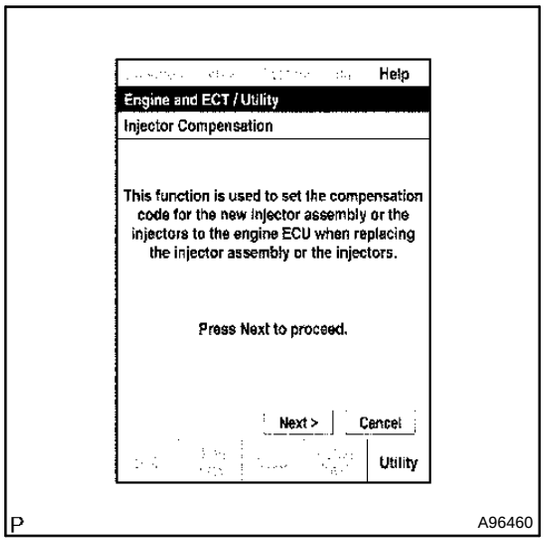
(c) Turn the tester ON.

NOTICE:

Do not start the engine during this operation.

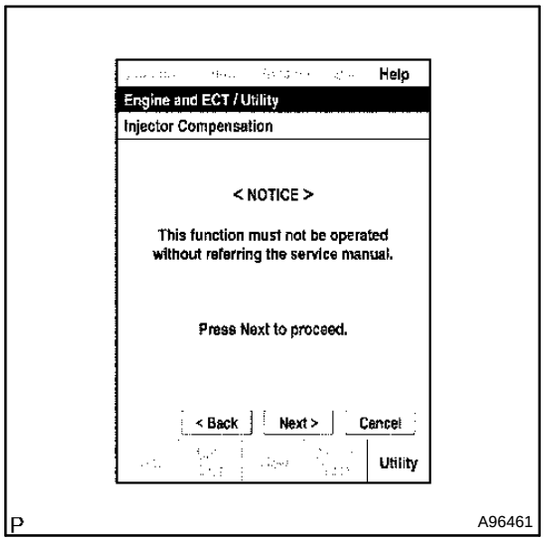
HINT:

An injector compensation code is imprinted on the head portion of each injector.

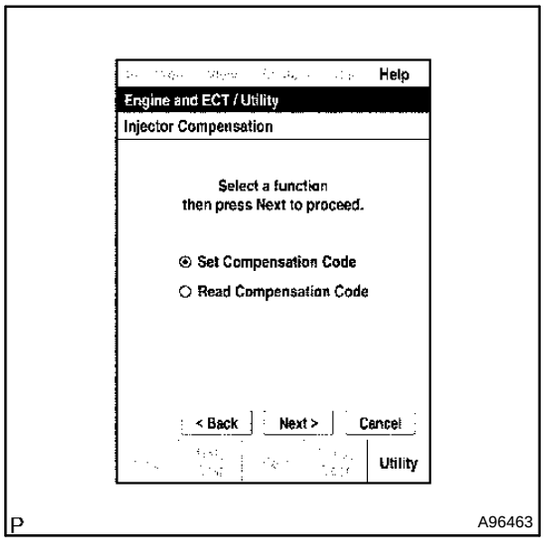


(d) Select the following menu items: Enter / Powertrain / Engine and ECT / Utility/Injector Compensation.

(e) Press the Next button on the tester screen.

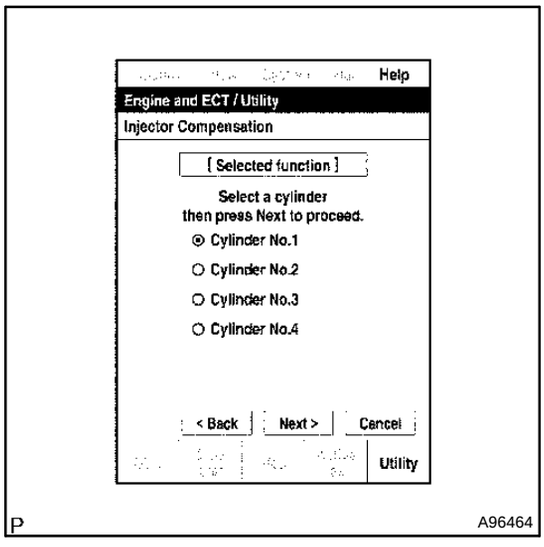


(f) Press the Next button again to proceed.



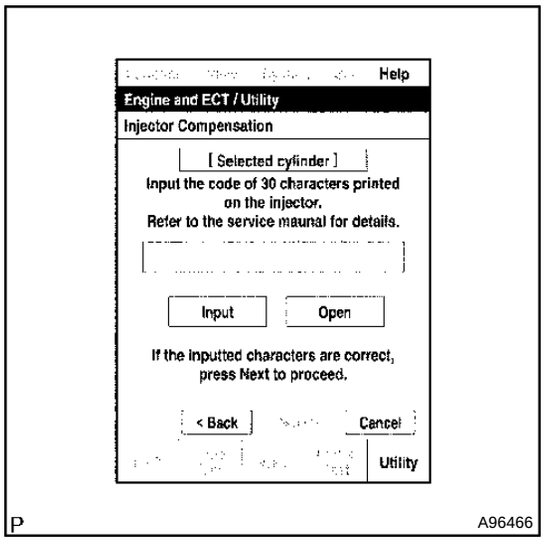
(g) Select the following menu items: Set Compensation Code.

(h) Press the Next button.



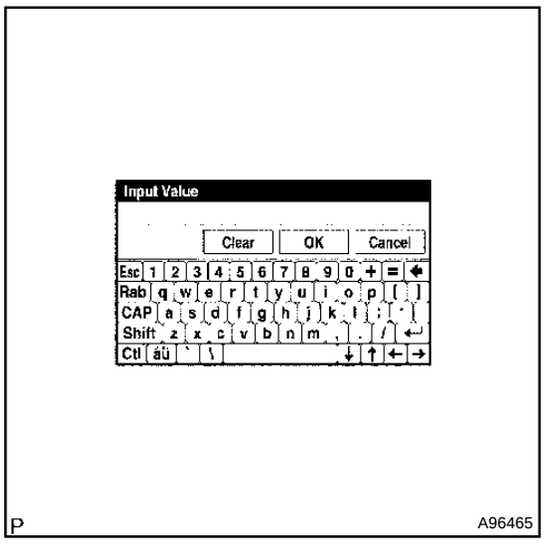
(i) Select the number of the cylinder corresponding to the injector compensation code that you want to read.

(j) Press the Next button.



(k) If a new injector(s) was/were installed (the injector compensation code for the selected cylinder does not exist in the tester):

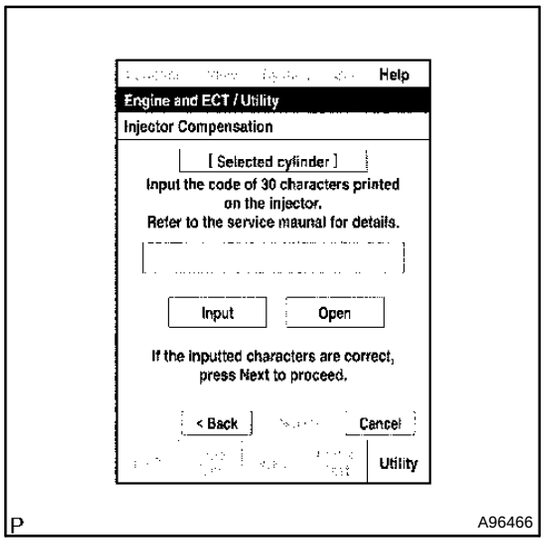
(1) Press the Input button on the screen.



(2) Manually input the compensation code, in the form of a 30-digit alphanumeric code imprinted on injector's head portion, for the cylinder, using the keyboard on the tester screen.

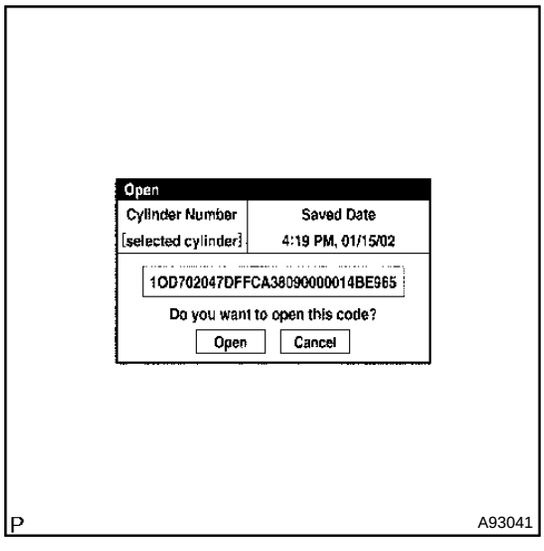
HINT:
Each injector compensation code is unique. The correct compensation code must be input into each cylinder selected on the tester.

(3) Check the compensation code is correct for the selected cylinder, and then press the OK button on the screen (proceed to step "m").



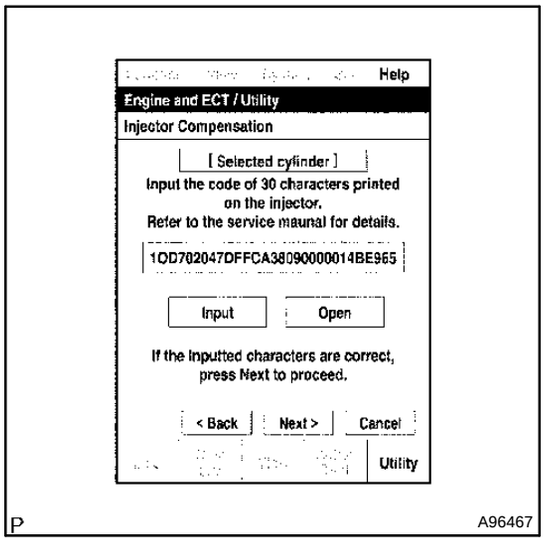
(l) If a new ECM was installed (and all the injectors' compensation codes have been saved in the tester):

(1) Press the Open button on the screen.



(2) Press the Open button again to retrieve the saved compensation code.

HINT:
If the retrieving process fails, a manual input with the tester is the alternative option. Refer to step (k).



(m) Ascertain that the compensation code displayed on the screen is correct, by comparing with the 30-digit alphanumeric code on the head portion of the injector.

NOTICE:

If an incorrect injector compensation code was input into the ECM, the engine assembly may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

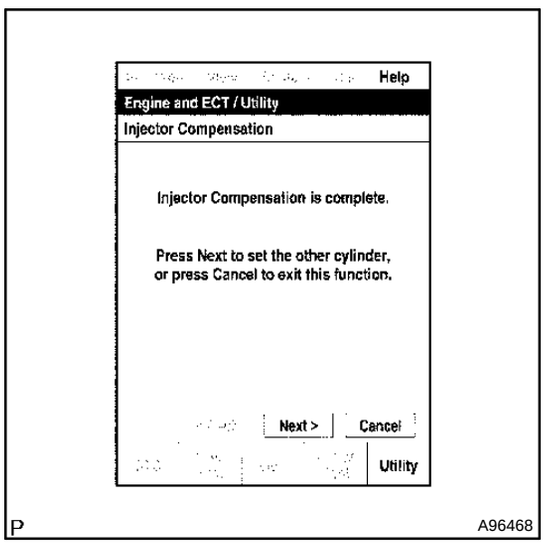
HINT:

If a wrong compensation code was input or read, return to the Input Value screen by pressing the Input button. The saving process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and the DLC3 connection. If no problem is found with either, it is supposed that the ECM is malfunctioning. Check the ECM and restart this operation.

(n) Press the Next button on the screen to set the compensation code to the ECM.

HINT:

- If the setting process fails, the compensation code may be incorrect. Ascertain the compensation code again.
- If the attempted compensation code is correct, a problem with the wire harness or a bad connection with the DLC3 may cause the failure. Check the wire harness and the DLC3 connection. If no problem is found with either, it is supposed that the ECM is malfunctioning. Check the ECM and restart this operation.



(o) If you want to continue with other compensation code registrations, press the Next button. To finish the registration, press the Cancel button.

(p) Turn the tester OFF and then turn the ignition switch to OFF.

(q) Wait for at least 30 seconds.

(r) Turn the ignition switch to ON and then turn the tester ON.

(s) Clear DTC P1601 stored in the ECM using the tester (See page 05-404).

054JF-31

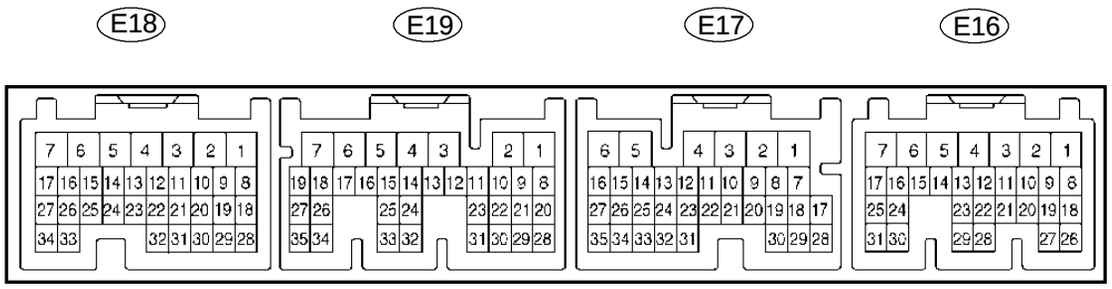
PROBLEM SYMPTOMS TABLE

When a malfunction is not confirmed by a DTC (Diagnostic Trouble Code) check and the cause of the problem cannot be identified through a basic inspection, troubleshoot according to the priority order indicated in the table below.

Symptoms	Conditions	See Page
Engine difficult to start or stalling	• Engine difficult to start with cold engine • Engine difficult to start with warm engine • Engine stalls soon after starting • Any condition other than those listed above	05-566
Black smoke emitted	• When idling • When driving	05-576
Rough idling or excessive engine vibration	• Abnormal initial idling • High engine idling speed • Low engine idling speed	05-589
Lack of power or hesitation	• Hunting with cold engine • Hunting with warm engine • Surging with cold engine • Surging with warm engine • Poor acceleration • Poor driveability	05-602
Engine knocking or rattling	• When idling • When driving	05-620

05L6P-03

TERMINALS OF ECM



Y

A66714

HINT:

The standard normal voltage between each pair of ECM terminals is shown in the table below. The appropriate conditions for checking each pair of terminals is also indicated.

The result of checks should be compared with the standard normal voltage for that pair of terminals, displayed in the STD Voltage column.

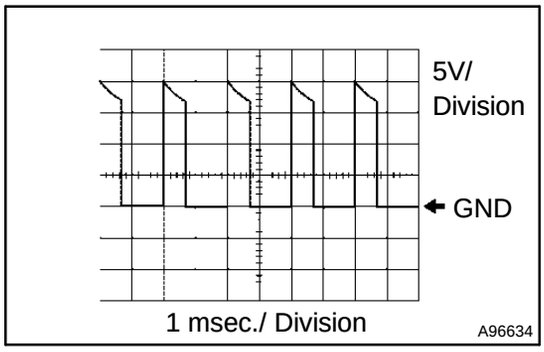
The illustration above can be used as a reference to identify the ECM terminal locations.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage (V)
BATT (E17-2) - E1 (E19-7)	R-W - BR	Battery (for measuring battery voltage and for ECM memory)	Always	9 to 14
IGSW (E16-9) - E1 (E19-7)	SB (B-O) - BR	Ignition switch	Ignition switch ON	9 to 14
+B (E16-1) - E1 (E19-7)	B - BR	Power source of ECM	Ignition switch ON	9 to 14
MREL (E16-8) - E1 (E19-7)	B-W - BR	EFI MAIN relay	Ignition switch ON	9 to 14
			Ignition switch OFF	0 to 1.5
VC (E18-18) - E1 (E19-7)	R-W - BR	Power source of sensor (a specific voltage)	Ignition switch ON	4.5 to 5.5
VPA (E16-22) - EPA (E16-28)	G - Y	Accelerator pedal position sensor (for engine control)	ignition switch ON, accelerator pedal fully released	0.5 to 1.1
			Ignition switch ON, accelerator pedal fully depressed	2.6 to 4.5
VPA2 (E16-23) - EPA2 (E16-29)	W - Y *1 L - L *2	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, accelerator pedal fully released	1.2 to 2.0
			Ignition switch ON, accelerator pedal fully depressed	3.4 to 5.3
VCPA (E16-26) - EPA (E16-28)	B - Y *1 W - Y *2	Power source of accelerator pedal position sensor (for VPA)	Ignition switch ON	4.5 to 5.5
VCP2 (E16-27) - EPA2 (E16-29)	B - Y *1 B - L *2	Power source of accelerator pedal position sensor (for VPA2)	Ignition switch ON	4.5 to 5.5
VG (E19-24) - EVG (E19-32)	G - L-Y	Mass air flow meter	Idling, A/C switch OFF	0.5 to 3.4
THA (E18-31) - E2 (E18-28)	G-R - BR	Intake air temperature sensor	Idling, intake air temperature at 20 °C (68 °F)	0.5 to 3.4
THW (E18-19) - E2 (E18-28)	B-W - BR	Engine coolant temperature sensor	Idling, engine coolant temperature at 80°C (176°F)	0.2 to 1.0
STA (E16-7) - E1 (E19-7)	SB (B-R) - BR	Starter signal	Cranking	6.0 or more

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage (V)
#1 (E18-24) - E1 (E19-7) #2 (E18-23) - E1 (E19-7) #3 (E18-22) - E1 (E19-7) #4 (E18-21) - E1 (E19-7)	G-W - BR W-R - BR R-W - BR W-L - BR	Injector	Idling	Pulse generation (See waveform 3)
G1 (E19-23) - G- (E19-31)	P - L	Camshaft position sensor	Idling	Pulse generation (See waveform 5)
NE+ (E18-27) - NE- (E18-34)	G - B	Crankshaft position sensor	Idling	Pulse generation (See waveform 5)
STP (E17-19) - E1 (E19-7)	SB (G-W) - BR	Stop lamp switch	Brake pedal depressed	7.5 to 14
			Brake pedal released	0 to 1.5
ST1- (E17-12) - E1 (E19-7)	G-R - BR	Stop lamp switch (opposite to STP)	Brake pedal depressed	0 to 1.5
			Brake pedal released	7.5 to 14
TC (E16-11) - E1 (E19-7)	W (P-B) - BR	Terminal TC of DLC3	Ignition switch ON	9 to 14
W (E16-12) - E1 (E19-7)	W (R-Y) - BR	MIL	MIL illuminated	0 to 3
			MIL not illuminated	9 to 14
SP1 (E17-17) - E1 (E19-7)	W (V-W) - BR	Speed signal from combination meter	Ignition switch ON, rotate driving wheel slowly	Pulse generation (See waveform 9)
SIL (E16-18) - E1 (E19-7)	W (L-R) - BR	Terminal SIL of DLC3	Connect intelligent tester II to DLC3	Pulse generation
PIM (E19-28) - E2 (E18-28)	W-R - BR	Turbo pressure sensor	Applied negative pressure of 40 kPa (300 mmHg, 11.8 in.Hg)	0.2 to 0.8
			Same as atmospheric pressure	1.3 to 1.9
			Applied positive pressure of 69kPa (0.7 kg/cm^3, 10.0 psi)	3.2 to 3.8
IREL (E16-10) - E1 (E19-7)	SB (B-W) - BR	Circuit opening relay	Ignition switch OFF	9 to 14
			Idling	0 to 1.5
TACH (E16-5) - E1 (E19-7)	W (B) - BR	Engine speed	Idling	Pulse generation
VCS (E19-2) - E2S (E19-1)	R-W - BR	Common rail pressure sensor	Ignition switch ON	4.5 to 5.5
GREL (E16-14) - E1 (E19-7)	G-R - BR	Glow plug relay	Cranking	9 to 14
			Idling	0 to 1.5
THIA (E18-20) - E2 (E18-28)	GR - BR	Intake air temperature sensor	Idling, intake air temperature at 80 °C (176 °F)	0.5 to 3.4
THF (E18-29) - E2 (E18-28)	L - BR	Fuel temperature sensor	Ignition switch ON	0.5 to 3.4
PCR1 (E18-26) - E2 (E18-28)	P - BR	Common rail pressure sensor (main)	Idling	1.8 to 2.1
PCR2 (E18-33) - E2 (E18-28)	P-B - BR	Common rail pressure sensor (sub)	Idling	1.2 to 1.5
ALT (E18-8) - E1 (E19-7)	B-L - BR (*3) B-R - BR (*4)	Generator (alternator) duty ratio	Idling	Pulse generation
PCV+ (E18-2) - PCV- (E18-1)	LG-R - LG	Suction control valve	Idling	Pulse generation (See waveform 2)
PRD (E18-32) - E1 (E19-7)	R-L - BR	Pressure discharge valve signal	Drive vehicle at 50 km/h (31 mph) with third gear, and then decelerate by releasing accelerator pedal	Pulse generation (See waveform 8)
INJF (E18-25) - E1 (E19-7)	R-B - BR	EDU	Idling	Pulse generation (See waveform 4)
EG+A (E19-6) - E1 (E19-7) EG-A (E19-5) - E1 (E19-7) EG+B (E19-4) - E1 (E19-7) EG-B (E19-3) - E1 (E19-7)	G - BR Y-G - BR R-L - BR G-B - BR	EGR valve	Idling	Pulse generation (See waveform 6)
LU+A (E18-15) - E1 (E19-7) LU-A (E18-14) - E1 (E19-7) LU+B (E18-13) - E1 (E19-7) LU-B (E18-12) - E1 (E19-7)	B - BR G - BR Y - BR L - BR	Intake shutter	Idling	Pulse generation (See waveform 7)

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage (V)
THOP (E18-11) - E1 (E19-7)	P-L - BR	Intake shutter fully opened switch	Idling	9 to 14
			Ignition switch ON	0 to 3
VN (E18-10) - E1 (E19-7)	W - BR	VRV (for VN turbocharger)	Idling	Pulse generation (See waveform 1)

*1: LHD
*2: RHD
*3: TMMT Made
*4: TMUK Made



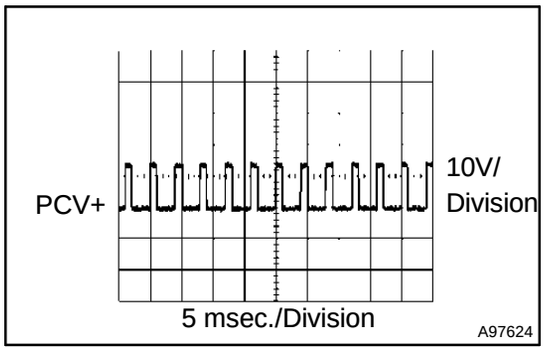
WAVEFORM 1

VRV for turbocharger signal

ECM Terminal Name	Between VN and E1
Tester Range	5 V/Division, 1 msec./Division
Condition	Idling with warm engine

HINT:

The waveform changes depending on the VRV for turbocharger operation.



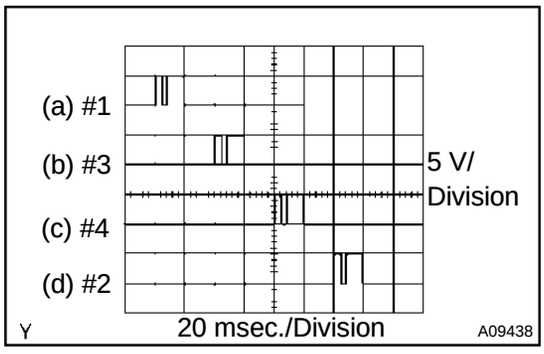
WAVEFORM 2

Suction control valve signal

ECM Terminal Name	Between PCV+ and PCV-
Tester Range	10 V/Division, 5 msec./Division
Condition	Idling or cranking with warm engine

HINT:

The waveform varies depending on the suction control valve operation.



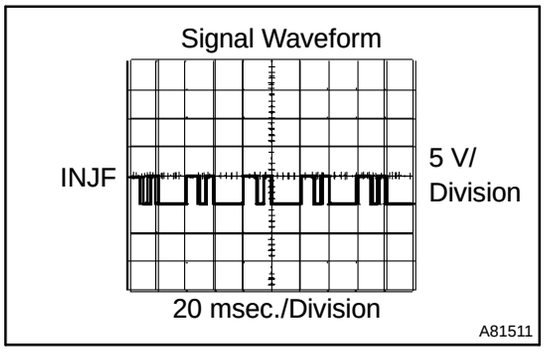
WAVEFORM 3

(a) Injector No. 1 injection signal
(b) Injector No. 2 injection signal
(c) Injector No. 3 injection signal
(d) Injector No. 4 injection signal

ECM Terminal Name	(c) Between #1 and E1 (d) Between #3 and E1 (e) Between #4 and E1 (f) Between #2 and E1
Tester Range	5 V/Division, 20 msec./Division
Condition	Idling with warm engine

HINT:

The waveform varies depending on the injector injection.



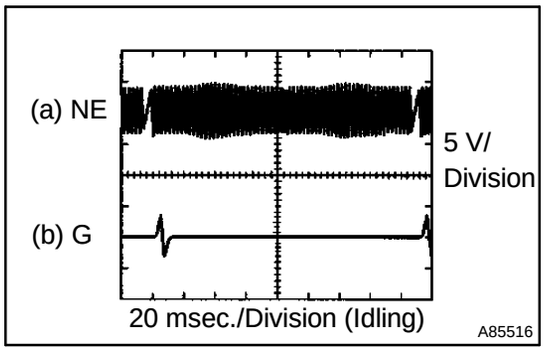
WAVEFORM 4

Injector injection confirmation signal

ECM Terminal Name	Between INJF and E1
Tester Range	5 V/Division, 20 msec./Division
Condition	Idling with warm engine

HINT:

The waveform varies depending on the injector injection.



WAVEFORM 5

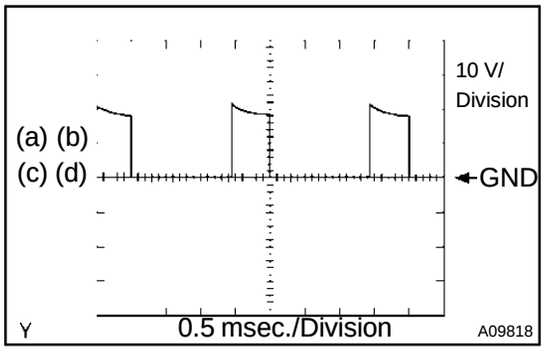
(a) Crankshaft position sensor signal

(b) Camshaft position sensor signal

ECM Terminal Name	(a) Between NE+ and NE- (b) Between G1 and G-
Tester Range	5 V/Division, 20 msec./Division
Condition	Idling with warm engine

HINT:

The waveform varies depending on the engine revolution.



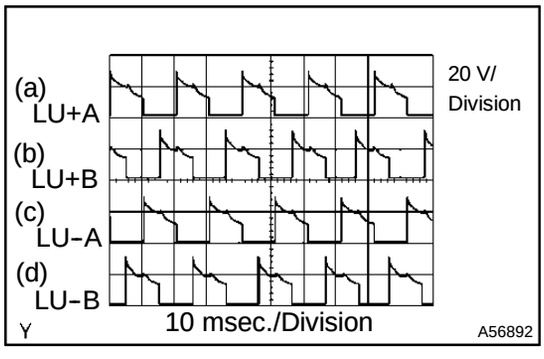
WAVEFORM 6

EGR valve signal

ECM Terminal Name	(a) Between EG+A and E1 (b) Between EG-A and E1 (c) Between EG+B and E1 (d) Between EG-B and E1
Tester Range	10 V/Division, 0.5 msec./Division
Condition	Idling with warm engine

HINT:

The waveform varies depending on the EGR valve operation.



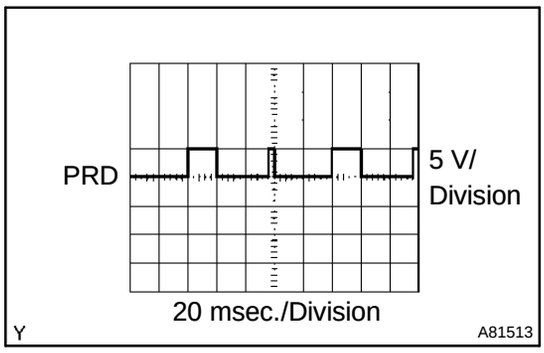
WAVEFORM 7

Intake shutter signal

ECM Terminal Name	(a) Between LU+A and E1 (b) Between LU-A and E1 (c) Between LU+B and E1 (d) Between LU-B and E1
Tester Range	20 V/Division, 10 msec./Division
Condition	Idling with warm engine

HINT:

The waveform varies depending on intake shutter operation.



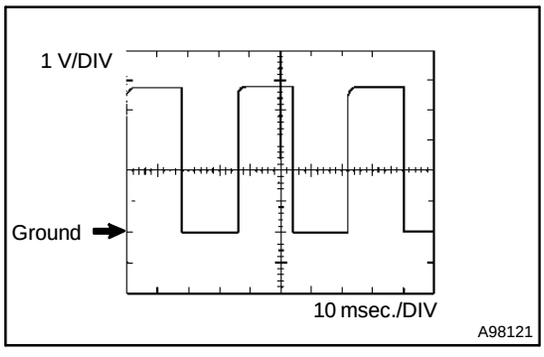
WAVEFORM 8

Pressure discharge valve signal

ECM Terminal Name	Between PRD and E1
Tester Range	5 V/Division, 20 msec./Division
Condition	Drive vehicle at 50 km/h (31 mph) with third gear, and then decelerate by releasing accelerator pedal

HINT:

- The waveform varies depending on the pressure discharge valve operation.
- Alternative inspection:
  Run the engine at 2,500 rpm for 10 seconds and then decrease the engine speed to idling by completely releasing the accelerator pedal.



WAVEFORM 9

Vehicle speed signal

ECM Terminal Name	Between SP1+ and E1
Tester Range	1 V/Division, 10 msec./Division
Condition	Rotate driving wheel slowly

HINT:

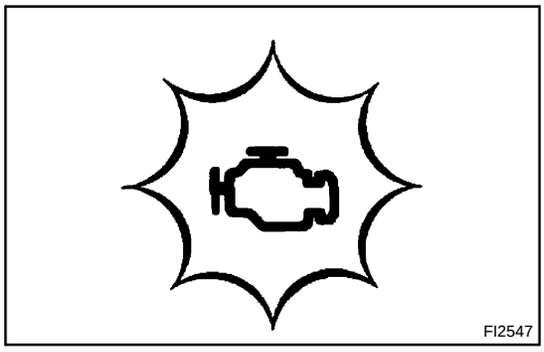
The wavelength becomes shorter as the vehicle speed increases.

05L7I–03

DIAGNOSIS SYSTEM

1. DESCRIPTION

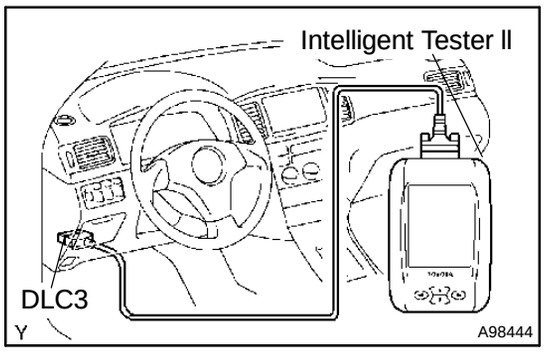
When troubleshooting Euro–OBD (On–Board Diagnostic) vehicle, an intelligent tester II or OBD scan tool must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle's ECM (Engine Control Module) can be then read.


FI2547

Euro–OBD regulations require that the vehicle's on–board computer illuminates the MIL (Malfunction Indicator Lamp) in the instrument panel when the computer detects a malfunction in:

1) The emission control system and components.
2) The power train control components (which affect vehicle emissions).
3) The computer itself.

In addition, the applicable DTCs (Diagnostic Trouble Codes) prescribed by ISO 15031–4 are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



To check the DTCs, connect an intelligent tester II to the DLC3. The tester displays DTCs, freeze frame data, and variety of engine data. The DTCs and freeze frame data can be erased with the tester (refer to DTC CHECK/CLEAR on page 05–404).

2. NORMAL MODE AND CHECK MODE

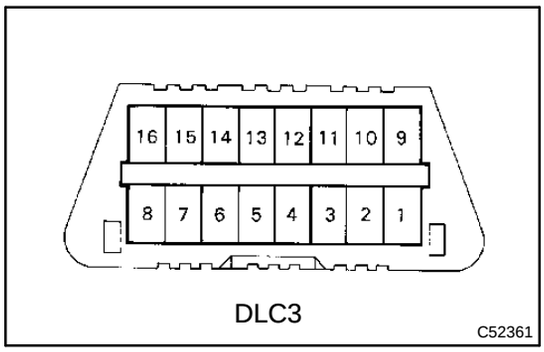
The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (see page 05–380).

3. 2 TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the next subsequent drive cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

The freeze frame data record the engine conditions (fuel system, calculated engine load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc) when a malfunction is detected. When troubleshooting, the freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.



DLC3

5. DLC3 (Data Link Connector 3)

The vehicle's ECM uses the ISO 9141-2 (Euro-OBD) communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031-03 and matches the ISO 9141-2 format.

Symbol	Terminal No.	Name	Reference Terminal	Result	Condition
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always

HINT:

The DLC3 is the interface prepared for reading various data from the vehicle's ECM. After connecting the cable of an intelligent tester ll, turn the ignition switch to ON and turn the tester on.

If a communication failure message, NO INFORMATION AVAILABLE, is displayed on the tester, and the bus check also failed, a problem exists in either the vehicle or tester. In order to identify the location of the problem, connect the tester to another vehicle.

- If communication is normal: Inspect the DLC3 on the original vehicle.
- If communication is impossible: The trouble is probably with the tester itself. Consult the Service Department listed in the instruction manual.

6. BATTERY VOLTAGE

Battery voltage: 11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL illuminates when the ignition switch is turned to ON and the engine is not running.

HINT:

If the MIL is not illuminated, check the MIL circuit (refer to MIL CIRCUIT on page 05-559).

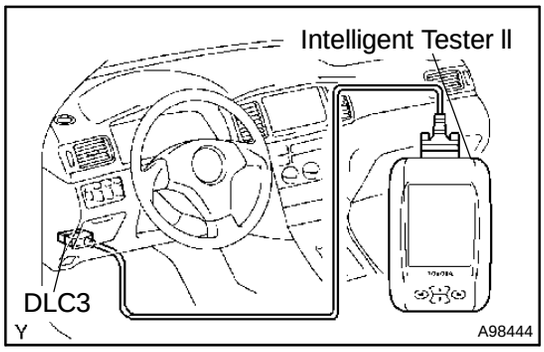
(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

05L6Q-03

DTC CHECK/CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode, or vice versa, all the DTCs and freeze frame data recorded in normal mode are erased. Before changing modes, always check and make a note of any DTCs and freeze frame data.



1. CHECK DTC (using an intelligent tester II)

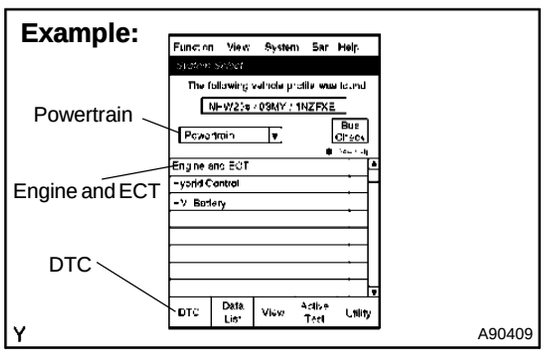
(a) Connect an intelligent tester II to the DLC3.

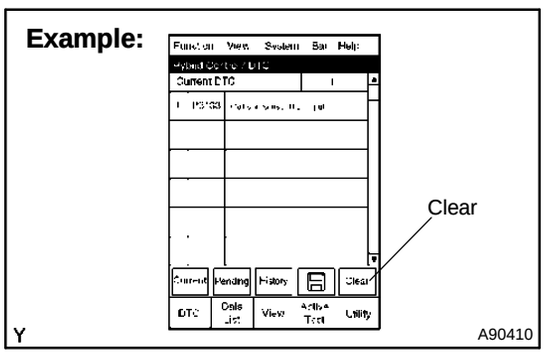
(b) Turn the ignition switch to ON and turn the tester ON.

(c) Select the following menu items: Powertrain / Engine and ECT / DTC.

(d) Check the DTC(s) and freeze frame data, and then write them down.

(e) See page 05-412 to confirm the details of the DTCs.





2. CLEAR DTCS AND FREEZE FRAME DATA (using the intelligent tester II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON (do not start the engine) and turn the tester ON.

(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.

(d) Erase DTCs and freeze frame data by pressing the yes button on the tester.

3. CLEAR DTCS AND FREEZE FRAME DATA (without using an intelligent tester II)

(a) Perform either one of the following operations.

(1) Disconnect the battery cable for more than 1 minute.

(2) Remove the EFI and ETCS fuses from the Relay Block (R/B) located inside the engine compartment for more than 1 minute.

NOTICE:

When disconnecting the battery cable, perform the INITIALIZE procedure.

05L6R-03

CHECK MODE PROCEDURE

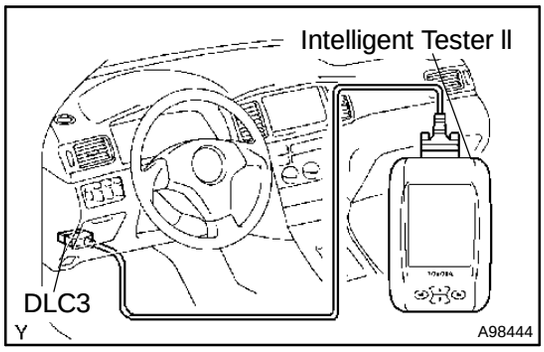
HINT:

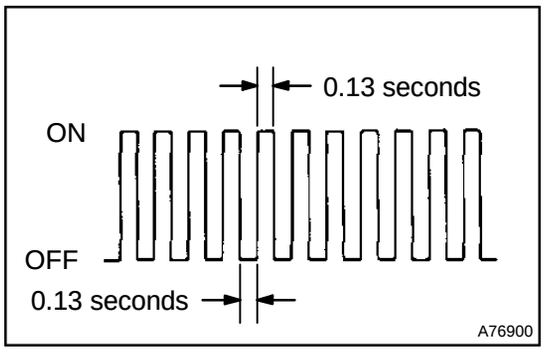
Compared to normal mode, check mode is more sensitive to malfunctions. Therefore, check mode can detect the malfunctions that cannot be detected by normal mode.

In check mode, the ECM sets DTCs using 1 trip detection logic.

NOTICE:

All the stored DTCs and freeze frame data are erased if: 1) the ECM is changed from normal mode to check mode or vice versa; 2) the ignition switch is turned from ON to ACC or OFF while in check mode. Before changing modes, always check and make a note of any DTCs and freeze frame data.





CHECK MODE PROCEDURE

(a) Make sure that the vehicle is in the following condition:
  (1) Battery voltage 11 V or more.
  (2) Throttle valve fully closed.
  (3) Transmission in the neutral position.
  (4) A/C switched OFF.

(b) Turn the ignition switch to OFF (where ON).

(c) Connect an intelligent tester II to the DLC3.

(d) Turn the ignition switch to ON and turn the tester ON.

(e) Select the following menu items: Powertrain / Engine and ECT / Check Mode.

(f) Make sure the MIL flashes as shown in the illustration.

(g) Start the engine (the MIL should turn off).

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

(i) Check the DTC(s) and freeze frame data using the tester.

(j) After checking the DTC, inspect the applicable circuits (see page 05-412).

05DVX-07

FAIL-SAFE CHART

1. FAIL-SAFE CHART

If any of the following DTCs are set, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily.

DTC No.	Detection Item	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0087 (05-420)	Fuel Rail/System Pressure - Too Low [Fuel pressure sensor system malfunction]	Limits engine power	Ignition switch OFF
P0088 (05-427)	Fuel Rail/System Pressure - Too High [Common rail system malfunction]	Limits engine power	Ignition switch OFF
P0093 (05-434)	Fuel System Leak Detected - Large Leak [Fuel leaks in common rail system]	Limit engine power for 1 minute before stalling engine	Ignition switch OFF
P0095 (05-437)	Intake Air Temperature Sensor 2 Circuit [Intake air temperature sensor (intake air connector)]	Intake air (intake manifold) temperature fixed at 145°C (293°F)	Pass condition detected
P0097 (05-437)	Intake Air Temperature Sensor 2 Circuit Low [Intake air temperature sensor low input (intake air connector)]		
P0098 (05-437)	Intake Air Temperature Sensor 2 Circuit High [Intake air temperature sensor high input (intake air connector)]		
P0100 (05-442)	Mass or Volume Air Flow Circuit [Mass air flow meter]	Limits engine power	Pass condition detected
P0102 (05-442)	Mass or Volume Air Flow Meter Circuit Low Input [Mass air flow meter low input]		
P0103 (05-442)	Mass or Volume Air Flow Meter Circuit High Input [Mass air flow meter high input]		
P0105 (05-448)	Manifold Absolute Pressure/Barometric Pressure Circuit [Intake air pressure sensor]	Turbo pressure fixed	Pass condition detected
P0107 (05-448)	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input [Intake air pressure sensor low input]		
P0108 (05-448)	Manifold Absolute Pressure/Barometric Pressure Circuit High Input [Intake air pressure sensor high input]		
P0110 (05-453)	Intake Air Temperature Circuit [Intake air temperature sensor (built into mass air flow meter)]	Intake air (mass air flow meter) temperature value fixed	Pass condition detected
P0112 (05-453)	Intake Air Temperature Circuit Low Input [Intake air temperature sensor (built into mass air flow meter) low input]		
P0113 (05-453)	Intake Air Temperature Circuit High Input [Intake air temperature sensor (built into mass air flow meter) high input]		

DTC No.	Detection Item	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0115 (05-458)	Engine Coolant Temperature Circuit [Engine coolant temperature sensor]	Fuel temperature sensor output fixed at specified value (fixed value varies depending on conditions)	Pass condition detected
P0117 (05-458)	Engine Coolant Temperature Circuit Low Input [Engine coolant temperature sensor low input]		
P0118 (05-458)	Engine Coolant Temperature Circuit High Input [Engine coolant temperature sensor high input]		
P0168 (05-464)	Fuel Temperature Too High [Fuel temperature sensor rationality]	Limits engine power	Pass condition detected
P0180 (05-465)	Fuel Temperature Sensor "A" Circuit [Fuel temperature sensor]	Fuel temperature fixed at 40°C (104°F)	Pass condition detected
P0182 (05-465)	Fuel Temperature Sensor "A" Circuit Low Input [Fuel temperature sensor low input]		
P0183 (05-465)	Fuel Temperature Sensor "A" Circuit High Input [Fuel temperature sensor high input]		
P0190 (05-420)	Fuel Rail Pressure Sensor Circuit [Fuel pressure sensor]	Limits engine power	Ignition switch OFF
P0191 (05-470)	Fuel Rail Pressure Sensor Circuit Range/Performance [Fuel pressure sensor rationality]		
P0192 (05-420)	Fuel Rail Pressure Sensor Circuit Low Input [Fuel pressure sensor low input]		
P0193 (05-420)	Fuel Rail Pressure Sensor Circuit High Input [Fuel pressure sensor high input]		
P0200 (05-471)	Injector Circuit/Open [EDU system for injector malfunction]	Limits engine power	Ignition switch OFF
P0234 (05-479)	Turbo/Super Charger Overboost Condition [Turbocharger system malfunction]	Limits engine power	Ignition switch OFF
P0335 (05-484)	Crankshaft Position Sensor "A" Circuit [Crankshaft position sensor]	Limits engine power	Pass condition detected
P0340 (05-488)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor) [Camshaft position sensor]	Limits engine power	Pass condition detected
P0488 (05-502)	Exhaust Gas Recirculation Throttle Position Control Range/Performance [Intake shutter]	Limits engine power	Ignition switch OFF
P0500 (05-508)	Vehicle Speed Sensor "A" [Vehicle speed sensor]	Vehicle speed fixed at 0 km/h (0 mph)	Pass condition detected
P0627 (05-522)	Fuel Pump Control Circuit / Open [Common rail system malfunction]	Limits engine power	Pass condition detected
P1229 (05-427)	Fuel Pump System [Common rail system malfunction]	Limits engine power	Ignition switch OFF
P1251 (05-479)	Turbo/Super Charger Overboost Condition (Too High) [Turbocharger system malfunction]	Limits engine power	Ignition switch OFF





DTC No.	Detection Item	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P1271 (05-529)	Fuel Regulator Circuit Malfunction (EDU Drive) [EDU system for pressure discharge valve malfunction]	Limits engine power	Ignition switch OFF
P1272 (05-529)	Fuel Pressure Regulator Malfunction [Pressure discharge valve]	Limits engine power	Ignition switch OFF
P1611 (05-518)	IC Circuit Malfunction [ECM]	Limits engine power	Ignition switch OFF
P2120 (05-541)	Throttle/Pedal Position Sensor/Switch "D" Circuit [Accelerator pedal position sensor (sensor1)]	Limits engine power	Ignition switch OFF
P2121 (05-547)	Throttle/Pedal Position Sensor/Switch "D" Circuit Range/Performance [Accelerator pedal position sensor rationality (sensor1)]		
P2122 (05-541)	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input [Accelerator pedal position sensor low input (sensor1)]		
P2123 (05-541)	Throttle/Pedal Position Sensor/Switch "D" Circuit High Input [Accelerator pedal position sensor high input (sensor1)]		
P2125 (05-541)	Throttle/Pedal Position Sensor/Switch "E" Circuit [Accelerator pedal position sensor (sensor2)]		
P2127 (05-541)	Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input [Accelerator pedal position sensor low input (sensor2)]		
P2128 (05-541)	Throttle/Pedal Position Sensor/Switch "E" Circuit High Input [Accelerator pedal position sensor high input (sensor2)]		
P2138 (05-541)	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation [Accelerator pedal position sensor malfunction]		
P2226 (05-550)	Barometric Pressure Circuit [ECM]	Atmospheric pressure fixed	Pass condition detected
P2228 (05-550)	Barometric Pressure Circuit Low Input [ECM]		
P2229 (05-550)	Barometric Pressure Circuit High Input [ECM]		





05DVU-07

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

By reading the Data List displayed on an intelligent tester ll, you can check values, including those of the switches, sensors, and actuators, without removing any parts. Reading the Data List as the first step of troubleshooting is one method of shortening diagnostic time.

NOTICE:

In the table below, the values listed under Normal Conditions are for reference only. Do not depend solely on these values when determining whether or not a part is faulty.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect an intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the tester ON.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List.
(g) Check the values by referring to the following table.

Intelligent Tester II Display (Abbreviation)	Measurement Item: Range (Display)	Normal Conditions *	Diagnostic Notes
Injection Volume (INJ VOLUME)	Injection volume: Min.: 0 mm^3, Max.: 1279.98 mm^3	3 to 10 mm^3: Idling	—
Engine SPD (ENGINE SPD)	Engine speed: Min.: 0 rpm, Max.: 16383.75 rpm	750 to 850 rpm: Idling	—
MAF (MAF)	Air flow rate from Mass Air Flow (MAF) meter status: Min.: 0 gm/s, Max.: 655.35 gm/s	• 3.2 to 4.7 gm/s: Idling • 13.1 to 18.9 gm/s: Running without load (2,500 rpm)	If value approximately 0.0 gm/s: • MAF meter power source circuit open • VG circuit open or shorted If valve 135 gm/s or more: • E2G circuit open
PIM (PIM)	Absolute pressure inside intake manifold: Min.: 0 kPa, Max.: 255 kPa	• 85 to 110 kPa: Idling • 80 to 110 kPa: Engine running at 2,000 rpm • 90 to 130 kPa: Engine running at 3,000 rpm	—
Coolant Temp (COOLANT TEMP)	Engine coolant temperature: Min.: -40°C, Max.: 215°C	80° to 95°C (176° to 203°F): After warming up engine	If value -40°C or 140°C, sensor circuit open or shorted
Intake Air (INTAKE AIR)	Intake air temperature: Min.: -40°C, Max.: 215°C	Equivalent to temperature at intake manifold	
Fuel Temp. (FUEL TEMP)	Fuel temperature status: Min.: -40°C, Max.: 215°C	Actual fuel temperature	
Accel Position (ACCEL POSITION)	Accelerator position status: Min.: 0 %, Max.: 100 %	• 10 to 22 %: Accelerator pedal released • 52 to 90 %: Accelerator pedal depressed	Read value with ignition switch ON (Do not start engine)
Vehicle SPD (VEHICLE SPD)	Vehicle speed: Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on speedometer
Throttle POS (THROTTLE POS)	Throttle step position: Min.: 1 step, Max.: 255 step	• 1 step: Throttle fully closed • 255 step: Throttle fully open	Read value with ignition switch ON (Do not start engine)
Common Rail Pressure (COMN RAIL PRESS)	Common rail pressure: Min.: 0 MPa, Max.: 255 MPa	30 to 40 MPa: Idling	—
Ambient Temperature (AMBI TEMP SENS)	Ambient temperature sensor: Min.: -40°C, Max.: 215°C	Actual atmospheric air temperature	If value -40°C or 140°C, sensor circuit open or shorted
Accel Open SW (ACCEL OPEN SW)	Accelerator pedal open switch: ON or OFF	ON: Ignition Switch ON	—

Intelligent Tester II Display (Abbreviation)	Measurement Item: Range (Display)	Normal Conditions *	Diagnostic Notes
Revised Injection Volume #1 (INJ VOL FB #1)	Injection volume correction for cylinder 1: Min.: -5 mm^3, Max.: 5 mm^3	-2.0 to 2.0 mm^3: Idling	—
Revised Injection Volume #2 (INJ VOL FB #2)	Injection volume correction for cylinder 2: Min.: -5 mm^3, Max.: 5 mm^3	-2.0 to 2.0 mm^3: Idling	—
Revised Injection Volume #3 (INJ VOL FB #3)	Injection volume correction for cylinder 3: Min.: -5 mm^3, Max.: 5 mm^3	-2.0 to 2.0 mm^3: Idling	—
Revised Injection Volume #4 (INJ VOL FB #4)	Injection volume correction for cylinder 4: Min.: -5 mm^3, Max.: 5 mm^3	-2.0 to 2.0 mm^3: Idling	—
M-INJ/PILOT ON (M-INJ/PILOT ON)	M-INJ/PILOT ON: Min.: 0 μs, Max.: 65,535 μs	600 to 1,200 us: Idling	—
Pilot-Injection (PILOT-INJ)	Pilot-injection: Min.: 0 μs, Max.: 65,535 μs	400 to 700 μs: Idling	—
Stop Light SW (STOP LIGHT SW)	Stop lamp switch: ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	—
Starter SIG (STARTER SIG)	Starter signal: ON or OFF	ON: Cranking	—
Check Mode (CHECK MODE)	Check mode: ON or OFF	ON: Check mode ON	—
EGR Step POS (EGR STEP POS)	EGR step position status: Min.: 0 step, Max.: 125 step	0 to 125 step: Idling	—
Injection Volume Feedback (INJ FB VALUE)	Injection volume feedback learning value: Min.: -10 mm^3, Max.: 9.92 mm^3	-4.0 to 4.0 mm^3: Idling	—

*: If no idling conditions are specified, the shift lever should be in the neutral position, the A/C switch and all accessory switches should be OFF.

2. ACTIVE TEST

HINT:

Performing an Active Test enables components including the relays, VSV (Vacuum Switching Valve), and actuators, to be operated without removing any parts. The Active Test can be performed with an intelligent tester ll. Active Test as a first step of troubleshooting is one method of shortening diagnostic time.

The Data List can be displayed during Active Tests.

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the tester ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Active Test.
(e) Perform the Active Tests by referring to the following table.

Intelligent Tester II Display (Abbreviation)	Test Details	Control Range	Diagnostic Notes
TE1 (TC) (TC/TE1)	Turn on TC and TE1 connection	ON/OFF	—
Fuel leak test (FUEL LEAK TEST)	Pressurize common rail internal fuel pressure, in order to see if fuel leaks	ON/OFF	• Fuel pressure inside common rail pressurized to 135 MPa and engine speed increased to 2,000 rpm when ON selected • Above conditions preserved while test ON
EGR Step POS (EGR STEP POS)	Open and close EGR valve	From 0 to 125 steps	• EGR valve fully closed at step position 0, and fully open at step position 125 • Amount of EGR gas, flowed into intake manifold, varies in accordance with EGR valve opening angle
Injector cut #1 (INJECTOR CUT #1)	Cut off fuel injection from No. 1 injector	ON/OFF	Fuel injection stopped while test ON
Injector cut #2 (INJECTOR CUT #2)	Cut off fuel injection from No. 2 injector	ON/OFF	As above
Injector cut #3 (INJECTOR CUT #3)	Cut off fuel injection from No. 3 injector	ON/OFF	As above
Injector cut #4 (INJECTOR CUT #4)	Cut off fuel injection from No. 4 injector	ON/OFF	As above

054JD-28

DIAGNOSTIC TROUBLE CODE CHART

HINT:

The parameters listed in the chart are for reference only. Factors such as instrument type may cause readings to differ slightly from the stated values.

If any DTCs are displayed during a check mode DTC check, check the circuit for the DTCs listed in the table below. For details of each DTC, refer to the page indicated.

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	*2 Memory
P0045 (05-417)	Turbo/Super Charger Boost Control Solenoid Circuit / Open [Turbocharger system malfunction]	• VRV (Vacuum Regulating Valve) • Open or short in VRV circuit • ECM	○	○
P0087 (05-420)	Fuel Rail/System Pressure - Too Low [Fuel pressure sensor system malfunction]	• Open or short in fuel pressure sensor circuit • Fuel pressure sensor • ECM	○	○
P0088 (05-427)	Fuel Rail/System Pressure - Too High [Common rail system malfunction]	• Supply pump (suction control valve) • Pressure discharge valve • Short in supply pump (suction control valve) circuit • Open in pressure discharge valve circuit • ECM	○	○
P0093 (05-434)	Fuel System Leak Detected - Large Leak [Fuel leaks in common rail system]	• Fuel line between supply pump and common rail • Fuel line between common rail and each injector • Supply pump • Common rail • Injectors (DTC P1238 set simultaneously) • Pressure discharge valve • Open or short in EDU circuit (DTC P0200 set simultaneously) • Open or short in injector circuit (DTCs P0200 and P1238 set simultaneously) • EDU (DTC P0200 set simultaneously) • ECM	○	○
P0095 (05-437)	Intake Air Temperature Sensor 2 Circuit [Intake air temperature sensor (intake air connector)]	• Open or short in diesel turbo inlet air temperature sensor circuit • Diesel turbo inlet air temperature sensor • ECM	○	○
P0097 (05-437)	Intake Air Temperature Sensor 2 Circuit Low [Intake air temperature sensor low input (intake air connector)]		○	○
P0098 (05-437)	Intake Air Temperature Sensor 2 Circuit High [Intake air temperature sensor high input (intake air connector)]		○	○
P0100 (05-442)	Mass or Volume Air Flow Circuit [MAF meter]	• Open or short in Mass Air Flow (MAF) meter circuit • MAF meter • ECM	○	○
P0101 (05-447)	Mass or Volume Air Flow Circuit Range/Performance Problem [MAF meter rationality]	• MAF meter	○	○
P0102 (05-442)	Mass or Volume Air Flow Meter Circuit Low Input [MAF meter low input]	• Open or short in MAF meter circuit • MAF meter • ECM	○	○
P0103 (05-442)	Mass or Volume Air Flow Meter Circuit High Input [MAF meter high input]		○	○

DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	*2 Memory
P0105 (05-448)	Manifold Absolute Pressure/ Barometric Pressure Circuit [Intake air pressure sensor]	• Open or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • Turbocharger assembly • EGR valve assembly • ECM	○	○
P0106 (05-452)	Manifold Absolute Pressure/ Barometric Pressure Circuit Range/Performance Problem [Intake air pressure sensor rationality]	• Manifold absolute pressure sensor	○	○
P0107 (05-448)	Manifold Absolute Pressure/ Barometric Pressure Circuit Low Input [Intake air pressure sensor low input]	• Open or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • Turbocharger assembly • EGR valve assembly • ECM	○	○
P0108 (05-448)	Manifold Absolute Pressure/ Barometric Pressure Circuit High Input [Intake air pressure sensor high input]		○	○
P0110 (05-453)	Intake Air Temperature Circuit [IAT sensor (built into MAF meter)]	• Open or short in Intake Air Temperature (IAT) sensor circuit • IAT sensor (built into Mass Air Flow (MAF) meter) • ECM	○	○
P0112 (05-453)	Intake Air Temperature Circuit Low Input [IAT sensor (built into MAF meter) low input]		○	○
P0113 (05-453)	Intake Air Temperature Circuit High Input [IAT sensor (built into MAF meter) high input]		○	○
P0115 (05-458)	Engine Coolant Temperature Circuit [ECT sensor]	• Open or short in Engine Coolant Temperature (ECT) sensor circuit • ECT sensor • ECM	○	○
P0116 (05-463)	Engine Coolant Temperature Circuit Range/Performance Problem [ECT sensor rationality]	• ECT sensor	○	○
P0117 (05-458)	Engine Coolant temperature Circuit Low Input [ECT sensor low input]	• Open or short in ECT sensor circuit • ECT sensor • ECM	○	○
P0118 (05-458)	Engine Coolant temperature Circuit High Input [ECT sensor high input]		○	○
P0168 (05-464)	Fuel Temperature Too High [Fuel temperature sensor rationality]	• Fuel temperature sensor	○	○





DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	*2 Memory
P0180 (05-465)	Fuel Temperature Sensor "A" Circuit [Fuel temperature sensor]	• Open or short in fuel temperature sensor circuit • Fuel temperature sensor • ECM	○	○
P0182 (05-465)	Fuel Temperature Sensor "A" Circuit Low Input [Fuel temperature sensor low input]		○	○
P0183 (05-465)	Fuel Temperature Sensor "A" Circuit High Input [Fuel temperature sensor high input]		○	○
P0190 (05-420)	Fuel Rail Pressure Sensor Circuit [Fuel pressure sensor]	• Open or short in fuel pressure sensor circuit • Fuel pressure sensor • ECM	○	○
P0191 (05-470)	Fuel Rail Pressure Sensor Circuit Range/Performance [Fuel pressure sensor rationality]	• Fuel pressure sensor	○	○
P0192 (05-420)	Fuel Rail Pressure Sensor Circuit Low Input [Fuel pressure sensor low input]	• Open or short in fuel pressure sensor circuit • Fuel pressure sensor • ECM	○	○
P0193 (05-420)	Fuel Rail Pressure Sensor Circuit High Input [Fuel pressure sensor high input]		○	○
P0200 (05-471)	Injector Circuit/Open [EDU system for injector malfunction]	• Open or short in EDU circuit • Injector • EDU • ECM	○	○
P0234 (05-479)	Turbo/Super Charger Overboost Condition [Turbocharger system malfunction]	• VRV (Vacuum Regulating Valve) • Open or short in VRV circuit • Turbocharger assembly • EGR valve assembly • Vacuum hose • ECM	○	○
P0299 (05-479)	Turbo/Super Charger Underboost [Turbocharger system malfunction]		○	○
P0335 (05-484)	Crankshaft Position Sensor "A" Circuit [Crankshaft position sensor]	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Sensor plate (crankshaft timing pulley) • ECM	○	○
P0339 (05-484)	Crankshaft Position Sensor "A" Circuit Intermittent [Crankshaft position sensor intermittent problem]		—	○
P0340 (05-488)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor) [CMP sensor]	• Open or short in Camshaft Position (CMP) sensor circuit • Camshaft position sensor • Camshaft timing pulley • ECM	○	○
P0380 (05-491)	Glow Plug/Heater Circuit "A" [Glow system malfunction]	• Open or short in glow plug circuit • Glow fuse • Glow plug relay • Glow plug • ECM	○	○
P0400 (05-498)	Exhaust Gas Recirculation Flow [EGR system malfunction]	• EGR (Exhaust Gas Recirculation) valve assembly • Open or short in EGR circuit • EGR passage • ECM	○	○
P0403 (05-498)	Exhaust Gas Recirculation Control Circuit [EGR valve]		○	○





DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	*2 Memory
P0488 (05-502)	Exhaust Gas Recirculation Throttle Position Control Range/ Performance [Intake shutter]	• Open or short in intake shutter control motor circuit • Open or short in intake shutter valve fully opened switch circuit • Intake shutter • ECM	○	○
P0500 (05-508)	Vehicle Speed Sensor "A" [Vehicle speed sensor]	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM • Skid control ECU	○	○
P0504 (05-511)	Brake Switch "A"/"B" Correlation [Stop lamp rationality]	• Short in stop lamp switch signal circuit • Stop lamp switch • ECM	—	○
P0560 (05-515)	System Voltage [Engine control module power source]	• Open in backup power source circuit • Low battery voltage • ECM	○	○
P0606 (05-518)	ECM/PCM Processor [ECM]	• ECM	—	—
P0607 (05-518)	Control Module Performance [ECM]		○	○
P0622 (05-519)	Generator Field "F" Terminal Circuit [Alternator system malfunction]	• Open in generator (alternator) circuit • Generator (alternator) • Drive belt • ECM	○	○
P0627 (05-522)	Fuel Pump Control Circuit / Open [Common rail system malfunction]	• Open or shot in suction control valve circuit • Suction control valve • ECM	○	○
P1229 (05-427)	Fuel Pump System [Common rail system malfunction]	• Short in supply pump (suction control valve) circuit • Supply pump (suction control valve) • ECM	○	○
P1238 (05-525)	Injector Malfunction [Rough idling (misfire)]	• Injector • EDU (DTC P0200 set simultaneously) • Open or short in engine wire harness (DTC P0200 set simultaneously) • Connector connection (DTC P0200 set simultaneously) • Compression pressure • Valve clearance • Valve timing • ECM	○	○
P1251 (05-479)	Turbo/Super Charger Overboost Condition (Too High) [Turbocharger system malfunction]	• VRV (Vacuum Regulating Valve) • Open or short in VRV circuit • Turbocharger assembly • EGR valve assembly • Vacuum hose • ECM	○	○
P1271 (05-529)	Fuel Regulator Circuit Malfunction (EDU Drive) [EDU system for pressure discharge valve malfunction]	• Open or short in pressure discharge valve circuit • Open or short in pressure discharge valve itself • EDU • ECM	○	○
P1272 (05-529)	Fuel Pressure Regulator Malfunction [Pressure discharge valve]	• Open or short in pressure discharge valve circuit (DTC P1271 set simultaneously) • Pressure discharge valve • Supply pump • ECM	○	○
P1601 (05-539)	Injector Correction Circuit Malfunction (EEPROM) [ECM]	• Injector compensation code • ECM	○	○
P1611 (05-518)	IC Circuit Malfunction [ECM]	• ECM	○	○





DTC No. (See Page)	Detection Item	Trouble Area	*1 MIL	*2 Memory
P2120 (05-541)	Throttle/Pedal Position Sensor/ Switch "D" Circuit [Accelerator pedal position sensor (sensor1)]	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○
P2121 (05-547)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Range/Performance [Accelerator pedal position sensor rationality (sensor1)]	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○
P2122 (05-541)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Low Input [Accelerator pedal position sensor low input (sensor1)]	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○
P2123 (05-541)	Throttle/Pedal Position Sensor/ Switch "D" Circuit High Input [Accelerator pedal position sensor high input (sensor1)]		○	○
P2125 (05-541)	Throttle/Pedal Position Sensor/ Switch "E" Circuit [Accelerator pedal position sensor (sensor2)]		○	○
P2127 (05-541)	Throttle/Pedal Position Sensor/ Switch "E" Circuit Low Input [Accelerator pedal position sensor low input (sensor2)]		○	○
P2128 (05-541)	Throttle/Pedal Position Sensor/ Switch "E" Circuit High Input [Accelerator pedal position sensor high input (sensor2)]		○	○
P2138 (05-541)	Throttle/Pedal Position Sensor/ Switch "D"/"E" Voltage Correlation [Accelerator pedal position sensor malfunction]		○	○
P2226 (05-550)	Barometric Pressure Circuit [ECM]	• ECM	○	○
P2227 (05-551)	Barometric Pressure Circuit Range/Performance [ECM]		○	○
P2228 (05-550)	Barometric Pressure Circuit Low Input [ECM]		○	○
P2229 (05-550)	Barometric Pressure Circuit High Input [ECM]		○	○
B2799	Engine Immobilizer System Malfunction	• Immobilizer system	—	○

*1: "○": MIL (Malfunction Indicator Lamp) illuminates, "—": MIL does not illuminate.
*2: "○": DTC is stored in the ECM, "—": DTC is not stored in the ECM.





DTC	P0045	TURBO/SUPER CHARGER BOOST CONTROL SOLENOID CIRCUIT / OPEN

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P0045	Open or short in VRV circuit for 0.5 seconds or more (1 trip detection logic)	• VRV (Vacuum Regulating Valve) • Open or short in VRV circuit • ECM

WIRING DIAGRAM

Refer to DTC P0234 on page 05-479.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	INSPECT VACUUM REGULATING VALVE ASSY (See page 12-2 of Pub. No. RM1039E COROLLA Supplement)

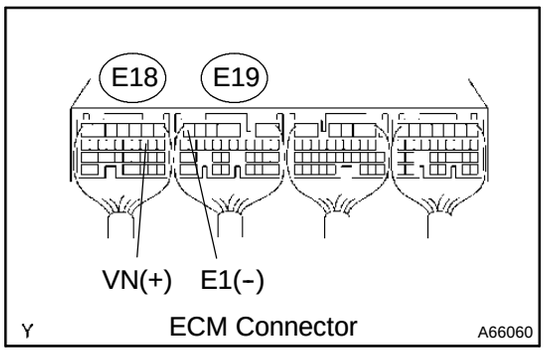
OK:

The VRV (Vacuum Regulating Valve) resistance is within the standard range and the VRV operates normally.

NG → **REPLACE VACUUM REGULATING VALVE ASSY (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK ↓

2	INSPECT ECM(VN VOLTAGE)

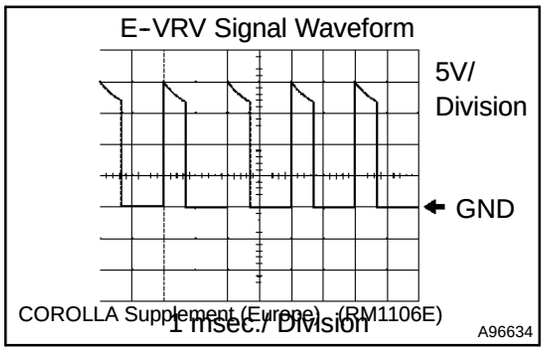


(a) Inspect the ECM using an oscilloscope.

(b) While idling, check the waveform between terminals VN and E1 of the E18 and E19 ECM connectors.

Standard:

Tester Connection	Specified Condition
VN (E18-10) - E1 (E19-7)	Correct waveform shown

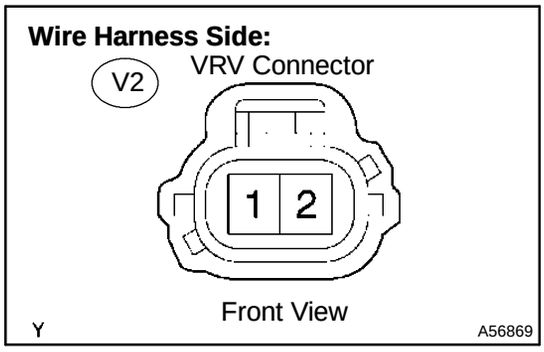


NG	Go to step 3

OK

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-380)**

3 CHECK HARNESS AND CONNECTOR(VRV - ECM)



(a) Disconnect the V2 VRV connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

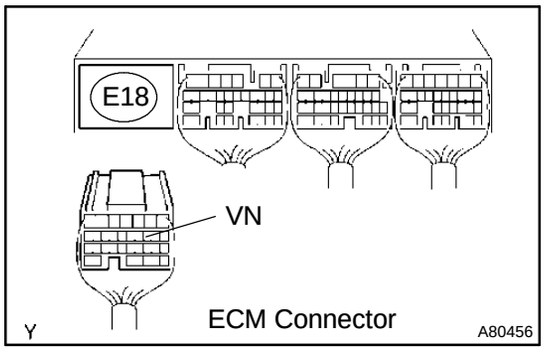
Standard (Check for open):

Tester Connection	Specified Condition
VN (E18-10) - (V2-2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VN (E18-10) or (V2-2) - Body ground	10 kΩ or higher

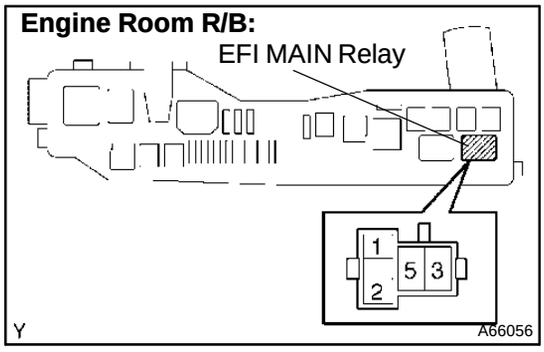
(d) Reconnect the VRV connector.
(e) Reconnect the ECM connector.

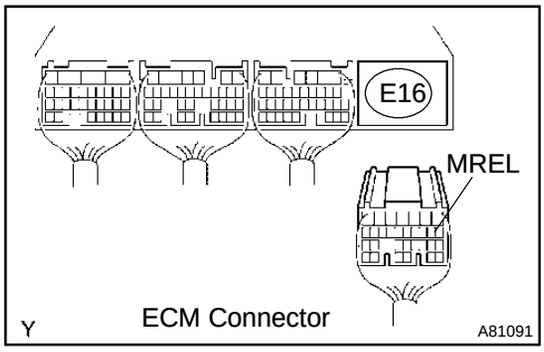


NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(VRV - EFI MAIN RELAY)





(a) Remove the EFI MAIN relay from the engine room R/B.
(b) Disconnect the E16 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI MAIN relay (1) - MREL (E16-8)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI MAIN relay (1) or MREL (E16-8) - Body ground	10 kΩ or higher

(d) Reinstall the EFI MAIN relay.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0087	FUEL RAIL/SYSTEM PRESSURE - TOO LOW

DTC	P0190	FUEL RAIL PRESSURE SENSOR CIRCUIT

DTC	P0192	FUEL RAIL PRESSURE SENSOR CIRCUIT LOW INPUT

DTC	P0193	FUEL RAIL PRESSURE SENSOR CIRCUIT HIGH INPUT

HINT:

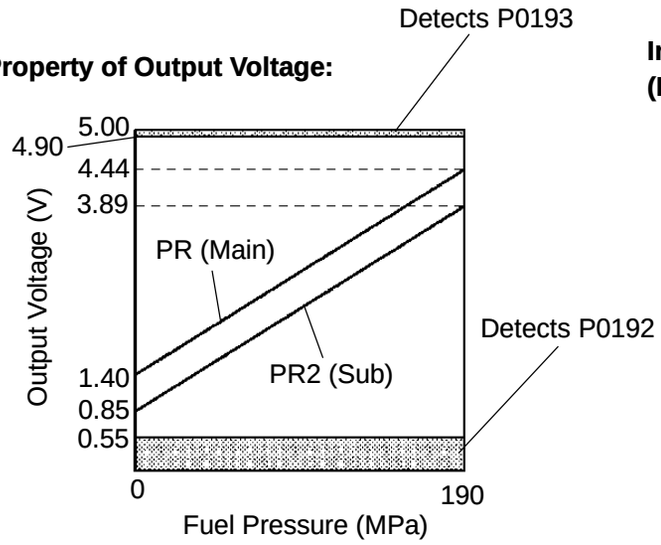
- For more information on the fuel pressure sensor and the common rail system, see page 05-365.
- If DTC P0087, P0190, P0192 and/or P0193 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

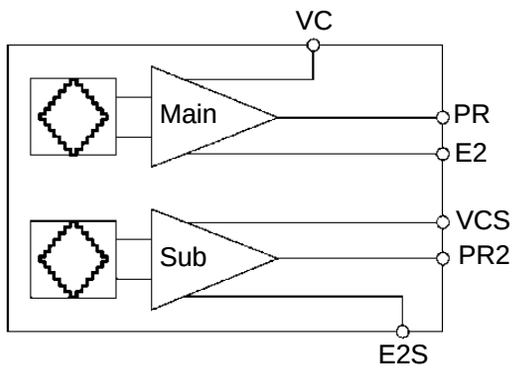
The ECM monitors an internal fuel pressure of the common rail using the fuel pressure sensor, and controls the suction control valve to regulate the internal fuel pressure to the target pressure, approximately 30 to 180 MPa (306 to 1,835 kgf/cm^2, 4,351 to 26,106 psi).

The pressure sensor is a semiconductor pressure sensor that varies electric resistance when applying pressure to its silicon. This sensor output voltage changes in proportion to the internal fuel pressure. The sensor has been designed as a duplicate circuit, and its main (PR) circuit is used under normal condition. Even if either of the sensor circuit is failed, the other normal circuit will be used to monitor the internal fuel pressure.

Property of Output Voltage:



Internal Structure of the Pressure Sensor (Duplicate System):



Y

A91222

DTC No.	DTC Detection Condition	Trouble Area
P0087	Fuel pressure sensor output voltage stays at fixed value (1 trip detection logic)	• Open or short in fuel pressure sensor circuit • Fuel pressure sensor • ECM
P0190	Fuel pressure sensor output voltage 0.55 V or less, or 4.9 V or more for 0.5 seconds (1 trip detection logic)	
P0192	Fuel pressure sensor output voltage 0.55 V or less for 0.5 seconds (1 trip detection logic)	
P0193	Fuel pressure sensor output voltage 4.9 V or more for 0.5 seconds (1 trip detection logic)	

HINT:
When DTC P0087, P0190, P0192 and/or P0193 is set, check the internal fuel pressure of the common rail by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

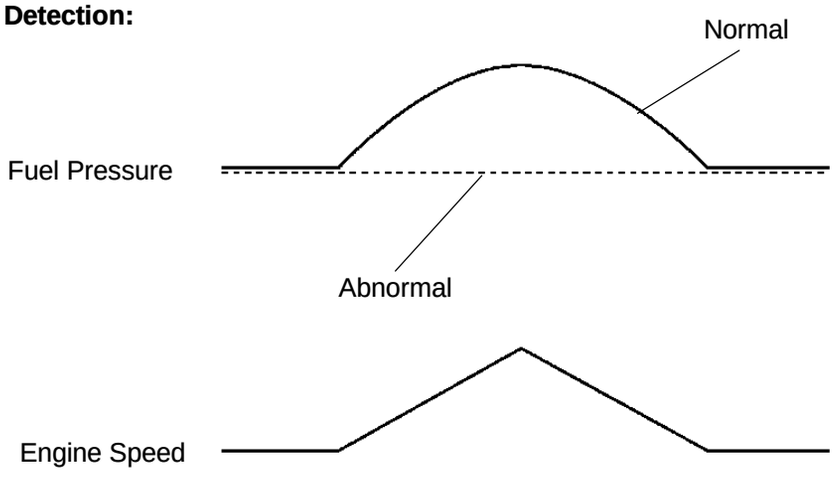
Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

MONITOR DESCRIPTION

P0087 (Fuel pressure sensor output stays at fixed value):
Under normal condition, the internal fuel pressure of the common rail usually varies by 1 to 2 MPa (10 to 20 kgf/cm^2, 145 to 290 psi) even when the driving condition is constant. The internal fuel pressure is approximately 30 to 40 MPa (306 to 408 kgf/cm^2, 4,351 to 5,801 psi) when idling, and it increases to approximately 50 to 100 MPa (510 to 1,020 kgf/cm^2, 7,251 to 14,503 psi) when running the engine at 2,500 rpm. This DTC is set if there is no fluctuation in the internal fuel pressure.
If this DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

P0190, P0192 and P0193 (Open or short in fuel pressure sensor circuit):
These DTCs are set if the fuel pressure sensor output voltage is out of the standard range. The DTCs stand for an open or short malfunction of the sensor circuit.
If these DTCs are set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

P0087 Malfunction Detection:



MONITOR STRATEGY

P0087:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	1 second
MIL operation	1 driving cycle

P0190:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	0.5 seconds
MIL operation	1 driving cycle

P0192:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	0.5 seconds
MIL operation	1 driving cycle

P0193:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	0.5 seconds
MIL operation	1 driving cycle

TYPICAL ENABLING CONDITIONS

P0087:

Item	Specification	
	Minimum	Maximum
Engine speed	500 rpm	-
Battery voltage	8 V	-
Fuel volume	5 mm^3	-
Monitor does not run if fuel pressure sensor circuit (P0190, P0192 and P0193) malfunctioning		

TYPICAL MALFUNCTION THRESHOLDS

P0087:

Detection Criteria	Threshold
Changing value of fuel pressure	Virtually no fluctuation

P0190:

Detection Criteria	Threshold
Fuel pressure sensor output voltage	Less than 0.55 V or more than 4.9 V

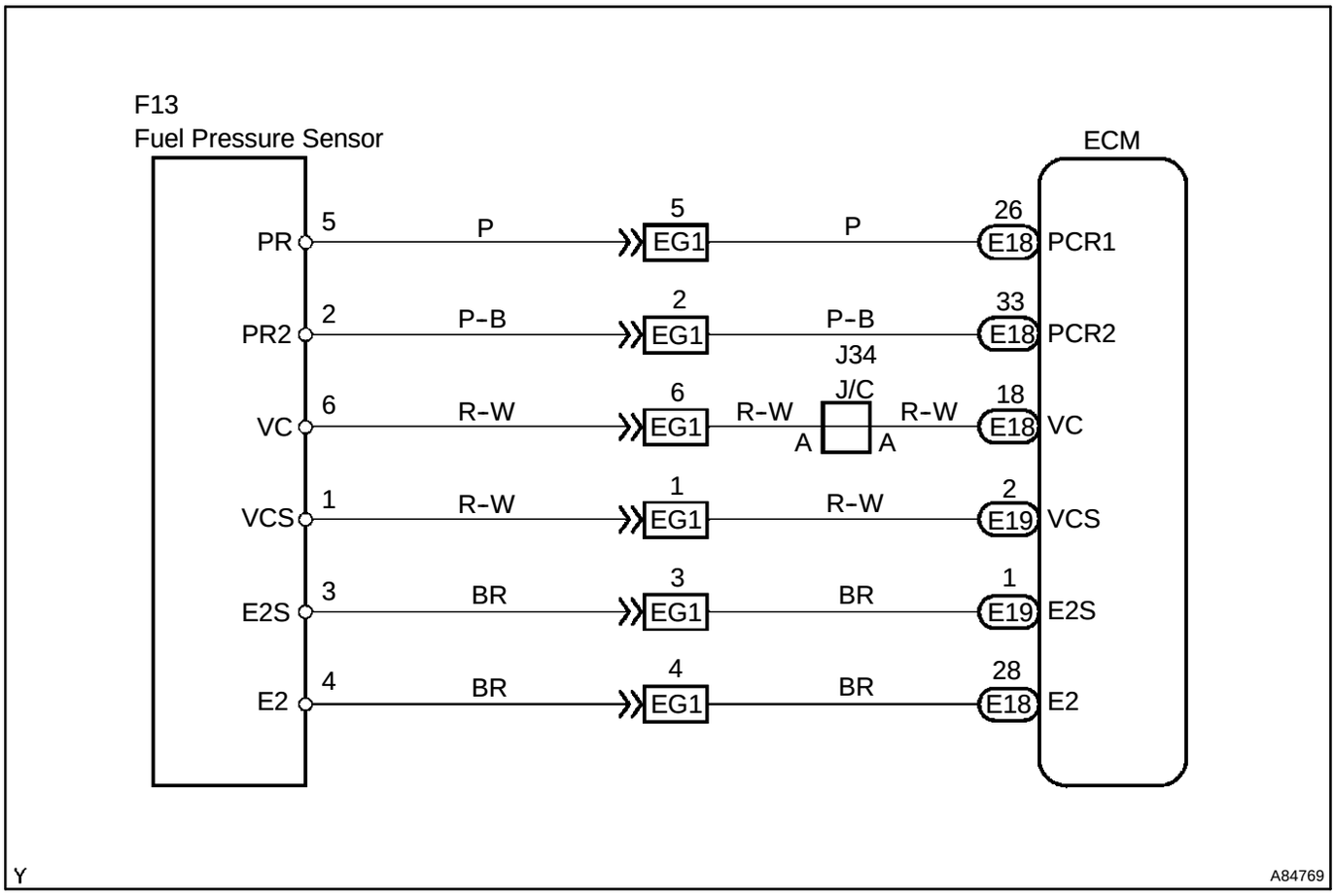
P0192:

Detection Criteria	Threshold
Fuel pressure sensor output voltage	Less than 0.55 V

P0193:

Detection Criteria	Threshold
Fuel pressure sensor output voltage	More than 4.9 V

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- After completing repairs, check that DTC P0087, P0190, P0192 and/or P0193 is not set again.
- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(FUEL PRESSURE)

(a) Connect an intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Common Rail Pressure.
(d) Check that the internal fuel pressure of the common rail is within the specification below.
Standard:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

NG → **Go to step 3**

OK

2 CHECK IF DTC OUTPUT RECURS(FUEL PRESSURE SENSOR DTCS)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(d) Clear DTCs.
(e) Let the engine idle for 60 seconds, and repeat quick engine RPM accelerations (to 2,500 rpm) for 30 seconds.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs.

Result:

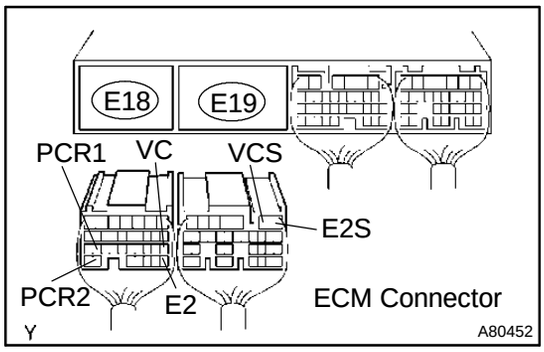
Display (DTC Output)	Proceed To
P0087, P0190, P0192 and/or P0193	A
No output	B

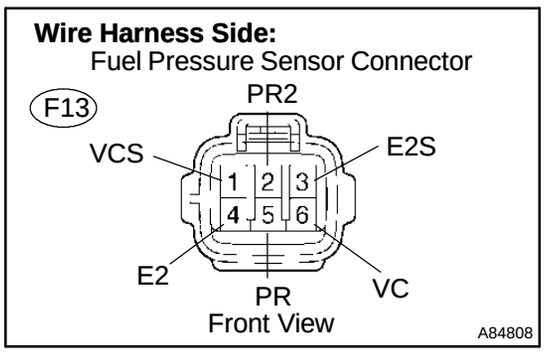
B → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

A

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

3 CHECK HARNESS AND CONNECTOR(FUEL PRESSURE SENSOR - ECM)





(a) Disconnect the E18 and E19 ECM connectors.
(b) Disconnect the F13 fuel pressure sensor connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PCR1 (E18-26) - PR (F13-5)	Below 1 Ω
PCR2 (E18-33) - PR2 (F13-2)	
VCS (E19-2) - VCS (F13-1)	
VC (E18-18) - VC (F13-6)	
E2 (E18-28) - E2 (F13-4)	
E2S (E19-1) - E2S (F13-3)	

Standard (Check for short):

Tester Connection	Specified Condition
PCR1 (E18-26) or PR (F13-5) - Body ground	10 kΩ or higher
PCR2 (E18-33) or PR2 (F13-2) - Body ground	
VCS (E19-2) or VCS (F13-1) - Body ground	
VC (E18-18) or VC (F13-6) - Body ground	
E2 (E18-28) or E2 (F13-4) - Body ground	
E2S (E19-1) or E2S (F13-3) - Body ground	

(d) Reconnect the ECM connectors.
(e) Reconnect the fuel pressure sensor connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

DTC	P0088	FUEL RAIL/SYSTEM PRESSURE - TOO HIGH

DTC	P1229	FUEL PUMP SYSTEM

HINT:

- For more information on the supply pump (suction control valve) and the common rail system, see page 05-365.
- If DTC P0088 and/or P1229 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

Refer to the description on page 05-365.

DTC No.	DTC Detection Condition	Trouble Area
P0088	• Internal fuel pressure of common rail too high: Fuel pressure exceeds 200 MPa (2,039 kgf/cm^2, 29,007 psi) (1 trip detection logic)	• Supply pump (suction control valve) • Pressure discharge valve • Short in supply pump (suction control valve) circuit • Open in pressure discharge valve circuit • ECM
P1229	• Fuel over-feed: Internal fuel pressure continues exceeding target fuel pressure despite ECM closing suction control valve (1 trip detection logic)	• Short in supply pump (suction control valve) circuit • Supply pump (suction control valve) • ECM

HINT:

When DTC P0088 and/or P1229 is set, check the internal fuel pressure of the common rail by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

MONITOR DESCRIPTION

P0088 (Internal fuel pressure too high):

The ECM sets this DTC if the fuel pressure inside the common rail is beyond 200 MPa (2,039 kgf/cm^2, 29,007 psi). This DTC indicates that the suction control valve may be stuck open, or there may be short in its circuit, and the pressure discharge valve may be stuck closed, or there may be open in its circuit.

If this DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

P1229 (Fuel over-feed):

The ECM sets this DTC if the actual fuel pressure inside the common rail remains higher than the target fuel pressure, despite the ECM closing the suction control valve. This DTC represents that the suction control valve may be stuck open, or there may be short in its circuit. Under this condition, the pressure discharge valve operates frequently.

If this DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

MONITOR STRATEGY

P0088:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	1 second
MIL operation	1 driving cycle

P1229:

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	1 minute
MIL operation	1 driving cycle

TYPICAL ENABLING CONDITIONS

P0088:

Specification
Monitor dose not run if fuel pressure sensor, or suction control valve circuit, or pressure discharge valve malfunctioning

P1229:

Item	Specification
Target fuel pressure variation	Small
Monitor dose not run if fuel pressure sensor, or suction control valve circuit, or pressure discharge valve malfunctioning	

TYPICAL MALFUNCTION THRESHOLDS

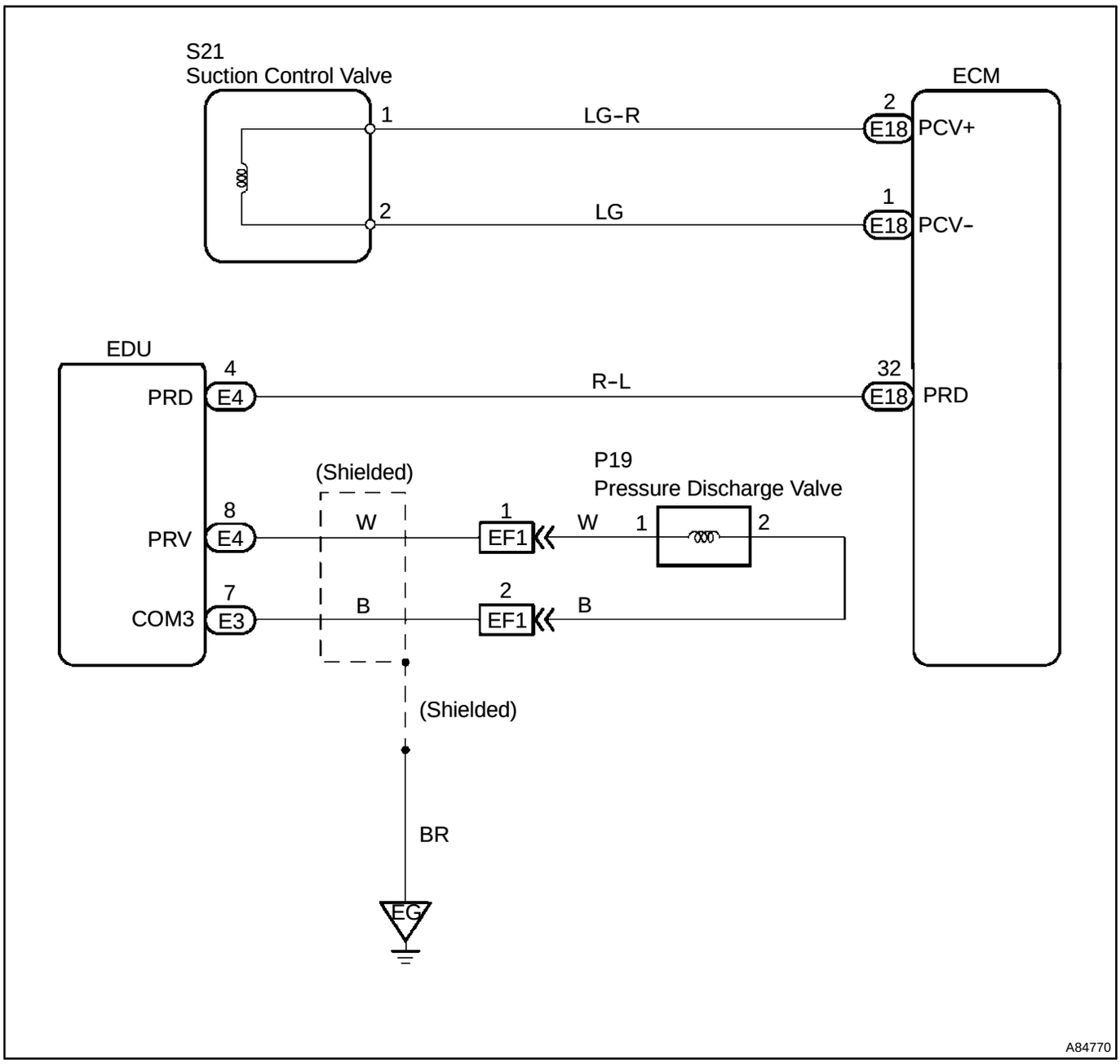
P0088:

Detection Criteria	Threshold
Fuel pressure sensor	200 MPa (2,039 kgf/cm^2, 29,007 psi) or more

P1229:

Item	Threshold
Internal fuel pressure of common rail when the suction control valve closed	Remains higher than target fuel pressure
Behavior of pressure discharge valve	Frequently operates

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0088 AND/OR P1229)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0088, or P0088 and P1229	A
P1229	B
P0190, P0191, P0192, P0193 and/or P1271	C
P1272	D

B → **Go to step 4**

C → **GO TO RELEVANT DTC CHART**
(See page 05-412)

D → **Go to step 3**

A

2	READ OUTPUT DTC(SEE IF DTC P1272 IS OUTPUT)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(d) Clear DTCs.
(e) Start the engine and turn the ignition switch to OFF. Wait for 10 seconds.
(f) Restart the engine and turn the ignition switch to OFF again.
(g) Select the following menu items: Powertrain / Engine and ECT / DTC.
(h) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P1272	A
No output	B

B → **Go to step 4**

A

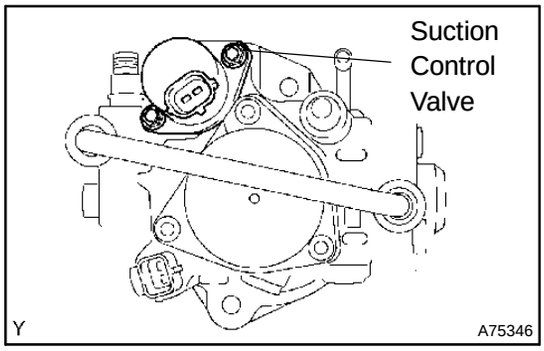
3	REPLACE COMMON RAIL ASSY(PRESSURE DISCHARGE VALVE) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P0088 AND/OR P1229)

HINT:
After clearing the DTC(s), drive the vehicle at 50 km/h (31 mph) for 5 minutes, and then confirm that DTC P0088 and/or P1229 is not present again.

4	INSPECT INJECTION OR SUPPLY PUMP ASSY(SUCTION CONTROL VALVE)



(a) Disconnect the S21 suction control valve connector.
(b) Measure the resistance between the terminals of the suction control valve.
Standard: 1.9 to 2.3 Ω at 20°C (68°F)
(c) Reconnect the suction control valve connector.

NG → **REPLACE INJECTION OR SUPPLY PUMP ASSY (SUCTION CONTROL VALVE)** **(See page 11-15 of Pub. No. RM1039E COROLLA Supplement)**

OK

5	CHECK IF DTC OUTPUT RECURS(DTC P1229)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(d) Clear DTCs.
(e) Disconnect the suction control valve connector and then start the engine. Wait for 1 minute.
HINT:
If the engine does not start, the suction control valve is normal. Therefore proceed to step 6.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs.
Result:

Display (DTC Output)	Proceed To
No output	A
P1229	B

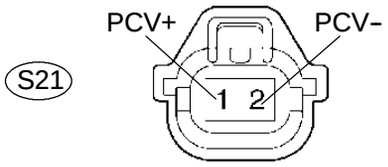
B → **REPLACE INJECTION OR SUPPLY PUMP ASSY (SUCTION CONTROL VALVE)** **(See page 11-15 of Pub. No. RM1039E COROLLA Supplement)**

A

6 CHECK HARNESS AND CONNECTOR(SUCTION CONTROL VALVE - ECM)

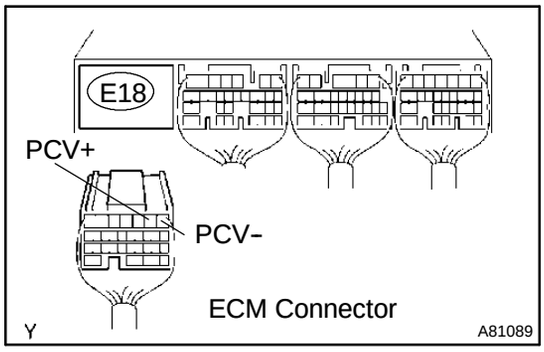
Wire Harness Side:

Suction Control Valve Connector



Front View

A81460



ECM Connector

A81089

(a) Disconnect the S21 suction control valve connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PCV+ (S21-1) - PCV+ (E18-2)	Below 1 Ω
PCV- (S21-2) - PCV- (E18-1)	

Standard (Check for short):

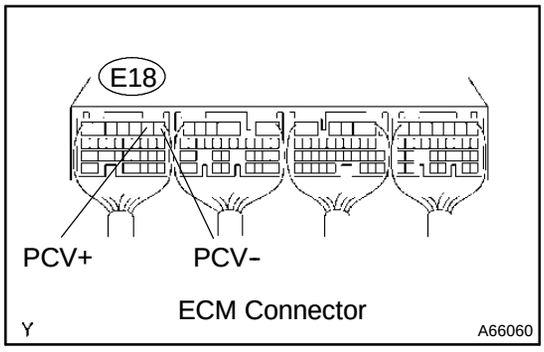
Tester Connection	Specified Condition
PCV+ (S21-1) or PCV+ (E18-2) - Body ground	10 kΩ higher
PCV- (S21-2) or PCV- (E18-1) - Body ground	

(d) Reconnect the suction control valve connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

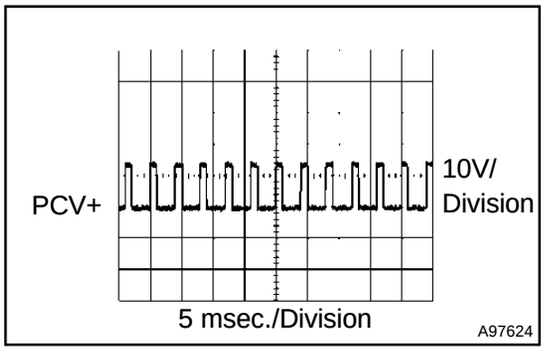
7	INSPECT ECM(PCV VOLTAGE)



(a) Inspect the ECM using an oscilloscope.
(b) While cranking or idling, check the waveform between the terminals of the E18 ECM connector.

Standard :

Tester Connection	Specified Condition
PCV+ (E18-2) - PCV- (E18-1)	Correct waveform shown



NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

CHECK IF DTC OUTPUT RECURS (DTC P0088 AND/OR P1229)

HINT:
After clearing the DTC(s), drive the vehicle at 50 km/h (31 mph) for 5 minutes, and then confirm that DTC P0088 and/or P1229 is not present again.

DTC	P0093	FUEL SYSTEM LEAK DETECTED - LARGE LEAK

HINT:

- If DTC P1229 is set, P0093 (fuel leaks from high-pressure areas) may be set simultaneously. This may be due to the extremely high internal fuel pressure in the common rail opening the pressure limiter, and the ECM interpreting this as a fault and setting P0093.
- For more information on the common rail system, see page 05-365.
- If DTC P0093 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

Refer to the description on page 05-365.

DTC No.	DTC Detection Condition	Trouble Area
P0093	Fuel leaks from high-pressure areas (1 trip detection logic)	• Fuel line between supply pump and common rail • Fuel line between common rail and each injector • Supply pump • Common rail • Injectors (P1238 set simultaneously) • Pressure discharge valve • Open or short in EDU circuit (P0200 set simultaneously • Open or short in injector circuit (P0200 and P1238 set simultaneously) • EDU (P0200 set simultaneously • ECM

HINT:

When DTC P0093 is set, check the internal fuel pressure of the common rail by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

MONITOR DESCRIPTION

P0093 (Fuel leaks from high-pressure areas):

This DTC indicates fuel leaks that exist in highly-pressurized areas in the common rail system. The ECM constantly monitors the internal fuel pressure of the common rail after the engine is started, and the ECM then sets this DTC if the drop in the internal fuel pressure is large when injecting the fuel.

In the common rail system, high-pressure fuel, approximately 30 to 180 MPa (306 to 1,835 kgf/cm^2, 4,351 to 26,106 psi), is always supplied to the high-pressure areas including the supply pump, common rail, injectors and piping. The ECM adjusts the suction control valve opening angle to obtain the target internal fuel pressure.

If this DTC is set, the ECM enters fail-safe mode. Fail-safe mode suspends both fuel injection and supply pump operation, and then stops the engine. Before stopping the engine, the ECM permits the vehicle to be driven for 1 minute. Fail-safe mode continues until the ignition switch is turned to OFF.

MONITOR STRATEGY

Required sensors	Fuel pressure sensor
Frequency of operation	Continuous
Duration	1 second
MIL operation	1 driving cycle

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Engine speed	600 rpm	-
Monitor does not run if fuel pressure sensor, suction control valve circuit, or pressure discharge valve malfunctioning		

TYPICAL MALFUNCTION THRESHOLDS

Threshold
Drop in internal fuel pressure large when injecting fuel

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0093)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0093	A
P0093 and P1238	B
P0093 and P0200 and/or P1271	C

B → **Go to step 3**

C → **GO TO RELEVANT DTC CHART**
(See page 05-412)

A

2 CHECK FUEL LEAKAGE(IN HIGH-PRESSURE FUEL PARTS AND AREAS)

(a) Visually check the supply pump, each injector and fuel line located between the supply pump and common rail for fuel leaks or fuel pressure leaks. Also, perform the same on the fuel line between the common rail and the each injector (see page 11-5, 11-15 of Pub. No. RM1039E COROLLA Supplement).

HINT:

There is possibility that fuel leaks inside the components (supply pump, etc) have been occurred.

OK: No leakage

NG → **REPAIR OR REPLACE**

OK

3	READ VALUE USING INTELLIGENT TESTER II(COMPENSATORY INJECTION VOLUME FOR EACH CYLINDER)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Revised Injection Volume #1, #2, #3 and #4.
(d) Read the value.
Standard: Compensatory Injection Volume is between -4.9 mm^3 and 4.9 mm^3

HINT:
- If the injector is malfunctioning, the compensatory injection volume remains at -5.0 mm^3 or 5.0 mm^3.
- The compensatory injection volume is usually between -3.0 mm^3 and 3.0 mm^3.

NG → **REPLACE INJECTOR ASSY (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

4	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(FUEL LEAK TEST)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel leak test.
(d) Check for fuel leaks from the high-pressure areas.

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P0093)

HINT:
- After clearing the DTC, let the engine idle for 1 minute and then run it at 2,500 rpm for 30 seconds.
- At the same time, check the fuel pressure inside the common rail by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Common Rail Pressure.
- The internal fuel pressure of the common rail must be stable under each driving condition.
Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

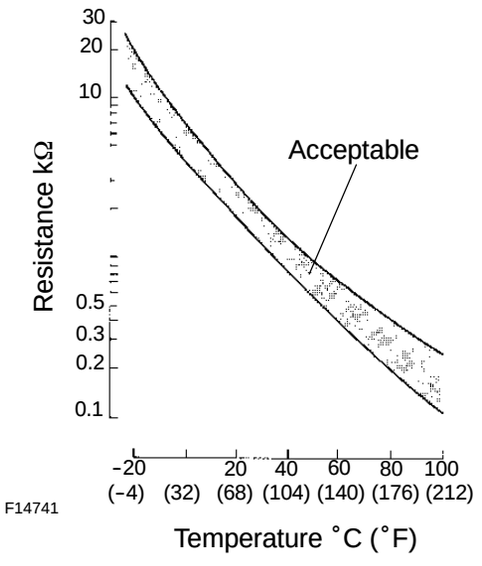
DTC	P0095	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT

DTC	P0097	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT LOW

DTC	P0098	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT HIGH

CIRCUIT DESCRIPTION

(Figure 1)



F14741

A56276

The diesel turbo inlet air temperature sensor is built into the intake air connector and senses the intake air temperature. A built-in thermistor of the sensor changes the resistance value according to the intake air temperature. The lower the intake air temperature is, the greater the thermistor resistance value becomes, and the higher the temperature is, the lower the resistance value becomes (see figure 1).

The sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the sensor from terminal THIA via resistor R. Resistor R and the sensor are connected in series. When the resistance value of the sensor changes in accordance with changes in the intake air temperature, the potential at terminal THIA also changes. Based on this signal, the ECM corrects the fuel injection volume to improve the driveability with a cold engine.

DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0095	Step 1	Open or short in diesel turbo inlet air temperature sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in diesel turbo inlet air temperature sensor circuit • Diesel turbo inlet air temperature sensor • ECM
P0097	Step 4	• Short in diesel turbo inlet air temperature sensor circuit for 0.5 seconds (Sensor resistance value less than 25 Ω [Sensor output voltage less than 0.05 V]) (1 trip detection logic)	
P0098	Step 2	• Open in diesel turbo inlet air temperature sensor circuit for 0.5 seconds (Sensor resistance value more than 156 kΩ [Sensor output voltage more than 4.9 V]) (1 trip detection logic)	

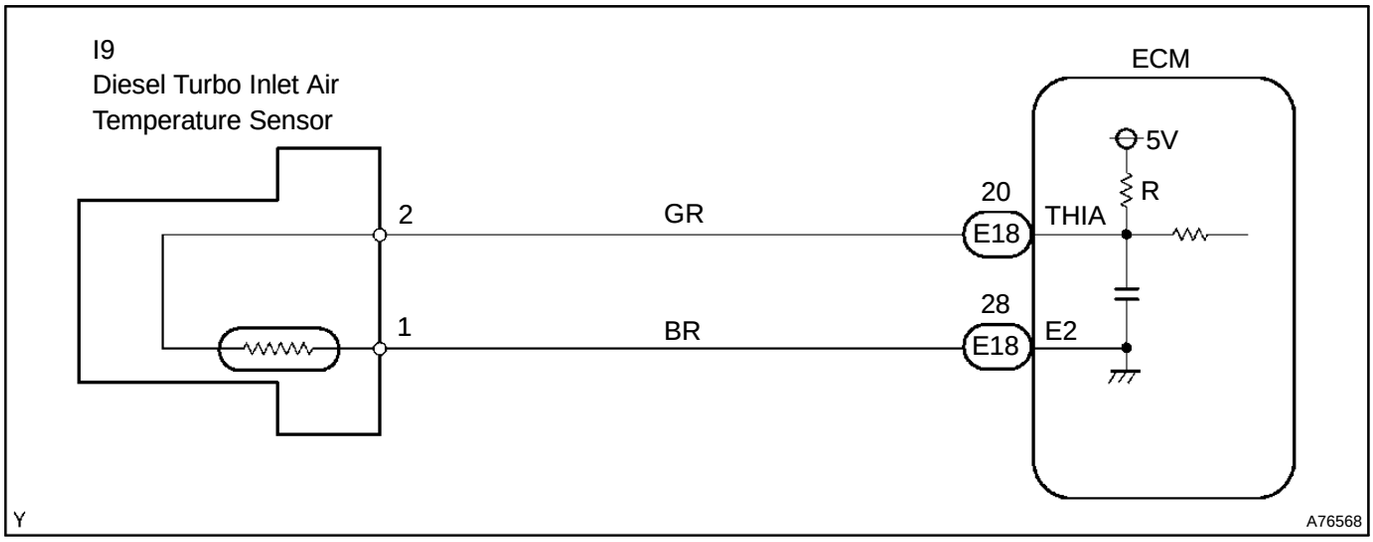
HINT:

When DTC P0095, P0097 and/or P0098 is set, check the intake air temperature by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Ambient Temperature.

Reference:

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Ambient Temperature.
(d) Read the value.
OK: Same value as the air temperature at the intake manifold.
Result:

Temperature Displayed	Proceed To
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as air temperature near intake manifold)	C

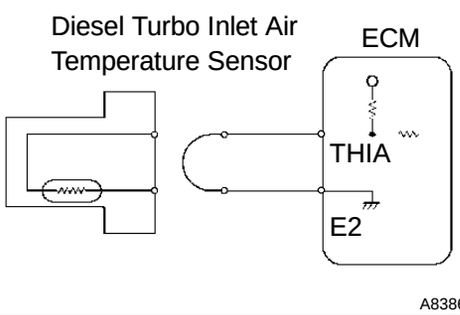
HINT:
- If there is an open circuit, the intelligent tester II indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester II indicates 140°C (284°F) or more.

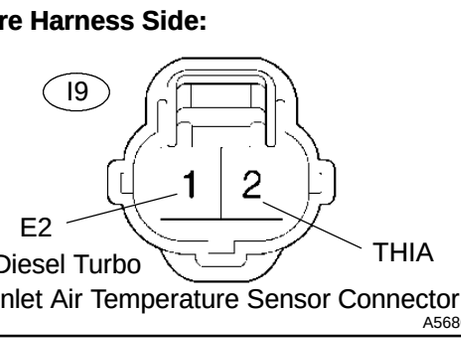
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

A

2	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



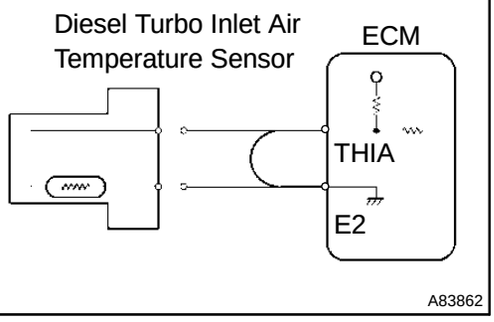


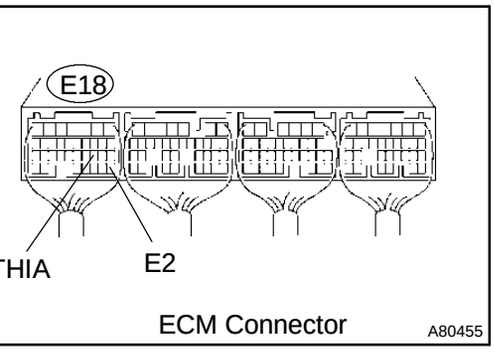
(a) Disconnect the I9 diesel turbo inlet air temperature sensor connector.
(b) Connect terminals 1 and 2 of the diesel turbo inlet air temperature sensor wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Ambient Temperature.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the diesel turbo inlet air temperature sensor connector.

OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE DIESEL TURBO INLET AIR TEMPERATURE SENSOR**

NG

3	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)





(a) Disconnect the I9 diesel turbo inlet air temperature sensor connector.
(b) Connect terminals THIA and E2 of the E18 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

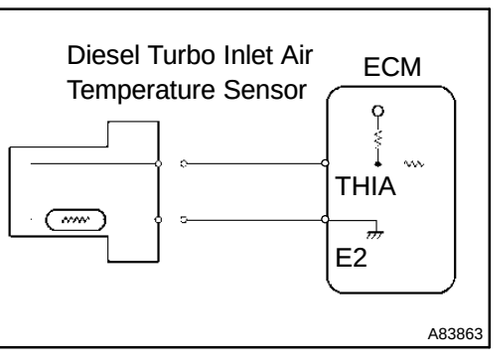
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Ambient Temperature.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the diesel turbo inlet air temperature sensor connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

4	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

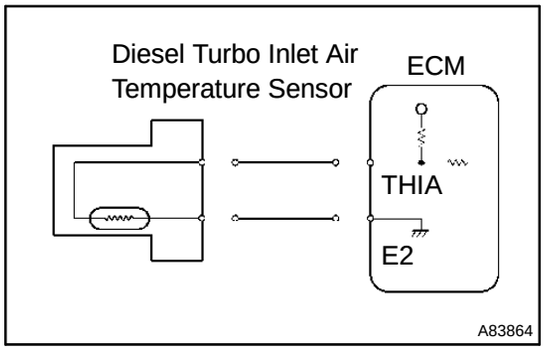


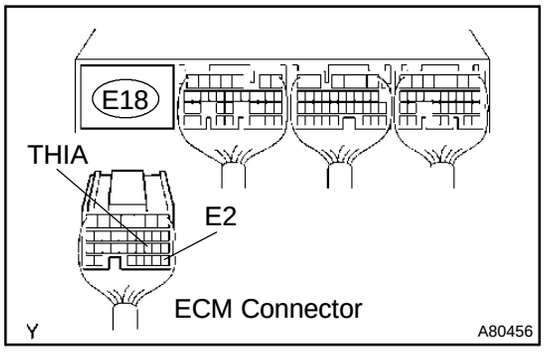
(a) Disconnect the I9 diesel turbo inlet air temperature sensor connector.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Ambient Temperature.
(e) Read the value.
Standard: -40°C (-40°F)
(f) Reconnect the diesel turbo inlet air temperature sensor connector.

OK	REPLACE DIESEL TURBO INLET AIR TENPERATURE SENSOR

NG

5	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the I9 diesel turbo inlet air temperature sensor connector.
(b) Disconnect the E18 ECM connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Ambient Temperature.
(f) Read the value.
Standard: -40°C (-40°F)
(g) Reconnect the diesel turbo inlet air temperature sensor connector.
(h) Reconnect the ECM connector.

OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0100	MASS OR VOLUME AIR FLOW CIRCUIT

DTC	P0102	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

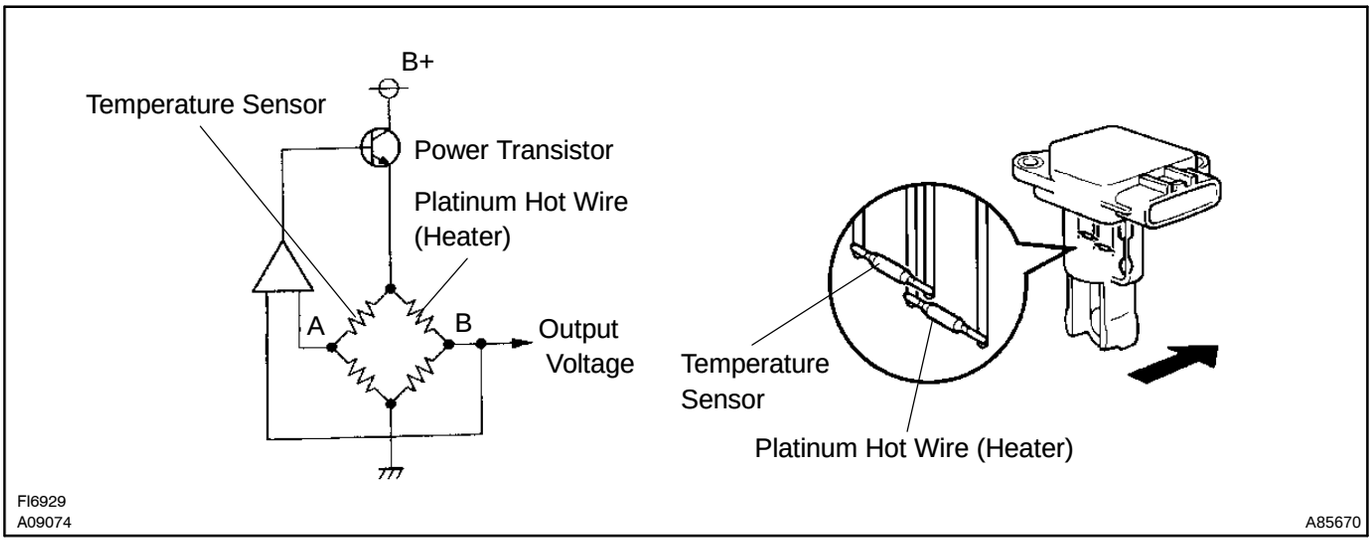
DTC	P0103	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The Mass Air Flow (MAF) meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provides a proper air-fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the flow of the air passing through the sensor. The ECM interprets this voltage as the intake air amount.

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



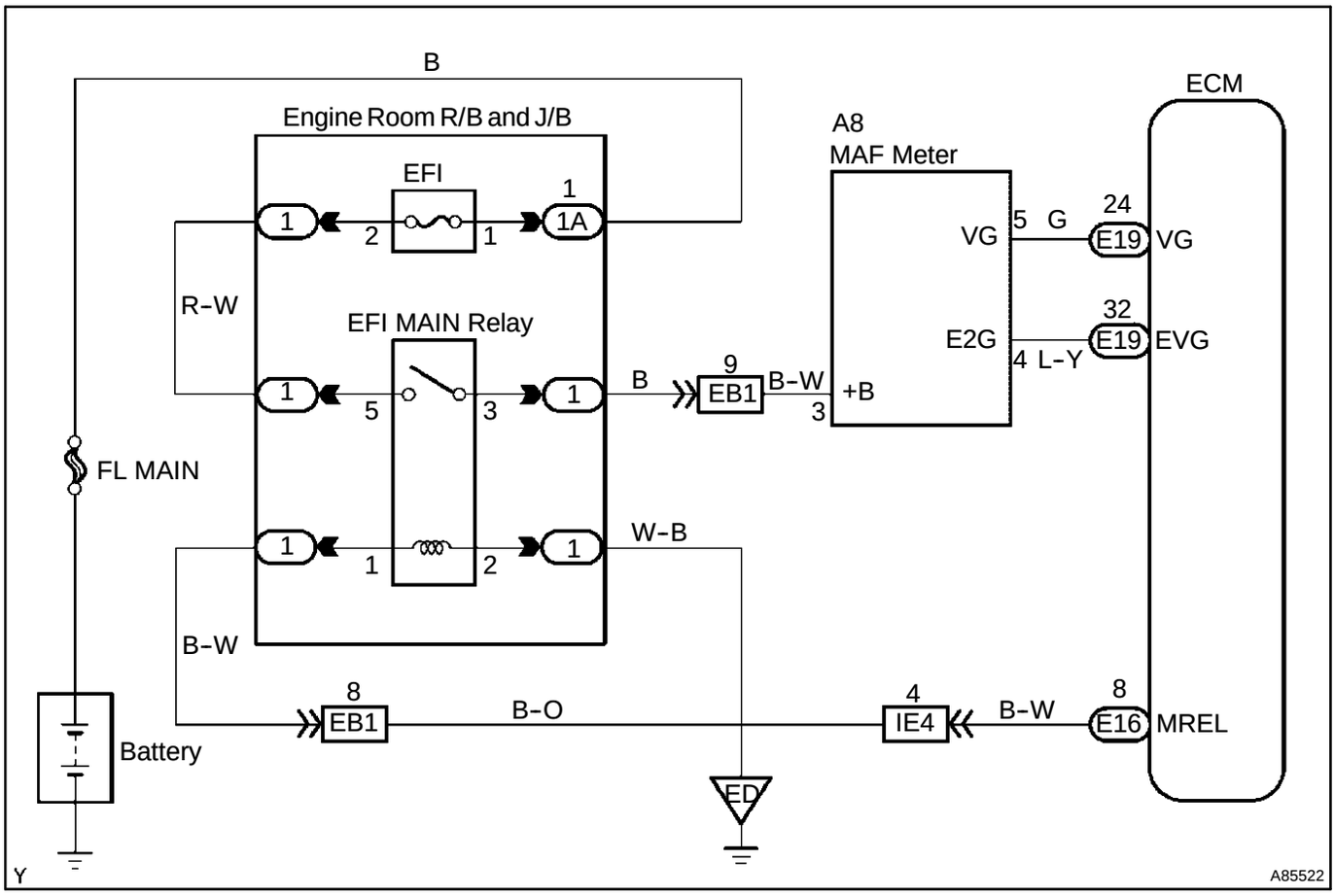
DTC No.	DTC Detection Condition	Trouble Area
P0100	Open or short in MAF meter circuit for more than 3 seconds at engine speed of 2,000 rpm or less (1 trip detection logic)	• Open or short in MAF meter circuit • MAF meter • ECM
P0102	Open in MAF meter circuit for more than 3 seconds at engine speed of 2,000 rpm or less (1 trip detection logic)	
P0103	Short in MAF meter circuit for more than 3 seconds at engine speed of 2,000 rpm or less (1 trip detection logic)	

HINT:
When DTC P0100, P0102 and/or P0103 is set, check the mass air flow rate by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / MAF.

Reference:

Air Flow Rate (gm/s)	Malfunction
Approximately 0.0	• Open in Mass Air Flow (MAF) meter power source circuit • Open or short in VG circuit
174.0 or more	• Open in EVG circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 READ VALUE USING INTELLIGENT TESTER II(MASS AIR FLOW RATE)

(a) Connect an intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(d) Read the value.

Result:

Air Flow Rate (gm/s)	Proceed To
0.0	A
174.0 or more	B
Between 1 and 173.0 (*1)	C

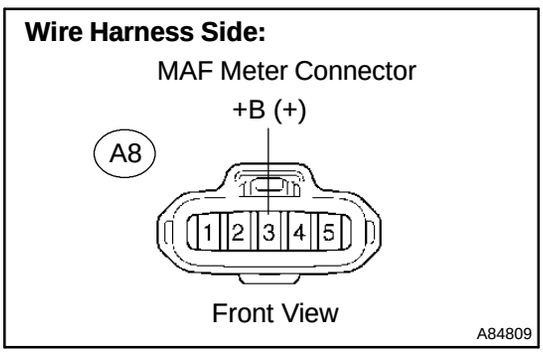
*1: The value must be changed when the throttle valve is open or closed.

B → **Go to step 6**

C → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

A

2 INSPECT MASS AIR FLOW METER(POWER SOURCE)



(a) Disconnect the A8 MAF meter connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminal of the wire harness side connector and the body ground.

Standard:

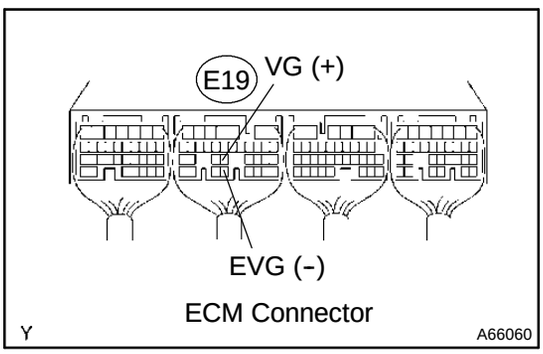
Tester Connection	Specified Condition
+B (A8-3) - Body ground	9 to 14 V

(d) Reconnect the MAF meter connector.

NG → **Go to step 5**

OK

3 INSPECT ECM(VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E19 ECM connector.

HINT:
The A/C switch should be turned OFF.

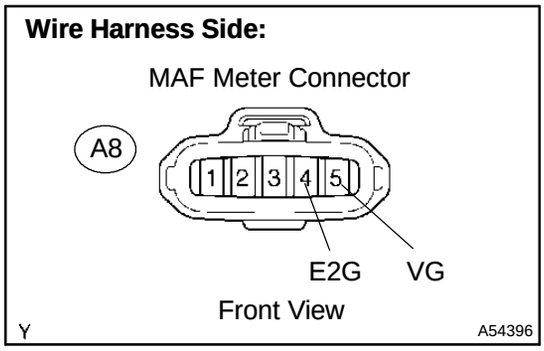
Standard:

Tester Connection	Condition	Specified Condition
VG (E19-24) - EVG (E19-32)	Engine idling	0.5 to 3.4 V

OK → **REPLACE ECM** **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

4 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



(a) Disconnect the A8 MAF meter connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

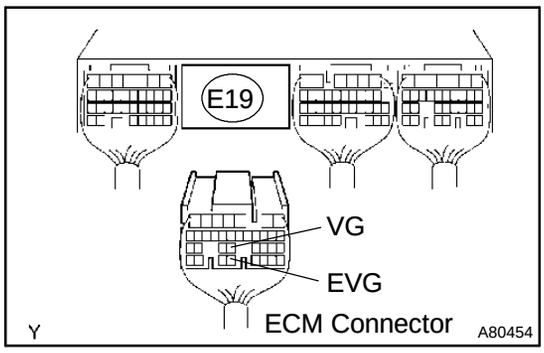
Standard (Check for open):

Tester Connection	Specified Condition
VG (A8-5) - VG (E19-24)	Below 1 Ω
E2G (A8-4) - EVG (E19-32)	

Standard (Check for short):

Tester Connection	Specified Condition
VG (A8-5) or VG (E19-24) - Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reconnect the ECM connector.

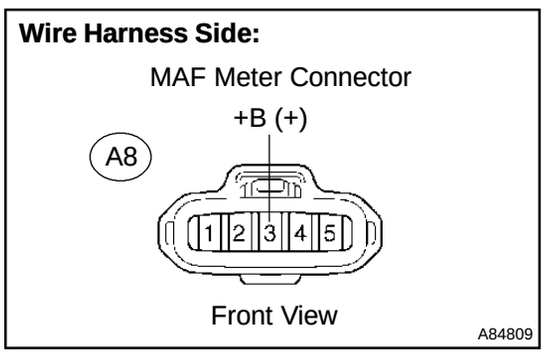


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

5 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - EFI MAIN RELAY)



(a) Disconnect the A8 MAF meter connector.
(b) Remove the EFI MAIN relay from the engine room R/B.
(c) Check the resistance.

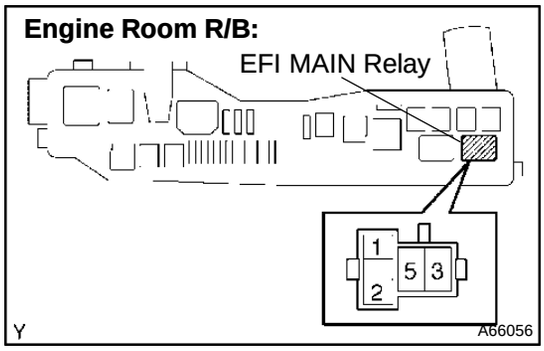
Standard (Check for open):

Tester Connection	Specified Condition
+B (A8-3) - EFI MAIN relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A8-3) or EFI MAIN relay (3) - Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reinstall the EFI MAIN relay.

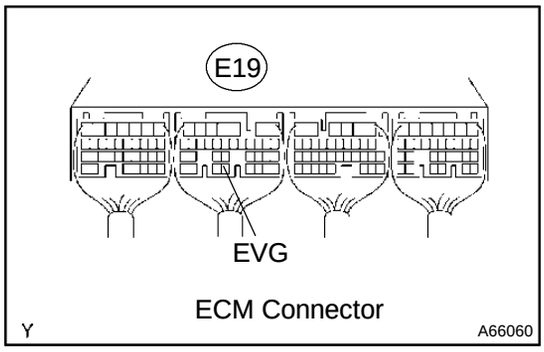


NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK ECM POWER SOURCE CIRCUIT (See page 05-552)

6 INSPECT ECM(SENSOR GROUND)



(a) Check the resistance between the terminal of the E19 ECM connector and body ground.

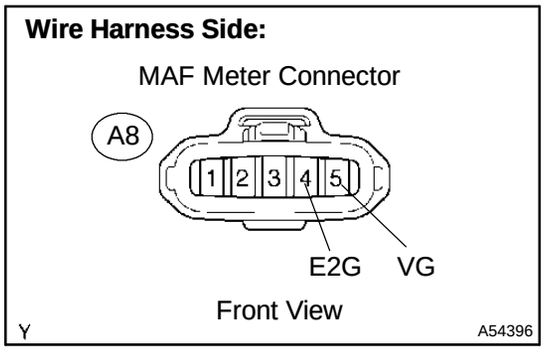
Standard:

Tester Connection	Specified Condition
EVG (E19-32) - Body ground	Below 1 Ω

NG	REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

OK

7 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



(a) Disconnect the A8 MAF meter connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

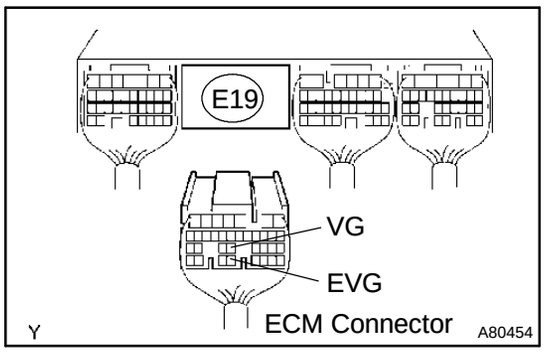
Standard (Check for open):

Tester Connection	Specified Condition
VG (A8-5) - VG (E19-24)	Below 1 Ω
E2G (A8-4) - EVG (E19-32)	

Standard (Check for short):

Tester Connection	Specified Condition
VG (A8-5) or VG (E19-24) - Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reinstall the ECM connector.



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE MASS AIR FLOW METER

DTC	P0101	MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0100 on page 05-442.

DTC No.	DTC Detection Condition	Trouble Area
P0101	After engine warmed up, condition (a) continues for more than 10 seconds while idling: (2 trip detection logic) (a) Mass Air Flow (MAF) meter output greater than 2.2 V	• MAF meter
	Conditions (a) and (b) continue for more than 6 seconds at engine speed of 2,000 rpm or more: (2 trip detection logic) (a) VTA greater than 0.1 V (b) MAF meter output less than 0.25 V	

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0101)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0101 and other DTCs	A
P0101	B

HINT:

If any DTCs other than P0101 are output, troubleshoot those DTCs first.

B → REPLACE MASS AIR FLOW METER

A

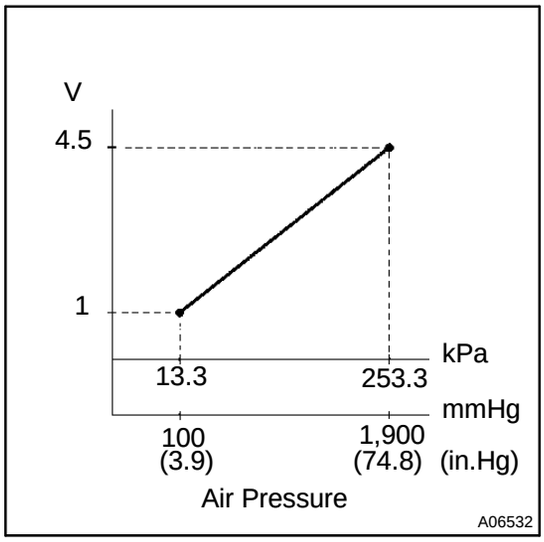
GO TO RELEVANT DTC CHART (See page 05-412)

DTC	P0105	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT

DTC	P0107	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT

DTC	P0108	MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION



The manifold absolute pressure sensor detects the intake manifold pressure by using the built-into sensor unit. The ECM determines the basic injection duration and injection advance timing based on the voltage output by the manifold absolute pressure sensor.

The manifold absolute pressure sensor monitors the absolute pressure inside the intake manifold (default is 0 mmHg), so that the ECM controls the air-fuel ratio at the proper level under any driving condition, without influence of fluctuations in the atmospheric pressure due to factors such as high altitude etc.

DTC No.	DTC Detection Condition	Trouble Area
P0105 P0107 P0108	Open or short in manifold absolute pressure sensor circuit for 0.5 seconds or more (1 trip detection logic)	• Open or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • Turbocharger assembly • EGR valve assembly • ECM

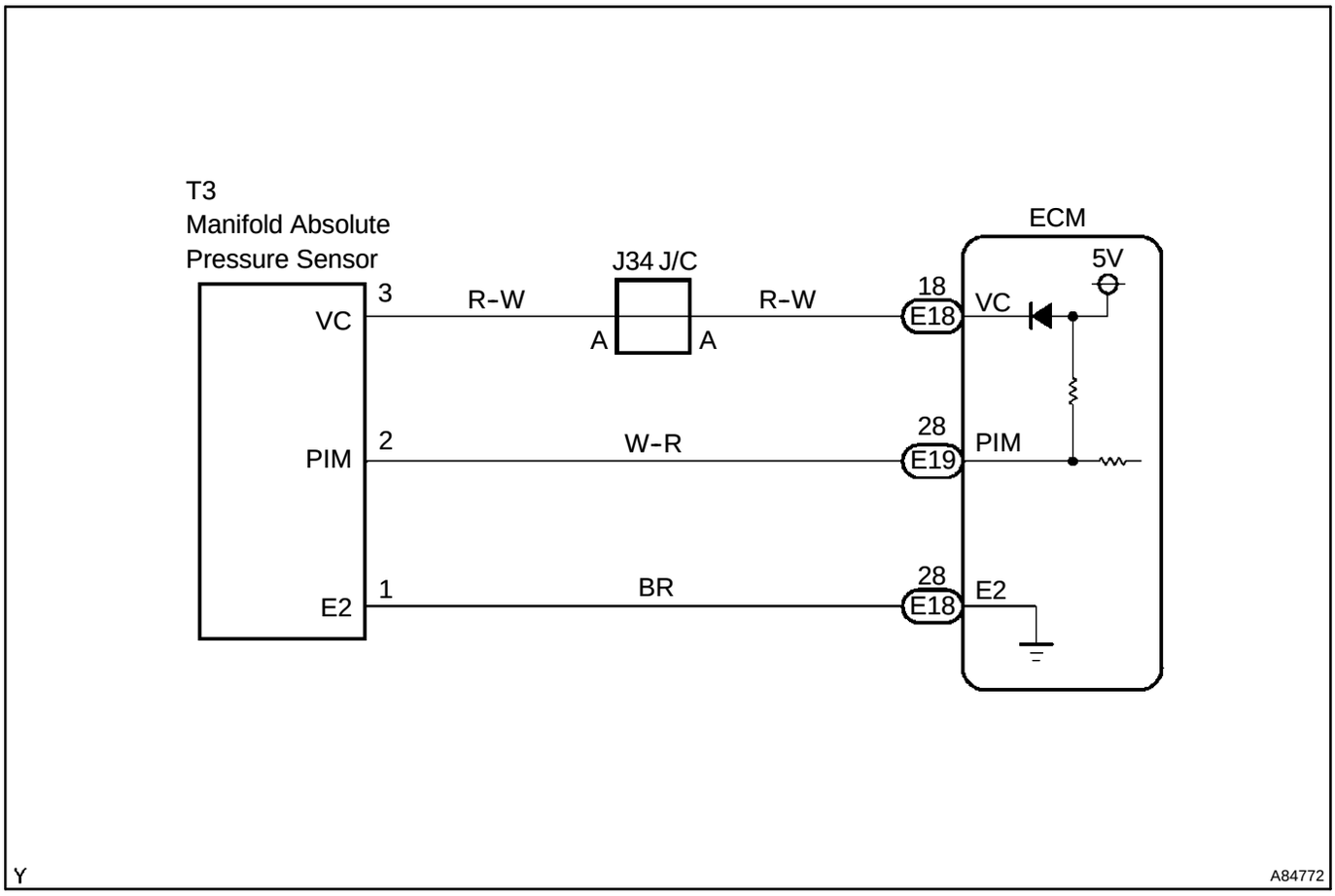
HINT:

When DTC P0105, P0107 and/or P0108 is set, check the intake manifold pressure by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / PIM.

Reference:

Intake Manifold Pressure (kPa)	Malfunction
Approximately 0	• Short in PIM circuit
250 or more	• Open or short in VC circuit • Open in PIM circuit • Open in E2 circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

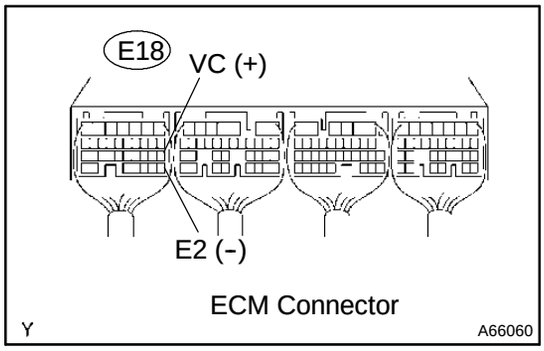
1	**READ VALUE USING INTELLIGENT TESTER II(MANIFOLD ABSOLUTE PRESSURE)**

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / PIM.
(d) Read the value.
OK: Same value as the actual atmospheric pressure.

OK → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

NG

2 INSPECT ECM(VC VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E18 ECM connector.

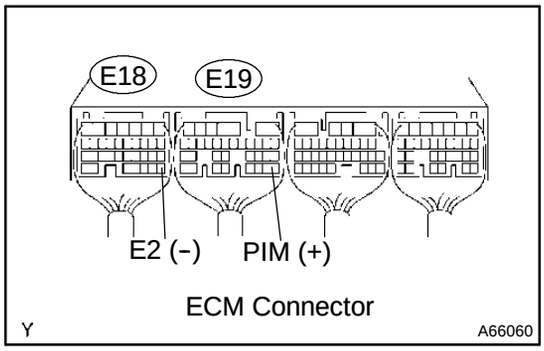
Standard:

Tester Connection	Specified Condition
VC (E18-18) - E2 (E18-28)	4.5 to 5.5 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

3 INSPECT ECM(PIM VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E18 and E19 ECM connectors.

Standard:

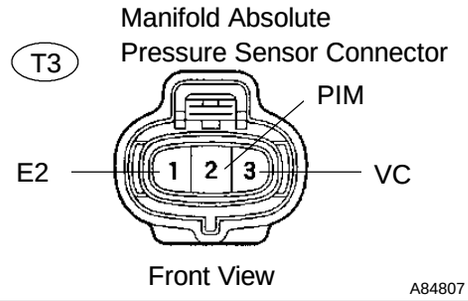
Tester Connection	Condition	Specified Condition
PIM (E19-28) - E2 (E18-28)	Applied negative pressure of 40 kPa (300 mmHg, 11.8 in.Hg)	1.4 to 2.0 V
PIM (E19-28) - E2 (E18-28)	Same as atmospheric pressure	2.0 to 2.6 V
PIM (E19-28) - E2 (E18-28)	Applied positive pressure of 69 kPa (518 mmHg, 20.4 in.Hg)	3.0 to 3.6 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

4	CHECK HARNESS AND CONNECTOR(MANIFOLD ABSOLUTE PRESSURE SENSOR - ECM)

Wire Harness Side:



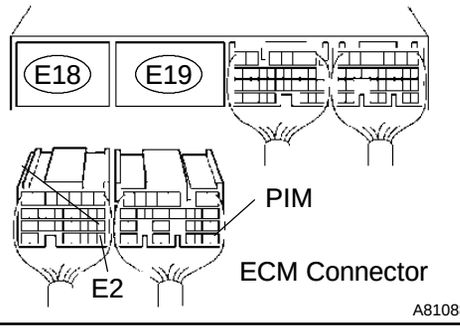
(a) Disconnect the T3 manifold absolute pressure sensor connector.
(b) Disconnect the E18 and E19 ECM connectors.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PIM (T3-2) - PIM (E19-28)	Below 1 Ω
VC (T3-3) - VC (E18-18)	
E2 (T3-1) - E2 (E18-28)	

Standard (Check for short):

Tester Connection	Specified Condition
PIM (T3-2) or PIM (E19-28) - Body ground	10 kΩ higher
VC (T3-3) or VC (E18-18) - Body ground	
E2 (T3-1) or E2 (E18-28) - Body ground	



(d) Reconnect the manifold absolute pressure sensor connector.
(e) Reconnect the ECM connectors.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5	INSPECT TURBOCHARGER SUB-ASSY (See page 13-3 of Pub. No. RM1039E COROLLA Supplement)

OK: None of the inspection results show any abnormalities.

NG → **REPLACE TURBOCHARGER SUB-ASSY (See page 13-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

6	INSPECT EGR VALVE ASSY (See page 12-2 of Pub. No. RM1039E COROLLA Supplement)

OK: None of the inspection results show any abnormalities.

NG → **REPLACE EGR VALVE ASSY (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

DTC	P0106	MANIFOLD ABSOLUTE PRESSURE/ BAROMETRIC PRESSURE CIRCUIT RANGE/ PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0105 on page 05-448.

DTC No.	DTC Detection Condition	Trouble Area
P0106	Voltage output of manifold absolute pressure sensor outside standard range (2 trip detection logic)	• Manifold absolute pressure sensor

INSPECTION PROCEDURE

HINT:

- If DTC P0105, P0107 or P0108 is set simultaneously with P0106, the manifold absolute pressure sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0106)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0106	A
P0106 and other DTCs	B

HINT:

If any DTCs other than P0106 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-412)

A →

REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

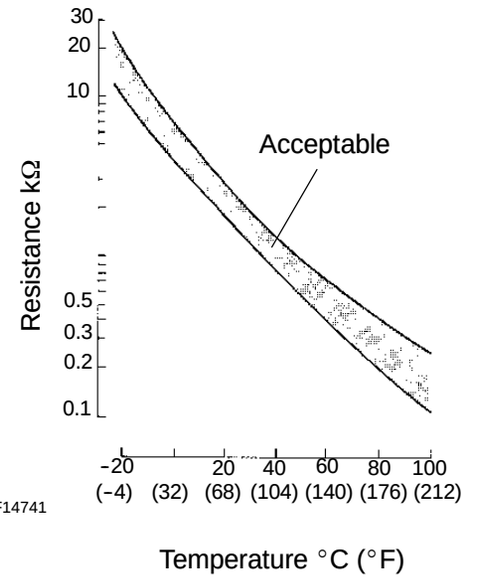
DTC	P0110	INTAKE AIR TEMPERATURE CIRCUIT

DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT

DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

(Figure 1)



The Intake Air Temperature (IAT) sensor is built into the Mass Air Flow (MAF) meter, and monitors the IAT. The IAT sensor has a built-in thermistor with a resistance that varies depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in the resistance are reflected as voltage changes to the ECM terminal (see figure 1).

The sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the sensor form terminal THA via resistor R. Resistor R and the sensor are connected in series. When the resistance value of the sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM corrects the fuel injection volume to improve the driveability with a cold engine.

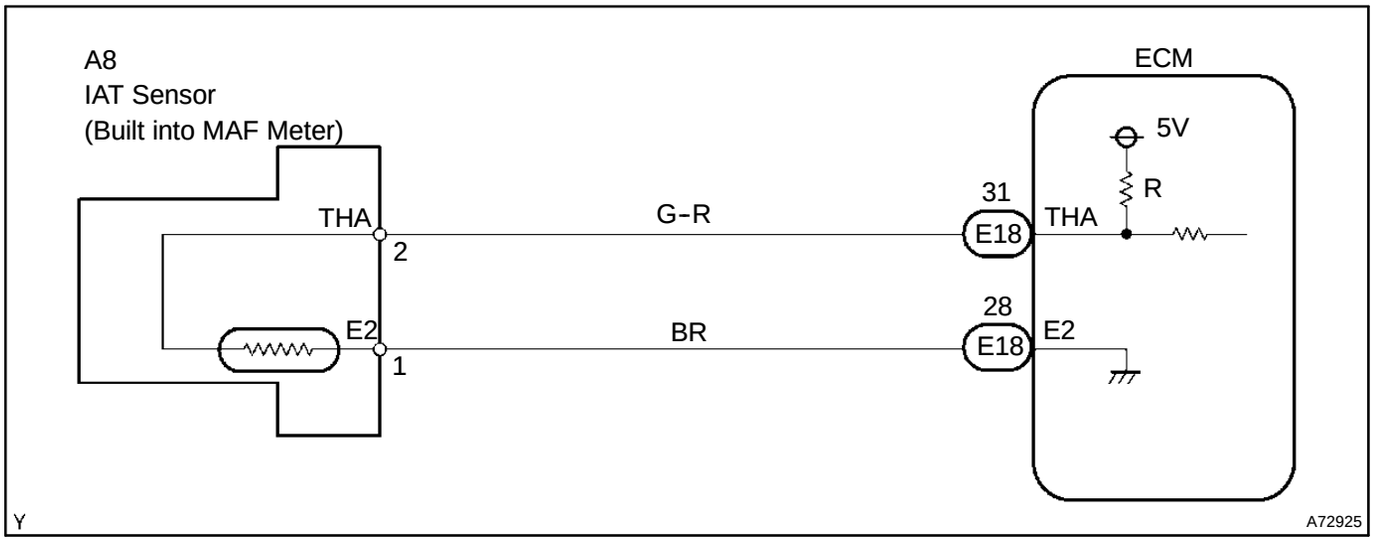
DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in IAT sensor circuit • IAT sensor (built into mass air flow meter) • ECM
P0112	Step 4	Short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	
P0113	Step 2	Open in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	

HINT:
When DTC P0110, P0112 or P0113 is set, check the intake air temperature by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Intake Air.

Reference:

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(INTAKE AIR TEMPERATURE)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(d) Read the value.

OK: Same value as the air temperature at the intake manifold.

Result:

Temperature Displayed	Proceed To
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as air temperature near intake manifold)	C

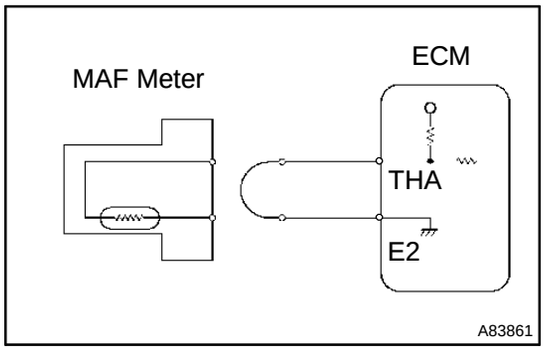
HINT:

- If there is an open circuit, the intelligent tester ll indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester ll indicates 140°C (284°F) or more.

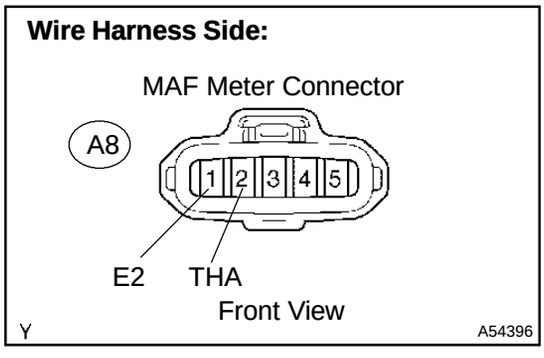
B	Go to step 4
C	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

A

2	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



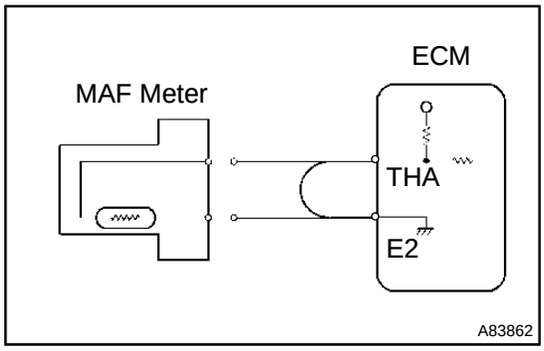
(a) Disconnect the A8 Mass Air Flow (MAF) meter connector.
(b) Connect terminals 1 and 2 of the MAF meter wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the MAF meter connector.

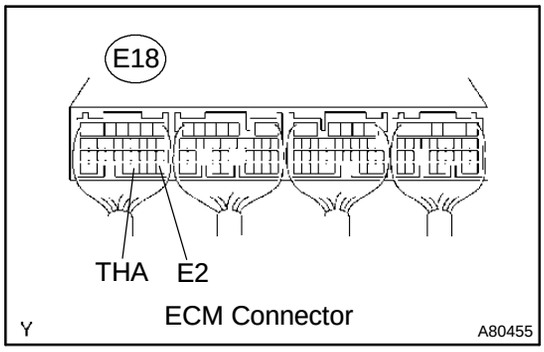


OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW METER

NG

3	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)





(a) Disconnect the A8 MAF meter connector.
(b) Connect terminals THA and E2 of the E18 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

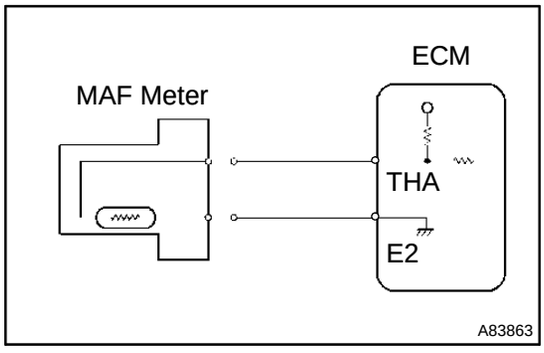
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the MAF meter connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

4	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

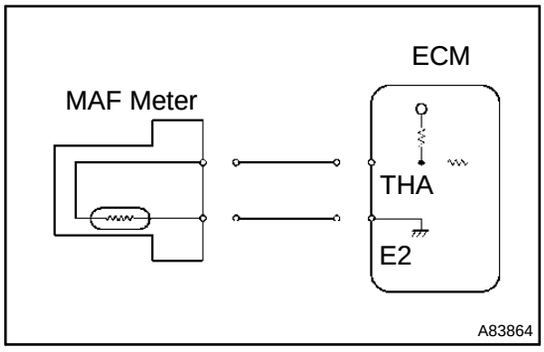


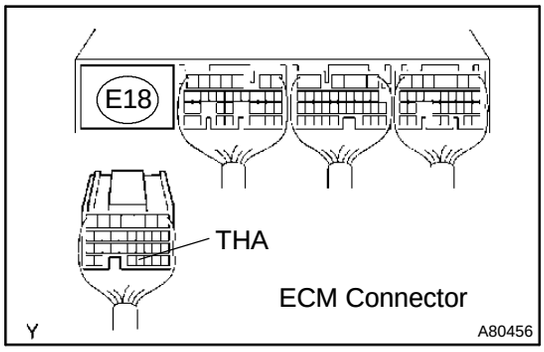
(a) Disconnect the A8 MAF meter connector.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(e) Read the value.
Standard: -40°C (-40°F)
(f) Reconnect the MAF meter connector.

OK	REPLACE MASS AIR FLOW METER

NG

5 READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the A8 MAF meter connector.
(b) Disconnect the E18 ECM connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Intake Air.
(f) Read the value.
Standard: -40°C (-40°F)
(g) Reconnect the ECM sensor connector.
(h) Reconnect the MAF meter connector.

OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0115	ENGINE COOLANT TEMPERATURE CIRCUIT

DTC	P0117	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT

DTC	P0118	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

A thermistor built into the Engine Coolant Temperature (ECT) sensor changes its resistance value according to the ECT.

The structure of the sensor and connection to the ECM is the same as those of the intake air temperature sensor.

DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in ECT sensor circuit • ECT sensor • ECM
P0117	Step 4	• Short in ECT sensor circuit for 0.5 seconds (Sensor resistance value less than 79 Ω) (1 trip detection logic)	
P0118	Step 2	• Open in ECT sensor circuit for 0.5 seconds (Sensor resistance value more than 156 kΩ) (1 trip detection logic)	

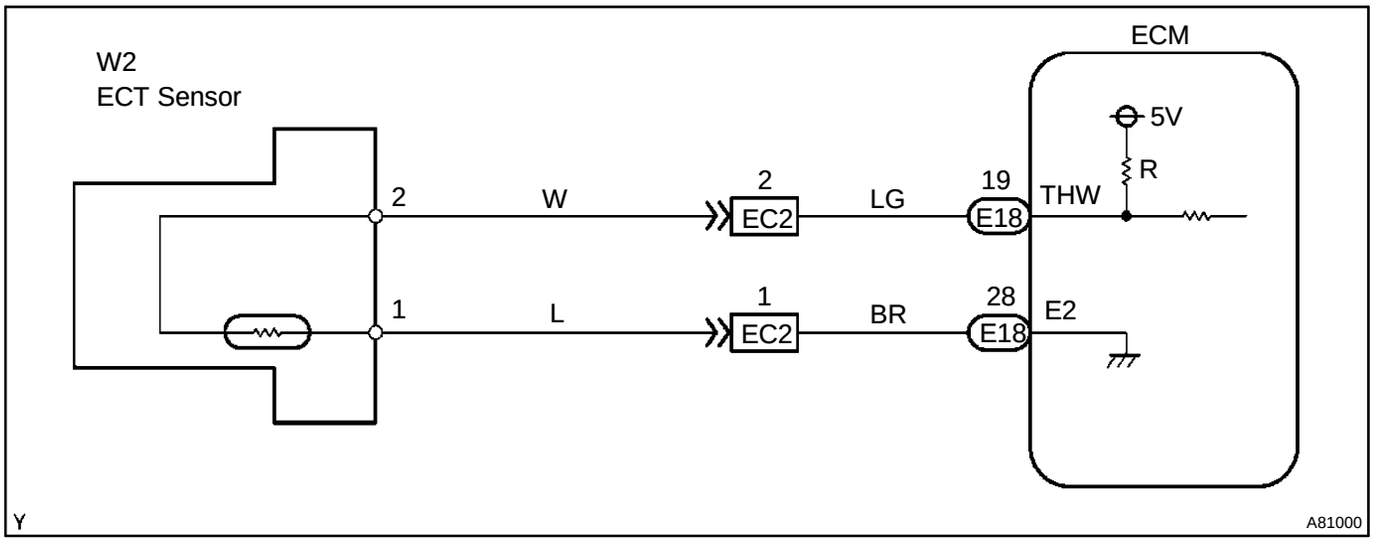
HINT:

When DTC P0115, P0117 and/or P0118 is set, check the engine coolant temperature by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Coolant Temp.

Reference:

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(ENGINE COOLANT TEMPERATURE)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(d) Read the value.
Standard: 75° to 95°C (167° to 203°F) after warming up the engine.
Result:

Temperature Displayed	Proceed To
-40°C(-40°F)	A
140°C(284°F) or more	B
OK (Same as actual engine coolant temperature)	C

HINT:

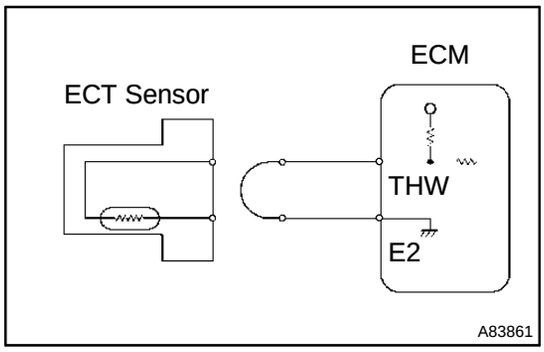
- If there is an open circuit, the intelligent tester II indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester II indicates 140°C (284°F) or more.

B → **Go to step 4**

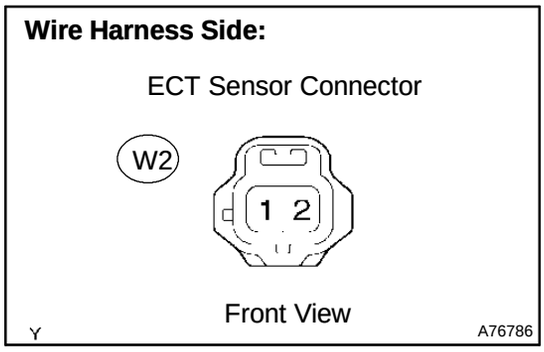
C → **CHECK FOR INTERMITTENT PROBLEMS**
(See page 05-380)

A

2	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



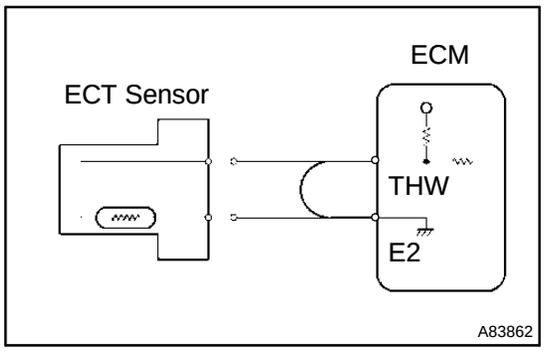
(a) Disconnect the W2 Engine Coolant Temperature (ECT) sensor connector.
(b) Connect terminals 1 and 2 of the ECT sensor wire harness side connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the ECT sensor connector.



OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

NG

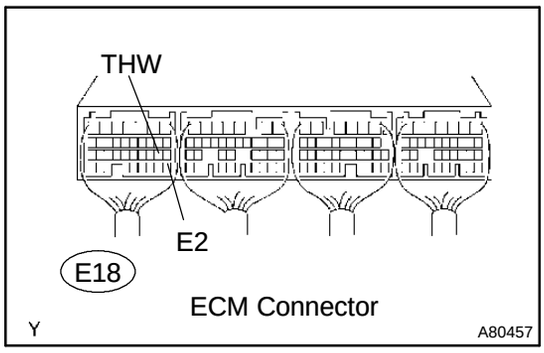
3	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)



(a) Disconnect the W2 ECT sensor connector.
(b) Connect terminals THW and E2 of the E18 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the ECT sensor connector.

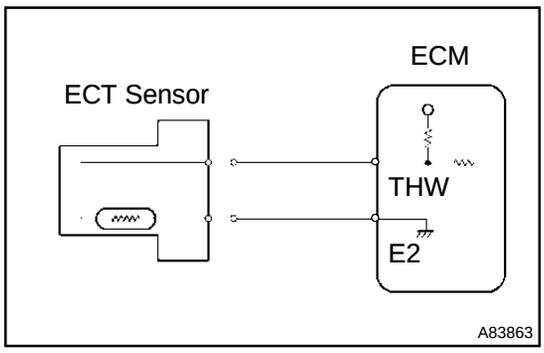


OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

4 READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

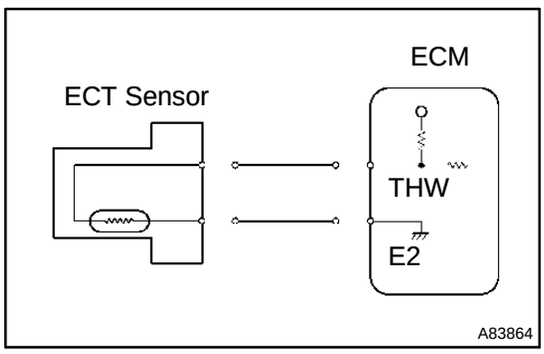


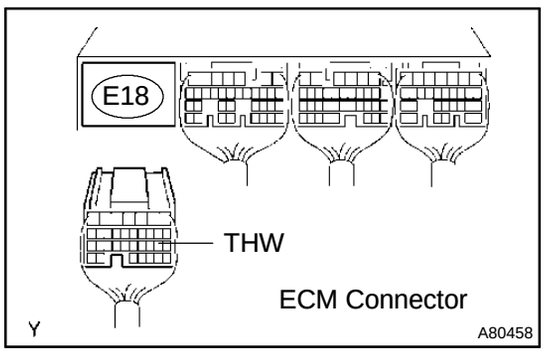
(a) Disconnect the W2 ECT sensor connector.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(e) Read the value.
Standard: -40°C (-40°F)
(f) Reconnect the ECT sensor connector.

OK	REPLACE ENGINE COOLANT TEMPERATURE SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

NG

5 READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the W2 ECT sensor connector.
(b) Disconnect the E18 ECM connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard: -40°C (-40°F)
(g) Reconnect the ECT sensor connector.
(h) Reconnect the ECM connector.

OK → REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

DTC	P0116	ENGINE COOLANT TEMPERATURE CIRCUIT RANGE/PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page 05-458.

DTC No.	DTC Detection Condition	Trouble Area
P0116	If Engine Coolant Temperature (ECT) between -40°C(-40°F) and 60°C(140°F) at engine start, and condition (a) and (b) met (2 trip detection logic): (a) Vehicle driven at varying speeds (under acceleration and deceleration) (b) ECT remains within 3°C(5.4°F) of engine starting temperature	• ECT sensor

MONITOR DESCRIPTION

The ECT sensor is used to monitor the ECT. The ECT sensor has a thermistor with a resistance that varies depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected in the voltage output from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the ECT. When the sensor voltage output has virtually no variation, the ECM interprets this as a fault in the ECT sensor and sets the DTC.

Examples:

Upon starting the engine, the ECT was between -40°C (-40°F) and 60°C (140°F). If after driving for a few minutes, the ECT still remains within 3°C (5.4°F) of the staring temperature, the DTC is set (2 trip detection logic).

INSPECTION PROCEDURE

HINT:

- If DTC P0115, P0117 or P0118 is set simultaneously with P0116, the engine coolant temperature sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine conditions when a malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE ENGINE COOLANT TEMPERATURE SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

DTC	P0168	FUEL TEMPERATURE TOO HIGH

CIRCUIT DESCRIPTION

Refer to DTC P0180 on page 05-465.

DTC No.	DTC Detection Condition	Trouble Area
P0168	If fuel temperature between 35°C (95°F) and 60°C (140°F) at engine start, and condition (a) and (b) met (2 trip detection logic): (a) Vehicle driven at varying speeds (under acceleration and deceleration) (b) Fuel temperature remains within 3°C (5.4°F) of engine starting temperature	• Fuel temperature sensor
	If fuel temperature more than 60°C (140°F) at engine start, and conditions (a) and (b) met (6 trip detection logic): (a) Vehicle driven at varying speeds (under acceleration and deceleration) (b) fuel temperature remains within 1°C (1.8°F) of engine starting temperature, and this successively recorded 6 times	

INSPECTION PROCEDURE

HINT:

- If DTC P0180, P0182 or P0183 is set simultaneously with P0168, the fuel temperature sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0168)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0168	A
P0168 and other DTCs	B

HINT:

If any DTCs other than P0168 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-412)**

A

REPLACE FUEL TEMPERATURE SENSOR

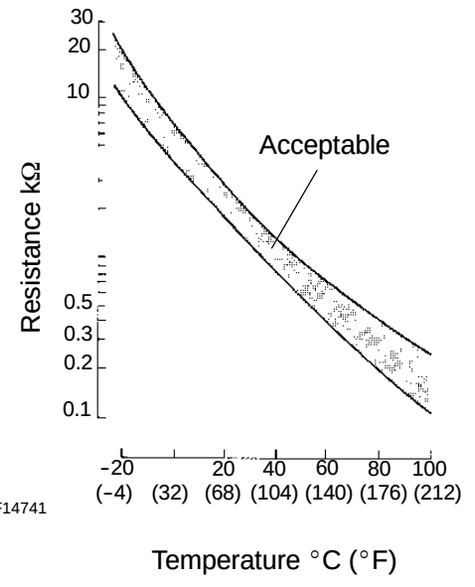
DTC	P0180	FUEL TEMPERATURE SENSOR "A" CIRCUIT

DTC	P0182	FUEL TEMPERATURE SENSOR "A" CIRCUIT LOW INPUT

DTC	P0183	FUEL TEMPERATURE SENSOR "A" CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

(Figure 1)



The fuel temperature sensor monitors the fuel temperature. A thermistor built into the sensor changes the resistance value according to the fuel temperature. The lower the fuel temperature is, the greater the thermistor resistance becomes, and the higher the temperature is, the lower the resistance becomes (see figure 1).

The fuel temperature sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the fuel temperature sensor from terminal THF via resistor R. Resistor R and the fuel temperature sensor are connected in series. When the resistance value of the fuel temperature sensor changes in accordance with the fuel temperature, the voltage at terminal THF also changes. Based on this signal, the ECM corrects the pressure control compensation of the supply pump and errors.

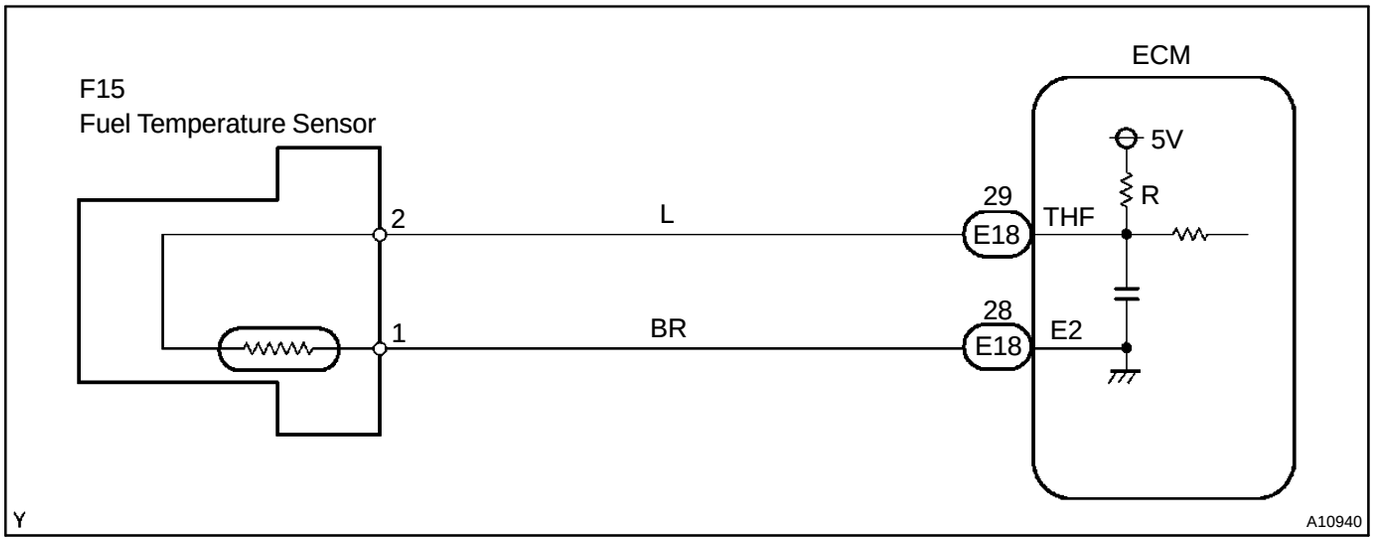
DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0180	Step 1	Open or short in fuel temperature sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in fuel temperature sensor circuit • Fuel temperature sensor • ECM
P0182	Step 4	Short in fuel temperature sensor circuit for 0.5 seconds (1 trip detection logic)	
P0183	Step 2	Open in fuel temperature sensor circuit for 0.5 seconds (1 trip detection logic)	

HINT:
When DTC P0180, P0182 and/or P0183 is set, check the fuel temperature by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Fuel Temp.

Reference:

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(FUEL TEMPARATURE)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Fuel Temp.
(d) Read the value.

OK: Same value as the actual fuel temperature.

Result:

Temperature Displayed	Proceed To
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as actual fuel temperature)	C

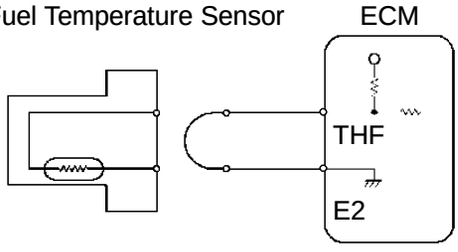
HINT:

- If there is an open circuit, the intelligent tester ll indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester ll indicates 140°C (284°F) or more.

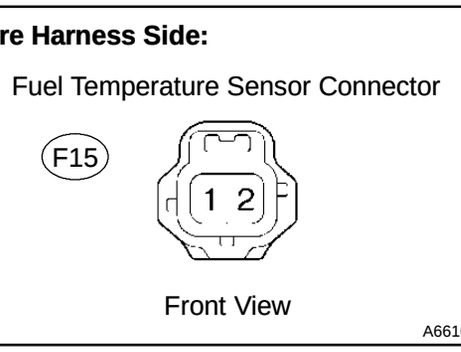
B	Go to step 4
C	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

A

2	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



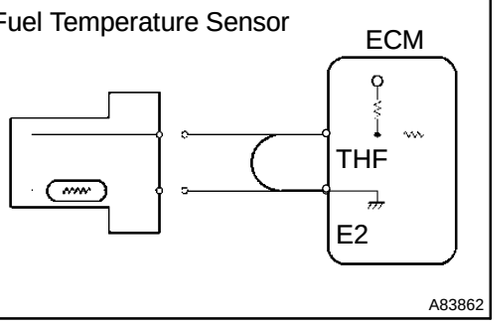
(a) Disconnect the F15 fuel temperature sensor connector.
(b) Connect terminals 1 and 2 of the fuel temperature sensor wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Fuel Temp.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the fuel temperature sensor connector.



OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE FUEL TEMPERATURE SENSOR

NG

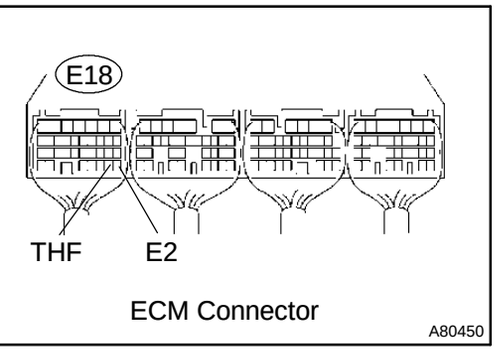
3	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)



(a) Disconnect the F15 fuel temperature sensor connector.
(b) Connect terminals THF and E2 of the E18 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connector.

(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Fuel Temp.
(f) Read the value.
Standard: 140°C (284°F) or more
(g) Reconnect the fuel temperature sensor connector.

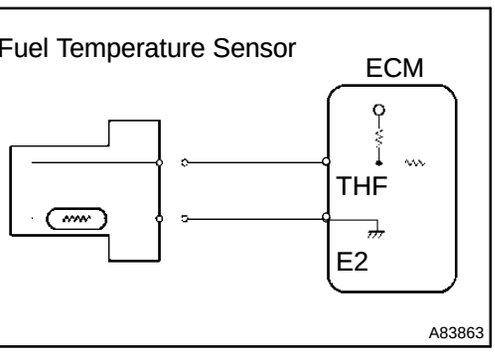


OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

4	READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

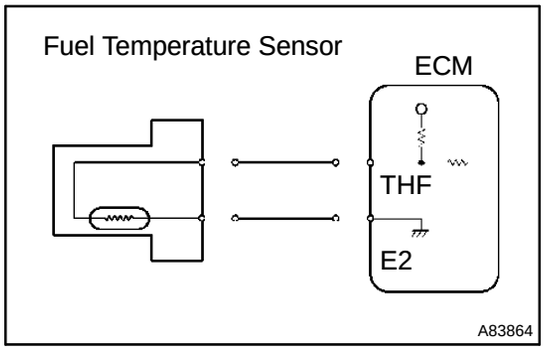


(a) Disconnect the F15 fuel temperature sensor connector.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Fuel Temp.
(e) Read the value.
Standard: -40°C (-40°F)
(f) Reconnect the fuel temperature sensor connector.

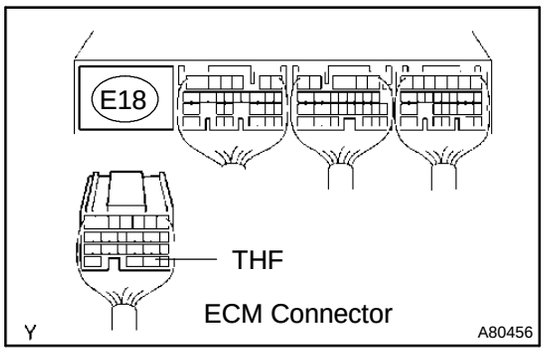
OK	REPLACE FUEL TEMPERATURE SENSOR

NG

5 READ VALUE USING INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)



(a) Disconnect the F15 fuel temperature sensor connector.
(b) Disconnect the E18 ECM connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Fuel Temp.
(f) Read the value.
Standard: -40°C (-40°F)
(g) Reconnect the fuel temperature sensor connector.
(h) Reconnect the ECM connector.



OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0191	FUEL RAIL PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE

CIRCUIT DESCRIPTION

Refer to DTC P0087 on page 05-421.

INSPECTION PROCEDURE

HINT:

- If DTC P0087, P0190, P0192 or P0193 is set simultaneously with P0191, the manifold absolute pressure sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

DTC No.	DTC Detection Condition	Trouble Area
P0191	Voltage output of fuel pressure sensor for common rail outside standard range (1 trip detection logic)	• Fuel pressure sensor

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0191)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0191	A
P0191 and other DTCs	B

HINT:

If any DTCs other than P0191 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-412)**

A

REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR) **(See page 11-24 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0200	INJECTOR CIRCUIT / OPEN

HINT:

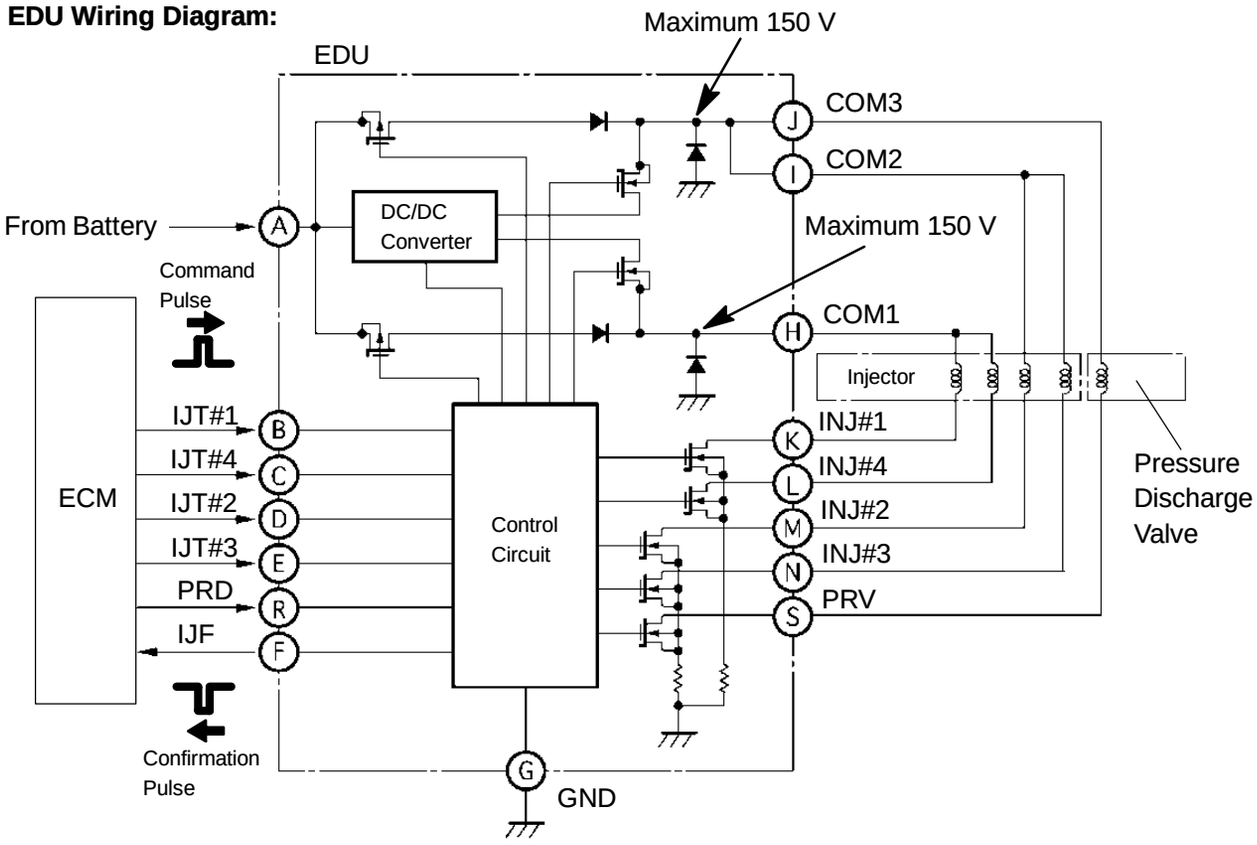
- For more information on the EDU, see page 05-365.
- If DTC P0200 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

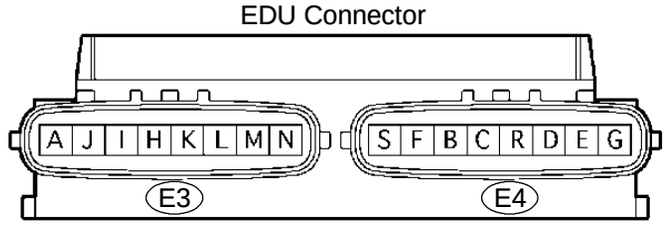
The EDU has been adopted to drive the injectors at high speeds. The EDU delivers high-speed driving under highly-pressurized fuel conditions using the DC/DC converter that provides a high-voltage, and the quick-charging system.

Soon after the EDU receives an injection command (IJT) signal from the ECM, the EDU responds to the command with an injector injection confirmation (IJF) signal when the current is applied to the injector.

EDU Wiring Diagram:



EDU Connector



CAUTION: Terminals J, I, H, K, L, M, N and S are high voltage

Y

A81481

DTC No.	DTC Detection Condition	Trouble Area
P0200	• Open or short in EDU or injector circuit After engine started, no injection confirmation (IJF) signal from EDU to ECM, despite ECM sending injection command (IJT) signal to EDU (1 trip detection logic)	• Open or short in EDU circuit • Injector • EDU • ECM

MONITOR DESCRIPTION

P0200 (Open or short in EDU or injector circuit):

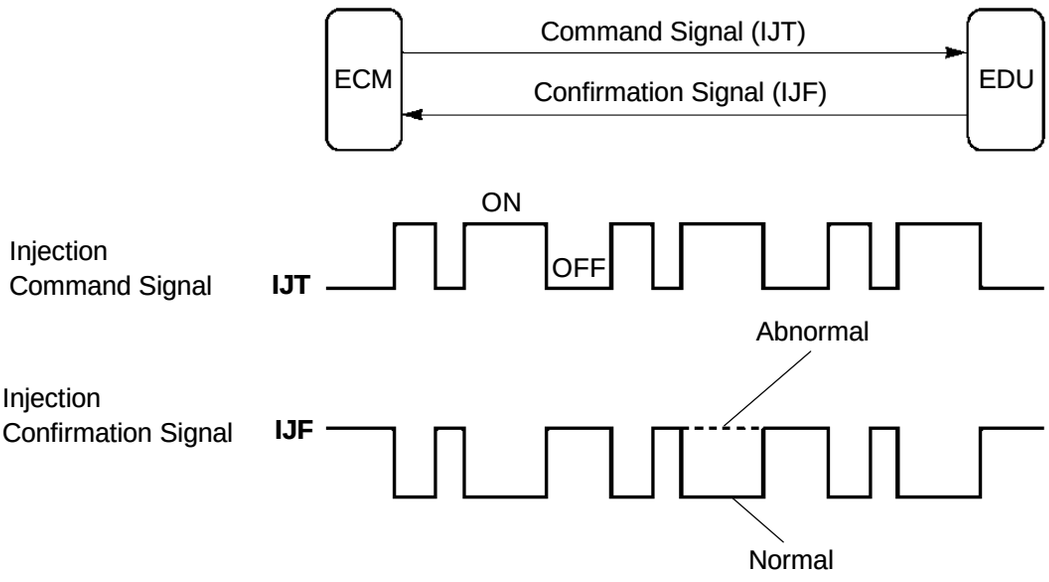
The ECM continuously monitors both injection command (IJT) signal and injection confirmation (IJF) signal. This DTC will be set if the ECM judges that the number of IJT signals and IJF signals are inconsistent.

The injectors are grounded over a FET (Field Effect Transistor) and a serial resistor. This resistor creates a voltage drop, which is monitored by the EDU (injector drive circuit), in relation to the current drawn by the injector. When the injector current becomes too high, the voltage drop over the resistor exceeds a specified level and no IJF signal for that cylinder is sent to the ECM.

DTC P0200 refers to a malfunction in the EDU or injector circuit.

If this DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

Malfunction Detection:



MONITOR STRATEGY

Required sensors	IJF signal from EDU
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	1 driving cycle

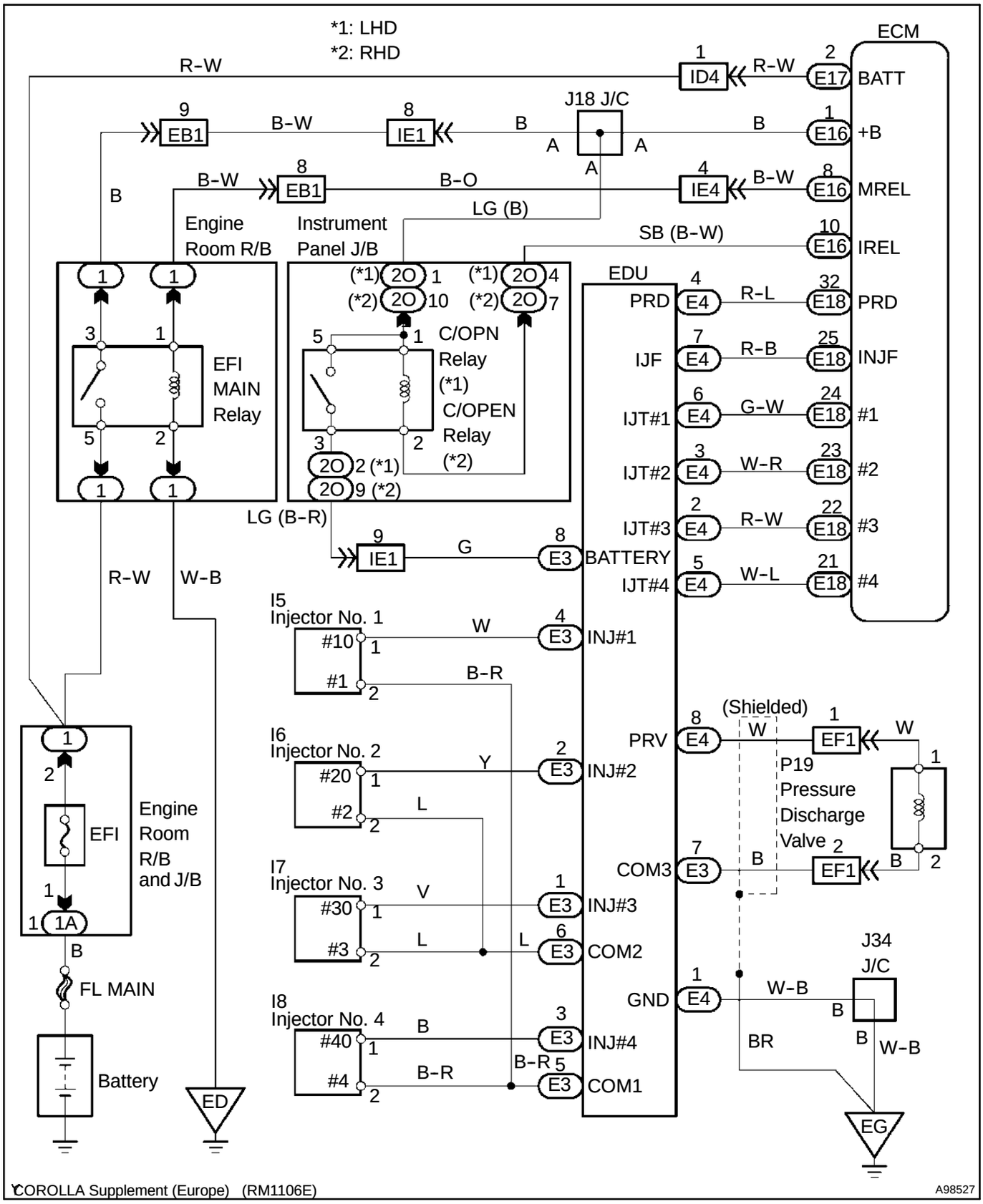
TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Engine speed	500 rpm	-
Battery voltage	11 V	-
Ignition switch	ON	

TYPICAL MALFUNCTION THRESHOLDS

Threshold
Injection missing counter* for all cylinders, or for one individual cylinder, reaches specified number (taking approximately 1 second from starting engine) *: Increments when no IJF signal is received from EDU despite ECM sending IJT signals

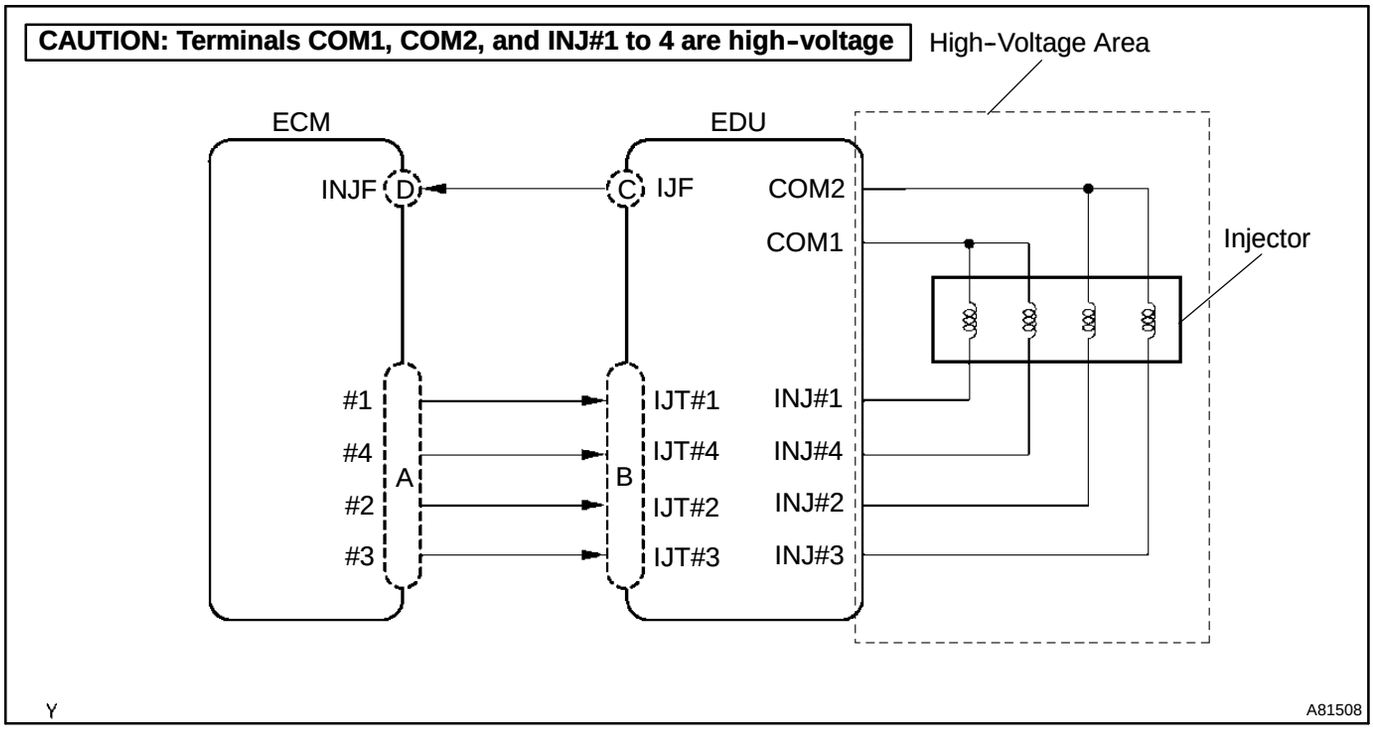
WIRING DIAGRAM



PULSE GENERATION INSPECTION

HINT:

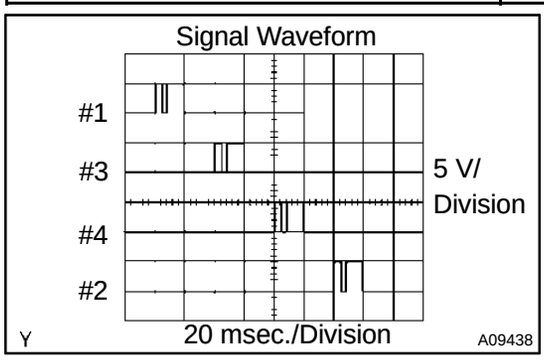
Problem areas can be located by checking the waveform at the following terminals.



HINT:

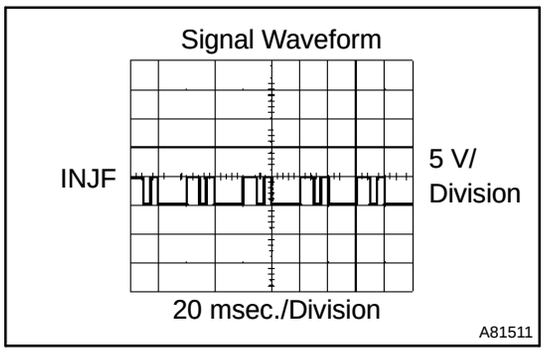
If you check the ECM side first, inspect the following A to D in sequence. If you check the EDU side first, inspect the following B and C in sequence. This shortens the inspection time.

Malfunction Point	Trouble Area
A	• ECM
B (if A is normal)	• Open or short in "#1 to #4 (ECM)" - "IJT#1 to IJT#4 (EDU)" harness or connector
C (if A and B are normal)	• Open or short in "INJ#1 to INJ#4 (EDU)" - "COM1 and/or COM2" (EDU) circuit • Injector • EDU
D (if A, B and C are normal)	• Open or short in "INJ (EDU)" - "INJF (ECM)" circuit (DTC P1271 set simultaneously)



(a) Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.

Inspection Points	Specified Condition
A and B	Correct waveform shown



(b) Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.

Inspection Points	Specified Condition
C and D	Correct waveform shown

INSPECTION PROCEDURE

HINT:

- If DTCs P0200 and P1271 are present simultaneously, there is open in the INJF wire harness between the EDU and ECM, or there is open in the wire harness for both injector and pressure discharge valve.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT(IN ADDTION TO DTC P0200)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
P0200 and P1238	A
P0200	B

B → Go to step 3

A

2 READ VALUE USING INTELLIGENT TESTER II(COMPENSATORY INJECTION VOLUME BETWEEN CYLINDERS)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Revised Injection Volume #1, #2, #3, and #4.
(d) Read the value.
Standard: The compensatory injection volume is between -4.9 mm^3 and 4.9 mm^3

HINT:

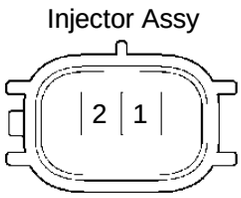
- If the injector is malfunctioning, the compensatory injection volume remains at -5.0 mm^3 or 5.0 mm^3.
- The compensatory injection volume is usually between -3.0 mm^3 and 3.0 mm^3.

(e) Inspect and repair the cylinder that has an improper compensation value according to the following steps.

NEXT

3 INSPECT INJECTOR ASSY

Component Side:



(a) Disconnect the I5, I6, I7 and/or I8 injector connector.
(b) Measure the resistance between the terminals of the injector assembly.

Standard:

Tester Connection	Specified Condition
1 - 2	0.85 to 1.05 Ω at 20°C (68°F)

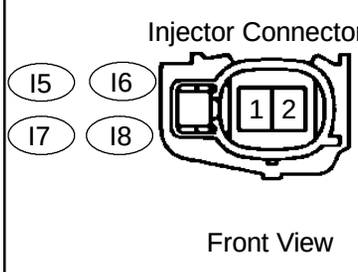
(c) Reconnect the injector connector.

NG → **REPLACE INJECTOR ASSY**
(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

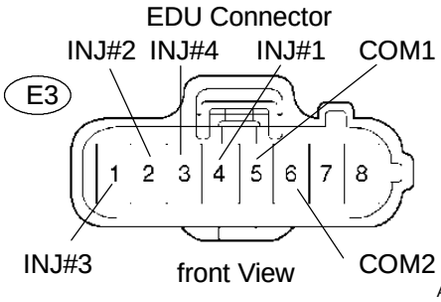
OK

4 CHECK HARNESS AND CONNECTOR(EDU - INJECTOR ASSY)

Wire Harness Side:



Wire Harness Side:



(a) Check the harness and connectors between the injector and EDU (INJ terminal).
(1) Disconnect the I5, I6, I7, and/or I8 injector connector.
(2) Disconnect the E3 EDU connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-1) - INJ#1 (E3-4)	Below 1 Ω
Injector (I6-1) - INJ#2 (E3-2)	
Injector (I7-1) - INJ#3 (E3-1)	
Injector (I8-1) - INJ#4 (E3-3)	
Injector (I5-2) - COM1 (E3-5)	
Injector (I6-2) - COM2 (E3-6)	
Injector (I7-2) - COM2 (E3-6)	
Injector (I8-2) - COM1 (E3-5)	

Standard (Check for short):

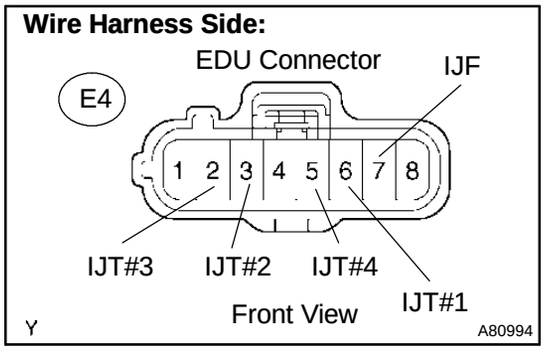
Tester Connection	Specified Condition
Injector (I5-1) or INJ#1 (E3-4) - Body ground	10 kΩ or higher
Injector (I6-1) or INJ#2 (E3-2) - Body ground	
Injector (I7-1) or INJ#3 (E3-1) - Body ground	
Injector (I8-1) or INJ#4 (E3-3) - Body ground	
Injector (I5-2) or COM1 (E3-5) - Body ground	
Injector (I6-2) or COM2 (E3-6) - Body ground	
Injector (I7-2) or COM2 (E3-6) - Body ground	
Injector (I8-2) or COM1 (E3-5) - Body ground	

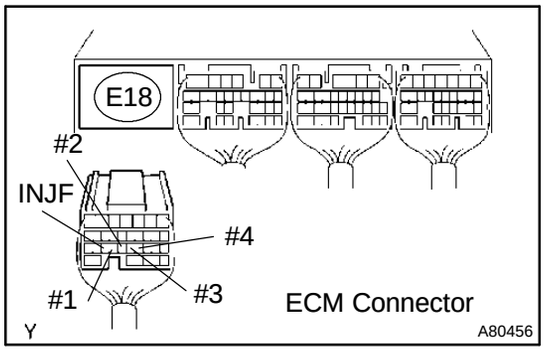
(4) Reconnect the injector connector.
(5) Reconnect the EDU connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK HARNESS AND CONNECTOR(EDU - ECM)





(a) Disconnect the E4 EDU connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
IJT#1 (E4-6) - #1 (E18-24)	Below 1 Ω
IJT#2 (E4-3) - #2 (E18-23)	
IJT#3 (E4-2) - #3 (E18-22)	
IJT#4 (E4-5) - #4 (E18-21)	
IJF (E4-7) - INJF (E18-25)	

Standard (Check for short):

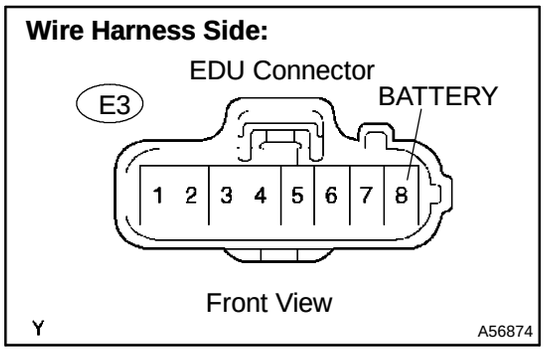
Tester Connection	Specified Condition
#1 (E18-24) or IJT#1 (E4-6) - Body ground	10 kΩ or higher
#2 (E18-23) or IJT#2 (E4-3) - Body ground	
#3 (E18-22) or IJT#3 (E4-2) - Body ground	
#4 (E18-21) or IJT#4 (E4-5) - Body ground	
INJF (E18-25) or IJF (E4-7) - Body ground	

(d) Reconnect the EDU connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6 INSPECT INJECTOR DRIVER(BATTERY VOLTAGE)

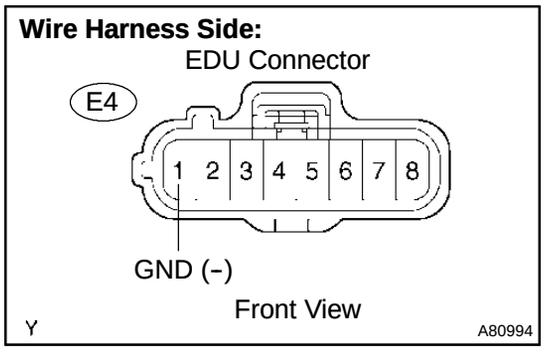


(a) Disconnect the E3 and E4 EDU connectors.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminals of the EDU connectors.

Standard:

Tester Connection	Specified Condition
BATTERY (E3-8) - GND (E4-1)	9 to 14 V

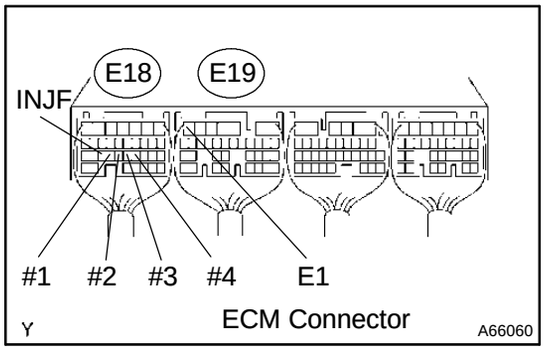
(d) Reconnect the EDU connectors.



NG → **CHECK INJECTOR DRIVER POWER SOURCE CIRCUIT (BATTERY - EDU)**

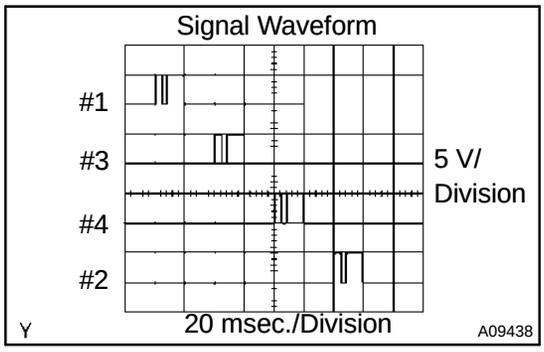
OK

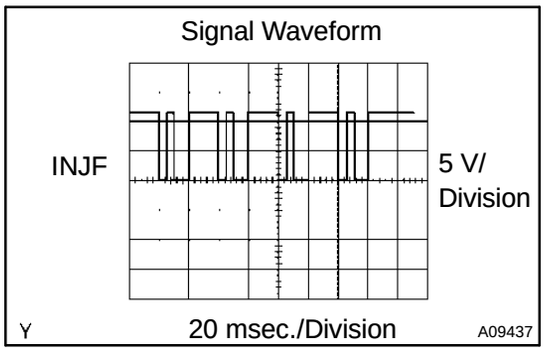
7	INSPECT ECM(INJECTOR VOLTAGE)



(a) Inspect the ECM using an oscilloscope.
(b) While idling, check the waveform between the terminals of the E18 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
#1 (E18-24) - E1 (E19-7)	Correct waveform shown
#2 (E18-23) - E1 (E19-7)	
#3 (E18-22) - E1 (E19-7)	
#4 (E18-21) - E1 (E19-7)	
INJF (E18-25) - E1 (E19-7)	





NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

8	REPLACE INJECTOR DRIVER (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P0200)

HINT:
After clearing the DTC, start the engine and let it idle for 30 seconds, and then confirm that DTC P0200 is not present again.

DTC	P0234	TURBO/SUPER CHARGER OVERBOOST CONDITION

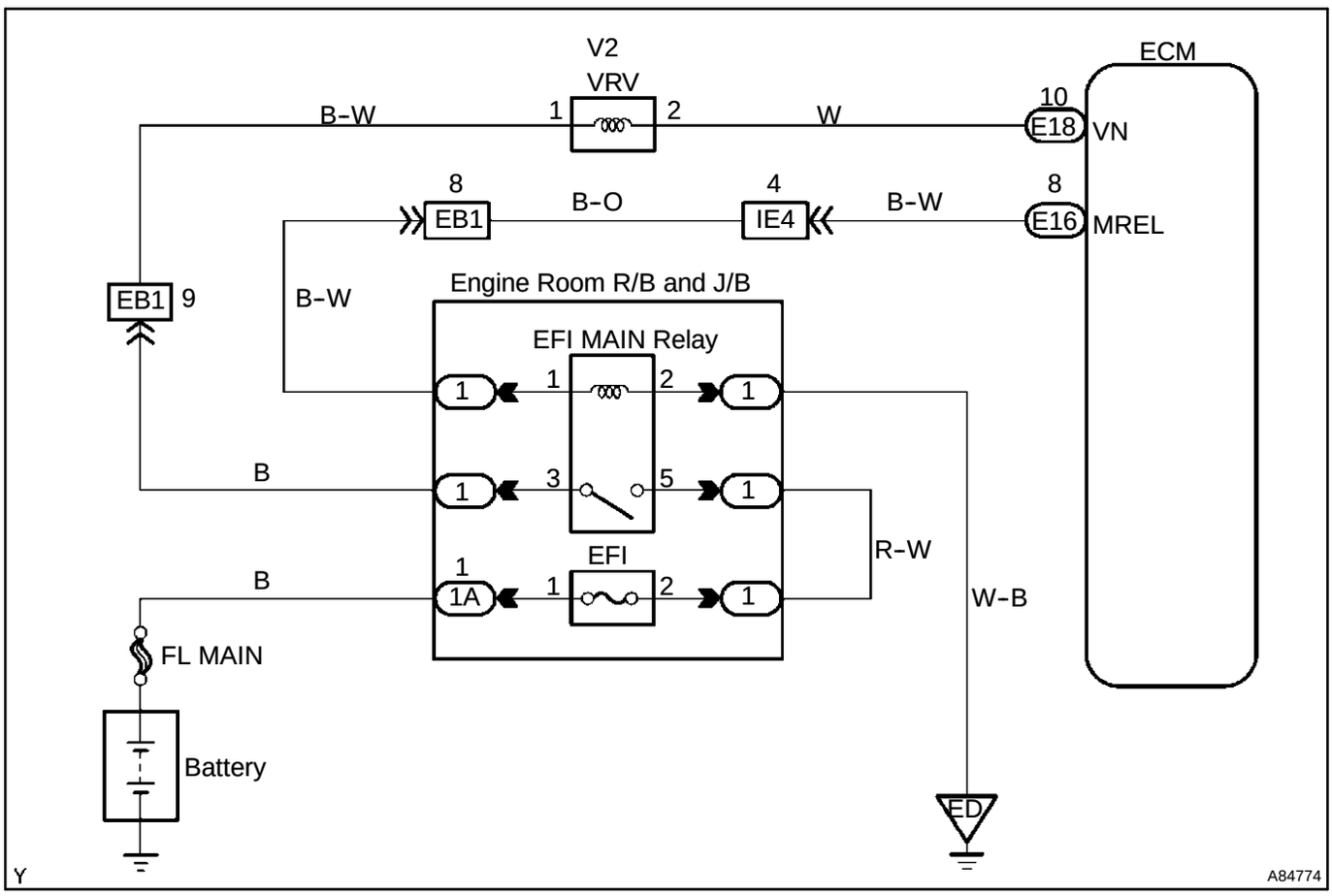
DTC	P0299	TURBO/SUPER CHARGER UNDERBOOST

DTC	P1251	TURBO/SUPER CHARGER OVERBOOST CONDITION (TOO HIGH)

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P0234 P0299 P1251	Turbocharger pressure exceeds standard value for 0.5 seconds or more (1 trip detection logic)	• VRV (Vacuum Regulating valve) • Open or short in VRV circuit • Turbocharger assembly • EGR valve assembly • Vacuum hose • ECM
	Actual turbocharger pressure is deviated 20 kPa (150 mmHg, 5.9 in.Hg) or more from simulated target pressure for 60 seconds (1 trip detection logic)	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0234, P0299 AND/OR P1251)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0234, P0299 and/or P1251	A
P0234, P0299 and/or P1251 and other DTCs	B

B → **GO TO RELEVANT DTC CHART**
(See page 05-412)

A

2	CHECK CONNECTION OF VACUUM HOSES

HINT:
Check the vacuum hose connection of the turbocharger system.

OK: The vacuum hoses have been appropriately connected to each other.

NG → **REPAIR OR REPLACE VACUUM HOSES**

OK

3	CHECK VACUUM HOSES(CHECK VACUUM BETWEEN TURBOCHARGER - VRV FOR TURBO CHARGER)

(a) Using a three-way connector, connect a vacuum gauge to the hoses between the VRV (Vacuum Regulating Valve) and turbocharger.
(b) Warm up the engine coolant temperature to more than 75˚C (167˚F).
(c) Check the vacuum at the engine speed of 900 rpm.

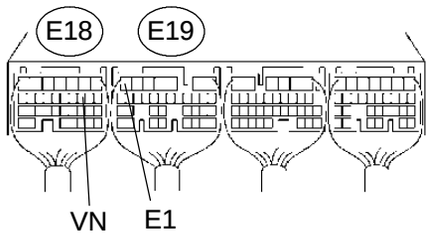
Result:

Vacuum	Proceed To
0 kPa (0 mmHg, 0 in.Hg) to 50 kPa (375 mmHg, 14.8 in.Hg)	A
Above 50 kPa (375 mmHg, 14.8 in.Hg)	B

B → **Go to step 8**

A

4	INSPECT ECM(VN VOLTAGE)

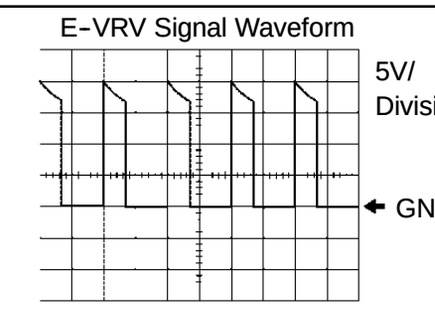


Y ECM Connector A66060

(a) Inspect the ECM using an oscilloscope.
(b) While idling, check the waveform between the terminals of the E18 and E19 ECM connectors.

Standard:

Tester Connection	Specified Condition
VN (E18-10) - E1 (E19-7)	Correct waveform shown



A96634

NG → **Go to step 5**

OK

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-380)**

5	INSPECT VACUUM REGULATING VALVE ASSY(OPERATION) (See page 12-2 of Pub. No. RM1039E COROLLA Supplement)

OK: The VRV operates normally.

NG → **REPLACE VACUUM REGULATING VALVE ASSY** **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

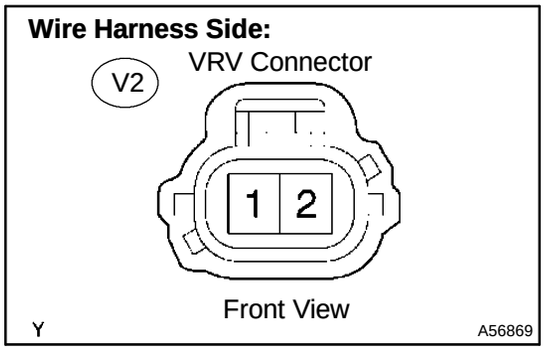
6	INSPECT VACUUM REGULATING VALVE ASSY(RESISTANCE) (See page 12-2 of Pub. No. RM1039E COROLLA Supplement)

OK: The VRV resistance is within the standard range.

NG → **REPLACE VACUUM REGULATING VALVE ASSY** **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

7	CHECK HARNESS AND CONNECTOR(VRV - ECM, VRV - EFI MAIN RELAY)



(a) Disconnect the V2 VRV connector.
(b) Disconnect the E18 ECM connector.
(c) Remove the EFI MAIN relay from the engine room R/B.
(d) Check the resistance.

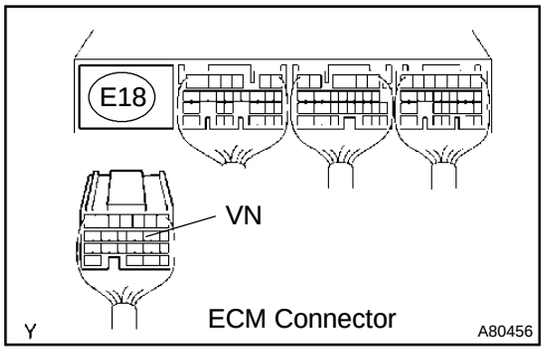
Standard (Check for open):

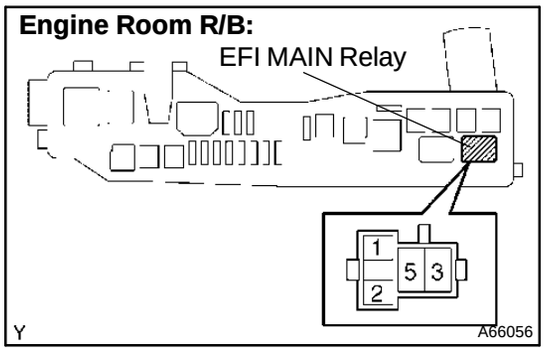
Tester Connection	Specified Condition
VN (E18-10) - (V2-2)	Below 1 Ω
EFI MAIN relay (3) - (V2-1)	

Standard (Check for short):

Tester Connection	Specified Condition
VN (E18-10) or (V2-2) - Body ground	10 kΩ or higher
EFI MAIN relay (3) or (V2-1) - Body ground	

(e) Reconnect the VRV connector.
(f) Reconnect the ECM connector.
(g) Reinstall the EFI MAIN relay.





NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

8	INSPECT TURBOCHARGER SUB-ASSY (See page 13-3 of Pub. No. RM1039E COROLLA Supplement)

OK: None of the inspection results show any abnormalities.

NG → **REPLACE TURBOCHARGER SUB-ASSY (See page 13-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

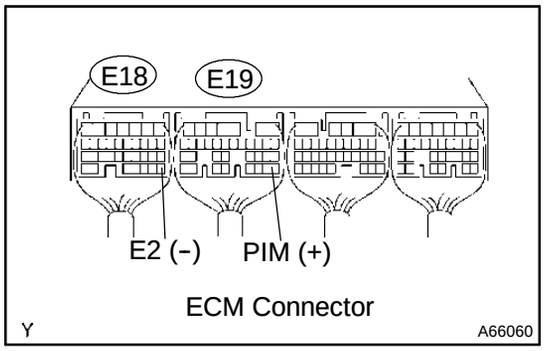
9	INSPECT EGR VALVE ASSY (See page 12-2 of Pub. No. RM1039E COROLLA Supplement)

OK: None of the inspection results show any abnormalities.

NG → **REPLACE EGR VALVE ASSY (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

10 CHECK AND REPLACE MANIFOLD ABSOLUTE SENSOR



(a) Turn the ignition switch to ON.

(b) Measure the voltage between the terminals of the E18 and E19 ECM connectors.

Standard:

Tester Connection	Condition	Specified Condition
PIM (E19-28) - E2 (E18-28)	Applied negative pressure of 40 kPa (300 mmHg, 11.8 in.Hg)	1.4 to 2.0 V
PIM (E19-28) - E2 (E18-28)	Same as atmospheric pressure	2.0 to 2.6 V
PIM (E19-28) - E2 (E18-28)	Applied positive pressure of 69 kPa (518 mmHg, 20.4 in.Hg)	3.0 to 3.6 V

HINT:

Even if the voltage output from the manifold absolute sensor is within the standard range, there may be a problem in the sensor by age deterioration.

NG → **REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR**

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

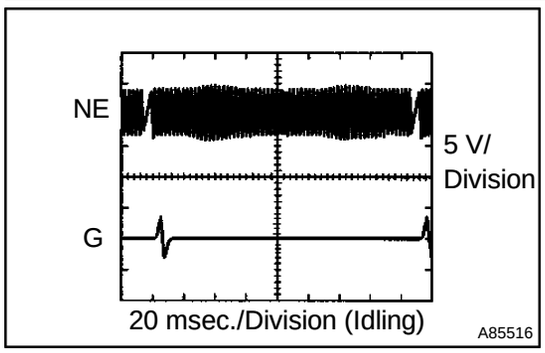
DTC	P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC	P0339	CRANKSHAFT POSITION SENSOR "A" CIRCUIT INTERMITTENT

CIRCUIT DESCRIPTION

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pickup coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pickup coil is made of an iron core and magnet. The sensor plate rotates and as each tooth passes through the pickup coil, a pulse signal is created. The pickup coil generates 34 signals per engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine RPM. Using these calculations, the common rail system is controlled.

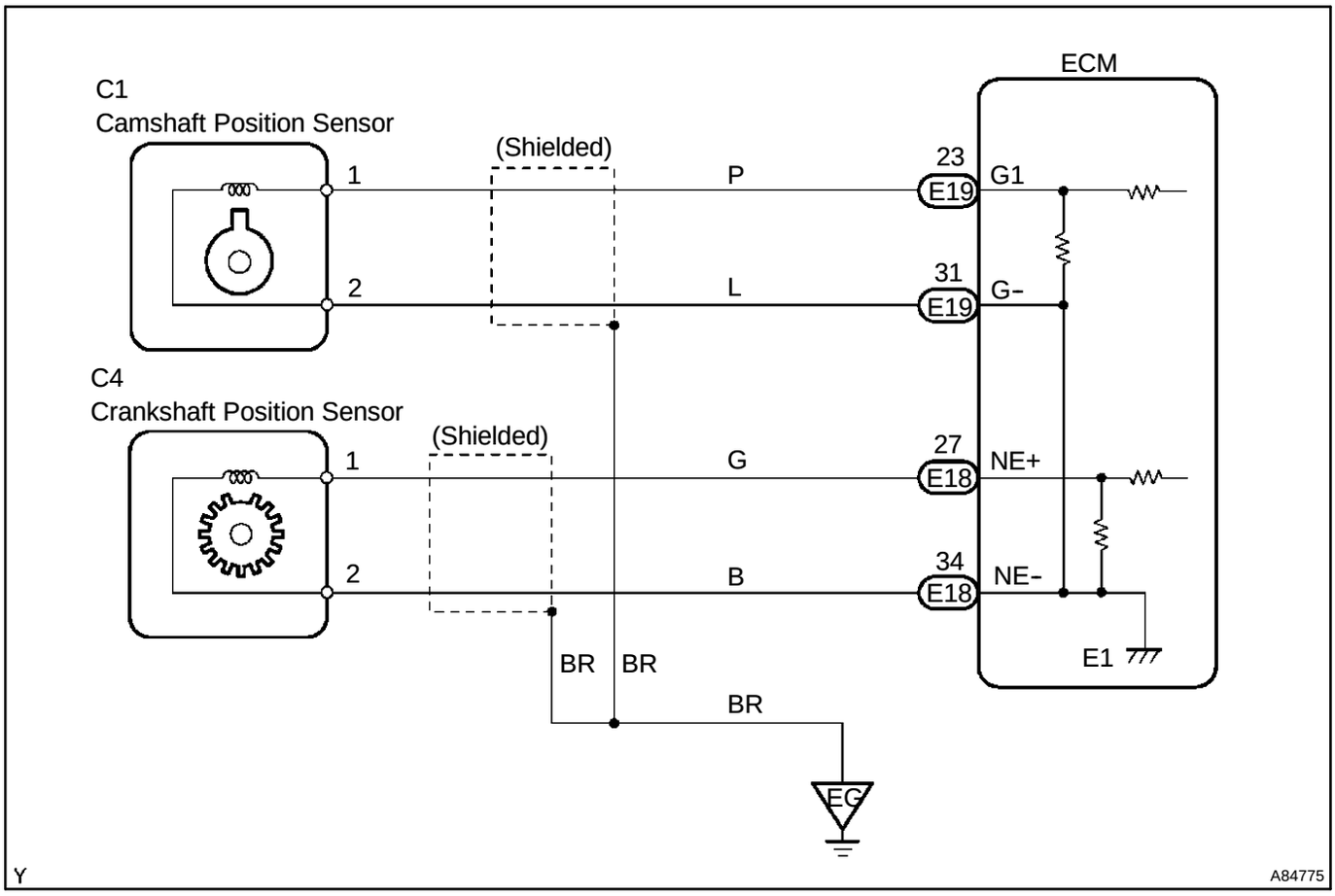
DTC No.	DTC Detection Condition	Trouble Area
P0335	No crankshaft position sensor signal to ECM while cranking (2 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Sensor plate (crankshaft timing pulley) • ECM
	No crankshaft position sensor signal to ECM at engine speed of 650 rpm or more (2 trip detection logic)	
P0339	In conditions (a), (b) and (c), no crankshaft position sensor (NE) signal for 0.05 seconds or more (1 trip detection logic) (a) Engine speed 1,000 rpm or more (b) STA signal OFF (c) 3 seconds or more having lapsed since STA signal switched from ON to OFF	



Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.
HINT:
G stands for the camshaft position sensor signal, and NE stands for the crankshaft position sensor signal.

Item	Contents
Terminal	NE+ - NE-
Tester Range	5V/Division, 20ms/Division
Condition	Cranking or idling

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If no trouble is found in the diagnostic troubleshooting procedure of DTC P0335, troubleshoot the engine mechanical system.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	INSPECT CRANKSHAFT POSITION SENSOR(RESISTANCE)

Component Side:

Crankshaft Position Sensor



A78431

(a) Disconnect the C4 crankshaft position sensor connector.

(b) Measure the resistance between the terminals of the crankshaft position sensor.

Standard:

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
	2,065 to 3,225 Ω at hot

HINT:

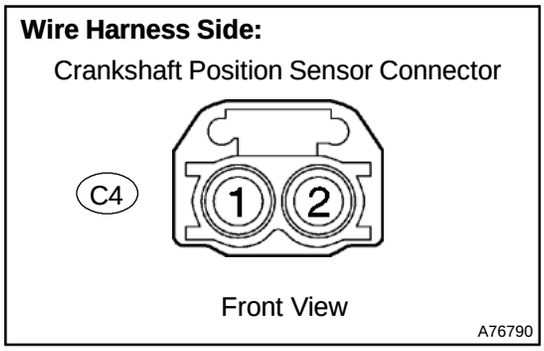
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

(c) Reconnect the crankshaft position sensor connector.

NG → **REPLACE CRANKSHAFT POSITION SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

2 CHECK HARNESS AND CONNECTOR(CRANKSHAFT POSITION SENSOR - ECM)



(a) Disconnect the C4 crankshaft position sensor connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

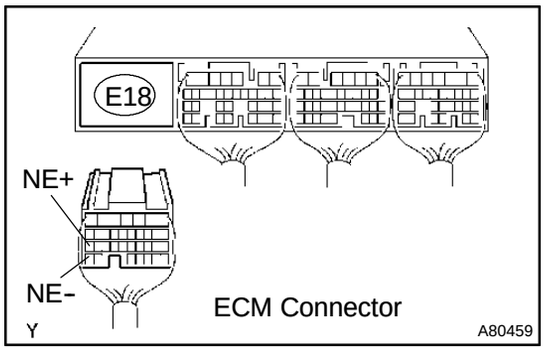
Standard (Check for open):

Tester Connection	Specified Condition
Crankshaft position sensor (C4-1) - NE+ (E18-27)	Below 1 Ω
Crankshaft position sensor (C4-2) - NE- (E18-34)	

Standard (Check for short):

Tester Connection	Specified Condition
Crankshaft position sensor (C4-1) or NE+ (E18-27) - Body ground	10 kΩ or higher
Crankshaft position sensor (C4-2) or NE- (E18-34) - Body ground	

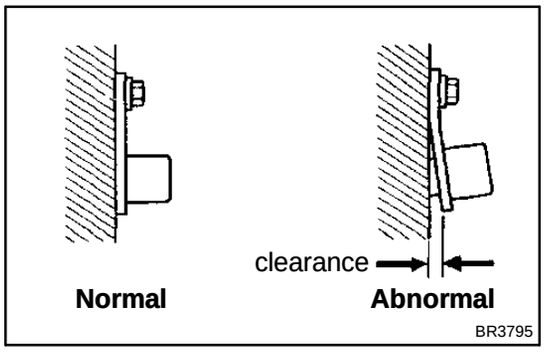
(d) Reconnect the crankshaft position sensor connector.
(e) Reconnect the ECM connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 CHECK SENSOR INSTALLATION(CRANKSHAFT POSITION SENSOR)



(a) Check that the crankshaft position sensor installation.
OK: The sensor has been installed correctly.

NG → **TIGHTEN SENSOR**

OK

4	CHECK CRANKSHAFT POSITION SENSOR PLATE(TEETH OF SENSOR PLATE(CRANKSHAFT TIMING PULLEY))

(a) Check the teeth of the sensor plate.
OK: No deformation on the teeth of the signal plate.

NG → **REPLACE CRANKSHAFT POSITION SENSOR PLATE (CRANKSHAFT TIMING PULLEY)**

OK

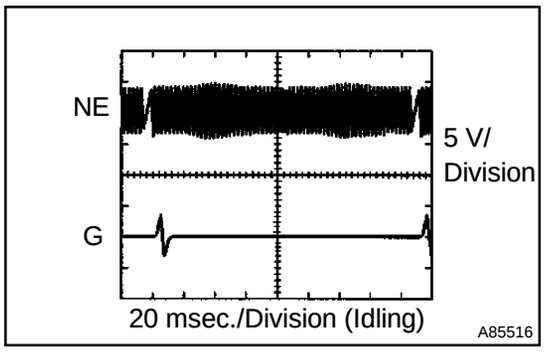
REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR)

CIRCUIT DESCRIPTION

The Camshaft Position (CMP) sensor consists of a magnet and an iron core which is wrapped with copper wire, and installed on the cylinder head. The sensor plate has one tooth on its circumference, and is installed on the camshaft timing pulley. When the camshaft rotates, the tooth on the camshaft timing pulley passes through the CMP sensor. This activates the internal magnet in the sensor, generating a voltage in the copper wire. The generated voltage in the sensor acts as a signal. The ECM locates each cylinder position based on the combination of the signal and another signal from the crankshaft position sensor.

DTC No.	DTC Detection Condition	Trouble Area
P0340	No CMP sensor signal to ECM while cranking (2 trip detection logic)	• Open or short in CMP sensor circuit • CMP sensor • Camshaft timing pulley • ECM
	No CMP sensor signal to ECM at engine speed of 650 rpm or more (1 trip detection logic)	



Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.
HINT:
G stands for the camshaft position sensor signal, and NE stands for the crankshaft position sensor signal.

Item	Contents
Terminal	G1 - G-
Tester Range	5V/Division, 20ms/Division
Condition	Cranking or idling

WIRING DIAGRAM

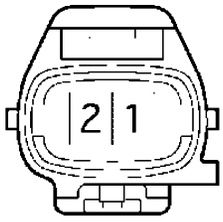
Refer to DTC P0335 on page 05-485.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 INSPECT CAMSHAFT POSITION SENSOR

Component Side:



CMP Sensor

A64984

(a) Disconnect the C1 Camshaft Position (CMP) sensor connector.

(b) Measure the resistance between the terminals of the CMP sensor.

Standard:

Tester Connection	Specified Condition
1 - 2	835 to 1,400 Ω at cold
	1,060 to 1,645 Ω at hot

HINT:

Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

(c) Reconnect the CMP sensor.

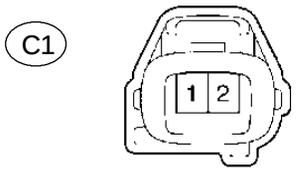
NG → **REPLACE CAMSHAFT POSITION SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

2 CHECK HARNESS AND CONNECTOR(CAMSHAFT POSITION SENSOR - ECM)

Wire Harness Side:

CMP Sensor Connector



Front View

A54385

(a) Disconnect the C1 CMP sensor connector.

(b) Disconnect the E19 ECM connector.

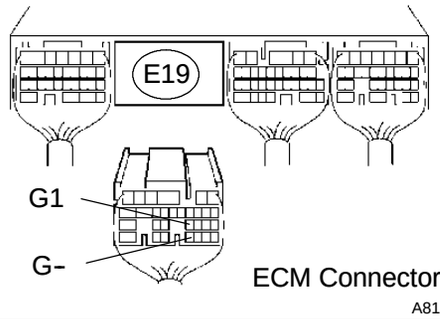
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
CMP sensor (C1-1) - G1 (E19-23)	Below 1 Ω
CMP sensor (C1-2) - G- (E19-31)	

Standard (Check for short):

Tester Connection	Specified Condition
CMP sensor (C1-1) or G1 (E19-23) - Body ground	10 kΩ or higher
CMP sensor (C1-2) or G- (E19-31) - Body ground	



ECM Connector

A81087

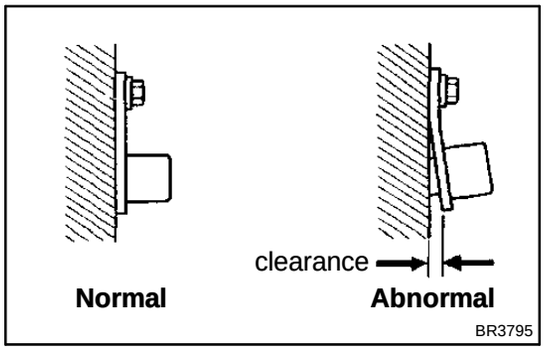
(d) Reconnect the CMP sensor connector.

(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK SENSOR INSTALLATION(CAMSHAFT POSITION SENSOR)



(a) Check that the camshaft position sensor installation.
OK: The sensor has been installed correctly.

NG → **TIGHTEN SENSOR**

OK

4	CHECK CAMSHAFT TIMING PULLEY(TOOTH OF SENSOR PLATE)

(a) Check the tooth of the sensor plate.
OK: No deformation on the tooth of the sensor plate.

NG → **REPLACE CAMSHAFT TIMING PULLEY**

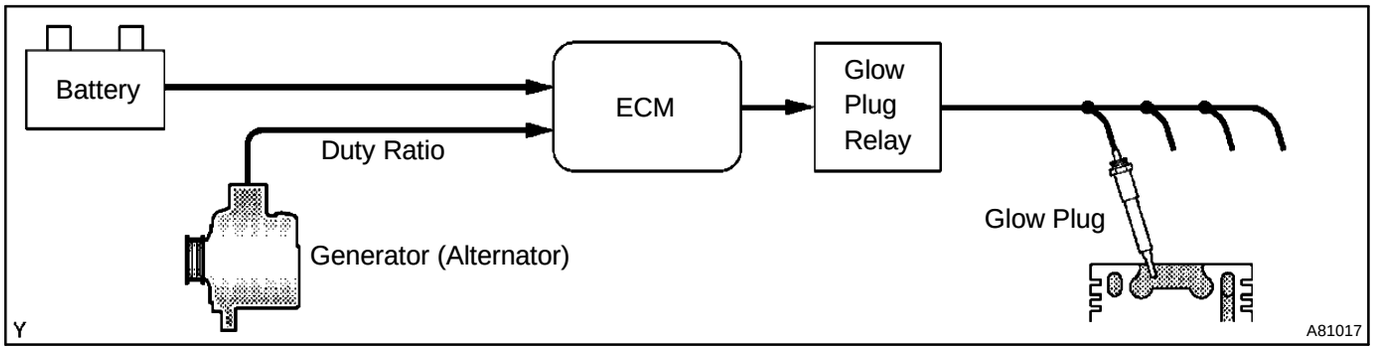
OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0380	GLOW PLUG/HEATER CIRCUIT "A"

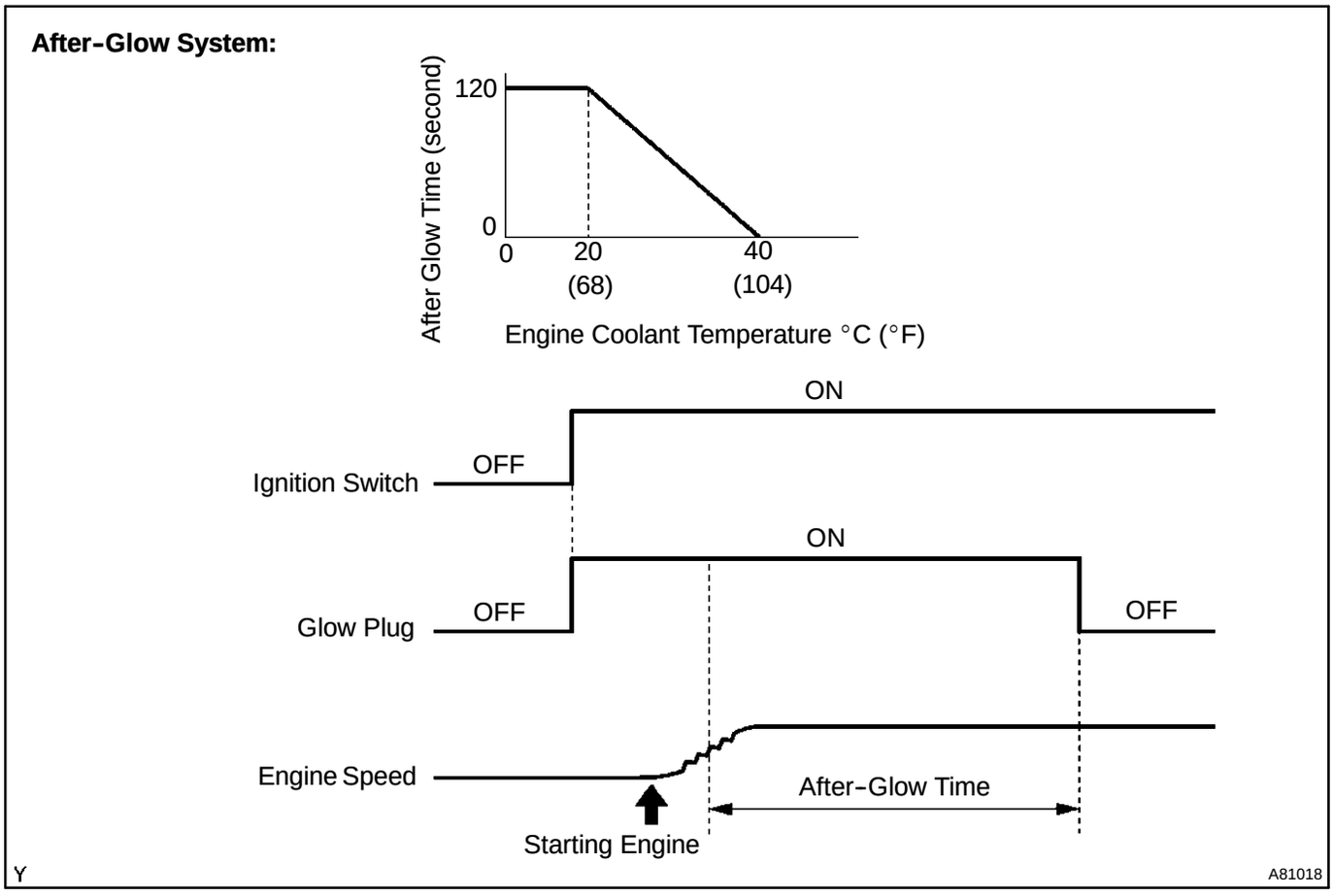
CIRCUIT DESCRIPTION

The glow plug is mounted inside the engine combustion chamber. To ensure the efficient engine starting with a cold engine, the ECM calculates a time interval of the current needs to flow through the glow plug depending on the starting engine coolant temperature when the ignition switch is turned to ON. The ECM then turns on the glow plug relay and permits the current to flow through the glow plug based on the ECM's calculated time. The glow plug is then heated, and enhances fuel combustion with a cold engine.
This DTC is set if there is open in the glow plug itself or the circuit.



HINT:
After the engine is started, the ECM performs an after-glow for a certain period of time. In proportion to the actual engine coolant temperature, the time period varies. The after-grow reduces diesel engine knocking, white smoke emissions and engine noises when the engine is in cold.

After-Glow System:



DTC No.	DTC Detection Condition	Trouble Area
P0380	When glow plug turned from ON to OFF, or vice versa, conditions (a) and (b) satisfied (2 trip detection logic): (a) No changes in battery voltage (b) No changes in duty ratio from terminal M of generator (alternator)	• Open or short in glow plug circuit • Glow fuse • Glow plug relay • Glow plug • ECM

MONITOR DESCRIPTION

When starting a cold engine, the ECM supplies current to the glow plug for a certain period of time. As supplying the current to the glow plug is terminated, the large current is suddenly cut off, therefore the battery voltage then varies and also the output (duty ratio) from terminal M of the generator (alternator) varies. If these variations do not occur when the glow plug is turned from ON to OFF, or vice versa, the ECM determines that the current is not being supplied to the glow plug, and interprets this as an open malfunction in the glow plug or glow plug circuit.

MONITOR STRATEGY

Required sensors	Glow plug circuit
Frequency of operation	Twice per driving cycle
Duration	3 minutes
MIL operation	2 driving cycles

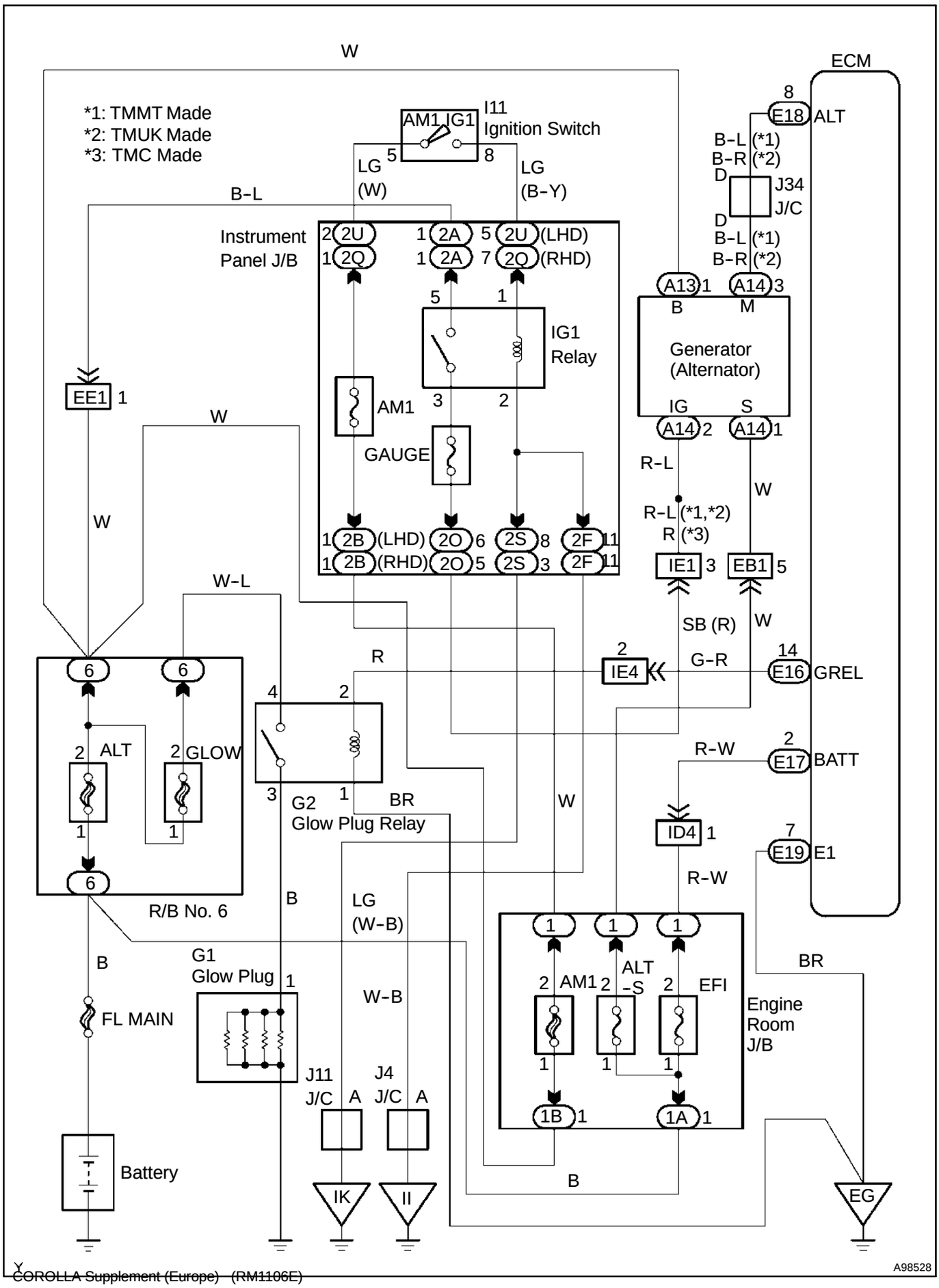
TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Battery voltage	11 V	-
Engine speed	700 rpm	2,000 rpm
Engine coolant temperature	-	40°C (104°F)
Engine speed stable	-	
Time after engine start	8 seconds	-
Any switches, which vary electrical loads, have not operated	-	
Monitor does not run if generator (alternator) circuit malfunctioning		

TYPICAL MALFUNCTION THRESHOLDS

Threshold
When battery voltage, or output (duty ratio) from terminal M of generator (alternator), does not change, despite ECM turning glow plug from ON to OFF, or vice versa

WIRING DIAGRAM

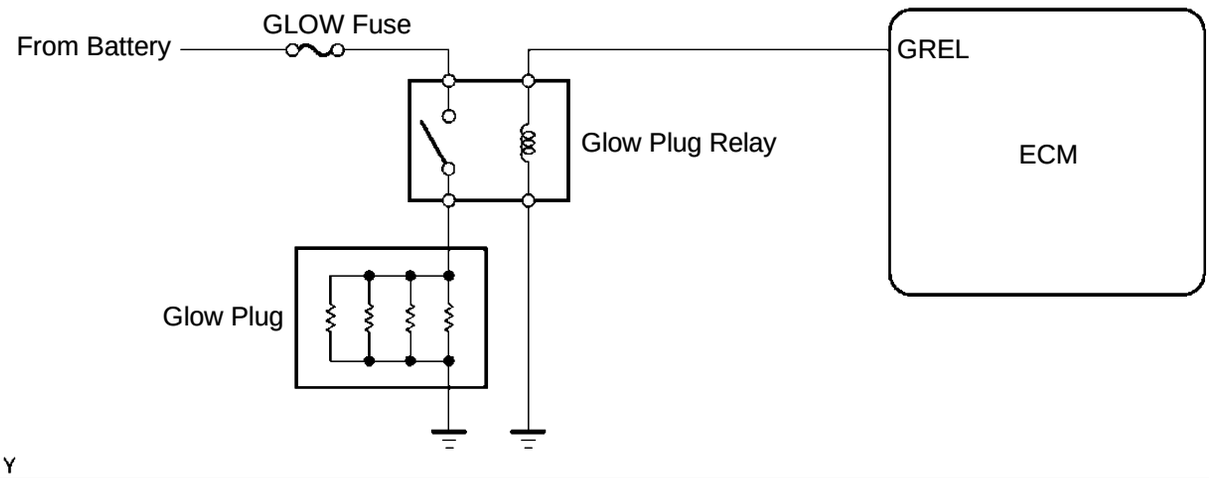


INSPECTION PROCEDURE

HINT:

- After completing repairs, confirm that DTC P0380 is not set again.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

Glow System Wiring Diagram:



1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0380)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0380	A
P0380 and P0622	B

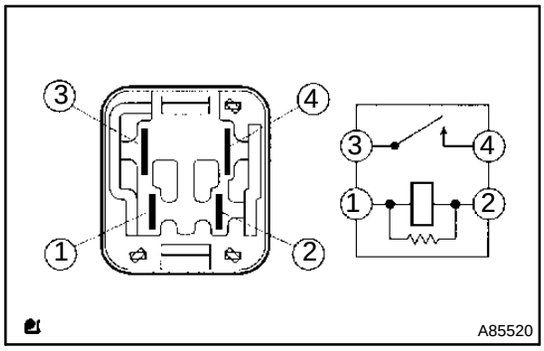
HINT:

If any DTCs other than P0380 and P0622 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-412)

A

2 INSPECT GLOW PLUG RELAY ASSY



(a) Remove the glow plug relay.
(b) Check the glow plug relay resistance.
Standard:

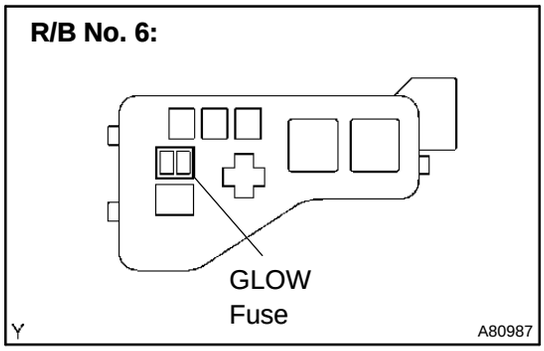
Tester Connection	Specified Condition
3 - 4	10 kΩ or higher
3 - 4	Below 1 Ω (When battery voltage applied to terminals 1 and 2)

(c) Reinstall the glow plug relay.

NG → **REPLACE GLOW PLUG RELAY ASSY**

OK

3 INSPECT FUSE(GLOW FUSE)

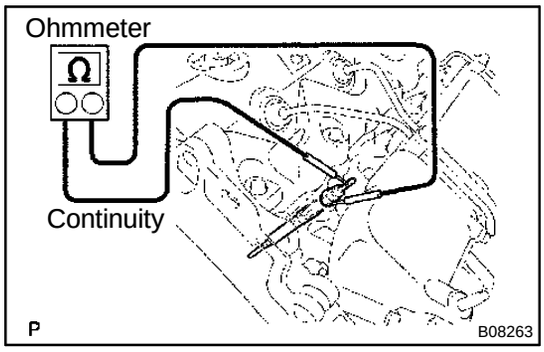


(a) Remove the GLOW fuse from the R/B No. 6.
(b) Check the GLOW fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the GLOW fuse.

NG → **CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED TO FUSE**

OK

4 INSPECT GLOW PLUG ASSY



(a) Disconnect the glow plug wire.
(b) Measure the glow plug resistance.
Standard:

Tester Connection	Specified Condition
Glow plug terminal - Body ground	Approximately 1.1 Ω at 20°C (68°F)

NOTICE:

- **Exercise extreme care not to damage the glow plug pipes. Damaging them could cause an open circuit, or shorten the life of the glow plugs.**
- **Keep the glow plug free of oil and fuel while cleaning.**
- **Wipe any oil off the terminal and Bakelite washer with a clean-dry cloth during inspection.**
- **Do not apply more than 11 V to the glow plug as it could cause an open circuit.**

(c) Reconnect the glow plug wire.

NG → **REPLACE GLOW PLUG ASSY**
(See page 19-4 of Pub. No. RM1039E COROLLA Supplement)

OK

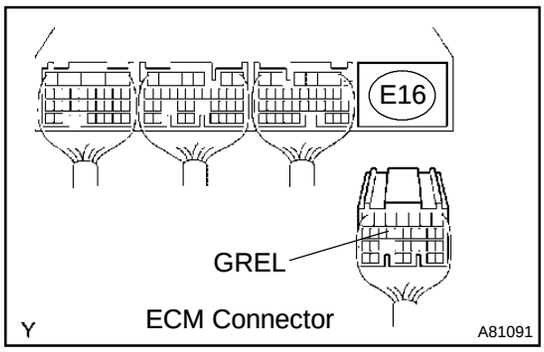
5 INSPECT GLOW PLUG ASSY(INSTALLATION)

(a) Check that the glow plug assy installation.
Torque: 12.3 N·m (125 kgf·cm, 9 ft·lbf)
OK: The grow plug has been installed securely.

NG → **TIGHTEN GLOW PLUG**

OK

6 CHECK HARNESS AND CONNECTOR(GLOW PLUG RELAY - ECM, AND GLOW PLUG RELAY - BODY GROUND)



(a) Disconnect the E16 ECM connector.
(b) Remove the glow plug relay.
(c) Check the resistance.

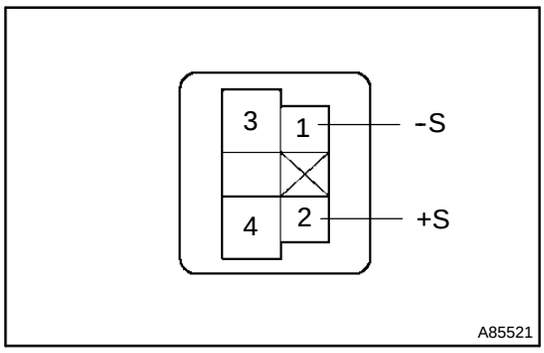
Standard (Check for open):

Tester Connection	Specified Condition
+S (Glow plug relay terminal 2) - GREL (E16-14)	Below 1 Ω
-S (Glow plug relay terminal 1) - Body ground	

Standard (Check for short):

Tester Connection	Specified Condition
GREL (E16-14) - Body ground	10 kΩ or higher

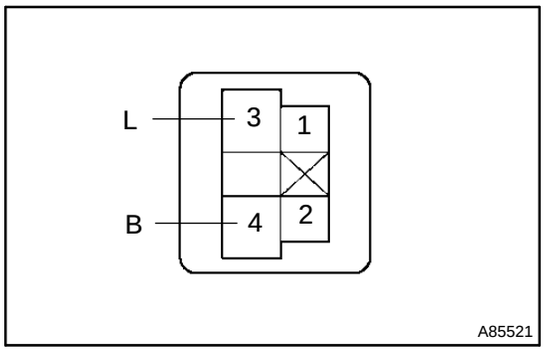
(d) Reconnect the ECM connector.
(e) Reinstall the glow plug relay.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

7 CHECK HARNESS AND CONNECTOR(GLOW PLUG RELAY - GLOW PLUG, AND GLOW PLUG RELAY - BATTERY)



(a) Remove the glow plug relay.
(b) Disconnect the glow plug wire.
(c) Check the resistance.
Standard (Check for open):

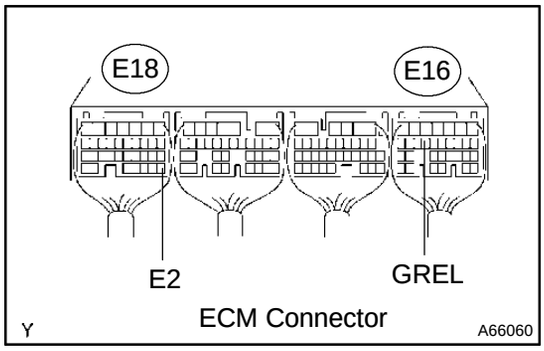
Tester Connection	Specified Condition
L (Glow plug relay terminal 3) - Glow plug wire	Below 1 Ω
B (Glow plug relay terminal 4) - Battery terminal	

(d) Reinstall the glow plug relay.
(e) Reconnect the glow plug wire.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

8 INSPECT ECM(GREL VOLTAGE)



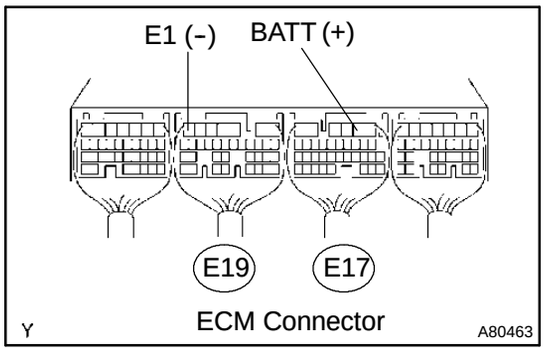
(a) Start the engine.
(b) Measure the voltage between the terminals of the E16 and E18 ECM connectors.
Standard:

Tester Connection	Condition	Specified Condition
GREL (E16-15) - E2 (E18-28)	Engine coolant temperature 40°C (104°F) or less	9 to 14 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

9 INSPECT ECM(BATT VOLTAGE)



(a) Measure the voltage between the terminals of the E17 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
BATT (E17-2) - E1 (E19-7)	9 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - ECM)**

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

DTC	P0400	EXHAUST GAS RECIRCULATION FLOW

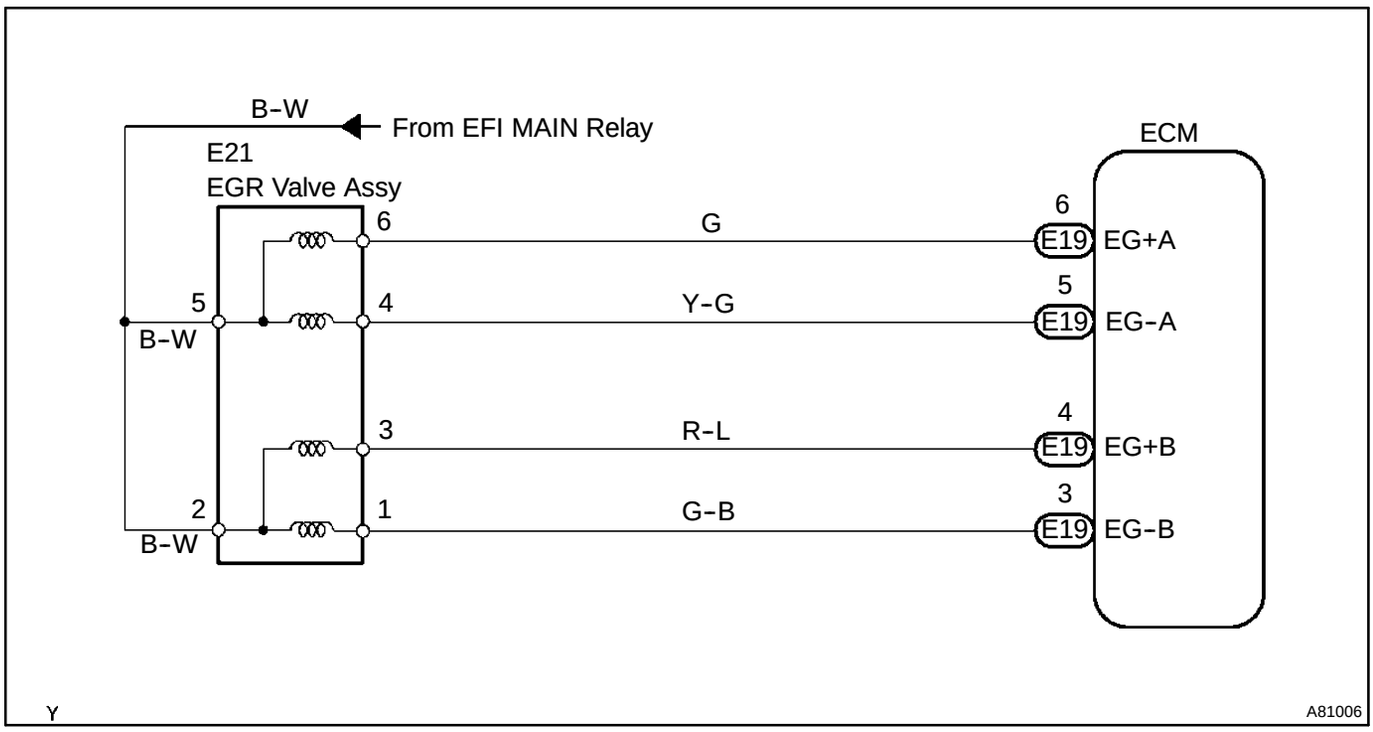
DTC	P0403	EXHAUST GAS RECIRCULATION CONTROL CIRCUIT

CIRCUIT DESCRIPTION

The EGR (Exhaust Gas Recirculation) system recirculates exhaust gases, and which are controlled to the proper volume to be suited every driving condition. The recirculated gas mingles with the intake air, therefore the EGR system can slow down engine combustion and let the combustion temperature down. This helps reduce nitrogen oxides (NOx) emissions.
In order to increase a circulatory efficiency, the ECM adjusts the lift amount of the EGR valve and intake shutter valve (throttle valve).

DTC No.	DTC Detection Condition	Trouble Area
P0400	Mass air flow rate not changed when turning on EGR valve	• EGR valve assembly • Open or short in EGR circuit • EGR passage • ECM
P0403	EGR valve assembly motor malfunction	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO P0400 AND/OR P0403)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0400 and/or P0403	A
P0400 and/or P0403 and other DTCs	B

HINT:
If any DTCs other than P0400 and/or P0403 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART**
(See page 05-412)

A

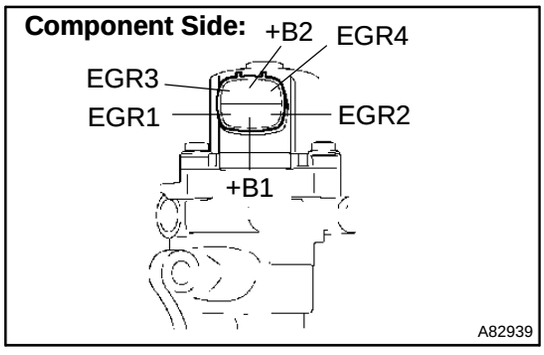
2 READ VALUE USING INTELLIGENT TESTER II(MASS AIR FLOW RATE)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Warm up the engine until the engine coolant temperature reaches between 75°C (167°F) and 90°C (194°F).
(d) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(e) Check the Mass Air Flow (MAF) rate while idling.
Standard: The MAF rate is between 4 gm/s and 16 gm/s
(f) Operate the EGR (Exhaust Gas Recirculation) valve using the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data list / EGR Step POS.
(g) Make the valve opening 0, and check the MAF rate while idling.
Standard: The MAF rate is between 10 gm/s and 16 gm/s

NG → **REPLACE EGR VALVE ASSY**
(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

OK

3 INSPECT EGR VALVE ASSY



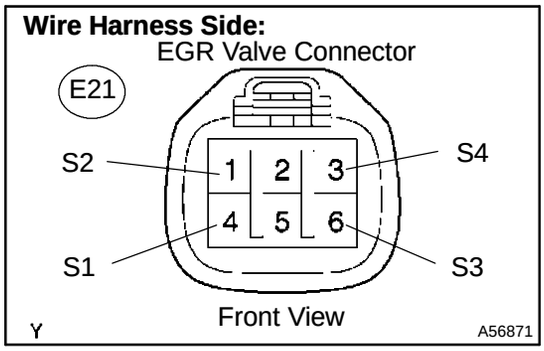
(a) Disconnect E21 EGR valve connector.
(b) Measure the resistance between the terminals of the EGR valve.
Standard:

Tester Connection	Specified Condition
+B1 - EGR1	19.6 ± 1.4 Ω
+B1 - EGR2	19.6 ± 1.4 Ω
+B2 - EGR3	19.6 ± 1.4 Ω
+B2 - EGR4	19.6 ± 1.4 Ω

NG	REPLACE EGR VALVE ASSY (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

OK

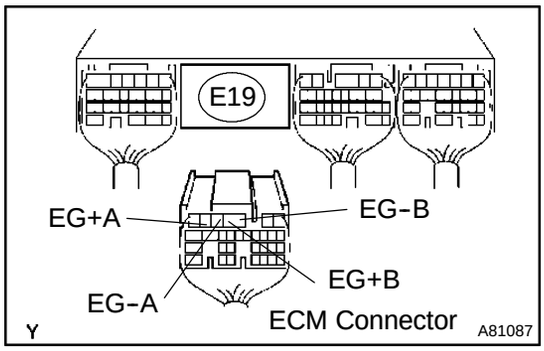
4 CHECK HARNESS AND CONNECTOR(EGR VALVE ASSY - ECM)



(a) Disconnect the E21 EGR valve connector.
(b) Disconnect the E19 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EG+A (E19-6) - S3 (E21-6)	Below 1 Ω
EG-A (E19-5) - S1 (E21-4)	
EG+B (E19-4) - S4 (E21-3)	
EG-B (E19-3) - S2 (E21-1)	



Standard (Check for short):

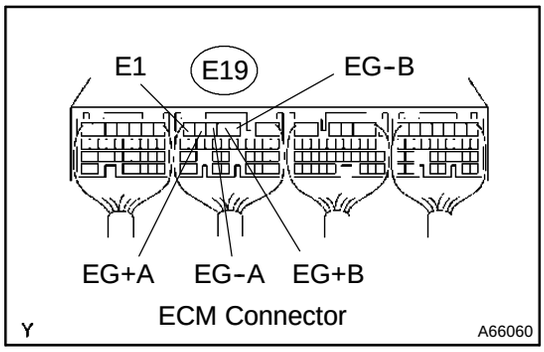
Tester Connection	Specified Condition
EG+A (E19-6) or S3 (E21-6) - Body ground	10 kΩ or higher
EG-A (E19-5) or S1 (E21-4) - Body ground	
EG+B (E19-4) or S4 (E21-3) - Body ground	
EG-B (E19-3) or S2 (E21-1) - Body ground	

(d) Reconnect the EGR valve connector.
(e) Reconnect the ECM connector.

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

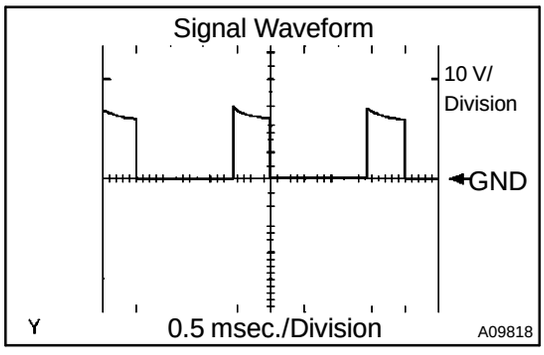
5 INSPECT ECM(EGR VALVE ASSY VOLTAGE)



(a) Inspect the ECM using an oscilloscope.
(b) While idling, check the waveform between the terminals of the E19 ECM connector.

Standard:

Tester Connection	Specified Condition
EG+A (E19-6) - E1 (E19-7)	Correct waveform shown
EG-A (E19-5) - E1 (E19-7)	
EG+B (E19-4) - E1 (E19-7)	
EG-B (E19-3) - E1 (E19-7)	



NG → REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

OK

6	CHECK FOR DEPOSIT(EGR VALVE ASSY)

OK: No deposit

NG → REMOVE FOREIGN OBJECT AND CLEAN EGR VALVE

OK

7	CHECK FOR DEPOSIT(EGR PASSAGE)

OK: No deposit

NG → REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENTS AND AREA

OK

8	CHECK FOR EXHAUST GAS LEAKS

OK: No leakage

NG → REPAIR EXHAUST GAS LEAKAGE POINT

OK

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

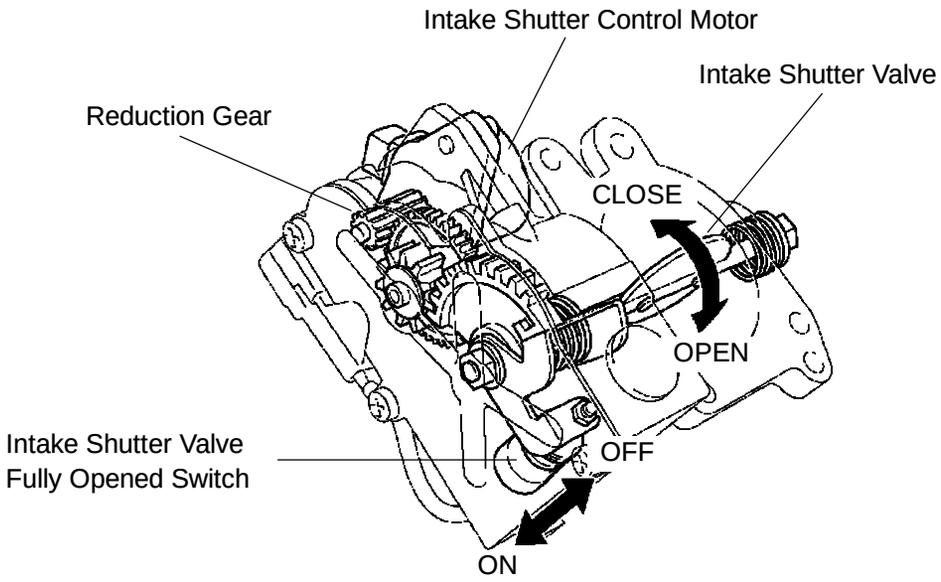
DTC	P0488	EXHAUST GAS RECIRCULATION THROTTLE POSITION CONTROL RANGE/PERFORMANCE

HINT:
For more information on the intake shutter, see page 05-365.

CIRCUIT DESCRIPTION

The ECM opens and closes the intake shutter (throttle valve) using the step motor. Upon opening and closing the valve, the exhaust gas recirculation volume is properly controlled. Also, engine vibrations and noises are suppressed by closing the valve when the engine is stopped.
HINT:
The ECM detects fully open position of the intake shutter valve by using the intake shutter valve fully opened switch which is mounted on the intake shutter.

Intake Shutter Internal Structure:



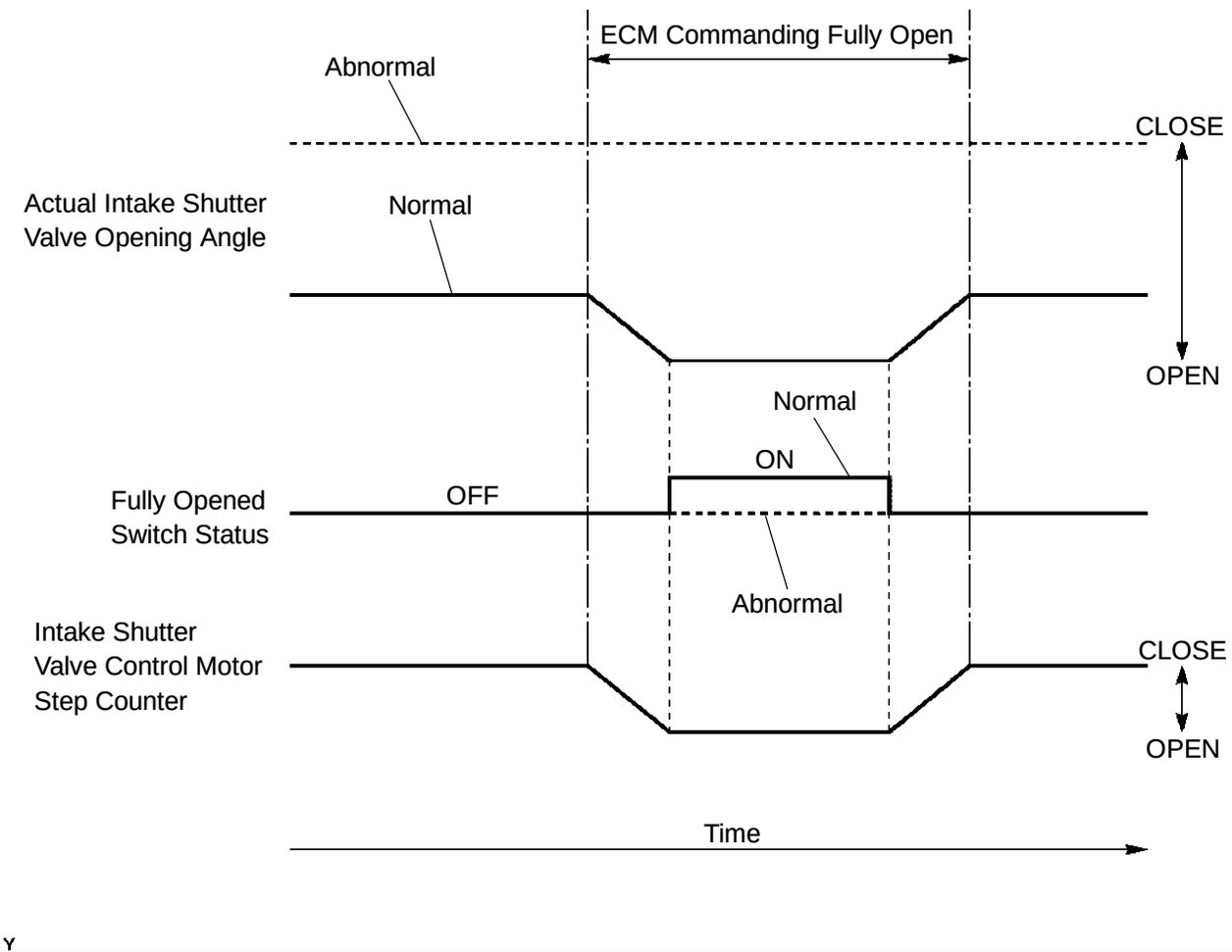
A81482

DTC No.	DTC Detection Condition	Trouble Area
P0488	Intake shutter valve fully opened switch not turned on, despite ECM commanding intake shutter valve to fully open (1 trip detection)	• Open or short in intake shutter control motor circuit • Open or short in intake shutter valve fully opened switch circuit • Intake shutter • ECM

MONITOR DESCRIPTION

This DTC is set if the actual opening angle of the intake shutter valve varies from the target opening angle. The ECM forces the valve to fully open within 2 to 3 seconds after the ignition switch is turned to ON, and then checks if the intake shutter valve fully opened switch is turned ON. In addition, the ECM also forces the valve to fully open when accelerating the engine (high engine load) and checks if the switch is turned ON. When starting and/or accelerating the engine, the ECM sets this DTC if the switch is not turned ON. If the DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

Malfunction Detection:



MONITOR STRATEGY

Required sensors	Intake shutter valve fully opened switch
Frequency of operation	Continuous
Duration	3 seconds
MIL operation	1 driving cycle

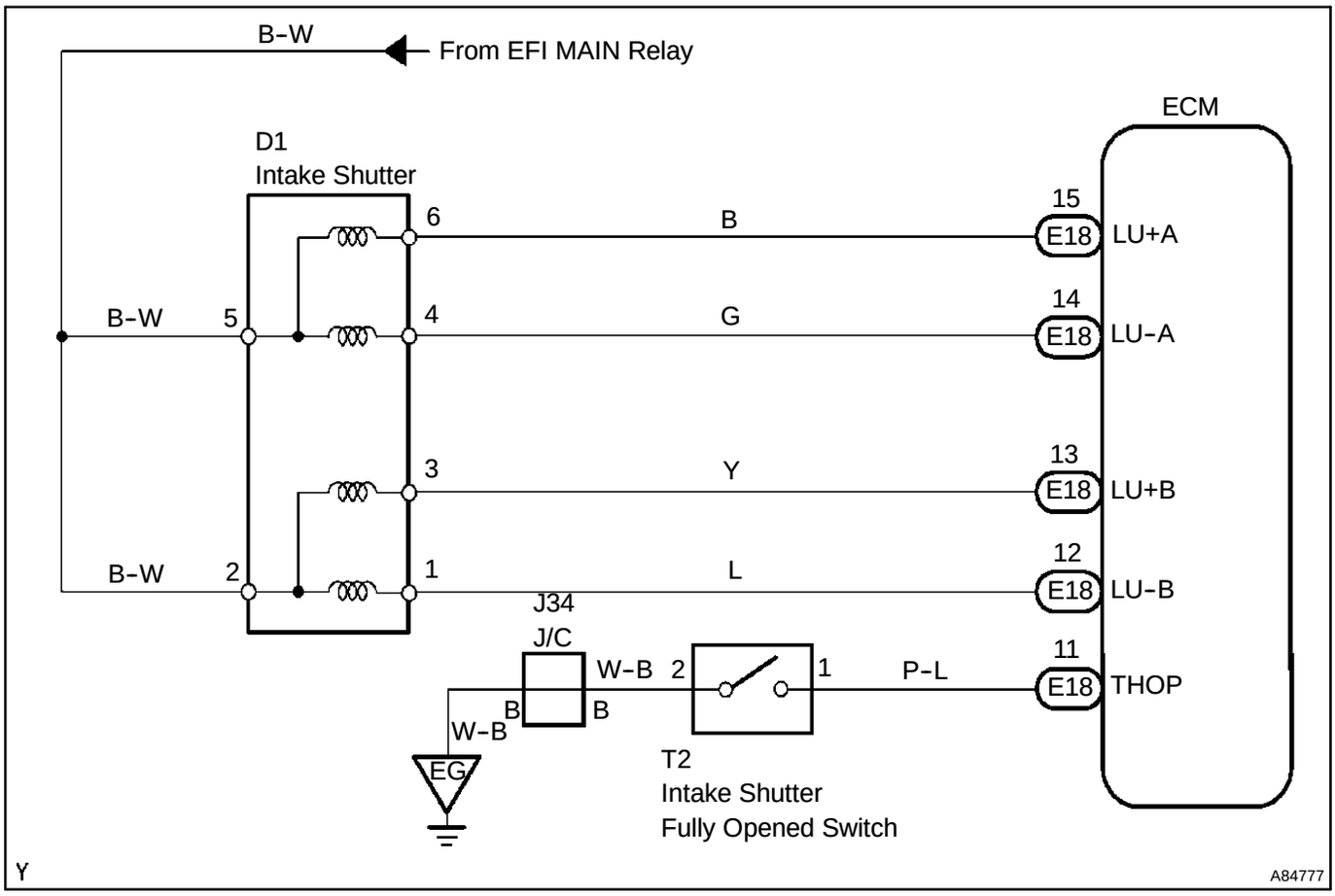
TYPICAL ENABLING CONDITIONS

Specification
Start engine and let it idle for 30 seconds and accelerate vehicle speed to 60 km/h (37 mph) with accelerator pedal opened more than half angle

TYPICAL MALFUNCTION THRESHOLDS

Threshold
Intake shutter valve fully opened switch not turned ON, despite ECM commanding intake shutter valve to open fully

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK INTAKE SHUTTER ASSY

(a) Visually check that the intake shutter valve moves within approximately 2 to 3 seconds after the ignition switch is turned to ON.

Result:

Intake Shutter Valve Condition	Proceed To
Does not move	A
Smoothly moves to full-open position	B

B → **Go to step 6**

A

2 CHECK INTAKE SHUTTER ASSY

(a) Check if the intake shutter valve moves as the lever is rotated by hand.
Result:

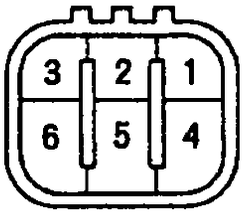
Intake Shutter Valve Condition	Proceed To
Smoothly moves	A
Difficult to move smoothly	B

B → **REPLACE INTAKE SHUTTER ASSY**
(See page 10-29 of Pub. No. RM925E COROLLA)

A

3 INSPECT INTAKE SHUTTER ASSY

Component Side:



Intake Shutter Assy
A31135

(a) Disconnect the D1 intake shutter connector.
(b) Measure the resistance between the terminals.
Standard:

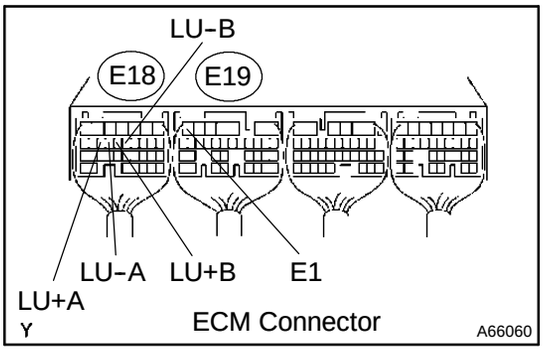
Tester Connection	Specified Condition
1 - 2	18 to 22 Ω at 20°C (68°F)
2 - 3	
4 - 5	
5 - 6	

(c) Reconnect the intake shutter connector.

NG → **REPLACE INTAKE SHUTTER ASSY**
(See page 10-29 of Pub. No. RM925E COROLLA)

OK

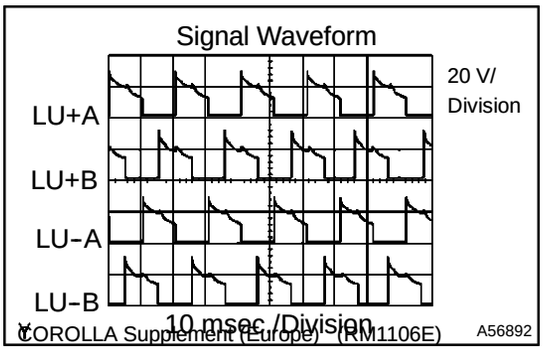
4 INSPECT ECM(LU VOLTAGE)



A66060

(a) Inspect the ECM using an oscilloscope.
(b) While repeating quick engine RPM accelerations, check the waveform between the terminals of the E18 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
LU+A (E18-15) - E1 (E19-7)	Correct waveform shown
LU-A (E18-14) - E1 (E19-7)	
LU+B (E18-13) - E1 (E19-7)	
LU-B (E18-12) - E1 (E19-7)	

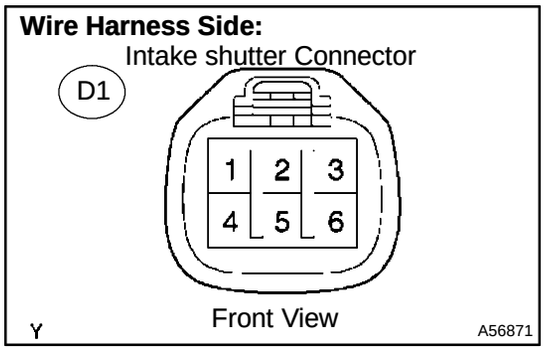


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OK → Go to step 6

NG

5 CHECK HARNESS AND CONNECTOR(INTAKE SHUTTER ASSY - ECM)



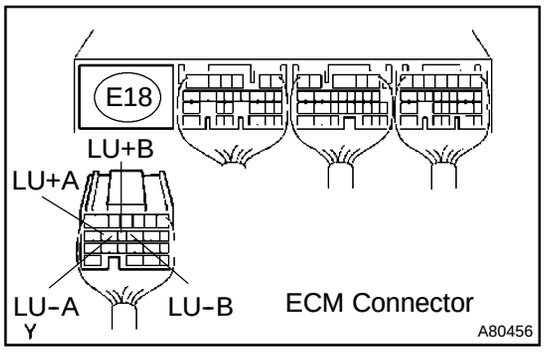
(a) Disconnect the D1 intake shutter connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
LU+A (E18-15) - Intake shutter (D1-6)	Below 1 Ω
LU-A (E18-14) - Intake shutter (D1-4)	
LU+B (E18-13) - Intake shutter (D1-3)	
LU-B (E18-12) - Intake shutter (D1-1)	

Standard (Check for short):

Tester Connection	Specified Condition
LU+A (E18-15) or Intake shutter (D1-6) - Body ground	10 kΩ or higher
LU-A (E18-14) or Intake shutter (D1-4) - Body ground	
LU+B (E18-13) or Intake shutter (D1-3) - Body ground	
LU-B (E18-12) or Intake shutter (D1-1) - Body ground	



(d) Reconnect the ECM connector.
(e) Reconnect the intake shutter connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 READ VALUE USING INTELLIGENT TESTER II(INTAKE SHUTTER VALVE FULLY OPENED SWITCH OPERATION)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Fully open the intake shutter valve by hand.
(d) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Accel Open SW.
(e) Read the value.

Result:

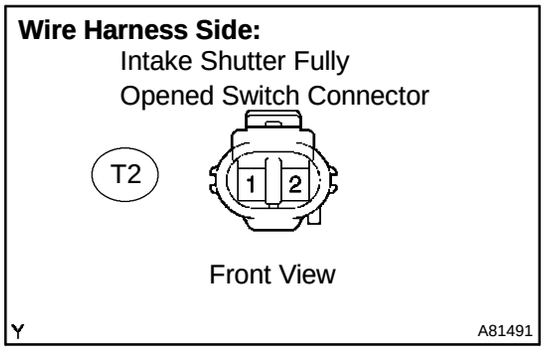
Switch Condition Display	Proceed To
OFF	A
ON	B

B → CHECK IF DTC OUTPUT RECURS (DTC P0488)

HINT:
After clearing the DTC, start the engine and let it idle for 30 seconds. Then, accelerate the vehicle to 60 km/h (37 mph) by depressing the accelerator pedal more than half angle. Confirm that DTC P0488 is not present.

A

7 CHECK HARNESS AND CONNECTOR(FULLY OPENED SWITCH - ECM)



(a) Disconnect T2 the intake shutter fully opened switch connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

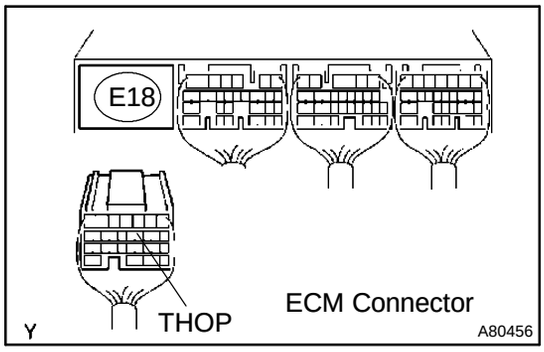
Standard (Check for open):

Tester Connection	Specified Condition
THOP (E18-11) - Intake shutter (T2-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
THOP (E18-11) or Intake shutter (T2-1) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the intake shutter fully opened switch connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

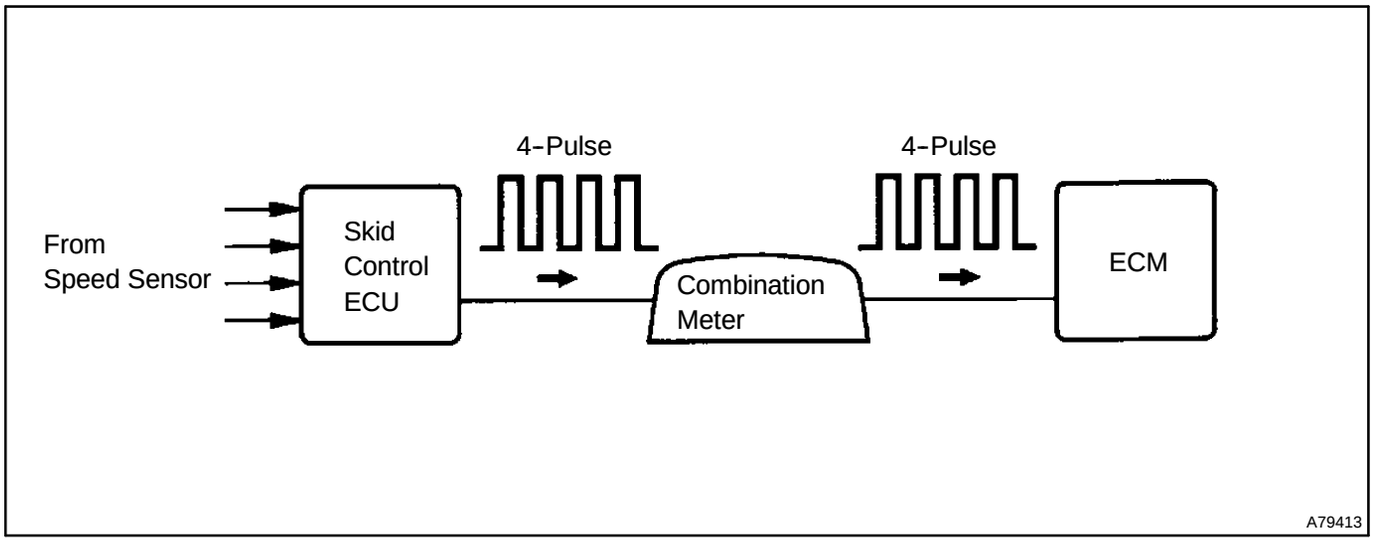
CHECK IF DTC OUTPUT RECURS (DTC P0488)

HINT:
After clearing the DTC, start the engine and let it idle for 30 seconds. Then, accelerate the vehicle to 60 km/h (37 mph) by depressing the accelerator pedal more than half angle. Confirm that DTC P0488 is not present.

DTC	P0500	VEHICLE SPEED SENSOR "A"

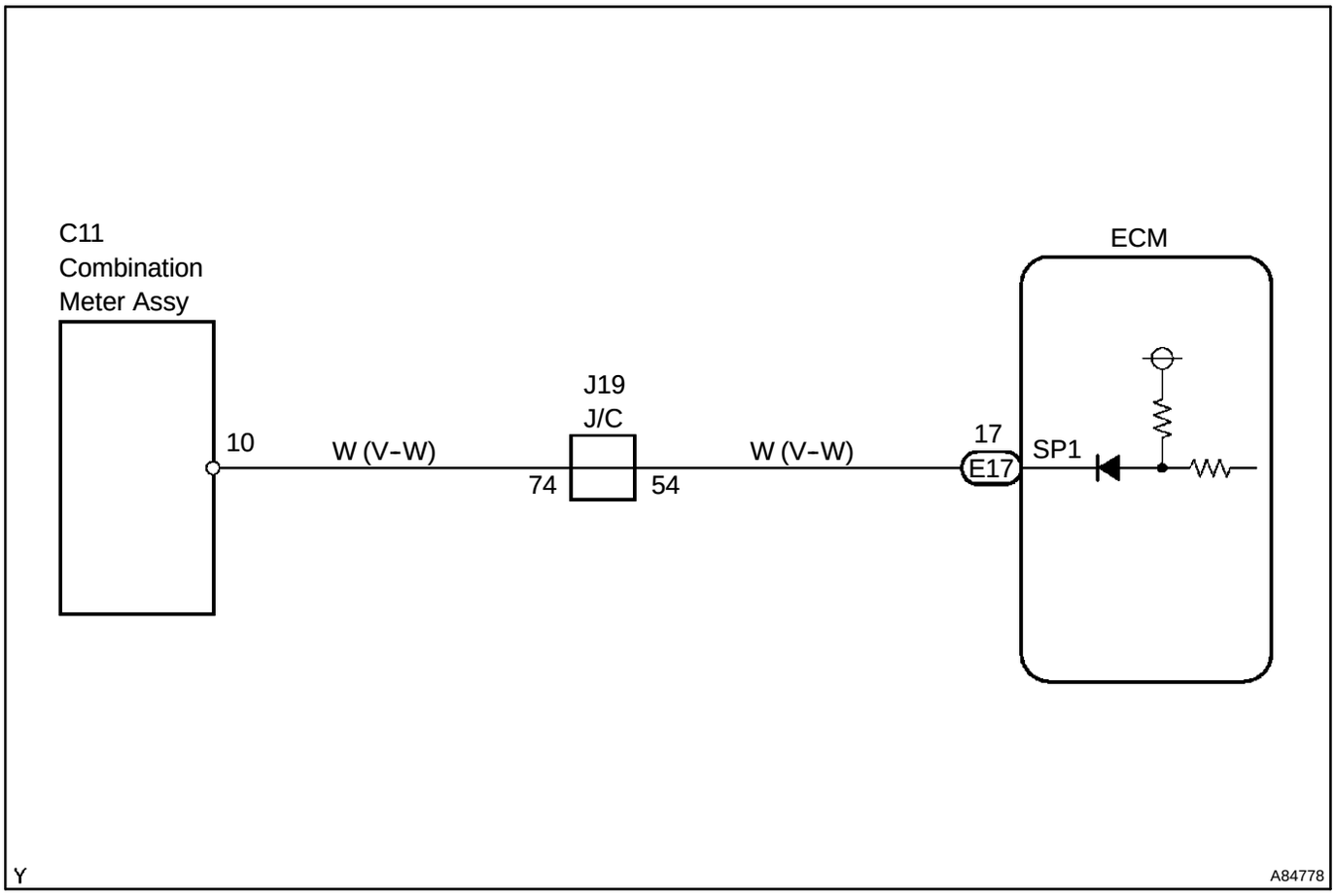
CIRCUIT DESCRIPTION

The speed sensor detects the wheel speed and sends appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a 4-pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detection Condition	Trouble Area
P0500	Conditions (a), (b) and (c) continue for 8 seconds or more (2 trip detection logic): (a) Engine coolant temperature more than 70°C (158°F) (b) Engine speed between 2,000 rpm and 3,500 rpm (c) No speed signal input to ECM	• Open or short in speed sensor circuit • Speed sensor • Combination meter • ECM • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OPERATION OF SPEEDOMETER

(a) Check the speedometer reading in the combination meter.

HINT:

If the vehicle speed sensor has any malfunctions, the speedometer shows abnormal readings.

OK: The speedometer operates normally.

NG → **CHECK SPEEDOMETER CIRCUIT (INCLUDE SPEED SENSOR)**

OK

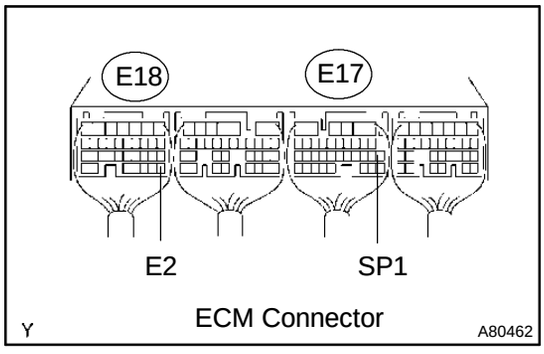
2 READ VALUE USING INTELLIGENT TESTER II(VEHICLE SPEED)

(a) Connect an intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Vehicle SPD.
(d) Check the vehicle speed at the engine speed of 2,000 rpm or more while the vehicle is running.
OK: Same value as the actual vehicle speed.

YES → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

NO

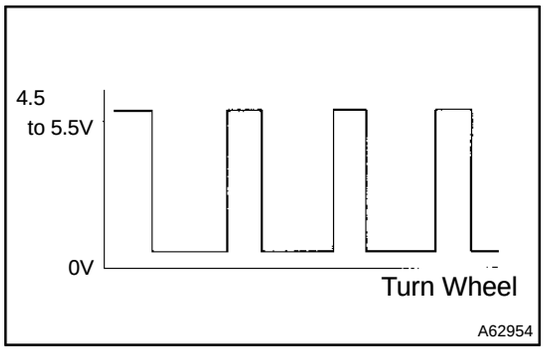
3 INSPECT ECM(SP1 VOLTAGE)



(a) Shift the transmission gear selector lever to the neutral position.
(b) Jack up the vehicle.
(c) Turn the ignition switch to ON.
(d) Check the voltage between the terminals of the E17 and E18 ECM connectors as the wheel is turned slowly.
Standard:

Tester Connection	Specified Condition
SP1 (E17-17) - E2 (E18-28)	Generated intermittently

HINT:
The output voltage should fluctuate up and down similarly to the diagram on the left when the wheel is turned slowly.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0504	BRAKE SWITCH "A"/"B" CORRELATION

CIRCUIT DESCRIPTION

In this system, the signal transmitted from the stop lamp switch is used to determine whether or not the brake system is normal.

The stop lamp switch has a duplex system (signals STP and ST1-) to detect abnormalities. When the signals of depressing and releasing the brake pedal are detected simultaneously, the ECM interprets this as a malfunction of the stop lamp switch.

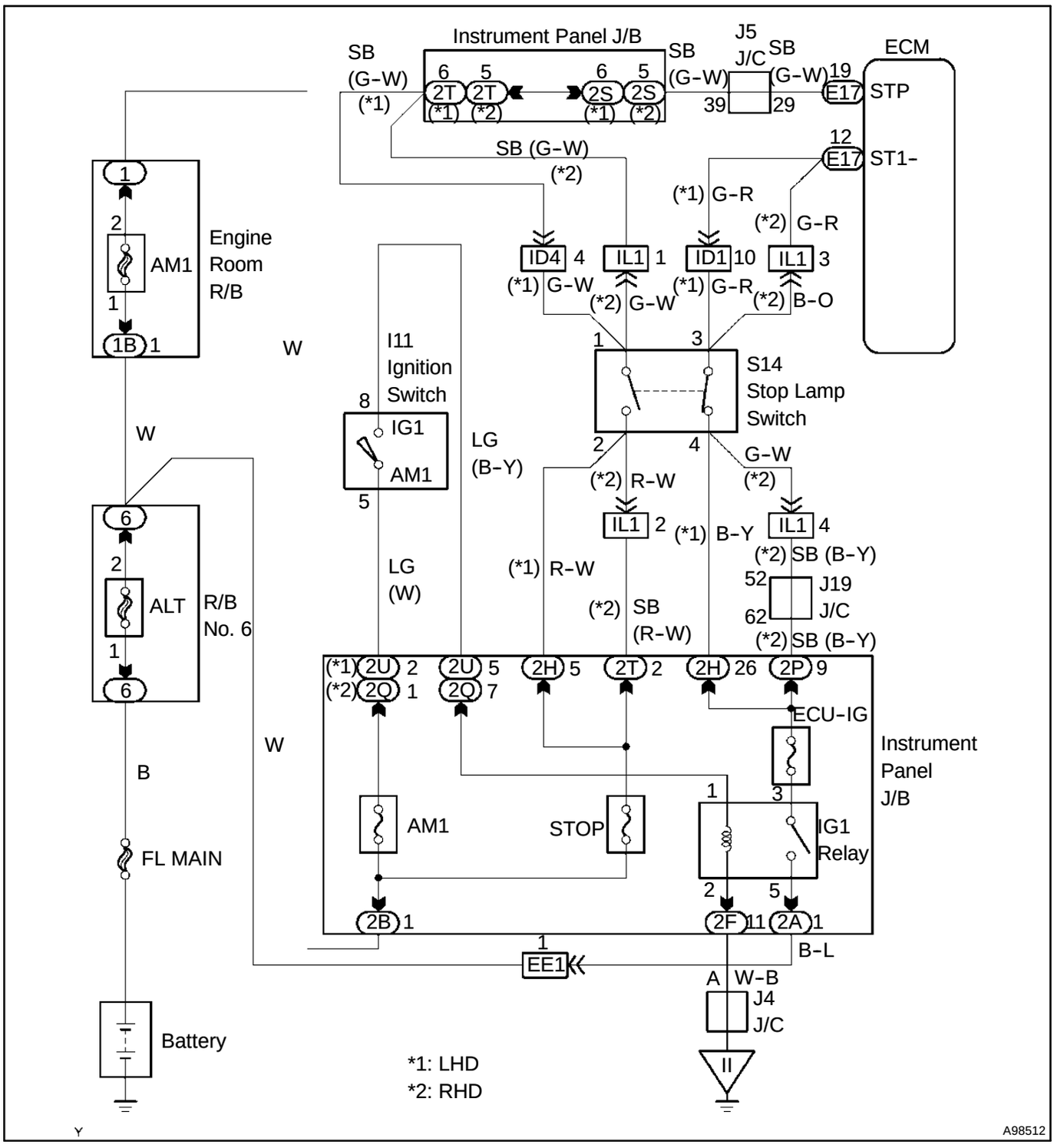
HINT:

Normal condition is shown in the table below.

Signal	Brake Pedal Released	In Transition	Brake Pedal Depressed
STP	OFF	ON	ON
ST1-	ON	ON	OFF

DTC No.	DTC Detection Condition	Trouble Area
P0504	Conditions (a), (b) and (c) continue for 0.5 seconds or more: (a) Ignition switch ON (b) Brake pedal released (c) STP signal OFF when ST1- signal OFF	• Short in stop lamp switch signal circuit • Stop lamp switch • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 CHECK OPERATION OF STOP LAMP

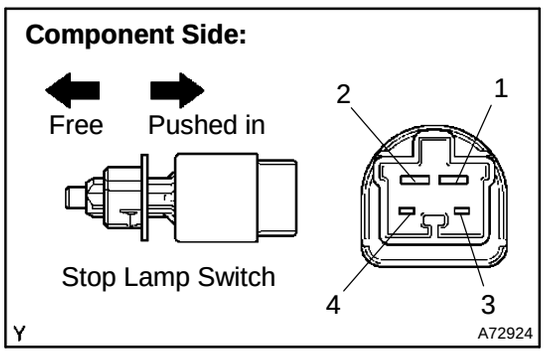
(a) Check that the stop lamps illuminate when the brake pedal is depressed, and turn off when the brake pedal is released.

OK: The stop lamps illuminate and turn off according to the brake pedal operation.

NG → **REPAIR OR REPLACE STOP LAMP SWITCH CIRCUIT**

OK

2 INSPECT STOP LAMP SWITCH ASSY



(a) Remove the S14 stop lamp switch.

(b) Check the resistance.

Standard:

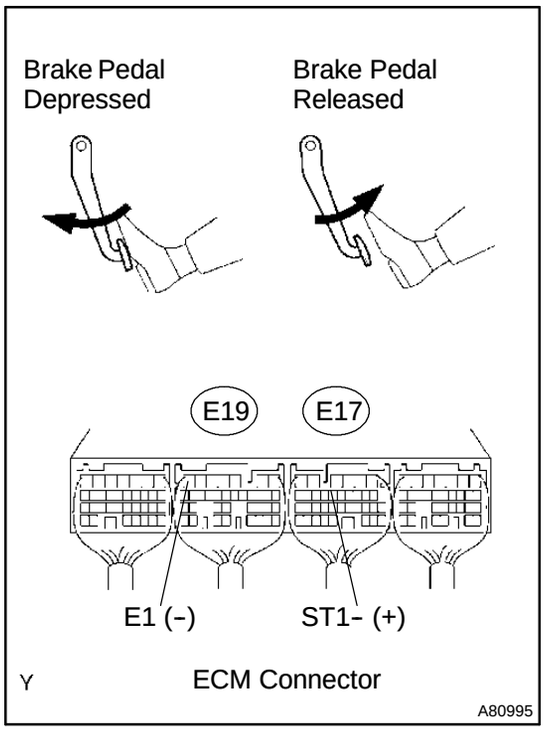
Switch Position	Tester Connection	Specified Condition
Switch pin free	1 - 2	Below 1 Ω
	3 - 4	10 kΩ or higher
Switch pin pushed in	1 - 2	10 kΩ or higher
	3 - 4	Below 1 Ω

(c) Reinstall the stop lamp switch.

NG → **REPLACE STOP LAMP SWITCH ASSY**

OK

3 READ VALUE USING INTELLIGENT TESTER II(STP SIGNAL AND ST1- VOLTAGE)



(a) Connect an intelligent tester II to the DLC3.

(b) Turn the ignition switch to ON and turn the intelligent tester II ON.

(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Stop Light SW.

(d) Read the value.

OK:

Brake Pedal	Specified Condition
Depressed	STP signal ON
Released	STP signal OFF

(e) Measure the voltage between the terminals of the E17 and E19 ECM connectors.

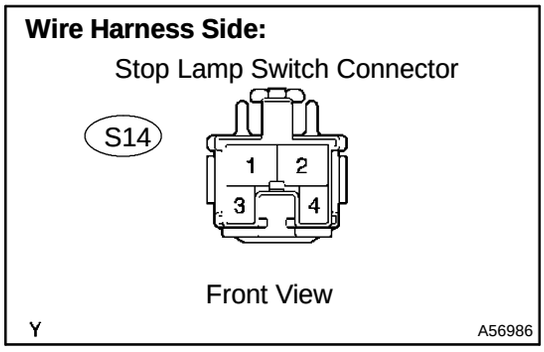
Standard:

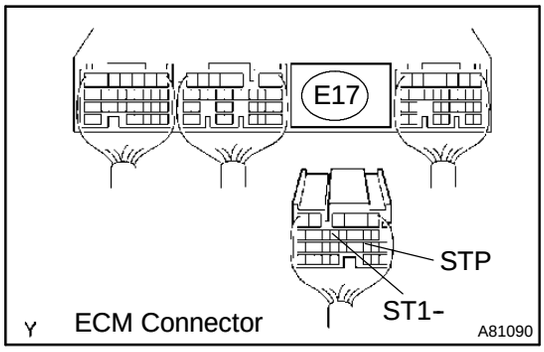
Tester Connection	Brake Pedal	Specified Condition
ST1- (E17-12) - E1 (E19-7)	Depressed	Below 1.5 V
	Released	7.5 to 14 V

OK → **CHECK FOR INTERMITTENT PROBLEMS** **(See page 05-380)**

NG

4	CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH - ECM)





(a) Disconnect the S14 stop lamp switch connector.
(b) Disconnect the E17 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Stop lamp switch (S14-1) - STP (E17-19)	Below 1 Ω
Stop lamp switch (S14-4) - ST1- (E17-12)	

Standard (Check for short):

Tester Connection	Specified Condition
Stop lamp switch (S14-1) or STP (E17-19) - Body ground	10 kΩ or higher
Stop lamp switch (S14-4) or ST1- (E17-12) - Body ground	

(d) Reconnect the ECM connector.
(e) Reconnect the stop lamp switch connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P0560	SYSTEM VOLTAGE

CIRCUIT DESCRIPTION

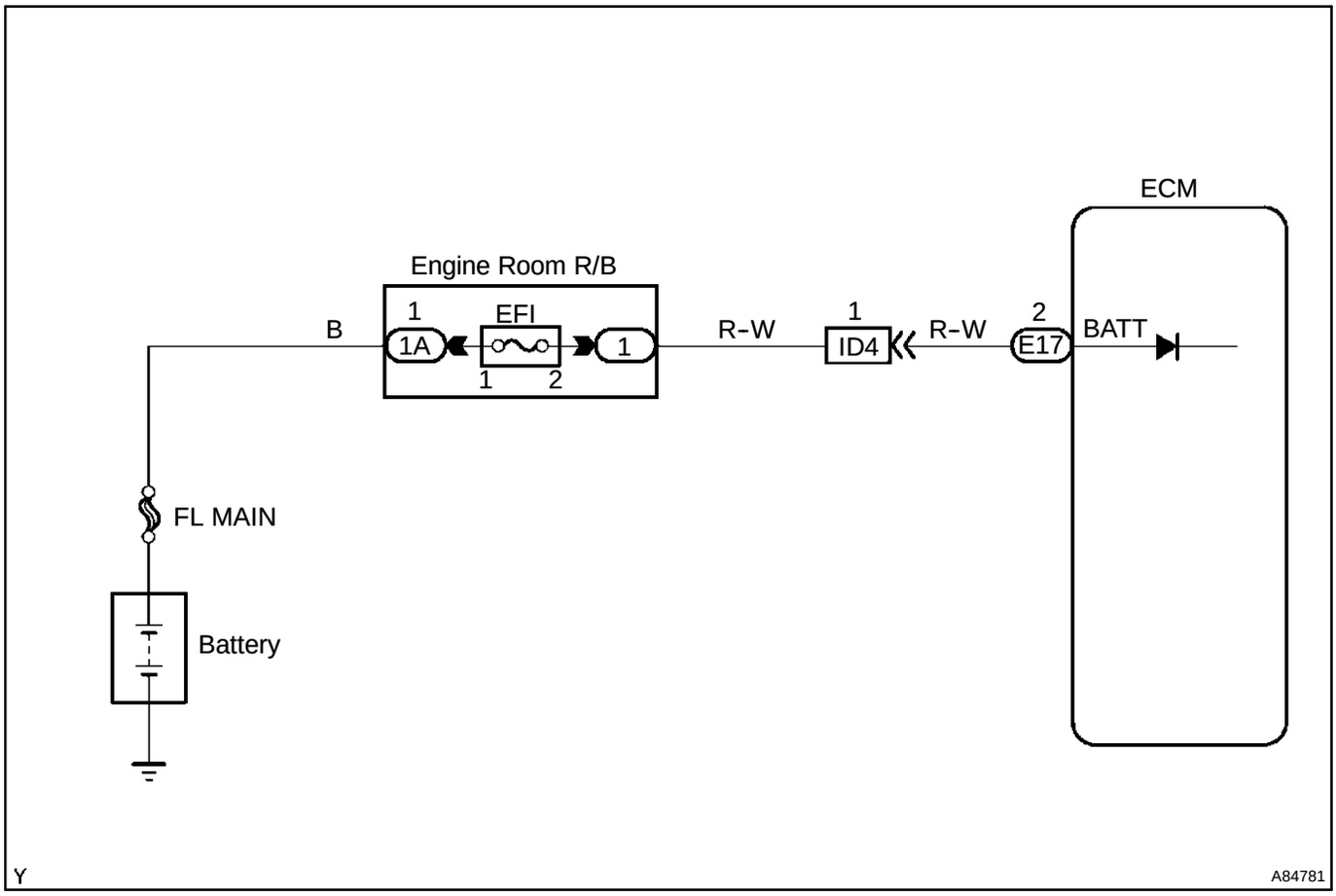
The battery supplies power to terminal BATT of the ECM even when the ignition switch is OFF. This power supply enables the ECM to store a variety of engine data such as DTC histories, freeze frame data and fuel injection feedback learning values.

DTC No.	DTC Detection Condition	Trouble Area
P0560	Either of following conditions met: (a) Significant decrease in battery voltage (b) Open in backup power source circuit (1 trip detection logic)	• Open in backup power source circuit • Low battery voltage • ECM

HINT:

If DTC P0560 is set, the ECM does not store other DTCs.

WIRING DIAGRAM

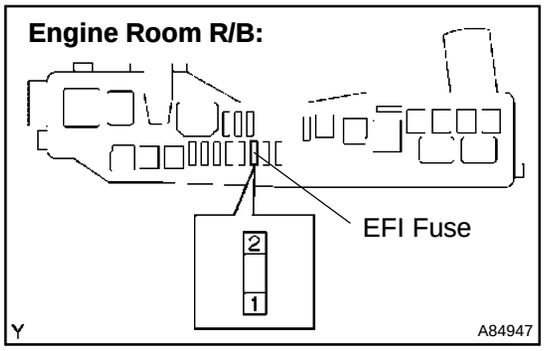


INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 CHECK FUSE(EFI FUSE)

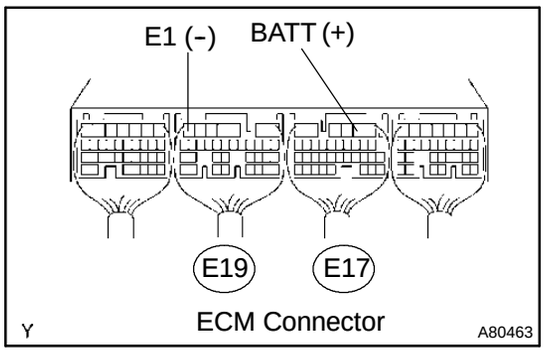


(a) Remove the EFI fuse from the engine room R/B.
(b) Check the EFI fuse resistance.
Standard: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

2 INSPECT ECM(BATT VOLTAGE)



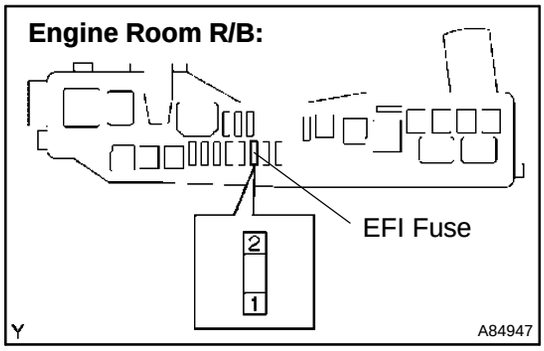
(a) Measure the voltage between the terminals of the E17 and E19 ECM connectors.
Standard:

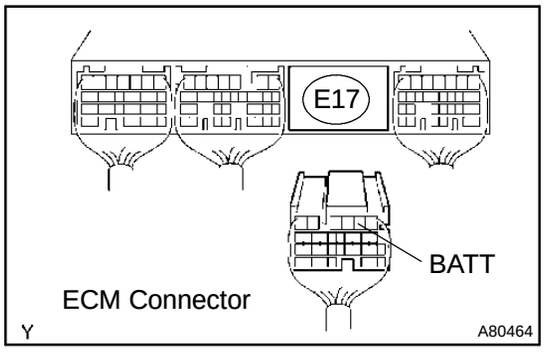
Tester Connection	Specified Condition
BATT (E17-2) - E1 (E19-7)	9 to 14 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

3	CHECK HARNESS AND CONNECTOR(EFI FUSE - ECM, EFI FUSE - BATTERY)





(a) Check the harness and connectors between the EFI fuse and ECM.
(1) Remove the EFI fuse from the engine room R/B.
(2) Disconnect the E17 ECM connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI fuse (2) - BATT (E17-2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI fuse (2) or BATT (E17-2) - Body ground	10 kΩ or higher

(4) Reinstall the EFI fuse.
(5) Reconnect the ECM connector.

(b) Check the harness and connector between the EFI fuse and battery.
(1) Remove the EFI fuse from the engine room R/B.
(2) Disconnect the battery cable.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Battery cable terminal - EFI fuse (1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Battery cable terminal or EFI fuse (1) - Body ground	10 kΩ or higher

(4) Reinstall the EFI fuse.
(5) Reconnect the battery cable.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4	INSPECT BATTERY(VOLTAGE) (See page 19-26 of Pub. No. RM925E COROLLA)

Standard: The battery voltage is between 9 and 14 V.

NG → **REPAIR OR REPLACE BATTERY**

OK

REPLACE ENGINE ROOM RELAY BLOCK

DTC	P0606	ECM/PCM PROCESSOR

DTC	P0607	CONTROL MODULE PERFORMANCE

DTC	P1611	IC CIRCUIT MALFUNCTION

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P0606 P0607 P1611	ECM internal error (1 trip detection logic)	• ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

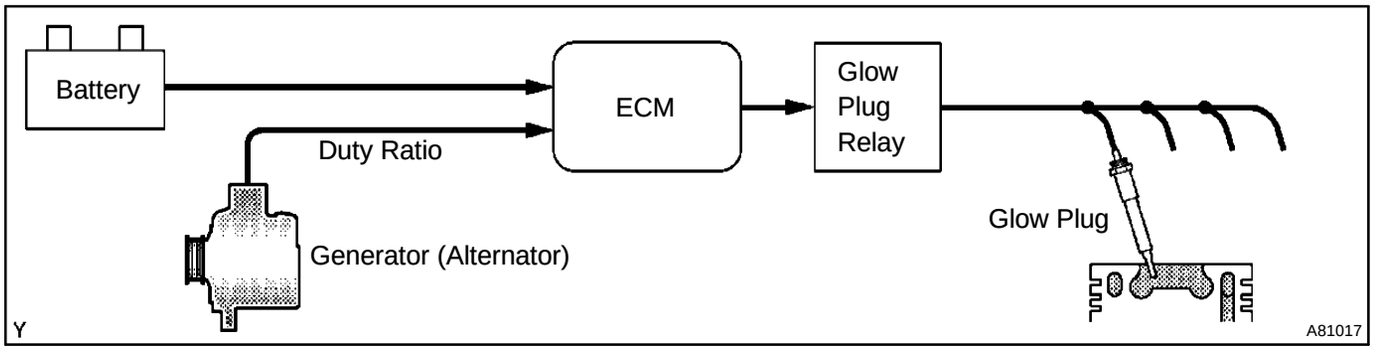
DTC	P0622	GENERATOR FIELD "F" TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

While the generator (alternator) is generating current, a duty ratio is transmitted from terminal M of the generator to the ECM terminal ALT. This duty ratio is used for detecting an open malfunction of the generator circuit and DTC P0380.

HINT:

DTC P0380 indicates an open or short malfunction in the glow plug circuit. If this DTC is set, inspect the glow plug circuit (see page 05-491).



DTC No.	DTC Detection Condition	Trouble Area
P0622	No duty ratio from terminal M of the generator (alternator) while engine running (1 trip detection logic)	• Open in generator (alternator) circuit • Generator (alternator) • Drive belt • ECM

Result:

Engine Speed	Generator Duty Ratio (%)
Idling	10 to 100
When increasing engine speed	Generator duty ratio drops
When decreasing engine speed	Generator duty ratio rises

MONITOR DESCRIPTION

The ECM detects a generator (alternator) failure or an open malfunction of the circuit, if the duty ratio is not transmitted from terminal M of the generator (alternator) despite the engine running.

MONITOR STRATEGY

Required sensors	Generator (alternator) circuit
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	1 driving cycle

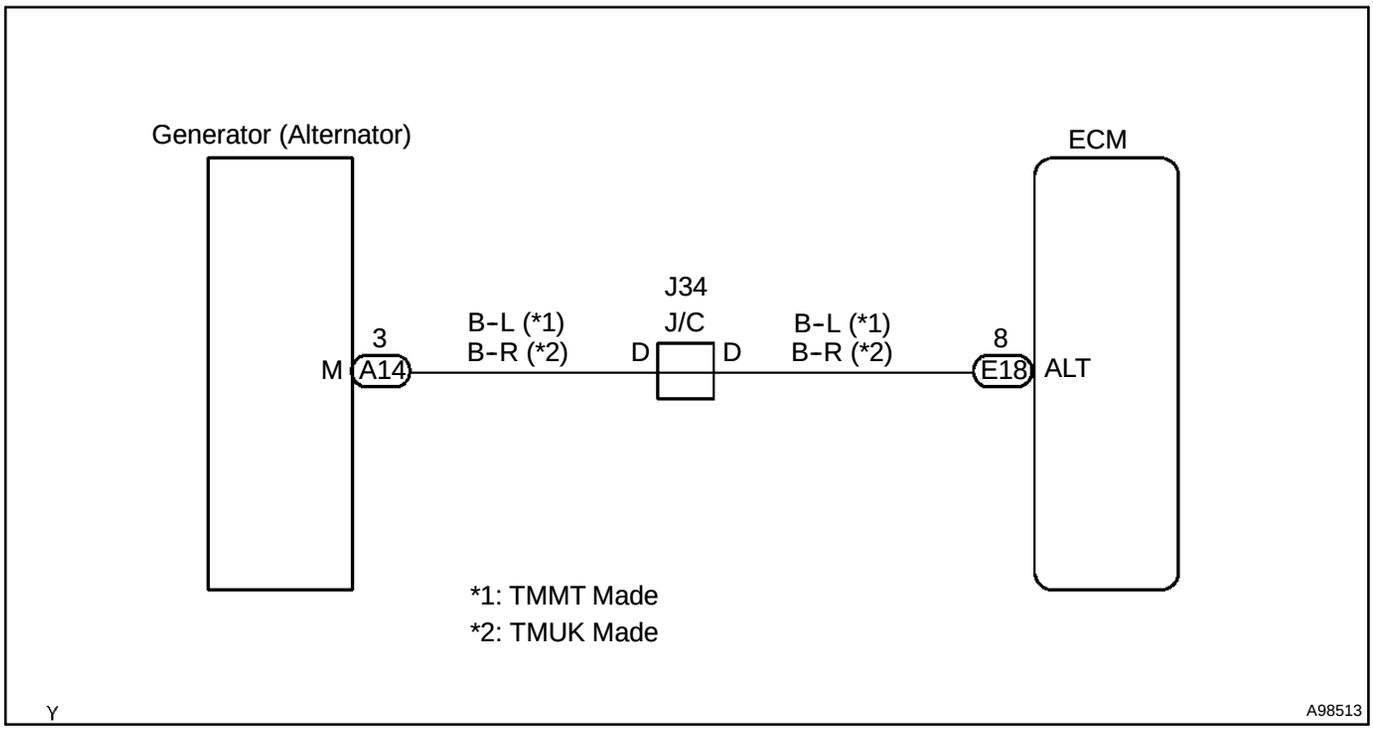
TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Battery voltage	11 V	-
Engine speed	700 rpm	2,000 rpm

TYPICAL MALFUNCTION THRESHOLDS

Threshold
There is no duty ratio output from terminal M of generator (alternator)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

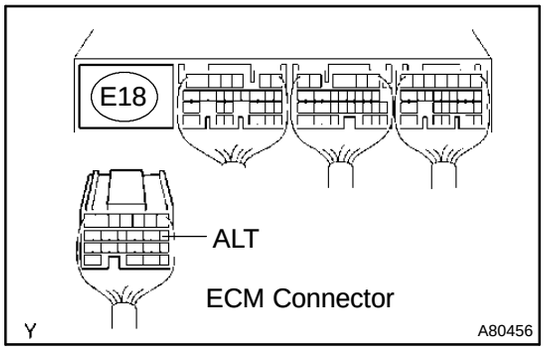
1	CHECK IF CHARGE LAMP IS ILLUMINATED

HINT:
Run the engine at 2,000 rpm, and check that the charge lamp located in the combination meter remains illuminated.

YES → **Go to step 3**

NO

2	CHECK HARNESS AND CONNECTOR(GENERATOR (ALTERNATOR) - ECM)



(a) Disconnect the E18 ECM connector.
(b) Disconnect the A14 generator (alternator) connector.
(c) Check the resistance.

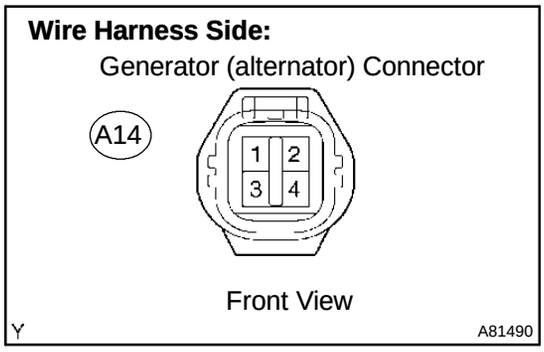
Standard (Check for open):

Tester Connection	Specified Condition
ALT (E18-8) - M (A14-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
ALT (E18-8) or M (A14-3) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the generator (alternator) connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	INSPECT DRIVE BELT (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

OK: None of the inspection results show any abnormalities.

NG → **REPAIR OR REPLACE DRIVE BELT (See page 14-4 of Pub. No. RM1039E COROLLA Supplement)**

OK

4	INSPECT CHARGING SYSTEM (See page 19-26 of Pub. No. RM925E COROLLA)

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P0622)

HINT:
After clearing the DTC, start the engine and let it idle for 10 seconds or more, and then confirm that DTC P0622 is not present again.

DTC	P0627	FUEL PUMP CONTROL CIRCUIT / OPEN

HINT:
For more information on the supply pump (suction control valve) and the common rail system,
see page 05-365.

CIRCUIT DESCRIPTION

Refer to the description on page 05-365.

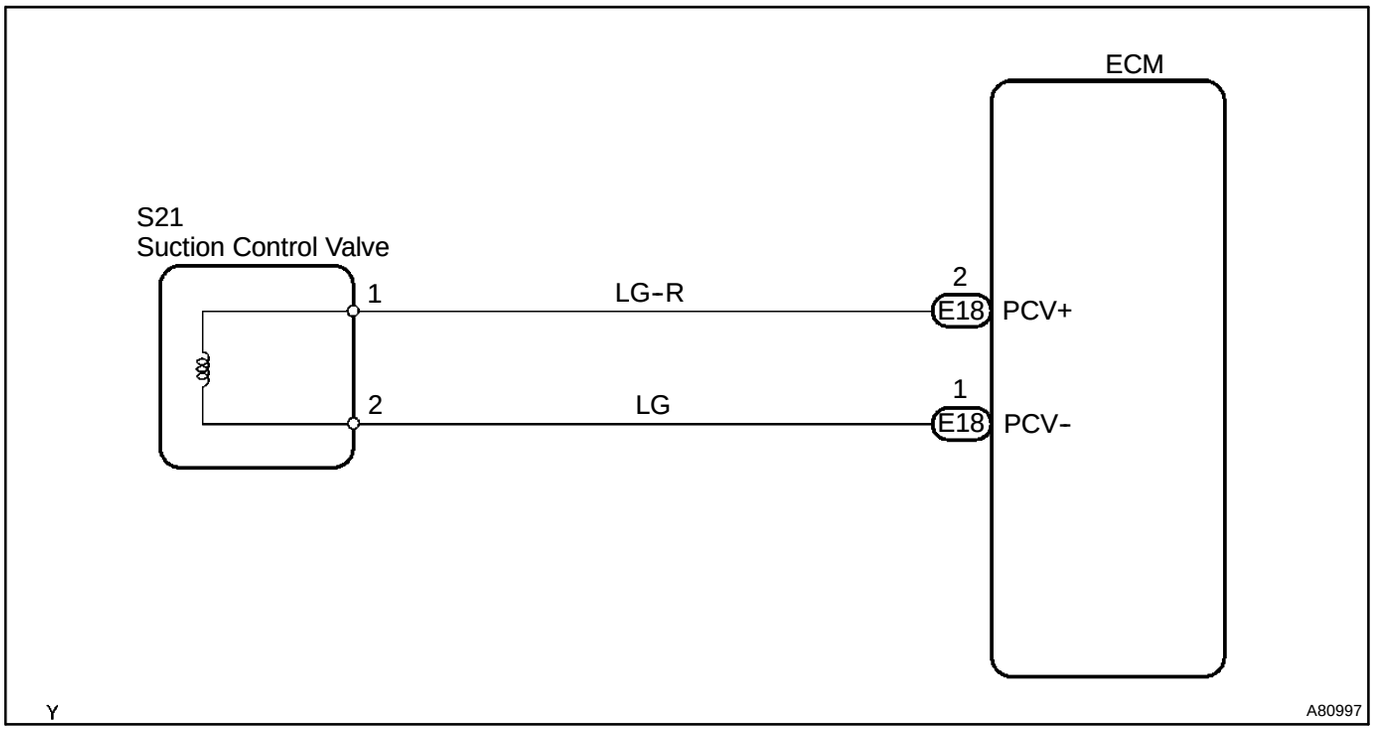
DTC No.	DTC Detection Condition	Trouble Area
P0627	Open or short in suction control valve circuit for more than 0.5 seconds (1 trip detection logic)	• Open or short in suction control valve circuit • Suction control valve • ECM

HINT:
When DTC P0627 is set, check the internal fuel pressure of the common rail by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

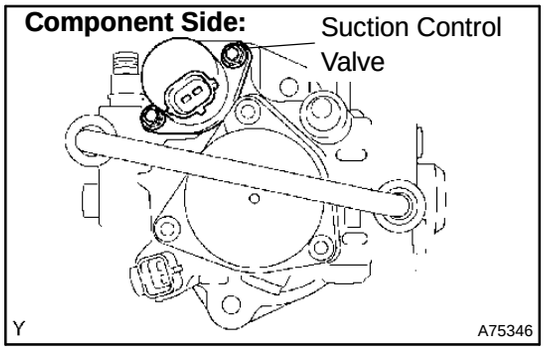
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 INSPECT INJECTION OR SUPPLY PUMP ASSY

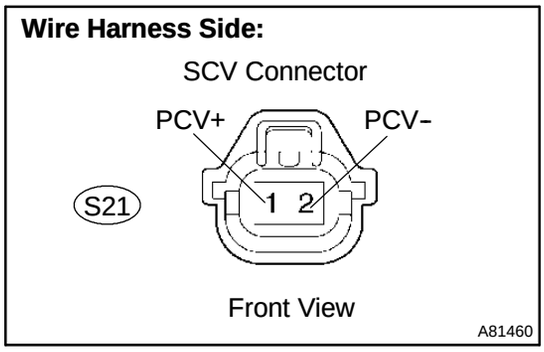


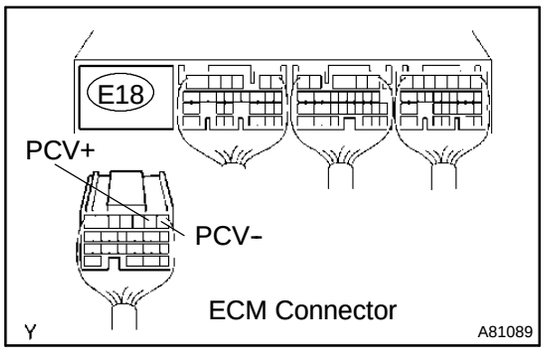
(a) Disconnect the S21 suction control valve connector.
(b) Measure the resistance between the terminals of the suction control valve.
Standard: 1.9 to 2.3 Ω at 20°C (68°F)
(c) Reconnect the suction control valve connector.

NG → **REPLACE INJECTION OR SUPPLY PUMP ASSY (SUCTION CONTROL VALVE) (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)**

OK

2 CHECK HARNESS AND CONNECTOR(SUCTION CONTROL VALVE - ECM)





(a) Disconnect the S21 suction control valve connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PCV+ (S21-1) - PCV+ (E18-2)	Below 1 Ω
PCV- (S21-2) - PCV- (E18-1)	

Standard (Check for short):

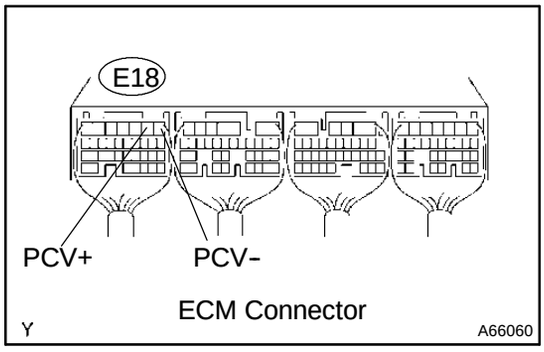
Tester Connection	Specified Condition
PCV+ (S21-1) or PCV+ (E18-2) - Body ground	10 kΩ or higher
PCV- (S21-2) or PCV- (E18-1) - Body ground	

(d) Reconnect the suction control valve connector.
(e) Reconnect ECM connector.

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

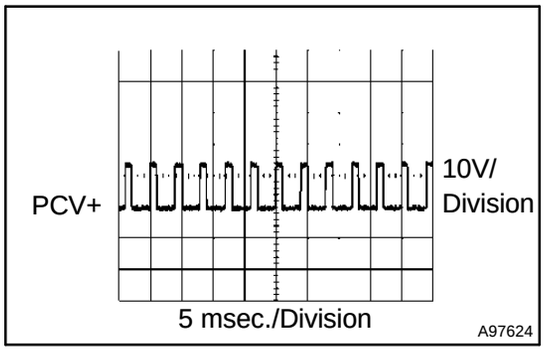
3	INSPECT ECM(PCV VOLTAGE)



(a) Inspect the ECM using an oscilloscope.
(b) While cranking or idling, check the waveform between the terminals of the E18 ECM connector.

Standard :

Tester Connection	Specified Condition
PCV+ (E18-2) - PCV- (E18-1)	Correct waveform shown



NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK →

CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

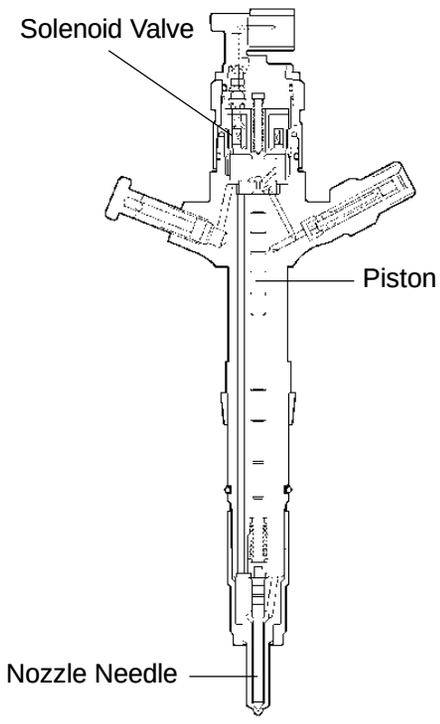
DTC	P1238	INJECTOR MALFUNCTION

HINT:

- For more information on the injector and the common rail system, see page 05-365.
- If P1238 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

Injector Cross Section Diagram:



The ECM detects combustion deterioration for a specific cylinder.

HINT:

- The cylinder, which has the compensation value for Revised Injection Volume #1, #2, #3 and #4 that varies from other cylinders, may be malfunctioning.
- If DTC P0093 (fuel leaks from high-pressure areas) is set simultaneously, a leakage malfunction of the cylinder has probably occurred.
- If DTC P0200 (open or short in the EDU or injector circuit) is set simultaneously, there is probably a faulty circuit located between the ECM and the injector including the EDU.
- If only DTC P1238 (injector malfunction) is present, an injector mechanical malfunction or insufficient compression (valve clearance etc) has probably occurred. An open or short malfunction of the ECM, EDU or injector circuit is unlikely.
- The solenoid valve of the injector is the same type as that of the pressure discharge valve.

DTC No.	DTC Detection Condition	Main Trouble Area	Related Trouble Area
P1238	Large engine speed fluctuations while idling (2 trip detection logic)	• Injector • EDU (DTC P0200 set simultaneously) • Open or short in engine wire harness (DTC P0200 set simultaneously) • Connector connection (DTC P0200 set simultaneously) • Compression pressure • Valve clearance	• Valve timing • ECM

HINT:

When DTC P1238 is set, check the internal fuel pressure by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (No engine load)	Approximately 50 to 100

MONITOR DESCRIPTION

P1238 (Injection malfunctions, excluding open or short in the injector circuit):

This DTC is set if the engine speed fluctuation between each cylinder is large. The ECM monitors changes in the crankshaft rotation speed using the crankshaft position sensor for detecting poor combustion. Also, it identifies a faulty cylinder using the camshaft position sensor. The fluctuation counter increments when irregular crankshaft rotation speed variation exceeds the threshold while idling. Therefore, if either one of the cylinders has very poor combustion (rough idling), the ECM sets this DTC.

MONITOR STRATEGY

Required sensors	Crankshaft position sensor
Frequency of operation	Continuous
Duration	10 minutes
MIL operation	2 driving cycles

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Engine	At idling	
Engine speed	500 rpm	-
Engine coolant temperature	20°C (68°F)	-

TYPICAL MALFUNCTION THRESHOLDS

Threshold
Number of irregular changes in crankshaft rotation speed

HINT:

The number of irregular changes in the crankshaft rotation speed indicates the insufficient combustion.

WIRING DIAGRAM

Refer to DTC P0200 on page 05-473.

INSPECTION PROCEDURE

HINT:

- If any DTCs other than P1238 are set simultaneously, troubleshoot those DTCs first.
- Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P1238)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.

Result:

Display (DTC Output)	Proceed To
P1238	A
P1238 and other DTCs	B

HINT:

If any DTCs other than P1238 are output, troubleshoot those DTCs first.

B → **GO TO RELEVANT DTC CHART** **(See page 05-412)**

A

2 CHECK WIRE HARNESS AND CONNECTOR IN ENGINE ROOM

(a) Check the wire harnesses and connectors connections.
OK: The wire harnesses and connectors have been connected securely and there are good connections.

NG → **REPAIR OR REPLACE**

OK

3 READ VALUE USING INTELLIGENT TESTER II(COMPENSATORY INJECTION VOLUME BETWEEN CYLINDERS FOR IDENT)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Revised Injection Volume #1, #2, #3 and #4.
(d) Read the value.
Standard: The compensatory injection volume is between -4.9 mm^3 and 4.9 mm^3

HINT:
- If the injector is malfunctioning, the compensatory injection volume remains at -5.0 mm^3 or 5.0 mm^3.
- The compensatory injection volume is usually between -3.0 mm^3 and 3.0 mm^3.

(e) Any cylinders that have a higher compensatory injection volume than shown above are considered to be faulty. Use the following steps to inspect and repair the cylinders.
Result:

Result	Proceed To
Faulty cylinder not identified	A
Faulty cylinder identified	B

B → **Go to step 5**

A

4 PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTION CUT FOR IDENTIFYING MALFUNCTIONING CYLINDER)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify a faulty cylinder by performing the power-balance inspection.

HINT:
If the engine idling remains normal despite cutting off the fuel injection, the cylinder is malfunctioning.

NEXT

5	**CHECK CYLINDER COMPRESSION PRESSURE OF MALFUNCTIONING CYLINDER (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)**

(a) Measure the compression pressure.
Standard: 2,628 kPa (26.8 kgf/cm^2, 381 psi) or more
OK: The cylinder compression pressure is within the standard range.

NG → **REPAIR OR REPLACE**

OK

6	**CHECK VALVE CLEARANCE OF MALFUNCTIONING CYLINDER (See page 14-5 of Pub. No. RM1039E COROLLA Supplement)**

OK: The valve clearance is within the standard range.

NG → **ADJUST VALVE CLEARANCE (See page 14-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

7	**CHECK IF DTC OUTPUT RECURS(DTC P1238)**

HINT:
After clearing the DTC, let the engine idle for 10 minutes after warming up, and then confirm that DTC P1238 is not present again.
OK: No DTC output.

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)**

NG

8	**REPLACE INJECTOR ASSY (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P1238)

HINT:
After clearing the DTC, let the engine idle for 10 minutes after warming up, and then confirm that DTC P1238 is not present again.

DTC	P1271	FUEL REGULATOR CIRCUIT MALFUNCTION (EDU DRIVE)

DTC	P1272	FUEL PRESSURE REGULATOR MALFUNCTION

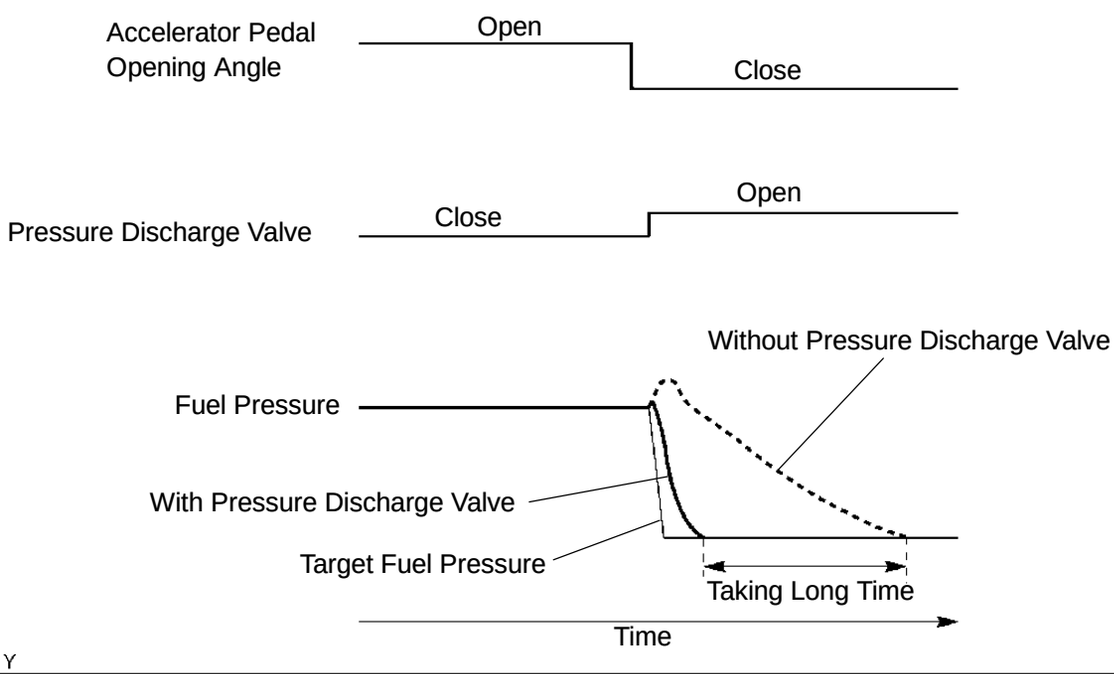
HINT:

- For more information on the pressure discharge valve and the common rail system, see page 05-365.
- For more information on the EDU, see page 05-471.
- If DTC P1271 and/or P1272 is present, refer to the Diagnostic Trouble Codes (DTCs) Table for Common Rail System on page 05-365.

CIRCUIT DESCRIPTION

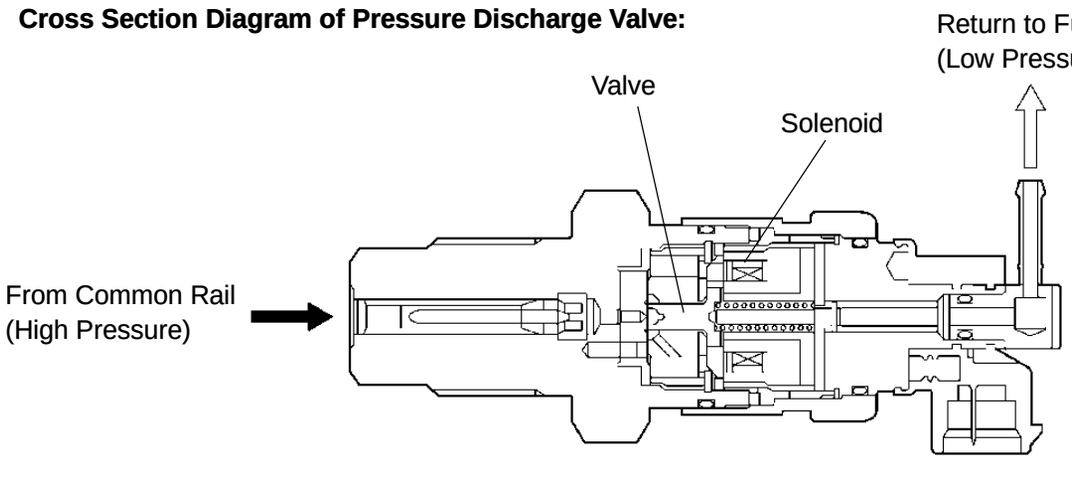
The ECM controls the internal fuel pressure of the common rail by opening and closing the pressure discharge valve. When sudden deceleration occurs, the internal fuel pressure temporarily becomes higher than usual, and combustion noises may result. As a result, the ECM opens the valve temporarily to discharge the pressure inside the common rail. Also, the pressure discharge valve opens when the ignition switch is turned to OFF, and the internal pressure is then promptly discharged.

Pressure Discharge Valve Operation by Sudden Deceleration:



HINT:
The solenoid valve of the pressure discharge valve is the same type as that of the injector solenoid valve.

Cross Section Diagram of Pressure Discharge Valve:



DTC No.	DTC Detection Condition	Trouble Area
P1271	• Open or short in pressure discharge valve circuit No valve opening confirmation (IJF) signal from EDU to ECM after engine started, despite ECM sending valve opening command (PRD) signal (1 trip detection)	• Open or short in pressure discharge valve circuit • Open or short in pressure discharge valve itself • EDU • ECM
P1272	• Pressure discharge valve closed malfunction Actual pressure decreasing rate deviates from simulated pressure decreasing rate after ignition switch turned to OFF (2 trip detection)	• Open or short in pressure discharge valve circuit (P1271 set simultaneously) • Pressure discharge valve • Supply pump • ECM

HINT:
When DTC P1271 and/or P1272 is set, check the internal fuel pressure of the common rail by selecting the following menu items on the intelligent tester ll: Powertrain / Engine and ECT / Data List / Common Rail Pressure.

Reference:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 20 to 40
2,500 rpm (No engine load)	Approximately 40 to 80

MONITOR DESCRIPTION

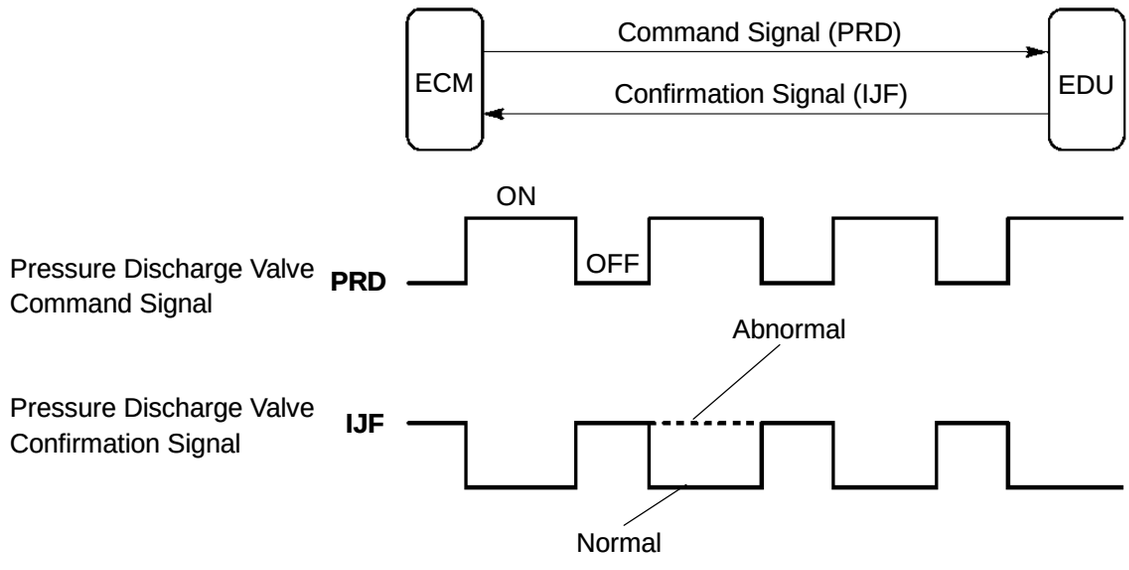
P1271 (Open or short in the pressure discharge valve circuit):

This DTC is set if there is no valve opening confirmation (IJF) signal from the EDU to the ECM, despite the ECM commanding the pressure discharge valve to open with the EDU. This DTC refers to an open or short malfunction in the pressure discharge valve circuit, therefore the malfunctions that the valve is stuck open or closed can be excluded.

The EDU monitors the current supplied to the pressure discharge valve and indicates that the current flows into the valve. If the current exceeds the specified level, the EDU interprets this as the IJF signal is low.

If this DTC is set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

P1271 Malfunction:



P1272 (Closed malfunction of the pressure discharge valve):

The pressure discharge valve opens and discharges the internal fuel pressure from the common rail to the fuel tank when the ignition switch is turned to OFF. In this event, the ECM compares the actual dropping rate of the internal fuel pressure and the simulated dropping rate. If the ECM determines the actual dropping rate to be smaller than its simulated rate, the ECM then interprets the valve as being stuck closed, and sets this DTC. This DTC is set if the internal fuel pressure does not decrease to below the specified level after the ignition switch is turned to OFF.

If this DTC is present, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned to OFF.

MONITOR STRATEGY

P1271:

Required sensors	EDU
Frequency of operation	Continuous
Duration	3 seconds
MIL operation	1 driving cycle

P1272:

Required sensors	Fuel pressure sensor
Frequency of operation	Once per driving cycle
Duration	1 second
MIL operation	2 driving cycles

TYPICAL ENABLING CONDITIONS

P1271:

Specification
Drive vehicle at 50 km/h (31 mph) with 3rd gear and then decelerate it by completely releasing accelerator pedal

P1272:

Item	Specification	
	Minimum	Maximum
Fuel pressure	30 MPa (306 kgf/cm^2, 4,351 psi)	-
Fuel temperature	0°C (32°F)	-
Battery voltage	11 V	-
Monitor does not run if fuel pressure sensor, pressure discharge valve circuit, or fuel temperature sensor malfunctioning		

TYPICAL MALFUNCTION THRESHOLDS

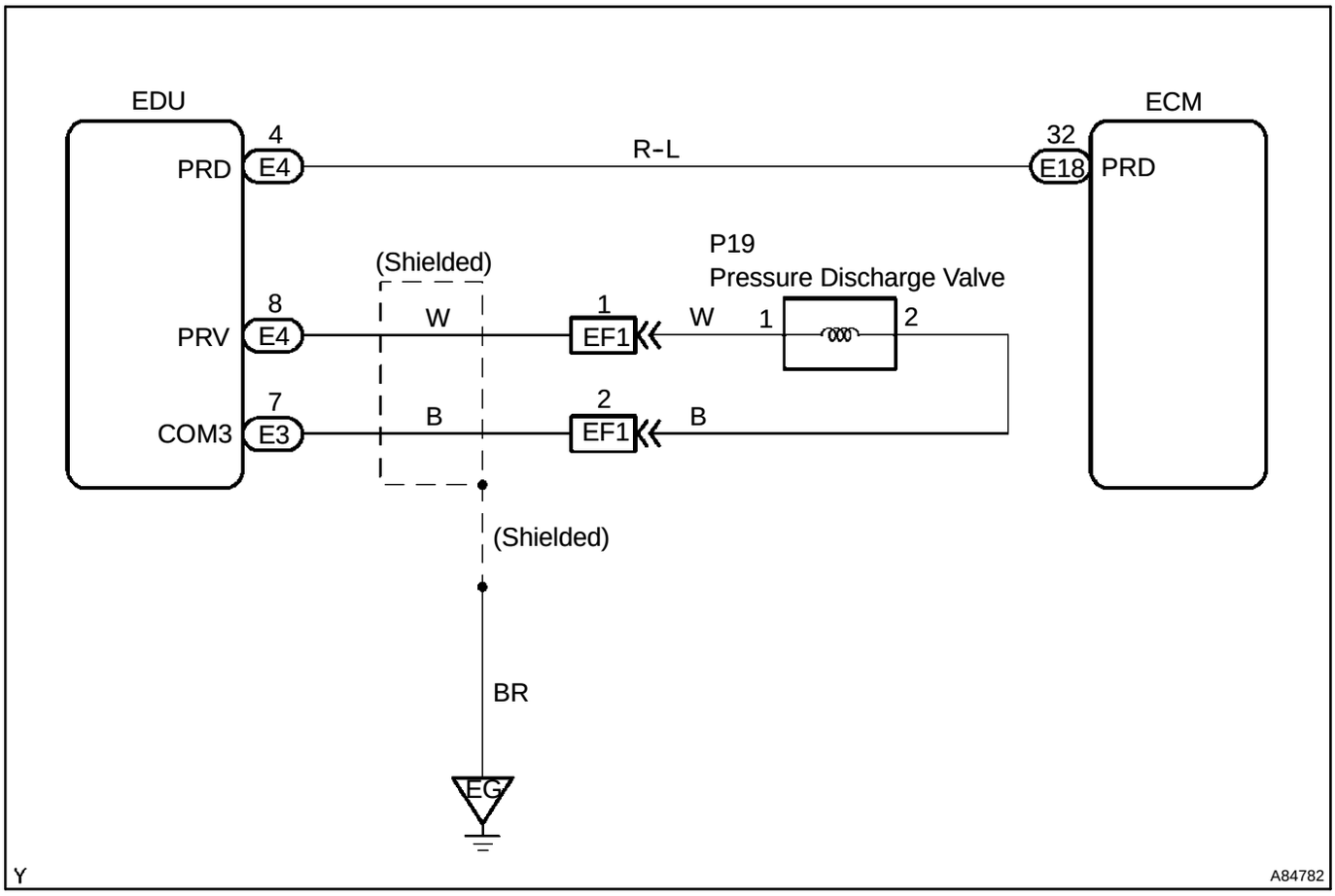
P1271:

Threshold
If confirmation signals from EDU not present, despite ECM sending command signals regularly while decelerating

P1272:

Threshold
If internal pressure continues exceeding specified level after ignition switch turned to OFF

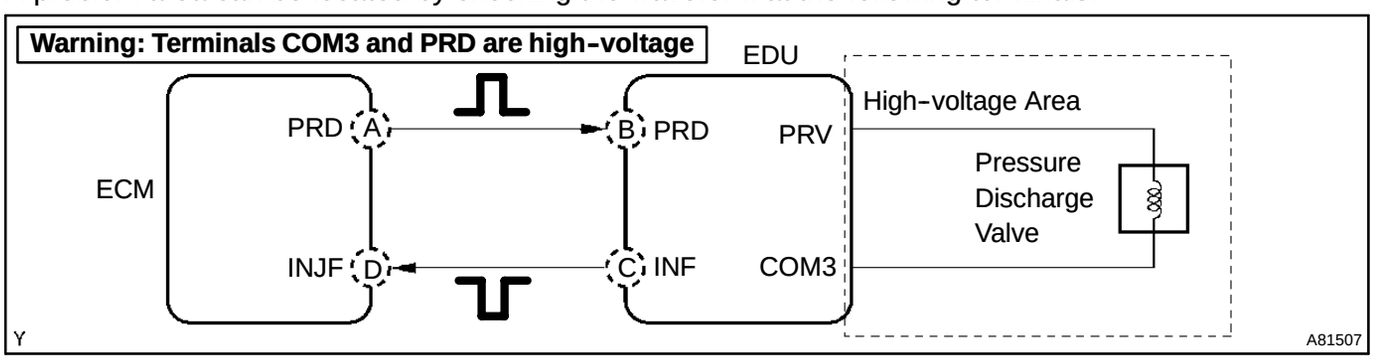
WIRING DIAGRAM



PULSE GENERATION INSPECTION

HINT:

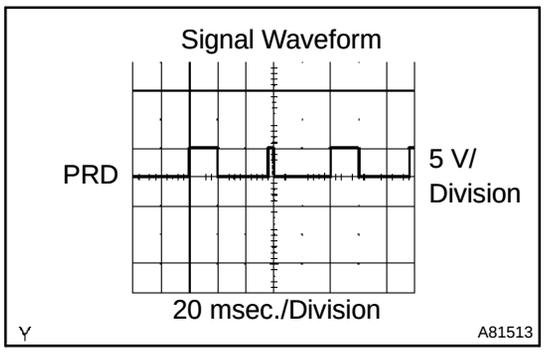
A problem area can be located by checking the waveform at the following terminals.



HINT:

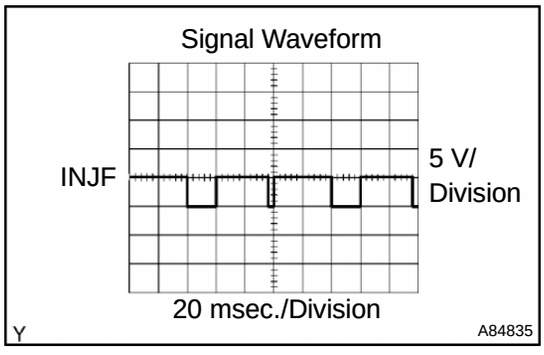
If you check the ECM side first, inspect the following A to D in sequence. If you check the EDU side first, inspect the following B and C in sequence. This shortens the inspecting time.

Inspection Point	Trouble Area
A	• ECM
B (If A is normal)	• Open or short in PRD (ECM) - PRD (EDU) circuit
C (If A and B are normal)	• Open or short in PRV (EDU) - COM3 (EDU) circuit • Pressure discharge valve • EDU
D (If A, B and C are normal)	• Open or short in INF (EDU) - INJF (ECM) circuit (DTC P0200 set simultaneously)



(a) Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.

Inspection Point	Specified Condition
A and B	Correct waveform shown



(b) Reference: Inspection using an oscilloscope.
While idling, the correct waveform is shown in the diagram on the left.

Inspection Point	Specified Condition
C and D	Correct waveform shown

INSPECTION PROCEDURE

HINT:

- After completing repairs, confirm that DTC P1271 and/or P1272 is not set again.
- If DTCs P0200 and P1271 are set simultaneously, there is an open in the INJF wire harness between the EDU and ECM, or there is an open in the wire harness for both injector and pressure discharge valve.
- Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ OUTPUT DTC(DTC P1271 AND/OR P1272)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P1271 and P1272	A
P1272	B

B → Go to step 8

A

2 INSPECT COMMON RAIL ASSY(PRESSURE DISCHARGE VALVE)

Component Side:



Pressure Discharge Valve

Y A82883

(a) Disconnect the P19 pressure discharge valve connector.
(b) Measure the resistance between the terminals of the pressure discharge valve.
Standard: 0.85 to 1.05 Ω at 20°C (68°F)
(c) Reconnect the pressure discharge valve connector.

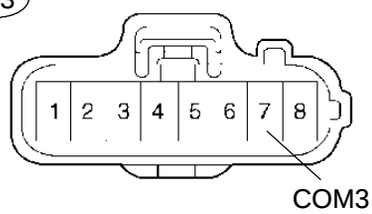
NG → **REPLACE COMMON RAIL ASSY (PRESSURE DISCHARGE VALVE)** **(See page 11-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

3 CHECK HARNESS AND CONNECTOR(PRESSURE DISCHARGE VALVE - EDU)

Wire Harness Side:

E3 EDU Connector



Front View

Y A81461

(a) Disconnect the E3 and E4 EDU connectors.
(b) Disconnect the P19 pressure discharge valve connector.
(c) Check the resistance.
Standard (Check for open):

Tester Connection	Specified Condition
COM3 (E3-7) - (P19-2)	Below 1 Ω
PRV (E4-8) - (P19-1)	

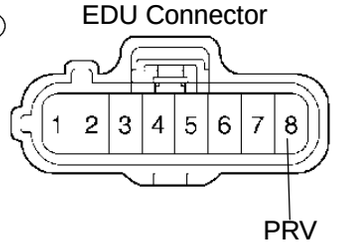
Standard (Check for short):

Tester Connection	Specified Condition
COM3 (E3-7) or (P19-2) - Body ground	10 kΩ or higher
PRV (E4-8) or (P19-1) - Body ground	

(d) Reconnect the EDU connectors.
(e) Reconnect the pressure discharge valve connector.

Wire Harness Side:

E4 EDU Connector



Front View

Y A81462

Wire Harness Side:

Pressure Discharge Valve Connector

P19



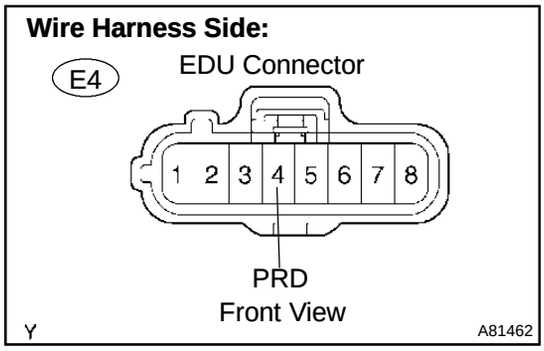
Front View

Y A81694

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 CHECK HARNESS AND CONNECTOR(EDU - ECM)



(a) Disconnect the E4 EDU connector.
(b) Disconnect the E18 ECM connector.
(c) Check the resistance.

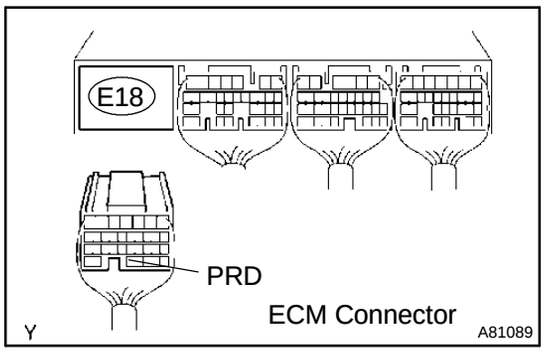
Standard (Check for open):

Tester Connection	Specified Condition
PRD (E4-4) - PRD (E18-32)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
PRD (E4-4) or PRD (E18-32) - Body ground	10 kΩ or higher

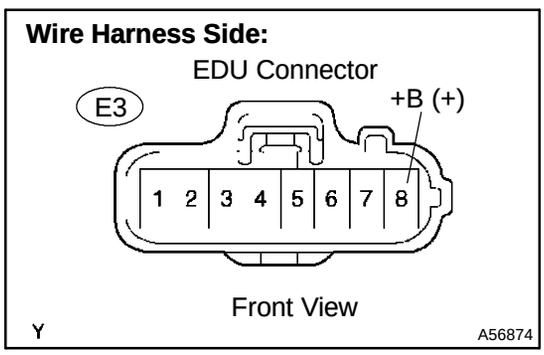
(d) Reconnect the EDU connector.
(e) Reconnect the ECM connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 INSPECT INJECTOR DRIVER(BATTERY VOLTAGE)

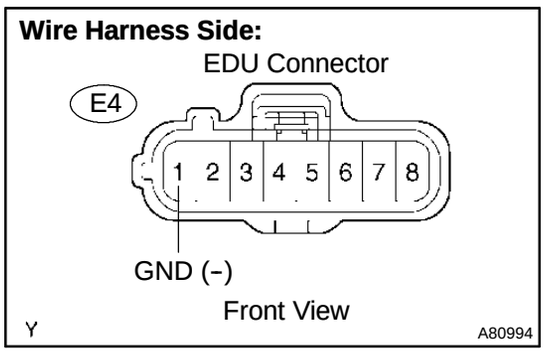


(a) Disconnect the E3 and E4 EDU connectors.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminals of each EDU connector.

Standard:

Tester Connection	Specified Condition
+B (E3-8) - GND (E4-1)	9 to 14 V

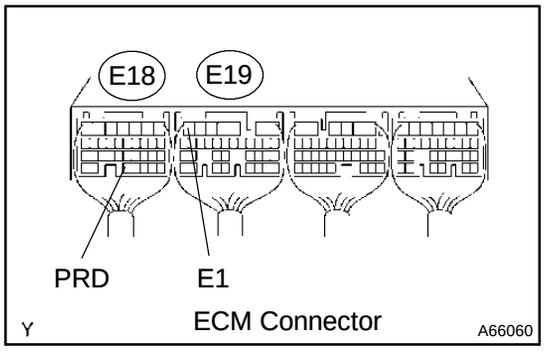
(d) Reconnect the EDU connectors.



NG → **CHECK INJECTOR DRIVER POWER SOURCE CIRCUIT (EDU - BATTERY)**

OK

6	INSPECT ECM(PRD VOLTAGE)

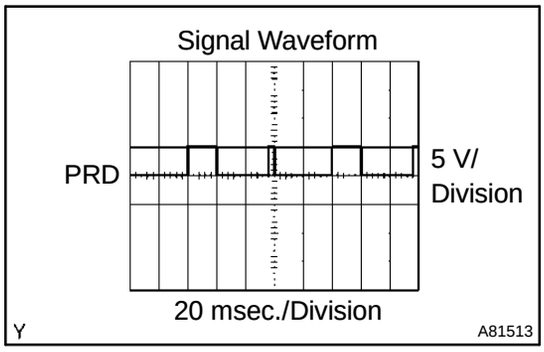


(a) Inspect the ECM using an oscilloscope.
(b) Drive the vehicle at 50 km/h (31 mph) with the third gear, and then decelerate by releasing the accelerator pedal.
(c) Check the waveform between the terminal of the E18 and E19 ECM connectors.

Standard:

Tester Connection	Specified Condition
PRD (E18-32) - E1 (E19-7)	Correct waveform shown

HINT:
Alternative inspection:
Run the engine at 2,500 rpm for 10 seconds and then decrease the engine speed to idling by completely releasing the accelerator pedal.



NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

7	REPLACE INJECTOR DRIVER (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P1271 AND/OR P1272)

HINT:
P1271:
After clearing the DTC, drive the vehicle at 50 km/h (31 mph) with the third gear and then decelerate by releasing the accelerator pedal. Confirm that DTC P1271 is not present again.
P1272:
After clearing the DTC, start and stop the engine twice, and then confirm that DTC P1272 is not present again.

8	REPLACE COMMON RAIL ASSY(PRESSURE DISCHARGE VALVE) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

NEXT

CHECK IF DTC OUTPUT RECURS (DTC P1271 AND/OR P1272)

HINT:
P1271:
After clearing the DTC, drive the vehicle at 50 km/h (31 mph) with the third gear and then decelerate by releasing the accelerator pedal. Confirm that DTC P1271 is not present again.
P1272:
After clearing the DTC, start and stop the engine twice, and then confirm that DTC P1272 is not present again.

DTC	P1601	INJECTOR CORRECTION CIRCUIT MALFUNCTION (EEPROM)

NOTICE:

- **When an injector is replaced, the injector's compensation code must be input into the ECM. When the ECM is changed, all of the existing injector compensation codes must be input into the new ECM.**
- **An injector compensation code is unique. The 30-digit alphanumeric value imprinted on the head portion of an injector is its compensation code. If an incorrect injector compensation code is input into the ECM, the engine assembly may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.**

1. When you replace the ECM with a new one, input all the injectors' compensation codes into the new ECM as follows:

(a) Prior to replacing the ECM, read and save each injector's compensation code, stored in the original ECM, using the intelligent tester II (see page 05-384).

(b) After installing a new ECM, input the saved compensation codes into the new ECM using the tester (see page 05-389).

(c) Turn the tester OFF and then turn the ignition switch to OFF.

(d) Wait for at least 30 seconds.

(e) Turn the ignition switch to ON and then turn the tester ON.

(f) Clear DTC P1601 stored in the ECM using the tester (see page 05-404).

HINT:

- Each injector has different fuel injection characteristics. In order to optimize the fuel injections, the ECM uses the compensation codes to balance the different fuel injections between each injector.
- When you first turn the ignition switch to ON after replacing the ECM or an injector(s), DTC P1601 is set. This is to inform you that an injector compensation code(s) is/are required to be registered. Manually clear the DTC upon completion of the compensation code registration.

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P1601	Injector compensation code not registered (1 trip detection logic)	• Injector compensation code • ECM
	Wrong injector compensation code registered (1 trip detection logic)	

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK INJECTOR COMPENSATION CODE (See page 05-384)

OK: The compensation codes stored in the ECM match the compensation codes of the installed injectors.

NG → REGISTER INJECTOR COMPENSATION CODE (See page 05-389)

OK ↓

REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

DTC	P2120	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT

DTC	P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT LOW INPUT

DTC	P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT HIGH INPUT

DTC	P2125	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT

DTC	P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT LOW INPUT

DTC	P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT HIGH INPUT

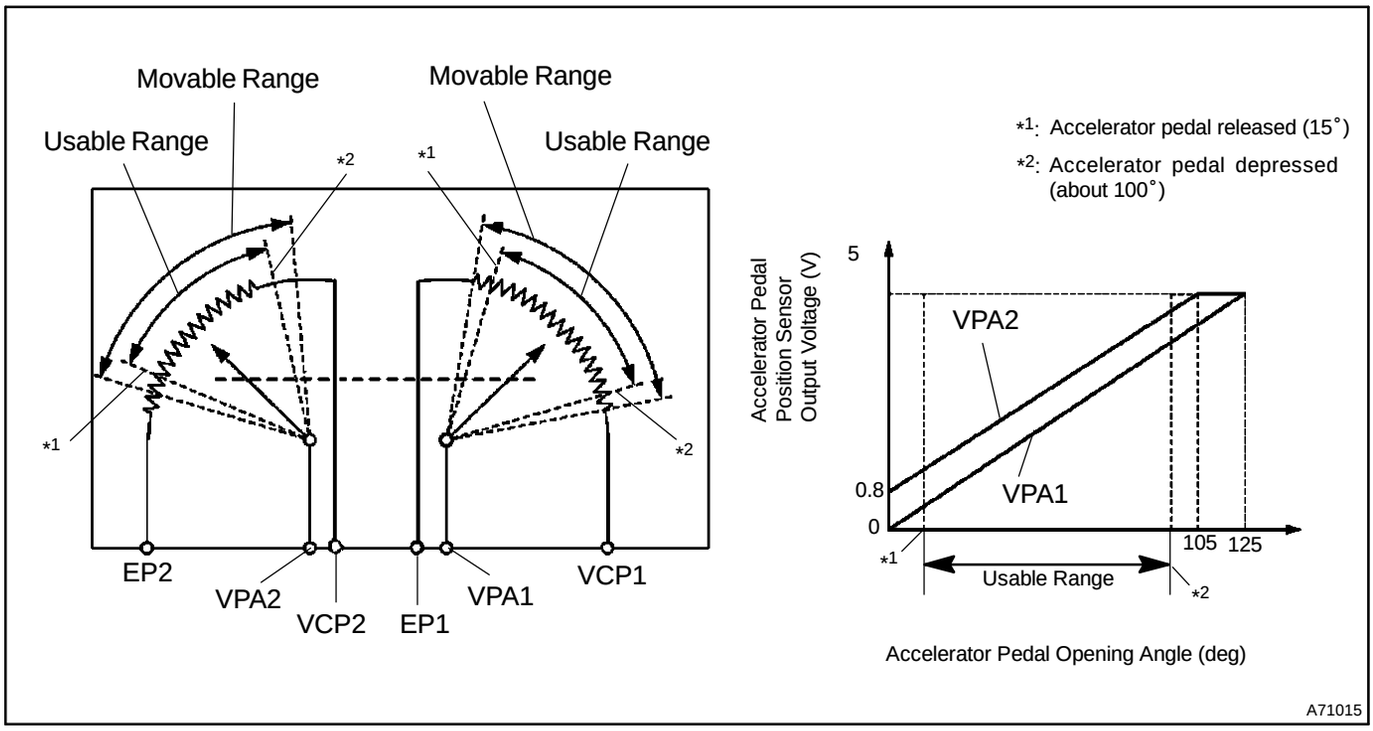
DTC	P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D”/”E” VOLTAGE CORRELATION

HINT:

- These DTCs relate to the accelerator pedal position sensor.
- The ETCS (Electronic Throttle Control System) does not use a throttle cable.

CIRCUIT DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal bracket and has the 2 sensors to detect the accelerator position and malfunctions of the accelerator position sensor itself.
In the accelerator pedal position sensor, the voltage applied to pedal terminals VPA1 and VPA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal. The VPA1 is a signal to indicate the actual accelerator pedal opening angle which is used for engine control, and the VPA2 is a signal to indicate the information about the opening angle which is used for detecting a malfunction in the sensor.
The ECM determines the actual accelerator pedal opening angle with the signals transmitted by pedal terminals VPA1 and VPA2, and controls the throttle motor based on these signals.



DTC No.	DTC Detection Condition	Trouble Area
P2120	Condition (a) continues for 0.5 seconds or more: (a) VPA less than 0.2 V when accelerator pedal fully released, or VPA more than 4.8 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM
P2122	VPA less than 0.2 V for 0.5 seconds or more when accelerator pedal fully released	
P2123	VPA more than 4.8 V for 2.0 seconds or more	
P2125	Condition (a) continues for 0.5 seconds or more: (a) VPA2 less than 0.5 V when accelerator pedal fully released, or VPA2 more than 4.8 V when VPA between 0.2 V and 3.45 V	
P2127	VPA2 less than 0.5 V for 0.5 seconds or more when accelerator pedal fully released	
P2128	VPA2 more than 4.8 V for 2.0 seconds or more when VPA between 0.2 V and 3.45 V	
P2138	Condition (a) or (b) continues for 2.0 seconds or more: (a) Difference between VPA and VPA2 less than 0.02 V (b) VPA less than 0.2 V and VPA2 less than 0.5 V	

HINT:

When DTC P2120, P2122, P2123, P2125, P2127, P2128 or P2138 is set, check the accelerator pedal position sensor output voltage by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Accel Position.

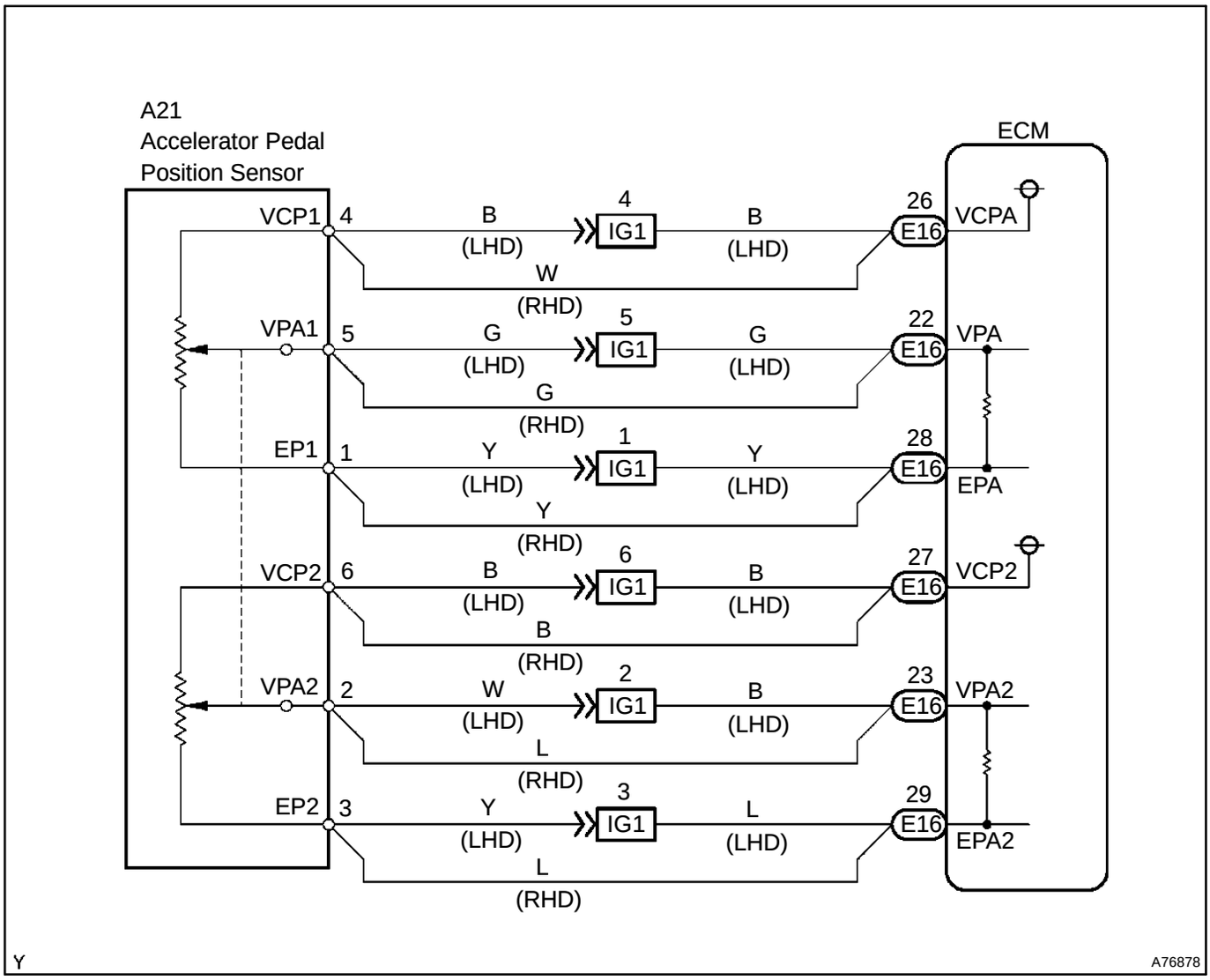
Reference:

Accelerator Pedal Position		Trouble Area
Fully Closed	Fully Open	
0 %	0 %	• Open in VCC circuit • Open or short in VA or VAS circuit
Approximately 100 %	Approximately 100 %	• Open in E2C circuit

HINT:

Accelerator pedal positions are expressed as voltages.

WIRING DIAGRAM

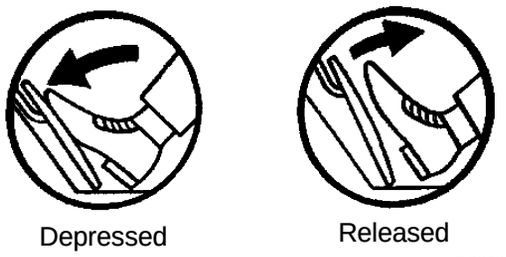


INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester ll. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER II(ACCEL POSITION)



(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Accel Position.
(d) Read the value.

Standard:

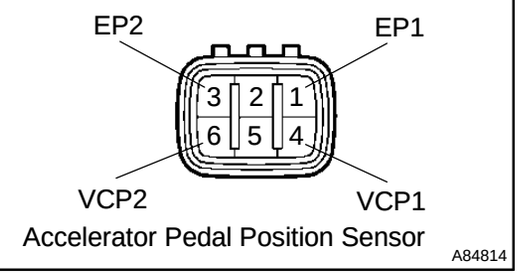
Accelerator Pedal Operation	Specified Condition
Depressed	52 to 90 %
Released	10 to 22 %

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

2	INSPECT ACCELERATOR PEDAL ASSY(ACCELERATOR PEDAL POSITION SENSOR)

Component Side:



(a) Disconnect the A21 accelerator pedal position sensor connector.
(b) Measure the resistance between each pair of terminals.

Standard:

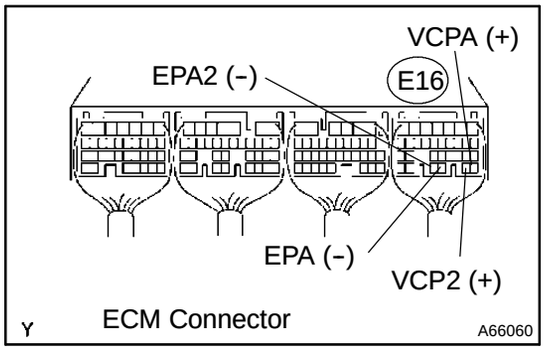
Tester Connection	Specified Condition
EP1 (1) - VCP1 (4)	2.25 to 4.75 kΩ at 20°C (68°F)
EP2 (3) - VCP2 (6)	

(c) Reconnect the accelerator pedal position sensor connector.

NG → **REPLACE ACCELERATOR PEDAL ASSY (See page 10-14 of Pub. No. RM1039E COROLLA Supplement)**

OK

3 INSPECT ECM(VCPA AND VCP2 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 ECM connector.

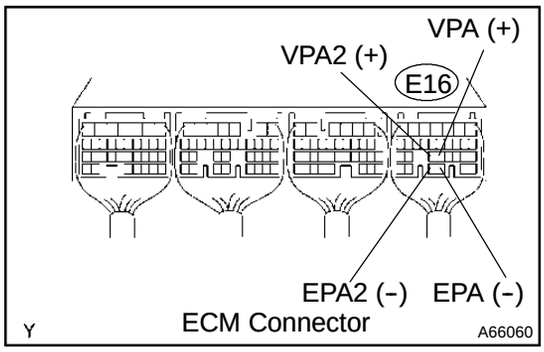
Standard:

Tester Connection	Specified Condition
VCPA (E16-26) - EPA (E16-28)	4.5 to 5.5 V
VCP2 (E16-27) - EPA2 (E16-29)	

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

4 INSPECT ECM(VPA AND VPA2 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 ECM connector.

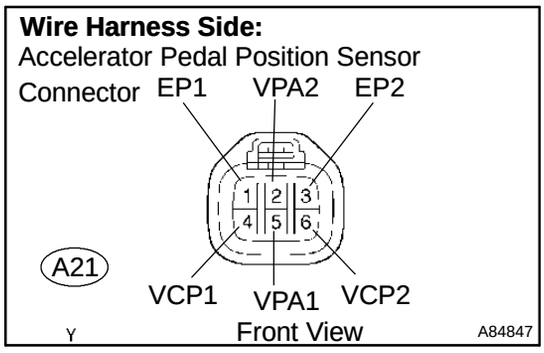
Standard:

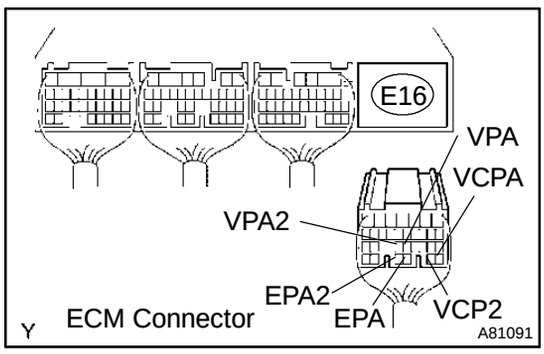
Accelerator Pedal Position	Tester Connection	Specified Condition
Released	VPA (E16-22) - EPA (E16-28)	0.5 to 1.1 V
Depressed		2.6 to 4.5 V
Released	VPA2 (E16-23) - EPA2 (E16-29)	1.2 to 2.0 V
Depressed		3.4 to 5.3 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

5	CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)





(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Disconnect the E16 ECM connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A21-5) - VPA (E16-22)	Below 1 Ω
EP1 (A21-1) - EPA (E16-28)	
VCP1 (A21-4) - VCPA (E16-26)	
VPA2 (A21-2) - VPA2 (E16-23)	
EP2 (A21-3) - EPA2 (E16-29)	
VCP2 (A21-6) - VCP2 (E16-27)	

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A21-5) or VPA (E16-22) - Body ground	10 kΩ or higher
EP1 (A21-1) or EPA (E16-28) - Body ground	
VCP1 (A21-4) or VCPA (E16-26) - Body ground	
VPA2 (A21-2) or VPA2 (E16-23) - Body ground	
EP2 (A21-3) or EPA2 (E16-29) - Body ground	
VCP2 (A21-6) or VCP2 (E16-27) - Body ground	

(d) Reconnect the accelerator pedal position sensor connector.

(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P2121	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT RANGE/PERFORMANCE

HINT:

- This DTC relates to the accelerator pedal position sensor.
- The ETCS (Electronic Throttle Control System) does not use a throttle cable.

CIRCUIT DESCRIPTION

Refer to DTC P2120 on page 05-542.

DTC No.	DTC Detection Condition	Trouble Area
P2121	Conditions (a) and (b) continue for 0.5 seconds: (a) Difference between VPA and VPA2 exceeds threshold (b) IDL OFF	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM

HINT:

When DTC P2121 is set, check the accelerator pedal position sensor output voltage by selecting the following menu items on the intelligent tester II: Powertrain / Engine and ECT / Data List / Accel Position.

Reference:

Accelerator Pedal Position		Trouble Area
Fully Closed	Fully Open	
0 %	0 %	• Open in VCC circuit • Open or short in VA or VAS circuit
Approximately 100 %	Approximately 100 %	• Open in E2C circuit

HINT:

Accelerator pedal positions are expressed as percentages.

WIRING DIAGRAM

Refer to DTC P2120 on page 05-542.

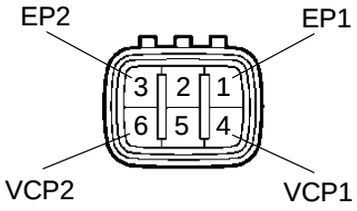
INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 INSPECT ACCELERATOR PEDAL ASSY(ACCELERATOR PEDAL POSITION SENSOR)

Component Side:



Accelerator Pedal Position Sensor

A84814

(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Measure the resistance between each pair of terminals.

Standard:

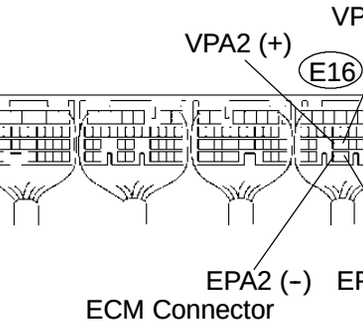
Tester Connection	Specified Condition
EP1 (1) - VCP1 (4)	2.25 to 4.75 kΩ at 20°C (68°F)
EP2 (3) - VCP2 (6)	

(c) Reconnect the accelerator pedal position sensor connector.

NG → **REPLACE ACCELERATOR PEDAL ASSY (See page 10-14 of Pub. No. RM1039E COROLLA Supplement)**

OK

2 INSPECT ECM(VPA AND VPA2 VOLTAGE)



ECM Connector

A66060

(a) Turn the ignition switch to ON.

(b) Measure the voltage between the terminals of the E16 ECM connector.

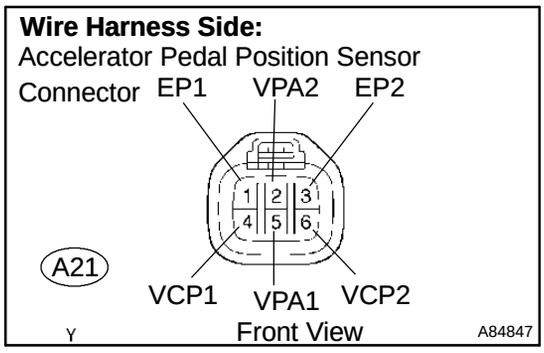
Standard:

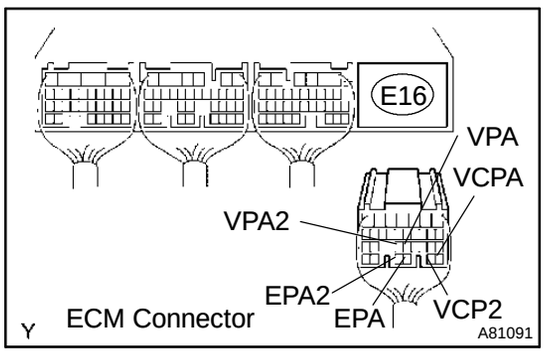
Accelerator Pedal Position	Tester Connection	Specified Condition
Released	VPA (E16-22) - EPA (E16-28)	0.5 to 1.1 V
Depressed		2.6 to 4.5 V
Released	VPA2 (E16-23) - EPA2 (E16-29)	1.2 to 2.0 V
Depressed		3.4 to 5.3 V

OK → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

3	CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)





(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Disconnect the E16 ECM connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A21-5) - VPA (E16-22)	Below 1 Ω
EP1 (A21-1) - EPA (E16-28)	
VCP1 (A21-4) - VCPA (E16-26)	
VPA2 (A21-2) - VPA2 (E16-23)	
EP2 (A21-3) - EPA2 (E16-29)	
VCP2 (A21-6) - VCP2 (E16-27)	

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A21-5) or VPA (E16-22) - Body ground	10 kΩ or higher
EP1 (A21-1) or EPA (E16-28) - Body ground	
VCP1 (A21-4) or VCPA (E16-26) - Body ground	
VPA2 (A21-2) or VPA2 (E16-23) - Body ground	
EP2 (A21-3) or EPA2 (E16-29) - Body ground	
VCP2 (A21-6) or VCP2 (E16-27) - Body ground	

(d) Reconnect the accelerator pedal position sensor connector.

(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK FOR INTERMITTENT PROBLEMS **(See page 05-380)**

DTC	P2226	BAROMETRIC PRESSURE CIRCUIT

DTC	P2228	BAROMETRIC PRESSURE CIRCUIT LOW INPUT

DTC	P2229	BAROMETRIC PRESSURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

To detect atmospheric pressure, the built-in atmospheric pressure sensor in the ECM is used for the common rail system. According to changes in the atmospheric pressure, the ECM corrects the fuel injection volume, timing and duration, and adjusts the common rail internal fuel pressure in order to optimize engine combustion.

DTC No.	DTC Detection Condition	Trouble Area
P2226 P2228 P2229	Atmospheric pressure sensor malfunction (1 trip detection logic)	• ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

DTC	P2227	BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE

CIRCUIT DESCRIPTION

To detect atmospheric pressure, the built-in atmospheric pressure sensor in the ECM is used for the common rail system. According to changes in the atmospheric pressure, the ECM corrects the fuel injection volume, timing and duration, and adjusts the common rail internal fuel pressure in order to optimize engine combustion.

DTC No.	DTC Detection Condition	Trouble Area
P2227	Atmospheric pressure sensor malfunction (2 trip detection logic)	• ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P2227)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2227 and other DTCs	A
P2227	B

HINT:

If any DTCs other than P2227 are output, troubleshoot those DTCs first.

B → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

A

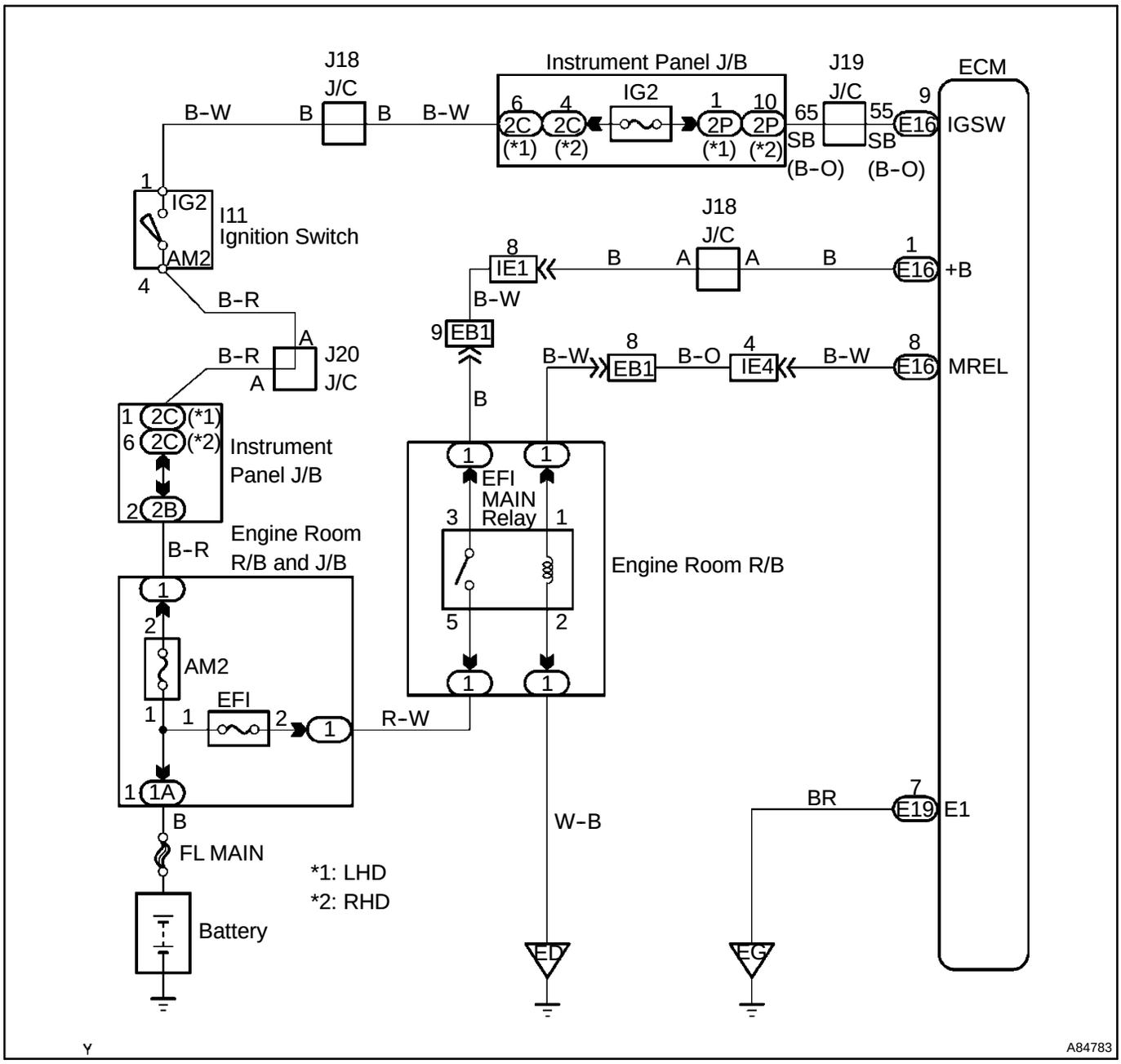
GO TO RELEVANT DTC CHART (See page 05-412)

ECM POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

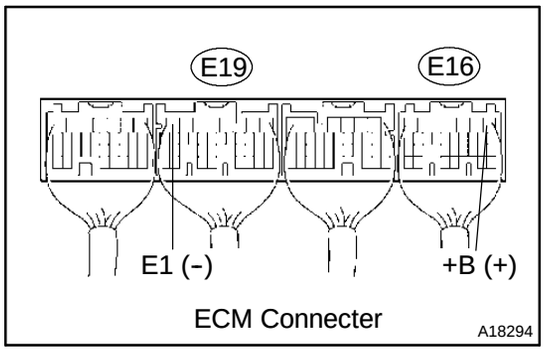
When the ignition switch is turned to ON, the battery voltage is applied to terminal IGSW of the ECM. The ECM "MREL" output signal causes a current to flow to the coil, closing the contacts of the EFI MAIN relay and supplying power to terminal +B of the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT ECM(+B VOLTAGE)



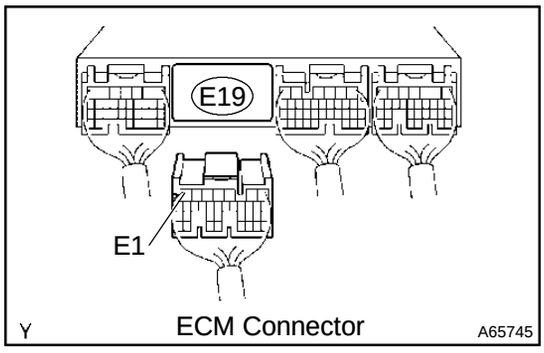
(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
+B (E16-1) - E1 (E19-7)	9 to 14 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE** **(See page 05-395)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - BODY GROUND)



(a) Disconnect the E19 ECM connector.
(b) Check the resistance.
Standard (Check for open):

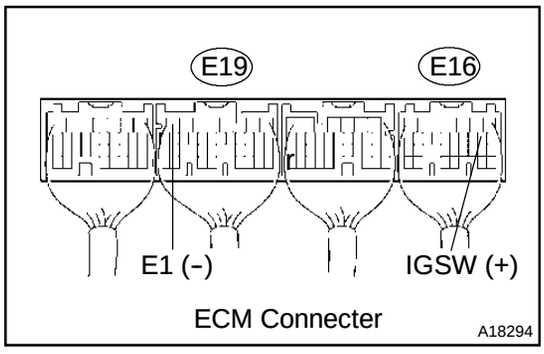
Tester Connection	Specified Condition
E1 (E19-7) - Body ground	Below 1 Ω

(c) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM(IGSW VOLTAGE)



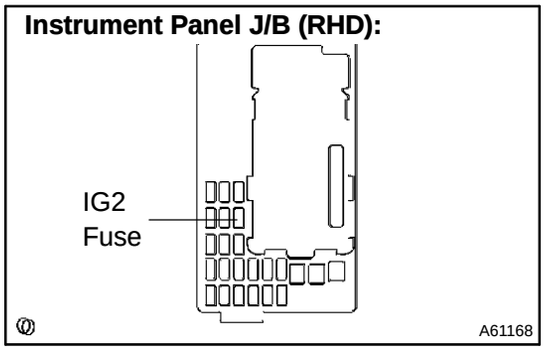
(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
IGSW (E16-9) - E1 (E19-7)	9 to 14 V

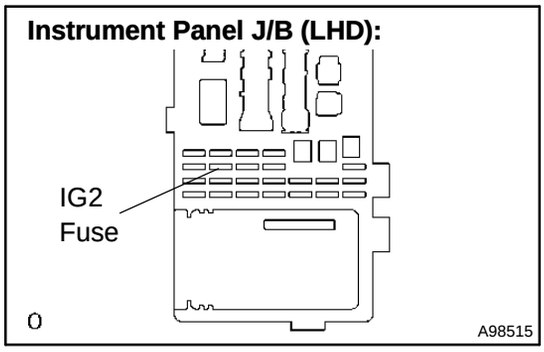
OK → **Go to step 5**

NG

4 INSPECT FUSE(IG2 FUSE)



(a) Remove the IG2 fuse from the instrument panel J/B.
(b) Check the IG2 fuse resistance.
OK: Below 1 Ω
(c) Reinstall the IG2 fuse.

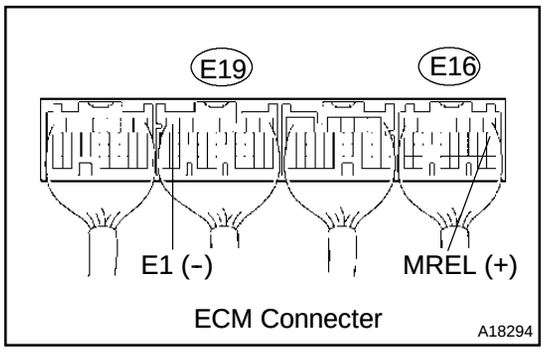


NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (BATTERY - ECM)

5 INSPECT ECM(MREL VOLTAGE)



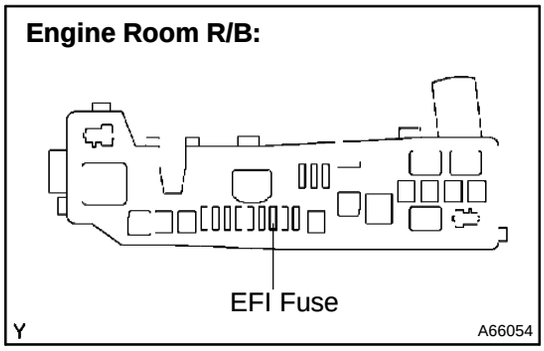
(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 and E19 ECM connectors.
Standard:

Tester Connection	Specified Condition
MREL (E16-8) - E1 (E19-7)	9 to 14 V

NG → **REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

OK

6 INSPECT FUSE(EFI FUSE)

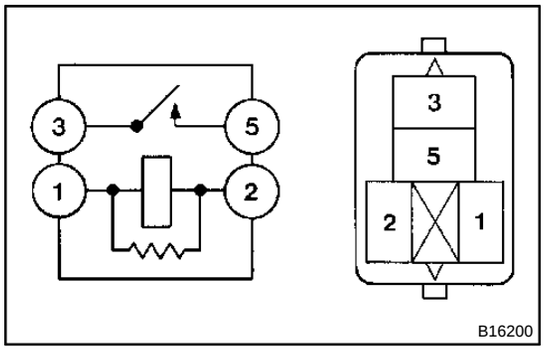


(a) Remove the EFI fuse from the engine room R/B.
(b) Check the EFI fuse resistance.
OK: Below 1 Ω
(c) Reinstall the EFI fuse.

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

7 INSPECT EFI MAIN RELAY



(a) Remove the EFI MAIN relay from the engine room R/B.
(b) Check the EFI MAIN relay resistance.
Standard:

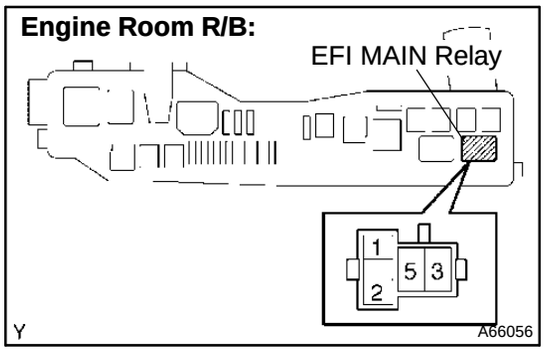
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

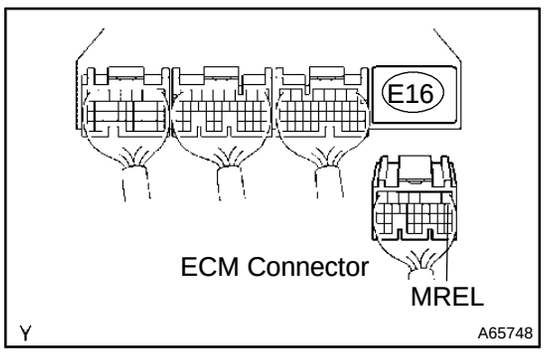
(c) Reinstall the EFI MAIN relay.

NG → **REPLACE EFI MAIN RELAY**

OK

8	CHECK HARNESS AND CONNECTOR(EFI MAIN RELAY - ECM, EFI MAIN RELAY - BODY GROUND)





(a) Check the resistance between the EFI MAIN relay and ECM.

(1) Remove the EFI MAIN relay from the engine room R/B.

(2) Disconnect the E16 ECM connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI MAIN relay (1) - MREL (E16-8)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
EFI MAIN relay (1) or MREL (E16-8) - Body ground	10 kΩ or higher

(4) Reinstall the EFI MAIN relay.

(5) Reconnect the ECM connector.

(b) Check the resistance between the EFI MAIN relay and body ground.

(1) Remove the EFI MAIN relay from the engine room R/B.

(2) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
EFI MAIN relay (2) - Body ground	Below 1 Ω

(3) Reinstall the EFI MAIN relay.

OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

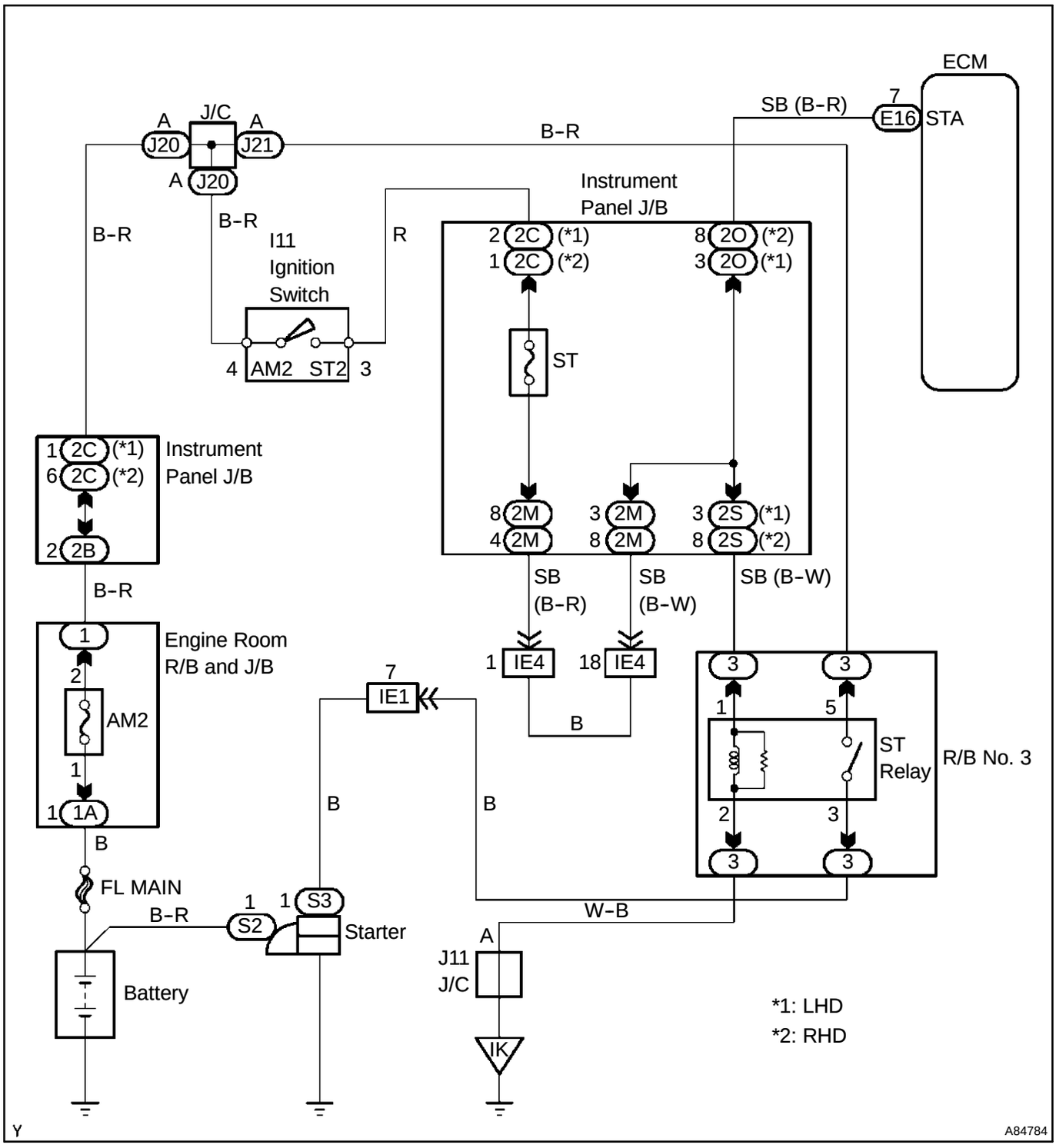
CHECK AND REPAIR HARNESS AND CONNECTOR (TERMINAL +B OF ECM - BATTERY POSITIVE TERMINAL)

STARTER SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

While the engine is being cranked, a current flows from terminal ST2 of the ignition switch to the ST relay fuse and also flows to terminal STA of the ECM (STA signal).

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

This chart assumes that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page 05-395.

1 READ VALUE USING INTELLIGENT TESTER II(STA SIGNAL)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Starter SIG.
(d) Read the value.

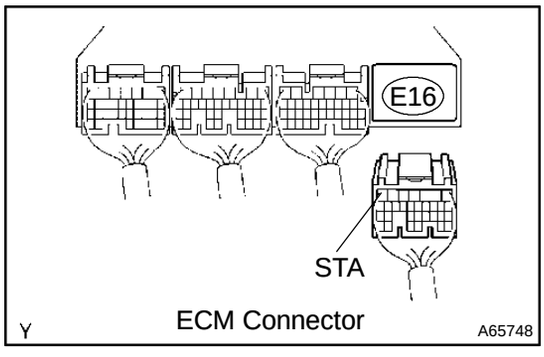
Standard:

Ignition Switch Position	ON	START
Starter SIG	OFF	ON

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-395)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - ST RELAY)



(a) Disconnect the E16 ECM connector.
(b) Remove the ST relay from the R/B No. 3.
(c) Check the resistance.

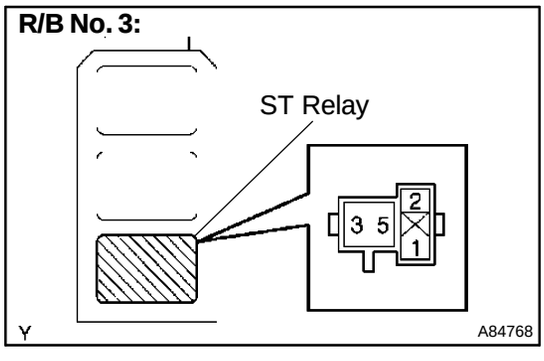
Standard (Check for open):

Tester Connection	Specified Condition
ST relay (1) - STA (E16-7)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
ST relay (1) or STA (E16-7) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reinstall the ST relay.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

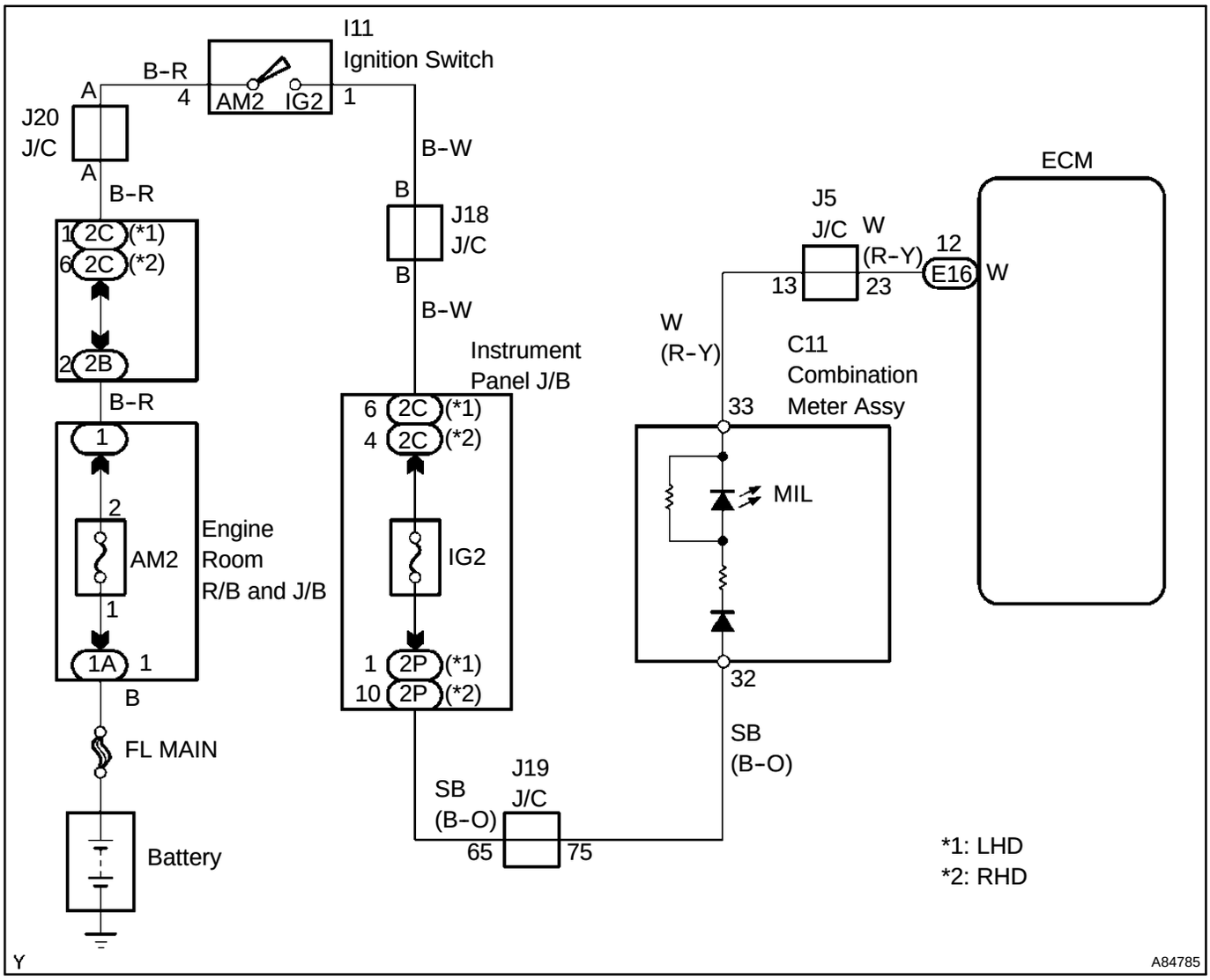
REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

MIL CIRCUIT

CIRCUIT DESCRIPTION

If the ECM detects a problem, the MIL is illuminated. At this time, the ECM records the DTC in its memory.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshoot each trouble symptom in accordance with the chart below.

Reference:

Condition	Proceed To
MIL remains on	Start inspection from step 1
MIL not illuminated	Start inspection from step 3

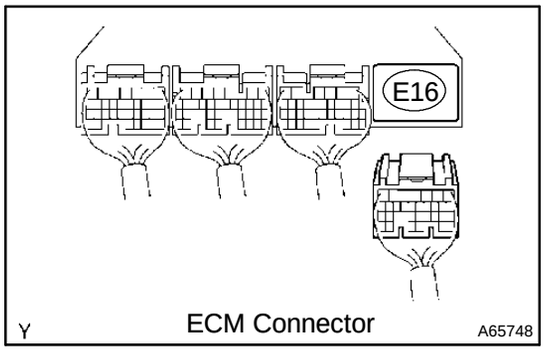
1 CHECK IF MIL TURNS OFF

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Check if DTCs have been stored. Note down if there are DTCs.
(e) Select the following menu items: Powertrain / Engine and ECT / DTC / Clear.
(f) Clear DTCs.
(g) Check if the MIL turns off.
OK: The MIL should turn off.

OK → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC** **(See page 05-412)**

NG

2 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT IN WIRE HARNESS)



(a) Disconnect the E16 ECM connector.
(b) Turn the ignition switch to ON.
(c) Check that the MIL is not illuminated.
OK: MIL is not illuminated.
(d) Reconnect the ECM connector.

OK → **REPLACE ECM** **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

3 CHECK IF MIL ILLUMINATES

(a) Check if the MIL illuminates when the ignition switch is turned to ON.
OK: MIL should illuminate.

OK → **NORMAL**

NG

4	INSPECT COMBINATION METER ASSY(MIL CIRCUIT) (See page 05-1297 of Pub. No. RM925E COROLLA)

OK: The combination meter circuit is normal.

NG → REPAIR OR REPLACE BULB OR COMBINATION METER ASSEMBLY

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)

CLUTCH SWITCH CIRCUIT

CIRCUIT DESCRIPTION

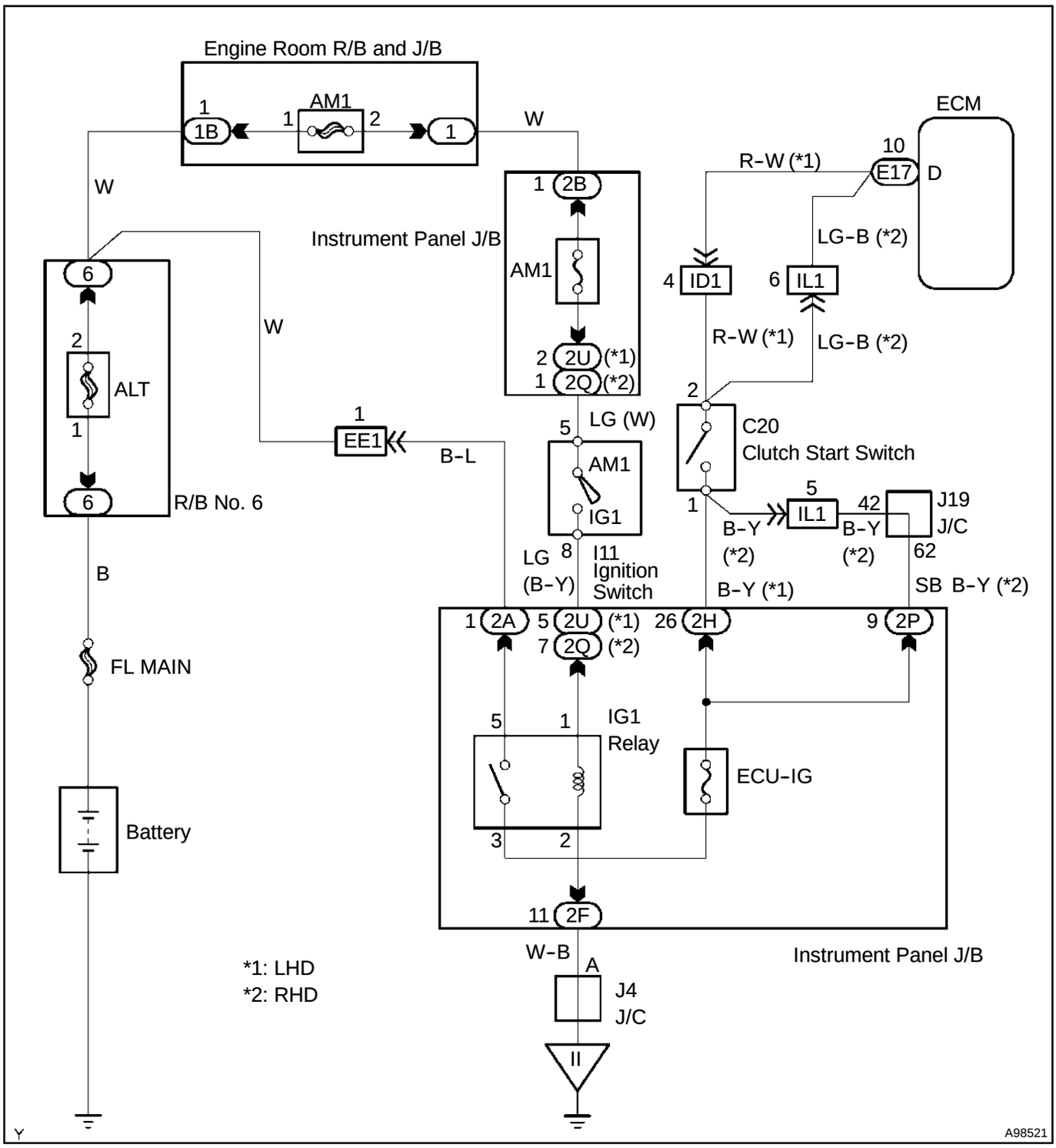
The clutch switch is mounted on the clutch pedal. The switch is turned ON when depressing the clutch pedal, and transmits a signal to the ECM.

HINT:

Normal condition is shown in the table below.

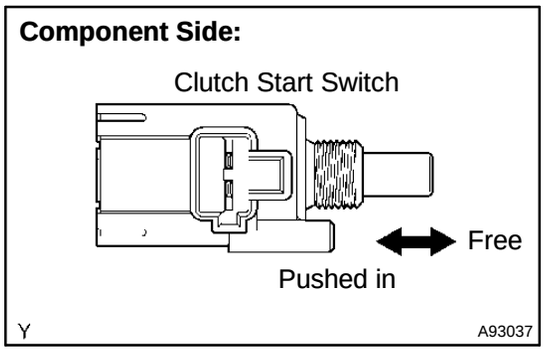
Clutch Pedal Operation	Voltage (at Clutch Start Switch [D] Terminal of ECM)
Depressed	9 to 14 V
Released	0 V

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT CLUTCH START SWITCH ASSY



(a) Remove the C20 clutch start switch.
(b) Check the resistance.

Standard:

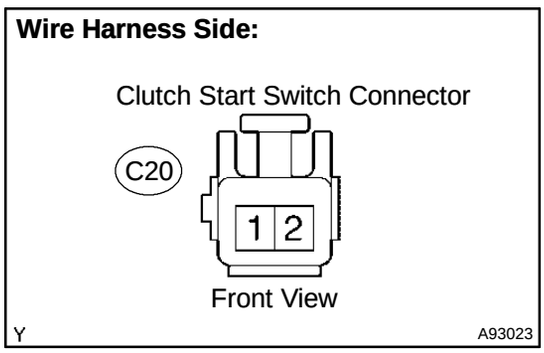
Switch Position	Specified Condition
Switch pin free	10 kΩ or higher
Switch pin pushed in	Below 1 Ω

(c) Reinstall the clutch start switch.

NG → **REPLACE CLUTCH START SWITCH ASSY**

OK

2 CHECK HARNESS AND CONNECTOR(CLUTCH START SWITCH - ECM)



(a) Disconnect the C20 clutch start switch connector.
(b) Disconnect the E17 ECM connector.
(c) Check the resistance.

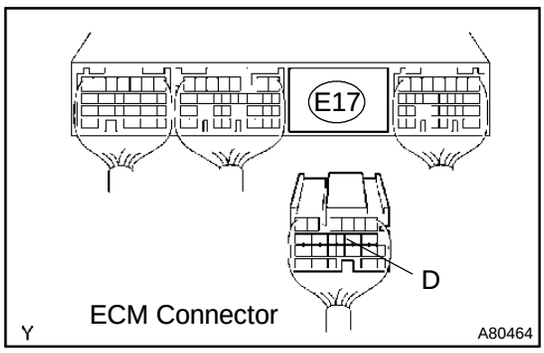
Standard (Check for open):

Tester Connection	Specified Condition
D (E17-10) - (C20-2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
D (E17-10) or (C20-2) - Body ground	10 kΩ or higher

(d) Reconnect the clutch start switch connector.
(e) Reconnect the ECM connector.

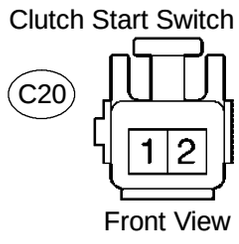


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

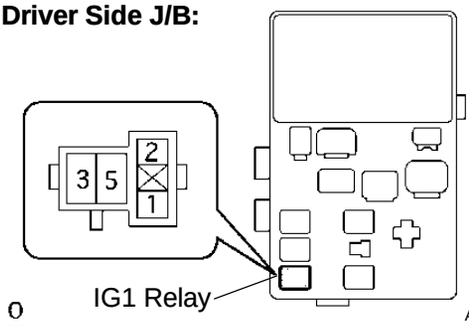
OK

3 CHECK HARNESS AND CONNECTOR(CLUTCH START SWITCH - IG1 RELAY)

Wire Harness Side:



Driver Side J/B:



(a) Disconnect the C20 clutch start switch connector.
(b) Remove the IG1 relay from the instrument panel J/B.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
IG1 relay (3) - Clutch start switch (C20-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
IG1 relay (3) or Clutch start switch (C20-1) - Body ground	10 kΩ or higher

(d) Reconnect the clutch start switch connector.
(e) Reinstall the IG1 relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

ENGINE DIFFICULT TO START OR STALLING

HINT:
Specified values in the following troubleshooting flowchart are for reference only. Variations in the Data List result values may occur depending on the measuring conditions or the vehicle's age. Do not judge the vehicle to be normal even when the Data List values indicate a standard level. There are possibly some concealed factors of the malfunction.

INSPECTION PROCEDURE

1 READ OUTPUT DTCS(RELATED TO ENGINE)

(a) Connect an intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
Other than engine-related DTCs (see page 05-412)	A
DTCs related to engine (see page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

2 CHECK ENGINE CRANKING CONDITION

(a) Check the engine cranking condition.
(b) Compare the cranking condition with that of a normal engine of the same model, and carefully check if there is any difference between them.
OK: The engine cranking condition is normal.

NG → **CHECK AND REPAIR BATTERY, CHARGING SYSTEM, STARTER ASSY AND STARTING SYSYTEM**

OK

3 READ VALUE USING INTELLIGENT TESTER II(FUEL PRESSURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Common Rail Pressure.
(d) Read the value.
Reference:

Item	Inspection Condition	Reference Value
Common Rail Pressure	Cranking, and engine coolant temperature 0°C (32°F) or more	30 MPa

NG → BLEED AIR FOR FUEL SYSTEM

OK

4	READ VALUE USING INTELLIGENT TESTER II

(a) Check if initial combustion occurs.
Result:

Result	Proceed To
No occurrence with cold engine	A
No occurrence with hot engine	B
Occurred	C

B → Go to step 6

C → Go to step 7

A

5	CHECK INDICATOR LIGHTING TIME AND AFTER GLOW TIME (See page 05-491)

OK: The indicator lighting time is normal.

HINT:
DTC P0380 is set if there is an open or short malfunction in the glow plug circuit (2 trip detection logic, when the engine coolant temperature is less than 40°C [104°F]).

NG → REPAIR OR REPLACE PRE-HEATING SYSTEM

OK

6	READ VALUE USING INTELLIGENT TESTER II(FUEL PRESSURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) On the intelligent tester ll, select the following menu items: Powertrain / Engine and ECT / Data List / Common Rail Pressure.
(d) Check that the internal fuel pressure of the common rail is within the specification below.
Standard:

Engine Speed	Fuel Pressure (MPa)
Idling	Approximately 30 to 40
2,500 rpm (no engine load)	Approximately 50 to 100

NG → Go to step 12

OK

7	CHECK AIR INTAKE SYSTEM AND EXHAUST SYSTEM

(a) Remove the air cleaner filter.
(b) Inspect the EGR valve operation.
  (1) Start the engine and warm it up.
  (2) Check that clicking sounds are heard from the EGR valve when the vacuum hose is disconnected from EGR valve with the engine in an idling condition.
(c) Inspect the intake shutter (throttle valve) operation.
  (1) Start the engine.
  (2) Check if the intake shutter (throttle valve) fully opens when accelerating the engine speed.

HINT:
While revving up, the EGR valve is fully closed and the intake shutter is fully opened. If the systems are normal, the volume of black smoke decreases.

OK: The EGR valve and intake shutter operate normally.

NG → **CHECK AND REPAIR LOCATIONS WHERE MALFUNCTIONS EXIST**

OK

8	READ VALUE USING INTELLIGENT TESTER II

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the values displayed on the intelligent tester ll respectively.
  (1) Common Rail Pressure
  (2) Injection Volume
  (3) Injection Timing

Standard:

Item	Engine Speed *	Reference Value
Common Rail Pressure	Idling	30 to 40 MPa
Common Rail Pressure	2,000 rpm (no engine load)	35 to 80 MPa
Common Rail Pressure	3,000 rpm (no engine load)	50 to 100 MPa
Injection Volume	Idling	3 to 10 mm^3
Injection Volume	2,000 rpm (no engine load)	3 to 10 mm^3
Injection Volume	3,000 rpm (no engine load)	5 to 12 mm^3
Injection Timing	Idling	-1 to 5°CA
Injection Timing	2,000 rpm (no engine load)	0 to 4°CA
Injection Timing	3,000 rpm (no engine load)	1 to 5°CA

*: If no idling conditions are specified, the transmission gear selector lever should be in the neutral position, the A/C switch and all accessory switches should be OFF.

NG → **Go to step 13**

OK

9	INSPECT CYLINDER COMPRESSION PRESSURE (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

(a) Measure the compression pressure.
Standard: 2,628 kPa (26.8 kgf/cm^2, 381 psi) or more
OK: The cylinder compression pressure is within the standard range.

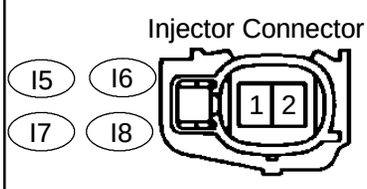
NG → **CHECK AND REPAIR ENGINE**

OK

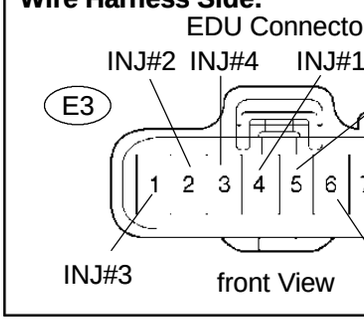
10	CHECK HARNESS AND CONNECTOR(INJECTOR - EDU)

HINT:
DTC P0200 is set if there is an open or short malfunction in the EDU circuit (1 trip detection logic).

Wire Harness Side:



Wire Harness Side:



(a) Check the harness and connector between the injector and EDU (INJ terminal).
(1) Disconnect the I5, I6, I7 and/or I8 injector connector.
(2) Disconnect the E3 EDU connector.
(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-1) - INJ#1 (E3-4)	Below 1 Ω
Injector (I6-1) - INJ#2 (E3-2)	
Injector (I7-1) - INJ#3 (E3-1)	
Injector (I8-1) - INJ#4 (E3-3)	
Injector (I5-2) - COM1 (E3-5)	
Injector (I6-2) - COM2 (E3-6)	
Injector (I7-2) - COM2 (E3-6)	
Injector (I8-2) - COM1 (E3-5)	

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-1) or INJ#1 (E3-4) - Body ground	10 kΩ or higher
Injector (I6-1) or INJ#2 (E3-2) - Body ground	
Injector (I7-1) or INJ#3 (E3-1) - Body ground	
Injector (I8-1) or INJ#4 (E3-3) - Body ground	
Injector (I5-2) or COM1 (E3-5) - Body ground	
Injector (I6-2) or COM2 (E3-6) - Body ground	
Injector (I7-2) or COM2 (E3-6) - Body ground	
Injector (I8-2) or COM1 (E3-5) - Body ground	

(4) Reconnect the injector connector.
(5) Reconnect the EDU connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

11	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT #1 TO #4)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the engine idling condition while the fuel injection of each cylinder is cut using the intelligent tester ll.

Result:

Engine Idling Condition	Proceed To
Becomes unstable	A
Does not change	B

HINT:
Replace the injector mounted on the cylinder that causes rough idling.

B → **GO TO DTC P1238** **(See page 05-525)**

A

REPLACE INJECTOR DRIVER **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

12	CHECK IF FUEL IS BEING SUPPLIED TO SUPPLY PUMP

(a) Disconnect the inlet hose from the supply pump.
(b) Operate the priming pump and check that fuel is being supplied to the supply pump.

HINT:
Cover the inlet hose using a shop rag to prevent spillage of fuel.

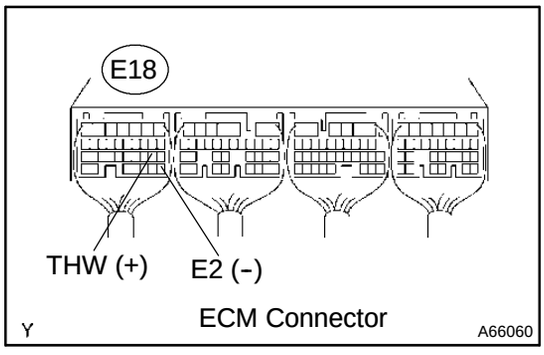
OK: Fuel is properly supplied to the supply pump when the priming pump is actuated.

OK → **REPLACE INJECTION OR SUPPLY PUMP ASSY** **(See page 11-15 of Pub. No. RM1039E COROLLA Supplement)**

NG

CHECK AND REPAIR FUEL PIPE CLOGGING (INCLUDING FUEL FREEZING) (FUEL TANK - SUPPLY PUMP)

13	INSPECT ECM(THW VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E18 ECM connector.

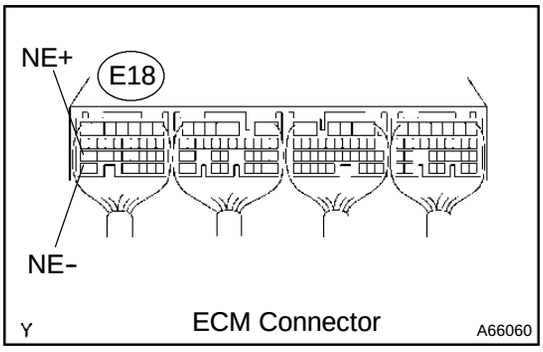
Standard:

Tester Connection	Condition	Specified Condition
THW (E18-19) - E2 (E18-28)	Idling, engine coolant temperature between 60°C and 120°C (140°F and 248°F)	0.2 to 1.0 V

NG → Go to step 17

OK

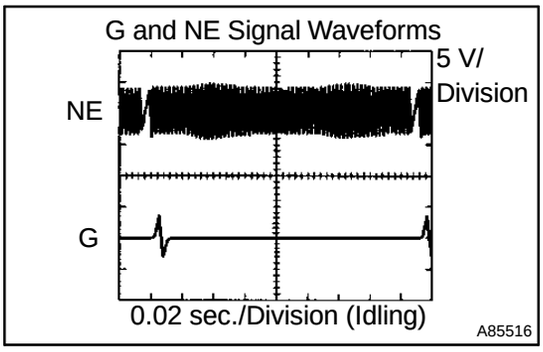
14 INSPECT ECM(NE SIGNAL)



(a) Inspect the ECM using an oscilloscope.
(b) While idling, check the waveform between the terminals of the E18 ECM connector.

Standard:

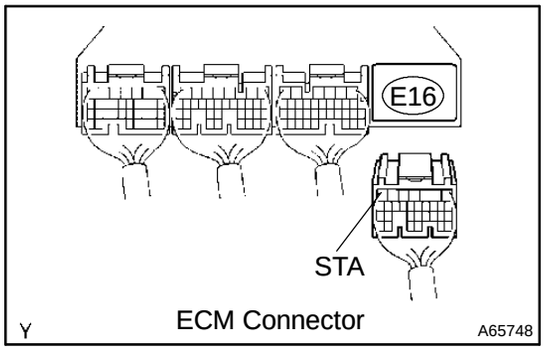
Tester Connection	Specified Condition
NE+ (E18-27) - NE- (E18-34)	Correct waveform shown



NG → Go to step 18

OK

15 CHECK HARNESS AND CONNECTOR(ECM - ST RELAY)



(a) Disconnect the E16 ECM connector.
(b) Remove the ST relay from the R/B No. 3.
(c) Check the resistance.

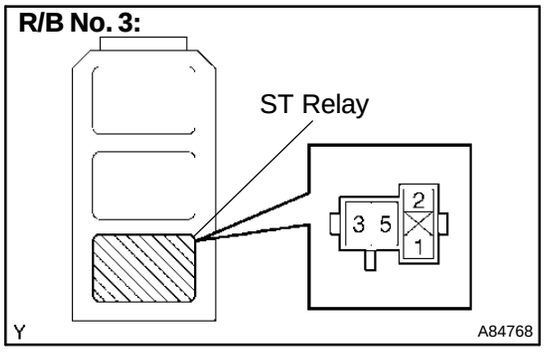
Standard (Check for open):

Tester Connection	Specified Condition
ST relay (1) - STA (E16-7)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
ST relay (1) or STA (E16-7) - Body ground	10 kΩ or higher

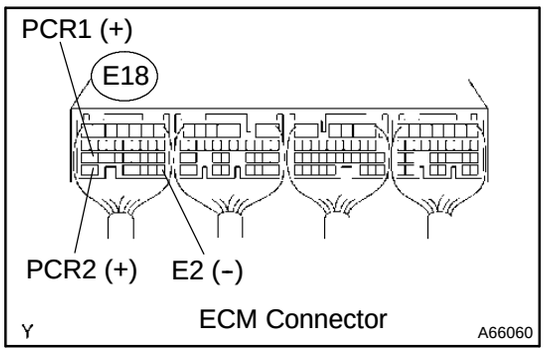
(d) Reconnect the ECM connector.
(e) Reinstall the ST relay.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

16 INSPECT ECM(PCR1 AND PCR2 VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E18 ECM connector.

Standard:

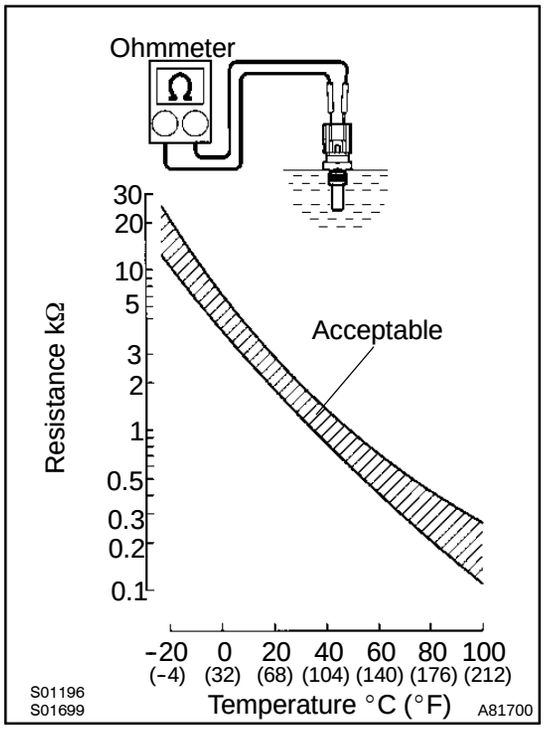
Tester Connection	Condition	Specified Condition
PCR1 (E18-26) - E2 (E18-28)	Idling	1.8 to 2.1 V
PCR2 (E18-33) - E2 (E18-28)	Idling	1.2 to 1.5 V

NG → **Go to step 19**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

17 INSPECT ENGINE COOLANT TEMPERATURE SENSOR



(a) Remove the engine coolant temperature sensor.

(b) Measure the resistance between the terminals.

Standard:

2.32 to 2.59 kΩ at 20°C (68°F)

0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:

If you check the engine coolant temperature sensor in water, be careful not to allow water to get in contact with the terminals. After checking, dry the sensor.

HINT:

Alternative procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values against the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

(c) Reinstall the engine coolant temperature sensor.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR** **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

18 INSPECT CRANKSHAFT POSITION SENSOR

Component Side:



Crankshaft Position Sensor

A78431

(a) Disconnect the C4 crankshaft position sensor connector.

(b) Measure the resistance between terminals 1 and 2.

Standard:

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
	2,065 to 3,225 Ω at hot

HINT:

Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

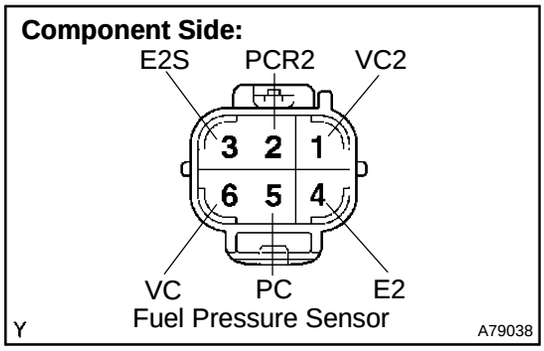
(c) Reconnect the crankshaft position sensor connector.

NG → **REPLACE CRANKSHAFT POSITION SENSOR** **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

19 INSPECT COMMON RAIL ASSY(FUEL PRESSURE SENSOR)



(a) Disconnect the F13 fuel pressure sensor connector.
(b) Measure the resistance between each pair of the terminals of the fuel pressure sensor.

Standard:

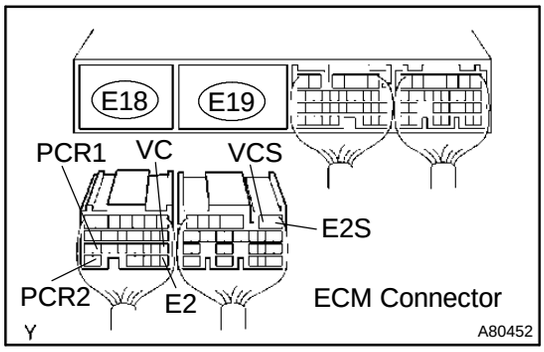
Tester Connection	Specified Condition
PC (F13-5) - E2 (F13-4)	16.4 kΩ or less
PCR2 (F13-2) - E2S (F13-3)	16.4 kΩ or less
PC (F13-5) - VC (F13-6)	3 kΩ or less
PCR2 (F13-2) - VC2 (F13-1)	3 kΩ or less

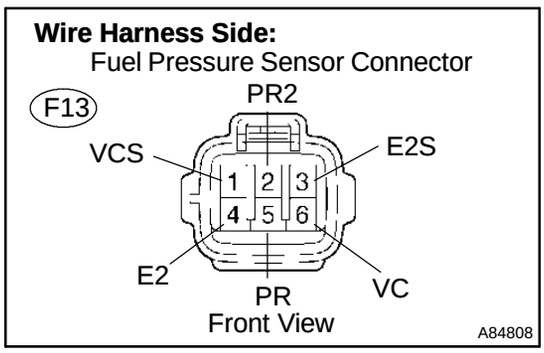
(c) Reconnect the fuel pressure sensor connector.

NG → **REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

20 CHECK HARNESS AND CONNECTOR(FUEL PRESSURE SENSOR - ECM)





(a) Disconnect the E18 and E19 ECM connectors.
(b) Disconnect the F13 fuel pressure sensor connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PCR1 (E18-26) - PR (F13-5)	Below 1 Ω
PCR2 (E18-33) - PR2 (F13-2)	
VCS (E19-2) - VCS (F13-1)	
VC (E18-18) - VC (F13-6)	
E2 (E18-28) - E2 (F13-4)	
E2S (E19-1) - E2S (F13-3)	

Standard (Check for short):

Tester Connection	Specified Condition
PCR1 (E18-26) or PR (F13-5) - Body ground	10 kΩ or higher
PCR2 (E18-33) or PR2 (F13-2) - Body ground	
VCS (E19-2) or VCS (F13-1) - Body ground	
VC (E18-18) or VC (F13-6) - Body ground	
E2 (E18-28) or E2 (F13-4) - Body ground	
E2S (E19-1) or E2S (F13-3) - Body ground	

(d) Reconnect the ECM connectors.
(e) Reconnect the fuel pressure sensor connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

21	REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE INJECTION OR SUPPLY PUMP ASSY (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)

OK

END

BLACK SMOKE EMITTED

HINT:
Specified values in the following troubleshooting flowchart are for reference only. Variations in the Data List result values may occur depending on the measuring conditions or the vehicle's age. Do not judge the vehicle to be normal even when the Data List values indicate a standard level. There are possibly some concealed factors of the malfunction.

INSPECTION PROCEDURE

1 READ OUTPUT DTCS(RELATED TO ENGINE)

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / DTC.
(d) Read DTCs.
Result:

Display (DTC Output)	Proceed To
Other than engine-related DTCs (see page 05-412)	A
DTCs related to the engine (see page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

2 READ VALUE USING INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Injection Volume and Revised Injection Volume #1, #2, #3 and #4.
(d) Read the value.
Standard:

Item	Engine Speed *	Reference Value
Injection Volume	Idling (no engine load)	3 to 10 mm^3
Revised Injection Volume #1	Idling (no engine load)	-4.9 to 4.9 mm^3
Revised Injection Volume #2	Idling (no engine load)	-4.9 to 4.9 mm^3
Revised Injection Volume #3	Idling (no engine load)	-4.9 to 4.9 mm^3
Revised Injection Volume #4	Idling (no engine load)	-4.9 to 4.9 mm^3

*: If no idling conditions are specified, the transmission gear selector lever should be in the neutral position, the A/C switch and all accessory switches should be OFF.

NG → **Go to step 11**

OK

3	PERFORM ENGINE RPM ACCELERATION

HINT:
If the exhaust gas contains excessive black smoke, perform the following operations.
(a) Accelerate the engine speed up to the maximum RPM with no load 20 times.
(b) Check the volume of black smoke in the exhaust gas.
Result:

Result	Proceed To
Black smoke faded away	OK
Black smoke remains in exhaust gas	NG

HINT:
Deposited soot in the exhaust system can be a source of excessive black smoke.

NG → **Go to step 4**

OK

END

4	CHECK AIR INTAKE SYSTEM AND EXHAUST SYSTEM

(a) Remove the air cleaner filter.
(b) Inspect the EGR valve operation.
(1) Connect the intelligent tester ll to the DLC3.
(2) Start the engine and turn the intelligent tester ll ON.
(3) Select the following menu items: Powertrain / Engine and ECT / Active Test / EGR step POS.
(4) Check that the EGR valve operates.
(c) Turn the ignition switch to OFF, and then disconnect the connector from the EGR valve in order to close the EGR valve.
(d) Inspect the intake shutter operation.
(1) Start the engine.
(2) Check if the intake shutter fully opens when accelerating the engine speed.

HINT:
While revving up, the EGR valve is fully closed and the intake shutter is fully opened. If the systems are normal, the volume of black smoke decreases.
OK: The EGR valve and intake shutter operate normally.

NG → **Go to step 5**

OK

CHECK AND REPAIR LOCATIONS WHERE MALFUNCTIONS EXIST

5	READ VALUE USING INTELLIGENT TESTER II(MASS AIR FLOW RATE)

HINT:
DTC P0100 is set if there is an open or short malfunction in the Mass Air Flow (MAF) meter (1 trip detection logic). DTC P0101 is set if there are any other malfunctions in the MAF meter (2 trip detection logic).

(a) Disconnect the throttle control motor connector.
(b) Disconnect the EGR valve connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Start the engine and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(f) Read the value.

Result:

Engine Speed Condition	Air Flow Rate (gm/s)
800 rpm	4 to 9

(g) Reconnect the throttle control motor connector.
(h) Reconnect the EGR valve connector.

NG → **REPLACE MASS AIR FLOW METER**

OK

6	CHECK TURBOCHARGING PRESSURE (See page 13-3 of Pub. No. RM1039E COROLLA Supplement)

OK: The turbocharging pressure is within the standard range.

NG → **REPLACE TURBOCHARGER SUB-ASSY (See page 13-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

7	READ VALUE USING INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the values displayed on the intelligent tester II respectively.
(1) Common Rail Pressure
(2) Injection Volume
(3) M-INJ/PILOT ON
(4) Pilot-Injection
(5) Revised Injection Volume #1, #2, #3 and #4

Reference:

Item	Engine Speed *	Reference Value
Common Rail Pressure	Idling	30 to 40 MPa
Common Rail Pressure	2,000 rpm (no engine load)	35 to 80 MPa
Common Rail Pressure	3,000 rpm (no engine load)	50 to 100 MPa
Injection Volume	Idling	3 to 10 mm^3
Injection Volume	2,000 rpm (no engine load)	3 to 10 mm^3
Injection Volume	3,000 rpm (no engine load)	5 to 12 mm^3
M-INJ/PILOT ON	Idling	600 to 1,200 μs
Pilot-Injection	Idling	400 to 700 μs
Revised Injection Volume #1	Idling	-4.9 to 4.9 mm^3
Revised Injection Volume #2	Idling	-4.9 to 4.9 mm^3
Revised Injection Volume #3	Idling	-4.9 to 4.9 mm^3
Revised Injection Volume #4	Idling	-4.9 to 4.9 mm^3

*: If no idling conditions are specified, the transmission gear selector lever should be in the neutral position, the A/C switch and all accessory switches should be OFF.

Result:

Result	Proceed To
Within reference value	A
One of Revised Injection Volume #1 to #4 indicates outside reference value	B
Other than above	C

B → **GO TO DTC P1238** **(See page 05-525)**

C → **Go to step 11**

A

8	INSPECT CYLINDER COMPRESSION PRESSURE (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

(a) Measure the compression pressure.
Standard: 2,628 kPa (26.8 kgf/cm^2, 381 psi) or more
OK: The cylinder compression pressure is within the standard range.

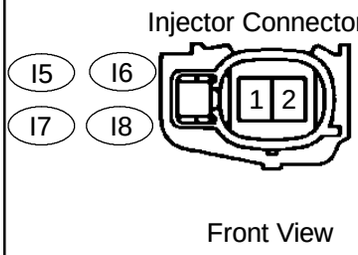
NG → **CHECK AND REPAIR ENGINE**

OK

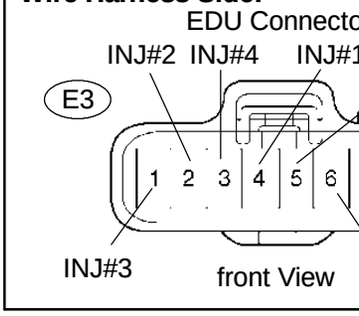
9	CHECK HARNESS AND CONNECTOR(INJECTOR - EDU)

HINT:
DTC P0200 is set if there is an open or short malfunction in the EDU circuit (1 trip detection logic).

Wire Harness Side:



Wire Harness Side:



(a) Check the harness and connector between the injector and EDU (INJ terminal).

(1) Disconnect the I5, I6, I7 and/or I8 injector connector.

(2) Disconnect the E3 EDU connector.

(3) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I5-1) - INJ#1 (E3-4)	Below 1 Ω
Injector (I6-1) - INJ#2 (E3-2)	
Injector (I7-1) - INJ#3 (E3-1)	
Injector (I8-1) - INJ#4 (E3-3)	
Injector (I5-2) - COM1 (E3-5)	
Injector (I6-2) - COM2 (E3-6)	
Injector (I7-2) - COM2 (E3-6)	
Injector (I8-2) - COM1 (E3-5)	

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-1) or INJ#1 (E3-4) - Body ground	10 kΩ or higher
Injector (I6-1) or INJ#2 (E3-2) - Body ground	
Injector (I7-1) or INJ#3 (E3-1) - Body ground	
Injector (I8-1) or INJ#4 (E3-3) - Body ground	
Injector (I5-2) or COM1 (E3-5) - Body ground	
Injector (I6-2) or COM2 (E3-6) - Body ground	
Injector (I7-2) or COM2 (E3-6) - Body ground	
Injector (I8-2) or COM1 (E3-5) - Body ground	

(4) Reconnect the injector connector.

(5) Reconnect the EDU connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

10	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT #1 TO #4)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the engine idling condition while the fuel injection of each cylinder is cut using the intelligent tester ll.

Result:

Engine Idling Condition	Proceed To
Becomes unstable	A
Does not change	B

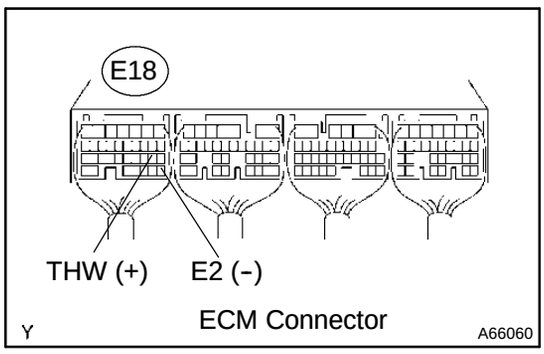
HINT:
Replace the injector mounted on the cylinder that causes rough idling.

B → **GO TO DTC P1238** **(See page 05-525)**

A

REPLACE INJECTOR DRIVER **(See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

11	INSPECT ECM(THW VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E18 ECM connector.

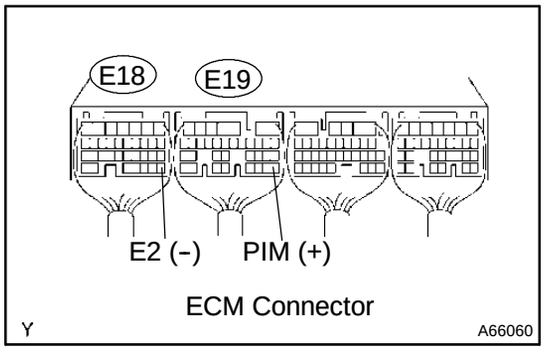
Standard:

Tester Connection	Condition	Specified Condition
THW (E18-19) - E2 (E18-28)	Idling, engine coolant temperature between 60°C and 120°C (140°F and 248°F)	0.2 to 1.0 V

NG → **Go to step 17**

OK

12 INSPECT ECM(PIM VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E18 and E19 ECM connectors.

Standard:

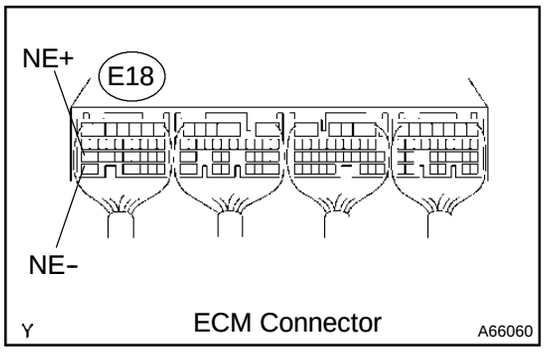
Tester Connection	Condition	Specified Condition
PIM (E19-28) - E2 (E18-28)	Applied negative pressure of 40 kPa (300 mmHg, 11.8 in.Hg)	1.4 to 2.0 V
PIM (E19-28) - E2 (E18-28)	Same as atmospheric pressure	2.0 to 2.6 V
PIM (E19-28) - E2 (E18-28)	Applied positive pressure of 69 kPa (518 mmHg, 20.4 in.Hg)	3.0 to 3.6 V

HINT:
Even when the voltage output from the manifold absolute pressure sensor is within the standard level, there may be a problem in the sensor caused by age deterioration.

NG → **Go to step 18**

OK

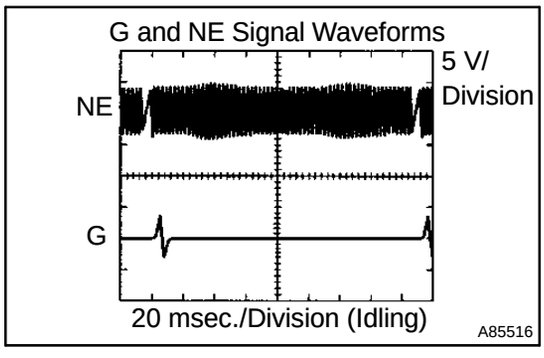
13 INSPECT ECM(NE SIGNAL)



(a) Inspect the ECM using an oscilloscope.
(b) While idling, check the waveform between the terminals of the E18 ECM connector.

Standard:

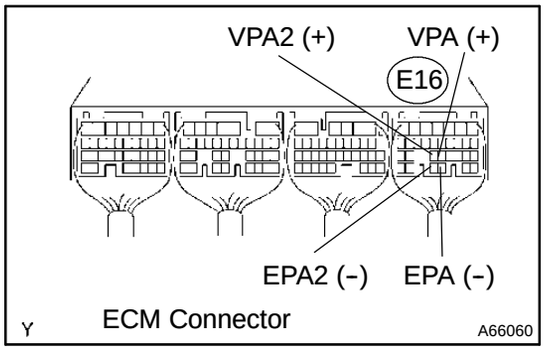
Tester Connection	Specified Condition
NE+ (E18-27) - NE- (E18-34)	Correct waveform shown



NG → **Go to step 19**

OK

14 INSPECT ECM(VPA AND VPA2 VOLTAGE)



(a) Turn the ignition switch to ON.
(b) Measure the voltage between the terminals of the E16 ECM connector.

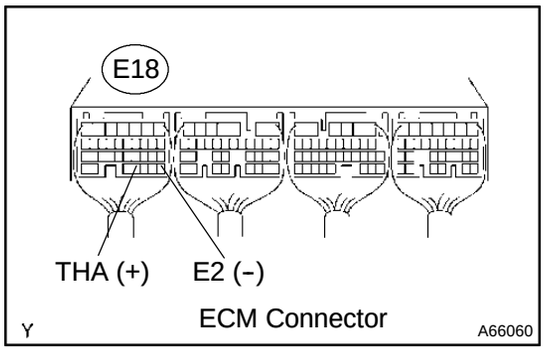
Standard:

Accelerator Pedal Position	Tester Connection	Specified Condition
Released	VPA (E16-22) - EPA (E16-28)	0.5 to 1.1 V
Depressed		2.5 to 4.6 V
Released	VPA2 (E16-23) - EPA2 (E16-29)	1.5 to 2.9 V
Depressed		3.5 to 5.5 V

NG → **Go to step 20**

OK

15 INSPECT ECM(THA VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E18 ECM connector.

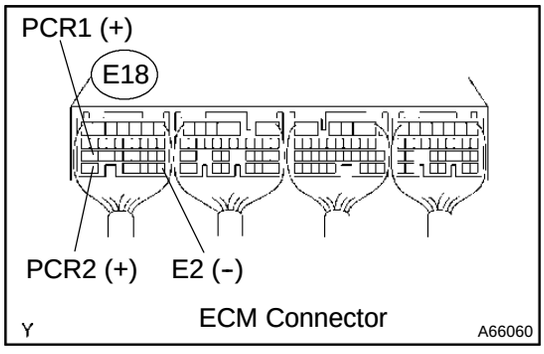
Standard:

Tester Connection	Condition	Specified Condition
THA (E18-31) - E2 (E18-28)	Idling, intake air temperature at 20°C (68°F)	0.5 to 3.4 V

NG → **Go to step 21**

OK

16 INSPECT ECM(PCR1 AND PCR2 VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E18 ECM connector.

Standard:

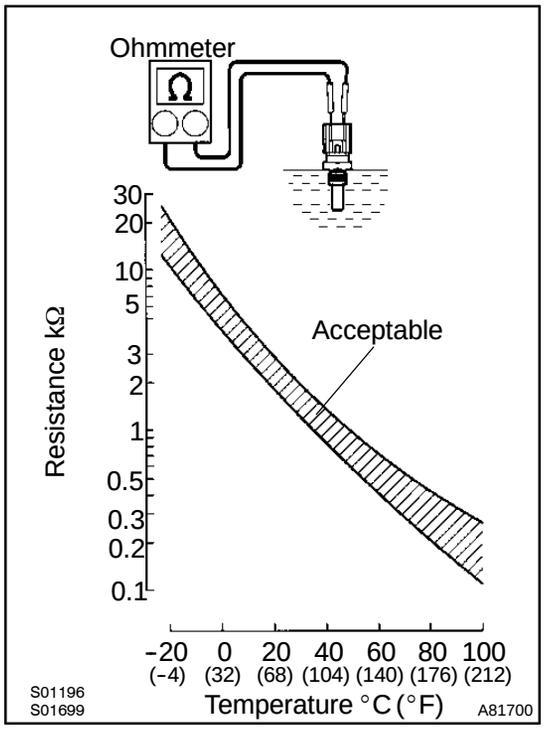
Tester Connection	Condition	Specified Condition
PCR1 (E18-26) - E2 (E18-28)	Idling	1.8 to 2.1 V
PCR2 (E18-33) - E2 (E18-28)	Idling	1.2 to 1.5 V

NG → **Go to step 22**

OK

REPLACE ECM **(See page 10-8 of Pub. No. RM1039E COROLLA Supplement)**

17 INSPECT ENGINE COOLANT TEMPERATURE SENSOR



(a) Remove the engine coolant temperature sensor.

(b) Measure the resistance between the terminals.

Standard:

2.32 to 2.59 kΩ at 20°C (68°F)

0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:

If you check the engine coolant temperature sensor in water, be careful not to allow water to get in contact with the terminals. After checking, dry the sensor.

HINT:

Alternative procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values against the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

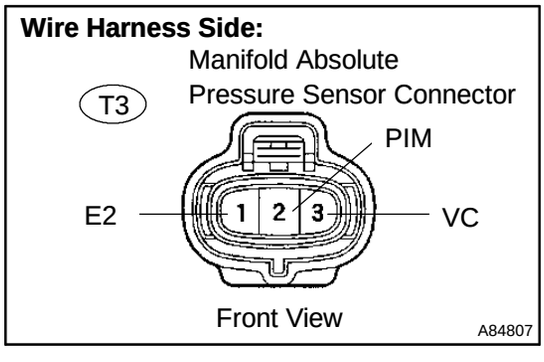
(c) Reinstall the engine coolant temperature sensor.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

18 CHECK HARNESS AND CONNECTOR(MANIFOLD ABSOLUTE PRESSURE SENSOR - ECM)



(a) Disconnect the T3 manifold absolute pressure sensor connector.

(b) Disconnect the E18 and E19 ECM connectors.

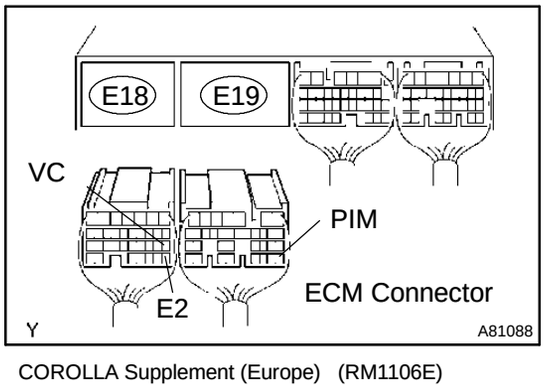
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PIM (T3-2) - PIM (E19-28)	Below 1 Ω
VC (T3-3) - VC (E18-18)	
E2 (T3-1) - E2 (E18-28)	

Standard (Check for short):

Tester Connection	Specified Condition
PIM (T3-2) or PIM (E19-28) - Body ground	10 kΩ higher
VC (T3-3) or VC (E18-18) - Body ground	
E2 (T3-1) or E2 (E18-28) - Body ground	



(d) Reconnect the manifold absolute pressure sensor connector.

(e) Reconnect the ECM connectors.

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

19 INSPECT CRANKSHAFT POSITION SENSOR

Component Side:



Crankshaft Position Sensor

A78431

(a) Disconnect the C4 crankshaft position sensor connector.

(b) Measure the resistance between terminals 1 and 2.

Standard:

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
	2,065 to 3,225 Ω at hot

HINT:

Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10° to 50°C (14° to 122°F). "Hot" means approximately 50° to 100°C (122° to 212°F).

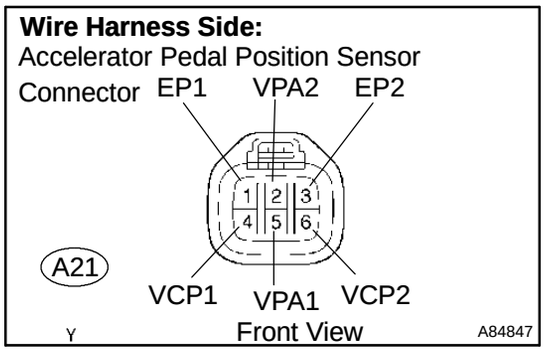
(c) Reconnect the crankshaft position sensor connector.

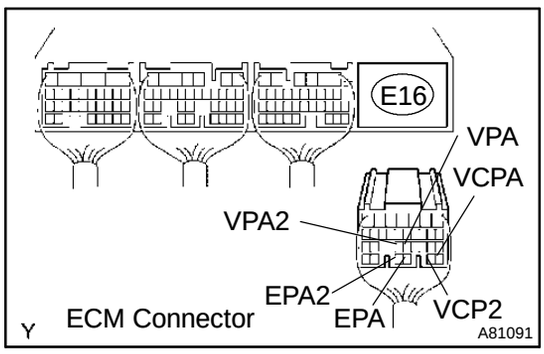
NG	REPLACE CRANKSHAFT POSITION SENSOR (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

20	CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)





(a) Disconnect the A21 accelerator pedal position sensor connector.

(b) Disconnect the E16 ECM connector.

(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A21-5) - VPA (E16-22)	Below 1 Ω
EP1 (A21-1) - EPA (E16-28)	
VCP1 (A21-4) - VCPA (E16-26)	
VPA2 (A21-2) - VPA2 (E16-23)	
EP2 (A21-3) - EPA2 (E16-29)	
VCP2 (A21-6) - VCP2 (E16-27)	

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A21-5) or VPA (E16-22) - Body ground	10 kΩ or higher
EP1 (A21-1) or EPA (E16-28) - Body ground	
VCP1 (A21-4) or VCPA (E16-26) - Body ground	
VPA2 (A21-2) or VPA2 (E16-23) - Body ground	
EP2 (A21-3) or EPA2 (E16-29) - Body ground	
VCP2 (A21-6) or VCP2 (E16-27) - Body ground	

(d) Reconnect the accelerator pedal position sensor connector.

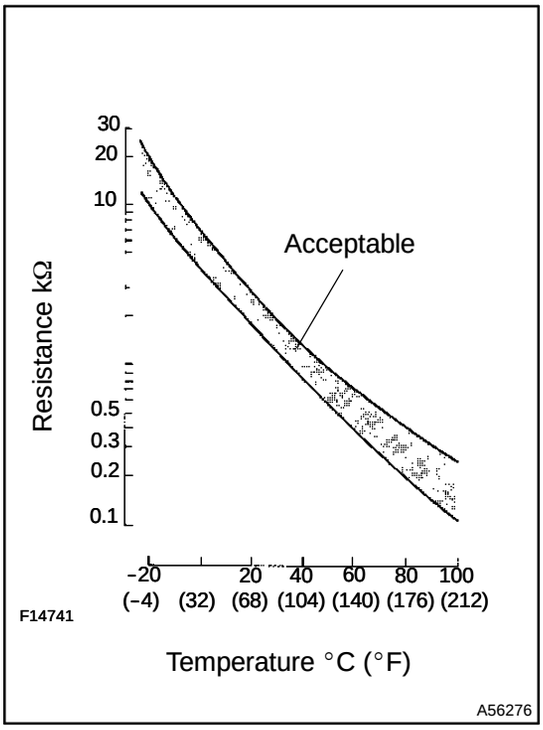
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ACCELERATOR PEDAL ASSY (ACCELERATOR PEDAL POSITION SENSOR)
(See page 10-14 of Pub. No. RM1039E COROLLA Supplement)

21 INSPECT DIESEL TURBO INLET AIR TENPERATURE SENSOR



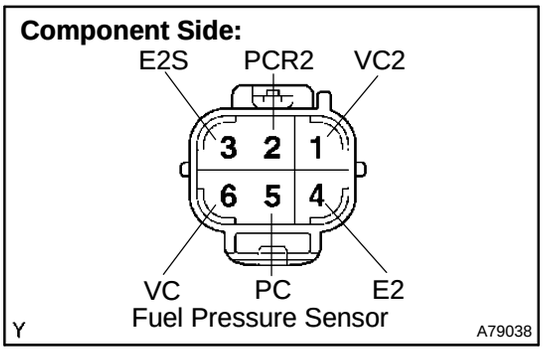
(a) Remove the diesel turbo inlet air temperature sensor.
(b) Measure the resistance between the terminals.
Standard:
2.21 to 2.65 kΩ at 20°C (68°F)
(c) Reinstall the diesel turbo inlet air temperature sensor.

NG → **REPLACE DIESEL TURBO INLET AIR TENPERATURE SENSOR**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

22 INSPECT COMMON RAIL ASSY(FUEL PRESSURE SENSOR)



(a) Disconnect the F13 fuel pressure sensor connector.
(b) Measure the resistance between each pair of the terminals of the fuel pressure sensor.
Standard:

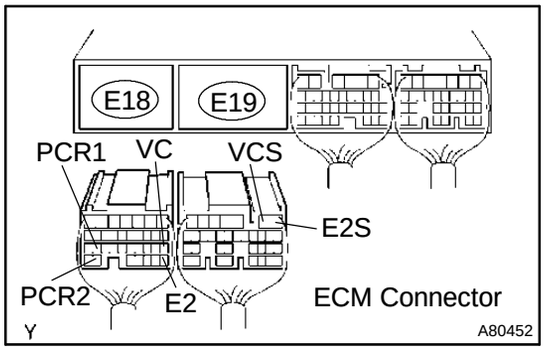
Tester Connection	Specified Condition
PC (F13-5) - E2 (F13-4)	16.4 kΩ or less
PCR2 (F13-2) - E2S (F13-3)	16.4 kΩ or less
PC (F13-5) - VC (F13-6)	3 kΩ or less
PCR2 (F13-2) - VC2 (F13-1)	3 kΩ or less

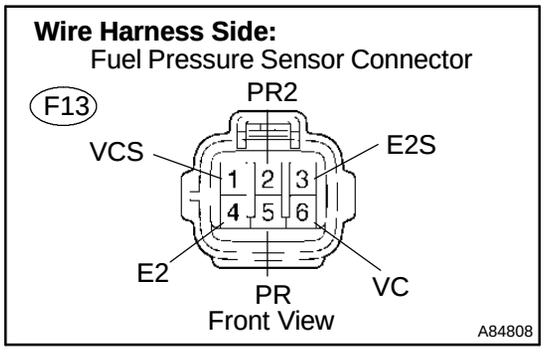
(c) Reconnect the fuel pressure sensor connector.

NG → **REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR)** **(See page 11-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

23	CHECK HARNESS AND CONNECTOR(FUEL PRESSURE SENSOR - ECM)





(a) Disconnect the E18 and E19 ECM connectors.
(b) Disconnect the F13 fuel pressure sensor connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
PCR1 (E18-26) - PR (F13-5)	Below 1 Ω
PCR2 (E18-33) - PR2 (F13-2)	
VCS (E19-2) - VCS (F13-1)	
VC (E18-18) - VC (F13-6)	
E2 (E18-28) - E2 (F13-4)	
E2S (E19-1) - E2S (F13-3)	

Standard (Check for short):

Tester Connection	Specified Condition
PCR1 (E18-26) or PR (F13-5) - Body ground	10 kΩ or higher
PCR2 (E18-33) or PR2 (F13-2) - Body ground	
VCS (E19-2) or VCS (F13-1) - Body ground	
VC (E18-18) or VC (F13-6) - Body ground	
E2 (E18-28) or E2 (F13-4) - Body ground	
E2S (E19-1) or E2S (F13-3) - Body ground	

(d) Reconnect the ECM connectors.
(e) Reconnect the fuel pressure sensor connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

24	REPLACE ECM (See page 10-8 of Pub. No. RM1039E COROLLA Supplement)

NG → **REPLACE INJECTION OR SUPPLY PUMP ASSY (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)**

OK

END

ROUGH IDLING OR EXCESSIVE ENGINE VIBRATIONS

HINT:
This troubleshooting procedure checks for rough idling and excessive engine vibrations.

CIRCUIT DESCRIPTION

Malfunction Condition	Main Trouble Areas	Related Trouble Areas
• Rough idling or juddering due to abnormal combustion • Juddering when vehicle starting due to clutch system malfunctions	(c) Injector malfunctions • Injector piston movement malfunction • Injector stuck closed • Injector stuck open • Deposit in injector • Malfunctions in injector circuit (d) Clutch system malfunctions • Clutch system (juddering when vehicle starting)	• Injector compensation code • Fuel leak • Engine mounting insulator • Intake air system leakage • Intake air system blockage • EGR system • Intake shutter system • Mass air flow meter • Supply pump • Pressure discharge valve • Fuel pressure sensor • Mass air flow meter • EDU (P0200 set simultaneously) • Low quality fuel • Vehicle modifications • ECM

HINT:

- Specified values in the following troubleshooting flowchart are for reference only. Variations in the Data List result values may occur depending on the measuring conditions or the vehicle's age. Do not judge the vehicle to be normal even when the Data List values indicate a standard level. There are possibly some concealed factors of the malfunction.
- Check that the vehicle has not been modified in any way prior to the vehicle inspection.

INSPECTION PROCEDURE

1 CHECK MALFUNCTION CONDITION

(a) Identify when rough idling or juddering occurs.
Result:

Driving Condition	Proceed To
When idling	A
When engaging engine clutch at vehicle start	B Clutch system judders

B → REPAIR OR REPLACE CLUTCH SYSTEM

A

2 CHECK WIRE HARNESS AND CONNECTOR IN ENGINE ROOM

(a) Check the wire harness and connector connections.
OK: The wire harnesses and connectors are connected securely.

NG → REPAIR OR REPLACE

OK

3	CHECK DTCS OUTPUT(RELATING TO PRESSURE DISCHARGE VALVE)

HINT:
Conduct the inspection below to detect malfunctions in the pressure discharge valve. If any of the DTCs relating to the pressure discharge valve are set, problem areas can be identified.

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Start the engine.
(d) Stop the engine and wait for at least 10 seconds.
(e) Repeat steps (a) and (b) described above (to allow the ECM to set pressure discharge valve malfunction DTCs).

NEXT

4	READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Turn the intelligent tester II ON.
(b) Select the following menu items: Powertrain / Engine and ECT / DTC.
(c) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

5	CHECK DTCS OUTPUT(RELATING TO FUEL SYSTEM AND INTAKE SYSTEM)

HINT:
Drive the vehicle according to the driving pattern below to allow the ECM to set DTCs relating to malfunctions of the fuel system, EGR system and intake shutter. If any of the DTCs are set, problem areas can be identified.

(a) Select the following menu items: CHECK MODE
(b) Fully warm up the engine.
(c) Allow the engine to idle for 5 minutes or more (to set DTCs relating to rough idling).
(d) Drive the vehicle at more than 40 km/h for 30 seconds or more.
(e) Decelerate and stop the vehicle.
(f) Repeat steps (d) and (e) 4 times or more.
(g) Stop the engine and wait for at least 10 seconds.
(h) Repeat steps (d) and (g) described above (to set DTCs relating to the EGR system and intake shutter).
(i) Drive the vehicle at more than 70 km/h for at least 1 minute (to set DTCs relating to the supply pump).

NEXT

6 READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Select the following menu items: Powertrain / Engine and ECT / DTC.
(b) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

7 PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(FUEL LEAK TEST)

HINT:
By performing this Active Test, the engine speed is maintained at 2,000 rpm and the common rail internal fuel pressure is raised to 135 MPa. As a result, a fuel leak check can be conducted, while retaining the high common rail pressure condition.

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel leak test.
(d) Visually check the supply pump, injector and fuel line located between the supply pump and common rail for fuel leaks. Also, perform the same check on the fuel line between the common rail and the injector (see page 11-15 of Pub. No. RM1039E COROLLA Supplement, see page 11-5 of Pub. No. RM1039E COROLLA Supplement).

HINT:
There may be fuel leaks inside the components, such as the supply pump.

OK: No leakage.

NG → **REPAIR OR REPLACE**

OK

8 READ VALUE USING INTELLINGENT TESTER II(MAF, PIM AND COMMON RAIL PRESSURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and warm it up and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the corresponding values displayed on the intelligent tester ll.
- PIM
- MAF
- Common Rail Pressure

Standard:

Item	Engine Speed *1	Standard Range	Proceed To	Description
PIM	Ignition switch ON (engine stopped)	Same as atmospheric pressure	• A (standard range) • B (both PIM and MAF outside standard range) • C (only PIM outside standard range)	Intake manifold internal pressure detected by intake pressure sensor
	Idling	92 to 102 kPa (690 to 765 mmHg, 27.17 to 30.13 in.Hg)		
	3,000 rpm (no engine load)	115 to 130 kPa (863 to 975 mmHg, 33.97 to 38.40 in.Hg)		
	3,000 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	3,500 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	4,000 rpm (driving with full throttle acceleration)	92 to 112 kPa (690 to 840 mmHg, 27.17 to 33.08 in.Hg)		
MAF *2	Ignition switch ON (engine stopped)	0 g/s	• A (standard range) • B (both PIM and MAF outside standard range) • D (only MAF outside standard range)	Intake air volume detected by mass air flow meter
	Idling	3 to 9 g/s		
	3,000 rpm (no engine load)	30 to 36 g/s		
	3,000 rpm (driving with full throttle acceleration)	95 to 115 g/s		
	3,500 rpm (driving with full throttle acceleration)	107 to 127 g/s		
	4,000 rpm (driving with full throttle acceleration)	110 to 130 g/s		
Common Rail Pressure	Idling	29 to 35 MPa	• A (standard range) • E (common rail pressure outside standard range)	Common rail internal fuel pressure
	2,000 rpm (no engine load)	37 to 70 MPa		
	3,000 rpm (no engine load)	50 to 72 MPa		
	3,000 rpm (driving with full throttle acceleration)	145 to 155 MPa		
	3,500 rpm (driving with full throttle acceleration)	152 to 162 MPa		
	4,000 rpm (driving with full throttle acceleration)	155 to 165 MPa		

HINT:
*1: The A/C switch and all accessory switches should be OFF with a fully warm engine.
*2: When the mass air flow meter malfunctions, the MAF output may deviate from the standard (referential) range when the engine idles and is accelerated from 3,000 to 4,000 rpm with full throttle acceleration.

B	**Go to step 14**
C	**GO TO DTC P0105, P0107 AND P0108 (RELATED TO MANIFOLD ABSOLUTE SENSOR) (See page 05-448)**
D	**GO TO DTC P0100, P0102 AND P0103 (RELATED TO MASS AIR FLOW METER) (See page 05-442)**

HINT:
Visual inspection of the mass air flow meter is effective.

E	**Go to step 27**

A

9	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Standard Range	Proceed To	Description
Revised Injection Volume #1	Idling	-3.0 to 3.0 mm^3	• A (standard range) • B (Revised Injection Volume and/or Injection Volume outside standard range)	Value of injector fuel injection volume compensates for differences in combustion condition of the each cylinders • Positive values indicate control which corrects combustion degradation • Negative values indicate control which corrects excessive combustion pressure • If problems exist, Revised Injection Volume may deviate from -3.0 mm and 3.0 mm range
Revised Injection Volume #2	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #3	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #4	Idling	-3.0 to 3.0 mm^3		
Injection Volume	Idling	4.0 to 7.0 mm^3		Fuel injection volume value controlled by the ECU • Based on NE signal, fuel temperature, engine coolant temperature, intake air temperature, boost pressure, atmospheric pressure, EGR volume, and MAF

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

B → **Go to step 17**

A

10	CHECK INJECTOR COMPENSATION CODE (See page 05-384)

HINT:
If the injector compensation code is not correctly registered, it may cause malfunctions (see page 05-363).

OK: The compensation codes of the installed injector and the ECM are the same.

NG → **REGISTER INJECTOR COMPENSATION CODE (See page 05-389)**

OK

11	CLEAR BATTERY

(a) Disconnect the negative battery terminal for at least 2 minutes.
(b) Reconnect the negative battery terminal.
(c) Check whether the malfunction has been successfully repaired by performing a driving test using the freeze frame data recorded at the time the malfunction occurred.
OK: Malfunction has been repaired successfully.

OK	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

NG

12	BASIC INSPECTION (See page 05-381)

(a) Check the fuel quality.
(b) Check the fuel for air.
(c) Check the fuel system for blockages.
(d) Check the air filter.
(e) Check the engine oil.
(f) Check the engine coolant.
(g) Check the engine idling speed and the maximum engine speed.
(h) Check the vacuum pump.
OK: Each inspection result is normal.

NG	REPAIR OR REPLACE

OK

13	CHECK ENGINE MOUNTING INSULATOR

(a) Visually check that the engine mounting insulator is installed correctly and is not crocked or twisted.
OK: No obnormalities.

NG	REPAIR OR REPLACE (See page 14-14 of Pub. No. RM1039E COROLLA Supplement)

OK

14	CHECK INTAKE AND EXHAUST SYSTEM

(a) Check for air leakage and any blockages between the air cleaner and the turbocharger.
(b) Check for air leakage and any blockages between the turbocharger and the intake manifold.
OK: No air leakage or blockages.

NG	REPAIR OR REPLACE

OK

15	CHECK EGR VALVE ASSY

HINT:
In this inspection, measure the Mass Air Flow (MAF) rate while idling with the EGR valve fully closed.
(a) Make sure the engine is not in operation.
(b) Disconnect the EGR valve connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Start the engine.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(g) Measure the MAF rate while idling.
Standard: MAF rate is between 10 g/s and 15 g/s.
HINT:
With the EGR valve connector disconnected, a DTC is set when turning the ignition switch to ON. Therefore, clear the DTC upon completion of the inspection above (see page 05-404).

NG → **REPAIR OR REPLACE (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

16	CHECK INTAKE SHUTTER ASSY(SEE REPAIR MANUAL FOR VISUAL AND OPERATIONAL INSPECTIONS) (See page 05-502)

OK: No malfunction.

OK → **Go to step 19**

NG

REPLACE MALFUNCTIONING CYLINDER INJECTOR
(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

17 IDENTIFY MALFUNCTIONING CYLINDER INJECTOR

(a) Follow the instructions in the table below according to the check result when using an intelligent tester II.

HINT:

This operation is based on the premise that the common rail pressure is normal.

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

Result:

Injection Volume / Revised Injection Volume #1 to #4	Less than 4.0 mm^3	Between 4.0 mm^3 and 7.0 mm^3 (Normal)	More than 7.0 mm^3
3.0 mm^3 or more, -3.0 mm^3 or less	A	B	B
Between -3.0 mm^3 and 3.0 mm^3	--	Normal	C*

Proceed To	Inspection Areas	Descriptions
A	Inspect and repair cylinder injector with revised injection volume of less than -3.0 mm^3: • Perform power balance inspection and identify malfunctioning cylinder. Replace the injector of malfunctioning cylinder	Abnormal value cylinder injector injects excessively large quantity of fuel
B	Identify malfunctioning cylinders by conducting power balance test: • Perform power balance inspection to identify malfunctioning cylinders • Clean malfunctioning cylinder injector, then check and repair it	Abnormal value cylinder injector injects excessively small quantity of fuel: • Fuel injection volume too low due to injector nozzle being blocked by deposits • Injector compression decreases Abnormal value cylinder injector injects excessively large quantity of fuel
C	Inspect and repair all cylinder injectors: • Clean all cylinder injectors, and then inspect and repair them	All cylinder injectors inject excessively small quantity of fuel: • Fuel injection volume too low due to all cylinder injector nozzles being blocked by deposits

*: When the Injection Volume displayed on the intelligent tester II is too large despite the Common Rail Pressure and Revised Injection Volume #1 to #4 in the Data List being normal, the injector may have a clogging malfunction. In this case, there may be deposits inside or outside the injector.

HINT:

- Despite the injector functioning normally, the indicated Revised Injection Volume #1 to #4 value may be outside the normal operating range due to compensation for other problems (such as low compression).
- Revised Injection Volume is the value used to correct the fuel injection volumes of each cylinder, in order to optimize (compensate for the unevenness between) all the cylinder combustion condition. If any of the cylinders malfunction, the fuel injection volumes for the normal cylinders are corrected simultaneously. As a result, the Revised Injection Volume may deviate from the standard range.

B	Go to step 19
C	Go to step 24

A

18	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTIONING CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

REPLACE INJECTOR OF MALFUNCTIONING CYLINDER
(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

19	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTION CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

20	CHECK CYLINDER COMPRESSION PRESSURE OF MALFUNCTION CYLINDER (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

OK: The cylinder compression pressure is normal.

NG	REPAIR OR REPLACE

OK

21	CHECK MALFUNCTIONING CYLINDER INJECTION FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.

Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER** **(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

A

22	CLEAN INJECTOR

NEXT

23	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the corresponding values displayed on the intelligent tester ll.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.
HINT:
When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER** **(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

END

24	CHECK ALL CYLINDER INJECTORS FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.

Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B → **REPLACE INJECTOR OF ALL CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

A

25	CLEAN INJECTOR

NEXT

26	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: If no idling conditions are specified, the A/C switch and all accessory switches should be OFF with a fully warm engine.

HINT:
When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF ALL CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

OK

END

27	**INSPECT SUPPLY PUMP ASSY** (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → **REPLACE SUPPLY PUMP ASSY** (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)

OK

28	**INSPECT FUEL PRESSURE SENSOR** (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → **REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR)** (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

OK

INSPECT COMMON RAIL ASSY (PRESSURE DISCHARGE VALVE) (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

LACK OF POWER OR HESITATION

HINT:
This troubleshooting procedure checks for the cause of an obvious lack of engine power (the vehicle speed does not reach the target speed in the high speed range) while the vehicle is being driven.

CIRCUIT DESCRIPTION

Malfunction Condition	Main Trouble Areas	Related Trouble Areas
• Lack of power caused by abnormal fuel injection volume (supply pump malfunction or injector malfunction) • Lack of power caused by intake air volume shortage (turbocharger malfunction, front exhaust pipe or exhaust manifold converter blocked)	(a) Injector malfunctions • Injector piston movement malfunction • Injector stuck closed • Injector stuck open • Deposits in injector • Injector circuit malfunction (b) Abnormal common rail pressure • Supply pump (c) Abnormal intake air volume • Turbocharger • Front exhaust pipe blockage • Exhaust manifold converter blockage	• Pressure discharge valve (P1271 set simultaneously) • Mass air flow meter • Intake air system leakage • Intake air system blockage • EGR system • Fuel filter element is clogged • Intake shutter system • Compression pressure • Injector compensation code • Fuel leak • Glow plug • Fuel pressure sensor • EDU (P0200 set simultaneously) • Vehicle modifications • Low quality fuel • Frozen fuel • ECM

HINT:

- Specified values in the following troubleshooting flowchart are for reference only. Variations in the Data List result values may occur depending on the measuring conditions or the vehicle's age. Do not judge the vehicle to be normal even when the Data List values indicate a standard level. There are possibly some concealed factors of the malfunction.
- Check that the vehicle has not been modified in any way prior to the vehicle inspection.

INSPECTION PROCEDURE

1	CHECK WIRE HARNESS AND CONNECTOR IN ENGINE ROOM

(a) Check the wire harness and connector connections.
OK: The wire harnesses and connectors are connected securely.

NG → **REPAIR OR REPLACE**

OK

2	CHECK DTCS OUTPUT(RELATING TO PRESSURE DISCHARGE VALVE)

HINT:
Conduct the inspection below to detect malfunctions in the pressure discharge valve. If any of the DTCs relating to the pressure discharge valve are set, problem areas can be identified.

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Start the engine.
(d) Stop the engine and wait for at least 10 seconds.
(e) Repeat steps (a) and (b) described above (to allow the ECM to set pressure discharge valve malfunction DTCs).

NEXT

3 READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Turn the intelligent tester ll ON.
(b) Select the following menu items: Powertrain / Engine and ECT / DTC.
(c) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page05-412)**

A

4 CHECK DTCS OUTPUT(RELATING TO FUEL SYSTEM AND INTAKE SYSTEM)

HINT:
Drive the vehicle according to the driving pattern below to allow the ECM to set DTCs relating to malfunctions of the fuel system, EGR system and intake shutter. If any of the DTCs are set, problem areas can be identified.

(a) Select the following menu items: CHECK MODE
(b) Fully warm up the engine.
(c) Allow the engine to idle for 5 minutes or more (to set DTCs relating to rough idling).
(d) Drive the vehicle at more than 40 km/h for 30 seconds or more.
(e) Decelerate and stop the vehicle.
(f) Repeat steps (d) and (e) 4 times or more.
(g) Stop the engine and wait for at least 10 seconds.
(h) Repeat steps (d) and (g) described above (to set DTCs relating to the EGR system and intake shutter).
(i) Drive the vehicle at more than 70 km/h for at least 1 minute (to set DTCs relating to the supply pump).

NEXT

5 READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Select the following menu items: Powertrain / Engine and ECT / DTC.
(b) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

6	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(FUEL LEAK TEST)

HINT:
By performing this Active Test, the engine speed is maintained at 2,000 rpm and the common rail internal fuel pressure is raised to 135 MPa. As a result, a fuel leak check can be conducted, while retaining the high common rail pressure condition.

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel leak test.
(d) Visually check the supply pump, injector and fuel line located between the supply pump and common rail for fuel leaks. Also, perform the same check on the fuel line between the common rail and the injector (see page 11-15 of Pub. No. RM1039E COROLLA Supplement, see page 11-5 of Pub. No. RM1039E COROLLA Supplement).

HINT:
There may be fuel leaks inside the components, such as the supply pump.

OK: No leakage.

NG → **REPAIR OR REPLACE**

OK

7	CHECK WHITE SMOKE

(a) Rev up the engine from an idling speed to 3,000 rpm several times to check whether white smoke is emitted from the exhaust pipe.
(b) Check that the intake system pipes and hoses are not excessively contaminated with oil.

HINT:
If the presence of white smoke in the exhaust gas is confirmed, there is a high possibility of mechanical problems in the turbocharger or engine.

Result	Proceed To
None of problems described below	A
White smoke emitted, or intake system pipes and hoses excessively contaminated with oil	B

B → **Go to step 30**

A

8 READ VALUE USING INTELLINGENT TESTER II(MAF, PIM AND COMMON RAIL PRESSURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and warm it up and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the corresponding values displayed on the intelligent tester ll.
- PIM
- MAF
- Common Rail Pressure

Standard:

Item	Engine Speed *1	Standard Range	Proceed To	Description
PIM	Ignition switch ON (engine stopped)	Same as atmospheric pressure	• A (standard range) • B (both PIM and MAF outside standard range) • C (only PIM outside standard range)	Intake manifold internal pressure detected by intake pressure sensor
	Idling	92 to 102 kPa (690 to 765 mmHg, 27.17 to 30.13 in.Hg)		
	3,000 rpm (no engine load)	115 to 130 kPa (863 to 975 mmHg, 33.97 to 38.40 in.Hg)		
	3,000 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	3,500 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	4,000 rpm (driving with full throttle acceleration)	92 to 112 kPa (690 to 840 mmHg, 27.17 to 33.08 in.Hg)		
MAF *2	Ignition switch ON (engine stopped)	0 g/s	• A (standard range) • B (both PIM and MAF outside standard range) • D (only MAF outside standard range)	Intake air volume detected by mass air flow meter
	Idling	3 to 9 g/s		
	3,000 rpm (no engine load)	30 to 36 g/s		
	3,000 rpm (driving with full throttle acceleration)	95 to 115 g/s		
	3,500 rpm (driving with full throttle acceleration)	107 to 127 g/s		
	4,000 rpm (driving with full throttle acceleration)	110 to 130 g/s		
Common Rail Pressure	Idling	29 to 35 MPa	• A (standard range) • E (common rail pressure outside standard range)	Common rail internal fuel pressure
	2,000 rpm (no engine load)	37 to 70 MPa		
	3,000 rpm (no engine load)	50 to 72 MPa		
	3,000 rpm (driving with full throttle acceleration)	145 to 155 MPa		
	3,500 rpm (driving with full throttle acceleration)	152 to 162 MPa		
	4,000 rpm (driving with full throttle acceleration)	155 to 165 MPa		

HINT:
*1: The A/C switch and all accessory switches should be OFF with a fully warm engine.
*2: When the mass air flow meter malfunctions, the MAF output may deviate from the standard (referential) range when the engine idles and is accelerated from 3,000 to 4,000 rpm with full throttle acceleration.

B	**Go to step 31**
C	**GO TO DTC P0105, P0107 AND P0108 (RELATED TO MANIFOLD ABSOLUTE SENSOR) (See page 05-448)**
D	**GO TO DTC P0100, P0102 AND P0103 (RELATED TO MASS AIR FLOW METER) (See page 05-442)**

HINT:
Visual inspection of the mass air flow meter is effective.

E	**Go to step 38**

A

9	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Standard Range	Proceed To	Description
Revised Injection Volume #1	Idling	-3.0 to 3.0 mm^3	• A (standard range) • B (Revised Injection Volume and/or Injection Volume outside standard range)	Value of injector fuel injection volume compensates for differences in combustion condition of the each cylinders • Positive values indicate control which corrects combustion degradation • Negative values indicate control which corrects excessive combustion pressure • If problems exist, Revised Injection Volume may deviate from -3.0 mm and 3.0 mm range
Revised Injection Volume #2	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #3	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #4	Idling	-3.0 to 3.0 mm^3		
Injection Volume	Idling	4.0 to 7.0 mm^3		Fuel injection volume value controlled by the ECU • Based on NE signal, fuel temperature, engine coolant temperature, intake air temperature, boost pressure, atmospheric pressure, EGR volume, and MAF

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

B → **Go to step 17**

A

10	CHECK INJECTOR COMPENSATION CODE (See page 05-384)

HINT:
If the injector compensation code is not correctly registered, it may cause malfunctions (see page 05-363).

OK: The compensation codes of the installed injector and the ECM are the same.

NG → **REGISTER INJECTOR COMPENSATION CODE (See page 05-389)**

OK

11	CLEAR BATTERY

(a) Disconnect the negative battery terminal for at least 2 minutes.
(b) Reconnect the negative battery terminal.
(c) Check whether the malfunction has been successfully repaired by performing a driving test using the freeze frame data recorded at the time the malfunction occurred.
OK: Malfunction has been repaired successfully.

OK	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

NG

12	BLEED AIR FROM FUEL SYSTEM

(a) Pump the priming pump until it cannot be pumped any more, to bleed the air.

NEXT

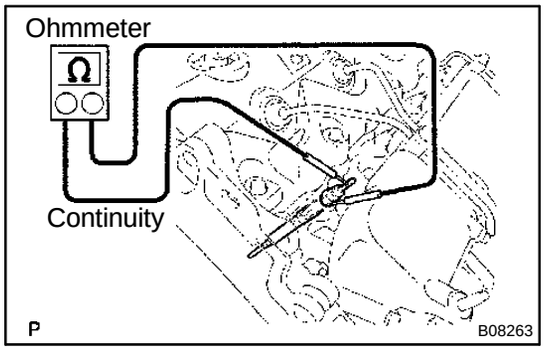
13	CONFIRM WHETHER LACK OF POWER HAS BEEN SUCCESSFULLY REPAIRED

(a) Check whether the lack of power has been successfully repaired by performing a driving test.
OK: Lack of power has been repaired successfully.

OK	END

NG

14 INSPECT GLOW PLUG ASSY



(a) Disconnect the glow plug wire.
(b) Measure the glow plug resistance.
(c) Check other grow plugs in the same way.
Standard:

Tester Connection	Specified Condition
Glow plug terminal - Body ground	Approximately 1.1 Ω at 20°C (68°F)

HINT:
- If all the grow plugs have an open malfunction, DTC P0380 is set.
- If any one of the glow plugs has an open malfunction, the engine power is insufficient only when the engine is cold.

NOTICE:
- **Exercise extreme care not to damage the glow plug pipes. Damaging them could cause an open circuit, or shorten the life of the glow plugs.**
- **Keep the glow plug free of oil and fuel while cleaning.**
- **Wipe any oil off the terminal and Bakelite washer with a clean-dry cloth during inspection.**
- **Do not apply more than 11 V to the glow plug as it could cause an open circuit.**

(d) Reconnect the glow plug wire.

NG → **REPAIR OR REPLACE**

OK

15 BASIC INSPECTION (See page 05-381)

(a) Check the fuel quality.
(b) Check the fuel for air.
(c) Check the fuel system for blockages.
(d) Check the air filter.
(e) Check the engine oil.
(f) Check the engine coolant.
(g) Check the engine idling speed and the maximum engine speed.
(h) Check the vacuum pump.
OK: Each inspection result is normal.

NG → **REPAIR OR REPLACE**

OK

16	CHECK INTAKE AND EXHAUST SYSTEM

(a) Check for air leakage and any blockages between the air cleaner and the turbocharger.
(b) Check for air leakage and any blockages between the turbocharger and the intake manifold.
OK: No malfunctions.

NEXT

END

17 IDENTIFY MALFUNCTIONING CYLINDER INJECTOR

(a) Follow the instructions in the table below according to the check result when using an intelligent tester II.

HINT:

This operation is based on the premise that the common rail pressure is normal.

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

Result:

Injection Volume / Revised Injection Volume #1 to #4	Less than 4.0 mm^3	Between 4.0 mm^3 and 7.0 mm^3 (Normal)	More than 7.0 mm^3
3.0 mm^3 or more, -3.0 mm^3 or less	A	B	B
Between -3.0 mm^3 and 3.0 mm^3	--	Normal	C*

Proceed To	Inspection Areas	Descriptions
A	Inspect and repair cylinder injector with revised injection volume of less than -3.0 mm^3: • Perform power balance inspection and identify malfunctioning cylinder. Replace the injector of malfunctioning cylinder	Abnormal value cylinder injector injects excessively large quantity of fuel
B	Identify malfunctioning cylinders by conducting power balance test: • Perform power balance inspection to identify malfunctioning cylinders • Clean malfunctioning cylinder injector, then check and repair it	Abnormal value cylinder injector injects excessively small quantity of fuel: • Fuel injection volume too low due to injector nozzle being blocked by deposits • Injector compression decreases Abnormal value cylinder injector injects excessively large quantity of fuel
C	Inspect and repair all cylinder injectors: • Clean all cylinder injectors, and then inspect and repair them	All cylinder injectors inject excessively small quantity of fuel: • Fuel injection volume too low due to all cylinder injector nozzles being blocked by deposits

*: When the Injection Volume displayed on the intelligent tester II is too large despite the Common Rail Pressure and Revised Injection Volume #1 to #4 in the Data List being normal, the injector may have a clogging malfunction. In this case, there may be deposits inside or outside the injector.

HINT:

- Despite the injector functioning normally, the indicated Revised Injection Volume #1 to #4 value may be outside the normal operating range due to compensation for other problems (such as low compression).
- Revised Injection Volume is the value used to correct the fuel injection volumes of each cylinder, in order to optimize (compensate for the unevenness between) all the cylinder combustion condition. If any of the cylinders malfunction, the fuel injection volumes for the normal cylinders are corrected simultaneously. As a result, the Revised Injection Volume may deviate from the standard range.

B	Go to step 19
C	Go to step 24

A

18	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTIONING CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

REPLACE MALFUNCTIONING CYLINDER INJECTOR
(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

19	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTION CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

20	CHECK CYLINDER COMPRESSION PRESSURE OF MALFUNCTION CYLINDER (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

OK: The cylinder compression pressure is normal.

NG	REPAIR OR REPLACE

OK

21	CHECK MALFUNCTIONING CYLINDER INJECTION FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.

Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

A

22	CLEAN INJECTOR

NEXT

23	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the values displayed on the intelligent tester ll respectively.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.
HINT:
When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

OK

END

24	CHECK ALL CYLINDER INJECTORS FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.

Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B → **REPLACE INJECTOR OF ALL CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

A

25	CLEAN INJECTOR

NEXT

26	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the values displayed on the intelligent tester ll respectively.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

HINT:
When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF ALL CYLINDER**

OK

END

27	CHECK EGR VALVE ASSY

HINT:
In this inspection, measure the Mass Air Flow (MAF) rate while idling with the EGR valve fully closed.
(a) Make sure the engine is not in operation.
(b) Disconnect the EGR valve connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Start the engine.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(g) Measure the MAF rate while idling.
Standard: MAF rate is between 10 g/s and 15 g/s.
HINT:
With the EGR valve connector disconnected, a DTC is set when the ignition switch is turned to ON. Therefore, clear the DTC upon completion of the above inspection (see page).

NG → **REPAIR OR REPLACE EGR VALVE ASSY (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

28	CHECK INTAKE SHUTTER ASSY(SEE REPAIR MANUAL FOR VISUAL AND OPERATIONAL INSPECTIONS) (See page 05-502)

OK: No malfunction.

NG → **REPAIR OR REPLACE (See page 10-29 of Pub. No. RM925E COROLLA)**

OK

29	CHECK INTAKE AND EXHAUST SYSTEM

(a) Check for air leakage and any blockages between the air cleaner and the turbocharger.
(b) Check for air leakage and any blockages between the turbocharger and the intake manifold.
OK: No malfunction.

NG → **REPAIR OR REPLACE**

OK

30	CHECK TURBOCHARGER SUB-ASSY(MECHANICAL PROBLEM) (See page 13-1 of Pub. No. RM1039E COROLLA Supplement)

(a) Disconnect the air cleaner hose.
(b) Use a mirror to visually check the turbocharger for any mechanical problems.
(c) When the engine is cold, check that the impellor of the turbocharger rotates smoothly, and confirm whether there is any damage to it.
OK: No problem.

NG → REPAIR OR REPLACE

OK

31	CHECK VACUUM HOSE CONNECTIONS(TURBOCHARGER - VRV FOR TURBOCHARGER - VACUUM PUMP)

(a) Check that the vacuum hoses are installed correctly.
(b) Check the vacuum hoses for any cracks and damage.
(c) Check the vacuum hoses for air leaks and any blockage.

OK: The vacuum hoses are appropriately connected to each other.

NG → REPAIR OR REPLACE VACUUM HOSES

OK

32	INSPECT VACUUM REGULATING VALVE ASSY

(a) Measure the negative pressure (vacuum) applied to the actuator using a vacuum gauge.

Standard:

Engine Speed *	Specified Conditions
3200 to 3300 rpm	Negative pressure decreases in reverse proportion to engine speed

Reference:

Engine Speed *	Specified Conditions
Idling	-51 to -56 kPa (-383 to -420 mmHg, -15.06 to -16.54 in.Hg)
1,000 rpm	-51 to -56 kPa (-383 to -420 mmHg, -15.06 to -16.54 in.Hg)
2,000 rpm	-51 to -56 kPa (-383 to -420 mmHg, -15.06 to -16.54 in.Hg)
3,000 rpm	-44 to -56 kPa (-330 to -420 mmHg, -12.00 to -16.54 in.Hg)
3,200 rpm	-44 to -56 kPa (-330 to -420 mmHg, -12.00 to -16.54 in.Hg)
3,400 rpm	-36 to -56 kPa (-270 to -420 mmHg, -10.63 to -16.54 in.Hg)
3,600 rpm	-31 to -56 kPa (-233 to -420 mmHg, -9.156 to -16.54 in.Hg)
4,000 rpm	-26 to -56 kPa (-195 to -420 mmHg, -7.68 to -16.54 in.Hg)

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

HINT:

The negative pressure values listed in the table above are for reference only. Those values stated are based on the average atmospheric pressure. Therefore, when measurement is taken at high altitude or under low atmospheric pressure condition, results are lower than the stated values.

Standard: The vacuum regulating valve is within the standard range.

NG → REPLACE VACUUM REGULATING VALVE ASSY

OK

33 INSPECT TURBOCHARGER ACTUATOR

(a) Apply a high negative pressure (minimum: -60 kPa) to the turbocharger actuator using a MITYVAC.
(b) Allow the negative pressure in the actuator to decreases gradually.
(c) Measure the turbocharger actuator stroke from the initial position of the actuator rod.

Result:

Apply pressure	-48 to -53.4 kPa (-360 to -401 mmHg, -14.18 to -15.77 in.Hg)	-26.7 to -34.7 kPa (-200 to -260 mmHg, -7.89 to -10.25 in.Hg)	-4.5 to -15.2 kPa (-33 to -114 mmHg, -1.33 to -4.49 in.Hg)
Strokes	0.20 mm (0.008 in.)	5.0 mm (0.197 in.)	10.0 mm (0.394 in.)
Vane Positions	Fully closed	Half open	Fully open

Standard: The turbocharger actuator stroke is standard level.

NG → **REPLACE TURBOCHARGER SUB-ASSY (See page 13-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

34 REPLACE EXHAUST PIPE ASSY FRONT(PARTS NO. 17410-0G070)

NEXT

35 CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and warm it up and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- PIM
- MAF

Standard:

Item	Engine Speed *	Reference Value
PIM	3,000 rpm (full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)
	3,500 rpm (full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)
	4,000 rpm (full throttle acceleration)	92 to 112 kPa (690 to 840 mmHg, 27.17 to 33.08 in.Hg)
MAF	3,000 rpm (full throttle acceleration)	95 to 115 g/s
	3,500 rpm (full throttle acceleration)	107 to 127 g/s
	4,000 rpm (full throttle acceleration)	110 to 130 g/s

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

OK: The values are within the standard range.

OK → **END**

NG

36	REPLACE EXHAUST MANIFOLD CONVERTER SUB-ASSY(PARTS NO. 25051-27061)

NEXT

37	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester ll to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Start the engine and warm it up.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List.
(e) Select the following menu items in order and read the corresponding values displayed on the intelligent tester ll.
- PIM
- MAF

Standard:

Item	Engine Speed *	Reference Value
PIM	3,000 rpm (full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)
	3,500 rpm (full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)
	4,000 rpm (full throttle acceleration)	92 to 112 kPa (690 to 840 mmHg, 27.17 to 33.08 in.Hg)
MAF	3,000 rpm (full throttle acceleration)	95 to 115 g/s
	3,500 rpm (full throttle acceleration)	107 to 127 g/s
	4,000 rpm (full throttle acceleration)	110 to 130 g/s

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

OK: The values are within the standard range.

OK → END

NG

REPLACE TURBOCHARGER SUB-ASSY
(See page 13-5 of Pub. No. RM1039E COROLLA Supplement)

38	CHECK AND REPLACE FUEL FILTER ELEMENT

NEXT

39	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and warm it up and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- Common Rail Pressure

Standard:

Item	Engine Speed *	Reference Value
Common Rail Pressure	Idling	29 to 35 MPa
	2,000 rpm (no engine load)	37 to 70 MPa
	3,000 rpm (no engine load)	50 to 72 MPa
	3,000 rpm (full throttle acceleration)	145 to 155 MPa
	3,500 rpm (full throttle acceleration)	152 to 162 MPa
	4,000 rpm (full throttle acceleration)	155 to 165 MPa

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

OK: The values are within the standard range.

OK → END

NG

40	INSPECT SUPPLY PUMP ASSY (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE SUPPLY PUMP ASSY (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)

OK

41	INSPECT FUEL PRESSURE SENSOR (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

OK

INSPECT COMMON RAIL ASSY (PRESSURE DISCHARGE VALVE)
(See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

ENGINE KNOCKING OR RATTLING

HINT:

- This troubleshooting procedure checks for knocking and rattling.
- Knocking is most likely to occur while the engine is idling.

CIRCUIT DESCRIPTION

Malfunction Condition	Main Trouble Areas	Related Trouble Areas
• Knocking and abnormal sound due to extremely rich combustion • Abnormal sound due to friction between parts	(a) Injector malfunctions • Injector piston movement malfunction • Injector stuck closed • Injector stuck open • Deposits in injector • Injector circuit malfunction (b) Abnormal common rail pressure • Supply pump • Fuel pulsation sound • Air in fuel (c) Friction between parts (d) Compression pressure	• Injector compensation codes • Fuel leakage • Intake air system leakage • Intake air system blockage • EGR system • Intake shutter system • Fuel pressure sensor • Manifold absolute pressure sensor • Mass air flow meter • Atmosphere air pressure sensor (built into ECM) • Mass air flow meter • Vehicle modifications • Low quality fuel • Lack of fuel • ECM

HINT:

- Specified values in the following troubleshooting flowchart are for reference only. Variations in the Data List result values may occur depending on the measuring conditions or the vehicle's age. Do not judge the vehicle to be normal even when the Data List values indicate a standard level. There are possibly some concealed factors of the malfunction.
- Check that the vehicle has not been modified in any way prior to the vehicle inspection.

INSPECTION PROCEDURE

1 CHECK SOUND AREA

(a) Find source of the abnormal sound using a mechanic's stethoscope.

Result	Proceed To
Sound from supply pump or knocking	A
Sound from parts other than supply pump	B

B → **REPAIR OR REPLACE**

A

2 CHECK WIRE HARNESS AND CONNECTOR IN ENGINE ROOM

(a) Check the wire harness and connector connections.
OK: The wire harnesses and connectors are connected securely.

NG → **REPAIR OR REPLACE**

OK

3 CHECK DTCS OUTPUT(RELATING TO PRESSURE DISCHARGE VALVE)

HINT:
Conduct the inspection below to detect malfunctions in the pressure discharge valve. If any of the DTCs relating to the pressure discharge valve are set, problem areas can be identified.

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON.
(c) Start the engine.
(d) Stop the engine and wait for at least 10 seconds.
(e) Repeat steps (a) and (b) described above (to allow the ECM to set pressure discharge valve malfunction DTCs).

NEXT

4 READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Turn the intelligent tester II ON.
(b) Select the following menu items: Powertrain / Engine and ECT / DTC.
(c) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

5 CHECK DTCS OUTPUT(RELATING TO FUEL SYSTEM AND INTAKE SYSTEM)

HINT:
Drive the vehicle according to the driving pattern below to allow the ECM to set DTCs relating to malfunctions of the fuel system, EGR system and intake shutter. If any of the DTCs are set, problem areas can be identified.

(a) Select the following menu items: CHECK MODE
(b) Fully warm up the engine.
(c) Allow the engine to idle for 5 minutes or more (to set DTCs relating to rough idling).
(d) Drive the vehicle at more than 40 km/h for 30 seconds or more.
(e) Decelerate and stop the vehicle.
(f) Repeat steps (d) and (e) 4 times or more.
(g) Stop the engine and wait for at least 10 seconds.
(h) Repeat steps (d) and (g) described above (to set DTCs relating to the EGR system and intake shutter).
(i) Drive the vehicle at more than 70 km/h for at least 1 minute (to set DTCs relating to the supply pump).

NEXT

6	READ OUTPUT DTCS(RELATING TO ENGINE)

(a) Select the following menu items: Powertrain / Engine and ECT / DTC.
(b) Read pending DTCs.

Result:

Display (DTC Output)	Proceed To
No DTCs (See page 05-412)	A
Engine related DTCs (See page 05-412)	B

B → **REPAIR OR REPLACE ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT (See page 05-412)**

A

7	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(FUEL LEAK TEST)

HINT:
By performing this Active Test, the engine speed is maintained at 2,000 rpm and the common rail internal fuel pressure is raised to 135 MPa. As a result, a fuel leak check can be conducted, while retaining the high common rail pressure condition.

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Fuel leak test.
(d) Visually check the supply pump, injector and fuel line located between the supply pump and common rail for fuel leaks. Also, perform the same check on the fuel line between the common rail and the injector (see page 11-15 of Pub. No. RM1039E COROLLA Supplement, see page 11-5 of Pub. No. RM1039E COROLLA Supplement).

HINT:
There may be fuel leaks inside the components, such as the supply pump.

OK: No leakage.

NG → **REPAIR OR REPLACE**

OK

8 READ VALUE USING INTELLINGENT TESTER II(MAF, PIM AND COMMON RAIL PRESSURE)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and warm it up and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List.
(d) Select the following menu items in order and read the corresponding values displayed on the intelligent tester ll.
- PIM
- MAF
- Common Rail Pressure

Standard:

Item	Engine Speed *1	Standard Range	Proceed To	Description
PIM	Ignition switch ON (engine stopped)	Same as atmospheric pressure	• A (standard range) • B (both PIM and MAF outside standard range) • C (only PIM outside standard range)	Intake manifold internal pressure detected by intake pressure sensor
	Idling	92 to 102 kPa (690 to 765 mmHg, 27.17 to 30.13 in.Hg)		
	3,000 rpm (no engine load)	115 to 130 kPa (863 to 975 mmHg, 33.97 to 38.40 in.Hg)		
	3,000 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	3,500 rpm (driving with full throttle acceleration)	202 to 222 kPa (1,515 to 1,665 mmHg, 59.66 to 65.57 in.Hg)		
	4,000 rpm (driving with full throttle acceleration)	92 to 112 kPa (690 to 840 mmHg, 27.17 to 33.08 in.Hg)		
MAF *2	Ignition switch ON (engine stopped)	0 g/s	• A (standard range) • B (both PIM and MAF outside standard range) • D (only MAF outside standard range)	Intake air volume detected by mass air flow meter
	Idling	3 to 9 g/s		
	3,000 rpm (no engine load)	30 to 36 g/s		
	3,000 rpm (driving with full throttle acceleration)	95 to 115 g/s		
	3,500 rpm (driving with full throttle acceleration)	107 to 127 g/s		
	4,000 rpm (driving with full throttle acceleration)	110 to 130 g/s		
Common Rail Pressure	Idling	29 to 35 MPa	• A (standard range) • E (common rail pressure outside standard range)	Common rail internal fuel pressure
	2,000 rpm (no engine load)	37 to 70 MPa		
	3,000 rpm (no engine load)	50 to 72 MPa		
	3,000 rpm (driving with full throttle acceleration)	145 to 155 MPa		
	3,500 rpm (driving with full throttle acceleration)	152 to 162 MPa		
	4,000 rpm (driving with full throttle acceleration)	155 to 165 MPa		

HINT:
*1: The A/C switch and all accessory switches should be OFF with a fully warm engine.
*2: When the mass air flow meter malfunctions, the MAF output may deviate from the standard (referential) range when the engine idles and is accelerated from 3,000 to 4,000 rpm with full throttle acceleration.

B	**Go to step 13**
C	**GO TO DTC P0105, P0107 AND P0108 (RELATED TO MANIFOLD ABSOLUTE SENSOR) (See page 05-448)**
D	**GO TO DTC P0100, P0102 AND P0103 (RELATED TO MASS AIR FLOW METER) (See page 05-442)**

HINT:
Visual inspection of the mass air flow meter is effective.

E	**Go to step 30**

A

9	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Select the following menu items in order and read the corresponding values displayed on the intelligent tester II.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Standard Range	Proceed To	Description
Revised Injection Volume #1	Idling	-3.0 to 3.0 mm^3	• A (standard range) • B (Revised Injection Volume and/or Injection Volume outside standard range)	Value of injector fuel injection volume compensates for differences in combustion condition of the each cylinders • Positive values indicate control which corrects combustion degradation • Negative values indicate control which corrects excessive combustion pressure • If problems exist, Revised Injection Volume may deviate from -3.0 mm and 3.0 mm range
Revised Injection Volume #2	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #3	Idling	-3.0 to 3.0 mm^3		
Revised Injection Volume #4	Idling	-3.0 to 3.0 mm^3		
Injection Volume	Idling	4.0 to 7.0 mm^3		Fuel injection volume value controlled by the ECU • Based on NE signal, fuel temperature, engine coolant temperature, intake air temperature, boost pressure, atmospheric pressure, EGR volume, and MAF

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

B → **Go to step 22**

A

10	CHECK INJECTOR COMPENSATION CODE (See page 05-384)

HINT:
If the injector compensation code is not correctly registered, it may cause malfunctions (see page 05-363).

OK: The compensation codes of the installed injector and the ECM are the same.

NG → **REGISTER INJECTOR COMPENSATION CODE (See page 05-389)**

OK

11	CLEAR BATTERY

(a) Disconnect the negative battery terminal for at least 2 minutes.
(b) Reconnect the negative battery terminal.
(c) Check whether the malfunction has been successfully repaired by performing a driving test using the freeze frame data recorded at the time the malfunction occurred.
OK: Malfunction has been repaired successfully.

OK	CHECK FOR INTERMITTENT PROBLEMS (See page 05-380)

NG

12	BASIC INSPECTION (See page 05-381)

(a) Check the fuel quality.
(b) Check the fuel for air.
(c) Check the fuel system for blockages.
(d) Check the air filter.
(e) Check the engine oil.
(f) Check the engine coolant.
(g) Check the engine idling speed and the maximum engine speed.
(h) Check the vacuum pump.
OK: Each inspection result is normal.

NG	REPAIR OR REPLACE

OK

13	CHECK INTAKE AND EXHAUST SYSTEM

(a) Check for air leakage and any blockages between the air cleaner and the turbocharger.
(b) Check for air leakage and any blockages between the turbocharger and the intake manifold.
OK: No air leakage or blockages.

NG	REPAIR OR REPLACE

OK

14	CHECK EGR VALVE ASSY

HINT:
In this inspection, measure the Mass Air Flow (MAF) rate while idling with the EGR valve fully closed.
(a) Make sure the engine is not in operation.
(b) Disconnect the EGR valve connector.
(c) Connect the intelligent tester ll to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Start the engine.
(f) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(g) Measure the MAF rate while idling.
Standard: MAF rate is between 10 g/s and 15 g/s.
HINT:
With the EGR valve connector disconnected, a DTC is set when the ignition switch is turned to ON. Therefore, clear the DTC upon completion of the above inspection (see page 05-404).

NG → **REPAIR OR REPLACE (See page 14-24 of Pub. No. RM1039E COROLLA Supplement)**

OK

15	INSPECT INTAKE SHUTTER ASSY(SEE REPAIR MANUAL FOR VISUAL AND OPERATIONAL INSPECTIONS) (See page 05-502)

OK: No malfunction.

NG → **REPAIR OR REPLACE (See page 10-29 of Pub. No. RM925E COROLLA)**

OK

16	CHECK COMBUSTION SOUND

(a) Confirm type of sound emitted.

Result	Proceed To
Knocking	A
Mechanical sound, other than knocking	B

B → **Go to step 27**

A

17	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTION CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

18	CHECK CYLINDER COMPRESSION PRESSURE OF MALFUNCTION CYLINDER (See page 14-1 of Pub. No. RM1039E COROLLA Supplement)

OK: The cylinder compression pressure is normal.

NG → **REPAIR OR REPLACE**

OK

19	CHECK MALFUNCTIONING CYLINDER INJECTION FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.

Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

A

20	CLEAN INJECTOR

NEXT

21	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the values displayed on the intelligent tester ll respectively.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

HINT:

When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF MALFUNCTIONING CYLINDER** **(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

OK

END

22 IDENTIFY MALFUNCTIONING CYLINDER INJECTOR

(a) Follow the instructions in the table below according to the check result when using an intelligent tester II.

HINT:

This operation is based on the premise that the common rail pressure is normal.

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.

Result:

Revised Injection Volume #1 to #4 \ Injection Volume	Less than 4.0 mm^3	Between 4.0 mm^3 and 7.0 mm^3 (Normal)	More than 7.0 mm^3
3.0 mm^3 or more, -3.0 mm^3 or less	A	B	B
Between -3.0 mm^3 and 3.0 mm^3	--	Normal	C*

Proceed To	Inspection Areas	Descriptions
A	Inspect and repair cylinder injector with revised injection volume of less than -3.0 mm^3: • Perform power balance inspection and identify malfunctioning cylinder. Replace the injector of malfunctioning cylinder	Abnormal value cylinder injector injects excessively large quantity of fuel
B	Identify malfunctioning cylinders by conducting power balance test: • Perform power balance inspection to identify malfunctioning cylinders • Clean malfunctioning cylinder injector, then check and repair it	Abnormal value cylinder injector injects excessively small quantity of fuel: • Fuel injection volume too low due to injector nozzle being blocked by deposits • Injector compression decreases Abnormal value cylinder injector injects excessively large quantity of fuel
C	Inspect and repair all cylinder injectors: • Clean all cylinder injectors, and then inspect and repair them	All cylinder injectors inject excessively small quantity of fuel: • Fuel injection volume too low due to all cylinder injector nozzles being blocked by deposits

*: When the Injection Volume displayed on the intelligent tester II is too large despite the Common Rail Pressure and Revised Injection Volume #1 to #4 in the Data List being normal, the injector may have a clogging malfunction. In this case, there may be deposits inside or outside the injector.

HINT:

- Despite the injector functioning normally, the indicated Revised Injection Volume #1 to #4 value may be outside the normal operating range due to compensation for other problems (such as low compression).
- Revised Injection Volume is the value used to correct the fuel injection volumes of each cylinder, in order to optimize (compensate for the unevenness between) all the cylinder combustion condition. If any of the cylinders malfunction, the fuel injection volumes for the normal cylinders are corrected simultaneously. As a result, the Revised Injection Volume may deviate from the standard range.

B	Go to step 19
C	Go to step 24

A

23	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(INJECTOR CUT FOR IDENTIFYING MALFUNCTIONING CYLINDER)

(a) Connect the intelligent tester ll to the DLC3.
(b) Start the engine and turn the intelligent tester ll ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Active Test / Injector cut #1, #2, #3 and #4.
(d) Check the four cylinders in sequence to identify any faulty cylinders by performing the power-balance inspection.

HINT:

- While the engine is idling, if the idling stability variation is small despite cutting off the fuel injection, the cylinder is malfunctioning.
- With normal cylinders, the engine idles roughly when the fuel injection is cut off.

NEXT

REPLACE MALFUNCTIONING CYLINDER INJECTOR
(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

24	CHECK ALL CYLINDER INJECTORS FOR DEPOSIT

HINT:
If an injector is contaminated with deposits, the fuel injection volume deviates from the standard range. This may cause malfunctions.

(a) Check the injector for any deposits.
Result:

Injector Condition	Proceed To
Deposits	A
No deposits	B

B	**REPLACE INJECTOR OF ALL CYLINDER** **(See page 11-5 of Pub. No. RM1039E COROLLA Supplement)**

A

25	CLEAN INJECTOR

NEXT

26	READ VALUE USING INTELLINGENT TESTER II(REVISED INJECTION VOLUME #1 TO #4 AND INJECTION VOLUME)

(a) Reinstall the injector to cylinder head.
(b) Connect the intelligent tester ll to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(d) Start the engine and warm it up.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List.
(f) Select the following menu items in order and read the values displayed on the intelligent tester ll respectively.
- Revised Injection Volume #1, #2, #3 and #4
- Injection Volume

Standard:

Item	Engine Speed *	Reference Value (mm^3)
Revised Injection Volume #1 to #4	Idling	-3.0 to 3.0
Injection Volume	Idling	4.0 to 7.0

*: The A/C switch and all accessory switches should be OFF with a fully warm engine.
HINT:
When the values are outside the standard range, deposits inside the injector may be causing the problem.

OK: The values are within the standard range.

NG → **REPLACE INJECTOR OF ALL CYLINDER** (See page 11-5 of Pub. No. RM1039E COROLLA Supplement)

OK →

END

27	CHECK SOUND AREA

(a) Find source of the abnormal sound using a mechanic's stethoscope.

Result	Proceed To
Sound from supply pump	A
Sound from parts other than supply pump	B

B → **REPAIR OR REPLACE**

A →

28	BLEED AIR FROM FUEL SYSTEM

(a) Pump the priming pump until it becomes hard, to bleed the air.

NEXT →

29	CONFIRM WHETHER KNOCKING HAS BEEN SUCCESSFULLY REPAIRED

(a) Check whether the knocking has been successfully repaired by performing a driving test.
OK: Malfunction has been repaired successfully.

NEXT

CONFIRM WHETHER KNOCKING HAS BEEN SUCCESSFULLY REPAIRED

30	INSPECT SUPPLY PUMP ASSY (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE SUPPLY PUMP ASSY (See page 11-15 of Pub. No. RM1039E COROLLA Supplement)

OK

31	INSPECT FUEL PRESSURE SENSOR (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

NG → REPLACE COMMON RAIL ASSY (FUEL PRESSURE SENSOR) (See page 11-24 of Pub. No. RM1039E COROLLA Supplement)

OK

CONFIRM WHETHER KNOCKING HAS BEEN SUCCESSFULLY REPAIRED (PRESSURE DISCHARGE VALVE) (See page 11-1 of Pub. No. RM1039E COROLLA Supplement)

ELECTRONIC CONTROLLED AUTOMATIC TRANSAXLE [ECT]

05CVL-10

PRECAUTION

NOTICE:

Perform the RESET MEMORY (AT initialization) when replacing the automatic transaxle assy, engine assy or ECM (see page 05-651).

HINT:

RESET MEMORY can not be completed by only disconnecting the battery terminal.

05LTJ-01

DEFINITION OF TERMS

Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).

05LTK-01

PART AND SYSTEM NAME LIST

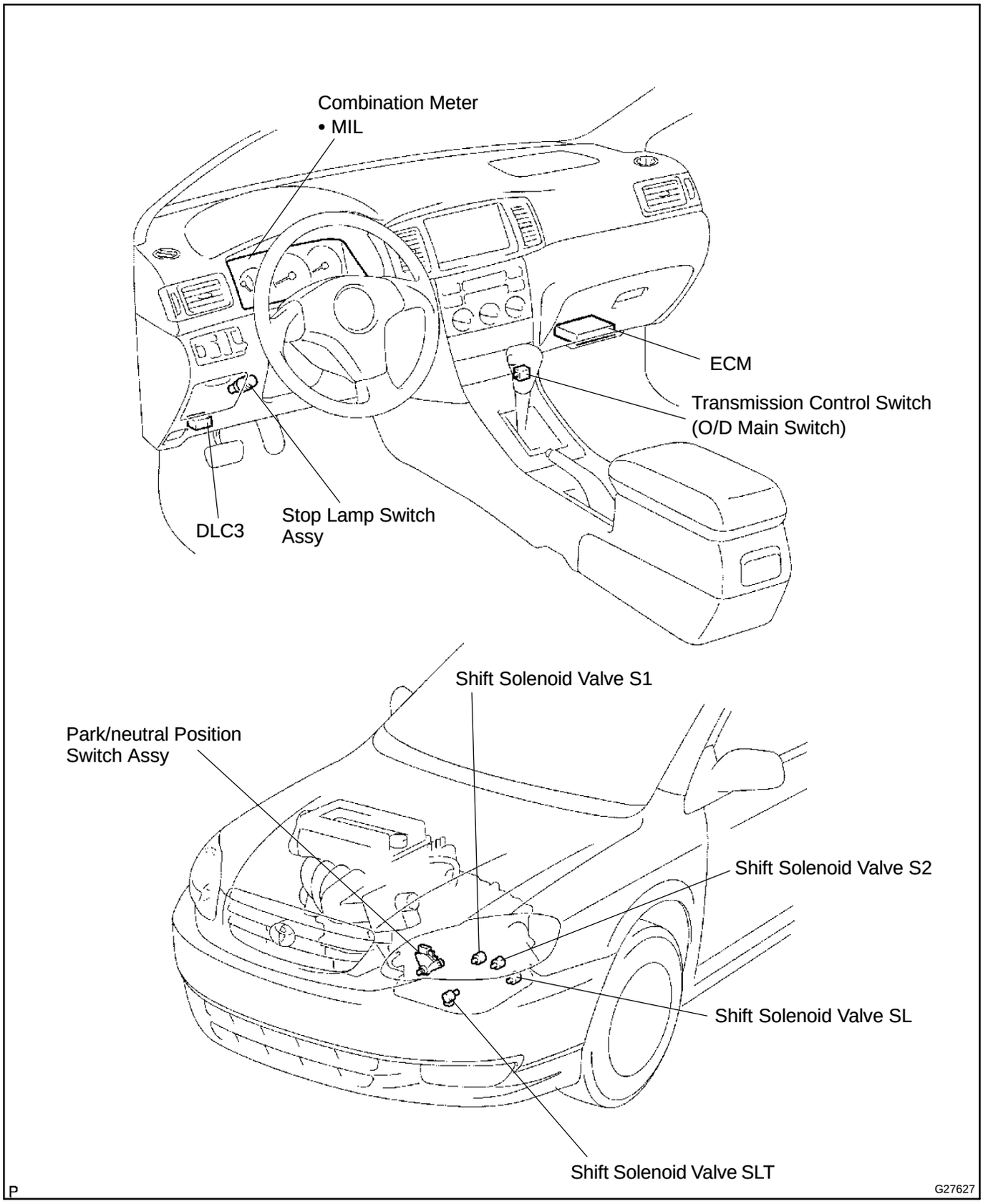
This reference list indicates the part names used in this manual along with their definitions.

Part and system name	Definition
Toyota HCAC system, Hydrocarbon adsorptive Catalyst (HCAC) system, HC adsorptive three-way catalyst	HC adsorptive three-way catalytic converter
Variable Valve Timing sensor, VVT sensor	Camshaft position sensor
Variable valve timing system, VVT system	Camshaft timing control system
Camshaft timing oil control valve, Oil control valve OCV, VVT, VSV	Camshaft timing oil control valve
Variable timing and lift, VVTL	Camshaft timing and lift control
Crankshaft position sensor "A"	Crankshaft position sensor
Engine speed sensor	Crankshaft position sensor
THA	Intake air temperature
Knock control module	Engine knock control module
Knock sensor	Engine knock sensor
Mass or volume air flow circuit	Mass air flow sensor circuit
Vacuum sensor	Manifold air pressure sensor
Internal control module, Control module, Engine control ECU, PCM	Power train control module
FC idle	Deceleration fuel cut
Idle air control valve	Idle speed control
VSV for CCV, Canister close valve VSV for canister control	Evaporative emissions canister vent valve
VSV for EVAP, Vacuum switching valve assembly No.1, EVAP VAV, Purge VSV	Evaporative emissions canister purge valve
VSV for pressure switching valve, Bypass VSV	Evaporative emission pressure switching valve
Vapor pressure sensor, EVAP pressure sensor, Evaporative emission control system pressure sensor	Fuel tank pressure sensor
Charcoal canister	Evaporative emissions canister
ORVR system	On-boad refueling vapor recovery system
Intake manifold runner control	Intake manifold tuning system
Intake manifold runner valve, IMRV, IACV (runner valve)	Intake manifold tuning valve
Intake control VSV	Intake manifold tuning solenoid valve
AFS	Air fuel ratio sensor
O2 sensor	Heater oxygen sensor
Oxygen sensor pumping current circuit	Oxygen sensor output signal
Oxygen sensor reference ground circuit	Oxygen sensor signal ground
Accel position sensor	Accelerator pedal position sensor
Throttle actuator control motor, Actuator control motor, Electronic throttle motor, Throttle control motor	Electronic throttle actuator
Electronic throttle control system, Throttle actuator control system	Electronic throttle control system
Throttle/pedal position sensor, Throttle/pedal position switch, Throttle position sensor/switch	Throttle position sensor
Turbo press sensor	Turbocharger pressure sensor
Turbo VSV	Turbocharger pressure control solenoid valve
P/S pressure switch	Power-steering pressure switch
VSV for ACM	Active control engine mount
Speed sensor, Vehicle speed sensor "A", Speed sensor for skid control ECU	Vehicle speed sensor
ATF temperature sensor, Trans. fluid temp. sensor, ATF temperature sensor "A"	Transmission fluid temperature sensor
Electronic controlled automatic transmission, ECT	Electronically controlled automatic
Intermediate shaft speed sensor "A"	Couter gear speed sensor

Part and system name	Definition
Output speed sensor	Output shaft speed sensor
Input speed sensor, Input turbine speed sensor "A", Speed sensor (NT), Turbine speed sensor	Input turbine speed sensor
PNP switch, NSW	Park/neutral position switch
Pressure control solenoid	Transmission pressure control solenoid
Shift solenoid	Transmission shift solenoid valve
Transmission control switch, Shift lock control unit	Shift lock control module
Engine immobilizer system, Immobilizer system	Vehicle anti-theft system

05LTL-01

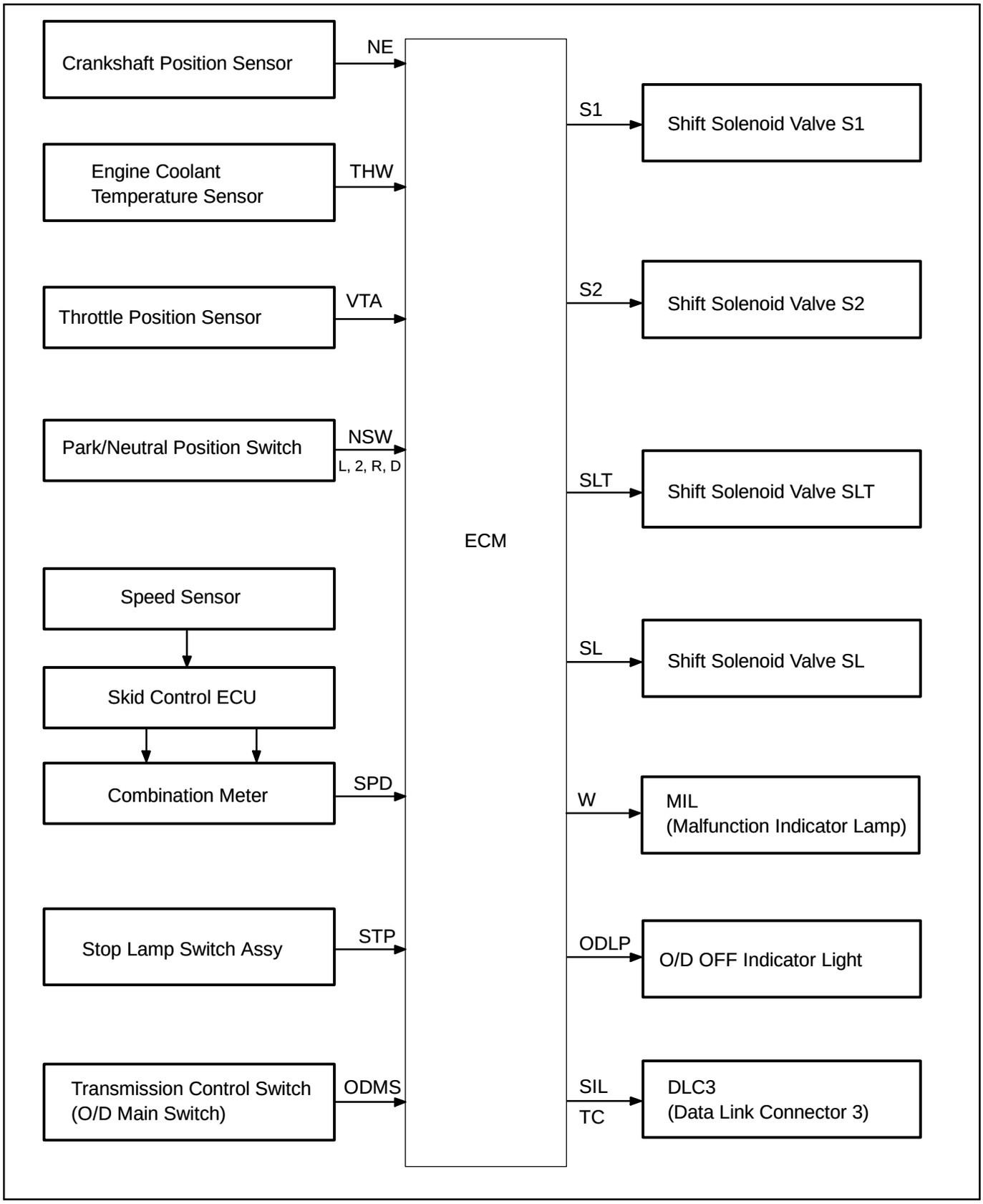
LOCATION



05LTM-01

SYSTEM DIAGRAM

The configuration of the electronic control system in the A246E automatic transaxles is as shown in the following chart.



05LTN-01

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The ECT (Electronic controlled automatic transmission/transaxle) is an automatic transmission/transaxle that electronically controls shift timing using the ECM. The ECM detects electrical signals that indicate engine and driving conditions, controls the shift point, and selects the appropriate shift pattern based on driver habits and road conditions. As a result, fuel efficiency and power transmission/transaxle performance are improved.

Shift shock has been reduced by controlling the engine and transmission/transaxle simultaneously.

In addition, the ECT has the following features:

- Diagnostic function.
- Fail-safe function when a malfunction occurs.

056IH-13

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

The intelligent tester II can be used at steps 3, 4, 6, and 9.

1	**Vehicle Brought to Workshop**

2	**Customer Problem Analysis (SEE PAGE 05-644)**

3	**Connect the intelligent tester II to DLC3**

4	**Check and Clear DTC and Freeze Frame Data (SEE PAGE 05-663)**

5	**Visual Inspection**

6	**Setting the Check Mode Diagnosis (SEE PAGE 05-664)**

7	**Problem Symptom Confirmation (SEE PAGE 05-645)**

- **Symptom does not occur: Go to step 8**
- **Symptom occur: Go to step 9**

8	**Symptom Simulation (SEE PAGE 01-21)**

9	**DTC Check (SEE PAGE 05-663)**

- **DTC is not output: Go to step 10**
- **DTC is output: Go to step 17**

10	Basic Inspection (SEE PAGE 40-4 and See Pub. No. RM925E, page 40-2 and 40-43)

NG → Go to step 19

OK

11	Mechanical System Test (SEE PAGE 05-647)

NG → Go to step 16

OK

12	Hydraulic Test (SEE PAGE 05-649)

NG → Go to step 16

OK

13	Manual Shifting Test (SEE PAGE 05-650)

NG → Go to step 15

OK

14	Problem Symptoms Table Chapter 1 (SEE PAGE 05-655)

NG → Go to step 18

OK

15	Problem Symptoms Table Chapter 2 (SEE PAGE 05-655)

16	Part Inspection

→ Go to step 19

17	DTC Chart (SEE PAGE 05-668)

18	Circuit Inspection

19	Repair or Replace

20	Confirmation Test

End

056II-12

CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transaxle System Check Sheet

Inspector's Name :

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred	/ /
How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any position ☐ Particular position)
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → O/D)
	☐ No down-shift (☐ O/D → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)
	☐ Lock-up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock-up ☐ Any drive position)
	☐ Slip or shudder
	☐ No kick-down
	☐ Others ( )

Check Item	MIL	☐ Normal ☐ Remains ON

DTC Check	1st Time	☐ Normal code ☐ Malfunction code (DTC)
	2nd Time	☐ Normal code ☐ Malfunction code (DTC)

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transaxle does not shift up, shift down, or the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

2. ROAD TEST

NOTICE:

Perform the test at the ATF (Automatic Transmission Fluid) temperature 50 to 80˚C (122 to 176˚F) in the normal operation.

(a) D position test:

Shift into the D position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that 1 → 2, 2 → 3 and 3 → O/D up-shifts take place, and that the shift points conform to the automatic shift schedule (see page 03-22).

HINT:

O/D Gear Up-shift Prohibition Control

- Engine coolant temperature is 55˚C (131˚F) or less and vehicle speed is at 70 km/h (43 mph) or less.

O/D Gear Lock-up Prohibition Control

- Brake pedal is depressed.
- Accelerator pedal is released.
- Engine coolant temperature is 55˚C (131˚F) or less.

3rd Gear Lock-up Prohibition Control

- O/D main switch off (O/D ON)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up-shifts.

(3) Check for abnormal noise and vibration.

Check for abnormal noise and vibration when up-shifting from 1 → 2, 2 → 3 and 3 → O/D while driving with the shift lever in the D position, and check while driving in the lock-up condition.

HINT:

The check for the cause of abnormal noise and vibration must be done thoroughly as it could also be due to loss of balance in the differential, torque converter clutch, etc.

(4) Check kick-down operation.

Check vehicle speeds when the 2nd to 1st, 3rd to 2nd and O/D to 3rd kick-downs take place while driving with the shift lever in the D position. Confirm that each speed is within the applicable vehicle speed range indicated in the automatic shift schedule (see page 03-22).

(5) Check abnormal shock and slip at kick-down.

(6) Check the lock-up mechanism.

- Drive in D position (O/D gear), at a steady speed (lock-up ON).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- There is no lock-up function in the 1st and 2nd gear.
- If there is a big jump in engine speed, there is no lock-up.

(b) 2 position test:
Shift into the 2 position and fully depress the accelerator pedal and check the following points.
(1) Check up-shift operation.
Check that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (see page 03-22).

HINT:
There is no 3rd up-shift and lock-up in the 2 position.

(2) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise during acceleration and deceleration, and for shock at up-shift and down-shift.

(c) L position test:
Shift into the L position and fully depress the accelerator pedal and check the following points.
(1) Check no up-shift.
While running in the L position, check that there is no up-shift to 2nd gear.

HINT:
There is no lock-up in the L position.

(2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise during acceleration and deceleration.

(d) R position test:
Shift into the R position, lightly depress the accelerator pedal, and check that the vehicle moves backward without any abnormal noise or vibration.

CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

(e) P position test:
Stop the vehicle on the grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check that the parking lock pawl holds the vehicle in place.

05LTP-01

MECHANICAL SYSTEM TESTS

1. PERFORM MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- **Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature 50 to 80°C (122 to 176°F).**
- **Do not continuously run this test for longer than 10 seconds.**
- **To ensure safety, do this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**

(1) Chock the 4 wheels.

(2) Connect an Intelligent Tester II to the DLC3.

(3) Fully apply the parking brake.

(4) Using your left foot, keep the brake pedal firmly depressed.

(5) Start the engine.

(6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot.

(7) Quickly read the stall speed at this time.

Stall speed: 2,450 ± 150 rpm

(8) Do the same test in the R position.

Stall speed: 2,450 ± 150 rpm

Evaluation:

Problem	Possible cause
(a) Stall engine speed is low in D and R positions	• Engine power output may be insufficient • Stator one-way clutch not operating properly HINT: If the value is less than the specified value by 600 rpm or more, the torque converter could be faulty.
(b) Stall engine speed is high in D position	• Line pressure is too low • Forward clutch slipping • No. 2 one-way clutch not operating properly • U/D one-way clutch not operating properly
(c) Stall engine speed is high in R position	• Line pressure is too low • Direct clutch slipping • 1st and reverse brake slipping • U/D brake slipping
(d) Stall engine speed is high in D and R positions	• Line pressure is too low • Improper fluid level • U/D one-way clutch not operating properly

(b) Measure the time lag.

(1) When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the direct clutch, forward clutch, and 1st and reverse brake.

NOTICE:

- **Perform the test at the normal operating ATF temperature 50 to 80˚C (122 to 176˚F).**
- **Be sure to allow 1 minute interval between tests.**
- **Perform the test three times, and measure the time lags. Calculate the average value of the three time lags.**

(2) Connect an Intelligent Tester II to the DLC3.

(3) Fully apply the parking brake.

(4) Start and warm up the engine and check idle speed.

Idle speed: approx. 700 rpm (In N position and A/C OFF)

(5) Shift the lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag: N → D less than 1.2 seconds

(6) In the same way, measure the time lag for N → R.

Time lag: N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the specified):

Problem	Possible cause
N → D time lag is longer	• Line pressure is too low • Forward clutch worn • U/D one-way clutch not operating properly
N → R time lag is longer	• Line pressure is too low • Direct clutch worn • 1st and reverse brake worn • U/D one-way clutch not operating properly

05LTQ-01

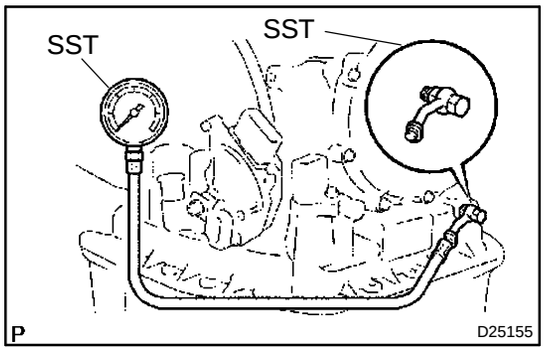
HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- **Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature 50 to 80°C (122 to 176°F).**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stopper outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**
- **This check must be conducted after checking and adjusting engine.**
- **Perform under condition that A/C is OFF.**
- **When conducting stall test, do not continue more than 10 seconds.**



(1) Warm up the ATF.
(2) Remove the test plug on the left side of the transaxle case and connect SST.

SST 09992-00095 (09992- 00231, 09992-00271)

(3) Fully apply the parking brake and chock the 4 wheels.
(4) Connect an Intelligent Tester II to the DLC3.
(5) Start the engine and check idling speed.
(6) Using your left foot, keep the brake pedal firmly depressed and shift into D position.
(7) Measure the line pressure when the engine is idling.
(8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
(9) In the same way, do the test in R position.

Specified line pressure:

Condition	D position kPa (kgf / cm^2, psi)	R position kPa (kgf / cm^2, psi)
Idling	382 to 422 kPa (3.9 to 4.3 kgf/cm^2, 55 to 61 psi)	647 to 760 kPa (6.6 to 7.8 kgf/cm^2, 94 to 111 psi)
Stall test	728 to 859 kPa (7.42 to 8.76 kgf/cm^2, 106 to 125 psi)	1,511 to 1,755 kPa (15.4 to 17.9 kgf/cm^2, 219 to 254 psi)

Evaluation:

Problem	Possible cause
If the measured values at all positions are higher	• Shift solenoid valve SLT defective • Regulator valve detective
If the measured values at all positions are lower	• Shift solenoid valve SLT defective • Regulator valve detective • Oil pump defective • O/D direct clutch defective
If pressure is low in the D position only	• D position circuit fluid leak • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leak • Direct clutch defective • 1st and reverse brake defective

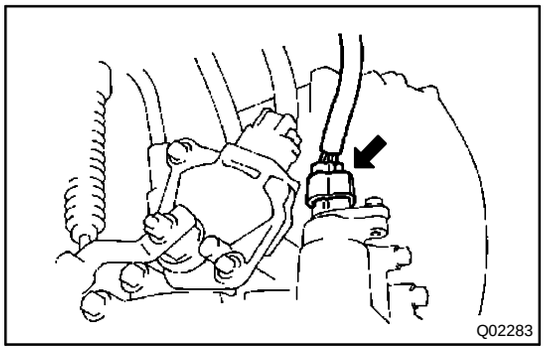
05LTR-01

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

By this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transaxle.



(a) Disconnect the transmission wire connector.

(b) Inspect the manual driving operation.

Check that the shift and gear positions correspond to the table below.

While driving, shift through the L, 2 and D positions.

Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
D	O/D
2	O/D
L	1st
R	Reverse
P	Pawl Lock

HINT:

If the gear positions of the L, 2 and D are difficult to distinguish, do the following road test (see page 05-645).

If any abnormality is found in the above test, the problem is in the transaxle itself.

(c) Connect the transmission wire connector.

(d) Clear the DTC (see page 05-663).

05LTS-01

INITIALIZATION

1. RESET MEMORY

NOTICE:

- **Perform the RESET MEMORY (AT initialization) when replacing the automatic transaxle assy, engine assy or ECM.**
- **Intelligent tester II only**

HINT:

The ECM memorizes the condition that the ECT controls the automatic transaxle assy and engine assy according to those characteristics. Therefore, when the automatic transaxle assy, engine assy, or ECM has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

Reset procedure is as follows.

(a) Turn the ignition switch off.
(b) Connect the Intelligent tester II to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn the Intelligent tester II main switch on.
(e) Perform the reset memory procedure from the main menu.

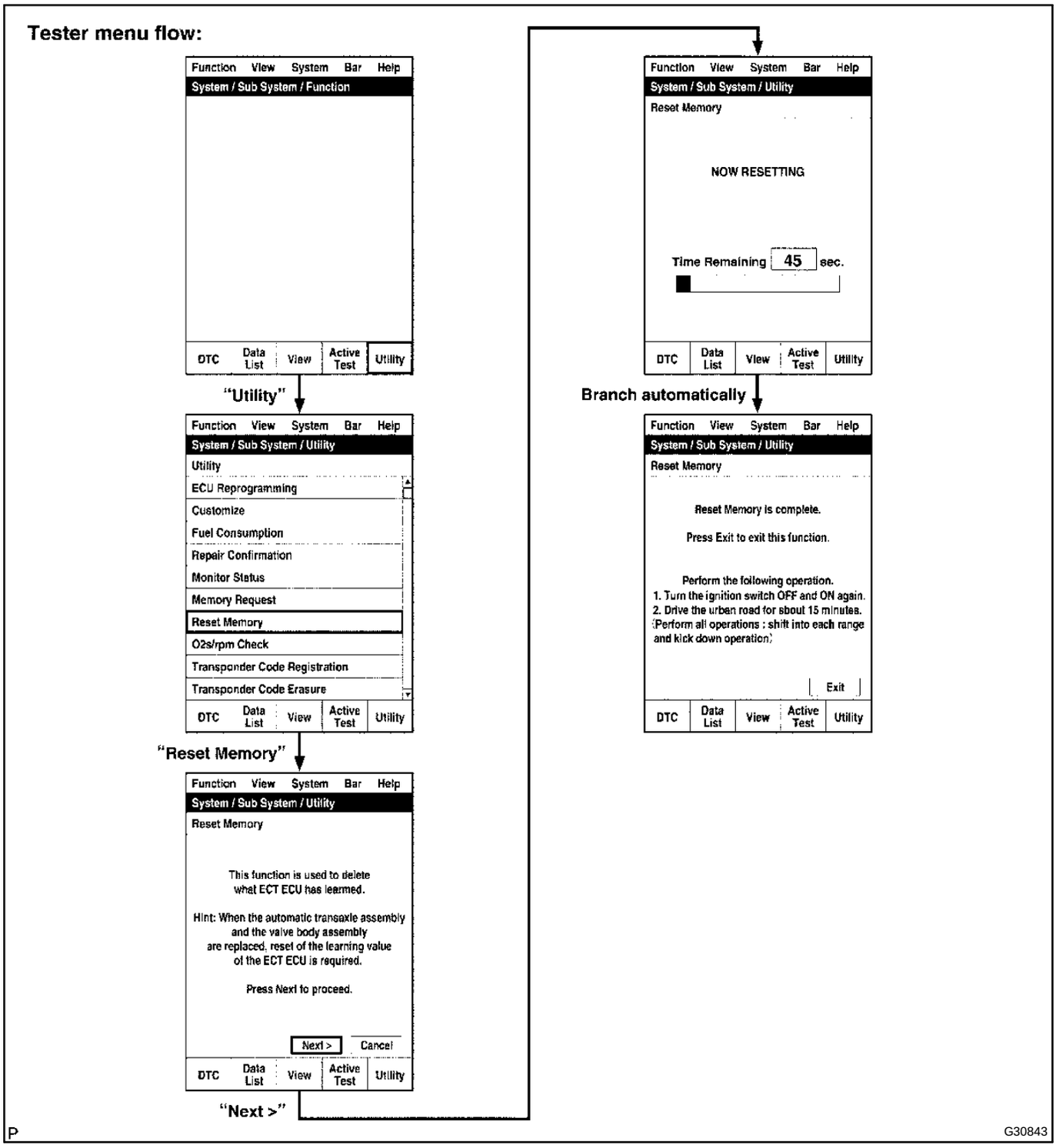
NOTICE:

After performing the RESET MEMORY, be sure to perform the ROAD TEST (see page 05-645) described earlier.

HINT:

The ECM is learned by performing the ROAD TEST.

Tester menu flow:



05LTT-01

MONITOR DRIVE PATTERN

1. MONITOR DRIVE PATTERN FOR ECT TEST

(a) Perform this drive pattern as one method to simulate the detection conditions of the ECT malfunctions. (The DTCs may not be detected due the actual driving conditions. And some codes may not be detected through this drive pattern).

HINT:

Preparation for driving

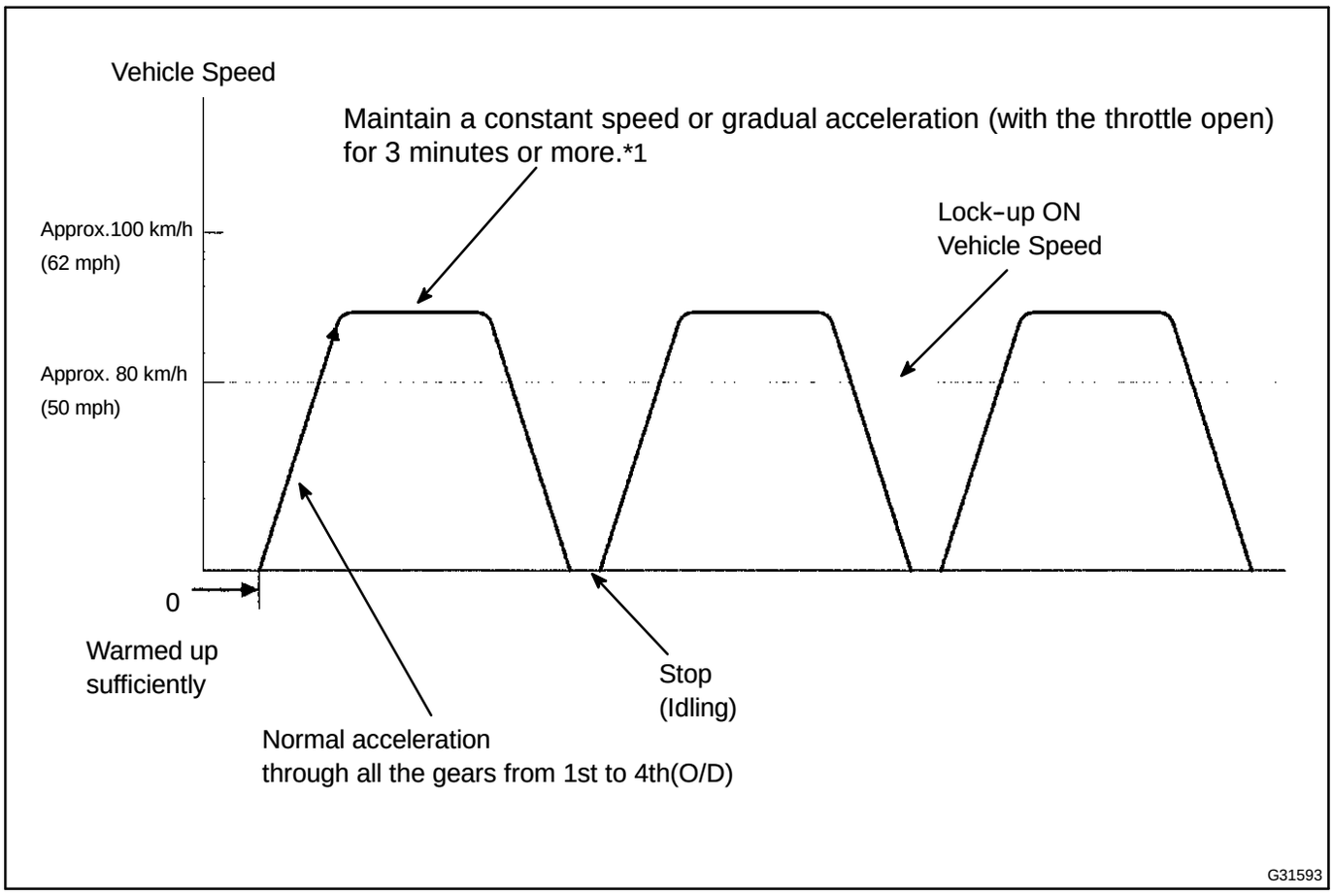
- Warm up the engine sufficiently. (Engine coolant temperature is 60°C (140°F) or higher)
- Drive the vehicle when the atmospheric temperature is −10°C (14°F) or higher. (Malfunction is not detected when the atmospheric temperature is −10°C (14°F) or less)

Driving note

- Drive the vehicle through all gears.
  Stop → 1st → 2nd → 3rd → 4th → 4th (lock−up ON).
- Repeat the above driving pattern three times or more.

NOTICE:

- **When using the intelligent tester II, monitor status can be found in the "Power train / Engine and ECT / Data List".**
- **In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors) the drive pattern can be resumed and, in most cases, the monitor can be completed.**
- **Perform this drive pattern on a level road as much as possible and strictly observe the posted speed limits and traffic laws while driving.**



HINT:

*1: Drive at such a speed in the uppermost gear, to engage lock-up. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

056IN-13

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check although the trouble still occurs, check the electrical circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 2 chapters.

1. Chapter 1: Electronic Circuit Matrix Chart

- Refer to the table below when the trouble cause is considered to be electrical.
- If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart of each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, check and replace the ECM.

HINT:

*1: When the circuit on which mark *1 is attached is a malfunction, DTC could be output (see page 05-668).

*2: LHD

Symptom	Suspect Area	See page
No up-shift (1st → 2nd)	ECM	01-31
No up-shift (2nd → 3rd)	ECM	01-31
No up-shift (3rd → O/D)	3. O/D main switch circuit 4. ECM	05-701 01-31
No down-shift (O/D → 3rd)	1. O/D main switch circuit 2. ECM	05-701 01-31
No down-shift (3rd → 2nd)	ECM	01-31
No down-shift (2nd → 1st)	ECM	01-31
No lock-up or No lock-up off	1. Shift solenoid valve (SL) circuit *1 2. Stop light switch circuit *1 3. Engine coolant temp. sensor circuit *1 4. ECM	05-698 05-676 05-28 01-31
Shift point too high or too low	1. Throttle position sensor circuit *1 2. Shift solenoid valve (SLT) circuit *1 3. Engine coolant temp. sensor circuit *1 4. ECM	05-28 05-695 05-28 01-31
Up-shift to O/D from 3rd while O/D main switch is OFF	1. O/D main switch circuit 2. ECM	05-701 01-31
Up-shift to O/D from 3rd while engine is cold	1. Engine coolant temp. sensor circuit *1 2. ECM	05-28 01-31
Harsh engagement (N → D)	ECM	01-31
Harsh engagement (Lock-up)	ECM	01-31
Harsh engagement (Any driving position)	1. Shift solenoid valve (SLT) circuit *1 2. ECM	05-695 01-31
Poor acceleration	1. Shift solenoid valve (SLT) circuit *1 2. ECM	05-695 01-31
Engine stalls when starting off or stopping	1. Shift solenoid valve (SL) circuit *1 2. ECM	05-698 01-31
No kick-down	1. Kick-down switch circuit *2 2. ECM	05-704 01-31
Malfunction in shifting	1. Park/neutral position switch circuit *1 2. O/D main switch circuit 3. ECM	05-670 05-701 01-31

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair
(★ : A245E/A246E automatic transaxle repair manual Pub. No. RM847E)
(●: COROLLA Repair Manual Pub. No. RM925E, page 05-776)

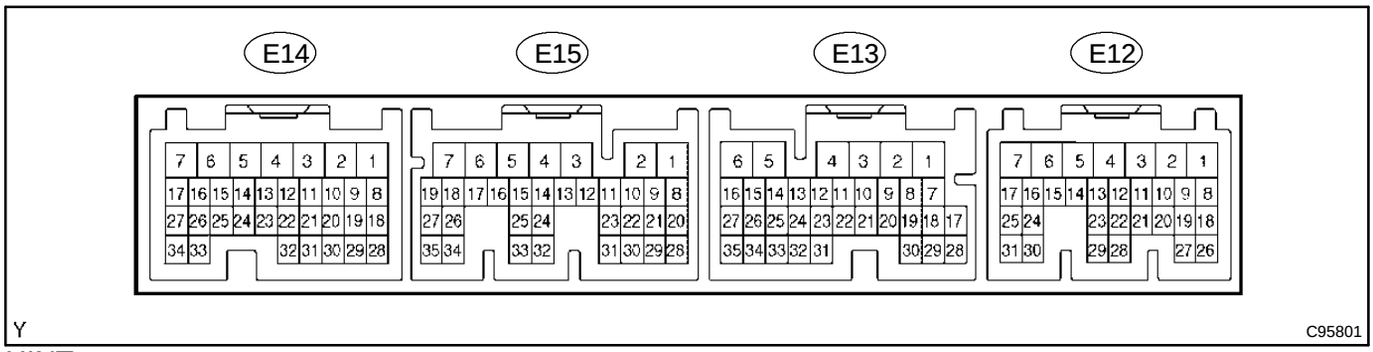
Symptom	Suspect Area	See page
Does not move in any forward positions	Forward clutch (C_1)	★
Does not move in reverse position	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3) 3. U/D brake (B_4)	★ ★ ★
Does not move in any position	1. Valve body assembly (Primary regulator valve) 2. Valve body assembly (Manual valve) 3. Torque converter clutch 4. Oil pump 5. U/D one-way clutch (F_3) 6. Front planetary gear 7. Rear planetary gear	★ ★ ● ★ ★ ★ ★
No-up shift (1st → 2nd)	1. Valve body assembly (1 - 2 shift valve) 2. 2nd brake (B_2) 3. No.1 one-way clutch (F_1)	★ ★ ★
No-up shift (2nd → 3rd)	1. Valve body assembly (2 - 3 shift valve) 2. Direct clutch (C_2)	★ ★
No-up shift (3rd → O/D)	1. Valve body assembly (3 - 4 shift valve) 2. U/D clutch (C_3)	★ ★
No-down shift (O/D → 3rd)	1. Valve body assembly (3 - 4 shift valve) 2. U/D brake (B_4) 3. U/D one-way clutch (F_3)	★ ★ ★
No-down shift (3rd → 2nd)	1. Valve body assembly (2 - 3 shift valve) 2. No.1 one-way clutch (F_1)	★ ★
No-down shift (2nd → 1st)	1. Valve body assembly (1 - 2 shift valve) 2. No.2 one-way clutch (F_2)	★ ★
Harsh engagement (N → R)	1. Valve body assembly (C_2 accumulator) 2. Direct clutch (C_2) 3. 1st and reverse brake (B_3)	★ ★ ★
Harsh engagement (N → D)	1. Valve body assembly (C_1 accumulator) 2. Forward clutch (C_1)	★ ★
Harsh engagement (N → L)	1. Valve body assembly (C_1 accumulator) 2. Valve body assembly (Low coast modulator valve) 3. Forward clutch (C_1)	★ ★ ★
Harsh engagement (1st → 2nd "D" position)	1. Valve body assembly (Accumulator control valve) 2. Valve body assembly (B_2 accumulator) 3. 2nd brake (B_2) 4. No.1 one-way clutch (F_1)	★ ★ ★ ★
Harsh engagement (1st → 2nd "2" position)	1. Valve body assembly (B_2 accumulator) 2. Valve body assembly (Accumulator control valve) 3. Valve body assembly (2nd coast modulator control) 4. 2nd coast brake (B_1) 5. 2nd brake (B_2) 6. No.1 one-way clutch (F_1)	★ ★ ★ ★ ★ ★
Harsh engagement (1st → 2nd → 3rd → O/D)	Valve body assembly (Primary regulator valve)	★
Harsh engagement (2nd → 3rd)	1. Valve body assembly (C_2 accumulator) 2. Valve body assembly (Accumulator control valve) 3. Direct clutch (C_2)	★ ★ ★

Harsh engagement (3rd → O/D)	1. Valve body assembly (Accumulator control valve) 2. Valve body assembly (C_3 accumulator) 3. U/D clutch (C_3)	★ ★ ★
Harsh engagement (O/D → 3rd)	1. Valve body assembly (B_4 accumulator) 2. U/D brake (B_4)	★ ★
Harsh engagement (3rd → 2nd)	1. Valve body assembly (C_2 accumulator) 2. Direct clutch (C_2)	★ ★
Slip (Forward & Reverse)	1. Valve body assembly (Primary regulator valve) 2. Oil strainer 3. Torque converter clutch 4. Oil pump	★ ● ● ★
Slip (”R” position)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3)	★ ★
Slip (1st)	1. Forward clutch (C_1) 2. No.2 one-way clutch (F_2) 3. U/D one-way clutch (F_3)	★ ★ ★
Slip (2nd)	1. Forward clutch (C_1) 2. 2nd brake (B_2) 3. No.1 one-way clutch (F_1) 4. U/D one-way clutch (F_3)	★ ★ ★ ★
Slip (3rd)	1. Forward clutch (C_1) 2. Direct clutch (C_2) 3. U/D one-way clutch (F_3)	★ ★ ★
Slip (O/D)	1. Forward clutch (C_1) 2. Direct clutch (C_2) 3. U/D clutch (C_3)	★ ★ ★
No engine braking (1st ”L” position)	1. Valve body assembly (Low coast modulator valve) 2. 1st and reverse brake (B_3)	★ ★
No engine braking (2nd ”2” position)	1. Valve body assembly (2nd coast modulator valve) 2. 2nd coast brake (B_1)	★ ★
No kick down	1. Valve body assembly (1 - 2 shift valve) 2. Valve body assembly (2 - 3 shift valve) 3. Valve body assembly (3 - 4 shift valve)	★ ★ ★
Poor acceleration	1. Valve body assembly (Primary regulator valve) 2. Torque converter clutch 3. Forward clutch (C_1)	★ ● ★
No lock-up	1. Valve body assembly (Lock-up relay valve) 2. Torque converter clutch	★ ●
Engine stalls when starting off or stopping	Torque converter clutch	●

05LTU-01

TERMINALS OF ECM

1. ECM



HINT:

Each ECM terminal's standard voltage is shown in the table below.

In the table, first follow the information under "Condition". Look under "Symbols (Terminal No.)" for the terminals to inspected. The standard voltage between the terminals is shown under "Specific Condition".

Use the illustration above as a reference for the ECM terminals.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ODLP (E13-7) - E1 (E14-5)	W(LG) - BR	O/D OFF indicator light circuit	IG switch ON and O/D OFF indicator light lights up	Below 3 V
			IG switch ON and O/D OFF indicator light goes off	10 to 14 V
L (E13-8) - E1 (E14-5)	LG-B - BR	L shift position switch signal	IG switch ON and shift lever L position	10 to 14 V
			IG switch ON and shift lever except L position	Below 1 V
2 (E13-9) - E1 (E14-5)	LG-R - BR	2 shift position switch signal	IG switch ON and shift lever 2 position	10 to 14 V
			IG switch ON and shift lever except 2 position	Below 1 V
D (E13-10) - E1 (E14-5)	SB(L-B) - BR	D shift position switch signal	IG switch ON and shift lever D position	10 to 14 V
			IG switch ON and shift lever except D position	Below 1 V
R (E13-11) - E1 (E14-5)	SB(R-B) - BR	R shift position switch signal	IG switch ON and shift lever R position	10 to 14 V
			IG switch ON and shift lever except R position	Below 1 V
STP (E13-19) - E1 (E14-5)	SB(G-W) - BR	Stop lamp switch signal	Brake pedal is depressed	7.5 to 14 V
			Brake pedal is released	Below 1.5 V
SPD (E13-17) - E1 (E14-5)	W(V-W) - BR	Speed signal	IG switch ON and rotate driving wheel slowly	Pulse generation
ODMS (E13-2) - E1 (E14-5)	LG - BR	O/D main switch signal	IG switch ON	10 to 14 V
			IG switch ON and press continuously O/D main switch	Below 1 V
NSW (E14-23) - E1 (E14-5)	B-R *1 - BR W *2 - BR	Park neutral switch signal	IG switch ON and shift lever P and N position	Below 2 V
			IG switch ON and shift lever except P and N position	10 to 14 V
SL (E15-15) - E1 (E14-5)	L-W - BR	SL solenoid signal	IG switch ON	Below 1 V
			Vehicle driving under lock-up range	10 to 14 V

S1 (E15-11) - E1 (E14-5)	R-Y - BR	S1 solenoid signal	IG switch ON	10 to 14 V
			1st or 2nd gear	10 to 14 V
			3rd or O/D gear	Below 1 V
S2 (E15-10) - E1 (E14-5)	L - BR	S2 solenoid signal	IG switch ON	Below 1 V
			1st or O/D gear	Below 1 V
			2nd or 3rd gear	10 to 14 V
SLT+ (E15-13) - SLT- (E15-12)	R-W - P	SLT solenoid signal	IG switch ON	10 to 14 V
KD *3 (E13-31) - E1 (E14-5)	W *3 - BR	Kick-down switch signal	IG switch ON and Accelerator pedal is depressed	Below 1 V

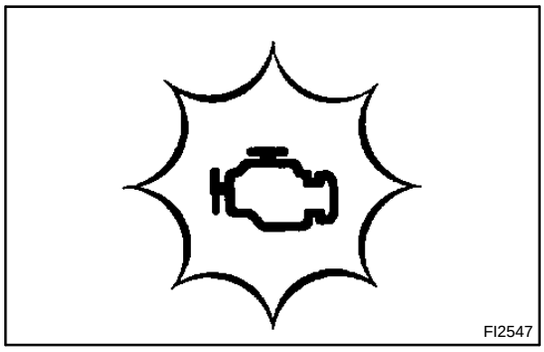
HINT:
*1: TMC Made
*2: TMUK Made, TMMT Made
*3: LHD

05LTV-01

DIAGNOSIS SYSTEM

EURO-OBD (EUROPE)

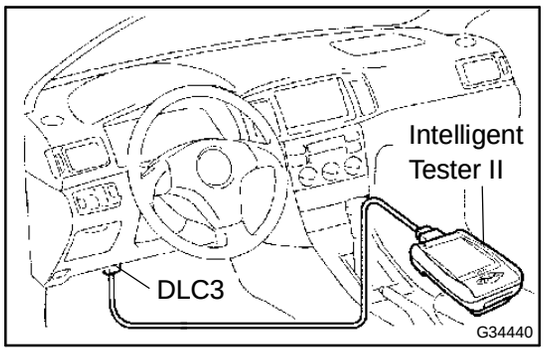
When troubleshooting Europe On-Board Diagnostic (Euro-OBD) vehicles, the vehicle must be connected to an OBD scan tool (complying with ISO 15031-4). Various data output from the vehicle's ECM can then be read.


FI2547

Euro-OBD regulations require that the vehicle's on-board computer illuminates the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in:

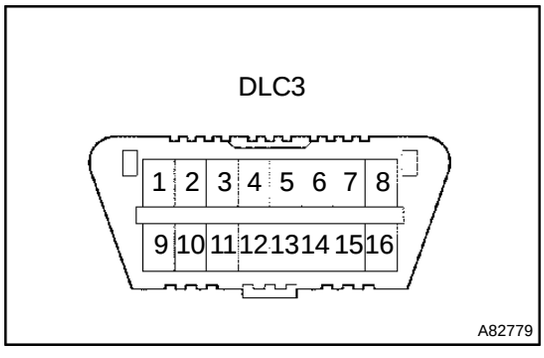
1) The emission control system/components.
2) The powertrain control components (which affect vehicle emissions).
3) The computer.

In addition, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO 15031-6 are recorded in the ECM memory. If the malfunction does not reoccur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



G34440

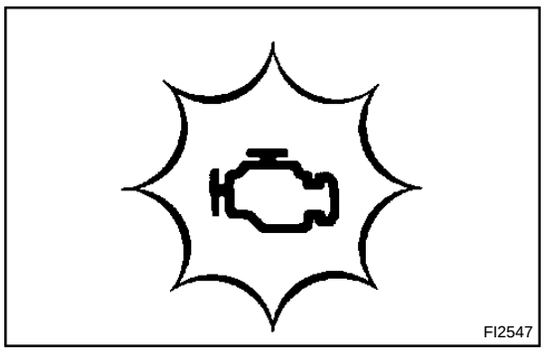
To check DTCs, connect the Intelligent Tester II or OBD scan tool to the Data Link Connector 3 (DLC3) of the vehicle.
The scan tool displays DTCs, the freeze frame data and a variety of the engine data.
The DTCs and freeze frame data can be erased with the scan tool (see page 05-663).



A82779

M-OBD (EXCEPT EUROPEAN SPEC.)

When troubleshooting Multiplex On-Board Diagnostic (M-OBD) vehicles, the vehicle must be connected to the Intelligent Tester II. Various data output from the ECM can then be read.


FI2547

OBD II regulations require that the vehicle's on-board computer illuminates the MIL on the instrument panel when the computer detects a malfunction in:

1) The emission control system/components
2) The power train control components (which affect vehicle emissions)
3) The computer

In addition to, the applicable DTCs are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.

NORMAL MODE AND CHECK MODE

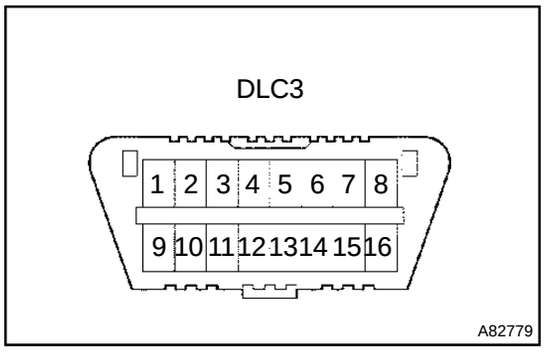
The diagnosis system operates in "normal mode" during normal vehicle use. In normal mode, "2 trip detection logic" is used to ensure accurate detection of malfunctions. "Check mode" is also available to technicians as an option. In check mode, "1-trip detection logic" is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent malfunctions (Intelligent Tester II only).

2-TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the ignition switch is turned OFF and then ON again, and the same malfunction is detected again, the MIL will illuminate.

FREEZE FRAME DATA

Freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air/fuel ratio was Lean or Rich, and other data from the time the malfunction occurred.



DLC3 (Data Link Connector 3)

The vehicle's ECM uses the ISO 9141-2 (Euro-OBD)/ISO 14230 (M-OBD) communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031-03 and matches the ISO 9141-2/ISO 14230 format.

HINT:

Connect the cable of the Intelligent Tester II to the DLC3, turn the ignition switch ON and attempt to use the Intelligent Tester II. If the screen displays UNABLE TO CONNECT TO VEHICLE, a problem exists in the vehicle side or the tester side.

If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.

If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.

Symbol	Terminal No.	Name	Reference terminal	Result	Condition
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always

INSPECT BATTERY VOLTAGE

Battery Voltage: 11 to 14 V

If voltage is below 11 V, replace the battery before proceeding.

CHECK MIL

(a) Check that the MIL illuminates when turning the ignition switch ON.

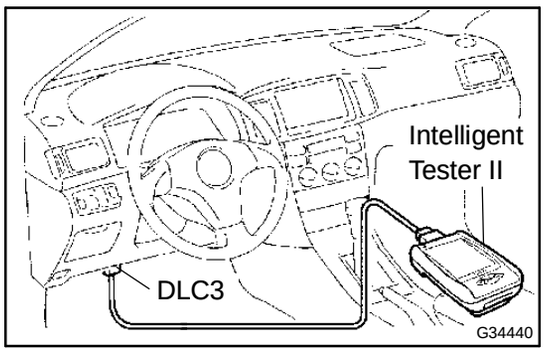
If the MIL does not illuminate, there is a problem in the MIL circuit (refer to MIL CIRCUIT on page 05-205).

(b) When the engine is started, the MIL should turn off.

DTC CHECK/CLEAR

1. CHECK DTC WITH INTELLIGENT TESTER II

DTCs which are stored in the ECM can be displayed with the Intelligent Tester II and generic OBD scantool.
These scan tools can display pending DTCs and current DTCs. Some DTC aren't stored if the ECM doesn't detect a malfunction during consecutive driving. However, the detected malfunction during once driving is stored as pending DTC.



(a) Connect the Intelligent Tester II to the Data Link Connector 3 (DLC3).
(b) Turn the ignition switch to the ON position.
(c) Enter the following menus: Enter / Power train / Engine and ECT / DTC / Current (or Pending).
(d) Confirm the DTCs and freeze frame data and then write them down.
(e) See page 05-668 to confirm the details of the DTCs.

NOTICE:
When simulating a symptom with the scan tool to check the DTCs, use normal mode. For codes on DIAGNOSTIC TROUBLE CODE CHART subject to "2-trip detection logic", perform the following actions.
Turn the ignition switch off after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL illuminates and the DTCs are recorded in the ECM.

2. CLEAR DTC WITH INTELLIGENT TESTER II

(a) Connect the Intelligent Tester II to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Enter the following menus: Enter / Power train / Engine and ECT / DTC / Clear.

3. CLEAR DTC WITHOUT INTELLIGENT TESTER II

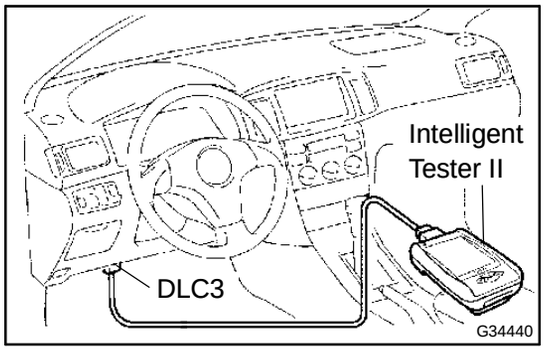
Disconnecting the battery terminal or remove the EFI and ETCS fuses from the engine room R/B for 60 seconds or more. But if you disconnect the battery terminal, you should do the "INITIALIZE " procedure.

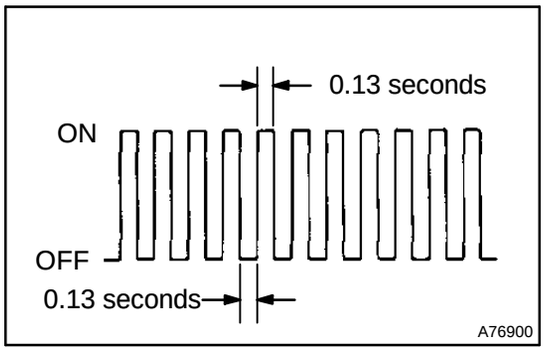
05LTX-01

CHECK MODE PROCEDURE

DESCRIPTION

Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1−tirp detection logic.





CHECK MODE PROCEDURE

(a) Make sure that the items below are true:
  (1) Battery voltage 11 V or more
  (2) Throttle valve fully closed
  (3) Transmission in the P or N position
  (4) A/C switched off

(b) Turn the ignition switch OFF.

(c) Connect the Intelligent Tester II to the DLC3.

(d) Turn the ignition switch to the ON position.

(e) Enter the following menues: Utility / Check Mode.

(f) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.

NOTICE:

All DTCs and freeze frame data recorded will be erased if: 1) the intelligent tester II is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or LOCK.

Before check mode, make notes of the DTCs and freeze frame data.

(g) Start the engine. The MIL should turn off after the engine starts.

(h) Perform ”MONITOR DRIVE PATTERN” for the ECT test (see page 05−653).
(Or, simulate the conditions of the malfunction described by the customer).

(i) After simulating the malfunction conditions, use the Intelligent Tester II diagnosis selector to check the DTC and freeze frame data.

05LTY-01

FAIL-SAFE CHART

1. FAIL-SAFE

This function minimizes the loss of the ECT functions when any malfunction occurs in each sensor or solenoid.

(a) Vehicle speed signal (SPD):
The vehicle speed is detected through signals from the crankshaft position sensor and shift position signal to maintain normal control when the speed sensor has a malfunction.

(b) Shift solenoid valve SL:
If the ECM detects a malfunction in the solenoid valve SL, it turns the valve off.

(c) Shift solenoid valve S1 and S2:

Fail safe function:

If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid "ON" and "OFF" in order to shift into the gear positions shown in the table below.

Manual shifting as shown in the following table must be done (In case of a short circuit, the ECM stops sending the current to the short circuit solenoid).

Even if starting the engine in the fail-safe mode, the gear position remain in the same position.

Position	NORMAL			S1 SOLENOID VALVE MALFUNCTIONING			S2 SOLENOID VALVE MALFUNCTIONING			BOTH SOLENOID MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	S1	S2		S1	S2		S1	S2		
D	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	O/D
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

X: Malfunctions

05LTZ-01

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the Intelligent Tester II Data List allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the Data List early in troubleshooting is one way to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "Enter / Power train / Engine and ECT / Data List".
(g) Follow the instructions on the tester and read the Data List.

Item	Measurement Item/ Range (display)	Normal Condition	Diagnostic Note
Stop Light Switch	Stop light SW Status/ ON or OFF	• Brake Pedal is depressed: ON • Brake Pedal is released: OFF	-
Neutral Position SW Signal	PNP SW Status/ ON or OFF	Shift lever position is; P and N: ON Except P and N: OFF	When the shift lever position displayed on the Intelligent tester II differs from the actual position, adjustment of the PNP switch or the shift cable may be incorrect. HINT: When the failure still occurs even after adjusting these parts, see page 05-670.
Shift SW Status (L Range)	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	↑
Shift SW Status (2 Range)	PNP SW Status/ ON or OFF	Shift lever position is; 2: ON Except 2: OFF	↑
Shift SW Status (R Range)	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	↑
Shift SW Status (D Range)	PNP SW Status/ ON or OFF	Shift lever position is; D: ON Except D: OFF	↑
Overdrive Cut Switch #2	O/D SW Status/ ON or OFF	• IG SW ON: ON ↓ • O/D SW Push: OFF ↓ • O/D SW Push: ON	-
Shift Status	Actual Gear position/ 1st, 2nd, 3rd, 4th (O/D)	Shift lever position is; • L: 1st • 2: 1st or 2nd • 3: 1st, 2nd or 3rd • D(O/D ON): 1st, 2nd, 3rd or 4th (O/D)	-
Lock Up Solenoid Status	Lock Up Solenoid Status/ ON or OFF	• Lock Up: ON • Except Lock Up: OFF	-

SLT Solenoid Status	Shift Solenoid SLT Status/ ON or OFF	• Accelerator pedal is depressed: OFF • Accelerator pedal is released: ON	-
Kick Down Switch Status *1	Kick down SW Status/ ON or OFF	• Accelerator Pedal is depressed all the way down: ON • Accelerator Pedal is released: OFF	-

HINT:
*1: LHD

2. ACTIVE TEST

HINT:
Performing the Intelligent Tester II Active Test allows relay, Vacuum Switching Valve (VSV), actuator and other items to be operated without removing any parts. Performing the Active Test early in troubleshooting is one way to shorten labor time. The Data List can be displayed during the Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "Enter / Power train / Engine and ECT / Active Test".
(g) Follow the instructions on the tester and read the Active Test.

Item	Test Details	Diagnostic Note
Control the Shift Position	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.
Control the Lock Up	[Test Details] Control the shift solenoid SL to set the automatic transaxle to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the SL operation.
Control the Line Pressure Up *	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] • Vehicle Stopped. • IDL: ON [HINT] OFF: Line pressure up (When the active test of "Control the Line Pressure Up" is performed, the ECM commands the SLT solenoid to turn off). ON: No action (normal operation)	-

*: "Control the Line Pressure Up" in the ACTIVE TEST is performed to check the line pressure changes by connecting the SST to the automatic transmission, which is used in the HYDRAULIC TEST (See page 05-649) as well.
HINT:
The pressure values in ACTIVE TEST and HYDRAULIC TEST are different from each other.

056IK-13

DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the page given.

HINT:

- *1 : ● ... MIL (Malfunction Indicator Lamp) light up
- *2 : "○" mark means ECM memorizes the malfunction code if the ECM detects the DTC detection condition.
- This DTC may be output when the clutch, brake and gear components etc. inside the automatic transaxle are damaged.

DTC No. (See Page)	Detection Item	Trouble Area	MIL *1	Memory *2
P0500 (05-157)	Vehicle Speed Sensor "A"	• Combination meter • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • ECM	●	○
P0705 (05-670)	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	●	○
P0724 (05-676)	Brake Switch "B" Circuit High	• Short in stop light switch circuit • Stop light switch • ECM	●	○
P0741 (05-679)	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)	• Shift solenoid valve SL remains open or closed • Valve body is blocked • Shift solenoid valve SL • Torque converter clutch • Automatic transaxle (clutch, brake or gear etc.) • Line pressure is too low • ECM	●	○
P0751 (05-683)	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	• Shift solenoid valve S1 remains open or closed • Valve body is blocked • Shift solenoid valve S1 • Automatic transaxle (clutch, brake or gear etc.) • ECM	●	○
P0756 (05-686)	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	• Shift solenoid valve S2 remains open or closed • Valve body is blocked • Shift solenoid valve S2 • Automatic transaxle (clutch, brake or gear etc.) • ECM	●	○
P0850 (05-670)	Park/Neutral Switch Input Circuit	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	●	○
P0973 (05-689)	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	• Short in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM	●	○
P0974 (05-689)	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)	• Open in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM	●	○
P0976 (05-692)	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	• Short in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM	●	○
P0977 (05-692)	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)	• Open in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM	●	○

P2716 (05-695)	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM	●	○
P2769 (05-698)	Torque Converter Clutch Solenoid Circuit Low (Shift Solenoid Valve SL)	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	●	○
P2770 (05-698)	Torque Converter Clutch Solenoid Circuit High (Shift Solenoid Valve SL)	• Open in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	●	○

DTC	P0705	TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION (PRNDL INPUT)

DTC	P0850	PARK/NEUTRAL SWITCH INPUT CIRCUIT

CIRCUIT DESCRIPTION

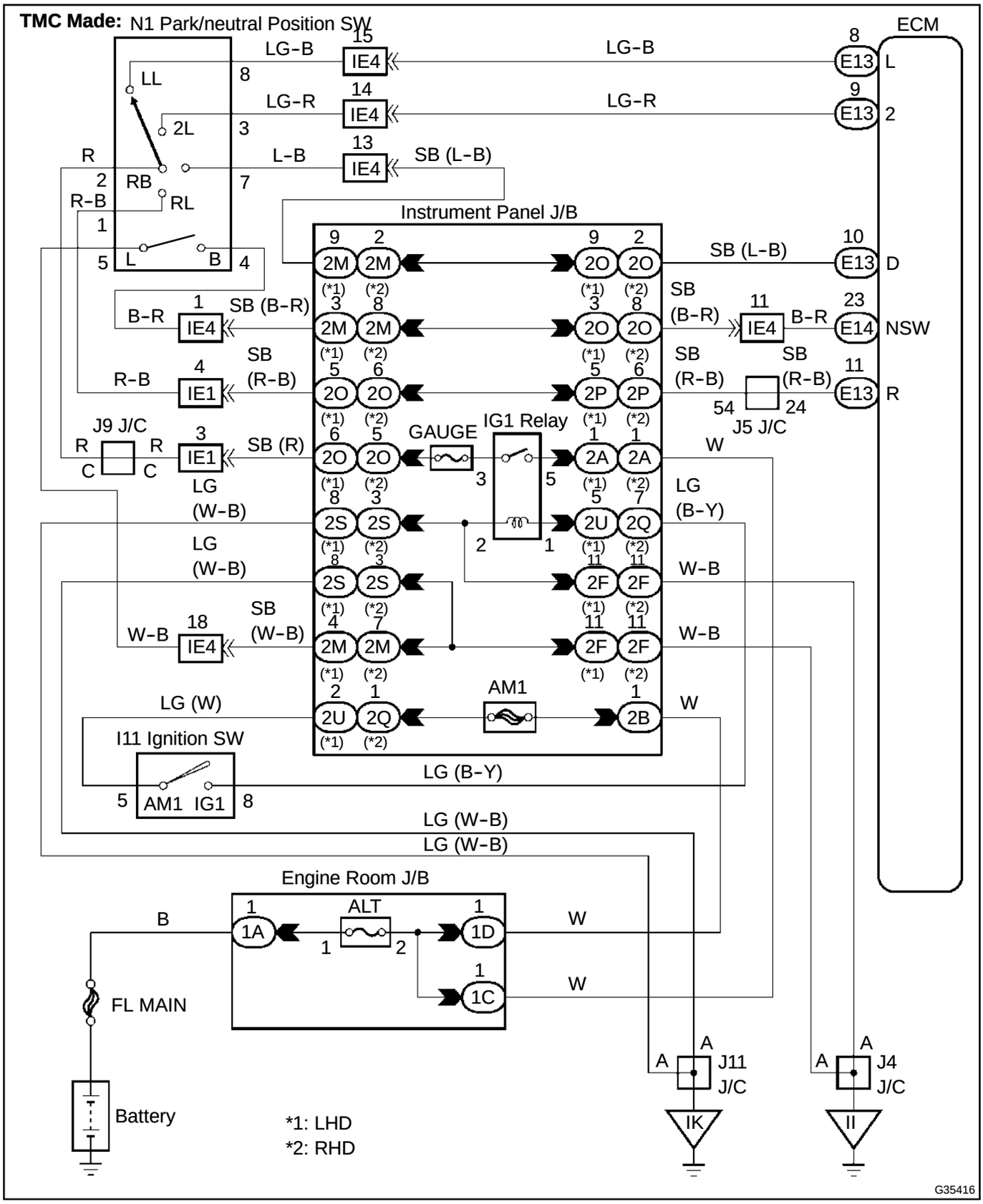
The park/neutral position switch detects the shift lever position and sends signals to the ECM.

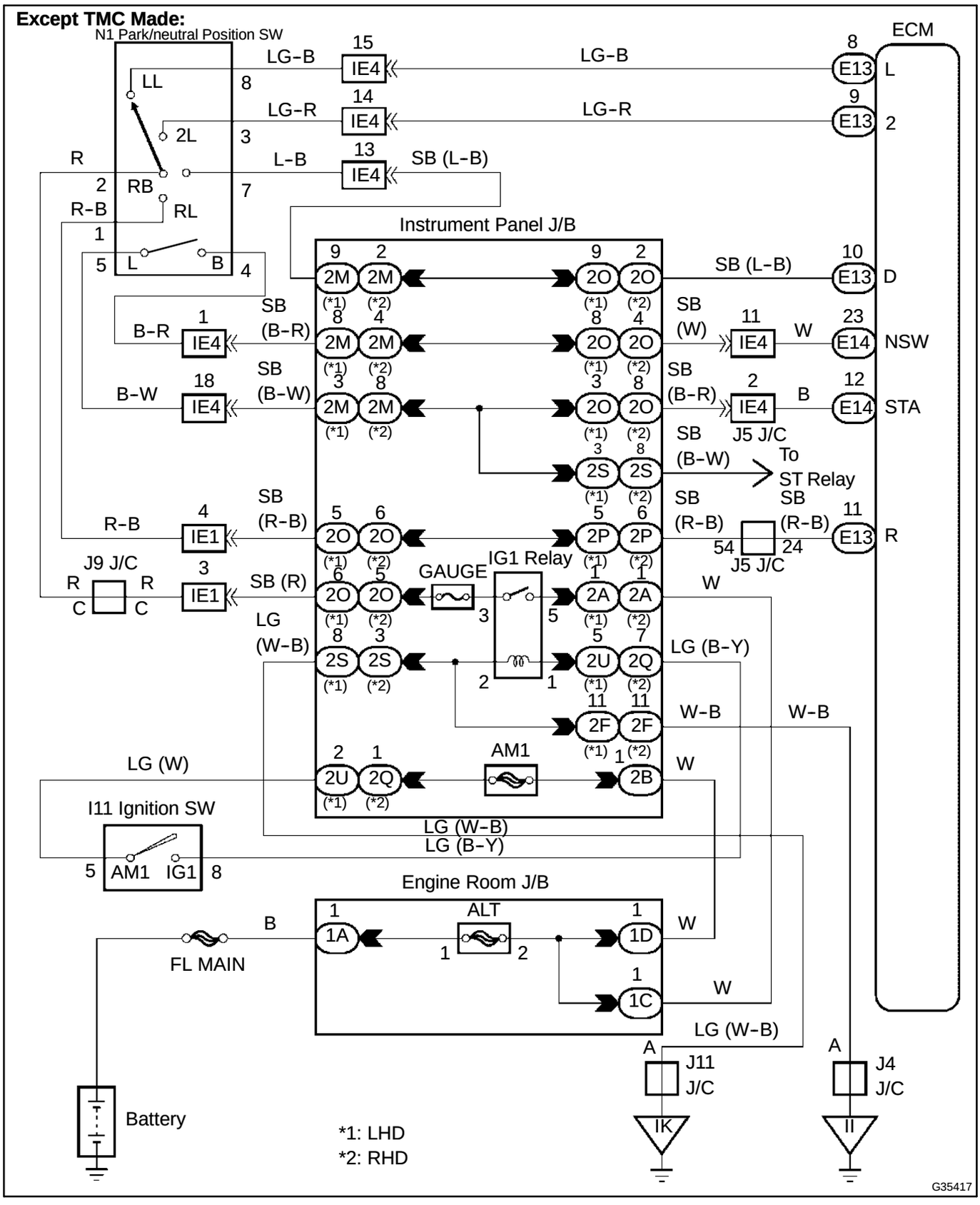
DTC No.	DTC Detecting Condition	Trouble Area
P0705	2 or more switches are ON simultaneously for P, R, N, D, 2 and L positions (2-trip detection logic)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
P0850	Park/neutral position switch remains ON (P, N position) during driving under conditions (a) and (b) for 30 sec. (2-trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,600 - 4,300 rpm	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM

MONITOR DESCRIPTION

The park/neutral position switch detects the shift lever position and sends a signal to the ECM.
For security, the park/neutral position switch detects the shift lever position so that engine can be started only when the vehicle is in P or N shift position.
When the park/neutral position switch sends more than one signal at a time from switch positions P, R, N, D, 2 or L, the ECM interprets this as a fault in the switch. The ECM will turn on the MIL and store the DTC.

WIRING DIAGRAM




Except TMC Made:
N1 Park/neutral Position SW
LL
2L
RB
RL
L
B
ECM
Instrument Panel J/B
LG-B
LG-R
L-B
SB (L-B)
SB (B-R)
SB (B-W)
SB (W)
SB (R-B)
R-B
B-R
B-W
J5 J/C
To ST Relay
J9 J/C
IG1 Relay
GAUGE
SB (R)
LG (W-B)
LG (B-Y)
W-B
LG (W)
I11 Ignition SW
AM1
IG1
Engine Room J/B
ALT
FL MAIN
Battery
J11 J/C
J4 J/C
*1: LHD
*2: RHD
G35417

INSPECTION PROCEDURE

HINT:

Using the Intelligent Tester II Data List allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the Data List early in troubleshooting is one way to shorten labor time.

NOTICE:

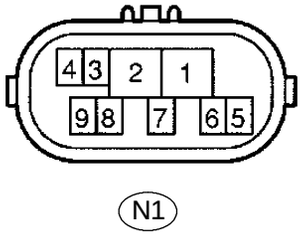
In the table below, the values listed under ”Normal Condition” are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Turn the ignition switch off.
(b) Connect the Intelligent Tester II to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn on the tester.
(e) Select the item ”Enter / Power train / Engine and ECT / Data List”.
(f) Follow the instructions on the tester and read the Data List.

Item	Measurement Item/ Range (display)	Normal Condition	Diagnostic Note
Neutral Position SW Signal	PNP SW Status/ ON or OFF	Shift lever position is; P and N: ON Except P and N: OFF	When the shift lever position displayed on the Intelligent tester II differs from the actual position, adjustment of the PNP switch or the shift cable may be incorrect.
Shift SW Status (L Range)	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	↑
Shift SW Status (2 Range)	PNP SW Status/ ON or OFF	Shift lever position is; 2: ON Except 2: OFF	↑
Shift SW Status (R Range)	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	↑
Shift SW Status (D Range)	PNP SW Status/ ON or OFF	Shift lever position is; D: ON Except D: OFF	↑

1 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY

Switch Side:
(Connector Front View):



(a) Disconnect the park/neutral position switch connector.
(b) Measure resistance according to the value(s) in the table below when the shift lever is moved to each position.

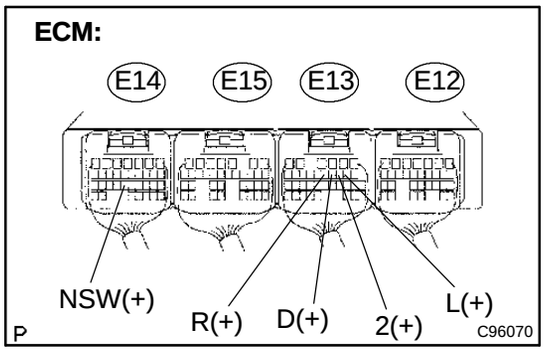
Standard:

Shift Position	Tester Connection	Specified Condition
P	2 - 6 and 4 - 5	Below 1 Ω
Except P	↑	10 kΩ or higher
R	2 - 1	Below 1 Ω
Except R	↑	10 kΩ or higher
N	2 - 9 and 4 - 5	Below 1 Ω
Except N	↑	10 kΩ or higher
D	2 - 7	Below 1 Ω
Except D	↑	10 kΩ or higher
2	2 - 3	Below 1 Ω
Except 2	↑	10 kΩ or higher
L	2 - 8	Below 1 Ω
Except L	↑	10 kΩ or higher

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH ASSY** **(SEE PAGE 40-1)**

OK

2	CHECK HARNESS AND CONNECTOR(PARK/NEUTRAL POSITION SWITCH - ECM)



(a) Connect the the park/neutral position switch connector.
(b) Turn the ignition switch to the ON position, and measure the voltage according to the value(s) in the table below when the shift lever is moved to each position.

Standard:

Shift Position	Tester Connection	Specified condition
P and N	E14 - 23 (NSW) - Body ground	Below 1 V
Except P and N	↑	10 to 14 V
R	E13 - 11 (R) - Body ground	10 to 14 V*
Except R	↑	Below 1 V
D	E13 - 10 (D) - Body ground	10 to 14 V
Except D	↑	Below 1 V
2	E13 - 9 (2) - Body ground	10 to 14 V
Except 2	↑	Below 1 V
L	E13 - 8 (L) - Body ground	10 to 14 V
Except L	↑	Below 1 V

HINT:
*: The voltage will drop slightly due to lighting up of the back up light.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

REPLACE ECM

DTC	P0724	BRAKE SWITCH "B" CIRCUIT HIGH

CIRCUIT DESCRIPTION

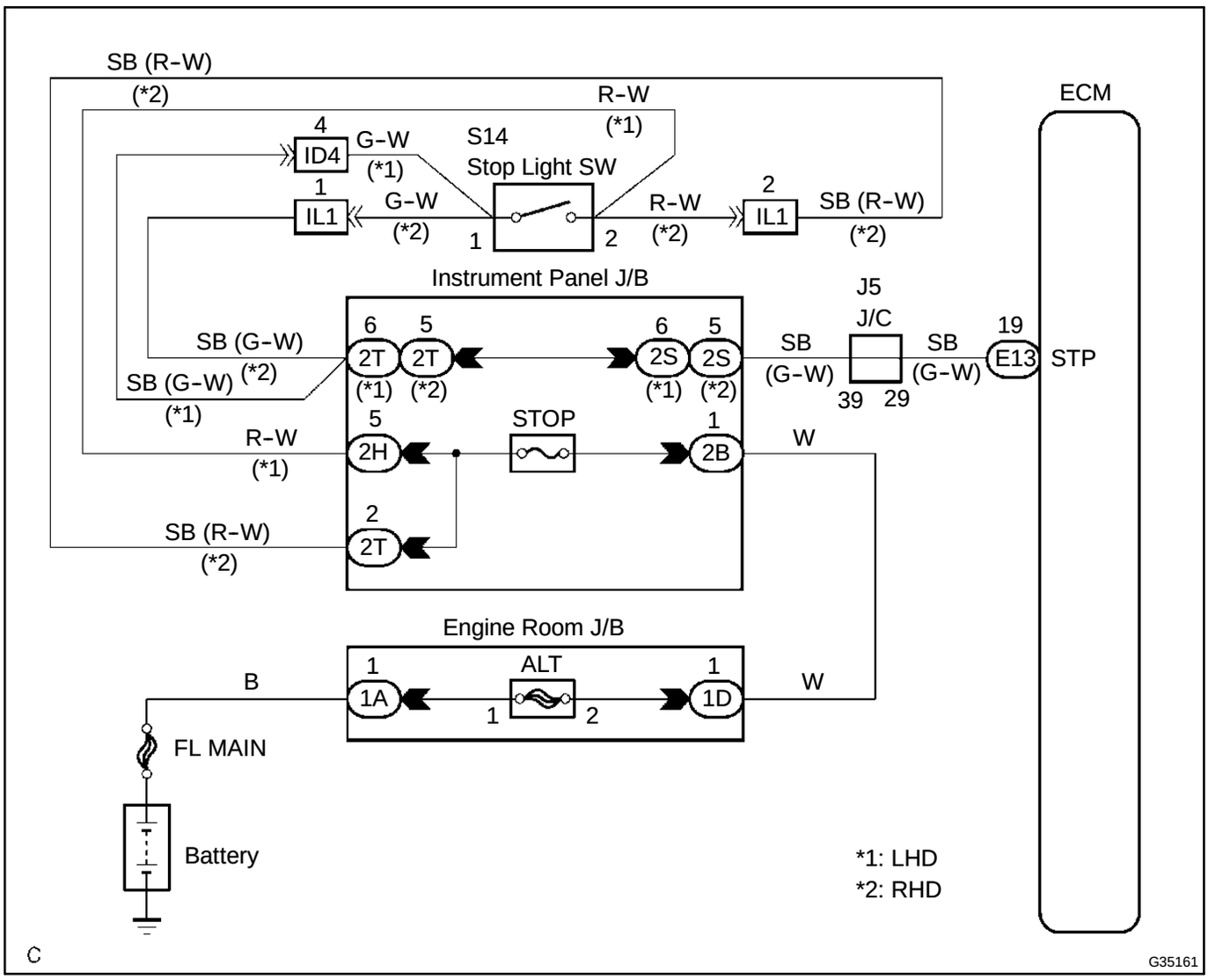
The purpose of this circuit is to prevent the engine from stalling while driving in lock-up condition, when brakes are suddenly applied.
When the brake pedal is depressed, this switch sends a signals to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P0724	The stop light switch remains ON even when the vehicle is driven in a STOP (less than 3 km/h (2 mph)) and GO (30 km/h (19 mph) or more) fashion 10 times. (2-trip detection logic).	• Short in stop light switch circuit • Stop light switch • ECM

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains on. When the stop light switch remains ON during "stop and go" driving, the ECM interprets this as a fault in the stop light switch and the MIL comes on and the ECM stores the DTC. The vehicle must stop (less than 3 km/h (2 mph)) and go (30 km/h (19 mph) or more) 10 times for two driving cycles in order to detect malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF DATA LIST(STP SIGNAL)

HINT:
Using the Intelligent Tester II Data List allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the Data List early in troubleshooting is one way to shorten labor time.

(a) Turn the ignition switch off.
(b) Connect the Intelligent Tester II to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn on the tester.
(e) Select the item "Enter / Power train / Engine and ECT / Data List".
(f) Follow the instructions on the tester and read the Data List.

Standard:

Item	Measurement Item/ Range (display)	Normal Condition
Stop Light Switch	Stop light SW Status/ ON or OFF	• Brake Pedal is depressed: ON • Brake Pedal is released: OFF

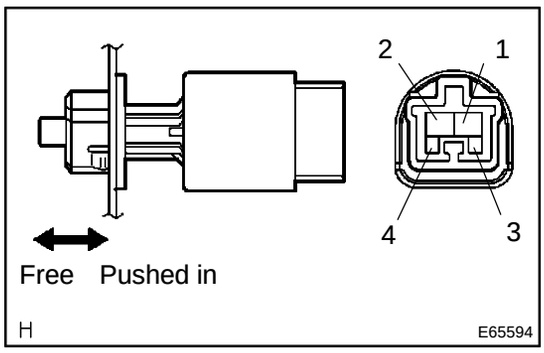
NOTICE:
In the table above, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

NG → **Go to step 2**

OK

Go to step 3

2 INSPECT STOP LAMP SWITCH ASSY



(a) Disconnect the stop lamp switch assy connector.
(b) Measure the resistance according to the value(s) in the table below.

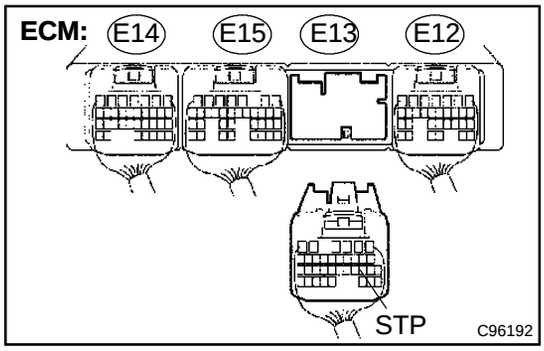
Standard:

Switch position	Tester Connection	Specified Condition
Switch pin free	1 - 2	Below 1 Ω
Switch pin pushed in	↑	10 kΩ or higher
Switch pin free	3 - 4	10 kΩ or higher
Switch pin pushed in	↑	Below 1 Ω

NG → **REPLACE STOP LAMP SWITCH ASSY**

OK

3	CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH ASSY - ECM)



(a) Connect the stop lamp switch assy connector.
(b) Disconnect the ECM connector.
(c) Measure the voltage according to the value(s) in the table below when the brake pedal is depressed and released.

Standard:

Condition	Tester Connection	Specified Condition
Brake pedal is depressed	E13 - 19 (STP) - Body ground	7.5 to 14 V
Brake pedal is released	↑	Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK →

REPLACE ECM

DTC	P0741	TORQUE CONVERTER CLUTCH SOLENOID PERFORMANCE (SHIFT SOLENOID VALVE SL)

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.
Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SL, valve body and torque converter clutch or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0741	• Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range. (2-trip detection logic) • When lock-up is ON, clutch or brake slips or gear is broken. (2-trip detection logic)	• Shift solenoid valve SL remains open or closed • Valve body is blocked • Shift solenoid valve SL • Torque converter clutch • Automatic transaxle (clutch, brake or gear etc.) • Line pressure is too low • ECM

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the airflow meter and the crankshaft position sensor, the ECM sends a signal to the shift solenoid valve SL to regulate the hydraulic pressure and provide smoother gearshifts. The shift-solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform torque-converter lock-up and flexible lock-up functions.
The ECM compares the engine rpm (NE) signal and the input speed calculated by output speed sensor (output speed) and gear ratio to detect torque converter lock-up. The ECM then compares the lock-up status against the lock-up schedule in the ECM memory. If the ECM does not detect lock-up at the appropriate time, it will conclude that there is a malfunction of shift solenoid SL. The ECM will illuminate the MIL.

INSPECTION PROCEDURE

HINT:

Performing the Intelligent Tester II Active Test allows relay, Vacuum Switching Valve (VSV), actuator and other items to be operated without removing any parts. Performing the Active Test early in troubleshooting is one way to shorten labor time. The Data List can be displayed during the Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Clear the DTC.
(g) Select the item "Enter / Power train / Engine and ECT / Active Test / Control the Lock Up".
(h) Follow the instructions on the tester and read the Active Test.

Item	Test Details	Diagnostic Note
Control the Lock Up	[Test Details] Control the shift solenoid SL to set the automatic transaxle to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the SL operation.

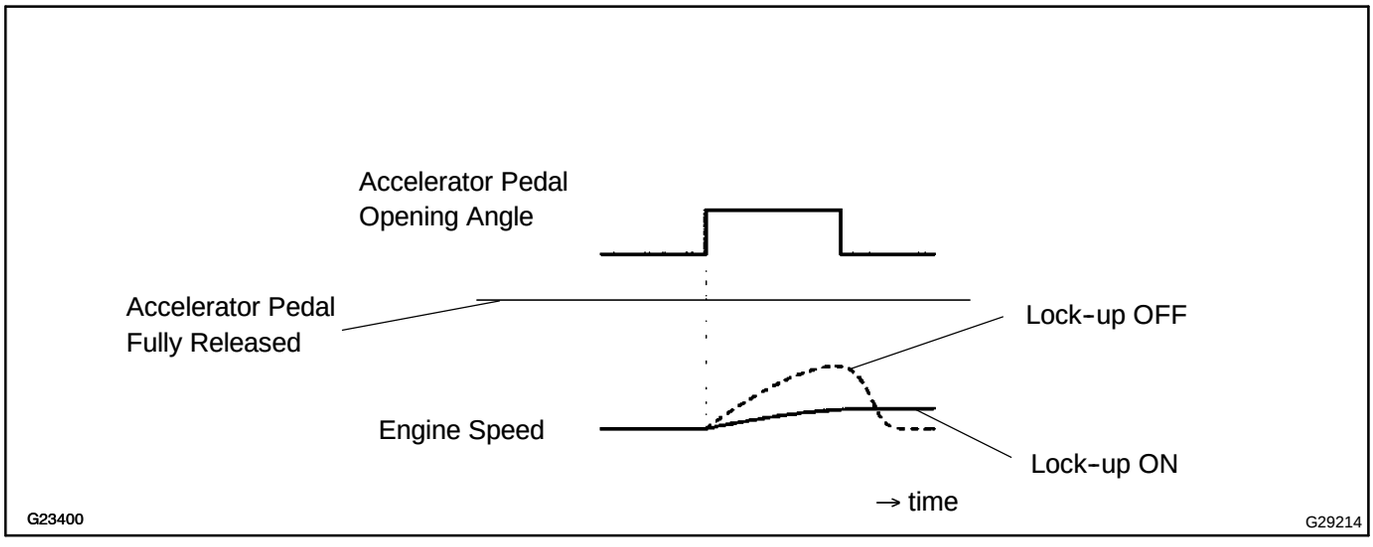
HINT:

- This test can be conducted when the vehicle speed is 58 km/h (36 mph) or more.
- This test can be conducted with the 3rd or O/D gear.

(i) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release, but not fully, the accelerator pedal in order to decelerate. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)



1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0741)

(a) Connect the Intelligent Tester II to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn on the tester.
(d) Select the item "Power train / Engine and ECT / DTC / Current or Pending".
(e) Read the DTCs using the Intelligent Tester II.

Result:

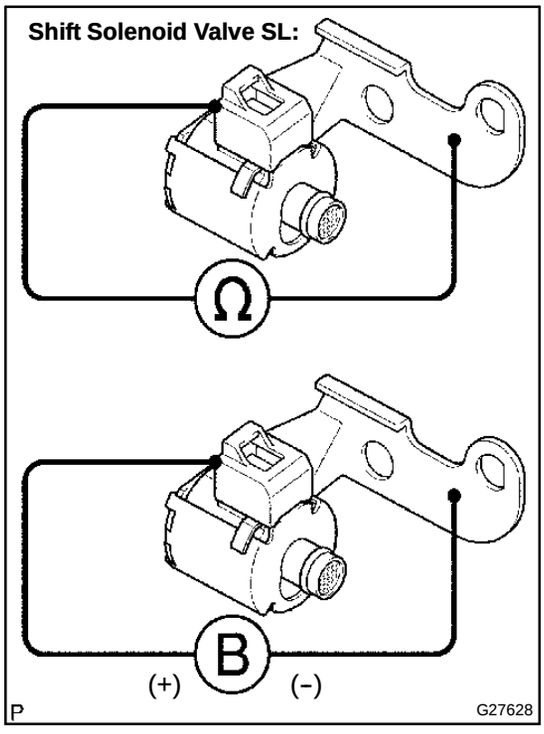
Display (DTC output)	Proceed to
Only "P0741" is output	A
"P0741" and other DTCs	B

HINT:
If any other codes besides "P0741" is output, perform the troubleshooting for those DTCs first.

B → **GO TO DTC CHART (SEE PAGE 05-668)**

A

2 INSPECT SHIFT SOLENOID VALVE(SL)



(a) Remove the shift solenoid valve SL.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (SL) - Solenoid Body (SL)	11 to 15 Ω

(c) Connect the positive (+) battery lead to the solenoid connector terminal, and the negative (-) battery lead to the solenoid body for checking the solenoid valve operation.

OK:

The solenoid valve makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE(SL)**

OK

3	**INSPECT TRANSMISSION VALVE BODY ASSY (See Pub. No. RM925E, page 40-22)**

OK:

There are no foreign objects on each valve.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY**

OK

4	**INSPECT TORQUE CONVERTER CLUTCH ASSY (See Pub. No. RM925E, page 40-20)**

OK:

The torque converter clutch operates normally.

NG → **REPLACE TORQUE CONVERTER CLUTCH ASSY**

OK

REPAIR AUTOMATIC TRANSAXLE ASSY (See Pub. No. RM925E, page 40-7)

DTC	P0751	SHIFT SOLENOID ”A” PERFORMANCE (SHIFT SOLENOID VALVE S1)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and crankshaft position sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect the mechanical trouble of the shift solenoid valves, the valve body or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0751	During normal driving, the gear required by the ECM does not match the actual gear (2-trip detection logic)	• Shift solenoid valve S1 remains open or closed • Valve body is blocked • Shift solenoid valve S1 • Automatic transaxle (clutch, brake or gear etc.) • ECM

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves ”ON/OFF”. According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or O/D gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL.

INSPECTION PROCEDURE

HINT:

Performing the Intelligent Tester II Active Test allows relay, Vacuum Switching Valve (VSV), actuator and other items to be operated without removing any parts. Performing the Active Test early in troubleshooting is one way to shorten labor time. The Data List can be displayed during the Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Clear the DTC.
(g) Select the item "Enter / Power train / Engine and ECT / Active Test / Control the Shift Position".
(h) Follow the instructions on the tester and read the Active Test.

HINT:

While driving, the shift position can be forcibly changed with the Intelligent Tester II.
Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-665).

Item	Test Details	Diagnostic Note
Control the Shift Position	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The shift position commanded by the ECM is shown in the DATA LIST (Shift Status) display on the Intelligent Tester II.

1	CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0751)

(a) Connect the Intelligent Tester II to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn on the tester.
(d) Select the item "Power train / Engine and ECT / DTC / Current or Pending".
(e) Read the DTCs using the Intelligent Tester II.

Result:

Display (DTC output)	Proceed to
Only "P0751" is output	A
"P0751" and other DTCs	B

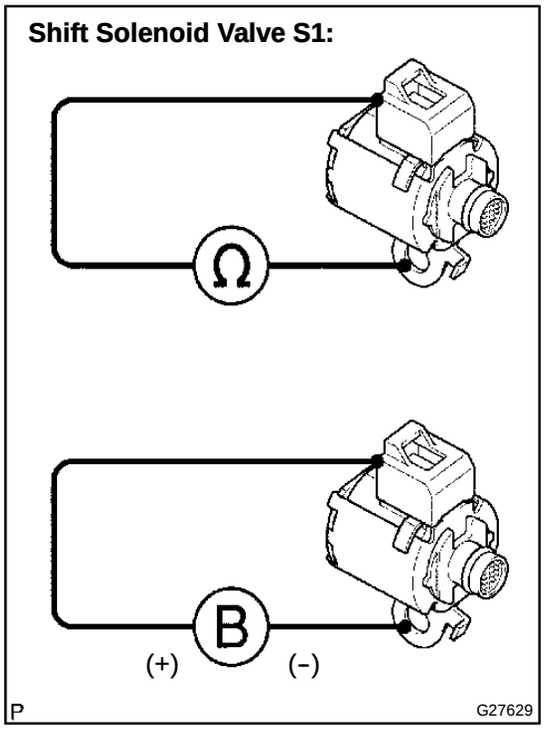
HINT:

If any other codes besides "P0751" is output, perform the troubleshooting for those DTCs first.

B → GO TO DTC CHART (SEE PAGE 05-668)

A

2 INSPECT SHIFT SOLENOID VALVE(S1)



(a) Remove the shift solenoid valve S1.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S1) - Solenoid Body (S1)	11 to 15 Ω

(c) Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S1)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSY (See Pub. No. RM925E, page 40-22)

OK:

There are no foreign objects on each valve.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSY (See Pub. No. RM925E, page 40-7)

DTC	P0756	SHIFT SOLENOID ”B” PERFORMANCE (SHIFT SOLENOID VALVE S2)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and crankshaft position sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect the mechanical trouble of the shift solenoid valves, the valve body or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0756	During normal driving, the gear required by the ECM does not match the actual gear (2-trip detection logic)	• Shift solenoid valve S2 remains open or closed • Valve body is blocked • Shift solenoid valve S2 • Automatic transaxle (clutch, brake or gear etc.) • ECM

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves ”ON/OFF”. According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or O/D gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL.

INSPECTION PROCEDURE

HINT:

Performing the Intelligent Tester II Active Test allows relay, Vacuum Switching Valve (VSV), actuator and other items to be operated without removing any parts. Performing the Active Test early in troubleshooting is one way to shorten labor time. The Data List can be displayed during the Active Test.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Clear the DTC.
(g) Select the item "Enter / Power train / Engine and ECT / Active Test / Control the Shift Position".
(h) Follow the instructions on the tester and read the Active Test.

HINT:

While driving, the shift position can be forcibly changed with the Intelligent Tester II.
Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-665).

Item	Test Details	Diagnostic Note
Control the Shift Position	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The shift position commanded by the ECM is shown in the DATA LIST (Shift Status) display on the Intelligent Tester II.

1	CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0756)

(a) Connect the Intelligent Tester II to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn on the tester.
(d) Select the item "Power train / Engine and ECT / DTC / Current or Pending".
(e) Read the DTCs using the Intelligent Tester II.

Result:

Display (DTC output)	Proceed to
Only "P0756" is output	A
"P0756" and other DTCs	B

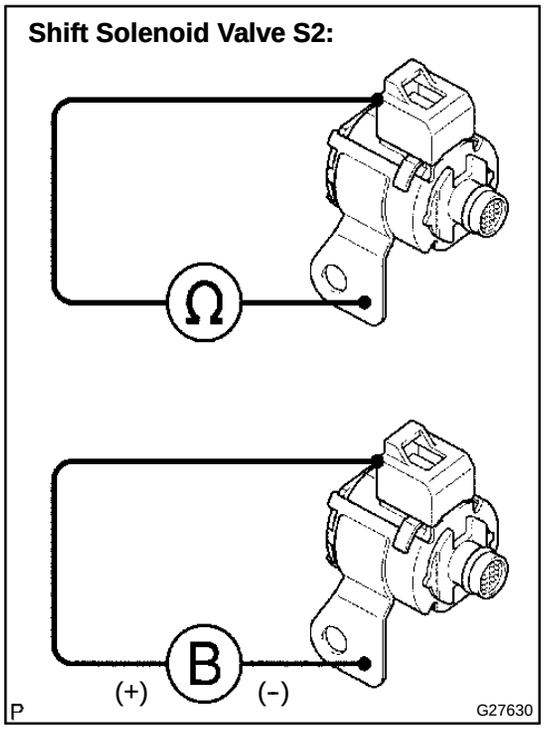
HINT:

If any other codes besides "P0756" is output, perform the troubleshooting for those DTCs first.

B → GO TO DTC CHART (SEE PAGE 05-668)

A

2	INSPECT SHIFT SOLENOID VALVE(S2)



(a) Remove the shift solenoid valve S2.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S2) - Solenoid Body (S2)	11 to 15 Ω

(c) Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S2)**

OK

3	INSPECT TRANSMISSION VALVE BODY ASSY (See Pub. No. RM925E, page 40-22)

OK:

There are no foreign objects on each valve.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSY (See Pub. No. RM925E, page 40-7)

DTC	P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW (SHIFT SOLENOID VALVE S1)

DTC	P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH (SHIFT SOLENOID VALVE S1)

CIRCUIT DESCRIPTION

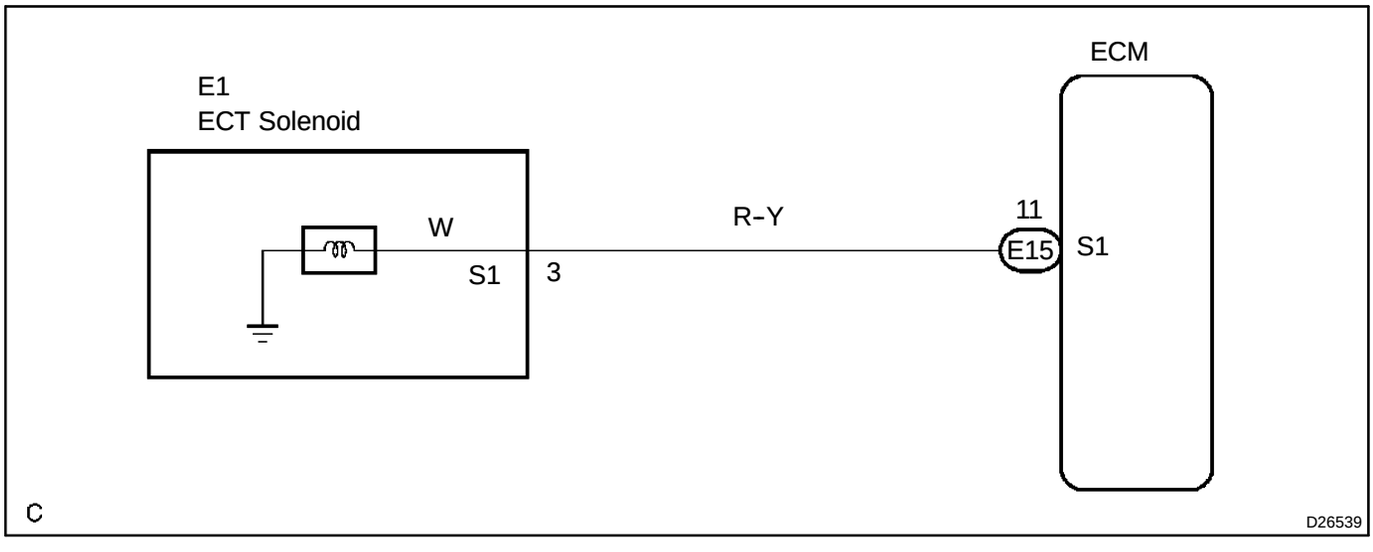
Shifting from 1st to O/D is performed in combination with ON and OFF of the shift solenoid valve S1 and S2 controlled by ECM. If an open or short circuit occurs in either of the solenoid valves, the ECM controls the remaining normal solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0973	ECM detects short in solenoid valve S1 circuit 2 times when solenoid valve S1 is operated (1-detection logic)	• Short in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM
P0974	ECM detects open in solenoid valve S1 circuit 2 times when solenoid valve S1 is not operated (1-detection logic)	• Open in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM

MONITOR DESCRIPTION

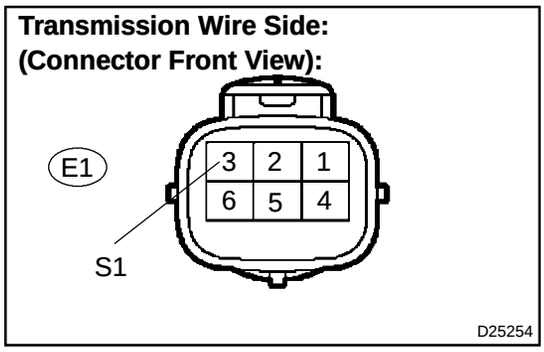
The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.)
(see page 05-665).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION WIRE(S1)



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

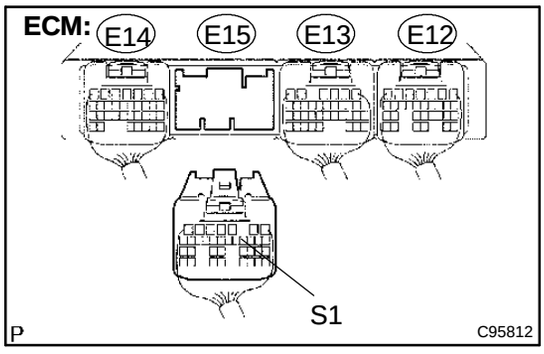
Standard:

Tester Connection	Specified Condition 20°C (68°F)
3 - Body ground	11 to 15 Ω

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



(a) Connect the transmission connector to the transaxle.

(b) Disconnect the connector from the ECM.

(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E15 - 11 (S1) - Body ground	11 to 15 Ω

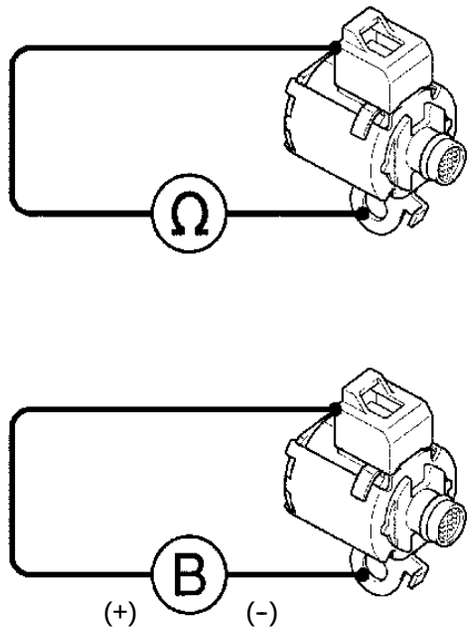
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

REPLACE ECM

3 INSPECT SHIFT SOLENOID VALVE(S1)

Shift Solenoid Valve S1:



(a) Remove the shift solenoid valve S1.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S1) - Solenoid Body (S1)	11 to 15 Ω

(c) Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S1)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (See Pub. No. RM925E, page 40-26)

DTC	P0976	SHIFT SOLENOID ”B” CONTROL CIRCUIT LOW (SHIFT SOLENOID VALVE S2)

DTC	P0977	SHIFT SOLENOID ”B” CONTROL CIRCUIT HIGH (SHIFT SOLENOID VALVE S2)

CIRCUIT DESCRIPTION

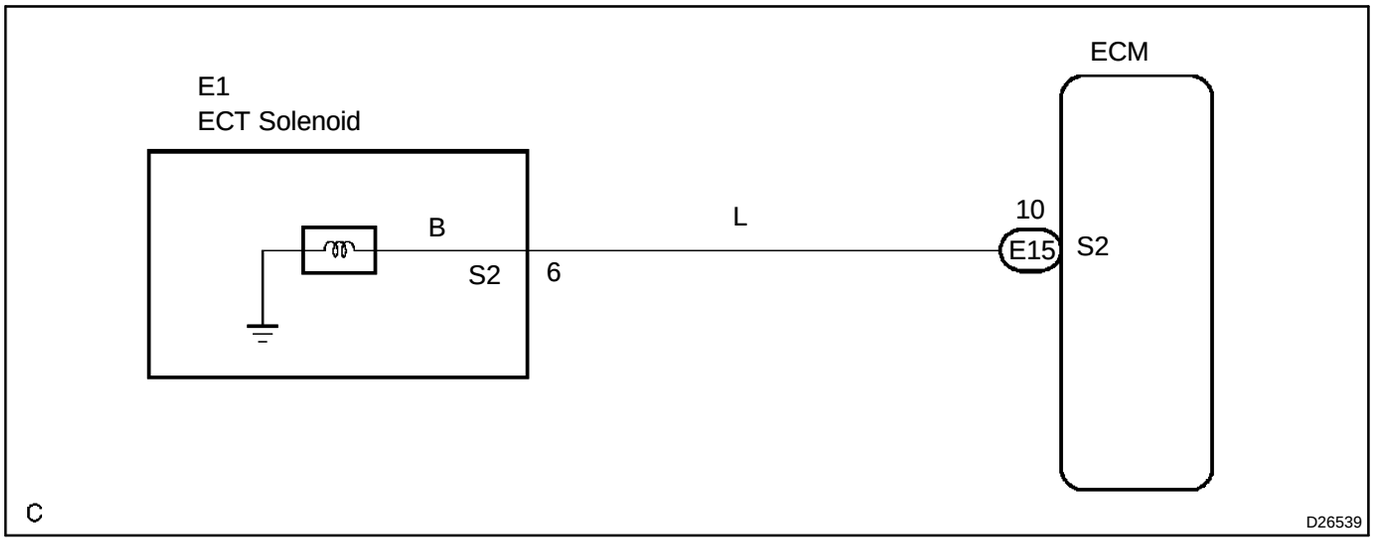
Shifting from 1st to O/D is performed in combination with ON and OFF of the shift solenoid valve S1 and S2 controlled by ECM. If an open or short circuit occurs in either of the solenoid valves, the ECM controls the remaining normal solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0976	ECM detects short in solenoid valve S2 circuit 2 times when solenoid valve S2 is operated (1-trip detection logic)	• Short in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM
P0977	ECM detects open in solenoid valve S2 circuit 2 times when solenoid valve S2 is not operated (1-trip detection logic)	• Open in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM

MONITOR DESCRIPTION

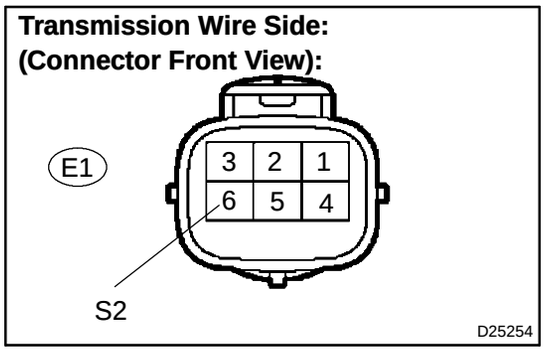
The ECM commands gear shifts by turning the shift solenoid valves ”ON/OFF”. When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition ”ON/OFF” (In case of an open or short circuit, the ECM stops sending current to the circuit.)
(see page 05-665).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION WIRE(S2)



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

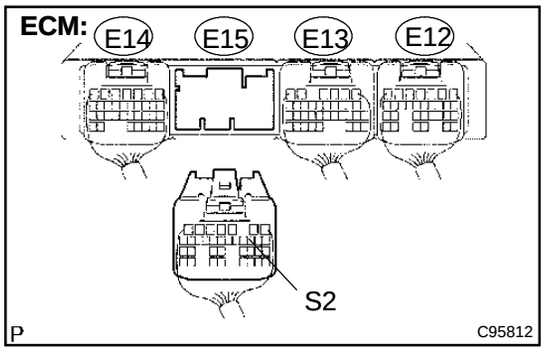
Standard:

Tester Connection	Specified Condition 20°C (68°F)
6 - Body ground	11 to 15 Ω

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



(a) Connect the transmission connector to the transaxle.

(b) Disconnect the connector from the ECM.

(c) Measure the resistance according to the value(s) in the table below.

Standard:

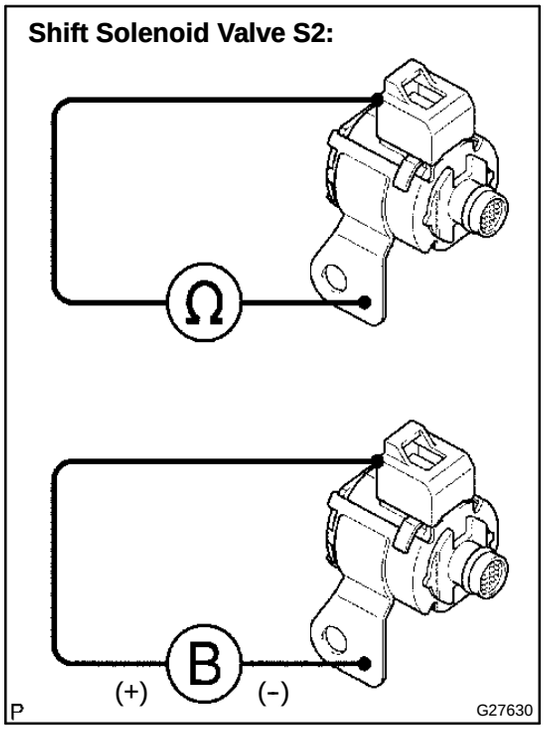
Tester Connection	Specified Condition 20°C (68°F)
E15 - 10 (S2) - Body ground	11 to 15 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

REPLACE ECM

3 INSPECT SHIFT SOLENOID VALVE(S2)



(a) Remove the shift solenoid valve S2.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S2) - Solenoid Body (S2)	11 to 15 Ω

(c) Connect positive (+) lead to the terminal of solenoid connector, negative (-) lead to the solenoid body.

OK:

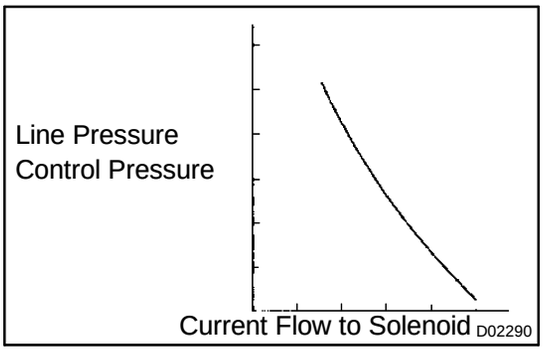
The solenoid makes an operating sound.

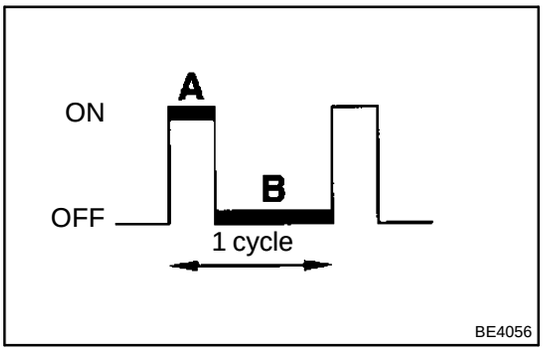
NG → **REPLACE SHIFT SOLENOID VALVE (S2)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (See Pub. No. RM925E, page 40-26)

DTC	P2716	PRESSURE CONTROL SOLENOID "D" ELECTRICAL (SHIFT SOLENOID SLT)





CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates the line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate the line pressure according the extent of the accelerator pedal depressed or the output of engine power.

This controls the line pressure and provides smooth shifting.

Upon receiving a signal of the throttle valve opening angle, the ECM controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure and generating throttle pressure.

(*): Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

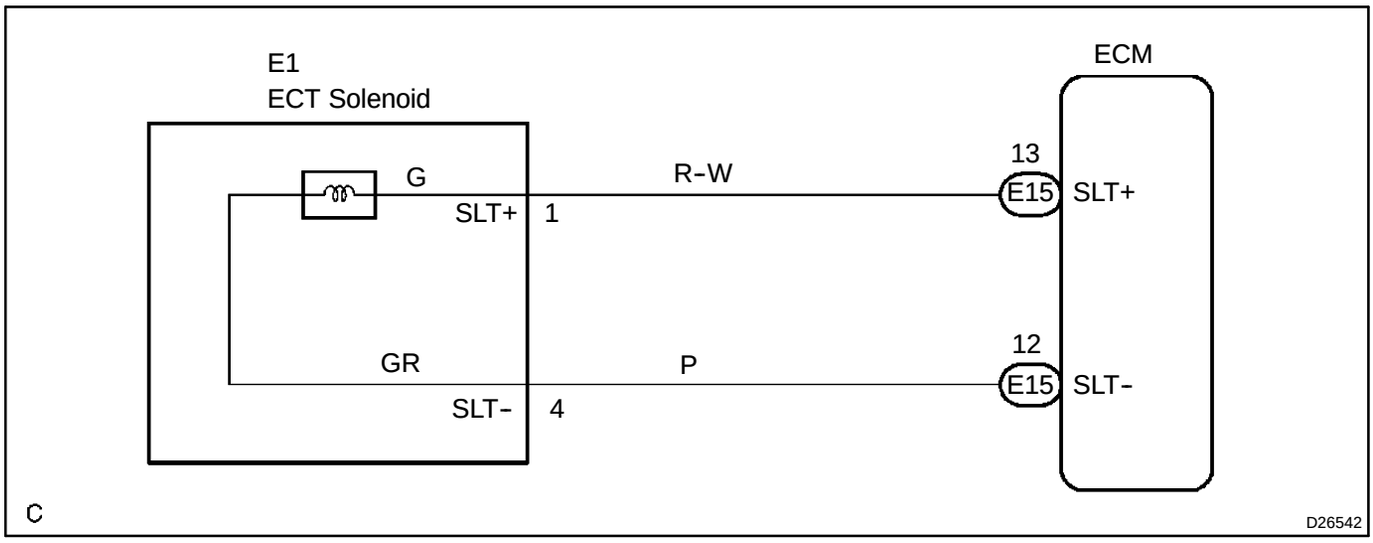
Duty Ratio = A / (A + B) x 100 (%)

DTC No.	DTC Detection Condition	Trouble Area
P2716	Condition (a) or (b) below is detected 1 sec. or more: (1-trip detection logic) (a) SLT- terminal: 0V (b) SLT- terminal: 12V	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM

MONITOR DESCRIPTION

The linear solenoid valve (SLT) controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the duty cycle of the SLT solenoid valve to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs. When an open or short in the linear solenoid valve (SLT) circuit is detected, the ECM interprets this as a fault. The ECM will turn ON the MIL.

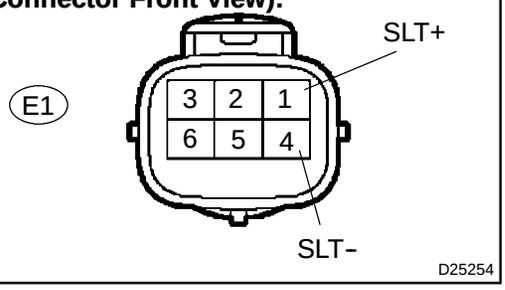
WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE(SLT)

Transmission Wire Side:
(Connector Front View):



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 (SLT+) - 4 (SLT-)	5.0 to 5.6 Ω

(c) Measure the resistance according to the value(s) in the table below.

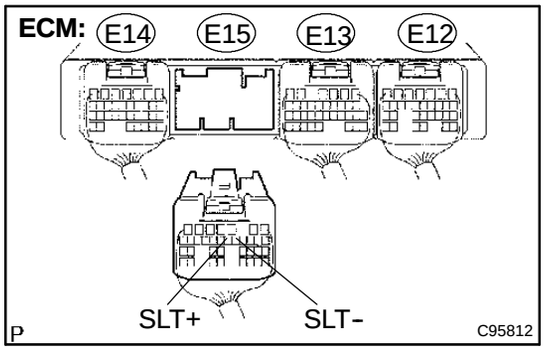
Standard (Check for short):

Tester Connection	Specified Condition
1 (SLT+) - Body ground	10 kΩ or higher
4 (SLT-) - Body ground	

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector to the transaxle.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E15 - 13 (SLT+) - E15 - 12 (SLT-)	5.0 to 5.6 Ω

(d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

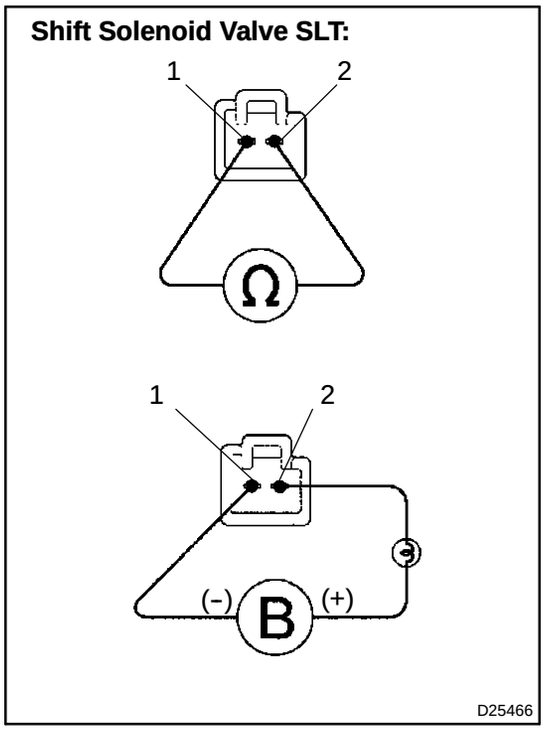
Tester Connection	Specified Condition
E15 - 13 (SLT+) - Body ground	10 kΩ or higher
E15 - 12 (SLT-) - Body ground	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

REPLACE ECM

3 INSPECT SHIFT SOLENOID VALVE(SLT)



(a) Remove the shift solenoid valve (SLT).
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) battery lead with a 21 W bulb to the terminal 2 of the solenoid valve connector and the negative (-) battery lead to the terminal 1 of the solenoid valve connector for checking the solenoid valve operation.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SLT)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (See Pub. No. RM925E, page 40-26)

DTC	P2769	TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT LOW (SHIFT SOLENOID VALVE SL)

DTC	P2770	TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT HIGH (SHIFT SOLENOID VALVE SL)

CIRCUIT DESCRIPTION

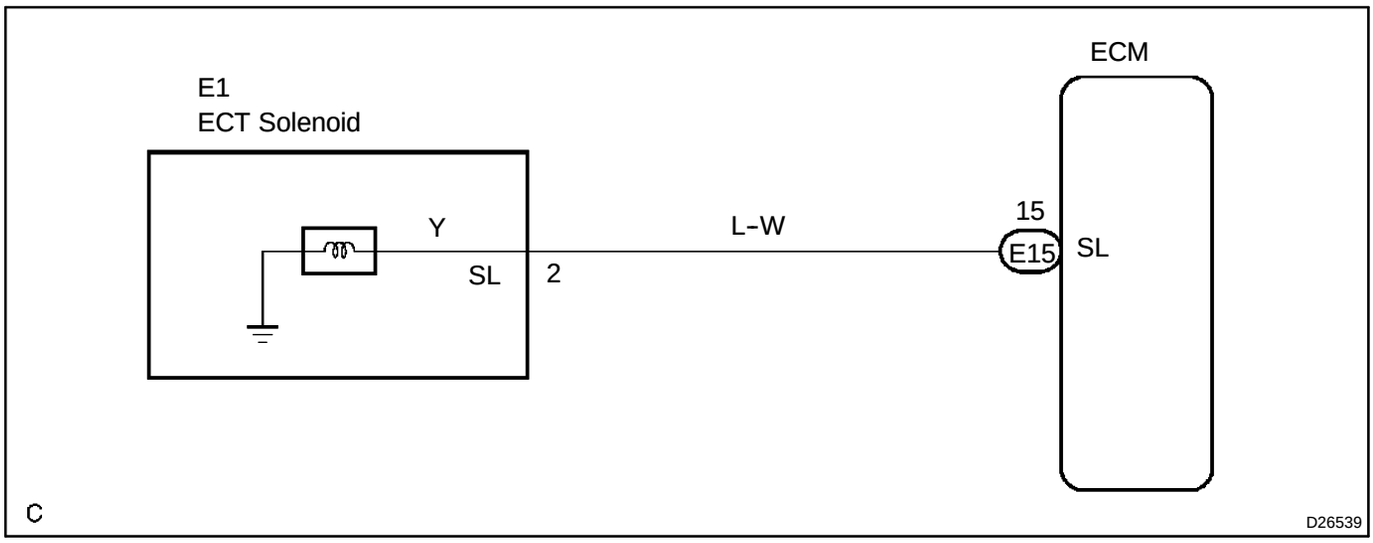
The shift solenoid valve SL is turned "ON" and "OFF" by signals from the ECM in order to control the hydraulic pressure operation, the lock-up relay valve, which then the controls operation of the lock-up clutch.

DTC No.	DTC Detection Condition	Trouble Area
P2769	ECM detects short in solenoid valve SL circuit 1 time when solenoid valve SL is operated (2-trip detection logic)	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM
P2770	ECM detects open in solenoid valve SL circuit 1 time when solenoid valve SL is not operated (2-trip detection logic)	• Open in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM

MONITOR DESCRIPTION

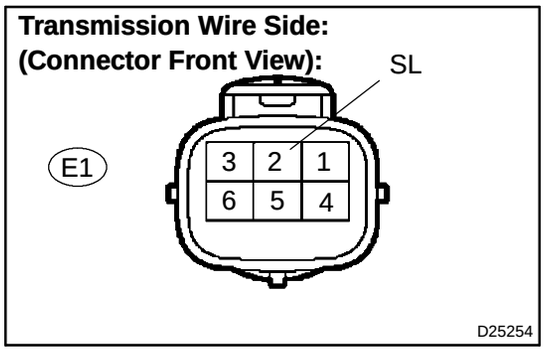
Based on the signals from the Throttle Position Sensor, the Airflow Meter and the Crankshaft Position Sensor, the ECM sends a signal to the SL Solenoid Valve to regulate the hydraulic pressure and provide smoother gearshifts. The shift-solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects an open or short circuit for shift-solenoid SL, it will illuminate the MIL.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION WIRE(SL)



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

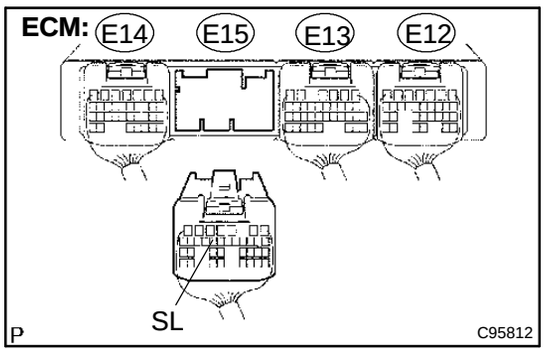
Standard:

Tester Connection	Specified Condition 20°C (68°F)
2 - Body ground	11 to 15 Ω

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard:

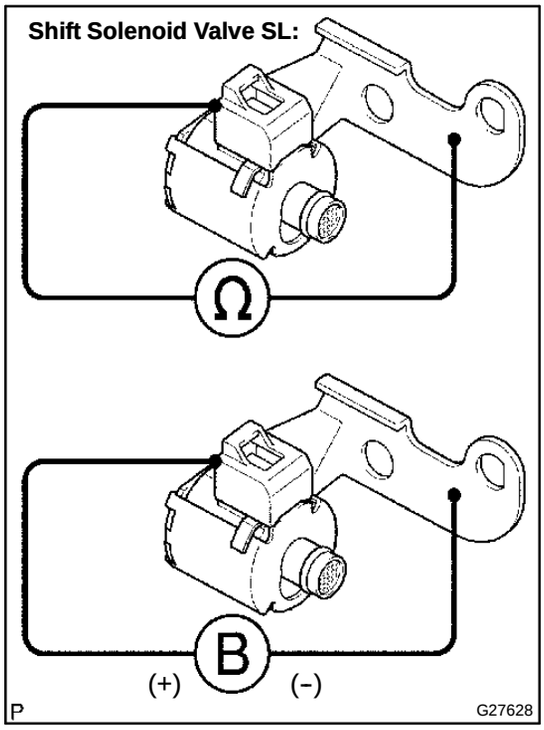
Tester Connection	Specified Condition 20°C (68°F)
E15 - 15 (SL) - Body ground	11 to 15 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

REPLACE ECM

3 INSPECT SHIFT SOLENOID VALVE(SL)



(a) Remove the shift solenoid valve SL.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (SL) – Solenoid Body (SL)	11 to 15 Ω

(c) Connect positive (+) lead to the terminal of solenoid connector, negative (–) lead to the solenoid body.

OK:

The solenoid valve makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SL)**

OK

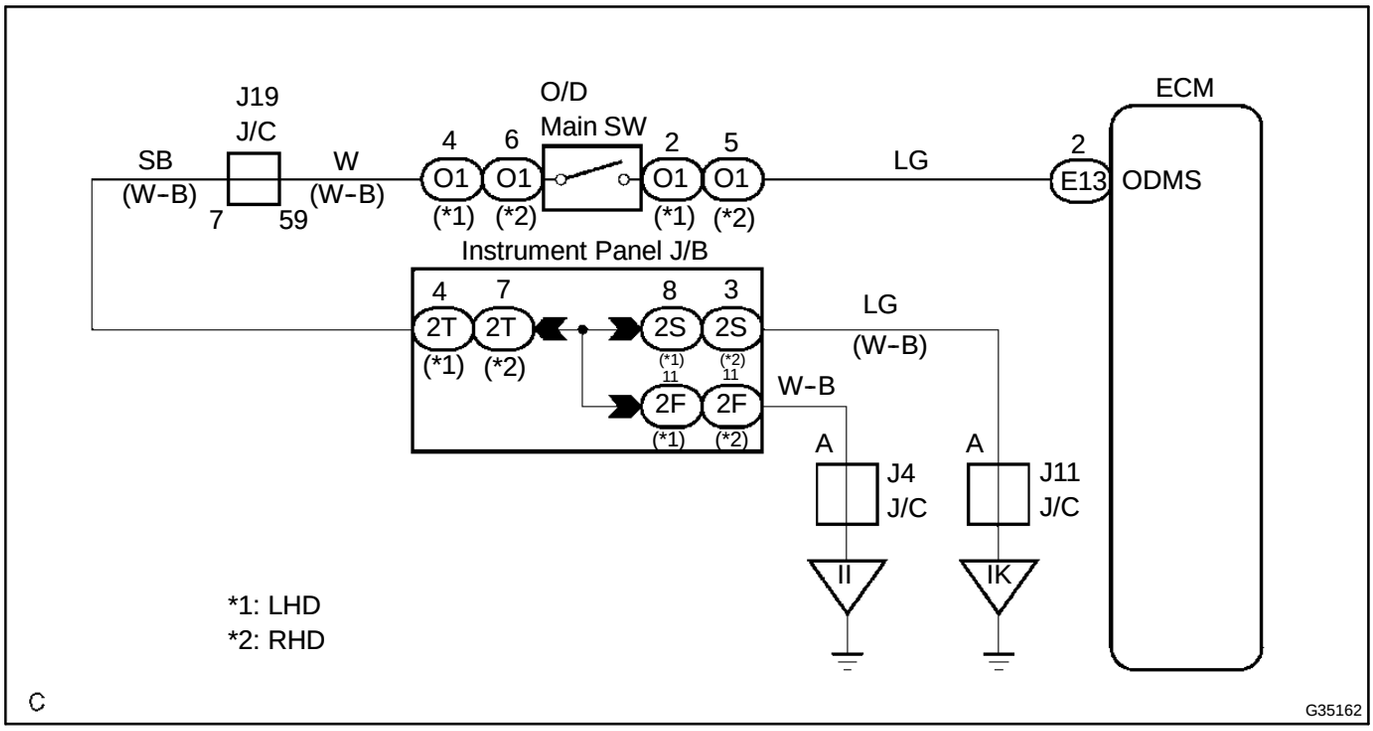
REPAIR OR REPLACE TRANSMISSION WIRE (See Pub. No. RM925E, page 40–26)

O/D MAIN SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The O/D main switch (transmission control switch) is a momentary type switch. When pressing the O/D main switch, the O/D OFF indicator light lights up and the ECM prohibits shifting into O/D, and when pressing it once again, the O/D OFF indicator light goes off and the ECM allows shifting into O/D. Turning the IG switch OFF will reset the O/D OFF indicator light.

WIRING DIAGRAM

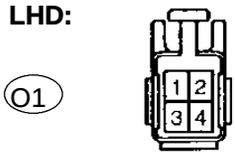


INSPECTION PROCEDURE

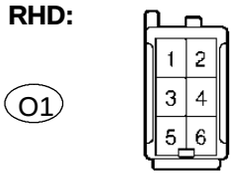
1	CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL SWITCH - BODY GROUND)

Wire Harness Side:
(Connector Front View):

LHD:



RHD:



G35422

(a) Disconnect the transmission control switch connector of shift lever assy.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

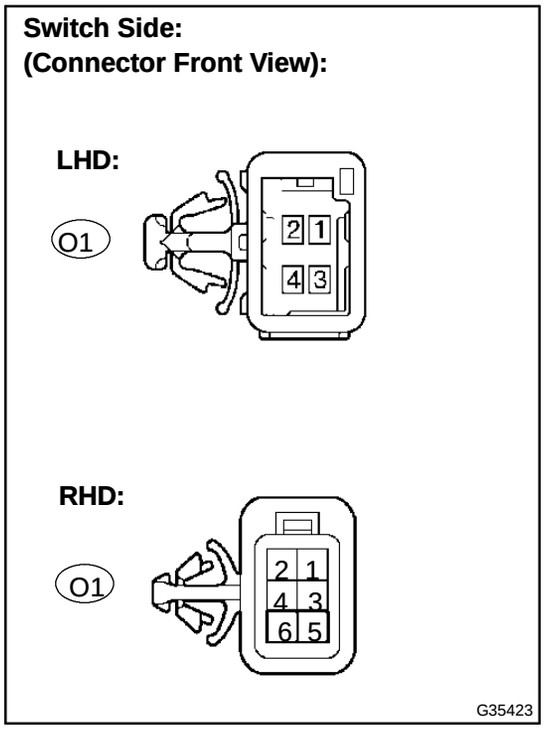
Tester Connection	Specified Condition
4 *1 - Body ground 6 *2 - Body ground	Below 1 Ω

HINT:
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR** **(SEE PAGE 01-31)**

OK

2 INSPECT TRANSMISSION CONTROL SWITCH



(a) Measure the resistance according to the value(s) in the table below.

Standard:

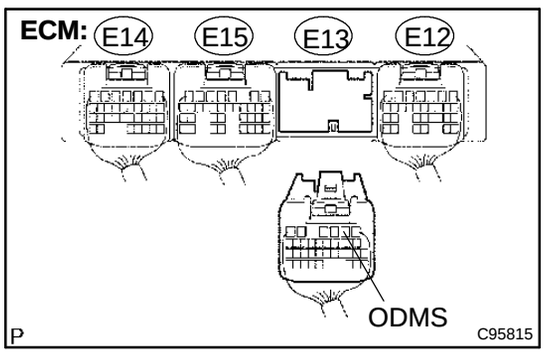
Switch Condition	Tester Connection	Specified Condition
Press continuously transmission control switch	2 *1 - 4 *1 5 *2 - 6 *2	Below 1 Ω
Release transmission control switch	↑	10 kΩ or higher

HINT:
*1: LHD
*2: RHD

NG → **REPLACE TRANSMISSION CONTROL SWITCH**

OK

3 CHECK HARNESS AND CONNECTOR(TRANSMISSION CONTROL SWITCH - ECM)



(a) Connect the transmission control switch connector of shift lever assy.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Switch Condition	Tester Connection	Specified Condition
Press continuously transmission control switch	E13 - 2 (ODMS) - Body ground	Below 1 Ω
Release transmission control switch	↑	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-655)

KICK-DOWN SWITCH CIRCUIT

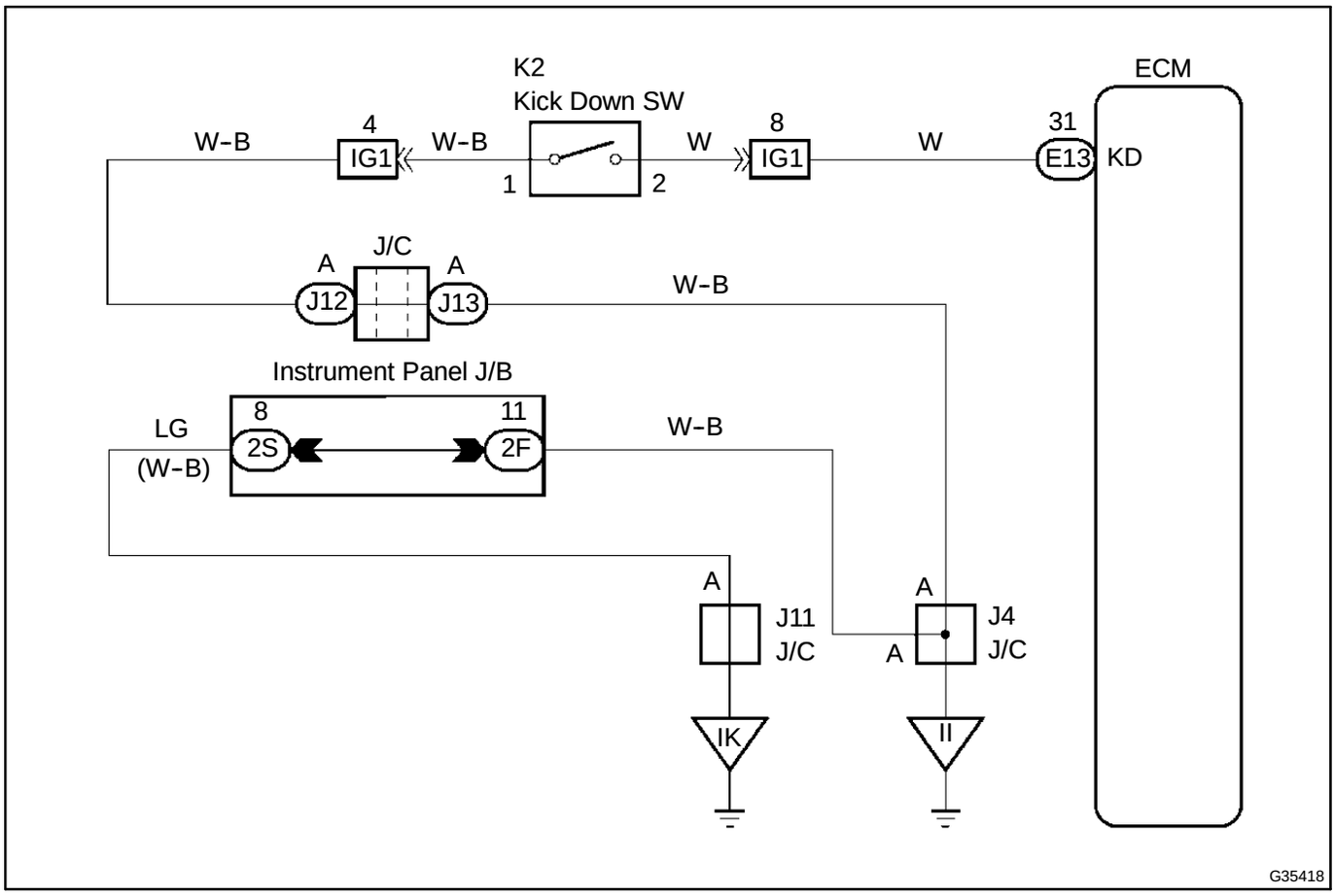
CIRCUIT DESCRIPTION

The kick-down switch is turned ON when the accelerator pedal is fully depressed and a signal is sent to the ECM.

When the kick-down switch is turned ON, the ECM controls gear shifting according to the programmed shift diagrams.

If a short circuit develops in the kick-down switch, the ECM disregards the kick-down signals and controls shifting at the normal shift points.

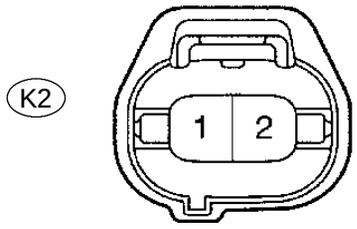
WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(KICK DOWN SWITCH - BODY GROUND)

Wire Harness Side:
(Connector Front View):



(a) Disconnect the kick-down switch connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard:

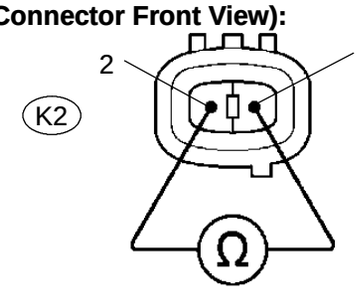
Tester Connection	Specified Condition
1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR** **(SEE PAGE 01-31)**

OK

2 INSPECT KICK DOWN SWITCH

Switch Side:
(Connector Front View):



(a) Measure resistance according to the value(s) in the table below when kick-down switch is ON and OFF.

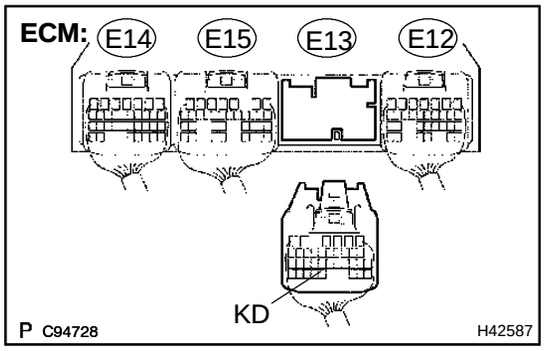
Standard:

Switch Condition	Tester Connection	Specified Condition
Press continuously (Kick-down switch is ON)	1 - 2	Below 1 Ω
Release (Kick-down switch is OFF)	↑	10 kΩ or higher

NG → **REPLACE KICK DOWN SWITCH**

OK

3 CHECK HARNESS AND CONNECTOR(KICK DOWN SWITCH - ECM)



(a) Connect the kick-down switch connector.
(b) Disconnect the ECM connector.
(c) Measure resistance according to the value(s) in the table below when accelerator pedal is fully depressed or not.

Standard:

Switch Condition	Tester Connection	Specified Condition
Fully depressed (Kick-down switch is ON)	E13 -31 (KD) - Body ground	Below 1 Ω
Release (Kick-down switch is OFF)	↑	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-31)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-655)

SUPPLEMENTAL RESTRAINT SYSTEM

PRECAUTION

05D5V-05

1. HANDLING PRECAUTIONS FOR AIRBAG SENSOR

HINT:

In this section, the airbag sensor assy center, airbag sensor front LH, airbag sensor front RH, side airbag sensor assy LH, side airbag sensor assy RH, airbag sensor rear LH, airbag sensor rear RH and seat position airbag sensor are collectively referred to as the airbag sensor.

(a) Before starting the following operations, wait at least 90 seconds after disconnecting the negative (−) terminal of the battery:
  (1) Replacement of the airbag sensor.
  (2) Adjustment of the front/rear doors of the vehicle equipped with the side airbag and curtain shield airbag (fitting adjustment).

(b) When connecting or disconnecting the airbag sensor connector, ensure that all of the sensors are installed in the vehicle.

(c) Do not use an airbag sensor which has been dropped during the operation or transportation.

(d) Do not disassemble the airbag sensor.

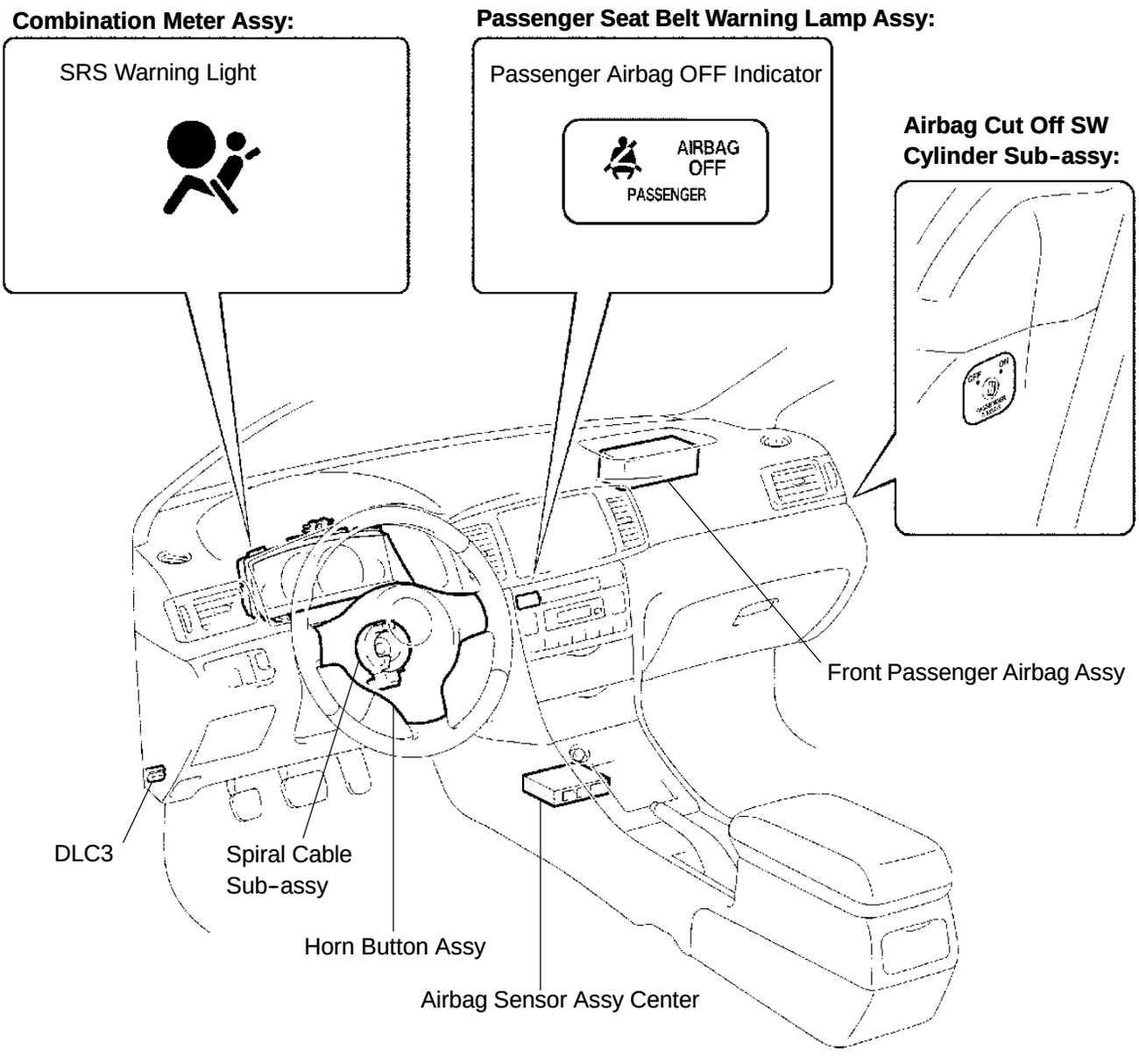
2. INSPECTION PROCEDURE FOR VEHICLE INVOLVED IN ACCIDENT

(a) When the airbag has not deployed, confirm the DTC by checking the SRS warning light. If there is any malfunction in the SRS airbag system, perform troubleshooting.

(b) When any of the airbags have deployed, replace the airbag sensor and check the installation condition.

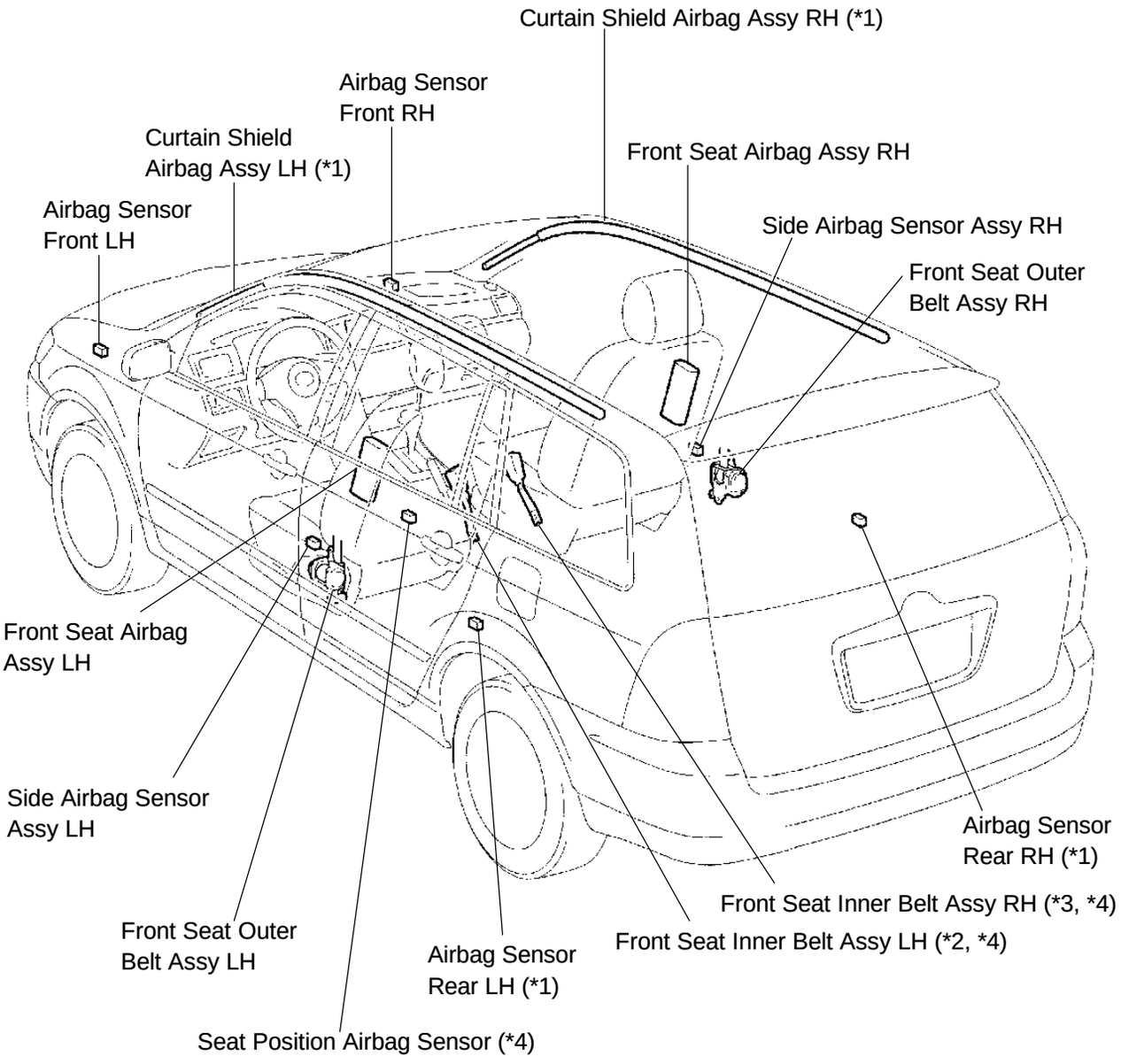
05LUK-01

LOCATION



P H45395

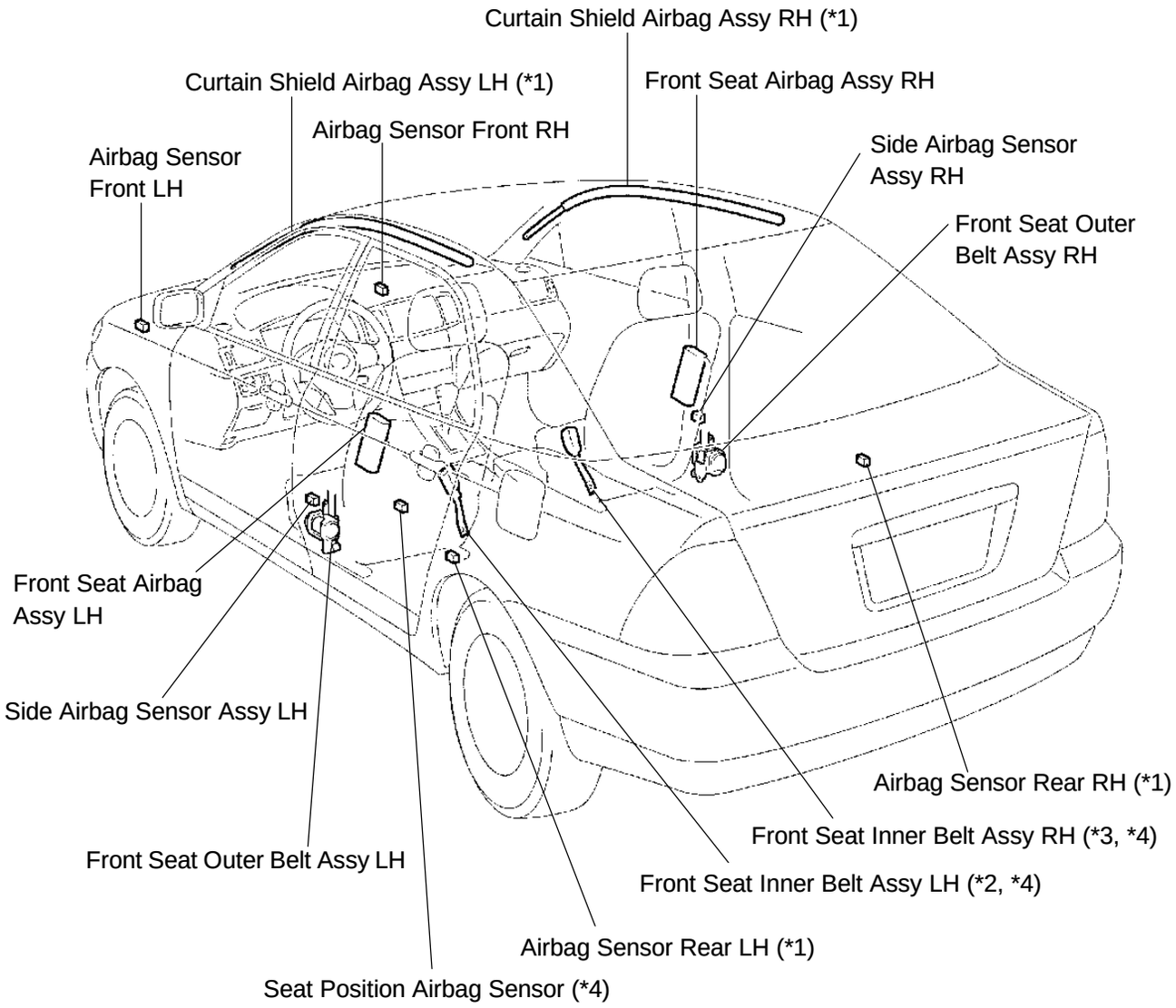
Wagon:



*1: w/ Curtain Shield Airbag
*2: LHD
*3: RHD
*4: Equipped on Driver Side

P H45396

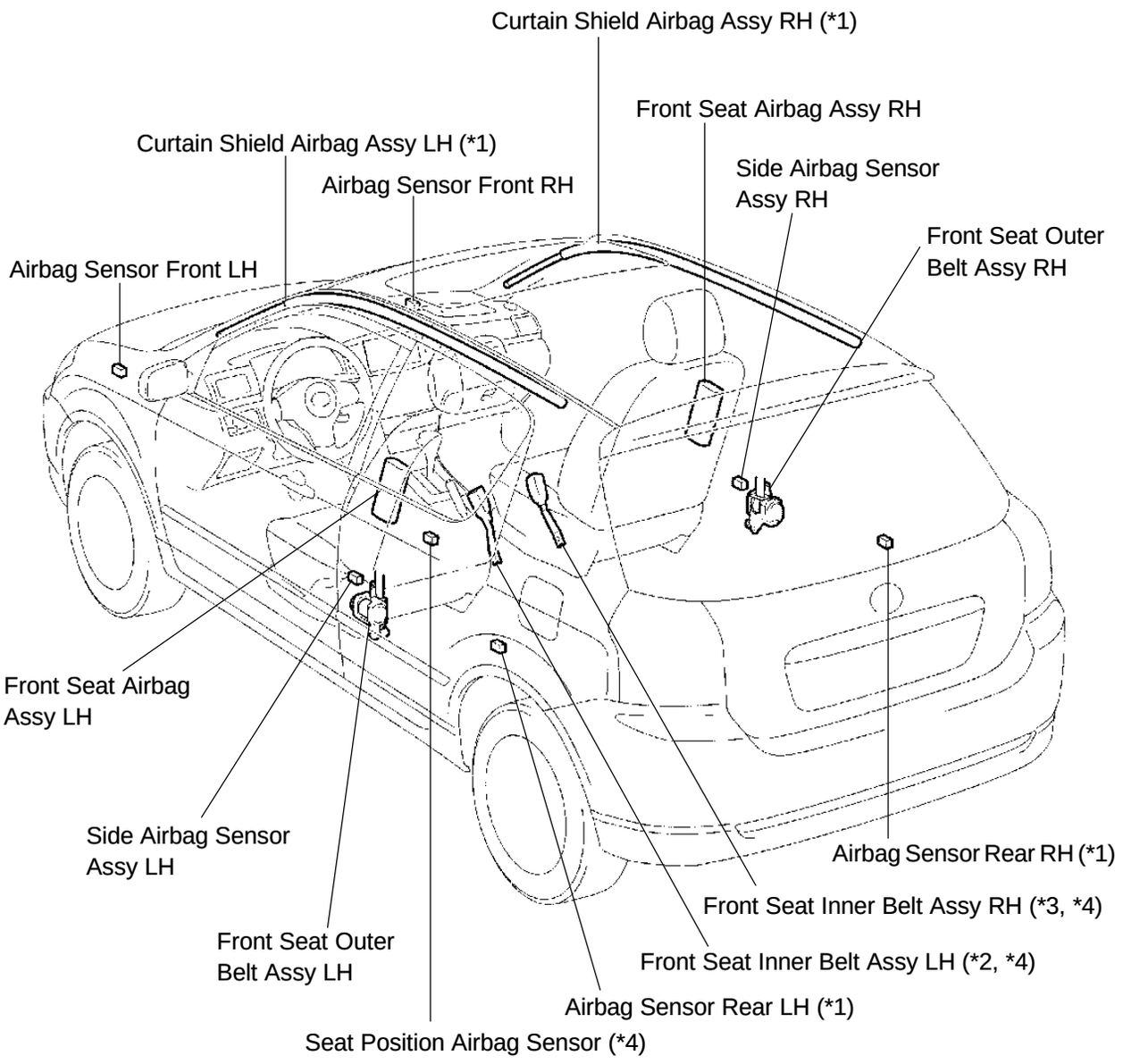
Sedan:



*1: w/ Curtain Shield Airbag
*2: LHD
*3: RHD
*4: Equipped on Driver Side

P H45397

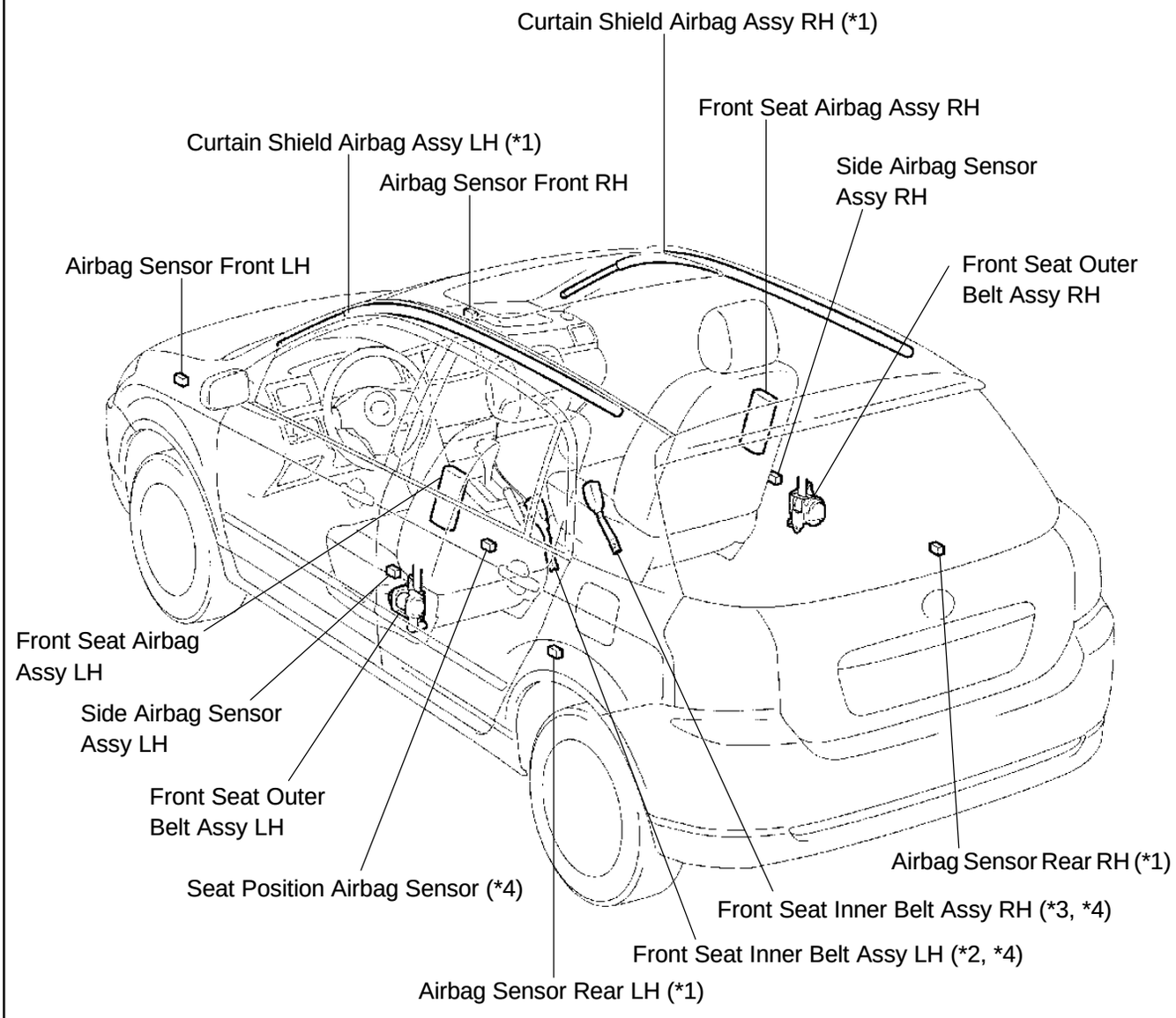
3-Door Hatchback:



*1: w/ Curtain Shield Airbag
*2: LHD
*3: RHD
*4: Equipped on Driver Side

H45398

5-Door Hatchback:

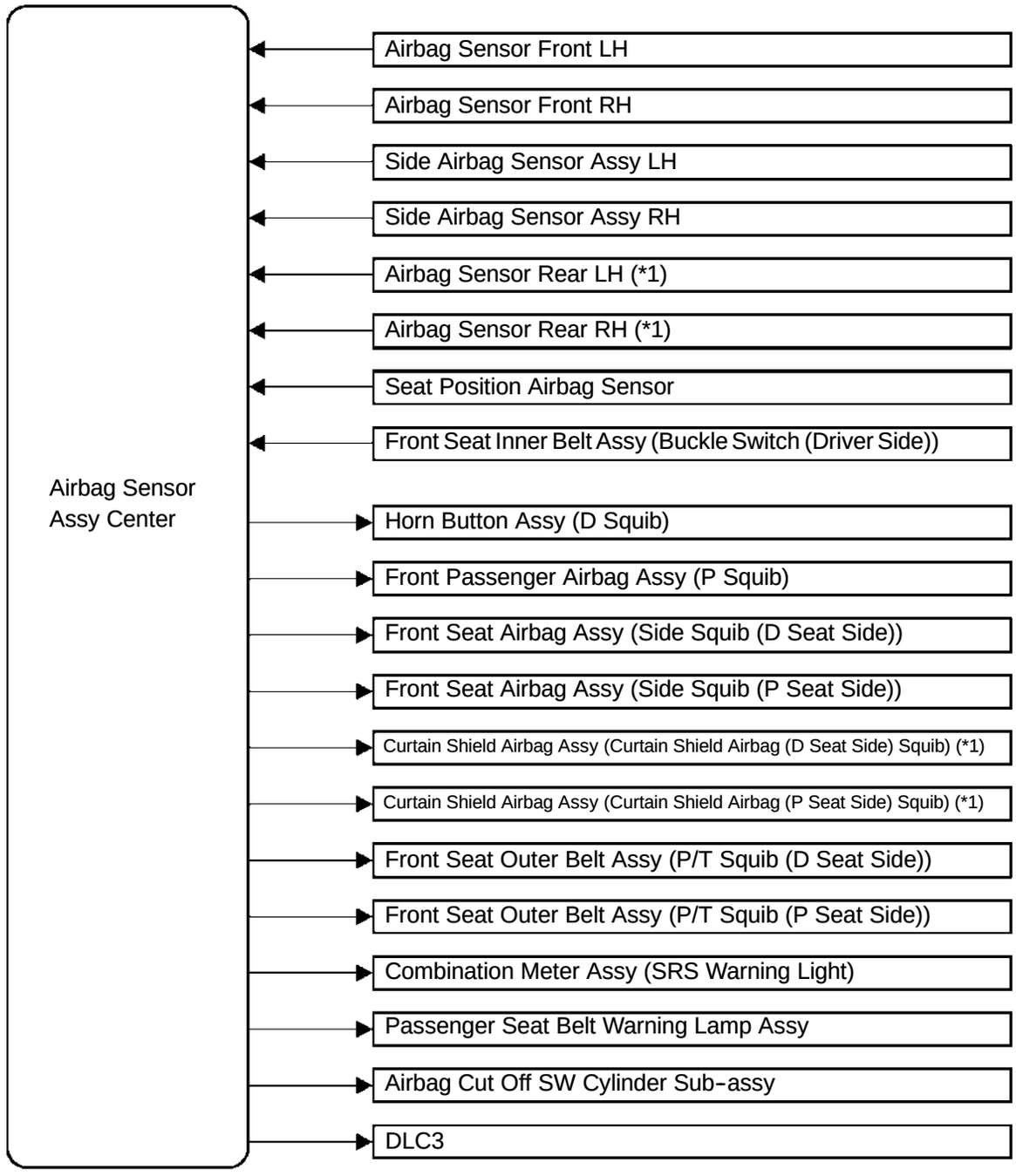


*1: w/ Curtain Shield Airbag
*2: LHD
*3: RHD
*4: Equipped on Driver Side

P H45399

05LUL-01

SYSTEM DIAGRAM



*1: w/ Curtain Shield Airbag

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05LUM-01

SYSTEM DESCRIPTION

1. DESCRIPTION OF SUPPLEMENTAL RESTRAINT SYSTEM

(a) General description.

(1) In this system, the airbag sensor assy center installed on the floor under the A/C unit determines whether or not to activate the SRS airbags (driver airbag, passenger airbag, front seat airbags and curtain shield airbags) and seat belt pretensioners by receiving the collision signal from each sensor (excluding the airbag sensor assy center). When there is trouble in the system, the airbag sensor assy center turns on the SRS warning light on the combination meter assy to inform the driver.

(b) Description of the dual stage control.

(1) The airbag sensor assy center controls the dual stage deployment of the driver airbag in the horn button assy and the passenger airbag on the instrument panel. The airbag sensor assy center controls the dual stage deployment of the driver airbag according to the collision impact, seat position and seat belt ON/OFF state. It also controls the dual stage deployment of the passenger airbag according to the collision impact and seat belt ON/OFF state.

(c) Description of check mode (signal check).

(1) This airbag sensor assy center is operable using the check mode of the intelligent tester II function. Check mode can detect and output DTC by using an intelligent tester II to switch the airbag sensor assy center to the check mode.

A simulation method is used, if the malfunction cannot be reproduced during troubleshooting (the malfunction is temporarily solved, etc.). In this case, joggling each connector, or driving on a city or rough road with the airbag sensor assy center in check mode makes it possible to obtain a more accurate malfunction condition.

2. IGNITION JUDGEMENT AND CONDITIONS

(a) Operation in case of front collision.

(1) When the vehicle collides in the hatched area (Fig.1) and shock is larger than a predetermined level, the airbags (driver and front passenger) are activated automatically. The deceleration sensor of the airbag sensor assy center determines the need for ignition in response to collisions within the hatched area based on the signal from the deceleration sensor of the front airbag sensor.

(2) Safing sensor of the airbag sensor assy center is designed to activate at a smaller deceleration rate than the deceleration sensor. As illustrated in Fig.2 below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.

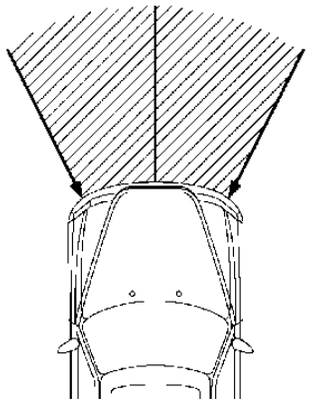


Fig.1

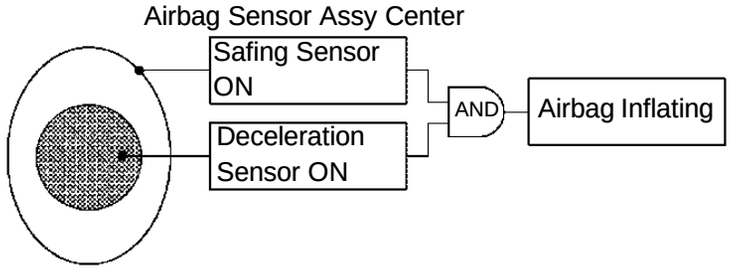


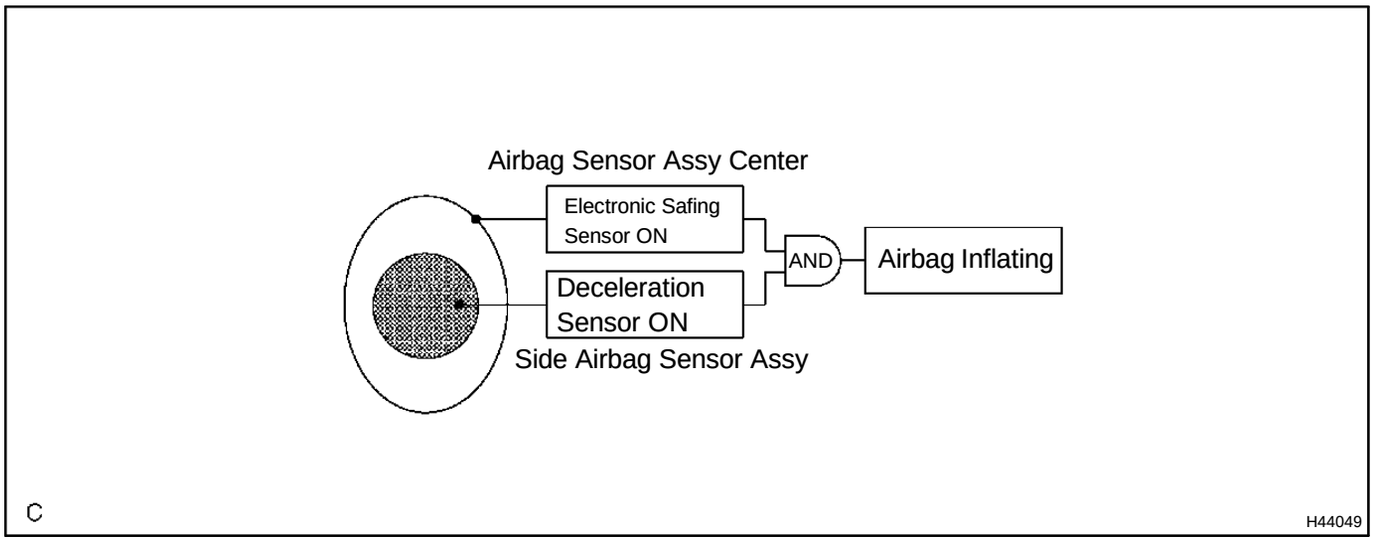
Fig.2

C

H44048

(b) Operation in case of front side collision.

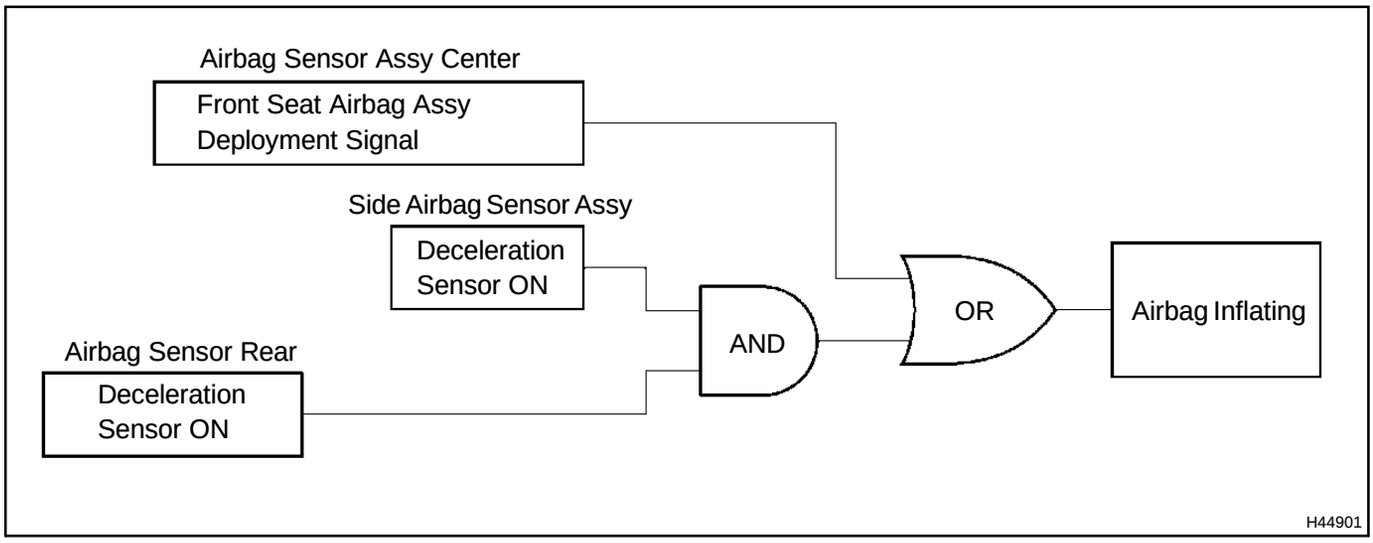
(1) Electronic safing sensor of the side airbag sensor assy is designed to activate at a smaller deceleration rate than the deceleration sensor of the side airbag sensor assy. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



(c) w/ Curtain shield airbag:

Operation in case of rear side collision.

(1) Electronic safing sensor of the airbag sensor assy center is designed to activate at a smaller deceleration rate than the deceleration sensor of the airbag sensor rear. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



050YF-34

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester II can be used in steps 4, 6, 8 and 9.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-718)

NEXT

3	WARNING LIGHT CHECK (SEE PAGE 05-719)

NEXT

4	DTCs CHECK (Present and Past DTCs) (SEE PAGE 05-727)

- DTCs ARE OUTPUT (INCLUDING NORMAL SYSTEM CODE): Go to step 5
- DTCs ARE NOT OUTPUT: PROBLEM SYMPTOMS TABLE (SEE PAGE 05-734)

5	DTCs CHART (SEE PAGE 05-735)

NEXT

6	CIRCUIT INSPECTION (SEE PAGE 05-740 TO 05-948)

NEXT

7	REPAIR

NEXT

8	CLEAR DTCs (Present and Past DTCs) (SEE PAGE 05-727)

NEXT

9	DTCs CHECK (Present and Past DTCs) (SEE PAGE 05-727)

- DTCs ARE NOT OUTPUT: Go to step 10
- DTCs ARE OUTPUT: Go to step 5

10	SYMPTOM SIMULATION (SEE PAGE 01–21)

WARNING LIGHT REMAINS OFF: Go to step 11

WARNING LIGHT IS ON: Go to step 5

11	CONFIRMATION TEST

NEXT

END

05D5X-05

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet	Inspector's Name

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Miles

Date Problem Occurred	
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.

Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Condition	
Details of Problem	

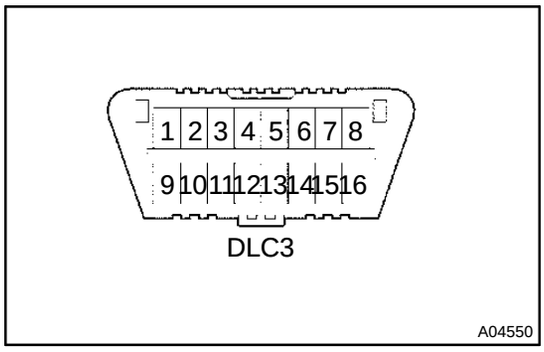
Vehicle Inspection, and Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnostic System Inspection

SRS Warning Light Inspection	1st Time	☐ Remains ON ☐ Sometimes comes on ☐ Does not come on
	2nd Time	☐ Remains ON ☐ Sometimes comes on ☐ Does not come on
Passenger Airbag OFF Indicator Inspection	1st Time	☐ Remains ON ☐ Does not come on
	2nd Time	☐ Remains ON ☐ Does not come on
DTC Inspection	1st Time	☐ Normal System Code ☐ Trouble Code [Code.]
	2nd Time	☐ Normal System Code ☐ Trouble Code [Code.]

05LUN–01

DIAGNOSIS SYSTEM



1. CHECK DLC3

(a) The vehicle's ECM conforms to ISO 14230 and ISO 9141–2 for communication protocol. The terminal arrangement of the DLC3 complies with ISO J15031–03 and meets the ISO 14230 and ISO 9141–2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus + Line/Pulse generation	During Transmission
4	Chassis Ground ⇔ Body Ground/Below 1 Ω	Always
16	Battery Positive ⇔ Body Ground/10 to 14 V	Always

HINT:

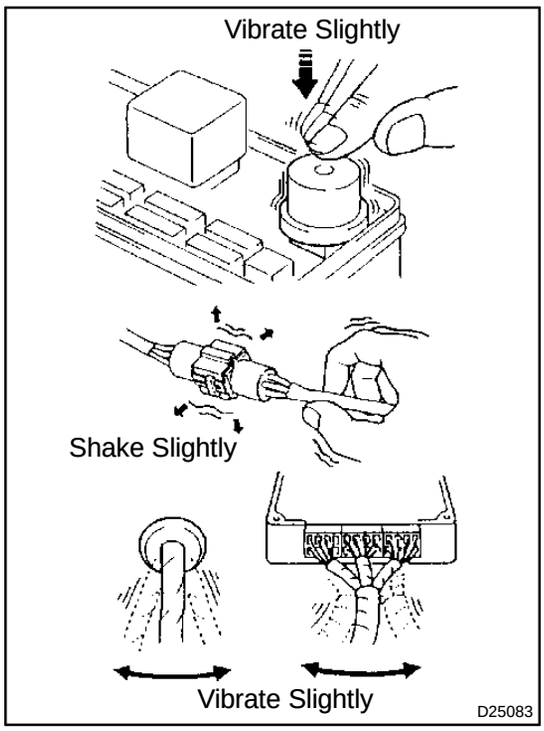
If the display shows UNABLE TO CONNECT TO VEHICLE when you connect the cable of the intelligent tester II to the DLC3, turn the ignition switch to the ON position and operate the intelligent tester II, there is a problem on the vehicle side or tool side.

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

2. SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no symptoms occur. In such cases, a thorough customer problem analysis must be carried out. Then the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be simulated. No matter how experienced or skilled a technician may be, if he proceeds to troubleshoot without confirming the problem symptoms, he will likely overlook something important and make a wrong guess at some points in the repair operation. This leads to a standstill in troubleshooting.



(a) Vibration method: When vibration seems to be the major cause.

HINT:

Perform the simulation method only during the primary check period (for approximately 6 seconds after the ignition switch is turned to the ON position.

(1) Slightly vibrate the part of the sensor considered to be the problem cause with your fingers and check whether the malfunction occurs.

HINT:

Shaking the relays too strongly may result in open relays.

(2) Slightly shake the connector vertically and horizontally.

(3) Slightly shake the wire harness vertically and horizontally.

The connector joint and fulcrum of the vibration are the major areas to be checked thoroughly.

3. FUNCTION OF SRS WARNING LIGHT

(a) Primary check.

(1) Turn the ignition switch to the LOCK position. Wait for at least 2 seconds, then turn the ignition switch to the ON position. The SRS warning light comes on for approximately 6 seconds and the SRS airbag system diagnosis (including the seat belt pretensioner) is performed.

HINT:

If trouble is detected during the primary check, the SRS warning light remains on even after the primary check period (for approximately 6 seconds) has elapsed.

(b) Constant check.

(1) After the primary check, the airbag sensor assy center constantly monitors the SRS airbag system for trouble.

HINT:

If trouble is detected during the constant check, the airbag sensor assy center functions as follows:

- The SRS warning light comes on.
- The SRS warning light goes off, and then comes on. This blinking pattern indicates the source voltage drop. The SRS warning light goes off 10 seconds after the source voltage returns to normal.

(c) Review.

(1) When the airbag system is normal:

The SRS warning light comes on only during the primary check period (for approximately 6 seconds after the ignition switch is turned to the ON position).

(2) When the airbag system has trouble:

- The SRS warning light remains on even after the primary check period has elapsed.
- The SRS warning light goes off after the primary check, but comes on again during the constant check.
- The SRS warning light does not come on when turning the ignition switch from the LOCK to ON position.

HINT:

The airbag sensor assy center keeps the SRS warning light on if the airbag has been deployed.

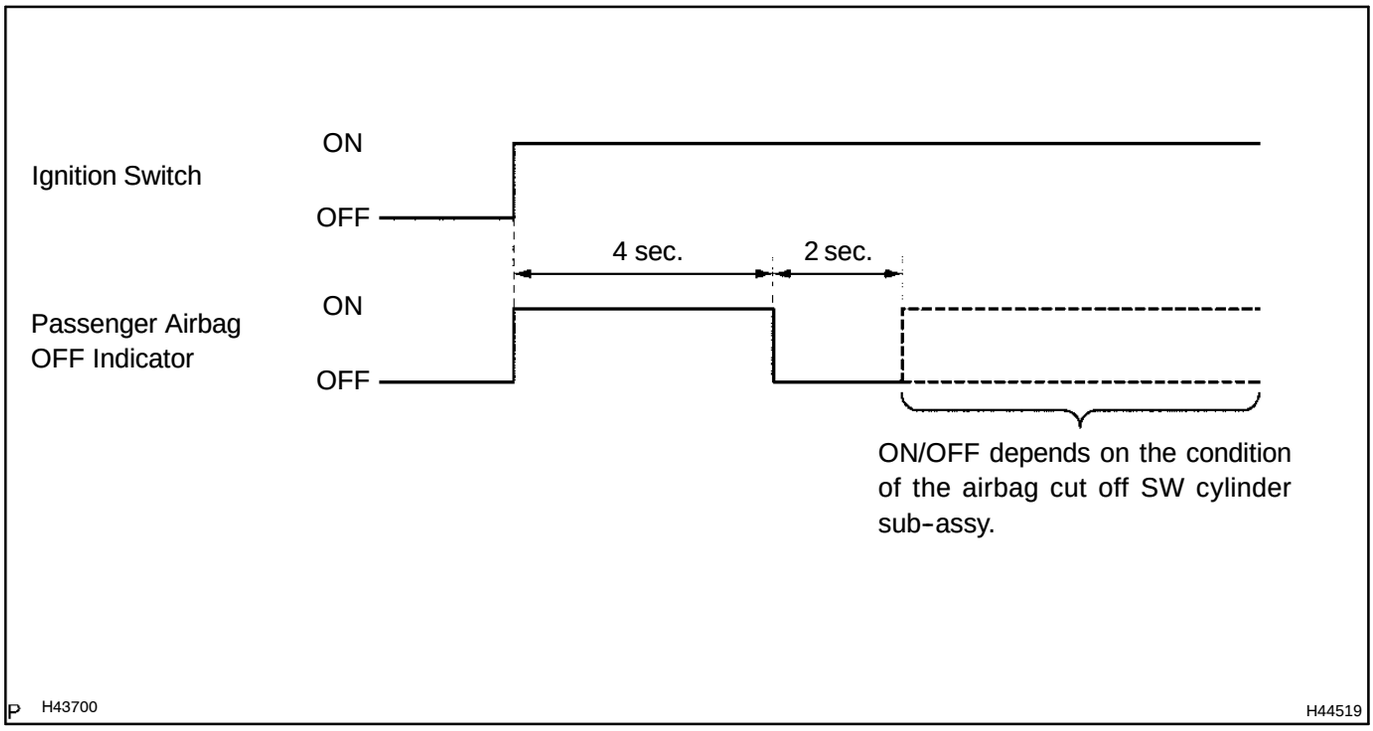
4. FUNCTION OF PASSENGER AIRBAG OFF INDICATOR

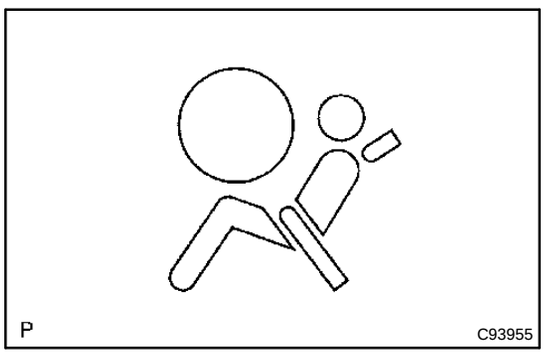
(a) The passenger airbag OFF indicator informs the driver and passengers of the passenger airbag operating condition based on the airbag cut off SW cylinder sub–assy (passenger airbag manual cut off switch) condition.

Airbag cut of SW cylinder sub–assy	Passenger airbag	Passenger airbag OFF indicator
ON position	Active	OFF
OFF position	Not active	ON

(1) When the airbag cut off SW cylinder sub-assy (passenger airbag manual cut off switch) is ON, the passenger airbag OFF indicator comes on for approximately 4 seconds after the ignition switch is turned to the ON position, and then goes off.

(2) When the airbag cut off SW cylinder sub-assy (passenger airbag manual cut off switch) is OFF, the passenger airbag OFF indicator comes on for approximately 4 seconds after the ignition switch is turned to the ON position, and goes off for approximately 2 seconds, and then comes on again.





5. SRS WARNING LIGHT CHECK

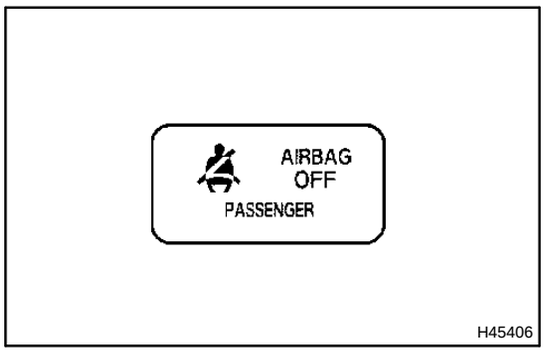
(a) Turn the ignition switch to the ON position, and check that the SRS warning light comes on for approximately 6 seconds (primary check).

(b) Check that the SRS warning light goes off approximately 6 seconds after the ignition switch is turned to the ON position (constant check).

HINT:

When any of the following symptoms occur, refer to the "Problem Symptoms Table" (see page 05-734).

- The SRS warning light comes on occasionally, after the primary check period has elapsed.
- The SRS warning light comes on, but DTC is not output.
- The ignition switch is turned from the LOCK to ON position, but the SRS warning light does not come on.



6. PASSENGER AIRBAG OFF INDICATOR CHECK

(a) Turn the ignition switch to the ON position.

(b) Check that the passenger airbag OFF indicator comes on for approximately 4 seconds, then goes off for approximately 2 seconds.

HINT:

Refer to the table in step 4 regarding the passenger airbag OFF indicator when the ignition switch is turned to the ON position and approximately 6 seconds pass.

7. RELEASE METHOD OF ACTIVATION PREVENTION MECHANISM

(a) The activation prevention mechanism is built into the connector for the squib circuit of the SRS. As explained in the troubleshooting section, insert a piece of paper that is the same thickness as the male terminal between the terminal and the short spring to release it (Refer to the illustrations on the next 3 pages).

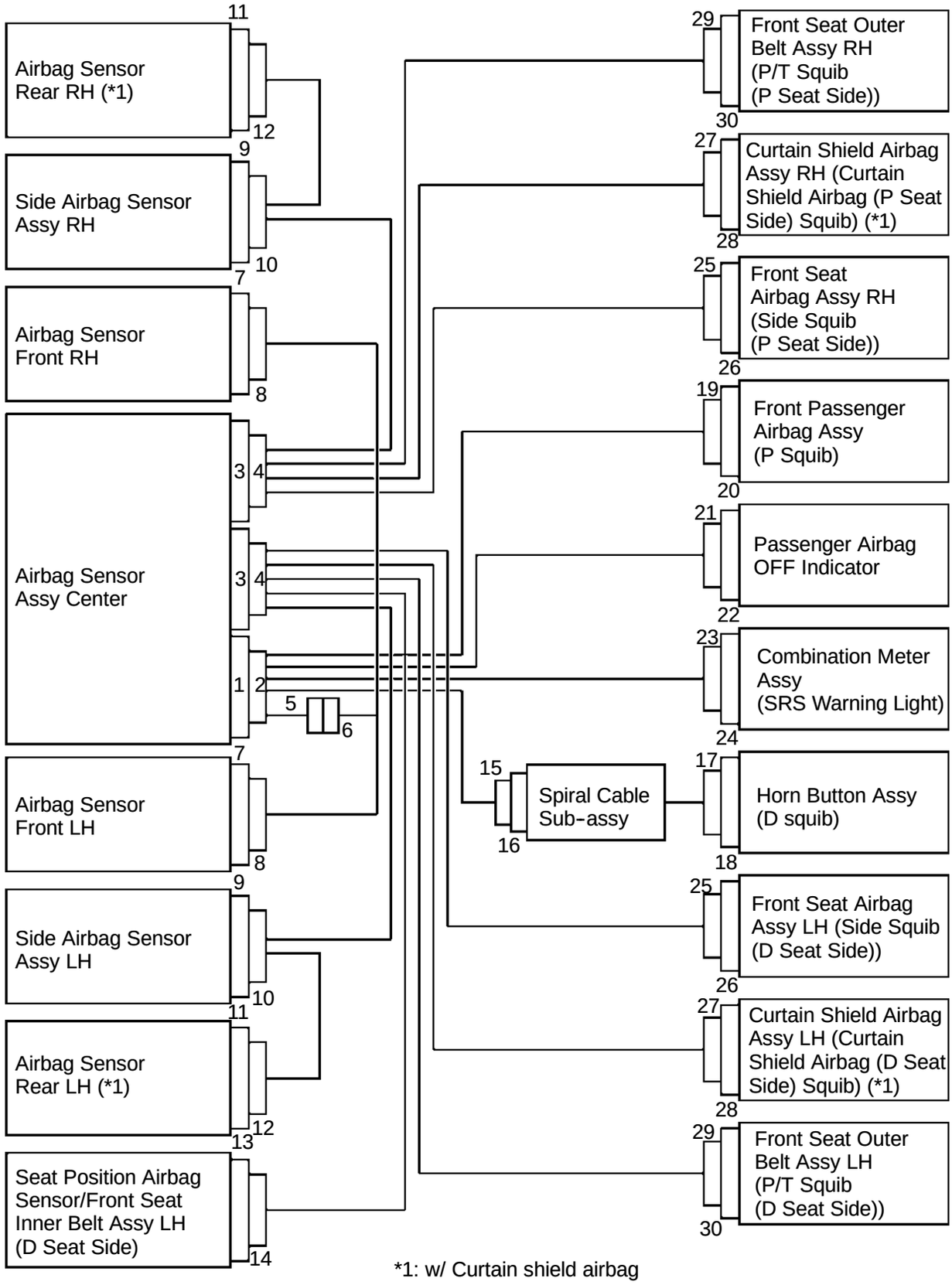
CAUTION:

Never release the activation prevention mechanism on the squib connector even when inspecting with the squib disconnected.

NOTICE:

- **Do not release the activation prevention mechanism unless specially directed by the trouble-shooting procedure.**
- **To prevent the terminal and the short spring from being damaged, always use a piece of paper that is the same thickness as the male terminal.**

LHD:

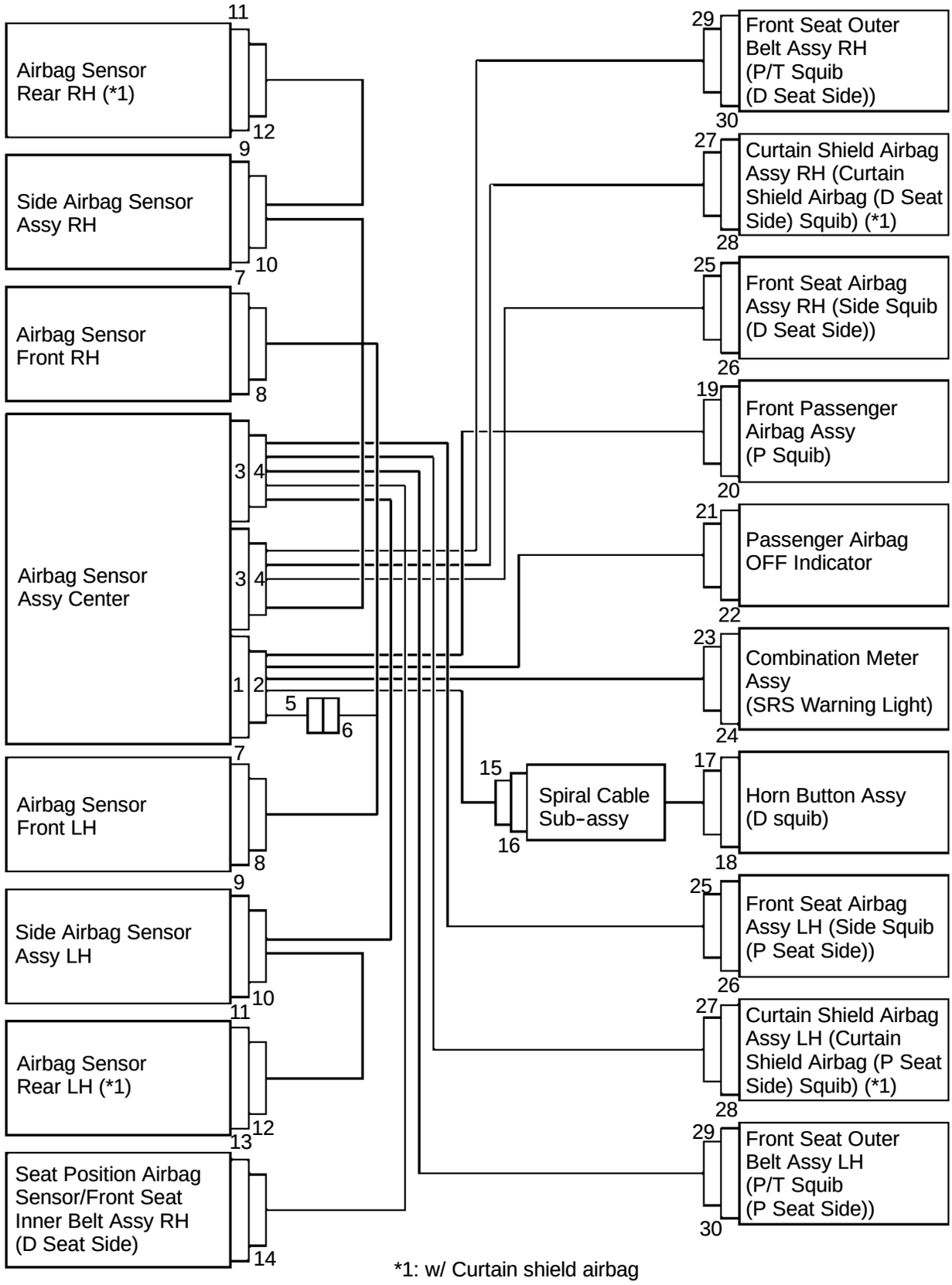


*1: w/ Curtain shield airbag

C

H45407

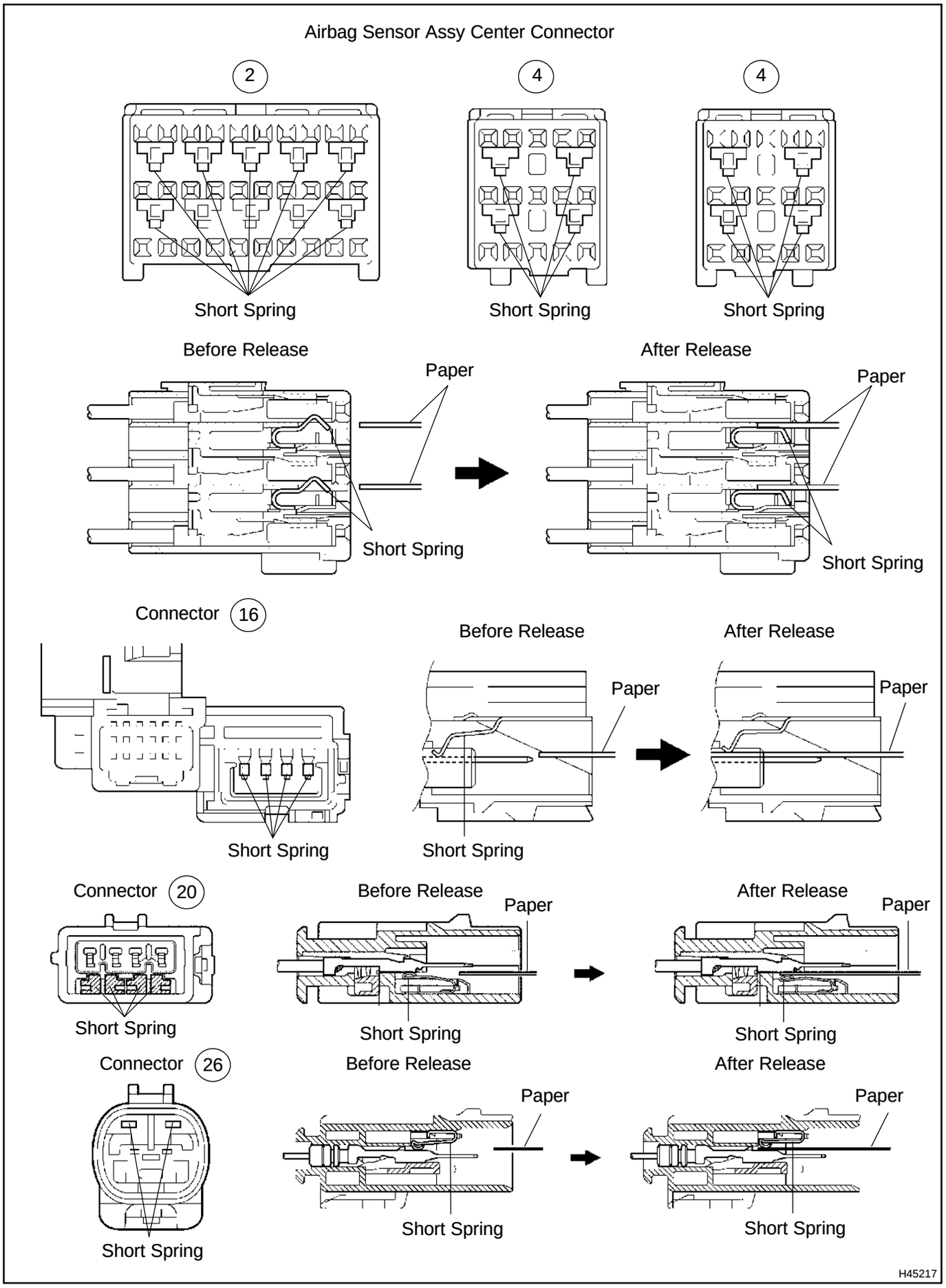
RHD:



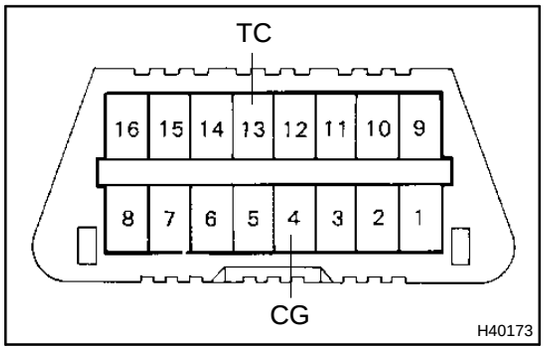
*1: w/ Curtain shield airbag

C

H45408


Airbag Sensor Assy Center Connector
2
4
4
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Connector 16
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Connector 20
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Short Spring
Connector 26
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Short Spring
H45217

DTC CHECK/CLEAR



1. SUPPLEMENTAL RESTRAINT SYSTEM DTC CHECK (USING SST CHECK WIRE)

(a) Check the DTCs (Present trouble code).

(1) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.

(2) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

(b) Check the DTCs (Past trouble code).

(1) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

(2) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.

(c) Read the DTCs.

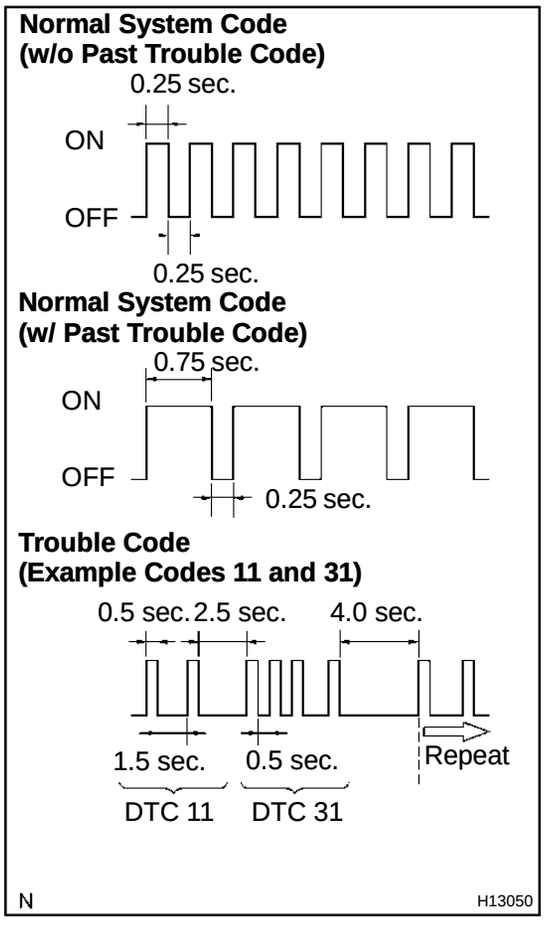
(1) Read the blinking patterns of the DTCs. Examples, the blinking patterns for the normal system code and trouble codes 11 and 31 are shown in the illustration to the left.

- Normal system code indication (w/o past trouble code)
  The light blinks twice per second.
- Normal system code indication (w/ past trouble code)
  When the past trouble code is stored in the airbag sensor assy center, the light blinks only once per second.
- Trouble code indication
  The first blinking indicates the first DTC. The second blinking occurs after a 1.5-second pause.

If there are more than 1 code, there will be a 2.5-second pause between each code. After all codes are shown, there will be a 4.0-second pause, and they all will be repeated.

HINT:

- If 2 or more malfunctions are found, the indication begins with the smaller numbered code.
- If DTCs are indicated without connecting the terminals, proceed to the "TC terminal circuit" on page 05-948.



2. DTC CLEAR (USING SST CHECK WIRE)

(a) Clear the DTCs.

(1) When the ignition switch is turned off, the DTCs are cleared.

HINT:

Depending on the DTC, the code may not be cleared by turning off the ignition switch. In this case, proceed to the next procedure.

(2) Using SST, connect terminals TC and CG of the DLC3, and then turn the ignition switch to the ON position.

SST 09843-18040

(3) Disconnect terminal TC of the DLC3 within 3 to 10 seconds after the DTCs are output, and check if the SRS warning light comes on after 3 seconds.

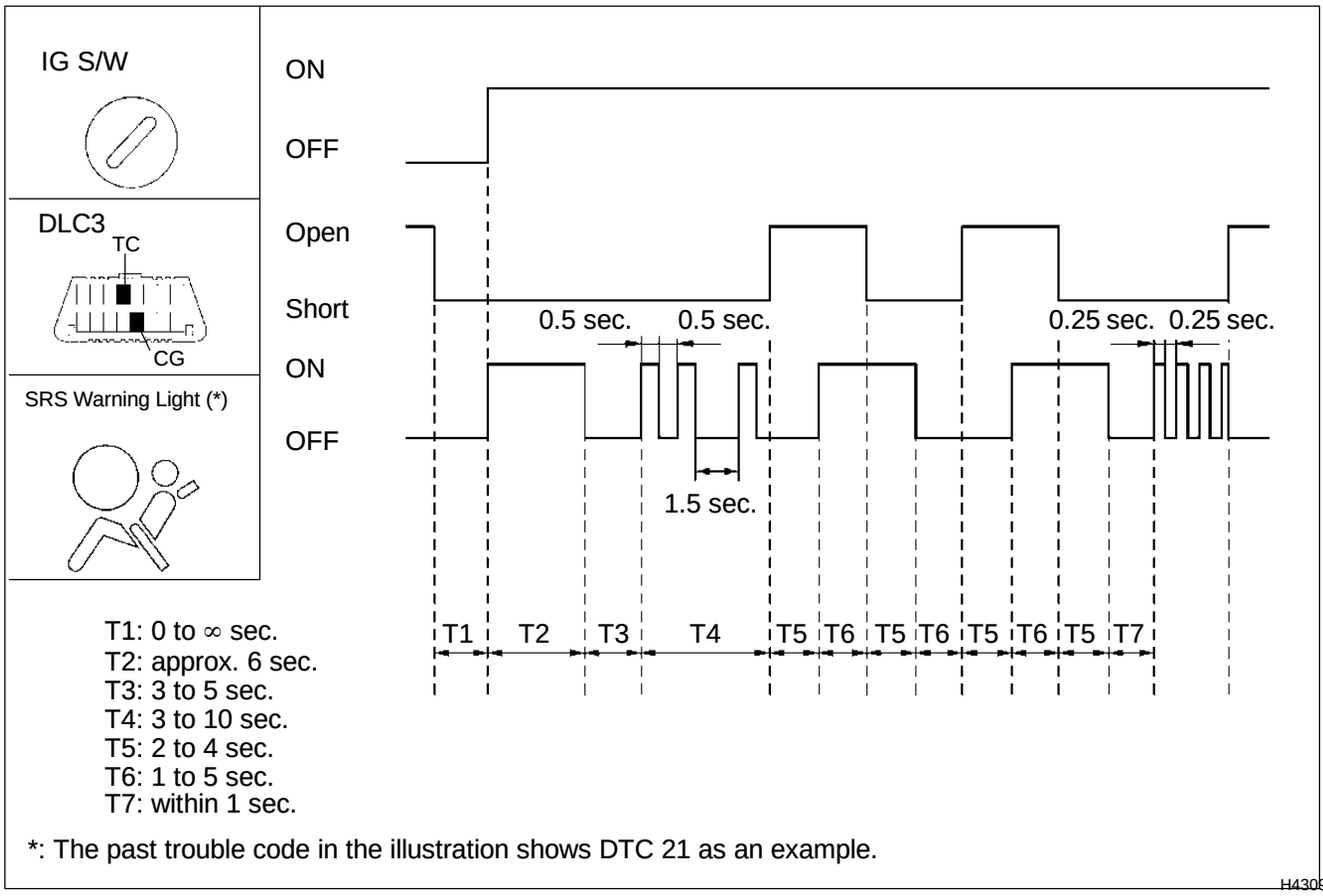
(4) Within 2 to 4 seconds after the SRS warning light comes on, connect terminals TC and CG of the DLC3.

(5) The SRS warning light should go off within 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Then, disconnect terminal TC within 2 to 4 seconds after the SRS warning light goes off.

(6) The SRS warning light comes on again within 2 to 4 seconds after disconnecting terminal TC. Then, reconnect terminals TC and CG within 2 to 4 seconds after the SRS warning light comes on, connect terminals TC and CG of the DLC3.

(7) Check if the SRS warning light goes off 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Also check if the normal system code is output within 1 second after the SRS warning light goes off.

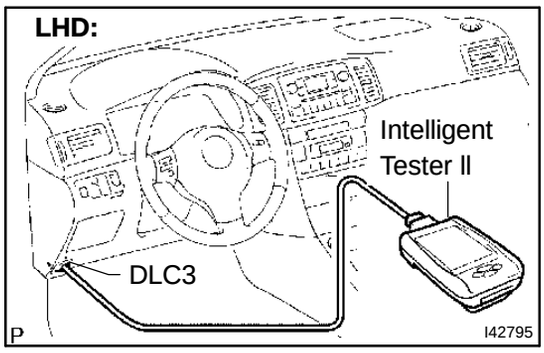
If DTCs are not cleared, repeat this procedure until the codes are cleared.

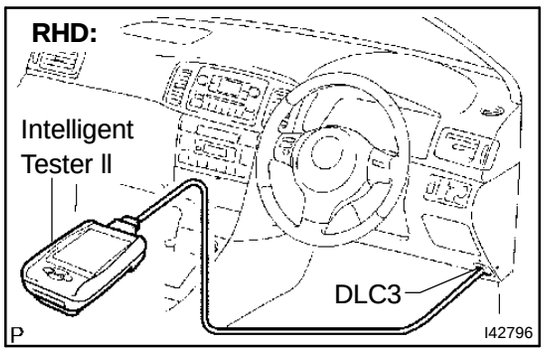


T1: 0 to ∞ sec.
T2: approx. 6 sec.
T3: 3 to 5 sec.
T4: 3 to 10 sec.
T5: 2 to 4 sec.
T6: 1 to 5 sec.
T7: within 1 sec.

*: The past trouble code in the illustration shows DTC 21 as an example.

H43090





3. DTC CHECK (USING INTELLIGENT TESTER II)

(a) Check the DTCs.

(1) Connect the intelligent tester II to the DLC3.

(2) Turn the ignition switch to the ON position.

(3) Check the DTCs by following the prompts on the tester screen.

HINT:

Refer to the intelligent tester II operator's manual for further details.

(b) Clear the DTCs.

(1) Connect the intelligent tester II to the DLC3.

(2) Turn the ignition switch to the ON position.

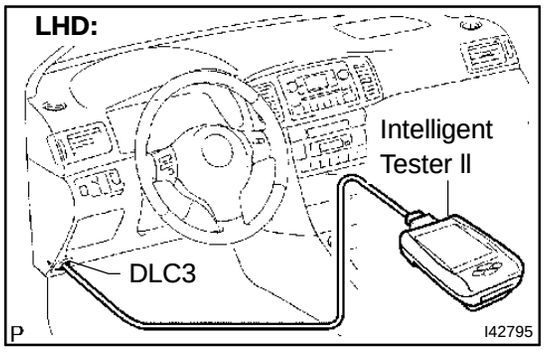
(3) Clear the DTCs by following the prompts on the tester screen.

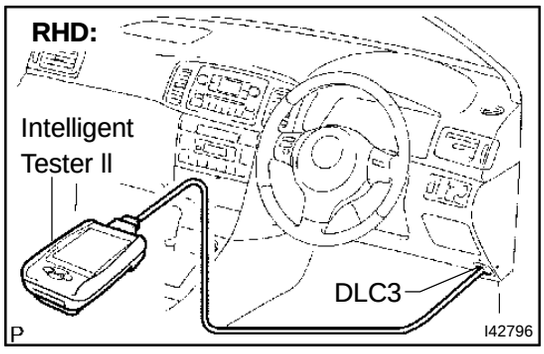
HINT:

Refer to the intelligent tester II operator's manual for further details.

05LUP-01

CHECK MODE PROCEDURE





1. CHECK MODE (SIGNAL CHECK) (USING INTELLIGENT TESTER II)

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to the ON position.

(c) Select the "SIGNAL CHECK", and proceed checking with the intelligent tester II.

05LUQ-01

DATA LIST/ACTIVE TEST

HINT:

By accessing the DATA LIST displayed by the intelligent tester II, you can perform such functions as reading the values of switches and sensors without removing any parts. Reading the DATA LIST is the first step of troubleshooting and is one method to shorten labor time.

(d) Connect the intelligent tester II to the DLC3.

(e) Turn the ignition switch to the ON position.

(f) Following the display on the tester screen, read the ”DATA LIST”.

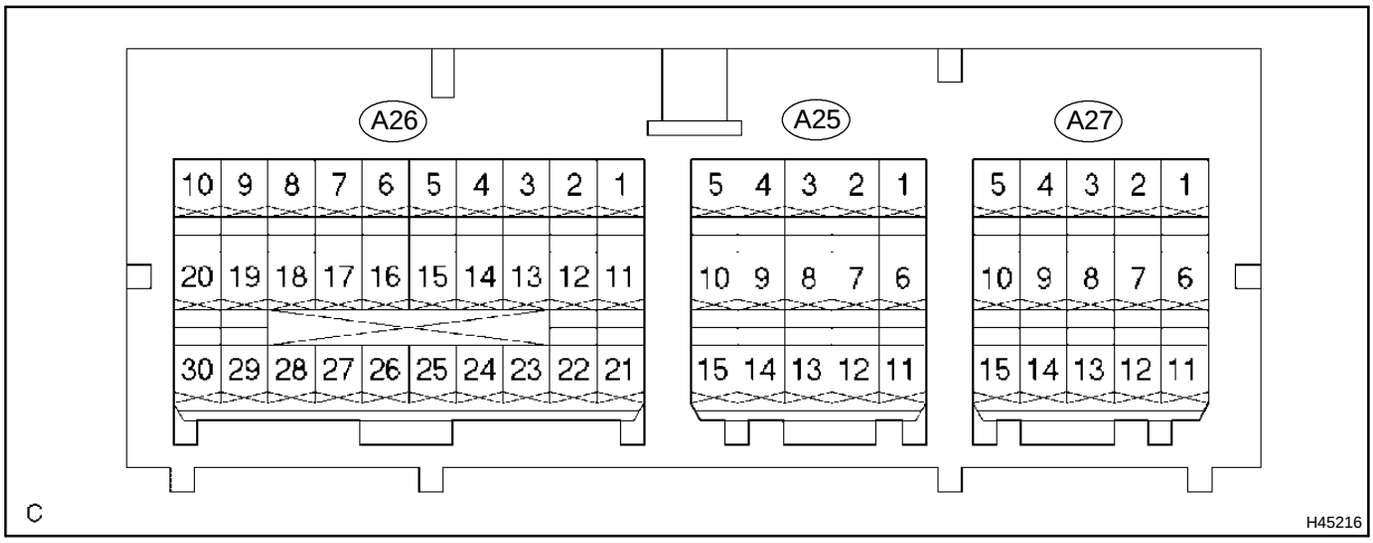
1. DATA LIST FOR AIRBAG SENSOR ASSY CENTER

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
D Seat	Driver Seat Position/ FORWARD: Seat position is forward BKWARD: Seat position is rearward FAIL: A failure is detected	FORWARD/BKWARD	-
D Bk SW	Driver Buckle SW/ UNSET: The seat belt is not fastened SET: The seat belt is fastened NG: Data is not determined	UNSET/SET	-
Disp Typ	Display Type Information/ LR: The display is indicated by LH/RH DP: The display is indicated by Driver/Passenger	DP	-
#Past Codes	Number of Past DTC/ Min.: 0, Max.: 255	0	-

05D5Z-04

TERMINALS OF ECU

1. AIRBAG SENSOR ASSY CENTER



Terminal No.	Terminal Symbol	Destination
A26-1	P2+	Front passenger airbag assy (P squib, Dual stage - 2nd step)
A26-2	P2-	Front passenger airbag assy (P squib, Dual stage - 2nd step)
A26-3	P-	Front passenger airbag assy (P squib)
A26-4	P+	Front passenger airbag assy (P squib)
A26-5	D+	Horn button assy (D squib)
A26-6	D-	Horn button assy (D squib)
A26-7	D2-	Horn button assy (D squib, Dual stage - 2nd step)
A26-8	D2+	Horn button assy (D squib, Dual stage - 2nd step)
A26-11	MSW+	Airbag cut off SW cylinder sub-assy
A26-12	MSW-	Airbag cut off SW cylinder sub-assy
A26-14	LA	Combination meter assy (SRS warning light)
A26-15	TC	DLC3
A26-16	SIL	DLC3
A26-17	P-AB	Passenger seat belt warning lamp assy
A26-21	IG2	IG2 Fuse (Power Source)
A26-22	GSW2	ECM
A26-25	E1	Ground
A26-26	E2	Ground
A26-27	-SR	Airbag sensor front RH
A26-28	-SL	Airbag sensor front LH
A26-29	+SR	Airbag sensor front RH
A26-30	+SL	Airbag sensor front LH
A25-1	PD-	Front seat outer belt assy LH (P/T squib (D seat side)) (*1) Front seat outer belt assy RH (P/T squib (D seat side)) (*2)
A25-2	PD+	Front seat outer belt assy LH (P/T squib (D seat side)) (*1) Front seat outer belt assy RH (P/T squib (D seat side)) (*2)
A25-6 (*3)	ICD-	Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2)
A25-7 (*3)	ICD+	Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2)

Terminal No.	Terminal Symbol	Destination
A25-8	BBD+	Side airbag sensor assy LH (*1) Side airbag sensor assy RH (*2)
A25-9	SFD+	Front seat airbag assy LH (Side squib (D seat side)) (*1) Front seat airbag assy RH (Side squib (D seat side)) (*2)
A25-10	SFD-	Front seat airbag assy LH (Side squib (D seat side)) (*1) Front seat airbag assy RH (Side squib (D seat side)) (*2)
A25-11	DBE+	Front seat inner belt assy LH (*1) Front seat inner belt assy RH (*2)
A25-12	DBE-	Front seat inner belt assy LH (*1) Front seat inner belt assy RH (*2)
A25-13	DSP-	Seat position airbag sensor
A25-14	DSP+	Seat position airbag sensor
A25-15	BBD-	Side airbag sensor assy LH (*1) Side airbag sensor assy RH (*2)
A27-4	PP+	Front seat outer belt assy RH (P/T squib (P seat side)) (*1) Front seat outer belt assy LH (P/T squib (P seat side)) (*2)
A27-5	PP-	Front seat outer belt assy RH (P/T squib (P seat side)) (*1) Front seat outer belt assy LH (P/T squib (P seat side)) (*2)
A27-6	SFP-	Front seat airbag assy RH (Side squib (P seat side)) (*1) Front seat airbag assy LH (Side squib (P seat side)) (*2)
A27-7	SFP+	Front seat airbag assy RH (Side squib (P seat side)) (*1) Front seat airbag assy LH (Side squib (P seat side)) (*2)
A27-8	BBP+	Side airbag sensor assy RH (*1) Side airbag sensor assy LH (*2)
A27-9 (*3)	ICP+	Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2)
A27-10 (*3)	ICP-	Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2)
A27-11	BBP-	Side airbag sensor assy RH (*1) Side airbag sensor assy LH (*2)

*1: LHD
*2: RHD
*3: w/ Curtain shield airbag

050YH-31

PROBLEM SYMPTOMS TABLE

HINT:

Proceed to the troubleshooting for each circuit in the table below.

Symptom	Suspected Area	See Page
• When the ignition switch is in the ON position, the SRS warning light sometimes comes on after approximately 6 seconds.	• SRS warning light circuit malfunction (Always comes on, when DTC is not output).	05-942
• SRS warning light always comes on even when DTC is not output.	• SRS warning light circuit malfunction (Always comes on, when DTC is not output).	05-942
• With the ignition switch in the ON position, the SRS warning light does not come on.	• SRS warning light circuit malfunction (Does not come on, when ignition switch is turned to the ON position).	05-946
• Although a SRS warning light operates normally, DTC or a normal system code is not displayed.	• TC Terminal circuit	05-948
• Although terminals TC and CG are not connected, DTC or a normal system code is displayed.	• TC Terminal circuit	05-948

050WZ-33

DIAGNOSTIC TROUBLE CODE CHART

1. DTCS FOR SUPPLEMENTAL RESTRAINT SYSTEM

If a trouble code is displayed during the DTC check, check the circuit listed for the code in the table below (Proceed to the page listed for that circuit).

HINT:

- When the SRS warning light remains on and the DTC output is the normal system code, a voltage source drop is likely to occur. This malfunction is not stored in memory by the airbag sensor assy center. If the power source voltage returns to normal, the SRS warning light will automatically go off.
- When 2 or more codes are indicated, the code with the lower number appears first.
- If a code is not listed on the display chart, the airbag sensor assy center may have failed.
- In the case of any malfunction concerning an open circuit, short to ground, or short to B+ due to a squib, other trouble codes may not be detected. In this case, repair the malfunction currently indicated and then perform malfunction diagnosis again.
- Mark in the check mode column:
  "○": DTC is corresponding to the check mode.
  "—": DTC is not corresponding to the check mode.

DTC No. (See Page)	Detection Item	Trouble Area	Check Mode	SRS Warning Light
B1000/31 (05-740)	• Airbag sensor assy center malfunction	• Airbag sensor assy center	-	ON
B1610/13 (05-741)	• Front airbag sensor RH circuit malfunction	• Airbag sensor front RH • Airbag sensor assy center • Instrument panel wire • Engine room main wire	-	ON
B1615/14 (05-748)	• Front airbag sensor LH circuit malfunction	• Airbag sensor front LH • Airbag sensor assy center • Instrument panel wire • Engine room main wire	-	ON
B1620/21 (05-755)	• Side airbag sensor assembly (D seat side) malfunction	• Side airbag sensor assy LH (*1) • Side airbag sensor assy RH (*2) • Airbag sensor rear LH (*1, *3) • Airbag sensor rear RH (*2, *3) • Airbag sensor assy center • Floor wire	-	ON
B1625/22 (05-766)	• Side airbag sensor assembly (P seat side) malfunction	• Side airbag sensor assy RH (*1) • Side airbag sensor assy LH (*2) • Airbag sensor rear RH (*1, *3) • Airbag sensor rear LH (*2, *3) • Airbag sensor assy center • Floor wire	-	ON
B1630/23 (*3) (05-777)	• Curtain shield airbag sensor (D seat side) malfunction	• Airbag sensor rear LH (*1) • Airbag sensor rear RH (*2) • Side airbag sensor assy LH (*1) • Side airbag sensor assy RH (*2) • Airbag sensor assy center • Floor wire	-	ON
B1635/24 (*3) (05-784)	• Curtain shield airbag sensor (P seat side) malfunction	• Airbag sensor rear RH (*1) • Airbag sensor rear LH (*2) • Side airbag sensor assy RH (*1) • Side airbag sensor assy LH (*2) • Airbag sensor assy center • Floor wire	-	ON
B1651/33 (05-791)	• Manual cut off SW trouble	• Airbag cut off SW cylinder sub-assy • Airbag sensor assy center • Instrument panel wire	-	ON

B1653/35 (05-796)	• Seat position sensor assembly malfunction	• Seat position airbag sensor • Airbag sensor assy center • Floor wire	-	ON
B1655/37 (05-802)	• Seat belt buckle switch (D seat side) malfunction	• Front seat inner belt assy LH (*1) • Front seat inner belt assy RH (*2) • Airbag sensor assy center • Floor wire	-	ON
B1660/43 (05-808)	• Passenger airbag OFF indicator light circuit malfunction	• Passenger seat belt warning lamp assy • Airbag sensor assy center • Instrument panel wire	-	ON
B1662/45 (05-817)	• Indicator lamp circuit malfunction	• Combination meter assy (SRS warning light) • Airbag sensor assy center • Instrument panel wire	-	ON
B1800/51 (05-821)	• Short in D squib circuit	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1801/51 (05-821)	• Open in D squib circuit	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1802/51 (05-821)	• Short in D squib circuit (to ground)	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1803/51 (05-821)	• Short in D squib circuit (to B+)	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1805/52 (05-838)	• Short in P squib circuit	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B1806/52 (05-838)	• Open in P squib circuit	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B1807/52 (05-838)	• Short in P squib circuit (to ground)	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B1808/52 (05-838)	• Short in P squib circuit (to B+)	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B1810/53 (05-848)	• Short in D squib (Dual stage - 2nd step) circuit	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1811/53 (05-848)	• Open in D squib (Dual stage - 2nd step) circuit	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1812/53 (05-848)	• Short in D squib (Dual stage - 2nd step) circuit (to ground)	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1813/53 (05-848)	• Short in D squib (Dual stage - 2nd step) circuit (to B+)	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1815/54 (05-865)	• Short in P squib (Dual stage - 2nd step) circuit	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON

B1816/54 (05-865)	• Open in P squib (Dual stage - 2nd step) circuit	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1817/54 (05-865)	• Short in P squib (Dual stage - 2nd step) circuit (to ground)	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1818/54 (05-865)	• Short in P squib (Dual stage - 2nd step) circuit (to B+)	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1820/55 (05-875)	• Short in side squib (D seat side) circuit	• Front seat airbag assy LH (Side squib (D seat side)) (*1) • Front seat airbag assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1821/55 (05-875)	• Open in side squib (D seat side) circuit	• Front seat airbag assy LH (Side squib (D seat side)) (*1) • Front seat airbag assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1822/55 (05-875)	• Short in side squib (D seat side) circuit (to ground)	• Front seat airbag assy LH (Side squib (D seat side)) (*1) • Front seat airbag assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1823/55 (05-875)	• Short in side squib (D seat side) circuit (to B+)	• Front seat airbag assy LH (Side squib (D seat side)) (*1) • Front seat airbag assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1825/56 (05-885)	• Short in side squib (P seat side) circuit	• Front seat airbag assy RH (Side squib (P seat side)) (*1) • Front seat airbag assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1826/56 (05-885)	• Open in side squib (P seat side) circuit	• Front seat airbag assy RH (Side squib (P seat side)) (*1) • Front seat airbag assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1827/56 (05-885)	• Short in side squib (P seat side) circuit (to ground)	• Front seat airbag assy RH (Side squib (P seat side)) (*1) • Front seat airbag assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1828/56 (05-885)	• Short in side squib (P seat side) circuit (to B+)	• Front seat airbag assy RH (Side squib (P seat side)) (*1) • Front seat airbag assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1830/57 (*3) (05-895)	• Short in curtain shield airbag (D seat side) squib circuit	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1831/57 (*3) (05-895)	• Open in curtain shield airbag (D seat side) squib circuit	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1832/57 (*3) (05-895)	• Short in curtain shield airbag (D seat side) squib circuit (to ground)	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON

B1833/57 (*3) (05-895)	• Short in curtain shield airbag (D seat side) squib circuit (to B+)	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1835/58 (*3) (05-906)	• Short in curtain shield airbag (P seat side) squib circuit	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1836/58 (*3) (05-906)	• Open in curtain shield airbag (P seat side) squib circuit	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1837/58 (*3) (05-906)	• Short in curtain shield airbag (P seat side) squib circuit (to ground)	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1838/58 (*3) (05-906)	• Short in curtain shield airbag (P seat side) squib circuit (to B+)	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1900/73 (05-917)	• Short in P/T squib (D seat side) circuit	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1901/73 (05-917)	• Open in P/T squib (D seat side) circuit	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1902/73 (05-917)	• Short in P/T squib (D seat side) circuit (to ground)	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1903/73 (05-917)	• Short in P/T squib (D seat side) circuit (to B+)	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1905/74 (05-928)	• Short in P/T squib (P seat side) circuit	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1906/74 (05-928)	• Open in P/T squib (P seat side) circuit	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
B1907/74 (05-928)	• Short in P/T squib (P seat side) circuit (to ground)	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON

B1908/74 (05-928)	• Short in P/T squib (P seat side) circuit (to B+)	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire	○	ON
Normal (05-939)	• Source voltage drop	• Battery • Airbag sensor assy center	-	ON
Normal	• System normal	-	-	OFF

*1: LHD
*2: RHD
*3: w/ Curtain shield airbag

DTC	B1000/31	AIRBAG SENSOR ASSY CENTER MALFUNCTION

CIRCUIT DESCRIPTION

The airbag sensor assy center consists of the airbag sensor, the safing sensor, the drive circuit, the diagnostic circuit, the ignition control, etc.

If the airbag sensor assy center receives signals from the airbag sensor, it determines whether or not the SRS should be activated.

B1000/31 is recorded when a malfunction is detected in the airbag sensor assy center.

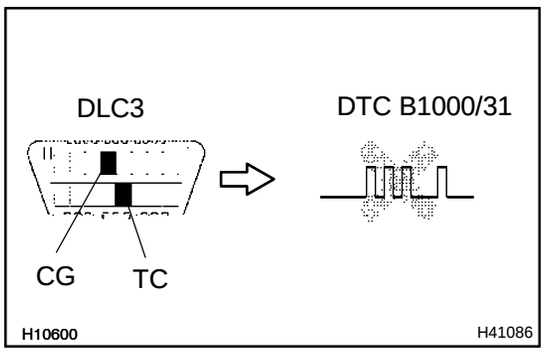
DTC No.	DTC Detecting Condition	Trouble Area
B1000/31	• Airbag sensor assy center malfunction	• Airbag sensor assy center

HINT:

When a trouble code is displayed simultaneously with B1000/31, repair the malfunction indicated by this code (except B1000/31) first.

INSPECTION PROCEDURE

1	CHECK AIR BAG SENSOR ASSY CENTER



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

OK:

DTC B1000/31 is not output.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

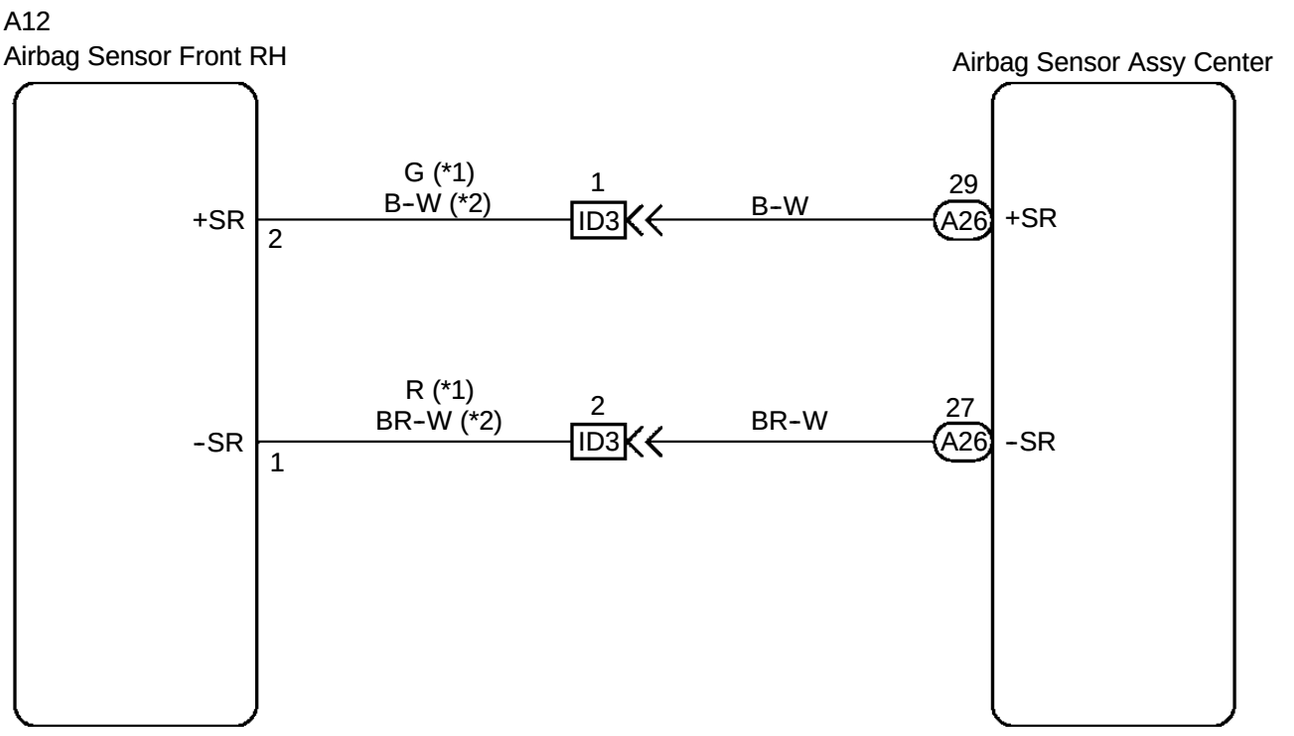
DTC	B1610/13	FRONT AIRBAG SENSOR (RH) MALFUNCTION

CIRCUIT DESCRIPTION

The front airbag sensor RH consists of the diagnostic circuit, the frontal deceleration sensor, etc.
If the airbag sensor assy center receives signals from the frontal deceleration sensor, it determines whether or not the SRS should be activated.
DTC B1610/13 is recorded when a malfunction is detected in the front airbag sensor RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1610/13	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the front airbag sensor RH circuit for 2 seconds. • Airbag sensor front RH malfunction • Airbag sensor assy center malfunction	• Airbag sensor front RH • Airbag sensor assy center • Instrument panel wire • Engine room main wire

WIRING DIAGRAM



*1: 1CD-FTV Engine
*2: Except 1CD-FTV Engine

H02750

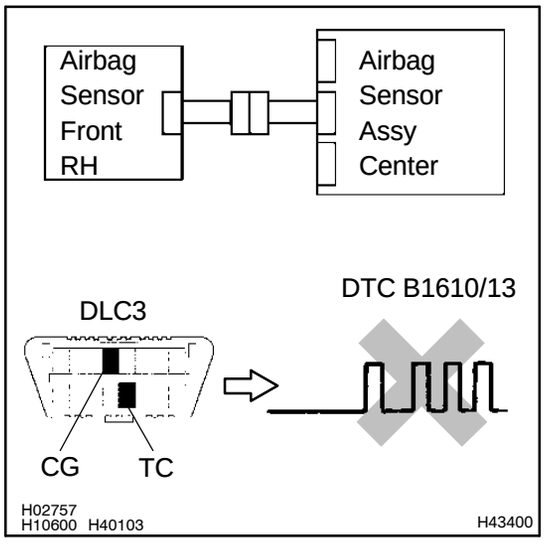
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1610/13 is not output.

HINT:
Codes other than code B1610/13 may be output at this time, but they are not related to this check.

NG	Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor front RH.

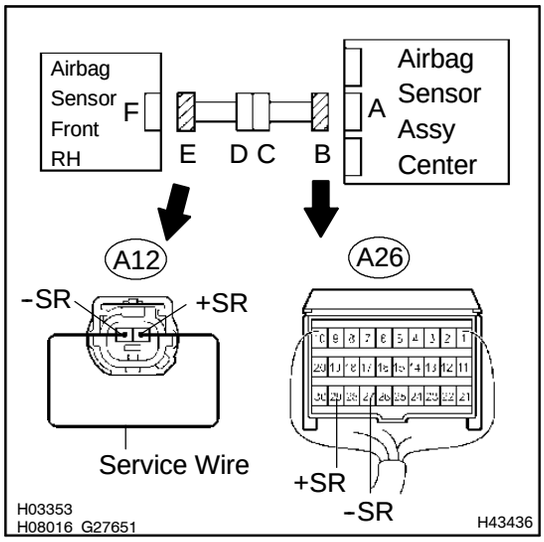
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FRONT AIRBAG SENSOR (RH) CIRCUIT (OPEN)



(a) Disconnect the connectors from the airbag sensor assy center and the airbag sensor front RH.
(b) Using a service wire, connect A12-2 (+SR) and A12-1 (-SR) of connector "E".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

(c) Measure the resistance according to the value(s) in the table below.

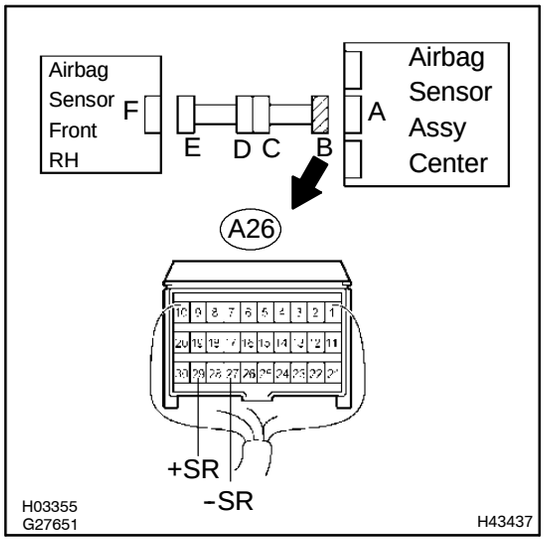
Standard:

Tester connection	Condition	Specified condition
A26-29 (+SR) - A26-27 (-SR)	Always	Below 1 Ω

NG → **Go to step 8**

OK

4 CHECK FRONT AIRBAG SENSOR (RH) CIRCUIT (SHORT)



(a) Disconnect the service wire from connector "E".
(b) Measure the resistance according to the value(s) in the table below.

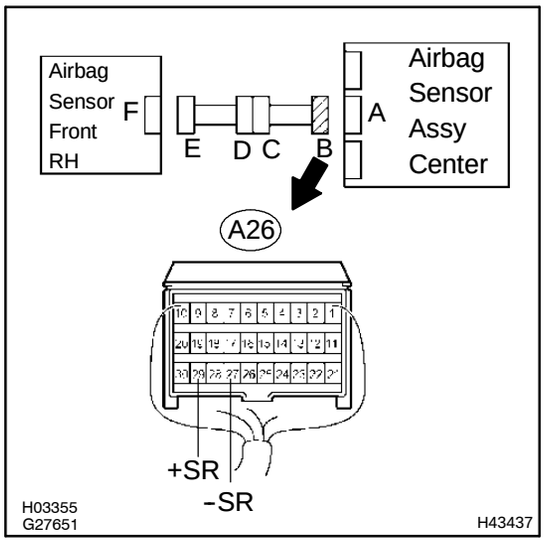
Standard:

Tester connection	Condition	Specified condition
A26-29 (+SR) - A26-27 (-SR)	Always	1 MΩ or Higher

NG → **Go to step 9**

OK

5 CHECK FRONT AIRBAG SENSOR (RH) CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

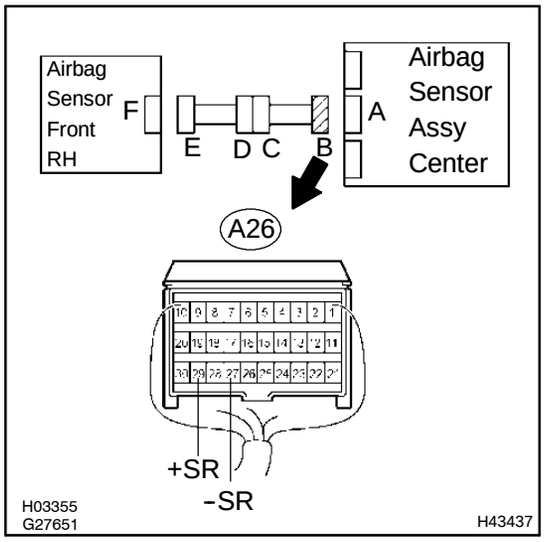
Standard:

Tester connection	Condition	Specified condition
A26-29 (+SR) - Body ground	Ignition switch ON	Below 1 V
A26-27 (-SR) - Body ground	Ignition switch ON	Below 1 V

NG → **Go to step 10**

OK

6 CHECK FRONT AIRBAG SENSOR (RH) CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

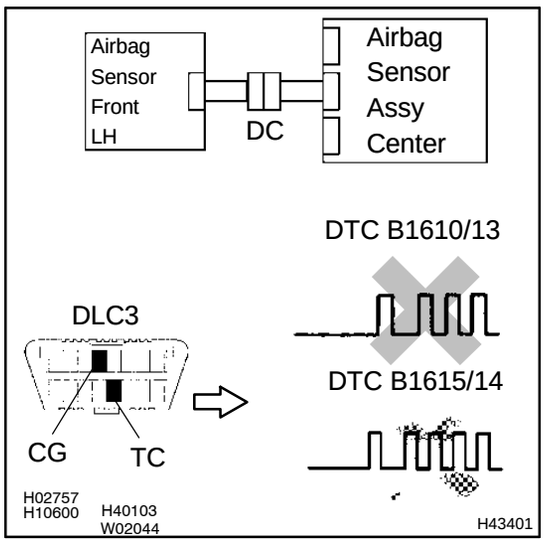
Standard:

Tester connection	Condition	Specified condition
A26-29 (+SR) - Body ground	Always	1 MΩ or Higher
A26-27 (-SR) - Body ground	Always	1 MΩ or Higher

NG → **Go to step 11**

OK

7 CHECK AIRBAG SENSOR FRONT RH



(a) Connect the connectors to the airbag sensor assy center.
(b) Interchange the airbag sensor front RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

Result:

DTC B1610/13 is output.	A
DTC B1615/14 is output.	B
DTC B1610/13 and B1615/14 are not output.	C

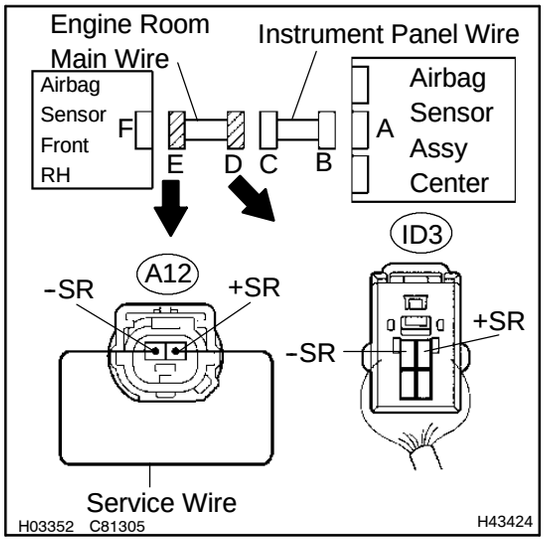
A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE AIRBAG SENSOR FRONT RH (SEE PAGE 60-77)**

C

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

8 CHECK ENGINE ROOM MAIN WIRE (OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

HINT:

Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

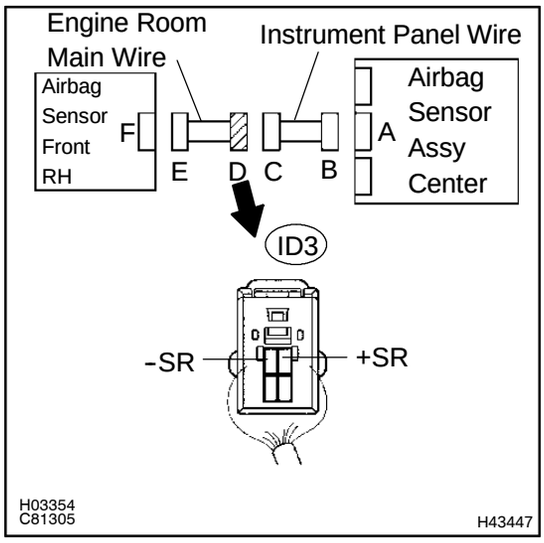
Tester connection	Condition	Specified condition
ID3-1 (+SR) - ID3-2 (-SR)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

9 CHECK ENGINE ROOM MAIN WIRE (SHORT)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

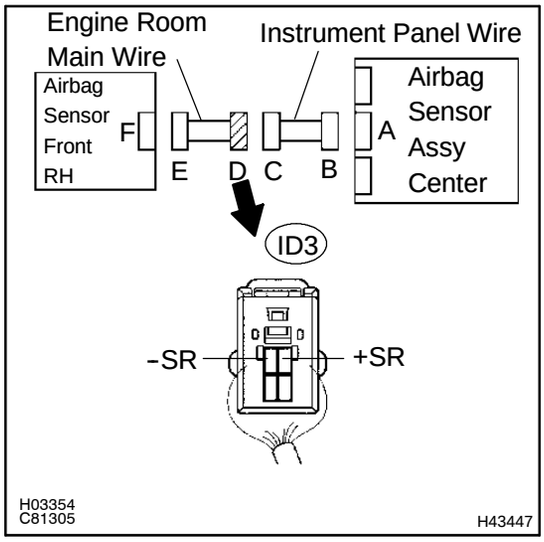
Tester connection	Condition	Specified condition
ID3-1 (+SR) - ID3-2 (-SR)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

10 CHECK ENGINE ROOM MAIN WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the engine room main wire connector from the instrument panel wire.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard:

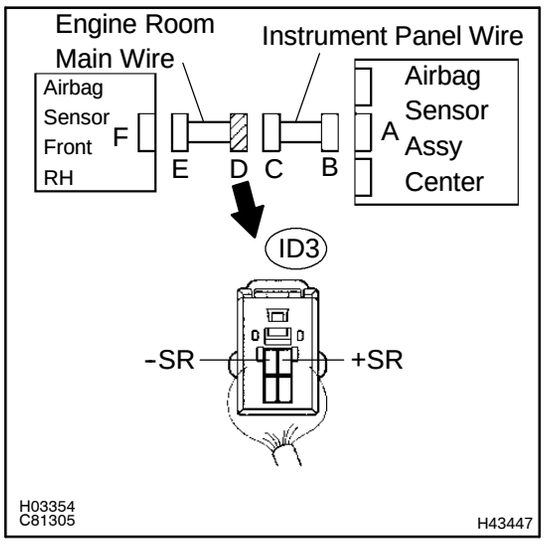
Tester connection	Condition	Specified condition
ID3-1 (+SR) - Body ground	Ignition switch ON	Below 1 V
ID3-2 (-SR) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK →

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

11 CHECK ENGINE ROOM MAIN WIRE (TO GROUND)



(a) Disconnect the engine room main wire connector from the instrument panel wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
ID3-1 (+SR) - Body ground	Always	1 MΩ or Higher
ID3-2 (-SR) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK →

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

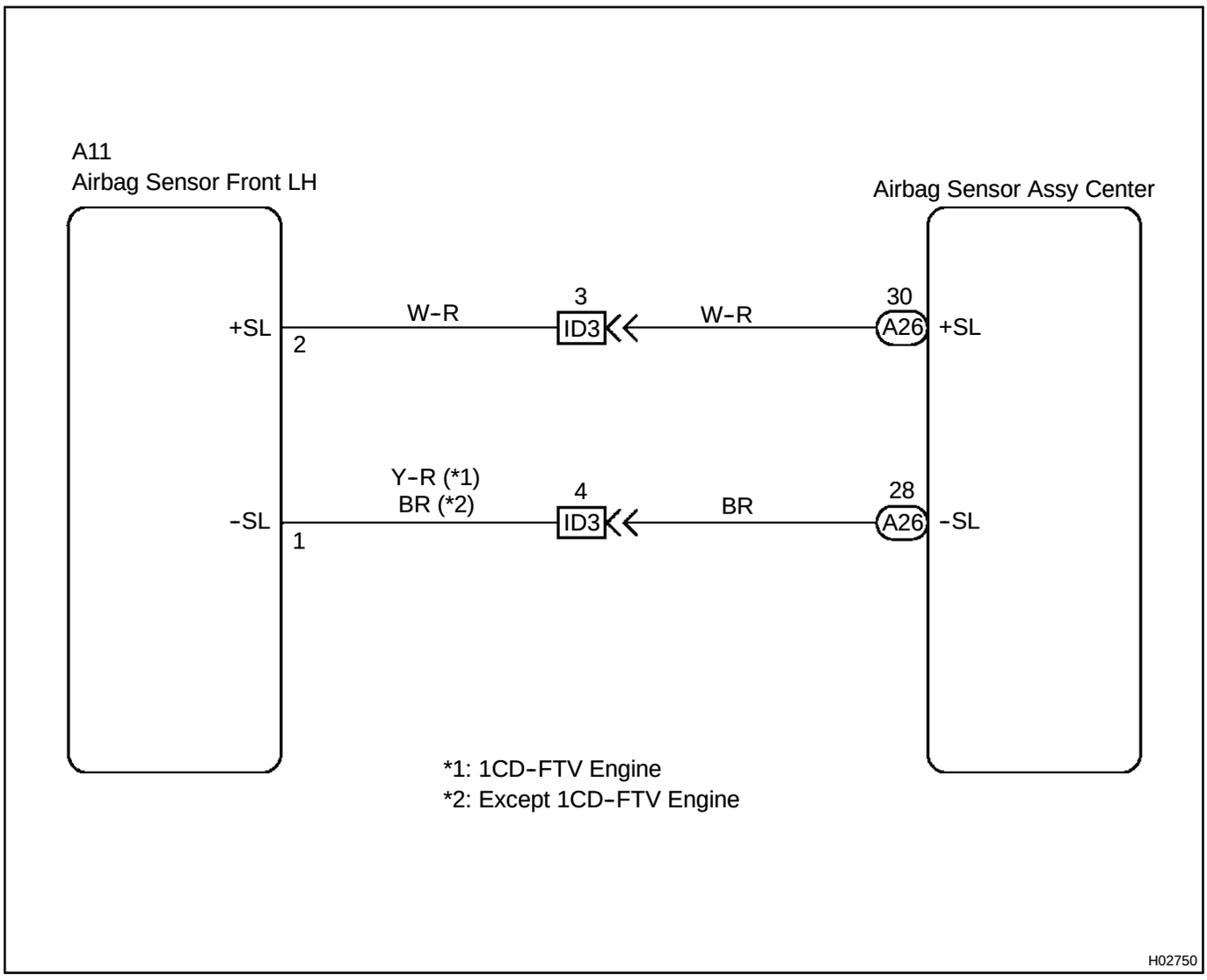
DTC	B1615/14	FRONT AIRBAG SENSOR (LH) MALFUNCTION

CIRCUIT DESCRIPTION

The front airbag sensor LH consists of the diagnostic circuit, the frontal deceleration sensor, etc.
If the airbag sensor assy center receives signals from the frontal deceleration sensor, it determines whether or not the SRS should be activated.
DTC B1615/14 is recorded when a malfunction is detected in the front airbag sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1615/14	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the front airbag sensor LH circuit for 2 seconds. • Airbag sensor front LH malfunction • Airbag sensor assy center malfunction	• Airbag sensor front LH • Airbag sensor assy center • Instrument panel wire • Engine room main wire

WIRING DIAGRAM

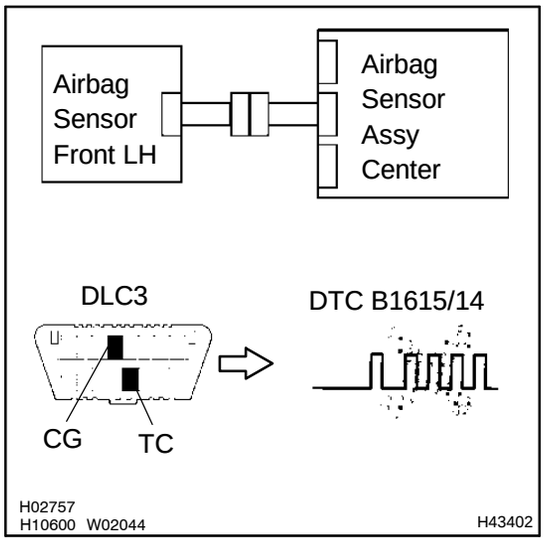


INSPECTION PROCEDURE

CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1615/14 is not output.

