GENERAL DESCRIPTION

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

   i. Diagnosis

   ii. Removing/Installing, Replacing, Disassembling/Reassembling, Checking and Adjusting

   iii. Final Inspection

b. The following procedures are omitted from this manual. However, these procedures must be performed.

   i. Use a jack or lift to perform operations.

   ii. Clean all removed parts.

   iii. Perform a visual check.

INDEX

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

PREPARATION

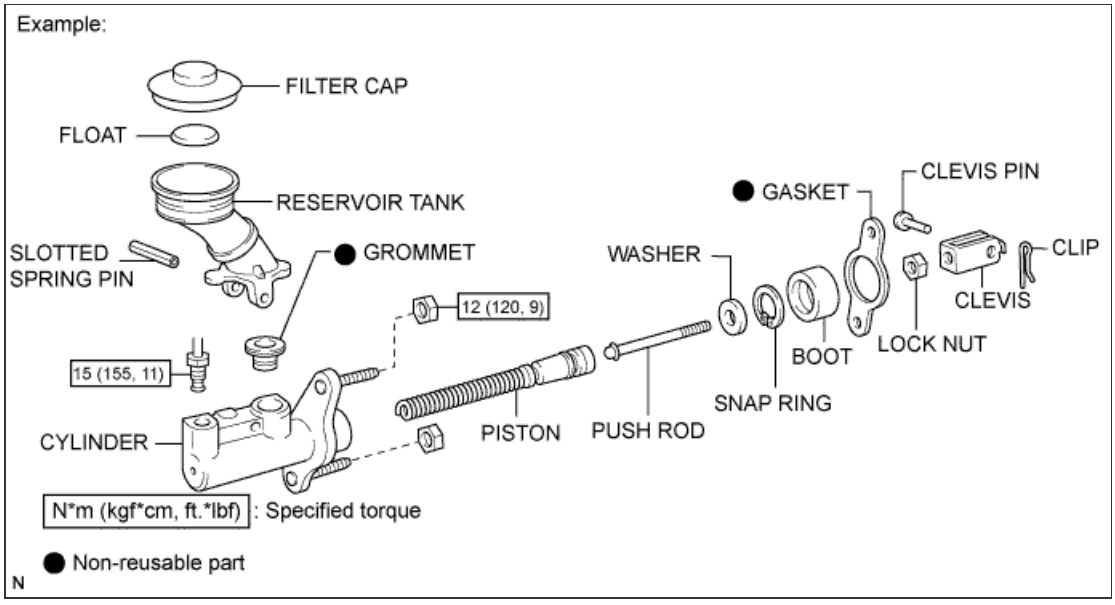
a. Use of Special Service Tools (SST) and Special Service Materials (SSM) may be required, depending on the repair procedure. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the "Preparation" section of this manual.

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.

The following illustration is an example.



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

HINT:

There are cases where such information can only be explained by using an illustration. In these cases, the information is described in the illustration.

d. Only items with key points are described in the text. What to do and other details are explained using illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.

Illustration	What to do and where to do it.
Task heading	What work will be performed.
Explanation text	How to perform the task. Also has information such as specifications and warnings, which are written in boldface text.

e. Illustrations of similar vehicle models are sometimes used. In these cases, minor details may be different from the actual vehicle.

f. Procedures are presented in a step-by-step format.

SERVICE SPECIFICATIONS

a. SPECIFICATIONS are presented in boldface text throughout the manual. The specifications are also found in the "Service Specifications" section for reference.

TERM DEFINITIONS

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

INTERNATIONAL SYSTEM OF UNITS

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

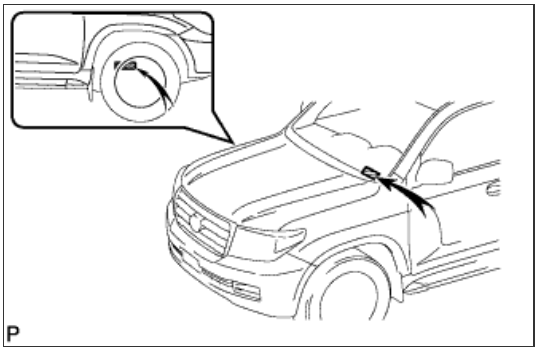
Below is an example.

Torque:
30 N*m{ 310 kgf*cm , 22 ft.*lbf }

VEHICLE IDENTIFICATION NUMBER

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

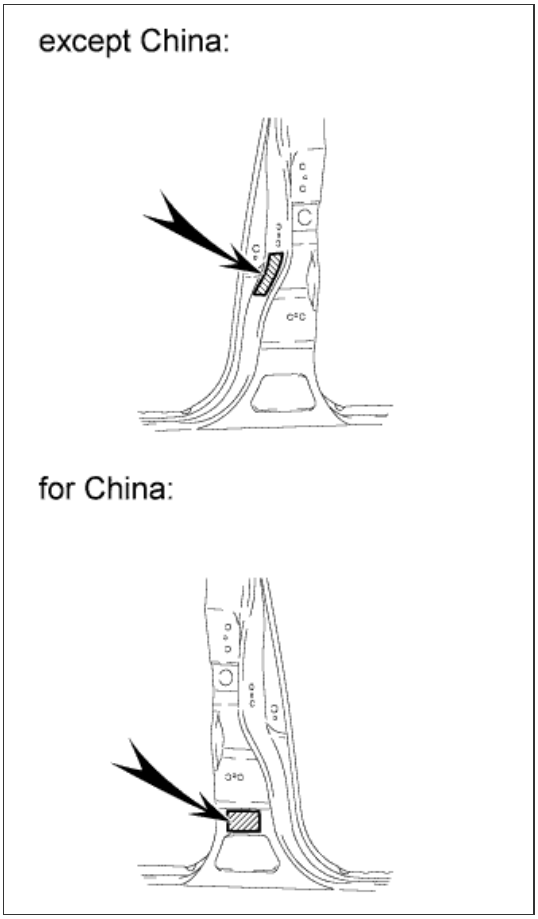
i. Vehicle Identification Number Plate



ii. Certification Label*1 or name plate*2

HINT:

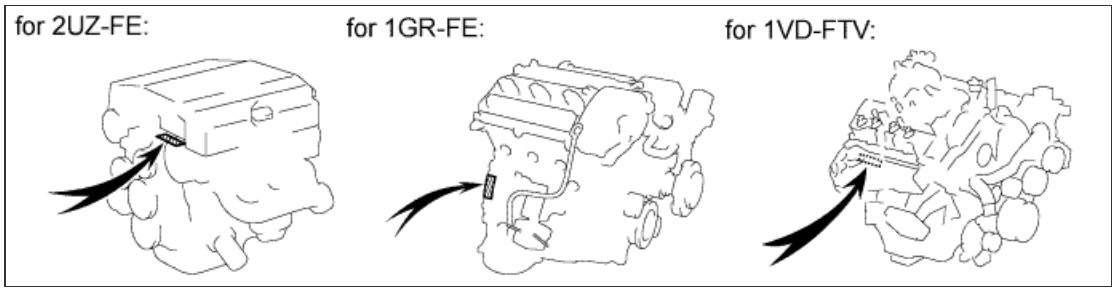
- ***1: except china**
- ***2: for china**



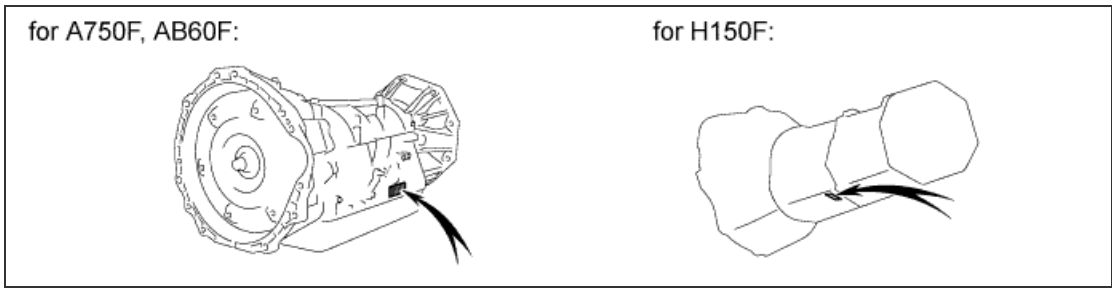
ENGINE SERIAL NUMBER AND TRANSMISSION SERIAL NUMBER

a. The engine serial number is stamped on the cylinder block of the engine and the transmission serial number is stamped on the housing as shown in the illustrations.

i. Engine Serial Number



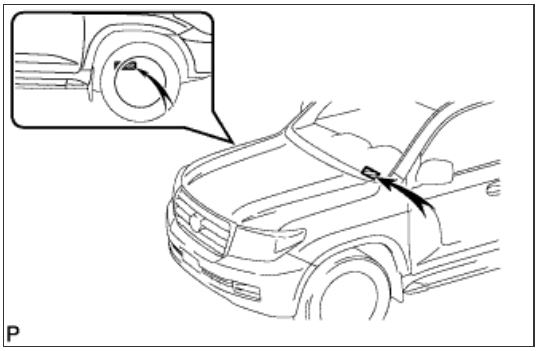
ii. Transmission Serial Number



VEHICLE IDENTIFICATION NUMBER

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

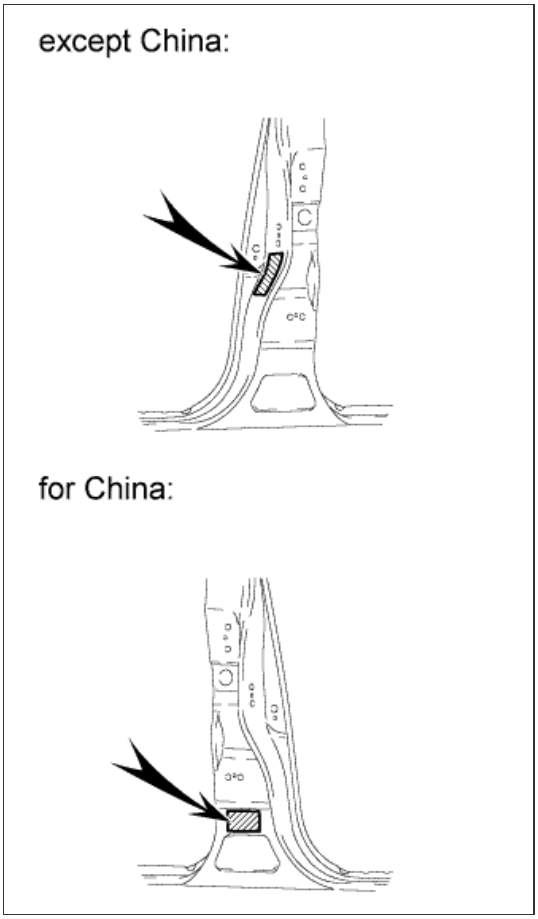
i. Vehicle Identification Number Plate



ii. Certification Label*1 or name plate*2

HINT:

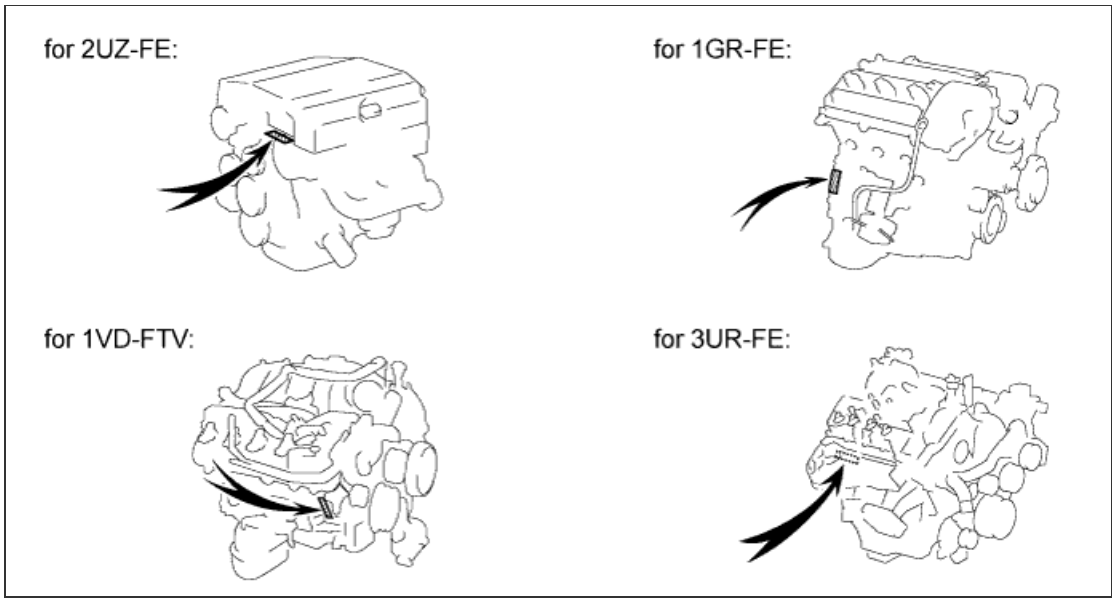
- ***1: except china**
- ***2: for china**



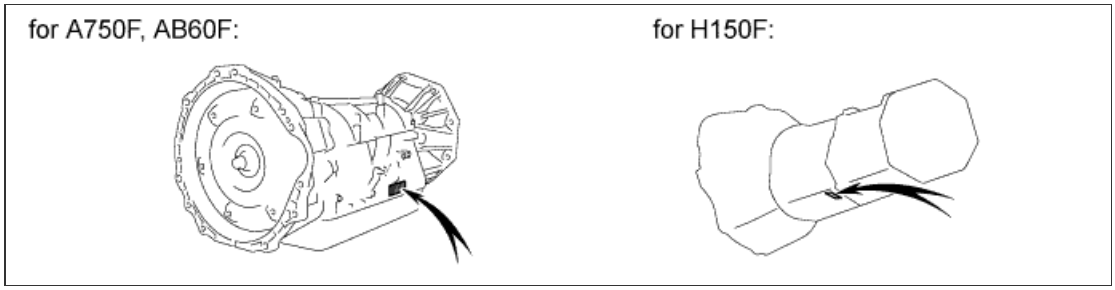
ENGINE SERIAL NUMBER AND TRANSMISSION SERIAL NUMBER

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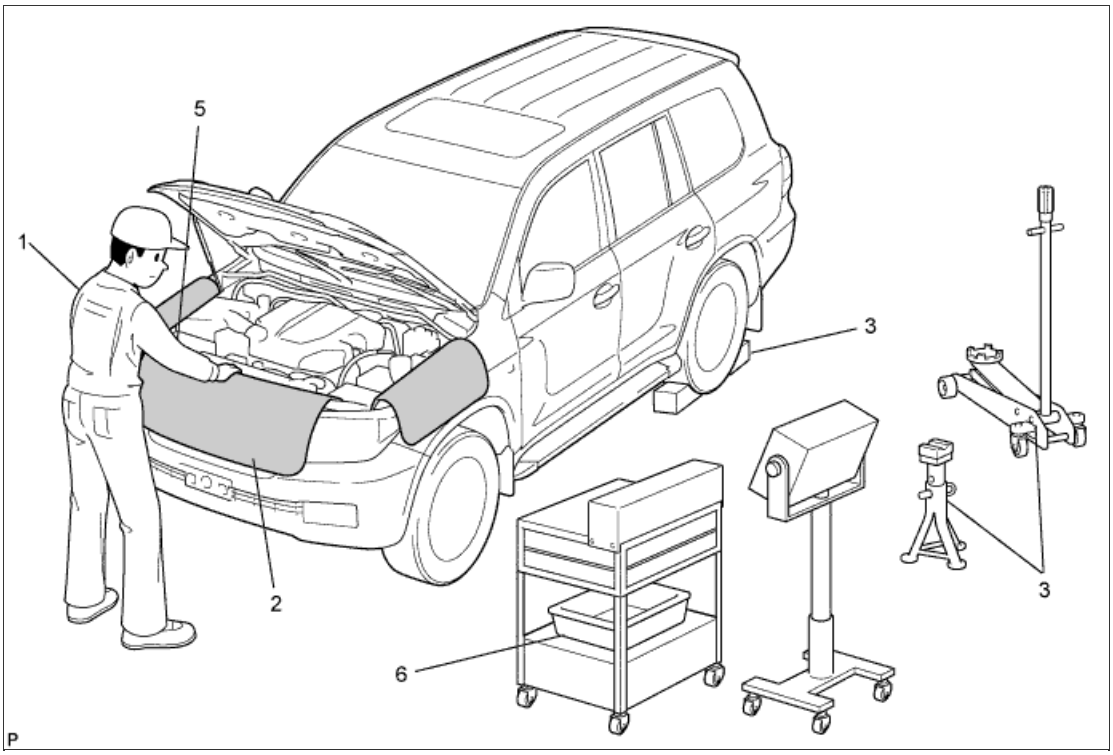


ii. Transmission Serial Number



1.BASIC REPAIR HINT

a. HINTS ON OPERATIONS



1	Attire	• 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	• Use wheel chocks to secure the vehicle. • When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop. • When removing or installing heavy parts, such as the engine, transmission, differential, etc., before starting work make sure there are no problems with the equipment that will be used. • When working with 2 or more persons, be sure to check safety for one another. • 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.
4	Preparation of tools and measuring gauge	Before starting operation, prepare a tool stand, SST, a gauge, oil and the 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 ensure reassembly 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.

7*	Checks to perform after work is finished	• Make sure that removed and installed parts (oil filler cap, level dipstick, floor mat, etc.) are properly installed/tightened. • Make sure that none of the cloths or tools that were used have been left in the engine compartment or within the vehicle. • Check that there are no oil leaks.

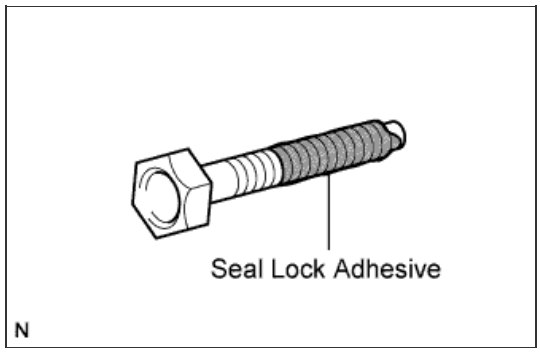
CAUTION:

*:Be sure to perform these checks properly, not performing these checks properly after finishing work can lead to serious accident or injury.

b. JACKING UP AND SUPPORTING VEHICLE

i. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.

c. PRECOATED PARTS



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

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

iii. 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.

iv. Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

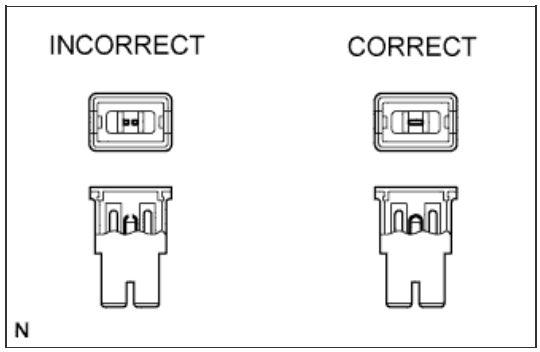
d. GASKETS

i. When necessary, use a sealer on gaskets to prevent leaks.

e. BOLTS, NUTS AND SCREWS

i. Carefully follow all the specifications for tightening torques. Always use a torque wrench.

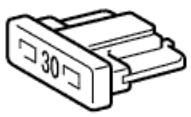
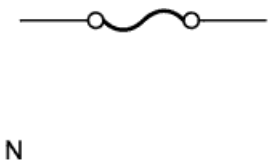
f. FUSES

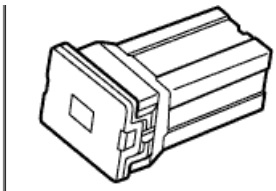
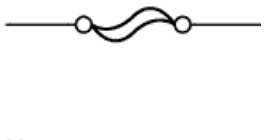
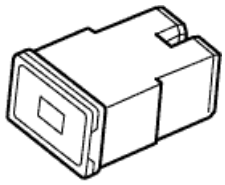
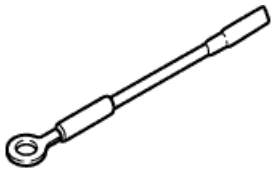
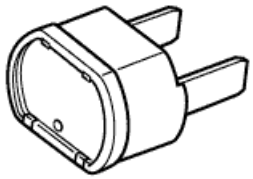
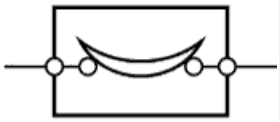


i. When inspecting a fuse, check that the wire of the fuse is not broken.

ii. If the wire of a fuse is broken, confirm that there are no shorts in its circuit.

iii. When a fuse is replaced, a fuse with the same amperage rating must be used.

Illustration	Symbol	Part Name	Abbreviation
	 N	FUSE	FUSE

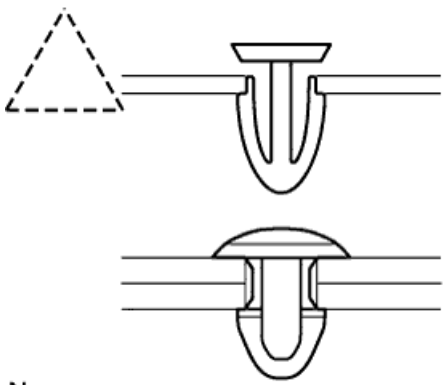
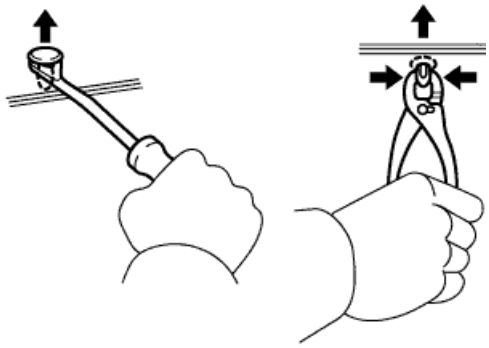
 N	 N	MEDIUM CURRENT FUSE	M-FUSE
 N	 N	HIGH CURRENT FUSE	H-FUSE
 N	 N	FUSIBLE LINK	FL
 N	 N	CIRCUIT BREAKER	CB

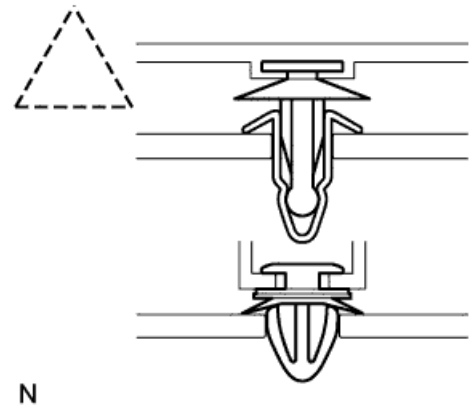
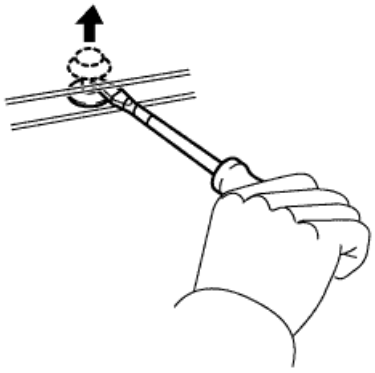
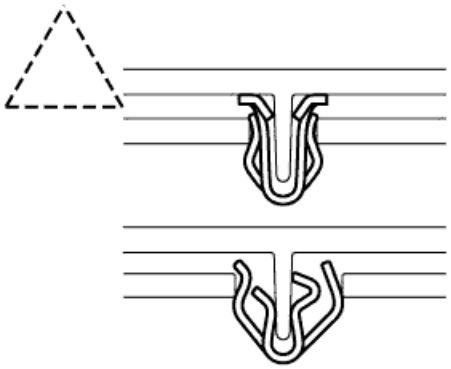
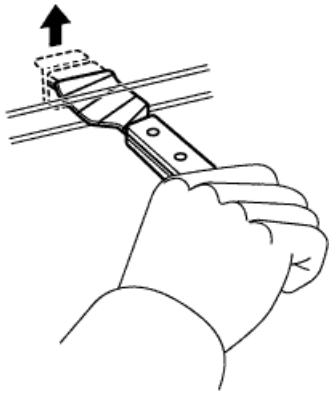
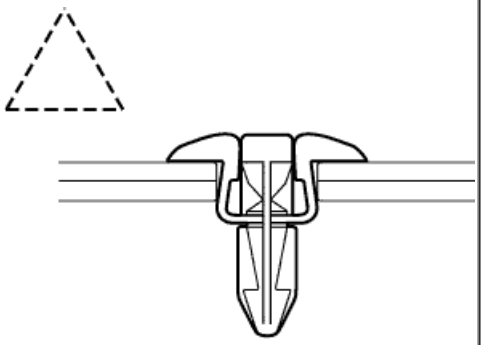
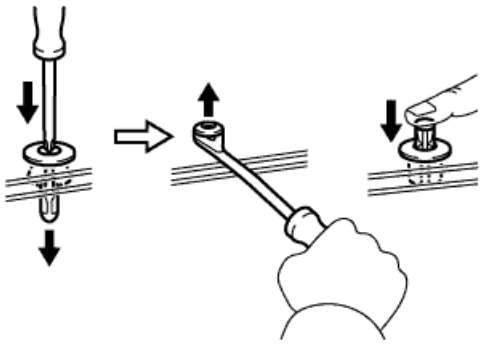
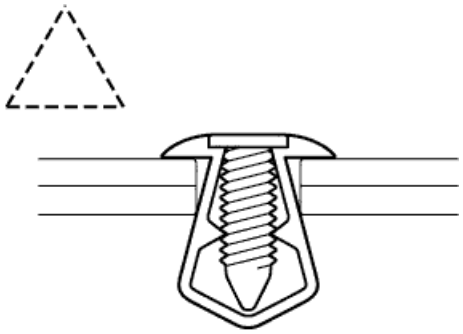
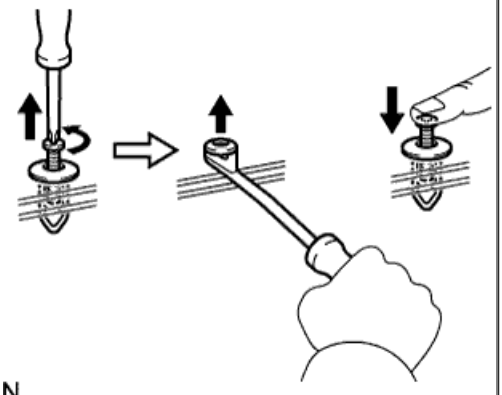
g. CLIPS

i. The removal and installation methods of typical clips used for vehicle body parts are shown in the table below.

HINT:

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

Shape (Example)	Illustration	Procedures
 N	 N	Remove clips with a clip remover or pliers.
		Remove

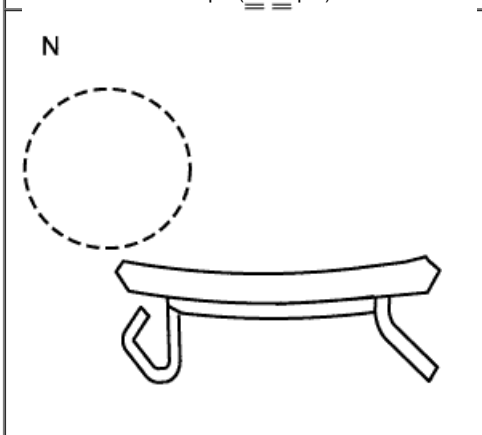
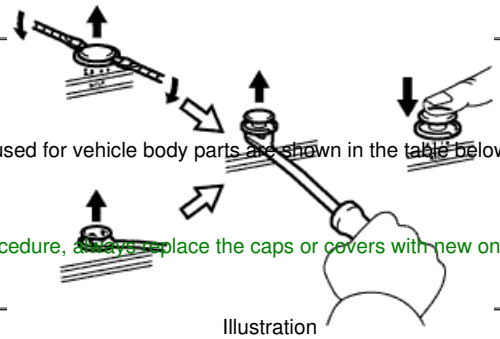
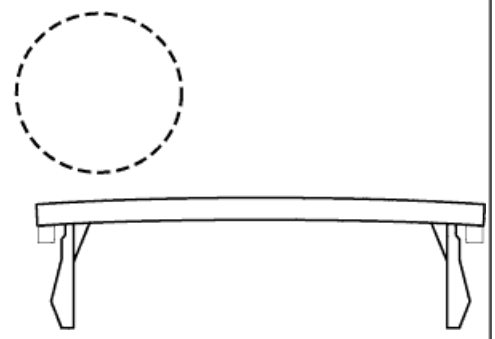
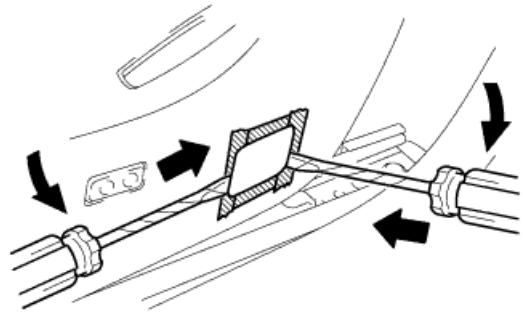
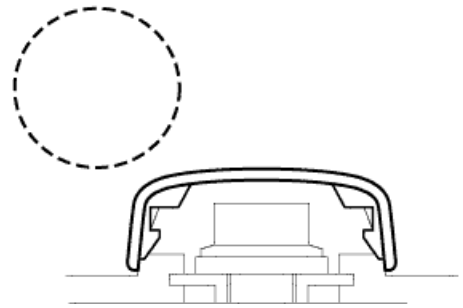
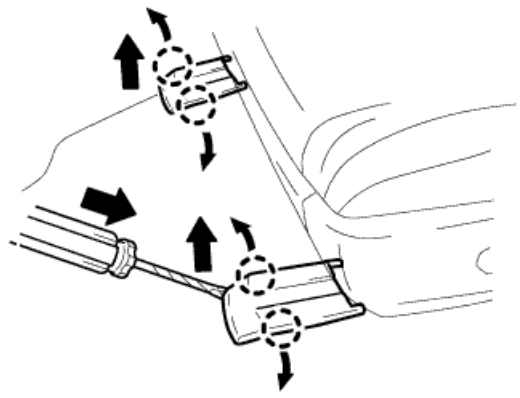
 N	 N	clips with a clip remover or screwdriver.
 N	 N	Remove clips with a wide scraper to prevent panel damage.
 N	 N	Remove clips by pushing the center pin through and prying out the shell.
 N	 N	Remove clips by unscrewing the center pin and prying out the shell.
		Remove clips by prying out the pin and then prying out the shell.

h. CLAWS

i. The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

HINT:

If claws of caps or covers are damaged during a procedure, always replace the caps or covers with new ones.

Shape (Example)	Illustration	Procedures
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.

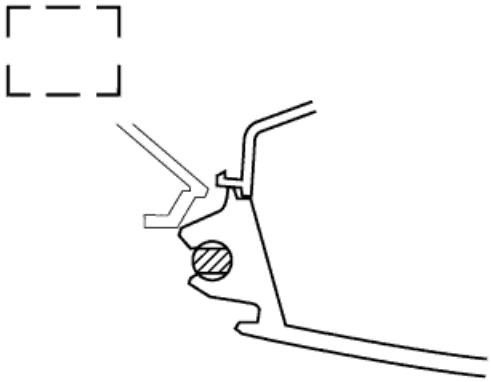
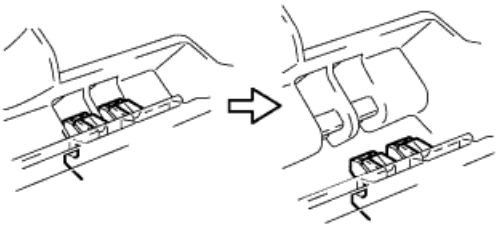
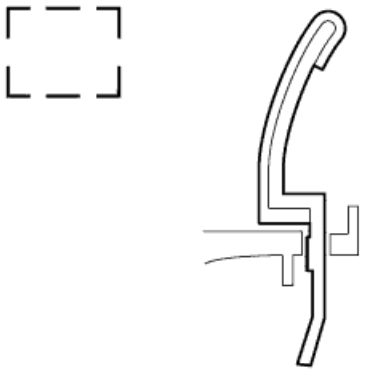
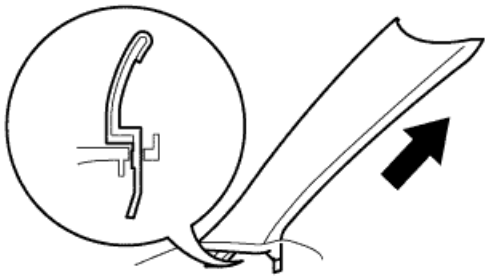
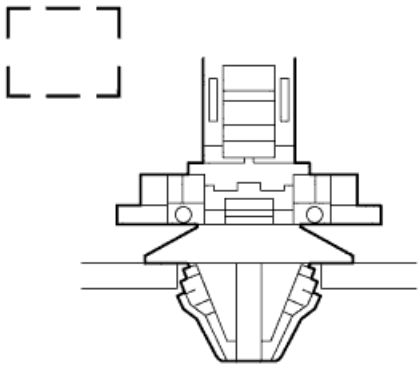
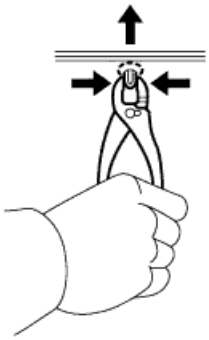
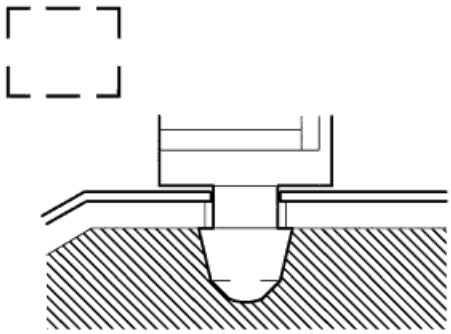
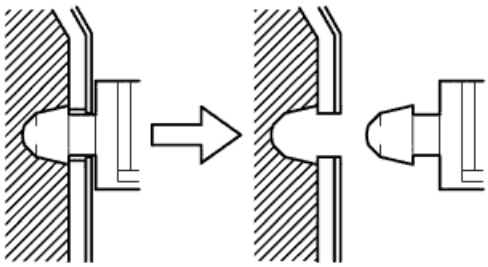
i. HINGE, GUIDE, CLAMP, PIN ETC.

i. The removal and installation methods of typical hinges, guides, clamps and pins used for vehicle body parts are shown in the table below.

HINT:

If clamps are damaged during a procedure, always replace the cap or cover that has damaged clamps with a new one.

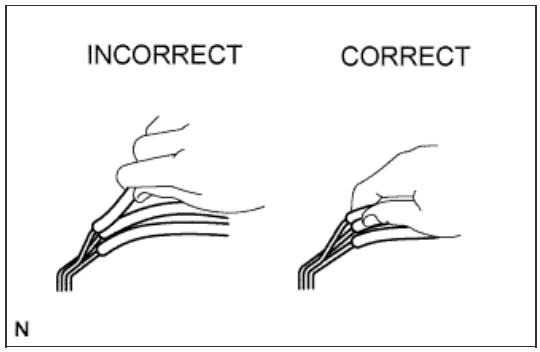
Shape (Example)	Illustration	Procedures

		Disengage the pins by pulling.
		Disengage the pins by pulling.
		Remove the clamps with pliers.
		Disengage the pins by pulling.

j. REMOVAL AND INSTALLATION OF VACUUM HOSES

i. To disconnect a vacuum hose, pull and twist from the end of the hose.

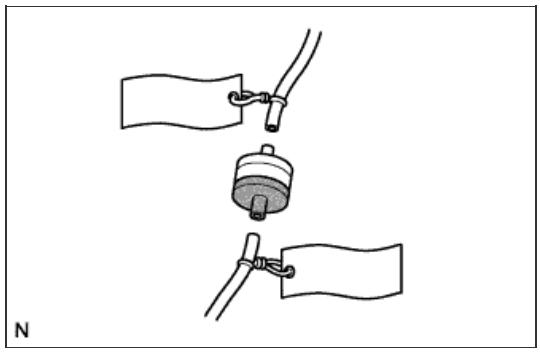
Do not pull from the middle of the hose as this may cause damage.



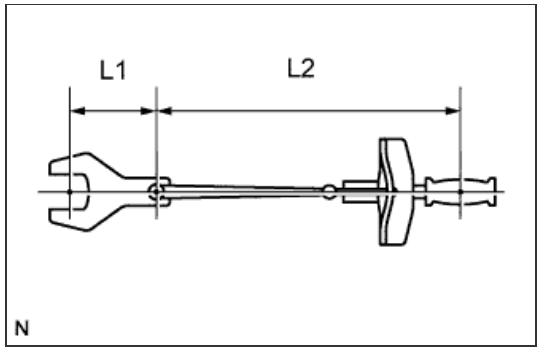
ii. When disconnecting vacuum hoses, use tags to identify where they should be reconnected.

iii. After completing any hose related repairs, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.

iv. When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, it may leak air. Use a step-down adapter if necessary.



k. TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL

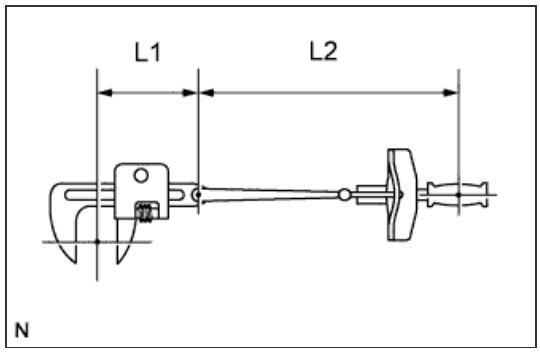


i. Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with a torque wrench.

Formula:

T' = L2 / (L1 + L2) * T

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.)}



NOTICE:

If an extension tool or SST is combined with a torque wrench and the wrench is used to tighten to a torque specification in this manual, the actual torque will be excessive and parts will be damaged.

2.FOR VEHICLES WITH SUPPLEMENTAL RESTRAINT SYSTEM

The LAND CRUISER Station Wagon is equipped with a Supplemental Restraint System (SRS). The SRS of this vehicle consists of the following:

1. Steering pad
2. Front passenger airbag assembly
3. Curtain shield airbag assembly
4. Front seat side airbag assembly
5. Knee airbag assembly
6. Center airbag sensor assembly
7. Front airbag sensor

8. Side airbag sensor
9. Seat position airbag sensor
10. Occupant classification ECU
11. Front seat outer belt assembly with pretensioner

CAUTION:

- **Failure to carry out service procedures in the correct sequence could cause SRS parts to unexpectedly deploy and possibly lead to serious injuries. Furthermore, if a mistake is made when servicing SRS parts, they may fail to operate when required. Before performing servicing (including installation/removal, inspection and replacement of parts), be sure to read the following precautions.**
- **Before starting work, wait at least 90 seconds after the engine switch is turned off and after the cable of the negative (-) battery terminal is disconnected. (SRS parts are equipped with a backup power source. If work is started within 90 seconds of turning the engine switch is turned off and disconnecting the cable from the negative (-) battery terminal, SRS parts may deploy.)**
- **Do not expose SRS parts directly to hot air or flames.**

NOTICE:

- **Malfunction symptoms of SRS parts are difficult to confirm. DTCs are the most important source of information when troubleshooting. During troubleshooting, always confirm DTCs before disconnecting the cable from the negative (-) battery terminal.**
- **For minor collisions where SRS parts do not deploy, always inspect the SRS parts.**
- **Before performing repairs, remove airbag sensors as necessary if any kind of impact is likely to occur to an airbag sensor during repairs.**
- **Never use SRS parts from another vehicle. When replacing SRS parts, replace them with new ones.**
- **Never disassemble or attempt to repair SRS parts.**
- **If an SRS part has been dropped, or if there are any cracks, dents or other defects in the case, bracket or connector, replace the SRS part with a new one.**
- **Use an ohmmeter/voltmeter with high impedance (10 kΩ/V minimum) for troubleshooting the electrical circuits.**
- **Information labels are attached to the periphery of SRS parts. Follow the cautions and instructions on the labels.**
- **After work on SRS parts is completed, perform the SRS warning light check.**
- **When the cable is disconnected from the negative (-) battery terminal, the memory settings of each system will be cleared. Because of this, be sure to write down the settings of each system before starting work. When work is finished, reset the settings of each system as before. Never use a backup power supply from outside the vehicle to avoid erasing the memory in a system.**
- **An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with bare hands to discharge static electricity before performing this procedure.**

a. SPIRAL CABLE

i. The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, as cable disconnection and other problems may occur. Refer to the information about correct installation of the steering wheel.

b. AIRBAG ASSEMBLY

i. Airbag assembly with pad:
Always place a removed or new airbag assembly with the pad surface facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag inflates. Also, do not place anything on top of the airbag assembly.

ii. Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause a serious injury.

iii. Grease or detergents of any kind should not be applied to the airbag assembly.

iv. Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

v. When using electric welding anywhere on the vehicle, disconnect the center airbag sensor connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

vi. When disposing of the vehicle or the airbag assembly by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.

c. SEAT OUTER BELT ASSEMBLY WITH PRETENSIONER

i. Never measure the resistance of the seat outer belt. This may cause the pretensioner of the seat outer belt to activate, which could cause a serious injury.

ii. Never install the seat outer belt on another vehicle.

iii. Store the seat outer belt in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and there is no electrical noise.

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

v. When disposing of a vehicle or the seat outer belt by itself, the pretensioner should be activated before disposal. Activate the

pretensioner in a safe place away from electrical noise.

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

vii. Grease, detergents, oil or water should not be applied to the seat outer belt.

d. AIRBAG SENSOR ASSEMBLY

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

ii. The connectors to the airbag sensor assembly should be connected or disconnected with the sensor placed on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not placed on the floor, the SRS may activate.

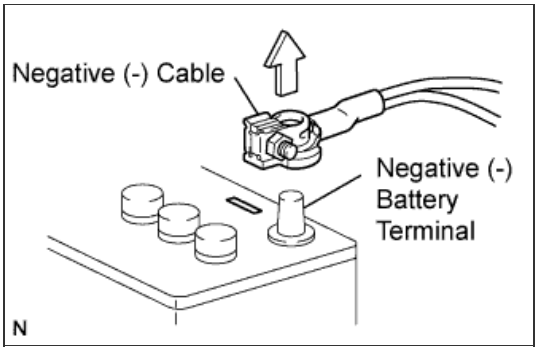
iii. Work must be started at least 90 seconds after the engine switch is turned off and the cable is disconnected from the negative (-) battery terminal, even if only loosening the set bolts of the airbag sensor assembly.

e. WIRE HARNESS AND CONNECTOR

i. The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are yellow. 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



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

ii. When disconnecting the cable, turn the engine switch off and headlight dimmer switch off and loosen the cable nut completely. Perform these operations without twisting or prying the cable. Then disconnect the cable.

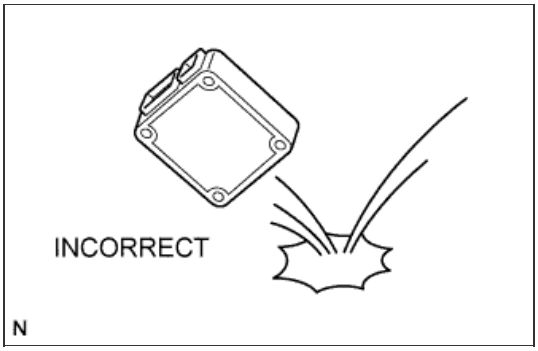
iii. Clock settings*, radio settings, audio system memory, DTCs and other data are cleared when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

HINT:

*: w/o Multi-display, w/o Radio Receiver or w/ Cassette Tape Player

iv. Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

b. HANDLING OF ELECTRONIC PARTS



i. 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.

ii. Do not pull the wires when disconnecting electronic connectors. Pull the connector.

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

iv. When cleaning the engine with steam, protect the electronic components, air filter and emission-related components from water.

v. Never use an impact wrench to remove or install temperature switches or temperature sensors.

vi. When measuring the resistance of a wire connector, insert the tester probe carefully to prevent terminals from bending.

4.REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

a. PLACE FOR REMOVING AND INSTALLING FUEL SYSTEM PARTS

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

ii. Never work in a pit or near a pit as vaporized fuel will collect in those places.

b. REMOVING AND INSTALLING FUEL SYSTEM PARTS

i. Prepare a fire extinguisher before starting the operation.

ii. To prevent 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 gasoline to spread, and possibly create a fire hazard.

iii. Avoid using electric motors, working lights and other electric equipment that can cause sparks or high temperatures.

iv. Avoid using iron hammers as they may create sparks.

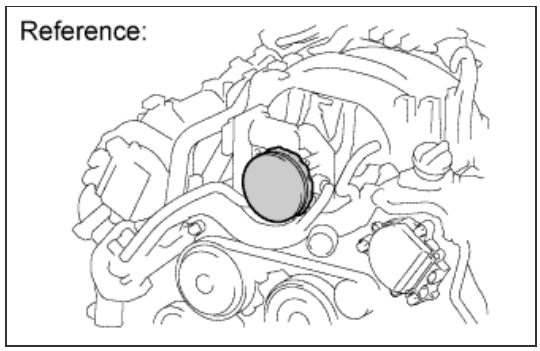
v. Dispose of fuel-contaminated cloths separately using a fire resistant container.

5.REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

a. If any metal particles enter inlet system parts, they may damage the engine.

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

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



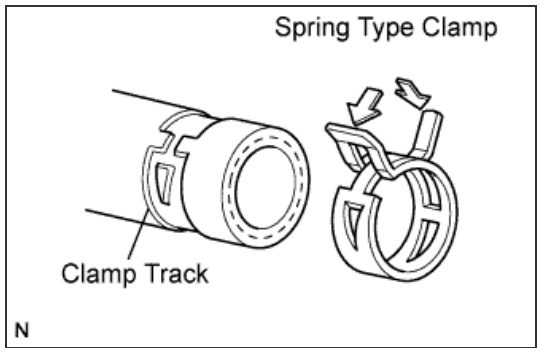
6.HANDLING OF HOSE CLAMPS

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 arrows as shown in the illustration.



7.FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEMS

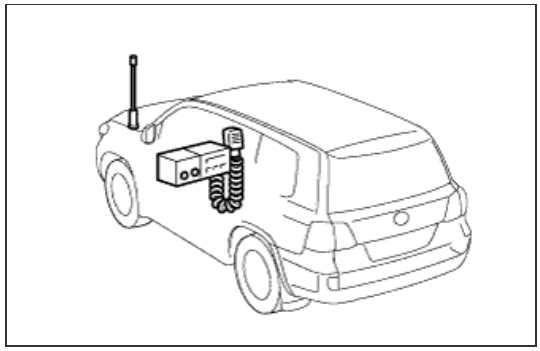
a. Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.

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

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

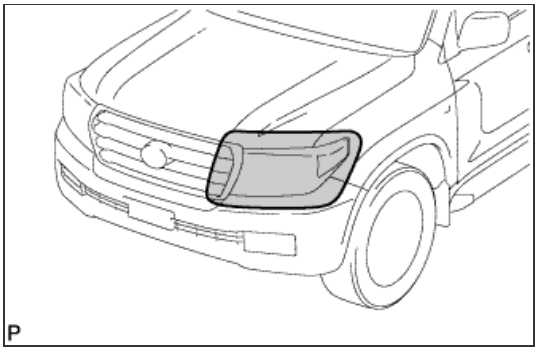
d. Check that the antenna and feeder are correctly adjusted.

e. Do not install a high-powered mobile communication system.



8.WHEN INSPECTING HEADLIGHT

a. When the headlights are illuminated, do not cover the headlights for 3 minutes or more.



NOTICE:

- **for HID Headlight:**
  1. **When the headlight dimmer switch assembly is set to HEAD, do not touch the high-voltage socket area of the discharge headlight.**
  2. **As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.**
- **for Standard Headlight:**
  1. **As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.**

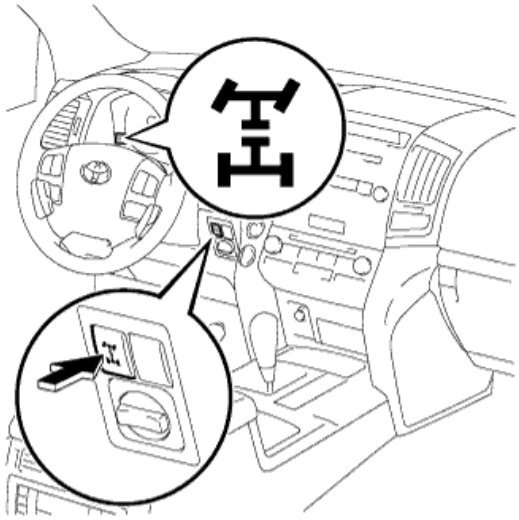
9.WHEN SERVICING FULL-TIME 4WD VEHICLES

a. The full-time 4WD LAND CRUISER Station Wagon is equipped with a mechanical lock type center differential system.

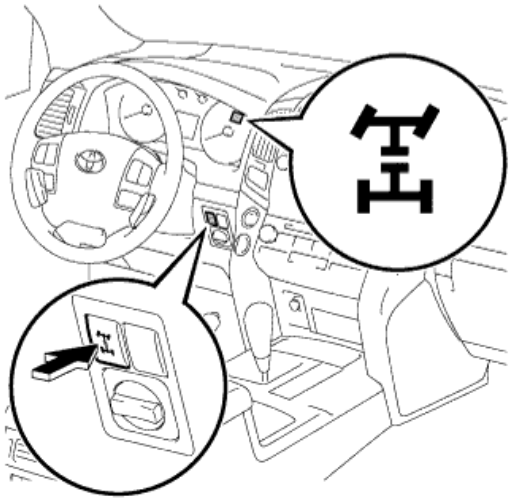
HINT:

Be sure to check that the indicator on the combination meter illuminates when operating the center differential switch (see the illustration).