HINT:
Codes other than code B1615/14 may be output at this time, but they are not related to this check.

NG	Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

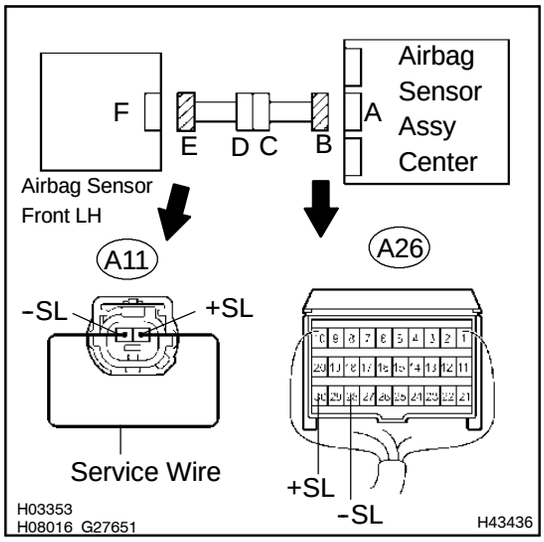
2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor front LH.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FRONT AIRBAG SENSOR (LH) CIRCUIT (OPEN)



(a) Disconnect the connectors from the airbag sensor assy center and the airbag sensor front LH.
(b) Using a service wire, connect A11-2 (+SL) and A11-1 (-SL) of connector "E".

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

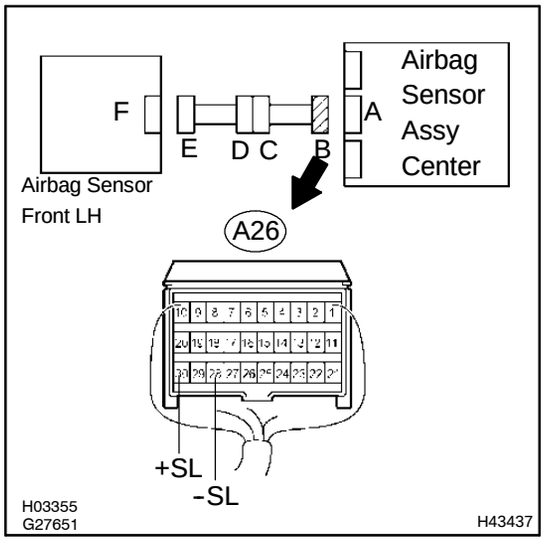
(c) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A26-30 (+SL) - A26-28 (-SL)	Always	Below 1 Ω

NG → **Go to step 8**

OK

4 CHECK FRONT AIRBAG SENSOR (LH) CIRCUIT (SHORT)



(a) Disconnect the service wire from connector "E".
(b) Measure the resistance according to the value(s) in the table below.

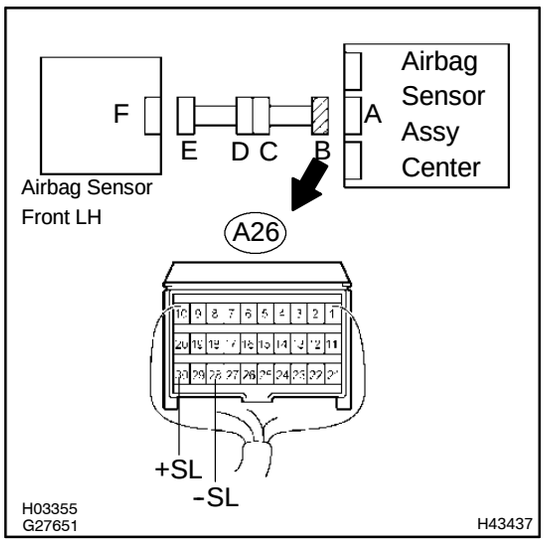
Standard:

Tester connection	Condition	Specified condition
A26-30 (+SL) - A26-28 (-SL)	Always	1 MΩ or Higher

NG → **Go to step 9**

OK

5 CHECK FRONT AIRBAG SENSOR (LH) CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

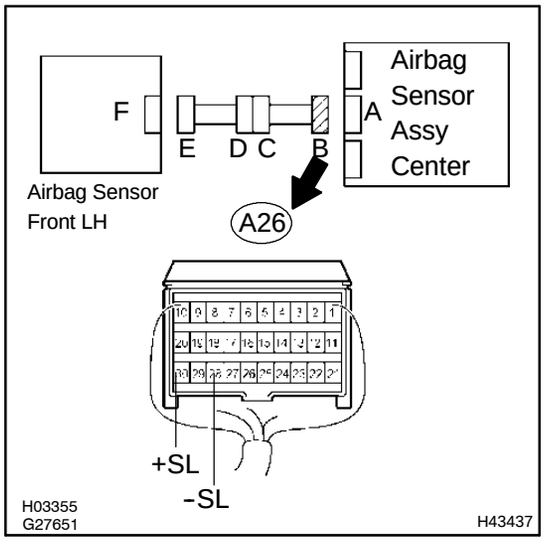
Standard:

Tester connection	Condition	Specified condition
A26-30 (+SL) - Body ground	Ignition switch ON	Below 1 V
A26-28 (-SL) - Body ground	Ignition switch ON	Below 1 V

NG → **Go to step 10**

OK

6 CHECK FRONT AIRBAG SENSOR (LH) CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

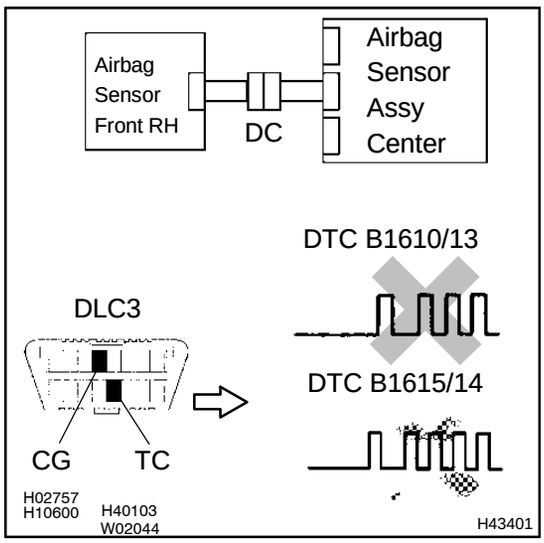
Standard:

Tester connection	Condition	Specified condition
A26-30 (+SL) - Body ground	Always	1 MΩ or Higher
A26-28 (-SL) - Body ground	Always	1 MΩ or Higher

NG → **Go to step 11**

OK

7 CHECK AIRBAG SENSOR FRONT LH



(a) Connect the connectors to the airbag sensor assy center.
(b) Interchange the airbag sensor front RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

Result:

DTC B1615/14 is output.	A
DTC B1610/13 is output.	B
DTC B1610/13 and B1615/14 are not output.	C

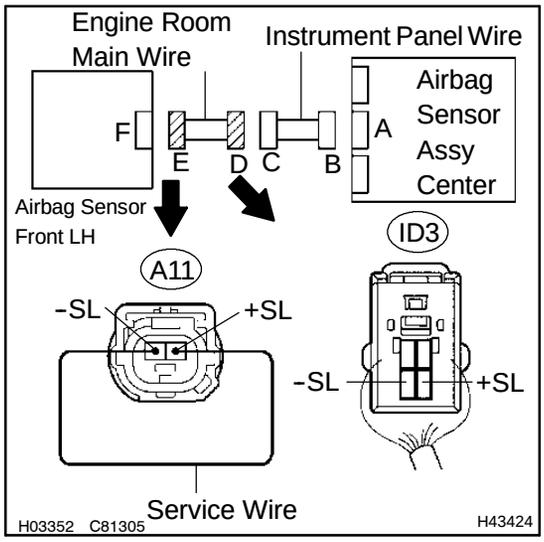
A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE AIRBAG SENSOR FRONT LH (SEE PAGE 60-77)**

C

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

8 CHECK ENGINE ROOM MAIN WIRE (OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

HINT:

Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

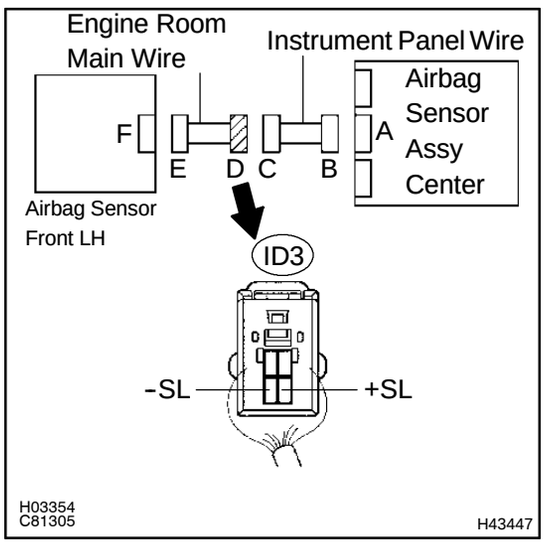
Tester connection	Condition	Specified condition
ID3-3 (+SL) - ID3-4 (-SL)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

9 CHECK ENGINE ROOM MAIN WIRE



(a) Disconnect the engine room main wire connector from the instrument panel wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

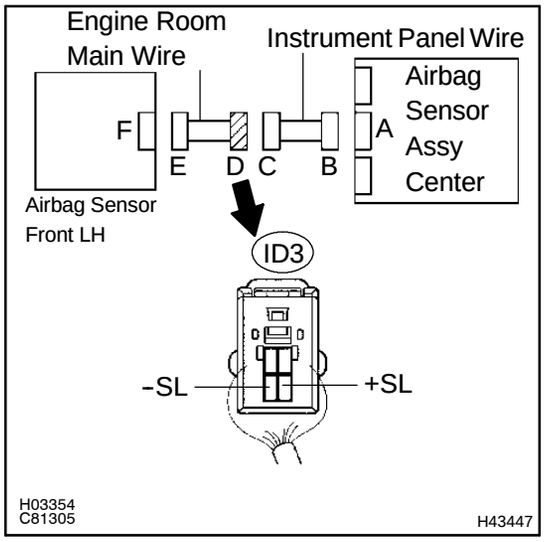
Tester connection	Condition	Specified condition
ID3-3 (+SL) - ID3-4 (-SL)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

10 CHECK ENGINE ROOM MAIN WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the engine room main wire connector from the instrument panel wire.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard:

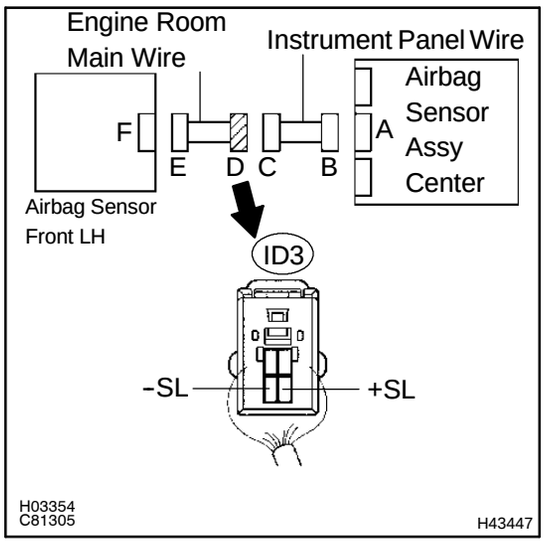
Tester connection	Condition	Specified condition
ID3-3 (+SL) - Body ground	Ignition switch ON	Below 1 V
ID3-4 (-SL) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK →

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

11 CHECK ENGINE ROOM MAIN WIRE (TO GROUND)



(a) Disconnect the engine room main wire connector from the instrument panel wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
ID3-3 (+SL) - Body ground	Always	1 MΩ or Higher
ID3-4 (-SL) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK →

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

DTC	B1620/21	SIDE AIRBAG SENSOR ASSEMBLY (D SEAT SIDE) MALFUNCTION

CIRCUIT DESCRIPTION

The side airbag sensor assembly (D seat side) circuit consists of the airbag sensor assy center and the side airbag sensor assy.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1620/21 is recorded when a malfunction is detected in the side airbag sensor assembly (D seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1620/21	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the side airbag sensor assembly (D seat side) circuit for 2 seconds. • Side airbag sensor assembly (D seat side) malfunction • Curtain shield airbag sensor (D seat side) malfunction (*3) • Airbag sensor assy center malfunction	• Floor wire • Side airbag sensor assy LH (*1) • Side airbag sensor assy RH (*2) • Airbag sensor rear LH (*1, *3) • Airbag sensor rear RH (*2, *3) • Airbag sensor assy center

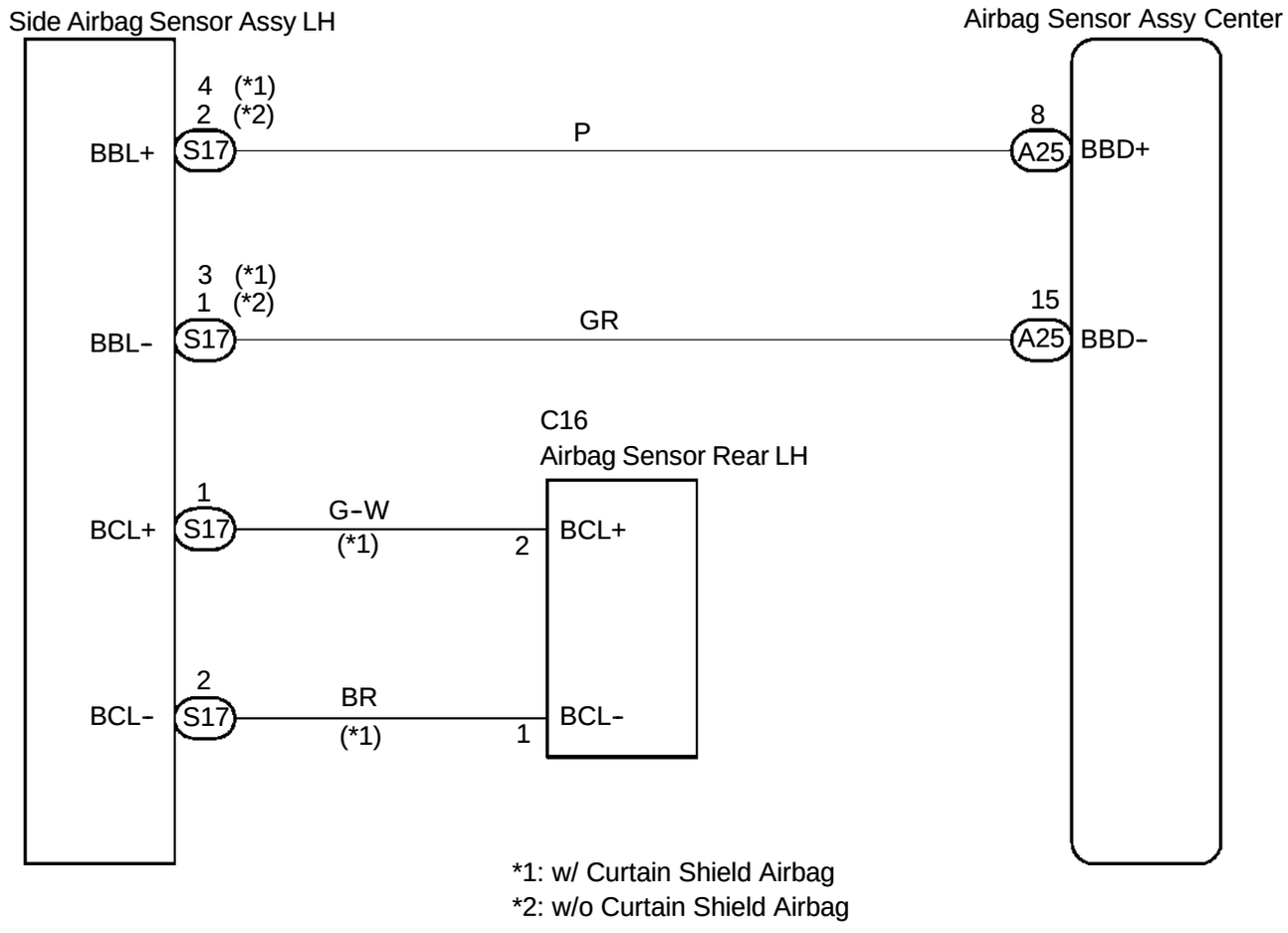
*1: LHD

*2: RHD

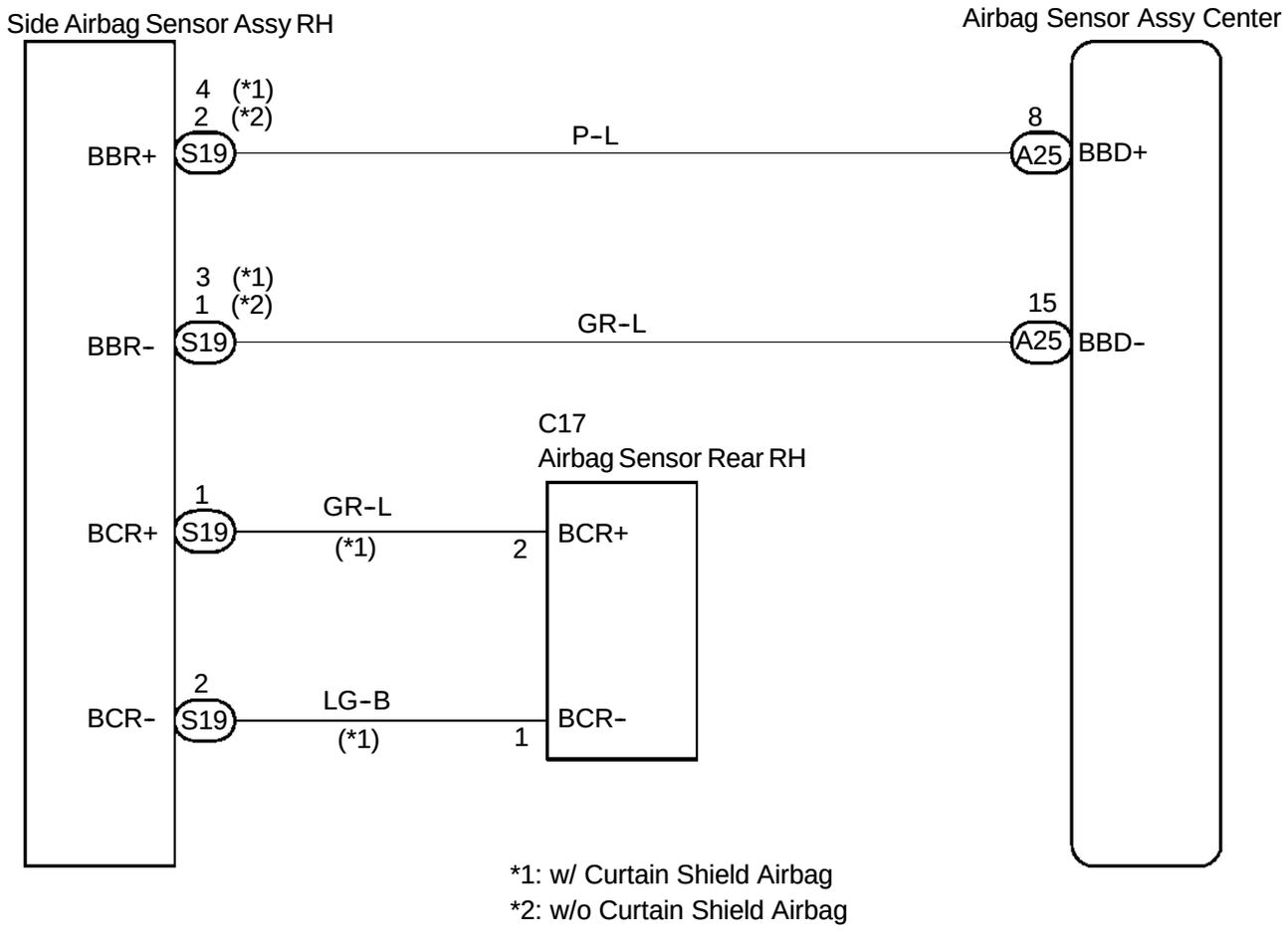
*3: w/ Curtain shield airbag

WIRING DIAGRAM

LHD:



RHD:


Side Airbag Sensor Assy RH
Airbag Sensor Assy Center
4 (*1)
2 (*2)
BBR+
S19
P-L
8
A25
BBD+
3 (*1)
1 (*2)
BBR-
S19
GR-L
15
A25
BBD-
C17
Airbag Sensor Rear RH
1
BCR+
S19
GR-L
(*1)
2
BCR+
2
BCR-
S19
LG-B
(*1)
1
BCR-
*1: w/ Curtain Shield Airbag
*2: w/o Curtain Shield Airbag
C
H45224

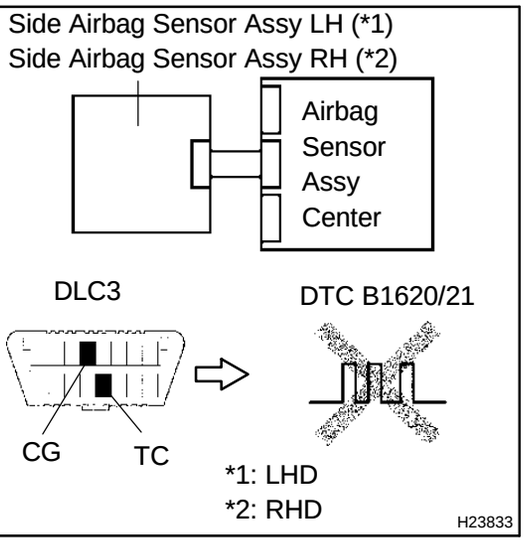
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1620/21 is not output.

HINT:
Codes other than code B1620/21 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK →

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

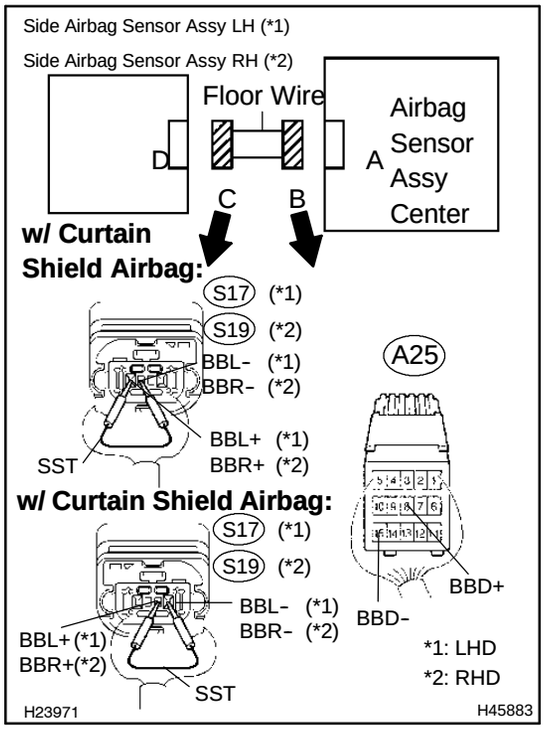
2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (–) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Check that the connectors are properly connected to the airbag sensor assy center and the side airbag sensor assy LH.
(d) RHD:
Check that the connectors are properly connected to the airbag sensor assy center and the side airbag sensor assy RH.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE (OPEN)



(a) LHD:
Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy LH.

(b) RHD:
Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy RH.

(c) LHD, w/o Curtain shield airbag:
Using SST, connect S17-2 (BBL+) and S17-1 (BBL-) of connector "C".

(d) LHD, w/ Curtain shield airbag:
Using SST, connect S17-4 (BBL+) and S17-3 (BBL-) of connector "C".

(e) RHD, w/o Curtain shield airbag:
Using SST, connect S19-2 (BBR+) and S19-1 (BBR-) of connector "C".

(f) RHD, w/ Curtain shield airbag:
Using SST, connect S19-4 (BBR+) and S19-3 (BBR-) of connector "C".
SST 09843-18040

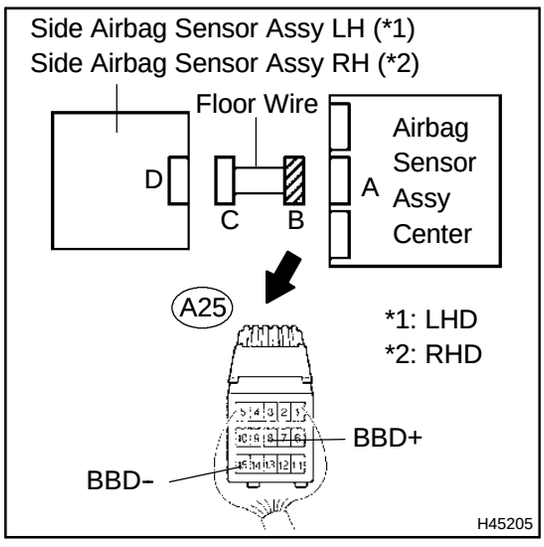
(g) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A25-8 (BBD+) - A25-15 (BBD-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the SST from connector "C".

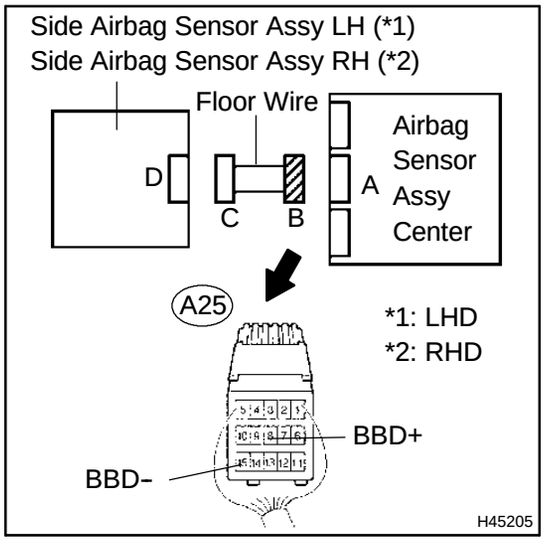
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A25-8 (BBD+) - A25-15 (BBD-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

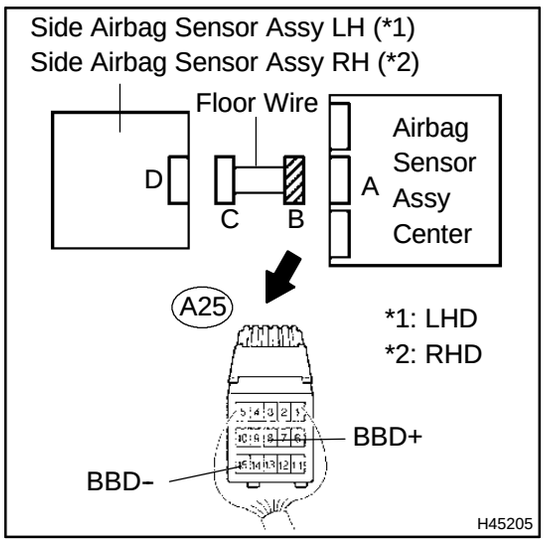
Standard:

Tester connection	Condition	Specified condition
A25-8 (BBD+) - Body ground	Ignition switch ON	Below 1 V
A25-15 (BBD-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

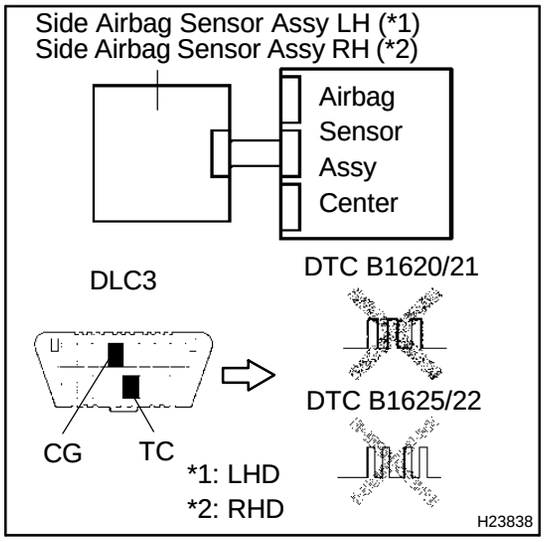
Standard:

Tester connection	Condition	Specified condition
A25-8 (BBD+) - Body ground	Always	1 MΩ or Higher
A25-15 (BBD-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 CHECK SIDE AIRBAG SENSOR ASSY (D SEAT SIDE)



(a) Connect the connectors to the airbag sensor assy center.
(b) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

Result:

A	DTC B1620/21 is output (w/ Curtain shield airbag).
B	DTC B1620/21 is output (w/o Curtain shield airbag).
C	DTC B1625/22 is output (LHD).
D	DTC B1625/22 is output (RHD).
E	DTC B1620/21 and B1625/22 are not output.

A → **Go to step 8**

B → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

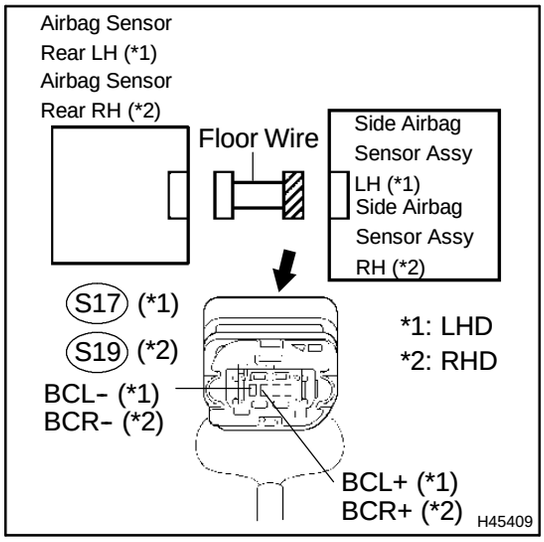
C → **REPLACE SIDE AIR BAG SENSOR ASSY LH (SEE PAGE 60-79, 60-81)**

D → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-79, 60-81)**

E

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

8 CHECK FLOOR WIRE (SHORT)



(a) Turn the ignition switch to the LOCK position.

(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Return the side airbag sensor assy RH and LH to their original positions and connect the connectors to them.

(d) LHD:
Disconnect the connectors from the side airbag sensor assy LH and airbag sensor rear LH.

(e) RHD:
Disconnect the connectors from the side airbag sensor assy RH and airbag sensor rear RH.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

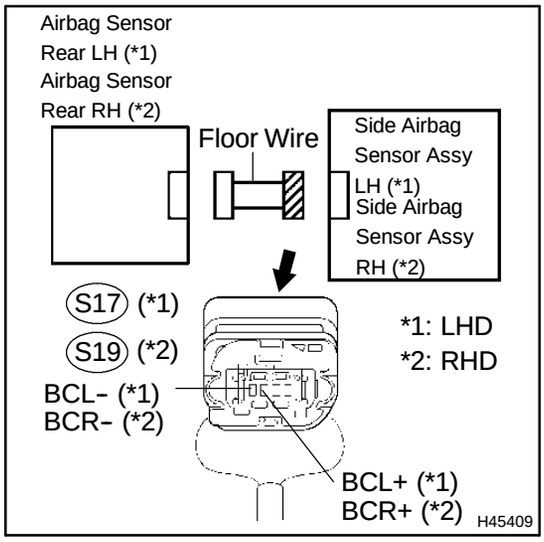
Tester connection	Condition	Specified condition
S17-1 (BCL+) - S17-2 (BCL-) (*1)	Always	1 MΩ or Higher
S19-1 (BCR+) - S19-2 (BCR-) (*2)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

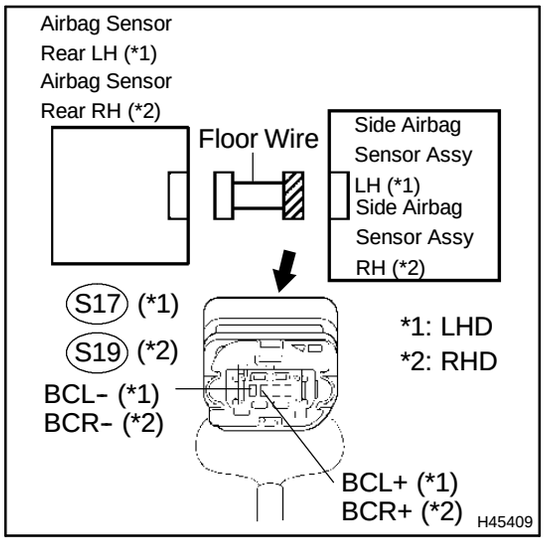
Tester connection	Condition	Specified condition
S17-1 (BCL+) - Body ground (*1)	Ignition switch ON	Below 1 V
S17-2 (BCL-) - Body ground (*1)	Ignition switch ON	Below 1 V
S19-1 (BCR+) - Body ground (*2)	Ignition switch ON	Below 1 V
S19-2 (BCR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

10 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

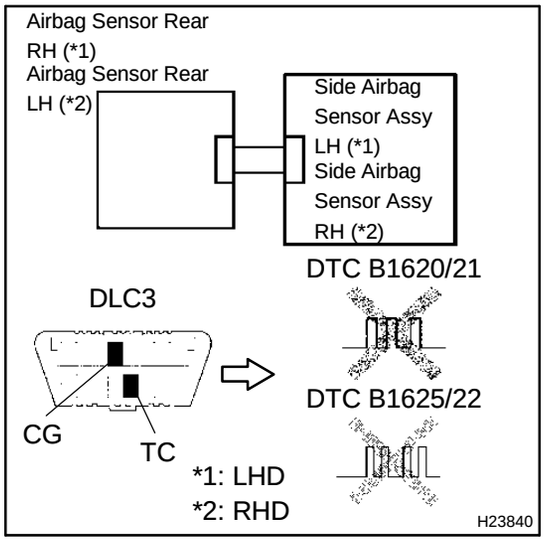
Tester connection	Condition	Specified condition
S17-1 (BCL+) - Body ground (*1)	Always	1 MΩ or Higher
S17-2 (BCL-) - Body ground (*1)	Always	1 MΩ or Higher
S19-1 (BCR+) - Body ground (*2)	Always	1 MΩ or Higher
S19-2 (BCR-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

11 CHECK AIRBAG SENSOR REAR (D SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.

(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) LHD:
Connect the connector to the side airbag sensor assy LH.

(d) RHD:
Connect the connector to the side airbag sensor assy RH.

(e) Interchange the airbag sensor rear RH with LH and connect the connectors to them.

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(k) Check the DTCs (see page 05-727).

Result:

A	DTC B1620/21 is output.
B	DTC B1625/22 is output (LHD).
C	DTC B1625/22 is output (RHD).
D	DTC B1620/21 and B1625/22 are not output.

A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE AIRBAG SENSOR REAR RH (See Pub. No. RM1028E, page 60-31 and 60-33)**

C → **REPLACE AIRBAG SENSOR REAR RH (See Pub. No. RM1028E, page 60-31 and 60-33)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC	B1625/22	SIDE AIRBAG SENSOR ASSEMBLY (P SEAT SIDE) MALFUNCTION

CIRCUIT DESCRIPTION

The side airbag sensor assembly (P seat side) circuit consists of the airbag sensor assy center and the side airbag sensor assy.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1625/22 is recorded when a malfunction is detected in the side airbag sensor assembly (P seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1625/22	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the side airbag sensor assembly (P seat side) circuit for 2 seconds. • Side airbag sensor assembly (P seat side) malfunction • Curtain shield airbag sensor (P seat side) malfunction (*3) • Airbag sensor assy center malfunction	• Floor wire • Side airbag sensor assy RH (*1) • Side airbag sensor assy LH (*2) • Airbag sensor rear RH (*1, *3) • Airbag sensor rear LH (*2, *3) • Airbag sensor assy center

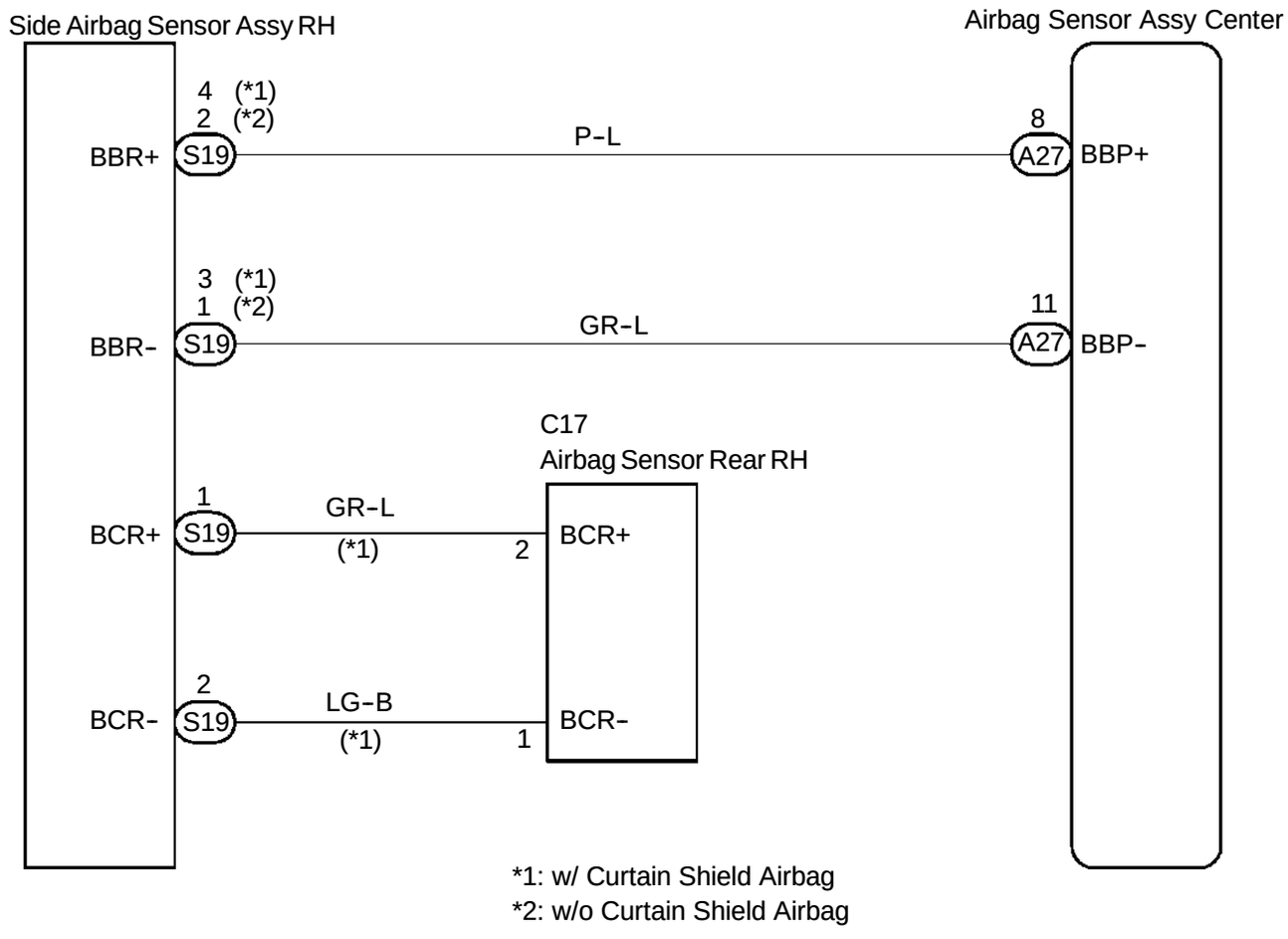
*1: LHD

*2: RHD

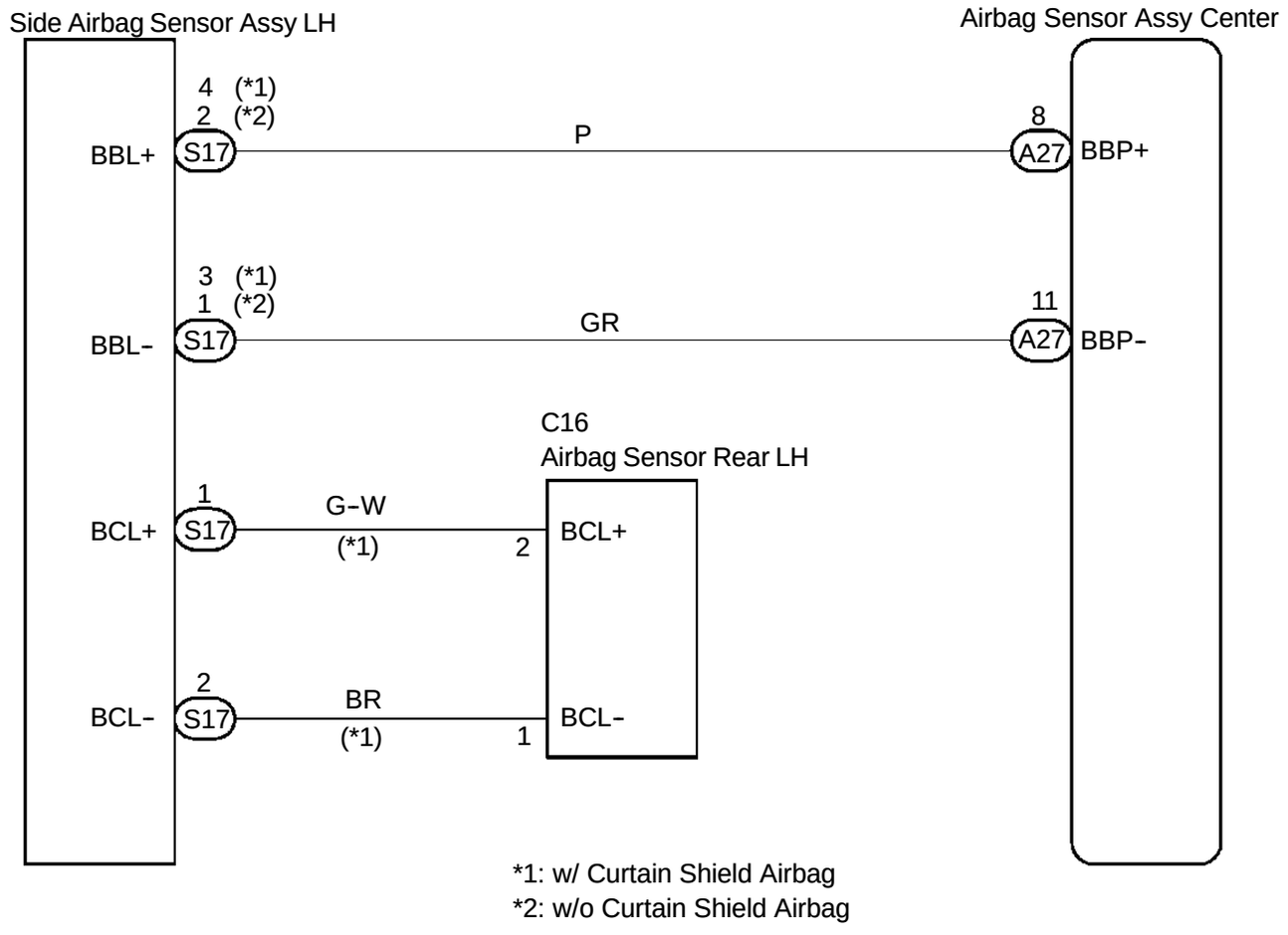
*3: w/ Curtain shield airbag

WIRING DIAGRAM

LHD:



RHD:


Side Airbag Sensor Assy LH
Airbag Sensor Assy Center
4 (*1)
2 (*2)
BBL+
S17
P
8
A27
BBP+
3 (*1)
1 (*2)
BBL-
S17
GR
11
A27
BBP-
C16
Airbag Sensor Rear LH
1
BCL+
S17
G-W
(*1)
2
BCL+
2
BCL-
S17
BR
(*1)
1
BCL-
*1: w/ Curtain Shield Airbag
*2: w/o Curtain Shield Airbag
C
H45224

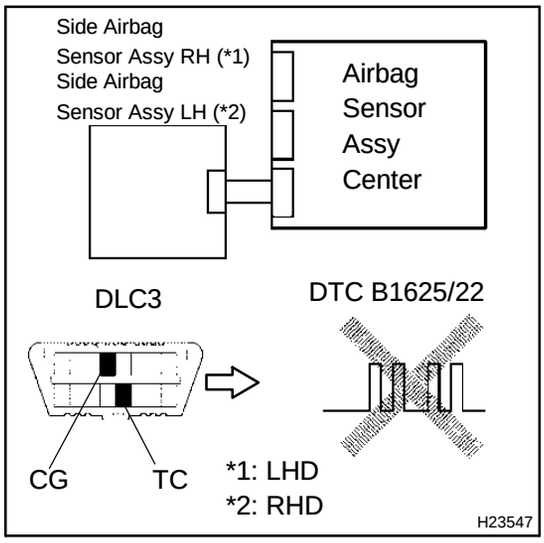
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1625/22 is not output.

HINT:
Codes other than code B1625/22 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

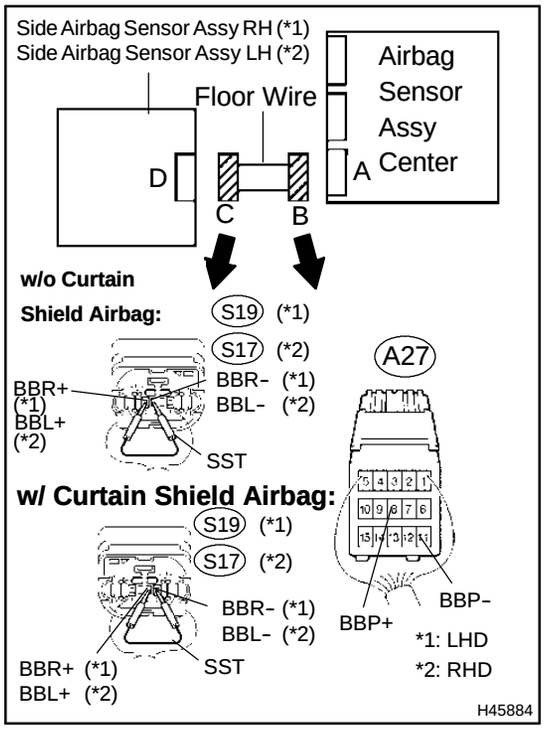
2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (–) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Check that the connectors are properly connected to the airbag sensor assy center and the side airbag sensor assy RH.
(d) RHD:
Check that the connectors are properly connected to the airbag sensor assy center and the side airbag sensor assy LH.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE (OPEN)



(a) LHD:
Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy RH.

(b) RHD:
Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy LH.

(c) LHD, w/o Curtain shield airbag:
Using SST, connect S19-2 (BBR+) and S19-1 (BBR-) of connector "C".

(d) LHD, w/ Curtain shield airbag:
Using SST, connect S19-4 (BBR+) and S19-3 (BBR-) of connector "C".

(e) RHD, w/o Curtain shield airbag:
Using SST, connect S17-2 (BBL+) and S17-1 (BBL-) of connector "C".

(f) RHD, w/ Curtain shield airbag:
Using SST, connect S17-4 (BBL+) and S17-3 (BBL-) of connector "C".
SST 09843-18040

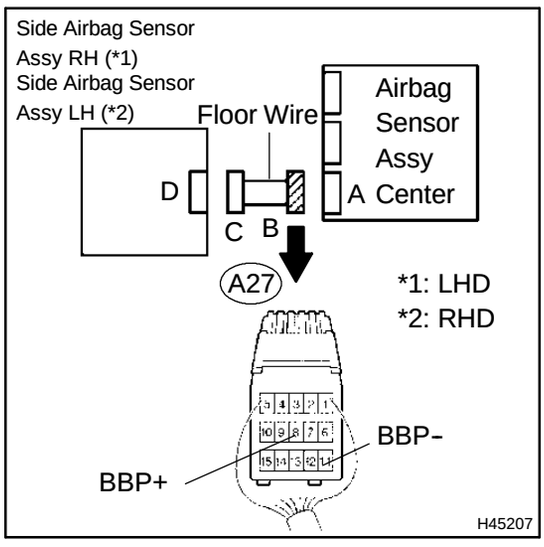
(g) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A27-8 (BBP+) - A27-11 (BBP-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the SST from connector "C".

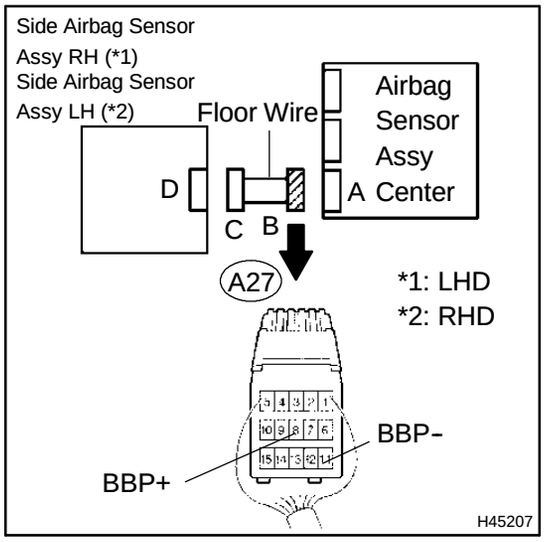
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A27-8 (BBP+) - A27-11 (BBP-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

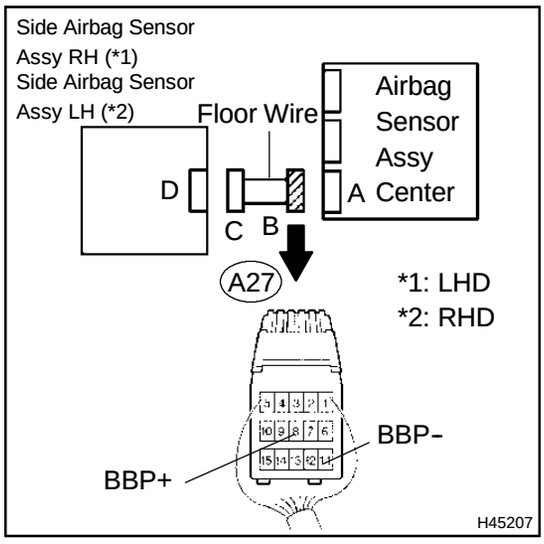
Standard:

Tester connection	Condition	Specified condition
A27-8 (BBP+) - Body ground	Ignition switch ON	Below 1 V
A27-11 (BBP-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

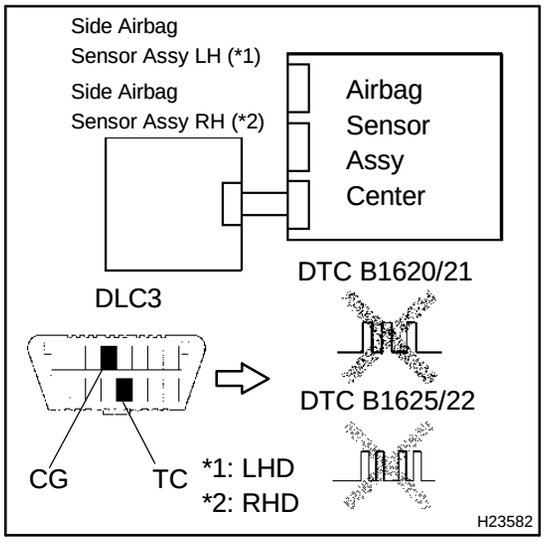
Standard:

Tester connection	Condition	Specified condition
A27-8 (BBP+) - Body ground	Always	1 MΩ or Higher
A27-11 (BBP-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 CHECK SIDE AIRBAG SENSOR ASSY (P SEAT SIDE)



(a) Connect the connectors to the airbag sensor assy center.
(b) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

Result:

A	DTC B1625/22 is output (w/ Curtain shield airbag).
B	DTC B1625/22 is output (w/o Curtain shield airbag).
C	DTC B1620/21 is output (LHD).
D	DTC B1620/21 is output (RHD).
E	DTC B1620/21 and B1625/22 are not output.

A → **Go to step 8**

B → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

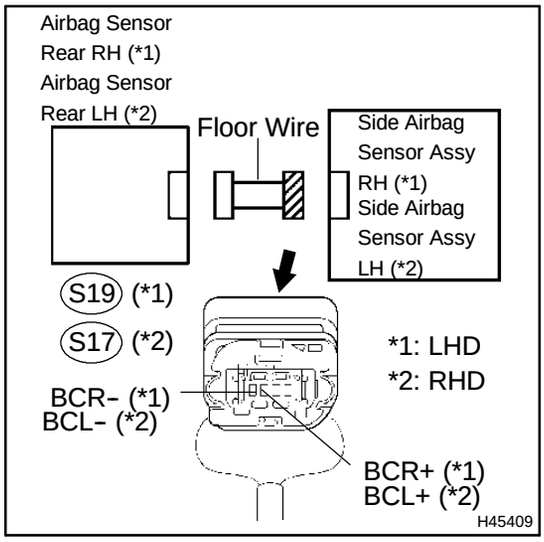
C → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-79, 60-81)**

D → **REPLACE SIDE AIR BAG SENSOR ASSY LH (SEE PAGE 60-79, 60-81)**

E

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

8 CHECK FLOOR WIRE (SHORT)



(a) Turn the ignition switch to the LOCK position.

(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Return the side airbag sensor assy RH and LH to their original positions and connect the connectors to them.

(d) LHD:
Disconnect the connectors from the side airbag sensor assy RH and airbag sensor rear RH.

(e) RHD:
Disconnect the connectors from the side airbag sensor assy LH and sensor rear LH.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

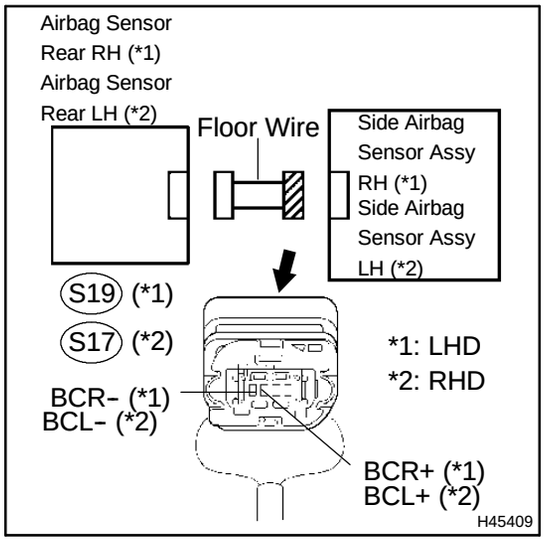
Tester connection	Condition	Specified condition
S19-1 (BCR+) - S19-2 (BCR-) (*1)	Always	1 MΩ or Higher
S17-1 (BCL+) - S17-2 (BCL-) (*2)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

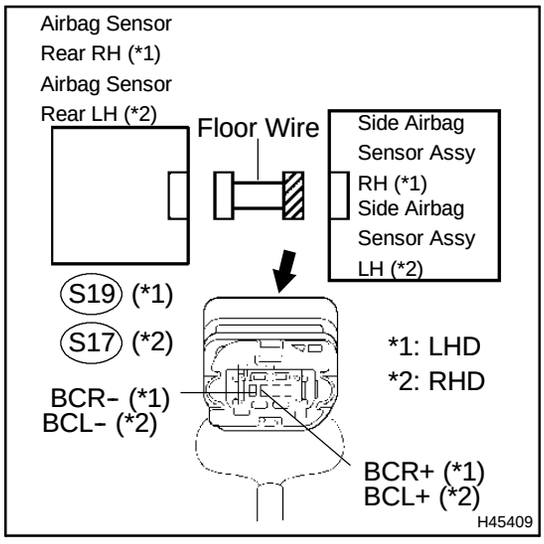
Tester connection	Condition	Specified condition
S19-1 (BCR+) - Body ground (*1)	Ignition switch ON	Below 1 V
S19-2 (BCR-) - Body ground (*1)	Ignition switch ON	Below 1 V
S17-1 (BCL+) - Body ground (*2)	Ignition switch ON	Below 1 V
S17-2 (BCL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

10 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

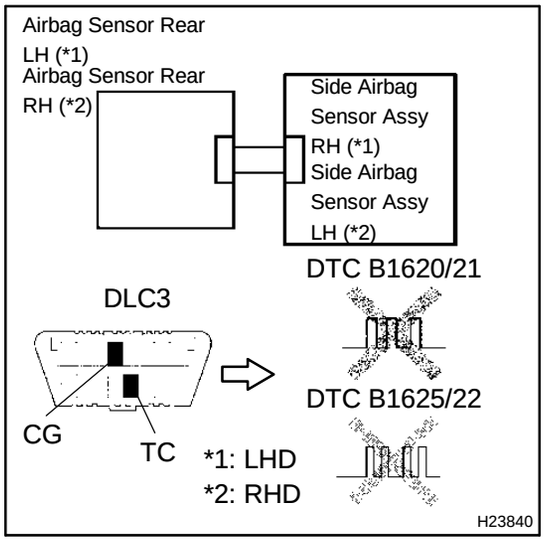
Tester connection	Condition	Specified condition
S19-1 (BCR+) - Body ground (*1)	Always	1 MΩ or Higher
S19-2 (BCR-) - Body ground (*1)	Always	1 MΩ or Higher
S17-1 (BCL+) - Body ground (*2)	Always	1 MΩ or Higher
S17-2 (BCL-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

11 CHECK AIRBAG SENSOR REAR (P SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.

(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) LHD:
Connect the connector to the side airbag sensor assy RH.

(d) RHD:
Connect the connector to the side airbag sensor assy LH.

(e) Interchange the airbag sensor rear RH with LH and connect the connectors to them.

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(k) Check the DTCs (see page 05-727).

Result:

A	DTC B1625/22 is output.
B	DTC B1620/21 is output (LHD).
C	DTC B1620/21 is output (RHD).
D	DTC B1620/21 and B1625/22 are not output.

A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE AIRBAG SENSOR REAR RH (See Pub. No. RM1028E, page 60-31 and 60-33)**

C → **REPLACE AIRBAG SENSOR REAR LH (See Pub. No. RM1028E, page 60-31 and 60-33)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC	B1630/23	CURTAIN SHIELD AIRBAG SENSOR (D SEAT SIDE) MALFUNCTION

CIRCUIT DESCRIPTION

The curtain shield airbag sensor (D seat side) circuit consists of the airbag sensor assy center and the airbag sensor rear.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1630/23 is recorded when a malfunction is detected in the curtain shield airbag sensor (D seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1630/23	• The airbag sensor assy center receives an open circuit signal in the curtain shield airbag sensor (D seat side) circuit for 2 seconds. • Curtain shield airbag sensor (D seat side) malfunction • Side airbag sensor assembly (D seat side) malfunction • Airbag sensor assy center malfunction	• Floor wire • Airbag sensor rear LH (*1) • Airbag sensor rear RH (*2) • Side airbag sensor assy LH (*1) • Side airbag sensor assy RH (*2) • Airbag sensor assy center

*1: LHD

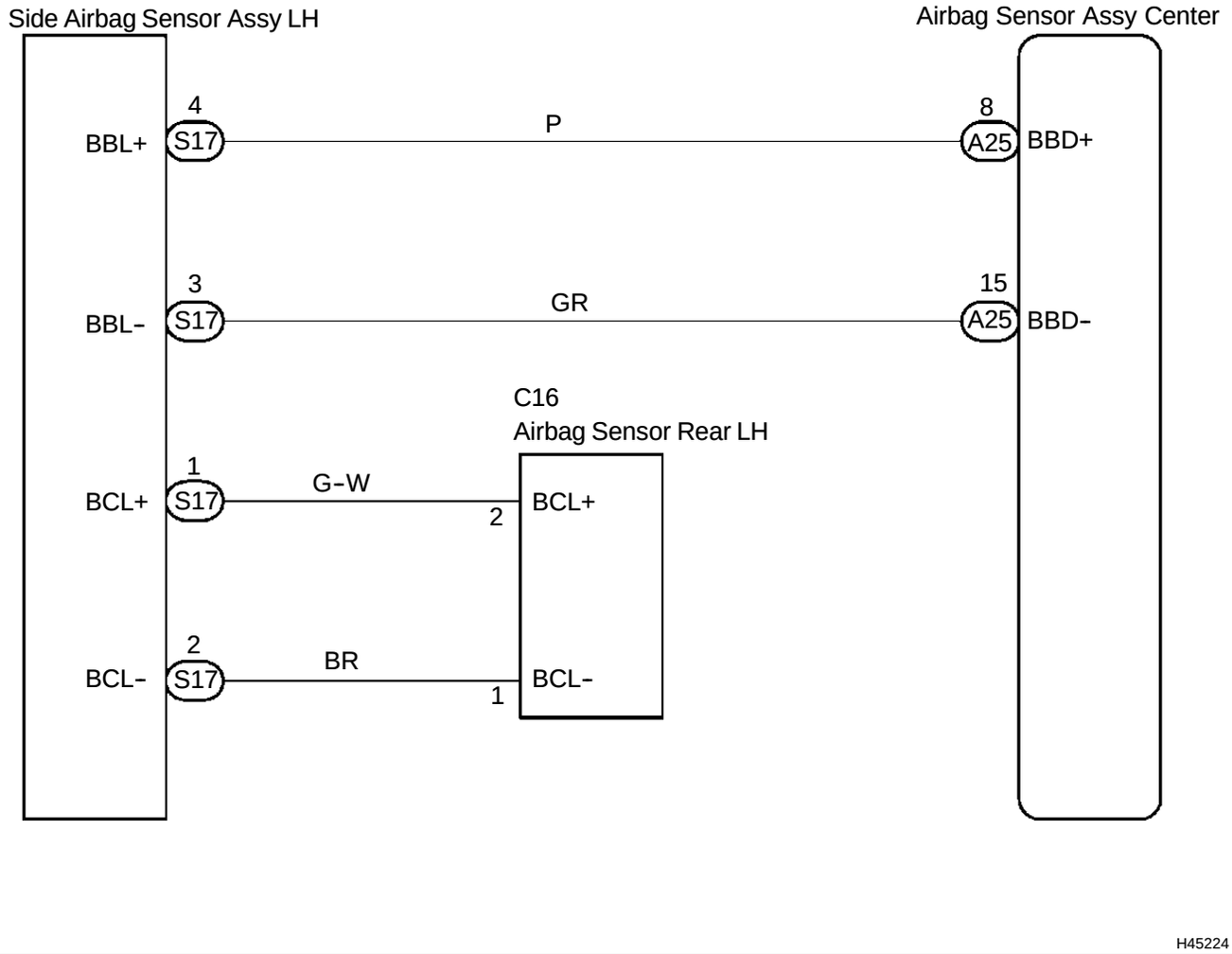
*2: RHD

HINT:

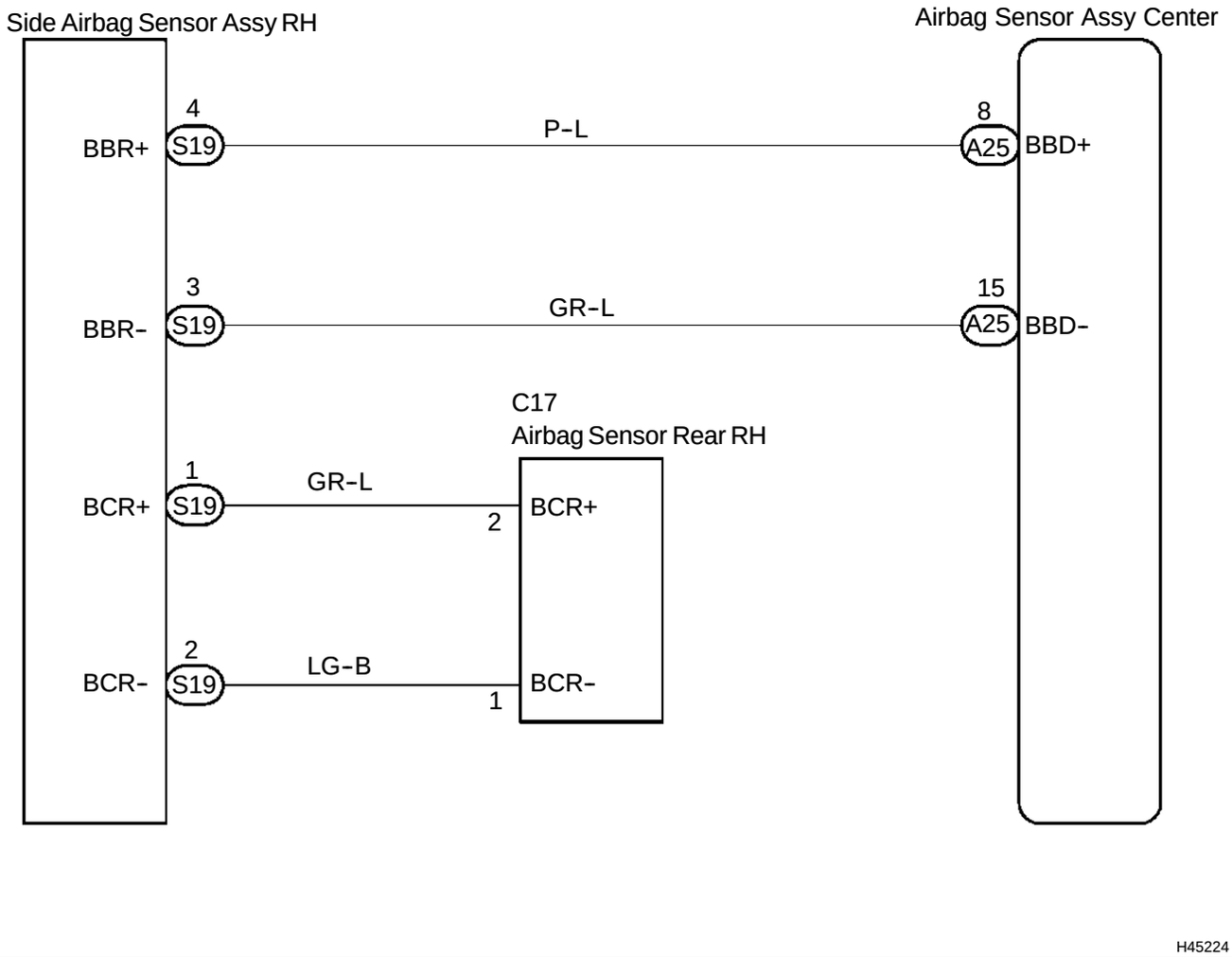
Troubleshoot DTC B1620/21 first when the DTC B1620/21 and B1630/23 are output simultaneously.

WIRING DIAGRAM

LHD:



RHD:


Side Airbag Sensor Assy RH
Airbag Sensor Assy Center
BBR+
4
S19
P-L
8
A25
BBD+
BBR-
3
S19
GR-L
15
A25
BBD-
C17
Airbag Sensor Rear RH
BCR+
1
S19
GR-L
2
BCR+
BCR-
2
S19
LG-B
1
BCR-
C
H45224

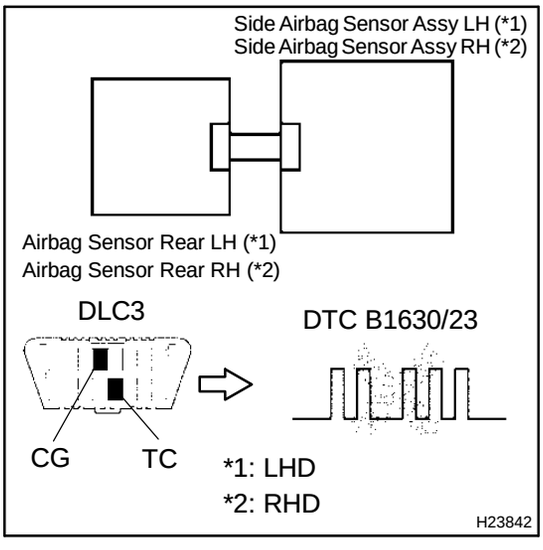
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1630/23 is not output.

HINT:
Codes other than code B1630/23 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

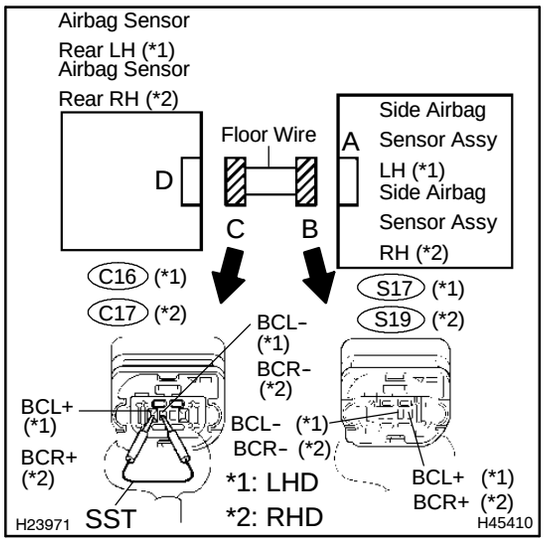
2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear LH.
(d) RHD:
Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear RH.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE (OPEN)



(a) LHD:
Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear LH.
(b) RHD:
Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear RH.
(c) LHD:
Using SST, connect C16-2 (BCL+) and C16-1 (BCL-) of connector "C".
(d) RHD:
Using SST, connect C17-2 (BCR+) and C17-1 (BCR-) of connector "C".
SST 09843-18040
(e) Measure the resistance according to the value(s) in the table below.
Standard:

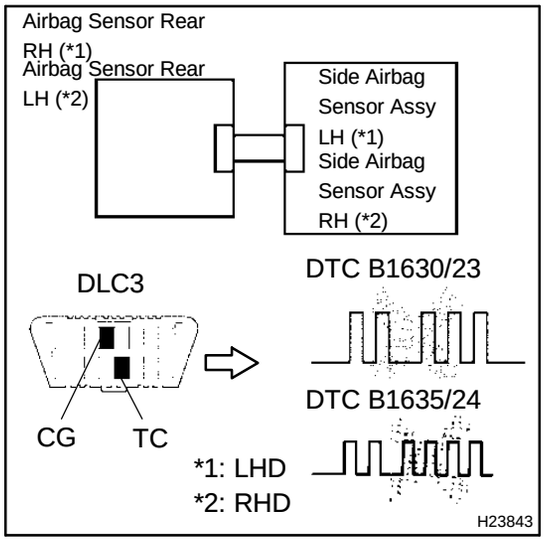
Tester connection	Condition	Specified condition
S17-1 (BCL+) - S17-2 (BCL-) (*1)	Always	Below 1 Ω
S19-1 (BCR+) - S19-2 (BCR-) (*2)	Always	Below 1 Ω

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK AIRBAG SENSOR REAR (D SEAT SIDE)



(a) Disconnect the SST from connector "C".
(b) Connect the connectors to the airbag sensor assy center.
(c) Interchange the airbag sensor rear RH with LH and connect the connectors to them.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page 05-727).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check the DTCs (see page 05-727).

Result:

A	DTC B1630/23 is output.
B	DTC B1635/24 is output (LHD).
C	DTC B1635/24 is output (RHD).
D	DTC B1630/23 and B1635/24 are not output.

A → **Go to step 5**

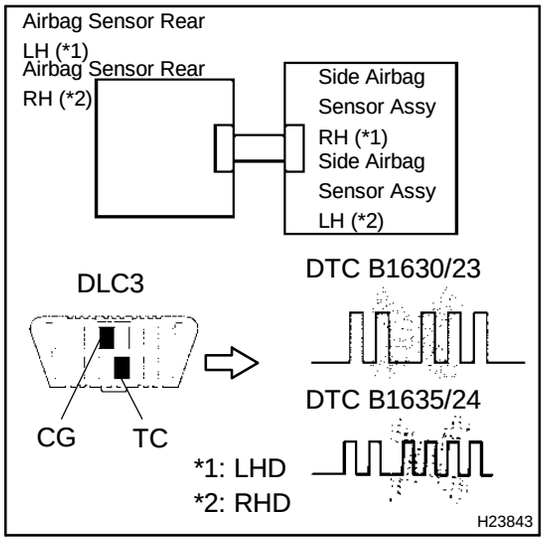
B → **REPLACE AIRBAG SENSOR REAR LH (See Pub. No. RM1028E, page 60-31 and 60-33)**

C → **REPLACE AIRBAG SENSOR REAR RH (See Pub. No. RM1028E, page 60-31 and 60-33)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

5 CHECK SIDE AIRBAG SENSOR ASSY (D SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Return the airbag sensor rear RH and LH to their original positions and connect the connectors to them.
(d) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).

Result:

A	DTC B1630/23 is output.
B	DTC B1635/24 is output (LHD).
C	DTC B1635/24 is output (RHD).
D	DTC B1630/23 and B1635/24 are not output.

A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE SIDE AIR BAG SENSOR ASSY LH (SEE PAGE 60-79, 60-81)**

C → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-79, 60-81)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC	B1635/24	CURTAIN SHIELD AIRBAG SENSOR (P SEAT SIDE) MALFUNCTION

CIRCUIT DESCRIPTION

The curtain shield airbag sensor (P seat side) circuit consists of the airbag sensor assy center and the airbag sensor rear.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1635/24 is recorded when a malfunction is detected in the curtain shield airbag sensor (P seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1635/24	• The airbag sensor assy center receives an open circuit signal in the curtain shield airbag sensor (P seat side) circuit for 2 seconds. • Curtain shield airbag sensor (P seat side) malfunction • Side airbag sensor assembly (P seat side) malfunction • Airbag sensor assy center malfunction	• Floor wire • Airbag sensor rear RH (*1) • Airbag sensor rear LH (*2) • Side airbag sensor assy RH (*1) • Side airbag sensor assy LH (*2) • Airbag sensor assy center

*1: LHD

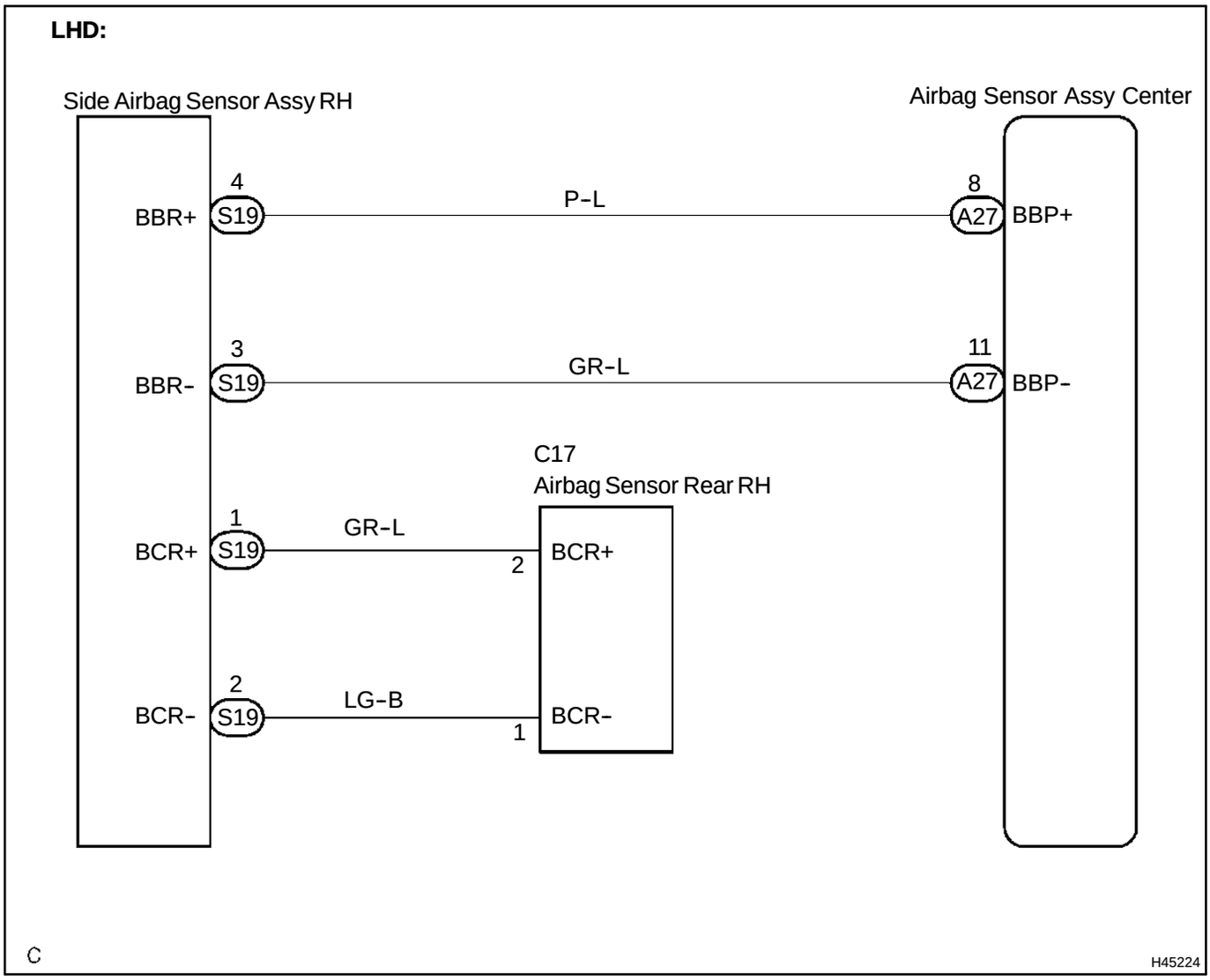
*2: RHD

HINT:

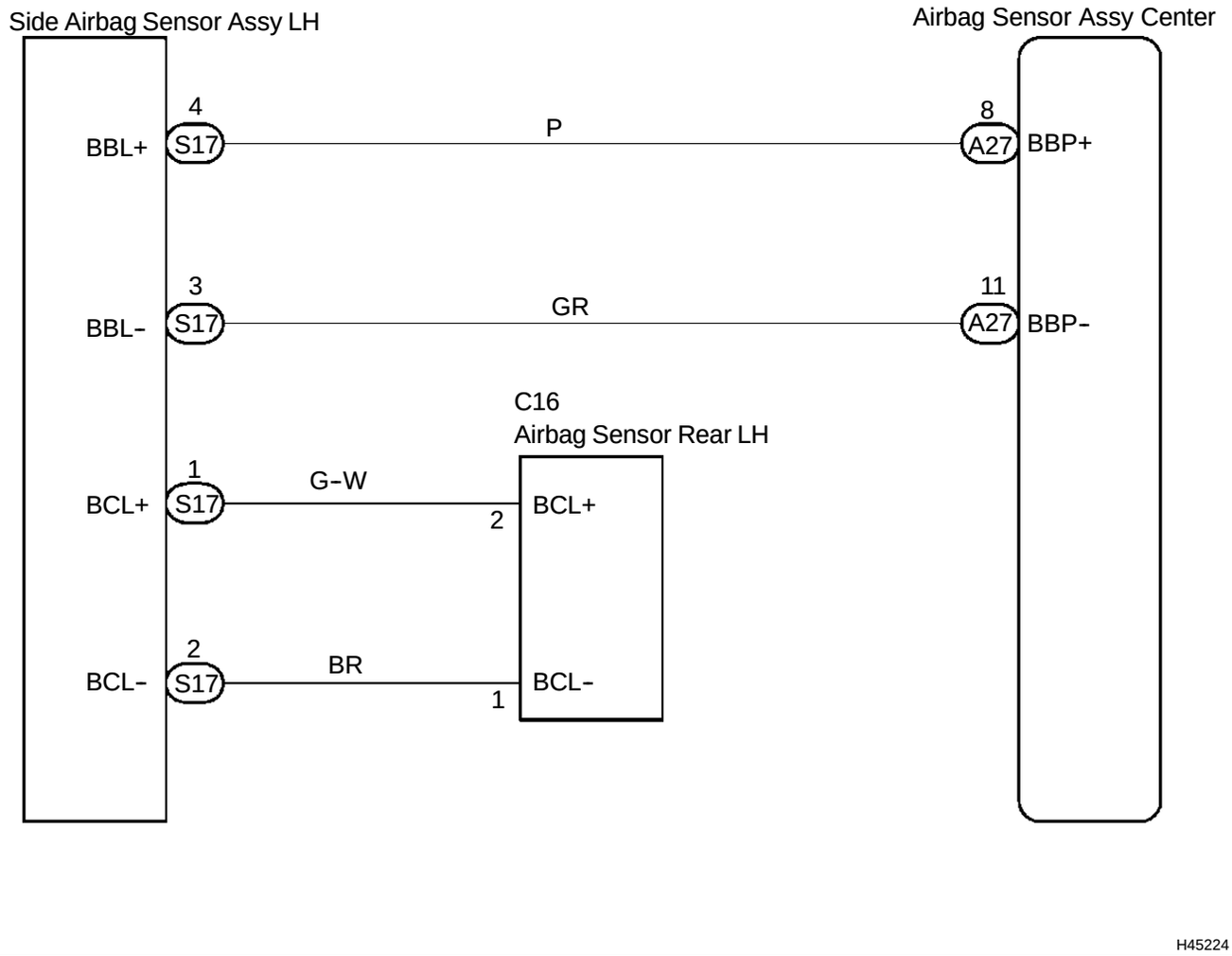
Troubleshoot DTC B1625/22 first when the DTC B1625/22 and B1635/24 are output simultaneously.

WIRING DIAGRAM

LHD:



RHD:


Side Airbag Sensor Assy LH
Airbag Sensor Assy Center
4
BBL+
S17
P
8
A27
BBP+
3
BBL-
S17
GR
11
A27
BBP-
C16
Airbag Sensor Rear LH
1
BCL+
S17
G-W
2
BCL+
2
BCL-
S17
BR
1
BCL-
C
H45224

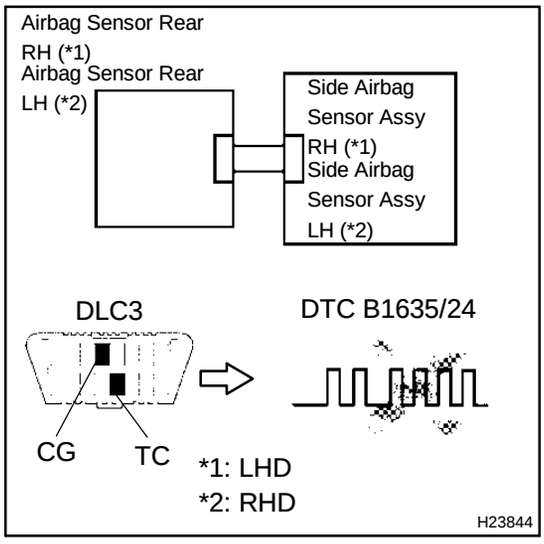
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1635/24 is not output.

HINT:
Codes other than code B1635/24 may be output at this time, but they are not related to this check.

NG	Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

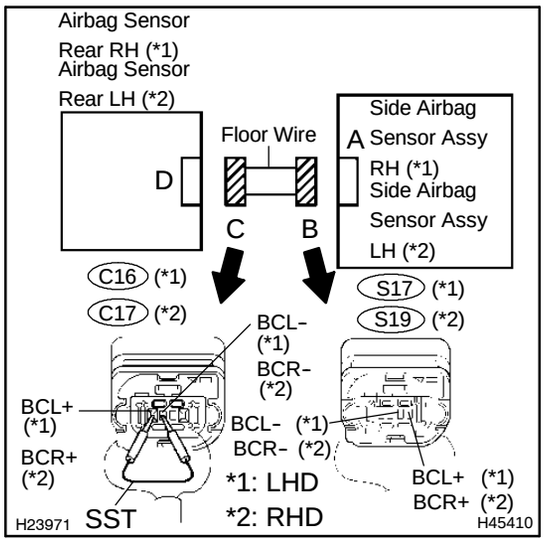
2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear RH.
(d) RHD:
Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear LH.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE (OPEN)



(a) LHD:
Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear RH.
(b) RHD:
Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear LH.
(c) LHD:
Using SST, connect C17-2 (BCR+) and C17-1 (BCR-) of connector "C".
(d) RHD:
Using SST, connect C16-2 (BCL+) and C16-1 (BCL-) of connector "C".
SST 09843-18040
(e) Measure the resistance according to the value(s) in the table below.
Standard:

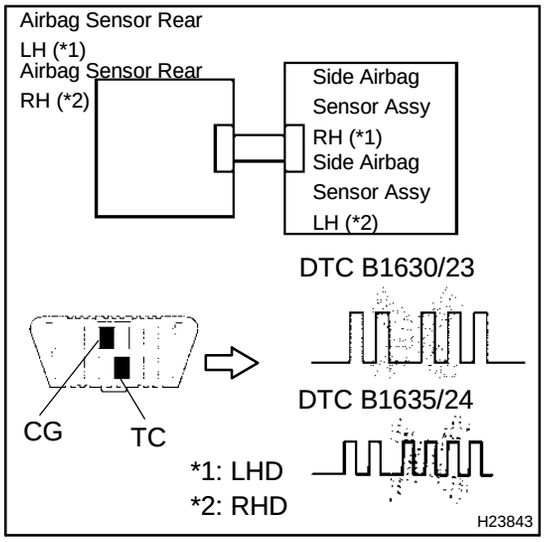
Tester connection	Condition	Specified condition
S19-1 (BCR+) - S19-2 (BCR-) (*1)	Always	Below 1 Ω
S17-1 (BCL+) - S17-2 (BCL-) (*2)	Always	Below 1 Ω

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK AIRBAG SENSOR REAR (P SEAT SIDE)



(a) Disconnect the SST from connector "C".
(b) Connect the connectors to the airbag sensor assy center.
(c) Interchange the airbag sensor rear RH with LH and connect the connectors to them.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page 05-727).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check the DTCs (see page 05-727).

Result:

A	DTC B1635/24 is output.
B	DTC B1630/23 is output (LHD).
C	DTC B1630/23 is output (RHD).
D	DTC B1630/23 and B1635/24 are not output.

A → **Go to step 5**

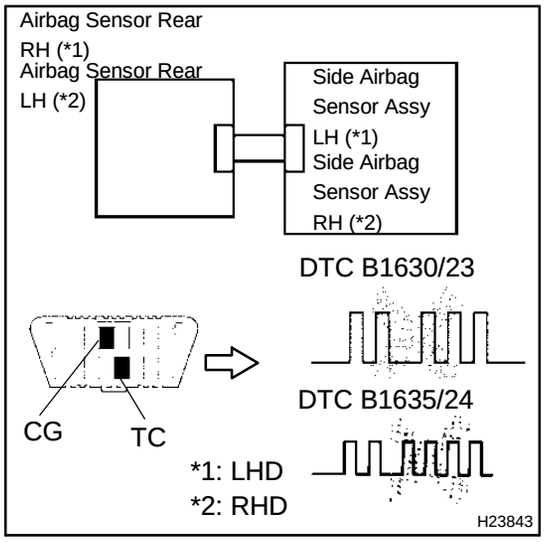
B → **REPAIR OR REPLACE FLOOR WIRE (See Pub. No. RM1028E, page 60-31 and 60-33)**

C → **REPLACE AIRBAG SENSOR REAR RH (See Pub. No. RM1028E, page 60-31 and 60-33)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

5 CHECK SIDE AIRBAG SENSOR ASSEMBLY (P SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Return the airbag sensor rear RH and LH to their original positions and connect the connectors to them.
(d) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).

Result:

A	DTC B1635/24 is output.
B	DTC B1630/23 is output (LHD).
C	DTC B1630/23 is output (RHD).
D	DTC B1630/23 and B1635/24 are not output.

A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

B → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-79, 60-81)**

C → **REPLACE SIDE AIR BAG SENSOR ASSY LH (SEE PAGE 60-79, 60-81)**

D

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC B1651/33 MANUAL CUT OFF SW TROUBLE

CIRCUIT DESCRIPTION

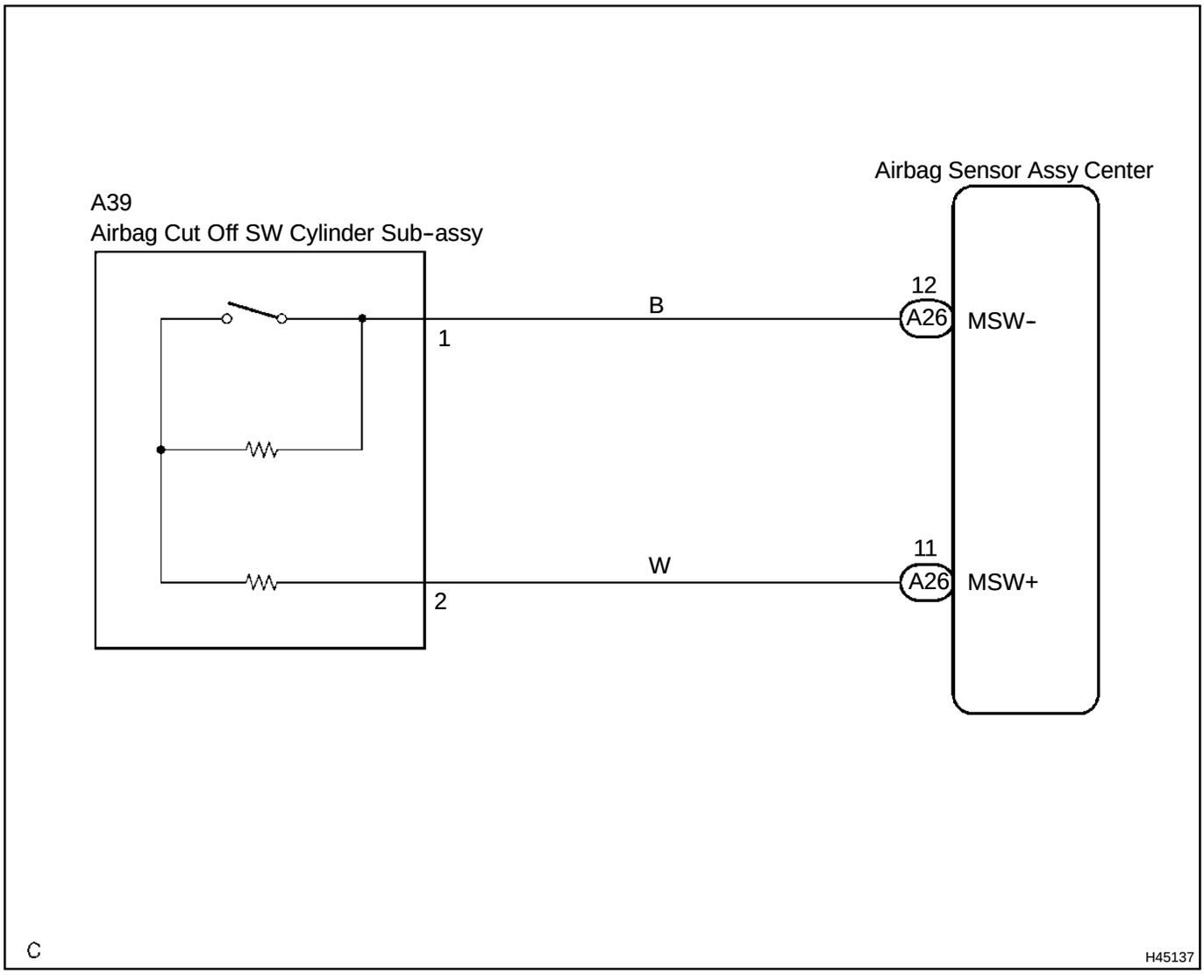
The manual cutoff switch circuit consists of the airbag cut off SW cylinder sub-assy (passenger airbag manual cutoff switch) and the airbag sensor assy center.

If the airbag sensor assy center receives signals from the passenger airbag manual cutoff switch, it determines whether or not the front passenger airbag assy should be operated.

DTC B1651/33 is recorded when a malfunction is detected in the manual cutoff switch circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1651/33	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the manual cutoff switch circuit for 2 seconds. • Airbag cut off SW cylinder sub-assy malfunction • Airbag sensor assy center malfunction	• Airbag cut off SW cylinder sub-assy (Passenger airbag manual cutoff switch) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



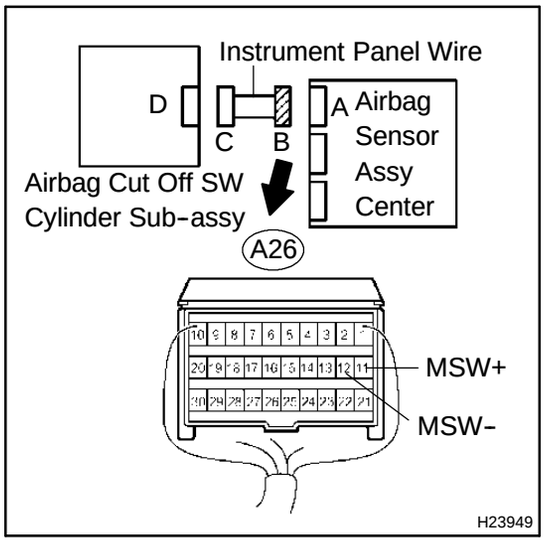
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (–) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the connector from the airbag cut off SW cylinder sub–assy.
(b) Measure the resistance according to the value(s) in the table below.

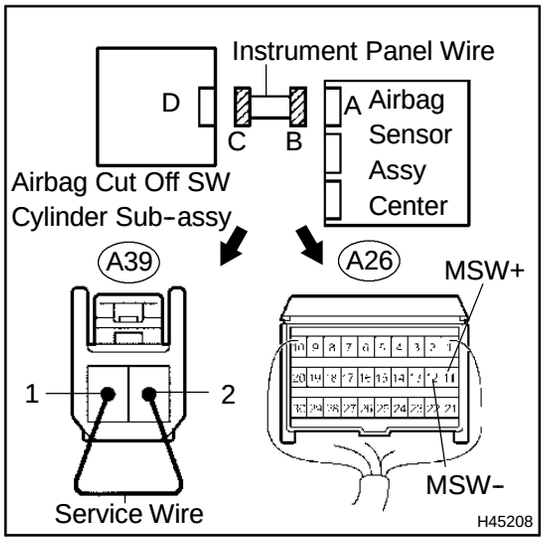
Standard:

Tester connection	Condition	Specified condition
A26–11 (MSW+) – A26–12 (MSW–)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

2 CHECK INSTRUMENT PANEL WIRE



(a) Using a service wire, connect the A39-2 and A39-1 of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

(b) Measure the resistance according to the value(s) in the table below.

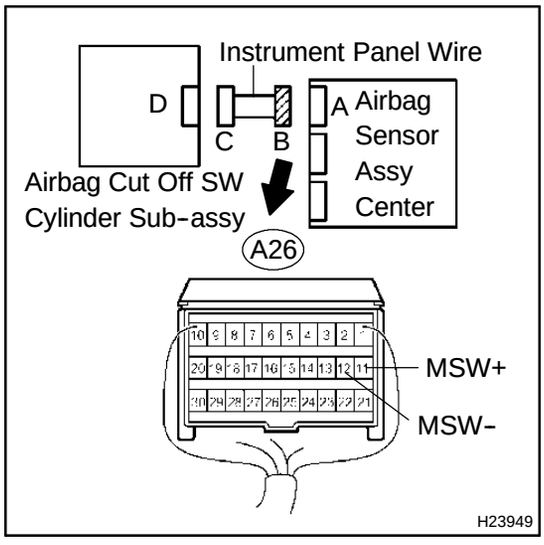
Standard:

Tester connection	Condition	Specified condition
A26-11 (MSW+) - A26-12 (MSW-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

3 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the service wire from connector "C".

(b) Measure the resistance according to the value(s) in the table below.

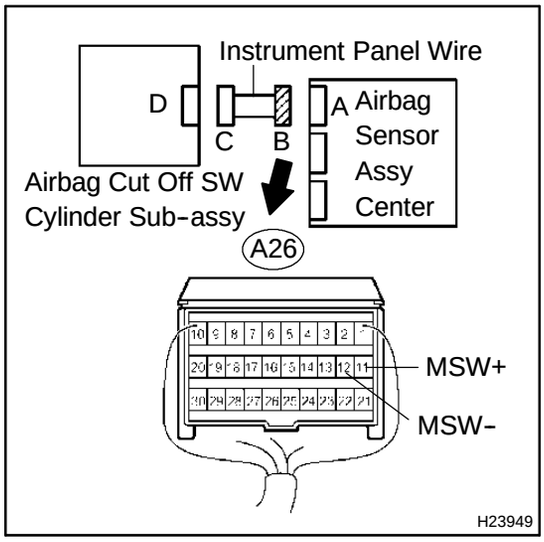
Standard:

Tester connection	Condition	Specified condition
A26-11 (MSW+) - Body ground	Always	1 MΩ or Higher
A26-12 (MSW-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

4 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

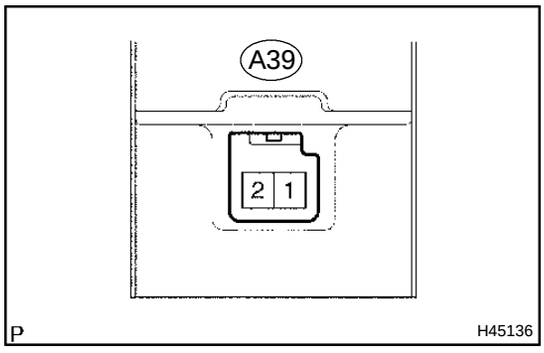
Standard:

Tester connection	Condition	Specified condition
A26-11 (MSW+) - Body ground	Ignition switch ON	Below 1 V
A26-12 (MSW-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

5 CHECK AIRBAG CUT OFF SW CYLINDER SUB-ASSY



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

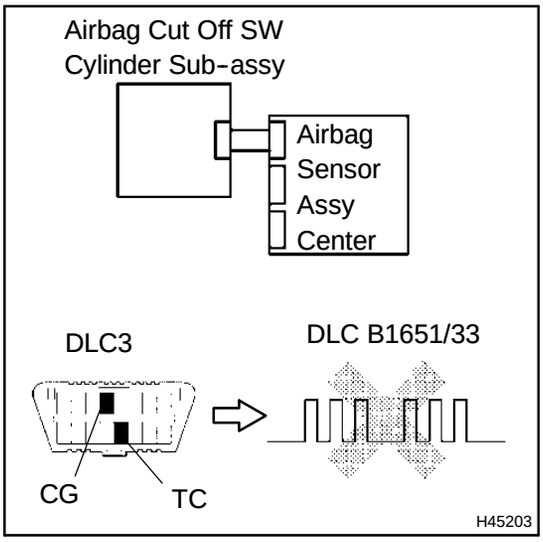
Standard:

Tester connection	Condition	Specified condition
A39-2 - A39-1	Cut off switch is in ON position (Passenger airbag is not active)	360 to 440 Ω
A39-2 - A39-1	Cut off switch is in OFF position (Passenger airbag is active)	90 to 110 Ω

NG → **REPLACE AIRBAG CUT OFF SW CYLINDER SUB-ASSY** **(SEE PAGE 71-6)**

OK

6 CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center and the airbag cut off SW cylinder sub-assy.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).

OK:

DTC B1651/33 is not output.

HINT:

Codes other than DTC B1651/33 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC	B1653/35	SEAT POSITION SENSOR ASSEMBLY MALFUNCTION

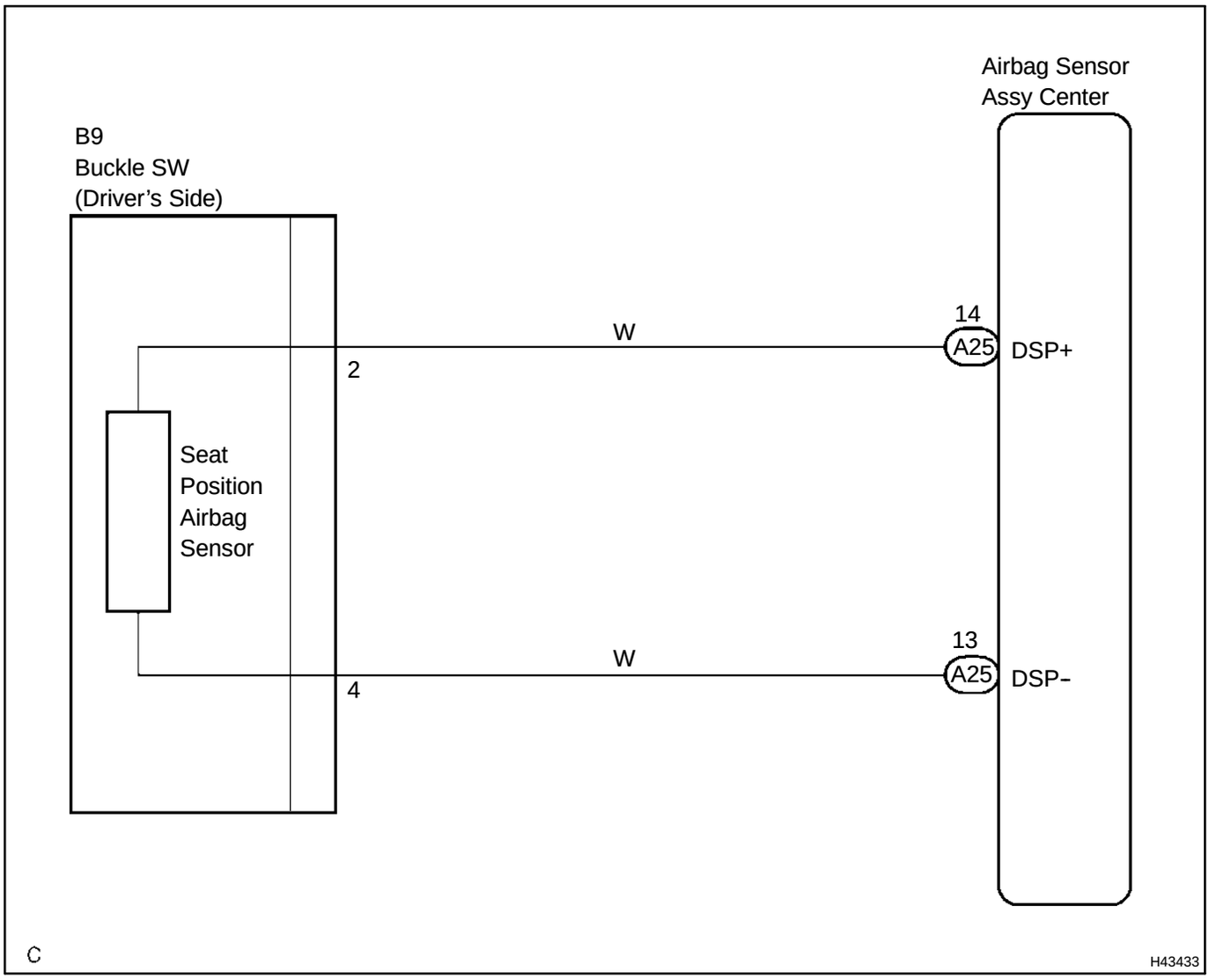
CIRCUIT DESCRIPTION

The seat position airbag sensor circuit consists of the airbag sensor assy center and the seat position airbag sensor.

DTC B1653/35 is recorded when a malfunction is detected in the seat position airbag sensor circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1653/35	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the seat position sensor circuit for 2 seconds. • Seat position airbag sensor malfunction • Airbag sensor assy center malfunction	• Floor wire • Seat position airbag sensor • Airbag sensor assy center

WIRING DIAGRAM



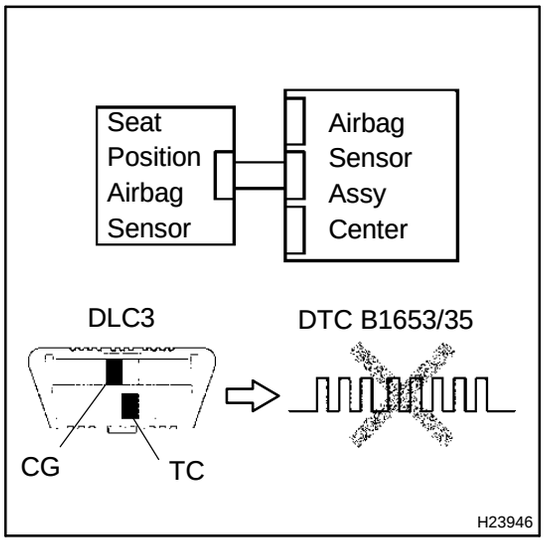
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (–) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (–) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05–727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05–727).
OK:
DTC B1653/35 is not output.

HINT:
Codes other than code B1653/35 may be output at this time, but they are not related to this check.

NG	Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05–719)

2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the airbag sensor assy center and the seat position airbag sensor.

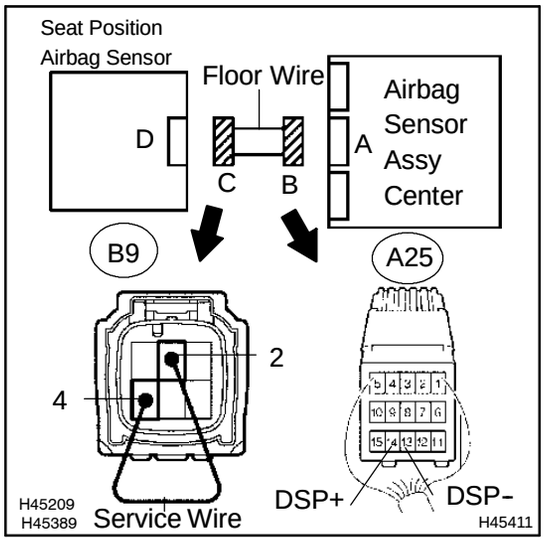
OK:

The connectors are connected.

NG	CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FLOOR WIRE (OPEN)



(a) Disconnect the connectors from the airbag sensor assy center and the seat position airbag sensor.
(b) Using a service wire, connect B9-2 and B9-4 of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

(c) Measure the resistance according to the value(s) in the table below.

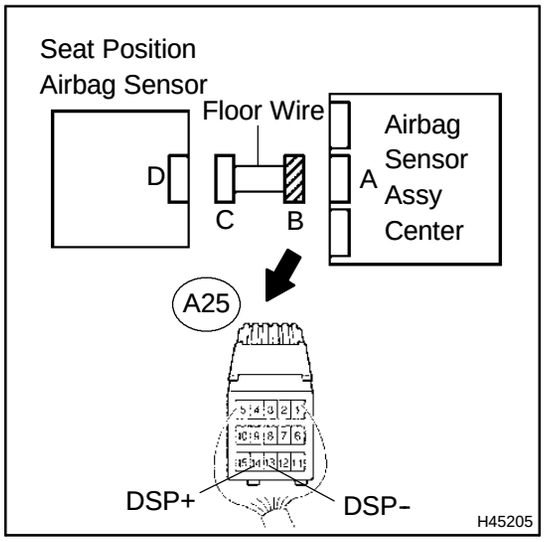
Standard:

Tester connection	Condition	Specified condition
A25-14 (DSP+) - A25-13 (DSP-)	Always	Below 1 Ω

NG	REPAIR OR REPLACE FLOOR WIRE

OK

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the service wire from connector "C".
(b) Measure the resistance according to the value(s) in the table below.

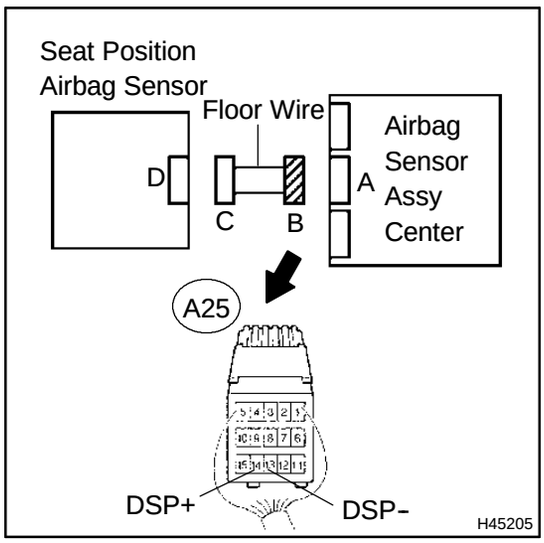
Standard:

Tester connection	Condition	Specified condition
A25-14 (DSP+) - A25-13 (DSP-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

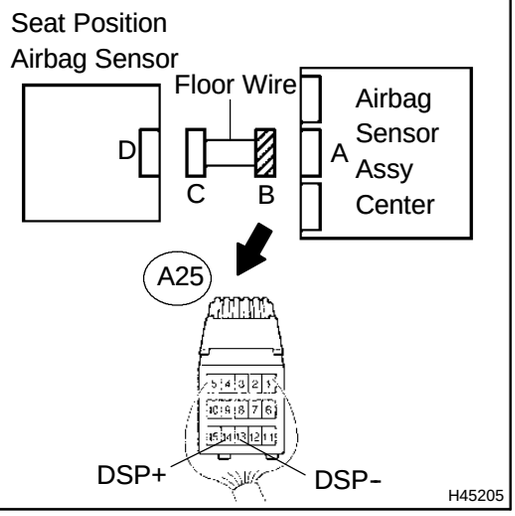
Standard:

Tester connection	Condition	Specified condition
A25-14 (DSP+) - Body ground	Always	Below 1 V
A25-13 (DSP-) - Body ground	Always	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

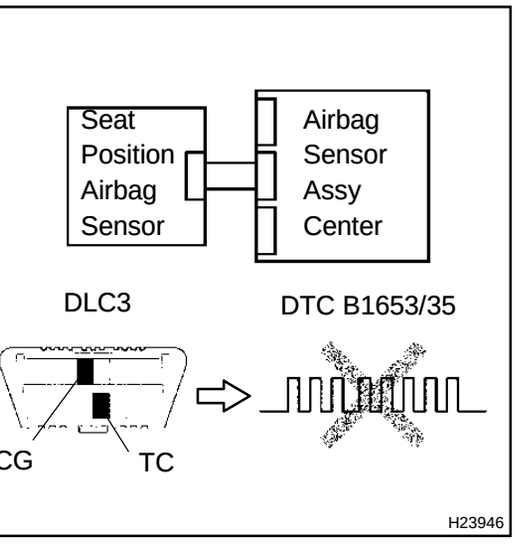
Standard:

Tester connection	Condition	Specified condition
A25-14 (DSP+) - Body ground	Always	1 MΩ or Higher
A25-13 (DSP-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 CHECK SEAT POSITION AIR BAG SENSOR



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the connector to the seat position airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

OK:

DTC B1653/35 is not output.

HINT:

Codes other than code B1653/35 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

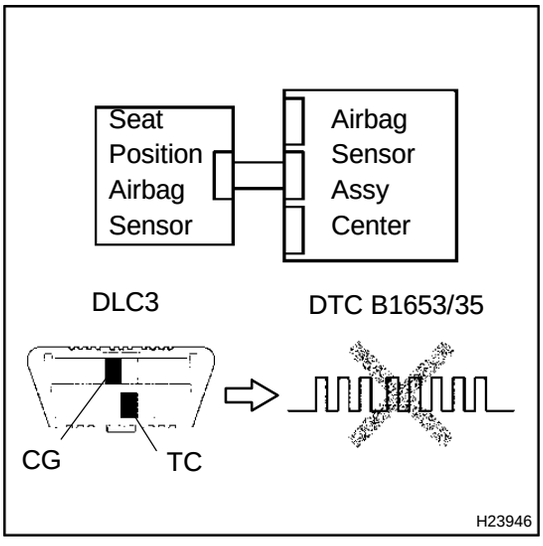
8	REPLACE SEAT POSITION AIR BAG SENSOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Replace the seat position airbag sensor (see page 60-85).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(c) Clear the DTCs stored in memory (see page 05-727).
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Check the DTCs (see page 05-727).
OK:
DTC B1653/35 is not output.

HINT:
Codes other than code B1653/35 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

DTC	B1655/37	SEAT BELT BUCKLE SWITCH (D SEAT SIDE) MALFUNCTION

CIRCUIT DESCRIPTION

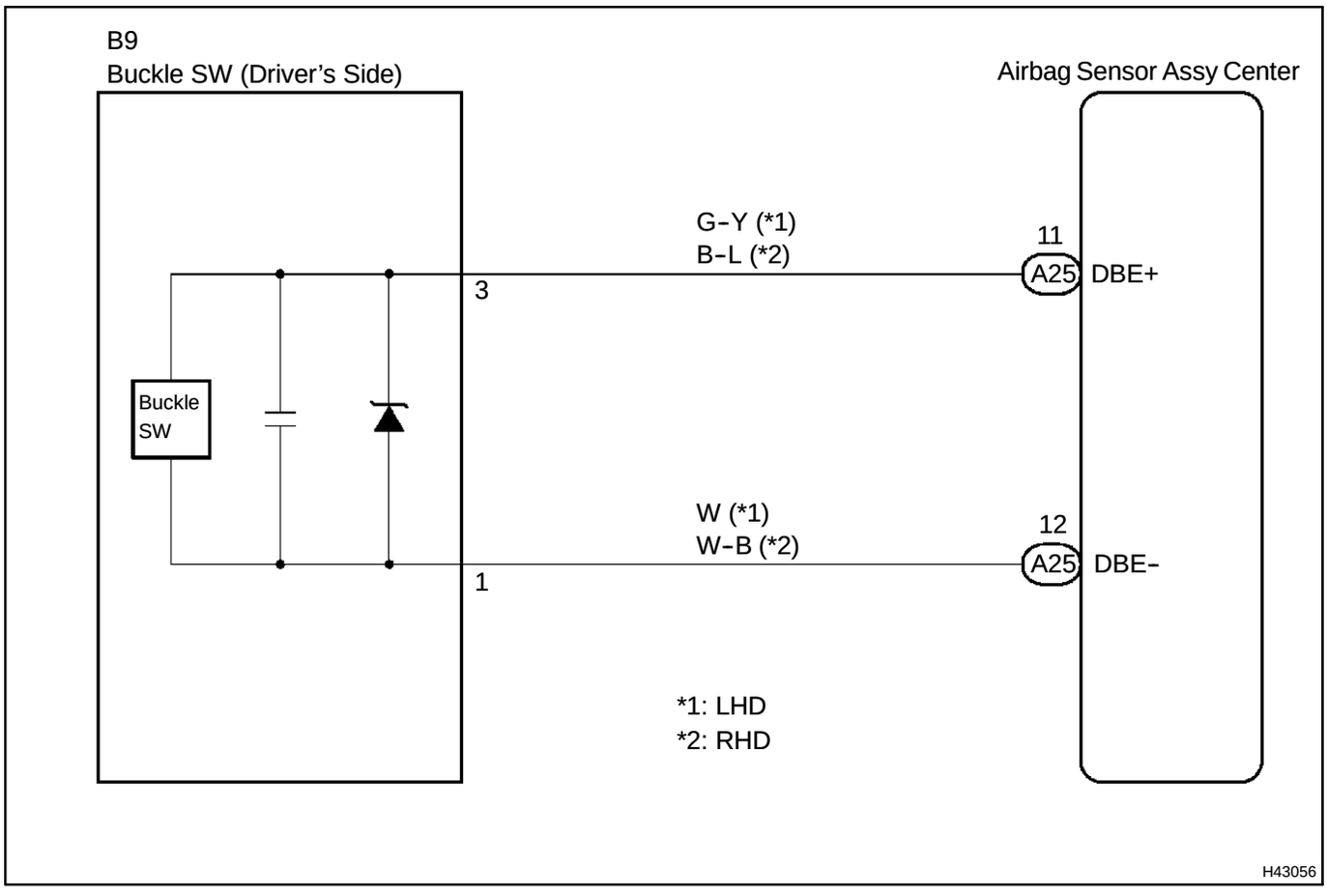
The seat belt buckle switch (D seat side) circuit consists of the airbag sensor assy center and the seat belt buckle switch (D seat side).

DTC B1655/37 is recorded when a malfunction is detected in the seat belt buckle switch (D seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1655/37	• The airbag sensor assy center receives a line short circuit signal, an open circuit signal, short circuit to ground or a short circuit to B+ signal in the seat belt buckle switch (D seat side) circuit for 2 seconds. • Seat belt buckle switch (D seat side) malfunction • Airbag sensor assy center malfunction	• Floor wire • Front seat inner belt assy LH (*1) • Front seat inner belt assy RH (*2) • Airbag sensor assy center

*1: LHD
*2: RHD

WIRING DIAGRAM



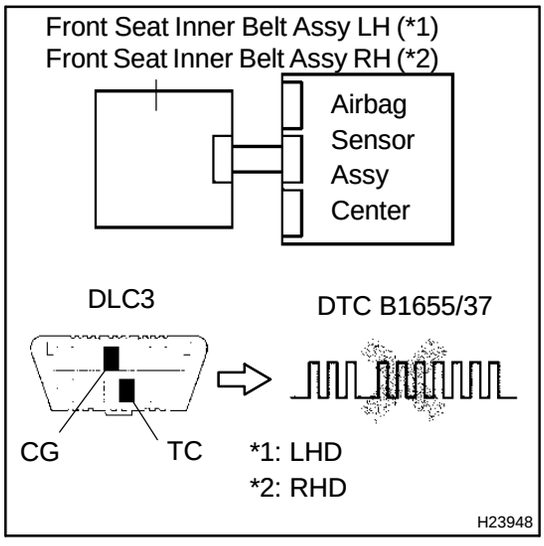
INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK DTC



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1655/37 is not output.

HINT:
Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK →

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

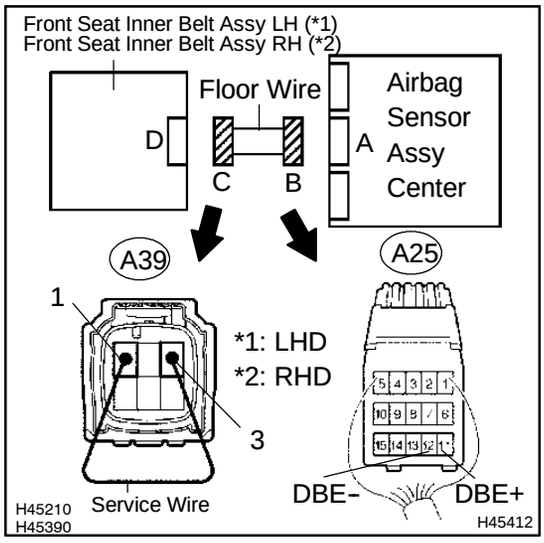
2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Check that the connectors are properly connected to the airbag sensor assy center and the front seat inner belt assy LH.
(d) RHD:
Check that the connectors are properly connected to the airbag sensor assy center and the front seat inner belt assy RH.
OK:
The connectors are connected.

NG	**CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE (OPEN)



(a) LHD:
Disconnect the connectors from the airbag sensor assy center and the front seat inner belt assy LH.
(b) RHD:
Disconnect the connectors from the airbag sensor assy center and the front seat inner belt assy RH.
(c) Using a service wire, connect A39-3 and A39-1 of connector "C".

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

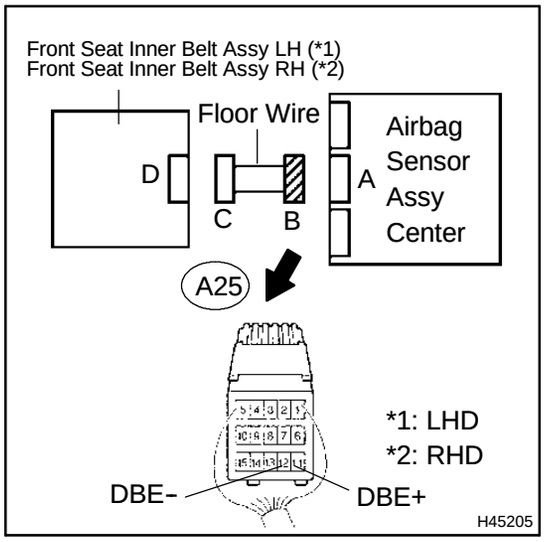
(d) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A25-11 (DBE+) - A25-12 (DBE-)	Always	Below 1 Ω

NG	**REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the service wire from connector "C".
(b) Measure the resistance according to the value(s) in the table below.

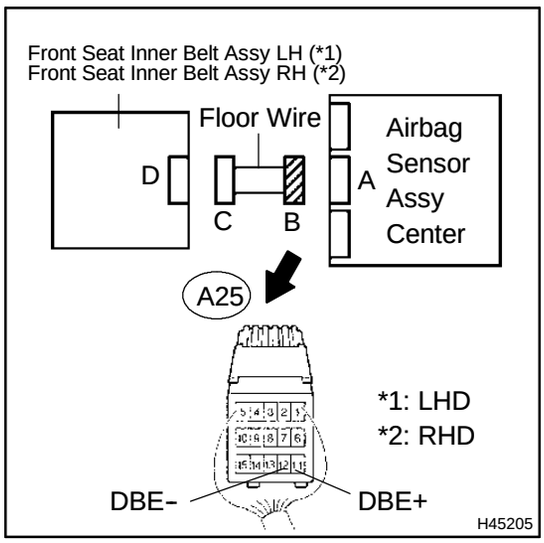
Standard:

Tester connection	Condition	Specified condition
A25-11 (DBE+) - A25-12 (DBE-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

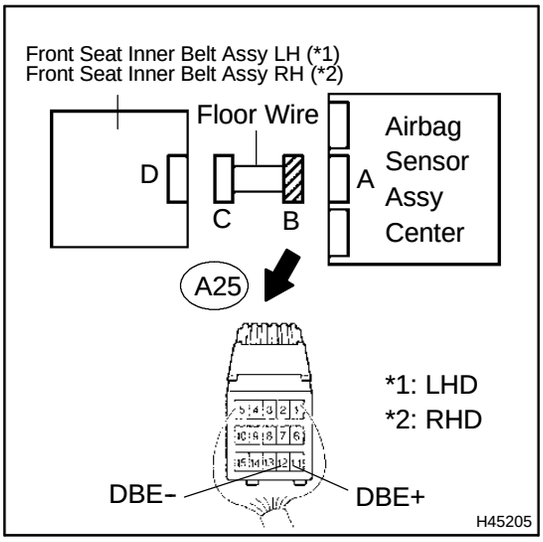
Standard:

Tester connection	Condition	Specified condition
A25-11 (DBE+) - Body ground	Ignition switch ON	Below 1 V
A25-12 (DBE-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

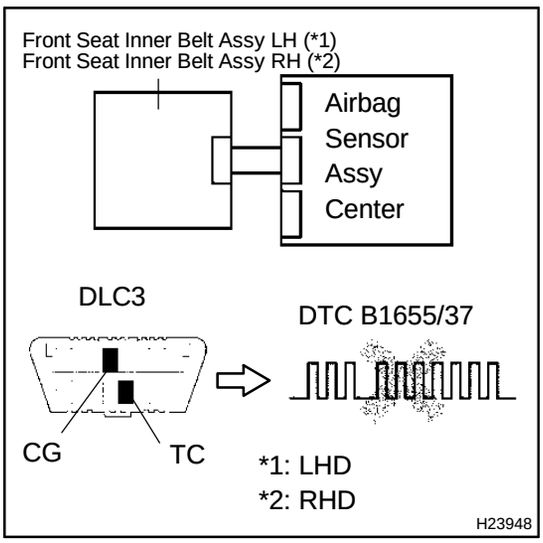
Standard:

Tester connection	Condition	Specified condition
A25-11 (DBE+) - Body ground	Always	1 MΩ or Higher
A25-12 (DBE-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 CHECK FRONT SEAT INNER BELT ASSY (D SEAT SIDE)



(a) Connect the connectors to the airbag sensor assy center.
(b) LHD:
Connect the connector to the front seat inner belt assy LH.
(c) RHD:
Connect the connector to the front seat inner belt assy RH.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page 05-727).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check the DTCs (see page 05-727).

OK:

DTC B1655/37 is not output.

HINT:
Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

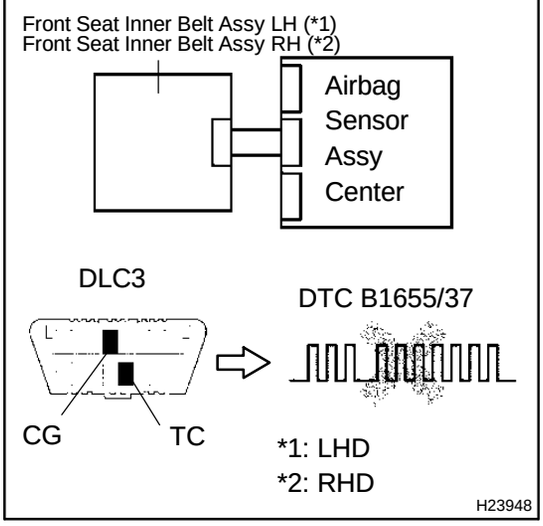
8 REPLACE FRONT SEAT INNER BELT ASSY (D SEAT SIDE)

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) LHD:
Replace the front seat inner belt assy LH (see page 72-2).
(d) RHD:
Replace the front seat inner belt assy RH (see page 72-2).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9 CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(c) Clear the DTCs stored in memory (see page 05-727).
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Check the DTCs (see page 05-727).
OK:
DTC B1655/37 is not output.

HINT:
Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

DTC	B1660/43	PASSENGER AIRBAG OFF INDICATOR LIGHT CIRCUIT MALFUNCTION

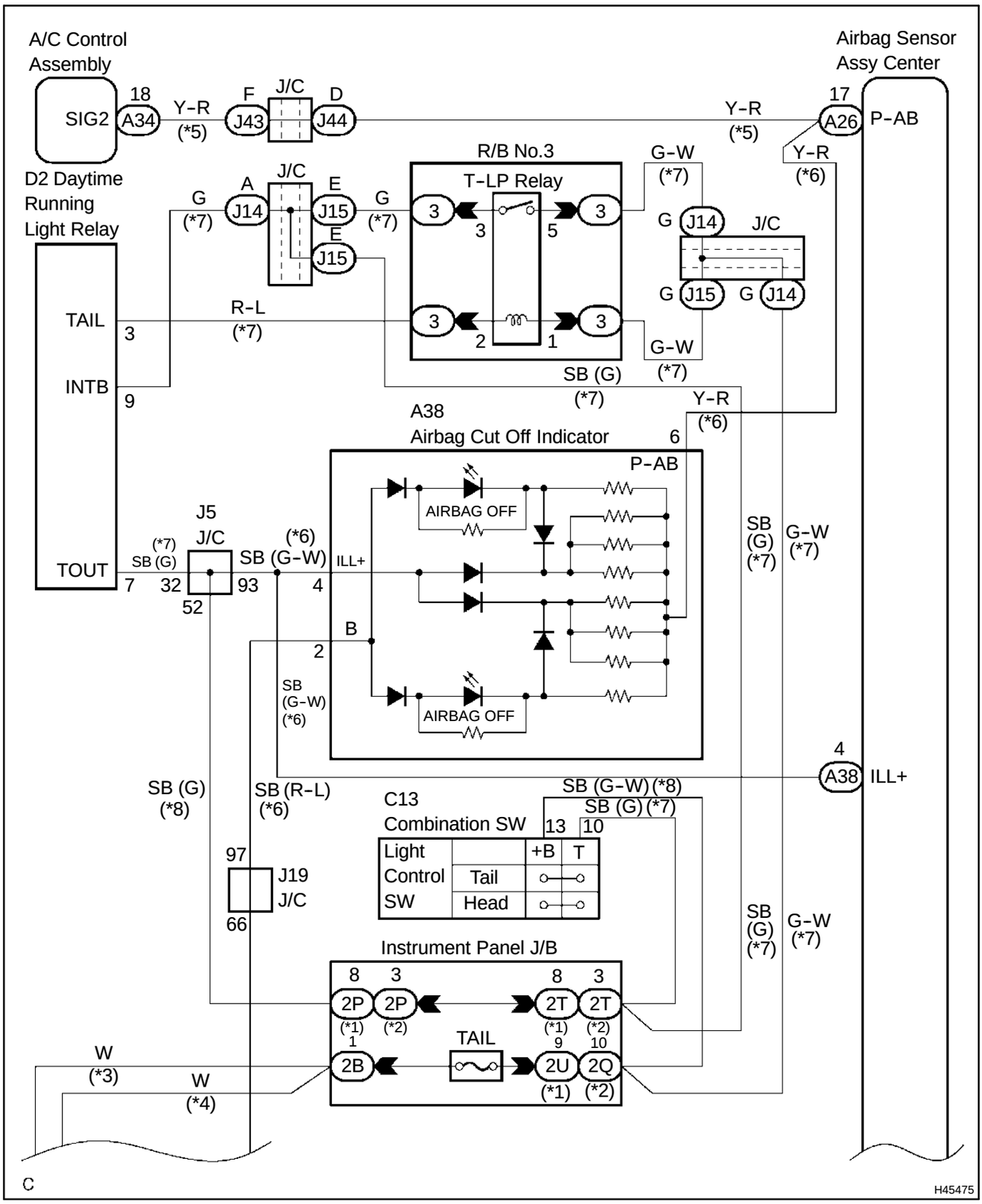
CIRCUIT DESCRIPTION

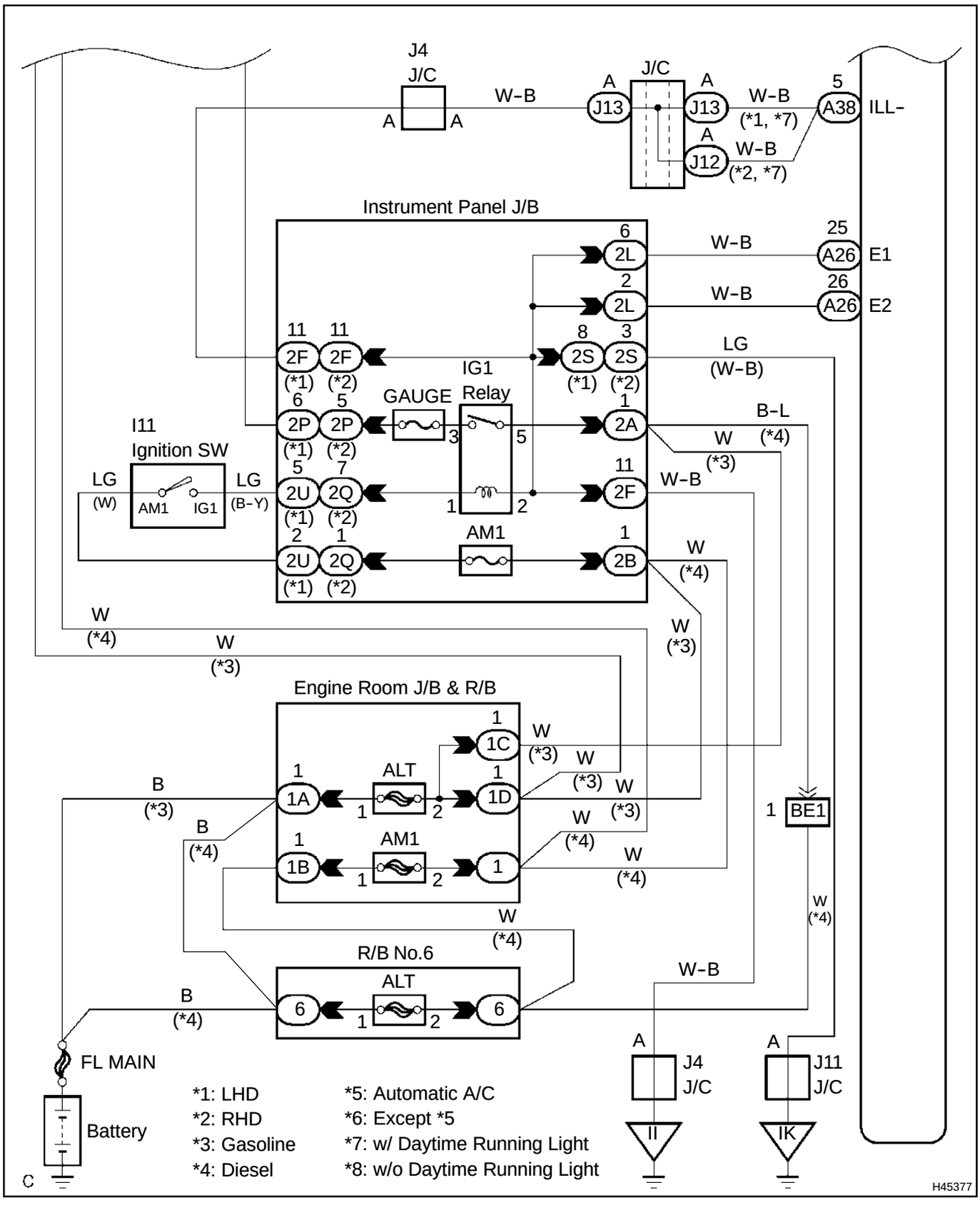
The passenger airbag OFF indicator circuit consists of the airbag sensor assy center and the passenger seat belt warning lamp assy.

DTC B1660/43 is recorded when a malfunction is detected in the passenger airbag OFF indicator circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1660/43	• The airbag sensor assy center receives an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the passenger airbag OFF indicator circuit for 2 seconds. • Passenger seat belt warning lamp assy malfunction • Airbag sensor assy center malfunction	• Passenger seat belt warning lamp assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM




J4 J/C
W-B
J/C
J13
J12
W-B (*1, *7)
W-B (*2, *7)
A38
ILL-
Instrument Panel J/B
2L
2F
2S
2P
2U
2Q
2A
2B
A26
E1
E2
W-B
LG (W-B)
B-L
W (*4)
W (*3)
IG1 Relay
GAUGE
AM1
I11 Ignition SW
LG (W)
LG (B-Y)
AM1
IG1
Engine Room J/B & R/B
1C
1A
1B
1D
1
ALT
AM1
B (*3)
B (*4)
W (*3)
W (*4)
BE1
R/B No.6
ALT
6
B (*4)
W-B
FL MAIN
Battery
C
J4 J/C
J11 J/C
II
IK
*1: LHD
*2: RHD
*3: Gasoline
*4: Diesel
*5: Automatic A/C
*6: Except *5
*7: w/ Daytime Running Light
*8: w/o Daytime Running Light
H45377

INSPECTION PROCEDURE

1	CHECK PASSENGER AIRBAG OFF INDICATOR

(a) Turn the ignition switch to the ON position.
(b) Check the passenger airbag OFF indicator operation.

HINT:
Refer to the normal condition of the passenger airbag OFF indicator (see page 05-719).

Airbag cut of SW cylinder sub-assy	Passenger airbag	Passenger airbag OFF indicator
ON position	Active	OFF
OFF position	Not active	ON

Result:

A:

Passenger airbag OFF indicator always comes on, when the airbag cut off SW cylinder sub-assy is ON position.

B:

Passenger airbag OFF indicator does not come on, when the airbag cut off SW cylinder sub-assy is OFF position.

B → **Go to step 6**

A

2	CHECK PASSENGER SEAT BELT WARNING LAMP ASSY

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connector from the passenger seat belt warning lamp assy.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Check the passenger airbag OFF indicator operation.

OK:

The passenger airbag OFF indicator does not come on.

NG → **REPLACE PASSENGER SEAT BELT WARNING LAMP ASSY (SEE PAGE 71-6)**

OK

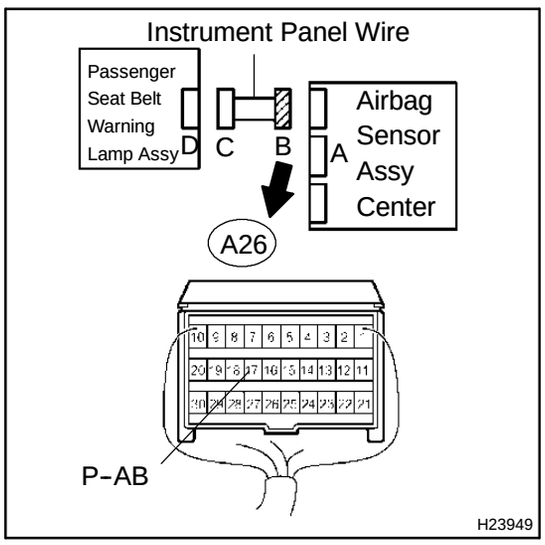
3 PREPARE FOR INSPECTION

CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

NEXT

4 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



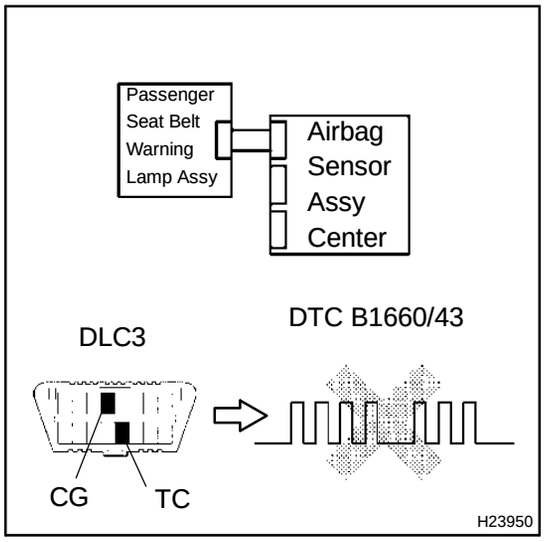
(a) Measure the resistance according to the value(s) in the table below.
Standard:

Terminal connection	Condition	Specified condition
A26-17 (P-AB) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

5 CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center and the passenger seat belt warning lamp assy.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).

OK:

DTC B1660/43 is not output.

HINT:

Codes other than code B1660/43 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

6 PREPARE FOR INSPECTION

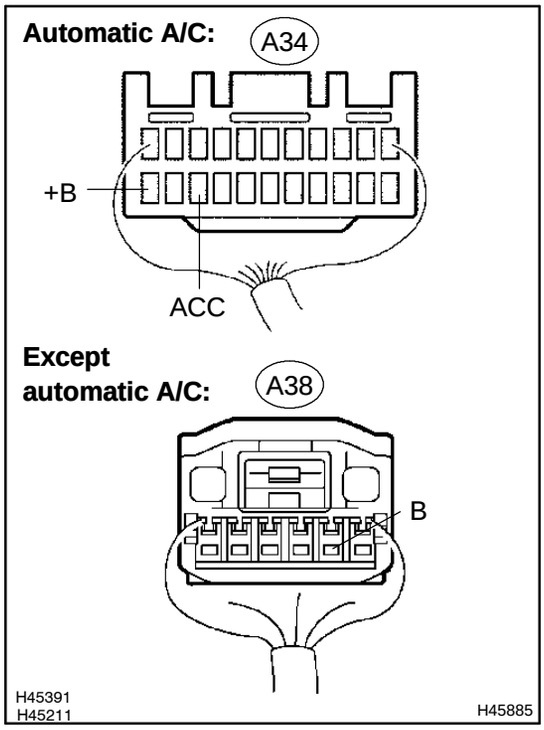
CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

NEXT

7 CHECK PASSENGER AIRBAG OFF INDICATOR (SOURCE VOLTAGE)



(a) Disconnect the connector from the passenger seat belt warning lamp assy.
(b) Connect the connectors to the airbag sensor assy center.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard:

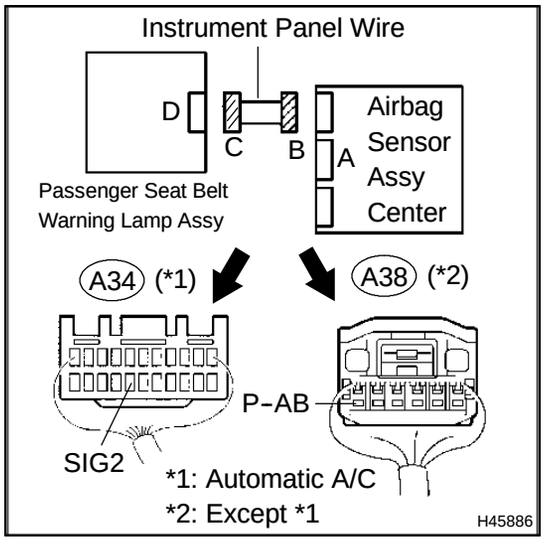
Terminal connection	Condition	Specified condition
A34-20 (ACC) - Body ground (*1)	Ignition switch ON	10 to 14 V
A34-22 (+B) - Body ground (*1)	Ignition switch ON	10 to 14 V
A38-2 (B) - Body ground (*2)	Ignition switch ON	10 to 14 V

*1: Automatic A/C
*2: Except *1

NG → **REPLACE PASSENGER AIRBAG OFF INDICATOR OR WIRE HARNESS (PASSENGER AIRBAG OFF INDICATOR - BATTERY) OR BATTERY**

OK

8 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

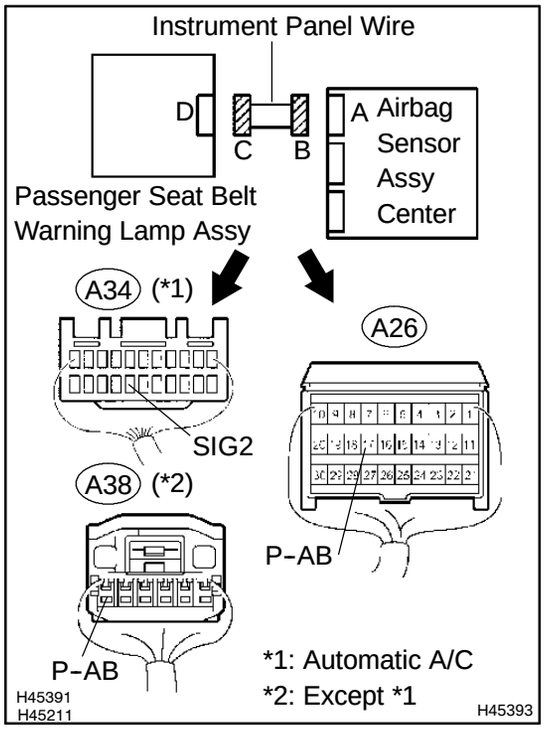
Tester connection	Condition	Specified condition
A34-18 (SIG2) - Body ground (*1)	Ignition switch ON	Below 1 V
A38-6 (P-AB) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: Automatic A/C
*2: Except *1

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

9 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

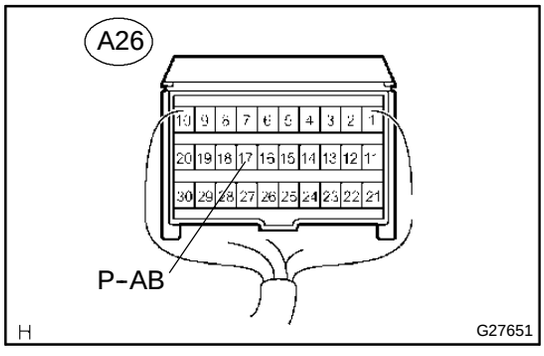
Tester connection	Condition	Specified condition
A34-18 (SIG2) - A26-17 (P-AB) (*1)	Always	Below 1 Ω
A38-6 (P-AB) - A26-17 (P-AB) (*2)	Always	Below 1 Ω

*1: Automatic A/C
*2: Except *1

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

10 CHECK PASSENGER AIRBAG OFF INDICATOR



(a) Connect the connector to the passenger seat belt warning lamp assy.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

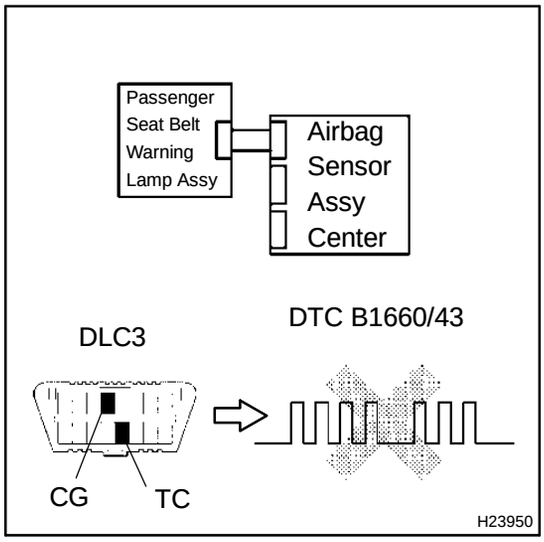
Standard:

Tester connection	Condition	Specified condition
A26-17 (P-AB) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE PASSENGER SEAT BELT WARNING LAMP ASSY (SEE PAGE 71-6)**

OK

11	CHECK AIR BAG SENSOR ASSY CENTER



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connectors to the airbag sensor assy center.
(d) Connect the negative(-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page 05-727).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check the DTCs (see page 05-727).

OK:

DTC B1660/43 is not output.

HINT:

Codes other than code B1660/43 may be output at this time, but they are not related to this check.

NG → **REPLACE AIRBAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

DTC	B1662/45	INDICATOR LAMP CIRCUIT MALFUNCTION

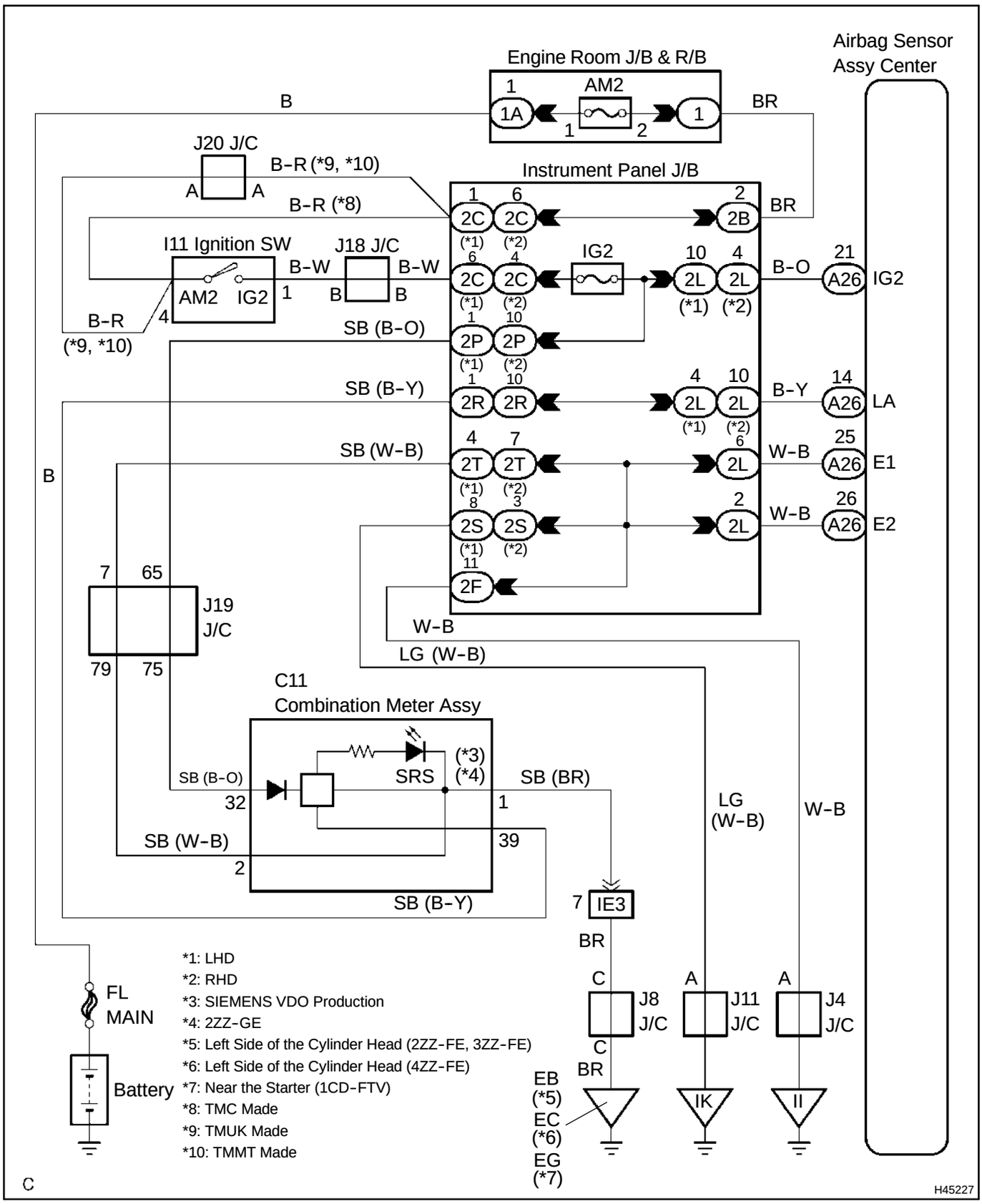
CIRCUIT DESCRIPTION

The indicator lamp circuit consists of the airbag sensor assy center and the combination meter assy.
When the airbag sensor assy center detects a malfunction in the SRS airbag system, the SRS warning light comes on to inform the driver.
It also comes on when the power voltage drops, and automatically goes off in approximately 10 seconds after the power voltage returns to normal (DTC is not stored).
The SRS warning light comes on for 6 seconds after the ignition switch is turned to the ON position, and goes off if the system is normal.
When an open circuit is detected, such as when the connector between the combination meter assy and the airbag sensor assy center is disconnected, the SRS warning light remains on even when approximately 6 seconds elapsed after the ignition switch is turned to the ON position.
DTC B1662/45 is recorded when a malfunction is detected in the indicator lamp circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1662/45	• The airbag sensor assy center receives an open circuit signal or a short circuit to ground signal in the indicator lamp circuit for 2 seconds. • Combination meter assy malfunction • Airbag sensor assy center malfunction	• Combination meter assy • Airbag sensor assy center • Instrument panel wire

HINT:
When DTC B1662/45 and B1000/31 are output simultaneously, perform the troubleshooting for DTC B1662/45 first.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK BATTERY

(a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG → **REPLACE BATTERY**

OK

2	CHECK CONNECTION OF CONNECTORS

(a) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(b) Check that the connectors are properly connected to the airbag sensor assy center and combination meter assy.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3	CHECK COMBINATION METER ASSY

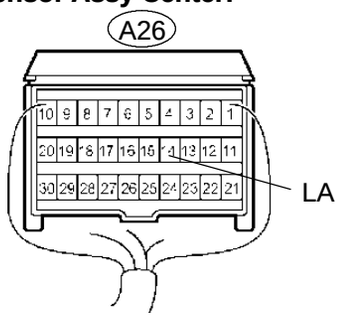
(a) Disconnect the connector from the combination meter assy.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 6 seconds.
(d) Check the operation of the SRS warning light.
OK:
The SRS warning light comes on.

NG → **GO TO COMBINATION METER SYSTEM**
(See Pub. No. RM925E, page 05-1286)

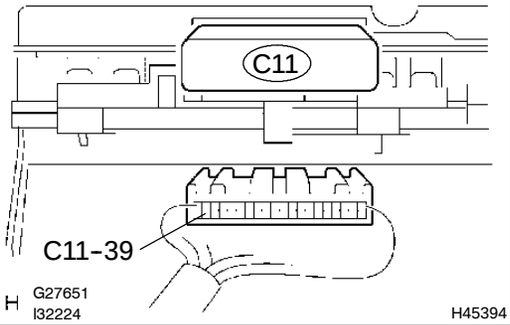
OK

4	CHECK WIRE HARNESS (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)

Airbag Sensor Assy Center:



Combination Meter Assy:



(a) Disconnect the connector from the combination meter assy.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A26-14 (LA) - C11-39	Always	Below 1 Ω
A26-14 (LA) - Body ground	Always	1 MΩ or Higher

OK

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)

DTC	B1800/51	SHORT IN D SQUIB CIRCUIT

DTC	B1801/51	OPEN IN D SQUIB CIRCUIT

DTC	B1802/51	SHORT IN D SQUIB CIRCUIT (TO GROUND)

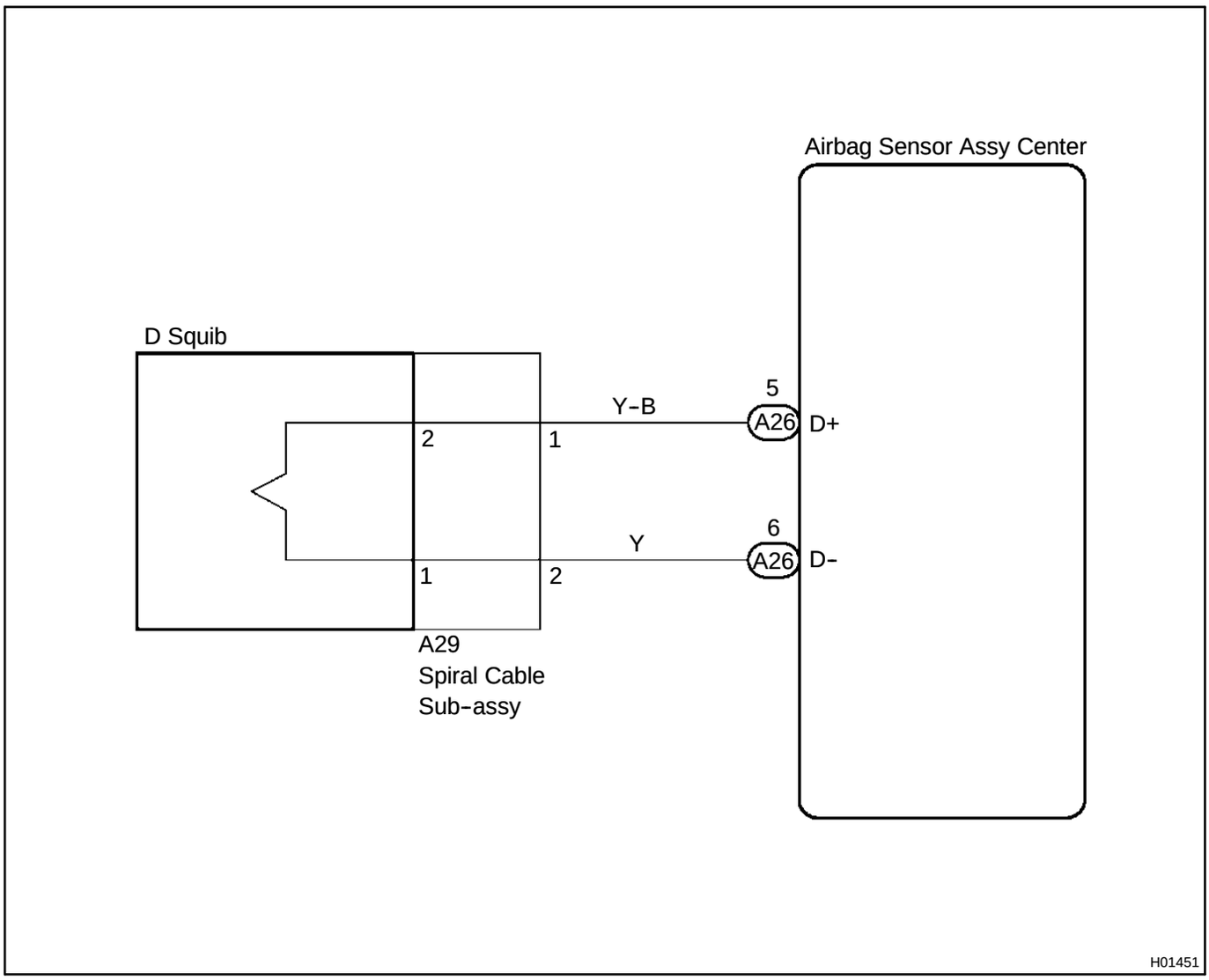
DTC	B1803/51	SHORT IN D SQUIB CIRCUIT (TO B+)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1800/51	• The airbag sensor assy center receives a line short circuit signal 5 times in the D squib circuit during primary check. • Spiral cable sub-assy malfunction • D squib malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1801/51	• The airbag sensor assy center receives an open circuit signal in the D squib circuit for 2 seconds. • Spiral cable sub-assy malfunction • D squib malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1802/51	• The airbag sensor assy center receives a short circuit to ground signal in the D squib circuit for 0.5 seconds. • Spiral cable sub-assy malfunction • D squib malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1803/51	• The airbag sensor assy center receives a short circuit to B+ signal in the D squib circuit for 0.5 seconds. • Spiral cable sub-assy malfunction • D squib malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTC (see page 05-727).

Result:

DTC B1800 is output.	A
DTC B1801 is output.	B
DTC B1802 is output.	C
DTC B1803 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTC (see page 05-727).

Result:

DTC 51 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

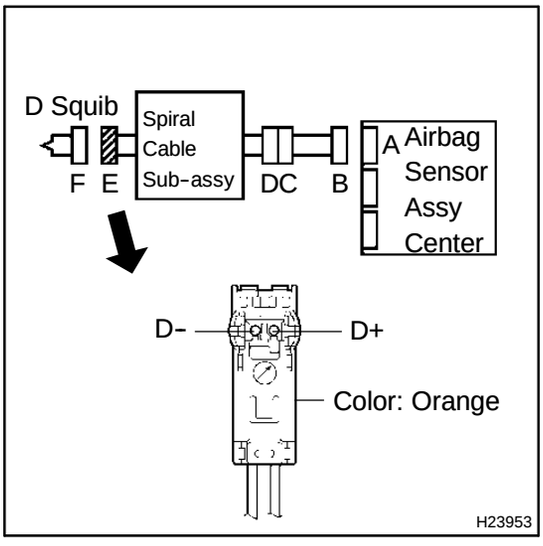
2	CHECK CONNECTOR

(a) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

3	CHECK D SQUIB CIRCUIT (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).
(b) Measure the resistance according to the value(s) in the table below.
Standard:

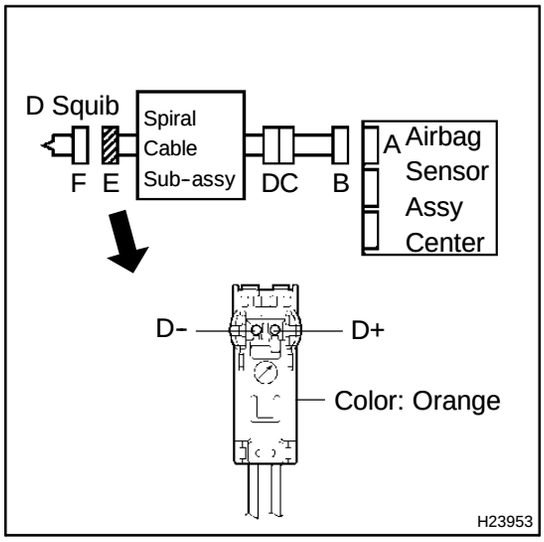
Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or Higher

NG → **Go to step 13**

OK

GO TO STEP 10

4 CHECK D SQUIB CIRCUIT (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

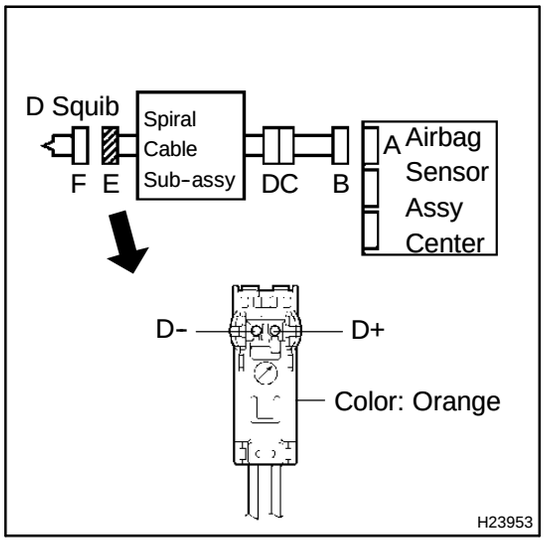
Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

NG → **Go to step 15**

OK

GO TO STEP 11

5 CHECK D SQUIB CIRCUIT (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

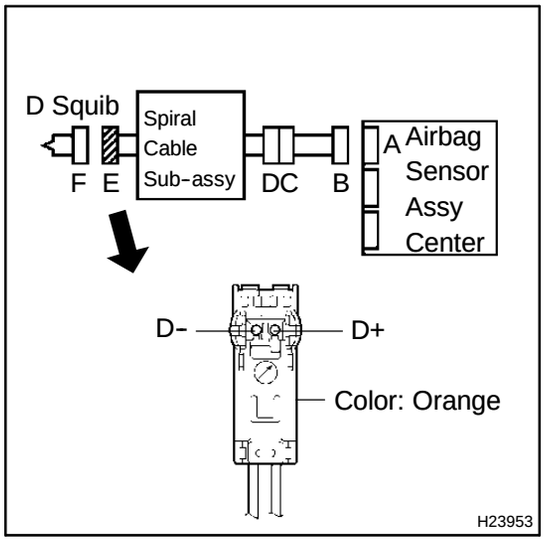
Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

NG → **Go to step 17**

OK

GO TO STEP 11

6 CHECK D SQUIB CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

NG → **Go to step 19**

OK

GO TO STEP 11

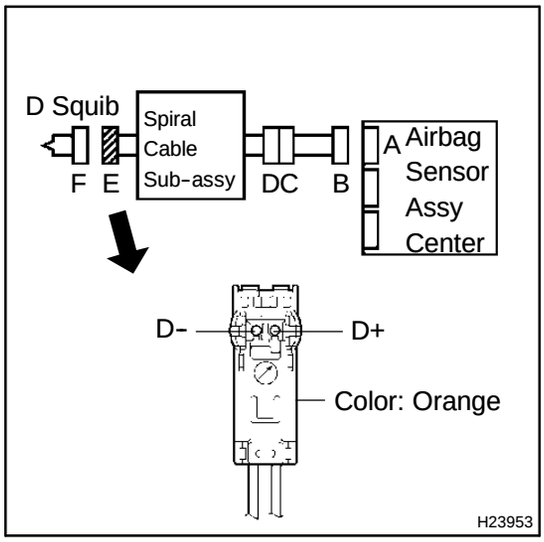
7	CHECK CONNECTOR

(a) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

8	CHECK D SQUIB CIRCUIT



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

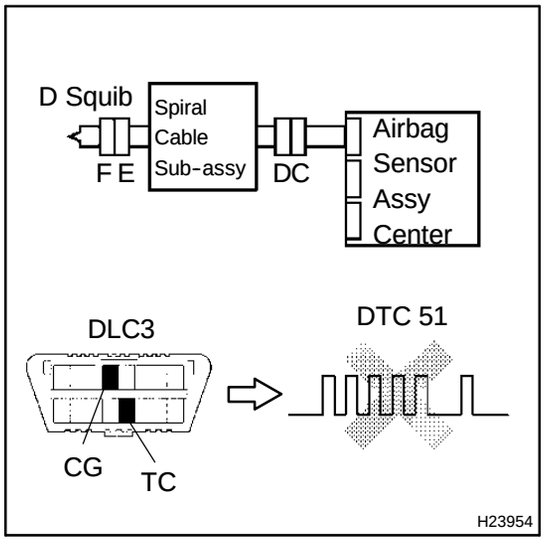
(h) Release the activation prevention mechanism built into connector "B" (see page 05-719).
(i) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or Higher

NG → **Go to step 21**

OK

9	REPLACE HORN BUTTON ASSY (D SQUIB)



(a) Replace the horn button assy (see page 60-21, 60-31).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

(b) Connect the connectors to the airbag sensor assy center.

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(e) Clear the DTCs stored in memory (see page 05-727).

(f) Turn the ignition switch to the LOCK position.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Check the DTCs (see page 05-727).

OK:

DTC 51 is not output.

HINT:

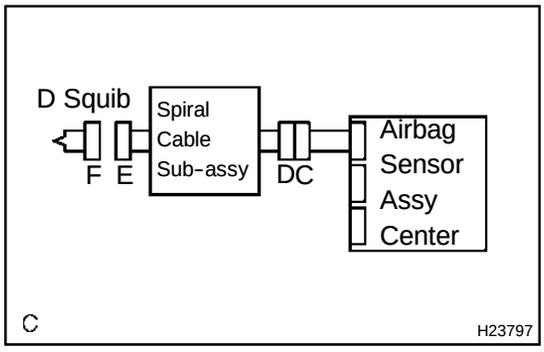
Codes other than code 51 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1800 is not output.

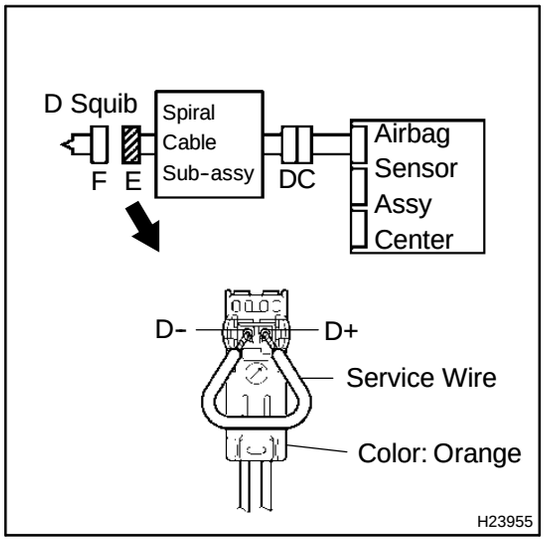
HINT:
Codes other than code B1800 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

GO TO STEP 12

11	CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) Using a service wire, connect D+ and D- of connector "E".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(g) Clear the DTCs stored in memory (see page 05-727).

(h) Turn the ignition switch to the LOCK position.

(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

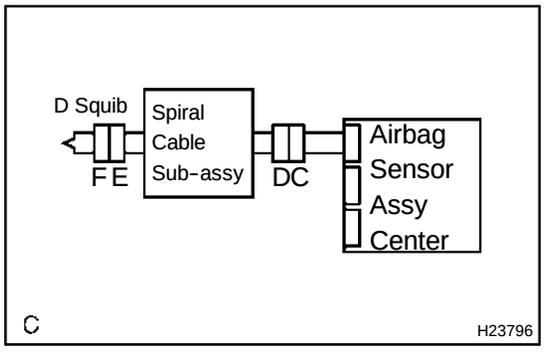
(j) Check the DTCs (see page 05-727).
OK:
DTC B1801, B1802 or B1803 is not output.

HINT:
Codes other than code B1801, B1802 or B1803 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12	CHECK HORN BUTTON ASSY (D SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "E".
(d) Connect the connectors to the horn button assy.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).
OK:
DTC B1800, B1801, B1802 or B1803 is not output.

HINT:
Codes other than code B1800, B1801, B1802 or B1803 may be output at this time, but they are not related to this check.

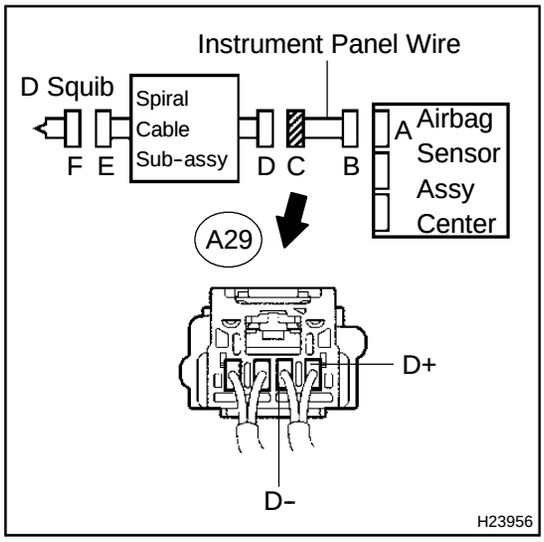
NG → **REPLACE HORN BUTTON ASSY (SEE PAGE 60-21, 60-31)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

HINT:

The activation prevention mechanism of connector "B" has already been released.

(b) Measure the resistance according to the value(s) in the table below.

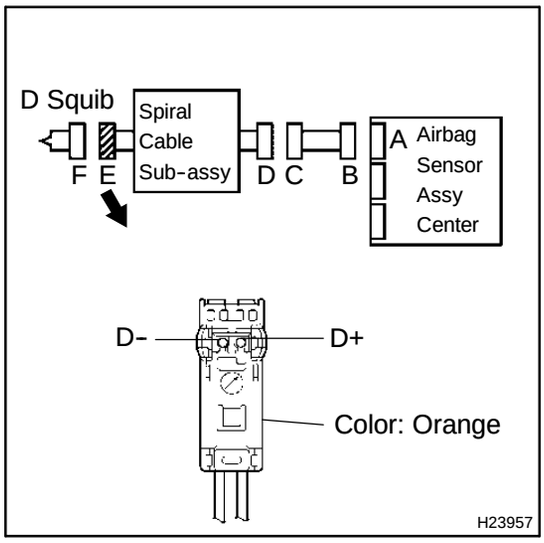
Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - A29-2 (D-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14 CHECK SPIRAL CABLE SUB-ASSY (SHORT)



(a) Release the activation prevention mechanism built into connector "D" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

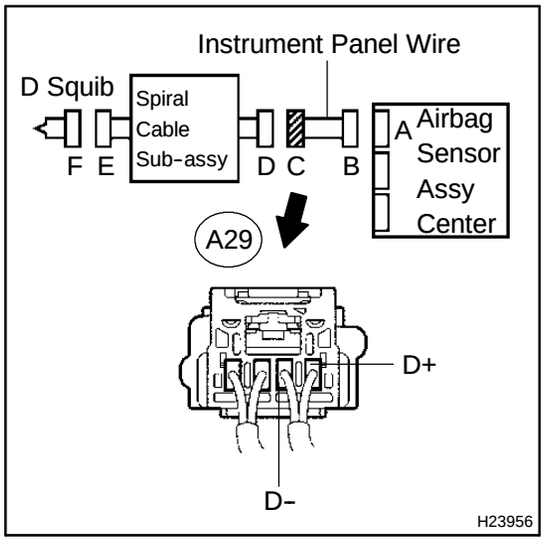
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

15 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(b) Measure the resistance according to the value(s) in the table below.

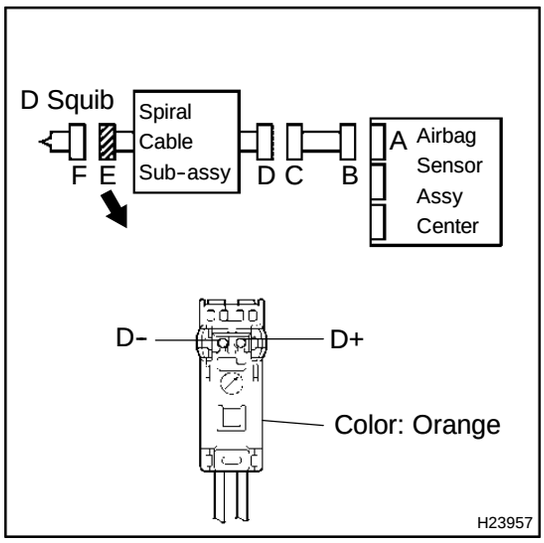
Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - A29-2 (D-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK SPIRAL CABLE SUB-ASSY (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

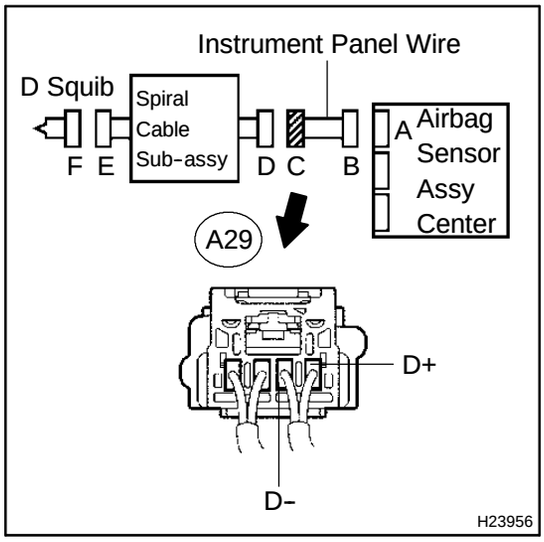
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-730).

17 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(b) Measure the resistance according to the value(s) in the table below.

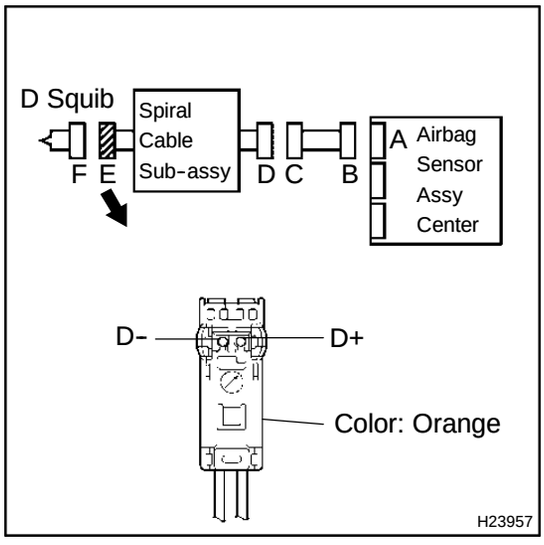
Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - Body ground	Always	1 MΩ or Higher
A29-2 (D-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

18 CHECK SPIRAL CABLE SUB-ASSY (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

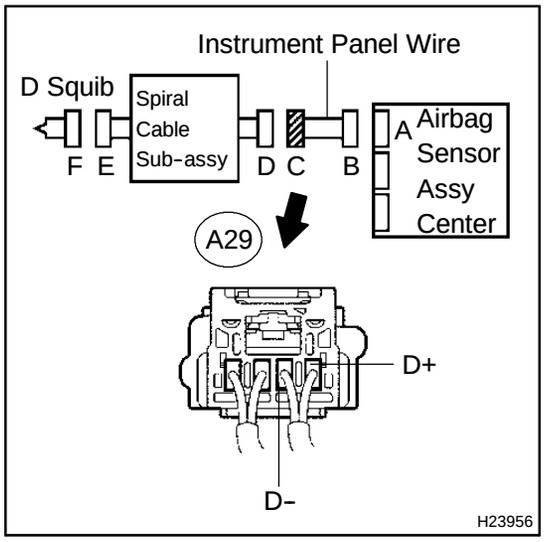
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-730).

19 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the instrument panel wire connector from the spiral cable sub-assy.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

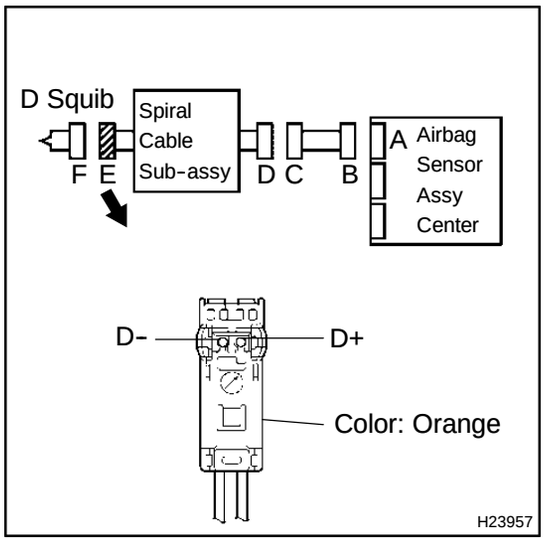
Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - Body ground	Ignition switch ON	Below 1 V
A29-2 (D-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

20 CHECK SPIRAL CABLE SUB-ASSY (TO B+)



(a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

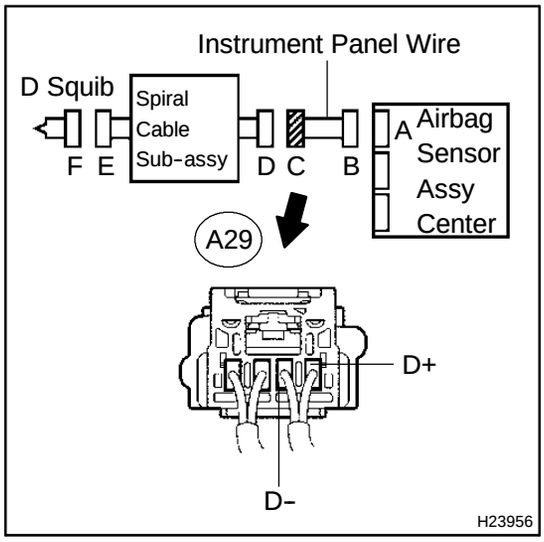
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

21 CHECK INSTRUMENT PANEL WIRE



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.

(b) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(d) Turn the ignition switch to the ON position.

(e) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - Body ground	Ignition switch ON	Below 1 V
A29-2 (D-) - Body ground	Ignition switch ON	Below 1 V

(f) Turn the ignition switch to the LOCK position.

(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - A29-2 (D-)	Always	Below 1 Ω

(i) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - Body ground	Always	1 MΩ or Higher
A29-2 (D-) - Body ground	Always	1 MΩ or Higher

(j) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(k) Measure the resistance according to the value(s) in the table below.

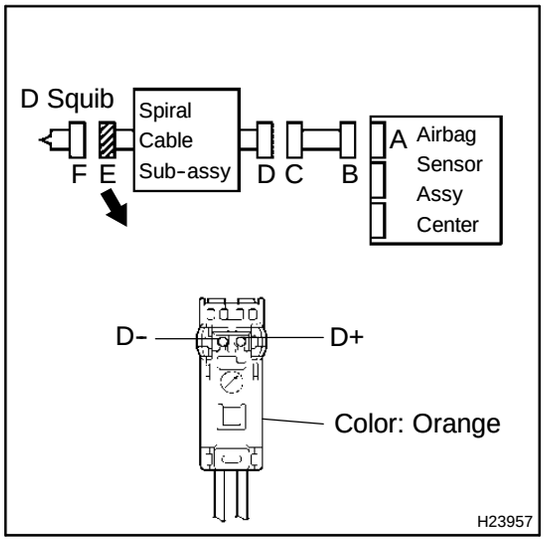
Standard:

Tester connection	Condition	Specified condition
A29-1 (D+) - A29-2 (D-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

22 CHECK SPIRAL CABLE SUB-ASSY



(a) Connect the negative (-) terminal cable from the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

(h) Release the activation prevention mechanism built into connector "D" (see page 05-719).

(i) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1805/52	SHORT IN P SQUIB CIRCUIT

DTC	B1806/52	OPEN IN P SQUIB CIRCUIT

DTC	B1807/52	SHORT IN P SQUIB CIRCUIT (TO GROUND)

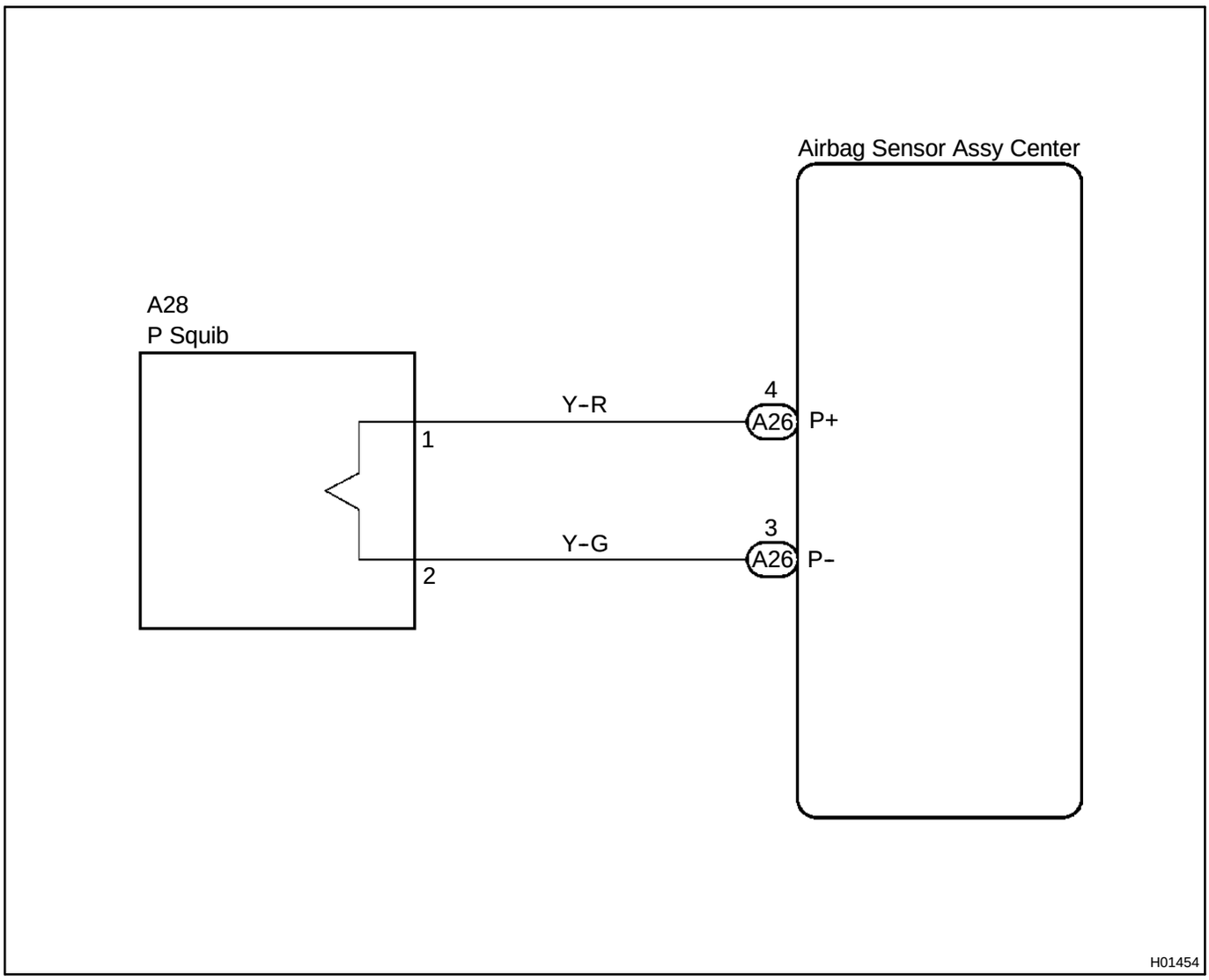
DTC	B1808/52	SHORT IN P SQUIB CIRCUIT (TO B+)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assy center and the front passenger airbag assy.
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1805/52	• The airbag sensor assy center receives a line short circuit signal 5 times in the P squib circuit during primary check. • P squib malfunction • Airbag sensor assy center malfunction	• Instrument panel wire • Front passenger airbag assy (P squib) • Airbag sensor assy center
B1806/52	• The airbag sensor assy center receives an open circuit signal in the P squib circuit for 2 seconds. • P squib malfunction • Airbag sensor assy center malfunction	• Instrument panel wire • Front passenger airbag assy (P squib) • Airbag sensor assy center
B1807/52	• The airbag sensor assy center receives a short circuit to ground signal in the P squib circuit for 0.5 seconds. • P squib malfunction • Airbag sensor assy center malfunction	• Instrument panel wire • Front passenger airbag assy (P squib) • Airbag sensor assy center
B1808/52	• The airbag sensor assy center receives a short circuit to B+ signal in the P squib circuit for 0.5 seconds. • P squib malfunction • Airbag sensor assy center malfunction	• Instrument panel wire • Front passenger airbag assy (P squib) • Airbag sensor assy center

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1805 is output.	A
DTC B1806 is output.	B
DTC B1807 is output.	C
DTC B1808 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 52 is output.	E

B → **Go to step 3**

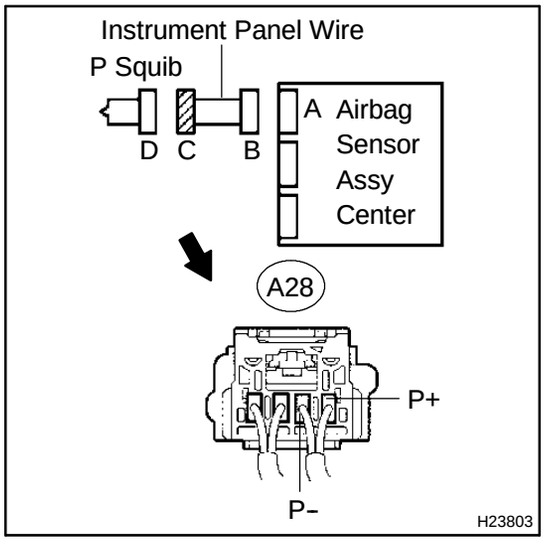
C → **Go to step 4**

D → **Go to step 5**

E → **Go to step 6**

A

2 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

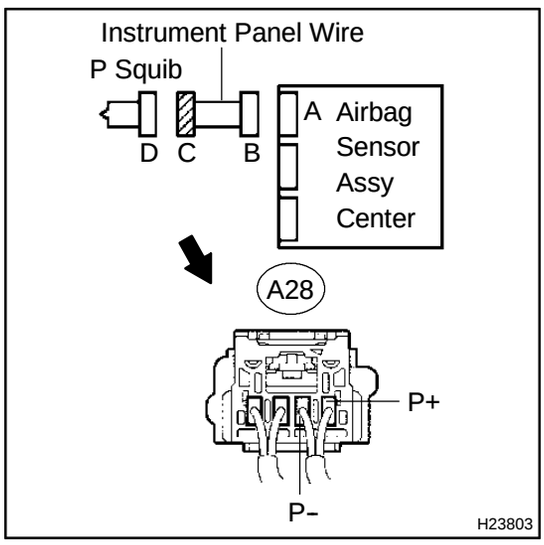
Tester connection	Condition	Specified condition
A28-1 (P+) - A28-2 (P-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 8

3 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

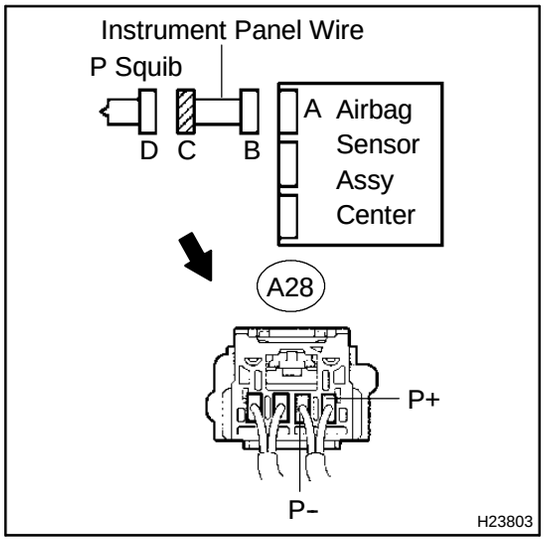
Tester connection	Condition	Specified condition
A28-1 (P+) - A28-2 (P-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

4 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

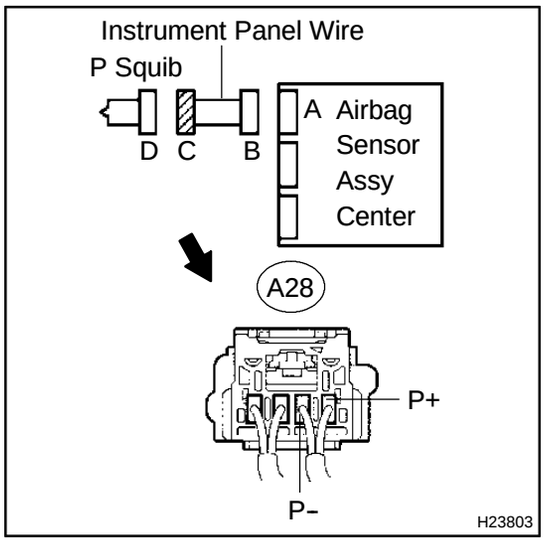
Tester connection	Condition	Specified condition
A28-1 (P+) - Body ground	Always	1 MΩ or Higher
A28-2 (P-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

5 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

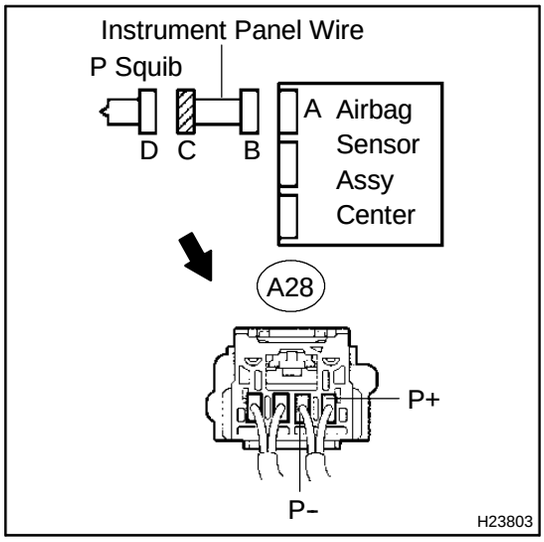
Tester connection	Condition	Specified condition
A28-1 (P+) - Body ground	Ignition switch ON	Below 1 V
A28-2 (P-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

6 CHECK INSTRUMENT PANEL WIRE (P SQUIB CIRCUIT)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-1 (P+) - Body ground	Ignition switch ON	Below 1 V
A28-2 (P-) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-1 (P+) - A28-2 (P-)	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-1 (P+) - Body ground	Always	1 MΩ or Higher
A28-2 (P-) - Body ground	Always	1 MΩ or Higher

(h) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(i) Measure the resistance according to the value(s) in the table below.

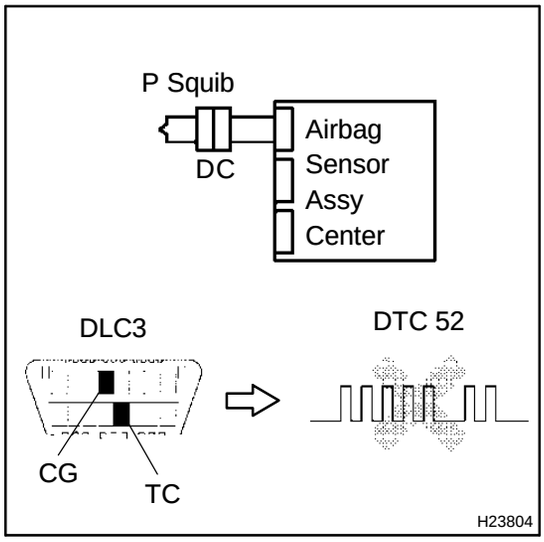
Standard:

Tester connection	Condition	Specified condition
A28-1 (P+) - A28-2 (P-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

7 REPLACE FRONT PASSENGER AIRBAG ASSY (P SQUIB)



(a) Replace the front passenger airbag assy (See page 60-43).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

(b) Connect the connectors to the airbag sensor assy center.

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(e) Clear the DTCs stored in memory (see page 05-727).

(f) Turn the ignition switch to the LOCK position.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Check the DTCs (see page 05-727).

OK:

DTC 52 is not output.

HINT:

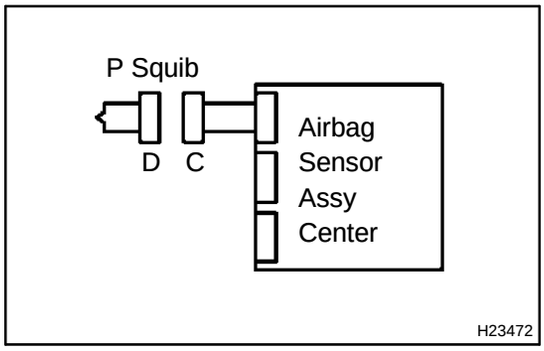
Codes other than code 52 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

8	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1805 is not output.

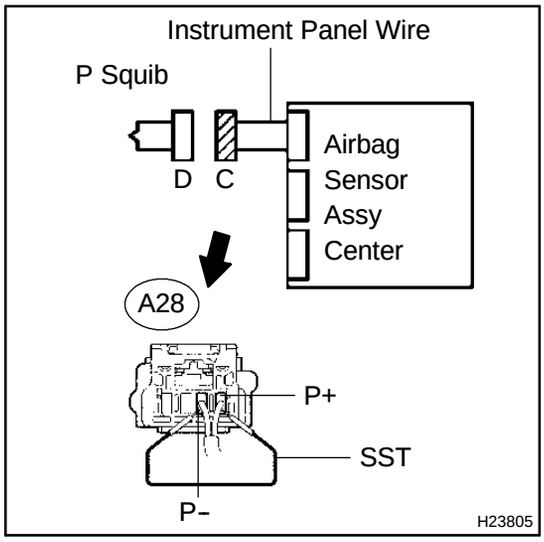
HINT:
Codes other than code B1805 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

GO TO STEP 10

9 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 5:
Turn the ignition switch to the LOCK position.

(b) From the step 5:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) Using SST, connect A28-1 (P+) and A28-2 (P-) of connector "C".
SST 09843-18040

(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(g) Clear the DTCs stored in memory (see page 05-727).

(h) Turn the ignition switch to the LOCK position.

(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

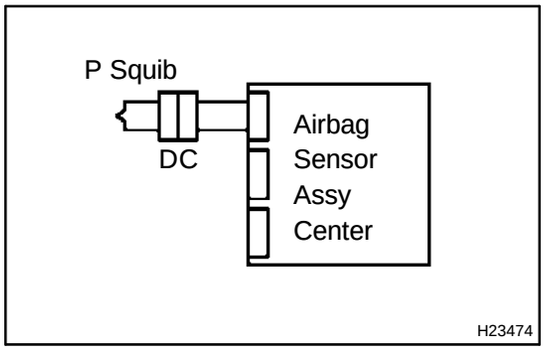
(j) Check the DTCs (see page 05-727).
OK:
DTC B1806, B1807 or B1808 is not output.

HINT:
Codes other than code B1806, B1807 or B1808 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

10	CHECK FRONT PASSENGER AIRBAG ASSY (P SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 9:
Disconnect the SST from connector "C".
(d) Connect the connectors to the front passenger airbag assy.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).
OK:
DTC B1805, B1806, B1807 or B1808 is not output.

HINT:
Codes other than code B1805, B1806, B1807 or B1808 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT PASSENGER AIRBAG ASSY (SEE PAGE 60-43)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1810/53	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT

DTC	B1811/53	OPEN IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT

DTC	B1812/53	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)

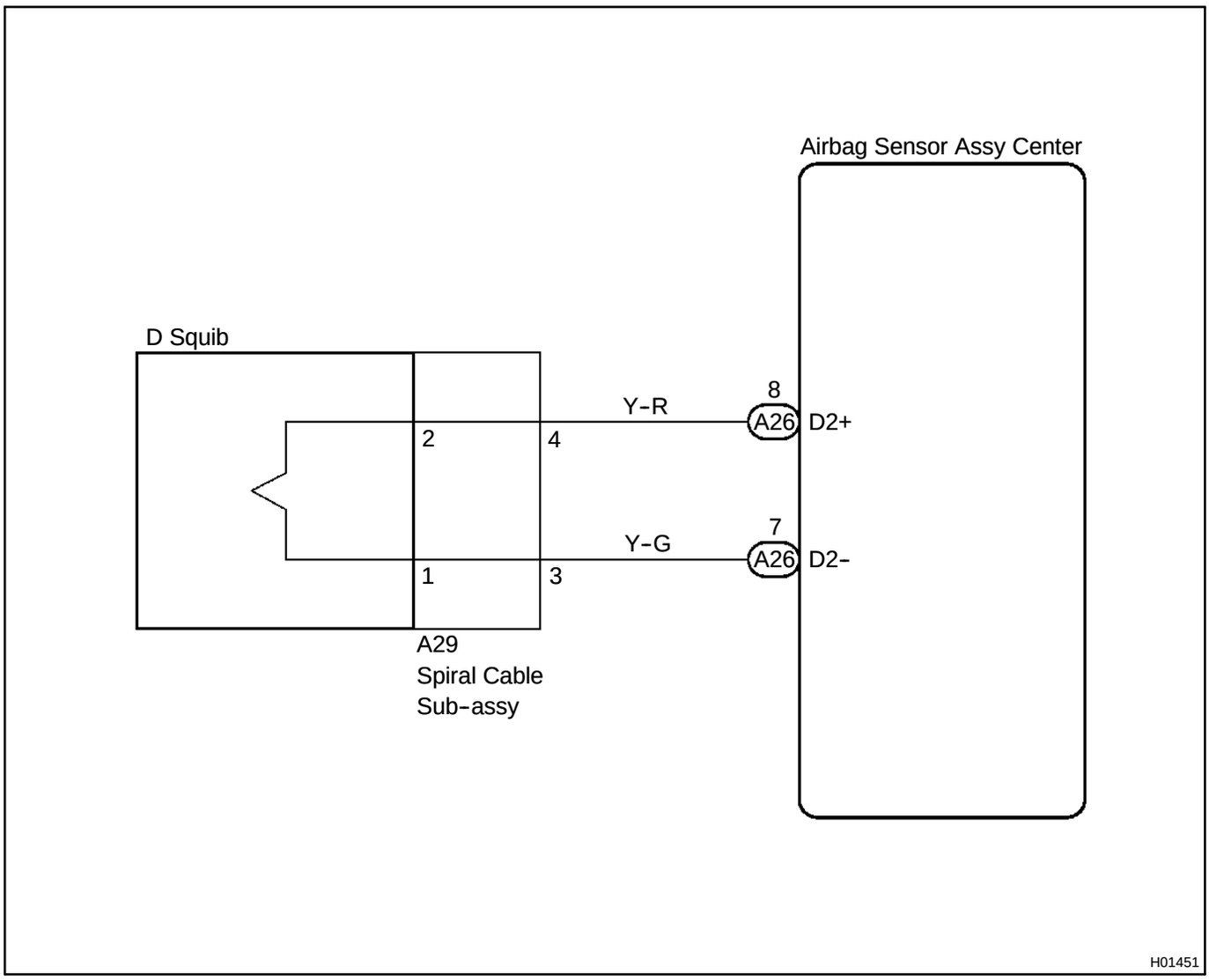
DTC	B1813/53	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO B+)

CIRCUIT DESCRIPTION

The D squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the D squib (Dual stage - 2nd step) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1810/53	• The airbag sensor assy center receives a line short circuit signal 5 times in the D squib (Dual stage - 2nd step) circuit during primary check. • Spiral cable sub-assy malfunction • D squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1811/53	• The airbag sensor assy center receives an open circuit signal in the D squib (Dual stage - 2nd step) circuit for 2 seconds. • Spiral cable sub-assy malfunction • D squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1812/53	• The airbag sensor assy center receives a short circuit to ground signal in the D squib (Dual stage - 2nd step) circuit for 0.5 seconds. • Spiral cable sub-assy malfunction • D squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire
B1813/53	• The airbag sensor assy center receives a short circuit to B+ signal in the D squib (Dual stage - 2nd step) circuit for 0.5 seconds. • Spiral cable sub-assy malfunction • D squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (–) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5–digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05–727).

Result:

DTC B1810 is output.	A
DTC B1811 is output.	B
DTC B1812 is output.	C
DTC B1813 is output.	D

(2) If not using the intelligent tester II (read the 2–digit of DTC):
Check the DTCs (see page 05–727).

Result:

DTC 53 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

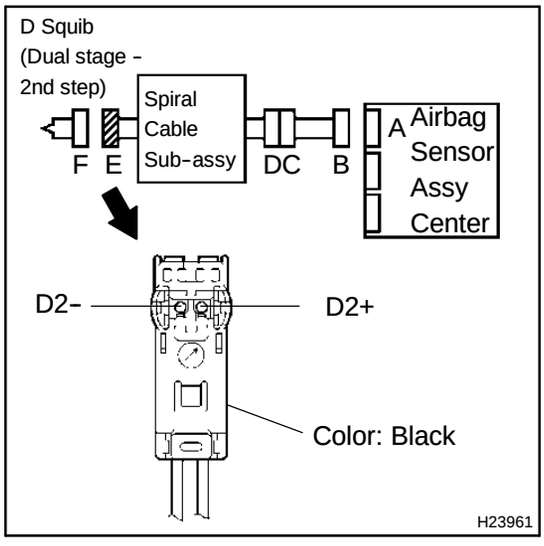
2	CHECK CONNECTOR

(a) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

3	CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).
(b) Measure the resistance according to the value(s) in the table below.
Standard:

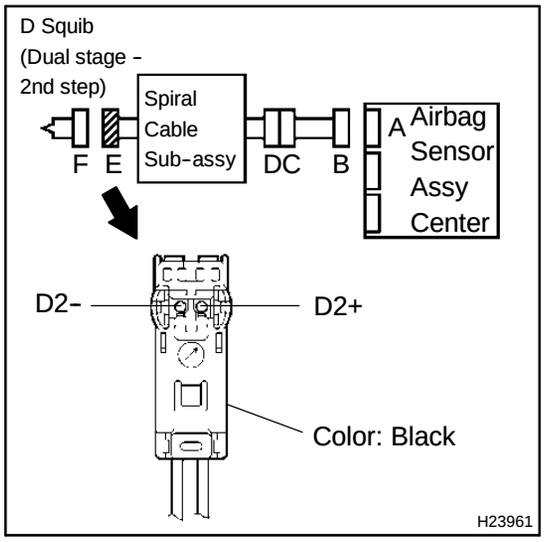
Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG → **Go to step 13**

OK

GO TO STEP 10

4 CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

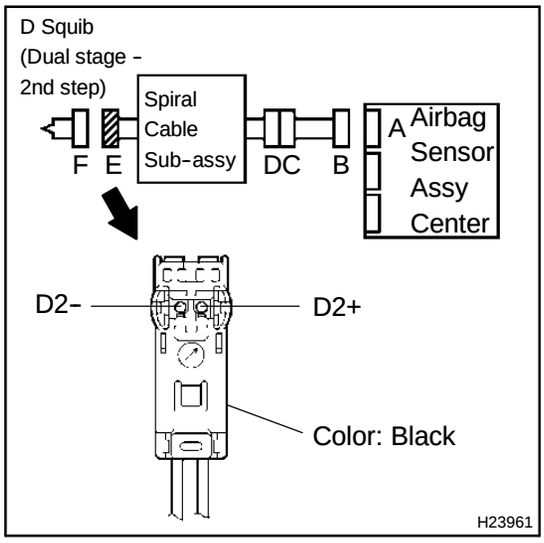
Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

NG → **Go to step 15**

OK

GO TO STEP 11

5 CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

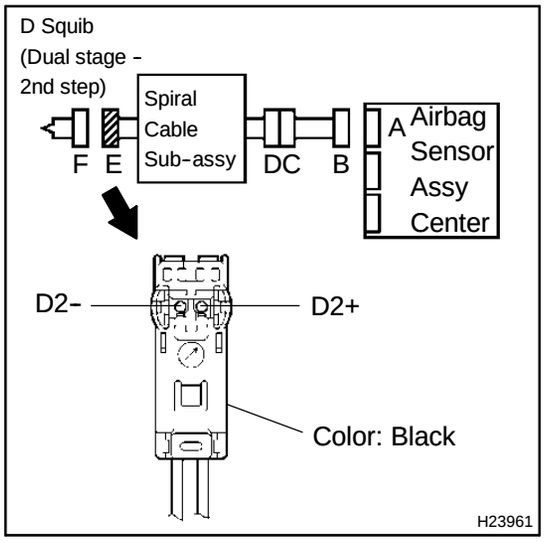
Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

NG → **Go to step 17**

OK

GO TO STEP 11

6 CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

NG → **Go to step 19**

OK

GO TO STEP 11

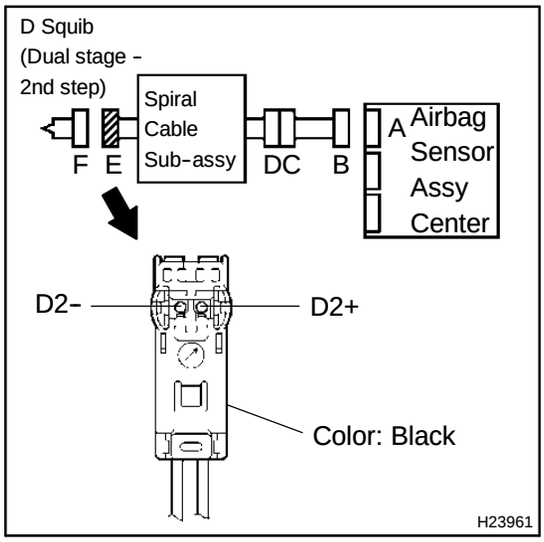
7	CHECK CONNECTOR

(a) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

8	CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

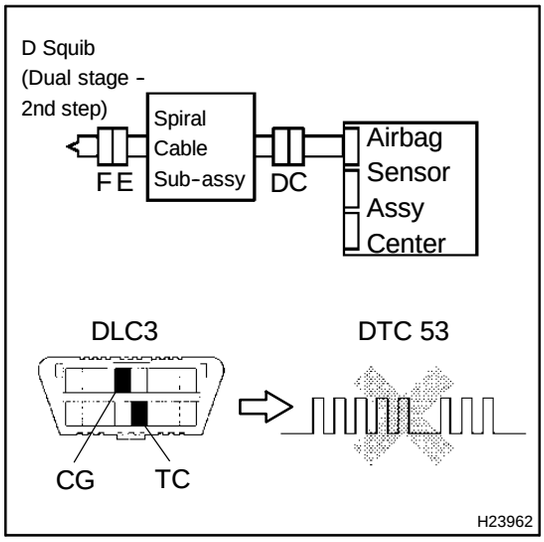
(h) Release the activation prevention mechanism built into connector "B" (see page 05-719).
(i) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG → **Go to step 21**

OK

9 REPLACE HORN BUTTON ASSY (D SQUIB, DUAL STAGE - 2ND STEP)



(a) Replace the horn button assy (see page 60-21, 60-31).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

(b) Connect the connectors to the airbag sensor assy center.

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(e) Clear the DTCs stored in memory (see page 05-727).

(f) Turn the ignition switch to the LOCK position.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Check the DTCs (see page 05-727).

OK:

DTC 53 is not output.

HINT:

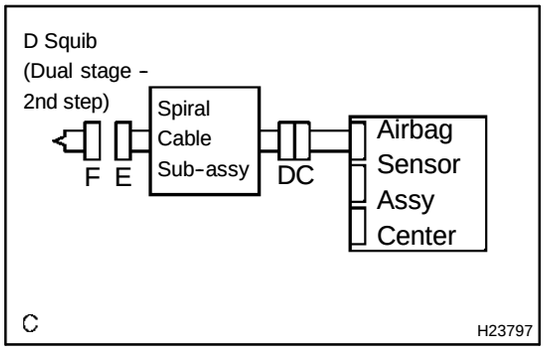
Codes other than code 53 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1810 is not output.

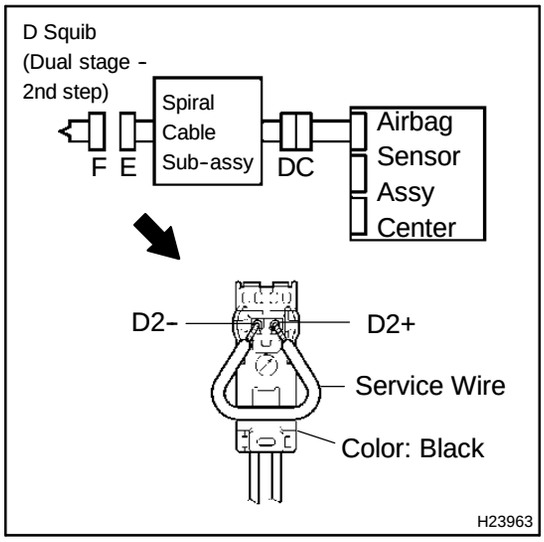
HINT:
Codes other than code B1810 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

GO TO STEP 12

11 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) Using a service wire, connect D2+ and D2- of connector "E".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(g) Clear the DTCs stored in memory (see page 05-727).

(h) Turn the ignition switch to the LOCK position.

(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

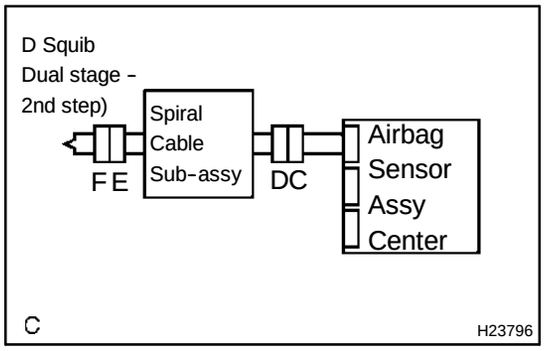
(j) Check the DTCs (see page 05-727).
OK:
DTC B1811, B1812 or B1813 is not output.

HINT:
Codes other than code B1811, B1812 or B1813 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12 CHECK HORN BUTTON ASSY (D SQUIB, DUAL STAGE - 2ND STEP)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "E".
(d) Connect the connectors to the horn button assy.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).
OK:
DTC B1810, B1811, B1812 or B1813 is not output.

HINT:
Codes other than code B1810, B1811, B1812 or B1813 may be output at this time, but they are not related to this check.

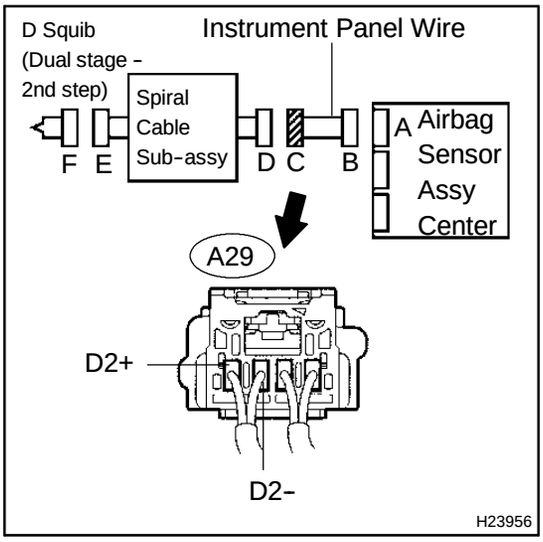
NG → **REPLACE HORN BUTTON ASSY (SEE PAGE 60-21, 60-31)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

HINT:

The activation prevention mechanism of connector "B" has already been released.

(b) Measure the resistance according to the value(s) in the table below.

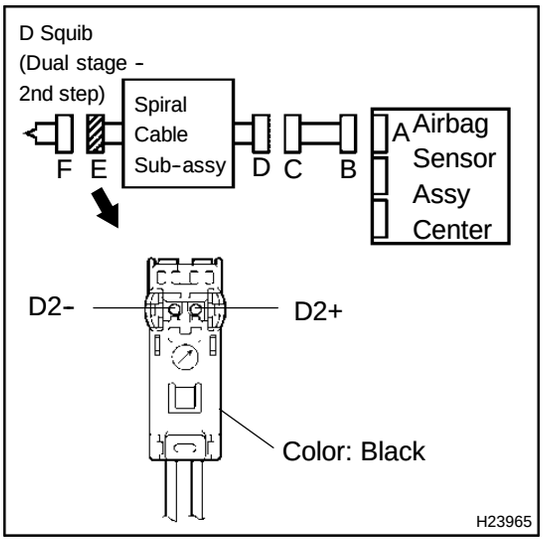
Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - A29-3 (D2-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14 CHECK SPIRAL CABLE SUB-ASSY (SHORT)



(a) Release the activation prevention mechanism built into connector "D" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

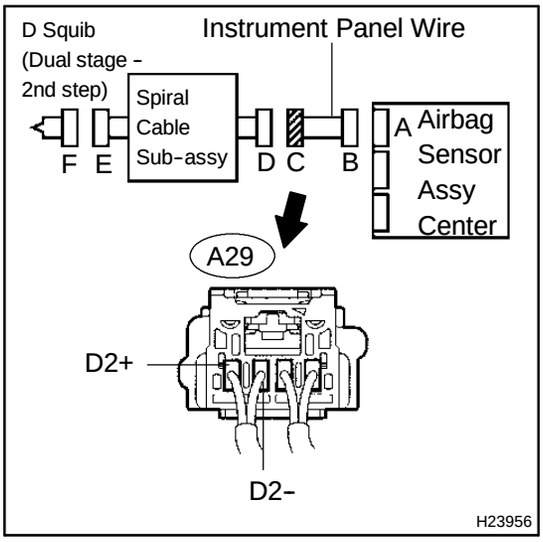
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

15 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(b) Measure the resistance according to the value(s) in the table below.

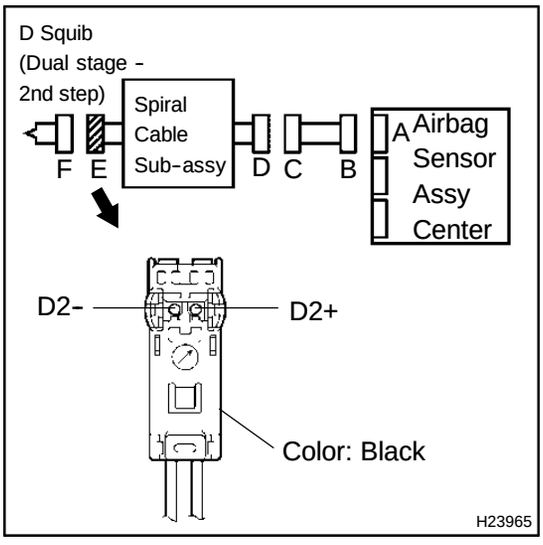
Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - A29-3 (D2-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK SPIRAL CABLE SUB-ASSY (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

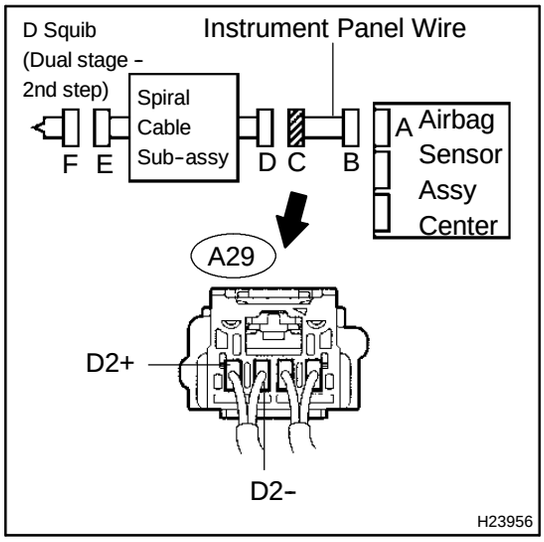
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-730).

17 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(b) Measure the resistance according to the value(s) in the table below.

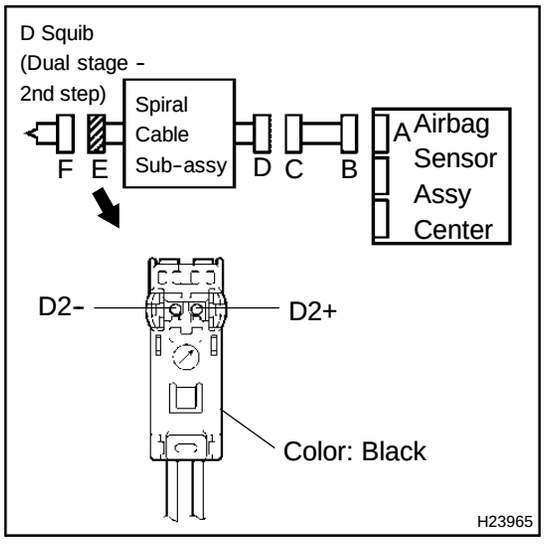
Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - Body ground	Always	1 MΩ or Higher
A29-3 (D2-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

18 CHECK SPIRAL CABLE SUB-ASSY (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

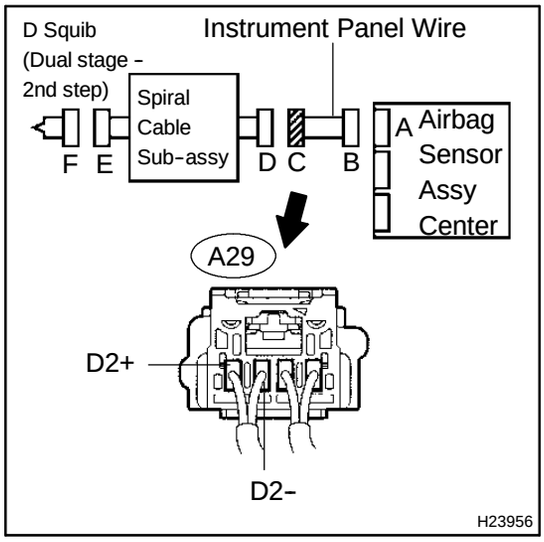
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-730).

19 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the instrument panel wire connector from the spiral cable sub-assy.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

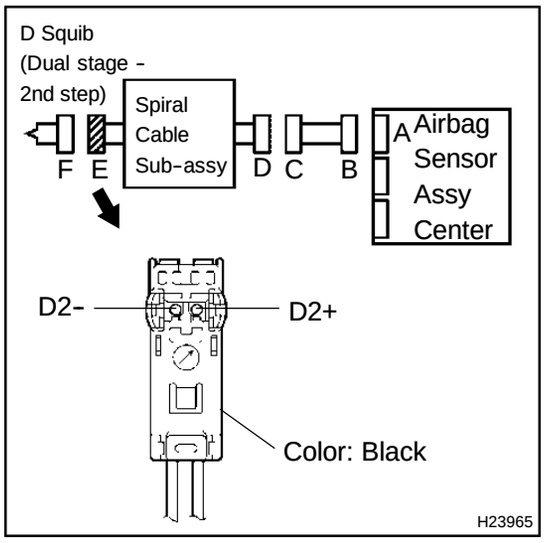
Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - Body ground	Ignition switch ON	Below 1 V
A29-3 (D2-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

20 CHECK SPIRAL CABLE SUB-ASSY (TO B+)



(a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

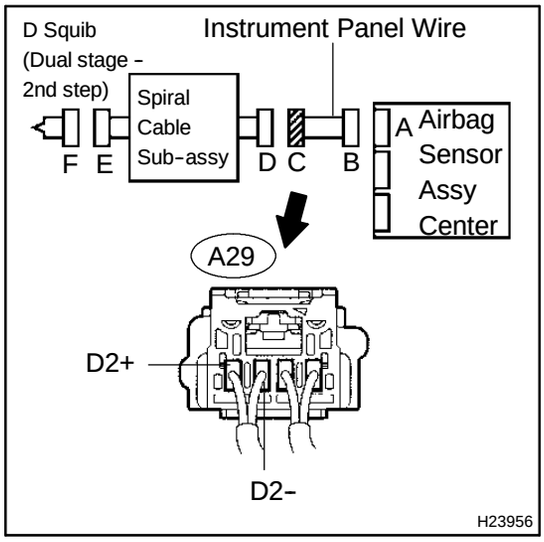
OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

21 CHECK INSTRUMENT PANEL WIRE



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.

(b) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(d) Turn the ignition switch to the ON position.

(e) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - Body ground	Ignition switch ON	Below 1 V
A29-3 (D2-) - Body ground	Ignition switch ON	Below 1 V

(f) Turn the ignition switch to the LOCK position.

(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - A29-3 (D2-)	Always	Below 1 Ω

(i) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - Body ground	Always	1 MΩ or Higher
A29-3 (D2-) - Body ground	Always	1 MΩ or Higher

(j) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(k) Measure the resistance according to the value(s) in the table below.

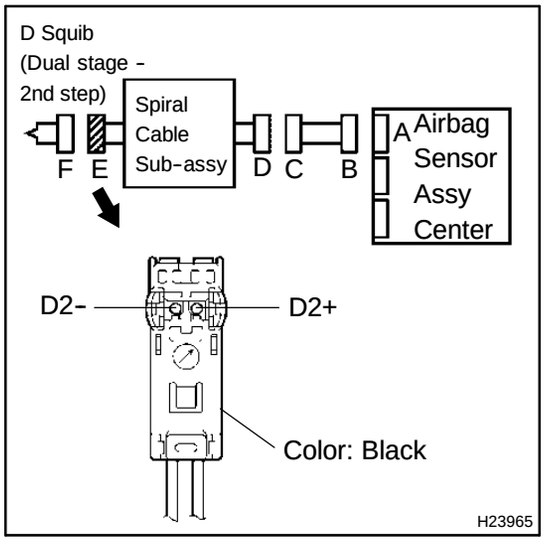
Standard:

Tester connection	Condition	Specified condition
A29-4 (D2+) - A29-3 (D2-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

22 CHECK SPIRAL CABLE SUB-ASSY



(a) Connect the negative (-) terminal cable from the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

(h) Release the activation prevention mechanism built into connector "D" (see page 05-719).

(i) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:

- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1815/54	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT

DTC	B1816/54	OPEN IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT

DTC	B1817/54	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)

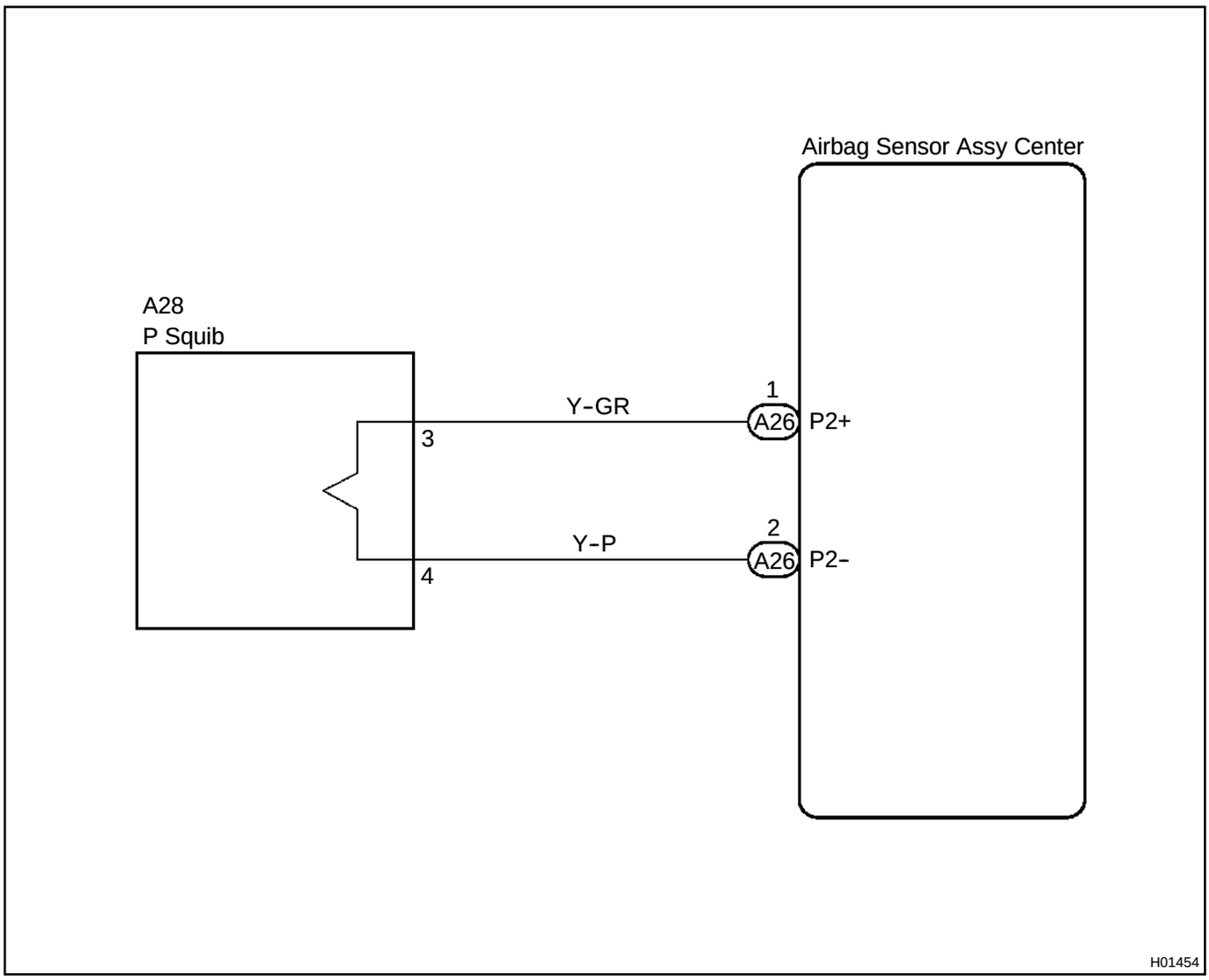
DTC	B1818/54	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO B+)

CIRCUIT DESCRIPTION

The P squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center and the front passenger airbag assy.
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the P squib (Dual stage - 2nd step) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1815/54	• The airbag sensor assy center receives a line short circuit signal 5 times in the P squib (Dual stage - 2nd step) circuit during primary check. • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire
B1816/54	• The airbag sensor assy center receives an open circuit signal in the P squib (Dual stage - 2nd step) circuit for 2 seconds. • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire
B1817/54	• The airbag sensor assy center receives a short circuit to ground signal in the P squib (Dual stage - 2nd step) circuit for 0.5 seconds. • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire
B1818/54	• The airbag sensor assy center receives a short circuit to B+ signal in the P squib (Dual stage - 2nd step) circuit for 0.5 seconds. • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction	• Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1815 is output.	A
DTC B1816 is output.	B
DTC B1817 is output.	C
DTC B1818 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 54 is output.	E

B → **Go to step 3**

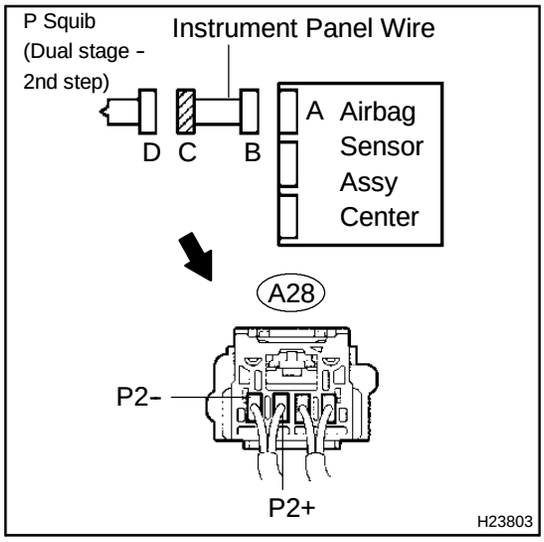
C → **Go to step 4**

D → **Go to step 5**

E → **Go to step 6**

A

2 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

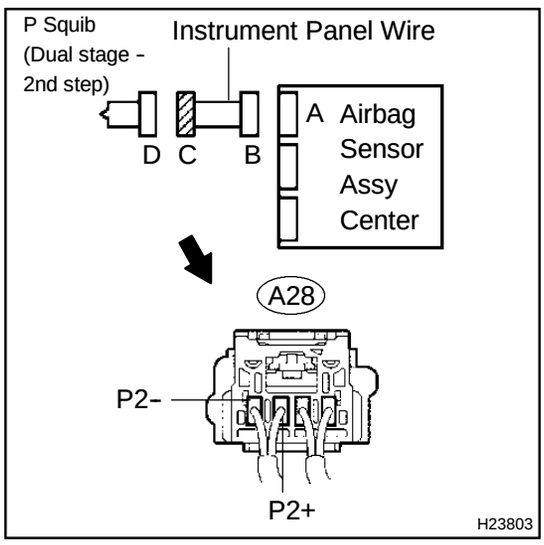
Tester connection	Condition	Specified condition
A28-3 (P2+) - A28-4 (P2-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 8

3 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

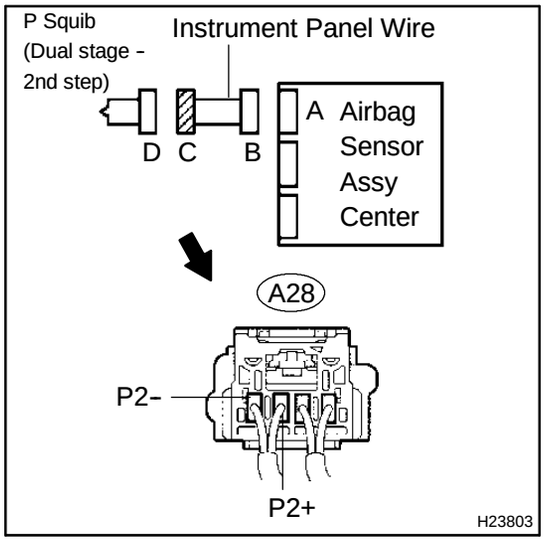
Tester connection	Condition	Specified condition
A28-3 (P2+) - A28-4 (P2-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

4 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

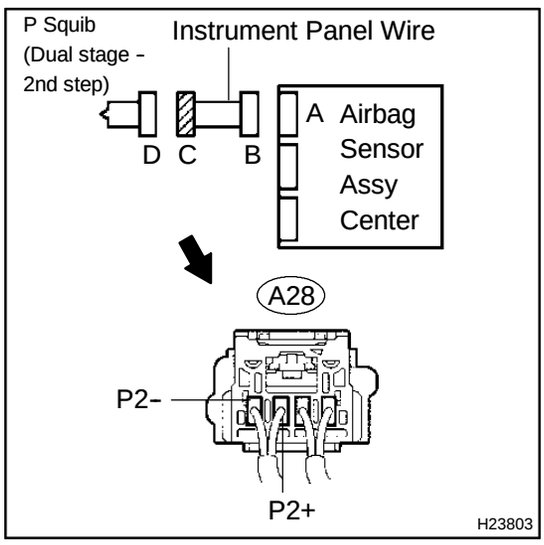
Tester connection	Condition	Specified condition
A28-3 (P2+) - Body ground	Always	1 MΩ or Higher
A28-4 (P2-) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

5 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

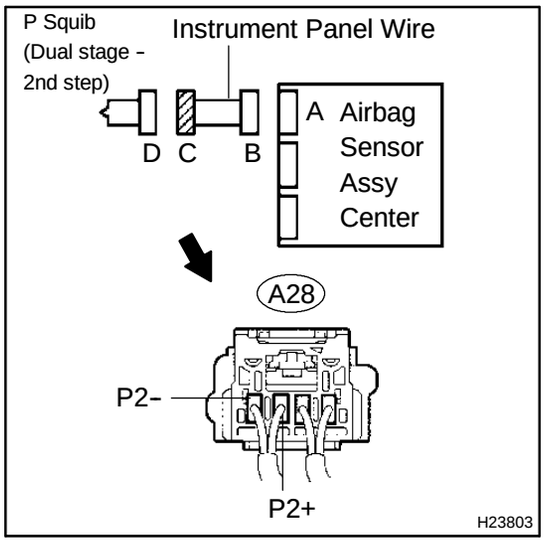
Tester connection	Condition	Specified condition
A28-3 (P2+) - Body ground	Ignition switch ON	Below 1 V
A28-4 (P2-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

GO TO STEP 9

6	CHECK INSTRUMENT PANEL WIRE (P SQUIB CIRCUIT, DUAL STAGE - 2ND STEP)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (P2+) - Body ground	Ignition switch ON	Below 1 V
A28-4 (P2-) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (P2+) - A28-4 (P2-)	Always	Below 1 Ω

(g) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (P2+) - Body ground	Always	1 MΩ or Higher
A28-4 (P2-) - Body ground	Always	1 MΩ or Higher

(h) Release the activation prevention mechanism built into connector "B" (see page 05-719).
(i) Measure the resistance according to the value(s) in the table below.

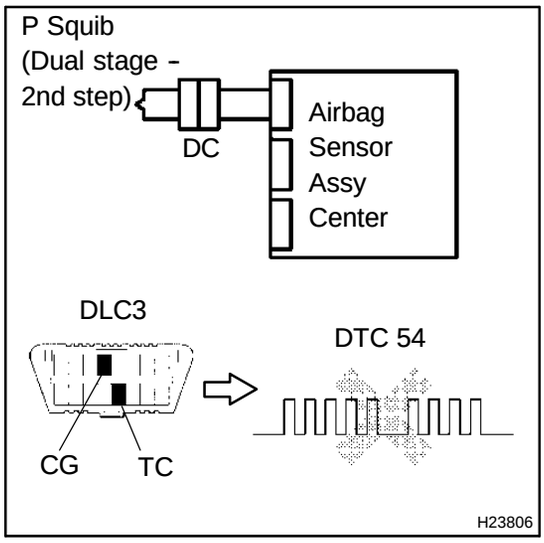
Standard:

Tester connection	Condition	Specified condition
A28-3 (P2+) - A28-4 (P2-)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

7	REPLACE FRONT PASSENGER AIRBAG ASSY (P SQUIB, DUAL STAGE - 2ND STEP)



(a) Replace the front passenger airbag assy (see page 60-43).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(b) Connect the connectors to the airbag sensor assy center.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page 05-727).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page 05-727).

OK:

DTC 54 is not output.

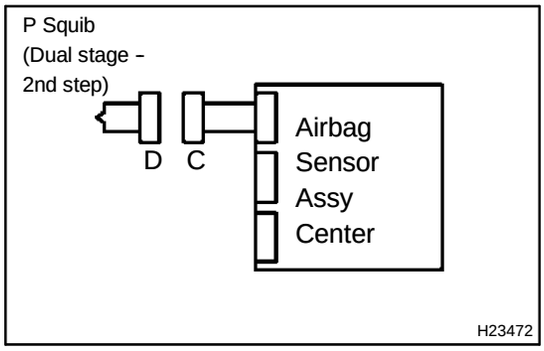
HINT:
Codes other than code 54 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

8	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1815 is not output.

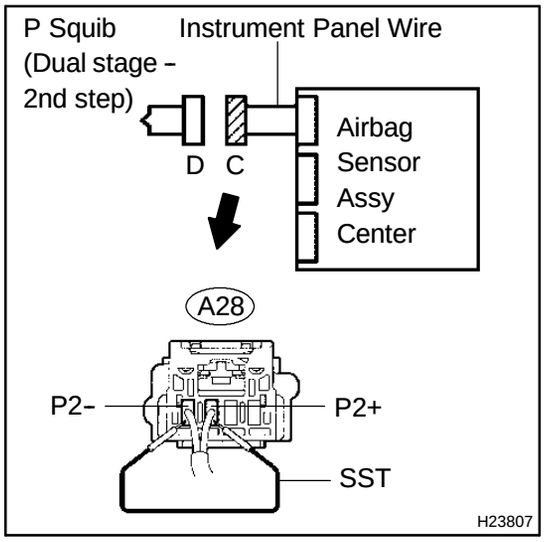
HINT:
Codes other than code B1815 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

GO TO STEP 10

9 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 5:
Turn the ignition switch to the LOCK position.

(b) From the step 5:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) Using SST, connect A28-3 (P2+) and A28-4 (P2-) of connector "C".
SST 09843-18040

(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(g) Clear the DTCs stored in memory (see page 05-727).

(h) Turn the ignition switch to the LOCK position.

(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

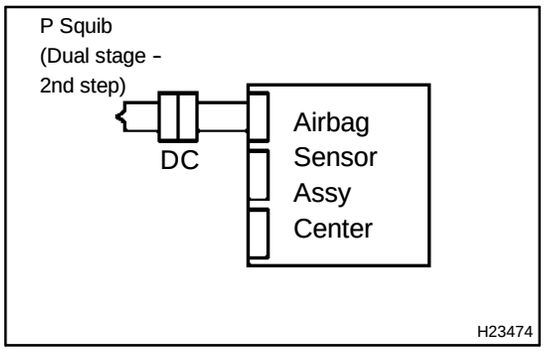
(j) Check the DTCs (see page 05-727).
OK:
DTC B1816, B1817 or B1818 is not output.

HINT:
Codes other than code B1816, B1817 or B1818 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

10	CHECK FRONT PASSENGER AIRBAG ASSY (P SQUIB, DUAL STAGE - 2ND STEP)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 9:
Disconnect the SST from connector "C".
(d) Connect the connectors to the front passenger airbag assy.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Clear the DTCs stored in memory (see page 05-727).
(h) Turn the ignition switch to the LOCK position.
(i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(j) Check the DTCs (see page 05-727).
OK:
DTC B1815, B1816, B1817 or B1818 is not output.

HINT:
Codes other than code B1815, B1816, B1817 or B1818 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT PASSENGER AIRBAG ASSY (SEE PAGE 60-43)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-727).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-727).

DTC	B1820/55	SHORT IN SIDE SQUIB (D SEAT SIDE) CIRCUIT

DTC	B1821/55	OPEN IN SIDE SQUIB (D SEAT SIDE) CIRCUIT

DTC	B1822/55	SHORT IN SIDE SQUIB (D SEAT SIDE) CIRCUIT (TO GROUND)

DTC	B1823/55	SHORT IN SIDE SQUIB (D SEAT SIDE) CIRCUIT (TO B+)

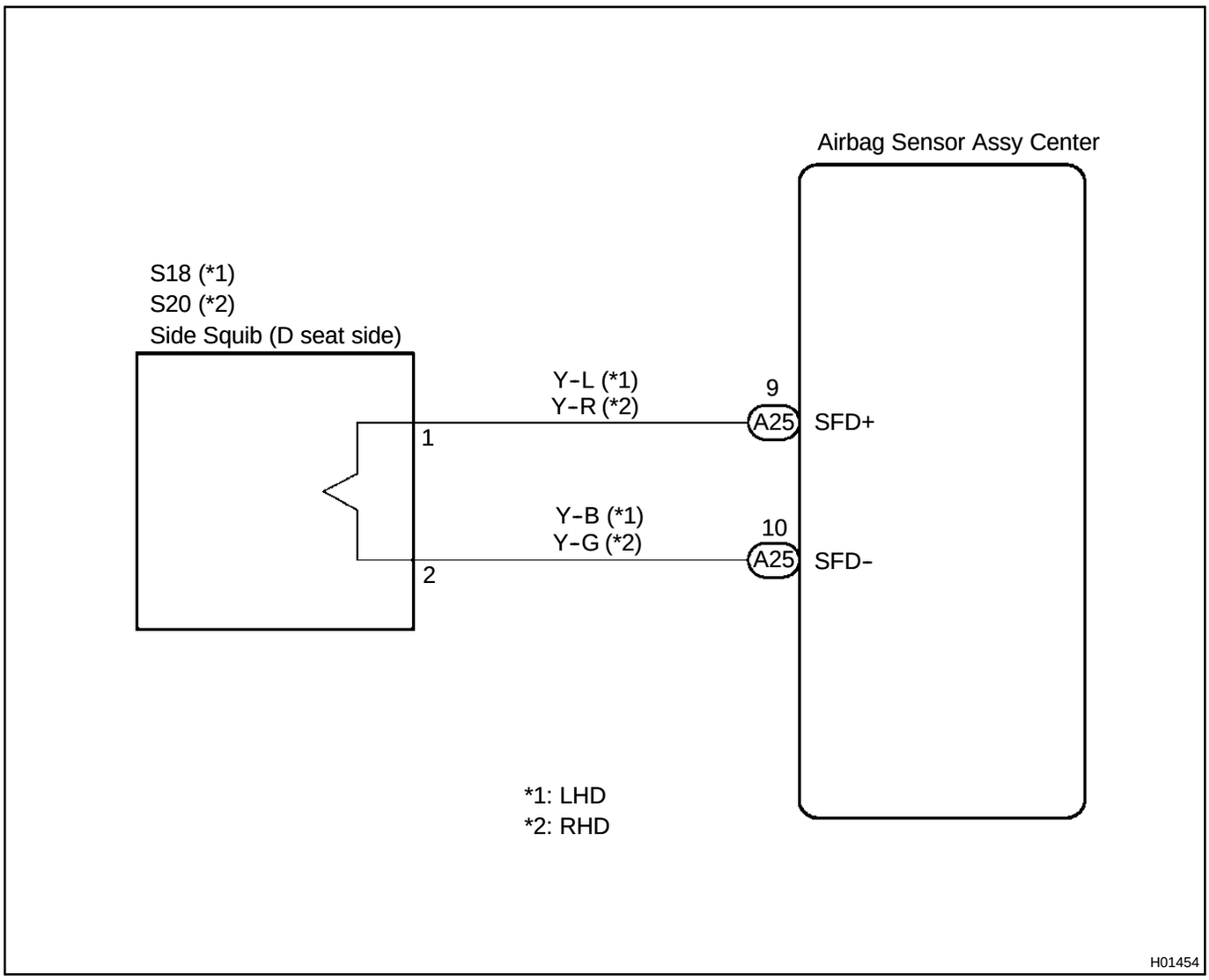
CIRCUIT DESCRIPTION

The side squib (D seat side) circuit consists of the airbag sensor assy center and the separate type front seat back assy LH (LHD) or separate type front seat back assy RH (RHD).
This circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the side squib (D seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1820/55	• The airbag sensor assy center receives a line short circuit signal 5 times in the side squib (D seat side) circuit during primary check. • Side squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy LH (Side squib (D seat side)) (*1) • Separate type front seat back assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1821/55	• The airbag sensor assy center receives an open circuit signal in the side squib (D seat side) circuit for 2 seconds. • Side squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy LH (Side squib (D seat side)) (*1) • Separate type front seat back assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1822/55	• The airbag sensor assy center receives a short circuit to ground signal in the side squib (D seat side) circuit for 0.5 seconds. • Side squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy LH (Side squib (D seat side)) (*1) • Separate type front seat back assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1823/55	• The airbag sensor assy center receives a short circuit to B+ signal in the side squib (D seat side) circuit for 0.5 seconds. • Side squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy LH (Side squib (D seat side)) (*1) • Separate type front seat back assy RH (Side squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1820 is output.	A
DTC B1821 is output.	B
DTC B1822 is output.	C
DTC B1823 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 55 is output.	E

B → **Go to step 3**

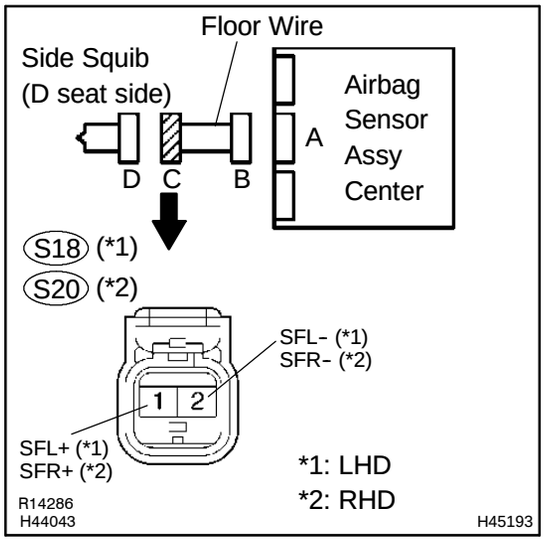
C → **Go to step 4**

D → **Go to step 5**

E → **Go to step 6**

A

2 CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - S18-2 (SFL-) (*1)	Always	1 MΩ or Higher
S20-1 (SFR+) - S20-2 (SFR-) (*2)	Always	1 MΩ or Higher

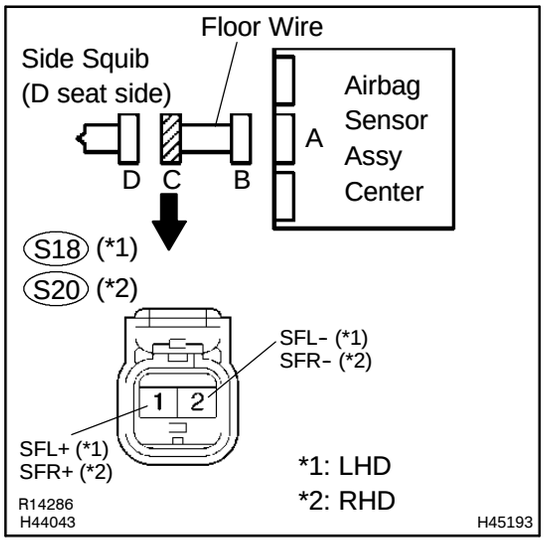
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 8

3 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - S18-2 (SFL-) (*1)	Always	Below 1 Ω
S20-1 (SFR+) - S20-2 (SFR-) (*2)	Always	Below 1 Ω

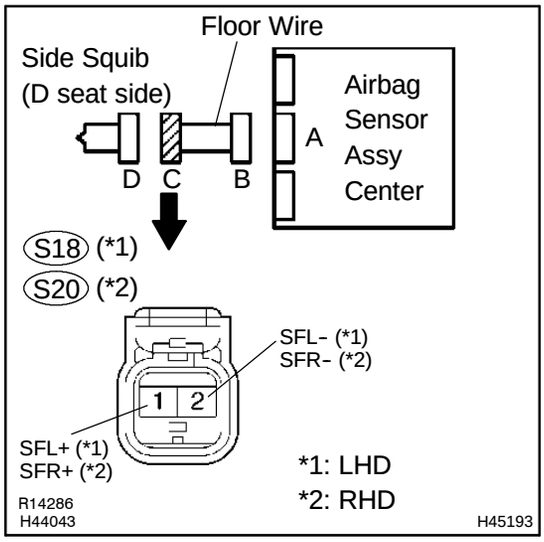
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

4 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - Body ground (*1)	Always	1 MΩ or Higher
S18-2 (SFL-) - Body ground (*1)	Always	1 MΩ or Higher
S20-1 (SFR+) - Body ground (*2)	Always	1 MΩ or Higher
S20-2 (SFR-) - Body ground (*2)	Always	1 MΩ or Higher

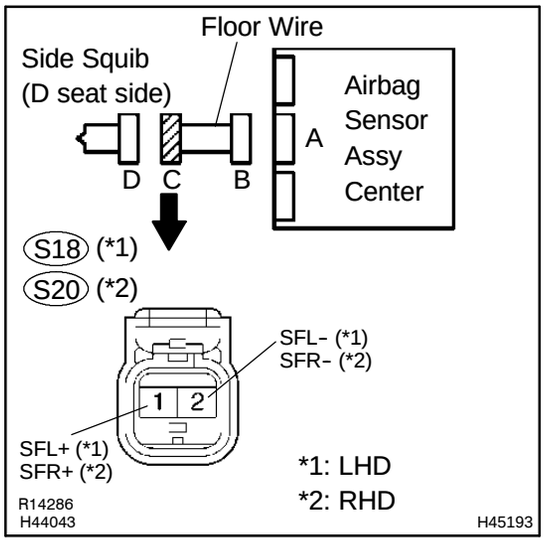
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - Body ground (*1)	Ignition switch ON	Below 1 V
S18-2 (SFL-) - Body ground (*1)	Ignition switch ON	Below 1 V
S20-1 (SFR+) - Body ground (*2)	Ignition switch ON	Below 1 V
S20-2 (SFR-) - Body ground (*2)	Ignition switch ON	Below 1 V

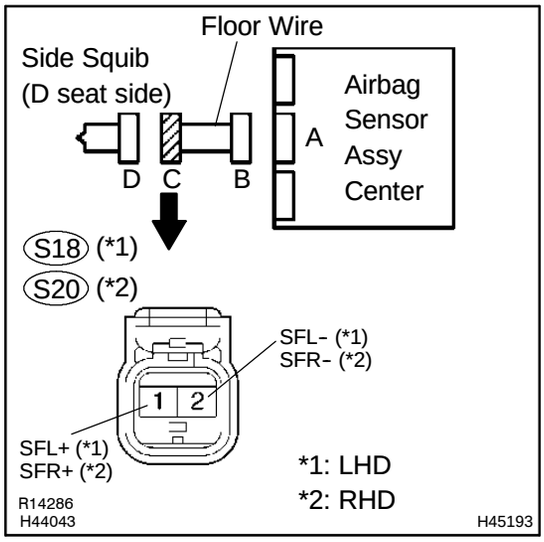
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

6 CHECK FLOOR WIRE (SIDE SQUIB (D SEAT SIDE) CIRCUIT)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - Body ground (*1)	Ignition switch ON	Below 1 V
S18-2 (SFL-) - Body ground (*1)	Ignition switch ON	Below 1 V
S20-1 (SFR+) - Body ground (*2)	Ignition switch ON	Below 1 V
S20-2 (SFR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - S18-2 (SFL-) (*1)	Always	Below 1 Ω
S18-1 (SFL+) - Body ground (*1)	Always	1 MΩ or Higher
S18-2 (SFL-) - Body ground (*1)	Always	1 MΩ or Higher
S20-1 (SFR+) - S20-2 (SFR-) (*2)	Always	Below 1 Ω
S20-1 (SFR+) - Body ground (*2)	Always	1 MΩ or Higher
S20-2 (SFR-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S18-1 (SFL+) - S18-2 (SFL-) (*1)	Always	1 MΩ or Higher
S20-1 (SFR+) - S20-2 (SFR-) (*2)	Always	1 MΩ or Higher

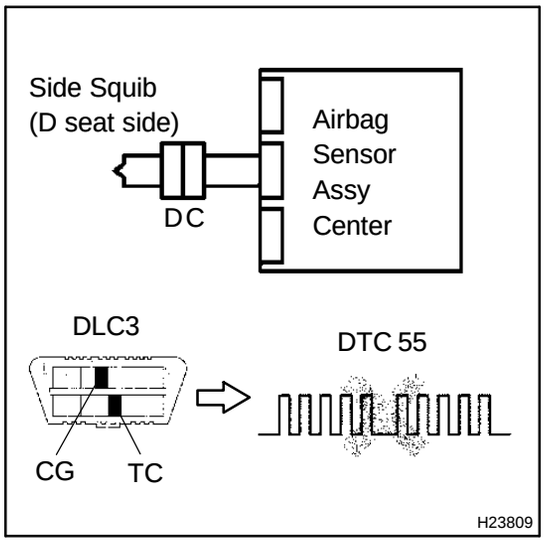
*1: LHD

*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 REPLACE SIDE SQUIB (D SEAT SIDE)



(a) LHD:
Replace the separate type front seat back assy LH (see page 72-2).

(b) RHD:
Replace the separate type front seat back assy RH (see page 72-2).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:

DTC 55 is not output.

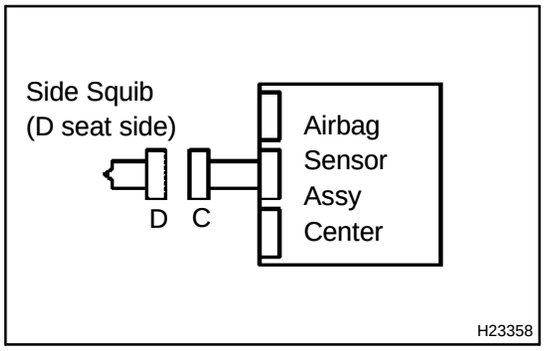
HINT:
Codes other than code 55 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

8	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1820 is not output.

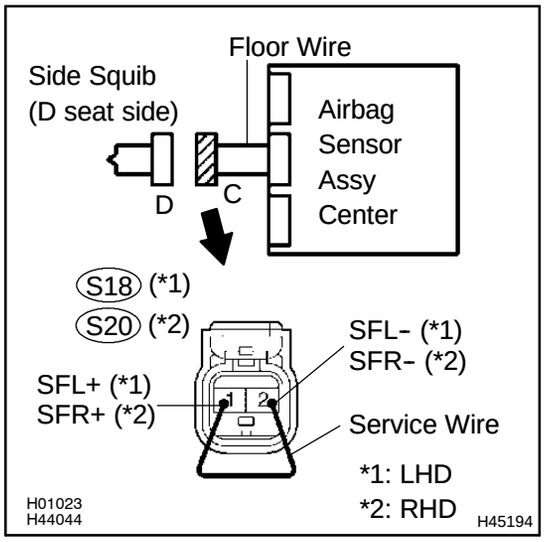
HINT:
Codes other than code B1820 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

GO TO STEP 10

9 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 5:
Turn the ignition switch to the LOCK position.

(b) From the step 5:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect S18-1 (SFL+) and S18-2 (SFL-) of connector "C".

(e) RHD:
Using a service wire, connect S20-1 (SFR+) and S20-2 (SFR-) of connector "C".

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

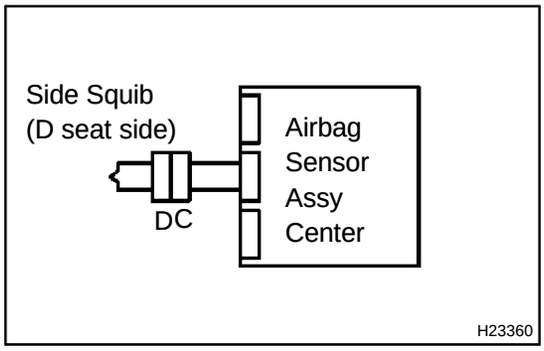
(k) Check the DTCs (see page 05-727).
OK:
DTC B1821, B1822 or B1823 is not output.

HINT:
Codes other than code B1821, B1822 or B1823 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

10	CHECK SIDE SQUIB (D SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 9:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the separate type front seat back assy LH.
(e) RHD:
Connect the connector to the separate type front seat back assy RH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1820, B1821, B1822 or B1823 is not output.

HINT:
Codes other than code B1820, B1821, B1822 or B1823 may be output at this time, but they are not related to this check.

NG → **REPLACE SEPARATE TYPE FRONT SEAT BACK ASSY LH (LHD) (SEE PAGE 72-2)**

NG → **REPLACE SEPARATE TYPE FRONT SEAT BACK ASSY RH (RHD) (SEE PAGE 72-2)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1825/56	SHORT IN SIDE SQUIB (P SEAT SIDE) CIRCUIT

DTC	B1826/56	OPEN IN SIDE SQUIB (P SEAT SIDE) CIRCUIT

DTC	B1827/56	SHORT IN SIDE SQUIB (P SEAT SIDE) CIRCUIT (TO GROUND)

DTC	B1828/56	SHORT IN SIDE SQUIB (P SEAT SIDE) CIRCUIT (TO B+)

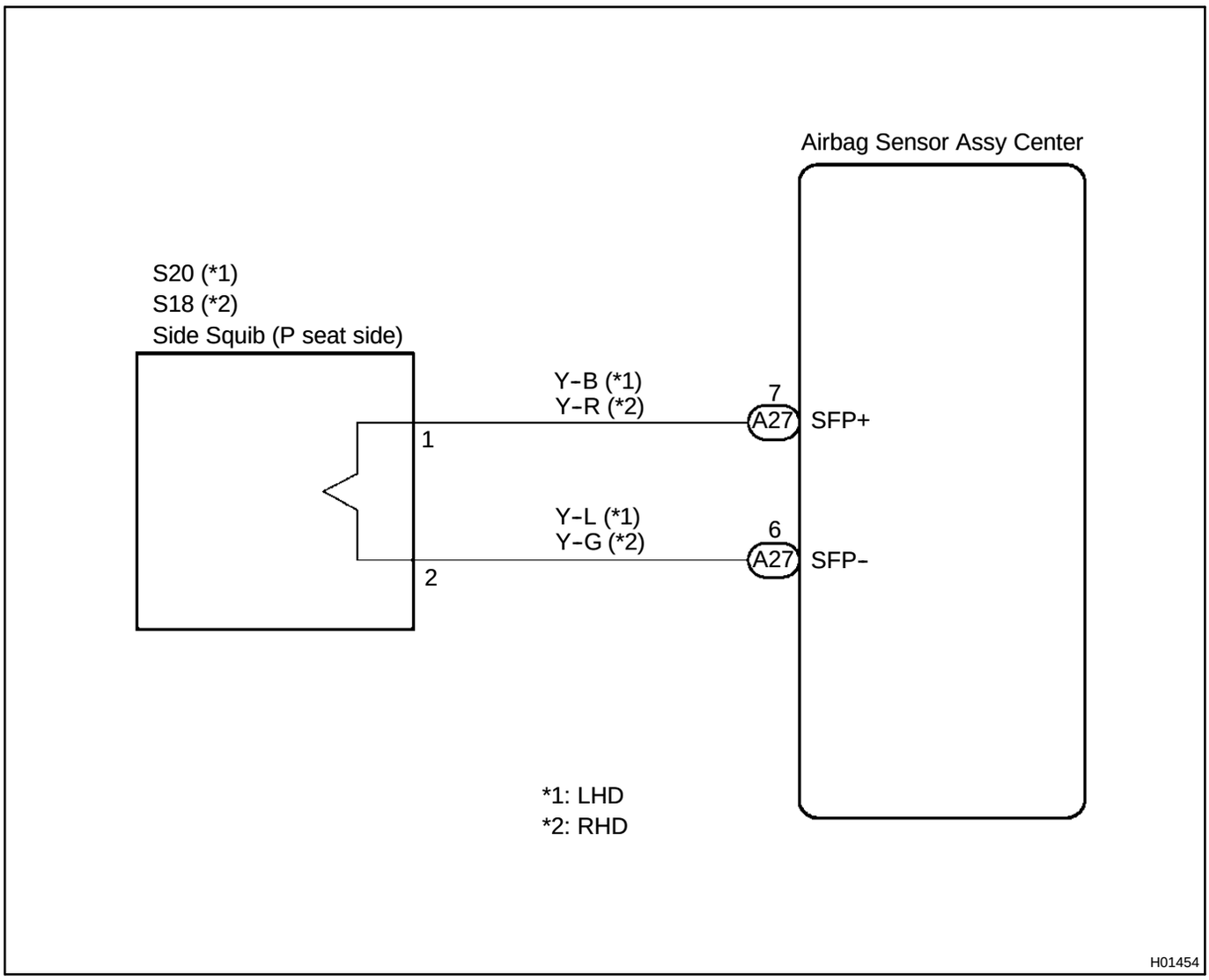
CIRCUIT DESCRIPTION

The side squib (P seat side) circuit consists of the airbag sensor assy center and the separate type front seat back assy RH (LHD) or separate type front seat back assy LH (RHD).
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the side squib (P seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1825/56	• The airbag sensor assy center receives a line short circuit signal 5 times in the side squib (P seat side) circuit during primary check. • Side squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy RH (Side squib (P seat side)) (*1) • Separate type front seat back assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1826/56	• The airbag sensor assy center receives an open circuit signal in the side squib (P seat side) circuit for 2 seconds. • Side squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy RH (Side squib (P seat side)) (*1) • Separate type front seat back assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1827/56	• The airbag sensor assy center receives a short circuit to ground signal in the side squib (P seat side) circuit for 0.5 seconds. • Side squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy RH (Side squib (P seat side)) (*1) • Separate type front seat back assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1828/56	• The airbag sensor assy center receives a short circuit to B+ signal in the side squib (P seat side) circuit for 0.5 seconds. • Side squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Separate type front seat back assy RH (Side squib (P seat side)) (*1) • Separate type front seat back assy LH (Side squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1825 is output.	A
DTC B1826 is output.	B
DTC B1827 is output.	C
DTC B1828 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 56 is output.	E

B → **Go to step 3**

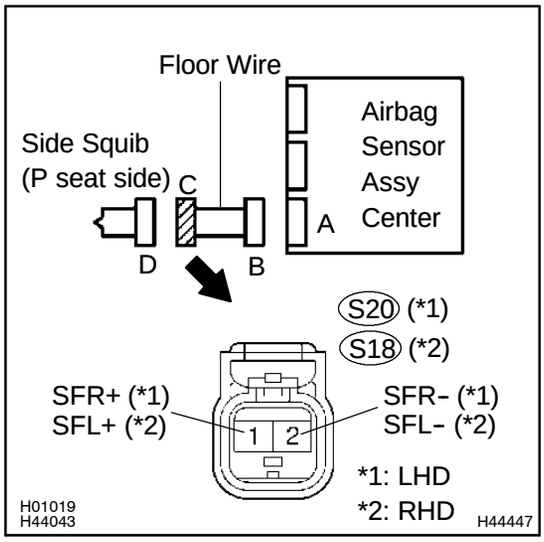
C → **Go to step 4**

D → **Go to step 5**

E → **Go to step 6**

A

2 CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - S20-2 (SFR-) (*1)	Always	1 MΩ or Higher
S18-1 (SFL+) - S18-2 (SFL-) (*2)	Always	1 MΩ or Higher

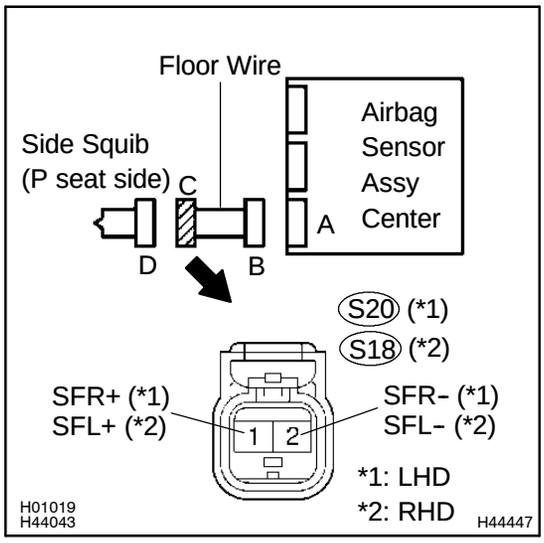
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 8

3 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - S20-2 (SFR-) (*1)	Always	Below 1 Ω
S18-1 (SFL+) - S18-2 (SFL-) (*2)	Always	Below 1 Ω

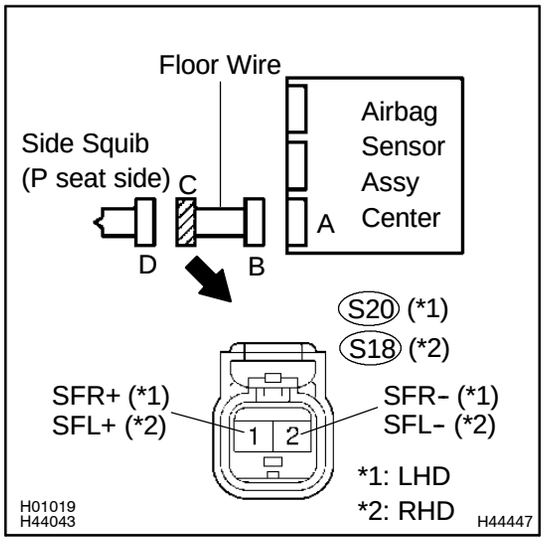
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

4 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - Body ground (*1)	Always	1 MΩ or Higher
S20-2 (SFR-) - Body ground (*1)	Always	1 MΩ or Higher
S18-1 (SFL+) - Body ground (*2)	Always	1 MΩ or Higher
S18-2 (SFL-) - Body ground (*2)	Always	1 MΩ or Higher

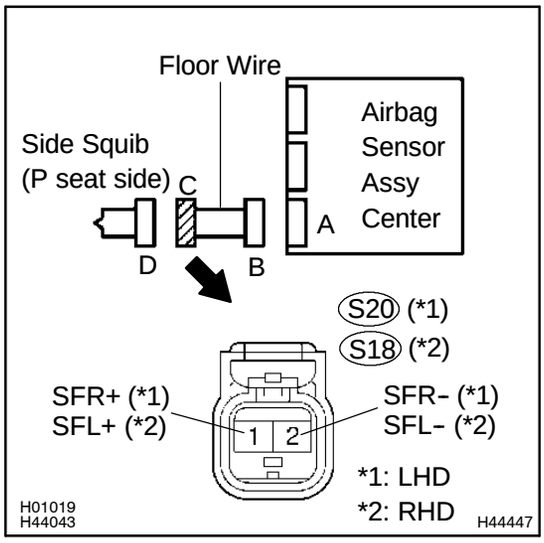
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - Body ground (*1)	Ignition switch ON	Below 1 V
S20-2 (SFR-) - Body ground (*1)	Ignition switch ON	Below 1 V
S18-1 (SFL+) - Body ground (*2)	Ignition switch ON	Below 1 V
S18-2 (SFL-) - Body ground (*2)	Ignition switch ON	Below 1 V

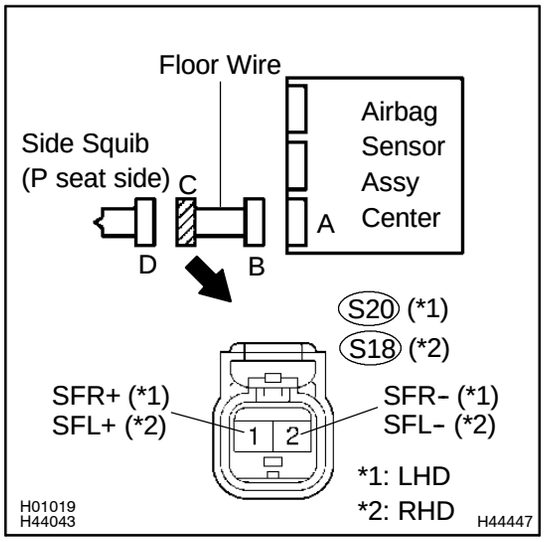
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 9

6 CHECK FLOOR WIRE (SIDE SQUIB (P SEAT SIDE) CIRCUIT)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - Body ground (*1)	Ignition switch ON	Below 1 V
S20-2 (SFR-) - Body ground (*1)	Ignition switch ON	Below 1 V
S18-1 (SFL+) - Body ground (*2)	Ignition switch ON	Below 1 V
S18-2 (SFL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
S20-1 (SFR+) - S20-2 (SFR-) (*1)	Always	Below 1 Ω
S20-1 (SFR+) - Body ground (*1)	Always	1 MΩ or Higher
S20-2 (SFR-) - Body ground (*1)	Always	1 MΩ or Higher
S18-1 (SFL+) - S18-2 (SFL-) (*2)	Always	Below 1 Ω
S18-1 (SFL+) - Body ground (*2)	Always	1 MΩ or Higher
S18-2 (SFL-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

Standard:

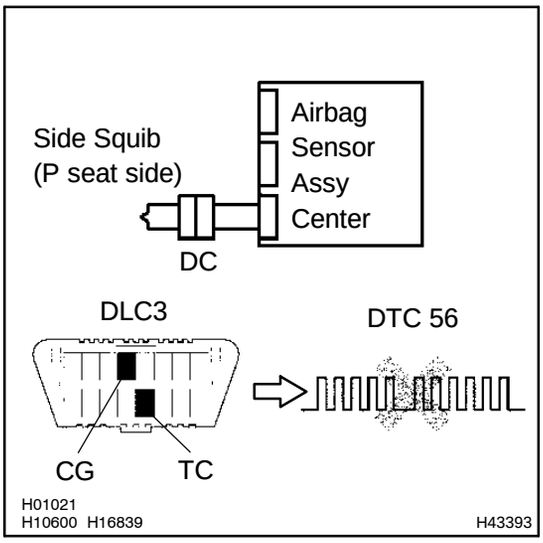
Tester connection	Condition	Specified condition
S20-1 (SFR+) - S20-2 (SFR-) (*1)	Always	1 MΩ or Higher
S18-1 (SFL+) - S18-2 (SFL-) (*2)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 REPLACE SIDE SQUIB (P SEAT SIDE)



(a) LHD:
Replace the separate type front seat back assy RH (see page 72-2).

(b) RHD:
Replace the separate type front seat back assy LH (see page 72-2).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:
DTC 56 is not output.

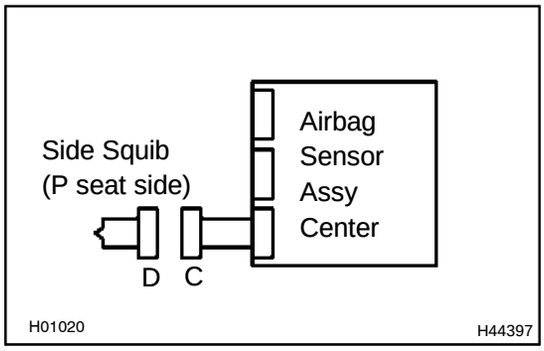
HINT:
Codes other than code 56 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

8 CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1825 is not output.

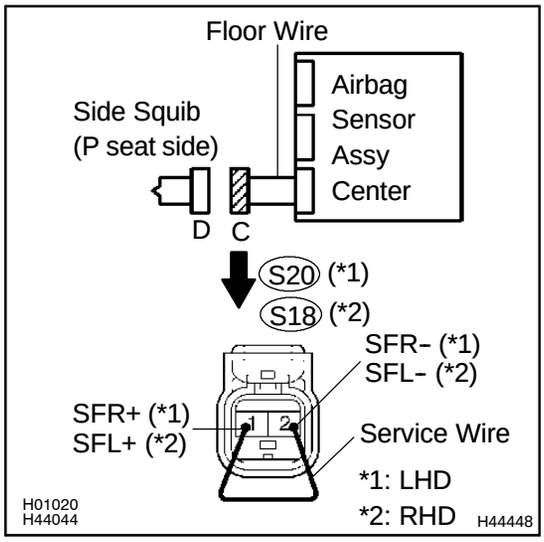
HINT:
Codes other than code B1825 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

GO TO STEP 10

9 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 5:
Turn the ignition switch to the LOCK position.

(b) From the step 5:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect S20-1 (SFR+) and S20-2 (SFR-) of connector "C".

(e) RHD:
Using a service wire, connect S18-1 (SFL+) and S18-2 (SFL-) of connector "C".

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

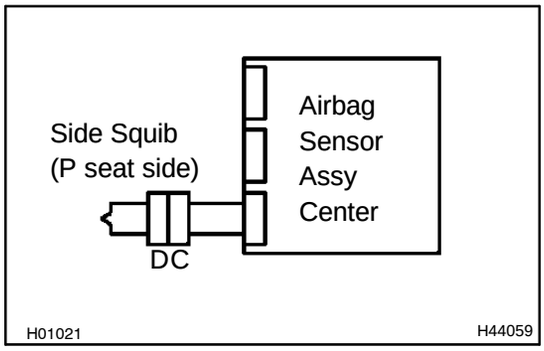
(k) Check the DTCs (see page 05-727).
OK:
DTC B1826, B1827 or B1828 is not output.

HINT:
Codes other than code B1826, B1827 or B1828 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

10	CHECK SIDE SQUIB (P SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 9:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the separate type front seat back assy RH.
(e) RHD:
Connect the connector to the separate type front seat back assy LH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1825, B1826, B1827 or B1828 is not output.

HINT:
Codes other than code B1825, B1826, B1827 or B1828 may be output at this time, but they are not related to this check.

NG → **REPLACE SEPARATE TYPE FRONT SEAT BACK ASSY RH (LHD) (SEE PAGE 72-2)**

NG → **REPLACE SEPARATE TYPE FRONT SEAT BACK ASSY LH (RHD) (SEE PAGE 72-2)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1830/57	SHORT IN CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB CIRCUIT

DTC	B1831/57	OPEN IN CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB CIRCUIT

DTC	B1832/57	SHORT IN CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB CIRCUIT (TO GROUND)

DTC	B1833/57	SHORT IN CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB CIRCUIT (TO B+)

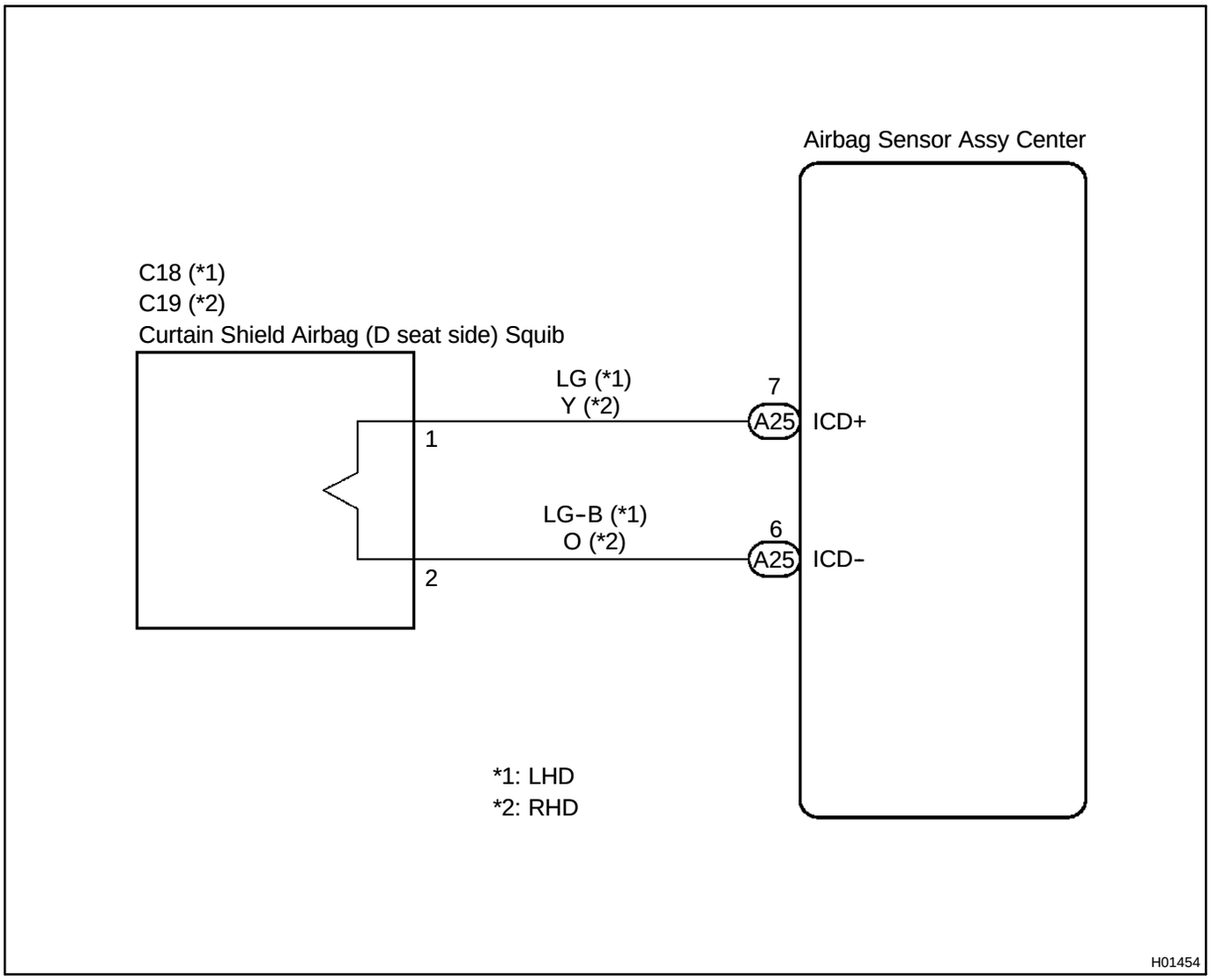
CIRCUIT DESCRIPTION

The curtain shield airbag (D seat side) squib circuit consists of the airbag sensor assy center and the curtain shield airbag assy LH (LHD) or curtain shield airbag assy RH (RHD).
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the curtain shield airbag (D seat side) squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1830/57	• The airbag sensor assy center receives a line short circuit signal 5 times in the curtain shield airbag (D seat side) squib circuit during primary check. • Curtain shield airbag (D seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1831/57	• The airbag sensor assy center receives an open circuit signal in the curtain shield airbag (D seat side) squib circuit for 2 seconds. • Curtain shield airbag (D seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1832/57	• The airbag sensor assy center receives a short to ground circuit signal in the curtain shield airbag (D seat side) squib circuit for 0.5 seconds. • Curtain shield airbag (D seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1833/57	• The airbag sensor assy center receives a short circuit to B+ signal in the curtain shield airbag (D seat side) squib circuit for 0.5 seconds. • Curtain shield airbag (D seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy LH (Curtain shield airbag (D seat side) squib) (*1) • Curtain shield airbag assy RH (Curtain shield airbag (D seat side) squib) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1830 is output.	A
DTC B1831 is output.	B
DTC B1832 is output.	C
DTC B1833 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 57 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

2	CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the curtain shield airbag assy LH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the curtain shield airbag assy RH side) is not damaged.

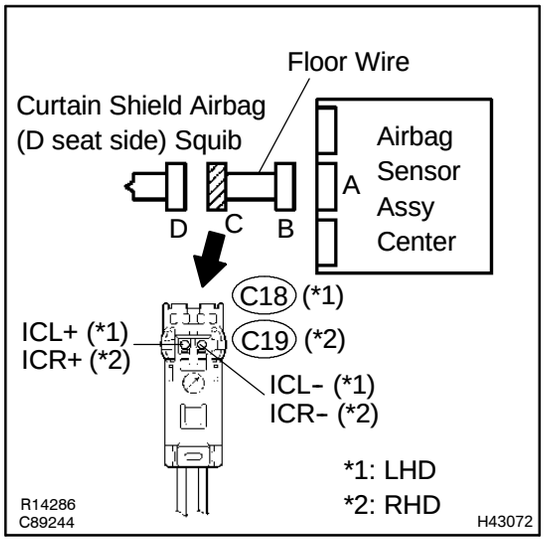
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

3	CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - C18-2 (ICL-) (*1)	Always	1 MΩ or Higher
C19-1 (ICR+) - C19-2 (ICR-) (*2)	Always	1 MΩ or Higher

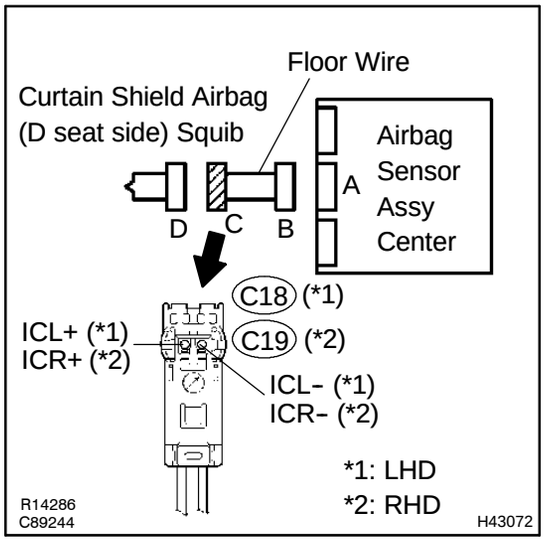
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 10

4 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - C18-2 (ICL-) (*1)	Always	Below 1 Ω
C19-1 (ICR+) - C19-2 (ICR-) (*2)	Always	Below 1 Ω

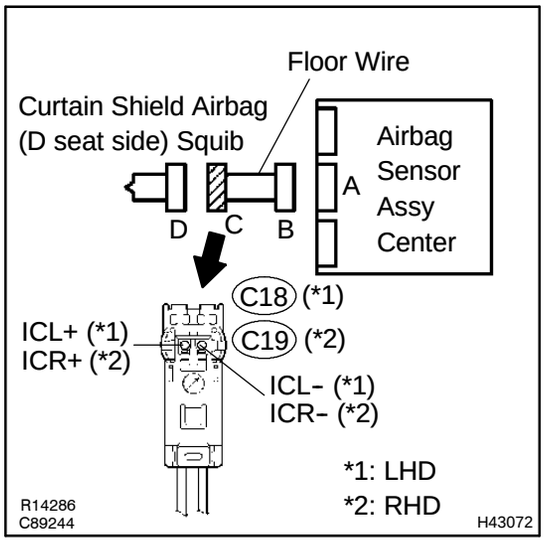
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

5 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - Body ground (*1)	Always	1 MΩ or Higher
C18-2 (ICL-) - Body ground (*1)	Always	1 MΩ or Higher
C19-1 (ICR+) - Body ground (*2)	Always	1 MΩ or Higher
C19-2 (ICR-) - Body ground (*2)	Always	1 MΩ or Higher

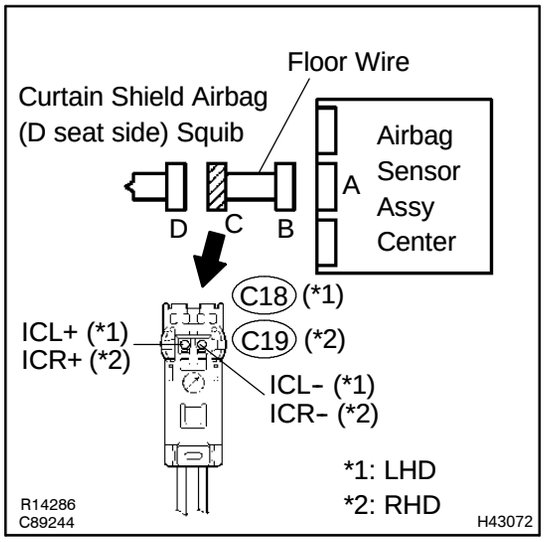
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

6 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - Body ground (*1)	Ignition switch ON	Below 1 V
C18-2 (ICL-) - Body ground (*1)	Ignition switch ON	Below 1 V
C19-1 (ICR+) - Body ground (*2)	Ignition switch ON	Below 1 V
C19-2 (ICR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

7 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the curtain shield airbag assy LH side) is not damaged.
(b) RHD:
Check that the floor wire connector (on the curtain shield airbag assy RH side) is not damaged.

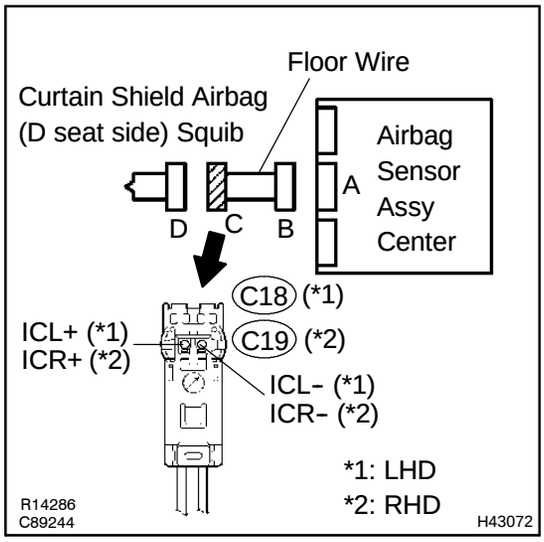
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8 CHECK FLOOR WIRE (CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - Body ground (*1)	Ignition switch ON	Below 1 V
C18-2 (ICL-) - Body ground (*1)	Ignition switch ON	Below 1 V
C19-1 (ICR+) - Body ground (*2)	Ignition switch ON	Below 1 V
C19-2 (ICR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - C18-2 (ICL-) (*1)	Always	Below 1 Ω
C18-1 (ICL+) - Body ground (*1)	Always	1 MΩ or Higher
C18-2 (ICL-) - Body ground (*1)	Always	1 MΩ or Higher
C19-1 (ICR+) - C19-2 (ICR-) (*2)	Always	Below 1 Ω
C19-1 (ICR+) - Body ground (*2)	Always	1 MΩ or Higher
C19-2 (ICR-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C18-1 (ICL+) - C18-2 (ICL-) (*1)	Always	1 MΩ or Higher
C19-1 (ICR+) - C19-2 (ICR-) (*2)	Always	1 MΩ or Higher

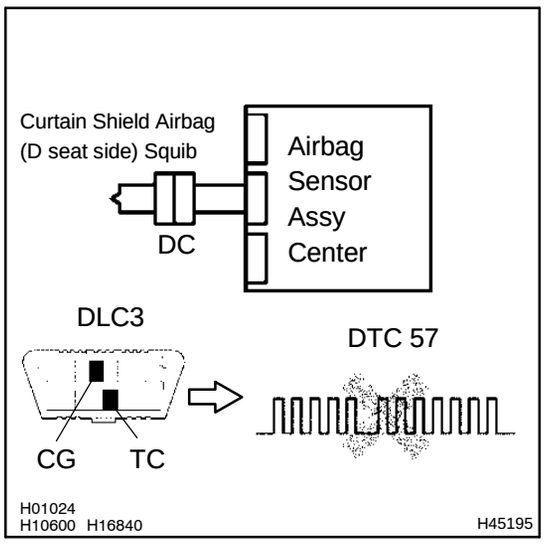
*1: LHD

*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 REPLACE CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB



(a) LHD:
Replace the curtain shield airbag assy LH (see page 60-57).

(b) RHD:
Replace the curtain shield airbag assy RH (see page 60-57).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:

DTC 57 is not output.

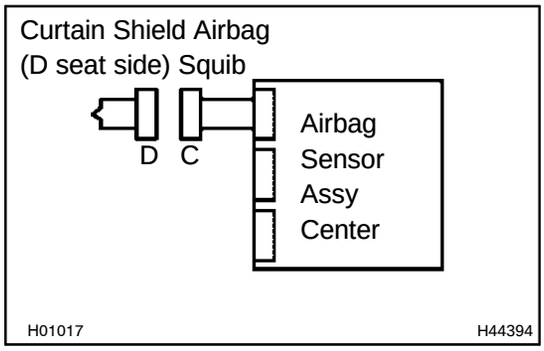
HINT:
Codes other than code 57 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).

OK:

DTC B1830 is not output.

HINT:

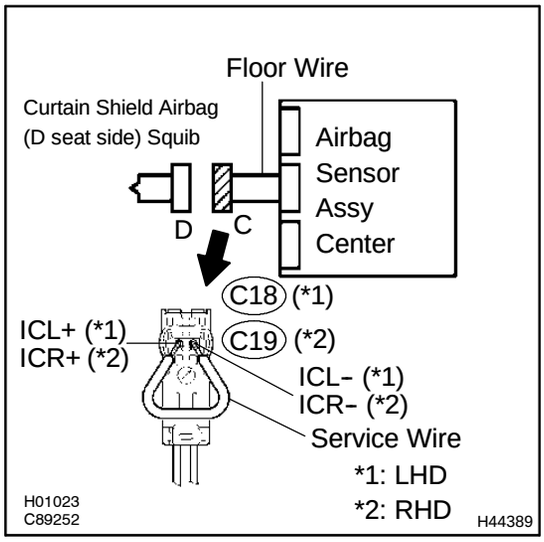
Codes other than code B1830 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

GO TO STEP 12

11 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect C18-1 (ICL+) and C18-2 (ICL-) of connector "C".

(e) RHD:
Using a service wire, connect C19-1 (ICR+) and C19-2 (ICR-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

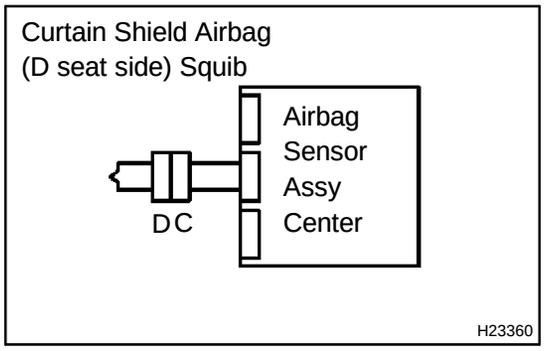
(k) Check the DTCs (see page 05-727).
OK:
DTC B1831, B1832 or B1833 is not output.

HINT:
Codes other than code B1831, B1832 or B1833 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12	CHECK CURTAIN SHIELD AIRBAG (D SEAT SIDE) SQUIB



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the curtain shield airbag assy LH.
(e) RHD:
Connect the connector to the curtain shield airbag assy RH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1830, B1831, B1832 or B1833 is not output.

HINT:
Codes other than code B1830, B1831, B1832 or B1833 may be output at this time, but they are not related to this check.

NG → **REPLACE CURTAIN SHIELD AIR BAG ASSY LH (LHD) (SEE PAGE 60-57)**

NG → **REPLACE CURTAIN SHIELD AIR BAG ASSY RH (RHD) (SEE PAGE 60-57)**

OK →

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1835/58	SHORT IN CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB CIRCUIT

DTC	B1836/58	OPEN IN CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB CIRCUIT

DTC	B1837/58	SHORT IN CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB CIRCUIT (TO GROUND)

DTC	B1838/58	SHORT IN CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIIB CIRCUIT (TO B+)

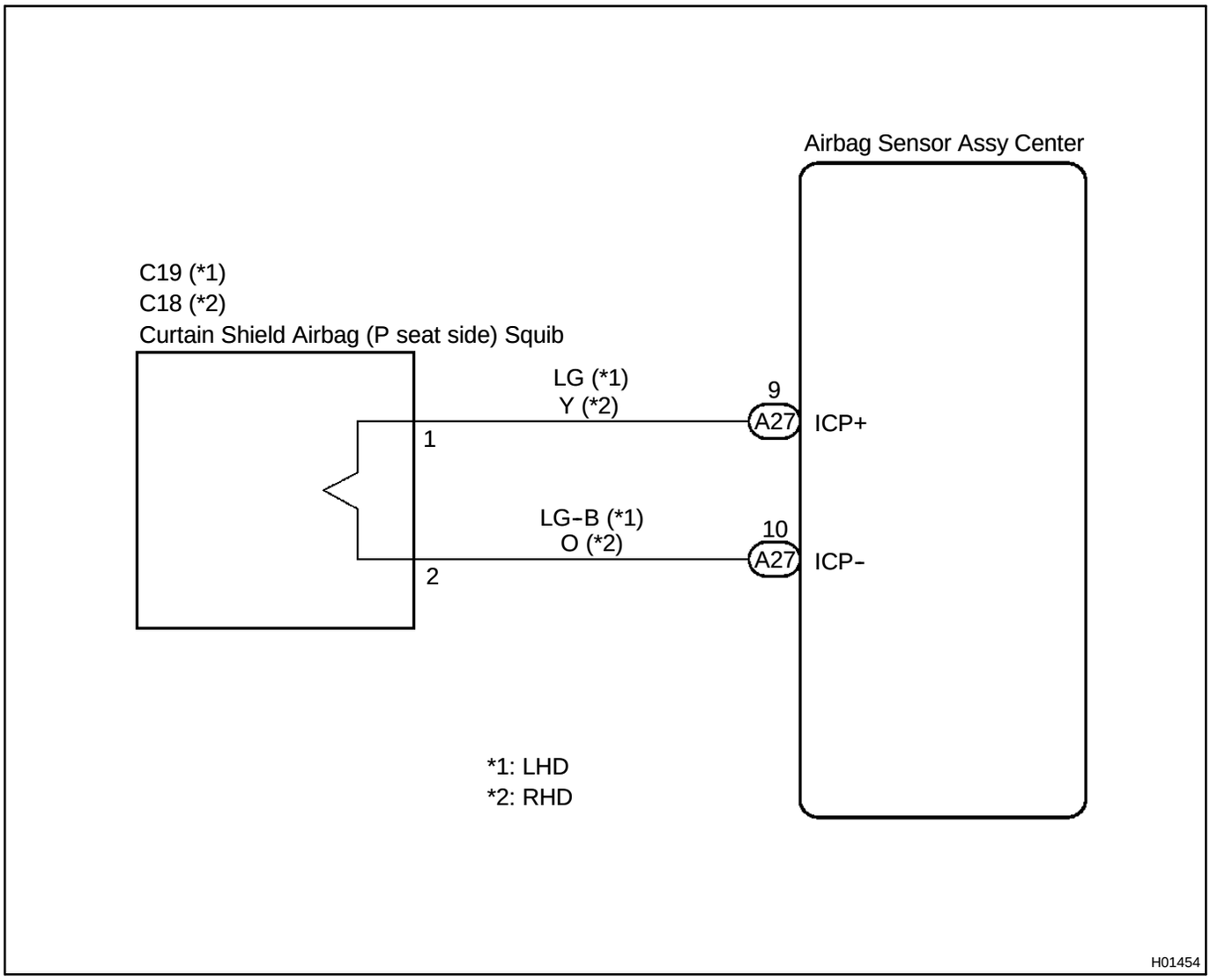
CIRCUIT DESCRIPTION

The curtain shield airbag (P seat side) squib circuit consists of the airbag sensor assy center and the curtain shield airbag assy RH (LHD) or curtain shield airbag assy LH (RHD).
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the curtain shield airbag (P seat side) squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1835/58	• The airbag sensor assy center receives a line short circuit signal 5 times in the curtain shield airbag (P seat side) squib circuit during primary check. • Curtain shield airbag (P seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1836/58	• The airbag sensor assy center receives an open circuit signal in the curtain shield airbag (P seat side) squib circuit for 2 seconds. • Curtain shield airbag (P seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1837/58	• The airbag sensor assy center receives a short to ground circuit signal in the curtain shield airbag (P seat side) squib circuit for 0.5 seconds. • Curtain shield airbag (P seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire
B1838/58	• The airbag sensor assy center receives a short to B+ signal in the curtain shield airbag (P seat side) squib circuit for 0.5 seconds. • Curtain shield airbag (P seat side) squib malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy RH (Curtain shield airbag (P seat side) squib) (*1) • Curtain shield airbag assy LH (Curtain shield airbag (P seat side) squib) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1835 is output.	A
DTC B1826 is output.	B
DTC B1837 is output.	C
DTC B1838 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 58 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

2 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the curtain shield airbag assy RH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the curtain shield airbag assy LH side) is not damaged.

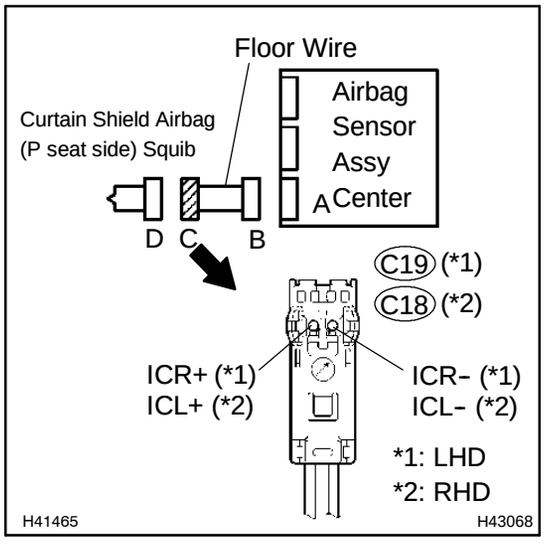
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

3 CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - C19-2 (ICR-) (*1)	Always	1 MΩ or Higher
C18-1 (ICL+) - C18-2 (ICL-) (*2)	Always	1 MΩ or Higher

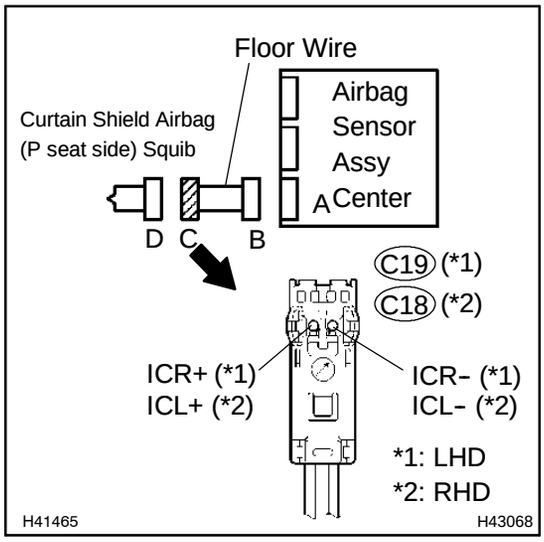
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 10

4 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - C19-2 (ICR-) (*1)	Always	Below 1 Ω
C18-1 (ICL+) - C18-2 (ICL-) (*2)	Always	Below 1 Ω

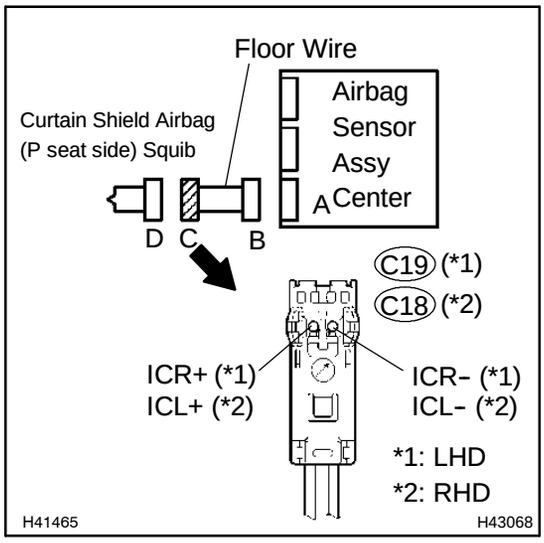
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

5 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - Body ground (*1)	Always	1 MΩ or Higher
C19-2 (ICR-) - Body ground (*1)	Always	1 MΩ or Higher
C18-1 (ICL+) - Body ground (*2)	Always	1 MΩ or Higher
C18-2 (ICL-) - Body ground (*2)	Always	1 MΩ or Higher

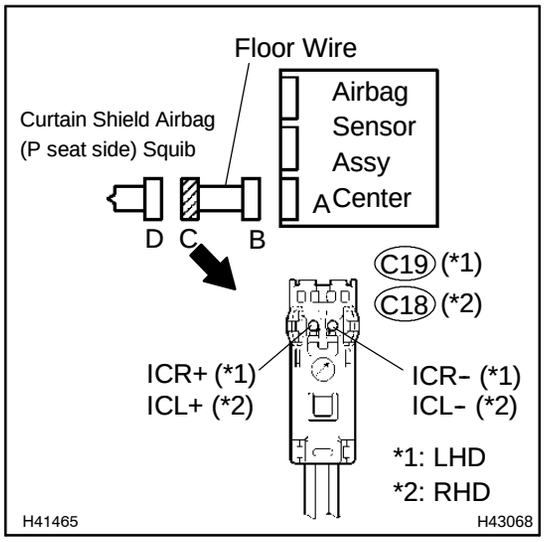
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

6 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - Body ground (*1)	Ignition switch ON	Below 1 V
C19-2 (ICR-) - Body ground (*1)	Ignition switch ON	Below 1 V
C18-1 (ICL+) - Body ground (*2)	Ignition switch ON	Below 1 V
C18-2 (ICL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

7 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the curtain shield airbag assy RH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the curtain shield airbag assy LH side) is not damaged.

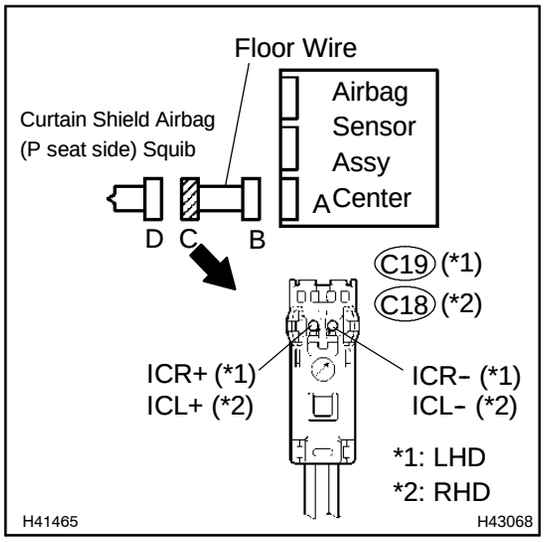
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8 CHECK FLOOR WIRE (CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - Body ground (*1)	Ignition switch ON	Below 1 V
C19-2 (ICR-) - Body ground (*1)	Ignition switch ON	Below 1 V
C18-1 (ICL+) - Body ground (*2)	Ignition switch ON	Below 1 V
C18-2 (ICL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - C19-2 (ICR-) (*1)	Always	Below 1 Ω
C19-1 (ICR+) - Body ground (*1)	Always	1 MΩ or Higher
C19-2 (ICR-) - Body ground (*1)	Always	1 MΩ or Higher
C18-1 (ICL+) - C18-2 (ICL-) (*2)	Always	Below 1 Ω
C18-1 (ICL+) - Body ground (*2)	Always	1 MΩ or Higher
C18-2 (ICL-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

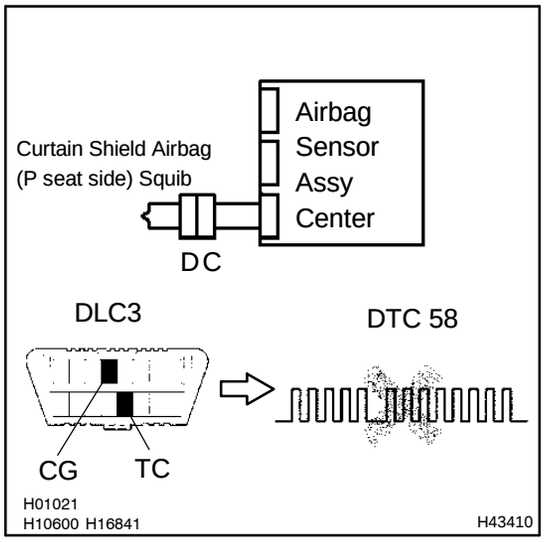
Standard:

Tester connection	Condition	Specified condition
C19-1 (ICR+) - C19-2 (ICR-) (*1)	Always	1 MΩ or Higher
C18-1 (ICL+) - C18-2 (ICL) (*2)	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 REPLACE CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB



(a) LHD:
Replace the curtain shield airbag assy RH (see page 60-57).

(b) RHD:
Replace the curtain shield airbag assy LH (see page 60-57).

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:

DTC 58 is not output.

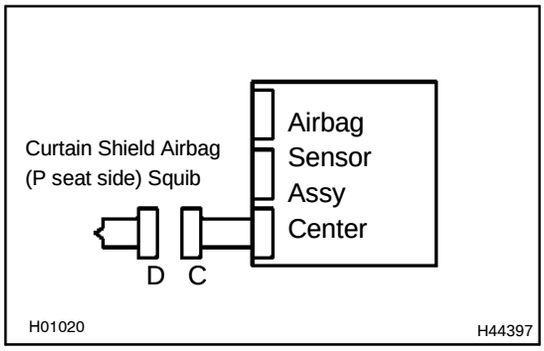
HINT:
Codes other than code 58 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1835 is not output.

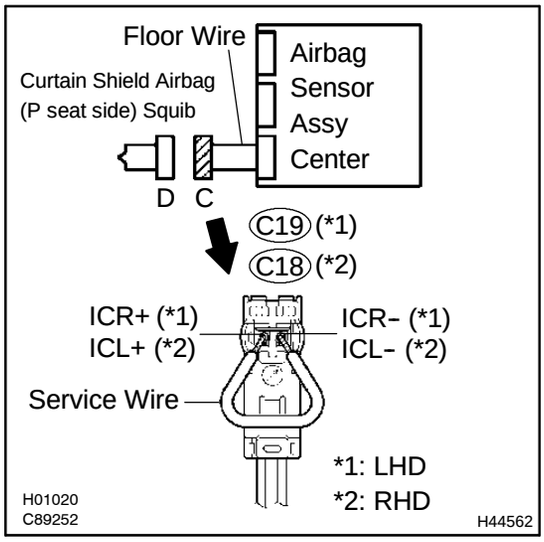
HINT:
Codes other than code B1835 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

GO TO STEP 12

11 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect C19-1 (ICR+) and C19-2 (ICR-) of connector "C".

(e) RHD:
Using a service wire, connect C18-1 (ICL+) and C18-2 (ICL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

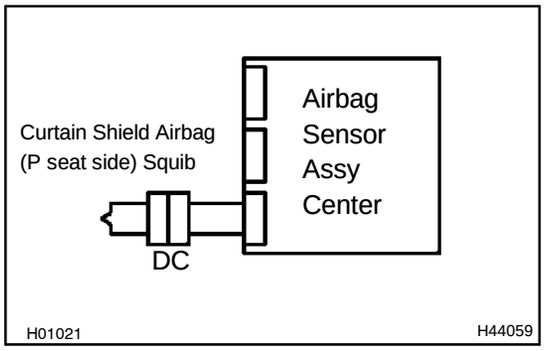
(k) Check the DTCs (see page 05-727).
OK:
DTC B1836, B1837 or B1838 is not output.

HINT:
Codes other than code B1836, B1837 or B1838 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12	CHECK CURTAIN SHIELD AIRBAG (P SEAT SIDE) SQUIB



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the curtain shield airbag assy RH.
(e) RHD:
Connect the connector to the curtain shield airbag assy LH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1835, B1836, B1837 or B1838 is not output.

HINT:
Codes other than code B1835, B1836, B1837 or B1838 may be output at this time, but they are not related to this check.

NG → **REPLACE CURTAIN SHIELD AIR BAG ASSY RH (LHD) (SEE PAGE 60-57)**

NG → **REPLACE CURTAIN SHIELD AIR BAG ASSY LH (RHD) (SEE PAGE 60-57)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1900/73	SHORT IN P/T SQUIB (D SEAT SIDE) CIRCUIT

DTC	B1901/73	OPEN IN P/T SQUIB (D SEAT SIDE) CIRCUIT

DTC	B1902/73	SHORT IN P/T SQUIB (D SEAT SIDE) CIRCUIT (TO GROUND)

DTC	B1903/73	SHORT IN P/T SQUIB (D SEAT SIDE) CIRCUIT (TO B+)

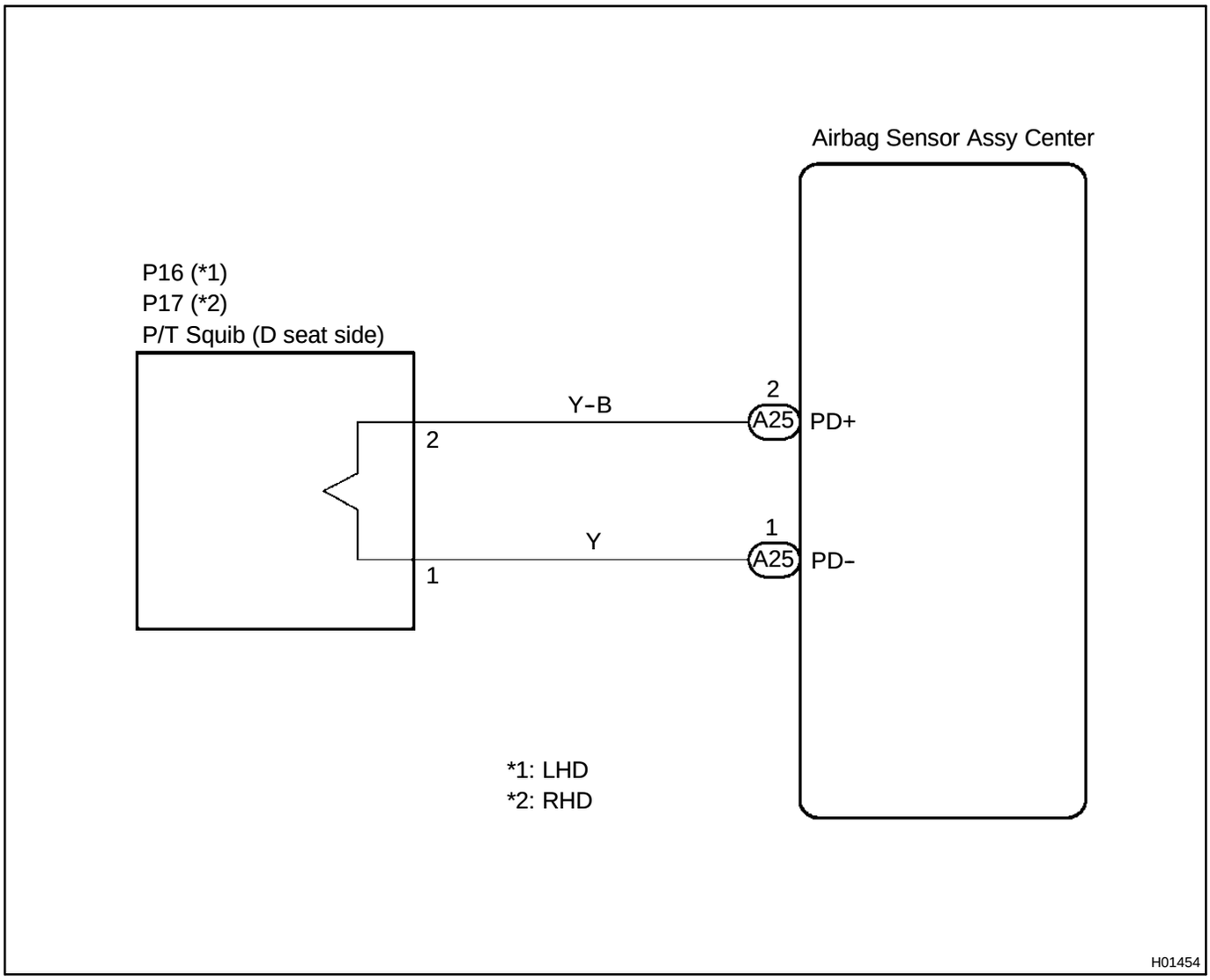
CIRCUIT DESCRIPTION

The P/T squib (D seat side) circuit consists of the airbag sensor assy center and the front seat outer belt assy LH (LHD) or front seat outer belt assy RH (RHD).
This circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the P/T squib (D seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1900/73	• The airbag sensor assy center receives a line short circuit signal 5 times in the P/T squib (D seat side) circuit during primary check. • P/T squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1901/73	• The airbag sensor assy center receives an open circuit signal in the P/T squib (D seat side) circuit for 2 seconds. • P/T squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1902/73	• The airbag sensor assy center receives a short circuit to ground signal in the P/T squib (D seat side) circuit for 0.5 seconds. • P/T squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire
B1903/73	• The airbag sensor assy center receives a B+ short circuit signal in the P/T squib (D seat side) circuit for 0.5 seconds. • P/T squib (D seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy LH (P/T squib (D seat side)) (*1) • Front seat outer belt assy RH (P/T squib (D seat side)) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1900 is output.	A
DTC B1901 is output.	B
DTC B1902 is output.	C
DTC B1903 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 73 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

2	CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the front seat outer belt assy LH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the front seat outer belt assy RH side) is not damaged.

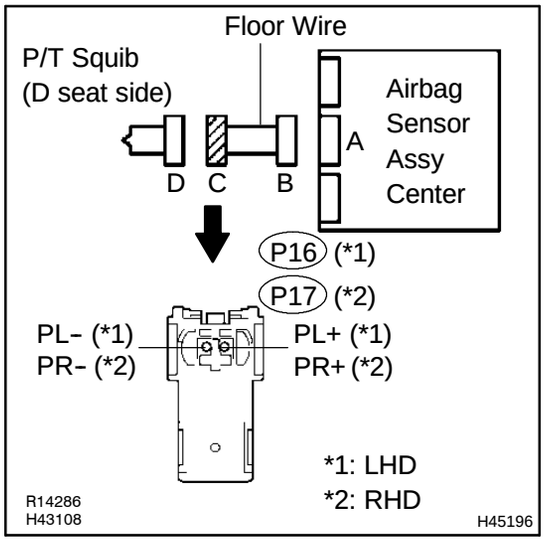
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

3	CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - P16-1 (PL-) (*1)	Always	1 MΩ or Higher
P17-2 (PR+) - P17-1 (PR-) (*2)	Always	1 MΩ or Higher

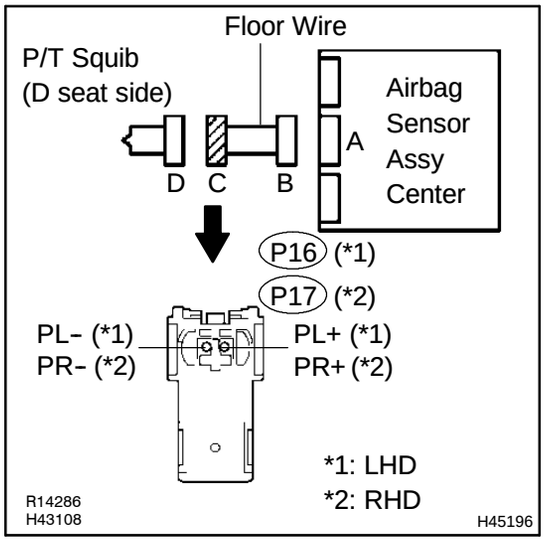
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 10

4 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - P16-1 (PL-) (*1)	Always	Below 1 Ω
P17-2 (PR+) - P17-1 (PR-) (*2)	Always	Below 1 Ω

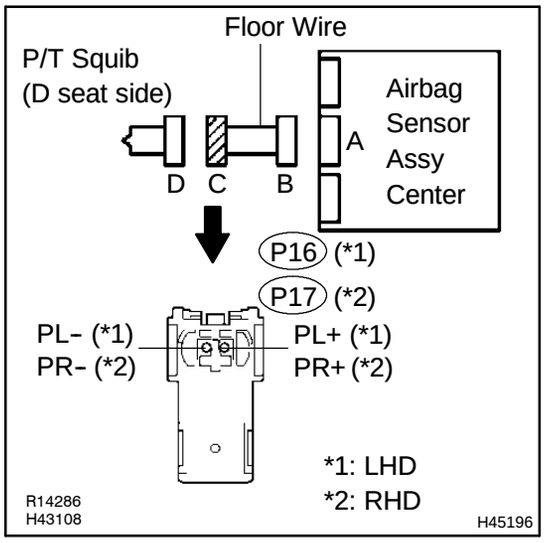
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

5 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - Body ground (*1)	Always	1 MΩ or Higher
P16-1 (PL-) - Body ground (*1)	Always	1 MΩ or Higher
P17-2 (PR+) - Body ground (*2)	Always	1 MΩ or Higher
P17-1 (PR-) - Body ground (*2)	Always	1 MΩ or Higher

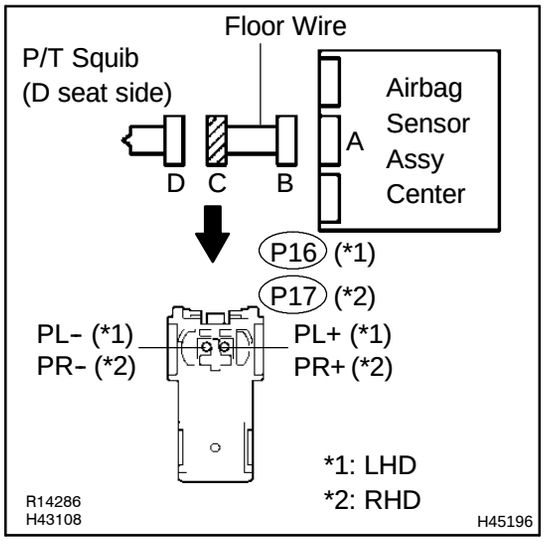
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

6 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - Body ground (*1)	Ignition switch ON	Below 1 V
P16-1 (PL-) - Body ground (*1)	Ignition switch ON	Below 1 V
P17-2 (PR+) - Body ground (*2)	Ignition switch ON	Below 1 V
P17-1 (PR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

7 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the front seat outer belt assy LH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the front seat outer belt assy RH side) is not damaged.

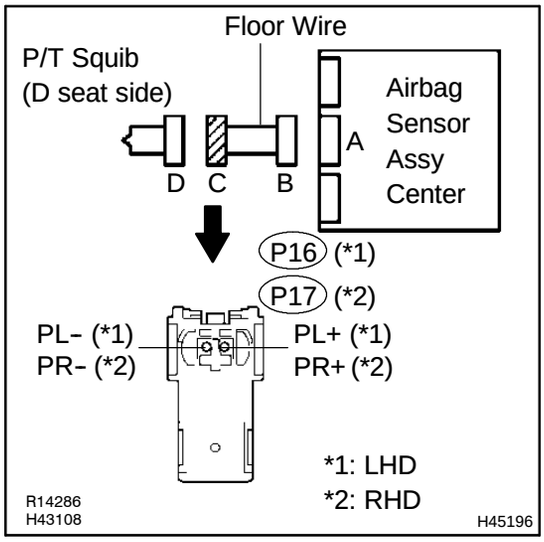
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8 CHECK FLOOR WIRE (P/T SQUIB (D SEAT SIDE) CIRCUIT)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - Body ground (*1)	Ignition switch ON	Below 1 V
P16-1 (PL-) - Body ground (*1)	Ignition switch ON	Below 1 V
P17-2 (PR+) - Body ground (*2)	Ignition switch ON	Below 1 V
P17-1 (PR-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P16-2 (PL+) - P16-1 (PL-) (*1)	Always	Below 1 Ω
P16-2 (PL+) - Body ground (*1)	Always	1 MΩ or Higher
P16-1 (PL-) - Body ground (*1)	Always	1 MΩ or Higher
P17-2 (PR+) - P17-1 (PR-) (*2)	Always	Below 1 Ω
P17-2 (PR+) - Body ground (*2)	Always	1 MΩ or Higher
P17-1 (PR-) - Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

Standard:

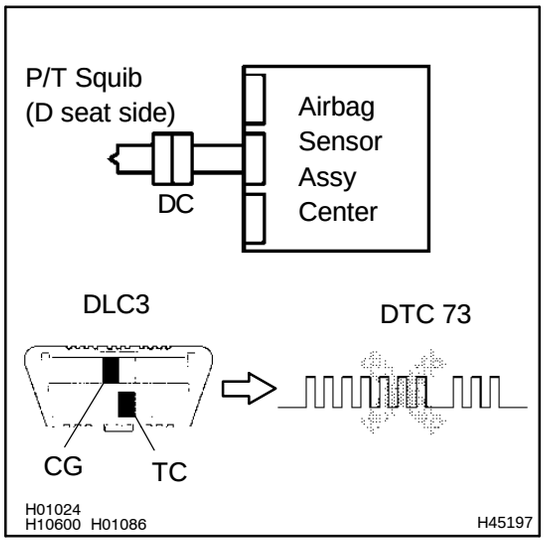
Tester connection	Condition	Specified condition
P16-2 (PL+) - P16-1 (PL-) (*1)	Always	1 MΩ or Higher
P17-2 (PR+) - P17-1 (PR-) (*1)	Always	1 MΩ or Higher

*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 REPLACE P/T SQUIB (D SEAT SIDE)



(a) LHD:
Replace the front seat outer belt assy LH
(See pub No. RM925E, page 61-2 and 61-9)

(b) RHD:
Replace the front seat outer belt assy RH
(See pub No. RM925E, page 61-2 and 61-9)

HINT:
Perform the inspection using parts from a normal vehicle if possible.

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:
DTC 73 is not output.

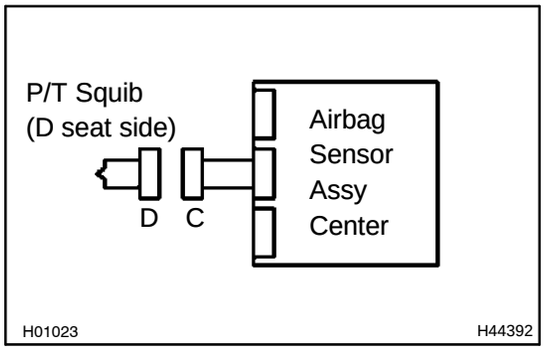
HINT:
Codes other than code 73 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10	CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).
OK:
DTC B1900 is not output.

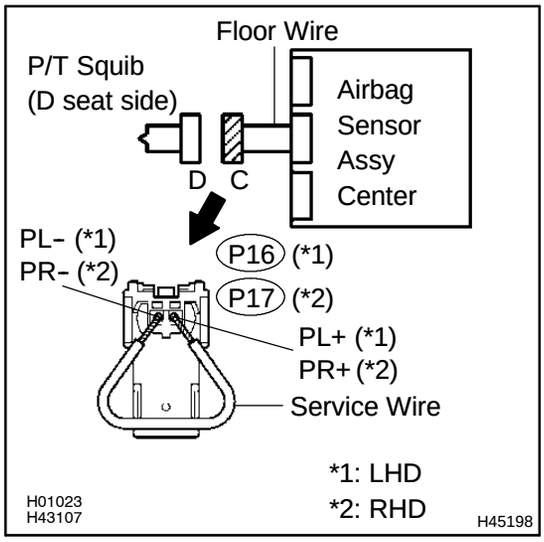
HINT:
Codes other than code B1900 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK →

GO TO STEP 12

11 CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect P16-2 (PL+) and P16-1 (PL-) of connector "C".

(e) RHD:
Using a service wire, connect P17-2 (PR+) and P17-1 (PR-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

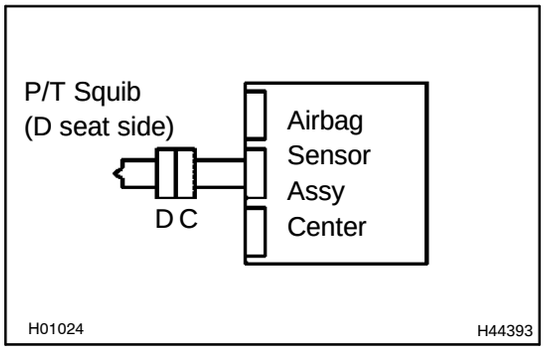
(k) Check the DTCs (see page 05-727).
OK:
DTC B1901, B1902 or B1903 is not output.

HINT:
Codes other than code B1901, B1902 or B1903 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12 CHECK P/T SQUIB (D SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the front seat outer belt assy LH.
(e) RHD:
Connect the connector to the front seat outer belt assy RH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1900, B1901, B1902 or B1903 is not output.

HINT:
Codes other than code B1900, B1901, B1902 or B1903 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT SEAT OUTER BELT ASSY LH (LHD) (See Pub. No. RM925E, page 61-2 and 61-9)**

NG → **REPLACE FRONT SEAT OUTER BELT ASSY RH (RHD) (See Pub. No. RM925E, page 61-2 and 61-9)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

DTC	B1905/74	SHORT IN P/T SQUIB (P SEAT SIDE) CIRCUIT

DTC	B1906/74	OPEN IN P/T SQUIB (P SEAT SIDE) CIRCUIT

DTC	B1907/74	SHORT IN P/T SQUIB (P SEAT SIDE) CIRCUIT (TO GROUND)

DTC	B1908/74	SHORT IN P/T SQUIB (P SEAT SIDE) CIRCUIT (TO B+)

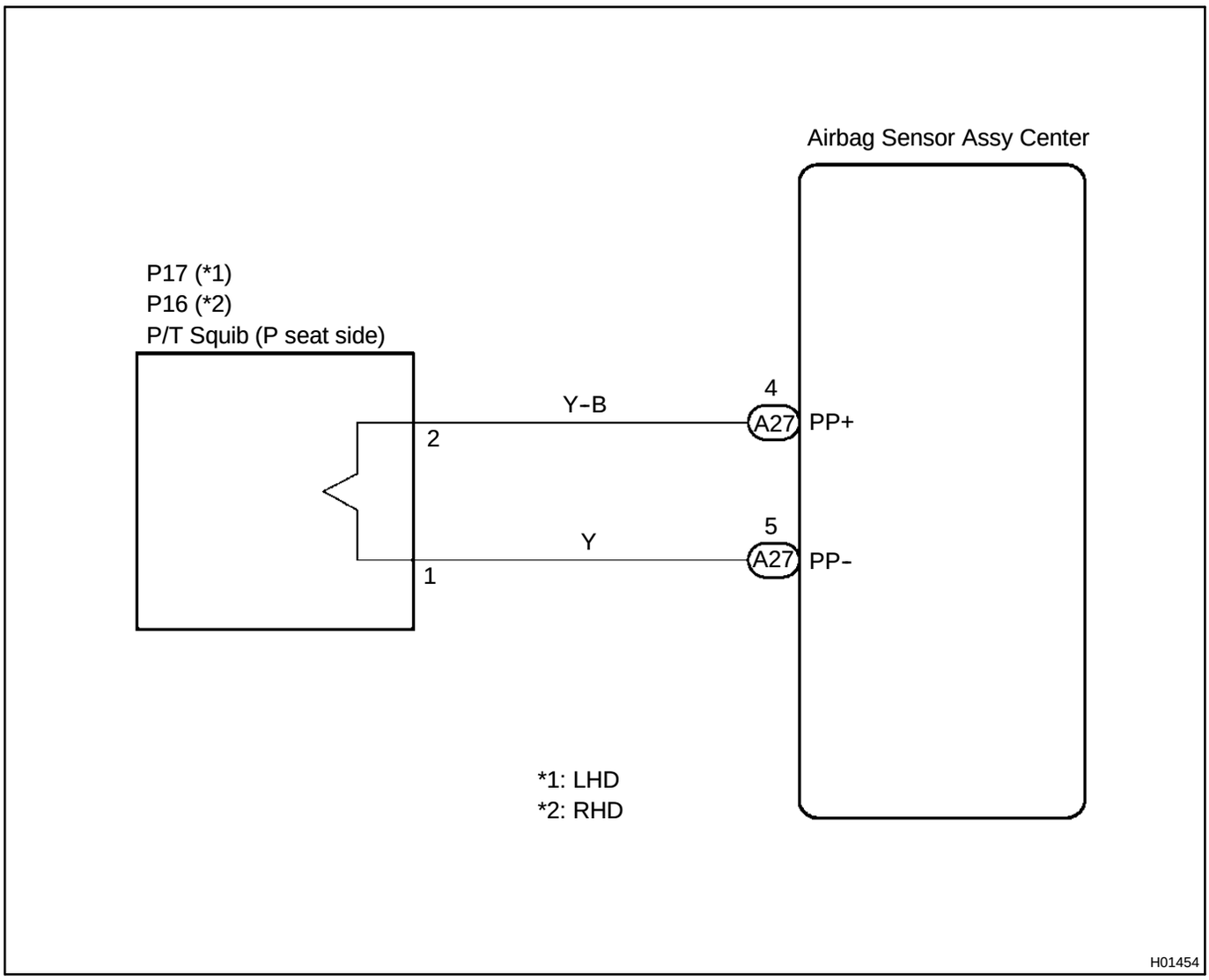
CIRCUIT DESCRIPTION

The P/T squib (P seat side) circuit consists of the airbag sensor assy center and the front seat outer belt assy RH (LHD) or front seat outer belt assy LH (RHD).
This circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the P/T squib (P seat side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1905/74	• The airbag sensor assy center receives a line short circuit signal 5 times in the P/T squib (P seat side) circuit during primary check. • P/T squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1906/74	• The airbag sensor assy center receives an open circuit signal in the P/T squib (P seat side) circuit for 2 seconds. • P/T squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1907/74	• The airbag sensor assy center receives a short circuit to ground signal in the P/T squib (P seat side) circuit for 0.5 seconds. • P/T squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire
B1908/74	• The airbag sensor assy center receives a B+ short circuit signal in the P/T squib (P seat side) circuit for 0.5 seconds. • P/T squib (P seat side) malfunction • Airbag sensor assy center malfunction	• Front seat outer belt assy RH (P/T squib (P seat side)) (*1) • Front seat outer belt assy LH (P/T squib (P seat side)) (*2) • Airbag sensor assy center • Floor wire

*1: LHD
*2: RHD

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK READ METHOD OF DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester II (read the 5-digit of DTC):
Using the intelligent tester II, check the DTCs (see page 05-727).

Result:

DTC B1905 is output.	A
DTC B1906 is output.	B
DTC B1907 is output.	C
DTC B1908 is output.	D

(2) If not using the intelligent tester II (read the 2-digit of DTC):
Check the DTCs (see page 05-727).

Result:

DTC 74 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

2 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the front seat outer belt assy RH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the front seat outer belt assy LH side) is not damaged.

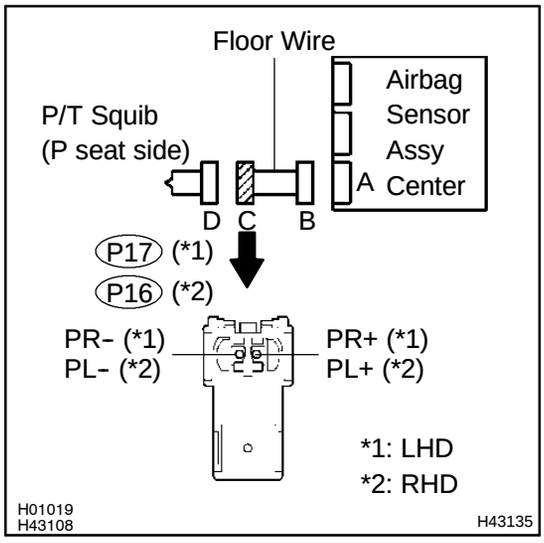
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

3 CHECK FLOOR WIRE (SHORT)



(a) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - P17-1 (PR-) (*1)	Always	1 MΩ or Higher
P16-2 (PL+) - P16-1 (PL-) (*2)	Always	1 MΩ or Higher

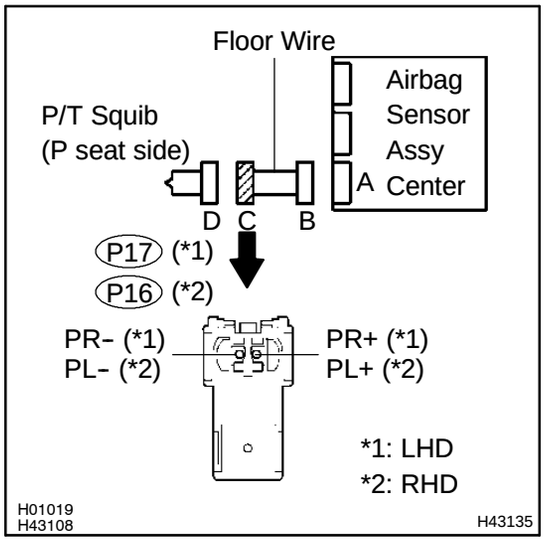
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 10

4 CHECK FLOOR WIRE (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - P17-1 (PR-) (*1)	Always	Below 1 Ω
P16-2 (PL+) - P16-1 (PL-) (*2)	Always	Below 1 Ω

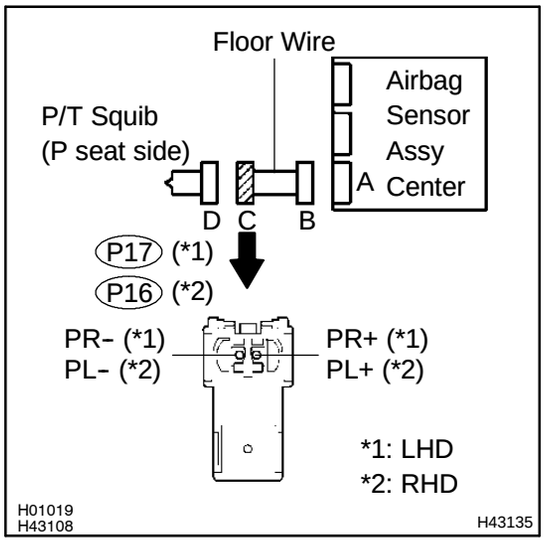
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

5 CHECK FLOOR WIRE (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - Body ground (*1)	Always	1 MΩ or Higher
P17-1 (PR-) - Body ground (*1)	Always	1 MΩ or Higher
P16-2 (PL+) - Body ground (*2)	Always	1 MΩ or Higher
P16-1 (PL-) - Body ground (*2)	Always	1 MΩ or Higher

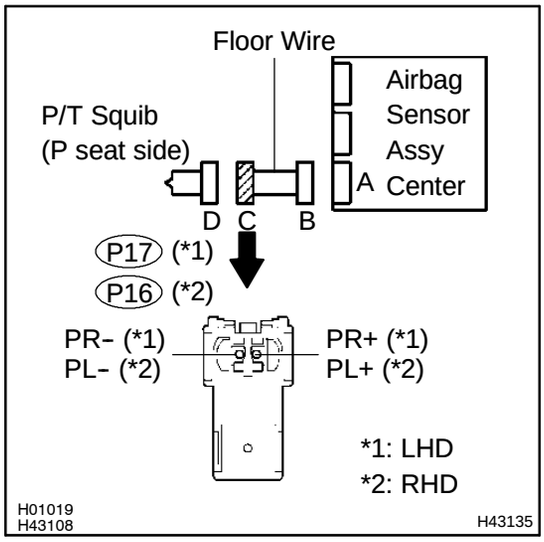
*1: LHD
*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

6 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - Body ground (*1)	Ignition switch ON	Below 1 V
P17-1 (PR-) - Body ground (*1)	Ignition switch ON	Below 1 V
P16-2 (PL+) - Body ground (*2)	Ignition switch ON	Below 1 V
P16-1 (PL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

GO TO STEP 11

7 CHECK CONNECTOR

(a) LHD:
Check that the floor wire connector (on the front seat outer belt assy RH side) is not damaged.

(b) RHD:
Check that the floor wire connector (on the front seat outer belt assy LH side) is not damaged.

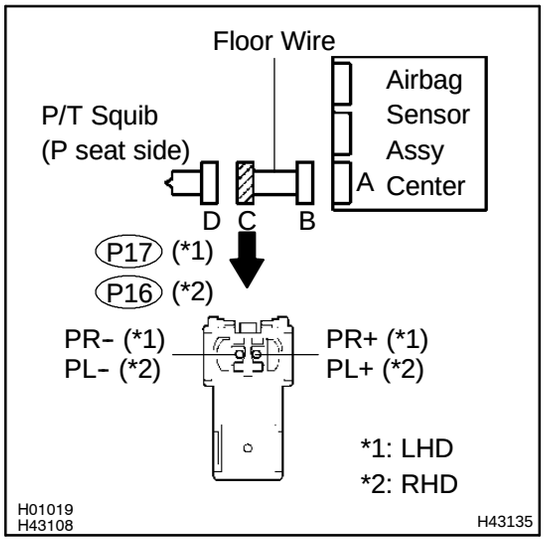
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8 CHECK FLOOR WIRE (P/T SQUIB (P SEAT SIDE) CIRCUIT)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - Body ground (*1)	Ignition switch ON	Below 1 V
P17-1 (PR-) - Body ground (*1)	Ignition switch ON	Below 1 V
P16-2 (PL+) - Body ground (*2)	Ignition switch ON	Below 1 V
P16-1 (PL-) - Body ground (*2)	Ignition switch ON	Below 1 V

*1: LHD

*2: RHD

(d) Turn the ignition switch to the LOCK position.

(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(f) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - P17-1 (PR-) (*1)	Always	Below 1 Ω
P17-2 (PR+) Body ground (*1)	Always	1 MΩ or Higher
P17-1 (PR-) Body ground (*1)	Always	1 MΩ or Higher
P16-2 (PL+) - P16-1 (PL-) (*2)	Always	Below 1 Ω
P16-2 (PL+) Body ground (*2)	Always	1 MΩ or Higher
P16-1 (PL-) Body ground (*2)	Always	1 MΩ or Higher

*1: LHD

*2: RHD

(g) Release the activation prevention mechanism built into connector "B" (see page 05-719).

(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P17-2 (PR+) - P17-1 (PR-) (*1)	Always	1 MΩ or Higher
P16-2 (PL+) - P16-1 (PL-) (*2)	Always	1 MΩ or Higher

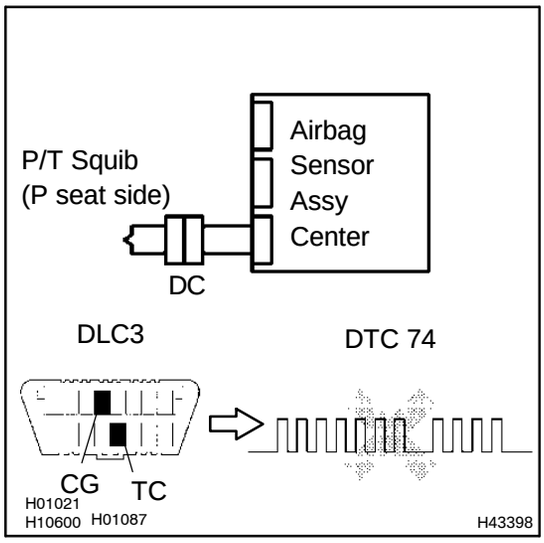
*1: LHD

*2: RHD

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9 REPLACE P/T SQUIB (P SEAT SIDE)



(a) LHD:
Replace the front seat outer belt assy RH (see pub. No. RM925E, page 61-2 and 61-9).

(b) RHD:
Replace the front seat outer belt assy LH (see pub. No. RM925E, page 61-2 and 61-9).

(c) Connect the connectors to the airbag sensor assy center.

(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(f) Clear the DTCs stored in memory (see page 05-727).

(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check the DTCs (see page 05-727).

OK:

DTC 74 is not output.

HINT:

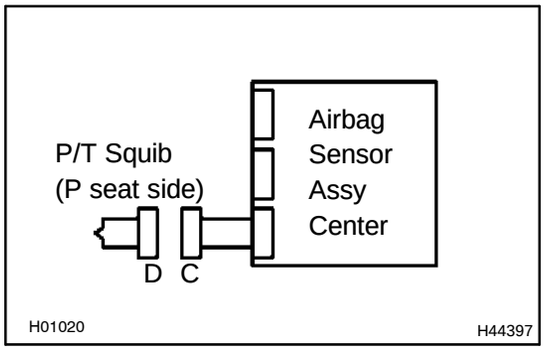
Codes other than code 74 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

END

10 CHECK AIR BAG SENSOR ASSY CENTER



(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in memory (see page 05-727).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (see page 05-727).

OK:

DTC B1905 is not output.

HINT:

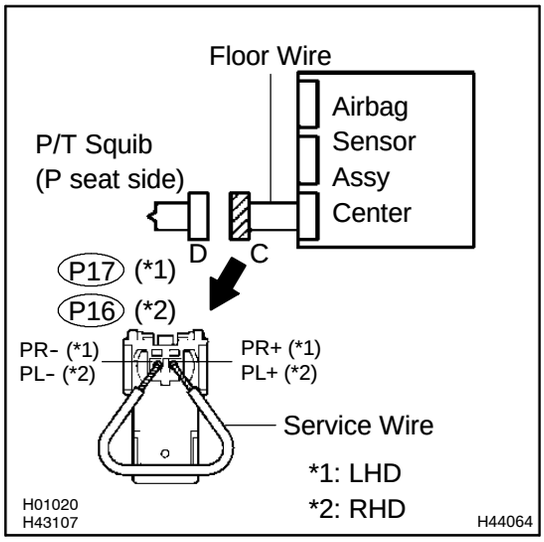
Codes other than code B1905 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

GO TO STEP 12

11	CHECK AIR BAG SENSOR ASSY CENTER



(a) From the step 6:
Turn the ignition switch to the LOCK position.

(b) From the step 6:
Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

(c) Connect the connectors to the airbag sensor assy center.

(d) LHD:
Using a service wire, connect P17-2 (PR+) and P17-1 (PR-) of connector "C".

(e) RHD:
Using a service wire, connect P16-2 (PL+) and P16-1 (PL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(h) Clear the DTCs stored in memory (see page 05-727).

(i) Turn the ignition switch to the LOCK position.

(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

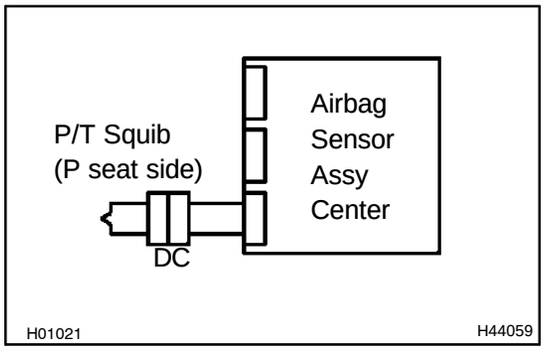
(k) Check the DTCs (see page 05-727).
OK:
DTC B1906, B1907 or B1908 is not output.

HINT:
Codes other than code B1906, B1907 or B1908 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

12	CHECK P/T SQUIB (P SEAT SIDE)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) From the step 11:
Disconnect the service wire from connector "C".
(d) LHD:
Connect the connector to the front seat outer belt assy RH.
(e) RHD:
Connect the connector to the front seat outer belt assy LH.
(f) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Clear the DTCs stored in memory (see page 05-727).
(i) Turn the ignition switch to the LOCK position.
(j) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(k) Check the DTCs (see page 05-727).
OK:
DTC B1905, B1906, B1907 or B1908 is not output.

HINT:
Codes other than code B1905, B1906, B1907 or B1908 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT SEAT OUTER BELT ASSY RH (LHD) (See Pub. No. RM925E, page 61-2 and 61-9)**

NG → **REPLACE FRONT SEAT OUTER BELT ASSY LH (RHD) (See Pub. No. RM925E, page 61-2 and 61-9)**

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-719)

HINT:
- Perform the simulation method by selecting the check mode with the intelligent tester II (See page 05-730).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-730).

SOURCE VOLTAGE DROP

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag sensor assy center in case the source voltage drops.

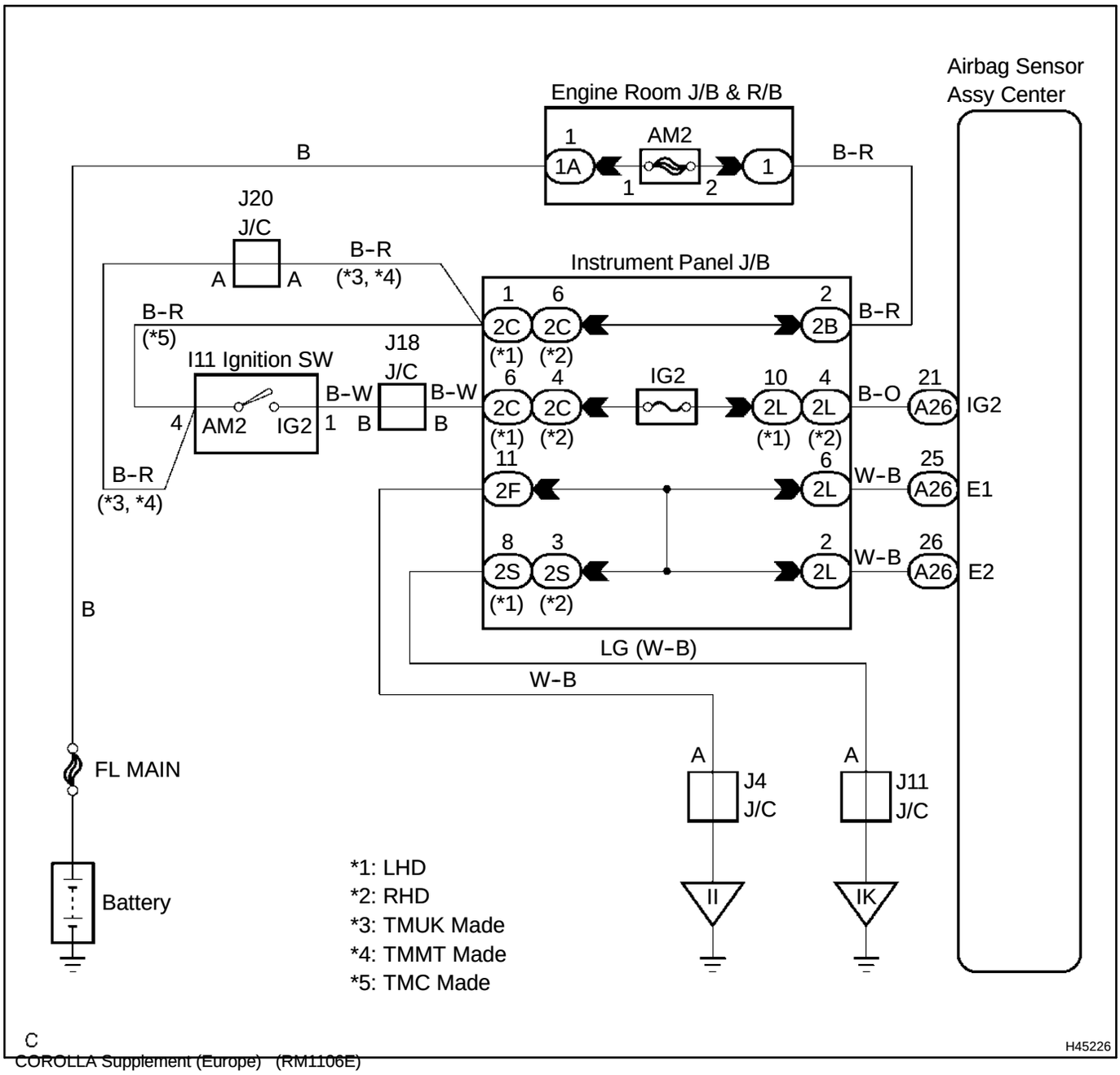
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

A malfunction in this circuit is displayed differently from other codes. The source voltage drop is indicated when the SRS warning light comes on without showing any DTCs.

A malfunction in this circuit is not recorded in the airbag sensor assy center. The SRS warning light automatically goes off when the source voltage returns to normal.

DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

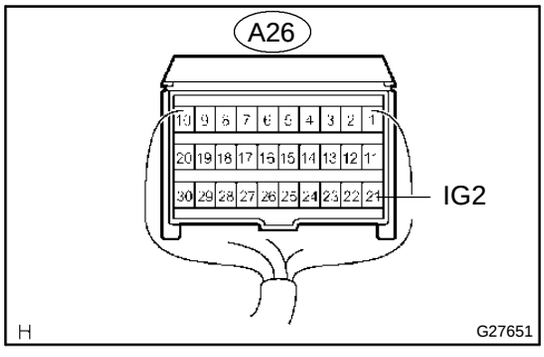
1	CHECK BATTERY

(a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG → **REPLACE BATTERY**

OK

2	CHECK WIRE HARNESS (POWER SOURCE)



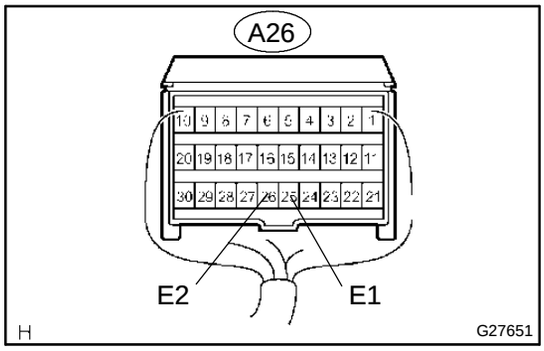
(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A26-21 (IG2) - Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE WIRE HARNESS (BATTERY - AIRBAG SENSOR ASSY CENTER)**

OK

3 CHECK WIRE HARNESS (AIRBAG SENSOR ASSY CENTER - BODY GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A26-25 (E1) - Body ground	Always	Below 1 Ω
A26-26 (E2) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE WIRE HARNESS**

OK

4 CHECK SRS WARNING LIGHT

(a) Connect the connectors to the airbag sensor assy center.
(b) Connect the connectors to the horn button assy.
(c) Connect the connector to the front passenger airbag assy.
(d) Connect the connector to the front seat airbag assy LH.
(e) Connect the connector to the front seat airbag assy RH.
(f) w/ Curtain shield airbag:
Connect the connector to the curtain shield airbag assy LH.
(g) w/ Curtain shield airbag:
Connect the connector to the curtain shield airbag assy RH.
(h) Connect the connector to the front seat outer belt assy LH.
(i) Connect the connector to the front seat outer belt assy RH.
(j) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(k) Turn the ignition switch to the ON position, and wait for at least 6 seconds.
(l) Operate all components of the electrical system (defogger, wiper, headlight, heater blower, etc.) and check the SRS warning light operation.

OK:

The SRS warning light does not come on.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER**
(SEE PAGE 60-74)

OK

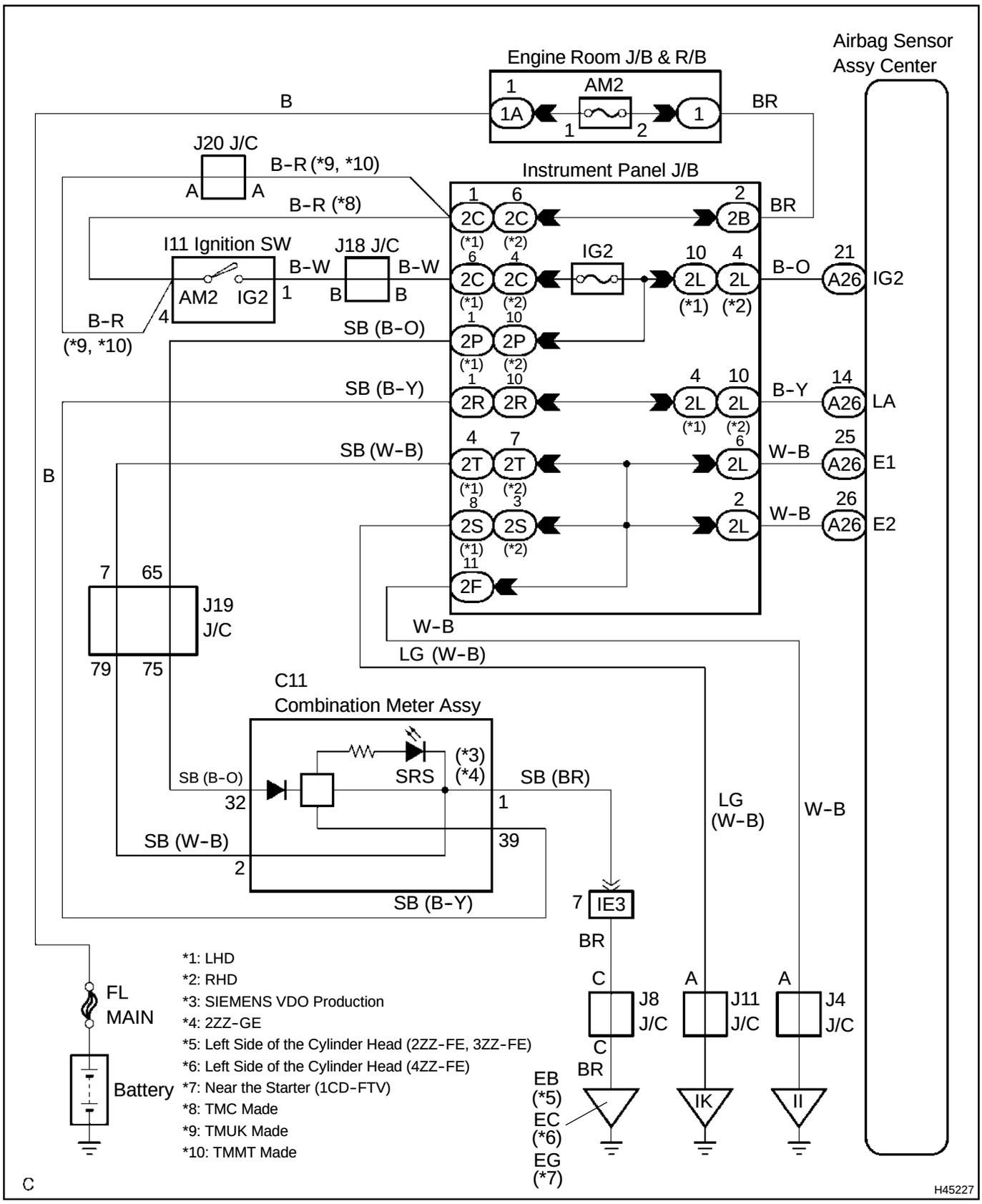
END

SRS WARNING LIGHT CIRCUIT MALFUNCTION (ALWAYS LIGHT UP, WHEN DTC IS NOT OUTPUT)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter assy.
When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, and then goes off automatically.
If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of a problem.
When terminals TC and CG of the DLC3 are connected, the DTCs are displayed by blinking the SRS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK BATTERY

(a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG → **REPLACE BATTERY**

OK

2	CHECK CONNECTION OF CONNECTORS

(a) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(b) Check that the connectors are properly connected to the airbag sensor assy center.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS**

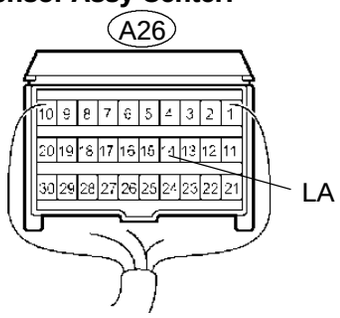
OK

3	PREPARE FOR INSPECTION

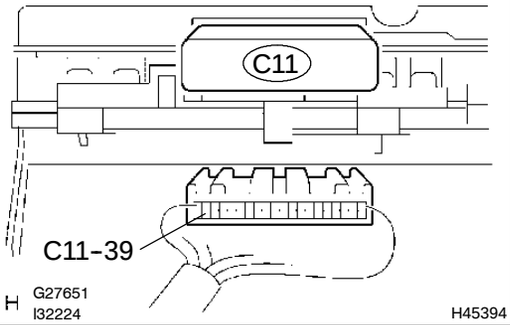
CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

4 CHECK WIRE HARNESS (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)

Airbag Sensor Assy Center:



Combination Meter Assy:



(a) Disconnect the connectors from the combination meter assy.

(b) Measure the voltage and resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A26-14 (LA) - C11-39	Always	Below 1 Ω
A26-14 (LA) - Body ground	Always	1 MΩ or Higher
A26-14 (LA) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE WIRE HARNESS**

OK

5 CHECK COMBINATION METER ASSY

(a) Connect the connector to the combination meter assy.

(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(c) Turn the ignition switch to the ON position.

(d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C11-39 - Body ground	Ignition switch ON	8 to 14 V

NG → **REPLACE COMBINATION METER ASSY (See Pub. No. RM925E, page 71-14 and 71-23)**

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)

SRS WARNING LIGHT CIRCUIT MALFUNCTION (DOES NOT LIGHT UP, WHEN IGNITION SWITCH IS TURNED TO ON)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter assy.
When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, and then goes off automatically.
If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of a problem.
When terminals TC and CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

See page 05-943.

INSPECTION PROCEDURE

CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK BATTERY

(a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG → **REPAIR OR REPLACE WIRE HARNESS**

OK

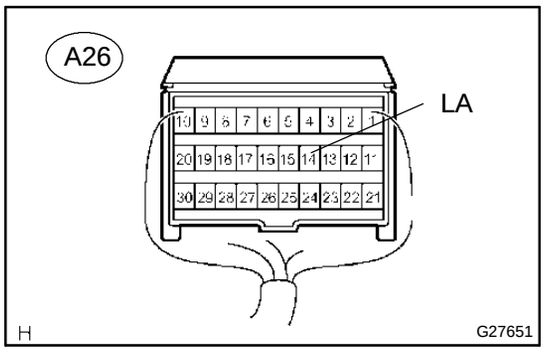
2	CHECK COMBINATION METER ASSY

(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Check the SRS warning light operation.
OK:
The SRS warning light does not come on.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-74)**

OK

3	CHECK WIRE HARNESS (COMBINATION METER ASSY - AIRBAG SENSOR ASSY CENTER)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connector from the combination meter assy.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
A26-14 (LA) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE WIRE HARNESS**

OK

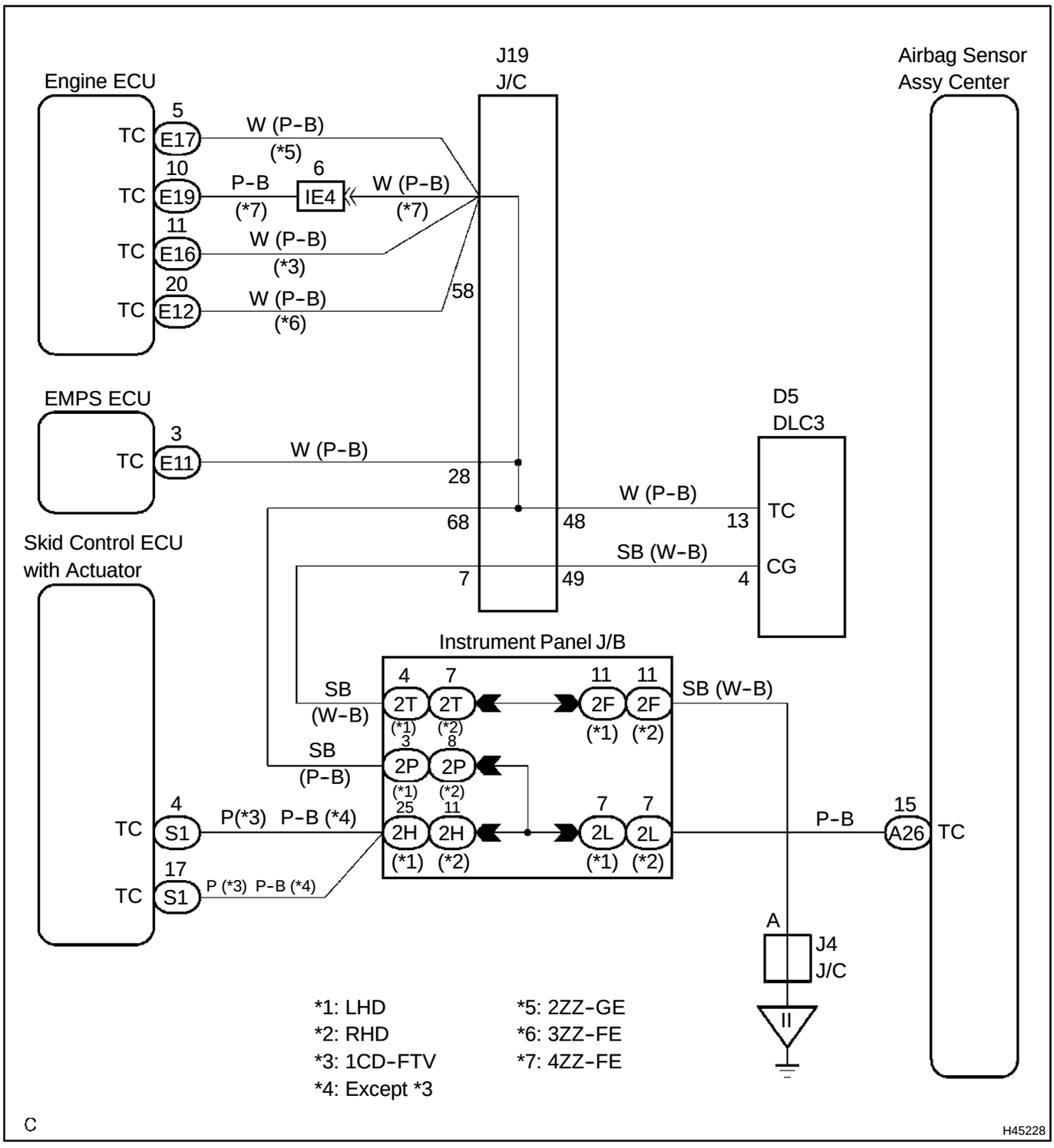
REPLACE COMBINATION METER ASSY (See Pub. No. RM925E, page 71-14 and 71-23)

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.
The DTCs are displayed by blinking the SRS warning light.

WIRING DIAGRAM



HINT:
When each warning light keeps blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

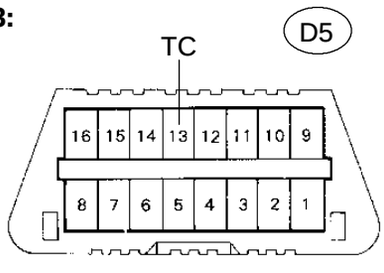
CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

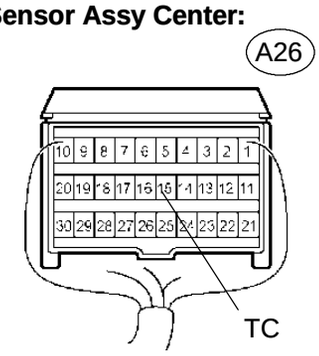
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the airbag sensor assy center.
(d) Disconnect the connectors from the horn button assy.
(e) Disconnect the connector from the front passenger airbag assy.
(f) Disconnect the connector from the front seat airbag assy LH.
(g) Disconnect the connector from the front seat airbag assy RH.
(h) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy LH.
(i) w/ Curtain shield airbag:
Disconnect the connector from the curtain shield airbag assy RH.
(j) Disconnect the connector from the front seat outer belt assy LH.
(k) Disconnect the connector from the front seat outer belt assy RH.

1	CHECK WIRE HARNESS(DLC3 - AIRBAG SENSOR ASSY CENTER)

DLC3:



Airbag Sensor Assy Center:



H40173
G27651
H43473

(a) Measure the resistance according to the value(s) in the table below.

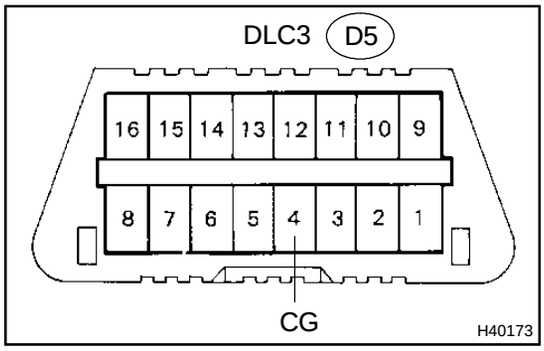
Standard:

Tester connection	Condition	Specified condition
D5-13 (TC) - A26-15 (TC)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE WIRE HARNESS (TC of DLC3 - TC of AIRBAG SENSOR ASSY CENTER)**

OK

2	CHECK WIRE HARNESS(CG of DLC3 - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

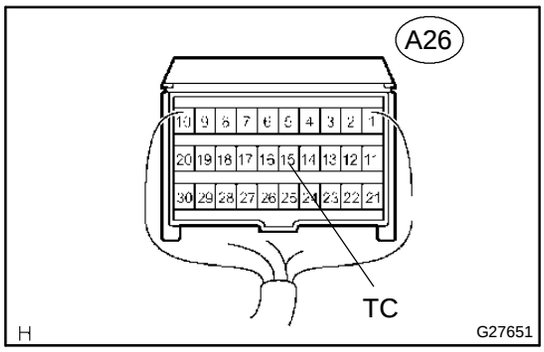
Standard:

Tester connection	Condition	Specified condition
D5-4 (CG) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE WIRE HARNESS (CG of DLC3 - BODY GROUND)**

OK

3	CHECK WIRE HARNESS(TC of AIRBAG SENSOR ASSY CENTER - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A26-15 (TC) - Body ground	Always	1 MΩ or Higher

NG → **REPAIR OR REPLACE WIRE HARNESS OR EACH ECU**

OK

REPLACE AIR BAG SENSOR ASSY CENTER **(SEE PAGE 60-74)**

AUDIO SYSTEM

DESCRIPTION

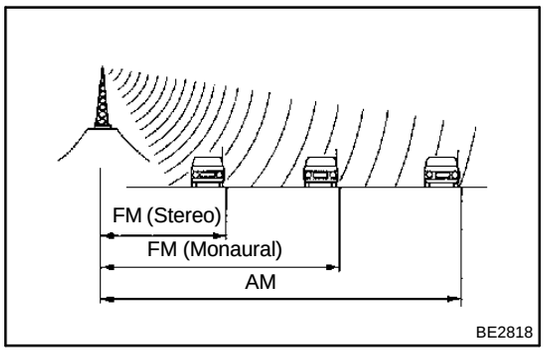
05L53-02

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ← →		FM ← →	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency
MF: Medium Frequency
HF: High Frequency
VHF: Very High Frequency

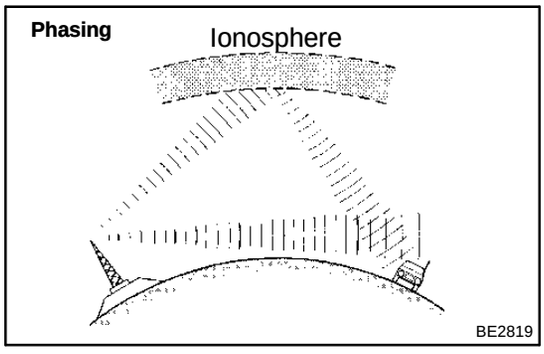


2. SERVICE AREA

(a) There is a great difference in the size of the service areas for AM and FM broadcasting. Sometimes an FM stereo broadcast cannot be received even though AM can be received very clearly.
FM stereo has the smaller service area, and it also picks up static and other types of interference (”noise”) easily.

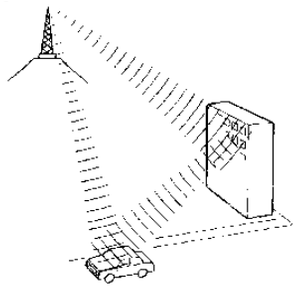
3. RECEPTION PROBLEMS

HINT:
Besides the problem of static, there are other problems called ”phasing”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



(a) Phasing
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 that reach the vehicle’s antenna directly from the same transmitter. This type of interference is called ”phasing”.

Multipath

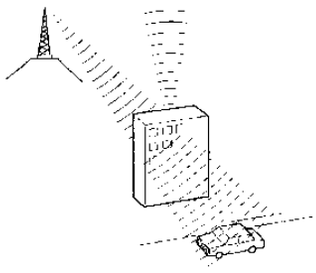


BE2820

(b) Multipath

Interference caused by reflection of radio waves against obstructions is called "multipath". Multipath occurs when radio signals emitted from the broadcast transmitter antenna are reflected against tall buildings or mountains and interfere with other signals which are to be received directly.

Fade Out



BE2821

(c) Fade Out

FM radio wave tends to be reflected against obstructions such as tall buildings or mountains because FM frequency is higher than that of AM. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind those obstructions. This phenomenon is called "fade out".

4. NOISE PROBLEMS

(a) It is very important for technicians to understand a customer's noise claim clearly. Use the following table to diagnose the phenomena.

Radio wave	Condition in which noise occurs	Probable cause
AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	The same program may be broadcasted from some local stations. If the program is the same, one of those may be tuned in.
FM	Noise occurs only at night.	Strong possibility of an interfering beat from a distant broadcast.
	Noise occurs at a specific place during driving.	Strong possibility of multipath noise and phasing noise caused by changes of FM frequency.

HINT:

If the condition when the noise occurs does not meet any of the above, find out the cause based on "Reception Problems". Refer to the description about "multipath" and "phasing" mentioned previously.

5. COMPACT DISC PLAYER

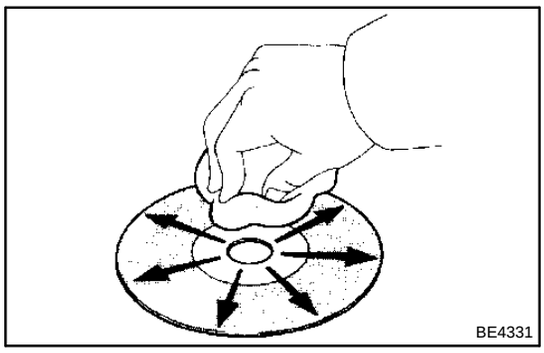
(a) Compact Disc Players (hereafter "CD player") use a laser beam pick-up to read the digital signals recorded on compact discs (hereafter "CD" or "disc") and reproduce analog signals of the music, etc. 4.7 in. (12 cm) and 3.2 in. (8 cm) discs are available for the CD player.

HINT:

Never disassemble or apply oil to any part of the player unit. Do not insert any object other than a disc into the CD player.

NOTICE:

CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. MAINTENANCE

CD Player / Disc Cleaning:

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in a radial direction with a soft cloth.

NOTICE:

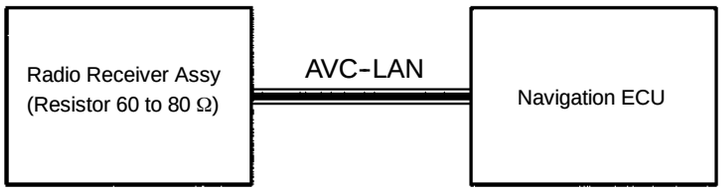
Do not use a conventional record cleaner or anti-static preservative.

7. AVC-LAN DESCRIPTION

(a) What is AVC-LAN?

AVC-LAN, an abbreviation for "Audio Visual Communication-Local Area Network", is a united standard developed by the manufacturers in affiliation with Toyota Motor Corporation. This standard pertains to audio and visual signals as well as switch and communication signals.

Example:



(b) Purpose

Recently, car audio systems have rapidly developed and the functions vastly changed. The conventional car audio system is being integrated with multi-media interfaces similar to those in navigation systems. At the same time, customers are demanding higher quality from their audio systems. This is merely an overview of the standardization background. The specific purposes are as follows.

(1) To solve sound problems, etc. caused by using components of different manufacturers through signal standardization.

(2) To allow each manufacturer to concentrate on developing products they do best. From this, reasonably priced products can be produced.

HINT:

- If a +B or GND short is detected in the AVC-LAN circuit, communication is interrupted and the audio system will stop functioning.
- If an audio system is equipped with a navigation system, the multi-display unit acts as the master unit. If the navigation system is not equipped, the audio head unit acts as the master unit instead. If the radio and navigation assy is equipped, it is the master unit.
- The radio receiver assy provides resistance to make communication possible.
- The car audio system with an AVC-LAN circuit has a diagnostic function.
- Each component has a specified number (3-digit) called a physical address. Each function has a number (2-digit) called a logical address.

8. COMMUNICATION SYSTEM OUTLINE

(a) Components of the audio system communicate with each other via the AVC-LAN.

(b) The radio receiver assy has enough resistance (60 to 80 Ω) for communication.
This is essential for communication.

(c) If a short circuit or open circuit occurs in the AVC-LAN circuit, communication is interrupted and the audio system will stop functioning.

9. DIAGNOSTIC FUNCTION OUTLINE

(a) The audio system has a diagnostic function (the result is indicated on the master unit).

(b) A 3-digit hexadecimal component code (physical address) is allocated to each component on the AVC-LAN. Using this code, the component in the diagnostic function can be displayed.

0549G-16

HOW TO PROCEED WITH TROUBLESHOOTING

1	VEHICLE BROUGHT TO WORKSHOP

2	CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-958)

3	BASIC INSPECTION

(a) Basic inspection.
  (1) Check the battery voltage.
  Standard: 11 to 14 V

(b) Check the power supply to the radio receiver assy.
  (1) Turn the engine switch on (ACC).
  (2) Check whether or not the display appears on the radio receiver assy.

DISPLAY DOES NOT APPEAR	DISPLAY DOES NOT APPEAR (PROCEED TO PROBLEM SYMPTOMS TABLE) (SEE PAGE 05-971)
DISPLAY APPEARS	DISPLAY APPEARS (GO TO STEP 4)

4	DTC CHECK (SEE PAGE 05-959)

DTC IS OUTPUT	DTC IS OUTPUT (GO TO STEP 5)
DTC IS NOT OUTPUT	DTC IS NOT OUTPUT (GO TO STEP 6)

5	DTC CHART (SEE PAGE 05-965)

	GO TO STEP 7

6	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-971)

7	CIRCUIT INSPECTION AND PART INSPECTION (SEE PAGE 05-972 - 05-996)

8	IDENTIFICATION OF PROBLEM

9	CONFIRMATION TEST

END

05D0T-08

CUSTOMER PROBLEM ANALYSIS CHECK

AUDIO SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**VIN**	
		Production Date	
		Licence Plate No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km mile**

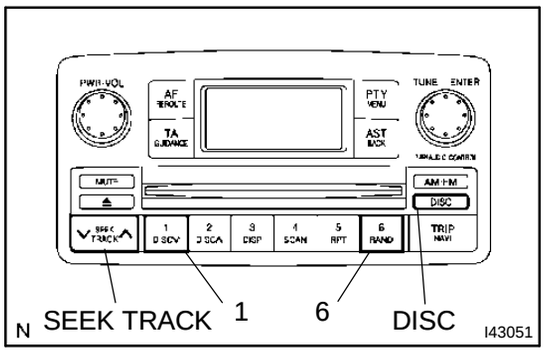
Date of First Occurrence	/ /
Frequency of Problem Occurrence	☐ Constant ☐ Intermittent (Times a day)

Problem Symptom	☐ **Switch**
	☐ **Radio**
	☐ **CD**
	☐ **Noise**

	Parts name	**DTC (1st time)**	**DTC (2nd time)**
DTC Check	Radio receiver assy		
	Others		

I32867

05L54-02



PRE-CHECK

1. DIAGNOSTIC CHECK

(a) Starting Diagnostic Mode (All elements come on during the SW check mode.)

(1) Turn off the ignition switch on (ACC) and turn the audio system. While pressing the preset switches "1" and "6" at the same time, press the "DISC" 3 times.

HINT:

- When the system enters the Diagnostic Mode, a beep sound is emitted 3 times and all the elements come on during the SW check mode.
- It takes about 40 seconds to complete the check.
- Turn all the elements in the LCD on.
- When pressing the switch, confirm a beep sound is emitted.

(b) Service Check Screen

(1) Press the "SEEK TRACK UP" switch to enter the "Service Check Screen".

(2) In the service check mode, the system check and the diagnostic memory check are performed, and the check results are displayed in ascending order of the component codes (physical address).

Terms	Meaning
Component code (Physical address)	Three-digit code (in hexadecimal) given to each device comprising AVC-LAN. Corresponding to its function, individual symbol is provided.
Logical address	Two-digit code (in hexadecimal) given to each function and device unit in each device comprising AVC-LAN.

Code No. (physical address) List

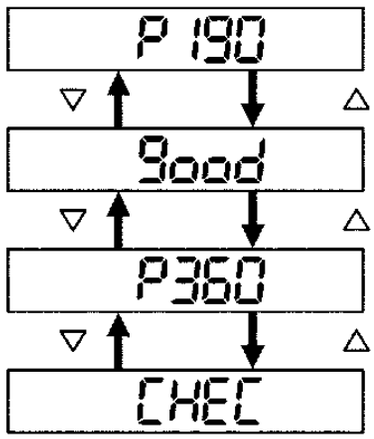
Code No. (physical address)	Equipment name
190	Radio receiver assy (Audio head unit)

(c) Finishing Diagnostic Mode

(1) Press the "DISC" switch for 2 seconds or more, or turn the ignition switch off.

(d) Service Check Mode Result Display (for checking the current and the past system conditions).

(1) Press the "SEEK TRACK" switch to see the check result of each component.



P---indicates physical address
190---physical address

good---"The component is normal".

P---indicates physical address
360---physical address

CHEC---"Check needed".

△ : SEEK TRACK UP

▽ : SEEK TRACK DOWN

The illustration shows the case that the system has 2 components with codes 190 and 360, and one component (code 360) requires a check.
The check result is displayed in ascending order of component code. The component device code is displayed first, and then the check result follows.

P I34696

(2) Check Result Display.

Display	Original Language	Meaning	Action to be taken
good	Good (normal)	No DTCs are detected in both "System Check Mode" and "Diagnostic Memory Mode".	-
NCON	No connection	The system recognized the component when it was registered, but the component gives no response to the "Diagnostic Mode ON Request".	Check the power source circuit and the communication circuit of the component indicated by the component code (physical address).
ECHN	Exchange	One or more DTCs for "Exchange" are detected in either "System Check Mode" or "Diagnostic Memory Mode".	Go to the detailed information mode to check the trouble area referring to the DTC list.
CHEC	Check	When no DTCs are detected for "Exchange", one or more DTCs for "Check" are detected in either "System Check Mode" or "Diagnostic Memory Mode".	Go to the detailed information mode to check the trouble area referring to the DTC list.

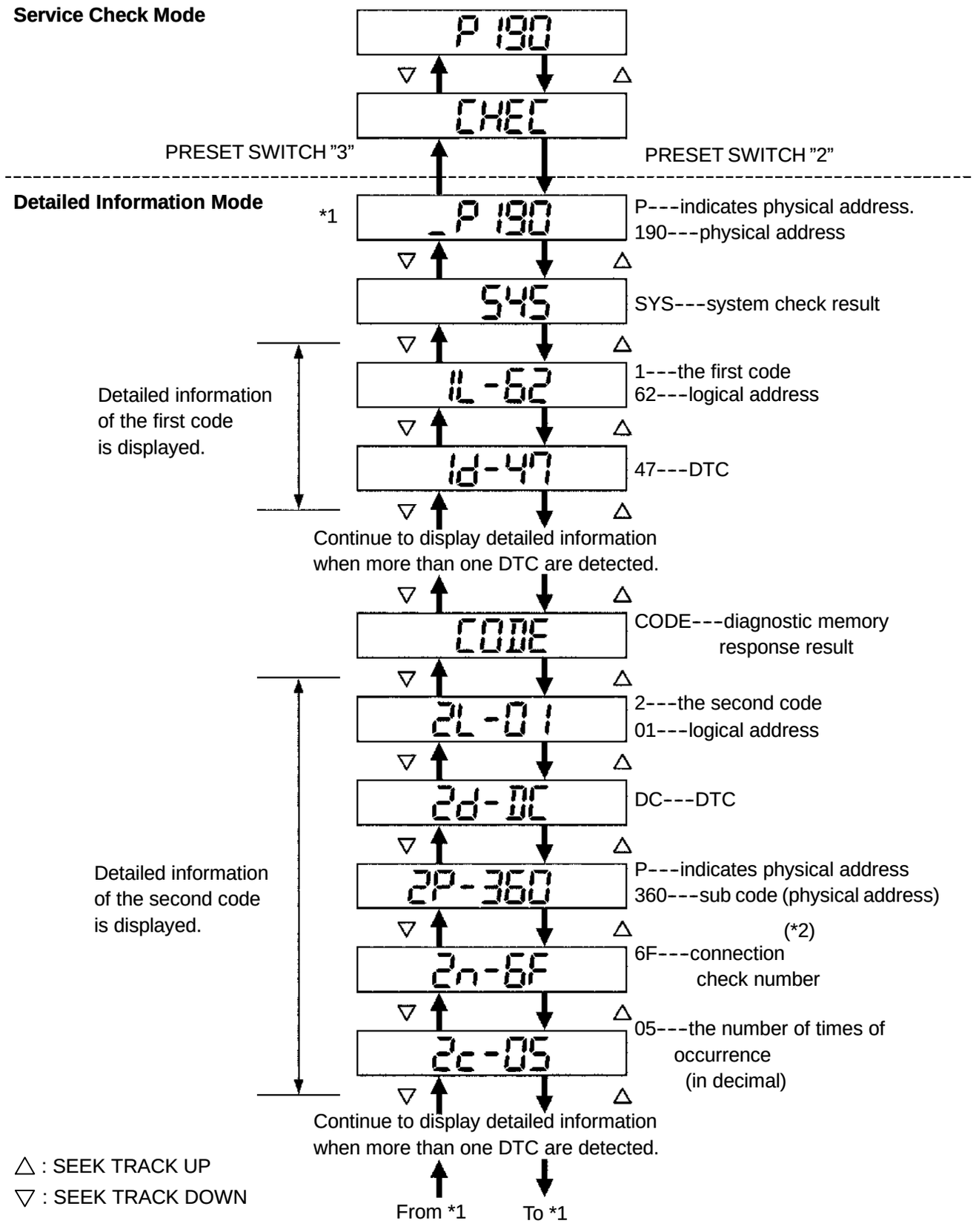
Display	Original Language	Meaning	Action to be taken
OLD	Old version	Old DTC application is identified and DTC is detected in either "System Check Mode" or "Diagnostic Memory Mode".	-
NRES	No response	The device gives no response to any one of "System Check Mode ON Request", "System Check Result Request" and "Diagnostic Memory Request".	Check the power source circuit and the communication circuit of the component indicated by the component code (physical address).

(3) To perform the Service Check again, press the preset switch "1".

(e) Detailed Information Mode (when displaying the DTC for a trouble component)

(1) With "CHEC" or "ECHN" being displayed, press the preset switch "2" to go to the detailed information mode.

(2) Press the "SEEK TRACK" switch to display the "System Check Result (SYS)" and "Diagnostic Memory Response (CODE)".



The illustration shows the case that the component with code 190 has DTC "47" and "dC" as a result of the system check and the diagnostic memory response.
The detailed information mode shows the system check result first, then the diagnostic memory response result follows. (*2): As for the DTCs that do not have any sub code, sub code is not displayed.

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(3) Displayed Items in Detailed Information Mode

Division Code for DTC display	Meaning	The order of detailed information displayed when the "TUNE UP" switch is pressed (The order is reversed when the "TUNE DOWN" switch is pressed.)
SYS	System check result is displayed.	Logical address → DTC
CODE	Diagnostic memory check result is displayed.	Logical address → DTC → Sub code → Connection confirmation number → The number of times of occurrence

(4) Check the trouble area referring to the DTC list.

(5) To return to the service check mode, press the preset switch "3".

(f) Clearing Individual DTC Memory (when clearing the memory of the DTC detected in the past individually)

(1) Press the preset switch "5" for 2 seconds or more while the "ECHN" is displayed in the service check mode or during the detailed information mode.

HINT:

- A beep sound is emitted once when the DTC memory is completely cleared.
- When the DTC memory is cleared, only the component code (physical address) is displayed for the target component.
- To check DTCs, press the preset switch "1" and perform the service check again.

(g) Clearance of all the DTC memory (when clearing all the memory of the DTCs detected in the past)

(1) Start the diagnostic mode after repairing the trouble area.

(2) Press the preset switch "5" for 2 seconds or more. ("CLR" is displayed at this time.)

HINT:

- A beep sound is emitted once when the DTC memory is completely cleared.
- When the DTC memory for all the component is cleared, only the component codes (physical address) are displayed.

(3) Press the preset switch "1" to perform the service check again, and check that no DTCs are displayed for all the component codes (physical address).

2. IDENTIFICATION OF NOISE SOURCE

(a) Identify the conditions under which the noise occurs, and check the noise filter on the relevant part.

Condition in which noise occurs	Noise Source
Noise increases when the accelerator pedal is depressed, but stops when the engine is stopped.	Generator
Noise occurs during A/C or heater operation.	Blower motor
Noise occurs when the vehicle accelerates rapidly on an unpaved road or after the ignition switch is turned on (IG).	Fuel pump
Noise occurs when the horn switch is pressed and released or when pressed and held.	Horn
Quiet noise occurs while the engine is running, but stops when the engine is stopped.	Ignition
Noise occurs synchronously with the blink of the turn signal.	Flasher
Noise occurs during window washer operation.	Washer
Noise occurs while the engine is running, and continues even after the engine is stopped.	Water temperature sensor
Noise occurs during wiper operation.	Wiper
Noise occurs when the brake pedal is depressed.	Stop light switch
Others	Static electricity stored on the vehicle

HINT:

- First ensure that the noise is not coming from the outside. Failure to do so makes noise source detection difficult and may lead to a misdiagnosis.
- Noise should be removed in descending order of loudness.
- Tuning the radio so that no station is received makes the noise more noticeable, making the recognition of the phenomenon easier.

0549J-19

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC-LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC-LAN.

HINT:

Titles for each unit are stated in the following order: physical address (parts name).

1. 190 (RADIO RECEIVER ASSY)

HINT:

- *1: Even if no failure is detected, trouble codes may be stored depending on the battery condition or voltage for starting the engine.
- *2: The code is stored 180 seconds after the power supply connector is disconnected after engine start.
- *3: The code may be stored when the ignition switch is turned on (READY) again 1 minute after engine start.
- *4: The code may be stored when the ignition switch is turned on (READY) again after engine start.
- *5: The code is stored 210 seconds after the master component power supply connector is disconnected with the ignition switch on (ACC or IG).

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace radio receiver assy.
22	RAM Error	Abnormal condition of RAM is detected.	Replace radio receiver assy.
D5 *1	Registered Component Disconnected	Component shown by sub code is or was disconnected from system with ignition switch on (ACC or IG). Communication with component shown by sub code is not ensured when engine is started.	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
D6 *1	Absence of Master	Component in which this code is recorded was disconnected from system or master component with ignition switch on (ACC or IG).	• Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
D7 *5	Connection Check Error	Component in which this code is recorded was disconnected from system or master component with ignition switch on (ACC or IG).	• Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
D8 *2	No Response to Connection Check	Component shown by sub code is or was disconnected from system after engine start.	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
D9 *1	Last Mode Error	Audio or visual component operated before engine stop is or was disconnected with ignition switch on (ACC or IG).	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Sound and picture do not change by button operation.	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code. • If error occurs again, replace component shown by sub code.

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
DB *1	Mode Status Error	Dual alarm is detected.	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
DC *3	Transmission Error	Transmission to component shown by sub code has failed. (Detecting this DTC does not necessarily mean actual failure.)	If same sub code is recorded in other component, check harness for power supply and communication system of all components shown by code. (If not, delete DTC and recheck.)
DD *4	Master Reset (Momentary Interruption)	After the engine was started, master component was disconnected from system.	• Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • If this error occurs frequently, replace radio receiver assy.
DE *4	Slave Reset (Momentary Interruption)	After the engine was started, component shown by sub code was disconnected from system.	• Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	• Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for communication system between radio receiver assy and sub-master component.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E1 *1	Voice Processing Device ON Error	The AMP device records that the AMP output does not function even while the source device operates.	• Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from master component.	Replace radio receiver assy.
E3 *1	Registration Request Transmission	Registration Request command is output from component shown by sub code. Receiving Connection Check Instruction, Registration Request command is output from sub-master component.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

(b) Logical address: 60 (Radio unit)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
43	AM Tuner Error	Abnormal condition of AM tuner is detected.	Replace radio receiver assy.
44	FM Tuner Error	Abnormal condition of FM tuner is detected.	Replace radio receiver assy.

(c) Logical address: 62 (CD player)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read.	• Inspect CD. • Replace radio receiver assy.
44	CD player Error	Error is detected in CD player.	Replace radio receiver assy.

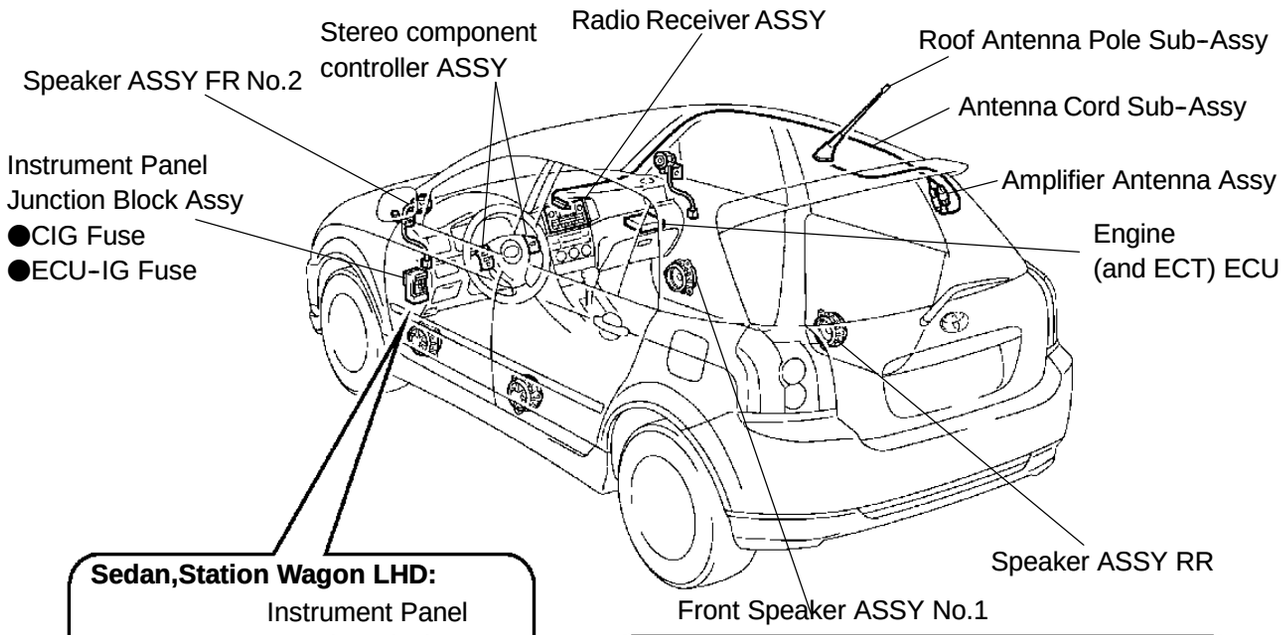
DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
45	EJECT Error	Magazine cannot be ejected.	Replace radio receiver assy.
46	Scratched/Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD.

(d) Logical address: 63 (In-dush CD changer)

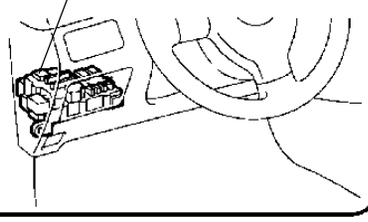
DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read.	• Inspect CD. • Replace radio receiver assy.
44	CD player Error	Error is detected in CD player.	Replace radio receiver assy.
45	EJECT Error	Magazine cannot be ejected.	Replace radio receiver assy.
46	Scratched/Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD.
51	CD changer elevator error	Mechanical error occurred during elevator operation	Replace radio receiver assy.
52	Scratched/Reversed Disc	Failure in disc clamping or clamp error	Replace radio receiver assy.

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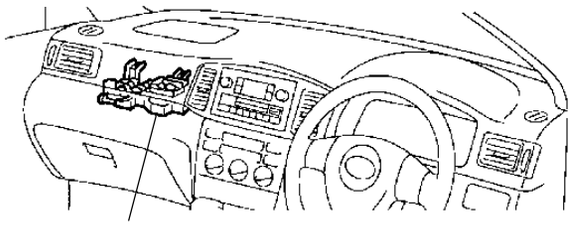
LOCATION



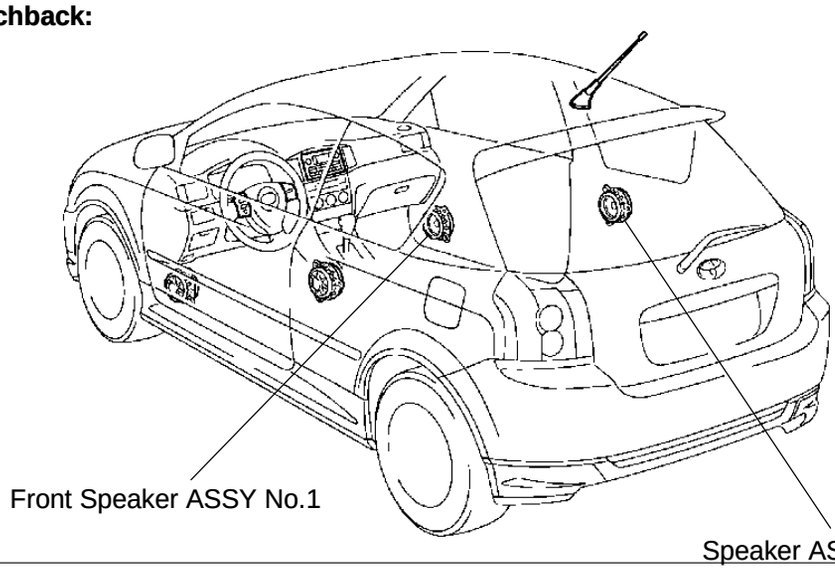
Sedan,Station Wagon LHD:



RHD:

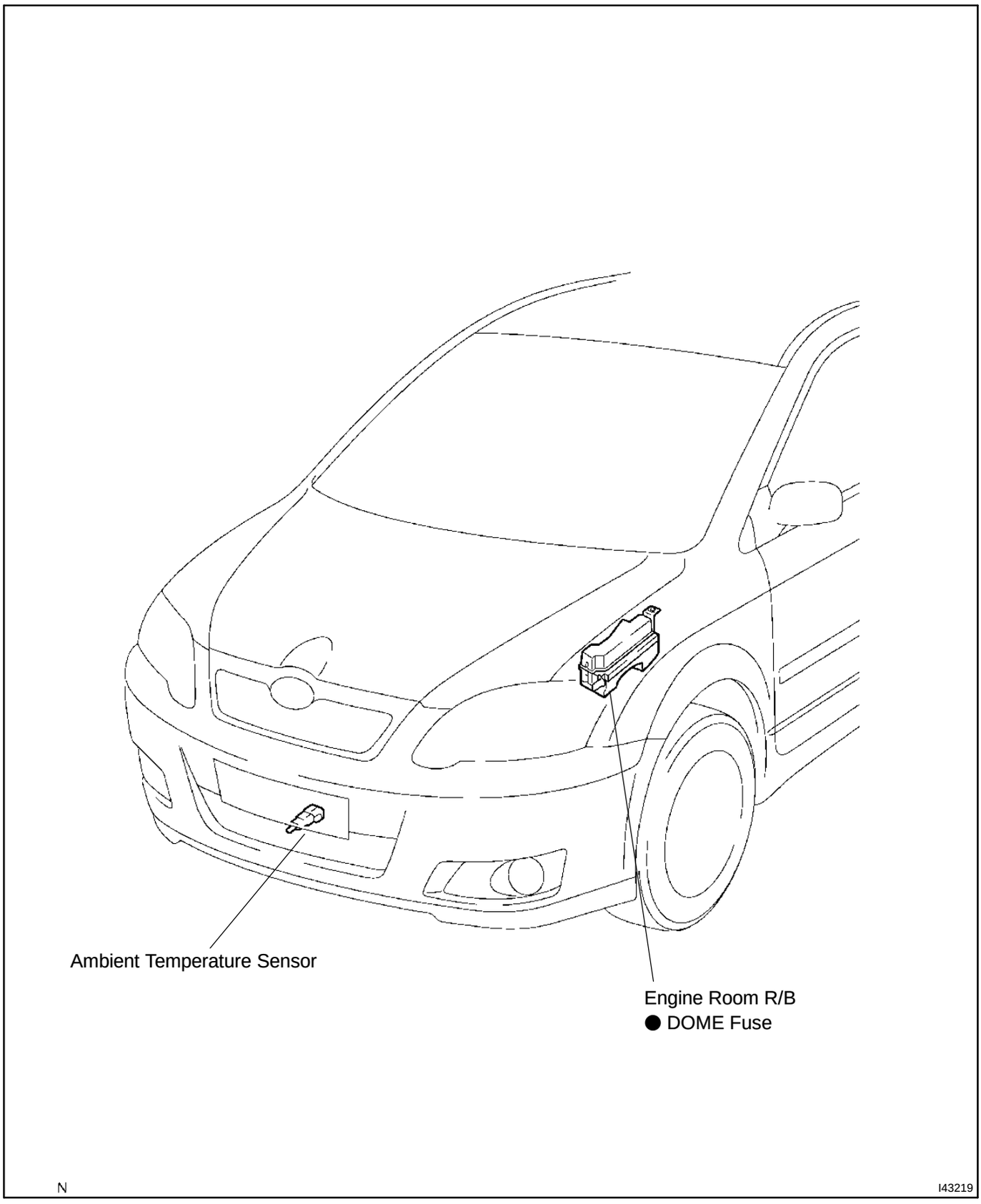


3-Door Hatchback:



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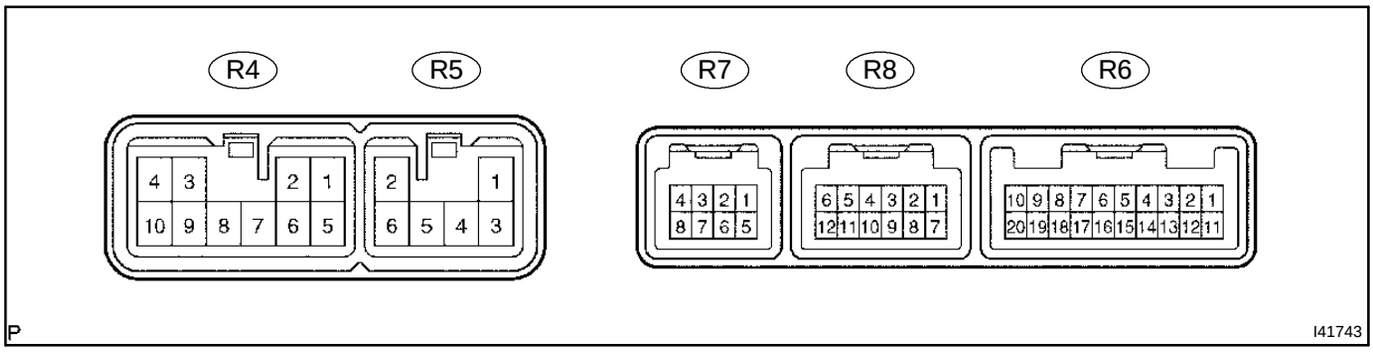
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Ambient Temperature Sensor
Engine Room R/B
● DOME Fuse
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05L55-02

TERMINALS OF ECU

1. RADIO RECEIVER ASSY



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
BRQ (R7-1)*1 - GND (R4-7)	Y - BR	Display communication signal	When the screen changes	10 to 14 V
SGND (R7-5)*1 - Body ground	L - Body ground	Ground	Always	Below 1 V
HIT- (R7-6)*1 - GND (R4-7)	G - BR	Display communication signal (HIT 64)	Constant	-
HIT+ (R7-7)*1 - GND (R4-7)	R - BR	Display communication signal (HIT 64)	Constant	-
GND (R8-7)*1 - Body ground	W-B - Body ground	Ground	Always	Below 1 V
TX+ (R8-9)*1 - GND (R4-7)	B - BR	AVC-LAN communication signal	Turn engine switch on (ACC)	2 to 3 V
TX- (R8-10)*1 - GND (R4-7)	W - BR	AVC-LAN communication signal	Turn engine switch on (ACC)	2 to 3 V
RR+ (R5-1) - GND (R4-7)	R - BR	Sound signal (Rear Right)	Audio system is playing	-
RL+ (R5-2) - GND (R4-7)	B - BR	Sound signal (Rear Left)	Audio system is playing	-
RR- (R5-3) - GND (R4-7)	W - BR	Sound signal (Rear Right)	Audio system is playing	-
RL- (R5-6) - GND (R4-7)	Y - BR	Sound signal (Rear Left)	Audio system is playing	-
FR+ (R4-1) - GND (R4-7)	LG - BR	Sound signal (Front Right)	Audio system is playing	-
FL+ (R4-2) - GND (R4-7)	P - BR	Sound signal (Front Left)	Audio system is playing	-
ACC (R4-3) - GND (R4-7)	SB(GR) - BR	Accessory	Turn engine switch off → on (ACC or IG)	Below 1 V → 10 to 14 V
+B (R4-4) - GND (R4-7)	L-Y - BR	Battery	Always	10 to 14 V
FR- (R4-5) - GND (R4-7)	L - BR	Sound signal (Front Right)	Audio system is playing	-
FL- (R4-6) - GND (R4-7)	V - BR	Sound signal (Front Left)	Audio system is playing	-
GND (R4-7) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
ANT+ (R4-8) - GND (R4-7)	B - BR	Power source of antenna	Radio switch ON and AM or FM	10 to 14 V
ILL+ (R4-10) - GND (R4-7)	SB(G) - BR	Illumination signal	Light control switch TAIL or HEAD	10 to 14 V
GND (R6-6) - GND (R4-7)	R - BR	Steering pad switch ground	Always	Below 1 V
SW1 (R6-7) - GND (R4-7)	GR - BR	Steering pad switch signal	No switch is pushed → SEEK+ switch push → SEEK- switch push → VOL+ switch push → VOL- switch push	4 V or more → Approx. 0.5 V → Approx. 0.9 V → Approx. 2.0 V → Approx. 3.4 V
SW2 (R6-8) - GND (R4-7)	G - BR	Steering pad switch signal	No switch is pushed → MODE switch push	4 V or more → Below 2.5 V

*1: w/ Navigation System (Turn by Turn Type)

0549M-19

PROBLEM SYMPTOMS TABLE

RADIO RECEIVER ASSY

Symptom	Suspected Area	See page
Pressing power switch does not start system.	1. Power source circuit (radio receiver assy) 2. Replace radio receiver assy	05-972 67-4*
Turning on light switch does not light up night time illumination of radio receiver or display.	1. Illumination circuit 2. Replace radio receiver assy	05-974 67-4*
All switches do not respond.	1. Steering pad switch circuit 2. Replace radio receiver assy	05-980 67-4*
No sound can be heard.	1. Power source circuit (radio receiver assy) 2. Speaker circuit 3. Replace radio receiver assy	05-972 05-984 67-4*
Sound quality is bad in all modes. (volume is too low)	1. Power source circuit (radio receiver assy) 2. Speaker circuit 3. Sound quality is bad in all modes (volume is too low)	05-972 05-984 05-987
Radio broadcast cannot be received (Bad reception)	1. Replace radio receiver assy 2. Antenna 3. Antenna code sub-assy	67-4* 05-988 05-988
Noise occurs.	-	05-996
Radio broadcast cannot be received. (bad reception)	-	05-988
CD cannot be inserted or is ejected right after insertion.	1. Power source circuit (radio receiver assy) 2. CD cannot be inserted or is ejected right after insertion	05-972 05-990
CD cannot be ejected.	1. Power source circuit (radio receiver assy) 2. CD cannot be ejected	05-972 05-992
Sound quality is bad only when playing CD. (volume is too low)	-	05-987
CD sound skips.	-	05-994

STEERING PAD SWITCH

Symptom	Suspected Area	See page
A audio system cannot be operated with steering pad switch.	1. Steering pad switch circuit 2. Replace radio receiver assy	05-980 67-4*

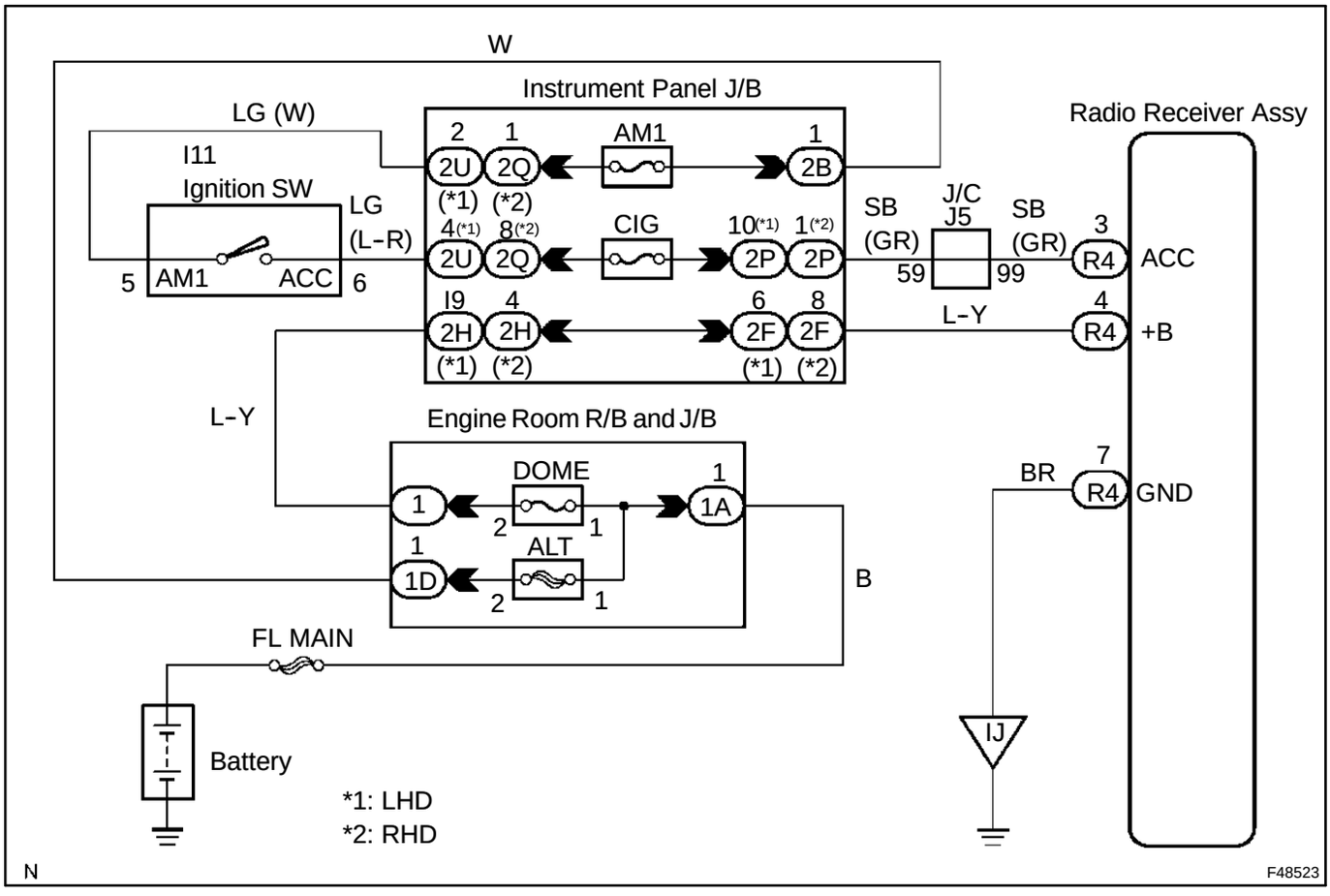
*: Refer to RM925E

POWER SOURCE CIRCUIT (RADIO RECEIVER ASSY)

CIRCUIT DESCRIPTION

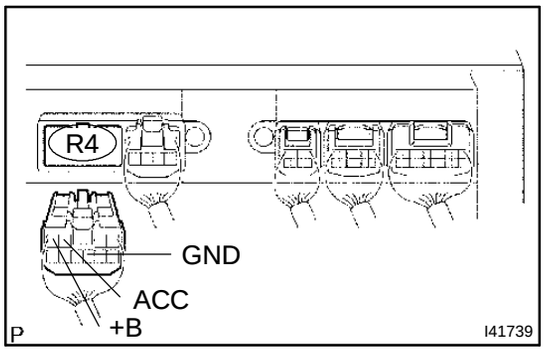
This circuit provides power to the radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT RADIO RECEIVER ASSY(+B, ACC, GND)



(a) Disconnect the connector from the radio receiver assy.

(b) Measure the resistance according to the value in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

(c) Measure the voltage according to the values in the table below.

Standard:

Tester connection	Condition	Specified condition
+B - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-971)

ILLUMINATION CIRCUIT

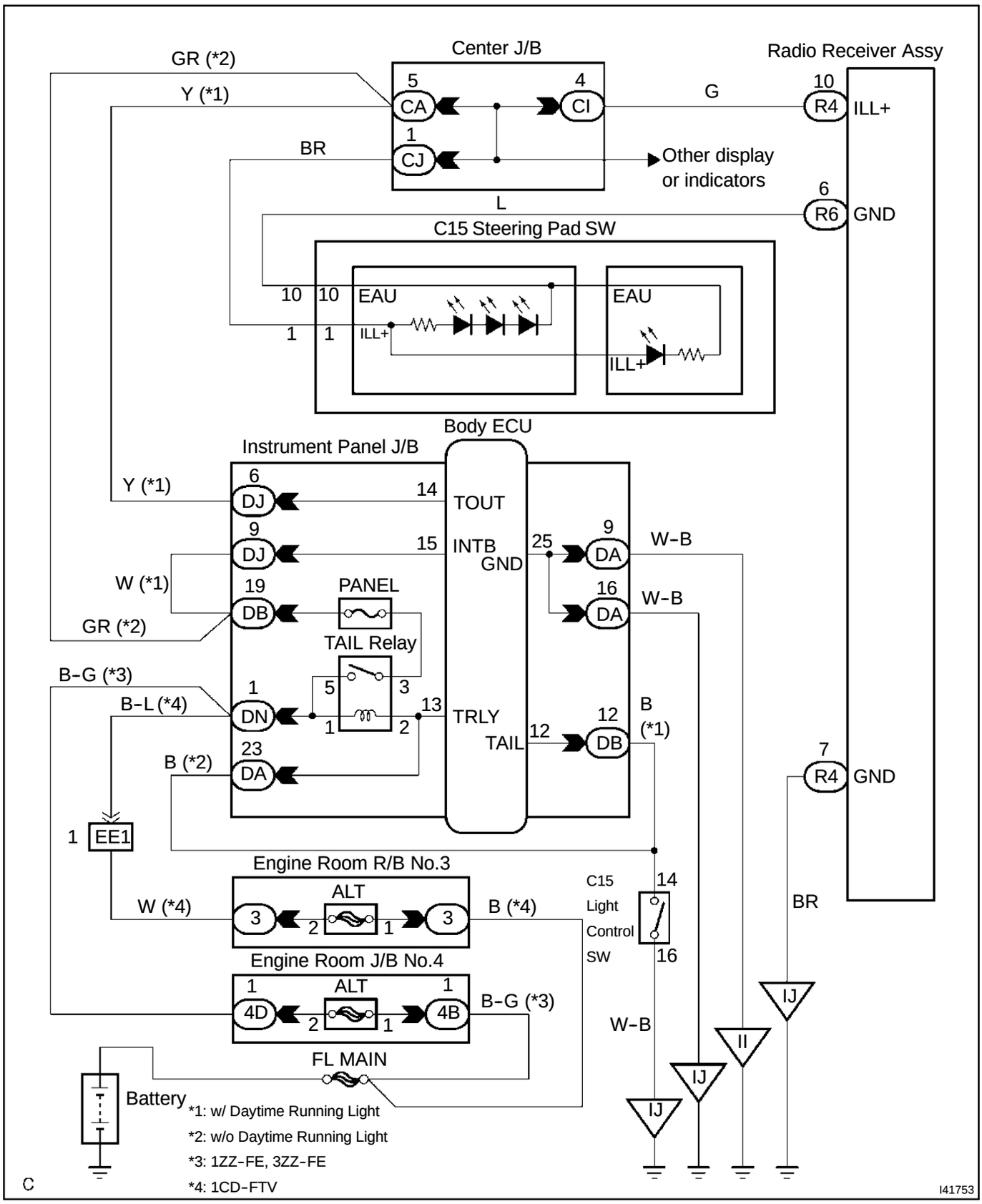
CIRCUIT DESCRIPTION

This is the illumination circuit for the radio receiver assy, steering pad switch, and other displays and indicators.

Inspection procedure of the illumination circuit between the driver side J/B and radio receiver assy or steering pad switch is described in this section.

When the light control switch is in the TAIL or HEAD position, the TAILLIGHT relay is activated and supplies power to illuminate the radio receiver assy and steering pad switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK LIGHTING SYSTEM

(a) Turn the light control switch to the TAIL or HEAD position.
Check if other displays or illumination such as the A/C control panel illumination come on.
OK: Other displays or illumination come on.

NG → **GO TO LIGHTING SYSTEM**

OK

2 CONFIRM SYMPTOMS

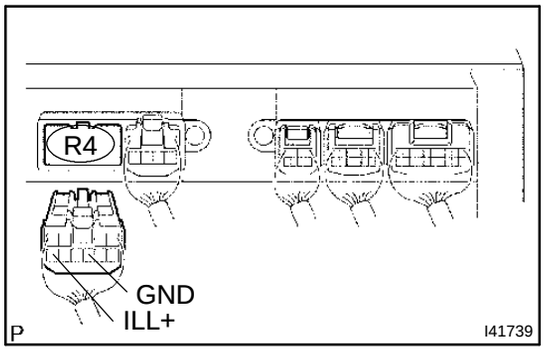
(a) Check the symptom.
(1) Check if the illumination for the radio receiver assy or steering pad switch comes on.

Symptom	Proceed to
Illumination for the radio receiver assy does not come on.	A
Illumination for the steering pad switch does not come on.	B

B → **Go to step 4**

A

3 INSPECT RADIO RECEIVER ASSY(ILL+, GND)



(a) Disconnect the connector from the radio receiver assy.
(b) Measure the voltage according to the value in the table below.
Standard:

Tester connection	Condition	Specified condition
ILL+ - GND	Light control SW TAIL or HEAD	10 to 14 V

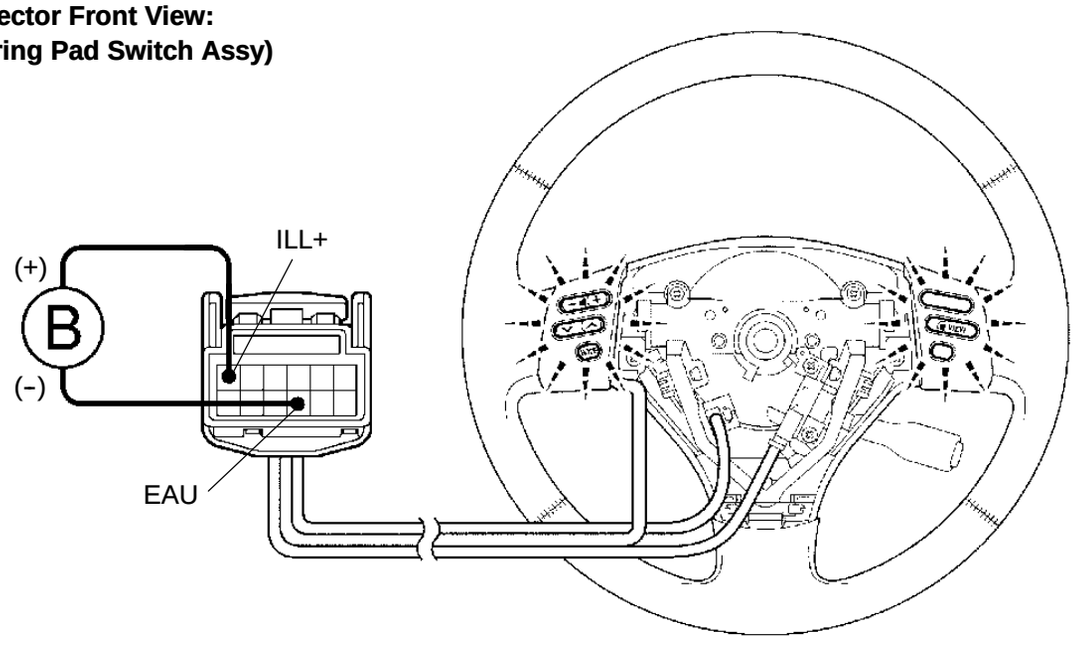
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR(RADIO RECEIVER ASSY - CENTER J/B)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-971)

4	INSPECT STEERING PAD SWITCH ASSY

Connector Front View:
(Steering Pad Switch Assy)



P I42169 I42412

NOTICE:

The vehicle is equipped with SRS (Supplemental Restraint System) such as airbags. Before servicing (including removal or installation of parts), be sure to read the precautionary notice for the supplemental restraint system.**(See page 05-707)**

(a) Disconnect the steering pad switch assy connector.

(b) Connect the positive (+) lead of the battery to terminal ILL+ and the negative (-) lead of the battery to terminal EAU of the steering pad switch assy connector.

(c) Check the illumination for the steering pad switch assy.

OK:

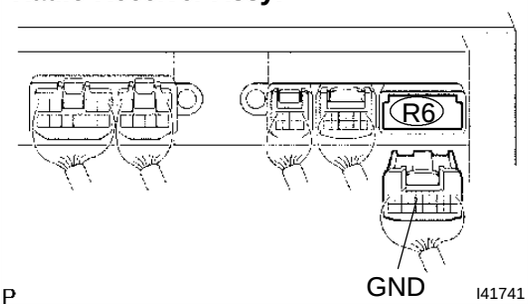
Illumination for the steering pad switch assy comes on.

NG → **REPLACE STEERING PAD SWITCH ASSY**
(SEE PAGE 67-2)

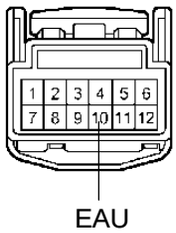
OK

5	CHECK HARNESS AND CONNECTOR(SPIRAL CABLE SUB-ASSY - RADIO RECEIVER ASSY)

Radio Receiver Assy:



Spiral Cable Side:



(a) Disconnect the connectors from the spiral cable sub-assy and radio receiver assy.

(b) Measure the resistance according to the value(s) in the table below.

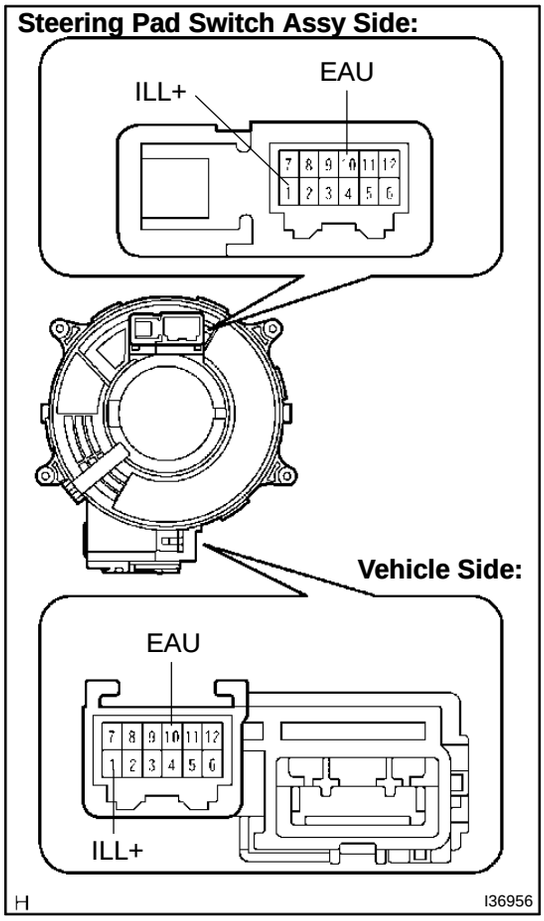
Standard:

Tester connection	Specified condition
GND - EAU	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6	INSPECT SPIRAL CABLE SUB-ASSY



(a) Disconnect the spiral cable sub-assy connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Specified condition
EAU - EAU	Below 1 Ω
ILL+ - ILL+	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY** **(SEE PAGE 60-40)**

OK

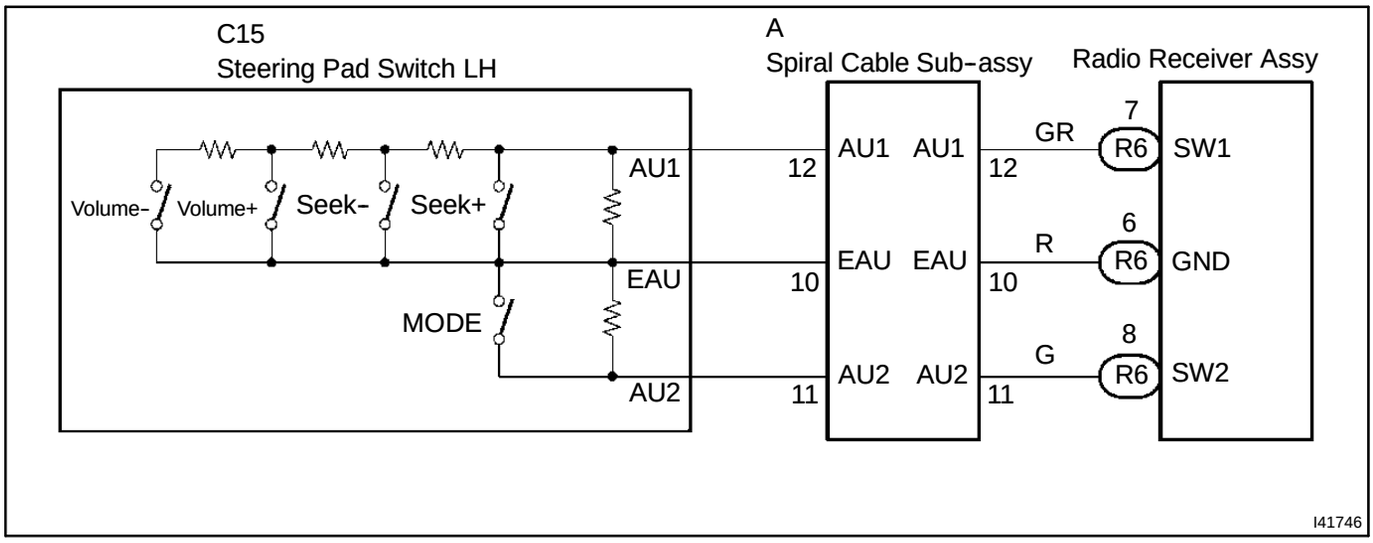
REPAIR OR REPLACE HARNESS OR CONNECTOR(SPIRAL CABLE SUB-ASSY - CENTER J/B)

STEERING PAD SWITCH CIRCUIT

CIRCUIT DESCRIPTION

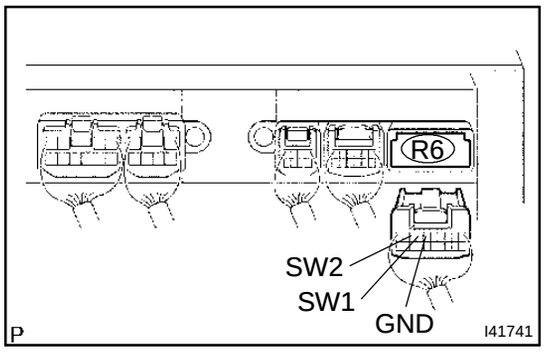
This circuit sends an operation signal from the steering pad switch to the radio receiver assy.
If there is an open in the circuit, the audio system cannot be operated by the steering pad switch.
If there is a short in the circuit, the same condition as that when the switch is continuously depressed occurs. Therefore, the radio receiver assy cannot be operated by the steering pad switch, and also the radio receiver assy itself does not function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT RADIO RECEIVER ASSY



(a) Disconnect the connector from the radio receiver assy.
(b) Measure the resistance according to the values in the table below.

Standard:

Tester connection	Condition	Specified condition
SW1 - GND	No switch is pushed	Approx. 100 kΩ
SW1 - GND	SEEK+ switch: push	Approx. 0 Ω
SW1 - GND	SEEK- switch: push	Approx. 0.3 kΩ
SW1 - GND	VOL+ switch: push	Approx. 1 kΩ
SW1 - GND	VOL- switch: push	Approx. 3.2 kΩ
SW2 - GND	No switch is pushed	Approx. 100 kΩ
SW2 - GND	MODE switch: push	Approx. 0 Ω

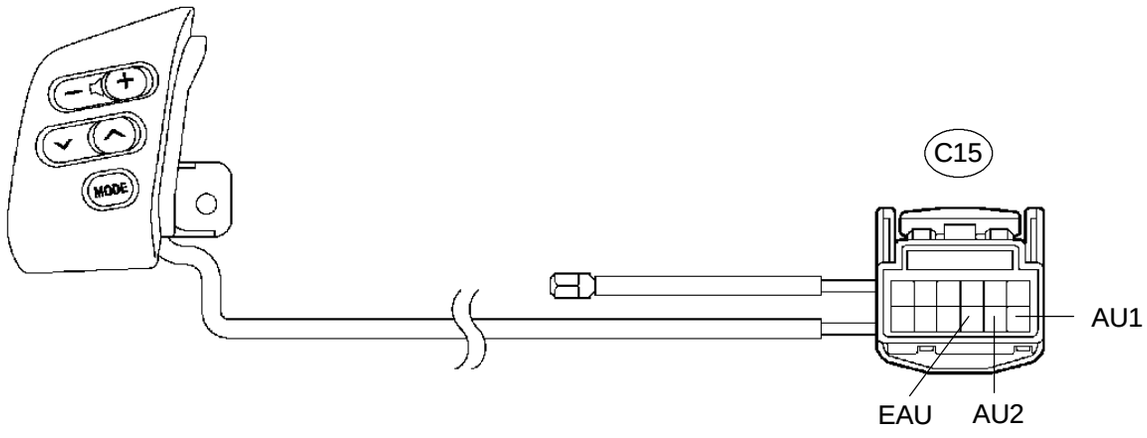
NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-971)

2	INSPECT STEERING PAD SWITCH LH(AU1, AU2, EAU)

Connector Front View:



(a) Disconnect the steering pad switch LH connector.
(b) Measure the resistance according to the values in the table below.
Standard:

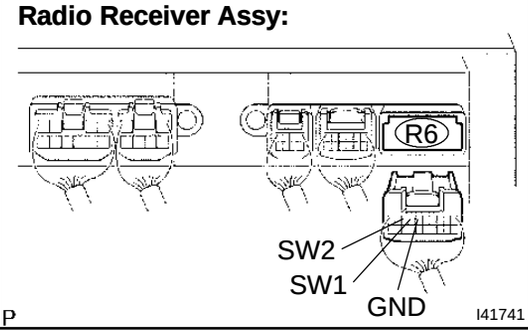
Tester connection	Condition	Specified condition
AU1 - EAU	No switch is pushed	Approx. 100 kΩ
AU1 - EAU	SEEK+ switch: push	Approx. 0 Ω
AU1 - EAU	SEEK- switch: push	Approx. 0.3 kΩ
AU1 - EAU	VOL+ switch: push	Approx. 1 kΩ
AU1 - EAU	VOL- switch: push	Approx. 3.2 kΩ
AU2 - EAU	No switch is pushed	Approx. 100 kΩ
AU2 - EAU	MODE switch: push	Approx. 0 Ω

NG → **REPLACE STEERING PAD SWITCH LH**
(SEE PAGE 67-2)

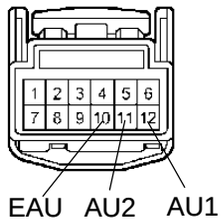
OK

3	CHECK HARNESS AND CONNECTOR(SPIRAL CABLE SUB-ASSY - RADIO RECEIVER ASSY)

Radio Receiver Assy:



Spiral Cable Side:



(a) Disconnect the connectors from the spiral cable sub-assy and radio receiver assy R6.

(b) Measure the resistance according to the values in the table below.

Standard:

Tester connection	Specified condition
SW1 - AU1	Below 1 Ω
SW2 - AU2	Below 1 Ω
GND - EAU	Below 1 Ω
SW1 - Body ground	10 kΩ or higher
SW2 - Body ground	10 kΩ or higher
GND - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

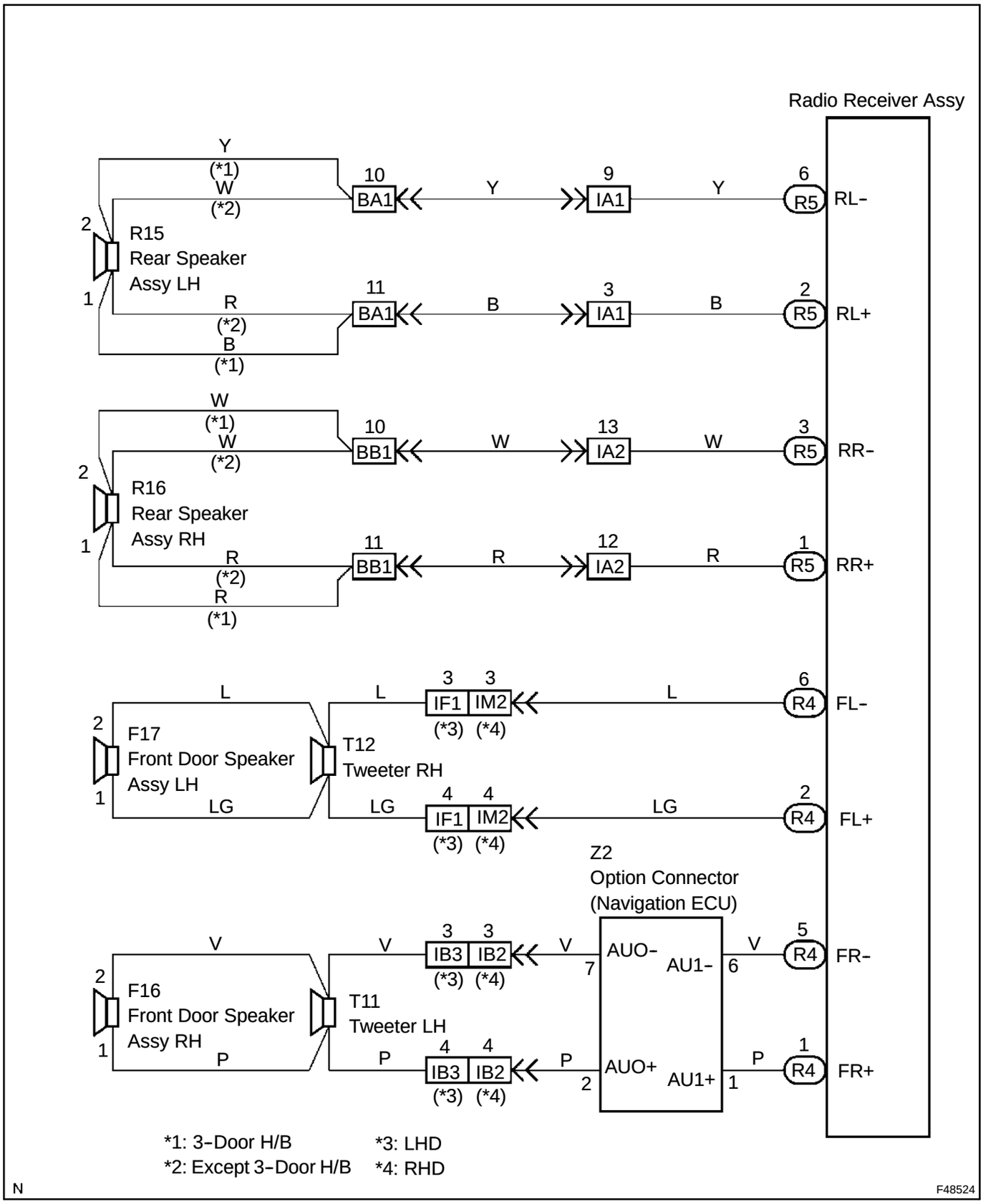
REPLACE SPIRAL CABLE SUB-ASSY **(SEE PAGE 60-40)**

SPEAKER CIRCUIT

CIRCUIT DESCRIPTION

A sound signal is sent from the radio receiver assy to the speakers via this circuit.

WIRING DIAGRAM

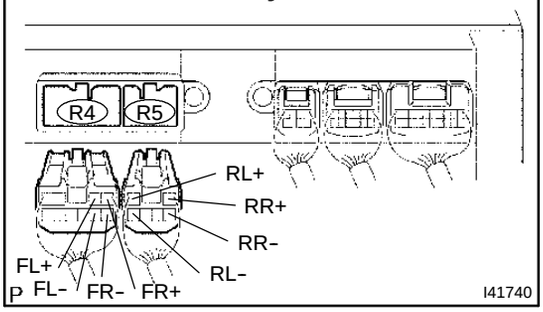


INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - SPEAKER ASSY)

HINT:
If the vehicle is equipped with a turn by turn type navigation system, check the front left side speaker by referring to the NAVIGATION SYSTEM (TURN BY TURN TYPE) section (see page 05-1087).

Radio Receiver Assy:



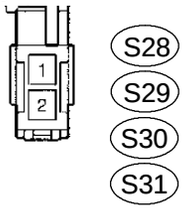
(a) Disconnect the connectors from the radio receiver assy and speakers.

(b) Measure the resistance according to the value(s) in the table below.

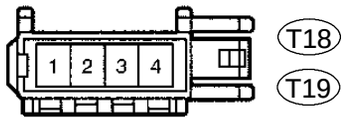
Standard:

Tester connection	Specified condition
FL+ - T18-4	Below 1 Ω
FL- - T18-2	Below 1 Ω
FR+ - T19-4	Below 1 Ω
FR- - T19-2	Below 1 Ω
T18-1 - S28-2	Below 1 Ω
T18-3 - S28-1	Below 1 Ω
T19-1 - S29-2	Below 1 Ω
T19-3 - S29-1	Below 1 Ω
RL+ - S30-1	Below 1 Ω
RL- - S30-2	Below 1 Ω
RR+ - S31-1	Below 1 Ω
RR- - S31-2	Below 1 Ω
FL+ - Body ground	10 kΩ or higher
FL- - Body ground	10 kΩ or higher
FR+ - Body ground	10 kΩ or higher
FR- - Body ground	10 kΩ or higher
RL+ - Body ground	10 kΩ or higher
RL- - Body ground	10 kΩ or higher
RR+ - Body ground	10 kΩ or higher
RR- - Body ground	10 kΩ or higher

Connector Front View:
(Front No.1 Speaker Assy)
(Rear Speaker Assy)



Connector Front View:
(Front No.2 Speaker Assy)



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	INSPECT FRONT NO. 1 SPEAKER ASSY

(a) Resistance check.
(1) Measure the resistance between the terminals of the speaker.

NOTICE:
The speaker should not be removed for checking.

Standard: Approximately 4 Ω

NG → **REPLACE FRONT NO. 1 SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-8)**

OK

3	INSPECT FRONT NO. 2 SPEAKER ASSY

(a) Check that malfunction disappears when another speaker in good condition is installed.

OK: Malfunction disappears.

HINT:
- Connect all the connectors to the speakers.
- When there is a possibility that either right or left front speaker is defective, inspect by interchanging the right one and the left one.

OK → **REPLACE FRONT NO. 2 SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-9)**

NG

4	INSPECT REAR SPEAKER ASSY

(a) Resistance check.
(1) Measure the resistance between the terminals of the speaker.

NOTICE:
The speaker should not be removed for checking.

Standard: Approximately 4 Ω

NG → **REPLACE REAR SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-10)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-971)

SOUND QUALITY IS BAD IN ALL MODES (VOLUME IS TOO LOW)

INSPECTION PROCEDURE

1	ADJUST SOUND QUALITY

(a) Adjust the sound quality.
(1) Operate the radio receiver assy to adjust the sound quality.
OK: Malfunction disappears.

OK → BAD SOUND QUALITY

NG

2	COMPARE IT WITH ANOTHER VEHICLE OF SAME MODEL

(a) Compare it with another vehicle of the same model.
(1) Compare it with the vehicle of the same model which does not have a trouble to see if there is any difference in the sound quality.
OK: No difference is found.

OK → CHECK SPEAKER CIRCUIT (SEE PAGE 05-984)

NG

REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)

RADIO BROADCAST CANNOT BE RECEIVED(BAD RECEPTION)

INSPECTION PROCEDURE

1	CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

(a) Check if the radio auto-search functions properly.
(1) Perform the auto-search of the radio and check that it functions normally.
OK: The radio auto-search functions properly.

OK → **Go to step 3**

NG

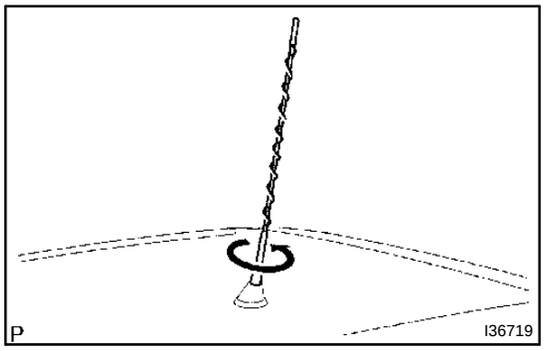
2	CHECK OPTIONAL COMPONENT

(a) Check optional component (telephone antenna, etc.).
(1) Check whether or not any optional component such as the sun shade film and the telephone antenna is installed.
OK: Optional component is installed.

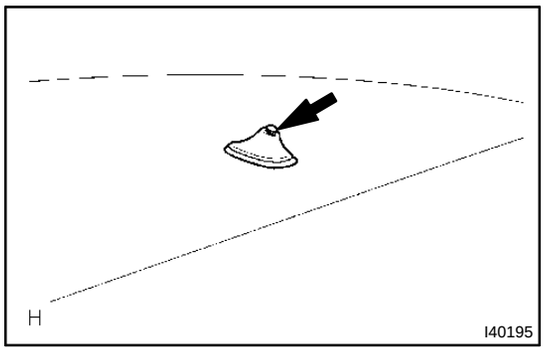
OK → **EFFECT FROM OPTIONAL COMPONENT**

NG

3 CHECK ANTENNA FOR NOISE PRODUCTION



(a) Noise Check with Antenna
(1) Remove the roof antenna pole sub-assy by turning it in the direction of the arrow as shown in the illustration.
(2) With the ignition switch on (ACC), turn on the radio and choose the AM mode.



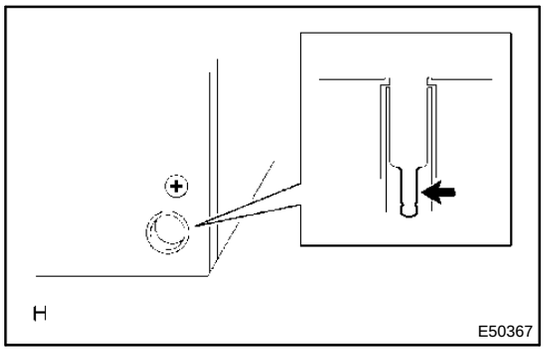
(3) Place the tip of a screwdriver on the antenna of the antenna assembly, and check that the noise is heard from the speaker.

OK: Noise occurs.

OK → **REPLACE ROOF ANTENNA POLE SUB-ASSY (SEE PAGE 05-971)**

NG

4 INSPECT RADIO RECEIVER ASSY(ANTENNA)



(a) Preparation for Check
(1) Remove the antenna plug of the radio receiver assembly.
(b) Noise Check
(1) With the radio receiver assy connector connected, turn the ignition switch on (ACC).
(2) Turn on the radio and choose the AM mode.
(3) Place a screwdriver or a piece of metal such as thin wire on an antenna jack of the radio receiver assy and check that the noise is heard from the speaker.

OK: Noise occurs.

NG → **REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)**

OK

CHECK AND REPLACE ANTENNA CORD SUB-ASSY

CD CANNOT BE INSERTED OR IS EJECTED RIGHT AFTER INSERTION

INSPECTION PROCEDURE

1	CHECK IF NORMAL CD IS INSERTED

(a) Check if a normal CD is inserted.
(1) Make sure that the CD is a normal audio CD, and that there is no deformation, flaw, stain, burr or other defects on the CD.
OK: Normal audio CD.

Reference:
- Translucent or oddly-shaped CD cannot be played.
- Computer CD-ROMs (even those with music) and CD-R discs cannot be played.
- Playing an 8 cm (3.2 in.) CD does not require an adapter.

NG → **CD IS FAULTY**

OK

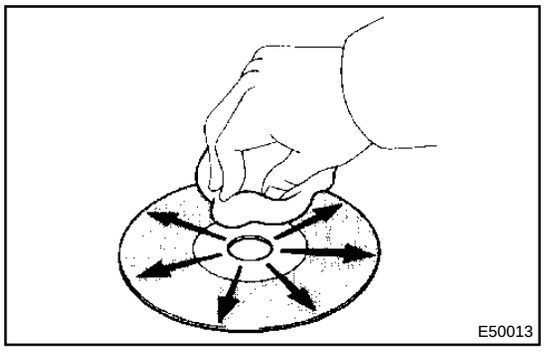
2	CHECK IF CD IS INSERTED PROPERLY

(a) Check if a CD is inserted properly.
(1) Check whether or not the CD is inserted upside down.
OK: Not upside down.

NG → **SET DISC CORRECTLY**

OK

3	DISC CLEANING


E50013

(a) Disc cleaning
(1) If the disc gets dirty, clean the disc by wiping the surface from the center to outside in a radial direction with a soft cloth.

NOTICE:
Do not use a conventional record cleaner or anti-static preservative.
OK: Malfunction disappears.

OK → **DISC IS DIRTY**

NG

4	REPLACE CD WITH ANOTHER AND RECHECK

(a) Replace the CD with another and recheck.
(1) Replace the CD with another normal one to see if the same trouble occurs again.
OK: Malfunction disappears.

NG → **REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)**

OK

CD IS FAULTY

CD CANNOT BE EJECTED

INSPECTION PROCEDURE

1	PRESS ”EJECT” AND CHECK OPERATION

(a) Press ”EJECT”and check the operation.
  (1) Press the CD EJECT switch of the radio receiver assembly for 2 seconds or more to see if the CD is ejected.
  OK: CD is ejected.

HINT:
If the CD is not ejected, bring the vehicle in for repair.
Do not attempt to remove it by force.

NG → **REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)**

OK

2	REPLACE CD WITH ANOTHER ONE AND RECHECK

(a) Replace the CD with another one and recheck.
  (1) Replace the CD with another normal one to see if the same trouble occurs again.
  OK: Malfunction disappears.

NG → **REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)**

OK

CD IS FAULTY

SOUND QUALITY IS BAD ONLY WHEN CD IS PLAYED (VOLUME IS TOO LOW)

INSPECTION PROCEDURE

1	REPLACE CD WITH ANOTHER ONE AND RECHECK

(a) Replace the CD with another one and recheck.
(1) Check the installation condition of the radio receiver assembly.
OK: Malfunction disappears.

NG → **REPLACE RADIO RECEIVER ASSY**
(SEE PUB. NO. RM925E, PAGE 67-4)

OK

CD IS FAULTY

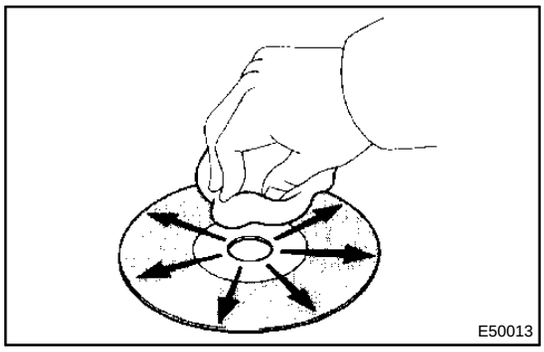
CD SOUND SKIPS

HINT:

- The sound may skip when driving on an unpaved road.

INSPECTION PROCEDURE

1	DISC CLEANING



(a) Disc cleaning

(1) If the disc gets dirty, clean the disc by wiping the surface from the center to outside in a radial direction with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti-static preservative.

OK: Malfunction disappears.

OK	DISC IS DIRTY

NG

2	REPLACE CD WITH ANOTHER AND RECHECK

(a) Replace the CD with another and recheck.

(1) Replace the CD with another normal one to see if the same trouble occurs again.

OK: Malfunction disappears.

OK	CD IS FAULTY

NG

3	CHECK RADIO RECEIVER ASSEMBLY INSTALLATION

(a) Check the radio receiver assembly installation condition.

(1) Check that the radio receiver assembly is installed properly.

OK: Installed properly.

NG	INSTALL THE RADIO RECEIVER ASSEMBLY PROPERLY

OK

4	DID TEMPERATURE IN CABIN CHANGE RAPIDLY?

(a) Did the temperature in the cabin change rapidly?

(1) Check whether or not the rapid temperature change occurred in the cabin.

YES: A rapid temperature change occurred.

HINT:

A rapid temperature change creates condensation inside the CD player, which may prevent the CD from being played.

NO → **REPLACE RADIO RECEIVER ASSY (SEE PUB. NO. RM925E, PAGE 67-4)**

YES

CONDENSATION DUE TO TEMPERATURE CHANGE (LET IT SIT FOR A WHILE BEFORE USING)

NOISE OCCURS

INSPECTION PROCEDURE

1	CHECK SPEAKER INSTALLATION

(a) Check the speaker installation condition.
(1) Check and securely installed each speaker.
OK: Malfunction disappears.

HINT:
The radio is equipped with a noise prevention system that blocks excessively loud noise. If such noise occurs, check that all wiring is proper and that the antenna installation part ground and noise-prevention equipment are installed.

Conditions under which noise occurs	Noise type
Noise increases when the accelerator pedal is depressed, but stops when the engine is stopped.	Generator noise
Noise occurs during A/C or heater operation.	Blower motor noise
Noise occurs when the vehicle accelerates rapidly on an unpaved road or after the engine switch is turned on (IG).	Fuel pump noise
Noise occurs when the horn switch is pressed and released or when pressed and held.	Horn noise
Quiet noise occurs while the engine is running, but stops when the engine is stopped.	Ignition noise
Noise occurs synchronously with the blink of the turn signal.	Flasher noise
Noise occurs during window washer operation.	Washer noise
Noise occurs while the engine is running, and continues even after the engine is stopped.	Water temperature sensor noise
Noise occurs during wiper operation.	Wiper noise
Noise occurs when the brake pedal is depressed.	Stop light switch noise
Others	Static electricity stored on the vehicle

HINT:
- Identify the conditions under which the noise occurs, and check the noise filter on the relevant part.
- First ensure that the noise is not coming from the outside. Failure to do so makes noise source detection difficult and may lead to a misdiagnosis.
- Noise should be removed in descending order of loudness.

NG → INSTALL IT PROPERLY

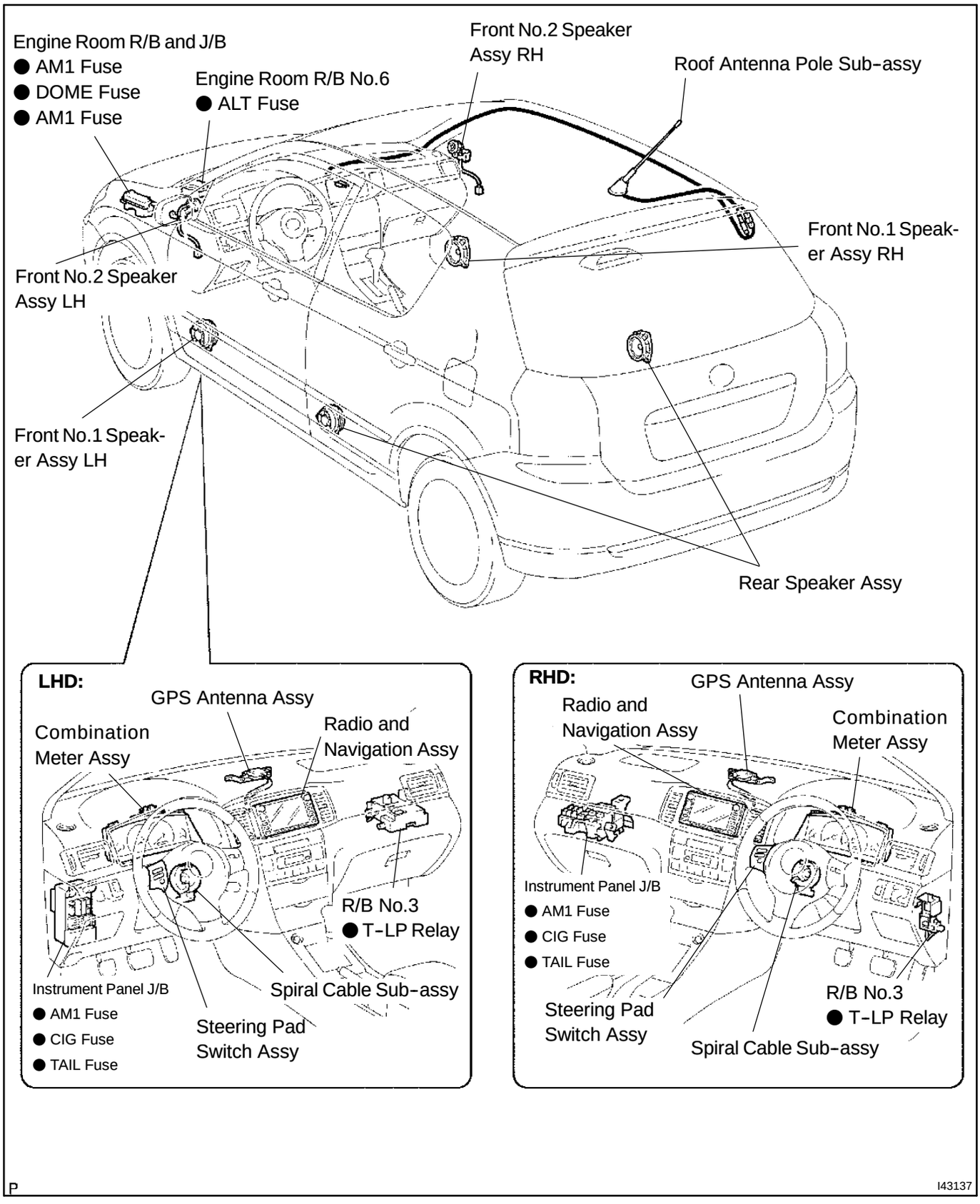
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IDENTIFICATION OF NOISE SOURCE

NAVIGATION SYSTEM

LOCATION

05FIH-04

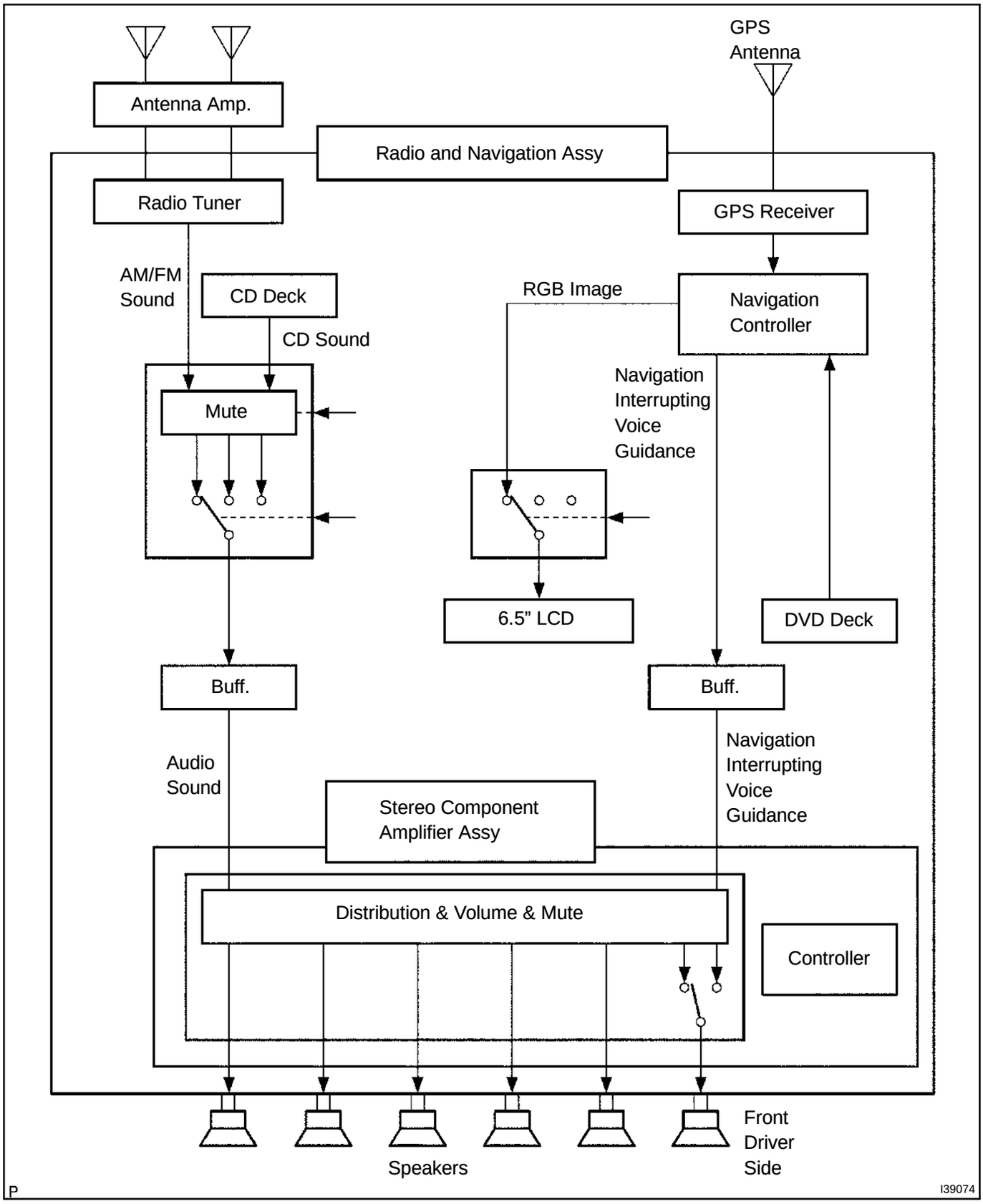


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05FII-04

SYSTEM DIAGRAM

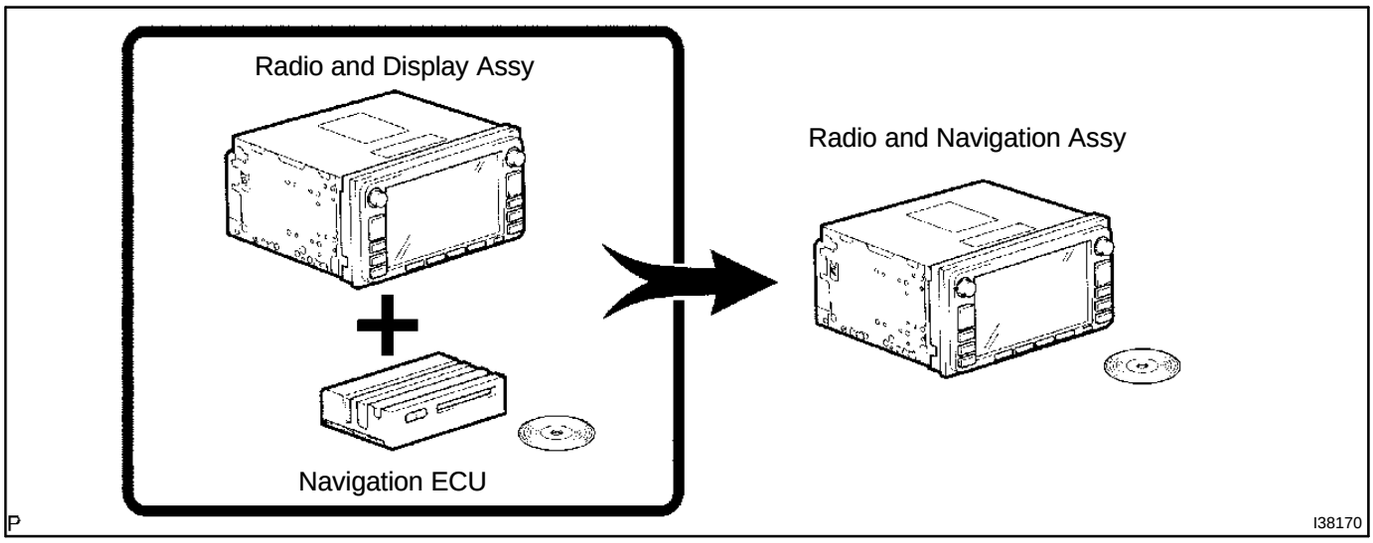


05FIJ-04

SYSTEM DESCRIPTION

1. Radio and navigation assy outline

(a) Conventionally, 2 separate devices, a "radio and display assy" and a "navigation ECU" are used. This model has adopted a new type, combining these devices into a single unit.

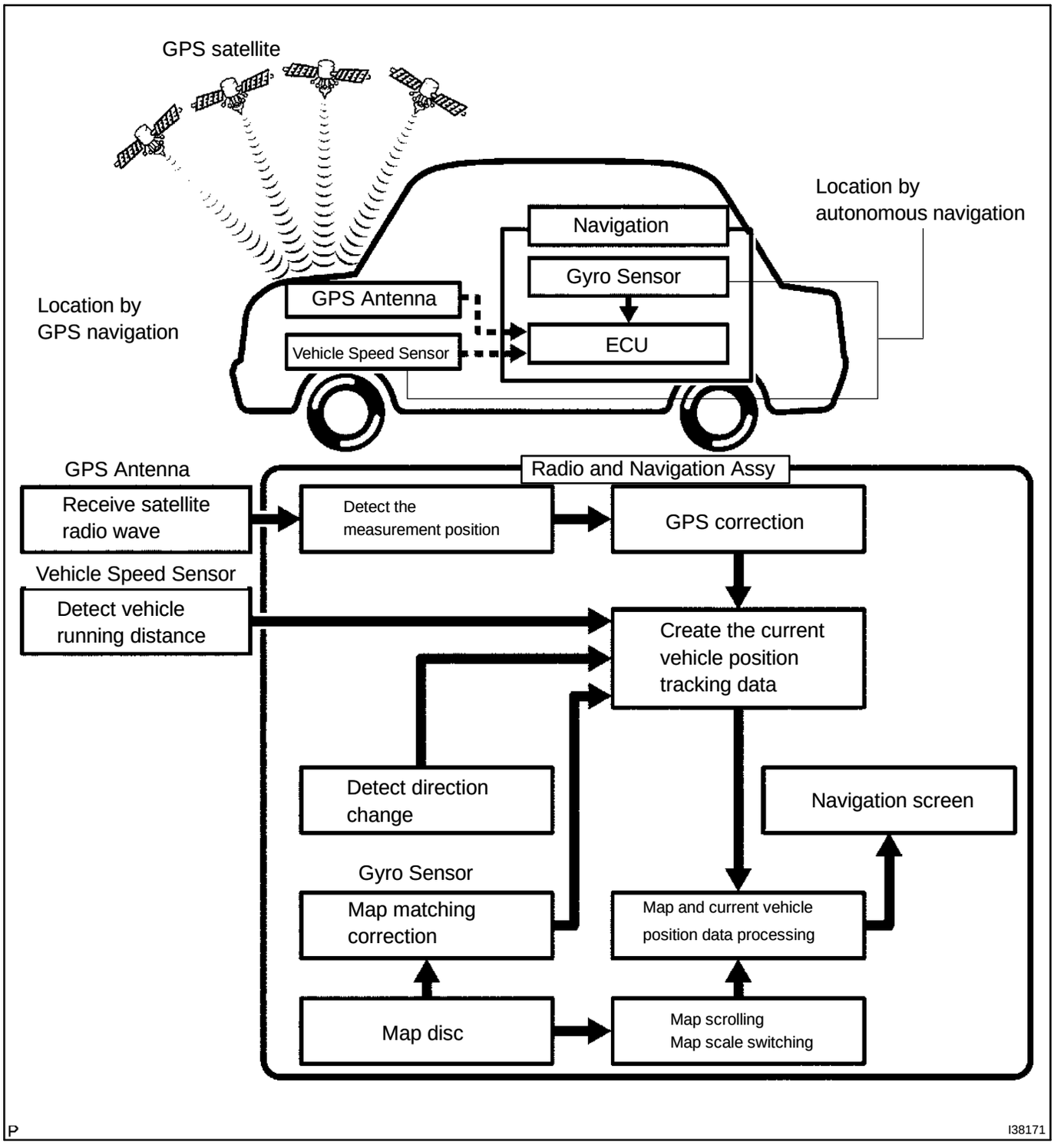


2. Navigation system outline

(a) Vehicle position tracking methods

It is essential that the navigation system correctly tracks the current vehicle position and displays it on the map. There are 2 methods to track the current vehicle position: autonomous (dead reckoning) and GPS* (satellite) navigation. Both navigation methods are used in conjunction with each other.

*GPS (Global Positioning System)



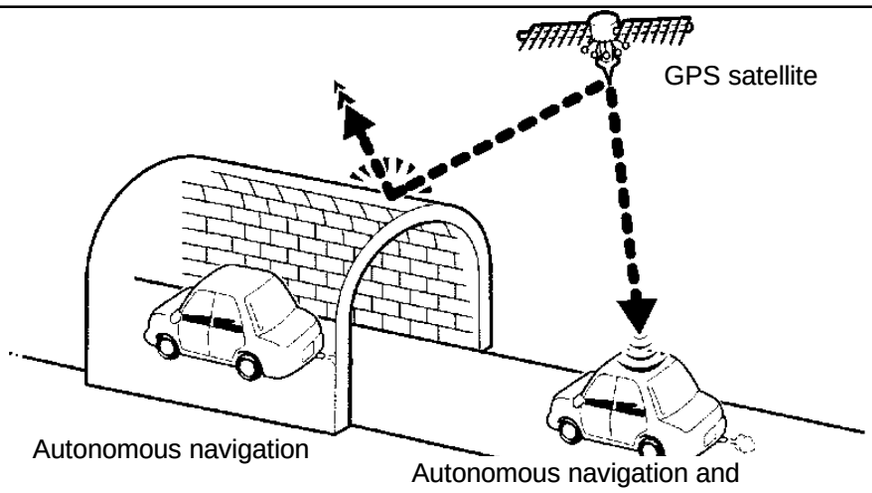
Operation	Description
Vehicle Position Calculation	The navigation ECU calculates the current vehicle position (direction and current position) using the direction deviation signal from the gyro sensor and the running distance signal from the vehicle speed sensor and creates the driving route.
Map Display processing	The navigation ECU displays the vehicle track on the map by processing the vehicle position data, vehicle running track, and map data from the map disc.
Map Matching	The map data from the map disc is compared to the vehicle position and running track data. Then, the vehicle position is matched with the nearest road.
GPS Correction	The vehicle position is matched to the position measured by GPS. Then, the measurement position data from the GPS unit is compared with the vehicle position and running track data. If the position is widely different, the GPS measurement position is used.
Distance Correction	The running distance signal from the vehicle speed sensor includes the error caused by tire wear and slippage between the tires and road surface. Distance correction is performed to account for this. The navigation ECU automatically offsets the running distance signal to make up for the difference between it and the distance data of the map. The offset is automatically updated.

HINT:

The combination of autonomous and GPS navigation makes it possible to display the vehicle position even when the vehicle is in places where the GPS radio wave cannot receive a signal. When only autonomous navigation is used, however, the mapping accuracy may slightly decline.

Navigation performed even where the GPS radio wave does not reach.

- In a tunnel
- In an indoor parking lot
- Between tall buildings
- Under an overpass
- On a forest or tree–lined path



P I38172

(b) Autonomous navigation

This method determines the relative vehicle position based on the running track determined by the gyro and vehicle speed sensors located in the navigation ECU.

(1) Gyro sensor

Calculates the direction by detecting angular velocity. It is located in the radio and navigation assy.

(2) Vehicle speed sensor

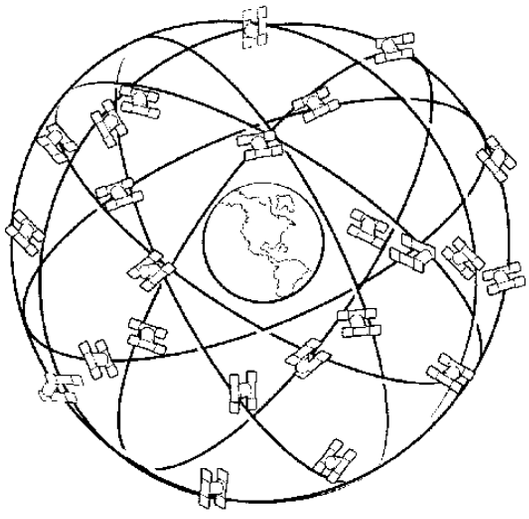
Used to calculate the vehicle running distance.

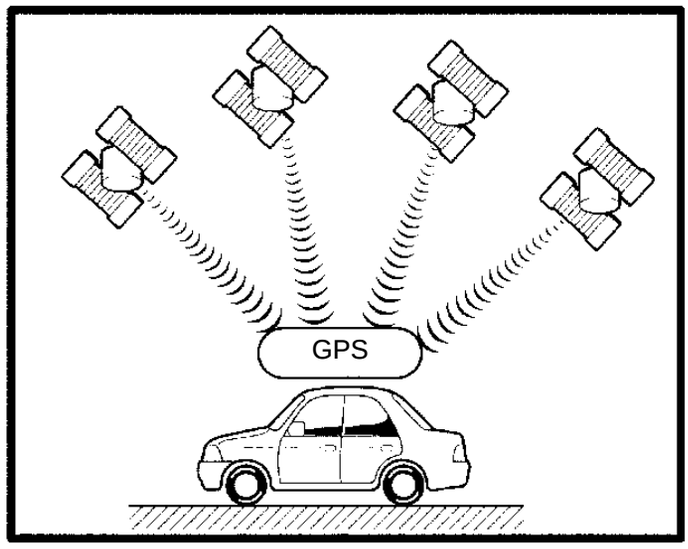
(c) GPS navigation (Satellite navigation)

This method detects the absolute vehicle position using radio wave from a GPS satellite.

* GPS satellites were launched by the U.S. Department of Defence for military purposes.

Current longitude/latitude/altitude is determined using the radio wave arrival time from four satellites.



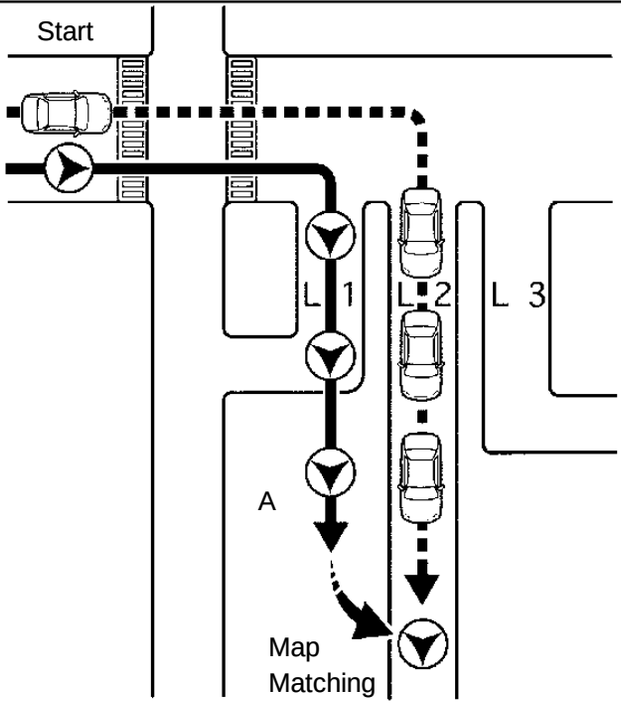


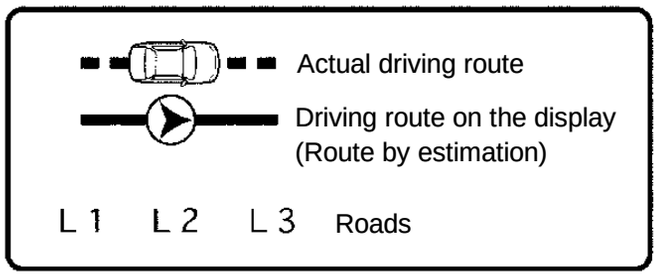
P I38174

Number of satellites	Measurement	Description
2 or less	Measurement impossible	Vehicle position cannot be obtained because the number of satellites is not enough.
3	2-dimensional measurement is possible	Vehicle position is obtained based on the current longitude and latitude (This is less precise than 3-dimensional measurement).
4	3-dimensional measurement is possible	Vehicle position is obtained based on the current longitude, latitude and altitude.

(d) Map matching

The current driving route is calculated by autonomous navigation (according to the gyro sensor and vehicle speed sensor) and GPS navigation. This information is then compared with possible road shapes from the map data in the map disc and the vehicle position is set onto the most appropriate road.



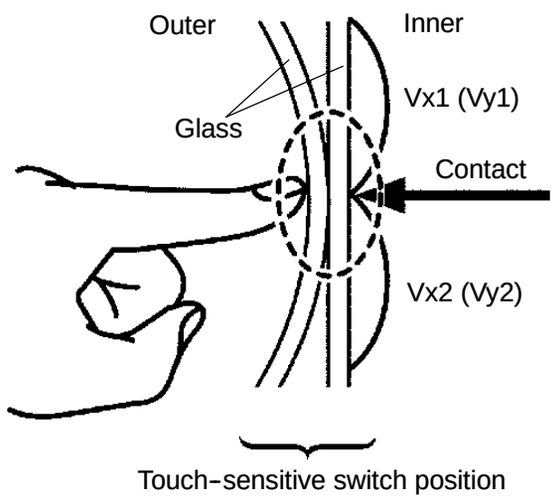


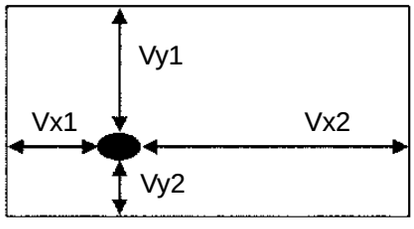
The system compares the shape of the roads L1, L2 and L3 to the estimated running track after the vehicle makes a right turn. At point A, the vehicle position differs enough from the shape of L1 that the display switches to the road L2.

I38177

(e) Touch switch

Touch switches are touch-sensitive (interactive) switches operated by touching the screen. When a switch is pressed, the outer glass bends in to contact the inner glass at the pressed position. By doing this, the voltage ratio is measured and the pressed position is detected.





The touch switch detects the voltage ratio and calculates the position on the screen.

I38179

3. DVD (Digital Versatile Disc) player outline (for navigation map)

(a) The navigation ECU uses a laser pickup to read the digital signals recorded on a DVD.

HINT:

- Do not disassemble any part of the navigation system.
- Do not apply oil to the navigation system.
- Do not insert anything but a DVD into the navigation system.

CAUTION:

Because the navigation system uses an invisible laser beam, do not look directly at the laser pickup. Be sure to only operate the navigation as instructed.

4. CD (Compact Disc) player outline

(a) A CD player uses a laser pickup to read digital signals recorded on a CD. By converting the digital signals to analog, it can play music and other things. In general, CD players can play a 4.7–inch (12 cm) or 3.2–inch (8 cm) disc.

HINT:

- Do not disassemble any part of the CD player.
- Do not apply oil to the CD player.
- Do not insert anything but a CD into the CD player.

CAUTION:

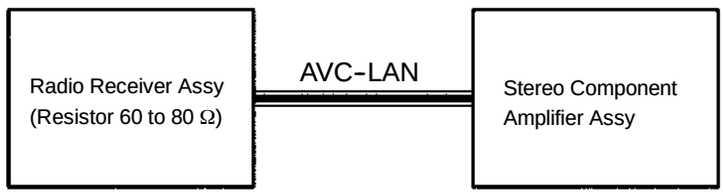
Because the CD player uses an invisible laser beam, do not look directly at the laser pickup. Be sure to only operate the player as instructed.

5. AVC-LAN Description

(a) What is AVC-LAN?

AVC-LAN, an abbreviation for "Audio Visual Communication Local Area Network", is a united standard developed by the manufacturers in affiliation with Toyota Motor Corporation. This standard pertains to audio and visual signals as well as switch and communication signals.

Example:



(b) Purpose:

Recently, car audio systems have rapidly developed and the functions vastly changed. The conventional car audio system is being integrated with multi-media interfaces similar to those in navigation systems. At the same time, customers are demanding higher quality from their audio systems. This is merely an overview of the standardization background. The specific purposes are as follows.

(1) To solve sound problems, etc. caused by using components of different manufacturers through signal standardization.

(2) To allow each manufacturer to concentrate on developing products they do best. From this, reasonably priced products can be produced.

(c) Above is the purpose of the AVC-LAN. Under this standardization, system errors caused by a new product development should not occur.

HINT:

- If a short to +B or short to ground is detected in the AVC-LAN circuit, communication is interrupted and the audio system will stop functioning.
- If an audio system is equipped with a navigation system, the multi-display unit acts as the master unit. If the navigation system is not equipped, the audio head unit acts as the master unit instead. If the radio and navigation assy is equipped, it is the master unit.
- The radio and navigation assy provides resistance to make communication possible.
- The car audio system with an AVC-LAN circuit has a diagnostic function.
- Each component has a specified number (3-digit) called a physical address. Each function has a number (2-digit) called a logical address.

6. Communication system outline

(a) Components of the audio system communicate with each other via the AVC-LAN.

(b) The master component of the AVC-LAN is a radio and navigation assy with a 60 to 80 Ω resistor. This is essential for communication.

(c) If a short circuit or open circuit occurs in the AVC-LAN circuit, communication is interrupted and the audio system will stop functioning.

7. Diagnostic function outline

(a) The audio system has a diagnostic function (the result is indicated on the master unit).

(b) A 3-digit hexadecimal component code (physical address) is allocated to each component on the AVC-LAN. Using this code, the component in the diagnostic function can be displayed.

05FIK-04

IDENTIFICATION OF NOISE SOURCE

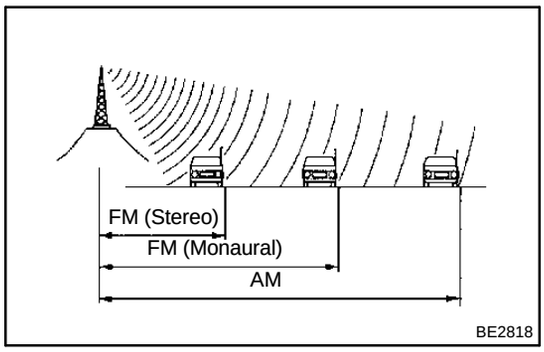
1. Radio Description

(a) Radio frequency band

(1) Radio Broadcasts use the radio frequency bands shown in the table below.

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⟷		FM ⟷	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency
MF: Medium Frequency
HF: High Frequency
VHF: Very High Frequency



(b) Service area

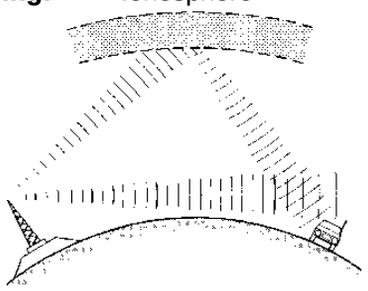
(1) The service areas of the AM and FM broadcasts are vastly different. Even if an AM broadcast has clear reception, an FM broadcast originating in the same location may not be received at all.
The service area of FM stereo broadcasts is small, and static as well as interference (noise) easily enters the signal.

(c) Radio reception problems

HINT:

In addition to static, other problems such as ”phasing”, ”multi–path”, and ”fade out” exist. These problems are not caused by electrical noise, but by the radio signal propagation method itself.

Phasing: Ionosphere

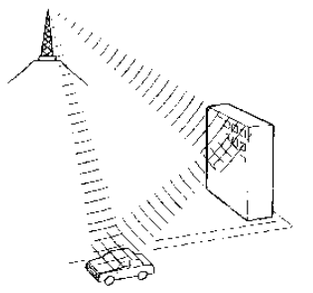


BE2819

(1) Phasing

The AM frequency band reflects off the earth’s ionosphere at night. When this occurs, the reflected signal may interfere with the direct signal sent by the same transmitter. This phenomenon is known as ”phasing”.

Multi–path:

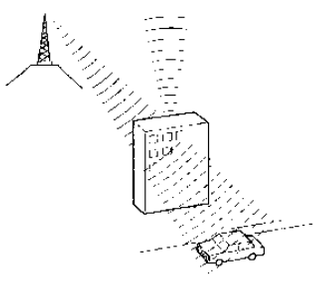


BE2820

(2) Multi–path

A radio signal can sometimes be reflected by an obstruction in its path. When this occurs, the reflected signal may interfere with the direct signal sent from the transmitter. This phenomenon is known as ”Multi–path”.

Fade Out:



BE2821

(3) Fade out

FM radio frequency is higher than AM. Therefore, it is more likely to be reflected by large obstructions such as tall buildings or mountains. For this reason, the FM signal will gradually weaken or disappear when the vehicle is behind such obstructions. This phenomenon is known as ”fade out”.

(d) Noise problem

It is very important for a technician to understand the specifics of the noise problem. To diagnose the symptom, use the table below.

Radio Frequency	Noise occurrence condition	Presumable cause
AM	Noise occurs in a specified area	Foreign noise
AM	Noise occurs when listening to an intermittent broadcast	An identical program transmitted from multiple towers can cause noise where the signals overlap
FM	Noise occurs only at night	Music beat from a far–off broadcast
FM	Noise occurs while driving in a specified area	Multi–path or phasing noise resulting from a change in FM frequency

HINT:

If the noise does not fall into any category in the table above, determine the cause using ”Radio reception problems” above. Refer to the multi–path and phasing sections.

05FJX-04

HOW TO PROCEED WITH TROUBLESHOOTING

1	**Vehicle brought into a workshop**

2	**Diagnostic questioning and symptom confirmation (SEE PAGE 05-1010)**

Ask the customer about symptoms and confirm malfunctions. Fill out the Customer Problem Analysis check sheet.

- **The screen displays nothing (Go to step 6, proceed to "BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION/AUDIO SCREEN)")**
- **Other symptoms (Go to step 3)**

3	**Confirm the system normal condition (SEE PAGE 05-1011)**

- **Applicable (This is not a malfunction.)**
- **Not applicable (Go to step 4)**

4	**Check the diagnostic trouble codes (SEE PAGE 05-1016)**

HINT:

- Even if the malfunction symptom is not confirmed, check the diagnostic trouble codes. This is because the system stores past diagnostic trouble codes.
- Refer to the detailed description on the diagnostic screen, as necessary (see page 05-1036).

- **A code is output (Go to step 5)**
- **A code is not output (Go to step 6)**

5	**Diagnostic trouble code chart (SEE PAGE 05-1019)**

Find the output code on the diagnostic trouble code chart.

- **Output the diagnostic trouble code (Go to step 8)**

6	**Problem symptoms table (SEE PAGE 05-1021)**

Find the applicable symptom code in the problem symptoms table.
HINT:
If the symptom does not recur and no code is output, perform the symptom reproduction method (See page 01-21).

- **There is an applicable symptom code in the table (Go to step 8)**
- **There is no applicable symptom code in the table (Go to step 7)**

7	**Check the ECU terminal arrangement based on the malfunction symptom** (SEE PAGE 05 -1025)

8	**Check the circuit**

Adjust, repair or replace as necessary.

9	**Recheck the diagnostic trouble code** (SEE PAGE 05–1026)

HINT:
After deleting the DTC, recheck the diagnostic trouble code.

10	**Perform confirmation test**

END

05FIL-04

CUSTOMER PROBLEM ANALYSIS CHECK

RADIO AND NAVIGATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**VIN**	
		Production Date	
		Licence Plate No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km mile**

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Always ☐ Intermittently (times a day)

DTC Check

1st time trouble code.

Unit Check Mode			
Current	Memory	Occured	Data/Time

LAN Monitor			
Code	Sub-Code	Code	Sub-Code

2nd time trouble code.

Unit Check Mode			
Current	Memory	Occured	Data/Time

LAN Monitor			
Code	Sub-Code	Code	Sub-Code

Problem Symptom

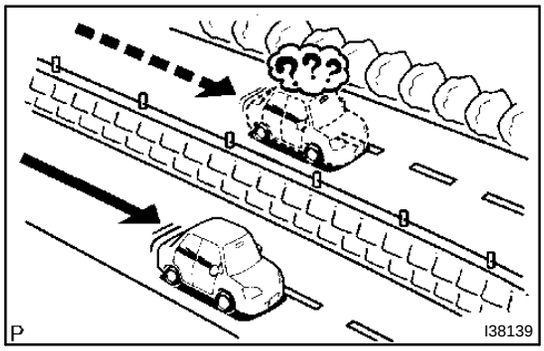
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05FIM-04

SYSTEM NORMAL CONDITION CHECK

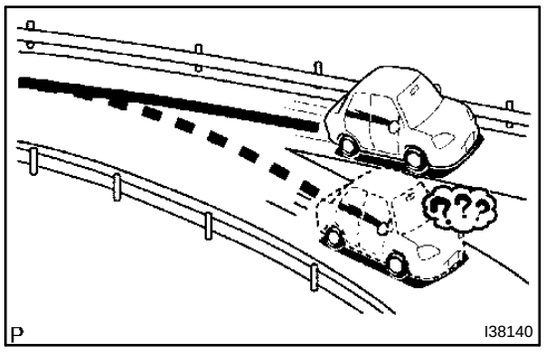
(a) If the symptom is applicable to any of the following, it is intended behavior, and not a malfunction.

Symptom	Answer
A longer route than expected is chosen.	Depending on the road conditions, the navigation ECU may determine that a longer route is quicker.
Even when distance priority is high, the shortest route is not shown.	Some paths may not be advised due to safety concerns.
When the vehicle is put into motion immediately after the engine starts, the navigation system deviates from the actual position.	If the vehicle starts before the navigation system activates, the system may not react.
When running on certain types of roads, especially new roads, the vehicle position deviates from the actual position.	When the vehicle is driving on new roads not available on the map disc, the system attempts to match it to another nearby road, causing the position mark to deviate.

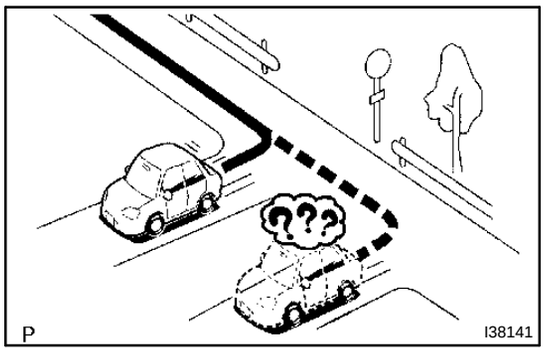


(b) The following symptoms are not a malfunction, but are caused by errors inherent in the GPS, gyro sensor, speed sensor, and navigation ECU.

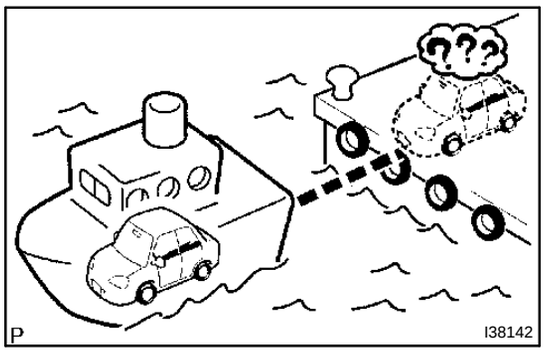
(1) The current position mark may be displayed on a nearby parallel road.



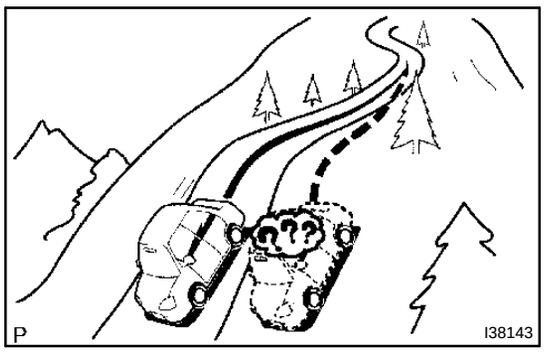
(2) Immediately after a fork in the road, the current vehicle position mark may be displayed on the wrong road.



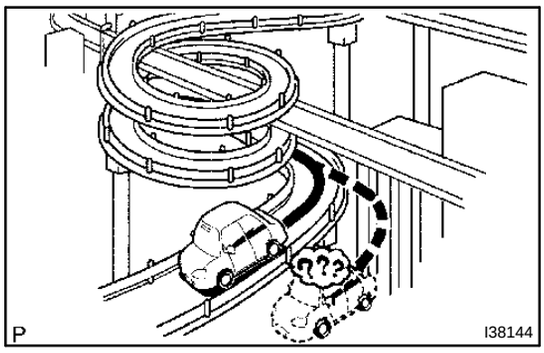
(3) When the vehicle turns right or left at an intersection, the current vehicle position mark may be displayed on a nearby parallel road.



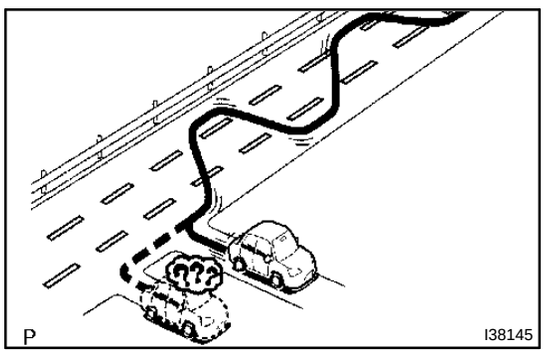
(4) When the vehicle is carried, such as on a ferry, and the vehicle itself is not running, the current vehicle position mark may be displayed in the position where the vehicle was until a measurement can be performed by GPS.



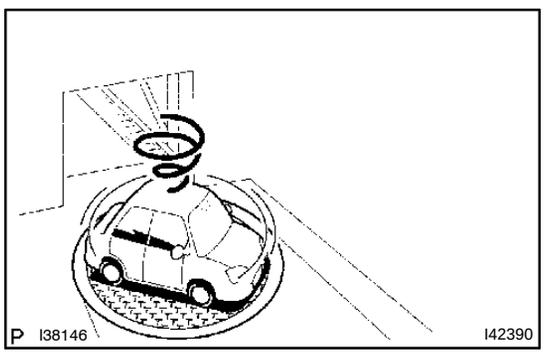
(5) When the vehicle runs on a steep hill, the current vehicle position mark may deviate from the correct position.



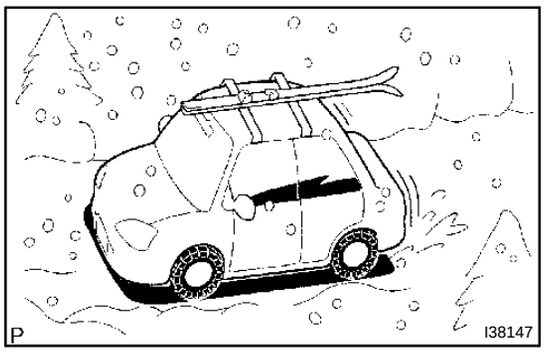
(6) When the vehicle makes a continuous turn of 360, 720, 1,080, etc. degrees, the current vehicle position mark may deviate from the correct position.



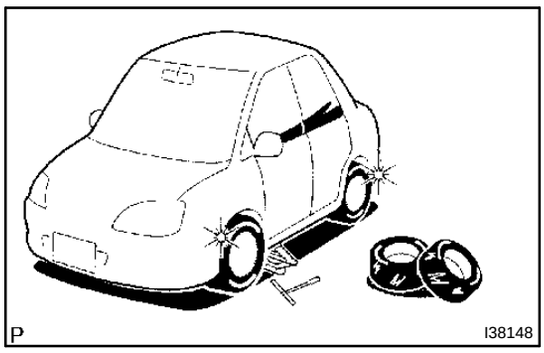
(7) When the vehicle moves erratically, such as constant lane changes, the current vehicle position mark may deviate from the correct position.



(8) When the ignition switch is turned to the ACC or ON position on a turntable before parking, the current vehicle position mark may not point in the correct direction. The same will occur when the vehicle comes out of parking.



(9) When the vehicle runs on the snowy road or a mountain path with the chains installed or using a spare tire, the current vehicle position mark may deviate from the correct position.



(10) When a tire is changed, the current vehicle position mark may deviate from the correct position.

HINT:

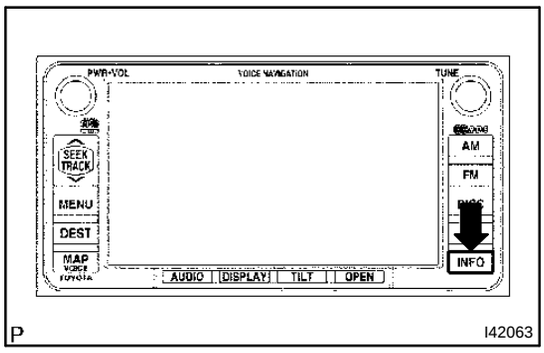
- Diameter of the tire may change, causing a speed sensor error.
- Performing the ”tire change” in calibration mode will allow the system to correct the current vehicle position faster.

DIAGNOSTIC START-UP/FINISH

HINT:

- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
- After the ignition switch is turned on, check that the map is displayed before starting the diagnostic mode. Otherwise, some items cannot be checked.

1. There are 2 methods to start diagnostic mode. Start the mode by using one of them.

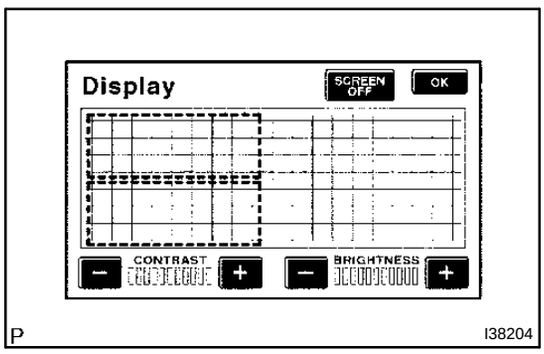


2. Method 1

(a) Start the engine.

(b) While pressing and holding "INFO" switch, operate the light control switch, OFF → TAIL → OFF → TAIL → OFF → TAIL → OFF.

(c) The diagnostic mode starts and the service check screen ("System Check Mode") will be displayed. Service inspection starts automatically and the result will be displayed.



3. Method 2

(a) Start the engine.

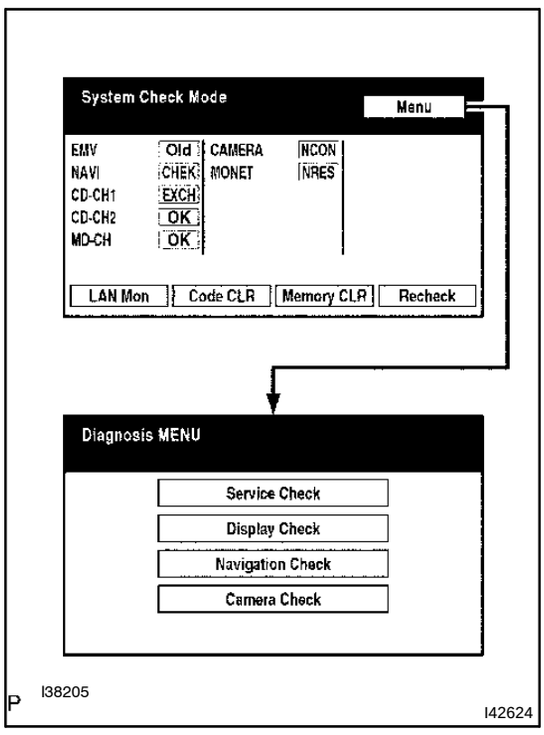
(b) Switch to the "Display quality adjustment" screen.

(c) From the display quality adjustment screen, touch the corners of the screen in the following order: upper left → lower left → upper left → lower left → upper left → lower left.

(d) The diagnostic mode starts and "Service Check" screen will be displayed. Service inspection starts automatically and the result will be displayed.

4. Diagnosis MENU

(a) Diagnostic screen will be displayed by pressing the menu switch on the service check screen.



5. There are 2 methods to exit. Use one of them.

(a) Turn the ignition switch off.

(b) Press the ”Display” switch for 3 seconds.

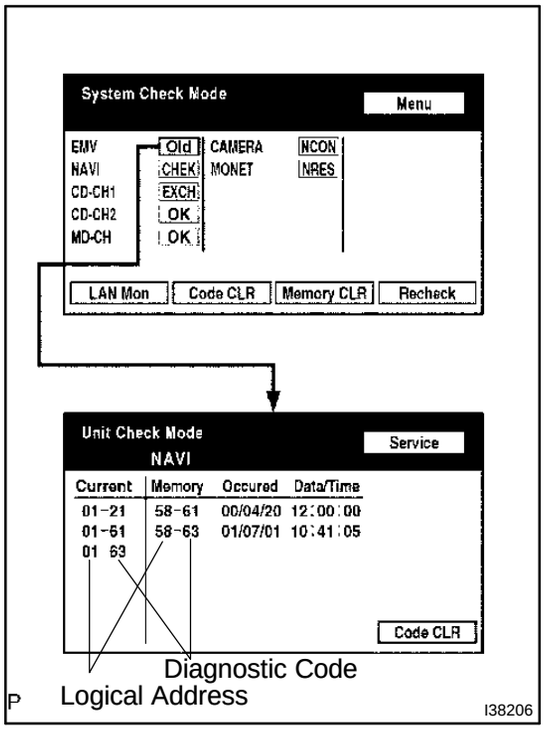
05FIO-04

SYSTEM CHECK MODE (DTC CHECK)

HINT:

Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. Start the diagnostic mode (see page 05-1014).

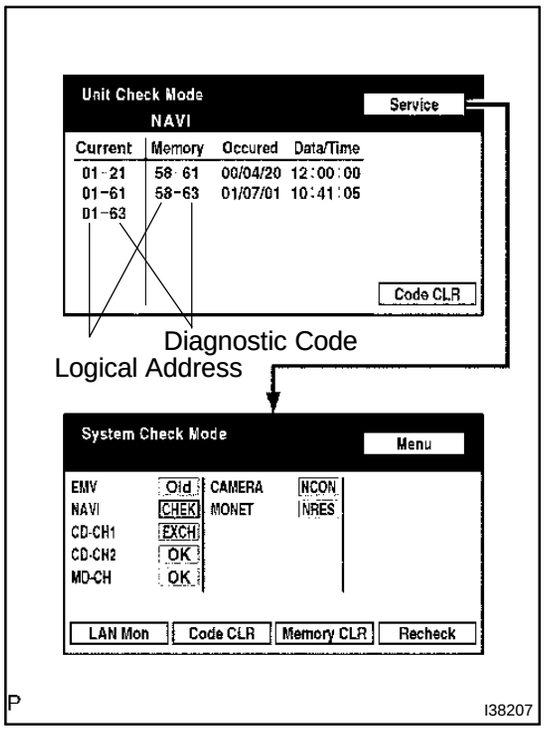


2. Read the system check result.

(a) If all check results are "EXCH," "CHEK" or "Old," touch the display to check the contents on the "Unit Check Mode" screen and record them on the customer problem analysis check sheet.

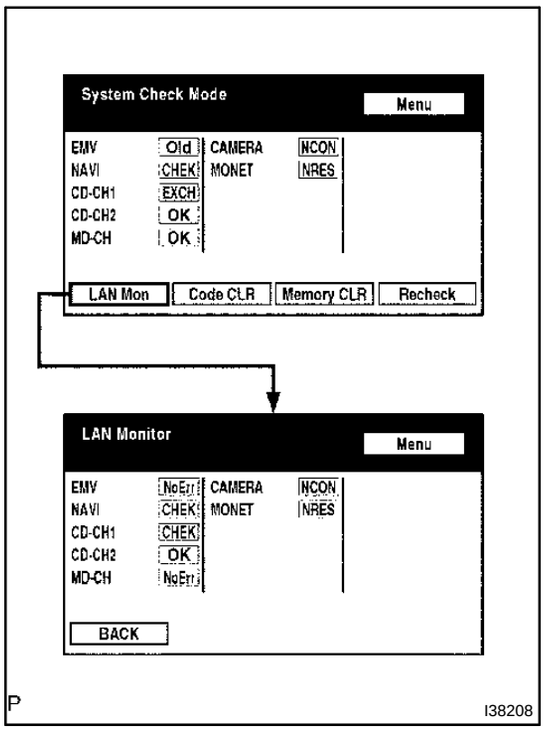
HINT:

- If all check results are "OK," go to communication DTC check (go to step 3).
- If a device name is not known, its physical address is displayed.



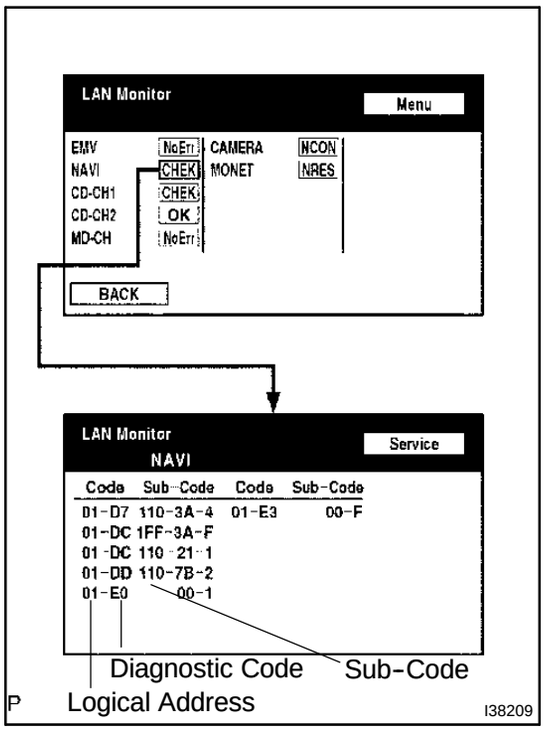
HINT:

If "EXCH", "CHEK" and "Old" as well as "OK" exist, press the service switch to return to the "System Check Mode". Then, check the "Unit Check Mode" screen and record them on the customer problem analysis check sheet.



3. Read the communication diagnostic check result.

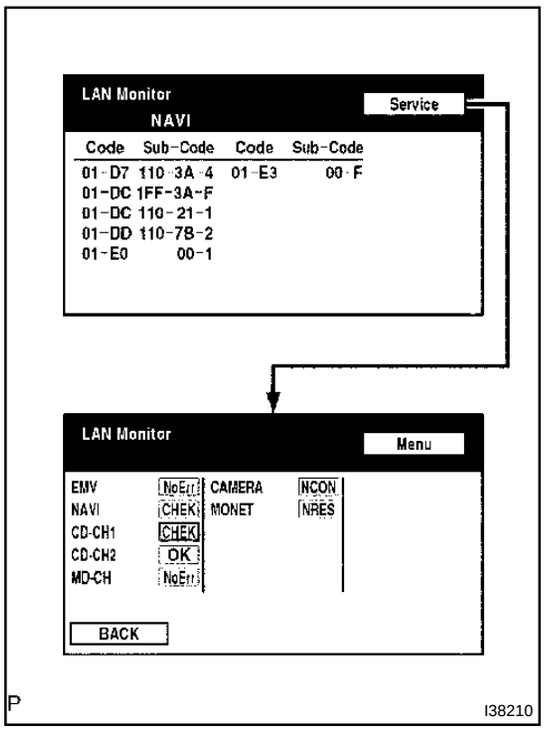
(a) Return to the "System Check Mode", and press "LAN Mon" switch to enter the LAN monitor screen.



(b) If the result is "CHEK" or "Old," touch the result switch to check the contents on the individual communication diagnostic screen and record them on the customer problem analysis check sheet.

HINT:

- If all check results are "No Err," the system determines that no DTC exists.
- The sub–code (relevant device) will be indicated by its physical address.



HINT:

If check results of other devices are "CHEK," press the "Service" switch to return to the original "LAN Monitor" screen. Then, check the individual communication diagnostic screen for the next device and record the result on the customer problem analysis check sheet.

05FIP-04

DIAGNOSTIC TROUBLE CODE CHART

Terms	Description
Physical address	3-digit, hexadecimal code assigned to all components connected to the AVC-LAN. Individual symbols are specified based on function. Units whose names are unknown or relevant units are displayed with physical addresses.
Logical address	2-digit, hexadecimal code assigned to all the functions in the AVC-LAN system.

HINT:

Titles for each unit are stated in the following order: parts name (physical address) [Name indicated by DTC]

1. RADIO AND NAVIGATION ASSY (physical address: 140) [AVN]

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D5	Absence of registration unit	A device that the sub code shows is (was) disconnected from the system when turning the ignition switch to the ACC or ON position. The communication condition with the device that the code shows cannot be obtained when the engine starts.	Power source circuit	05-1079
D8	No response to connection check	The device indicated by the sub code is (was) disconnected from the system after engine start.	Power source circuit	05-1079
D9	Last mode error	The device (for audio visual system) that had functioned before the engine stopped is (was) disconnected from the system when the ignition switch is (was) in the ACC or ON position.	Power source circuit	05-1079
DA	No response against ON/OFF command	No response is identified when changing mode (audio and visual mode change). Sound and image do not change by switch operation.	Power source circuit	05-1079
DB	Mode status error	A dual alarm is detected.	Power source circuit	05-1079
DC	Failure in transmission	A transmission failure to the device indicated by the sub code has occurred. NOTE: This DTC may have no direct relationship with the malfunction.	Power source circuit	05-1079
DE	Slave reset	A slave device has been disconnected after engine start.	Power source circuit	05-1079
21	ROM error	A malfunction exists in ROM.	Replace radio and navigation assy	See Pub. No. RM925E, page 67-6
22	RAM error	A malfunction exists in RAM.	Replace radio and navigation assy	See Pub. No. RM925E, page 67-6

(b) Logical address: 21 (SW): 23 (SW with name): 24 (SW converting): 25 (command SW)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
10	Panel switch error	The panel SW detection circuit has a failure.	Replace radio and navigation assy	See Pub. No. RM925E, page 67-6

(c) Logical address: 58 (Navigation): 80 (GPS)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
10	Gyro error	Ground short, power supply short, open circuit in the gyro signal, or gyro failure.	1. Inspect gyro error 2. Replace GPS antenna 3. Replace radio and navigation assy	05-1076 See Pub. No. RM925E, page 67-24 See Pub. No. RM925E, page 67-6
11	GPS receiver error	RTC, ROM, and RAM of the GPS receiver and TCXO errors. GPS receiver is failed.	Replace radio and navigation assy	See Pub. No. RM925E, page 67-6
40	GPS antenna error	GPS antenna error	1. Replace GPS antenna 2. Replace radio and navigation assy	See Pub. No. RM925E, page 67-24 See Pub. No. RM925E, page 67-6
41	GPS antenna power source error	Error of the power source to the GPS antenna	1. Replace GPS antenna 2. Replace radio and navigation assy	See Pub. No. RM925E, page 67-24 See Pub. No. RM925E, page 67-6
42	Map disc read error	Player error. A scratch or dirt on the disc. Access to an invalid address due to software error.	1. Inspect map disc reading error 2. Replace map disc 3. Replace radio and navigation assy	05-1077 - See Pub. No. RM925E, page 67-6
43	SPD signal error	A difference between the GPS speed and SPD pulse is detected.	1. Inspect SPD signal error 2. Speed signal circuit 3. Replace radio and navigation assy	05-1078 05-1096 See Pub. No. RM925E, page 67-6

05FIQ-04

PROBLEM SYMPTOMS TABLE

HINT:

- Before performing verification listed in the table below, check the fuse and relay.
- Methods used to verify the cause of the problem are listed in order of probability in the verification column.

Display function

Symptom	Verification	See page
Pressing PWR switch does not turn on system.	1. "PRESSING POWER SWITCH DOES NOT TURN ON SYSTEM" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1043 05-1079 See Pub. No. RM925E, page 67-6
Black screen (no image appears on navigation and audio screen).	1. "BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION AND AUDIO SCREEN)" 2. Dimmer signal circuit 3. Power source circuit (radio and navigation assy) 4. Replace radio and navigation assy	05-1044 05-1081 05-1079 See Pub. No. RM925E, page 67-6
Illumination for panel switch does not come on with TAIL switch on.	1. "ILLUMINATION FOR PANEL SWITCH DOES NOT COME ON WITH TAIL SWITCH ON" 2. Dimmer signal circuit 3. Replace radio and navigation assy	05-1045 05-1081 See Pub. No. RM925E, page 67-6
Display does not dim (night screen) with TAIL switch on.	1. "DISPLAY DOES NOT DIM (NIGHT SCREEN) WITH TAIL SWITCH ON" 2. Dimmer signal circuit 3. Replace radio and navigation assy	05-1046 05-1081 See Pub. No. RM925E, page 67-6
Power does not turn off (screen remains on).	1. Power source circuit (radio and navigation assy) 2. Replace radio and navigation assy	05-1079 See Pub. No. RM925E, page 67-6
Panel switch does not function.	1. "PANEL SWITCH DOES NOT FUNCTION" 2. Steering pad switch circuit 3. Replace radio and navigation assy	05-1047 05-1091 See Pub. No. RM925E, page 67-6
Touch panel switch does not function.	1. "TOUCH PANEL SWITCH DOES NOT FUNCTION" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1048 05-1079 See Pub. No. RM925E, page 67-6
Display panel does not open, tilt, or tilts improperly.	1. "DISPLAY PANEL DOES NOT OPEN, TILT, OR TILTS IMPROPERLY" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1049 05-1079 See Pub. No. RM925E, page 67-6

Screen is distorted.	1. Power source circuit (radio and navigation assy) 2. Replace radio and navigation assy	05-1079 See Pub. No. RM925E, page 67-6
Screen flicker or color distortion.	1. "SCREEN FLICKER OR COLOR DISTORTION" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1050 05-1079 See Pub. No. RM925E, page 67-6

Audio function

Symptom	Verification	See page
No sound can be heard from speakers (audio is mute).	1. "NO SOUND CAN BE HEARD FROM SPEAKERS (AUDIO IS MUTE)" 2. Speaker circuit 3. Power source circuit (radio and navigation assy) 4. Replace radio and navigation assy	05-1052 05-1087 05-1079 See Pub. No. RM925E, page 67-6
Radio broadcast cannot be received (poor reception).	1. "RADIO BROADCAST CANNOT BE RECEIVED (POOR RECEPTION)" 2. Replace radio and navigation assy	05-1053 See Pub. No. RM925E, page 67-6
CD cannot be inserted/played or CD is ejected right after insertion.	1. "CD CANNOT BE INSERTED/PLAYED OR CD IS EJECTED RIGHT AFTER INSERTION" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1055 05-1079 See Pub. No. RM925E, page 67-6
CD cannot be ejected.	1. "CD CANNOT BE EJECTED" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1057 05-1079 See Pub. No. RM925E, page 67-6
Abnormal noise occurs.	1. "ABNORMAL NOISE OCCURS" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1058 05-1079 See Pub. No. RM925E, page 67-6
CD sound skips.	1. "CD SOUND SKIPS" 2. Replace radio and navigation assy	05-1059 See Pub. No. RM925E, page 67-6
Poor sound quality in all modes (low volume).	1. "POOR SOUND QUALITY IN ALL MODES (LOW VOLUME)" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1061 05-1079 See Pub. No. RM925E, page 67-6

Navigation function

Symptom	Verification	See page
Map disc cannot be inserted.	1. "MAP DISC CANNOT BE INSERTED" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1062 05-1079 See Pub. No. RM925E, page 67-6
Map disc cannot be ejected.	1. "MAP DISC CANNOT BE EJECTED" 2. Power source circuit (radio and navigation assy) 3. Replace radio and navigation assy	05-1063 05-1079 See Pub. No. RM925E, page 67-6
Vehicle position mark deviates greatly.	1. "VEHICLE POSITION MARK DEVIATES GREATLY" 2. Replace GPS antenna assy 3. Replace radio and navigation assy	05-1064 See Pub. No. RM925E, page 67-24 See Pub. No. RM925E, page 67-6
Cursor or map rotates when vehicle is stopped.	1. "CURSOR OR MAP ROTATES WHEN VEHICLE IS STOPPED" 2. Replace radio and navigation assy	05-1066 See Pub. No. RM925E, page 67-6
Vehicle position mark is not updated.	1. "VEHICLE POSITION MARK IS NOT UPDATED" 2. Replace map disc 3. Replace radio and navigation assy	05-1067 - See Pub. No. RM925E, page 67-6
Current position display does not appear.	1. "CURRENT POSITION DISPLAY DOES NOT APPEAR" 2. Replace map disc 3. Replace radio and navigation assy	05-1068 - See Pub. No. RM925E, page 67-6
GPS mark does not displayed.	1. "GPS MARK IS NOT DISPLAYED" 2. Replace GPS antenna assy 3. Replace radio and navigation assy	05-1069 See Pub. No. RM925E, page 67-24 See Pub. No. RM925E, page 67-6
Voice guidance does not function.	1. "VOICE GUIDANCE DOES NOT FUNCTION" 2. Speaker circuit 3. Replace map disc 4. Replace radio and navigation assy	05-1071 05-1087 - See Pub. No. RM925E, page 67-6

Map display incomplete.	1. "MAP DISPLAY INCOMPLETE" 2. Replace map disc 3. Replace radio and navigation assy	05-1074 - See Pub. No. RM925E, page 67-6
Route cannot be calculated.	1. "ROUTE CANNOT BE CALCULATED" 2. Replace map disc 3. Replace radio and navigation assy	05-1075 - See Pub. No. RM925E, page 67-6

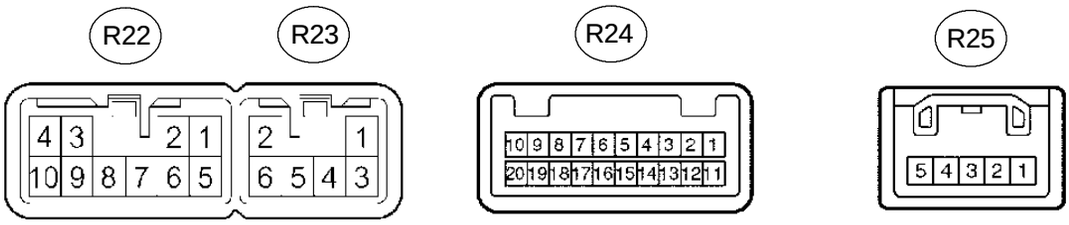
Steering pad switch assy function

Symptom	Verification	See page
The system cannot be operated by the steering pad switch.	1. Steering pad switch circuit 2. Replace radio and navigation assy	05-1091 See Pub. No. RM925E, page 67-6
Illumination for steering pad switch does not come on with TAIL switch on.	1. Dimmer signal circuit 2. Replace radio and navigation assy	05-1081 See Pub. No. RM925E, page 67-6

05L5Q-02

TERMINALS OF ECU

1. RADIO AND NAVIGATION ASSY



I42407

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
FR+ (R22-1) - GND (R22-7)	P (LG) - BR	Sound signal (Front Right)	Audio system is playing	-
FL+ (R22-2) - GND (R22-7)	P (P) - BR	Sound signal (Front Left)	Audio system is playing	-
ACC+B (R22-3) - GND (R22-7)	SB (GR) - BR	Accessory (ON)	Ignition switch OFF → ACC or ON	Below 1 V →10 to 14 V
BU+B (R22-4) - GND (R22-7)	L-Y - BR	Battery	Always	10 to 14 V
FR- (R22-5) - GND (R22-7)	P (L) - BR	Sound signal (Front Right)	Audio system is playing	-
FL- (R22-6) - GND (R22-7)	P (V) - BR	Sound signal (Front Left)	Audio system is playing	-
GND (R22-7) - Body ground	BR - Body ground	Ground	Always	Below 1 V
ANT (R22-8) - GND (R22-7)	B - BR	Power source of antenna	Radio switch ON and AM or FM	10 to 14 V
ILL+ (R22-10) - GND (R22-7)	SB (G) - BR	Illumination signal	Ignition switch ON Light control switch OFF → TAIL or ON	Below 1.0 V → 10 to 14 V
RR+ (R23-1) - GND (R22-7)	R - BR	Sound signal (Rear Right)	Audio system is playing	-
RL+ (R23-2) - GND (R22-7)	B - BR	Sound signal (Rear Left)	Audio system is playing	-
RR- (R23-3) - GND (R22-7)	W - BR	Sound signal (Rear Right)	Audio system is playing	-
RL- (R23-6) - GND (R22-7)	Y - BR	Sound signal (Rear Left)	Audio system is playing	-
GND (R24-6) - Body ground	R - Body ground	Steering pad switch ground	Always	Below 1 V
SW1 (R24-7) - GND (R24-6)	GR - R	Steering pad switch signal	Steering pad switch not operated → SEEK+ switch pushed → SEEK- switch pushed → VOL+ switch pushed → VOL- switch pushed	4 V or more → Approx. 0.5 V → Approx. 0.9 V → Approx. 2.0 V → Approx. 3.4 V
SW2 (R24-8) - GND (R24-6)	G - R	Steering pad switch signal	Steering pad switch not operated → MODE switch pushed	4 V or more → Below 2.5 V
L/R (R24-11) - GND (R22-7)	W-B - BR	LHD or RHD signal	Always	Below 1 Ω → RHD 10 kΩ or higher → LHD
SPD (R25-3) - GND (R22-7)	W (V-W) - BR	Speed signal from combination meter	See "Vehicle Signal Check Mode" (See page 05-1031)	-
REV (R25-5) - GND (R22-7)	SB (R-B) - BR	Reverse signal from combination meter	See "Vehicle Signal Check Mode" (See page 05-1031)	-

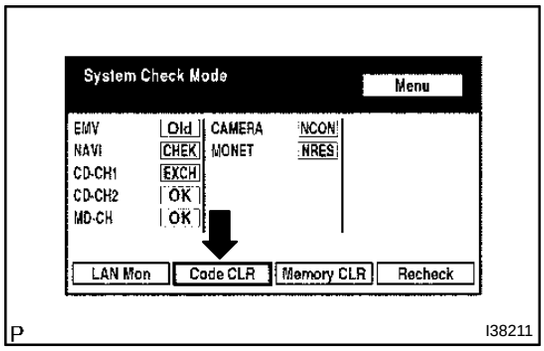
05FIS-04

SYSTEM CHECK MODE (DTC CLEAR/RECHECK)

HINT:

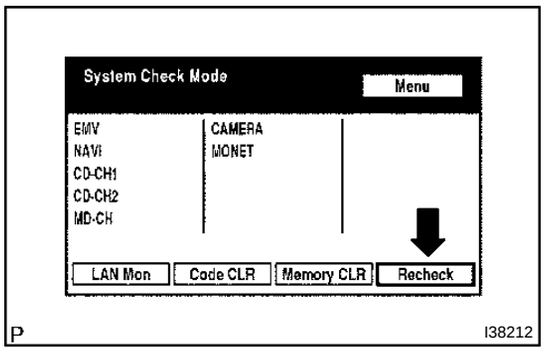
Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. Enter diagnostic mode (see page 05–1014).



2. Clear DTC

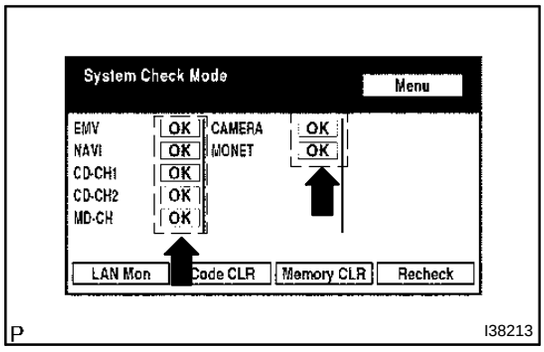
(a) Press the ”Code CLR” switch for 3 seconds.



(b) Check result is cleared.

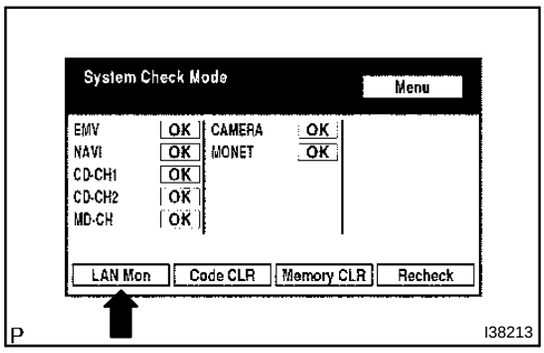
3. Recheck

(a) Press the ”Recheck” switch.

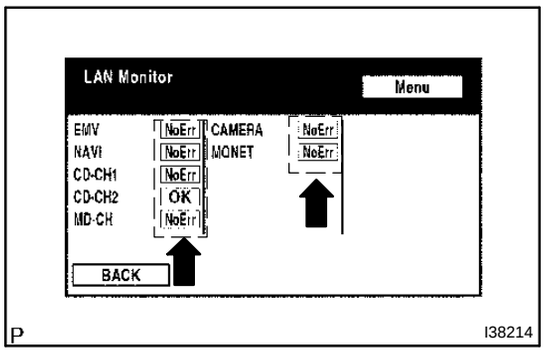


(b) Confirm that all diagnostic codes are ”OK” when the check results are displayed.

If a code other than ”OK” is displayed, troubleshoot again.



(c) Press the ”LAN Mon” switch to change to ”LAN Monitor” mode.



(d) Confirm that all diagnostic codes are ”No Err”.
If a code other than ”No Err” is displayed, troubleshoot again.

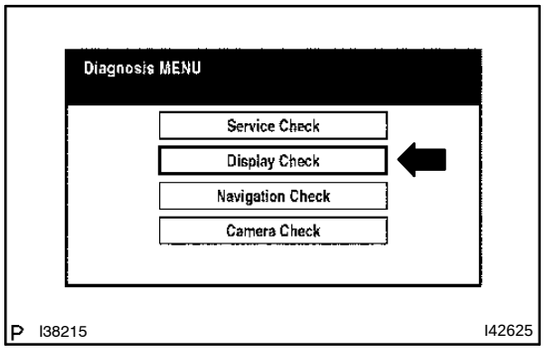
05FIT-04

DISPLAY CHECK MODE (COLOR BAR CHECK)

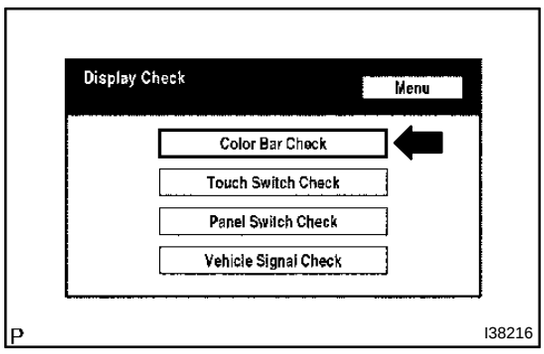
HINT:

- This mode checks the color display on the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

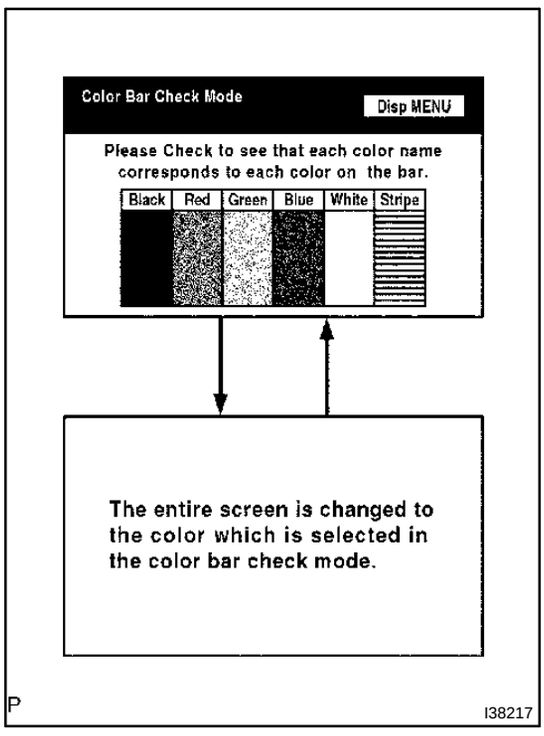
1. Enter diagnostic mode (see page 05-1014).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Color Bar Check" from the "Display Check" screen.



4. Select a color bar from the "Color Bar Check Mode" screen.

HINT:

- The entire screen turns to the color or stripe selected.
- Touching the display will return to the "Color Bar Check" screen.

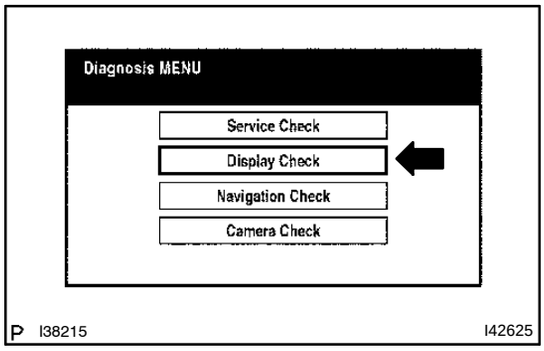
05FIU-04

DISPLAY CHECK MODE (TOUCH SWITCH CHECK)

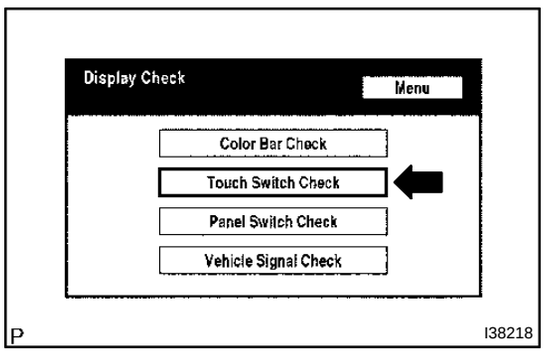
HINT:

- This mode checks the touch switch operation condition on the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

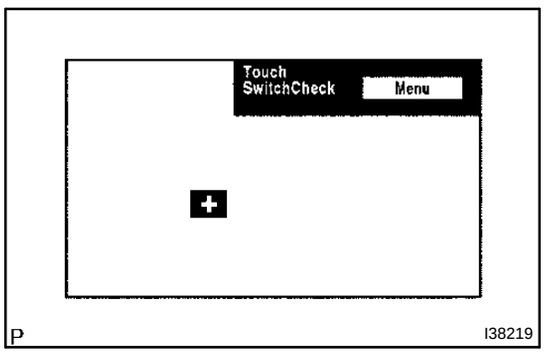
1. Enter diagnostic mode (see page 05–1014).



2. Select ”Display Check” from the ”Diagnosis MENU” screen.



3. Select ”Touch Switch Check” from the ”Display Check” screen.



4. Touch the display anywhere in the open area to perform the check when the ”Touch Switch Check” screen is displayed.

HINT:

- A ”+” mark is displayed where the display is touched.
- The ”+” mark remains on the display even after the finger is removed.

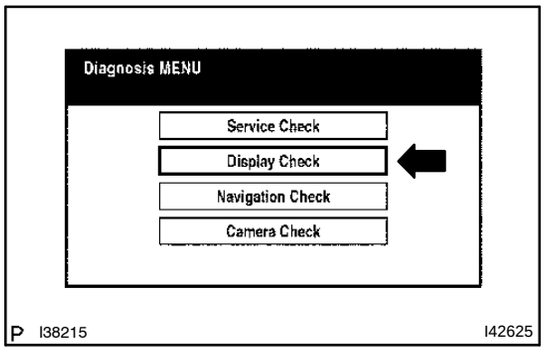
05FIV-04

DISPLAY CHECK MODE (PANEL SWITCH CHECK)

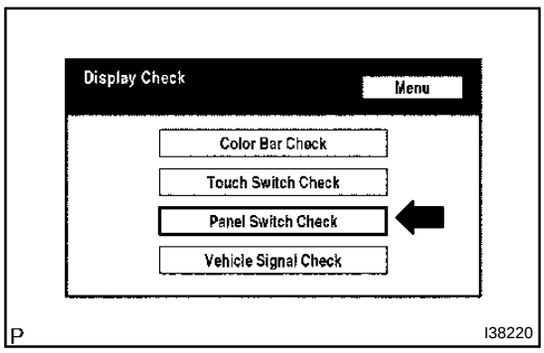
HINT:

- This mode checks the panel switch operation response on the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

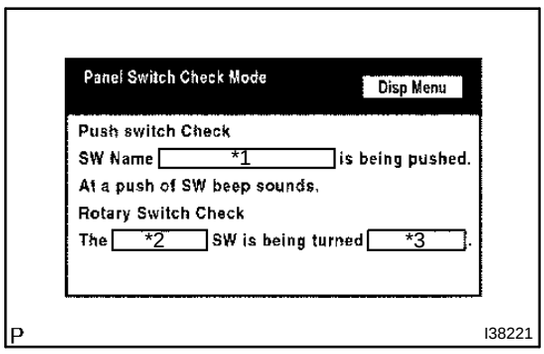
1. Enter diagnostic mode (see page 05-1014).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Panel Switch Check" from the "Display Check" screen.



4. Operate each switch and check that the switch name and condition are correctly displayed.

HINT:

- Pressing the "DISPLAY" switch for 3 seconds will exit the diagnostic mode.
- "OPEN" and "TILT" switches are not displayed. To test these switches, they must be operated.

Display	Contents
Push switch name/*1	• Name of the pressed switch is displayed. • If more than one switch is pressed, "MULTIPLE" is displayed.
Rotary switch name/*2	Name of the rotary switch is displayed.
Rotary switch direction/*3	Direction of the rotary switch is rotated.

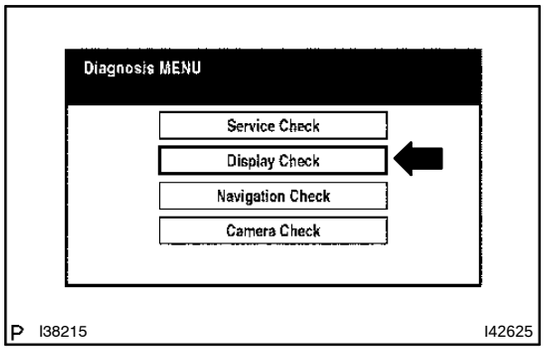
05FIW-04

DISPLAY CHECK MODE (VEHICLE SIGNAL CHECK)

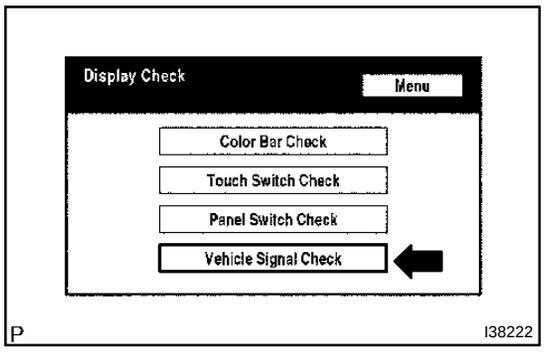
HINT:

- This mode checks the vehicle signal status input to the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

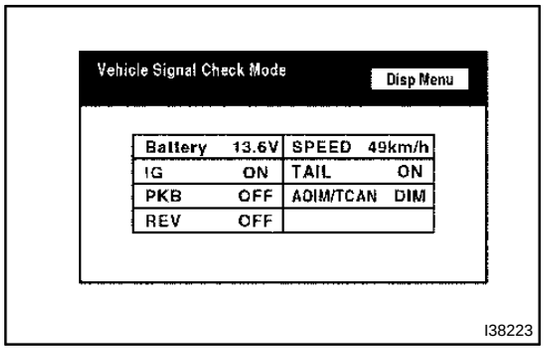
1. Enter diagnostic mode (see page 05–1014).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Vehicle Signal Check" from the "Display Check" screen.



4. When the "Vehicle Signal Check Mode" screen is displayed, check all the vehicle signal conditions.

HINT:

- Only conditions having inputs are displayed.
- This screen is updated once per second when input signals to the vehicle are changed.

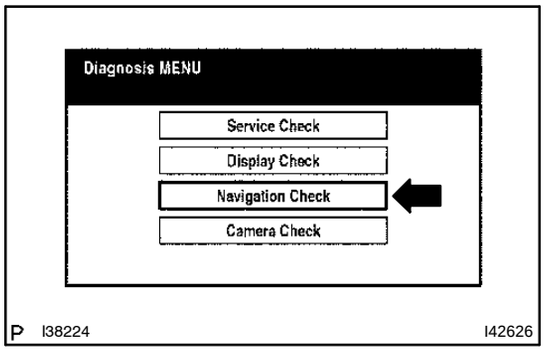
05FIX-04

NAVIGATION CHECK MODE (GPS INFORMATION)

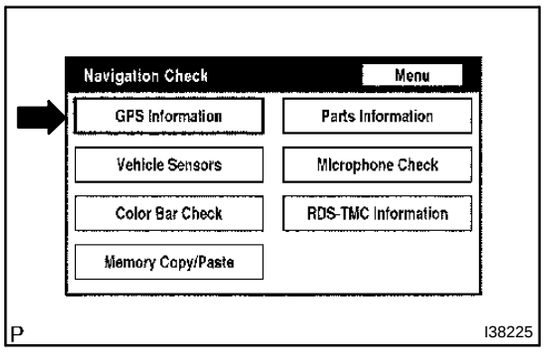
HINT:

- This mode displays GPS satellite information.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

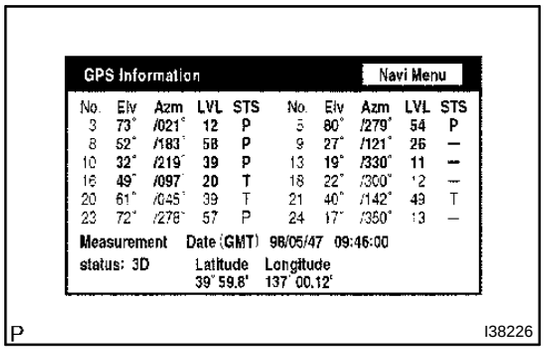
1. Enter diagnostic mode (see page 05–1014).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "GPS Information" from the "Navigation Check" screen.



4. When GPS information is displayed, check the GPS conditions.

HINT:

This screen is updated once per second when input signals to the vehicle are changed.

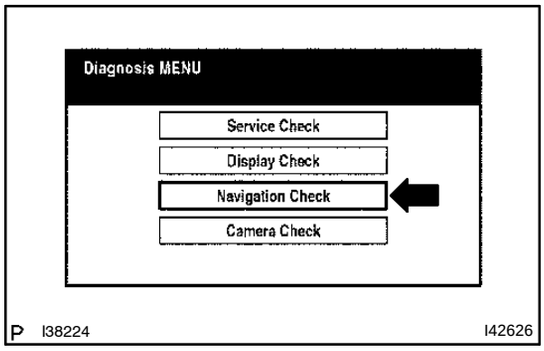
05FIY-04

NAVIGATION CHECK MODE (VEHICLE SENSORS)

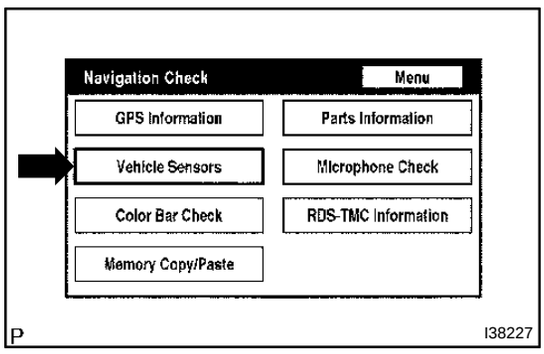
HINT:

- This mode checks the vehicle signal status input to the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

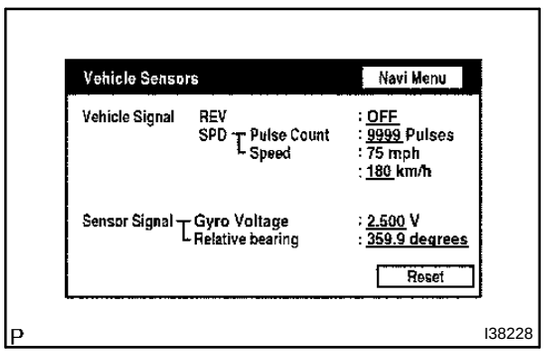
1. Enter diagnostic mode (see page 05-1014).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Vehicle Sensors" from the "Navigation Check" screen.



4. Check all the signals and sensors when vehicle signal information is displayed.

HINT:

This screen is updated once per second when input signals to the vehicle are changed.

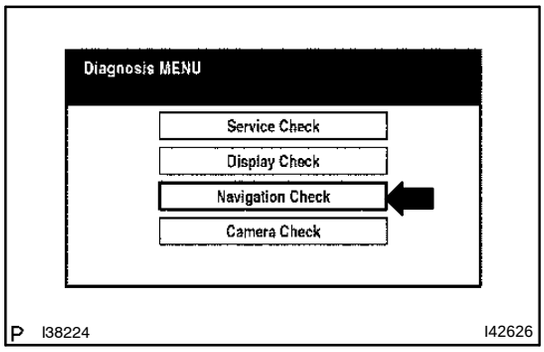
05FIZ-04

NAVIGATION CHECK MODE (NAVI COLOR BAR CHECK)

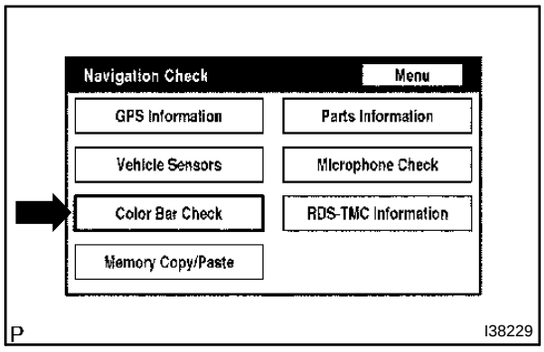
HINT:

- This mode checks the color display on the radio and navigation assy.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

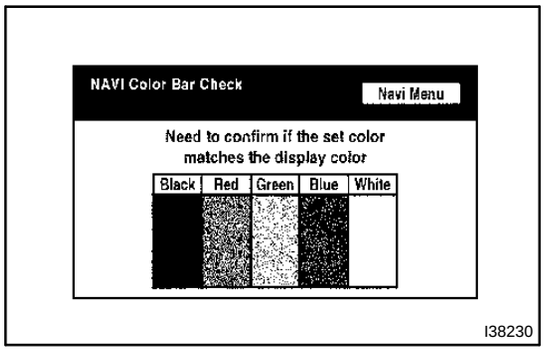
1. Enter diagnostic mode (see page 05–1014).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Color Bar Check" from the "Navigation Check" screen.



4. Check each color of the color bar when the "NAVI Color Bar Check" screen is displayed.

HINT:

Colors will not be displayed full–screen as in "Display Check Mode".

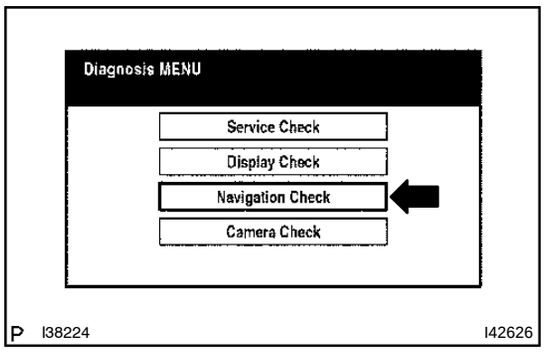
05FJ0-04

NAVIGATION CHECK MODE (PARTS INFORMATION)

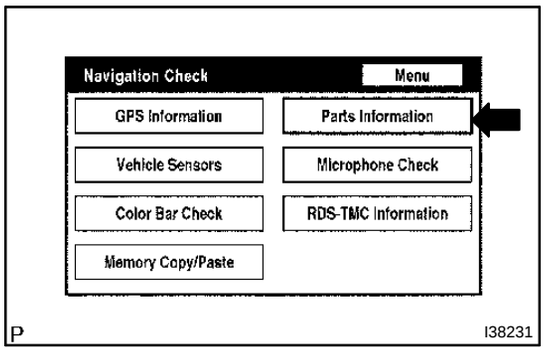
HINT:

- This mode displays product information on the radio and navigation assy and discs.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

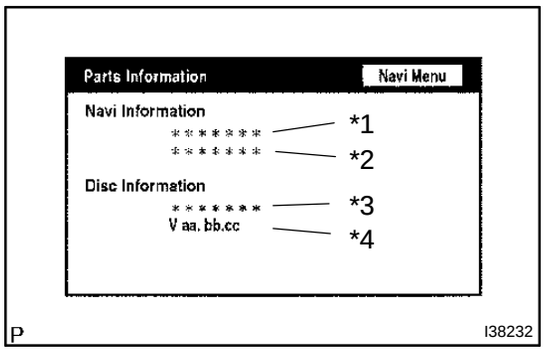
1. Enter diagnostic mode (see page 05-1014).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Parts Information" from the "Navigation Check" screen.



4. Check the navigation and disc information when the "Parts Information" screen is displayed.

Display	Contents
Navigation Manufacturer/*1	Radio and navigation assy manufacturer name is displayed.
Navigation Version/*2	Radio and navigation assy version is displayed.
Disc Manufacturer/*3	Map disc manufacturer is displayed.
Disc Version/*4	Map disc version is displayed.

05FJY-04

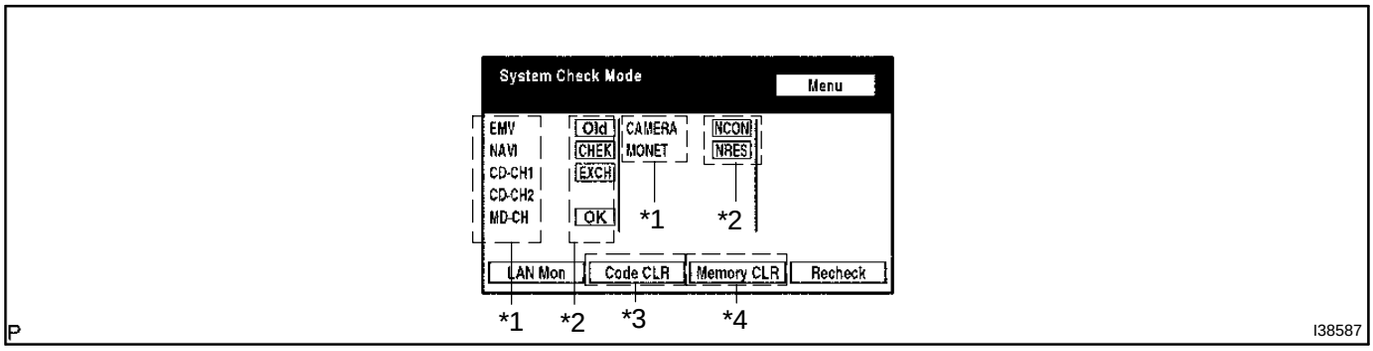
DIAGNOSIS DISPLAY DETAILED DESCRIPTION

HINT:

- This section contains a detailed description of displays within diagnostic mode.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. System Checks

(a) System Check Mode Screen



Device Names and Hardware Address/*1

HINT:

- Registered device names are displayed.
- If a device name is unknown to the system, its physical address is shown instead.

Address No.	Name	Address No.	Name
110	EMV	120	AVX
128	1DIN TV	140	AVN
144	G-BOOK	178	NAVI
17C	MONET	190	AUDIO H/U
1AC	CAMERA-C	1B0	Rr-TV
1C0	Rr-CONT	1C2	TV-TUNER2
1C4	PANEL	1C6	G/W
1C8	FM-M-LCD	1D8	CONT-SW
1EC	BODY	1F0	RADIO TUNER
1F1	XM	1F2	SIRIUS
230	TV-TUNER	240	CD-CH2
250	DVD-CH	280	CAMERA
360	CD-CH1	3A0	MD-CH
17D	TEL	440	DSP-AMP
530	ETC	5C8	MAYDAY
1A0	DVD-P	1D6	CLOCK
1F4	RSA	1F6	RSE
480	AMP		

Check Result/*2

HINT:

Result codes for all devices are displayed.

Result	Meaning	Action
OK	The device did not respond with a DTC (excluding communication DTCs from the AVC-LAN).	-
EXCH	The device responds with a "replace"-type DTC.	Look up the DTC in "Unit Check Mode" and replace the device.
CHEK	The device responds with a "check"-type DTC.	Look up the DTC in Unit Check Mode".
NCON	The device was previously present, but does not respond in diagnostic mode.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.
Old	The device responds with an "old"-type DTC.	Look up the DTC in "Unit Check Mode".
NRES	The device responds in diagnostic mode, but gives no DTC information.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.

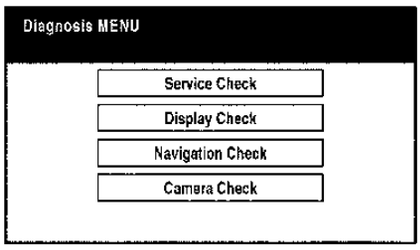
Code Clear/*3

Present DTCs are cleared.

Memory Clear/*4

Present and past DTCs and registered connected device names are cleared.

(b) Diagnosis MENU Screen

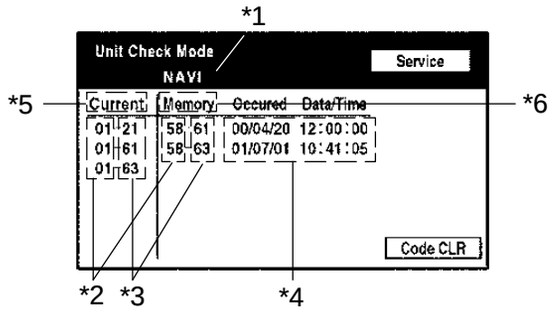


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HINT:

Each item is grayed out or not displayed based on the device settings.

(c) Unit Check Mode Screen

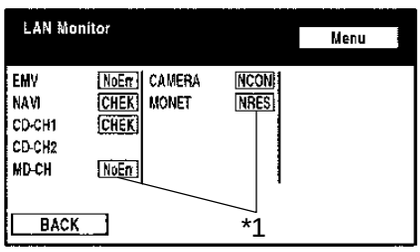


P I38588

Screen Description

Display	Contents
Device name/*1	Target device
Segment/*2	Target device logical address
DTC/*3	DTC (Diagnostic Trouble Code)
Timestamp/*4	The time and date of past DTCs are displayed (The year is displayed in 2 digit format.).
Present Code/*5	The DTC output at the service check is displayed.
Past Code/*6	Diagnostic memory results and recorded DTCs are displayed.

(d) LAN Monitor (Original) Screen



P I38589

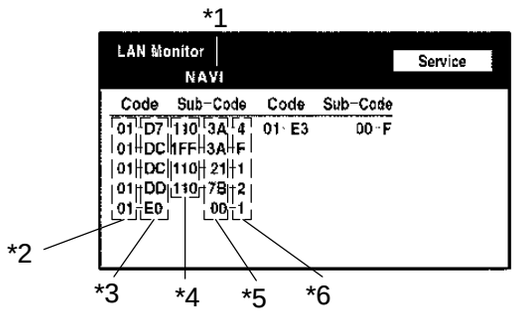
Check Result/*1

HINT:

Check results of all the devices are displayed.

Result	Meaning	Action
No Err (OK)	There are no communication DTCs.	-
CHEK	The device responds with a "check"-type DTC.	Look up the DTC in "Unit Check Mode".
NCON	The device was previously present, but does not respond in diagnostic mode.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.
Old	The device responded with an old-type DTC.	Look up the DTC in "Unit Check Mode".
NRES	Device responds in diagnostic mode, but gives no DTC information.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.

(e) LAN Monitor (Individual) Screen



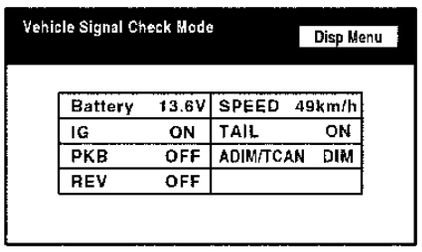
P I38590

Screen Description

Display	Contents
Device name/*1	Target device
Segment/*2	Target logical address
DTC/*3	DTC (Diagnostic Trouble Code)
Sub-Code (device address)/*4	Physical address stored with DTC (If there is no address, nothing is displayed.).
Connection check No./*5	Connection check number stored with DTC.
DTC occurrence/*6	Number of times the same DTC has been recorded.

2. DISPLAY CHECK

(a) Vehicle Signal Check Mode Screen



P I38591

Screen Description

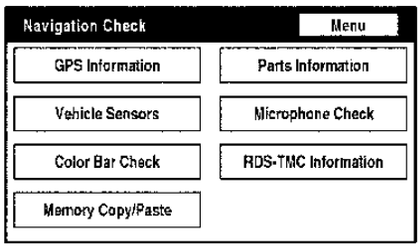
Name	Contents
Battery	Battery voltage is displayed.
PKB	Parking brake ON/OFF state is displayed.
REV	Reverse signal ON/OFF state is displayed.
IG	Engine switch ON/OFF state is displayed.
ADIM/TCAN	Brightness state DIM (with)/ BRIGHT (without) is displayed.
SPEED	Vehicle speed is displayed in km/h.
TAIL	TAIL signal (Head lamp dimmer switch) ON/OFF state is displayed.

HINT:

- Only items sending a vehicle signal will be displayed.
- This screen is updated once per second when input signals to the vehicle are changed.

3. NAVIGATION CHECK

(a) Navigation Check Screen

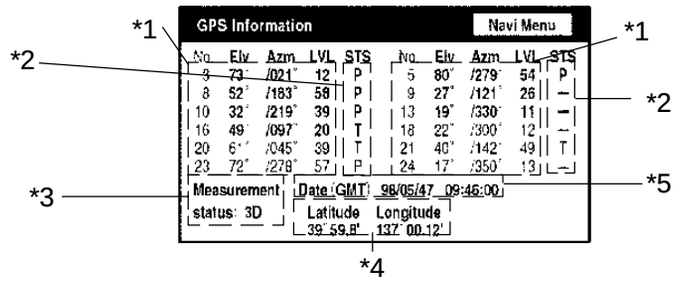


P I38667

HINT:

Each item is grayed out or not displayed based on the device settings.

(b) GPS information Screen



P I38592

Satellite information/*1

Information from a maximum of 12 satellites is displayed on the screen. This information includes the target GPS satellite number, elevation angle, direction and signal level.

Receiving condition/*2

(DENSO model)

Display	Contents
T	The system is receiving a GPS signal, but is not using it for location.
P	The system is using the GPS signal for location.
-	The system cannot receive a GPS signal.

(AISIN AW model)

Display	Contents
01H	The system cannot receive a GPS signal.
02H	The system is tracing a satellite.
03H	The system is receiving a GPS signal, but is not using it for location.
04H	The system is using the GPS signal for location.

Measurement information/*3

Display	Contents
2D	2-dimensional location method is being used.
3D	3-dimensional location method is being used.
NG	Location data cannot be used.
Error	Reception error has occurred.
-	Any other state.

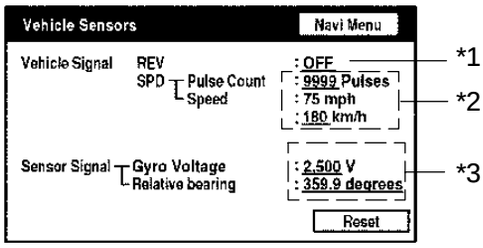
Position information/*4

Display	Contents
Position	Latitude and longitude information on the current position is displayed.

Date information/*5

Display	Contents
Date	The date/time information obtained from GPS signal is displayed in Greenwich mean time (GMT). The last 4 digits are displayed.

(c) Vehicle Sensors Screen



P I38593

Vehicle signal

Display	Contents
REV/*1	REV signal ON/OFF state is displayed.
SPD/*2	SPD signal condition is displayed.

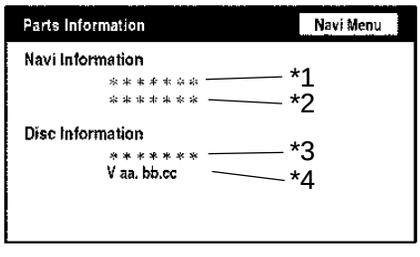
Sensor signal

Display	Contents
Gyro sensor/*3	Gyro sensor output condition is displayed (when the vehicle runs straight or is stationary, the voltage is approximately 2.5 V).

HINT:

Signals are updated once per second only when vehicle sensor signals are changed.

(d) Parts Information Screen

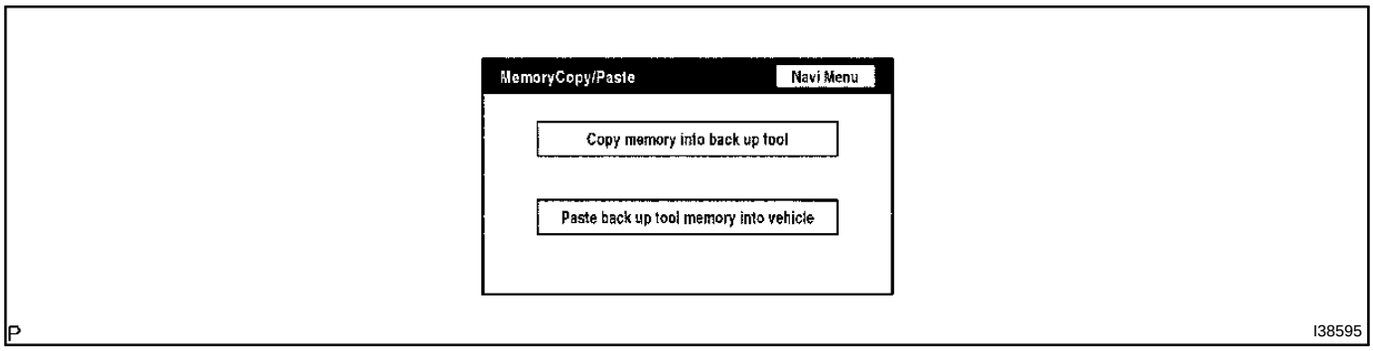


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Screen description

Display	Contents
Navigation Manufacturer/*1	Radio and navigation assy manufacturer is displayed.
Navigation Version No./*2	Radio and navigation assy version is displayed.
Disc Manufacturer/*3	Map disc manufacturer is displayed.
Disc Version No./*4	Map disc version is displayed.

(e) Memory Copy/Paste Screen



HINT:
This function cannot be used.

PRESSING POWER SWITCH DOES NOT TURN ON SYSTEM

INSPECTION PROCEDURE

1	CHECK CABIN

(a) Check that conditions in the cabin are not likely to cause condensation.

HINT:

This problem occurs when the cabin is humid and the temperature rapidly changes. This condition may produce condensation, resulting in a short circuit.

OK: Condensation is not likely.

NG → **DRY CABIN AND RECHECK CONDITIONS**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION AND AUDIO SCREEN)

INSPECTION PROCEDURE

1	CHECK DISPLAY SETTING

(a) Check that the display is not in "Screen OFF" mode.
OK: The display setting is not in "Screen OFF" mode.

NG → **CHANGE SCREEN TO "SCREEN ON" MODE**

OK

2	CHECK IMAGE QUALITY SETTING

(a) Check if screen color quality can be set.
OK: Screen color quality can be set.

OK → **PRESS PANEL SWITCH "DISPLAY" AND SET SCREEN COLOR QUALITY TO NORMAL**

NG

3	CHECK CABIN

(a) Check if condensation is likely to occur, or the temperature is high or low (extremely cold) in the cabin.
HINT:
This problem occurs when the cabin is humid and the temperature rapidly changes. This condition may produce condensation, resulting in a short circuit.
OK: The above conditions are not observed.

NG → **SET CABIN TEMPERATURE TO APPROPRIATE DEGREES (20 TO 30°C) (68 TO 86°F)**

OK

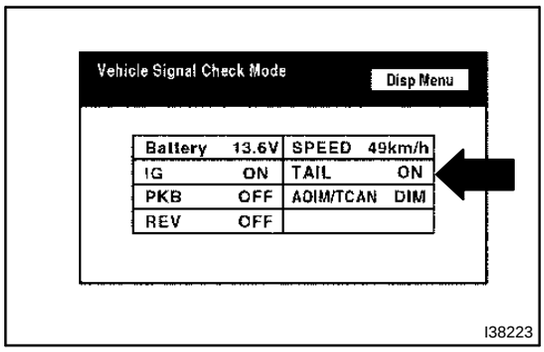
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

ILLUMINATION FOR PANEL SWITCH DOES NOT COME ON WITH TAIL SWITCH ON

INSPECTION PROCEDURE

1	DISPLAY CHECK MODE(VEHICLE SIGNAL CHECK MODE)

(a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (see page 05-1031).



(b) Turn the light control switch to the TAIL, HEAD or OFF position.

Standard:

Light Control Switch	Display
TAIL or HEAD	ON
OFF	OFF

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

OK → **REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67-6)**

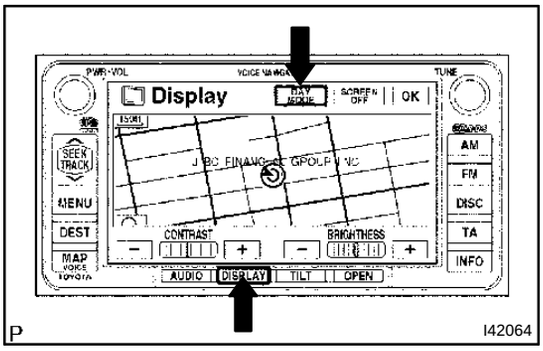
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

DISPLAY DOES NOT DIM (NIGHT SCREEN) WITH TAIL SWITCH ON

INSPECTION PROCEDURE

1 CHECK IMAGE QUALITY SETTING



(a) Enter the display adjustment screen by pressing the "DISPLAY" switch.

(b) Turn the light control switch to the TAIL position.

(c) Check if "DAY MODE" on the display adjustment is ON.

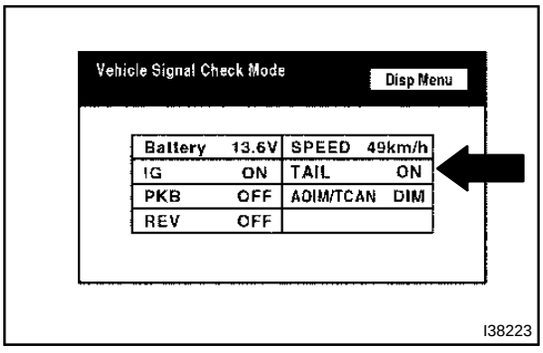
OK: "DAY MODE" is ON.

OK → **TURN FORCED "DAY MODE" SETTING OFF**

NG

2 DISPLAY CHECK MODE(VEHICLE SIGNAL CHECK MODE)

(a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (see page 05-1031).



(b) Turn the light control switch to the TAIL, HEAD or OFF position.

Standard:

Light Control Switch	Display
TAIL or HEAD	ON
OFF	OFF

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

OK → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

PANEL SWITCH DOES NOT FUNCTION

INSPECTION PROCEDURE

1	CHECK PANEL SWITCH

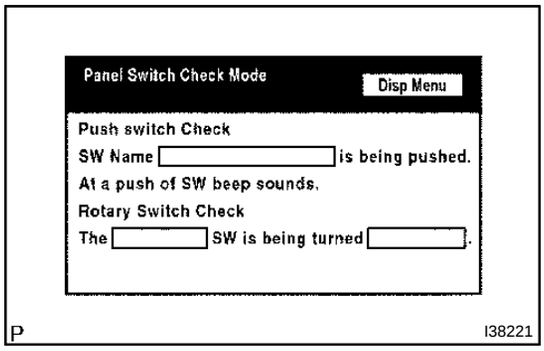
(a) Check for foreign matter around the switch that might prevent operation.
OK: No foreign matter is found.

NG → **REMOVE ANY FOREIGN MATTER FOUND**

OK

2	DISPLAY CHECK MODE(PANEL SWITCH CHECK MODE)

(a) Enter the "Display Check" mode (Panel Switch Check Mode) (see page 05-1030).



(b) Operate the abnormal switch and check if the switch name and status are correctly displayed.
OK: The switch name and status are correctly displayed as operated.

OK → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

TOUCH PANEL SWITCH DOES NOT FUNCTION

INSPECTION PROCEDURE

1	CHECK TOUCH PANEL

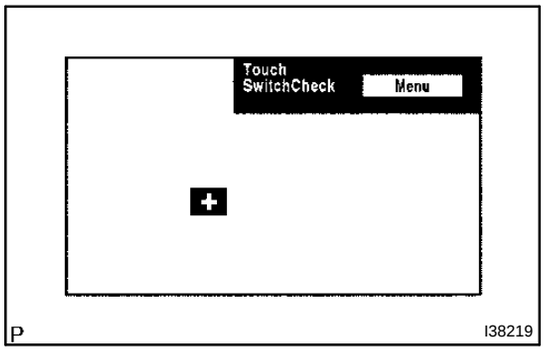
(a) Check for dirt on the display surface.
OK: The display surface is clean.

NG → **REMOVE ANY DIRT FOUND AND RECHECK TOUCH PANEL**

OK

2	DISPLAY CHECK MODE(TOUCH SWITCH CHECK)

(a) Enter the "Display Check" mode (Touch Switch Check) (see page 05-1029).



(b) Touch the display in the area where the abnormal switch occurs.
OK: A "+" mark appears at the touched position.

OK → **REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67-6)**

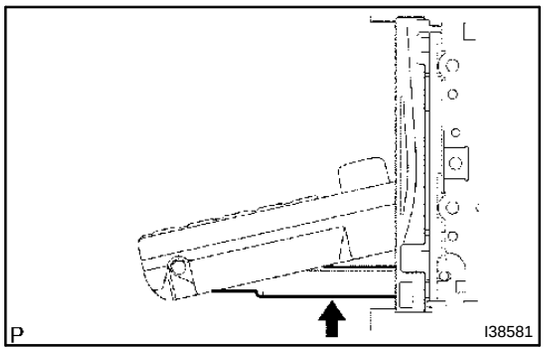
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

DISPLAY PANEL DOES NOT OPEN, TILT, OR TILTS IMPROPERLY

INSPECTION PROCEDURE

1	CHECK RADIO AND NAVIGATION ASSY



(a) Check for foreign matter or obstructions caught in the moving parts of the panel.
OK: No obstruction or foreign matter is found.

NG → **REMOVE ANY OBSTRUCTION OR FOREIGN MATTER FOUND**

OK

2	OPERATION CHECK

(a) Check if the navigation and audio systems function properly.
OK: Navigation and audio systems function properly.

OK → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

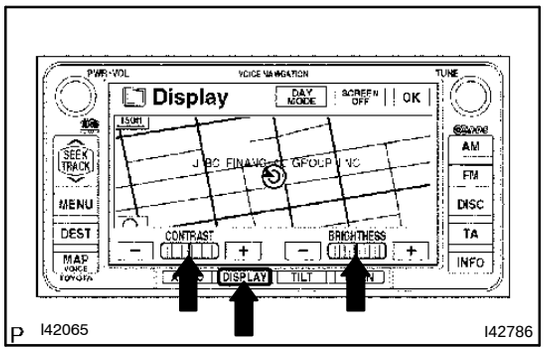
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

SCREEN FLICKER OR COLOR DISTORTION

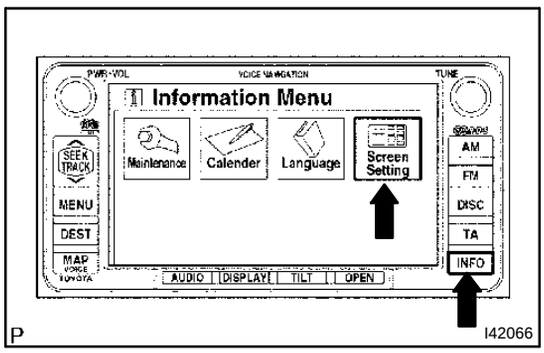
INSPECTION PROCEDURE

1	CHECK DISPLAY SETTING

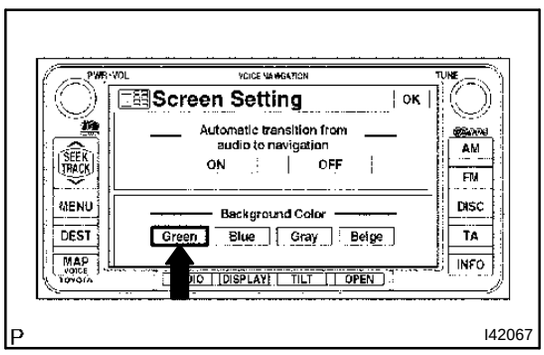


(a) Enter the display adjustment screen by pressing the "DISPLAY" switch.

(b) Reset display settings (contrast, brightness) and check if the screen appears normal.



(c) Press the "INFO" switch and then the "Screen Setting" switch.



(d) Set the "Background Color" to "Green" (initial setting) and check if it is normal.
OK: Returns to normal.

OK > **END**

NG

2	CHECK CABIN

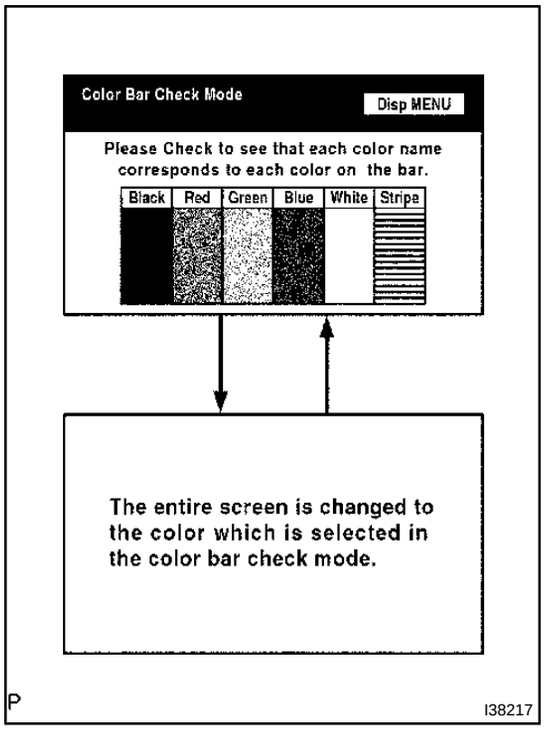
(a) Check if the cabin temperature is −20°C (−4.0°F) or less.
Standard: Cabin is warmer than -20°C (-4.0°F).

NG > **HEAT CABIN AND RECHECK TEMPERATURE**

OK

3 DISPLAY CHECK MODE(COLOR BAR CHECK MODE)

(a) Enter the "Display Check" mode (Color Bar Check Mode) (see page 05-1028).



(b) Check that color bars match the displayed names.

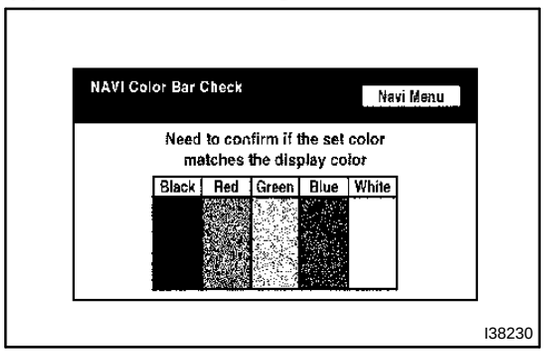
OK: Color bars match the displayed names.

NG → **REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE67-6)**

OK

4 NAVIGATION CHECK MODE(NAVI COLOR BAR CHECK)

(a) Enter the "Navigation Check" mode (NAVI Color Bar Check) (see page 05-1034).



(b) Check that color bars match the displayed names.

OK: Color bars match the displayed names.

NG → **REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE67-6)**

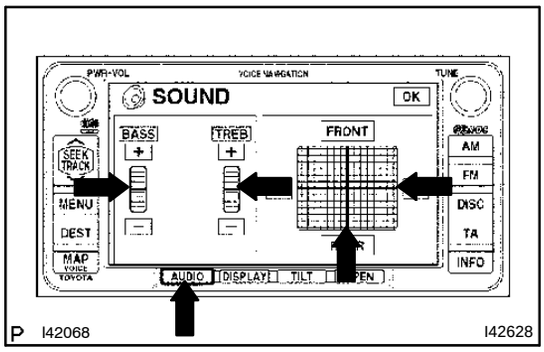
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

NO SOUND CAN BE HEARD FROM SPEAKERS (AUDIO IS MUTE)

INSPECTION PROCEDURE

1	CHECK AUDIO SETTINGS



(a) Enter the sound adjustment screen by pressing the "SOUND" switch on the AUDIO display.

(b) Set volume, fader, and balance to the initial values and check that sound is normal.

OK: Audio returns to normal.

HINT:

Sound quality adjustment items vary depending on the type of the amplifier.

OK → **END**

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

RADIO BROADCAST CANNOT BE RECEIVED (POOR RECEPTION)

INSPECTION PROCEDURE

1 CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

(a) Check if the radio auto-search functions properly.
(1) Perform the auto-search of the radio and check that it functions normally.
OK: The radio auto-search functions properly.

OK → **REPLACE RADIO AND NAVIGATION ASSY** (SEE PUB. NO. RM925E, PAGE 67-6)

NG

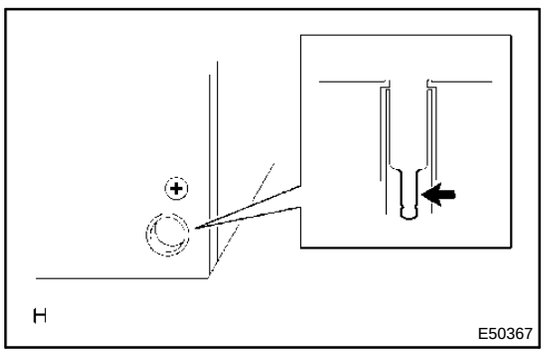
2 CHECK OPTIONAL COMPONENTS

(a) Check optional component (sun shade film, telephone antenna, etc.).
(1) Check whether or not any optional component such as the sun shade film and the telephone antenna is installed.
OK: Optional component is installed.

OK → **EFFECT FROM OPTIONAL COMPONENT**

NG

3 INSPECT RADIO AND NAVIGATION ASSY



(a) Preparation for Check
(1) Remove the antenna plug from the radio and navigation assy.
(b) Noise Check
(1) With the radio and navigation assy connector connected, turn the ignition switch to the ACC position.
(2) Turn on the radio and choose the AM mode.
(3) Place a screwdriver or a piece of metal such as thin wire on an antenna jack of the radio and navigation assy and check that the noise is heard from the speaker.
OK: Noise occurs.

NG → **REPLACE RADIO AND NAVIGATION ASSY** (SEE PUB. NO. RM925E, PAGE 67-6)

OK

4	CHECK ANTENNA ASSY

(a) Check that the antenna is securely installed.
OK: The antenna is installed properly.

NG → **INSTALL ANTENNA ASSY PROPERLY**

OK

5	CHECK ANTENNA CORD SUB-ASSY

(a) Remove the antenna plug of the radio and navigation assy and antenna assy.
(b) Measure the resistance between the antenna assy and radio and navigation assy to check for an open circuit in the antenna cord sub-assy.
Standard: Below 1 Ω
(c) Measure the resistance between the antenna cord sub-assy and body ground to check for a short circuit in the antenna cord sub-assy.
Standard: 10 kΩ or higher

NG → **REPLACE ANTENNA CORD SUB-ASSY (SEE PUB. NO. RM939E, PAGE 67-2 OR PUB. NO.RM925E, PAGE 67 - 14)**

OK

6	REPLACE AMPLIFIER ANTENNA ASSY (SEE PUB. NO. RM925E, PAGE 67-20)

(a) Replace the amplifier antenna assy and check if it operates normally.
OK: The amplifier antenna assy operates normally.

OK → **NORMAL OPERATION**

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

CD CANNOT BE INSERTED/PLAYED OR CD IS EJECTED RIGHT AFTER INSERTION

INSPECTION PROCEDURE

1	CHECK CD

(a) Check if the CD is a normal audio CD that has no cracks, scratches, deformations, dirt, or other defects.
OK: The CD is a normal audio CD.

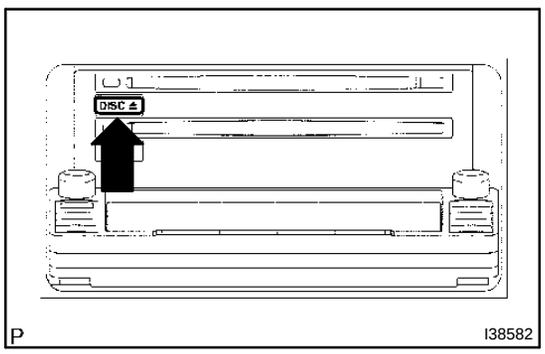
HINT:

- Translucent or deformed CDs cannot be played.
- CD-ROMs (even those with music) and CD-R discs cannot be played.
- A copy protected CD should not be used.
- An adaptor is not necessary to play 3.2 inch (8 cm) CDs.

NG → **REPLACE CD**

OK

2	CHECK RADIO AND NAVIGATION ASSY



(a) Check if the "DISC" indicator near the disc slot is on.
OK: It is not on.

NG → **PRESS DISC SWITCH TO EJECT DISC**

OK

3	CHECK IF A CD IS INSERTED PROPERLY

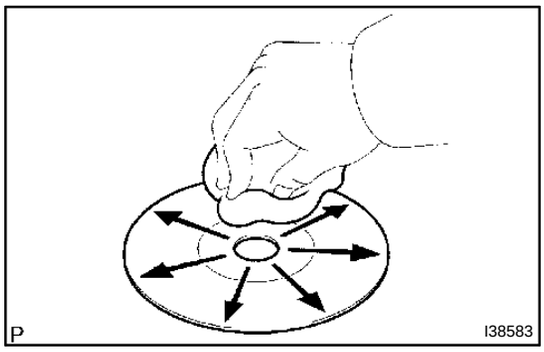
(a) Check if a CD is inserted properly.
(1) Check whether or not the CD is inserted upside down.
OK: Not upside down.

NG → **SET DISC CORRECTLY**

OK

4	CHECK CD

(a) Check for dirt on the CD surface.
OK: The CD is clean.



HINT:
If dirt is on the CD surface, wipe it with a soft cloth from inside to outside in a radial direction.
NOTICE:
Do not use conventional record cleaner or anti-static preservative.

NG → **CLEAN CD**

OK

5	CHECK USING ANOTHER CD

(a) Check using another CD.
(1) Check if the problem recurs using another CD.
OK: The problem does not recur.

OK → **REPLACE CD**

NG

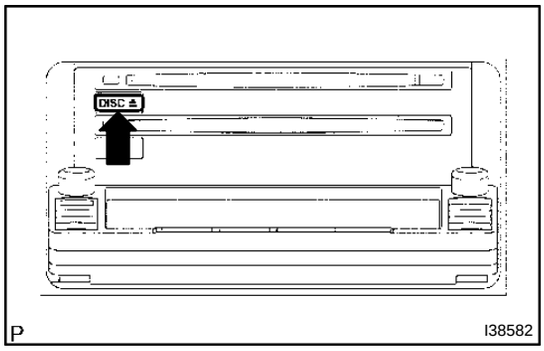
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

CD CANNOT BE EJECTED

INSPECTION PROCEDURE

1	CHECK RADIO AND NAVIGATION ASSY

(a) Turn the ignition switch to the ACC position.



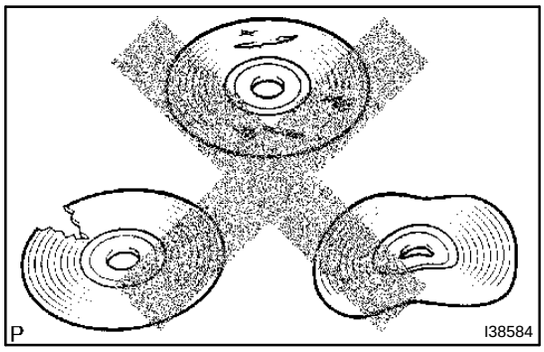
(b) Keep pressing the "DISC" eject switch for 5 seconds and check if the disc is ejected by forced ejection.
OK: The disc is ejected.

HINT:
The above operation can only be performed with the ignition switch in the ACC position.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**
(SEE PAGE 05-1021)

OK

2	CHECK THE CD



(a) Check that the CD is not deformed or cracked.
OK: No deformations or cracks appear on the CD.

NG → **REPLACE CD**

OK

3	CHECK RADIO AND NAVIGATION ASSY

(a) Insert another CD and check if it is ejected.
OK: The disc is ejected.

NG → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

OK

NORMAL OPERATION

ABNORMAL NOISE OCCURS

INSPECTION PROCEDURE

1	CHECK SPEAKERS

(a) Check the speaker installation conditions.
(1) Check that each speaker is securely installed.
OK: Malfunction disappears.

HINT:
The radio is equipped with a noise prevention system that blocks excessively loud noise. If such noise occurs, check that all wiring is proper and that the antenna installation part ground and noise-prevention equipment are installed.

Conditions Under Which Noise Occurs	Noise Type
Noise increases when the accelerator pedal is depressed, but stops when the engine is stopped.	Generator noise
Noise occurs during A/C or heater operation.	Blower motor noise
Noise occurs when the vehicle accelerates rapidly on an unpaved road or after the ignition switch is turned on.	Fuel pump noise
Noise occurs when the horn switch is pressed and released or when pressed and held.	Horn noise
Quiet noise occurs while the engine is running, but stops when the engine is stopped.	Ignition noise
Noise occurs synchronously with the blink of the turn signal.	Flasher noise
Noise occurs during window washer operation.	Washer noise
Noise occurs while the engine is running, and continues even after the engine is stopped.	Water temperature sensor noise
Noise occurs during wiper operation.	Wiper noise
Noise occurs when the brake pedal is depressed.	Stop light switch noise
Others	Static electricity stored on the vehicle

HINT:
- First ensure that the noise is not coming from the outside. Failure to do so makes noise source detection difficult and may lead to a misdiagnosis.
- Noise should be removed in descending order of loudness.

NG → **REINSTALL SPEAKER PROPERLY**

OK ↓

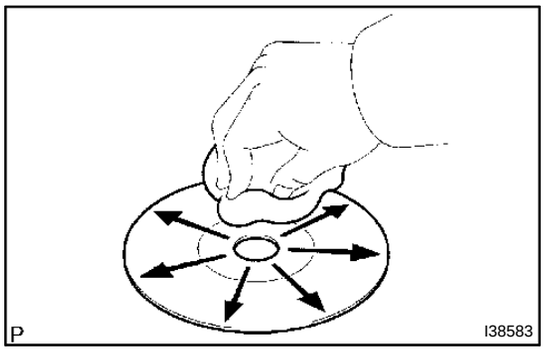
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

CD SOUND SKIPS

INSPECTION PROCEDURE

1	CHECK CD

(a) Check for dirt on the CD surface.
OK: The CD is clean.

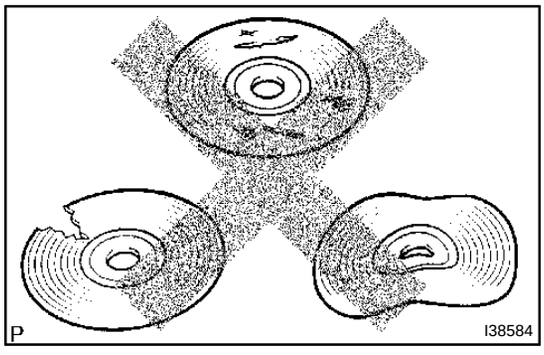


HINT:
If dirt is on the CD surface, wipe it with a soft cloth from inside to outside in a radial direction.
NOTICE:
Do not use conventional record cleaner or anti-static preservative.

NG → **CLEAN CD**

OK

2	CHECK CD



(a) Check that the CD is not deformed or cracked.
OK: No deformations or cracks appear on the CD.

NG → **REPLACE CD**

OK

3	CHECK USING ANOTHER CD

(a) Check using another CD.
(1) Check if the problem recurs using another CD.
OK: The problem does not recur.

OK → **REPLACE CD**

NG

4	CHECK RADIO AND NAVIGATION ASSY

(a) Check the radio and navigation assy installation condition.
(1) Check that the radio and navigation assy is properly installed.
OK: Radio and navigation assy is properly installed.

NG → **REINSTALL RADIO AND NAVIGATION ASSY PROPERLY**

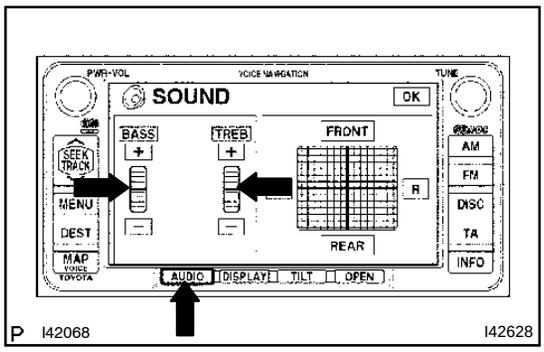
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05–1021)

POOR SOUND QUALITY IN ALL MODES (LOW VOLUME)

INSPECTION PROCEDURE

1	CHECK AUDIO SETTINGS



(a) Enter the sound adjustment screen by pressing the "SOUND" switch on the AUDIO display.

(b) Set "BASS" and "TREB" to the initial values and check if sound is normal.

OK: Returns to normal.

HINT:

Sound quality adjustment items vary depending on the type of the amplifier.

OK → **END**

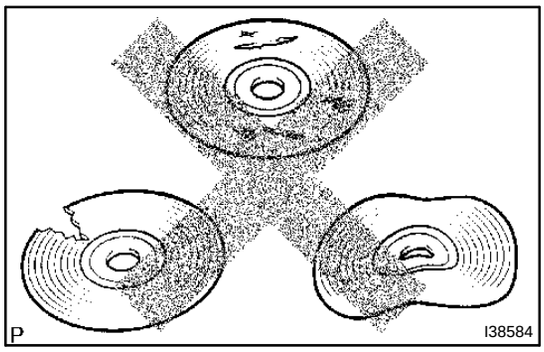
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

MAP DISC CANNOT BE INSERTED

INSPECTION PROCEDURE

1	CHECK MAP DISC

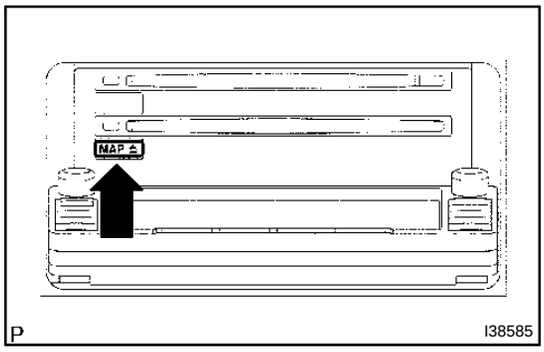


(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **CHECK MAP DISC**

OK

2	CHECK RADIO AND NAVIGATION ASSY



(a) Check if the "MAP" indicator near the disc slot is on.
OK: It is not on.

NG → **PRESS EJECT SWITCH TO EJECT DISC**

OK

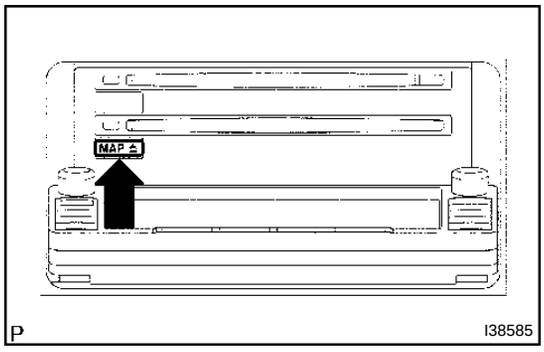
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

MAP DISC CANNOT BE EJECTED

INSPECTION PROCEDURE

1	CHECK RADIO AND NAVIGATION ASSY

(a) Turn the ignition switch to the ACC position.



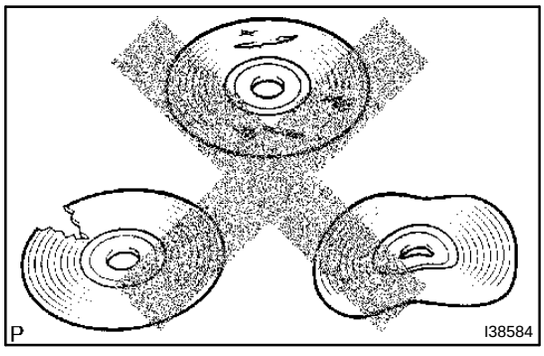
(b) Keep pressing the "MAP" eject switch for 5 seconds and check if the disc is ejected by forced ejection.
OK: The disc is ejected.

HINT:
The above operation can only be performed with the ignition switch in the ACC position.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**
(SEE PAGE 05-1021)

OK

2	CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

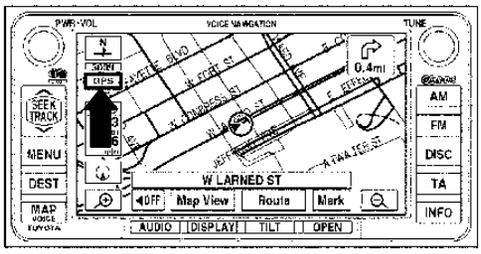
OK

NORMAL OPERATION

VEHICLE POSITION MARK DEVIATES GREATLY

INSPECTION PROCEDURE

1 CHECK GPS MARK



P I42069

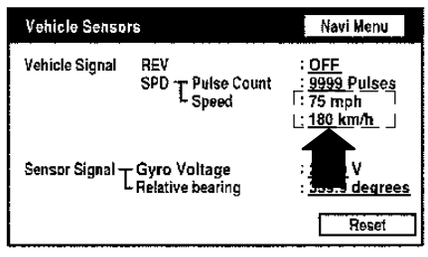
(a) Check that the GPS mark is displayed.
OK:The GPS mark is displayed.

NG → **GO TO "GPS MARK IS NOT DISPLAYED" IN FLOW CHART (SEE PAGE 05-1069)**

OK

2 NAVIGATION CHECK MODE(VEHICLE SENSORS CHECK)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1033).



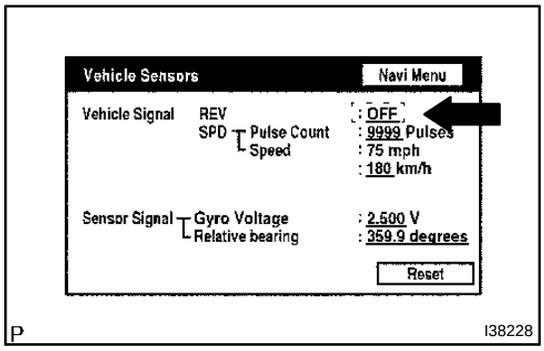
P I38228

(b) While driving, compare the "SPD" indicator to the reading on the speedometer. Check that these readings are almost the same.
OK: The readings are almost the same.

NG → **GO TO "SPEED SIGNAL CIRCUIT" IN FLOW CHART (SEE PAGE 05-1096)**

OK

3 NAVIGATION CHECK MODE(VEHICLE SENSORS CHECK)



(a) Move the shift lever to the R position.

Standard:

Shift lever	Display
R	ON
Any position except R	OFF

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

NG → **GO TO "REVERSE SIGNAL CIRCUIT" IN FLOW CHART (SEE PAGE 05-1098)**

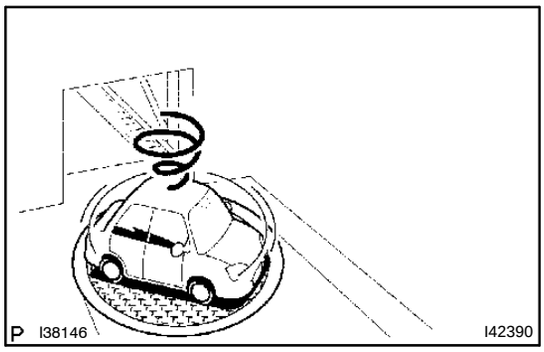
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

CURSOR OR MAP ROTATES WHEN VEHICLE IS STOPPED

INSPECTION PROCEDURE

1	CHECK CONDITION



(a) Check with the customer if the vehicle has been turned by a turntable at parking.

OK: The vehicle has not been turned by a turntable.

HINT:

If the ignition switch is turned to the ACC or ON position while the vehicle is being turned by a turntable, the system may store the angular velocity at this time. For this reason, the vehicle position cursor could deviate.

NG → **TURN IGNITION SWITCH TO ON POSITION WHEN VEHICLE IS COMPLETELY STOPPED**

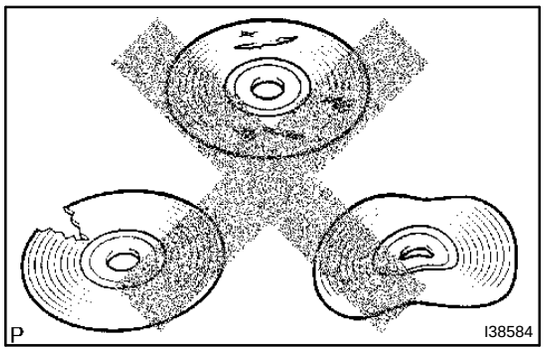
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

VEHICLE POSITION MARK IS NOT UPDATED

INSPECTION PROCEDURE

1 CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

2 CHECK MAP DISPLAY

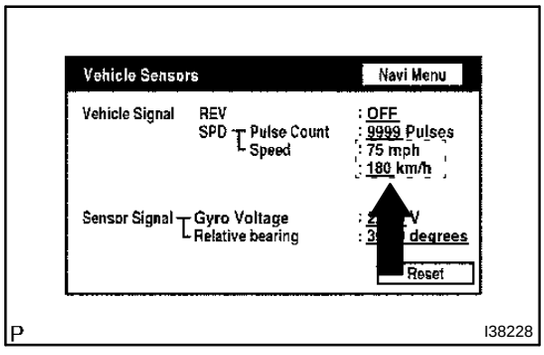
(a) Check if a touch scroll can be performed on the map display.
OK: Touch scroll can be performed.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)**

OK

3 NAVIGATION CHECK MODE(VEHICLE SENSORS CHECK)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1033).



(b) While driving, compare the "SPD" indicator to the reading on the speedometer. Check if these readings are almost the same.
OK: The readings are almost the same.

NG → **GO TO "SPEED SIGNAL CIRCUIT" IN FLOW CHART (SEE PAGE 05-1096)**

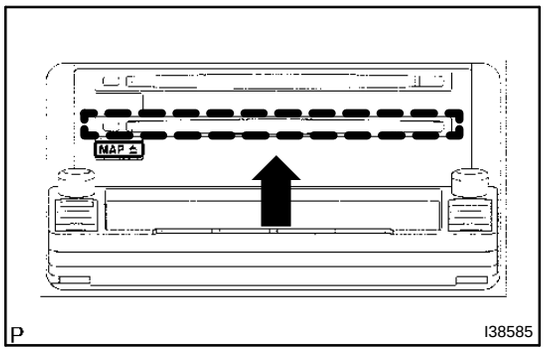
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

CURRENT POSITION DISPLAY DOES NOT APPEAR

INSPECTION PROCEDURE

1	CHECK RADIO AND NAVIGATION ASSY

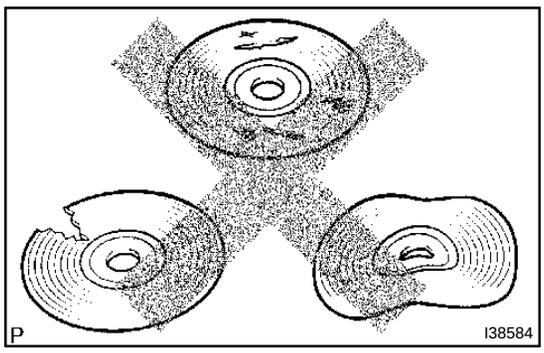


(a) Check if a map disc is inserted in the map disc slot.
OK: A map disc is inserted.

NG → **INSERT MAP DISC IN "MAP" SIDE SLOT**

OK

2	CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

GPS MARK IS NOT DISPLAYED

INSPECTION PROCEDURE

1	CHECK CABIN

(a) Check the cabin for any object that might interrupt radio reception on the instrument panel. If such an object exists, remove it and check if the GPS mark reappears.

HINT:

GPS works using extremely weak radio waves originating from satellites. If the signal is interrupted by obstructions or another radio wave, the GPS system may not be able to properly receive the signal.

OK: Mark appears.

OK	NORMAL OPERATION

NG

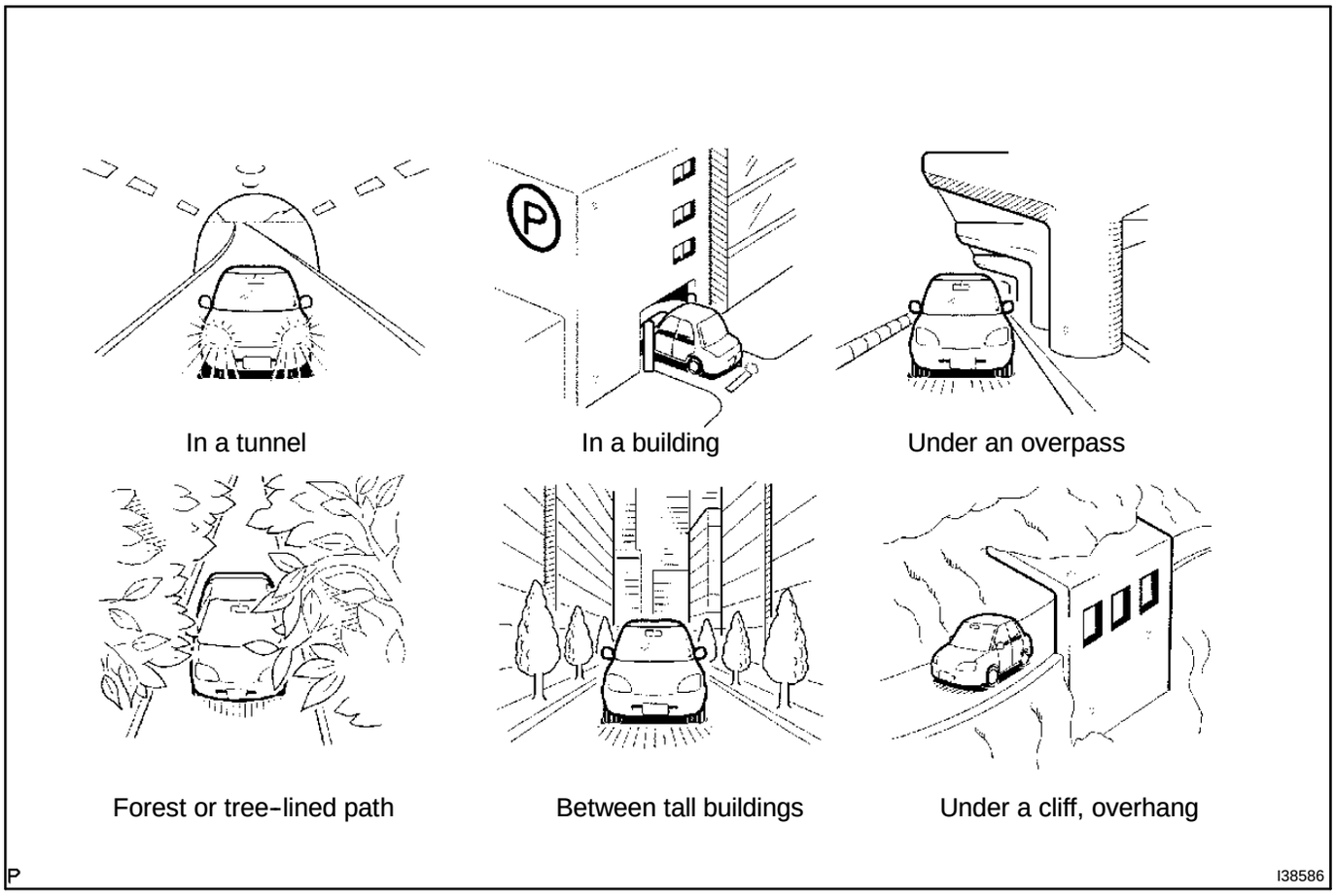
2	CHECK SURROUNDINGS

(a) Check if the vehicle is in a location where GPS signal reception is bad. If the vehicle is in such a place, move it elsewhere and check if the GPS mark reappears.

HINT:

- GPS uses 24 satellites in 6 orbits so that at any time 4 satellites will be in line-of-sight of your vehicle.
- GPS signals may not be received, however, based on surroundings, vehicle direction, and time.

- The following illustrations show some conditions where it may be difficult to receive GPS signals.



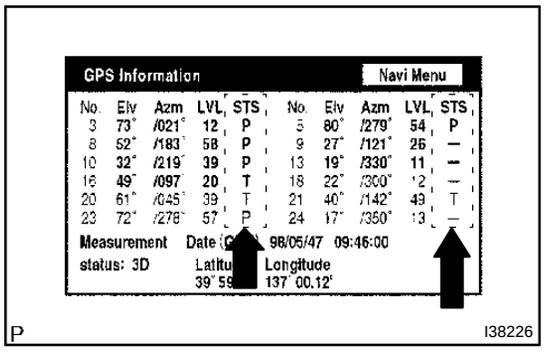
OK: GPS mark is displayed.

OK	**RETURNS TO NORMAL**

NG

3	**NAVIGATION CHECK MODE(GPS IMFORMATION)**

(a) Enter the ”Navigation Check” mode (GPS information) (see page 05–1032).



(b) Check how many of the following codes occur in the ”STS” column.

For DENSO Models: T, P
For AISIN AW Models: 04H, 08H
Standard: At least 3 codes occur.

OK	**REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67–6)**

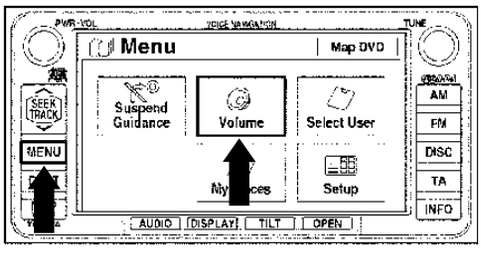
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1021)

VOICE GUIDANCE DOES NOT FUNCTION

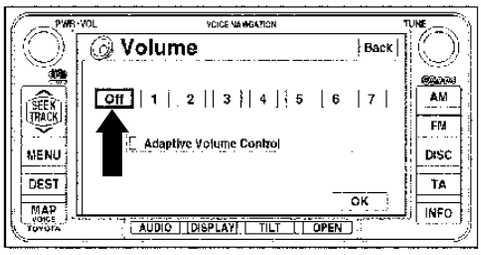
INSPECTION PROCEDURE

1	CHECK NAVIGATION SYSTEM SETTING



P I42070 I42413

(a) Enter the "MENU" screen by pressing the "MENU" switch.
(b) Enter the volume adjustment screen by pressing the "Volume" switch.



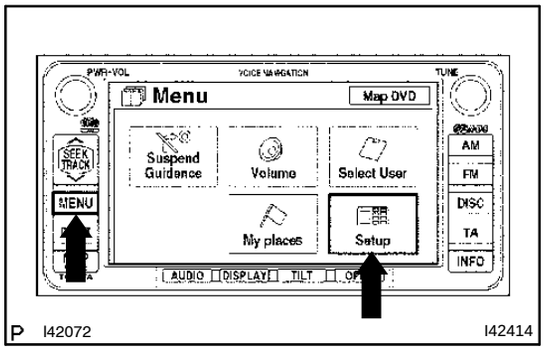
P I42071

(c) Check that "OFF" is not selected.
OK: OFF is not selected.

NG → **TURN VOICE GUIDANCE VOLUME UP TO 4 USING VOICE ADJUSTMENT SWITCHES**

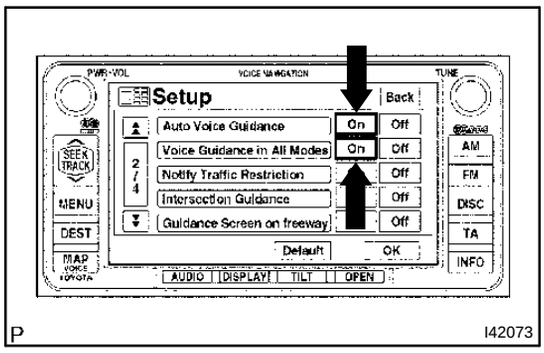
OK

2 CHECK NAVIGATION SETTING



P I42072 I42414

(a) Enter the ”MENU” screen by pressing the ”MENU” switch.
(b) Enter the ”Setup” screen by pressing the ”Setup” switch.



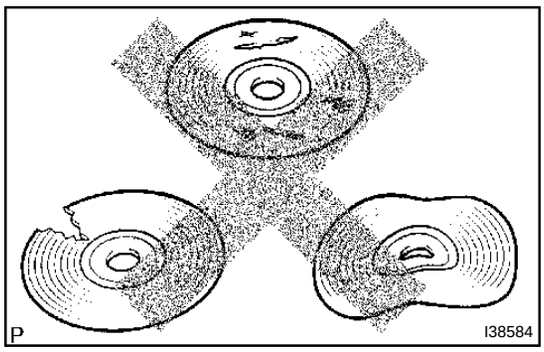
P I42073

(c) Check that ”Auto Voice Guidance” is not OFF.
OK: Auto voice guidance is not OFF.
(d) Check that ”Voice Guidance in All Modes” is not OFF.
OK: Voice guidance in all modes is not OFF.

NG → **TURN AUTO VOICE GUIDANCE TO ”ON”**

OK

3 CHECK MAP DISC


P I38584

(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

4	CHECK RADIO AND NAVIGATION ASSY

(a) Check if audio sound can be heard from the driver's side speaker.
OK: Audio sound can be heard.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1021)**

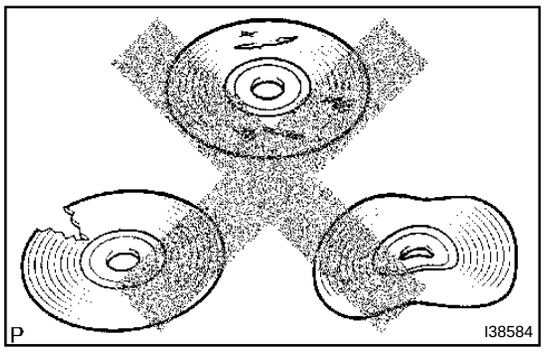
OK

REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67–6)

MAP DISPLAY INCOMPLETE

INSPECTION PROCEDURE

1	CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

2	CHECK DISPLAY

(a) Check that displays other than the navigation display are complete.
OK: No other incomplete displays are found.

NG → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

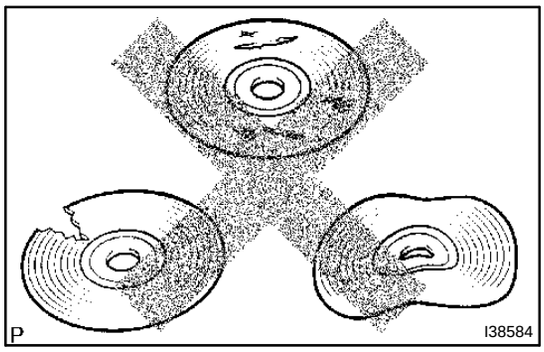
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

ROUTE CANNOT BE CALCULATED

INSPECTION PROCEDURE

1	CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

2	SET DESTINATION

(a) Set another destination and check if the system can calculate the route correctly.
OK: Route can be correctly calculated.

OK → **NORMAL OPERATION**

NG

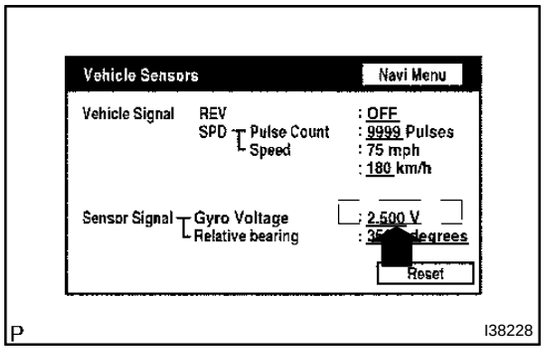
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

GYRO ERROR

INSPECTION PROCEDURE

1	NAVIGATION CHECK MODE(VEHICLE SENSORS CHECK)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1033).



(b) Check the gyro voltage.
OK: 0.1 to 4.5 V

NG → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

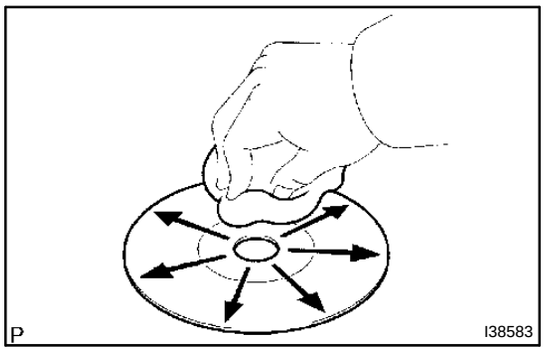
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART
(SEE PAGE 05-1019)

MAP DISC READ ERROR

INSPECTION PROCEDURE

1	CHECK MAP DISC



(a) Check for dirt on the map disc surface.
OK: No dirt is on the map disc surface.

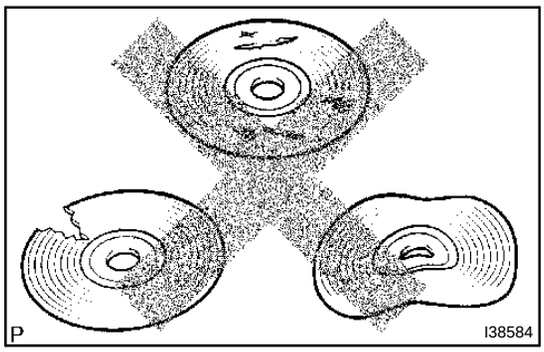
HINT:
If dirt is on the map disc surface, wipe it with a soft cloth from inside to outside in a radial direction.

NOTICE:
Do not use conventional record cleaner or anti-static preservative.

NG → **CLEAN MAP DISC**

OK

2	CHECK MAP DISC



(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

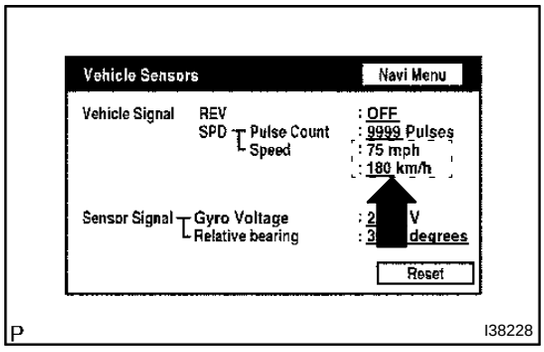
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART
(SEE PAGE 05-1019)

SPEED SIGNAL ERROR

INSPECTION PROCEDURE

1	NAVIGATION CHECK MODE(VEHICLE SENSORS CHECK)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1033).



(b) While driving, compare the "SPD" indicator to the reading on the speedometer. Check if these readings are almost the same.

OK: The readings are almost the same.

OK → **REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67-6)**

NG

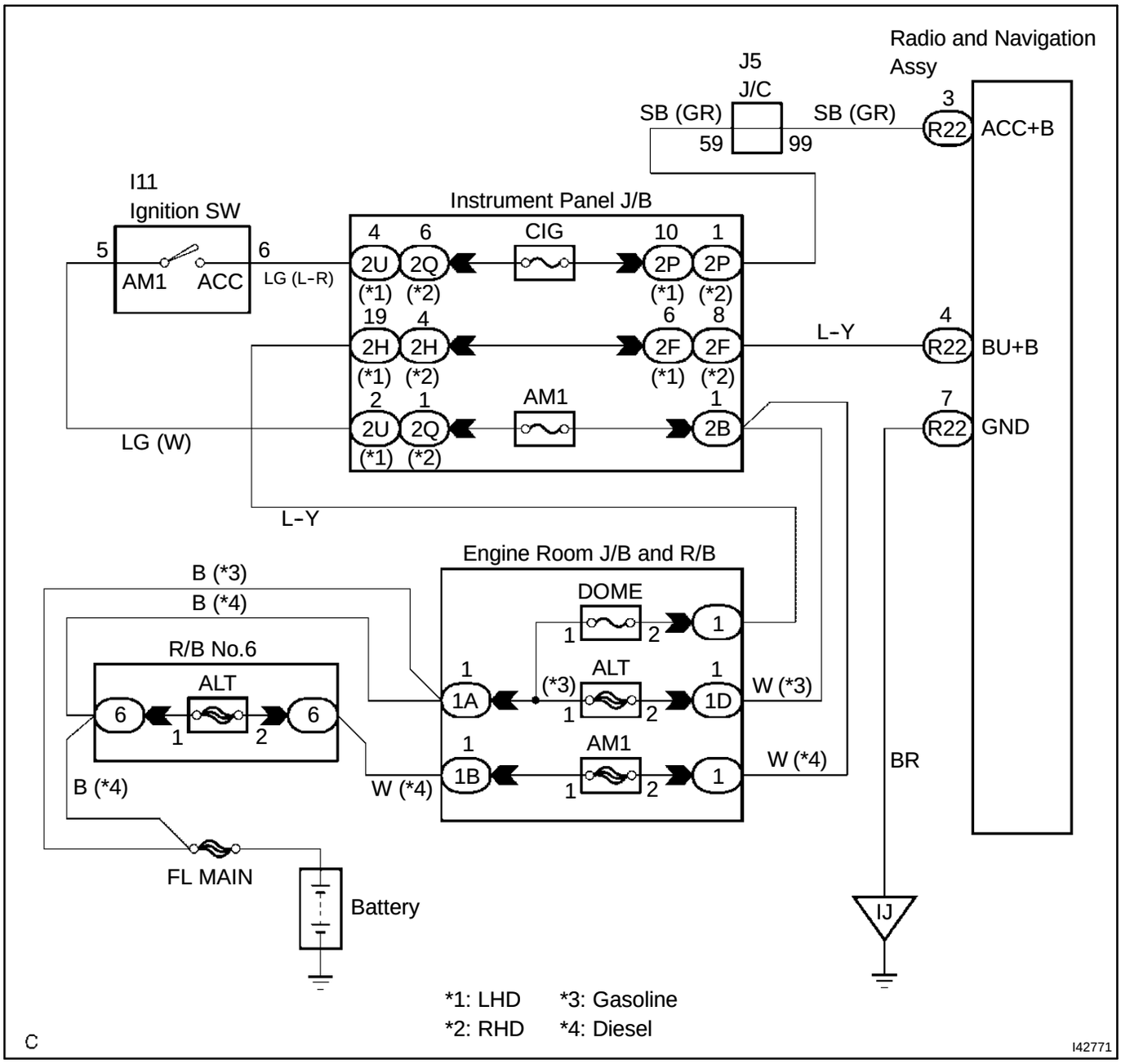
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1019)

POWER SOURCE CIRCUIT (RADIO AND NAVIGATION ASSY)

CIRCUIT DESCRIPTION

This circuit provides power to the radio and navigation assy.

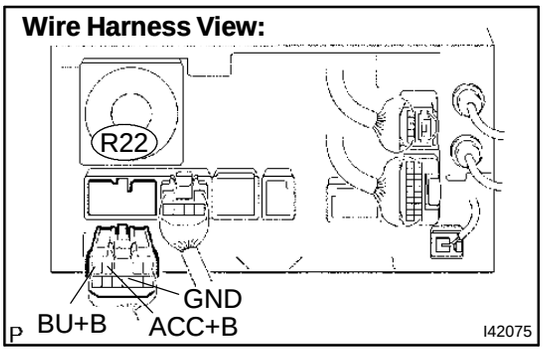
WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT RADIO AND NAVIGATION ASSY(BU+B, ACC+B, GND)

Wire Harness View:



(a) Disconnect the radio and navigation assy connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BU+B - GND	Always	10 to 14 V
ACC+B - GND	Ignition switch is in ACC	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE OR DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1021 OR 05-1019)

DIMMER SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

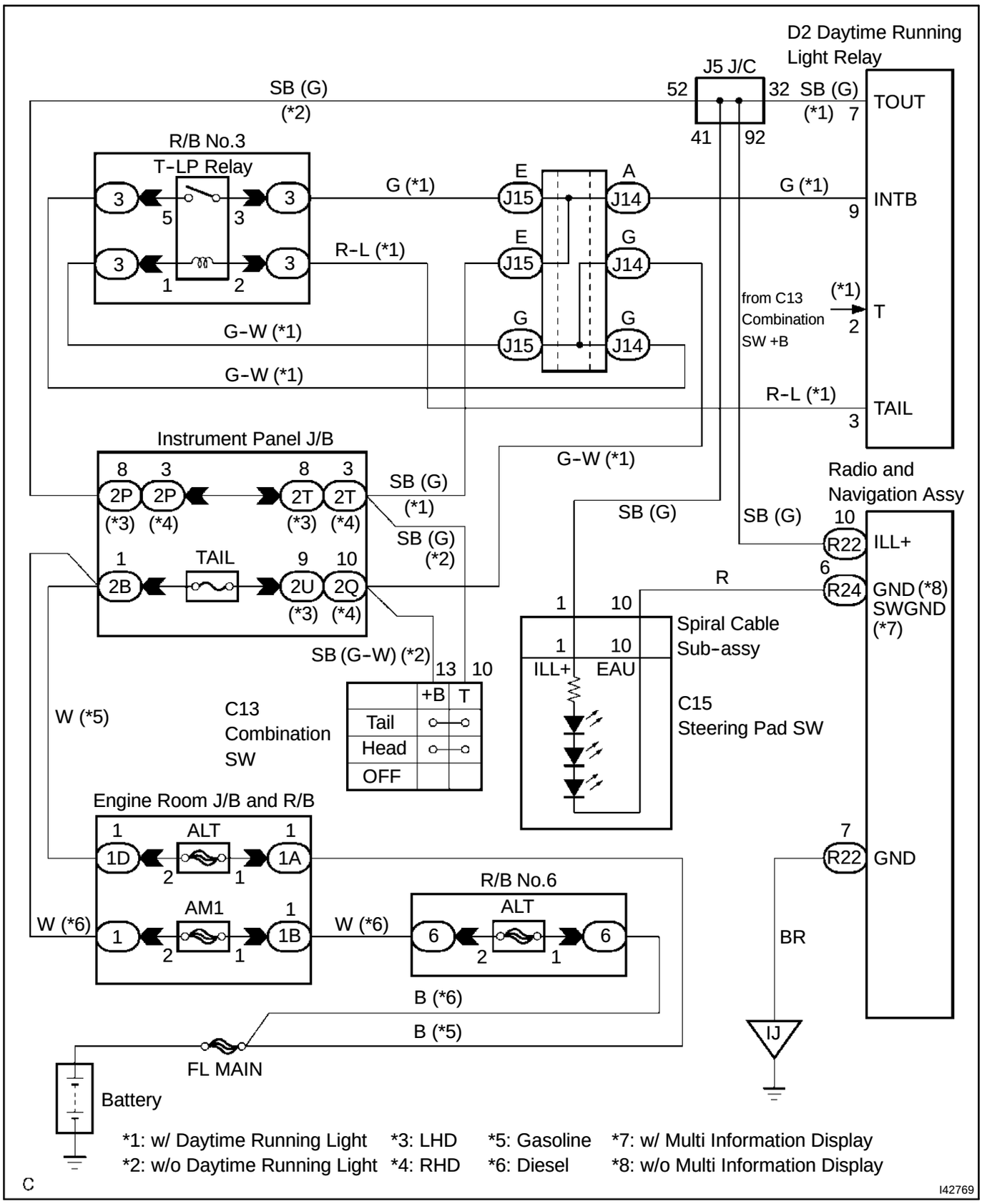
w/o D.R.L:

Receiving the dimmer signal from the tail relay, the radio and navigation assy dims the display and illuminates the panel switches and the steering pad switch assy.

w/ D.R.L:

Receiving the dimmer signal from the daytime running light relay, the radio and navigation assy dims the display and illuminates the panel switches and the steering pad switch assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

The vehicle is equipped with SRS (Supplemental Restraint System) such as airbags. Before servicing (including removal or installation of parts), be sure to read the precautionary notice for the supplemental restraint system (see page 60-1).

1 CHECK ILLUMINATION

(a) Check if the illumination for the radio and navigation assy, steering pad switch assy or others (A/C switch, cigarette lighter, etc.) comes on when the light control switch is turned to the HEAD or TAIL position.

Result:

Result	Proceed to
No illumination comes on.	A
Illumination for the steering pad switch assy does not come on.	B
Illumination for the radio and navigation assy does not come on.	C

B → **Go to step 2**

C → **Go to step 6**

A

GO TO LIGHTING SYSTEM (SEE PAGE 65-6)

2 INSPECT SPIRAL CABLE SUB-ASSY(ILL+)

Spiral Cable Sub-assy
Connector Front View:



H I36955 I38235

(a) Disconnect the spiral cable sub-assy connector.
(b) Measure the voltage according to the value(s) in the table below.

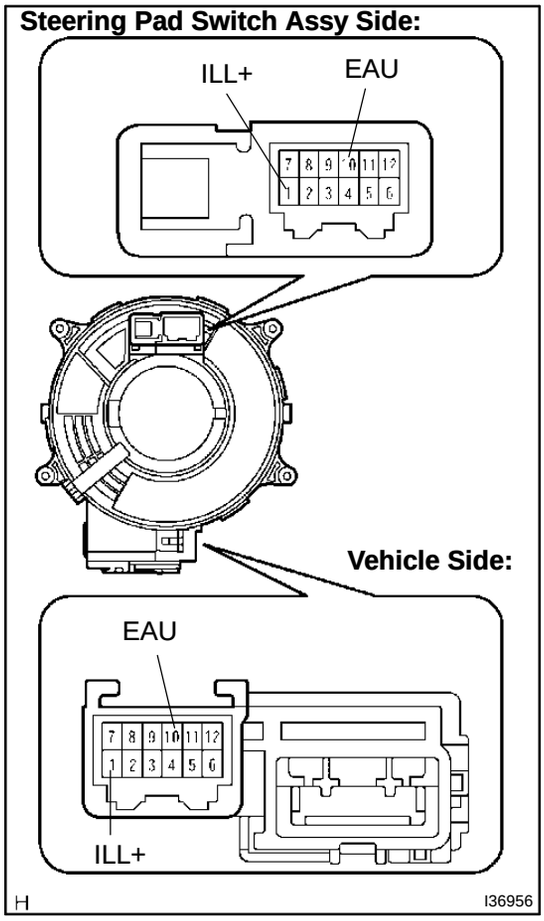
Standard:

Tester connector	Condition	Specified condition
ILL+ - Body ground	Light control switch TAIL or HEAD	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	INSPECT SPIRAL CABLE SUB-ASSY



(a) Disconnect the steering pad switch assy and spiral cable sub-assy connectors.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

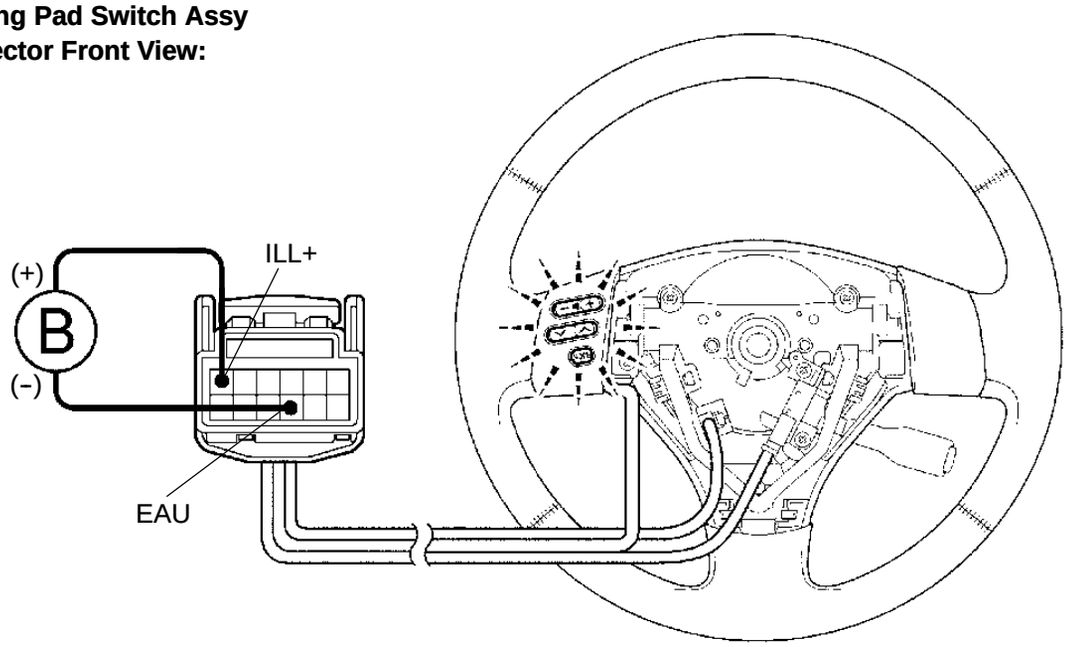
Tester connection	Specified condition
EAU - EAU	Below 1 Ω
ILL+ - ILL+	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY** **(SEE PAGE 60-40)**

OK

4	INSPECT STEERING PAD SWITCH ASSY

Steering Pad Switch Assy
Connector Front View:



P I43138

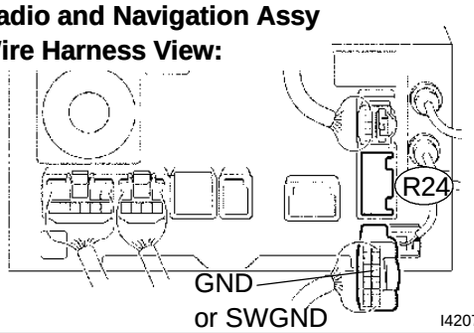
(a) Disconnect the steering pad switch assy connector.
(b) Connect the positive (+) lead to terminal ILL+ and the negative (-) lead to terminal EAU of the steering pad switch assy connector.
(c) Check if the illumination for the steering pad switch assy comes on.
OK:
Illumination for the steering pad switch assy comes on.

NG → **REPLACE STEERING PAD SWITCH ASSY (SEE PAGE 67-2)**

OK

5	CHECK HARNESS AND CONNECTOR(SPIRAL CABLE SUB-ASSY - RADIO AND NAVIGATION ASSY)

Radio and Navigation Assy
Wire Harness View:

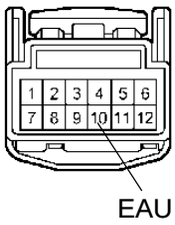


(a) Disconnect the spiral cable sub-assy and radio and navigation assy connectors.
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connector	Condition	Specified condition
EAU - GND (*1), SWGND (*2)	Always	Below 1 Ω

*1: w/o Multi Information Display
*2: w/ Multi Information Display

Spiral Cable Sub-assy
Connector Front View:



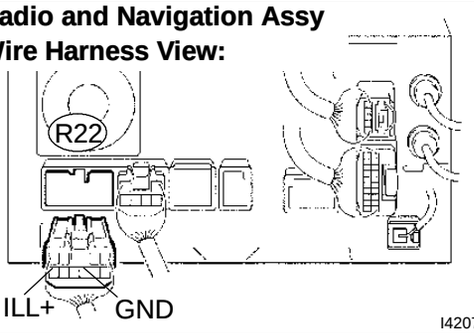
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67-6)

6	INSPECT RADIO AND NAVIGATION ASSY(ILL+, GND)

Radio and Navigation Assy
Wire Harness View:



(a) Disconnect the radio and navigation assy connector.
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

(c) Measure the voltage according to the value(s) in the table below.
Standard:

Tester connection	Condition	Specified condition
ILL+ - GND	Light control switch TAIL or HEAD	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

SPEAKER CIRCUIT

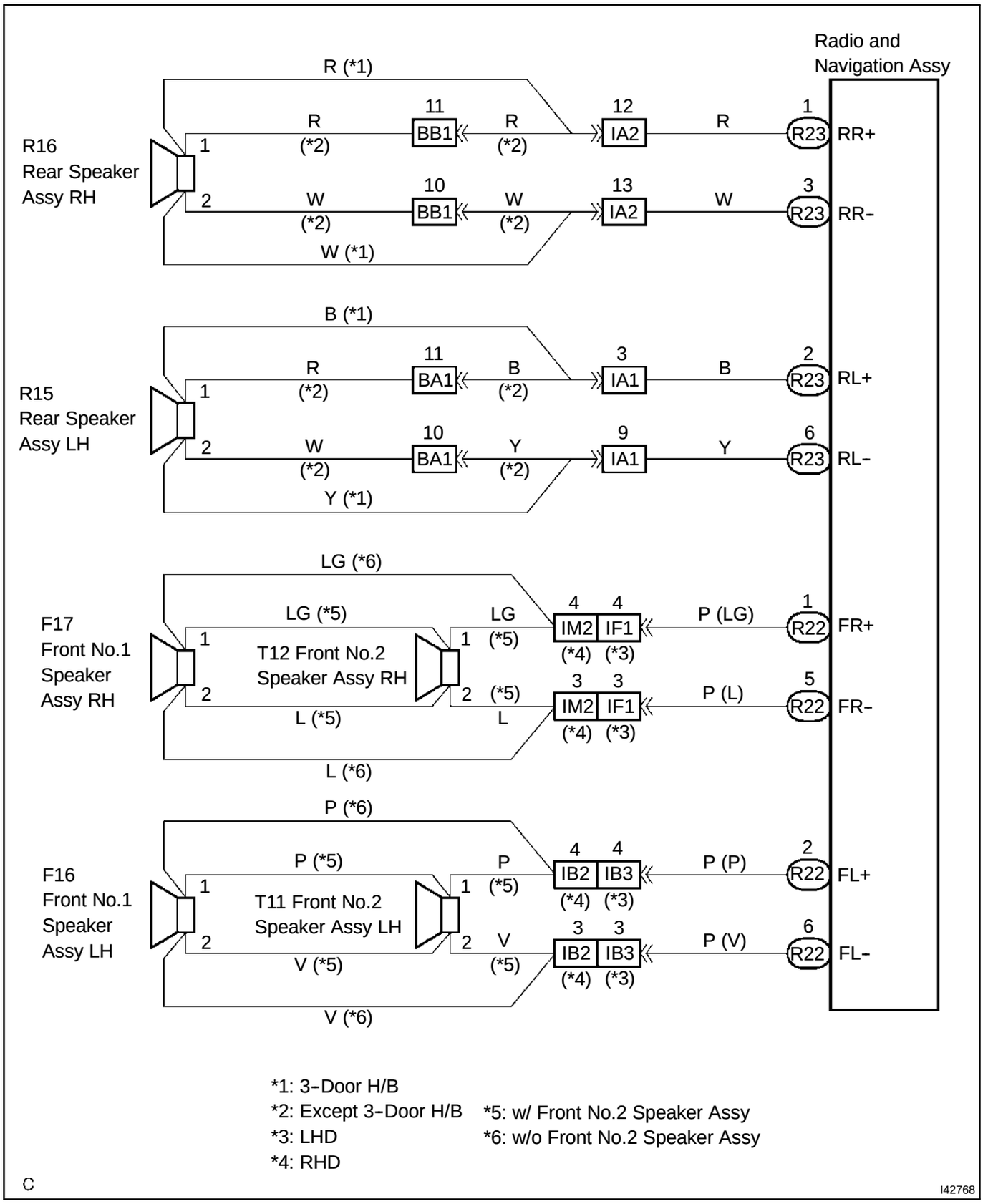
CIRCUIT DESCRIPTION

A sound signal amplified by the amplifier located in the radio and navigation assy is sent to each speaker through this circuit.

If there is a short in this circuit, the stereo component amplifier (built–in amp) detects it and stops output to the speaker.

Thus sound can not be heard from the speaker even if there is no malfunction in the stereo component amplifier (built–in amp) or speaker.

WIRING DIAGRAM

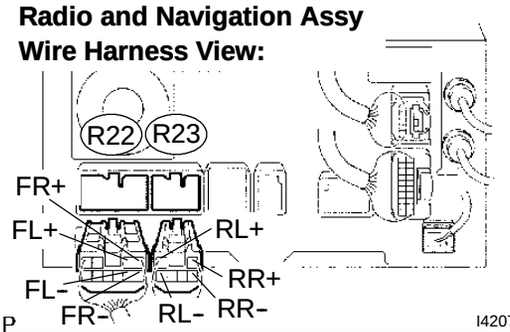


*1: 3-Door H/B
*2: Except 3-Door H/B
*3: LHD
*4: RHD
*5: w/ Front No.2 Speaker Assy
*6: w/o Front No.2 Speaker Assy

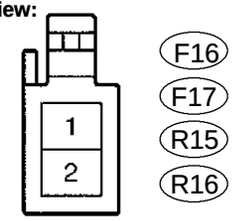
INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(RADIO AND NAVIGATION ASSY - SPEAKER ASSY)

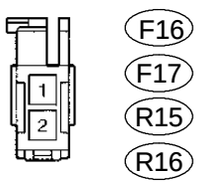
Radio and Navigation Assy
Wire Harness View:



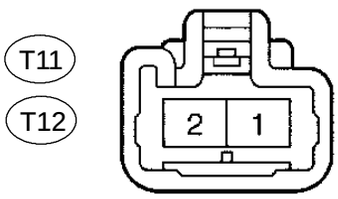
Front No.1 Speaker Assy (TMUK, TMMT Made)
Rear Speaker Assy (TMUK, TMMT Made)
Connector Front View:



Front No.1 Speaker Assy (TMC Made)
Rear Speaker Assy (TMC Made)
Connector Front View:



Front No.2 Speaker Assy
Connector Front View:



(a) Disconnect the connectors from the radio and navigation assy and speakers.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Specified condition
FL+ - F16-1 (Front No.1 speaker assy LH)	Below 1 Ω
FL- - F16-2 (Front No.1 speaker assy LH)	Below 1 Ω
FR+ - F17-1 (Front No.1 speaker assy RH)	Below 1 Ω
FR- - F17-2 (Front No.1 speaker assy RH)	Below 1 Ω
FL+ - T11-1 (Front No.2 speaker assy LH)	Below 1 Ω
FL- - T11-2 (Front No.2 speaker assy LH)	Below 1 Ω
FR+ - T12-1 (Front No.2 speaker assy RH)	Below 1 Ω
FR- - T12-2 (Front No.2 speaker assy RH)	Below 1 Ω
RL+ - R15-1 (Rear speaker assy LH)	Below 1 Ω
RL- - R15-2 (Rear speaker assy LH)	Below 1 Ω
RR+ - R16-1 (Rear speaker assy RH)	Below 1 Ω
RR- - R16-2 (Rear speaker assy RH)	Below 1 Ω
FL+ - Body ground	10 kΩ or higher
FL- - Body ground	10 kΩ or higher
FR+ - Body ground	10 kΩ or higher
FR- - Body ground	10 kΩ or higher
RL+ - Body ground	10 kΩ or higher
RL- - Body ground	10 kΩ or higher
RR+ - Body ground	10 kΩ or higher
RR- - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	INSPECT FRONT NO.1 SPEAKER ASSY

(a) Resistance check.
(1) Measure the resistance between the terminals of the speaker.

NOTICE:
The speaker should not be removed for checking.

Standard: Approximately 4 Ω

NG → **REPLACE FRONT NO.1 SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-8)**

OK

3	INSPECT FRONT NO.2 SPEAKER ASSY

(a) Check that malfunction disappears when another speaker in good condition is installed.

Standard: Malfunction disappears.

HINT:
- Connect all the connectors to the speakers.
- When there is a possibility that either right or left front speaker is defective, inspect by interchanging the right one and the left one.

OK → **REPLACE FRONT NO.2 SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-9)**

NG

4	INSPECT REAR SPEAKER ASSY

(a) Resistance check.
(1) Measure the resistance between the terminals of the speaker.

NOTICE:
The speaker should not be removed for checking.

Standard: Approximately 4 Ω

NG → **REPLACE REAR SPEAKER ASSY (SEE PUB. NO. RM925E, PAGE 67-10 OR 67-11 OR 67-12)**

OK

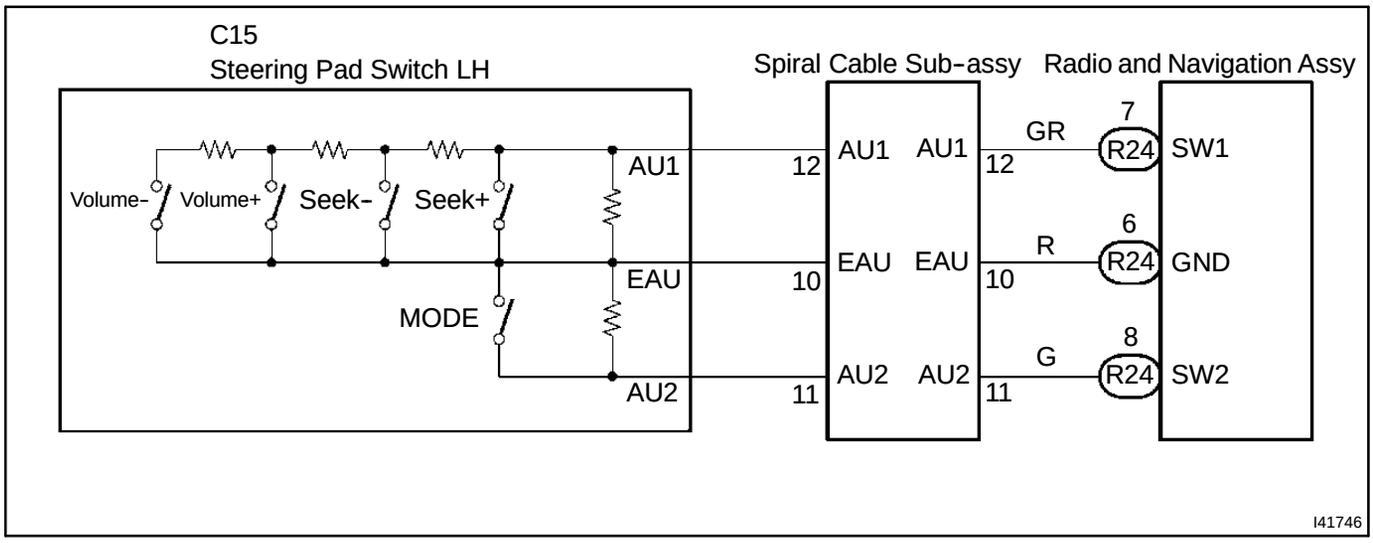
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

STEERING PAD SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends an operation signal from the steering pad switch assy to the radio and navigation assy.
If there is an open in the circuit, the audio system cannot be operated by the steering pad switch assy.
If there is a short in the circuit, the resulting condition is the same as if the switch were continuously depressed. Therefore, the radio and navigation assy cannot be operated by the steering pad switch assy, and the radio and navigation assy itself does not function.

WIRING DIAGRAM



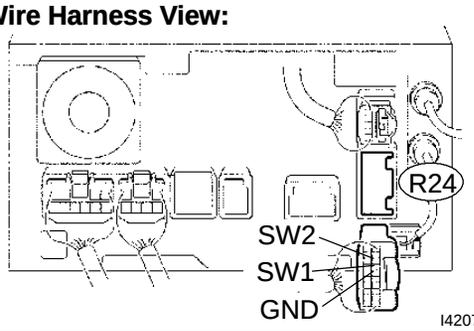
INSPECTION PROCEDURE

NOTICE:

The vehicle is equipped with SRS (Supplemental Restraint System) such as airbags. Before servicing (including removal or installation of parts), be sure to read the precautionary notice for the supplemental restraint system (see page 60-1).

1	INSPECT RADIO AND NAVIGATION ASSY

Wire Harness View:



(a) Disconnect the radio and navigation assy connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
SW1 - GND	No switch is pushed	Approx. 100 kΩ
SW1 - GND	SEEK+ switch: push	Approx. 0 Ω
SW1 - GND	SEEK- switch: push	Approx. 0.3 kΩ
SW1 - GND	VOL+ switch: push	Approx. 1 kΩ
SW1 - GND	VOL- switch: push	Approx. 3.2 kΩ
SW2 - GND	No switch is pushed	Approx. 100 kΩ
SW2 - GND	MODE switch: push	Approx. 0 Ω

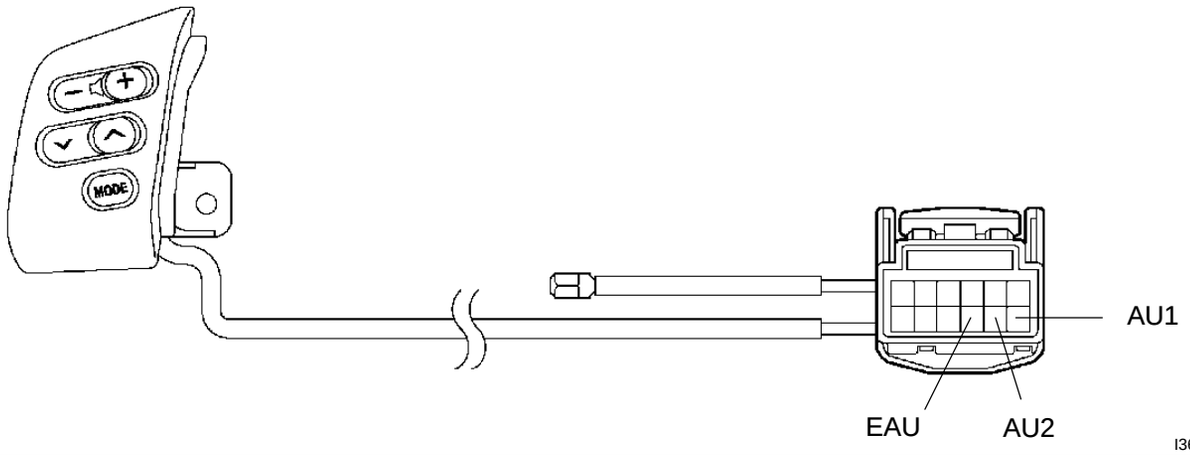
NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1021)

2 INSPECT STEERING PAD SWITCH ASSY

Steering Pad Switch Assy
Connector Front View:



(a) Disconnect the steering pad switch assy connector.

(b) Measure the resistance according to the value(s) in the table below.

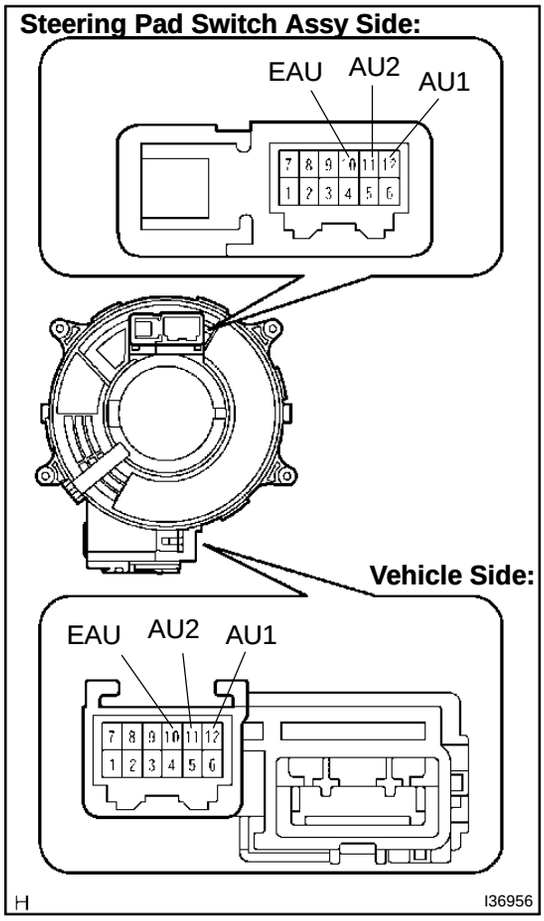
Standard:

Tester connection	Condition	Specified condition
AU1 - EAU	No switch is pushed	Approx. 100 kΩ
AU1 - EAU	SEEK+ switch: push	Approx. 0 Ω
AU1 - EAU	SEEK- switch: push	Approx. 0.3 kΩ
AU1 - EAU	VOL+ switch: push	Approx. 1 kΩ
AU1 - EAU	VOL- switch: push	Approx. 3.2 kΩ
AU2 - EAU	No switch is pushed	Approx. 100 kΩ
AU2 - EAU	MODE switch: push	Approx. 0 Ω

NG → **REPLACE STEERING PAD SWITCH ASSY** **(SEE PAGE 67-2)**

OK

3	INSPECT SPIRAL CABLE SUB-ASSY



(a) Disconnect the steering pad switch assy and spiral cable sub-assy connectors.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

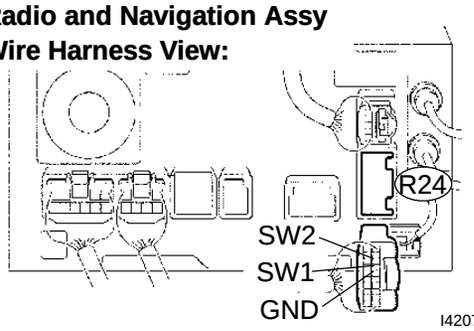
Tester connection	Specified condition
EAU - EAU	Below 1 Ω
AU1 - AU1	Below 1 Ω
AU2 - AU2	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY** **(SEE PAGE 60-40)**

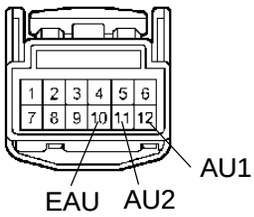
OK

4	CHECK HARNESS AND CONNECTOR(SPIRAL CABLE SUB-ASSY - RADIO AND NAVIGATION ASSY)

Radio and Navigation Assy
Wire Harness View:



Spiral Cable Sub-assy
Connector Front View:



(a) Disconnect the connectors from the spiral cable sub-assy and radio and navigation assy.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Specified condition
SW1 - AU1	Below 1 Ω
SW2 - AU2	Below 1 Ω
GND - EAU	Below 1 Ω
SW1 - Body ground	10 kΩ or higher
SW2 - Body ground	10 kΩ or higher
GND - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

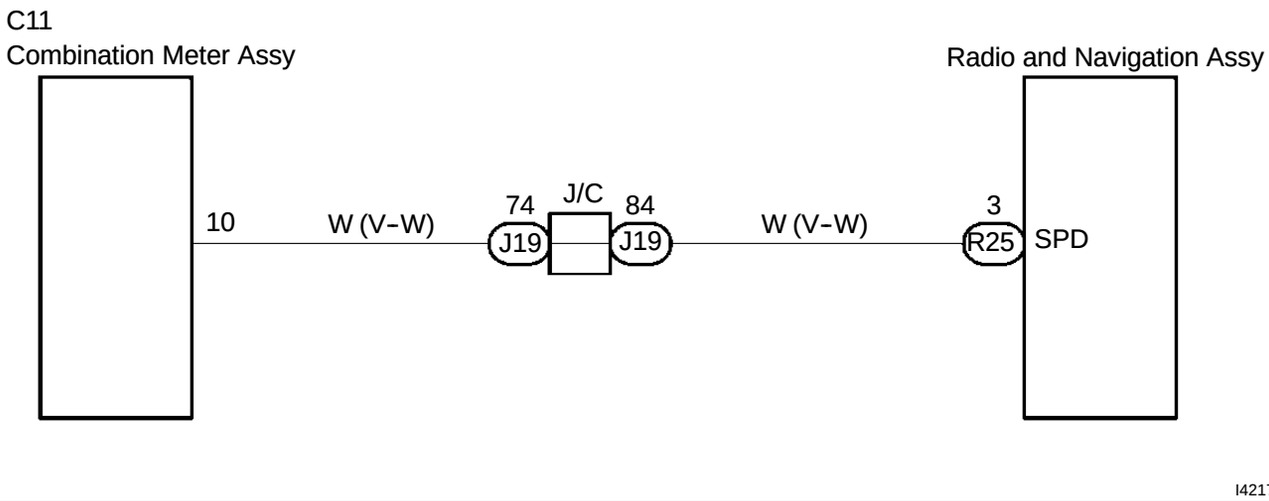
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1021)

SPEED SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

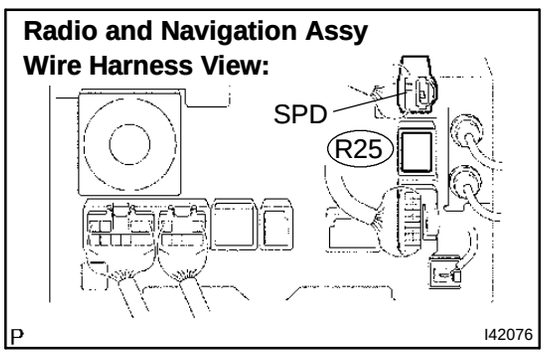
The navigation ECU (built in the radio and navigation assy) receives the vehicle speed signal and information about the GPS antenna to update the vehicle position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - RADIO AND NAVIGATION ASSY)

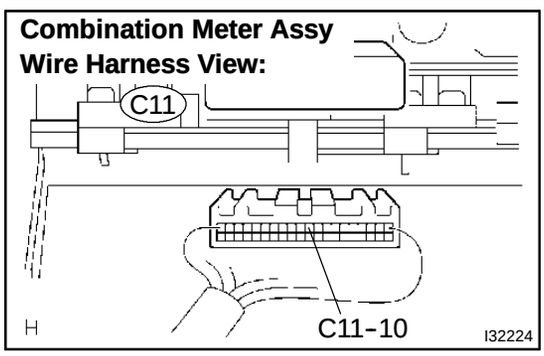


(a) Disconnect the connectors from the radio and navigation assy and combination meter assy.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

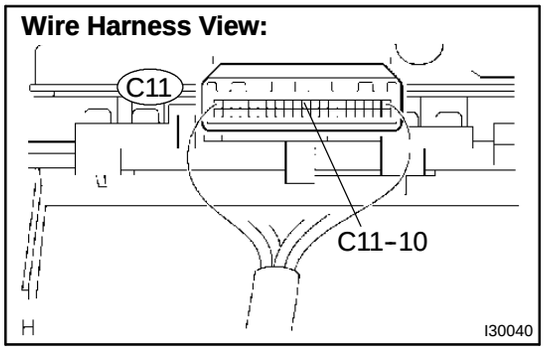
Tester connection	Condition	Specified condition
SPD - C11-10	Always	Below 1 Ω
SPD - Body ground	Always	10 kΩ or higher



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	INSPECT COMBINATION METER ASSY



(a) Connect the combination meter assy connector.

(b) Measure the voltage.

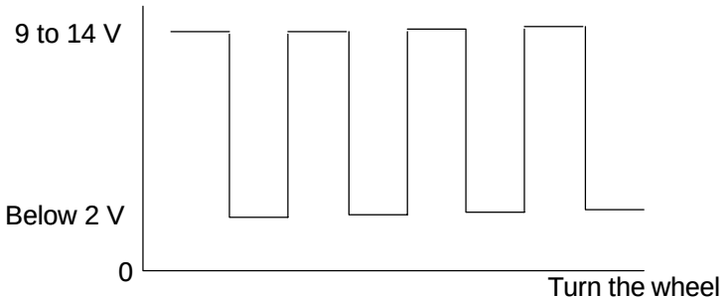
(1) Move the shift lever to the neutral position.

(2) Jack up either one of the front wheels.

(3) Turn the ignition switch on.

(4) Measure the voltage between terminal C11-10 and body ground of the combination meter assy when the front wheels are turned slowly.

Standard: Voltage is pulsed as shown below.



NG → **GO TO COMBINATION METER SYSTEM (SEE PUB. NO. RM925E, PAGE 05-1293)**

OK →

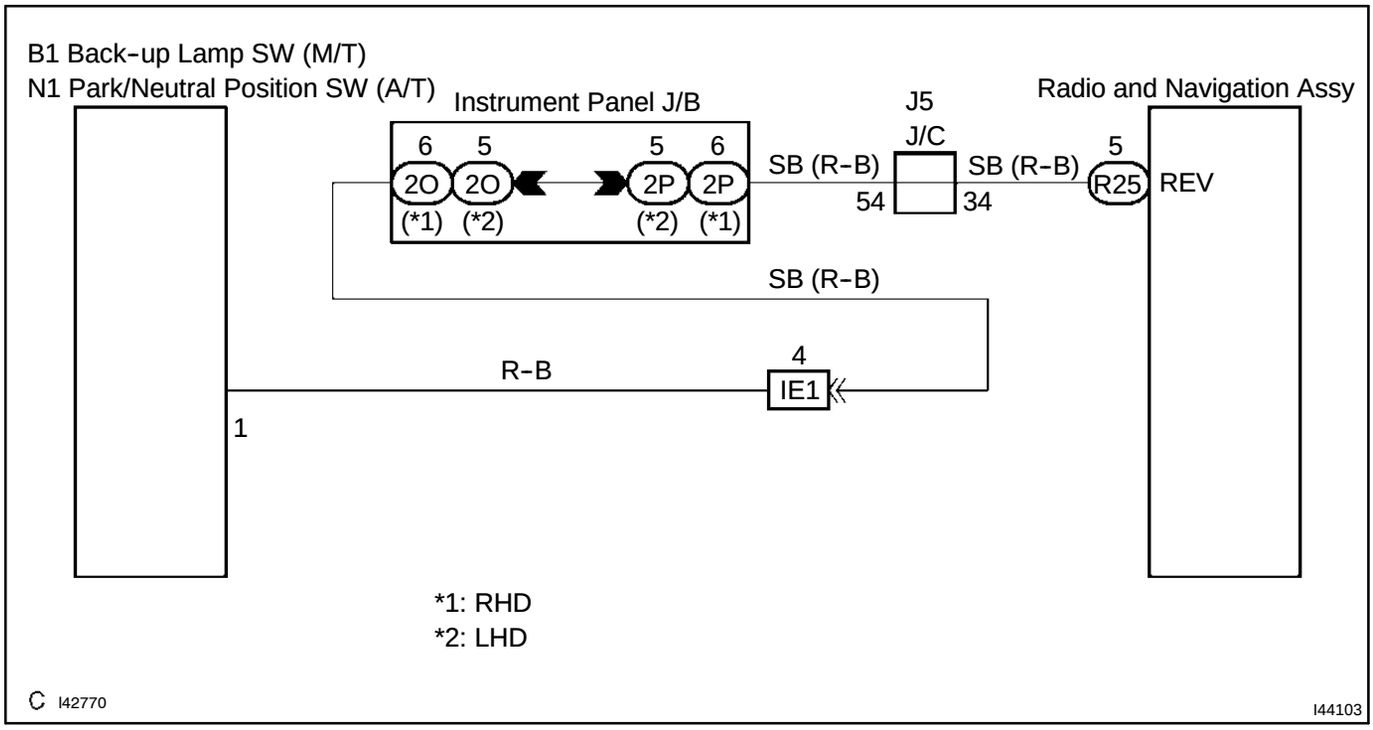
REPLACE RADIO AND NAVIGATION ASSY (SEE PUB. NO. RM925E, PAGE 67-6)

REVERSE SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

The radio and navigation assy receives the reverse signal from the back-up lamp switch (M/T) or park/neutral position switch (A/T) and information about the GPS antenna, and then adjusts the vehicle position.

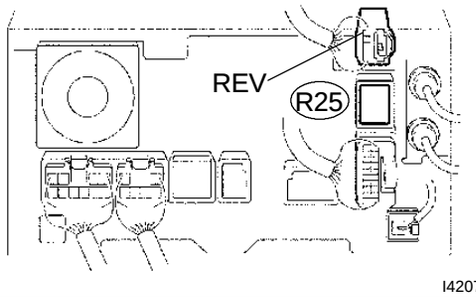
WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT RADIO AND NAVIGATION ASSY(REV)

Wire Harness View:



(a) Disconnect the radio and navigation assy connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

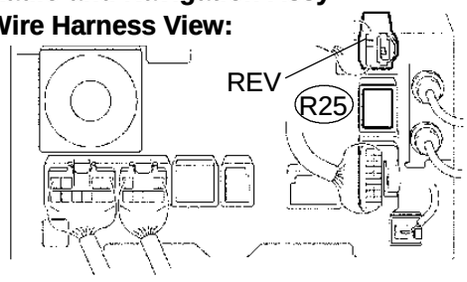
Tester connection	Condition	Specified condition
REV - Body ground	Ignition switch is on. Shift lever is moved to R position.	10 to 14 V
REV - Body ground	Ignition switch is on. Shift lever is moved to any position except R.	Below 1 V

OK → **REPLACE RADIO AND NAVIGATION ASSY**
(SEE PUB. NO. RM925E, PAGE 67-6)

NG

2	CHECK HARNESS AND CONNECTOR(RADIO AND NAVIGATION ASSY - BACK-UP LAMP SWITCH OR PARK/NEUTRAL POSITION SWITCH)

Radio and Navigation Assy
Wire Harness View:



P I42076

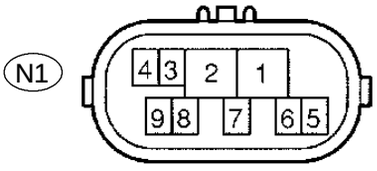
(a) Disconnect the connectors from the radio and navigation assy and back-up lamp switch (M/T) or park/neutral switch (A/T).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

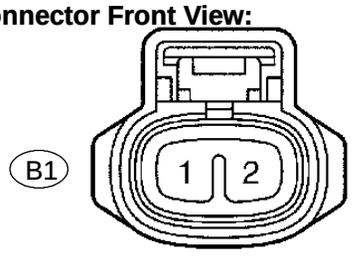
Tester connection	Condition	Specified condition
REV - B1-1 (M/T), N1-1 (A/T)	Always	Below 1 Ω
REV - Body ground	Always	10 kΩ or higher

Park/Neutral Position Switch (A/T)
Connector Front View:



P G26080

Back-up Lamp Switch (M/T)
Connector Front View:



P I42081

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

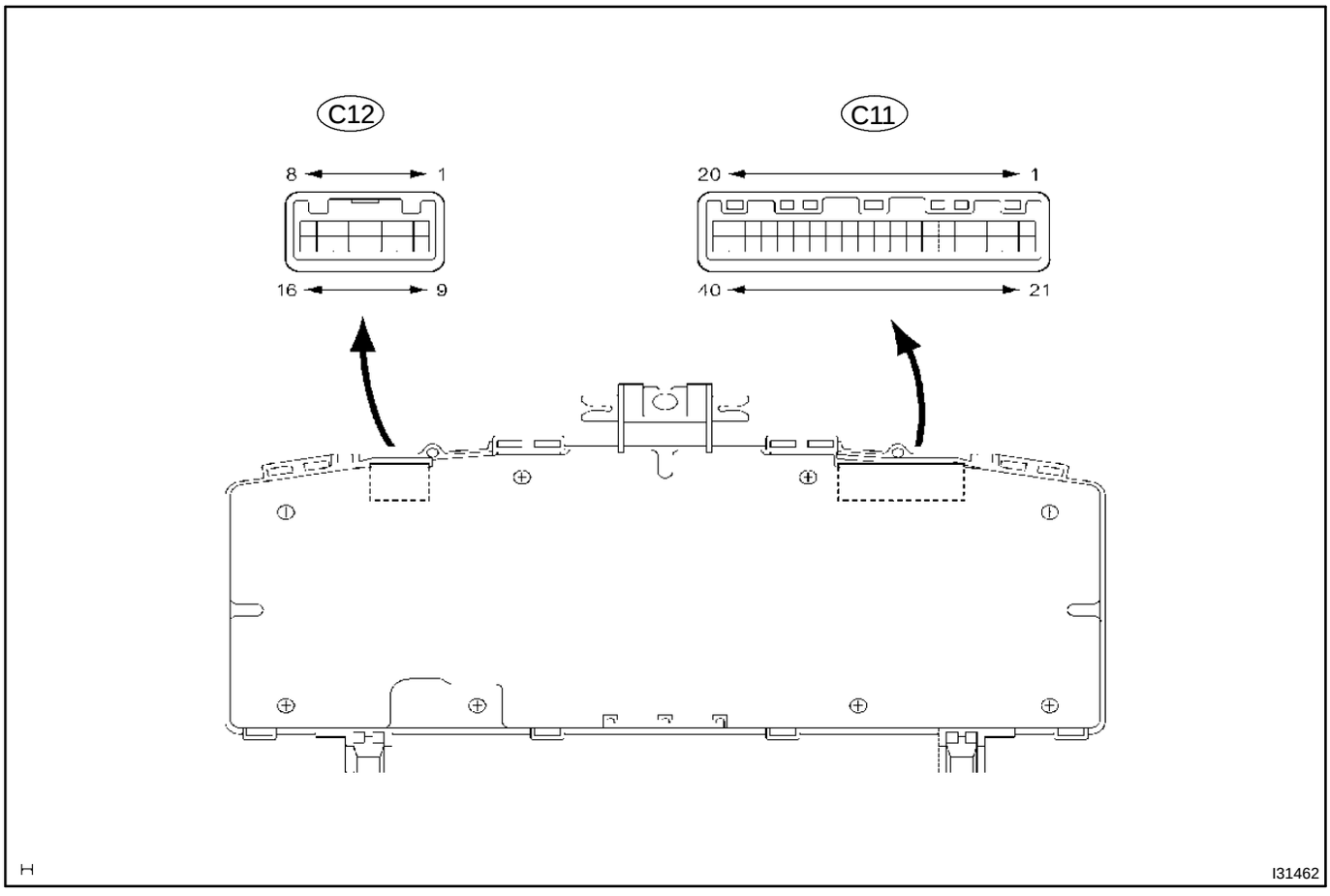
OK

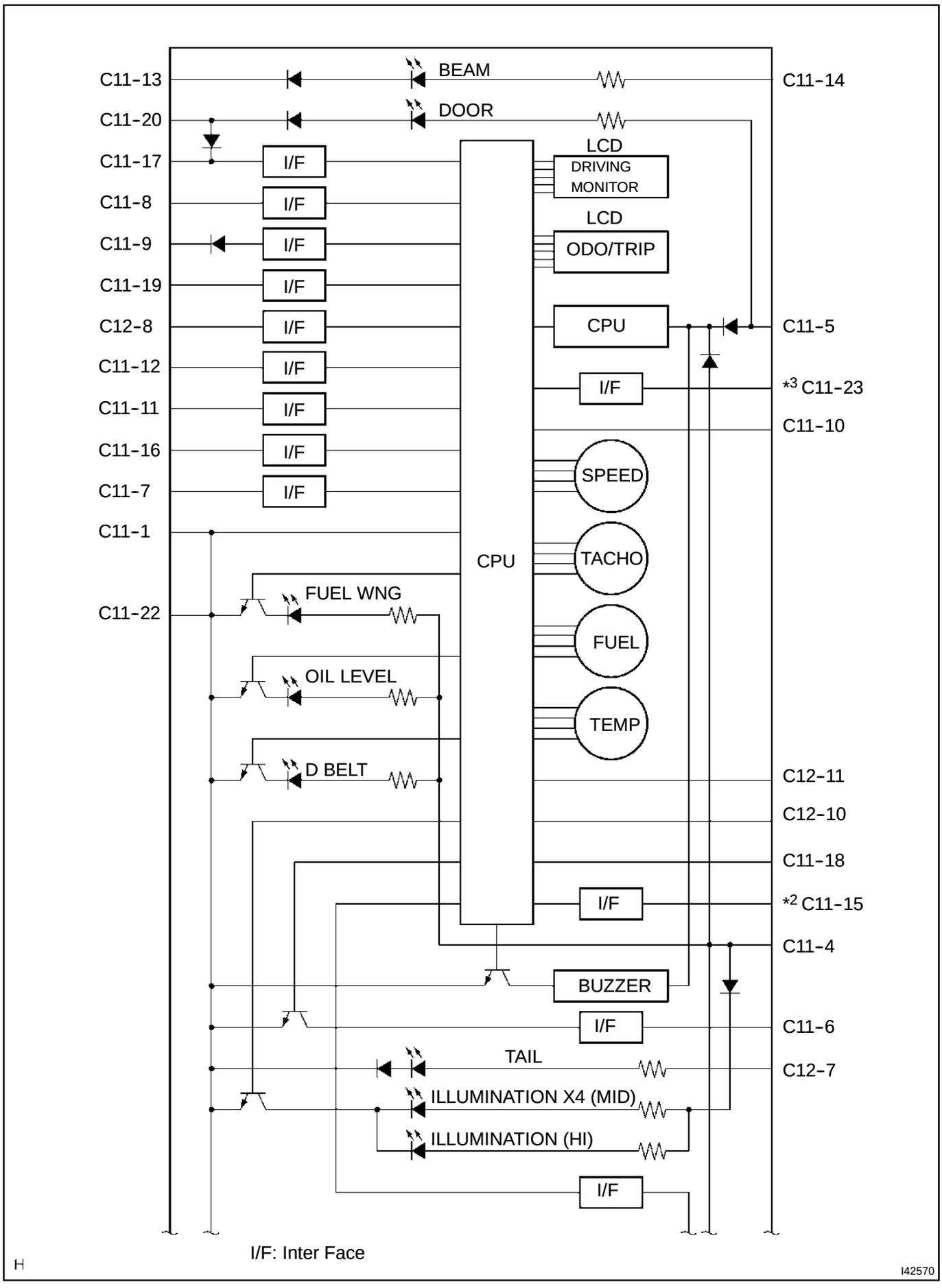
GO TO LIGHTING SYSTEM (SEE PAGE 65-2)

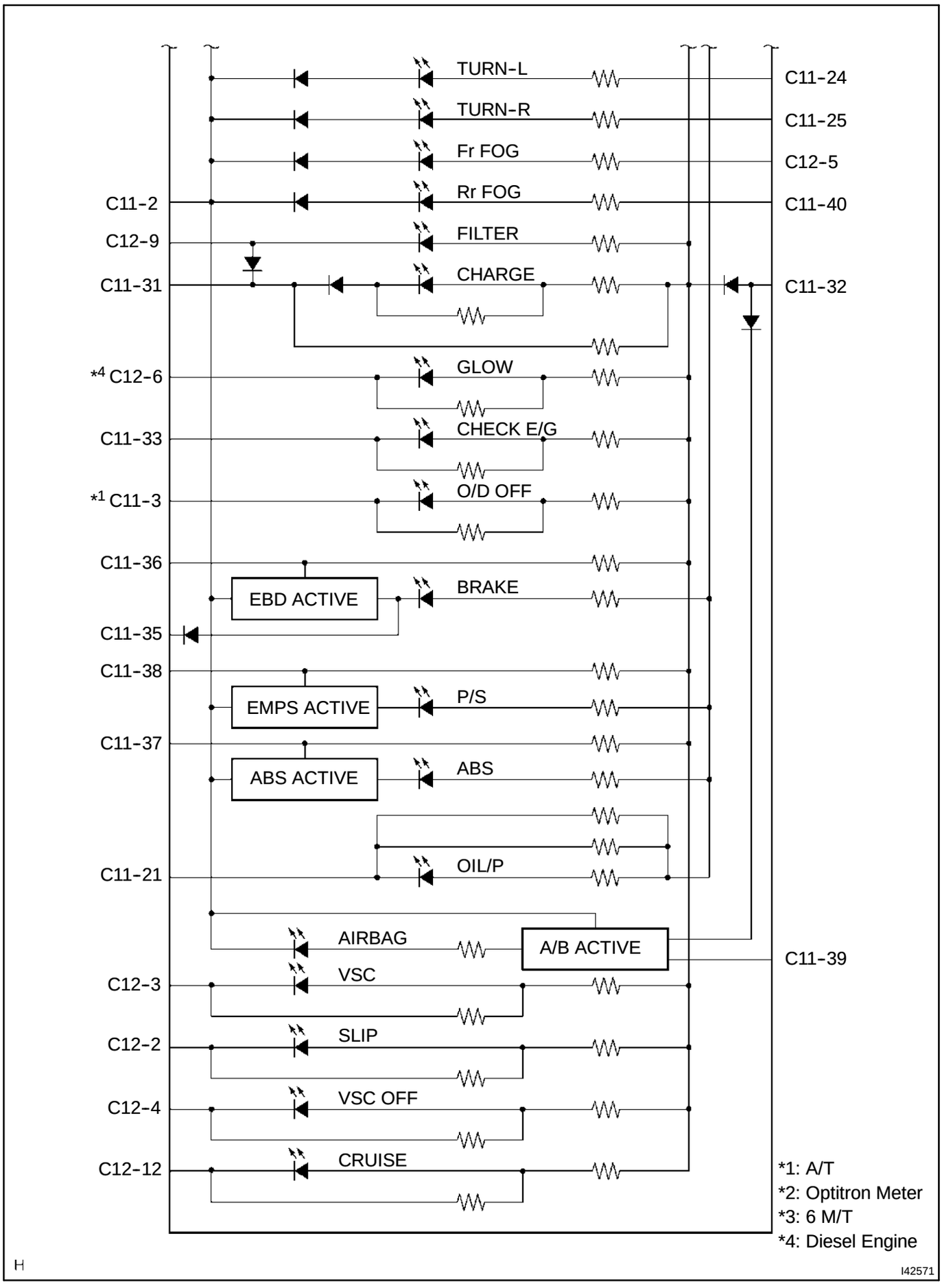
COMBINATION METER

LOCATION

05LU6-01




C11-13
C11-20
C11-17
C11-8
C11-9
C11-19
C12-8
C11-12
C11-11
C11-16
C11-7
C11-1
C11-22
BEAM
DOOR
I/F
LCD
DRIVING MONITOR
LCD
ODO/TRIP
CPU
SPEED
TACHO
FUEL
TEMP
FUEL WNG
OIL LEVEL
D BELT
TAIL
ILLUMINATION X4 (MID)
ILLUMINATION (HI)
BUZZER
C11-14
C11-5
*3 C11-23
C11-10
C12-11
C12-10
C11-18
*2 C11-15
C11-4
C11-6
C12-7
H
I/F: Inter Face
I42570


TURN-L
TURN-R
Fr FOG
Rr FOG
FILTER
CHARGE
GLOW
CHECK E/G
O/D OFF
EBD ACTIVE
BRAKE
EMPS ACTIVE
P/S
ABS ACTIVE
ABS
OIL/P
AIRBAG
A/B ACTIVE
VSC
SLIP
VSC OFF
CRUISE
C11-2
C12-9
C11-31
*4 C12-6
C11-33
*1 C11-3
C11-36
C11-35
C11-38
C11-37
C11-21
C12-3
C12-2
C12-4
C12-12
C11-24
C11-25
C12-5
C11-40
C11-32
C11-39
*1: A/T
*2: Optitron Meter
*3: 6 M/T
*4: Diesel Engine
H
I42571

Terminal No.		Wire harness side
C11	1	Signal Earth
	2	Power Earth
	3	*1 O/D Off Switch
	4	GAUGE Fuse
	5	DOME Fuse
	6	Passenger Seat Belt Warning Light
	7	Fuel Sender Gage Assy
	8	ECM (TEMP)
	9	Brake Actuator Assy (ABS)
		VSC & Traction Actuator Assy (VSC)
	10	4P-OUT
	11	Front Seat Inner Belt Assy (Passenger side)
	12	Front Seat Inner Belt Assy (Driver side)
	13	Headlight Dimmer Switch (BEAM-)
		Body Earth
	14	Headlight Assy
	15	*2 ST Fuse
	16	Key Unlock Warning Switch
	17	Door Courtesy Switch (Drider side)
	18	DRL ECU
	19	ECM
	20	Door Courtesy Switch (Except Driver side)
	21	Oil Pressure Warning Switch
	22	Fuel Sender Gauge Assy
	23	*3 Back-up Lamp Assy
	24	Flasher Relay (L)
	25	Flasher Relay (R)
	31	Generator
	32	IG2 Fuse
	33	ECM
	35	Brake Fluid Level Warning Switch
		Vacuum Switch
	36	Parking Brake Switch
	37	Brake Actuator Assy (ABS)
	38	EMPS
	39	Airbag Sensor Assembly Center
	40	Rr Fog Light Relay

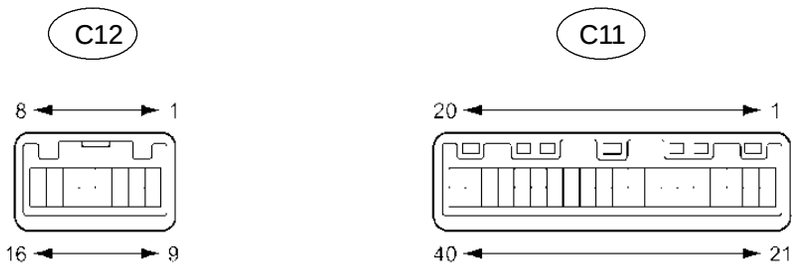
Terminal No.		Wire harness side
C12	2	VSC & Traction Actuator Assy (VSC)
	3	VSC & Traction Actuator Assy (VSC)
	4	VSC & Traction Actuator Assy (VSC)
	5	Fr Fog Light Relay
	6	*4 Glow Plug
	7	Tail Relay
	8	Oil Level Sensor
	9	Fuel Filter
	10	MMT ECU
	11	MMT ECU
	12	ECM

*1: A/T
*2: Optitron Meter
*3: 6 M/T
*4: Diesel Engine

05LU7-01

TERMINALS OF ECU

COMBINATION METER ASSY



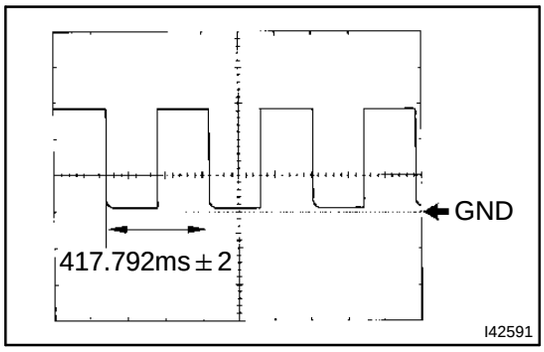
I31463

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
C11-1 - Body ground	SB(BR) - Body ground	Signal (E/G) ground	Always	Below 1 Ω
C11-2 - Body ground	SB(W-B) - Body ground	Power ground	Always	Below 1 Ω
*1 C11-3 - Body ground	W(LG) - Body ground	O/D signal	Ignition switch ON, O/O OFF indicator OFF → ON	10 to 14 V → Below 1 V
C11-4 - Body ground	SB(R-L) - Body ground	IG1 signal	Ignition switch OFF or ACC → ON	Below 1 V → 10 to 14 V
C11-5 - Body ground	SB(L-Y) - Body ground	Battery	Always	10 to 14 V
C11-6 - Body ground	SB(Y) - Body ground	Passenger seat belt warning signal	Ignition switch ON	10 to 14 V
C11-7 - Body ground	W(Y-B) - Body ground	Fuel signal	Ignition switch ON, fuel level FULL → EMPTY	Below 1.6 V → 5 to 8 V
C11-8 - Body ground	W(Y-R) - Body ground	Coolant temperature signal	Ignition switch ON	Pulse generation (See waveform 1)
C11-9 - Body ground	W(V-W) - Body ground	Speed signal (Input)	Ignition switch ON, turn the wheel slowly	Pulse generation (See waveform 2)
C11-10 - Body ground	W(V-W) - Body ground	Speed signal (Output)	Ignition switch ON, turn the wheel slowly	Pulse generation (See waveform 2)
C11-11 - Body ground	SB(L-Y) - Body ground	Passenger seat belt condition signal	Ignition switch ON, sit on the passenger seat, seat belt unfastened → fastened	Below 1 V → 10 to 14 V
C11-12 - Body ground	SB(R) - Body ground	Driver seat belt condition signal	Ignition switch ON, sit on the driver seat, seat belt unfastened → fastened	Below 1 V → 10 to 14 V
C11-13 - Body ground	*4 W(W-B) *5 SB(R-G) - Body ground	Hi-beam signal (-)	Headlight dimmer switch HI → LO	Below 1 V → 10 to 14 V
C11-14 - Body ground	*4 SB(R-L) *5 SB(L-Y) - Body ground	Hi-beam signal (+)	Always	10 to 14 V
*2 C11-15 - Body ground	W(B-W) - Body ground	ST signal	Ignition switch OFF or ACC or ON → Engine start	Below 1 V → 10 to 14 V
C11-16 - Body ground	SB(L-B) - Body ground	Key switch signal	Key is inserted → Not inserted	Below 1 V → 10 to 14 V

C11-17 - Body ground	SB(R-W) - Body ground	Driver door condition signal	Driver door OPEN → CLOSE	Below 1 V → 10 to 14 V
C11-18 - Body ground	SB(G) - Body ground	Illumination signal	Tail light switch OFF → ON	Below 1 V → 10 to 14 V
C11-19 - Body ground	W(B) - Body ground	Tachometer signal	Engine running	Pulse generation (See waveform 3)
C11-20 - Body ground	SB(R-G) - Body ground	Except driver door condition signal	Except driver door OPEN → CLOSE	Below 1 V → 10 to 14 V
C11-21 - Body ground	W - Body ground	Oil pressure signal	OIL/P warning light ON → OFF	Below 1 V → 10 to 14 V
C11-22 - Body ground	SB(BR) - Body ground	Fuel ground	Always	Below 1 Ω
*3 C11-23 - Body ground	SB(R-B) - Body ground	A/T shift signal (R)	A/T R indicator OFF → ON	Below 1 V → 10 to 14 V
C11-24 - Body ground	W(G-B) - Body ground	Turn signal L	Ignition switch ON, turn signal LH indicator OFF → ON	Below 1 V → 10 to 14 V
C11-25 - Body ground	W(G-Y) - Body ground	Turn signal R	Ignition switch ON, turn signal RH indicator OFF → ON	Below 1 V → 10 to 14 V
C11-31 - Body ground	W(Y) - Body ground	Charge signal	Engine running → Not running	10 to 14 V → Below 1 V
C11-32 - Body ground	SB(B-O) - Body ground	IG2 signal	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
C11-33 - Body ground	W(R-Y) - Body ground	Check engine signal	Ignition switch ON, check engine indicator light ON → OFF	Below 1 V → 10 to 14 V
C11-35 - Body ground	W(R-Y) - Body ground	Brake fluid level signal	Ignition switch ON, brake fluid level LO → NORMAL	Below 1 V → 10 to 14 V
C11-36 - Body ground	W(R-W) - Body ground	BRAKE signal	Ignition switch ON, BRAKE warning light ON → OFF	4 to 8 V → Below 1 V
C11-37 - Body ground	W(W-R) - Body ground	ABS signal	Ignition switch ON, ABS warning light ON → OFF	4 to 8 V → Below 1 V
C11-38 - Body ground	W(R-Y) - Body ground	EMPS signal	Ignition switch ON, EMPS indicator ON → OFF	Below 1 V → 10 to 14 V
C11-39 - Body ground	SB(B-Y) - Body ground	AIRBAG signal	Ignition switch ON, AIRBAG warning light ON → OFF	Below 1 V → 6 to 11 V
C11-40 - Body ground	SB(R) - Body ground	Rear fog signal	Rr Fog light indicator OFF → ON	Below 1 V → 10 to 14 V
C12-2 - Body ground	SB(R-G) - Body ground	SLIP signal	Ignition switch ON, SLIP indicator ON → OFF	Below 1 V → 10 to 14 V
C12-3 - Body ground	SB(L-B) - Body ground	VSC signal	Ignition switch ON, VSC indicator ON → OFF	Below 1 V → 10 to 14 V
C12-4 - Body ground	SB(R-Y) - Body ground	TRC OFF signal	Ignition switch ON, TRC OFF indicator ON → OFF	Below 1 V → 10 to 14 V
C12-5 - Body ground	SB(R) - Body ground	Front fog signal	Fr Fog light indicator OFF → ON	Below 1 V → 10 to 14 V
*4 C12-6 - Body ground	W(R) - Body ground	Glow signal	Ignition switch ON, Glow indicator ON → OFF	Below 1 V → 10 to 14 V
C12-7 - Body ground	SB(G) - Body ground	Taillight signal	Ignition switch ON, TAIL indicator ON → OFF	Below 1 V → 10 to 14 V
C12-8 - Body ground	W(L) - Body ground	Oil Level signal	Ignition switch ON, oil level indicator ON → OFF	Below 1 V → 10 to 14 V

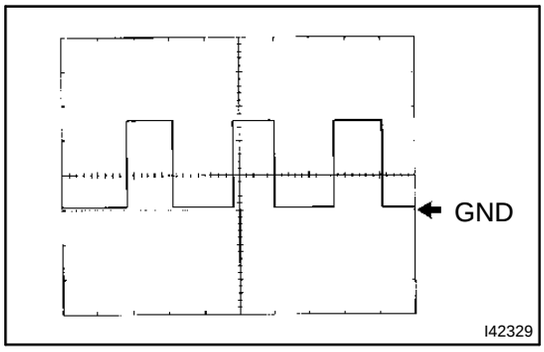
C12-9 - Body ground	W(LG) - Body ground	Fuel filter signal	Ignition switch ON, fuel filter indicator ON → OFF	Below 1 V → 10 to 14 V
C12-10 - Body ground	SB(LG) - Body ground	Multi-mode switch signal	Communication circuit	-
C12-11 - Body ground	SB(L-Y) - Body ground	Multi-mode switch signal	Engine switch ON (IG), multi-mode transmission warning light	Below 1 V
C12-12 - Body ground	SB(R) - Body ground	CRUISE signal	Ignition switch ON, CRUISE indicator ON → OFF	Below 1 V → 10 to 14 V

*1: A/T *2: Optitron meter *3: 6 M/T *4: Diesel engine *5: w/DRL *6: w/o DRL



Wave form 1 (Reference):

Item	Contents
Tool setting	5 V/DIV, 100 ms/DIV
Vehicle condition	Ignition switch ON

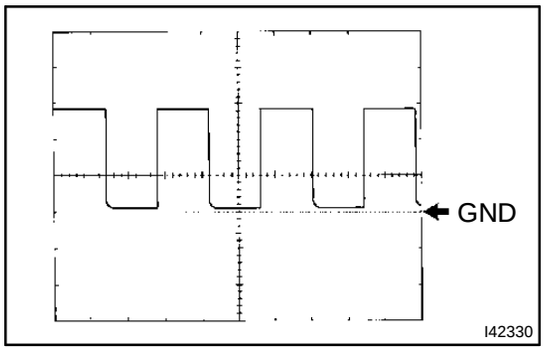


Wave form 2 (Reference):

Item	Contents
Tool setting	5 V/DIV, 20 ms/DIV
Vehicle condition	Driving at approx. 20 km/h (12 mph)

HINT:

As vehicle speed increases, the cycle of the signal wave form narrows.



Wave form 3 (Reference):

Item	Contents
Tool setting	5 V/DIV, 10 ms/DIV
Vehicle condition	Engine idle speed

ENGINE IMMOBILIZER SYSTEM (3ZZ-FE)

HOW TO PROCEED WITH TROUBLESHOOTING

054CF-14

HINT:

- Use this procedure to troubleshoot the engine immobilizer system.
- The intelligent tester II should be used in steps 4 and 7.

1	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2	**CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK** (See page 05-1109)

NEXT

3	**CRANK ENGINE FOR MORE THAN 10 SECONDS**

NEXT

4	**CHECK FOR DTC**

(a) Check DTC B2799 is output or not.

Result:

Result	Proceed to
If the DTC B2799 is not output	A
If the DTC B2799 is output	B

B → **Go to SFI SYSTEM** (See page 05-1)

A

5	**CHECK FOR CODE**

(a) Check for codes and note any codes that are output.
(b) Turn the ignition switch OFF.
(c) Recheck for codes. Based on the code output in (a), try to force output of the same code by simulating the operation indicated by the code.

Result:

Result	Proceed to
If the code does not reoccur	A
If the code reoccur	B

B → **Go to step 8**

A

6	PROBLEM SYMPTOMS TABLE (See page 05-1120)

Result:

Result	Proceed to
If the fault is not listed on the problem symptoms table	A
If the fault is listed on the problem symptoms table	B

B → **Go to step 8**

A

7	OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Pre-check (see page 05-1110)
(b) Terminals of ECU (see page 05-1115)

NEXT

8	REPAIR OR REPLACE

NEXT

9	CONFIRMATION TEST

NEXT

END

054CG-14

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILIZER SYSTEM Check Sheet

Inspector's Name :

Customer's Name		**VIN**	
		Production Date	/ /
		License Plate No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Always ☐ Intermittent (times a day/month) ☐ Only once
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °C (°F))
Symptoms	☐ Immobilizer is not set (Engine starts with unregistered key codes)	
	☐ Engine does not start	
Code Check	**1st Time**	☐ Normal code ☐ Malfunction code (Code)
	2nd Time	☐ Normal code ☐ Malfunction code (Code)

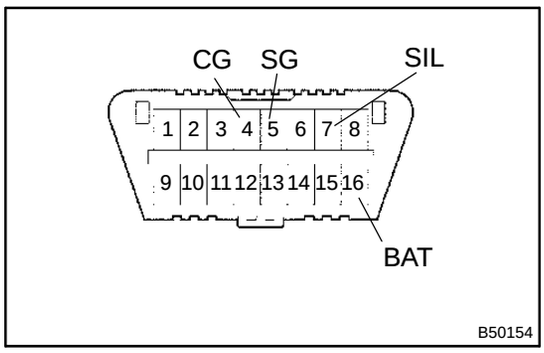
05LVD-01

PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

(1) The transponder key ECU controls the vehicle's immobilizer system functions. Immobilizer system data and the Diagnostic Trouble Codes (DTCs) can be read through the vehicle's Data Link Connector 3 (DLC3). In some cases, a malfunction may be occurring in the immobilizer system even though the security indicator is not illuminated. When the system seems to be malfunctioning, use the intelligent tester II to check for malfunctions and perform repairs.

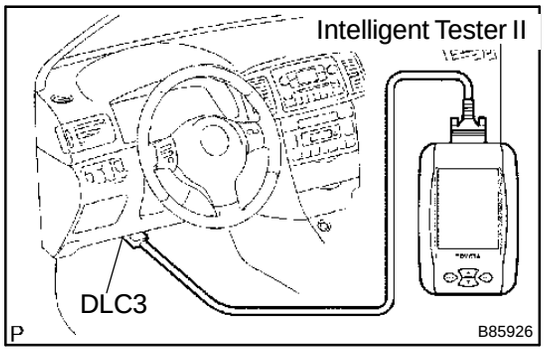


(b) Inspect the DLC3.

The vehicle uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with ISO 15031-03 and matches the ISO 15765-4 format.

Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 14 V

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.



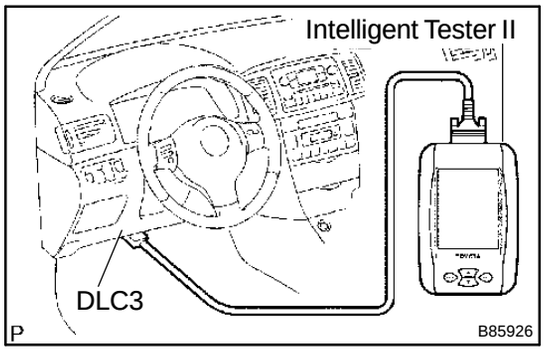
HINT:

Connect the cable of the intelligent tester II to the DLC3, turn the ignition switch ON and attempt to use the intelligent tester II. If the display informs that a communication error has occurred, there is a problem either with the vehicle or with the tester.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.
- If communication is still impossible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.

(c) Check the battery voltage.
Standard: 11 to 14 V

If the voltage is below 11 V, replace the battery before proceeding.

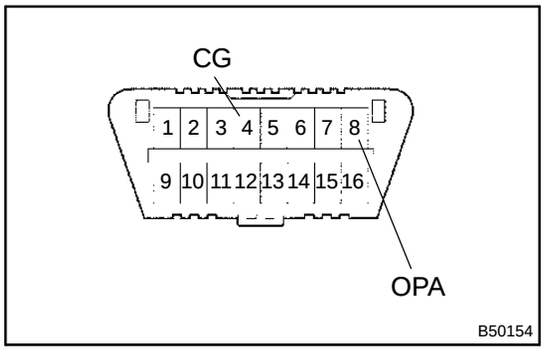


2. CHECK DTC (USING INTELLIGENT TESTER II)

HINT:
Use the intelligent tester II to detect the output of DTC B2799 from the ECM. The outputs of the other codes are detected using SST.

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch ON.
(c) Read the DTCs by following the directions on the tester's screen.

HINT:
Refer to the intelligent tester ll operator's manual for further details.



3. CHECK TRANSPONDER KEY ECU INPUT CONDITION DISPLAY READ CODE

(a) Using SST, connect terminal OPA and CG of the DLC3.
SST 09843–18040
(b) Turn the ignition switch ON.
(c) Read the code from the security indicator.

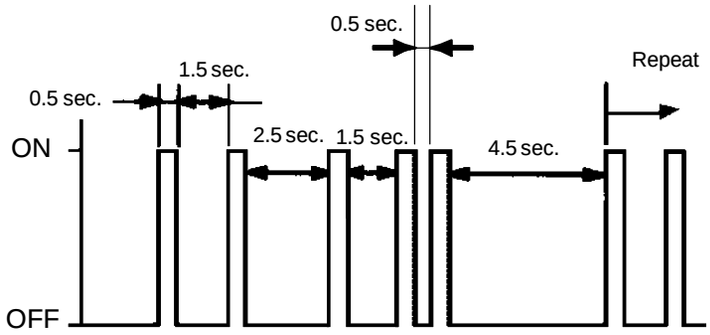
HINT:

- If 2 or more codes are detected at the same time, the lowest numbered code will be displayed first.
- If no code appears, check the diagnostic circuit and the security indicator circuit.

Table Area	See Page
OPA and CG terminal circuit	05–1138
Security indicator circuit	05–1136

- As an example, the blinking patterns for codes 11 and 12 are shown on the illustration below.

Example: Codes 11 and 12 are output



Normal Code: 11, 12, 13, 21 and 22
Abnormal Code: 31, 32, 33, and 34

B51490
B86992

(d) Code chart

Code	Output Condition
11	Key unlock warning switch ON (Ignition key inserted).
12	Any door is open (Door courtesy switch ON).
13	Ignition switch at ON position.
21	Master key is inserted in ignition key cylinder and the immobiliser system is OFF.
22	Sub-key is inserted in ignition key cylinder and immobiliser system is OFF.
31	Key code recorded in transponder key ECU differs from code of key inserted in ignition key cylinder.
32	Transponder key code cannot be read.
33	Key code cannot be read because format of chip inside key is wrong.
34	Transponder key ECU has no memory space to register key code.

(e) After completing the check, disconnect terminals OPA and CG of the DLC3.

4. CLEAR DTC (USING INTELLIGENT TESTER II)

HINT:

Use the intelligent tester II to delete DTC B2799.

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch ON.

(c) Erase the DTCs by following the directions on the tester's screen.

HINT:

Refer to the intelligent tester ll operator's manual for further details.

054CI-14

DIAGNOSTIC TROUBLE CODE CHART

1. ECM DTC CHART

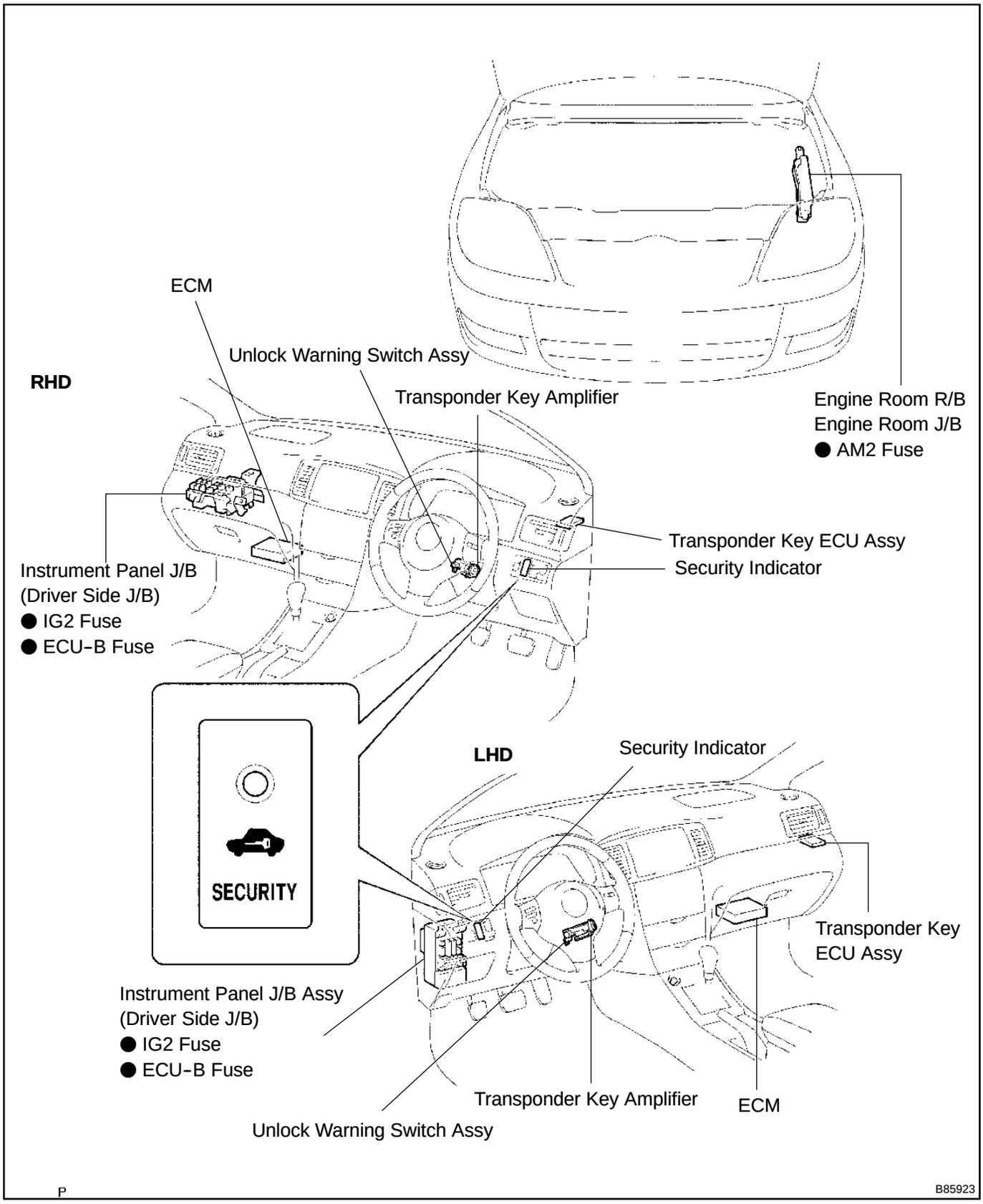
NOTICE:

The DTC for the immobilizer system is specified. If other codes are output, check the DTC chart of the SFI system.

DTC No. (See Page)	Detection Item	Trouble Area
B2799 (05-1121)	Engine Immobiliser System Malfunction	• Wire harness • ECM

054CM-14

LOCATION



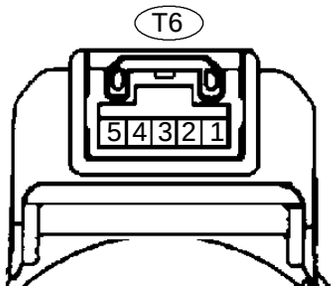
P

B85923

05LVE-01

TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



B58084

(a) Disconnect the T6 amplifier connector.

(b) Measure the resistance of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (T6-3) - Body ground	R - Body ground	Ground	Always	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

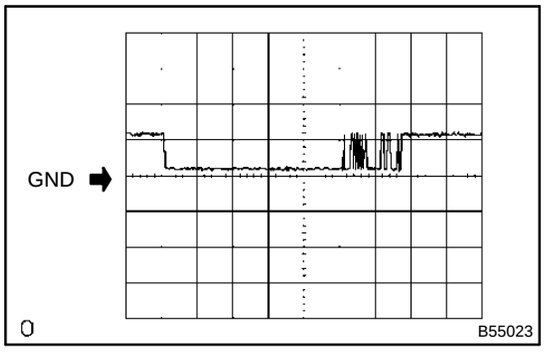
(c) Reconnect the T6 amplifier connector.

(d) Measure the voltage of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (T6-5) - GND (T6-3)	B -R	Power source	No key in ignition key cylinder → key inserted	0 V → 10 to 14 V
CODE (T6-2) - GND (T6-3)	P - R	Demodulated signal of transponder ID data	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 1)
RXCK (T6-4) - GND (T6-3)	V - R	Clock signal	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 2)
TXCT (T6-1) - GND (T6-3)	G - R	Key code output signal	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 3)

If the result is not as specified, the amplifier may have a malfunction.

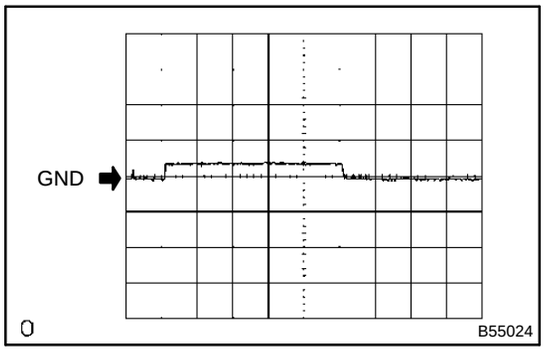


B55023

(e) Inspect using an oscilloscope.

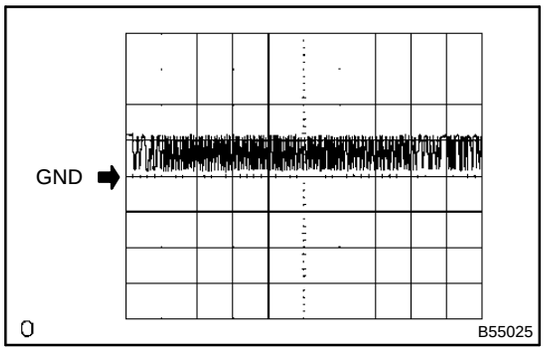
Waveform 1 (Reference):

Terminal	CODE - GND
Tool Setting	10 V/DIV., 10 ms/DIV.
Condition	No key in ignition key cylinder → key inserted



Waveform 2 (Reference):

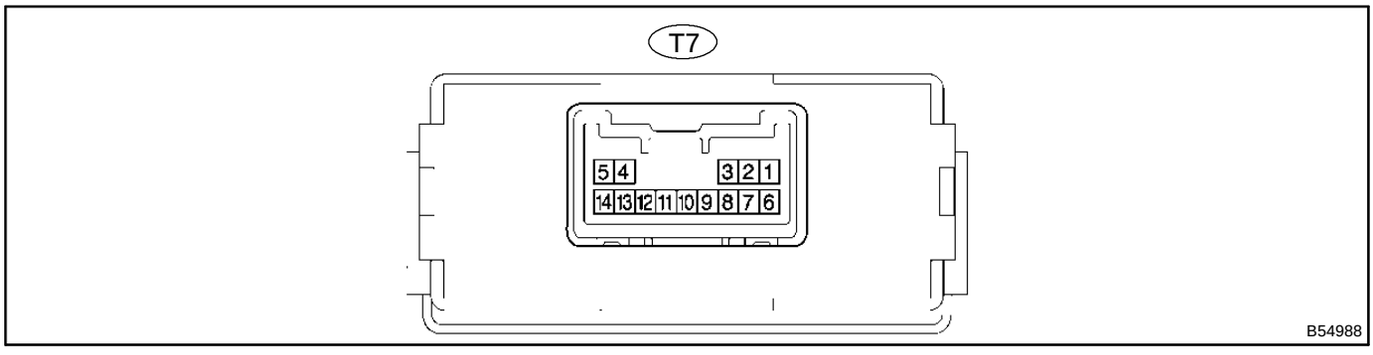
Terminal	RXCK - GND
Tool Setting	10 V/DIV., 10 ms/DIV.
Condition	No key in ignition key cylinder → key inserted



Waveform 3 (Reference):

Terminal	TXCT - GND
Tool Setting	10 V/DIV., 10 ms/DIV.
Condition	No key in ignition key cylinder → key inserted

2. CHECK TRANSPONDER KEY ECU ASSY



(a) Disconnect the T7 ECU connector.
(b) Measure the resistance and voltage of the wire harness side connector.
Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (T7-1) - GND (T7-14)	SB (R-G) - W-B	Battery	Always	10 to 14 V
IG (T7-2) - GND (T7-14)	SB (B-W) - W-B	Ignition power supply	Ignition switch OFF → ON	0 V → 10 to 14 V
KSW (T7-9) - GND (T7-14)	L-B - W-B	Unlock warning switch	No key in ignition key cylinder → key inserted	10 kΩ or higher → Below 1 Ω
AGND (T7-12) - GND (T7-14)	R - W-B	Ground	Always	Below 1 Ω
GND (T7-14) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the T7 ECU connector.

(d) Measure the voltage of the connector.

Standard:

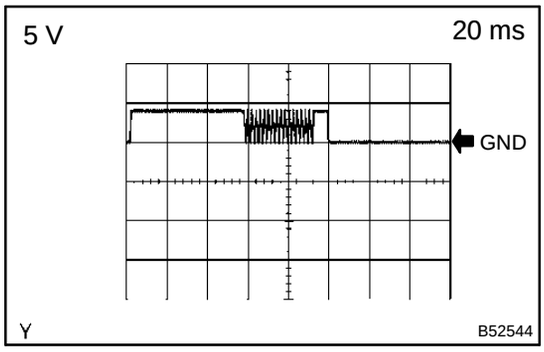
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
KSW (T7-9) - GND (T7-14)	L-B - W-B	Unlock warning switch	No key in ignition key cylinder → key inserted	10 to 14 V Below 1 V
VC12 (T7-6) - GND (T7-14)	B - W-B	Power source of transponder key amplifier	No key in ignition key cylinder → key inserted	0 V → 10 to 14 V
TXCT (T7-13) - AGND (T7-12)	G - R	Transponder key amplifier communication signal	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 1)
CODE (T7-4) - AGND (T7-12)	P - R	Transponder key amplifier communication signal	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 2)
RXCK (T7-5) - AGND (T7-12)	V - R	Transponder key amplifier communication signal	No key in ignition key cylinder → key inserted	Pulse generation (see waveform 3)
EFIO (T7-11) - GND (T7-14)	LG-R - W-B	ECM output signal	Ignition switch OFF → ON	Pulse generation (see waveform 4)
EFII (T7-10) - GND (T7-14)	LG-B - W-B	ECM input signal	Ignition switch OFF → ON	Pulse generation (see waveform 5)
CTY (T7-8) - GND (T7-14)	R-G*1 - W-B R-W*2 - W-B	Door courtesy switch	Driver's door fully closed → open	10 to 14 V → Below 1 V
IND (T7-7) - GND (T7-14)	W(W-R) - W-B	Security indicator	Engine immobilizer system is set (indicator is blinking)	Alternating between 10 to 14 V (0.2 sec.) and 0 V (1.8 sec.)

HINT:

*1: RHD

*2: LHD

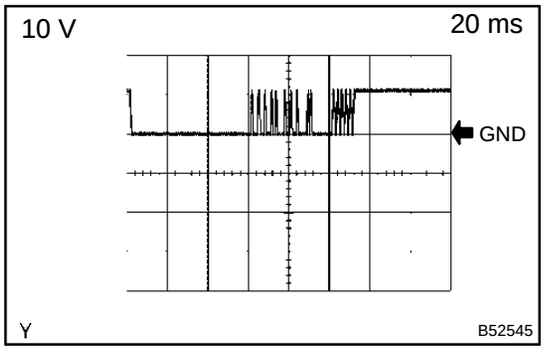
If the result is not as specified, the ECU may have a malfunction.



(e) Inspect using an oscilloscope.

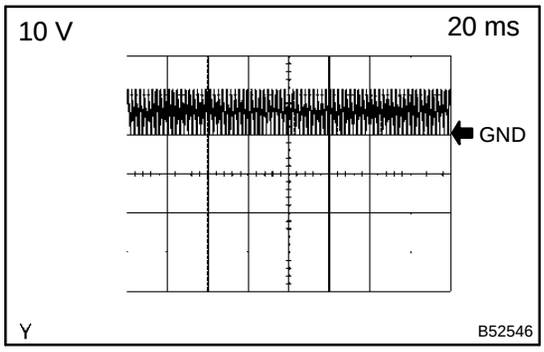
Waveform 1 (Reference):

Terminal	TXCT - GND
Tool Setting	5 V/DIV., 20 ms/DIV.
Condition	No key in ignition key cylinder → key inserted



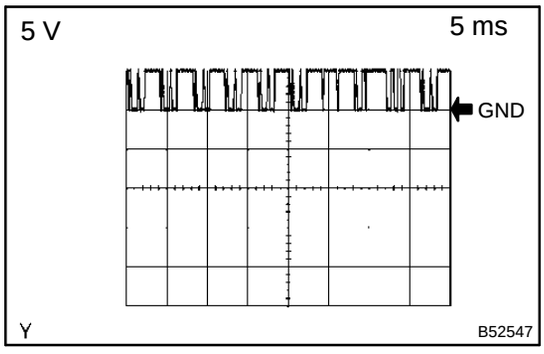
Waveform 2 (Reference):

Terminal	CODE - GND
Tool Setting	10 V/DIV., 20 ms/DIV.
Condition	No key in ignition key cylinder → key inserted



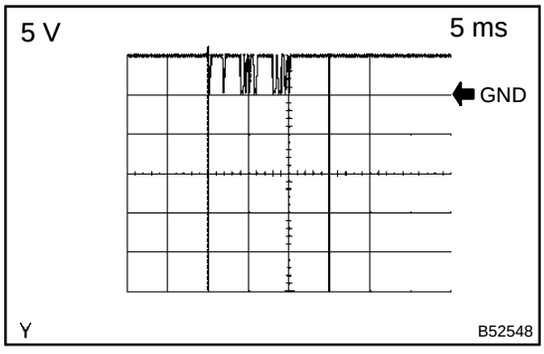
Waveform 3 (Reference):

Terminal	RXCK - GND
Tool Setting	10 V/DIV., 20 ms/DIV.
Condition	No key in ignition key cylinder → key inserted



Waveform 4 (Reference):

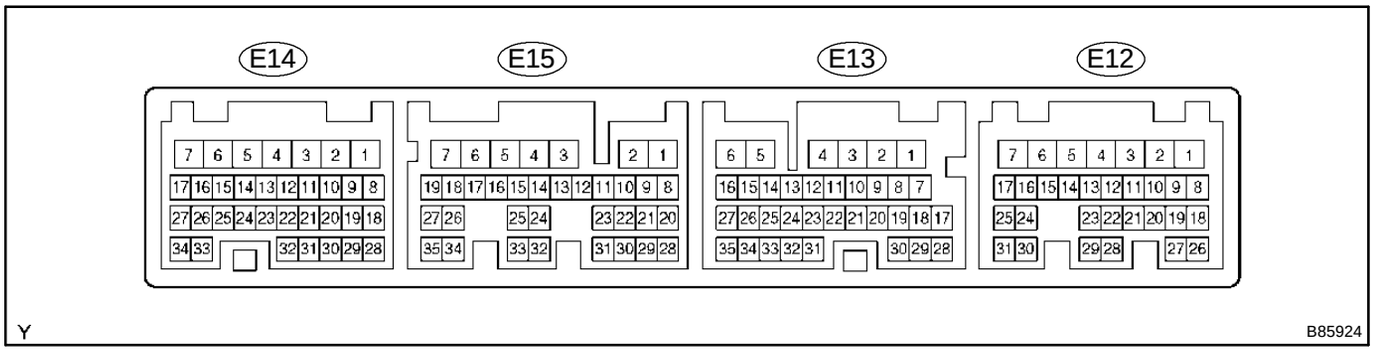
Terminal	EFIO - GND
Tool Setting	5 V/DIV., 5 ms/DIV.
Condition	Ignition switch OFF → ON



Waveform 5 (Reference):

Terminal	EFII - GND
Tool Setting	5 V/DIV., 5 ms/DIV.
Condition	Ignition switch OFF → ON

3. CHECK ECM



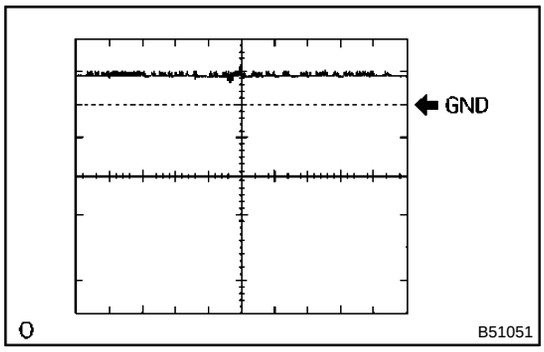
(a) Measure the voltage of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BATT (E12-3) - E1 (E14-5)	R-W - BR	Battery	Always	10 to 14 V
+B1 (E12-1) - E1 (E14-5)	B - BR	Ignition power supply	Ignition switch ON	10 to 14 V
IMO (E13-26) - E1 (E14-5)	LG-B - BR	Transponder key ECU input signal	Ignition switch ON	Pulse generation (see waveform 1)

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IMI (E13-27) - E1 (E14-5)	LG-R - BR	Transponder key ECU input signal	Ignition switch ON	Pulse generation (see waveform 2)
E1 (E14-5) - Body ground	BR - Body ground	Ground	Always	Below 1 Ω

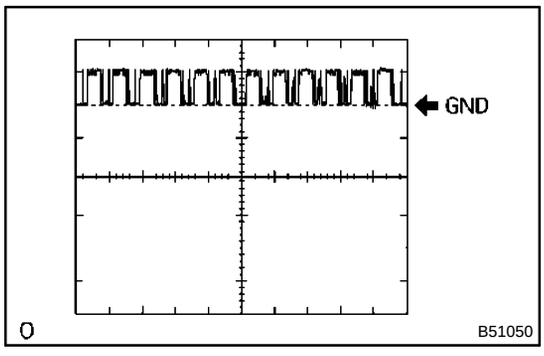
If the result is not as specified, the ECM may have a malfunction.



(b) Inspect using an oscilloscope.

Waveform 1 (Reference):

Terminal	IMO - E1
Tool Setting	10 V/DIV., 100 ms/DIV.
Condition	Ignition switch ON



Waveform 2 (Reference):

Terminal	IMI - E1
Tool Setting	10 V/DIV., 100 ms/DIV.
Condition	Ignition switch ON

054CK-14

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Engine does not start	3. ECU power source circuit • ECU-B fuse • IG2 fuse • AM2 fuse • Wire harness • Transponder key ECU assy 4. SFI system	05-1130 05-1
Key is inserted into ignition key cylinder but code 11 is not output (unlock warning switch circuit may be malfunctioning)	1. Unlock warning switch circuit • Unlock warning switch assy • Wire harness • Transponder key ECU assy	05-1127
Driver side door is opened but code 12 is not output (front door courtesy lamp switch assy circuit may be malfunctioning)	1. Front door courtesy lamp switch assy circuit • Front door courtesy lamp switch assy • Wire harness • Transponder key ECU assy	05-1140
Ignition switch is ON but code 13 is not output (ignition or starter switch assy circuit may be malfunctioning)	1. Ignition switch assy circuit • IG2 Fuse • Wire harness • Transponder key ECU assy	05-1132
Master key is used to turn ignition switch ON but code 21 is not output (transponder key amplifier circuit may be malfunctioning)	1. Master key 2. Transponder key amplifier circuit • Wire harness • Transponder key amplifier • Transponder key ECU assy	- 05-1134
Sub-key is used to turn ignition switch ON but 22 is not output (transponder key amplifier circuit may be malfunctioning)	1. Sub-key 2. Transponder key amplifier circuit • Wire harness • Transponder key amplifier • Transponder key ECU assy	- 05-1134
Code 31 is output (unmatched key code)	1. Key	-
Code 32 is output (no communication in immobilizer system)	1. Key 2. Wire harness 3. Transponder key amplifier 4. Transponder key ECU assy	- - - -
Code 33 is output (no communication in immobilizer system)	1. Key 2. Wire harness 3. Transponder key amplifier 4. Transponder key ECU assy	- - - -
Code 34 is output	Transponder key ECU has no memory space to register key code	-

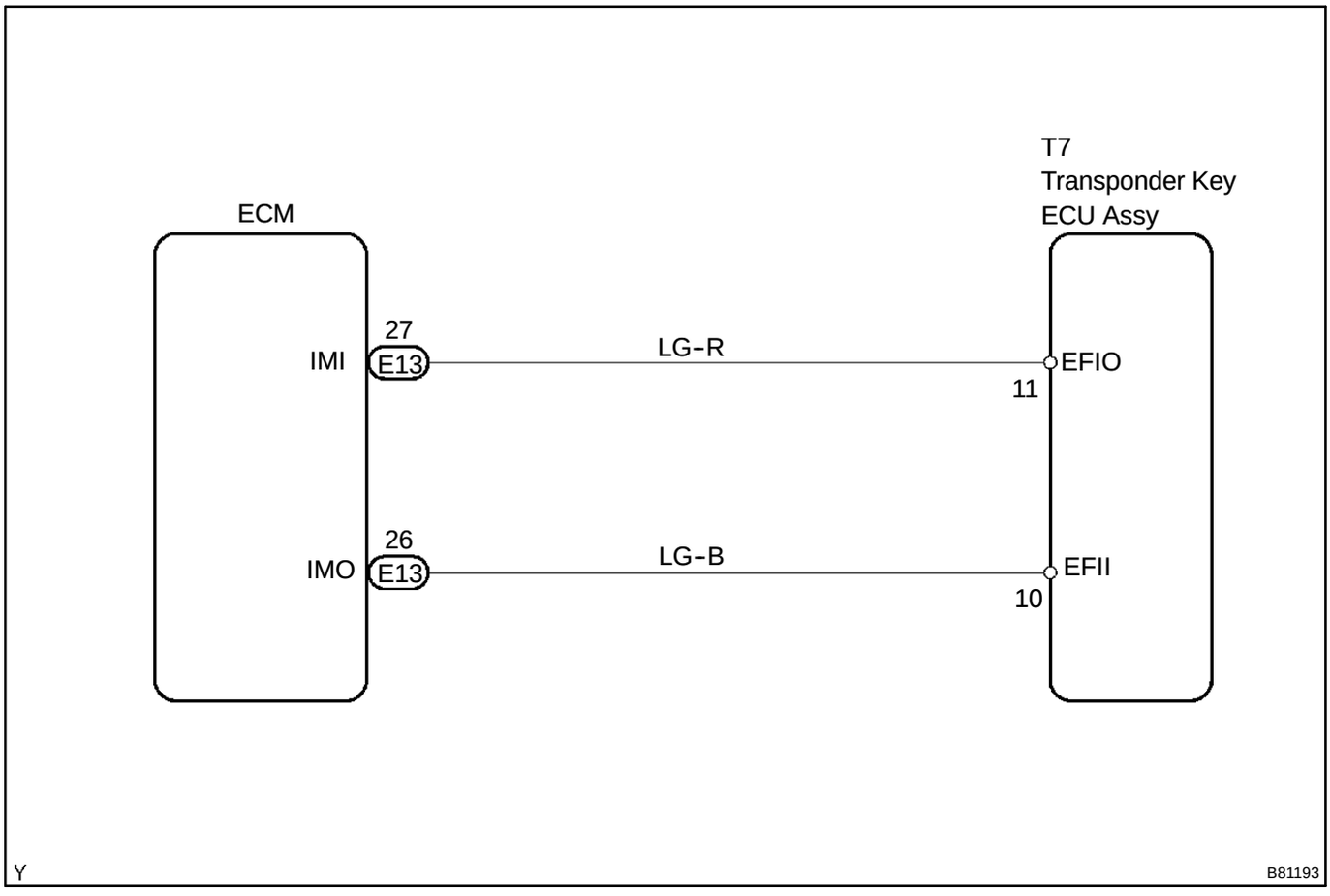
DTC	B2799	ENGINE IMMOBILISER SYSTEM MALFUNCTION

CIRCUIT DESCRIPTION

This DTC is output when: 1) the ECM detects errors in its own communications with the transponder key ECU; 2) the ECM detects errors in the communication lines; and 3) the ECU communication ID that is used between the transponder key ECU and the ECM are different.

DTC No.	DTC Detection Condition	Trouble Area
B2799	• Error in communication between ECM and transponder key ECU assy • Error in communication line • Communication ID is different during communication between transponder key ECU and ECM	• Wire harness • ECM

WIRING DIAGRAM



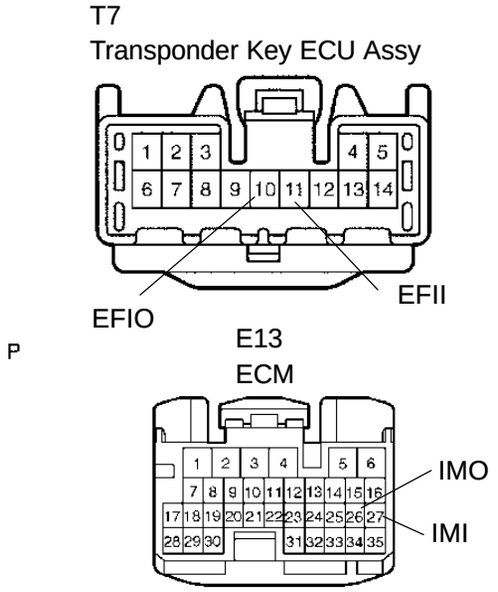
INSPECTION PROCEDURE

HINT:

Before troubleshooting for this DTC, make sure no transponder key ECU DTCs are present. If any transponder key ECU DTC is present, repair it first.

1	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - ECM)

Wire Harness Side



(a) Disconnect the T7 ECU connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
T7-11 (EFIO) - E13-27 (IMI)	Below 1 Ω
T7-10 (EFII) - E13-26 (IMO)	Below 1 Ω
T7-11 (EFIO) or E13-27 (IMI) - Body ground	10 kΩ or higher
T7-10 (EFII) or E13-26 (IMO) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE ECM

CODE 31 IS OUTPUT (UNMACHED KEY CODE)

CIRCUIT DESCRIPTION

This code is output when a key with a key code that has not been registered in the ECU is inserted into the ignition key cylinder.

Code No.	Detection Condition	Trouble Area
31	Key with unregistered key code is inserted	Key

INSPECTION PROCEDURE

1	RE-REGISTER KEY

(a) Re-register the key and insert this key into the ignition key cylinder. Check that the engine starts with the key.
OK: Engine starts

NG → **REPLACE KEY**

OK

END

CODE 32 IS OUTPUT (NO COMMUNICATION IN IMMOBILIZER SYSTEM)

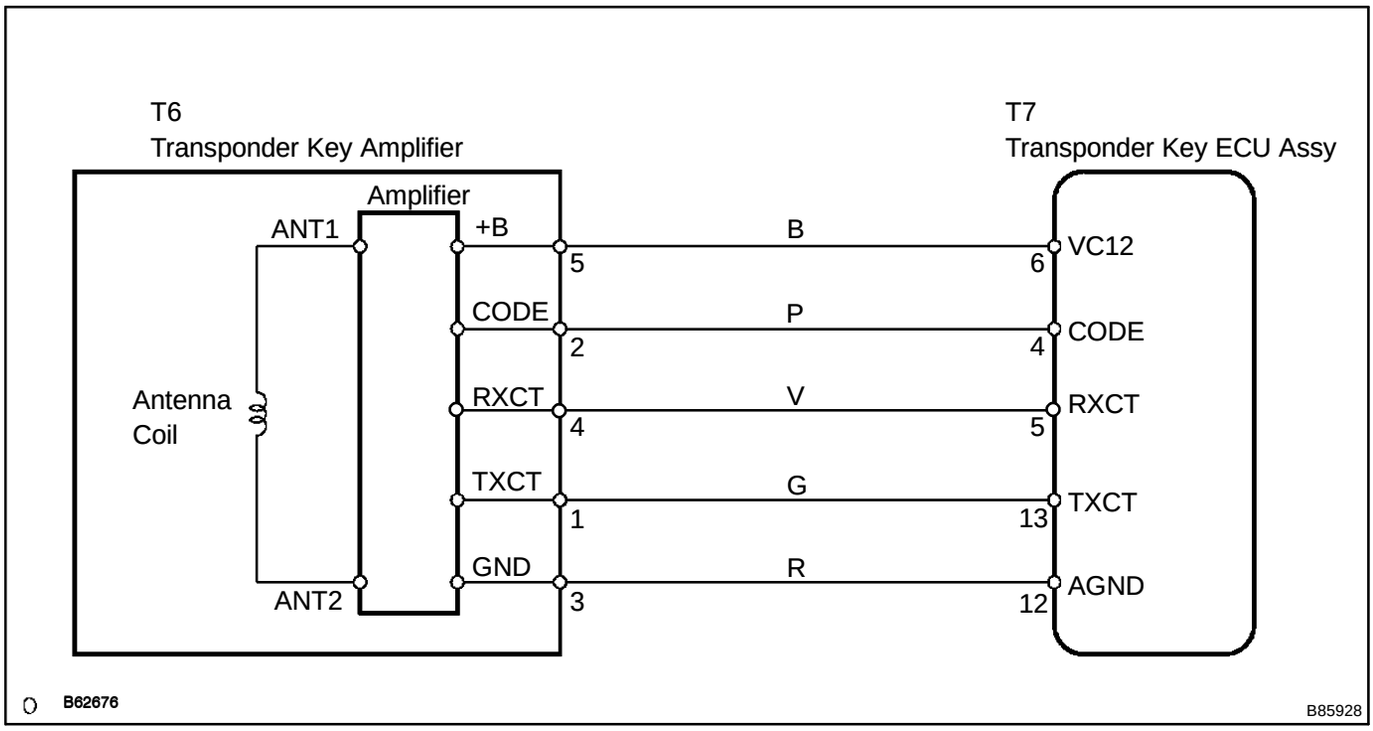
CODE 33 IS OUTPUT (COMMUNICATION IN MALFUNCTION)

CIRCUIT DESCRIPTION

This DTC is output when a key that does not have a transponder chip is inserted into the ignition key cylinder or if communication between the key and transponder key ECU is not possible.

Code No.	Detection Condition	Trouble Area
32	No communication	• Wire harness • Transponder key amplifier • Transponder key ECU assy
33	Communication error	Key

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WHETHER ENGINE STARTS WITH OTHER KEYS

(a) Insert the vehicle's other key into the ignition key cylinder.
(b) Check that the engine starts with the key.
OK: Engine starts

NG → **Go to step 2**

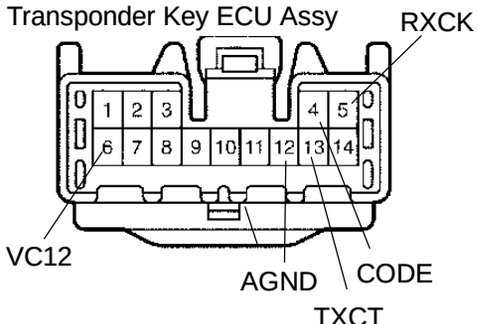
OK

RE-REGISTER OR REPLACE KEY THAT CANNOT START ENGINE

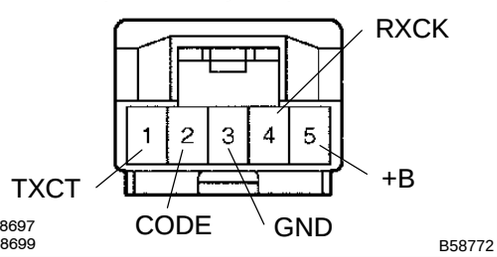
2	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - TRANSPONDER KEY AMPLIFIER)

Wire Harness Side

T7
Transponder Key ECU Assy



T6
Transponder Key Amplifier



B58697
B58699
B58772

(a) Disconnect the T7 ECU connector.
(b) Disconnect the T6 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.
Standard:

Tester Connection	Specified Condition
T7-6 (VC12) - T6-5 (+B)	Below 1 Ω
T7-4 (CODE) - T6-2 (CODE)	Below 1 Ω
T7-13 (TXCT) - T6-1 (TXCT)	Below 1 Ω
T7-12 (AGND) - T6-3 (GND)	Below 1 Ω
T7-5 (RXCT) - T6-4 (RXCT)	Below 1 Ω
T7-6 (VC12) or T6-5 (+B) - Body ground	10 kΩ or higher
T7-4 (CODE) or T6-2 (CODE) - Body ground	10 kΩ or higher
T7-13 (TXCT) or T6-1 (TXCT) - Body ground	10 kΩ or higher
T7-12 (AGND) or T6-3 (GND) - Body ground	10 kΩ or higher
T7-5 (RXCT) or T6-4 (RXCT) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

(a) After replacing the transponder key amplifier with a normally functioning transponder key amplifier, check that the engine starts.
OK: Engine starts

NG → **REPLACE TRANSPONDER KEY ECU ASSY**

OK

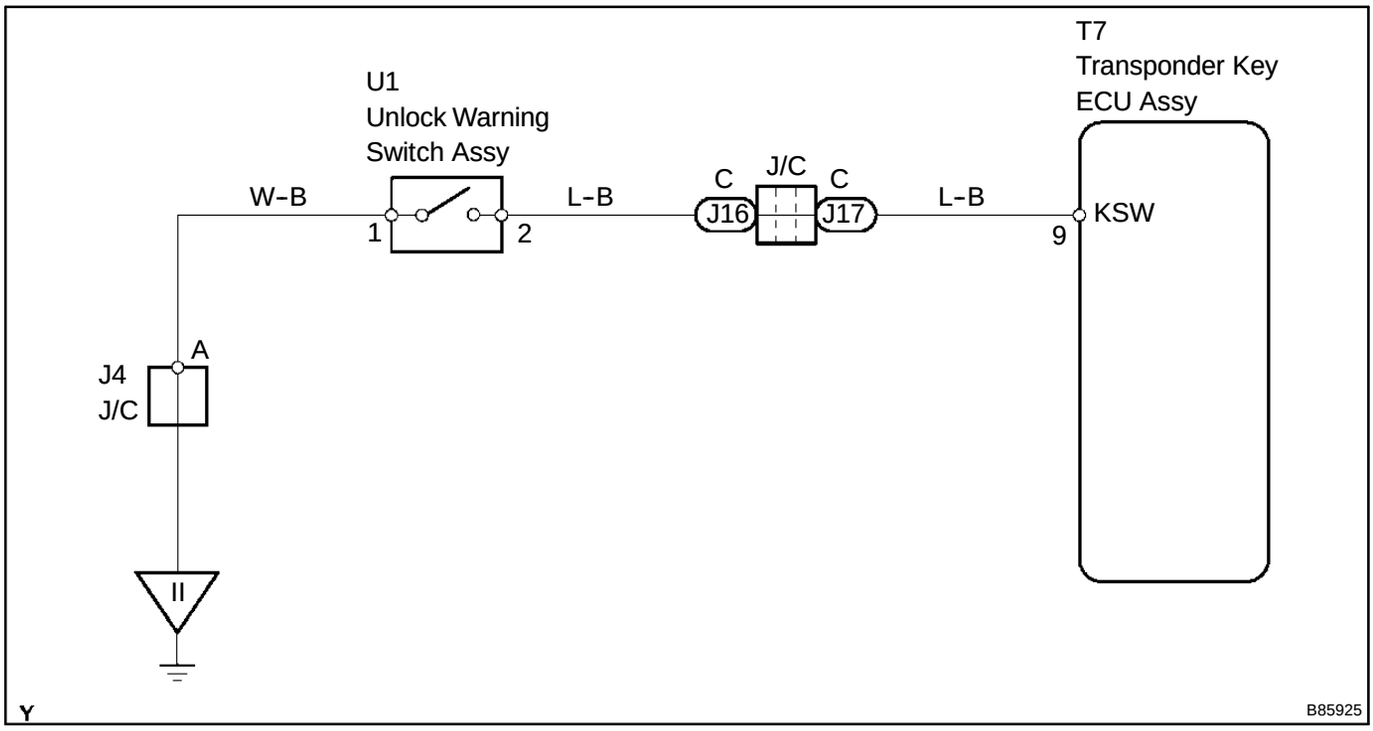
END (TRANSPONDER KEY AMPLIFIER DEFECTIVE)

UNLOCK WARNING SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The unlock warning switch is ON while the key is in the ignition key cylinder.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR CODE

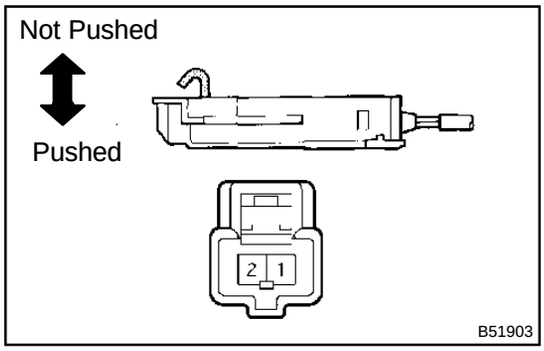
(a) Insert the key into the ignition key cylinder.
(b) Check for code (see page 05–1110).
OK: Code 11 is output.

NG → **Go to step 2**

OK

END (NORMAL)

2	INSPECT UNLOCK WARNING SWITCH ASSY



(a) Remove the unlock warning switch.
(b) Measure the resistance of the switch.
Standard:

Tester Connection	Switch Condition	Specified Condition
1 – 2	Pushed	Below 1 Ω
1 – 2	Not pushed	10 kΩ or higher

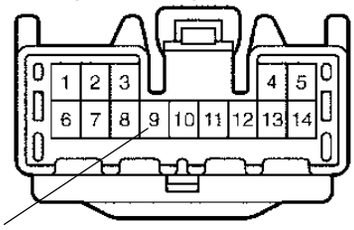
NG → **REPLACE UNLOCK WARNING SWITCH ASSY**

OK

3	CHECK WIRE HARNESS (UNLOCK WARNING SWITCH ASSY - TRANSPONDER KEY ECU ASSY AND BODY GROUND)

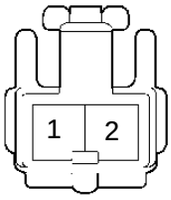
Wire Harness Side

T7
Transponder key ECU



KSW

U1
Unlock Warning Switch Assy



B58697
B58517
B58768

(a) Disconnect the T7 ECU connector.
(b) Disconnect the U1 switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
T7-9 (KSW) - U1-2	Below 1 Ω
U1-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

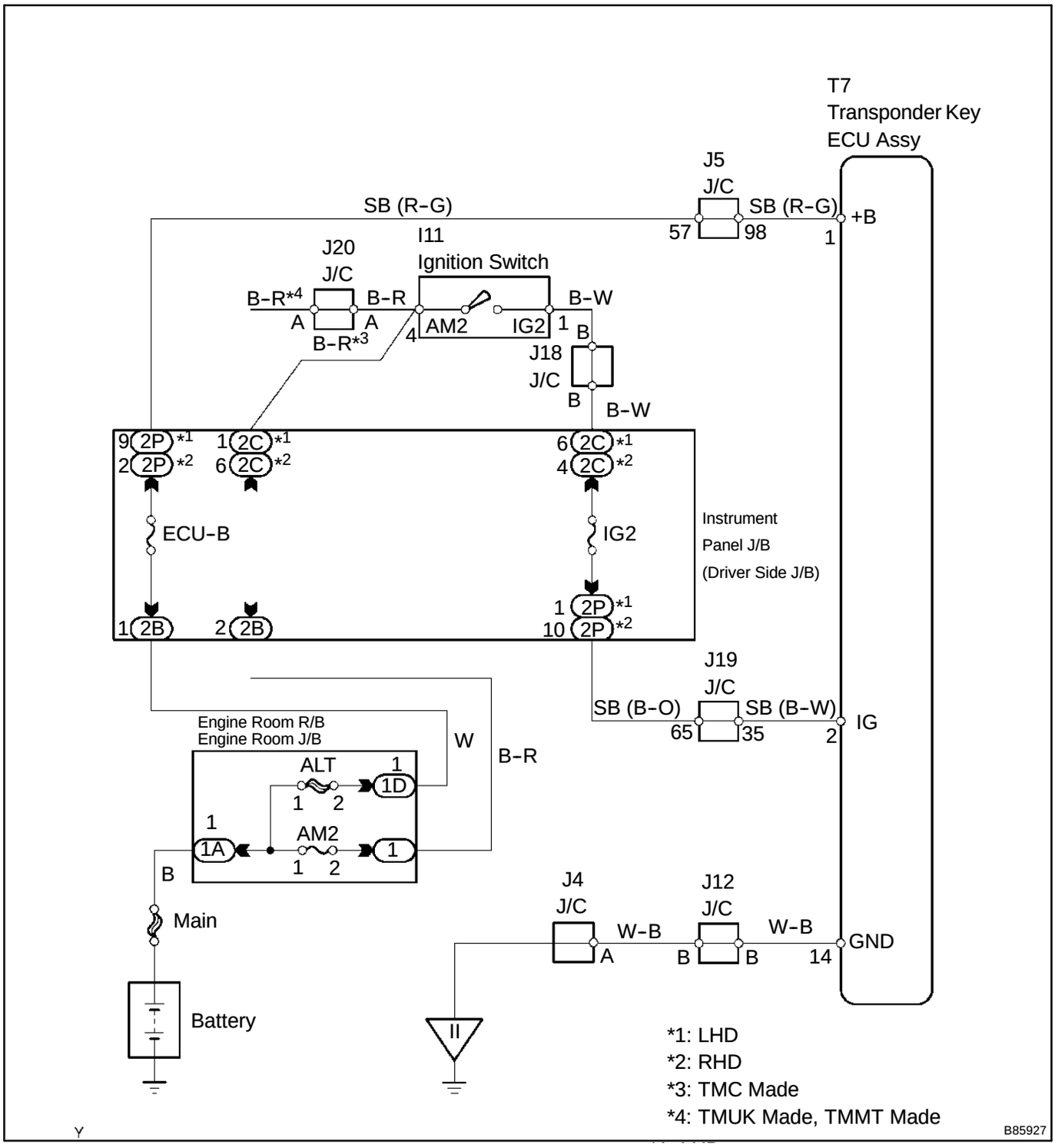
REPLACE TRANSPONDER KEY ECU ASSY

ECU POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This circuit provides power to operate the transponder key ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

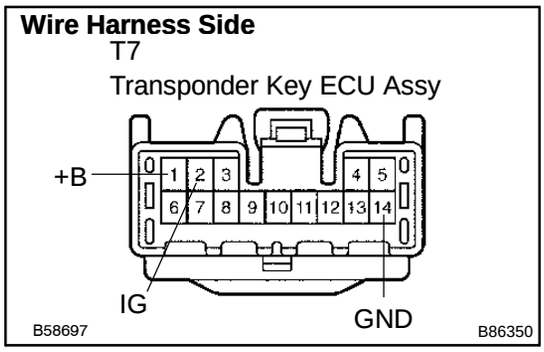
1	INSPECT FUSE (ECU-B, IG2, AM2)

(a) Remove the ECU-B and IG2 fuses from the instrument panel J/B.
(b) Remove the AM2 fuse from the engine room R/B.
(c) Measure the resistance of fuses.
Standard: Below 1 Ω

NG → **REPLACE FUSE**

OK

2	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - BATTERY AND BODY GROUND)



(a) Disconnect the T7 ECU connector.
(b) Measure the resistance and voltage of the wire harness side connector.
Standard:

Tester Connection	Condition	Specified Condition
T7-2 (IG) - Body ground	Ignition switch OFF ON	0 V 10 to 14 V
T7-1 (+B) - Body ground	Always	10 to 14 V
T7-14 (GND) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

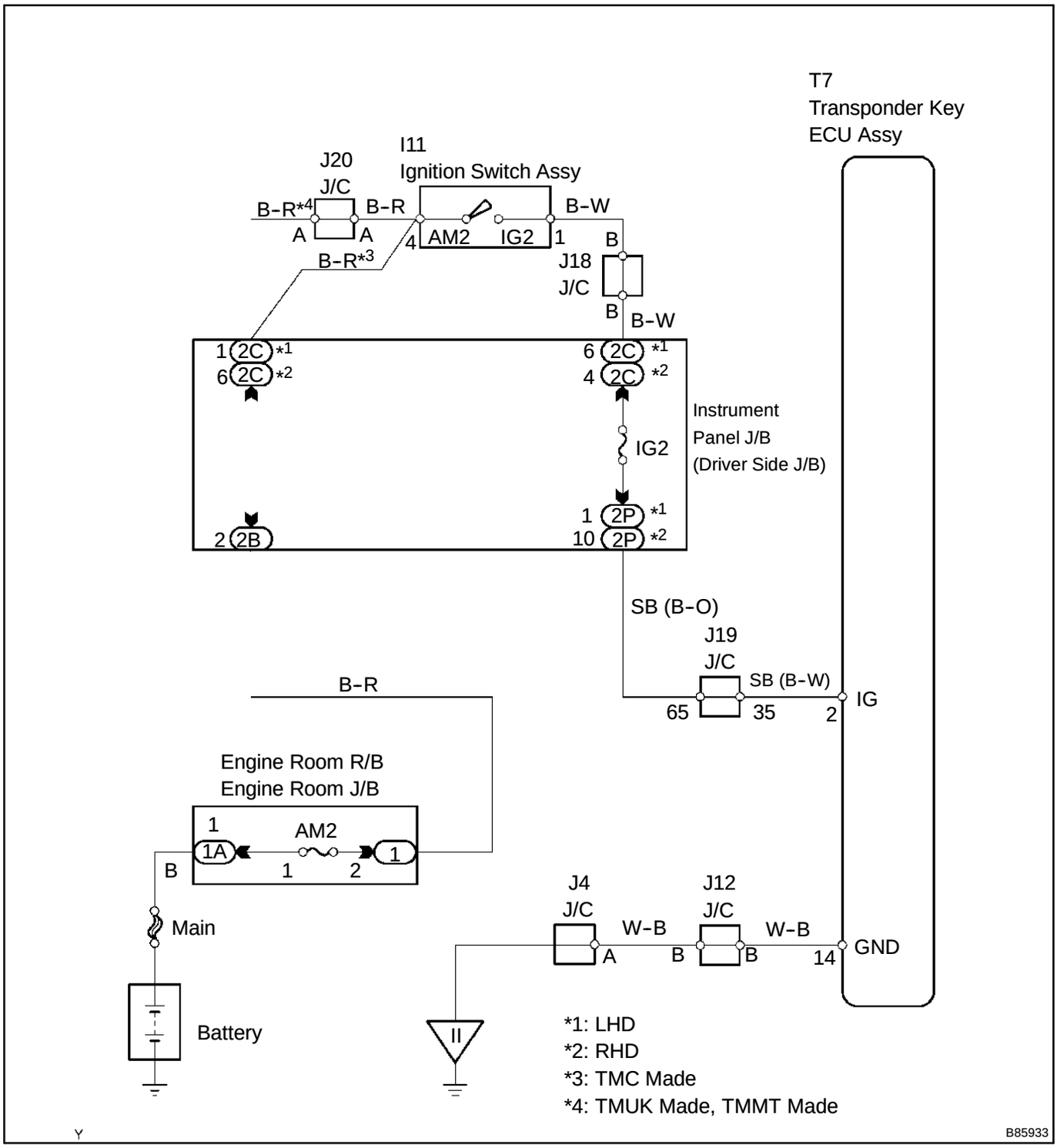
REPLACE TRANSPONDER KEY ECU ASSY

IGNITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit provides power to operate the transponder key ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR CODE

(a) Turn the ignition switch ON.
(b) Check for code (see page 05-1110).
OK: Code 13 is output.

NG → **Go to step 2**

OK

END

2	INSPECT FUSE (IG2,AM2)

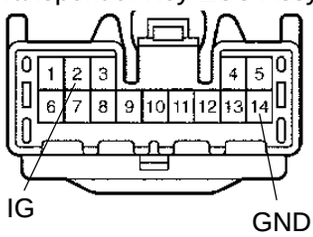
(a) Remove the IG2 fuse from the instrument panel J/B.
(b) Remove the AM2 fuse from the engine room R/B.
(c) Measure the resistance of the fuses.
Standard: Below 1 Ω

NG → **REPLACE FUSE**

OK

3	CHECK WIRE HARNESS (TRANSPONDER KEY ECU - BATTERY AND BODY GROUND)

Wire Harness Side
T7
Transponder Key ECU Assy



(a) Disconnect the T7 ECU connector.
(b) Measure the resistance and voltage of the wire harness side connector.
Standard:

Tester Connection	Condition	Specified Condition
T7-2 (IG) - Body ground	Ignition switch OFF ON	0 V 10 to 14 V
T7-14 (GND) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

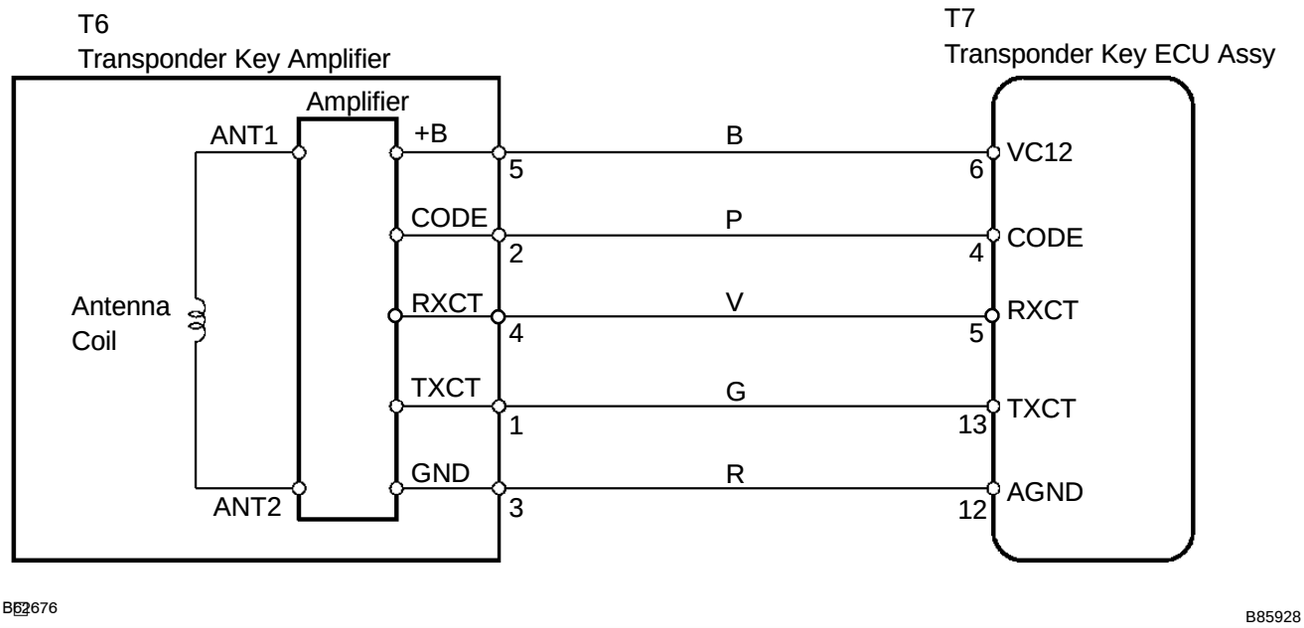
REPLACE TRANSPONDER KEY ECU ASSY

TRANSPONDER KEY AMPLIFIER CIRCUIT

CIRCUIT DESCRIPTION

Inserting the key into the ignition key cylinder will activate the transponder key ECU to begin communication with the transponder key amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR CODE

(a) Insert the master key or sub-key into the ignition key cylinder.
(b) Check for code (see page 05-1110).
OK: Code 21 or 22 is output.

NG → **Go to step 2**

OK

END

2	CHECK WHETHER ENGINE STARTS WITH OTHER KEYS

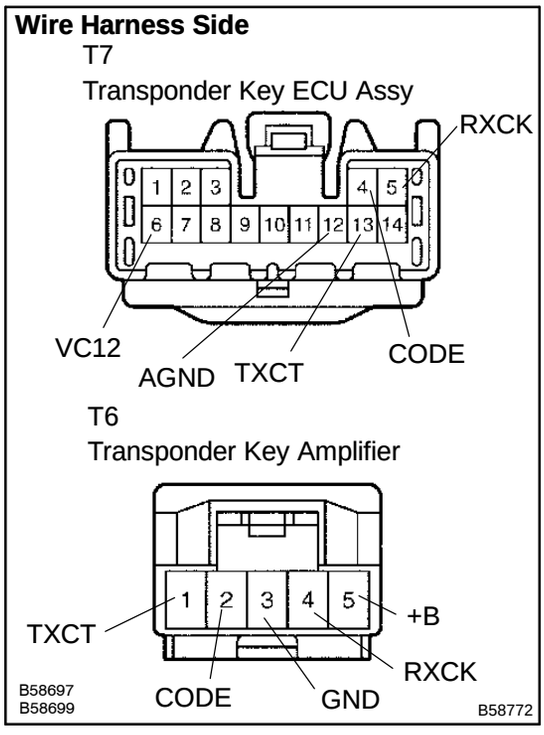
(a) Insert the vehicle's other key into the ignition key cylinder.
(b) Check that the engine starts with the key.
OK: Engine starts.

NG	Go to step 3

OK

RE-REGISTER OR REPLACE KEY THAT CANNOT START ENGINE

3	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY - TRANSPONDER KEY AMPLIFIER)



(a) Disconnect the T7 ECU connector.
(b) Disconnect the T6 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.
Standard:

Tester Connection	Specified Condition
T7-6 (VC12) - T6-5 (+B)	Below 1 Ω
T7-4 (CODE) - T6-2 (CODE)	Below 1 Ω
T7-13 (TXCT) - T6-1 (TXCT)	Below 1 Ω
T7-12 (AGND) - T6-3 (GND)	Below 1 Ω
T7-5 (RXCT) - T6-4 (RXCT)	Below 1 Ω
T7-6 (VC12) or T6-5 (+B) - Body ground	10 kΩ or higher
T7-4 (CODE) or T6-2 (CODE) - Body ground	10 kΩ or higher
T7-13 (TXCT) or T6-1 (TXCT) - Body ground	10 kΩ or higher
T7-12 (AGND) or T6-3 (GND) - Body ground	10 kΩ or higher
T7-5 (RXCT) or T6-4 (RXCT) - Body ground	10 kΩ or higher

NG	REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

(a) After replacing the transponder key amplifier with a normally functioning transponder key amplifier, check that the engine starts.
OK: Engine starts.

NG	REPLACE TRANSPONDER KEY ECU ASSY

OK

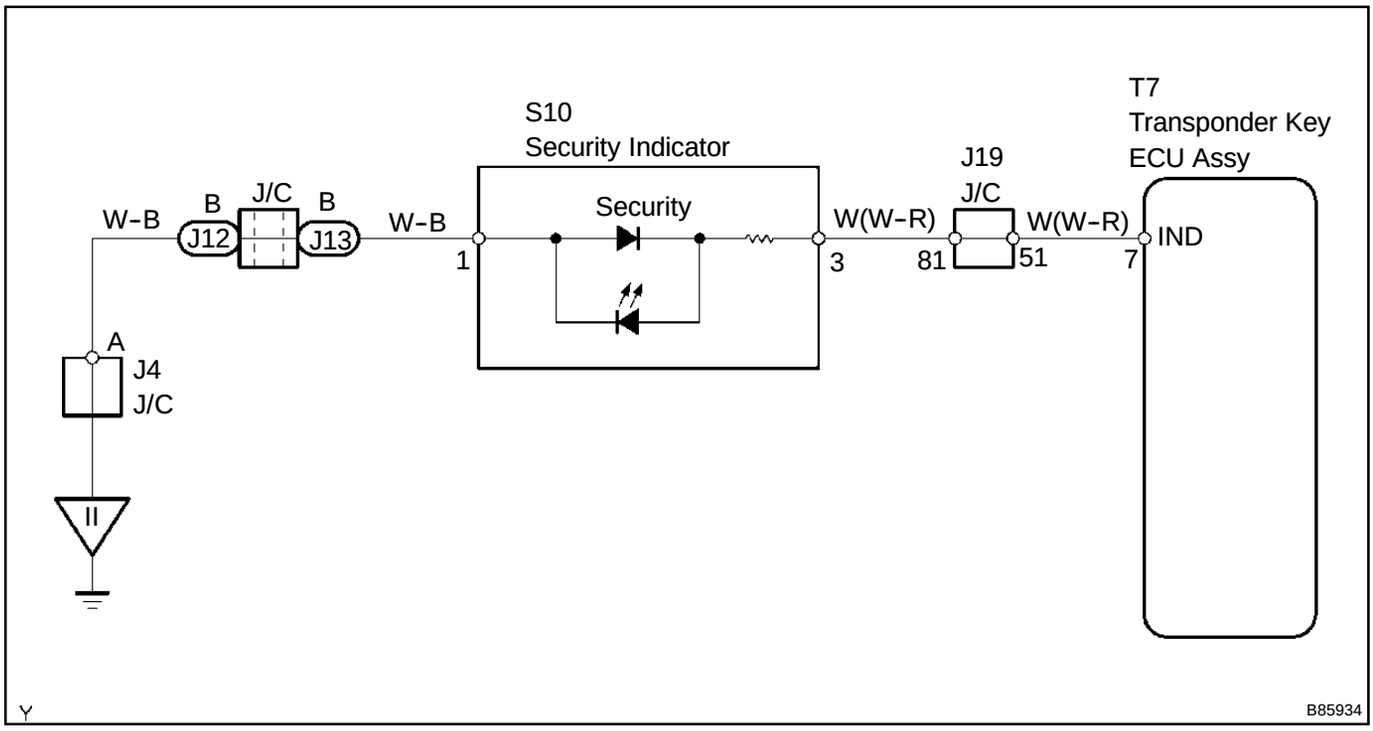
END(TRANSPONDER KEY AMPLIFIER DEFECTIVE)

SECURITY INDICATOR CIRCUIT

CIRCUIT DESCRIPTION

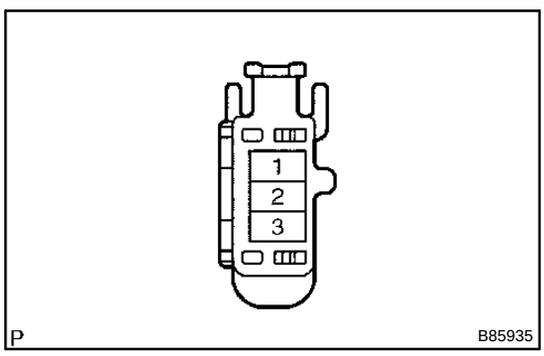
The transponder key ECU operates the security indicator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT SECURITY INDICATOR



(a) Apply 12 V to the terminals of the indicator, and check the lighting condition of the security indicator.

OK:

Tester Connection	Specified Condition
Battery potitive (+) → S10-3 (IND) Battery negative (-) → S10-1 (GND)	Illuminates

NOTICE:

- **If the positive (+) lead and the negative (-) lead are incorrectly connected, the security indicator does not illuminate.**
- **If the voltage is too low, the security indicator will not illuminate.**

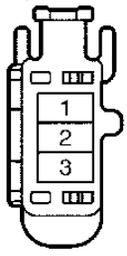
NG → **REPLACE SECURITY INDICATOR**

OK

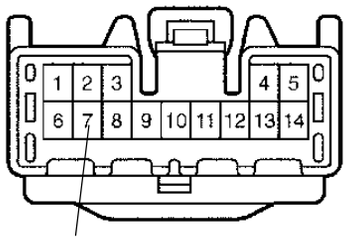
2	CHECK WIRE HARNESS (SECURITY INDICATOR - TRANSPONDER KEY ECU ASSY AND BODY GROUND)

Wire Harness Side

S10
Security Indicator



P T7
Transponder key ECU Assy



B85935
B58697
B86351

(a) Disconnect the S10 indicator connector.
(b) Disconnect the T7 ECU connector.
(c) Measure the resistance of the wire harness side connector.

Standard:

Tester Connection	Specified Condition
S10-3 - T7-7 (IND)	Below 1 Ω
S10-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

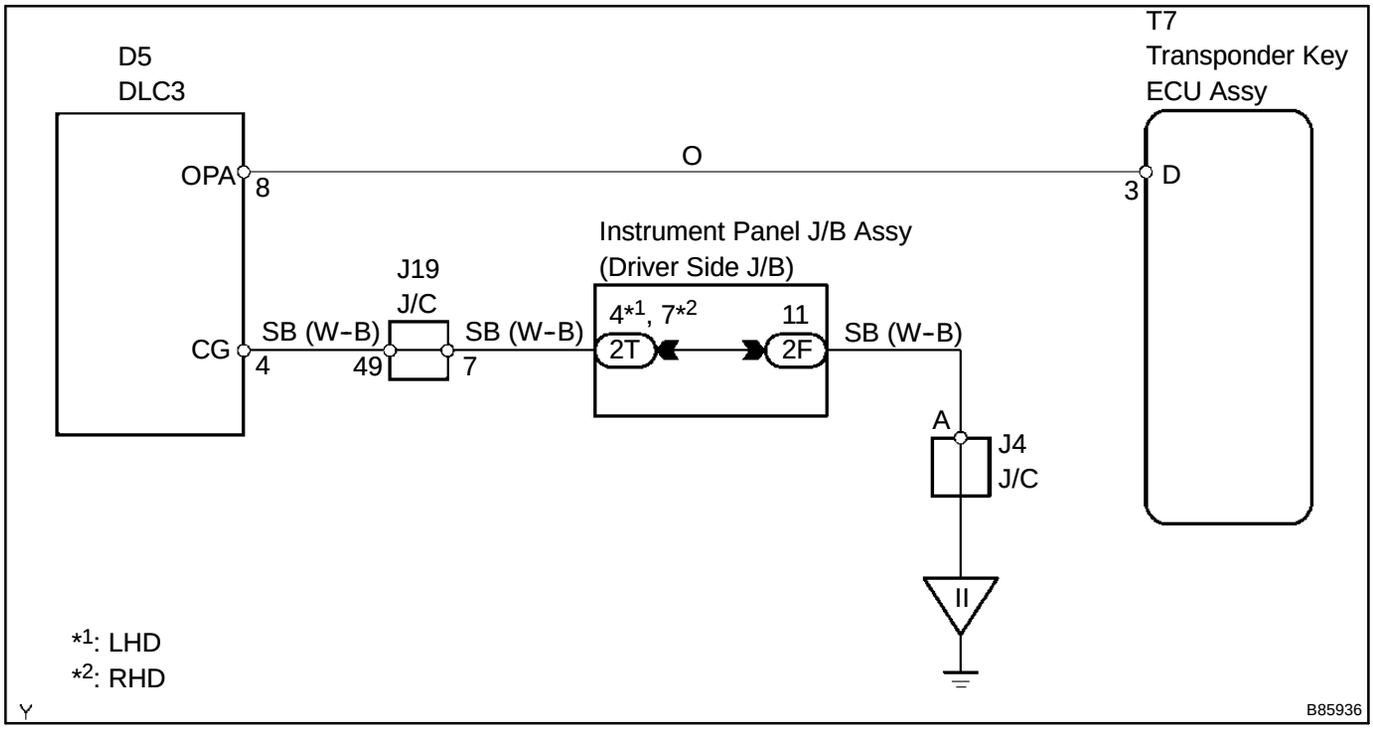
REPLACE TRANSPONDER KEY ECU ASSY

OPA AND CG TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

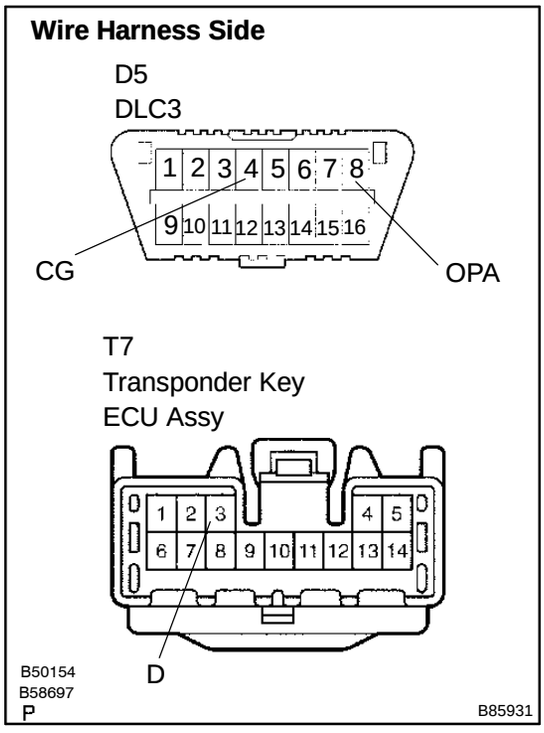
Connecting terminals OPA and CG of the DLC3 causes the transponder key ECU to display the DTC by blinking the security indicator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (DLC3 - TRANSPONDER KEY ECU ASSY AND BODY GROUND)



(a) Disconnect the T7 ECU connector.

(b) Measure the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
D5-8 (OPA) - T7-3 (D)	Below 1 Ω
D5-4 (CG) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

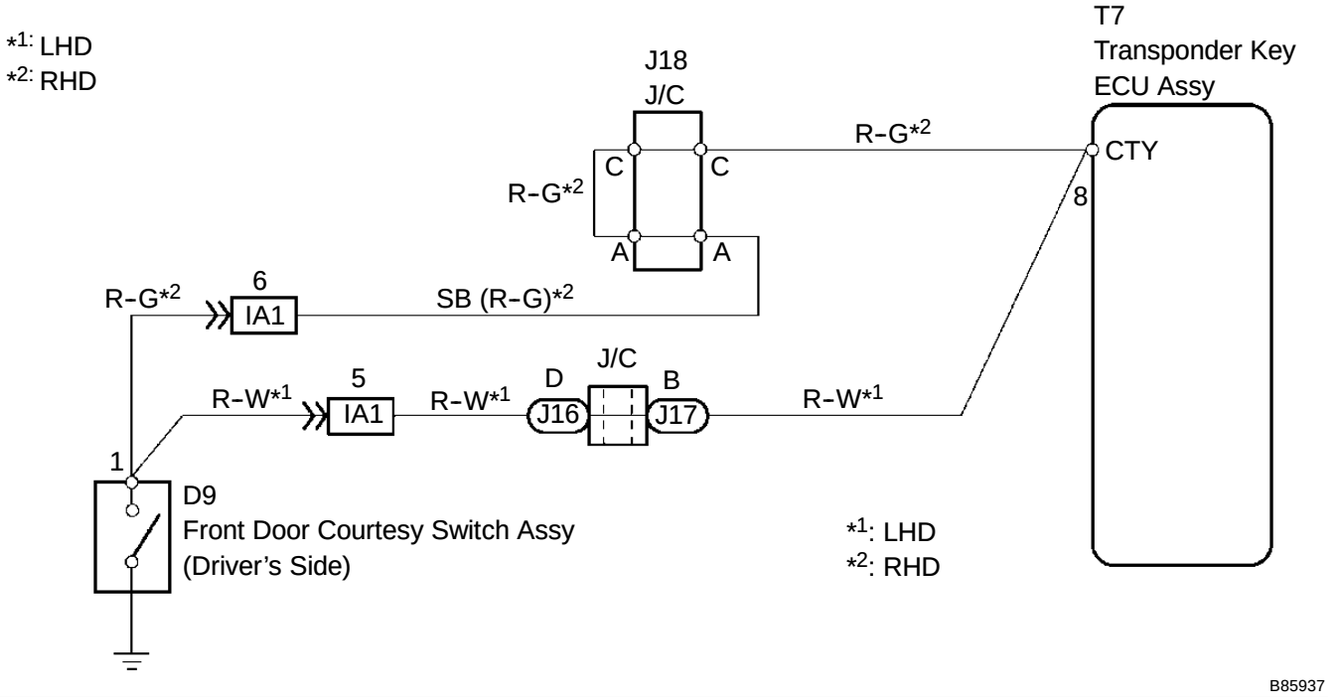
REPLACE TRANSPONDER KEY ECU ASSY

FRONT DOOR COURTESY LAMP SWITCH ASSY CIRCUIT (DRIVER SIDE)

CIRCUIT DESCRIPTION

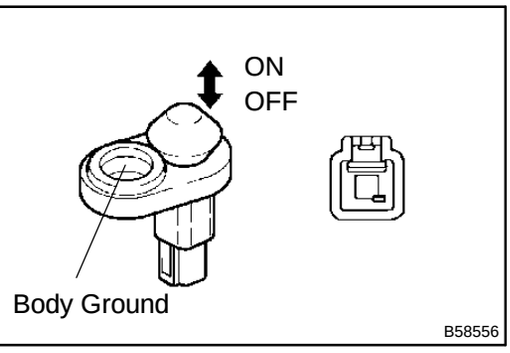
The switch turns ON when the driver side door opened and turns OFF when the driver side door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE)



(a) Measure the resistance of the switch.