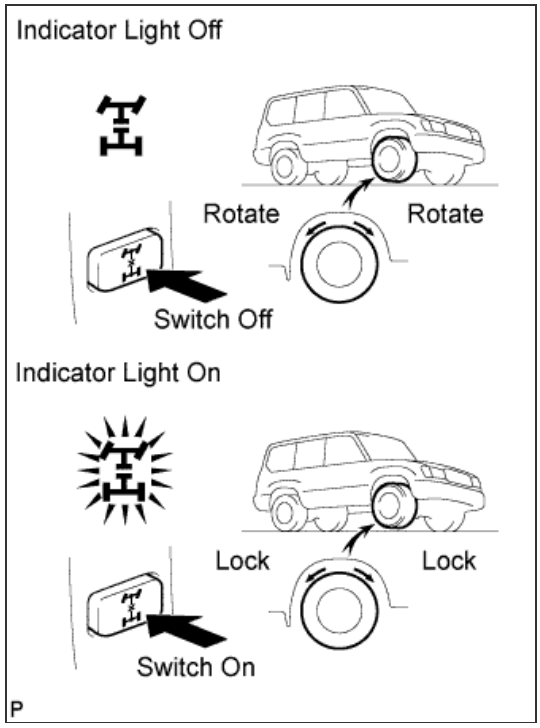
w/o Multi-information Display:



w/ Multi-information Display:



b. During tests that require the use of a braking force tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the rear wheels are to be rotated, it is necessary to set the position of the center differential to on or off depending on the type of the test being performed.



Center Differential FREE Condition

Item	Condition	Wheel
Center differential switch	Off	A lifted wheel can be rotated if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	Off	
4WD control switch (H4/L4)	Either	

Center Differential LOCK Condition

Item	Condition	Wheel
Center differential switch	On	A lifted wheel can be rotated if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	On	
4WD control switch (H4/L4)	Either	

CAUTION:

Center differential ON ←→ OFF selecting procedures:

- **Operate the switch only when all 4 wheels are stopped or driving in a straight line.**
- **Never operate the switch when any wheel is slipping.**
- **Never operate the switch when any wheel is spinning freely.**
- **Never operate the switch when swerving or cornering.**

10.WHEN TESTING BRAKES, SPEEDOMETER, ETC.

a. When carrying out any kind of servicing or testing on a Full-time 4WD with Active Traction Control System & Vehicle Stability Control (VSC) System in which the front or rear wheels are to be rotated (braking test, speedometer test), be sure to observe the precautions listed below.
Incorrect preparations or test procedures may cause damage as well as unsuccessful test results.

b. Before starting any such servicing or test, be sure to check the following items:

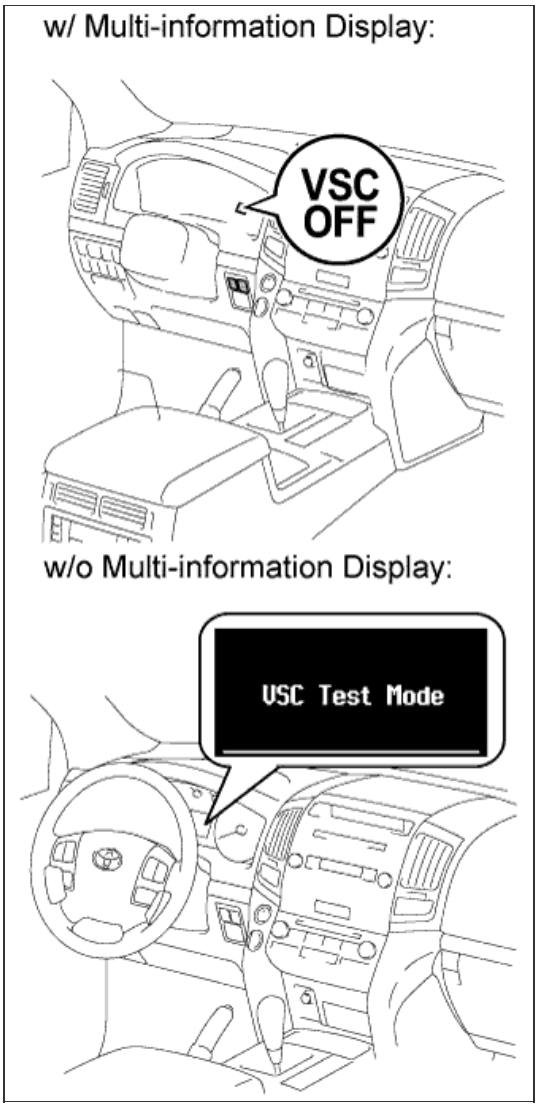
- The VSC system has entered to test mode using the intelligent tester (Click here)
- Whether the wheels should be touching the ground or the vehicle should be jacked up
- Shift lever in neutral.
- 4WD control switch (H4 or L4 position)
- Maximum testing vehicle speed
- Maximum testing time

CAUTION:

- **Do not start, accelerate or decelerate the vehicle suddenly.**
- **Maximum vehicle speed must be below 60 km/h (37 mph) (when using free roller, it must be below 50 km/h (31 mph)).**

NOTICE:

- **A tester with a function of load setting for only two wheels cannot be used.**
- **Inspection should be done on the rear wheels.**
- **Driving time should be within 1 minute.**



c. When using a braking force tester (not free roller type):
When performing measurements using a low-speed type braking force tester, observe the following instructions.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the braking force tester.

iii. Jack up the front wheels.

iv. Ensure that the vehicle does not move using wires.

v. Move the shift lever to N*1 or neutral*2.

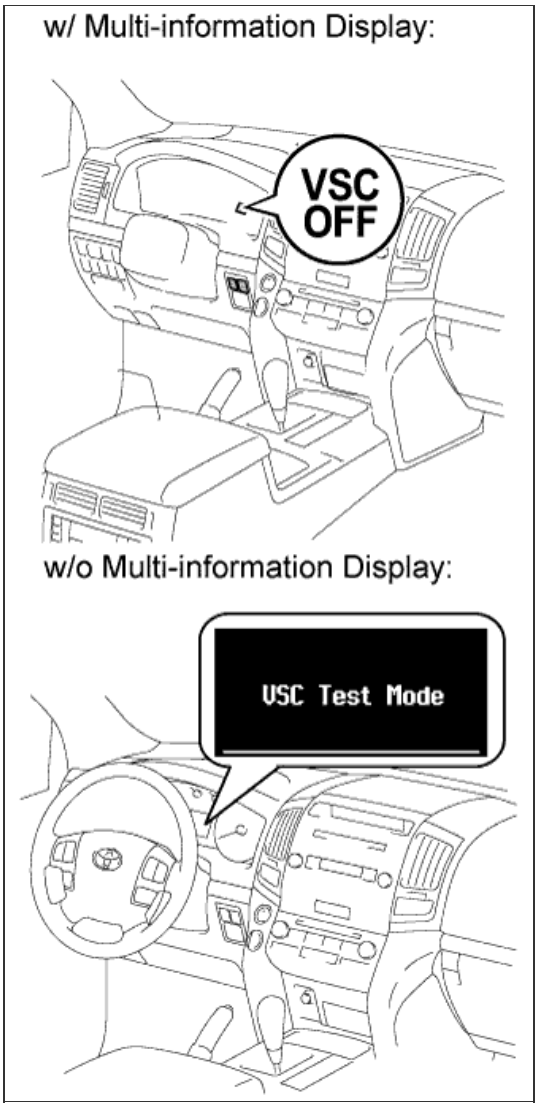
HINT:

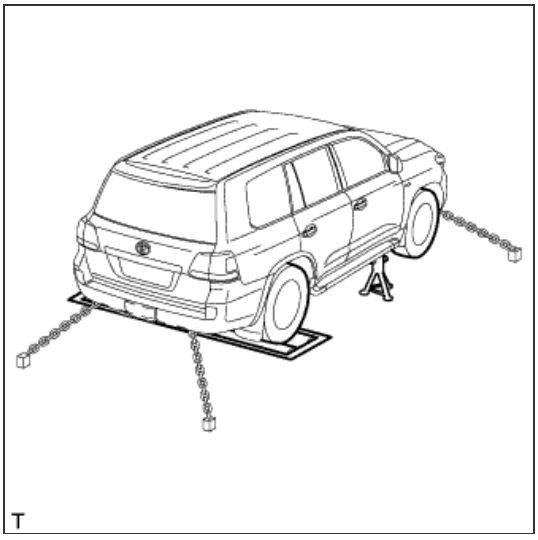
- ***1: for Automatic Transmission**
- ***2: for Manual Transmission**

vi. Idle the engine, operate the brake booster and perform the test.

NOTICE:

The maximum driving time should be 1 minute.





d. When using a braking force tester (free roller type):
When performing measurements using a low-speed type braking force tester, observe the following instructions.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the braking force tester.

iii. Position the front wheels to be tested on the free roller.

iv. Ensure that the vehicle does not move using wires.

v. Move the shift lever to N*1 or neutral*2.

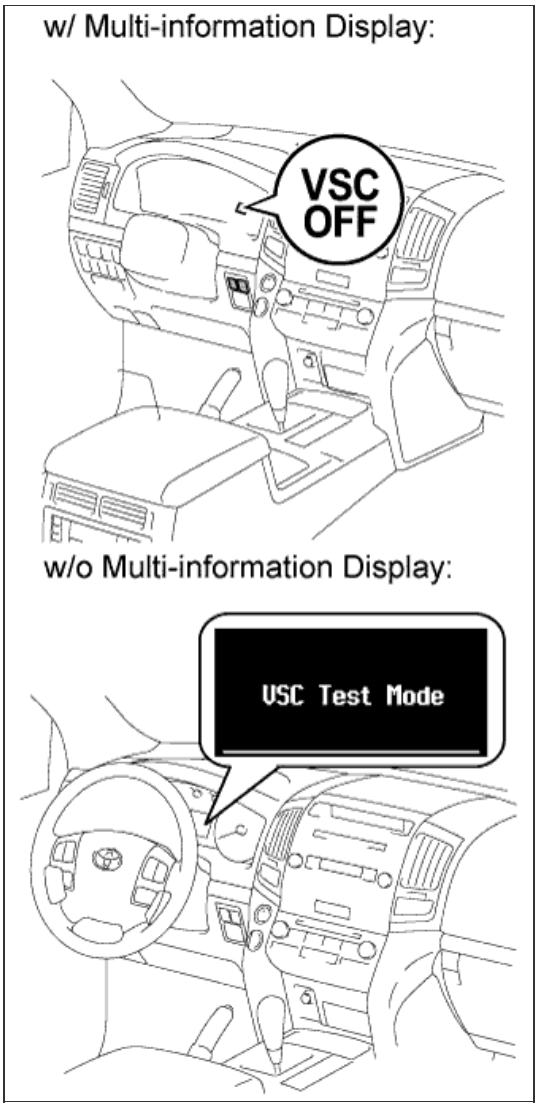
HINT:

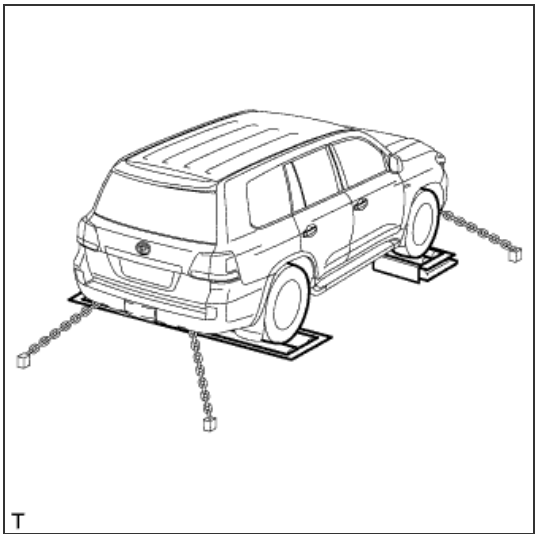
- ***1: for Automatic Transmission**
- ***2: for Manual Transmission**

vi. Idle the engine, operate the brake booster and perform the test.

NOTICE:

The maximum driving time should be 1 minute.





e. When using a speedometer (not free roller type):
Observe the following instructions and then measure with the rear wheels.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the dram tester.

iii. Jack up the front wheels.

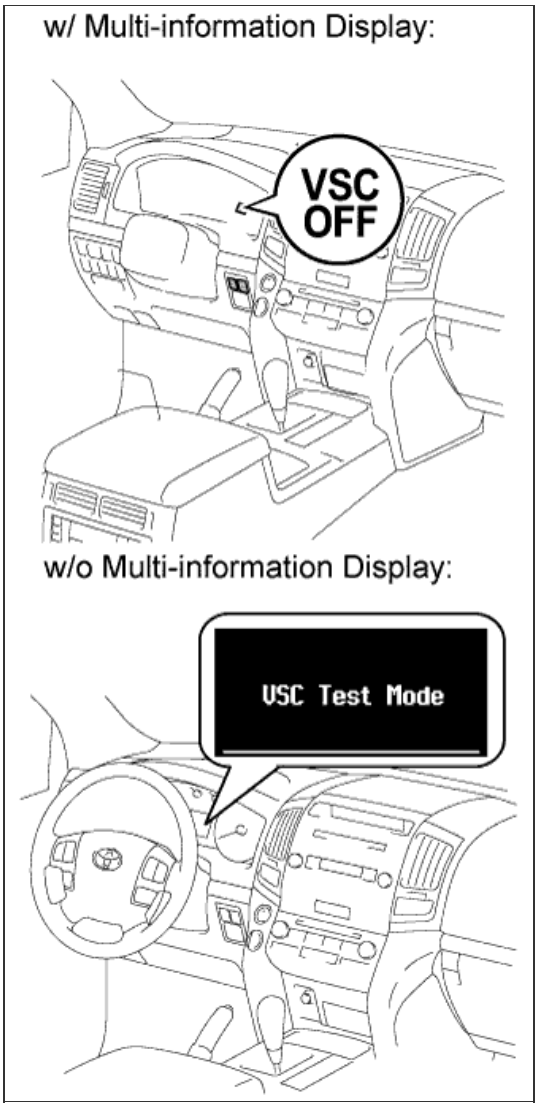
iv. Ensure that the vehicle does not move using wires.

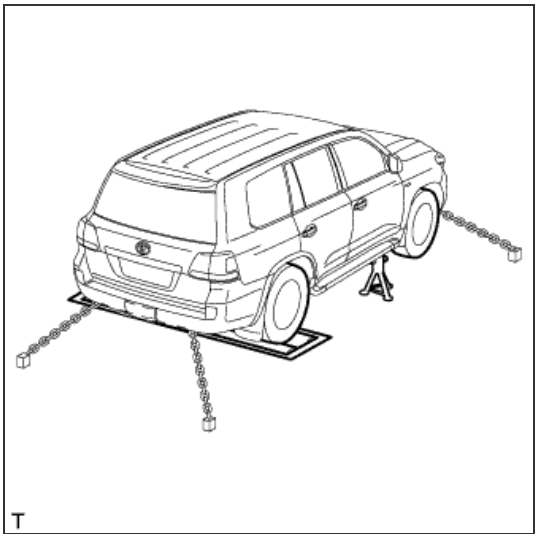
NOTICE:

- **When performing measurement, be sure to only drive**

the drive wheels in the forward direction.

- The maximum speed should be less than 50 km/h (31 mph).
- If the measurement must be made while the vehicle speed is over 50 km/h (31 mph), remove the propeller shaft.





f. When using a speedometer (not free roller type):
Observe the following instructions and then measure with the rear wheels.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the dram tester.

iii. Position the front wheels to be tested on the free roller.

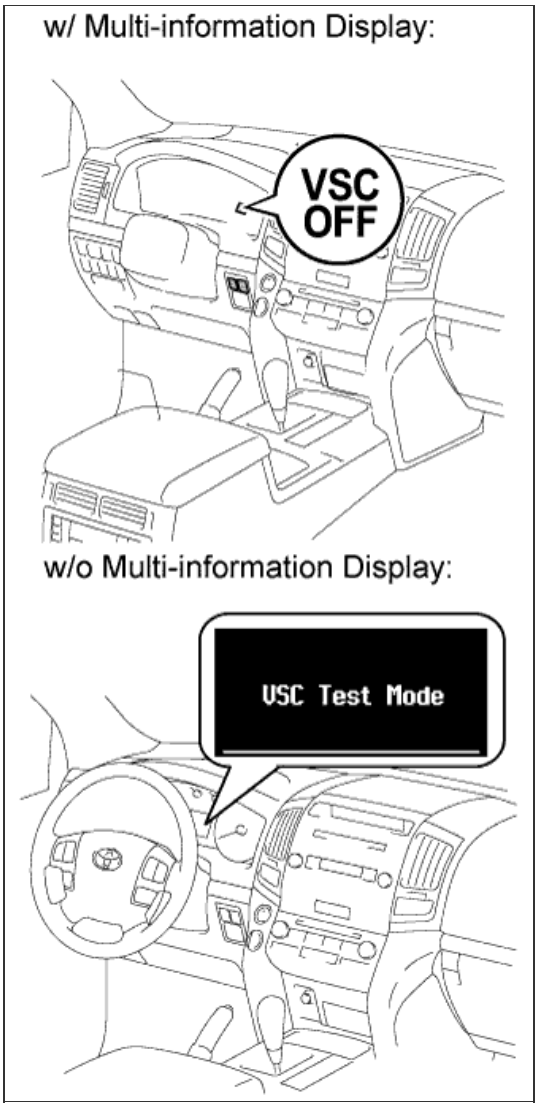
iv. Ensure that the vehicle does not move using wires.

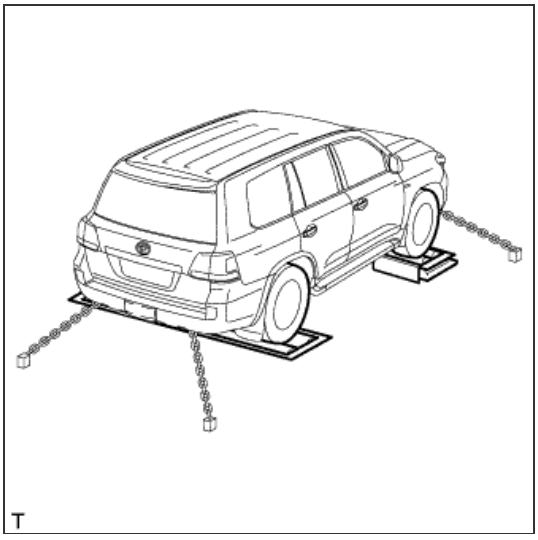
NOTICE:

- When performing measurement, be sure to only drive

the drive wheels in the forward direction.

- The maximum speed should be less than 50 km/h (31 mph).
- If the measurement must be made while the vehicle speed is over 50 km/h (31 mph), remove the propeller shaft.





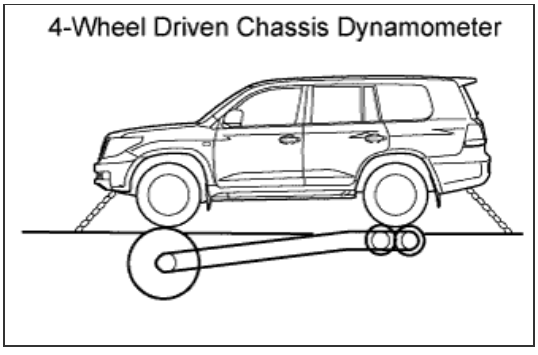
g. Using chassis dynamometer

NOTICE:

If you do not observe the following conditions for the test. There will be the cases where the 4WD functions will deteriorate; the parts in the drive-train system will have a malfunction; the vehicle will jump out. Therefore. do not conduct a test unless observing the following conditions.

HINT:

When conducting a test with the vehicle highly loaded are driven with high speeds, observe the following



Chassis Dynamometer Type	Vehicle Speed and Test Time	Propeller Shaft
4-wheel Driven chassis Dynamometer	No restriction	Normal (Do not remove)

NOTICE:

- **Do not suddenly accelerate and do not suddenly apply brake.**
- **Confirm that the vehicle is securely immobilized.**

11.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 idling the engine for more than 20 minutes.

c. When performing spark jump tests:

i. Perform a spark jump test only when absolutely necessary. Perform this test as rapidly as possible.

ii. While testing, never race the engine.

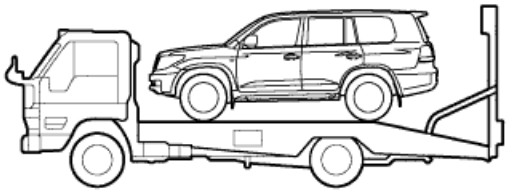
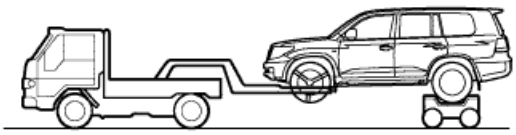
d. Avoid a prolonged engine compression measurement. Engine compression measurements must be performed as rapidly as possible.

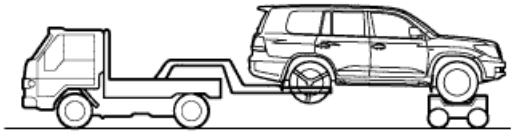
e. Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

12.WHEN TOWING FULL-TIME 4WD VEHICLES

a. Use one of the methods shown below to tow the vehicle.

i. If the vehicle has trouble in the chassis and drive train, use method 1 (flat bed truck).

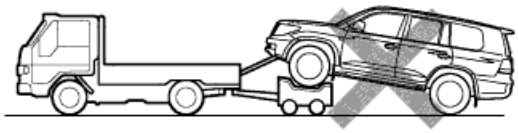
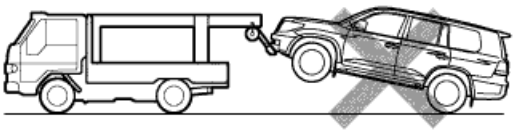
Towing Method	Parking Brake Condition	Transmission Shift Lever Position
1. Flat Bed Truck 	Applied	Any Position
2. Wheel Lift Type Truck From Front 		
From Rear	Applied	

NOTICE:

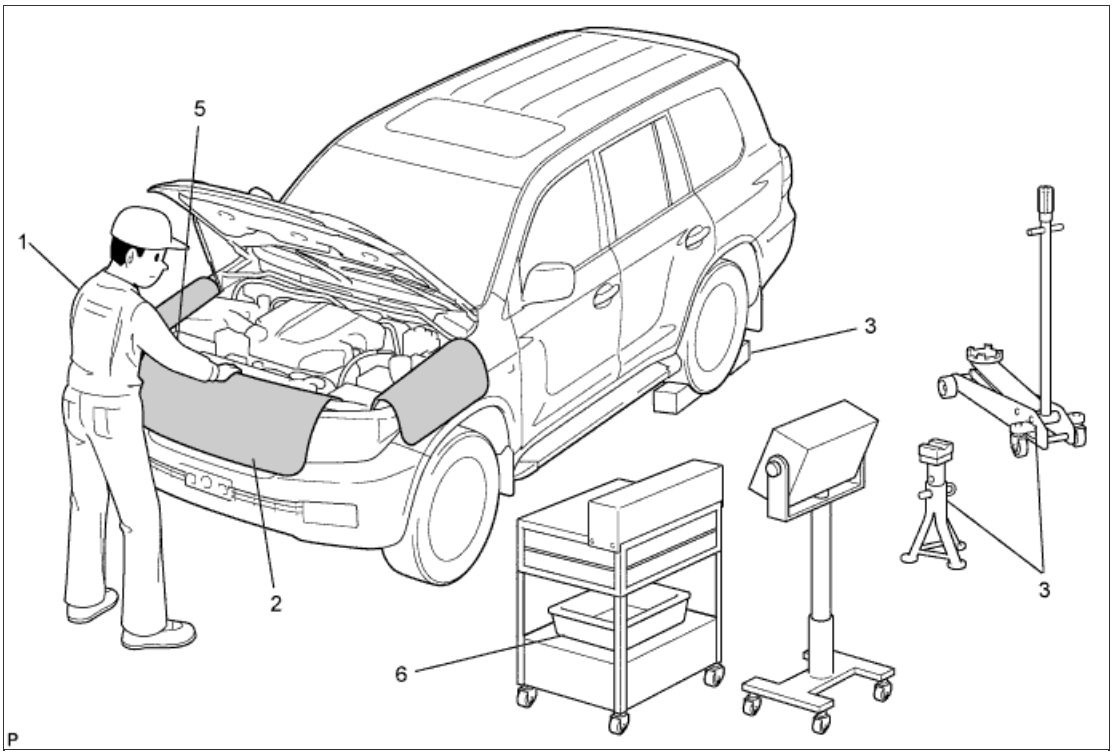
Do not use any towing method other than those shown above.

ii. For example, the towing methods shown below are dangerous or may damage the vehicle, so do not use them.

	• Never tow the vehicle using a method where the lifted-up wheel cannot rotate. • If this towing method is used, either from the front or rear: 1. There is a danger of the drive train heating up and causing a breakdown, or of the wheels flying off the dolly. 2. In addition, if the vehicle is equipped with a Vehicle Stability Control (VSC) & Traction Control (TRC) system, the system will apply the rotating wheels brake unless the engine is shut off.
	Do not use the sling type method, either from the front or rear, as this method causes damage to the body.

1.BASIC REPAIR HINT

a. HINTS ON OPERATIONS



1	Attire	• 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	• Use wheel chocks to secure the vehicle. • When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop. • When removing or installing heavy parts, such as the engine, transmission, differential, etc., before starting work make sure there are no problems with the equipment that will be used. • When working with 2 or more persons, be sure to check safety for one another. • 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.
4	Preparation of tools and measuring gauge	Before starting operation, prepare a tool stand, SST, a gauge, oil and the 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 ensure reassembly 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.

7*	Checks to perform after work is finished	• Make sure that removed and installed parts (oil filler cap, level dipstick, floor mat, etc.) are properly installed/tightened. • Make sure that none of the cloths or tools that were used have been left in the engine compartment or within the vehicle. • Check that there are no oil leaks.

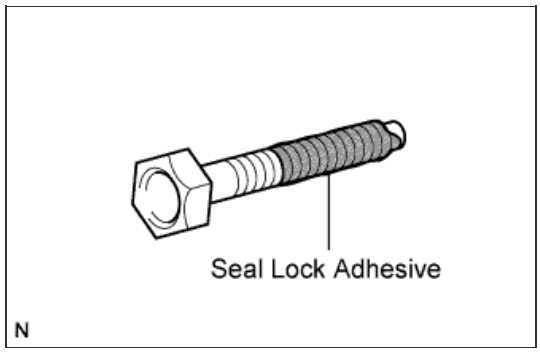
CAUTION:

*:Be sure to perform these checks properly, not performing these checks properly after finishing work can lead to serious accident or injury.

b. JACKING UP AND SUPPORTING VEHICLE

i. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.

c. PRECOATED PARTS



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

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

iii. 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.

iv. Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

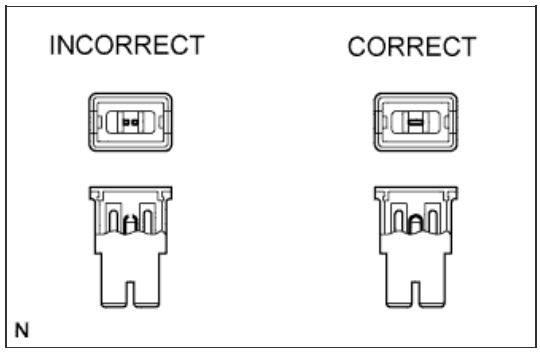
d. GASKETS

i. When necessary, use a sealer on gaskets to prevent leaks.

e. BOLTS, NUTS AND SCREWS

i. Carefully follow all the specifications for tightening torques. Always use a torque wrench.

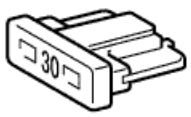
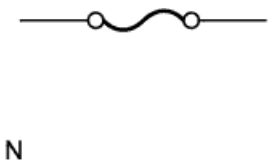
f. FUSES

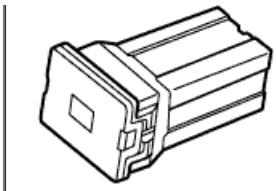
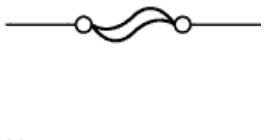
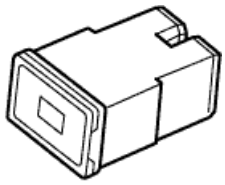
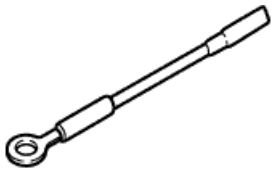
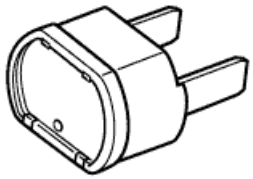
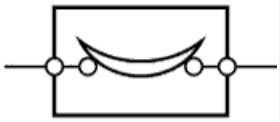


i. When inspecting a fuse, check that the wire of the fuse is not broken.

ii. If the wire of a fuse is broken, confirm that there are no shorts in its circuit.

iii. When a fuse is replaced, a fuse with the same amperage rating must be used.

Illustration	Symbol	Part Name	Abbreviation
	 N	FUSE	FUSE

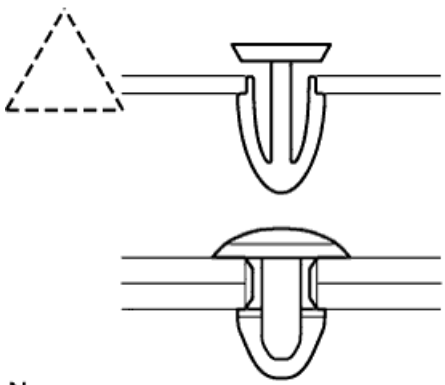
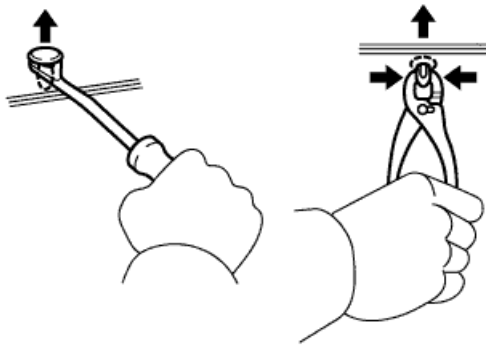
 N	 N	MEDIUM CURRENT FUSE	M-FUSE
 N	 N	HIGH CURRENT FUSE	H-FUSE
 N	 N	FUSIBLE LINK	FL
 N	 N	CIRCUIT BREAKER	CB

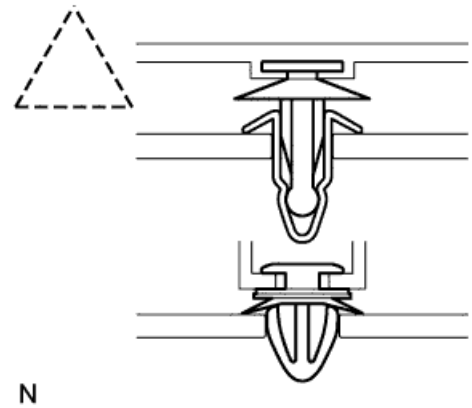
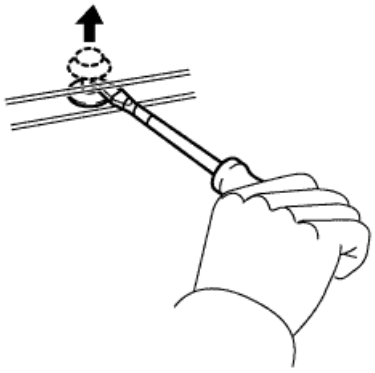
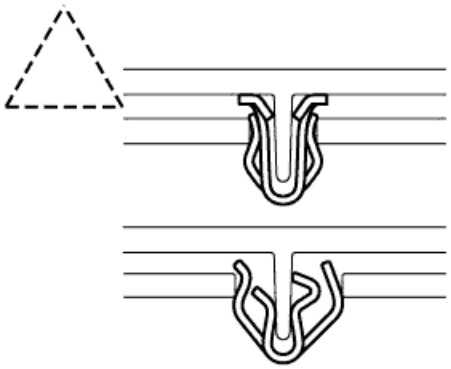
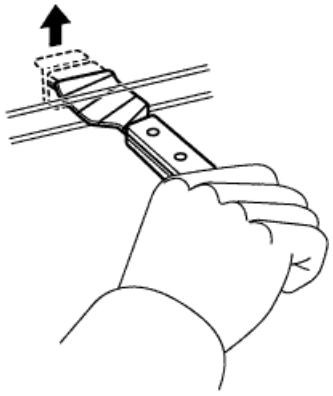
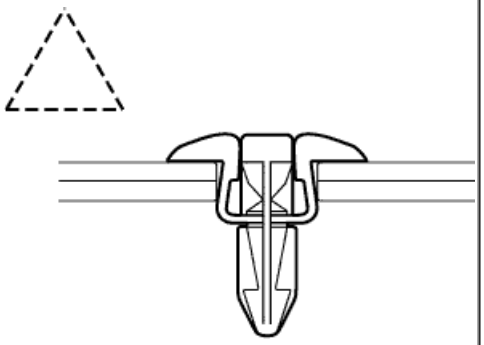
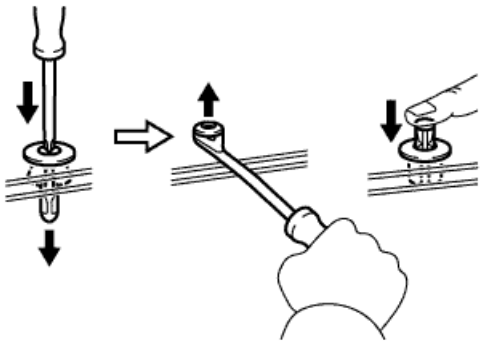
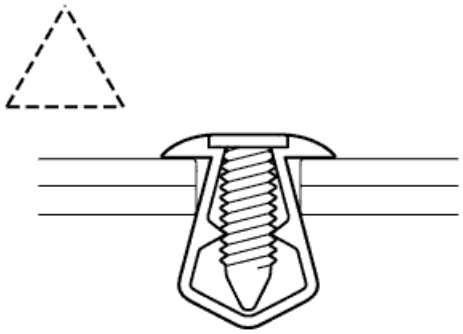
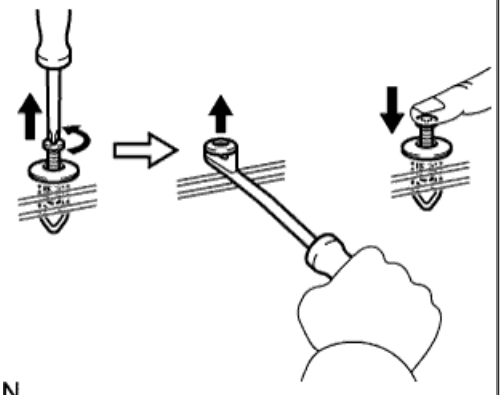
g. CLIPS

i. The removal and installation methods of typical clips used for vehicle body parts are shown in the table below.

HINT:

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

Shape (Example)	Illustration	Procedures
 N	 N	Remove clips with a clip remover or pliers.
		Remove

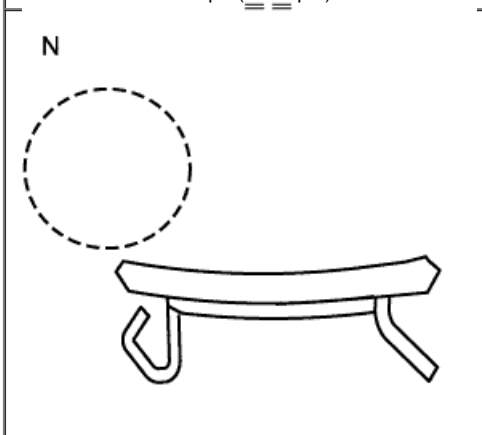
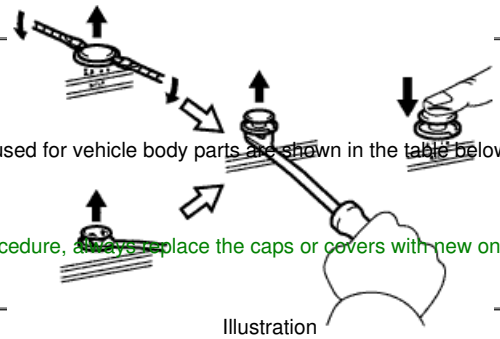
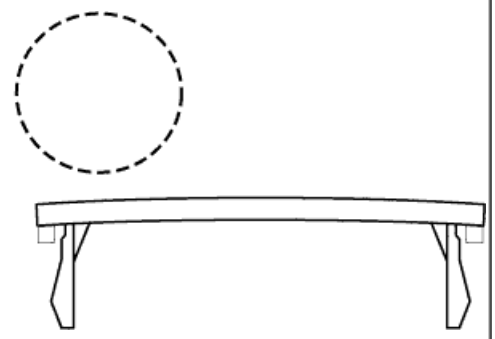
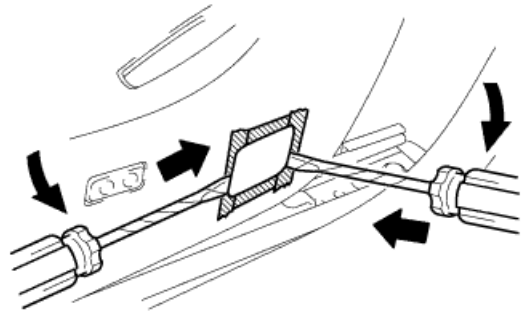
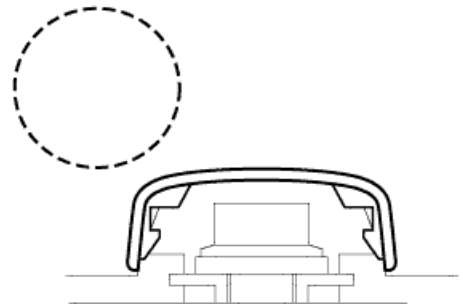
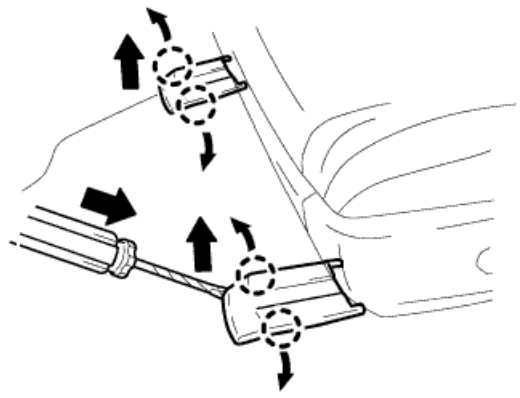
 N	 N	clips with a clip remover or screwdriver.
 N	 N	Remove clips with a wide scraper to prevent panel damage.
 N	 N	Remove clips by pushing the center pin through and prying out the shell.
 N	 N	Remove clips by unscrewing the center pin and prying out the shell.
		Remove clips by prying out the pin and then prying out the shell.

h. CLAWS

i. The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

HINT:

If claws of caps or covers are damaged during a procedure, always replace the caps or covers with new ones.

Shape (Example)	Illustration	Procedures
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.

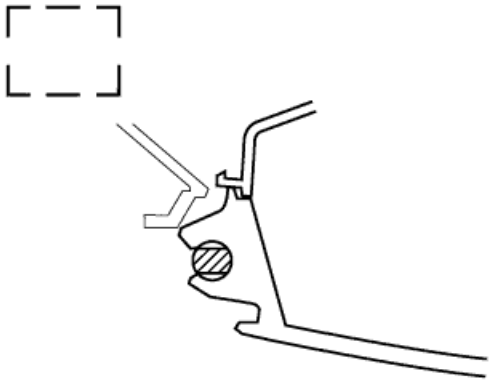
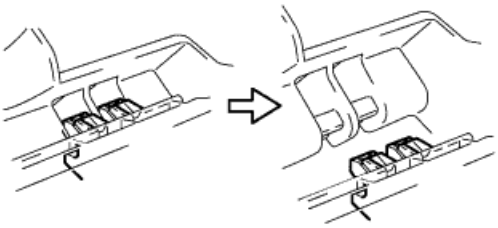
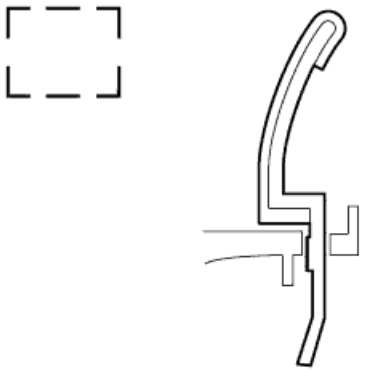
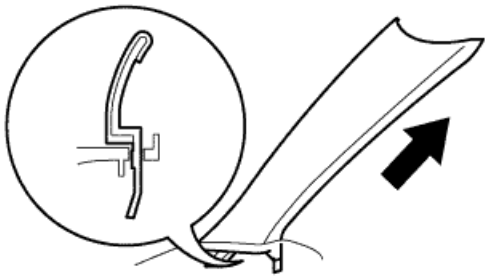
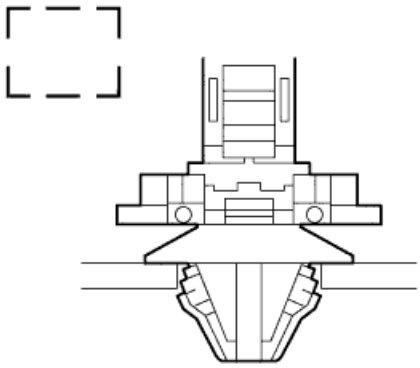
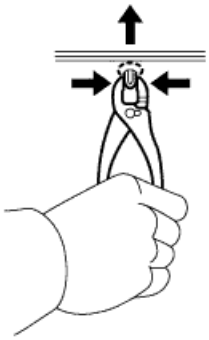
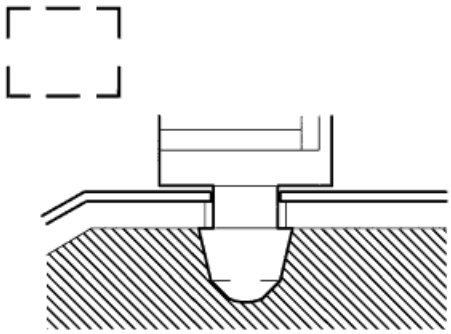
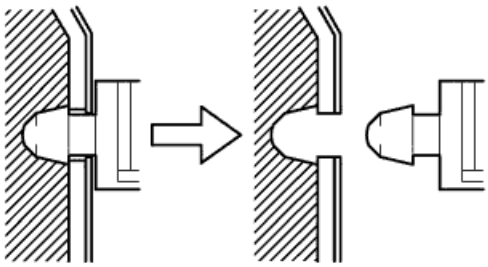
i. HINGE, GUIDE, CLAMP, PIN ETC.

i. The removal and installation methods of typical hinges, guides, clamps and pins used for vehicle body parts are shown in the table below.

HINT:

If clamps are damaged during a procedure, always replace the cap or cover that has damaged clamps with a new one.

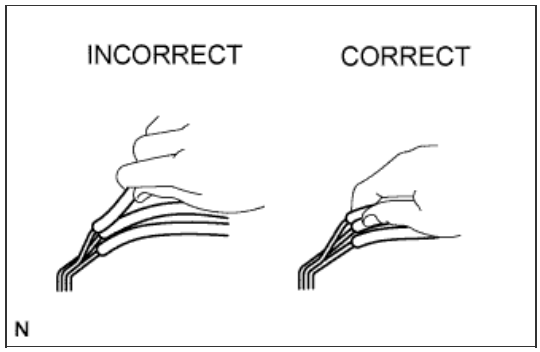
Shape (Example)	Illustration	Procedures

		Disengage the pins by pulling.
		Disengage the pins by pulling.
		Remove the clamps with pliers.
		Disengage the pins by pulling.

j. REMOVAL AND INSTALLATION OF VACUUM HOSES

i. To disconnect a vacuum hose, pull and twist from the end of the hose.

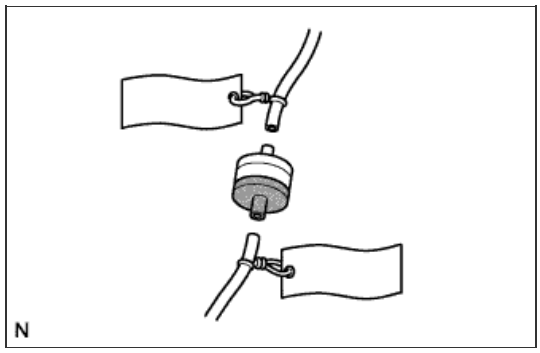
Do not pull from the middle of the hose as this may cause damage.



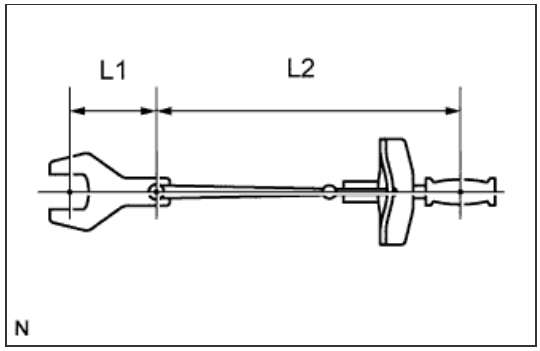
ii. When disconnecting vacuum hoses, use tags to identify where they should be reconnected.

iii. After completing any hose related repairs, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.

iv. When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, it may leak air. Use a step-down adapter if necessary.



k. TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL

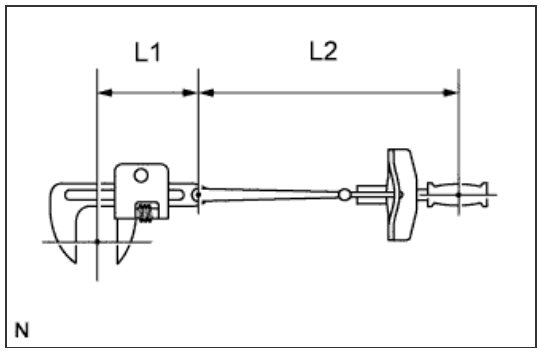


i. Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with a torque wrench.

Formula:

T' = L2 / (L1 + L2) * T

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.)}



NOTICE:

If an extension tool or SST is combined with a torque wrench and the wrench is used to tighten to a torque specification in this manual, the actual torque will be excessive and parts will be damaged.

2.FOR VEHICLES WITH SUPPLEMENTAL RESTRAINT SYSTEM

The LAND CRUISER Station Wagon is equipped with a Supplemental Restraint System (SRS). The SRS of this vehicle consists of the following:

1. Steering pad
2. Front passenger airbag assembly
3. Curtain shield airbag assembly
4. Front seat side airbag assembly
5. Knee airbag assembly
6. Center airbag sensor assembly
7. Front airbag sensor

8. Side airbag sensor
9. Seat position airbag sensor
10. Occupant classification ECU
11. Front seat outer belt assembly with pretensioner

CAUTION:

- **Failure to carry out service procedures in the correct sequence could cause SRS parts to unexpectedly deploy and possibly lead to serious injuries. Furthermore, if a mistake is made when servicing SRS parts, they may fail to operate when required. Before performing servicing (including installation/removal, inspection and replacement of parts), be sure to read the following precautions.**
- **Before starting work, wait at least 90 seconds after the engine switch is turned off and after the cable of the negative (-) battery terminal is disconnected. (SRS parts are equipped with a backup power source. If work is started within 90 seconds of turning the engine switch is turned off and disconnecting the cable from the negative (-) battery terminal, SRS parts may deploy.)**
- **Do not expose SRS parts directly to hot air or flames.**

NOTICE:

- **Malfunction symptoms of SRS parts are difficult to confirm. DTCs are the most important source of information when troubleshooting. During troubleshooting, always confirm DTCs before disconnecting the cable from the negative (-) battery terminal.**
- **For minor collisions where SRS parts do not deploy, always inspect the SRS parts.**
- **Before performing repairs, remove airbag sensors as necessary if any kind of impact is likely to occur to an airbag sensor during repairs.**
- **Never use SRS parts from another vehicle. When replacing SRS parts, replace them with new ones.**
- **Never disassemble or attempt to repair SRS parts.**
- **If an SRS part has been dropped, or if there are any cracks, dents or other defects in the case, bracket or connector, replace the SRS part with a new one.**
- **Use an ohmmeter/voltmeter with high impedance (10 kΩ/V minimum) for troubleshooting the electrical circuits.**
- **Information labels are attached to the periphery of SRS parts. Follow the cautions and instructions on the labels.**
- **After work on SRS parts is completed, perform the SRS warning light check.**
- **When the cable is disconnected from the negative (-) battery terminal, the memory settings of each system will be cleared. Because of this, be sure to write down the settings of each system before starting work. When work is finished, reset the settings of each system as before. Never use a backup power supply from outside the vehicle to avoid erasing the memory in a system.**
- **An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with bare hands to discharge static electricity before performing this procedure.**

a. SPIRAL CABLE

i. The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, as cable disconnection and other problems may occur. Refer to the information about correct installation of the steering wheel.

b. AIRBAG ASSEMBLY

i. Airbag assembly with pad:
Always place a removed or new airbag assembly with the pad surface facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag inflates. Also, do not place anything on top of the airbag assembly.

ii. Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause a serious injury.

iii. Grease or detergents of any kind should not be applied to the airbag assembly.

iv. Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

v. When using electric welding anywhere on the vehicle, disconnect the center airbag sensor connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

vi. When disposing of the vehicle or the airbag assembly by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.

c. SEAT OUTER BELT ASSEMBLY WITH PRETENSIONER

i. Never measure the resistance of the seat outer belt. This may cause the pretensioner of the seat outer belt to activate, which could cause a serious injury.

ii. Never install the seat outer belt on another vehicle.

iii. Store the seat outer belt in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and there is no electrical noise.

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

v. When disposing of a vehicle or the seat outer belt by itself, the pretensioner should be activated before disposal. Activate the

pretensioner in a safe place away from electrical noise.

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

vii. Grease, detergents, oil or water should not be applied to the seat outer belt.

d. AIRBAG SENSOR ASSEMBLY

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

ii. The connectors to the airbag sensor assembly should be connected or disconnected with the sensor placed on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not placed on the floor, the SRS may activate.

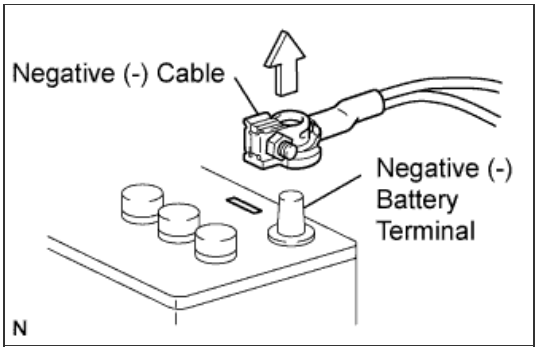
iii. Work must be started at least 90 seconds after the engine switch is turned off and the cable is disconnected from the negative (-) battery terminal, even if only loosening the set bolts of the airbag sensor assembly.

e. WIRE HARNESS AND CONNECTOR

i. The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are yellow. 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



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

ii. When disconnecting the cable, turn the engine switch off and headlight dimmer switch off and loosen the cable nut completely. Perform these operations without twisting or prying the cable. Then disconnect the cable.

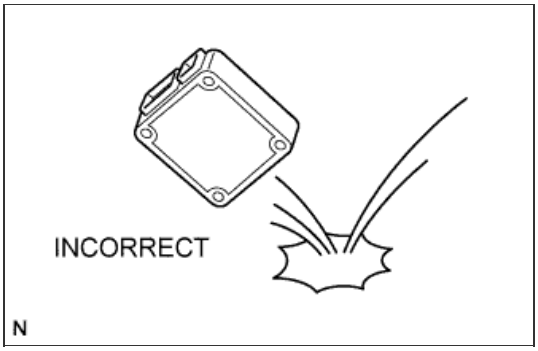
iii. Clock settings*, radio settings, audio system memory, DTCs and other data are cleared when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

HINT:

*: w/o Multi-display, w/o Radio Receiver or w/ Cassette Tape Player

iv. Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

b. HANDLING OF ELECTRONIC PARTS



i. 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.

ii. Do not pull the wires when disconnecting electronic connectors. Pull the connector.

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

iv. When cleaning the engine with steam, protect the electronic components, air filter and emission-related components from water.

v. Never use an impact wrench to remove or install temperature switches or temperature sensors.

vi. When measuring the resistance of a wire connector, insert the tester probe carefully to prevent terminals from bending.

4.REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

a. PLACE FOR REMOVING AND INSTALLING FUEL SYSTEM PARTS

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

ii. Never work in a pit or near a pit as vaporized fuel will collect in those places.

b. REMOVING AND INSTALLING FUEL SYSTEM PARTS

i. Prepare a fire extinguisher before starting the operation.

ii. To prevent 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 gasoline to spread, and possibly create a fire hazard.

iii. Avoid using electric motors, working lights and other electric equipment that can cause sparks or high temperatures.

iv. Avoid using iron hammers as they may create sparks.

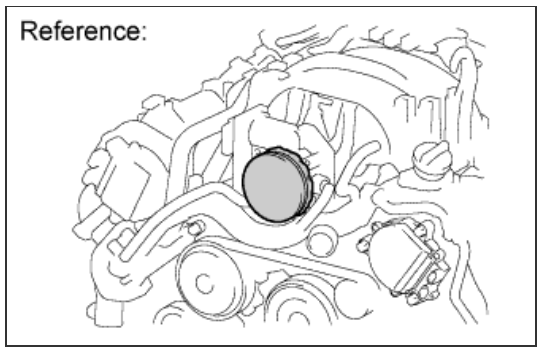
v. Dispose of fuel-contaminated cloths separately using a fire resistant container.

5.REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

a. If any metal particles enter inlet system parts, they may damage the engine.

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

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



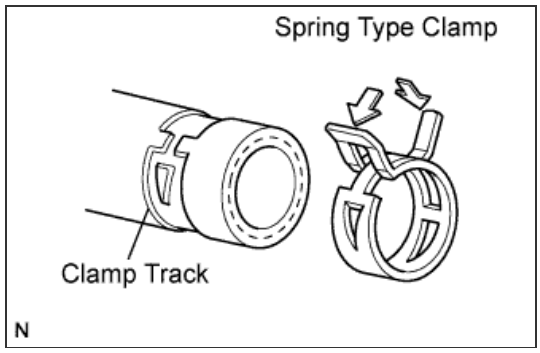
6.HANDLING OF HOSE CLAMPS

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 arrows as shown in the illustration.



7.FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEMS

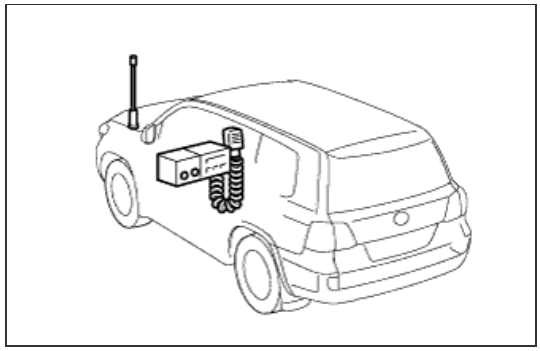
a. Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.

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

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

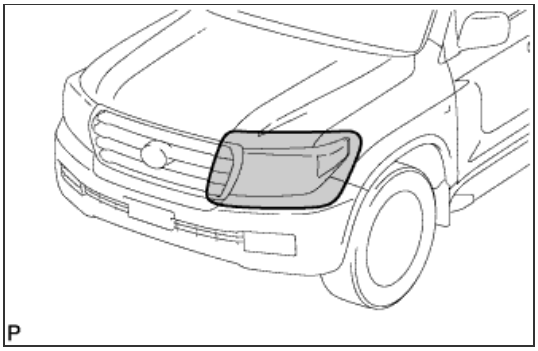
d. Check that the antenna and feeder are correctly adjusted.

e. Do not install a high-powered mobile communication system.



8.WHEN INSPECTING HEADLIGHT

a. When the headlights are illuminated, do not cover the headlights for 3 minutes or more.



NOTICE:

- **for HID Headlight:**
  1. **When the headlight dimmer switch assembly is set to HEAD, do not touch the high-voltage socket area of the discharge headlight.**
  2. **As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.**
- **for Standard Headlight:**
  1. **As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.**

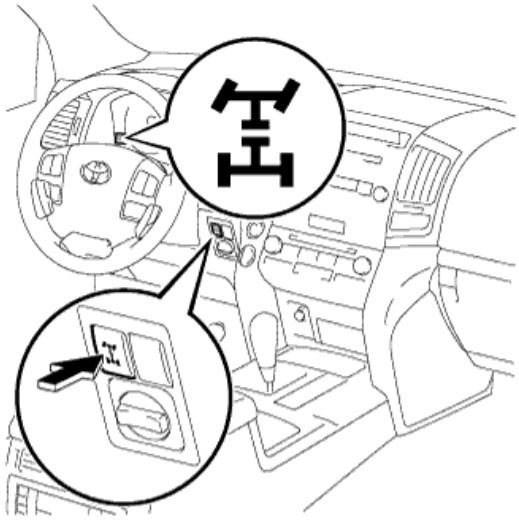
9.WHEN SERVICING FULL-TIME 4WD VEHICLES

a. The full-time 4WD LAND CRUISER Station Wagon is equipped with a mechanical lock type center differential system.

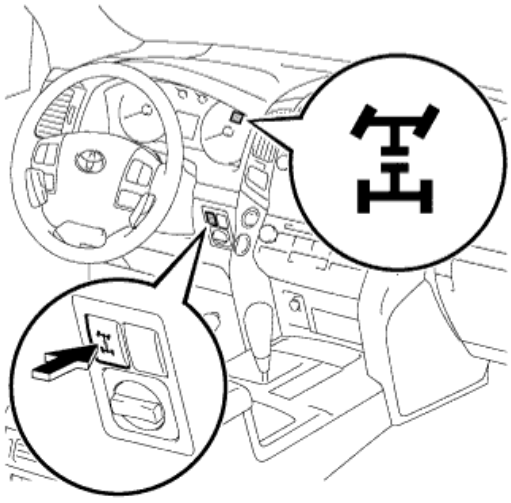
HINT:

Be sure to check that the indicator on the combination meter illuminates when operating the center differential switch (see the illustration).

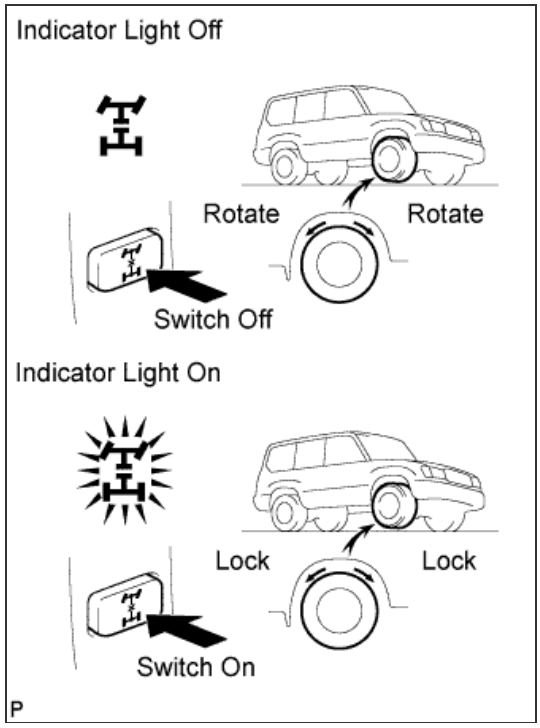
w/o Multi-information Display:



w/ Multi-information Display:



b. During tests that require the use of a braking force tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the rear wheels are to be rotated, it is necessary to set the position of the center differential to on or off depending on the type of the test being performed.



Center Differential FREE Condition

Item	Condition	Wheel
Center differential switch	Off	A lifted wheel can be rotated if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	Off	
4WD control switch (H4/L4)	Either	

Center Differential LOCK Condition

Item	Condition	Wheel
Center differential switch	On	A lifted wheel can be rotated if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	On	
4WD control switch (H4/L4)	Either	

CAUTION:

Center differential ON ←→ OFF selecting procedures:

- **Operate the switch only when all 4 wheels are stopped or driving in a straight line.**
- **Never operate the switch when any wheel is slipping.**
- **Never operate the switch when any wheel is spinning freely.**
- **Never operate the switch when swerving or cornering.**

10.WHEN TESTING BRAKES, SPEEDOMETER, ETC.

a. When carrying out any kind of servicing or testing on a Full-time 4WD with Active Traction Control System & Vehicle Stability Control (VSC) System in which the front or rear wheels are to be rotated (braking test, speedometer test), be sure to observe the precautions listed below.
Incorrect preparations or test procedures may cause damage as well as unsuccessful test results.

b. Before starting any such servicing or test, be sure to check the following items:

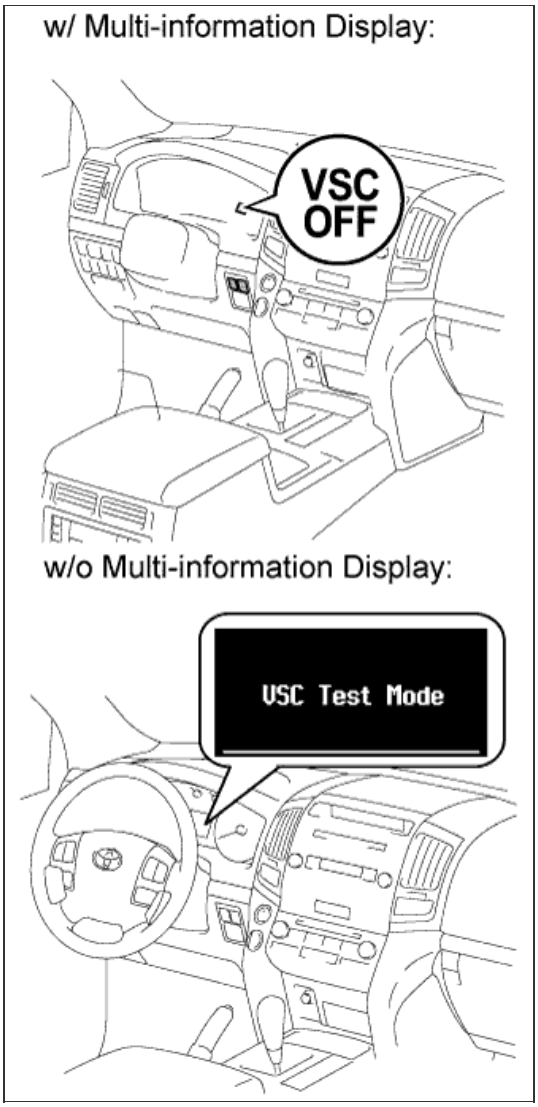
- The VSC system has entered to test mode using the intelligent tester (Click here)
- Whether the wheels should be touching the ground or the vehicle should be jacked up
- Shift lever in neutral.
- 4WD control switch (H4 or L4 position)
- Maximum testing vehicle speed
- Maximum testing time

CAUTION:

- **Do not start, accelerate or decelerate the vehicle suddenly.**
- **Maximum vehicle speed must be below 60 km/h (37 mph) (when using free roller, it must be below 50 km/h (31 mph)).**

NOTICE:

- **A tester with a function of load setting for only two wheels cannot be used.**
- **Inspection should be done on the rear wheels.**
- **Driving time should be within 1 minute.**



c. When using a braking force tester (not free roller type):
When performing measurements using a low-speed type braking force tester, observe the following instructions.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the braking force tester.

iii. Jack up the front wheels.

iv. Ensure that the vehicle does not move using wires.

v. Move the shift lever to N*1 or neutral*2.

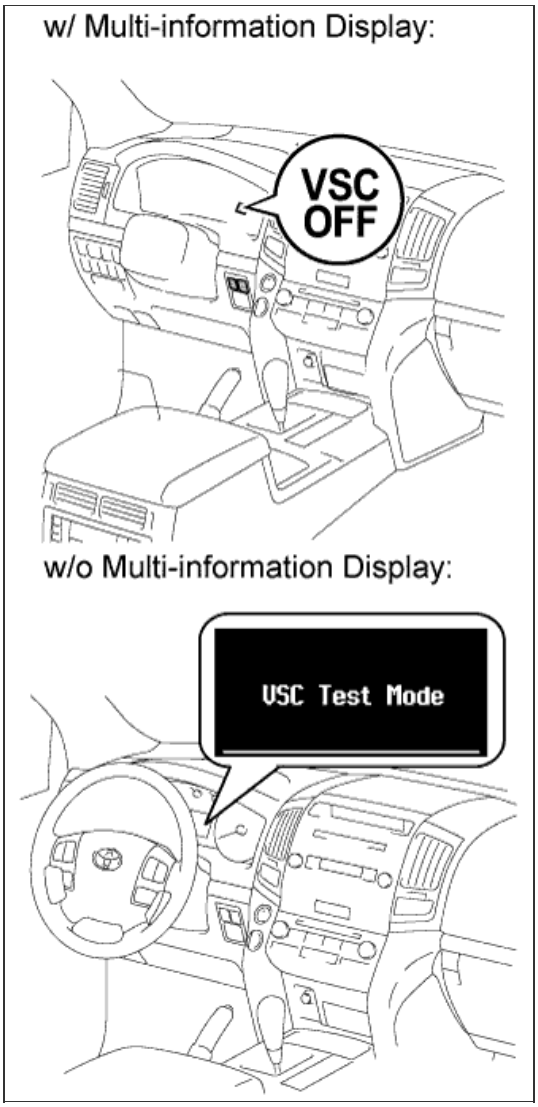
HINT:

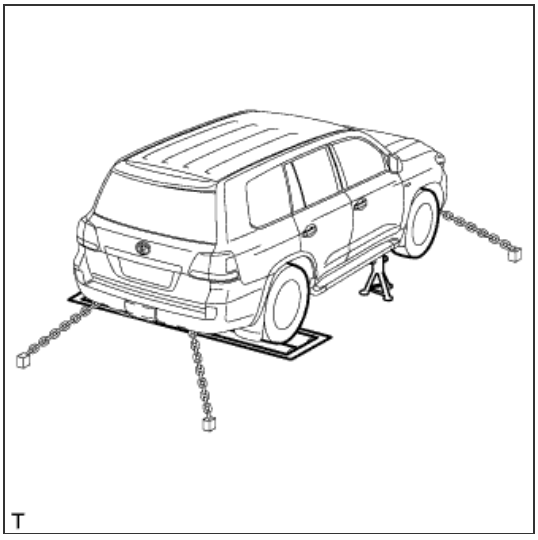
- ***1: for Automatic Transmission**
- ***2: for Manual Transmission**

vi. Idle the engine, operate the brake booster and perform the test.

NOTICE:

The maximum driving time should be 1 minute.





d. When using a braking force tester (free roller type):
When performing measurements using a low-speed type braking force tester, observe the following instructions.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the braking force tester.

iii. Position the front wheels to be tested on the free roller.

iv. Ensure that the vehicle does not move using wires.

v. Move the shift lever to N*1 or neutral*2.

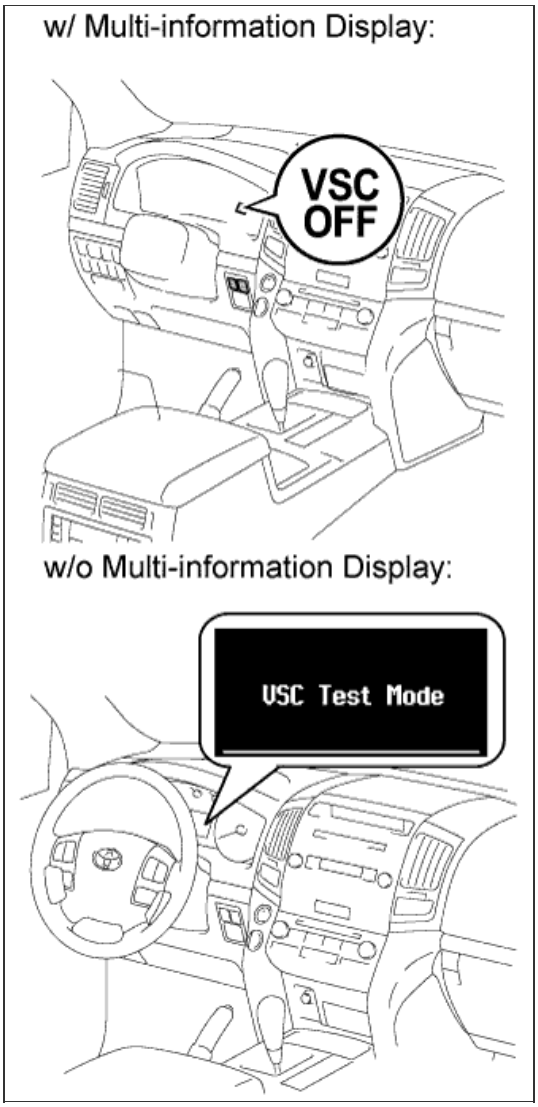
HINT:

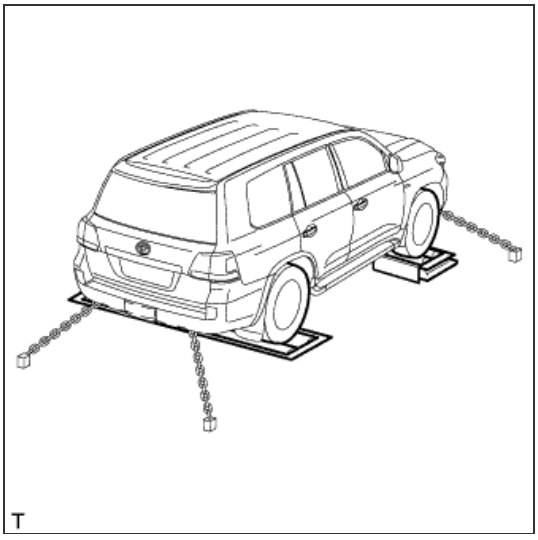
- ***1: for Automatic Transmission**
- ***2: for Manual Transmission**

vi. Idle the engine, operate the brake booster and perform the test.

NOTICE:

The maximum driving time should be 1 minute.





e. When using a speedometer (not free roller type):
Observe the following instructions and then measure with the rear wheels.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the dram tester.

iii. Jack up the front wheels.

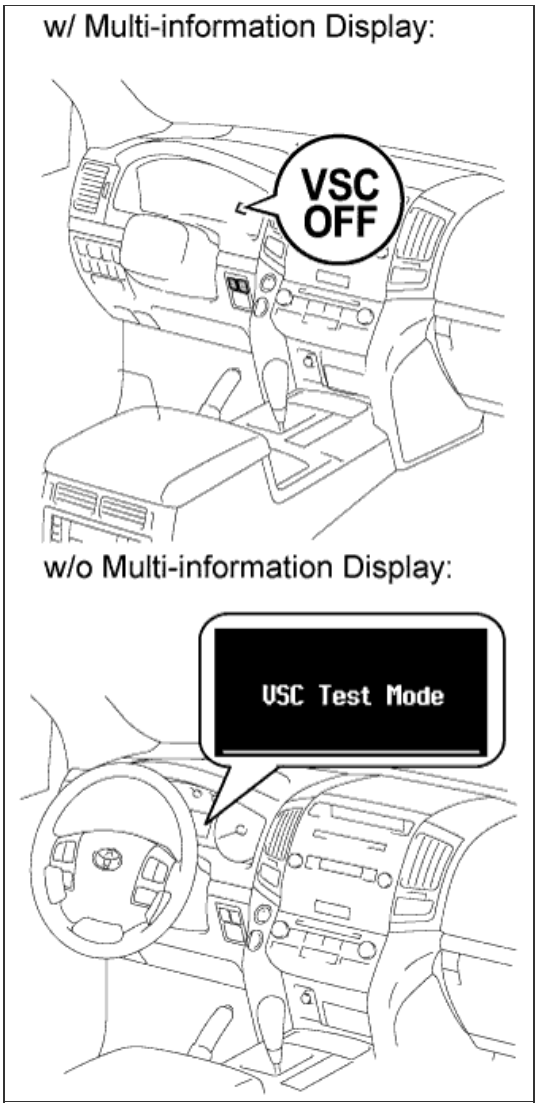
iv. Ensure that the vehicle does not move using wires.

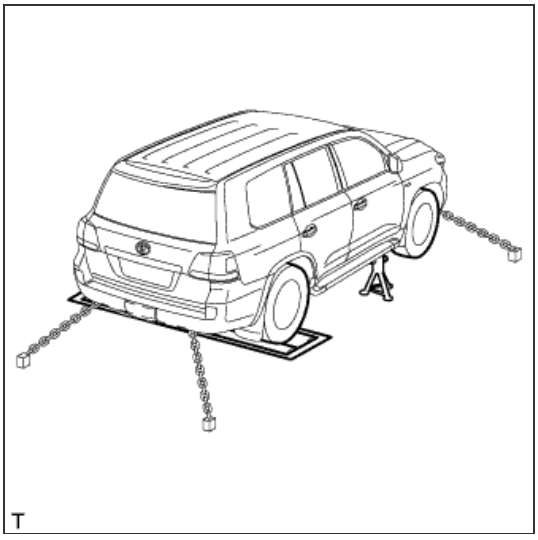
NOTICE:

- **When performing measurement, be sure to only drive**

the drive wheels in the forward direction.

- The maximum speed should be less than 50 km/h (31 mph).
- If the measurement must be made while the vehicle speed is over 50 km/h (31 mph), remove the propeller shaft.





f. When using a speedometer (not free roller type):
Observe the following instructions and then measure with the rear wheels.

i. Enter test mode using the intelligent tester (Click here).

ii. Position the rear wheels on the dram tester.

iii. Position the front wheels to be tested on the free roller.

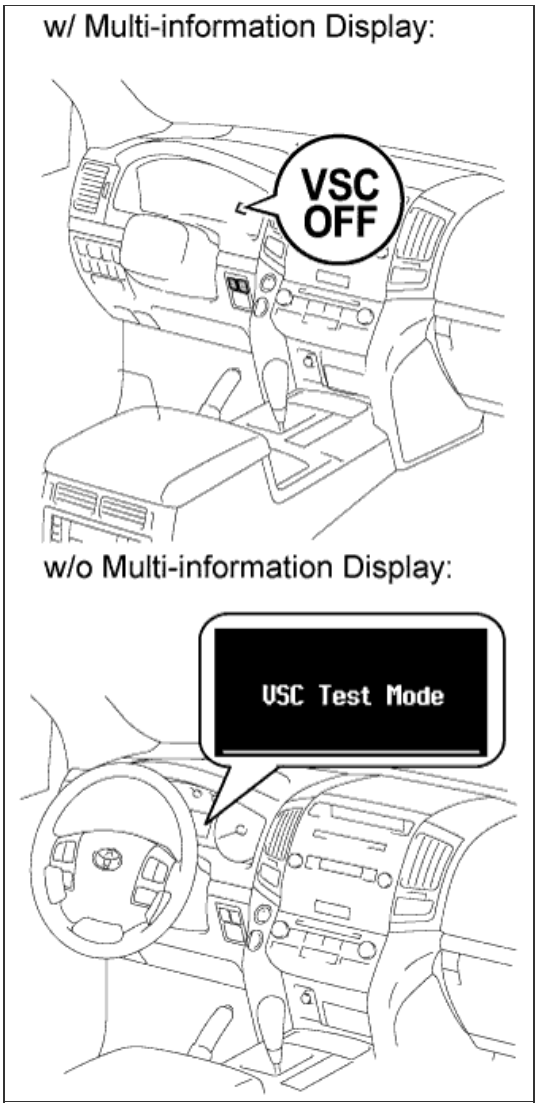
iv. Ensure that the vehicle does not move using wires.

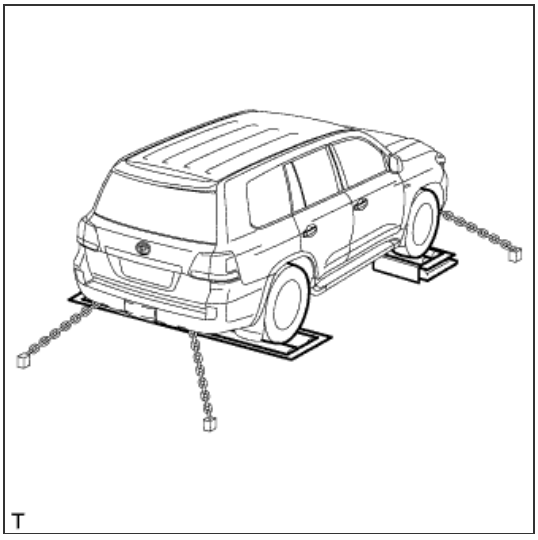
NOTICE:

- When performing measurement, be sure to only drive

the drive wheels in the forward direction.

- The maximum speed should be less than 50 km/h (31 mph).
- If the measurement must be made while the vehicle speed is over 50 km/h (31 mph), remove the propeller shaft.





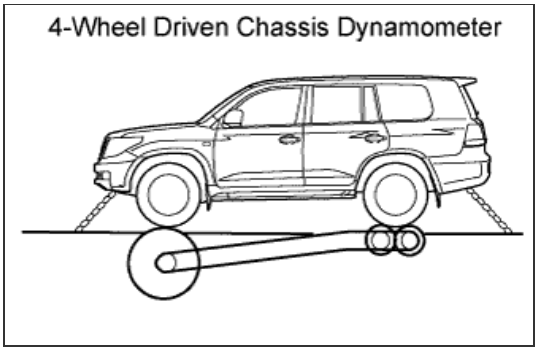
g. Using chassis dynamometer

NOTICE:

If you do not observe the following conditions for the test. There will be the cases where the 4WD functions will deteriorate; the parts in the drive-train system will have a malfunction; the vehicle will jump out. Therefore. do not conduct a test unless observing the following conditions.

HINT:

When conducting a test with the vehicle highly loaded are driven with high speeds, observe the following



Chassis Dynamometer Type	Vehicle Speed and Test Time	Propeller Shaft
4-wheel Driven chassis Dynamometer	No restriction	Normal (Do not remove)

NOTICE:

- **Do not suddenly accelerate and do not suddenly apply brake.**
- **Confirm that the vehicle is securely immobilized.**

11.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 idling the engine for more than 20 minutes.

c. When performing spark jump tests:

i. Perform a spark jump test only when absolutely necessary. Perform this test as rapidly as possible.

ii. While testing, never race the engine.

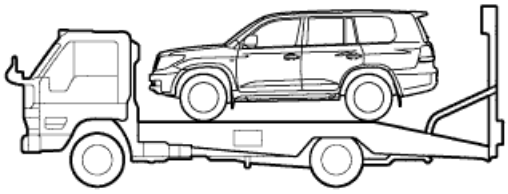
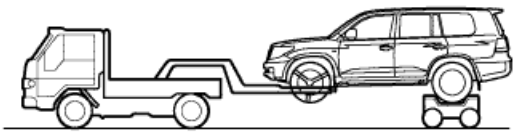
d. Avoid a prolonged engine compression measurement. Engine compression measurements must be performed as rapidly as possible.

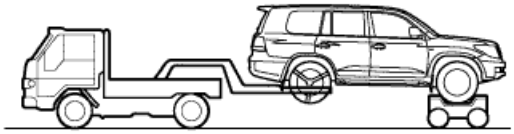
e. Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

12.WHEN TOWING FULL-TIME 4WD VEHICLES

a. Use one of the methods shown below to tow the vehicle.

i. If the vehicle has trouble in the chassis and drive train, use method 1 (flat bed truck).

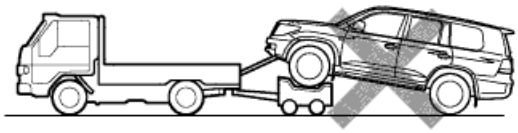
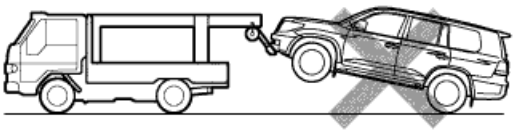
Towing Method	Parking Brake Condition	Transmission Shift Lever Position
1. Flat Bed Truck 	Applied	Any Position
2. Wheel Lift Type Truck From Front 		
From Rear	Applied	

NOTICE:

Do not use any towing method other than those shown above.

ii. For example, the towing methods shown below are dangerous or may damage the vehicle, so do not use them.

	• Never tow the vehicle using a method where the lifted-up wheel cannot rotate. • If this towing method is used, either from the front or rear: 1. There is a danger of the drive train heating up and causing a breakdown, or of the wheels flying off the dolly. 2. In addition, if the vehicle is equipped with a Vehicle Stability Control (VSC) & Traction Control (TRC) system, the system will apply the rotating wheels brake unless the engine is shut off.
	Do not use the sling type method, either from the front or rear, as this method causes damage to the body.

NOTICE ABOUT VEHICLE CONDITION WHEN RAISING VEHICLE

a. The vehicle must be unloaded before jacking up or raising the vehicle. Never jack up or raise a heavily loaded vehicle.

b. Set the jack and safety stands exactly under the specified locations on the vehicle.

c. Never try to jack up or raise a vehicle that exceeds the weight specifications of the equipment being used.

d. When raising the vehicle, first raise the vehicle only a little, and then shake the vehicle slightly to make sure it is stable before raising it to the specified position.

e. Before removing the jack, tap the safety stands with a hammer or equivalent to make sure that the vehicle is properly supported.

f. When using a lift, always lower the vehicle when work is not being performed.

g. When removing any heavy components like the engine or transmission, the vehicle's center of gravity will shift. To stabilize the vehicle, place a balance weight in a location that will prevent the vehicle from rolling or shifting, or place a transmission jack under the appropriate jack position at the opposite end of the vehicle.

NOTICE FOR USING 4 POST LIFT

a. Follow the safety procedures outlined in the lift's instruction manual.

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

c. Use wheel chocks to secure the vehicle.

NOTICE FOR USING JACK AND SAFETY STAND

a. Work on a level surface. Use wheel chocks at all times.

b. Use safety stands with rubber attachments as shown in the illustration.

c. Set the jack and safety stands to the specified locations of the vehicle accurately.

d. When jacking up the vehicle, first release the parking brake and move the shift lever to N.

e. When jacking up the entire vehicle:

   i. When jacking up the front wheels first, make sure wheel chocks are behind the rear wheels.

   ii. When jacking up the rear wheels first, make sure wheel chocks are in front of the front wheels.

f. When jacking up only the front or rear wheels of the vehicle:

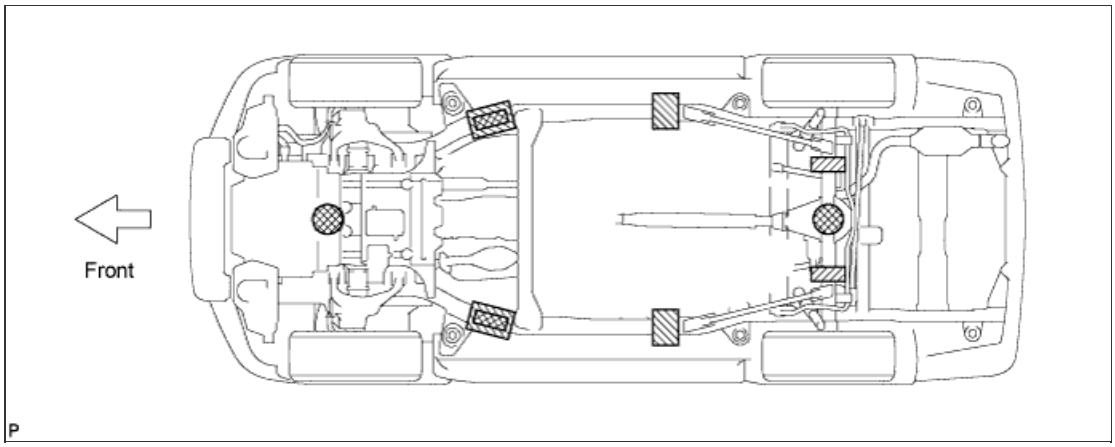
   i. Before jacking up the front wheels, place wheel chocks on both sides of the rear wheels.

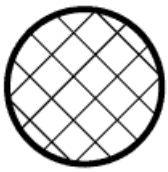
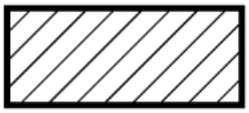
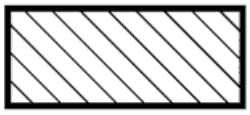
   ii. Before jacking up the rear wheels, place wheel chocks on both sides of the front wheels.

g. When lowering a vehicle that only has its front or rear wheels jacked up:

   i. Before lowering the front wheels, make sure wheel chocks are in front of the rear wheels.

   ii. Before lowering the rear wheels, make sure wheel chocks are behind the front wheels.



	JACK POSITION Front: Center of crossmember Rear: Center of rear axle housing	**CAUTION:** When jacking up the vehicle, make sure the vehicle is not carrying any extra weight.
	SUPPORT POSITION Safety stand	-
	SUPPORT POSITION Swing arm type lift	-

h. It is extremely dangerous to perform any work on a vehicle raised on a jack alone, even for work that can be finished quickly. Safety stands must be used to support the vehicle.

HINT:

The following items can be customized.

NOTICE:

- **When the customer requests a change in a function, first make sure that the function can be customized.**
- **Be sure to make a note of the current settings before customizing.**
- **When troubleshooting a function, first make sure that the function is set to the default setting.**

CUSTOMIZING FUNCTION WITH INTELLIGENT TESTER

a. POWER TILT AND POWER TELESCOPIC STEERING COLUMN SYSTEM

Tilt & Telescopic

Display	Default	Contents	Setting
Autoaway / Return function	ON	Turn the auto away/return function ON/OFF	ON/OFF

b. TOYOTA PARKING ASSIST-SENSOR SYSTEM

Warning

Display	Default	Contents	Setting
Fr Sensor Onset Range	Wide	Sets the buzzer activation range for the front sensors.	Narrow or Wide
Rr Sensor Onset Range	Wide	Sets the buzzer activation range for the rear sensors.	Narrow or Wide
Keep Sense Buzzer	Avail	Makes the buzzer sound when the distance between the vehicle and obstacle does not change for more than 3 seconds.	Not Avail or Avail
Fr & Rr Buzzer Freq	Middle	Changes the buzzer sounding frequency.	Low, Middle or High
Fr & Rr Buzzer Volume	H	Changes the buzzer volume setting.	L, M1, M2, M3 or H

Sensor

Display	Default	Contents	Setting
Sensor Condition N	Avail	Makes the sensors available when the shift lever is in N.	Not Avail or Avail
Front Side Dist Sensor	Long	Sets the buzzer activation range for the front sensors.	Short or Long
Reverse Range Front Sensor	Fsde	Changes the operation setting for the vehicle front sensors when the shift lever is in R.	F, Fs,Fc, Fsde or F Stop
Non P/R Range Rear Sensor	R Stop	Changes the operation setting for the vehicle rear sensors when the shift lever is not in P or R.	R, Rcrn or R Stop

Display

Display	Default	Contents	Setting
Approach Display OFF	Avail	The display when moving away from a previously detected obstacle.	Not Avail or Avail
Display Mode	All	The display mode setting (when the intuitive parking assist system is normal).	All or Undisp

c. POWER DOOR LOCK CONTROL SYSTEM

Door Lock

Display	Default	Contents	Setting
Unlock Key Twice	OFF	Function that unlocks only the driver side door when the driver side door key cylinder is turned to unlock once, and unlock all doors when it is turned to unlock twice. For the OFF setting, turning it once unlocks all doors.	ON/OFF

d. WIRELESS DOOR LOCK CONTROL SYSTEM

Wireless Door Lock

Display	Default	Contents	Setting
Hazard Answer Back	ON	When the lock switch on the transmitter is pressed, this function illuminates the hazard warning lights once. When the unlock switch is pressed, the hazard warning lights illuminate twice.	ON/OFF
Wireless	ON		

Control		Function that turns the wireless door lock function ON or OFF.	ON/OFF
Open Door Warning*1	ON	If a door is not completely closed and the transmitter lock switch is pressed, this function makes the buzzer sound for 10 seconds.	ON/OFF
Panic Alarm Function*2	ON	Function to operate the theft deterrent system by continuously pressing the panic switch on transmitter for 2.5 seconds.	ON/OFF
Unlock 2 Operation	OFF	Function that unlocks the driver side door when the unlock switch on the transmitter is pressed once, and unlocks all doors when the switch is pressed twice. If the setting is OFF, pressing the unlock switch once makes all the doors unlock.	ON/OFF
Auto Lock Time	30 s	Function to change the time until relocking after unlocking with the wireless door lock function.	30 s/60 s/120 s
Wireless Auto Lock	ON	Function to control the automatic relocking of doors after unlocking with the wireless door lock function.	ON/OFF
Wireless Buzzer Resp	ON*3	Wireless buzzer response function.	ON/OFF
Wireless Buzzer Volume	Level 7	This function changes the wireless buzzer volume.	Level 0/Level 1/Level 2/Level 3/Level 4/Level 5/Level6/Level 7

HINT:

*1: Expect China

*2: w/ Panic Switch

*3: Expect Europe and China

e. ENTRY AND START SYSTEM (for Entry Function)

Entry & Start

Display	Default	Contents	Setting
Ignition Area (Entry ignition available area)	ALL	Function to choose the available area for the key to start the engine and cancel the steering lock.	FRONT/ALL*
Park Wait Time (Waiting time to permit unlocking door after locking)	2.5s	Function that sets the waiting time to permit unlocking the door after the door is locked with the entry lock function.	0.5s/1.5s/2.5s/5s
Back Door Opening Operation (Back door open mode when vehicle is locked)	LONG	Back door opening the operation.	LONG/TWICE/OFF

Warning

Display	Default	Contents	Setting
Passenger Take Key	ON	Warn a key is taken out by fellow passengers	ON/OFF
Key Low Battery Warning (Warn when key battery becomes weak)	ON	Function that warns the driver that the key battery power is low.	ON/OFF
Key Out Range Warning	ON	Warn Starting E/G when the key is out of range	ON/OFF

HINT:

*: "FRONT" means front, and "ALL" means front, rear 1 and rear 2.

f. ENTRY UNLOCK MODE SWITCHING FUNCTION

i. To use the entry unlock mode switching function, make sure the engine switch is off and simultaneously press and hold the lock switch on the key and another key switch for 5 seconds.

When the switches are pressed and held for 5 seconds, the entry door unlock mode changes in the following order: all door unlock mode, driver door unlock mode.

NOTICE:

After pressing and holding the switches for 5 seconds, wait 5 seconds before performing the same procedure again.

- All door unlock mode (default):
  When a touch sensor is touched, all doors unlock.
- Driver door unlock mode:
  When the driver door touch sensor is touched, only the driver door unlocks. When another touch sensor is touched, all doors unlock.

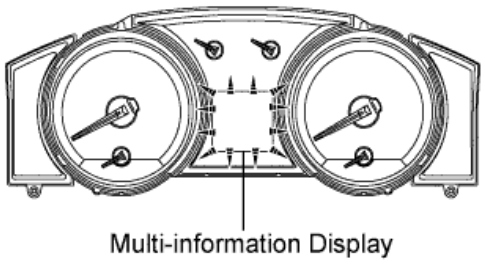
ii. The certification ECU (smart key ECU assembly) receives this signal from the door control receiver and changes the entry and start system to the entry unlock mode.

iii. The certification ECU (smart key ECU assembly) sounds the wireless door lock buzzer and combination meter buzzer to inform the user that the mode has been switched.

HINT:

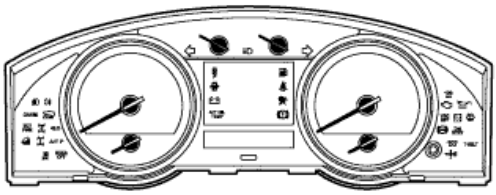
The function only changes the entry unlock mode of the entry and start system. It does not switch the unlocking of the wireless door lock control.

w/ Multi-information Display:



Multi-information Display

w/o Multi-information Display:



- All door unlock mode:

Mode		All Doors (Default)
Wireless Door Lock Buzzer*1		ON / OFF  Sounds 2 times
Combination Meter	Multi-information Display*2	 Displayed for 4 seconds
	Buzzer	Sounds once

HINT:

- ***1: except China.**
- ***2: For vehicles with the multi-information display.**

- Driver door unlock mode:

Mode		Driver Door (Customized)
Wireless Door Lock Buzzer*1		Each interval approximately 0.13 seconds 
Combination Meter	Multi-information Display*2	 Displayed for 4 seconds
	Buzzer	Sounds once

HINT:

- ***1: except China.**
- ***2: For vehicles with the multi-information display.**
- **The above illustration is for LHD vehicles. For RHD vehicles, the left side and right side are reversed.**

g. KEY CANCEL
The key cancel operation disables the following functions:

- Entry Unlock/Lock
- Key Lock-in Prevention
- Memory Call
- Entry Back Door Open
- Warning
- Entry Ignition

i. The operation procedures are as follows:
Precondition:
Engine switch off, driver side door closed and unlocked.

1. Unlock the driver side door once with the unlock switch of the key.
2. Open the driver door within 5 seconds.
3. Unlock the driver side door twice with the unlock switch of the key within 5 seconds.
4. Perform close → open twice for the driver door within 30 seconds.
   (Driver door: Open condition → Close → Open → Close → Open)
5. Unlock the driver side door twice with the unlock switch of the key within 5 seconds.
6. Perform close → open once for the driver door within 30 seconds.
   (Driver door: Open condition → Close → Open)
7. Close the driver door within 5 seconds.
   When key cancel is activated, the wireless door lock buzzer sounds twice.
   To return to the original condition, perform the procedures again. When the original condition is returned, the wireless door lock buzzer sounds once.

h. ENTRY AND START SYSTEM (for Start Function)

Entry & Start

Display	Default	Content	Setting
Ignition Available Area	All	Function to choose the available area for the key to start the engine and cancel the steering lock.	Front/All

i. THEFT DETERRENT SYSTEM

Security:

Display	Default	Contents	Setting
Warning by Horn*1	ON	Function that allows vehicle horns and security horn to be used as warning device.	ON/OFF
Warning by Glass Broken Sensor*2	ON	Function that turns the glass breakage sensor on/off.	ON/OFF

HINT:

- ***1: w/ Security Horn**

- ***2: w/ Glass Breakage Sensor**

j. METER AND GAUGE SYSTEM

Warning

Display (Item)	Default	Contents	Setting
Driver Side Seatbelt Warning Buzzer	ON	To change the seat-belt warning buzzer.	ON / OFF
Front Passenger Side Seatbelt Warning Buzzer	ON	To change the seat-belt warning buzzer.	ON / OFF

Unit Conversion

Display (Item)	Default	Contents	Setting
Units By Region	Different for each vehicle	To change the units of the display.	Km/l JP / Km/l / Mi/g US / Mi/g UK

Display

Display (Item)	Default	Contents	Setting
Language	None	To change the language of the display.	Eng US / Eng UK / French / German / Spanish / Italian / Japanes / CHN Sim / CHN Trd

k. SEAT BELT WARNING SYSTEM

Seat Belt Warning

Display	Default	Contents	Setting
D-Seatbelt Warning Buzzer	ON	If driver side seat belt is unfastened and the vehicle is driven at approximately 20 km/h (12.5 mph) or more, this system sound the seat belt warning buzzer	ON/OFF
P-Seatbelt Warning Buzzer	ON	If front passenger side seat belt is unfastened and the vehicle is driven at approximately 20 km/h (12.5 mph) or more, this system sound the seat belt warning buzzer	ON/OFF

l. AIR CONDITIONING SYSTEM

Air Conditioner

Display	Default	Contents	Setting
Set Temperature Shift	Normal	Function to set the temperature shift.	+2 C/+1 C/Normal/-1 C/-2 C
Compressor/Air Inlet DEF operation	Link	Function to automatically turn the A/C on when the FRONT DEF button is pressed.	Normal/Link
Compressor Mode	Automatic	Function to turn the A/C on automatically by pressing the AUTO button when the blower is on and the A/C is off.	Manual/Automatic
Air Inlet Mode	Automatic	Function to automatically change to recirculation mode when the A/C is turned on.	Manual/Automatic
Foot/DEF Auto Mode	ON	Function to turn the airflow from FOOT/DEF on automatically when auto mode is on.	ON/OFF
Foot/DEF Automatic Blow Up Function	ON	Function to change the blower level automatically when the defroster is on.	ON/OFF
Ambient Temperature Shift	Normal	Function to control the shifted ambient temperature in relation to the displayed ambient temperature.	+3 C/+2 C/+1 C/Normal/-1 C/-2 C/-3 C
Button Press Buzzer	ON	Function to sound a buzzer when a button is pressed.	ON/OFF
Add Foot Air in FACE Mode	ON	When the FACE mode is selected, an additional amount of air blow to the foot area. Selecting OFF will cancel this additional air flow.	ON/OFF

m. POWER WINDOW CONTROL SYSTEM

Power Window

Display (Item)	Default	Contents	Setting
Door Key P/W Up	OFF	Function that raises all the power windows when, with the engine switch off, a key is used to hold the driver door key cylinder to the lock position for more than 2.3 sec.	ON/OFF
Door Key P/W Down	OFF	Function that lowers all the power windows when, with the engine switch off, a key is used to hold the driver door key cylinder to the unlock position for more than 2.3 sec.	ON/OFF
P/W Up W/ Transmit	OFF	Function that raises all the power windows when, with the engine switch off, the unlock switch on the transmitter is pressed and held for more than 3.0 sec.	ON/OFF
P/W Down W/ Transmit	OFF	Function that lowers all the power windows when, with the engine switch off, the unlock switch on the transmitter is pressed and held for more than 3.0 sec.	ON/OFF
P/W Up W/ Smart	OFF	Function that raises all the power windows when, with the engine switch off, the entry lock switch on the driver side door outside handle is pressed and held for more than 3.0 sec.	ON/OFF

n. SLIDING ROOF SYSTEM

Slide Roof

Display (Item)	Default	Contents	Setting
Door Key Related Open	ON	The function to manually open the sliding roof linked with the power window if holding the driver side door key for 3 seconds or more to unlock position when the engine switch is off.	ON/OFF
Door Key Related Close	ON	The function to manually close the sliding roof linked with the power window if holding the driver side door key for 3 seconds or more to lock position when the engine switch is off.	ON/OFF
Wireless Key Related Open	ON	The function to manually open the sliding roof linked with the power window if pressing the transmitter unlock switch for 3 seconds or more when the engine switch is off.	ON/OFF
Wireless Key Related Close	OFF	The function to manually close the sliding roof linked with the power window if pressing the transmitter lock switch for 3 seconds or more when the engine switch is off.	ON/OFF
Door Handle Lock Button	ON	The function to manually close the sliding roof linked with the power window if pushing the door lock switch for 3 seconds or more when the engine switch is off and the key is outside vehicle.	ON/OFF
Door Key Related Operation	Slide	The function to select tilt up or slide open of manual sliding roof operation linked with the power window activated by holding the driver side door key for 3 seconds or more to unlock position when the engine switch is off.	Tilt/Slide
Wireless Key Related Operation	Slide	The function to select tilt up or slide open of manual sliding roof operation linked with the power window activated by pressing on the transmitter unlock switch for 3 seconds or more when the engine switch is off.	Tilt/Slide

o. LIGHTING SYSTEM

Main Body

Display	Default	Contents	Setting
Lighting Time	15s	To change the lighting time after closing the door. (It will quickly fade out in the case of turning the engine switch on (IG)).	7.5s/15s/30s
I/L when ACC OFF	ON	Function to light the interior light when the engine switch is turned from on (IG) to off.	ON/OFF
I/L ON W/Door Key Unlock	ON	Function to light the interior light, etc. when the door is unlocked with a transmitter, door key or door lock control switch.	ON/OFF
Room Light when Aprchd	ON	Dome light illumination (when approaching vehicle)	ON/OFF
Disp Ex ON Sen	NORMAL	Changes brightness when lowering lights such as the combination meter indicator light, A/C indicator light, and clock light*2.	LIGHT2/LIGHT1/NORMAL/DARK1/DARK2
Disp Ex OFF Sen	NORMAL	Changes brightness when canceling lowering lights such as the combination meter indicator light, A/C indicator light, and clock light*3.	LIGHT2/LIGHT1/NORMAL/DARK1/DARK2
Sensitivity	NORMAL	Function to adjust the sensitivity of the lighting illumination*1	LIGHT2/LIGHT1/NORMAL/DARK1/DARK2

HINT:

*1: The sensitivity adjustment may be difficult to confirm. Check by driving the vehicle.