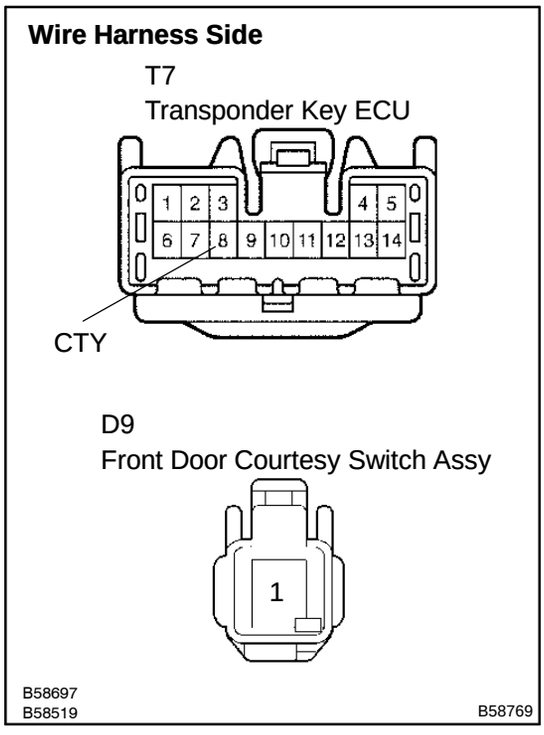
Standard:

Tester Connection	Condition	Specified Condition
1 - Body ground	Switch OFF	Below 1 Ω
1 - Body ground	Switch ON	10 kΩ or higher

NG → **REPAIR FRONT DOOR COURTESY LAMP SWITCH ASSY**

OK

2	CHECK WIRE HARNESS (TRANSPONDER KEY ECU - FRONT DOOR COURTESY LAMP SWITCH ASSY)



(a) Disconnect the T7 ECU connector.
(b) Disconnect the D9 switch connector.
(c) Measure the resistance of the wire harness side connector.

Standard:

Tester Connection	Specified Condition
T7-8 (CTY) - D9-1	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK →

REPLACE TRANSPONDER KEY ECU ASSY

CRUISE CONTROL SYSTEM

05L0H-02

PRECAUTION

1. Pay attention to the following points when inspecting the cruise control system.

(a) Push the cruise control main switch ON-OFF button off when not using the cruise control.

(b) Be careful of vehicle speed increase when driving downhill with the cruise control on.

(c) "RES/+" operation, after canceling the cruise control, works as RESUME, and works as '+' (ACCEL) while the cruise control system is in operation.

(d) Push the cruise control main switch ON-OFF button off and reset the cruise control if the CRUISE main indicator light blinks while the cruise control system is in operation. When the cruise control cannot be set by this procedure or cancelled immediately after setting, there may be a malfunction in the system.

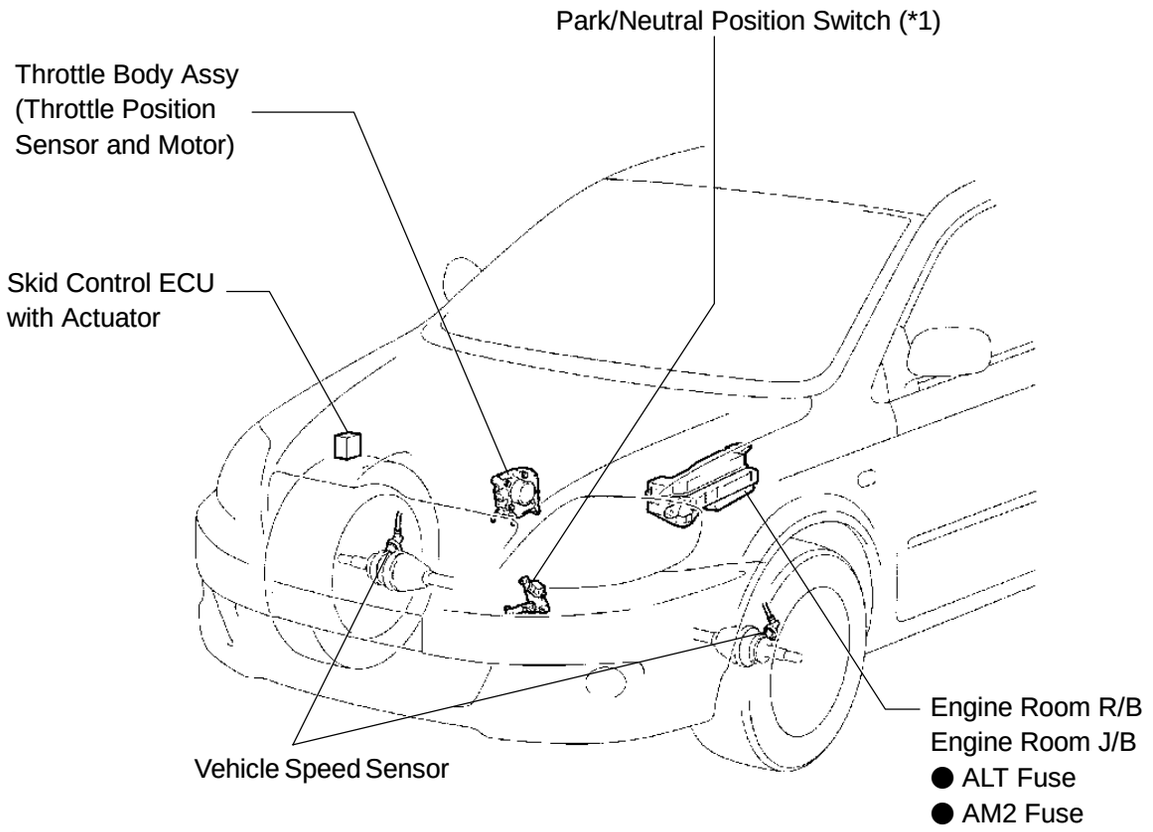
(e) Do not use the cruise control system where the road conditions are as follows:

- Heavy traffic
- Steep downhill
- Sharp turns
- Icy or snowy roads
- Slippery roads

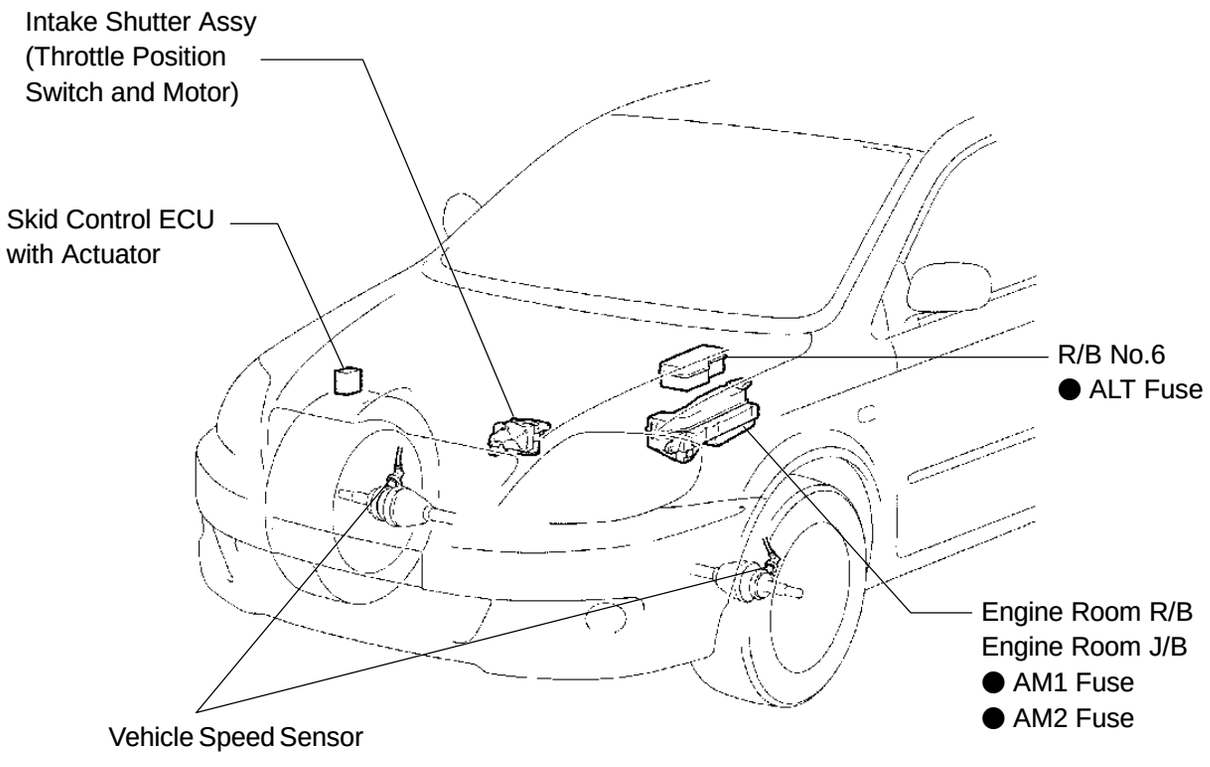
05L0I-02

LOCATION

3ZZ-FE:



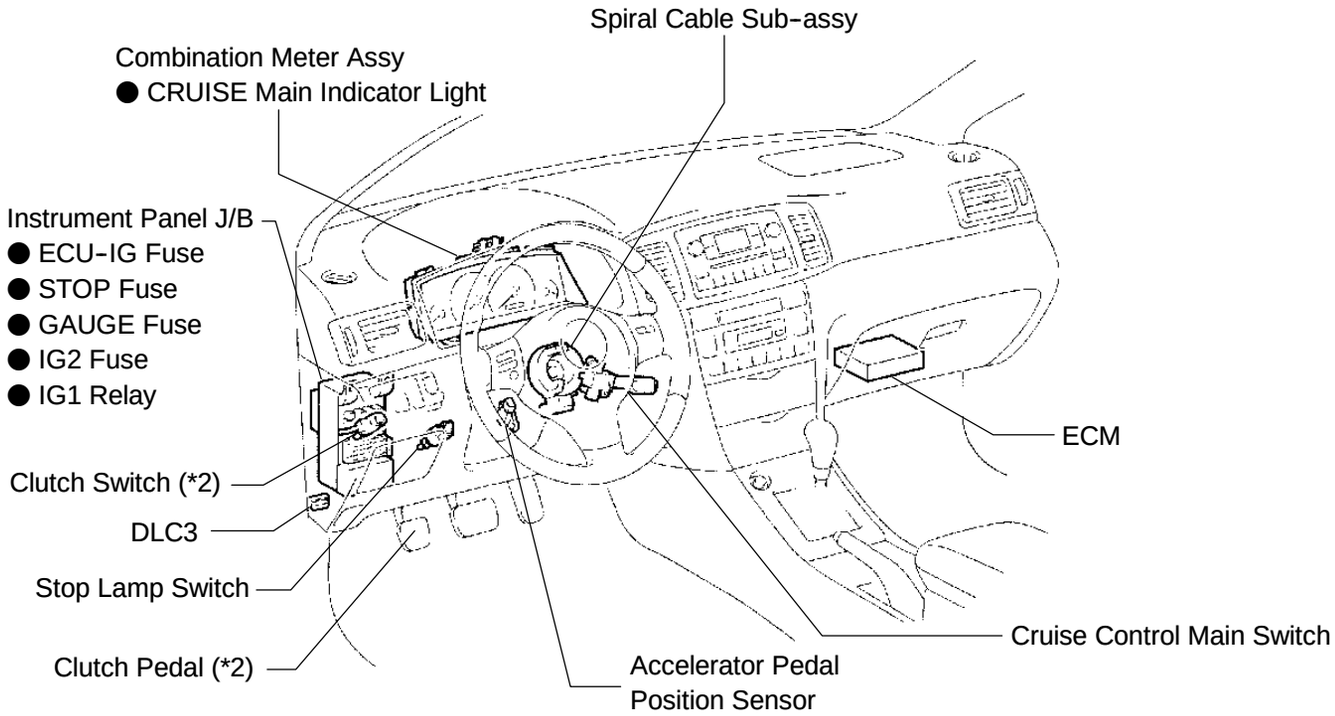
1CD-FTV:



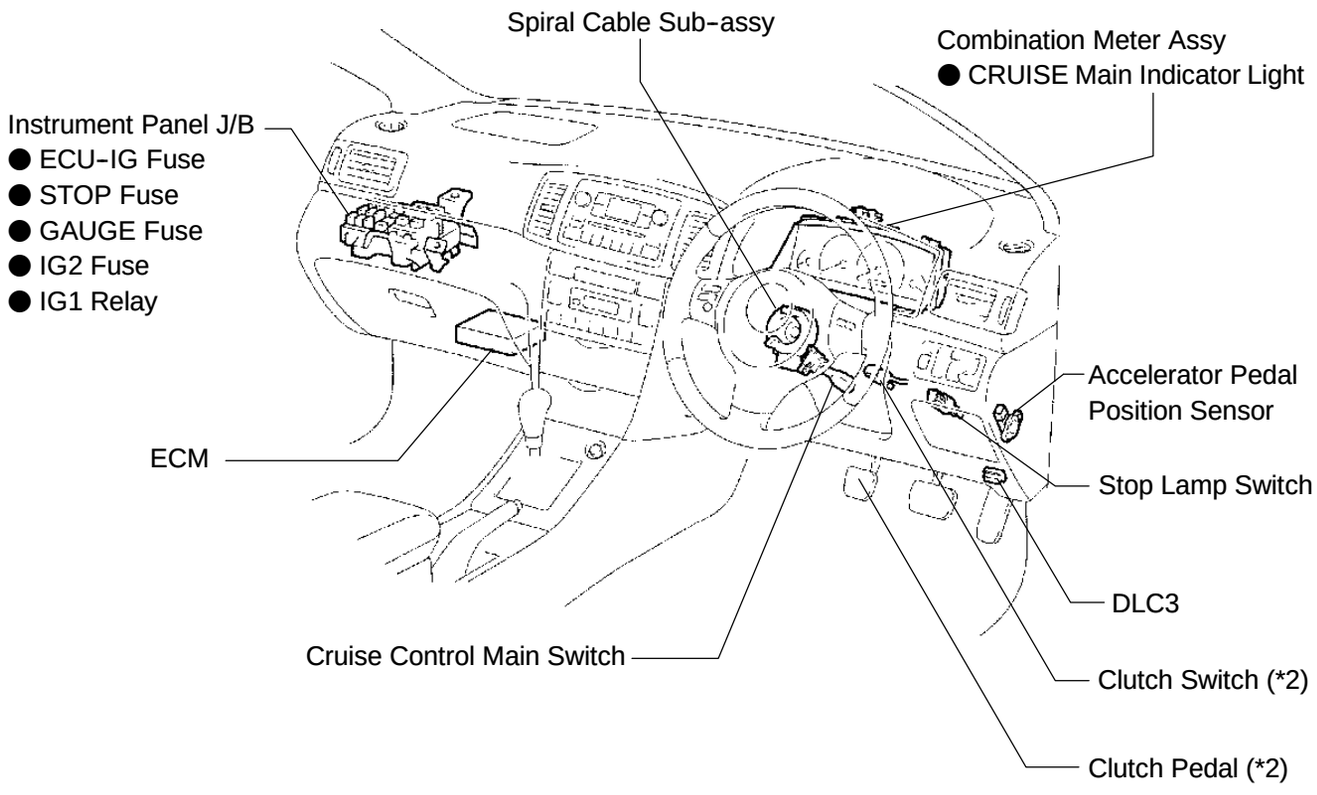
(*1): Automatic Transaxle

I41983

LHD:



RHD:

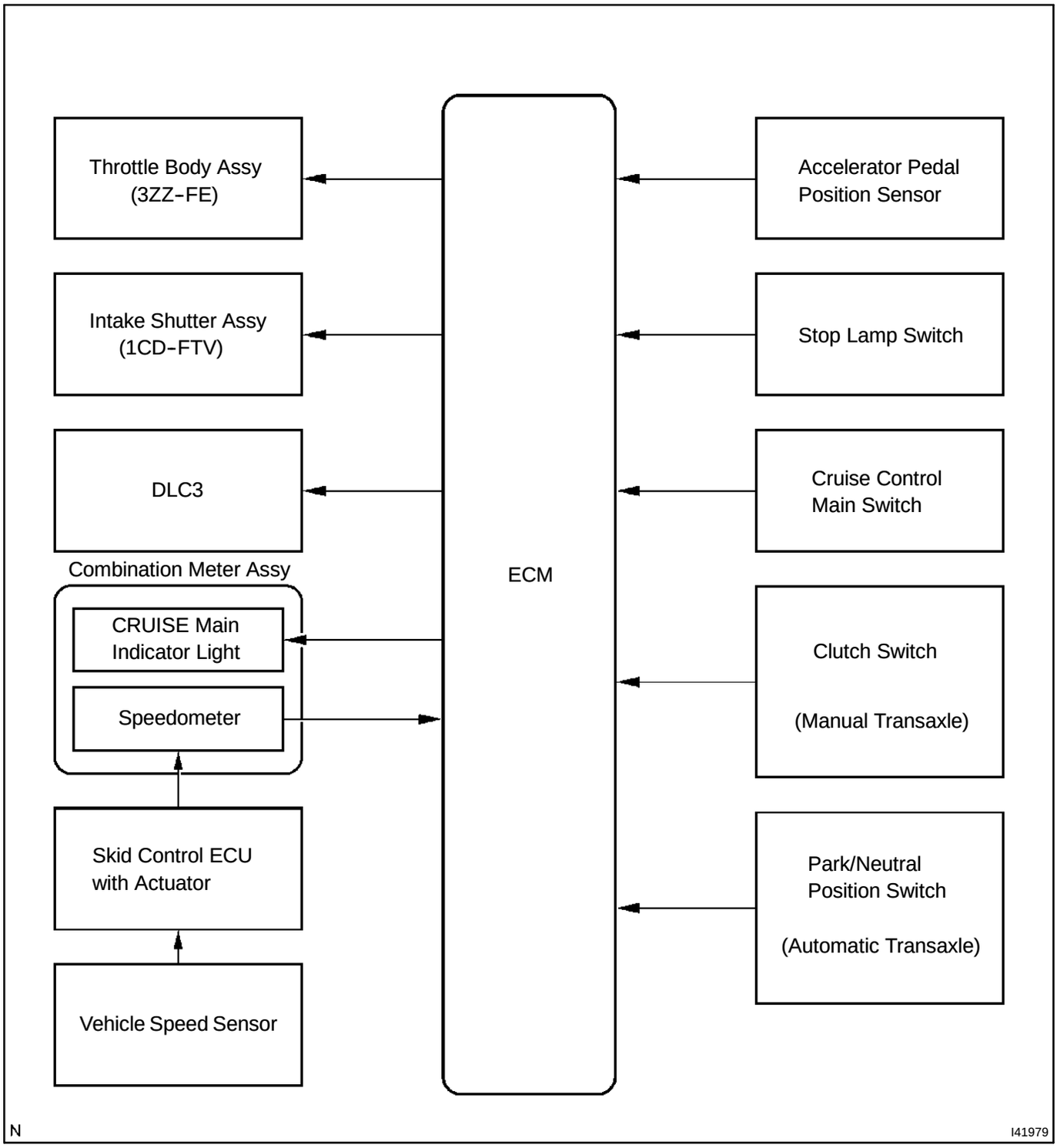


(*2): Manual Transaxle

P I41984

05L0J-02

SYSTEM DIAGRAM



05L0Y-02

SYSTEM DESCRIPTION

1. CRUISE CONTROL SYSTEM

The cruise control system makes it possible to drive at a desired speed without using the accelerator pedal. The ECM controls the throttle opening angle based on signals from switches and sensors.

A microcomputer which controls the cruise control system is built into the ECM, and the actuator is the throttle body assy/intake shutter assy.

Constant speed control is ready to operate when the cruise control main switch ON-OFF button is pushed (the CRUISE main indicator light comes on).

Operating the cruise control main switch, the driver can control the following functions.

2. LIMIT CONTROL

(a) Low speed limit

The lowest possible limit of the speed setting range is set at approximately 40 km/h (25 mph). The cruise control system cannot be set when the driving vehicle speed is below the low speed limit. Cruise control operation will be automatically canceled and the stored vehicle speed will be erased when the vehicle speed goes below the low speed limit while the cruise control is in operation.

(b) High speed limit

The highest possible limit of the speed setting range is set at approximately 200 km/h (125 mph). The cruise control system cannot be set when the driving vehicle speed is over the high speed limit. Speed up using "RES/+" with the cruise control main switch assy also cannot be set beyond the high speed limit.

3. OPERATION OF CRUISE CONTROL

The cruise control main switch operates seven functions: SET, '-' (COAST), TAP-DOWN, '+' (ACCEL), TAP-UP, RESUME and CANCEL. The SET, TAP-DOWN and '-' (COAST) functions, and the RESUME ,TAP-UP and '+' (ACCEL) functions are operated with the same switch. The cruise control main switch assy is an automatic return type switch which turns on only while operating it in each arrow direction and turns off after releasing it.

(a) SET CONTROL

When pushing down the cruise control main switch to "SET/-", the ECM stores the set speed and compares it to actual vehicle speed. If the actual driving speed is greater than the set speed, the ECM sends a signal to the throttle body assy/intake shutter assy to close the throttle valve. If lower, it opens the throttle valve. The cruise control operative speed range is between the low and high speed limits.

(b) '-' (COAST) CONTROL

A cruise set speed decreases while pushing down on the cruise control main switch to "SET/-". The vehicle cruises at the newly set speed when releasing the cruise control main switch.

(c) TAP-DOWN CONTROL

When tapping down on the cruise control main switch to "SET/-" (approximately 0.6 second), the ECM decreases the stored set speed by 1.6 km/h (1 mph) at a time. However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approximately 3.1 mph), vehicle speed, when the cruise control main switch is released from "SET/-", will be stored and constant speed control is maintained.

(d) '+' (ACCEL) CONTROL

A cruise set speed increases while pushing up on the cruise control main switch to "RES/+". The vehicle cruises at the newly set speed when releasing the cruise control main switch.

(e) TAP-UP CONTROL

When tapping up on the cruise control main switch to "RES/+" (approximately 0.6 second), the ECM increases the stored set speed by 1.6 km/h (1 mph) at a time. However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approximately 3.1 mph), the stored vehicle speed will not be changed.

(f) RESUME CONTROL

If cruise control operation was canceled under the manual cancel conditions (other than turning the cruise control main switch ON−OFF button off), and if driving speed is within the limit range, pushing up the cruise control main switch to ”RES/+” restores vehicle speed memorized at the time of cancellation, and maintains constant speed control.

(g) MANUAL CANCEL CONTROL

The ECM cancels the cruise control under the following conditions while driving:

- The cruise control main switch is pulled to CANCEL.
- The brake pedal is depressed.
- The clutch pedal is depressed (Manual Transaxle).
- D position circuit in the park/neutral position switch ON → OFF (The shift lever is moved from the D to the N, 2 or 1 position)(Automatic Transaxle).
- The cruise control main switch ON−OFF button is pushed off.

(h) AUTO CANCEL CONTROL

If any of the following malfunctions occur in the system, the ECM stops the cruise control until the cruise control main switch ON−OFF button is pushed off.

- Stop lamp switch assy malfunction
- Vehicle speed signal circuit malfunction
- Throttle position sensor and motor malfunction (3ZZ−FE)
- Fuel injection system malfunction (1CD−FTV)

If any of the following malfunctions occur in the system, the ECM stops the cruise control until the ignition switch is turned off.

- Stop lamp switch input circuit malfunction
- CANCEL function circuit malfunction

Under these conditions, the cruise main indicator light blinks until the cruise control main switch ON−OFF button is pushed off.

AUTO CANCEL also works when actual vehicle speed either drops below 40 km/h (25 mph) or is 16 km/h (10 mph) lower than the set speed.

(i) OTHER CANCEL CONTROL

Cruise control will be halted if VSC starts operation while driving (vehicle speed will be memorized).

05L0K-02

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester II can be used at steps 5 and 8.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-1150)

NEXT

3	PROBLEM SYMPTOM CONFIRMATION

→ SYMPTOM DOES NOT OCCUR (GO TO STEP 4)

→ SYMPTOM OCCURS (GO TO STEP 5)

4	SYMPTOM SIMULATION (SEE PAGE 01-21)

NEXT

5	DTC CHECK (SEE PAGE 05-1158)

→ TROUBLE CODE (GO TO STEP 6)

→ NORMAL SYSTEM CODE (GO TO STEP 7)

6	DTC CHART (SEE PAGE 05-1161)

NEXT

GO TO STEP 8

7	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1153)

NEXT

8	CIRCUIT INSPECTION (SEE PAGE 05-1162 TO 05-1187)

NEXT

9	TERMINAL OF ECM (SEE PAGE 05-1154)

NEXT

10	IDENTIFICATION OF PROBLEM

NEXT

11	REPAIR OR REPLACE

NEXT

12	CONFIRMATION TEST

NEXT

END

05L0L-02

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**VIN**	
		Production Date	
		Licence Plate No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km mile**

Condition of Problem Occurrence	**Date Problem Occurred**	/ /
	Frequency Problem Occurs	Continuous Intermittent (times a day)
	Vehicle Speed when Problem Occurred	**km mile**

Symptoms	Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Uphill ☐ Downhill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ Depressing the brake pedal ☐ Depressing the clutch pedal (Manual Transaxle) ☐ D position circuit in the park/neutral position switch ON → OFF (The shift lever is moved from the D to the N, 2 or 1 position) (Automatic Transaxle) ☐ Pulling the cruise control main switch to CANCEL
	☐ Cruise control malfunction	☐ Acceleration function failure ☐ Deceleration function failure ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ '+' (ACCEL) ☐ '–' (COAST) ☐ RESUME ☐ CANCEL
	☐ CRUISE main indicator light	☐ Remains ON ☐ Does not come on ☐ Blinks

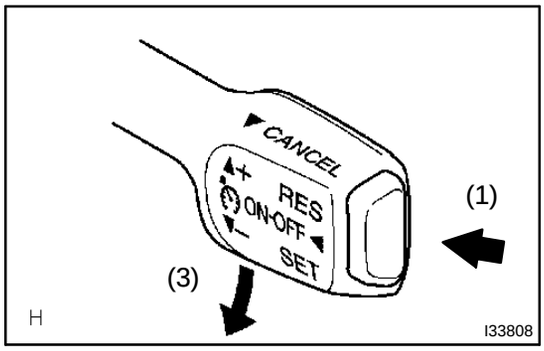
DTC Check	**1st Time**	☐ Normal System Code ☐ Trouble Code (Code)
	2nd Time	☐ Normal System Code ☐ Trouble Code (Code)

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ROAD TEST

HINT:

SET and '−', RES and '+', ON−OFF functions share the same switch. Operate the cruise control main switch according to the directions (▼, ▲, ◀) indicated on the switch.



1. PROBLEM SYMPTOM CONFIRMATION

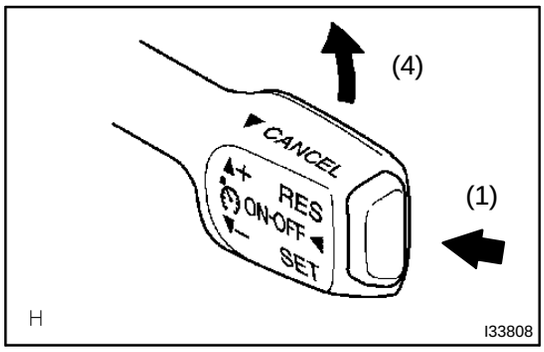
(a) Inspect the SET function.

(1) Push the ON−OFF button on.

(2) Drive at the required speed (40 km/h (25 mph) or higher).

(3) Push down the cruise control main switch to "SET/−".

(4) After releasing the switch, check that the vehicle cruises at the set speed.



(b) Inspect the '+' (ACCEL) function.

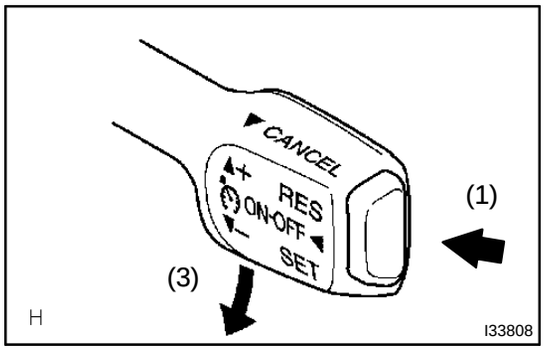
(1) Push the ON−OFF button on.

(2) Drive at the required speed (40 km/h (25 mph) or higher).

(3) Push down the cruise control main switch to "SET/−".

(4) Check that vehicle speed increases while the cruise control main switch is pushed up to "RES/+", and that the vehicle cruises at the newly set speed when the switch is released.

(5) Momentarily (approximately 0.6 second) push up the cruise control main switch to "RES/+" and then immediately release it. Check that vehicle speed increases by approximately 1.6 km/h (1.0 mph) (Tap−up function).



(c) Inspect the '−' (COAST) function.

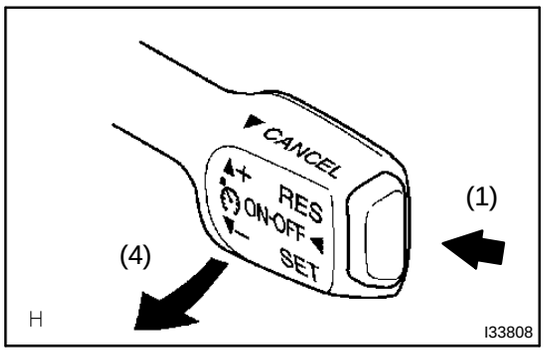
(1) Push the ON−OFF button on.

(2) Drive at the required speed (40 km/h (25 mph) or higher).

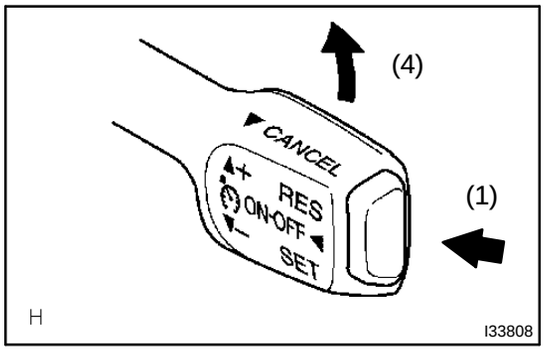
(3) Push down the cruise control main switch to "SET/−".

(4) Check that vehicle speed decreases while the cruise control main switch is pushed down to "SET/−", and the vehicle cruises at the newly set speed when the switch is released.

(5) Momentarily (approximately 0.6 second) push down the cruise control main switch to "SET/−", and then immediately release it. Check that vehicle speed decreases by approximately 1.6 km/h (1.0 mph) (Tap−down function).



(d) Inspect the CANCEL function.
(1) Push the ON–OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET/–".
(4) When doing one of the following, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depressing the brake pedal
- Depressing the clutch pedal (Manual Transaxle)
- D position circuit in the park/neutral position switch ON → OFF (The shift lever is moved from the D to the N, 2 or 1 position) (Automatic Transaxle)
- Pushing the ON–OFF button off
- Pulling the cruise control main switch to CANCEL



(e) Inspect the RES (RESUME) function.
(1) Push the ON–OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET/–".
(4) When doing one of the following, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depressing the brake pedal
- Depressing the clutch pedal (Manual Transaxle)
- D position circuit in the park/neutral position switch ON → OFF (The shift lever is moved from the D to the N, 2 or 1 position) (Automatic Transaxle)
- Pulling the cruise control main switch to CANCEL

(5) After pushing the cruise control main switch to "RES/+" at a driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.

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PROBLEM SYMPTOMS TABLE

If a normal system code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

HINT:

Inspect the "Fuse" and "Relay" before confirming the suspected areas as shown in the table below.

Inspect each malfunction circuit in numerical order for the corresponding symptom.

Symptom	Suspected Area	See Page
Main switch cannot be turned ON. (Cruise indicator light in combination meter does not come on.)	5. Cruise control switch circuit 6. Combination meter system (CRUISE main indicator light circuit) 7. Combination meter assy 8. ECM	05-1170 05-1175 *1 *2
Vehicle speed setting cannot be done. (Although indicator light in combination meter comes on when the main switch is turned ON, it goes off when vehicle speed is set.)	1. Cruise control switch circuit 2. ECM	05-1170 *2
Setting cannot be done. (Indicator light in combination meter comes on when the main switch is turned ON and it remains ON while setting.)	1. Cruise control switch circuit 2. Vehicle speed sensor circuit 3. Stop lamp switch circuit 4. Combination meter system (CRUISE main indicator light circuit) 5. Clutch switch circuit (Manual Transaxle) 6. Park/Neutral position switch circuit (Automatic Transaxle) 7. Combination meter assy 8. ECM	05-1170 05-1162 05-1163 05-1175 05-1179 05-1183 *1 *2
While the vehicle is driven with cruise control, the set control is cancelled. (Indicator light and CRUISE remain ON.)	1. Cruise control switch circuit 2. Vehicle speed sensor circuit 3. Stop lamp switch circuit 4. Combination meter system (CRUISE main indicator light circuit) 5. Clutch switch circuit (Manual Transaxle) 6. Park/Neutral position switch circuit (Automatic Transaxle) 7. Combination meter assy 8. ECM	05-1170 05-1162 05-1163 05-1175 05-1179 05-1183 *1 *2
Hunting (Speed is not constant.)	1. Vehicle speed sensor circuit 2. ECM	05-1162 *2
Setting cannot be cancelled (when functions such as '-' (coast), '+' (acceleration), resume, set speed change are operated using control switch).	1. Cruise control switch circuit 2. ECM	05-1170 *2
DTC is not output, or is output when should not be.	1. Diagnosis circuit	05-1187
CRUISE main indicator light does not come on.	1. Cruise control switch circuit 2. Combination meter system (CRUISE main indicator light circuit) 3. Combination meter assy 4. ECM	05-1170 05-1175 *1 *2

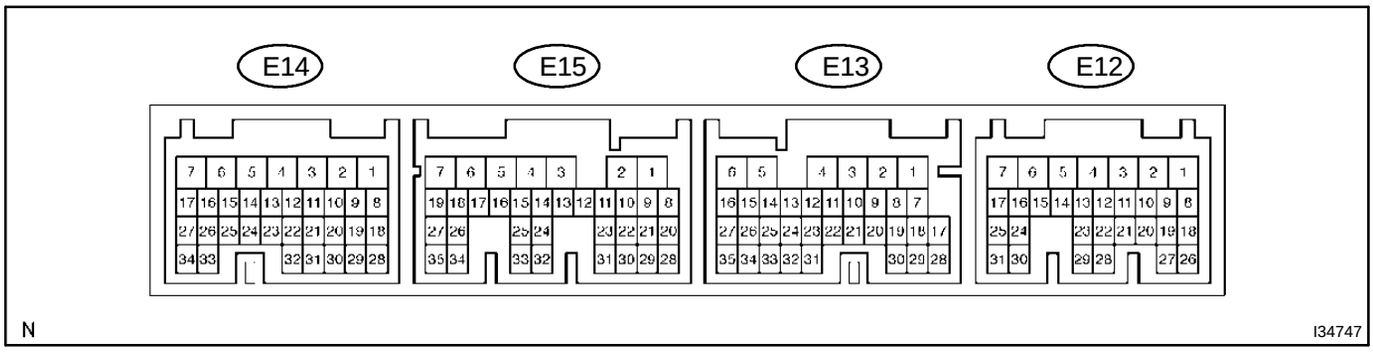
*1: See Pub. No. RM925E, Page 71-32

*2: See Pub. No. RM1039E, Page 10-8

05LNE-01

TERMINALS OF ECM

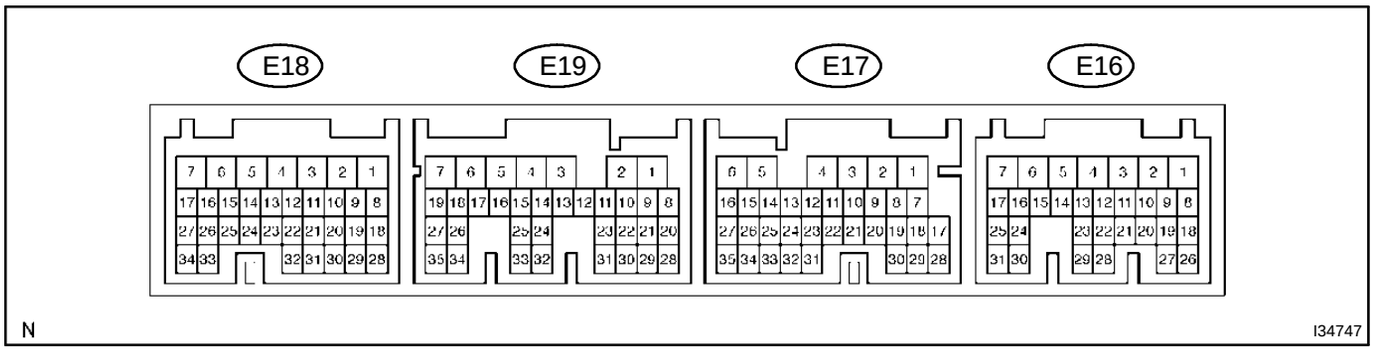
3ZZ-FE:



Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
TC (E12-20) - E1 (E14-5)	W (P-B) - BR	DTC output signal	Ignition switch ON → Connect terminals TC and CG of DLC3	10 to 14 V → Below 2 V
D (E13-10) - E1 (E14-5) (*1)	R-W (LHD), LG-B (RHD) - BR	Clutch switch input signal	Ignition switch ON, depress clutch pedal → release clutch pedal	Below 1 V → 10 to 14 V
D (E13-10) - E1 (E14-5) (*2)	SB (L-B) - BR	Shift position input signal	Ignition switch ON, shift position D → any shift position except D	10 to 14 V → Below 1 V
ST1- (E13-12) - E1 (E14-5)	G-R - BR	Cruise cancel input signal	Ignition switch ON, depress brake pedal → release brake pedal	Below 1 V → 10 to 14 V
PI (E13-13) - E1 (E14-5)	SB (R) - BR	Cruise indicator light input signal	Ignition switch ON, cruise main indicator light ON → OFF (Cruise control main switch ON → OFF)	Below 1 V → 10 to 14 V
STP (E13-19) - E1 (E14-5)	SB (G-W) - BR	Stop lamp switch input signal	Ignition switch ON, depress brake pedal → release brake pedal	10 to 14 V → Below 1 V
CCS (E13-24) - E1 (E14-5)	Y-R - BR	Cruise control main switch input signal	Ignition switch ON CANCEL switch held ON SET/- switch held ON RES/+ switch held ON MAIN switch held ON	10 to 14 V 6.6 to 10.1 V 4.5 to 7.1 V 2.3 to 4 V Below 1 V

(*1): Manual Transaxle
(*2): Automatic Transaxle

1CD-FTV:



Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
TC (E16-11) - E1 (E19-7)	W (P-B) - BR	DTC output signal	Ignition switch ON → Connect terminals TC and CG of DLC3	10 to 14 V → Below 2 V
D (E17-10) - E1 (E19-7)	R-W (LHD), LG-B (*3) R-W (*4) (RHD) - BR	Clutch switch input signal	Ignition switch ON, depress clutch pedal → release clutch pedal	Below 1 V → 10 to 14 V
ST1- (E17-12) - E1 (E19-7)	G-R - BR	Cruise cancel input signal	Ignition switch ON, depress brake pedal → release brake pedal	Below 1 V → 10 to 14 V
STP (E17-19) - E1 (E19-7)	SB (G-W) - BR	Stop lamp switch input signal	Ignition switch ON, depress brake pedal → release brake pedal	10 to 14 V → Below 1 V
PI (E17-21) - E1 (E19-7)	SB (R) - BR	Cruise indicator light input signal	Ignition switch ON, cruise main indicator light ON → OFF (Cruise control main switch ON → OFF)	Below 1 V → 10 to 14 V
CCS (E17-24) - E1 (E19-7)	Y-R - BR	Cruise control main switch input signal	Ignition switch ON CANCEL switch held ON SET/- switch held ON RES/+ switch held ON MAIN switch held ON	10 to 14 V 6.6 to 10.1 V 4.5 to 7.1 V 2.3 to 4 V Below 1 V

(*3): TMMT Made
(*4): TMUK Made

05L0O-02

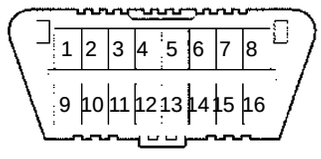
DIAGNOSIS SYSTEM

1. DESCRIPTION

The ECM stores trouble codes when trouble occurs on the vehicle.

The diagnosis system allows for reading of the trouble codes from the DLC3. If the CRUISE main indicator light does not come on after DTC check, it means a malfunction has occurred in the cruise control system.

Use the intelligent tester II or SST to check and solve the problem.



DLC3

F40034

2. CHECK DLC3

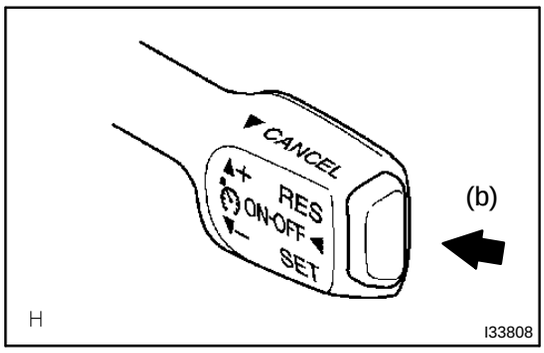
(a) The vehicle's ECM uses ISO 9141-2 (Eure-OBD)/ISO 14230 (M-OBD) for communication. The terminal arrangement of the DLC3 complies with ISO 15031-03 and matches the ISO 9141-2/ISO 14230 format.

Symbols (Terminals No.)	Terminal Description	Condition	Specified Condition
SIL(7) - SG(5)	Bus "+" line	During transmission	Pulse generation
CG(4) - Body ground	Chassis ground	Always	Below 1 Ω
SG(5) - Body ground	Signal ground	Always	Below 1 Ω
BAT(16) - Body ground	Battery positive	Always	11 to 14 V
CANH(6) - CANL(14)	HIGH-level CAN bus line	Ignition switch OFF	54 to 67 Ω
CANH(6) - Battery positive	HIGH-level CAN bus line	Ignition switch OFF	1 MΩ or higher
CANH(6) - CG(4)	HIGH-level CAN bus line	Ignition switch OFF	3 kΩ or higher
CANL(14) - Battery positive	LOW-level CAN bus line	Ignition switch OFF	1 MΩ or higher
CANL(14) - CG(4)	LOW-level CAN bus line	Ignition switch OFF	3 kΩ or higher

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" after connecting the intelligent tester II to the DLC3 and turning the ignition switch to the ON position, there is a problem with either the vehicle or the tool. (Intelligent tester II only)

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



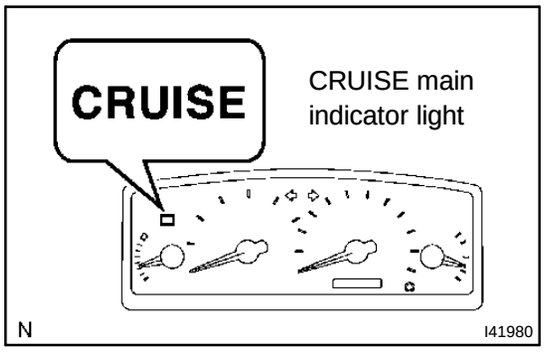
3. CHECK INDICATOR

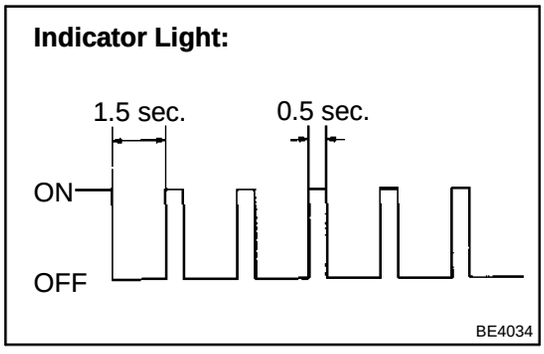
(a) Turn the ignition switch to the ON position.

(b) Check that the CRUISE main indicator light comes on when the cruise control main switch ON-OFF button is pushed on, and that the indicator light goes off when the ON-OFF button is pushed off.

HINT:

If there is a problem with the indicator light, inspect the CRUISE main indicator light circuit (see page 05-1175).



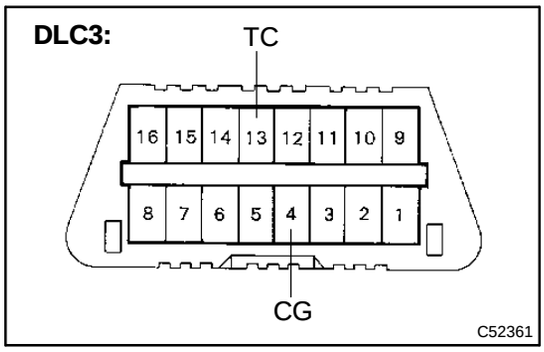


HINT:

If a malfunction occurs in the vehicle speed sensors, stop lamp switch assy or other related parts during cruise control driving, the ECM actuates AUTO CANCEL of the cruise control. Then the CRUISE main indicator light starts to blink, informing the driver of the malfunction. At the same time, data of the malfunction is stored as a diagnostic trouble code (DTC).

05L0P-02

DTC CHECK/CLEAR



1. DTC CHECK/CLEAR (USING SST CHECK WIRE)

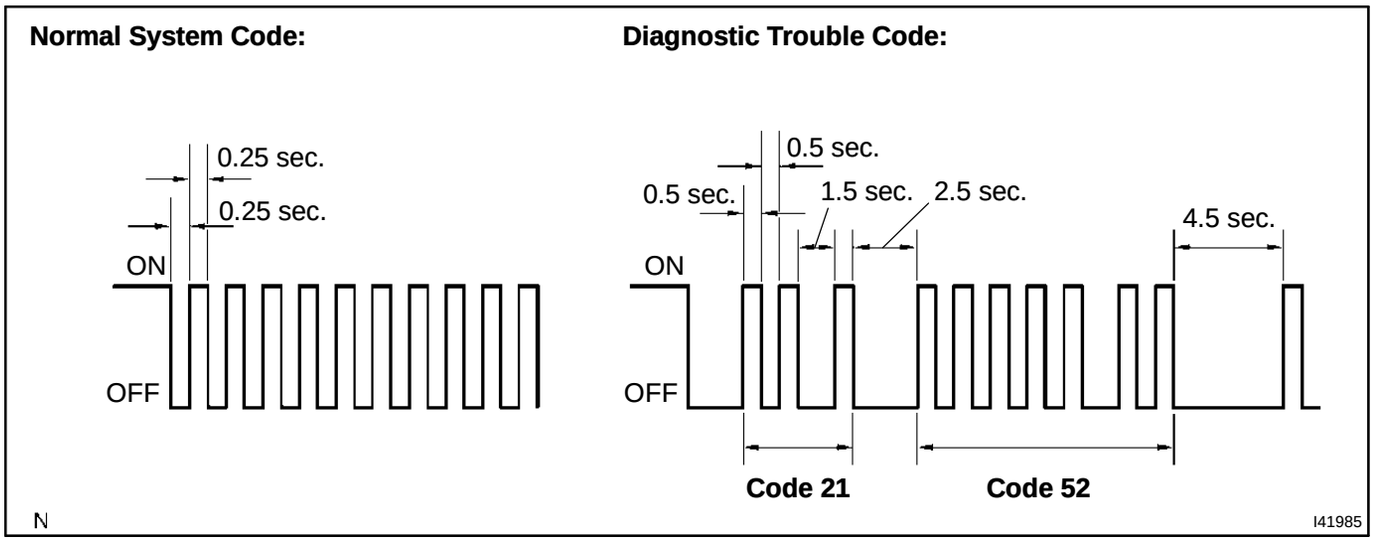
(a) DTC CHECK

(1) Using SST, short-circuit between terminals TC and CG of the DLC3.

SST 09843-18040

(2) Turn the ignition switch to the ON position.

(3) Read and record DTCs from the CRUISE main indicator light on the combination meter. As examples, refer to the chart below for the blinking patterns of the normal system code and diagnostic trouble codes 21 and 52.



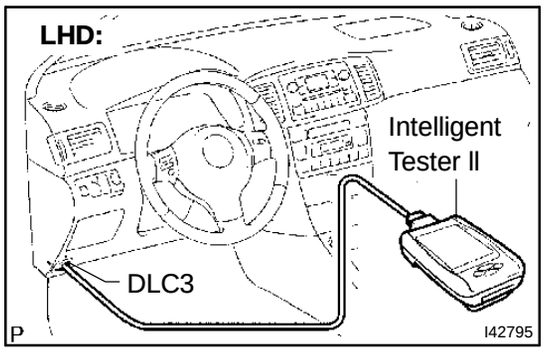
HINT:

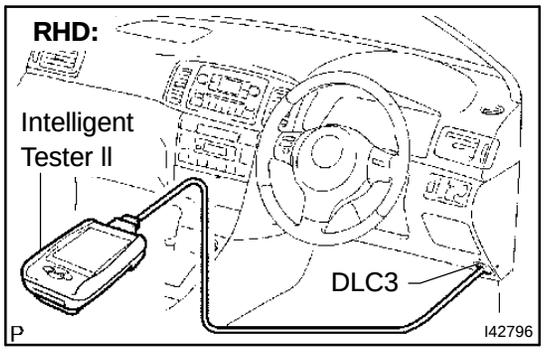
If the CRUISE main indicator light does not blink DTC blinking patterns, or the normal system code blinking pattern, inspect the following circuits.

Relevant Circuit	See Page
TC and CG terminal circuit	05-1187
CRUISE main indicator light circuit	05-1175

(b) DTC CLEAR
(1) Turn the ignition switch off.
(2) If DTCs are indicated, repair the relevant circuits referring to the Diagnostic Trouble Code Chart (See page 05-1161).
(3) Clear the DTCs according to either one of the following procedures.
- Disconnect the negative (-) battery cable for at least 10 seconds, then reconnect it.
- Remove the EFI fuse for at least 10 seconds, then reinstall it.

(4) Recheck DTCs (see step (a)).





2. DTC CHECK/CLEAR (USING INTELLIGENT TESTER II)

(a) DTC CHECK
(1) Connect the intelligent tester II to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Read DTCs on the tester screen.

(b) DTC CLEAR
(1) Connect the intelligent tester II to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Clear the DTCs following the prompts on the tester screen.

HINT:
Intelligent tester II has a "Snapshot" function which records the monitored data.
Refer to the intelligent tester II operator's manual for further details.

DATA LIST/ACTIVE TEST

1. DATA LIST

(a) While the intelligent tester II is connected to the DLC3 with the ignition switch in the ON position, the CRUISE CONTROL data list can be displayed. Follow the prompts on the tester screen to access the data list.

Chassis/Cruise Control (ECM):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
Cruise Ctrl Vehicle SPD (CCS Vehicle Spd)	Vehicle speed/min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
Cruise Ctrl Memory SPD (CCS Mem Vehicle Spd)	Cruise control memorized speed/ min.: 36 km/h (22.5 mph), max.: 200 km/h (125 mph)	Actual stored vehicle speed	-
Cruise Throttle Opening (Throttle Opening Angle) (*1)	Required throttle opening angle/ min.: 0°, max.: 125°	Actual required throttle opening angle	-
Cruise Throttle Opening (Throttle Opening Angle) (*2)	Required throttle opening angle/ min.: 0%, max.: 100%	Actual required throttle opening angle	-
Cruise Control	Cruise control system active condition/ON or OFF	ON: Cruise control activated OFF: Cruise control inactivated	-
Cruise Control Main SW (Main SW M-CPU)	Main SW signal (Main CPU)/ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	"3"
Cruise Main SW (Sub) (Main SW S-CPU)	Main SW signal (Sub CPU)/ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	"3"
Cruise SW-Ready (Main) (CCS Ready M-CPU)	Cruise control system standby condition (Main CPU)/ON or OFF	ON ⇔ OFF: ON/OFF changes each time main SW is pushed in.	"1"
Cruise SW-Ready (Sub) (CCS Ready S-CPU)	Cruise control system standby condition (Sub CPU)/ON or OFF	ON ⇔ OFF: ON/OFF changes each time main SW is pushed in.	"1"
Cruise Ctrl SW-Indicator (CCS indicator M-CPU)	Cruise indicator signal (Main CPU)/ON or OFF	ON: "CRUISE" ON OFF: "CRUISE" OFF	"2"
Cancel Switch	CANCEL SW signal/ON or OFF	ON: CANCEL SW ON OFF: CANCEL SW OFF	-
SET/COAST Switch	SET/- SW signal/ON or OFF	ON: SET/- SW ON OFF: SET/- SW OFF	-
RES/ACC Switch	RES/+ SW signal/ON or OFF	ON: RES/+ SW ON OFF: RES/+ SW OFF	-
Stop Light SW 2 (Main) (Stp Light SW M-CPU)	Stop lamp SW signal (Main CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Stop Light Switch 1 (Stp Light SW S1-CPU)	Stop lamp SW signal (Sub CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Stop Light Switch 2 (Stp Light SW S2-CPU)	Stop lamp SW signal (Sub CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Shift D Position (*3)	PNP SW signal (D position)/ON or OFF	ON: Shift position D OFF: Any shift position except D	-

(*1): 3ZZ-FE (*2): 1CD-FTV (*3): Automatic Transaxle

HINT:

"3" is OK but "1" is NG → ECM failure

"1" is OK but "2" is NG → DTC output or ECM failure

"3" is OK but the cruise indicator does not come on → CRUISE main indicator, wire harness or ECM failure

05L0Q-02

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is displayed during the DTC check, check the circuit listed for that code. For details of each code, refer to the "See Page" under respective "DTC No." in the DTC chart.

DTC No. (See Page)	Circuit Inspection	Trouble Area
P0500/21 (05-1162)	Vehicle Speed Sensor Circuit	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM
P0503/23 (05-1162)	Vehicle Speed Sensor Circuit	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM
P0571/52 (05-1163)	Stop Light Switch Circuit	• Stop lamp switch assy • Stop lamp switch assy circuit • ECM
P0607/54 (05-1169)	Input Signal Circuit	• ECM

DTC	P0500/21	VEHICLE SPEED SENSOR CIRCUIT

DTC	P0503/23	VEICLE SPEED SENSOR CIRCUIT

CIRCUIT DESCRIPTION

See page 05-157 (3ZZ-FE) or 05-508 (1CD-FTV).

DTC No.	DTC Detection Condition	Trouble Area
P0500/21	This trouble code is output when the vehicle speed signal from the vehicle speed sensor is cut for 0.14 sec. or more while the cruise control is in operation.	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM
P0503/23	Momentary interruption and noise are detected when a rapid change of vehicle speed occurs while the cruise control is in operation.	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM

WIRING DIAGRAM

See page 05-157 (3ZZ-FE) or 05-508 (1CD-FTV).

INSPECTION PROCEDURE

See page 05-157 (3ZZ-FE) or 05-508 (1CD-FTV).

DTC	P0571/52	STOP LIGHT SWITCH CIRCUIT

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop lamp switch assy sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.

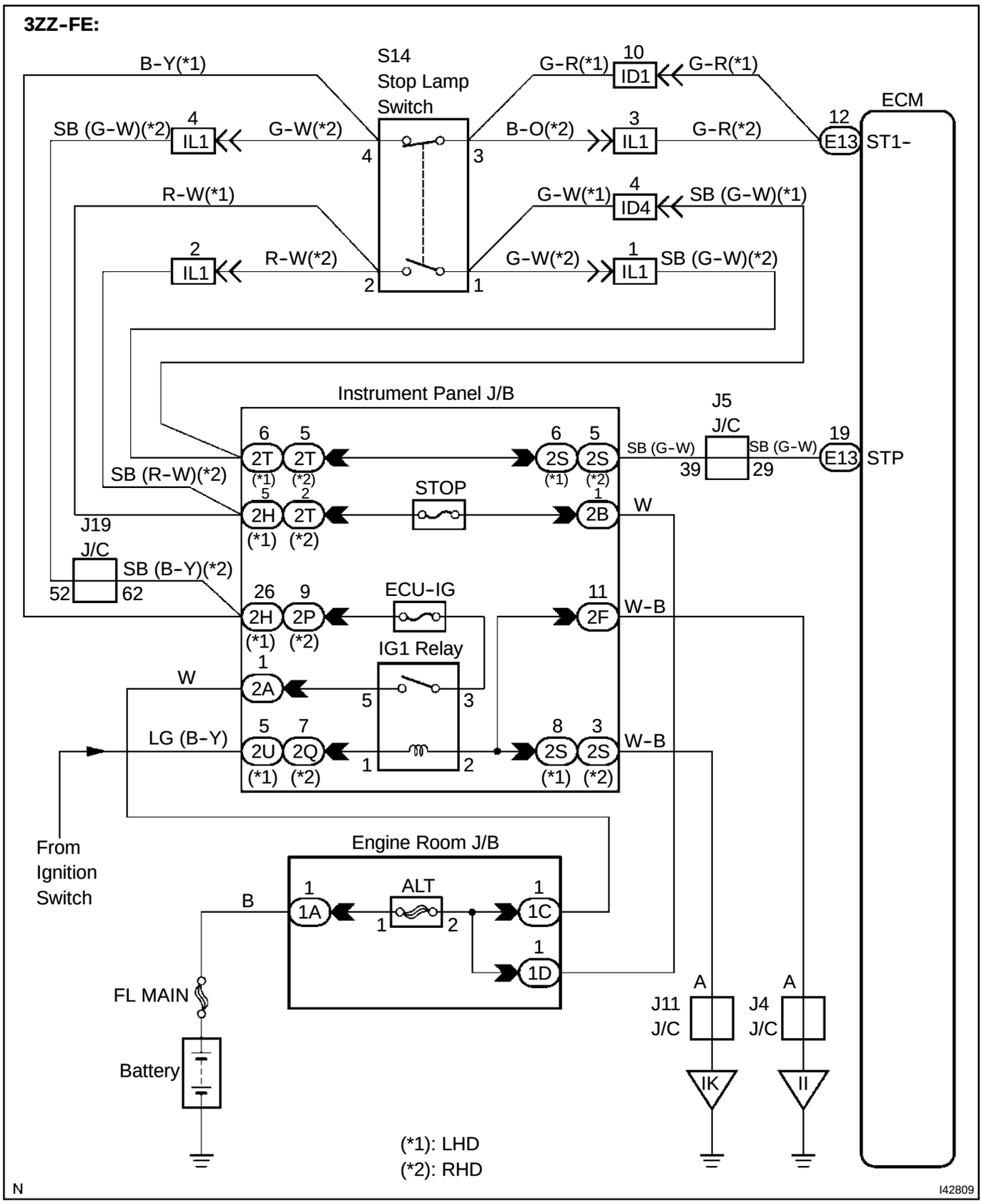
Fail-safe function operates to enable normal driving even if there is a malfunction in the stop lamp signal circuit.

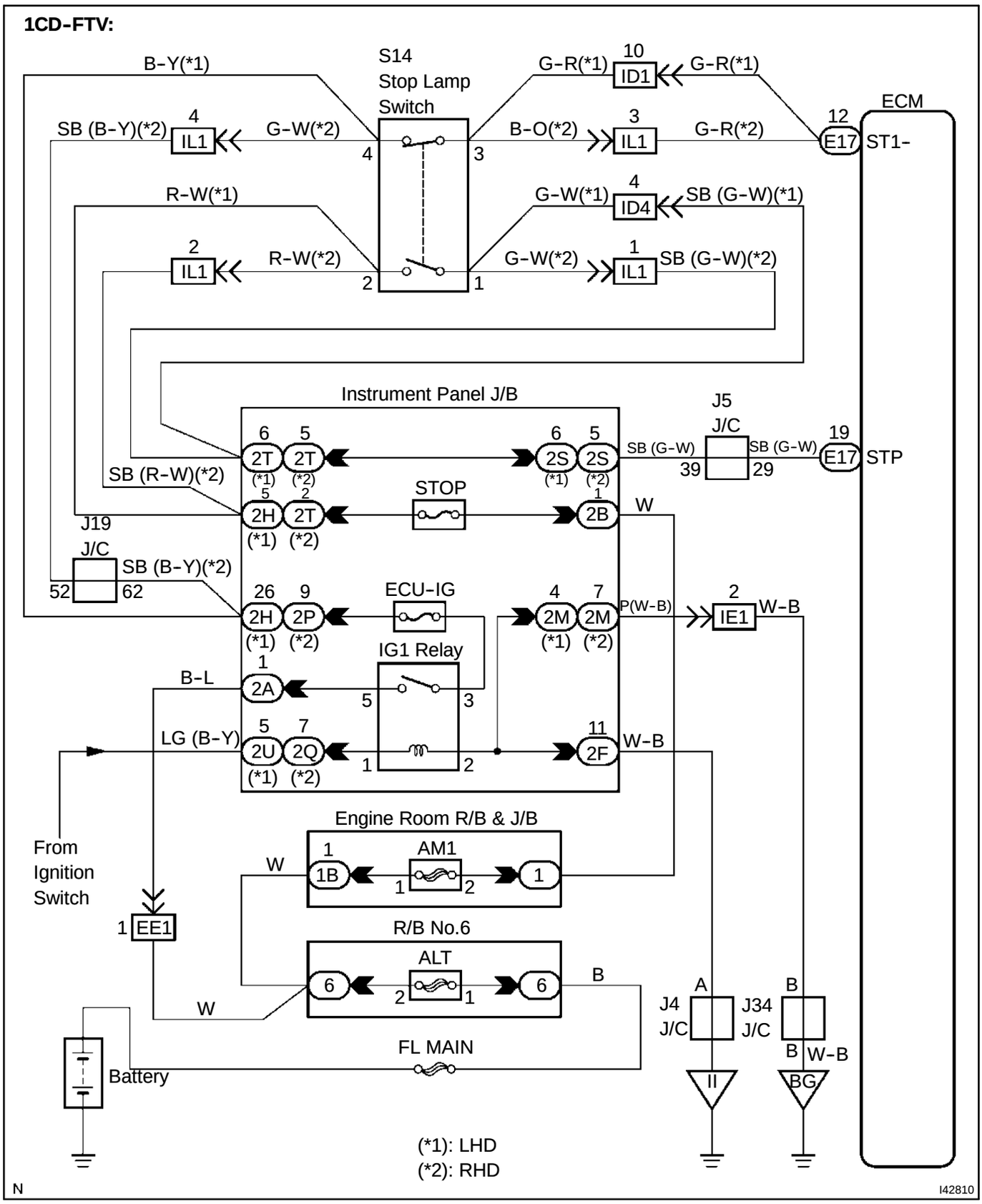
The cancel condition occurs when positive battery voltage is applied to terminal STP.

When the brake is applied, battery positive voltage is normally applied to terminal STP of the ECM through the STOP fuse and the stop lamp switch assy, and the ECM turns the cruise control off.

DTC No.	DTC Detection Condition	Trouble Area
P0571/52	This trouble code is output when the voltage of the STP terminal and that of the ST1- terminal on the ECM are below 1 V for 0.5 sec. or more.	• Stop lamp switch assy • Stop lamp switch assy circuit • ECM

WIRING DIAGRAM




1CD-FTV:
S14
Stop Lamp
Switch
B-Y(*1)
SB (B-Y)(*2)
G-W(*2)
G-R(*1)
B-O(*2)
G-R(*2)
R-W(*1)
R-W(*2)
G-W(*1)
SB (G-W)(*1)
G-W(*2)
SB (G-W)(*2)
ECM
ST1-
STP
Instrument Panel J/B
J5
J/C
SB (G-W)
SB (R-W)(*2)
STOP
J19
J/C
SB (B-Y)(*2)
ECU-IG
IG1 Relay
P(W-B)
W-B
B-L
LG (B-Y)
W
From
Ignition
Switch
Engine Room R/B & J/B
AM1
R/B No.6
ALT
B
FL MAIN
Battery
J4
J/C
J34
J/C
(*1): LHD
(*2): RHD
N
I42810

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the intelligent tester II and start from step 2 when not using the intelligent tester II.

1	READ VALUE ON INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to the ON position, and turn the intelligent tester II main switch on.
(c) Select the item "Stp Light SW M-CPU", "Stp Light SW S1-CPU" or "Stp Light SW S2-CPU" in the DATA LIST, and read its value displayed on the intelligent tester II.
(d) Check that the stop lamps come on when the brake pedal is depressed, and goes off when the brake pedal is released.

Chassis/Cruise Control (ECM):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
Stop Light SW 2 (Main) (Stp Light SW M-CPU)	Stop lamp SW signal (Main CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Stop Light Switch 1 (Stp Light SW S1-CPU)	Stop lamp SW signal (Sub CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Stop Light Switch 2 (Stp Light SW S2-CPU)	Stop lamp SW signal (Sub CPU)/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK:

When the brake pedal is operated, the display changes as shown above.

Result:

OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

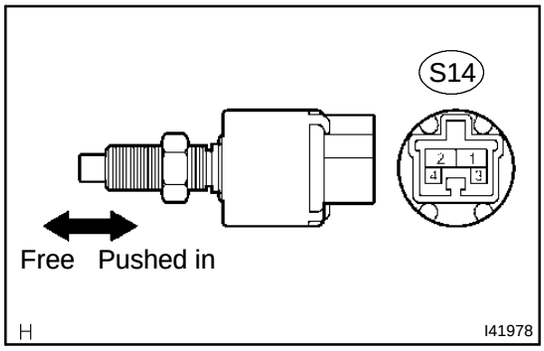
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE** **(SEE PAGE 05-1153)**

C → **Go to step 2**

A

REPLACE ECM **(SEE PUB. NO. RM1039E, PAGE 10-8)**

2	INSPECT STOP LAMP SWITCH ASSY



(a) Disconnect the stop lamp switch connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

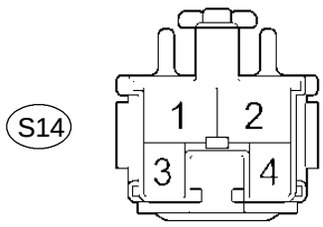
Tester Connection	Condition	Specified Condition
1 - 2	Switch pin free	Below 1 Ω
3 - 4	Switch pin free	10 kΩ or higher
1 - 2	Switch pin pushed in	10 kΩ or higher
3 - 4	Switch pin pushed in	Below 1 Ω

NG → **REPLACE STOP LAMP SWITCH ASSY**

OK

3	CHECK HARNESS AND CONNECTOR (BETWEEN BATTERY AND STOP LAMP SWITCH ASSY) (SEE PAGE 01-21)

Stop Lamp Switch (Wire Harness Side) Connector Front View:



(a) Measure the voltage according to the value(s) in the table below.

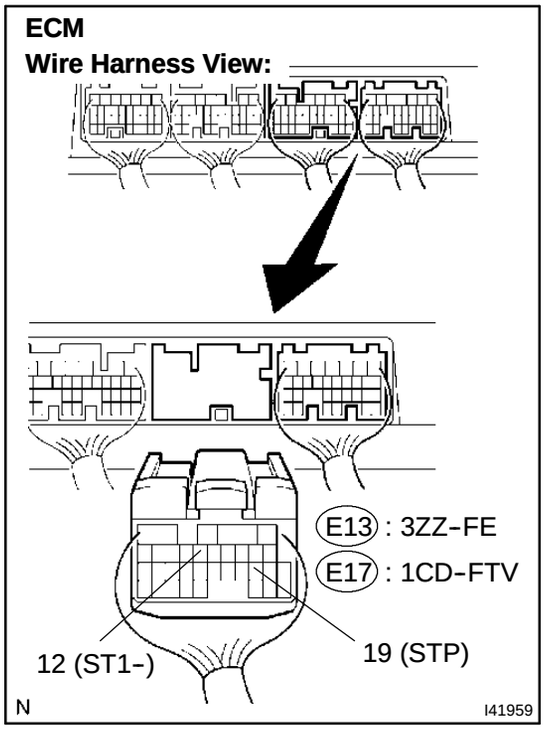
Standard:

Tester Connection	Condition	Specified Condition
2 - Body ground	Always	10 to 14 V
4 - Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4	INSPECT ECM



(a) Reconnect the stop lamp switch connector.
(b) Disconnect the E13/E17 connector from the ECM.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
E13/E17-12 - Body ground	Brake pedal depressed	Below 1 V
E13/E17-12 - Body ground	Brake pedal released	10 to 14 V
E13/E17-19 - Body ground	Brake pedal depressed	10 to 14 V
E13/E17-19 - Body ground	Brake pedal released	Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (BETWEEN STOP LAMP SWITCH ASSY AND ECM)**

OK

REPLACE ECM (SEE PUB. NO. RM1039E, PAGE 10-8)

HINT:
When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE, be sure to follow the table before replacing the ECM (see page 05-1153).

DTC	P0607/54	INPUT SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

This DTC indicates the internal abnormalities of the ECM.

DTC No.	Detection Item	Trouble Area
P0607/54	The ECM has a supervisory CPU and a control ECU inside. When each input STP signal is different for 0.15 sec. or more, this trouble code is output. This trouble code is output after 0.4 sec. has passed from the time the cruise cancel input signal (STP input) is input into the ECM.	• ECM

HINT:
The ECM receives signals from each sensor to control all the functions of the cruise control with the micro-computer.
When a trouble code is detected, fail-safe remains on until the ignition switch is turned off.

INSPECTION PROCEDURE

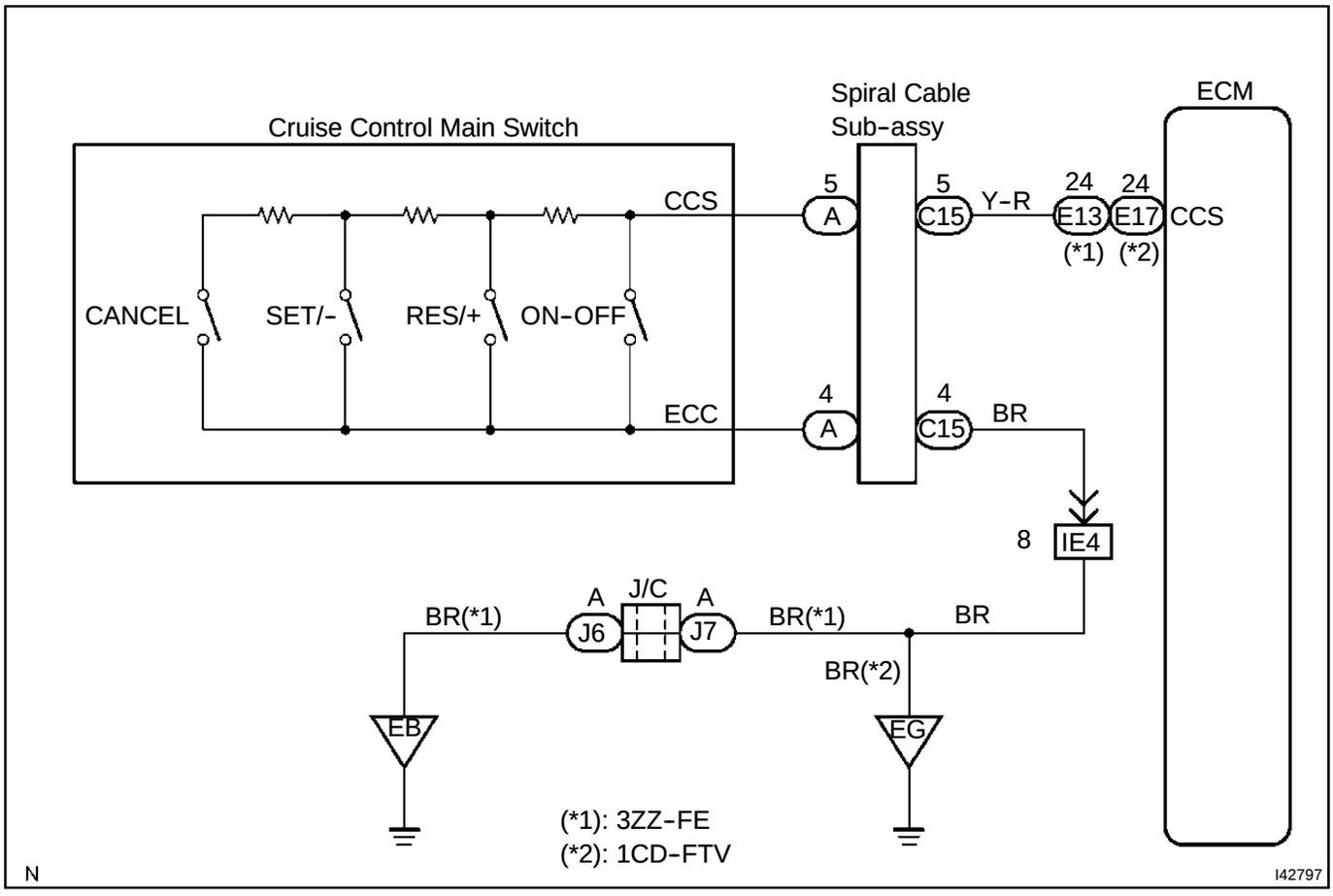
1	**REPLACE ECM (SEE PUB. NO. RM1039E, PAGE 10-8)**

CRUISE CONTROL SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The cruise control main switch operates seven functions: SET, '–' (COAST), TAP–DOWN, RESUME, '+' (ACCEL), TAP–UP, and CANCEL. The SET, TAP–DOWN and COAST functions, and the RESUME, TAP–UP and ACCEL functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in each arrow direction and turns off after releasing it. The internal contact point of the cruise control main switch is turned on with the switch operation. Then the ECM reads the voltage value that has been changed by the switch operation to control SET, '–' (COAST), RESUME, '+' (ACCEL) and CANCEL.

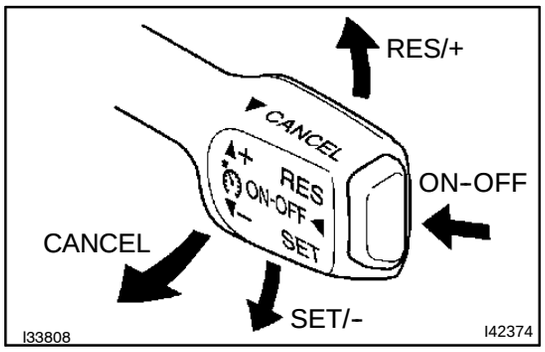
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 when using the intelligent tester II and start from step 2 when not using the intelligent tester II.

1	READ VALUE ON INTELLIGENT TESTER II



(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) According to the display on the tester, read the "DATA LIST".

Chassis/Cruise Control (ECM):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
Cruise Control Main SW (Main SW M-CPU)	Main SW signal (Main CPU)/ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	-
Cruise Main SW (Sub) (Main SW S-CPU)	Main SW signal (Sub CPU)/ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	-
Cancel Switch	CANCEL SW signal/ON or OFF	ON: CANCEL SW ON OFF: CANCEL SW OFF	-
SET/COAST Switch	SET/- SW signal/ON or OFF	ON: SET/- SW ON OFF: SET/- SW OFF	-
RES/ACC Switch	RES/+ SW signal/ON or OFF	ON: RES/+ SW ON OFF: RES/+ SW OFF	-

OK:
When the cruise control main switch is operated, the display changes as shown above.
Result:

OK	A
NG (All items are defective.)	B
NG (One to four items are defective.)	C

B → **Go to step 2**

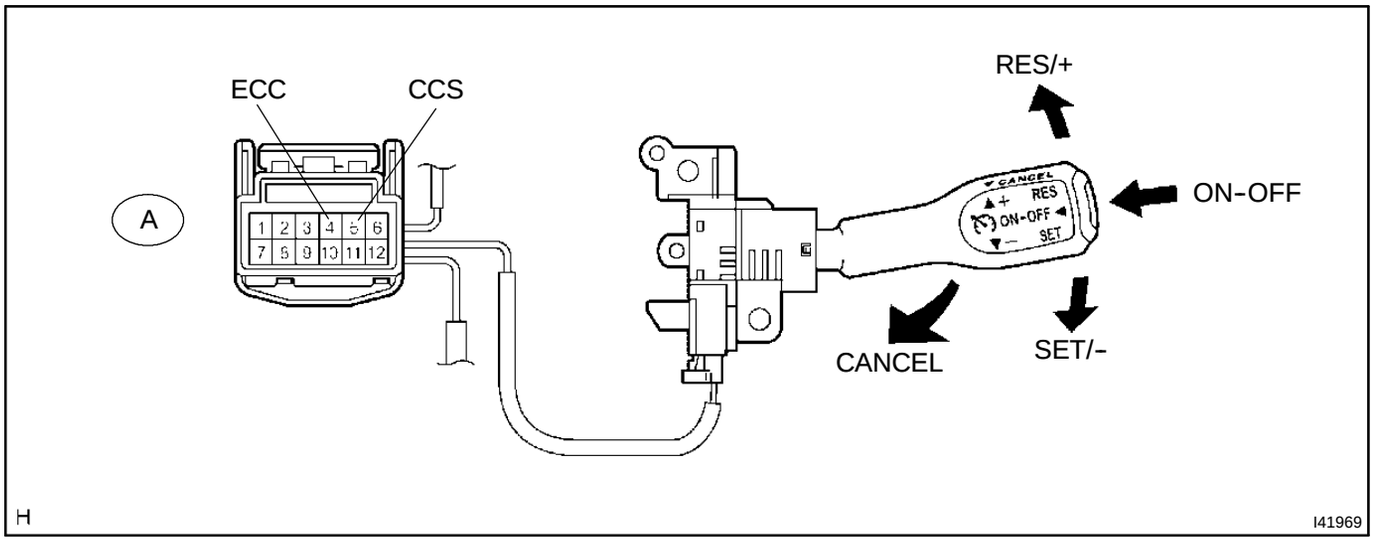
C → **REPLACE CRUISE CONTROL MAIN SWITCH ASSY (SEE PAGE 82-1)**

A

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1153)

2	INSPECT CRUISE CONTROL MAIN SWITCH ASSY

(a) Disconnect the cruise control main switch connector.



(b) Measure the resistance according to the value(s) in the table below.

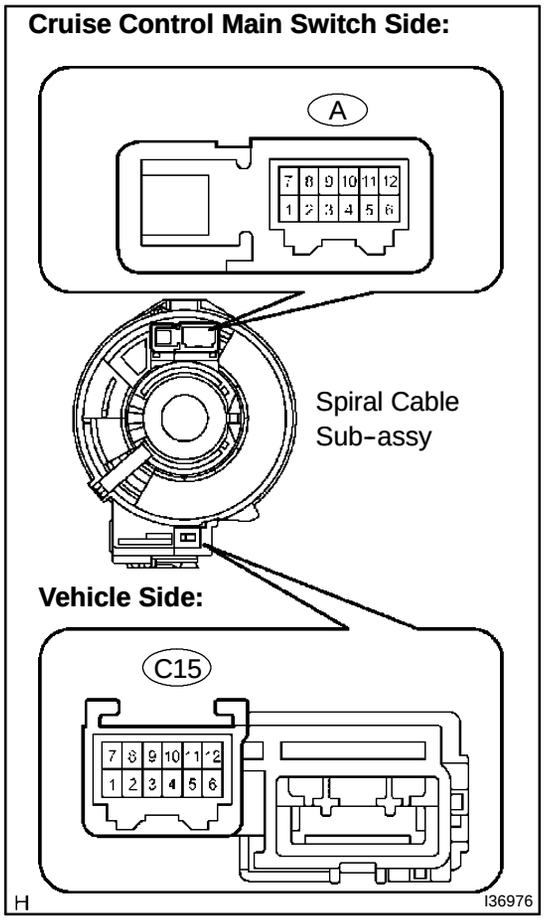
Standard:

Tester Connection	Condition	Specified Condition
4 - 5	Neutral	10 kΩ or higher
4 - 5	RES/+	210 to 270 Ω
4 - 5	SET/-	560 to 700 Ω
4 - 5	CANCEL	1,380 to 1,700 Ω
4 - 5	Main Switch OFF	10 kΩ or higher
4 - 5	Main Switch ON	Below 1 Ω

NG → **REPLACE CRUISE CONTROL MAIN SWITCH ASSY (SEE PAGE 82-1)**

OK

3 INSPECT SPIRAL CABLE SUB-ASSY



(a) Disconnect the spiral cable sub-assy connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

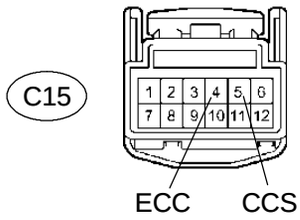
Tester Connection	Condition	Specified Condition
A-4 - C15-4	Always	Below 1 Ω
A-5 - C15-5	Always	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY** **(SEE PAGE 60-40)**

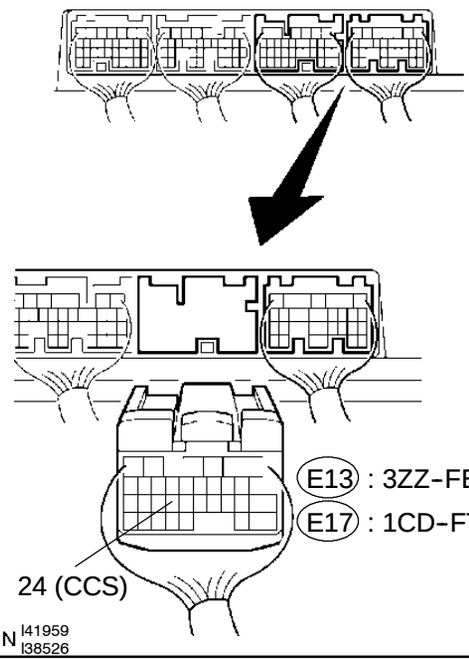
OK

4	CHECK HARNESS AND CONNECTOR (BETWEEN SPIRAL CABLE SUB-ASSY AND ECM, BODY GROUND) (SEE PAGE 01-21)

Spiral Cable Sub-assy (Wire Harness Side) Connector Front View:



ECM
Wire Harness View:



N I41959 I38526 I42364

(a) Disconnect the E13/E17 connector from the ECM.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
C15-5 - E13/E17-24	Always	Below 1 Ω
C15-5 - Body ground	Always	10 kΩ or higher
C15-4 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

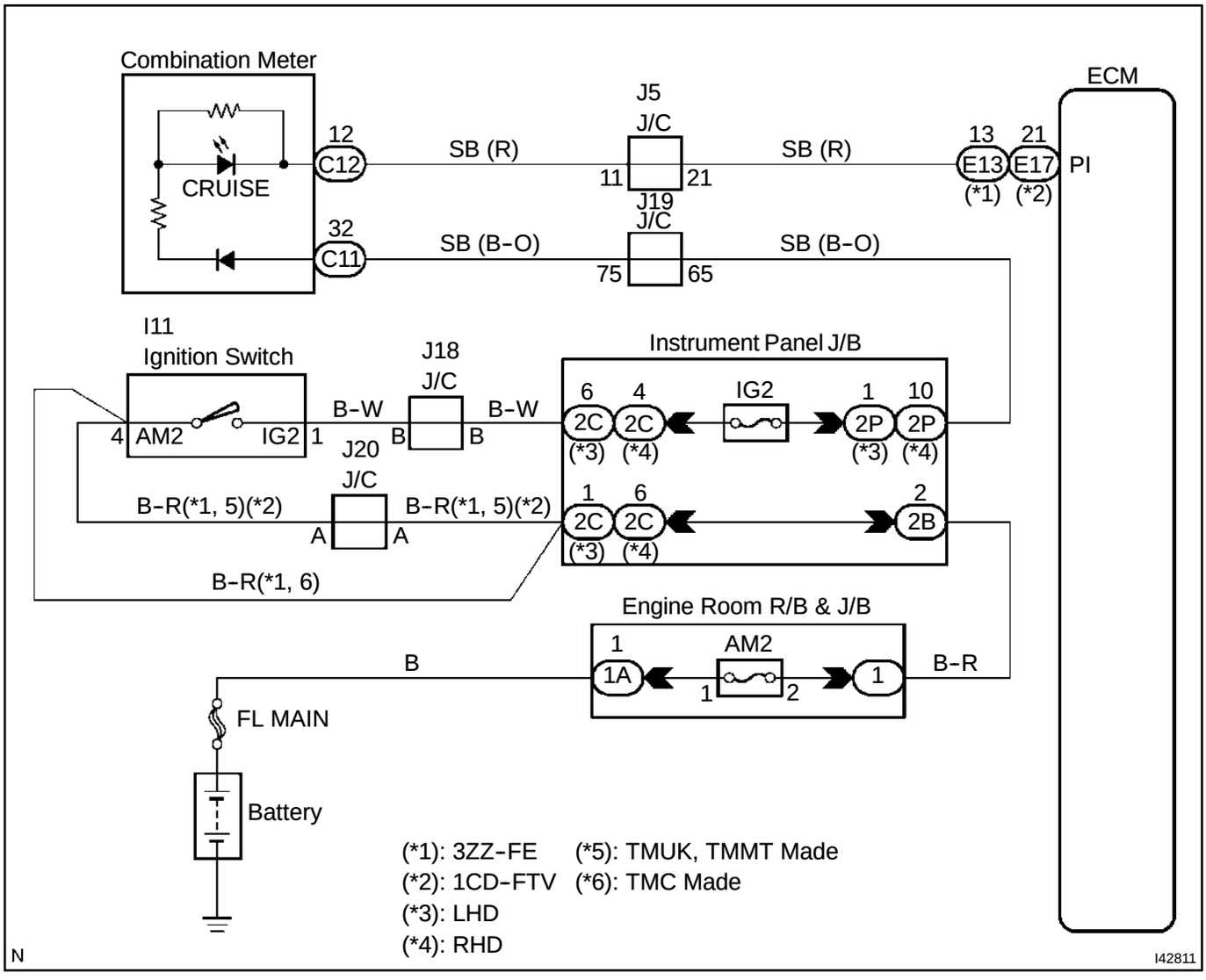
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1153)

CRUISE MAIN INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

When the cruise control main switch is turned off, cruise control does not operate.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the intelligent tester II and start from step 2 when not using the intelligent tester II.

1	READ VALUE ON INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to the ON position and turn the intelligent tester II main switch on.

(c) Select the item below in the "DATA LIST", and read the display on the intelligent tester II.

Chassis/Cruise Control (ECM):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
Cruise Ctrl SW-Indicator (CCS indicator M-CPU)	Cruise indicator signal (Main CPU)/ON or OFF	ON: "CRUISE" ON OFF: "CRUISE" OFF	-

OK:

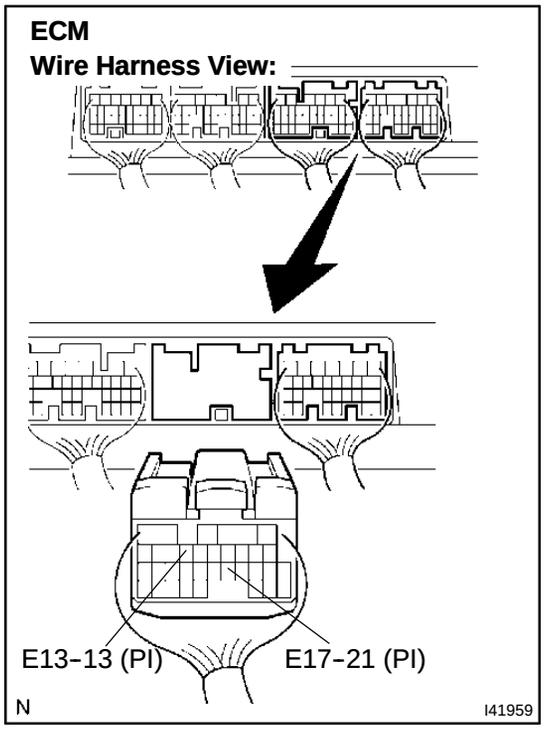
When the cruise control main switch is operated, the display changes as shown above.

NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1153)

2 INSPECT ECM



(a) Disconnect the E13/E17 connector from the ECM.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

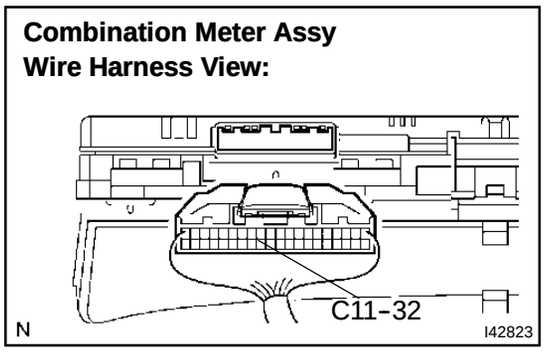
Tester Connection	Condition	Specified Condition
E13-13 - Body ground (3ZZ-FE)	Cruise main indicator light ON → OFF (Cruise control main switch ON → OFF)	Below 1 V → 10 to 14 V
E17-21 - Body ground (1CD-FTV)	Cruise main indicator light ON → OFF (Cruise control main switch ON → OFF)	Below 1 V → 10 to 14 V

NG → **Go to Step 3**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1153)

3 INSPECT COMBINATION METER ASSY



(a) Disconnect the C11 connector from the combination meter assy.
(b) Measure the voltage according to the value(s) in the table below.

Standard:

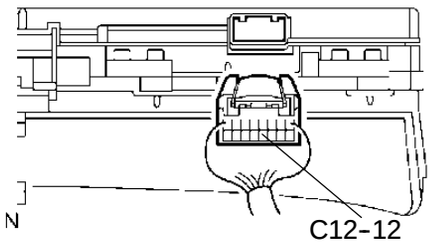
Tester Connection	Condition	Specified Condition
C11-32 - Body ground	Ignition switch OFF	Below 1 V
C11-32 - Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (BETWEEN BATTERY AND COMBINATION METER ASSY)**

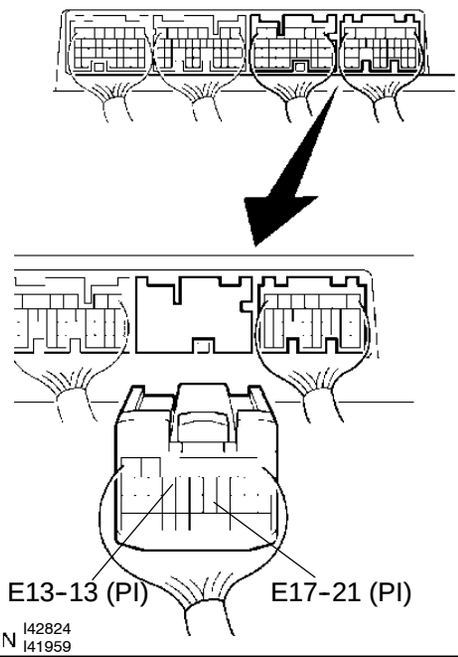
OK

4	CHECK HARNESS AND CONNECTOR (BETWEEN COMBINATION METER ASSY AND ECM) (SEE PAGE 01-21)

Combination Meter Assy
Wire Harness View:



ECM
Wire Harness View:



(a) Disconnect the C12 connector from the combination meter assy.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
C12-12 - E13-13 (3ZZ-FE)	Always	Below 1 Ω
C12-12 - E17-21 (1CD-FTV)	Always	Below 1 Ω
C12-12 - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

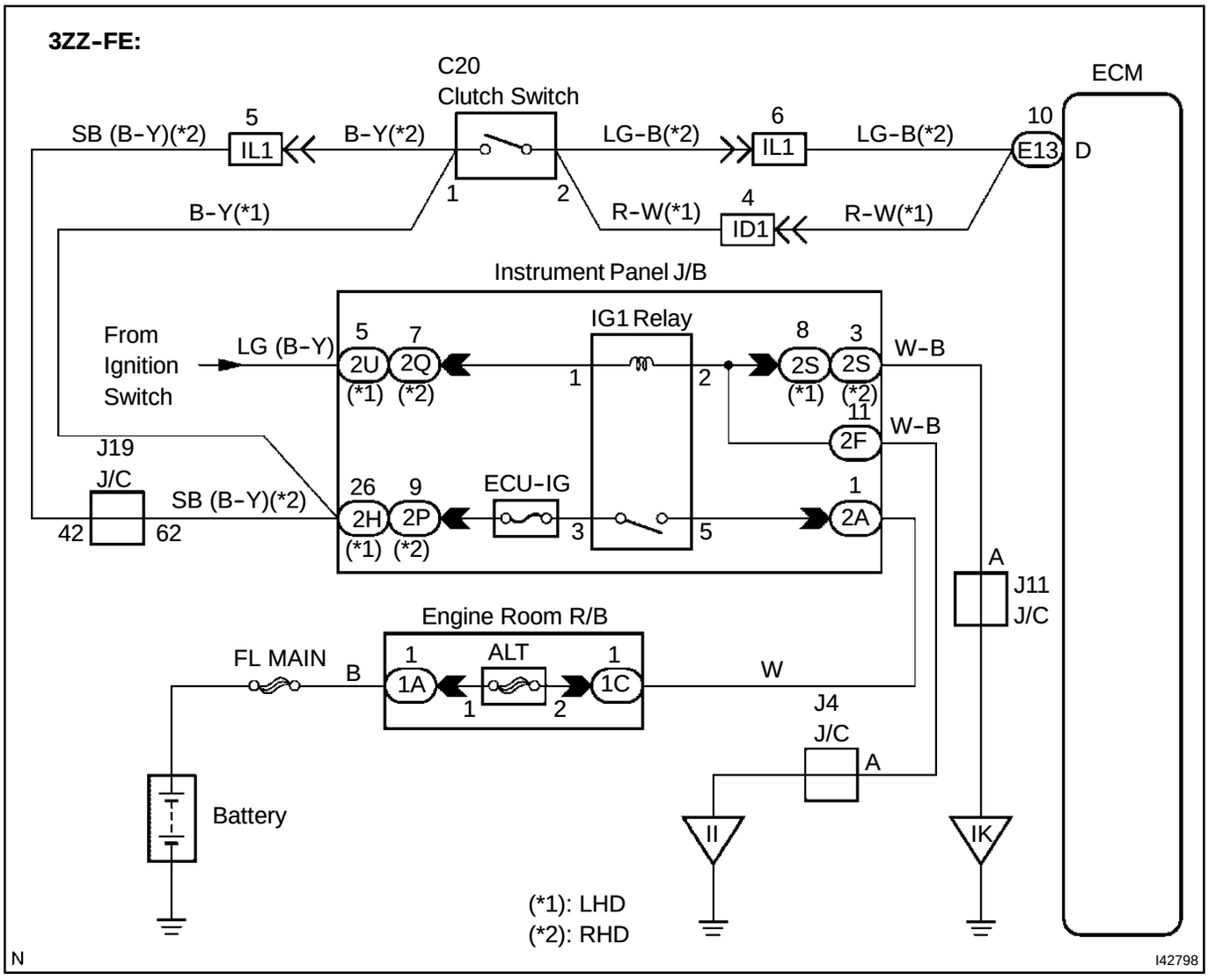
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1153)

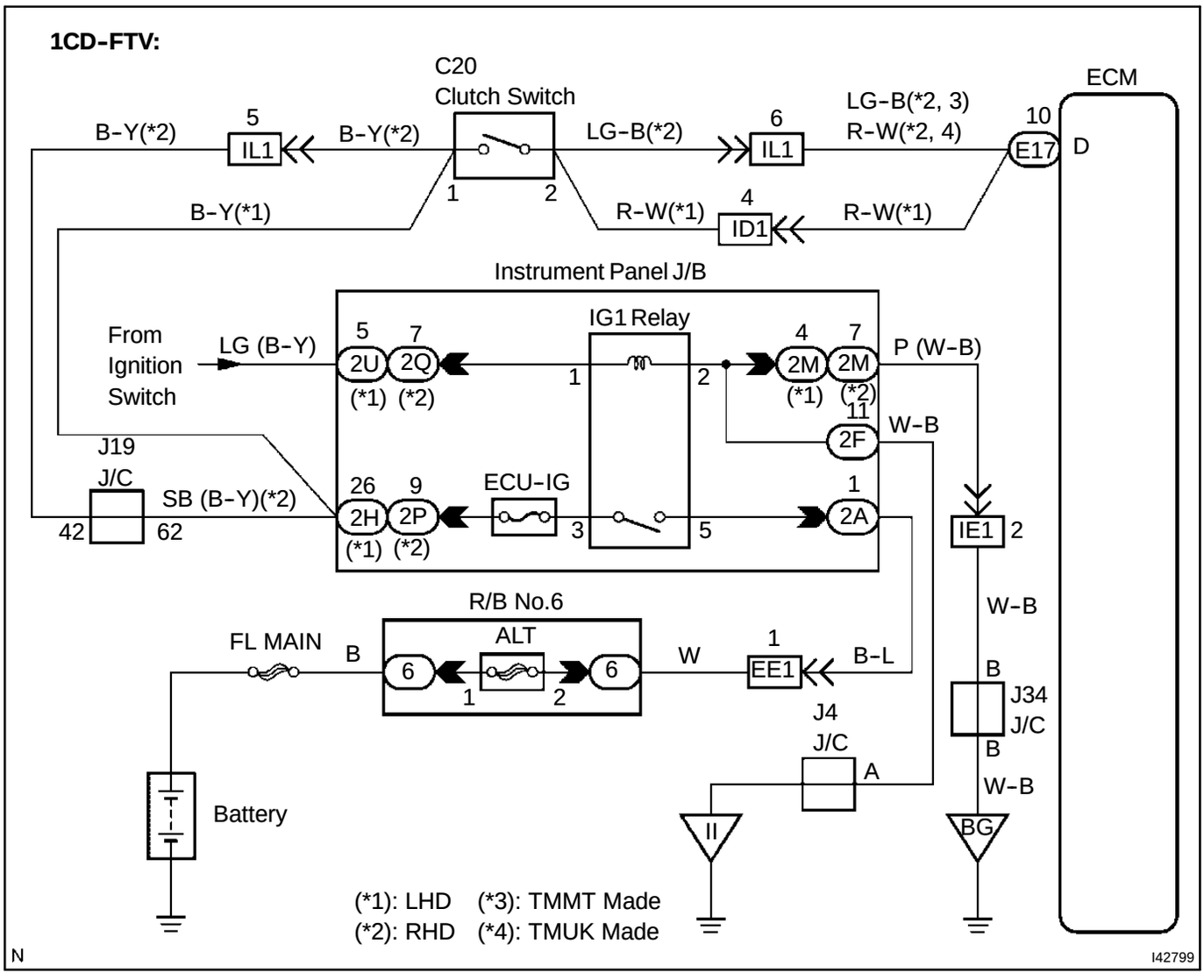
CLUTCH SWITCH CIRCUIT

CIRCUIT DESCRIPTION

Clutch switch circuit inspection is necessary for manual transaxle vehicles.
When the clutch pedal is released, the ECM receives positive (+) battery voltage through the IG1 relay and ECU-IG fuse. While depressing the clutch pedal, the clutch switch assy sends a signal to terminal D of the ECM. The ECM cancels cruise control drive when terminal D receives the signal.

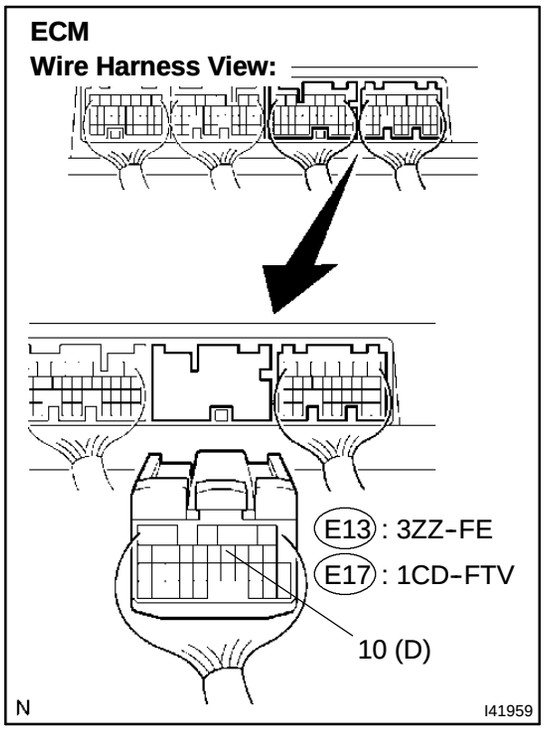
WIRING DIAGRAM




1CD-FTV:
C20
Clutch Switch
ECM
B-Y(*2)
5
IL1
B-Y(*2)
LG-B(*2)
6
IL1
LG-B(*2, 3)
R-W(*2, 4)
10
E17
D
1
2
B-Y(*1)
R-W(*1)
4
ID1
R-W(*1)
Instrument Panel J/B
IG1 Relay
From
Ignition
Switch
LG (B-Y)
5
7
2U
2Q
(*1) (*2)
1
2
4
7
2M
2M
(*1) (*2)
P (W-B)
11
2F
W-B
J19
J/C
SB (B-Y)(*2)
42
62
26
9
2H
2P
(*1) (*2)
ECU-IG
3
5
1
2A
IE1
2
W-B
R/B No.6
ALT
FL MAIN
B
6
6
1
2
W
1
EE1
B-L
B
J34
J/C
B
J4
J/C
A
W-B
Battery
II
BG
(*1): LHD (*3): TMMT Made
(*2): RHD (*4): TMUK Made
N
I42799

INSPECTION PROCEDURE

1 INSPECT ECM



(a) Disconnect the E13/E17 connector from the ECM.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

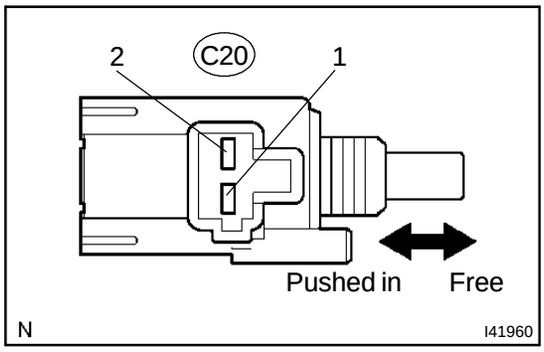
Tester Connection	Condition	Specified Condition
E13/E17-10 - Body ground	Clutch pedal depressed	Below 1 V
E13/E17-10 - Body ground	Clutch pedal released	10 to 14 V

NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1153)

2 INSPECT CLUTCH SWITCH ASSY



(a) Disconnect the clutch switch connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

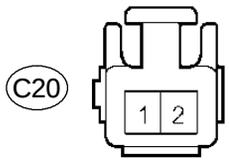
Tester Connection	Condition	Specified Condition
1 - 2	Switch pin free (Clutch pedal depressed)	10 kΩ or higher
1 - 2	Switch pin pushed in (Clutch pedal released)	Below 1 Ω

NG → **REPLACE CLUTCH SWITCH ASSY**
(SEE PAGE 82-2)

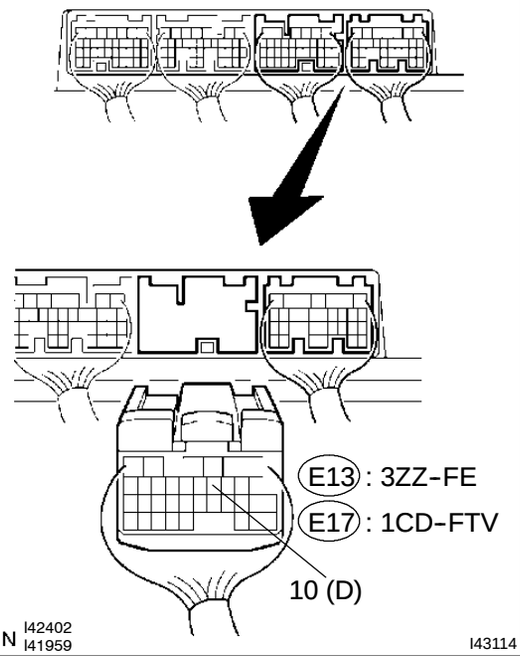
OK

3	CHECK HARNESS AND CONNECTOR (BETWEEN CLUTCH SWITCH ASSY AND ECM) (SEE PAGE 01-21)

Clutch Switch (Wire Harness Side) Connector Front View:



ECM
Wire Harness View:



N I42402 I41959 I43114

(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
C20-2 - E13/E17-10	Always	Below 1 Ω
C20-2 - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

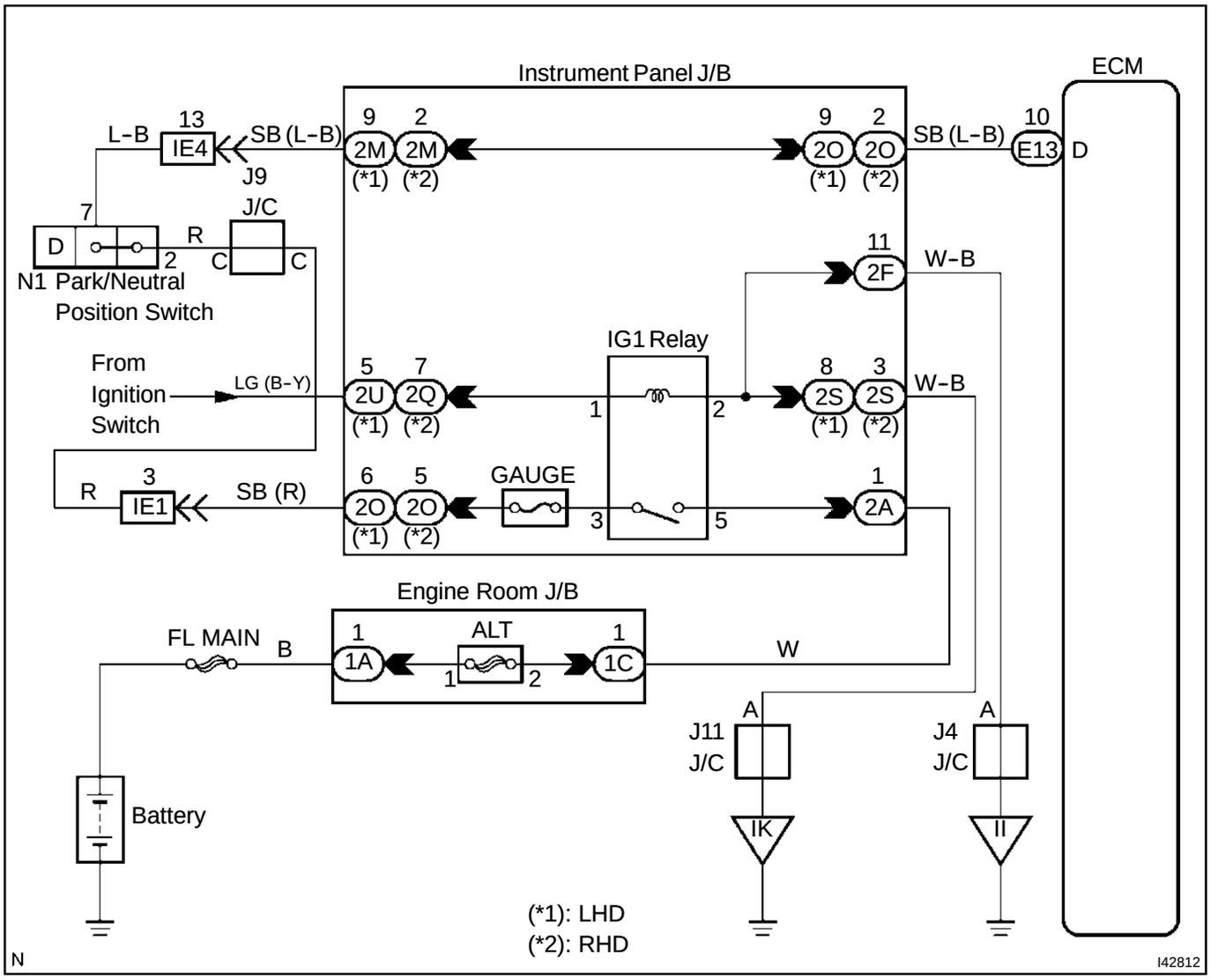
REPAIR OR REPLACE HARNESS OR CONNECTOR (BETWEEN BATTERY AND CLUTCH SWITCH ASSY)

PARK/NEUTRAL POSITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

Park/Neutral position switch circuit inspection is necessary for automatic transaxle vehicles.
When the shift lever is in any position except D, a signal is sent from the park/neutral position switch to the ECM. When this signal is input during cruise control driving, the ECM cancels the cruise control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the intelligent tester II and start from step 2 when not using the intelligent tester II.

1	READ VALUE ON INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to the ON position and turn the intelligent tester II main switch on.

(c) Select the item below in the "DATA LIST", and read the display on the intelligent tester II.

Chassis/Cruise Control (ECM):

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
Shift D Position	PNP SW signal (D position)/ON or OFF	ON: Shift position D OFF: Any shift position except D	-

OK:

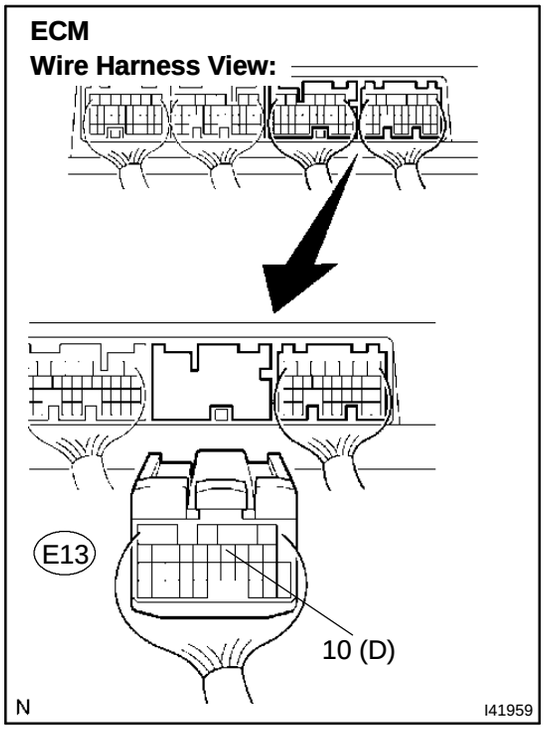
When the shift lever is operated, the display changes as shown above.

NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1153)

2 INSPECT ECM



(a) Disconnect the E13 connector from the ECM.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

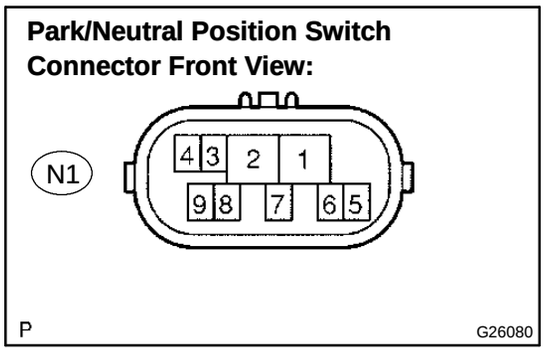
Tester Connection	Condition	Specified Condition
E13-10 - Body ground	Shift position D	10 to 14 V
E13-10 - Body ground	Any shift position except D	Below 1 V

NG → **Go to step 3**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1153)

3 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



(a) Disconnect the park/neutral position switch connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

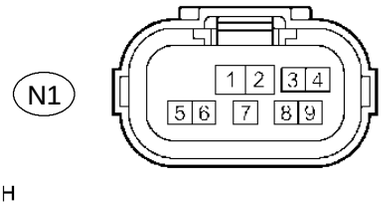
Tester Connection	Condition	Specified Condition
2 - 7	Shift position D	Below 1 Ω
2 - 7	Any shift position except D	10 kΩ or higher

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH ASSY** **(SEE PAGE 40-1)**

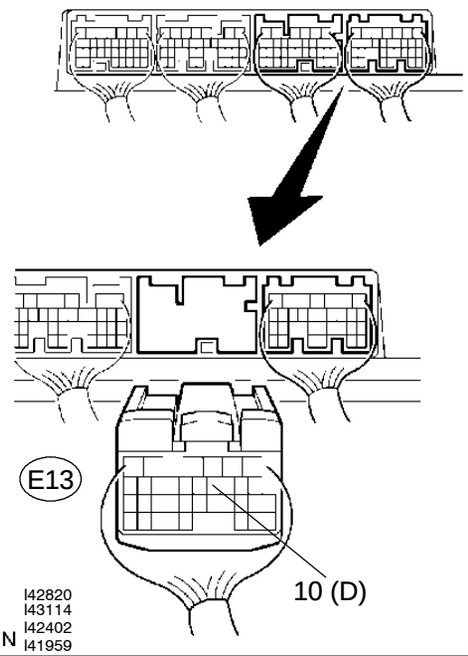
OK

4	CHECK HARNESS AND CONNECTOR (BETWEEN PARK/NEUTRAL POSITION SWITCH ASSY AND ECM) (SEE PAGE 01-21)

Park/Neutral Position Switch (Wire Harness Side) Connector Front View:



ECM
Wire Harness View:



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
N1-7 - E13-10	Always	Below 1 Ω
N1-7 - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

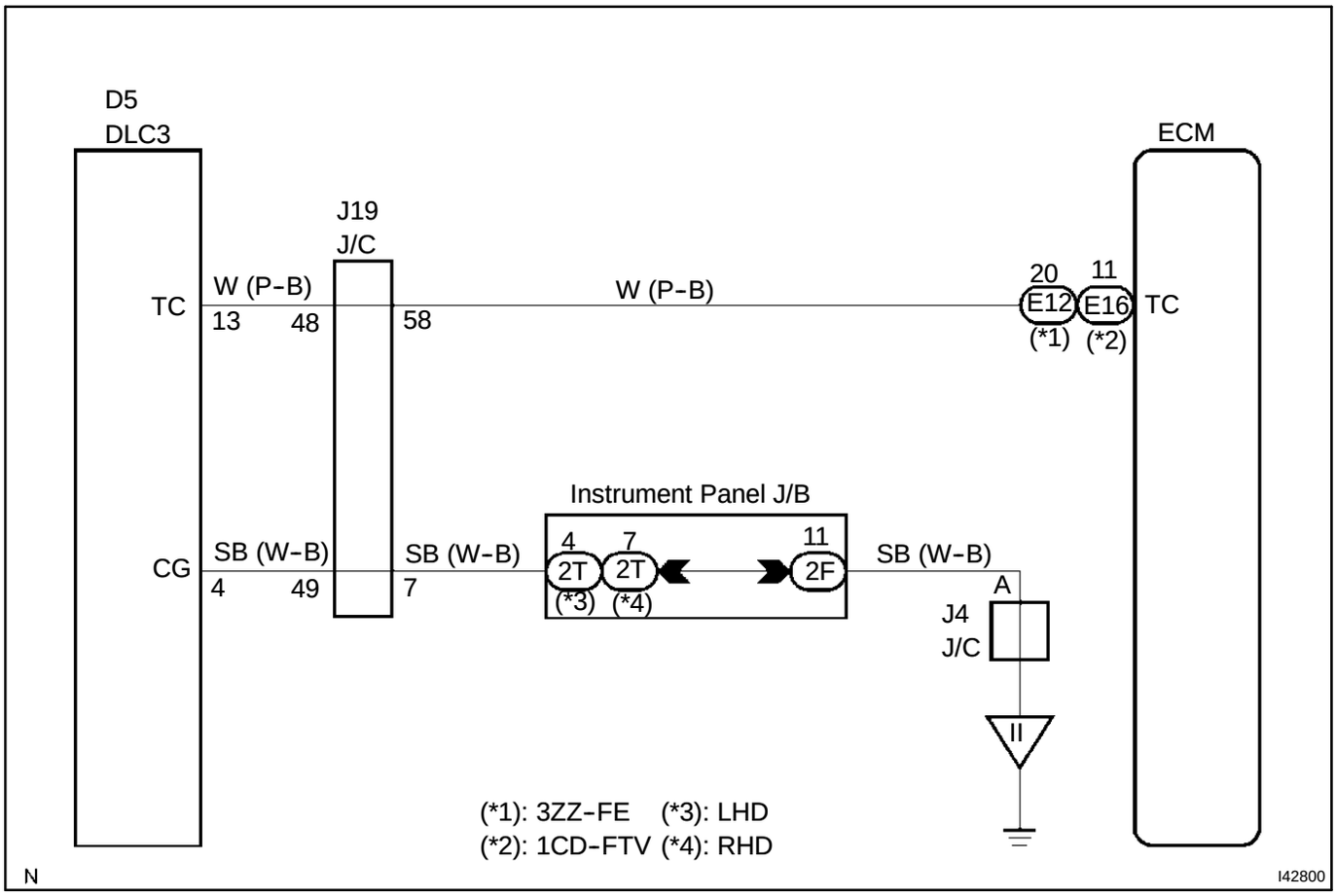
REPAIR OR REPLACE HARNESS OR CONNECTOR (BETWEEN BATTERY AND PARK/NEUTRAL POSITION SWITCH ASSY)

DIAGNOSIS CIRCUIT

CIRCUIT DESCRIPTION

Making a short circuit between terminals TC and CG of the DLC3 will output DTCs from the DLC3.

WIRING DIAGRAM

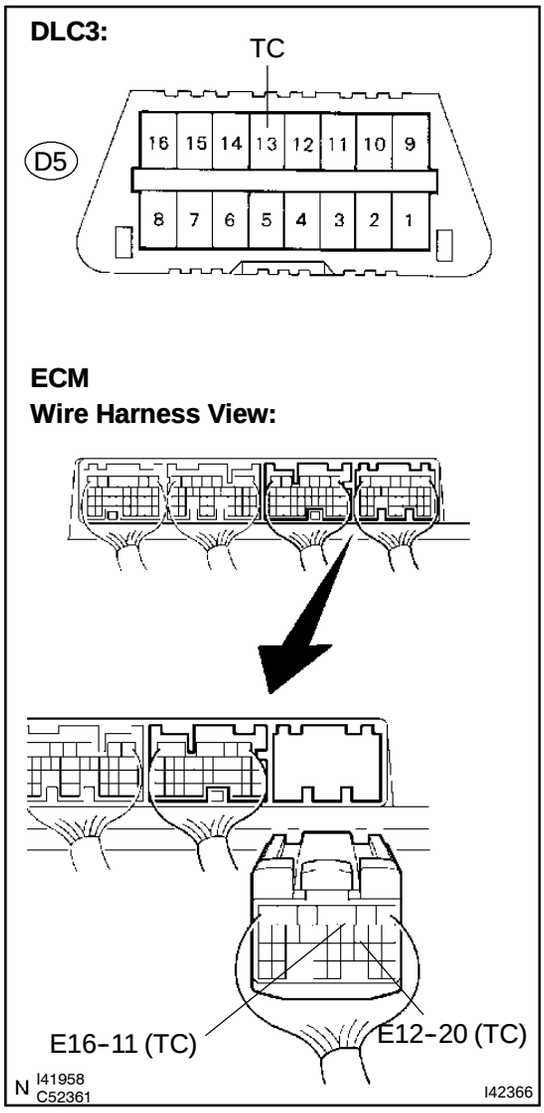


HINT:

When a particular warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in the relevant ECU is suspected.

INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (TC) AND ECM) (SEE PAGE 01-21)



(a) Disconnect the E12/E16 connector from the ECM.
(b) Measure the resistance according to the value(s) in the table below.

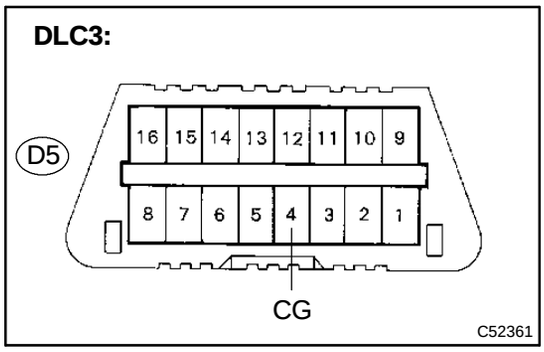
Standard:

Tester Connection	Condition	Specified Condition
D5-13 - E12-20 (3ZZ-FE)	Always	Below 1 Ω
D5-13 - E16-11 (1CD-FTV)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (CG) AND BODY GROUND) (SEE PAGE 01-21)



(a) Measure the resistance according to the value(s) in the table below.

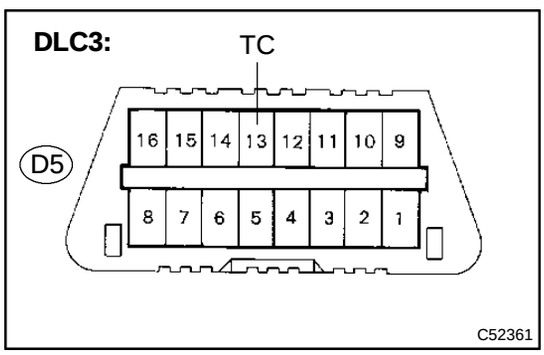
Standard:

Tester Connection	Condition	Specified Condition
4 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (TC) AND BODY GROUND) (SEE PAGE 01-21)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
13 - Body ground	Ignition switch OFF	10 kΩ or higher

NG → **REPAIR OR REPLACE WIRE HARNESS OR EACH ECU**

OK

REPLACE ECM (SEE PUB. NO. RM1039E, PAGE 10-8)

ENGINE CONTROL SYSTEM

SFI SYSTEM (3ZZ–FE) (From May, 2004) . . . 10–1
ON–VEHICLE INSPECTION 10–1/2
INSPECTION 10–3
THROTTLE BODY ASSY
(3ZZ–FE) (From May, 2004) 10–4
COMPONENTS 10–4/5
REPLACEMENT 10–6/12
ACCELERATOR PEDAL ASSY
(3ZZ–FE) (From May, 2004) 10–13
REPLACEMENT 10–13

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

SFI SYSTEM (3ZZ–FE) (From May, 2004)

100R6–01

ON–VEHICLE INSPECTION

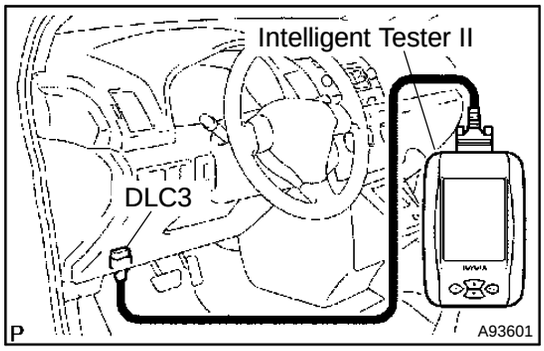
1. INSPECT THROTTLE BODY ASSY

(a) Listen to the throttle control motor operating sounds.

(1) Turn the ignition switch to ON.

(2) When pressing the accelerator pedal, listen to the running sound of the motor. Make sure no friction noise comes from the motor.

If friction noise exists, check the throttle body, wire harness and ECM.



(b) Check the throttle position sensor.

(1) Connect the intelligent tester II to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the intelligent tester II ON.

(4) Select the menu items: Powertrain / Engine and ECT / Data List / Throttle Position.

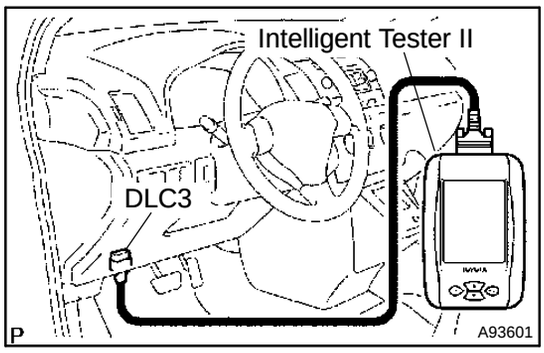
(5) Depress the accelerator pedal. When the throttle valve is fully opened, then check that the Throttle Position value is within the specification.

Standard: 60 % or more

NOTICE:

When checking the standard throttle valve opening percentage, the transmission should be in the neutral position.

If the result is not as specified, check the throttle body, wire harness and ECM.



2. INSPECT ACCELERATOR PEDAL ASSY

(a) Check the voltage.

(1) Connect the intelligent tester II to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the intelligent tester II ON.

(4) Select the menu items: Powertrain / Engine and ECT / Data List / Accelerator POS No. 1, Accelerator POS No. 2.

(5) Operate the accelerator pedal, then check that the Accelerator POS No. 1 and Accelerator POS No. 2 value are within the specifications.

Standard:

Accelerator POS No. 1:

Accelerator Pedal Condition	Specified Condition
Released	0.5 to 1.1 V
Depressed	2.6 to 4.5 V

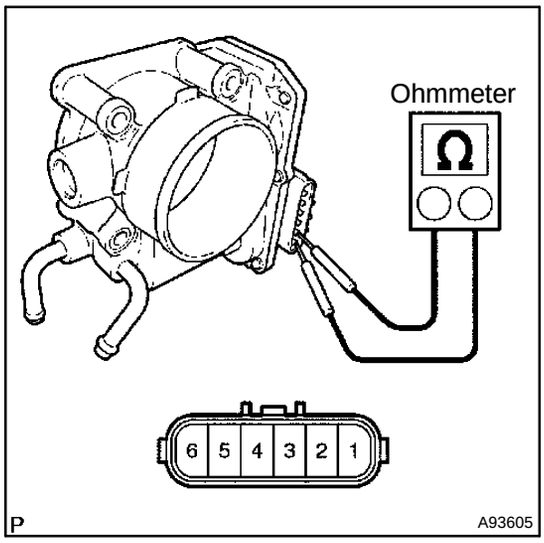
Accelerator POS No. 2:

Accelerator Pedal Condition	Specified Condition
Released	1.2 to 2.0 V
Depressed	3.4 to 5.0 V

If the result is not as specified, check the accelerator pedal, wire harness and ECM.

100R7-01

INSPECTION



1. INSPECT THROTTLE BODY ASSY

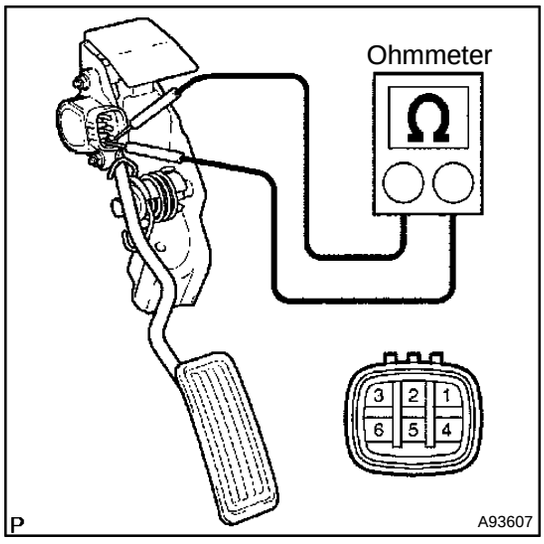
(a) Check the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (M+) – 2 (M–)	0.3 to 100 Ω at 20°C (68°F)
3 (E2) – 5 (VC)	2.0 to 4.0 kΩ at 20°C (68°F)

If the result is not as specified, replace the throttle body.



2. INSPECT ACCELERATOR PEDAL ASSY

(a) Check the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

LHD Steering Position Type:

Tester Connection	Specified Condition
3 (EP1) – 6 (VCP1)	1.5 to 6.0 kΩ
1 (EP2) – 4 (VCP2)	1.5 to 6.0 kΩ

RHD Steering Position Type:

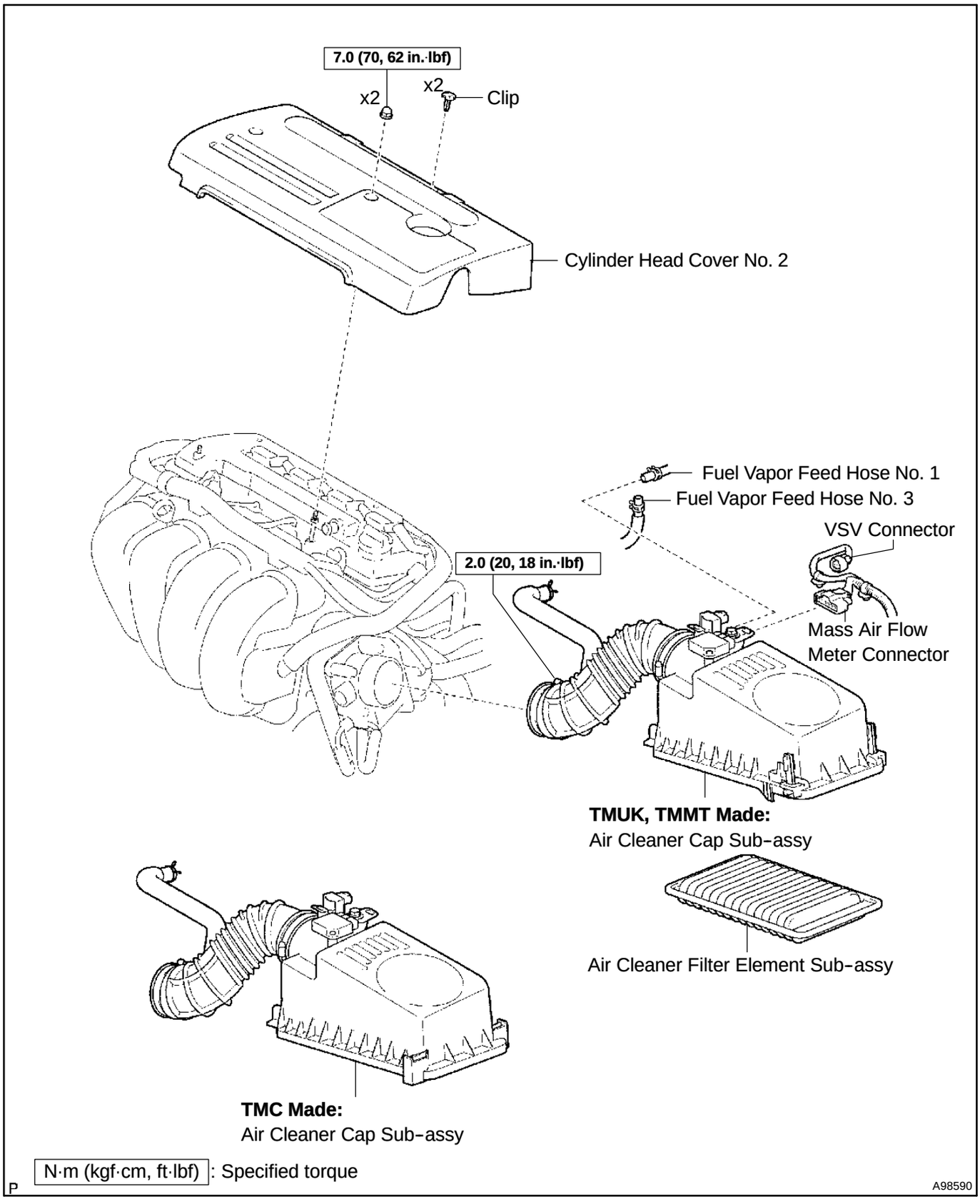
Tester Connection	Specified Condition
1 (EP1) – 4 (VCP1)	1.5 to 6.0 kΩ
3 (EP2) – 6 (VCP2)	1.5 to 6.0 kΩ

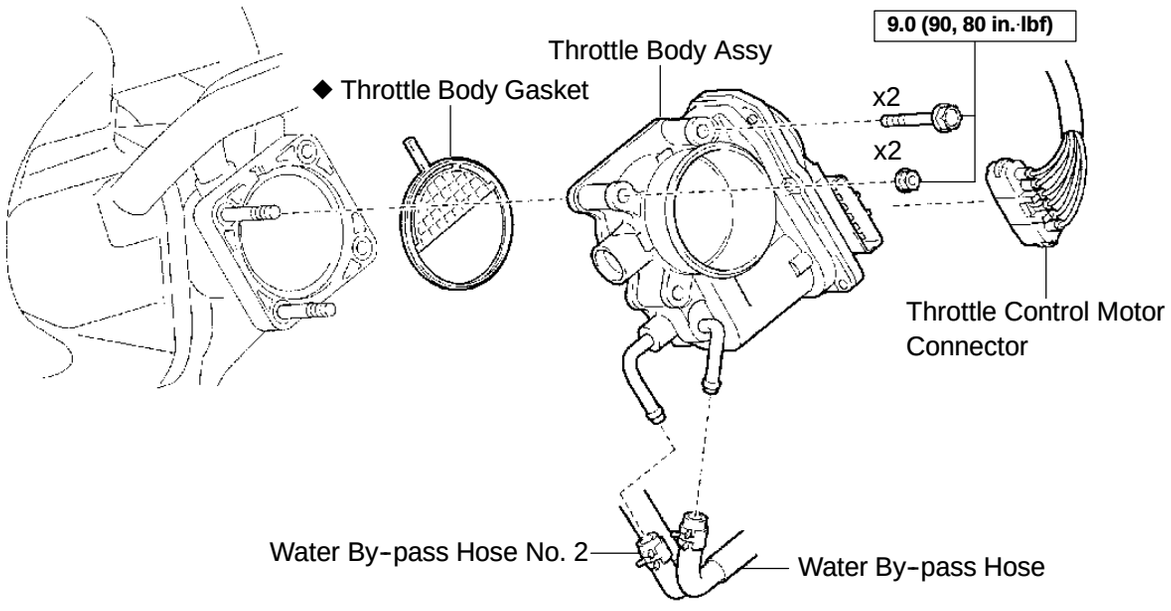
If the result is not as specified, replace the accelerator pedal.

THROTTLE BODY ASSY (3ZZ-FE) (From May, 2004)

100R8-01

COMPONENTS





N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part

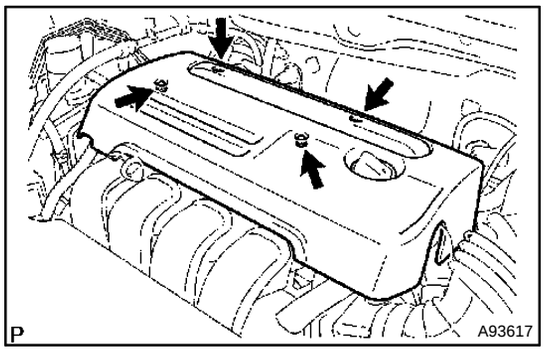
P A98555

100R9-01

REPLACEMENT

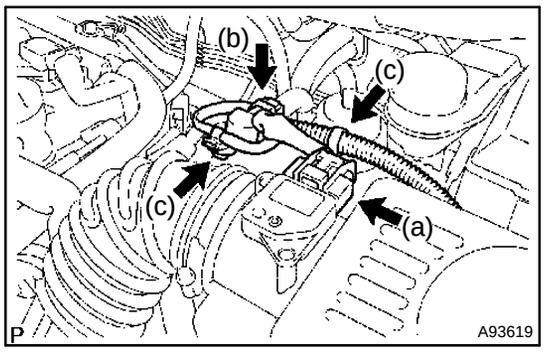
1. DISCONNECT BATTERY NEGATIVE TERMINAL

2. DRAIN ENGINE COOLANT **(See page 16-8)**



3. REMOVE CYLINDER HEAD COVER NO.2

(a) Remove the 2 nuts and 2 clips, then remove the cylinder head cover No. 2.

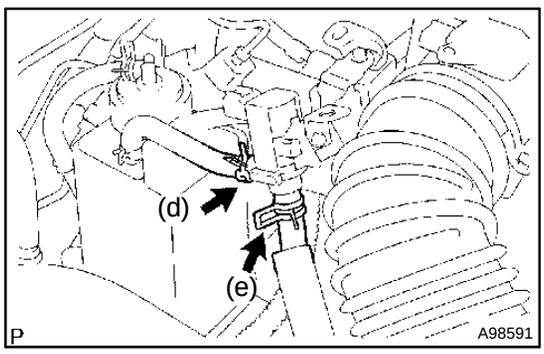


4. REMOVE AIR CLEANER CAP SUB-ASSY

(a) Disconnect the mass air flow meter connector.

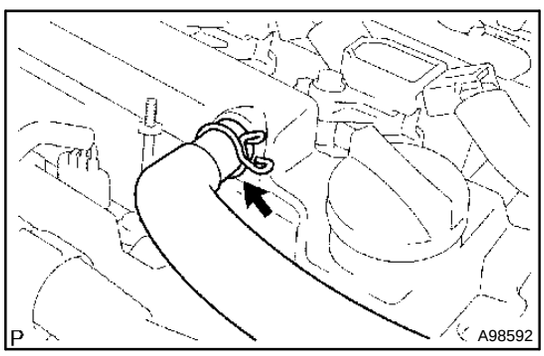
(b) Disconnect the VSV connector.

(c) Remove the 2 wire harness clamps.

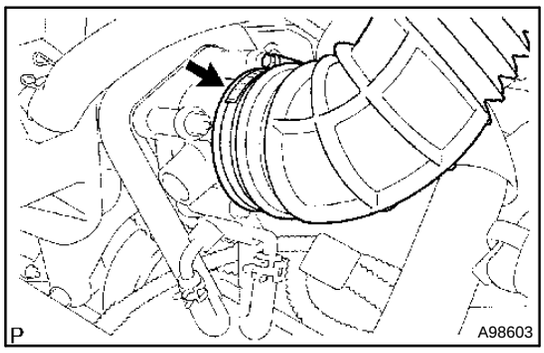


(d) Disconnect the fuel vapor feed hose No. 1 from the VSV.

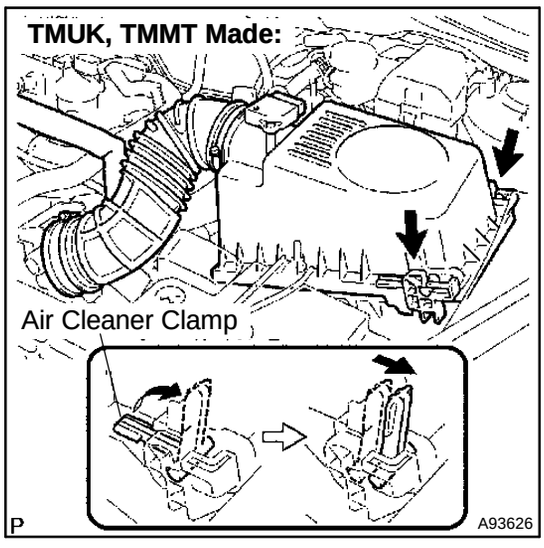
(e) Disconnect the fuel vapor feed hose No. 3 from the VSV.



(f) Disconnect the ventilation hose No. 1 from the cylinder head cover.



(g) Loosen the hose clamp bolt, then disconnect the air cleaner hose No. 1 from the throttle body.



(h) TMUK, TMMT Made:

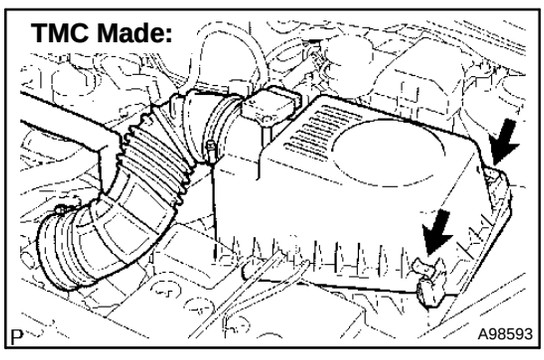
(1) Pull up the air cleaner clamp.

(2) Slide the air cleaner clamp in the direction indicated.

NOTICE:

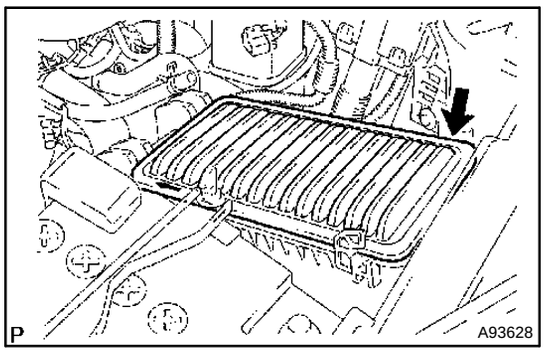
Only slide the air cleaner clamp in a vertical position.

(3) Remove the air cleaner cap from the air cleaner case.

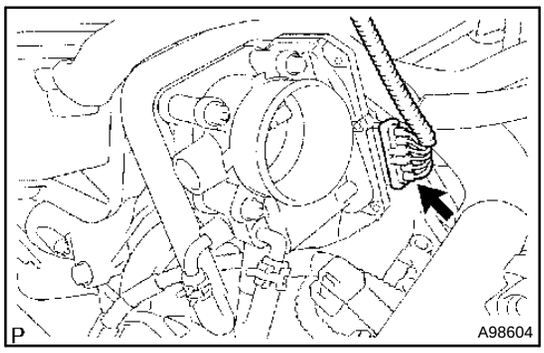


(i) TMC Made:

(1) Unfasten the 2 hook clamps, then remove the air cleaner cap.

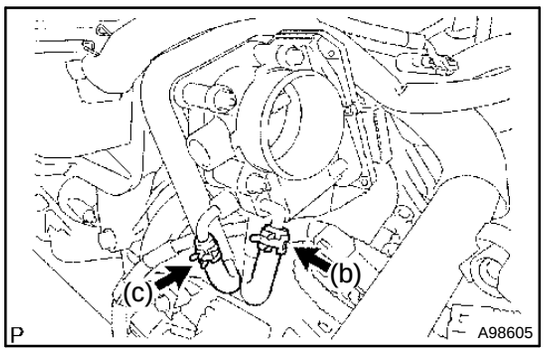


(j) Remove the air cleaner element from the air cleaner case.



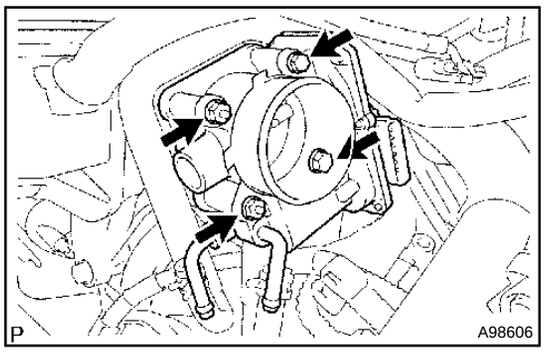
5. REMOVE THROTTLE BODY ASSY

(a) Disconnect the throttle control motor connector.

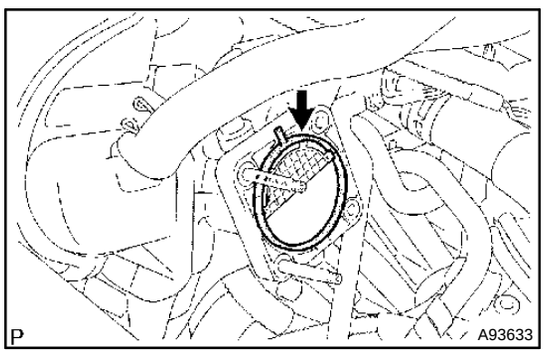


(b) Disconnect the water by-pass hose from the throttle body.

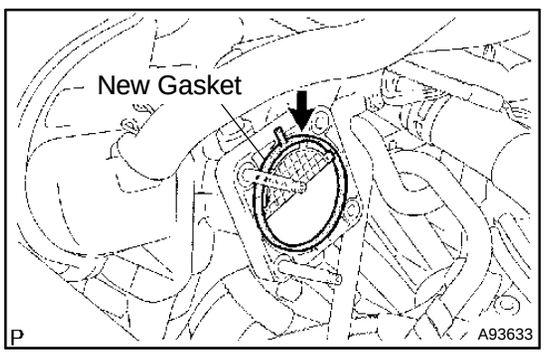
(c) Disconnect the water by-pass hose No. 2 from the throttle body.



(d) Remove the 2 bolts and 2 nuts, then remove the throttle body.

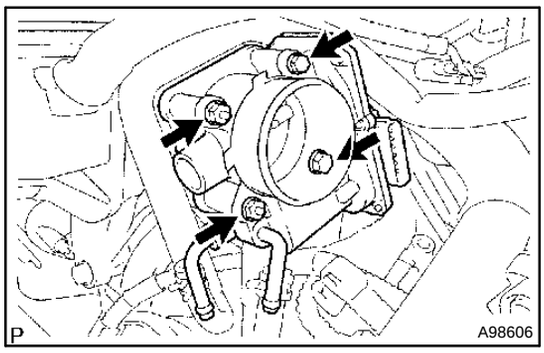


(e) Remove the gasket from the intake manifold.

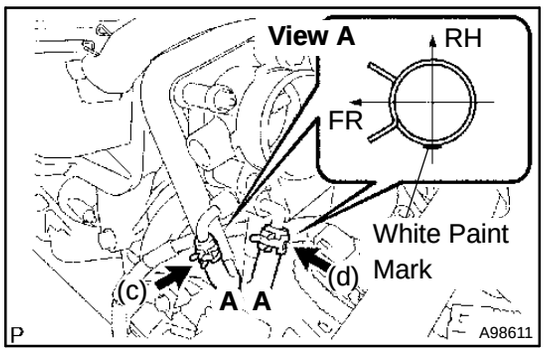


6. INSTALL THROTTLE BODY ASSY

(a) Install a new gasket into the intake manifold.



(b) Install the throttle body with the 2 bolts and 2 nuts.
Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)



(c) Connect the water by–pass hose No. 2 to the throttle body.

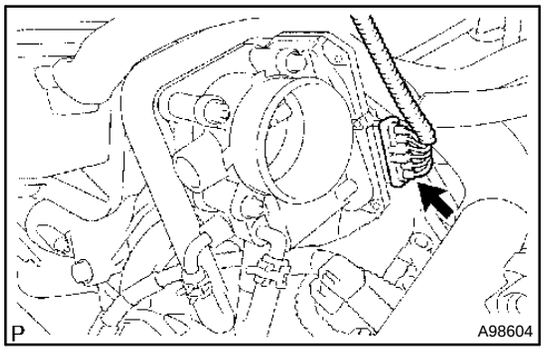
NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.

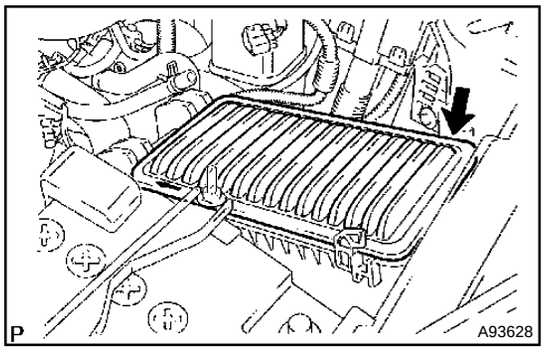
(d) Connect the water by–pass hose to the throttle body.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.



(e) Connect the throttle control motor connector.

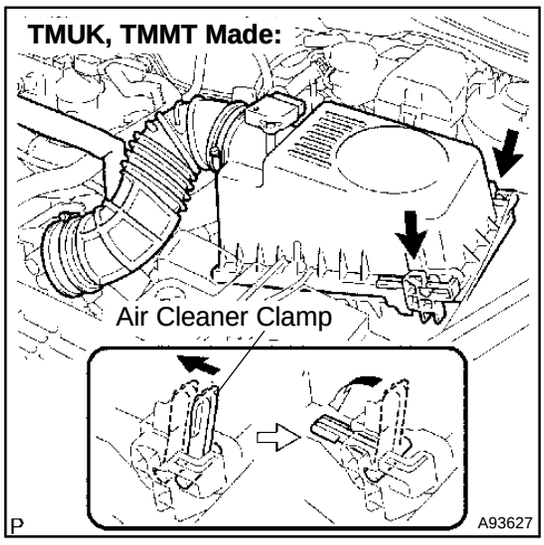


7. INSTALL AIR CLEANER CAP SUB–ASSY

(a) Install the air cleaner filter element onto the air cleaner case.

NOTICE:

Make sure that the air cleaner filter element is in the correct direction when installing.



(b) TMUK, TMMT Made:

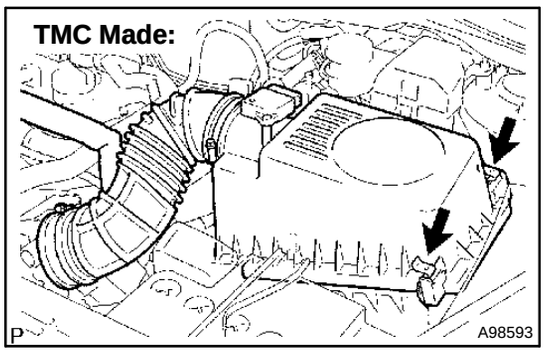
(1) Install the air cleaner cap onto the air cleaner case.

(2) Slide the air cleaner clamp in the direction indicated.

NOTICE:

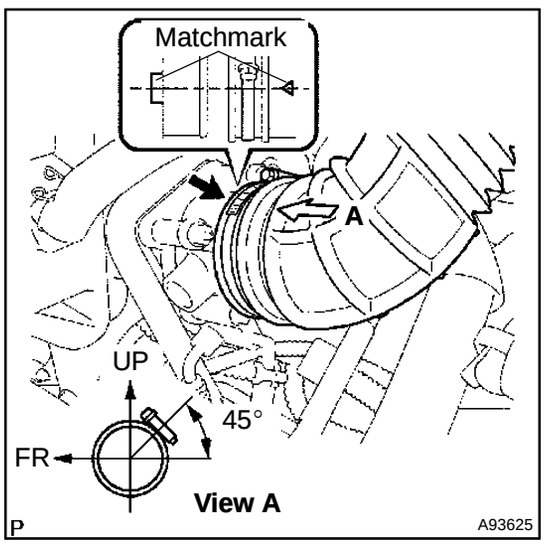
Only slide the air cleaner clamp in a vertical position.

(3) Push the air cleaner clamp back down.



(c) TMC Made:

(1) Install the air cleaner cap, then hung the 2 hook clamps.

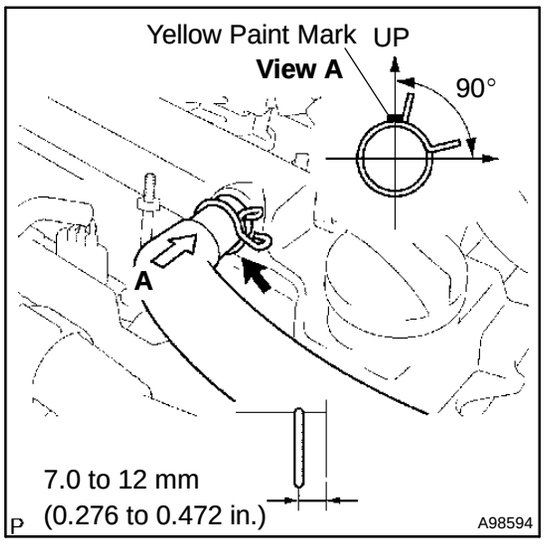


(d) Align the matchmarks of the air cleaner hose No. 1 and throttle body, connect the air cleaner hose No. 1 to the throttle body and tighten the hose clamp bolt.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)

NOTICE:

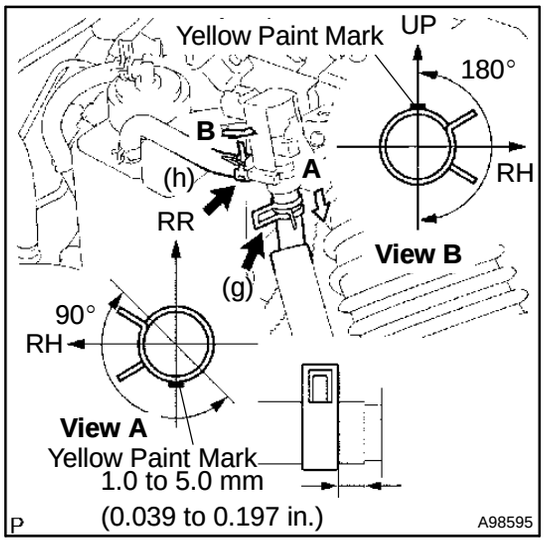
Make sure that the hose clamp is at the correct angle when installing.



(e) Connect the ventilation hose No. 1 to the cylinder head cover.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.



(f) Connect the fuel vapor feed hose No. 3 to the VSV.

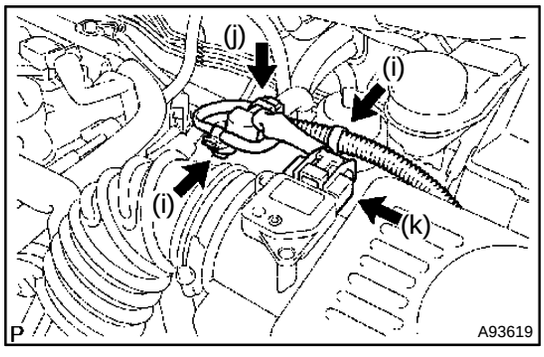
NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.

(g) Connect the fuel vapor feed hose No. 1 to the VSV.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.



(h) Install the 2 wire harness clamps.

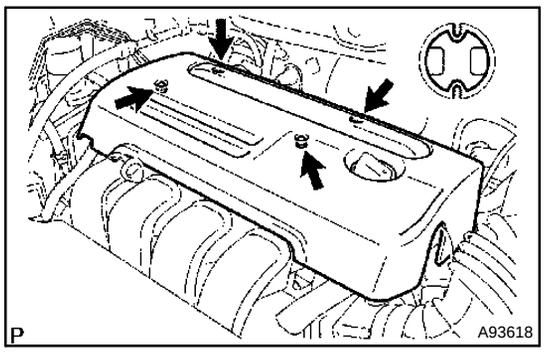
(i) Connect the VSV connector.

(j) Connect the mass air flow meter connector.

8. ADD ENGINE COOLANT (See page 16-8)

9. CONNECT BATTERY NEGATIVE TERMINAL
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

10. CHECK FOR ENGINE COOLANT LEAKAGE (See page 16-1)



11. INSTALL CYLINDER HEAD COVER NO.2

(a) Install the cylinder head cover No. 2 with the 2 nuts and 2 clips.

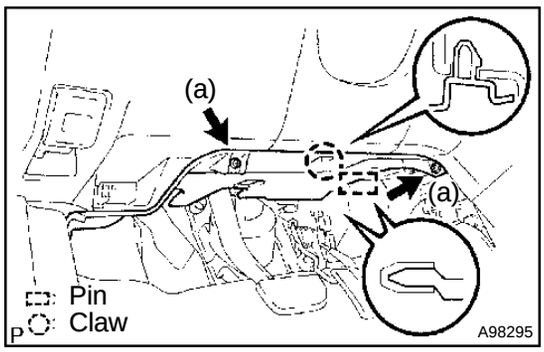
Torque: 7.0 N·m (70 kgf·cm, 62 in.·lbf)

ACCELERATOR PEDAL ASSY (3ZZ-FE) (From May, 2004)

100RA-01

REPLACEMENT

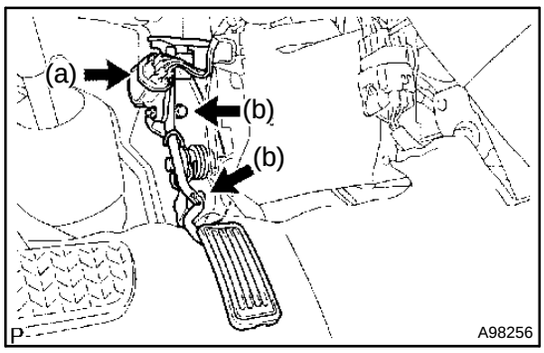
1. DISCONNECT BATTERY NEGATIVE TERMINAL



2. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1

(a) Remove the 2 screws.

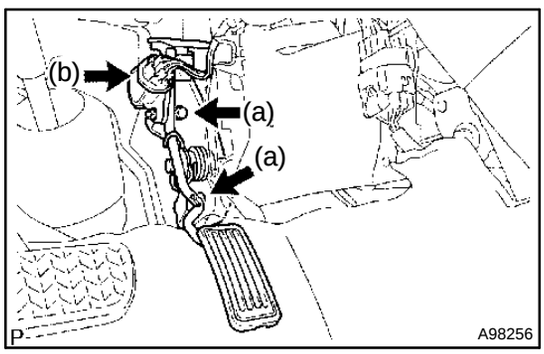
(b) Separate the claw and pin fittings, then remove the instrument panel under cover No. 1.



3. REMOVE ACCELERATOR PEDAL ASSY

(a) Disconnect the accelerator position sensor connector.

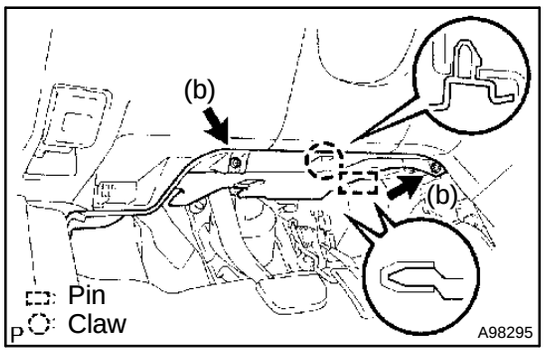
(b) Remove the 2 bolts, then remove the accelerator pedal.



4. INSTALL ACCELERATOR PEDAL ASSY

(a) Install the accelerator pedal with the bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the accelerator position sensor connector.



5. INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1

(a) Align the claw and pin positions, then install the instrument panel under cover No. 1.

(b) Tighten the 2 screws.

6. CONNECT BATTERY NEGATIVE TERMINAL

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

EMISSION CONTROL

EMISSION CONTROL SYSTEM
(3ZZ-FE/4ZZ-FE) 12-1
ON-VEHICLE INSPECTION 12-1/2
INSPECTION 12-3/7
EMISSION CONTROL SYSTEM
(2ZZ-GE) 12-8
ON-VEHICLE INSPECTION 12-8/9
INSPECTION 12-10

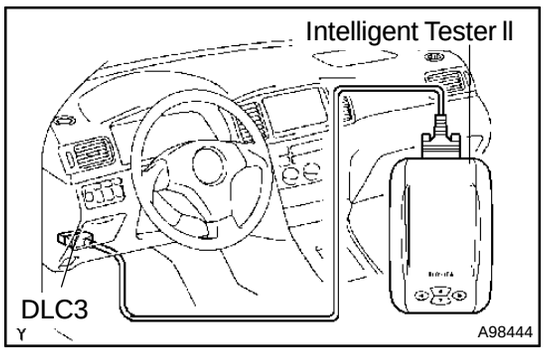
REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

EMISSION CONTROL SYSTEM (3ZZ-FE/4ZZ-FE)

ON-VEHICLE INSPECTION

120G1-01



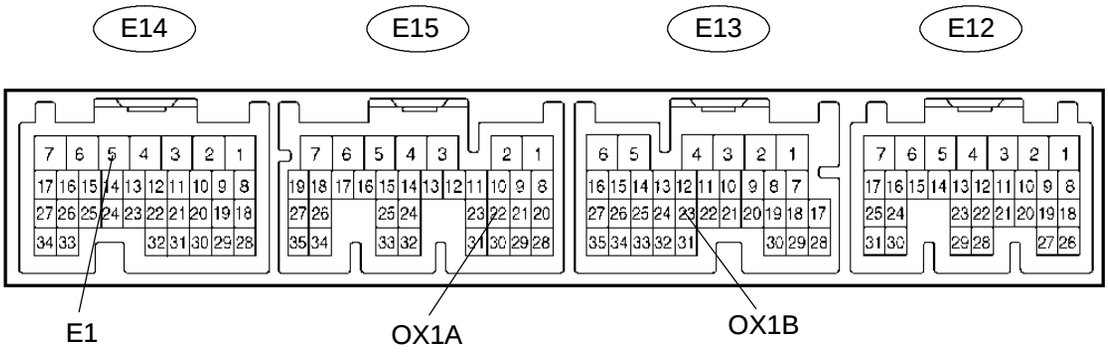
1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

(a) When using the intelligent tester II.
  (1) Connect the intelligent tester II to the DLC3.
  (2) Turn the ignition switch to ON.
  (3) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S2.

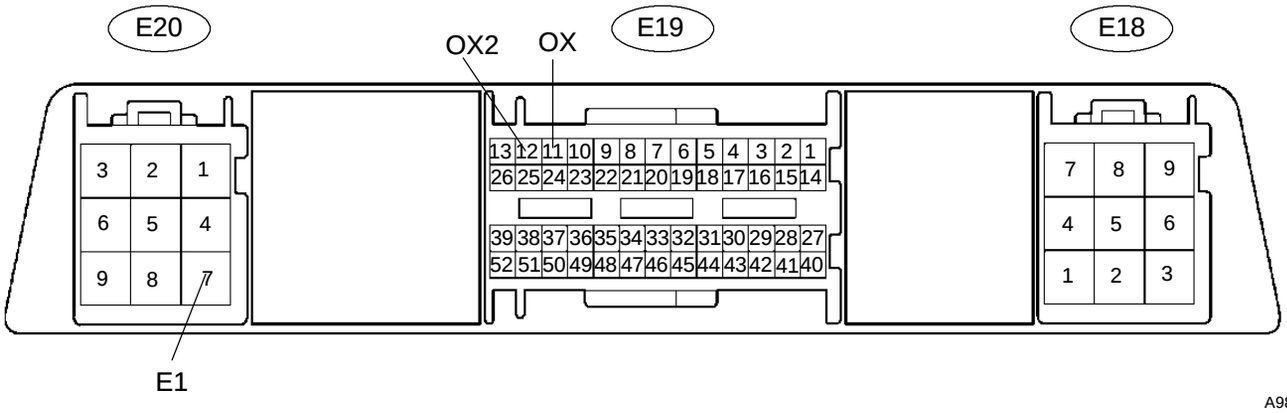
(b) When not using the intelligent tester II.
  (1) Connect the voltmeter tester to the terminals E15-22 (OX1A) and E14-5 (E1) and to terminals E13-23 (OX1B) and E14-5 (E1) of the ECM. (3ZZ-FE)
  (2) Connect the voltmeter tester to the terminals E19-11 (OX) and E20-7 (E1) and to terminals E19-12 (OX2) and E20-7 (E1) of the ECM. (4ZZ-FE)

CAUTION:
Connect test leads from the back side of the connector with the ECM connected.

ECM
3ZZ-FE:



4ZZ-FE:



(c) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 2 minutes.

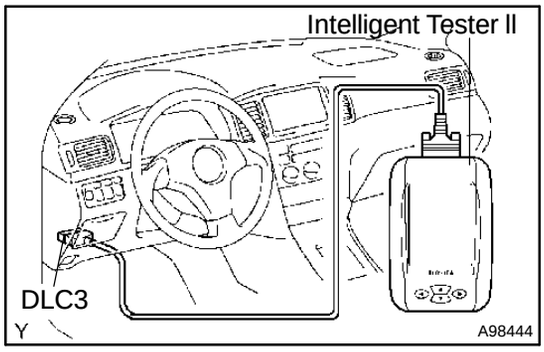
(d) Confirm that the voltage output varies between 0 V and 1 V with the engine speed at 2,500 rpm.

OK:

The voltage output oscillates more than 8 times in 10 seconds.

CAUTION:

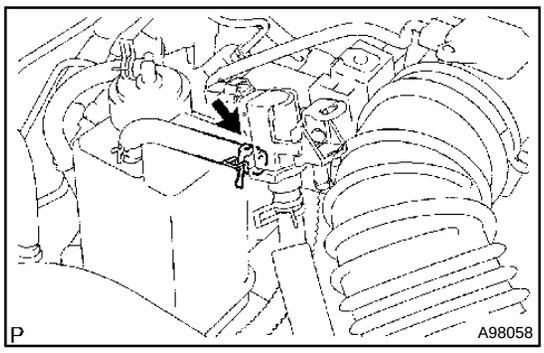
- **Perform the check immediately after warming the engine up.**
- **If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check the DTC No. (see page 3ZZ-FE: 05-28 , 4ZZ-FE: 05-226).**



2. INSPECT EVAPORATIVE EMISSION CONTROL SYSTEM

(a) Check the operation.

(1) Connect the intelligent tester II to the DLC3.



(2) After starting the engine, disconnect the fuel vapor feed hose shown in the illustration.

(3) Select the following menu items: Powertrain / Engine and ECT / Active Test / Purge VSV / ON.

(4) Check that a vacuum occurs in the VSV port.

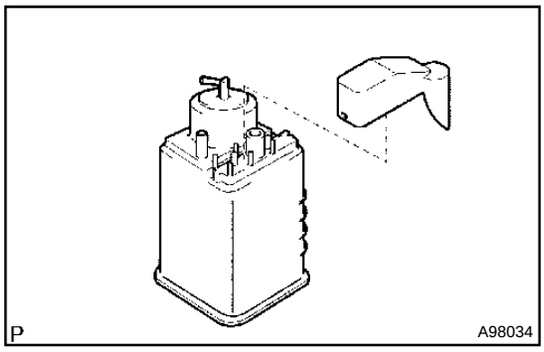
(5) Finish Active Test, then connect the fuel vapor feed hose.

(6) Select the following menu items: Powertrain / Engine and ECT / Data List / EVAP VSV.

(7) Warm the engine up and turn it off. Then, restart the engine and confirm that the VSV turns from OFF to ON within 60 seconds while the engine is idling.

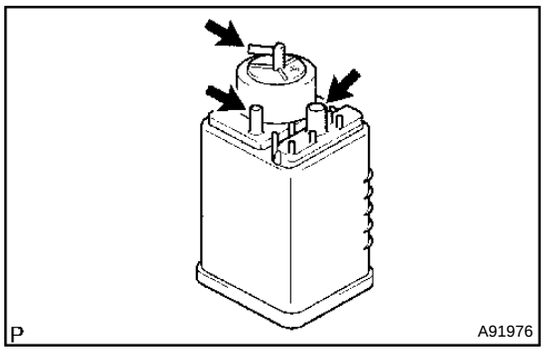
120G2-01

INSPECTION



1. INSPECT CHARCOAL CANISTER ASSY (TMC MADE)

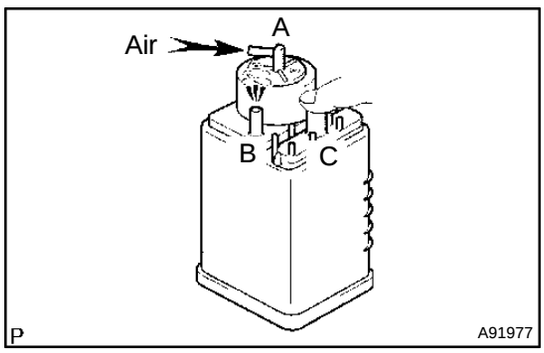
(a) Remove the cap from the charcoal canister.



(b) Check the appearance.

(1) Visually check whether the portions indicated with the arrows are cracked or damaged.

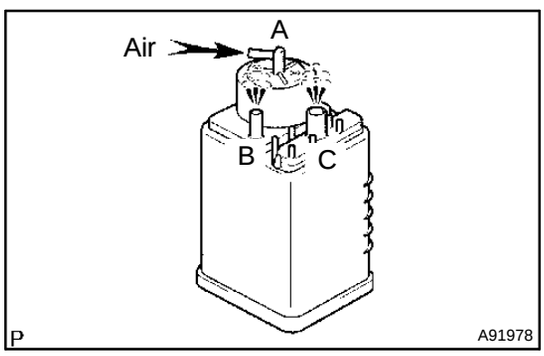
If necessary, replace the charcoal canister.



(c) Check the ventilation.

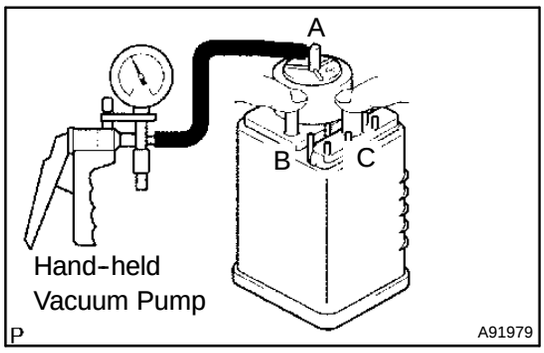
(1) Blow air 4.7 kPa (48 gf/cm^2, 0.68 psi) into the port A, then check that the air flows from the port B while holding the port C closed.

If the ventilation is not as specified, replace the charcoal canister.



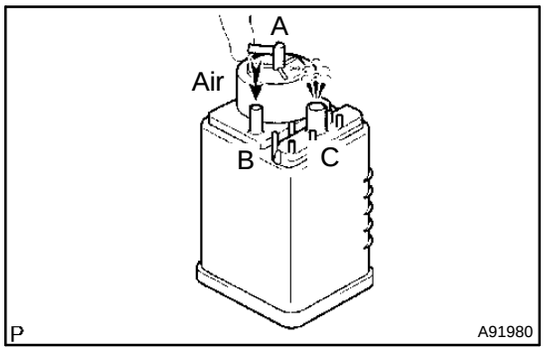
(2) Blow air 4.7 kPa (48 gf/cm^2, 0.68 psi) into the port A, then check that the air flows from the ports B and C.

If the ventilation is not as specified, replace the charcoal canister.



(3) Apply a vacuum 2.0 kPa (15 mmHg, 0.59 in.Hg) to the port A, then check that the vacuum does not decrease when the ports B and C are closed, and check that the vacuum decreases when the port B is released.

If the ventilation is not as specified, replace the charcoal canister.

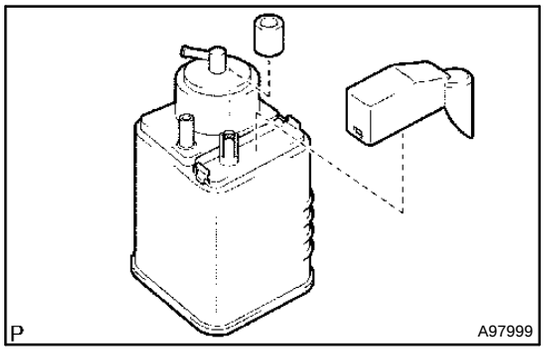


(d) Clean the filter in the canister.

(1) Clean the filter by blowing 19.6 kPa (0.2 kgf/cm^2, 2.8 psi) compressed air into the port B while holding the port A closed.

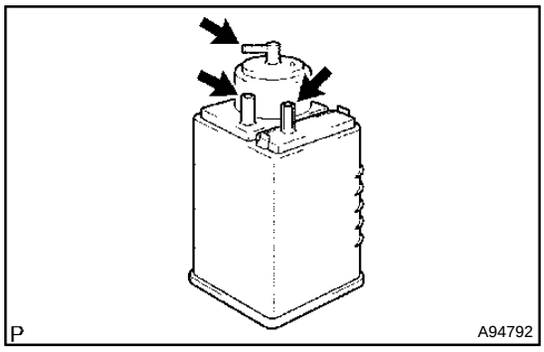
NOTICE:

- **Do not attempt to wash the charcoal canister.**
- **No activated carbon should come out.**



2. INSPECT CHARCOAL CANISTER ASSY (EXCEPT TMC MADE)

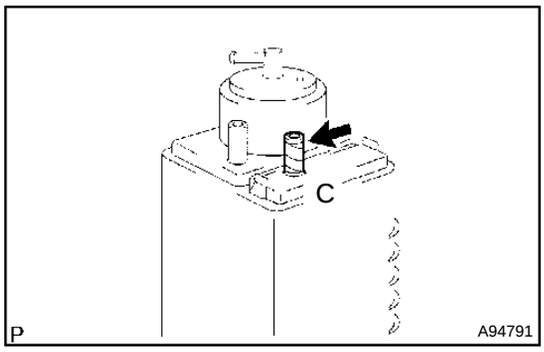
(a) Remove the cap and filter from the charcoal canister.



(b) Check the appearance.

(1) Visually check the charcoal canister whether the portions indicated with the arrows are cracked or damaged.

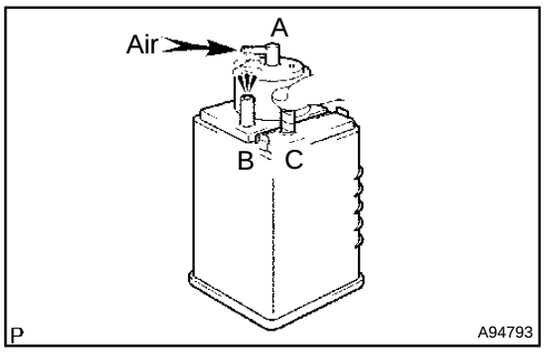
If necessary, replace the charcoal canister.



(c) Wrap the port C with tape.

HINT:

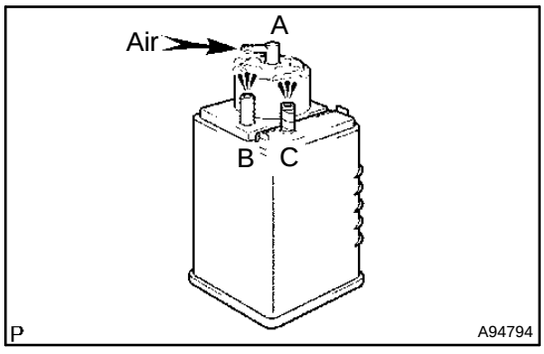
This prevents air leakage from the port C side.



(d) Check the ventilation.

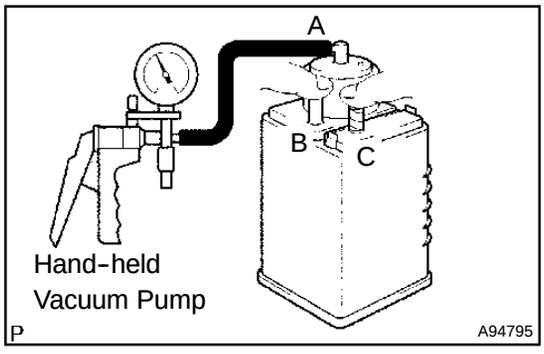
(1) Blow air 4.7 kPa (48 gf/cm^2, 0.68 psi) into the port A, then check that the air flows from the B while holding the port C closed.

If the ventilation is not as specified, replace the charcoal canister.



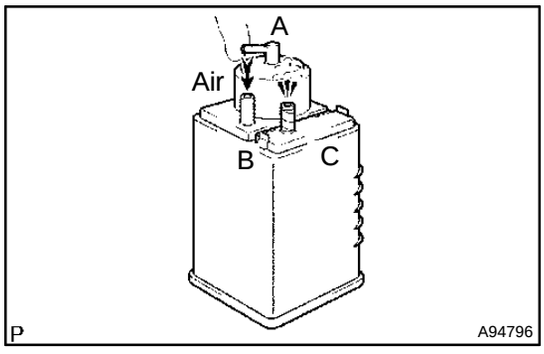
(2) Blow air 4.7 kPa (48 gf/cm^2, 0.68 psi) into the port A, then check that the air flows from the ports B and C.

If the ventilation is not as specified, replace the charcoal canister.



(3) Apply a vacuum 2.0 kPa (15 mmHg, 0.59 in.Hg) to the port A, then check that the vacuum does not decrease when the ports B and C are closed, and check that the vacuum decreases when the port B is released.

If the ventilation is not as specified, replace the charcoal canister.

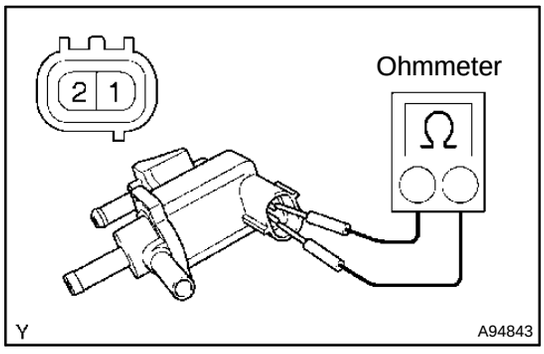


(e) Clean the filter in the canister.

(1) Clean the filter by blowing 19.6 kPa (0.2 kgf/cm^2, 2.8 psi) compressed air into the port B while holding the port A closed.

NOTICE:

- **Do not attempt to wash the charcoal canister.**
- **No activated carbon should come out.**



3. INSPECT VACUUM SWITCHING VALVE ASSY NO.1

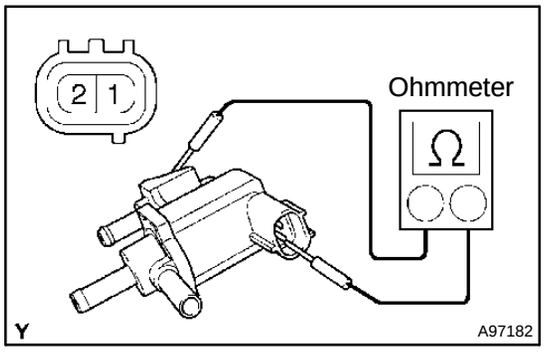
(a) Check the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)

If the resistance is not as specified, replace the vacuum switching valve No. 1.



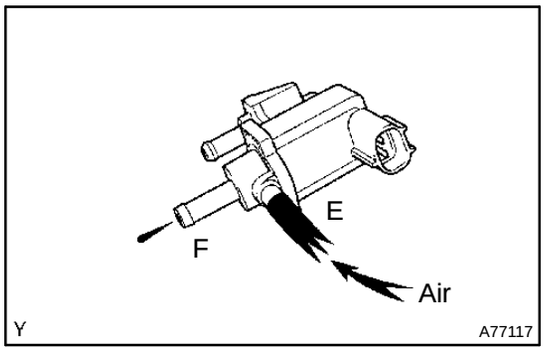
(b) Check the vacuum switching valve No. 1 for ground.

(1) Using an ohmmeter, check the resistance between each terminal and the body.

Standard:

Tester Connection	Specified Condition
1 – Body	10 MΩ or higher
2 – Body	10 MΩ or higher

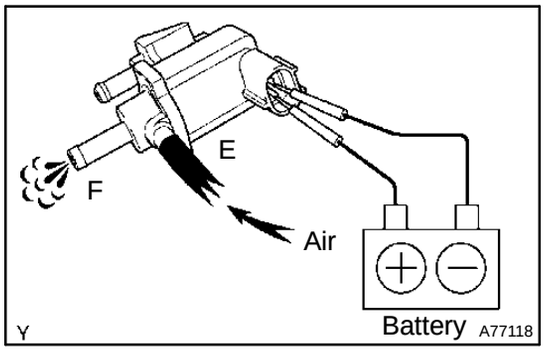
If the resistance is not as specified, replace the vacuum switching valve No. 1.



(c) Check the operation.

(1) Check that air does not flow from port E to port F.

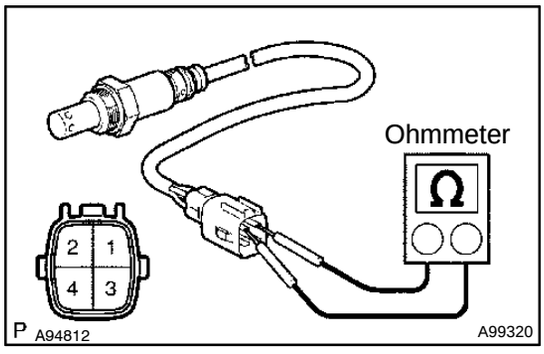
If the operation is not as specified, replace the vacuum switching valve No. 1.



(2) Apply battery voltage across the terminals.

(3) Check that air flows from port E to port F.

If the operation is not as specified, replace the vacuum switching valve No. 1.



4. INSPECT HEATED OXYGEN SENSOR (3ZZ-FE ENGINE TYPE)

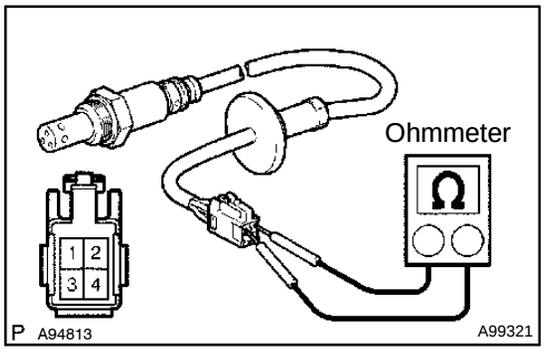
(a) Check the resistance. (Bank 1 Sensor 1)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (HT) – 2 (+B)	5 to 10 Ω at 20°C (68°F)
1 (HT) – 4 (E1)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.



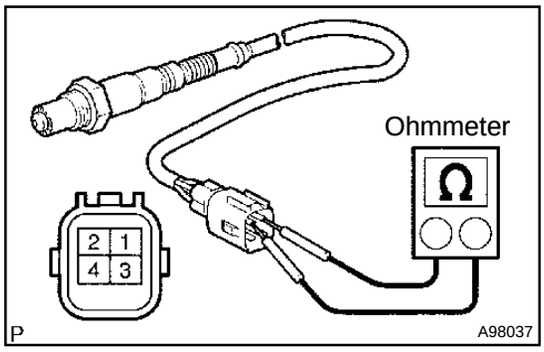
(b) Check the resistance. (Bank 1 Sensor 2)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (+B) - 2 (HT)	11 to 16 Ω at 20°C (68°F)
2 (HT) - 3 (E)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.



5. INSPECT HEATED OXYGEN SENSOR (4ZZ-FE ENGINE TYPE)

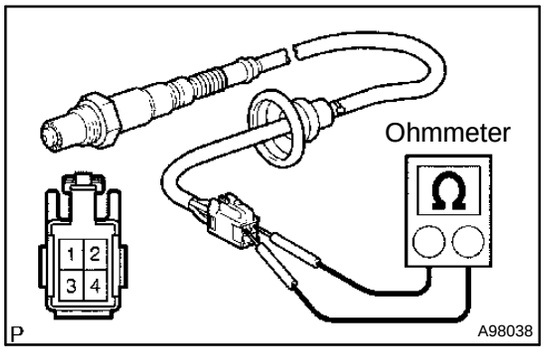
(a) Check the resistance. (Bank 1 Sensor 1)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	5 to 30 Ω at 25°C (77°F)
1 (HT) - 4 (E1)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.



(b) Check the resistance. (Bank 1 Sensor 2)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

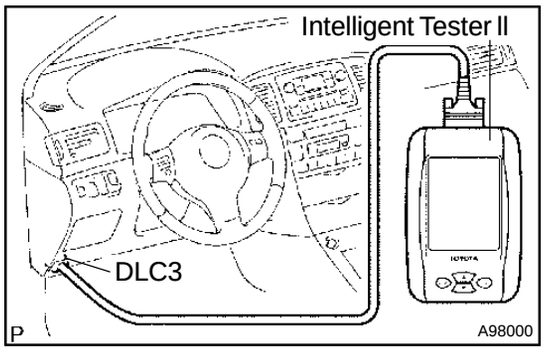
Tester Connection	Specified Condition
1 (+B) - 2 (HT2)	5 to 30 Ω at 25°C (77°F)
2 (HT2) - 3 (E1)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.

EMISSION CONTROL SYSTEM (2ZZ-GE)

ON-VEHICLE INSPECTION

120G3-01

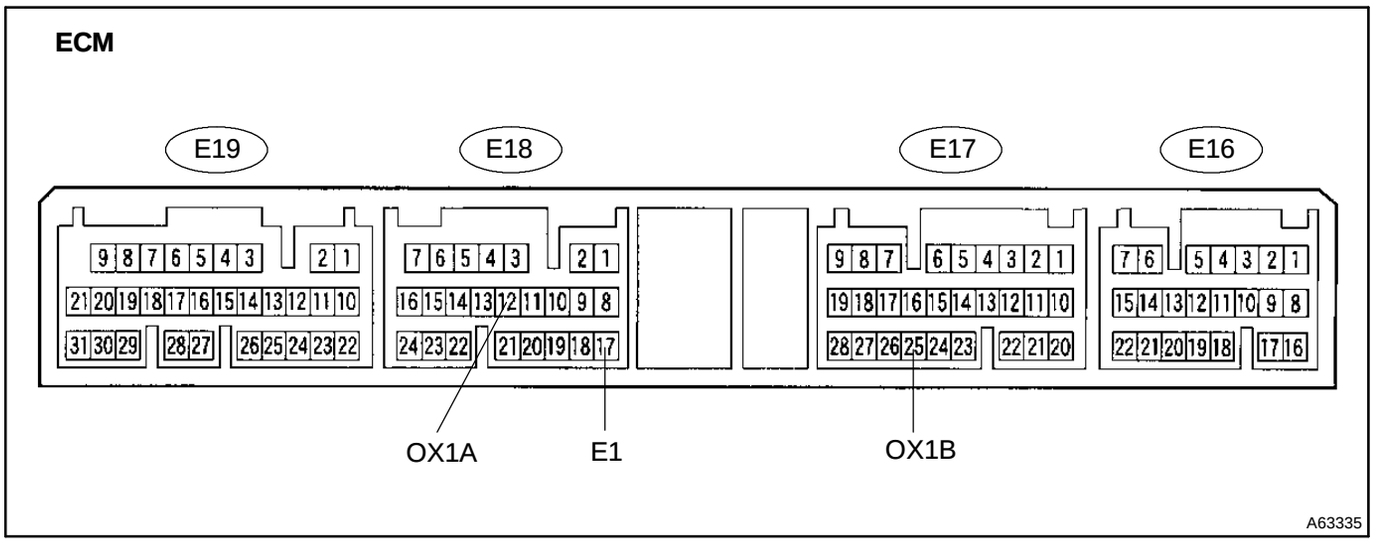


1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

(a) When using the intelligent tester II.
  (1) Connect the intelligent tester II to the DLC3.
  (2) Turn the ignition switch to ON.
  (3) Select the following menu items: Powertrain / Engine and ECT / Data List / O2S B1 S1 and O2S B1 S2.

(b) When not using the intelligent tester II.
  (1) Connect the voltmeter tester to the terminals E18-12 (OX1A) and E18-17 (E1) and to terminals E17-25 (OX1B) and E18-17 (E1) of the ECM.

CAUTION:
Connect test leads from the back side of the connector with the ECM connected.

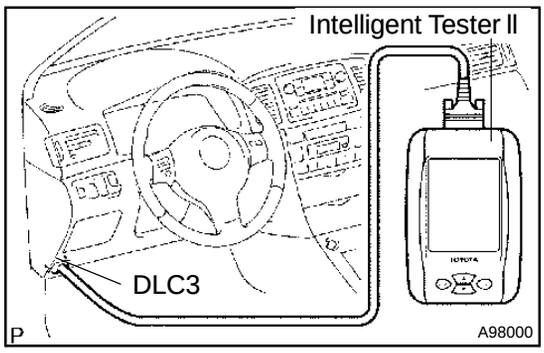


(c) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 2 minutes.

(d) Confirm that the voltage output varies between 0 V and 1 V with the engine speed at 2,500 rpm.
  OK:
  The voltage output oscillates more than 8 times in 10 seconds.

CAUTION:

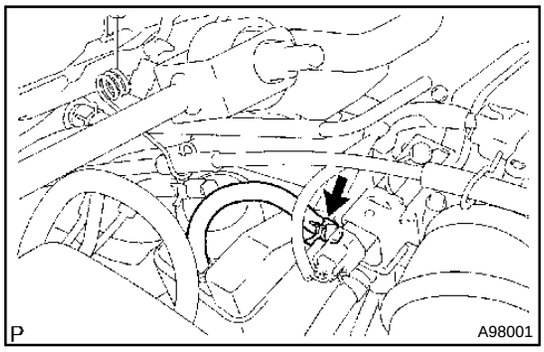
- **Perform the check immediately after warming the engine up.**
- **If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check the DTC No. (See pub No. RM925E on page 05 - 14).**



2. INSPECT EVAPORATIVE EMISSION CONTROL SYSTEM

(a) Check the operation.

(1) Connect the intelligent tester II to the DLC3.



(2) After starting the engine, disconnect the fuel vapor feed hose shown in the illustration.

(3) Select the following menu items: Powertrain / Engine and ECT / Active Test / Purge VSV / ON.

(4) Check that a vacuum occurs in the VSV port.

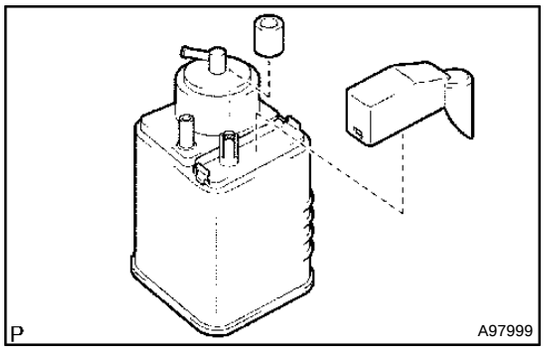
(5) Finish Active Test, then connect the fuel vapor feed hose.

(6) Select the following menu items: Powertrain / Engine and ECT / Data List / EVAP VSV.

(7) Warm the engine up and turn it off. Then, restart the engine and confirm that the VSV turns from OFF to ON within 60 seconds while the engine is idling.

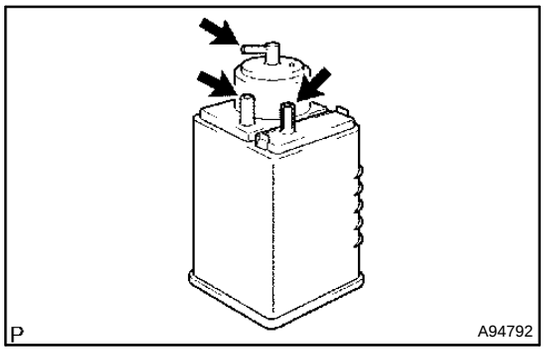
120G4-01

INSPECTION



1. INSPECT CHARCOAL CANISTER ASSY

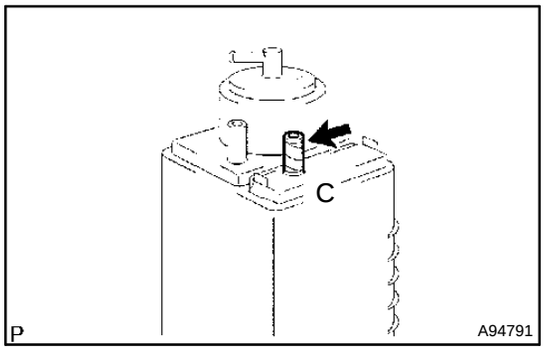
(a) Remove the cap and filter from the charcoal canister.



(b) Check the appearance.

(1) Visually check whether the portions indicated with the arrows are cracked or damaged.

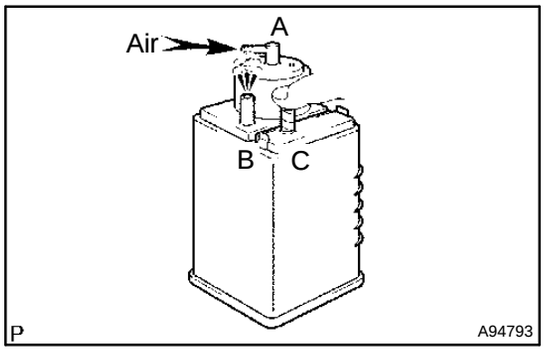
If necessary, replace the charcoal canister.



(c) Wrap the port C with tape.

HINT:

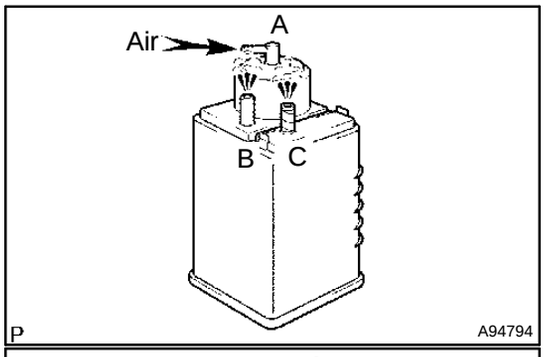
This prevents air leakage from the port C side.



(d) Check the ventilation.

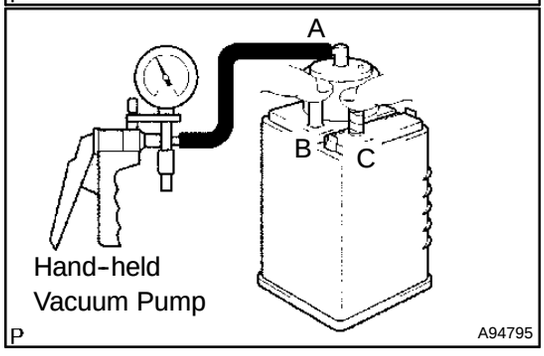
(1) Blow air 4.7 kPa (48 gf/cm^2, 0.68 psi) into the port A, then check that the air flows from the B while holding the port C closed.

If the ventilation is not as specified, replace the charcoal canister.



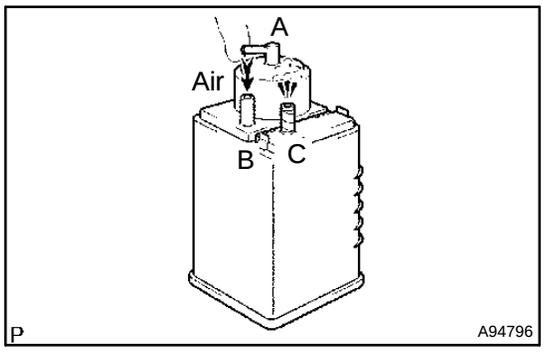
(2) Blow air 4.7 kPa 48 gf/cm^2, 0.68 psi into the port A, then check that the air flows from the ports B and C.

If the ventilation is not as specified, replace the charcoal canister.



(3) Apply vacuum 2.0 kPa (15 mmHg, 0.59 in.Hg) to the port A, then check that the vacuum does not decrease when the ports B and C are closed, and check that the vacuum decreases when the port B is released.

If the ventilation is not as specified, replace the charcoal canister.

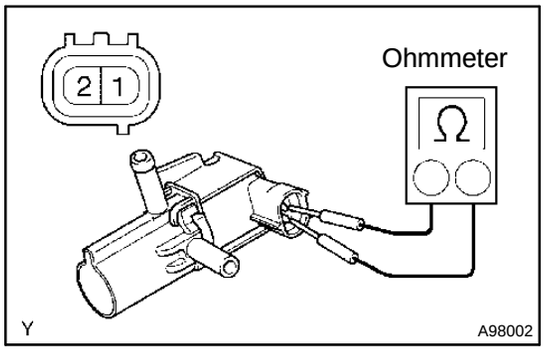


(e) Clean the filter in the canister.

(1) Clean the filter by blowing 19.6 kPa (0.2 kgf/cm^2, 2.8 psi) compressed air into the port B while holding the port A closed.

NOTICE:

- **Do not attempt to wash the charcoal canister.**
- **No activated carbon should come out.**



2. INSPECT VACUUM SWITCHING VALVE ASSY NO.1

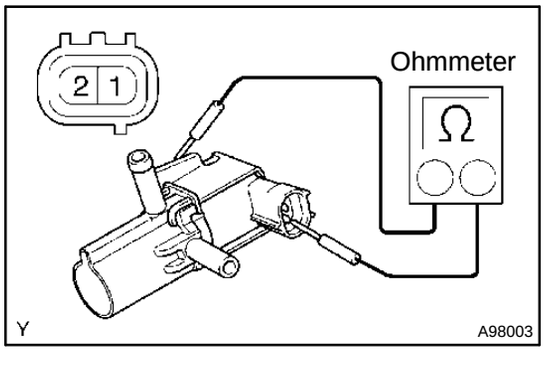
(a) Check the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)

If the resistance is not as specified, replace the vacuum switching valve No. 1.



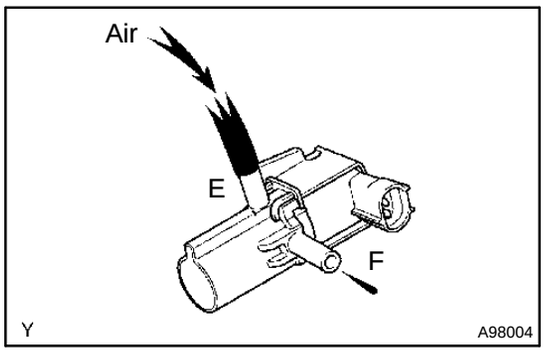
(b) Check the vacuum switching valve No. 1 for ground.

(1) Using an ohmmeter, check the resistance between each terminal and the body.

Standard:

Tester Connection	Specified Condition
1 - Body	10 MΩ or higher
2 - Body	10 MΩ or higher

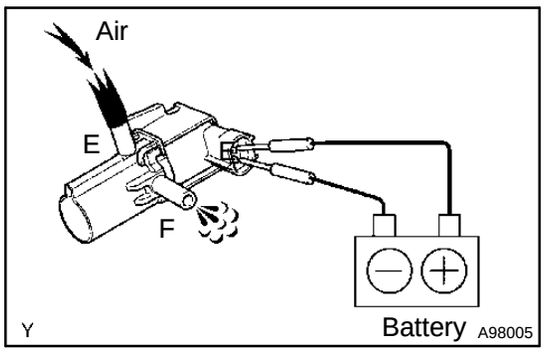
If the resistance is not as specified , replace the vacuum switching valve No. 1.



(c) Check the operation.

(1) Check that air does not flow from port E to port F.

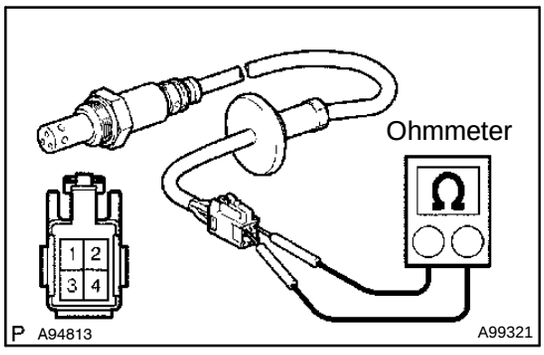
If the operation is not as specified, replace the vacuum switching valve No. 1.



(2) Apply battery voltage across the terminals.

(3) Check that air flows from port E to port F.

If the operation is not as specified, replace the vacuum switching valve No. 1.



3. INSPECT HEATED OXYGEN SENSOR

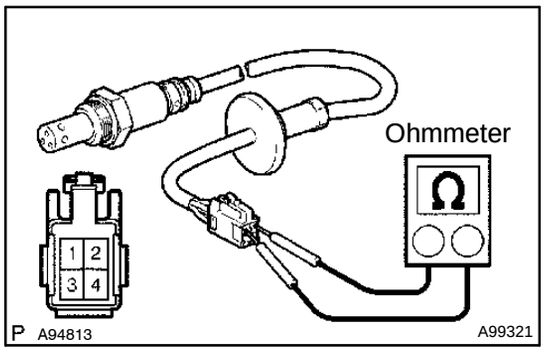
(a) Check the resistance. (Bank 1 Sensor 1)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (+B) - 2 (HT)	5 to 10 Ω at 20°C (68°F)
1 (HT) - 3 (E)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.



(b) Check the resistance. (Bank 1 Sensor 2)

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (+B) - 2 (HT)	11 to 16 Ω at 20°C (68°F)
2 (HT) - 3 (E)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.

ENGINE MECHANICAL

PARTIAL ENGINE ASSY
(3ZZ-FE/4ZZ-FE) 14-1
COMPONENTS 14-1/11
REPLACEMENT 14-12/31
CYLINDER HEAD GASKET
(3ZZ-FE/4ZZ-FE) 14-32
COMPONENTS 14-32/37
REPLACEMENT 14-38/55
VALVE CLEARANCE (2ZZ-GE) 14-56
ADJUSTMENT 14-56/61
CHAIN SUB-ASSY (2ZZ-GE) 14-62
COMPONENTS 14-62/65
REPLACEMENT 14-66/74
CAMSHAFT (2ZZ-GE) 14-75
COMPONENTS 14-75/77
REPLACEMENT 14-78/90
CYLINDER HEAD GASKET (2ZZ-GE) 14-91
COMPONENTS 14-91/96
REPLACEMENT 14-97/103

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

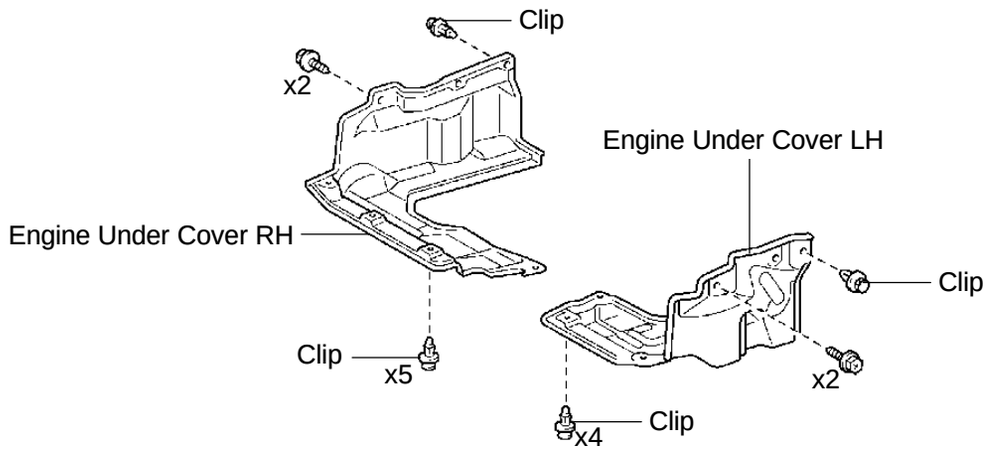
NOTE: The above pages contain only the points which differ from the above listed manual.

PARTIAL ENGINE ASSY (3ZZ-FE/4ZZ-FE)

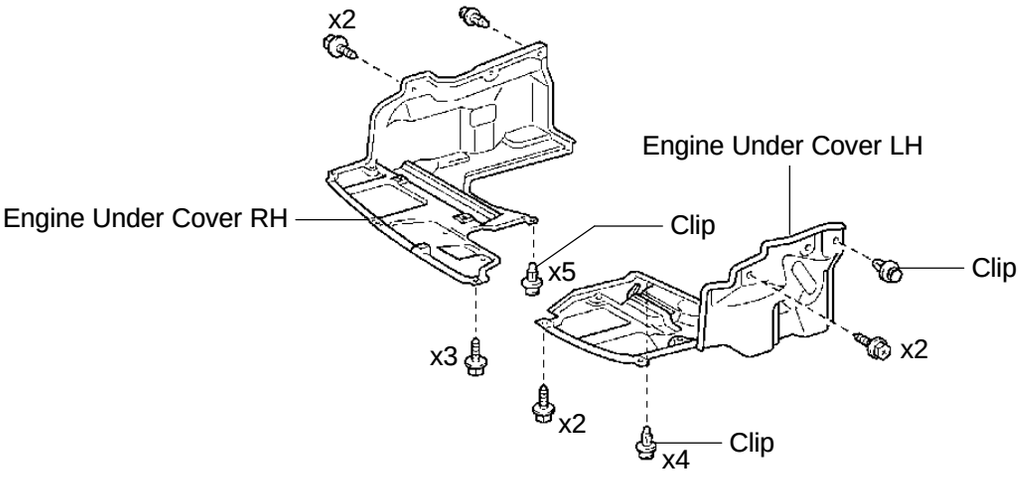
141XE-01

COMPONENTS

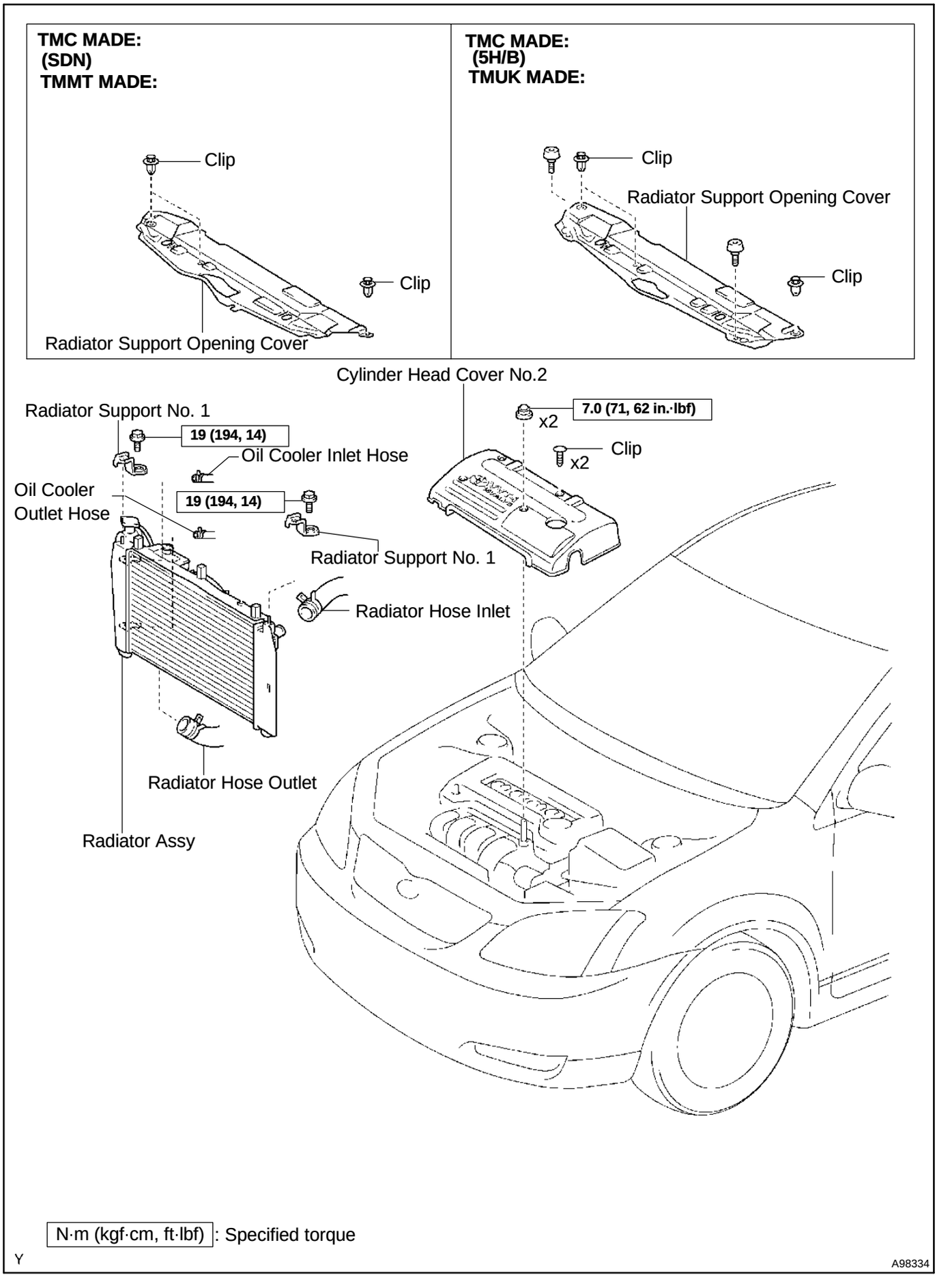
TMC MADE:

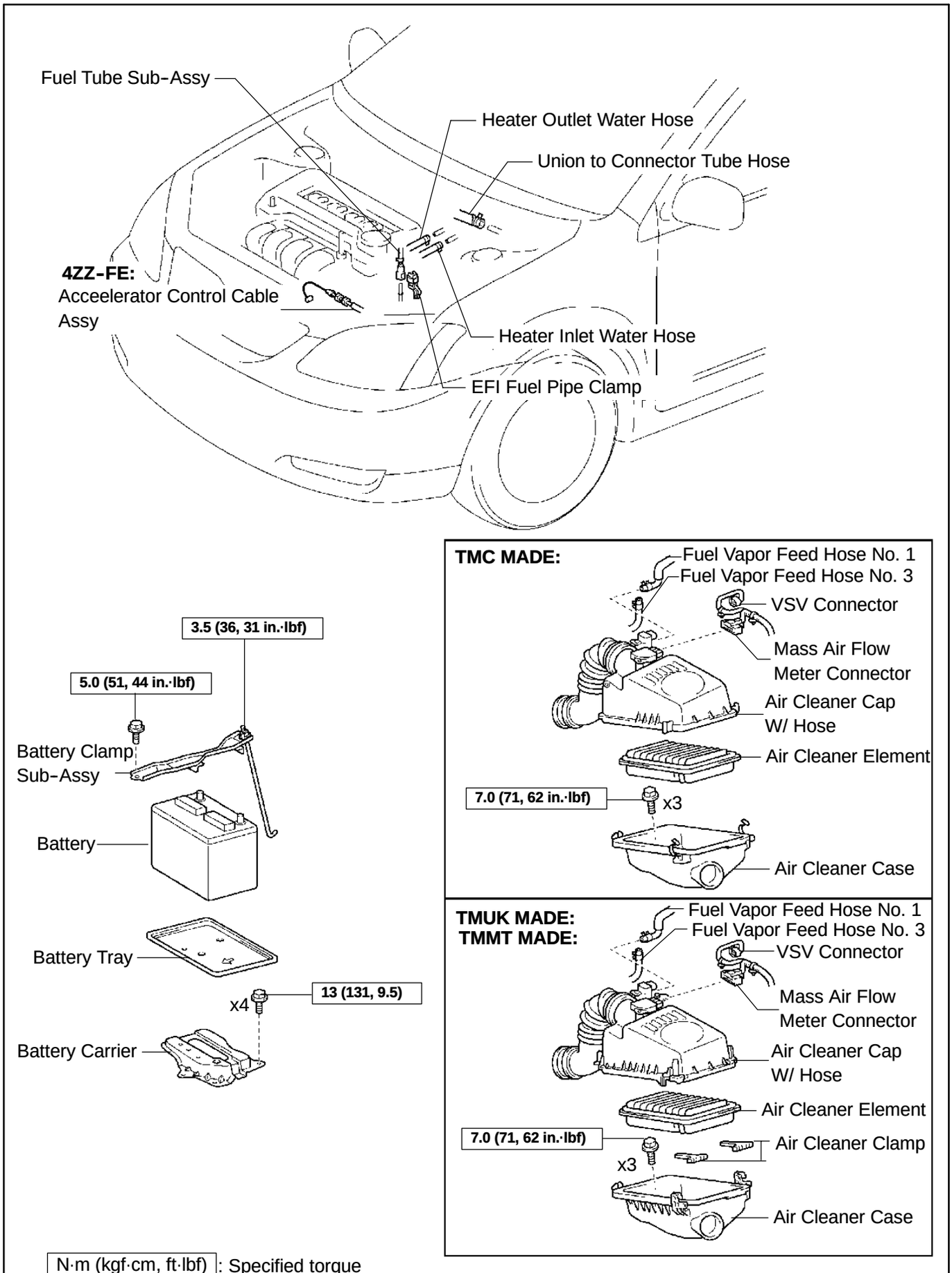


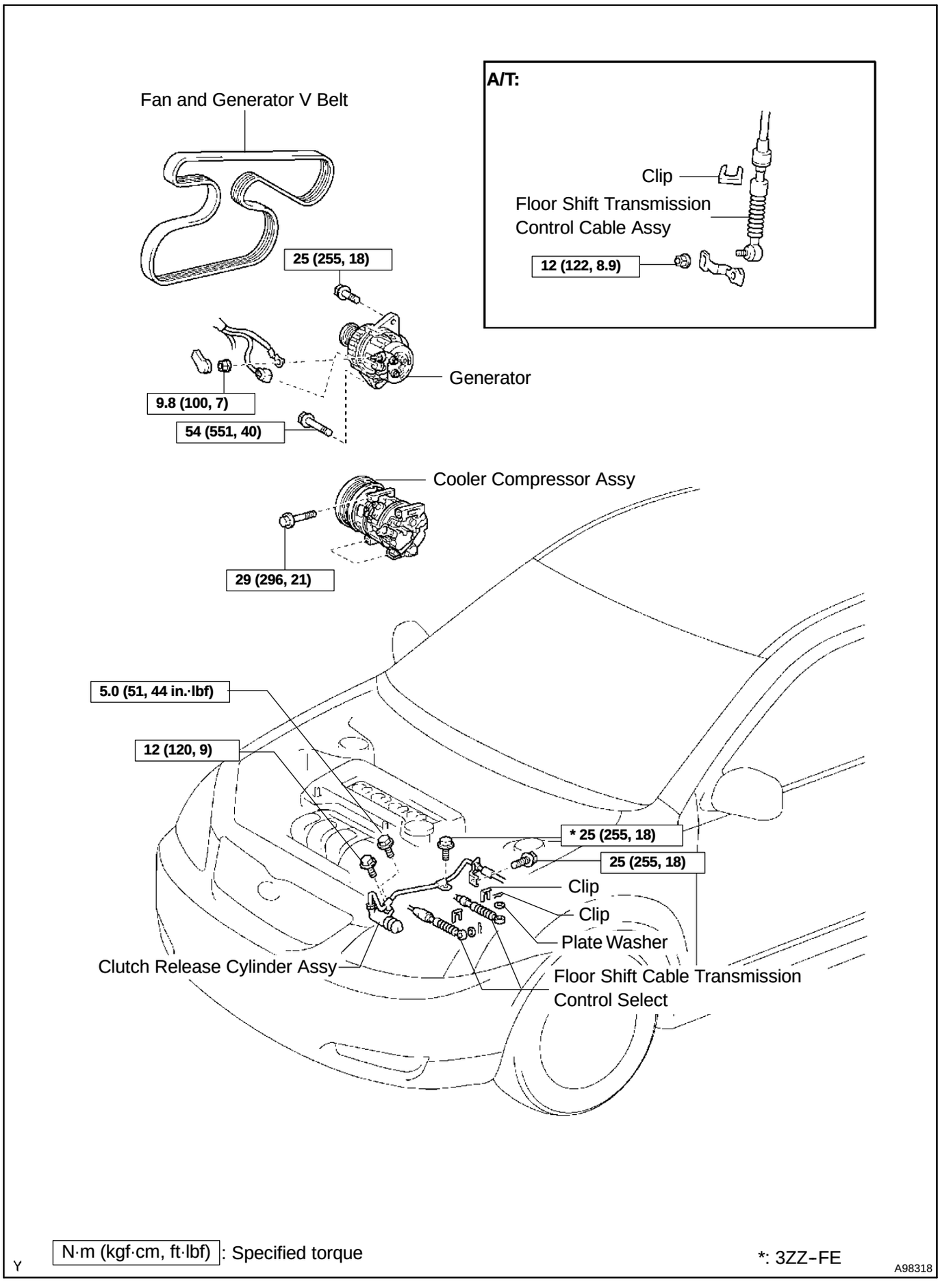
TMUK MADE:
TMMT MADE:

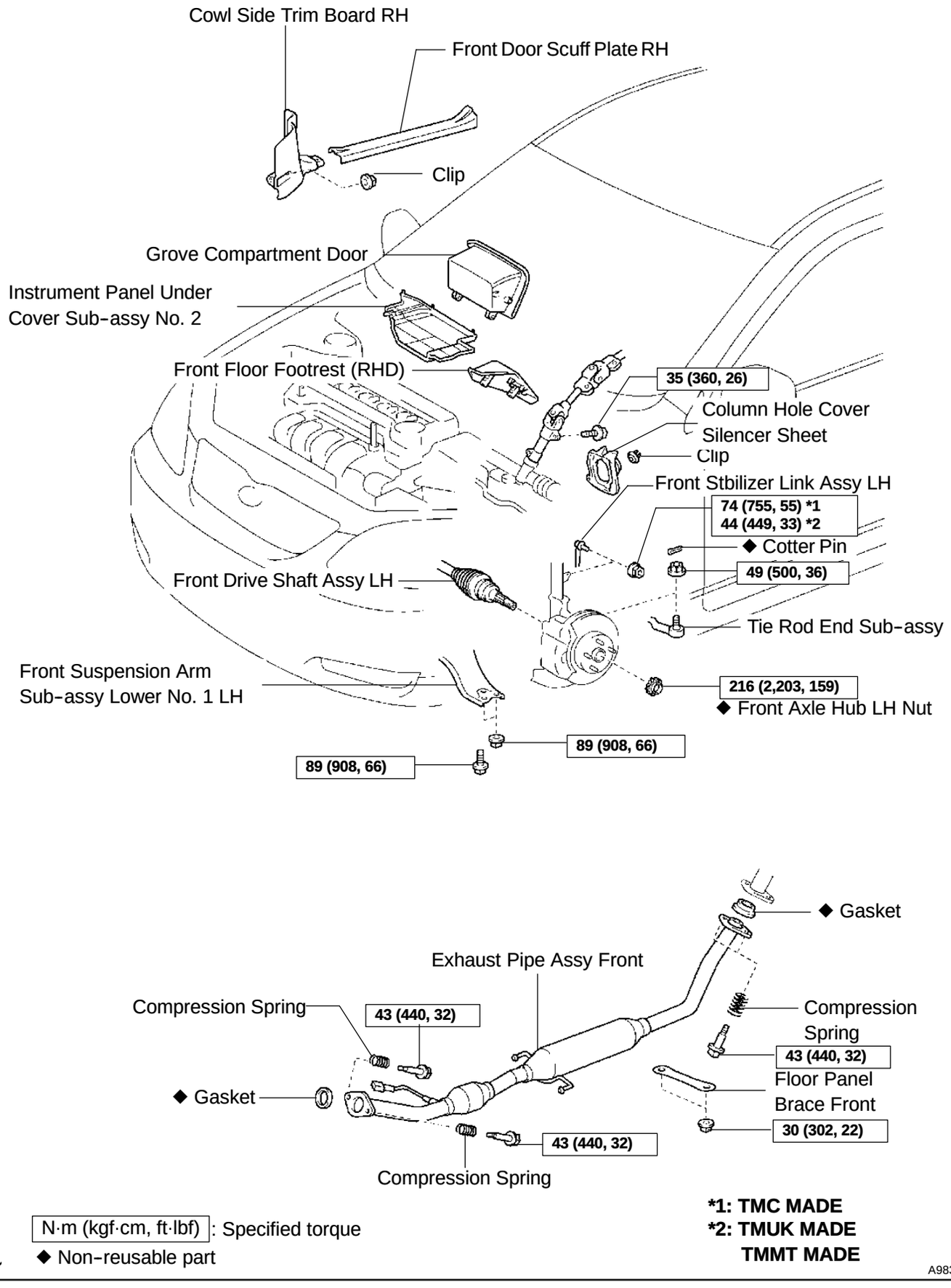


A98322

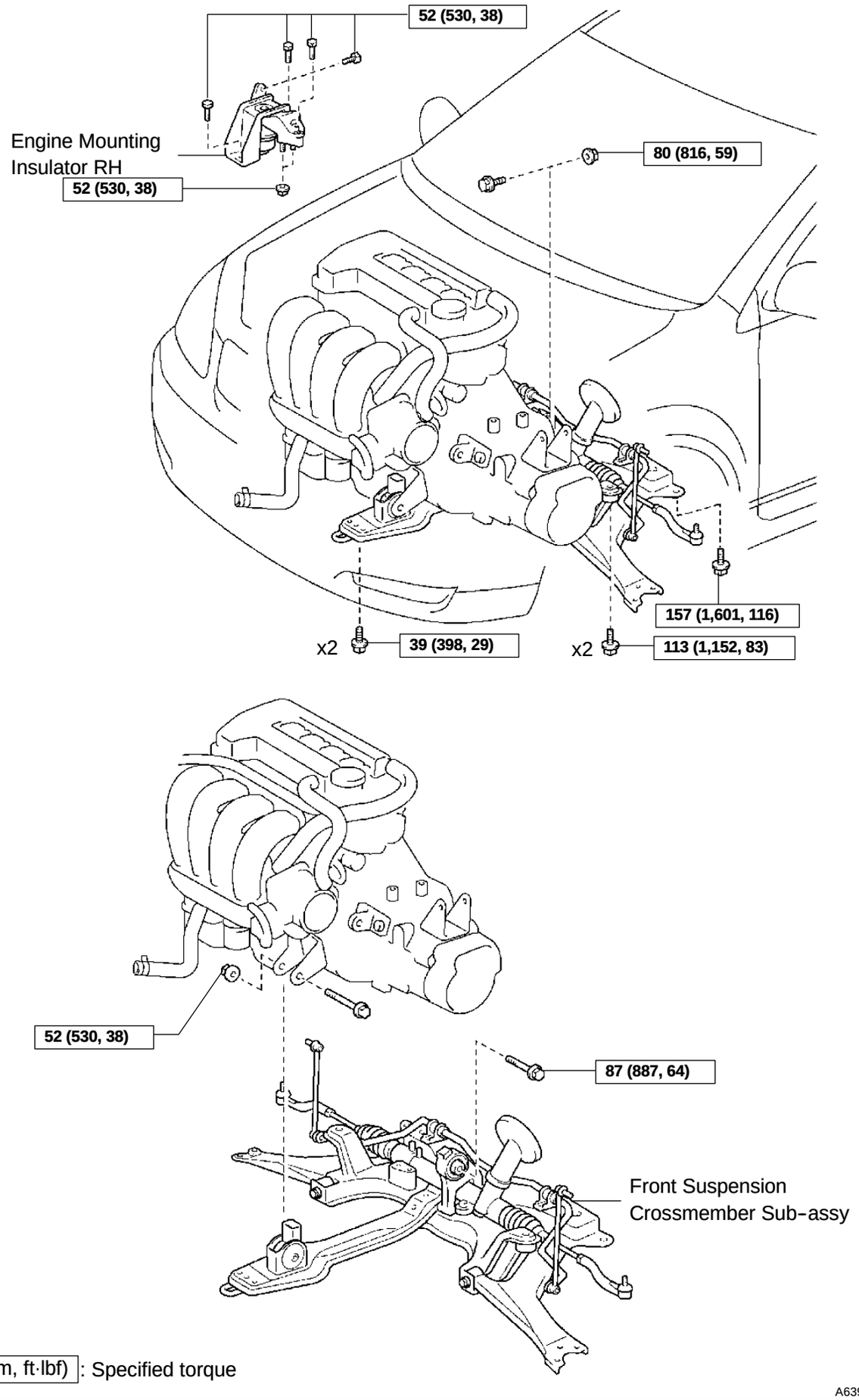

TMC MADE:
(SDN)
TMMT MADE:
Clip
Clip
Radiator Support Opening Cover
TMC MADE:
(5H/B)
TMUK MADE:
Clip
Radiator Support Opening Cover
Clip
Cylinder Head Cover No.2
Radiator Support No. 1
19 (194, 14)
Oil Cooler Inlet Hose
Oil Cooler
Outlet Hose
19 (194, 14)
Radiator Support No. 1
7.0 (71, 62 in.·lbf)
x2
Clip
x2
Radiator Hose Inlet
Radiator Hose Outlet
Radiator Assy
N·m (kgf·cm, ft·lbf): Specified torque
Y
A98334


Fuel Tube Sub-Assy
Heater Outlet Water Hose
Union to Connector Tube Hose
4ZZ-FE:
Acceelerator Control Cable Assy
Heater Inlet Water Hose
EFI Fuel Pipe Clamp
TMC MADE:
Fuel Vapor Feed Hose No. 1
Fuel Vapor Feed Hose No. 3
VSV Connector
Mass Air Flow Meter Connector
Air Cleaner Cap W/ Hose
Air Cleaner Element
7.0 (71, 62 in.·lbf)
x3
Air Cleaner Case
TMUK MADE:
TMMT MADE:
Fuel Vapor Feed Hose No. 1
Fuel Vapor Feed Hose No. 3
VSV Connector
Mass Air Flow Meter Connector
Air Cleaner Cap W/ Hose
Air Cleaner Element
7.0 (71, 62 in.·lbf)
Air Cleaner Clamp
x3
Air Cleaner Case
3.5 (36, 31 in.·lbf)
5.0 (51, 44 in.·lbf)
Battery Clamp Sub-Assy
Battery
Battery Tray
x4
13 (131, 9.5)
Battery Carrier
N·m (kgf·cm, ft·lbf): Specified torque
Y
A98324


A/T:
Clip
Floor Shift Transmission
Control Cable Assy
12 (122, 8.9)
Fan and Generator V Belt
25 (255, 18)
Generator
9.8 (100, 7)
54 (551, 40)
Cooler Compressor Assy
29 (296, 21)
5.0 (51, 44 in.·lbf)
12 (120, 9)
* 25 (255, 18)
25 (255, 18)
Clip
Clip
Plate Washer
Clutch Release Cylinder Assy
Floor Shift Cable Transmission
Control Select
N·m (kgf·cm, ft·lbf): Specified torque
*: 3ZZ-FE
A98318

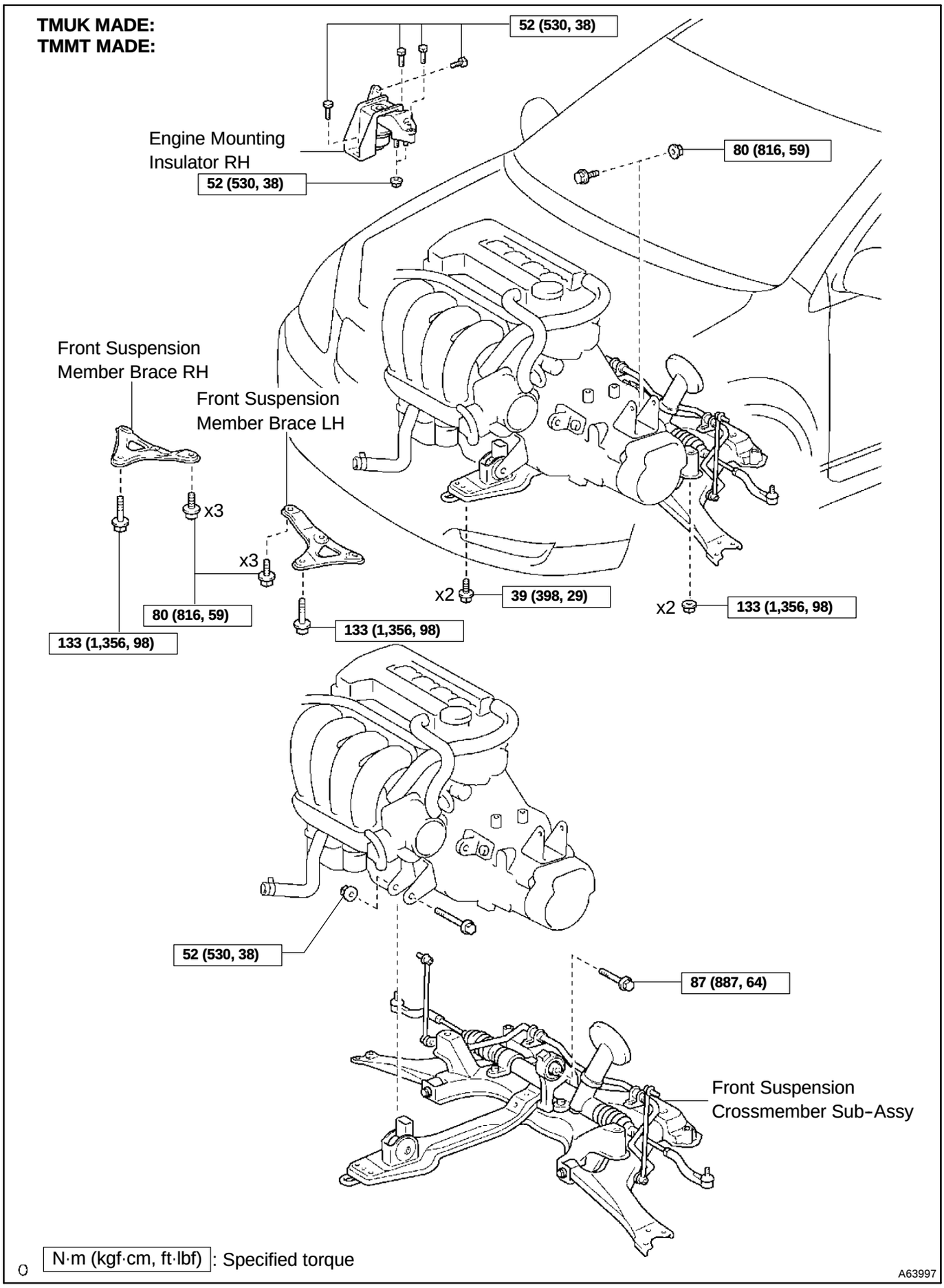

Cowl Side Trim Board RH
Front Door Scuff Plate RH
Clip
Grove Compartment Door
Instrument Panel Under Cover Sub-assy No. 2
Front Floor Footrest (RHD)
35 (360, 26)
Column Hole Cover
Silencer Sheet
Clip
Front Stbilizer Link Assy LH
74 (755, 55) *1
44 (449, 33) *2
◆ Cotter Pin
49 (500, 36)
Front Drive Shaft Assy LH
Tie Rod End Sub-assy
Front Suspension Arm Sub-assy Lower No. 1 LH
216 (2,203, 159)
◆ Front Axle Hub LH Nut
89 (908, 66)
89 (908, 66)
◆ Gasket
Exhaust Pipe Assy Front
Compression Spring
43 (440, 32)
Compression Spring
43 (440, 32)
Floor Panel Brace Front
◆ Gasket
30 (302, 22)
43 (440, 32)
Compression Spring
*1: TMC MADE
*2: TMUK MADE
TMMT MADE
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Y
A98319

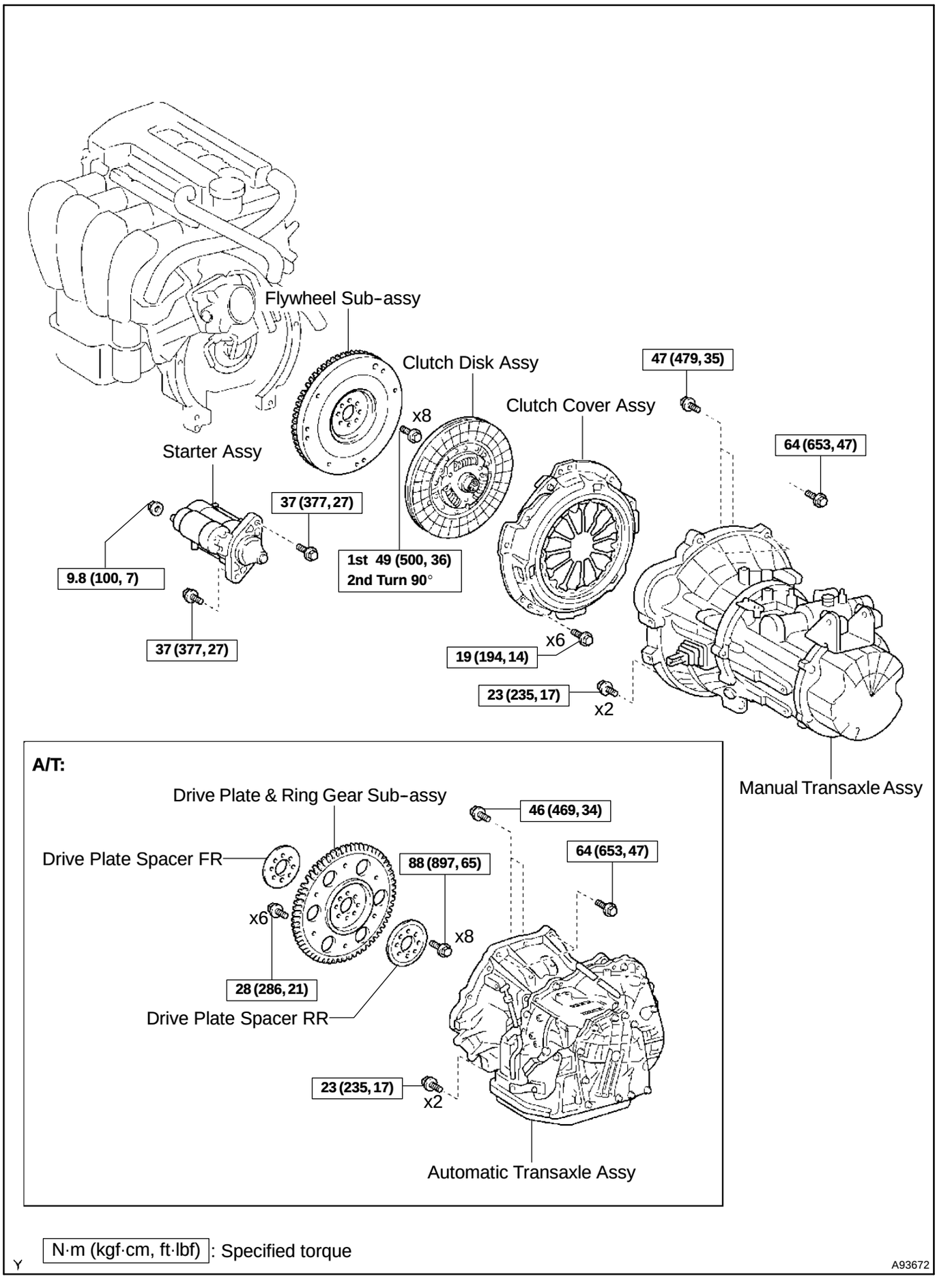
TMC MADE:



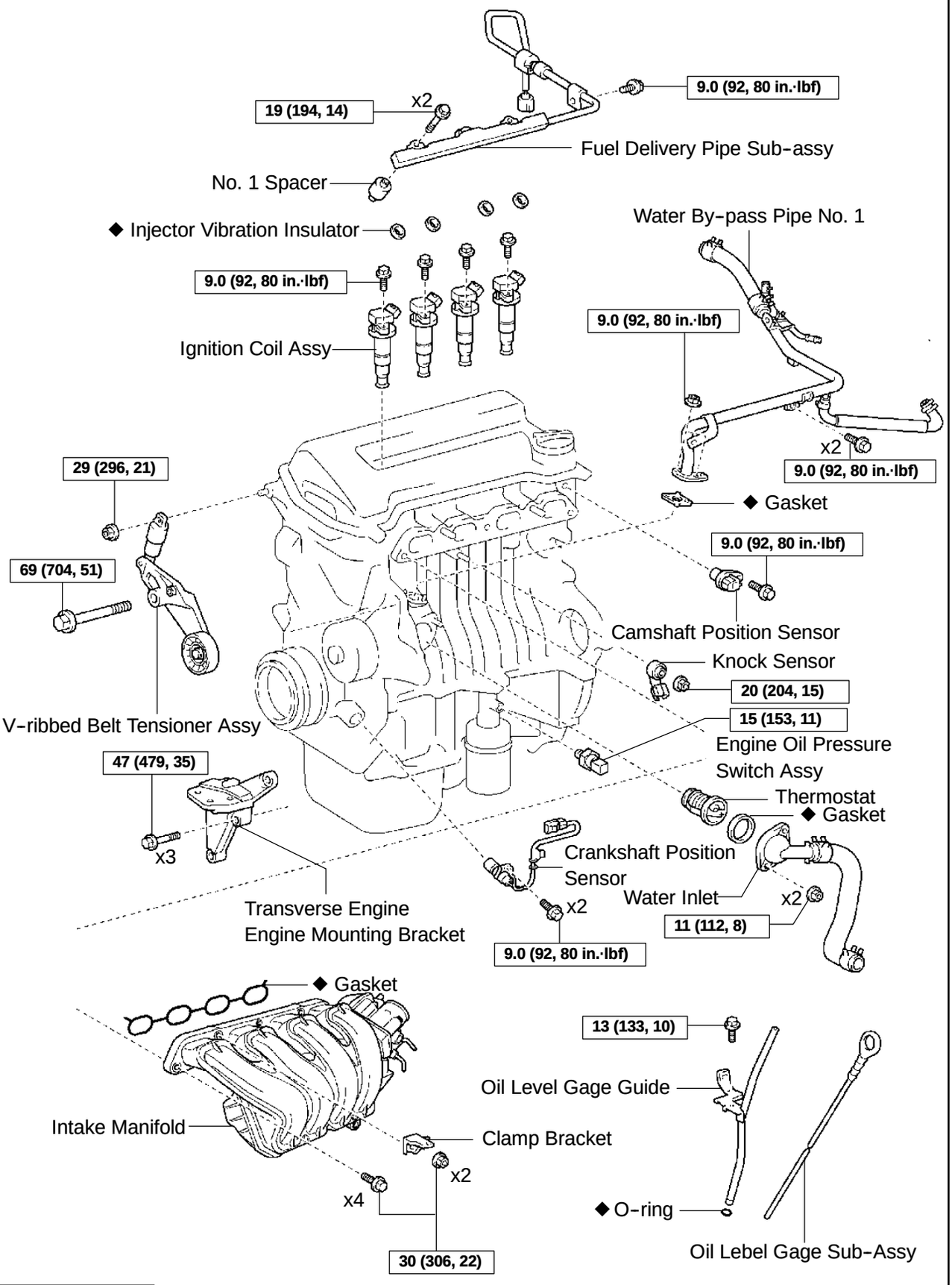
N·m (kgf·cm, ft·lbf): Specified torque

A63998


TMUK MADE:
TMMT MADE:
52 (530, 38)
Engine Mounting Insulator RH
52 (530, 38)
80 (816, 59)
Front Suspension Member Brace RH
Front Suspension Member Brace LH
x3
x3
80 (816, 59)
133 (1,356, 98)
133 (1,356, 98)
x2
39 (398, 29)
x2
133 (1,356, 98)
52 (530, 38)
87 (887, 64)
Front Suspension Crossmember Sub–Assy
N·m (kgf·cm, ft·lbf): Specified torque
A63997


Flywheel Sub-assy
Clutch Disk Assy
x8
47 (479, 35)
Clutch Cover Assy
64 (653, 47)
Starter Assy
37 (377, 27)
9.8 (100, 7)
1st 49 (500, 36)
2nd Turn 90°
37 (377, 27)
x6
19 (194, 14)
23 (235, 17)
x2
Manual Transaxle Assy
A/T:
Drive Plate & Ring Gear Sub-assy
46 (469, 34)
Drive Plate Spacer FR
88 (897, 65)
64 (653, 47)
x6
x8
28 (286, 21)
Drive Plate Spacer RR
23 (235, 17)
x2
Automatic Transaxle Assy
N·m (kgf·cm, ft·lbf): Specified torque
Y
A93672

3ZZ-FE:

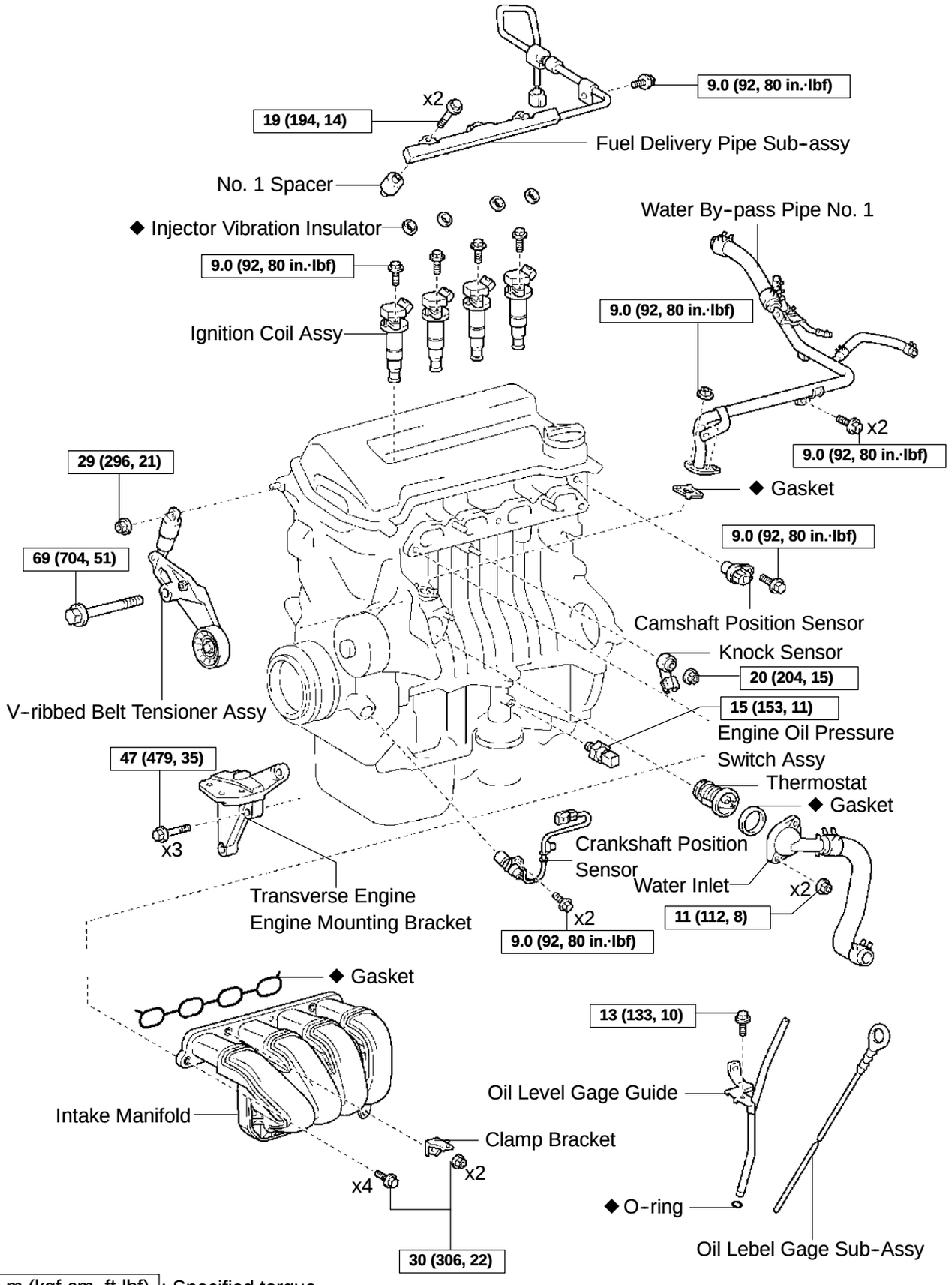


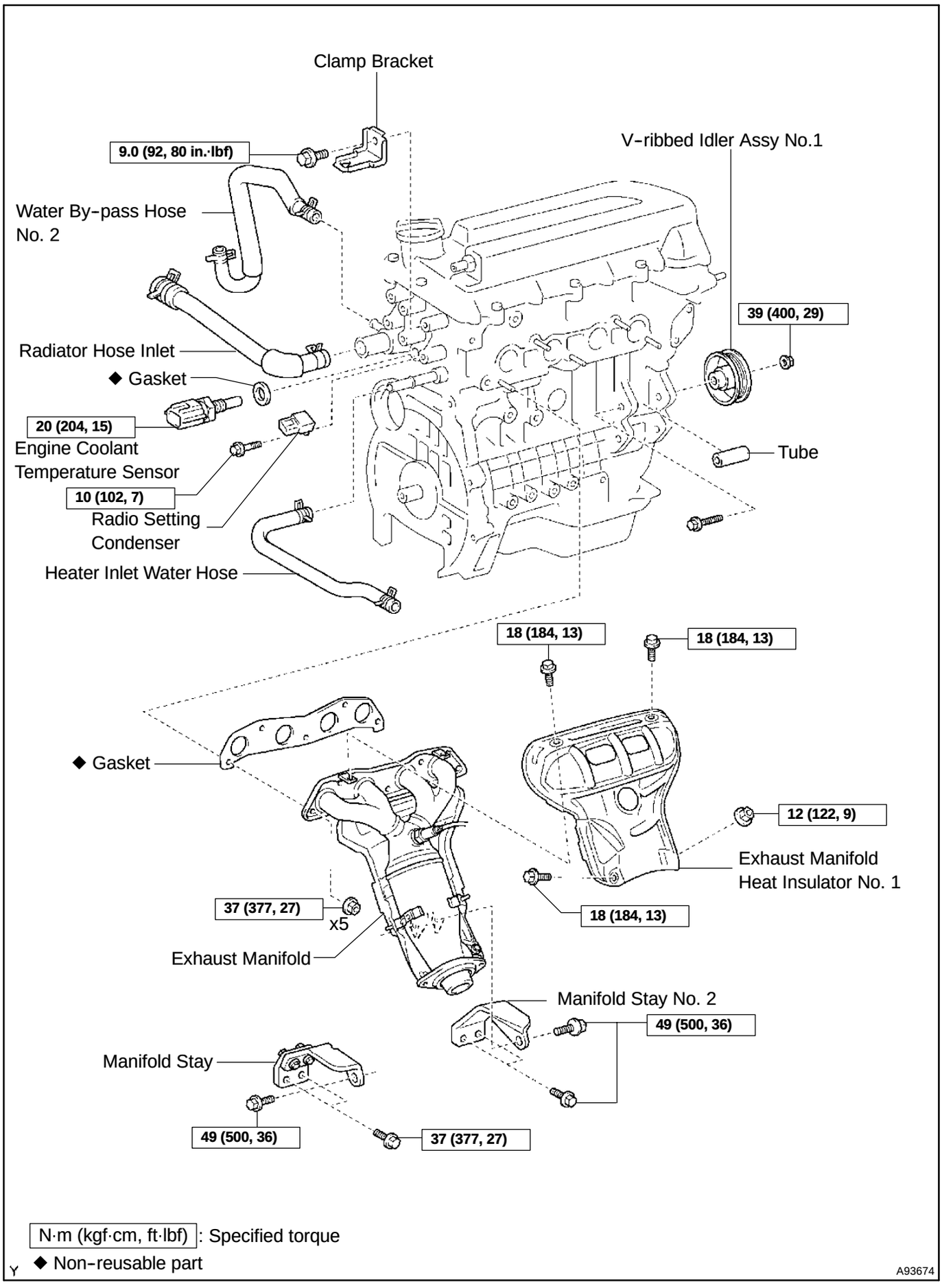
N·m (kgf·cm, ft·lbf): Specified torque

◆ Non-reusable part

A98320

4ZZ-FE:

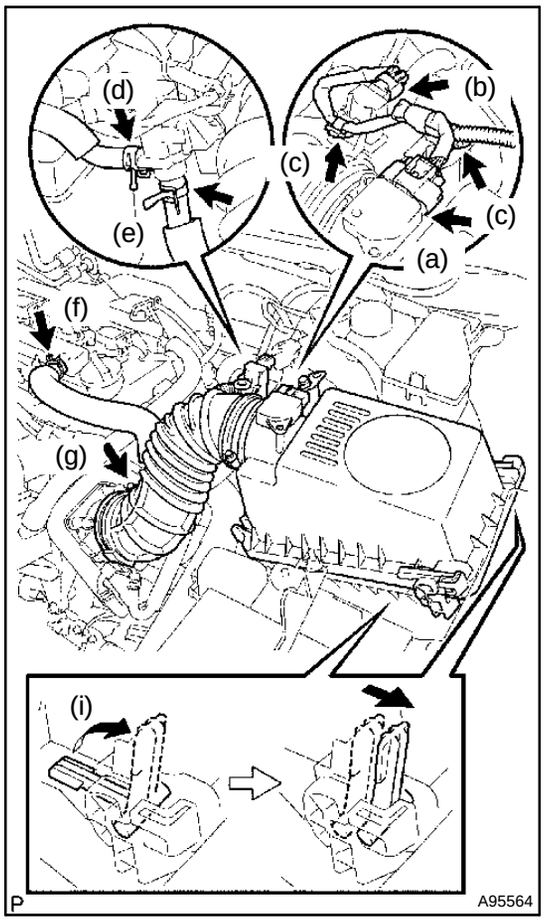

9.0 (92, 80 in.·lbf)
x2
19 (194, 14)
Fuel Delivery Pipe Sub-assy
No. 1 Spacer
◆ Injector Vibration Insulator
Water By-pass Pipe No. 1
9.0 (92, 80 in.·lbf)
Ignition Coil Assy
9.0 (92, 80 in.·lbf)
x2
9.0 (92, 80 in.·lbf)
29 (296, 21)
◆ Gasket
69 (704, 51)
9.0 (92, 80 in.·lbf)
Camshaft Position Sensor
Knock Sensor
20 (204, 15)
V-ribbed Belt Tensioner Assy
15 (153, 11)
Engine Oil Pressure
Switch Assy
47 (479, 35)
Thermostat
◆ Gasket
x3
Crankshaft Position
Sensor
Water Inlet
x2
Transverse Engine
Engine Mounting Bracket
x2
11 (112, 8)
9.0 (92, 80 in.·lbf)
◆ Gasket
13 (133, 10)
Oil Level Gage Guide
Intake Manifold
Clamp Bracket
x2
x4
◆ O-ring
30 (306, 22)
Oil Lebel Gage Sub-Assy
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A93873


Clamp Bracket
9.0 (92, 80 in.·lbf)
V-ribbed Idler Assy No.1
Water By-pass Hose No. 2
39 (400, 29)
Radiator Hose Inlet
◆ Gasket
20 (204, 15)
Engine Coolant Temperature Sensor
Tube
10 (102, 7)
Radio Setting Condenser
Heater Inlet Water Hose
18 (184, 13)
18 (184, 13)
◆ Gasket
12 (122, 9)
Exhaust Manifold Heat Insulator No. 1
37 (377, 27)
x5
18 (184, 13)
Exhaust Manifold
Manifold Stay No. 2
49 (500, 36)
Manifold Stay
49 (500, 36)
37 (377, 27)
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A93674

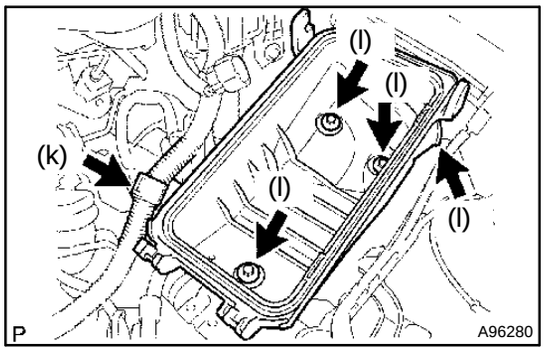
141XF-01

REPLACEMENT

1. DISCHARGE FUEL SYSTEM PRESSURE **(See Pub. No. RM925E on page 11-1)**
2. REMOVE FRONT WHEELS
3. REMOVE ENGINE UNDER COVER RH
4. REMOVE ENGINE UNDER COVER LH
5. DRAIN ENGINE COOLANT **(See page 16-8)**
6. REMOVE CYLINDER HEAD COVER NO.2
7. REMOVE RADIATOR SUPPORT OPENING COVER
8. REMOVE RADIATOR ASSY **(See Pub. No. RM925E on page 16-26)**
9. REMOVE BATTERY
10. REMOVE BATTERY CARRIER
(a) Remove the 4 bolts and battery carrier.



11. REMOVE AIR CLEANER ASSY
(a) Disconnect the mass air flow meter connector.
(b) Disconnect the VSV connector.
(c) Remove the 2 wire harness clamps.
(d) Disconnect fuel vapor feed hose No. 1 from the VSV.
(e) Disconnect fuel vapor feed hose No. 3 from the VSV.
(f) Disconnect ventilation hose No. 1 from the cylinder head cover. (3ZZ-FE ENGINE TYPE)
(g) Loosen the hose clamp bolt, then disconnect the air cleaner hose.
(h) Remove the 2 air cleaner clamps. (TMC MADE)
(i) Raise the air cleaner clamp up, then slide it to the air cleaner cap. (TMUK, TMMT MADE)
(j) Remove the air cleaner cap together with the air cleaner hose.



(k) Disconnect the clamp of the engine wire.
(l) Remove the 3 bolts and the air cleaner inlet No. 1, then remove the air cleaner case.

12. REMOVE EFI FUEL PIPE CLAMP **(See Pub. No. RM925E on page 11-1)**

13. DISCONNECT FUEL TUBE SUB-ASSY **(See Pub. No. RM925E on page 11-1)**

14. DISCONNECT UNION TO CONNECTOR TUBE HOSE

(a) RHD

(1) Disconnect the union to connector tube hose from the hose to hose tube.

(b) LHD

(1) Disconnect the union to connector tube hose from the brake booster.

15. DISCONNECT HEATER INLET WATER HOSE

(a) Disconnect the heater inlet water hose from the air conditioner tube.

16. DISCONNECT HEATER OUTLET WATER HOSE

(a) Disconnect the heater outlet water hose from the air conditioner tube.

17. DISCONNECT ACCELERATOR CONTROL CABLE ASSY (4ZZ-FE ENGINE TYPE)

(a) Loosen the nut, and remove the accelerator control cable.

18. DISCONNECT OIL COOLER INLET HOSE NO.2 (AUTOMATIC TRANSAXLE)

(a) Disconnect the oil cooler inlet hose from the oil cooler inlet tube.

19. DISCONNECT OIL COOLER OUTLET HOSE NO.2 (AUTOMATIC TRANSAXLE)

(a) Disconnect the oil cooler outlet hose from the oil cooler inlet tube.

20. DISCONNECT TRANSMISSION CONTROL CABLE ASSY (MANUAL TRANSAXLE) **(See Pub. No. RM925E on page 41-24)**

21. DISCONNECT TRANSMISSION CONTROL CABLE ASSY (AUTOMATIC TRANSAXLE) **(See Pub. No. RM925E on page 40-47)**

22. DISCONNECT CLUTCH RELEASE CYLINDER ASSY (MANUAL TRANSAXLE) **(See Pub. No. RM925E on page 41-24)**

23. REMOVE GLOVE COMPARTMENT DOOR ASSY **(See page 71-6)**

24. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.2 **(See page 71-6)**

25. DISCONNECT ENGINE WIRE

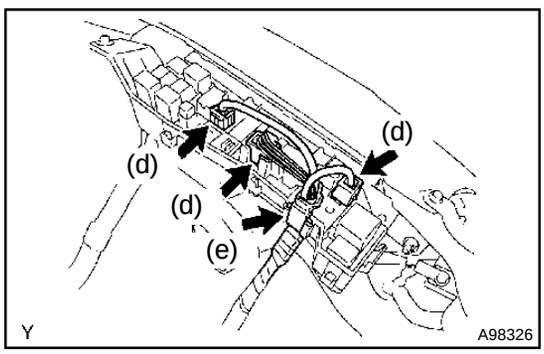
(a) Disconnect the engine wire harness from the ECM and junction block.

(b) Pull out the engine wire harness.

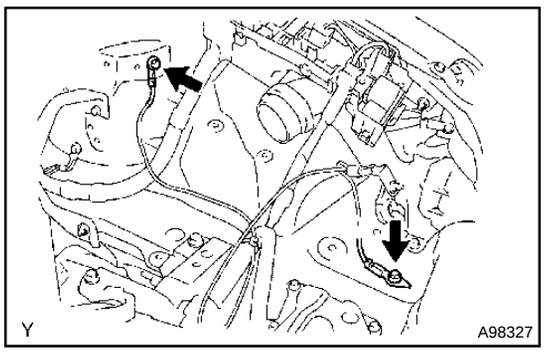
(c) Remove the engine room relay block cover.

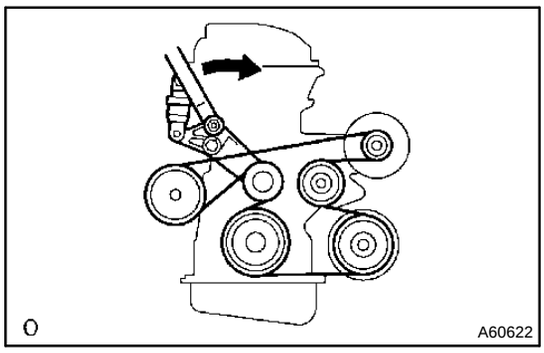
(d) Disconnect the 3 connectors.

(e) Disconnect the engine wire harness by pulling it upward.



(f) Remove the 2 bolts, then disconnect the ground terminal.





26. REMOVE FAN AND GENERATOR V BELT

(a) Turn the drive belt tensioner clockwise to relieve tension on the belt, and then remove the belt.

(b) Carefully return the tensioner to the unloaded position.

NOTICE:

- **When retracting the tensioner, turn it clockwise slowly in 3 sec. or more. Be sure to not apply force rapidly.**
- **After the tensioner is retracted all the way, do not apply force any more than necessary.**

27. SEPARATE COOLER COMPRESSOR ASSY (W/ AIR CONDITIONING) **(See page 55-37)**

28. REMOVE FRONT DOOR SCUFF PLATE RH **(See page 71-6)**

29. REMOVE COWL SIDE TRIM BOARD RH **(See page 71-6)**

30. REMOVE FRONT FLOOR FOOTREST (RHD STEERING POSITION TYPE)

31. REMOVE COLUMN HOLE COVER SILENCER SHEET

(a) Remove the 2 clips and column hole cover silencer sheet.

32. SEPARATE STEERING INTERMEDIATE SHAFT ASSY NO.2
(See Pub. No. RM925E on page 51-6)

33. REMOVE FLOOR PANEL BRACE FRONT

(a) Remove the 2 nuts and floor panel brace front.

34. REMOVE EXHAUST PIPE ASSY FRONT **(See Pub. No. RM925E on page 15-5)**

35. REMOVE FRONT AXLE HUB LH NUT **(See Pub. No. RM925E on page 30-6)**
SST 09930-00010

36. REMOVE FRONT AXLE HUB RH NUT
SST 09930-00010

HINT:
Perform the same procedure as above on the opposite side.

37. SEPARATE TIE ROD END SUB-ASSY LH **(See Pub. No. RM925E on page 30-6)**
SST 09628-62011

38. SEPARATE TIE ROD END SUB-ASSY RH
SST 09628-62011

HINT:
Perform the same procedure as above on the opposite side.

39. SEPARATE FRONT STABILIZER LINK ASSY LH **(See Pub. No. RM925E on page 26-20)**

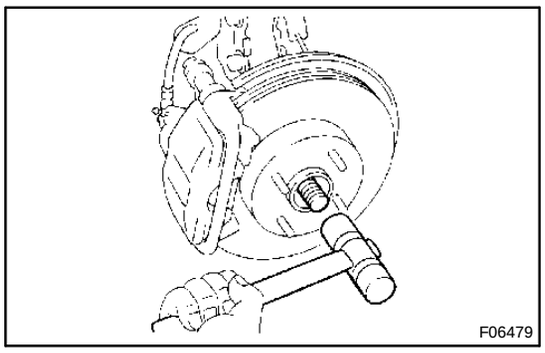
40. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:
Perform the same procedure as above on the opposite side.

41. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
(See Pub. No. RM925E on page 30-6)

42. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:
Perform the same procedure as above on the opposite side.



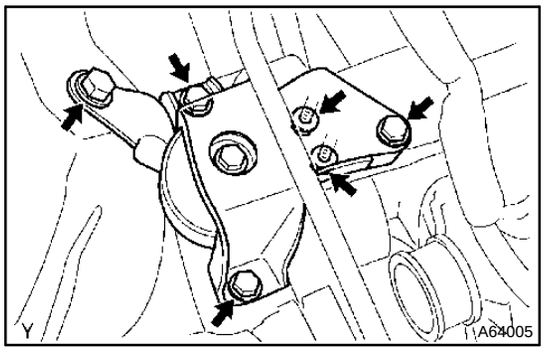
43. SEPARATE FRONT DRIVE SHAFT ASSY LH

(a) Using a platic hammer, disconnect the front drive shaft from the axle hab.

44. SEPARATE FRONT DRIVE SHAFT ASSY RH

HINT:

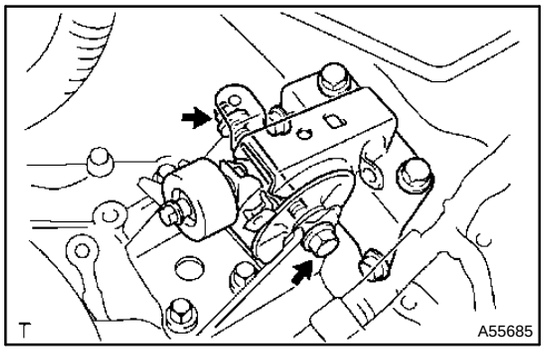
Perform the same procedure as above on the opposite side.



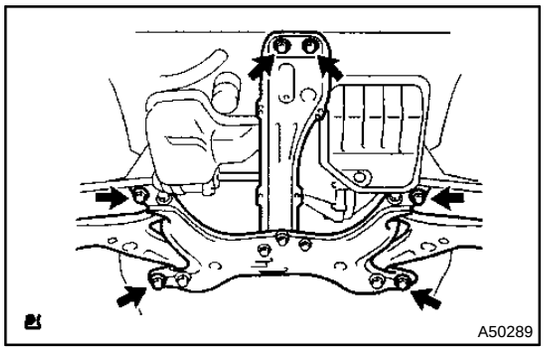
45. REMOVE ENGINE ASSEMBLY WITH TRANSAXLE

(a) Set the engine lifter.

(b) Remove the 4 bolts and 2 nuts, then detach the engine mounting insulator.



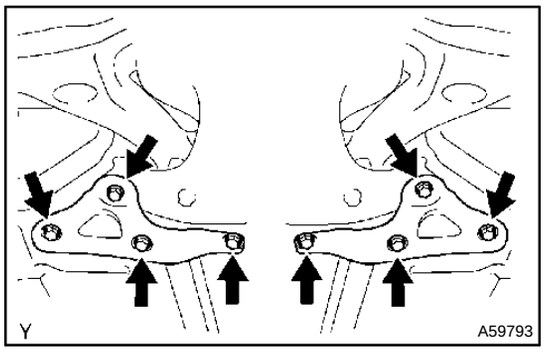
(c) Remove the through bolt and nut, then detach the engine mounting insulator from the vehicle.



(d) Remove the engine with transaxle. (TMC MADE)

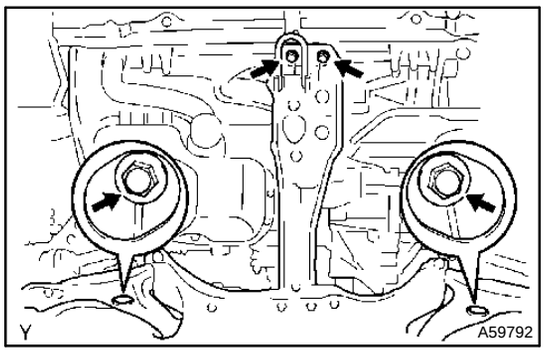
(1) Remove the 6 bolts as shown in the illustration.

(2) Carefully remove the engine with transaxle from the engine compartment.



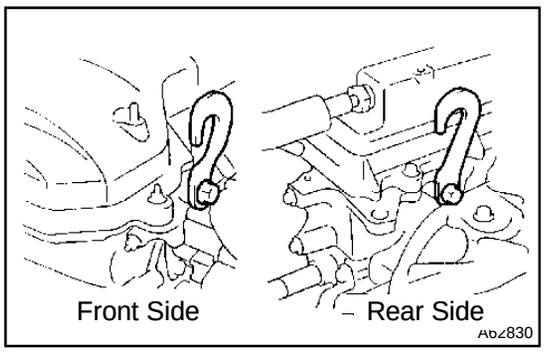
(e) Remove the engine with transaxle.
(TMUK, TMMT MADE)

(1) Remove the 8 bolts and front suspension member brace rear RH and LH.



(2) Remove the 2 bolts and 2 nuts as shown in the illustration.

(3) Carefully remove the engine with transaxle from the engine compartment.



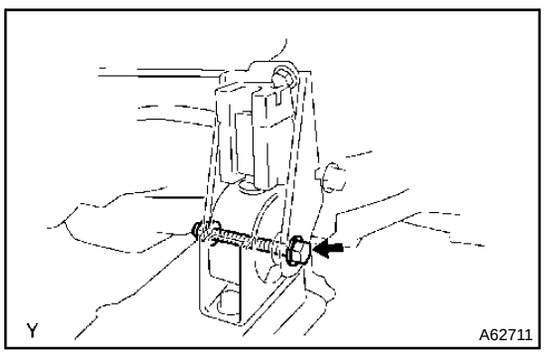
(f) Install the engine hanger with the bolt.

Part No.:
No. 1 engine hanger 12281-15040
No. 2 engine hanger 12281-22021
Bolt 91512-B1016
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

HINT:

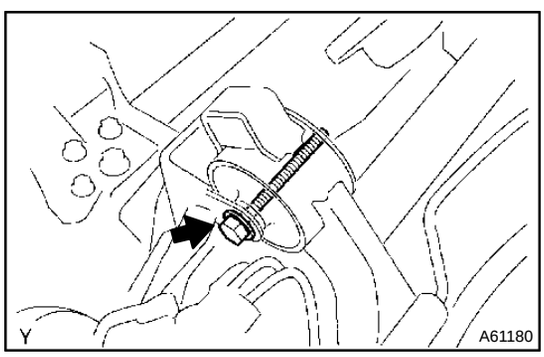
Securely install the front engine hanger (12281-22021) and the rear engine hanger (12281-15040) onto the engine assembly.

(g) Using the chain block and engine sling device, then hang the engine assembly.



46. REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSY

(a) Remove the through bolt and a nut, then detach the engine mounting insulator FR from the engine mounting bracket.



(b) Remove the through bolt, then detach the engine mounting insulator RR from the suspension crossmember.

(c) Detach the engine and transaxle assembly from the suspension crossmember and engine mounting member.

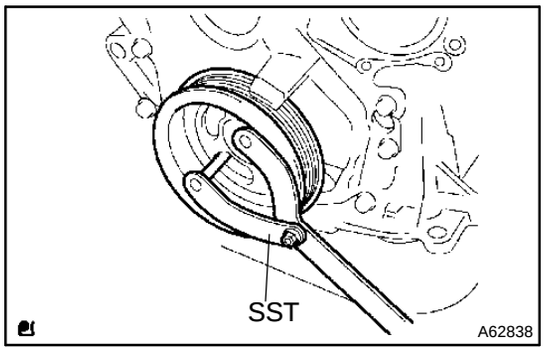
47. REMOVE STARTER ASSY **(See Pub. No. RM925E on page 19-15)**

48. REMOVE MANUAL TRANSAXLE ASSY (MANUAL TRANSAXLE)
(See Pub. No. RM925E on page 41-24)

49. REMOVE AUTOMATIC TRANSAXLE ASSY (AUTOMATIC TRANSAXLE)
(See Pub. No. RM925E on page 40-9)
SST 09213-70011, 09330-00021

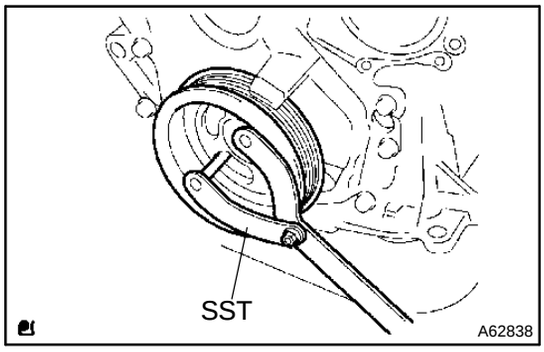
50. REMOVE CLUTCH COVER ASSY (MANUAL TRANSAXLE)
(See Pub. No. RM925E on page 42-29)

51. REMOVE CLUTCH DISC ASSY (MANUAL TRANSAXLE) **(See Pub. No. RM925E on page 42-29)**



52. REMOVE FLYWHEEL SUB-ASSY (MANUAL TRANSAXLE)

(a) Hold the crankshaft with SST, then remove the 8 bolts and flywheel.
SST 09960-10010 (09962-01000, 09963-01000)

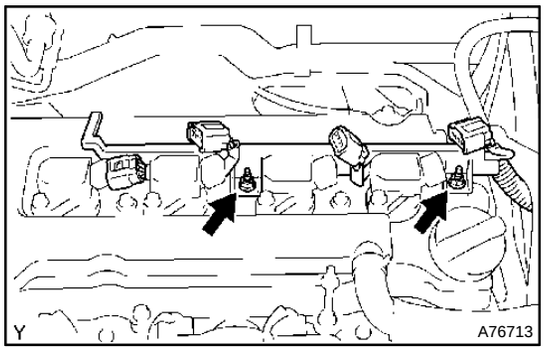


53. REMOVE DRIVE PLATE & RING GEAR SUB-ASSY (AUTOMATIC TRANSAXLE)

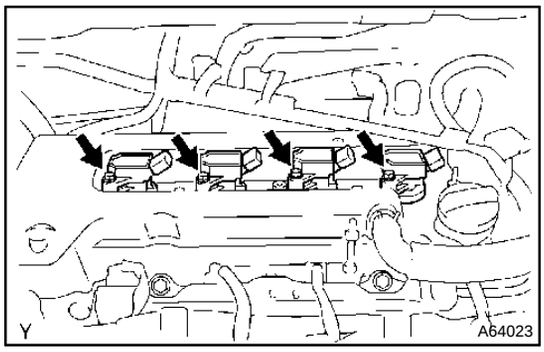
(a) Hold the crankshaft with SST, then remove the 8 bolts and drive plate & ring gear.
SST 09960-10010 (09962-01000, 09963-01000)

54. REMOVE IGNITION COIL ASSY

(a) Disconnect the 4 ignition coil connectors.



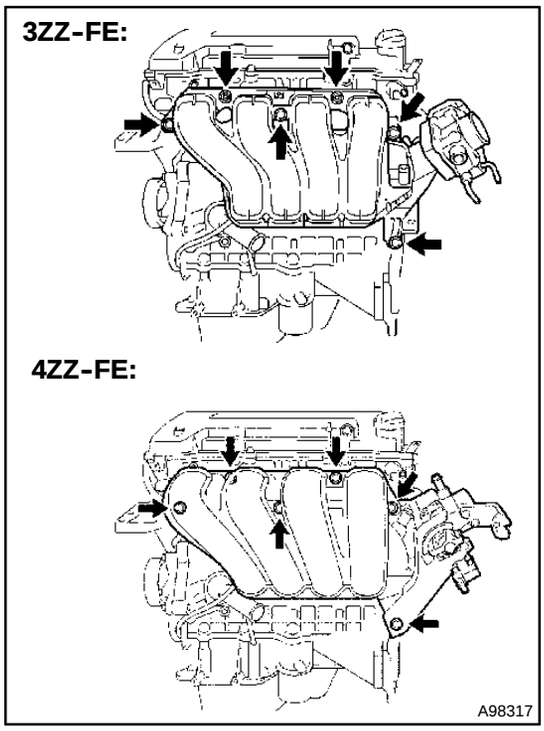
(b) Remove the 2 nuts which are used to secure the engine wire.



(c) Remove the 4 bolts and 4 ignition coils.

55. REMOVE FUEL DELIVERY PIPE SUB-ASSY **(See Pub. No. RM925E on page 11-24)**

56. REMOVE GENERATOR ASSY **(See Pub. No. RM925E on page 19-20)**



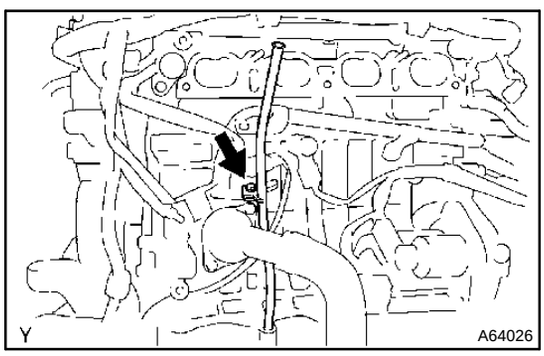
57. REMOVE INTAKE MANIFOLD

(a) Remove the 4 bolts, 2 nuts and 2 wire brackets, then remove the intake manifold and throttle body assembly.

(b) Remove the gasket from the intake manifold and the throttle body assembly.

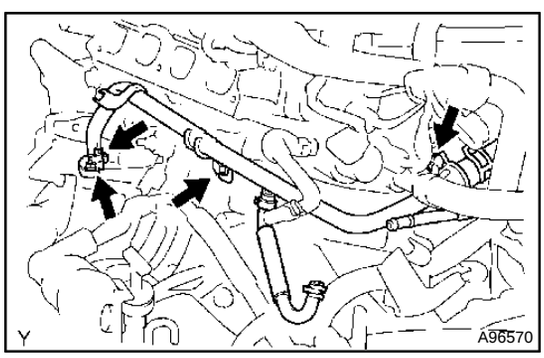
58. REMOVE OIL LEVEL GAGE SUB-ASSY

(a) Remove the oil level gage from the oil level gage guide.



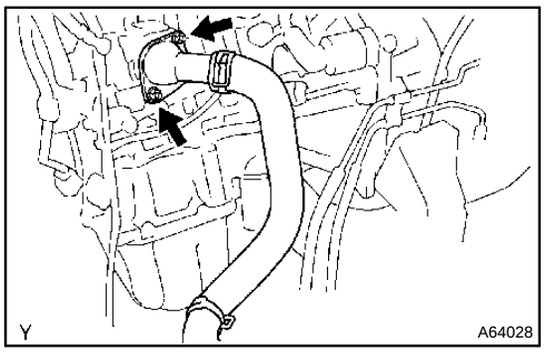
59. REMOVE OIL LEVEL GAGE GUIDE

(a) Remove the bolt and oil level gage guide.



60. REMOVE WATER BY-PASS PIPE NO.1

(a) Remove the 2 bolts and 2 nuts, then remove water by-pass pipe No. 1 and gasket.



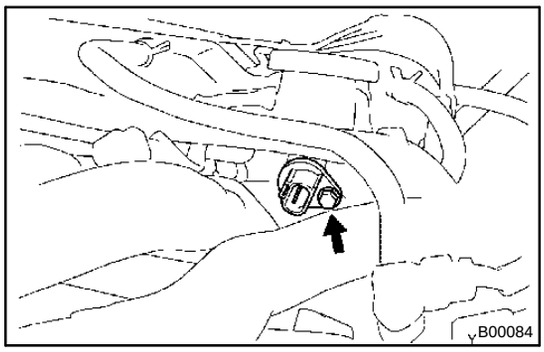
61. REMOVE WATER INLET

(a) Remove the 2 nuts and water inlet.

62. REMOVE THERMOSTAT **(See Pub. No. RM925E on page 16–24)**

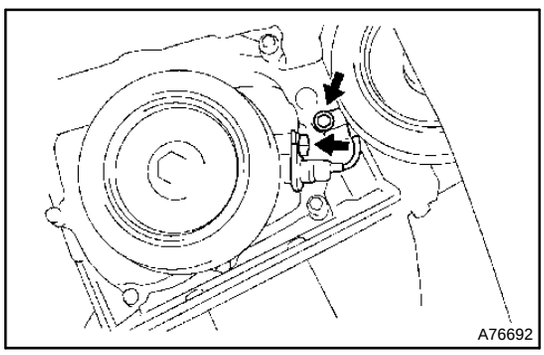
63. REMOVE ENGINE OIL PRESSURE SWITCH ASSY **(See Pub. No. RM925E on page 17–6)**

SST 09268–46021



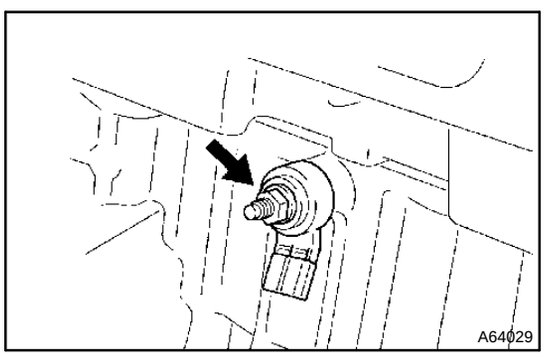
64. REMOVE CAMSHAFT POSITION SENSOR

(a) Remove the bolt and camshaft position sensor.



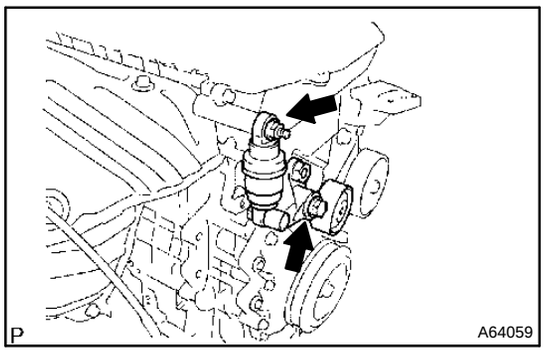
65. REMOVE CRANKSHAFT POSITION SENSOR

(a) Remove the 2 bolts and crankshaft position sensor.



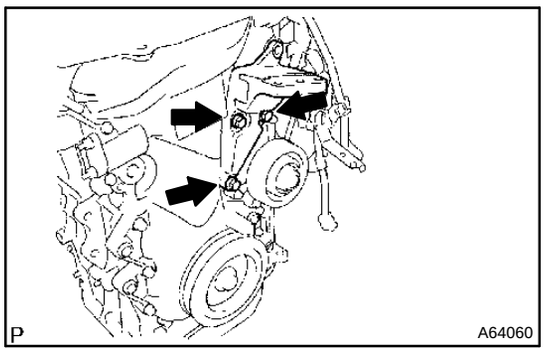
66. REMOVE KNOCK SENSOR

(a) Remove the nut and knock sensor.



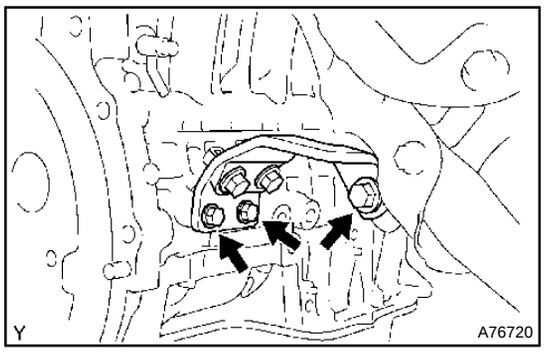
67. REMOVE V-RIBBED BELT TENSIONER ASSY

(a) Remove the bolt, nut and V-ribbed belt tensioner.



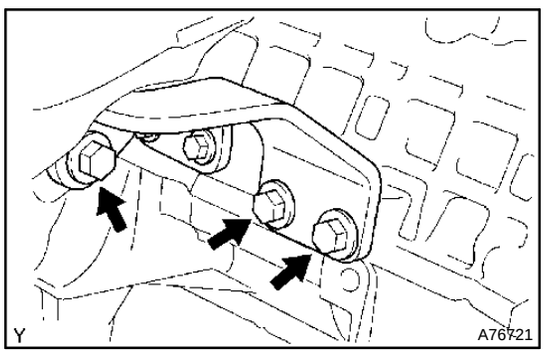
68. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Remove the 3 bolts and transverse engine engine mounting bracket.



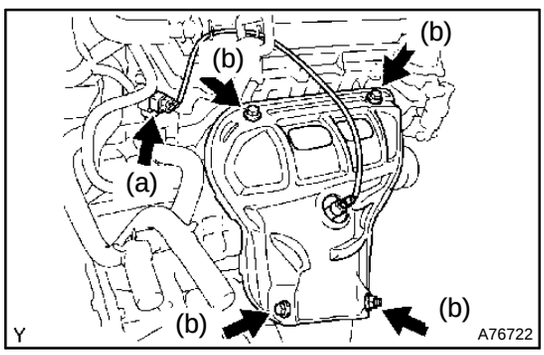
69. REMOVE MANIFOLD STAY

(a) Remove the 3 bolts and manifold stay.



70. REMOVE MANIFOLD STAY NO.2

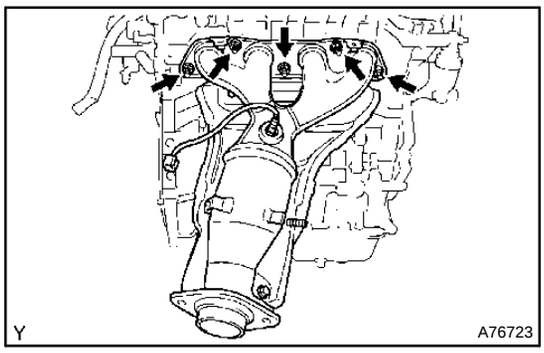
(a) Remove the 3 bolts and manifold stay No. 2.



71. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1

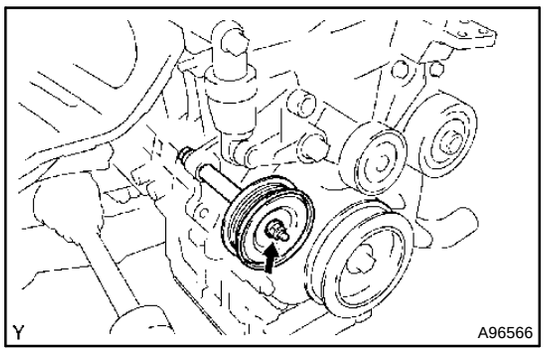
(a) Disconnect the heated oxygen sensor connector.

(b) Remove the 3 bolts and nut, then remove the exhaust manifold heat insulator.



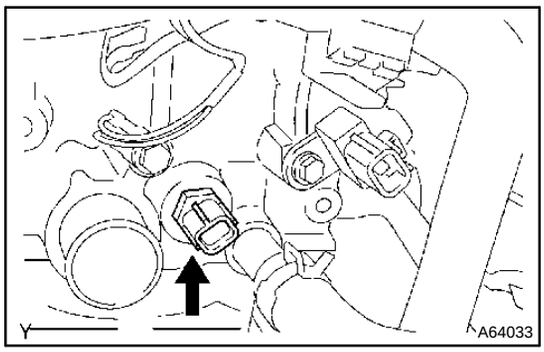
72. REMOVE EXHAUST MANIFOLD

(a) Remove the 5 nuts, then remove the exhaust manifold and gasket.



73. REMOVE V-RIBBED IDLER ASSY NO.1

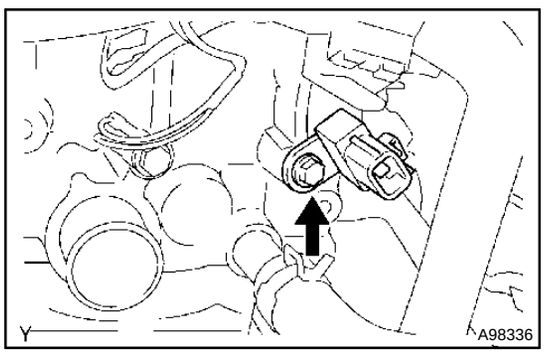
(a) Remove the nut, bolt, tube and idler.



74. REMOVE ENGINE COOLANT TEMPERATURE SENSOR

(a) Using SST, remove the engine coolant temperature sensor.

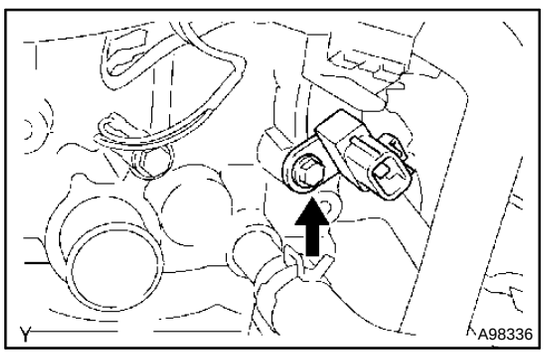
SST 09817-33190



75. REMOVE RADIO SETTING CONDENSER

(a) Remove the bolt and condenser.

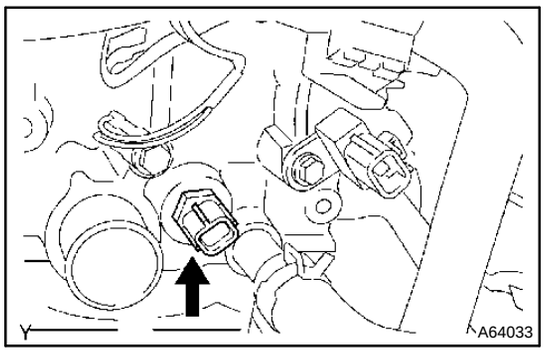
76. REPLACE PARTIAL ENGINE ASSY



77. INSTALL RADIO SETTING CONDENSER

(a) Install the condenser with the bolt.

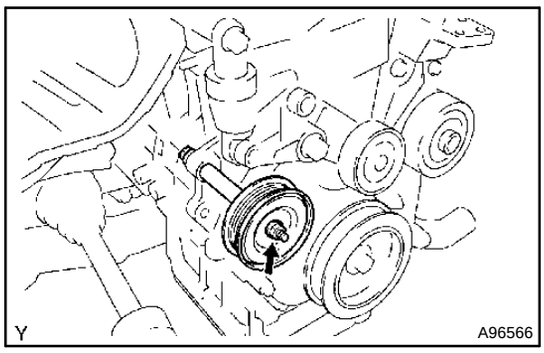
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



78. INSTALL ENGINE COOLANT TEMPERATURE SENSOR

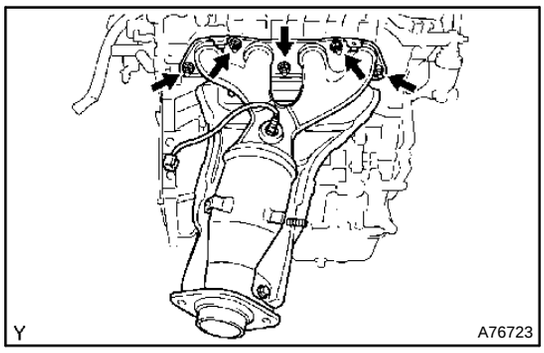
(a) Install a new gasket onto the engine coolant temperature sensor.

(b) Using SST, install the engine coolant temperature sensor.
SST 09817-33190
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)



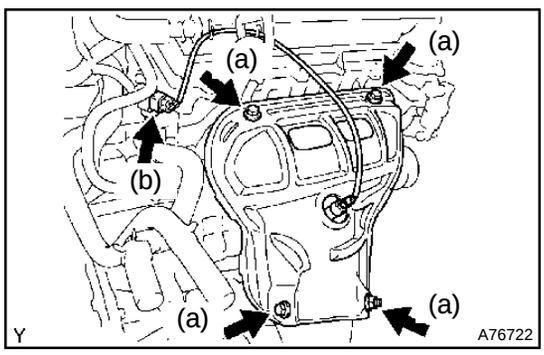
79. INSTALL V-RIBBED IDLER ASSY NO.1

(a) Install the tube and idler with the nut and bolt.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



80. INSTALL EXHAUST MANIFOLD

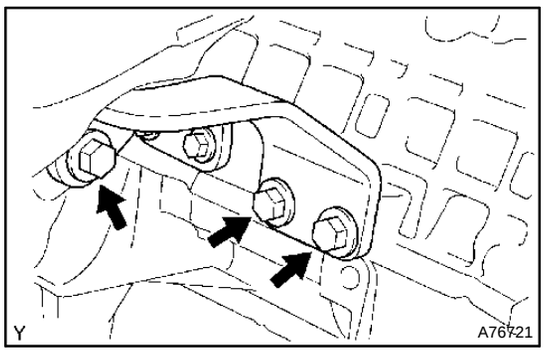
(a) Install a new gasket and the exhaust manifold with the 5 nuts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



81. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1

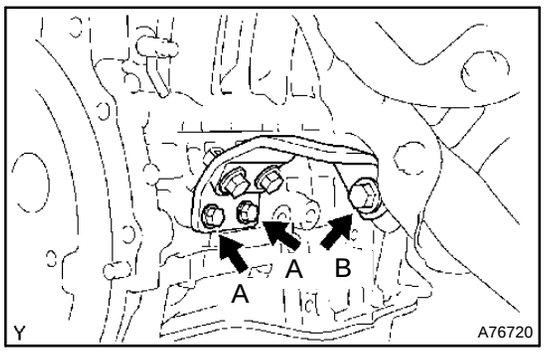
(a) Install the exhaust manifold heat insulator, then install the 3 bolts and nut.
Torque:
18 N·m (184 kgf·cm, 13 ft·lbf) for bolt
12 N·m (122 kgf·cm, 9 ft·lbf) for nut

(b) Connect the heated oxygen sensor connector.



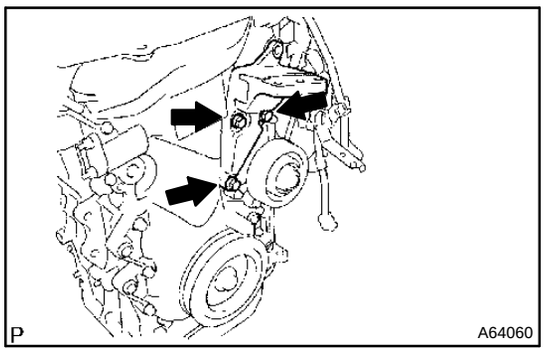
82. INSTALL MANIFOLD STAY NO.2

(a) Install the manifold stay No. 2 with the 3 bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



83. INSTALL MANIFOLD STAY

(a) Install the manifold stay with 3 bolts.
Torque:
37 N·m (377 kgf·cm, 27 ft·lbf) for bolt A
49 N·m (500 kgf·cm, 36 ft·lbf) for bolt B

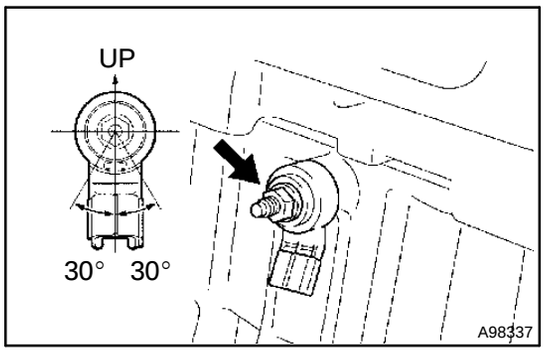


84. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Install the transverse engine engine mounting bracket with the 3 bolts.
Torque: 47 N·m (479 kgf·cm, 35 ft·lbf)

85. INSTALL V-RIBBED BELT TENSIONER ASSY

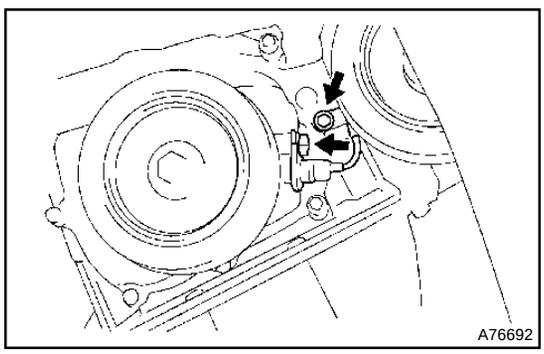
(a) Install the V-ribbed belt tensioner with the bolt and nut.
Torque:
29 N·m (296 kgf·cm, 21 ft·lbf) for nut
69 N·m (704 kgf·cm, 51 ft·lbf) for bolt



86. INSTALL KNOCK SENSOR

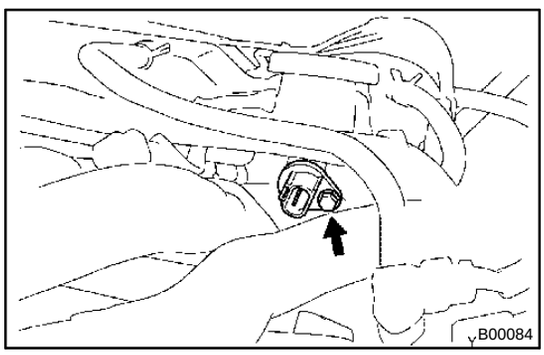
(a) Install the knock sensor with the nut.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

NOTICE:
Make sure that the knock sensor is at the correct angle when installing.



87. INSTALL CRANKSHAFT POSITION SENSOR

(a) Apply a light coat of engine oil to the O-ring on the crankshaft position sensor.
(b) Install the crankshaft position sensor with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



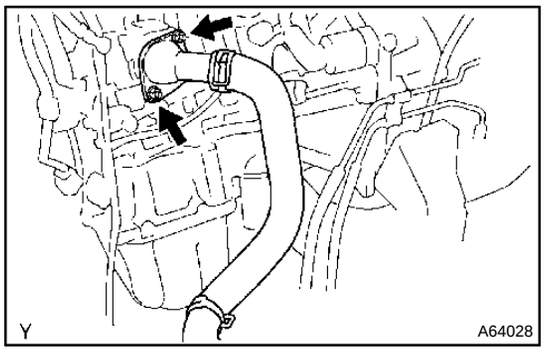
88. INSTALL CAMSHAFT POSITION SENSOR

(a) Apply a light coat of engine oil to the O-ring on the camshaft position sensor.
(b) Install the camshaft position sensor with the bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

89. INSTALL ENGINE OIL PRESSURE SWITCH ASSY **(See Pub. No. RM925E on page 17-6)**

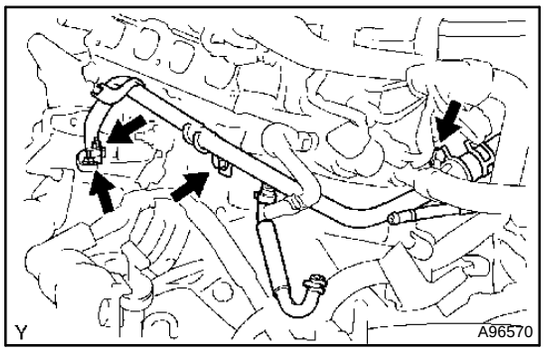
SST 09268-46021

90. INSTALL THERMOSTAT **(See Pub. No. RM925E on page 16-24)**



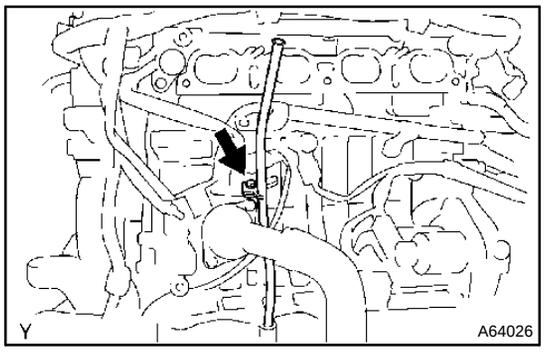
91. INSTALL WATER INLET

(a) Install the water inlet with the 2 nuts.
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)



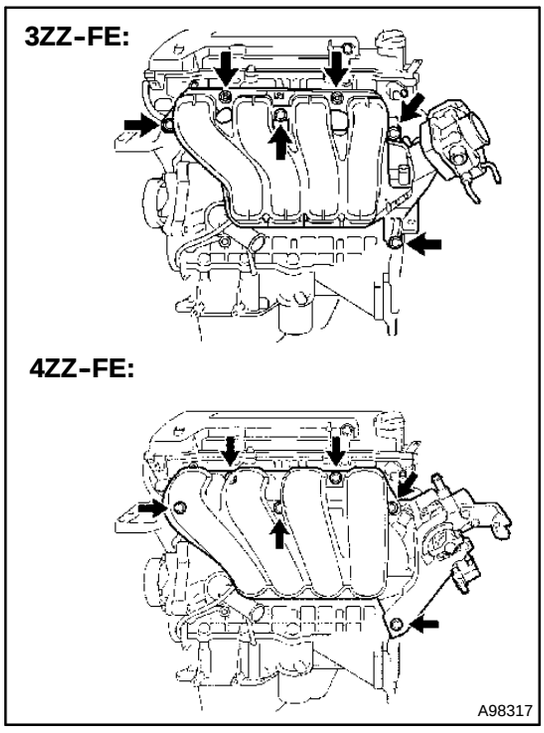
92. INSTALL WATER BY-PASS PIPE NO.1

(a) Install a new gaseket and water by-pass pipe with the 2 nuts and 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



93. INSTALL OIL LEVEL GAGE GUIDE

(a) Apply a light coat of engine oil to a new O-ring and install it onto the oil level gage guide.
(b) Install the oil level gage guide with the bolt.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)



94. INSTALL INTAKE MANIFOLD

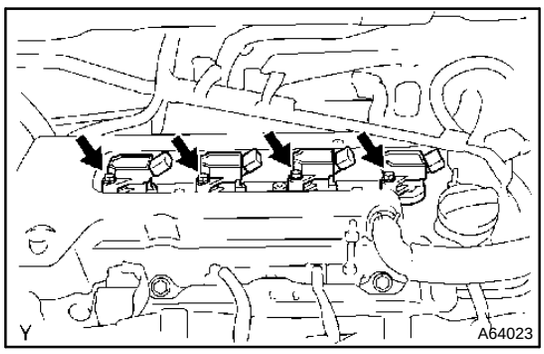
(a) Install a new gasket onto the intake manifold.

(b) Install the intake manifold and 2 clamp brackets with the 2 nuts and 4 bolts.

Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)

95. INSTALL GENERATOR ASSY **(See Pub. No. RM925E on page 19-20)**

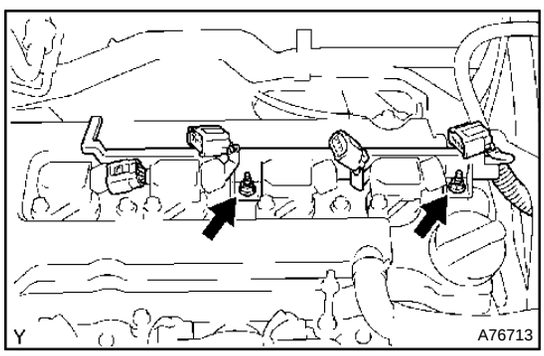
96. INSTALL FUEL DELIVERY PIPE SUB-ASSY **(See Pub. No. RM925E on page 11-24)**



97. INSTALL IGNITION COIL ASSY

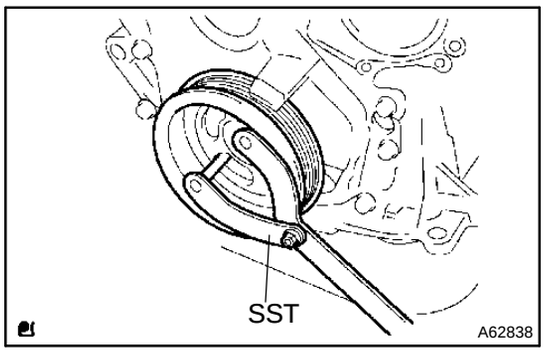
(a) Install the 4 ignition coils with the 4 bolts.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



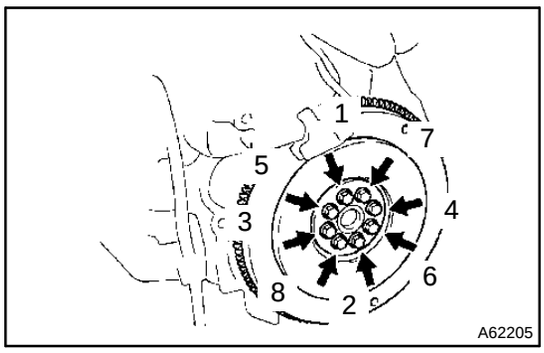
(b) Install the engine wire with the 2 nuts.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

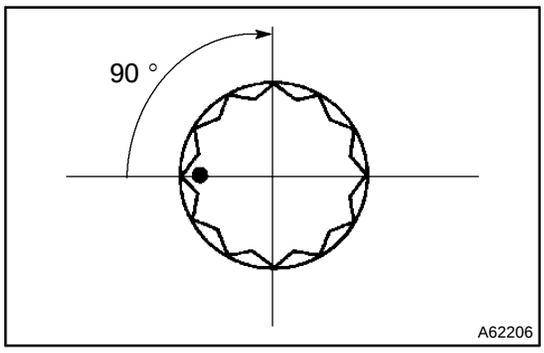


98. INSTALL FLYWHEEL SUB-ASSY (MANUAL TRANSAXLE)

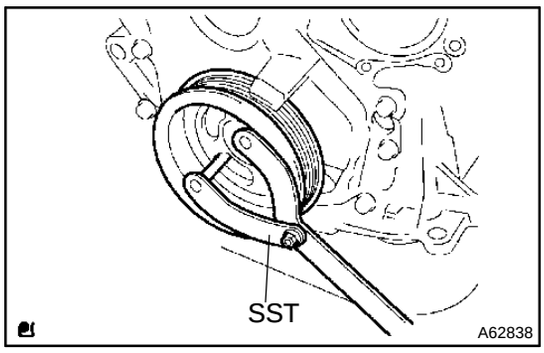
(a) Hold the crankshaft with SST.
SST 09960-10010 (09962-01000, 09963-01000)



(b) Clean the bolt and bolt hole.
(c) Apply adhesive to the bolts.
Adhesive:
Part No. 09330-00070, THREE BOND or equivalent.
(d) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

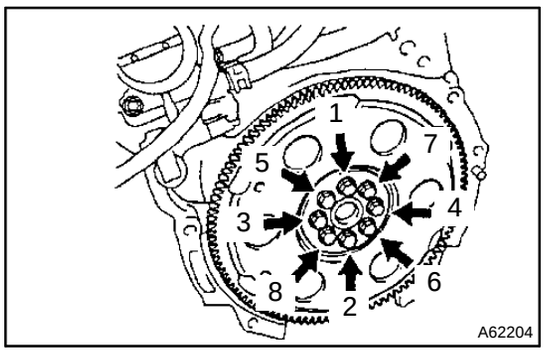


(e) Mark each bolt head with paint as shown in the illustration.
(f) Retighten the bolts by 90° in the same sequence as step (d).
(g) Check that the paint marks are at a 90° angle to their original positions.



99. INSTALL DRIVE PLATE & RING GEAR SUB-ASSY (AUTOMATIC TRANSAXLE)

(a) Hold the crankshaft with SST.
SST 09960-10010 (09962-01000, 09963-01000)



(b) Clean the bolts and bolt holes.
(c) Apply adhesive to the bolts.
Adhesive:
Part No. 09330-00070, THREE BOND or equivalent.
(d) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)

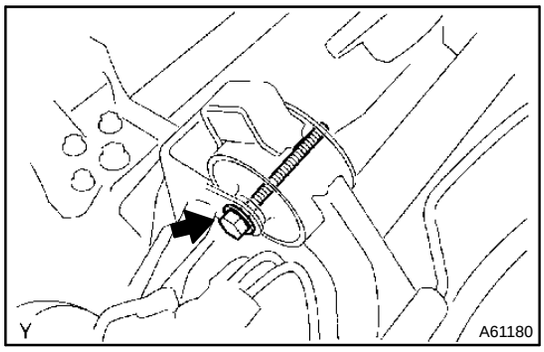
100. INSTALL CLUTCH DISC ASSY (MANUAL TRANSAXLE) **(See Pub. No. RM925E on page 42-29)**
SST 09301-00210

101. INSTALL CLUTCH COVER ASSY (MANUAL TRANSAXLE) **(See Pub. No. RM925E on page 42-29)**
SST 09301-00210

102. INSTALL MANUAL TRANSAXLE ASSY (MANUAL TRANSAXLE)
(See Pub. No. RM925E on page 41-24)

103. INSTALL AUTOMATIC TRANSAXLE ASSY (AUTOMATIC TRANSAXLE)
(See Pub. No. RM925E on page 40-9)

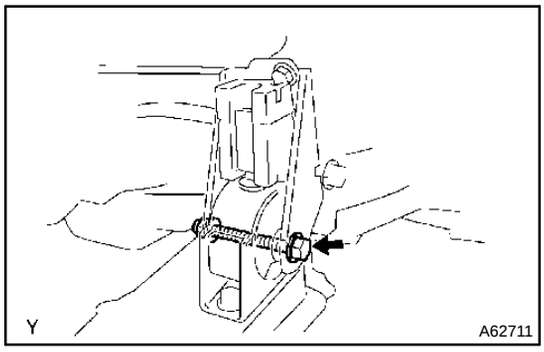
104. INSTALL STARTER ASSY **(See Pub. No. RM925E on page 19-15)**



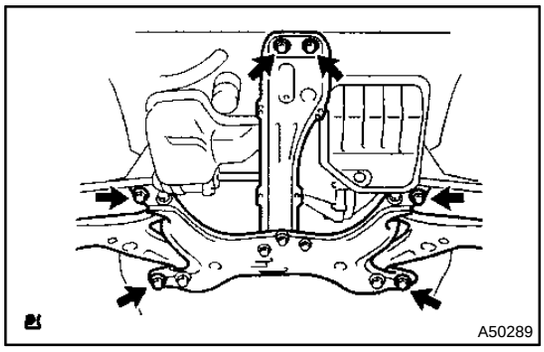
105. INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSY

(a) Attach the engine and transaxle assembly to the suspension crossmember and engine mounting member.

(b) Install the bolt, which is used to secure the rear engine mounting bracket, onto the mounting insulator.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)



(c) Install the bolt, which is used to secure the front engine mounting bracket, onto the mounting insulator.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



106. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE

(a) TMC MADE:

(1) Set the engine with transaxle on the engine lifter.

(2) Install the engine with transaxle to the vhicle.

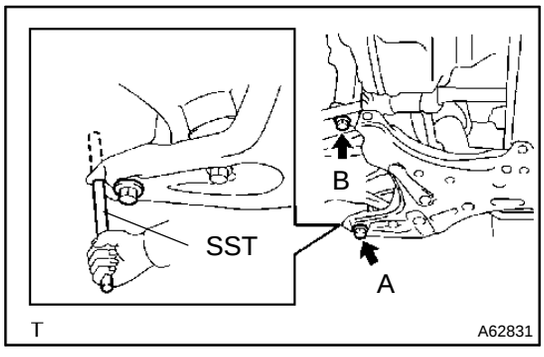
(3) Temporarily install the suspension crossmember and 6 bolts.

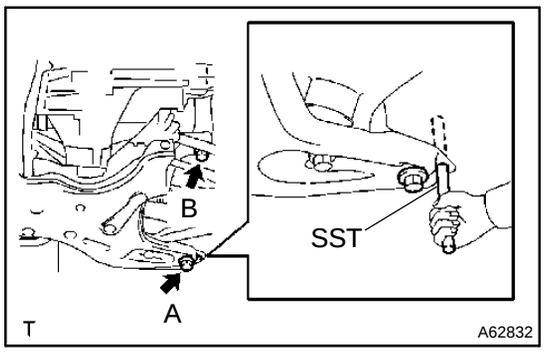
(4) Install the engine mounting insulator LH.
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

(5) Install the engine mounting insulator RH.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

(6) Insert SST in the positioning holes on the right handle crossmember and on the right-handle of the vehicle.
SST 09670-00010

(7) Temporarily tighten the bolt A first, then bolt B.





(8) Insert SST in the positioning holes on the left handle crossmember and on the left-handle of the vehicle.

SST 09670-00010

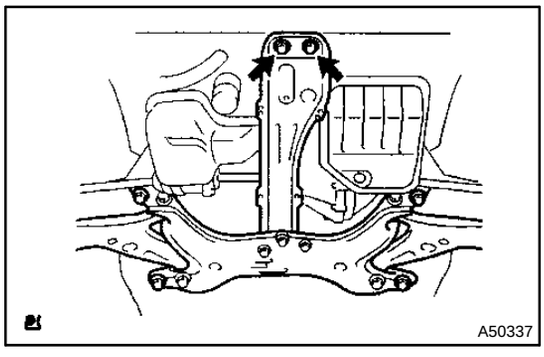
(9) Temporarily tighten the bolt A first, then bolt B.

(10) Insert SST in the positioning holes on the right-handle crossmember and right-handleof the vhicle, then tighten the bolts to a specified torque.

(11) Insert SST in the positioning holes on the right-handle crossmember and left-handleof the vhicle, then tighten the bolts to a specified torque.

SST 09670-00010

Torque:
157 N·m (1,601 kgf·cm, 116 ft·lbf) for bolt A
113 N·m (1,152 kgf·cm, 83 ft·lbf) for bolt B



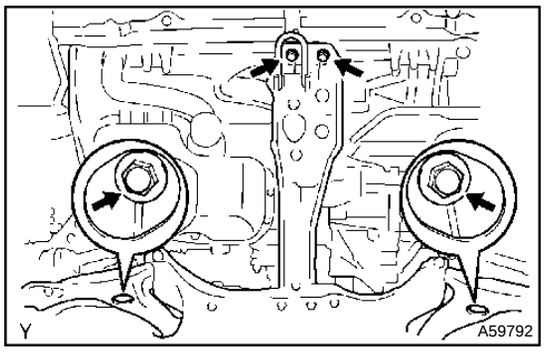
(12) Tighten the 2 bolts as shown in the illustration.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

NOTICE:
After installing the crossmember, check that the positioning holes on the crossmember and vhicle are alligned with each other.

(b) TMUK, TMMT MADE:

(1) Set the engine assembly with transaxle on the ingine lifter.



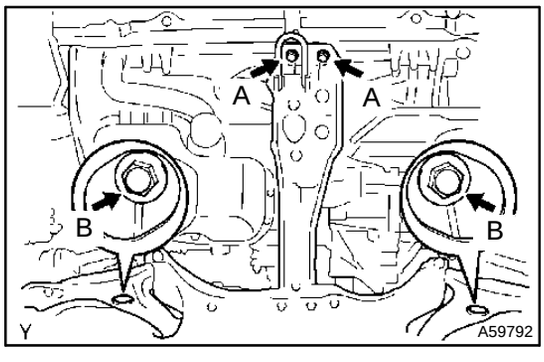
(2) Temporarily install the suspension crossmember with 2 bolts and 2 nuts.

(3) Install the engine mounting insulator LH.

Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

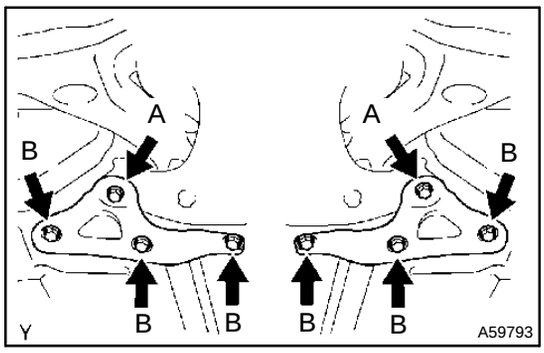
(4) Install the engine mounting insulator RH.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



(5) Install the front suspension crossmember with the 2 bolts and 2 nuts.

Torque:
39 N·m (398 kgf·cm, 29 ft·lbf) for bolt A
133 N·m (1,356 kgf·cm, 98 ft·lbf) for nut B



(6) Install the front suspension member brace LH and RH with the 8 bolts.

Torque:
133 N·m (1,356 kgf·cm, 98 ft·lbf) for bolt A
80 N·m (816 kgf·cm, 59 ft·lbf) for bolt B

107. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 LH
(See Pub. No. RM925E on page 30–6)

108. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 RH

HINT:

Perform the same procedure as above on the opposite side.

109. INSTALL FRONT STABILIZER LINK ASSY LH (See Pub. No. RM925E on page 26–20)

110. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Perform the same procedure as above on the opposite side.

111. INSTALL TIE ROD END SUB–ASSY LH (See Pub. No. RM925E on page 30–6)

112. INSTALL TIE ROD END SUB–ASSY RH

HINT:

Perform the same procedure as above on the opposite side.

113. INSTALL FRONT AXLE HUB LH NUT (See Pub. No. RM925E on page 30–6)

114. INSTALL FRONT AXLE HUB RH NUT

HINT:

Perform the same procedure as above on the opposite side.

115. INSTALL EXHAUST PIPE ASSY FRONT (See Pub. No. RM925E on page 15–5)

116. INSTALL FLOOR PANEL BRACE FRONT

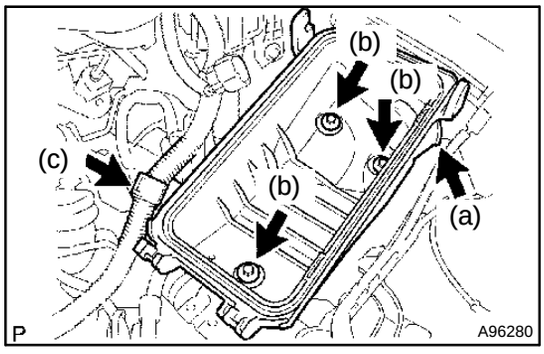
(a) Install front floor panel brace with the 2 nuts.

Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)

117. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2 (See Pub. No. RM925E on page 51–6)

118. INSTALL COOLER COMPRESSOR ASSY (W/ AIR CONDITIONING) (See page 55–37)

119. INSTALL CLUTCH RELEASE CYLINDER ASSY (MANUAL TRANSAXLE)
(See Pub. No. RM925E on page 41–24)



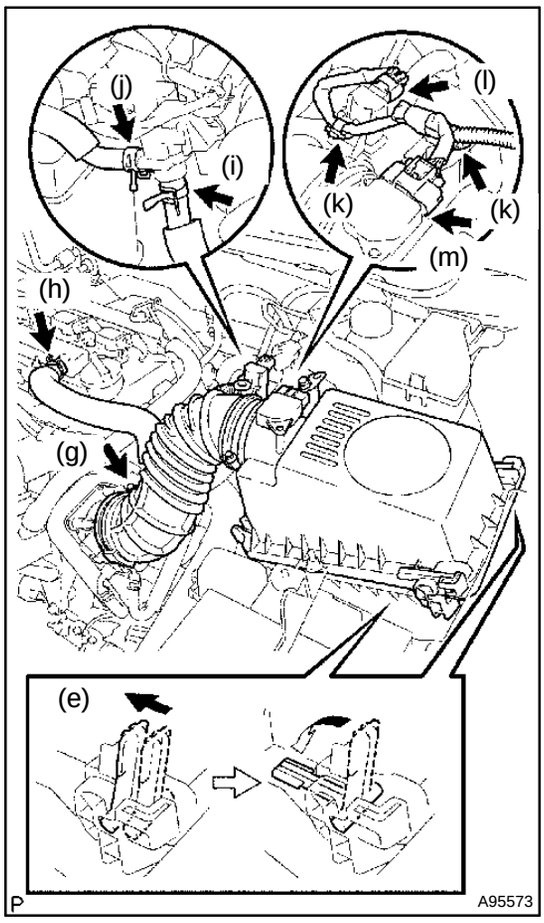
120. INSTALL AIR CLEANER ASSY

(a) Insert the air cleaner case into the air cleaner inlet No. 1.

(b) Install the air cleaner case with the 3 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

(c) Connect the clamp of the engine wire.



(d) Install the air cleaner cap together with the air cleaner hose.
(e) Slide the air cleaner clamp on the air cleaner case, then pull it down. (TMUK, TMMT MADE)
(f) Install the 2 air cleaner clamps. (TMC MADE)
(g) Tighten the hose clamp bolt, then connect the air cleaner hose.
Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)
(h) Connect ventilation hose No. 1 to the cylinder head cover. (3ZZ-FE ENGINE TYPE)
(i) Connect fuel vapor feed hose No. 3 to the VSV.
(j) Connect fuel vapor feed hose No. 1 to the VSV.
(k) Install the 2 wire harness clamps.
(l) Connect the VSV connector.
(m) Connect the mass air flow meter connector.

121. INSTALL BATTERY CARRIER
(a) Install battery carrier with the 4 bolts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)
122. INSTALL BATTERY
Torque:
5.0 N·m (51 kgf·cm, 44 in.·lbf) for bolt
3.5 N·m (36 kgf·cm, 31 in.·lbf) for nut
123. INSTALL RADIATOR ASSY (See Pub. No. RM925E on page 16-26)
124. INSTALL CYLINDER HEAD COVER NO.2
(a) Install the cylinder head cover with the 2 nuts and 2 clips.
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)
125. INSTALL FRONT WHEELS
Torque: 103 N·m (1050 kgf·cm, 76 ft·lbf)
126. ADD AUTOMATIC TRANSAXLE FLUID (AUTOMATIC TRANSAXLE)
(See Pub. No. RM925E on page 40-2)
127. ADD ENGINE OIL
128. ADD ENGINE COOLANT (See page 16-8)
129. CHECK FOR ENGINE OIL LEAKS
130. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)
131. CHECK FOR FUEL LEAKS
132. CHECK FOR EXHAUST GAS LEAKS

133. INSPECT CHECK IDLE SPEED AND IGNITION TIMING **(See Pub. No. RM925E on page 14-82)**

SST 09843-18030, 09843-18040

134. INSPECT CO/HC **(See Pub. No. RM925E on page 14-82)**

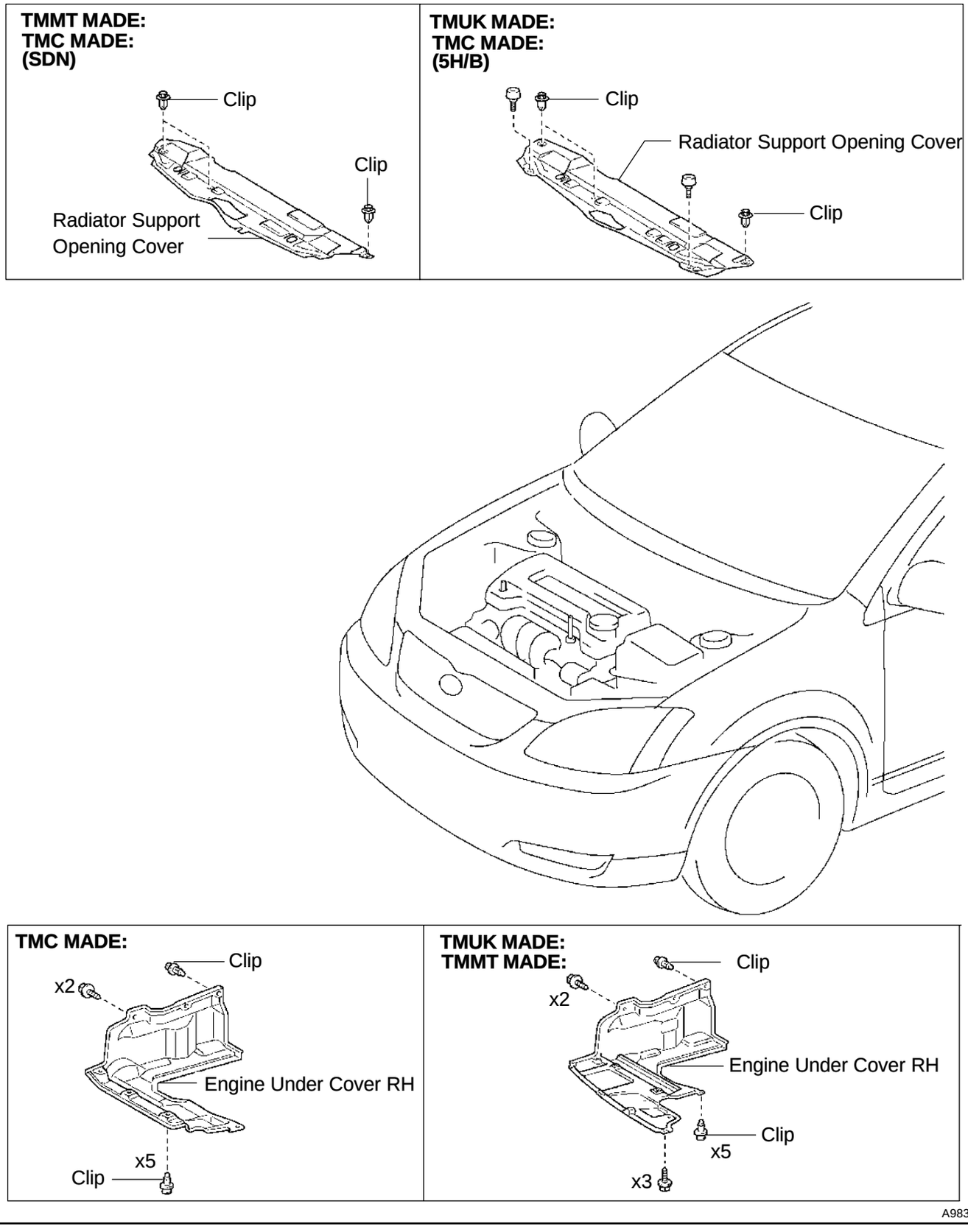
135. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT **(See page 26-1)**

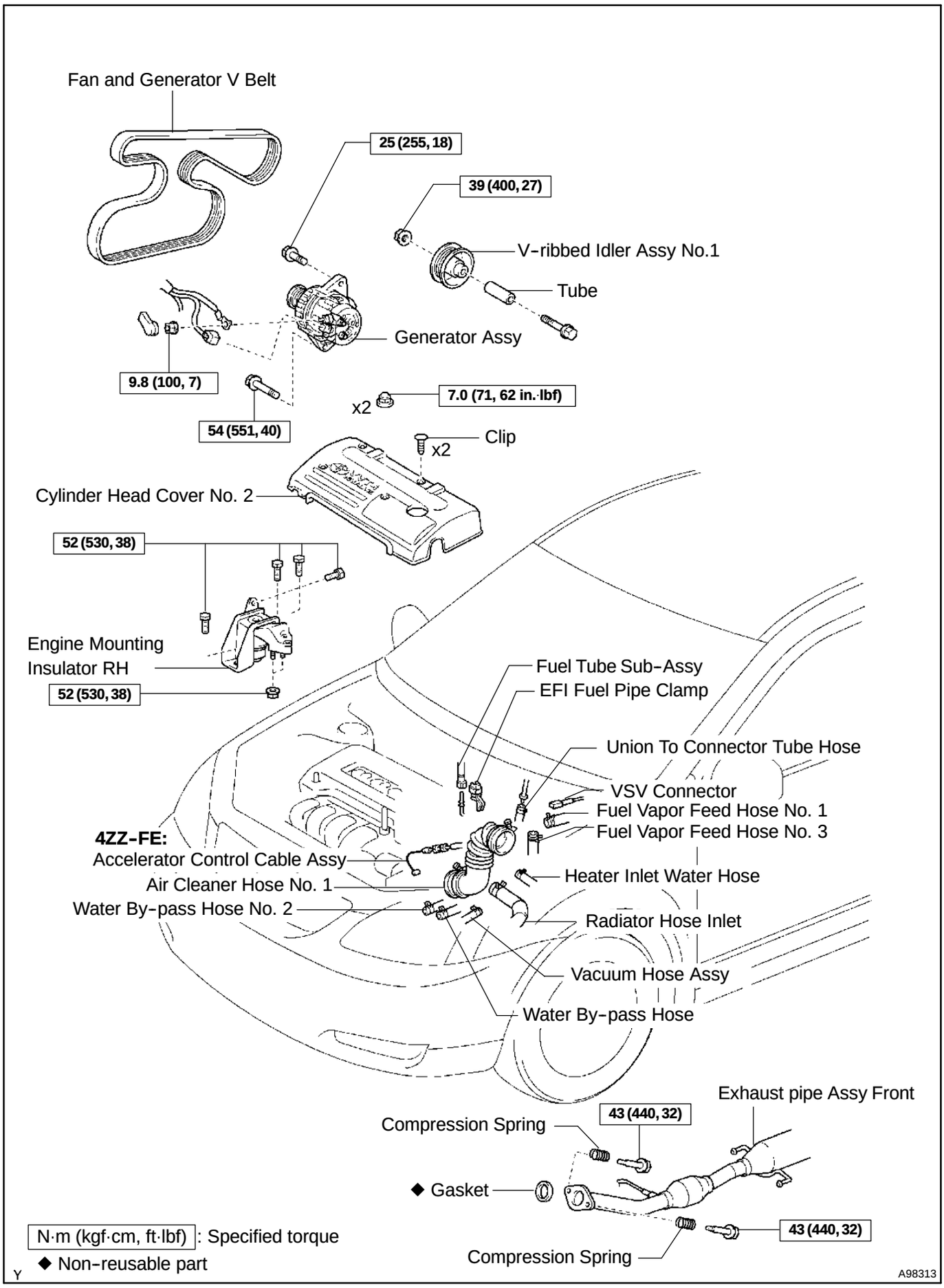
136. CHECK ABS SPEED SENSOR SIGNAL

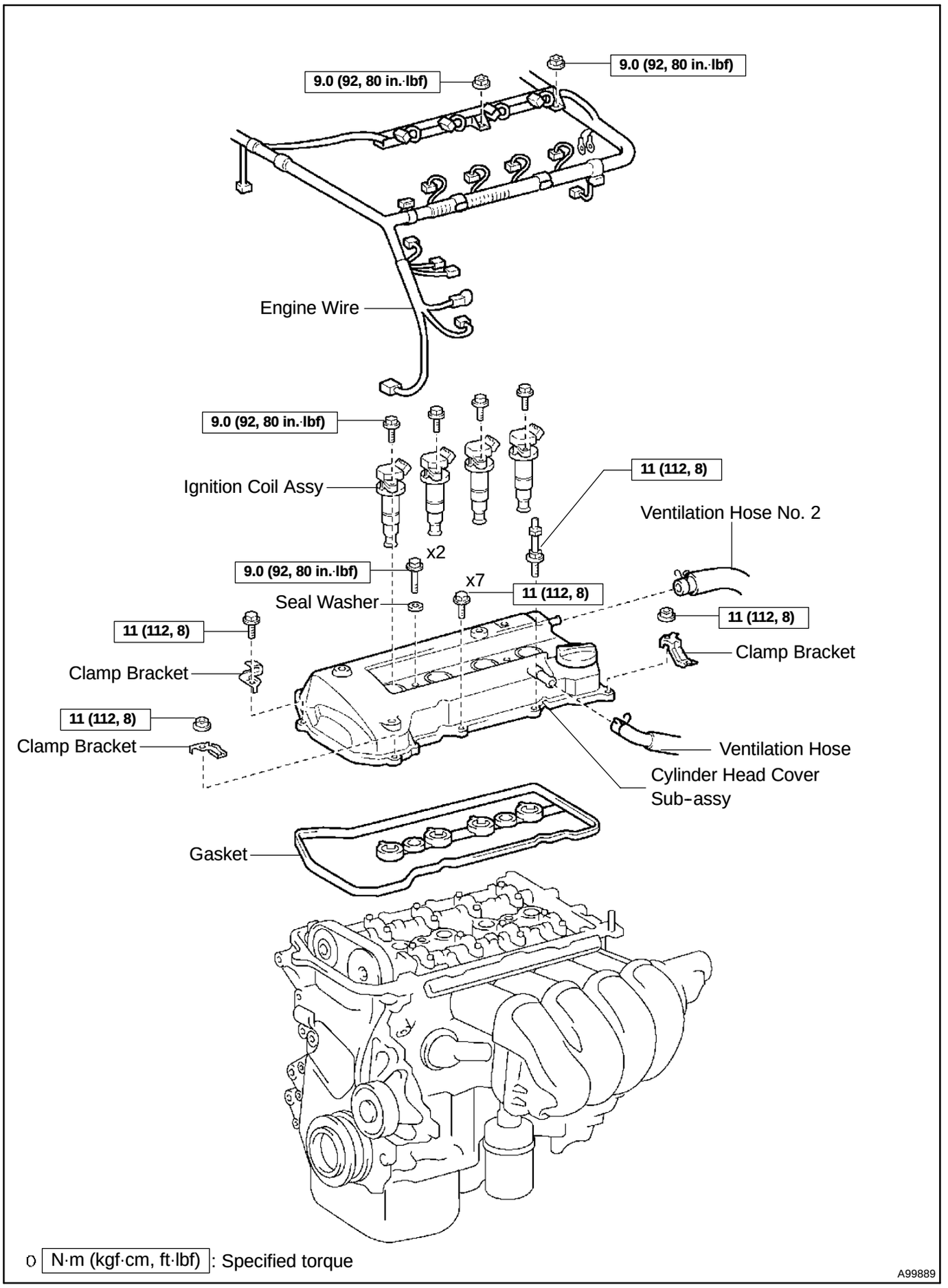
CYLINDER HEAD GASKET (3ZZ-FE/4ZZ-FE)

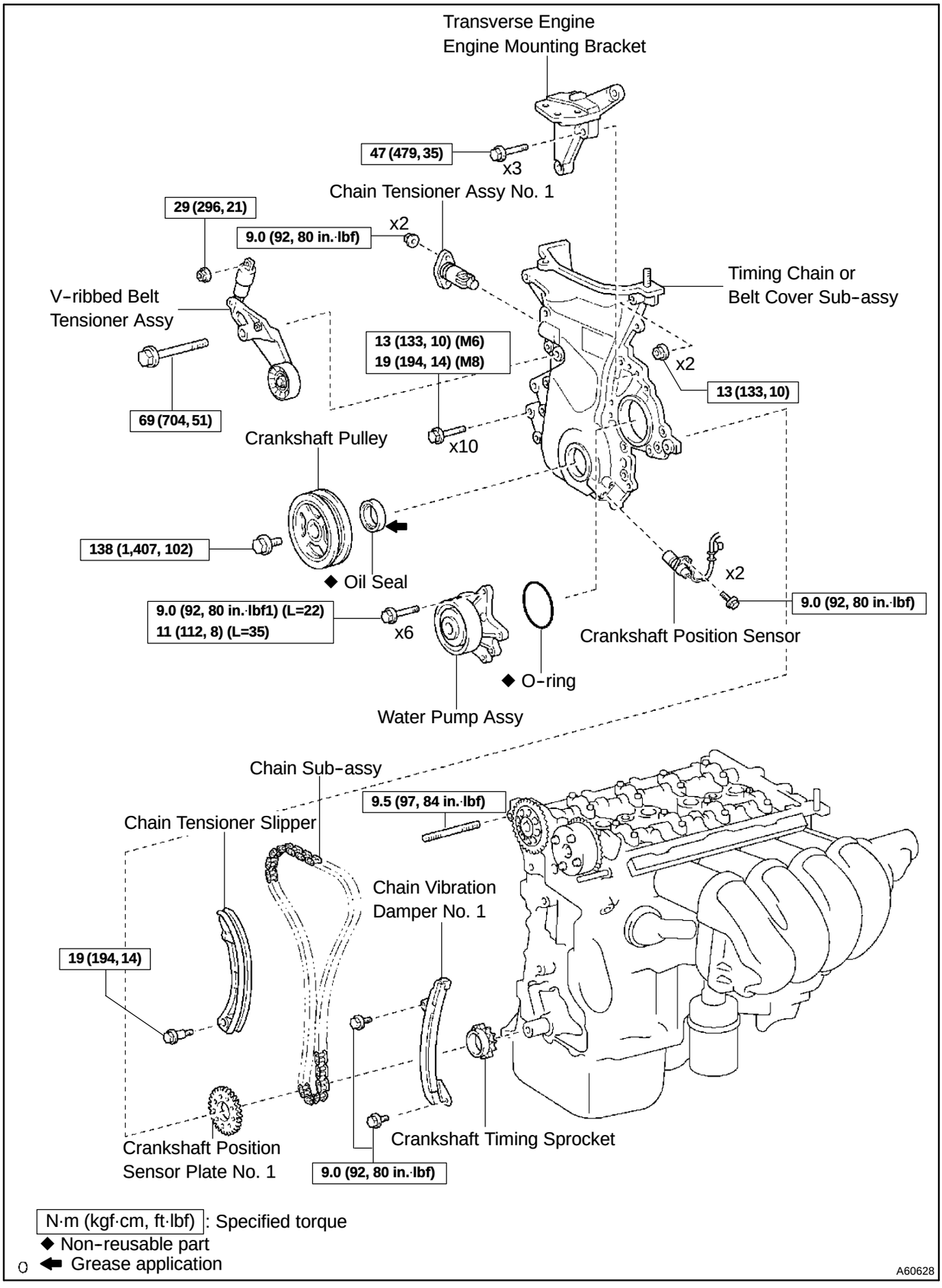
COMPONENTS

141XG-01

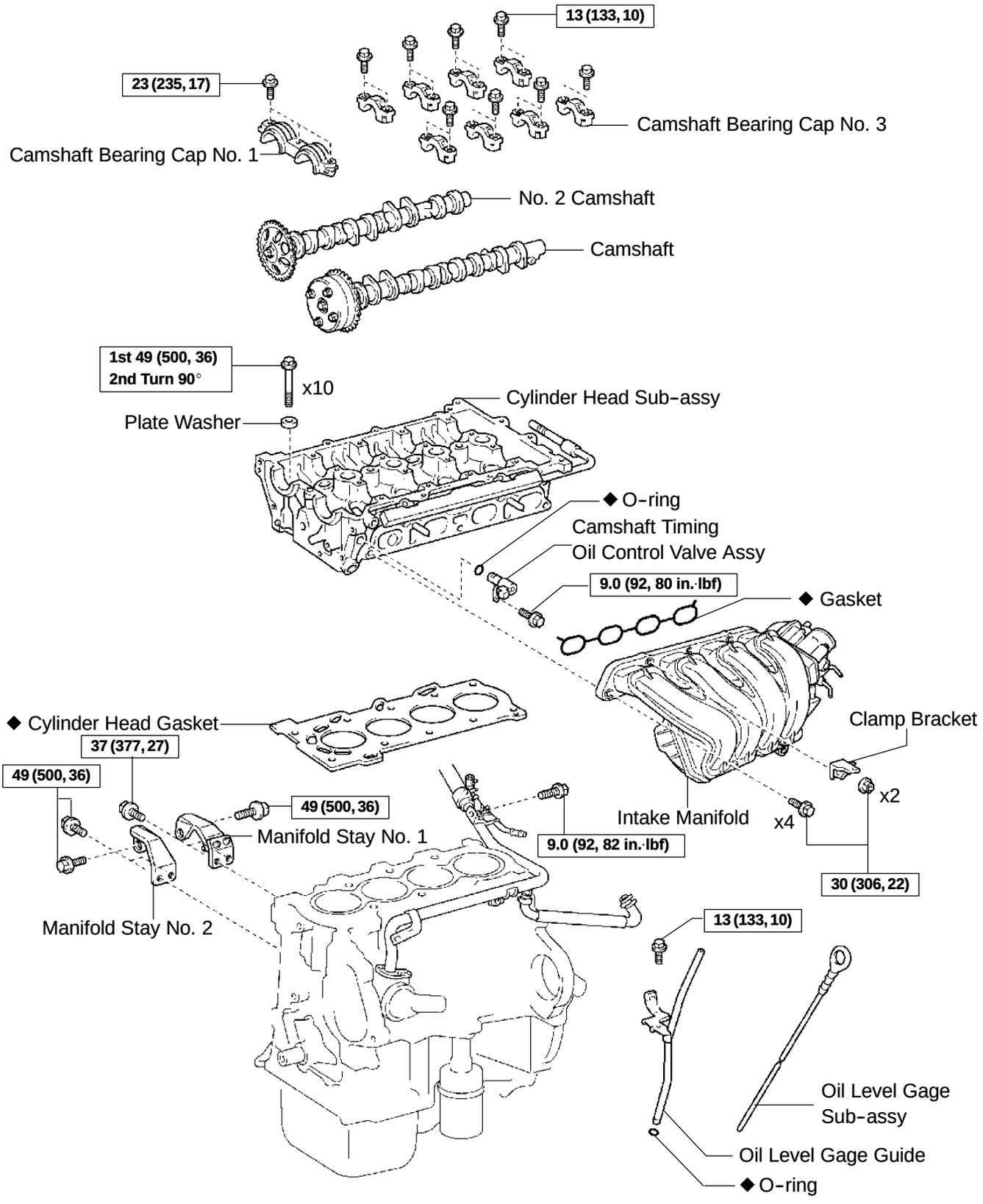



Fan and Generator V Belt
25 (255, 18)
39 (400, 27)
V-ribbed Idler Assy No.1
Tube
Generator Assy
9.8 (100, 7)
54 (551, 40)
x2
7.0 (71, 62 in.·lbf)
Clip
x2
Cylinder Head Cover No. 2
52 (530, 38)
Engine Mounting
Insulator RH
52 (530, 38)
Fuel Tube Sub-Assy
EFI Fuel Pipe Clamp
Union To Connector Tube Hose
VSV Connector
Fuel Vapor Feed Hose No. 1
Fuel Vapor Feed Hose No. 3
4ZZ-FE:
Accelerator Control Cable Assy
Air Cleaner Hose No. 1
Water By-pass Hose No. 2
Heater Inlet Water Hose
Radiator Hose Inlet
Vacuum Hose Assy
Water By-pass Hose
Exhaust pipe Assy Front
Compression Spring
43 (440, 32)
◆ Gasket
43 (440, 32)
Compression Spring
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Y
A98313


9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf)
Engine Wire
9.0 (92, 80 in.·lbf)
Ignition Coil Assy
11 (112, 8)
Ventilation Hose No. 2
x2
9.0 (92, 80 in.·lbf)
x7
11 (112, 8)
Seal Washer
11 (112, 8)
11 (112, 8)
Clamp Bracket
Clamp Bracket
11 (112, 8)
Clamp Bracket
Ventilation Hose
Cylinder Head Cover Sub-assy
Gasket
o N·m (kgf·cm, ft·lbf): Specified torque
A99889


Transverse Engine
Engine Mounting Bracket
47 (479, 35)
x3
Chain Tensioner Assy No. 1
29 (296, 21)
9.0 (92, 80 in.·lbf)
x2
V-ribbed Belt
Tensioner Assy
Timing Chain or
Belt Cover Sub-assy
13 (133, 10) (M6)
19 (194, 14) (M8)
x2
13 (133, 10)
69 (704, 51)
Crankshaft Pulley
x10
138 (1,407, 102)
◆ Oil Seal
x2
9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf1) (L=22)
11 (112, 8) (L=35)
x6
Crankshaft Position Sensor
◆ O-ring
Water Pump Assy
Chain Sub-assy
9.5 (97, 84 in.·lbf)
Chain Tensioner Slipper
Chain Vibration
Damper No. 1
19 (194, 14)
Crankshaft Position
Sensor Plate No. 1
9.0 (92, 80 in.·lbf)
Crankshaft Timing Sprocket
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Grease application
A60628

3ZZ-FE:



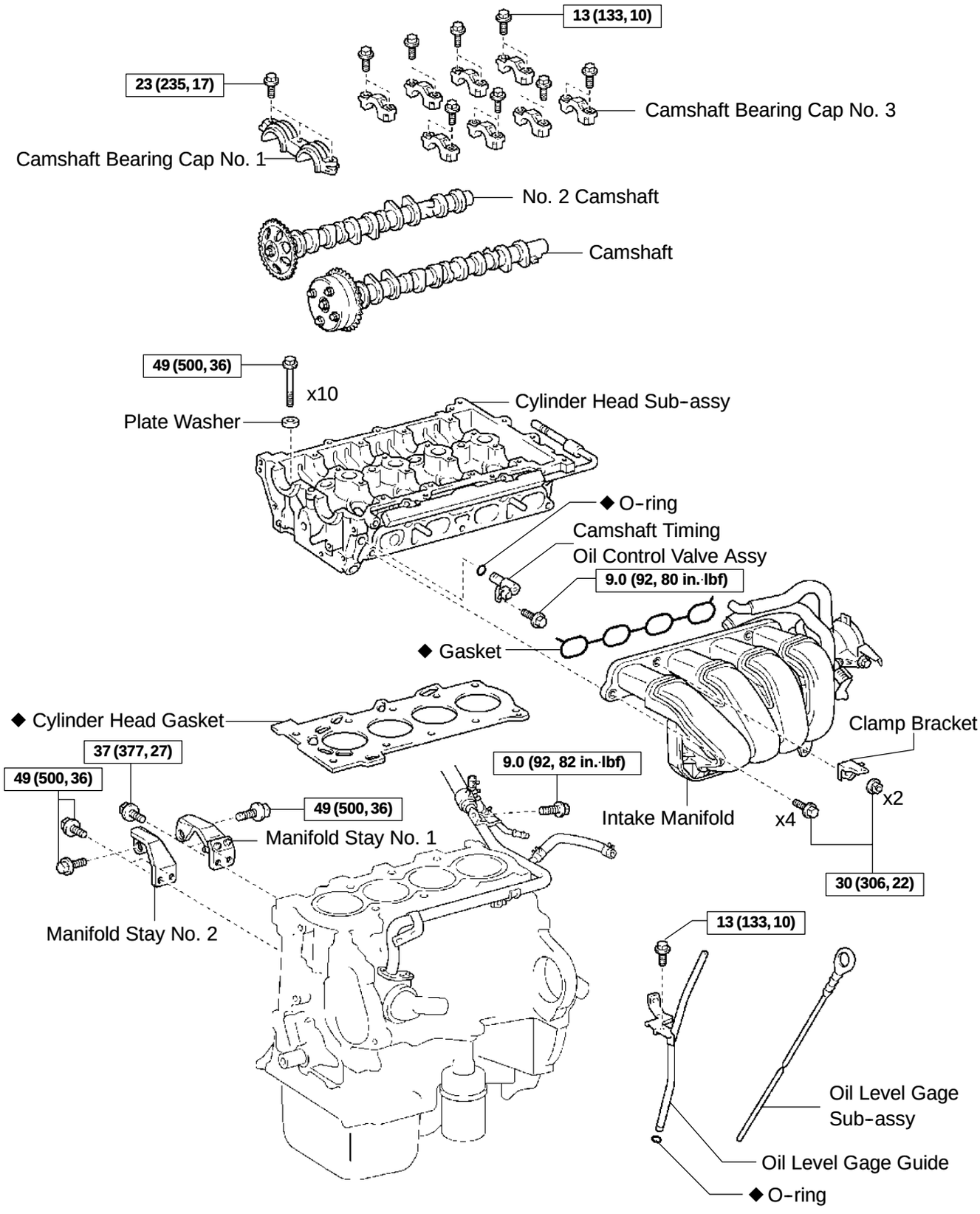
N·m (kgf·cm, ft·lbf): Specified torque

◆ Non-reusable part

Y

A98314

4ZZ-FE:



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

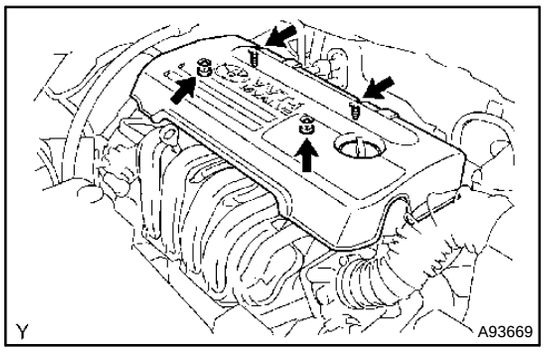
◆ Non-reusable part

A98315

141XH-01

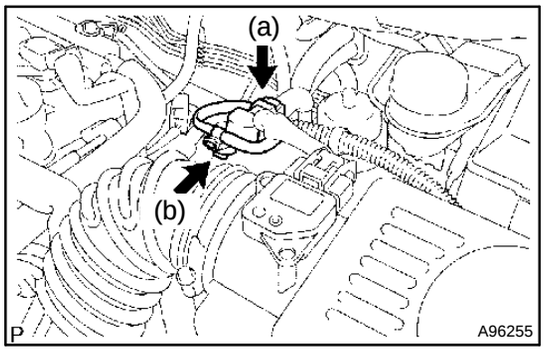
REPLACEMENT

1. **DISCHARGE FUEL SYSTEM PRESSURE** **(See Pub. No. RM925E on page 11-1)**
2. **REMOVE ENGINE UNDER COVER RH**
3. **DRAIN ENGINE COOLANT** **(See page 16-8)**
4. **REMOVE FRONT WHEEL RH**



5. REMOVE CYLINDER HEAD COVER NO.2

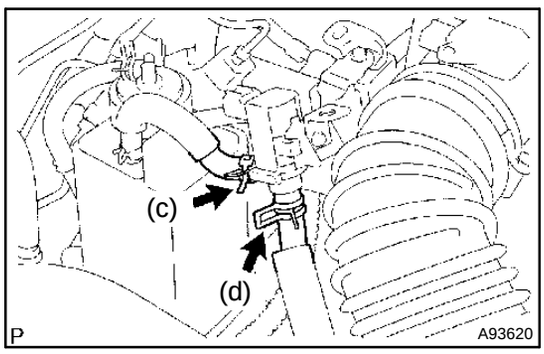
(a) Remove the 2 nuts, 2 clips and cylinder head cover.



6. REMOVE AIR CLEANER HOSE NO.1

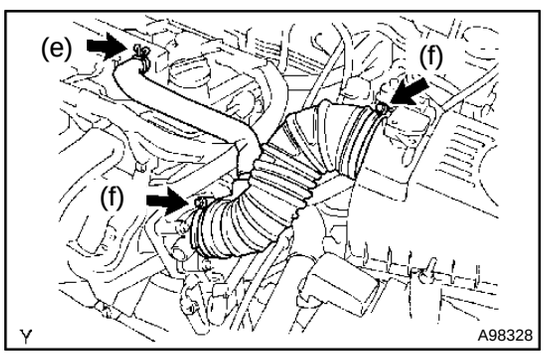
(a) Disconnect the VSV connector.

(b) Remove the clamp of the engine wire.



(c) Disconnect the fuel vapor feed hose No. 1 from the VSV.

(d) Disconnect the fuel vapor feed hose No. 3 from the VSV.



(e) Disconnect the ventilation hose from the cylinder head cover. (3ZZ-FE ENGINE TYPE)

(f) Loosen the 2 air cleaner hose clamp bolts, then remove the air cleaner hose No. 1.

7. DISCONNECT ACCELERATOR CONTROL CABLE ASSY (4ZZ-FE ENGINE TYPE)

(a) Loosen the nut, and remove the accelerator control cable from the accelerator control cable bracket.

8. DISCONNECT WATER BY-PASS HOSE

(a) Disconnect the water by-pass hose from the throttle body.

9. DISCONNECT WATER BY-PASS HOSE NO.2

(a) Disconnect the water by-pass hose from the throttle body.

10. REMOVE EFI FUEL PIPE CLAMP **(See Pub. No. RM925E on page 11-1)**

11. DISCONNECT FUEL TUBE SUB-ASSY **(See Pub. No. RM925E on page 11-1)**

12. DISCONNECT UNION TO CONNECTOR TUBE HOSE

(a) RHD

(1) Disconnect the union to connector tube hose from the brake booster.

(b) LHD

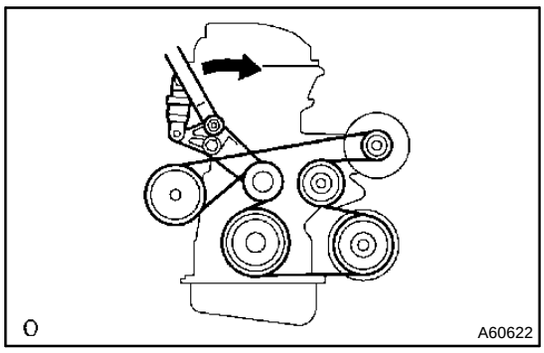
(1) Disconnect the union to connector tube hose from the hose to hose tube.

13. DISCONNECT RADIATOR HOSE INLET

(a) Disconnect radiator hose inlet from the cylinder head.

14. DISCONNECT HEATER INLET WATER HOSE

(a) Disconnect the heater inlet water hose from the cylinder head.



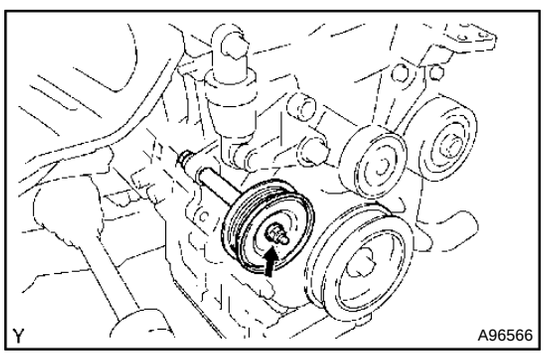
15. REMOVE FAN AND GENERATOR V BELT

(a) Turn the drive belt tensioner clockwise to relieve tension on the belt, and then remove the belt.

(b) Carefully return the tensioner to the unloaded position.

NOTICE:

- **When retracting the tensioner, turn it clockwise slowly in 3 sec. or more. Be sure to not apply force rapidly.**
- **After the tensioner is retracted all the way, do not apply force any more than necessary.**

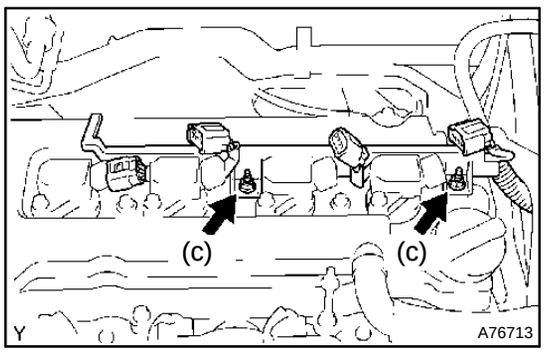


16. REMOVE V-RIBBED IDLER ASSY NO.1

(a) Remove the nut, bolt, tube and idler.

17. REMOVE GENERATOR ASSY

(See Pub. No. RM925E on page 19-20)

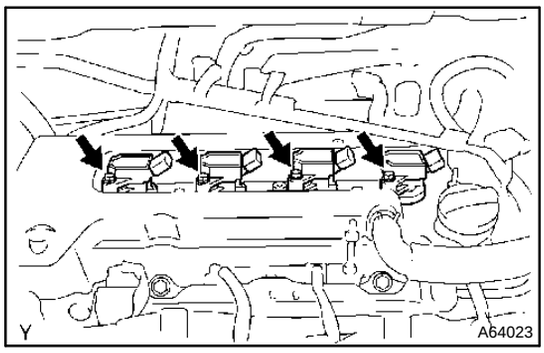


18. REMOVE IGNITION COIL ASSY

(a) Remove the 5 clamps from the 5 clamp brackets.

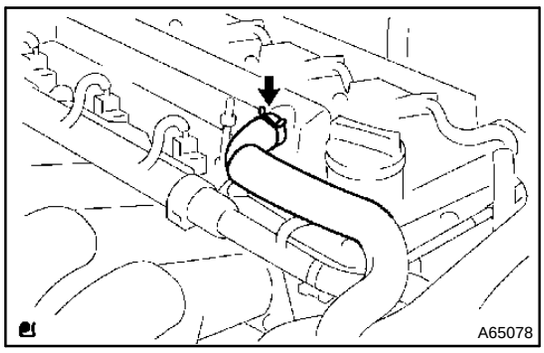
(b) Disconnect the 4 ignition coil connectors.

(c) Remove the 2 nuts which are used to secure the engine wire.



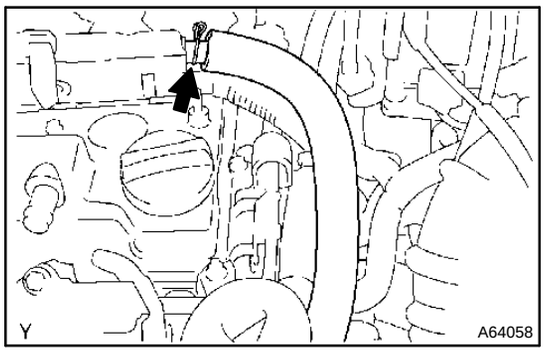
(d) Remove 4 bolts and 4 ignition coils.

19. DISCONNECT ENGINE WIRE



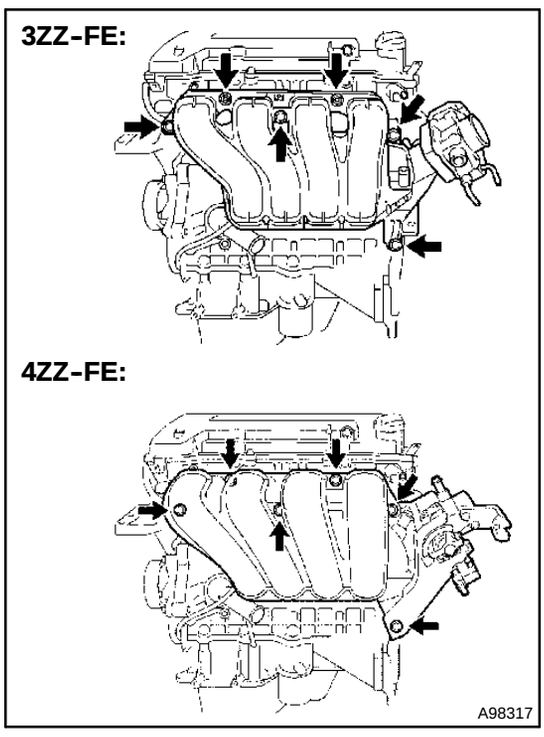
20. DISCONNECT VENTILATION HOSE (4ZZ-FE ENGINE TYPE)

(a) Disconnect the ventilation hose from the cylinder head cover.



21. DISCONNECT VENTILATION HOSE NO.2

(a) Disconnect the ventilation hose from the cylinder head cover.



22. REMOVE INTAKE MANIFOLD

(a) Disconnect the throttle motor connector.
(3ZZ-FE ENGINE TYPE)

(b) Disconnect the vacuum hose from water by-pass pipe No. 1.

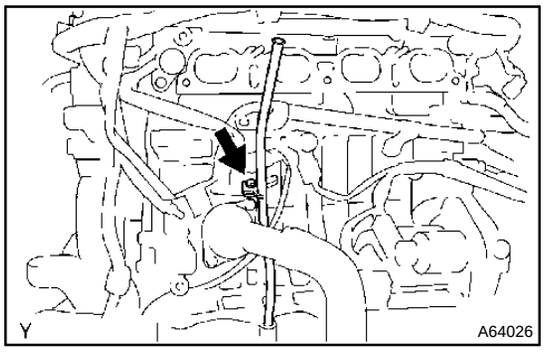
(c) Remove the 4 bolts, 2 nuts and 2 wire brackets.

(d) Remove the intake manifold and throttle body assembly.

(e) Remove the gasket from the intake manifold and throttle body assembly.

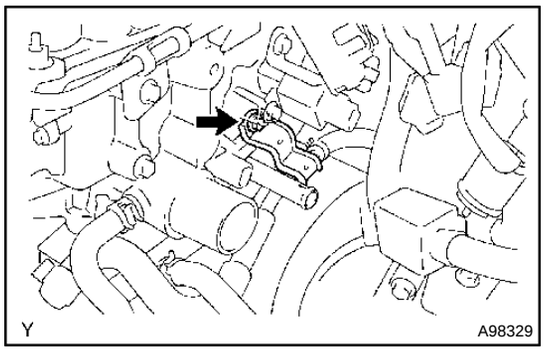
23. REMOVE OIL LEVEL GAGE SUB-ASSY

(a) Remove the oil level gage from the oil level gage guide.



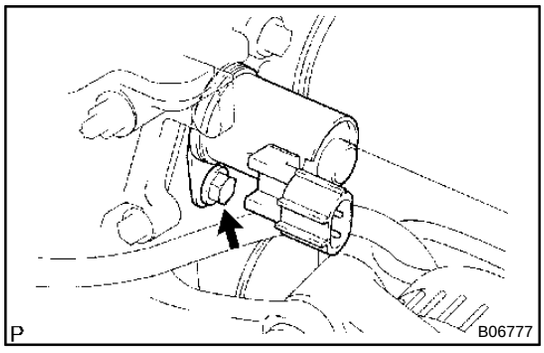
24. REMOVE OIL LEVEL GAGE GUIDE

(a) Remove the bolt and oil level gage guide.



25. SEPARATE WATER BY-PASS PIPE NO.1

(a) Remove the bolt, then separate the water by-pass pipe No. 1.



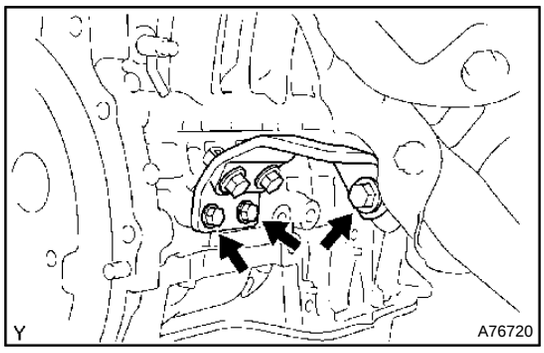
26. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Remove the bolt and camshaft timing oil control valve.

27. SEPARATE EXHAUST PIPE ASSY FRONT

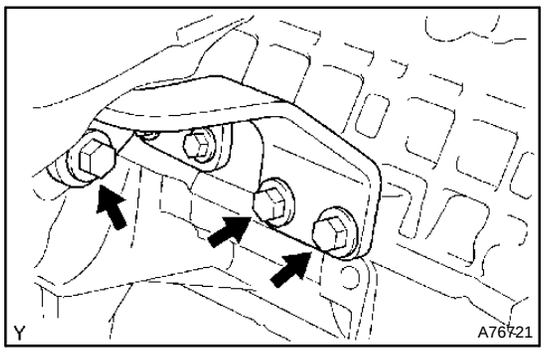
(a) Remove the 2 bolts and 2 compression springs, installing the front side of exhaust pipe.

(b) Remove the gasket.



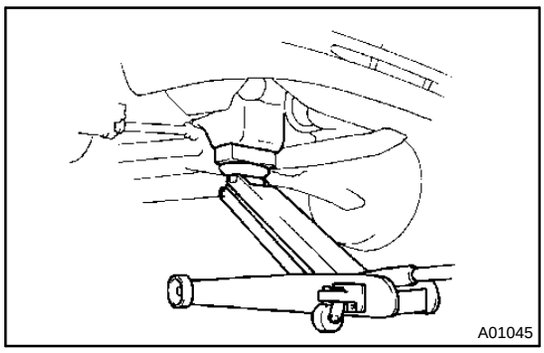
28. REMOVE MANIFOLD STAY

(a) Remove the 3 bolts and manifold stay.



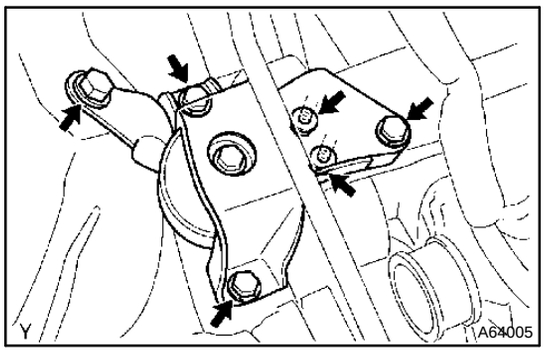
29. REMOVE MANIFOLD STAY NO.2

(a) Remove the 3 bolts and manifold stay No. 2.



30. REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH

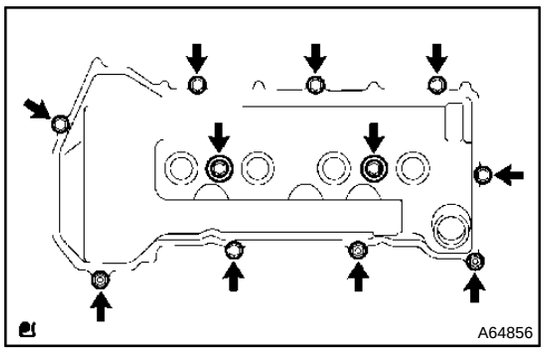
(a) Place a wooden block on a jack, and jack up the engine. Remove the 4 bolts and 2 nuts, then detach the engine mounting insulator RH.

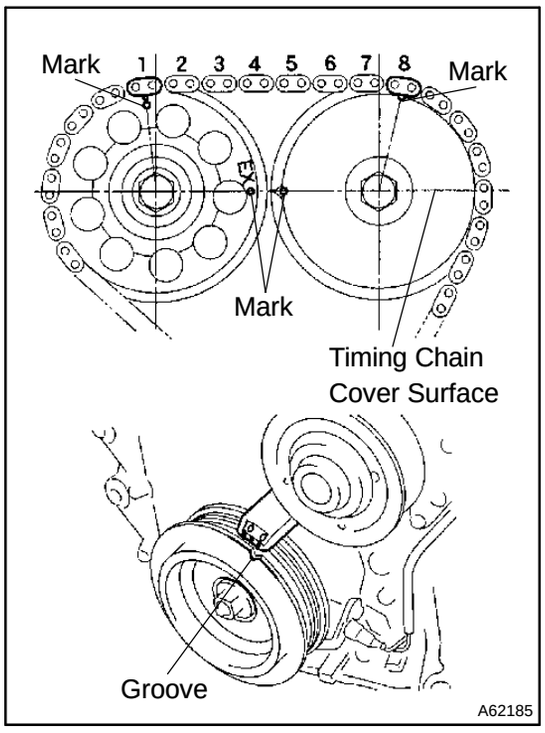


31. REMOVE CYLINDER HEAD COVER SUB-ASSY

(a) Remove the 9 bolts, 2 seal washers, 2 nuts and 3 clamp brackets.

(b) Remove the cylinder head cover.





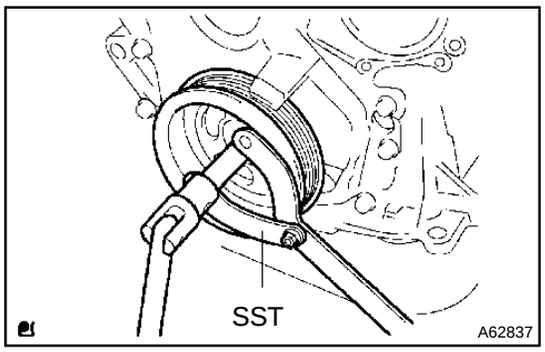
32. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley until the timing groove is aligned with timing mark "0" of the timing chain cover.

(b) Check that the point marks of the camshaft timing sprocket and VVT timing sprocket are in a straight line on the timing chain cover surface as shown in the illustration.

HINT:

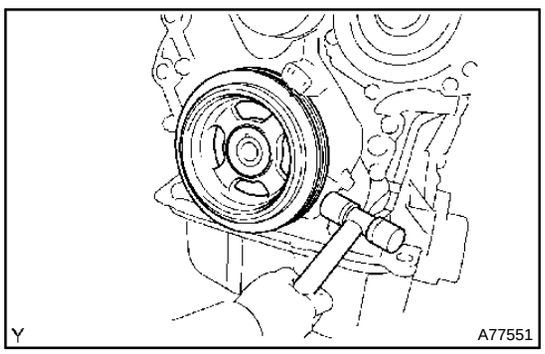
If not, turn the crankshaft 1 revolution (360°) to align the marks as above.



33. REMOVE CRANKSHAFT PULLEY

(a) Using SST, remove the pulley bolt.

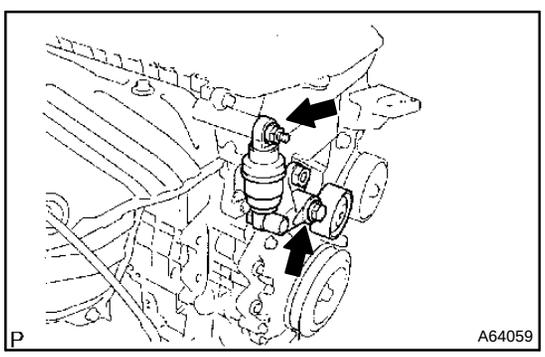
SST 09960-10010 (09962-01000, 09963-01000)



(b) Remove the crankshaft pulley from the crankshaft.

HINT:

If the crankshaft pulley key is stuck, tap it with a plastic-surfaced hammer so that it can be removed.



34. REMOVE V-RIBBED BELT TENSIONER ASSY

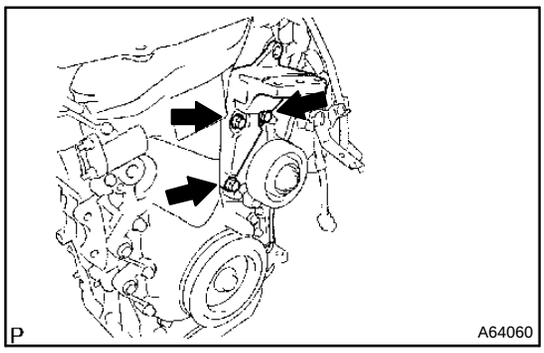
(a) Remove the bolt and nut, then detach the V-ribbed belt tensioner.

HINT:

Jack the engine up and down to remove the bolt.

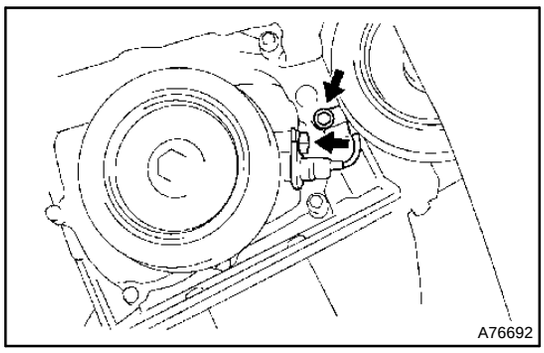
35. REMOVE WATER PUMP ASSY

(See Pub. No. RM925E on page 16-22)



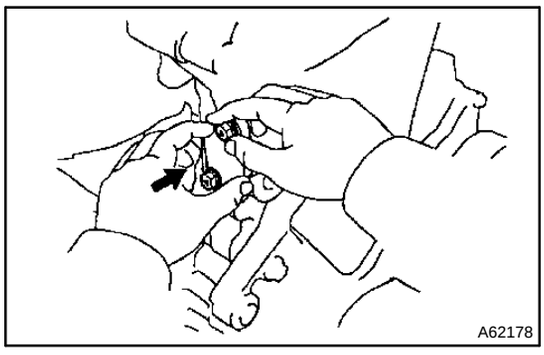
36. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Remove the 3 bolts and transverse engine engine mounting bracket.



37. REMOVE CRANKSHAFT POSITION SENSOR

(a) Remove the 2 bolts which are used to secure the crankshaft position sensor.

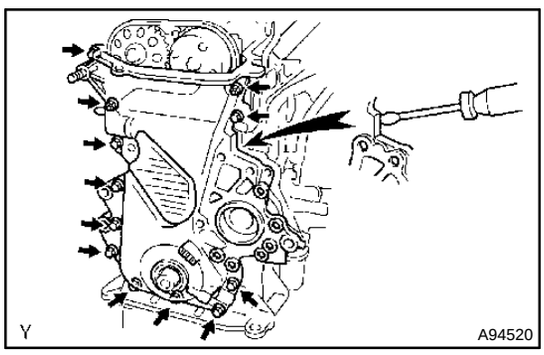


38. REMOVE CHAIN TENSIONER ASSY NO.1

(a) Remove the 2 nuts and chain tensioner.

NOTICE:

Do not turn the crankshaft without the chain tensioner.



39. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY

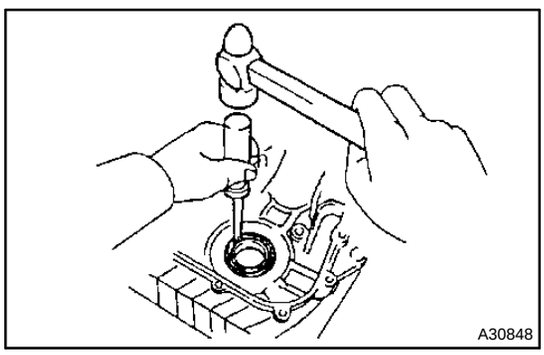
(a) Remove the 10 bolts and 2 nuts.

(b) Using a torx wrench socket (E8), remove the stud bolt.

(c) Remove the timing chain cover by using a screwdriver to pry between the cylinder head and cylinder block.

NOTICE:

Be careful not to damage the timing chain cover, the cylinder head and the cylinder block.



40. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

(a) Using a screwdriver, remove the oil seal.

41. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1

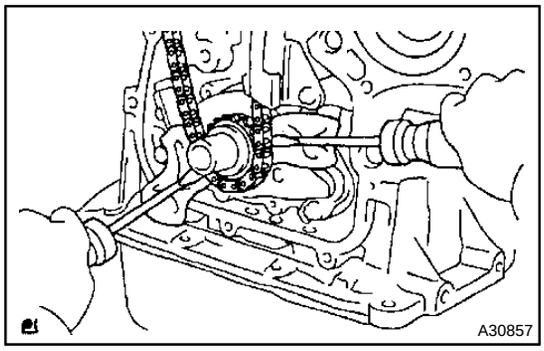
(a) Remove the crankshaft position sensor plate from the crankshaft.

42. REMOVE CHAIN TENSIONER SLIPPER

(a) Remove the bolt and chain tensioner slipper.

43. REMOVE CHAIN VIBRATION DAMPER NO.1

(a) Remove the 2 bolts and chain vibration damper.

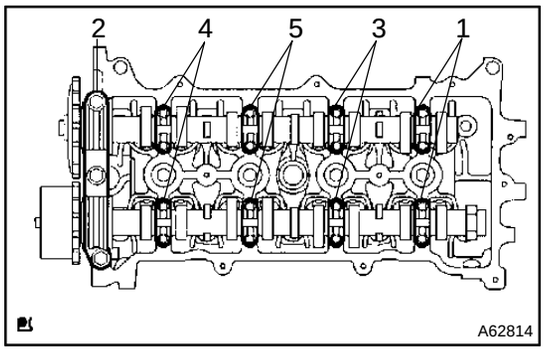


44. REMOVE CHAIN SUB-ASSY

(a) Remove the timing chain by prying the crankshaft timing gear plying using screwdrivers as shown in the illustration.

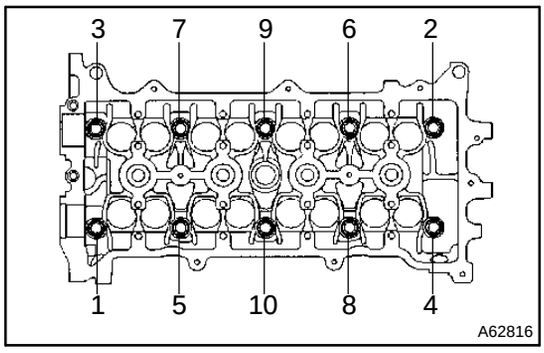
NOTICE:

- **Use a shop rag to protect the engine.**
- **If revolving the camshafts with the chain off the sprockets, turn the crankshaft 1/4 revolution counterclockwise to prevent the valves from coming into contact with the pistons.**



45. REMOVE CAMSHAFT

(a) Using several steps, uniformly loosen and remove the 19 bearing cap bolts in the sequence shown in the illustration. Remove the 9 bearing caps and both intake and exhaust camshafts.

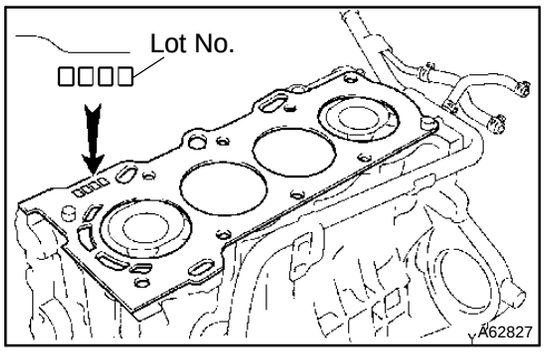


46. REMOVE CYLINDER HEAD SUB-ASSY

(a) Using several steps, uniformly loosen and remove the 10 cylinder head bolts with a 10 mm hexagon wrench in the sequence shown in the illustration. Remove the 10 cylinder head bolts and 10 plate washers.

(b) Remove the cylinder head.

47. REMOVE CYLINDER HEAD GASKET

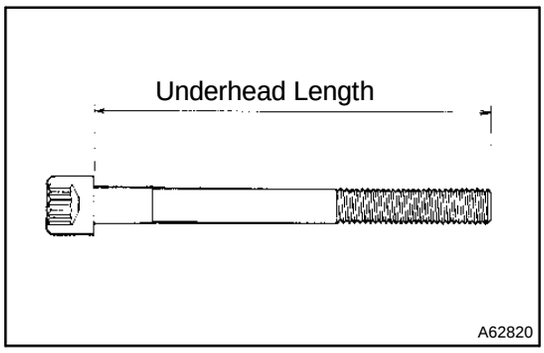


48. INSTALL CYLINDER HEAD GASKET

(a) Place a new cylinder head gasket on the cylinder block with the Lot No. stamp upward.

NOTICE:

- **Make sure that the cylinder head gasket is mounted in the correct direction when installing.**
- **Place the cylinder head on the gasket gently in order to avoid damaging the gasket.**



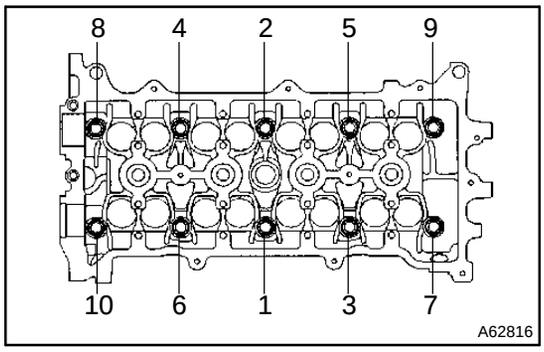
49. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the length of the cylinder head bolts from the seat to the end.

Standard length: 146.8 to 148.2 mm (5.780 to 5.835 in.)

Maximum length: 148.5 mm (5.846 in.)

If the bolt length is greater than maximum, replace the cylinder head set bolt.



50. INSTALL CYLINDER HEAD SUB-ASSY

HINT:

The cylinder head bolts are tightened in 2 successive steps.

(a) Apply a light coat of engine oil to the threads of the cylinder head bolts.

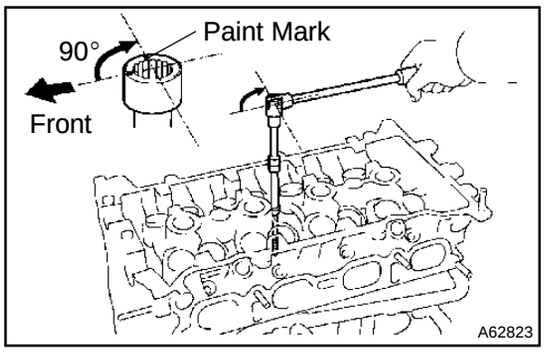
(b) Using several steps, uniformly install and tighten the 10 cylinder head bolts and plate washers with a 10 mm bi-hexagon wrench in the sequence shown in the illustration.

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

(c) Mark the front of the cylinder head bolt with paint.

(d) Retighten the cylinder head bolts 90° in the same sequence as step (b).

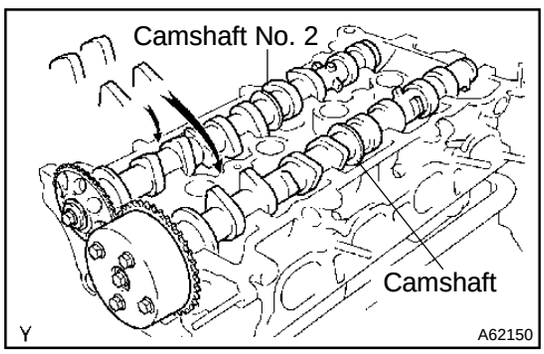
(e) Check that the paint mark of each bolt is at a 90° angle to the front.