*1

Lighting brightness	Dark ← → Bright				
Setting	DARK2	DARK1	NORMAL	LIGHT1	LIGHT2

*2

Brightness when lowering the lights	Dark ← → Bright				
Setting	DARK2	DARK1	NORMAL	LIGHT1	LIGHT2

*3

Brightness when canceling the lowering of the lights	Dark ← → Bright				
Setting	DARK2	DARK1	NORMAL	LIGHT1	LIGHT2

PROCEDURES NECESSARY WHEN CABLE IS DISCONNECTED/RECONNECTED TO BATTERY TERMINAL

Procedures Necessary when Cable is Disconnected/Reconnected to Battery Terminal

Necessary Procedure	Procedure Details	Effect or Inoperative Function when Necessary Procedure is not Performed	Notes
Initialize parking assist monitor system	**Perform either of the following procedures.** • Fully turn the steering wheel to the right and left. • Drive the vehicle at more than 20 km/h (12 mph) for more than 5 minutes on a straight road with as little traffic congestion as possible.	Parking assist function	-

NOTICE:

After the engine switch is turned off, the display and navigation module display (HDD navigation system) records various types of memory and settings. As a result, after turning the engine switch off, make sure to wait at least 60 seconds before disconnecting the cable from the negative (-) battery terminal.

Procedures necessary when ECU or other parts are replaced

Procedures necessary when ECU or other parts are replaced

Replacement Part	Necessary Procedures	Effects / Inoperative Functions When Necessary Procedures are not Performed	Notes
Fuel injector (1VD-FTV)	Injector compensation code registration	DTC B1603 is output	-
Fuel supply pump (1VD-FTV)	ECM initialization	Engine starting	-
ECM (1VD-FTV)	ECU communication ID registration	Engine starting	-
Any of shift solenoid valves	Reset memory	Large shift shock	-
Transmission wire	Add and adjust the ATF level	Automatic transmission assembly damaged	-
Valve body and shift solenoid valve	Add and adjust the ATF level	Automatic transmission assembly damaged	-
	Perform the Reset Memory (AT initialization)	Large shift shock	-
Oil cooler and oil cooler tube	Add and adjust the ATF level	Large shift shock	-
Park/neutral position switch	Adjust the park/neutral position switch	1. Back-up light does not turn on 2. Meter indicator display malfunction 3. Vehicle undrivable 4. Shifting not possible	-
Transmission floor shift assembly	Adjust the shift lever position	1. Back-up light does not turn on 2. Meter indicator display malfunction 3. Vehicle undrivable 4. Shifting not possible	-
Automatic transmission assembly	Add and adjust the ATF level	Automatic transmission assembly damaged	-
	Perform the Reset Memory (AT initialization)	Large shift shock	-
• Clutch pedal (for LHD) • Clutch master cylinder (for LHD)	Inspect and adjust clutch pedal	• Clutch slips • Clutch dies not disengage	-
• Clutch			

• Clutch pedal (for RHD) • Clutch master cylinder (for RHD)	Inspect and adjust clutch pedal	• Clutch slips • Clutch dies not disengage	-
Suspension control ECU	Vehicle height offset calibration	Vehicle height sensor date may be affected due to installation position, or vehicle height recognition may be erroneous	After vehicle height offset calibration is performed, it is necessary to calibrate the yaw rate sensor
Height control sensor	Vehicle height offset calibration	Vehicle height sensor date may be affected due to installation position, or vehicle height recognition may be erroneous	After vehicle height offset calibration is performed, it is necessary to calibrate the yaw rate sensor
• Suspension • Underbody components	• Steering angle neutral point in memory • Yaw rate and G sensor zero point calibration	• The brake control and dynamic control systems do not operate properly • VGRS system • Parking assist monitor system	Removed/installed or replaced
Master cylinder solenoid (Skid control ECU)	G sensor zero point calibration	The brake control system does not operate properly	-
G sensor	1. Clearing zero point calibration data 2. G sensor zero point calibration	The brake control system does not operate properly	-
Master cylinder solenoid (Skid control ECU)	Yaw rate and G sensor zero point calibration	The brake control and dynamic control systems do not operate properly	-
Yaw rate and G sensor	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration	The brake control and dynamic control systems do not operate properly	-
Vehicle height adjustment	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration 3. Steering angle sensor initialization	The brake control and dynamic control systems do not operate properly	w/ active height control system
• Brake pedal • Hydraulic brake booster	Check brake pedal height	• Brake performance problem • Delayed stop light illumination or continuous illumination	-
• Parking brake lever • Parking brake cable • Parking brake assembly	Adjust parking brake lever travel	• Brake drag • Brake performance problem • Delayed stop light illumination or continuous illumination	-
• Steering control ECU • Steering column • Steering intermediate	Calibration	• VGRS system • DTC output	-

shaft • Steering actuator assembly			
Steering angle sensor	Initialization	• VGRS system • Other related systems cannot operate properly	-
Steering column	Steering off center adjustment	Steering system does not operate normally	-
Rear television camera	Rear television camera optional axis (Camera position setting)	Vehicle width extension lines and expected course are deviated	Replace or installation angle of the rear television camera changes because of the removal and installation of the rear television camera
Parking assist ECU	• Steering angle neutral point in memory • Store the left and right maximum steering angles • Rear television camera optical axis (Camera position setting)	Parking assist monitor system	Replace or installation angle of the rear television camera changes because of the removal and installation of the rear television camera
• ID code box • Steering lock ECU • Key • Certification ECU	Registration	• Wireless door lock operation • Entry operation • Engine starting • Steering unlock	-
• Front Power window regulator motor LH • Front Power window regulator motor RH • Rear Power window regulator motor LH • Rear Power window regulator motor RH	Initialize the motor	• Jam protection function • Power window control system	-
Inner rear view mirror	• Compass zone setting • Compass calibration • Register transmitter code	Direction is not displayed correctly	-
• Sliding roof driver gear (Sliding roof ECU) • Sliding roof glass	Initialize sliding roof system	• Auto operation • Jam protection function • Sliding roof operation after engine switch OFF • Wireless door lock control function • Key-linked operation function (Driver side door only) • Entry lock switch-linked operation	-
Headlight assembly	Adjustment	Beam axis deviation	-

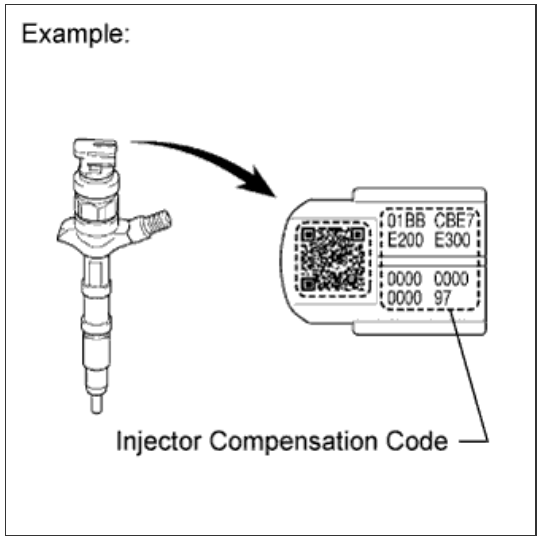
Fog light assembly	Adjustment	Beam axis deviation	-
Front bumper	Adjustment	Beam axis deviation	-

REGISTRATION RELATED TO ECD SYSTEM

a. REGISTRATION

NOTICE:

- **When a fuel injector is replaced, the new fuel injector compensation code must be input into the ECM. When the ECM is replaced, all of the existing fuel injector compensation codes must be input into the new ECM.**
- **Fuel injector compensation codes are unique, 30 digit, alphanumeric values printed on the head portion of each fuel injector. If an incorrect fuel 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.**



i. After replacing fuel injector(s) with new one(s), input compensation code(s) of fuel injector(s) into ECM as follows:

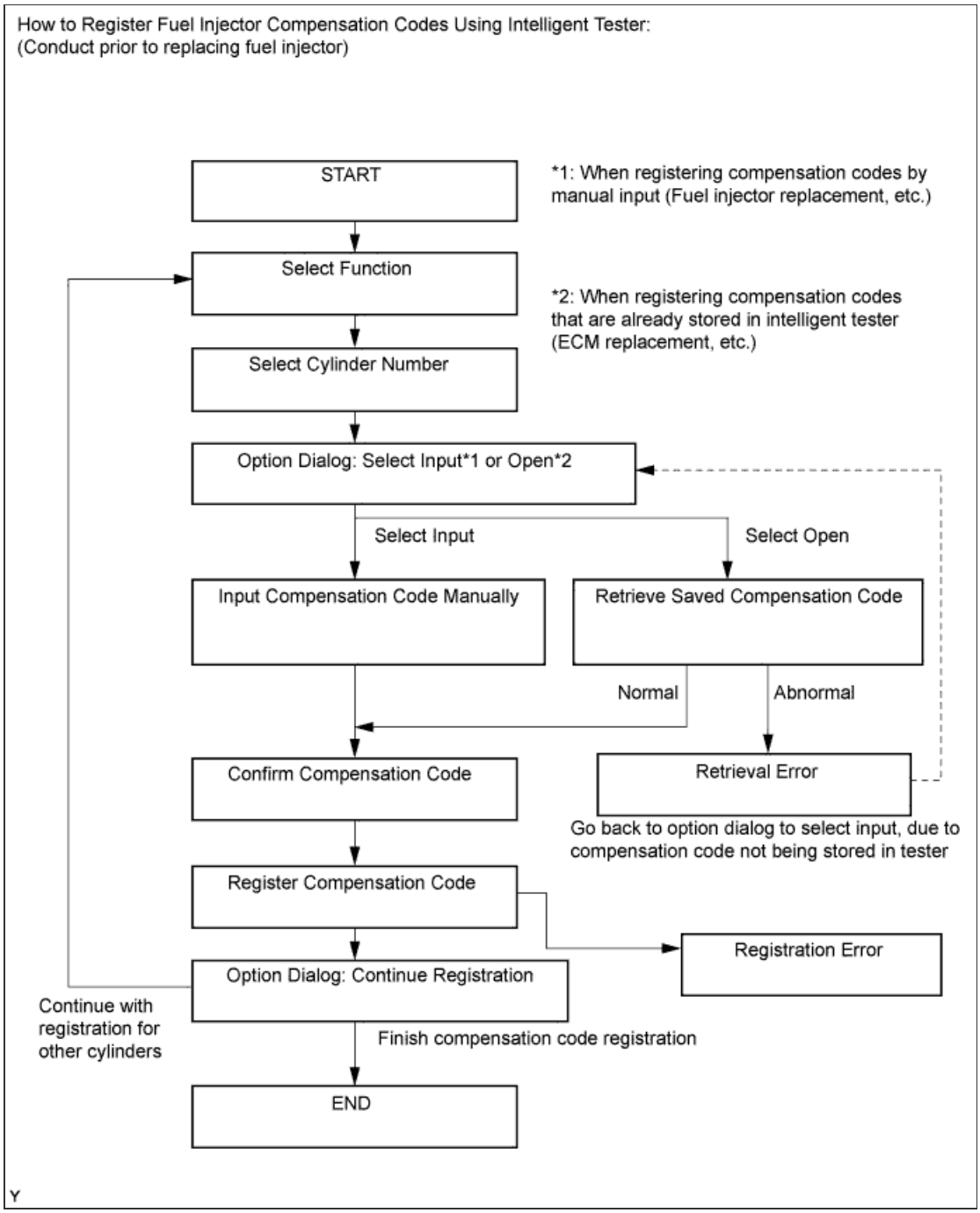
HINT:

- **Each fuel 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 fuel injector.**
- **When you first turn the engine switch on (IG) after replacing the ECM or a fuel injector(s), DTC P1601 is set. This is to inform you that registration of a fuel injector compensation code(s) is/are required. Manually clear the DTC upon completion of the compensation code registration.**

1. Input the compensation code(s), which is/are imprinted on the head portion(s) of the new fuel injector(s), into the intelligent tester.
2. Input the new compensation code(s) into the ECM using the tester.
3. Turn the tester off and turn the engine switch off.
4. Wait for at least 30 seconds.
5. Turn the engine switch on (IG) and turn the tester on.
6. Clear DTC P1601 stored in the ECM using the tester.

ii. Register compensation code.

How to Register Fuel Injector Compensation Codes Using Intelligent Tester:
(Conduct prior to replacing fuel injector)



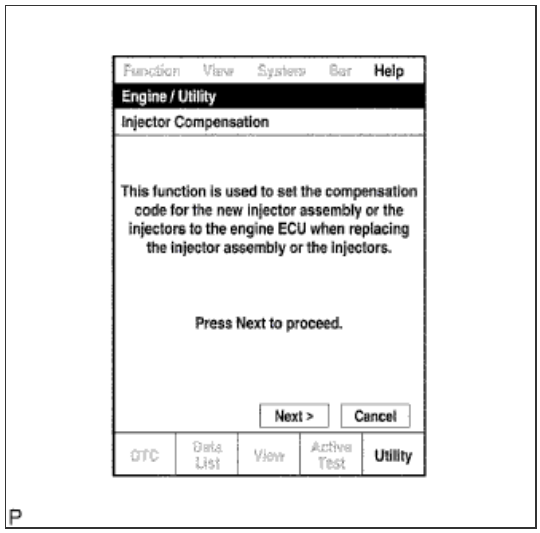
Y

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).

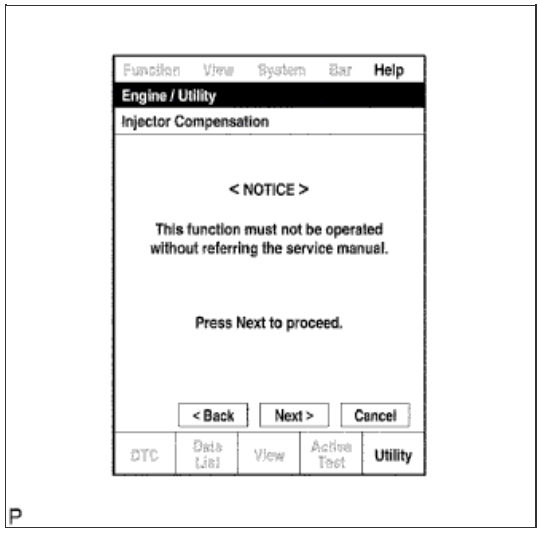
NOTICE:

Do not start the engine.

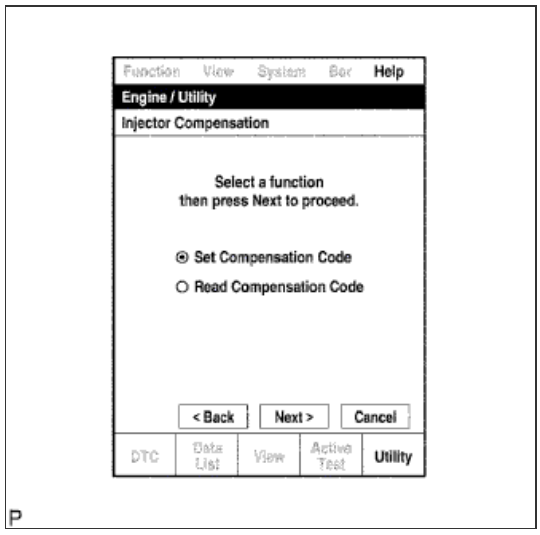
3. Turn the tester on.
4. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
5. Press Next.



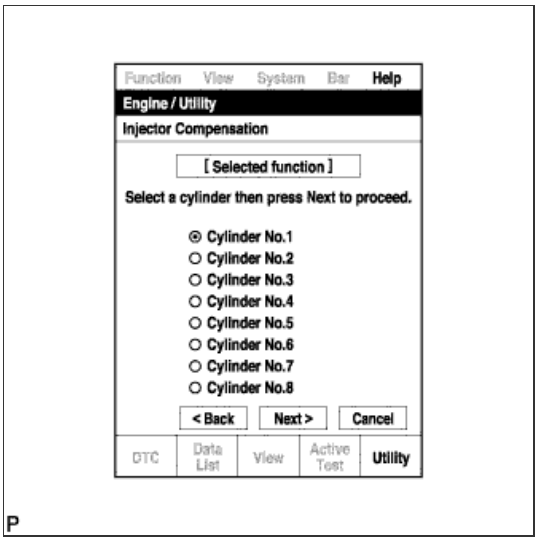
6. Press Next again to proceed.



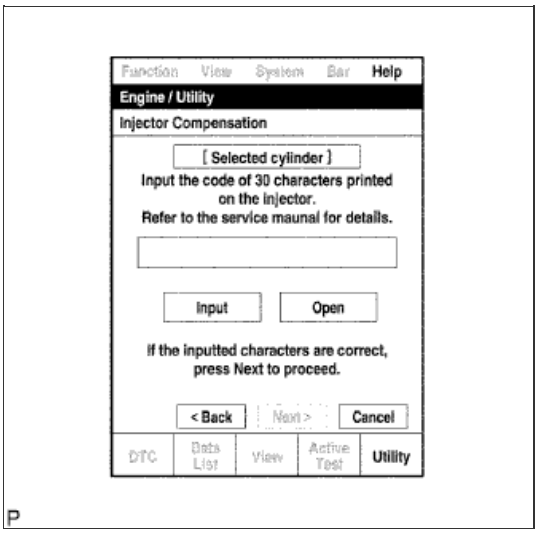
7. Select "Set Compensation Code".
8. Press Next.



9. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
10. Press Next.



11. Register compensation code.
    1. Press Input.



    2. Manually input the cylinder compensation code using the keyboard on the tester screen. The code is a 30 digit, alphanumeric value printed on the injector head portion.

       HINT:

       Each fuel injector compensation code is unique. The compensation code for each selected cylinder must be input into the tester correctly.

    3. Confirm that the compensation code for the selected cylinder is correct, and then press OK.



12. Check that the compensation code displayed on the screen is correct by comparing it with the 30 digit alphanumeric value on the head portion of the fuel injector.

    NOTICE:

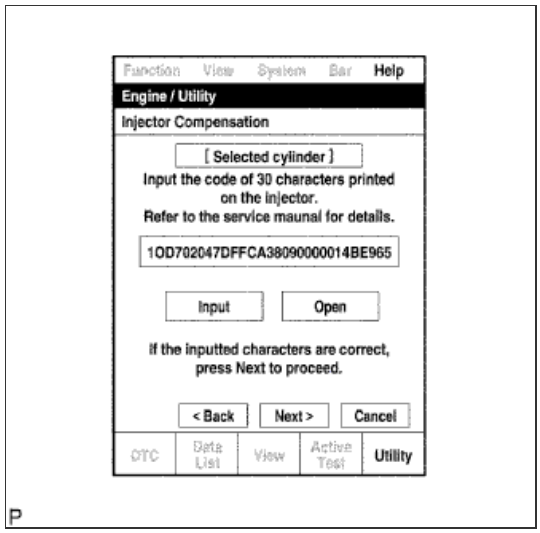
    If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

    HINT:

    - **If a wrong compensation code is input or read, return to the Input Value screen by**

pressing Input.

- **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 DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and repeat this operation.**

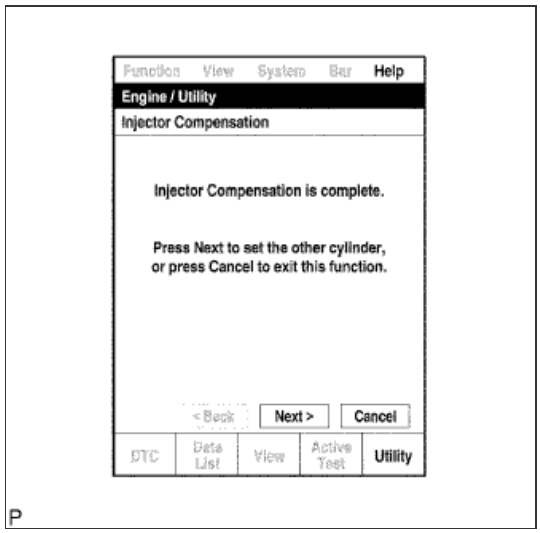


13. Press Next to register the compensation code in the ECM.

    HINT:

    - **If the registration process fails, the compensation code may be incorrect. Check the compensation code again.**
    - **If the input compensation code fails to register even though it is input correctly, there may be a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.**

14. If you want to continue with other compensation code registrations, press Next. To finish the registration, press Cancel.
15. Turn the engine switch off and then turn the tester off.
16. Wait for at least 30 seconds.
17. Turn the engine switch on (IG) and then turn the tester on.
18. Clear DTC P1601 stored in the ECM using the tester.



b. READING REGISTERED DATA

NOTICE:

- **When a fuel injector is replaced, the new fuel injector compensation code must be input into the ECM. When the ECM is changed, all of the existing fuel injector compensation codes must be input into the new ECM.**
- **Fuel injector compensation codes are unique, 30 digit, alphanumeric values printed on the head portion of each fuel injector. If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.**

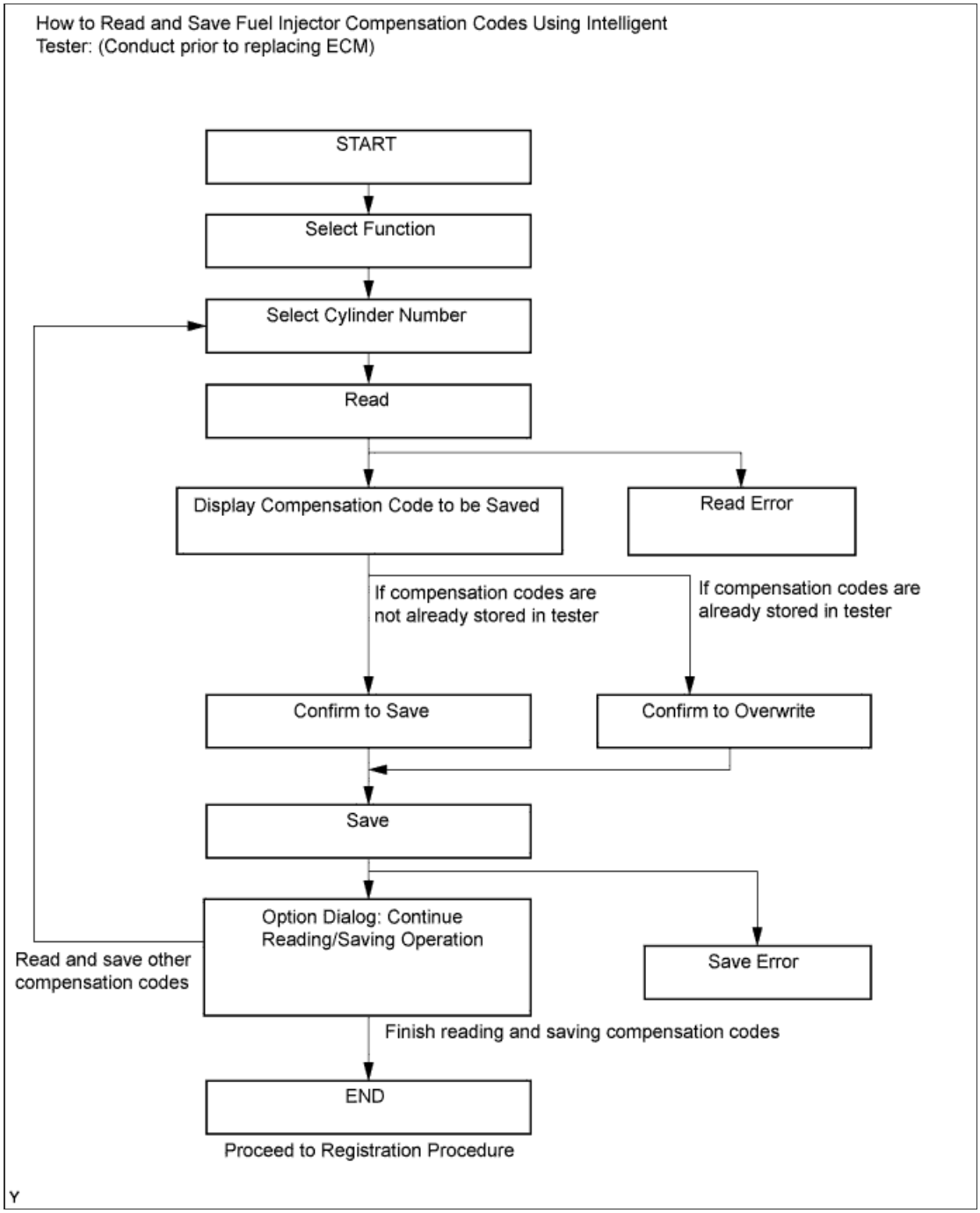
i. When replacing ECM with a new one, input all fuel injector compensation codes into new ECM as follows:

HINT:

- **Each fuel 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 engine switch on (IG) after replacing the ECM or a fuel injector(s), DTC P1601 is set. This is to inform you that registration of a fuel injector compensation codes(s) is/are required. Manually clear the DTC upon completion of the compensation code registration.**

1. Prior to replacing the ECM, read and save each fuel injector compensation code, stored in the original ECM, using the intelligent tester.
2. After installing a new ECM, input the saved compensation codes into the new ECM using the tester.
3. Turn the tester off and turn the engine switch off.
4. Wait for at least 30 seconds.
5. Turn the engine switch on (IG) and turn the tester on.
6. Clear DTC P1601 stored in the ECM using the tester.

ii. Read and save fuel injector compensation codes.



HINT:

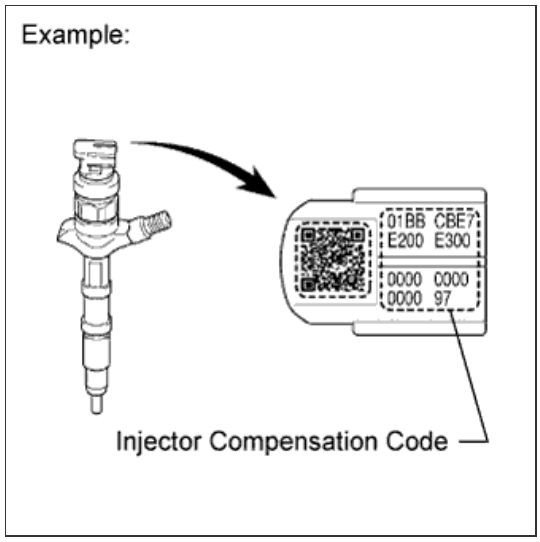
The following operation is available with ECMs that can transmit the registered fuel injector compensation codes to the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).

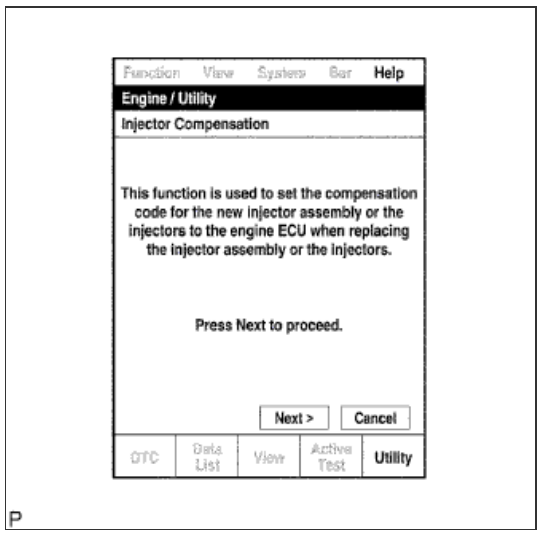
   NOTICE:

   Do not start the engine.

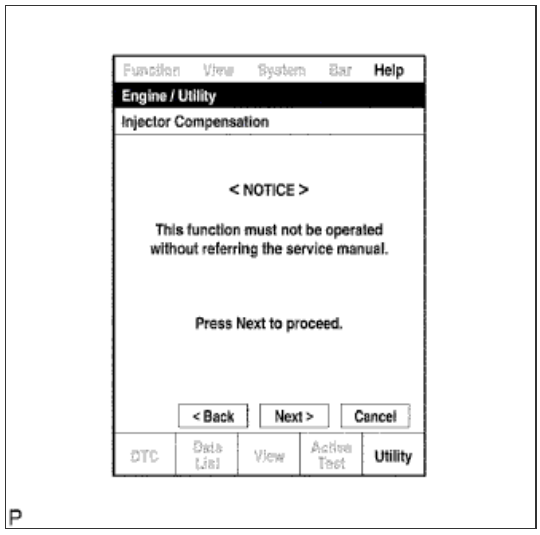
3. Turn the tester on.



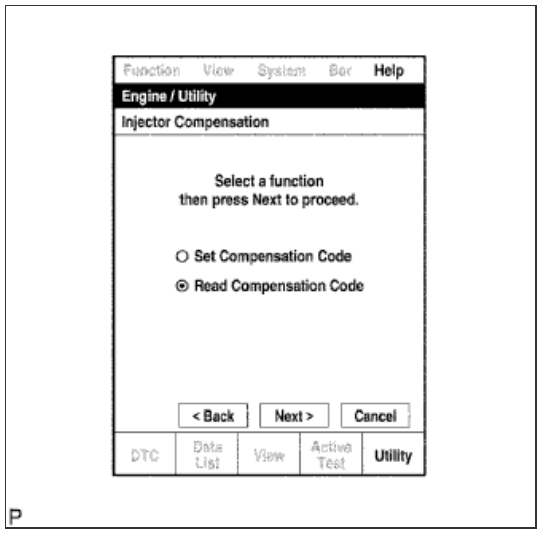
4. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
5. Press Next.



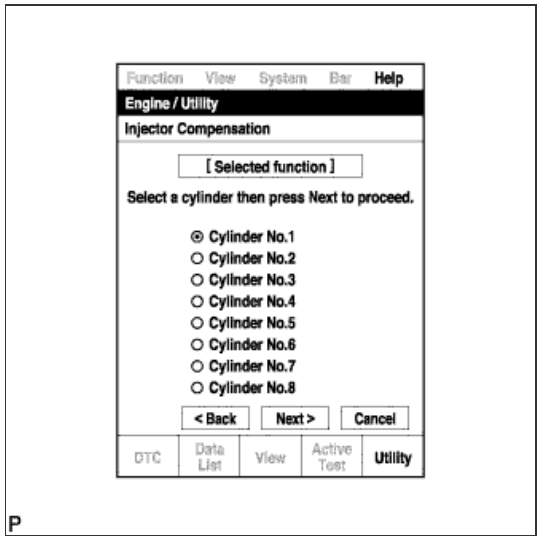
6. Press Next again to proceed.



7. Select Read Compensation Code.
8. Press Next.



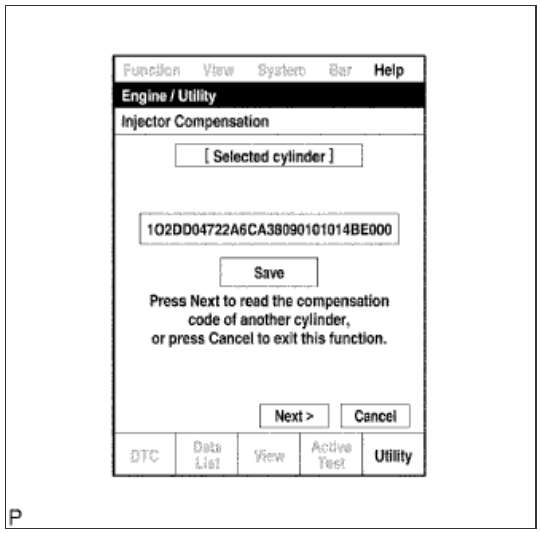
9. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
10. Press Next.



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 DLC3 connection. If no problem is found, the ECM may be malfunctioning. Check the ECM and restart this operation.

11. Check the fuel injector compensation code (30 digit alphanumeric value) displayed on the tester screen.
12. Press Save.



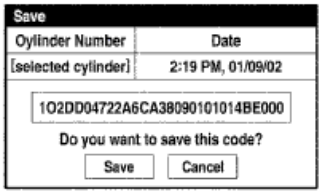
13. Check that the compensation code displayed on the tester screen is correct.
14. Press Save or Replace to save the fuel injector compensation code.

HINT:

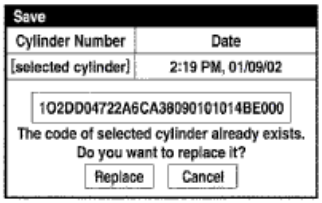
- **The existing compensation code is overwritten with the new compensation code and is deleted from the tester.**
- **The saving process may fail due to a problem with the wire harness or a bad**

connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.

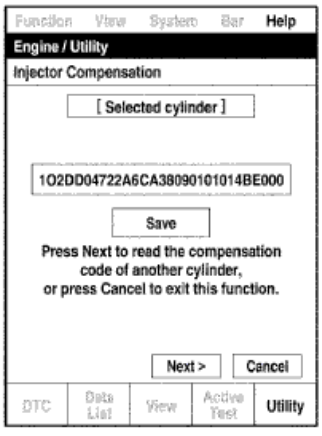
When no fuel injector compensation code for the cylinder exists in the tester:



When another fuel injector compensation code for the cylinder exists in the tester:



15. If you want to read and save other fuel injector compensation codes for other cylinders, press Next to continue. To finish this operation, press Cancel.
16. Turn the engine switch off.
17. Turn the tester off.
18. Replace the ECM.



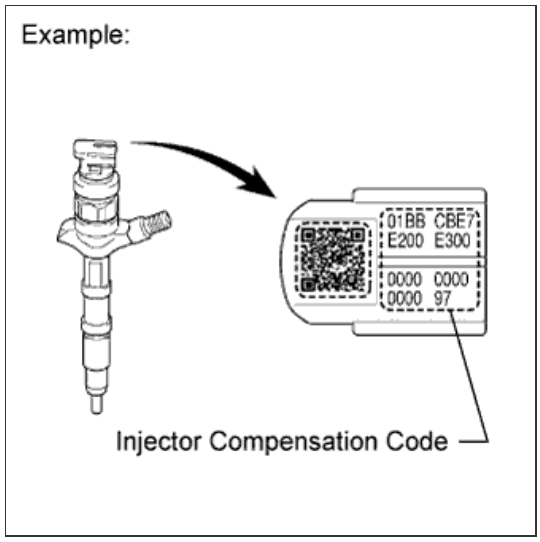
P

19. Connect the intelligent tester to the DLC3.
20. Turn the engine switch on (IG).

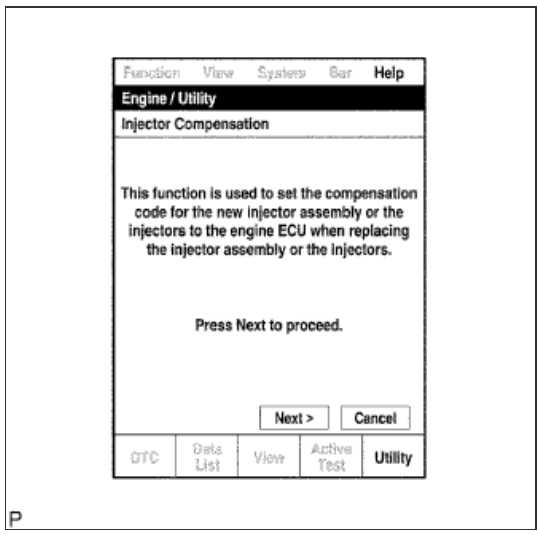
NOTICE:

Do not start the engine.

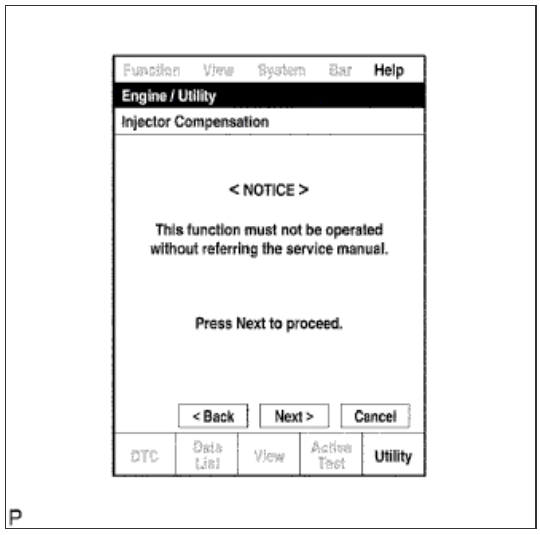
21. Turn the tester on.



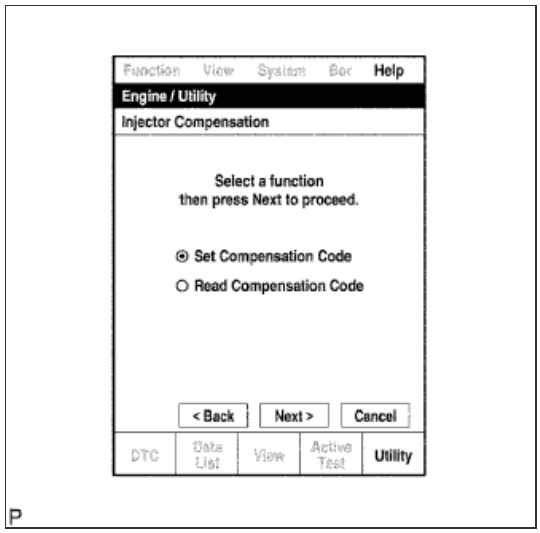
22. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
23. Press Next.



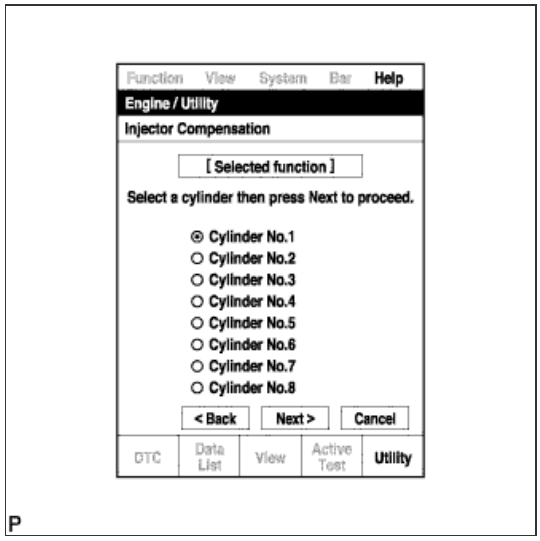
24. Press Next again to proceed.



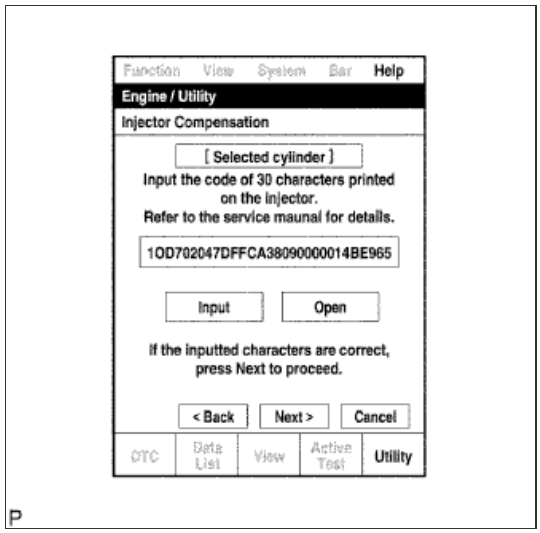
25. Select Set Compensation Code.
26. Press Next.



27. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
28. Press Next.



29. Check that the compensation code displayed on the screen is correct by comparing it with the 30 digit alphanumeric value on the head portion of the fuel injector.



NOTICE:

If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

HINT:

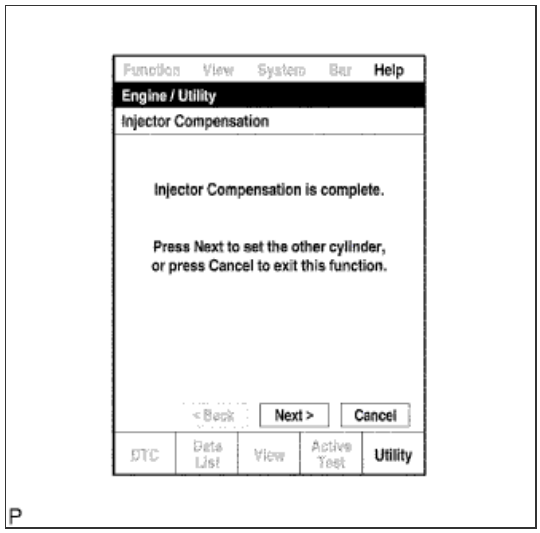
- **If a wrong compensation code is input or read, return to the Input Value screen by pressing input.**
- **The saving process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and repeat this operation.**

30. Press Next to register the compensation code in the ECM.

HINT:

- **If the registration process fails, the compensation code may be incorrect. Check the compensation code again.**
- **If the input compensation code fails to register even though it is input correctly, there may be a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.**

31. If you want to continue with other compensation code registrations, press Next. To finish the registration, press Cancel.
32. Turn the engine switch off and then turn the tester off.
33. Wait for at least 30 seconds.
34. Turn the engine switch on (IG) and then turn the tester on.
35. Clear DTC P1601 stored in the ECM using the tester.



P

c. FUEL SUPPLY PUMP INITIALIZATION PROCEDURE

HINT:

After replacing the supply pump and/or the ECM, the ECM learned values must be initialized.

The engine can be initialized through the intelligent tester or by connecting DLC3 terminals.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

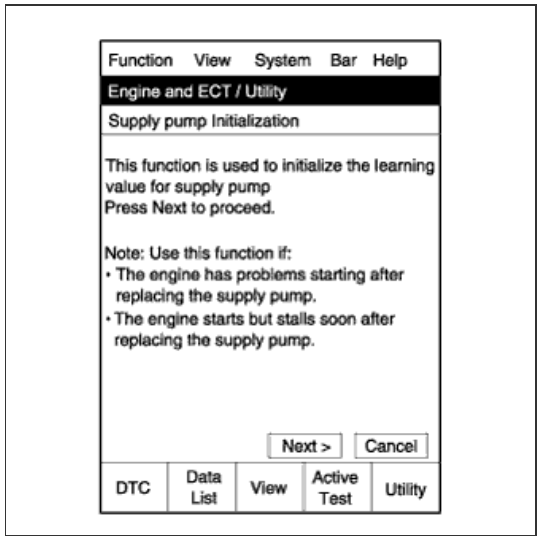
NOTICE:

Do not start the engine.

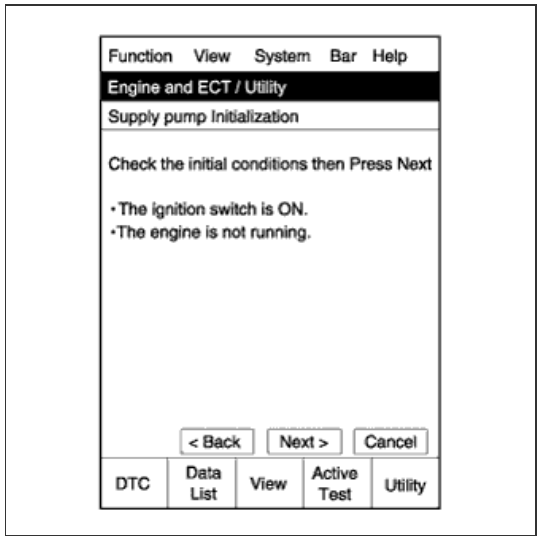
iii. Turn the tester on.

iv. Enter the following menus: Powertrain / Engine / Utility / Supply Pump Initialization.

v. Press "Next".



vi. Press "Next".



vii. Press "Exit".

viii. Start the engine to check if the initialization is complete. If the engine cannot be started, repeat the initialization procedures from the beginning.

ix. Idle the engine for at least 1 minute under the following conditions:

- The engine coolant temperature is 60°C (140°F) or more.
- The fuel temperature is 20°C (68°F) or more.

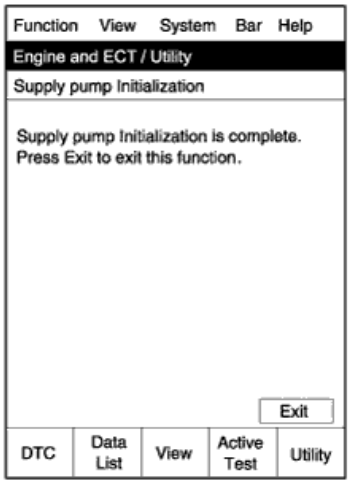
NOTICE:

Do not race the engine immediately after starting the engine. After warming up the engine, racing the engine is acceptable.

HINT:

If the engine coolant temperature is difficult to estimate, use the intelligent tester and enter the following menus: Powertrain / Engine / Data List / Coolant Temp and Fuel Temperature.

x. Initialization is complete.



INITIALIZATION RELATED TO AUTOMATIC TRANSMISSION SYSTEM

a. RESET MEMORY

NOTICE:

- **Perform the Reset Memory (AT initialization) when replacing the automatic transmission assembly, valve body assembly or any of the shift solenoid valves.**
- **The Reset Memory can be performed only with the intelligent tester.**

HINT:

The ECM memorizes the control conditions of the automatic transmission assembly and engine assembly. Therefore, when the automatic transmission assembly, valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

iii. Turn the intelligent tester on.

iv. Enter the following menus: Powertrain / Engine and ECT / Utility / Reset Memory.

NOTICE:

After performing the Reset Memory, be sure to perform the Road Test described earlier.

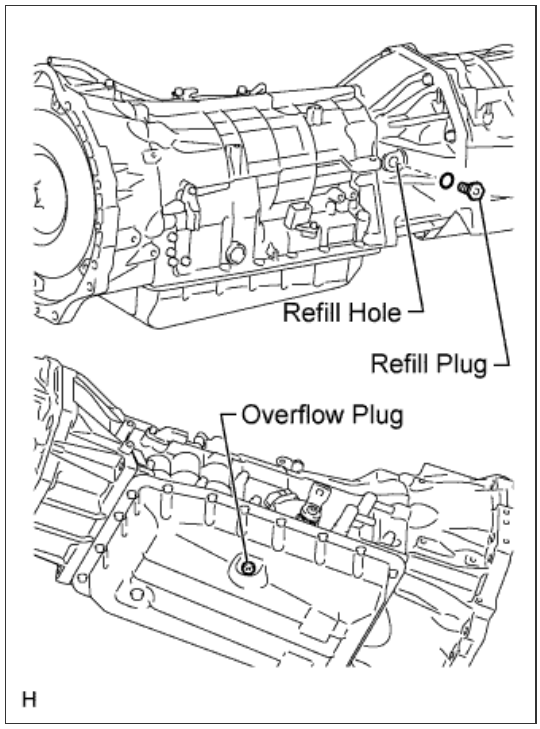
HINT:

The ECM learns through the Road Test.

ADJUSTMENT FOR AUTOMATIC TRANSMISSION FLUID (A750F)

a. BEFORE FILLING TRANSMISSION

- This transmission requires Toyota Genuine ATF WS transmission fluid.
- After servicing the transmission, you must refill the transmission with the correct amount of fluid.
- Keep the vehicle level while adjusting the fluid level.
- Proceed to the "Transmission Pan Fill" procedures if you replaced the entire transmission, transmission pan, drain plug, valve body and/or torque converter.
- Proceed to the "Transmission Fill" procedures after removing the refill plug if you replaced the transmission hose and/or output shaft oil seal.

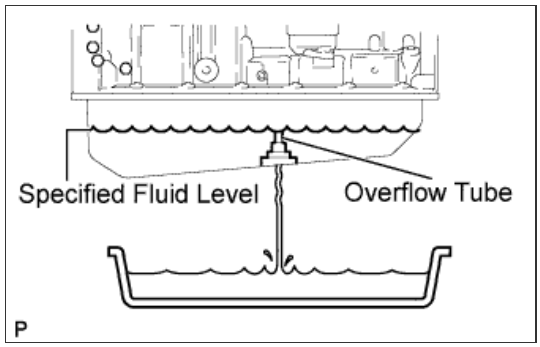


b. TRANSMISSION PAN FILL

i. Remove the refill plug and overflow plug.

ii. Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

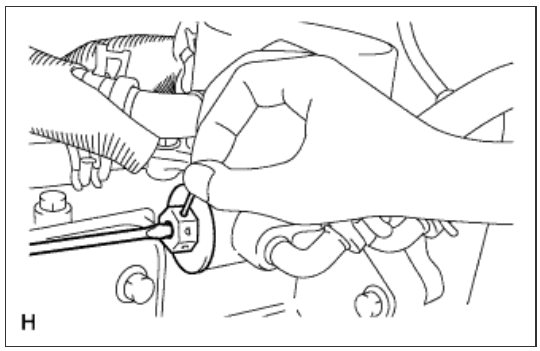
iii. Reinstall the overflow plug.



c. TRANSMISSION FILL

i. w/o Air Cooled Transmission Oil Cooler (w/ ATF Warmer): Push the shaft of the thermostat and fix it in place.

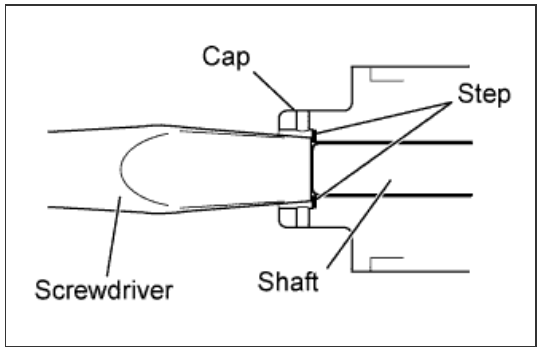
1. By using compressed air, etc., blow dust off of the thermostat cap to clean it.