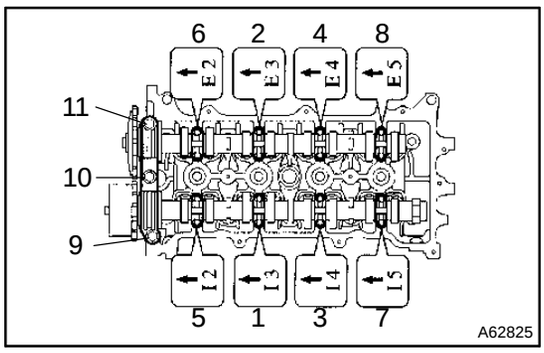


51. INSTALL CAMSHAFT

(a) Apply a light coat of engine oil to the camshaft journals.

(b) Place the 2 camshafts on the cylinder head as shown the illustration.



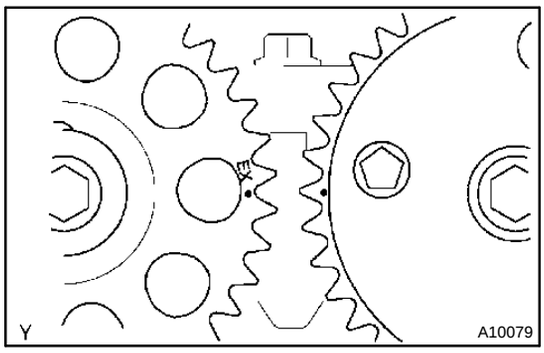


(c) Examine the front marks and numbers and check that the sequence order is as shown in the illustration. Then tighten the bolts.

Torque:

23 N·m (235 kgf·cm, 17 ft·lbf) for bearing cap No. 1

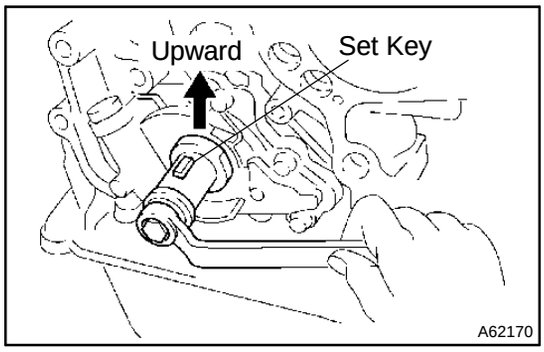
13 N·m (133 kgf·cm, 10 ft·lbf) for bearing cap No. 3



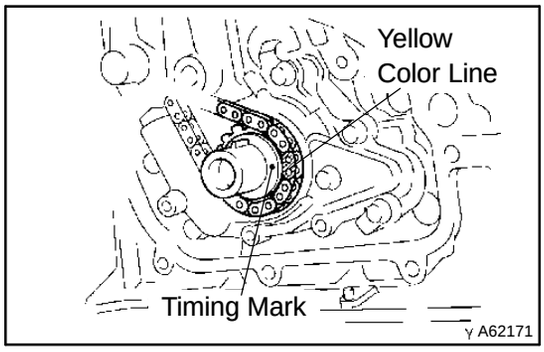
52. INSTALL CHAIN SUB-ASSY

(a) Set No. 1 cylinder to TDC/compression.

(1) Using a wrench, turn the camshafts until the timing marks of the 2 camshaft timing sprockets are aligned.



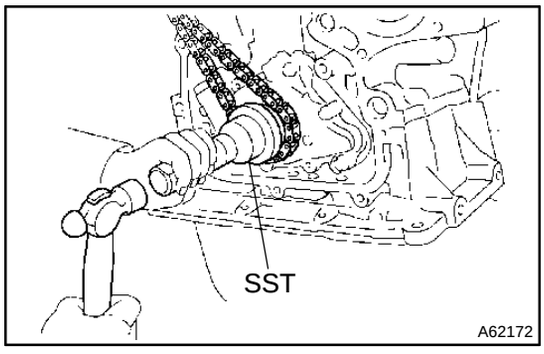
(2) Using a crankshaft pulley bolt, turn the crankshaft to set the set key on the crankshaft upward.



(b) Install the timing chain onto the crankshaft timing sprocket with the yellow color link and the timing mark on the crankshaft timing sprocket aligned.

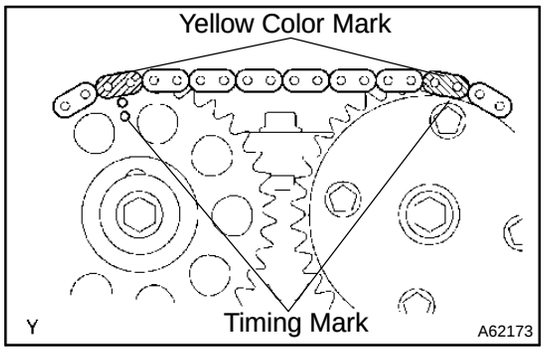
HINT:

Three yellow color links are on the chain.



(c) Using SST, install the crankshaft timing sprocket.

SST 09223-22010



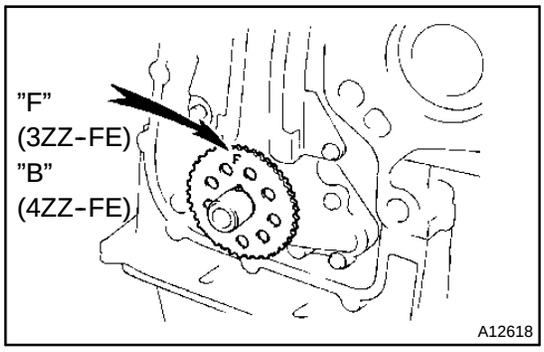
(d) Install the timing chain onto the camshaft timing sprockets with the yellow color links and the timing marks on the camshaft timing sprockets aligned.

53. INSTALL CHAIN VIBRATION DAMPER NO.1

(a) Install chain vibration damper with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

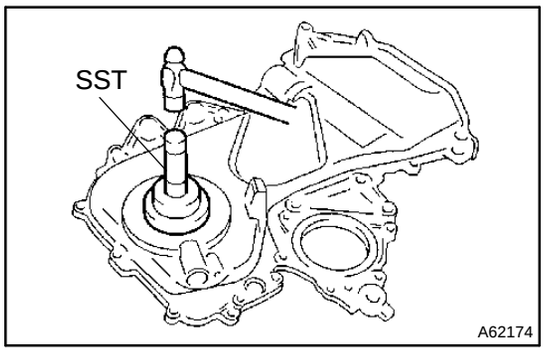
54. INSTALL CHAIN TENSIONER SLIPPER

(a) Install the chain tensioner slipper with the bolt.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



55. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1

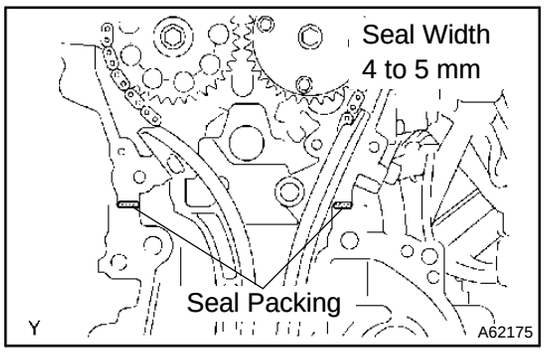
(a) Install the plate with the ”F” (3ZZ–FE) or ”B” (4ZZ–FE) mark facing forward.



56. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL

(a) Apply multi–purpose grease to a new oil seal lip.
(b) Using SST, tap in the oil seal until its surface is flush with the timing chain cover edge.
SST 09223–22010

NOTICE:
Keep the lip free of foreign objects.



57. INSTALL TIMING CHAIN OR BELT COVER SUB–ASSY

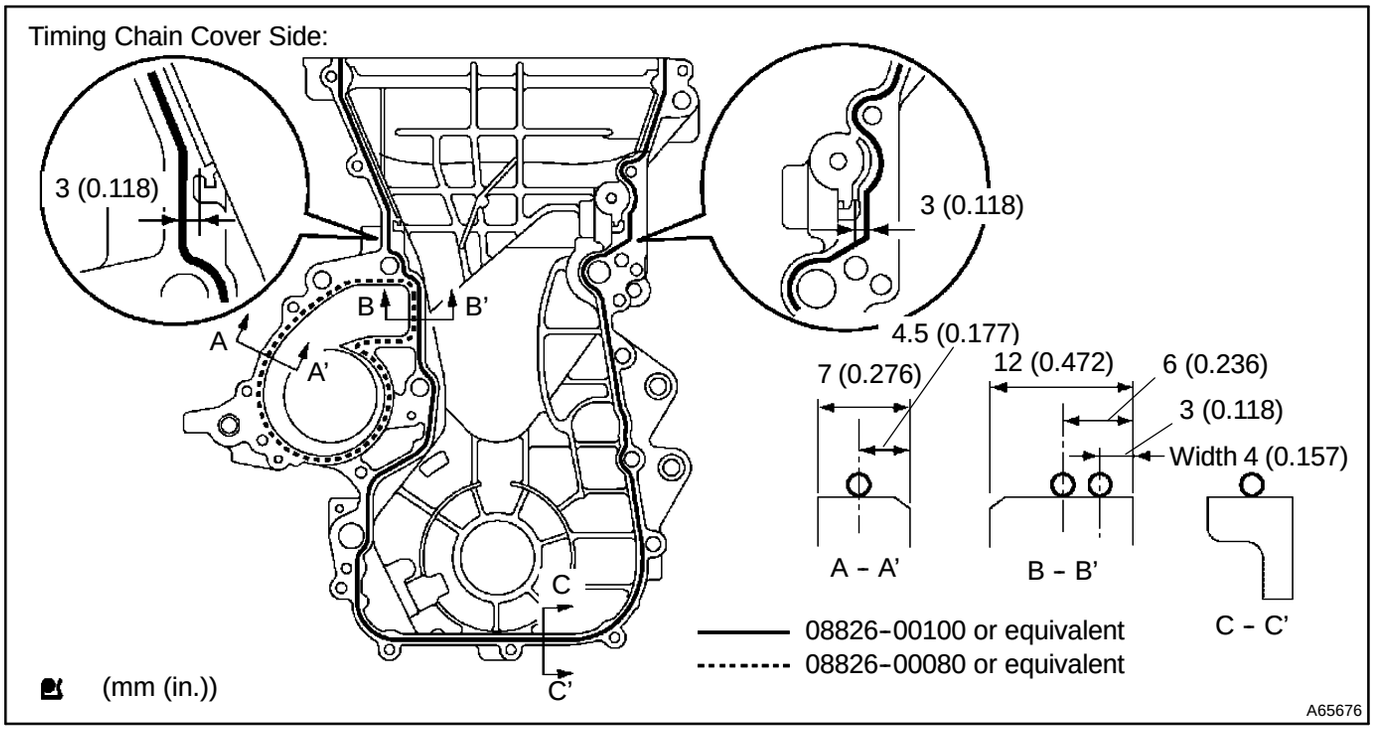
(a) Remove any old packing material from the contact surface.

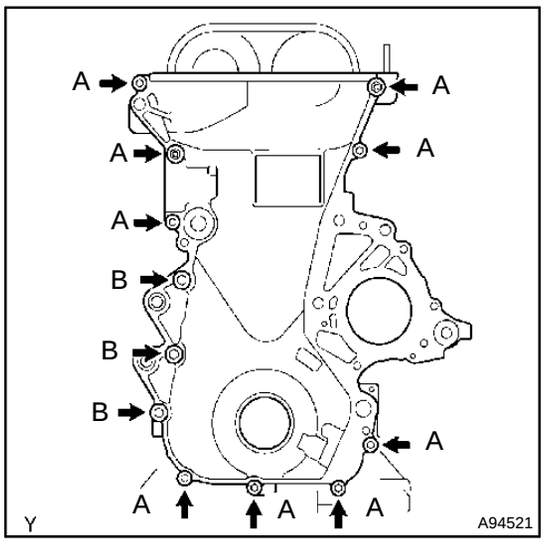
(b) Apply a continuous bead of seal packing (Diameter 3.5 mm to 4.5 mm (0.1379 to 0.177 in.)) as shown in the illustration.

Seal packing:
Water pump part: part No. 08826–00100 or equivalent
Other part: part No. 08826–00080 or equivalent.

NOTICE:

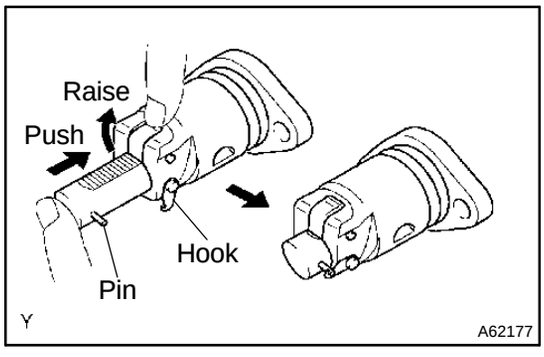
- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes of applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installation.**
- **Do not apply seal packing too much more than the specified amount.**





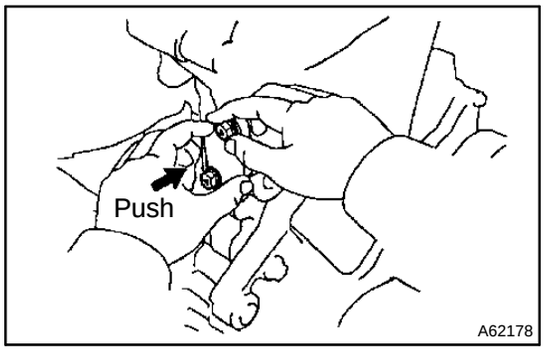
(c) Install the timing chain cover with the 10 bolts and 2 nuts.
Torque:
13 N·m (133 kgf·cm, 10 ft·lbf) for A
19 N·m (194 kgf·cm, 14 ft·lbf) for B

(d) Using a torx wrench socket (E8), install the stud bolt.
Torque: 9.5 N·m (97 kgf·cm, 84 in.·lbf)



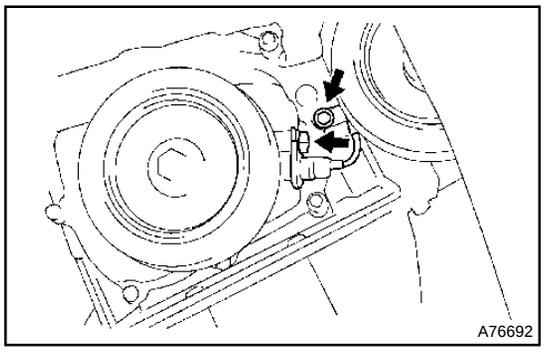
58. INSTALL CHAIN TENSIONER ASSY NO.1

(a) Check that the O-ring is clean, then set the hook as shown in the illustration.



(b) Apply engine oil to the chain tensioner and install it with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

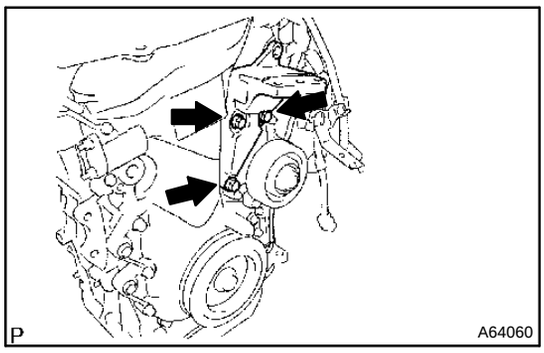
NOTICE:
If the hook released the plunger during installation, rehook the plunger.



59. INSTALL CRANKSHAFT POSITION SENSOR

(a) Apply a light coat of the engine oil to the O-ring of the crankshaft position sensor.

(b) Install the crank position sensor with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



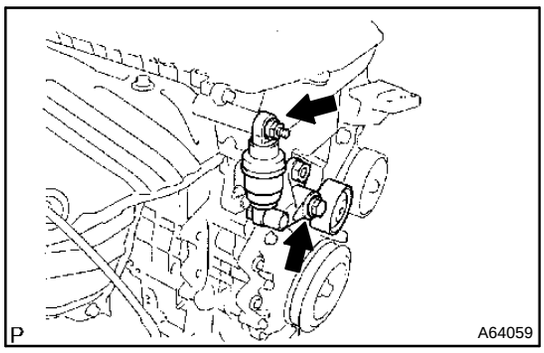
60. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Install the transverse engine engine mounting bracket with the 3 bolts.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

61. INSTALL WATER PUMP ASSY

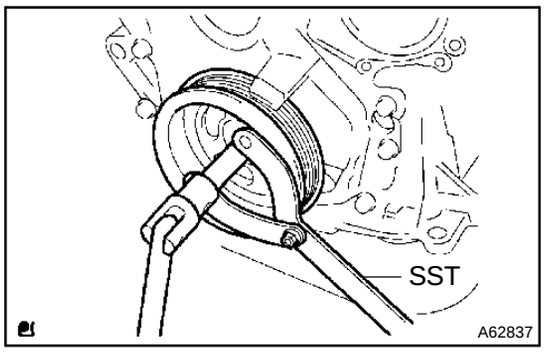
(See Pub. No. RM925E on page 16-22)



62. INSTALL V-RIBBED BELT TENSIONER ASSY

(a) Install the V-ribbed belt tensioner with the nut and bolt.

Torque:
29 N·m (296 kgf·cm, 21 ft·lbf) for nut
69 N·m (704 kgf·cm, 51 ft·lbf) for bolt



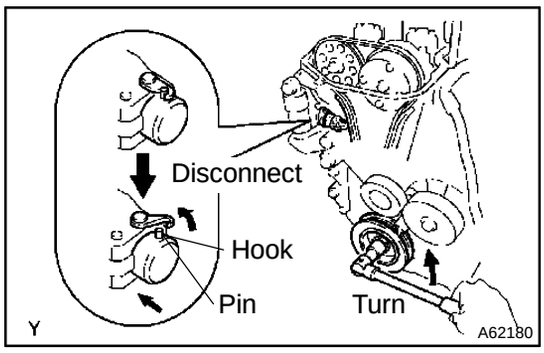
63. INSTALL CRANKSHAFT PULLEY

(a) Align the keyway of the pulley with the key located on the crankshaft, then slide on the crankshaft pulley.

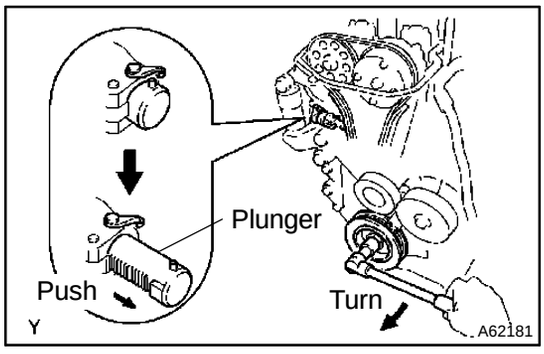
(b) Using SST, install the crankshaft pulley bolt.

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

Torque: 138 N·m (1,407 kgf·cm, 102 ft·lbf)



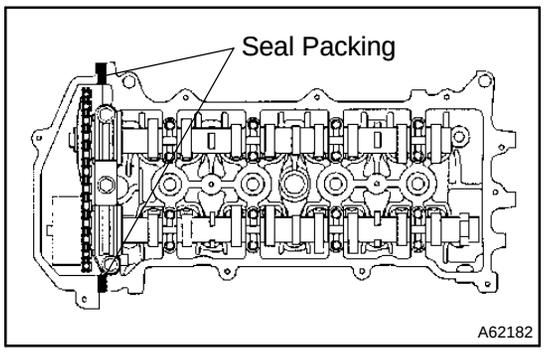
(c) Turn the crankshaft counterclockwise, then take the hook off the knock pin to release the plunger.



(d) Turn the crankshaft clockwise, then check that the plunger is extended.

HINT:

If the plunger is not extended, press the slipper into the chain tensioner using a screwdriver so that the hook is taken off from the knock pin and the plunger can be extended.



64. INSTALL CYLINDER HEAD COVER SUB-ASSY

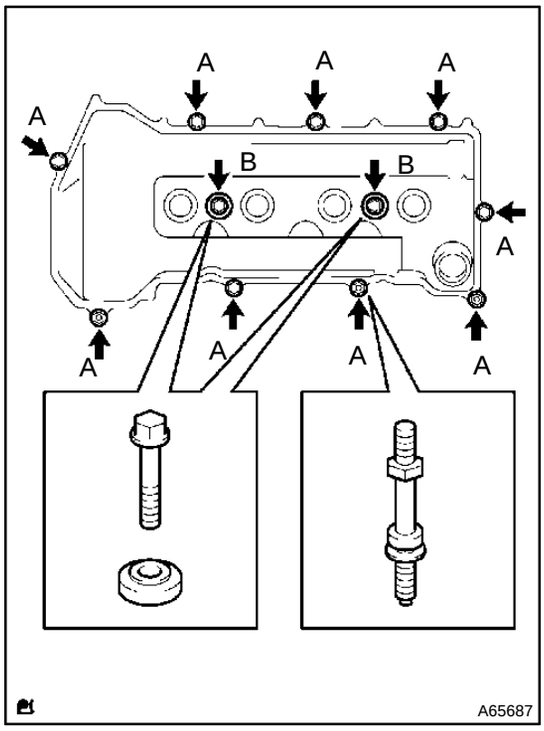
(a) Remove any old packing (FIPG) material.

(b) Apply seal packing to the 2 locations as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

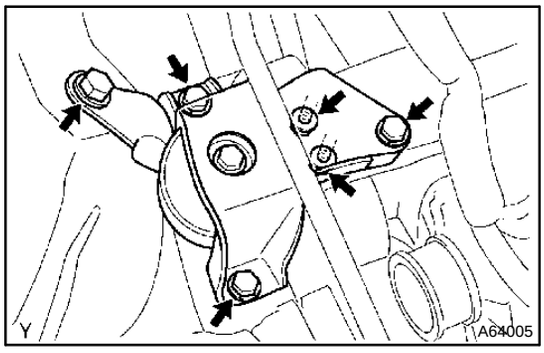
NOTICE:

- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes of applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installation.**



(c) Install the cylinder head cover and 3 cable brackets with the 9 bolts, 2 seal washers and 2 nuts. Uniformly tighten the bolts and nuts in several steps.

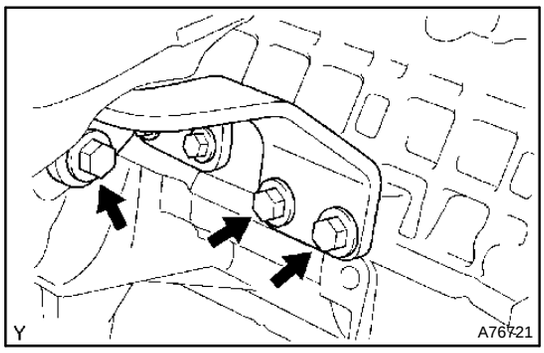
Torque:
11 N·m (112 kgf·cm, 8 ft·lbf) for A
9.0 N·m (92 kgf·cm, 80 in.·lbf) for B



65. INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH

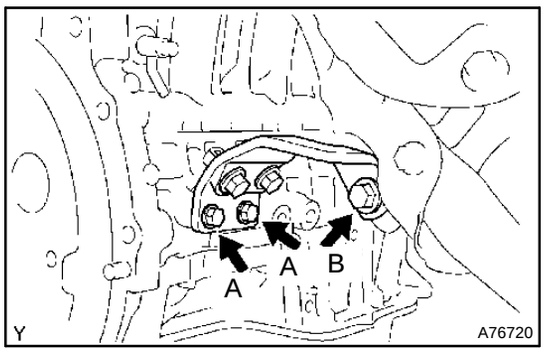
(a) Install the engine mounting insulator RH with the 4 bolts and 2 nuts.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



66. INSTALL MANIFOLD STAY NO.2

(a) Install the manifold stay No. 2 with the 3 bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

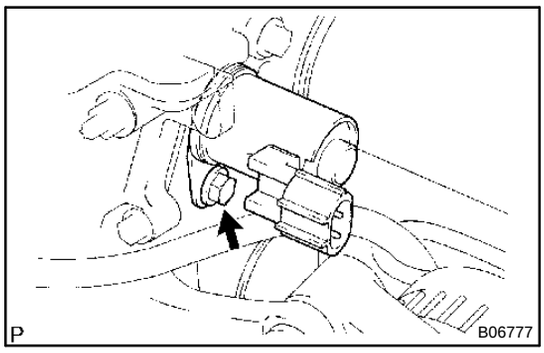


67. INSTALL MANIFOLD STAY

(a) Install the manifold stay with 3 bolts.
Torque:
37 N·m (377 kgf·cm, 27 ft·lbf) for bolt A
49 N·m (500 kgf·cm, 36 ft·lbf) for bolt B

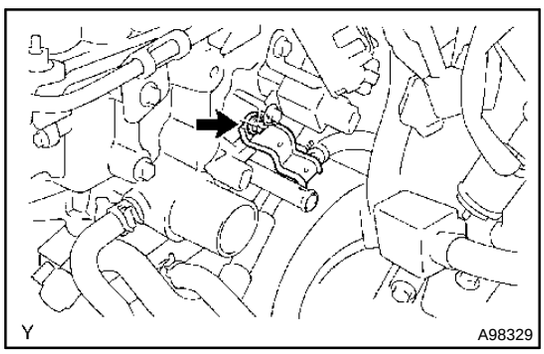
68. INSTALL EXHAUST PIPE ASSY FRONT

(See Pub. No. RM925E on page 15-5)



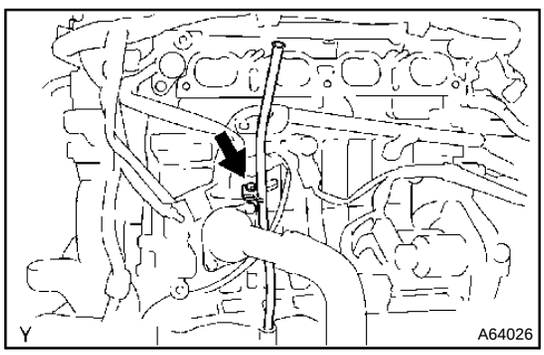
69. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Apply a light coat of engine oil to a new O-ring, then install it onto the camshaft timing oil control valve.
(b) Install the camshaft timing oil control valve with the bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



70. INSTALL WATER BY-PASS PIPE NO.1

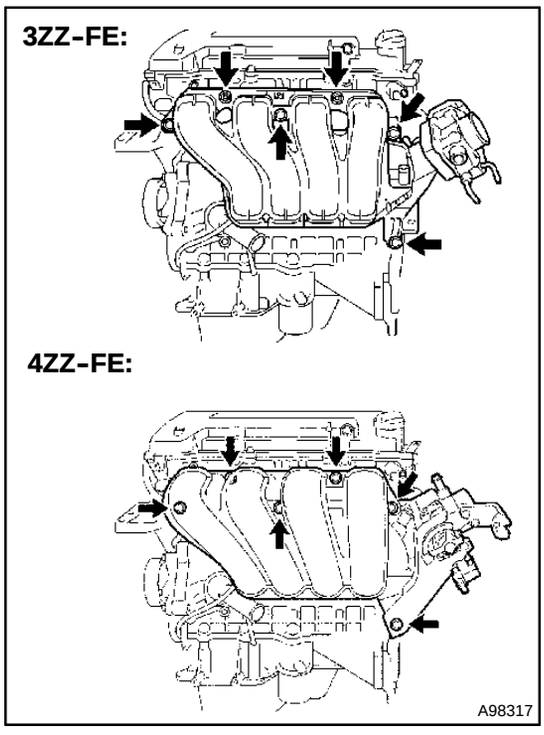
(a) Install the water by-pass pipe No. 1 with the bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



71. INSTALL OIL LEVEL GAGE GUIDE

(a) Apply a light coat of engine oil to a new O-ring, then install it onto the oil level gage guide.
(b) Install the oil level gage guide with the bolt.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

72. INSTALL OIL LEVEL GAGE SUB-ASSY



73. INSTALL INTAKE MANIFOLD

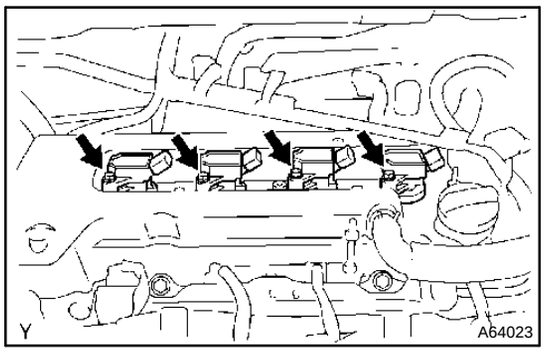
(a) Install a new gasket onto the intake manifold.

(b) Install the intake manifold and the throttle body assembly with the 2 brackets, 4 bolts and 2 nuts.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)

(c) Connect the vacuum hose to water by-pass pipe No. 1.

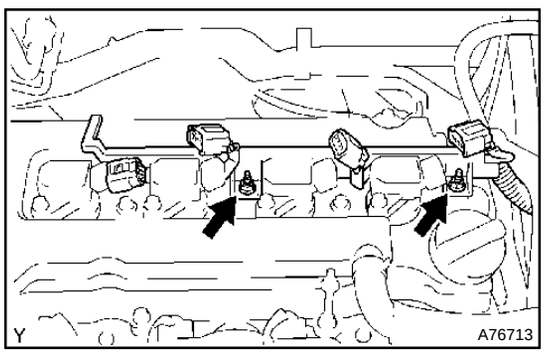
(d) Connect the throttle control motor connector.
(3ZZ-FE ENGINE TYPE)

74. INSTALL ENGINE WIRE



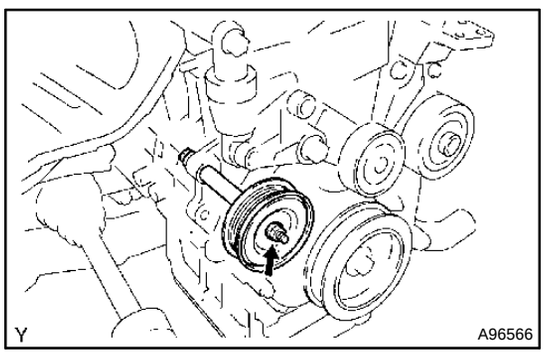
75. INSTALL IGNITION COIL ASSY

(a) Install the 4 ignition coils with the 4 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



(b) Install the engine wire with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

76. INSTALL GENERATOR ASSY
(See Pub. No. RM925E on page 19-20)

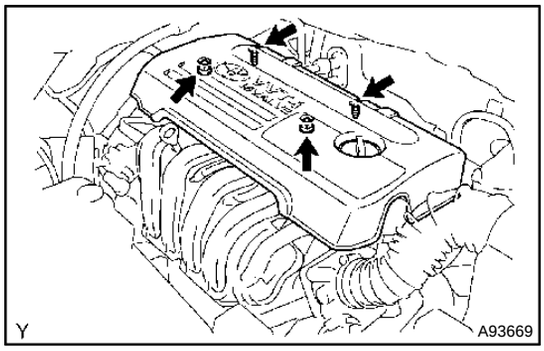


77. INSTALL V-RIBBED IDLER ASSY NO.1

(a) Install the tube and idler with the nut and bolt.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

78. INSTALL FAN AND GENERATOR V BELT **(See Pub. No. RM925E on page 14-86)**

79. INSTALL AIR CLEANER HOSE NO.1
Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)



80. INSTALL CYLINDER HEAD COVER NO.2
(a) Install the cylinder head cover with the 2 nuts and 2 clips.
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

81. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1050 kgf·cm, 76 ft·lbf)

82. ADD ENGINE COOLANT **(See page 16-8)**

83. INSPECT COMPRESSION **(See Pub. No. RM925E on page 14-82)**
SST 09992-00500

84. INSPECT CO/HC **(See Pub. No. RM925E on page 14-82)**

85. INSPECT IGNITION TIMING **(See Pub. No. RM925E on page 14-82)**
SST 09843-18030, 09843-18040

86. CHECK FOR ENGINE COOLANT LEAKS **(See page 16-1)**

87. CHECK FOR ENGINE OIL LEAKS

88. CHECK FOR EXHAUST GAS LEAKS

VALVE CLEARANCE (2ZZ-GE)

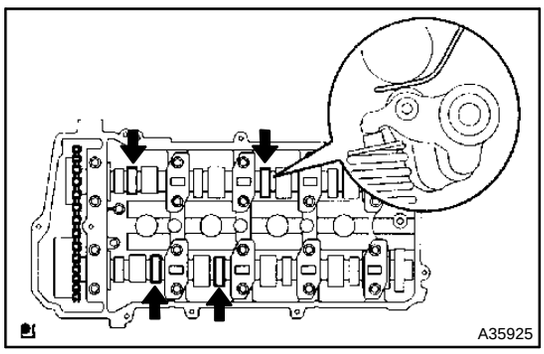
141XJ-01

ADJUSTMENT

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **REMOVE ENGINE UNDER COVER RH**
3. **REMOVE SUSPENSION TOWER DAMPER ASSY** **(See page 26-8)**
4. **REMOVE CYLINDER HEAD COVER NO.2**

(a) Remove the 3 bolts and nut, then remove the cylinder head cover No. 2.

5. **REMOVE WIRE HARNESS PROTECTOR** **(See page 14-78)**
6. **SEPARATE SUCTION HOSE SUB-ASSY** **(See page 14-78)**
7. **REMOVE AIR SWITCHING VALVE ASSY** **(See Pub. No. RM925E on page 12-6)**
8. **REMOVE FAN AND GENERATOR V BELT** **(See page 14-78)**
9. **REMOVE GENERATOR BRACKET NO.1** **(See Pub. No. RM925E on page 19-8)**
10. **REMOVE GENERATOR ASSY** **(See Pub. No. RM925E on page 19-8)**
11. **REMOVE IGNITION COIL ASSY** **(See page 14-78)**
12. **REMOVE CYLINDER HEAD COVER SUB-ASSY** **(See page 14-78)**
13. **SET NO. 1 CYLINDER TO TDC/COMPRESSION** **(See page 14-78)**



14. **INSPECT VALVE CLEARANCE**

(a) Check only the valves indicated.

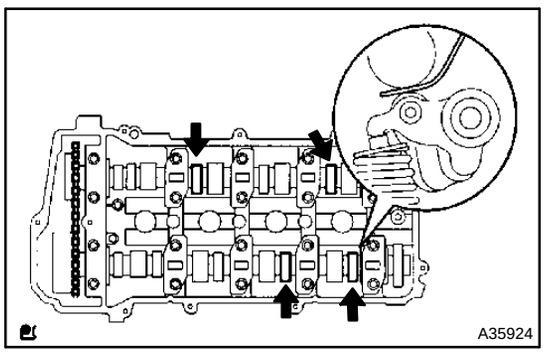
(1) Using a feeler gauge, measure the clearance between the valve rocker arm and camshaft.

(2) Record any out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

Intake	0.08 to 0.18 mm (0.0031 to 0.0071 in.)
Exhaust	0.22 to 0.32 mm (0.0087 to 0.0126 in.)

(b) Turn the crankshaft 1 revolution (360°) to set the No. 4 cylinder to the TDC/compression.



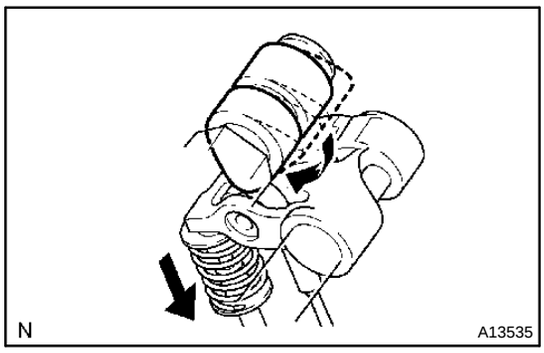
(c) Check only the valves indicated.

(1) Using a feeler gauge, measure the clearance between the valve rocker arm and camshaft.

(2) Record any out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

Intake	0.08 to 0.18 mm (0.0031 to 0.0071 in.)
Exhaust	0.22 to 0.32 mm (0.0087 to 0.0126 in.)



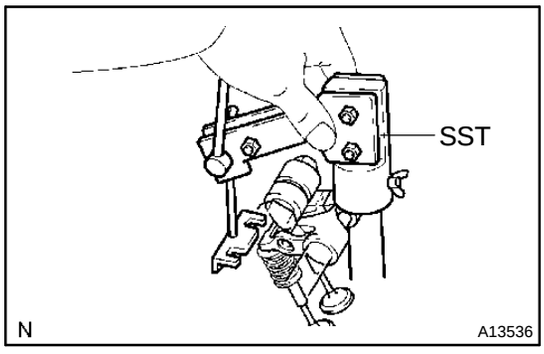
15. ADJUST VALVE CLEARANCE

(a) Set SST.

(1) Turn the crankshaft so that the related rocker arm, where the valve clearance is adjusted, is fully pushed down.

NOTICE:

Remove the spark plug, then release the compression.

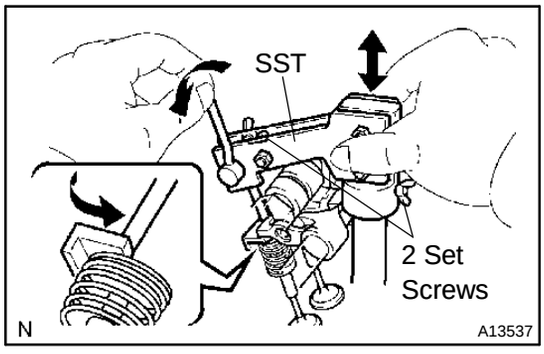


(2) Insert SST into the plug tube.

SST 09248-77010 (09248-07010)

NOTICE:

- **SST cannot be inserted unless the set screw is loosened.**
- **Make sure that the camshaft is in the same condition as step (1).**

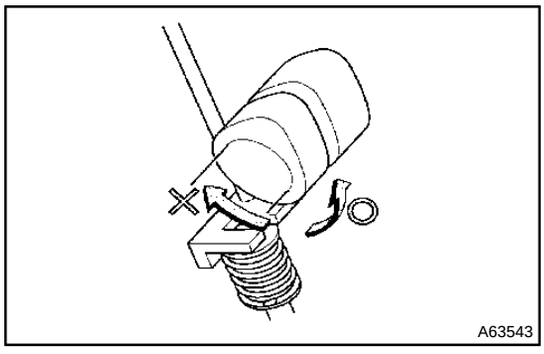


(3) Operate the lever so that the SST seat surface comes into contact with the valve retainer, then lock them with the 2 set screws.

NOTICE:

- **Clearance between the valve retainer and SST seat surface is not allowed.**
- **Be careful not to make clearance when inserting SST since a presence of clearance may unlock the keeper.**

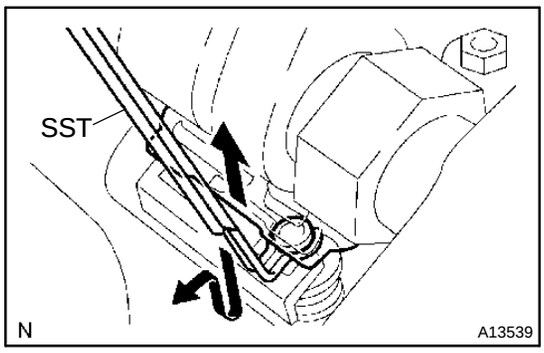
(4) Lock the set screw on the plug tube side of SST.

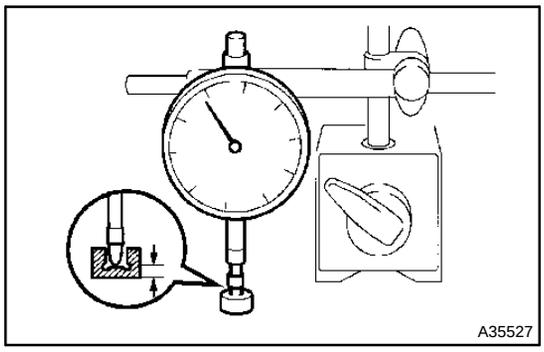


(5) Turn the crankshaft so that the camshaft is positioned as shown in the illustration.

NOTICE:

- **Take care of the rotation direction to prevent the camshaft lobe from interfering with the SST shaft.**
- **Do not turn the crankshaft excessively.**





(b) Remove the adjusting shim.

(1) Lift the rocker arm to make room, then remove the adjusting shim using SST.

SST 09248-77010 (09248-07010)

NOTICE:

Do not remove SST with the adjusting shim removed.

HINT:

- Setting SST from the upper right makes the removal easier.
- If there is not enough room, reset SST.

(2) Determine the size of the replaced shim according to the formulas or charts:

- Using a dial indicator, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

A	Thickness of new shim
B	Thickness of used shim
C	Measured valve clearance

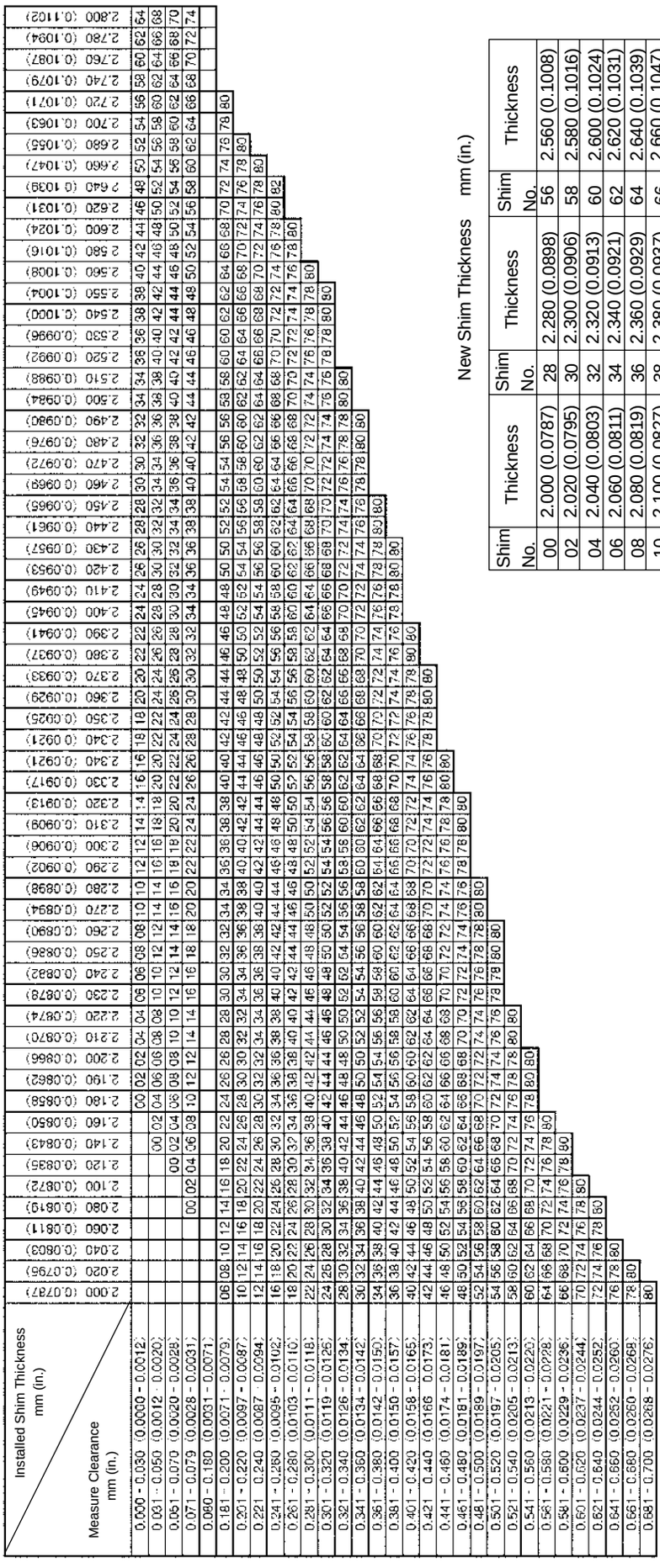
Intake: A = B + (C - 0.13 mm (0.005 in.)) × 1.5

Exhaust: A = B + (C - 0.27 mm (0.011 in.)) × 1.5

HINT:

Shim are available in 41 sizes in increments of 0.020 mm (0.0008 in.), from 2.000 mm (0.0787 in.) to 2.800 mm (0.1102 in.).

Valve Shim Selection Chart (Intake)



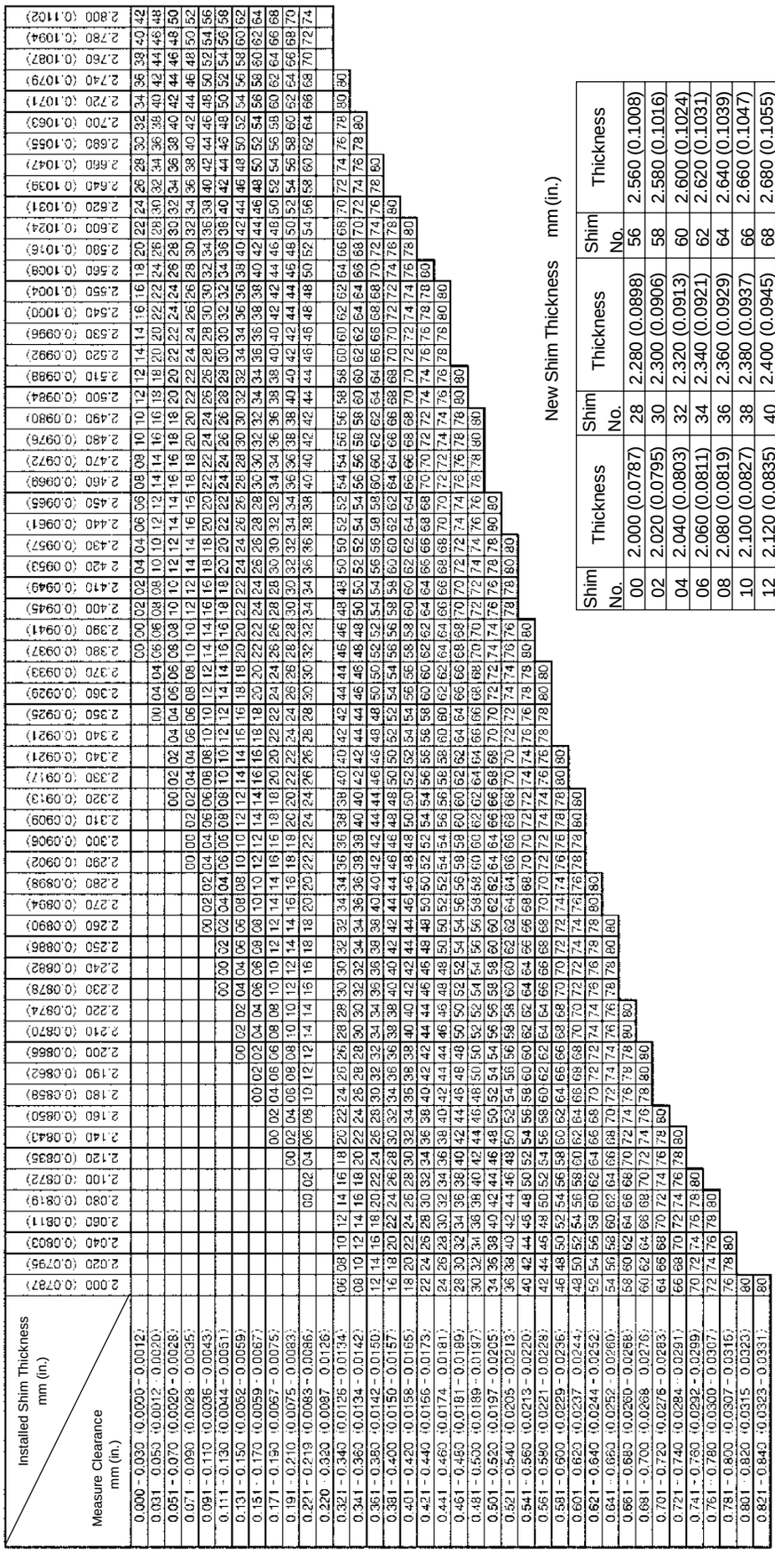
New Shim Thickness mm (in.)

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)		

Intake valve clearance (Cold):
0.08 to 0.18 mm (0.0031 to 0.0071 in.)
EXAMPLE: The 2.200 mm (0.0826 in.) shim is installed, and the measured clearance is 0.400 mm (0.0157 in.).
Replace the 2.600 mm (0.1024 in.) shim with a new No. 60 shim.

A96945

Valve Shim Selection Chart (Exhaust)

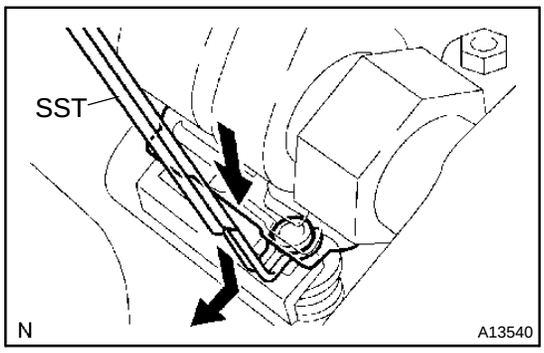


Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)
08	2.080 (0.0819)	36	2.360 (0.0929)	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)		

New Shim Thickness mm (in.)

Exhaust valve clearance (Cold):
0.22 to 0.32 mm (0.0087 to 0.0126 in.)
EXAMPLE: The 2.200 mm (0.0862 in.) shim is installed, and the measured clearance is 0.500 mm (0.0197 in.).
Replace the 2.540 mm (0.1000 in.) shim with a new No. 54 shim.

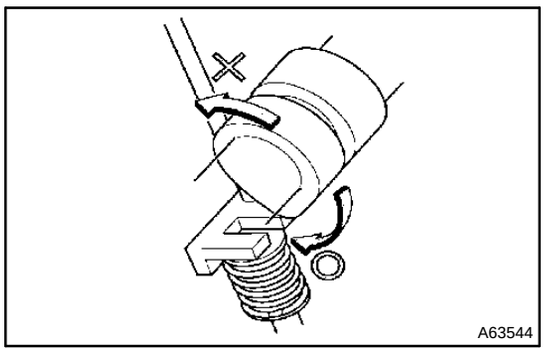
A96946



(c) Using SST, lift the rocker arm to make room, then install the adjusting shim.

HINT:

- Setting SST from the upper right makes the removal easy.
- To remove SST from the adjusting shim, it is advisable to push down the rocker arm.



(d) Turn the crankshaft so that the related rocker arm, where the valve clearance is adjusted, is fully pushed down.

NOTICE:

- **Take care of the rotation direction to prevent the camshaft lobe from interfering with the SST shaft.**
- **Do not rotate the crankshaft excessively.**

(e) After loosening the 2 set screws of SST, remove SST itself.

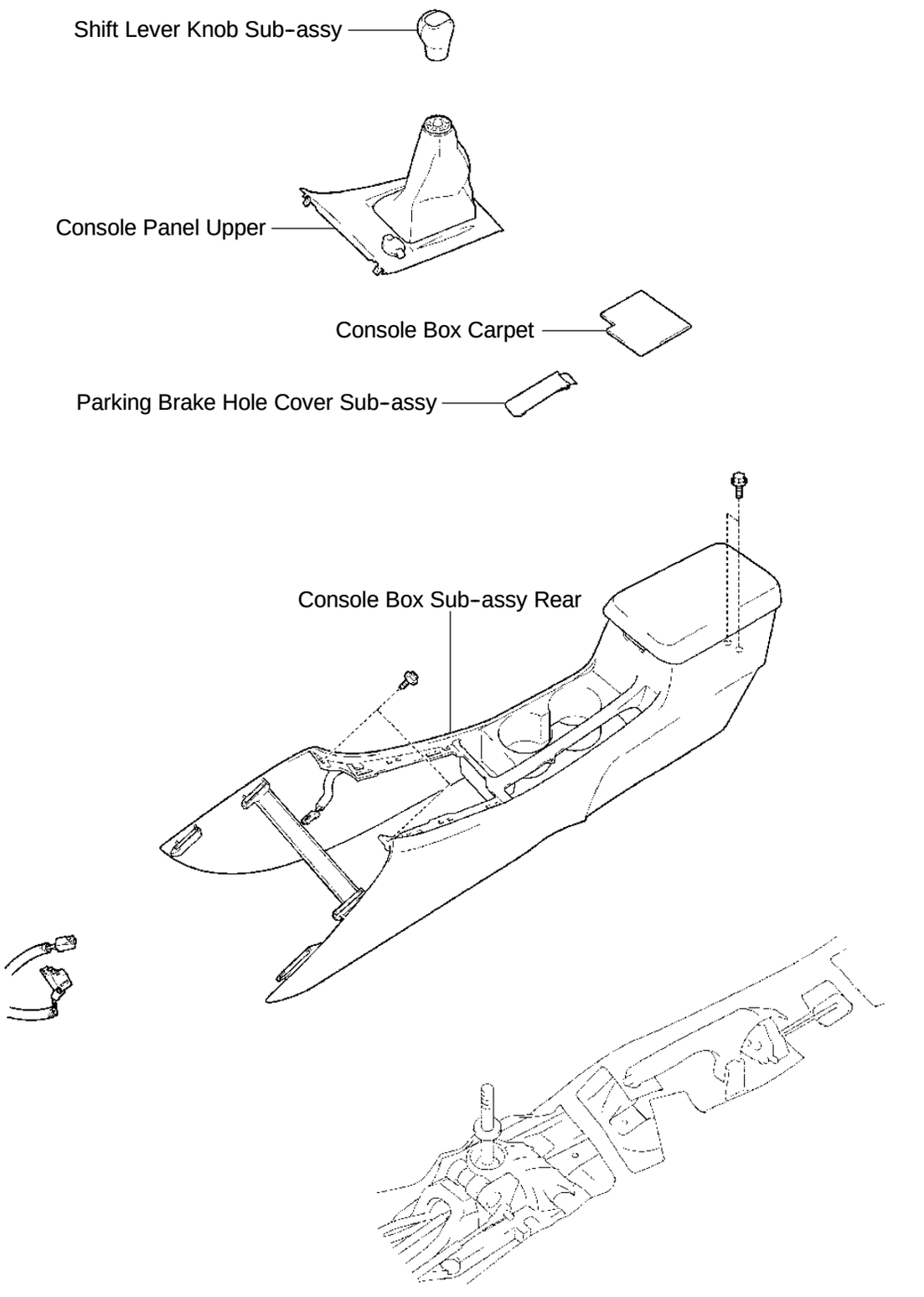
SST 09248-77010 (09248-07010)

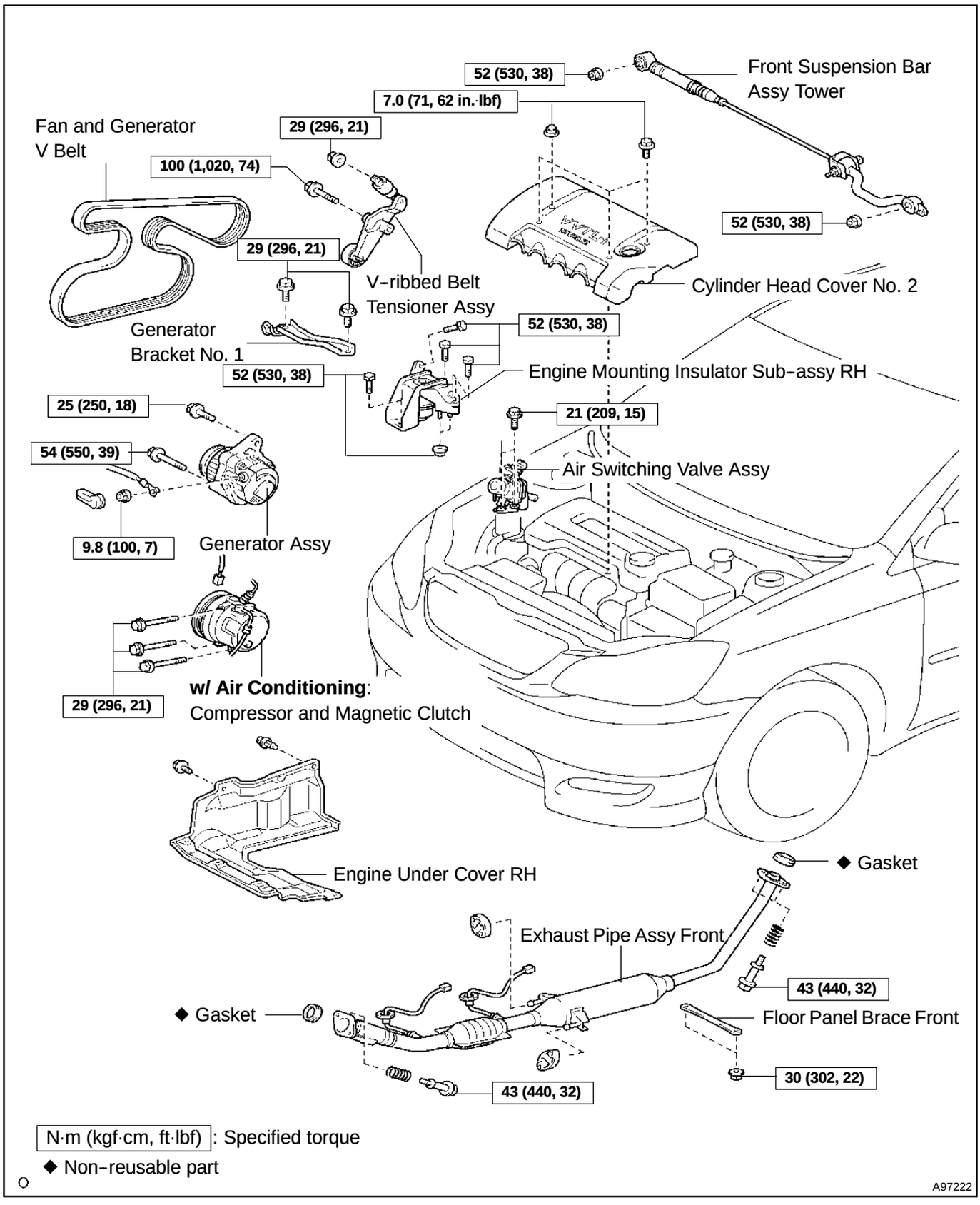
16. INSTALL CYLINDER HEAD COVER SUB-ASSY (See page 14-78)
17. INSTALL IGNITION COIL ASSY (See page 14-78)
18. INSTALL GENERATOR ASSY (See Pub. No. RM925E on page 19-8)
19. INSTALL GENERATOR BRACKET NO.1 (See Pub. No. RM925E on page 19-8)
20. INSTALL AIR SWITCHING VALVE ASSY (See Pub. No. RM925E on page 12-6)
21. INSTALL SUCTION HOSE SUB-ASSY
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
22. INSTALL SUSPENSION TOWER DAMPER ASSY (See page 26-8)
23. CONNECT BATTERY NEGATIVE TERMINAL
24. CHECK FOR ENGINE OIL LEAKAGE
25. INSTALL CYLINDER HEAD COVER NO.2
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

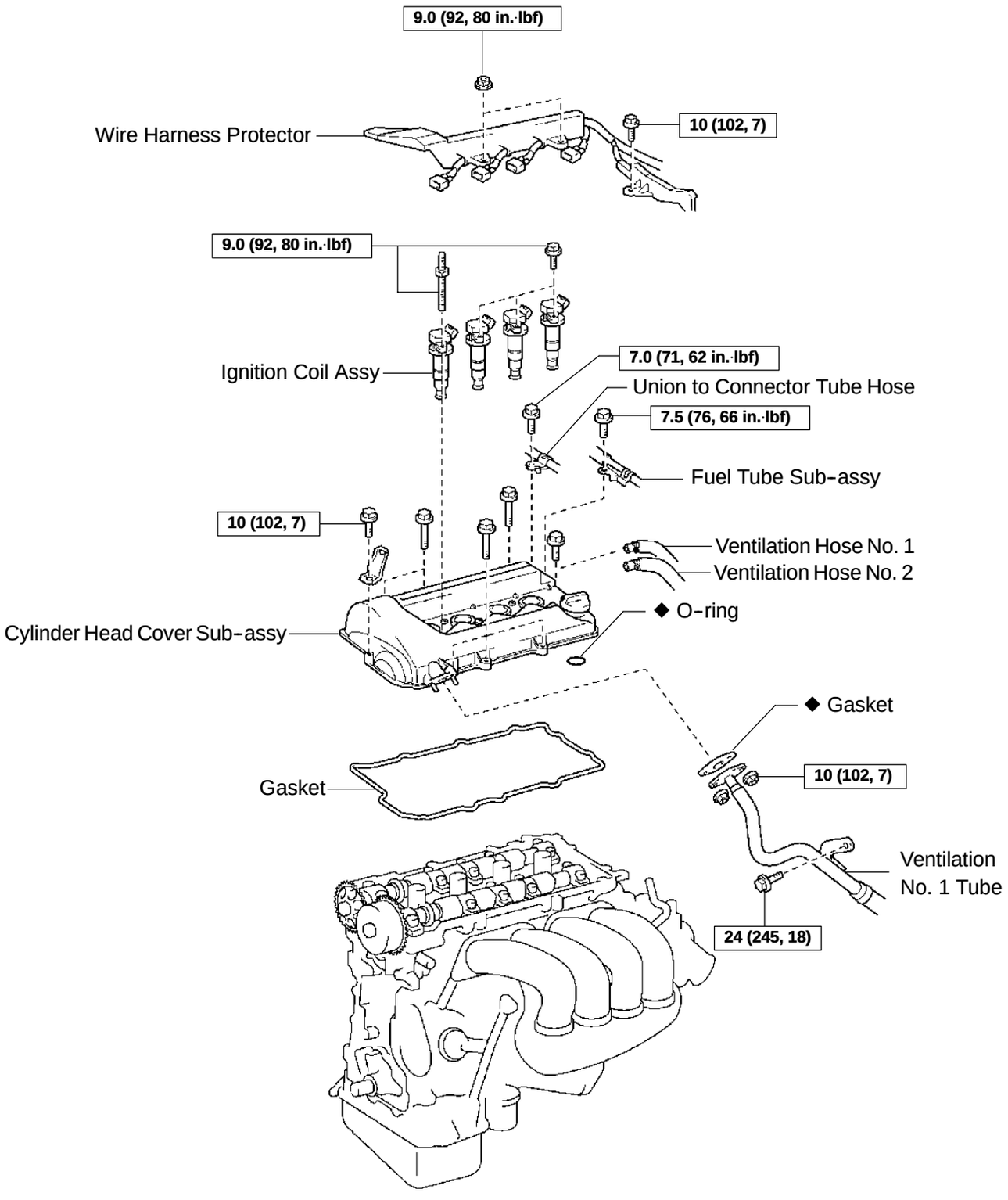
CHAIN SUB-ASSY (2ZZ-GE)

COMPONENTS

141XK-01



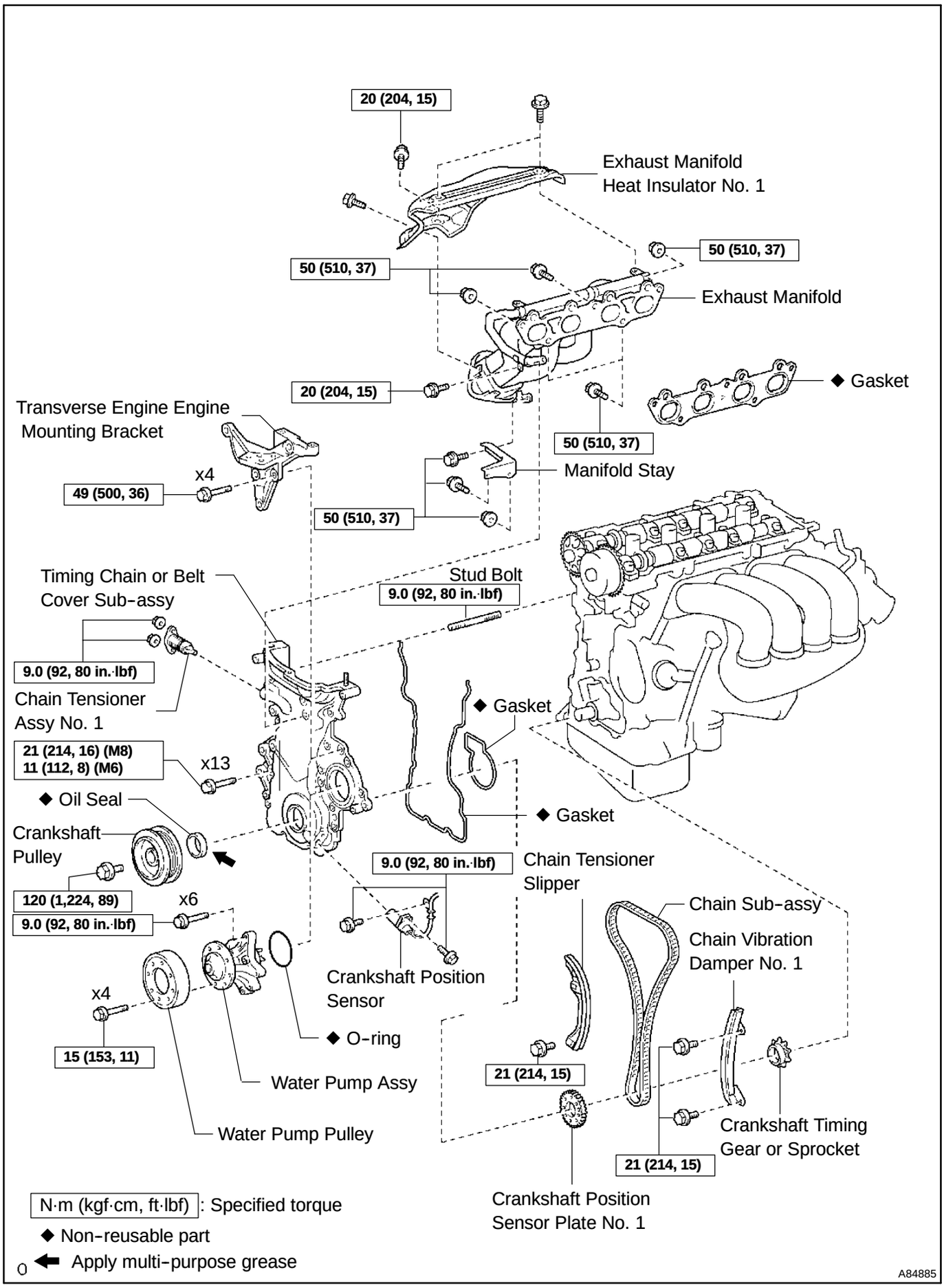

52 (530, 38)
Front Suspension Bar Assy Tower
7.0 (71, 62 in.·lbf)
Fan and Generator V Belt
29 (296, 21)
100 (1,020, 74)
52 (530, 38)
29 (296, 21)
V-ribbed Belt Tensioner Assy
Cylinder Head Cover No. 2
Generator Bracket No. 1
52 (530, 38)
52 (530, 38)
Engine Mounting Insulator Sub-assy RH
25 (250, 18)
21 (209, 15)
54 (550, 39)
Air Switching Valve Assy
9.8 (100, 7)
Generator Assy
w/ Air Conditioning:
Compressor and Magnetic Clutch
29 (296, 21)
Engine Under Cover RH
◆ Gasket
Exhaust Pipe Assy Front
43 (440, 32)
◆ Gasket
Floor Panel Brace Front
30 (302, 22)
43 (440, 32)
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A97222



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

◆ Non-reusable part

A84884


20 (204, 15)
Exhaust Manifold Heat Insulator No. 1
50 (510, 37)
50 (510, 37)
Exhaust Manifold
20 (204, 15)
◆ Gasket
Transverse Engine Engine Mounting Bracket
x4
49 (500, 36)
50 (510, 37)
50 (510, 37)
Manifold Stay
Timing Chain or Belt Cover Sub-assy
Stud Bolt
9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf)
Chain Tensioner Assy No. 1
◆ Gasket
21 (214, 16) (M8)
11 (112, 8) (M6)
x13
◆ Oil Seal
◆ Gasket
Crankshaft Pulley
9.0 (92, 80 in.·lbf)
Chain Tensioner Slipper
120 (1,224, 89)
9.0 (92, 80 in.·lbf)
x6
Chain Sub-assy
Chain Vibration Damper No. 1
Crankshaft Position Sensor
x4
◆ O-ring
15 (153, 11)
21 (214, 15)
Water Pump Assy
Water Pump Pulley
Crankshaft Timing Gear or Sprocket
21 (214, 15)
Crankshaft Position Sensor Plate No. 1
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Apply multi-purpose grease
A84885

141XL-01

REPLACEMENT

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **DRAIN COOLANT (See page 16-8)**
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE ENGINE UNDER COVER RH**
5. **REMOVE SUSPENSION TOWER DAMPER ASSY (See page 26-8)**
6. **REMOVE CYLINDER HEAD COVER NO.2**

(a) Remove the 3 bolts and nut, then remove the cylinder head cover No. 2.

7. **REMOVE WIRE HARNESS PROTECTOR (See page 14-78)**
8. **SEPARATE SUCTION HOSE SUB-ASSY (See page 14-78)**
9. **REMOVE AIR SWITCHING VALVE ASSY (See Pub. No. RM925E on page 12-6)**
10. **REMOVE FAN AND GENERATOR V BELT (See page 14-78)**
11. **REMOVE GENERATOR BRACKET NO.1 (See Pub. No. RM925E on page 19-8)**
12. **REMOVE GENERATOR ASSY (See Pub. No. RM925E on page 19-8)**
13. **REMOVE COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) (See page 55-37)**

HINT:

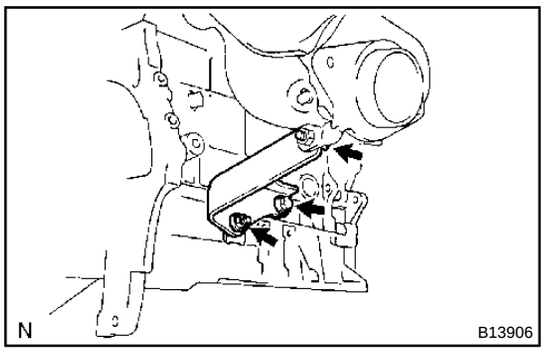
Hang up the hoses instead of detaching.

14. **REMOVE SHIFT LEVER KNOB SUB-ASSY**
15. **REMOVE CONSOLE PANEL UPPER**
16. **REMOVE PARKING BRAKE HOLE COVER SUB-ASSY**
17. **REMOVE CONSOLE BOX CARPET**
18. **REMOVE CONSOLE BOX SUB-ASSY REAR**
19. **REMOVE EXHAUST PIPE ASSY FRONT (See Pub. No. RM925E on page 15-2)**
20. **REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-78)**
21. **REMOVE V-RIBBED BELT TENSIONER ASSY**

HINT:

Jack the engine up and down to remove the bolt.

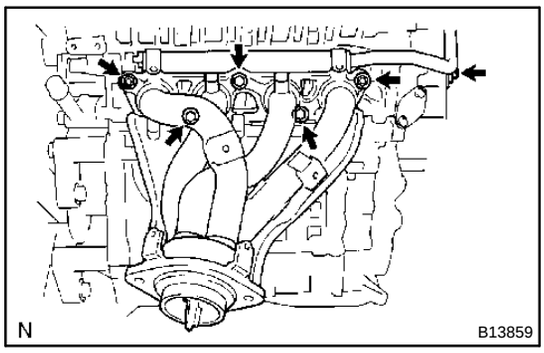
22. **REMOVE IGNITION COIL ASSY (See page 14-78)**
23. **REMOVE CYLINDER HEAD COVER SUB-ASSY (See page 14-78)**



24. **REMOVE MANIFOLD STAY**

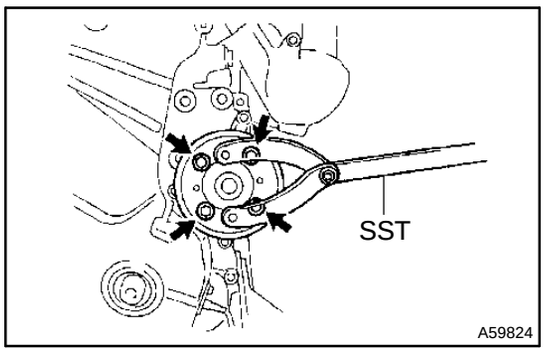
(a) Remove the 2 bolts and nut, then remove the manifold stay.

25. **REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1**



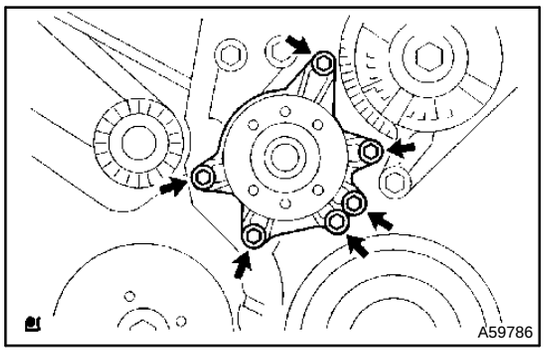
26. REMOVE EXHAUST MANIFOLD

(a) Remove the 4 bolts and 2 nuts, then remove the exhaust manifold and gasket.



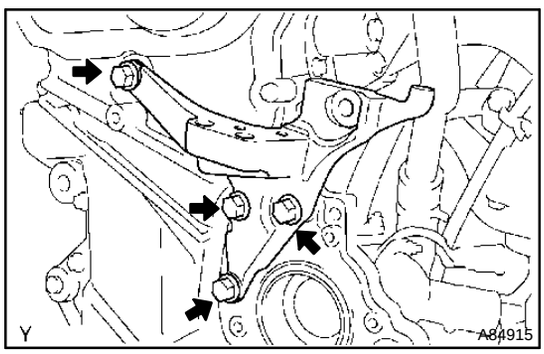
27. REMOVE WATER PUMP PULLEY

(a) Using SST, remove the water pump pulley.
SST 09960-10010 (09962-01000, 09963-00600)



28. REMOVE WATER PUMP ASSY

(a) Remove the 6 bolts and water pump.
(b) Remove the O-ring from the timing chain cover.

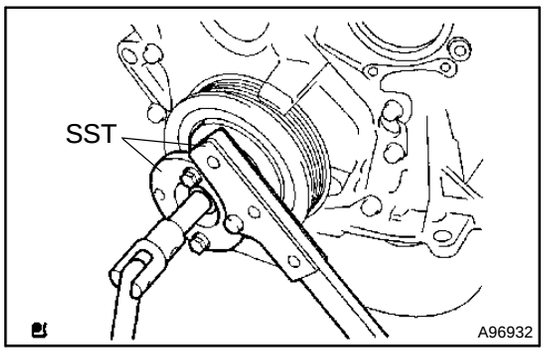


29. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Remove the 4 bolts and engine mounting bracket.

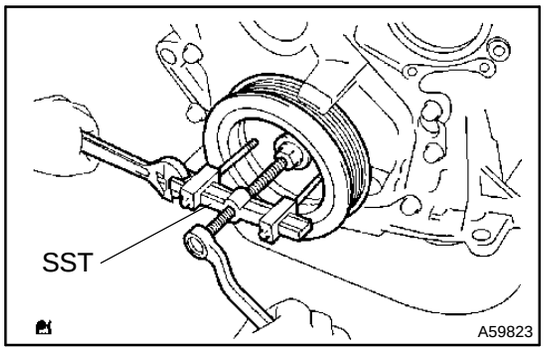
30. REMOVE CRANKSHAFT POSITION SENSOR

31. SET NO. 1 CYLINDER TO TDC/COMPRESSION **(See page 14-78)**

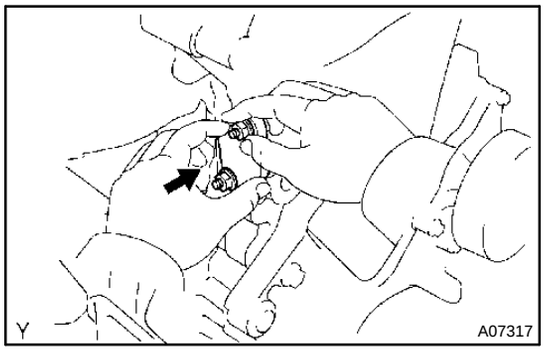


32. REMOVE CRANKSHAFT PULLEY

(a) Using SST, remove the pulley bolt.
SST 09213-70011 (09213-70020), 09330-00021



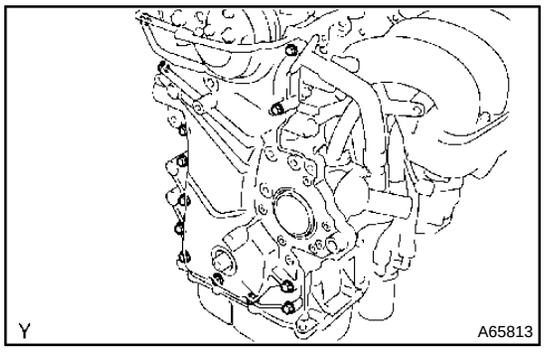
(b) Using SST, remove the crankshaft pulley.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021, 09957-04010)



33. REMOVE CHAIN TENSIONER ASSY NO.1

NOTICE:

Do not turn the crankshaft without the chain tensioner.

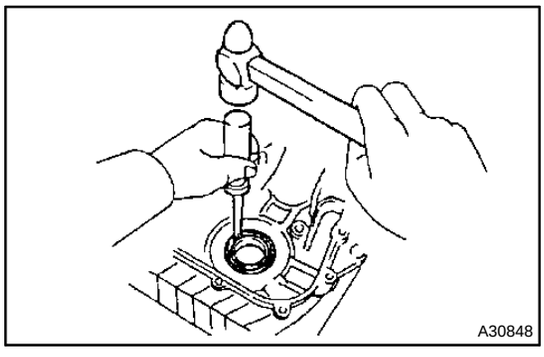


34. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY

(a) Remove the 13 bolts and timing chain cover.
(b) Remove the 2 gaskets from the timing chain cover.

NOTICE:

Be careful not to damage the contact surfaces of the timing chain cover, cylinder head and cylinder block.



35. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

(a) Place the timing chain cover on a wooden block.
(b) Using a screwdriver, remove the oil seal.

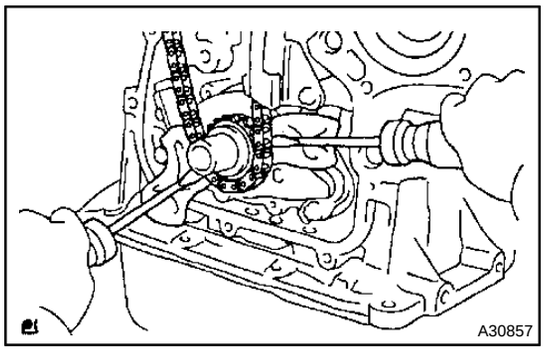
36. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1

37. REMOVE CHAIN TENSIONER SLIPPER

(a) Remove the bolt and chain tensioner slipper.

38. REMOVE CHAIN VIBRATION DAMPER NO.1

(a) Remove the 2 bolts and chain vibration damper No. 1.



39. REMOVE CHAIN SUB-ASSY

(a) Using 2 screwdrivers, pry out the timing chain together with the crankshaft timing gear as shown in the illustration.

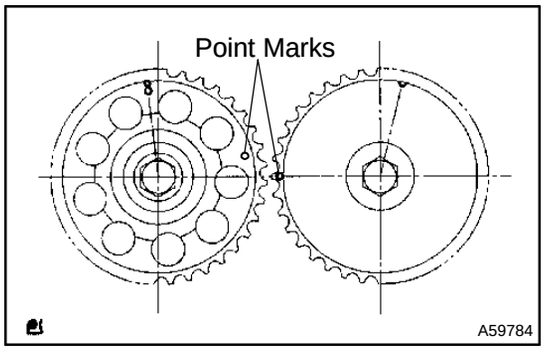
NOTICE:

- **Use a shop rag to protect the engine.**
- **If revolving the camshafts with the chain off the sprockets, turn the crankshaft 1/4 revolution to prevent the valves from coming into contact with the pistons.**

40. INSTALL CHAIN VIBRATION DAMPER NO.1

(a) Install the chain vibration damper No. 1 with the 2 bolts.

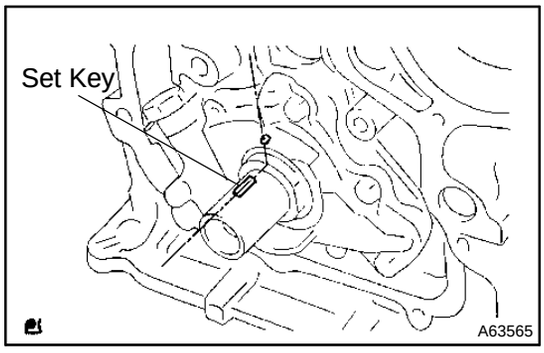
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)



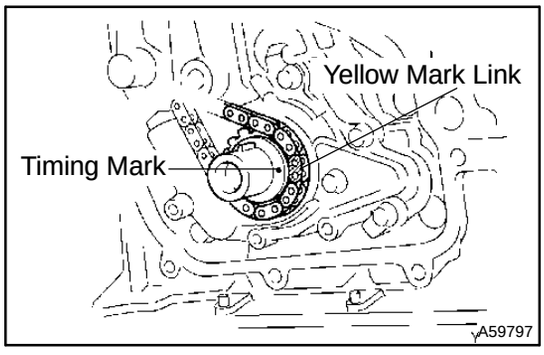
41. INSTALL CHAIN SUB-ASSY

(a) Set the No. 1 cylinder to the TDC/compression.

(1) Turn the hexagonal wrench head portion of the camshafts to align the point marks of the camshaft timing sprockets.



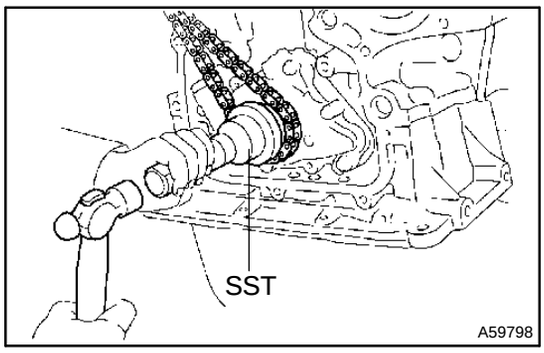
(2) Turn the crankshaft to set the set key on the crankshaft upward.



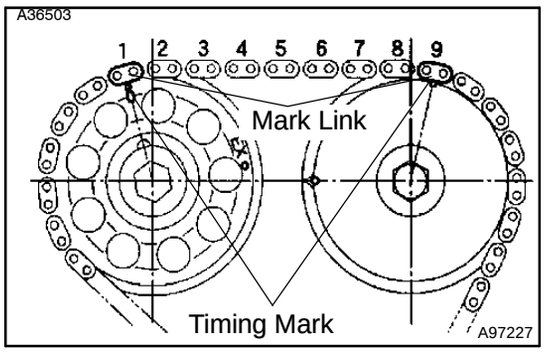
(b) Install the timing chain on the crankshaft timing sprocket with the yellow mark link aligned with the timing mark on the crankshaft timing sprocket.

HINT:

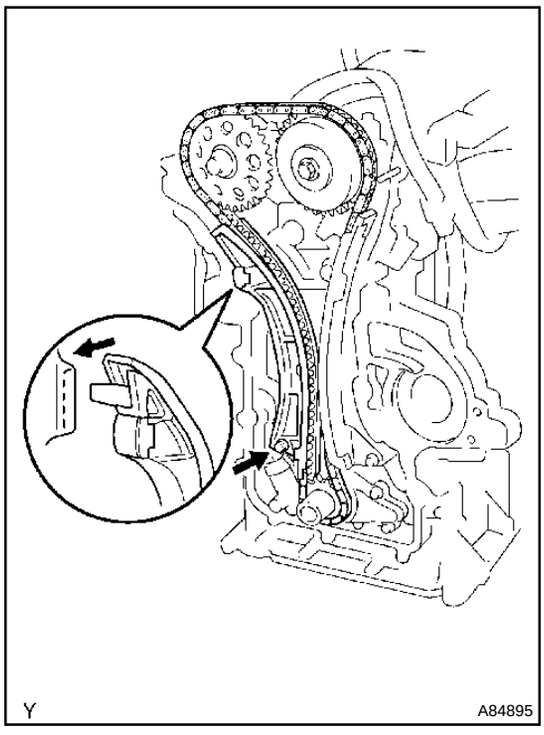
A yellow color link and 2 orange color links are on the chain.



(c) Using SST, install the sprocket.
SST 09223-22010



(d) Install the timing chain onto the camshaft timing sprockets with the orange mark links aligned with the timing marks on the camshaft timing sprockets.

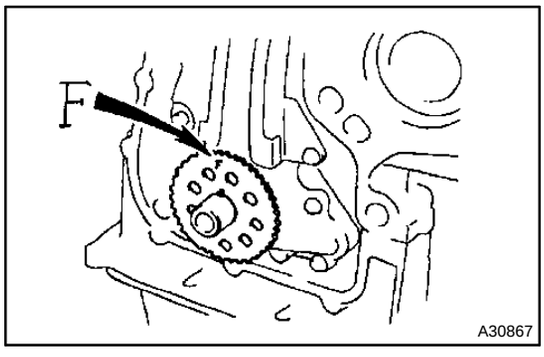


42. INSTALL CHAIN TENSIONER SLIPPER

(a) Install the chain tensioner slipper with the bolt.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

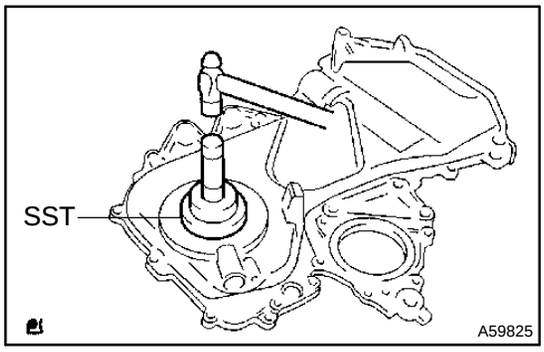
(b) Check that the chain tensioner slipper is caught on the cylinder head stopper.

NOTICE:
Do not turn the crankshaft.



43. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1

(a) Install the plate with the F mark facing forward.



44. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL

(a) Apply a light coat of multi-purpose grease to the oil seal lip.

(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.

SST 09223-22010

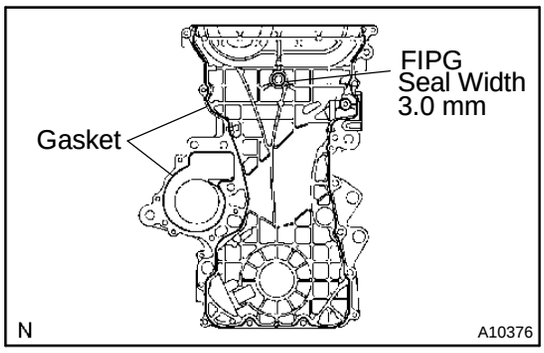
NOTICE:

Keep the lip free of foreign objects.

45. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSY

(a) Remove any old packing (FIPG) material. Be careful not to drop any oil on the contact surface of the timing chain cover, cylinder head and cylinder block.

- Using a razor blade and gasket scraper, remove all old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.



(b) Apply a continuous bead of seal packing (Diameter 3 mm (0.118 in.)) as shown in the illustration.

Seal packing: THREE BOND 1280 B or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Do not put in engine oil for at least 2 hours after installation.**
- **Install a nozzle that has been cut to a 1.5 mm opening.**

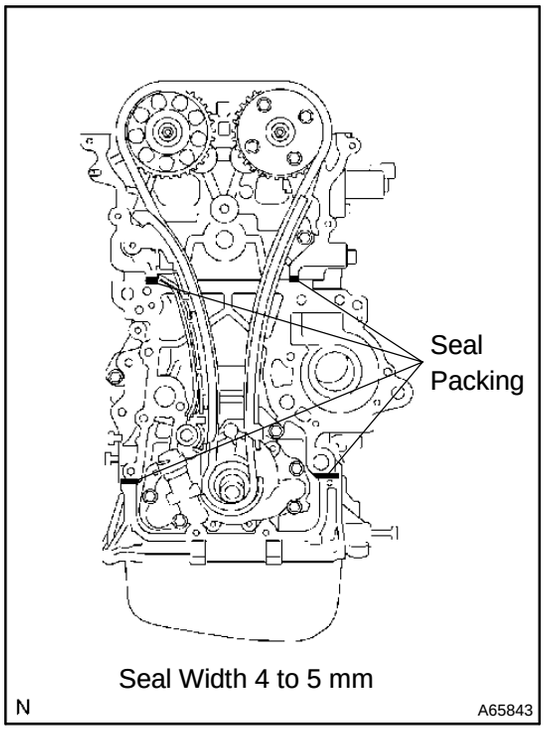
(c) Install the 2 gaskets onto the timing chain cover as shown in the illustration.

(d) Apply a continuous bead of seal packing (Diameter 3 mm (0.118 in.)) as shown in the illustration.

Seal packing: THREE BOND 1280 B or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Do not put into engine oil within 2 hours of installation.**
- **Install the chain cover, engine mounting bracket and water pump within 15 minutes of applying seal packing.**

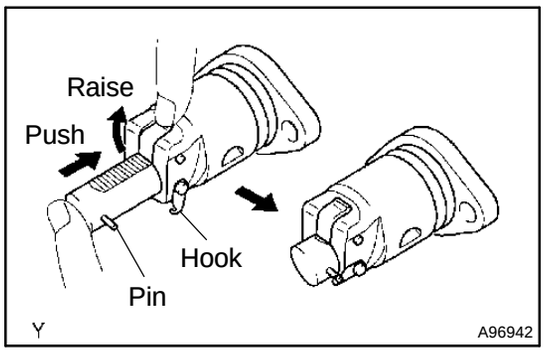


(e) Install the timing chain cover with the 13 bolts.

Torque:
21 N·m (214 kgf·cm, 15 ft·lbf) for (M8) bolt
11 N·m (112 kgf·cm, 8 ft·lbf) for (M6) bolt

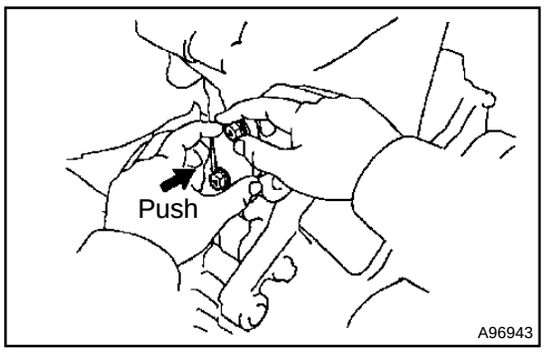
(f) Install the stud bolt.

Torque: 9.5 N·m (97 kgf·cm, 84 in.·lbf)



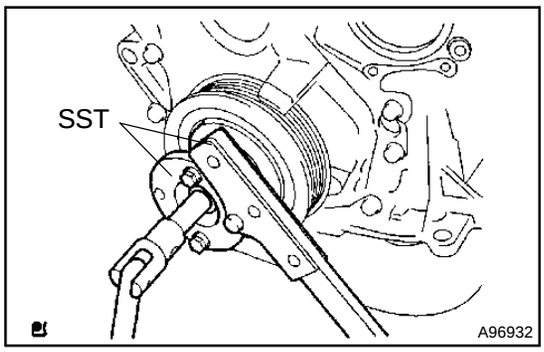
46. INSTALL CHAIN TENSIONER ASSY NO.1

(a) Check that the O-ring is clean, then set the hook as shown in the illustration.



(b) Apply engine oil to the chain tensioner, then install it.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

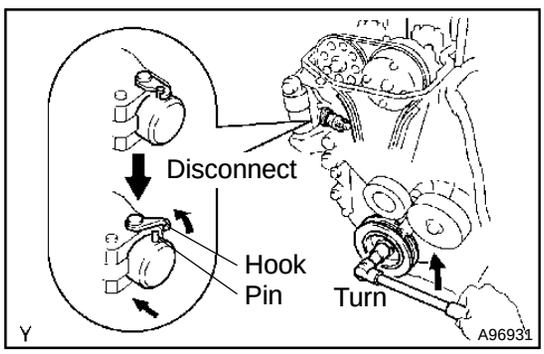
NOTICE:
When installing the tensioner, set the hook again if the hook releases the plunger.



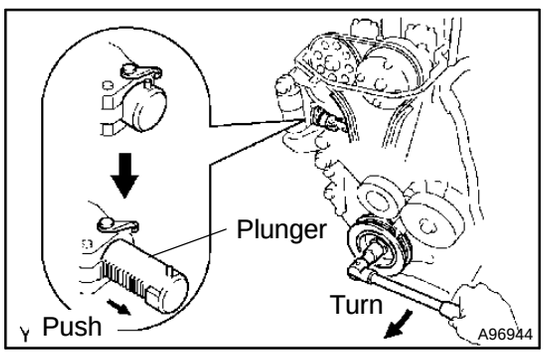
47. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley, then slide on the pulley.

(b) Using SST, install the pulley bolt.
SST 09213-70011 (09213-70020), 09330-00021
Torque: 120 N·m (1,224 kgf·cm, 89 ft·lbf)



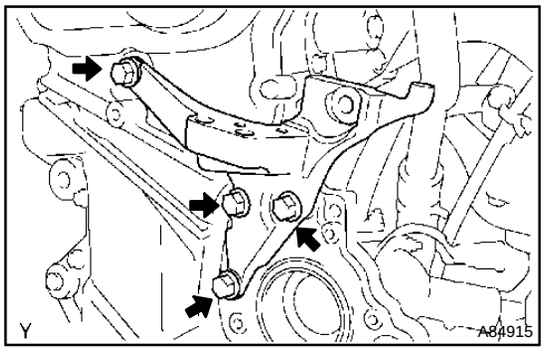
(c) Turn the crankshaft counterclockwise to disconnect the plunger knock pin from the hook.



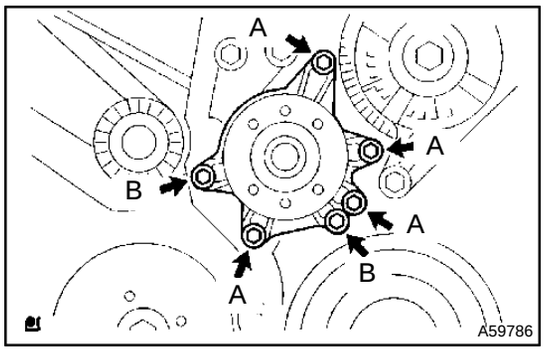
(d) Turn the crankshaft clockwise, then check that the slipper is pushed by the plunger.

HINT:
If the plunger is not extended, press the slipper into the chain tensioner with a screw driver so that the hook is taken off from the knock pin and the plunger can be extended.

48. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

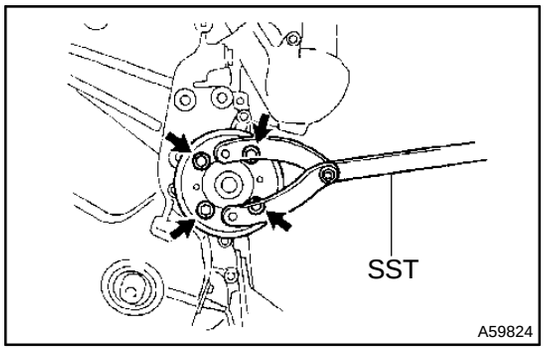


49. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET
(a) Install the engine mounting bracket with the 4 bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

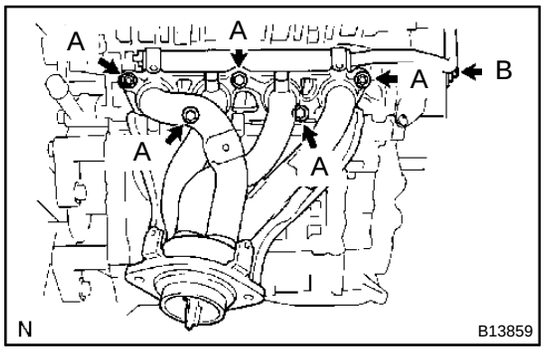


50. INSTALL WATER PUMP ASSY
(a) Place a new O–ring onto the timing chain cover.
(b) Install the water pump with the 6 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
HINT:
Each bolt length is indicated in the table.

Bolt A	35 mm (1.38 in.)
Bolt B	28 mm (1.10 in.)

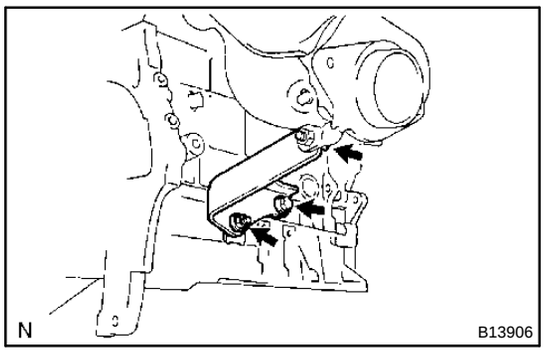


51. INSTALL WATER PUMP PULLEY
(a) Using SST, install the water pump pulley.
SST 09960–10010 (09962–01000, 09963–00600)
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)



52. INSTALL EXHAUST MANIFOLD
(a) Install a new gasket and the exhaust manifold with the 4 bolts and 2 nuts.
Torque:
50 N·m (510 kgf·cm, 37 ft·lbf) for bolt A and nut A
20 N·m (204 kgf·cm, 14 ft·lbf) for bolt B

53. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)



54. INSTALL MANIFOLD STAY

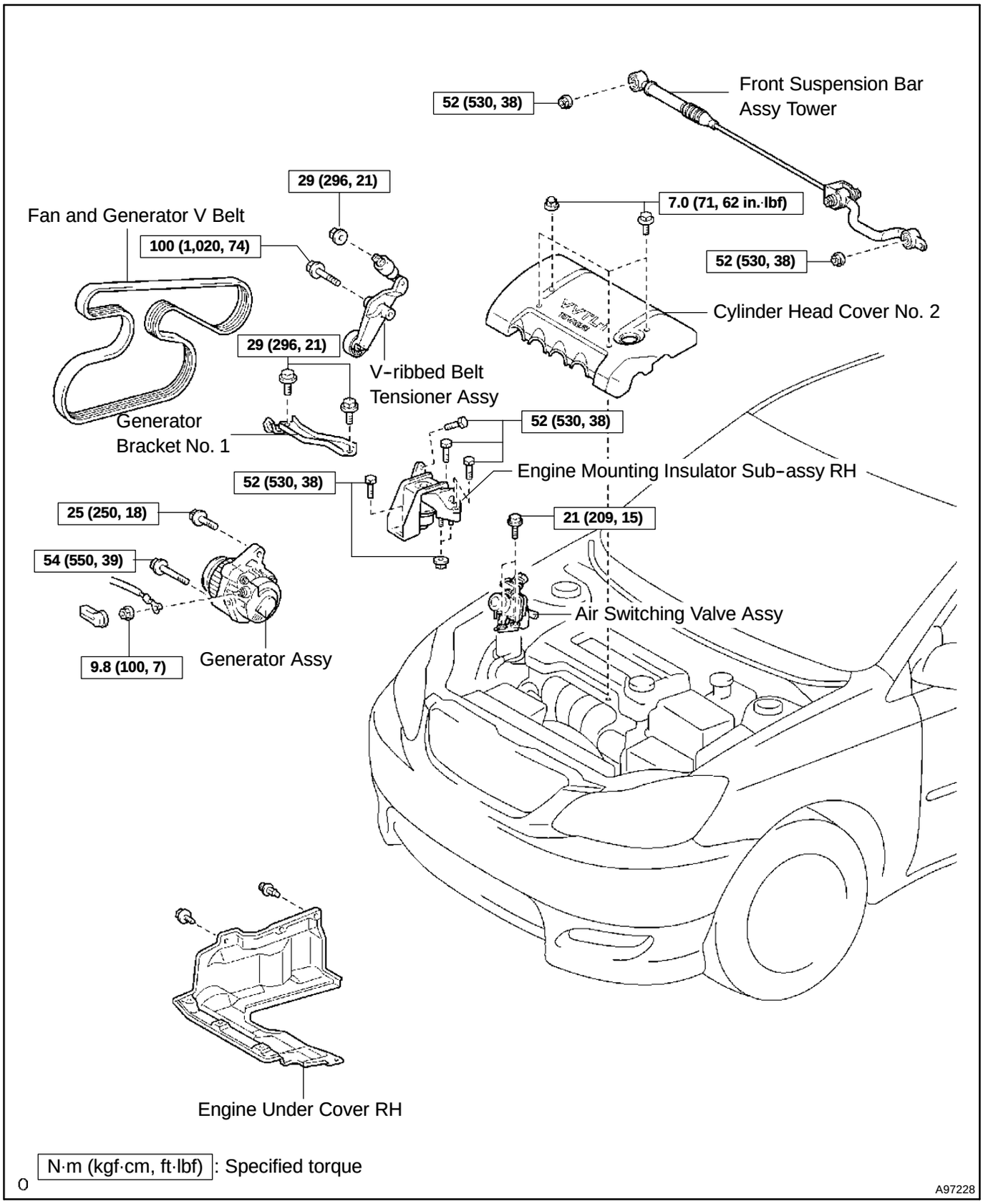
(a) Install the manifold stay with the 2 bolts and nut.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

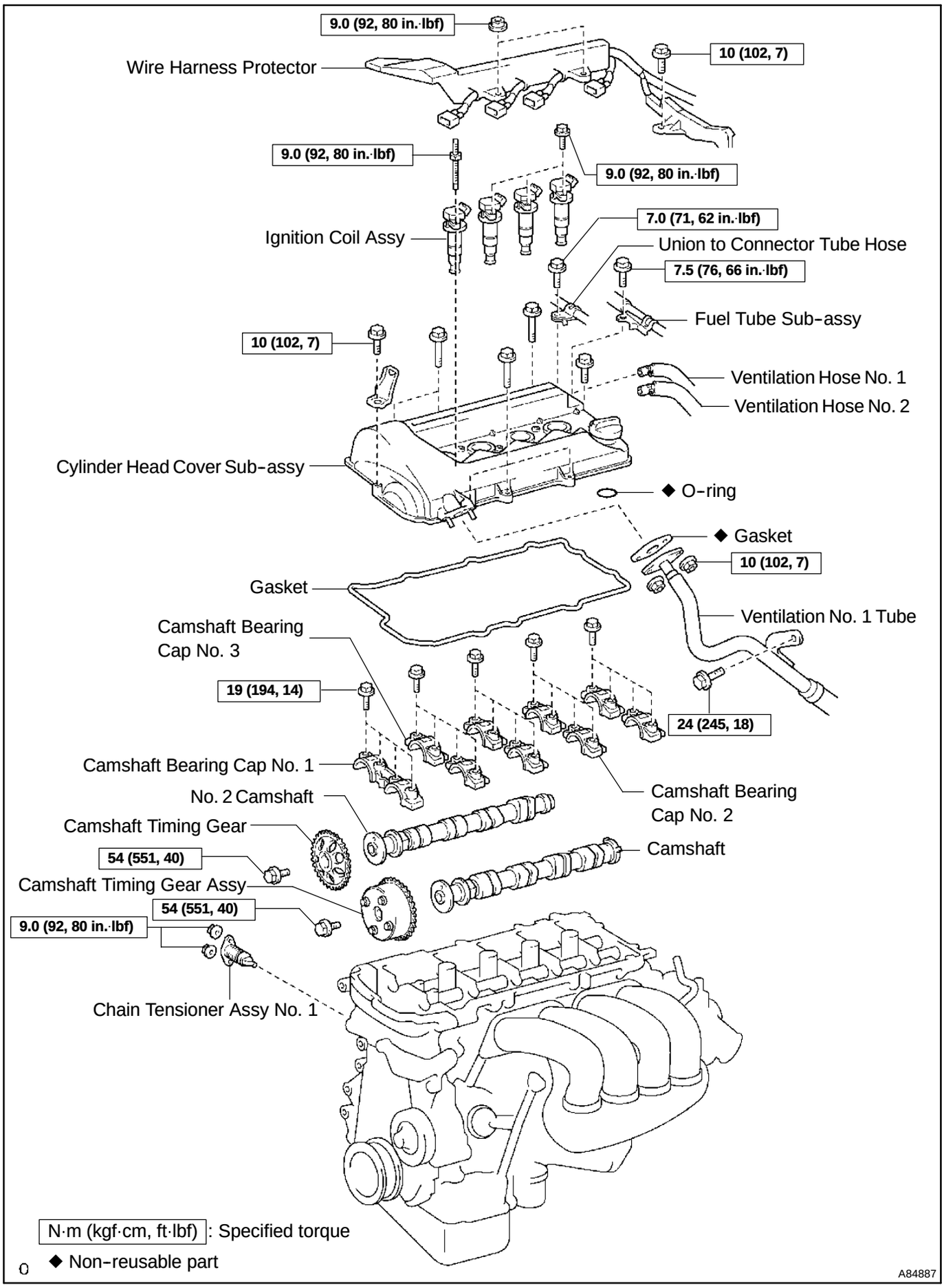
55. INSTALL CYLINDER HEAD COVER SUB-ASSY (See page 14-78)
56. INSTALL IGNITION COIL ASSY (See page 14-78)
57. INSTALL V-RIBBED BELT TENSIONER ASSY
Torque:
29 N·m (296 kgf·cm, 21 ft·lbf) for nut
100 N·m (1,020 kgf·cm, 74 ft·lbf) for bolt
58. INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-78)
59. INSTALL EXHAUST PIPE ASSY FRONT (See Pub. No. RM925E on page 15-2)
60. INSTALL CONSOLE BOX SUB-ASSY REAR
61. INSTALL CONSOLE BOX CARPET
62. INSTALL PARKING BRAKE HOLE COVER SUB-ASSY
63. INSTALL CONSOLE PANEL UPPER
64. INSTALL SHIFT LEVER KNOB SUB-ASSY
65. INSTALL COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) (See page 55-37)
66. INSTALL GENERATOR ASSY (See Pub. No. RM925E on page 19-8)
67. INSTALL GENERATOR BRACKET NO.1 (See Pub. No. RM925E on page 19-8)
68. INSTALL SUCTION HOSE SUB-ASSY
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
69. INSTALL AIR SWITCHING VALVE ASSY (See Pub. No. RM925E on page 12-6)
70. INSTALL SUSPENSION TOWER DAMPER ASSY (See page 26-8)
71. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
72. CONNECT BATTERY NEGATIVE TERMINAL
73. ADD COOLANT (See page 16-8)
74. CHECK FOR ENGINE COOLANT LEAKAGE (See page 16-1)
75. CHECK FOR ENGINE OIL LEAKAGE
76. INSTALL CYLINDER HEAD COVER NO.2
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

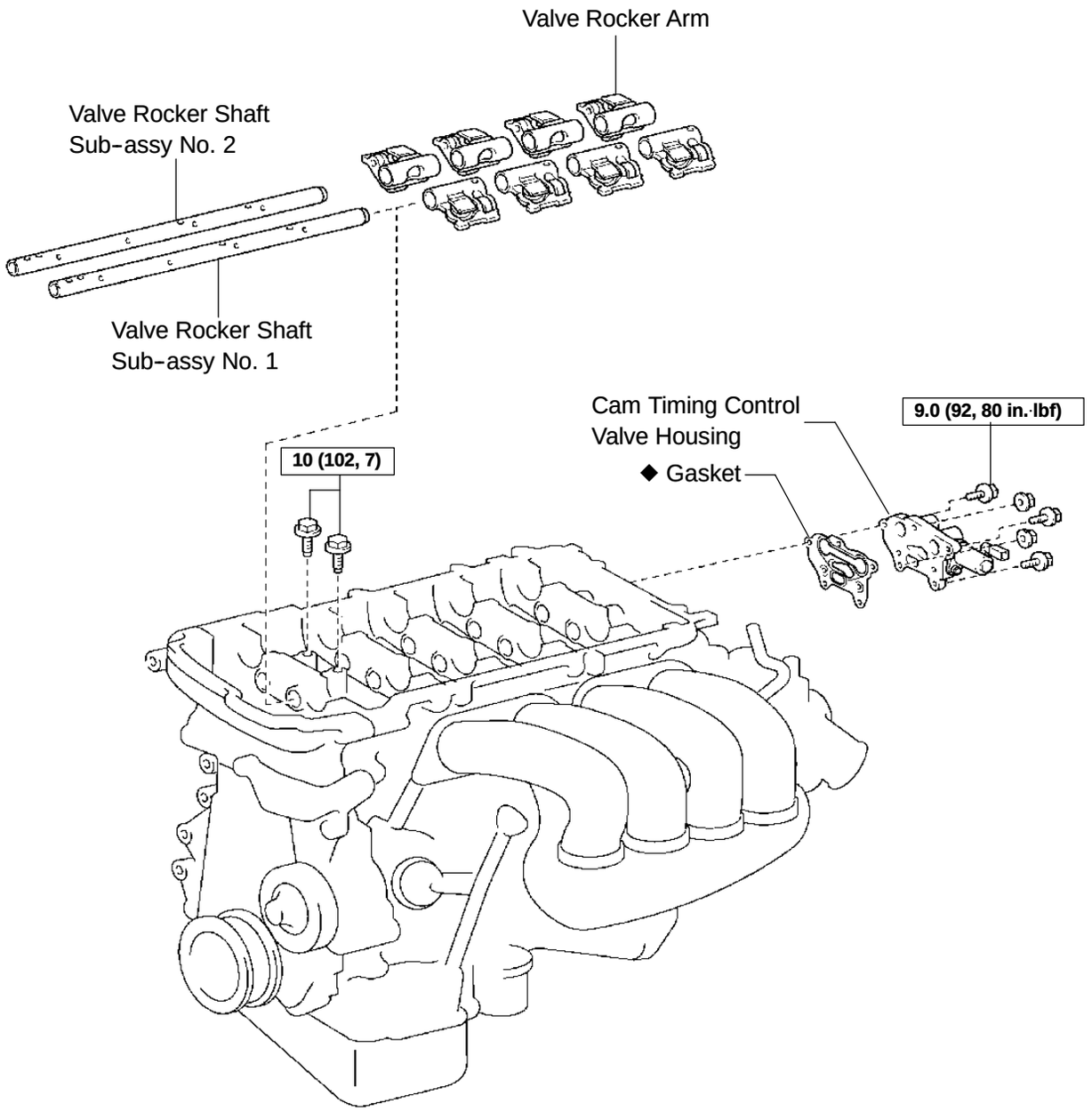
CAMSHAFT (2ZZ-GE)

COMPONENTS

140MN-03




9.0 (92, 80 in.·lbf)
10 (102, 7)
Wire Harness Protector
9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf)
7.0 (71, 62 in.·lbf)
Ignition Coil Assy
Union to Connector Tube Hose
7.5 (76, 66 in.·lbf)
Fuel Tube Sub-assy
10 (102, 7)
Ventilation Hose No. 1
Ventilation Hose No. 2
Cylinder Head Cover Sub-assy
◆ O-ring
◆ Gasket
10 (102, 7)
Gasket
Ventilation No. 1 Tube
Camshaft Bearing Cap No. 3
19 (194, 14)
24 (245, 18)
Camshaft Bearing Cap No. 1
No. 2 Camshaft
Camshaft Bearing Cap No. 2
Camshaft Timing Gear
Camshaft
54 (551, 40)
Camshaft Timing Gear Assy
54 (551, 40)
9.0 (92, 80 in.·lbf)
Chain Tensioner Assy No. 1
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A84887



o

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

◆ Non-reusable part

A84888

141XI-01

REPLACEMENT

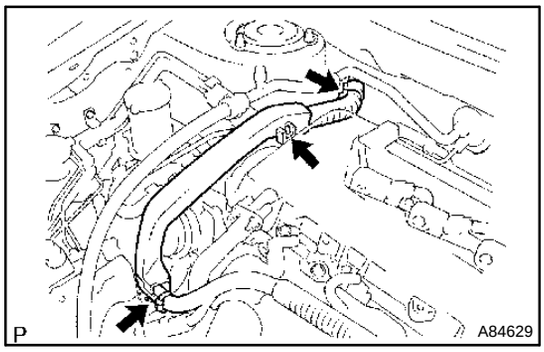
1. DISCONNECT BATTERY NEGATIVE TERMINAL

2. REMOVE ENGINE UNDER COVER RH

3. REMOVE SUSPENSION TOWER DAMPER ASSY **(See page 26-8)**

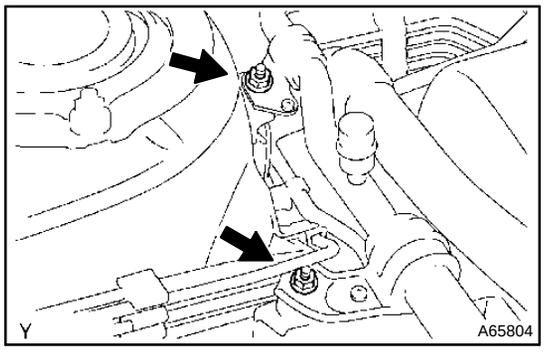
4. REMOVE CYLINDER HEAD COVER NO.2

(a) Remove the 3 bolts and nut, then remove the cylinder head cover No. 2.



5. REMOVE WIRE HARNESS PROTECTOR

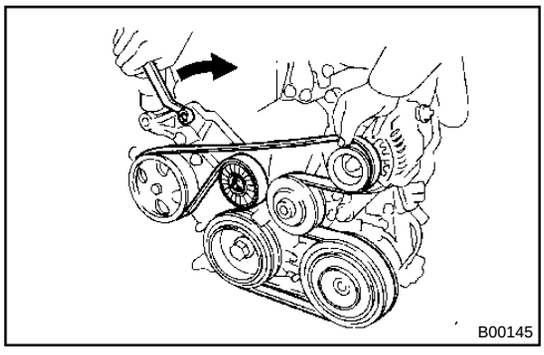
(a) Unfasten the 3 clips, then remove the wire harness protector.



6. SEPARATE SUCTION HOSE SUB-ASSY

(a) Remove the 2 nuts, then separate the suction hose.

7. REMOVE AIR SWITCHING VALVE ASSY **(See Pub. No. RM925E on page 12-6)**



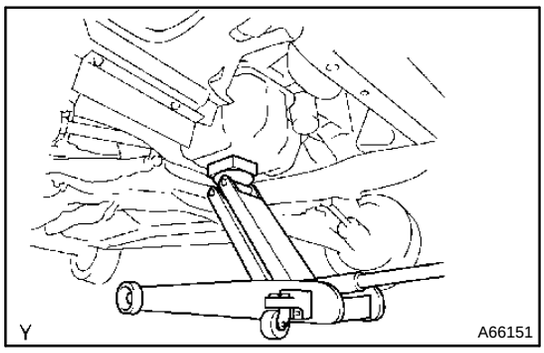
8. REMOVE FAN AND GENERATOR V BELT

(a) Turn the drive belt tensioner clockwise to relieve tension on the belt, and then remove the bolt.

(b) Carefully return the tensioner to the unloaded position.

9. REMOVE GENERATOR BRACKET NO.1 **(See Pub. No. RM925E on page 19-8)**

10. REMOVE GENERATOR ASSY **(See Pub. No. RM925E on page 19-8)**

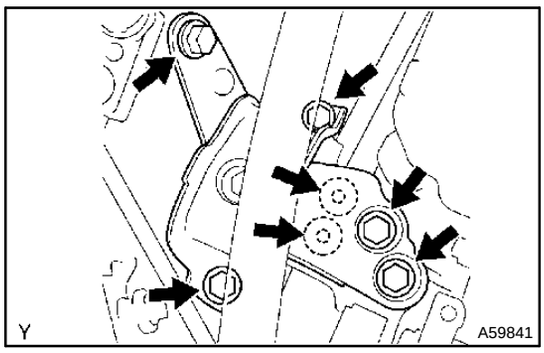


11. REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH

(a) Set the jack underneath the engine, and jack up the engine.

HINT:

Place a wooden block between the jack and engine.

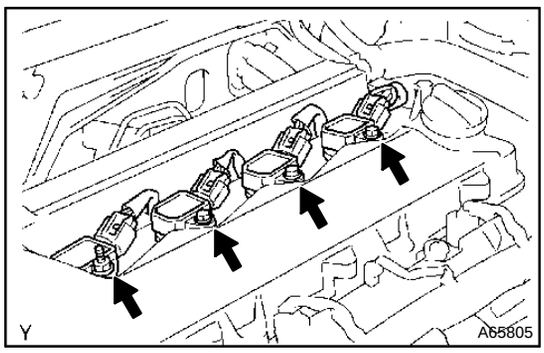


(b) Remove the 5 bolts and 2 nuts, then remove the engine mounting insulator RH.

12. REMOVE V-RIBBED BELT TENSIONER ASSY

HINT:

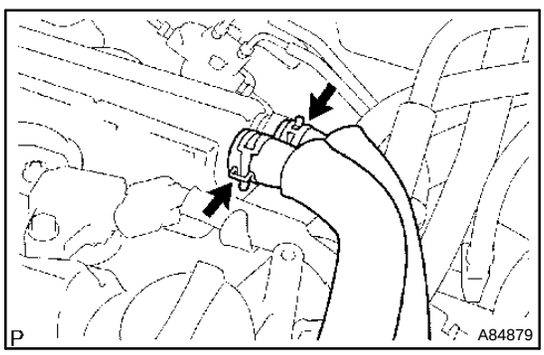
Jack the engine up and down to remove the bolt.



13. REMOVE IGNITION COIL ASSY

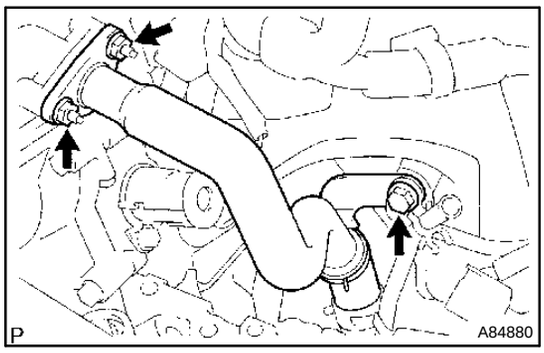
(a) Disconnect the 4 ignition coil connectors.

(b) Remove the 3 bolts and nut, then remove the 4 ignition coils.

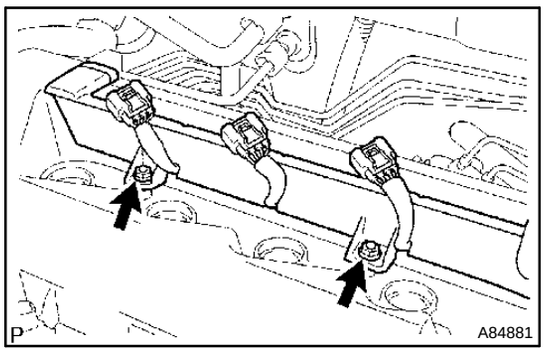


14. REMOVE CYLINDER HEAD COVER SUB-ASSY

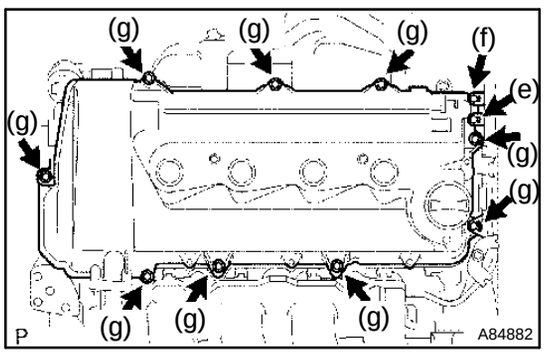
(a) Disconnect the 2 ventilation hoses.



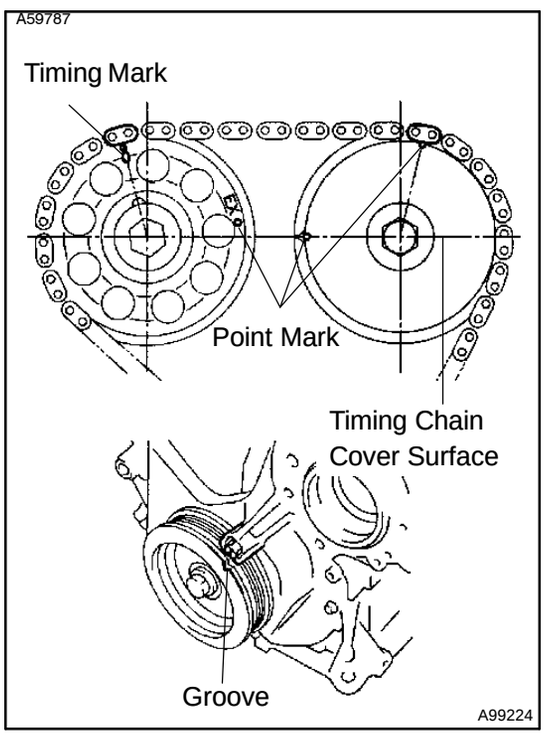
(b) Remove the 2 nuts and bolt, then separate the ventilation tube No. 1.
(c) Remove the gasket from the cylinder head cover.



(d) Remove the 2 nuts, then separate the wire harness protector.



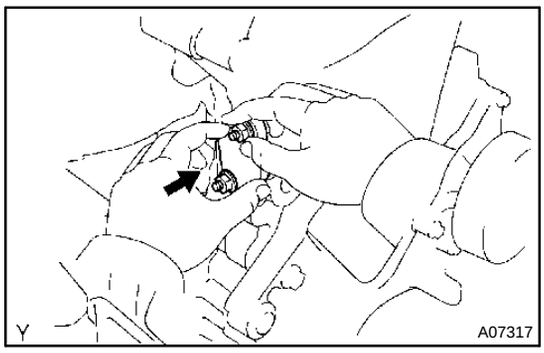
(e) Remove the bolt and fuel tube clamp.
(f) Remove the bolt and union to connector tube hose clamp.
(g) Remove the 9 bolts, bracket, wire harness protector, and cylinder head cover.
(h) Remove the O-ring from the cylinder head cover.



15. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.
(b) Check that the point marks of the camshaft timing sprocket and the VVT timing sprocket are as shown in the illustration.

HINT:
If not, turn the crankshaft 1 revolution (360°) to align the marks above.

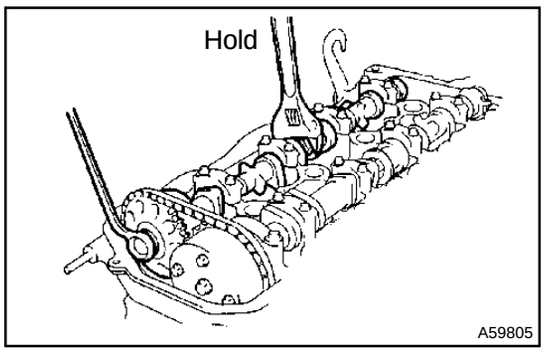


16. REMOVE CHAIN TENSIONER ASSY NO.1

(a) Remove the 2 nuts and chain tensioner No. 1.

NOTICE:

Do not to turn the crankshaft without the chain tensioner.

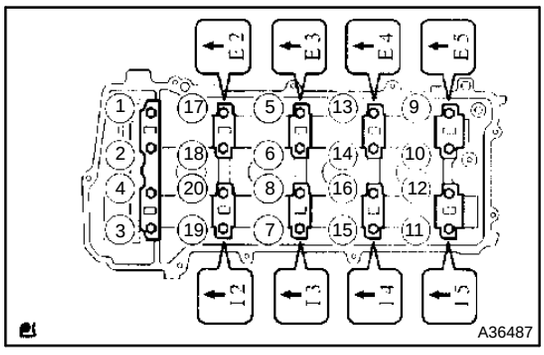


17. REMOVE CAMSHAFT

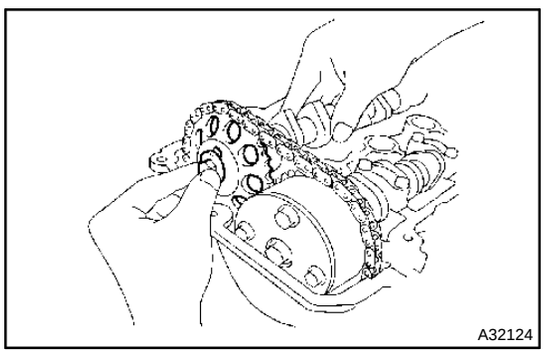
(a) Hold the hexagonal lobe of the camshaft, then loosen the camshaft timing gear set bolt.

NOTICE:

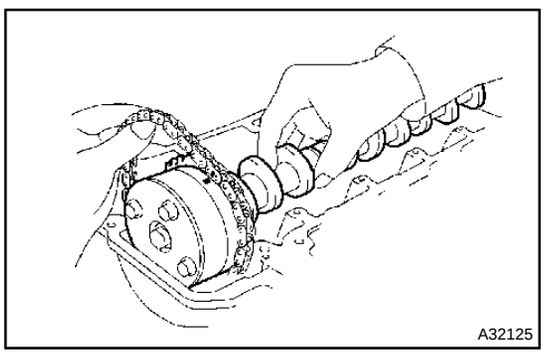
Do not turn the crankshaft without the chain tensioner.



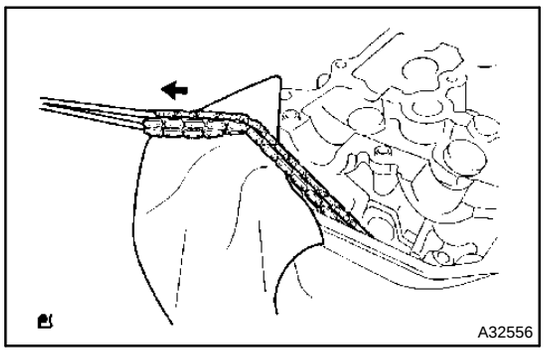
(b) Using several steps, uniformly loosen and remove the camshaft bearing cap bolts in the sequence shown, then remove the caps.



(c) Lift up the camshaft slightly and remove the bolt.



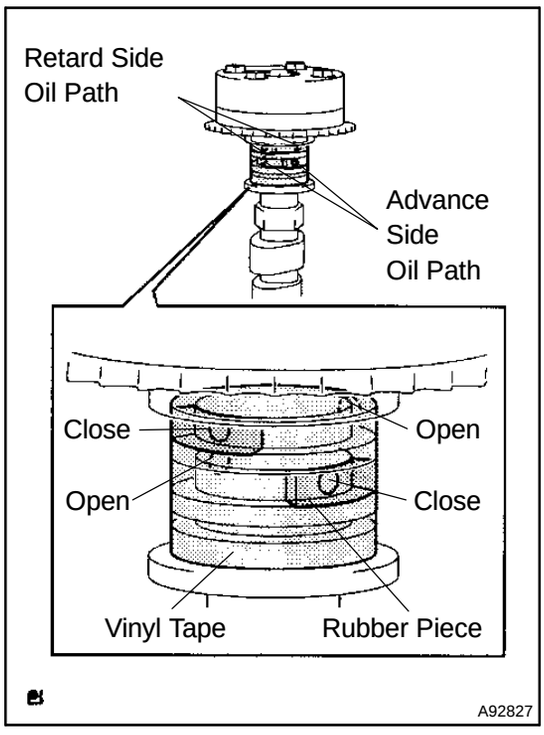
(d) Hold the timing chain by hand, then remove the camshaft.



(e) Tie the timing chain with a string as shown in the illustration.

NOTICE:

Be careful not to drop anything inside the timing chain cover.



18. REMOVE CAMSHAFT TIMING GEAR ASSY

(a) Check the lock of camshaft timing gear.

(1) Clamp the camshaft in a vise, then confirm that the camshaft timing gear is locked.

NOTICE:

Be careful not to damage the camshaft.

(b) Check that the camshaft timing gear assembly does not turn.

NOTICE:

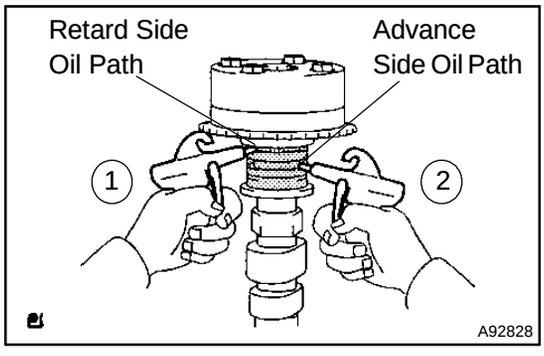
Do not damage the camshaft by clamping it in a vise too tightly.

(c) Cover the 4 oil paths of the cam journal with vinyl tape as shown in the illustration.

HINT:

One of the 2 grooves located on the cam journal is for retarding cam timing (upper) and the other is for advancing cam timing (lower). Each groove has 2 oil paths. Plug one of the 2 oil paths for each groove with a pieces of rubber before wrapping the cam journal with the tape.

(d) Punctuate the tape which covers the advance side path and retard side path on the opposite side.

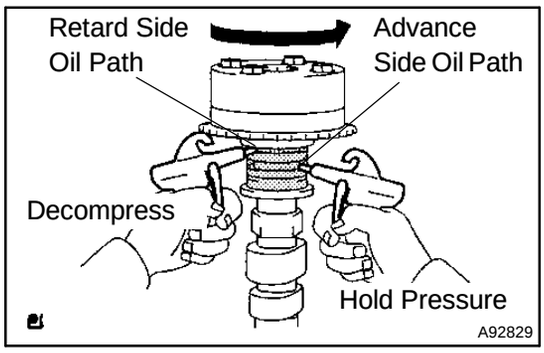


(e) Apply approximately 150 kPa (1.5 kgf/cm^2) of air pressure to the retard side oil path.

NOTICE:

When applying air pressure, cover the paths with a shop rag to prevent oil splashes.

(f) Apply approximately 150 kPa (1.5 kgf/cm^2) of air pressure to the advance side oil path.



(g) Confirm that the camshaft timing gear assembly revolves in the advance direction when the air pressure on the retard side path is reduled.

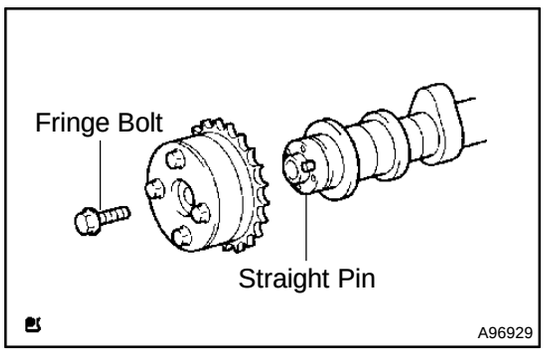
HINT:

- If the timing gear assembly does not revolve in the advance direction by air pressure, turn it forcibly by hand after air pressure is applied to both oil paths. When revolving, first turn it in the retard direction, then in the advance direction.
- The lock pin is released, and the camshaft timing gear revolves in the advance direction.

(h) When the camshaft timing gear assembly comes to the most advanced position, release the air pressure on the retard side path, then release the air pressure on the advance side path.

NOTICE:

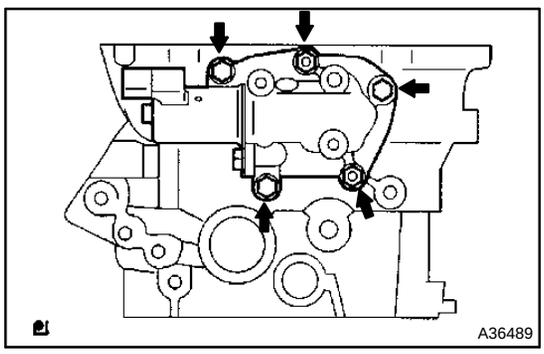
If the air pressure on the advance side path is released first, the camshaft timing gear assembly occasionally shifts abruptly in the retard direction. It may cause the breakage of the lock pin. Be sure to release the air pressure on the retard side path first.



(i) Remove the bolt and camshaft timing gear assembly.

NOTICE:

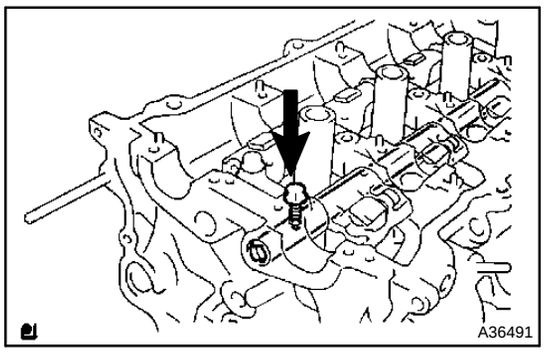
- **Do not remove the other 4 bolts.**
- **When reusing the camshaft timing gear assembly, unlock the lock pin inside the camshaft timing gear first.**



19. REMOVE CAM TIMING CONTROL VALVE HOUSING

(a) Remove the 3 bolts and 2 nuts, then remove the cam timing control valve housing.

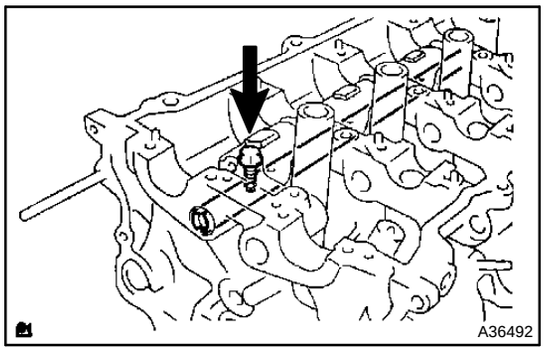
(b) Remove the gasket.



20. REMOVE VALVE ROCKER SHAFT SUB-ASSY NO.1

(a) Remove the bolt and rocker shaft No. 1.

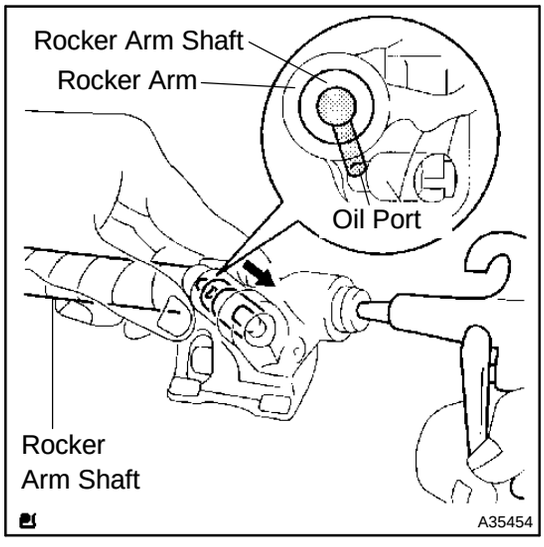
(b) Remove the valve rocker arm.



21. REMOVE VALVE ROCKER SHAFT SUB-ASSY NO.2

(a) Remove the bolt and rocker shaft No. 2

(b) Remove the valve rocker arm.

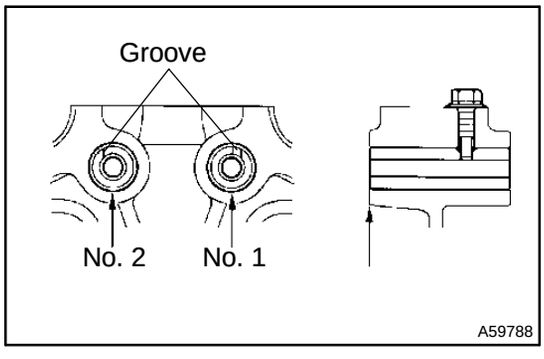


22. INSPECT VALVE ROCKER ARM

(a) Cover the oil paths of the rocker arm shaft except the 2 paths covered with vinyl type.

(b) Align the oil path of the rocker arm shaft with the oil path of the rocker arm.

(c) Check that the piston inside of the rocker arm moves when 180 kpa {1.8 kgf/cm^2, 25.6 psi} of air pressure is applied to the oil paths.

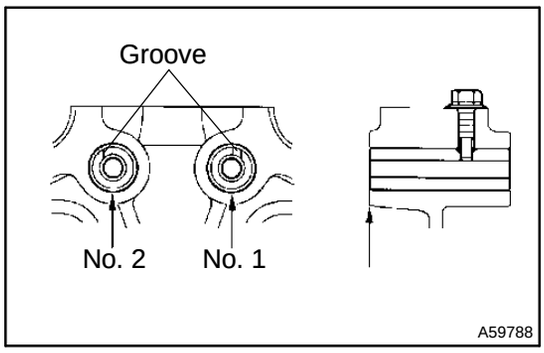


23. INSTALL VALVE ROCKER SHAFT SUB-ASSY NO.2

(a) Put the valve rocker shaft through the cylinder head and the hole of the valve rocker arm, then check that the groove is at the right direction as shown.

(b) Install the bolt to fix the rocker shaft No. 2.

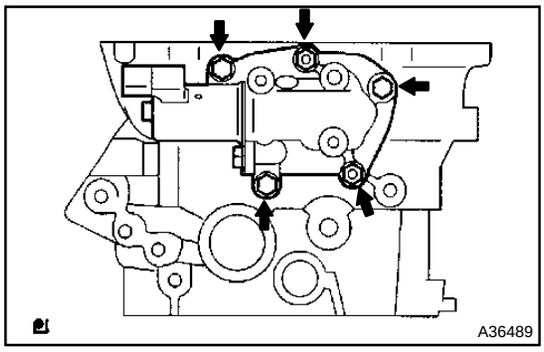
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



24. INSTALL VALVE ROCKER SHAFT SUB-ASSY NO.1

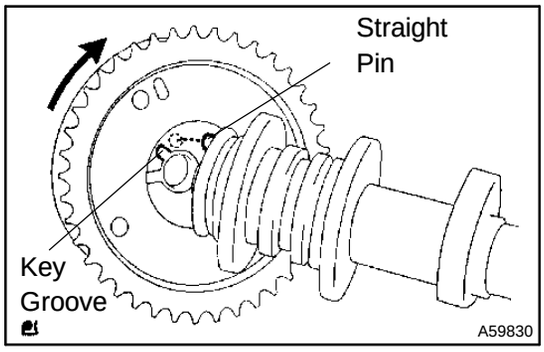
(a) Put the valve rocker shaft through the cylinder head and the hole of the valve rocker arm, then check that the groove is at the right direction as shown.

(b) Install the bolt to fix the rocker shaft No.1.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



25. INSTALL CAM TIMING CONTROL VALVE HOUSING

(a) Install a new gasket and the control valve housing with the 3 bolts and 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



26. INSTALL CAMSHAFT TIMING GEAR ASSY

(a) Put the camshaft timing gear together with the camshaft with the straight pin off the key groove.

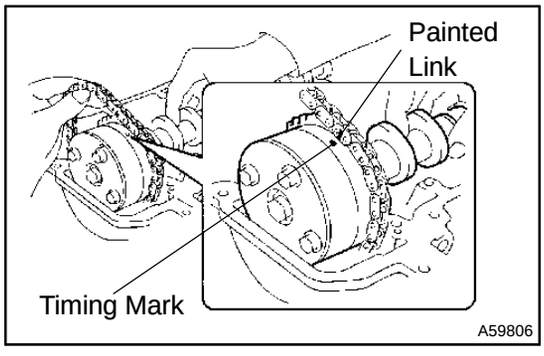
(b) Turn the camshaft timing gear to the left direction as shown in the illustration while pushing it lightly against the camshaft. Push further at the position where the pin gets into the groove.

CAUTION:
Be sure not to turn the camshaft timing gear to the retard angle side (the right angle).

(c) Check that there is no clearance between the gear fringe and camshaft.

(d) Tighten the fringe bolt with the camshaft timing gear fixed.
Torque: 54 N·m (551 kgf·cm, 40 ft·lbf)

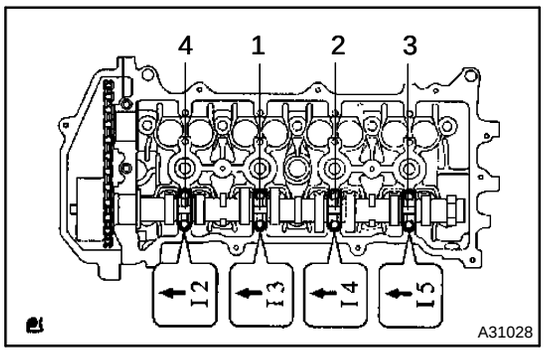
(e) Check that the camshaft timing gear can move to the retard angle side (the right angle), and is locked in the most retarded position.



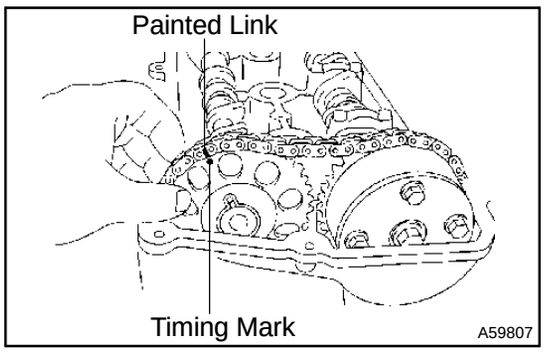
27. INSTALL CAMSHAFT

(a) Apply engine oil to the camshaft journal parts.

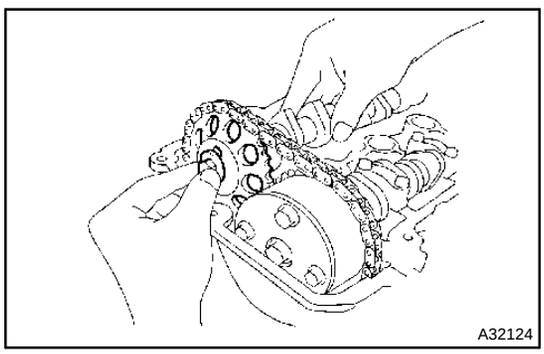
(b) Install the timing chain onto the camshaft timing gear with the painted link aligned with the timing mark of the camshaft timing sprocket as shown in the illustration.



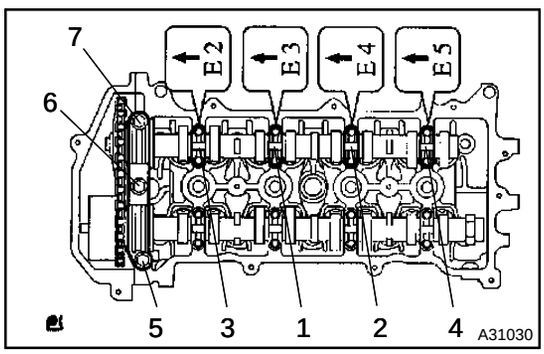
(c) Examine the front marks and numbers and check that the sequence order is as shown in the illustration. Then check the bolts.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



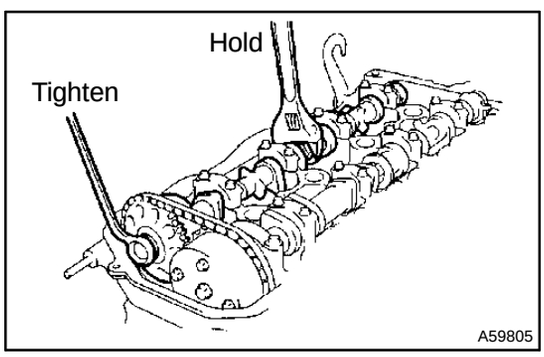
(d) Put the No. 2 camshaft on the cylinder head with the painted links of the chain aligned with the timing mark on the camshaft timing sprockets.



(e) Tighten the set bolt temporarily.

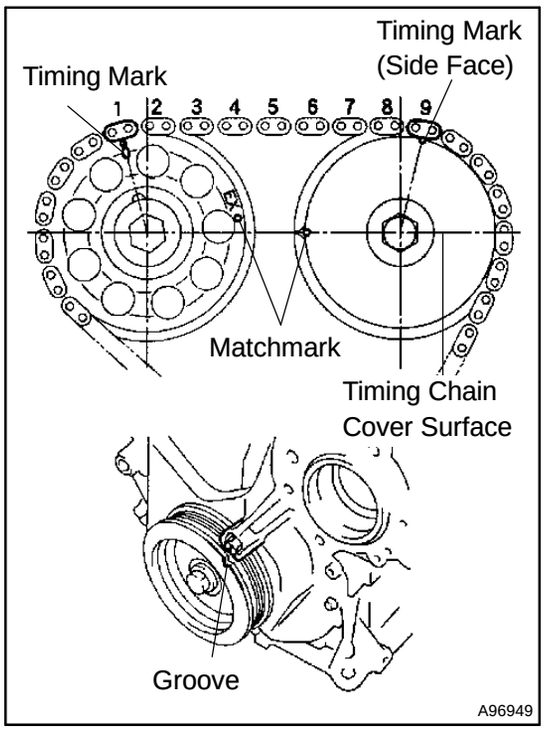


(f) Examine the front marks and numbers and check the sequence order is as shown in the illustration. Then check the bolts.

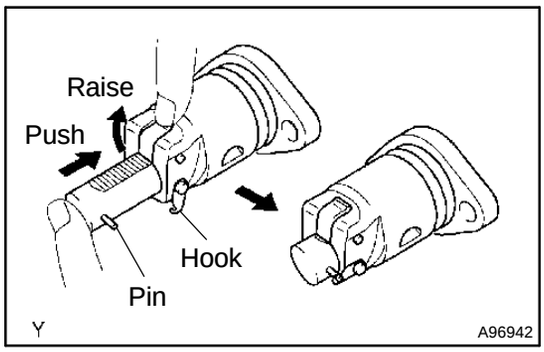


(g) Hold the hexagonal lobe of the camshaft, then tighten the camshaft timing gear set bolt.
Torque: 54 N·m (551 kgf·cm, 40 ft·lbf)

NOTICE:
Be careful not to damage the valve lifter.

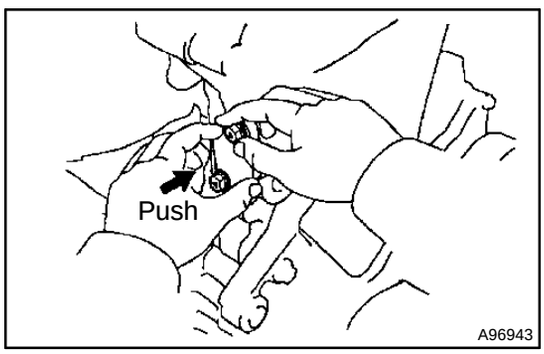


(h) Check that the 2 matchmarks are aligned on the timing chain cover surface. Also check that each timing mark is aligned with its corresponding painted link on the timing chain as shown in the illustration.



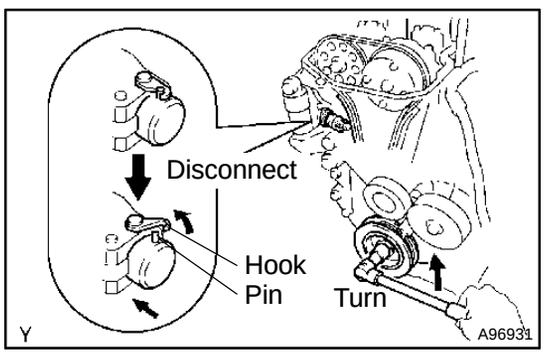
28. INSTALL CHAIN TENSIONER ASSY NO.1

(a) Check that the O-ring is clean, then set the hook as shown in the illustration.

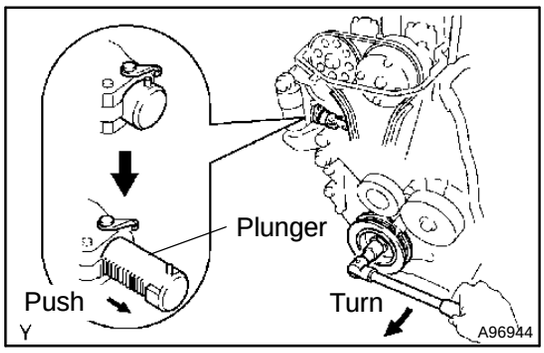


(b) Apply engine oil to the chain tensioner, then install it.
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

NOTICE:
When installing the tensioner, set the hook again if the hook releases the plunger.



(c) Turn the crankshaft counterclockwise, then disconnect the plunger knock pin from the hook.



(d) Turn the crankshaft clockwise, then check that the slipper is pushed by the plunger.

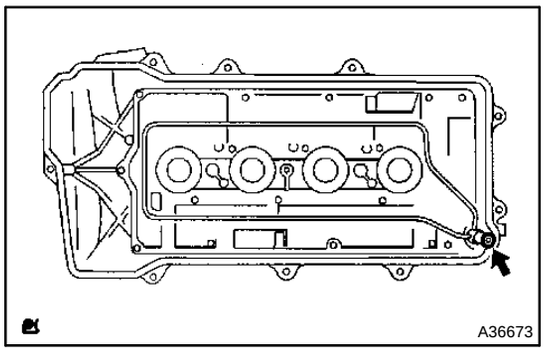
HINT:

If the plunger is not expended, press the slipper into the chain tensioner with a screwdriver so that the hook is released from the knock pin and the plunger can be extended.

29. INSPECT VALVE CLEARANCE **(See page 14-56)**

30. ADJUST VALVE CLEARANCE **(See page 14-56)**

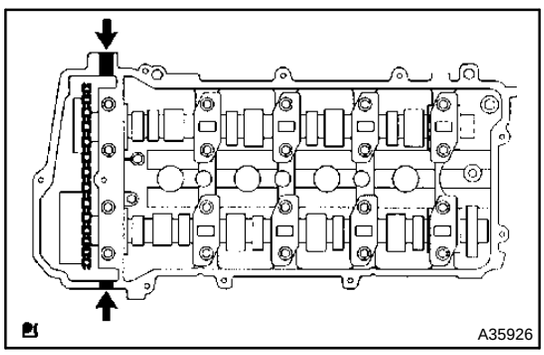
SST 09248-77010 (09248-07010)



31. INSTALL CYLINDER HEAD COVER SUB-ASSY

(a) Install a new O-ring onto the cylinder head cover.

(b) Remove any old packing (FIPG) material.

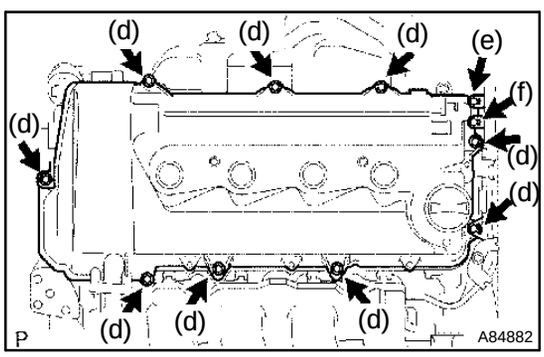


(c) Apply seal packing to 2 locations as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes of applying seal packing.**
- **Do not put into engine oil for at least 2 hours after installation.**



(d) Install the cylinder head cover, wire harness protector and bracket with the 9 bolts. Uniformly tighten the bolts, in the several passes in the sequence shown.

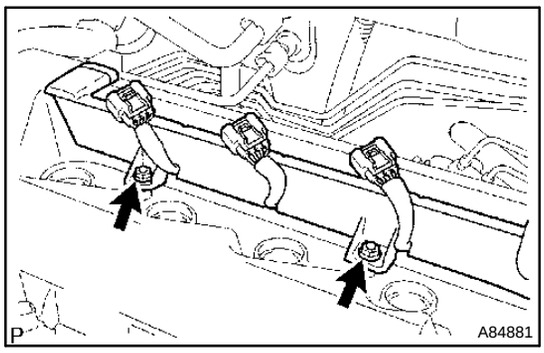
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

(e) Install the union to connector tube hose clamp with the bolt.

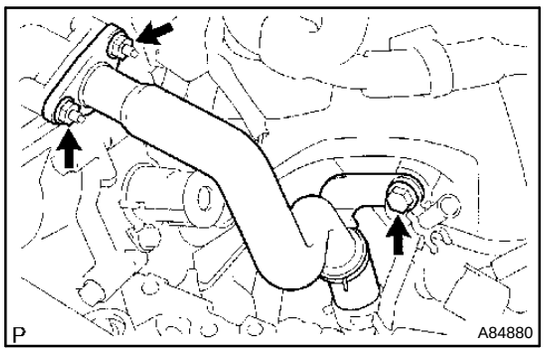
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

(f) Install the fuel tube clamp with the bolt.

Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



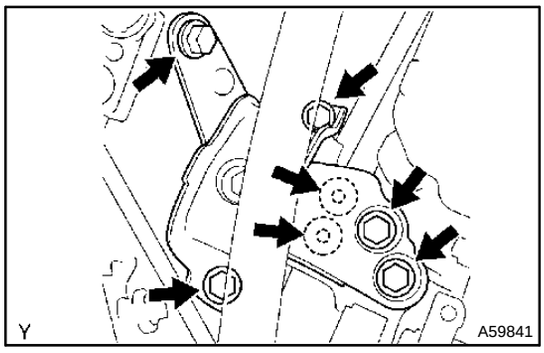
(g) Install the wire harness protector with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



(h) Install a new gasket and ventilation tube No. 1 with the 2 nuts and bolt.
Torque:
10 N·m (102 kgf·cm, 7 ft·lbf) for nut
24 N·m (245 kgf·cm, 18 ft·lbf) for bolt

32. INSTALL IGNITION COIL ASSY
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

33. INSTALL V-RIBBED BELT TENSIONER ASSY
Torque:
29 N·m (296 kgf·cm, 21 ft·lbf) for nut
100 N·m (1,020 kgf·cm, 74 ft·lbf) for bolt



34. INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH

(a) Install the engine mounting insulator RH with the 5 bolts and 2 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

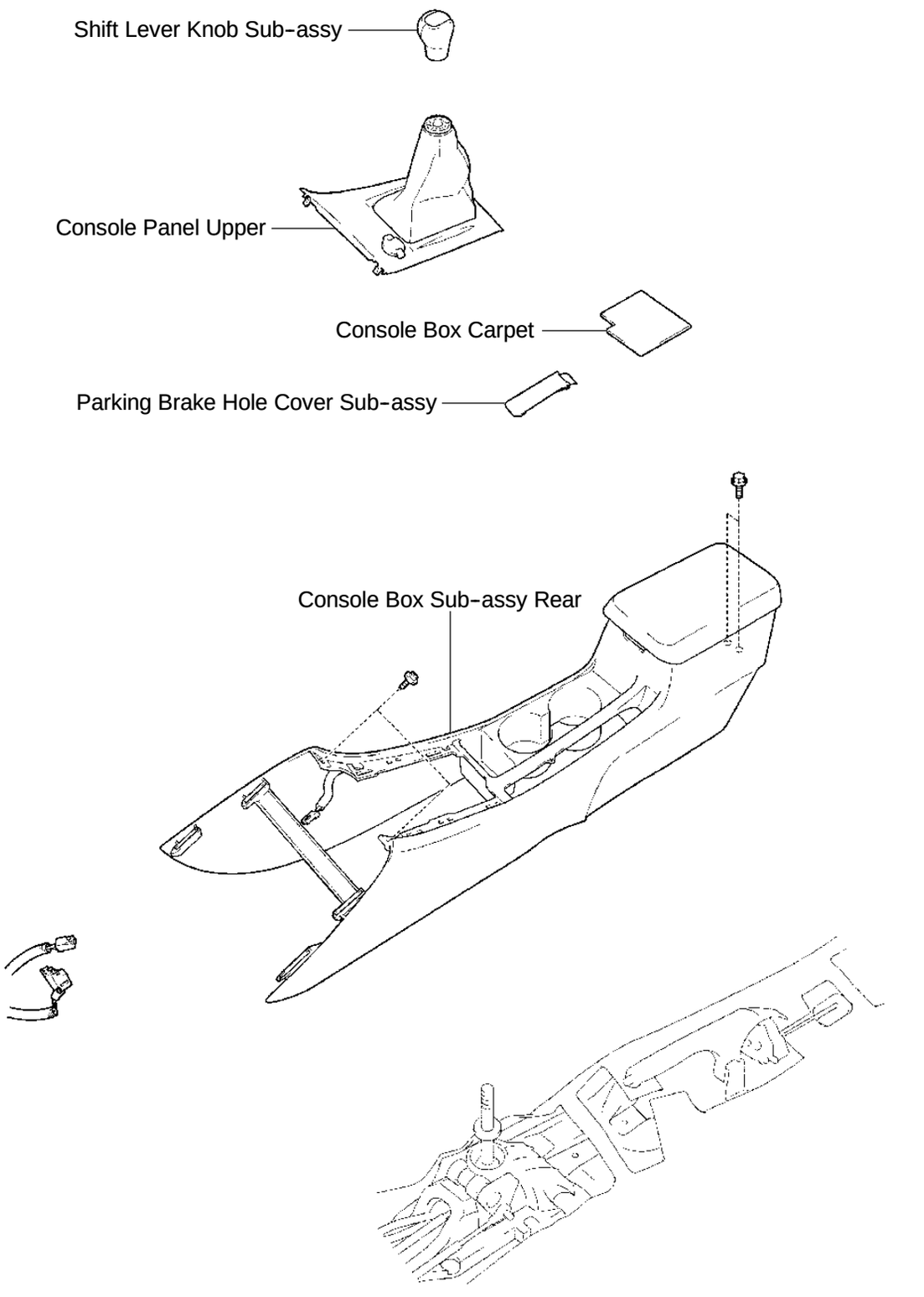
35. INSTALL GENERATOR ASSY **(See Pub. No. RM925E on page 19-8)**
36. INSTALL GENERATOR BRACKET NO.1 **(See Pub. No. RM925E on page 19-8)**
37. INSTALL AIR SWITCHING VALVE ASSY **(See Pub. No. RM925E on page 12-6)**
38. INSTALL SUCTION HOSE SUB-ASSY
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
39. INSTALL SUSPENSION TOWER DAMPER ASSY **(See page 26-8)**
40. CONNECT BATTERY NEGATIVE TERMINAL
41. CHECK FOR ENGINE OIL LEAKAGE

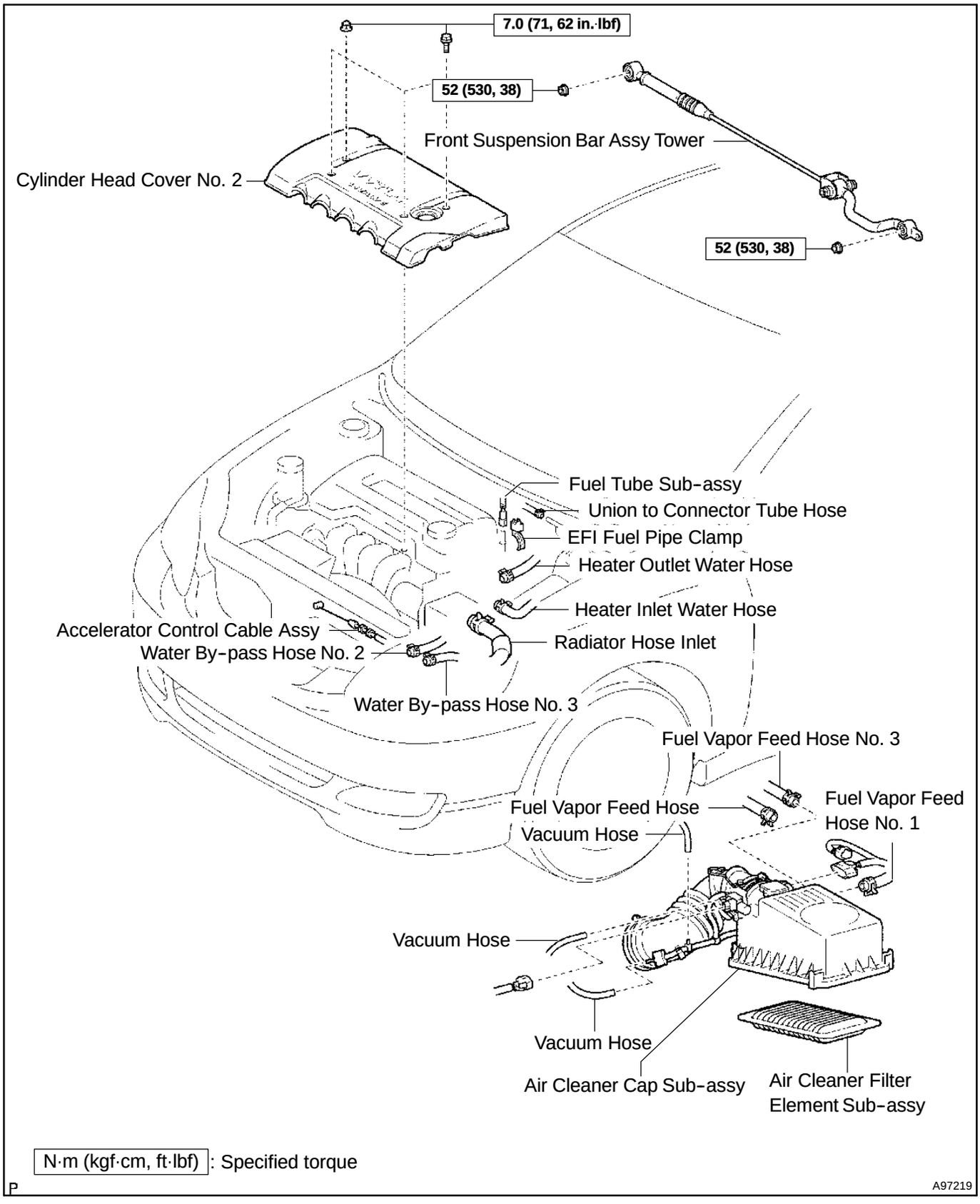
42. INSTALL CYLINDER HEAD COVER NO.2
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

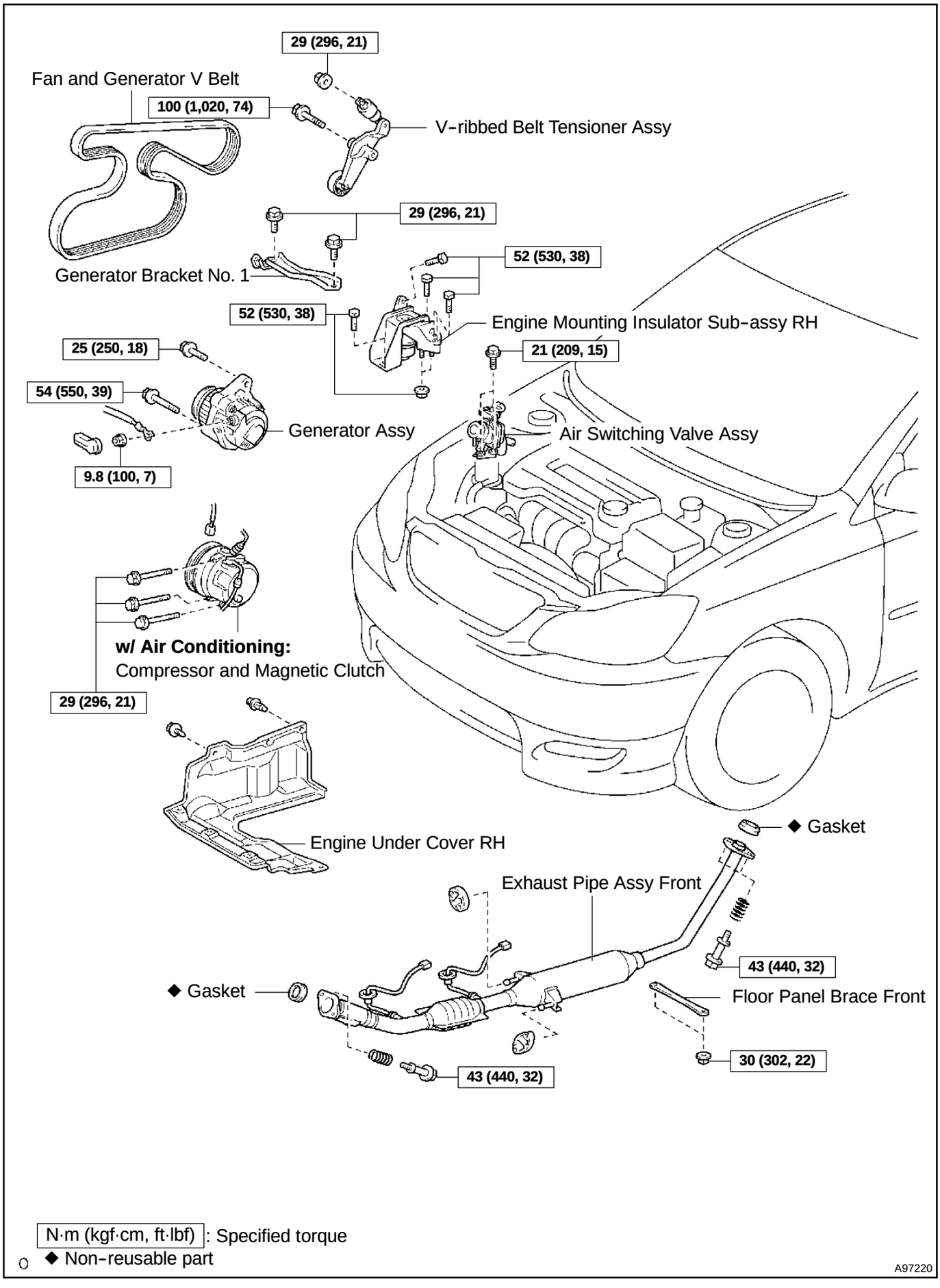
CYLINDER HEAD GASKET (2ZZ-GE)

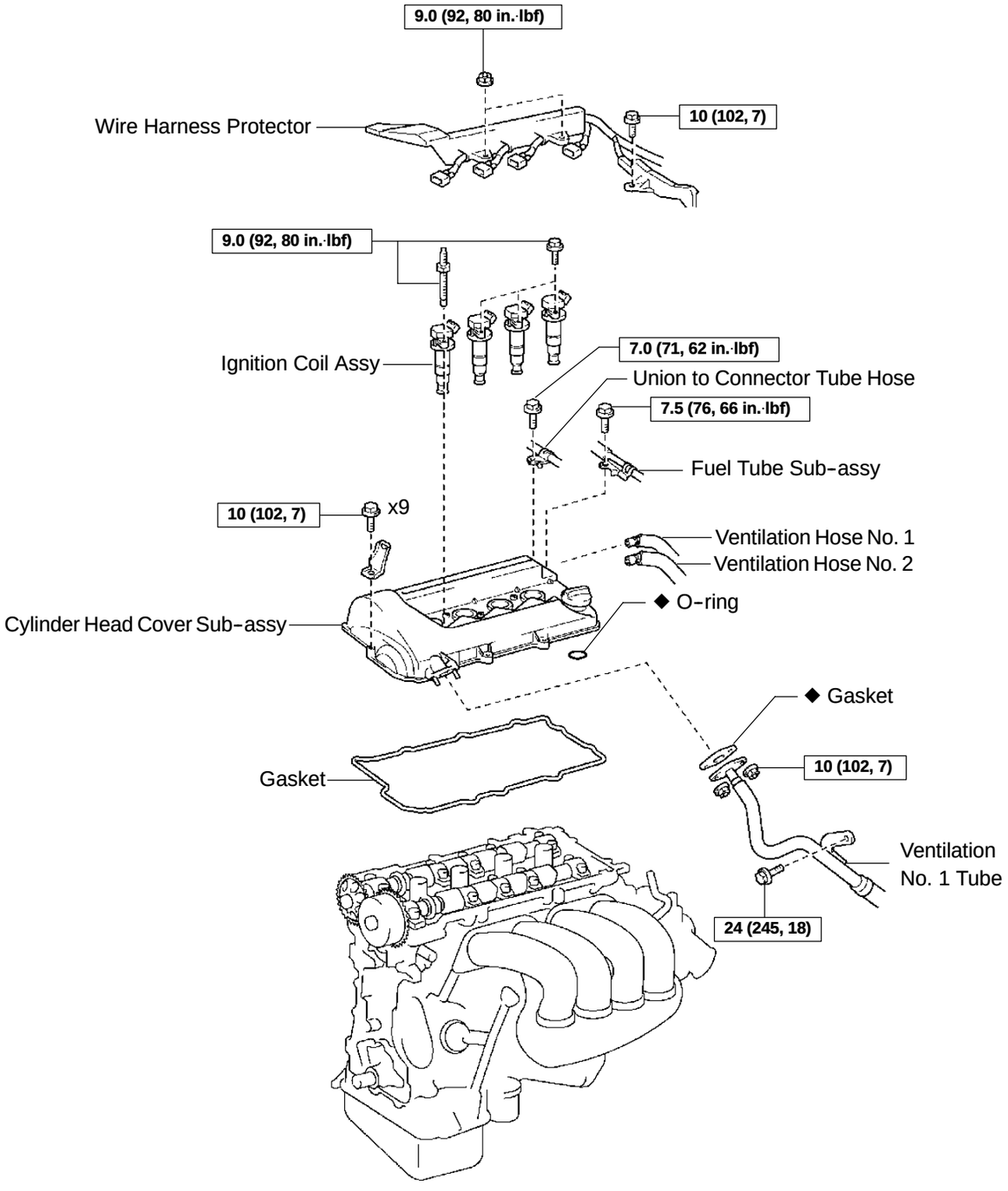
COMPONENTS

141XM-01




7.0 (71, 62 in.·lbf)
52 (530, 38)
Front Suspension Bar Assy Tower
Cylinder Head Cover No. 2
52 (530, 38)
Fuel Tube Sub-assy
Union to Connector Tube Hose
EFI Fuel Pipe Clamp
Heater Outlet Water Hose
Heater Inlet Water Hose
Accelerator Control Cable Assy
Radiator Hose Inlet
Water By-pass Hose No. 2
Water By-pass Hose No. 3
Fuel Vapor Feed Hose No. 3
Fuel Vapor Feed Hose
Fuel Vapor Feed Hose No. 1
Vacuum Hose
Vacuum Hose
Vacuum Hose
Air Cleaner Cap Sub-assy
Air Cleaner Filter Element Sub-assy
N·m (kgf·cm, ft·lbf): Specified torque
P
A97219

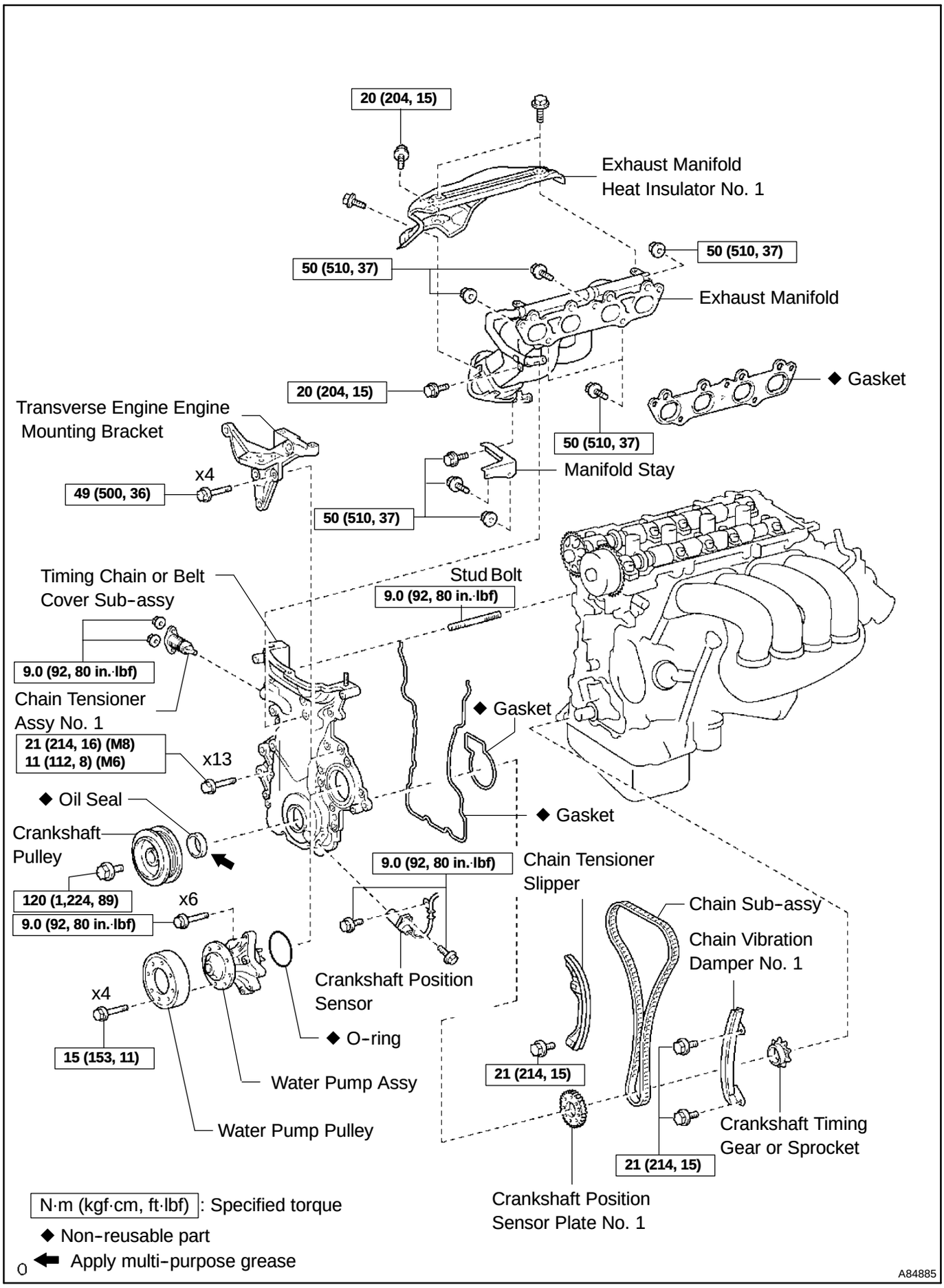

29 (296, 21)
Fan and Generator V Belt
100 (1,020, 74)
V-ribbed Belt Tensioner Assy
29 (296, 21)
Generator Bracket No. 1
52 (530, 38)
52 (530, 38)
Engine Mounting Insulator Sub-assy RH
25 (250, 18)
21 (209, 15)
54 (550, 39)
Generator Assy
Air Switching Valve Assy
9.8 (100, 7)
w/ Air Conditioning:
Compressor and Magnetic Clutch
29 (296, 21)
Engine Under Cover RH
◆ Gasket
Exhaust Pipe Assy Front
43 (440, 32)
◆ Gasket
Floor Panel Brace Front
30 (302, 22)
43 (440, 32)
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A97220

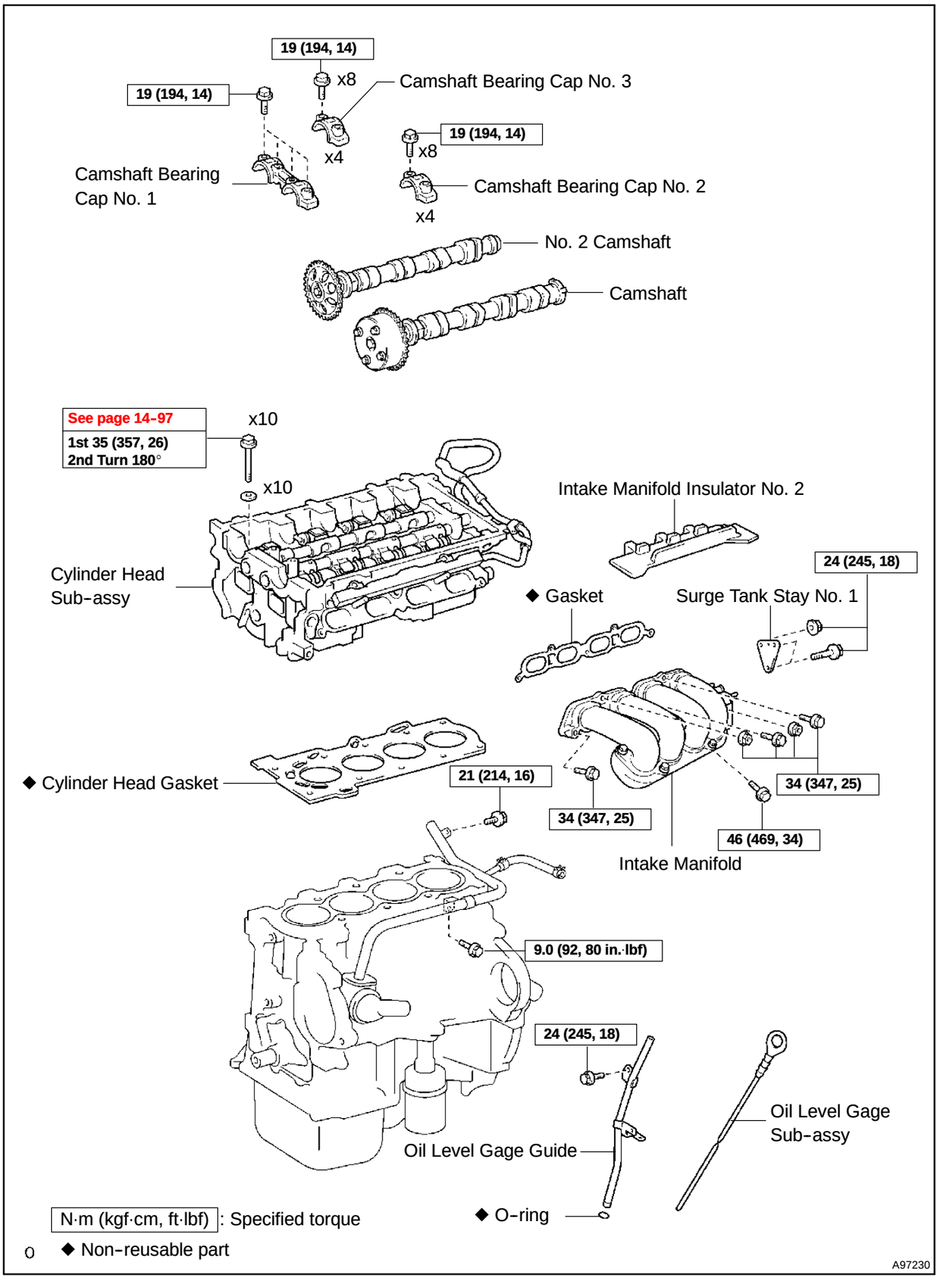


N·m (kgf·cm, ft·lbf): Specified torque

◆ Non-reusable part

A97221


20 (204, 15)
Exhaust Manifold
Heat Insulator No. 1
50 (510, 37)
50 (510, 37)
Exhaust Manifold
20 (204, 15)
◆ Gasket
Transverse Engine Engine
Mounting Bracket
50 (510, 37)
x4
49 (500, 36)
Manifold Stay
50 (510, 37)
Timing Chain or Belt
Cover Sub-assy
Stud Bolt
9.0 (92, 80 in.·lbf)
9.0 (92, 80 in.·lbf)
Chain Tensioner
Assy No. 1
◆ Gasket
21 (214, 16) (M8)
11 (112, 8) (M6)
x13
◆ Oil Seal
◆ Gasket
Crankshaft
Pulley
9.0 (92, 80 in.·lbf)
Chain Tensioner
Slipper
120 (1,224, 89)
9.0 (92, 80 in.·lbf)
x6
Chain Sub-assy
Chain Vibration
Damper No. 1
Crankshaft Position
Sensor
x4
◆ O-ring
21 (214, 15)
15 (153, 11)
Water Pump Assy
Water Pump Pulley
Crankshaft Timing
Gear or Sprocket
21 (214, 15)
Crankshaft Position
Sensor Plate No. 1
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Apply multi-purpose grease
A84885

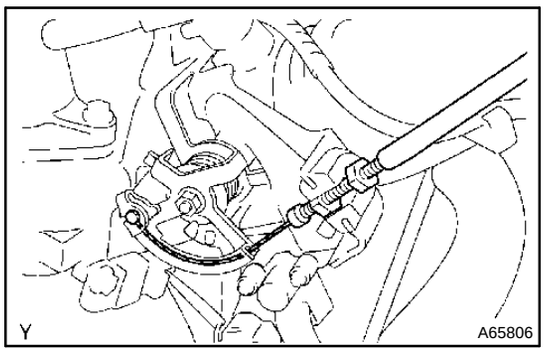

19 (194, 14)
x8
Camshaft Bearing Cap No. 3
19 (194, 14)
x4
19 (194, 14)
x8
Camshaft Bearing Cap No. 1
Camshaft Bearing Cap No. 2
x4
No. 2 Camshaft
Camshaft
See page 14-97
1st 35 (357, 26)
2nd Turn 180°
x10
x10
Intake Manifold Insulator No. 2
Cylinder Head Sub-assy
◆ Gasket
24 (245, 18)
Surge Tank Stay No. 1
◆ Cylinder Head Gasket
21 (214, 16)
34 (347, 25)
34 (347, 25)
46 (469, 34)
Intake Manifold
9.0 (92, 80 in.·lbf)
24 (245, 18)
Oil Level Gage Guide
Oil Level Gage Sub-assy
◆ O-ring
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A97230

141XN-01

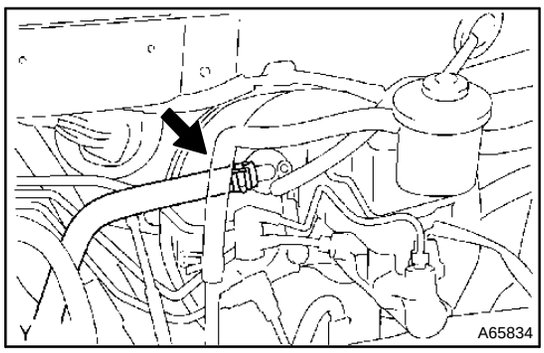
REPLACEMENT

1. **DISCHARGE FUEL SYSTEM PRESSURE** **(See Pub. No. RM925E on page 11-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **DRAIN COOLANT** **(See page 16-8)**
4. **REMOVE FRONT WHEEL RH**
5. **REMOVE ENGINE UNDER COVER RH**
6. **REMOVE SUSPENSION TOWER DAMPER ASSY** **(See page 26-8)**
7. **REMOVE CYLINDER HEAD COVER NO.2**

(a) Remove the 3 bolts and nut, then remove the cylinder head cover No. 2.



8. **SEPARATE ACCELERATOR CONTROL CABLE ASSY**
9. **REMOVE AIR CLEANER CAP SUB-ASSY**



10. **DISCONNECT UNION TO CONNECTOR TUBE HOSE**

(a) Disconnect the union to connector tube hose from the brake booster.

11. **REMOVE EFI FUEL PIPE CLAMP** **(See Pub. No. RM925E on page 11-5)**
12. **DISCONNECT FUEL TUBE SUB-ASSY** **(See Pub. No. RM925E on page 11-5)**
13. **DISCONNECT RADIATOR HOSE INLET**
14. **DISCONNECT HEATER INLET WATER HOSE**
15. **DISCONNECT HEATER OUTLET WATER HOSE**
16. **DISCONNECT WATER BY-PASS HOSE NO.2**
17. **DISCONNECT WATER BY-PASS HOSE NO.3**
18. **REMOVE WIRE HARNESS PROTECTOR** **(See page 14-78)**
19. **SEPARATE SUCTION HOSE SUB-ASSY** **(See page 14-78)**
20. **REMOVE AIR SWITCHING VALVE ASSY** **(See Pub. No. RM925E on page 12-6)**
21. **REMOVE FAN AND GENERATOR V BELT** **(See page 14-78)**
22. **REMOVE GENERATOR BRACKET NO.1** **(See Pub. No. RM925E on page 19-8)**
23. **REMOVE GENERATOR ASSY** **(See Pub. No. RM925E on page 19-8)**

24. SEPARATE COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) **(See page 55-37)**

HINT:

Hang up the hoses instead of detaching.

25. REMOVE SHIFT LEVER KNOB SUB-ASSY

26. REMOVE CONSOLE PANEL UPPER

27. REMOVE PARKING BRAKE HOLE COVER SUB-ASSY

28. REMOVE CONSOLE BOX CARPET

29. REMOVE CONSOLE BOX SUB-ASSY REAR

30. REMOVE EXHAUST PIPE ASSY FRONT **(See Pub. No. RM925E on page 15-2)**

31. REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH **(See page 14-78)**

32. REMOVE V-RIBBED BELT TENSIONER ASSY

HINT:

Jack the engine up and down to remove the bolt.

33. REMOVE IGNITION COIL ASSY **(See page 14-78)**

34. REMOVE CYLINDER HEAD COVER SUB-ASSY **(See page 14-78)**

35. REMOVE MANIFOLD STAY **(See page 14-66)**

36. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1

37. REMOVE EXHAUST MANIFOLD **(See page 14-66)**

38. REMOVE WATER PUMP PULLEY

SST 09960-10010 (09962-01000, 09963-00600)

39. REMOVE WATER PUMP ASSY **(See page 14-66)**

40. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET **(See page 14-66)**

41. REMOVE CRANKSHAFT POSITION SENSOR

42. SET NO. 1 CYLINDER TO TDC/COMPRESSION **(See page 14-78)**

43. REMOVE CRANKSHAFT PULLEY **(See page 14-66)**

SST 09213-70011 (09213-70020), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021, 09957-04010)

44. REMOVE CHAIN TENSIONER ASSY NO.1 **(See page 14-66)**

45. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY **(See page 14-66)**

46. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL **(See page 14-66)**

47. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1

48. REMOVE CHAIN TENSIONER SLIPPER

(a) Remove the bolt and chain tensioner slipper.

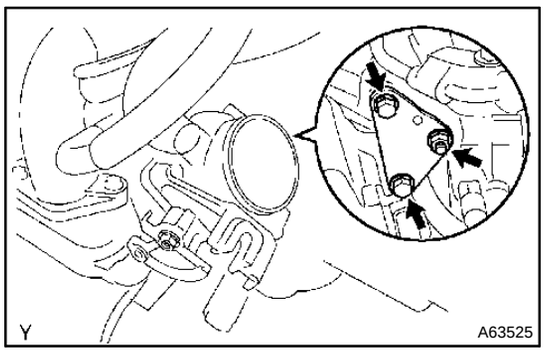
49. REMOVE CHAIN VIBRATION DAMPER NO.1

(a) Remove the 2 bolts and chain vibration damper No. 1.

50. REMOVE CHAIN SUB-ASSY **(See page 14-66)**

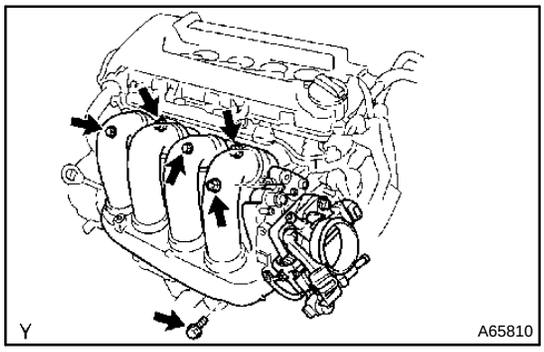
51. REMOVE OIL LEVEL GAGE GUIDE

52. REMOVE OIL LEVEL GAGE SUB-ASSY



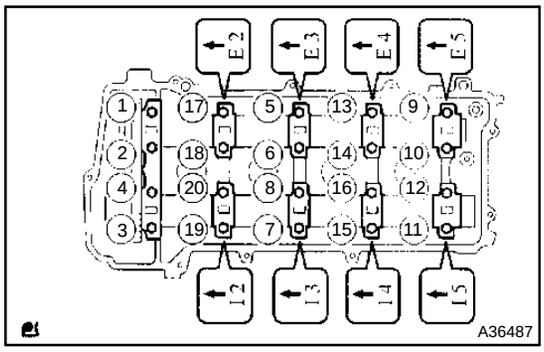
53. REMOVE SURGE TANK STAY NO.1

(a) Remove the 2 bolts and nut, then remove the surge tank stay.



54. REMOVE INTAKE MANIFOLD

(a) Remove the 4 bolts and 2 nuts, then remove the intake manifold and gasket.

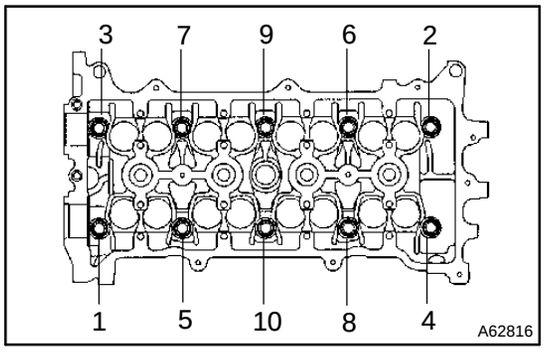


55. REMOVE CAMSHAFT

(a) Uniformly loosen and remove the 20 bearing cap bolts, in several passes in the sequence shown, then remove the 9 bearing caps of the intake and exhaust camshafts.

56. REMOVE CYLINDER HEAD SUB-ASSY

(a) Disconnect the water by-pass pipe from the cylinder head.



(b) Using a bi-hexagon wrench 10, uniformly loosen the 10 cylinder head bolts, in several passes in the sequence shown.

(c) Remove the 10 cylinder head bolts and plate washers.

NOTICE:

- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in the wrong order.**

(d) Remove the cylinder head from the cylinder block.

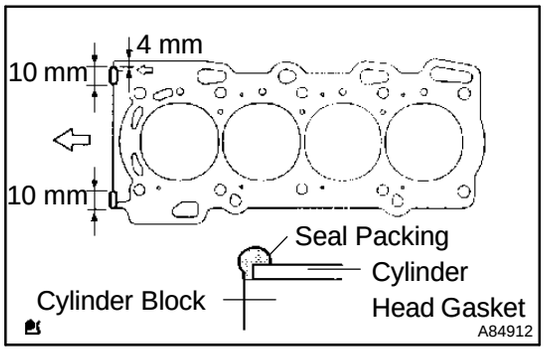
57. REMOVE CYLINDER HEAD GASKET

58. INSTALL CYLINDER HEAD GASKET

(a) Place a new cylinder head gasket on the cylinder block surface with the Lot No. stamp upward.

NOTICE:

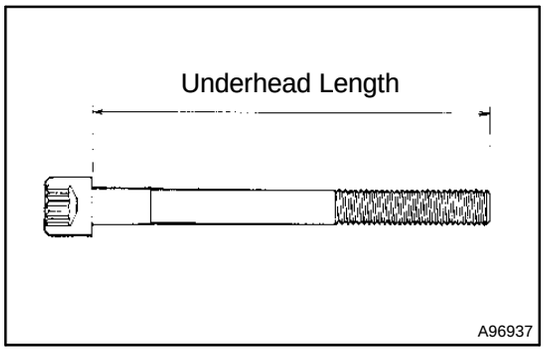
- **Make sure that the cylinder head gasket is mounted in the correct direction when installing.**
- **Place the cylinder head gently in order to avoid damaging the gasket.**



(b) Apply seal packing to the cylinder head gasket as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

HINT:
Avoid applying an excessive amount of seal packing to the surface.

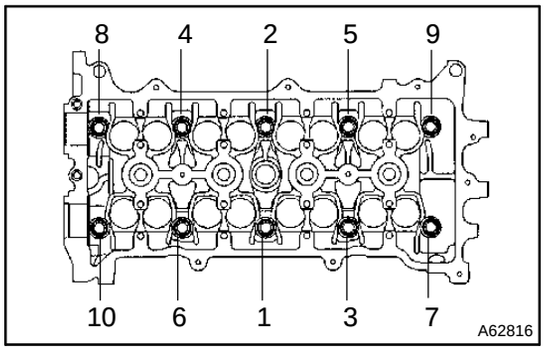
- The parts must be assembled within 3 minutes of applying. Otherwise, the seal packing must be removed and reapplied.
- Immediately remove the nozzle from the tube, then reinstall the cap.



59. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the length of the head bolts from the seat to the end.
Standard bolt length:
146.8 to 148.2 mm (5.780 to 5.835 in.)
Maximum bolt length: 148.5 mm (5.846 in.)

If the bolt length is greater than maximum, replace the cylinder head set bolt.



60. INSTALL CYLINDER HEAD SUB–ASSY

(a) Place the cylinder head on the cylinder block.

HINT:
The cylinder head bolts are tightened in 2 progressive steps.

(b) Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.

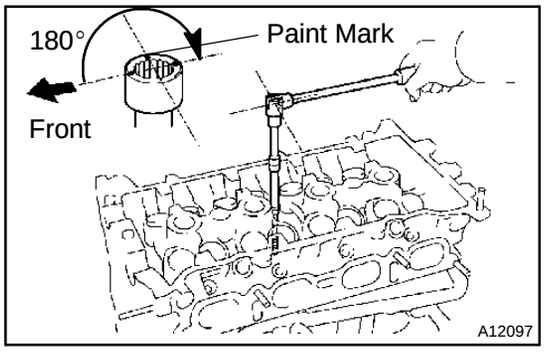
(c) Using a 10 mm bi–hexagon wrench, install and uniformly tighten the 10 cylinder head bolts with the plate washers, in several passes in the sequence shown.
Torque: 35 N·m (357 kgf·cm, 26 ft·lbf)

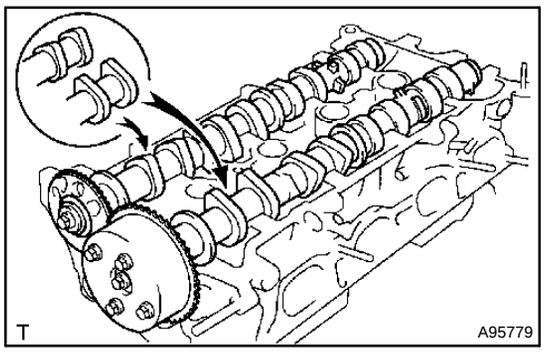
(d) Mark the front of each cylinder head bolt with paint.

(e) Retighten the cylinder head bolts 180° in the sequence shown.

(f) Check that the paint mark on each bolt is at a 180° angle to its original position.

(g) Install the water by–pass pipe.
Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

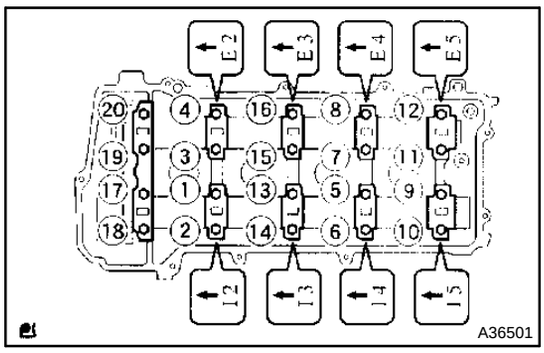




61. INSTALL CAMSHAFT

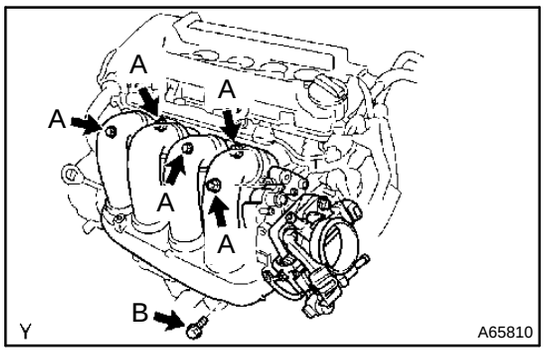
(a) Apply a light coat of engine oil to the camshaft journals.

(b) Place the 2 camshafts on the cylinder head with the No. 1 cam lobes facing as shown in the illustration.



(c) Examine the front marks and numbers and check that the sequence order is as shown in the illustration. Then tighten the bolts.

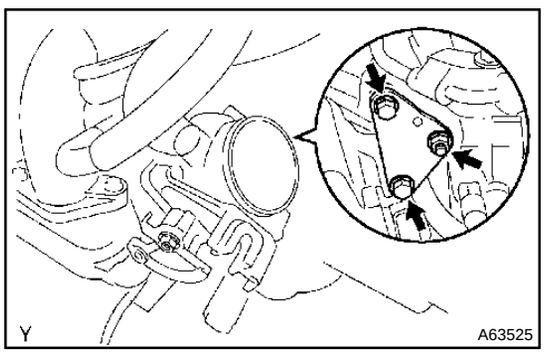
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



62. INSTALL INTAKE MANIFOLD

(a) Install a new gasket and the intake manifold with the 4 bolts and 2 nuts.

Torque:
34 N·m (347 kgf·cm, 25 ft·lbf) for bolt A and nut A
46 N·m (469 kgf·cm, 34 ft·lbf) for bolt B



63. INSTALL SURGE TANK STAY NO.1

(a) Install the surge tank stay with the 2 bolts and nut.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

64. INSTALL OIL LEVEL GAGE GUIDE

(a) Apply a light coat of engine oil to the new O–ring, then install it onto the oil level gage guide.

(b) Install the oil level gage guide with the bolt.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

65. INSTALL CHAIN VIBRATION DAMPER NO.1

(a) Install the chain vibration damper No. 1 with the 2 bolts.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

66. INSTALL CHAIN SUB–ASSY **(See page 14–66)**

SST 09223–22010

67. INSTALL CHAIN TENSIONER SLIPPER **(See page 14–66)**

68. **INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1** (See page 14-66)
69. **INSTALL TIMING CHAIN OR BELT COVER OIL SEAL** (See page 14-66)
    SST 09223-22010
70. **INSTALL TIMING CHAIN OR BELT COVER SUB-ASSY** (See page 14-66)
71. **INSTALL CHAIN TENSIONER ASSY NO.1** (See page 14-66)
72. **INSTALL CRANKSHAFT PULLEY** (See page 14-66)
    SST 09213-70011 (09213-70020), 09330-00021
73. **INSTALL CRANKSHAFT POSITION SENSOR**
    Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
74. **INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET** (See page 14-66)
75. **INSTALL WATER PUMP ASSY** (See page 14-66)
76. **INSTALL WATER PUMP PULLEY** (See page 14-66)
    SST 09960-10010 (09962-01000, 09963-00600)
77. **INSTALL EXHAUST MANIFOLD** (See page 14-66)
78. **INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1**
    Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
79. **INSTALL MANIFOLD STAY** (See page 14-66)
80. **INSTALL CYLINDER HEAD COVER SUB-ASSY** (See page 14-78)
81. **INSTALL IGNITION COIL ASSY** (See page 14-78)
82. **INSTALL V-RIBBED BELT TENSIONER ASSY**
    Torque:
    29 N·m (296 kgf·cm, 21 ft·lbf) for nut
    100 N·m (1,020 kgf·cm, 74 ft·lbf) for bolt
83. **INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH** (See page 14-78)
84. **INSTALL EXHAUST PIPE ASSY FRONT** (See Pub. No. RM925E on page 15-2)
85. **INSTALL CONSOLE BOX SUB-ASSY REAR**
86. **INSTALL CONSOLE BOX CARPET**
87. **INSTALL PARKING BRAKE HOLE COVER SUB-ASSY**
88. **INSTALL CONSOLE PANEL UPPER**
89. **INSTALL SHIFT LEVER KNOB SUB-ASSY**
90. **INSTALL COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING)** (See page 55-37)
91. **INSTALL GENERATOR ASSY** (See Pub. No. RM925E on page 19-8)
92. **INSTALL GENERATOR BRACKET NO.1** (See Pub. No. RM925E on page 19-8)
93. **INSTALL AIR SWITCHING VALVE ASSY** (See Pub. No. RM925E on page 12-6)
94. **INSTALL SUCTION HOSE SUB-ASSY**
    Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
95. **INSTALL SUSPENSION TOWER DAMPER ASSY** (See page 26-8)
96. **INSTALL FRONT WHEEL RH**
    Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
97. **CONNECT BATTERY NEGATIVE TERMINAL**
98. **ADD COOLANT** (See page 16-8)
99. **CHECK FOR ENGINE COOLANT LEAKAGE** (See page 16-1)
100. **CHECK FOR ENGINE OIL LEAKAGE**
101. **CHECK FOR EXHAUST GAS LEAKAGE**
102. **INSPECT IGNITION TIMING** (See Pub. No. RM925E on page 14-1)
    SST 09843-18040
103. **INSPECT ENGINE IDLING SPEED** (See Pub. No. RM925E on page 14-1)
104. **INSPECT COMPRESSION** (See Pub. No. RM925E on page 14-1)
    SST 09992-00500

105. INSPECT CO/HC (See Pub. No. RM925E on page 14–1)

106. INSTALL CYLINDER HEAD COVER NO.2
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

COOLING

COOLING SYSTEM
(2ZZ-GE/3ZZ-FE/4ZZ-FE) 16-1
ON-VEHICLE INSPECTION 16-1/2
INSPECTION 16-3/4
COOLING FAN SYSTEM
(2ZZ-GE/3ZZ-FE/4ZZ-FE) 16-5
ON-VEHICLE INSPECTION 16-5/6
INSPECTION 16-7
ENGINE COOLANT
(2ZZ-GE/3ZZ-FE/4ZZ-FE) 16-8
REPLACEMENT 16-8/9

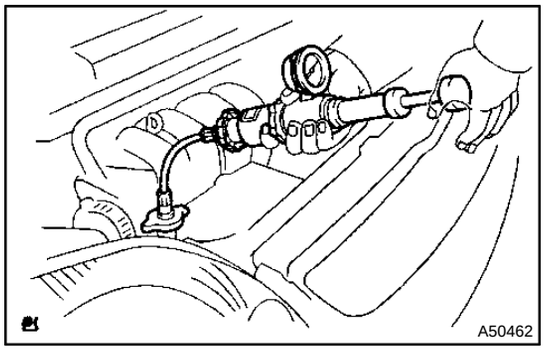
REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

COOLING SYSTEM (2ZZ-GE/3ZZ-FE/4ZZ-FE)

ON-VEHICLE INSPECTION

160Y0-01



1. INSPECT COOLING SYSTEM FOR LEAKS

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(a) Fill the radiator with coolant, then attach a radiator cap tester.

(b) Warm up the engine.

(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), then check that the pressure does not drop.

HINT:

If the pressure drops, check to hoses, radiator and water pump for leaks. If there are no signs of external coolant leaks, check the heater core, cylinder block and head.

2. CHECK ENGINE COOLANT LEVEL OF RESERVOIR

(a) The engine coolant level should be between the "LOW" and "FULL" line.

HINT:

If low, check for leaks and add "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology up to the "FULL" line.

3. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap.

CAUTION:

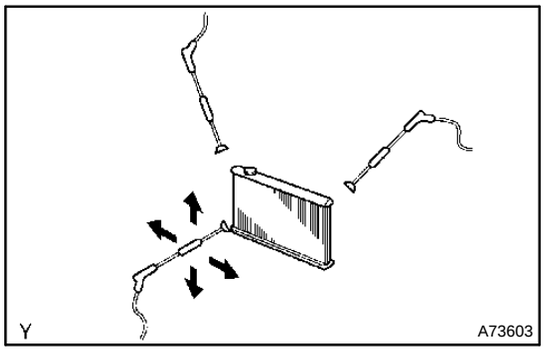
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(b) Check for any excessive deposits of rust or scale around the radiator cap and radiator filler hole; the coolant should be free of oil.

HINT:

If excessively dirty, replace the coolant.

(c) Reinstall the radiator cap.



4. INSPECT FIN FOR BLOCKAGE

(a) If the fins are clogged, wash them with water or a steam cleaner, then dry with compressed air.

NOTICE:

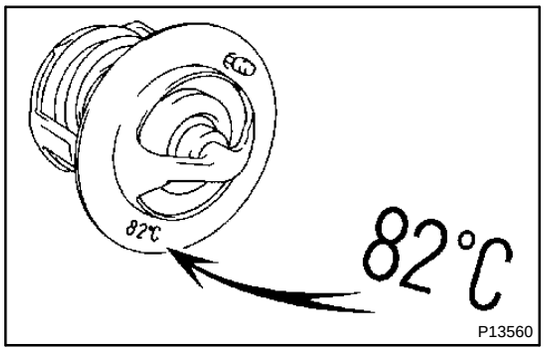
- **If the distance between the steam cleaner and core is too small, there is a possibility of damaging the fins, so keep to the following injection distances.**

Injection Pressure kPa (kgf/cm^2, psi)	Injection Distance mm (in.)
2,942 to 4,903 (30 to 50, 427 to 711)	300 (11.811)
4,903 to 7,845 (50 to 80, 711 to 1,138)	500 (19.685)

- **If the fins are bent, straighten them with a screwdriver or pliers.**
- **Be careful not to expose the electronic components to water.**

1600U-13

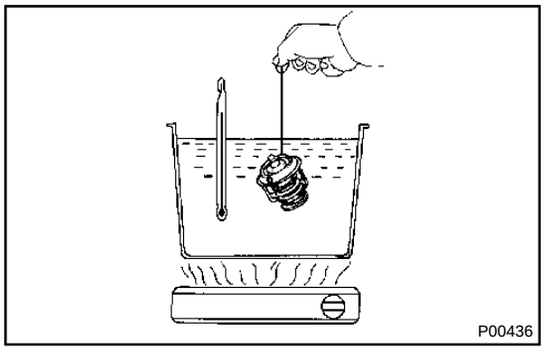
INSPECTION



P13560

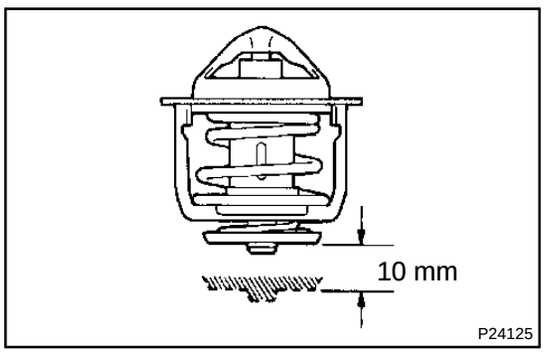
1. THERMOSTAT

HINT:
The valve opening temperature is inscribed on the thermostat.


P00436

(a) Immerse the thermostat in water, then gradually heat the water.
(b) Check the valve opening temperature of the thermostat.
Valve opening temperature:
80 to 84°C (176 to 183°F)

If the valve opening temperature is not as specified, replace the thermostat.



P24125

(c) Inspect the valve lift.
Valve lift: 10 mm (0.394 in.) or more at 95°C (203°F)

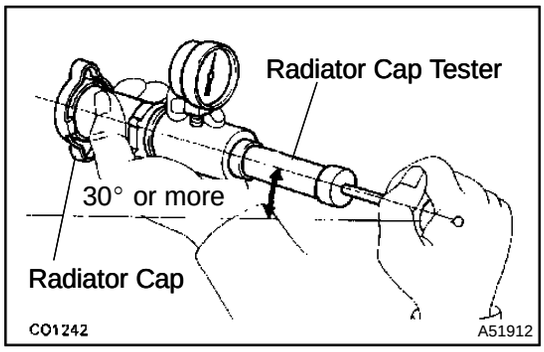
If the valve lift is not as specified, replace the thermostat.
(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 77°C (171°F)).

If not fully closed, replace the thermostat.

2. RADIATOR CAP SUB-ASSY

NOTICE:

- **If the radiator cap is contaminated, rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and the pressure valve with engine coolant or water.**
- **When performing the following steps (a) and (b), keep the tester at an angle of 30° or more above the horizontal.**



(a) Using a radiator cap tester, slowly pump and check that air comes from the vacuum valve.

Pumping speed: 1 push every 3 seconds or more

NOTICE:

Push the pump at a constant speed.

If air does not come from the vacuum valve, replace the radiator cap.

(b) Pump the tester, then measure the relief valve opening pressure.

Pumping speed: 1 push within 1 second

NOTICE:

The above pumping speed is for the first pumping only (in order to close the vacuum valve). After the first pumping, the pumping speed can be reduced.

Standard opening pressure:

74 to 103 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)

Minimum opening pressure:

59 kPa (0.6 kgf/cm^2, 8.6 psi)

If the opening pressure is less than minimum, replace the radiator cap.

HINT:

Use the tester's maximum reading as the opening pressure.

COOLING FAN SYSTEM (2ZZ-GE/3ZZ-FE/4ZZ-FE)

160X8-02

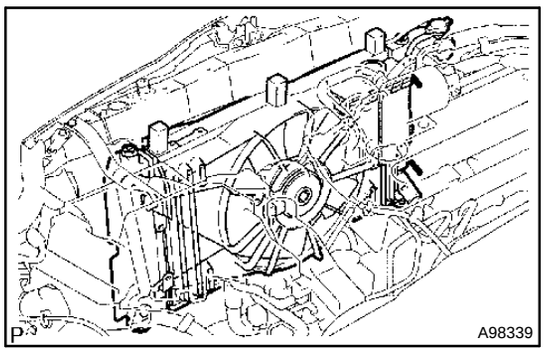
ON-VEHICLE INSPECTION

HINT:

It is normal for the cooling fan to sometimes rotate when the ignition switch is turned from ACC to ON.

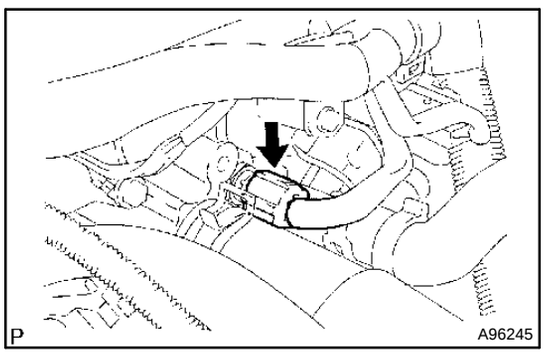
1. CHECK COOLING FAN OPERATION AT LOW TEMPERATURES (Below 94.5°C (202°F))

(a) Turn the ignition switch ON (START) with the A/C switch OFF.

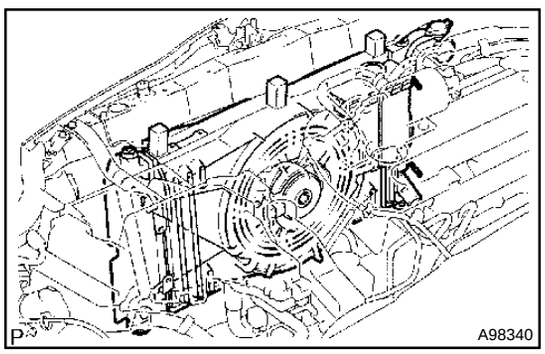


(b) Check that the cooling fan stops.

If not, check the cooling fan relays and engine coolant temperature sensor, then check for disconnection of the connector or wire break between the cooling fan relay and engine coolant temperature sensor.



(c) Disconnect the engine coolant temperature sensor connector.



(d) Check that the cooling fan rotates.

If not, check the fuses, cooling fan relays, ECM and cooling fan, then check for a short circuit between the cooling fan relay and engine coolant temperature sensor.

(e) Reconnect the engine coolant temperature sensor connector.

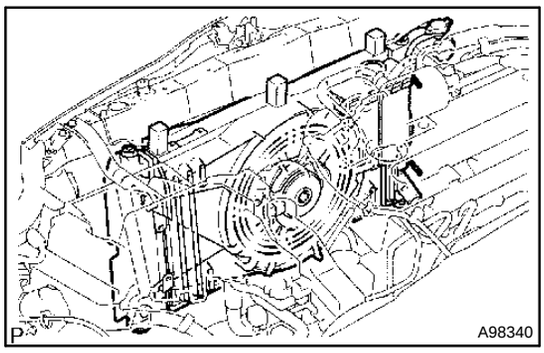
2. CHECK COOLING FAN OPERATION AT HIGH TEMPERATURES (Above 96°C (205°F))

(a) Start the engine, then raise the coolant temperature to above 96°C (205°F).

HINT:

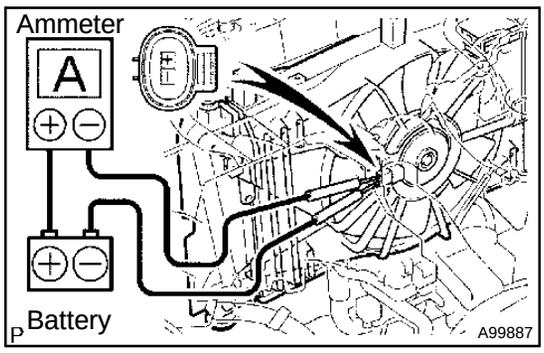
Coolant temperature is the value detected by the engine coolant temperature sensor on the cylinder head.

(b) Check that the A/C switch is OFF.



(c) Check that the cooling fan rotates.

If not, replace the engine coolant temperature sensor.



3. INSPECT FAN

(a) Disconnect the fan connector.

(b) Connect the battery and ammeter to the fan connector.

(c) Check that the fan rotates smoothly, then check the reading on the ammeter.

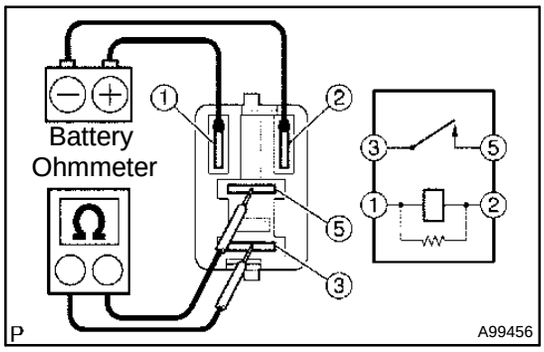
Standard amperage: 7.6 to 10.9 A at 20°C (68°F)

If the amperage is not as specified, replace the cooling fan motor.

(d) Reconnect the fan connector.

160X9-02

INSPECTION



1. INSPECT COOLING FAN RELAY

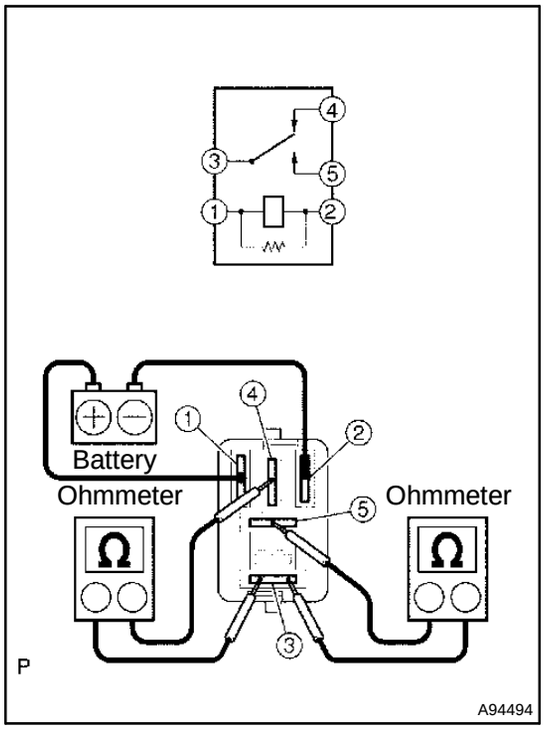
(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the resistance is not as specified, replace the relay.



2. INSPECT COOLING FAN RELAY NO.2

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between each terminal.

Standard:

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 4	10 kΩ or higher (Apply battery voltage to terminals 1 and 2)
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the resistance is not as specified, replace the relay.

3. INSPECT COOLING FAN RESISTOR (W/ AIR CONDITIONING)

(a) Inspect the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	1.17 to 1.43 Ω at 20°C (68°F)

If the resistance is not as specified, replace the cooling fan resister.

ENGINE COOLANT (2ZZ-GE/3ZZ-FE/4ZZ-FE)

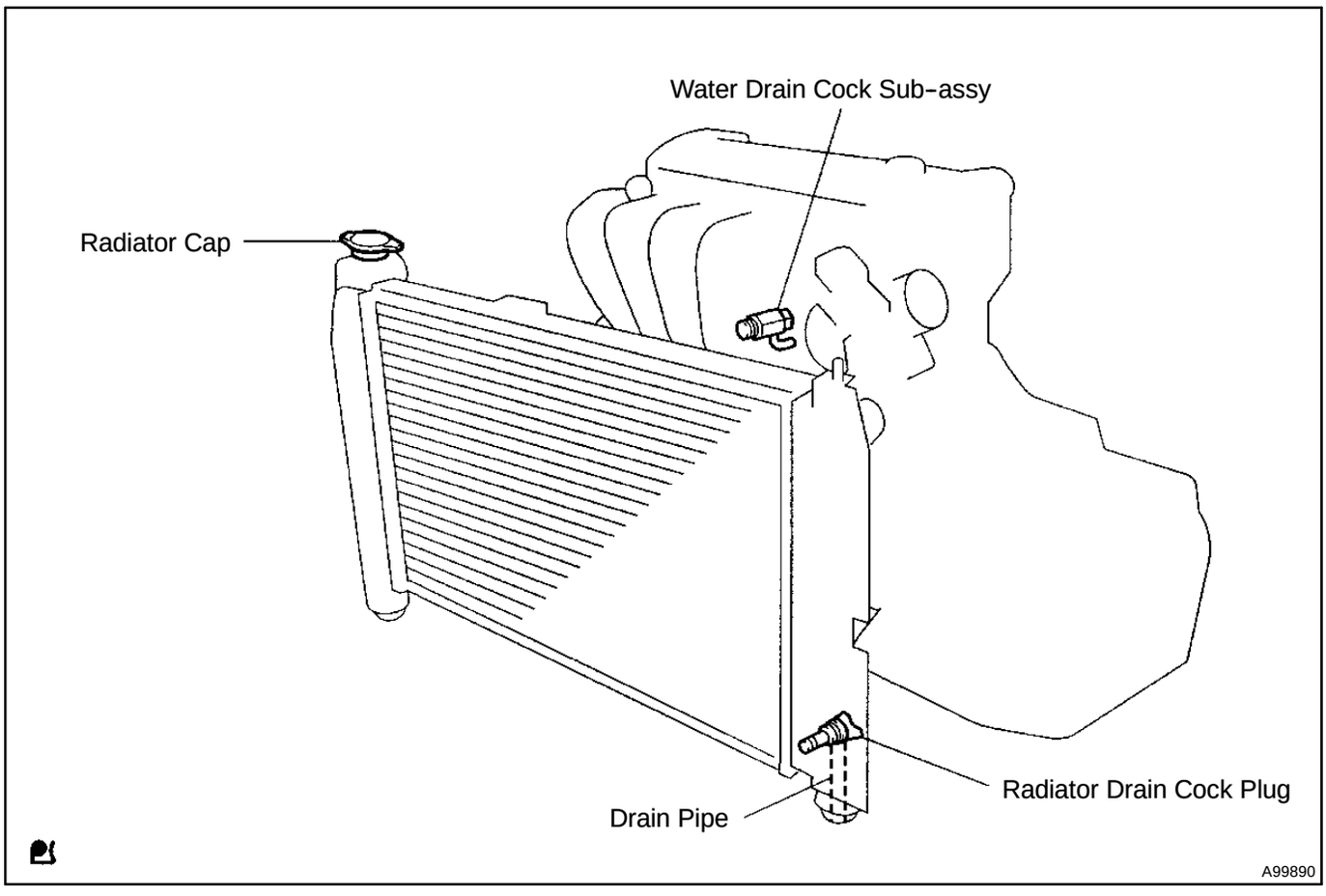
1600V-16

REPLACEMENT

1. DRAIN ENGINE COOLANT

CAUTION:
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(a) Remove the radiator cap.
(b) Drain engine coolant by loosening the drain cock plug of the radiator and the water drain cock plug of the water drain cock.



(c) Tighten the water drain cock plug of the water drain cock.
Torque: 13 N·m (129 kgf·cm, 9.4 ft·lbf)

2. ADD ENGINE COOLANT

(a) Tighten the radiator drain plug, and pour coolant into radiator until it overflows.

Capacity:

2ZZ-GE 6.7 liters (7.1 US qts, 5.9 lmp. qts)

3ZZ-FE/4ZZ-FE 6.5 liters (6.9 US qts, 5.7 lmp. qts)

HINT:

- Improper coolants may damage the engine cooling system.
- Use only "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate,non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids).
- New Toyota vehicles are filled with Toyota Super Long Life Coolant (color is pink, premixed ethylene-glycol concentration is approximately 50% and freezing temperature is -35°C (-31°F)).When replacing the coolant, Toyota Super Long Life Coolant is recommended.

NOTICE:

Do not substitute plain water for engine coolant.

(b) Observe the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add coolant.

(c) Install the radiator cap securely.

(d) Slowly pour coolant into the radiator reservoir until it reaches the FULL line.

(e) Warm up the engine until the cooling fan operates.

- Set the air conditioning as follows while warming up the engine.

	Manual air conditioning system	Automatic air conditioning system
Set control as follows	Fan speed — Any setting except "OFF" Temperature — Toward WARM Air condition switch "OFF"	Fan speed — Any setting except "OFF" Temperature — To the highest temperature Air condition switch "OFF" "AUTO" switch "OFF"

- Maintain the engine speed at 2,000 to 2,500 rpm and warm up the engine until the cooling fan operates.

(f) Push the inlet and outlet radiator hoses several times by hand while warming up the engine.

(g) Stop the engine and wait until the coolant cools down.

(h) Remove the radiator cap and check the coolant level inside the radiator.

(i) If the coolant level is below the full level, perform the steps from (a) through (h) and repeat the operation until the coolant level stays the full level.

(j) Recheck the coolant level inside the radiator reservoir tank. If it is below the full level, add the coolant.

3. CHECK FOR ENGINE COOLANT LEAKS

(a) Fill the radiator with coolant and attach a radiator cap tester.

(b) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi) and check leakage.

LUBRICATION

OIL PUMP ASSY (2ZZ-GE) 17-1
COMPONENTS 17-1/4
REPLACEMENT 17-5/7

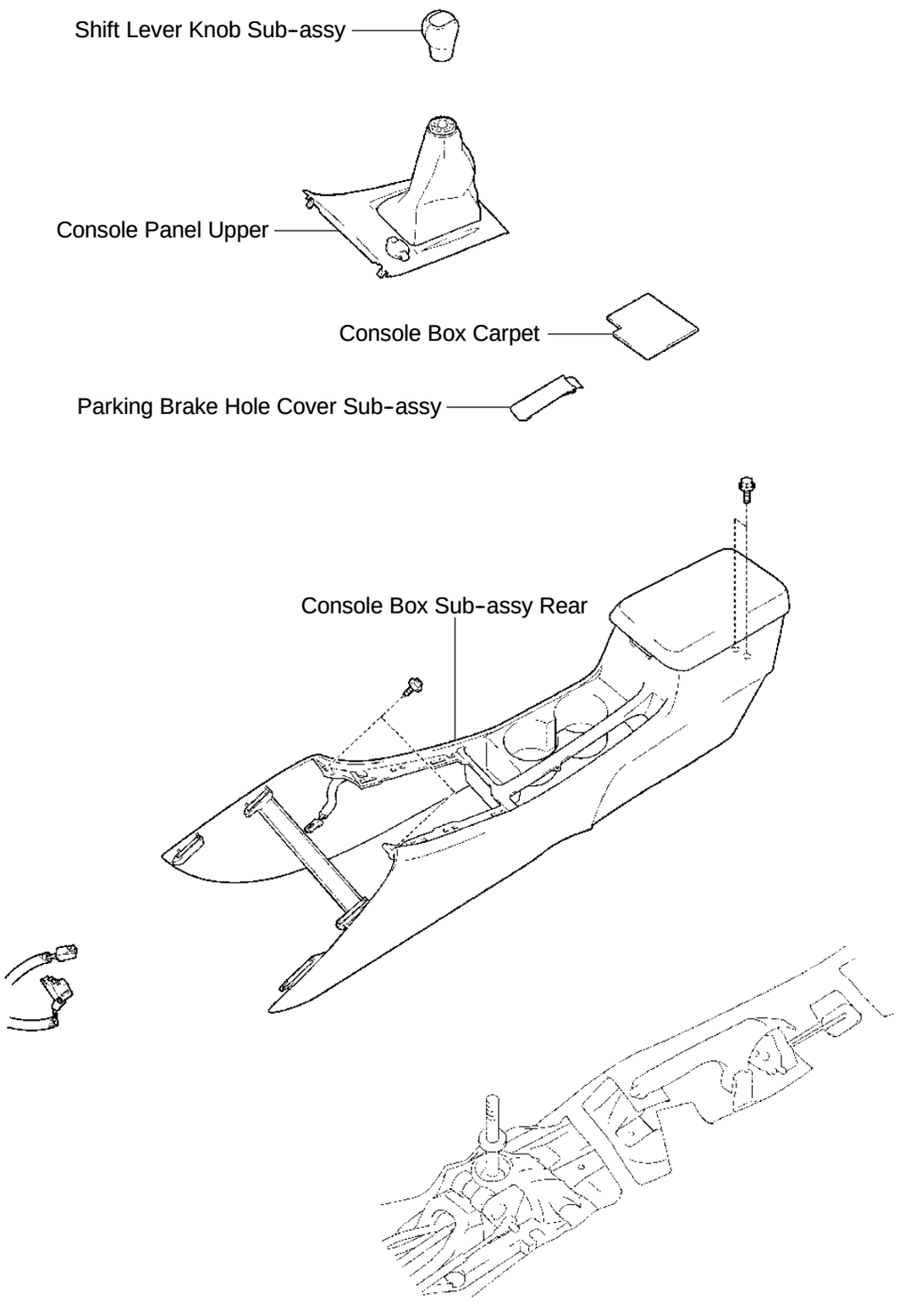
REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

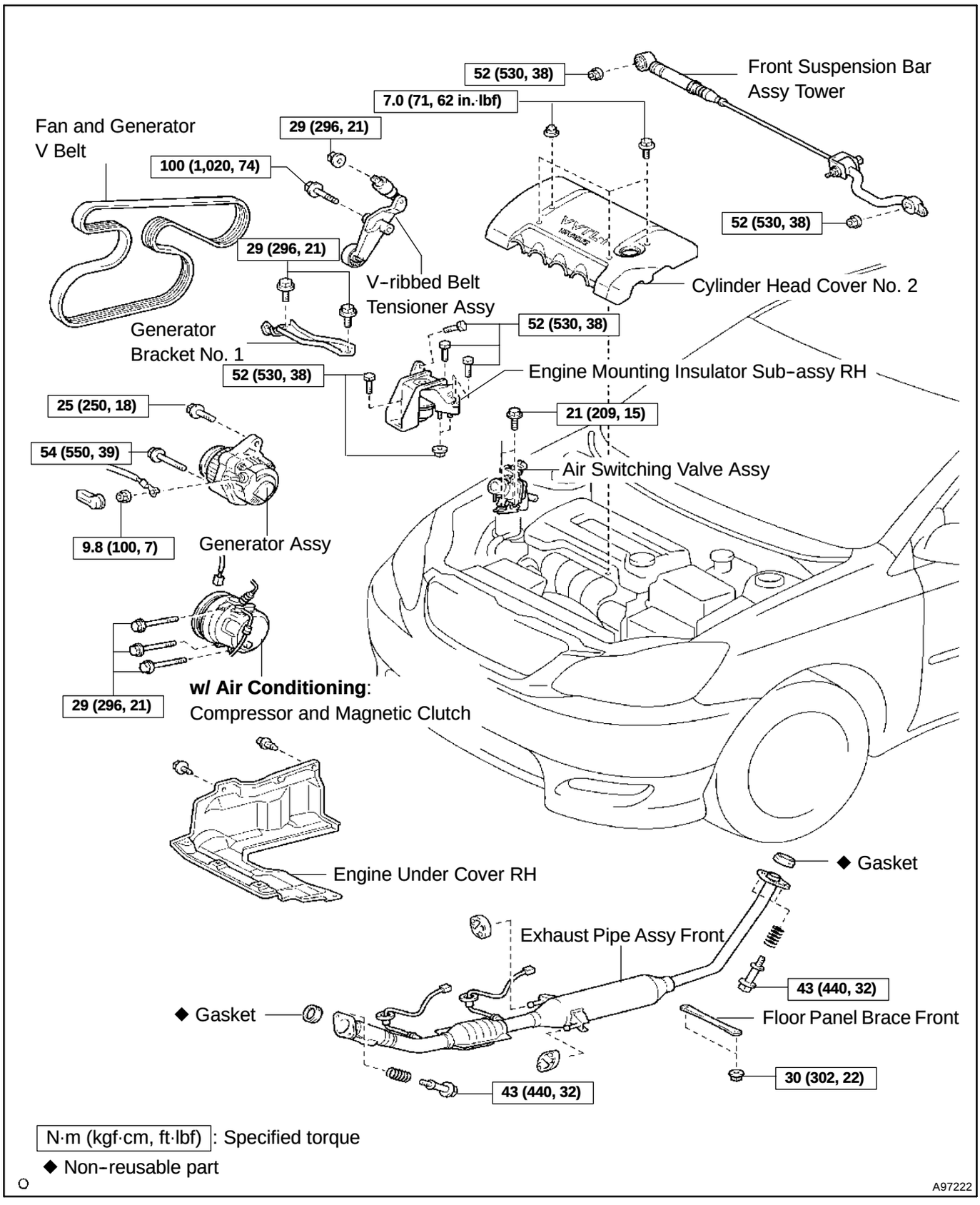
NOTE: The above pages contain only the points which differ from the above listed manual.

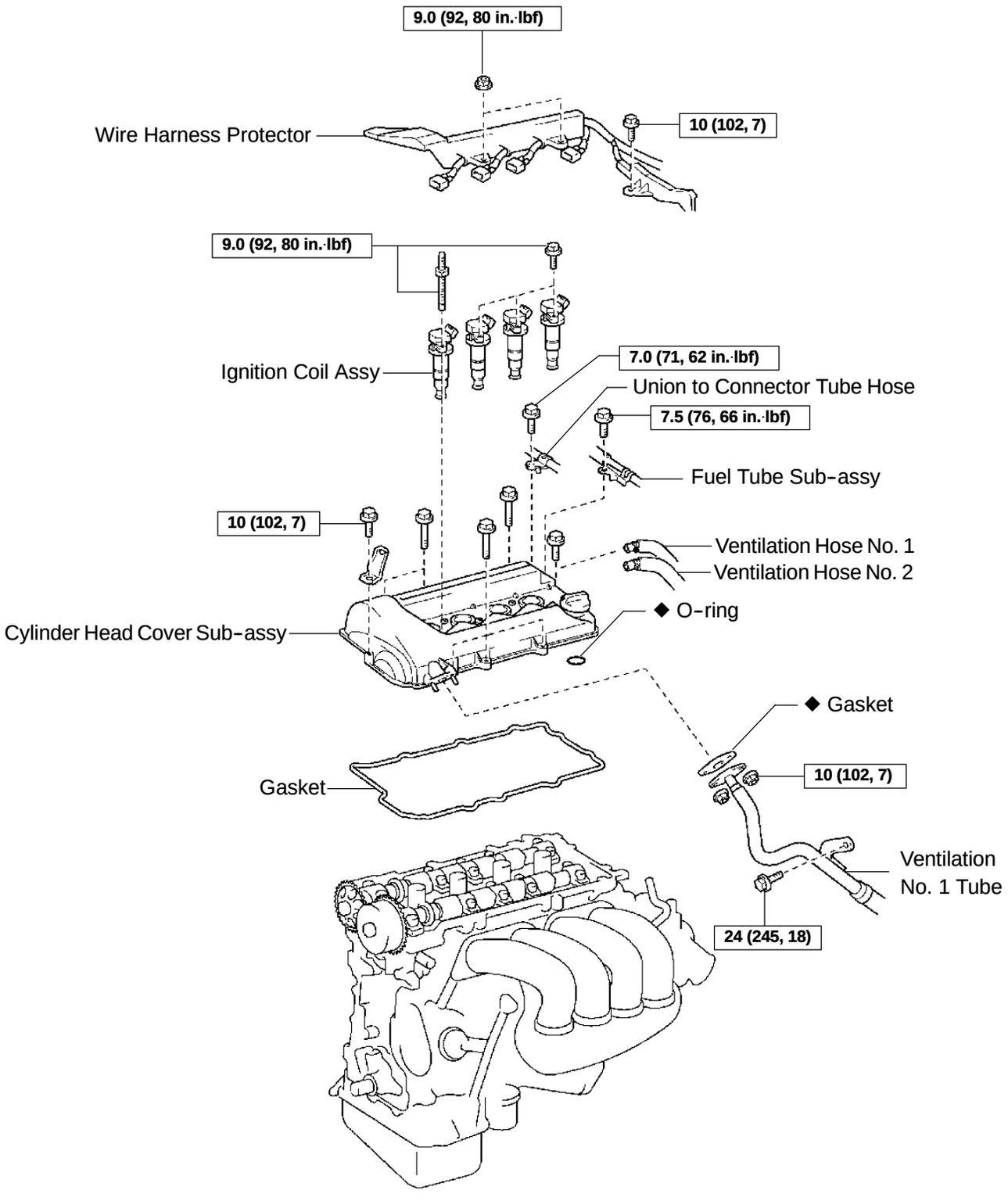
OIL PUMP ASSY (2ZZ-GE)

COMPONENTS

170LW-01



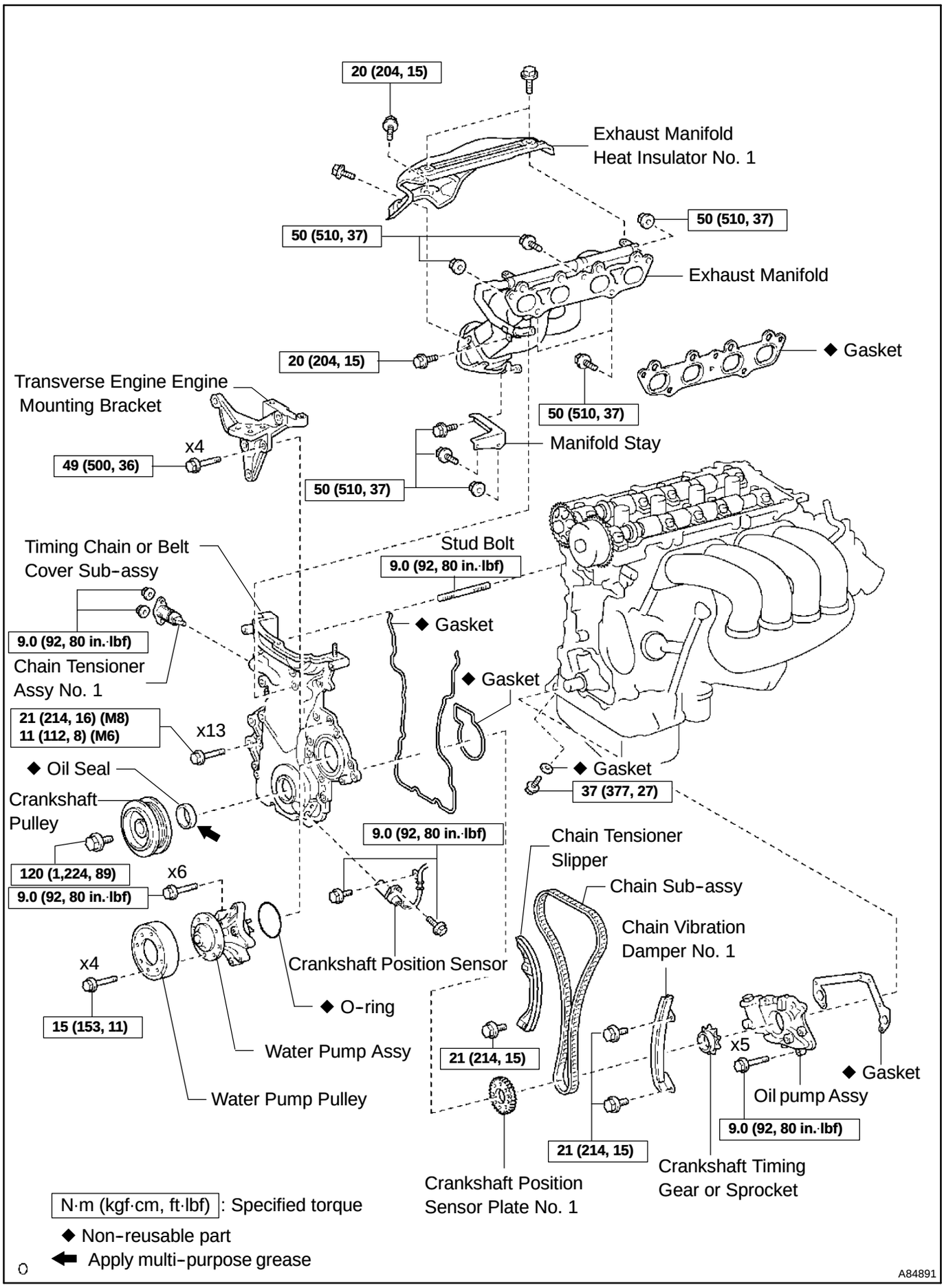

52 (530, 38)
Front Suspension Bar Assy Tower
7.0 (71, 62 in.·lbf)
Fan and Generator V Belt
29 (296, 21)
100 (1,020, 74)
52 (530, 38)
29 (296, 21)
V-ribbed Belt Tensioner Assy
Cylinder Head Cover No. 2
Generator Bracket No. 1
52 (530, 38)
52 (530, 38)
Engine Mounting Insulator Sub-assy RH
25 (250, 18)
21 (209, 15)
54 (550, 39)
Air Switching Valve Assy
9.8 (100, 7)
Generator Assy
29 (296, 21)
w/ Air Conditioning: Compressor and Magnetic Clutch
◆ Gasket
Engine Under Cover RH
Exhaust Pipe Assy Front
43 (440, 32)
◆ Gasket
Floor Panel Brace Front
30 (302, 22)
43 (440, 32)
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
A97222



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

◆ Non-reusable part

A84884


20 (204, 15)
Exhaust Manifold
Heat Insulator No. 1
50 (510, 37)
50 (510, 37)
Exhaust Manifold
20 (204, 15)
◆ Gasket
Transverse Engine Engine
Mounting Bracket
50 (510, 37)
x4
49 (500, 36)
Manifold Stay
50 (510, 37)
Timing Chain or Belt
Cover Sub-assy
Stud Bolt
9.0 (92, 80 in.·lbf)
◆ Gasket
9.0 (92, 80 in.·lbf)
Chain Tensioner
Assy No. 1
◆ Gasket
21 (214, 16) (M8)
11 (112, 8) (M6)
x13
◆ Gasket
◆ Oil Seal
37 (377, 27)
Crankshaft
Pulley
9.0 (92, 80 in.·lbf)
Chain Tensioner
Slipper
120 (1,224, 89)
9.0 (92, 80 in.·lbf)
x6
Chain Sub-assy
Chain Vibration
Damper No. 1
x4
Crankshaft Position Sensor
◆ O-ring
15 (153, 11)
Water Pump Assy
21 (214, 15)
x5
◆ Gasket
Water Pump Pulley
Oil pump Assy
9.0 (92, 80 in.·lbf)
21 (214, 15)
Crankshaft Timing
Gear or Sprocket
Crankshaft Position
Sensor Plate No. 1
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Apply multi-purpose grease
A84891

170LX-01

REPLACEMENT

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **DRAIN COOLANT (See page 16-8)**
3. **DRAIN ENGINE OIL**

(a) Remove the oil pan drain plug, then drain the engine oil.

4. **INSTALL OIL PAN DRAIN PLUG**

(a) Clean and install the oil pan drain plug with a new gasket.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

5. **REMOVE FRONT WHEEL RH**
6. **REMOVE ENGINE UNDER COVER RH**
7. **REMOVE SUSPENSION TOWER DAMPER ASSY (See page 26-8)**
8. **REMOVE CYLINDER HEAD COVER NO.2**

(a) Remove the 3 bolts and nut, then remove the cylinder head cover No. 2.

9. **REMOVE WIRE HARNESS PROTECTOR (See page 14-66)**
10. **SEPARATE SUCTION HOSE SUB-ASSY (See page 14-66)**
11. **REMOVE AIR SWITCHING VALVE ASSY (See Pub. No. RM925E on page 12-6)**
12. **REMOVE FAN AND GENERATOR V BELT (See page 14-66)**
13. **REMOVE GENERATOR BRACKET NO.1 (See Pub. No. RM925E on page 19-8)**
14. **REMOVE GENERATOR ASSY (See Pub. No. RM925E on page 19-8)**
15. **REMOVE COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) (See page 55-37)**

HINT:

Hang up the hoses instead of detaching.

16. **REMOVE SHIFT LEVER KNOB SUB-ASSY**
17. **REMOVE CONSOLE PANEL UPPER**
18. **REMOVE PARKING BRAKE HOLE COVER SUB-ASSY**
19. **REMOVE CONSOLE BOX CARPET**
20. **REMOVE CONSOLE BOX SUB-ASSY REAR**
21. **REMOVE EXHAUST PIPE ASSY FRONT (See Pub. No. RM925E on page 15-2)**
22. **REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-66)**
23. **REMOVE V-RIBBED BELT TENSIONER ASSY (See page 14-66)**
24. **REMOVE IGNITION COIL ASSY (See page 14-66)**
25. **REMOVE CYLINDER HEAD COVER SUB-ASSY (See page 14-66)**
26. **REMOVE MANIFOLD STAY (See page 14-66)**
27. **REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1**
28. **REMOVE EXHAUST MANIFOLD (See page 14-66)**
29. **REMOVE WATER PUMP PULLEY (See page 14-66)**

SST 09960-10010 (09962-01000, 09963-00600)

30. **REMOVE WATER PUMP ASSY (See page 14-66)**
31. **REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET (See page 14-66)**
32. **REMOVE CRANKSHAFT POSITION SENSOR**
33. **SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page 14-66)**
34. **REMOVE CRANKSHAFT PULLEY (See page 14-66)**

SST 09213-70011 (09213-70020), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021, 09957-04010)

35. **REMOVE CHAIN TENSIONER ASSY NO.1 (See page 14-66)**
36. **REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY (See page 14-66)**
37. **REMOVE TIMING CHAIN OR BELT COVER OIL SEAL (See page 14-66)**
38. **REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1**

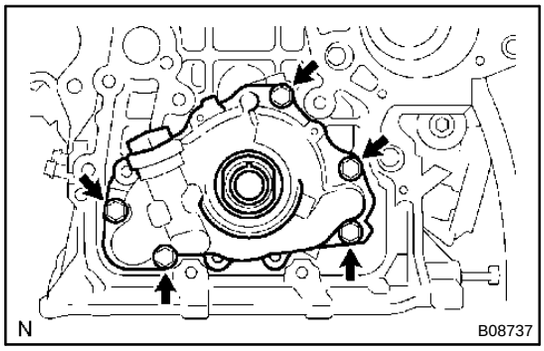
39. REMOVE CHAIN TENSIONER SLIPPER

(a) Remove the bolt and chain tensioner slipper.

40. REMOVE CHAIN VIBRATION DAMPER NO.1

(a) Remove the 2 bolts and chain vibration damper No. 1.

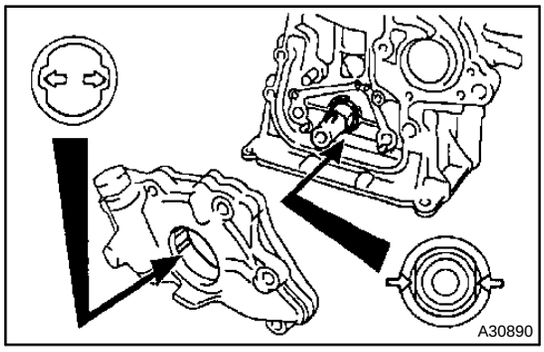
41. REMOVE CHAIN SUB-ASSY



42. REMOVE OIL PUMP ASSY

(a) Remove the 5 bolts, then remove the oil pump.

(b) Remove the gasket from the cylinder block.



43. INSTALL OIL PUMP ASSY

(a) Place a new gasket on the cylinder block.

(b) Align the spline teeth of the oil pump drive rotor with the large teeth of the crankshaft, then slide the oil pump.

(c) Install the oil pump with the 5 bolts.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

44. INSTALL CHAIN VIBRATION DAMPER NO.1

(a) Install the chain vibration damper No. 1 with the 2 bolts.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

45. INSTALL CHAIN SUB-ASSY **(See page 14-66)**

SST 09223-22010

46. INSTALL CHAIN TENSIONER SLIPPER **(See page 14-66)**

47. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1 **(See page 14-66)**

48. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL **(See page 14-66)**

SST 09223-22010

49. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSY **(See page 14-66)**

50. INSTALL CHAIN TENSIONER ASSY NO.1 **(See page 14-66)**

51. INSTALL CRANKSHAFT PULLEY **(See page 14-66)**

SST 09213-70011 (09213-70020), 09330-00021

52. INSTALL CRANKSHAFT POSITION SENSOR

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

53. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET **(See page 14-66)**

54. INSTALL WATER PUMP ASSY **(See page 14-66)**

55. INSTALL WATER PUMP PULLEY **(See page 14-66)**

SST 09960-10010 (09962-01000, 09963-00600)

56. INSTALL EXHAUST MANIFOLD **(See page 14-66)**

57. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1
    Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
58. INSTALL MANIFOLD STAY (See page 14-66)
59. INSTALL CYLINDER HEAD COVER SUB-ASSY (See page 14-66)
60. INSTALL IGNITION COIL ASSY
    Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
61. INSTALL V-RIBBED BELT TENSIONER ASSY
    Torque:
    29 N·m (296 kgf·cm, 21 ft·lbf) for nut
    100 N·m (1,020 kgf·cm, 74 ft·lbf) for bolt
62. INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-66)
63. INSTALL EXHAUST PIPE ASSY FRONT (See Pub. No. RM925E on page 15-2)
64. INSTALL CONSOLE BOX SUB-ASSY REAR
65. INSTALL CONSOLE BOX CARPET
66. INSTALL PARKING BRAKE HOLE COVER SUB-ASSY
67. INSTALL CONSOLE PANEL UPPER
68. INSTALL SHIFT LEVER KNOB SUB-ASSY
69. INSTALL COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING)
    (See page 55-37)
70. INSTALL GENERATOR ASSY (See Pub. No. RM925E on page 19-8)
71. INSTALL GENERATOR BRACKET NO.1 (See Pub. No. RM925E on page 19-8)
72. INSTALL SUCTION HOSE SUB-ASSY
    Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
73. INSTALL AIR SWITCHING VALVE ASSY (See Pub. No. RM925E on page 12-6)
74. INSTALL SUSPENSION TOWER DAMPER ASSY (See page 26-8)
75. INSTALL FRONT WHEEL RH
    Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
76. CONNECT BATTERY NEGATIVE TERMINAL
77. ADD COOLANT (See page 16-8)
78. ADD ENGINE OIL
79. CHECK FOR ENGINE COOLANT LEAKAGE (See page 16-1)
80. CHECK FOR ENGINE OIL LEAKAGE
81. INSTALL CYLINDER HEAD COVER NO.2
    Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

FRONT SUSPENSION

FRONT WHEEL ALIGNMENT 26–1
ADJUSTMENT 26–1/6
SUSPENSION TOWER
DAMPER ASSY 26–7
COMPONENTS 26–7
OVERHAUL 26–8/10
DISPOSAL 26–12

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

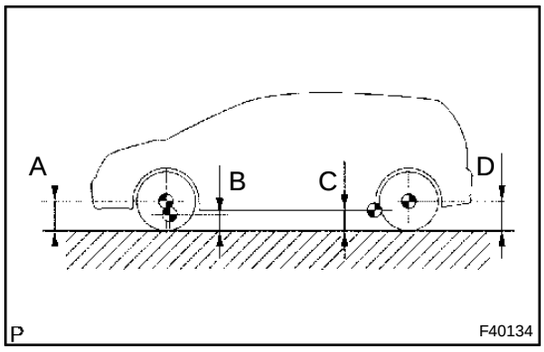
NOTE: The above pages contain only the points which differ from the above listed manual.

FRONT WHEEL ALIGNMENT

260KD-02

ADJUSTMENT

1. INSPECT TIRE (SEE PAGE 28-1)



2. MEASURE VEHICLE HEIGHT

Measuring points:

A: Ground clearance of front wheel center

B: Ground clearance of lower suspension arm front bolt center

C: Ground clearance of axle beam set bolt center

D: Ground clearance of rear wheel center

Vehicle height:

(Normal package)

Tire size	175/70R14	195/60R15		195/55R16
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE	1CD-FTV	2ZZ-GE
Front	A - B: 88 mm (3.46 in.)	A - B: 87 mm (3.43 in.)	A - B: 90 mm (3.54 in.)	A - B: 104 mm (4.09 in.)
Rear	D - C: 44 mm (1.73 in.)	D - C: 44 mm (1.73 in.)	D - C: 45 mm (1.77 in.)	D - C: 69 mm (2.72 in.)

(Rough road package)

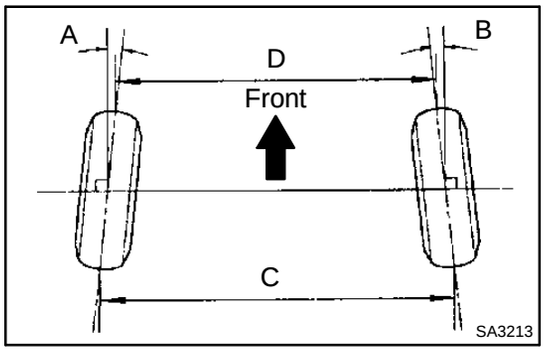
Tire size	175/70R14	195/60R15
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE
Front	A - B: 69 mm (2.72 in.)	A - B: 68 mm (2.68 in.)
Rear	D - C: 26 mm (1.02 in.)	D - C: 25 mm (0.98 in.)

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

HINT:

Bounce the vehicle at the corners up and down to stabilize the suspension and inspect the vehicle height.



3. INSPECT TOE-IN

Toe-in:

Toe-in (total)	A + B: 6' ± 12' (0.1° ± 0.2°) C - D: 1 ± 2 mm (0.04 ± 0.08 in.)

HINT:

- Measure "C-D" only when "A+B" can not be measured.
- If the toe-in is not within the specified value, adjust it at the rack ends.

4. ADJUST TOE-IN

(a) Measure the thread lengths of the right and left rack ends.

Standard:

Difference in thread length is 1.5 mm or less

(b) Remove the rack boot set clips.

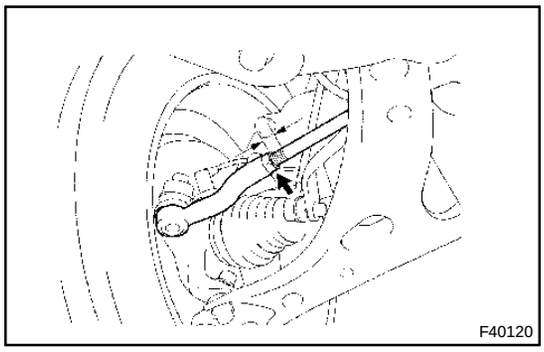
(c) Loosen the tie rod end lock nuts.

(d) Adjust the rack ends if the difference in thread length between the right and left rack ends is not within the specified range.
  (1) Extend the shorter rack end if the measured toe-in.
  (2) Shorten the longer rack end if the measured toe-in deviates toward the inner-side.

(e) Turn the right and left rack ends by an equal amount to adjust the toe-in.

HINT:

Try to adjust the toe-in to the center of the specified range.



(f) Make sure that the lengths of the right and left rack ends are the same.

Standard: Difference in thread length is 0 ± 1 mm

(g) Torque the tie rod end lock nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

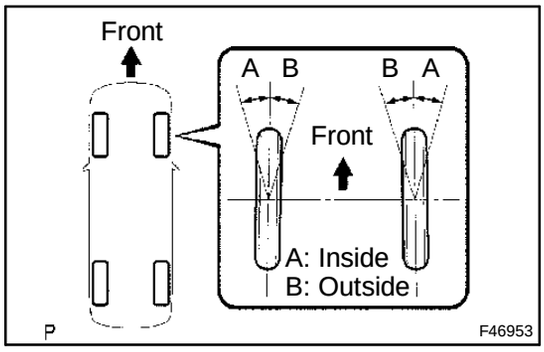
NOTICE:

Temporarily tighten the lock nut while holding the hexagonal part of the steering rack end so that the lock nut and the steering rack end do not turn together. Hold the width across flat of the tie rod end and tighten the lock nut.

(h) Place the boots on the seats and install the clips.

HINT:

Make sure that the boots are not twisted.



5. INSPECT WHEEL ANGLE

(a) Turn the steering wheel fully and measure the turning angle.

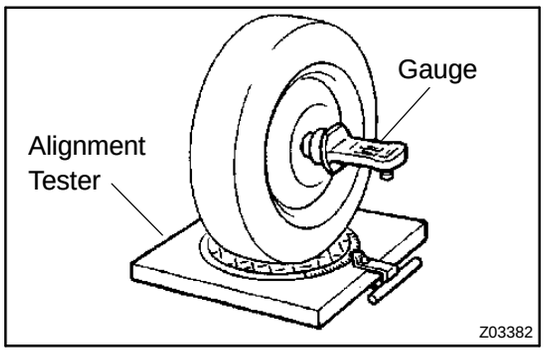
Wheel turning angle:
(Normal package)

Tire size	175/70R14	195/60R15		195/55R16
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE	1CD-FTV	2ZZ-GE
Inside wheel	38°44' ± 2° (38.73° ± 2°)	38°45' ± 2° (38.75° ± 2°)	38°41' ± 2° (38.68° ± 2°)	38°20' ± 2° (38.33° ± 2°)
Outside wheel: Reference	32°50' (32.83°)	32°50' (32.83°)	32°47' (32.78°)	32°28' (32.47°)

(Rough road package)

Tire size	175/70R14	195/60R15
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE
Inside wheel	39°05' ± 2° (39.08° ± 2°)	39°06' ± 2° (39.10° ± 2°)
Outside wheel: Reference	33°11' (33.18°)	33°11' (33.18°)

If the right and left inside wheel angles differ from the specified value, check the right and left rack end lengths.



6. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

(a) Put the front wheel on the center of the alignment tester.

(b) Remove the center ornament or wheel cap.

(c) Install the camber-caster-steering axis inclination gauge or position vehicle on wheel alignment tester or wheel cap.

(d) Inspect the camber, caster and steering axis inclination.

Camber, caster and steering axis inclination:
(Normal package)

Tire size	175/70R14	195/60R15		195/55R16
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE	1CD-FTV	2ZZ-GE
Camber Right-left error	-0°30' ± 45' (-0.50° ± 0.75°) 45' (0.75°) or less	-0°31' ± 45' (-0.52° ± 0.75°) 45' (0.75°) or less	-0°33' ± 45' (-0.55° ± 0.75°) 45' (0.75°) or less	-0°42' ± 45' (-0.70° ± 0.75°) 45' (0.75°) or less
Caster Right-left error	2°51' ± 45' (2.85° ± 0.75°) 45' (0.75°) or less	2°53' ± 45' (2.88° ± 0.75°) 45' (0.75°) or less	2°46' ± 45' (2.77° ± 0.75°) 45' (0.75°) or less	3°17' ± 45' (3.28° ± 0.75°) 45' (0.75°) or less
Steering axis inclination Right-left error	11°19' ± 45' (11.32° ± 0.75°) 45' (0.75°) or less	11°19' ± 45' (11.32° ± 0.75°) 45' (0.75°) or less	11°23' ± 45' (11.38° ± 0.75°) 45' (0.75°) or less	11°46' ± 45' (11.77° ± 0.75°) 45' (0.75°) or less

(Rough road package)

Tire size	175/70R14	195/60R15
Engine type	4ZZ-FE	3ZZ-FE, 4ZZ-FE
Camber Right-left error	-0°16' ± 45' (-0.27° ± 0.75°) 45' (0.75°) or less	-0°17' ± 45' (-0.28° ± 0.75°) 45' (0.75°) or less
Caster Right-left error	2°40' ± 45' (2.67° ± 0.75°) 45' (0.75°) or less	2°41' ± 45' (2.68° ± 0.75°) 45' (0.75°) or less
Steering axis inclination Right-left error	10°50' ± 45' (10.83° ± 0.75°) 45' (0.75°) or less	10°50' ± 45' (10.83° ± 0.75°) 45' (0.75°) or less

NOTICE:

- **Inspect while the vehicle is empty (without the spare tire or tools onboard).**
- **The maximum tolerance of right and left difference for the camber and caster is 45' or less.**

(e) Remove the camber - caster - steering axis inclination gauge and attachment.

(f) Install the center ornament or wheel cap.

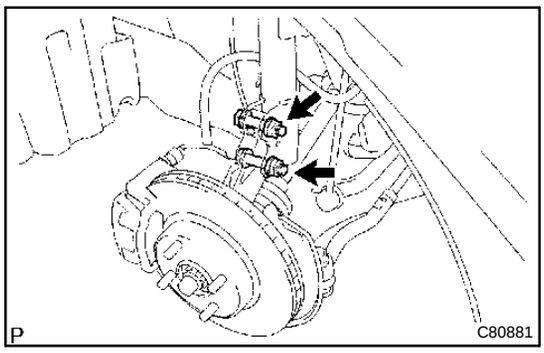
If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.

7. ADJUST CAMBER

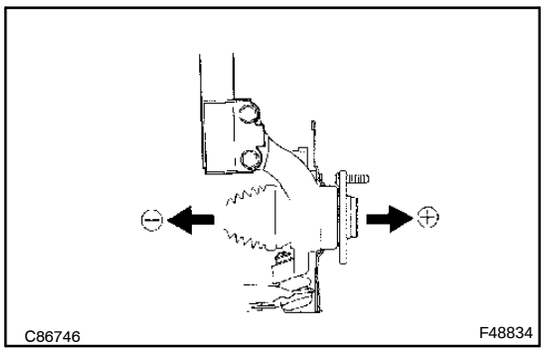
NOTICE:

After the camber has been adjusted, inspect the toe-in.

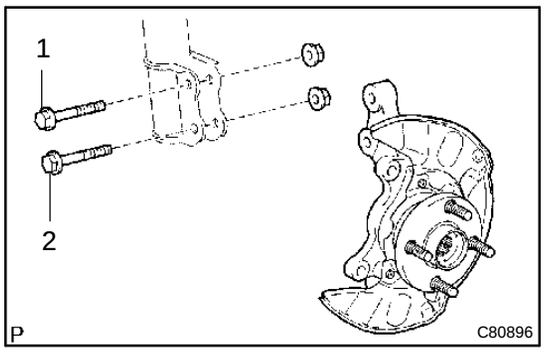
(a) Remove the front wheel.



(b) Remove the 2 nuts on the lower side of the shock absorber assy front LH.
(c) Clean the installation surfaces of the shock absorber assy front LH and the steering knuckle.
(d) Temporarily install the 2 nuts.



(e) Fully push or pull the front axle hub in the direction of the required adjustment.
(f) Tighten the nuts.
Torque: 153 N·m (1,560 kgf·cm, 113 ft·lbf)
(g) Install the front wheel.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



(h) Check the camber.

If the measured value is not within the specified range calculate the required adjustment amount using the formula below.

(Camber adjustment amount) = Center of the specified range - Measured value

(i) Check installed bolts combination. Select appropriate bolts from the table below to adjust the camber within the specified range.

Move the axle toward (+) in step (e)	Refer to table (1) (Move the axle toward positive side)
Move the axle toward (-) in step (e)	Refer to table (2) (Move the axle toward negative side)

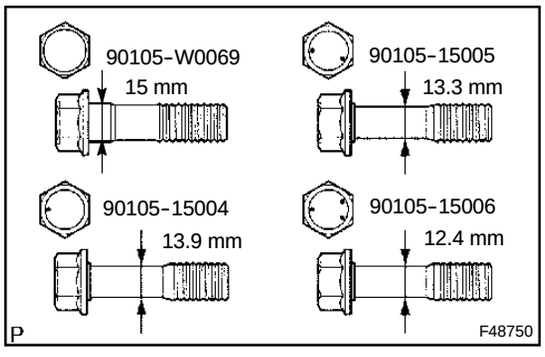
Table (1) (Move the axle toward positive side)

Installed Bolt / Adjusting Value	1	1	1	1	1	1	1
	90105-W0069	90105-W0069	90105-W0069	90105-W0069	90105-15004	90105-15005	90105-15006
	2	2	2	2	2	2	2
	90105-W0069	90105-15004	90105-15005	90105-15006	90105-15006	90105-15006	90105-15006
-1°30' to -1°15'							G
-1°15' to -1°00'						G	A
-1°00' to -0°45'					G	A	B
-0°45' to -0°30'				G	A	B	C
-0°30' to -0°15'			G	A	B	C	D
-0°15' to 0°		G	A	B	C	D	E
0° to 0°15'	A	B	C	D	E	F	
0°15' to 0°30	B	C	D	E	F		
0°30' to 0°45'	C	D	E	F			
0°45' to 1°00'	D	E	F				
1°00' to 1°15'	E	F					
1°15' to 1°30'	F						

Selected Bolt Combination

	A	B	C	D	E	F	G
1	90105-W0069	90105-W0069	90105-W0069	90105-15004	90105-15005	90105-15006	90105-W0069
2	90105-15004	90105-15005	90105-15006	90105-15006	90105-15006	90105-15006	90105-W0069

P F49204



The body and suspension may be damaged if the camber is not correctly adjusted according to the above table.

NOTICE:

Replace the nut with a new one when replacing the bolt.

(j) Repeat the steps mentioned above. At step (b), replace 1 or 2 selected bolts.

HINT:

Replace one bolt at a time when replacing 2 bolts.

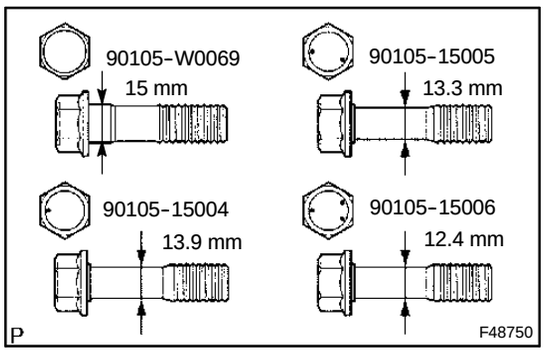
Table (2) (Move the axle toward negative side)

Installed Bolt / Adjusting Value		1	2	3	4	5	6	7
		90105-W0069	90105-W0069	90105-W0069	90105-W0069	90105-15004	90105-15005	90105-15006
		90105-W0069	90105-15004	90105-15005	90105-15006	90105-15006	90105-15006	90105-15006
-1°30' to -1°15'		F						
-1°15' to -1°00'		E	F					
-1°00' to -0°45'		D	E	F				
-0°45' to -0°30'		C	D	E	F			
-0°30' to -0°15'		B	C	D	E	F		
-0°15' to 0°		A	B	C	D	E	F	
0° to 0°15'			G	A	B	C	D	E
0°15' to 0°30				G	A	B	C	D
0°30' to 0°45'					G	A	B	C
0°45' to 1°00'						G	A	B
1°00' to 1°15'							G	A
1°15' to 1°30'								G

Selected Bolt Combination

	A	B	C	D	E	F	G
1	90105-W0069	90105-W0069	90105-W0069	90105-15004	90105-15005	90105-15006	90105-W0069
2	90105-15004	90105-15005	90105-15006	90105-15006	90105-15006	90105-15006	90105-W0069

P F49206



The body and suspension may be damaged if the camber is not correctly adjusted according to the above table.

NOTICE:

Replace the nut with a new one when replacing the bolt.

(k) Repeat the steps mentioned above. At step (b), replace 1 or 2 selected bolts.

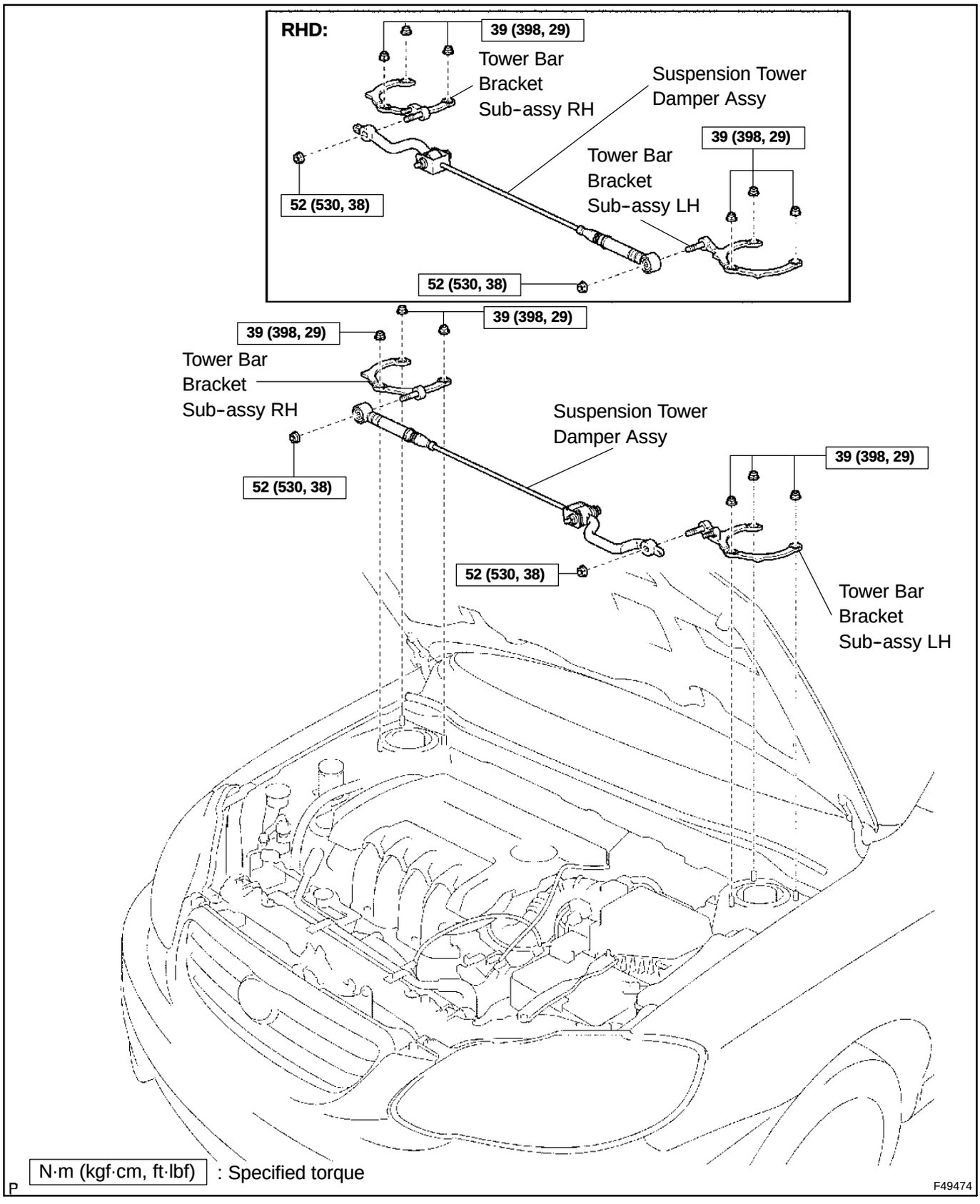
HINT:

Replace one bolt at a time when replacing 2 bolts.

SUSPENSION TOWER DAMPER ASSY

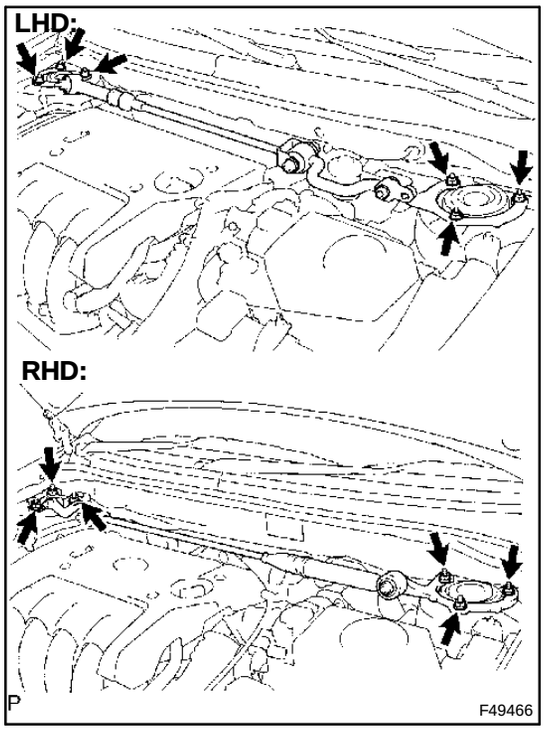
COMPONENTS

260KE-02



260KF-03

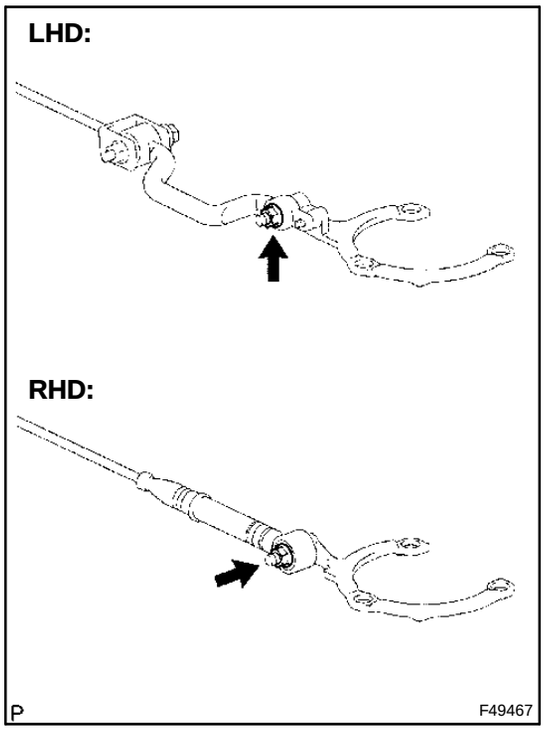
OVERHAUL



1. REMOVE SUSPENSION TOWER DAMPER ASSY

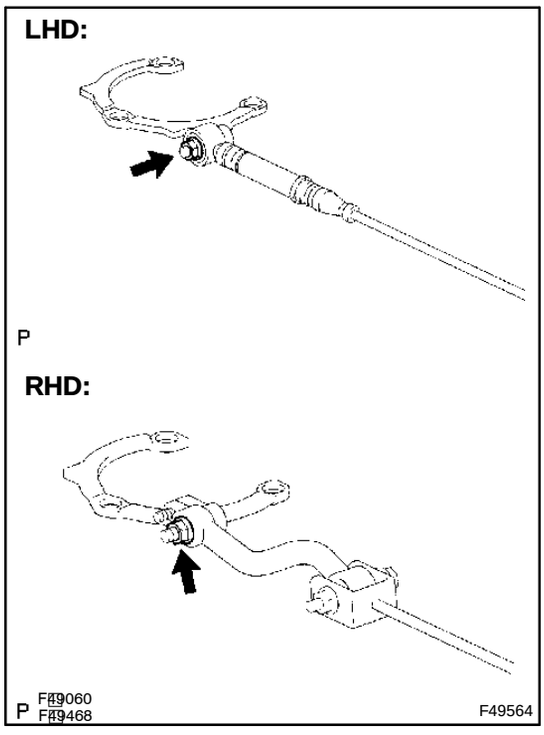
(a) RHD:
Remove the accelerator control cable.

(b) Remove the 6 nuts and the suspension tower damper assy.



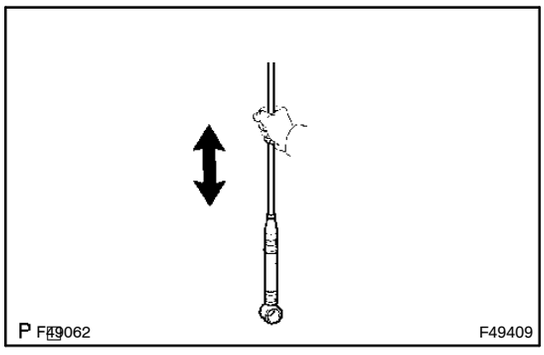
2. REMOVE TOWER BAR BRACKET SUB-ASSY LH

(a) Remove the nut and the tower bar bracket sub-assy LH from the suspension tower damper assy.



3. REMOVE TOWER BAR BRACKET SUB-ASSY RH

(a) Remove the nut and the tower bar bracket sub-assy RH from the suspension tower damper assy.

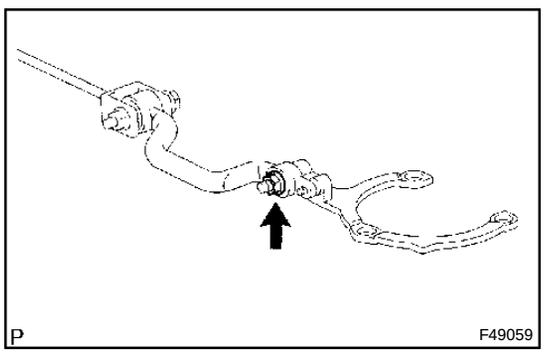


4. INSPECT SUSPENSION TOWER DAMPER ASSY

(a) Cause the suspension tower damper assy to expand and contract 4 times or more. Check that there is no abnormal resistance/noise, operational resistance, bends/scratches on the rod or oil leakage. If these are found, replace the suspension tower damper assy with a new one.

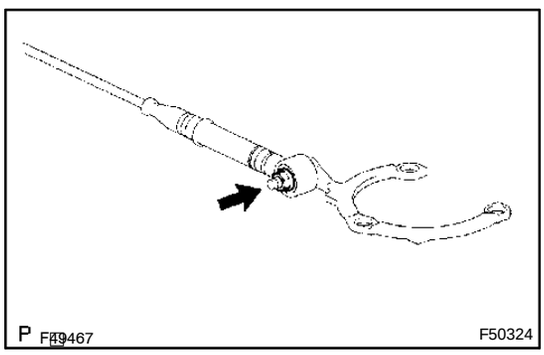
NOTICE:

When disposing of the suspension tower damper assy, see DISPOSAL on page 26-12.



5. TEMPORARILY TIGHTEN TOWER BAR BRACKET SUB-ASSY LH (LHD STEERING POSITION TYPE)

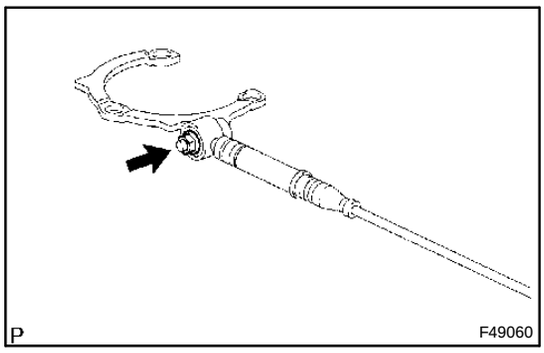
(a) Install the tower bar bracket sub-assy LH to the suspension tower damper assy with the nut.



6. INSTALL TOWER BAR BRACKET SUB-ASSY LH (RHD STEERING POSITION TYPE)

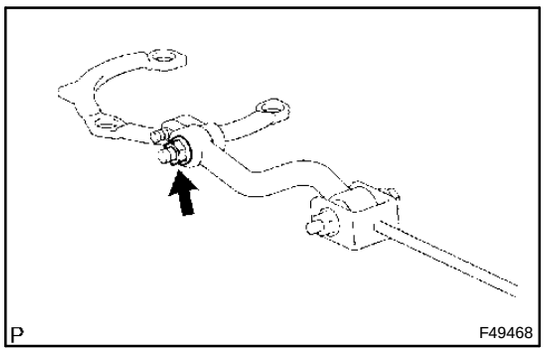
(a) Install the tower bar bracket sub-assy LH to the suspension tower damper assy with the nut.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



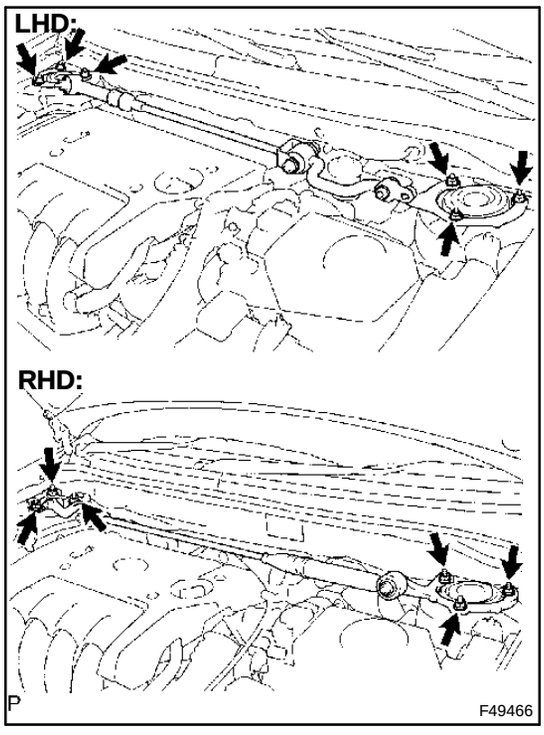
7. INSTALL TOWER BAR BRACKET SUB-ASSY RH (LHD STEERING POSITION TYPE)

(a) Install the tower bar bracket sub-assy RH to the suspension tower damper assy.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



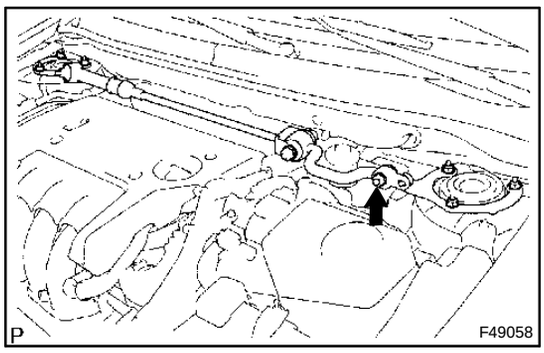
8. TEMPORARILY TIGHTEN TOWER BAR BRACKET SUB-ASSY RH (RHD STEERING POSITION TYPE)

(a) Install the tower bar bracket sub-assy RH to the suspension tower damper assy with the nut.



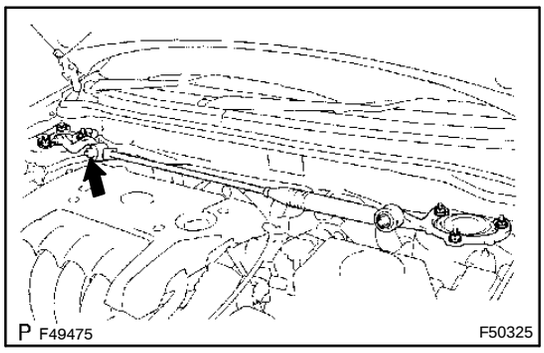
9. INSTALL SUSPENSION TOWER DAMPER ASSY

(a) Install the suspension tower damper assy with the 6 bolts.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)



10. FULLY TIGHTEN TOWER BAR BRACKET SUB-ASSY LH (LHD STEERING POSITION TYPE)

(a) Fully tighten the nut.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



11. FULLY TIGHTEN TOWER BAR BRACKET SUB-ASSY RH (RHD STEERING POSITION TYPE)

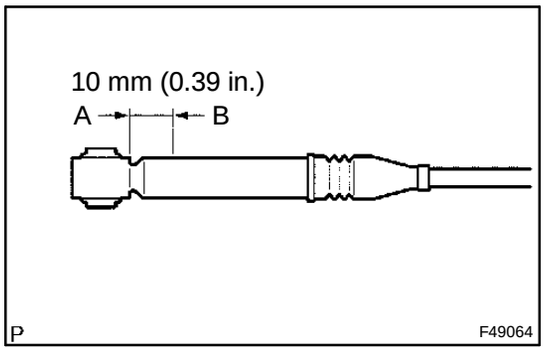
(a) Fully tighten the nut.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

(b) Install the accelerator control cable.

260KG-02

DISPOSAL



1. DISPOSE OF SUSPENSION TOWER DAMPER ASSY

(a) Fully extend the suspension tower damper assy.

(b) Using a drill, make a hold in the cylinder between A and B as shown in the illustration to discharge the gas inside.

CAUTION:

- **Be careful when drilling because shards of metal may fly about, so always use the proper safety equipment.**
- **The gas is colorless, odorless and non-poisonous.**

REAR SUSPENSION

REAR WHEEL ALIGNMENT 27–1
INSPECTION 27–1
SUSPENSION TOWER DAMPER ASSY 27–2
COMPONENTS 27–2
REPLACEMENT 27–3/4
DISPOSAL 27–5

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

REAR WHEEL ALIGNMENT

270JR-01

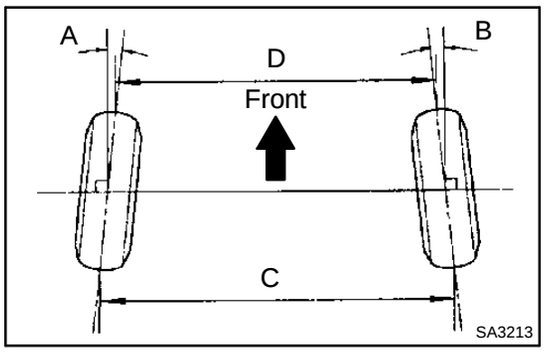
INSPECTION

1. INSPECT TIRE (SEE PAGE 28-1)

2. MEASURE VEHICLE HEIGHT (SEE PAGE 26-1)

NOTICE:

Before inspecting wheel alignment, adjust the vehicle height to the specified value.



3. INSPECT TOE-IN

Normal package:

Tire size	Toe-in (total)
175/70R14	A+B: 0°13' ± 14' (0.21° ± 0.24°) C-D: 2.2 ± 2.5 mm (0.09 ± 0.10 in.)
195/60R15	A+B: 0°14' ± 14' (0.23° ± 0.23°) C-D: 2.5 ± 2.5 mm (0.10 ± 0.10 in.)
195/55R16	A+B: 0°22' ± 14' (0.37° ± 0.23°) C-D: 4.0 ± 2.5 mm (0.16 ± 0.10 in.)

Rough road package:

Tire size	Toe-in (total)
175/70R14	A+B: 0°06' ± 14' (0.10° ± 0.24°) C-D: 1.0 ± 2.5 mm (0.04 ± 0.10 in.)
195/60R15	A+B: 0°06' ± 14' (0.09° ± 0.23°) C-D: 1.0 ± 2.5 mm (0.04 ± 0.10 in.)

HINT:

- Measure "C - D" only when "A + B" cannot be measured.
- If toe-in is not within the specified range, inspect the suspension parts for damage and/or wear, and replace them if necessary.

4. INSPECT CAMBER

(a) Install the camber-caster-kingpin gauge or set the vehicle on the wheel alignment tester.

(b) Inspect the camber.

Normal package:

Tire size	175/70R14 195/60R15	195/55R16
Camber	-1°28' ± 30' (-1.47° ± 0.50°)	-1°30' ± 30' (-1.50° ± 0.50°)
Right-left error	30' (0.5°) or less	30' (0.5°) or less

Rough road package:

Tire size	175/70R14 195/60R15
Camber	-1°26' ± 30' (-1.43° ± 0.50°)
Right-left error	30' (0.5°) or less

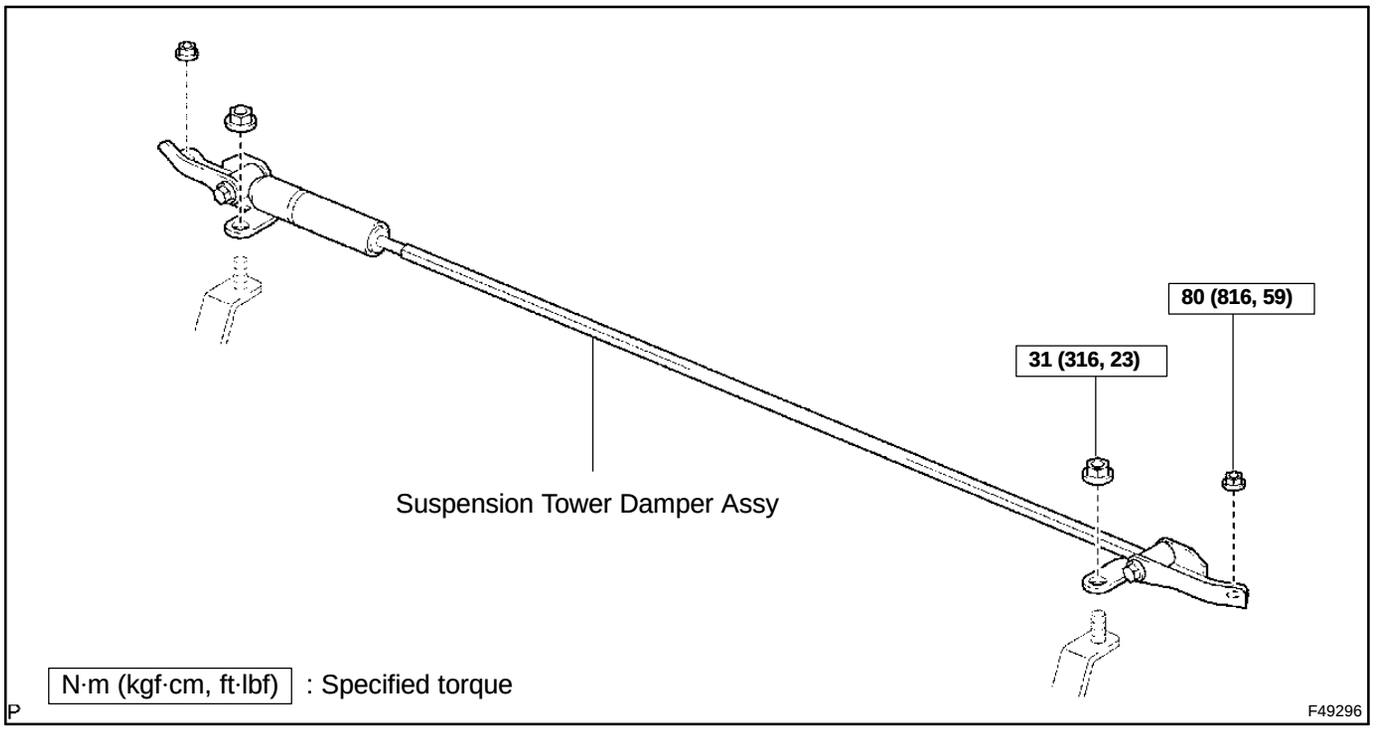
HINT:

Camber is not adjustable. If the measurement is not within the specified range, inspect the suspension parts for damage and/or wear, and replace them if necessary.

SUSPENSION TOWER DAMPER ASSY

COMPONENTS

270JS-01



270JT-01

REPLACEMENT

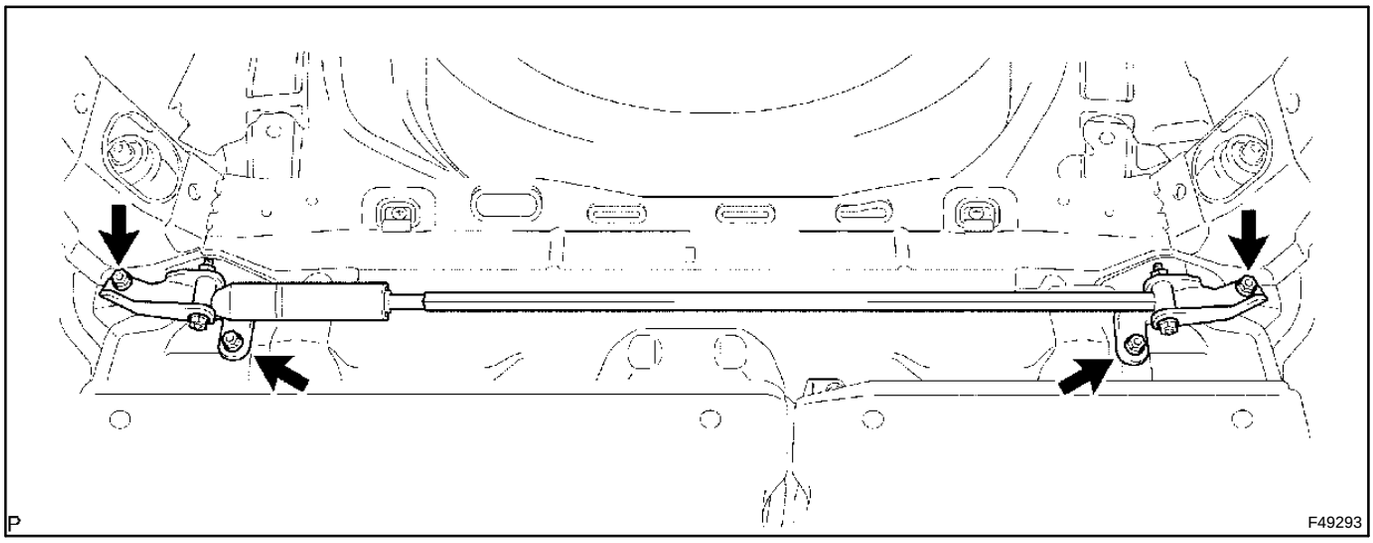
HINT:

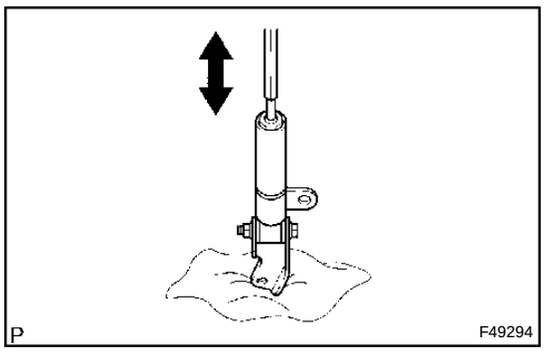
Installation is in the reverse order of removal.

1. REMOVE FRONT DOOR SCUFF PLATE RH (3 DOOR HATCH BACK BODY TYPE)
   (SEE PUB. NO. RM925E, PAGE 76-48)
2. REMOVE FRONT DOOR SCUFF PLATE LH (3 DOOR HATCH BACK BODY TYPE)
3. REMOVE REAR SEAT BACK ASSY RH (3 DOOR HATCH BACK BODY TYPE)
   (SEE PUB. NO. RM925E, PAGE 72-26)
4. REMOVE REAR SEAT BACK ASSY LH (3 DOOR HATCH BACK BODY TYPE)
5. REMOVE REAR FLOOR CARPET ASSY (3 DOOR HATCH BACK BODY TYPE)
6. REMOVE PACKAGE TRAY TRIM PANEL ASSY (3 DOOR HATCH BACK BODY TYPE)
7. REMOVE DECK FLOOR BOX RH (3 DOOR HATCH BACK BODY TYPE)
   (SEE PUB. NO. RM925E, PAGE 76-48)
8. REMOVE DECK FLOOR BOX LH (3 DOOR HATCH BACK BODY TYPE)
9. REMOVE DECK TRIM COVER REAR (3 DOOR HATCH BACK BODY TYPE)
   (SEE PUB. NO. RM925E, PAGE 76-48)
10. REMOVE QUARTER TRIM PANEL ASSY FRONT RH (3 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-48)
11. REMOVE QUARTER TRIM PANEL ASSY FRONT LH (3 DOOR HATCH BACK BODY TYPE)
12. REMOVE DECK TRIM SIDE PANEL ASSY RH (3 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-48)
13. REMOVE DECK TRIM SIDE PANEL ASSY LH (3 DOOR HATCH BACK BODY TYPE)
14. REMOVE REAR DOOR SCUFF PLATE RH (5 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-56)
15. REMOVE REAR DOOR SCUFF PLATE LH (5 DOOR HATCH BACK BODY TYPE)
16. REMOVE REAR FLOOR CARPET ASSY (5 DOOR HATCH BACK BODY TYPE)
17. REMOVE PACKAGE TRAY TRIM PANEL ASSY (5 DOOR HATCH BACK BODY TYPE)
18. REMOVE DECK FLOOR BOX RH (5 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-56)
19. REMOVE DECK FLOOR BOX LH (5 DOOR HATCH BACK BODY TYPE)
20. REMOVE DECK TRIM COVER REAR (5 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-56)
21. REMOVE REAR SEAT SIDE COVER RH (5 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-56)
22. REMOVE REAR SEAT SIDE COVER LH (5 DOOR HATCH BACK BODY TYPE)
23. REMOVE DECK TRIM SIDE PANEL ASSY RH (5 DOOR HATCH BACK BODY TYPE)
    (SEE PUB. NO. RM925E, PAGE 76-56)
24. REMOVE DECK TRIM SIDE BOARD LH (5 DOOR HATCH BACK BODY TYPE)

25. REMOVE SUSPENSION TOWER DAMPER ASSY

(a) Remove the 4 nuts and suspension tower damper assy.





26. INSPECT SUSPENSION TOWER DAMPER ASSY

(a) Compress and extend the suspension tower damper assy, and check that there is no abnormal resistance, noise or oil leakage, and no bends or scratches on the rod.

If there is any abnormality, replace the suspension tower damper assy with a new one.

NOTICE:

When disposing of the suspension tower damper assy, see DISPOSAL on page 27-5.

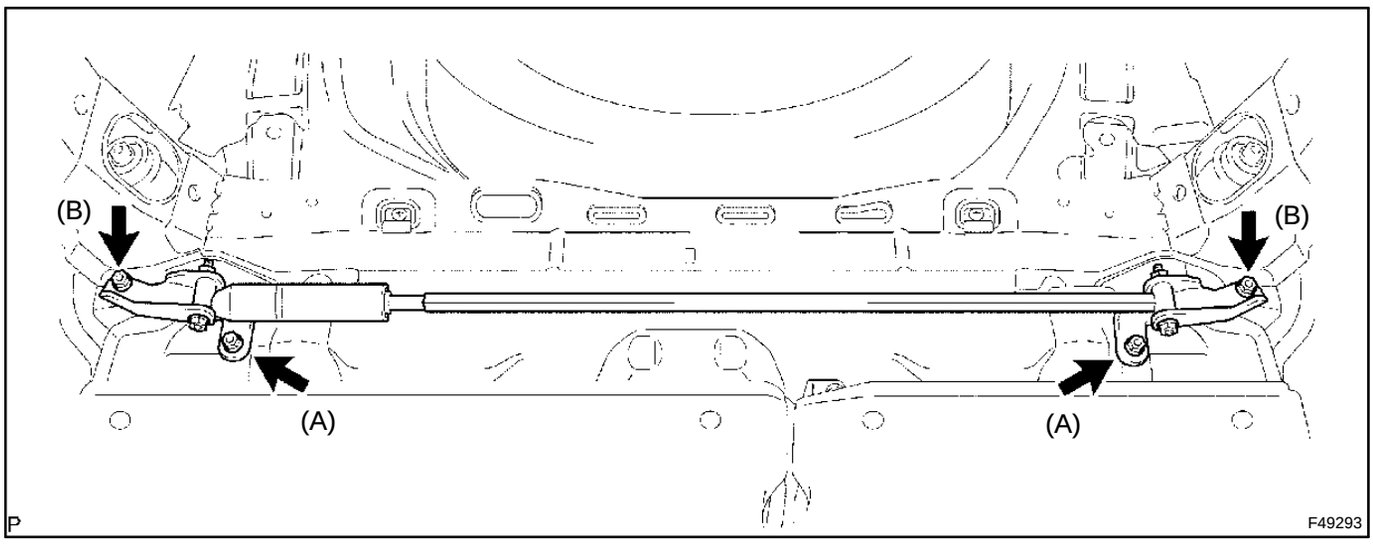
27. INSTALL SUSPENSION TOWER DAMPER ASSY

(a) Install the suspension tower damper assy with the 4 nuts.

Torque:

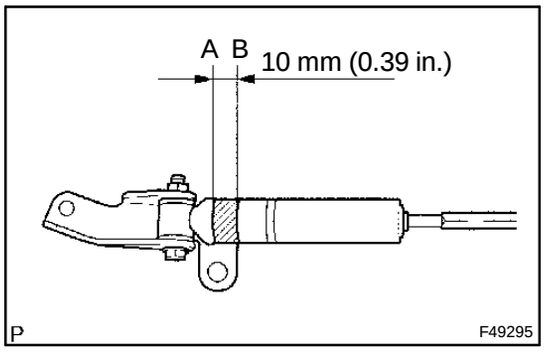
Nut A: 31 N·m (316 kgf·cm, 23 ft·lbf)

Nut B: 80 N·m (816 kgf·cm, 59 ft·lbf)



270JU-01

DISPOSAL



1. DISPOSE OF SUSPENSION TOWER DAMPER ASSY

(a) Fully extend the suspension tower damper assy.

(b) Using a drill, make a hole in the cylinder between A and B as shown in the illustration to discharge the gas inside.

CAUTION:

- **Be careful when drilling because shards of metal may fly about, so always use the proper safety equipment.**
- **The gas is colorless, odorless and non-poisonous.**

TIRE & WHEEL

WHEEL AND TIRE SYSTEM 28–1
INSPECTION 28–1/2
HOW TO PROCEED WITH TROUBLESHOOTING 28–3

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

WHEEL AND TIRE SYSTEM

INSPECTION

2804Z-04

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

Cold tire inflation pressure:

4ZZ-FE engine models:

Tire size	Front kPa (kgf·cm^2, psi)	Rear kPa (kgf·cm^2, psi)
175/70R14 84H	220 (2.2, 32) *1 260 (2.6, 38) *2	220 (2.2, 32) *1 260 (2.6, 38) *2
195/60R15 88V	220 (2.2, 32) *1 260 (2.6, 38) *2	220 (2.2, 32) *1 260 (2.6, 38) *2

3ZZ-FE engine models:

Tire size	Front kPa (kgf·cm^2, psi)	Rear kPa (kgf·cm^2, psi)
195/60R15 88V	220 (2.2, 32) *1 270 (2.7, 39) *2	220 (2.2, 32) *1 270 (2.7, 39) *2

2ZZ-FE engine models:

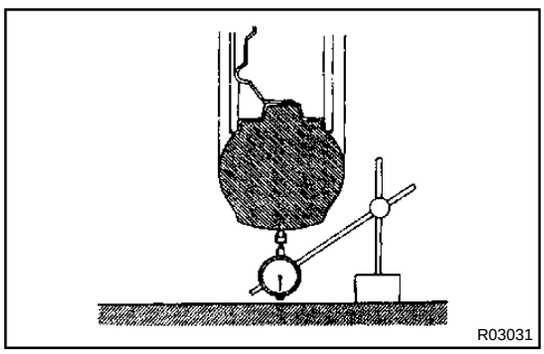
Tire size	Front kPa (kgf·cm^2, psi)	Rear kPa (kgf·cm^2, psi)
195/55R16 87V	220 (2.2, 32) *1 280 (2.8, 41) *2	220 (2.2, 32) *1 280 (2.8, 41) *2

1CD-FTV engine models:

Tire size	Front kPa (kgf·cm^2, psi)	Rear kPa (kgf·cm^2, psi)
195/60R15 88V	240 (2.4, 35) *1 290 (2.9, 42) *2	240 (2.4, 35) *1 290 (2.9, 42) *2

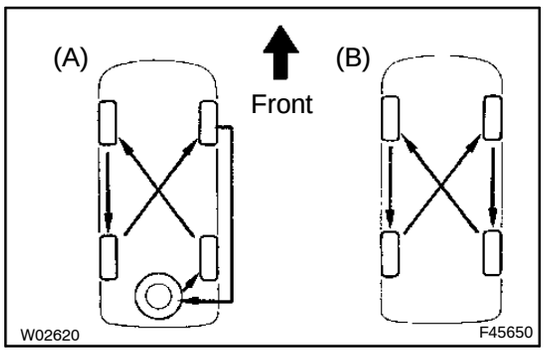
*1: For driving under 160 km/h (100 mph)

*2: For driving at 160 km/h (100 mph) or over



(b) Using a dial indicator, check the runout of tires.

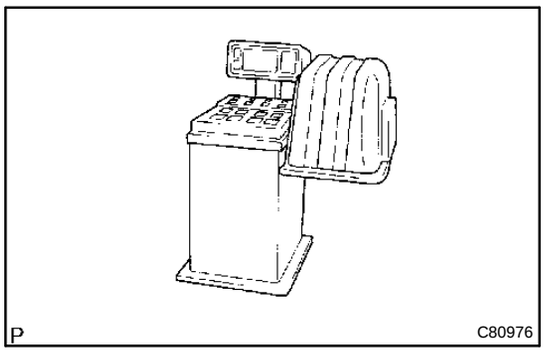
Tire runout: 1.4 mm (0.055 in.) or less



2. ROTATE TIRES

HINT:

If the spare tire is the same as ground tire, perform as ”A” in the illustration, and if the spare tire is compact tire, perform as ”B” in the illustration.



3. INSPECT WHEEL BALANCE

(a) Check and adjust the off-the-car balance.

(b) If required, check and adjust the on-the-car balance.

Imbalance after adjustment: 8.0 g (0.018 lb) or less

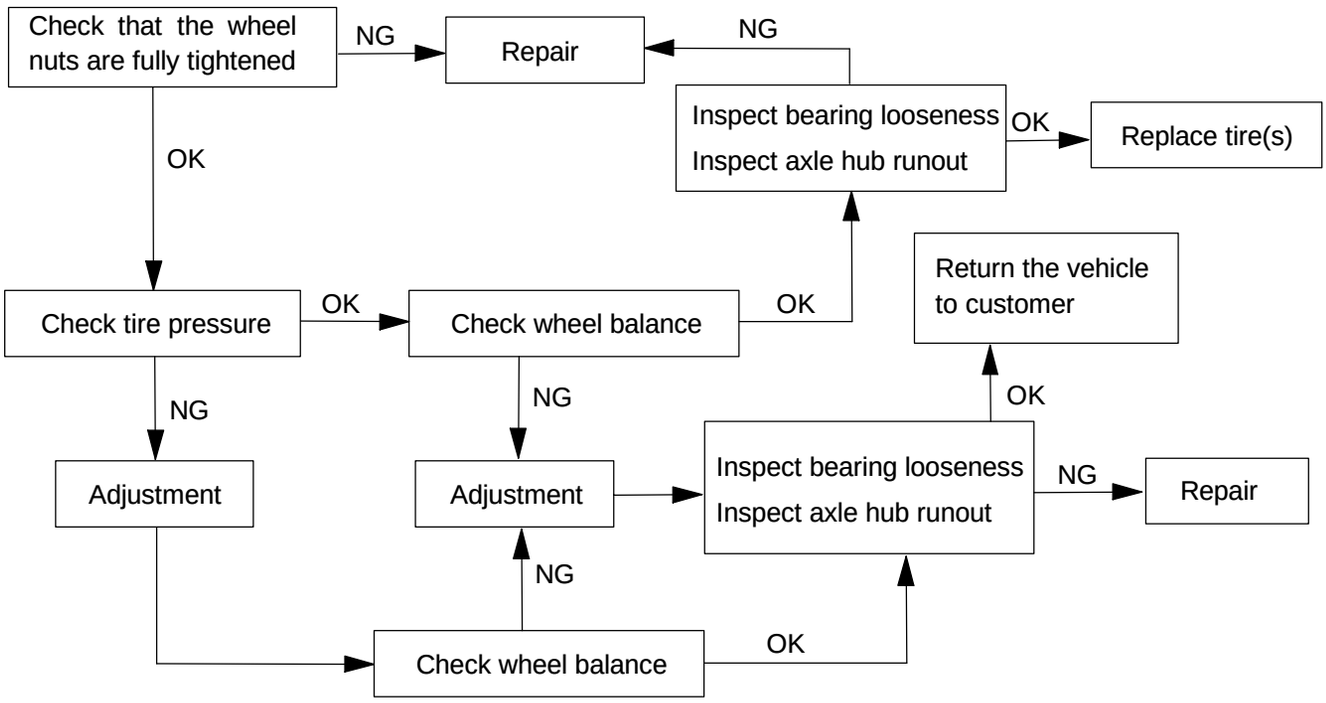
4. INSPECT BEARING LOOSENESS (SEE PUB. NO. RM925E PAGE 30-2)

5. INSPECT AXLE HUB RUNOUT (SEE PUB. NO. RM925E PAGE 30-2)

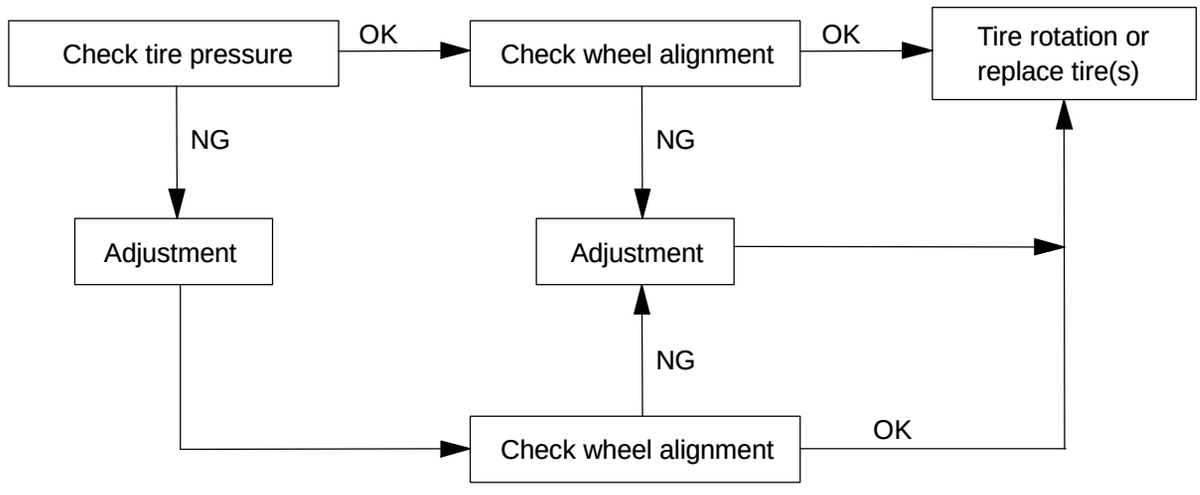
28050-02

HOW TO PROCEED WITH TROUBLESHOOTING

1. DIAGNOSIS OF TIRE VIBRATION



2. PREMATURE OF IRREGULAR TIRE WEAR



PARKING BRAKE

PARKING BRAKE LEVER SUB–ASSY 33–1
COMPONENTS 33–1
REPLACEMENT 33–2/3
PARKING BRAKE CABLE ASSY NO.1 33–4
COMPONENTS 33–4

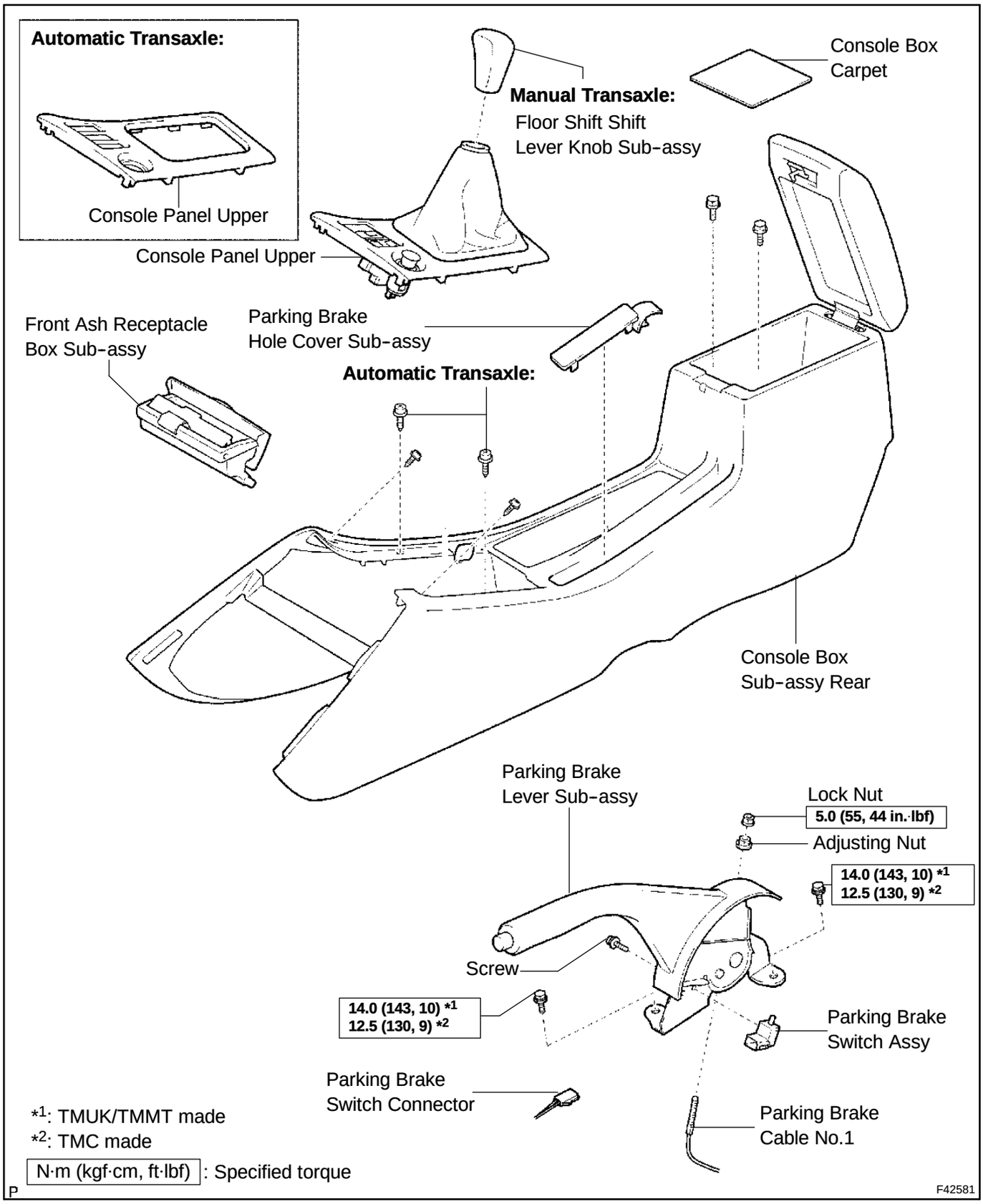
REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

PARKING BRAKE LEVER SUB-ASSY

COMPONENTS

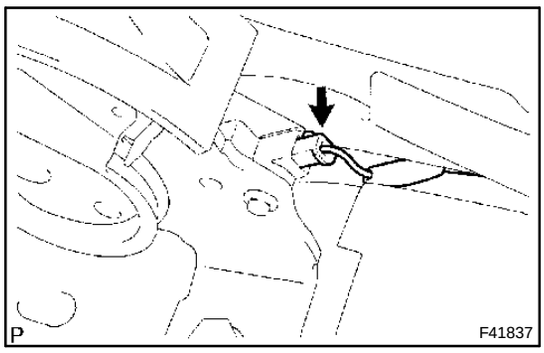
33068-04



3306I-02

REPLACEMENT

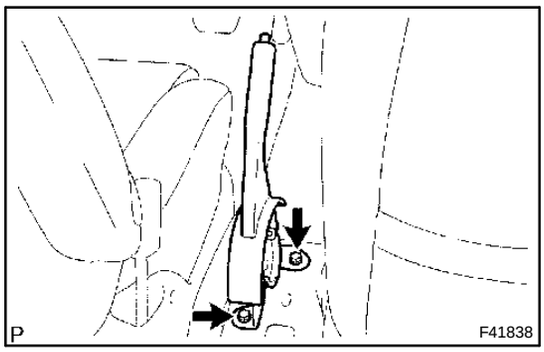
1. REMOVE FRONT ASH RECEPTACLE BOX SUB-ASSY (SEE PAGE 71-6)
2. REMOVE SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE) (SEE PAGE 71-6)
3. REMOVE CONSOLE PANEL UPPER (SEE PAGE 71-6)
4. REMOVE PARKING BRAKE HOLE COVER SUB-ASSY (SEE PAGE 71-6)
5. REMOVE CONSOLE BOX CARPET (SEE PAGE 71-6)
6. REMOVE CONSOLE BOX SUB-ASSY REAR (FOR MANUAL TRANSAXLE) (SEE PAGE 71-6)
7. REMOVE CONSOLE BOX SUB-ASSY REAR (EXCEPT MANUAL TRANSAXLE) (SEE PAGE 71-6)



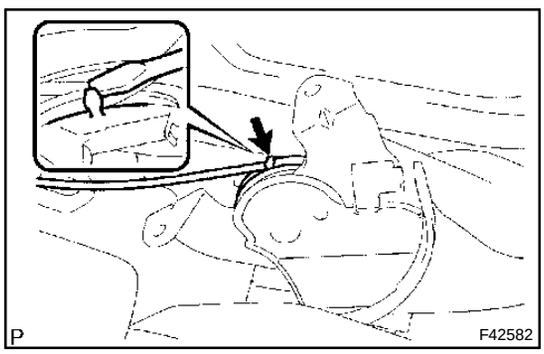
8. REMOVE PARKING BRAKE LEVER SUB-ASSY

(a) Disconnect the parking brake switch connector from the parking brake switch.

(b) Remove the lock nut and adjusting nut from the parking brake cable assy No.1.

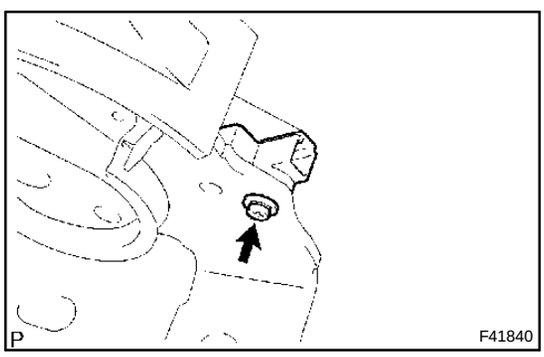


(c) Remove the 2 bolts.



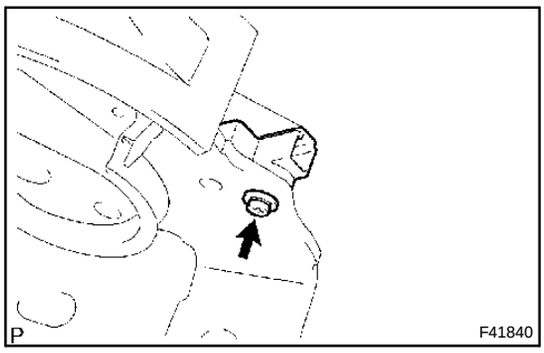
(d) Using a screwdriver, raise the pick on the parking brake lever, and disconnect the parking brake cable assy No.1 from the parking brake lever.

(e) Remove the parking brake lever from the body.



9. REMOVE PARKING BRAKE SWITCH ASSY

(a) Remove the screw and parking brake switch.

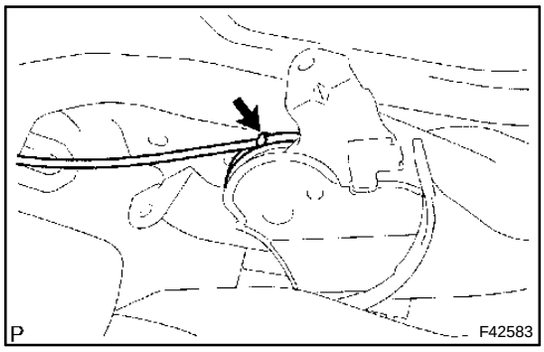


10. INSTALL PARKING BRAKE SWITCH ASSY

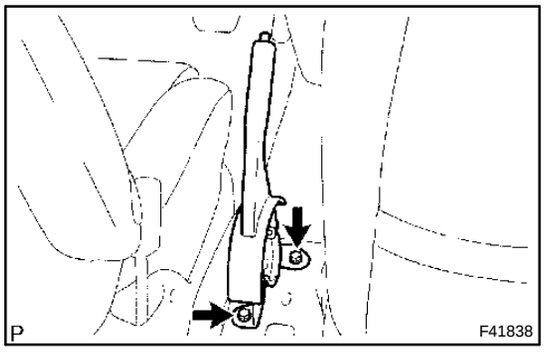
(a) Install the parking brake switch to the parking brake lever with the screw.

11. INSTALL PARKING BRAKE LEVER SUB-ASSY

(a) Install the parking brake cable assy No.1 to the parking brake lever, temporally tighten the adjusting nut and lock nut.

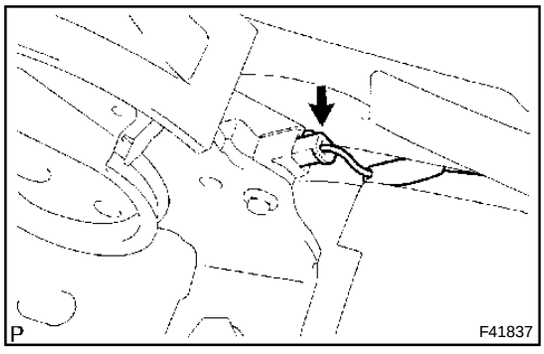


(b) Using a screwdriver, fix the parking brake cable No.1 to the pick.



(c) Install the parking brake lever with the 2 bolts.

Torque:
TMUK/TMMT made:
14.0 N·m (143 kgf·cm, 10 ft·lbf)
TMC made:
12.5 N·m (130 kgf·cm, 9 ft·lbf)



(d) Connect the parking brake switch connector to the parking brake switch.

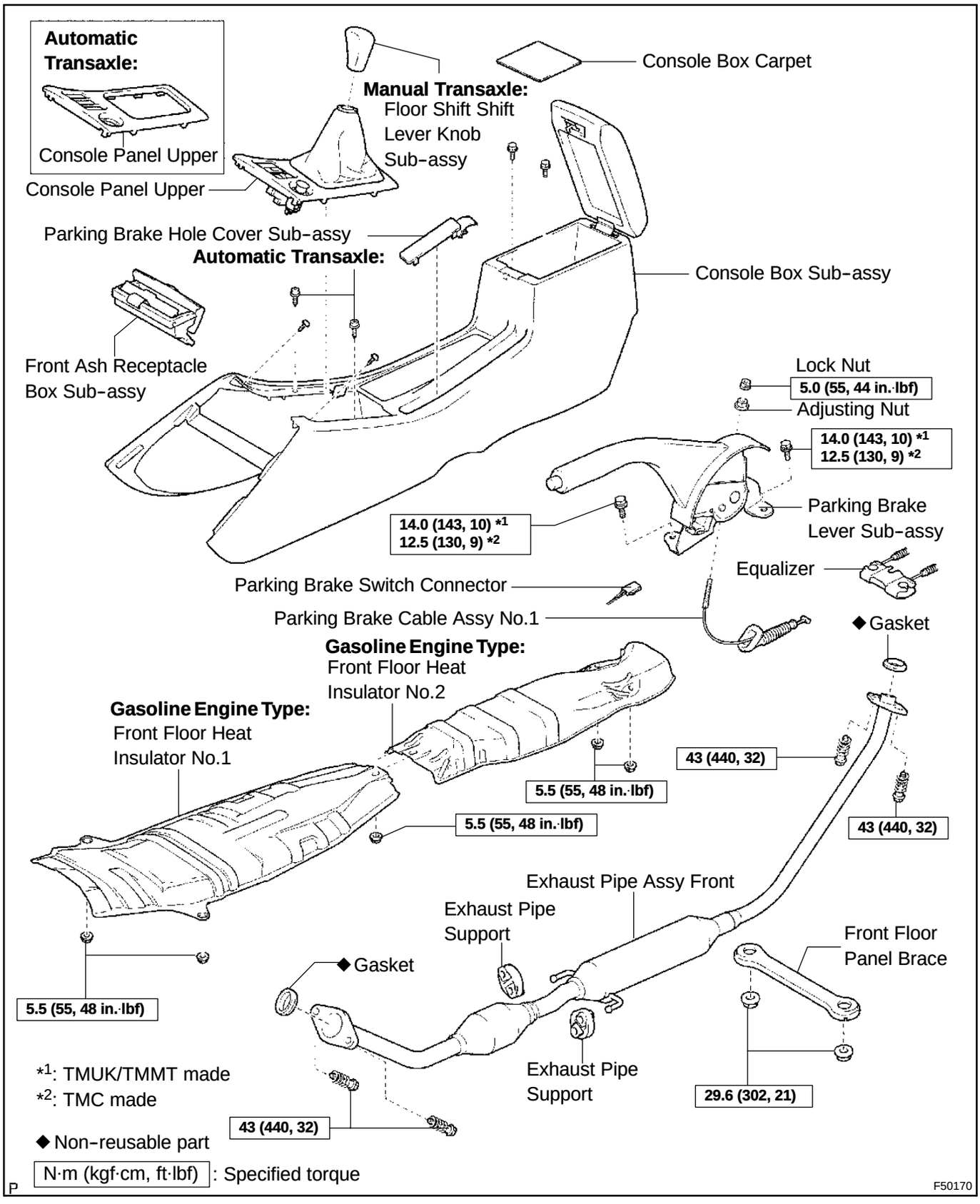
12. INSPECT PARKING BRAKE LEVER TRAVEL **(SEE PUB. No. RM925E, PAGE 33-2)**

13. ADJUST PARKING BRAKE LEVER TRAVEL **(SEE PUB. No. RM925E, PAGE 33-2)**

PARKING BRAKE CABLE ASSY NO.1

COMPONENTS

3306A-04



AUTOMATIC TRANSMISSION / TRANS

PARK/NEUTRAL POSITION SWITCH
ASSY (ATM) 40–1
REPLACEMENT 40–1/3
ADJUSTMENT 40–4

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

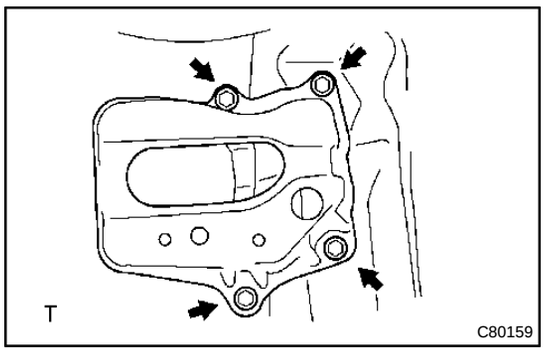
NOTE: The above pages contain only the points which differ from the above listed manual.

PARK/NEUTRAL POSITION SWITCH ASSY (ATM)

401C6-01

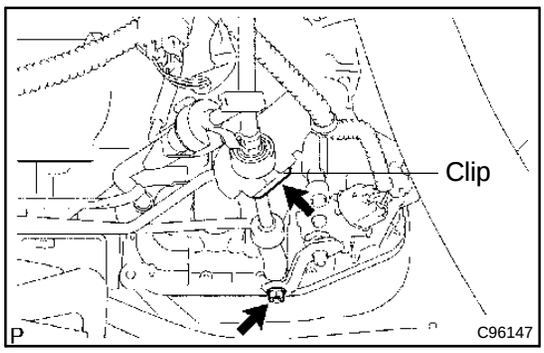
REPLACEMENT

1. REMOVE BATTERY **(SEE PAGE 14-12)**



2. REMOVE BATTERY CARRIER

(a) Remove the 4 bolts and battery carrier.

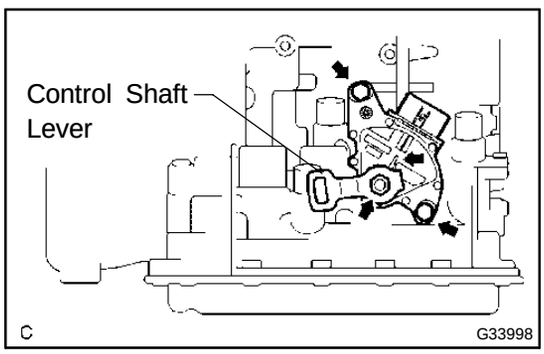


3. SEPARATE TRANSMISSION CONTROL CABLE ASSY

(a) Remove the nut from the control shaft lever.

(b) Disconnect the control cable from the control shaft lever.

(c) Remove the clip and disconnect the control cable from the control cable bracket.



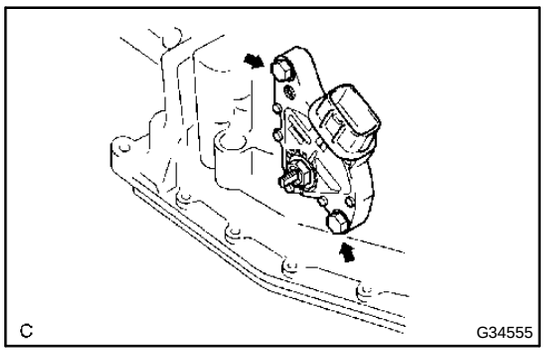
4. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

(a) Disconnect the park/neutral position switch connector.

(b) Remove the nut, washer and control shaft lever.

(c) Pry out the lock plate and remove the manual valve shaft nut.

(d) Remove the 2 bolts and pull out the park/neutral position switch.



5. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

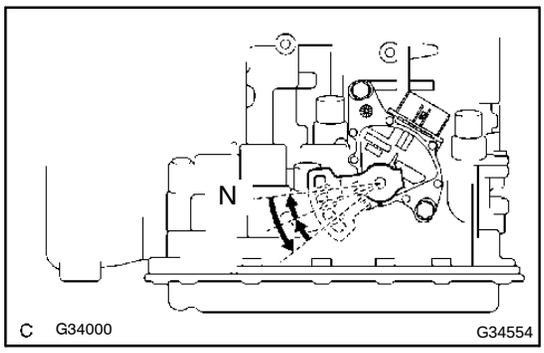
(a) Install the park/neutral position switch to the manual valve shaft.

(b) Temporarily install the 2 bolts.

(c) Place a new lock plate and tighten the nut.

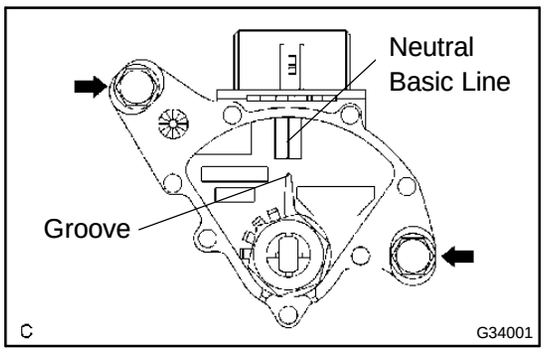
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(d) Temporarily install the control shaft lever.



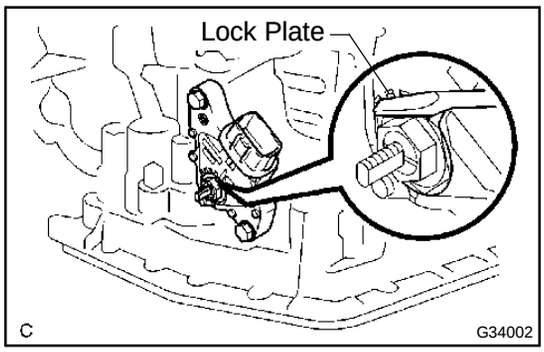
(e) Turn the lever counterclockwise until it stops, then turn it clockwise 2 notches.

(f) Remove the control shaft lever.

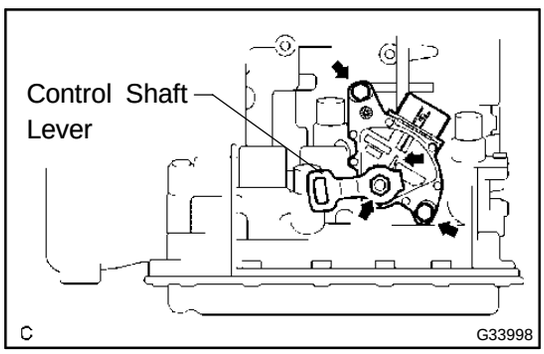


(g) Align the groove with neutral basic line.

(h) Hold the switch in position and tighten the 2 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

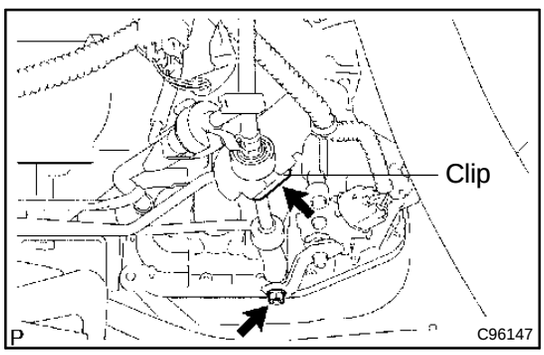


(i) Using a screwdriver, stake the nut with the lock plate.



(j) Install the control shaft lever, washer and nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(k) Connect the park/neutral position switch connector.

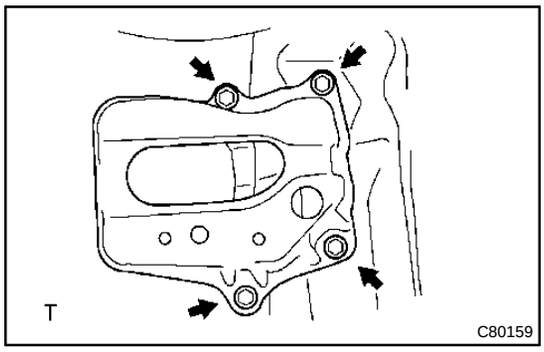


6. INSTALL TRANSMISSION CONTROL CABLE ASSY

(a) Temporarily install the control cable to the control shaft lever with the nut.

(b) Install the control cable and clip to the bracket.

7. INSPECT PARK/NEUTRAL POSITION SWITCH ASSY **(SEE PAGE 40-4)**



8. INSTALL BATTERY CARRIER

(a) Install the battery carrier and 4 bolts.
Torque: 13 N·m (132 kgf·cm, 10 ft·lbf)

9. INSTALL BATTERY **(SEE PAGE 14-12)**

10. ADJUST SHIFT LEVER POSITION **(SEE PUB. NO. RM925E, PAGE 40-43)**

11. INSPECT SHIFT LEVER POSITION **(SEE PUB. NO. RM925E, PAGE 40-43)**

401C7-01

ADJUSTMENT

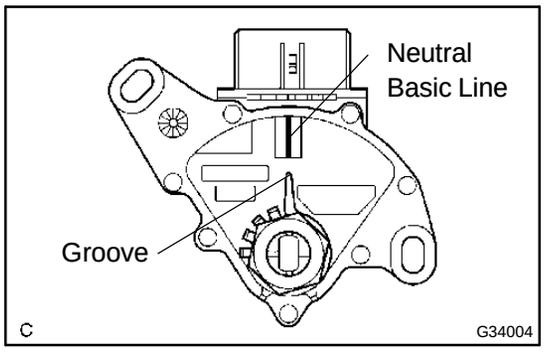
1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSY

(a) Apply the parking brake and turn the ignition switch ON.

(b) Depress the brake pedal and check that the engine starts only when the shift lever is set in N or P position and it does not start in the other position.

(c) Check that the back–up light comes on and the reverse warning buzzer sounds only when the shift lever is set in R position and these do not function in the other positions.

If a failure is found, check the park/neutral position switch for continuity.



2. ADJUST PARK/NEUTRAL POSITION SWITCH ASSY

(a) Loosen the 2 bolts of park/neutral position switch and set the shift lever to the N position.

(b) Align the groove and neutral basic line.

(c) Hold the switch in position and tighten the 2 bolts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(d) After adjustment, perform the inspection described in step 1.

MANUAL TRANSMISSION/TRANSAXLE

MANUAL TRANSAXLE SYSTEM (E357) 41–1
PROBLEM SYMPTOMS TABLE 41–1
MANUAL TRANSAXLE OIL (E357) 41–2
ON–VEHICLE INSPECTION 41–2
FRONT DIFFERENTIAL OIL SEAL (E357) 41–3
REPLACEMENT 41–3/4
MANUAL TRANSAXLE ASSY (E357) 41–5
COMPONENTS 41–5/6
REPLACEMENT 41–7/14

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

MANUAL TRANSAXLE SYSTEM (E357)

PROBLEM SYMPTOMS TABLE

4100Y-09

Use the table below to help determine 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.

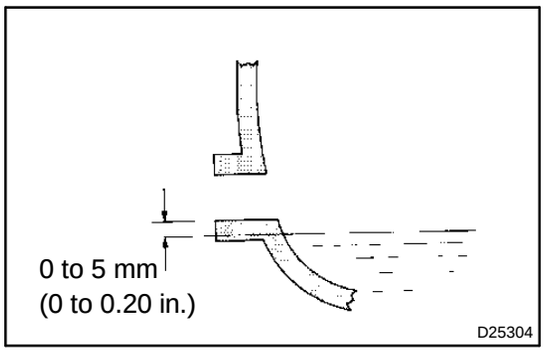
(★:COROLLA Repair Manual Pub. No. RM925E or E355, E356 MANUAL TRANSAXLE Repair Manual Pub. No. RM867E)

Symptom	Suspected Area	See page
Noise	5. Oil (Level low)	41-3
	6. Oil (Wrong)	41-3
	7. Gear (Worn or damaged)	★
	8. Bearing (Worn or damaged)	★
Oil leakage	1. Oil (Level too high)	41-2
	2. Gasket (Damaged)	★
	3. Oil seal (Worn or damaged)	41-3
	4. O-Ring (Worn or damaged)	★
Hard to shift or will not shift	1. Control cable (Faulty) HATCHBACK:	★
	SEDAN/ STATION WAGON:	★
	2. Synchronizer ring (Worn or damaged)	★
	3. Shift key spring (Damaged)	★
Jumps out of gear	1. Locking ball spring (Damaged)	★
	2. Shift fork (Worn)	★
	3. Gear (Worn or damaged)	★
	4. Bearing (Worn or damaged)	★

MANUAL TRANSAXLE OIL (E357)

ON-VEHICLE INSPECTION

4100Z-09



1. INSPECT TRANSAXLE OIL

(a) Stop the vehicle on a level surface.

(b) Remove the transmission filler plug and gasket.

(c) Check that the oil surface is within 5 mm (0.20 in.) from the lowest position of the inner surface of the transmission filler plug opening.

NOTICE:

- **An excessively large or small amount of oil may cause trouble.**
- **After changing the oil, drive the vehicle and check the oil level.**

(d) Check for oil leakage when the oil level is low.

(e) Install the transmission filler plug and a new gasket.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

FRONT DIFFERENTIAL OIL SEAL (E357)

41046-17

REPLACEMENT

1. DRAIN MANUAL TRANSAXLE OIL

(a) Remove the filler plug and gasket.

(b) Remove the drain plug, gasket and drain the oil.

(c) Install the drain plug with a new gasket.

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

2. REMOVE FRONT WHEELS

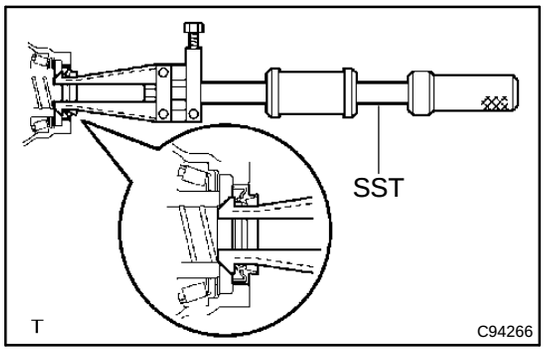
3. REMOVE ENGINE UNDER COVER LH

4. REMOVE ENGINE UNDER COVER RH

5. REMOVE FRONT DRIVE SHAFT ASSY LH **(SEE PUB. No. RM925E, PAGE 30-18)**

SST 09520-01010, 09520-24010 (09520-32040)

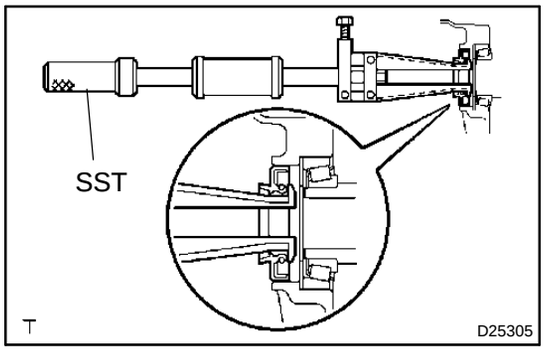
6. REMOVE FRONT DRIVE SHAFT ASSY RH **(SEE PUB. No. RM925E, PAGE 30-18)**



7. REMOVE FRONT TRANSAXLE CASE COVER OIL SEAL

(a) Using SST, remove the transaxle case cover oil seal.

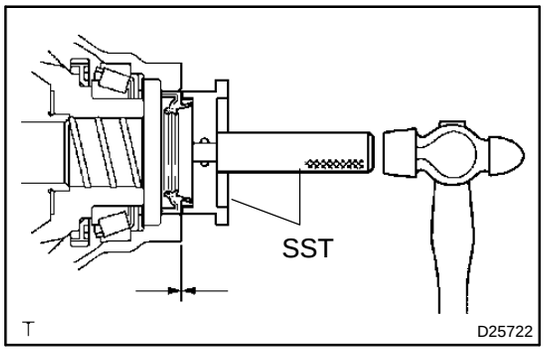
SST 09308-00010



8. REMOVE TRANSMISSION CASE OIL SEAL

(a) Using SST, remove the transmission case oil seal.

SST 09308-00010



9. INSTALL FRONT TRANSAXLE CASE COVER OIL SEAL

(a) Coat a new oil seal lip with MP grease.

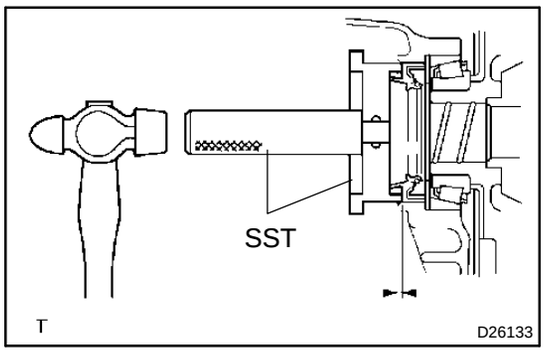
(b) Using SST and a hammer, install the transaxle case cover oil seal.

SST 09608-10010, 09950-70010 (09951-07200)

Drive in depth: -0.5 to 0.5 mm (-0.020 to 0.020 in.)

NOTICE:

Be careful not to damage the oil seal lip.



10. INSTALL TRANSMISSION CASE OIL SEAL

(a) Coat a new oil seal lip with MP grease.

(b) Using SST and a hammer, install the transmission case oil seal.

SST 09608-32010, 09950-70010 (09951-07200)

Drive in depth: 3.0 to 4.0 mm (0.120 to 0.157 in.)

NOTICE:

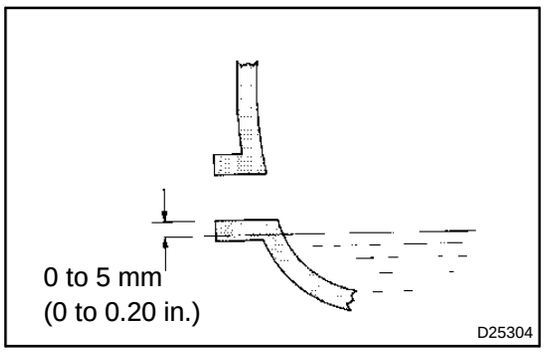
Be careful not to damage the oil seal lip.

11. INSTALL FRONT DRIVE SHAFT ASSY LH **(SEE PUB. No. RM925E, PAGE 30-18)**

12. INSTALL FRONT DRIVE SHAFT ASSY RH **(SEE PUB. No. RM925E, PAGE 30-18)**

13. INSTALL FRONT WHEELS

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



14. ADD MANUAL TRANSAXLE OIL

Oil grade: API GL-4 or GL-5

Viscosity: SAE 75 W-90

Capacity: 2.5 liters (2.6 US qts, 2.2 Imp. qts)

15. INSPECT MANUAL TRANSAXLE OIL **(SEE PAGE 41-2)**

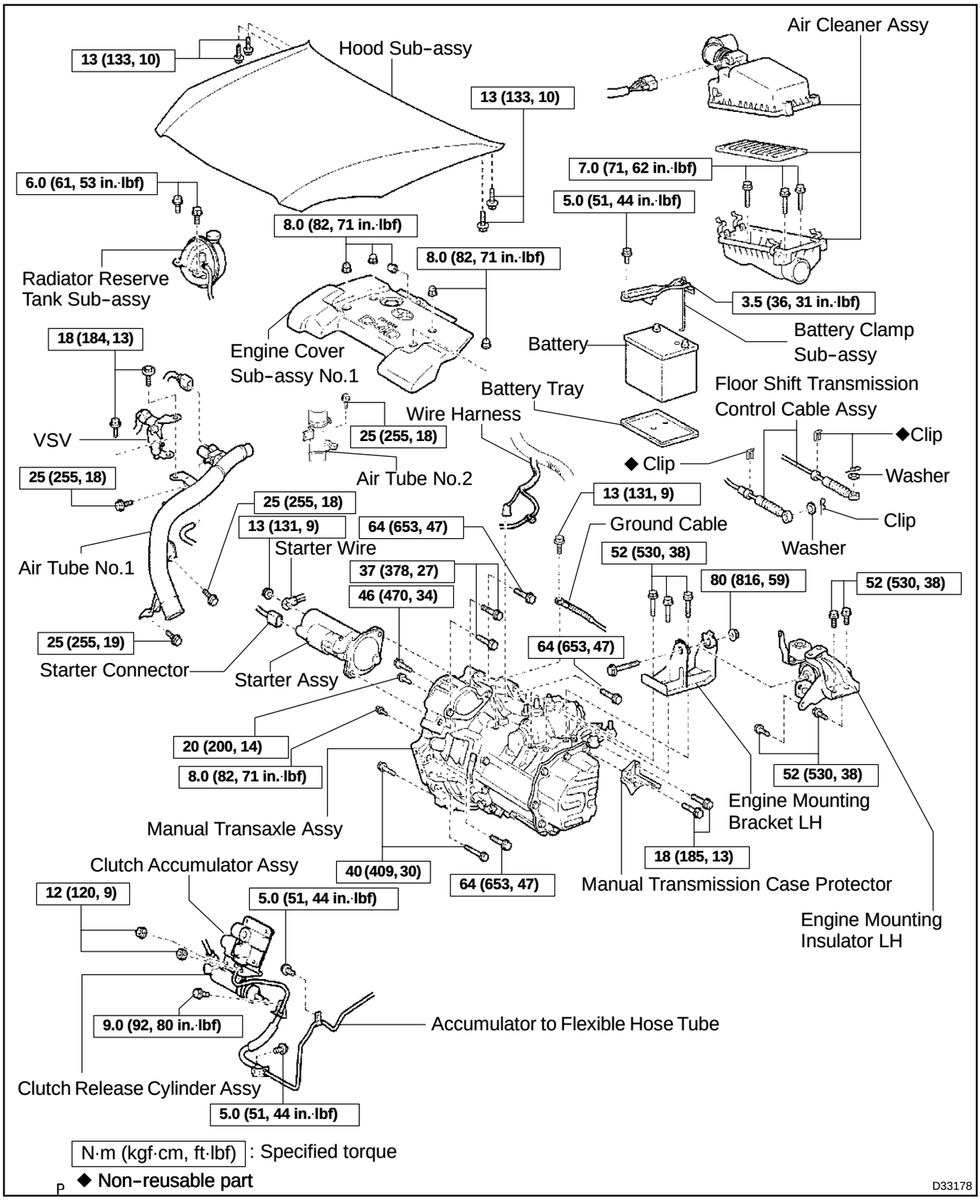
16. INSPECT FRONT WHEEL ALIGNMENT **(SEE PAGE 26-1)**

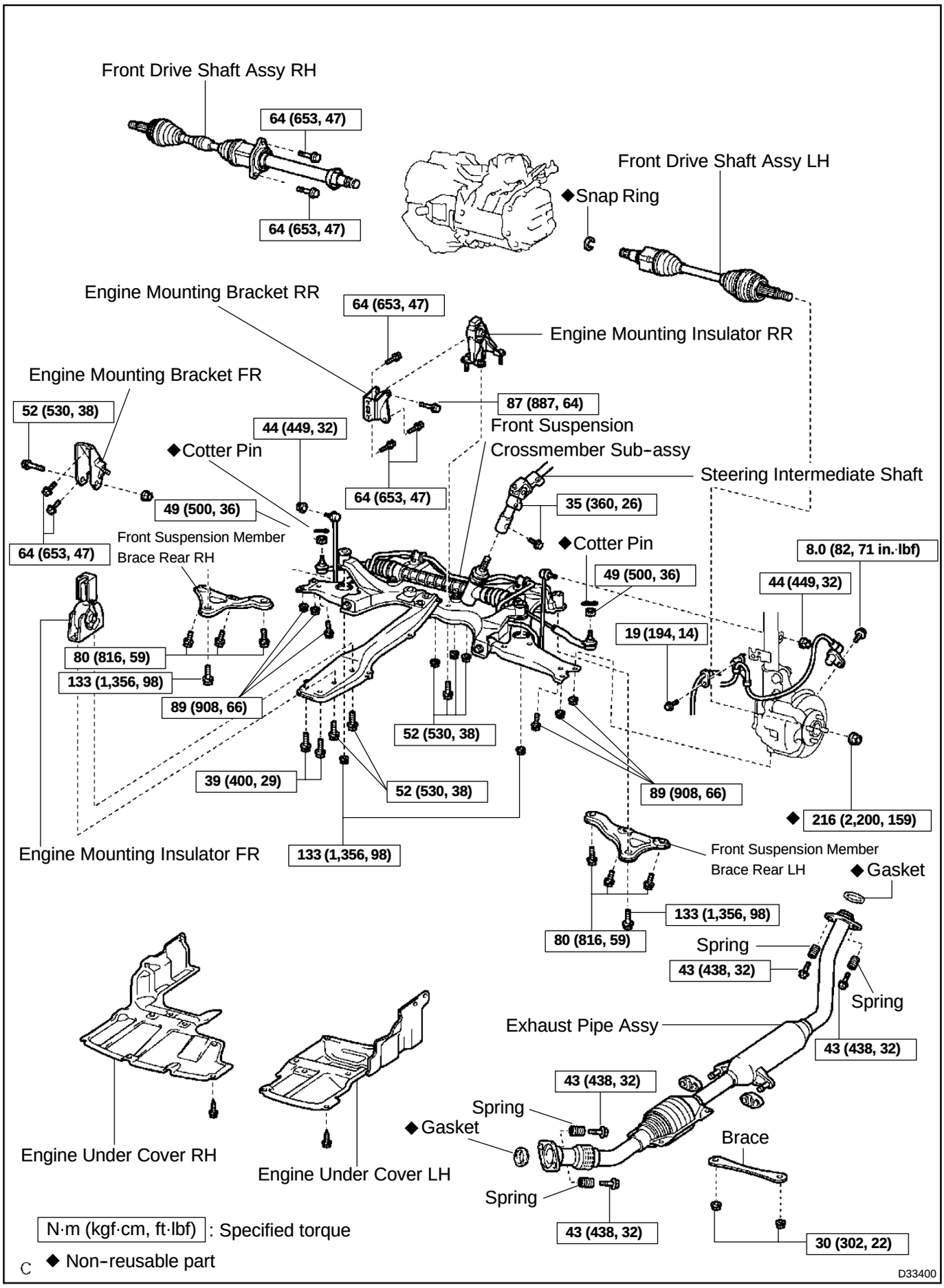
17. CHECK ABS SPEED SENSOR SIGNAL **(SEE PUB. No. RM925E, PAGE 05-614)**

MANUAL TRANSAXLE ASSY (E357)

COMPONENTS

410II-01




Front Drive Shaft Assy RH
64 (653, 47)
64 (653, 47)
◆Snap Ring
Front Drive Shaft Assy LH
Engine Mounting Bracket RR
64 (653, 47)
Engine Mounting Insulator RR
Engine Mounting Bracket FR
52 (530, 38)
87 (887, 64)
44 (449, 32)
Front Suspension
Crossmember Sub-assy
◆Cotter Pin
Steering Intermediate Shaft
64 (653, 47)
35 (360, 26)
49 (500, 36)
Front Suspension Member
Brace Rear RH
◆Cotter Pin
8.0 (82, 71 in.·lbf)
64 (653, 47)
49 (500, 36)
44 (449, 32)
19 (194, 14)
80 (816, 59)
133 (1,356, 98)
89 (908, 66)
52 (530, 38)
39 (400, 29)
52 (530, 38)
89 (908, 66)
◆ 216 (2,200, 159)
Engine Mounting Insulator FR
133 (1,356, 98)
Front Suspension Member
Brace Rear LH
◆Gasket
133 (1,356, 98)
80 (816, 59)
Spring
43 (438, 32)
Spring
Exhaust Pipe Assy
43 (438, 32)
43 (438, 32)
Spring
◆Gasket
Brace
Spring
43 (438, 32)
30 (302, 22)
Engine Under Cover RH
Engine Under Cover LH
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
C
D33400

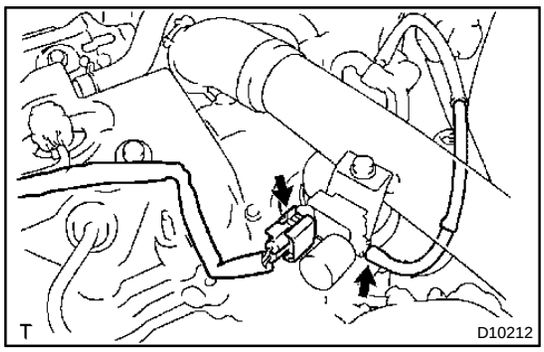
410IJ-01

REPLACEMENT

1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL** **(SEE PAGE 60-1)**
3. **REMOVE HORN BUTTON ASSY** **(SEE PAGE 60-31)**
4. **REMOVE STEERING WHEEL ASSY** **(SEE PAGE 50-6)**
5. **REMOVE COLUMN HOLE COVER SILENCER SHEET** **(SEE PAGE 50-6)**
6. **SEPARATE STEERING INTERMEDIATE SHAFT ASSY NO.2 (RHD STEERING POSITION TYPE)** **(SEE PAGE 50-6)**
7. **SEPARATE STEERING SLIDING YOKE SUB-ASSY (LHD STEERING POSITION TYPE)** **(SEE PAGE 50-6)**
8. **REMOVE FRONT WHEELS**
9. **REMOVE ENGINE UNDER COVER RH**
10. **REMOVE ENGINE UNDER COVER LH**
11. **REMOVE EXHAUST PIPE ASSY** **(SEE PUB. No. RM925E, PAGE 15-8)**
12. **DRAIN TRANSAXLE OIL**

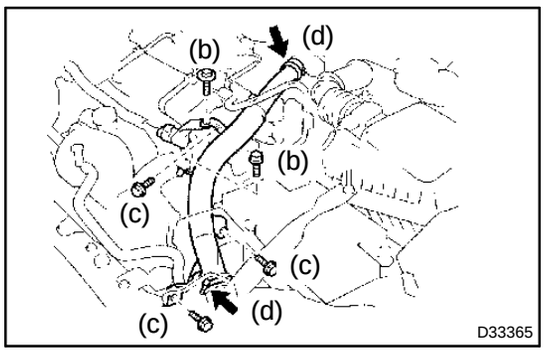
(a) Remove the filler plug and gasket.
(b) Remove the drain plug, gasket and drain the oil.
(c) Install the drain plug with a new gasket.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

13. **REMOVE HOOD SUB-ASSY**
14. **REMOVE ENGINE COVER SUB-ASSY NO.1**
15. **REMOVE AIR CLEANER ASSY**
16. **REMOVE BATTERY CLAMP SUB-ASSY**
17. **REMOVE BATTERY**
18. **REMOVE BATTERY TRAY**

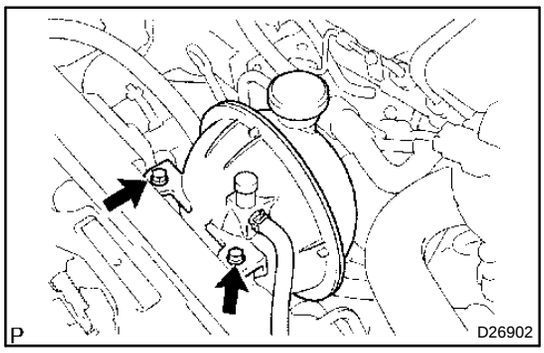


19. **REMOVE AIR TUBE NO.1**

(a) Disconnect the vacuum hose and connector.

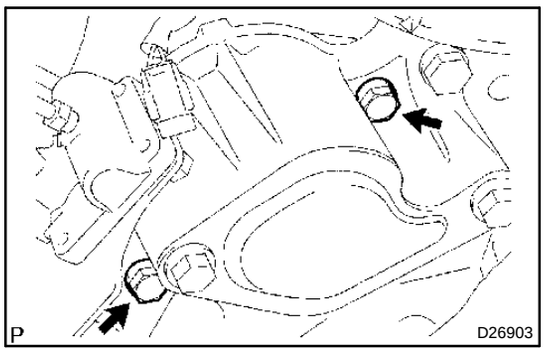


(b) Remove the 2 bolts and disconnect the VSV for the turbo-charging pressure control assembly.
(c) Remove the 3 bolts.
(d) Disconnect the 2 hose clamps and remove the No.1 air tube.



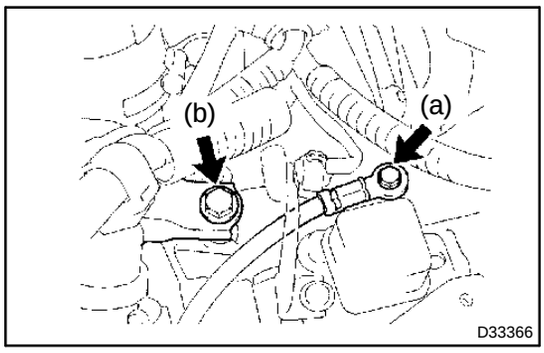
20. SEPARATE RADIATOR RESERVE TANK SUB-ASSY

(a) Remove the 2 bolts and separate the radiator reserve tank assy.



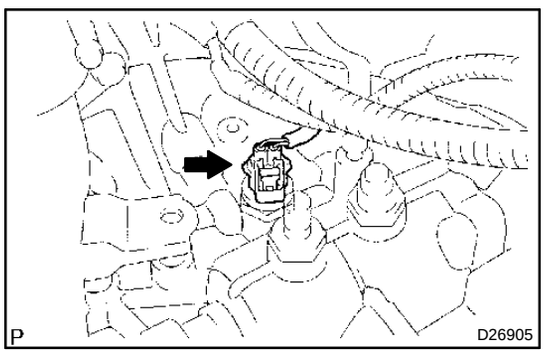
21. REMOVE STARTER ASSY

(a) Remove the nut and disconnect the starter wire.
(b) Disconnect the starter connector.
(c) Remove the 2 bolts and starter assy.



22. DISCONNECT WIRE HARNESS

(a) Remove the bolt and disconnect the ground cable.
(b) Remove the bolt and separate the air tube No.2.



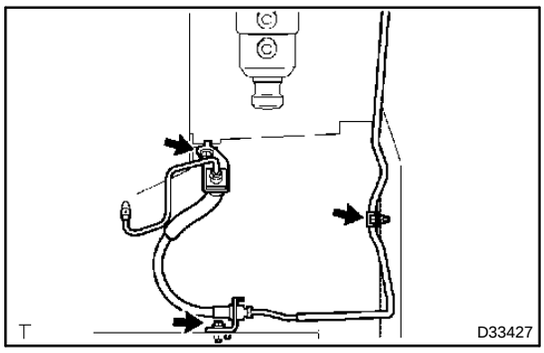
23. DISCONNECT CONNECTOR

(a) Disconnect the back-up lamp switch connector.

24. REMOVE CLUTCH ACCUMULATOR ASSY **(SEE PUB. No. RM925E, PAGE 42-23)**

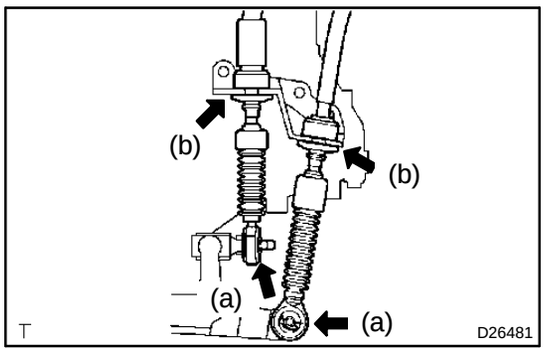
SST 09023-00101

25. REMOVE CLUTCH RELEASE CYLINDER ASSY **(SEE PUB. No. RM925E, PAGE 42-17)**



26. SEPARATE ACCUMULATOR TO FLEXIBLE HOSE TUBE

(a) Remove the 3 bolts, and separate the flexible hose tube with the bracket from the transaxle.



27. SEPARATE TRANSMISSION CONTROL CABLE ASSY

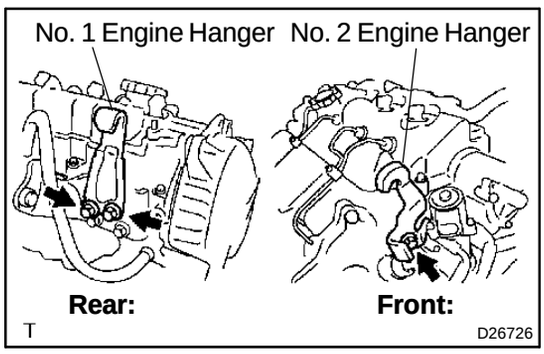
(a) Remove the 2 clips and 2 washers, and separate the 2 cables from the transaxle.

(b) Remove the 2 clips and separate the 2 cables from the bracket.

28. REMOVE FRONT DRIVE SHAFT ASSY LH (SEE PUB. No. RM925E, PAGE 30-18)

SST 09520-01010, 09520-24010 (09520-32040)

29. REMOVE FRONT DRIVE SHAFT ASSY RH (SEE PUB. No. RM925E, PAGE 30-18)



30. SUSPEND ENGINE ASSY

(a) Install the hangers in the correct direction.

Parts No.:
No.1 engine hanger: 12281-27010
No.2 engine hanger: 12282-27010
Bolt: 91642-81025
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

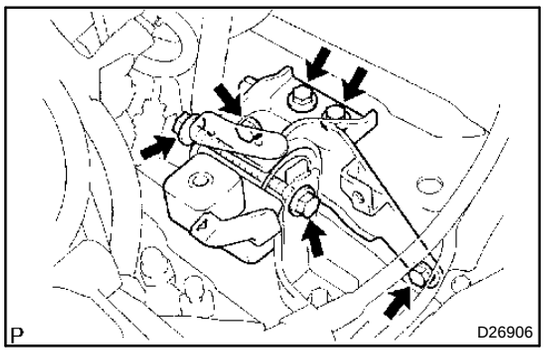
(b) Attach the engine chain hoist to the hanger.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

31. REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSY (SEE PUB. No. RM925E, PAGE 51-6)

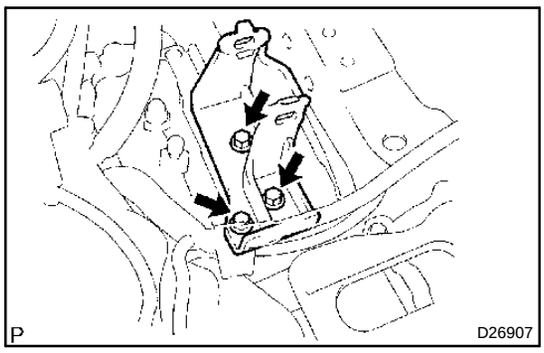
32. SUPPORT MANUAL TRANSAXLE ASSY

(a) Support the manual transaxle with a transmission jack.



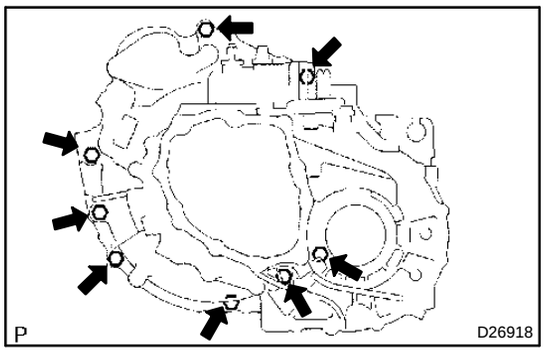
33. REMOVE ENGINE MOUNTING INSULATOR LH

(a) Remove the 5 bolts, nut and engine mounting insulator LH from the body.



34. REMOVE ENGINE MOUNTING BRACKET LH

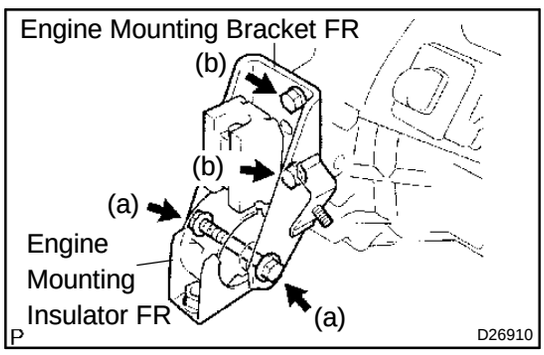
(a) Remove the 3 bolts and engine mounting bracket LH from the manual transaxle.



35. REMOVE MANUAL TRANSAXLE ASSY

(a) Remove the 8 bolts.

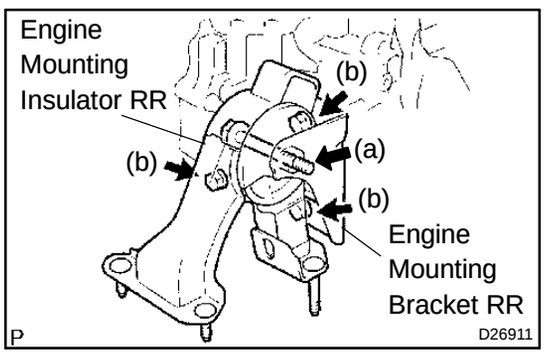
(b) Remove the manual transaxle from the engine.



36. REMOVE ENGINE MOUNTING BRACKET FR

(a) Remove the bolt, nut and engine mounting insulator FR from the engine mounting bracket FR.

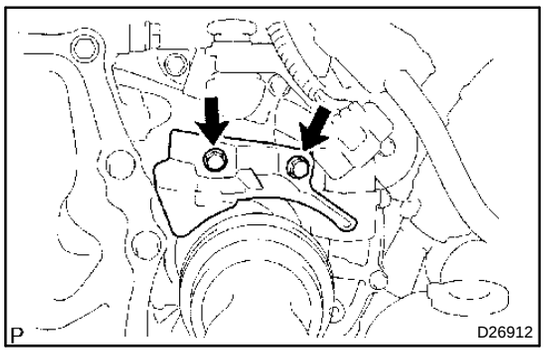
(b) Remove the 2 bolts and engine mounting bracket FR from the manual transaxle.



37. REMOVE ENGINE MOUNTING BRACKET RR

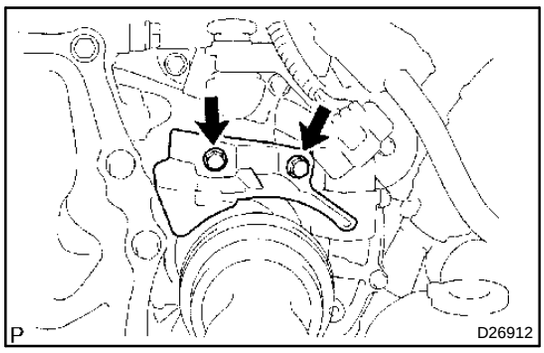
(a) Remove the bolt and engine mounting insulator RR from the engine mounting bracket RR.

(b) Remove the 3 bolts and engine mounting bracket RR from the manual transaxle.



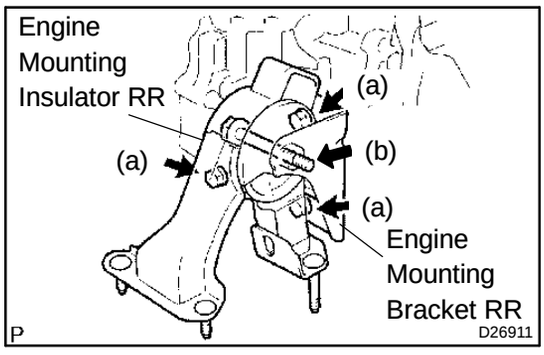
38. REMOVE MANUAL TRANSMISSION CASE PROTECTOR

(a) Remove the 2 bolts and case protector.



39. INSTALL MANUAL TRANSMISSION CASE PROTECTOR

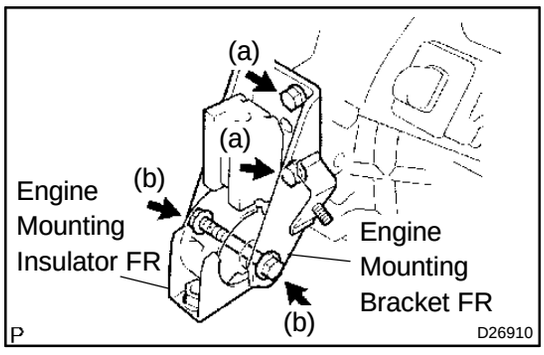
(a) Install the case protector with the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



40. INSTALL ENGINE MOUNTING BRACKET RR

(a) Install the engine mounting bracket RR and 3 bolts to the manual transaxle.
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

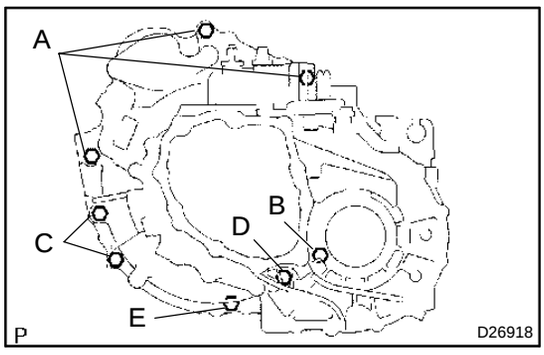
(b) Install the engine mounting insulator RR and bolt to the engine mounting bracket RR.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)



41. INSTALL ENGINE MOUNTING BRACKET FR

(a) Install the engine mounting bracket FR and 2 bolts to the manual transaxle.
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

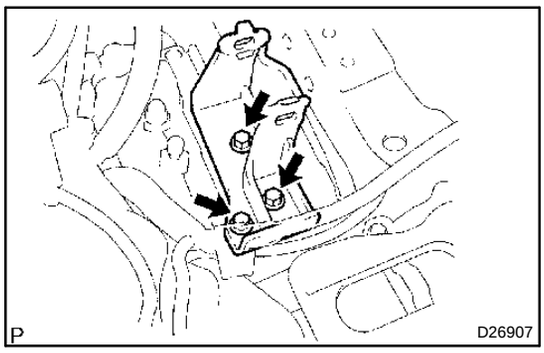
(b) Install the engine mounting insulator FR, bolt and nut to the engine mounting bracket FR.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



42. INSTALL MANUAL TRANSAXLE ASSY

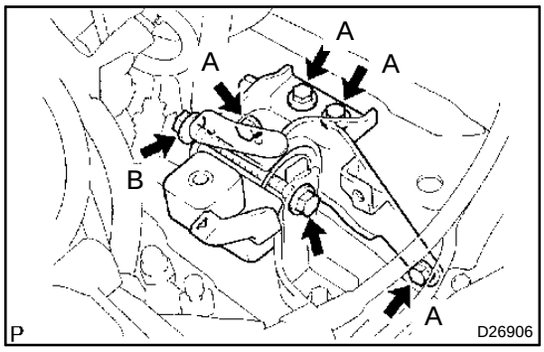
(a) Align the input shaft with the clutch disc and install the manual transaxle to the engine.

(b) Install the 8 bolts.
Torque:
Bolt A: 64 N·m (653 kgf·cm, 47 ft·lbf)
Bolt B: 46 N·m (470 kgf·cm, 34 ft·lbf)
Bolt C: 40 N·m (409 kgf·cm, 30 ft·lbf)
Bolt D: 20 N·m (200 kgf·cm, 14 ft·lbf)
Bolt E: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



43. INSTALL ENGINE MOUNTING BRACKET LH

(a) Install the engine mounting bracket LH to the manual transaxle with the 3 bolts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



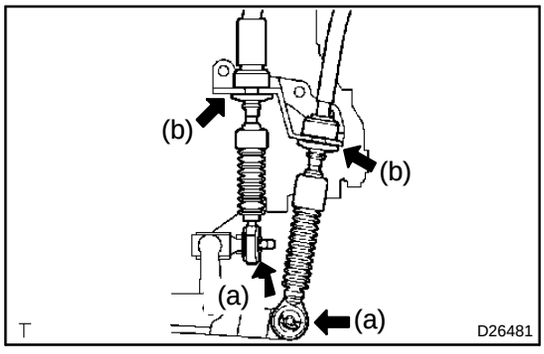
44. INSTALL ENGINE MOUNTING INSULATOR LH

(a) Install the engine mounting insulator LH with the 5 bolts and nut.
Torque:
Bolt A: 52 N·m (530 kgf·cm, 38 ft·lbf)
Nut B: 80 N·m (816 kgf·cm, 59 ft·lbf)

45. INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSY
(SEE PUB. No. RM925E, PAGE 51-6)

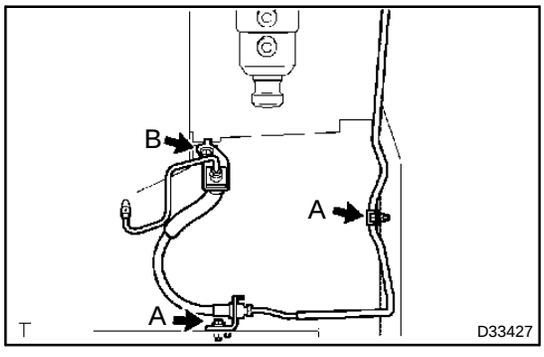
46. INSTALL FRONT DRIVE SHAFT ASSY LH (SEE PUB. No. RM925E, PAGE 30-18)

47. INSTALL FRONT DRIVE SHAFT ASSY RH (SEE PUB. No. RM925E, PAGE 30-18)



48. CONNECT TRANSMISSION CONTROL CABLE ASSY

(a) Connect the 2 cable ends and install the 2 washers and 2 clips.
(b) Install the 2 clips to the control cable bracket.

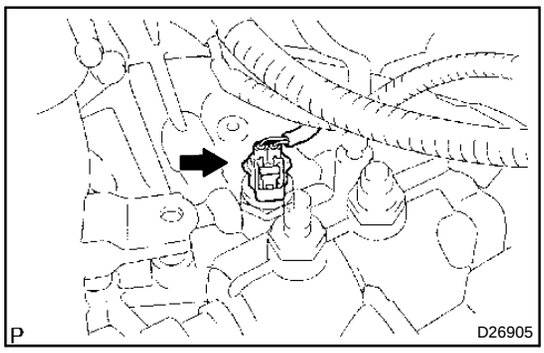


49. INSTALL ACCUMULATOR TO FLEXIBLE HOSE TUBE

(a) Install the flexible hose tube with the 3 bolts.
Torque:
Bolt A: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
Bolt B: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

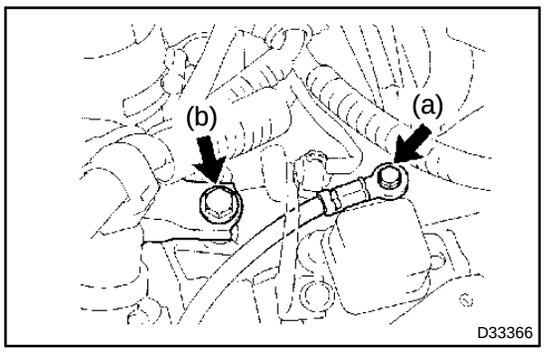
50. INSTALL CLUTCH RELEASE CYLINDER ASSY (SEE PUB. No. RM925E, PAGE 42-17)

51. INSTALL CLUTCH ACCUMULATOR ASSY (SEE PUB. No. RM925E, PAGE 42-23)
SST 09023-00101



52. CONNECT CONNECTOR

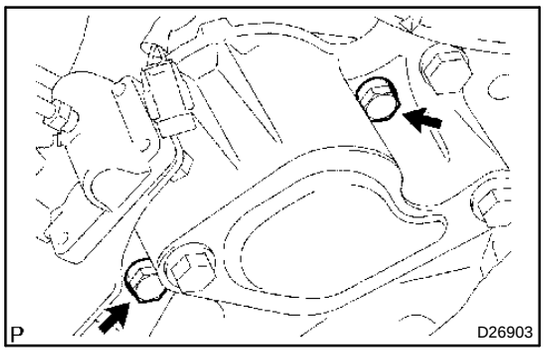
(a) Connect the back–up lamp switch connector.



53. CONNECT WIRE HARNESS

(a) Install the ground cable with the bolt.
Torque: 13 N·m (131 kgf·cm, 9 ft·lbf)

(b) Install the air tube No.2 with the bolt.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

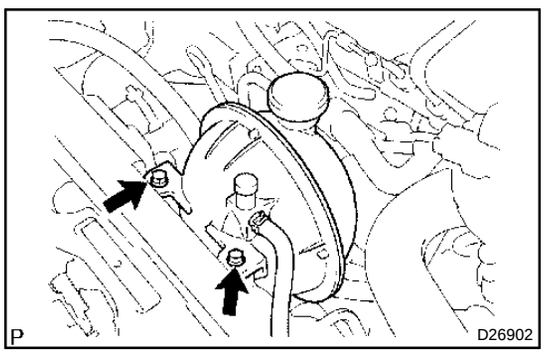


54. INSTALL STARTER ASSY

(a) Install the starter assy to the transaxle with the 2 bolts.
Torque: 37 N·m (378 kgf·cm, 27 ft·lbf)

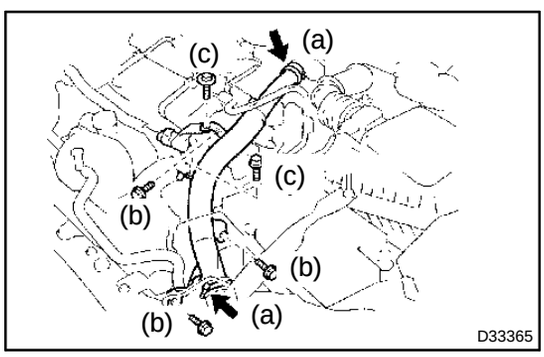
(b) Install the starter wire to the starter assy with the nut.
Torque: 13 N·m (131 kgf·cm, 9 ft·lbf)

(c) Connect the starter connector.



55. CONNECT RADIATOR RESERVE TANK SUB–ASSY

(a) Install the radiator reserve tank assy with the 2 bolts.
Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

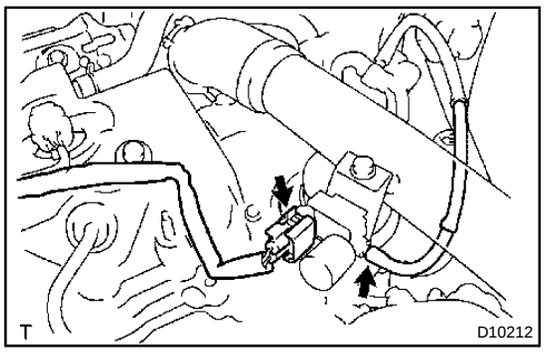


56. INSTALL AIR TUBE NO.1

(a) Connect the 2 hose clamps.
Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

(b) Install the 3 bolts.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

(c) Install the 2 bolts and connect the VSV for the turbocharging pressure control assembly.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



(d) Connect the vacuum hose and connector.

57. INSTALL BATTERY TRAY
58. INSTALL BATTERY
59. INSTALL BATTERY CLAMP SUB-ASSY
Torque:
Bolt: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
Nut: 3.5 N·m (36 kgf·cm, 31 in.·lbf)
60. INSTALL AIR CLEANER ASSY
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)
61. INSTALL ENGINE COVER SUB-ASSY NO.1
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
62. INSTALL STEERING COLUMN HOLE COVER SUB-ASSY NO.1 (SEE PAGE 50-6)
63. CONNECT STEERING INTERMEDIATE SHAFT ASSY NO.2 (RHD STEERING POSITION TYPE) (SEE PAGE 50-6)
64. CONNECT STEERING SLIDING YOKE SUB-ASSY (LHD STEERING POSITION TYPE) (SEE PAGE 50-6)
65. INSTALL COLUMN HOLE COVER SILENCER SHEET (SEE PAGE 50-6)
66. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
67. CENTER SPIRAL CABLE (SEE PAGE 50-6)
68. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-6)
69. STEERING WHEEL CENTER POINT
70. INSTALL HORN BUTTON ASSY (SEE PAGE 60-31)
71. INSTALL HOOD SUB-ASSY
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)
72. INSPECT HOOD SUB-ASSY (SEE PUB. No. RM925E, PAGE 75-1)
73. ADJUST HOOD SUB-ASSY (SEE PUB. No. RM925E, PAGE 75-1)
74. ADD TRANSAXLE OIL (SEE PAGE 41-3)
75. INSPECT TRANSAXLE OIL (SEE PAGE 41-2)
76. INSTALL EXHAUST PIPE ASSY (SEE PUB. No. RM925E, PAGE 15-8)
77. INSTALL ENGINE UNDER COVER RH
78. INSTALL ENGINE UNDER COVER LH
79. INSTALL FRONT WHEELS
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
80. INSPECT FRONT WHEEL ALIGNMENT (SEE PAGE 26-1)
81. CONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
82. CHECK ABS SPEED SENSOR SIGNAL (SEE PUB. No. RM925E, PAGE 05-614)

STEERING COLUMN

STEERING 50–1
PRECAUTION 50–1
PROBLEM SYMPTOMS TABLE 50–2
ON–VEHICLE INSPECTION 50–3
STEERING COLUMN ASSY 50–4
COMPONENTS 50–4/5
OVERHAUL 50–6/13
POWER STEERING ECU ASSY 50–14
REPLACEMENT 50–14/15

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

STEERING

PRECAUTION

5000C-23

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

(a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in hazardous driving.

2. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM

(a) The vehicle is equipped with SRS (Supplemental Restraint System), such as airbags. If service operation is not carried out properly, in a step by step fashion, sudden deployment of the airbags may result in serious injury. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the supplemental restraint system (see page 60–1).

3. HANDLING PRECAUTIONS FOR STEERING COLUMN

(a) Do not submit the steering column assy, especially the motor and the torque sensor, to a strong blow. If subjected to a strong blow (dropped it to the floor, etc.), replace it with a new one.

(b) When removing steering column assy, do not pull the harness.

(c) When having replaced the steering column assy and/or the ECU, calibrate the zero point of the steering torque sensor (see pub. No. RM925E, page 05–822).

(d) In the case of disconnecting a connector related to the power steering system, turn the ignition switch ON, set the steering wheel in the straight–ahead position and turn the ignition switch OFF before disconnecting the connector.

(e) In the case of connecting a connector related to the power steering system, make sure that the ignition switch is OFF at first. After connecting the connector, set the steering wheel in the straight–ahead position and then turn the ignition switch ON.

NOTICE:

Never turn on the ignition switch when the steering wheel is not set in the straight–ahead position.

(f) If the above operation is not done, the zero point of the steering torque sensor will deviate from the proper position, making a difference in steering effort between right and left. If this happens, perform the zero point calibration of the steering torque sensor (see pub. No. RM925E, page 05–822).

5000D-23

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine 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.

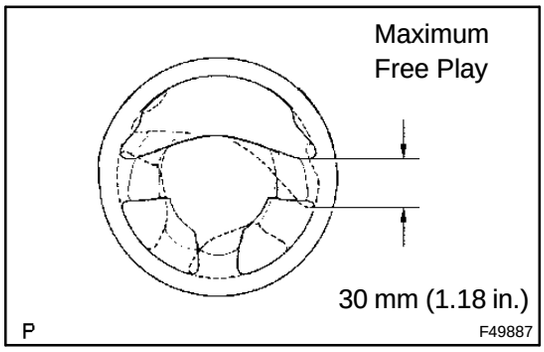
Symptom	Suspected Area	See page
Hard steering	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-1
	3. Steering system joints (Worn)	-
	4. Suspension arm ball joints (Worn)	-
	5. Steering column (Binding)	-
	6. Steering column (Electric power steering system)	50-6
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-1
	3. Steering column (Binding)	-
	4. Steering column (Electric power steering system)	50-6
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	-
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	-
	5. Steering column (Electric power steering system)	50-6
Abnormal noise	1. Steering system joints (Worn)	-
	2. Steering column (Electric power steering system)	50-6

HINT:

When the problem occurs on the electric power steering system, refer to the DIAGNOSTICS section (see pub No. RM925E, page 05-822).

5000E-08

ON-VEHICLE INSPECTION



1. CHECK STEERING WHEEL FREE PLAY

(a) Stop the vehicle and align the wheels straight ahead.

(b) Turn the steering wheel gently right and left, and check the steering wheel free play.

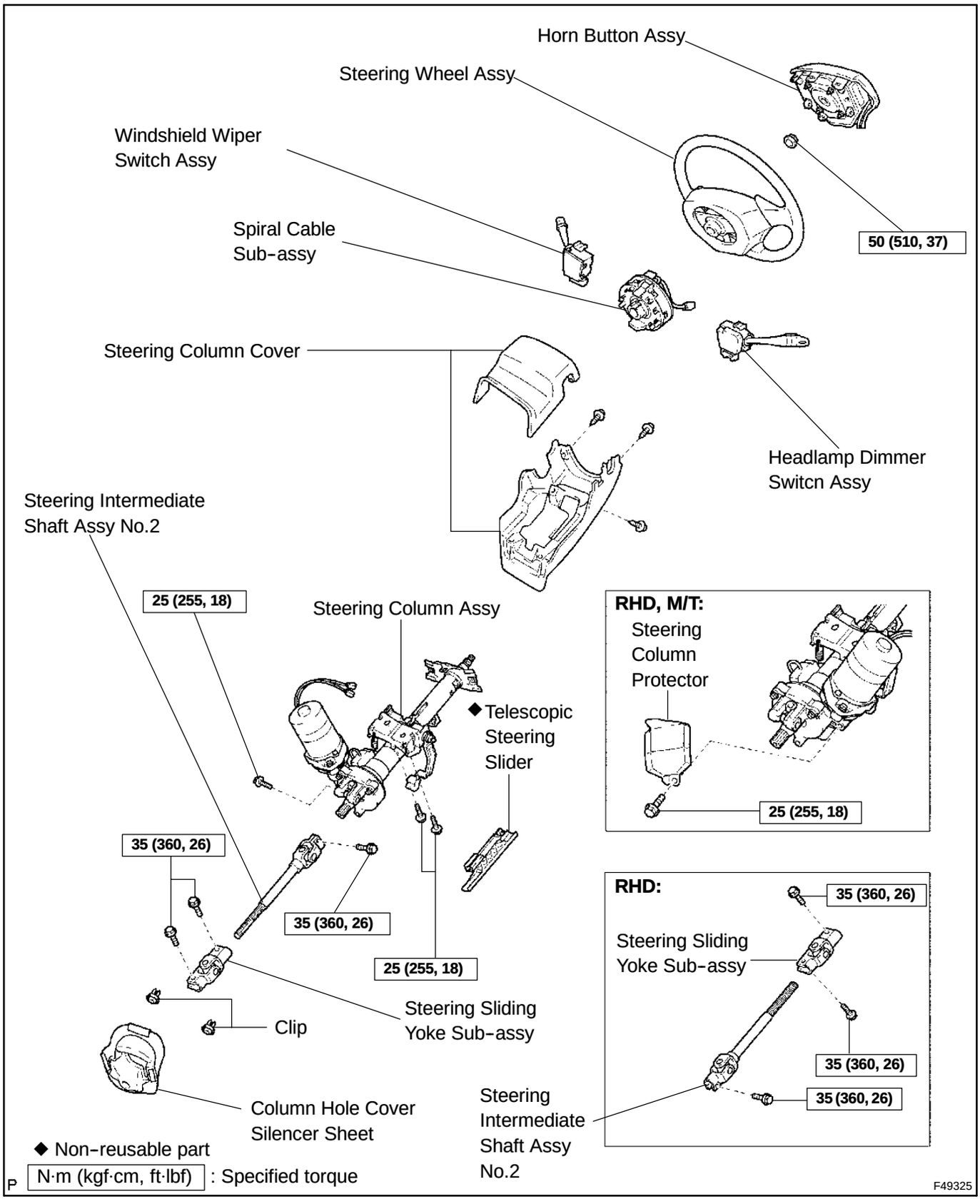
Maximum free play: 30 mm (1.18 in.)

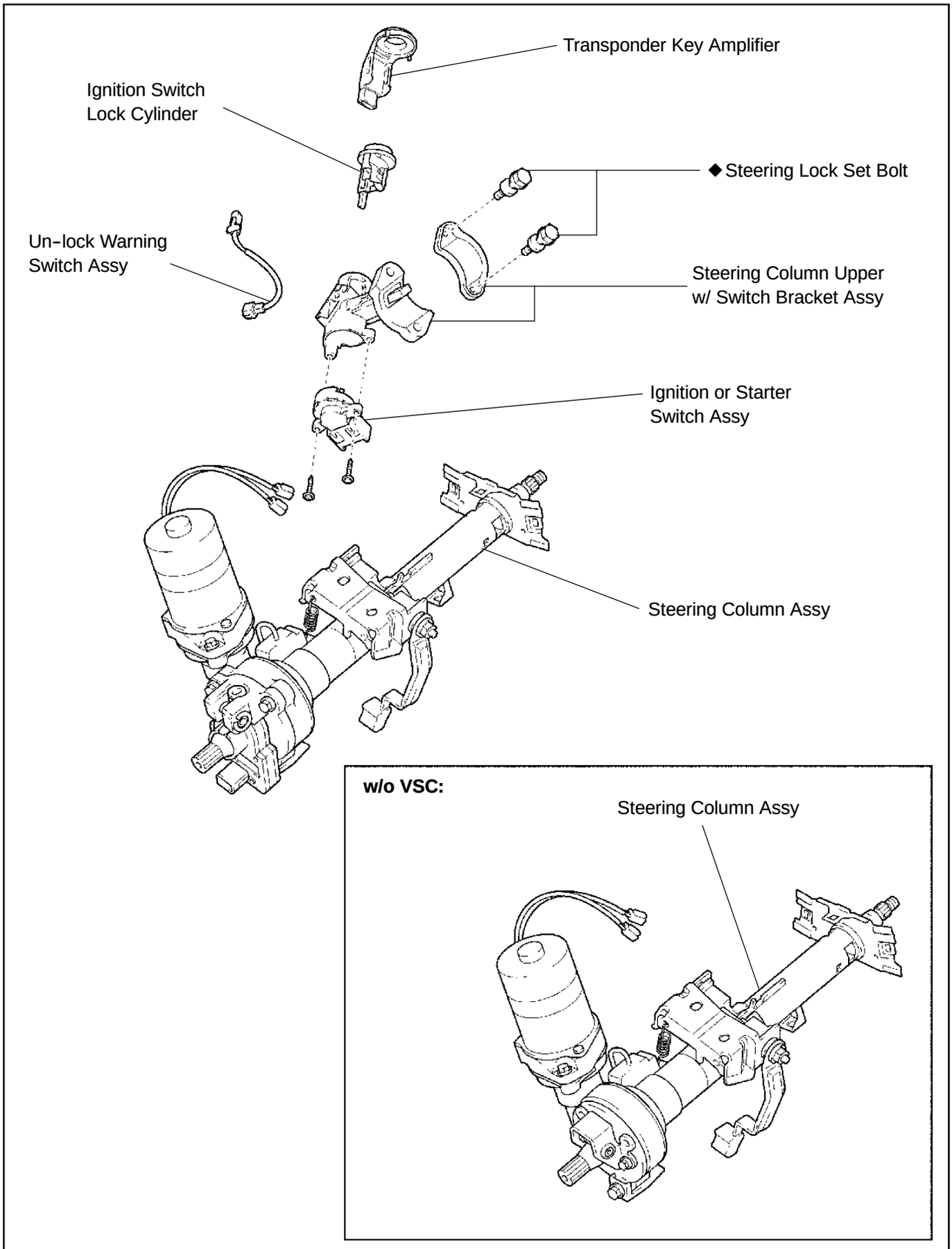
If the free play exceeds the maximum, replace the steering intermediate shaft sub-assy or steering gear.

STEERING COLUMN ASSY

COMPONENTS

500AM-01





◆ Non-reusable part

F49330

5003J-02

OVERHAUL

HINT:

COMPONENTS of the instrument panel: see page 71-1

1. PRECAUTION (SEE PAGE 60-1)

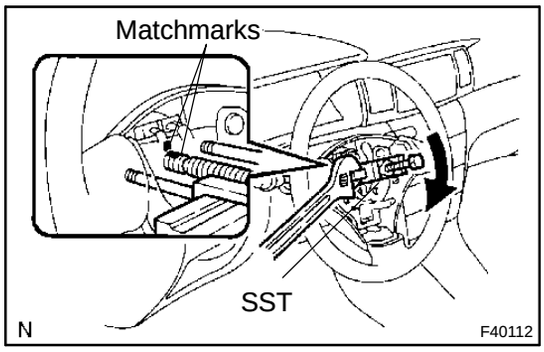
2. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

3. DISCONNECT BATTERY NEGATIVE TERMINAL

4. REMOVE HORN BUTTON ASSY

(a) TMC made (see page 60-21)

(b) TMMT/TMUK made (see page 60-31)



5. REMOVE STEERING WHEEL ASSY

(a) Remove the steering wheel set nut.

(b) Put matchmarks on the steering wheel assy and steering column assy.

(c) Using SST, remove the steering wheel assy from the steering column assy.

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

6. REMOVE STEERING COLUMN COVER

(a) Remove the 2 screws and steering tilt sub lever from the steering column assy.

(b) Remove the 3 screws and steering column cover.

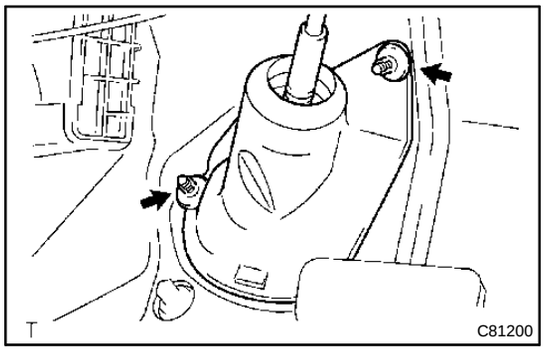
7. REMOVE HEADLAMP DIMMER SWITCH ASSY

8. REMOVE WINDSHIELD WIPER SWITCH ASSY

9. REMOVE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-40)

NOTICE:

Do not disassemble the spiral cable or apply oil to it.



10. REMOVE COLUMN HOLE COVER SILENCER SHEET

(a) Remove the 2 clips and the column hole cover silencer sheet.

11. REMOVE METER HOOD SUB-ASSY (SEE PAGE 71-6)

12. REMOVE COMBINATION METER ASSY (SEE PAGE 71-6)

13. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2 (SEE PAGE 71-6)

14. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1 (SEE PAGE 71-6)

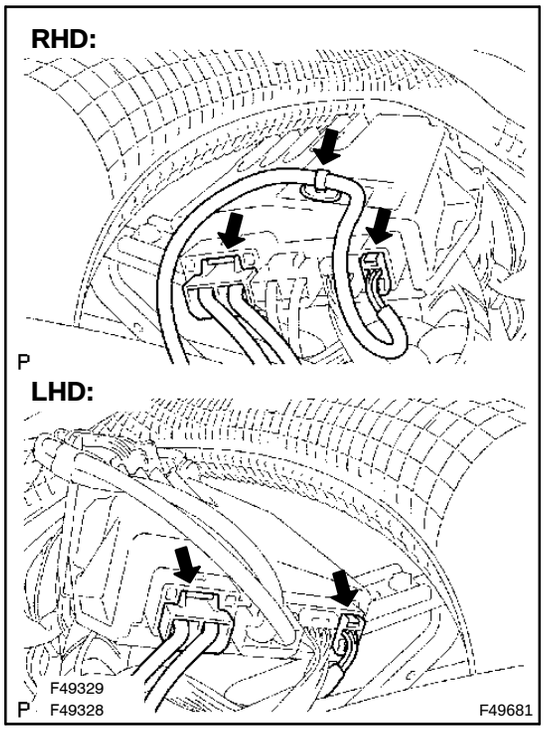
15. REMOVE FRONT ASH RECEPTACLE BOX SUB-ASSY (SEE PAGE 71-6)

16. REMOVE SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE) (SEE PAGE 71-6)

17. REMOVE CONSOLE PANEL UPPER (SEE PAGE 71-6)

18. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (MANUAL AIR CONDITIONING) (SEE PAGE 71-6)

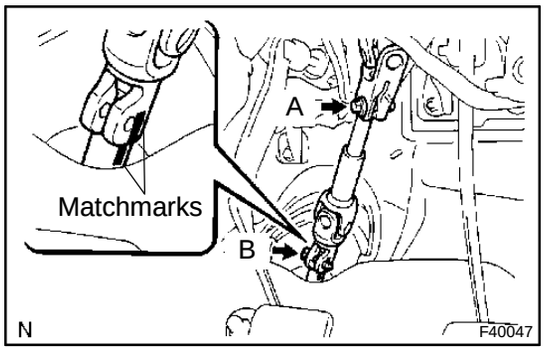
19. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (AUTO AIR CONDITIONING)** **(SEE PAGE 71-6)**
20. **REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER** **(SEE PAGE 71-6)**
21. **REMOVE GLOVE COMPARTMENT DOOR ASSY** **(SEE PAGE 71-6)**
22. **REMOVE FRONT PILLAR GARNISH RH** **(SEE PAGE 71-6)**
23. **REMOVE FRONT PILLAR GARNISH LH** **(SEE PAGE 71-6)**
24. **DISCONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR** **(SEE PAGE 60-43)**
25. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER** **(SEE PAGE 71-6)**



26. SEPARATE POWER STEERING ECU ASSY

(a) RHD:
Separate the wire harness clamp from the power steering ECU assy.

(b) Disconnect the 2 connecters from the power steering ECU assy.

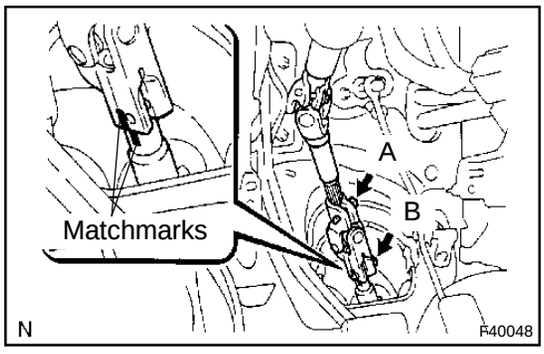


27. REMOVE STEERING INTERMEDIATE SHAFT ASSY NO.2 (RHD STEERING POSITION TYPE)

(a) Put matchmarks on the intermediate shaft assy No.2 and steering intermediate shaft.

(b) Loosen bolt A and remove bolt B, then disconnect the intermediate shaft assy No.2.

(c) Remove bolt A and the steering intermediate shaft assy No.2.

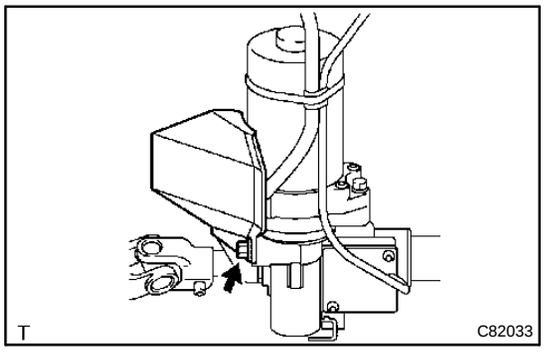


28. REMOVE STEERING SLIDING YOKE SUB-ASSY (LHD STEERING POSITION TYPE)

(a) Put matchmarks on the steering sliding yoke sub-assy and steering intermediate shaft.

(b) Loosen bolt A and remove bolt B, then disconnect the steering sliding yoke sub-assy.

(c) Remove bolt A and the steering sliding yoke sub-assy.



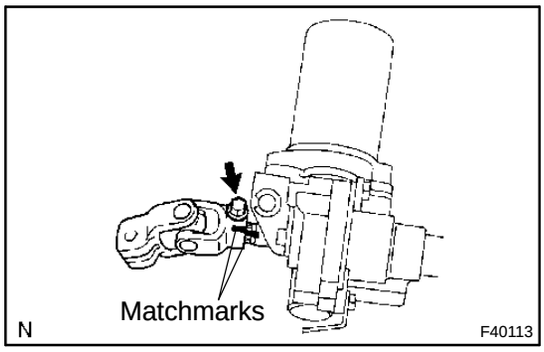
29. REMOVE STEERING COLUMN ASSY

(a) Remove telescopic steering slider.

(b) RHD, M/T:
Remove the bolt and the steering column protector from the steering column assy.

(c) Disconnect the connectors and wire harness clamps from the steering column assy.

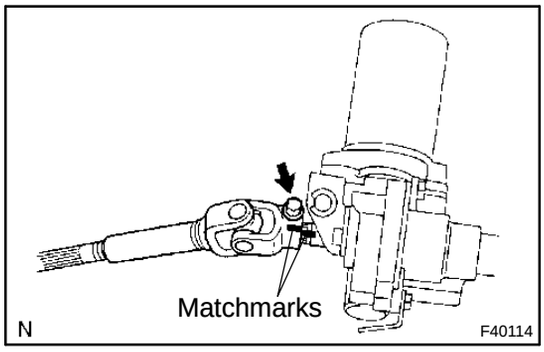
(d) Remove the 3 bolts and steering column assy.



30. REMOVE STEERING SLIDING YOKE SUB-ASSY (RHD STEERING POSITION TYPE)

(a) Put matchmarks on the steering sliding yoke sub-assy and steering column assy.

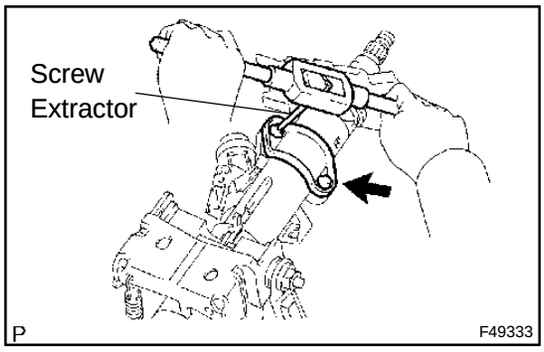
(b) Remove the bolt and steering sliding yoke sub-assy from the steering column assy.



31. REMOVE STEERING INTERMEDIATE SHAFT ASSY NO.2 (LHD STEERING POSITION TYPE)

(a) Put matchmarks on the steering intermediate shaft assy No.2 and steering column assy.

(b) Remove the bolt and steering intermediate shaft assy No.2 from the steering column assy.

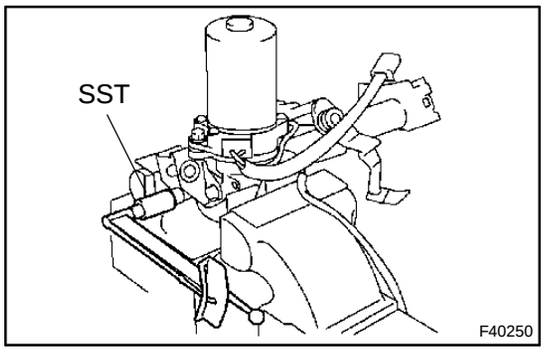


32. REMOVE STEERING COLUMN UPPER W/ SWITCH BRACKET ASSY

(a) Using a centering punch, mark the center of the 2 steering lock set bolts.

(b) Using a 3 to 4 mm (0.12 to 0.16 in.) drill, drill into the 2 steering lock set bolts.

(c) Using a screw extractor, remove the 2 steering lock set bolts and steering column upper w/ switch bracket assy from the steering column assy.

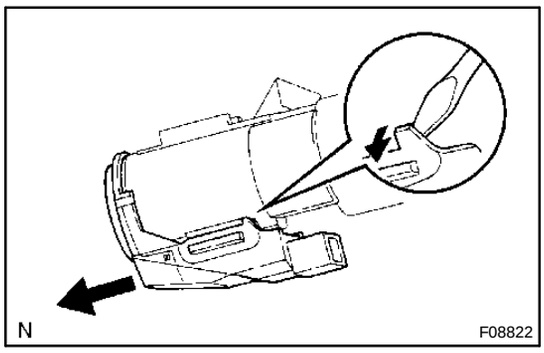


33. INSPECT STEERING COLUMN ASSY

(a) Using SST and a torque wrench, check the rotating torque.
SST 09616-00011
Rotating torque (2 sec./turn):
0.4 to 1.1 N·m (4 to 11 kgf·cm, 3.5 to 9.5 in.·lbf)

(b) If rotating torque is out of specification, replace the steering column assy with a new one.

NOTICE:
Do not apply excessive force to the motor part.



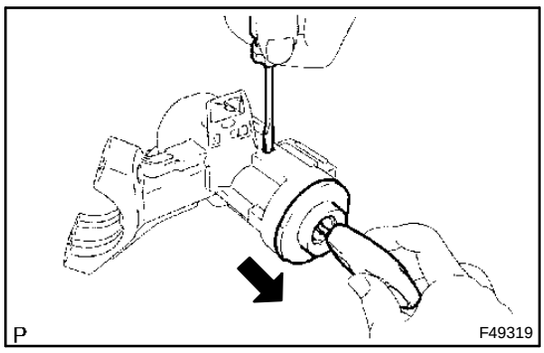
34. REMOVE TRANSPONDER KEY AMPLIFIER

(a) Using a screwdriver, widen the claw hanging onto the steering column upper bracket assy by approximately 1.0 mm (0.039 in.) .

(b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

NOTICE:

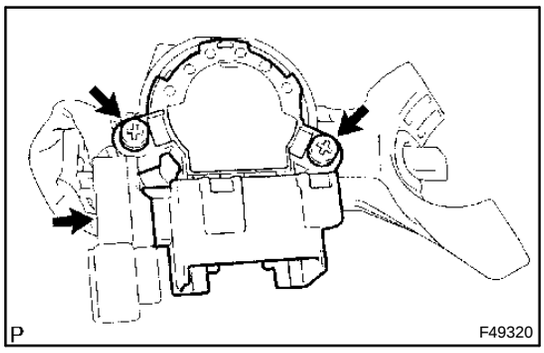
Take care not to use excessive force to prevent the case from being damaged.



35. REMOVE IGNITION SWITCH LOCK CYLINDER ASSY

(a) Place the ignition switch lock cylinder assy in the ACC position.

(b) Push down the stop pin with a screwdriver, and pull out the cylinder assy.



36. REMOVE IGNITION OR STARTER SWITCH ASSY

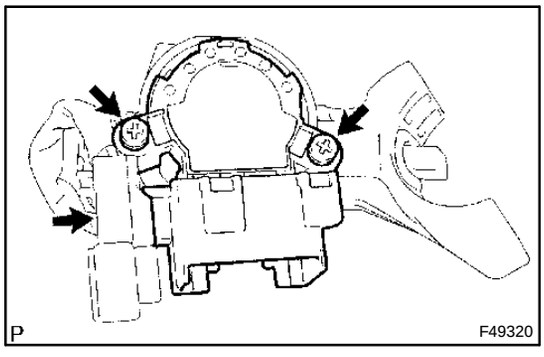
(a) Remove the un-lock warning switch connecter from the ignition or starter switch assy.

(b) Remove the 2 screws and ignition or starter switch assy.

37. REMOVE UN-LOCK WARNING SWITCH ASSY

(a) Slide the unlock warning switch assy out of the steering column upper bracket.

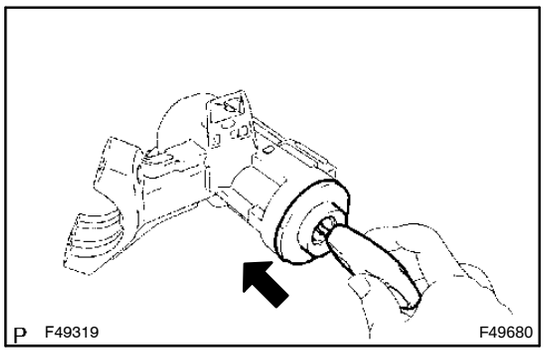
38. INSTALL UN-LOCK WARNING SWITCH ASSY



39. INSTALL IGNITION OR STARTER SWITCH ASSY

(a) Install the ignition or starter switch assy with the 2 screws.

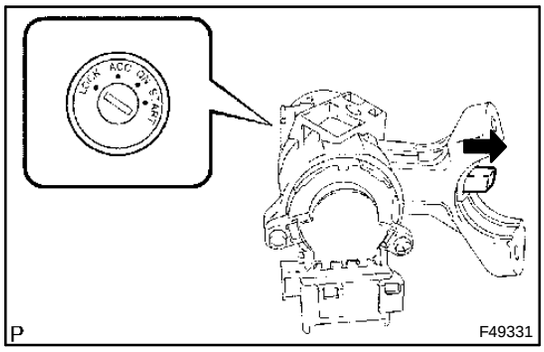
(b) Install the un-lock warning switch connecter to the ignition or starter switch assy.



40. INSTALL IGNITION SWITCH LOCK CYLINDER ASSY

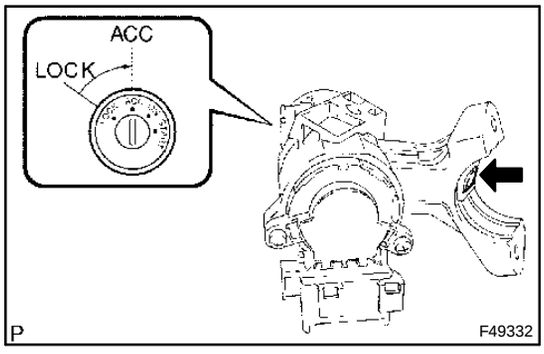
(a) Make sure the ignition switch lock cylinder assy is in the ACC position.

(b) Install the ignition switch lock cylinder assy to the steering column upper bracket assy.

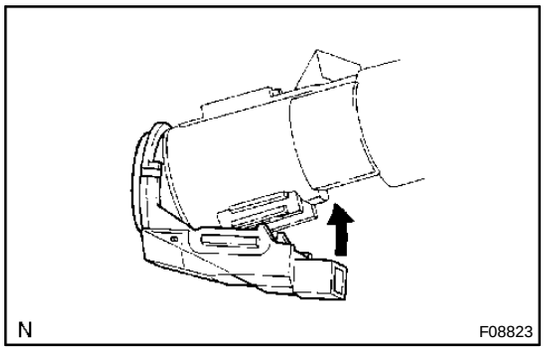


41. INSPECT STEERING LOCK OPERATION

(a) Check that the steering lock mechanism is activated when removing the key.



(b) Check that the steering lock mechanism is deactivated when inserting the key and turning it to the ACC position.



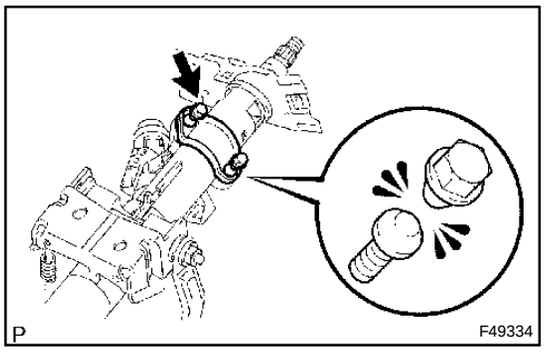
42. INSTALL TRANSPONDER KEY AMPLIFIER

(a) Align the transponder key amplifier with the installation position of the steering column upper bracket assy with the amplifier inclined.

(b) Push on the transponder key amplifier and connect it to the upper bracket.

NOTICE:

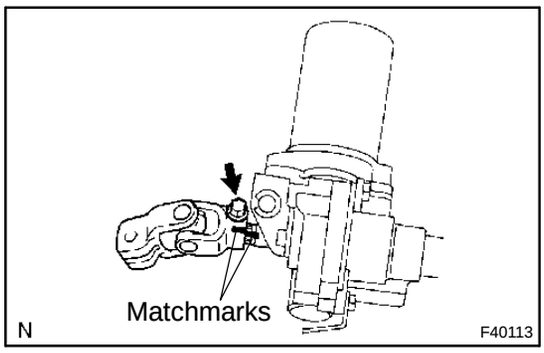
Take care not to push the amplifier with excessive force to prevent it from being damaged.



43. INSTALL STEERING COLUMN UPPER W/ SWITCH BRACKET ASSY

(a) Temporarily install the steering column upper w/ switch bracket assy with 2 new steering lock set bolts.

(b) Tighten the 2 steering lock set bolts until the bolt heads break off.

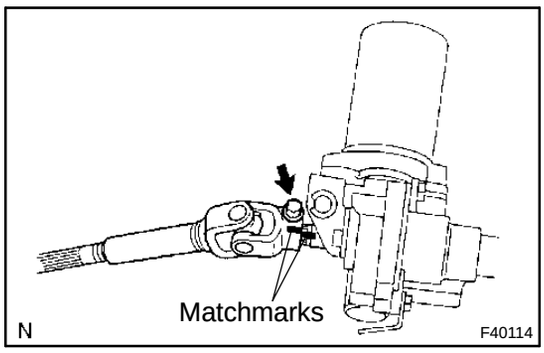


44. INSTALL STEERING SLIDING YOKE SUB-ASSY (RHD STEERING POSITION TYPE)

(a) Align the matchmarks on the steering sliding yoke and steering column assy.

(b) Install the steering sliding yoke with the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

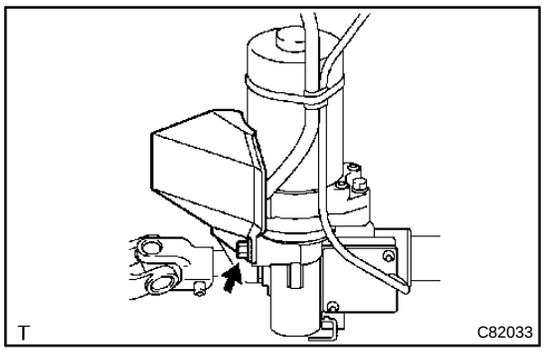


45. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2 (LHD STEERING POSITION TYPE)

(a) Align the matchmarks on the steering intermediate shaft assy No.2 and steering column assy.

(b) Install the steering intermediate shaft assy No.2 with the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)



46. INSTALL STEERING COLUMN ASSY

(a) Install the steering column assy with the 3 bolts.

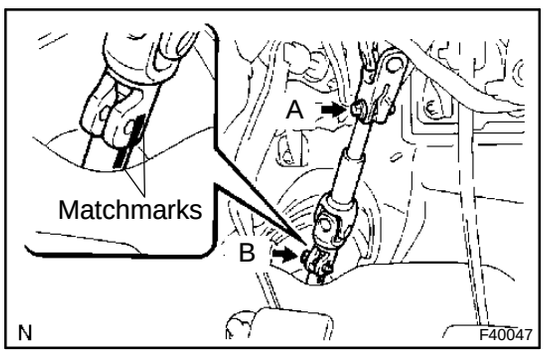
Torque:
25 N·m (255 kgf·cm, 18 ft·lbf)

(b) RHD, M/T:
Install the steering column protector with the bolt.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

(c) Connect the connectors and wire harness clamps to the steering column assy.

(d) Install new telescopic steering slider.



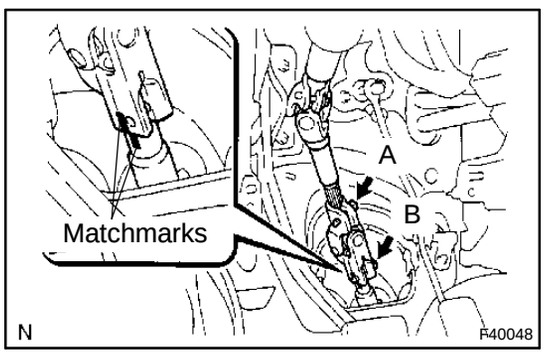
47. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2 (RHD STEERING POSITION TYPE)

(a) Temporarily install the steering intermediate shaft assy No.2 with bolt A.

(b) Align the matchmarks on the intermediate shaft assy No.2 and steering intermediate shaft.

(c) Install bolt B and tighten bolt A.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)



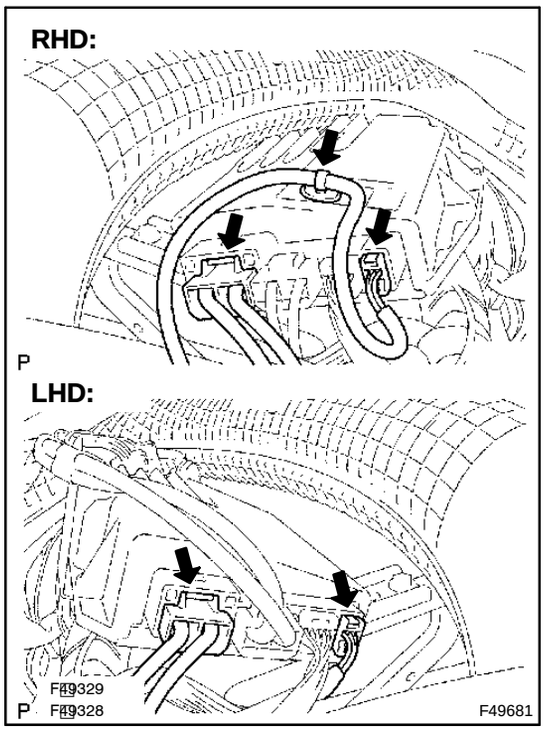
48. INSTALL STEERING SLIDING YOKE SUB-ASSY (LHD STEERING POSITION TYPE)

(a) Temporarily install the steering sliding yoke with bolt A.

(b) Align the matchmarks on the sliding yoke and steering intermediate shaft.

(c) Install bolt B and tighten bolt A.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

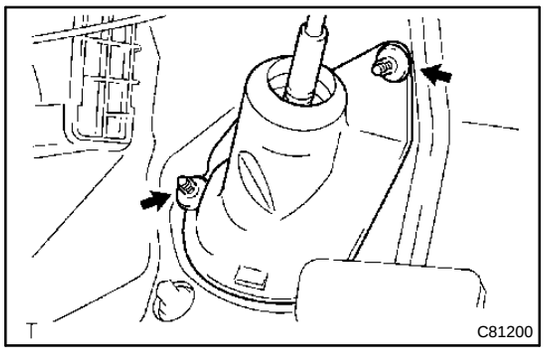


49. CONNECT POWER STEERING ECU ASSY

(a) Connect the 2 connecters to the power steering ECU assy.

(b) RHD:
Install the wire harness clamp to the power steering ECU assy.

50. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-6)
51. CONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR (SEE PAGE 60-43)
52. INSTALL FRONT PILLAR GARNISH LH
53. INSTALL FRONT PILLAR GARNISH RH
54. INSTALL GLOVE COMPARTMENT DOOR ASSY
55. INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER
56. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (AUTO AIR CONDITIONING)
57. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (MANUAL AIR CONDITIONING)
58. INSTALL CONSOLE PANEL UPPER
59. INSTALL SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE)
60. INSTALL FRONT ASH RECEPTACLE BOX SUB-ASSY
61. INSTALL INSTRUMENT PANEL REGISTER ASSY NO.1
62. INSTALL INSTRUMENT PANEL REGISTER ASSY NO.2
63. INSTALL COMBINATION METER ASSY
64. INSTALL METER HOOD SUB-ASSY



65. INSTALL COLUMN HOLE COVER SILENCER SHEET

(a) Install the column hole cover silencer sheet with the 2 clips.

66. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

67. INSTALL SPIRAL CABLE SUB–ASSY (SEE PAGE 60–40)

68. INSTALL WINDSHIELD WIPER SWITCH ASSY

69. INSTALL HEADLAMP DIMMER SWITCH ASSY

70. INSTALL STEERING COLUMN COVER

(a) Install the steering column cover with the 3 screws.

(b) Install the steering tilt sub lever with the 2 screws.

71. CENTER SPIRAL CABLE (SEE PAGE 60–40)

72. INSTALL STEERING WHEEL ASSY

(a) Align the matchmarks on the steering wheel and main shaft assembly.

(b) Install the steering wheel set nut.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

73. INSTALL HORN BUTTON ASSY

(a) TMC made (see page 60–21)

(b) TMMT/TMUK made (see page 60–31)

74. INSPECT STEERING WHEEL CENTER POINT

75. CONNECT BATTERY NEGATIVE TERMINAL

76. INSPECT SRS WARNING LIGHT (SEE PAGE 60–1)

77. PERFORM CALIBRATION OF TORQUE SENSOR ZERO POINT

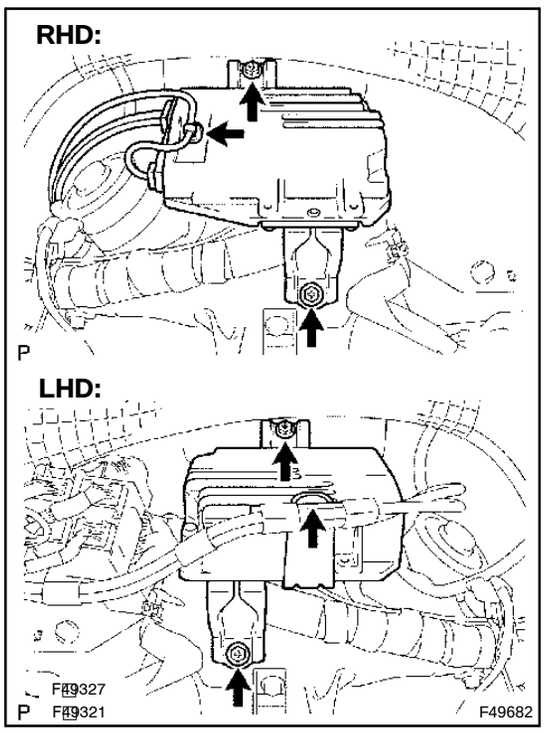
(SEE PUB. No. RM925E, PAGE 05–822)

POWER STEERING ECU ASSY

REPLACEMENT

500AN-01

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. REMOVE METER HOOD SUB-ASSY (SEE PAGE 71-6)
3. REMOVE COMBINATION METER ASSY (SEE PAGE 71-6)
4. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2 (SEE PAGE 71-6)
5. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1 (SEE PAGE 71-6)
6. REMOVE FRONT ASH RECEPTACLE BOX SUB-ASSY (SEE PAGE 71-6)
7. REMOVE SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE)
8. REMOVE CONSOLE PANEL UPPER (SEE PAGE 71-6)
9. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (MANUAL AIR CONDITIONING) (SEE PAGE 71-6)
10. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (AUTO AIR CONDITIONING) (SEE PAGE 71-6)
11. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER (SEE PAGE 71-6)
12. REMOVE GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-6)
13. REMOVE FRONT PILLAR GARNISH RH (SEE PAGE 71-6)
14. REMOVE FRONT PILLAR GARNISH LH (SEE PAGE 71-6)
15. DISCONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR (SEE PAGE 60-43)
16. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-6)

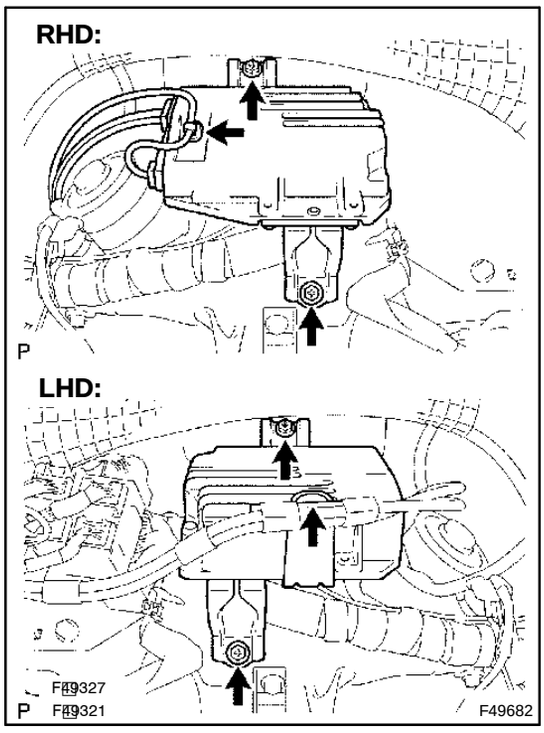


17. REMOVE POWER STEERING ECU ASSY

(a) Separate the wire harness clamp from the power steering ECU assy.

(b) Disconnect the 4 connectors from the power steering ECU assy.

(c) Remove the 2 screws and the power steering ECU assy.



18. INSTALL POWER STEERING ECU ASSY

(a) Install the power steering ECU assy with the 2 screws.

Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

If the screws fail to secure the power steering ECU assy, use oversize screws for repair.

Part No. 90159–70003

(b) Connect the 4 connectors to the power steering ECU assy.

(c) Install the wire harness clamp to the power steering ECU assy.

19. INSTALL INSTRUMENT PANEL SUB–ASSY UPPER (SEE PAGE 71–6)
20. CONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR (SEE PAGE 60–43)
21. INSTALL FRONT PILLAR GARNISH LH
22. INSTALL FRONT PILLAR GARNISH RH
23. INSTALL GLOVE COMPARTMENT DOOR ASSY
24. INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB–ASSY LOWER CENTER
25. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (AUTO AIR CONDITIONING)
26. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (MANUAL AIR CONDITIONING)
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30. INSTALL INSTRUMENT PANEL REGISTER ASSY NO.1
31. INSTALL INSTRUMENT PANEL REGISTER ASSY NO.2
32. INSTALL COMBINATION METER ASSY
33. INSTALL METER HOOD SUB–ASSY
34. CONNECT BATTERY NEGATIVE TERMINAL
35. INSPECT SRS WARNING LIGHT (SEE PAGE 60–14)
36. PERFORM CALIBRATION OF TORQUE SENSOR ZERO POINT (SEE PUB. No. RM925E, PAGE 05–822)

HEATER & AIR CONDITIONER

REFRIGERANT 55–1
ON–VEHICLE INSPECTION 55–1/6
REPLACEMENT 55–7/8
REFRIGERANT LINE 55–9
COMPONENTS 55–9/12
HEATER CONTROL & ACCESSORY ASSY 55–13
OVERHAUL 55–13/15
AIR CONDITIONING RADIATOR ASSY 55–16
COMPONENTS 55–16/17
OVERHAUL 55–18/29
BLOWER ASSY 55–30
COMPONENTS 55–30
OVERHAUL 55–31/35
COOLER COMPRESSOR ASSY (ZZ E/G Series) 55–36
COMPONENTS 55–36
REPLACEMENT 55–37/41
COOLER COMPRESSOR ASSY (1CD–FTV) 55–42
COMPONENTS 55–42
REPLACEMENT 55–43/47
W/RECEIVER CONDENSER ASSY 55–48
ON–VEHICLE INSPECTION 55–48
COMPONENTS 55–49
OVERHAUL 55–50/53
HEATER ASSY 55–54
REPLACEMENT 55–54/55
COOLER STABILIZER AMPLIFIER ASSY 55–56
REPLACEMENT 55–56

REFER TO COROLLA REPAIR MANUAL (Pub. No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

REFRIGERANT

ON-VEHICLE INSPECTION

551FQ-01

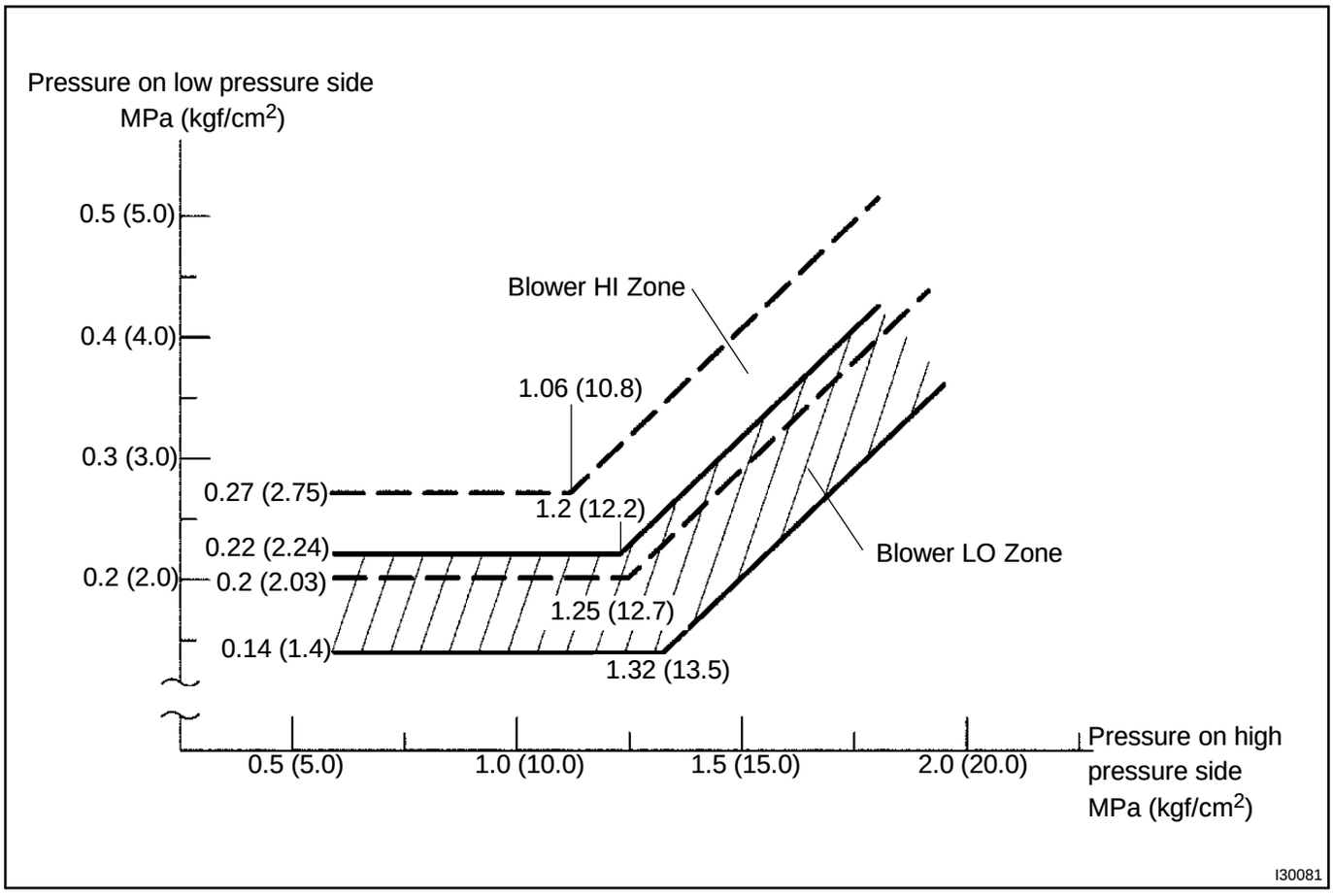
1. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

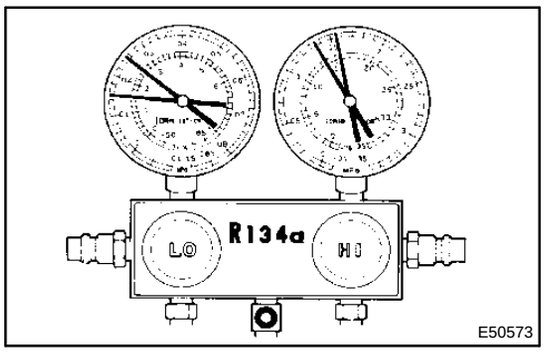
(a) This is a method to specify the trouble area by using a manifold gauge set. Read the manifold gauge pressure when the following conditions are fulfilled.

Test conditions:

- Engine has been warmed up.
- All doors are fully open.
- A/C switch is ON.
- Engine is running at 1,500 rpm.
- Air inlet mode selector damper is at recirculation.
- Temperature control switch is at "MAX. COLD".
- Blower speed control switch is at "HI".
- Temperature at the air inlet is 30 to 35˚C (86 to 95˚F).

Gauge readings (Reference)



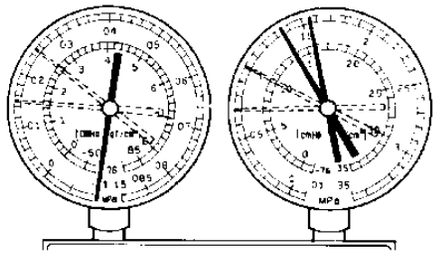


(1) When the refrigerant volume is proper:

Gauge reading:
Low pressure side:
0.15 to 0.25 MPa (1.5 to 2.5 kgf/cm^2)
High pressure side:
1.37 to 1.57 MPa (14 to 16 kgf/cm^2)

(2) When there is moisture in the refrigeration system:

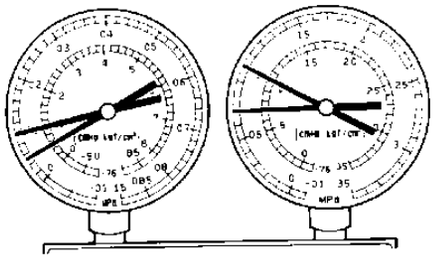
Condition: Air conditioning system periodically repeats proper and improper function.



Symptom	Probable cause	Diagnosis	Corrective Actions
During operation, pressure on low pressure side cycles between normal and vacuum	Moisture in refrigeration system freezes at expansion valve orifice, causing a temporary stop of cycle. However, when it melts, normal state is restored	• Drier is overly saturated • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	3. Replace cooler drier 4. Remove moisture in cycle by repeatedly evacuating air 5. Supply proper amount of new refrigerant

(3) When cooling is insufficient:

Condition: Air conditioning system does not function effectively.

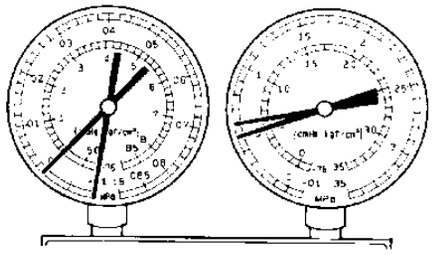


I22118

Symptom	Probable cause	Diagnosis	Corrective Actions
• Pressure is low on both low and high pressure sides • Cooling performance is insufficient	Gas leakage in refrigeration system	• Insufficient refrigerant • Refrigerant leakage	1. Check for gas leakage and repair if necessary 2. Supply proper amount of new refrigerant 3. If indicated pressure value is close to 0 when connected to the gauge, create a vacuum after inspecting and repairing the location of leakage.

(4) When the circulation of the refrigerant is poor:

Condition: Air conditioning system does not function effectively.

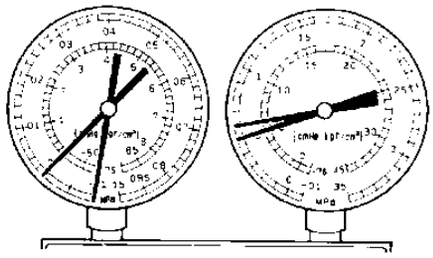


I22119

Symptom	Probable cause	Diagnosis	Corrective Action
• Pressure is low on both low and high pressure sides • Frost exists on piping from condenser to A/C unit	Refrigerant flow is obstructed by dirt in condenser	Condenser is clogged	Replace condenser

(5) When the refrigerant does not circulate:

Condition: Air conditioning system does not function. (Sometimes it may function)

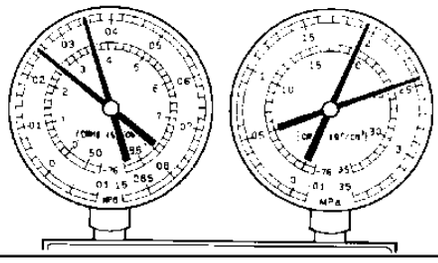


I22120

Symptom	Probable cause	Diagnosis	Corrective Actions
• Vacuum is indicated on low pressure side, and extreamly low pressure is indicated on high pressure side • Frost or condensation is seen on piping on both sides of condenser or expansion valve	• Refrigerant flow is obstructed by moisture or dirt in refrigeration system • Refrigerant flow is obstructed by gas leak from expansion valve	Refrigerant does not circulate	1. Check the expansion valve 2. Clean out dirt on expansion valve by blowing air 3. Replace condenser 4. Evaporate air and supply proper amount of new refrigerant 5. For gas leakage from expansion valve, replace expansion valve

(6) When the refrigerant is overcharged or cooling of condenser is insufficient:

Condition: Air conditioning system does not function effectively.

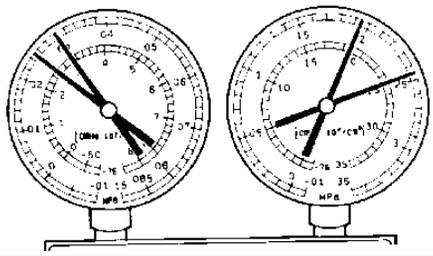


I22121

Symptom	Probable cause	Diagnosis	Corrective Actions
Pressure is extreamly high on both low and high pressure sides	• Excessive refrigerant • Cooling performance of condenser is insufficient	• Excessive refrigerant • Cooling performance of condenser is insufficient	1. Clean condenser 2. Check condenser fan motor operation 3. If 1. and 2. are normal, check the amount of refrigerant and supply proper amount of refrigerant

(7) When there is air in the refrigeration system:

Condition: Air conditioning system does not function.



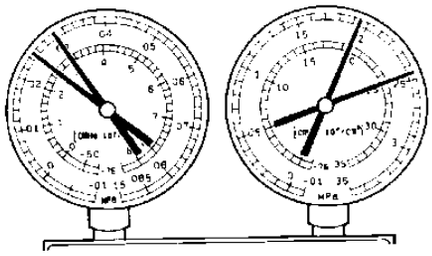
NOTE : These gauge indications occur when the refrigeration system opens and the refrigerant is charged without vacuum purging.

I22122

Symptom	Probable cause	Diagnosis	Corrective Actions
• Pressure is extreamly high on both low and the high pressure sides • The low pressure piping is too hot to touch	Air in refrigeration system	• There is air in refrigeration system • Vacuum purging is insufficient	1. Check if compressor oil is dirty or insufficient 2. Evaporate air and supply new refrigerant

(8) When the expansion valve malfunctions:

Condition : Air conditioning system does not function effectively.

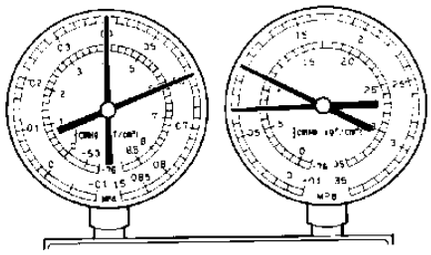


I22123

Symptom	Probable cause	Diagnosis	Corrective Actions
• Pressure is extreamly high on both low and high pressure sides • Frost or condensation is on piping on low pressure side	Trouble with expansion valve	• Excessive refrigerant in low pressure piping • Expansion valve opened too wide	Replace expansion valve

(9) When the compressor is defective:

Condition: Air conditioning system does not function.



I22124

Symptom	Probable cause	Diagnosis	Corrective Actions
• Pressure is extreamly high on both low and high pressure sides • Pressure is extreamly low on high pressure side	Internal leak from compressor	• Compression failure • Leakage from damaged valve or broken sliding parts	Repair or replace compressor

551FR-01

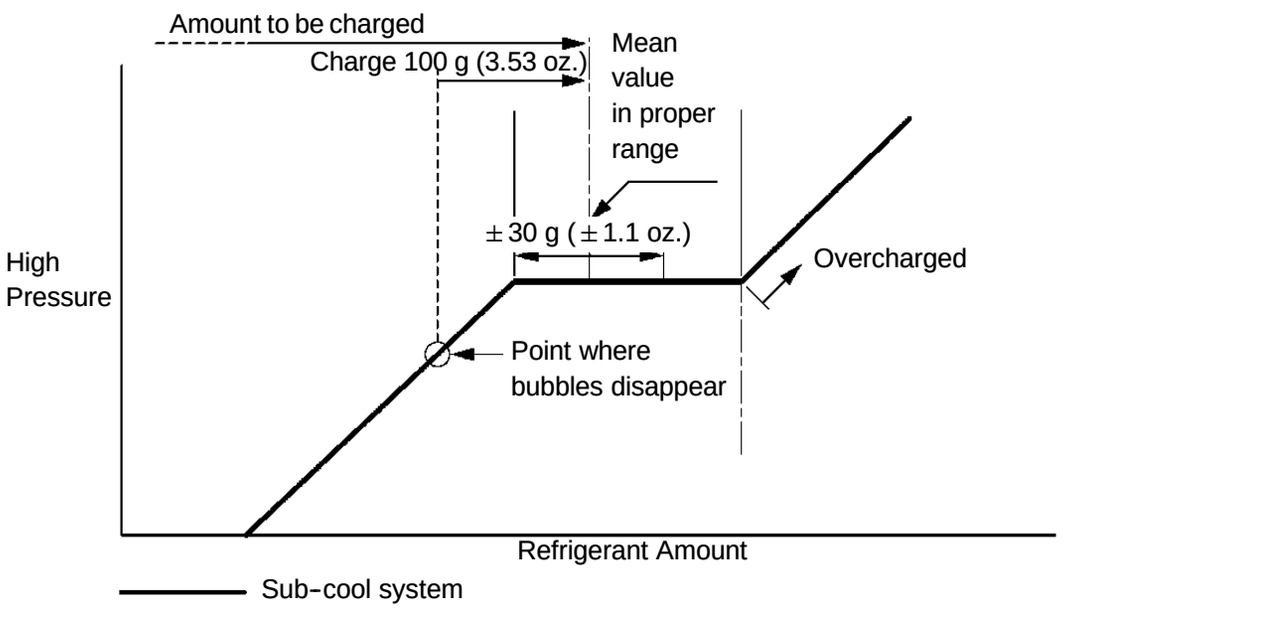
REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

(a) Start up the engine.
(b) Turn the A/C switch on.
(c) Operate the cooler compressor at an engine rpm of approximately 1,000 for 5 to 6 minutes to circulate the refrigerant and collect compressor oil remaining in each component into the cooler compressor as much as possible.
(d) Stop the engine.
(e) Using SST, let the refrigerant gas out.
SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

2. CHARGE REFRIGERANT

(a) Perform vacuum purging using a vacuum pump.
(b) Using SST, charge refrigerant HFC-134a (R134a).
Standard: 450 ± 30 g (15.9 ± 1.1 oz.)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



NOTICE:

- **Do not operate the cooler compressor before charging refrigerant as the cooler compressor doesn't work properly without any refrigerant, which causes the compressor to overheat.**
- **Approximately 100 g (3.53 oz.) of refrigerant may need to be charged after bubbles disappear. The refrigerant amount should be checked by quantity, and not with the sight glass.**

HINT:
Prepare a service can to recharge the refrigerant if using the refrigerant gas collected with the freon collection/recycling device because the collective rate of the device is approximately 90%.

3. WARM UP ENGINE

(a) Warm up the engine at less than 2,000 rpm for 2 minutes or more after charging refrigerant.

NOTICE:

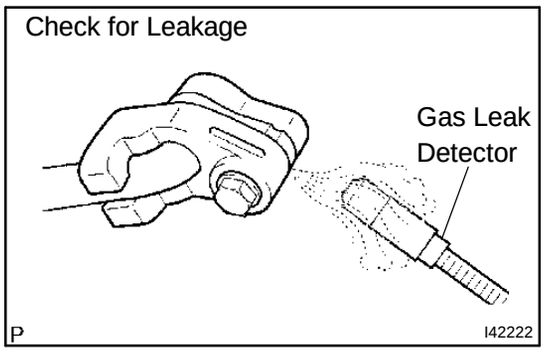
Be sure to warm up the compressor when turning the A/C switch on after removing and installing the cooler refrigerant lines (including the compressor), to prevent damage to the compressor.

4. CHECK FOR LEAKAGE OF REFRIGERANT

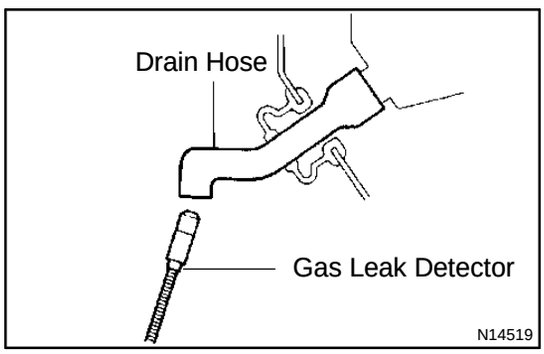
(a) After recharging the refrigerant gas, check for leakage of refrigerant gas using a halogen leak detector.

(b) Perform in these conditions:

- Stop the engine.
- Secure good ventilation (if the gas leak detector may 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 to 588 kPa (4 to 6 kgf/cm^2, 57 to 85 psi)



(c) Using a gas leak detector, check for leakage of the refrigerant line.



(d) Bring the gas leak detector close to the drain hose with the detector's power off.

HINT:

- After the blower motor has stopped, leave the cooling unit for more than 15 minutes.
- Bring the gas leak detector sensor under the drain hose.
- When bringing 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.

(e) If a gas leak is not detected on the drain hose, remove the blower motor control from the cooling unit. Insert the gas leak detector sensor into the unit and perform the test.

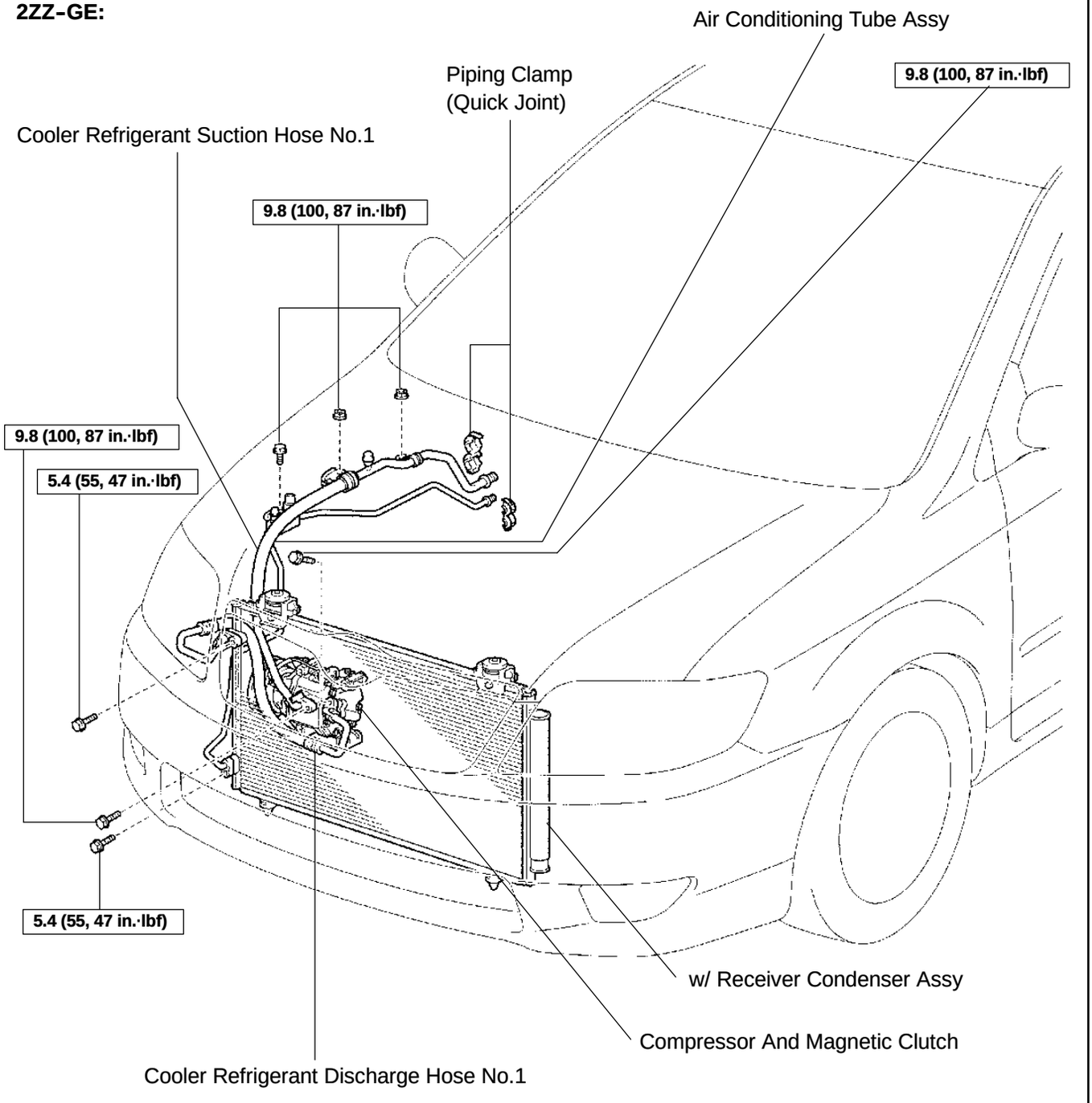
(f) Disconnect the pressure switch connector and leave it for approximately 20 minutes. Bring the gas leak detector close to the pressure switch and perform the test.

REFRIGERANT LINE

COMPONENTS

551FS-01

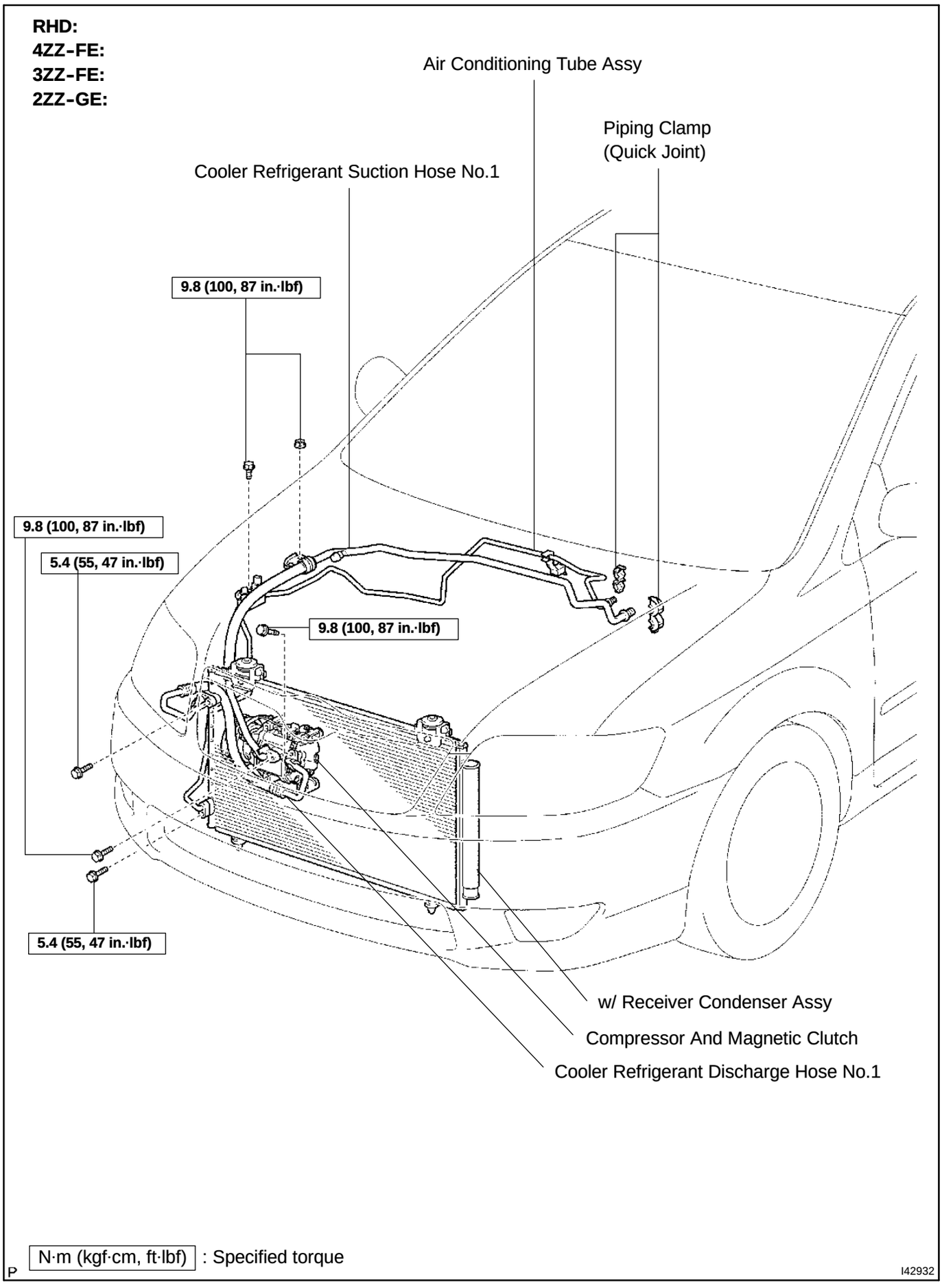
LHD:
4ZZ-FE:
3ZZ-FE:
2ZZ-GE:



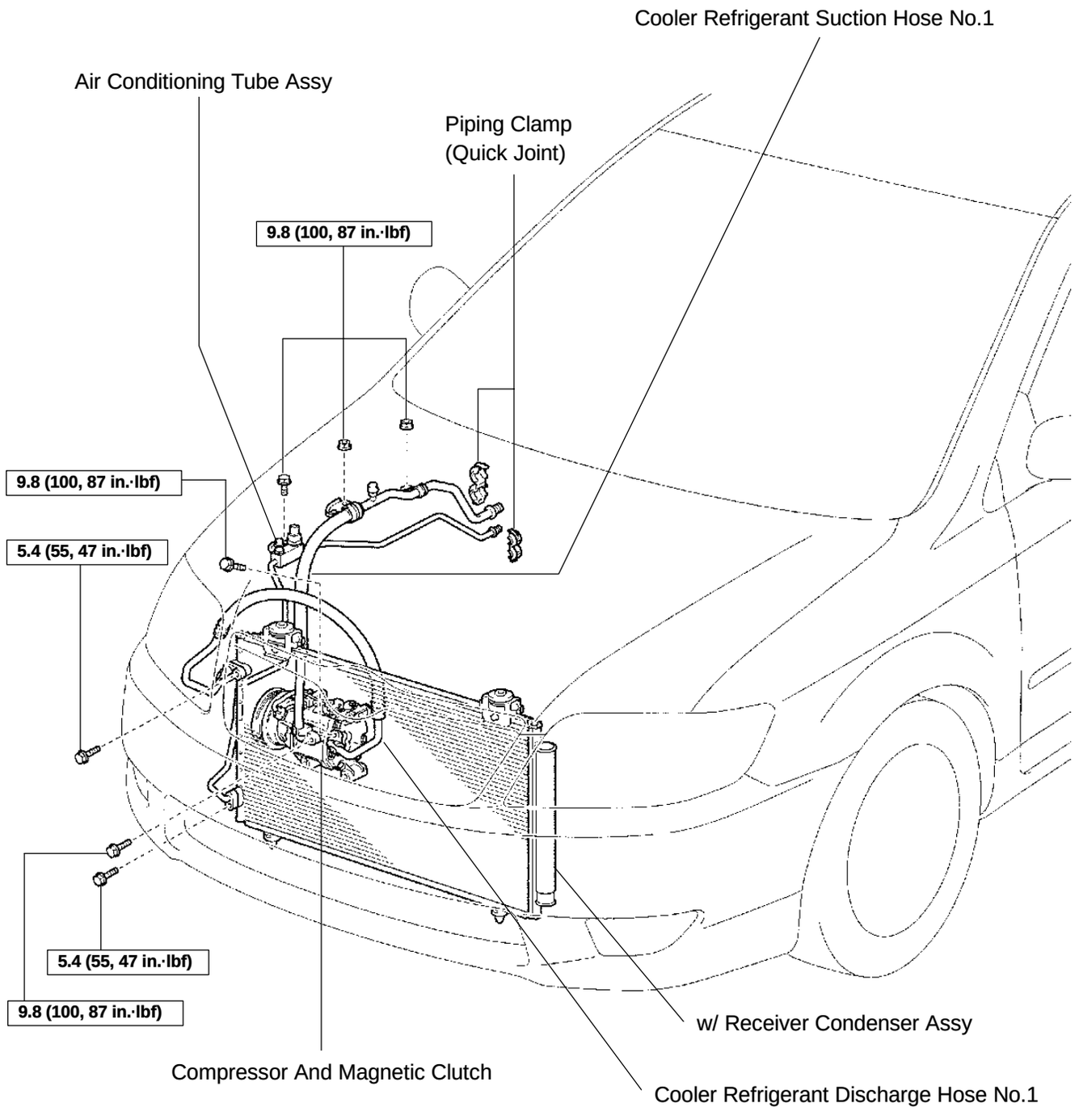
N·m (kgf·cm, ft·lbf) : Specified torque

P

I42931


RHD:
4ZZ-FE:
3ZZ-FE:
2ZZ-GE:
Air Conditioning Tube Assy
Piping Clamp
(Quick Joint)
Cooler Refrigerant Suction Hose No.1
9.8 (100, 87 in.·lbf)
9.8 (100, 87 in.·lbf)
5.4 (55, 47 in.·lbf)
9.8 (100, 87 in.·lbf)
5.4 (55, 47 in.·lbf)
w/ Receiver Condenser Assy
Compressor And Magnetic Clutch
Cooler Refrigerant Discharge Hose No.1
N·m (kgf·cm, ft·lbf) : Specified torque
P
I42932

LHD:
1CD-FTV:

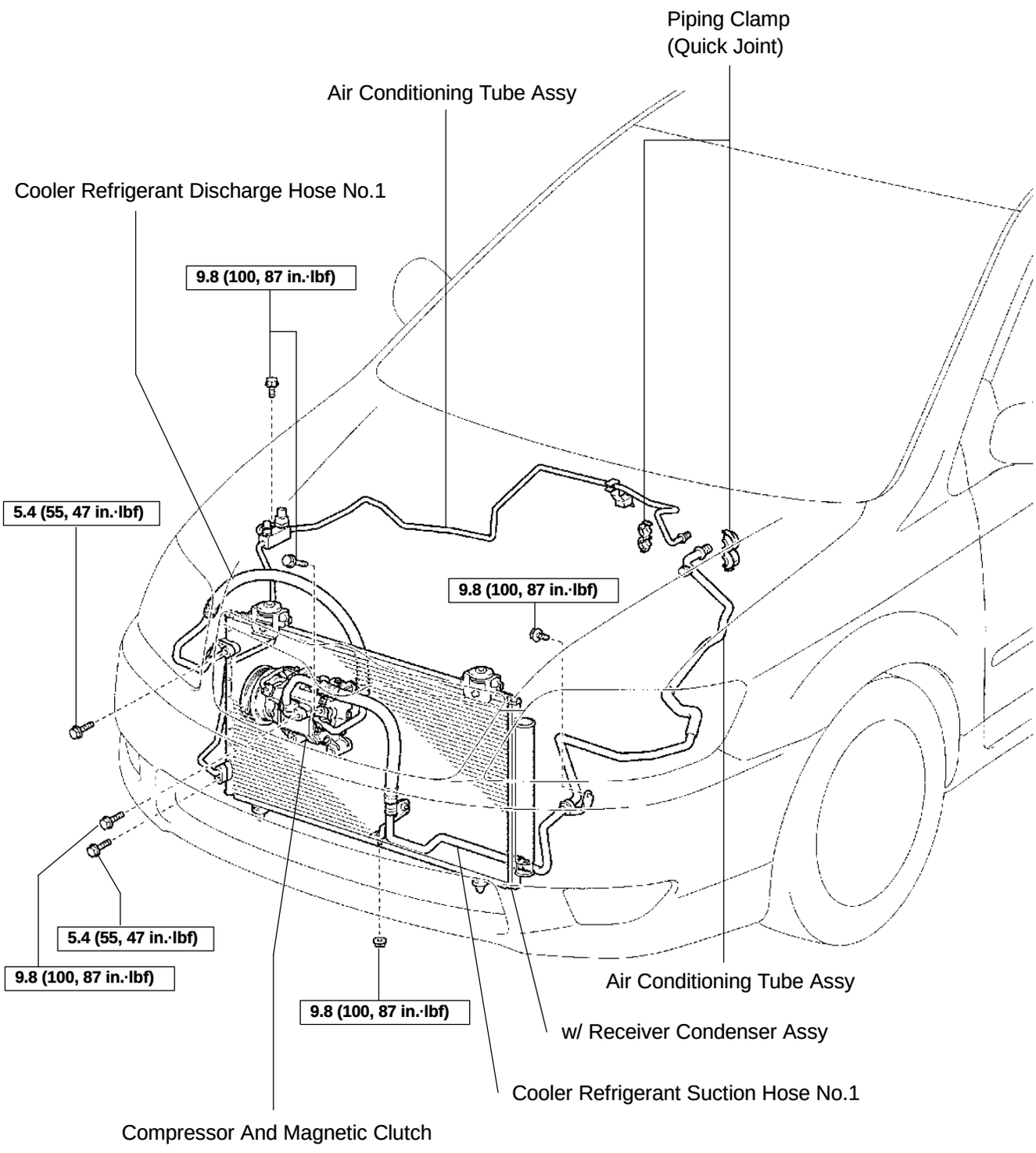


N·m (kgf·cm, ft·lbf) : Specified torque

P

I42933

RHD:
1CD-FTV:



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

P

I42934

HEATER CONTROL & ACCESSORY ASSY

OVERHAUL

551FT-01

HINT:

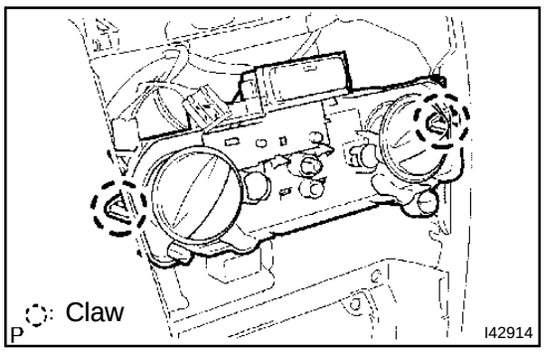
Installation is in the reverse order of removal.

1. REMOVE CONSOLE PANEL UPPER **(SEE PAGE 71-6)**

2. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER **(SEE PAGE 71-6)**

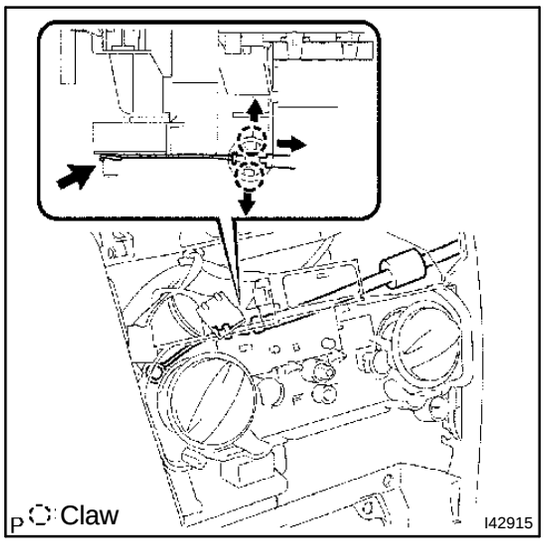
3. REMOVE COOLER SWITCH (W/ AIR CONDITIONING)

(a) Remove the cooler switch from the instrument cluster finish panel assy center.



4. REMOVE HEATER CONTROL & ACCESSORY ASSY

(a) Release the 2 claws and disconnect the heater control & accessory assy.



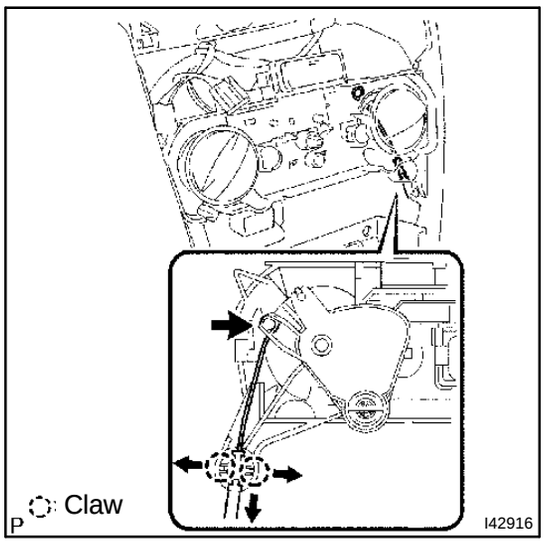
(b) Using a screwdriver, open the 2 claws of the cable clamp and disconnect the defroster damper control cable sub-assy.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the defroster damper control cable sub-assy operation may be affected.**

HINT:

Tape up the screwdriver tip before use.



(c) Using a screwdriver, open the 2 claws of the cable clamp and disconnect the air mix damper control cable sub-assy.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the air mix damper control cable sub-assy operation may be affected.**

HINT:

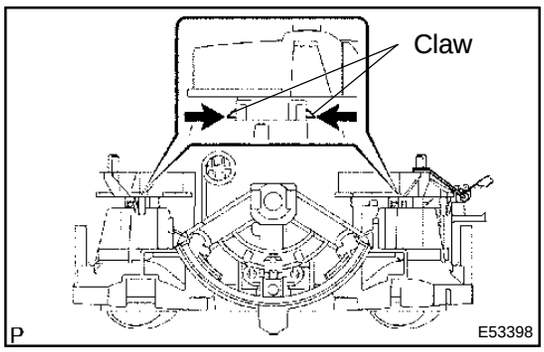
Tape up the screwdriver tip before use.

(d) Disconnect the connector and remove the heater control & accessory assy.

5. REMOVE HEATER BLOWER SWITCH ASSY

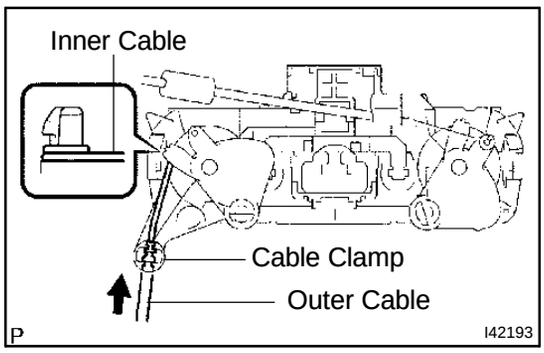
6. REMOVE AIR CONDITIONING CONTROL BULB

(a) Remove the 2 air conditioning control bulbs.



7. REMOVE HEATER CONTROL KNOB

(a) Release the 2 claws and remove the 2 heater control knobs.



8. INSTALL HEATER CONTROL & ACCESSORY ASSY

(a) Install the inner cable end of the air mix damper control cable sub-assy on the heater control & accessory assy.

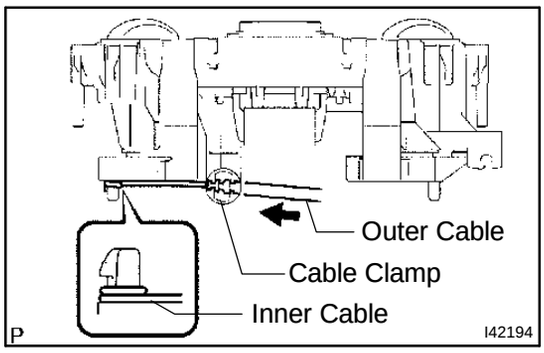
(b) Install the outer cable of the air mix damper control cable sub-assy on the cable clamp.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the air mix control cable operation may be affected.**

HINT:

- Operating the heater control knob, check that it properly stops at both ends of MAX. COOL and MAX. HOT and no recoil is identified.
- Check that the outer cable is not disengaged (moved) from the heater control & accessory assy when the cable is pulled.



(c) Install the inner cable end of the defroster damper control cable sub-assy on the heater control & accessory assy.

(d) Install the outer cable of the defroster damper control cable sub-assy on the cable clamp.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the defroster damper control cable sub-assy operation may be affected.**

HINT:

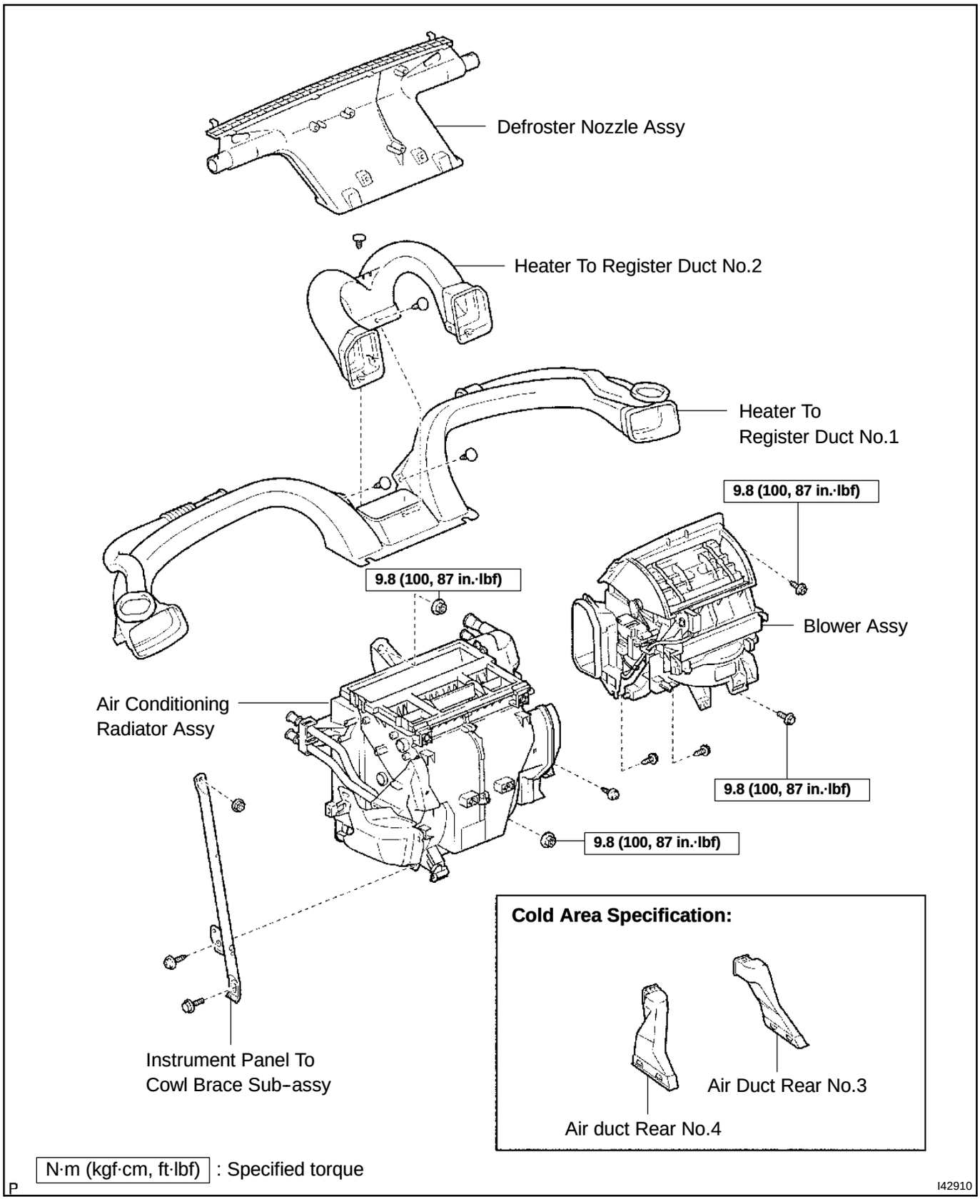
- Operating the heater control knob, check that it properly stops at both ends of FACE and DEF and no recoil is identified.
- Check that the outer cable is not disengaged (moved) from the heater control & accessory assy when the cable is pulled.

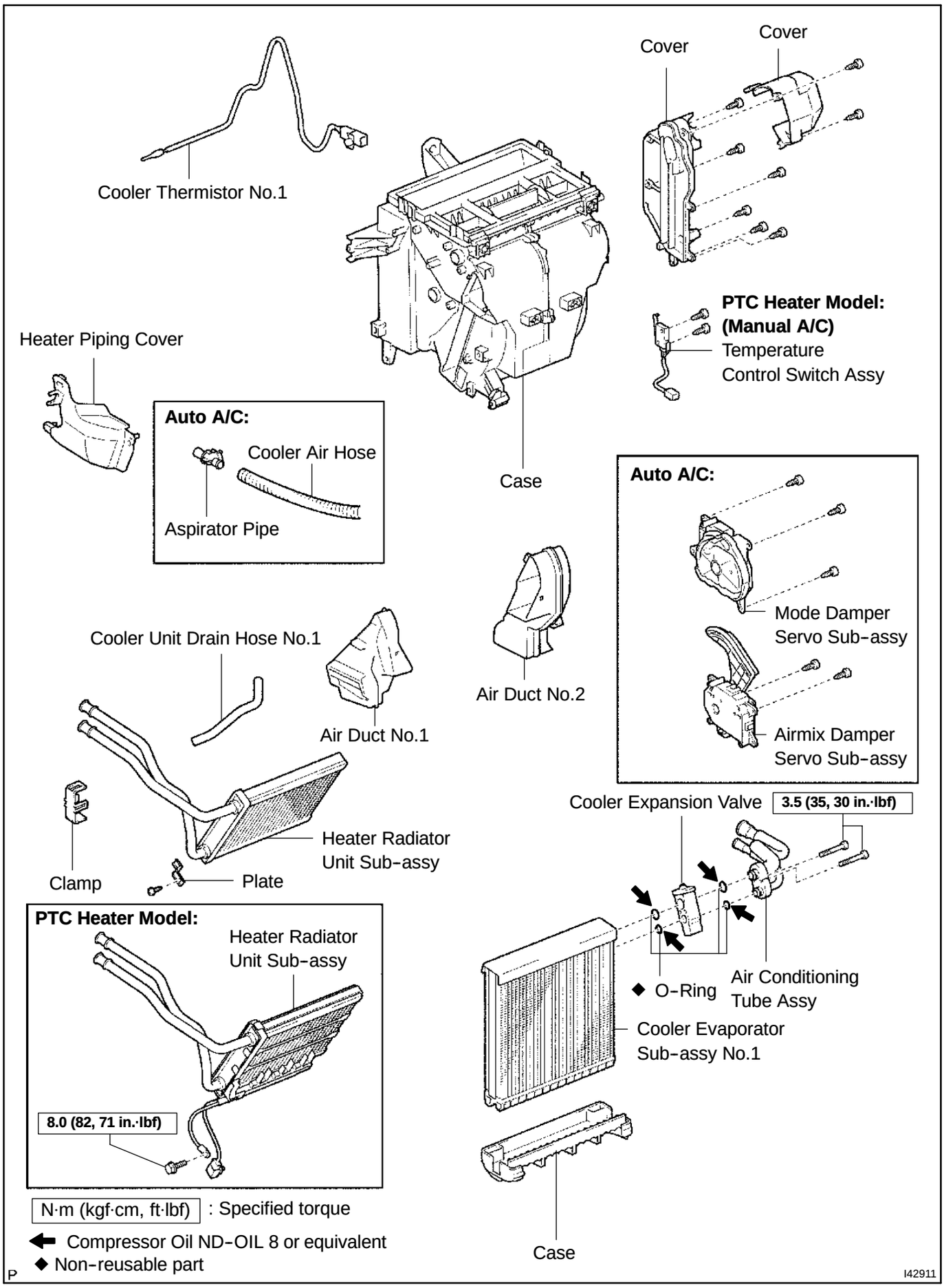
(e) Connect the connector and install the heater control & accessory assy.

AIR CONDITIONING RADIATOR ASSY

COMPONENTS

551FU-01




Cooler Thermistor No.1
Cover
Cover
PTC Heater Model:
(Manual A/C)
Temperature
Control Switch Assy
Heater Piping Cover
Auto A/C:
Cooler Air Hose
Aspirator Pipe
Case
Auto A/C:
Mode Damper
Servo Sub-assy
Airmix Damper
Servo Sub-assy
Air Duct No.2
Cooler Unit Drain Hose No.1
Air Duct No.1
Heater Radiator
Unit Sub-assy
Clamp
Plate
Cooler Expansion Valve
3.5 (35, 30 in.·lbf)
PTC Heater Model:
Heater Radiator
Unit Sub-assy
8.0 (82, 71 in.·lbf)
◆ O-Ring
Air Conditioning
Tube Assy
Cooler Evaporator
Sub-assy No.1
Case
N·m (kgf·cm, ft·lbf) : Specified torque
Compressor Oil ND-OIL 8 or equivalent
◆ Non-reusable part
P
I42911

551FV-01

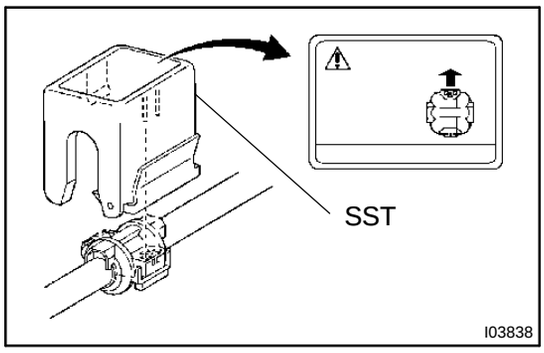
OVERHAUL

HINT:

- COMPONENT: See page 55-16.
- Installation is in the reverse order of removal.

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (SEE PAGE 55-7)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



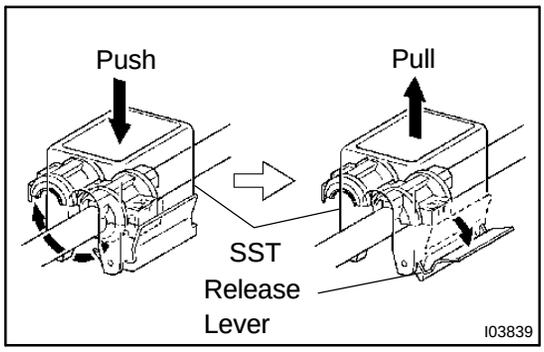
2. DISCONNECT COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Install SST on the piping clamp.

SST 09870-00015

HINT:

Make sure the direction of the piping clamp claw and SST by checking the illustration on the caution label.

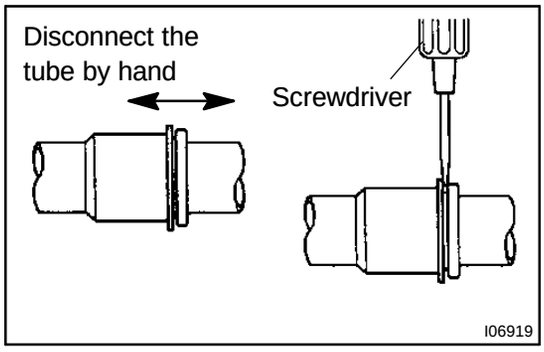


(b) Push down SST and release the clamp lock.

NOTICE:

Be careful not to deform the tube when pushing SST.

(c) Pull SST slightly and push the release lever, and then remove the piping clamp with SST.



(d) Disconnect the cooler refrigerant suction hose No.1.

NOTICE:

- **Do not use a screwdriver or similar tool to disconnect the hose.**
- **Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.**

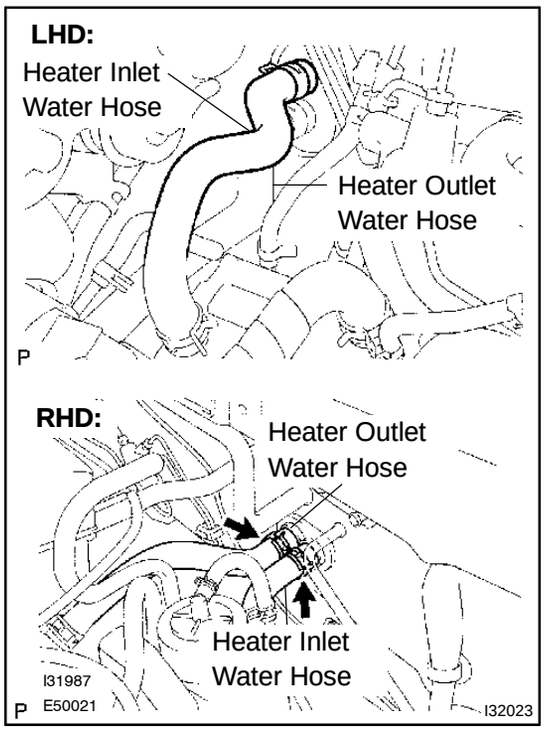
(e) Remove the 2 O-rings from the cooler refrigerant suction hose No.1.

3. DISCONNECT AIR CONDITIONING TUBE ASSY

SST 09870-00025

HINT:

Disconnection of the air conditioning tube assy is the same as for the cooler refrigerant suction hose No.1.



4. DISCONNECT HEATER INLET WATER HOSE

(a) Using pliers, grip the claws of the clip and slide the clip to disconnect the heater inlet water hose.

5. DISCONNECT HEATER OUTLET WATER HOSE

HINT:

Disconnection of the heater outlet water hose is the same as for the heater inlet water hose.

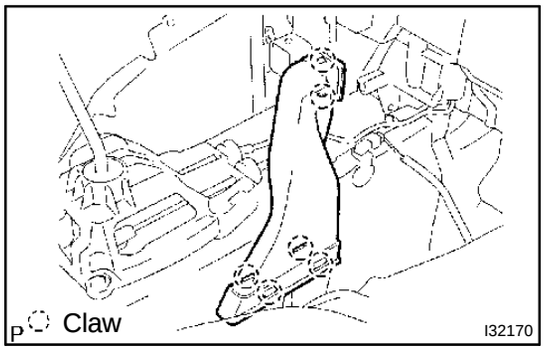
6. REMOVE INSTRUMENT PANEL SUB-ASSY LOWER (SEE PAGE 71-6)

HINT:

Refer to the instructions for removal of the instrument panel sub-assy lower.

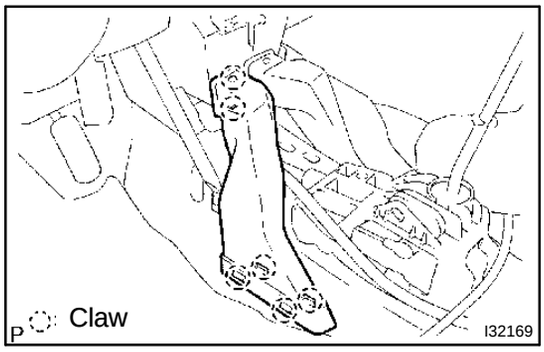
7. REMOVE COOLER STABILIZER AMPLIFIER ASSY (SEE PAGE 55-56)

8. REMOVE ECM (SEE PUB. NO. RM1039E, PAGE 10-8)



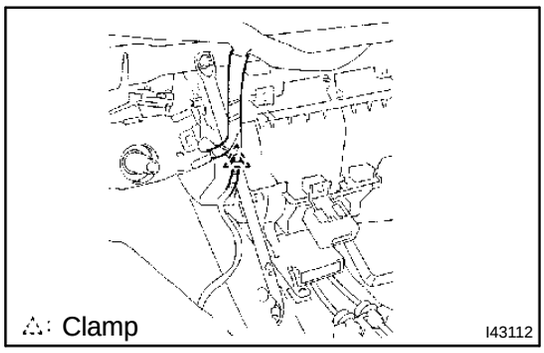
9. REMOVE AIR DUCT REAR NO.3 (COLD AREA SPECIFICATION)

(a) Release the 6 claws and remove the air duct rear No.3.



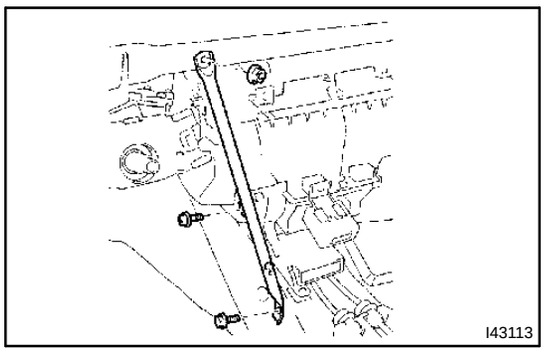
10. REMOVE AIR DUCT REAR NO.4 (COLD AREA SPECIFICATION)

(a) Release the 6 claws and remove the air duct rear No.4.



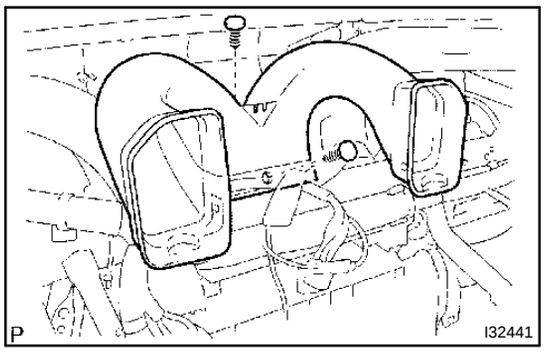
11. REMOVE INSTRUMENT PANEL TO COWL BRACE SUB-ASSY

(a) Remove the clamp, and then disconnect the wire harness.



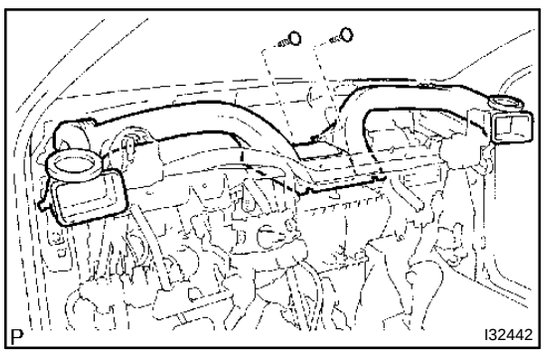
(b) Remove the screw.

(c) Remove the bolt, nut and the instrument panel to cowl brace sub-assy.



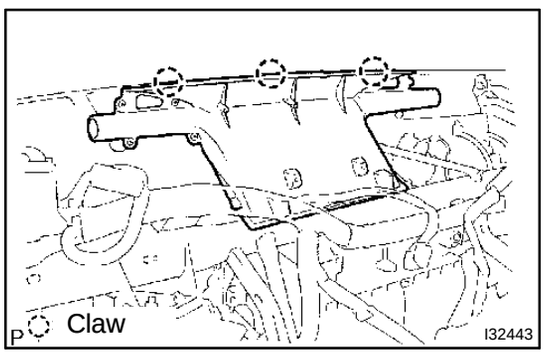
12. REMOVE HEATER TO REGISTER DUCT NO.2

(a) Remove the 2 clips and the heater to register duct No.2.



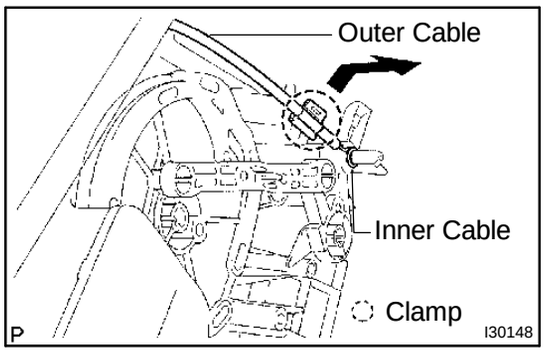
13. REMOVE HEATER TO REGISTER DUCT NO.1

(a) Remove the 2 clips and the heater to register duct No.1.



14. REMOVE DEFROSTER NOZZLE ASSY

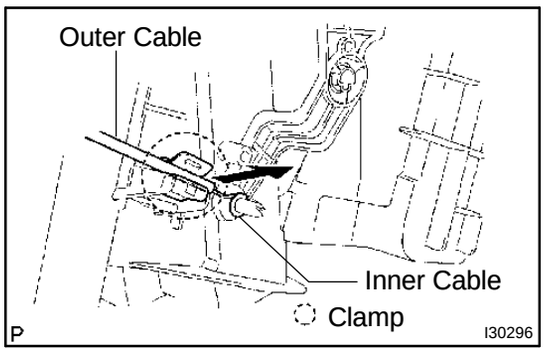
(a) Release the 3 claws and remove the defroster nozzle assy.



15. REMOVE DEFROSTER DAMPER CONTROL CABLE SUB-ASSY (MANUAL AIR CONDITIONING)

(a) Disconnect the outer cable from the clamp.

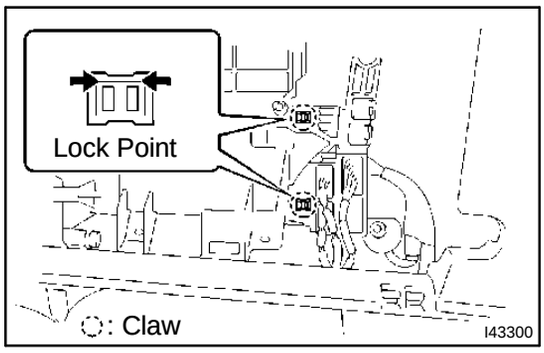
(b) Disconnect the inner cable and remove the defroster damper control cable sub-assy.



16. REMOVE AIRMIX DAMPER CONTROL CABLE SUB-ASSY (MANUAL AIR CONDITIONING)

(a) Disconnect the outer cable from the clamp.

(b) Disconnect the inner cable and remove the air mix damper control cable sub-assy.

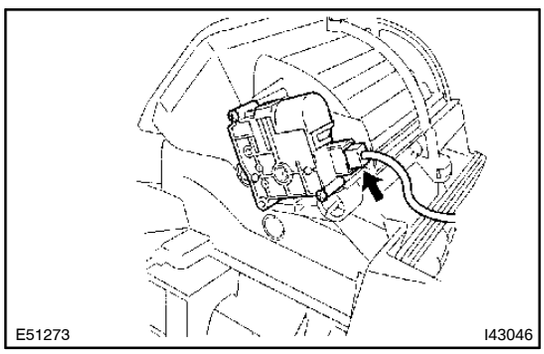


17. REMOVE AIR CONDITIONER UNIT ASSY

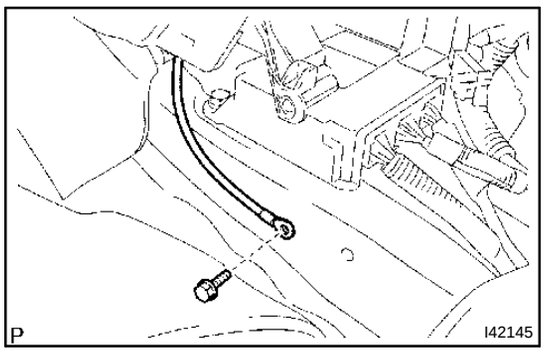
(a) Using a screwdriver, release the 2 claws and remove the connector holder.

HINT:

Tape up the screwdriver tip before use.

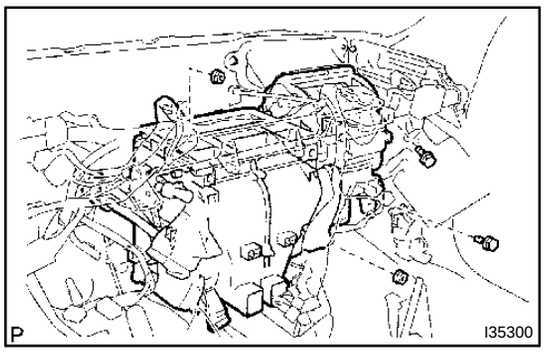


(b) Disconnect the connector.



(c) PTC HEATER MODEL:

(1) Remove the bolt and disconnect the earth wire.

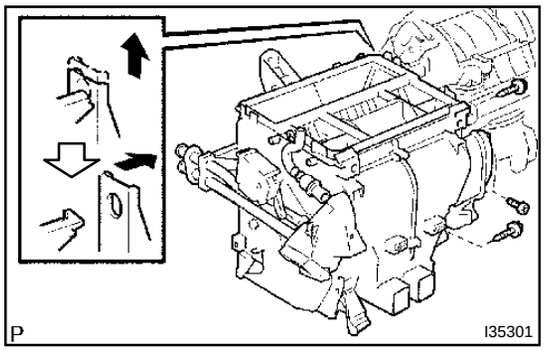


(d) Remove the bolt, the screw, the 2 nuts and the air conditioner unit assy.

18. REMOVE AIR CONDITIONING RADIATOR ASSY

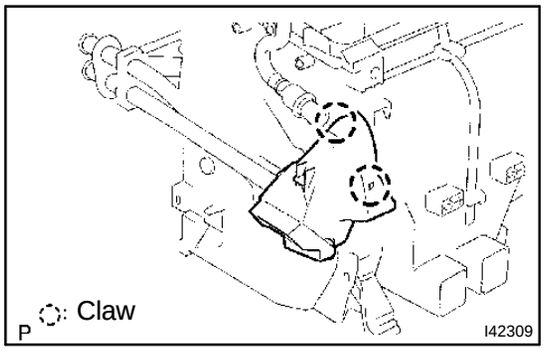
(a) PTC HEATER MODEL:

(1) Remove the clamp, and disconnect the wire harness.



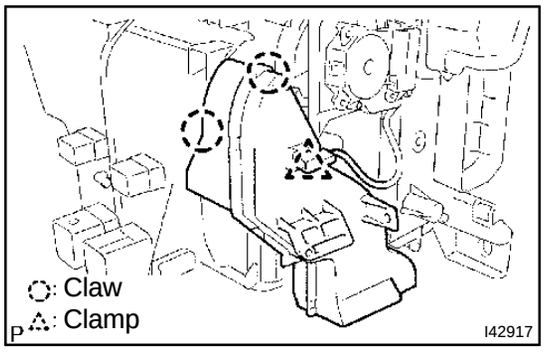
(b) Remove the 3 screws.

(c) Release the claw and remove the air conditioning radiator assy.



19. REMOVE AIR DUCT NO.1

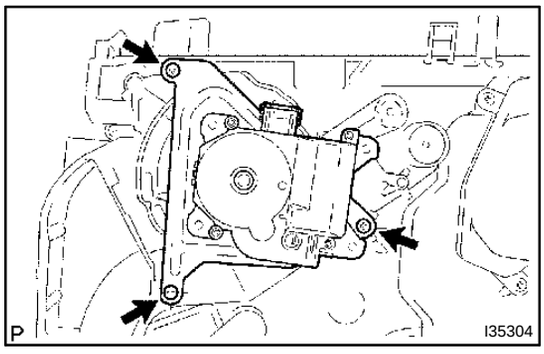
(a) Release the 2 claws and remove the air duct No.1.



20. REMOVE AIR DUCT NO.2

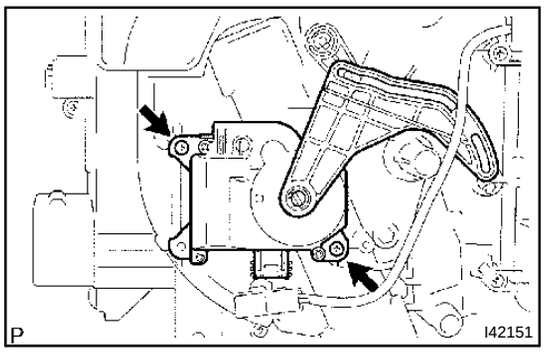
(a) Remove the clamp, and then disconnect the connector.

(b) Release the 2 claws and remove the air duct No.2.



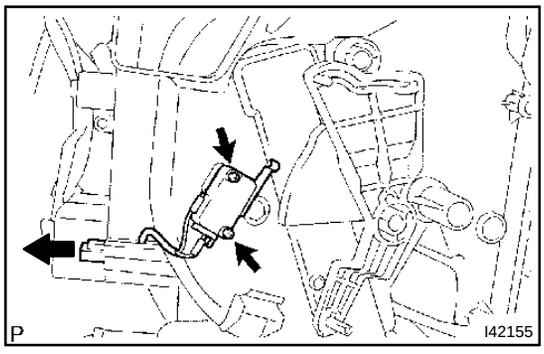
21. REMOVE MODE DAMPER SERVO SUB-ASSY (AUTO AIR CONDITIONING)

(a) Remove the 3 screws and the mode damper servo sub-assy.



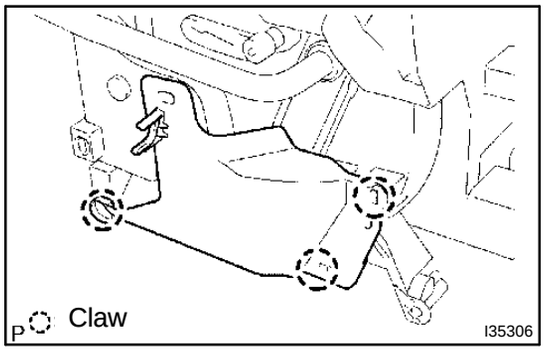
22. REMOVE AIRMIX DAMPER SERVO SUB-ASSY (AUTO AIR CONDITIONING)

(a) Remove the 2 screws and the air mix damper servo sub-assy.



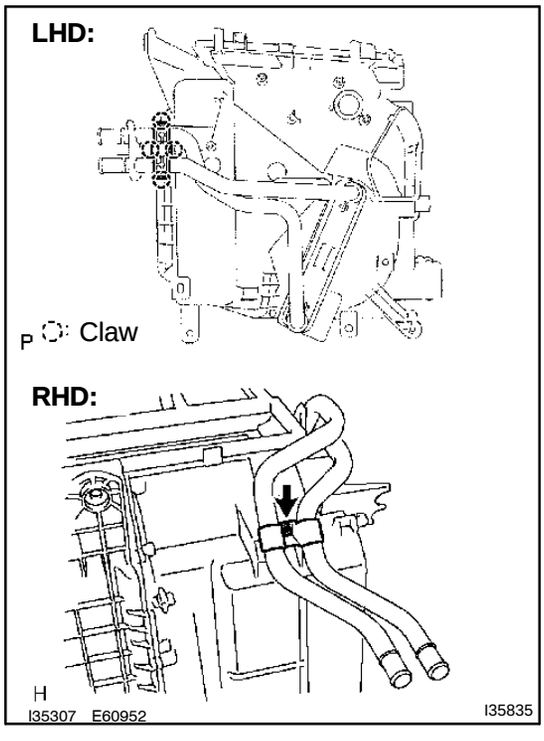
23. REMOVE TEMPERATURE CONTROL SWITCH ASSY (PTC HEATER MODEL (MANUAL AIR CONDITIONING))

(a) Remove the 2 screws and the temperature control switch assy.



24. REMOVE HEATER PIPING COVER

(a) Release the 3 claws and remove the heater piping cover.



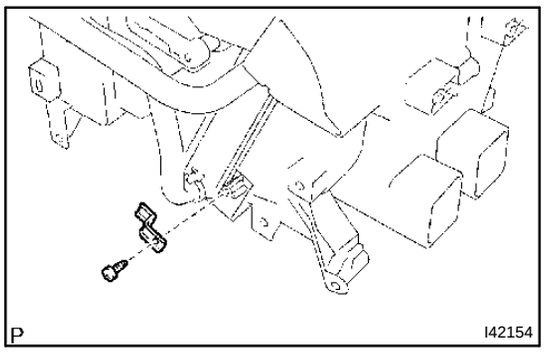
25. REMOVE HEATER RADIATOR UNIT SUB-ASSY

(a) LHD:

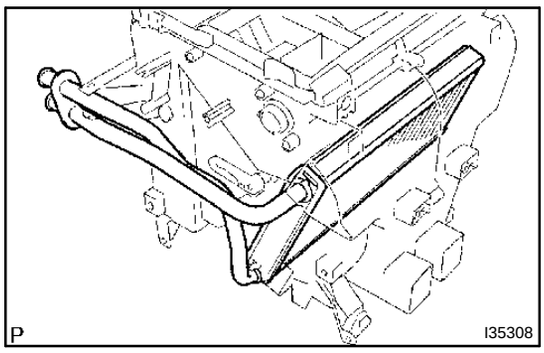
(1) Release the 4 claws and remove the clamp.

(b) RHD:

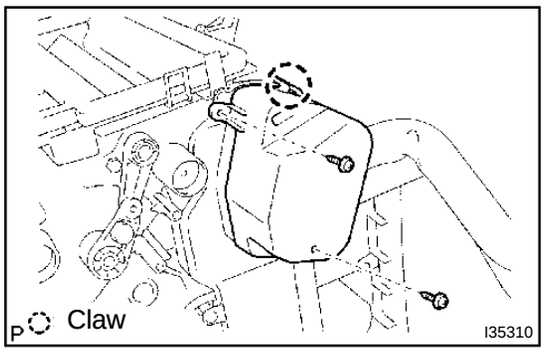
(1) Remove the screw and the clamp.



(c) EXCEPT PTC HEATER MODEL:
(1) Remove the screw and plate.

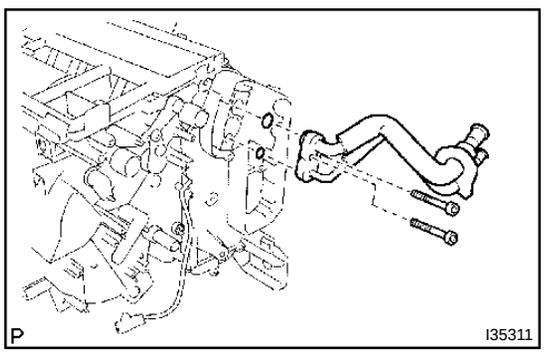


(d) Remove the heater radiator unit sub-assy.

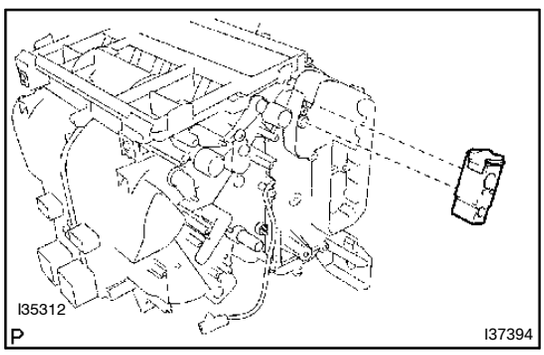


26. REMOVE AIR CONDITIONING TUBE ASSY

(a) Remove the 2 screws.
(b) Release the claw and remove the cover.

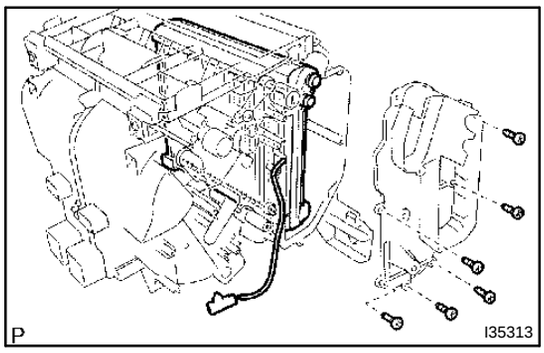


(c) Using a hexagon wrench 5.0 mm (0.20 in.), remove the 2 hexagon bolts and the air conditioning tube assy.
(d) Remove the 2 O-rings from the air conditioning tube assy.



27. REMOVE COOLER EXPANSION VALVE

(a) Remove the cooler expansion valve from the cooler evaporator sub-assy No.1.

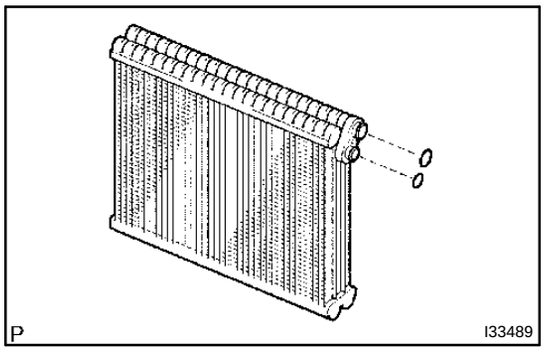


28. REMOVE COOLER THERMISTOR NO.1

(a) Remove the 6 screws and the cover.

(b) Remove the cooler thermistor No.1 and the cooler evaporator sub-assy No.1 from the case.

(c) Remove the cooler thermistor No.1 from the cooler evaporator sub-assy No.1.

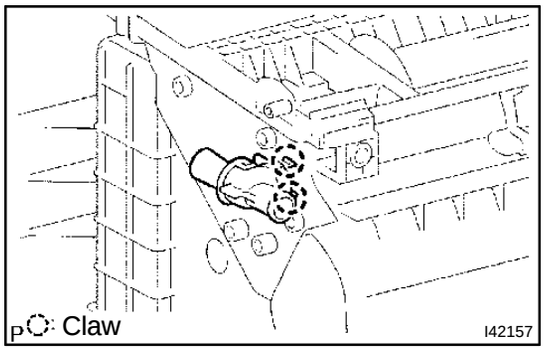


29. REMOVE COOLER EVAPORATOR SUB-ASSY NO.1

(a) Remove the 2 O-rings from the cooler evaporator sub-assy No.1.

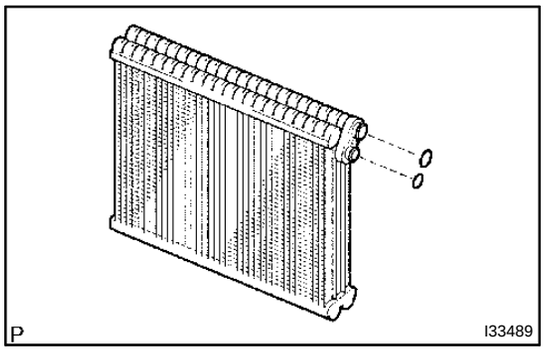
30. REMOVE COOLER UNIT DRAIN HOSE NO.1

31. REMOVE COOLER AIR HOSE (AUTO AIR CONDITIONING)



32. REMOVE ASPIRATOR PIPE (AUTO AIR CONDITIONING)

(a) Release the 2 claws and remove the aspirator pipe.

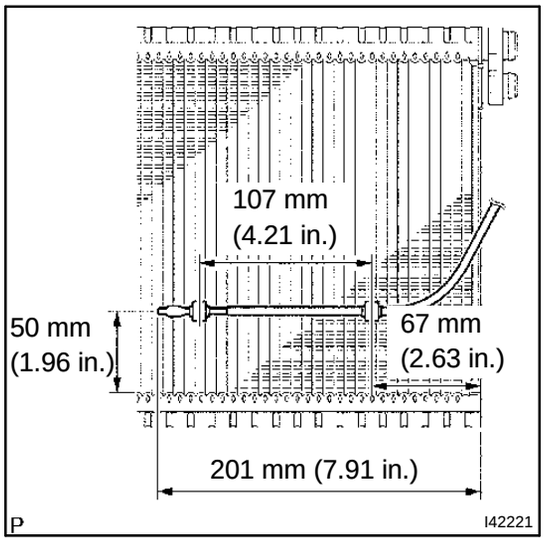


33. INSTALL COOLER EVAPORATOR SUB-ASSY NO.1

(a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the cooler expansion valve.

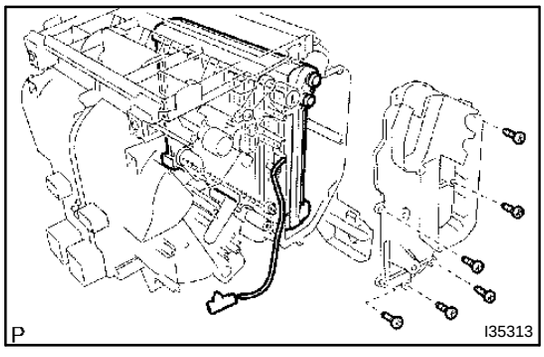
Compressor oil: ND-OIL 8 or equivalent

(b) Install the 2 O-rings on the cooler evaporator sub-assy No.1.



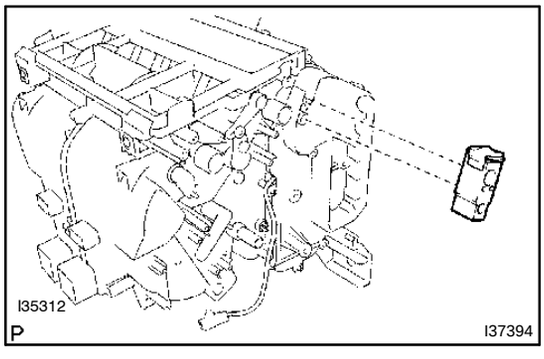
34. INSTALL COOLER THERMISTOR NO.1

(a) Install the cooler thermistor No.1 as shown in the illustration.



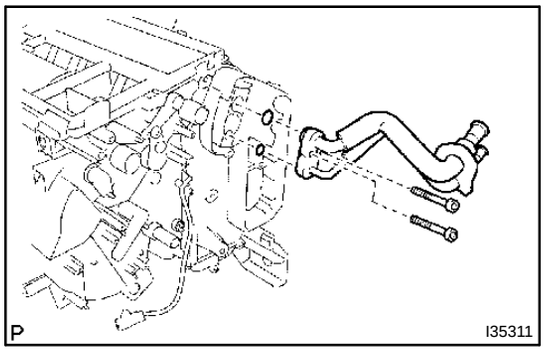
(b) Install the cooler evaporator sub-assy No.1 on the case.

(c) Install the cover with the 6 screws.



35. INSTALL COOLER EXPANSION VALVE

(a) Install the cooler expansion valve on the cooler evaporator sub-assy No.1.

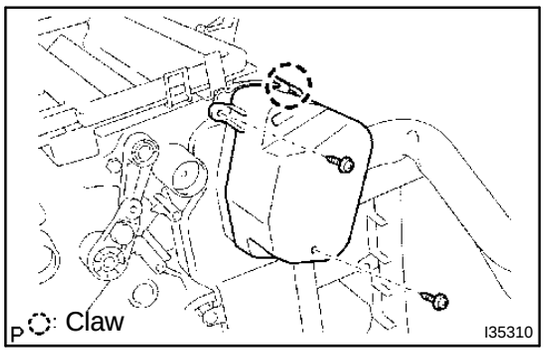


36. INSTALL AIR CONDITIONING TUBE ASSY

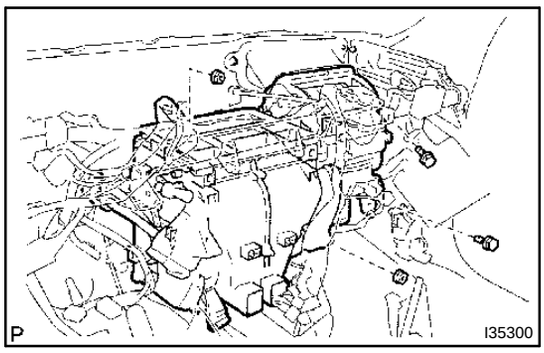
(a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the air conditioning tube assy.
Compressor oil: ND-OIL 8 or equivalent

(b) Install the 2 O-rings on the air conditioning tube assy.

(c) Using a hexagon wrench 5.0 mm (0.20 in.), install the air conditioning tube assy with the 2 hexagon bolts.
Torque: 3.5 N·m (35 kgf·cm, 30 in.·lbf)



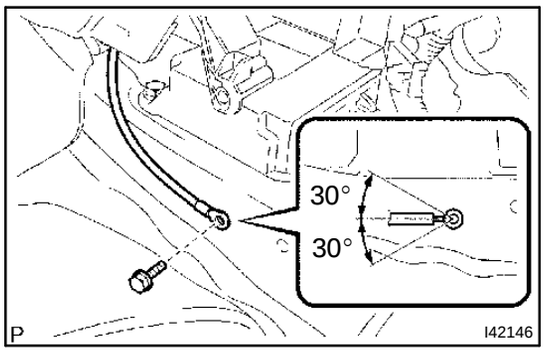
(d) Install the cover with the claw and 2 screws.



37. INSTALL AIR CONDITIONER UNIT ASSY

(a) Install the air conditioner unit assy with the bolt, screw and 2 nuts.

Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



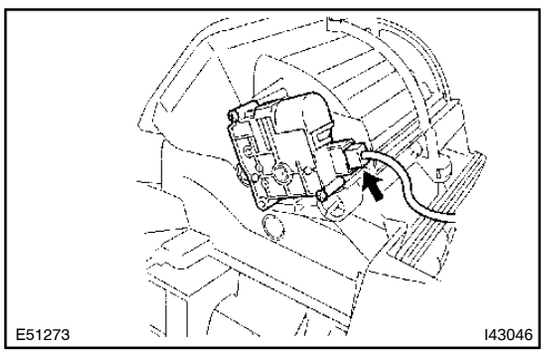
(b) PTC HEATER MODEL:

(1) Install the earth wire with the bolt.

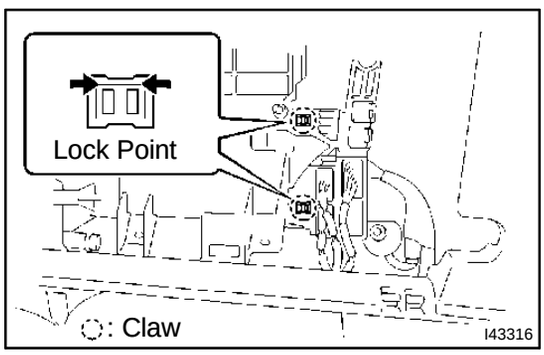
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

Be sure to install earth wire for PTC at the angle indicated in the illustration.



(c) Connect the connector.



(d) Install the connector holder with the 2 claws.

38. INSTALL ECM (SEE PUB. NO. RM1039E, PAGE 10-8)

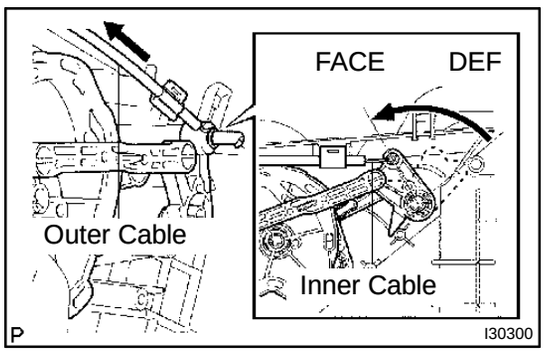
39. INSTALL INSTRUMENT PANEL SUB-ASSY LOWER (SEE PAGE 71-6)

40. INSTALL HEATER CONTROL & ACCESSORY ASSY

(a) Connect the defroster damper control cable sub-assy on the heater control & accessory assy.

(b) Connect the air mix damper control cable sub-assy on the heater control & accessory assy.

(c) Install the heater control & accessory assy on the instrument panel sub-assy lower.



41. INSTALL DEFROSTER DAMPER CONTROL CABLE SUB-ASSY (MANUAL AIR CONDITIONING)

(a) Set the arm in the FACE position.

(b) Install the inner cable end to the control lever with the arm in the FACE position.

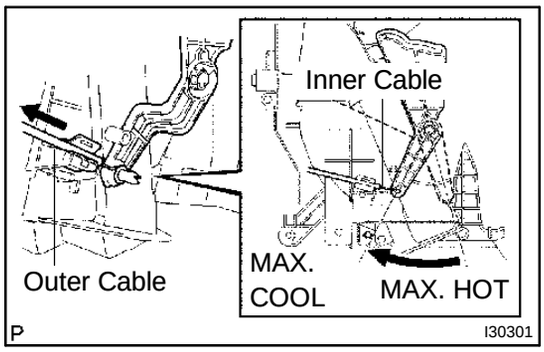
(c) Install the outer cable in the cable clamp while slightly pressing it in the direction of the arrow.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the heater control & accessory assy operation may be affected.**

HINT:

Operating the mode control lever, check that it properly stops at both ends of FACE and DEF and no recoil is identified.



42. INSTALL AIRMIX DAMPER CONTROL CABLE SUB-ASSY (MANUAL AIR CONDITIONING)

(a) Set the arm in the MAX.COOL position.

(b) Install the inner cable end in the control lever with the arm in the MAX.COOL position.

(c) Install the outer cable in the cable clamp while slightly pressing it in the direction of the arrow.

NOTICE:

- **Be careful not to bend the cable wire.**
- **If the cable wire bends, the heater or control & accessory assy operation may be affected.**

HINT:

Operating the mode control lever, check that it properly stops at both ends of MAX.COOL and MAX.HOT and no recoil is identified.

43. REMOVE HEATER CONTROL & ACCESSORY ASSY

(a) Release the 2 claws and disconnect the heater control & accessory assy.

(b) Disconnect the defroster damper control cable sub-assy from the heater control & accessory assy.

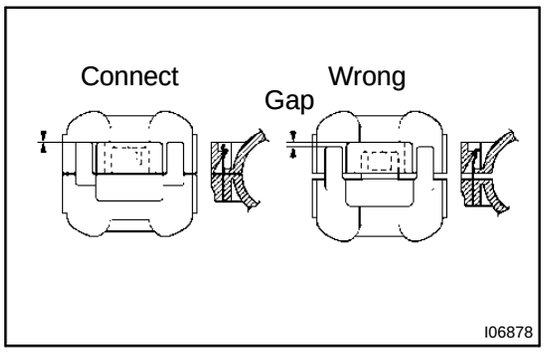
(c) Disconnect the air mix damper control cable sub-assy from the heater control & accessory assy.

(d) Remove the heater control & accessory assy from the instrument panel sub-assy lower.

44. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-6)

HINT:

Refer to the instructions for installation of the instrument panel sub-assy upper.



45. INSTALL AIR CONDITIONING TUBE ASSY

(a) Remove the attached vinyl tape from the tube.

(b) Sufficiently apply compressor oil to new 2 O-rings and the fitting surface of the suction hose sub-assy.

Compressor oil: ND-OIL 8 or equivalent

(c) Install the 2 O-rings on the air conditioning tube assy.

(d) Install the air conditioning tube assy and the piping clamp.

HINT:

After the connection, check that the claw of the piping clamp is engaged.

46. INSTALL COOLER REFRIGERANT SUCTION HOSE NO.1

HINT:

Installation of the cooler refrigerant suction hose No.1 is the same as for the air conditioning tube assy.

47. ADD COOLANT

ZZ E/G SERIES: (SEE PAGE 16-8)

1CD-FTV: (SEE PUB. NO. RM1039E, PAGE 16-3)

48. CHECK FOR ENGINE COOLANT LEAKS

ZZ E/G SERIES: (SEE PAGE 16-1)

1CD-FTV: (SEE PUB. NO. RM1039E, PAGE 16-1)

49. CHARGE REFRIGERANT (SEE PAGE 55-7)

Specified amount: 450 ± 30 g (15.9 ± 1.1 oz.)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080), 07117-48130, 07117-48140

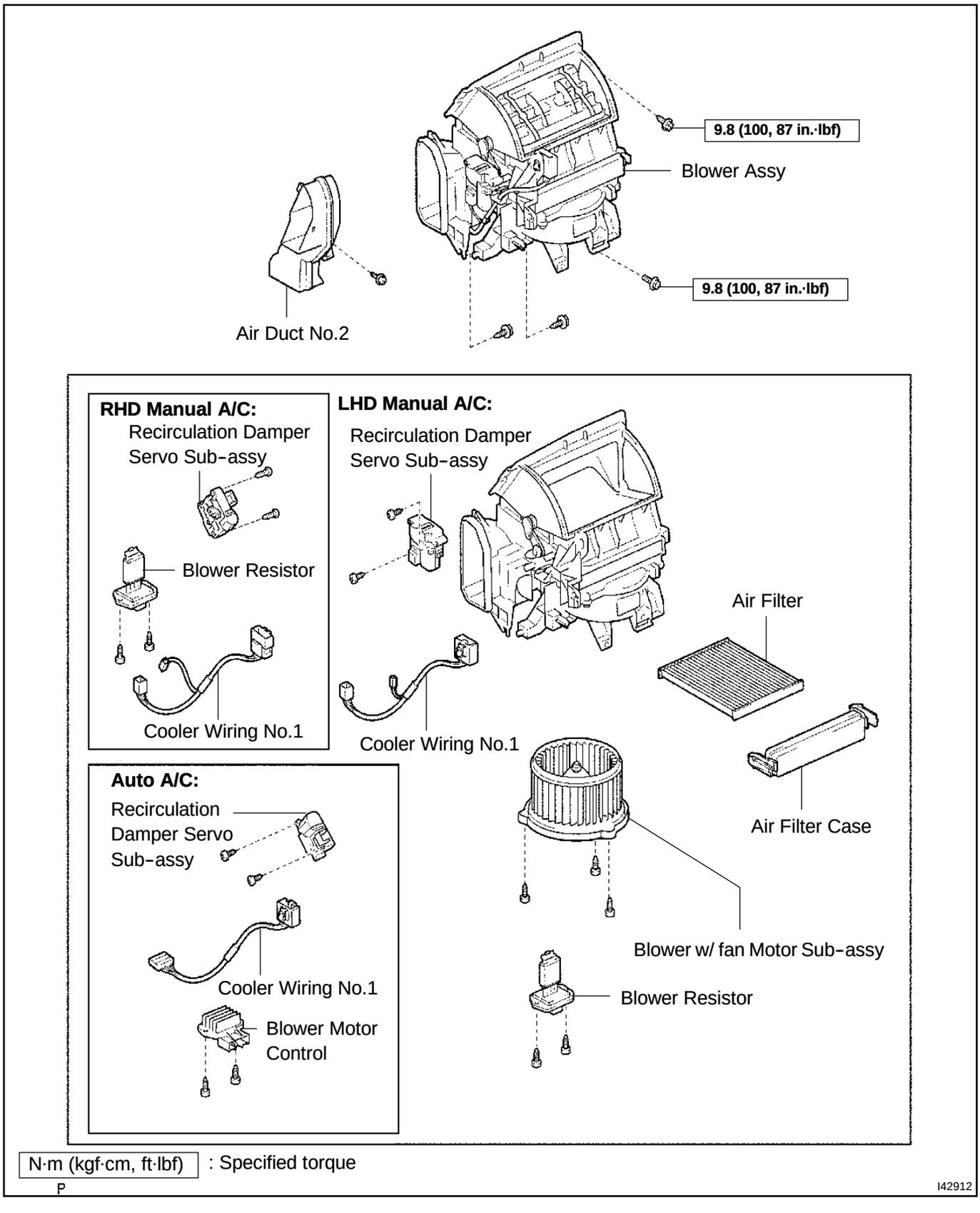
50. WARM UP ENGINE (SEE PAGE 55-7)

51. CHECK FOR LEAKAGE OF REFRIGERANT (SEE PAGE 55-7)

BLOWER ASSY

COMPONENTS

550FM-02



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

P

I42912

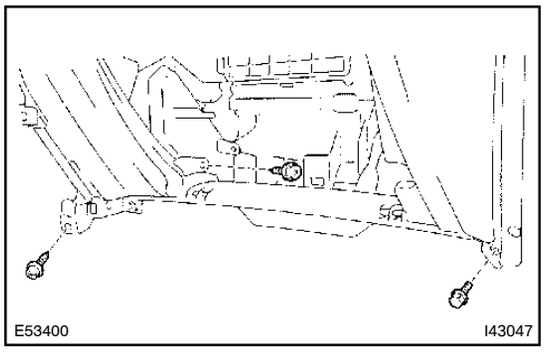
551FW-01

OVERHAUL

HINT:

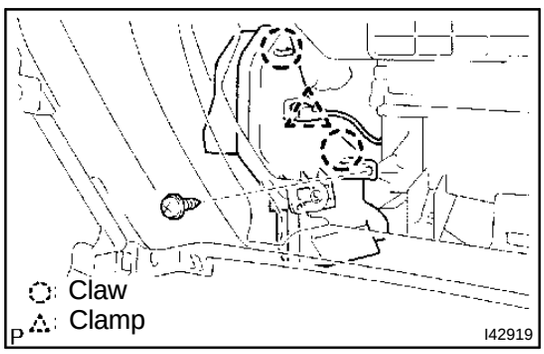
- COMPONENTS: See page 55-30.
- Installation is in the reverse order of removal.

1. **REMOVE GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-6)**
2. **REMOVE FRONT DOOR SCUFF PLATE RH (LHD STEERING POSITION TYPE) (SEE PAGE 71-6)**
3. **REMOVE FRONT DOOR SCUFF PLATE LH (RHD STEERING POSITION TYPE) (SEE PAGE 71-6)**
4. **REMOVE COWL SIDE TRIM BOARD RH (LHD STEERING POSITION TYPE) (SEE PAGE 71-6)**
5. **REMOVE COWL SIDE TRIM BOARD LH (RHD STEERING POSITION TYPE) (SEE PAGE 71-6)**
6. **REMOVE ECM (SEE PUB. NO. RM1039E, PAGE 10-8)**



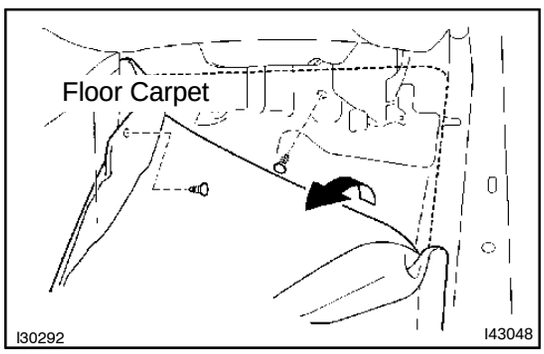
7. REMOVE AIR DUCT NO.2

(a) Remove the bolt and 2 screws.



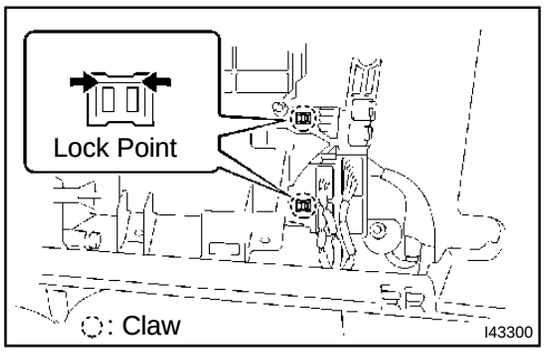
(b) Remove the clamp, and disconnect the connector.

(c) Release the 2 claws and remove the air duct No.2.



8. REMOVE BLOWER ASSY

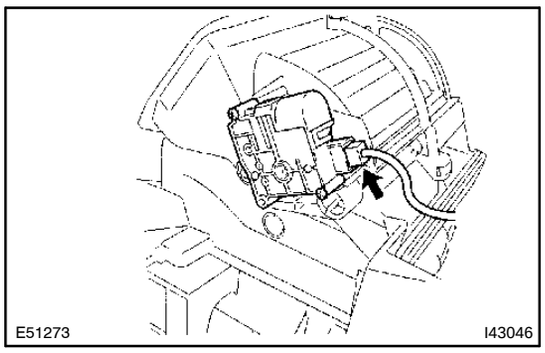
(a) Remove the 2 clips and turn back the floor carpet.



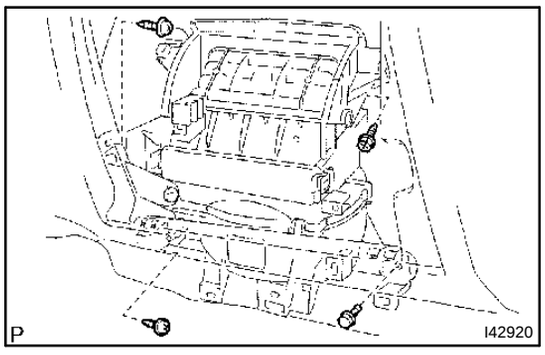
(b) Using a screwdriver, release the 2 claws and disconnect the connector holder.

HINT:

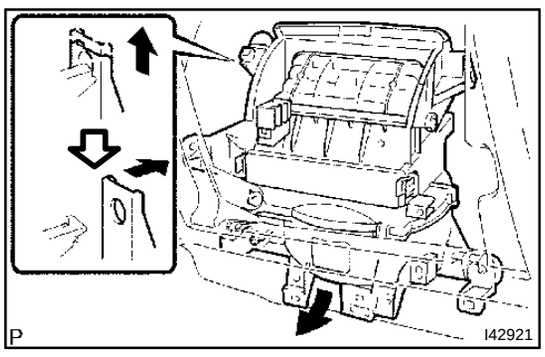
Tape up the screwdriver tip before use.



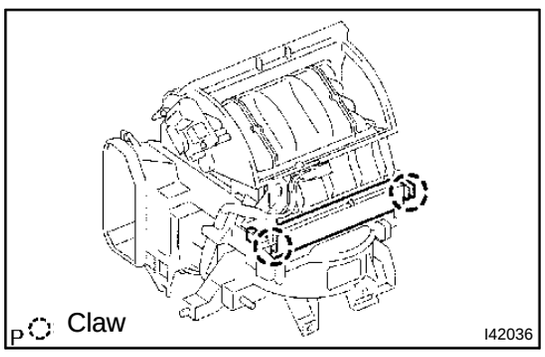
(c) Disconnect the connector.



(d) Remove the bolt and 3 screws.

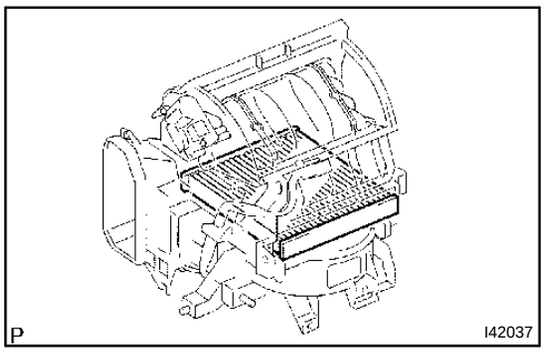


(e) Release the claw and remove the blower assy.



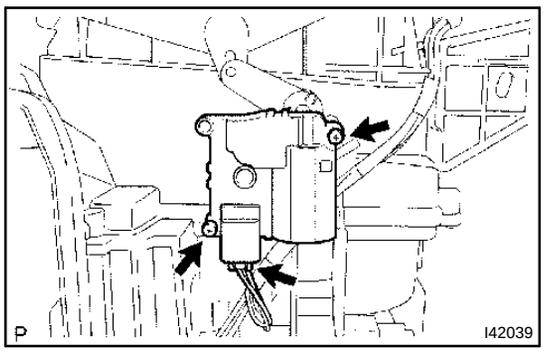
9. REMOVE AIR FILTER CASE

(a) Release the 2 claws and remove the air filter case.



10. REMOVE AIR FILTER

(a) Remove the air filter from the blower assy.

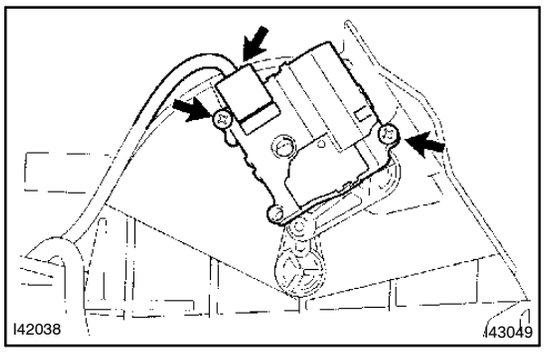


11. REMOVE RECIRCULATION DAMPER SERVO SUB-ASSY

(a) LHD MANUAL A/C:

(1) Disconnect the connector.

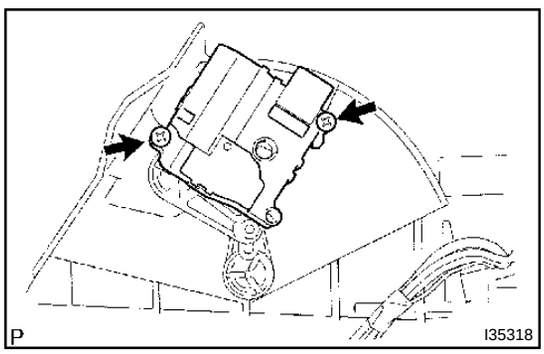
(2) Remove the 2 screws and the recirculation damper servo sub-assy.



(b) RHD MANUAL A/C:

(1) Disconnect the connector.

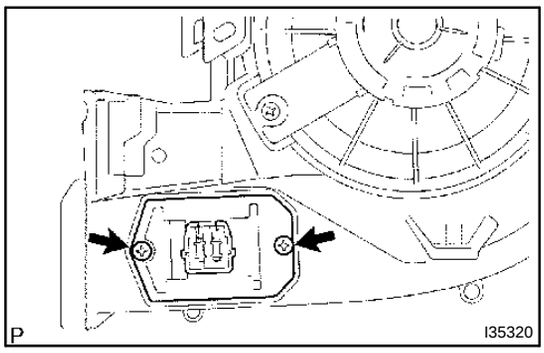
(2) Remove the 2 screws and the recirculation damper servo sub-assy.



(c) AUTO A/C:

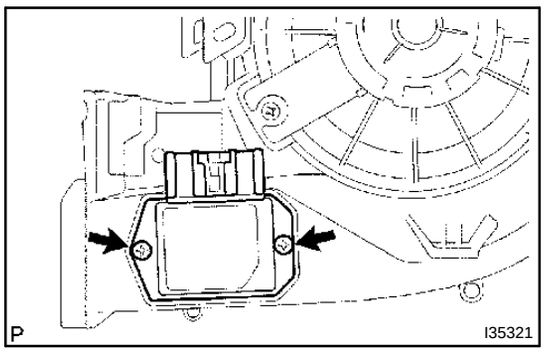
(1) Remove the 2 screws and the recirculation damper servo sub-assy.

12. REMOVE COOLER WIRING NO.1



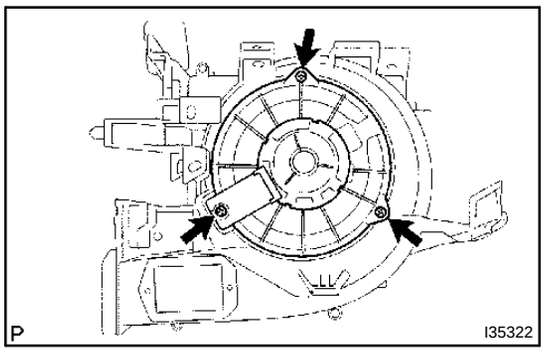
13. REMOVE BLOWER RESISTOR (MANUAL AIR CONDITIONING)

(a) Remove the 2 screws and the blower resistor.



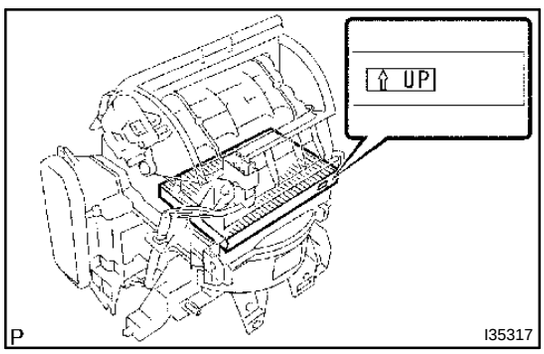
14. REMOVE BLOWER MOTOR CONTROL (AUTO AIR CONDITIONING)

(a) Remove the 2 screws and the blower motor control.



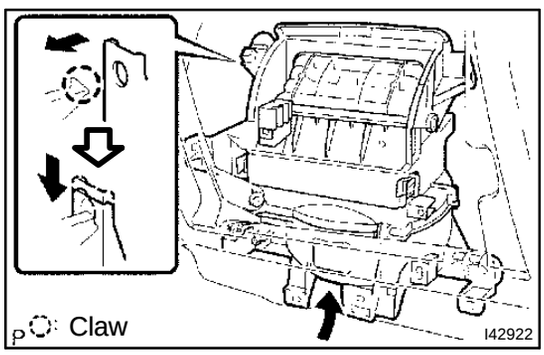
15. REMOVE BLOWER W/FAN MOTOR SUB-ASSY

(a) Remove the 3 screws and the blower w/ fan motor sub-assy.



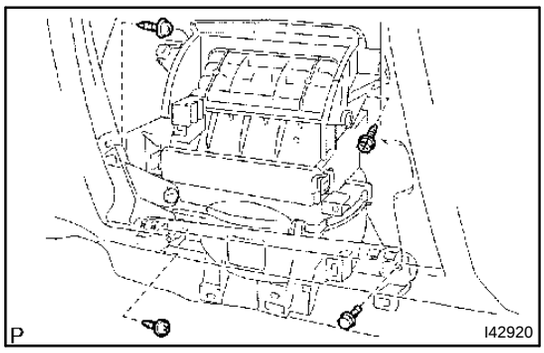
16. INSTALL AIR FILTER

(a) Install the air filter on the blower assy.



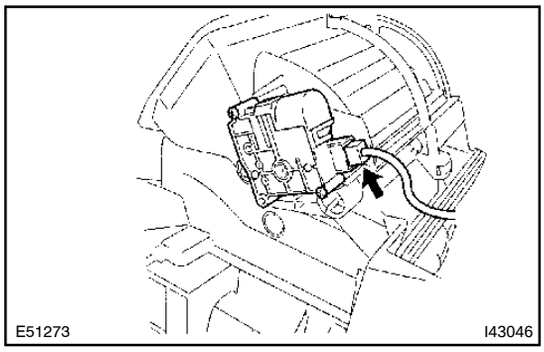
17. INSTALL BLOWER ASSY

(a) Install the blower assy with the claw.

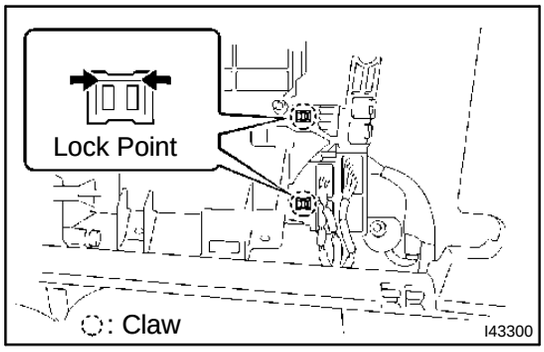


(b) Install the blower assy with the bolt and the 3 screws.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf) (Bolt)

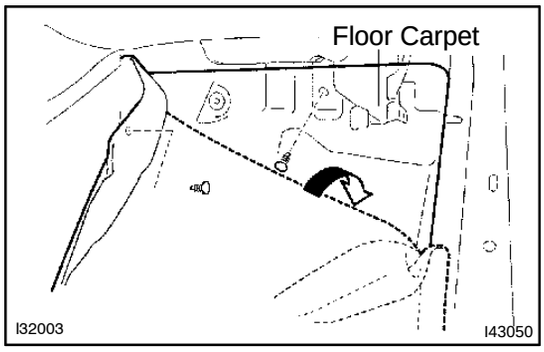
(c) Connect the connector.



(d) Connect the connector.



(e) Install the connector holder with the 2 claws.



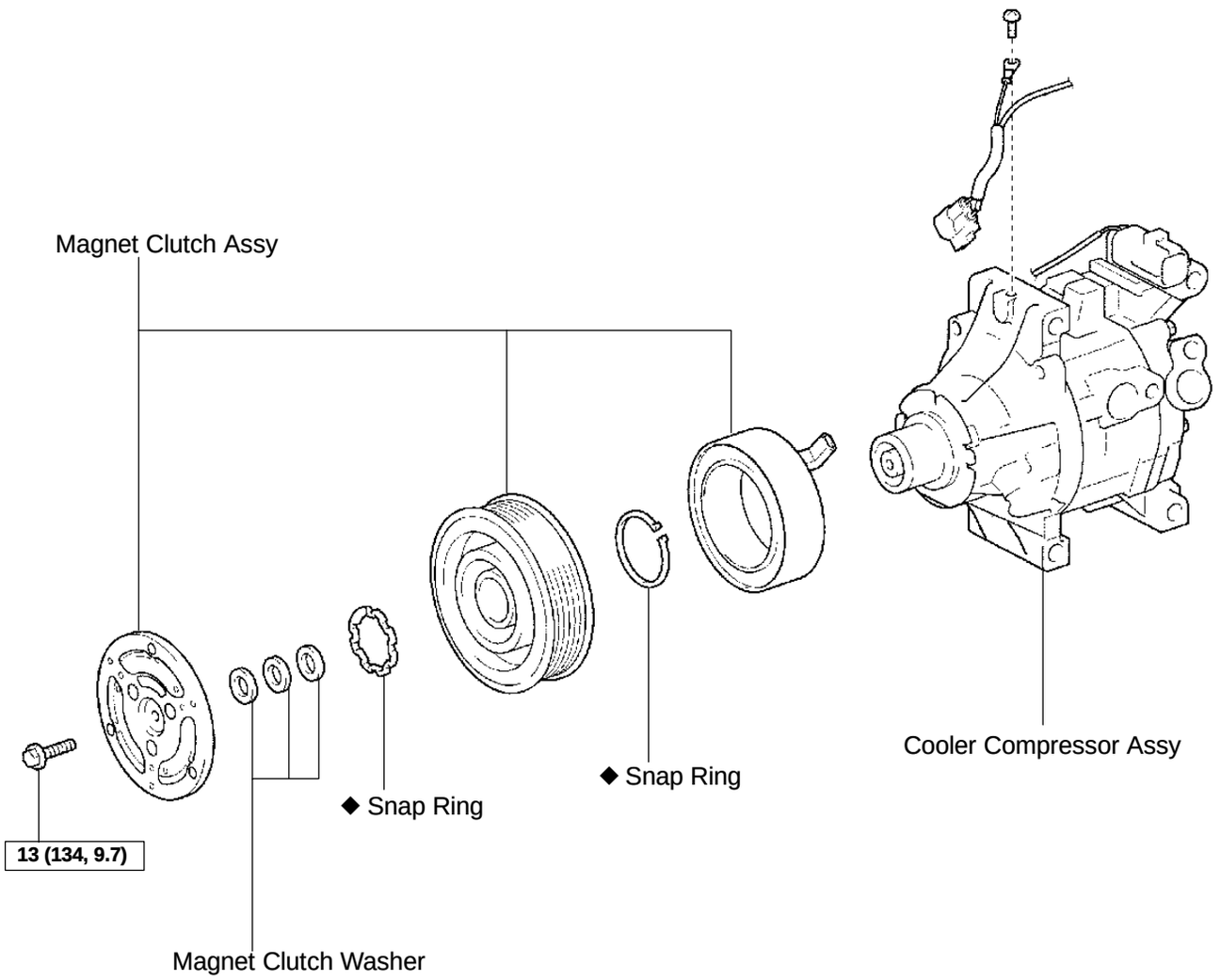
(f) Install the floor carpet with the 2 clips.

18. INSTALL ECM (SEE PUB. NO. RM1039E, PAGE 10-8)

COOLER COMPRESSOR ASSY (ZZ E/G Series)

COMPONENTS

551FX-01



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-Reusable part

I31962

551FY-01

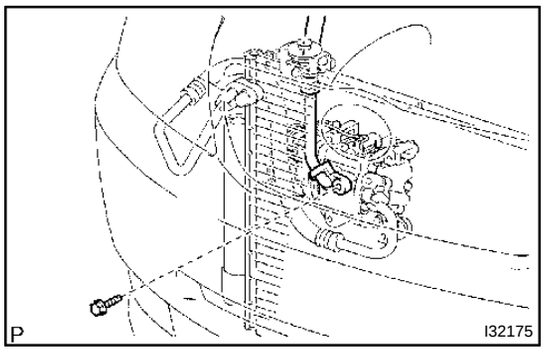
REPLACEMENT

HINT:

- COMPONENTS: See page 55-36.
- Installation is in the reverse order of removal.

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (SEE PAGE 55-7)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



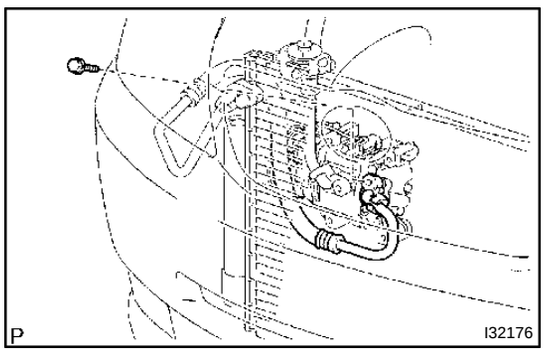
2. DISCONNECT COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant suction hose No.1 from the compressor and magnetic clutch.

(b) Remove the O-ring from the cooler refrigerant suction hose No.1.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



3. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant discharge hose No.1 from the compressor and magnetic clutch.

(b) Remove the O-ring from the cooler refrigerant discharge hose No.1.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

4. REMOVE ENGINE UNDER COVER RH

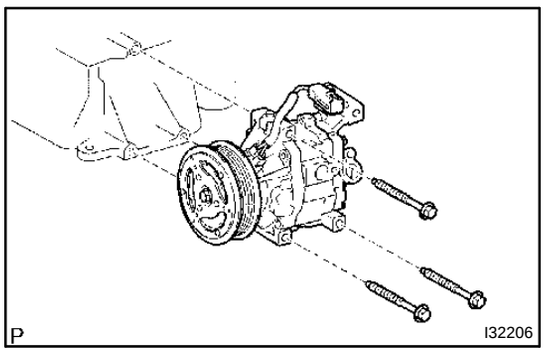
2ZZ-GE: (SEE PUB. NO. RM925E, PAGE 14-4)

3ZZ-FE/4ZZ-FE: (SEE PUB. NO. RM925E, PAGE 14-86)

5. REMOVE FAN AND GENERATOR V BELT

2ZZ-GE: (SEE PUB. NO. RM925E, PAGE 14-4)

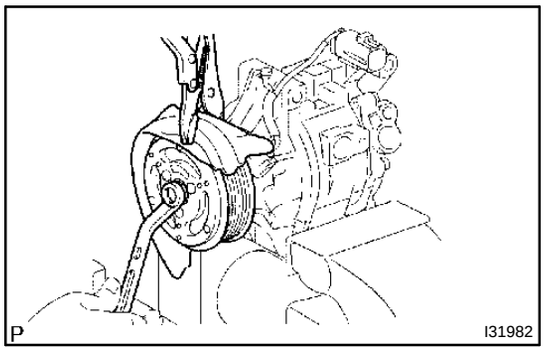
3ZZ-FE/4ZZ-FE: (SEE PUB. NO. RM925E, PAGE 14-86)



6. REMOVE COMPRESSOR AND MAGNETIC CLUTCH

(a) Disconnect the connector.

(b) Remove the 3 bolts and the compressor and magnetic clutch.



7. REMOVE MAGNET CLUTCH ASSY

(a) Place the compressor and magnetic clutch in a vise.

(b) Using vise pliers, hold the magnet clutch hub.

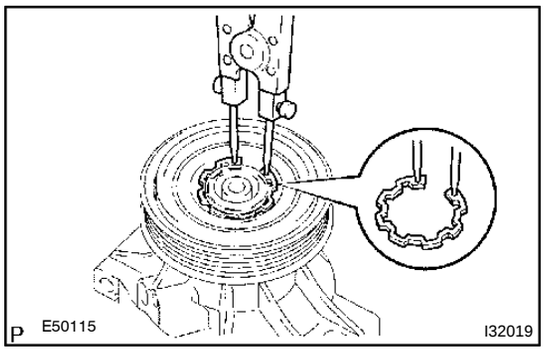
HINT:

Cover the magnet clutch with a shop rag when holding the magnet clutch hub to prevent it from being damaged.

(c) Remove the bolt, magnet clutch hub and magnet clutch washer.

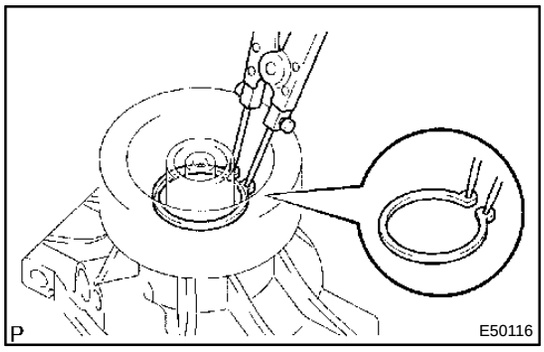
HINT:

There is no set number of magnet clutch washers since they are used for adjustment.

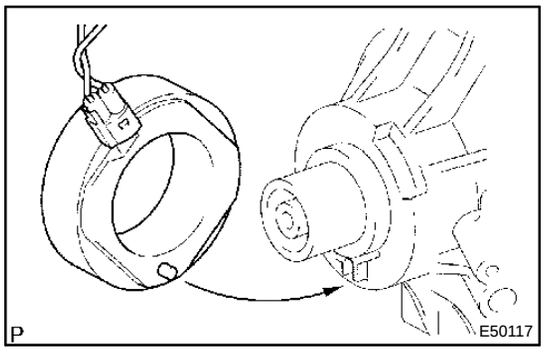


(d) Using a snap ring expander, remove the snap ring and magnet clutch rotor.

(e) Remove the screw, disconnect the connector.

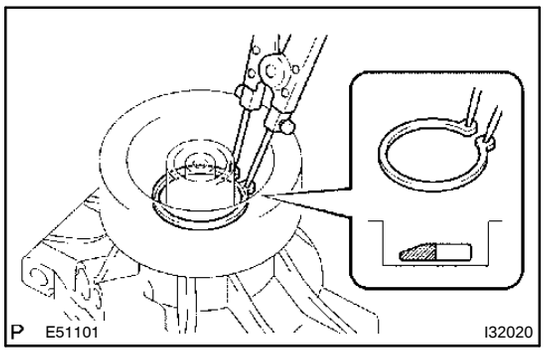


(f) Using a snap ring expander, remove the snap ring and magnet clutch stator.

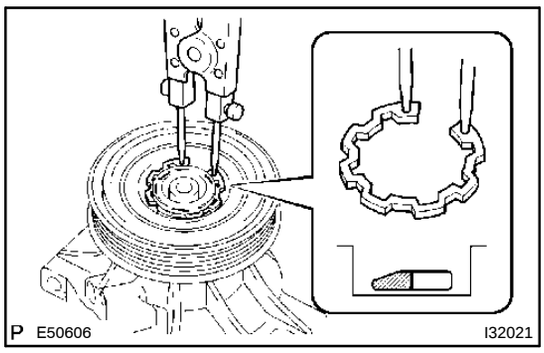


8. INSTALL MAGNET CLUTCH ASSY

(a) Matching the parts shown in the illustration, install the magnet clutch stator.

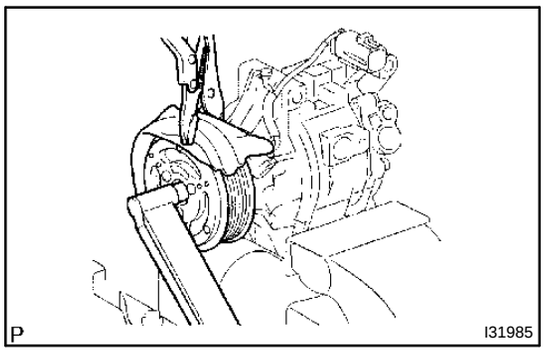


(b) Using a snap ring expander, install a new snap ring with the chamfered side facing up.
(c) Install the screw, connect the connector.



(d) Using a snap ring expander, install the magnet clutch rotor and a new snap ring with the chamfered side facing up.
(e) Install the magnet clutch washer and magnet clutch hub.

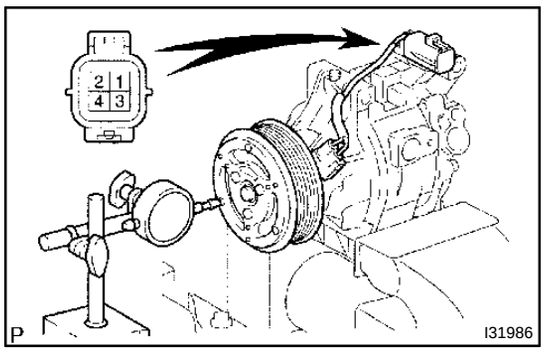
NOTICE:
Do not change the combination of the magnet clutch washers used before disassembly.



(f) Using vise pliers, hold the magnet clutch hub and install the bolt.
Torque: 13 N·m (134 kgf·cm, 9.7 ft·lbf)

NOTICE:
Ensure that there is no foreign matter or oil on the compressor shaft, bolt, and clutch hub.

HINT:
Cover the magnet clutch with a shop rag when holding the magnet clutch hub to prevent it from being damaged.



9. INSPECT MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the magnet clutch hub.
(b) Connect the battery positive lead to terminal 1 of magnet clutch connector and the negative lead to the earth wire. Turn on and off the magnet clutch and measure the clearance.
Standard clearance:
0.20 to 0.45 mm (0.008 to 0.018 in.)

If the measured value is out of the standard range, remove the magnet clutch hub and adjust it with magnet clutch washers.

NOTICE:
Adjustment shall be performed with 3 or less magnet clutch washers.

10. ADJUST COMPRESSOR OIL

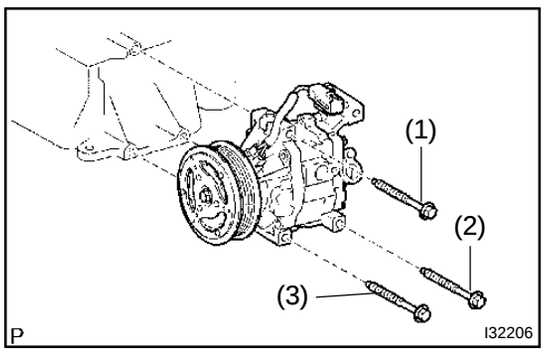
(a) When replacing the compressor and magnetic clutch with a new one, after gradually removing the refrigerant gas from the service valve, drain the following amount of oil from the new compressor and magnetic clutch before installation.

Standard:

(Oil capacity inside new compressor and magnetic clutch: 60 ± 10 cc (2.0 ± 0.3 fl. oz.)) - (Remaining oil amount in the removed compressor and magnetic clutch) = (Oil amount to be removed when replacing)

NOTICE:

- **When checking the compressor oil level, observe the precautions on the cooler removal/installation.**
- **Because compressor oil remains in the pipes of the vehicle, if a new compressor and magnetic clutch is installed without removing some oil inside, the oil amount becomes too much, preventing heat exchange in the refrigerant cycle and causing refrigerant failure.**
- **If the remaining oil in the removed compressor and magnetic clutch is too small in volume, check for oil leakage.**
- **Be sure to use ND-OIL8 or equivalent for compressor oil.**



11. INSTALL COMPRESSOR AND MAGNETIC CLUTCH

(a) Install the compressor and magnetic clutch with the 3 bolts.

Torque: 29 N·m (295 kgf·cm, 21 ft·lbf)

NOTICE:

Tighten the bolts in the order shown in the illustration to install the compressor and magnetic clutch.

(b) Connect the connector.

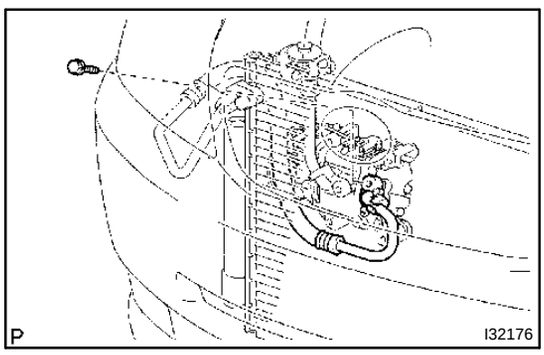
12. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the attached vinyl tape from the hose.

(b) Sufficiently apply compressor oil to a new O-ring and fitting surface of the compressor and magnetic clutch.

Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring to the cooler refrigerant discharge hose No.1.



(d) Install the cooler refrigerant discharge hose No.1. to the compressor and magnetic clutch with the bolt.

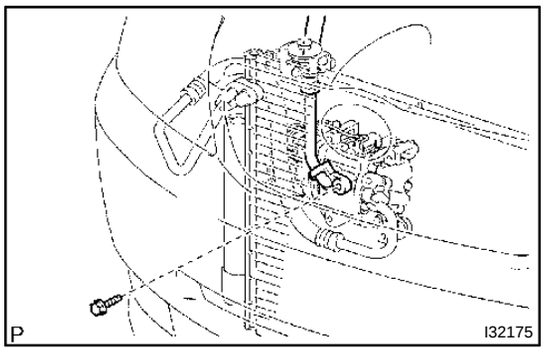
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

13. INSTALL COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Remove the attached vinyl tape from the hose.

(b) Sufficiently apply compressor oil to a new O-ring and fitting surface of the compressor and magnetic clutch.
Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring to the cooler refrigerant suction hose No.1.



(d) Install the cooler refrigerant suction hose No.1 to the compressor and magnetic clutch with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

14. CHARGE REFRIGERANT **(SEE PAGE 55-7)**
Specified amount: 450 ± 30 g (15.9 ± 1.1 oz.)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080), 07117-48130, 07117-48140

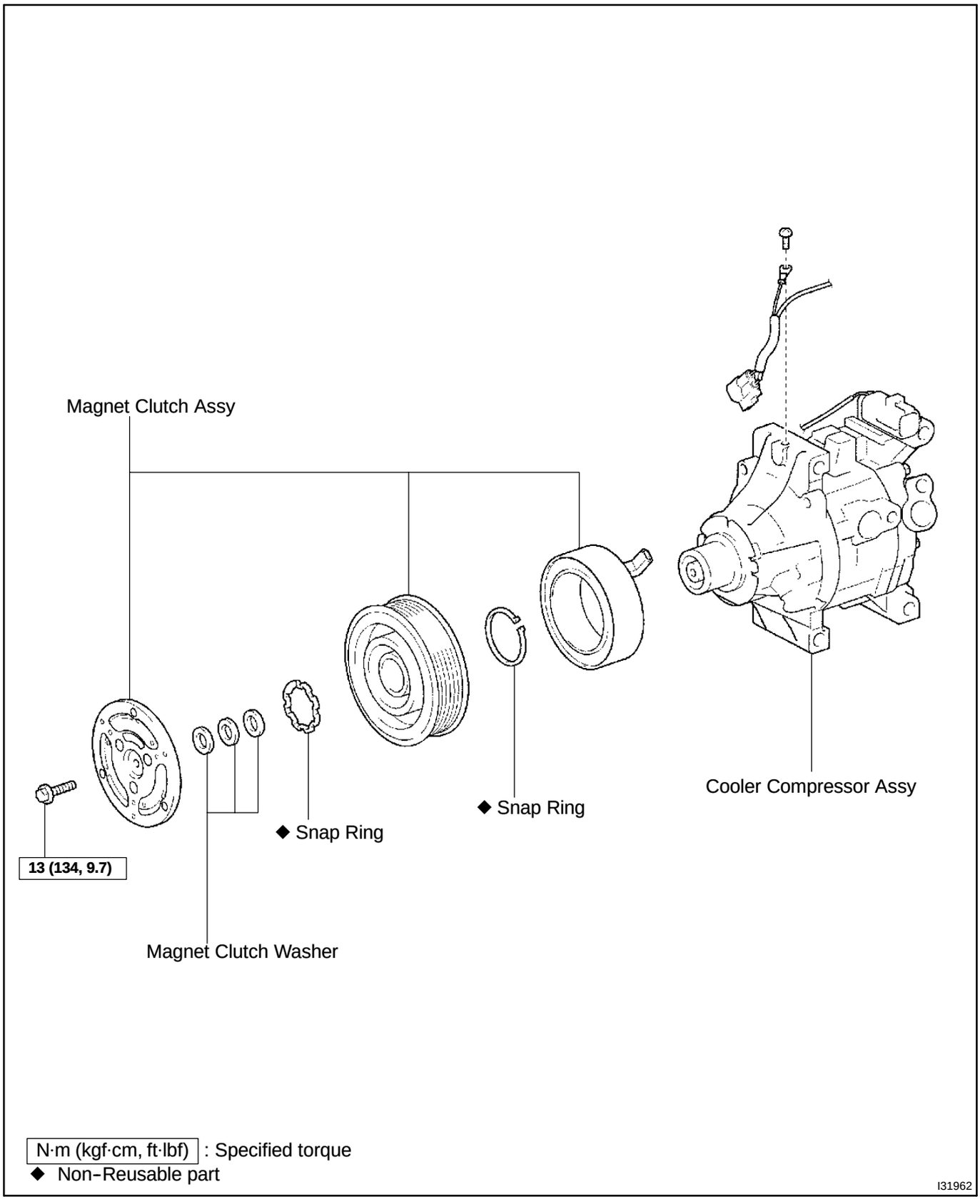
15. WARM UP ENGINE **(SEE PAGE 55-7)**

16. CHECK FOR LEAKAGE OF REFRIGERANT **(SEE PAGE 55-7)**

COOLER COMPRESSOR ASSY (1CD-FTV)

COMPONENTS

550G7-02



550G8-02

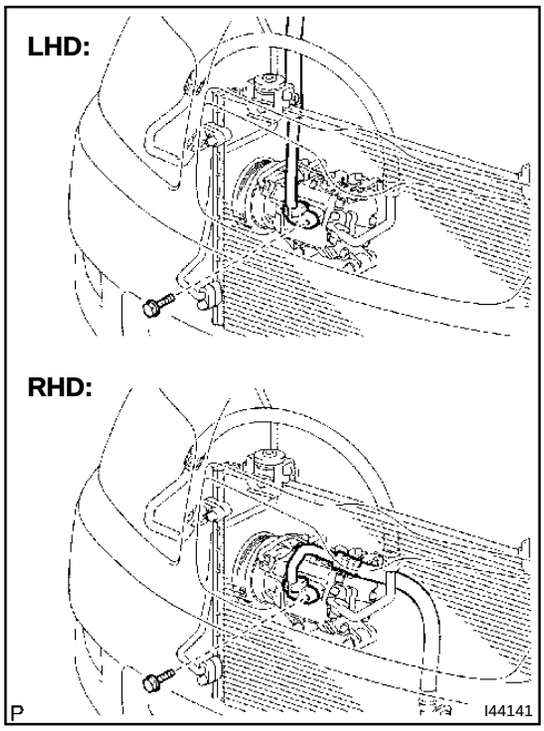
REPLACEMENT

HINT:

- COMPONENTS: See page 55-42.
- Installation is in the reverse order of removal.

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (SEE PAGE 55-7)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



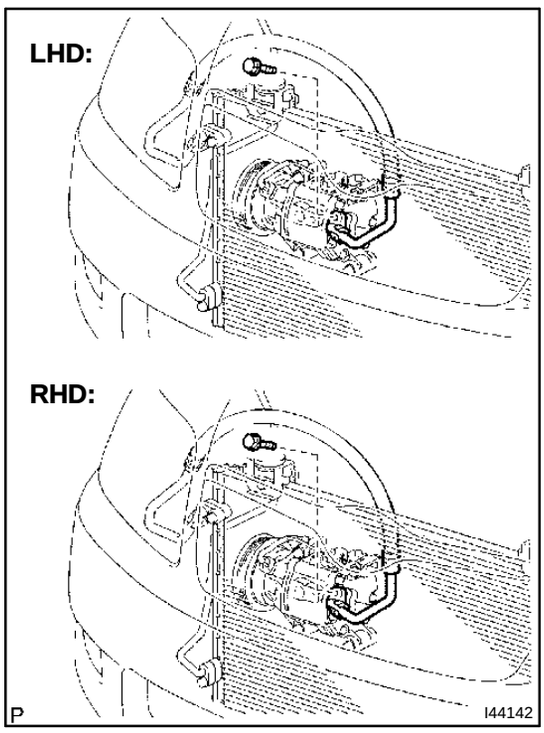
2. DISCONNECT COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant suction hose No.1 from the compressor and magnetic clutch.

(b) Remove the O-ring from the cooler refrigerant suction hose No.1.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



3. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant discharge hose No.1 from the compressor and magnetic clutch.

(b) Remove the O-ring from the cooler refrigerant discharge hose No.1.

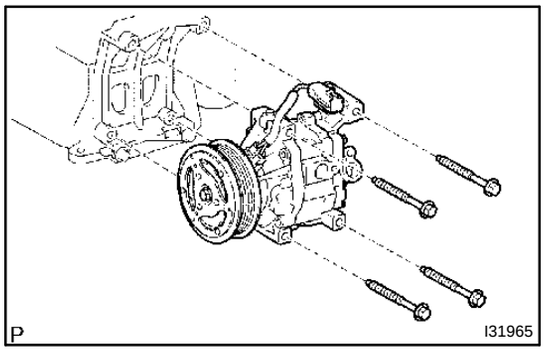
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

4. REMOVE ENGINE UNDER COVER RH

5. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(SEE PUB. NO. RM925E, PAGE 55-34)



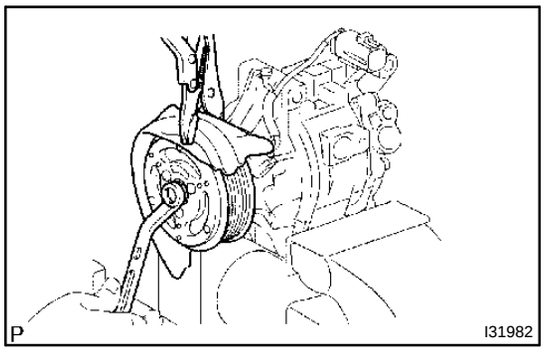
6. REMOVE COMPRESSOR AND MAGNETIC CLUTCH

(a) Disconnect the connector.

(b) Remove the 4 bolts and the compressor and magnetic clutch.

7. REMOVE MAGNET CLUTCH ASSY

(a) Place the compressor and magnetic clutch in vise.



(b) Using vise pliers, hold the magnet clutch hub.

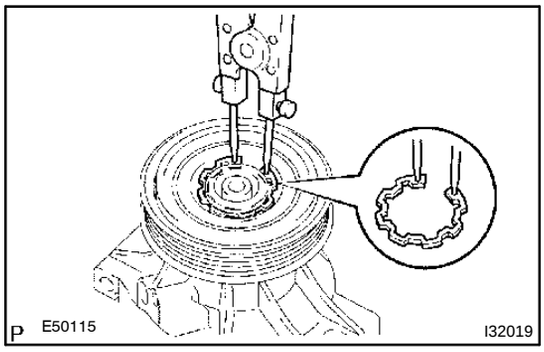
HINT:

Cover the magnet clutch with a shop rag when holding the magnet clutch hub to prevent it from being damaged.

(c) Remove the bolt, magnet clutch hub and magnet clutch washer.

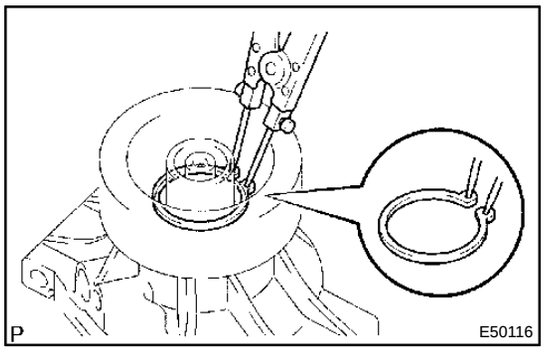
HINT:

There is no set number of magnet clutch washers since they are used for adjustment.

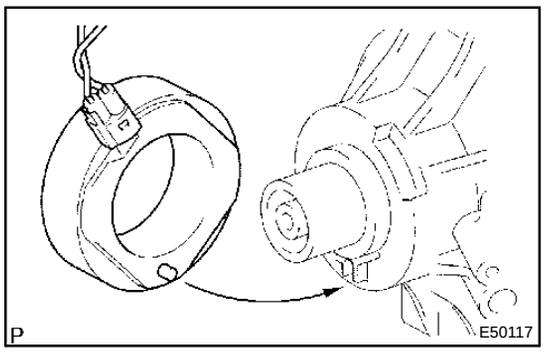


(d) Using a snap ring expander, remove the snap ring and magnet clutch rotor.

(e) Remove the screw, disconnect the connector.

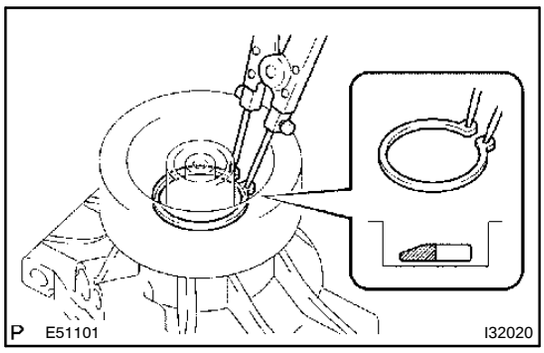


(f) Using a snap ring expander, remove the snap ring and magnet clutch stator.



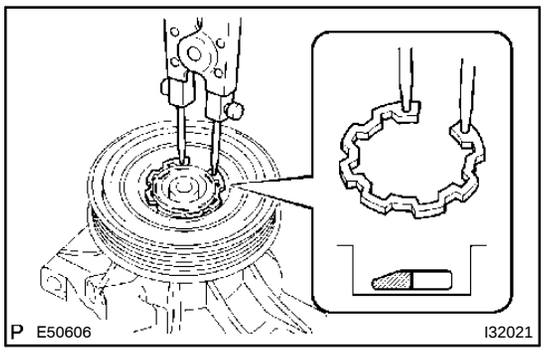
8. INSTALL MAGNET CLUTCH ASSY

(a) Matching the parts shown in the illustration, install the magnet clutch stator.



(b) Using a snap ring expander, install a new snap ring with the chamfered side facing up.

(c) Install the screw, connect the connector.

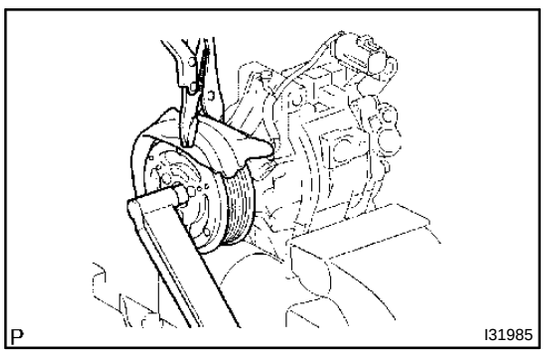


(d) Using a snap ring expander, install the magnet clutch rotor and a new snap ring with the chamfered side facing up.

(e) Install the magnet clutch washer and magnet clutch hub.

NOTICE:

Do not change the combination of the magnet clutch washers used before disassembly.



(f) Using vise pliers, hold the magnet clutch hub and install the bolt.

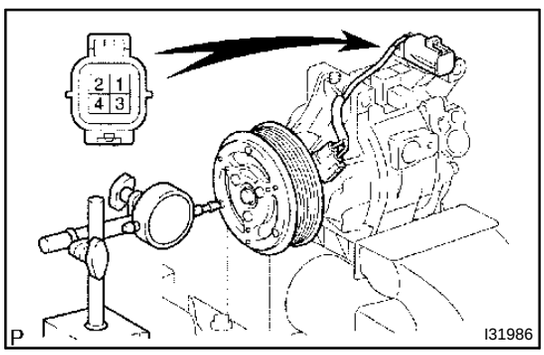
Torque: 13 N·m (134 kgf·cm, 9.7 ft·lbf)

NOTICE:

Ensure that there is no foreign matter or oil on the compressor shaft, bolt, and clutch hub.

HINT:

Cover the magnet clutch with a shop rag when holding the magnet clutch hub to prevent it from being damaged.



9. INSPECT MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the magnet clutch hub.

(b) Connect the battery positive lead to terminal 1 of magnet clutch connector and the negative lead to the earth wire. Turn on and off the magnet clutch and measure the clearance.

Standard clearance:

0.20 to 0.45 mm (0.008 to 0.018 in.)

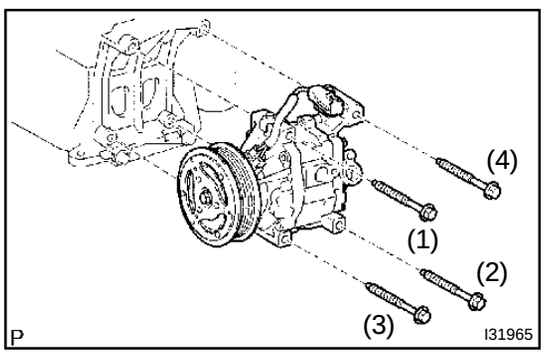
If the measured value is out of the standard range, remove the magnet clutch hub and adjust it with magnet clutch washers.

NOTICE:
Adjustment shall be performed with 3 or less magnet clutch washers.

10. ADJUST COMPRESSOR OIL

(a) When replacing the compressor and magnetic clutch with a new one, after gradually removing the refrigerant gas from the service valve, drain the following amount of oil from the new compressor and magnetic clutch before installation.
Standard:
(Oil capacity inside new compressor and magnetic clutch: 60 ± 10 cc (2.0 ± 0.3 fl. oz.)) - (Remaining oil amount in the removed compressor and magnetic clutch) = (Oil amount to be removed when replacing)

NOTICE:
- **When checking the compressor oil level, observe the precautions on the cooler removal/installation.**
- **Because compressor oil remains in the pipes of the vehicle, if a new compressor and magnetic clutch is installed without removing some oil inside, the oil amount becomes too much, preventing heat exchange in the refrigerant cycle and causing refrigerant failure.**
- **If the remaining oil in the removed compressor and magnetic clutch is too small in volume, check for oil leakage.**
- **Be sure to use ND-OIL8 or equivalent for compressor oil.**



11. INSTALL COMPRESSOR AND MAGNETIC CLUTCH

(a) Install the compressor and magnetic clutch with the 4 bolts.
Torque: 29 N·m (295 kgf·cm, 21 ft·lbf)

NOTICE:
Tighten the bolts in the order shown in the illustration to install the compressor and magnetic clutch.

(b) Connect the connector.

12. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(SEE PUB. NO. RM925E, PAGE 55-34)

13. ADJUST V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(SEE PUB. NO. RM925E, PAGE 55-34)

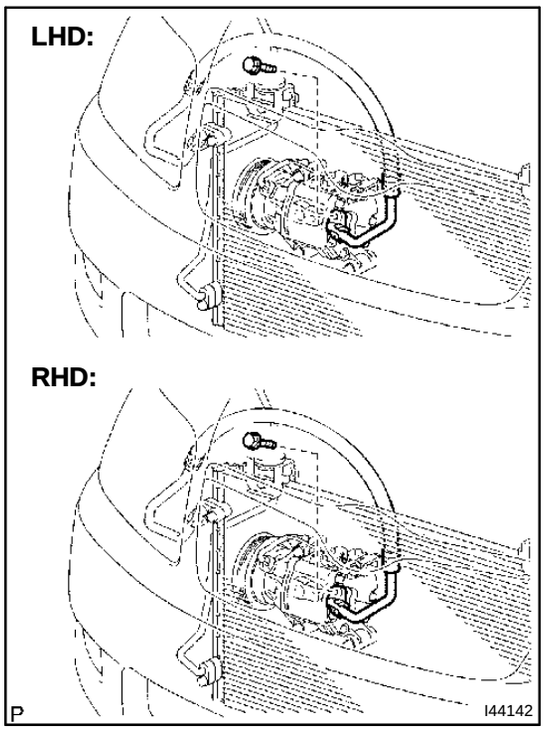
14. FULLY TIGHTEN V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(SEE PUB. NO. RM925E, PAGE 55-34)

15. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the attached vinyl tape from the hose.

(b) Sufficiently apply compressor oil to a new O-ring and fitting surface of the compressor and magnetic clutch.
Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring to the cooler refrigerant discharge hose No.1.



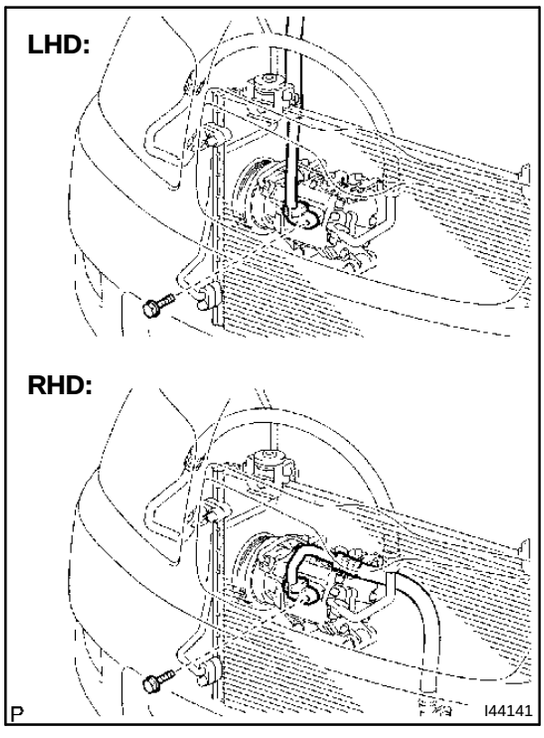
(d) Install the cooler refrigerant discharge hose No.1. to the compressor and magnetic clutch with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

16. INSTALL COOLER REFRIGERANT SUCTION HOSE NO.1

(a) Remove the attached vinyl tape from the hose.

(b) Sufficiently apply compressor oil to a new O-ring and fitting surface of the compressor and magnetic clutch.
Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring to the cooler refrigerant suction hose No.1.



(d) Install the cooler refrigerant suction hose No.1 to the compressor and magnetic clutch with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

17. CHARGE REFRIGERANT **(SEE PAGE 55-7)**
Specified amount: 450 ± 30 g (15.9 ± 1.1 oz.)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080), 07117-48130, 07117-48140

18. WARM UP ENGINE **(SEE PAGE 55-7)**

19. CHECK FOR LEAKAGE OF REFRIGERANT **(SEE PAGE 55-7)**

W/RECEIVER CONDENSER ASSY

550G9-02

ON-VEHICLE INSPECTION

1. INSPECT COOLER CONDENSER ASSY

(a) If the fin of the cooler condenser assy is dirty, clean it with water and dry them with compressed air.

NOTICE:

Do not damage the fin of the condenser assy.

(b) If the fin of the cooler condenser assy is bent, straighten them using a screwdriver or pliers.

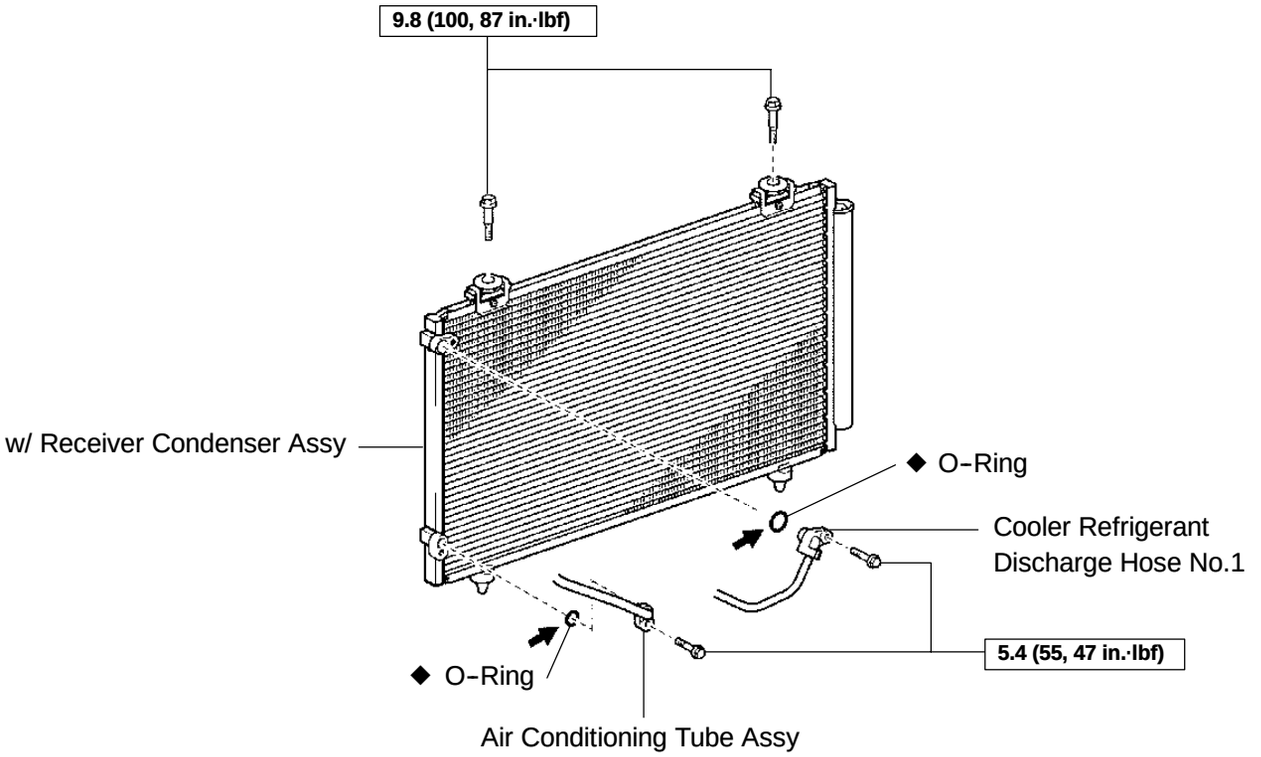
2. CHECK CONDENSER FOR LEAKAGE OF REFRIGERANT

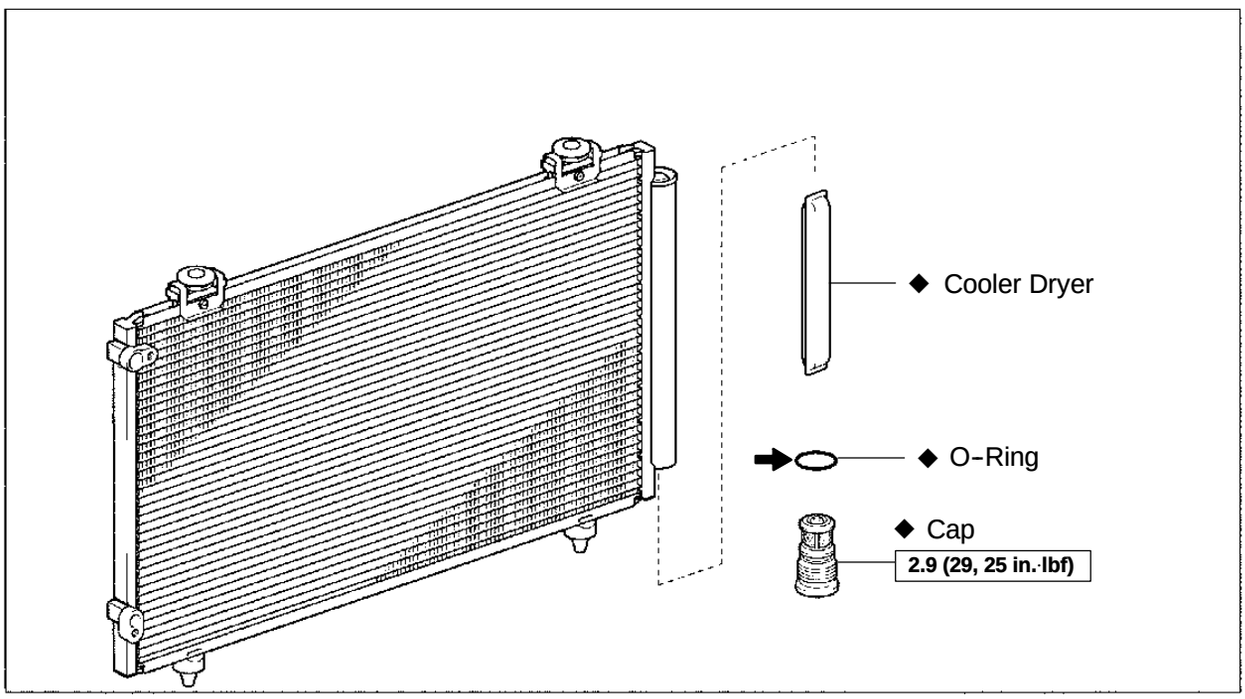
(a) Check the pipe joints for gas leakage using a halogen leak detector.

(b) Check the tightening torque of joint if a gas leakage is detected in a pipe joint.

550GA-02

COMPONENTS





N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
Compressor Oil ND-OIL 8 or equivalent

P

I42913

551G1-01

OVERHAUL

HINT:

- COMPONENTS: See page 55-49.
- Installation is in the reverse order of removal.

1. REMOVE RADIATOR GRILLE (SEDAN/STATION WAGON BODY TYPE) (SEE PAGE 76-2)

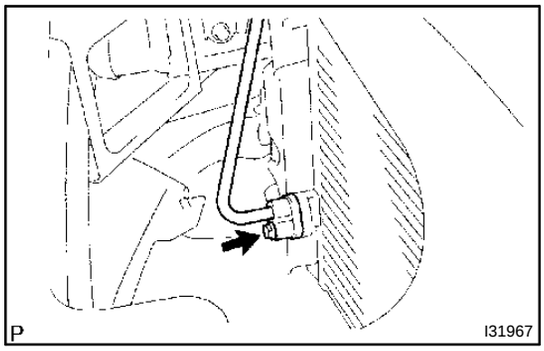
2. REMOVE FRONT BUMPER COVER (HATCH BACK BODY TYPE) (SEE PAGE 76-7)

HINT:

Refer to the instructions for removal of the front bumper cover.

3. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (SEE PAGE 55-7)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



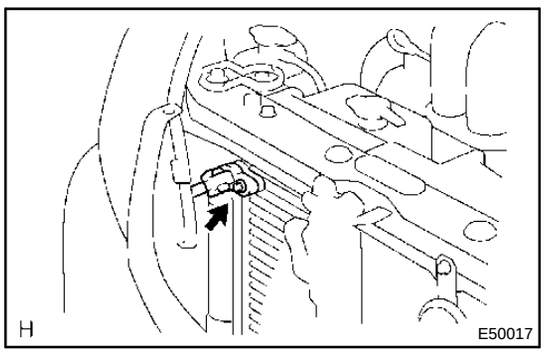
4. DISCONNECT AIR CONDITIONING TUBE ASSY

(a) Remove the bolt and disconnect the air conditioning tube assy from the cooler condenser assy.

(b) Remove the O-ring from the air conditioning tube assy.

NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



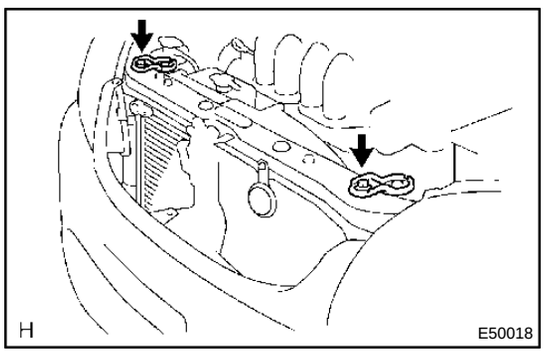
5. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the bolt and disconnect the cooler refrigerant discharge hose No.1 from the cooler condenser assy.

(b) Remove the O-ring from the cooler refrigerant discharge hose No.1.

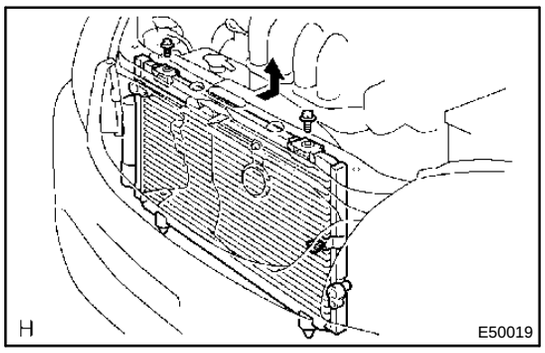
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.



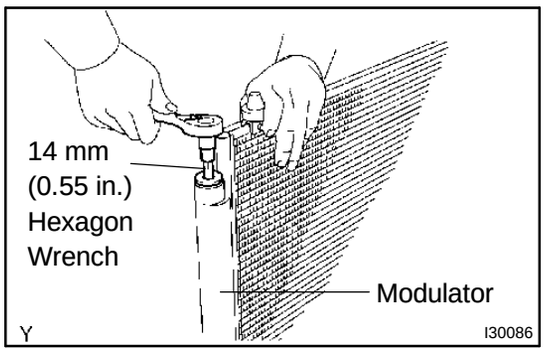
6. REMOVE W/RECEIVER CONDENSER ASSY

(a) Remove the 2 bolts and 2 radiator upper supports.



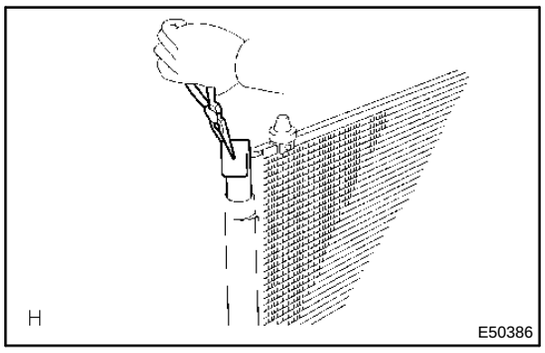
(b) Remove the 2 bolts.

(c) Slide the upper part of the radiator assy rearward to remove the w/ receiver condenser assy.

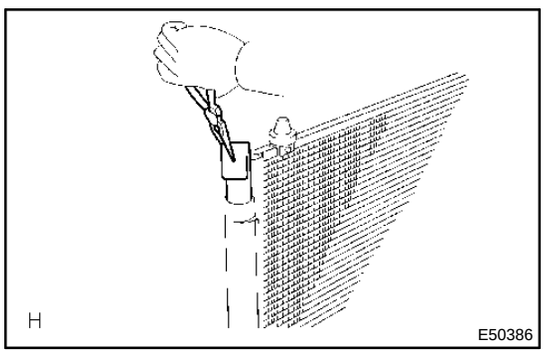


7. REMOVE COOLER DRYER

(a) Using a socket hexagon wrench 14 mm (0.55 in.), remove the cap from the modulator.

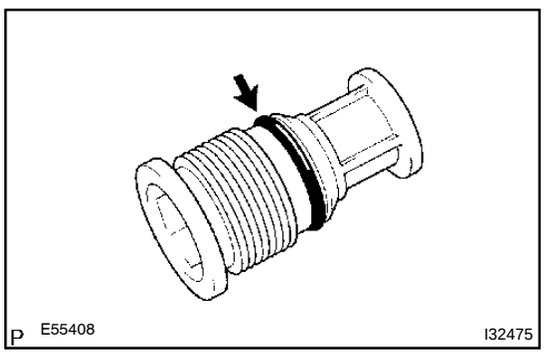


(b) Using pliers, remove the cooler drier.

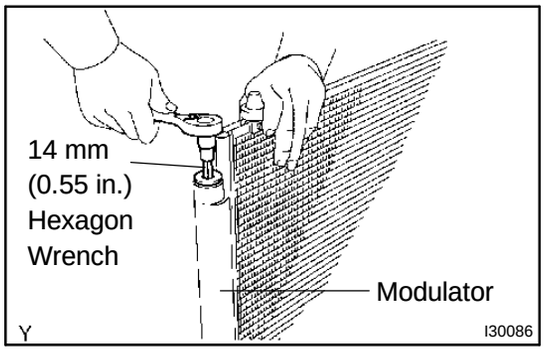


8. INSTALL COOLER DRYER

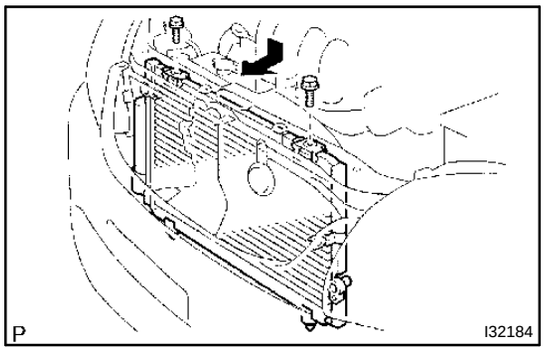
(a) Using pliers, install the cooler drier.



(b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the cap.
Compressor oil: ND-OIL8 or equivalent

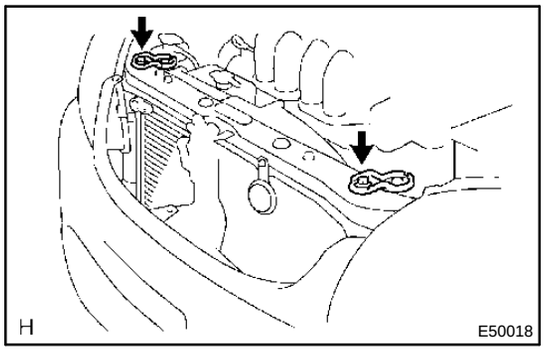


(c) Using a socket hexagon wrench 14 mm (0.55 in.), install the cap to the modulator.
Torque: 2.9 N·m (29 kgf·cm, 25 in.·lbf)



9. INSTALL W/RECEIVER CONDENSER ASSY

(a) Install the w/ receiver condenser assy with the 2 bolts.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



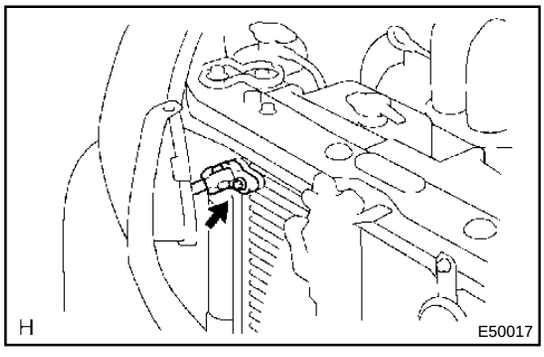
(b) Install the 2 radiator upper supports with the 2 bolts.

10. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1

(a) Remove the attached vinyl tape from the hose and the connecting part of the w/ receiver condenser assy.

(b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the hose joint.
Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring on the cooler refrigerant discharge hose No.1.



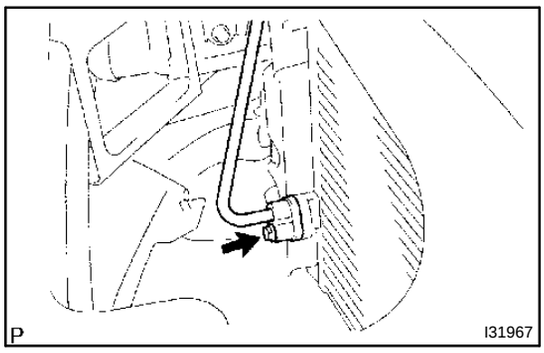
(d) Install the cooler refrigerant discharge hose No.1 on the cooler condenser assy with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 47 in.·lbf)

11. INSTALL AIR CONDITIONING TUBE ASSY

(a) Remove the attached vinyl tape from the hose and the connecting part of the w/ receiver condenser assy.

(b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the hose joint.
Compressor oil: ND-OIL8 or equivalent

(c) Install the O-ring on the air conditioning tube assy.



(d) Install the air conditioning tube assy on the cooler condenser assy with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 47 in.·lbf)

12. INSTALL FRONT BUMPER COVER (HATCH BACK BODY TYPE) **(SEE PAGE 76-7)**

13. CHARGE REFRIGERANT **(SEE PAGE 55-7)**
Specified amount: 450 ± 30 g (15.9 ± 1.1 oz.)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080), 07117-48130, 07117-48140

14. WARM UP ENGINE **(SEE PAGE 55-7)**

15. CHECK FOR LEAKAGE OF REFRIGERANT **(SEE PAGE 55-7)**

HEATER ASSY

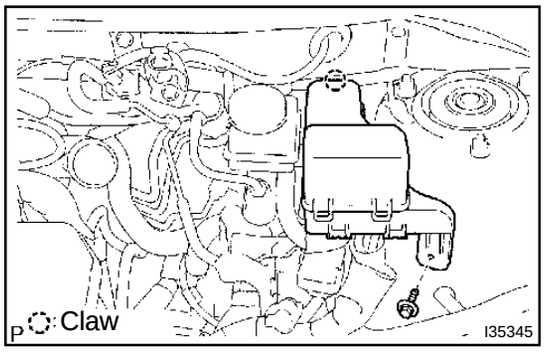
REPLACEMENT

551FZ-01

HINT:

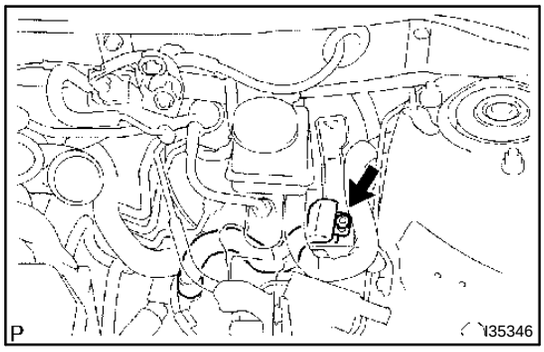
- Installation is in the reverse order of removal.

1. **DRAIN ENGINE COOLANT (SEE PUB. NO. RM1039E, PAGE 16-3)**
2. **REMOVE AIR CLEANER CAP SUB-ASSY (SEE PUB. NO. RM1039E, PAGE 11-28)**
3. **REMOVE FUEL FILTER ASSY (SEE PUB. NO. RM1039E, PAGE 11-28)**

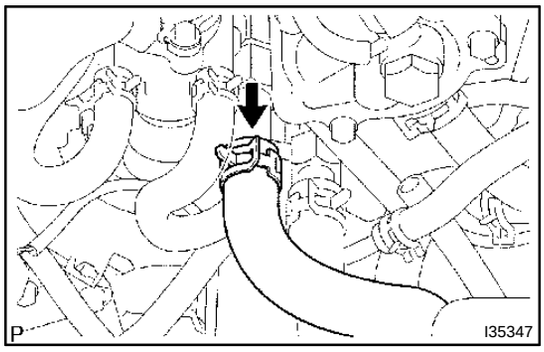


4. REMOVE AIR DUCT

(a) Release the claw and remove the bolt and the engine room relay No.2 block.



(b) Remove the clip and the air duct.

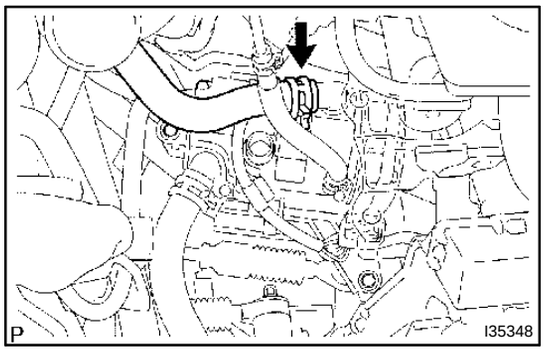


5. DISCONNECT HEATER OUTLET WATER HOSE

(a) Using pliers, grip the claws of the clip and slide the clip to disconnect the heater outlet water hose.

HINT:

Prepare a support plate and a cloth to catch the leaked coolant.

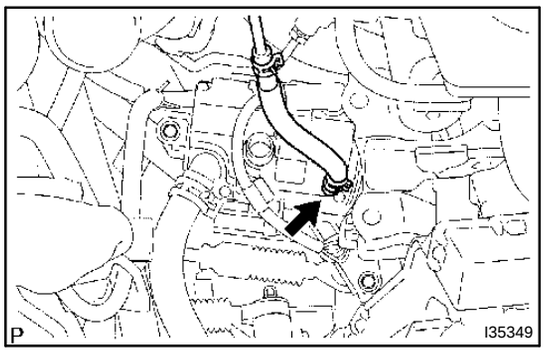


6. DISCONNECT HEATER WATER INLET HOSE A

(a) Using pliers, grip the claws of the clip and slide the clip to disconnect the heater water inlet hose A.

HINT:

Prepare a support plate and a cloth to catch the leaked coolant.



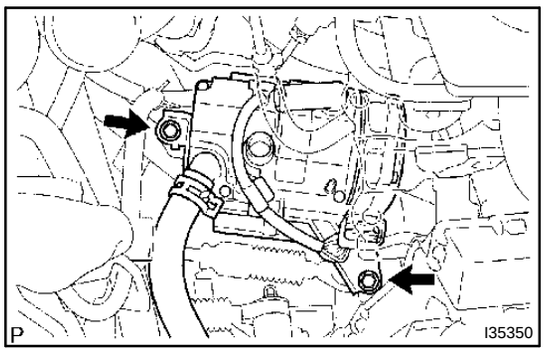
7. REMOVE HEATER ASSY

(a) Using pliers, grip the claws of the clip and slide the clip to disconnect the heater fuel hose.

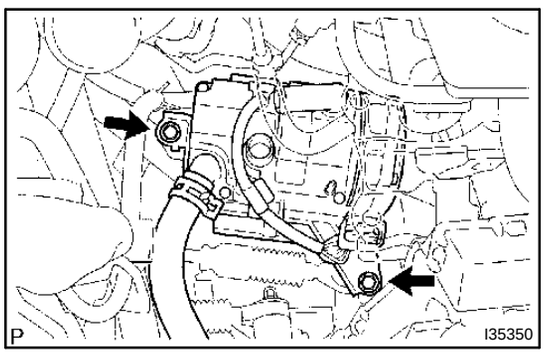
HINT:

Prepare a support plate and a cloth to catch the leaked fuel.

(b) Disconnect the connector.



(c) Remove the 2 bolts and the heater assy.

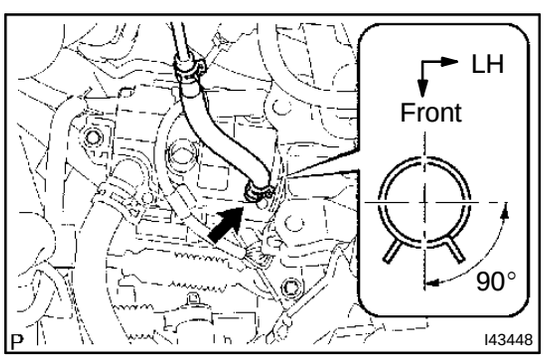


8. INSTALL HEATER ASSY

(a) Install the heater assy with the 2 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)

(b) Connect the connector.



(c) Using pliers, grip the claws of the clip and slide the clip to connect the heater fuel hose.

NOTICE:

Be sure to install the clip with the projections facing the front of the vehicle as shown in the illustration.

HINT:

Prepare a support plate and a cloth to catch the leaked fuel.

9. INSTALL FUEL FILTER ASSY (SEE PUB. NO. RM1039E, PAGE 11-28)

10. INSTALL AIR CLEANER CAP SUB-ASSY (SEE PUB. NO. RM1039E, PAGE 11-28)

11. CHECK FOR FUEL LEAKS (SEE PUB. NO. RM1039E, PAGE 11-5)

12. ADD COOLANT (SEE PUB. NO. RM1039E, PAGE 16-3)

13. CHECK FOR ENGINE COOLANT LEAKS (SEE PUB. NO. RM1039E, PAGE 16-1)

COOLER STABILIZER AMPLIFIER ASSY

551G0-01

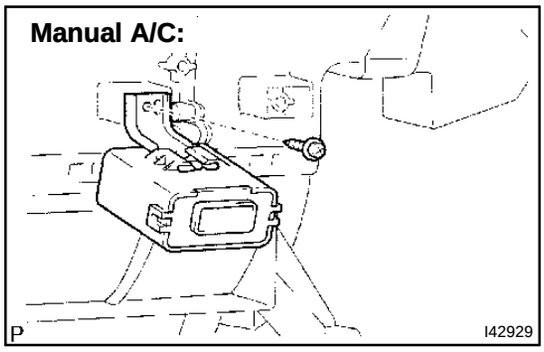
REPLACEMENT

HINT:

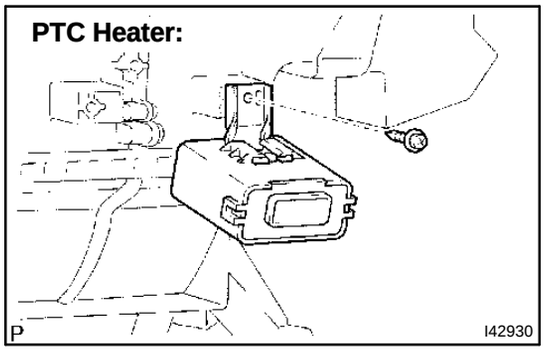
Installation is in the reverse order of removal.

1. **REMOVE CONSOLE PANEL UPPER** **(SEE PAGE 71-6)**
2. **REMOVE INSTRUMENT CLUSTER FINISH PANEL** **(SEE PAGE 71-6)**
3. **REMOVE HEATER CONTROL & ACCESSORY ASSY** **(SEE PAGE 55-13)**

Manual A/C:



PTC Heater:



4. **REMOVE COOLER STABILIZER AMPLIFIER ASSY**

(a) Disconnect the connecter.

(b) Remove the screw and cooler amplifier assy.

5. **INSTALL HEATER CONTROL & ACCESSORY ASSY** **(SEE PAGE 55-13)**

SUPPLEMENTAL RESTRAINT SYSTEM

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REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM1028E

NOTE: The above pages contain only the points which differ from the above listed manuals.

SUPPLEMENTAL RESTRAINT SYSTEM

PRECAUTION

600WC-01

CAUTION:

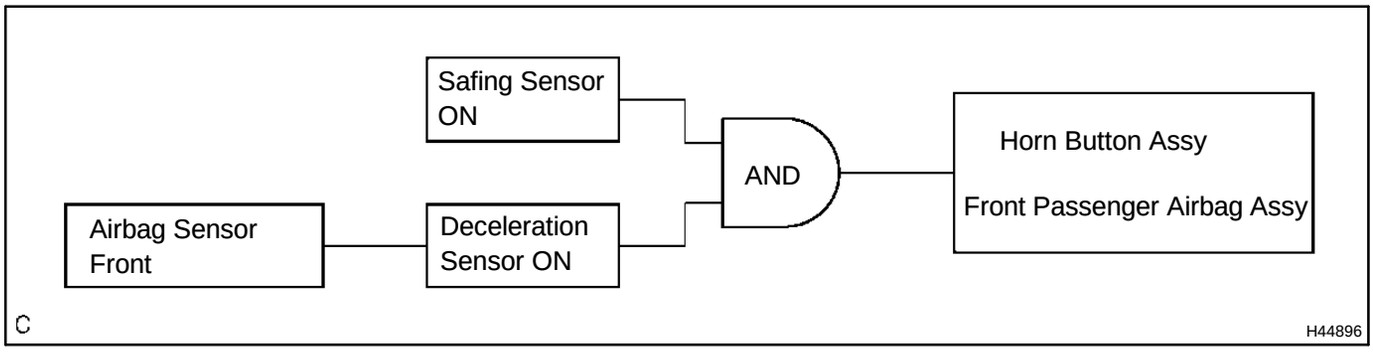
- **The vehicle is equipped with SRS, which consists of a driver airbag, front passenger airbag, side airbag and curtain shield airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible 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 indicated in the repair manual.**
- **Wait at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery before starting the operation.**
  (The SRS is equipped with a back–up power source, so that if work is started within 90 seconds after disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- **Do not expose the horn button assy, front passenger airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear or seat position airbag sensor directly to hot air or flames.**

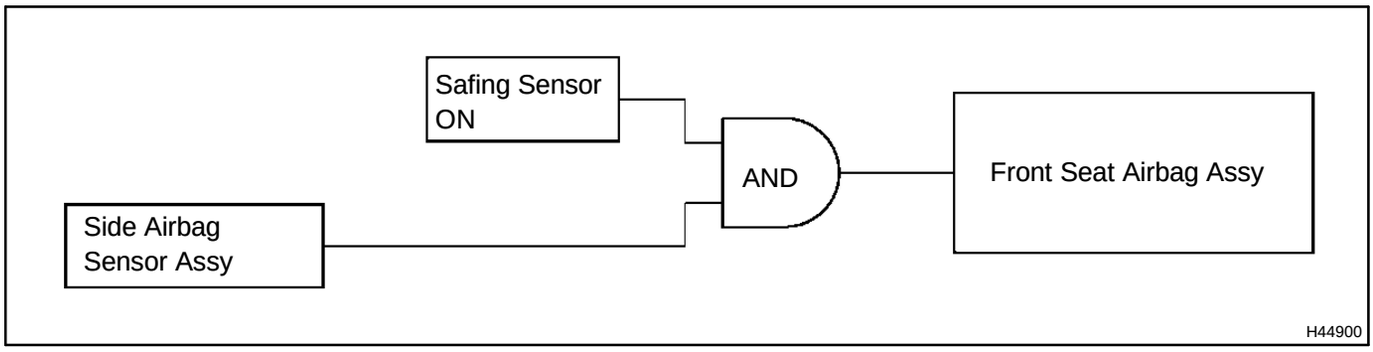
NOTICE:

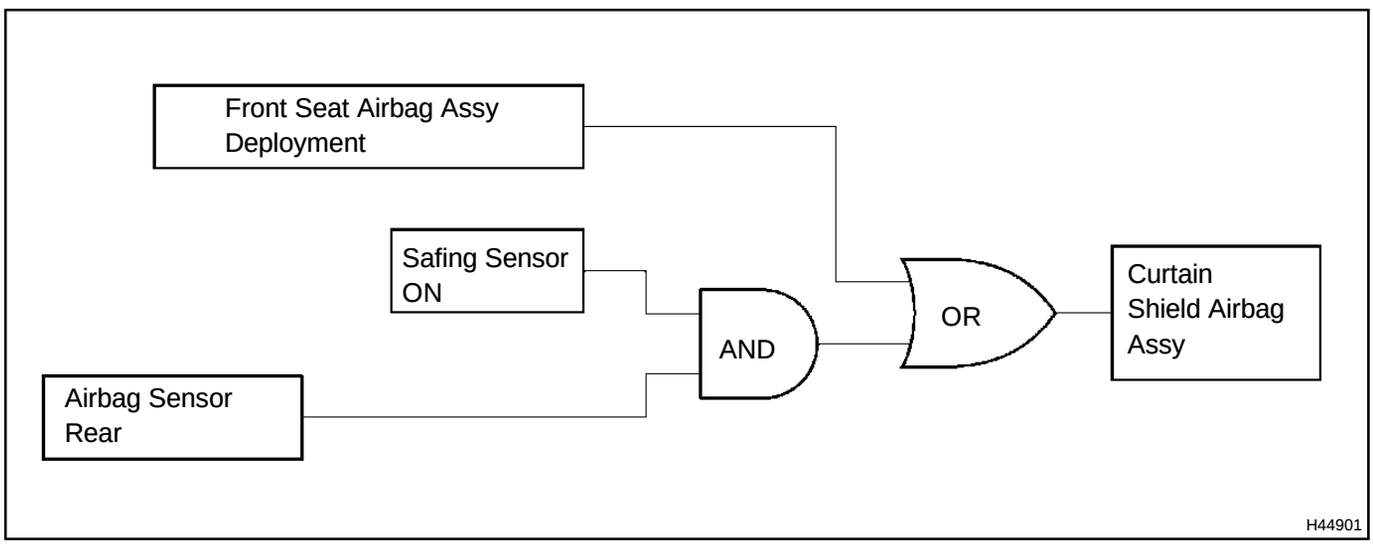
- **Malfunction symptoms of the SRS are difficult to confirm, so DTCs are the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect DTCs before disconnecting the battery.**
- **Even in the case of a minor collision when the SRS does not deploy, the horn button assy, front passenger airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear and seat position airbag sensor should be inspected (see page 60–14).**
- **Before repair work, remove the airbag sensor if any kind of shock is likely to occur to the airbag sensor during the operation.**
- **Never use SRS parts from another vehicle. When replacing the parts, replace them with new ones.**
- **Never disassemble or repair the horn button assy, front passenger airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear or seat position airbag sensor in order to reuse it.**
- **If the horn button assy, front passenger airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear or seat position airbag sensor has been dropped, or if there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.**
- **Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the electrical circuits.**
- **Information labels are attached to the periphery of the SRS components. Follow the instructions in the caution.**
- **After work on the SRS is completed, perform the SRS warning light check (see page 05–719).**
- **When the negative (–) terminal cable is disconnected from the battery, the memory will be cleared. Because of this, be sure to make a record of the contents memorized in each system before starting work. When work is finished, adjust each system as it was before. Never use a back–up power supply from outside the vehicle to avoid erasing the memory in any system.**
- **If the vehicle is equipped with a mobile communication system, see page 01–4.**

1. DEPLOYMENT CONDITION

(a) When the vehicle collides and the shock is greater than the specified value, the SRS is activated automatically. The airbag sensor assy center includes the safing sensor and deceleration sensor. The safing sensor was designed to be turned on at a smaller deceleration rate than the deceleration sensor. The deceleration sensor determines whether or not ignition is necessary based on signals from the airbag sensor front. Current flows to the squibs to deploy the SRS when the conditions shown in the illustrations below are met.



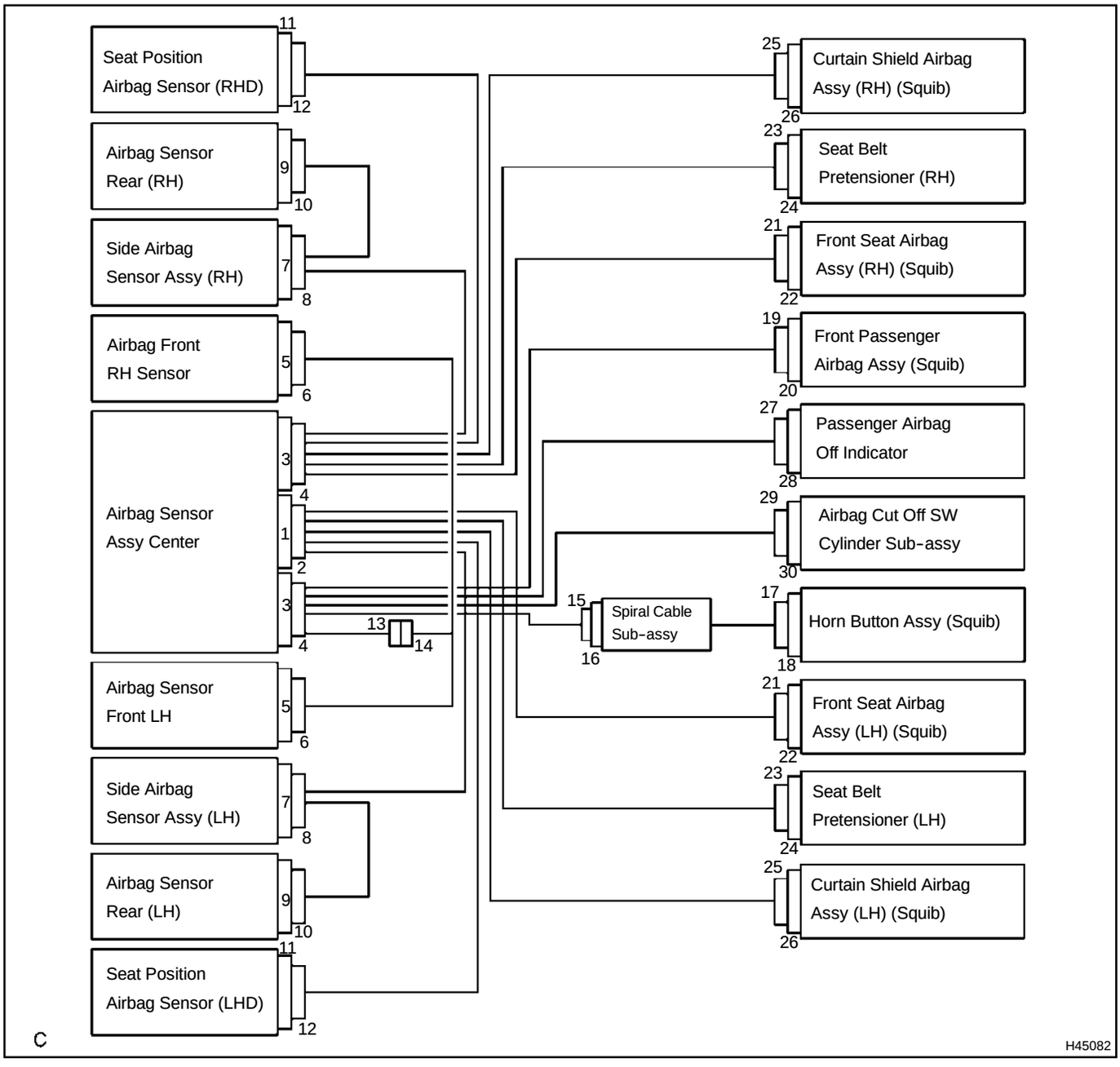




2. SRS CONNECTORS

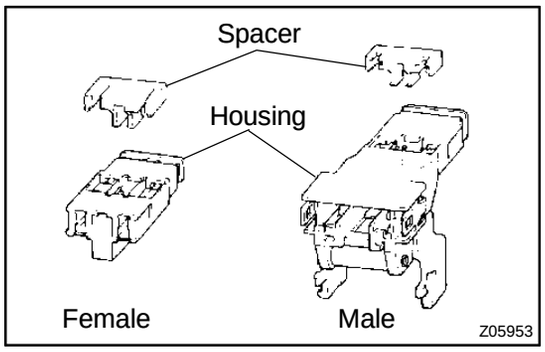
HINT:

SRS connectors are located as shown in the following illustration.



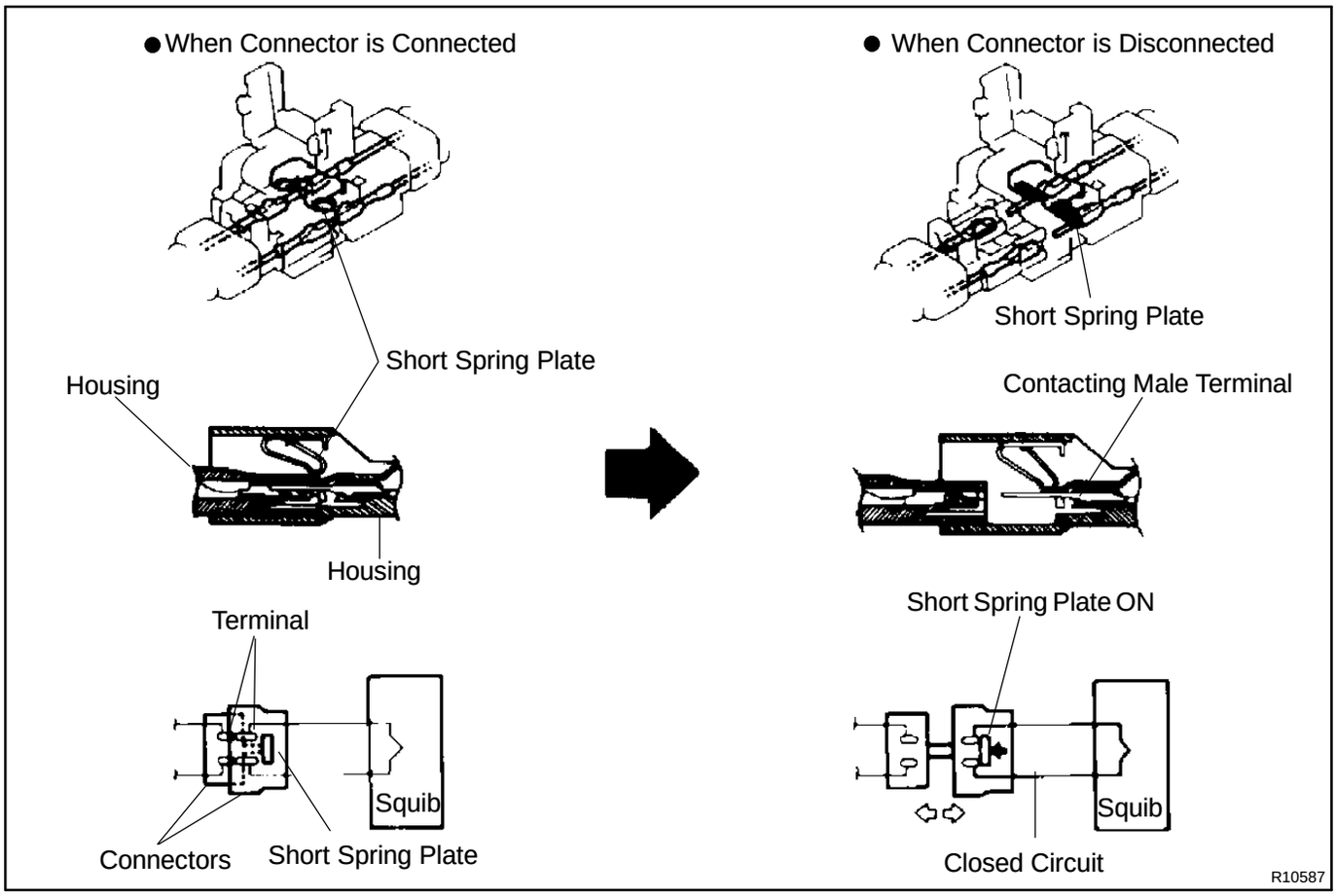
No.	Connector Type	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 6, 8, 10, 13, 14, 15, 19, 21, 22
(2)	Activation Prevention Mechanism	Connectors 16, 18, 20, 22, 24, 26
(3)	Half Connection Prevention Mechanism	Connectors 6, 8, 10, 14, 15, 19, 21
(4)	Connector Lock Mechanism (1)	Connectors 17, 23, 25
(5)	Connector Lock Mechanism (2)	Connectors 2, 4
(6)	Improper Connection Prevention Lock Mechanism	Connectors 1, 3

(a) All connectors in the SRS are colored yellow to distinguish them from other connectors, except the seat position airbag sensor connector. Some connectors have special functions, and are specially designed for the SRS. These connectors use durable gold-plated terminals, and are placed in the locations shown on the previous page to ensure high reliability.

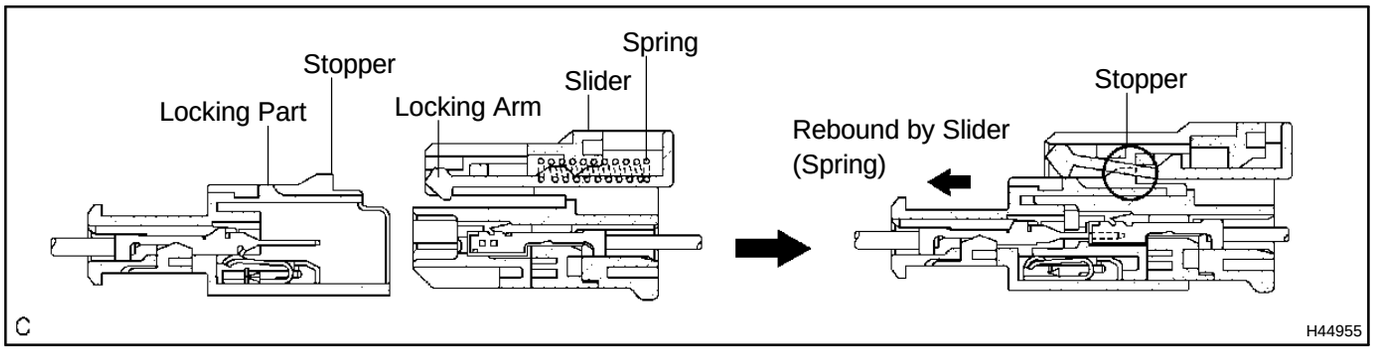


(1) Terminal twin-lock mechanism:
Each connector has a two-piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.

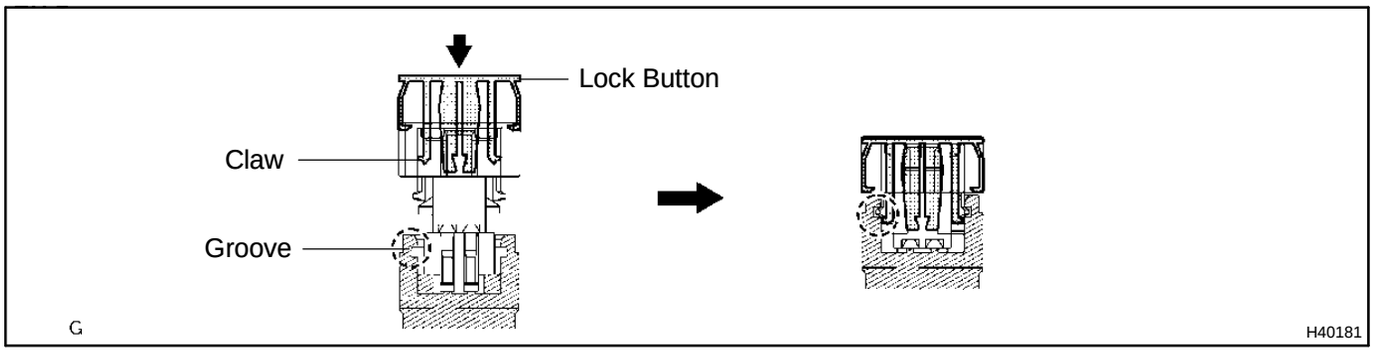
(2) Activation prevention mechanism:
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the positive (+) terminal and the negative (-) terminal of the squib.



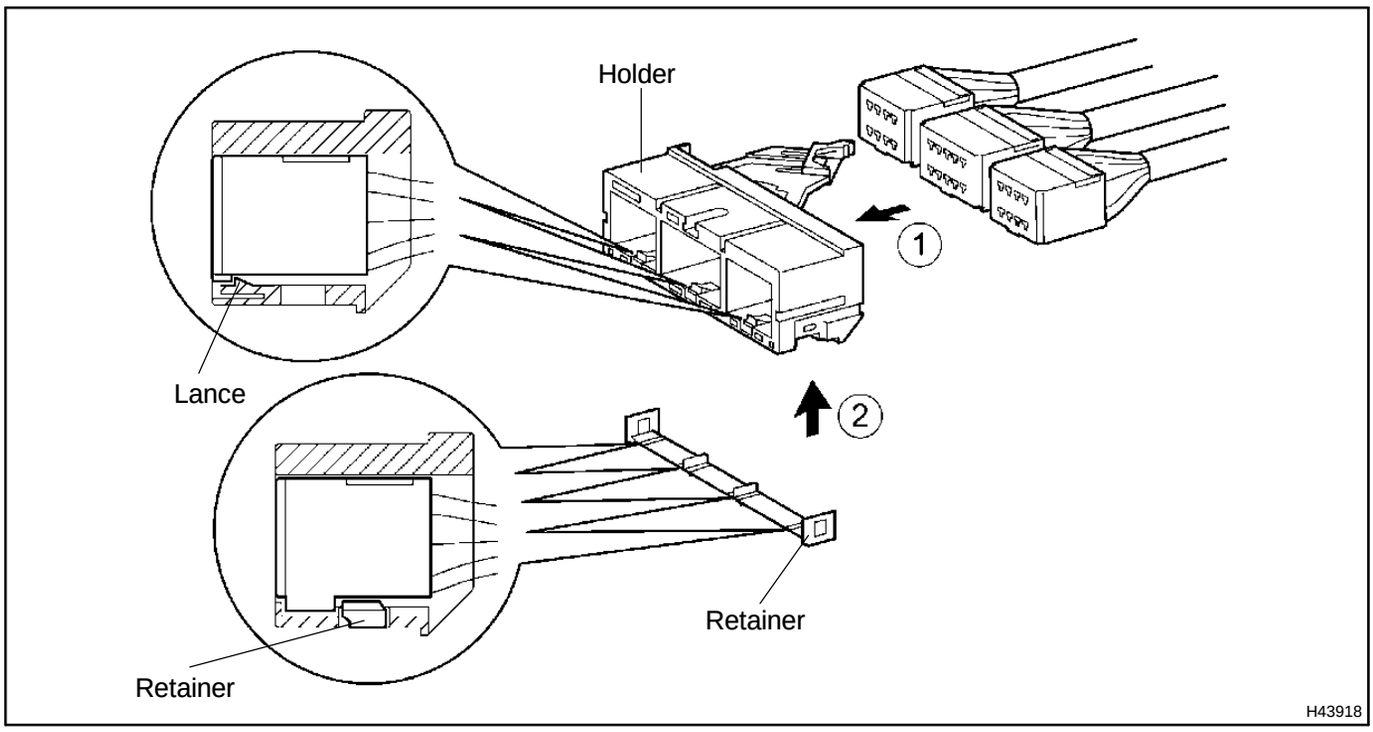
(3) Half connection prevention mechanism:
If the connector is not completely connected, the connector is disconnected due to the spring operation so that no continuity exists.



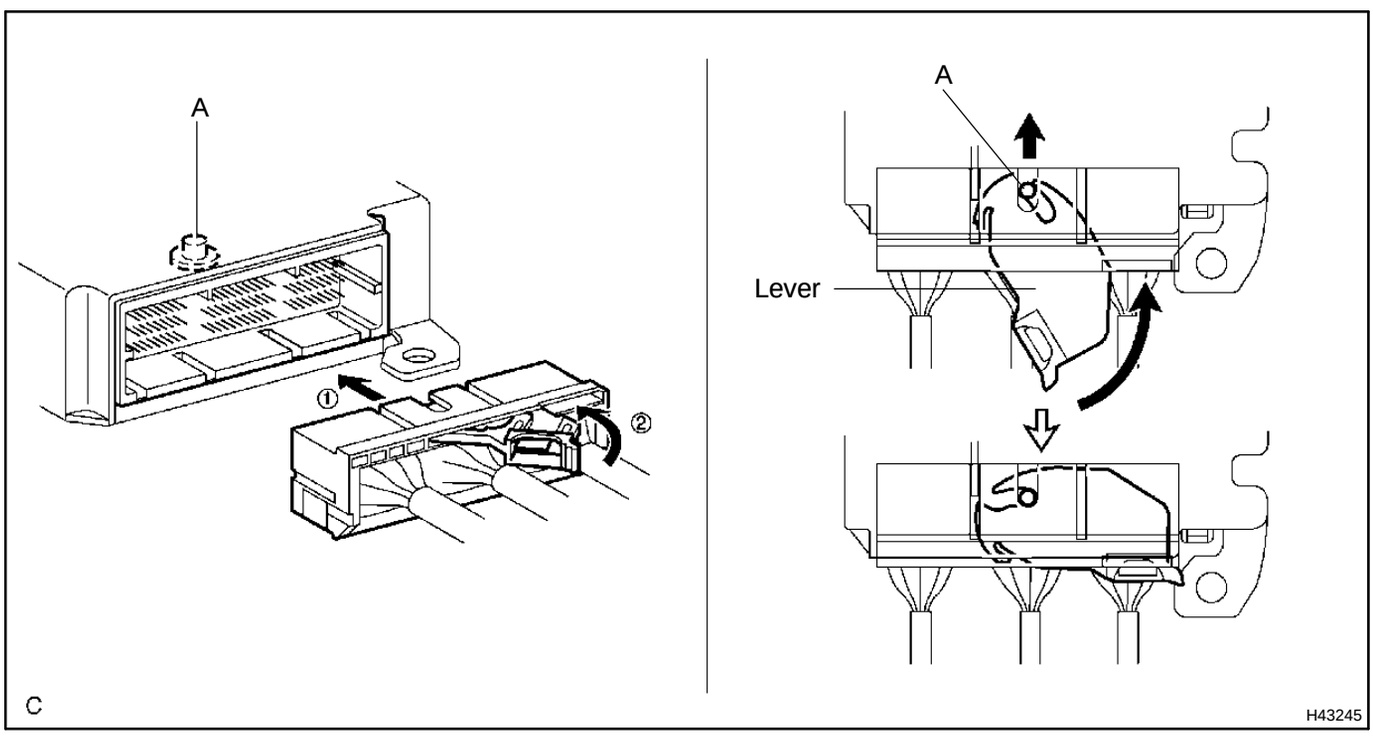
(4) Connector lock mechanism (1):
Locking the connector lock button connects the connector securely.



(5) Connector lock mechanism (2):
Both the primary lock with holder lances and the secondary lock with retainer prevent the connectors from becoming disconnected.



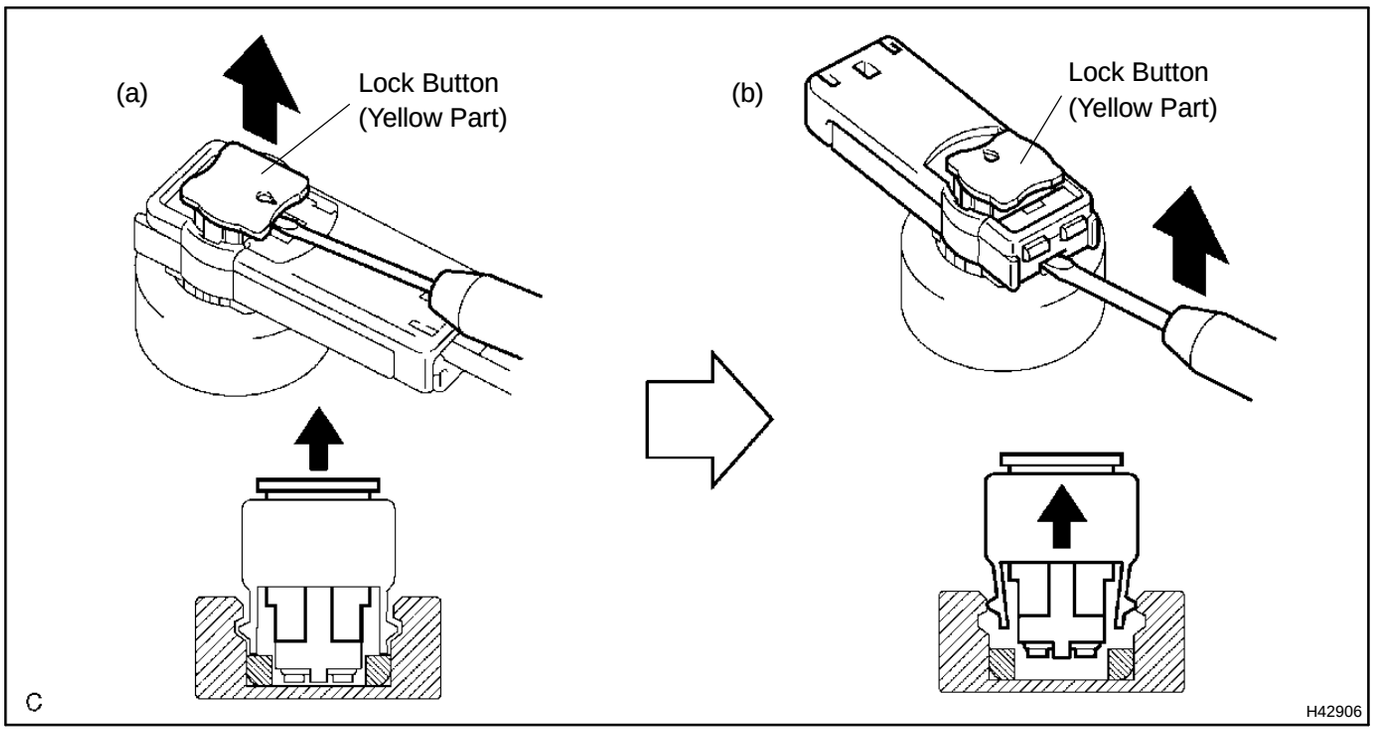
(6) Improper connection prevention lock mechanism:
When connecting the holder, the lever is pushed into the end by rotating around the A axis to lock the holder securely.



3. DISCONNECTION OF CONNECTORS FOR HORN BUTTON ASSY AND CURTAIN SHIELD AIRBAG ASSY

(a) Release the lock button (yellow part) of the connector using a screwdriver.

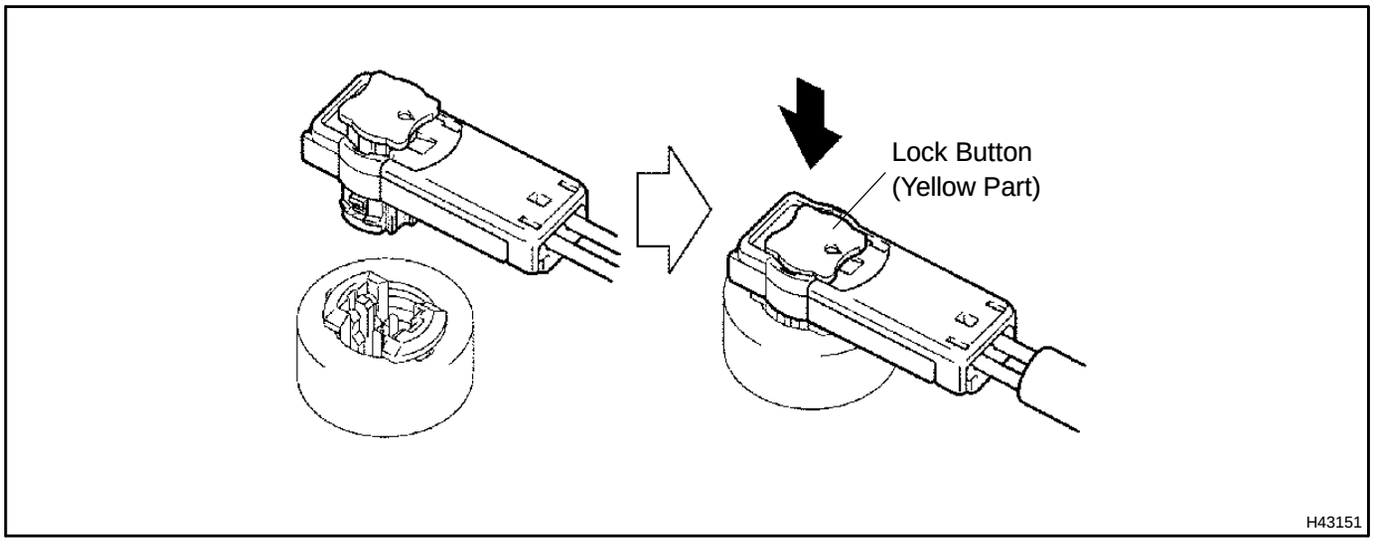
(b) Insert the screwdriver tip between the connector and the base, and then raise the connector.



4. CONNECTION OF CONNECTORS FOR HORN BUTTON ASSY AND CURTAIN SHIELD AIRBAG ASSY

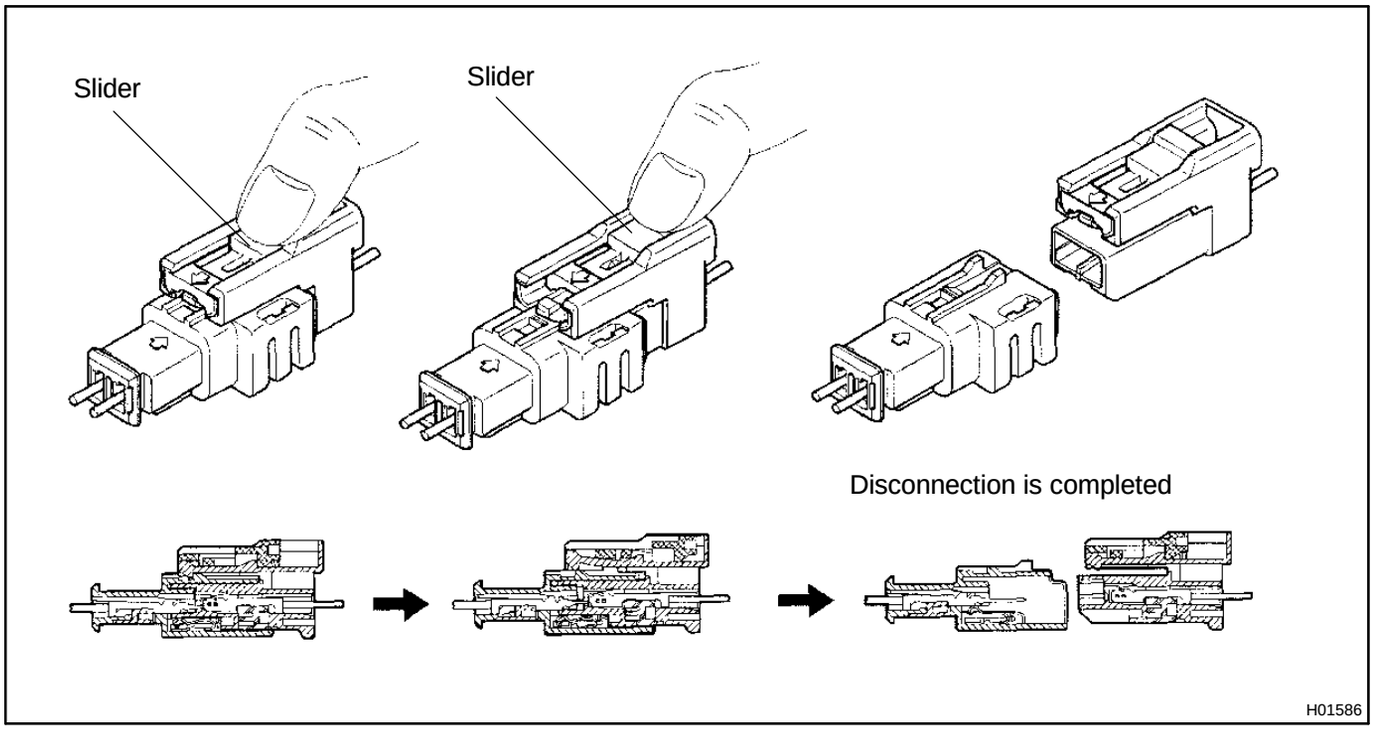
(a) Connect the connector.

(b) Push down securely on the lock button (yellow part) of the connector. (When locking, a click sound can be heard.)



5. DISCONNECTION OF CONNECTOR FOR FRONT PASSENGER AIRBAG ASSY

(a) Place a finger on the slider, slide the slider to release the lock, and then disconnect the connector.

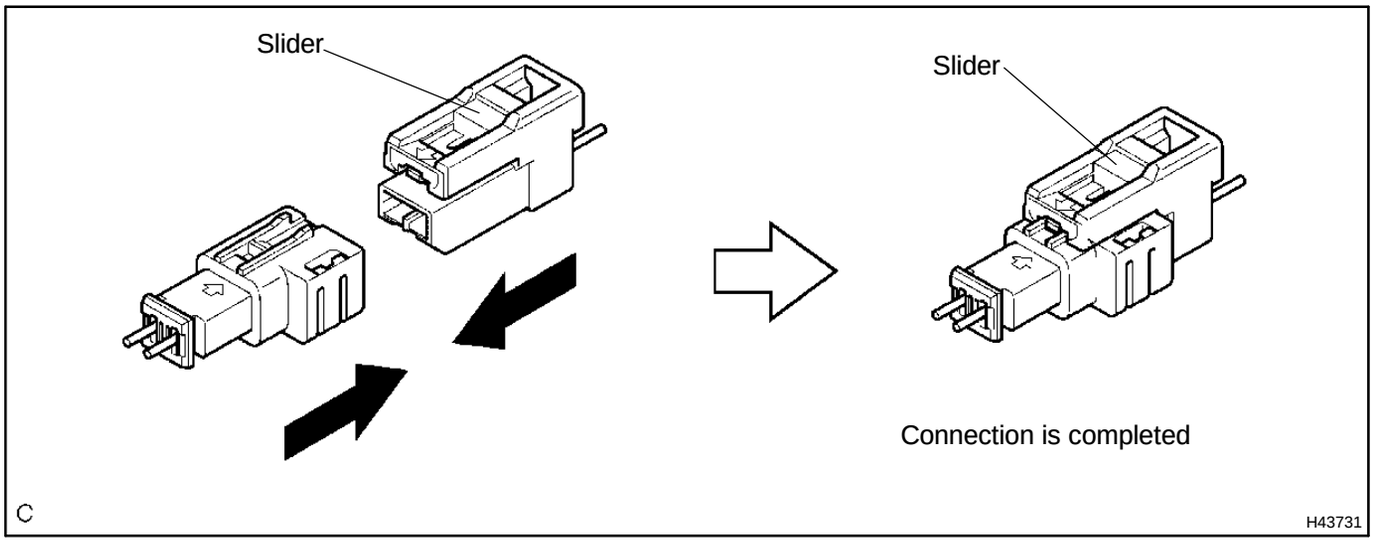


6. CONNECTION OF CONNECTOR FOR FRONT PASSENGER AIRBAG ASSY

(a) Connect the connector as shown in the illustration. (When locking, make sure that the slider returns to its original position and a click sound can be heard.)

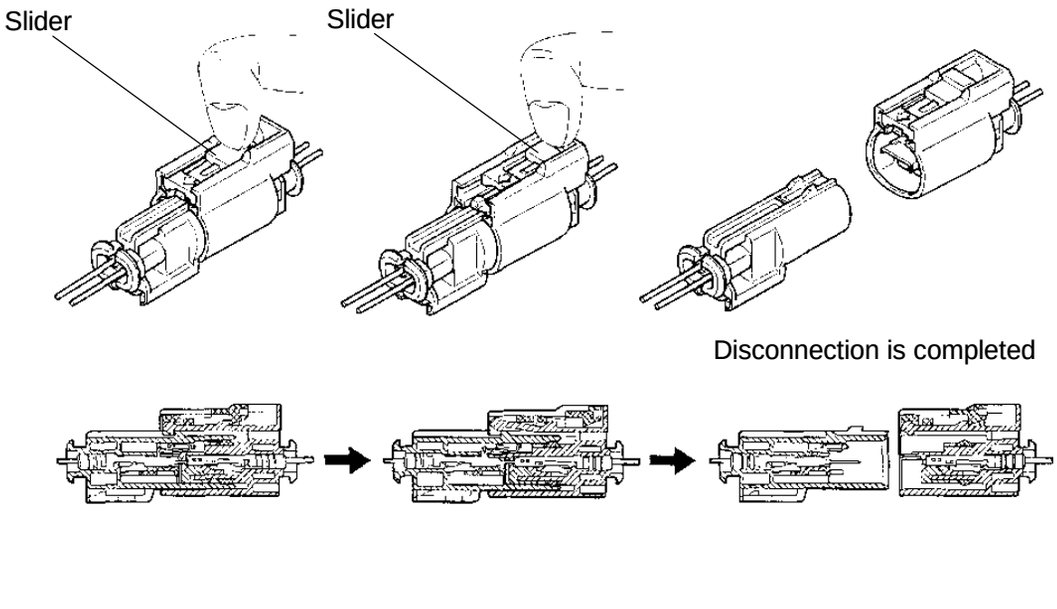
HINT:

When connecting, the slider will slide. Be sure not to touch the slider while connecting, as it may result in an insecure fit.



7. DISCONNECTION OF CONNECTOR FOR FRONT SEAT AIRBAG ASSY

(a) Place a finger on the slider, slide the slider to release the lock, and then disconnect the connector.

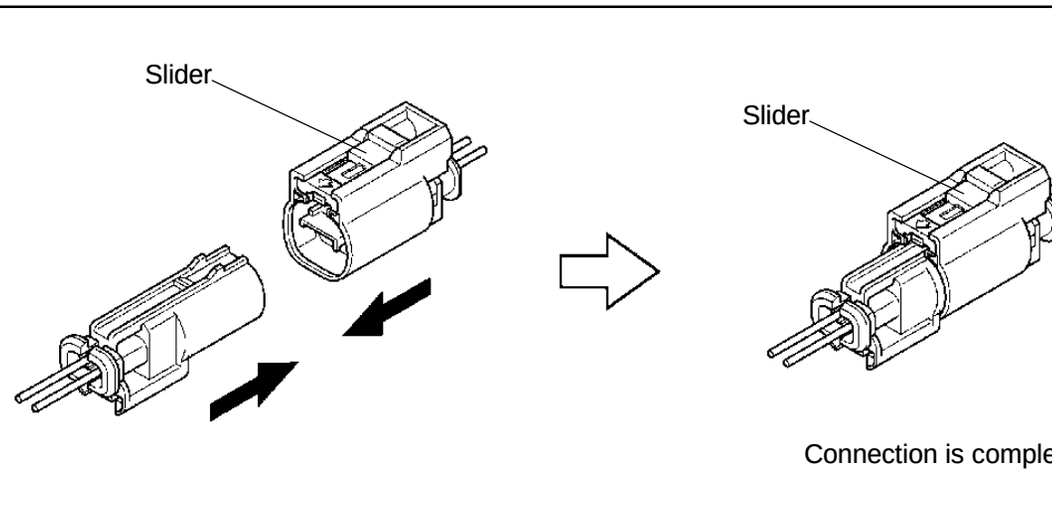


8. CONNECTION OF CONNECTOR FOR FRONT SEAT AIRBAG ASSY

(a) Connect the connector as shown in the illustration. (When locking, make sure that the slider returns to its original position and a click sound can be heard.)

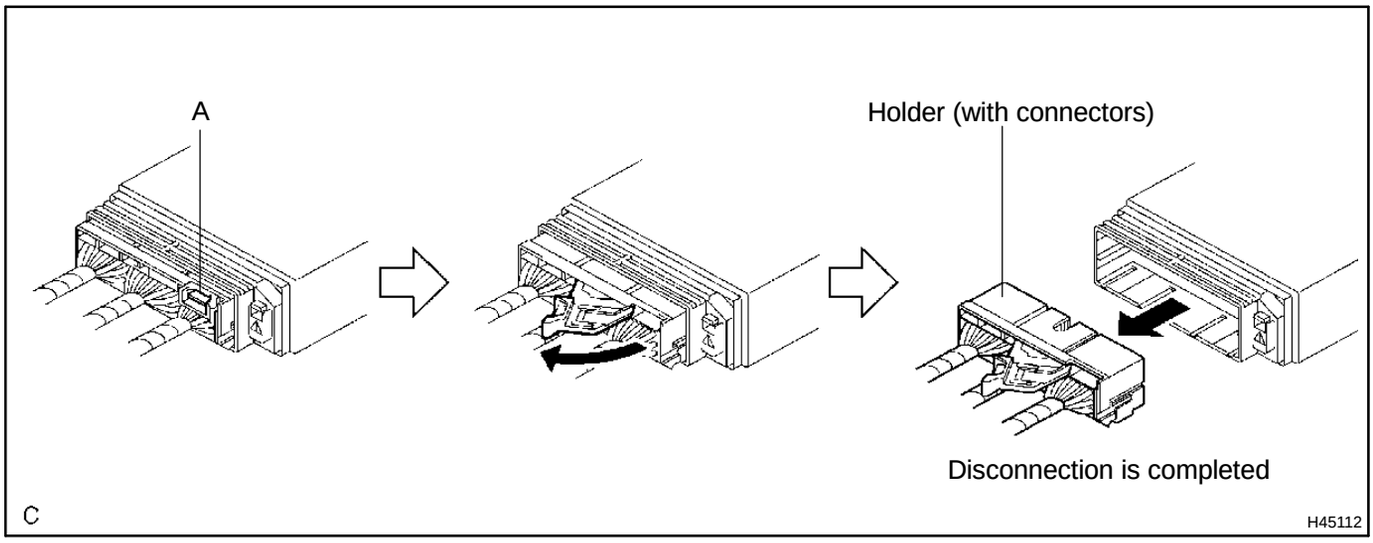
HINT:

When connecting, the slider will slide. Be sure not to touch the slider while connecting, as it may result in an insecure fit.



9. DISCONNECTION OF CONNECTOR FOR AIRBAG SENSOR ASSY CENTER

(a) Pull the lever by pushing part A as shown in the illustration and disconnect the holder (with connectors).

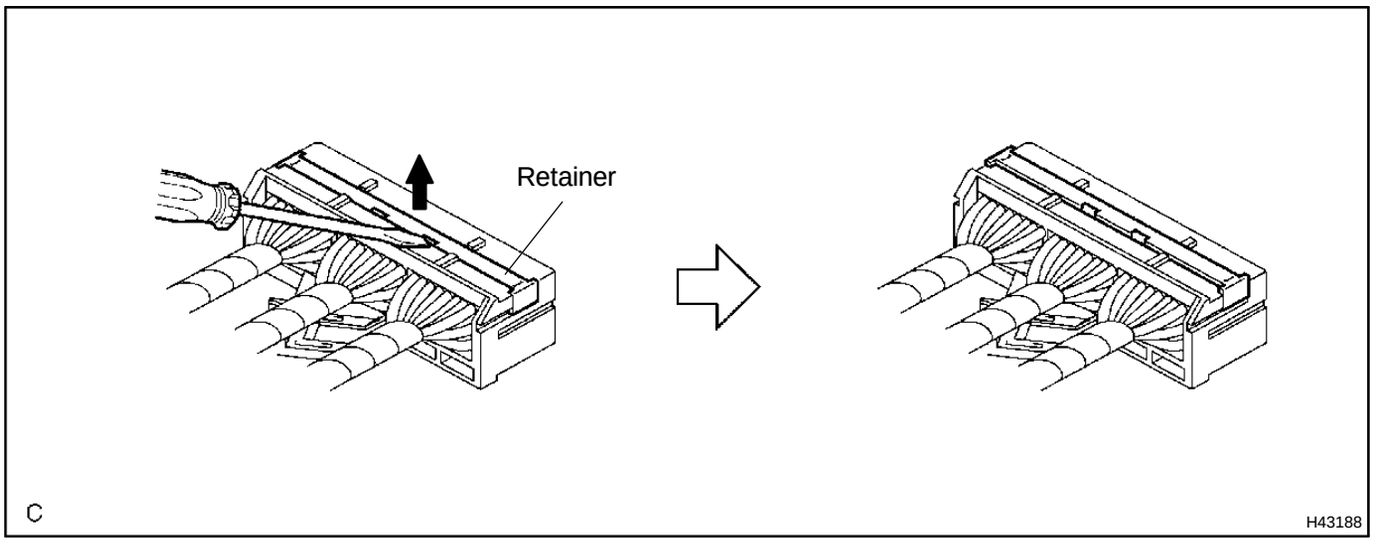


HINT:

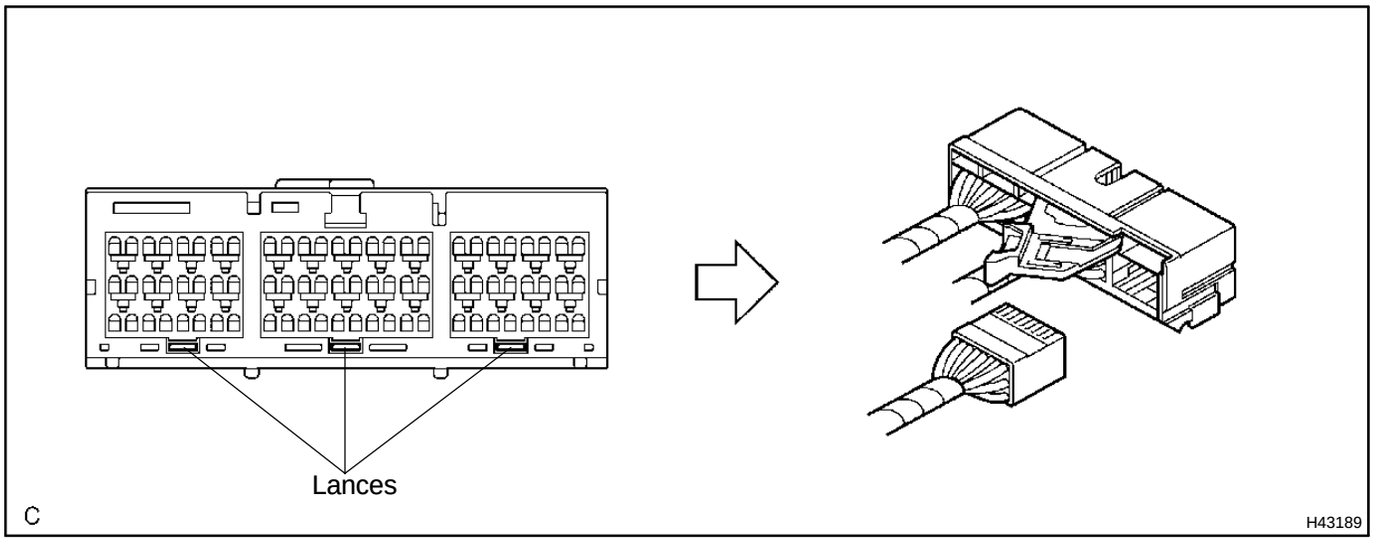
Perform the following procedures when replacing the holder.

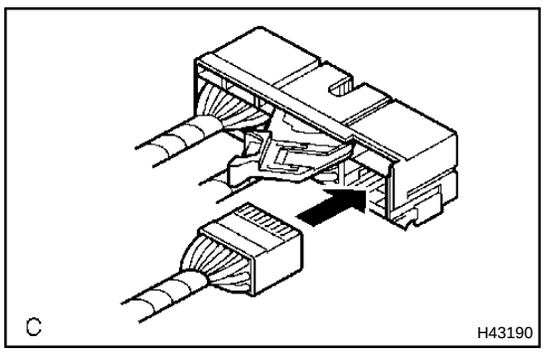
(b) Remove the holder.

(1) Using a screwdriver, unlock the retainer.



(2) Release the fitting lance and remove the holder.





(c) Install the holder.

(1) Install the connectors to the holder. (When locking, a click sound can be heard.)

HINT:

The retainer is locked when the holder is connected.

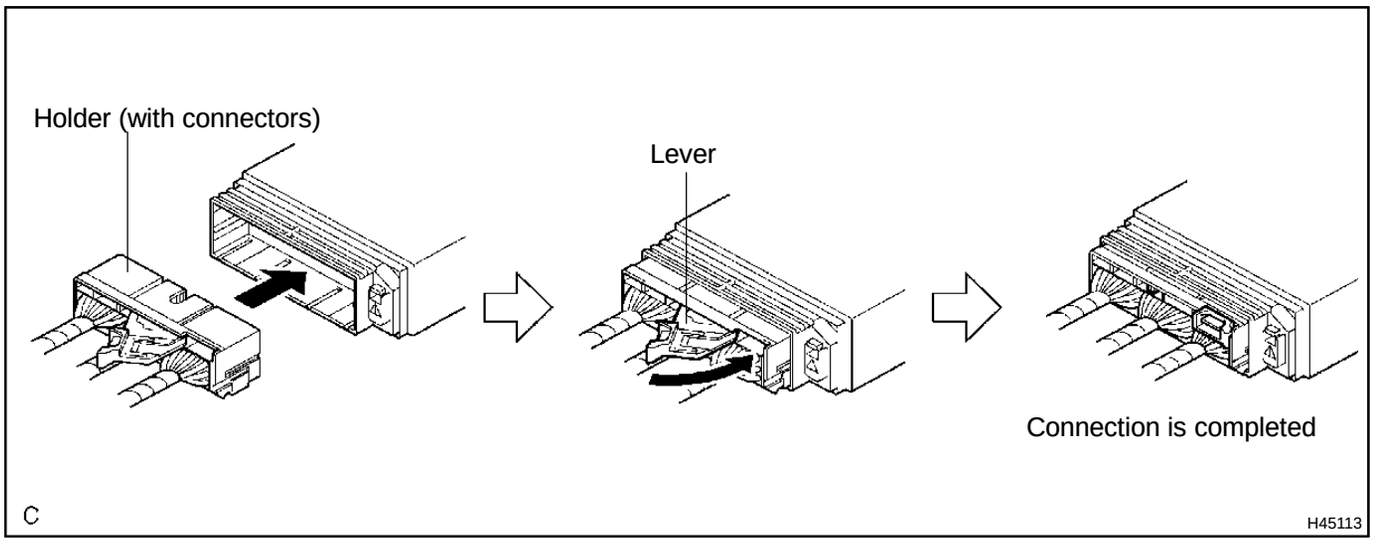
10. CONNECTION OF CONNECTOR FOR AIRBAG SENSOR ASSY CENTER

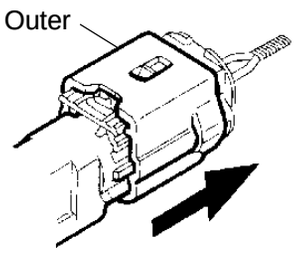
(a) Firmly insert the holder (with connectors) until it can not be pushed any further.

(b) Push the lever to connect the holder (with connectors). (When locking, a click sound can be heard.)

HINT:

The holder slides when connecting. Be sure not to hold the holder while connecting, as it may result in an insecure fit.





H02763

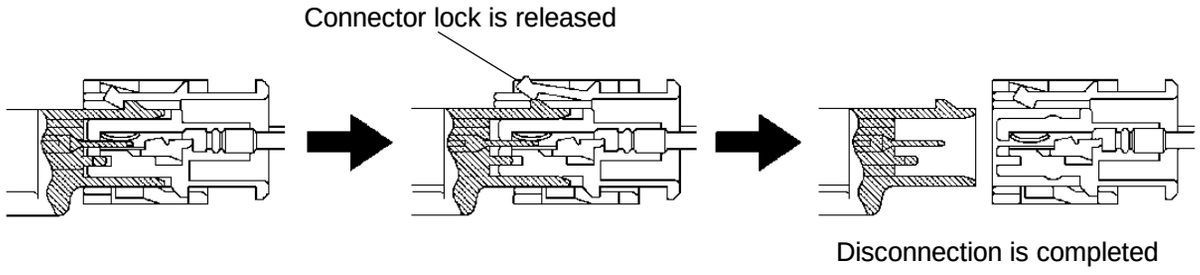
11. DISCONNECTION OF CONNECTORS FOR AIRBAG SENSOR FRONT, SIDE AIRBAG SENSOR ASSY AND AIRBAG SENSOR REAR

(a) While holding both outer flank sides, slide the outer in the direction shown by the arrow.

(b) When the connector lock is released, the connectors are disconnected.

HINT:

Be sure to hold both outer flank sides. Holding the top and bottom sides will make disconnection difficult.



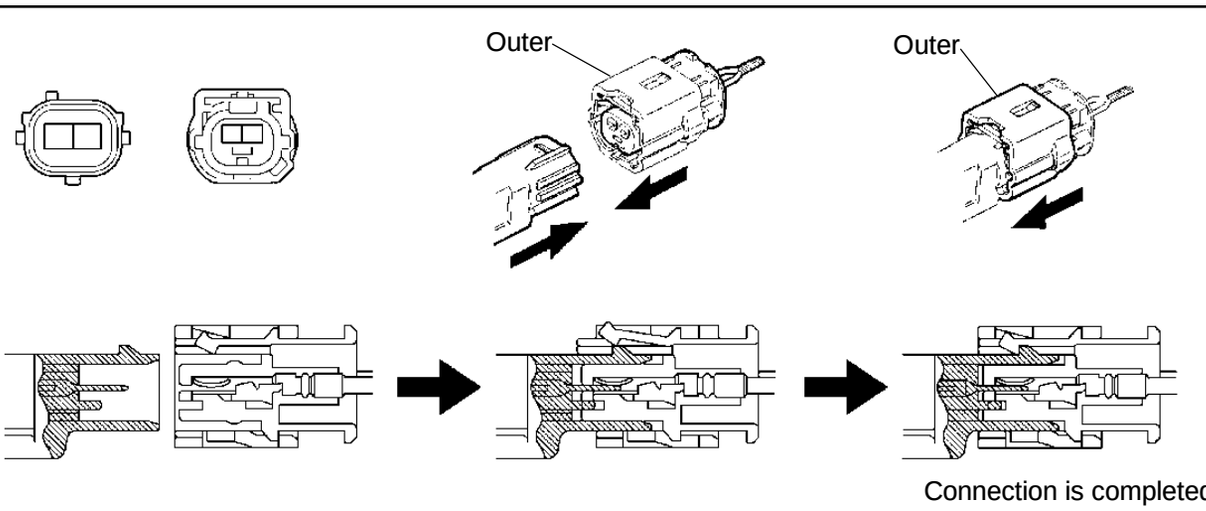
H02764

12. CONNECTION OF CONNECTORS FOR AIRBAG SENSOR FRONT, SIDE AIRBAG SENSOR ASSY AND AIRBAG SENSOR REAR

(a) Connect the connector as shown in the illustration. (When locking, make sure that the outer returns to its original position and a click sound can be heard.)

HINT:

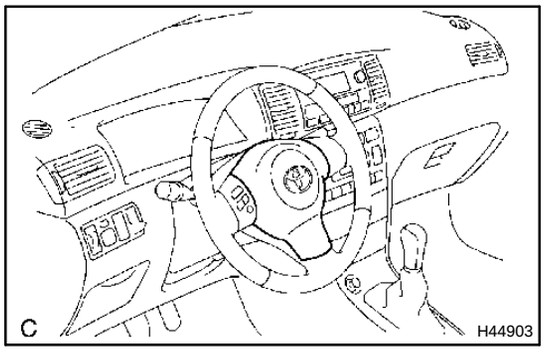
When connecting, the outer will slide. Be sure not to hold the outer while connecting, as it may result in an insecure fit.



H02768

600WD-01

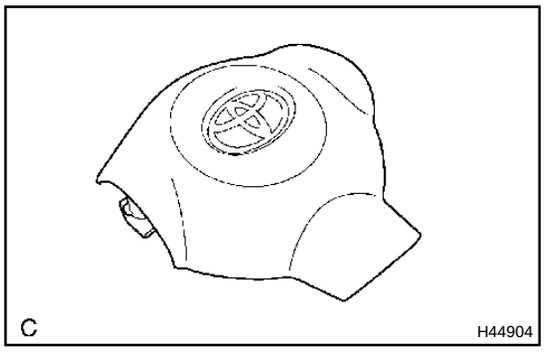
ON-VEHICLE INSPECTION



1. HORN BUTTON ASSY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-727).

(b) With the horn button assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy with a new one:
Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.

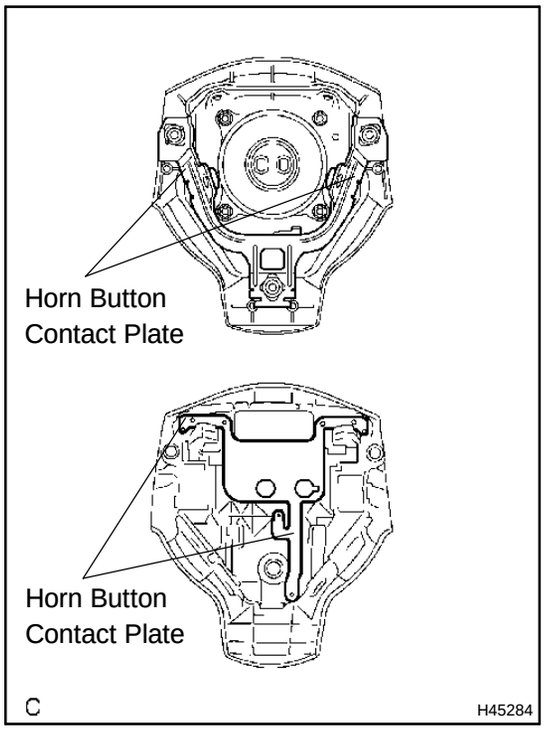


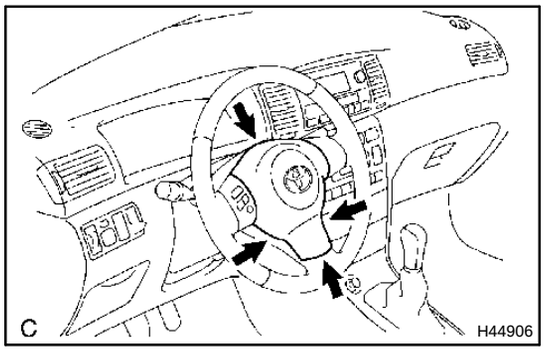
2. HORN BUTTON ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05-727).

(b) With the horn button assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy or steering wheel assy with a new one:

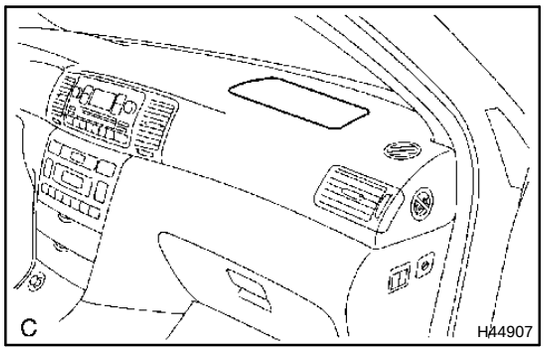
- Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.
- Cracks or other damage to the connectors.
- Deformation of the steering wheel assy.
- Deformation of the horn button contact plate of the horn button assy.





- There should be no interference between the horn button assy and steering wheel assy, and the clearance should be uniform all the way around when the new horn button assy is installed on the steering wheel assy.

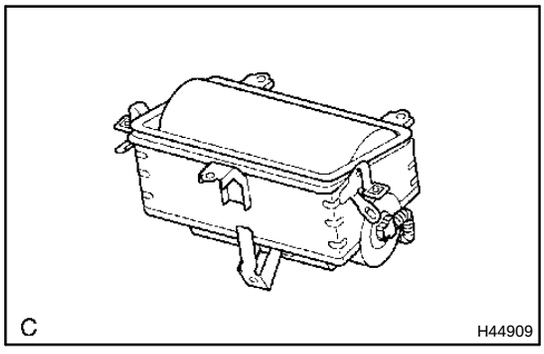
CAUTION:
For removal and installation procedures of the horn button assy, see page 60–21 (TMC Made) or 60–31 (TMMT/TMUK Made), and be sure to follow the correct procedure.



3. FRONT PASSENGER AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

(b) With the front passenger airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the instrument panel with a new one:
Cuts, minute cracks or marked discoloration on the instrument panel around the front passenger airbag assy.

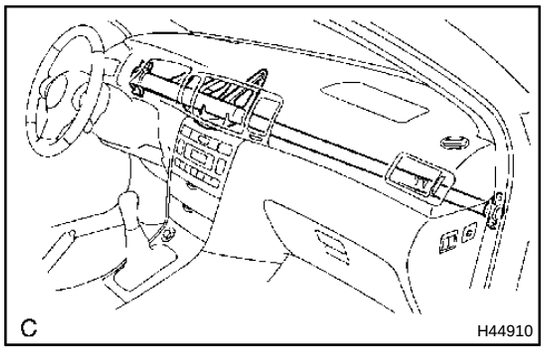


4. FRONT PASSENGER AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

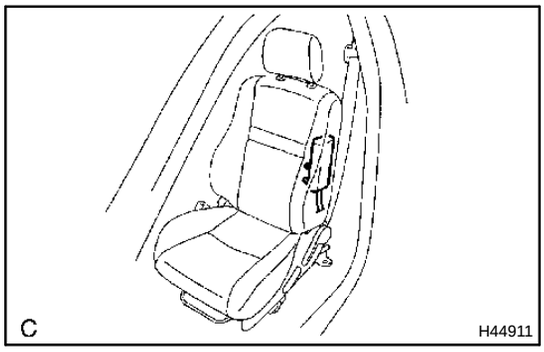
(a) Perform a diagnostic system check (see page 05–727).

(b) With the front passenger airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front passenger airbag assy, instrument panel or instrument panel reinforcement with a new one:

- Cuts, minute cracks or marked discoloration on the front passenger airbag assy.
- Cracks or other damage to the wire harness or connector.
- Deformation or cracks on the instrument panel or instrument panel reinforcement.



CAUTION:
For removal and installation procedures of the front passenger airbag assy, see page 60–43, and be sure to follow the correct procedure.

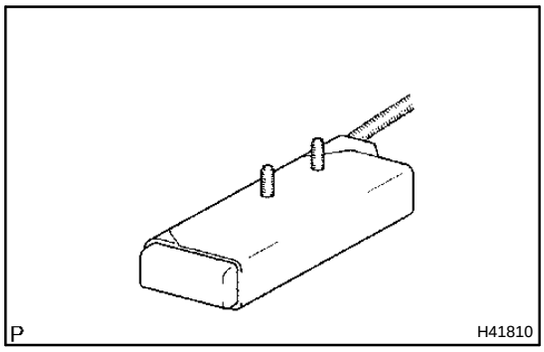


5. FRONT SEAT AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

(b) With the front seat airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seatback assy with a new one:

Cuts, minute cracks or marked discoloration on the front seatback assy around the front seat airbag assy.



6. FRONT SEAT AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

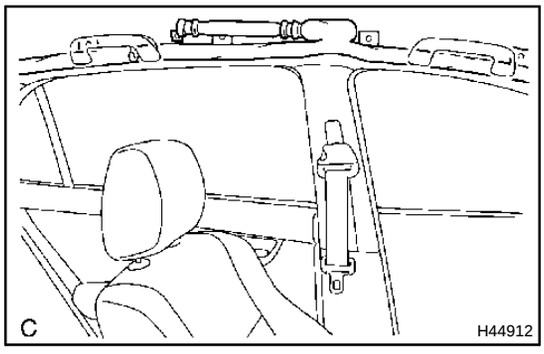
(a) Perform a diagnostic system check (see page 05–727).

(b) With the front seat airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seat airbag assy with a new one:

- Cuts, minute cracks or marked discoloration on the front seat airbag assy.
- Cracks or other damage to the wire harness or connector.

CAUTION:

For removal and installation procedures of the front seat airbag assy, see page 72–2, and be sure to follow the correct procedure.

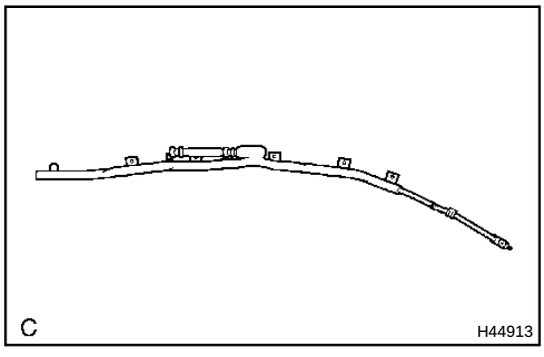


7. CURTAIN SHIELD AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

(b) With the curtain shield airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front pillar garnish or roof headlining assy with a new one:

Cuts, minute cracks or marked discoloration on the front pillar garnish or roof headlining assy around the curtain shield airbag assy.



8. CURTAIN SHIELD AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05–727).

(b) With the curtain shield airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the curtain shield airbag assy with a new one:

- Cuts, minute cracks or marked discoloration on the curtain shield airbag assy.
- Cracks or other damage to the connector.

CAUTION:

For removal and installation procedures of the curtain shield airbag assy, see page 60–57, and be sure to follow the correct procedure.

9. AIRBAG SENSOR ASSY CENTER (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

10. AIRBAG SENSOR ASSY CENTER (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05–727).

11. AIRBAG SENSOR ASSY CENTER (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the airbag sensor assy center (see page 60–74).

CAUTION:

For removal and installation procedures of the airbag sensor assy center, see page 60–74, and be sure to follow the correct procedure.

HINT:

The airbag sensor assy center should be replaced after any of the airbags has deployed, as it has been subjected to the impact.

12. AIRBAG SENSOR FRONT (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

13. AIRBAG SENSOR FRONT (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05–727).

(b) When the front bumper of the vehicle or its periphery is damaged, check if there is any damage to the airbag sensor front. If any of the airbag sensor front have defects as mentioned below, replace it with a new one:

- Cracks, dents or chips in the case.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:

For removal and installation procedures of the airbag sensor front, see page 60–77, and be sure to follow the correct procedure.

14. AIRBAG SENSOR FRONT (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the airbag sensor front (see page 60–77).

CAUTION:

For removal and installation procedures of the airbag sensor front, see page 60–77, and be sure to follow the correct procedure.

HINT:

The airbag sensor front on the impacted side should be replaced after the horn button assy or front passenger airbag assy has deployed.

15. SIDE AIRBAG SENSOR ASSY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

16. SIDE AIRBAG SENSOR ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05–727).

(b) When the center pillar of the vehicle or its periphery is damaged, check if there is any damage to the side airbag sensor assy. If there are any defects as mentioned below, replace the side airbag sensor assy with a new one:
- Cracks, dents or chips in the case.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:
For removal and installation procedures of the side airbag sensor assy, see page 60-79 (3-door hatchback) or see page 60-81 (except 3-door hatchback), and be sure to follow the correct procedure.

17. SIDE AIRBAG SENSOR ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the side airbag sensor assy (see page 60-79 (3-door hatchback) or 60-81 (except 3-door hatchback)).

CAUTION:
For removal and installation procedures of the side airbag sensor assy, see page 60-79 (3-door hatchback) or see page 60-81 (except 3-door hatchback), and be sure to follow the correct procedure.

HINT:
The side airbag sensor assy on the impacted side should be replaced after the front seat airbag assy and curtain shield airbag assy have deployed.

18. AIRBAG SENSOR REAR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-727).

19. AIRBAG SENSOR REAR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page 05-727).

(b) When the quarter panel of the vehicle or its periphery is damaged, check if there is any damage to the airbag sensor rear. If there are any defects as mentioned below, replace the airbag sensor rear with a new one:
- Cracks, dents or chips in the case.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:
For removal and installation procedures of the airbag sensor rear, see Pub. No. RM1028E, page 60-31 (3-door hatchback) or see Pub. No. RM1028E, page 60-33 (except 3-door hatchback), and be sure to follow the correct procedure.

20. AIRBAG SENSOR REAR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the airbag sensor rear (see Pub. No. RM1028E, page 60-31 (3-door hatchback) or See Pub. No. RM1028E, page 60-33 (except 3-door hatchback)).

CAUTION:
For removal and installation procedures of the airbag sensor rear, see Pub. No. RM1028E, page 60-31 (3-door hatchback) or see Pub. No. RM1028E, page 60-33 (except 3-door hatchback), and be sure to follow the correct procedure.

HINT:
The airbag sensor rear on the impacted side should be replaced after the curtain shield airbag assy has deployed.

21. SEAT POSITION AIRBAG SENSOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-727).

22. SEAT POSITION AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-727).

(b) Even if the airbag was not deployed, perform a visual check for damage to the seat position airbag sensor including the following:
- Cracks, dents or chips in the case.
- Cracks or other damage to the connector.

CAUTION:

For removal and installation procedures of the seat position airbag sensor, see page 60–85, and be sure to follow the correct procedure.

23. WIRE HARNESS AND CONNECTOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

24. WIRE HARNESS AND CONNECTOR (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05–727).

(b) Check for 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.

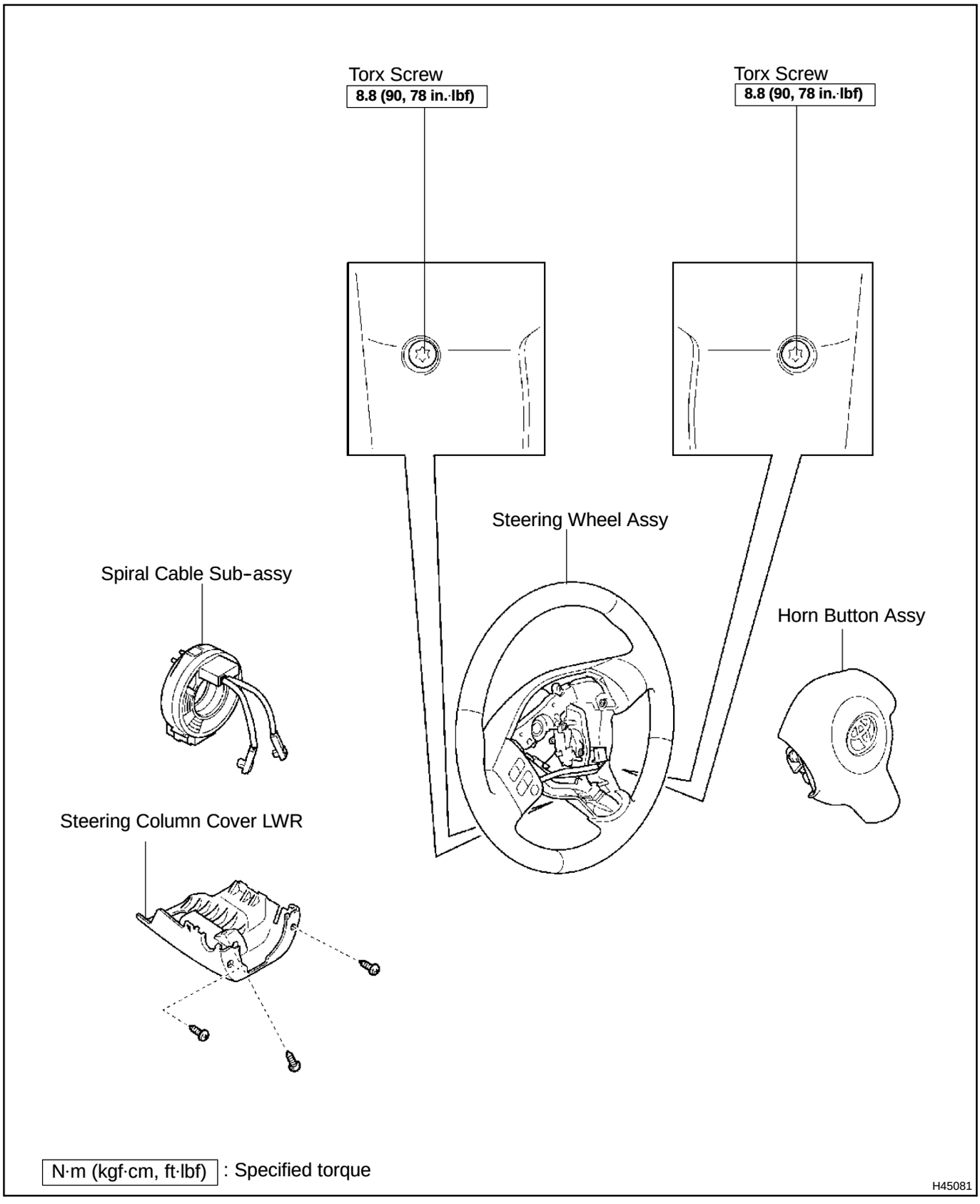
HINT:

The SRS wire harness is integrated with the engine room main wire, instrument panel wire and floor wire.

HORN BUTTON ASSY (TMC MADE)

COMPONENTS

600L2-09



6009P-13

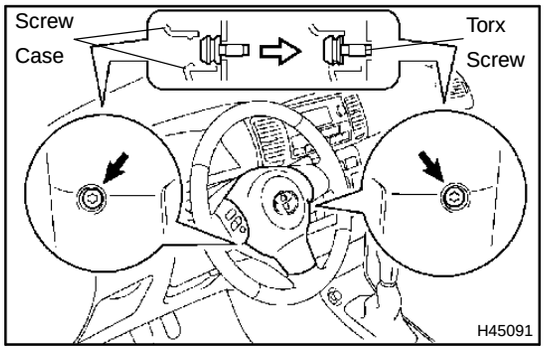
REPLACEMENT

1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

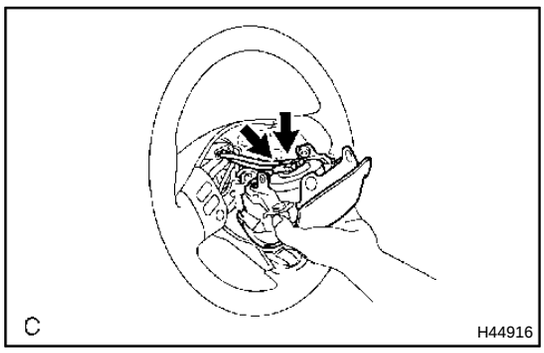
CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.



3. REMOVE HORN BUTTON ASSY

(a) Using a torx socket wrench (T30), loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.



(b) Pull out the horn button assy from the steering wheel assy and support the horn button assy with one hand as shown in the illustration.

NOTICE:

When removing the horn button assy, do not pull the airbag wire harness.

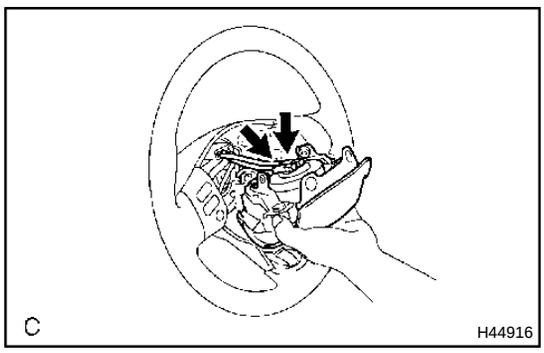
(c) Disconnect the horn connector.

(d) Disconnect the connectors from the horn button assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(e) Remove the horn button assy.



4. INSTALL HORN BUTTON ASSY

(a) Support the horn button assy with one hand as shown in the illustration.

(b) Connect the connectors to the horn button assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

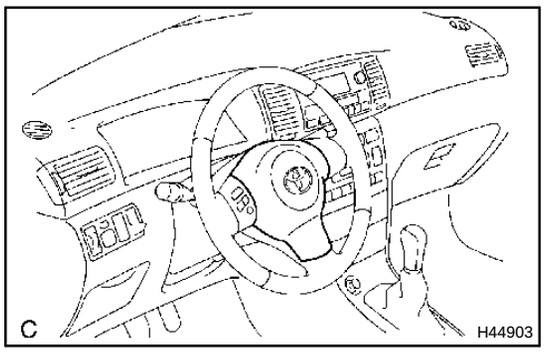
(c) Connect the horn connector.

(d) Confirm that the circumference groove of the torx screw fits in the screw case, and place the horn button assy onto the steering wheel assy.

(e) Using a torx socket wrench (T30), tighten the 2 torx screws.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

5. CONNECT BATTERY NEGATIVE TERMINAL



6. INSPECT HORN BUTTON ASSY

(a) With the horn button assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy with a new one:
Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.

(b) Make sure that the horn sounds.

HINT:

If the horn does not sound, inspect the horn system (see Pub. No. RM925E, page 69–3).

7. INSPECT SRS WARNING LIGHT (SEE PAGE 05–719)

600UY-02

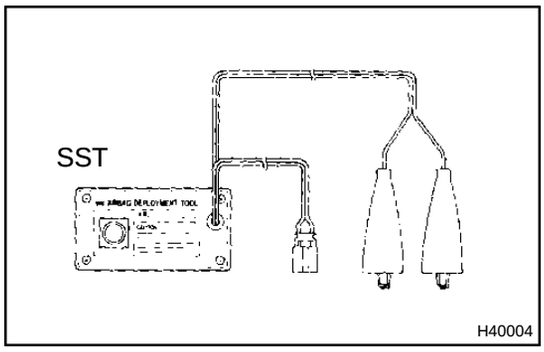
DISPOSAL

HINT:

When scrapping a vehicle equipped with the SRS or disposing of the horn button assy, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a horn button assy that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**

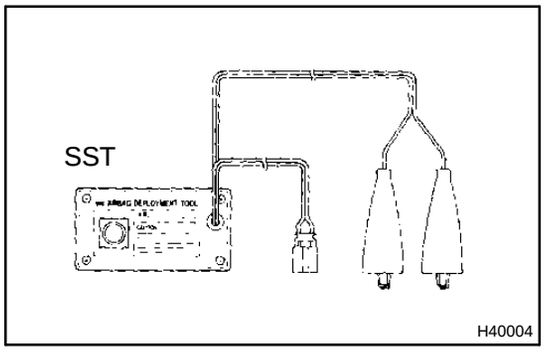


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
- **When deploying the airbag, perform the operation at least 10 m (33 ft) away from the horn button assy.**
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

1. DISPOSE OF HORN BUTTON ASSY (WHEN INSTALLED IN VEHICLE)

HINT:

Prepare a battery as the power source to deploy the airbag.

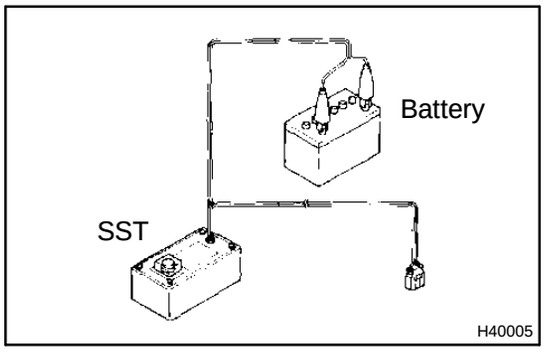


(a) Check the function of the SST.

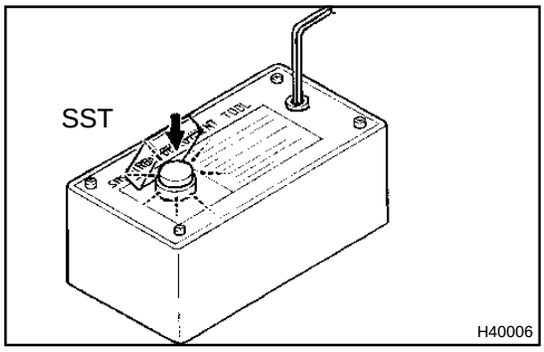
SST 09082-00700

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.



(1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.



(2) Check the function of the SST.
Press the SST activation switch, and check that the LED of the SST activation switch comes on.

CAUTION:

- **Do not connect the SST connector (yellow colored one) to the airbag.**
- **If the LED comes on when the activation switch is not being pressed, SST malfunction is possible, so replace the SST with a new one.**

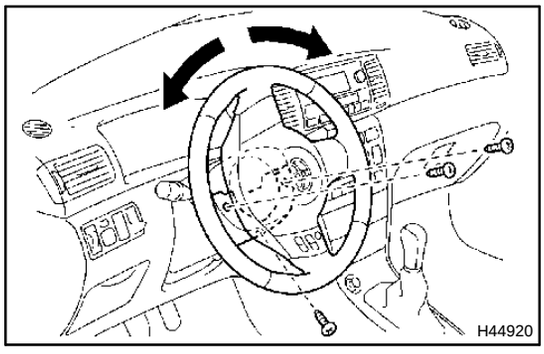
(3) Disconnect the SST from the battery.

(b) Precaution (see page 60-1).

(c) Disconnect the battery negative terminal.

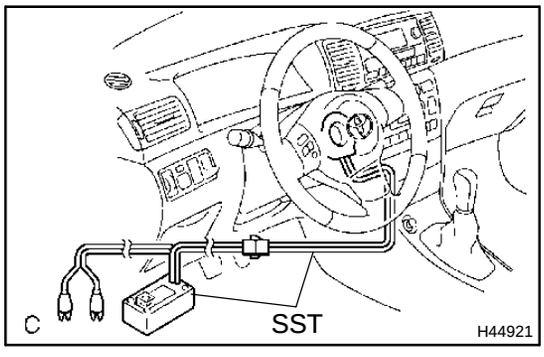
CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.



(d) Remove the steering column cover LWR.

(1) While turning the steering wheel assy to the right and left, remove the 3 screws and steering column cover LWR.



(e) Install the SST.

CAUTION:

Check that there is no looseness in the steering wheel assy and horn button assy.

(1) Disconnect the airbag connector (yellow colored one) from the spiral cable sub-assy.

NOTICE:

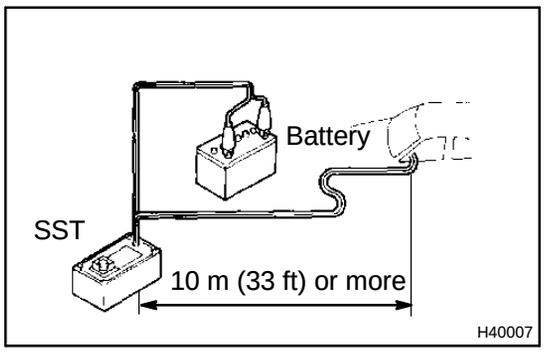
When handling the airbag connector, take care not to damage the airbag wire harness.

(2) Connect the SST connector to the airbag connector of the spiral cable sub-assy.

SST 09082-00700, 09082-00780

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the vehicle front side window.

(4) Maintaining enough clearance for the SST wire harness in the front side window, close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (–) terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

The airbag is deployed as the LED of the SST activation switch comes on.

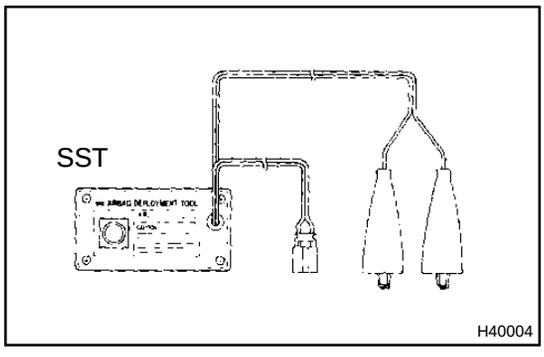
2. DISPOSE OF HORN BUTTON ASSY (WHEN NOT INSTALLED IN VEHICLE)

NOTICE:

- **When disposing of the horn button assy, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:

Prepare a battery as the power source to deploy the airbag.

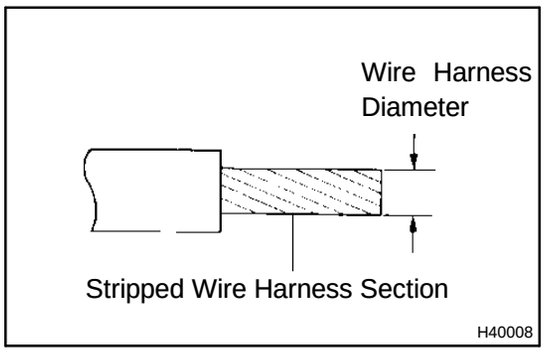


(a) Check the function of the SST (see step 1–(a)).

(b) Remove the horn button assy (see page 60–21).

CAUTION:

- **When removing the horn button assy, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**
- **When storing the horn button assy, keep the airbag deployment side facing upward.**



(c) Using a service–purpose wire harness for the vehicle, tie down the horn button assy to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more)

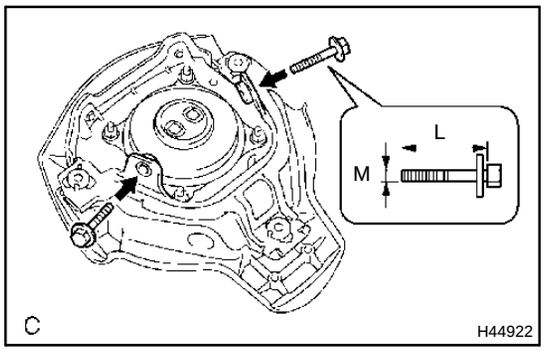
CAUTION:

If the wire harness is too thin or an alternative object is used to tie down the horn button assy, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).

HINT:

To calculate the area of the stripped wire harness section:

Area = 3.14 x (Diameter)^2 divided by 4



(1) Install the 2 bolts with washers into the 2 bolt holes on the horn button assy.

Bolt:

L: 35.0 mm (1.378 in.)

M: 6.0 mm (0.236 in.)

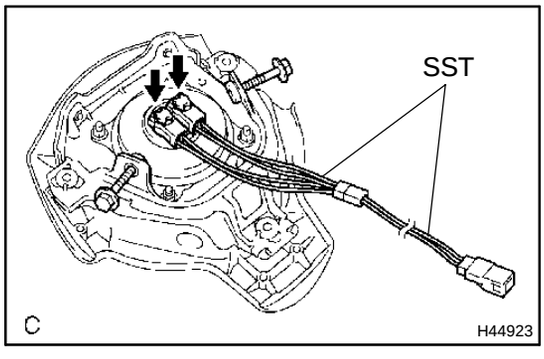
Pitch: 1.0 mm (0.039 in.)

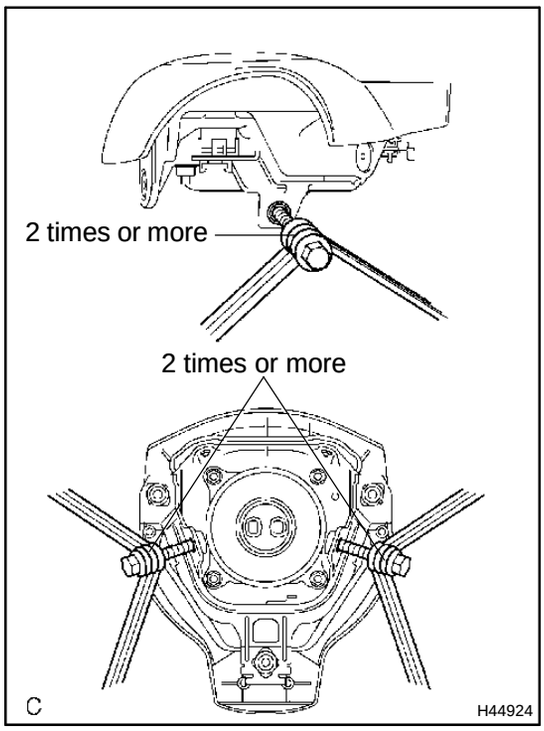
NOTICE:

- **Tighten the bolts by hand until they become difficult to turn.**
- **Do not tighten the bolts excessively.**

(2) After connecting the SST below to each other, connect them to the horn button assy.

SST 09082–00802 (09082–10801, 09082–30801)

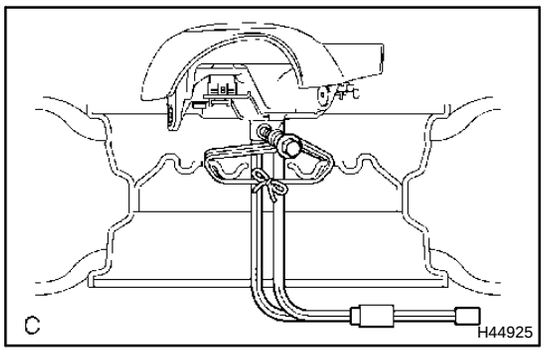




(3) Using 3 wire harnesses, wind wire harness at least 2 times each around the bolts installed on the left and right sides of the horn button assy.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **Make sure that the wire harness is tight. If there is slack in wire harness, the horn button assy may become loose due to the shock when the airbag is deployed.**



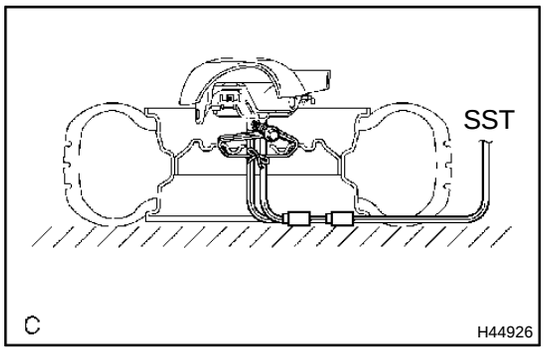
(4) Face the airbag deployment side of the horn button assy upward. Separately tie the left and right sides of the horn button assy to the disc wheel through the hub nut holes. Position the SST connector so that it hangs downward through the hub hole in the disc wheel.

CAUTION:

- **Make sure that the wire harness is tight. If there is slack in wire harness, the horn button assy may become loose due to the shock when the airbag is deployed.**
- **Always tie down the horn button assy with the airbag deployment side facing upward.**

NOTICE:

The disc wheel will be marked by the airbag deployment, so use an extra disc wheel.



(d) Install the SST.

CAUTION:

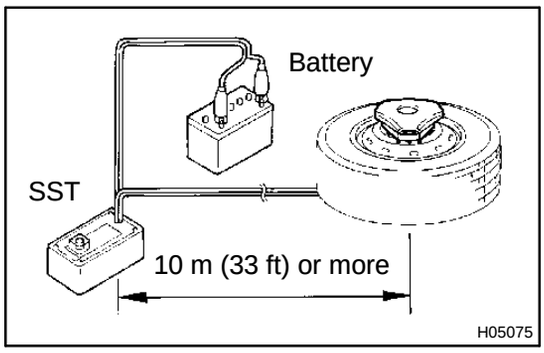
Place the disc wheel on level ground.

(1) Connect the SST connector.

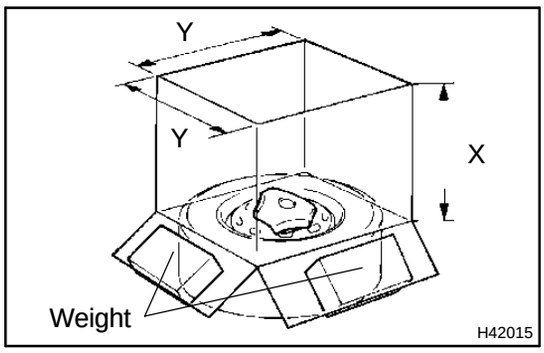
SST 09082–00700

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 at least 10 m (33 ft) away from the horn button assy tied down to the disc wheel.



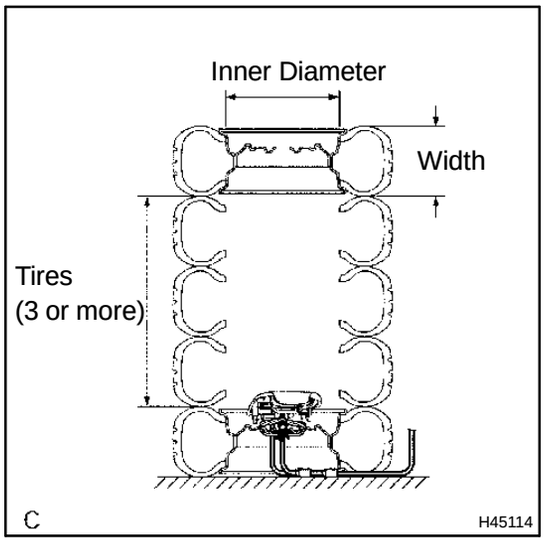
(e) Cover the horn button assy with a cardboard box or tires.

(1) Covering method using a cardboard box:
Cover the horn button assy with the cardboard box and place the weights on the cardboard box in 4 places with at least 190 N (19 kg, 43 lb).

Cardboard box size: Must exceed the following dimensions
X = 460 mm (18.11 in.)
Y = 650 mm (25.59 in.)

NOTICE:

- **When the dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire which the horn button assy is tied to, X should be the following size.**
  X = 460 mm (18.11 in.) + width of tire
- **If a cardboard box which is smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.**



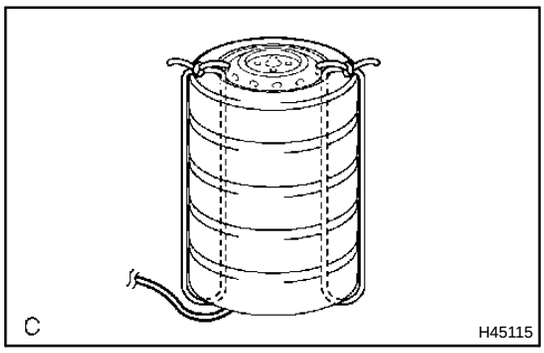
(2) Covering method using tires:
Place at least 3 tires without disc wheels on the tire with disc wheel which the horn button assy is tied to.
Place the tire with disc wheel on them.

Tire size: Must exceed the following dimensions
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels except on the top and bottom.

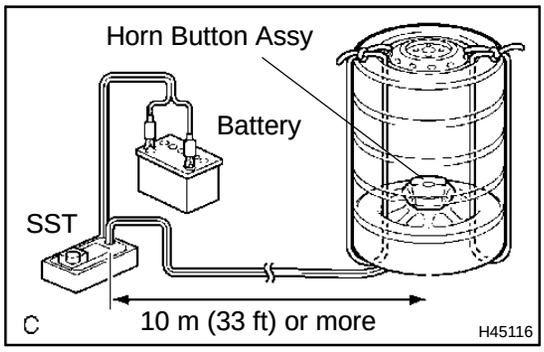
NOTICE:

- **The tires may be marked by the airbag deployment, so use an extra tire.**
- **Do not place the SST connector under the tire because it could be damaged.**



(3) Tie the tires together with 2 wire harnesses.

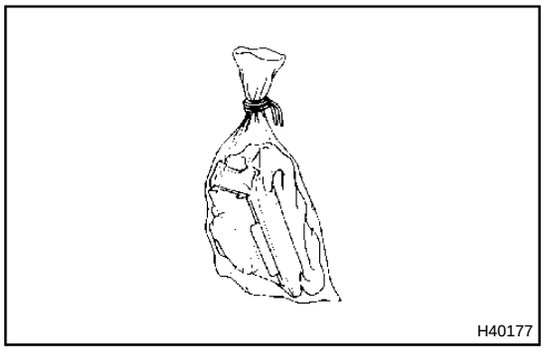
CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



(f) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (–) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the disc wheel which the horn button assy is tied to.
(3) Press the SST activation switch and deploy the airbag.

CAUTION:
When deploying the airbag, make sure that no one is near the tire.

HINT:
The airbag is deployed as the LED of the SST activation switch comes on.



(g) Dispose of the horn button assy.

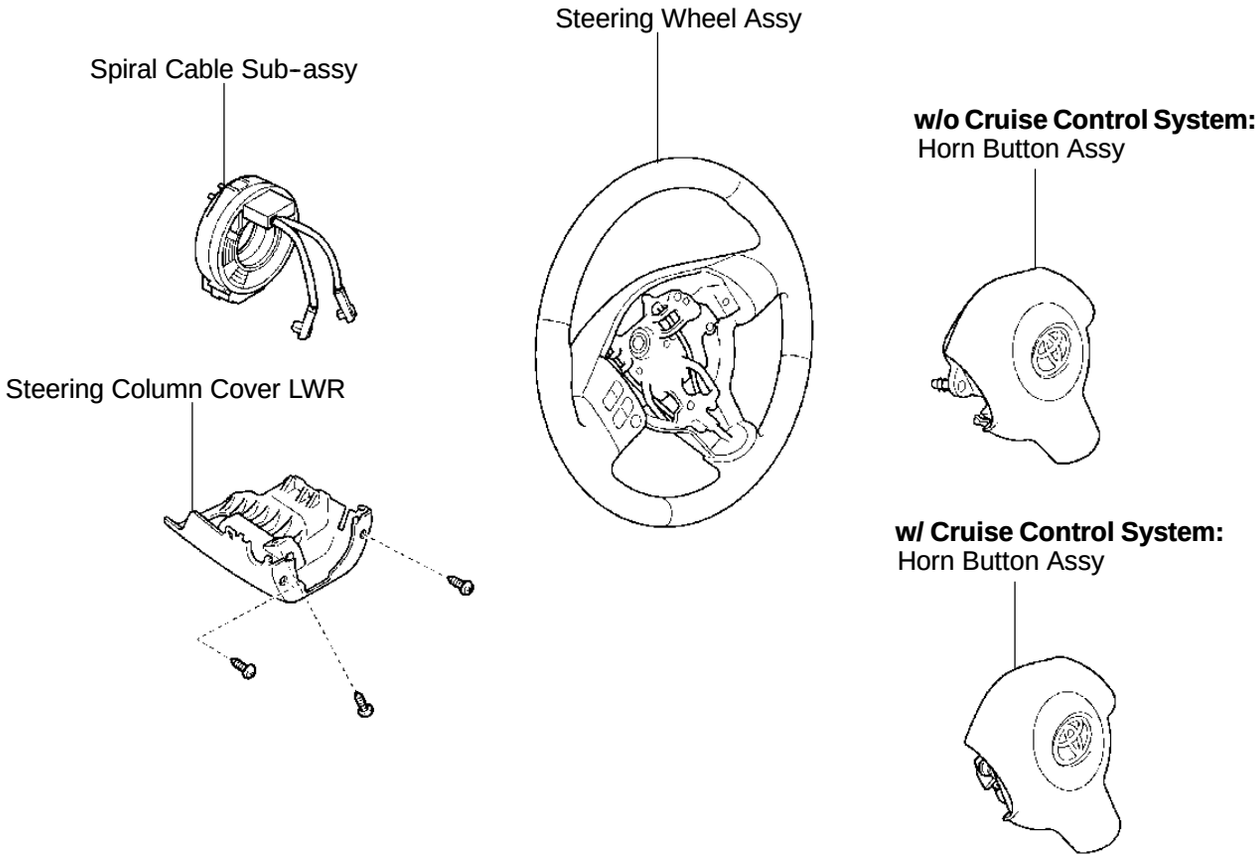
CAUTION:
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the horn button assy from the disc wheel.
(2) Place the horn button assy in a plastic bag, tie it tightly and dispose of it as other general part disposal.

HORN BUTTON ASSY (TMMT/TMUK MADE)

COMPONENTS

600L2-10



600WE-01

REPLACEMENT

HINT:

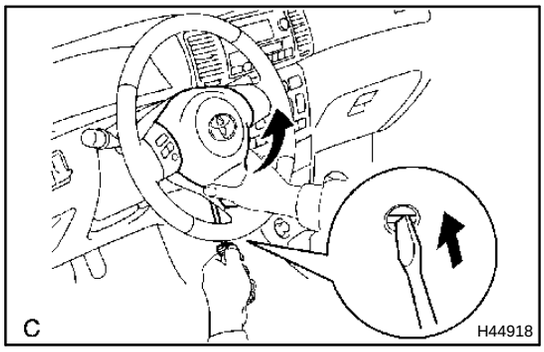
If the vehicle is equipped with the cruise control system, see page 60–21.

1. PRECAUTION (SEE PAGE 60–1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

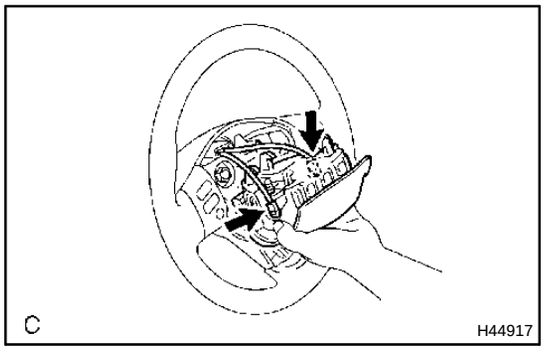


3. REMOVE HORN BUTTON ASSY

(a) Using a screwdriver, push up the spring as shown in the illustration.

HINT:

Pull out the lower part of the horn button assy when removing it.



(b) Pull out the horn button assy from the steering wheel assy and support the horn button assy with one hand as shown in the illustration.

NOTICE:

When removing the horn button assy, do not pull the airbag wire harness.

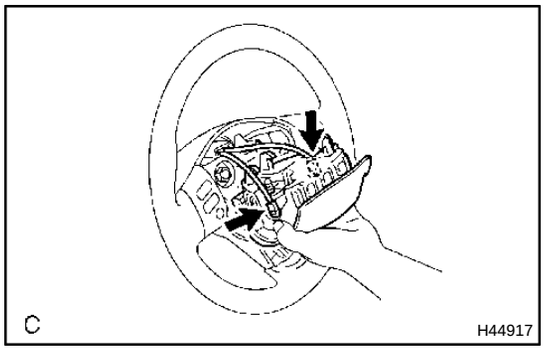
(c) Disconnect the horn connector.

(d) Disconnect the connectors from the horn button assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(e) Remove the horn button assy.



4. INSTALL HORN BUTTON ASSY

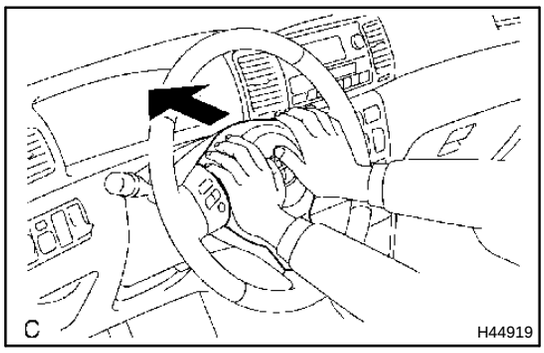
(a) Support the horn button assy with one hand as shown in the illustration.

(b) Connect the connectors to the horn button assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(c) Connect the horn connector.

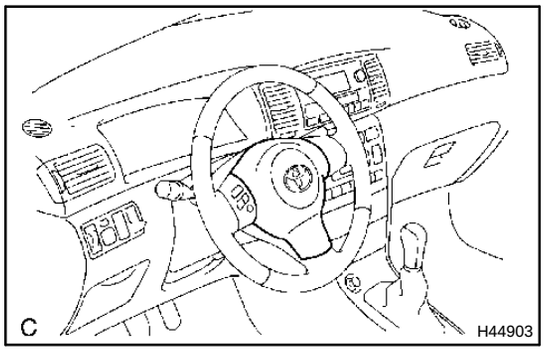


(d) Push down on the horn button assy until a clicking sound can be heard, as shown in the illustration.

NOTICE:

Check that the horn button assy is installed securely.

5. CONNECT BATTERY NEGATIVE TERMINAL



6. INSPECT HORN BUTTON ASSY

(a) With the horn button assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy with a new one:
Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.

(b) Make sure that the horn sounds.

HINT:

If the horn does not sound, inspect the horn system (see Pub. No. RM925E, page 69-3).

7. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

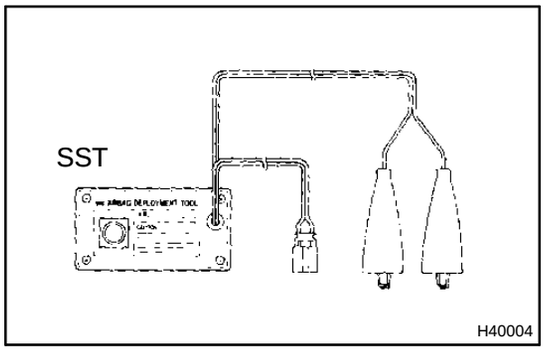
DISPOSAL

HINT:

When scrapping a vehicle equipped with the SRS or disposing of the horn button assy, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a horn button assy that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**

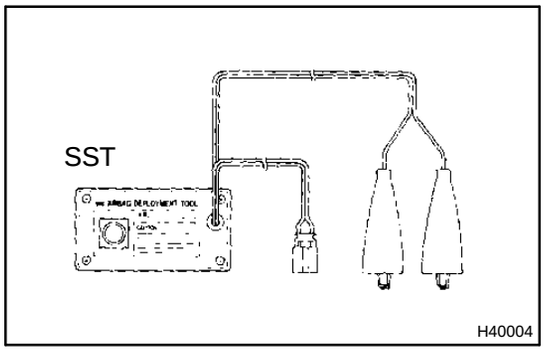


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
- **When deploying the airbag, perform the operation at least 10 m (33 ft) away from the horn button assy.**
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

1. DISPOSE OF HORN BUTTON ASSY (WHEN INSTALLED IN VEHICLE)

HINT:

Prepare a battery as the power source to deploy the airbag.

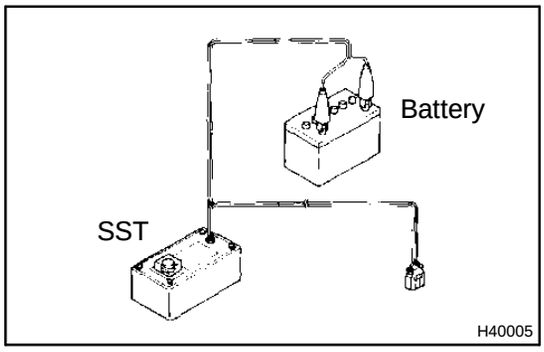


(a) Check the function of the SST.

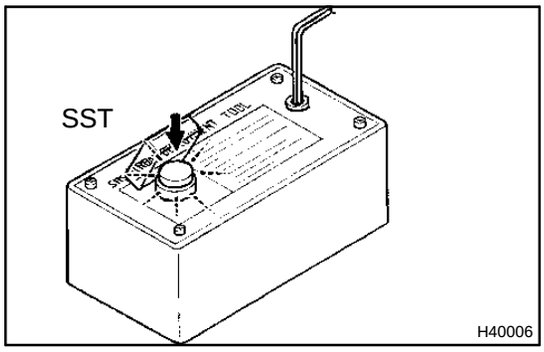
SST 09082-00700

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.



(1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (–) terminal.



(2) Check the function of the SST.
Press the SST activation switch, and check that the LED of the SST activation switch comes on.

CAUTION:

- **Do not connect the SST connector (yellow colored one) to the airbag.**
- **If the LED comes on when the activation switch is not being pressed, SST malfunction is possible, replace the SST with a new one.**

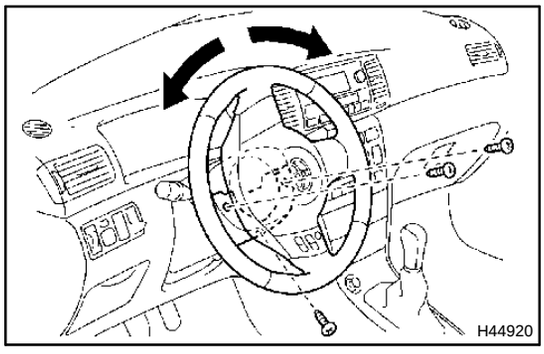
(3) Disconnect the SST from the battery.

(b) Precaution (see page 60–1).

(c) Disconnect the battery negative terminal.

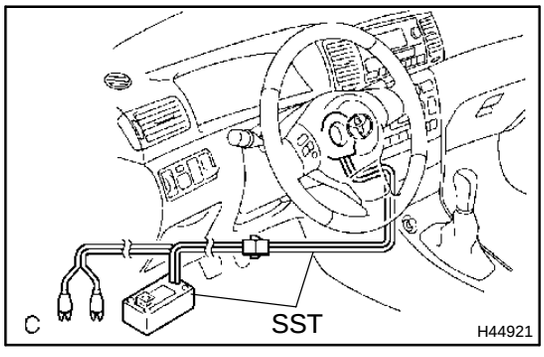
CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.



(d) Remove the steering column cover LWR.

(1) While turning the steering wheel assy to the right and left, remove the 3 screws and steering column cover LWR.



(e) Install the SST.

CAUTION:

Check that there is no looseness in the steering wheel assy and horn button assy.

(1) Disconnect the airbag connector (yellow colored one) from the spiral cable sub–assy.

NOTICE:

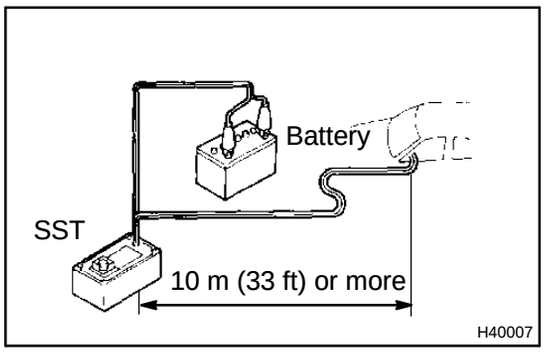
When handling the airbag connector, take care not to damage the airbag wire harness.

(2) Connect the SST connector to the airbag connector of the spiral cable sub–assy.

SST 09082–00700, 09082–00780

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the vehicle side window (3–door hatchback) or front side window (except 3–door hatchback).

(4) Maintaining enough clearance for the SST wire harness in the side window (3–door hatchback) or front side window (except 3–door hatchback), close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (–) terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

The airbag is deployed as the LED of the SST activation switch comes on.

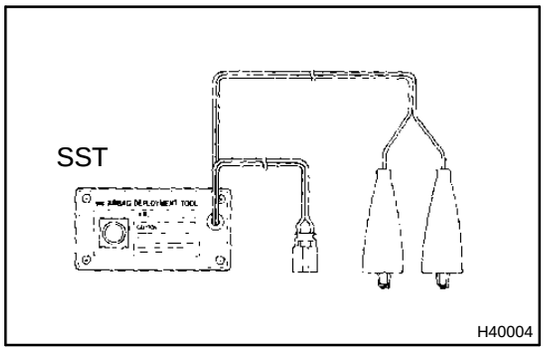
2. DISPOSE OF HORN BUTTON ASSY (WHEN NOT INSTALLED IN VEHICLE)

NOTICE:

- **When disposing of the horn button assy, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:

Prepare a battery as the power source to deploy the airbag.

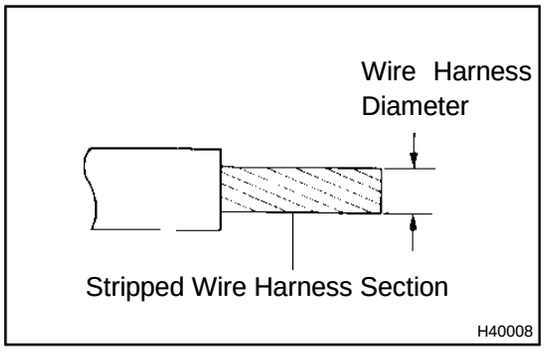


(a) Check the function of the SST (see step 1–(a)).

(b) Remove the horn button assy (see page 60–31).

CAUTION:

- **When removing the horn button assy, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
- **When storing the horn button assy, keep the airbag deployment side facing upward.**



(c) Using a service–purpose wire harness for the vehicle, tie down the horn button assy to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more)

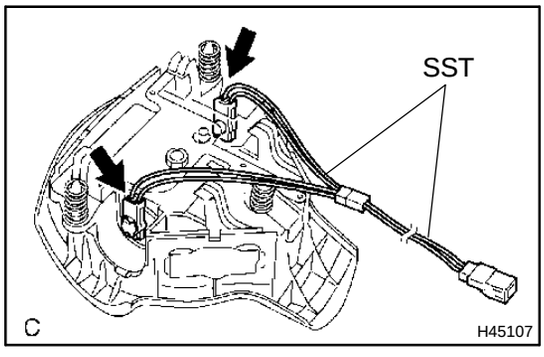
CAUTION:

If the wire harness is too thin or an alternative object is used to tie down the horn button assy, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).

HINT:

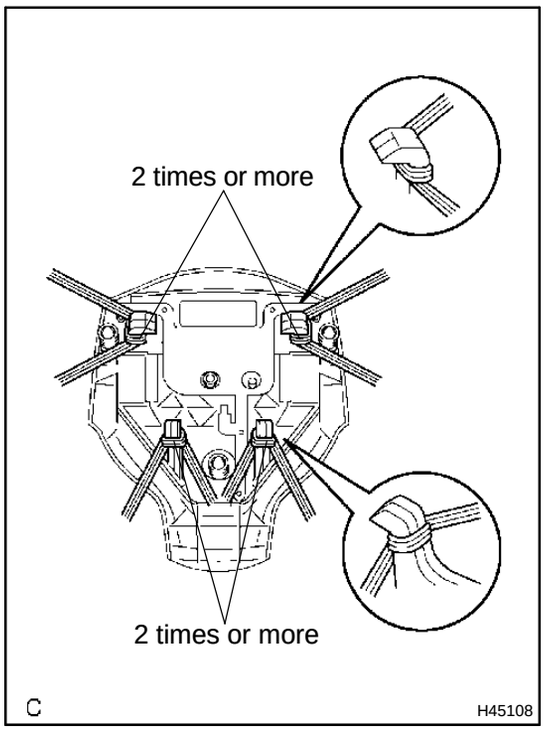
To calculate the area of the stripped wire harness section:

Area = 3.14 x (Diameter)^2 divided by 4



(1) After connecting the SST below to each other, connect them to the horn button assy.

SST 09082–00802 (09082–10801, 09082–30801)



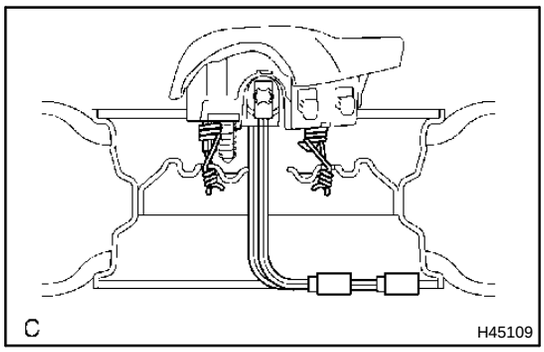
(2) Using 3 wire harnesses, wind wire harness at least 2 times each around the 4 claws on the horn button assy.

CAUTION:

- **Tightly wind the wire harness around the claws so that there is no slack.**
- **Make sure that the wire harness is tight. If there is slack in wire harness, the horn button assy may become loose due to the shock when the airbag is deployed.**

HINT:

Be sure to wind the wire harness securely by pulling it inside the claw.



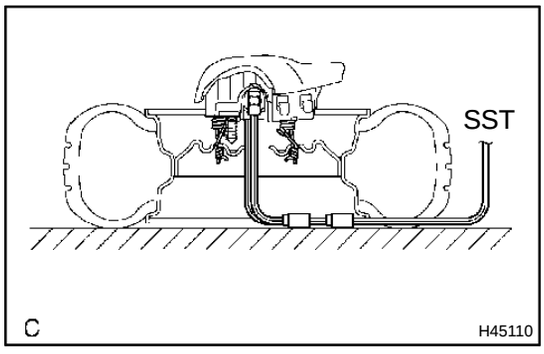
(3) Face the airbag deployment side of the horn button assy upward. Separately tie the wire harness that is wound around the claws on the horn button assy to the disc wheel through the hub nut holes. Position the SST connector so that it hangs downward through the hub hole in the disc wheel.

CAUTION:

- **Make sure that the wire harness is tight. If there is slack in wire harness, the horn button assy may become loose due to the shock when the airbag is deployed.**
- **Always tie down the horn button assy with the airbag deployment side facing upward.**

NOTICE:

The disc wheel will be marked by the airbag deployment, so use an extra disc wheel.



(d) Install the SST.

CAUTION:

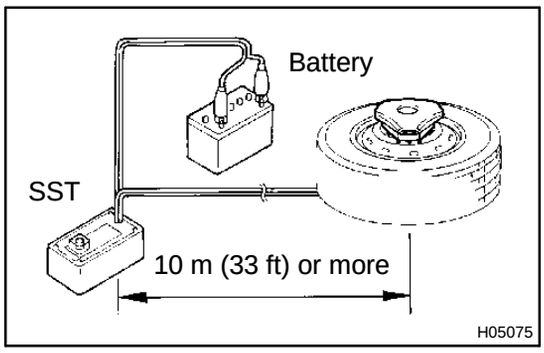
Place the disc wheel on level ground.

(1) Connect the SST connector.

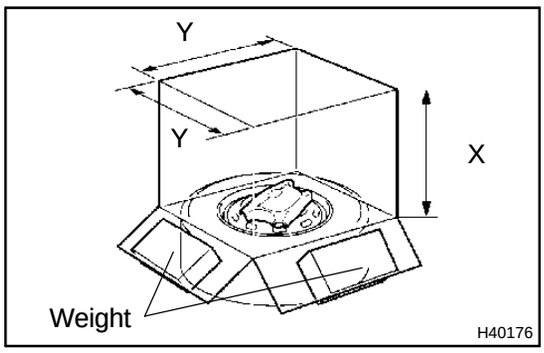
SST 09082–00700

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 at least 10 m (33 ft) away from the horn button assy tied down to the disc wheel.



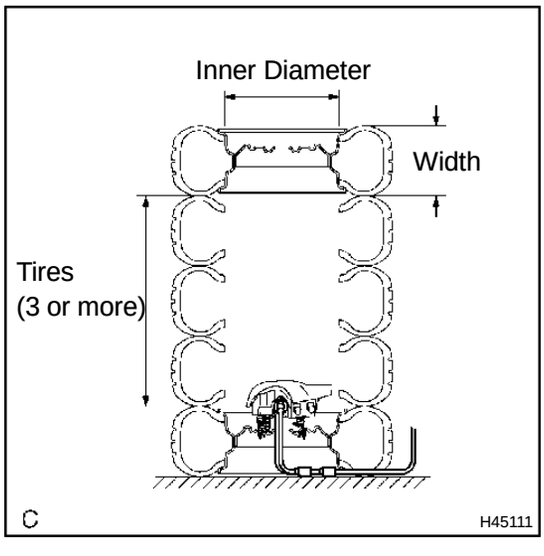
(e) Cover the horn button assy with a cardboard box or tires.

(1) Covering method using a cardboard box:
Cover the horn button assy with the cardboard box and place the weights on the cardboard box in 4 places with at least 190 N (19 kg, 43 lb).

Cardboard box size: Must exceed the following dimensions
X = 460 mm (18.11 in.)
Y = 650 mm (25.59 in.)

NOTICE:

- **When the dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire which the horn button assy is tied to, X should be the following size.**
  X = 460 mm (18.11 in.) + width of tire
- **If a cardboard box which is smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.**



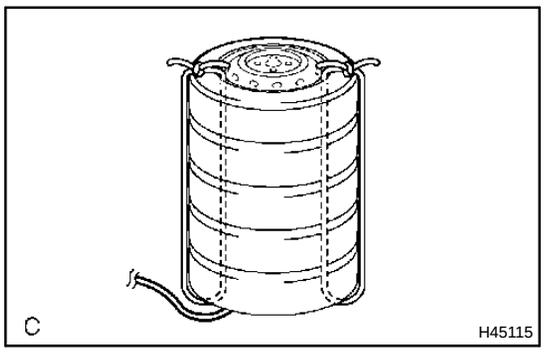
(2) Covering method using tires:
Place at least 3 tires without disc wheels on the tire with disc wheel which the horn button assy is tied to.
Place the tire with disc wheel on them.

Tire size: Must exceed the following dimensions
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels except on the top and bottom.

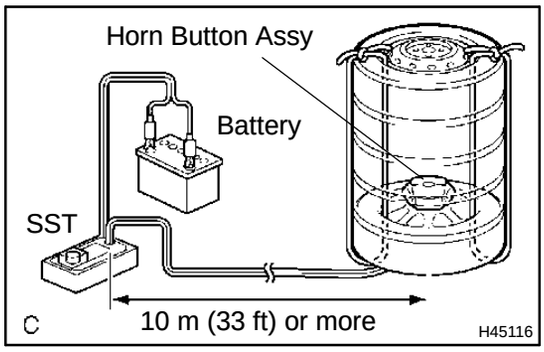
NOTICE:

- **The tires may be marked by the airbag deployment, so use an extra tire.**
- **Do not place the SST connector under the tire because it could be damaged.**



(3) Tie the tires together with 2 wire harnesses.

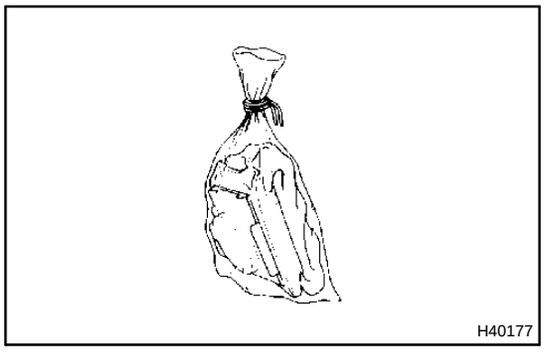
CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



(f) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (–) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the disc wheel which the horn button assy is tied to.
(3) Press the SST activation switch and deploy the airbag.

CAUTION:
When deploying the airbag, make sure that no one is near the tire.

HINT:
The airbag is deployed as the LED of the SST activation switch comes on.



(g) Dispose of the horn button assy.

CAUTION:
- **The horn button assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a horn button assy with a deployed airbag.**
- **Do not apply water, etc. to a horn button assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the horn button assy from the disc wheel.
(2) Place the horn button assy in a plastic bag, tie it tightly and dispose of it as other general part disposal.

SPIRAL CABLE SUB-ASSY

REPLACEMENT

6005S-05

HINT:

COMPONENTS: See page 60-20 (TMC Made) or 60-30 (TMMT/TMUK Made).

1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

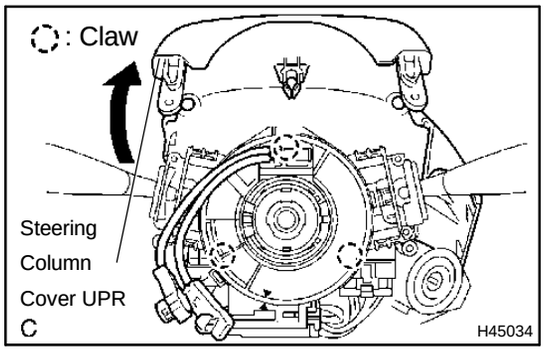
4. REMOVE HORN BUTTON ASSY

(SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))

5. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-6)

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

6. REMOVE STEERING COLUMN COVER LWR (SEE PAGE 50-6)



7. REMOVE SPIRAL CABLE SUB-ASSY

(a) Raise the steering column cover UPR.

(b) Disconnect the connectors from the spiral cable sub-assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(c) Disengage the 3 claws and remove the spiral cable sub-assy.

8. INSPECT SPIRAL CABLE SUB-ASSY

(a) If any of the following conditions occur, replace the spiral cable sub-assy with a new one.

Condition:

Scratches or cracks on the connector

Cracks, dents or chips in the spiral cable sub-assy

9. INSTALL SPIRAL CABLE SUB-ASSY

(a) Check that the front wheels are facing straight ahead.

(b) Set the turn signal switch to the neutral position.

NOTICE:

Make sure that the turn signal switch is in the neutral position or the pin of the turn signal switch may be snapped.

(c) Install the spiral cable sub-assy.

NOTICE:

When replacing the spiral cable sub-assy with a new one, remove the lock pin before installing the steering wheel assy.

(d) Connect the connectors to the spiral cable sub-assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

10. INSTALL STEERING COLUMN COVER LWR (SEE PAGE 50-6)

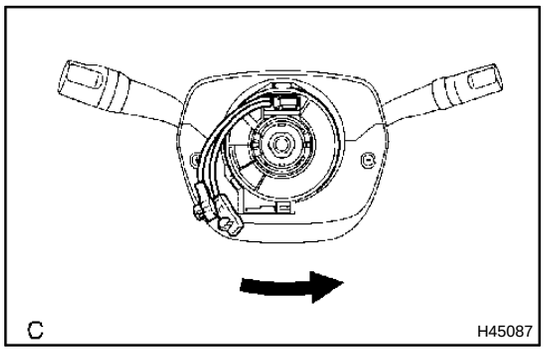
11. ADJUST SPIRAL CABLE SUB-ASSY

(a) Check that the ignition switch is off.

(b) Check that the battery negative (-) terminal is disconnected.

CAUTION:

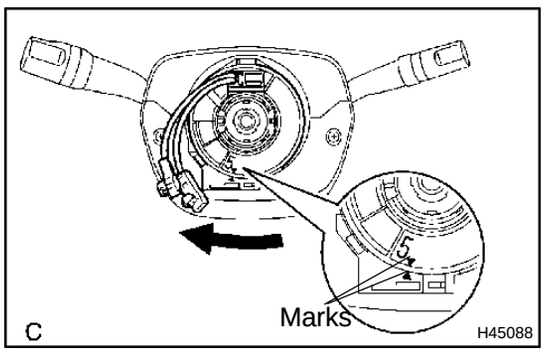
After removing the terminal, wait for at least 90 seconds before starting the operation.



(c) Rotate the spiral cable sub-assy counterclockwise slowly by hand until it feels firm.

NOTICE:

Do not turn the spiral cable sub-assy by the airbag wire harness.



(d) Rotate the spiral cable sub-assy clockwise approximately 2.5 turns to align the marks.

NOTICE:

Do not turn the spiral cable sub-assy by the airbag wire harness.

HINT:

The spiral cable sub-assy will rotate approximately 2.5 turns to both the left and right from the center.

12. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-6)

13. INSPECT STEERING WHEEL CENTER POINT

14. INSTALL HORN BUTTON ASSY (SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))

15. CONNECT BATTERY NEGATIVE TERMINAL

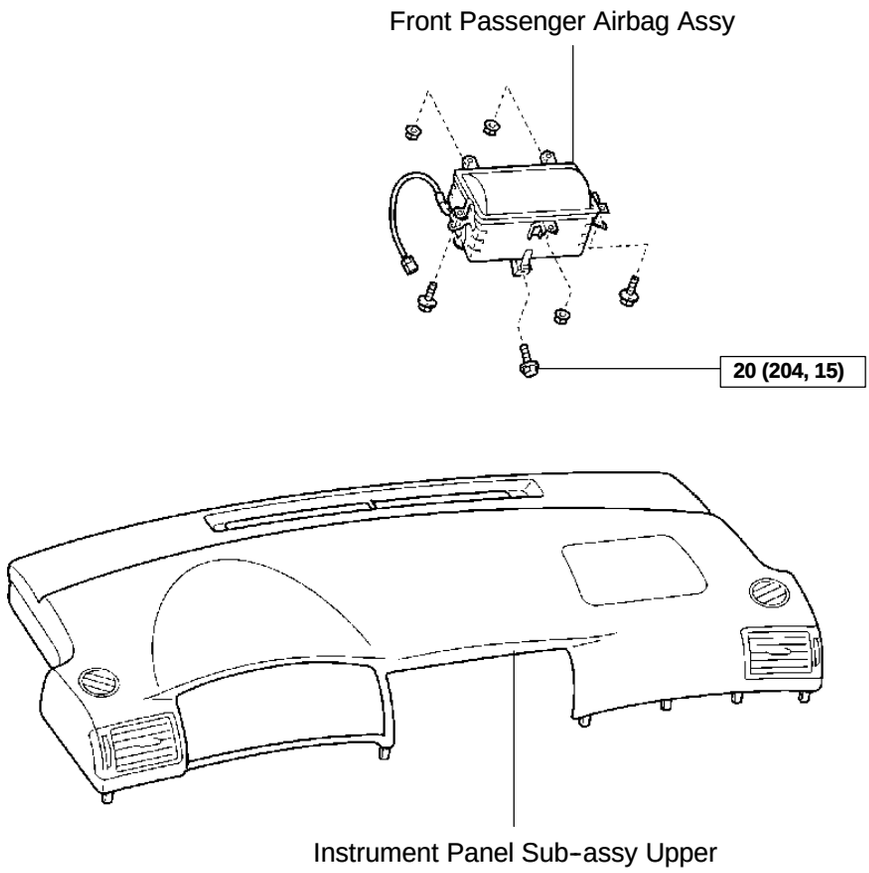
16. INSPECT HORN BUTTON ASSY (SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))

17. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

FRONT PASSENGER AIRBAG ASSY

COMPONENTS

600L4-06



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

H45035

600WG-01

REPLACEMENT

1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

4. REMOVE HORN BUTTON ASSY

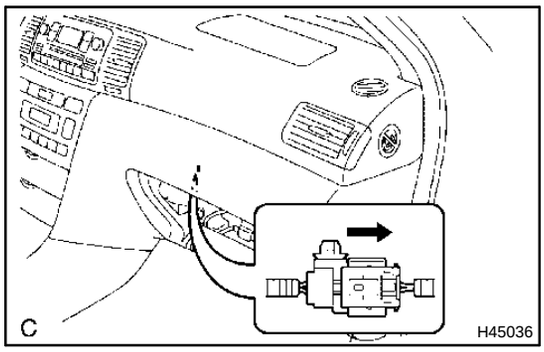
(SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))

5. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-6)

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

6. REMOVE STEERING COLUMN COVER LWR (SEE PAGE 50-6)

7. REMOVE GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-6)



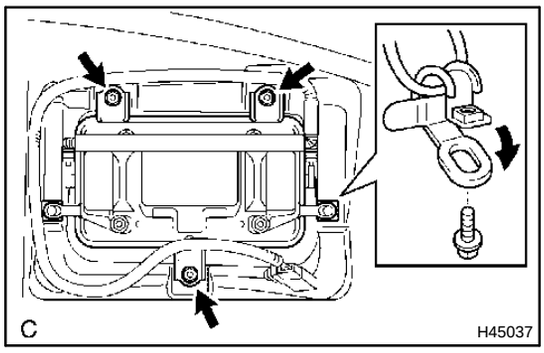
8. DISCONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR

(a) Disconnect the connector from the front passenger airbag assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

9. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-6)

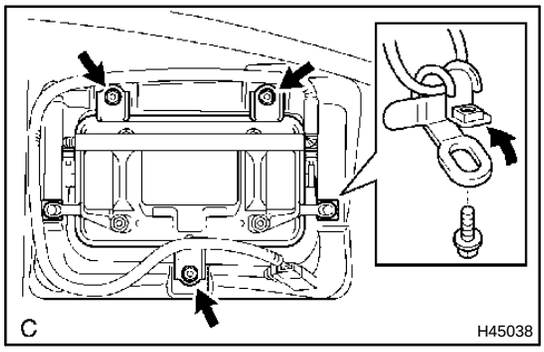


10. REMOVE FRONT PASSENGER AIRBAG ASSY

(a) Remove the 2 bolts and 2 strings from the right and left brackets of the front passenger airbag assy.

(b) Remove the 3 nuts and front passenger airbag assy from the instrument panel sub-assy upper.

11. INSPECT FRONT PASSENGER AIRBAG ASSY (SEE PAGE 60-14)



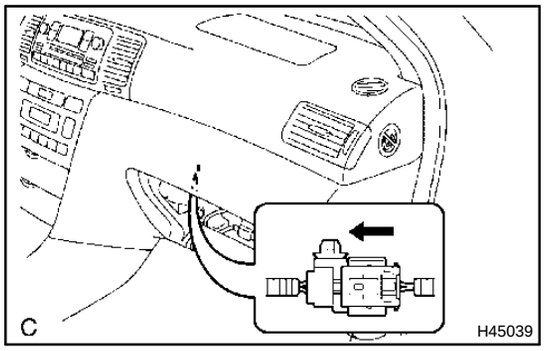
12. INSTALL FRONT PASSENGER AIRBAG ASSY

(a) Install the front passenger airbag assy with the 3 nuts to the instrument panel sub-assy upper.

(b) Install the 2 strings to the right and left brackets of the front passenger airbag assy.

(c) Fix the brackets of the front passenger airbag assy with the 2 bolts.

13. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER (SEE PAGE 71-6)



14. CONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR

(a) Connect the connector to the front passenger airbag assy.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

15. INSTALL GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-6)
16. INSTALL STEERING COLUMN COVER LWR (SEE PAGE 50-6)
17. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-6)
18. INSPECT STEERING WHEEL CENTER POINT
19. INSTALL HORN BUTTON ASSY (SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))
20. CONNECT BATTERY NEGATIVE TERMINAL
21. INSPECT HORN BUTTON ASSY (SEE PAGE 60-21 (TMC MADE) OR 60-31 (TMMT/TMUK MADE))
22. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

600L6-05

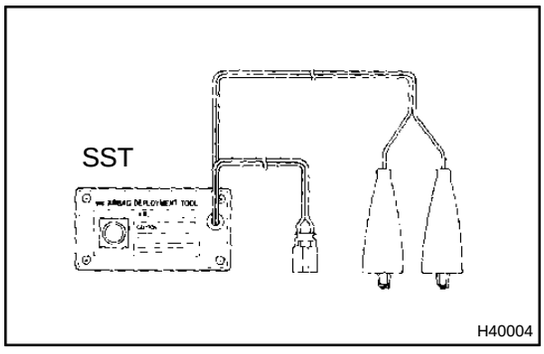
DISPOSAL

HINT:

When scrapping a vehicle equipped with the SRS or disposing of the front passenger airbag assy, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a front passenger airbag assy that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**

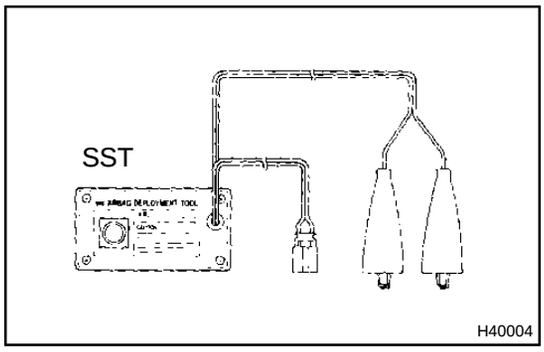


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
- **When deploying the airbag, perform the operation at least 10 m (33 ft) away from the front passenger airbag assy.**
- **The front passenger airbag assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assy with a deployed airbag.**
- **Do not apply water, etc. to a front passenger airbag assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

1. DISPOSE OF FRONT PASSENGER AIRBAG ASSY (WHEN INSTALLED IN VEHICLE)

HINT:

Prepare a battery as the power source to deploy the airbag.



(a) Check the function of the SST (see step 1–(a) on page 60–23).

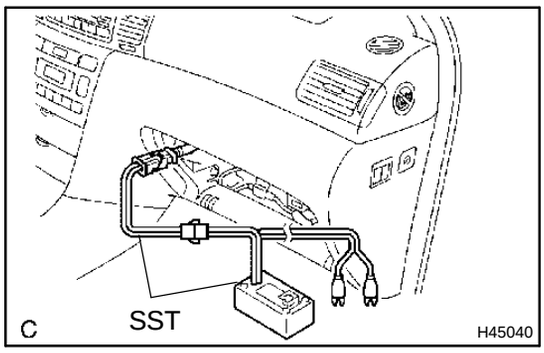
(b) Precaution (see page 60–1).

(c) Disconnect the battery negative terminal.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(d) Remove the glove compartment door assy (see page 71–6).



(e) Install the SST.

(1) Disconnect the connector from the front passenger airbag assy.

NOTICE:

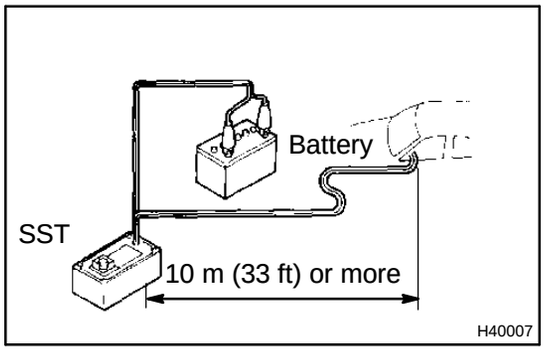
When handling the airbag connector, take care not to damage the airbag wire harness.

(2) Connect the SST connector to the front passenger airbag assy.

SST 09082-00700, 09082-00780

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the vehicle side window (3-door hatchback) or front side window (except 3-door hatchback).

(4) Maintaining enough clearance for the SST wire harness in the side window (3-door hatchback) or front side window (except 3-door hatchback), close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (-) terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The front passenger airbag assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assy with a deployed airbag.**
- **Do not apply water, etc. to a front passenger airbag assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

The airbag is deployed as the LED of the SST activation switch comes on.

2. DISPOSE OF FRONT PASSENGER AIRBAG ASSY (WHEN NOT INSTALLED IN VEHICLE)

NOTICE:

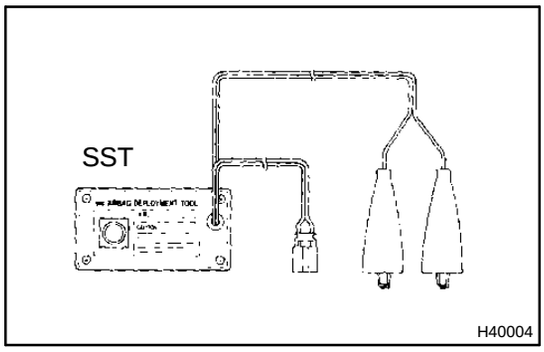
- **When disposing of the front passenger airbag assy, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:

Prepare a battery as the power source to deploy the airbag.

(a) Check the function of the SST (see step 1–(a) on page 60–23).

(b) Remove the front passenger airbag assy (see page 60–43).

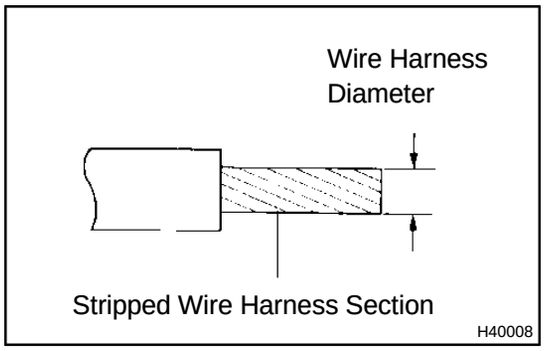


CAUTION:

- **When removing the front passenger airbag assy, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**
- **When storing the front passenger airbag assy, keep the airbag deployment side facing upward.**

(c) Using a service–purpose wire harness for the vehicle, tie down the front passenger airbag assy to the tire.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more)



CAUTION:

If the wire harness is too thin or an alternative object is used to tie down the front passenger airbag assy, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).

HINT:

To calculate the area of the stripped wire harness section:

Area = 3.14 x $(Diameter)^2$ divided by 4

(1) Position the front passenger airbag assy inside the tire with the airbag deployment side facing inside.

Tire size: Must exceed the following dimensions

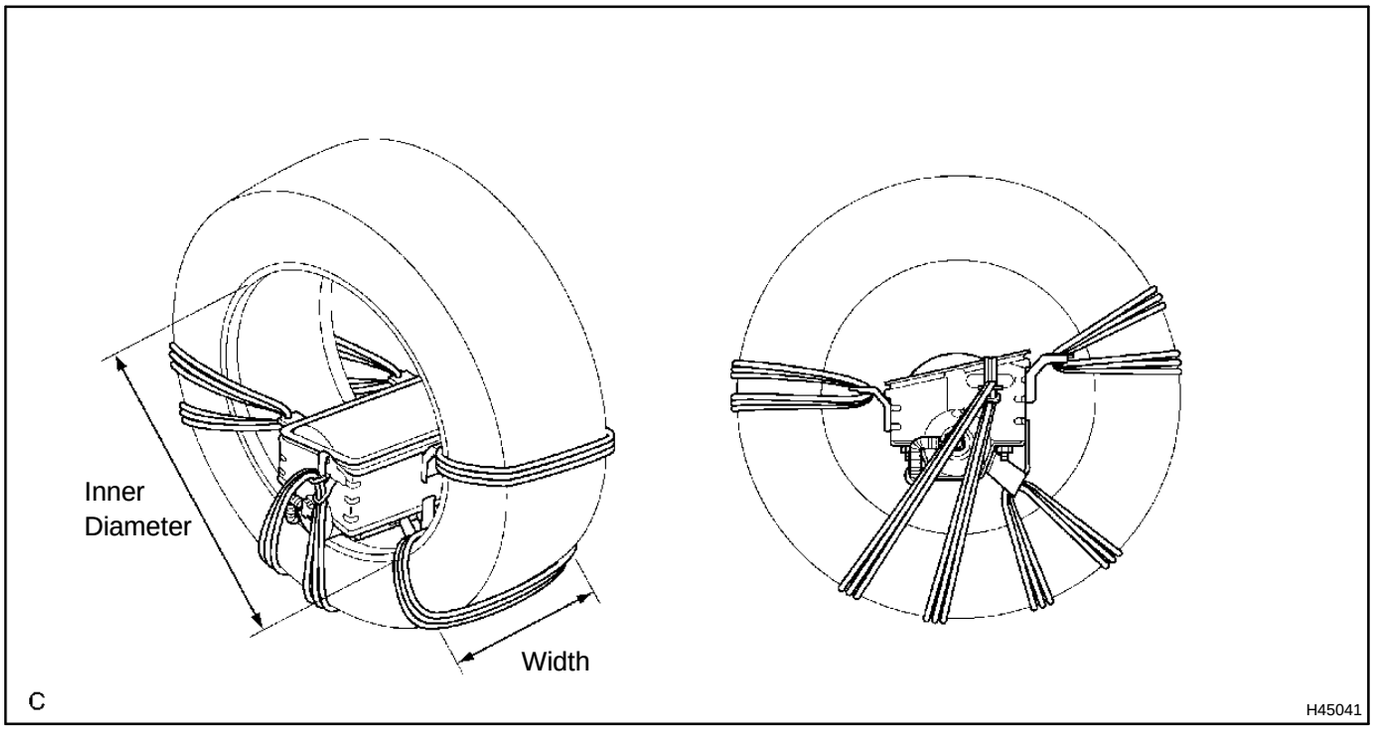
Width: 185 mm (7.28 in.)

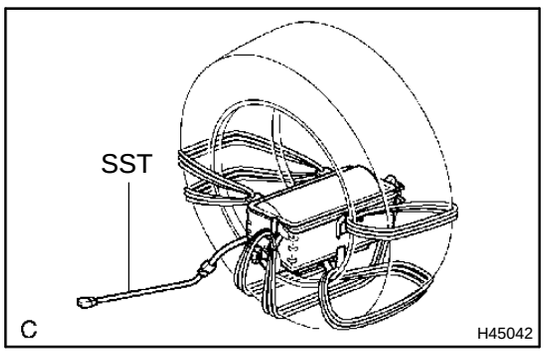
Inner diameter: 360 mm (14.17 in.)

CAUTION:

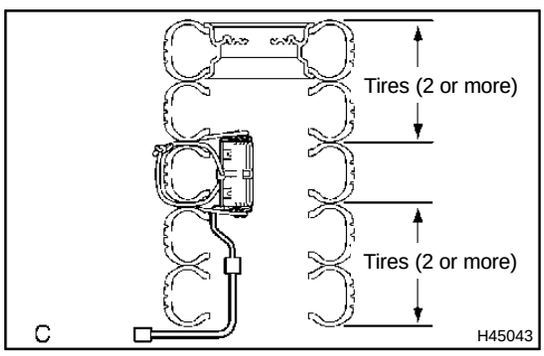
- **Make sure that the wire harness is tight. If there is slack in wire harness, the front passenger airbag assy may become loose due to the shock when the airbag is deployed.**
- **Always tie down the front passenger airbag assy with the airbag deployment side facing inside the tire.**

NOTICE:
The tire will be marked by the airbag deployment, so use an extra tire.



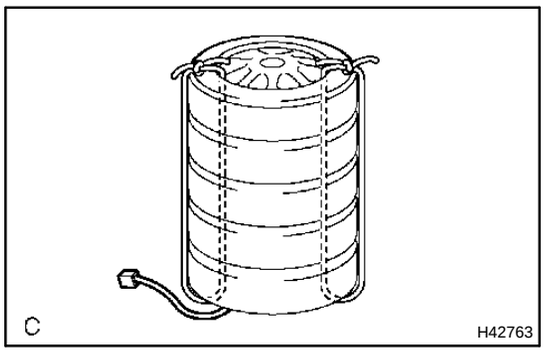


(d) Install the SST.
Connect the SST connector to the front passenger airbag assy.
SST 09082-00780



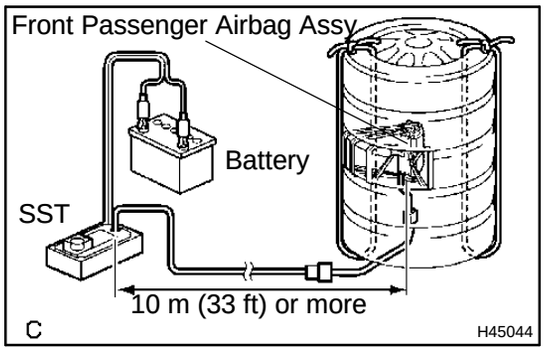
(e) Place the tires.
(1) Place at least 2 tires under the tire which the front passenger airbag assy is tied to.
(2) Place at least 2 tires over the tire which the front passenger airbag assy is tied to. The top tire should have the disc wheel installed.