2. Using a screwdriver, push the shaft of the thermostat.

HINT:

- **Pushed amount: 5.5 to 7.0 mm (0.217 to 0.276 in.)**
- **Push the shaft until the screwdriver contacts the inside step of the cap.**



3. With the shaft of the thermostat pressed, push a pin (diameter: 1.0 to 1.8 mm (0.0394 to 0.0709 in.)) into a hole on the side of the thermostat cap. Insert the pin until it passes through the hole on the other side of the thermostat cap to fix the shaft in place.

ii. Fill the transmission with the amount of fluid listed in the table below.

Standard Capacity:

Repair	Fill Amount
Transmission pan and drain plug removal	1.7 liters (1.8 US qts, 1.5 Imp. qts)
Transmission valve body removal	4.3 liters (4.5 US qts, 3.8 Imp. qts)
Torque converter removal	5.4 liters (5.7 US qts, 4.8 Imp. qts)

iii. Reinstall the refill plug to prevent the fluid from splashing.

HINT:

If you cannot add the listed amount of fluid, do the following:

1. Install the refill plug.
2. Allow the engine to idle with the air conditioning off.
3. Move the shift lever through the entire gear range to circulate fluid.
4. Wait for 30 seconds with the engine idling.
5. Stop the engine.
6. Remove the refill plug and add fluid.
7. Reinstall the refill plug.

d. FLUID CIRCULATION

i. Allow the engine to idle with the air conditioning off.

ii. Move the shift lever through the entire gear range to circulate fluid.

e. ADJUST FLUID TEMPERATURE

NOTICE:

The fluid temperature can be confirmed by checking the indicator light in the meter or by using the intelligent tester. When using the intelligent tester, it is necessary to change to temperature detection mode in order to idle the vehicle appropriately.

i. When using the intelligent tester:

1. Turn the engine switch off.
2. Connect the intelligent tester to the DLC3.
3. Turn the engine switch on (IG).
4. for 1GR-FE:
   Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1.
5. for 2UZ-FE:
   Enter the following menus: Powertrain / ECT / Active Test / Connect the TC and TE1.
6. Enter the following menus: Powertrain / ECT / Data List / A/T Oil Temperature 1.
7. Check the ATF temperature.

   NOTICE:

   - **If the fluid temperature is below 46°C (115°F), proceed to the next step. (Recommended ATF temperature: 38°C (100°F) or less)**
   - **If the fluid temperature is 46°C (115°F) or more, turn the engine switch off and wait until the fluid temperature drops below 46°C (115°F).**

8. According to the display on the intelligent tester, perform the Active Test "Connect the TC and TE1".

   HINT:

   Indicator lights of the meter blink to output DTCs when TC and TE1 are connected.

9. Start the engine.

   NOTICE:

   Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

ii. When not using the intelligent tester:

SST

09843-18040

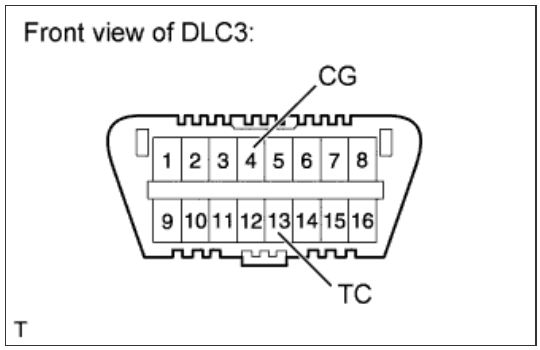
1. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
2. Start the engine.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

HINT:

Indicator lights of the meter blink to output DTCs when terminals TC and CG are connected.



iii. Slowly move the shift lever from P to S, then change the gears from 1st to 6th. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

iv. Move the shift lever to D, and quickly move back and forth between N and D (once within 1.5 seconds) for at least 6 seconds. This will activate the fluid temperature detection mode.

Standard condition:
Indicator light (D) remains illuminated for 2 seconds and then turns off.

v. When using the intelligent tester:

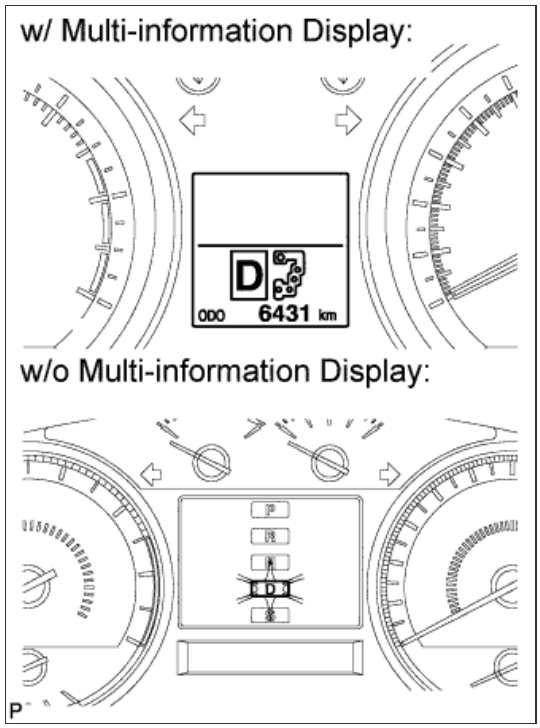
1. Return the shift lever to P and press OFF on the Active Test display.

vi. When not using the intelligent tester:

1. Return the shift lever to P and disconnect terminals 13 (TC) and 4 (CG).

vii. Allow the engine to idle until the fluid temperature reaches 38 to 46°C (100 to 115°F).

viii. The indicator (D) will come on again when the fluid temperature reaches 38°C (100°F) and will blink when it exceeds 46°C (115°F).



Indicator Indication of ATF Temperature:

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data List [A/T Oil Temperature 1] 38°C (100°F) or less	Data List [A/T Oil Temperature 1] 38 to 46°C (100 to 115°F)	Data List [A/T Oil Temperature 1] 46°C (115°F) or higher
Indicator light (D) Turn off	Indicator light (D) Turn on	Indicator light (D) Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.

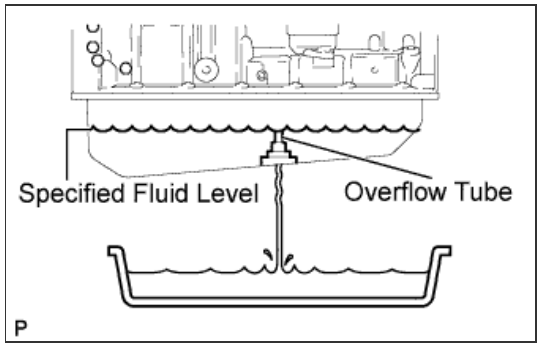
f. FLUID LEVEL CHECK

NOTICE:

The fluid temperature must be between 38 and 46°C (100 and 115°F) to accurately check the fluid level.

i. Remove the overflow plug with the engine idling.

ii. Check that fluid comes out of the overflow tube.
If fluid does not come out, proceed to the "Transmission Refill" procedures.
If fluid comes out, wait until the overflow slows to a trickle and proceed to the "Complete" procedures.



g. TRANSMISSION REFILL

i. Remove the overflow plug.

ii. Remove the refill plug.

iii. Add ATF into the refill hole until ATF flows from the overflow tube.

iv. Wait until the overflow slows to a trickle and proceed to the "COMPLETE" procedures.

h. COMPLETE

i. Install a new gasket and the overflow plug.

Torque:
20 N*m{ 204 kgf*cm , 15 ft.*lbf }

ii. Stop the engine.

iii. Install a new gasket and the refill plug.

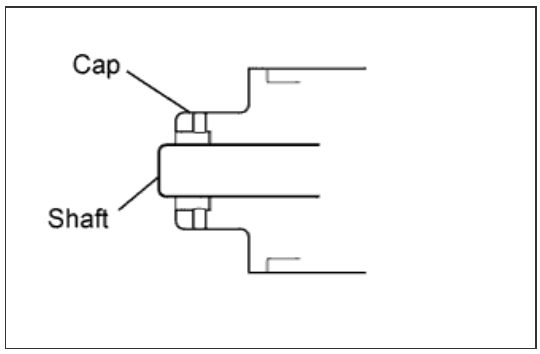
Torque:
39 N*m{ 400 kgf*cm , 29 ft.*lbf }

iv. w/o Air Cooled Transmission Oil Cooler (w/ ATF Warmer):

1. Remove the pin.

NOTICE:

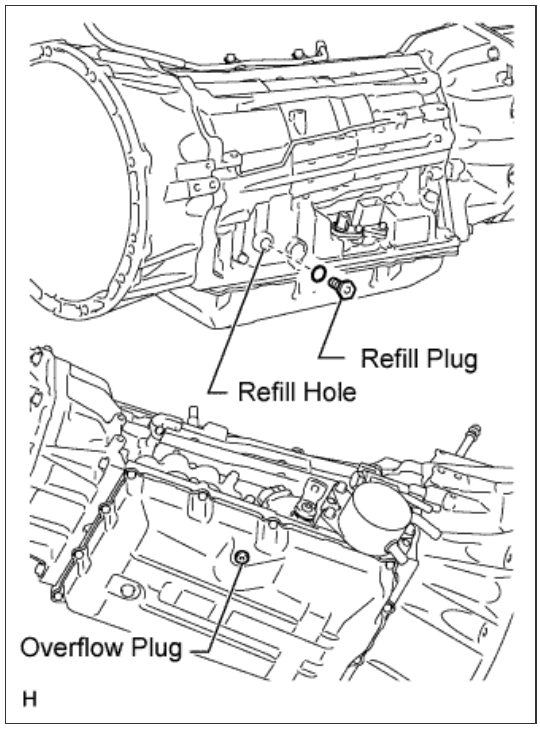
- **Make sure the shaft of the thermostat is protruding from the hole of the cap.**
- **Check that there is no ATF leaking from the cap hole.**



ADJUSTMENT FOR AUTOMATIC TRANSMISSION FLUID (AB60F)

a. BEFORE FILLING TRANSMISSION

- This transmission requires Toyota Genuine ATF WS transmission fluid.
- After servicing the transmission, you must refill the transmission with the correct amount of fluid.
- Keep the vehicle level while adjusting the fluid level.
- Proceed to the "Transmission Pan Fill" procedures if you replaced the entire transmission, transmission pan, drain plug, valve body and/or torque converter.
- Proceed to the "Transmission Fill" procedures after removing the refill plug if you replaced the transmission hose and/or output shaft oil seal.

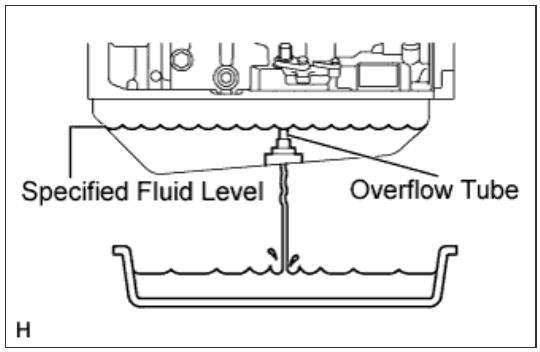


b. TRANSMISSION PAN FILL

i. Remove the refill plug and overflow plug.

ii. Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

iii. Reinstall the overflow plug.

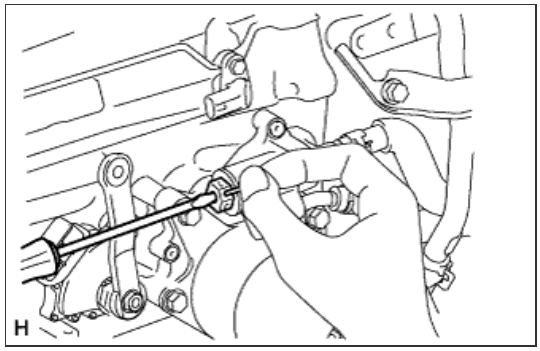


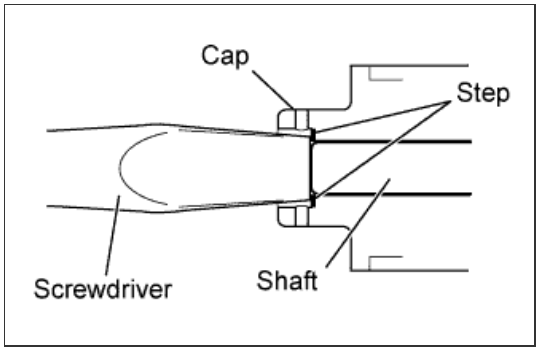
c. TRANSMISSION FILL

i. Push the shaft of the thermostat and fix it in place.

1. By using compressed air, etc., blow dust off of the thermostat cap to clean it.
2. Using a screwdriver, push the shaft of the thermostat.

HINT:





- **Pushed amount: 5.5 to 7.0 mm (0.217 to 0.276 in.)**
- **Push the shaft until the screwdriver contacts the inside step of the cap.**

3. With the shaft of the thermostat pressed, push a pin (diameter: 1.0 to 1.8 mm (0.0394 to 0.0709 in.)) into a hole on the side of the thermostat cap. Insert the pin until it passes through the hole on the other side of the thermostat cap to fix the shaft in place.

ii. Fill the transmission with the amount of fluid listed in the table below.

Standard Capacity:

Repair	Fill Amount
Transmission pan and drain plug removal	2.7 liters (2.9 US qts, 2.4 Imp. qts)
Transmission valve body removal	4.7 liters (5.0 US qts, 4.1 Imp. qts)
Torque converter removal	6.1 liters (6.4 US qts, 5.4 Imp. qts)

iii. Reinstall the refill plug to prevent the fluid from splashing.

HINT:

If you cannot add the listed amount of fluid, do the following:

1. **Install the refill plug.**
2. **Allow the engine to idle with the air conditioning OFF.**
3. **Move the shift lever through the entire gear range to circulate fluid.**
4. **Wait for 30 seconds with the engine idling.**
5. **Stop the engine.**
6. **Remove the refill plug and add fluid.**
7. **Reinstall the refill plug.**

d. FLUID CIRCULATION

i. Allow the engine to idle with the air conditioning OFF.

ii. Move the shift lever through the entire gear range to circulate fluid.

e. ADJUST FLUID TEMPERATURE

NOTICE:

The fluid temperature can be confirmed by checking the indicator light in the meter or by using the intelligent tester. When using the intelligent tester, it is necessary to change to temperature detection mode in order to idle the vehicle appropriately.

i. When using the intelligent tester:

1. Turn the engine switch off.
2. Connect the intelligent tester to the DLC3.
3. Turn the engine switch on (IG).
4. Enter the following menus: Powertrain / ECT / Active Test / Connect the TC and TE1.
5. Enter the following menus: Powertrain / ECT / Data List / A/T Oil Temperature 1.
6. Check ATF temperature.

NOTICE:

- **If the fluid temperature is below 46°C (115°F), proceed to the next step. (Recommended ATF temperature: 41°C (106°F) or less)**
- **If the fluid temperature is 46°C (115°F) or more, turn the engine switch off and wait until the fluid temperature drops below 46°C (115°F).**

7. According to the display on the intelligent tester, perform the Active Test "Connect the TC and TE1".

HINT:

Indicator lights of the combination meter blink to output DTCs when connect TC and TE1are connected.

8. Start the engine.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

ii. When not using the intelligent tester:

SST

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1. Using SST, connect terminals 13 (TC) and 4 (CG) of the

DLC3.

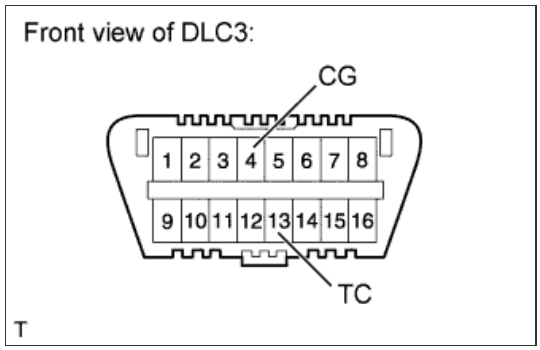
2. Start the engine.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

HINT:

Indicator lights of the meter blink to output DTCs when terminals TC and CG are connected.



iii. Slowly move the shift lever from P to S, then change the gears from 1st to 6th. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

iv. Move the shift lever to D, and quickly move back and forth between N and D (once within 1.5 seconds) for at least 6 seconds. This will activate the fluid temperature detection mode.

Standard condition:
Indicator light (D) remains illuminated for 2 seconds and then turns off.

v. When using the intelligent tester:

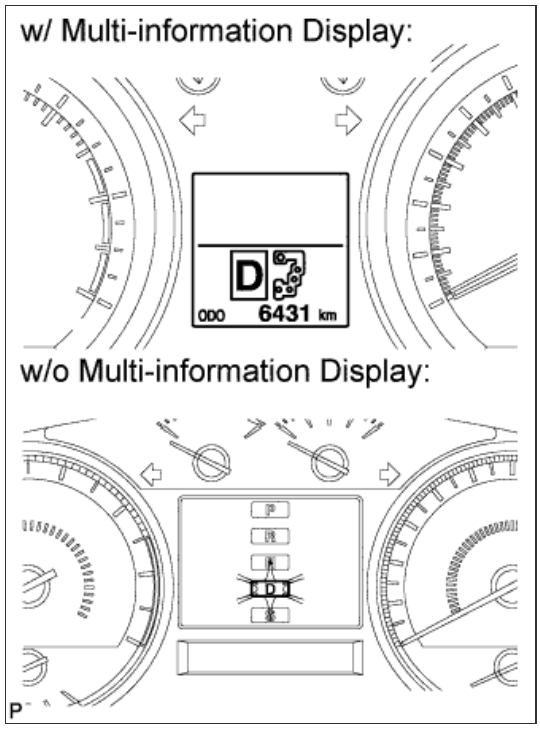
1. Return the shift lever to P and press OFF on the Active Test display.

vi. When not using the intelligent tester:

1. Return the shift lever to P and disconnect terminals 13 (TC) and 4 (CG).

vii. Allow the engine to idle until the fluid temperature reaches 41 to 46°C (106 to 115°F).

viii. The indicator (D) will come on again when the fluid temperature reaches 41°C (106°F) and will blink when it exceeds 46°C (115°F).



Indicator Indication of ATF Temperature:

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data List [A/T Oil Temperature 1] 41°C (106°F) or less	Data List [A/T Oil Temperature 1] 41 to 46°C (106 to 115°F)	Data List [A/T Oil Temperature 1] 46°C (115°F) or higher
Indicator light (D) Turn off	Indicator light (D) Turn on	Indicator light (D) Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.

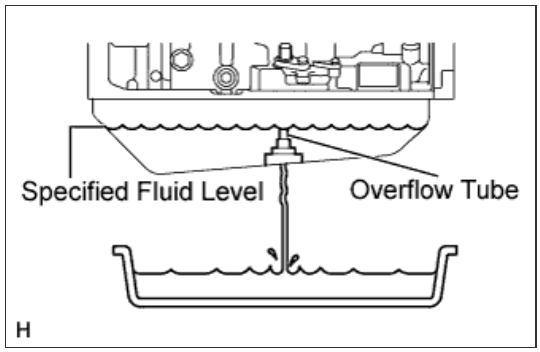
f. FLUID LEVEL CHECK

NOTICE:

The fluid temperature must be between 43 and 48°C (109 and 118°F) to accurately check the fluid level.

i. Remove the overflow plug with the engine idling.

ii. Check that fluid comes out of the overflow tube.
If fluid does not come out, proceed to the "Transmission Refill" procedures.
If fluid comes out, wait until the overflow slows to a trickle and proceed to the "Complete" procedures.



g. TRANSMISSION REFILL

i. Remove the overflow plug.

ii. Remove the refill plug and gasket.

iii. Add ATF into the refill hole until ATF flows from the overflow tube.

iv. Wait until the overflow slows to a trickle and proceed to the "Complete" procedures.

h. COMPLETE

i. Install a new gasket and the overflow plug.

Torque:
20 N*m{ 204 kgf*cm , 15 ft.*lbf }

ii. Stop the engine.

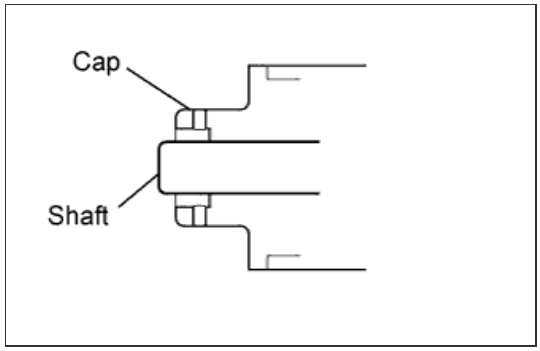
iii. Install a new gasket and the refill plug.

Torque:
39 N*m{ 400 kgf*cm , 29 ft.*lbf }

iv. Remove the pin.

NOTICE:

- **Make sure the shaft of the thermostat is protruding from the hole of the cap.**
- **Check that there is no ATF leaking from the cap hole.**



ADJUSTMENT FOR PARK/NEUTRAL POSITION SWITCH (for AUTOMATIC TRANSMISSION)

a. ADJUST PARK/NEUTRAL POSITION SWITCH ASSEMBLY

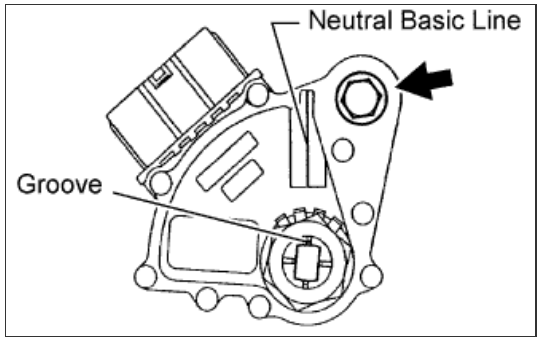
i. Loosen the bolt of the park/neutral position switch and move the shift lever to N.

ii. Align the groove with the neutral basic line.

iii. Hold the switch in the position described above and tighten the bolt.

Torque:
13 N*m{ 130 kgf*cm , 10 ft.*lbf }

iv. After the adjustment, perform the on-vehicle inspection.

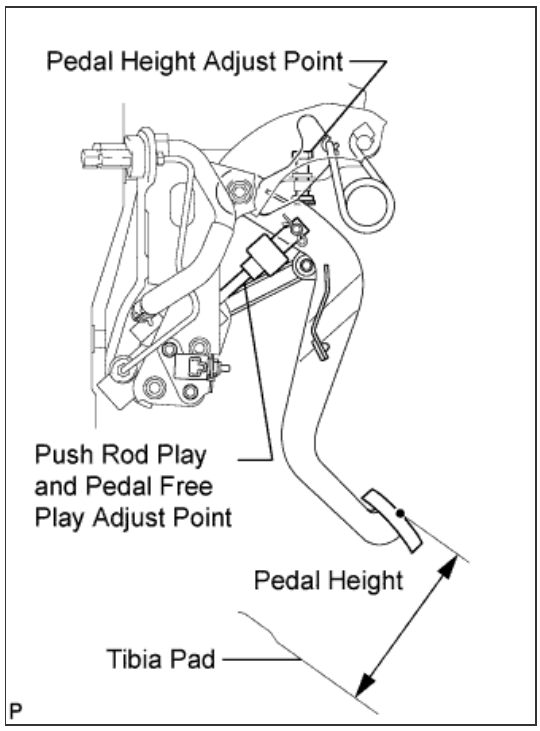


ADJUSTMENT FOR CLUTCH (for LHD)

a. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY

i. Check that the clutch pedal height is correct.

Standard Clutch Pedal Height from Tibia Pad:
162.7 to 172.7 mm (6.41 to 6.79 in.)



ii. Adjust the clutch pedal height.

1. Loosen the lock nut and turn the stopper bolt or clutch switch until the height is correct. Tighten the lock nut.

Torque:
16 N*m{ 160 kgf*cm , 12 ft.*lbf }

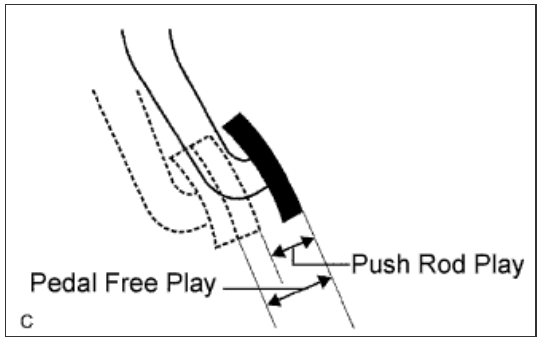
iii. Check that the clutch pedal free play and push rod play are correct.

1. Depress the clutch pedal until the clutch resistance begins to be felt.

Standard Pedal Free Play:
5.0 to 15.0 mm (0.197 to 0.591 in.)

2. Gently depress the clutch pedal until the resistance begins to increase a little.

Standard Push Rod Play at Pedal Top:
1.0 to 5.0 mm (0.0394 to 0.197 in.)



iv. Adjust the clutch pedal free play and push rod play.

1. Loosen the lock nut and turn the clutch push rod until the clutch pedal free play and push rod play are correct.
2. Tighten the lock nut.
3. After adjusting the clutch pedal free play and push rod play, check the clutch pedal height.

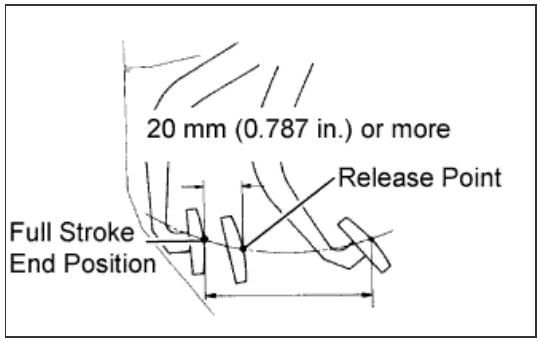
Standard Clutch Pedal Height from Tibia Pad:
162.7 to 172.7 mm (6.41 to 6.79 in.)

Torque:
12 N*m{ 120 kgf*cm , 9 ft.*lbf }

v. Check the clutch release point.

1. Pull the parking brake lever and chock the wheels.
2. Start the engine and allow it to idle.
3. Without depressing the clutch pedal, slowly move the shift lever to R until the gears engage.
4. Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops (release point) up to the full stroke end position.

Standard Distance from Pedal Stroke End Position to Release Point:
20 mm (0.787 in.) or more



If the distance is not as specified, perform the following operations:

- Check the clutch pedal height.

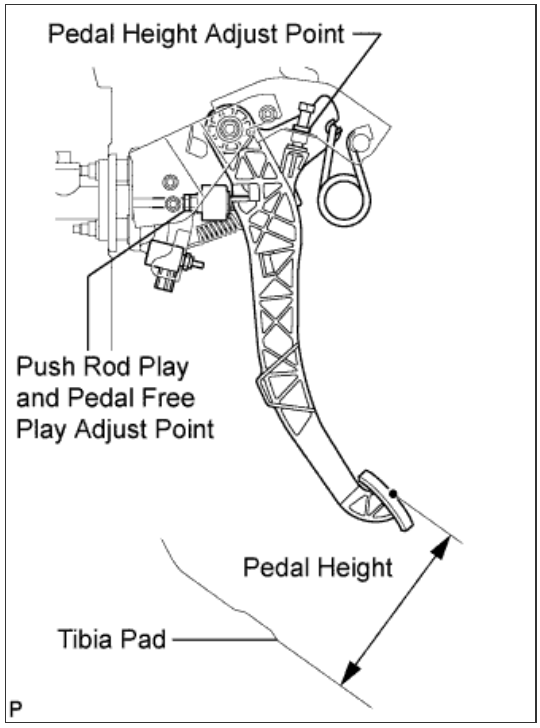
- Check the push rod play and pedal free play.
- Bleed the clutch line.
- Check the clutch cover and disc.

ADJUSTMENT FOR CLUTCH (for RHD)

a. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY

i. Check that the clutch pedal height is correct.

Standard Clutch Pedal Height from Tibia Pad:
164.8 to 174.8 mm (6.49 to 6.88 in.)



ii. Adjust the clutch pedal height.

1. Loosen the lock nut and turn the stopper bolt or clutch switch until the height is correct. Tighten the lock nut.

Torque:
16 N*m{ 160 kgf*cm , 12 ft.*lbf }

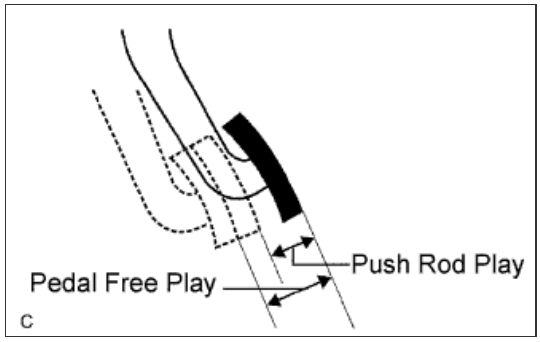
iii. Check that the clutch pedal free play and push rod play are correct.

1. Depress the clutch pedal until the clutch resistance begins to be felt.

Standard Clutch Pedal Free Play:
5.0 to 15.0 mm (0.197 to 0.591 in.)

2. Gently depress the clutch pedal until the resistance begins to increase a little.

Standard Push Rod Play at Pedal Top:
1.0 to 5.0 mm (0.0394 to 0.197 in.)



iv. Adjust the clutch pedal free play and push rod play.

1. Loosen the lock nut and turn the push rod until the clutch pedal free play and push rod play are correct.
2. Tighten the lock nut.
3. After adjusting the clutch pedal free play and push rod play, check the clutch pedal height.

Standard Clutch Pedal Height from Tibia Pad:
164.8 to 174.8 mm (6.49 to 6.88 in.)

Torque:
12 N*m{ 120 kgf*cm , 9 ft.*lbf }

v. Check the clutch release point.

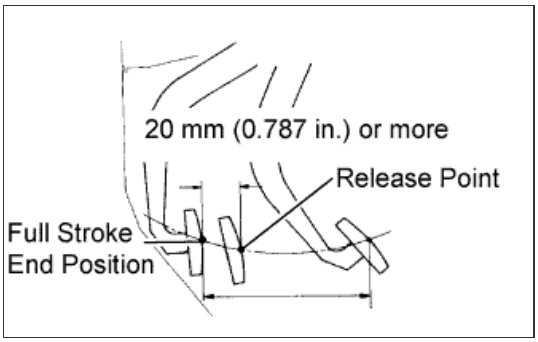
1. Pull the parking brake lever and chock the wheels.
2. Start the engine and allow it to idle.

3. Without depressing the clutch pedal, slowly move the shift lever to R until the gears engage.
4. Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops (release point) up to the full stroke end position.

Standard Distance from Pedal Stroke End Position to Release Point:
20 mm (0.787 in.) or more

If the distance is not as specified, perform the following operations:

- Check the clutch pedal height.
- Check the push rod play and pedal free play.
- Bleed the clutch line.
- Check the clutch cover and disc.



INITIALIZATION RELATED TO SUSPENSION CONTROL

HINT:

If replacing the suspension control ECU and/or height control sensor, perform the vehicle height offset calibration.

a. PERFORM VEHICLE HEIGHT INSPECTION

i. Adjust the pressure of the tires.

ii. Stabilize the suspension by releasing the parking brake and bouncing the corners of the vehicle up and down.

iii. Start the engine.

iv. Perform the following operation twice:
Set the vehicle height to LO with the height control switch, and then return the vehicle height to NORMAL.

v. Turn the engine switch off.

vi. Connect the intelligent tester to the DLC3.

vii. Move the shift lever to N and move the vehicle forward and rearward.

viii. Turn the engine switch on (IG) and the tester on.

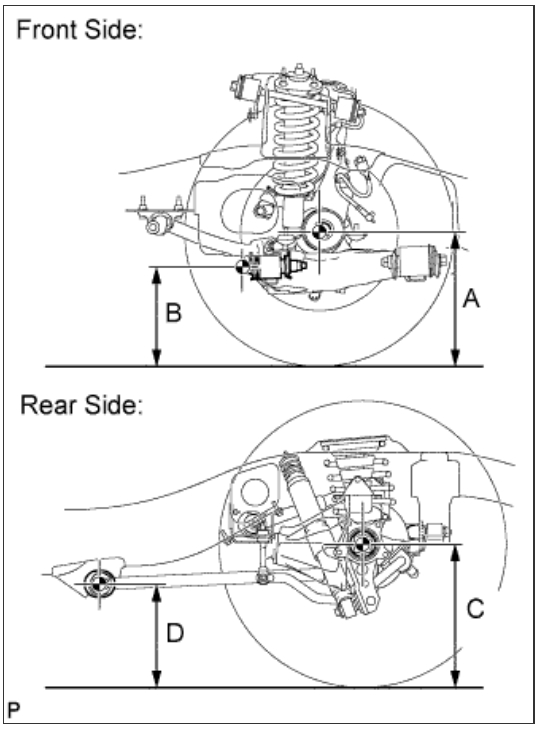
ix. Check that the vehicle height is NORMAL.

HINT:

The N of the multi-information display height control indicator in the combination meter turns on.

x. Perform the vehicle height inspection.

Measuring points:
A:
Ground clearance of front wheel center
B:
Ground clearance of the front adjusting cam bolt center
C:
Ground clearance of the rear axle shaft center
D:
Ground clearance of the rear lower control arm front side center



Standard vehicle height:

Front (A minus B)	Rear (C minus D)
101 mm (3.98 in.)	94 mm (3.70 in.)

xi. Using a jack, set the vehicle to the standard vehicle height and eliminate any difference in height between the left and right sides of the vehicle.

NOTICE:

The vehicle height may be outside the calibration range if there is a difference in height between the left and right sides of the vehicle.

xii. Using the intelligent tester, enter the following menus: Chassis / AHC / Data List. Then read and record the values for "After Height Adjust" and "Height Adjust" for each wheel.

AHC

Tester Display	Measurement Item/Range	Normal Condition	Diagnosis Note
FR Height Adjust	Display of vehicle height offset recorded value of front right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FL Height Adjust	Display of vehicle height offset recorded value of front left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RR Height Adjust	Display of vehicle height offset recorded value of rear right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RL Height Adjust	Display of vehicle height offset recorded value of rear left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FR After Height Adjust	Display of after-calibration vehicle height value of front right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FL After Height Adjust	Display of after-calibration vehicle height value of front left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RR After Height	Display of after-calibration vehicle height value of rear right wheel /		

Adjust	min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RL After Height Adjust	Display of after-calibration vehicle height value of rear left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-

xiii. Turn the engine switch off.

b. PERFORM VEHICLE HEIGHT OFFSET CALIBRATION

NOTICE:

- **The possible vehicle height automatic adjustment value is 20 mm (0.787 in.). If the "Height Adjust value + (Standard value - Measurement value - After Height Adjust value)" is 20 mm (0.787 in.) or more, first perform the vehicle height adjustment for the front side and for the rear side.**
- **Make sure that the pressure of the tires is normal.**
- **Make sure that the vehicle is empty.**
- **Make sure that the parking brake is released and that the shift lever is in N.**

i. Turn the engine switch off.

ii. Connect the intelligent tester to the DLC3.

iii. Turn the engine switch on (IG) and the tester on.

iv. Enter the following menus: Chassis / AHC / Utility / Height offset.

v. For each wheel, follow the instructions on the tester screen and input the input value to complete the vehicle height offset calibration.

HINT:

Input value = Measurement value and standard value

vi. Remove the jack.

vii. Start the engine.

viii. Set the vehicle height to LO and check that LO of the multi-information display height control indicator stops blinking and illuminates.

ix. Set the vehicle height to NORMAL and check that N of the height control indicator stops blinking and illuminates.

x. Turn the engine switch off.

xi. Perform the vehicle height inspection. Check that the result is within +/-8 mm (+/-0.315 in.) of the standard value.

xii. Perform yaw rate and G sensor zero point calibration.

CALIBRATION RELATED TO VEHICLE STABILITY CONTROL SYSTEM

a. DESCRIPTION
After replacing the relevant VSC components, clear the sensor calibration data and perform calibration.

Replacement/Adjustment Part	Necessary Operation
Master cylinder solenoid (Skid control ECU)	Yaw rate and G sensor zero point calibration
Yaw rate and G sensor	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration

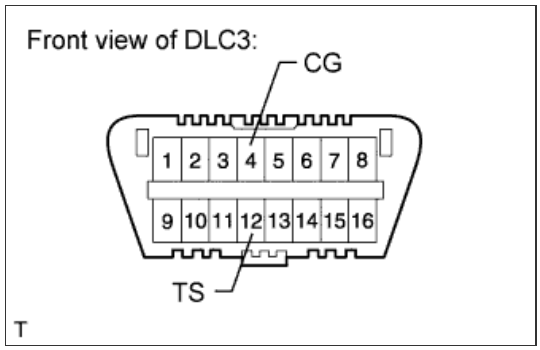
b. CLEAR ZERO POINT CALIBRATION (SST CHECK WIRE)
After replacing the yaw rate and G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

i. Turn the engine switch on (IG).

ii. Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

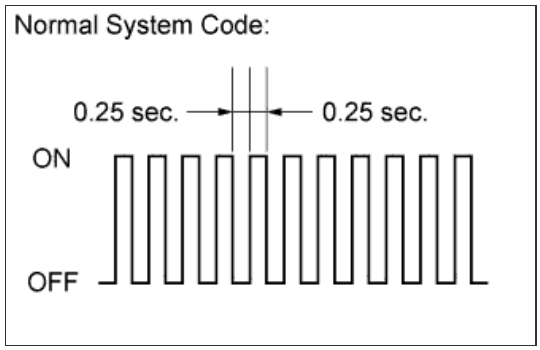
SST

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iii. Check that "DIAG VSC OK" is displayed on the multi-information display and check that the ABS warning light outputs the normal system code.

iv. Using a check wire, perform zero point calibration of the yaw rate and G sensor.



c. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (SST CHECK WIRE)
After replacing the master cylinder solenoid and/or yaw rate and G sensor, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

i. Procedures for Test Mode:

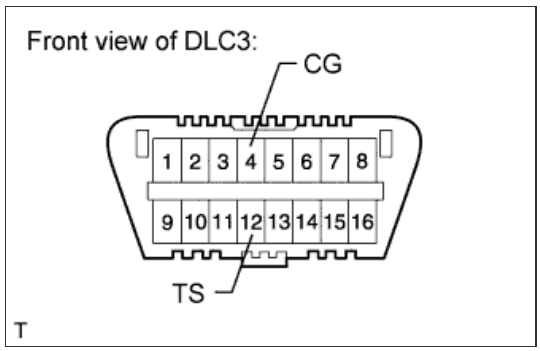
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1. Turn the engine switch off.
2. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P.

3. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
4. Check that the steering wheel is centered.
5. Turn the engine switch on (IG).
6. Keep the vehicle stationary on a level surface for 2 seconds or more.

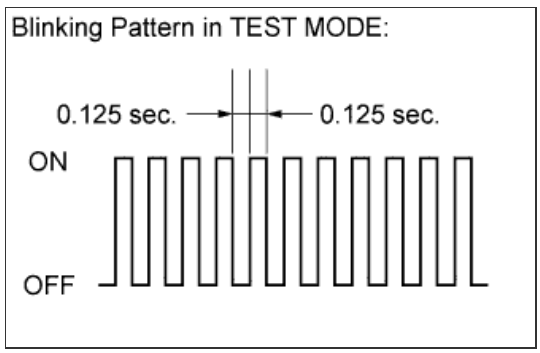


7. Check that "VSC TEST MODE" is displayed on the multi-information display and check that the ABS warning light is blinking in test mode.

NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:



- **If the ABS warning light does not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**

d. CLEAR ZERO POINT CALIBRATION (INTELLIGENT TESTER)
After replacing the yaw rate and G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Reset Memory.

v. Using the intelligent tester, perform zero point calibration of the yaw rate and G sensor.

e. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (INTELLIGENT TESTER)
After replacing the master cylinder solenoid and/or yaw rate and G sensor, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

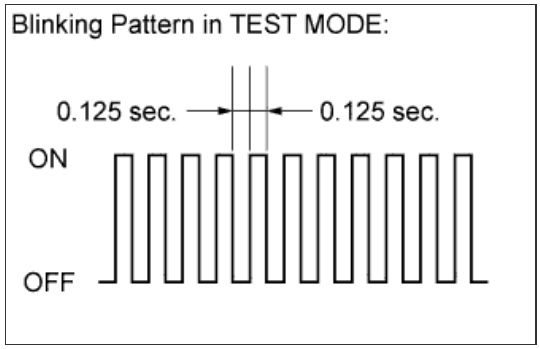
i. Procedures for Test Mode:

1. Turn the engine switch off.
2. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P.

3. Check that the steering wheel is centered.
4. Connect the intelligent tester to the DLC3.
5. Turn the engine switch on (IG).
6. Turn the intelligent tester on.
7. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Test Mode.
8. Keep the vehicle stationary on a level surface for 2 seconds or more.
9. Check that "VSC TEST MODE" is displayed on the multi-information display and check that the ABS warning light is blinking in test mode.



NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:

- **If the ABS warning light does not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**

ADJUSTMENT FOR BREAK PEDAL

a. CHECK BRAKE PEDAL HEIGHT

i. Check the brake pedal height.

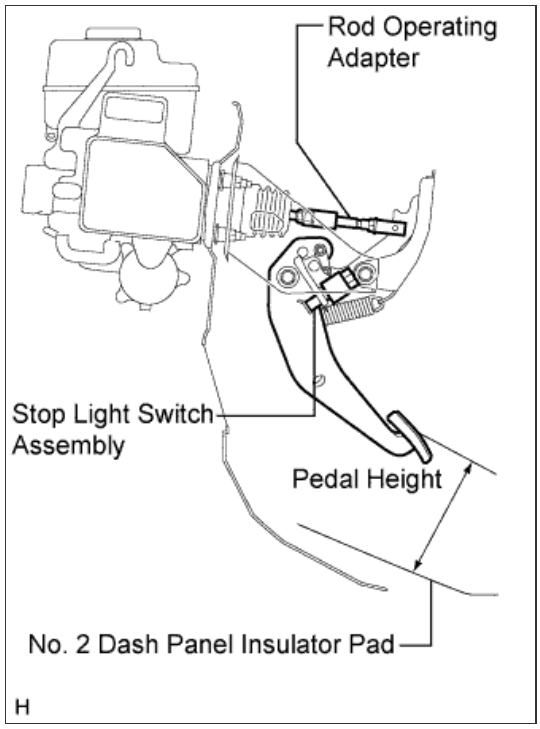
Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
147.1 to 157.1 mm (5.80 to 6.18 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod

length will structurally change the pedal ratio.

If the pedal height is incorrect, adjust the rod operating adapter length.



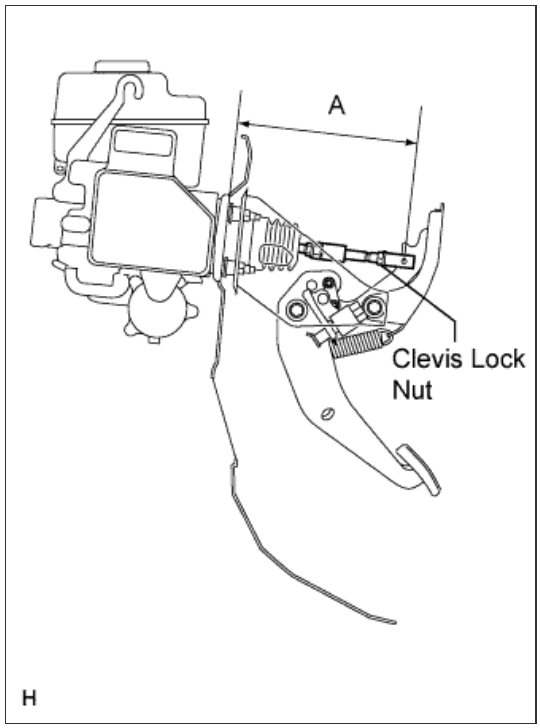
ii. Adjust the rod operating adapter length.

1. Remove the clip and clevis pin.
2. Loosen the clevis lock nut.
3. Adjust the rod operating adapter length by turning the pedal push rod clevis.

Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

4. Tighten the clevis lock nut.
5. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.
   If the pedal height is incorrect even if the rod operating adapter is adjusted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.
   - Even if there is damage, there is no problem if the reserve distance is within the standard value.
   - If necessary, replace any damaged parts.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }



b. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

If the pedal height is incorrect, check and adjust the stop light switch clearance.

i. Disconnect the stop light switch assembly connector from the stop light switch assembly.

ii. Turn the stop light switch assembly counterclockwise and remove the stop light switch assembly.

iii. Insert the stop light switch assembly until the body hits the brake pedal bracket.

NOTICE:

When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.

iv. Turn the stop light switch assembly a quarter turn clockwise to install it.

HINT:

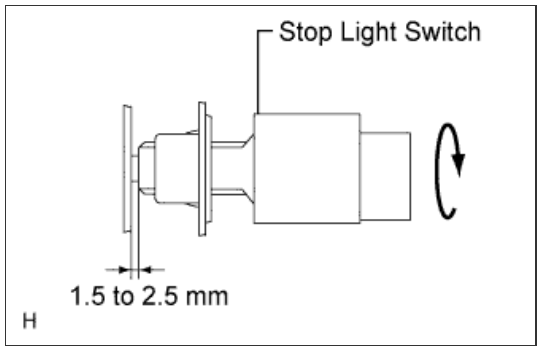
Turning the stop light switch assembly counterclockwise loosens the switch.

v. Connect the stop light switch connector to the stop light switch assembly.

vi. Check the protrusion of the rod.

Standard Rod Protrusion:
1.5 to 2.5 mm (0.0591 to 0.0984 in.)

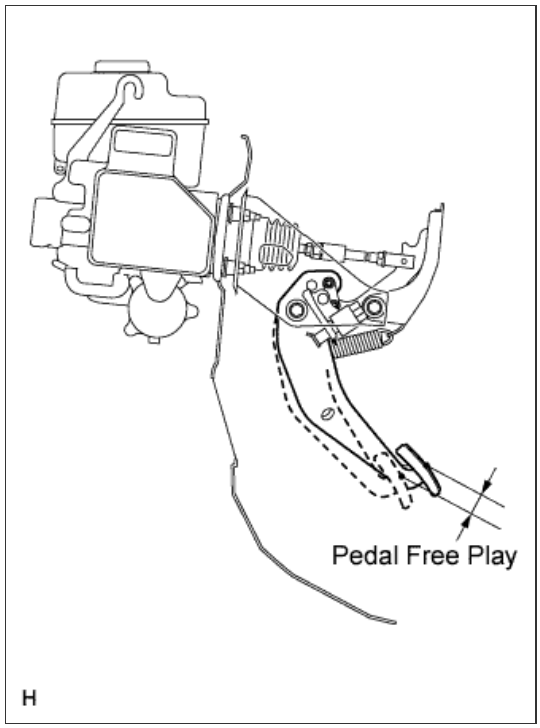
vii. After adjusting the pedal height, check the pedal free play.



c. CHECK PEDAL FREE PLAY

i. Push in the pedal until the beginning of the resistance is felt. Measure the distance as shown in the illustration.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

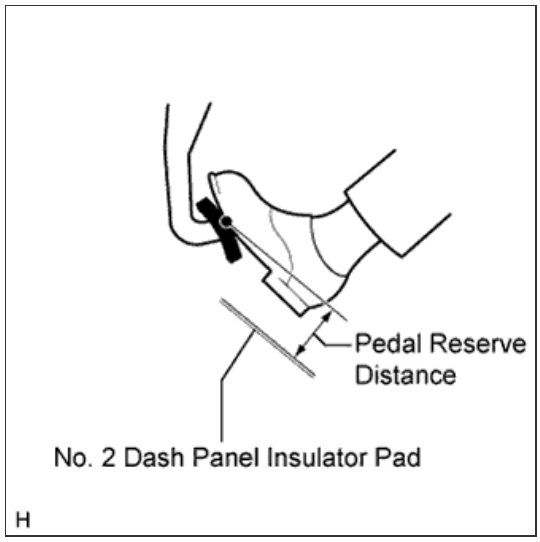


d. CHECK PEDAL RESERVE DISTANCE

i. Release the parking brake lever.
With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67 mm (2.64 in.)

If incorrect, troubleshoot the brake system.



ADJUSTMENT FOR PARKING BREAK SYSTEM

a. INSPECT PARKING BRAKE LEVER TRAVEL

i. Fully pull the parking brake lever to engage the parking brake.

ii. Release the lever to disengage the parking brake.

iii. Slowly pull the parking brake lever all the way, and count the number of clicks

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

If the parking brake lever travel is not as specified, adjust the parking brake shoe clearance and parking brake lever travel.

b. REMOVE REAR WHEEL

c. ADJUST PARKING BRAKE LEVER TRAVEL

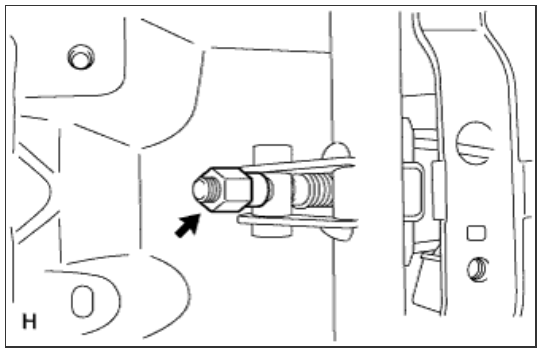
i. Remove the console cup holder box sub-assembly.

ii. Completely release the parking brake lever.

iii. Loosen the adjusting nut to completely release the parking brake cable.

iv. Temporarily install the hub nuts.

v. Remove the hole plug.

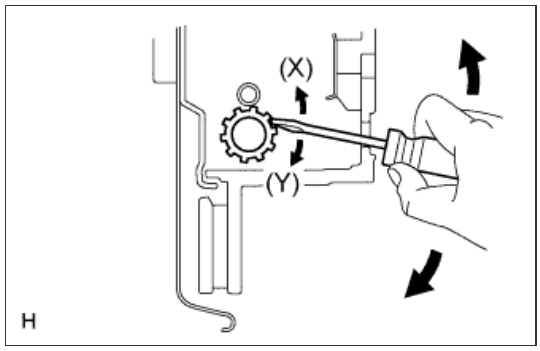


vi. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

vii. Check that the disc can be rotated lightly. If not, rotate the adjustment wheel in the "Y" direction and check again.

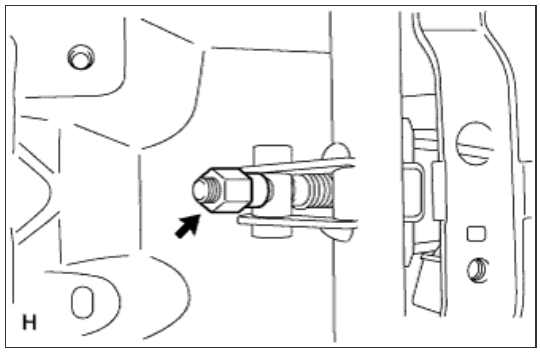
viii. Install the hole plug.

ix. Remove the hub nuts.



x. Turn the adjusting nut until the parking brake lever travel becomes correct.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks



xi. Operate the parking brake lever 3 to 4 times, and check the parking brake lever travel.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

xii. Check whether the parking brake drags or not.

xiii. When operating the parking brake lever, check that the brake warning light comes on.

Standard Condition:
The brake warning light always illuminates at the first click.

xiv. Install the console cup holder box sub-assembly.

d. INSTALL REAR WHEEL

Torque:
131 N*m{ 1,336 kgf*cm , 97 ft.*lbf }

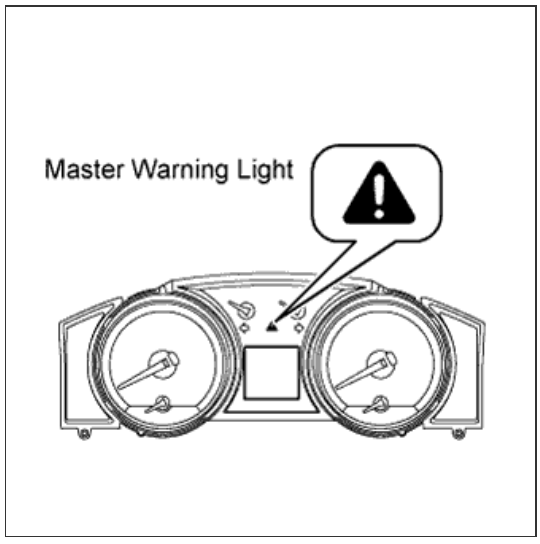
INITIALIZATION RELATED TO VGRS SYSTEM

a. STEERING ANGLE SENSOR INITIALIZATION (to obtain a tire angle (during straight-ahead driving) signal)

i. Turn the engine switch on (IG), and check that the master warning light illuminates for a few seconds.

NOTICE:

If the warning light remains on, repair the applicable system.



ii. Drive the vehicle on a straight road at 35 km/h (22 mph) or more for 5 seconds or more.

HINT:

- **At this point, the steering wheel will still remain off-center by 5 to 10°.**
- **In this step, the neutral position of the steering wheel is restored from the steering control ECU memory.**

iii. Confirm that steering angle sensor initialization is completed (using the tester).

1. Enter the VGRS menu using the tester. Select "Straight Angle Valid Flag" from "Data List". Check if the steering angle sensor has obtained a tire angle (during straight-ahead driving) signal.

Standard:
"Valid" is displayed on the tester screen.

iv. Confirm that steering angle sensor initialization is completed (not using the tester).

1. Stop the vehicle (engine running).
2. Slowly turn the steering wheel from lock to lock.
3. If it turns approximately 2.7 turns, steering angle sensor initialization is completed. If it turns approximately 3.2 turns, steering angle sensor initialization is not completed.

NOTICE:

If the steering wheel turns approximately 3.2 turns, drive the vehicle on a straight road at 35 km/h (22 mph) or more for 5 seconds or more. Then confirm the initialization again.

b. VGRS SYSTEM CALIBRATION PROCEDURE (WHEN USING SST CHECK WIRE)

NOTICE:

Use this procedure to center the steering wheel if:

- **The steering actuator assembly has been replaced.**
- **The steering control ECU has been replaced.**
- **The steering column or steering intermediate shaft has been disconnected.**
- **The steering wheel is still off-center after completing the steering angle sensor initialization.**

i. FACE TIRES STRAIGHT AHEAD (Procedure A)

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

ii. CHECK DTC (Procedure B)

1. Check for DTCs.

Result

Result	Proceed to
DTC C1591/51 is not output	Procedure C
DTC C1591/51 is output	Procedure D

iii. PERFORM ACTUATOR ANGLE INITIALIZATION (Procedure C)

SST
09843-18040

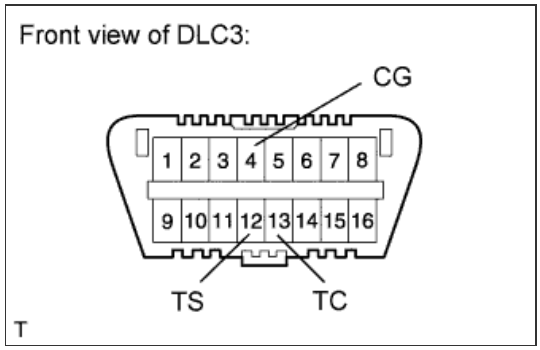
NOTICE:

If the procedures from *1 to *2 are not completed within 1 minute, or if errors are made during these procedures, perform the initialization again from the beginning.

1. Start the engine.
2. Center the steering wheel.
3. Using SST, connect terminals 12 (TS) and 4 (CG), and 13 (TC) and 4 (CG) of the DLC3.*1
4. Disconnect SST from terminal 12 (TS) of the DLC3, and turn the steering wheel to the left 180° or more.
5. Connect SST to terminal 12 (TS) of the DLC3.
6. Disconnect SST from terminal 13 (TC) of the DLC3, and turn the steering wheel to the right 180° or more.
7. Connect SST to terminal 13 (TC) of the DLC3.*2

HINT:

If the master warning light comes on, DTC C1591/51 is stored.



8. Disconnect SST from the DLC3.
9. Turn the engine switch off.

iv. FACE TIRES STRAIGHT AHEAD (Procedure D)

1. Confirm that the steering wheel is centered when facing the tires straight ahead.

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

Result

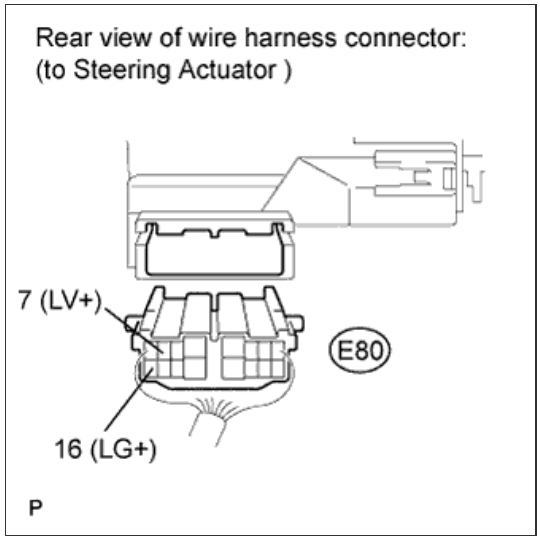
Result	Proceed to
Steering wheel is off-center	Procedure E
Steering wheel is centered	Procedure H

v. UNLOCK STEERING ACTUATOR (Procedure E)

NOTICE:

Make sure the engine is not running.

1. Turn the engine switch off.
2. Disconnect the cable from the negative (-) battery terminal.
3. Disconnect the E80 connector from the steering actuator.
4. Connect a jumper wire from terminal 7 (LV+) of the steering actuator to the positive (+) 12 V battery terminal and another jumper wire from terminal 16 (LG+) of the steering actuator to the negative (-) 12 V battery terminal.



NOTICE:

Do not apply voltage for more than 3 minutes.

vi. STEERING CENTER ADJUSTMENT (Procedure F)

1. Center the steering wheel.

NOTICE:

If the centering of the spiral cable was not confirmed when the steering wheel was installed, confirm the centering of the spiral cable.

vii. LOCK STEERING ACTUATOR (Procedure G)

1. Disconnect the positive (+) and negative (-) 12 V battery jumper wires from the steering actuator.
2. Connect the E80 connector to the steering actuator.
3. Connect the cable to the negative (-) battery terminal.
4. Turn the steering wheel approximately 3° to the left and right. Confirm that the reaction force can be felt.

NOTICE:

- **If the above procedures are not followed correctly, a DTC will be stored. If a DTC is stored, perform the above procedures again and then check for DTCs.**
- **Perform these procedures with the engine switch off.**

viii. ADJUST ACTUATOR ANGLE (Procedure H)

HINT:

Activating and ending test mode will complete actuator angle adjustment.

SST

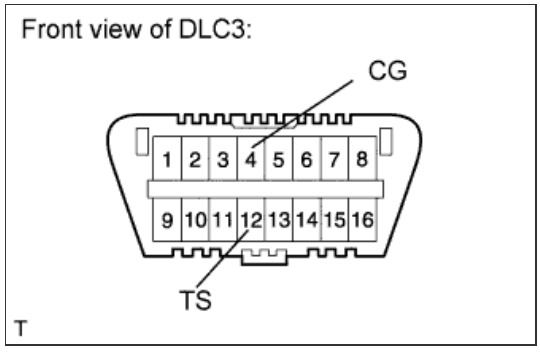
09843-18040

1. Make sure the engine switch is off.

NOTICE:

Do not touch the steering wheel during these procedures.

2. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
3. Turn the engine switch on (IG).
4. Confirm that "VGRS Test Mode" is displayed on the multi-information display when test mode is activated.



HINT:

Wait approximately 5 seconds.

5. Turn the engine switch off.
6. Disconnect SST from terminals 12 (TS) and 4 (CG) of the DLC3.
7. Turn the engine switch on (IG) again.

ix. CHECK MASTER WARNING LIGHT (Procedure I)

1. Confirm that the master warning light is off.

2. Turn the engine switch off, then on (IG).
3. Confirm that the master warning light is operating normally.

x. CHECK STEERING WHEEL OPERATION (Procedure J)

1. Start the engine.
2. Perform the steering angle sensor initialization.
3. Turn the steering wheel from lock to lock and check that it rotates approximately 2.7 turns.
4. Drive the vehicle and confirm that the steering wheel is centered.

c. VGRS SYSTEM CALIBRATION PROCEDURE (WHEN USING INTELLIGENT TESTER)

i. FACE TIRES STRAIGHT AHEAD (Procedure A)

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

ii. PERFORM VGRS SYSTEM CALIBRATION (Procedure B)

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).
3. Turn the tester on.
4. Enter the following menus: Chassis / VGRS / Utility / Steering Angle Adjust.
   Then, press "Next".
5. Follow the instructions on the tester, and press "Next".

   NOTICE:

   Press the "Next" key even if DTC C15B4/71 is output.

6. Follow the instructions on the tester, and press "Next".
7. Follow the instructions on the tester, and press "Next".

   NOTICE:

   Ensure that the engine switch is off.

8. Follow the instructions on the tester, and press "Next".
9. Follow the instructions on the tester, and press "Next".

   NOTICE:

   If the centering of the spiral cable was not confirmed when the steering wheel was installed, confirm the centering of the spiral cable.

10. Follow the instructions on the tester, and press "Next".

    NOTICE:

    Do not touch the steering wheel during these procedures.

11. Follow the instructions on the tester, and press "Next".
12. Follow the instructions on the tester, and press "Next".

    NOTICE:

    Do not touch the steering wheel during these procedures.

13. "NOW CALIBRATING" is displayed and the display switches automatically to the next screen.

    NOTICE:

    Do not touch the steering wheel during these procedures.

14. "Steering Angle Adjust is complete." is displayed. Then, check that the VGRS system calibration is completed normally.
15. Select "Exit" to return the display to the "MENU" screen.

iii. CHECK MASTER WARNING LIGHT (Procedure C)

1. Confirm that the master warning light is off.
2. Turn the engine switch off.
3. Disconnect the intelligent tester from the DLC3.
4. Turn the engine switch on (IG).
5. Confirm that the master warning light is operating normally.

iv. CHECK STEERING WHEEL OPERATION (Procedure D)

1. Start the engine.
2. Perform the steering angle sensor initialization.
3. Turn the steering wheel from lock to lock and check that it rotates approximately 2.7 turns.
4. Drive the vehicle and confirm that the steering wheel is centered.

ADJUSTMENT FOR STEERING SYSTEM

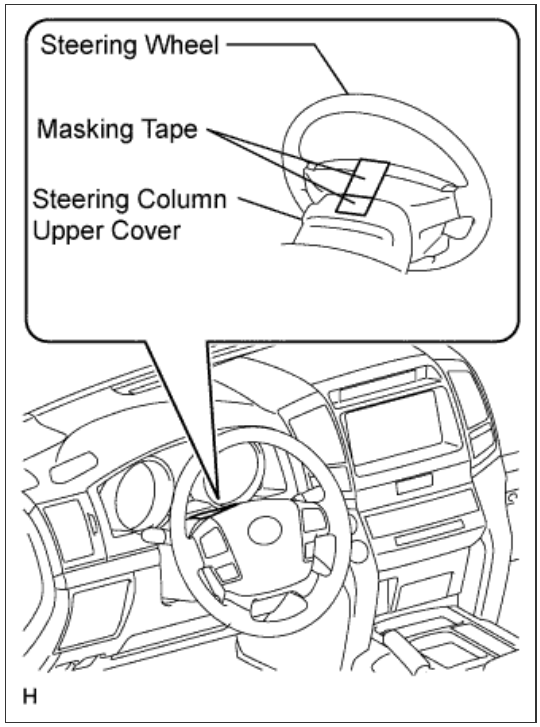
a. STEERING OFF CENTER ADJUSTMENT PROCEDURE

HINT:

This is the adjustment procedure for when the steering is off center.

i. Check if the steering wheel is off center.

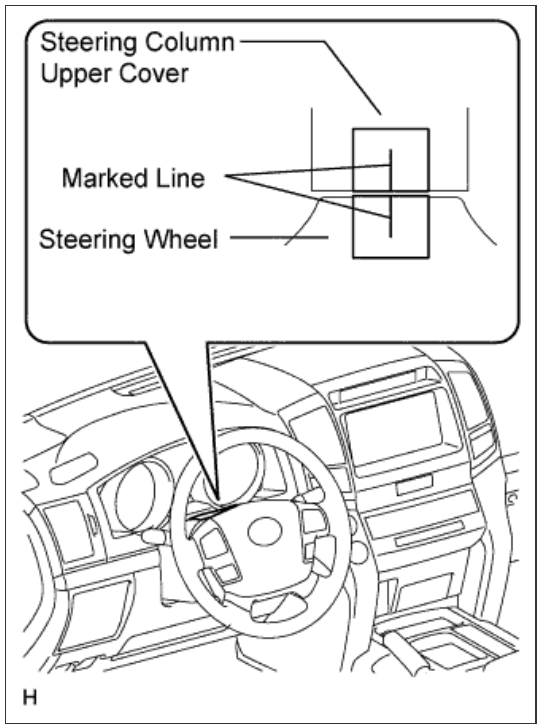
1. Apply masking tape to the top center of the steering wheel and steering column upper cover.
2. Drive the vehicle in a straight line for 100 m (328 ft.) at a constant speed of 56 km/h (35 mph), and hold the steering wheel to maintain the course.



3. Draw a line on the masking tape as shown in the illustration.
4. Turn the steering wheel to the center position.

HINT:

Look at the upper surface of the steering wheel, steering spoke and SRS airbag line to find the center position.

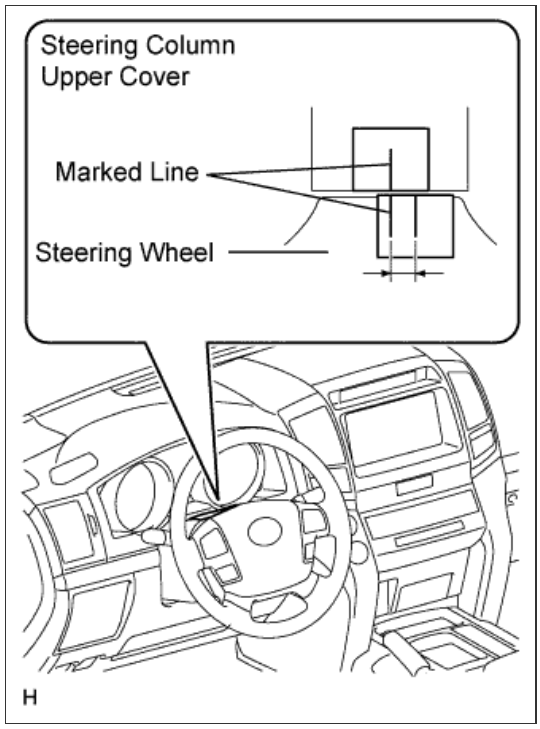


5. Draw a new line on the masking tape on the steering wheel as shown in the illustration.
6. Measure the distance between the 2 lines on the masking tape on the steering wheel.
7. Convert the measured distance to steering angle.

HINT:

- **Measured distance of 1 mm (0.0394 in.) = Steering angle of approximately 1°.**
- **Make a note of the steering angle.**

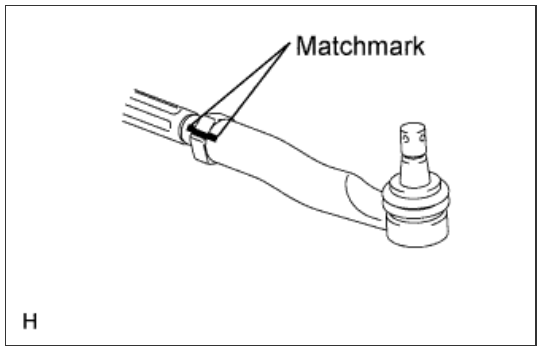
ii. Adjust the steering angle.



1. Put matchmarks on the RH and LH tie rod ends and rack ends where it can be easily seen.
2. Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.

HINT:

- **Measure both the RH and LH sides.**
- **Make a note of the measured values.**



3. Remove the RH and LH boot clips from the rack boots.
4. Loosen the RH and LH lock nuts.
5. Turn the RH and LH rack ends by the same amount (but in different directions) according to the steering angle.

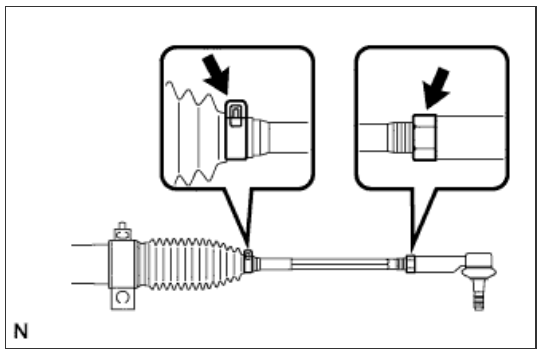
HINT:

One 360° turn of the rack end (1.5 mm (0.0591 in.) horizontal movement) equals 11° of steering angle.

6. Tighten the RH and LH lock nuts to the specified torque.

NOTICE:

Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is within 1.5 mm (0.0591 in.).



7. Install the RH and LH boot clips.

Torque:
82 N*m{ 836 kgf*cm , 60 ft.*lbf }

CALIBRATION RELATED TO PARK ASSIST/MONITORING (w/o USB Audio System)

a. ADJUST PARKING ASSIST MONITOR SYSTEM

i. This parking assist monitor system can be set from the diagnostic screen of the "NAVIGATION SYSTEM".

ii. If the following operations are performed, it is necessary to perform adjustments and checks on the diagnostic screen.

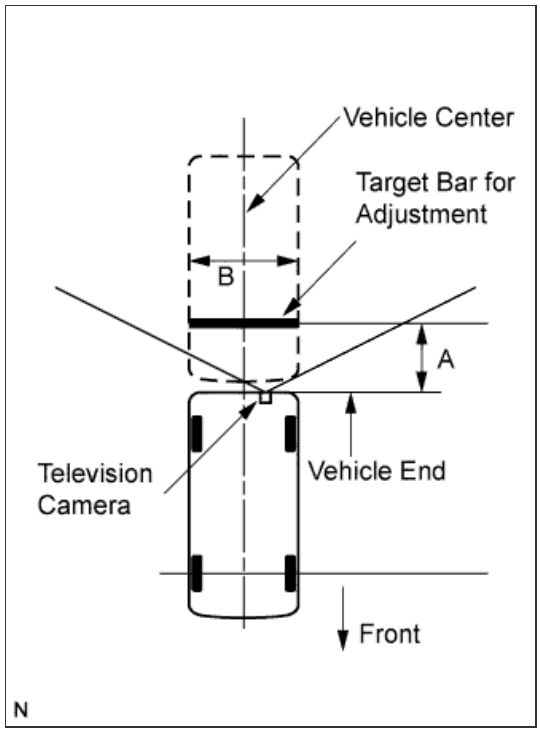
Part Name	Operation	Adjustment Item
	• Replace • Installation angle of the	

Rear television camera		rear television camera changes because of the removal and installation of the rear television camera, etc.	Rear television camera optical axis (Camera position setting)
Parking assist ECU	Replace		• Store the steering angle neutral point in memory • Store the left and right maximum steering angles • Rear television camera optical axis (Camera position setting)

b. PREPARATION FOR ADJUSTMENT

HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.



i. Park the vehicle with the steering wheel centered.

ii. Set a target bar for adjustment.

Dimension

Area	Specification
A	830 +/-5 mm (32.7 +/-0.194 in.)
B	2000 +/-5 mm (78.7 +/-0.194 in.)

HINT:

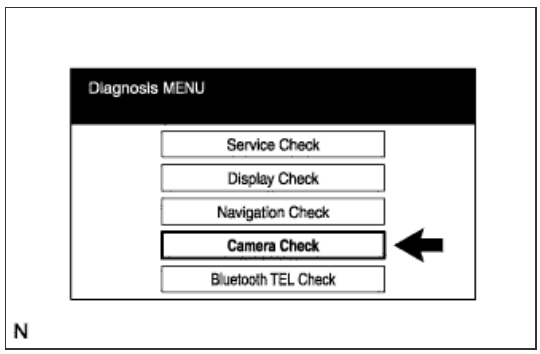
- **Set a piece of tape on the ground as the target bar for adjustment. Its width and length are 25 +/-5 mm (0.984 +/-0.194 in.) and 2000 +/-5 mm (78.7 +/-0.194 in.), respectively. Check the color on the multi-display and choose a tape color which can be easily seen.**
- **Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.**

c. START DIAGNOSIS MODE

i. Start the engine.

ii. Start the diagnostic system.

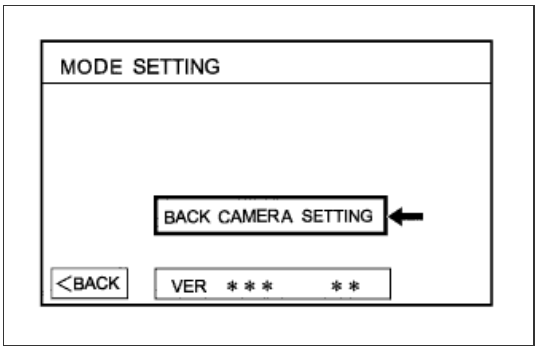
iii. Select "Camera Check" on the "Diagnosis MENU" screen.



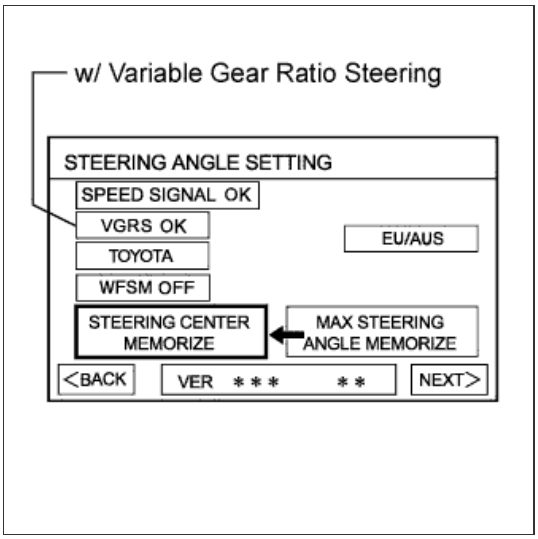
iv. Select "BACK CAMERA SETTING" on the "MODE SETTING" screen.

HINT:

After performing the rear camera position setting, the option on the menu display will dim. To perform the adjustment again, touch the dimmed button for 2 seconds or more (When the calibration is performed for the new ECU, the screen will not be display).



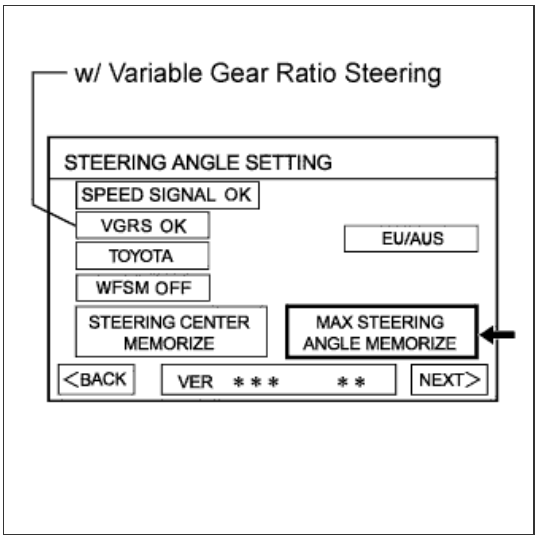
d. SET STEERING ANGLE



i. Perform the STEERING CENTER MEMORIZE operation.

1. Check that the steering wheel is centered, and then press "STEERING CENTER MEMORIZE".
   - When performing removal and installation, or replacement of the television camera, steering angle adjustment is not required. Press "NEXT" on the steering angle setting screen. However, the current steering angle is automatically stored as the steering angle neutral point when the steering angle setting screen is displayed. Make sure that the steering wheel is centered before changing the display to the steering angle setting screen.
   - Even when storing the steering angle neutral point only, the system cannot store it unless the operation is completed by following the prompts from "NEXT" to "OK".
   - >When the system displays "SPEED SIGNAL CHK", first press "SPEED SIGNAL CHK", and then press "MAX STEERING ANGLE MEMORIZE". The display does not change to the next screen if this procedure is not completed.

ii. Perform the MAX STEERING ANGLE MEMORIZE operation.



1. After adjusting the steering angle neutral point, turn the steering wheel to the left and right lock positions and press "MAX STEERING ANGLE MEMORIZE". The maximum steering angle is then stored.

   HINT:

   The button "NEXT" does not respond until the system stores the steering angle neutral point and maximum steering angle.

iii. w/ Variable Gear Ratio Steering (VGRS) system:
Perform the VGRS inspection.

1. Check that "VGRS OK" is displayed. If the VGRS is malfunctioning, "VGRS CHK" will be displayed, and pressing "NEXT" will not change the screen to the next display.

   HINT:

   For vehicles without VGRS, nothing is displayed.

e. SET CAMERA POSITION

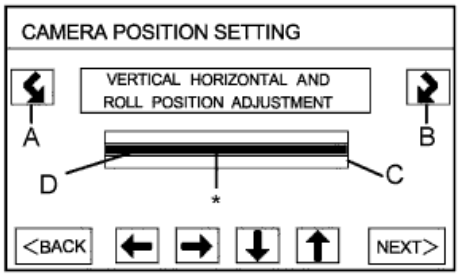
i. Perform the roll angle adjustment.

1. Press switches A and B to rotate C so that it is parallel to

the target adjustment bar D.

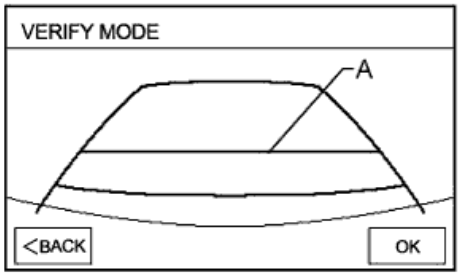
ii. Perform the vertical and horizontal position adjustment.

1. Press the directional switches to move C so that the target adjustment bar D is centered in C.



*: Target Bar for Adjustment

f. VERIFY MODE



i. Check that A and the target adjustment bar are overlapping.

- If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
- If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.

ii. Selecting "OK" will return the screen to the Diagnosis Menu, and complete the adjustment.

HINT:

The update is not completed until "OK" is pressed.

CALIBRATION RELATED TO PARK ASSIST/MONITORING (w/ USB Audio System)

a. ADJUST PARKING ASSIST MONITOR SYSTEM

i. This parking assist monitor system can be set from the diagnostic screen of the display and navigation module display.

ii. If the following operations are performed, it is necessary to perform adjustments and checks on the diagnostic screen.

Part Name	Operation	Adjustment Item
Steering angle sensor	• Removal and installation of the Steering angle sensor • Removal and installation of the connector of the Steering angle sensor	Steering angle neutral point
		Steering angle setting
Steering angle sensor	Replacement	Steering angle neutral point
		Steering angle setting
Parking assist ECU	Replacement	Parking assist ECU initialization
Suspension, tires, etc.	The vehicle height changes because of suspension or tire replacement	Rear television camera optical axis (Camera position setting)
Rear television camera assembly	• Replacement • Installation angle of the rear television camera changes because of the removal and installation of the rear television camera, etc.	Rear television camera optical axis (Camera position setting)

HINT:

The adjustment values stored while performing parking assist monitor system calibration are stored in the parking assist ECU.

b. PARKING ASSIST ECU INITIALIZATION

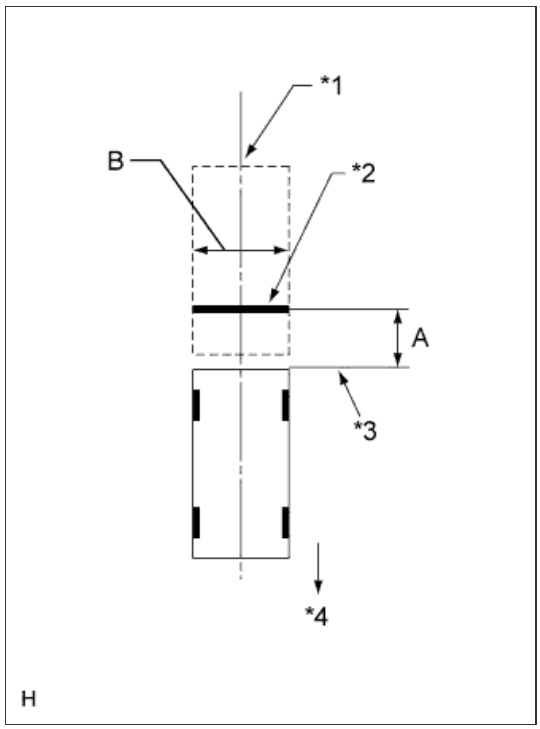
HINT:

Be sure to check for DTCs before performing this procedure.

i. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.

2. Set a target bar for optical axis adjustment of the rear television camera.



HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.

Dimension:

Area	Specification
A	825 to 835 mm (2.71 to 2.74 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

Text in Illustration

*1	Vehicle Center
*2	Target Bar for Back Camera Adjustment
*3	Vehicle End
*4	Front Side

HINT:

- **Set a piece of tape on the ground as the target bar for adjustment. Its width and length are 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the display and navigation module display and choose a tape color which can be easily seen.**
- **Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.**
- **Check that the back door is fully closed.**

ii. Start diagnostic mode .

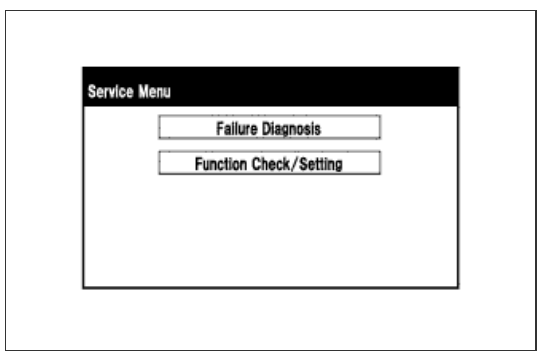
NOTICE:

Mode setting must be carried out with the hybrid system started. Apply the parking brake, depress the brake pedal, move the shift lever to P, and ensure that the vehicle is not moving.

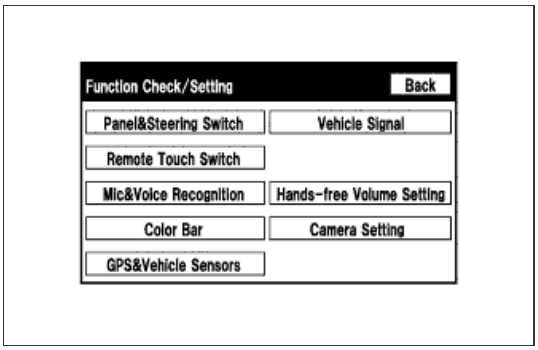
HINT:

The displayed items may differ depending on vehicle specifications.

1. Select "Function Check/Setting" on the Service Menu screen.



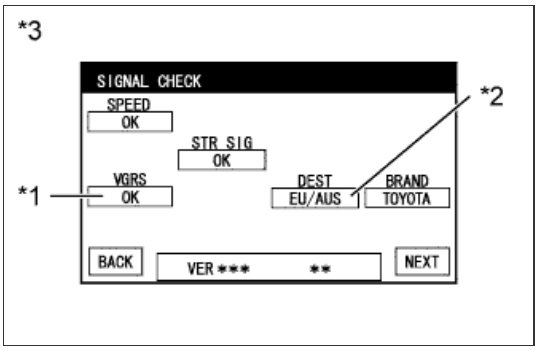
2. Select "Camera Setting" on the Function Check/Setting screen.



3. Select "NEXT" on the SIGNAL CHECK screen.

Text in Illustration

*1	w/ VGRS
*2	"EU/AUS" or "GCC/ZAF"
*3	Example



NOTICE:

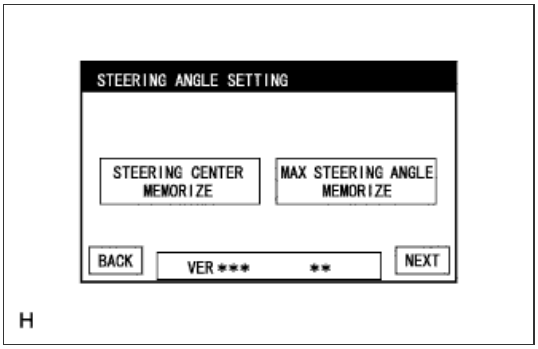
When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen.

iii. STEERING ANGLE SETTING

1. Perform the STEERING CENTER MEMORIZE operation.
   - Check that the steering wheel is centered, and then select "STEERING CENTER MEMORIZE".

     HINT:

     When performing removal and installation, or replacement of the television camera, steering angle adjustment is not required.



2. Perform the MAX STEERING ANGLE MEMORIZE operation.
   - After adjusting the steering angle neutral point, turn the steering wheel to the left and right lock positions and select "MAX STEERING ANGLE MEMORIZE". The maximum steering angle is then stored and the screen changes to the BACK CAMERA POSITION SETTING screen.

     HINT:

     The "NEXT" button does not respond until the system stores the steering angle neutral point and maximum steering angle.

     HINT:

     - **It is also possible to start by initially turning the steering to the right side.**
     - **When "MAX STEERING ANGLE MEMORIZE" is selected, a beep will sound to confirm that the steering adjustment values have been stored.**
     - **The adjustment value will not be stored unless "MAX STEERING ANGLE MEMORIZE" is selected after turning the steering wheel side to side.**
     - **When "BACK" is selected, the screen changes to SIDE VERIFY MODE without storing the set values.**
     - **Even if no DTCs are detected, selecting "MAX STEERING ANGLE MEMORIZE" may not cause the adjustment value to be stored if the steering sensor is malfunctioning.**
     - **If selecting "MAX STEERING ANGLE MEMORIZE" does not cause the adjustment value to be stored after adjusting the steering angle, replace the spiral with sensor cable sub-assembly.**

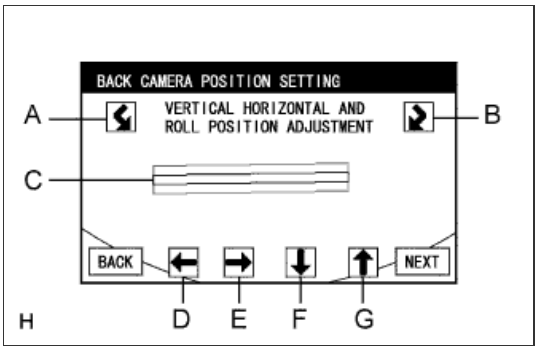
iv. BACK CAMERA POSITION SETTING

HINT:

- **When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed**

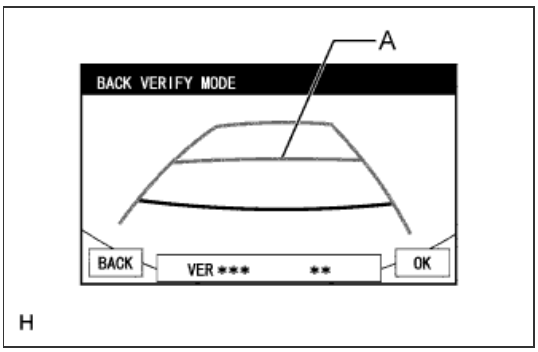
and camera position setting will not be possible.

- **If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed).**



1. Perform the roll angle adjustment.
   - Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
2. Perform the vertical and horizontal position adjustment.
   - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
3. Select the "NEXT" button on the BACK CAMERA POSITION SETTING screen.

v. BACK VERIFY MODE



1. Check that A and the target adjustment bar are overlapping.
   - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
   - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu screen, and complete the adjustment.

HINT:

- **The update is not completed until "OK" is selected.**
- **When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.**

vi. Finish diagnostic mode.

c. BACK CAMERA POSITION SETTING

HINT:

Be sure to check for DTCs before performing this procedure.

i. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.
2. Set a target bar for optical axis adjustment of the rear television camera.

HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.

Dimension:

Area	Specification
A	825 to 835 mm (2.71 to 2.74 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

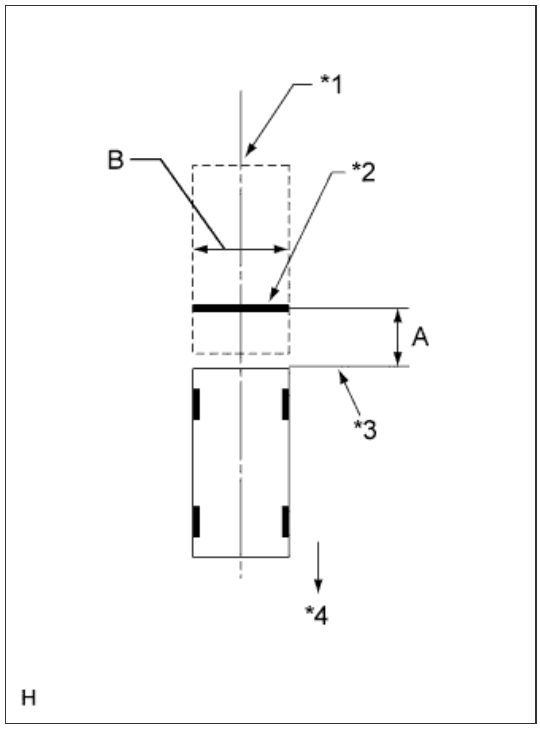
Text in Illustration

*1	Vehicle Center
*2	Target Bar for Back Camera Adjustment
*3	Vehicle End

*4 Front Side

HINT:

- **Set a piece of tape on the ground as the target bar for adjustment. Its width and length should be 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the multi-display and choose a tape color which can be easily seen.**
- **Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.**
- **Check that the back door is fully closed.**



ii. Start diagnostic mode.

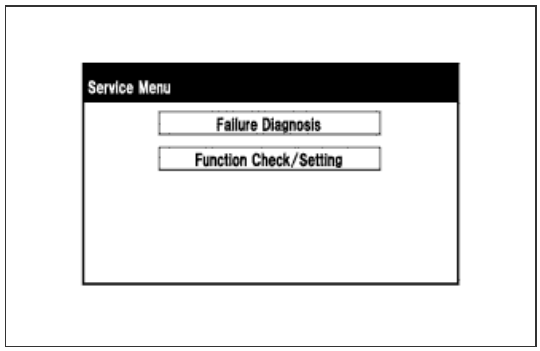
NOTICE:

Apply the parking brake, depress the brake pedal, move the shift lever to P, and ensure that the vehicle is not moving.

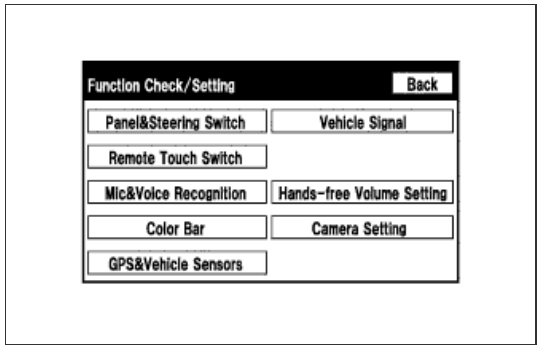
HINT:

The displayed items may differ depending on vehicle specifications.

1. Select "Function Check/Setting" on the "Service Menu" screen.



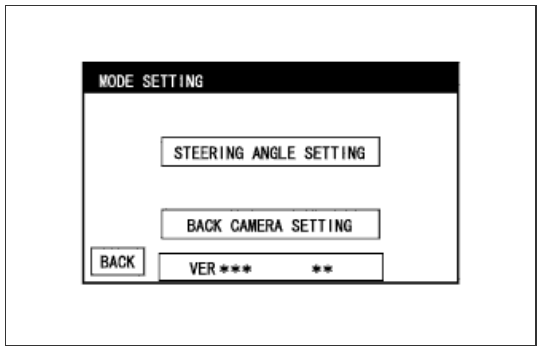
2. Select "Camera Setting" on the Function Check/Setting screen.



3. Select "BACK CAMERA SETTING" on the MODE SETTING screen.

HINT:

To select a grayed out item, select and hold the item for 2 seconds or more.



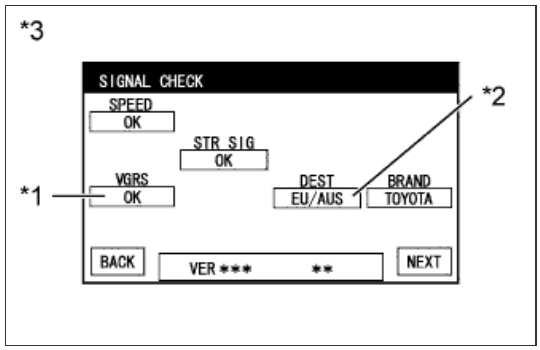
4. Select "NEXT" on the SIGNAL CHECK screen.

Text in Illustration

*1	w/ VGRS
*2	"EU/AUS" or "GCC/ZAF"
*3	Example

NOTICE:

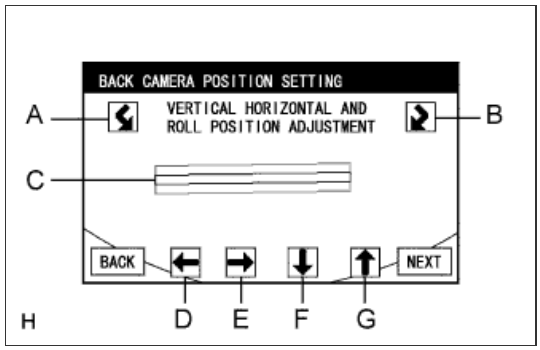
- **When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, selecting "NEXT" will not change the screen to the BACK CAMERA POSITION SETTING screen.**
- **When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen.**



iii. BACK CAMERA POSITION SETTING

HINT:

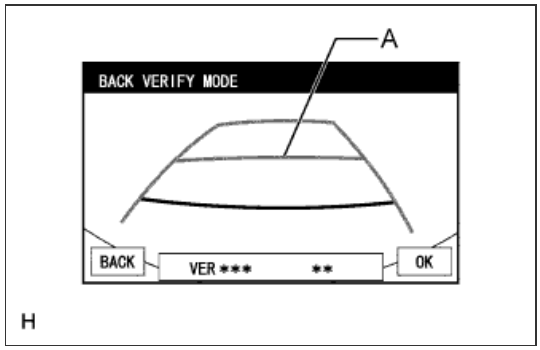
- **When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed and camera position setting will not be possible.**
- **If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed).**



1. Perform the roll angle adjustment.
   - Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
2. Perform the vertical and horizontal position adjustment.
   - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
3. Select the "NEXT" button on the "BACK CAMERA POSITION SETTING" screen.

iv. BACK VERIFY MODE

1. Check that A and the target adjustment bar are overlapping.
   - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
   - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu, and complete the adjustment.



HINT:

- **The update is not completed until "OK" is selected.**
- **When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.**

v. Finish diagnostic mode.

INITIALIZATION RELATED TO POWER WINDOW CONTROL SYSTEM

a. INITIALIZE POWER WINDOW CONTROL SYSTEM (POWER WINDOW REGULATOR MOTOR (ALL DOORS))

CAUTION:

When the power window regulator motor is reinstalled or replaced, the power window control system must be initialized. Functions such as the auto up/down, jam protection and key-off do not operate if the initialization is not performed.

HINT:

When the battery is replaced, it is not necessary to initialize the power window regulator motor.

NOTICE:

- **When the power window regulator motor is replaced, DTC B2313 is output. Clear the DTC after the initialization.**
- **When performing initialization, do not perform any other procedures.**
- **After a door glass or a door glass run has been replaced, the jam protection function may operate unexpectedly when the auto up function is used, due to detection of a value different from the operation learned value of the door glass movement speed. In such cases, the auto up function can be resumed by repeating the following operation at least 5 times:**
    1. **Open the power window by fully pushing down the power window switch.**
    2. **Close the power window by fully pulling up the power window switch and holding it at the auto up position.**
- **If the initialization is not completed properly, the LIN communication system may have a malfunction.**

i. Initialization procedures when replacing the power window regulator motor with a new one:

1. Connect the battery and turn the engine switch on (IG) (at this time, the LED on the power window switch blinks to indicate that it is ready for initialization).
2. Fully open the window by fully pushing the power window switch, and hold the switch for 1 second or more after the window is fully opened.
3. Fully close the power window by fully pulling the power window switch, and hold the switch for 1 second or more after the window is fully closed to reset the glass position. The LED on the power window switch stops blinking and illuminates to indicate that the initialization is complete.

ii. Initialization procedures when removing/installing the power window regulator motor:

1. Connect the battery and turn the engine switch on (IG).
2. Fully close the power window by fully pulling the power window switch, and hold the switch for 6 seconds or more after the window is fully closed (if the power window does not move or stops halfway even when the switch is fully pulled, release the switch and fully pull it again).
3. Fully open the window by pushing down the power window switch, and hold the switch for 1 second or more after the window is fully opened.
4. Release the power window switch. Then fully push and hold the switch for 4 seconds or more.
5. Fully close the power window by fully pulling the power window switch, and hold the switch for 1 second or more after the window is fully closed to reset the glass position and complete the initialization.

iii. Initialization procedures when the power window does not fully open:

1. Connect the battery and turn the engine switch on (IG).
2. Fully close the power window by fully pulling the power window switch, and hold the switch for 6 seconds or more after the window is fully closed (if the power window does not move or stops halfway even when the switch is fully pulled, release the switch and fully pull it again).
3. Fully open the window by pushing down the power window switch, and hold the switch for 1 second or more after the window is fully opened.
4. Release the power window switch. Then fully push and hold the switch 4 seconds or more.
5. Fully close the power window by fully pulling the power window switch, and hold the switch 1 second. or more after the window is fully closed to reset the glass position and complete the initialization.

INITIALIZATION RELATED TO INNER REAR VIEW MIRROR

a. SELECT COMPASS DISPLAY MODE

i. The compass switch allows you to select the Display or Non-display mode of the compass.

b. SET ZONE

i. Deviation between the "magnetic north" and "actual north" differs depending on the location. Therefore, adjustment of the magnetism is required. Because the magnetic condition differs depending on the area where the vehicle is used, it is necessary for each user to set the zone (refer to Compass Zone Map). The zone setting can be changed using the compass switch of the inner mirror.

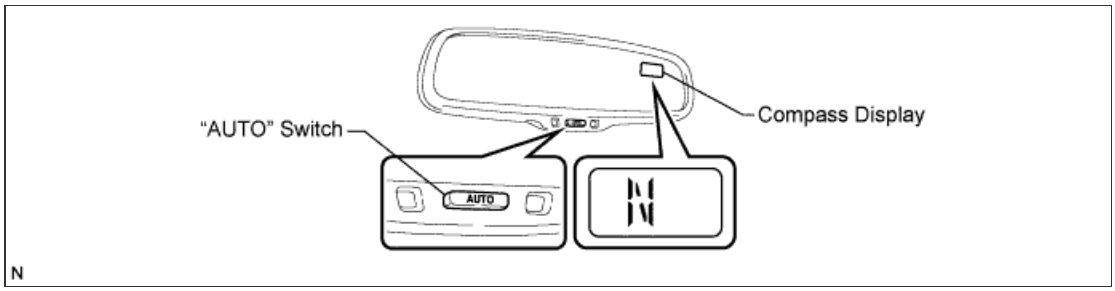
c. PERFORM CALIBRATION

i. Because each vehicle has its own magnetic field, calibration should be performed for each individual vehicle. This compass function is used when storing the record of the vehicle's magnetic field.

d. WHEN COMPASS IS MAGNETIZED

i. The compass could be magnetized during shipping by vessels or freight cars. Therefore, ensure that calibration is performed properly before delivery. If driving the vehicle in a circle several times does not complete the calibration procedure, there may be a

compass magnetization problem.