NOTICE:
Do not place the SST connector under the tire because it could be damaged.



(3) Tie the tires together with 2 wire harnesses.

CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



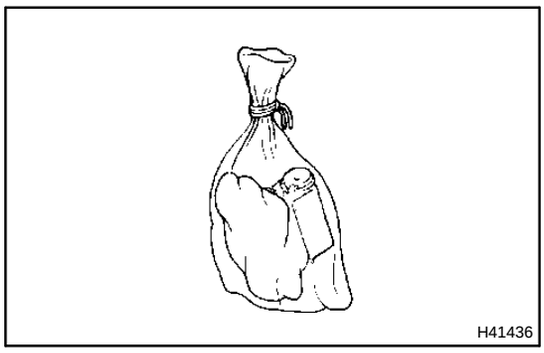
(f) Install the SST.
Connect the SST connector.
SST 09082–00700

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 tire.

(g) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (–) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the tire which the front passenger airbag assy is tied to.
(3) Press the SST activation switch and deploy the airbag.

CAUTION:
When deploying the airbag, make sure that no one is near the tire.

HINT:
The airbag is deployed as the LED of the SST activation switch comes on.


H41436

(h) Dispose of the front passenger airbag assy.

CAUTION:

- **The front passenger airbag assy becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assy with a deployed airbag.**
- **Do not apply water, etc. to a front passenger airbag assy with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the front passenger airbag assy from the tire.

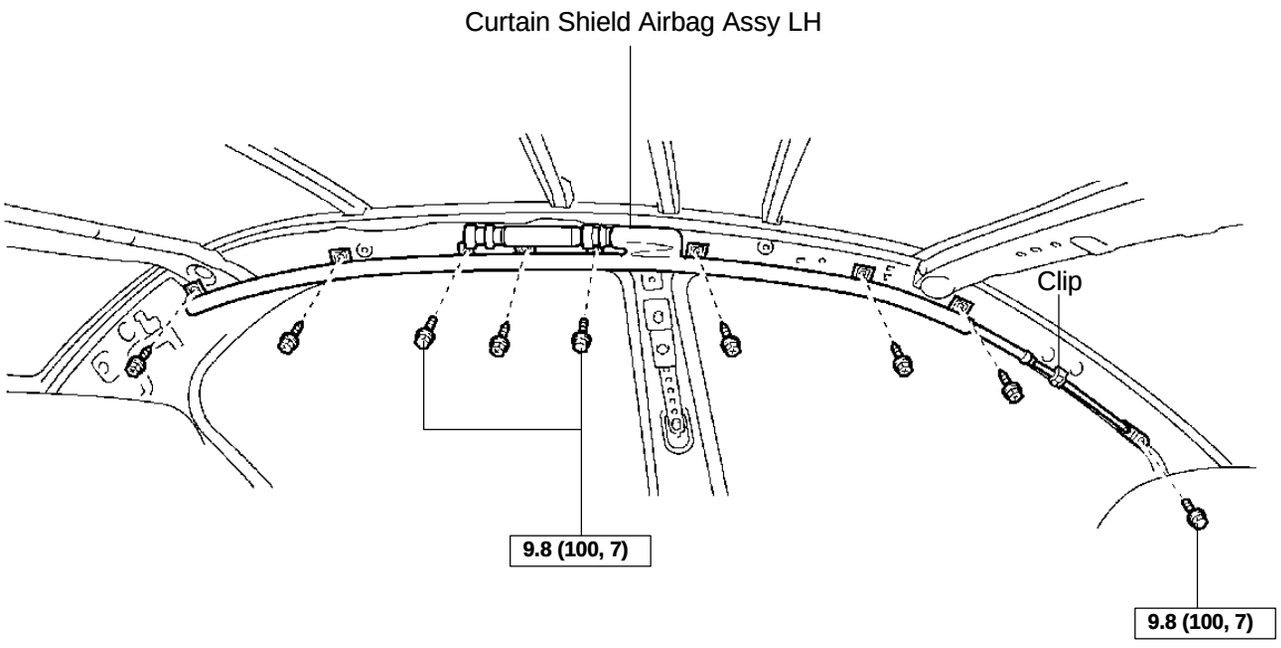
(2) Place the front passenger airbag assy in a plastic bag, tie it tightly and dispose of it as other general part disposal.

CURTAIN SHIELD AIR BAG ASSY LH

COMPONENTS

600WH-01

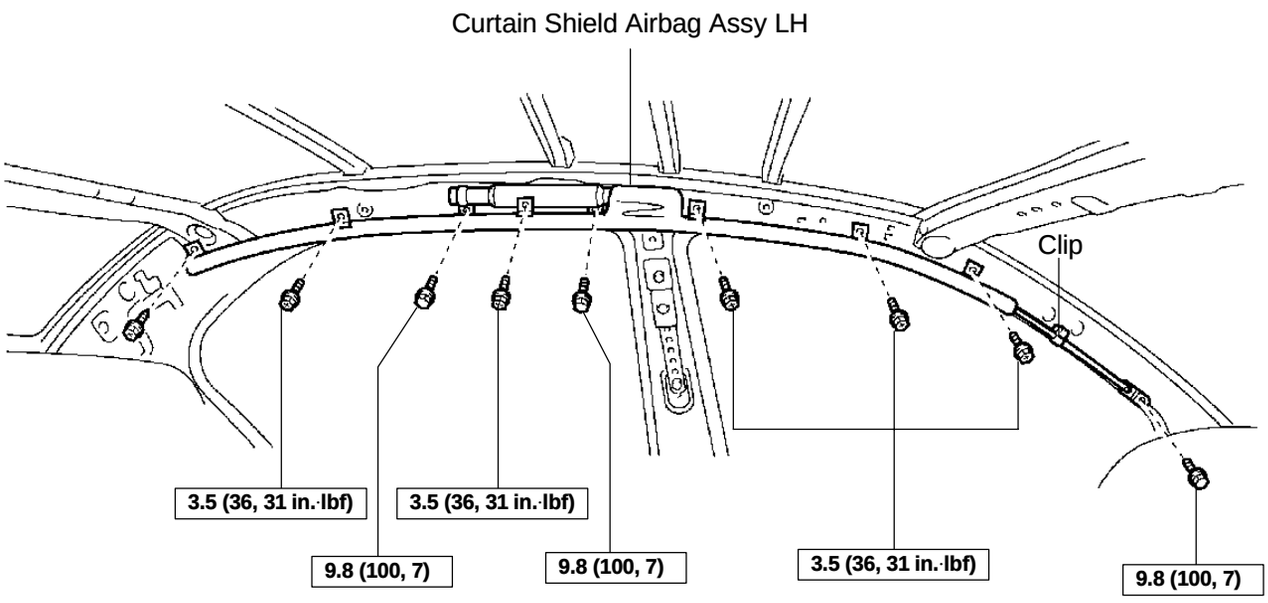
Sedan Body Type (TMC Made):



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

H45045

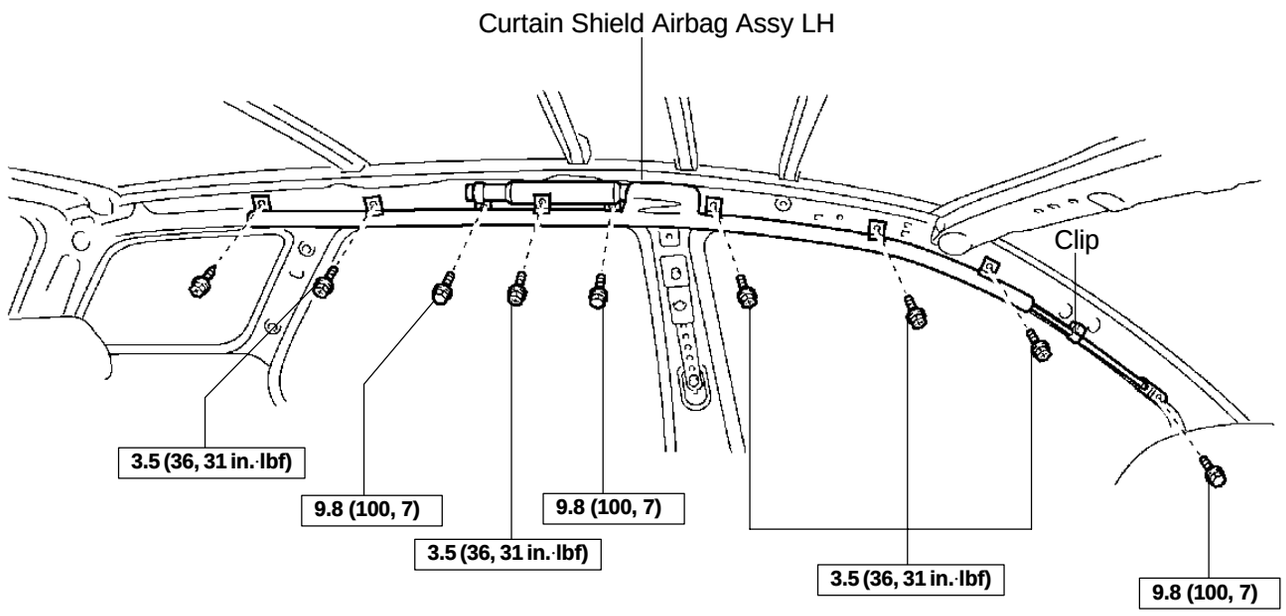
Sedan Body Type (TMMT Made):



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

H45285

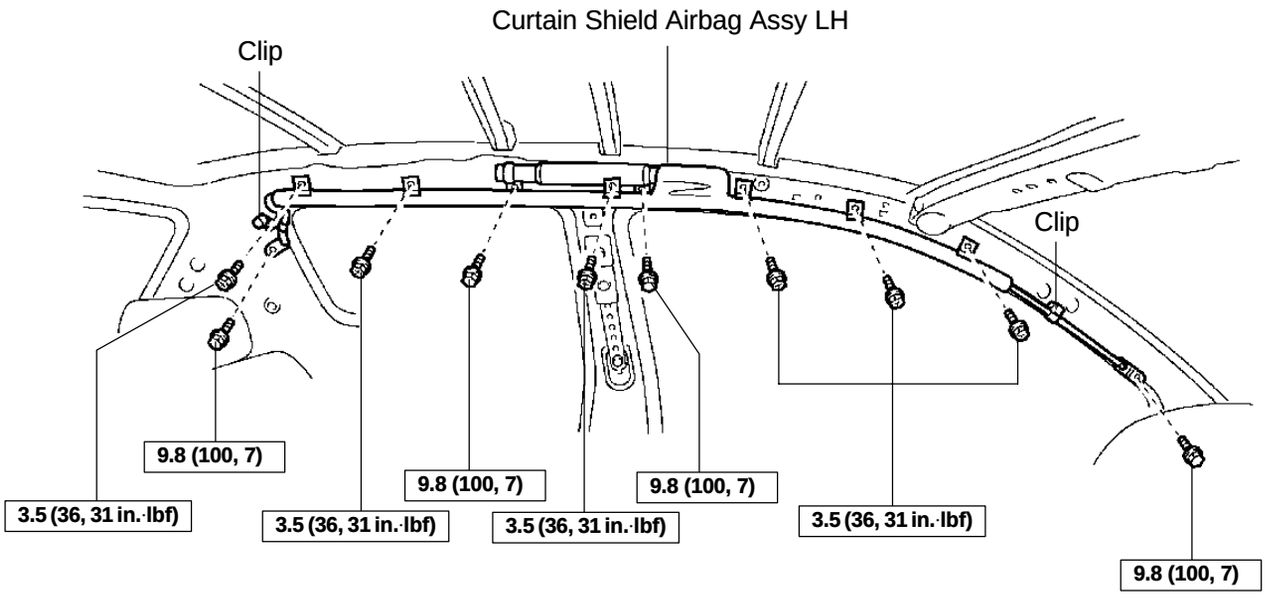
Wagon Body Type:



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

H45288

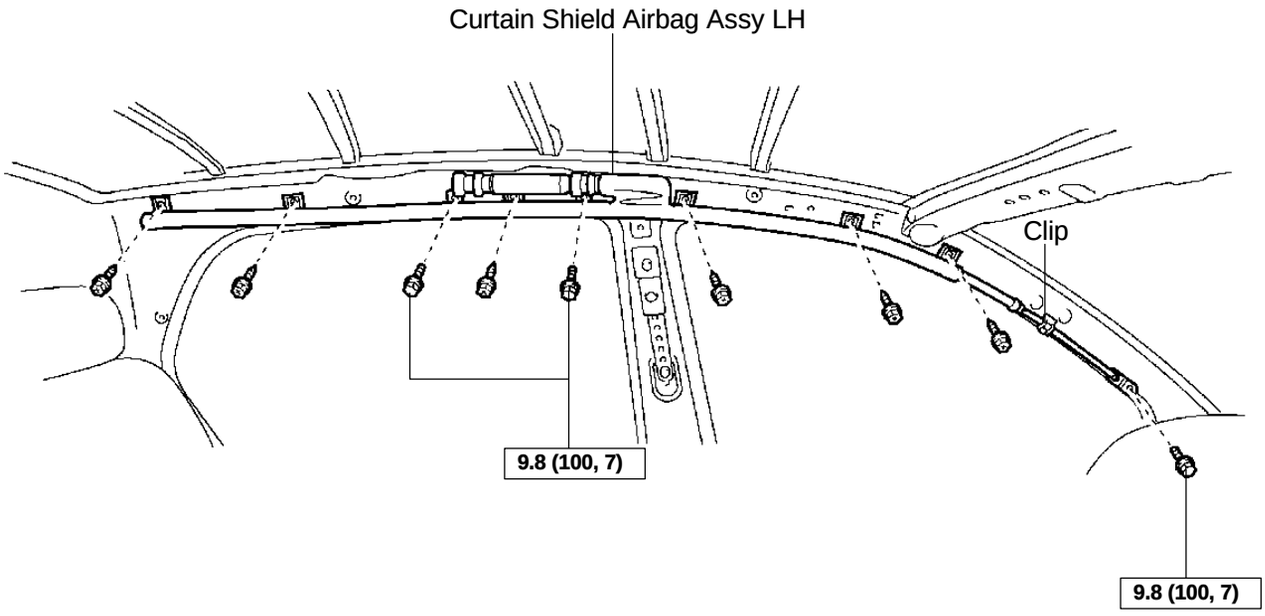
3 Door Hatchback Body Type:



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

H45286

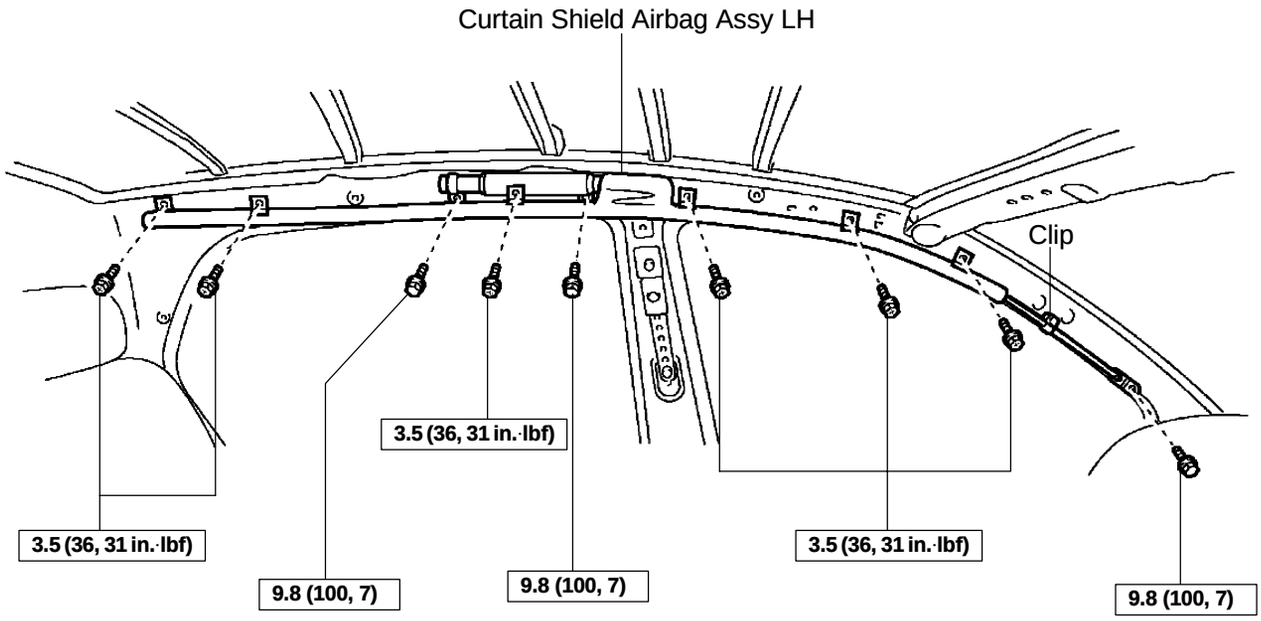
5 Door Hatchback Body Type (TMC Made):



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

H45046

5 Door Hatchback Body Type (TMUK Made):



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

H45287

600WI-01

REPLACEMENT

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. REMOVE ROOF HEADLINING ASSY (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)

4. REMOVE ROOF HEADLINING ASSY (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)

5. REMOVE ROOF HEADLINING ASSY (3 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-26)

6. REMOVE ROOF HEADLINING ASSY (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)

7. REMOVE CURTAIN SHIELD AIR BAG ASSY LH (SEDAN BODY TYPE)

(a) Disconnect the connector from the curtain shield airbag assy LH.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

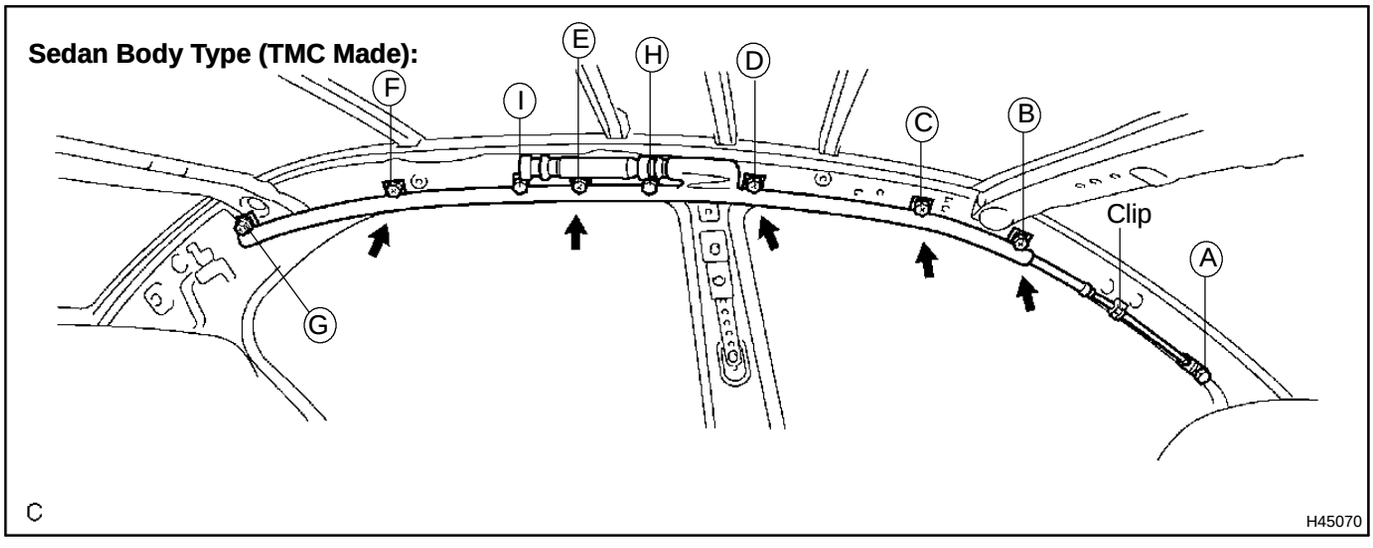
(b) TMC Made:

Remove the curtain shield airbag assy LH.

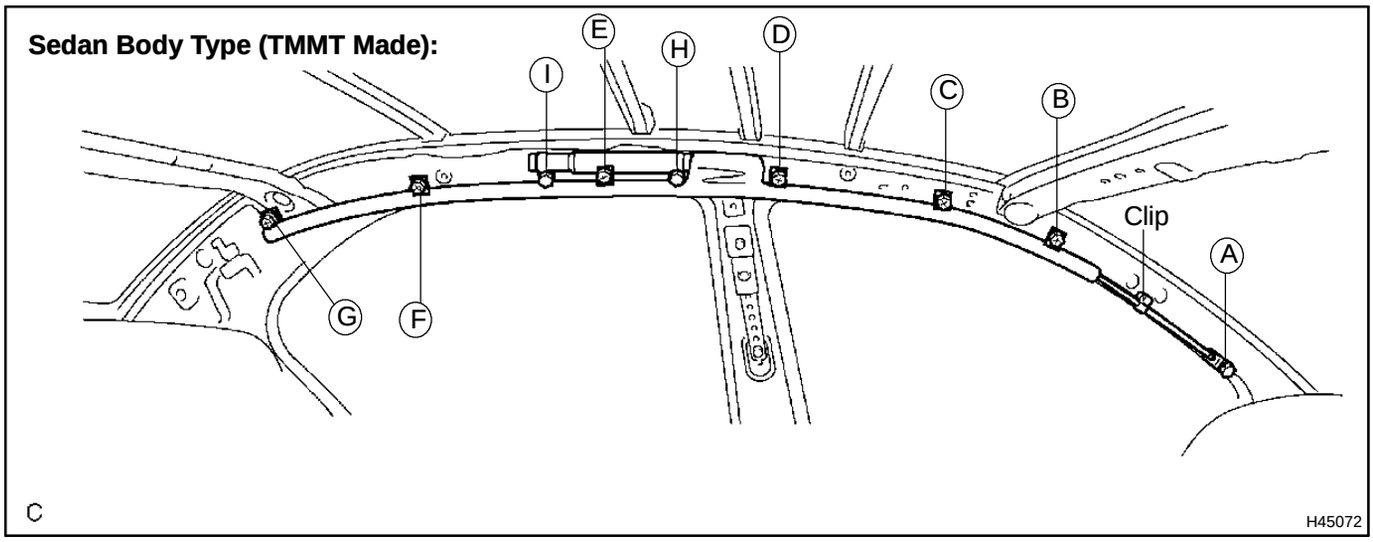
(1) Remove the clip.

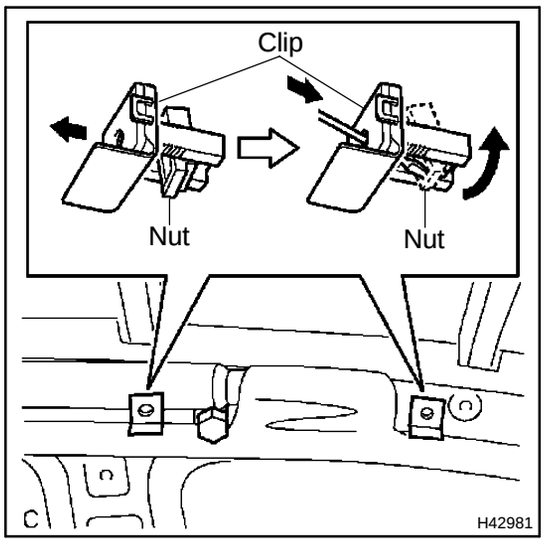
(2) Remove the 3 bolts and 6 screws.

(3) Remove the 5 clips in order of B to F.



(c) TMMT Made:
Remove the curtain shield airbag assy LH.
(1) Remove the clip.
(2) Remove the 6 bolts in order of A to F.





(3) Using a screwdriver, turn the nuts 90° and remove the clips in order as follows.
B → C → D → E → F
(4) Remove the screw and the 2 bolts in order as follows.
G → H → I

8. REMOVE CURTAIN SHIELD AIR BAG ASSY LH (WAGON BODY TYPE)

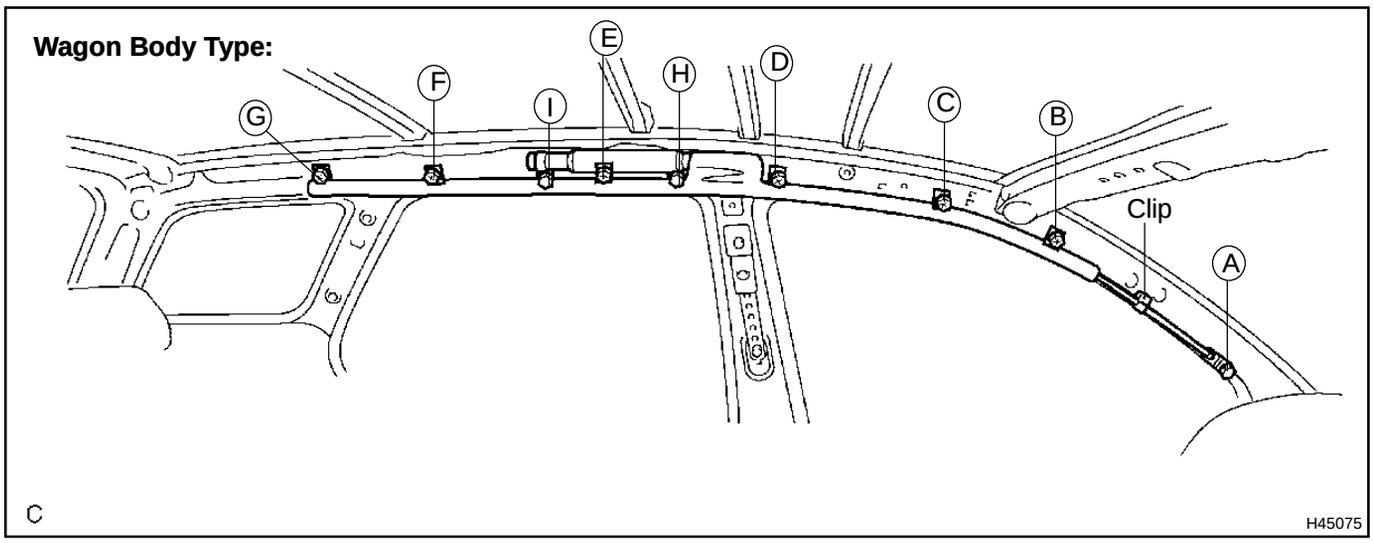
(a) Disconnect the connector from the curtain shield airbag assy LH.

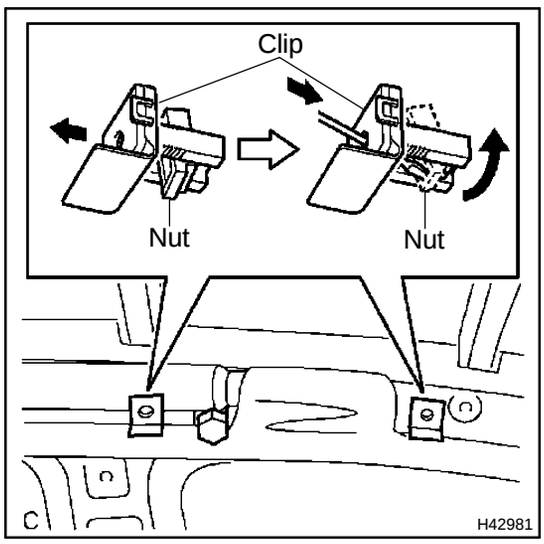
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(b) Remove the clip.

(c) Remove the 6 bolts in order of A to F.





(d) Using a screwdriver, turn the nuts 90° and remove the clips in order as follows.

B → C → D → E → F

(e) After removing the screw and the 2 bolts in order as follows, remove the curtain shield airbag assy LH.

G → H → I

9. REMOVE CURTAIN SHIELD AIR BAG ASSY LH (3 DOOR HATCH BACK BODY TYPE)

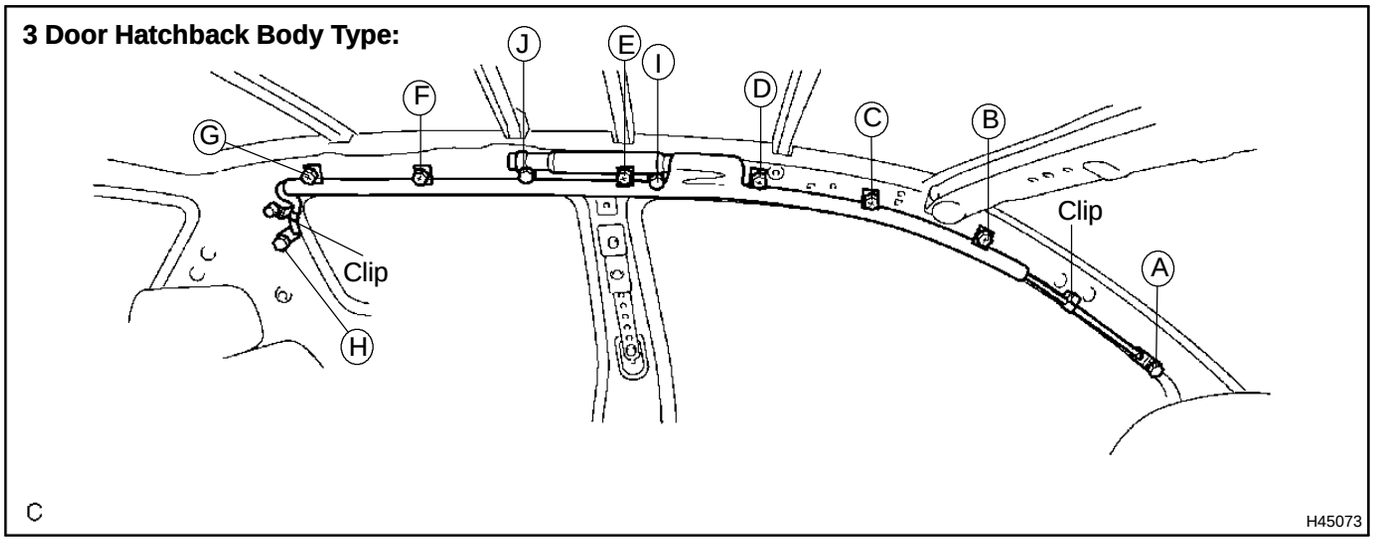
(a) Disconnect the connector from the curtain shield airbag assy LH.

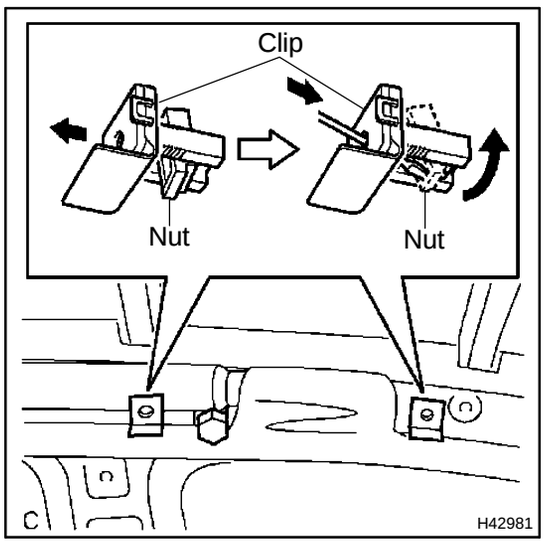
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(b) Remove the 2 clips.

(c) Remove the 7 bolts in order of A to G.





(d) Using a screwdriver, turn the nuts 90° and remove the clips in order as follows.
B → C → D → E → F → G

(e) After removing the 3 bolts in order as follows, remove the curtain shield airbag assy LH.
H → I → J

10. REMOVE CURTAIN SHIELD AIR BAG ASSY LH (5 DOOR HATCH BACK BODY TYPE)

(a) Disconnect the connector from the curtain shield airbag assy LH.

NOTICE:

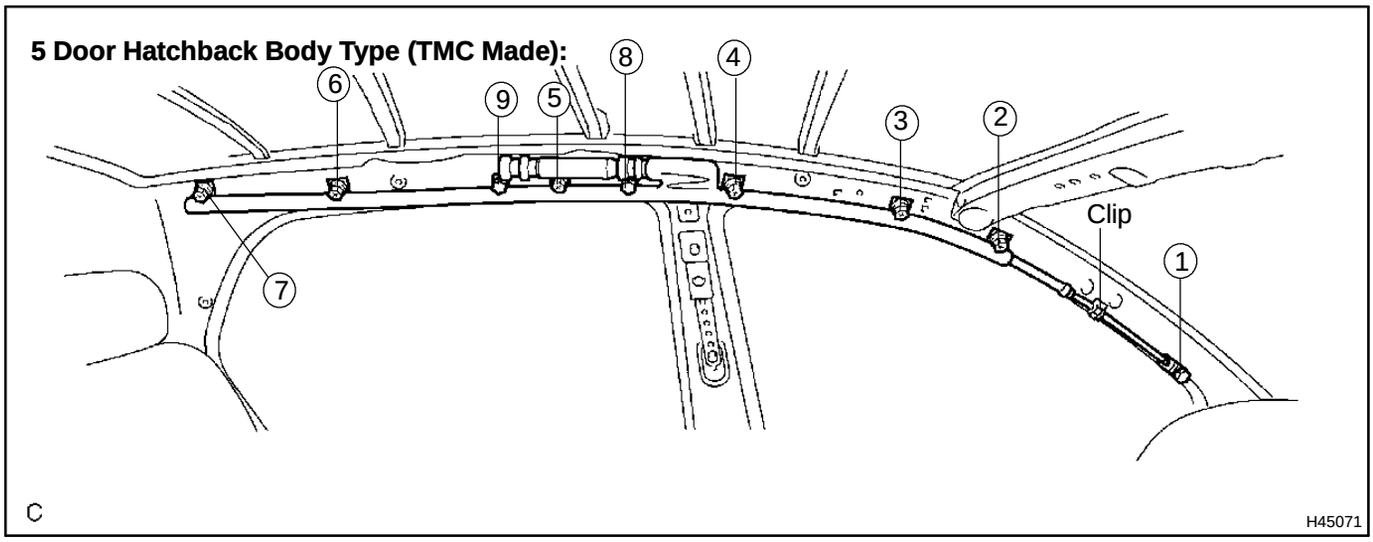
When handling the airbag connector, take care not to damage the airbag wire harness.

(b) TMC Made:

Remove the curtain shield airbag assy LH.

(1) Remove the clip.

(2) Remove the 3 bolts and 6 screws.

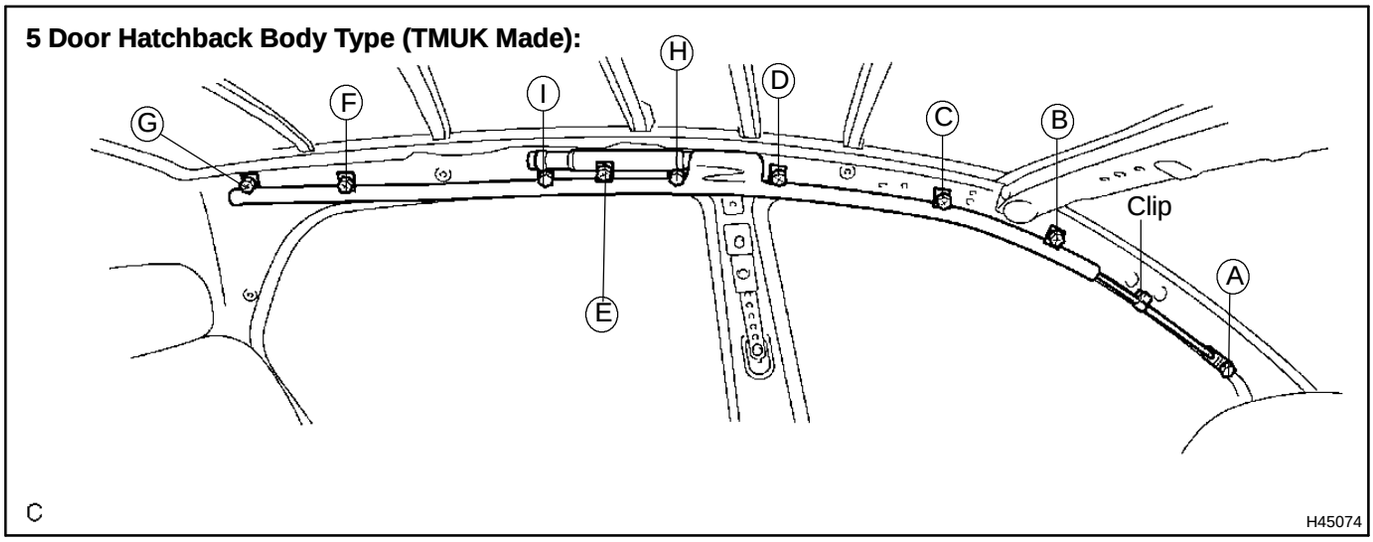


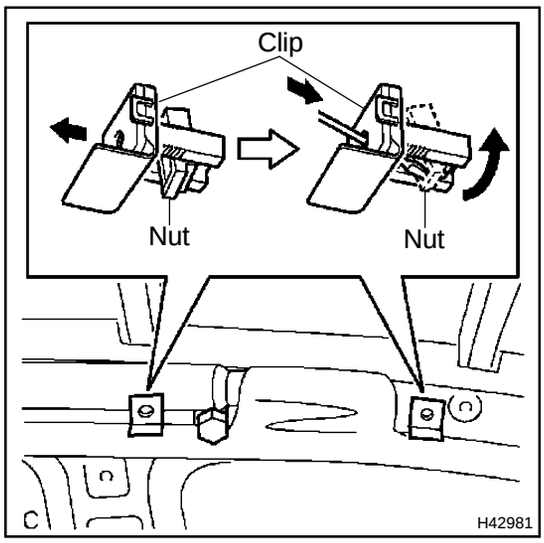
(c) TMUK Made:

Remove the curtain shield airbag assy LH.

(1) Remove the clip.

(2) Remove the 7 bolts in order of A to G.





(d) Using a screwdriver, turn the nuts 90° and remove the clips in order as follows.
B → C → D → E → F → G

(e) Remove the 2 bolts in order as follows.
H → I

11. INSPECT CURTAIN SHIELD AIR BAG ASSY LH **(SEE PAGE 60-14)**

12. INSTALL CURTAIN SHIELD AIR BAG ASSY LH (SEDAN BODY TYPE)

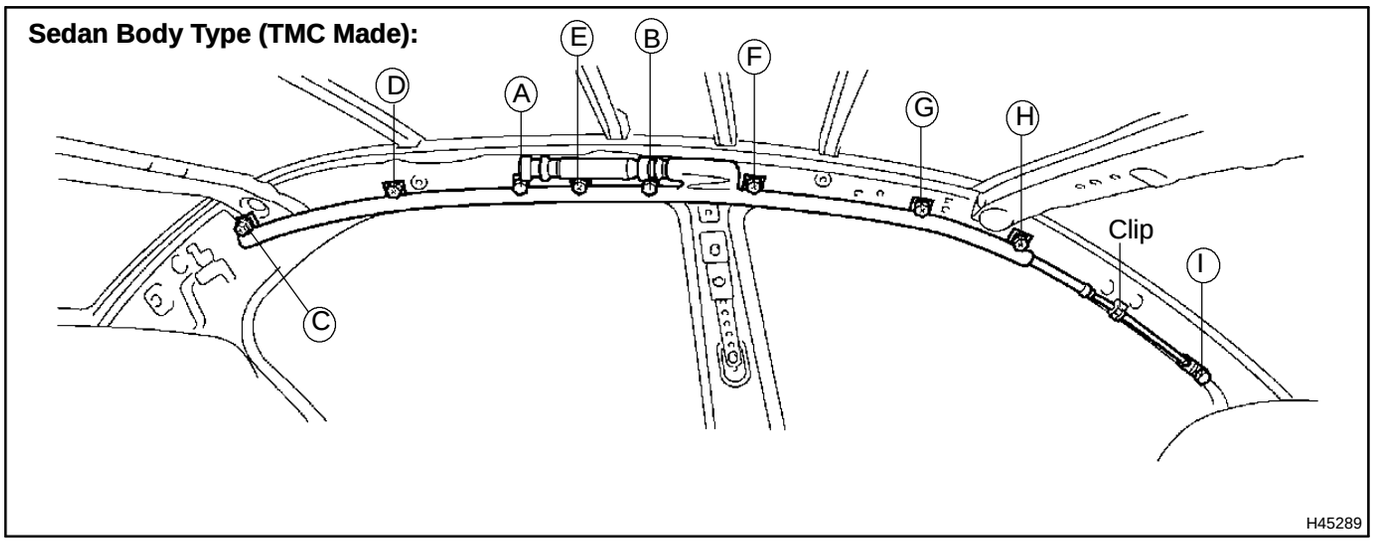
NOTICE:

Do not twist the curtain shield airbag assy LH when installing it.

(a) TMC Made:

Install the curtain shield airbag assy LH with the 3 bolts and 6 screws.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)



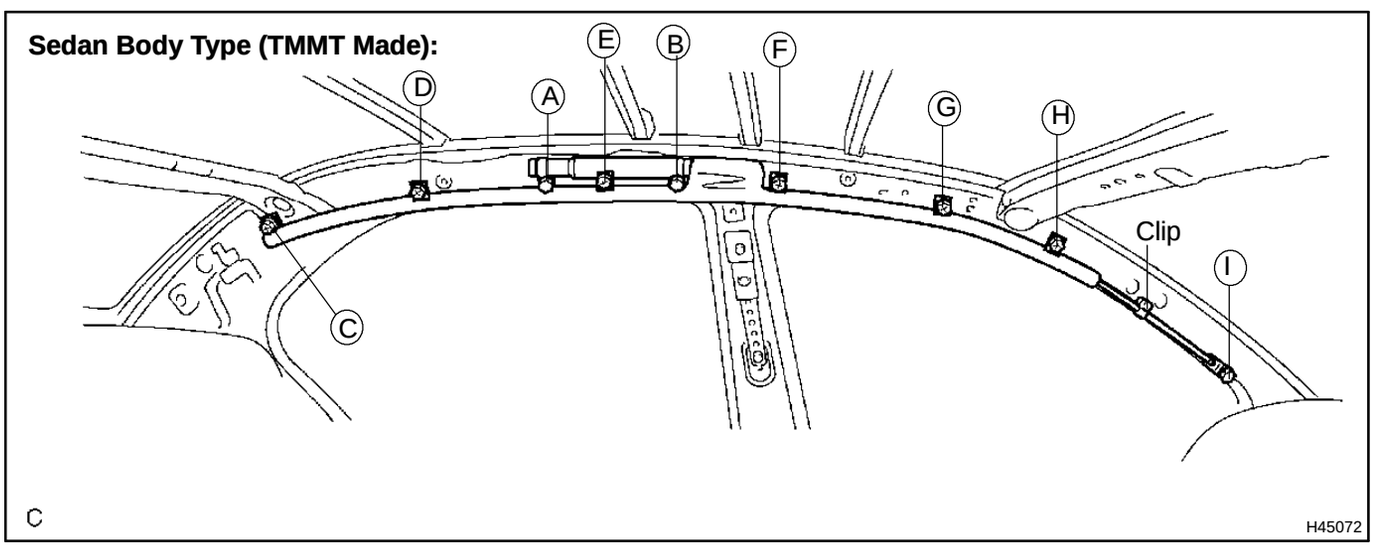
(b) TMUK Made:

Install the curtain shield airbag assy LH with the 8 bolts and screw.

Torque:

Bolt A, B, I: 9.8 N·m (100 kgf·cm, 7 ft.·lbf)

Bolt D, E, F, G, H: 3.5 N·m (36 kgf·cm, 31 in.·lbf)



(c) Install the clip.

(d) Connect the connector to the curtain shield airbag assy LH.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

13. INSTALL CURTAIN SHIELD AIR BAG ASSY LH (WAGON BODY TYPE)

NOTICE:

Do not twist the curtain shield airbag assy LH when installing it.

(a) Install the curtain shield airbag assy LH with the 8 bolts and screw.

Torque:

Bolt A, B, I: 9.8 N·m (100 kgf·cm, 7 ft.·lbf)

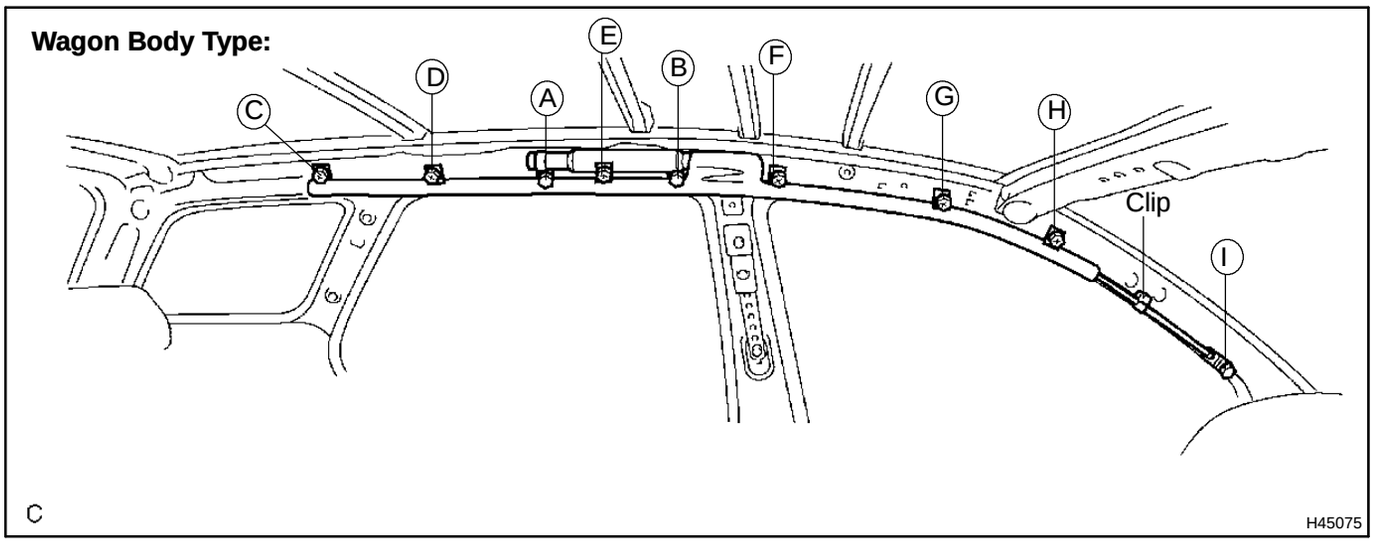
Bolt D, E, F, G, H: 3.5 N·m (36 kgf·cm, 31 in.·lbf)

(b) Install the clip.

(c) Connect the connector to the curtain shield airbag assy LH.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



14. INSTALL CURTAIN SHIELD AIR BAG ASSY LH (3 DOOR HATCH BACK BODY TYPE)

NOTICE:

Do not twist the curtain shield airbag assy LH when installing it.

(a) Install the curtain shield airbag assy LH with the 10 bolts.

Torque:

Bolt A, B, C, J: 9.8 N·m (100 kgf·cm, 7 ft.·lbf)

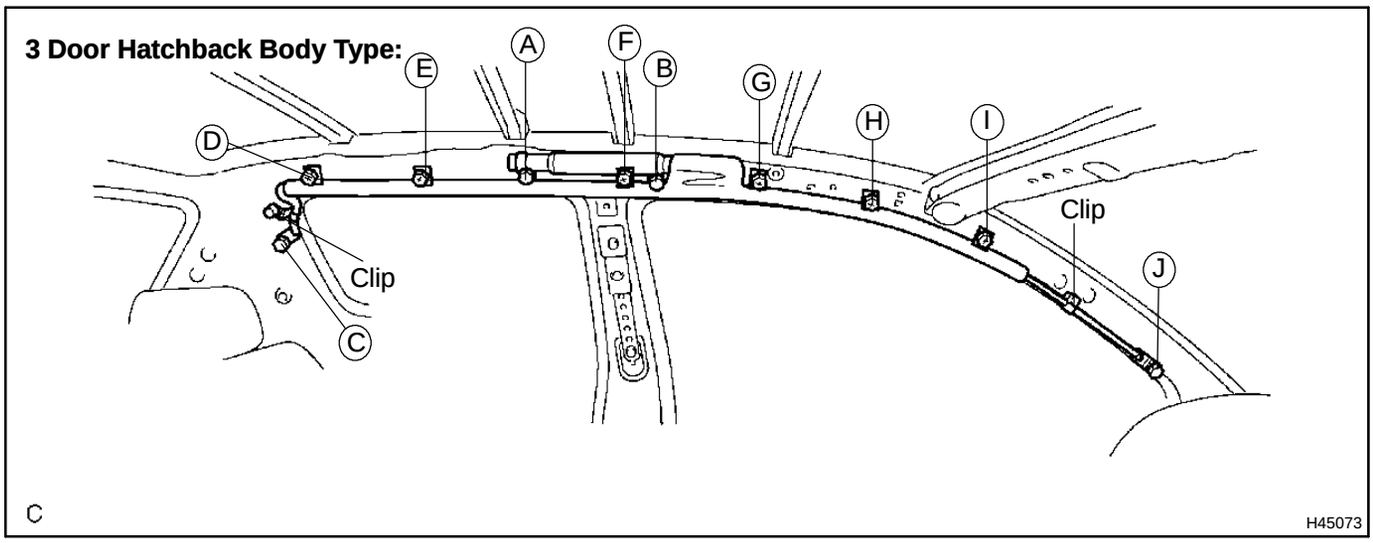
Bolt D, E, F, G, H, I: 3.5 N·m (36 kgf·cm, 31 in.·lbf)

(b) Install the 2 clips.

(c) Connect the connector to the curtain shield airbag assy LH.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



15. INSTALL CURTAIN SHIELD AIR BAG ASSY LH (5 DOOR HATCH BACK BODY TYPE)

NOTICE:

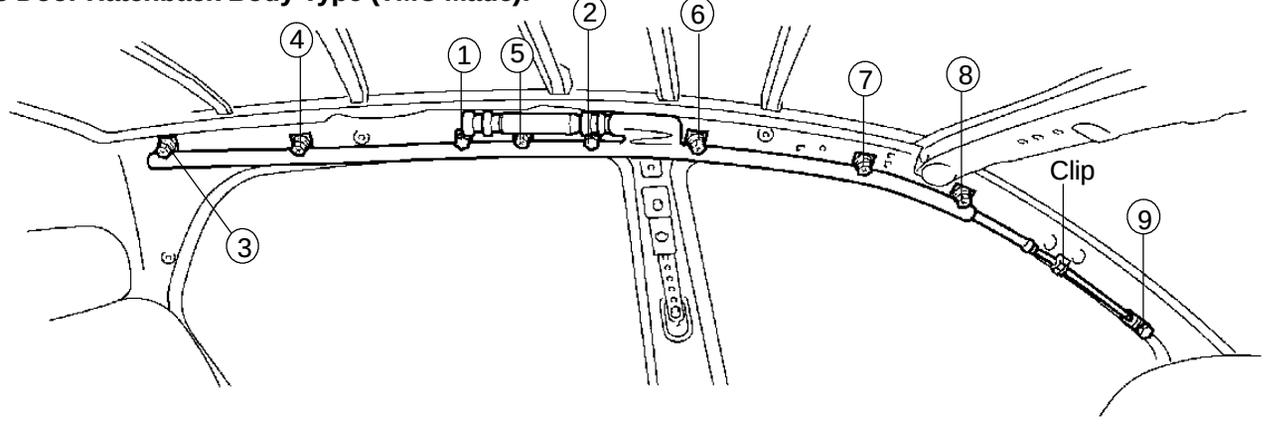
Do not twist the curtain shield airbag assy LH when installing it.

(a) TMC Made:

Install the curtain shield airbag assy LH with the 3 bolts and 6 screws.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

5 Door Hatchback Body Type (TMC Made):



(b) TMUK Made:

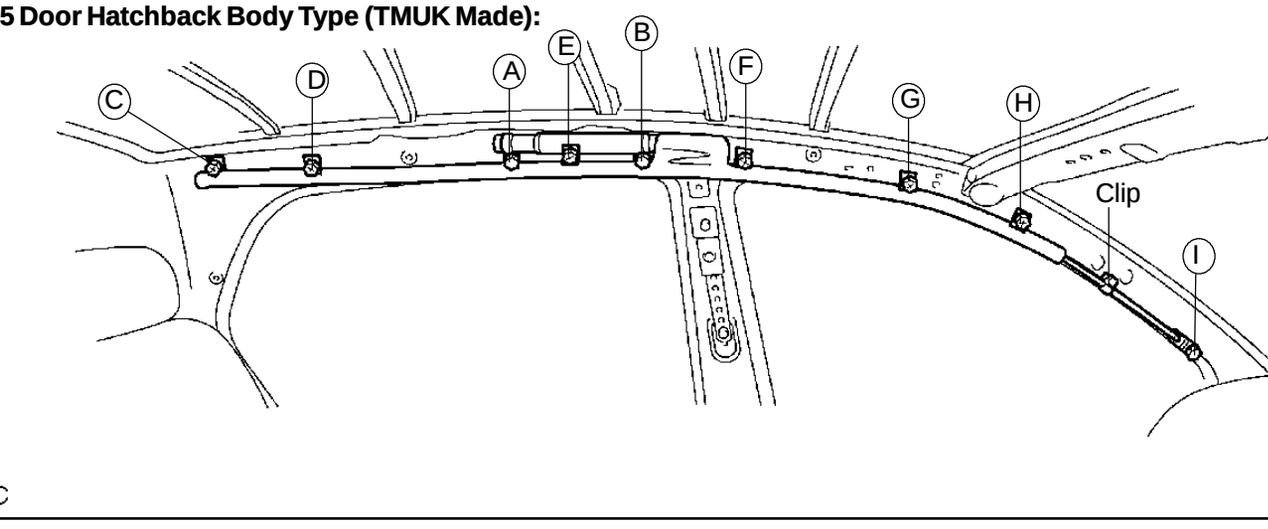
Install the curtain shield airbag assy LH with the 9 bolts.

Torque:

Bolt A, B, I: 9.8 N·m (100 kgf·cm, 7 ft.·lbf)

Bolt C, D, E, F, G, H: 3.5 N·m (36 kgf·cm, 31 in.·lbf)

5 Door Hatchback Body Type (TMUK Made):



(c) Install the clip.

(d) Connect the connector to the curtain shield airbag assy LH.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

16. INSTALL ROOF HEADLINING ASSY (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)
17. INSTALL ROOF HEADLINING ASSY (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)
18. INSTALL ROOF HEADLINING ASSY (3 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-26)
19. INSTALL ROOF HEADLINING ASSY (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)
20. CONNECT BATTERY NEGATIVE TERMINAL
21. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

600V0-02

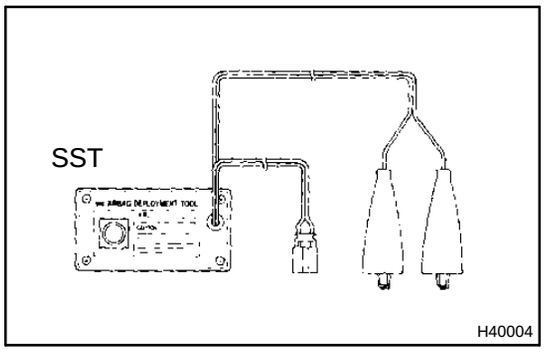
DISPOSAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- When scrapping a vehicle equipped with the SRS or disposing of the curtain shield airbag assy LH, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a curtain shield airbag assy LH that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**

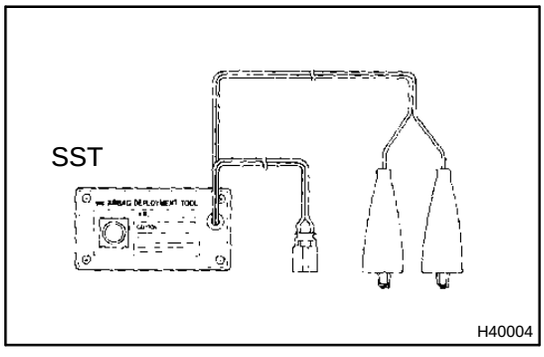


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
- **When deploying the airbag, perform the operation at least 10 m (33 ft) away from the curtain shield airbag assy LH.**
- **The curtain shield airbag assy LH becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a curtain shield airbag assy LH with a deployed airbag.**
- **Do not apply water, etc. to a curtain shield airbag assy LH with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

1. DISPOSE OF CURTAIN SHIELD AIR BAG ASSY LH (WHEN INSTALLED IN VEHICLE)

HINT:

Prepare a battery as the power source to deploy the airbag.



(a) Check the function of the SST (see step 1-(a) on page 60-23).

(b) Precaution (see page 60-1).

(c) Disconnect the battery negative terminal.

CAUTION:

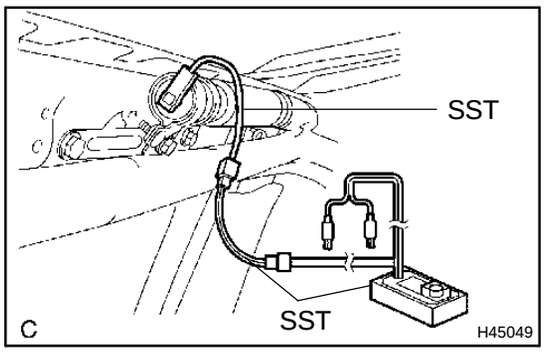
After removing the terminal, wait for at least 90 seconds before starting the operation.

(d) Remove the roof headlining assy (sedan body type) (see Pub. No. RM1028E, page 76-10).

(e) Remove the roof headlining assy (wagon body type) (see Pub. No. RM1028E, page 76-18).

(f) Remove the roof headlining assy (3 door hatchback body type) (see Pub. No. RM1028E, page 76-26).

(g) Remove the roof headlining assy (5 door hatchback body type) (see Pub. No. RM1028E, page 76-34).



(h) Install the SST.

(1) Disconnect the connector from the curtain shield airbag assy LH.

NOTICE:

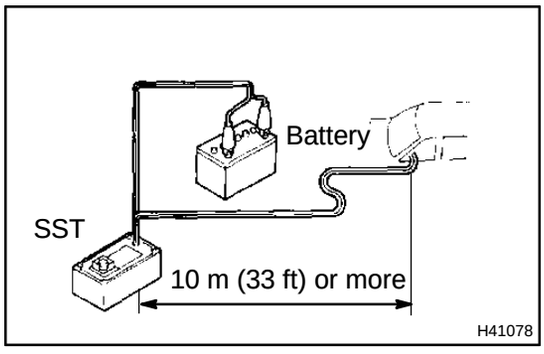
When handling the airbag connector, take care not to damage the airbag wire harness.

(2) After connecting the SST below to each other, connect them to the curtain shield airbag assy LH.

SST 09082-00700, 09082-00802 (09082-10801, 09082-20801)

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the vehicle side window (3-door hatchback) or rear side window (except 3-door hatchback).

(4) Maintaining enough clearance for the SST wire harness in the side window (3-door hatchback) or rear side window (except 3-door hatchback), close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (-) terminal.

(i) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The curtain shield airbag assy LH becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a curtain shield airbag assy LH with a deployed airbag.**
- **Do not apply water, etc. to a curtain shield airbag assy LH with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

The airbag is deployed as the LED of the SST activation switch comes on.

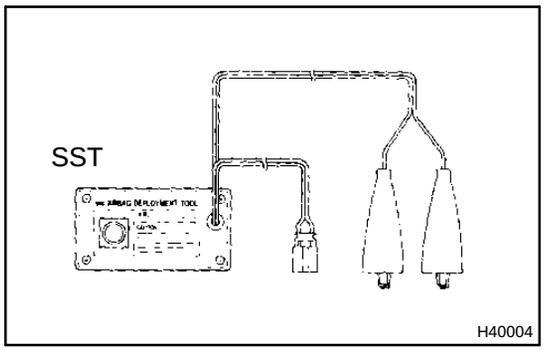
2. DISPOSE OF CURTAIN SHIELD AIR BAG ASSY LH (WHEN NOT INSTALLED IN VEHICLE)

NOTICE:

- **When disposing of the curtain shield airbag assy LH, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:

Prepare a battery as the power source to deploy the airbag.

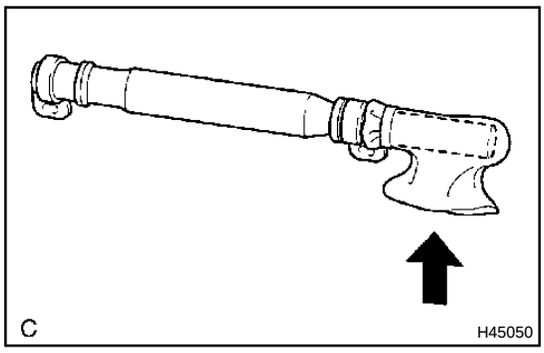


(a) Check the function of the SST (see step 1–(a) on page 60–23).

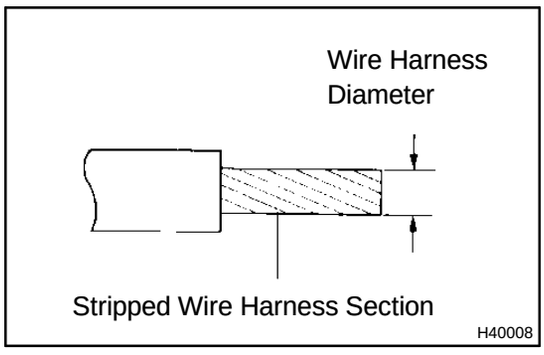
(b) Remove the curtain shield airbag assy LH (see page 60–57).

CAUTION:

When removing the curtain shield airbag assy LH, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.



(c) Cut off the deployment section of the curtain shield airbag assy LH.

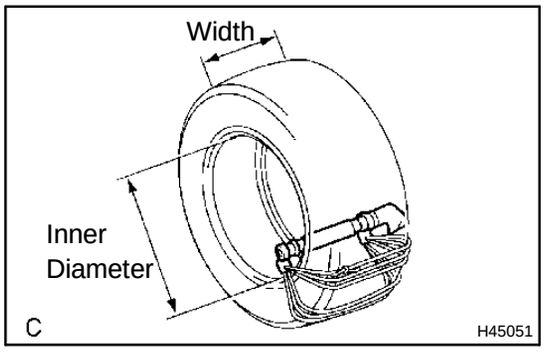


(d) Using a service–purpose wire harness for the vehicle, tie down the curtain shield airbag assy LH to the tire.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more)

CAUTION:

If the wire harness is too thin or an alternative object is used to tie down the curtain shield airbag assy LH, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).



HINT:

To calculate the area of the stripped wire harness section:

Area = 3.14 x (Diameter)^2 divided by 4

(1) Position the curtain shield airbag assy LH inside the tire as shown in the illustration.

Tire size: Must exceed the following dimensions

Width: 185 mm (7.28 in.)

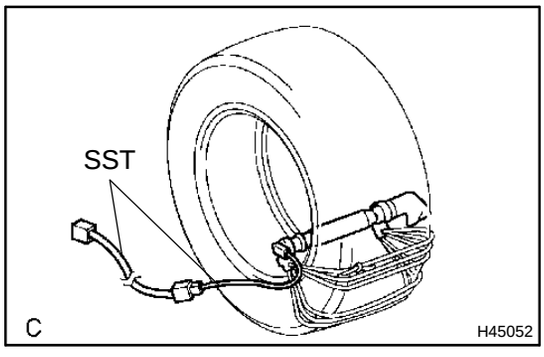
Inner diameter: 360 mm (14.17 in.)

CAUTION:

Make sure that the wire harness is tight. If there is slack in wire harness, the curtain shield airbag assy LH may become loose due to the shock when the airbag is deployed.

NOTICE:

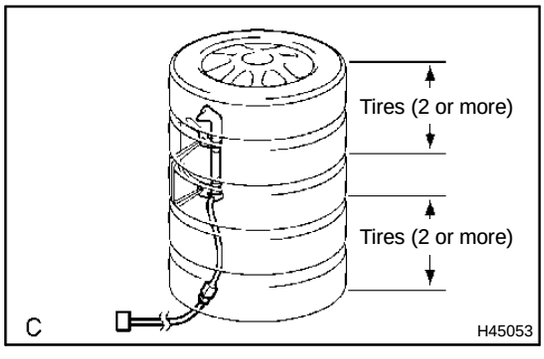
The tire will be marked by the airbag deployment, so use an extra tire.



(e) Install the SST.

After connecting the SST below to each other, connect them to the curtain shield airbag assy LH.

SST 09082–00802 (09082–10801, 09082–20801)



(f) Place the tires.

CAUTION:

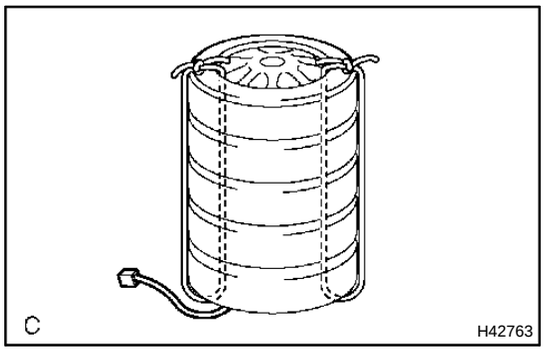
Do not place the deployment direction of the curtain shield airbag assy LH facing toward the ground.

(1) Place at least 2 tires under the tire which the curtain shield airbag assy LH is tied to.

(2) Place at least 2 tires over the tire which the curtain shield airbag assy LH is tied to. The top tire should have the disc wheel installed.

NOTICE:

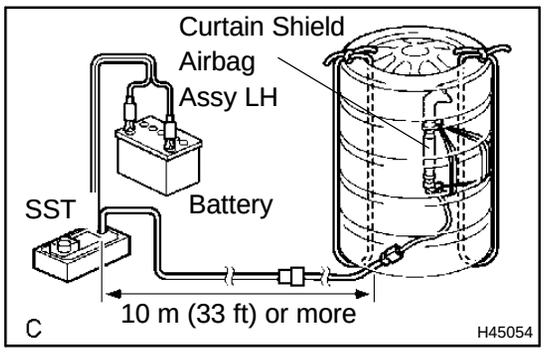
Do not place the SST connector under the tire because it could be damaged.



(3) Tie the tires together with 2 wire harnesses.

CAUTION:

Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



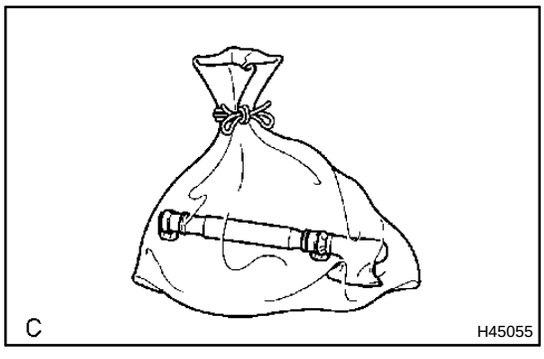
(g) Install the SST.
Connect the SST connector.
SST 09082–00700

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 tire.

(h) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (–) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the tire which the curtain shield airbag assy LH is tied to.
(3) Press the SST activation switch and deploy the airbag.

CAUTION:
When deploying the airbag, make sure that no one is near the tire.

HINT:
The airbag is deployed as the LED of the SST activation switch comes on.



(i) Dispose of the curtain shield airbag assy LH.

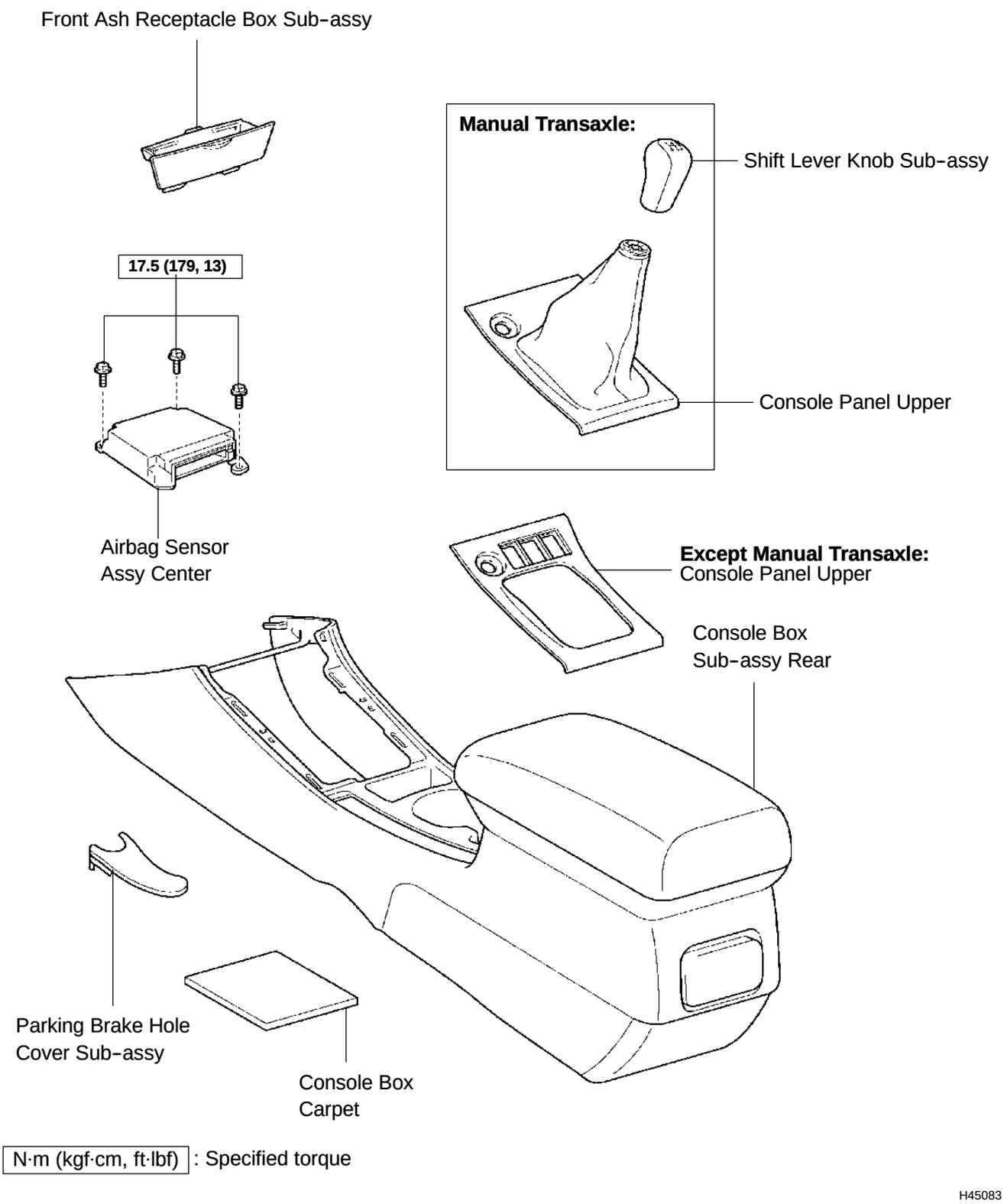
CAUTION:
- **The curtain shield airbag assy LH becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a curtain shield airbag assy LH with a deployed airbag.**
- **Do not apply water, etc. to a curtain shield airbag assy LH with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the curtain shield airbag assy LH from the tire.
(2) Place the curtain shield airbag assy LH in a plastic bag, tie it tightly and dispose of it as other general part disposal.

AIR BAG SENSOR ASSY CENTER

COMPONENTS

6008I-03



6008J-03

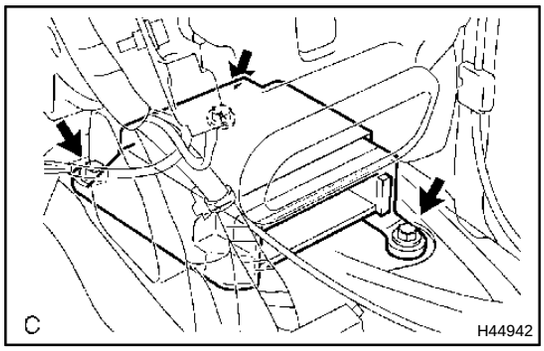
REPLACEMENT

1. **PRECAUTION** **(SEE PAGE 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. **REMOVE PARKING BRAKE HOLE COVER SUB-ASSY** **(SEE PAGE 71-6)**
4. **REMOVE FRONT ASH RECEPTACLE BOX SUB-ASSY** **(SEE PAGE 71-6)**
5. **REMOVE SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE)** **(SEE PAGE 71-6)**
6. **REMOVE CONSOLE PANEL UPPER** **(SEE PAGE 71-6)**
7. **REMOVE CONSOLE BOX CARPET** **(SEE PAGE 71-6)**
8. **REMOVE CONSOLE BOX SUB-ASSY REAR (FOR MANUAL TRANSAXLE)** **(SEE PAGE 71-6)**
9. **REMOVE CONSOLE BOX SUB-ASSY REAR (EXCEPT MANUAL TRANSAXLE)** **(SEE PAGE 71-6)**



10. **REMOVE AIR BAG SENSOR ASSY CENTER**

(a) Disconnect the holder (with connectors) from the airbag sensor assy center.

(b) Remove the 3 bolts and the airbag sensor assy center.

11. **INSTALL AIR BAG SENSOR ASSY CENTER**

(a) Check that the ignition switch is off.

(b) Check that the battery negative (-) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(c) Temporarily install the airbag sensor assy center with the 3 bolts.

NOTICE:

- **If the airbag sensor assy center has been dropped, or there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.**
- **When installing the airbag sensor assy center, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(d) Tighten the 3 bolts to the specified torque.

Torque: 17.5 N·m (179 kgf·cm, 13 ft·lbf)

(e) Check that there is no looseness in the installation parts of the airbag sensor assy center.

(f) Connect the holder (with connectors) to the airbag sensor assy center.

(g) Check that the water-proof sheet is properly set.

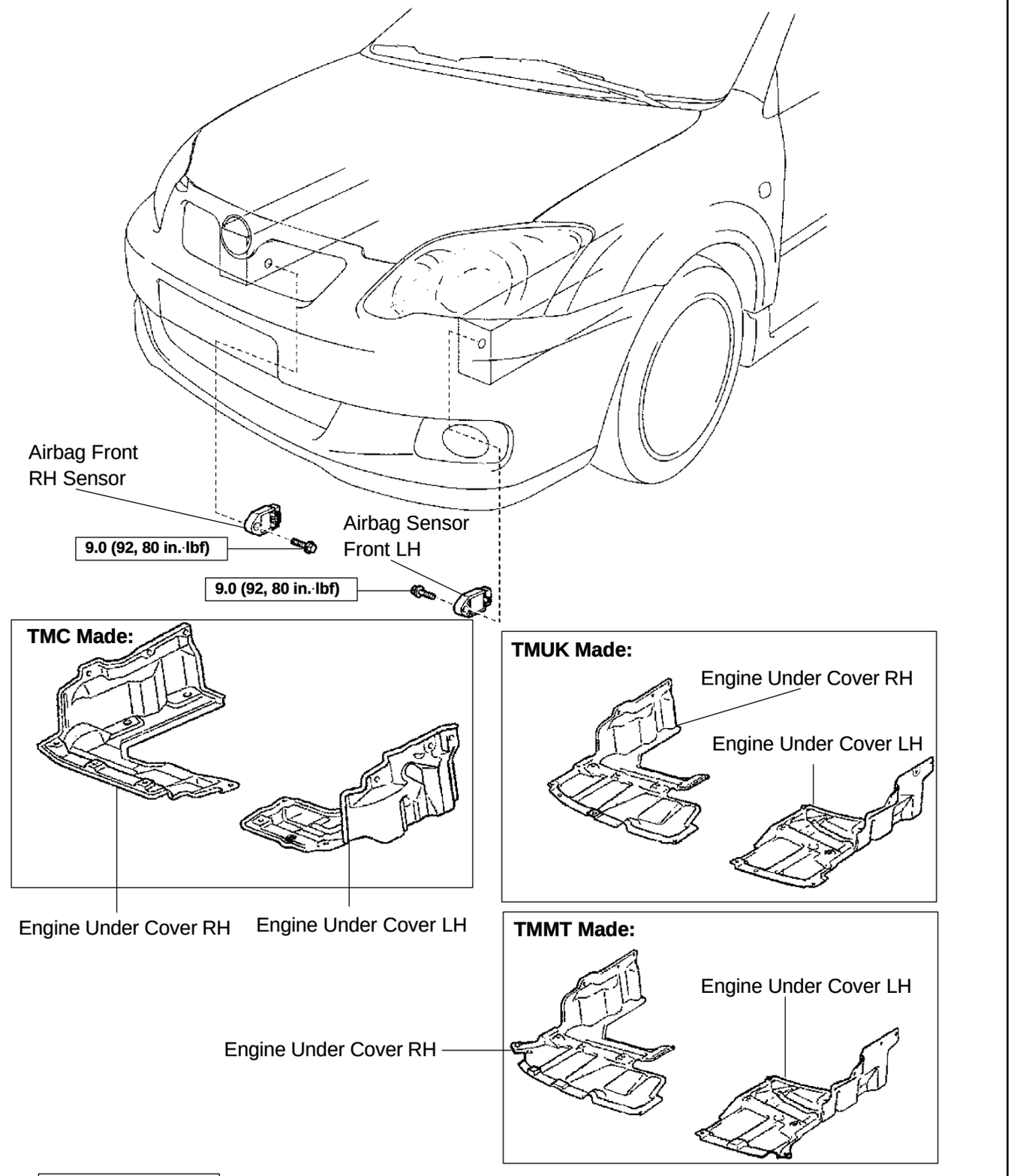
12. **INSTALL CONSOLE BOX SUB-ASSY REAR (FOR MANUAL TRANSAXLE)** **(SEE PAGE 71-6)**
13. **INSTALL CONSOLE BOX SUB-ASSY REAR (EXCEPT MANUAL TRANSAXLE)** **(SEE PAGE 71 - 6)**
14. **INSTALL CONSOLE BOX CARPET** **(SEE PAGE 71-6)**
15. **INSTALL CONSOLE PANEL UPPER** **(SEE PAGE 71-6)**
16. **INSTALL SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE)** **(SEE PAGE 71-6)**
17. **INSTALL FRONT ASH RECEPTACLE BOX SUB-ASSY** **(SEE PAGE 71-6)**
18. **INSTALL PARKING BRAKE HOLE COVER SUB-ASSY** **(SEE PAGE 71-6)**
19. **INSPECT SRS WARNING LIGHT** **(SEE PAGE 05-719)**

AIR BAG SENSOR FRONT LH

COMPONENTS

600WJ-01

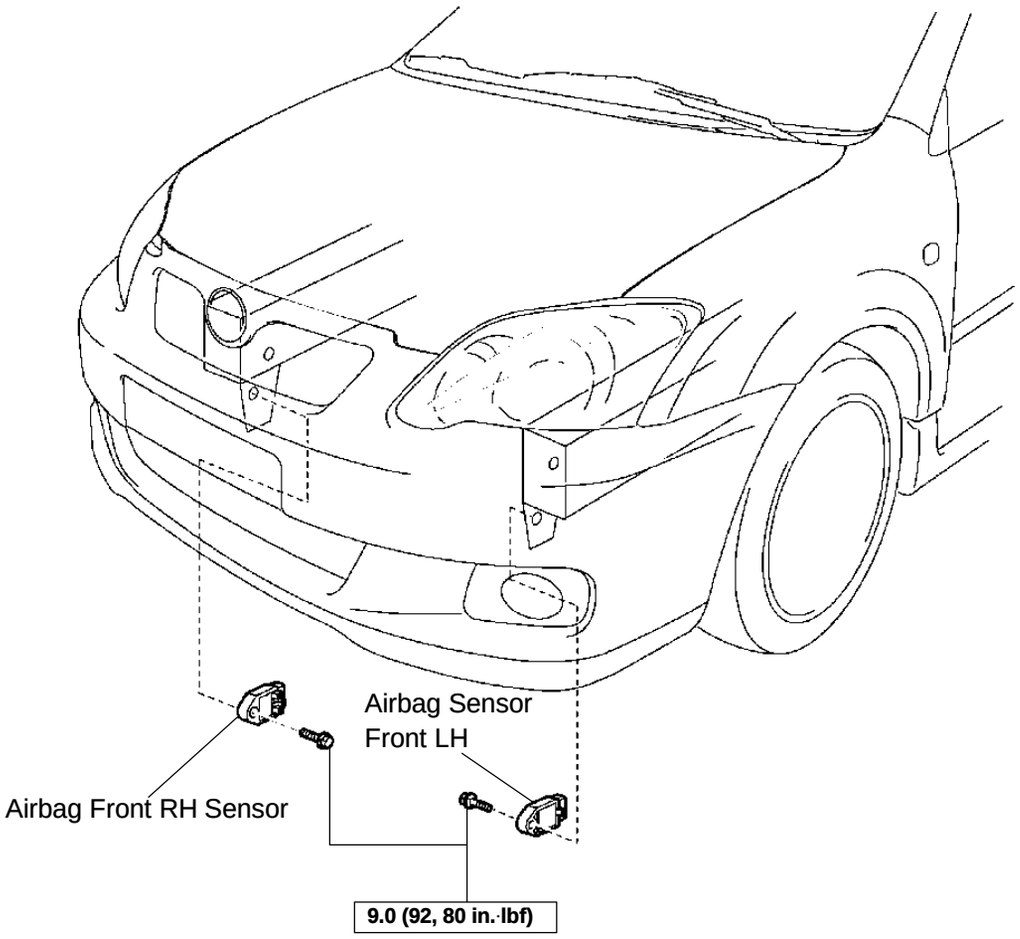
2ZZ-GE/3ZZ-FE/4ZZ-FE Engine Type:

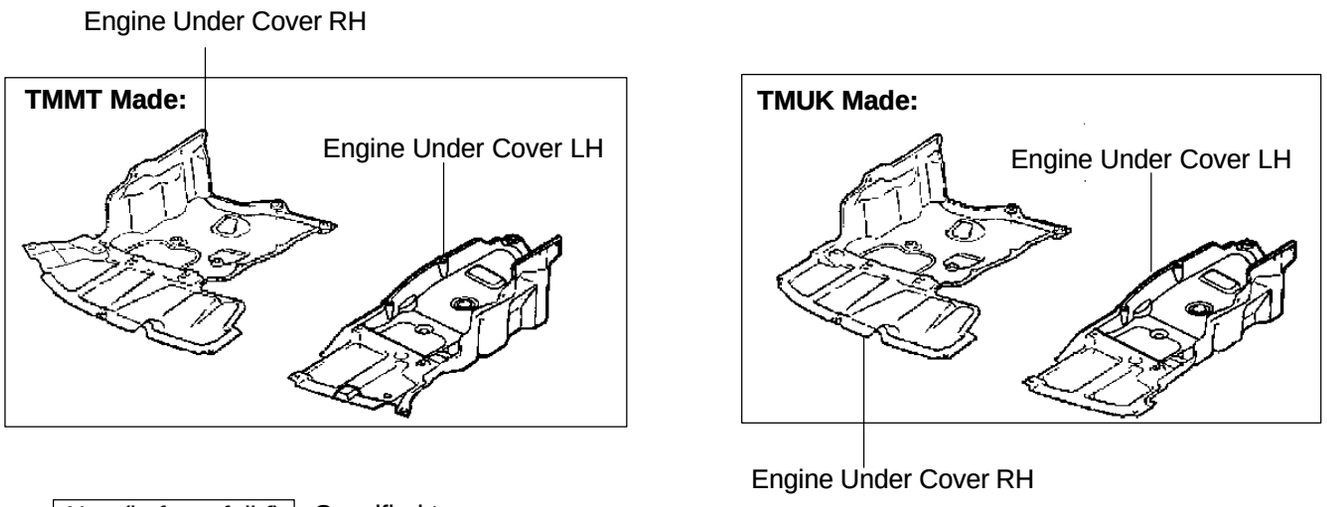


C N·m (kgf·cm, ft·lbf) : Specified torque

H45089

1CD-FTV Engine Type:





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

H45090

60063-08

REPLACEMENT

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

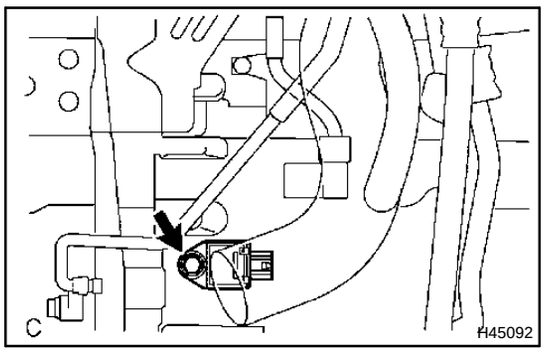
1. PRECAUTION **(SEE PAGE 60–1)**

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. REMOVE ENGINE UNDER COVER LH



4. REMOVE AIR BAG SENSOR FRONT LH

(a) Disconnect the connector from the airbag sensor front LH.

(b) Remove the bolt and the airbag sensor front LH.

5. INSTALL AIR BAG SENSOR FRONT LH

(a) Check that the ignition switch is off.

(b) Check that the battery negative (–) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(c) Install the airbag sensor front LH with the bolt.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

NOTICE:

- **If the airbag sensor front LH has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.**
- **When installing the airbag sensor front LH, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(d) Check that there is no looseness in the installation parts of the airbag sensor front LH.

(e) Connect the connector to the airbag sensor front LH.

6. INSTALL ENGINE UNDER COVER LH

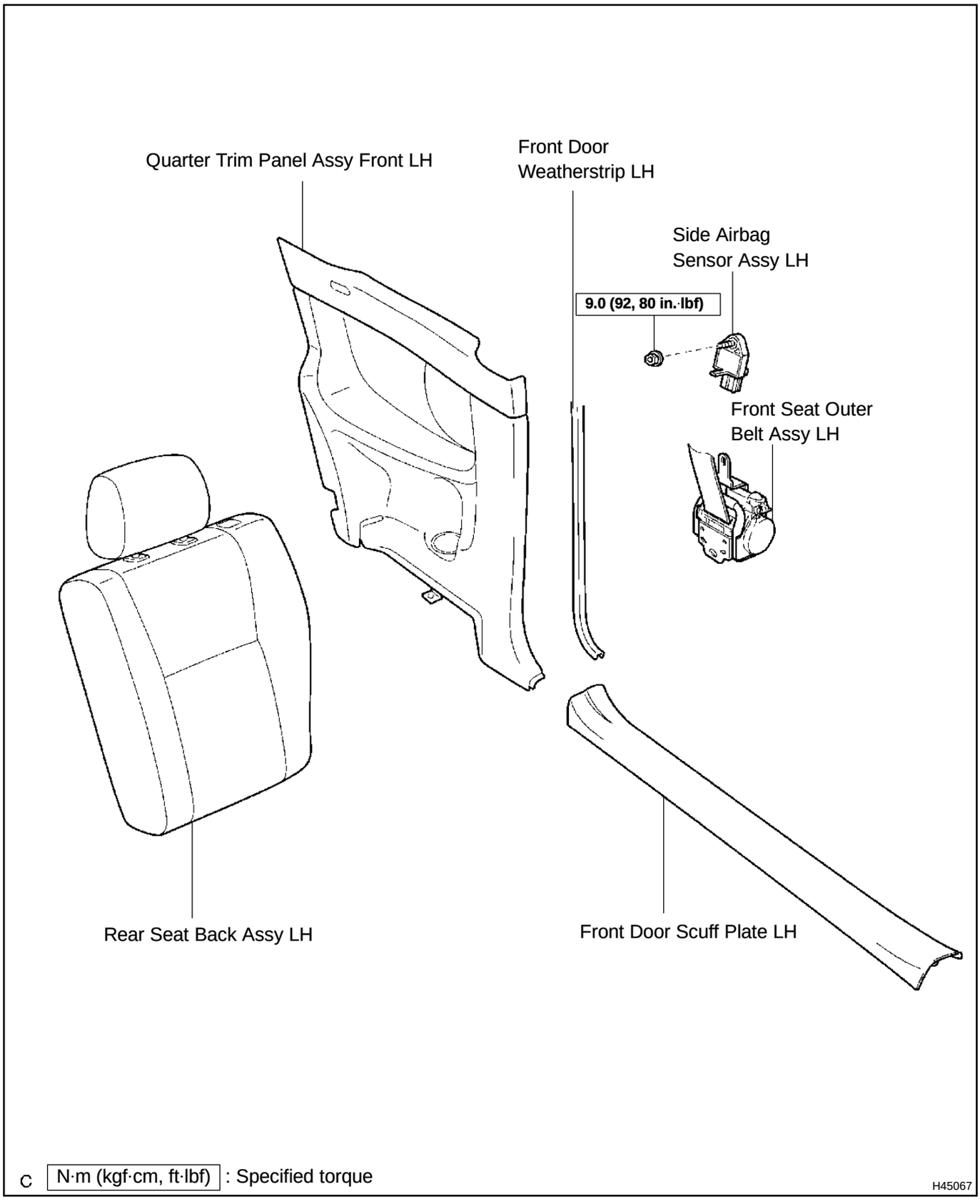
7. CONNECT BATTERY NEGATIVE TERMINAL

8. INSPECT SRS WARNING LIGHT **(SEE PAGE 05–719)**

SIDE AIR BAG SENSOR ASSY LH (3-DOOR HATCHBACK)

600WK-01

COMPONENTS



600WL-01

REPLACEMENT

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

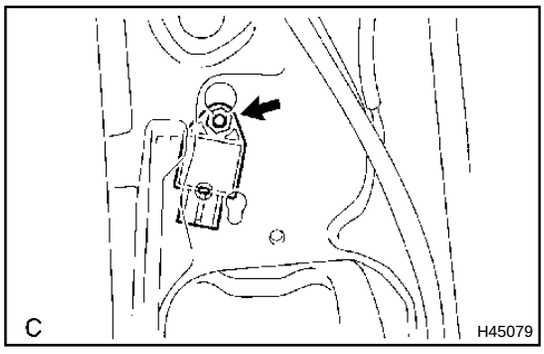
3. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PUB. NO. RM1028E, PAGE 76-26)

4. REMOVE FRONT DOOR WEATHERSTRIP LH (SEE PUB. NO. RM1028E, PAGE 76-26)

5. REMOVE REAR SEAT BACK ASSY LH (SEE PUB. NO. RM925E, PAGE 72-26)

6. REMOVE QUARTER TRIM PANEL ASSY FRONT LH (SEE PUB. NO. RM1028E, PAGE 76-26)

7. REMOVE FRONT SEAT OUTER BELT ASSY LH (SEE PUB. NO. RM925E, PAGE 61-9)



8. REMOVE SIDE AIR BAG SENSOR ASSY LH

(a) Disconnect the connector from the side airbag sensor assy LH.

(b) Remove the nut and the side airbag sensor assy LH.

9. INSTALL SIDE AIR BAG SENSOR ASSY LH

(a) Check that the ignition switch is off.

(b) Check that the battery negative (-) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(c) Install the side airbag sensor assy LH with the nut.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

NOTICE:

- **If the side airbag sensor assy LH has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.**
- **When installing the side airbag sensor assy LH, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(d) Check that there is no looseness in the installation parts of the side airbag sensor assy LH.

(e) Connect the connector to the side airbag sensor assy LH.

10. INSTALL FRONT SEAT OUTER BELT ASSY LH (SEE PUB. NO. RM925E, PAGE 61-9)

11. INSTALL QUARTER TRIM PANEL ASSY FRONT LH (SEE PUB. NO. RM1028E, PAGE 76-26)

12. INSTALL REAR SEAT BACK ASSY LH (SEE PUB. NO. RM925E, PAGE 72-26)

13. INSTALL FRONT DOOR WEATHERSTRIP LH (SEE PUB. NO. RM1028E, PAGE 76-26)

14. INSTALL FRONT DOOR SCUFF PLATE LH (SEE PUB. NO. RM1028E, PAGE 76-26)

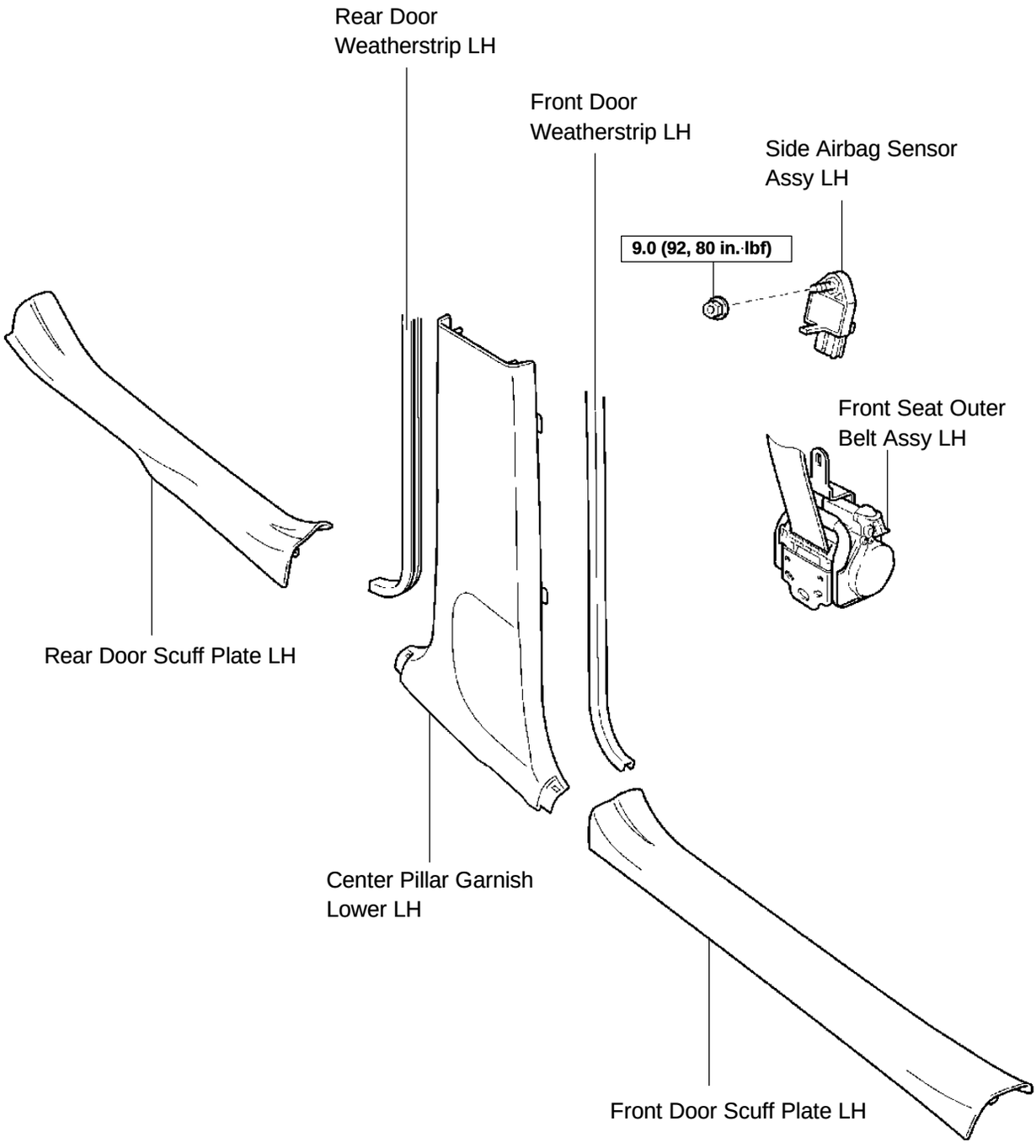
15. CONNECT BATTERY NEGATIVE TERMINAL

16. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

SIDE AIR BAG SENSOR ASSY LH (EXCEPT 3-DOOR HATCHBACK)

COMPONENTS

600WM-01



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

H45057

600WN-01

REPLACEMENT

HINT:

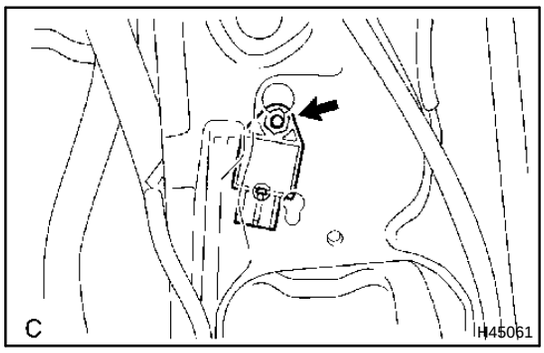
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **PRECAUTION (SEE PAGE 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. **REMOVE FRONT DOOR SCUFF PLATE LH (SEDAN BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-10)
4. **REMOVE FRONT DOOR SCUFF PLATE LH (WAGON BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-18)
5. **REMOVE FRONT DOOR SCUFF PLATE LH (5 DOOR HATCH BACK BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-34)
6. **REMOVE REAR DOOR SCUFF PLATE LH (SEDAN BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-10)
7. **REMOVE REAR DOOR SCUFF PLATE LH (WAGON BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-18)
8. **REMOVE REAR DOOR SCUFF PLATE LH (5 DOOR HATCH BACK BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-34)
9. **REMOVE FRONT DOOR WEATHERSTRIP LH (SEDAN BODY TYPE)**
   (SEE PUB. NO. RM1028E, PAGE 76-10)
10. **REMOVE FRONT DOOR WEATHERSTRIP LH (WAGON BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-18)
11. **REMOVE FRONT DOOR WEATHERSTRIP LH (5 DOOR HATCH BACK BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-34)
12. **REMOVE REAR DOOR WEATHERSTRIP LH (SEDAN BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-10)
13. **REMOVE REAR DOOR WEATHERSTRIP LH (WAGON BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-18)
14. **REMOVE REAR DOOR WEATHERSTRIP LH (5 DOOR HATCH BACK BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-34)
15. **REMOVE CENTER PILLAR GARNISH LOWER LH (SEDAN BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-10)
16. **REMOVE CENTER PILLAR GARNISH LOWER LH (WAGON BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-18)
17. **REMOVE CENTER PILLAR GARNISH LOWER LH (5 DOOR HATCH BACK BODY TYPE)**
    (SEE PUB. NO. RM1028E, PAGE 76-34)
18. **REMOVE FRONT SEAT OUTER BELT ASSY LH (SEDAN BODY TYPE)**
    (SEE PUB. NO. RM925E, PAGE 61-2)
19. **REMOVE FRONT SEAT OUTER BELT ASSY LH (WAGON BODY TYPE)**
    (SEE PUB. NO. RM925E, PAGE 61-2)
20. **REMOVE FRONT SEAT OUTER BELT ASSY LH (5 DOOR HATCH BACK BODY TYPE)**
    (SEE PUB. NO. RM925E, PAGE 61-9)



21. REMOVE SIDE AIR BAG SENSOR ASSY LH

(a) Disconnect the connector from the side airbag sensor assy LH.

(b) Remove the nut and the side airbag sensor assy LH.

22. INSTALL SIDE AIR BAG SENSOR ASSY LH

(a) Check that the ignition switch is off.

(b) Check that the battery negative (-) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(c) Install the side airbag sensor assy LH with the nut.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

NOTICE:

- **If the side airbag sensor assy LH has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.**
- **When installing the side airbag sensor assy LH, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(d) Check that there is no looseness in the installation parts of the side airbag sensor assy LH.

(e) Connect the connector to the side airbag sensor assy LH.

23. INSTALL FRONT SEAT OUTER BELT ASSY LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM925E, PAGE 61-2)

24. INSTALL FRONT SEAT OUTER BELT ASSY LH (WAGON BODY TYPE)
(SEE PUB. NO. RM925E, PAGE 61-2)

25. INSTALL FRONT SEAT OUTER BELT ASSY LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM925E, PAGE 61-9)

26. INSTALL CENTER PILLAR GARNISH LOWER LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)

27. INSTALL CENTER PILLAR GARNISH LOWER LH (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)

28. INSTALL CENTER PILLAR GARNISH LOWER LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)

29. INSTALL REAR DOOR WEATHERSTRIP LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)

30. INSTALL REAR DOOR WEATHERSTRIP LH (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)

31. INSTALL REAR DOOR WEATHERSTRIP LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)

32. INSTALL FRONT DOOR WEATHERSTRIP LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)

33. INSTALL FRONT DOOR WEATHERSTRIP LH (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)

34. INSTALL FRONT DOOR WEATHERSTRIP LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)

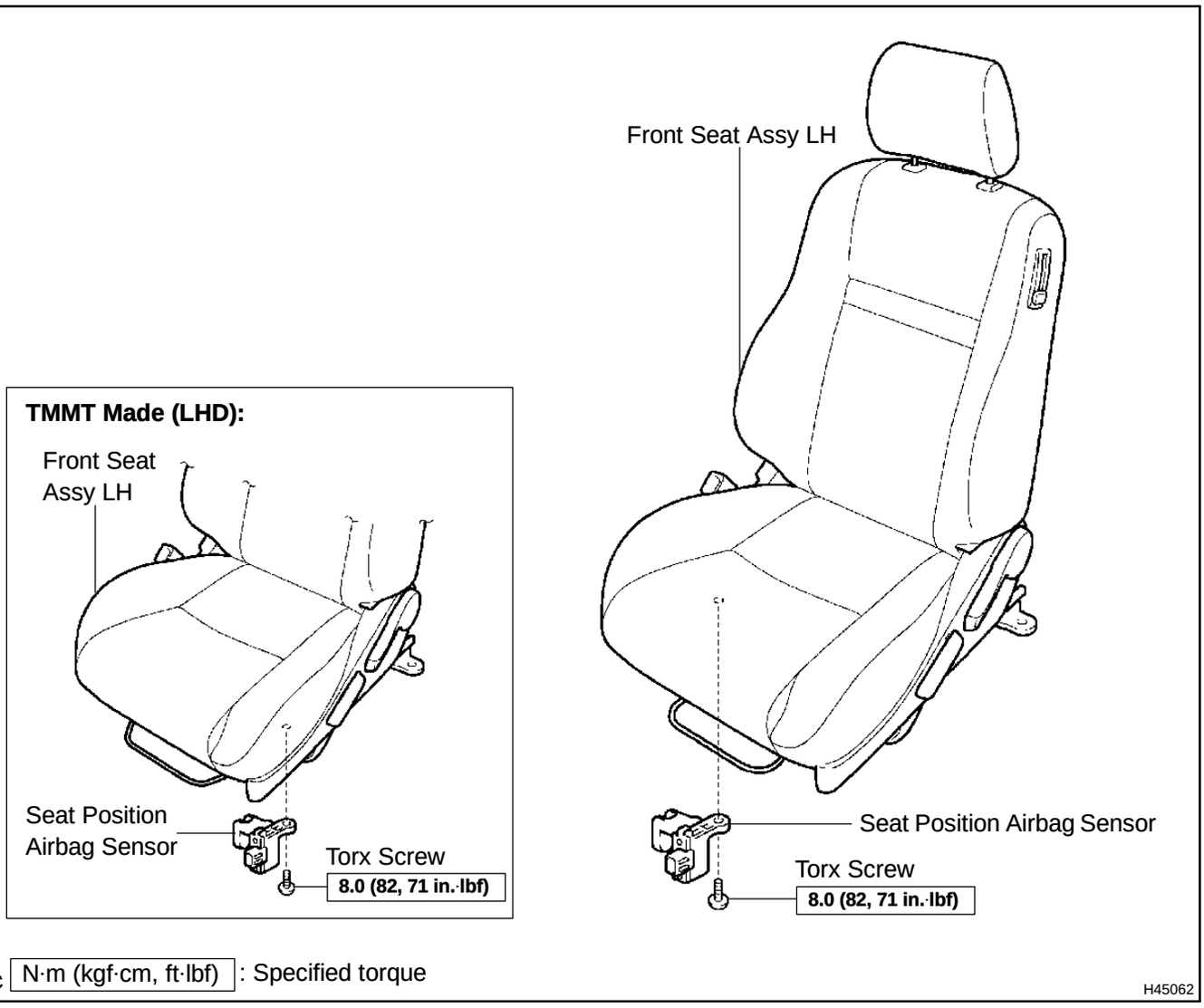
35. INSTALL REAR DOOR SCUFF PLATE LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)

36. INSTALL REAR DOOR SCUFF PLATE LH (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)
37. INSTALL REAR DOOR SCUFF PLATE LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)
38. INSTALL FRONT DOOR SCUFF PLATE LH (SEDAN BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-10)
39. INSTALL FRONT DOOR SCUFF PLATE LH (WAGON BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-18)
40. INSTALL FRONT DOOR SCUFF PLATE LH (5 DOOR HATCH BACK BODY TYPE)
(SEE PUB. NO. RM1028E, PAGE 76-34)
41. CONNECT BATTERY NEGATIVE TERMINAL
42. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

SEAT POSITION AIR BAG SENSOR

COMPONENTS

600SB-03



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

H45062

REPLACEMENT

HINT:

- Use the same procedures for RHD and LHD.
- The procedures listed below are for LHD.

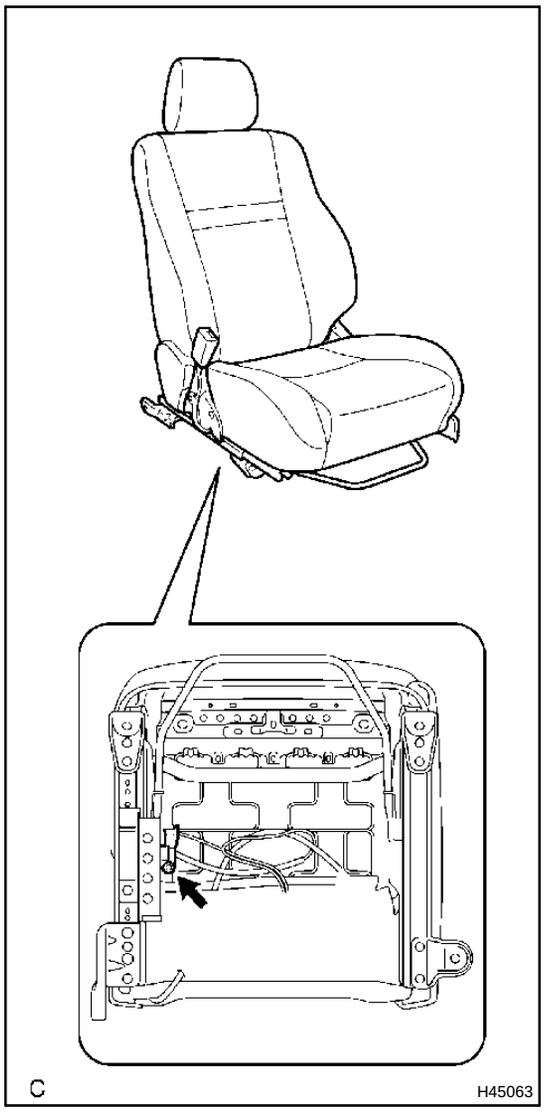
1. PRECAUTION (SEE PAGE 60-1)

2. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

3. REMOVE FRONT SEAT ASSY LH (SEE PAGE 72-2)



4. REMOVE SEAT POSITION AIR BAG SENSOR

(a) Disconnect the connector from the seat position airbag sensor.

(b) Using a torx socket wrench (T30), remove the torx screw and the seat position airbag sensor.

5. INSTALL SEAT POSITION AIR BAG SENSOR

(a) Check that the ignition switch is off.

(b) Check that the battery negative (–) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

(c) Using a torx socket wrench (T30), tighten the torx screw to install the seat position airbag sensor.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

- **If the seat position airbag sensor has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.**
- **When installing the seat position airbag sensor, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(d) Check that there is no looseness in the installation parts of the seat position airbag sensor.

(e) Connect the connector to the seat position airbag sensor.

6. INSTALL FRONT SEAT ASSY LH (SEE PAGE 72–2)

7. CONNECT BATTERY NEGATIVE TERMINAL

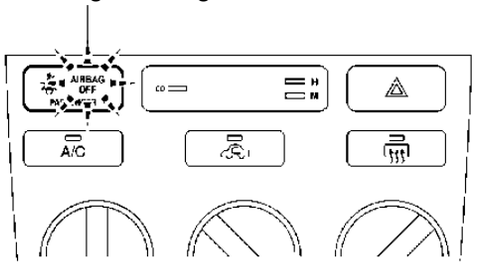
8. INSPECT SRS WARNING LIGHT (SEE PAGE 05–719)

AIR BAG CUT OFF SW CYLINDER SUB-ASSY

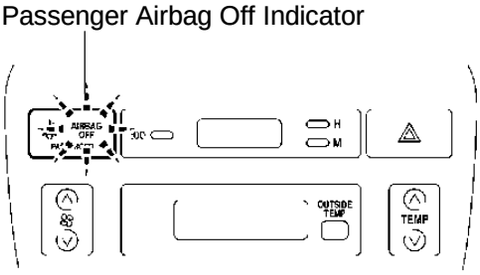
INSPECTION

600V6-02

Manual Air Conditioner:
Passenger Airbag Off Indicator



Auto Air Conditioner:
Passenger Airbag Off Indicator



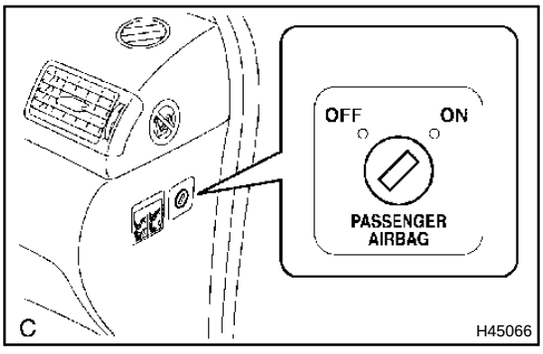
H45068

1. INSPECT PASSENGER AIRBAG OFF INDICATOR (WHEN INSTALLED IN VEHICLE)

(a) Turn the ignition switch to the ON position.

(b) When the passenger airbag switch position is ON:
Check that the passenger airbag off indicator comes on for approximately 4 seconds and then goes off.

(c) When the passenger airbag switch position is OFF:
Check that the passenger airbag off indicator comes on for approximately 4 seconds and goes off for approximately 2 seconds, and then comes on again.



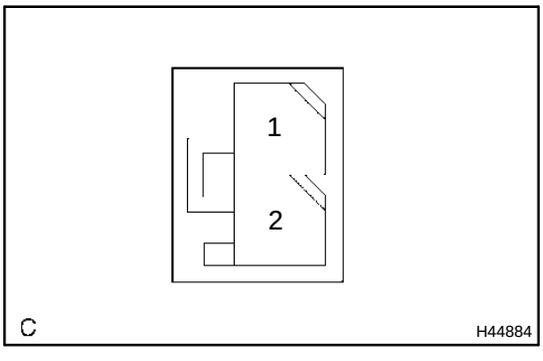
H45066

2. INSPECT AIR BAG CUT OFF SW CYLINDER SUB-ASSY

(a) Disconnect the connector from the airbag cut off SW cylinder sub-assy.

(b) Using a screwdriver, remove the airbag cut off SW cylinder sub-assy from the instrument panel sub-assy lower.

HINT:
Tape up the screwdriver tip before use.



H44884

(c) Measure the resistance according to the value(s) in the table below.

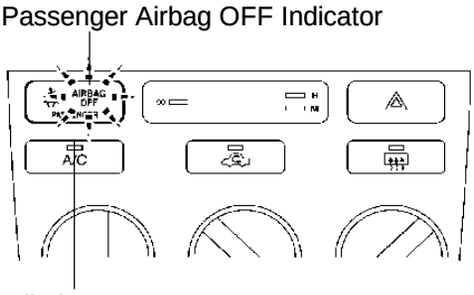
Switch position	Tester connection	Specified condition
ON	1 - 2	360 to 440
OFF	1 - 2	90 to 110

(1) If the measured value is not as specified, replace the airbag cut off SW cylinder sub-assy.

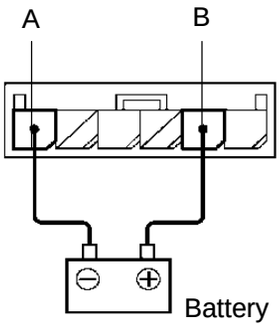
(d) Install the airbag cut off SW cylinder sub-assy to the instrument panel sub-assy lower.

Manual Air Conditioner:

Passenger Airbag OFF Indicator

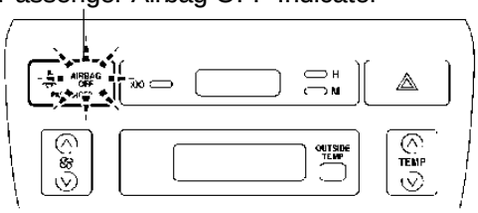


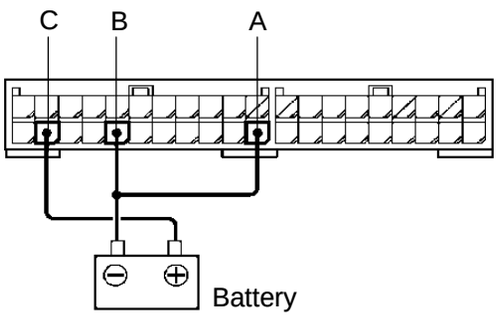
Telltale Lamp Assy



Auto Air Conditioner:

Passenger Airbag OFF Indicator





H45086

3. INSPECT PASSENGER AIRBAG OFF INDICATOR (WHEN NOT INSTALLED IN VEHICLE)

If the operation is not as specified, replace the telltale lamp assy (manual air conditioner) or center cluster module control assy (auto air conditioner).

(a) Manual Air Conditioner:

Remove the telltale lamp assy.

(1) Remove the front ash receptacle box sub-assy (see page 71-6).

(2) Remove the shift lever knob sub-assy (manual transaxle) (see page 71-6).

(3) Remove the console panel upper (See page 71-6).

(4) Remove the instrument cluster finish panel assy center (see page 71-6).

(5) Connect the positive (+) lead from the battery to terminal B and negative (-) lead to terminal A.

(6) Check that the passenger airbag OFF indicator lights up.

(b) Auto Air Conditioner:

Remove the center cluster module control assy (see Pub. No. RM925E, page 55-40).

(1) Remove the front ash receptacle box sub-assy (see page 71-6).

(2) Remove the shift lever knob sub-assy (manual transaxle) (see page 71-6).

(3) Remove the console panel upper (see page 71-6).

(4) Connect the positive (+) lead from the battery to terminal C and negative (-) lead to terminals A and B.

(5) Check that the passenger airbag OFF indicator lights up.

SEAT BELT

SEAT BELT WARNING SYSTEM
(From May, 2004) 61–1
LOCATION 61–1/2
PROBLEM SYMPTOMS TABLE 61–3
INSPECTION 61–4/5

REFER TO COROLLA REPAIR MANUAL:

Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM1028E

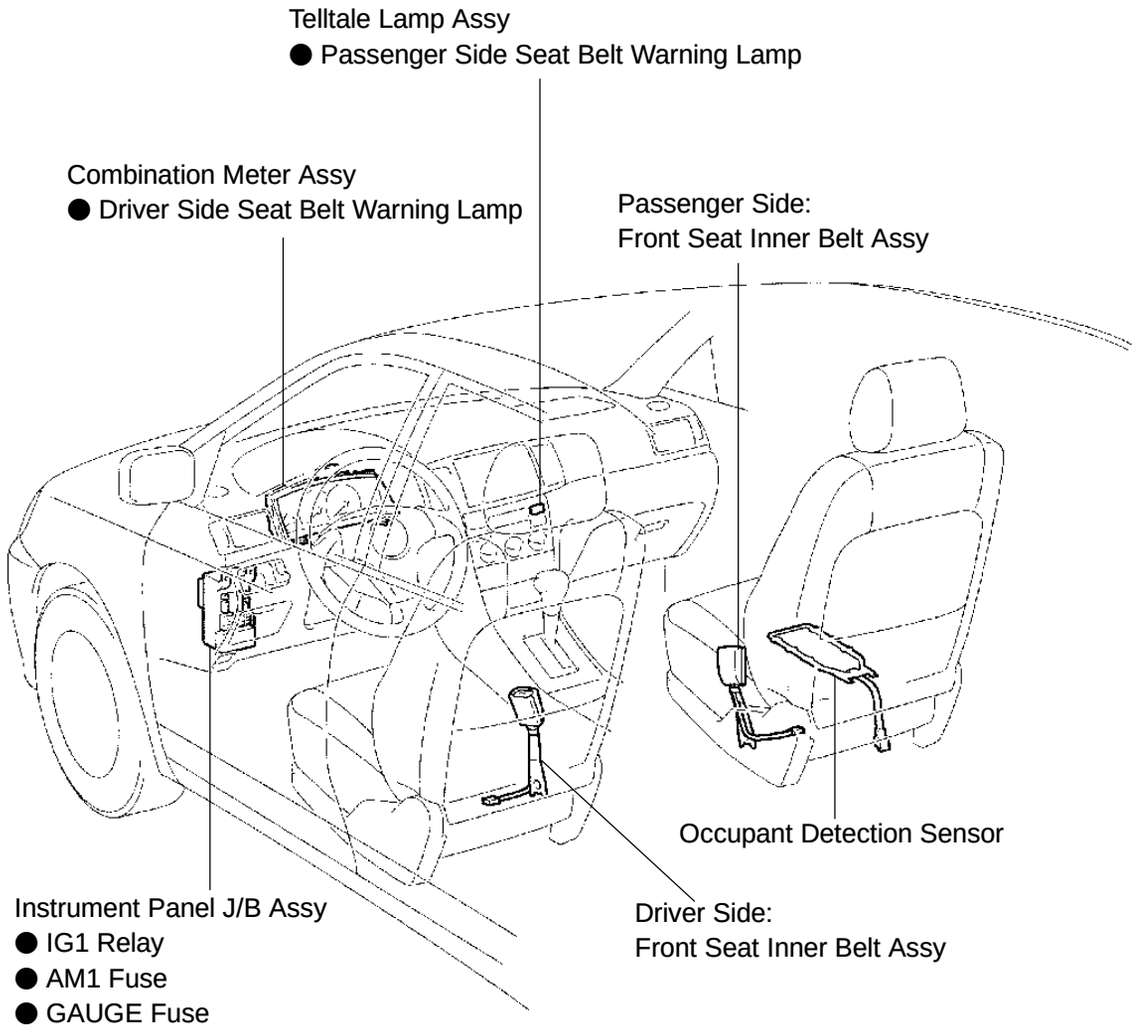
NOTE: The above pages contain only the points which differ from the above listed manual.

SEAT BELT WARNING SYSTEM (From May, 2004)

LOCATION

610MF-01

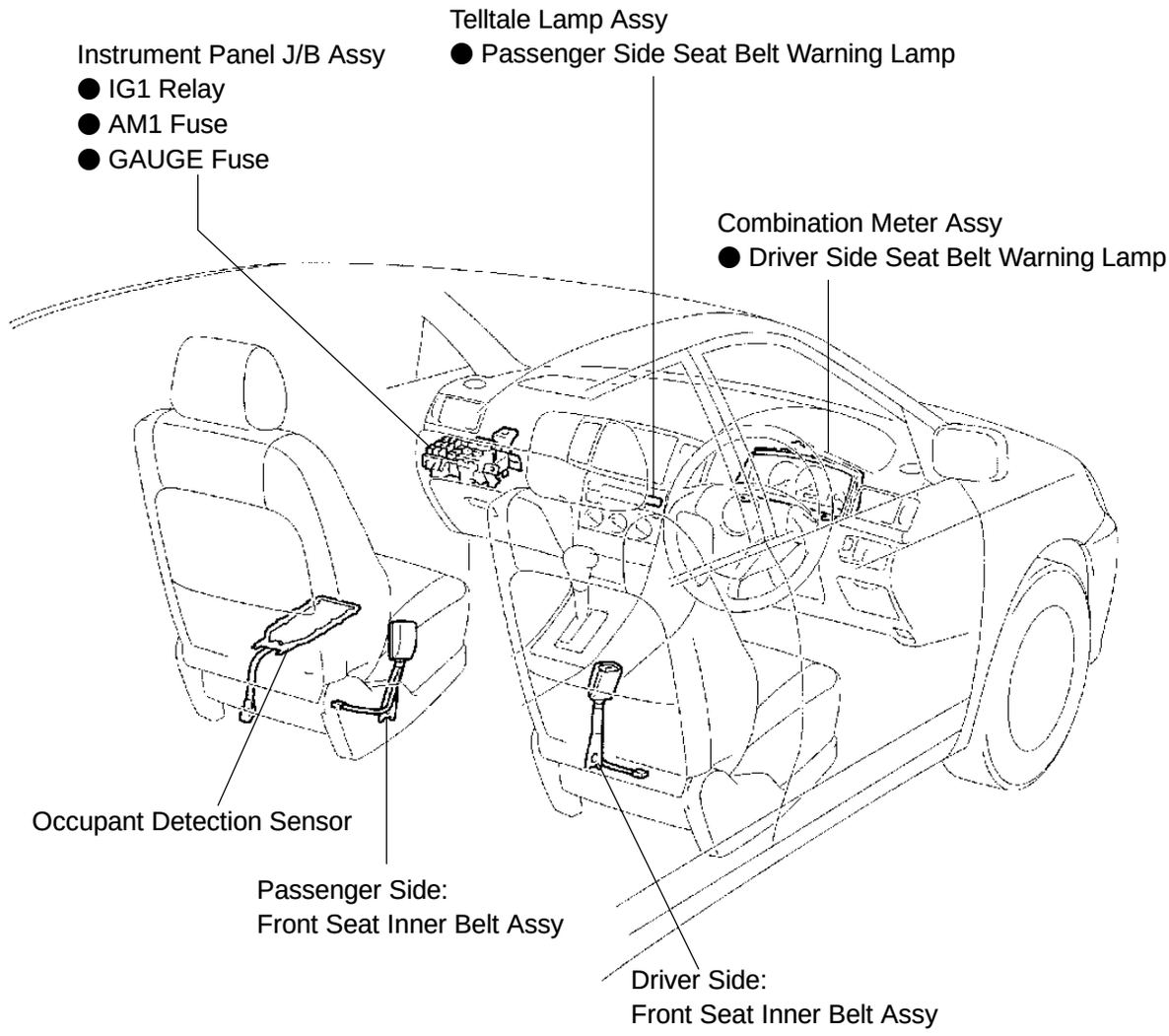
LHD



P

B84227

RHD


Telltale Lamp Assy
● Passenger Side Seat Belt Warning Lamp
Instrument Panel J/B Assy
● IG1 Relay
● AM1 Fuse
● GAUGE Fuse
Combination Meter Assy
● Driver Side Seat Belt Warning Lamp
Occupant Detection Sensor
Passenger Side:
Front Seat Inner Belt Assy
Driver Side:
Front Seat Inner Belt Assy

P B84226

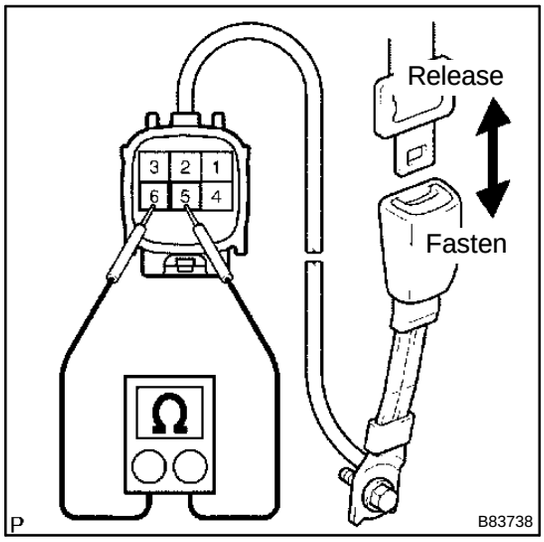
610MG-01

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Driver side seat belt warning lamp does not blink	3. AM1 fuse	61-1
	4. GAUGE fuse	61-1
	5. IG1 relay	61-1
	6. Combination meter assy	-
	7. Front seat inner belt assy	61-4
	8. Wire harness	-
Passenger side seat belt warning lamp does not blink	1. AM1 fuse	61-1
	2. GAUGE fuse	61-1
	3. IG1 relay	61-1
	4. Front seat inner belt assy	61-4
	5. Occupant detection sensor	61-4
	6. Wire harness	-
	7. Telltale lamp assy	-

610MH-01

INSPECTION



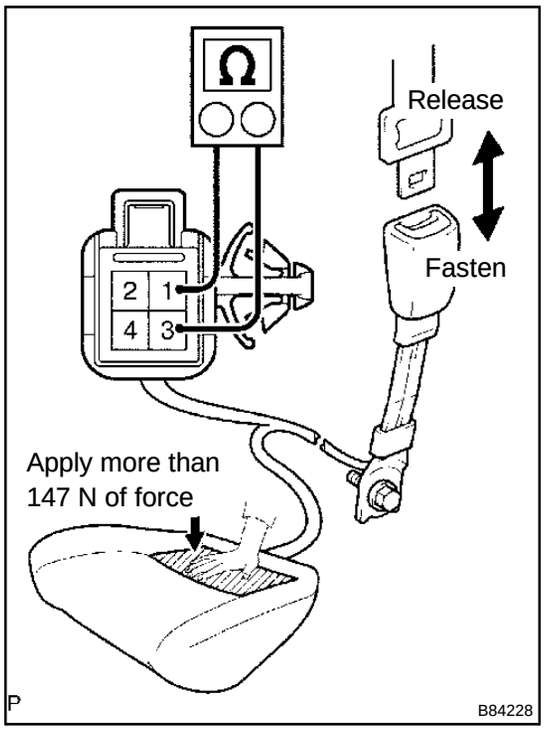
1. Driver side:
INSPECT FRONT SEAT INNER BELT ASSY

(a) Measure the resistance of the buckle switch.

Standard:

Tester Connection	Condition	Specified Condition
5 – 6	Fasten seat belt	1 MΩ or higher
5 – 6	Release seat belt	Below 1 Ω

If the result is not as specified, resistance of the inner belt assy.



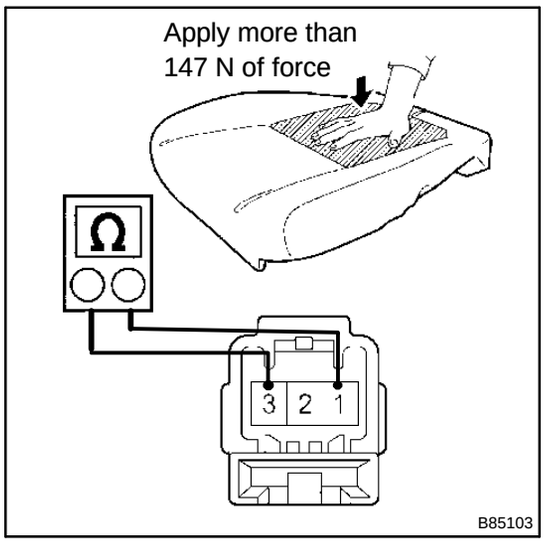
2. Passenger side:
INSPECT FRONT SEAT INNER BELT ASSY

(a) Measure the resistance of the buckle switch.

Standard:

Tester Connection	Condition	Specified Condition
1 – 3	Fasten seat belt (apply more than 147 N (15 kg, 33 lb) to occupant detection sensor)	1 MΩ or higher
1 – 3	Release seat belt (apply more than 147 N (15 kg, 33 lb) to occupant detection sensor)	Below 1 Ω

If the result is not as specified, replace the inner belt assy.



3. INSPECT OCCUPANT DETECTION SENSOR

(a) Measure the resistance of the sensor.

Standard:

Tester Connection	Condition	Specified Condition
1 – 3	Apply more than 147 N (15 kg, 33 lb) to occupant detection sensor	Below 1 Ω
1 – 3	Free	1 MΩ or higher

If the result is not as specified, replace the sensor.

LIGHTING

LIGHTING SYSTEM 65-1
PRECAUTION 65-1
PROBLEM SYMPTOMS TABLE 65-2/5
ON-VEHICLE INSPECTION 65-6
INSPECTION 65-7
HEADLAMP ASSY LH (HATCHBACK) 65-8
COMPONENTS 65-8
OVERHAUL 65-9/11
ADJUSTMENT 65-12/15
REPAIR 65-16/18
FOG LAMP ASSY LH (HATCHBACK) 65-19
OVERHAUL 65-19
ADJUSTMENT 65-20/22

REFER TO COROLLA REPAIR MANUAL (Pub.No. RM925E)

NOTE: The above pages contain only the points which differ from the above listed manual.

LIGHTING SYSTEM

650NC-09

PRECAUTION

1. PRECAUTION OF HEADLIGHT BULB REPLACEMENT

(a) If even a thin film of oil is left on the surface of the halogen lamp, its service life will be shortened because the lamp will burn at a higher temperature.

(b) Handle any halogen lamp with great care. Dropping, hitting or damaging the bulb, in any way, may result in it exploding and shattering because the internal pressure is high.

(c) Always prepare a new bulb for immediate replacement. While replacing the bulb, the lens may attract dust and moisture if removed from the vehicle for too long.

(d) Always use a bulb of the same wattage for replacement.

(e) Firmly reinstall the socket after bulb replacement. The lens may become cloudy or the light cavity may fill with water through the gaps around the socket.

6517V-01

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below, with suspected areas listed in numerical order, to determine the cause of the problem. Inspect and repair or replace parts as necessary according to the steps on the following pages.

1. HEADLAMP AND TAIL LAMP (W/O DAYTIME RUNNING LIGHT SYSTEM)

Symptoms	Suspected Area	See page
Only one headlamp comes on.	8. Bulb 9. HEAD-LH fuse or HEAD-RH fuse 10. Wire harness or connector	- - -
"LO-Beam" does not come on (All).	1. Headlamp dimmer switch assy 2. Wire harness or connector	★ -
"LO-Beam" does not come on (One side).	1. Bulb 2. Wire harness or connector	- -
"HI-Beam" does not come on (All).	1. Headlamp dimmer switch assy 2. Wire harness or connector	★ -
"HI-Beam" does not come on (One side).	1. Bulb 2. Wire harness or connector	- -
"Flash" does not operate (All).	1. Bulb 2. Headlamp dimmer switch assy 3. Wire harness or connector	- ★ -
Headlamp is dark.	1. Bulb 2. Wire harness or connector	- -
Only one tail lamp comes on.	1. Bulb 2. Wire harness or connector	- -
Tail lamp does not come on (Headlamp is normal).	1. TAIL fuse 2. Headlamp dimmer switch assy 3. Wire harness or connector	- ★ -
Tail lamp does not come on (Headlamp does not come on).	1. Headlamp dimmer switch assy 2. Wire harness or connector	★ -
Rear combination lamp does not come on.	1. Bulb 2. Wire harness or connector	- -

HINT:

★: Refer to repair manual RM925E.

2. HEADLAMP AND TAIL LAMP (W/ DAYTIME RUNNING LIGHT SYSTEM)

Symptoms	Suspected Area	See page
Headlamp does not come on with engine running and headlamp dimmer switch off (Daytime running light system function).	1. Bulb 2. ECU-B, ECU-IG fuse 3. HEAD MAIN fuse 4. Daytime running light main relay 5. HEAD relay 6. Alternator L terminal 7. Wire harness or connector	– – – ★ ★ – –
Only one headlamp comes on.	1. Bulb 2. Daytime running light main relay 3. Dim dip lamp relay 4. Wire harness or connector	– ★ ★ –
”LO-Beam” does not come on (All).	1. Bulb 2. Headlamp dimmer switch assy 3. Wire harness or connector	– ★ –
”LO-Beam” does not come on (One side).	1. Bulb 2. LO-LH fuse or LO-RH fuse 3. Wire harness or connector	– – –
”HI-Beam” does not come on (All).	1. Bulb 2. Headlamp dimmer switch assy 3. Dim dip lamp relay 4. Daytime running light main relay 5. Wire harness or connector	– ★ ★ ★ –
”HI-Beam” does not come on (One side).	1. Bulb 2. HI-LH fuse or HI-RH fuse 3. Wire harness or connector	– – –
”Flash” does not operate (All).	1. Bulb 2. Headlamp dimmer switch assy 3. Daytime running light main relay 4. Wire harness or connector	– ★ ★ –
Headlamp is dark.	1. Bulb 2. Wire harness or connector	– –
Only one tail lamp comes on.	1. Bulb 2. Wire harness or connector	– –
Tail lamp does not come on (Headlamp is normal).	1. TAIL fuse 2. Tail lamp relay 3. Headlamp dimmer switch assy 4. Wire harness or connector	– ★ ★ –
Tail lamp does not come on (Headlamp does not come on).	1. Headlamp dimmer switch assy 2. Wire harness or connector	★ –
Rear combination lamp does not come on.	1. Bulb 2. Wire harness or connector	– –

HINT:

★: Refer to repair manual RM925E.

3. HEADLAMP BEAM LEVEL CONTROL SYSTEM

Symptoms	Suspected Area	See page
Headlight beam level control system does not operate (All).	1. TAIL fuse 2. Headlamp leveling switch 3. Headlamp assy (Headlight beam level control actuator) 4. Wire harness or connector	– 65-7 65-6 –
Headlight beam level control system does not operate (One side).	1. Headlamp assy (Headlight beam level control actuator) 2. Wire harness or connector	65-6 –
Abnormal Operation.	1. Headlamp leveling switch 2. Headlamp assy (Headlight beam level control actuator) 3. Wire harness or connector	65-7 65-6 –

4. FOG LAMP SYSTEM (W/O DAYTIME RUNNING LIGHT SYSTEM)

Symptoms	Suspected Area	See page
Front fog lamp does not come on with light control switch in HEAD position (Headlamp is normal).	1. FOG fuse 2. Fog lamp relay 3. Headlamp dimmer switch assy 4. Wire harness or connector	– ★ ★ –
Front fog lamp does not come on with light control switch in HEAD position (Headlamp does not come on).	1. *1 Other parts 2. Wire harness or connector	– –
Only one front fog lamp does not come on.	1. Bulb 2. Wire harness or connector	– –
Rear fog lamp does not come on (Headlamp is normal).	1. Bulb 2. Headlamp dimmer switch assy 3. Wire harness or connector	– ★ –

HINT:

- *1: Inspect headlight system.
- ★: Refer to repair manual RM925E.

5. FOG LAMP SYSTEM (W/ DAYTIME RUNNING LIGHT SYSTEM)

Symptoms	Suspected Area	See page
Front fog lamp does not come on with light control switch in HEAD position (Headlamp is normal).	1. FOG fuse 2. Fog lamp relay 3. Headlamp dimmer switch assy 4. Daytime running light main relay (TMC Made) 5. Wire harness or connector	– ★ ★ ★ –
Front fog lamp does not come on with light control switch in HEAD position (Headlamp does not come on).	1. *1 Other parts 2. Wire harness or connector	– –
Only one front fog lamp does not come on.	1. Bulb 2. Wire harness or connector	– –
Rear fog lamp does not come on (Headlamp is normal).	1. Bulb 2. Headlamp dimmer switch assy 3. Wire harness or connector	– ★ –

HINT:

- *1: Inspect headlight system.
- ★: Refer to repair manual RM925E.

6. TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptoms	Suspected Area	See page
”Hazard” and ”Turn” do not come on.	1. GAUGE fuse 2. HAZARD fuse 3. Ignition switch 4. Turn signal flasher relay 5. Wire harness or connector	– – – ★ –
Hazard warning light does not come on (Turn is normal).	1. Hazard warning switch 2. Wire harness or connector	★ –
Turn signal does not come on (Hazard is normal).	1. Turn signal swish 2. Wire harness or connector	★ –
Turn signal does not come on in one direction.	1. Turn signal switch 2. Wire harness or connector	★ –
Only one bulb does not come on.	1. Bulb 2. Wire harness or connector	– –

HINT:

★: Refer to repair manual RM925E.

7. INTERIOR LAMP SYSTEM

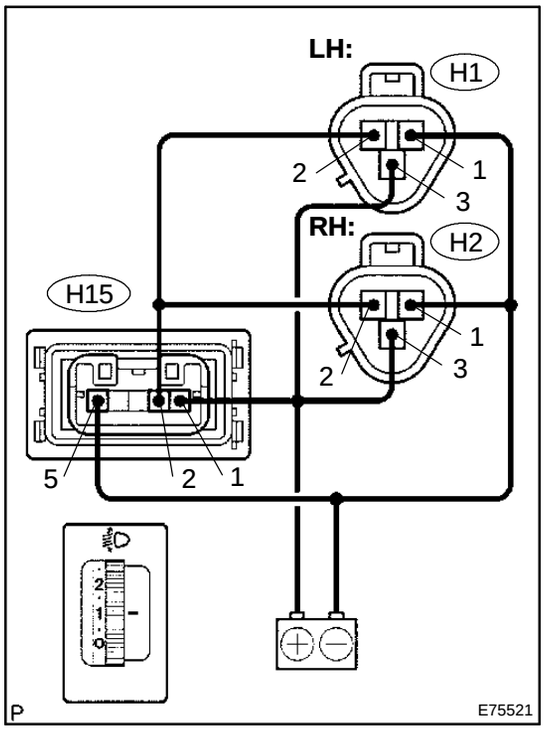
Symptoms	Suspected Area	See page
All the lamps do not come on.	1. DOME fuse 2. Wire harness or connector	– –
The interior lamp does not come on when the driver’s door is opened.	1. Driver’s door courtesy switch 2. Wire harness or connector	★ –
The interior lamp does not come on when the passenger’s door is opened.	1. Passenger’s door courtesy switch 2. Wire harness or connector	★ –
The interior lamp does not come on when the rear–right door is opened.	1. Rear–right door courtesy switch 2. Wire harness or connector	★ –
The interior lamp does not come on when the rear–left door is opened.	1. Rear–left door courtesy switch 2. Wire harness or connector	★ –
Only one of the bulb comes on.	1. Bulb 2. Wire harness or connector	– –
The interior lamp does not fade out when all the doors are closed.	1. Courtesy switch 2. Integration relay 3. Wire harness or connector	★ ★ –
The interior lamp 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. Integration relay 3. Wire harness or connector	★ ★ –
Illumination system does not come on (All).	1. *1 Other parts 2. Daytime running light relay (w/ Daytime running light system) 3. Wire harness or connector	– ★ –

HINT:

- *1: Inspect headlight system.
- ★: Refer to repair manual RM925E.

6517W-01

ON-VEHICLE INSPECTION



1. INSPECT HEADLAMP ASSY (HEADLIGHT BEAM LEVEL CONTROL ACTUATOR OPERATION) (SEDAN/ WAGON TYPE)

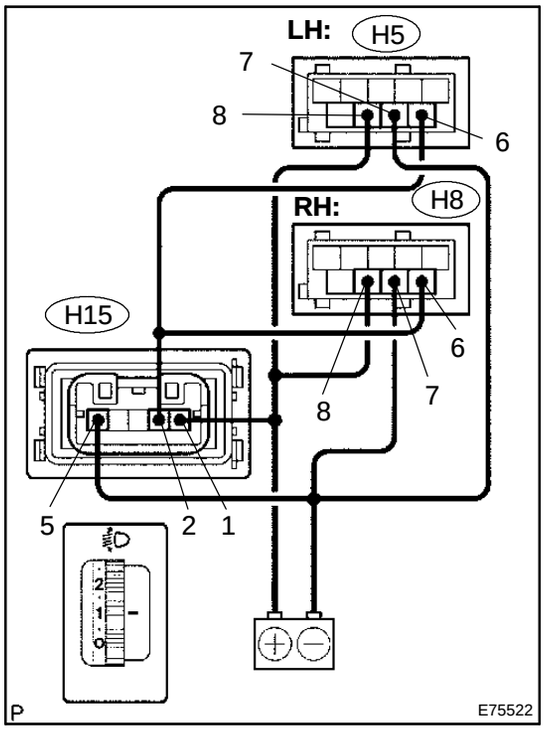
(a) Disconnect the connector from the headlight beam level control actuator.

(b) Connect the positive (+) lead from the battery to headlamp leveling switch terminal 1 and the negative (–) lead to headlamp leveling switch terminal 5.

(c) Connect the positive (+) lead from the battery to each headlight beam level control actuator terminal 3 and the negative (–) lead to each headlight beam level control actuator terminal 1.

(d) Connect the headlamp leveling switch terminal 2 and each headlight beam level control actuator terminal 2.

(e) Inspect headlight beam level control actuator operation when the headlamp leveling switch is operated.



2. INSPECT HEADLAMP ASSY (HEADLIGHT BEAM LEVEL CONTROL ACTUATOR OPERATION) (HATCH BACK TYPE)

(a) Disconnect the connector from the headlamp assy.

(b) Connect the positive (+) lead from the battery to headlamp leveling switch terminal 1 and the negative (–) lead to headlamp leveling switch terminal 5.

(c) Connect the positive (+) lead from the battery to each headlamp connector terminal 8 and the negative (–) lead to each headlamp connector terminal 7.

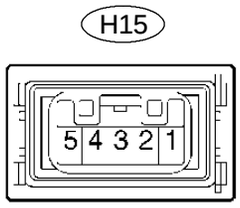
(d) Connect the headlamp leveling switch terminal 2 and each headlamp connector terminal 6.

(e) Inspect headlight beam level control actuator operation when the headlamp leveling switch is operated.

6517X-01

INSPECTION

Connecter Front View:



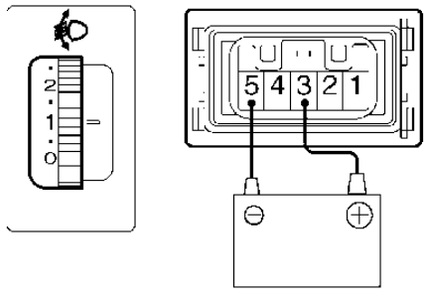
E75617

1. HEADLAMP LEVELING SWITCH

(a) Measure the resistance according to the value(s) in the table below.

Standard:

Switch operation	Tester connection	Specified condition
0	1 – 5	1.0 to 1.2 Ω
1	1 – 5	1.6 to 1.9 Ω
2	1 – 5	2.3 to 2.6 Ω
3	1 – 5	2.9 to 3.3 Ω
4	1 – 5	3.5 to 3.9 Ω
5	1 – 5	4.1 to 4.6 Ω
Always	4 – 5	Below 1 Ω



E68133

(b) Inspect switch illumination.

(1) Connect the battery positive (+) lead to terminal 3 and the battery negative (–) lead to terminal 5.

(2) Check that the illumination comes on.

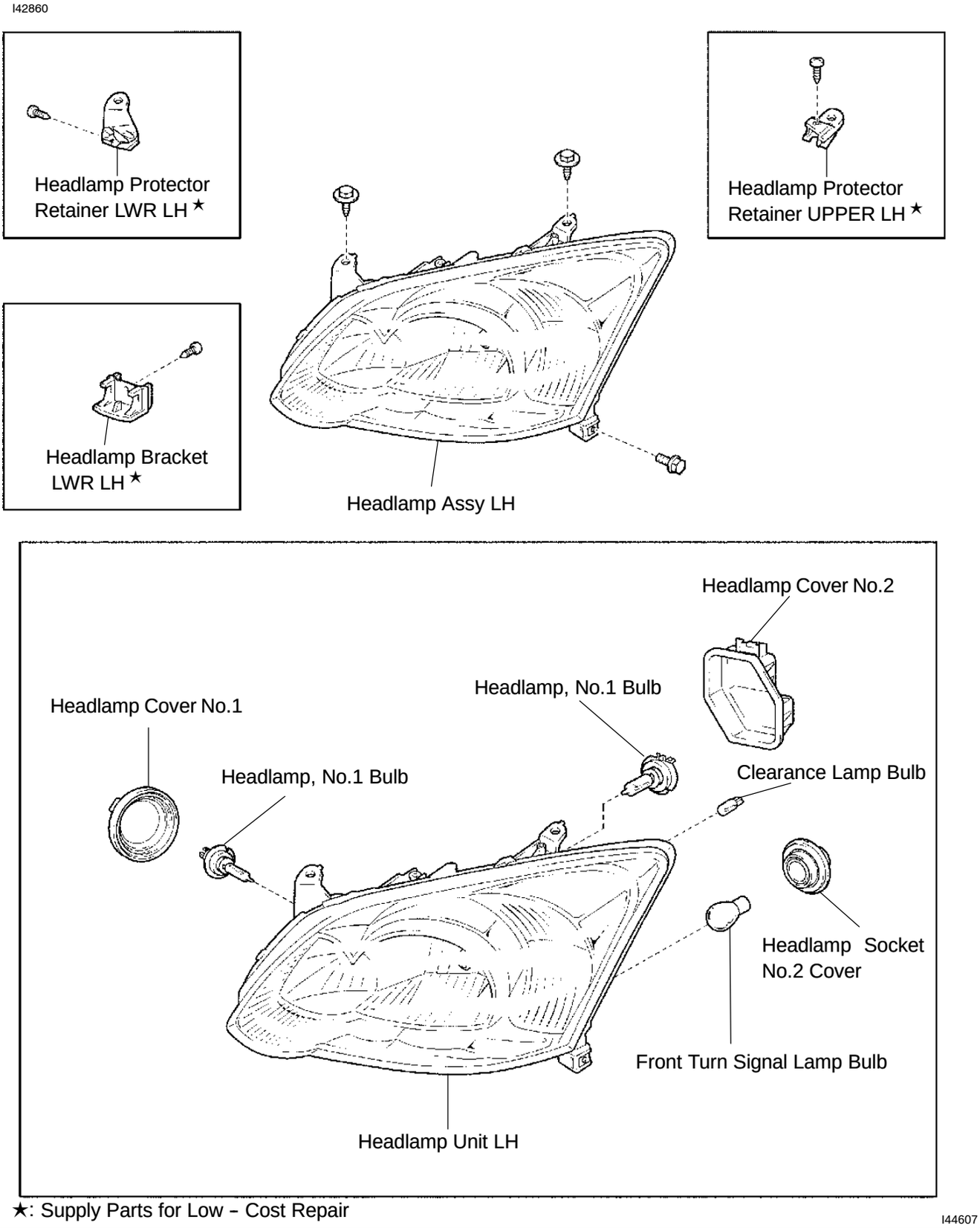
OK:

Illumination comes on.

HEADLAMP ASSY LH (HATCHBACK)

COMPONENTS

6517Y-01



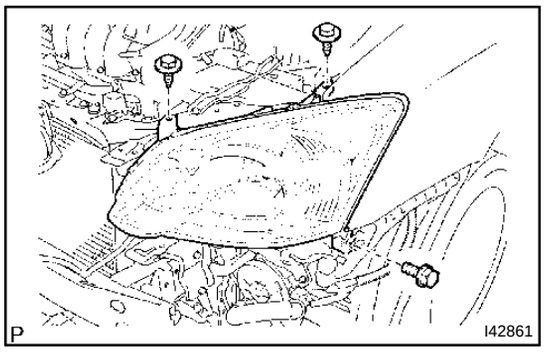
6517Z-01

OVERHAUL

HINT:

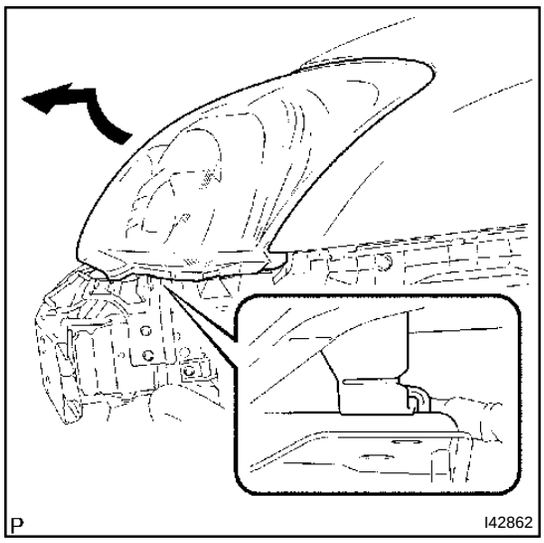
- COMPONENTS: SEE PAGE 65-8.
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- Installation is in the reverse order of removal.

1. REMOVE FRONT BUMPER COVER (SEE PUB. NO. RM925E, PAGE 76-5)

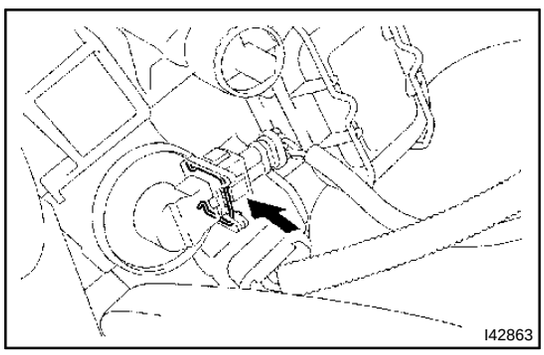


2. REMOVE HEADLAMP ASSY LH

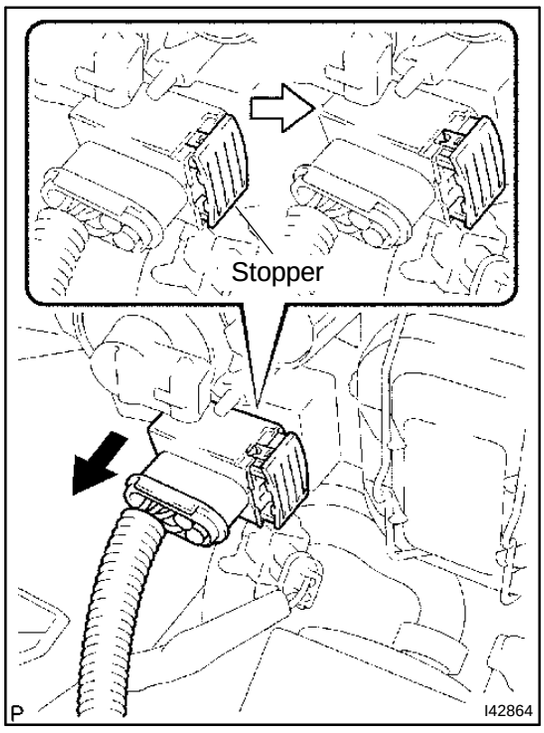
(a) Remove the bolt and 2 screws.



(b) Pull the headlamp assy LH in the direction indicated by the arrow, disengage the headlamp bracket, and then separate the headlamp assy LH.

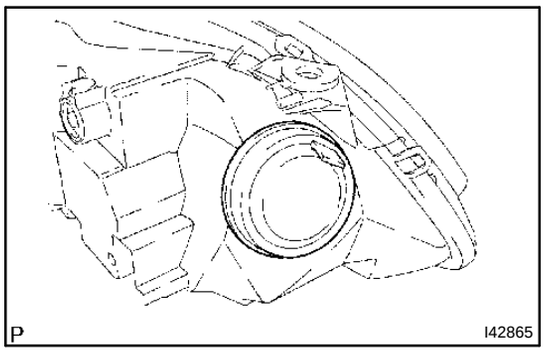


(c) After pushing the pin, disconnect the connector.



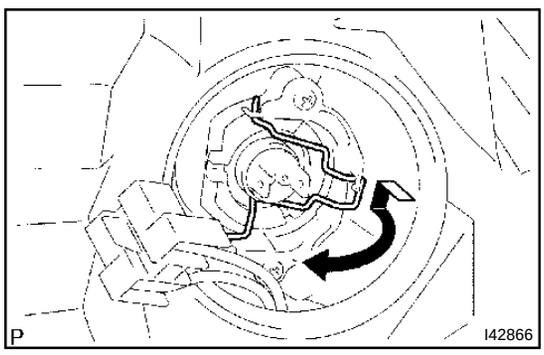
(d) Release the stopper as shown in the illustration and disconnect the connector.

(e) Remove the headlamp assy LH.



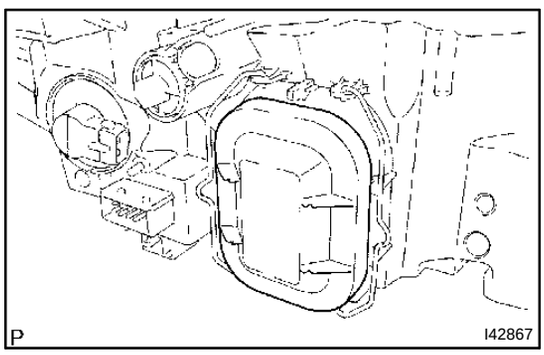
3. REMOVE HEADLAMP COVER NO.1

(a) Remove the headlamp cover No.1.



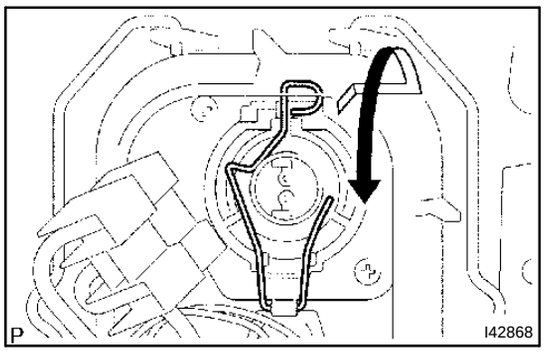
4. REMOVE HEADLAMP, NO.1 BULB

(a) Release the set spring lock as shown in the illustration and remove the headlamp, No.1 bulb.



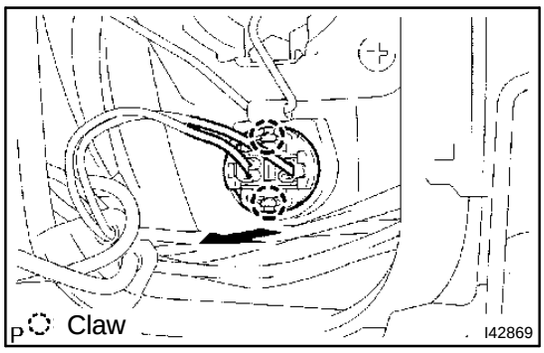
5. REMOVE HEADLAMP COVER NO.2

(a) Release the set spring lock and remove the headlamp cover No.2.



6. REMOVE HEADLAMP, NO.1 BULB

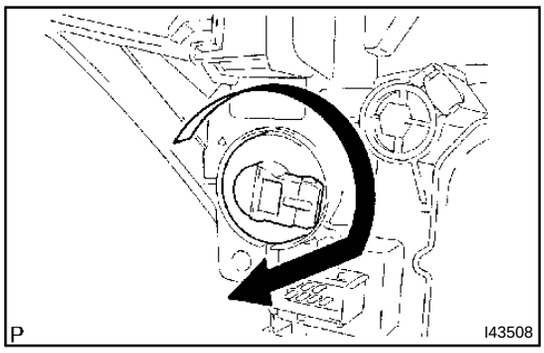
(a) Release the set spring lock as shown in the illustration and remove the headlamp, No.1 bulb.



7. REMOVE CLEARANCE LAMP BULB

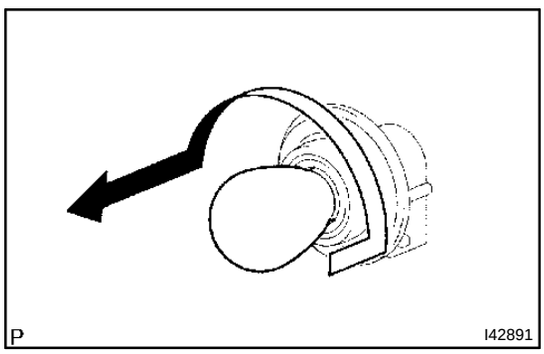
(a) While pushing the 2 claws, remove the clearance lamp bulb along with the clearance lamp socket.

(b) Remove the clearance lamp bulb from the clearance lamp socket.



8. REMOVE HEADLAMP SOCKET NO.2 COVER

(a) Turning in the direction indicated by the arrow, remove the headlamp socket No.2 cover and the front turn signal lamp bulb as a unit.



(b) Turning in the direction indicated by the arrow, remove the front turn signal lamp bulb.

(c) Remove the headlamp socket No.2 cover.

9. REMOVE HEADLAMP UNIT LH

10. VEHICLE PREPARATION FOR HEADLAMP AIM ADJUSTMENT **(SEE PAGE 65-12)**

11. PREPARATION FOR HEADLAMP AIMING (Using a screen) **(SEE PAGE 65-12)**

12. HEADLAMP AIMING INSPECTION **(SEE PAGE 65-12)**

13. HEADLAMP AIMING ADJUSTMENT **(SEE PAGE 65-12)**

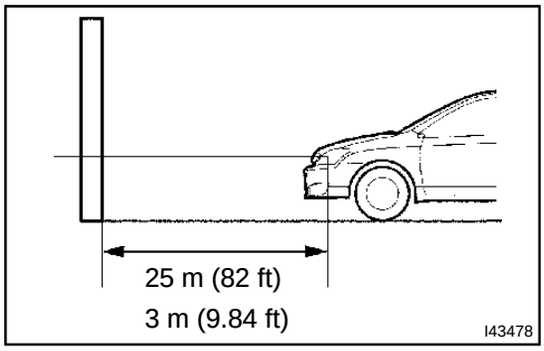
65180-01

ADJUSTMENT

1. VEHICLE PREPARATION FOR HEADLAMP AIM ADJUSTMENT

(a) Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the headlamps.
- Fill the fuel tank.
- Make sure that the oil is filled to the specified level.
- Make sure that the coolant is filled to the specified level.
- Inflate the tires to the appropriate pressure.
- Place the spare tire, tools, and jack in their original position.
- Unload the trunk.
- Sit a person of average weight (75 kg, 165 lb) in the driver's seat.



2. PREPARATION FOR HEADLAMP AIMING (Using a screen)

(a) Prepare the vehicle according to the following conditions:

- Place the vehicle in a location that is dark enough to clearly observe the cutoff line. The cutoff line is a distinct line, below which light from the headlamps can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82 ft) distance between the vehicle (headlamp bulb center) and the wall.
- Place the vehicle on a level surface.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:

A distance of 25 m (82 ft) between the vehicle (headlamp bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft) for check and adjustment. (The target zone will change with the distance so follow the instructions in the illustration.)

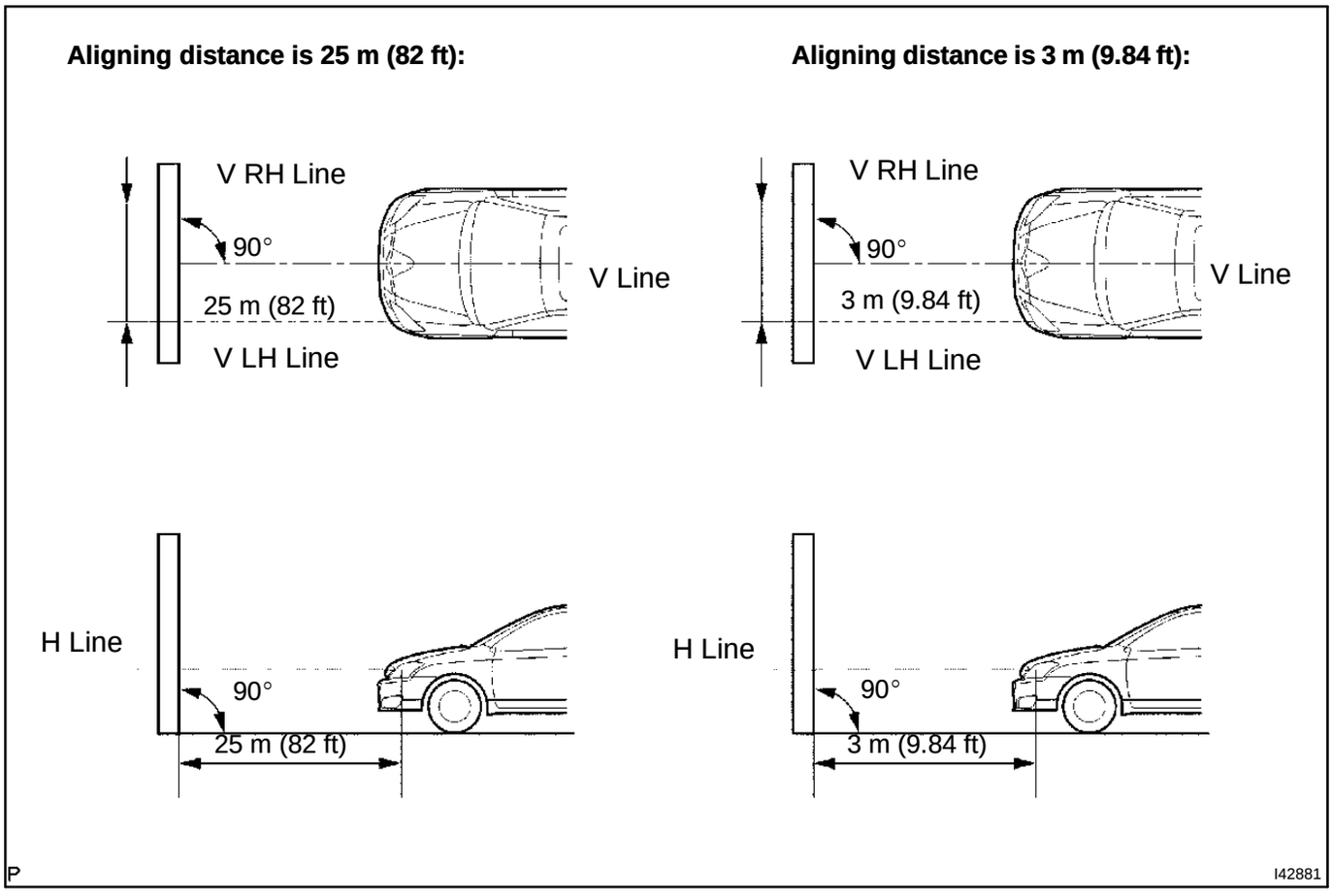
(b) Prepare a piece of thick white paper (approximately 2 m (6.6 ft) (height) x 4 m (13.1 ft) (width)) to use as a screen.

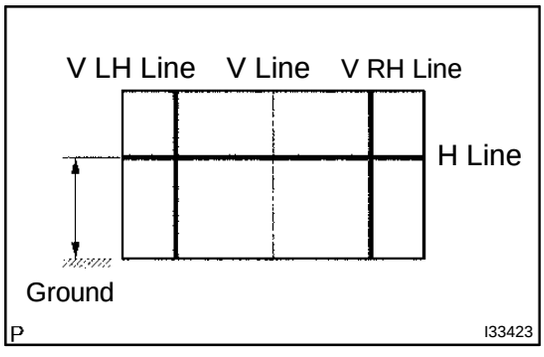
(c) Draw a vertical line down the center of screen (V line).

(d) Set the screen as shown in the illustration.

HINT:

- Stand the screen perpendicular to the ground.
- Align the V line on the screen with the center of the vehicle.





(e) Draw base lines (H line, V LH, V RH lines) on the screen as shown in the illustration.

HINT:

- The base lines differ for ”low–beam inspection” and ”high–beam inspection”.
- Mark the headlamp bulb center marks on the screen. If the center mark cannot be observed on the headlamp, use the center of the headlamp bulb or the manufacturer’s name marked on the headlamp as the center mark.

(1) H Line (Headlamp height):
Draw a horizontal line across the screen so that it passes through the center marks. The H line should be at the same height as the headlamp bulb center marks of the low–beam headlamps.

(2) V LH Line, V RH Line (Center mark position of left–hand (LH) and right–hand (RH) headlamps):
Draw two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low–beam headlamp bulbs).

3. HEADLAMP AIMING INSPECTION

(a) Cover or disconnect the connector of the headlamp on the opposite side to prevent light from the headlamp not being inspected from affecting headlamp aiming inspection.

NOTICE:

Do not keep the headlamp covered for more than 3 minutes. The headlamp lens is made of synthetic resin, and may easily melt or be damaged due to heat.

HINT:

When checking the aim of the high–beam, cover the low–beam or disconnect the connector.

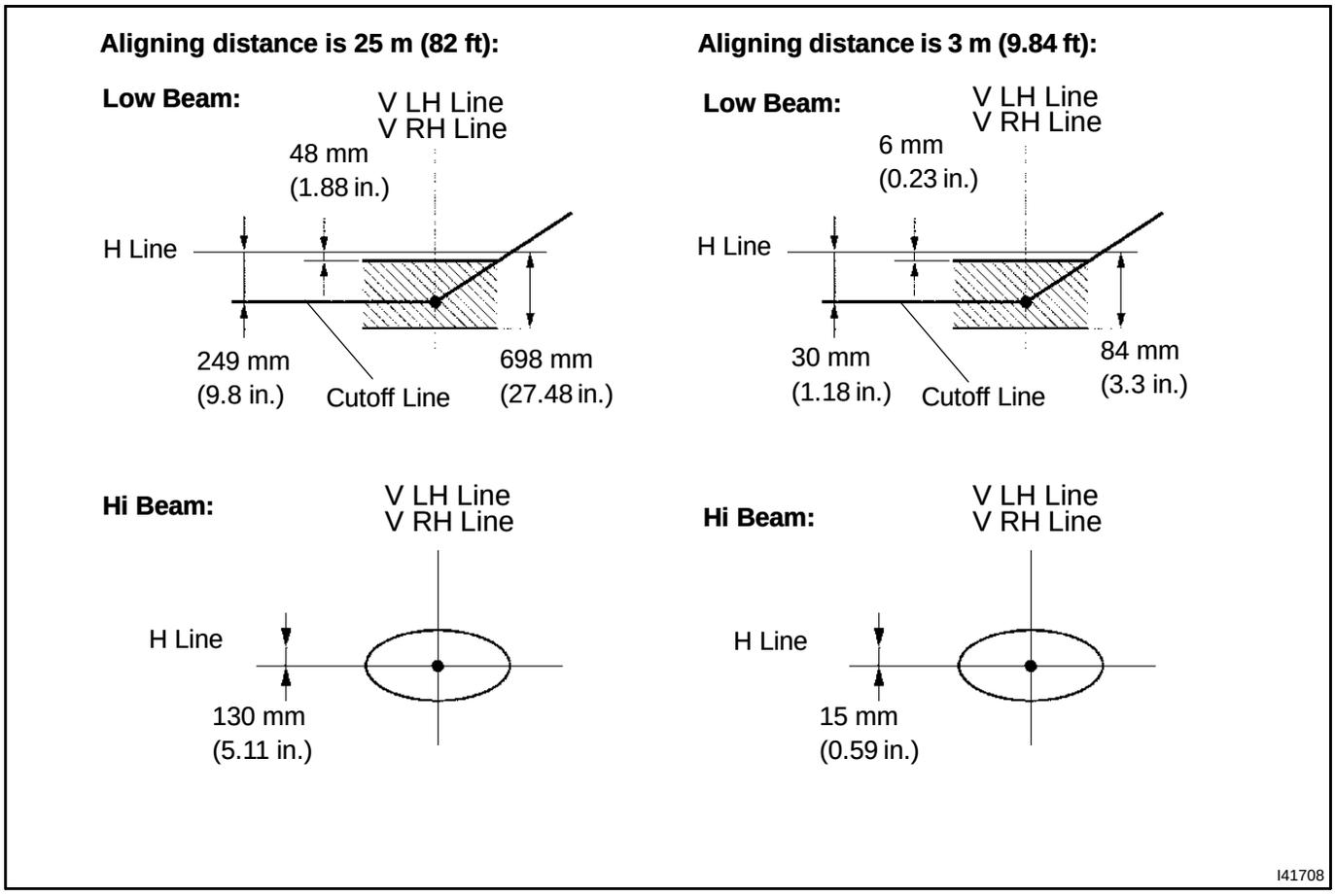
(b) Start the engine.

NOTICE:

Engine rpm must be 1,500 or more.

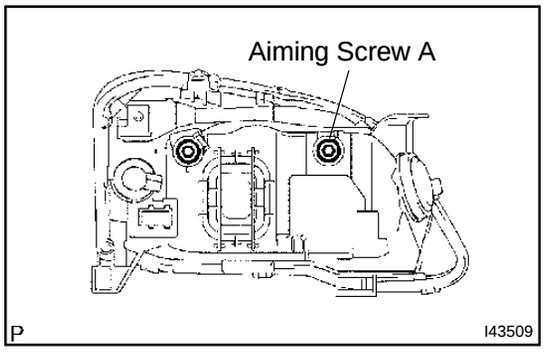
(c) Set the headlamp leveling switch to 0 (zero).

(d) Turn on the headlamp and make sure that the cutoff line falls within the specified area, as shown in the illustration.



HINT:

- Alignment distance is 25 m (82 ft):
  The cutoff line is 48 mm (1.88 in.) to 698 mm (27.48 in.) below the H line with low-beam (ECE Reg.48).
- Alignment distance is 3 m (9.84 ft):
  The cutoff line is 6 mm (0.23 in.) to 84 mm (3.3 in.) below the H line with low-beam (ECE Reg.48).
- Alignment distance is 25 m (82 ft):
  The cutoff line is 249 mm (9.8 in.) below the H line with low-beam.
- Alignment distance is 3 m (9.84 ft):
  The cutoff line is 30 mm (1.18 in.) below the H line with low-beam.
- Since the low-beam light and the high-beam light are a unit, if the aim on one is correct, the other should also be correct. However, check both beams just to make sure.



4. HEADLAMP AIMING ADJUSTMENT

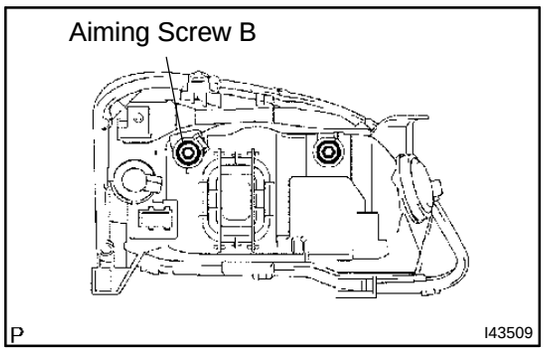
(a) Adjust the aim vertically:
Adjust the headlamp aim into the specified range by turning aiming screw A with a screwdriver.

NOTICE:

The final turn of the aiming screw should be made in the clockwise direction. If the screw is tightened excessively, loosen it and then retighten it, so that the final turn of the screw is in the clockwise direction.

HINT:

- Perform low-beam aim adjustment.
- The headlamp aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.



(b) Adjust the aim horizontally:
Adjust the headlamp aim into the specified range by turning aiming screw B with a screwdriver.

NOTICE:

The final turn of the aiming screw should be made in the clockwise direction. If the screw is tightened excessively, loosen it and then retighten it, so that the final turn of the screw is in the clockwise direction.

HINT:

Perform low-beam aim adjustment.

65181-01

REPAIR

HINT:

- COMPONENTS: SEE PAGE 65-8.
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- If the area where the headlamp unit LH is installed is broken, the repairs listed below can be performed inexpensively through the use of a repair use bracket. This may only be done if the headlamp assy LH itself is not damaged.

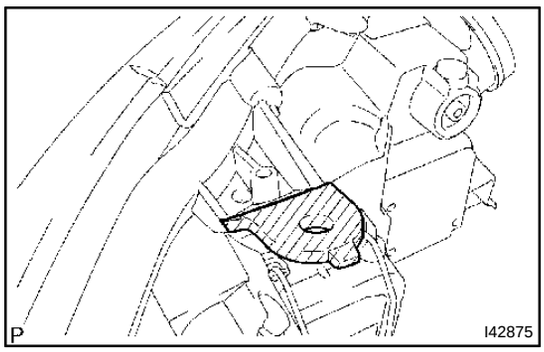
1. REMOVE FRONT BUMPER COVER (SEE PUB. NO. RM925E, PAGE 76-5)

2. REMOVE HEADLAMP ASSY LH (SEE PAGE 65-9)

3. INSTALL HEADLAMP PROTECTOR RETAINER UPPER LH

HINT:

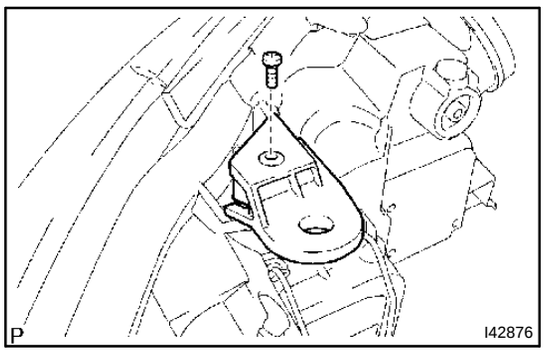
- If the installation area of the headlamp assy LH is damaged, use the supply bracket for low-cost repair.
- Ensure that the headlamp assy LH is not damaged.



(a) Cut off the part shaded in the illustration and sand smooth with sandpaper.

NOTICE:

After cutting off the part, place the headlamp protector retainer UPPER LH against the bosses and gradually file away until installation is possible.

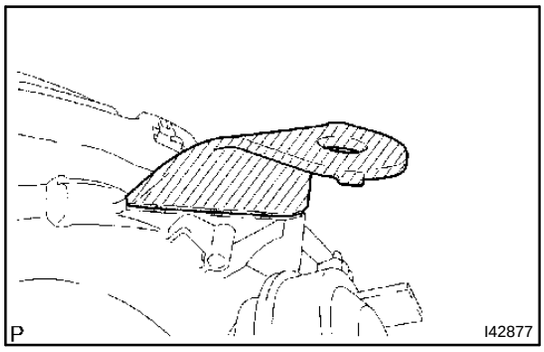


(b) Install the headlamp protector retainer UPPER LH with the screw.

4. INSTALL HEADLAMP PROTECTOR RETAINER LWR LH

HINT:

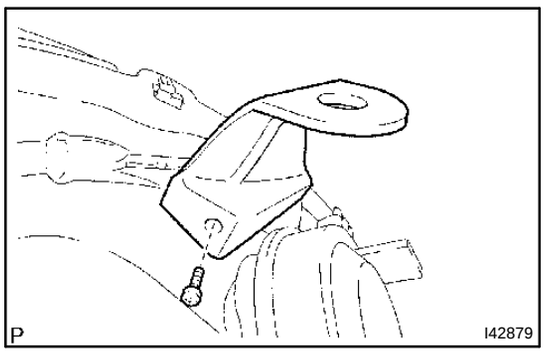
- If the installation area of the headlamp assy LH is damaged, use the supply bracket for low–cost repair.
- Ensure that the headlamp assy LH is not damaged.



(a) Cut off the part shaded in the illustration and sand smooth with sandpaper.

NOTICE:

After cutting off the part, place the headlamp protector retainer LWR LH against the bosses and gradually file away until installation is possible.

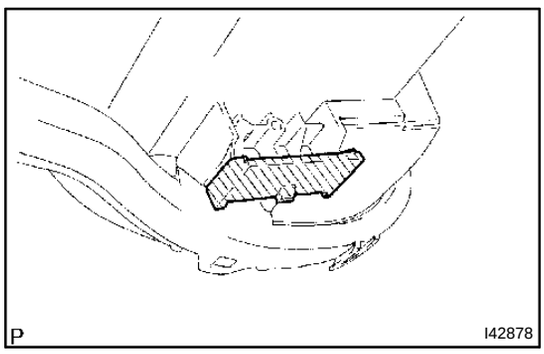


(b) Install the headlamp protector retainer LWR LH with the screw.

5. INSTALL HEADLAMP BRACKET LWR LH

HINT:

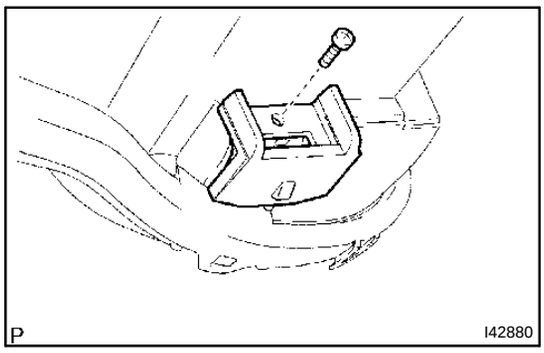
- If the installation area of the headlamp assy LH is damaged, use the supply bracket for low–cost repair.
- Ensure that the headlamp assy LH is not damaged.



(a) Cut off the part shaded in the illustration and sand smooth with sandpaper.

NOTICE:

After cutting off the part, place the headlamp bracket LWR LH against the bosses and gradually file away until installation is possible.



(b) Install the headlamp bracket LWR LH with the screw.

6. **VEHICLE PREPARATION FOR HEADLAMP AIM ADJUSTMENT** **(SEE PAGE 65-12)**
7. **PREPARATION FOR HEADLAMP AIMING (Using a screen)** **(SEE PAGE 65-12)**
8. **HEADLAMP AIMING INSPECTION** **(SEE PAGE 65-12)**
9. **HEADLAMP AIMING ADJUSTMENT** **(SEE PAGE 65-12)**

FOG LAMP ASSY LH (HATCHBACK)

65182-01

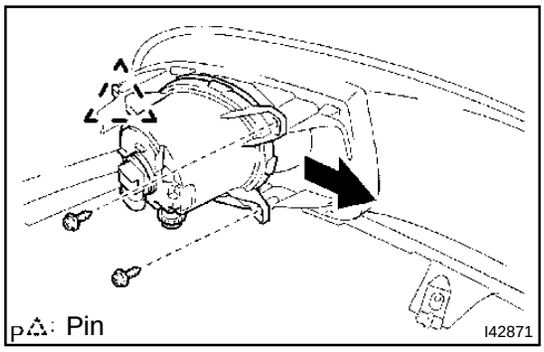
OVERHAUL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- Installation is in the reverse order of removal.

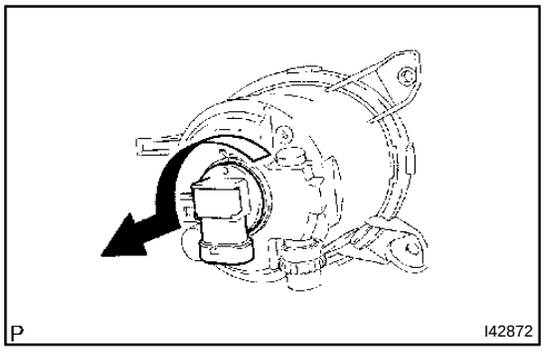
1. REMOVE ENGINE UNDER COVER LH **(SEE PUB. NO. RM925E PAGE 76-5)**

2. REMOVE FRONT FENDER LINER LH **(SEE PUB. NO. RM925E PAGE 76-5)**



3. REMOVE FOG LAMP ASSY LH

(a) Remove the 2 screws, disengage the pin and then remove the fog lamp assy LH.



(b) Turn the fog lamp bulb in the direction as shown in the illustration and remove the fog lamp bulb.

4. VEHICLE PREPARATION FOR FOG LAMP AIM ADJUSTMENT **(SEE PAGE 65-20)**

5. PREPARATION FOR FOG LAMP AIMING **(SEE PAGE 65-20)**

6. FOG LAMP AIMING INSPECTION **(SEE PAGE 65-20)**

7. FOG LAMP AIMING ADJUSTMENT **(SEE PAGE 65-20)**

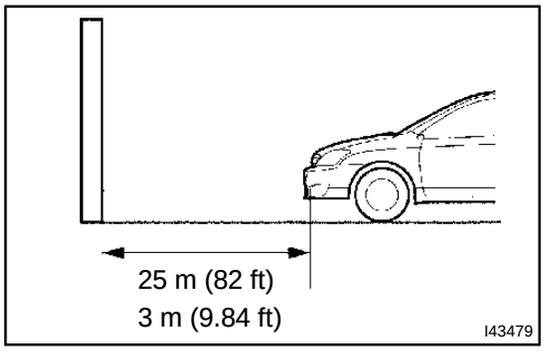
65183-01

ADJUSTMENT

1. VEHICLE PREPARATION FOR FOG LAMP AIM ADJUSTMENT

(a) Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the headlamps.
- Fill the fuel tank.
- Make sure that the oil is filled to the specified level.
- Make sure that the coolant is filled to the specified level.
- Inflate the tires to the appropriate pressure.
- Place the spare tire, tools, and jack in their original position.
- Unload the trunk.
- Sit a person of average weight (75 kg, 165 lb) in the driver's seat.



2. PREPARATION FOR FOG LAMP AIMING

(a) Prepare the vehicle according to the following conditions:

- Place the vehicle in a location that is dark enough to clearly observe the cutoff line. The cutoff line is a distinct line, below which light from the headlamps can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82 ft) distance between the vehicle (fog lamp bulb center) and the wall.
- Place the vehicle on a level surface.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:

A distance of 25 m (82 ft) between the vehicle (fog lamp bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft) for check and adjustment. (The target zone will change with the distance, so follow the instructions in the illustration.)

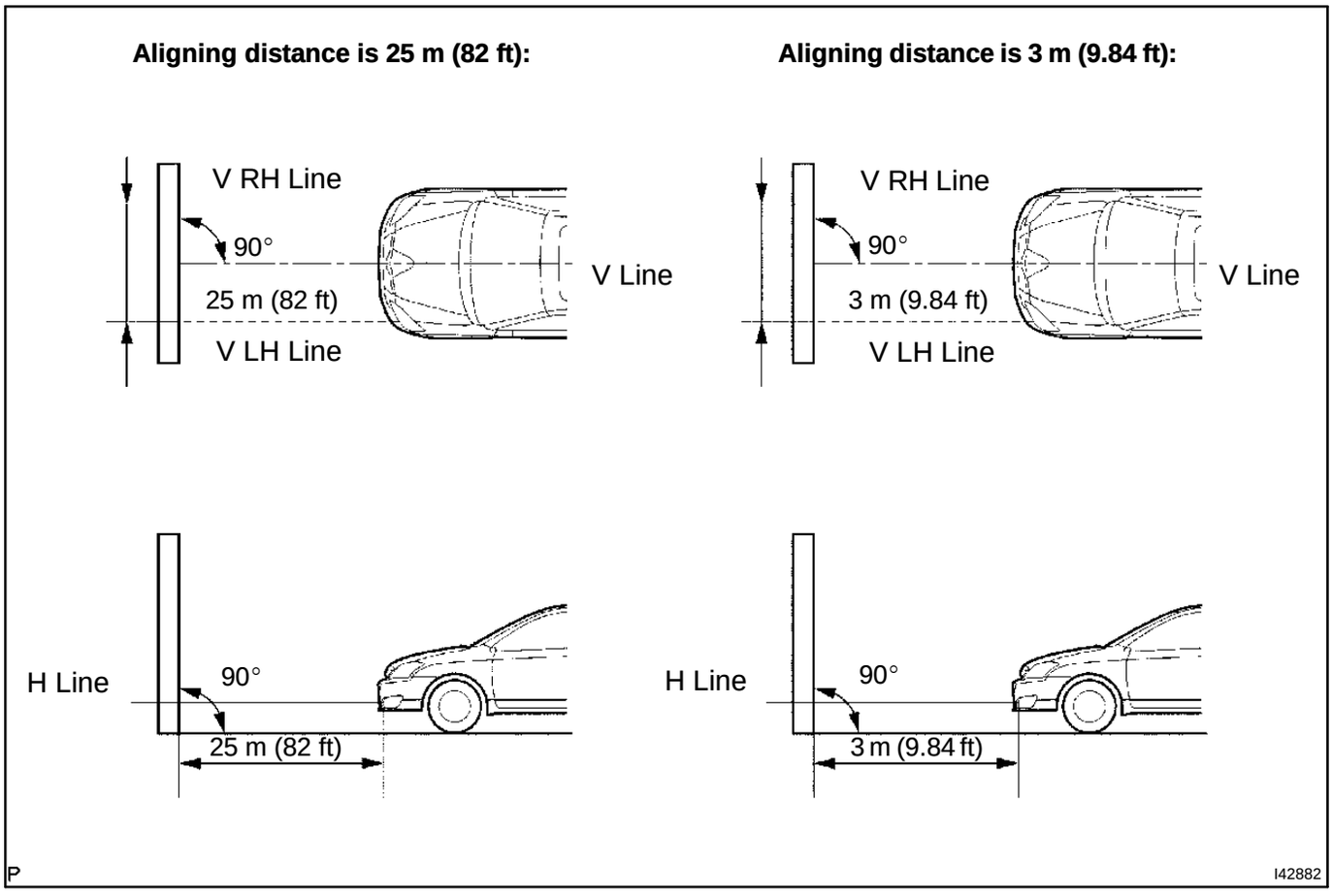
(b) Prepare a piece of thick white paper (approximately 2 m (6.6 ft) (height) x 4 m (13.1 ft) (width)) to use as a screen.

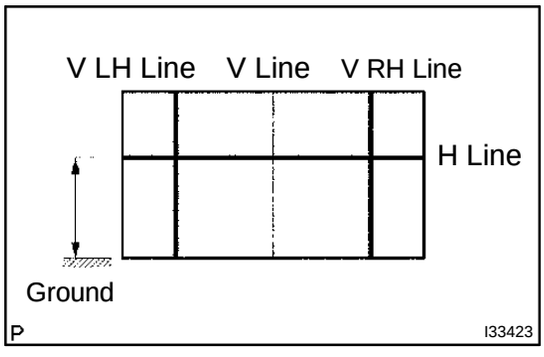
(c) Draw a vertical line down the center of screen (V line).

(d) Set the screen as shown in the illustration.

HINT:

- Stand the screen perpendicular to the ground.
- Align the V line on the screen with the center of the vehicle.





(e) Draw base lines (H line, V LH, V RH lines) on the screen as shown in the illustration.

HINT:

Mark the fog lamp bulb center marks on the screen. If the center mark cannot be observed on the fog lamp, use the center of the fog lamp bulb or the manufacturer's name marked on the fog lamp as the center mark.

(1) H Line (Fog lamp height):
Draw a horizontal line across the screen so that it passes through the center marks. The H line should be at the same height as the fog lamp bulb center marks of the low–beam fog lamps.

(2) V LH Line, V RH Line (Center mark position of left–hand (LH) and right–hand (RH) fog lamps):
Draw two vertical lines so that they intersect the H line at each center mark.

3. FOG LAMP AIMING INSPECTION

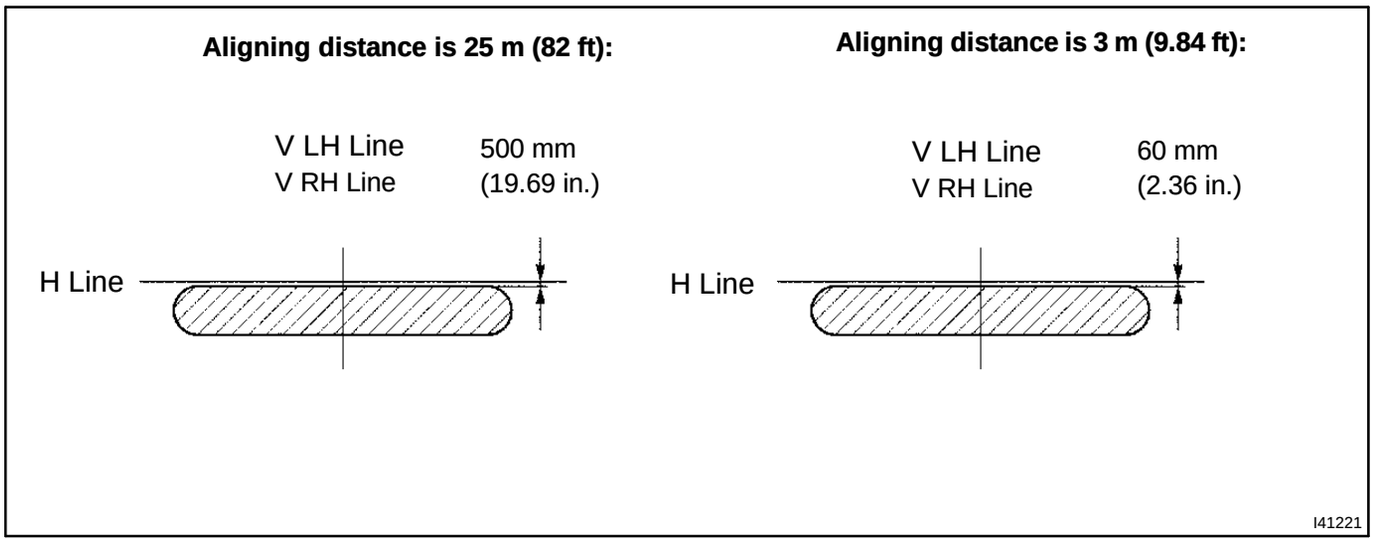
(a) Cover or disconnect the connector of the fog lamp on the opposite side to prevent light from the fog lamp not being inspected from affecting fog lamp aiming inspection.

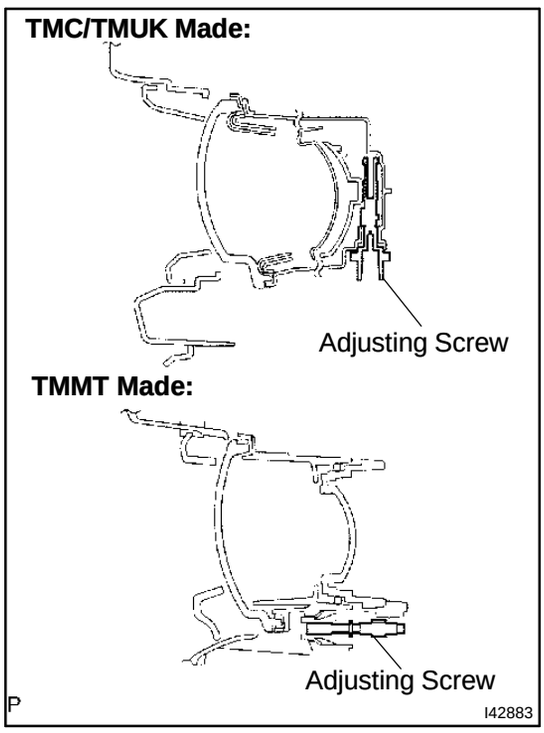
(b) Start the engine.

NOTICE:

Engine rpm must be 1,500 or more.

(c) Turn on the fog lamp and make sure that the cutoff line falls within the specified area, as shown in the illustration.





4. FOG LAMP AIMING ADJUSTMENT

(a) Adjust the fog lamp aim into the specified range by turning aiming screw with a screwdriver.

NOTICE:

The final turn of the aiming screw should be made in the clockwise direction. If the screw is tightened excessively, loosen it and then retighten it, so that the final turn of the screw is in the clockwise direction.

WIPER & WASHER

WIPER AND WASHER SYSTEM 66–1
PROBLEM SYMPTOMS TABLE 66–1/2
ON–VEHICLE INSPECTION 66–3/4
INSPECTION 66–5
WINDSHIELD WIPER RELAY ASSY 66–6
REPLACEMENT 66–6
RAIN SENSOR 66–7
REPLACEMENT 66–7/8

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement (Jan., 2002)	RM939E

NOTE: The above pages contain only the points which differ from the above listed manual.

WIPER AND WASHER SYSTEM

PROBLEM SYMPTOMS TABLE

660KG-01

HINT:

Use the table below, with suspected areas listed in numerical order, to determine the cause of the problem. Inspect and repair or replace parts as necessary according to the steps on the following pages.

1. FRONT WIPER AND WASHER SYSTEM (W/O AUTO WIPER SYSTEM)

Symptom	Suspected Area	See page
Front wipers do not operate.	1. IG1 relay 2. WIPER fuse 3. Windshield wiper switch assy 4. Wire harness or connector	- - ★ -
Front wipers do not operate in LO or HI.	1. Windshield wiper switch assy 2. Windshield wiper motor assy 3. Wire harness or connector	★ ★ -
Front wipers do not operate in INT.	1. Windshield wiper switch assy 2. Windshield wiper motor assy 3. Wire harness or connector	★ ★ -
Front washer motor does not operate.	1. IG1 relay 2. WASH fuse 3. Windshield wiper switch assy 4. Windshield washer motor assy 5. Wire harness or connector	- - ★ ★ -
Front wipers do not operate when washer switch is in ON position.	Windshield wiper switch assy	★
Washer fluid does not flow.	Washer hose and nozzle	-
• When front wiper switch is in HI position, the wiper blade is in contact with the body. • When the front wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Windshield wiper motor assy 2. Front wiper arm installation position (*1) 3. Wire harness or connector	★ ★ -

HINT:

- *1: Inspect wiper arm and blade set position.
- ★: Refer to repair manual RM925E.

2. FRONT WIPER AND WASHER SYSTEM (W/ AUTO WIPER SYSTEM)

Symptom	Suspected Area	See page
Front wipers do not operate.	1. IG1 relay 2. WIPER fuse 3. Windshield wiper switch assy 4. Windshield wiper relay assy 5. Wire harness or connector	- - 66-5 66-3 -
Front wipers do not operate in LO (Auto wiper system is normal).	Windshield wiper switch assy	66-5
Front wipers do not operate in HI (Auto wiper system is normal).	1. Windshield wiper switch assy 2. Wire harness or connector	66-5 -
Front washer motor does not operate.	1. IG1 relay 2. WASH fuse 3. Windshield wiper switch assy 4. Windshield washer motor assy 5. Windshield wiper relay assy 6. Wire harness or connector	- - 66-5 ★ 66-3 -

Symptom	Suspected Area	See page
Auto wiper system does not operate.	1. Windshield wiper switch assy 2. Windshield wiper relay assy 3. Rain sensor 4. Wire harness or connector	66-5 66-3 66-3 -
Front wipers do not operate when washer switch is in ON position.	Windshield wiper switch assy	66-5
Washer fluid does not flow.	Washer hose and nozzle	-
• When front wiper switch is in HI position, the wiper blade is in contact with the body. • When the front wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Windshield wiper motor assy 2. Front wiper arm installation position (*1) 3. Wire harness or connector	★ ★ -

HINT:

- *1: Inspect wiper arm and blade set position.
- ★: Refer to repair manual RM925E.

3. REAR WIPER AND WASHER SYSTEM

Symptom	Suspected Area	See page
Rear wiper does not operate.	1. IG1 relay 2. WIPER fuse 3. Windshield wiper switch assy (w/o Auto wiper system) 4. Windshield wiper switch assy (w/ Auto wiper system) 5. Wire harness or connector	- - ★ 66-5 -
Rear wiper does not operate in INT or ON.	1. Windshield wiper switch assy (w/o Auto wiper system) 2. Windshield wiper switch assy (w/ Auto wiper system) 3. Rear wiper motor assy 4. Wire harness or connector	★ 66-5 ★ -
Rear washer motor does not operate.	1. IG1 relay 2. WASH fuse 3. Windshield wiper switch assy (w/o Auto wiper system) 4. Windshield wiper switch assy (w/ Auto wiper system) 5. Rear washer motor assy 6. Wire harness or connector	- - ★ 66-5 ★ -
Rear wiper does not operate when washer switch is in ON.	1. Windshield wiper switch assy (w/o Auto wiper system) 2. Windshield wiper switch assy (w/ Auto wiper system)	★ 66-5
Rear washer fluid does not flow.	Washer hose and nozzle	-
• When rear wiper switch is in ON position, the wiper blade is in contact with the body. • When the wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Rear wiper motor assy 2. Rear wiper blade installation position (*1)	★ ★

HINT:

- *1: Inspect wiper arm and blade set position.
- ★: Refer to repair manual RM925E.

4. HEADLAMP CLEANER SYSTEM

Symptom	Suspected Area	See page
Headlamp cleaner system does not operate.	1. Headlight system (*1) 2. H-LP CLN fuse 3. Headlamp cleaner switch assy 4. Headlamp cleaner motor and pump assy 5. Headlamp cleaner control relay 6. Wire harness or connector	★ - ★ ★ ★ -

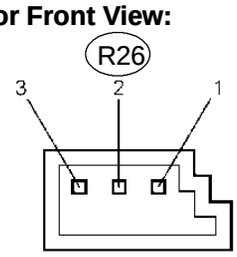
HINT:

- *1: Inspect headlight system.
- ★: Refer to repair manual RM925E.

660KH-01

ON-VEHICLE INSPECTION

Connector Front View:



H E68115

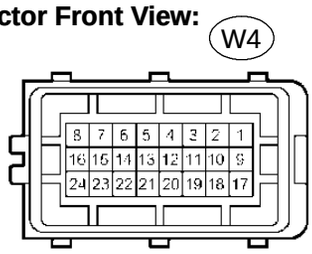
1. INSPECT RAIN SENSOR

(a) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified voltage
1 – 2	Ignition switch is in ON position	10 to 14 V
2 – 3	Ignition switch is in ON position, front wiper switch is in AUTO position, and water is spattered on rain sensor.	Signal waveform

Connector Front View:



H E68116

2. INSPECT WINDSHIELD WIPER RELAY ASSY

(a) Measure the voltage according to the value(s) in the table below.

Standard:

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG (1) – E (22)	L – W-B	Power source circuit (From WIPER fuse)	• Ignition switch OFF • Ignition switch is in ON position	• Below 1 V • 10 to 14 V
SPD (2) – E (22)	LG – W-B	Rain sensor circuit (Signal circuit)	Ignition switch is in ON position and water is spattered on rain sensor	Signal waveform
W (4) – E (22)	GR-R – W-B	Windshield wiper switch signal circuit	• Front washer switch OFF • Front washer switch is in ON position	• 10 to 14 V • Below 1 V
+2 (8) – E (22)	L-R – W-B	Front wiper motor circuit	• Front wiper is stopped • Front wiper is operated in HI speed	• Below 1 V • 10 to 14 V
C1 (9) – E (22)	O – W-B	Windshield wiper switch signal circuit	• Front wiper switch OFF • Front wiper switch is in AUTO position	• 10 to 14 V • Below 1 V
CO (11) – E (22)	W – W-B	Windshield wiper switch signal circuit	• Front wiper switch OFF • Front wiper switch is in AUTO position	• Below 1 V • 10 to 14 V
+SSW (12) – E (22)	L-Y – W-B	Front washer motor circuit (Operation signal)	• Front washer is stopped • Front washer is operated	• 10 to 14 V • Below 1 V

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+1 (16) – E (22)	L–Y – W–B	Front wiper motor circuit	• Front wiper is stopped • Front wiper is operated in LO speed	• Below 1 V • 10 to 14 V
+SM (17) – E (22)	L–W – W–B	Front wiper motor circuit	• Front wiper is in retract position • Front wiper is not in retract position	• Below 1 V • 10 to 14 V
SIG (19) – E (22)	P–B – W–B	Rain sensor circuit (Power source circuit)	• Ignition switch OFF • Ignition switch is in ON position and front wiper switch is in AUTO position	• Below 1 V • 10 to 14 V
VR1 (20) – E (22)	GR–R – W–B	Windshield wiper switch signal circuit	• Ignition switch OFF • Ignition switch is in ON position and front wiper switch is in AUTO position	• Below 1 V • 10 to 14 V
E (22) – Body ground	W–B – Body ground	Ground circuit	Always	Below 1 V
PA1 (23) – E (22)	V – W–B	Rain sensor circuit (Ground circuit)	Always	Below 1 V
VR2 (24) – E (22)	LG–R – W–B	Windshield wiper switch signal circuit	• Ignition switch OFF • Ignition switch is in ON position and rain sensor adjust switch is in (+) position → (–) position	• Below 1 V • Signal waveform

3. AUTO WIPER SYSTEM OPERATION CHECK

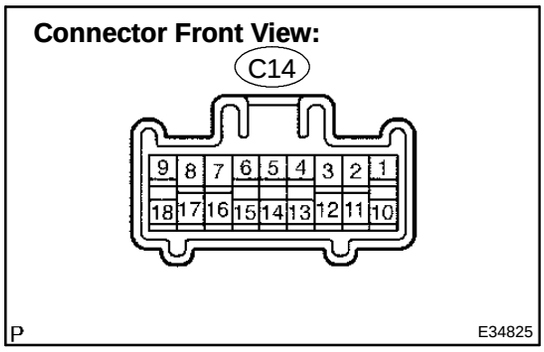
(a) Check that the auto wiper system operates when the ignition switch is ON and the front wiper switch is in the AUTO position.

(b) Spray once in the rain sensor area of the windshield. The wiper blades will immediately carry out a wiping cycle. If the water is continuously sprayed to the rain sensor area of the windshield, the wiper blades operate in interval mode first, then change to low speed operation and finally reach high speed operation after a few seconds.

(c) After stopping spraying water to the windshield, check the wiper blade back retract position.

660KI-01

INSPECTION



1. WINDSHIELD WIPER SWITCH ASSY (w/ RAIN SENSOR)

(a) Continuity Check

(1) Measure the resistance according to the value(s) in the table below.

Standard:

Front Wiper Switch

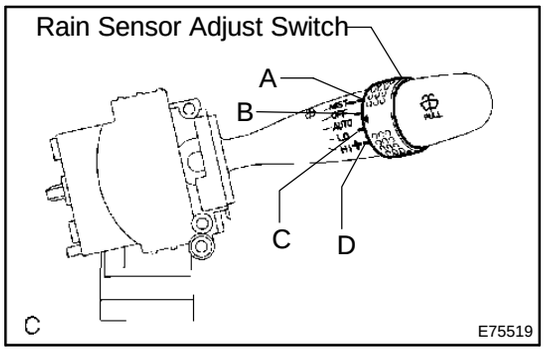
Tester connection	Condition	Specified condition
7 (+1) – 17 (+B)	MIST	Below 1 Ω
7 (+1) – 16 (+S)	OFF	Below 1 Ω
7 (+1) – 16 (+S) 13 (AUTO) – 15 (E)	AUTO	Below 1 Ω
7 (+1) – 17 (+B)	LO	Below 1 Ω
8 (+2) – 17 (+B)	HI	Below 1 Ω

Front Washer Switch

Tester connection	Condition	Specified condition
2 (EW) – 11 (WF)	OFF	10 kΩ or higher
2 (EW) – 11 (WF)	ON	Below 1 Ω

Rear Wiper and Washer Switch

Tester connection	Condition	Specified condition
2 (EW) – 3 (WR)	WASH (Rear wiper switch OFF position)	Below 1 Ω
2 (EW) – 3 (WR) 2 (EW) – 4 (C1R) 2 (EW) – 10 (+1R)	OFF	10 kΩ or higher
2 (EW) – 4 (C1R)	INT	Below 1 Ω
2 (EW) – 10 (+1R)	ON	Below 1 Ω
2 (EW) – 3 (WR) 2 (EW) – 10 (+1R)	WASH (Rear wiper switch ON position)	Below 1 Ω



(b) Rain Sensor Adjust Switch Operation Check

(1) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
12 (VR1) – 14 (VR2)	A position	10 kΩ or higher
12 (VR1) – 14 (VR2)	B position	432 to 528 Ω
12 (VR1) – 14 (VR2)	C position	216 to 264 Ω
12 (VR1) – 14 (VR2)	D position	Below 1 Ω

WINDSHIELD WIPER RELAY ASSY

REPLACEMENT

660KN-01

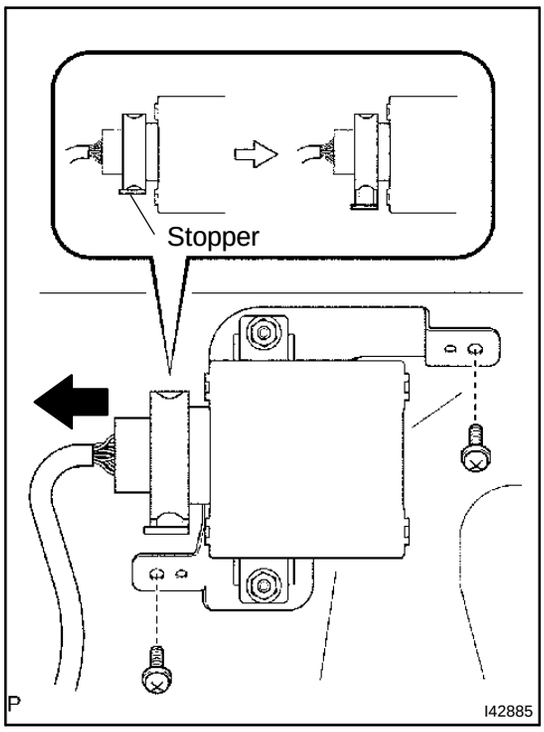
HINT:

Installation is in the reverse order of removal.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL** **(SEE PAGE 60-1)**
2. **REMOVE INSTRUMENT PANEL SUB-ASSY UPPER** **(SEE PAGE 71-6)**

HINT:

Refer to the procedures up to the removal of the instrument panel sub-assy UPPER .



3. **REMOVE WINDSHIELD WIPER RELAY ASSY**

(a) Release the stopper as shown in the illustration and disconnect the connector.

(b) Remove the 2 screws and the windshield wiper relay assy.

4. **INSTALL INSTRUMENT PANEL SUB-ASSY UPPER** **(SEE PAGE 71-6)**
5. **INSTALL HEATER CONTROL & ACCESSORY ASSY (MANUAL AIR CONDITIONING)** **(SEE PAGE 55-13)**
6. **INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER**
7. **CENTER SPIRAL CABLE** **(SEE PAGE 60-40)**
8. **INSTALL STEERING WHEEL ASSY** **(SEE PUB. NO. RM925E, PAGE 50-7)**
9. **INSTALL HORN BUTTON ASSY**
   (TMC MADE: **SEE PAGE 60-21****)**
   (TMMT/TMUK: **SEE PAGE 60-31****)**
10. **CONNECT BATTERY NEGATIVE TERMINAL**
11. **INSPECT HORN BUTTON ASSY** **(SEE PAGE 60-14)**
12. **INSPECT SRS WARNING LIGHT** **(SEE PAGE 05-719)**

RAIN SENSOR

REPLACEMENT

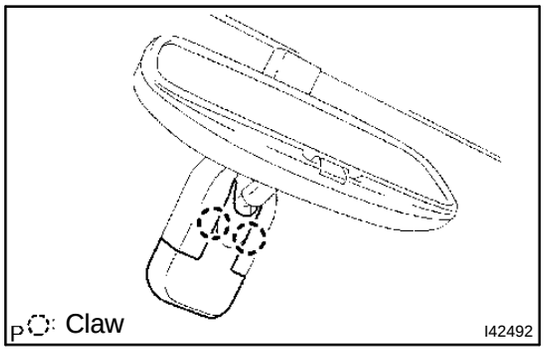
660KM-01

HINT:

Installation is in the reverse order of removal.

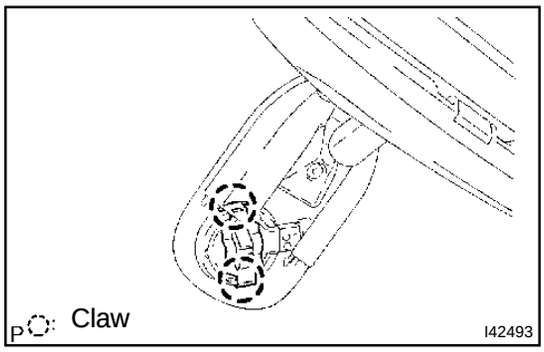
1. REMOVE INNER REAR VIEW MIRROR STAY HOLDER COVER (TMC MADE)

(a) Remove the inner rear view mirror stay holder cover.

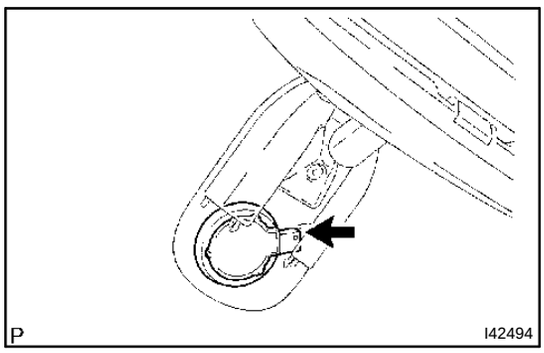


2. REMOVE RAIN SENSOR COVER

(a) TMUK, TMMT made:
Disengage the 2 claws, and remove the rain sensor cover.



(b) Disengage the 2 claws, and remove the brackets of the rain sensor cover.

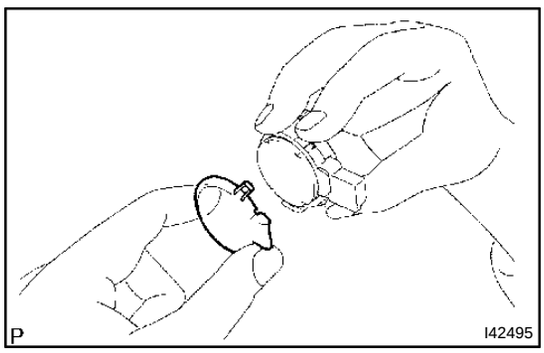


3. REMOVE RAIN SENSOR

(a) Disconnect the connector, and remove the rain sensor.

NOTICE:

Check that the adhesive of the rain sensor does not remain on the windshield glass. If it remains, remove it.



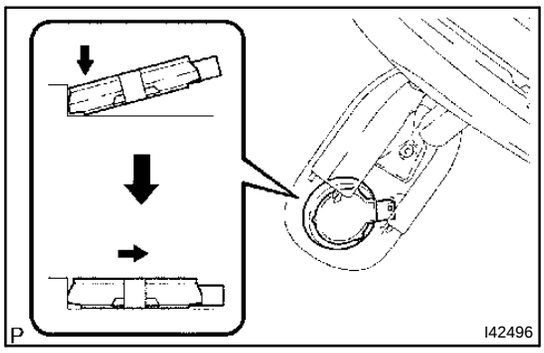
4. INSTALL RAIN SENSOR

(a) Clean the installation surface of the rain sensor on the windshield glass.

(b) Remove the protective cover on the rain sensor.

NOTICE:

Do not touch the adhesive surface directly with a finger.



(c) Install the rain sensor in the direction shown by the arrows in the illustration.

NOTICE:

Be careful that air bubbles do not enter between the adhesive surface and windshield glass.

(d) Connect the connector.

AUDIO & VISUAL SYSTEM

AUDIO & VISUAL SYSTEM 67-1
COMPONENTS 67-1
STEERING PAD SWITCH LH 67-2
REPLACEMENT 67-2

REFER TO FLLOWING REPAIR MANUALS

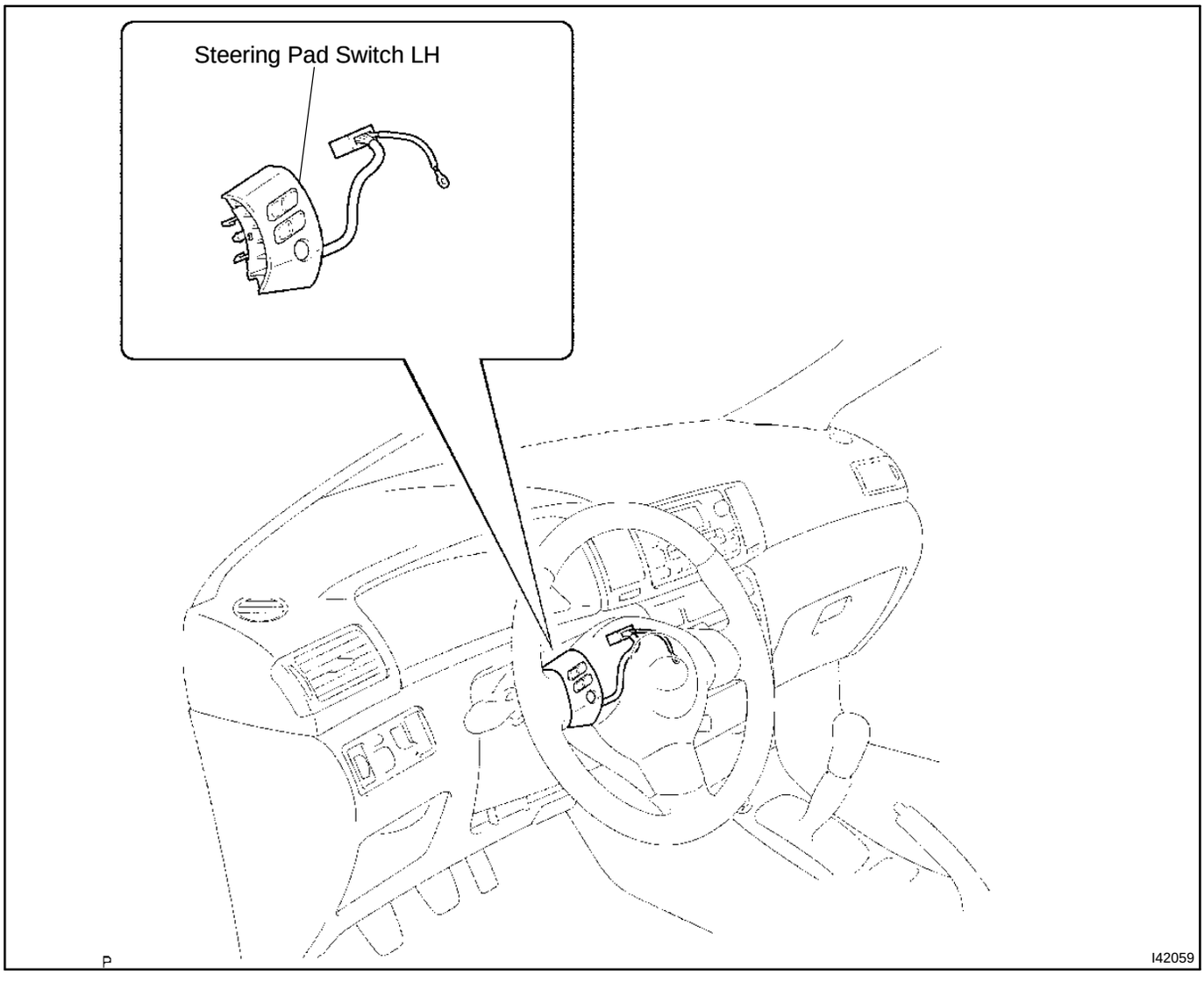
Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement (Jan., 2002)	RM939E

NOTE: The above pages contain only the points which differ from the above listed manual.

AUDIO & VISUAL SYSTEM

COMPONENTS

671CK-01



STEERING PAD SWITCH LH

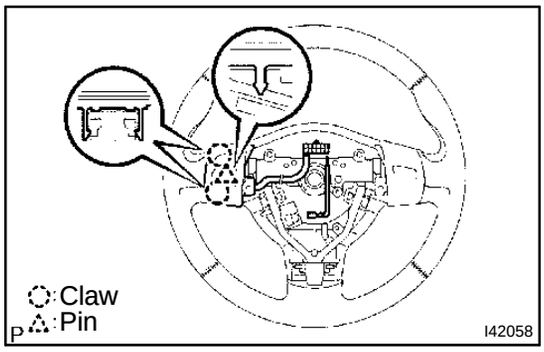
671CL-01

REPLACEMENT

HINT:

- COMPONENTS: SEE PAGE 67-1.
- Installation is in the reverse order of removal.

1. **PRECAUTION (SEE PAGE 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)**
3. **REMOVE HORN BUTTON ASSY**
   TMC MADE (SEE PAGE 60-21)
   TMMT/TMUK MADE (SEE PAGE 60-31)



4. **REMOVE STEERING PAD SWITCH LH**
   (a) Disconnect all connectors.
   (b) Disengage the 2 claws and pin and remove the steering pad switch LH.

5. **INSTALL HORN BUTTON ASSY**
   TMC MADE (SEE PAGE 60-21)
   TMMT/TMUK MADE (SEE PAGE 60-31)
6. **CONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)**
7. **INSPECT HORN BUTTON ASSY (SEE PAGE 60-14)**
8. **INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)**

WINDSHIELD/WINDOWGLASS/MIRROR

WINDSHIELD GLASS (From May, 2004) 70–1
COMPONENTS 70–1
REPLACEMENT 70–2/7
INNER REAR VIEW MIRROR ASSY
(From May, 2004) 70–8
REPLACEMENT 70–8/9
INSPECTION 70–10

REFER TO COROLLA REPAIR MANUAL:

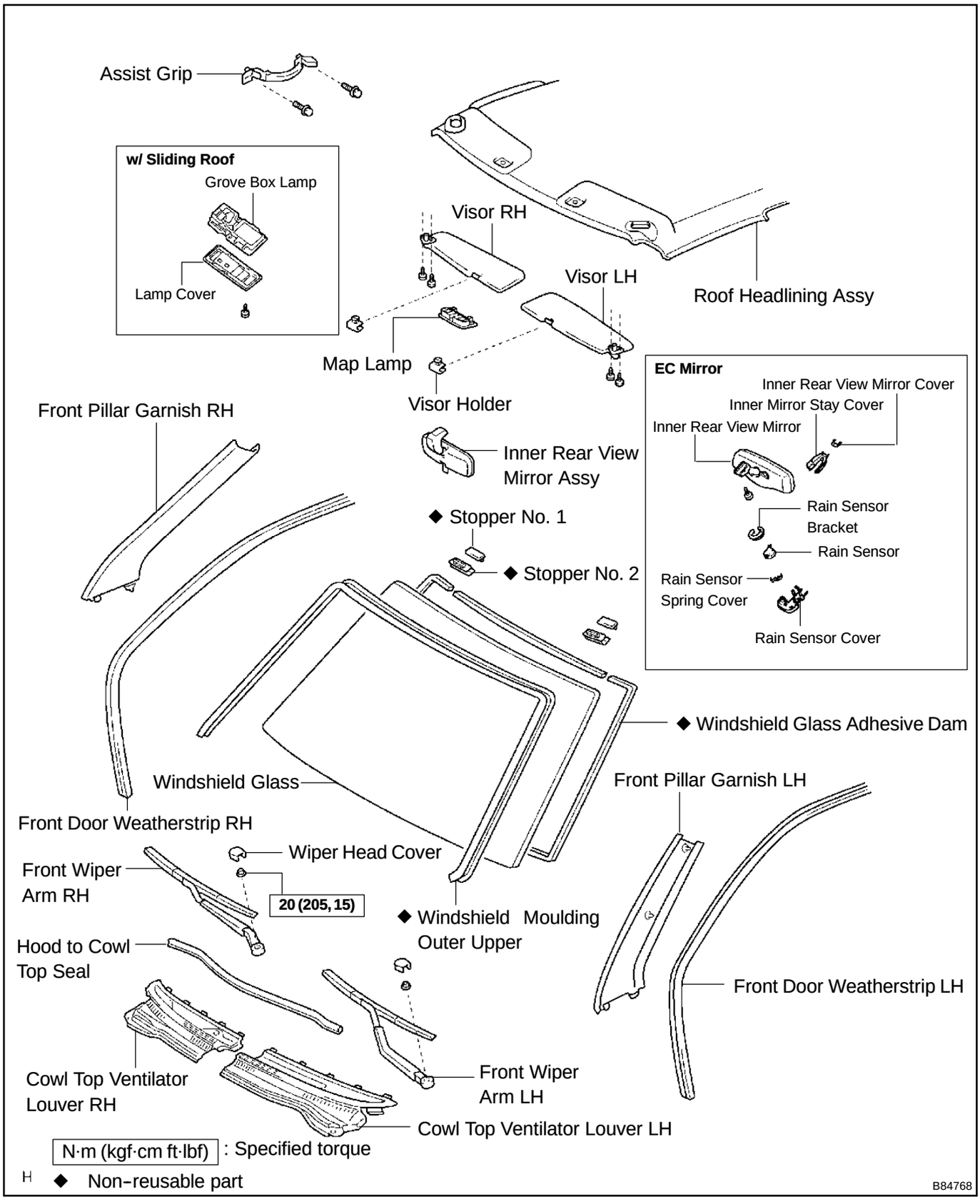
Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM1028E

NOTE: The above pages contain only the points which differ from the above listed manual.

WINDSHIELD GLASS (From May, 2004)

COMPONENTS

70172-01



70173-01

REPLACEMENT

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- A bolt without a torque specification is shown in the standard bolt chart (see page 03-2).

1. w/ Rain sensor:
REMOVE RAIN SENSOR (See page 66-7)

2. REMOVE INNER REAR VIEW MIRROR ASSY (See page 70-8)

3. REMOVE ROOF HEADLINING ASSY (See Pub. No. RM925E, page 76-33)

(a) Remove the front door weatherstrip LH and RH.
(b) Remove the front pillar garnish LH and RH.
(c) Remove the assist grip.
(d) Remove the visor LH and RH.
(e) Remove the 2 visor holders.
(f) w/ Sliding roof:
Remove the glove box lamp.
(g) w/o Sliding roof:
Remove the map lamp.
(h) Partially remove the roof headlining.

HINT:

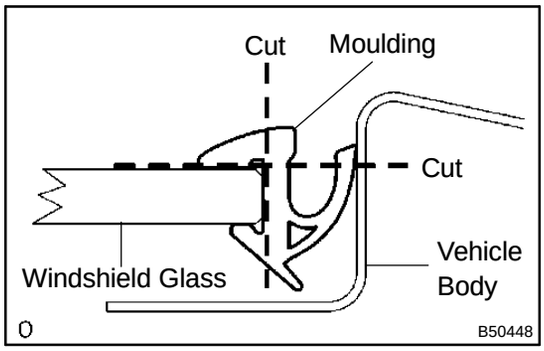
It is not necessary to completely remove the roof headlining. Slightly lower the front section of the roof headlining so that the windshield glass can be removed later in step 8.

4. REMOVE COWL TOP VENTILATOR LOUVER (See Pub. No. RM925E, page 66-10)

(a) Remove the front wiper arm LH and RH.
(b) Remove the hood to cowl top seal.
(c) Remove the cowl top ventilator louvers LH and RH.

5. REMOVE ROOF DRIP SIDE FINISH MOULDING CENTER LH
(See Pub. No. RM925E, page 76-28)

6. REMOVE ROOF DRIP SIDE FINISH MOULDING CENTER RH
(See Pub. No. RM925E, page 76-28)



7. REMOVE WINDSHIELD MOULDING OUTER UPPER

(a) Using a knife, cut off the moulding as shown in the illustration.

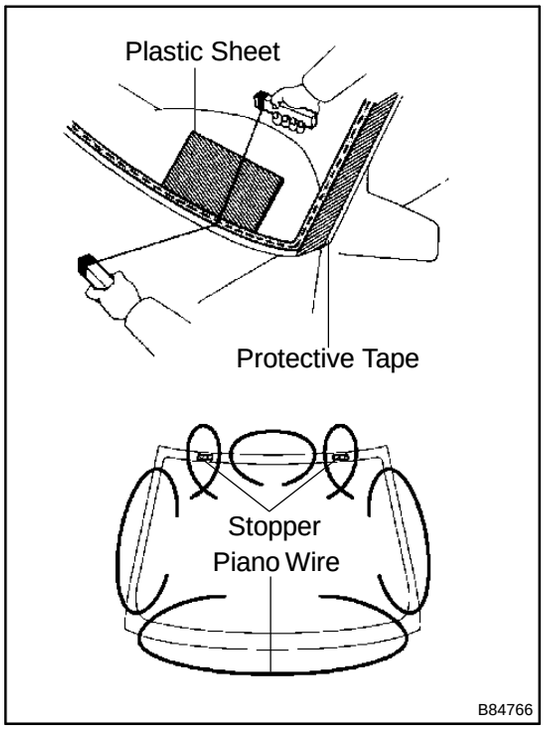
NOTICE:

Be careful not to damage the vehicle body with the knife.

(b) Remove the remaining moulding.

HINT:

Make a partial cut in the moulding. Then pull and remove it by hand.



8. REMOVE WINDSHIELD GLASS

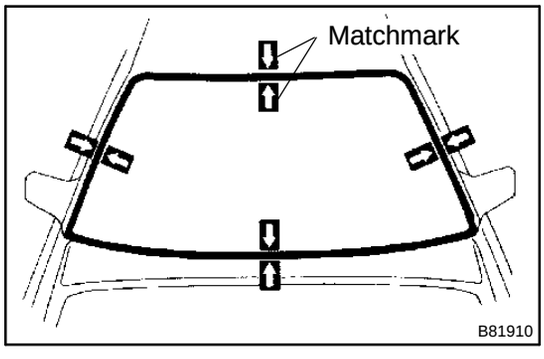
(a) To prevent scratches, apply protective tape to the outer surface of the vehicle body and place a plastic sheet between the piano wire and instrument panel.

(b) From the interior, insert piano wires between the vehicle body and windshield glass as shown in the illustration.

(c) Tie objects that can serve as handles (for example, wooden blocks) to all wire ends.

NOTICE:

When separating the windshield glass from the vehicle, be careful not to damage the vehicle's paint or interior/exterior ornaments.



(d) Place matchmarks over the windshield glass and vehicle body on the locations indicated in the illustration.

HINT:

Matchmarks do not need to be placed if the windshield glass is not going to be reused.

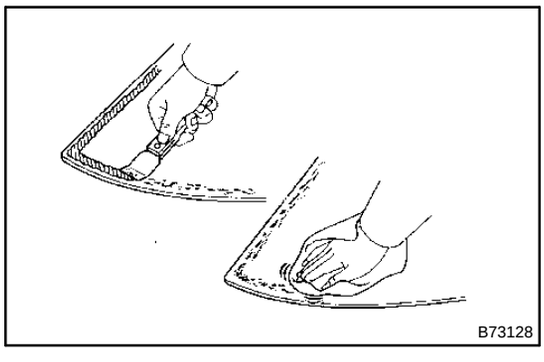
(e) Cut through the adhesive by pulling the piano wire around the windshield glass.

(f) Disengage the stoppers.

(g) Using a suction cup, remove the windshield glass.

NOTICE:

Leave as much adhesive on the vehicle body as possible when removing the windshield glass.



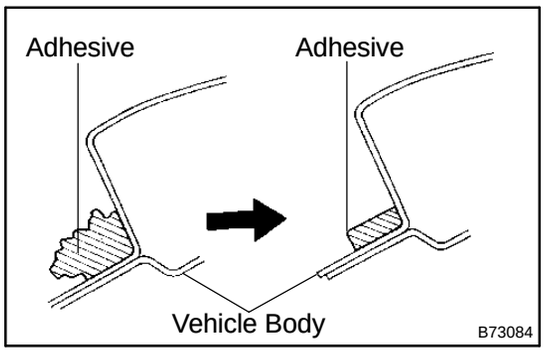
9. CLEAN WINDSHIELD GLASS

(a) Using a scraper, remove the damaged stoppers, dams and adhesive sticking to the windshield glass.

(b) Clean the outer edges of the windshield glass with white gasoline.

NOTICE:

- **Do not touch the windshield glass surface after cleaning it.**
- **Even if using new windshield glass, clean the windshield glass with white gasoline.**



10. CLEAN VEHICLE BODY

(a) Clean and shape the contact surface of the vehicle body.

(1) On the contact surface of the vehicle body, use a knife to cut away excess adhesive as shown in the illustration.

HINT:

Leave as much adhesive on the vehicle body as possible.

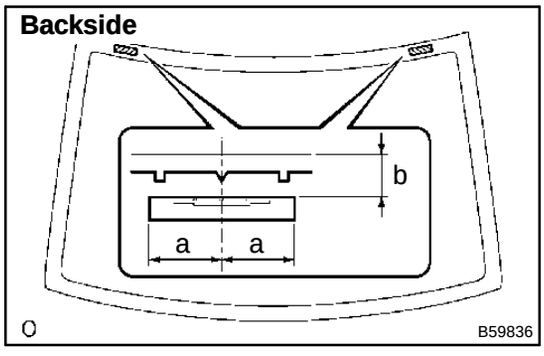
NOTICE:

Be careful not to damage the vehicle body.

(2) Clean the contact surface of the vehicle body with cleaner.

HINT:

Even if all the adhesive has been removed, clean the vehicle body.



11. INSTALL WINDSHIELD GLASS STOPPER NO.2

(a) Apply Primer G to the installation part of the stoppers.

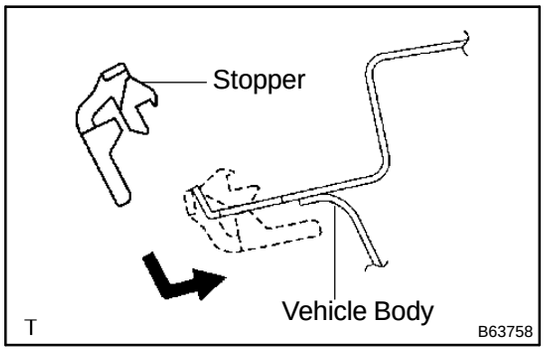
NOTICE:

- **Allow the Primer G to dry for 3 minutes or more.**
- **Throw away any leftover Primer G.**
- **Do not apply too much Primer G.**

(b) Install 2 new stoppers onto the windshield glass as shown in the illustration.

Standard:

Area	Measurement
a	40.0 mm (1.575 in.)
b	7.7 mm (0.303 in.)



12. INSTALL WINDSHIELD GLASS STOPPER NO.1

(a) Install 2 new stoppers to the vehicle body as shown in the illustration.

13. INSTALL WINDSHIELD ADHESIVE DAM

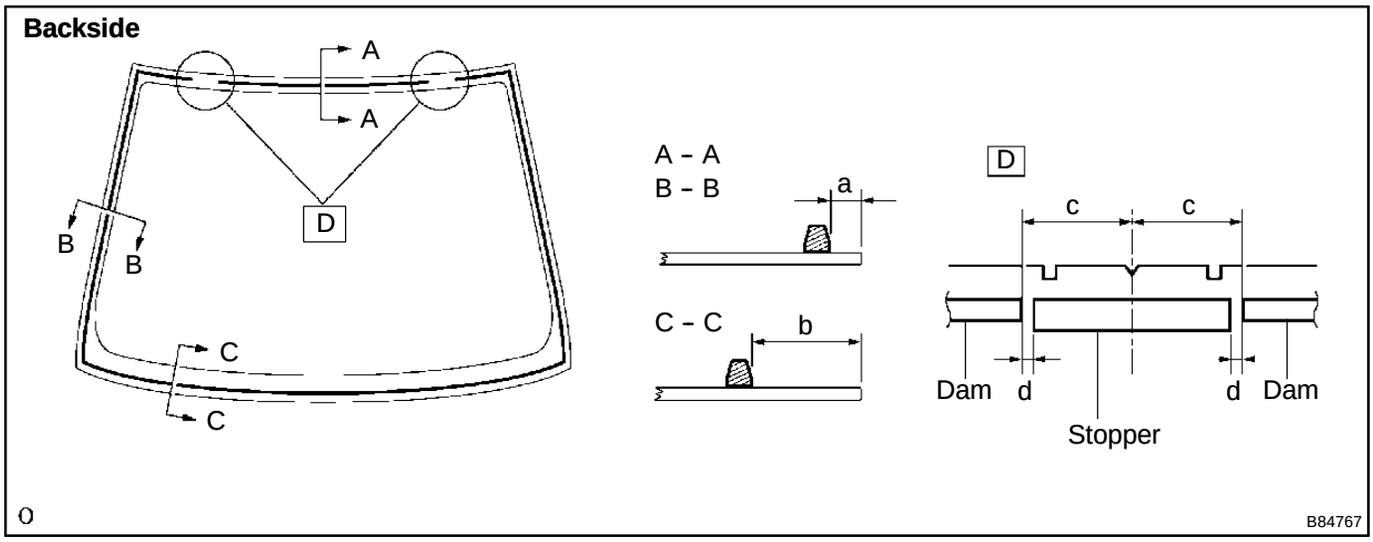
(a) Apply Primer G to the installation part of the windshield adhesive dams.

NOTICE:

- **Allow the Primer G to dry for 3 minutes or more.**
- **Throw away any leftover Primer G.**
- **Do not apply too much Primer G.**

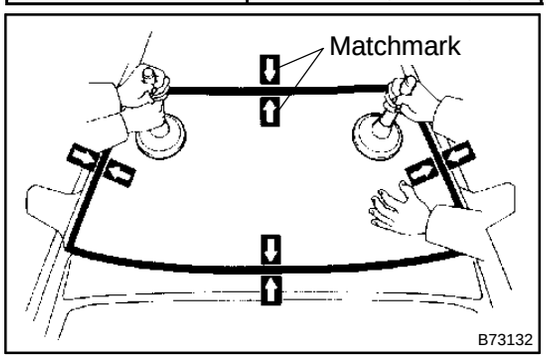
(b) Apply double–sided tape along the outer edge of the entire windshield glass except for the area marked D in the illustration.

(c) Install the windshield adhesive dams to the windshield glass as shown in the illustration.



Standard:

Area	Measurement
a	7.0 mm (0.276 in.)
b	22.5 mm (0.886 in.)
c	45.0 mm (1.771 in.)
d	5.0 mm (0.197 in.)



14. INSTALL WINDSHIELD GLASS

(a) Position the windshield glass.

(1) Using a suction cup, place the windshield glass in the correct position.

(2) Check that the entire contact surface of the windshield glass rim is perfectly even.

(3) Place matchmarks over the windshield glass and vehicle body on the locations indicated in the illustration.

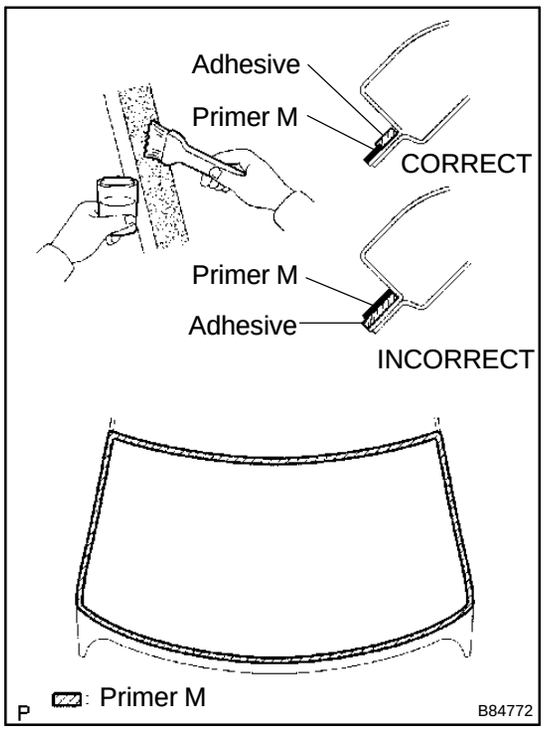
HINT:

- Placing matchmarks is only necessary if the windshield glass being installed is new. If it is reused windshield glass, matchmarks should already be present.
- When reusing the windshield glass, check and correct the matchmarks position.

NOTICE:

Check that the stoppers are attached to the vehicle body correctly.

(4) Using a suction cup, remove the windshield glass.



(b) Using a brush, apply Primer M to the exposed part of the vehicle body.

NOTICE:

- **Allow the Primer M to dry for 3 minutes or more.**
- **Do not apply Primer M to the adhesive.**
- **Throw away any leftover Primer M.**
- **Do not apply too much Primer M.**

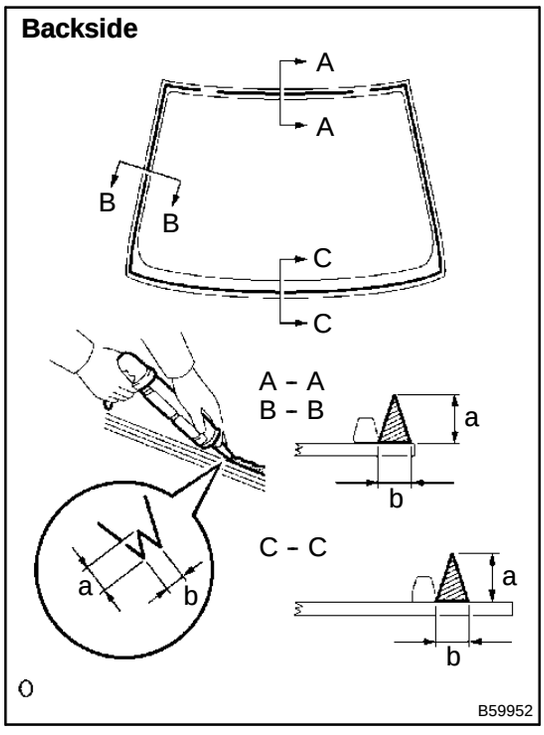
(c) Using a brush or sponge, apply Primer G to the contact surface of the windshield glass.

HINT:

If Primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

NOTICE:

- **Allow the Primer G to dry for 3 minutes or more.**
- **Throw away any leftover Primer G.**
- **Do not apply too much Primer G.**



(d) Apply adhesive to the windshield glass.

Adhesive: Part No. 08850-00801 or equivalent

(1) Cut off the tip of the cartridge nozzle as shown in the illustration.

HINT:

After cutting off the tip, use all adhesive within the time written in the table below.

Standard:

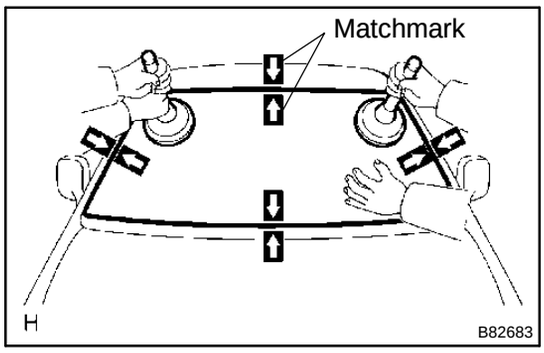
Temperature	Usage Timeframe
35°C (95°F)	15 minutes
20°C (68°F)	1 hour 40 minutes
5°C (41°F)	8 hours

(2) Load the sealer gun with the cartridge.

(3) Apply adhesive to the windshield glass as shown in the illustration.

Standard:

Area	Measurement
a	12.0 mm (0.472 in.)
b	8.0 mm (0.315 in.)



(e) Install the windshield glass to the vehicle body.
(1) Using a suction cup, position the windshield glass so that the matchmarks are aligned. Press it in gently along the rim.
(2) Lightly press the front surface of the windshield glass to ensure that the windshield glass is securely fit to the vehicle body.

NOTICE:
- **Check that the stoppers are attached to the vehicle body correctly.**
- **Check that the vehicle body and windshield glass have a small gap between them.**

(3) Hold the windshield glass in place securely with protective tape or equivalent until the adhesive hardens.

15. INSTALL WINDSHIELD MOULDING OUTER UPPER

(a) Using a brush or sponge, apply Primer G to the contact surface of the windshield glass.

NOTICE:
- **Allow the Primer G to dry for 3 minutes or more.**
- **Throw away any leftover Primer G.**
- **Do not apply too much Primer G.**

(b) Install new moulding before the adhesive dries.

NOTICE:
Do not drive the vehicle for the amount of time written in the table below.

Standard:

Temperature	Minimum time prior to driving vehicle
35˚C (95˚F)	1 hour 30 minutes
20˚C (68˚F)	5 hours
5˚C (41˚F)	24 hours

16. CHECK FOR LEAKS AND REPAIR

(a) Conduct a leak test after the adhesive has completely hardened.
(b) Seal any leaks with auto glass sealer.

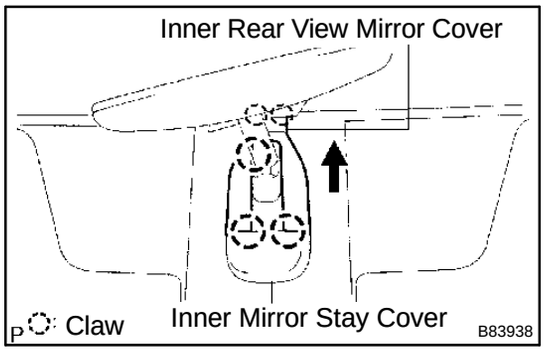
INNER REAR VIEW MIRROR ASSY (From May, 2004)

70174-01

REPLACEMENT

HINT:

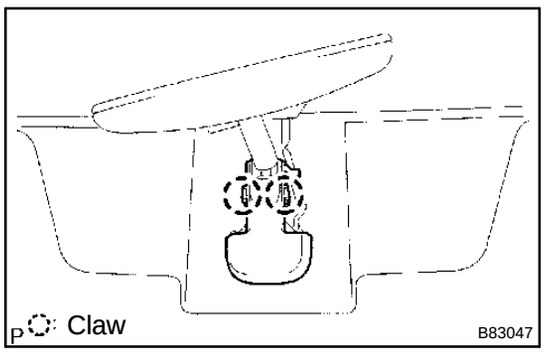
- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- EC mirror stands for electrochromic mirror.



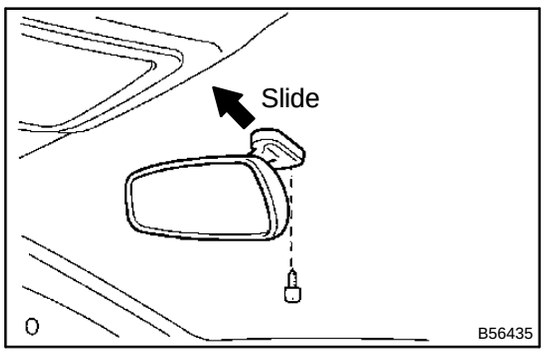
1. REMOVE INNER REAR VIEW MIRROR ASSY (EC MIRROR)

(a) Disengage the 2 claws and remove the inner rear view mirror cover.

(b) Disengage the 3 claws and remove the inner mirror stay cover.

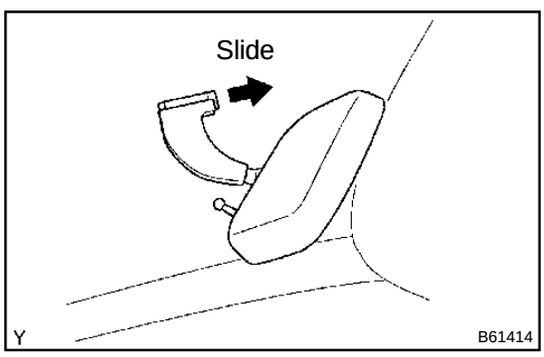


(c) Disengage the 2 claws and remove the rain sensor cover.



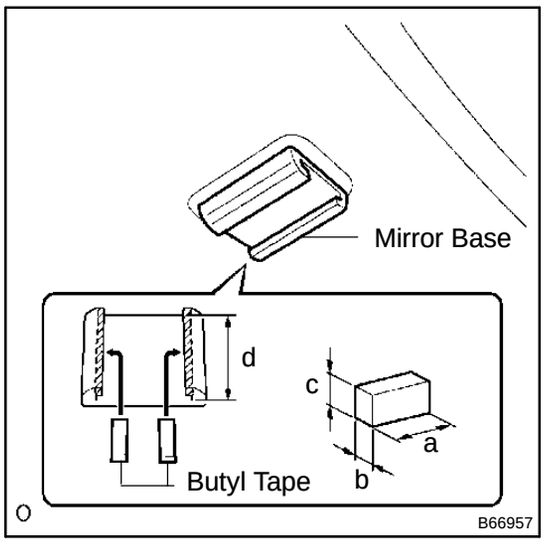
(d) Disconnect the mirror connector.

(e) Remove the screw and slide off the mirror.



2. REMOVE INNER REAR VIEW MIRROR ASSY (NORMAL MIRROR)

(a) Slide off the mirror as shown in the illustration.



3. INSTALL INNER REAR VIEW MIRROR ASSY (NORMAL MIRROR)

(a) Prepare 2 pieces of butyl tape having the dimensions, as shown in the illustration.

Standard:

Area	Measurement
a	10.0 mm (0.394 in.)
b	4.0 mm (0.157 in.)
c	6.0 mm (0.236 in.)
d	24.0 mm (0.945 in.)

(b) While extending them until they fit the length of the mirror base (24.0 mm (0.944 in.)), apply them to both side of the mirror base respectively.

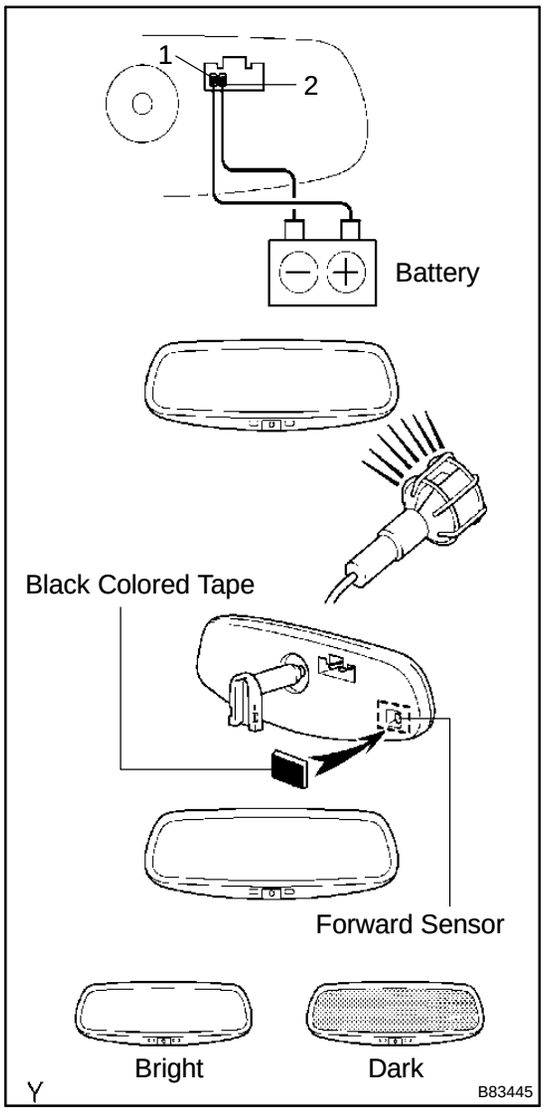
(c) Install the inner rear view mirror.

NOTICE:

If butyl tape spreads out of the inside groove when applied, remove the excessive amount of tape so that it will not stick to the glass.

70175-01

INSPECTION



1. INSPECT INNER REAR VIEW MIRROR ASSY (EC MIRROR)

(a) Check operation of the mirror.

(1) Connect the battery's positive (+) lead to terminal 1 and the battery's negative (–) lead to terminal 2.

(2) Attach black colored tape to the forward sensor to prevent it from sensing.

(3) Light up the mirror with an electric light, and check that the mirror surface changes from bright to dark.

If the result is not as specified, replace the mirror assy.

INSTRUMENT PANEL/METER

INSTRUMENT PANEL/METER 71–1
COMPONENTS 71–1/4
INSTRUMENT PANEL
SUB–ASSY LOWER 71–5
PRECAUTION 71–5
REPLACEMENT 71–6/14

REFER TO FOLLOWING REPAIR MANUALS:

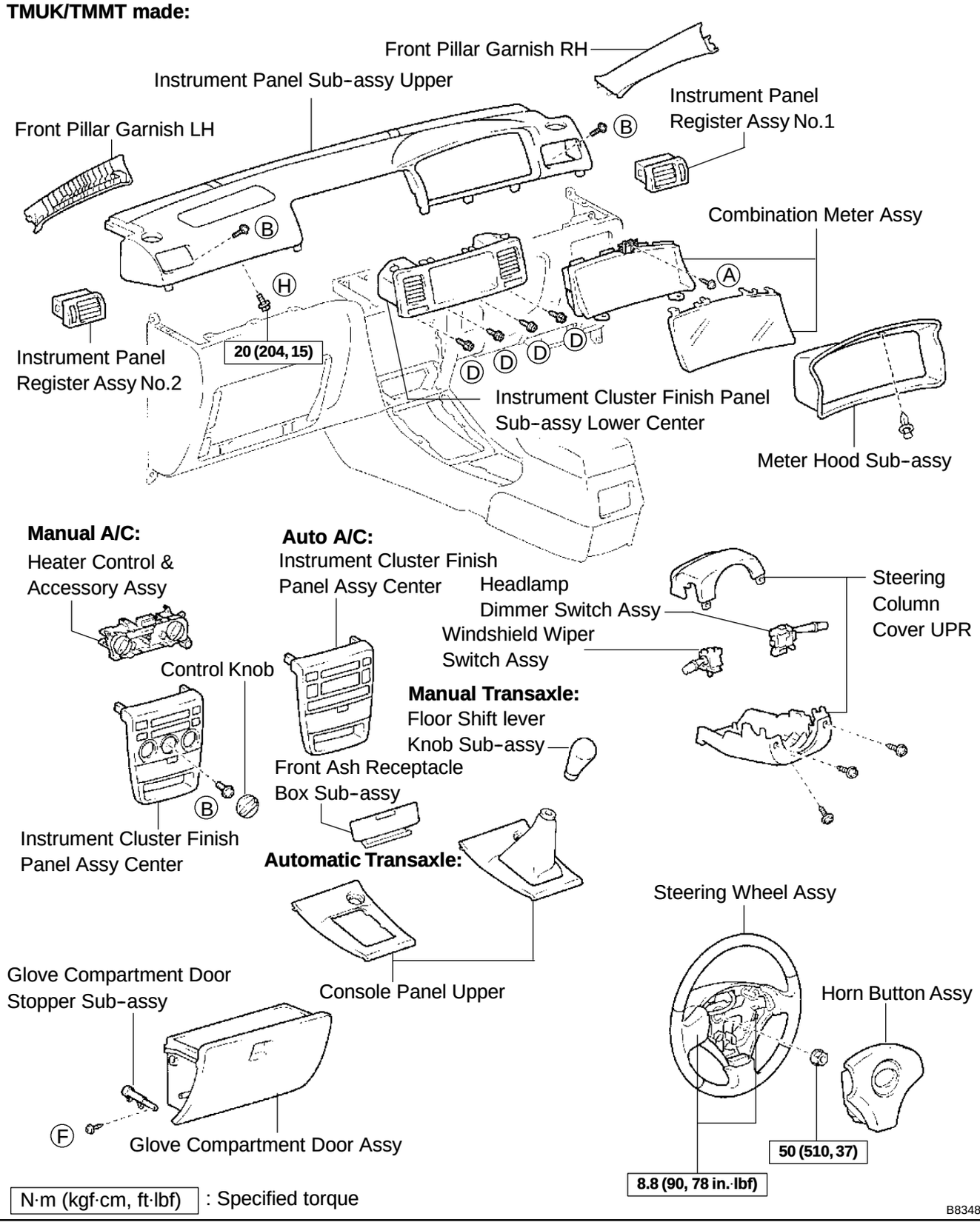
Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement (January, 2002)	RM939E

NOTE: The above pages contain only the points which differ from the above listed manuals.

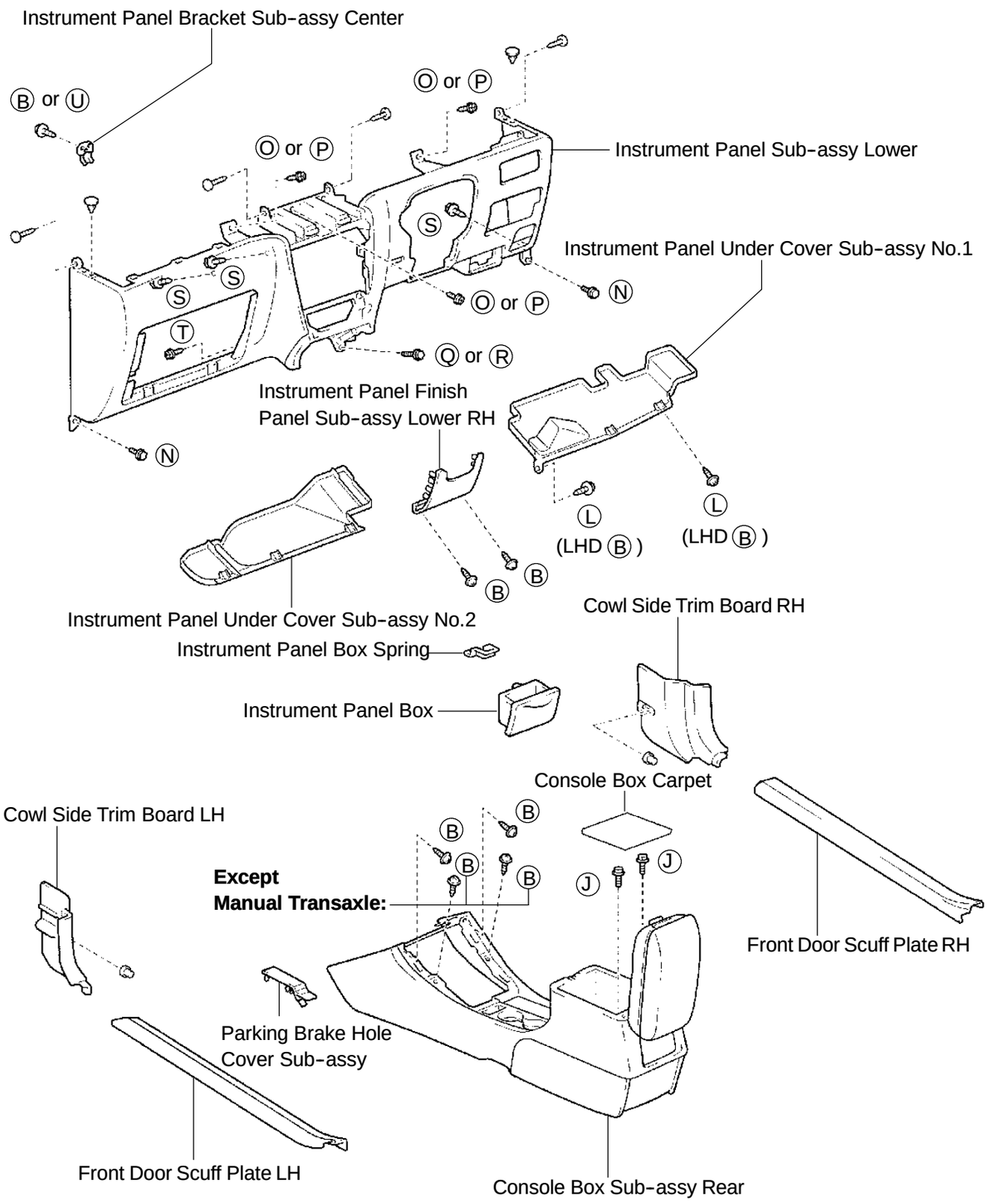
INSTRUMENT PANEL/METER

COMPONENTS

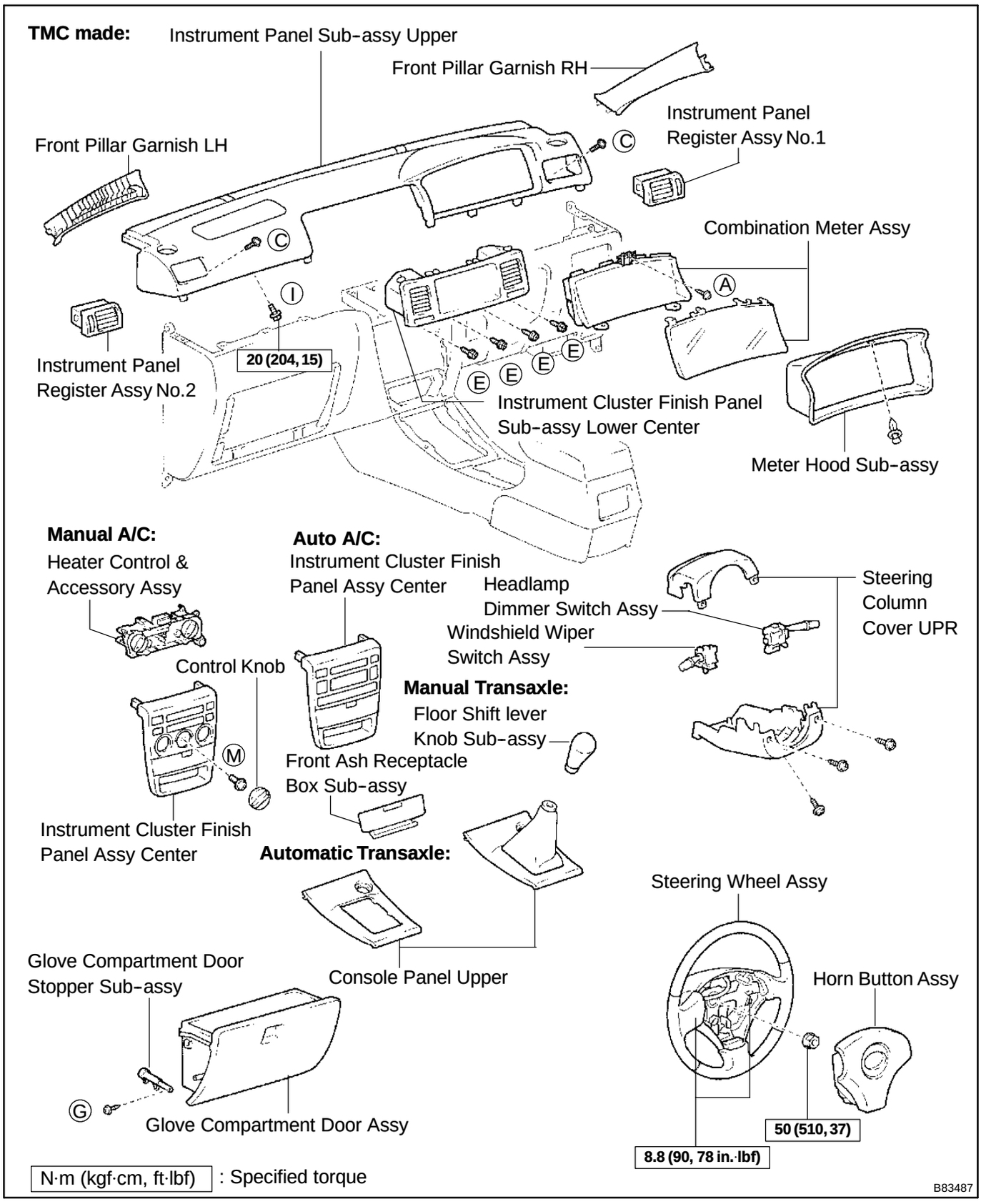
710O4-01



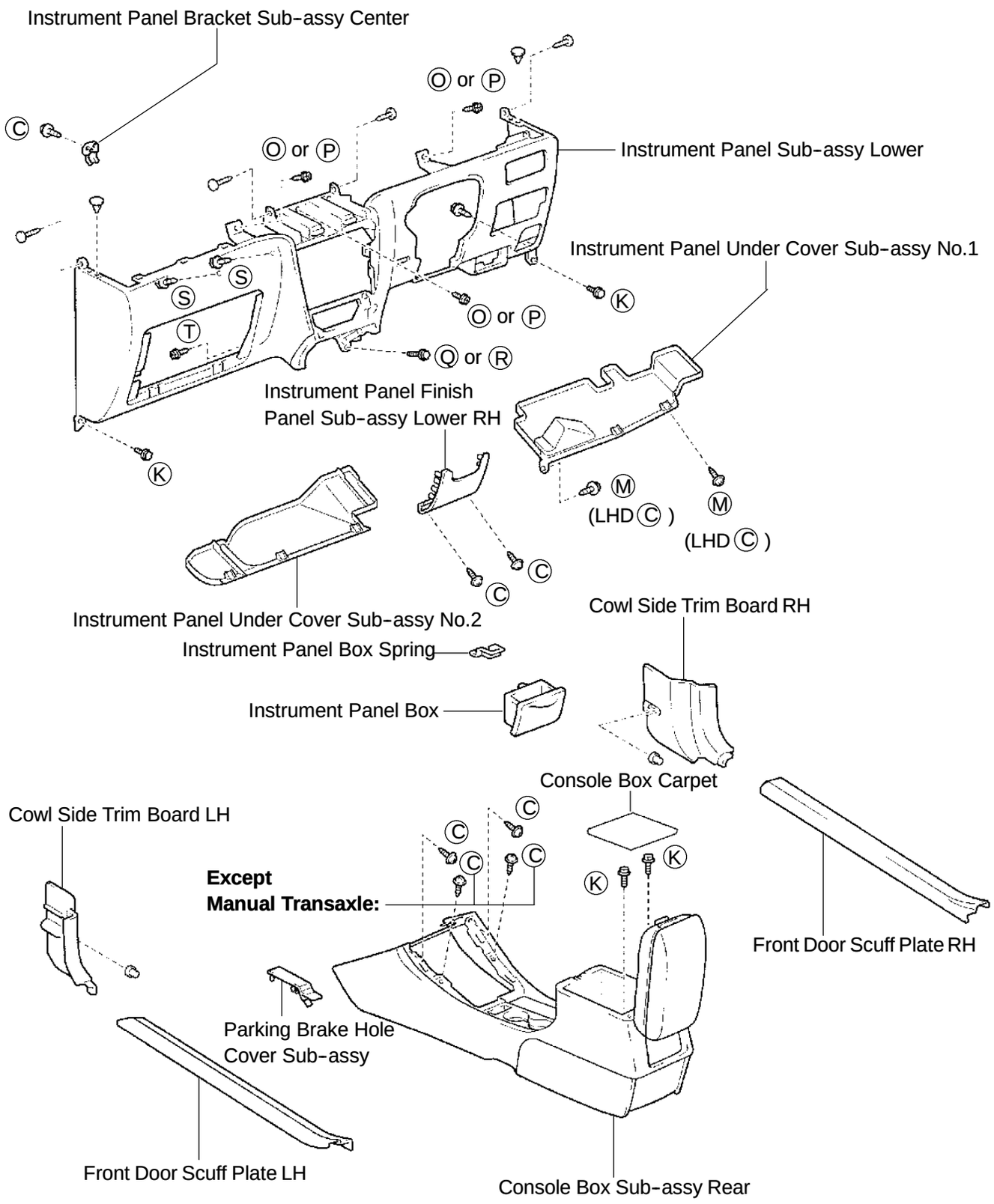
TMUK/TMMT made:



P B83488


TMC made:
Instrument Panel Sub-assy Upper
Front Pillar Garnish RH
Instrument Panel Register Assy No.1
Front Pillar Garnish LH
Combination Meter Assy
Instrument Panel Register Assy No.2
20 (204, 15)
Instrument Cluster Finish Panel Sub-assy Lower Center
Meter Hood Sub-assy
Manual A/C:
Heater Control & Accessory Assy
Auto A/C:
Instrument Cluster Finish Panel Assy Center
Headlamp Dimmer Switch Assy
Windshield Wiper Switch Assy
Steering Column Cover UPR
Control Knob
Manual Transaxle:
Floor Shift lever Knob Sub-assy
Front Ash Receptacle Box Sub-assy
Instrument Cluster Finish Panel Assy Center
Automatic Transaxle:
Steering Wheel Assy
Glove Compartment Door Stopper Sub-assy
Console Panel Upper
Horn Button Assy
Glove Compartment Door Assy
50 (510, 37)
8.8 (90, 78 in.·lbf)
N·m (kgf·cm, ft·lbf) : Specified torque
B83487

TMC made:



P B83488

INSTRUMENT PANEL SUB–ASSY LOWER

7100O–02

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

(a) Some operations in this section may affect the SRS airbags. Prior to performing the corresponding operations, read the SRS airbag NOTICE (see page 60–1).

7100P-02

REPLACEMENT

HINT:

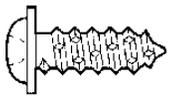
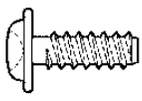
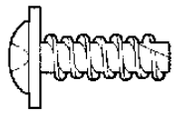
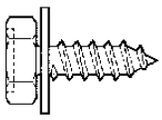
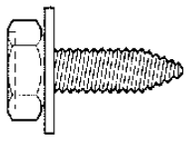
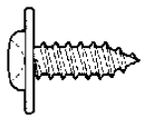
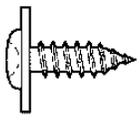
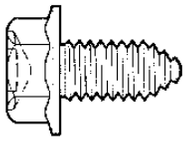
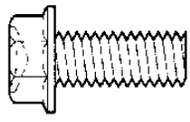
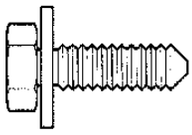
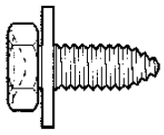
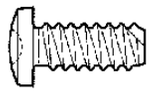
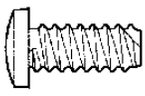
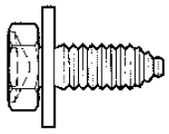
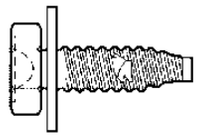
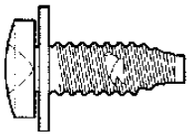
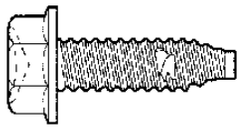
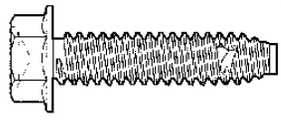
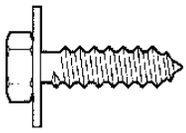
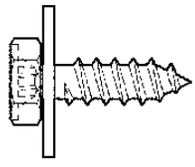
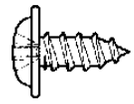
- Installation is in the reverse order of removal.
- COMPONENTS: SEE PAGE 71-1.

1. TABLE OF BOLT, SCREW AND NUT

HINT:

The bolts, screws and nuts necessary for installation and removal of the instrument panel are illustrated below and alphabetically coded.

mm (in.) (L = Length)

Code	Shape	Code	Shape	Code	Shape
<A>	 ϕ = 5 (0.20) L = 18 (0.71) 93567-55018	<B>	 ϕ = 5 (0.20) L = 14 (0.55) 90167-W0007	<C>	 ϕ = 5 (0.20) L = 14 (0.55) 93568-55014
<D>	 ϕ = 5 (0.20) L = 16 (0.63) 90159-W0004	<E>	 ϕ = 5 (0.20) L = 16 (0.63) 90159-50322	<F>	 ϕ = 5 (0.20) L = 14 (0.55) 90167-W0001
<G>	 ϕ = 5 (0.20) L = 14 (0.55) 90167-50022	<H>	 ϕ = 8 (0.31) L = 16 (0.63) 90105-W0029	<I>	 ϕ = 8 (0.31) L = 16 (0.63) 91535-60816
<J>	 ϕ = 6 (0.24) L = 20 (0.79) 90080-11522	<K>	 ϕ = 6 (0.24) L = 16 (0.63) 91635-60616	<L>	 ϕ = 5 (0.20) L = 15 (0.59) 90080-16074
<M>	 ϕ = 5 (0.20) L = 15 (0.59) 90164-50034	<N>	 ϕ = 6 (0.24) L = 16 (0.63) 90119-W0093	<O>	 ϕ = 6 (0.24) L = 20 (0.79) 90159-60546
<P>	 ϕ = 7 (0.28) L = 20 (0.79) 90159-70004	<Q>	 ϕ = 6 (0.24) L = 30 (1.18) 55394-12010	<R>	 ϕ = 7 (0.28) L = 30 (1.18) 55394-12020
<S>	 ϕ = 5 (0.20) L = 20 (0.79) 90159-50295	<T>	 ϕ = 6 (0.24) L = 20 (0.79) 90159-W0014 90159-60125	<U>	 ϕ = 5 (0.20) L = 12 (0.47) 90167-W0003

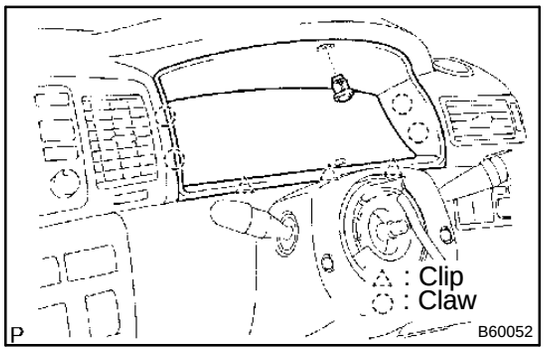
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2. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60–1)

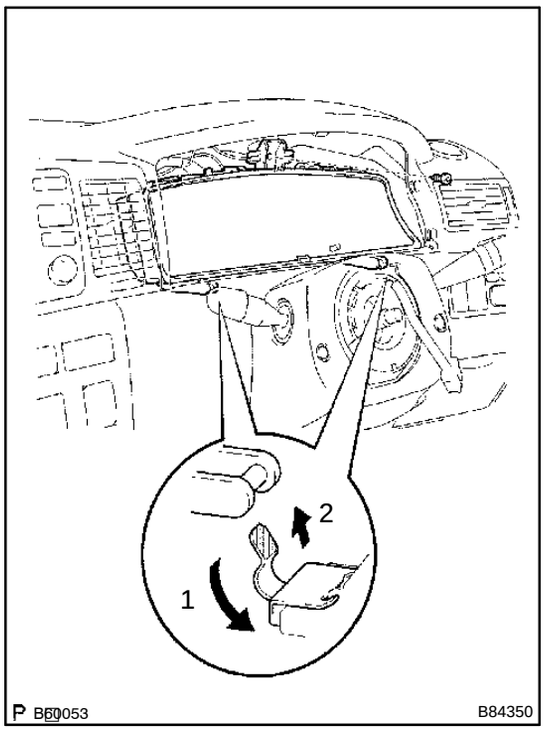
3. REMOVE HORN BUTTON ASSY
(TMC MADE: SEE PAGE 60–21)
(TMMT/TMUK: SEE PAGE 60–31)

4. REMOVE STEERING WHEEL ASSY (SEE PUB. NO. RM925E, PAGE 50–7)
SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)

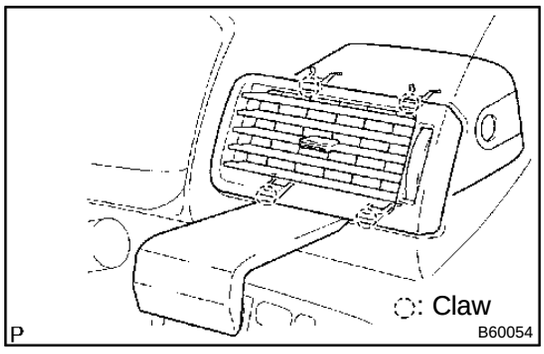


5. REMOVE METER HOOD SUB–ASSY
(a) Remove the clip from the meter hood sub–assy.
(b) Using a screwdriver, disengage the 3 clips and 4 claws, and then remove the meter hood sub–assy.

HINT:
Tape the screwdriver tip before use to avoid damage.



6. REMOVE COMBINATION METER ASSY
(a) Remove the screw<A>.
(b) Disengage the 2 claws as shown in the illustration.
(c) Disconnect the connector, and then remove the combination meter assy.



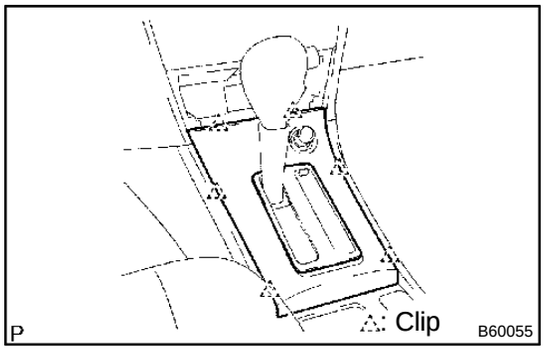
7. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2
(a) Using a moulding remover, disengage the 4 claws, and then remove the instrument panel register assy No.1.

HINT:
Tape the moulding remover tip before use to avoid damage.

8. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1

9. REMOVE FRONT ASH RECEPTACLE BOX SUB-ASSY

10. REMOVE SHIFT LEVER KNOB SUB-ASSY (MANUAL TRANSAXLE)



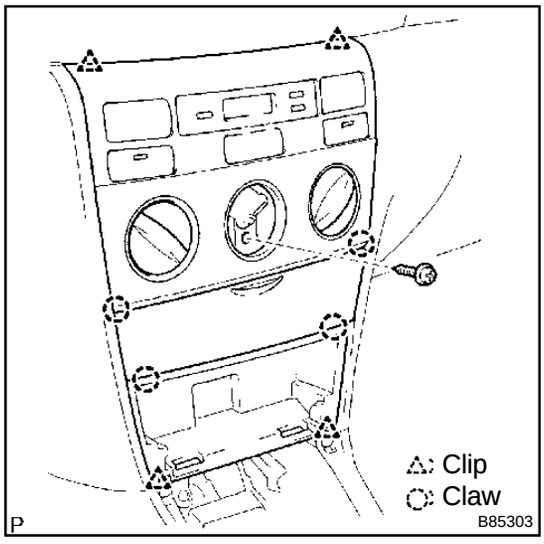
11. REMOVE CONSOLE PANEL UPPER

(a) Using a screwdriver, disengage the 6 clips.

HINT:

Tape the screwdriver tip before use to avoid damage.

(b) Disconnect the connector, and then remove the console panel upper.



12. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (MANUAL AIR CONDITIONING)

(a) Remove the control knob.

(b) TMUK/TMMT made:
Remove the screw<B>.

(c) TMC made:
Remove the screw<M>.

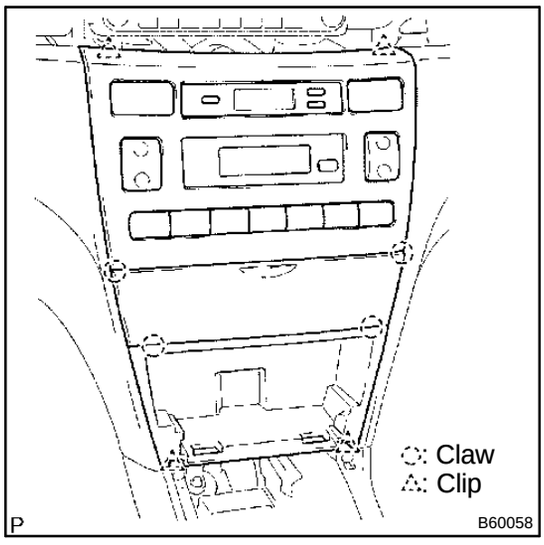
(d) Disengage the 4 clips and 4 claws with a screwdriver while pressing the control lever downward, disconnect each connector and remove the instrument cluster finish panel assy center.

HINT:

Tape the screwdriver tip before use to avoid damage.

NOTICE:

Do not pull the lid of auxiliary box.



13. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSY CENTER (AUTO AIR CONDITIONING)

(a) Using a screwdriver, disengage the 4 clips and 4 claws, then remove the instrument cluster finish panel assy center.

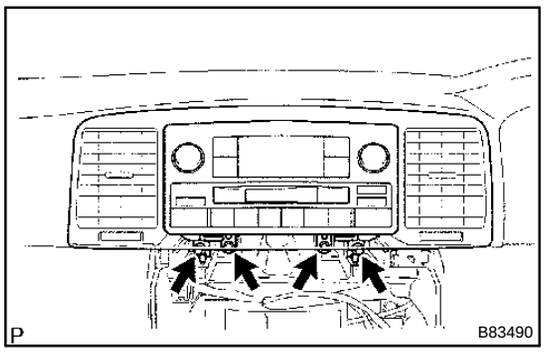
HINT:

Tape the screwdriver tip before use to avoid damage.

NOTICE:

Do not pull the lid of auxiliary box.

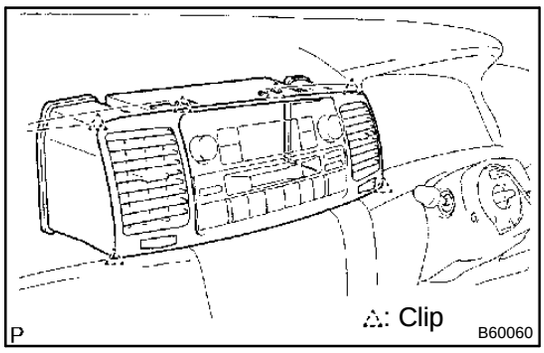
(b) Disconnect the connectors.



14. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER

(a) TMUK/TMMT made:
Remove the 4 screws<D>.

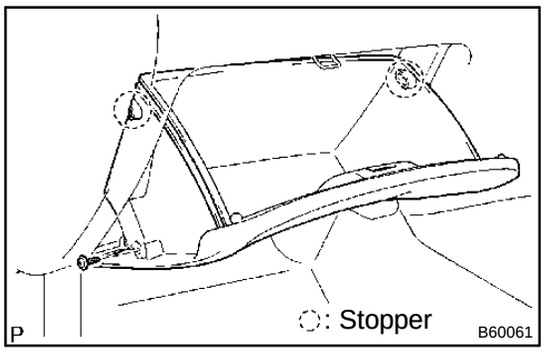
(b) TMC made:
Remove the 4 screws<E>.



(c) Using a screwdriver, disengage the 6 clips, and then remove the instrument cluster finish panel sub-assy lower center with radio receiver assy.

HINT:
Tape the screwdriver tip before use to avoid damage.

(d) Disconnect the connectors.



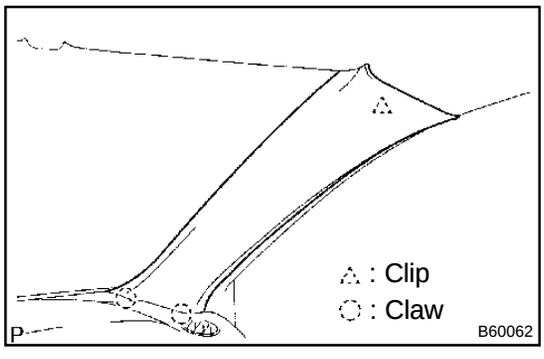
15. REMOVE GLOVE COMPARTMENT DOOR ASSY

(a) TMUK/TMMT made:
Remove the screw<F> from the glove compartment door stopper sub-assy.

(b) TMC made:
Remove the screw<G> from the glove compartment door stopper sub-assy.

(c) Alter the shape of the upper part of the glove compartment door assy to release the stoppers.

(d) Pull the glove compartment door assy upward to remove it.



16. REMOVE FRONT PILLAR GARNISH RH

(a) Disengage the clip and the 2 claws.

(b) Pull the front pillar garnish RH upward to remove it.

17. REMOVE FRONT PILLAR GARNISH LH

18. DISCONNECT FRONT PASSENGER AIRBAG ASSY CONNECTOR
(SEE PAGE 60-43)

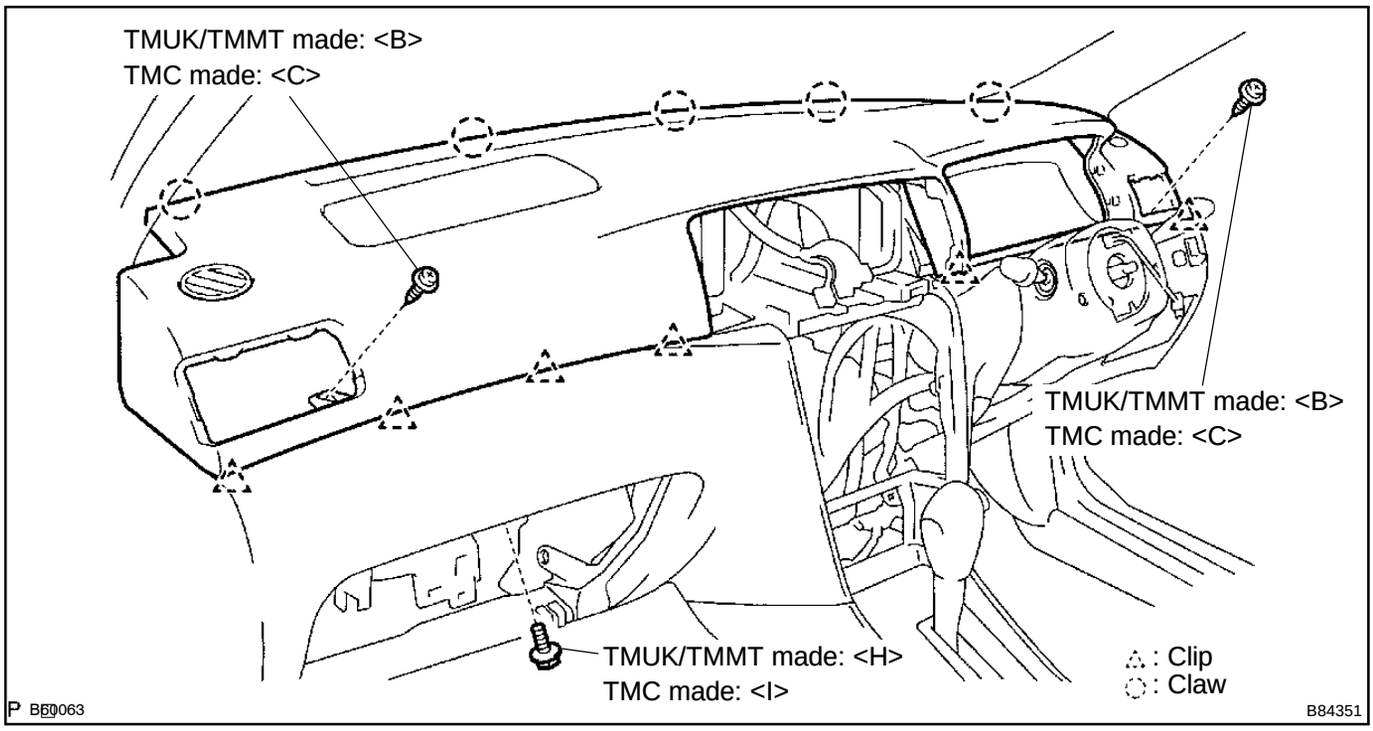
19. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER

(a) TMUK/TMMT made:
Remove the bolt<H> and 2 screws<B>.

(b) TMC made:
Remove the bolt<I> and 2 screws<C>.

(c) Using a moulding remover, disengage the 6 clips.

(d) Remove the instrument panel sub-assy upper.



20. REMOVE STEERING COLUMN COVER LWR (SEE PUB. NO. RM925E, PAGE 50-7)

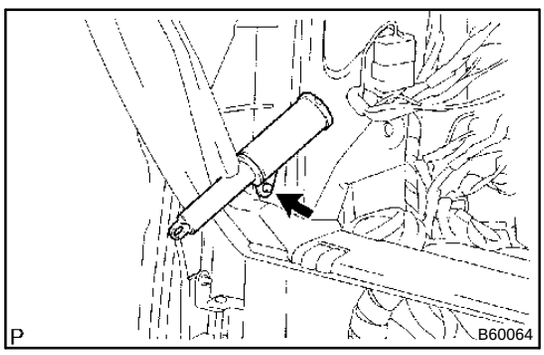
21. REMOVE STEERING COLUMN COVER UPR (SEE PUB. NO. RM925E, PAGE 50-7)

22. REMOVE HEADLAMP DIMMER SWITCH ASSY (SEE PUB. NO. RM925E, PAGE 65-36)

23. REMOVE WINDSHIELD WIPER SWITCH ASSY (SEE PUB. NO. RM925E, PAGE 66-19)

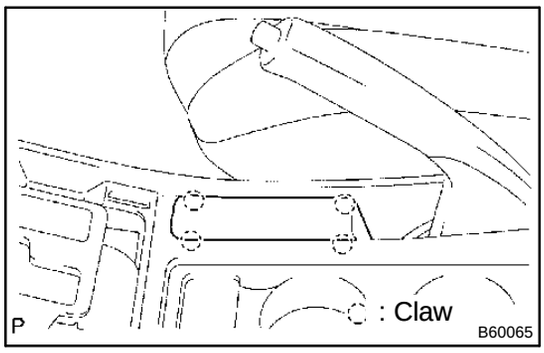
24. REMOVE HEATER TO REGISTER DUCT NO.2

25. REMOVE HEATER CONTROL & ACCESSORY ASSY (MANUAL AIR CONDITIONING) (SEE PAGE 55-13)



26. REMOVE GLOVE COMPARTMENT DOOR STOPPER SUB-ASSY

(a) Disengage the clip, and then remove the glove compartment door stopper sub-assy.



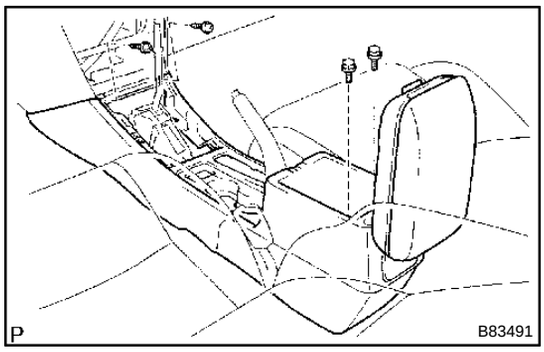
27. REMOVE PARKING BRAKE HOLE COVER SUB-ASSY

(a) Using a screwdriver, disengage the 4 claws, and then remove the parking brake hole cover sub-assy.

HINT:

Tape the screwdriver tip before use to avoid damage.

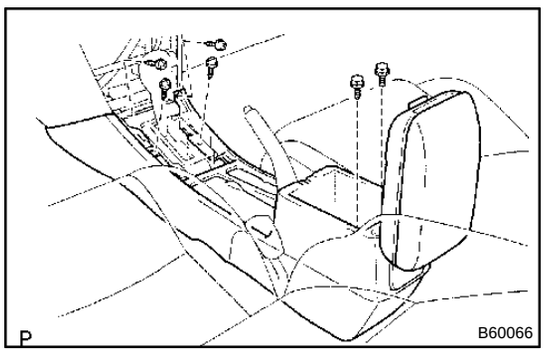
28. REMOVE CONSOLE BOX CARPET



29. REMOVE CONSOLE BOX SUB-ASSY REAR (FOR MANUAL TRANSAXLE)

(a) TMUK/TMMT made:
Remove the 2 bolts<J> and 2 screws<B> and console box sub-assy rear, then disconnect the connector.

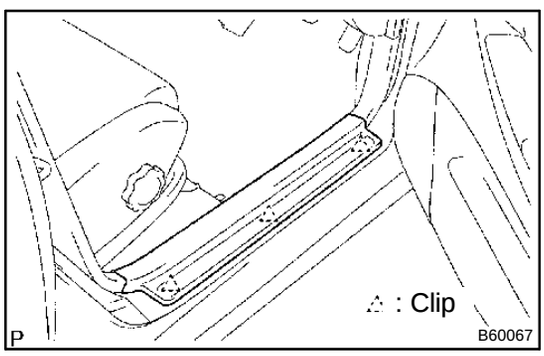
(b) TMC made:
Remove the 2 bolts<K> and 2 screws<C> and console box sub-assy rear, then disconnect the connector.



30. REMOVE CONSOLE BOX SUB-ASSY REAR (EXCEPT MANUAL TRANSAXLE)

(a) TMUK/TMMT made:
Remove the 2 bolts<J> and 4 screws<B> and console box sub-assy rear, then disconnect the connector.

(b) TMC made:
Remove the 2 bolts<K> and 4 screws<C> and console box sub-assy rear, then disconnect the connector.



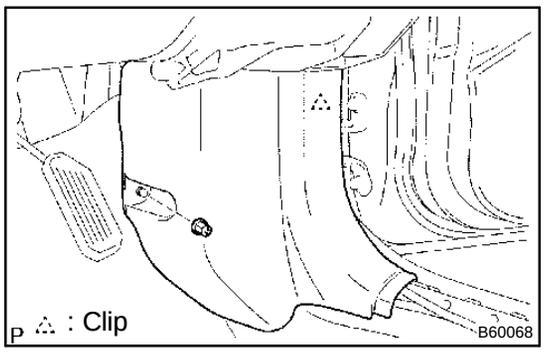
31. REMOVE FRONT DOOR SCUFF PLATE RH

(a) Using a screwdriver, disengage the 3 clips, and then remove the front door scuff plate RH.

HINT:

Tape the screwdriver tip before use to avoid damage.

32. REMOVE FRONT DOOR SCUFF PLATE LH

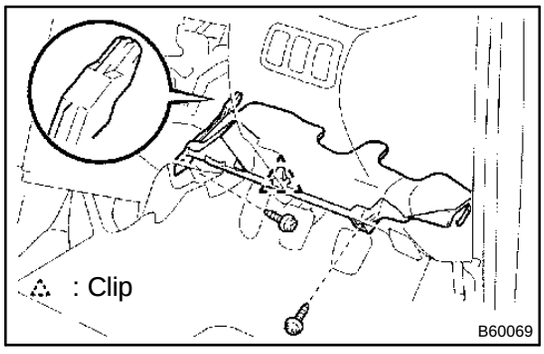


33. REMOVE COWL SIDE TRIM BOARD RH

(a) Remove the clip.

(b) Disengage the clip, and then remove the cowl side trim board RH as shown in the illustration.

34. REMOVE COWL SIDE TRIM BOARD LH

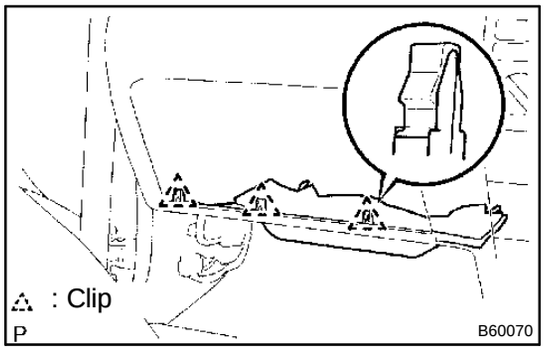


35. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1

(a) TMUK/TMMT made:
Remove the 2 screws<L> (LHD<B>).

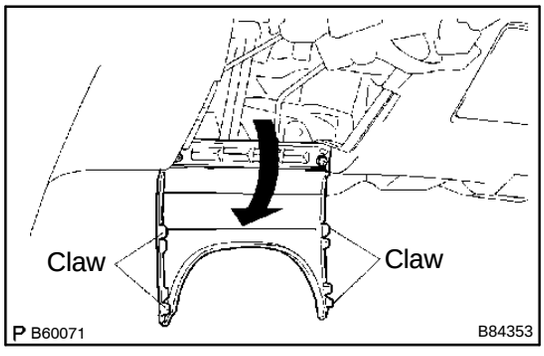
(b) TMC made:
Remove the 2 screws<M> (LHD<C>).

(c) Disengage the clip, and then remove the instrument panel under cover sub-assy No.1.



36. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.2

(a) Disengage the 3 clips, and then remove the instrument panel under cover sub-assy No.2.



37. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY LOWER RH

(a) Using a screwdriver, disengage the 4 claws, and then open the instrument panel finish panel sub-assy lower RH.

HINT:

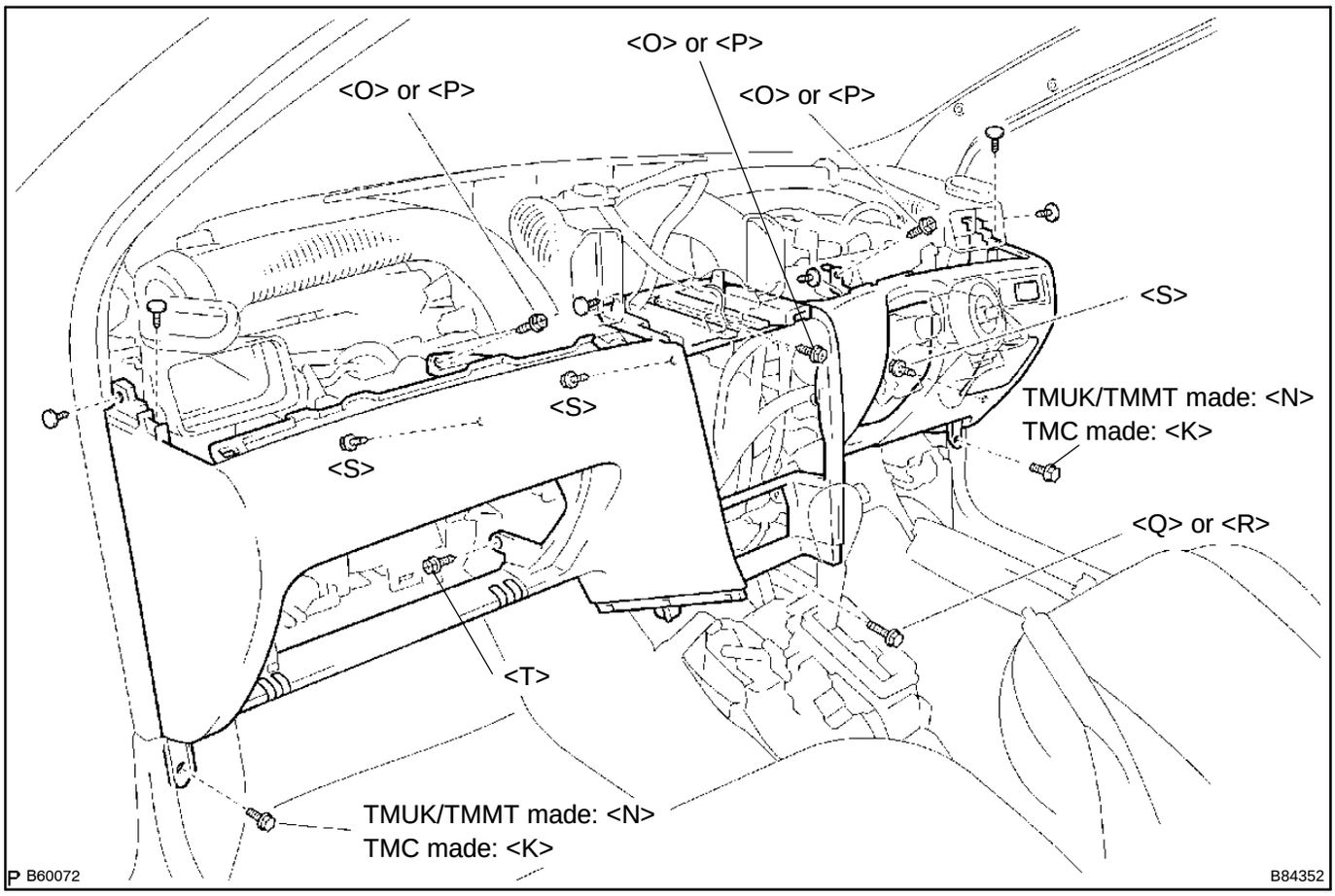
Tape the screwdriver tip before use to avoid damage.

(b) TMUK/TMMT made:
Remove the 2 screws<B> and instrument panel finish panel sub-assy lower RH.

(c) TMC made:
Remove the 2 screws<C> and instrument panel finish panel sub-assy lower RH.

38. REMOVE INSTRUMENT PANEL SUB–ASSY LOWER

(a) Disconnect the DLC3 connector.
(b) Disconnect the hood lock control lever.
(c) TMUK/TMMT made:
Remove the 2 bolts<N>.
(d) TMC made:
Remove the 2 bolts<K>.
(e) Remove the 3 screws<O> or <P>.
(f) Remove the bolt<Q> or <R>.
(g) Remove the screw<S>.
(h) Remove the screw<T>.
(i) Remove the 6 clips and instrument panel sub–assy lower.



39. REMOVE INSTRUMENT PANEL BRACKET SUB–ASSY CENTER

(a) TMUK/TMMT made:
Remove the screw<B> or <U> and instrument panel bracket sub–assy center.
(b) TMC made:
Remove the screw<C> and instrument panel bracket sub–assy center.

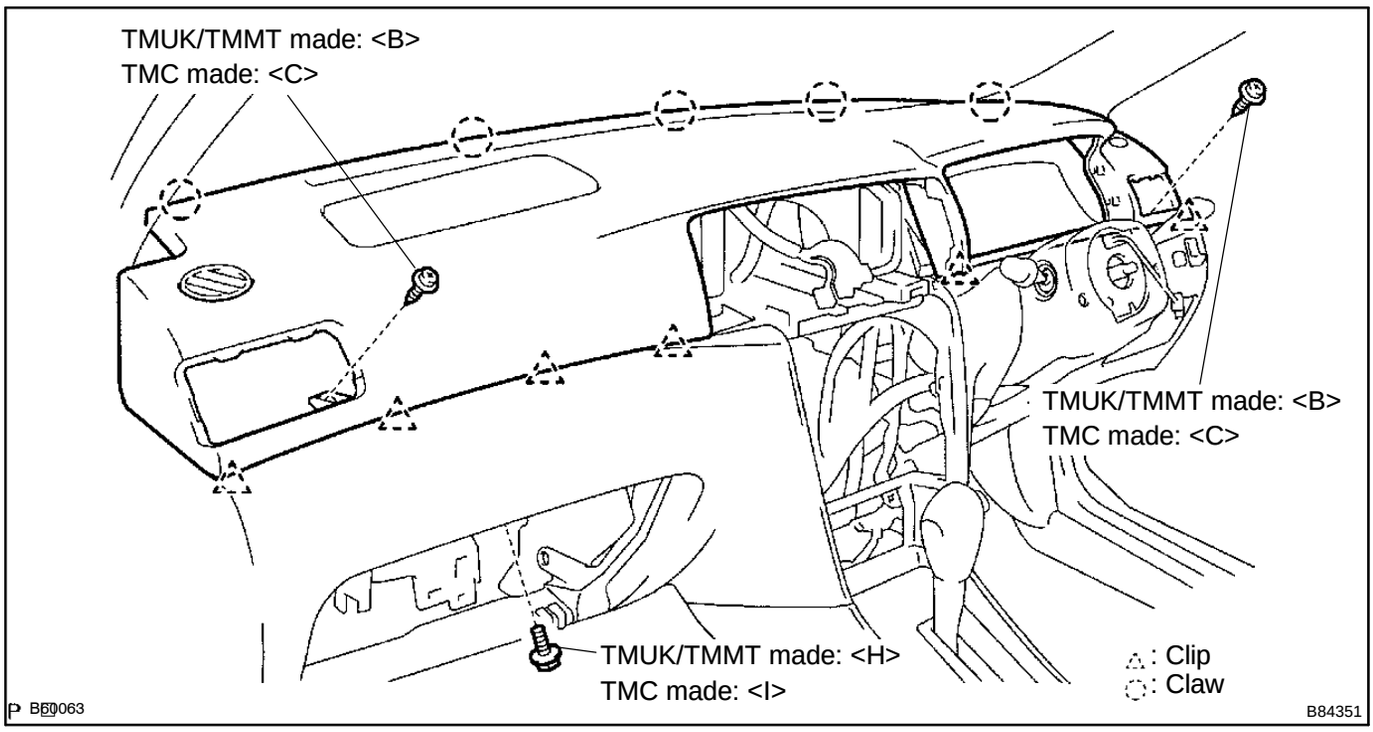
40. REMOVE INSTRUMENT PANEL BOX

41. REMOVE INSTRUMENT PANEL BOX SPRING

42. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER

(a) Using a torque wrench, install the bolt<H> or <I>.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

(b) Install the instrument panel sub-assy upper with the 2 screws<B> or <C>.



43. INSTALL HEATER CONTROL & ACCESSORY ASSY (MANUAL AIR CONDITIONING) (SEE PAGE 55-13)

44. INSTALL INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY LOWER CENTER

45. CENTER SPIRAL CABLE (SEE PAGE 60-40)

46. INSTALL STEERING WHEEL ASSY (SEE PUB. NO. RM925E, PAGE 50-7)

47. INSTALL HORN BUTTON ASSY
(TMC MADE: SEE PAGE 60-21)
(TMMT/TMUK: SEE PAGE 60-31)

48. CONNECT BATTERY NEGATIVE TERMINAL

49. INSPECT HORN BUTTON ASSY (SEE PAGE 60-14)

50. INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)

SEAT

FRONT SEAT ASSY (From May, 2004) 72–1
COMPONENTS 72–1
OVERHAUL 72–2/9

REFER TO COROLLA REPAIR MANUAL:

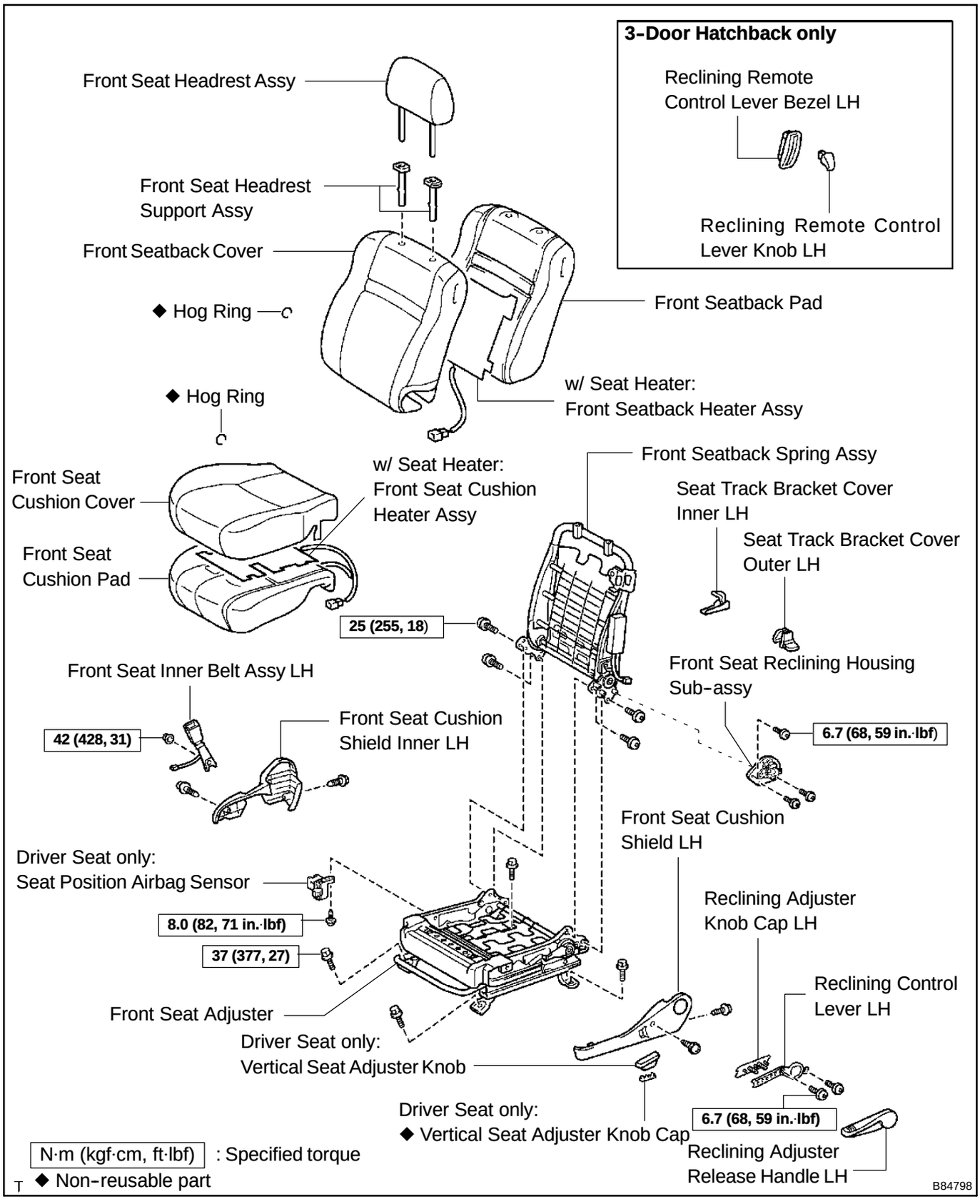
Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM1028E

NOTE: The above pages contain only the points which differ from the above listed manual.

FRONT SEAT ASSY (From May, 2004)

COMPONENTS

720UV-02



720UW-02

OVERHAUL

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page 03-2).

CAUTION:

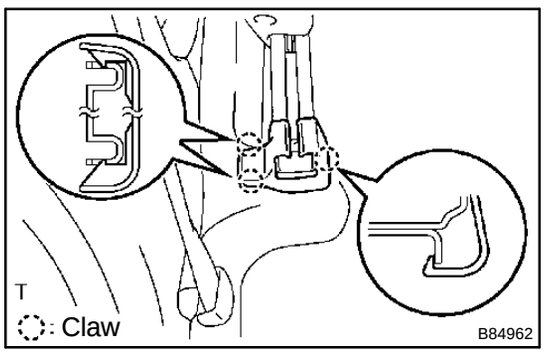
Wear protective gloves. Sharp areas on the seatback spring and seat adjuster can cause injuries to your hands.

1. DISCONNECT BATTERY NEGATIVE TERMINAL

CAUTION:

Work must be started at least 90 seconds after the ignition switch is turned OFF and the negative (-) terminal cable is disconnected from the battery.

(The SRS is equipped with a back-up power source. If work is started within 90 seconds of turning the ignition switch OFF and disconnecting the negative (-) terminal cable of the battery, the SRS may deploy.)

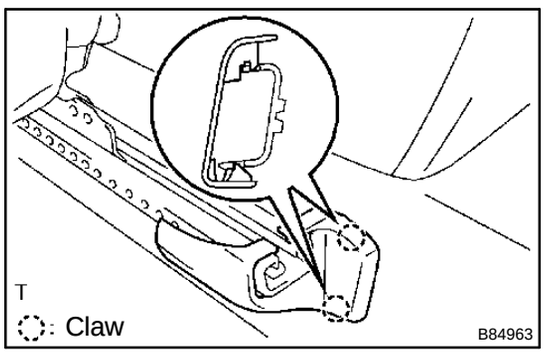


2. REMOVE SEAT TRACK BRACKET COVER OUTER LH

(a) Using a screwdriver, disengage the 3 claws and remove the bracket cover.

HINT:

Tape the screwdriver tip before use.



3. REMOVE SEAT TRACK BRACKET COVER INNER LH

(a) Using a screwdriver, disengage the 2 claws and remove the bracket cover.

HINT:

Tape the screwdriver tip before use.

4. REMOVE FRONT SEAT HEADREST ASSY

5. REMOVE FRONT SEAT ASSY

(a) Lift up the seat track adjusting handle and move the seat to the rearmost position.

(b) Remove the 2 bolts on the front side of the seat.

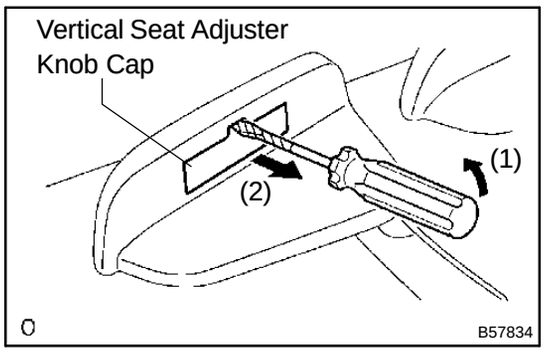
(c) Lift up the seat track adjusting handle and move the seat to the frontmost position.

(d) Remove the 2 bolts on the rear side of the seat.

(e) Disconnect the connectors under the seat. Then remove the front seat.

NOTICE:

Be careful not to damage the vehicle body.



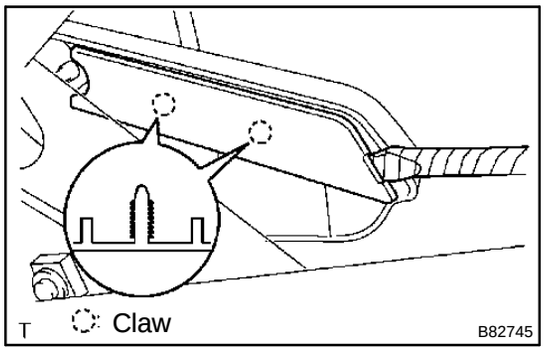
6. Driver seat only:
REMOVE VERTICAL SEAT ADJUSTER KNOB

(a) Using a screwdriver, remove the knob cap as shown in the illustration.

HINT:
Tape the screwdriver tip before use.

NOTICE:
The cap cannot be reused.

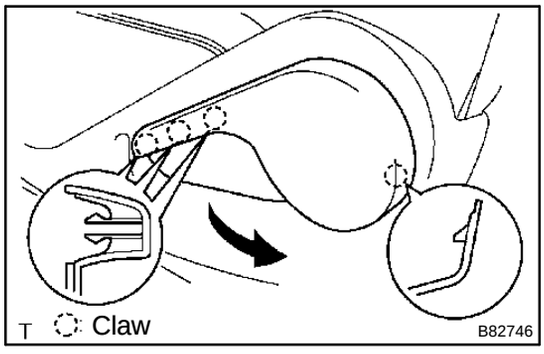
(b) Remove the knob.



7. REMOVE RECLINING ADJUSTER RELEASE HANDLE LH

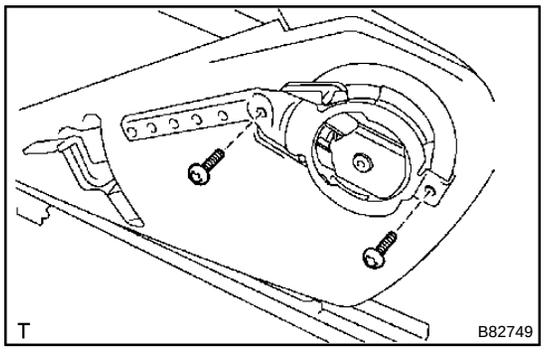
(a) Raise the reclining adjuster release handle to reveal the reclining adjuster knob cap. Using a screwdriver, disengage the 2 claws and remove the reclining adjuster knob cap.

HINT:
Tape the screwdriver tip before use.



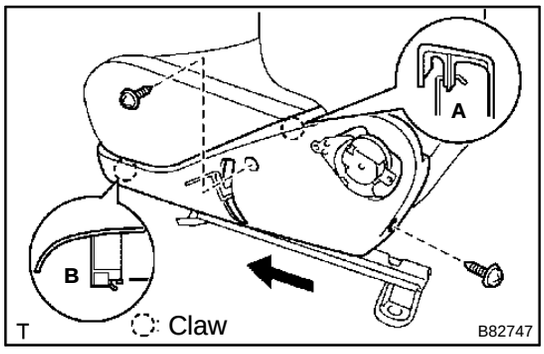
(b) Using a screwdriver, disengage the 3 claws and remove the release handle.

HINT:
Tape the screwdriver tip before use.



8. REMOVE RECLINING CONTROL LEVER LH

(a) Using a torx driver (T25), remove the 2 torx screws and control lever.



9. REMOVE FRONT SEAT CUSHION SHIELD LH

(a) Remove the 2 screws.

(b) Using a screwdriver, disengage the claw labeled A.

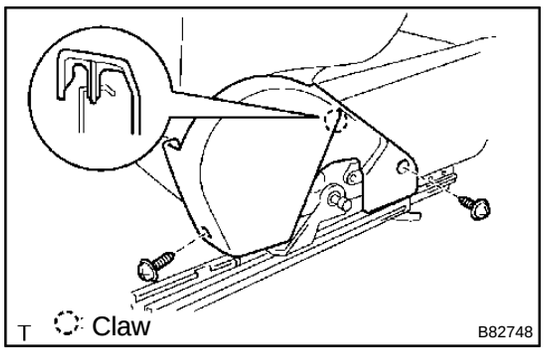
HINT:
Tape the screwdriver tip before use.

(c) Pull the cushion shield in the direction indicated by the arrow mark in the illustration to disengage the claw labeled B. Then, remove the cushion shield.

10. REMOVE FRONT SEAT INNER BELT ASSY LH

(a) Disconnect the connectors and disengage the clamps.

(b) Remove the nut and belt.



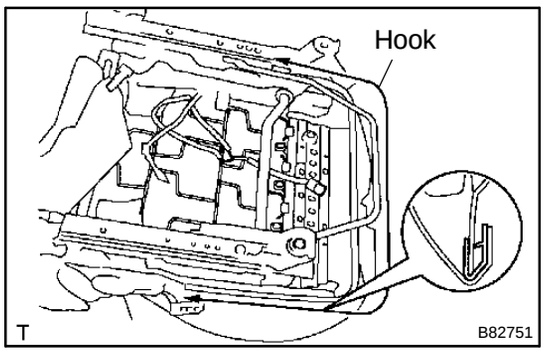
11. REMOVE FRONT SEAT CUSHION SHIELD INNER LH

(a) Remove the 2 screws.

(b) Using a screwdriver, disengage the claw and remove the cushion shield.

HINT:

Tape the screwdriver tip before use.



12. REMOVE FRONT SEAT CUSHION COVER

(a) w/ Seat heater:
Disconnect the connectors.

(b) Using a screwdriver, disengage the hook.

HINT:

Tape the screwdriver tip before use.

(c) Remove the hog rings and seat cushion cover (together with the pad) from the seat adjuster.

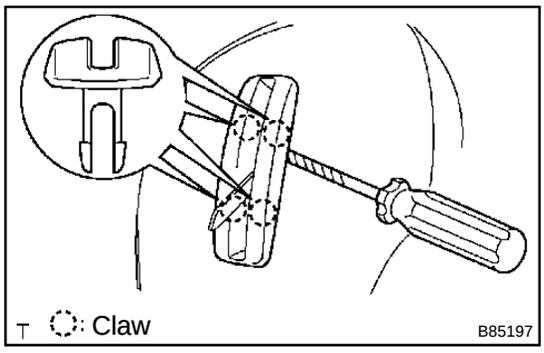
(d) Remove the hog rings and seat cushion cover from the cushion pad.

13. w/ Seat heater:
REMOVE FRONT SEAT CUSHION HEATER ASSY

(a) Cut off the tack pins holding together the seat heater and seat cushion cover, and then remove the seat heater.

NOTICE:

Be careful not to damage the seat cushion cover and seat heater.



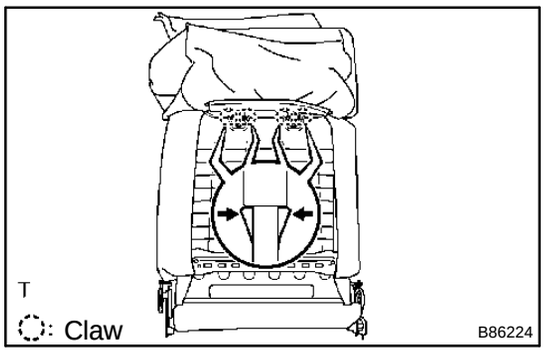
14. 3-door hatchback only:
REMOVE RECLINING REMOTE CONTROL LEVER BEZEL LH

(a) Remove the reclining remote control lever knob LH.

(b) Using a screwdriver, disengage the 4 claws and remove the control lever bezel.

HINT:

Tape the screwdriver tip before use.

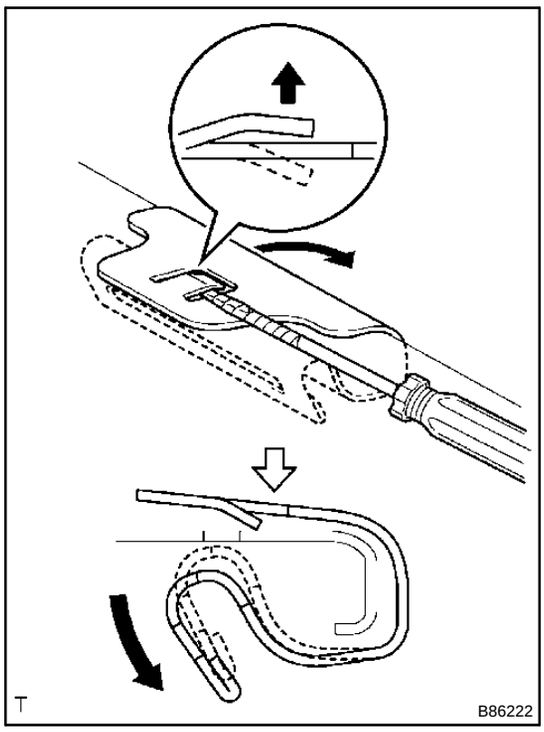


15. REMOVE FRONT SEATBACK COVER

(a) Remove the hog rings and disengage the hooks.

(b) Roll up the seatback cover.

(c) Disengage the 4 claws and remove the 2 headrest supports.



(d) Using a screwdriver, pry out the bracket as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(e) Remove the hog rings and seatback cover (together with the pad) from the seatback spring.

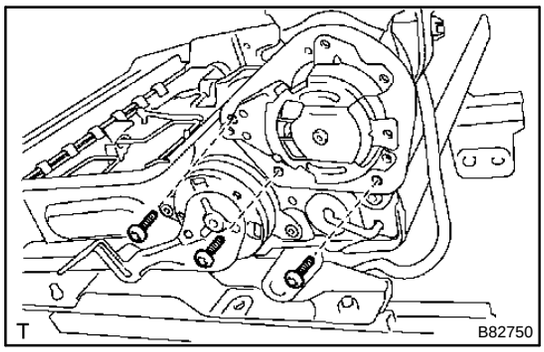
(f) Remove the hog rings and seatback cover from the seatback pad.

16. w/ Seat heater:
REMOVE FRONT SEATBACK HEATER ASSY LH

(a) Cut off the tack pins holding together the seat heater and seatback cover, and then remove the front seat heater.

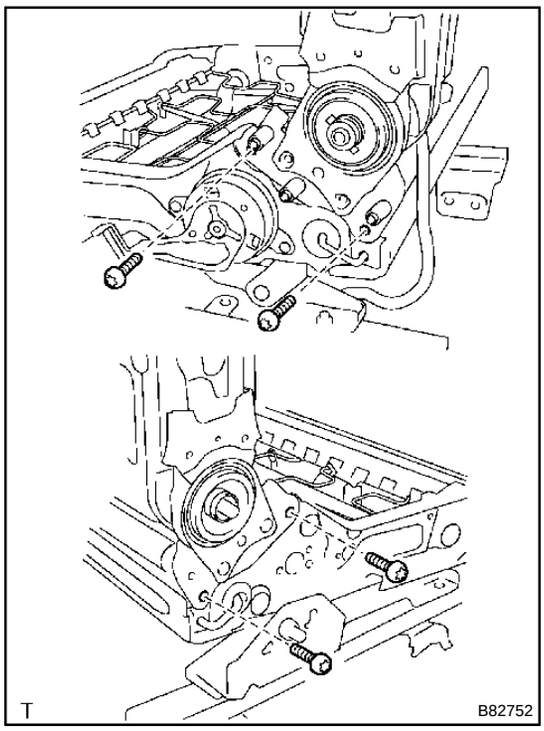
NOTICE:

Be careful not to damage the seatback cover and seat heater.



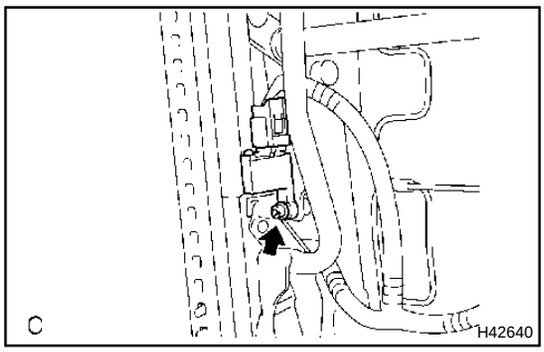
17. REMOVE FRONT SEAT RECLINING HOUSING SUB-ASSY

(a) Using a torx driver (T25), remove the 3 torx screws and reclining housing.



18. REMOVE FRONT SEATBACK SPRING ASSY

(a) Using a torx socket wrench (T40), remove the 4 torx bolts and seatback spring.



19. Driver seat only:
REMOVE SEAT POSITION AIRBAG SENSOR

(a) Disconnect the wire harness connector.

(b) Using a torx socket wrench (T30), remove the torx bolt and airbag sensor.

20. Driver seat only:
INSTALL SEAT POSITION AIRBAG SENSOR

(a) Using a torx socket wrench (T30), install the airbag sensor with the torx bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

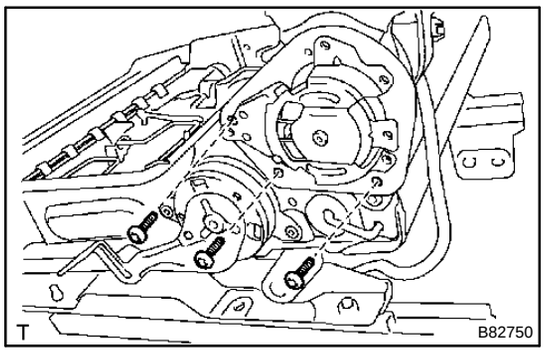
NOTICE:

- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor with a new one.**
- **When installing the sensor, make sure the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installation, shake the sensor to check that there is no looseness.**

(b) Connect the wire harness connector.

21. INSTALL FRONT SEATBACK SPRING ASSY

(a) Using a torx socket wrench (T40), install the seatback spring with the 4 torx bolts.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)



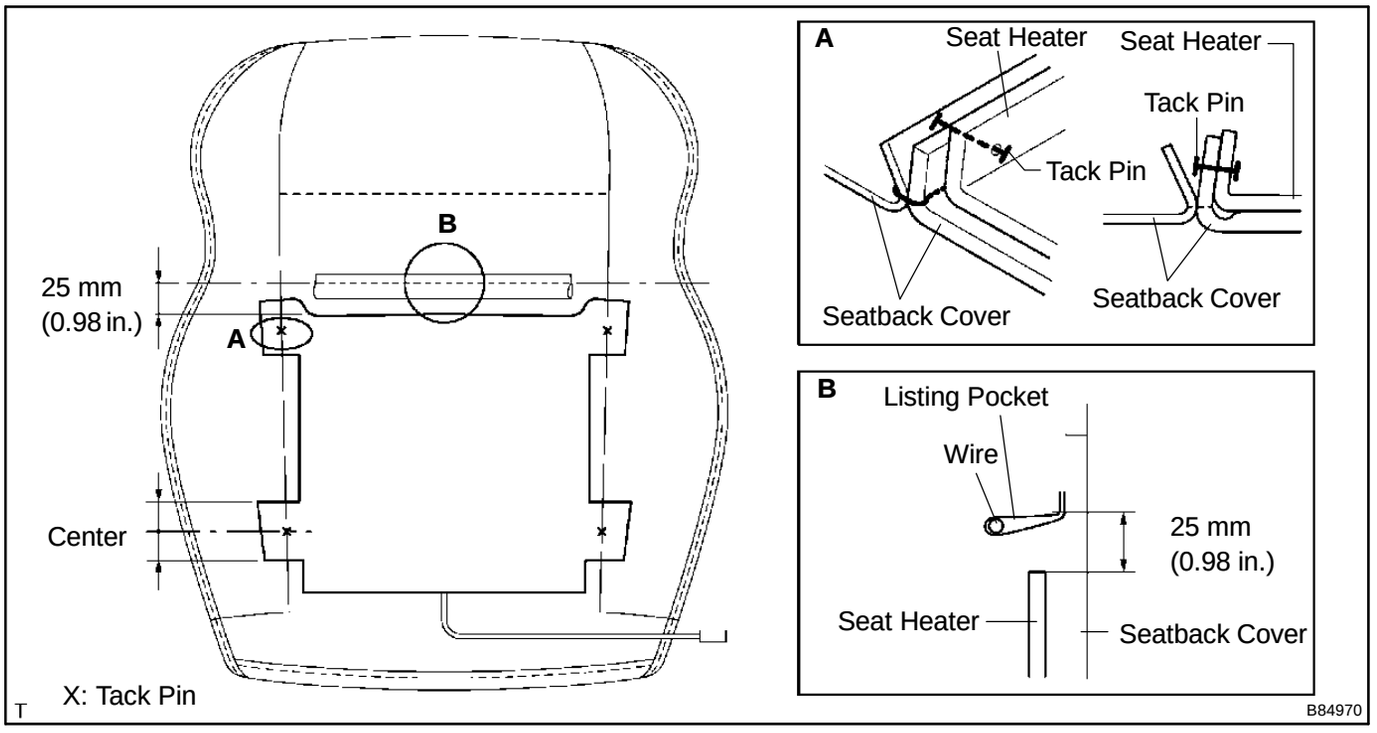
22. INSTALL FRONT SEAT RECLINING HOUSING SUB-ASSY

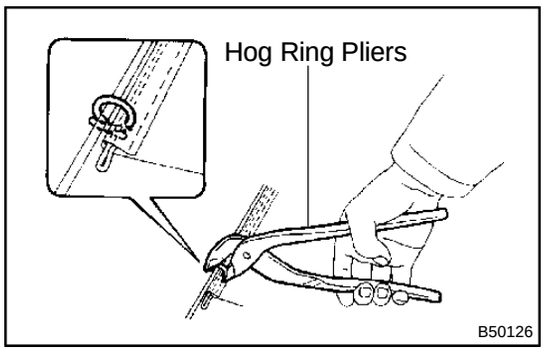
(a) Using a torx driver (T25), install the reclining housing with the 3 screws.
Torque: 6.7 N·m (68 kgf·cm, 59 in.·lbf)

23. w/ Seat heater:
INSTALL FRONT SEATBACK HEATER ASSY LH

(a) Set the seat heater to the seatback cover.
(b) Using a tacker, install the front seat heater to the seatback cover with 4 new tack pins, as shown in the illustration.

NOTICE:
Do not substitute other metal parts for tack pins.

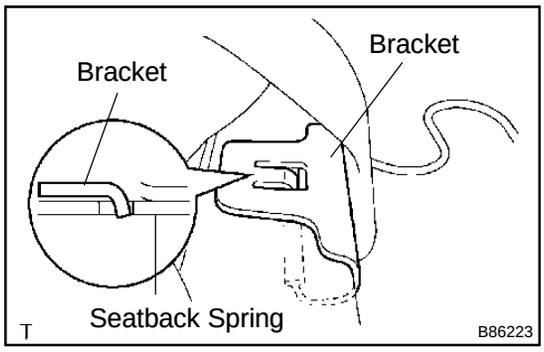




24. INSTALL FRONT SEATBACK COVER

NOTICE:
- **Be careful not to damage the cover.**
- **When installing the hog rings, take care to minimize wrinkles as much as possible.**

(a) Using hog ring pliers, install the seatback cover to the seatback pad with new hog rings.
(b) Install the seatback cover (with pad) to the seatback spring.



(c) Install the 2 headrest supports.

(d) Install the bracket as shown in the illustration.

NOTICE:

- **For vehicles with side airbags, the seatback cover must be securely installed. Otherwise, the side airbag may not deploy properly.**
- **Make sure that the strap is not twisted after installing the bracket.**
- **Install the bracket securely.**

(e) Install the seatback cover (with pad) to the seatback spring by using hog ring pliers to attach new hog rings and hooks.

25. w/ Seat heater:

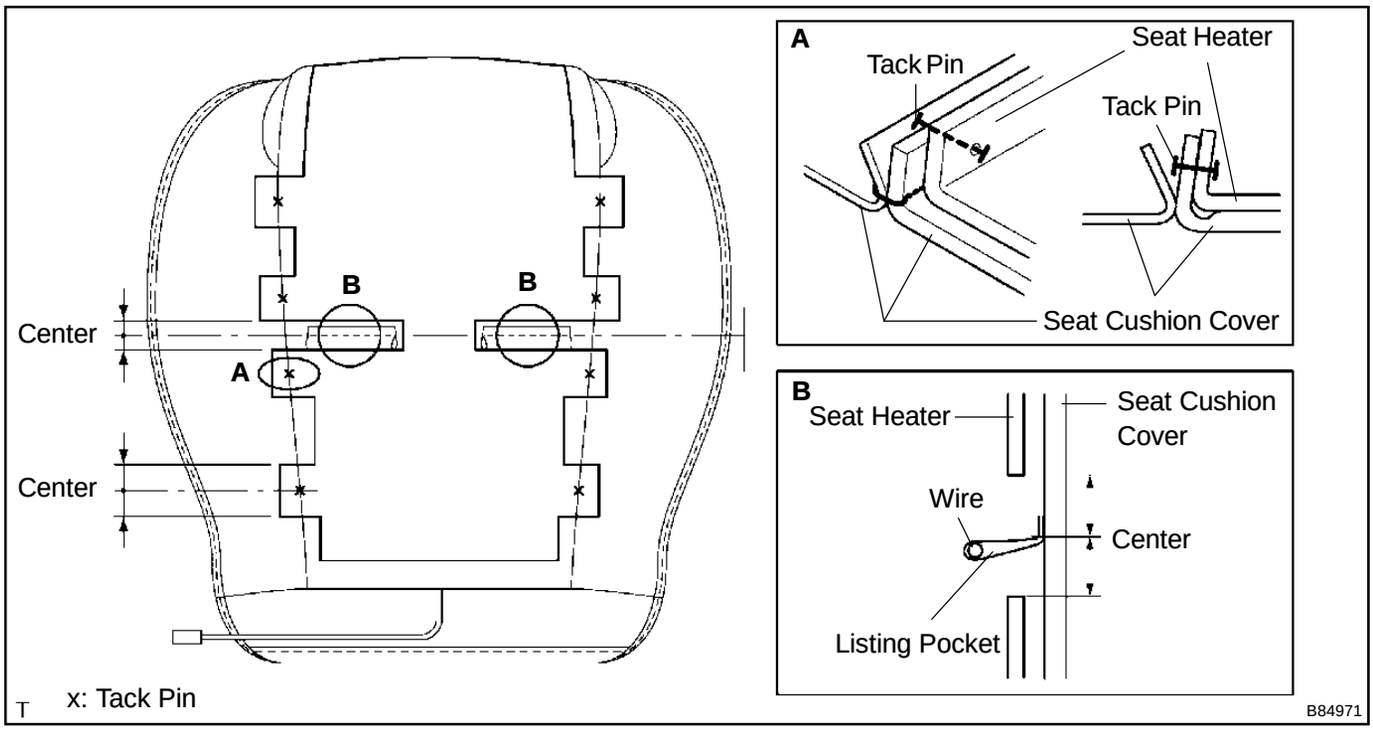
INSTALL FRONT SEAT CUSHION HEATER ASSY

(a) Set the seat heater to the seat cushion cover.

(b) Using a tacker, install the seat heater to the seat cushion cover with 8 new tack pins, as shown in the illustration.

NOTICE:

Do not substitute other metal parts for tack pins.



26. INSTALL FRONT SEAT CUSHION COVER

NOTICE:

- **Be careful not to damage the cover.**
- **When installing the hog rings, take care to minimize wrinkles as much as possible.**

(a) Using hog ring pliers, install the seat cushion cover to the seat cushion pad with new hog rings.

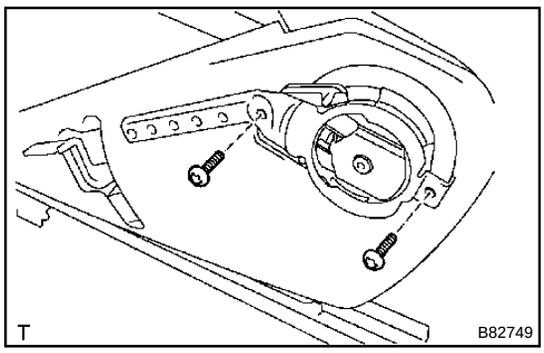
(b) Install the seat cushion cover (with pad) to the seat adjuster by using hog ring pliers to attach new hog rings and hooks.

(c) w/ Seat heater:
Connect the connectors.

27. INSTALL FRONT SEAT INNER BELT ASSY LH

(a) Instal the belt with the nut.
Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

(b) Connect the connectors and engage the clamps.



28. INSTALL RECLINING CONTROL LEVER LH

(a) Using a torx driver (T25), install the control lever with the 2 screws.
Torque: 6.7 N·m (68 kgf·cm, 59 in.·lbf)

29. Driver seat only:
INSTALL VERTICAL SEAT ADJUSTER KNOB CAP

(a) Install a new cap.

30. INSTALL FRONT SEAT ASSY

(a) Place the seat in the cabin.

NOTICE:

Do not damage the vehicle body.

(b) Tighten the 2 bolts on the rear side of the seat.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(c) Tighten the 2 bolts on the front side of the seat.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

31. CHECK SEAT SLIDE ADJUSTER LOCKS

(a) Check that during sliding operation of the seat, the left and right adjusters move together smoothly and lock simultaneously.

If the seat adjusters do not lock simultaneously, loosen the seat fixation bolts to adjust the adjuster's position.

32. CONNECT BATTERY NEGATIVE TERMINAL

33. CHECK SRS WARNING LAMP **(See page 60–1)**

EXTERIOR/INTERIOR TRIM

FRONT BUMPER
(TMMT MADE (SEDAN/WAGON)) 76-1
COMPONENTS 76-1
REPLACEMENT 76-2/4
FRONT BUMPER
(TMMT MADE (HATCH BACK)) 76-5
COMPONENTS 76-5/6
REPLACEMENT 76-7/9
NAME PLATE (TMMT MADE) 76-10
REPLACEMENT 76-10/12

REFER TO FOLLOWING REPAIR MANUALS:

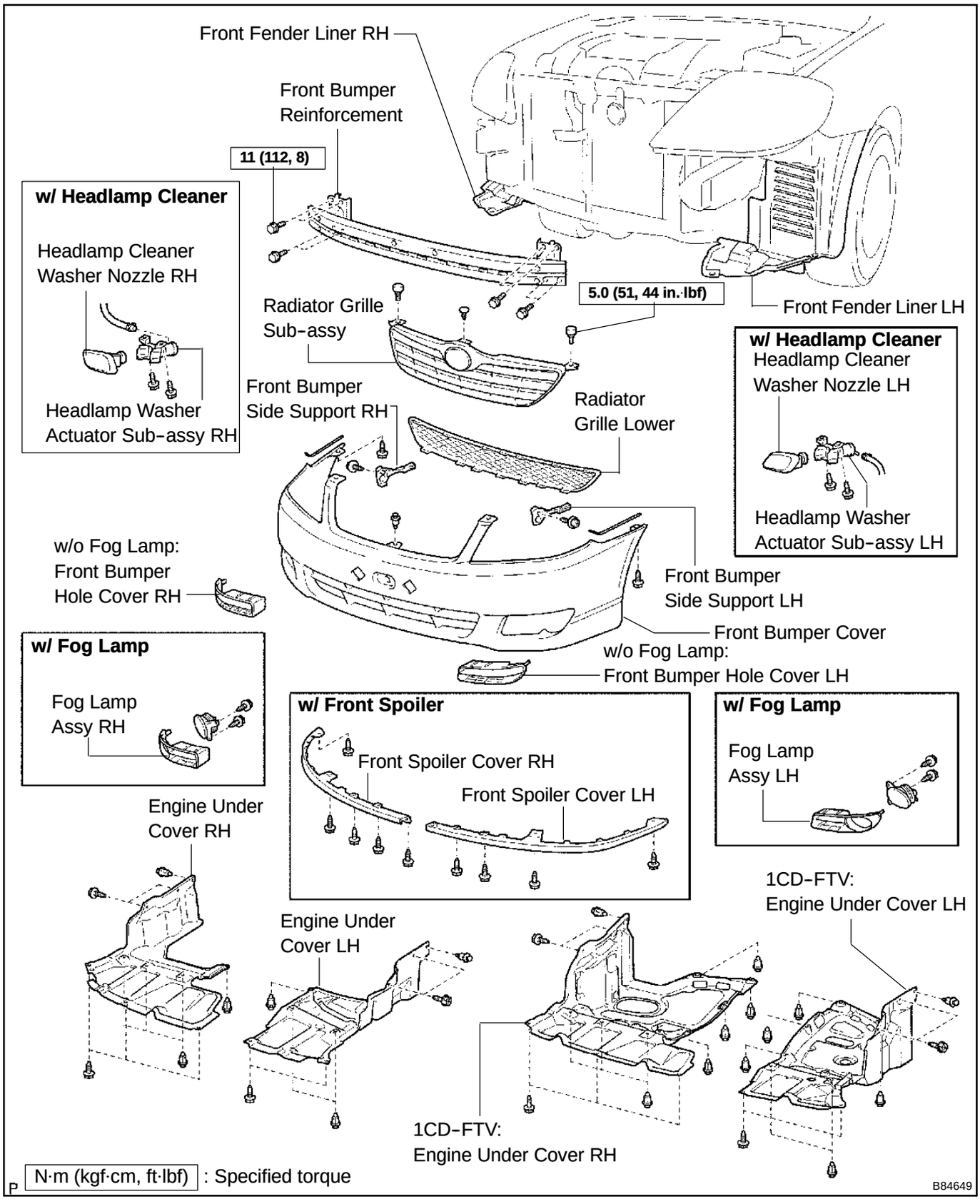
Manual Name	Pub. No.
COROLLA Repair Manual	RM925E
COROLLA Repair Manual Supplement	RM1028E

NOTE: The above pages contain only the points which differ from the above listed manual.

FRONT BUMPER (TMMT MADE (SEDAN/WAGON))

COMPONENTS

761C0-01

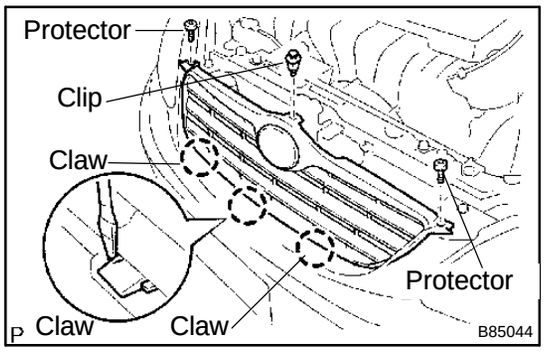


761C1-01

REPLACEMENT

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- A bolt without a torque specification is shown in the standard bolt chart (see page 03-2).



1. REMOVE RADIATOR GRILLE SUB-ASSY

(a) Remove the 2 protectors and clip.

(b) Using a screwdriver, disengage the 3 claws and remove the radiator grille.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SPOILER COVER LH (w/ FRONT SPOILER)

(a) Remove the 4 screws and spoiler cover.

3. REMOVE FRONT SPOILER COVER RH (w/ FRONT SPOILER)

(a) Remove the 5 screws and spoiler cover.

4. REMOVE ENGINE UNDER COVER LH

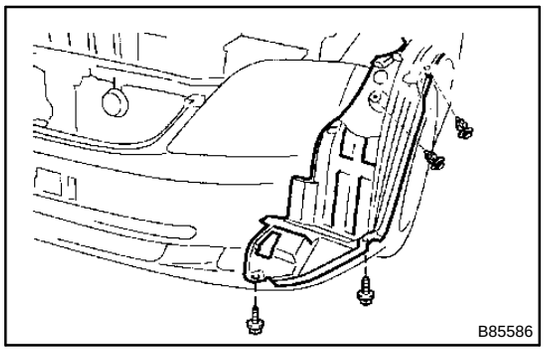
(a) Except 1CD-FTV:
Remove the 4 bolts, 4 clips and under cover.

(b) 1CD-FTV:
Remove the 4 bolts, 7 clips and under cover.

5. REMOVE ENGINE UNDER COVER RH

(a) Except 1CD-FTV:
Remove the 5 bolts, 5 clips and under cover.

(b) 1CD-FTV:
Remove the 5 bolts, 8 clips and under cover.



6. REMOVE FRONT FENDER LINER LH

(a) Remove the 2 bolts.

(b) Using a clip remover, remove the 2 clips.

(c) Partially remove the fender liner.

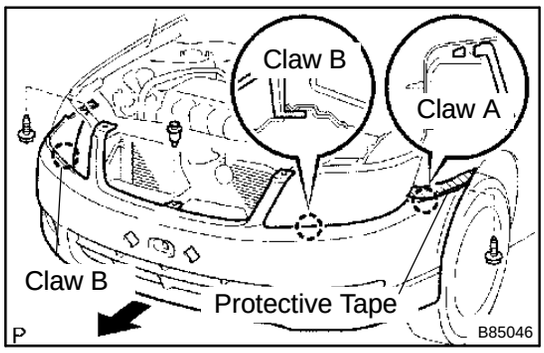
HINT:

It is not necessary to fully remove the fender liner. Partially remove it so that the bumper cover can be removed in step 8.

7. REMOVE FRONT FENDER LINER RH

HINT:

Use the same procedures described for the LH side.



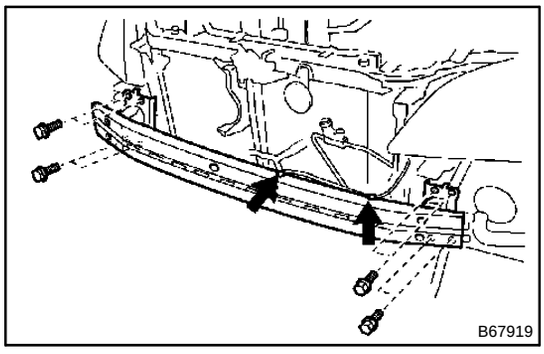
8. REMOVE FRONT BUMPER COVER

(a) Put protective tape under the front fender.
(b) Remove the 2 screws.
(c) Using a clip remover, remove the clip from the cover.
(d) Using a screwdriver, disengage the 2 claws labeled A and 2 claws labeled B, and remove the bumper cover.

HINT:

- Only one of the 2 claws labeled A is shown in the illustration. The other claw is on the opposite side of the vehicle.
- Tape the screwdriver tip before use.

(e) w/ Fog lamp:
Disconnect the 2 fog lamp connectors.
(f) w/ Headlamp cleaner:
Disconnect the 2 headlamp washer hoses.



9. REMOVE FRONT BUMPER REINFORCEMENT

(a) Using a clip remover, remove the 2 wire harness clamps.
(b) Remove the 8 bolts and reinforcement.

10. REMOVE FRONT BUMPER SIDE SUPPORT LH

(a) Remove the screw and side support.

11. REMOVE FRONT BUMPER SIDE SUPPORT RH

(a) Remove the screw and side support.

12. REMOVE RADIATOR GRILLE LOWER

13. REMOVE FOG LAMP ASSY LH

14. REMOVE FOG LAMP ASSY RH

15. REMOVE FRONT BUMPER HOLE COVER LH (w/o FOG LAMP)

16. REMOVE FRONT BUMPER HOLE COVER RH (w/o FOG LAMP)

17. REMOVE HEADLAMP WASHER NOZZLE SUB-ASSY LH (w/ HEADLAMP CLEANER)

(a) Using a screwdriver, disengage the 2 claws and remove the nozzle.

HINT:

Tape the screwdriver tip before use.

18. REMOVE HEADLAMP WASHER NOZZLE SUB-ASSY RH (w/ HEADLAMP CLEANER)

HINT:

Use the same procedures described for the LH side.

19. REMOVE HEADLAMP WASHER ACTUATOR SUB-ASSY LH (w/ HEADLAMP CLEANER)

(a) Remove the 2 bolts and actuator from the bumper.

20. REMOVE HEADLAMP WASHER ACTUATOR SUB-ASSY RH (w/ HEADLAMP CLEANER)

(a) Remove the 2 bolts and actuator from the bumper.

21. INSTALL FRONT BUMPER REINFORCEMENT

(a) Install the reinforcement with the 8 bolts.
Torque: 52 N·m (521 kgf·cm, 38 ft·lbf)

22. INSTALL HEADLAMP WASHER ACTUATOR SUB-ASSY

(a) Install the actuator with the 2 bolts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

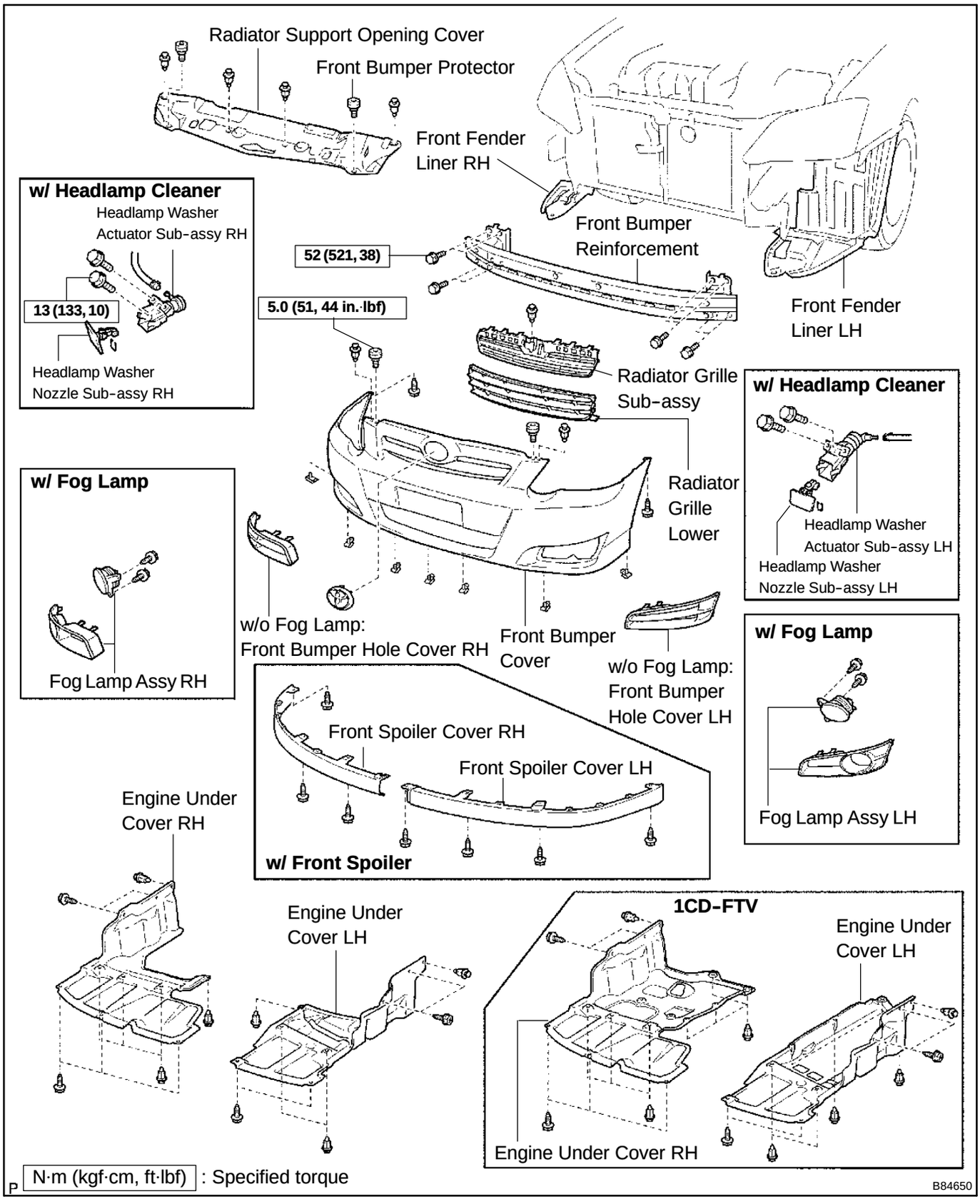
23. INSTALL FRONT BUMPER COVER

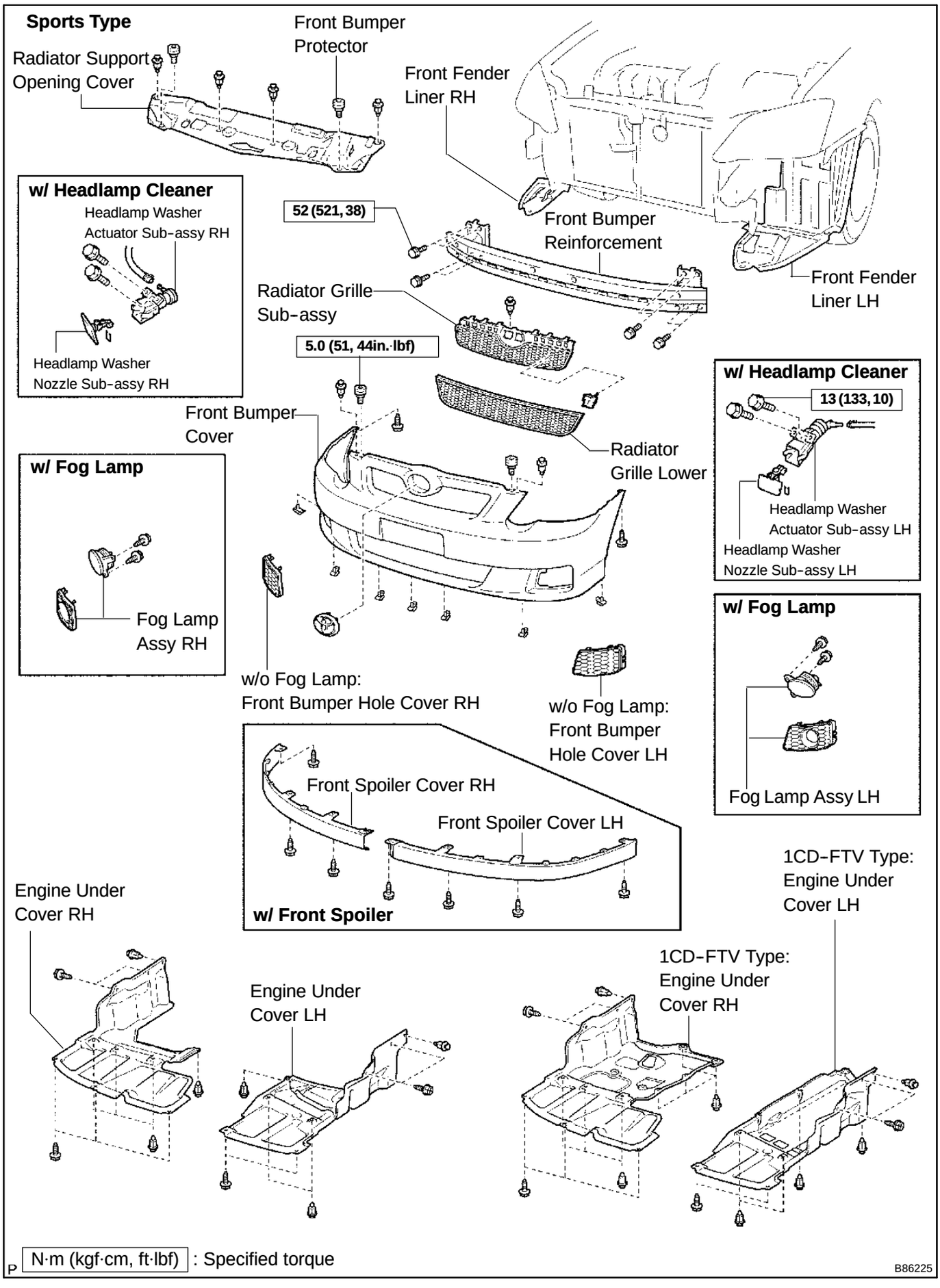
(a) Install the bumper cover with the 2 screws and 2 protectors.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf) for protector

FRONT BUMPER (TMMT MADE (HATCH BACK))

COMPONENTS

761C2-01




Sports Type
Front Bumper Protector
Radiator Support Opening Cover
Front Fender Liner RH
w/ Headlamp Cleaner
Headlamp Washer Actuator Sub-assy RH
Headlamp Washer Nozzle Sub-assy RH
52 (521, 38)
Front Bumper Reinforcement
Front Fender Liner LH
Radiator Grille Sub-assy
5.0 (51, 44in.·lbf)
Front Bumper Cover
Radiator Grille Lower
w/ Headlamp Cleaner
13 (133, 10)
Headlamp Washer Actuator Sub-assy LH
Headlamp Washer Nozzle Sub-assy LH
w/ Fog Lamp
Fog Lamp Assy RH
w/o Fog Lamp: Front Bumper Hole Cover RH
w/o Fog Lamp: Front Bumper Hole Cover LH
w/ Fog Lamp
Fog Lamp Assy LH
Front Spoiler Cover RH
Front Spoiler Cover LH
w/ Front Spoiler
Engine Under Cover RH
Engine Under Cover LH
1CD-FTV Type: Engine Under Cover RH
1CD-FTV Type: Engine Under Cover LH
P N·m (kgf·cm, ft·lbf) : Specified torque
B86225

761C3-01

REPLACEMENT

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- A bolt without a torque specification is shown in the standard bolt chart (see page 03–2).

1. REMOVE RADIATOR SUPPORT OPENING COVER

(a) Using a clip remover, remove the 4 clips.
(b) Remove the 2 bumper protectors and radiator support opening cover.

2. REMOVE FRONT SPOILER COVER LH (w/ FRONT SPOILER)

(a) Remove the 4 screws.
(b) Using a screwdriver, disengage the 5 claws and remove the spoiler cover.

HINT:
Tape the screwdriver tip before use.

3. REMOVE FRONT SPOILER COVER RH (w/ FRONT SPOILER)

(a) Remove the 3 screws.
(b) Using a screwdriver, disengage the 5 claws and remove the spoiler cover.

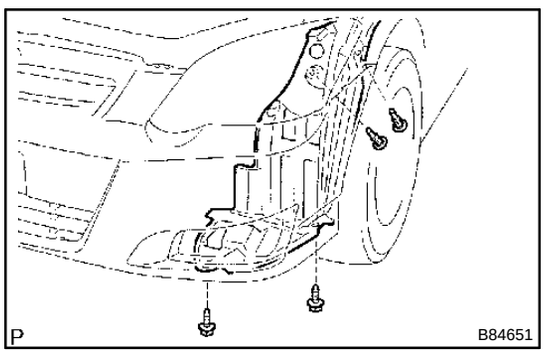
HINT:
Tape the screwdriver tip before use.

4. REMOVE ENGINE UNDER COVER LH

(a) Using a clip remover, remove the 4 clips.
(b) 1CD–FTV:
Using a clip remover, remove the 7 clips.
(c) Remove the 4 screws and cover.

5. REMOVE ENGINE UNDER COVER RH

(a) Using a clip remover, remove the 5 clips.
(b) 1CD–FTV:
Using a clip remover, remove the 8 clips.
(c) Remove the 5 screws and cover.



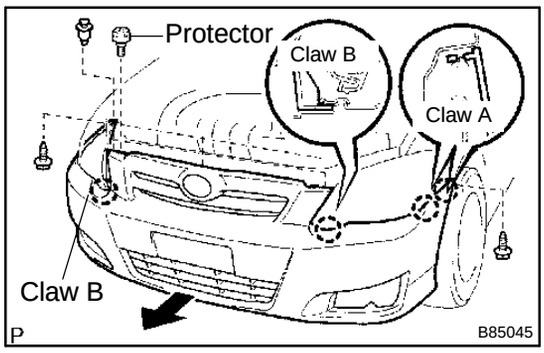
6. REMOVE FRONT FENDER LINER LH

(a) Remove the 2 bolts.
(b) Using a clip remover, remove the 2 clips.
(c) Partially remove the fender liner.

HINT:
It is not necessary to fully remove the fender liner. Partially remove it so that the bumper cover can be removed in step 9.

7. REMOVE FRONT FENDER LINER RH

HINT:
Use the same procedures described for the LH side.



8. REMOVE FRONT BUMPER COVER

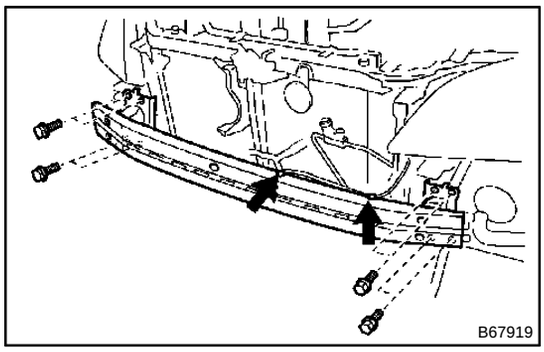
(a) Remove the 2 screws and 2 protectors.
(b) Using a clip remover, remove the 3 clips.
(c) Using a screwdriver, disengage the 2 claws labeled A and 2 claws labeled B, and remove the bumper cover.

HINT:

- Only one of the 2 claws labeled A is shown in the illustration. The other claw is on the opposite side of the vehicle.
- Tape the screwdriver tip before use.

(d) w/ Fog lamp:
Disconnect the 2 fog lamp connectors.
(e) w/ Headlamp cleaner:
Disconnect the 2 headlamp washer hoses.

9. REMOVE RADIATOR GRILLE (OR FRONT PANEL) EMBLEM



10. REMOVE FRONT BUMPER REINFORCEMENT

(a) Using a clip remover, disconnect the 2 wire harness clamps.
(b) Remove the 8 bolts and reinforcement.

11. REMOVE RADIATOR GRILLE SUB-ASSY

(a) Using a screwdriver, disengage the 19 claws and remove the grille.
(b) Sports type:
Using a screwdriver, disengage the 13 claws and remove the grille.

HINT:

Tape the screwdriver tip before use.

12. REMOVE RADIATOR GRILLE LOWER

(a) Using a screwdriver, disengage the 10 claws and remove the grille lower.
(b) Sports type:
Using a screwdriver, disengage the 11 claws and remove the grille lower.

HINT:

Tape the screwdriver tip before use.

13. REMOVE FRONT BUMPER SIDE SUPPORT LH

(a) Remove the 2 screws and side support.

14. REMOVE FRONT BUMPER SIDE SUPPORT RH

(a) Remove the 2 screws and side support.

15. REMOVE FOG LAMP ASSY LH

16. REMOVE FOG LAMP ASSY RH

17. REMOVE FRONT BUMPER HOLE COVER LH (w/o FOG LAMP)

18. REMOVE FRONT BUMPER HOLE COVER RH (w/o FOG LAMP)

19. REMOVE HEADLAMP WASHER NOZZLE SUB-ASSY LH (w/ HEADLAMP CLEANER)

(a) Using a screwdriver, disengage the 2 claws and remove the nozzle.

HINT:

Tape the screwdriver tip before use.

20. REMOVE HEADLAMP WASHER NOZZLE SUB-ASSY RH (w/ HEADLAMP CLEANER)

HINT:

Use the same procedures described for the LH side.

21. REMOVE HEADLAMP WASHER ACTUATOR SUB-ASSY LH (w/ HEADLAMP CLEANER)

(a) Remove the 2 bolts and actuator.

22. REMOVE HEADLAMP WASHER ACTUATOR SUB-ASSY RH (w/ HEADLAMP CLEANER)

(a) Remove the 2 bolts and actuator.

23. INSTALL FRONT BUMPER REINFORCEMENT

(a) Install the reinforcement with the 8 bolts.

Torque: 52 N·m (521 kgf·cm, 38 ft·lbf)

24. INSTALL HEADLAMP WASHER ACTUATOR SUB-ASSY

(a) Install the actuator with the 2 bolts.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

25. INSTALL FRONT BUMPER COVER

(a) Install the bumper cover with the 2 screws and 2 protectors.

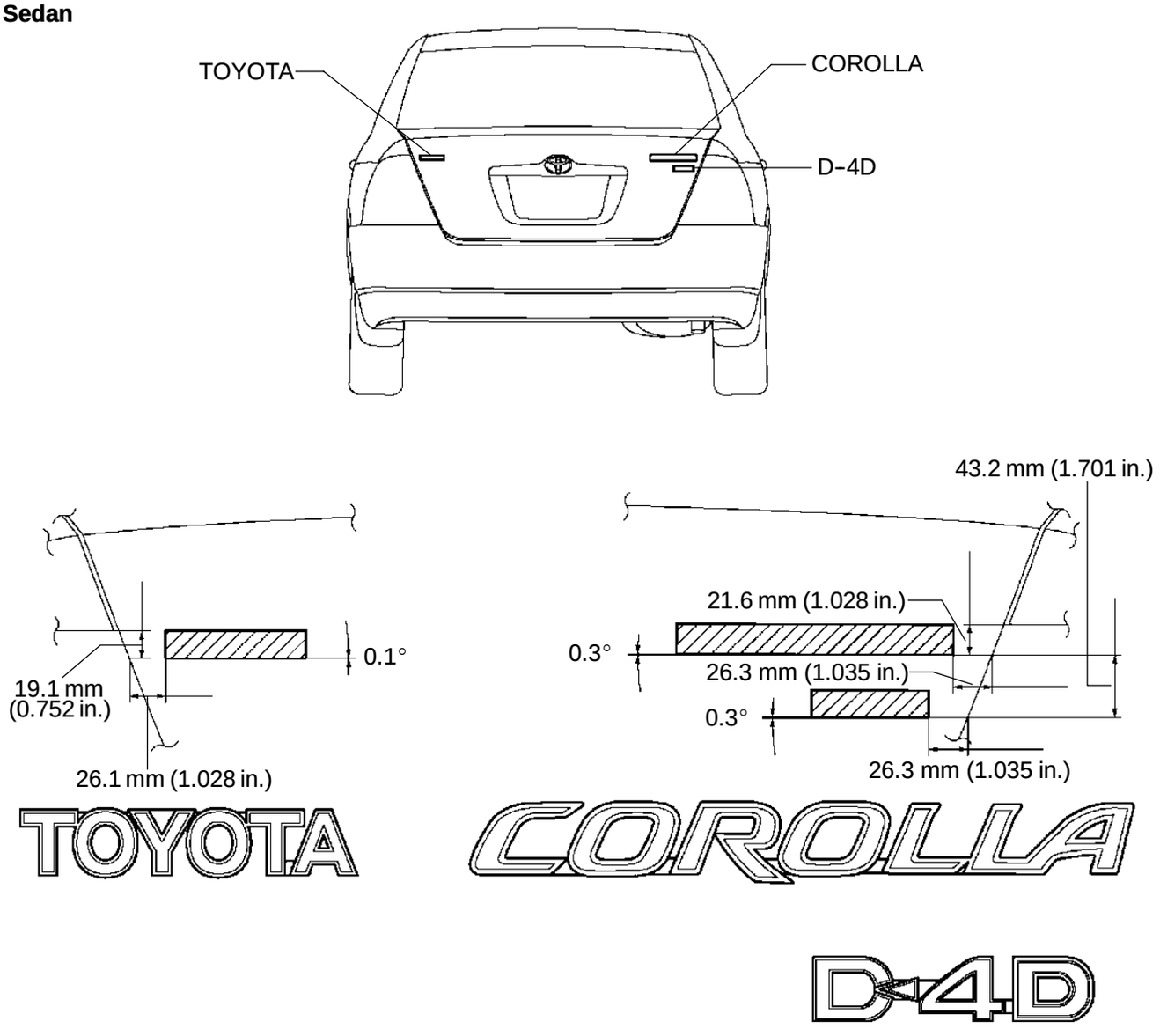
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf) for protector

NAME PLATE (TMMT MADE)

REPLACEMENT

761C4-01

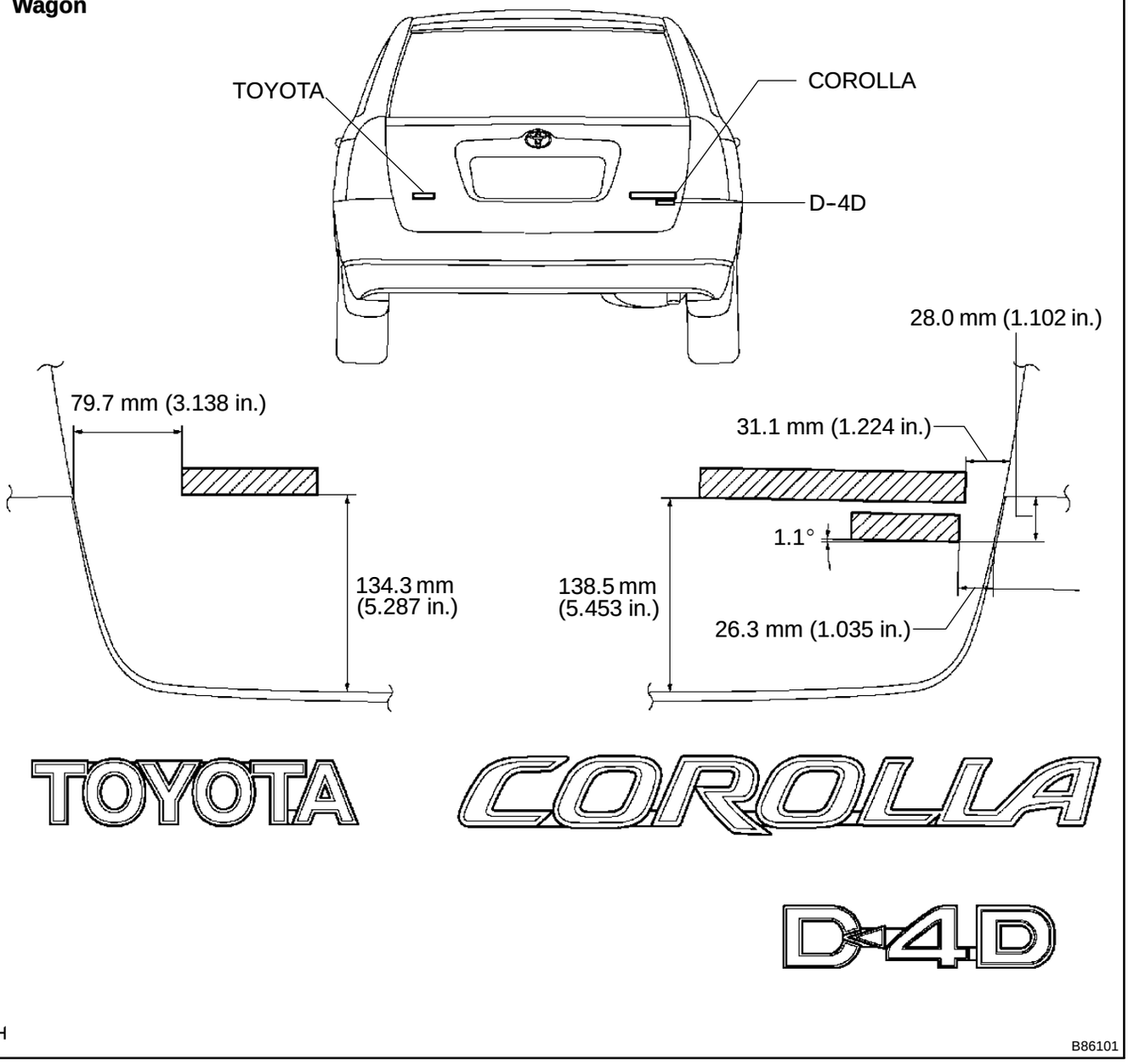
Sedan



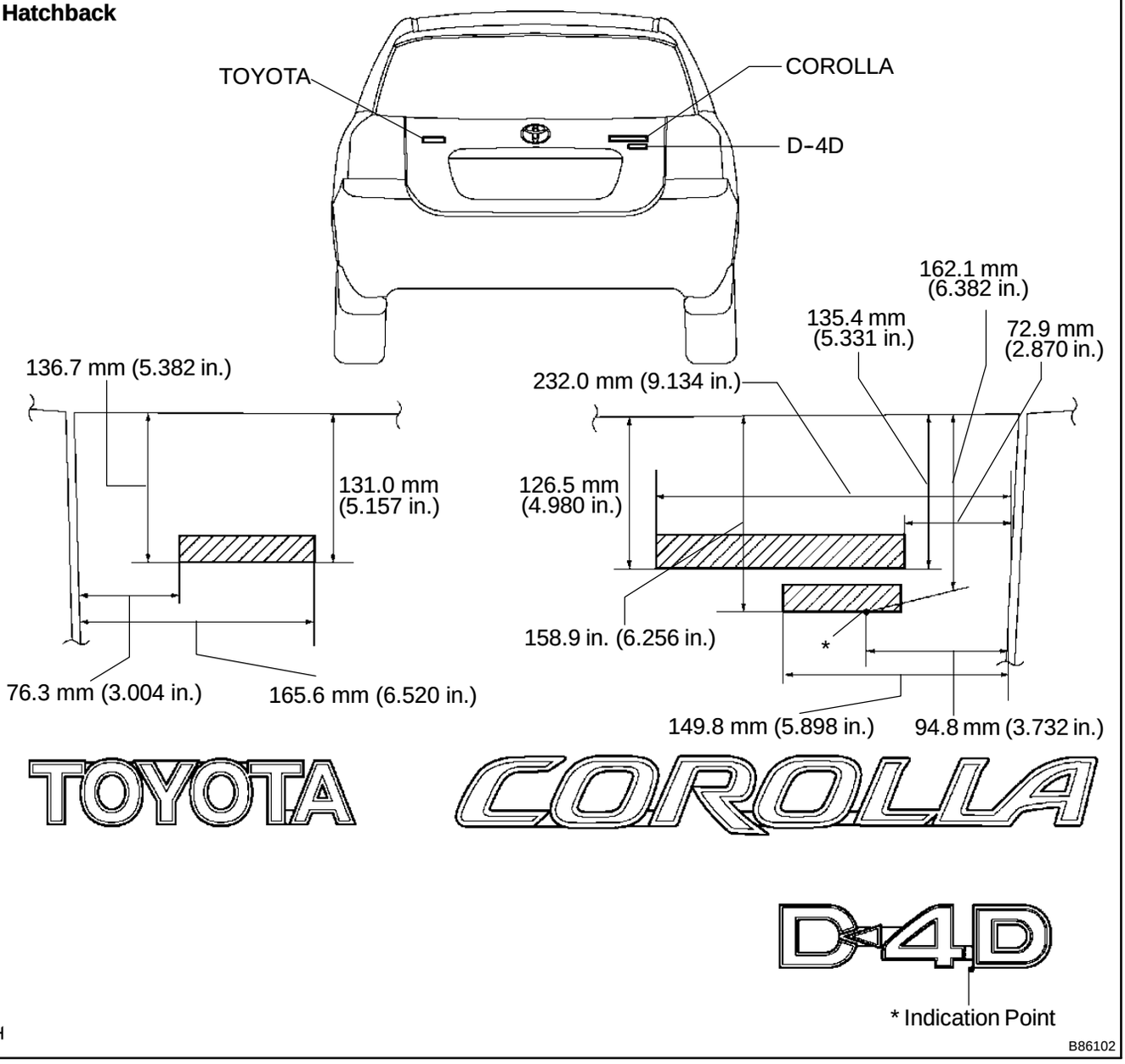
H

B86103

Wagon


TOYOTA
COROLLA
D-4D
28.0 mm (1.102 in.)
79.7 mm (3.138 in.)
31.1 mm (1.224 in.)
1.1°
134.3 mm
(5.287 in.)
138.5 mm
(5.453 in.)
26.3 mm (1.035 in.)
TOYOTA
COROLLA
D-4D
H
B86101

Hatchback



H

B86102

CRUISE CONTROL

CRUISE CONTROL MAIN SWITCH 82-1
REPLACEMENT 82-1
CLUTCH SWITCH ASSY 82-2
REPLACEMENT 82-2

CRUISE CONTROL MAIN SWITCH

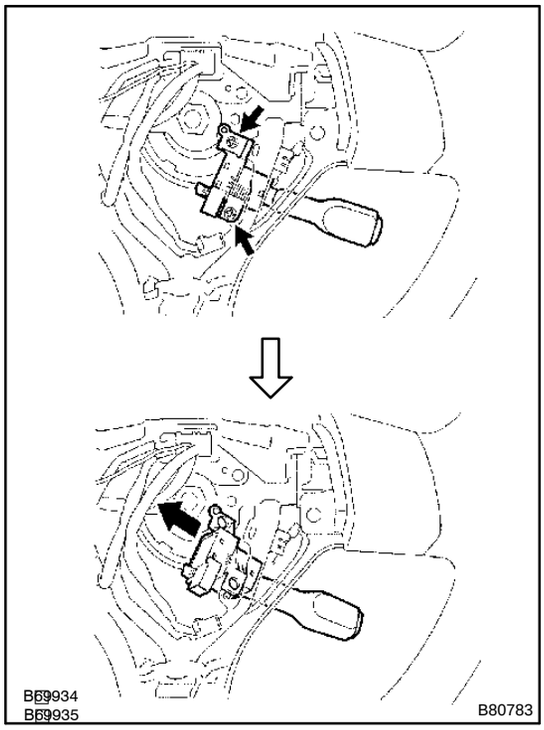
REPLACEMENT

82056-02

HINT:

Installation is in the reverse order of removal.

1. **PRECAUTION (SEE PAGE 60-1)**
2. **DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)**
3. **REMOVE HORN BUTTON ASSY**
   (TMC MADE: SEE PAGE 60-21)
   (TMMT/TMUK MADE: SEE PAGE 60-31)



4. **REMOVE CRUISE CONTROL MAIN SWITCH**

(a) Disconnect the connector.

(b) Remove the 2 screws and cruise control main switch.

5. **INSTALL HORN BUTTON ASSY**
   (TMC MADE: SEE PAGE 60-21)
   (TMMT/TMUK MADE: SEE PAGE 60-31)
6. **CONNECT BATTERY NEGATIVE TERMINAL**
7. **INSPECT HORN BUTTON ASSY (SEE PAGE 60-14)**
8. **INSPECT SRS WARNING LIGHT (SEE PAGE 05-719)**

CLUTCH SWITCH ASSY

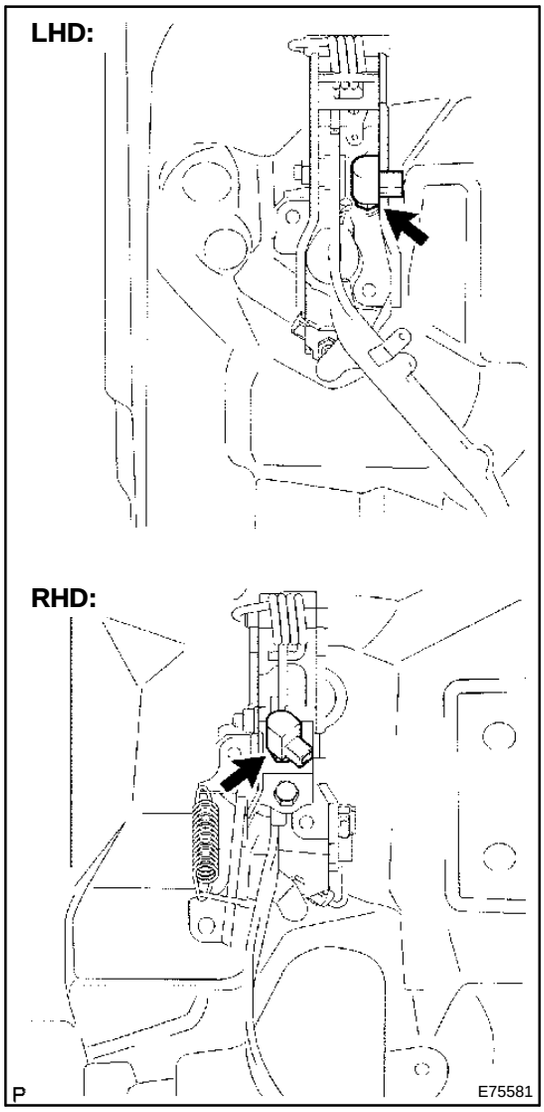
8205D-01

REPLACEMENT

HINT:

Installation is in the reverse order of removal.

1. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 **(SEE PAGE 71-6)**



2. REMOVE CLUTCH SWITCH ASSY

(a) Disconnect the connector.

(b) Loosen the nut and remove the clutch switch assy.

3. INSTALL CLUTCH SWITCH ASSY

(a) Install the clutch switch assy, tighten the nut.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

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