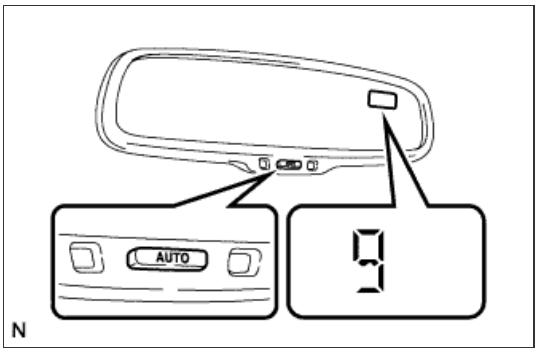


e. Deviation Calibration Procedure

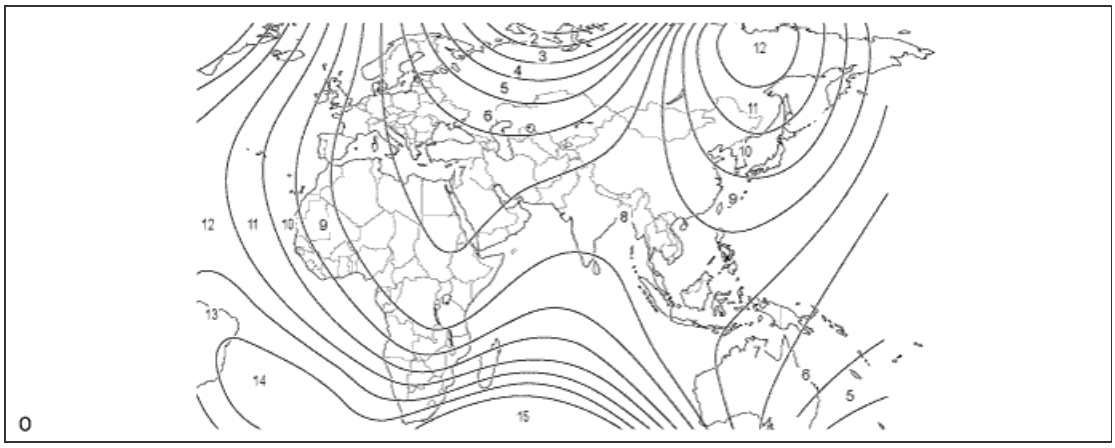
i. Turn the ignition switch to the "IG-ON" position and push and hold the "AUTO" switch for 6 seconds until the zone number appears on the display.

HINT:

Pushing the "AUTO" switch for 3 seconds turns on or off the compass display.

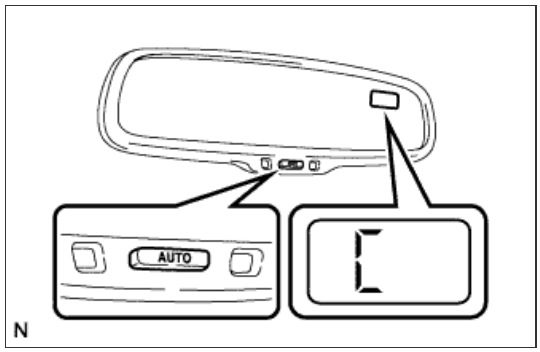


ii. Push the "AUTO" switch to select the number of the zone where the vehicle is located. See the map for zone reference.



f. Circling Calibration Procedure

i. Start the engine and push and hold the "AUTO" switch for 9 seconds until "C" appears on the display.

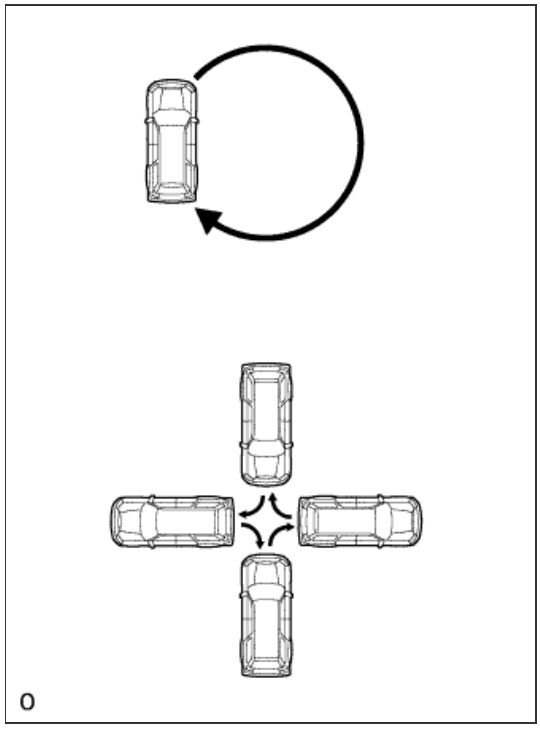


N

ii. Drive the vehicle slowly at 8 km/h (5 mph) or lower in a circle. If there is not enough space to drive in a circle, turn the car around in the following manner, doing two three-point turns in succession. After driving in 1 to 3 circles in the above method, calibration is completed with the direction is shown on the display.

HINT:

- **Do not perform calibration of the compass in a place where the earth's magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a crossing, near a large vehicle, etc.).**
- **During calibration, do not operate electric systems (sliding roof, power windows, etc.) as they may interfere with the calibration.**


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INITIALIZATION RELATED TO SLIDING ROOF SYSTEM

a. INITIALIZE SLIDING ROOF DRIVE GEAR

NOTICE:

- **When the sliding roof glass is replaced or removed and installed, or the drive gear assembly is replaced, the sliding roof drive gear requires initialization (pulse sensor initial position setting), as the glass position cannot be determined. If initialization is not performed, the auto slide open and close/tilt up and down function may not operate, or the sliding roof may move in reverse or become misaligned.**
- **During initialization, do not apply a physical shock, such as opening/closing a door or driving the vehicle at 5 km/h (3.10 mph) or more, to the vehicle and do not perform the following electrical operations:**
  1. **Cranking the engine**
  2. **Turning the engine switch from on (IG) to off**
  3. **Operating the power window switches**
  4. **Operating the window defogger switch**
  5. **Operating the blower switch**
  6. **Locking/Unlocking the door**
  7. **Operating the headlight dimmer switch**

HINT:

When the cable is disconnected and reconnected to the negative (-) battery terminal or the drive gear connector is disconnected and reconnected, the sliding roof drive gear (pulse sensor initial position setting) initialization is not necessary.

i. Perform initialization according to the table below.

Condition of Sliding Roof	Proceed to
Auto slide open and close/tilt up and down function does not operate	Procedure A
Sliding roof moves in reverse direction during tilt down operation	Procedure B
Sliding roof moves in reverse direction during slide close operation	Procedure C

1. Procedure A
    1. Turn the engine switch on (IG).
    2. Open the sliding roof to the fully tilt up position.
    3. Press and hold the UP switch to perform the following operations: tilt up → approximately 10 second pause → tilt down → slide open → slide close.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    4. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    5. The initialization is completed.
2. Procedure B
    1. Turn the engine switch on (IG).
    2. Press the UP switch until the sliding roof stops.

        HINT:

        If the glass becomes misaligned or does not fully tilt up, perform the following operations:

        1. **Operate the CLOSE switch until the sliding roof stops moving.**
        2. **Operate the UP switch until the sliding roof stops moving, then proceed to the next step.**

    3. Release the switch.
    4. Press and hold the UP switch to perform the following operations: tilt up → approximately 10 second pause → tilt down → slide open → slide close.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    5. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    6. The initialization is completed.
3. Procedure C
    1. Turn the engine switch on (IG).
    2. Press and hold the CLOSE switch to perform the following operations: slide close → move in reverse direction → 10 second pause → slide close → tilt up → tilt down.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    3. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    4. Check if the auto function is operative.

ADJUSTMENT FOR HEADLIGHT ASSEMBLY (for Standard)

a. VEHICLE PREPARATION FOR HEADLIGHT AIMING ADJUSTMENT

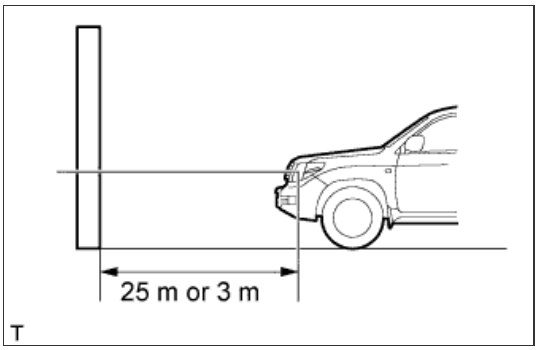
i. Prepare the vehicle:

- Ensure there is no damage to the body around the headlights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (75 kg, 165 lb) sit in the driver's seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the headlight aim.
- Vehicles with manually adjustable headlights should be adjusted to "0" (w/ headlight leveling switch).

b. PREPARATION FOR HEADLIGHT AIMING (Using a screen)

i. Prepare the vehicle:

- 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 headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82.0 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.



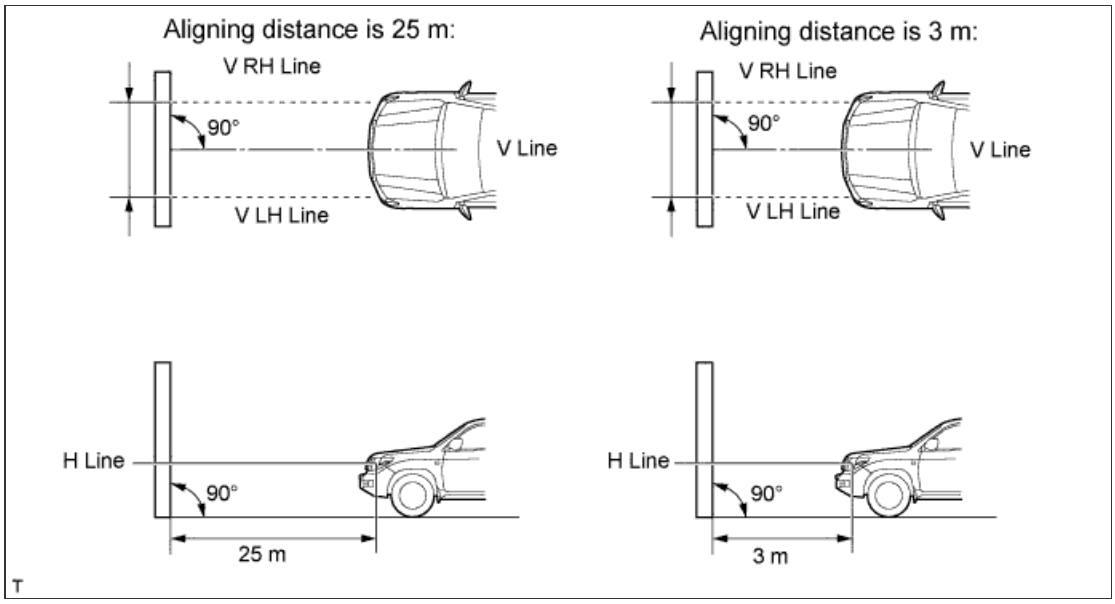
NOTICE:

A distance of 25 m (82.0 ft.) between the vehicle (headlight bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2 m (6.56 ft.) (height) x 4 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

iv. Set the screen as shown in the illustration.



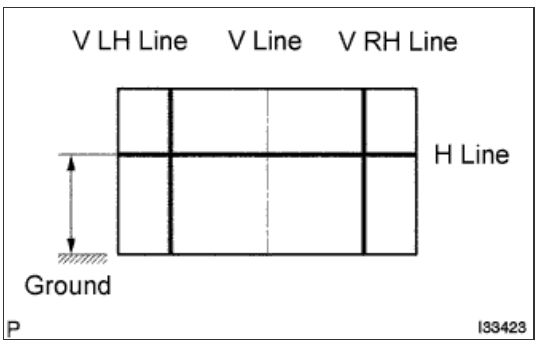
HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and V RH Lines) on the screen as shown in the illustration.

HINT:

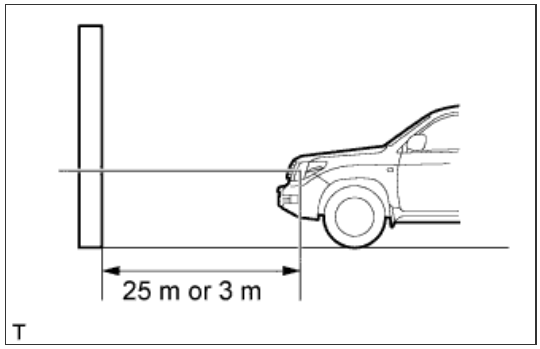
- **The base lines differ for "low beam inspection" and "high beam inspection".**
- **Mark the headlight bulb center marks on the screen. If the center mark cannot be observed on the headlight, use the center of the headlight bulb or the manufacturer's name marked on the headlight as the center mark.**



1. H Line (Headlight):
   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 headlight bulb center marks of the low beam headlights.
2. V LH Line, V RH Line (Center mark position of the left-hand (LH) and right-hand (RH) headlights):
   Draw two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low beam headlight bulbs).

c. HEADLIGHT AIMING INSPECTION

i. Cover the headlight or disconnect the connector of the headlight on the opposite side to prevent light from the headlight that is not being inspected from affecting the headlight aiming



NOTICE:

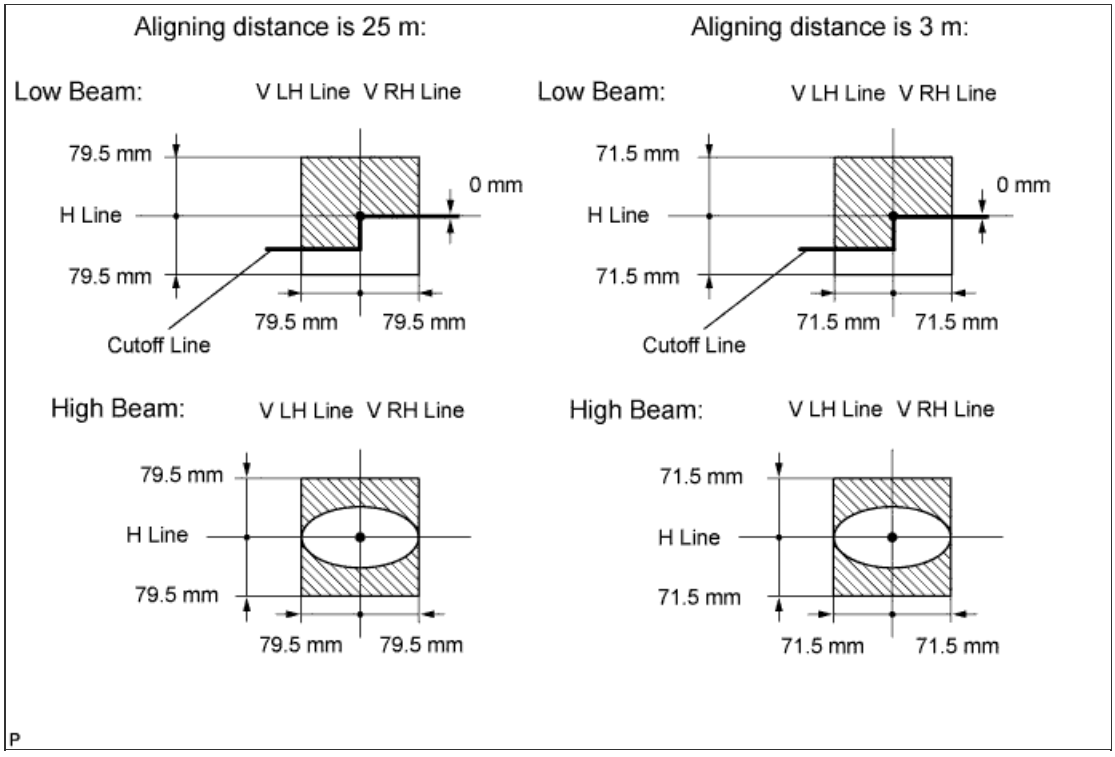
Do not keep the headlight covered for more than 3 minutes. The headlight lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

HINT:

When checking the aim of the high beam headlight, cover the low beam headlight or disconnect the connector.

ii. Start the engine.

iii. Turn on the headlight and check if the cutoff line matches the preferred cutoff line in the following illustration.

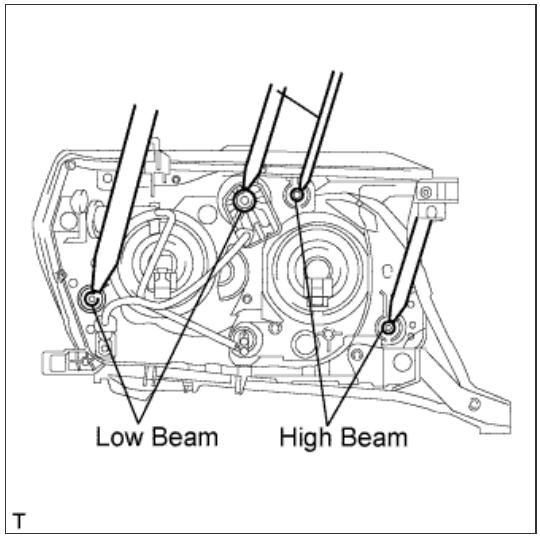


HINT:

- **Since the low beam and high beam headlight on each side have separate reflectors, it is necessary to check and adjust the aim separately for both.**
- **If the alignment distance is 25 m (82.0 ft.):**
  The low beam cutoff line should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3.0 m (9.84 ft.):**
  The low beam cutoff line should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.
- **If the alignment distance is 25 m (82.0 ft.):**
  The high beam center of intensity should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3.0 m (9.84 ft.):**
  The high beam center of intensity should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.

d. HEADLIGHT AIMING ADJUSTMENT

i. Adjust the aim vertically:



1. Adjust the aim of each headlight to the specified range by turning each 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.

HINT:

- **The low beam and high beam headlight are a unit. Adjusting the aim on the low beam to the correct position should also result in the high beam adjustment being correct.**
- **If it is not possible to correctly adjust headlight aim, check the bulb, headlight unit, and headlight unit reflector installation.**
- **The headlight aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.**

ADJUSTMENT FOR HEADLIGHT ASSEMBLY (for HID Headlight)

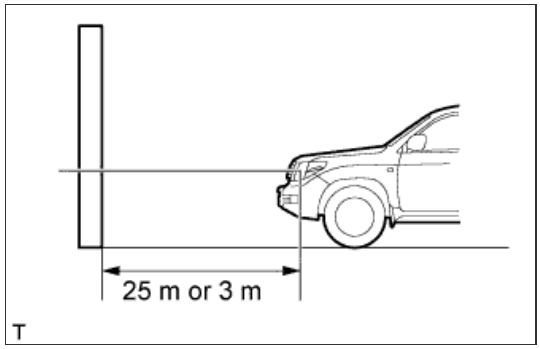
a. VEHICLE PREPARATION FOR HEADLIGHT AIMING ADJUSTMENT

i. Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the headlights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (75 kg, 165.3 lb) sit in the driver seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the headlight aim.
- Vehicles with manually adjustable headlights should be adjusted to "0" (w/ headlight leveling switch).

b. PREPARATION FOR HEADLIGHT AIMING (Using a screen)

i. Prepare the vehicle:



- 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 headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82.0 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:

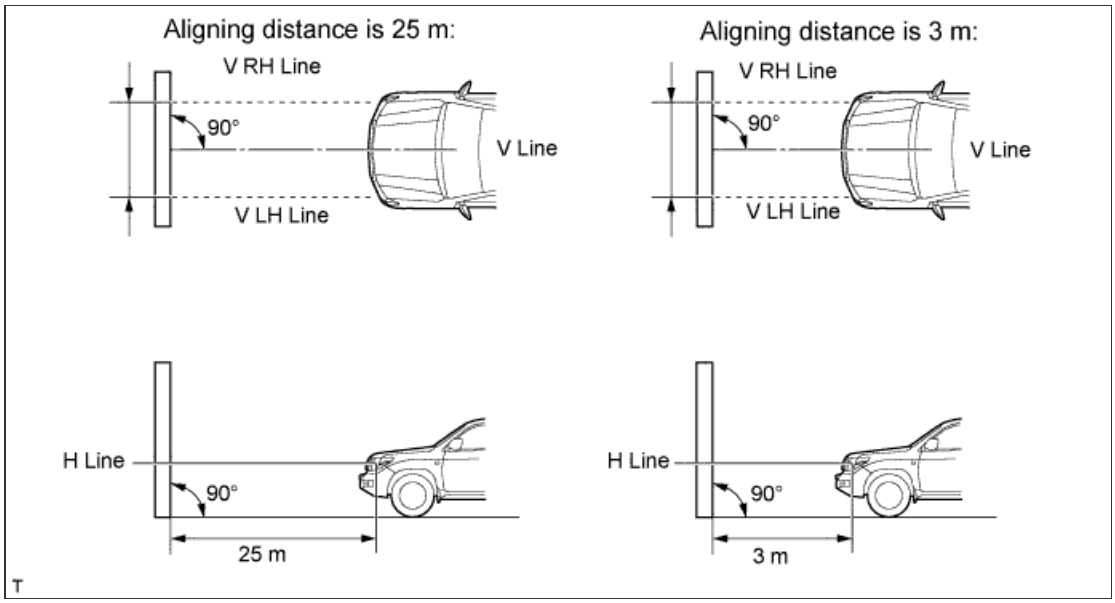
A distance of 25 m (82.0 ft.) between the vehicle (headlight bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone

will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2 m (6.56 ft.) (height) x 4 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

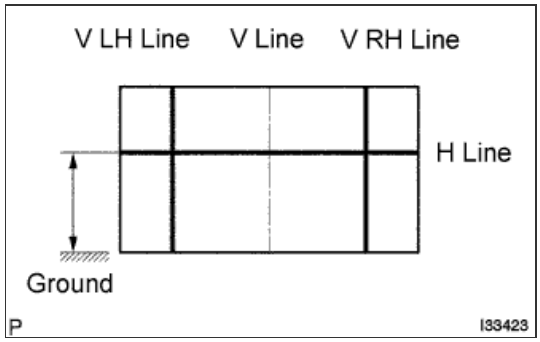
iv. Set the screen as shown in the illustration.



HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and 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 headlight bulb center marks on the screen. If the center mark cannot be observed on the headlight, use the center of the headlight bulb or the name of the manufacturer marked on the headlight as the center mark.**

1. H Line (Headlight 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 headlight bulb center marks of the low beam headlights.
2. V LH Line, V RH Line (Center mark position of the left-hand (LH) and right-hand (RH) headlights):
   Draw two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low beam headlight bulbs).

c. HEADLIGHT AIMING INSPECTION

i. Cover the headlight or disconnect the connector of the headlight on the opposite side to prevent light from the headlight that is not being inspected from affecting the headlight aiming inspection.

NOTICE:

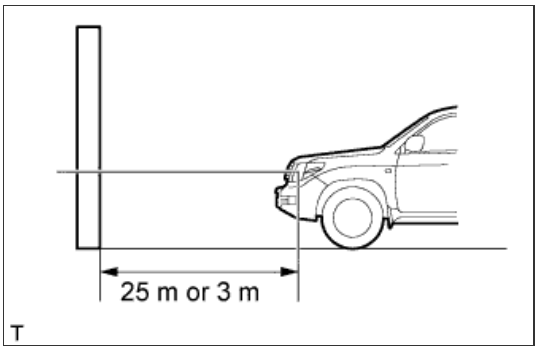
Do not keep the headlight covered for more than 3 minutes. The

headlight lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

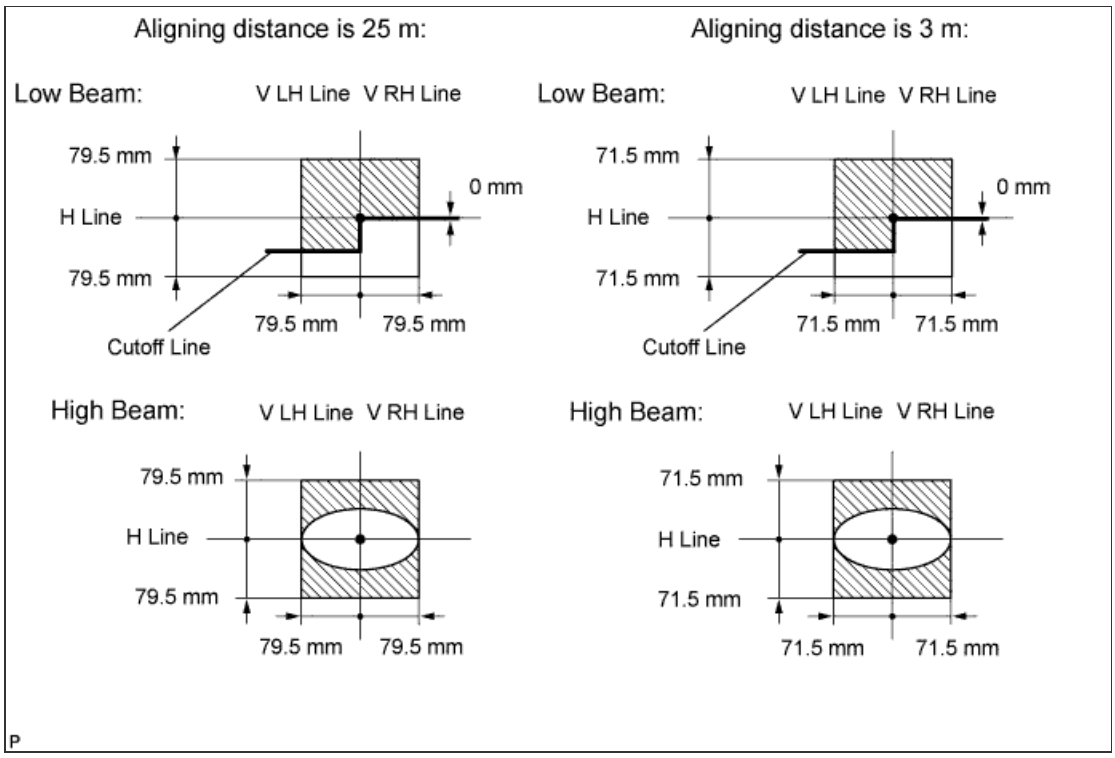
HINT:

When checking the aim of the high beam headlight, cover the low beam headlight or disconnect the connector.

ii. Start the engine.



iii. Turn on the headlight and check if the cutoff line matches the preferred cutoff line in the following illustration.



HINT:

- **Since the low beam and high beam headlight on each side have separate reflectors, it is necessary to check and adjust the aim separately for both.**
- **If the alignment distance is 25 m (82.0 ft.):**
  The low beam cutoff line should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3 m (9.84 ft.):**
  The low beam cutoff line should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.
- **If the alignment distance is 25 m (82.0 ft.):**
  The high beam center of intensity should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3 m (9.84 ft.):**
  The high beam center of intensity should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.

d. HEADLIGHT AIMING ADJUSTMENT

i. Adjust the aim vertically:

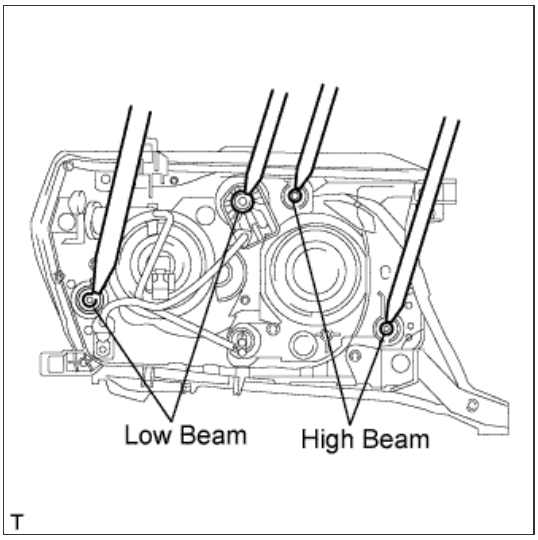
1. Adjust the aim of each headlight to the specified range by turning each aiming screw with a screwdriver.

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.

HINT:

- **The low beam and high beam headlight are a unit. Adjusting the aim on the low beam to the correct position should also result in the high beam adjustment being correct.**
- **If it is not possible to correctly adjust headlight aim, check the bulb, headlight unit, and headlight unit reflector installation.**
- **The headlight aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.**



ADJUSTMENT FOR FOG LIGHT ASSEMBLY

HINT:

It is possible that a bulb is incorrectly installed, affecting fog light aim. Bulb installation should be considered prior to performing the adjustment procedure.

a. VEHICLE PREPARATION FOR FOG LIGHT AIMING ADJUSTMENT

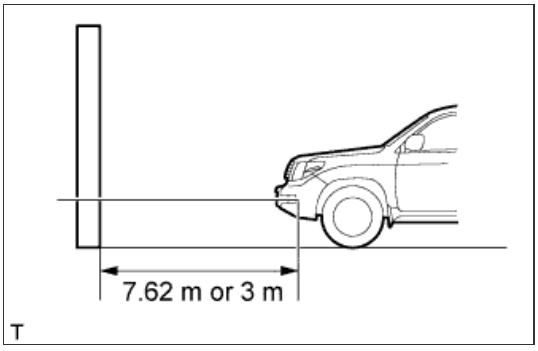
i. Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the fog lights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (68 kg, 150 lb) sit in the driver's seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the fog light aim.

b. PREPARATION FOR FOG LIGHT AIMING

i. Prepare the vehicle:

- 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 fog lights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 7.62 m (25.0 ft.) distance between the vehicle (fog light bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.



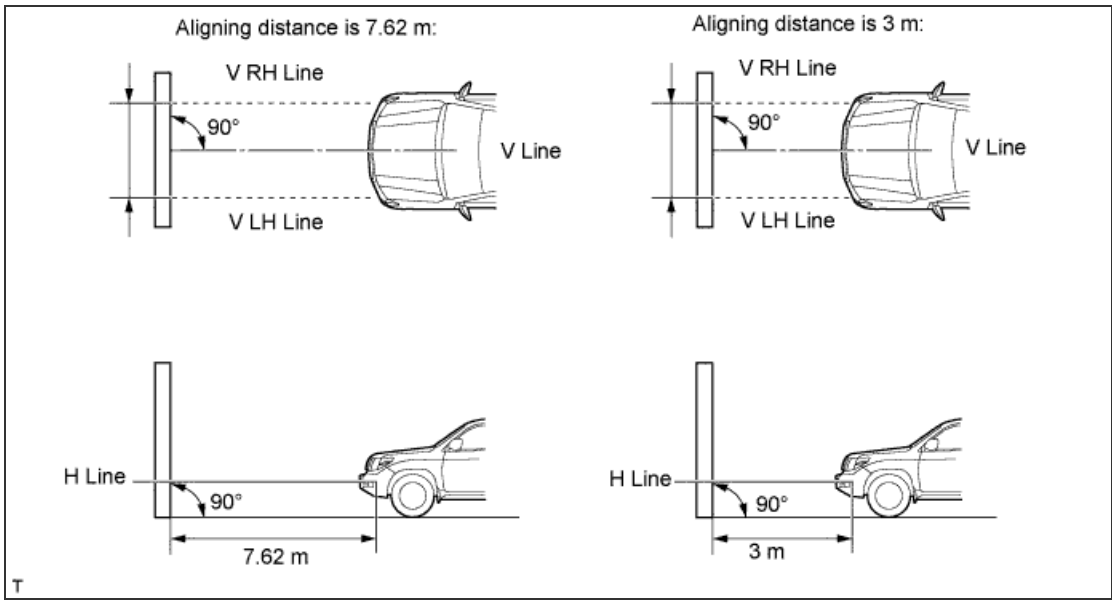
NOTICE:

A distance of 7.62 m (25.0 ft.) between the vehicle (fog light bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2.0 m (6.56 ft.) (height) x 4.0 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

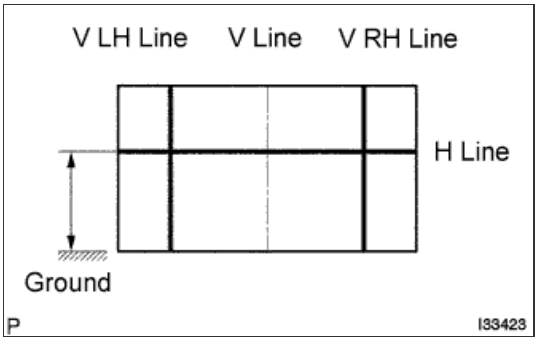
iv. Set the screen as shown in the illustration.



HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and V RH lines) on the screen as shown in the illustration.



HINT:

Mark the fog light bulb center marks on the screen. If the center mark cannot be observed on the fog light, use the center of the fog light bulb or the manufacturer's name marked on the fog light as the center mark.

1. H line (Fog light 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 light bulb center marks of the fog lights.
2. V LH Line, V RH Line (Center mark position of left-hand (LH) and right-hand (RH) fog lights):
   Draw two vertical lines so that they intersect the H line at each center mark.

c. INSPECT FOG LIGHT AIMING

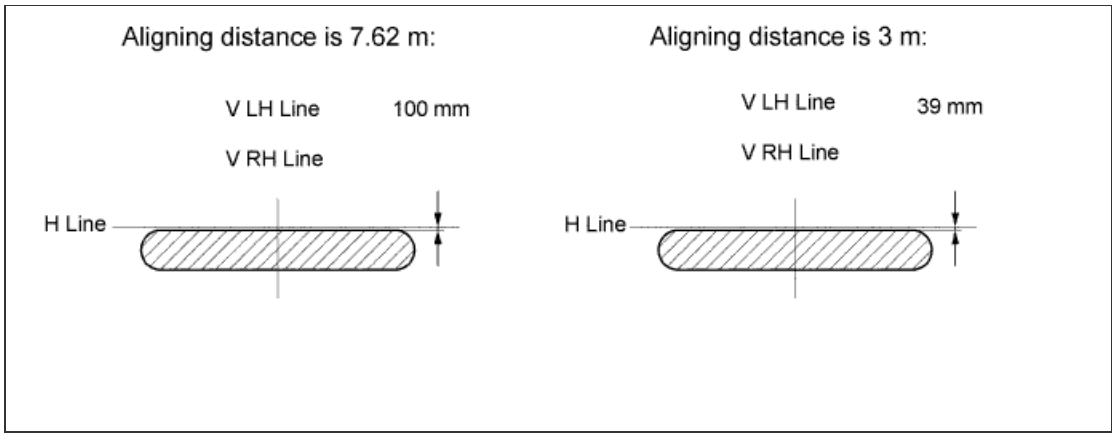
i. Cover the fog light or disconnect the connector of the fog light on the opposite side to prevent light from the fog light that is not being inspected from affecting the fog light aiming inspection.

NOTICE:

Do not keep the fog light covered for more than 3 minutes. The fog light lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

ii. Start the engine.

iii. Turn on the fog light and check if the cutoff line falls within the specified area in the following illustration.



d. ADJUST FOG LIGHT AIMING

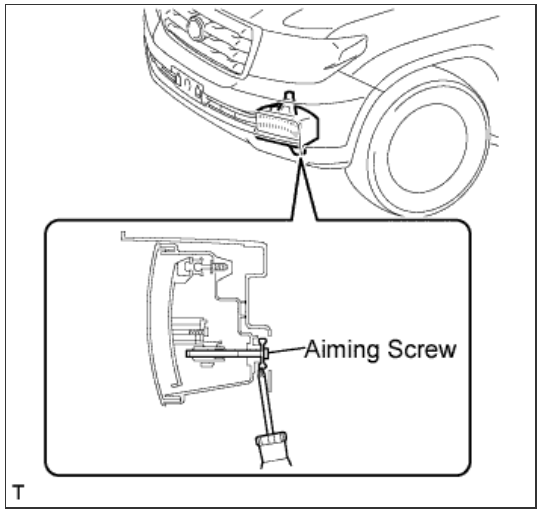
i. Adjust the aim vertically:
Adjust the aim of each fog light to the specified range by turning the aiming screw with a screwdriver.

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.

HINT:

If it is not possible to correctly adjust fog light aim, check the bulb, fog light unit, and fog light unit reflector installation.



PROCEDURES NECESSARY WHEN CABLE IS DISCONNECTED/RECONNECTED TO BATTERY TERMINAL

Procedures Necessary when Cable is Disconnected/Reconnected to Battery Terminal

Necessary Procedure	Procedure Details	Effect or Inoperative Function when Necessary Procedure is not Performed	Notes
Initialize parking assist monitor system	**Perform either of the following procedures.** • Fully turn the steering wheel to the right and left. • Drive the vehicle at more than 20 km/h (12 mph) for more than 5 minutes on a straight road with as little traffic congestion as possible.	Parking assist function	-

NOTICE:

After the engine switch is turned off, the display and navigation module display (HDD navigation system) records various types of memory and settings. As a result, after turning the engine switch off, make sure to wait at least 60 seconds before disconnecting the cable from the negative (-) battery terminal.

PROCEDURES NECESSARY WHEN ECU OR OTHER PARTS ARE REPLACED

Procedures Necessary when ECU or Other Parts are Replaced

Replacement Part	Necessary Procedures	Effects / Inoperative Functions When Necessary Procedures are not Performed	Notes
Fuel injector (1VD-FTV)	Injector compensation code registration	DTC B1603 is output	-
Fuel supply pump (1VD-FTV)	ECM initialization	Engine starting	-
ECM (1VD-FTV)	ECU communication ID registration	Engine starting	-
Any of shift solenoid valves	Reset memory	Large shift shock	-
Transmission wire	Add and adjust the ATF level	Automatic transmission assembly damaged	-
Valve body and shift solenoid valve	Add and adjust the ATF level	Automatic transmission assembly damaged	-
	Perform the Reset Memory (AT initialization)	Large shift shock	-
Oil cooler and oil cooler tube	Add and adjust the ATF level	Large shift shock	-
Park/neutral position switch	Adjust the park/neutral position switch	1. Back-up light does not turn on 2. Meter indicator display malfunction 3. Vehicle undrivable 4. Shifting not possible	-
Transmission floor shift assembly	Adjust the shift lever position	1. Back-up light does not turn on 2. Meter indicator display malfunction 3. Vehicle undrivable 4. Shifting not possible	-
Automatic transmission assembly	Add and adjust the ATF level	Automatic transmission assembly damaged	-
	Perform the Reset Memory (AT initialization)	Large shift shock	-
• Clutch pedal (for LHD) • Clutch master cylinder (for LHD)	Inspect and adjust clutch pedal	• Clutch slips • Clutch dies not disengage	-
• Clutch			

• Clutch pedal (for RHD) • Clutch master cylinder (for RHD)	Inspect and adjust clutch pedal	• Clutch slips • Clutch dies not disengage	-
Suspension control ECU	Vehicle height offset calibration	Vehicle height sensor date may be affected due to installation position, or vehicle height recognition may be erroneous	After vehicle height offset calibration is performed, it is necessary to calibrate the yaw rate sensor
Height control sensor	Vehicle height offset calibration	Vehicle height sensor date may be affected due to installation position, or vehicle height recognition may be erroneous	After vehicle height offset calibration is performed, it is necessary to calibrate the yaw rate sensor
• Suspension • Underbody components	• Steering angle neutral point in memory • Yaw rate and G sensor zero point calibration	• The brake control and dynamic control systems do not operate properly • VGRS system • Parking assist monitor system	Removed/installed or replaced
Master cylinder solenoid (Skid control ECU)	G sensor zero point calibration	The brake control system does not operate properly	-
G sensor	1. Clearing zero point calibration data 2. G sensor zero point calibration	The brake control system does not operate properly	-
Master cylinder solenoid (Skid control ECU)	Yaw rate and G sensor zero point calibration	The brake control and dynamic control systems do not operate properly	-
Yaw rate and G sensor	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration	The brake control and dynamic control systems do not operate properly	-
Vehicle height adjustment	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration 3. Steering angle sensor initialization	The brake control and dynamic control systems do not operate properly	w/ active height control system
• Brake pedal • Hydraulic brake booster	Check brake pedal height	• Brake performance problem • Delayed stop light illumination or continuous illumination	-
• Parking brake lever • Parking brake cable • Parking brake assembly	Adjust parking brake lever travel	• Brake drag • Brake performance problem • Delayed stop light illumination or continuous illumination	-
• Steering control ECU • Steering column • Steering intermediate	Calibration	• VGRS system • DTC output	-

shaft • Steering actuator assembly			
Steering angle sensor	Initialization	• VGRS system • Other related systems cannot operate properly	-
Steering column	Steering off center adjustment	Steering system does not operate normally	-
Rear television camera	Rear television camera optional axis (Camera position setting)	Vehicle width extension lines and expected course are deviated	Replace or installation angle of the rear television camera changes because of the removal and installation of the rear television camera
Parking assist ECU	• Steering angle neutral point in memory • Store the left and right maximum steering angles • Rear television camera optical axis (Camera position setting)	Parking assist monitor system	Replace or installation angle of the rear television camera changes because of the removal and installation of the rear television camera
• ID code box • Steering lock ECU • Key • Certification ECU	Registration	• Wireless door lock operation • Entry operation • Engine starting • Steering unlock	-
• Front Power window regulator motor LH • Front Power window regulator motor RH • Rear Power window regulator motor LH • Rear Power window regulator motor RH	Initialize the motor	• Jam protection function • Power window control system	-
Inner rear view mirror	• Compass zone setting • Compass calibration • Register transmitter code	Direction is not displayed correctly	-
• Sliding roof driver gear (Sliding roof ECU) • Sliding roof glass	Initialize sliding roof system	• Auto operation • Jam protection function • Sliding roof operation after engine switch OFF • Wireless door lock control function • Key-linked operation function (Driver side door only) • Entry lock switch-linked operation	-
Headlight assembly	Adjustment	Beam axis deviation	-

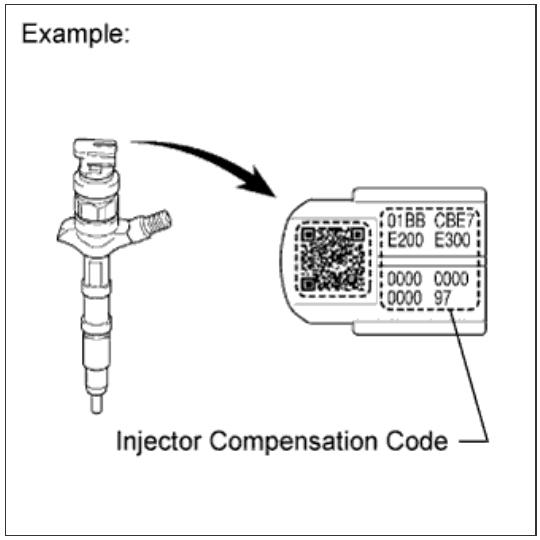
Fog light assembly	Adjustment	Beam axis deviation	-
Front bumper	Adjustment	Beam axis deviation	-

REGISTRATION RELATED TO ECD SYSTEM

a. REGISTRATION

NOTICE:

- **When a fuel injector is replaced, the new fuel injector compensation code must be input into the ECM. When the ECM is replaced, all of the existing fuel injector compensation codes must be input into the new ECM.**
- **Fuel injector compensation codes are unique, 30 digit, alphanumeric values printed on the head portion of each fuel injector. If an incorrect fuel 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.**



i. After replacing fuel injector(s) with new one(s), input compensation code(s) of fuel injector(s) into ECM as follows:

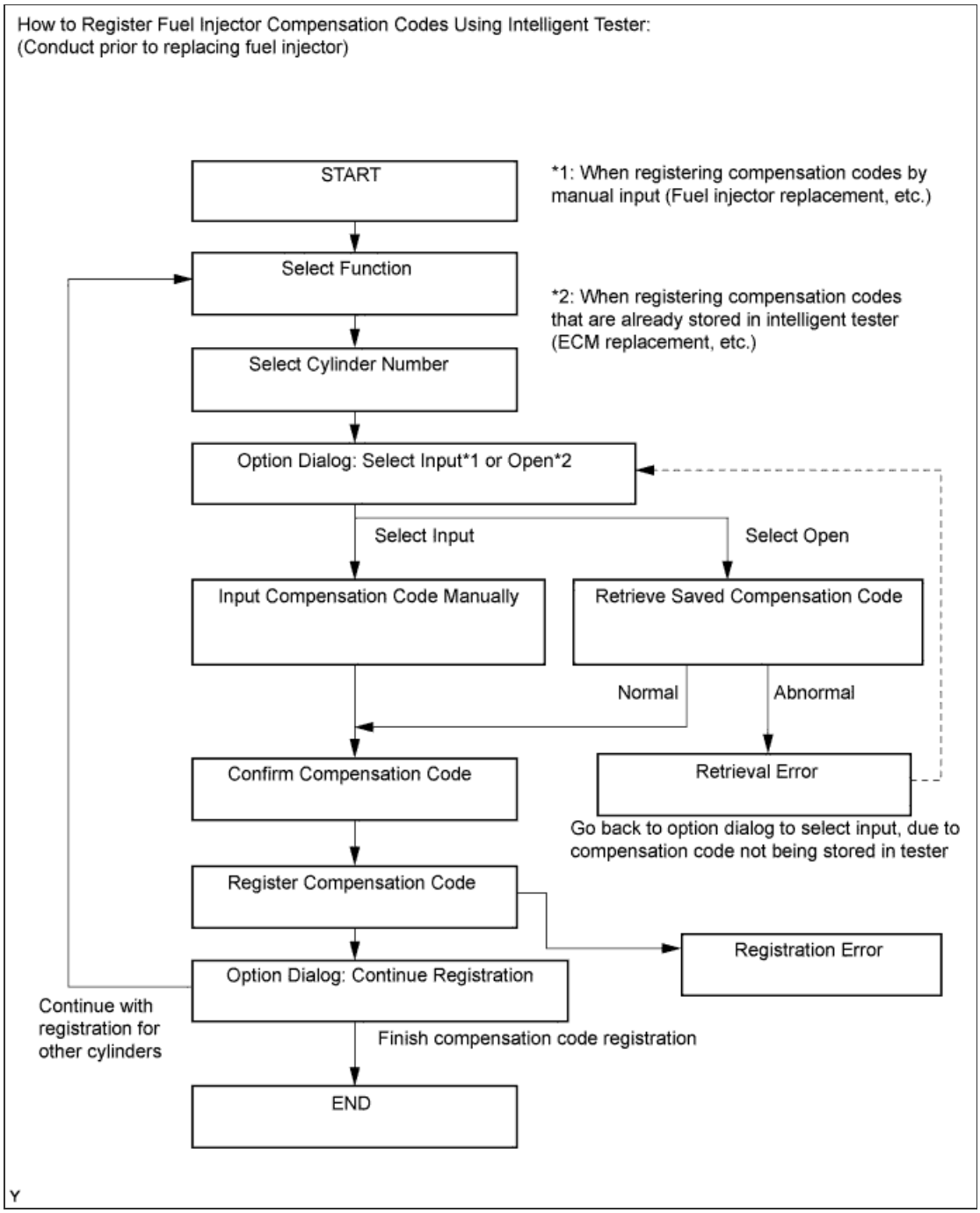
HINT:

- **Each fuel 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 fuel injector.**
- **When you first turn the engine switch on (IG) after replacing the ECM or a fuel injector(s), DTC P1601 is set. This is to inform you that registration of a fuel injector compensation code(s) is/are required. Manually clear the DTC upon completion of the compensation code registration.**

1. Input the compensation code(s), which is/are imprinted on the head portion(s) of the new fuel injector(s), into the intelligent tester.
2. Input the new compensation code(s) into the ECM using the tester.
3. Turn the tester off and turn the engine switch off.
4. Wait for at least 30 seconds.
5. Turn the engine switch on (IG) and turn the tester on.
6. Clear DTC P1601 stored in the ECM using the tester.

ii. Register compensation code.

How to Register Fuel Injector Compensation Codes Using Intelligent Tester:
(Conduct prior to replacing fuel injector)



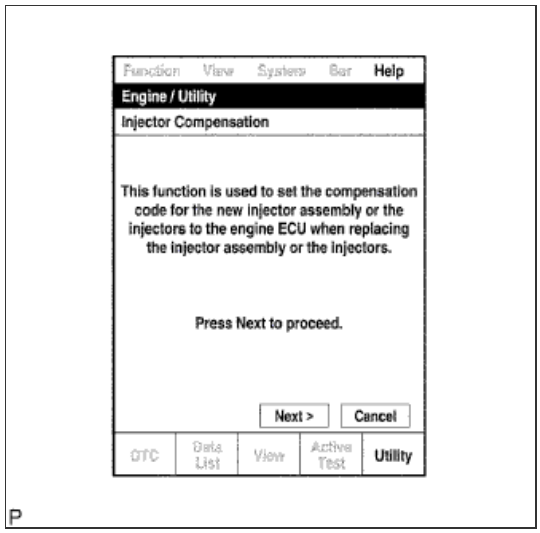
Y

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).

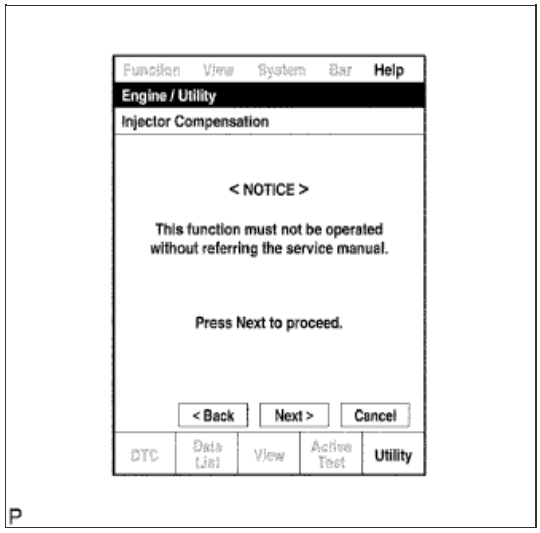
NOTICE:

Do not start the engine.

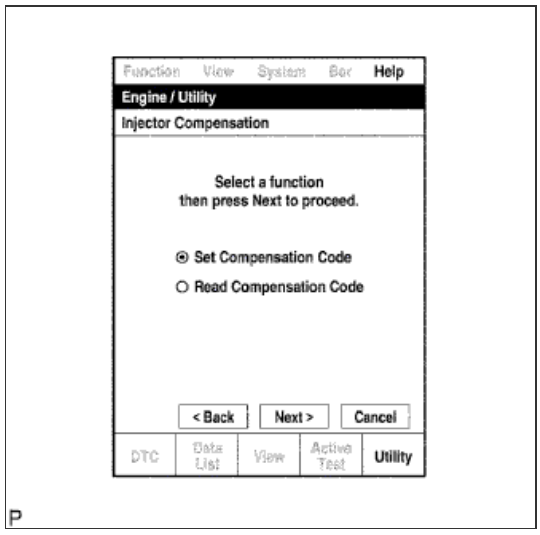
3. Turn the tester on.
4. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
5. Press Next.



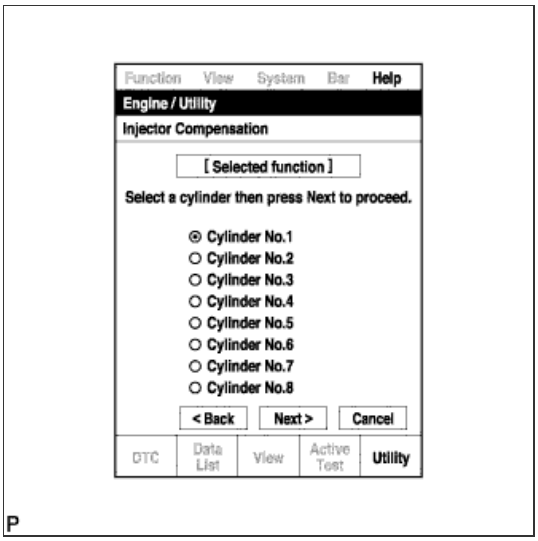
6. Press Next again to proceed.



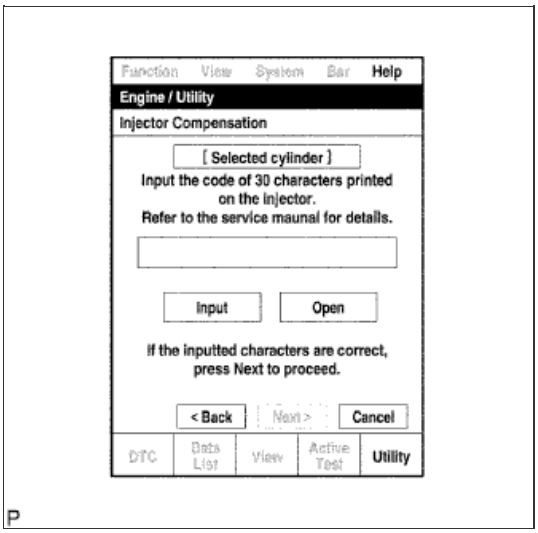
7. Select "Set Compensation Code".
8. Press Next.



9. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
10. Press Next.



11. Register compensation code.
    1. Press Input.



    2. Manually input the cylinder compensation code using the keyboard on the tester screen. The code is a 30 digit, alphanumeric value printed on the injector head portion.

       HINT:

       Each fuel injector compensation code is unique. The compensation code for each selected cylinder must be input into the tester correctly.

    3. Confirm that the compensation code for the selected cylinder is correct, and then press OK.



12. Check that the compensation code displayed on the screen is correct by comparing it with the 30 digit alphanumeric value on the head portion of the fuel injector.

    NOTICE:

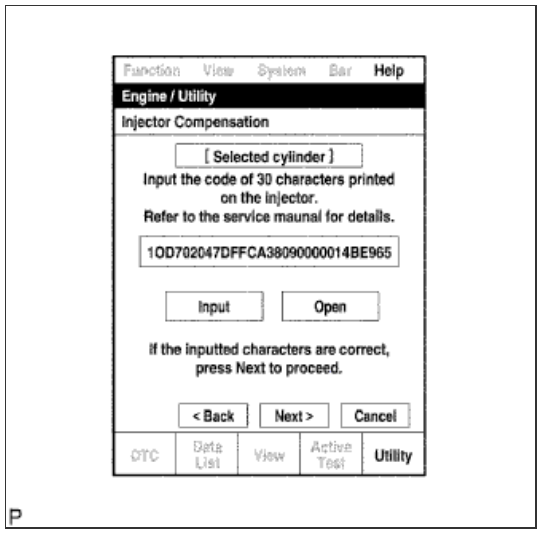
    If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

    HINT:

    - **If a wrong compensation code is input or read, return to the Input Value screen by**

pressing Input.

- **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 DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and repeat this operation.**

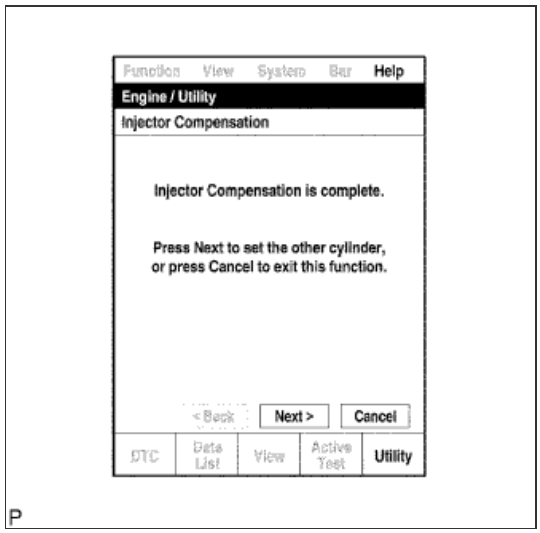


13. Press Next to register the compensation code in the ECM.

    HINT:

    - **If the registration process fails, the compensation code may be incorrect. Check the compensation code again.**
    - **If the input compensation code fails to register even though it is input correctly, there may be a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.**

14. If you want to continue with other compensation code registrations, press Next. To finish the registration, press Cancel.
15. Turn the engine switch off and then turn the tester off.
16. Wait for at least 30 seconds.
17. Turn the engine switch on (IG) and then turn the tester on.
18. Clear DTC P1601 stored in the ECM using the tester.



b. READING REGISTERED DATA

NOTICE:

- **When a fuel injector is replaced, the new fuel injector compensation code must be input into the ECM. When the ECM is changed, all of the existing fuel injector compensation codes must be input into the new ECM.**
- **Fuel injector compensation codes are unique, 30 digit, alphanumeric values printed on the head portion of each fuel injector. If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.**

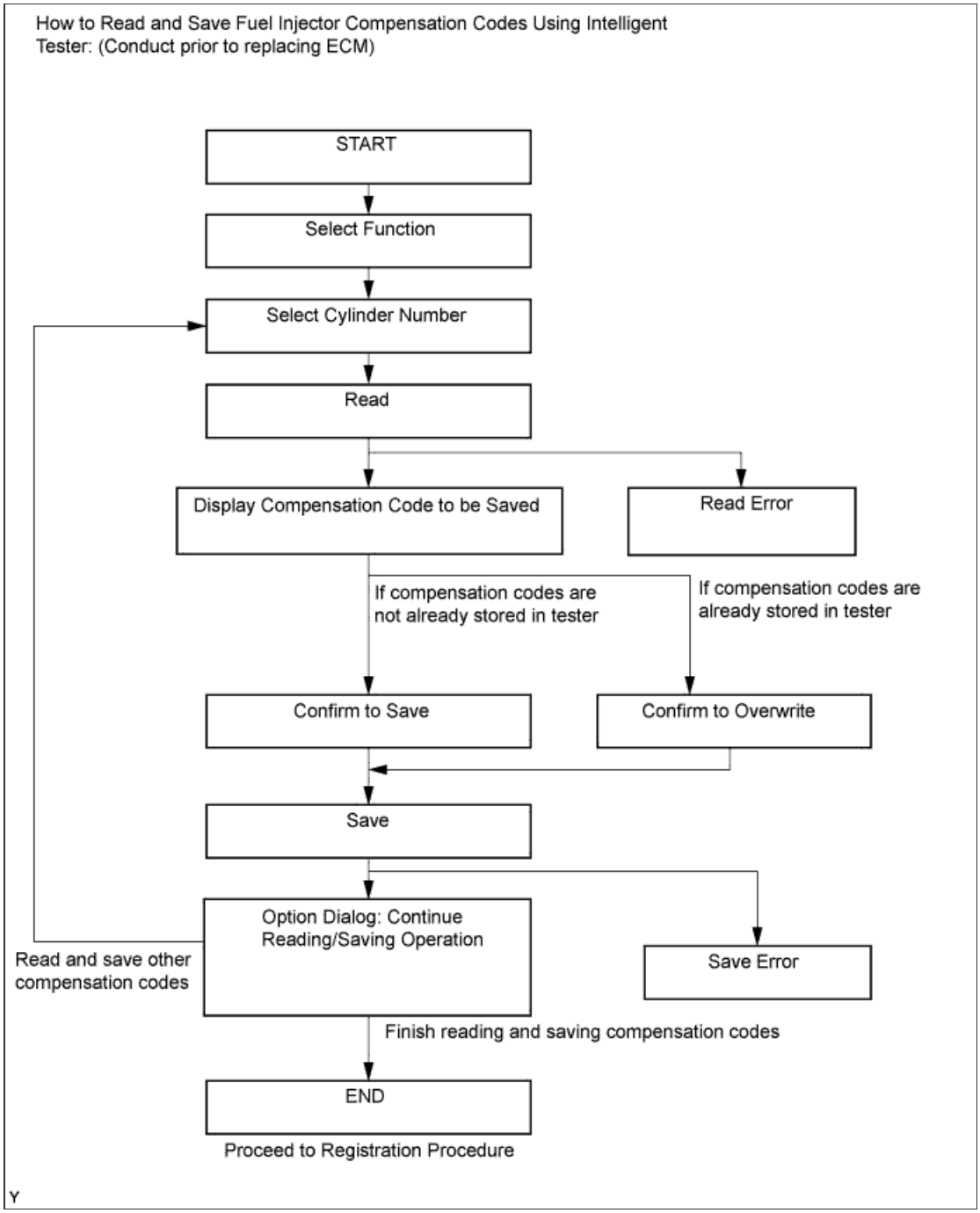
i. When replacing ECM with a new one, input all fuel injector compensation codes into new ECM as follows:

HINT:

- **Each fuel 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 engine switch on (IG) after replacing the ECM or a fuel injector(s), DTC P1601 is set. This is to inform you that registration of a fuel injector compensation codes(s) is/are required. Manually clear the DTC upon completion of the compensation code registration.**

1. Prior to replacing the ECM, read and save each fuel injector compensation code, stored in the original ECM, using the intelligent tester.
2. After installing a new ECM, input the saved compensation codes into the new ECM using the tester.
3. Turn the tester off and turn the engine switch off.
4. Wait for at least 30 seconds.
5. Turn the engine switch on (IG) and turn the tester on.
6. Clear DTC P1601 stored in the ECM using the tester.

ii. Read and save fuel injector compensation codes.



HINT:

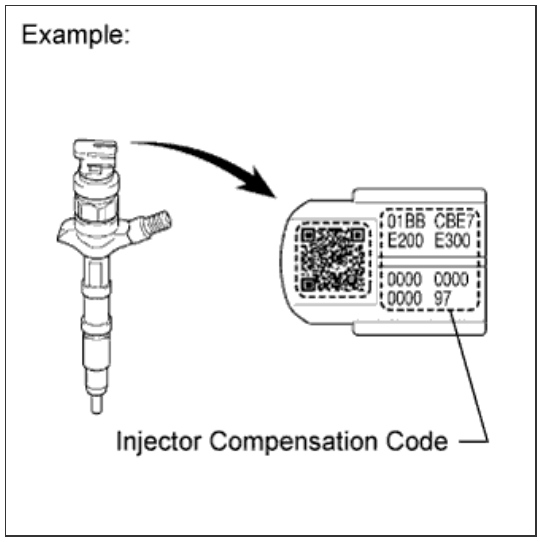
The following operation is available with ECMs that can transmit the registered fuel injector compensation codes to the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).

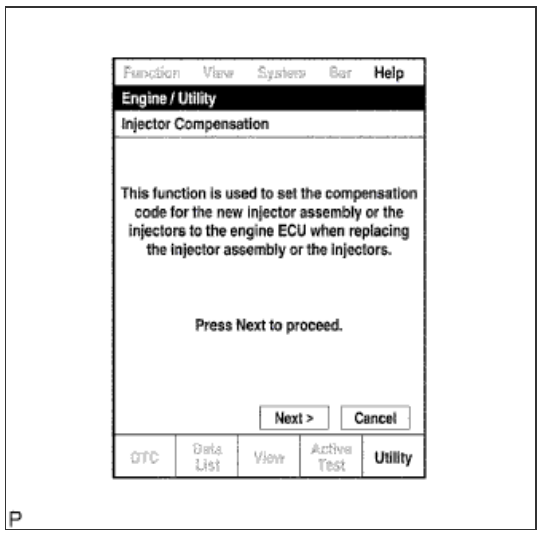
   NOTICE:

   Do not start the engine.

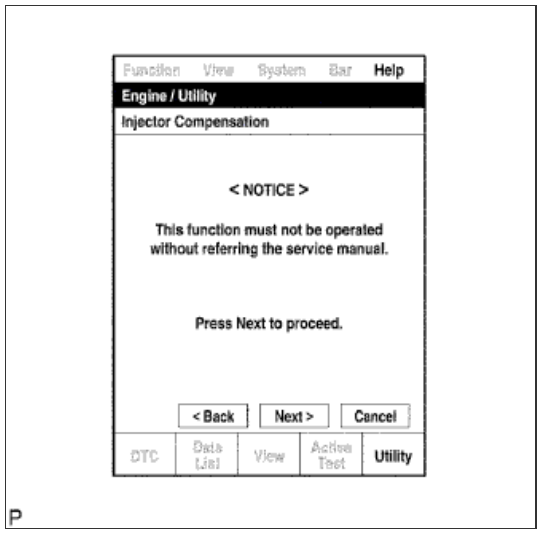
3. Turn the tester on.



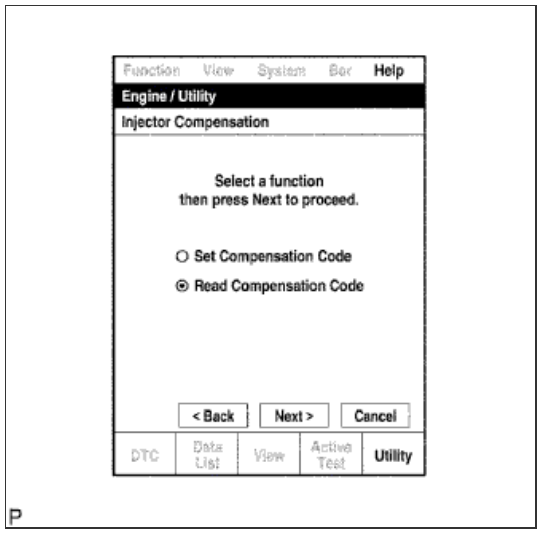
4. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
5. Press Next.



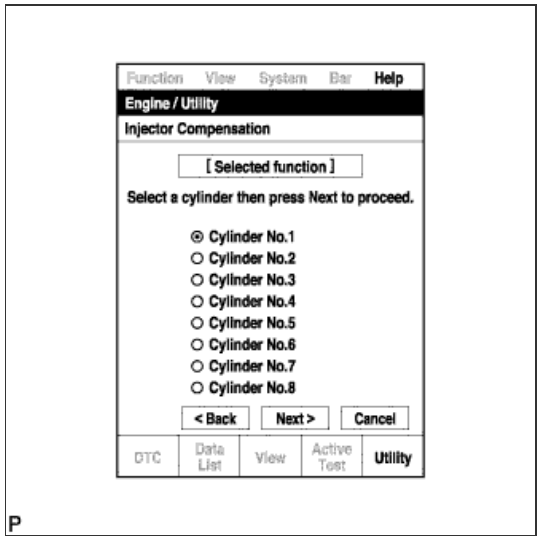
6. Press Next again to proceed.



7. Select Read Compensation Code.
8. Press Next.



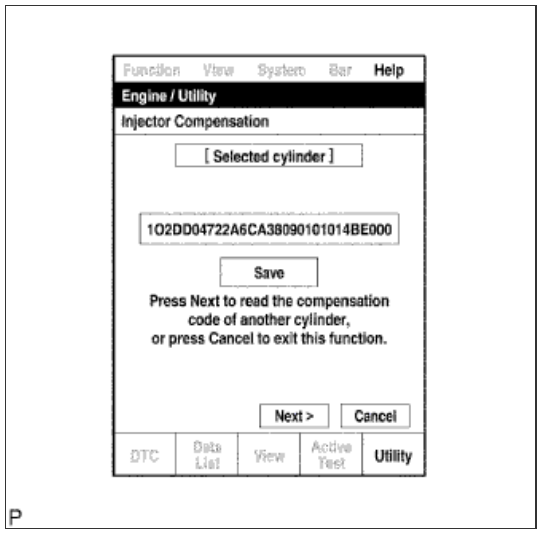
9. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
10. Press Next.



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 DLC3 connection. If no problem is found, the ECM may be malfunctioning. Check the ECM and restart this operation.

11. Check the fuel injector compensation code (30 digit alphanumeric value) displayed on the tester screen.
12. Press Save.



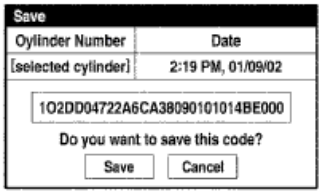
13. Check that the compensation code displayed on the tester screen is correct.
14. Press Save or Replace to save the fuel injector compensation code.

HINT:

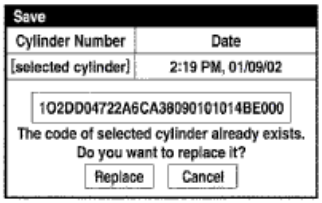
- **The existing compensation code is overwritten with the new compensation code and is deleted from the tester.**
- **The saving process may fail due to a problem with the wire harness or a bad**

connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.

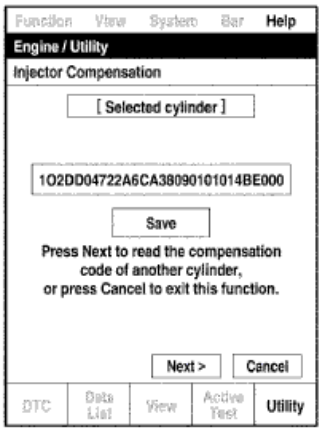
When no fuel injector compensation code for the cylinder exists in the tester:



When another fuel injector compensation code for the cylinder exists in the tester:



15. If you want to read and save other fuel injector compensation codes for other cylinders, press Next to continue. To finish this operation, press Cancel.
16. Turn the engine switch off.
17. Turn the tester off.
18. Replace the ECM.



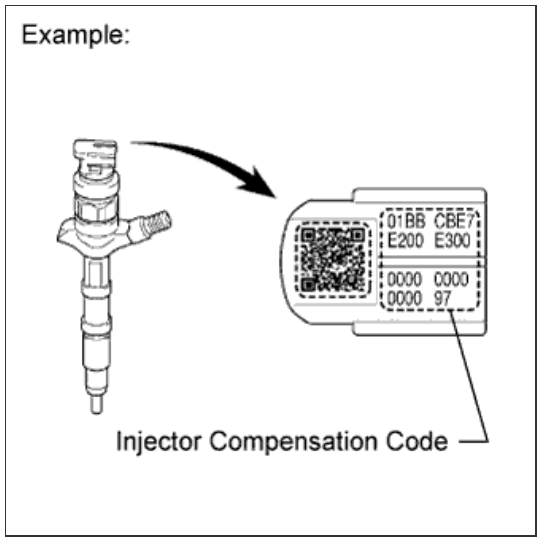
P

19. Connect the intelligent tester to the DLC3.
20. Turn the engine switch on (IG).

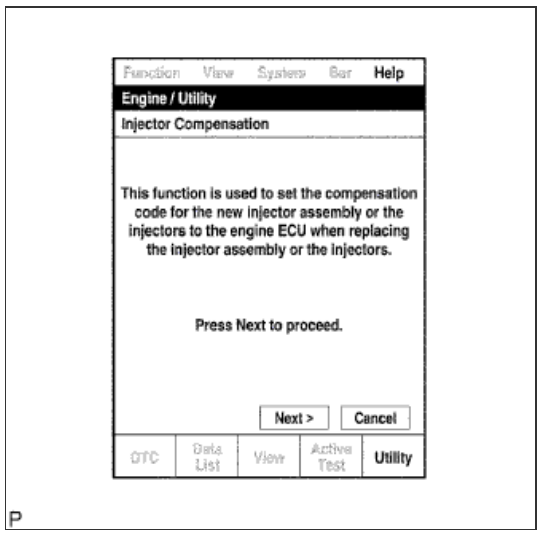
NOTICE:

Do not start the engine.

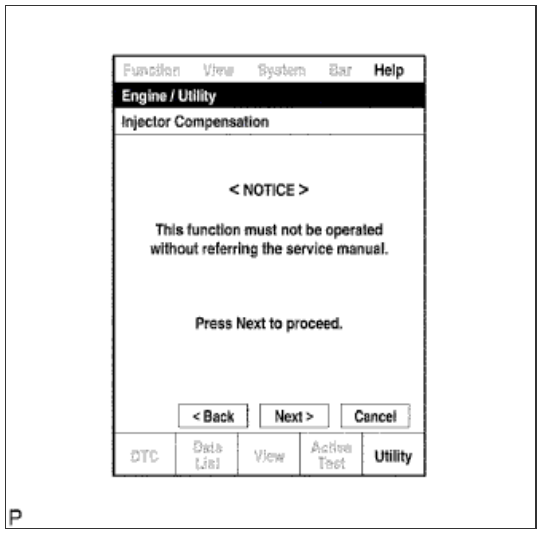
21. Turn the tester on.



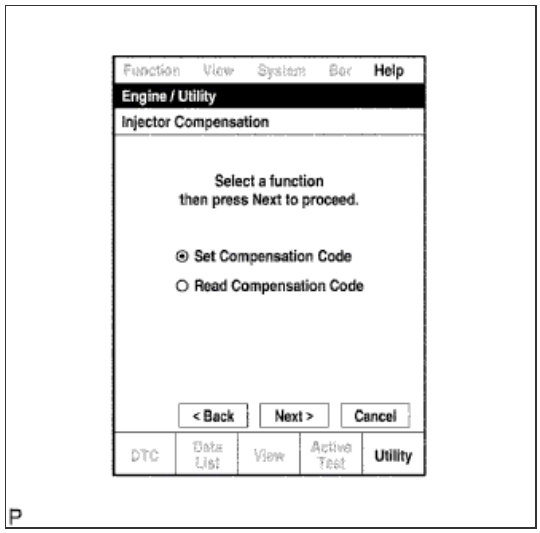
22. Enter the following menus: Powertrain / Engine / Utility / Injector Compensation.
23. Press Next.



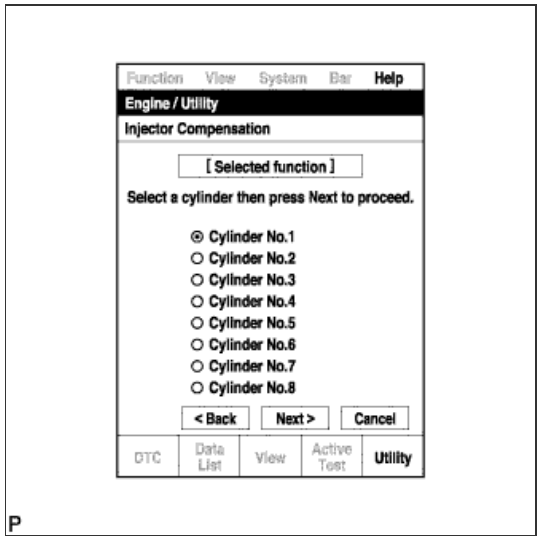
24. Press Next again to proceed.



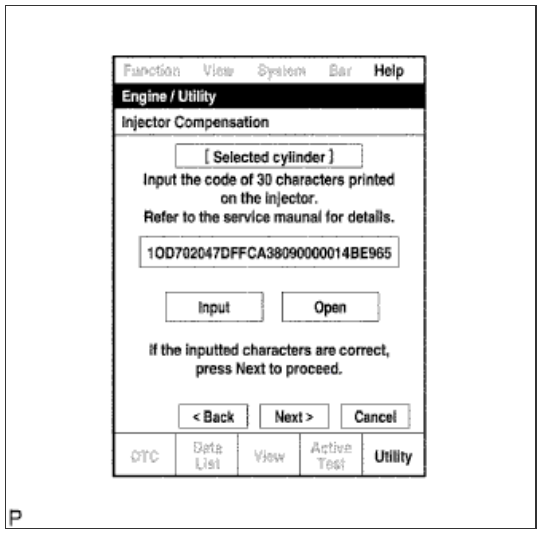
25. Select Set Compensation Code.
26. Press Next.



27. Select the number of the cylinder corresponding to the fuel injector compensation code that you want to read.
28. Press Next.



29. Check that the compensation code displayed on the screen is correct by comparing it with the 30 digit alphanumeric value on the head portion of the fuel injector.



NOTICE:

If an incorrect fuel injector compensation code is input into the ECM, the engine may rattle or engine idling may become rough. In addition, engine failure may occur and the life of the engine may be shortened.

HINT:

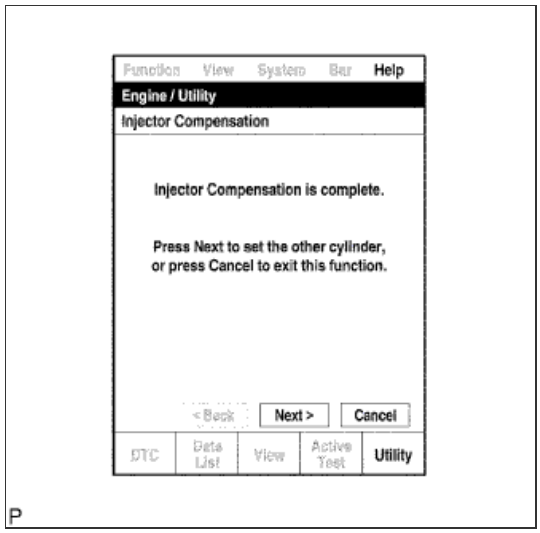
- **If a wrong compensation code is input or read, return to the Input Value screen by pressing input.**
- **The saving process may fail due to a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and repeat this operation.**

30. Press Next to register the compensation code in the ECM.

HINT:

- **If the registration process fails, the compensation code may be incorrect. Check the compensation code again.**
- **If the input compensation code fails to register even though it is input correctly, there may be a problem with the wire harness or a bad connection with the DLC3. Check the wire harness and DLC3 connection. If no problem is found with either, the ECM may be malfunctioning. Check the ECM and restart this operation.**

31. If you want to continue with other compensation code registrations, press Next. To finish the registration, press Cancel.
32. Turn the engine switch off and then turn the tester off.
33. Wait for at least 30 seconds.
34. Turn the engine switch on (IG) and then turn the tester on.
35. Clear DTC P1601 stored in the ECM using the tester.



P

c. FUEL SUPPLY PUMP INITIALIZATION PROCEDURE

HINT:

After replacing the supply pump and/or the ECM, the ECM learned values must be initialized.

The engine can be initialized through the intelligent tester or by connecting DLC3 terminals.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

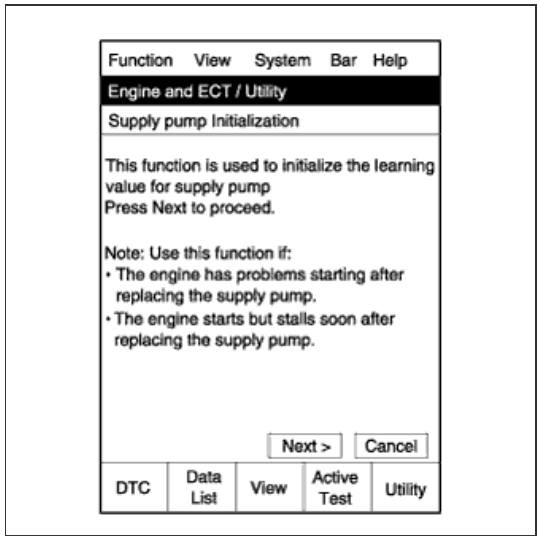
NOTICE:

Do not start the engine.

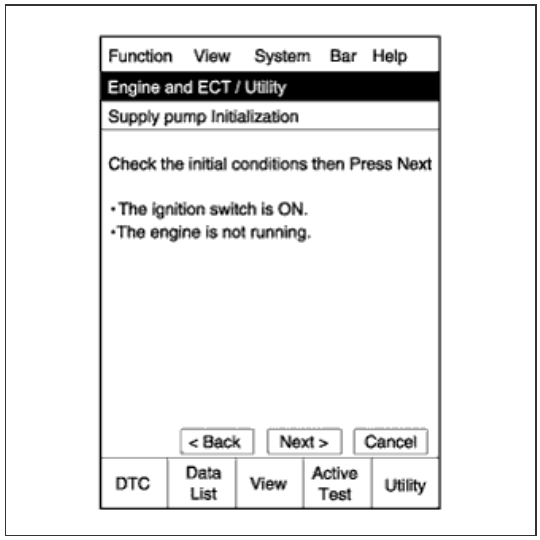
iii. Turn the tester on.

iv. Enter the following menus: Powertrain / Engine / Utility / Supply Pump Initialization.

v. Press "Next".



vi. Press "Next".



vii. Press "Exit".

viii. Start the engine to check if the initialization is complete. If the engine cannot be started, repeat the initialization procedures from the beginning.

ix. Idle the engine for at least 1 minute under the following conditions:

- The engine coolant temperature is 60°C (140°F) or more.
- The fuel temperature is 20°C (68°F) or more.

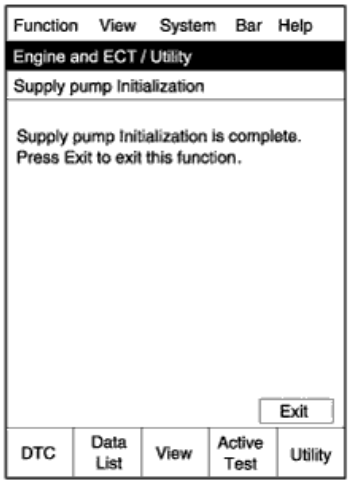
NOTICE:

Do not race the engine immediately after starting the engine. After warming up the engine, racing the engine is acceptable.

HINT:

If the engine coolant temperature is difficult to estimate, use the intelligent tester and enter the following menus: Powertrain / Engine / Data List / Coolant Temp and Fuel Temperature.

x. Initialization is complete.



INITIALIZATION RELATED TO AUTOMATIC TRANSMISSION SYSTEM

a. RESET MEMORY

NOTICE:

- **Perform the Reset Memory (AT initialization) when replacing the automatic transmission assembly, valve body assembly or any of the shift solenoid valves.**
- **The Reset Memory can be performed only with the intelligent tester.**

HINT:

The ECM memorizes the control conditions of the automatic transmission assembly and engine assembly. Therefore, when the automatic transmission assembly, valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

iii. Turn the intelligent tester on.

iv. Enter the following menus: Powertrain / Engine and ECT / Utility / Reset Memory.

NOTICE:

After performing the Reset Memory, be sure to perform the Road Test described earlier.

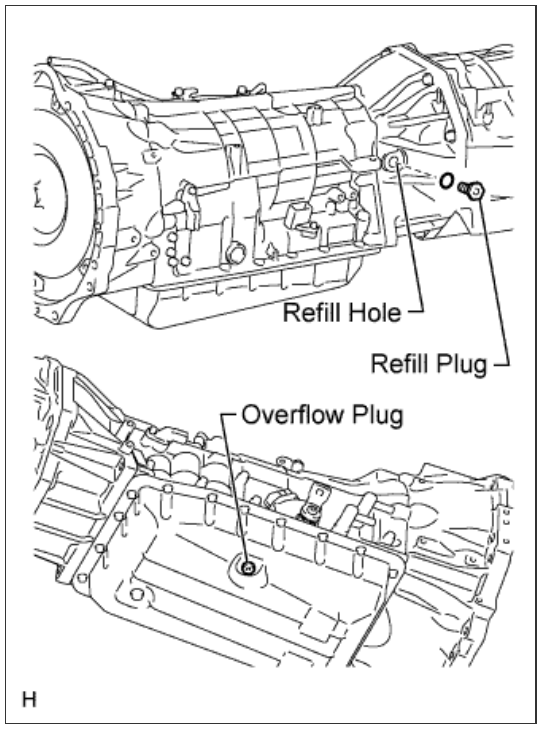
HINT:

The ECM learns through the Road Test.

ADJUSTMENT FOR AUTOMATIC TRANSMISSION FLUID (A750F)

a. BEFORE FILLING TRANSMISSION

- This transmission requires Toyota Genuine ATF WS transmission fluid.
- After servicing the transmission, you must refill the transmission with the correct amount of fluid.
- Keep the vehicle level while adjusting the fluid level.
- Proceed to the "Transmission Pan Fill" procedures if you replaced the entire transmission, transmission pan, drain plug, valve body and/or torque converter.
- Proceed to the "Transmission Fill" procedures after removing the refill plug if you replaced the transmission hose and/or output shaft oil seal.

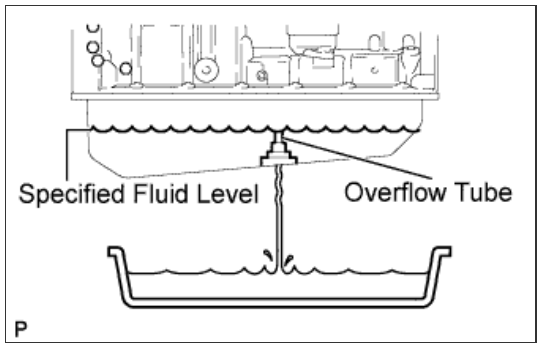


b. TRANSMISSION PAN FILL

i. Remove the refill plug and overflow plug.

ii. Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

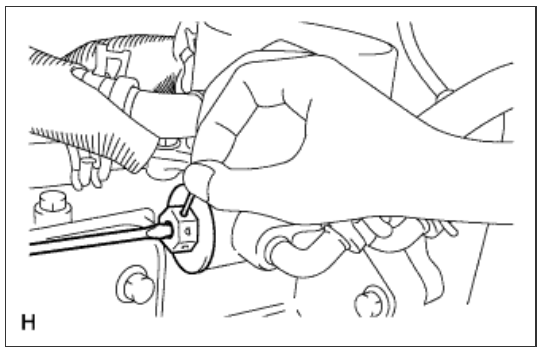
iii. Reinstall the overflow plug.



c. TRANSMISSION FILL

i. w/o Air Cooled Transmission Oil Cooler (w/ ATF Warmer): Push the shaft of the thermostat and fix it in place.

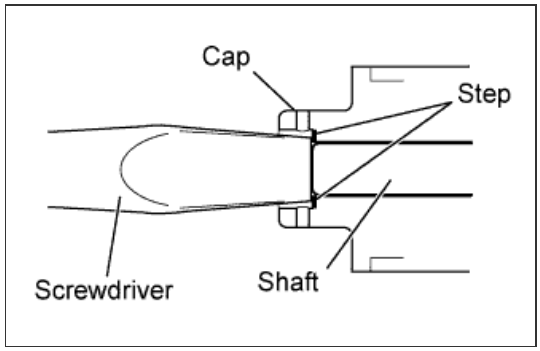
1. By using compressed air, etc., blow dust off of the thermostat cap to clean it.



2. Using a screwdriver, push the shaft of the thermostat.

HINT:

- **Pushed amount: 5.5 to 7.0 mm (0.217 to 0.276 in.)**
- **Push the shaft until the screwdriver contacts the inside step of the cap.**



3. With the shaft of the thermostat pressed, push a pin (diameter: 1.0 to 1.8 mm (0.0394 to 0.0709 in.)) into a hole on the side of the thermostat cap. Insert the pin until it passes through the hole on the other side of the thermostat cap to fix the shaft in place.

ii. Fill the transmission with the amount of fluid listed in the table below.

Standard Capacity:

Repair	Fill Amount
Transmission pan and drain plug removal	1.7 liters (1.8 US qts, 1.5 Imp. qts)
Transmission valve body removal	4.3 liters (4.5 US qts, 3.8 Imp. qts)
Torque converter removal	5.4 liters (5.7 US qts, 4.8 Imp. qts)

iii. Reinstall the refill plug to prevent the fluid from splashing.

HINT:

If you cannot add the listed amount of fluid, do the following:

1. Install the refill plug.
2. Allow the engine to idle with the air conditioning off.
3. Move the shift lever through the entire gear range to circulate fluid.
4. Wait for 30 seconds with the engine idling.
5. Stop the engine.
6. Remove the refill plug and add fluid.
7. Reinstall the refill plug.

d. FLUID CIRCULATION

i. Allow the engine to idle with the air conditioning off.

ii. Move the shift lever through the entire gear range to circulate fluid.

e. ADJUST FLUID TEMPERATURE

NOTICE:

The fluid temperature can be confirmed by checking the indicator light in the meter or by using the intelligent tester. When using the intelligent tester, it is necessary to change to temperature detection mode in order to idle the vehicle appropriately.

i. When using the intelligent tester:

1. Turn the engine switch off.
2. Connect the intelligent tester to the DLC3.
3. Turn the engine switch on (IG).
4. for 1GR-FE:
   Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1.
5. for 2UZ-FE:
   Enter the following menus: Powertrain / ECT / Active Test / Connect the TC and TE1.
6. Enter the following menus: Powertrain / ECT / Data List / A/T Oil Temperature 1.
7. Check the ATF temperature.

   NOTICE:

   - **If the fluid temperature is below 46°C (115°F), proceed to the next step. (Recommended ATF temperature: 38°C (100°F) or less)**
   - **If the fluid temperature is 46°C (115°F) or more, turn the engine switch off and wait until the fluid temperature drops below 46°C (115°F).**

8. According to the display on the intelligent tester, perform the Active Test "Connect the TC and TE1".

   HINT:

   Indicator lights of the meter blink to output DTCs when TC and TE1 are connected.

9. Start the engine.

   NOTICE:

   Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

ii. When not using the intelligent tester:

SST

09843-18040

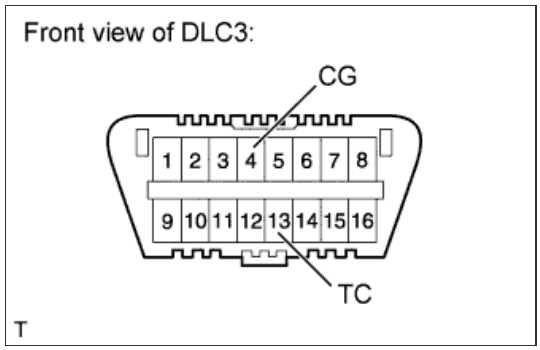
1. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
2. Start the engine.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

HINT:

Indicator lights of the meter blink to output DTCs when terminals TC and CG are connected.



iii. Slowly move the shift lever from P to S, then change the gears from 1st to 6th. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

iv. Move the shift lever to D, and quickly move back and forth between N and D (once within 1.5 seconds) for at least 6 seconds. This will activate the fluid temperature detection mode.

Standard condition:
Indicator light (D) remains illuminated for 2 seconds and then turns off.

v. When using the intelligent tester:

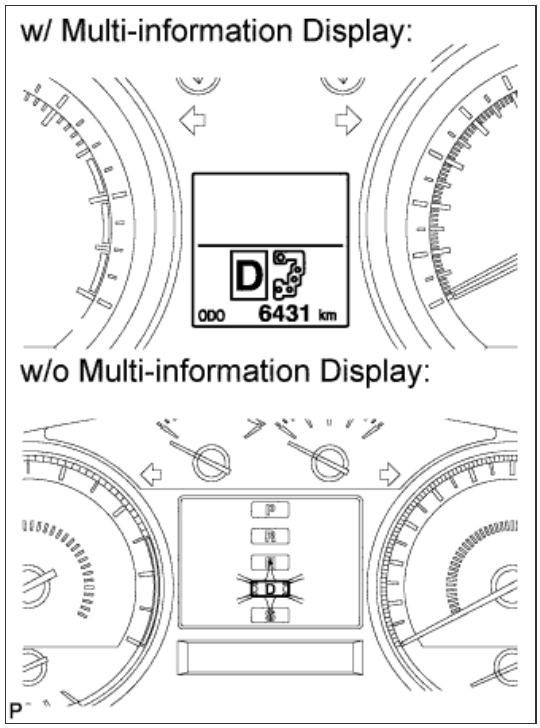
1. Return the shift lever to P and press OFF on the Active Test display.

vi. When not using the intelligent tester:

1. Return the shift lever to P and disconnect terminals 13 (TC) and 4 (CG).

vii. Allow the engine to idle until the fluid temperature reaches 38 to 46°C (100 to 115°F).

viii. The indicator (D) will come on again when the fluid temperature reaches 38°C (100°F) and will blink when it exceeds 46°C (115°F).



Indicator Indication of ATF Temperature:

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data List [A/T Oil Temperature 1] 38°C (100°F) or less	Data List [A/T Oil Temperature 1] 38 to 46°C (100 to 115°F)	Data List [A/T Oil Temperature 1] 46°C (115°F) or higher
Indicator light (D) Turn off	Indicator light (D) Turn on	Indicator light (D) Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.

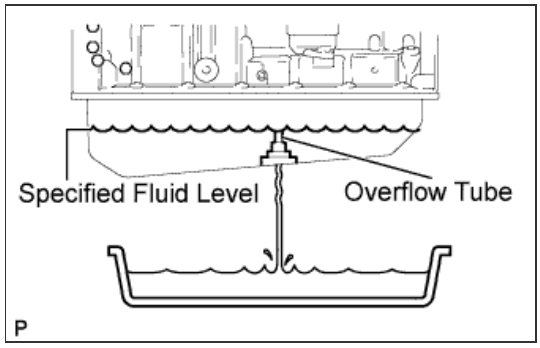
f. FLUID LEVEL CHECK

NOTICE:

The fluid temperature must be between 38 and 46°C (100 and 115°F) to accurately check the fluid level.

i. Remove the overflow plug with the engine idling.

ii. Check that fluid comes out of the overflow tube.
If fluid does not come out, proceed to the "Transmission Refill" procedures.
If fluid comes out, wait until the overflow slows to a trickle and proceed to the "Complete" procedures.



g. TRANSMISSION REFILL

i. Remove the overflow plug.

ii. Remove the refill plug.

iii. Add ATF into the refill hole until ATF flows from the overflow tube.

iv. Wait until the overflow slows to a trickle and proceed to the "COMPLETE" procedures.

h. COMPLETE

i. Install a new gasket and the overflow plug.

Torque:
20 N*m{ 204 kgf*cm , 15 ft.*lbf }

ii. Stop the engine.

iii. Install a new gasket and the refill plug.

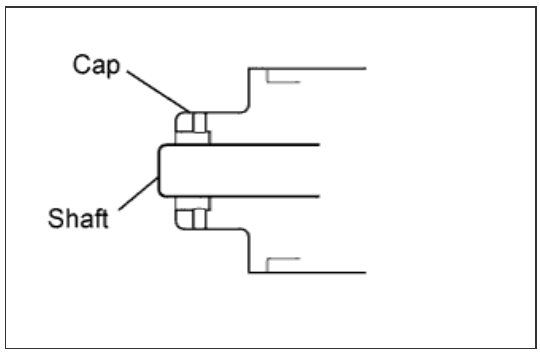
Torque:
39 N*m{ 400 kgf*cm , 29 ft.*lbf }

iv. w/o Air Cooled Transmission Oil Cooler (w/ ATF Warmer):

1. Remove the pin.

NOTICE:

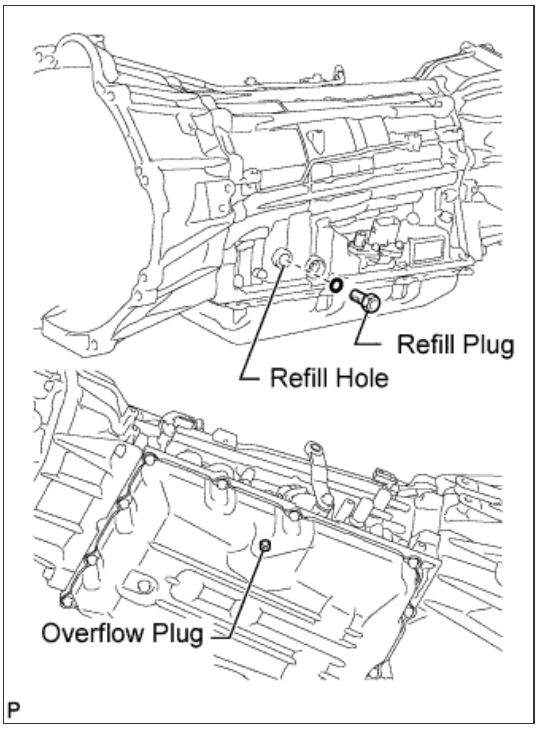
- **Make sure the shaft of the thermostat is protruding from the hole of the cap.**
- **Check that there is no ATF leaking from the cap hole.**



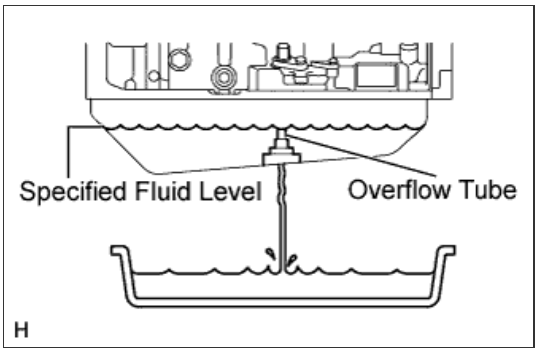
ADJUSTMENT FOR AUTOMATIC TRANSMISSION FLUID (AB60F)

a. BEFORE FILLING TRANSMISSION

- This transmission requires Toyota Genuine ATF WS transmission fluid.
- After servicing the transmission, you must refill the transmission with the correct amount of fluid.
- Keep the vehicle level while adjusting the fluid level.
- Proceed to the "Transmission Pan Fill" procedures if you replaced the entire transmission, transmission pan, drain plug, valve body and/or torque converter.
- Proceed to the "Transmission Fill" procedures after removing the refill plug if you replaced the transmission hose and/or output shaft oil seal.



b. TRANSMISSION PAN FILL



i. Remove the refill plug and overflow plug.

ii. Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

iii. Reinstall the overflow plug.

c. TRANSMISSION FILL

i. Fill the transmission with the amount of fluid listed in the table below.

Standard Capacity:

Repair	Fill Amount
Transmission pan and drain plug removal	2.1 liters (2.2 US qts, 1.9 Imp. qts)
Transmission valve body removal	4.7 liters (5.0 US qts, 4.1 Imp. qts)
Torque converter removal	6.1 liters (6.4 US qts, 5.4 Imp. qts)

ii. Reinstall the refill plug to prevent the fluid from splashing.

HINT:

If you cannot add the listed amount of fluid, do the following:

1. Install the refill plug.
2. Allow the engine to idle with the air conditioning OFF.
3. Move the shift lever through the entire gear range to circulate fluid.
4. Wait for 30 seconds with the engine idling.
5. Stop the engine.
6. Remove the refill plug and add fluid.
7. Reinstall the refill plug.

d. ADJUST FLUID TEMPERATURE

NOTICE:

The fluid temperature can be confirmed by checking the indicator light in the meter or by using the Techstream. When using the Techstream, it is necessary to change to temperature detection mode in order to idle the vehicle appropriately.

i. When using the intelligent tester:

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1. Turn the engine switch off.
2. Connect the intelligent tester to the DLC3.
3. Turn the engine switch on (IG).
4. Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1.
5. Enter the following menus: Powertrain / Engine and ECT / Data List / A/T Oil Temperature 1.
6. for 1VD-FTV:
   Check the ATF temperature.

   NOTICE:

   - **The ATF temperature must be between 41 to 46°C (106 to 115°F).**
   - **If the ATF temperature is not between 41 to 46°C (106 to 115°F), turn the engine switch off and wait until the fluid temperature drops between 41 to 46°C (106 to 115°F).**

7. for 3UR-FE:
   Check the ATF temperature.

   NOTICE:

   - **The ATF temperature must be between 43 to 48°C (109 to 118°F).**
   - **If the ATF temperature is not between 43 to 48°C (109 to 118°F), turn the engine switch off and wait until the fluid temperature drops between 43 to 48°C (109 to 118°F).**

8. According to the display on the intelligent tester, perform the Active Test "Connect the TC and TE1".

   HINT:

   Indicator lights of the combination meter blink to output DTCs when TC and TE1 are connected.

9. Start the engine.

   NOTICE:

   Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

ii. When not using the intelligent tester:

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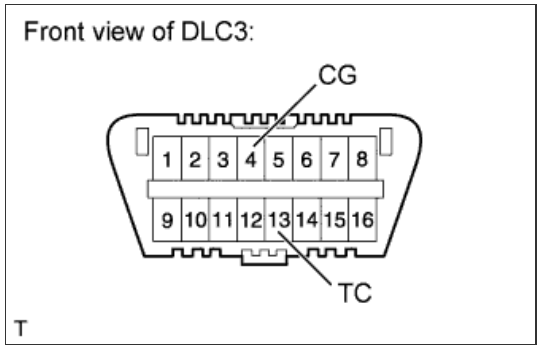
1. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
2. Start the engine.

   NOTICE:

   Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

   HINT:

   Indicator lights of the meter blink to output DTCs when terminals TC and CG are connected.



iii. Slowly move the shift lever from P to S, then change the gears from 1st to 6th. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

iv. Move the shift lever to D, and quickly move back and forth between N and D (once within 1.5 seconds) for at least 6 seconds. This will activate the fluid temperature detection mode.

Standard condition:
Indicator light (D) remains illuminated for 2 seconds and then turns off.

v. When using the intelligent tester:

1. Return the shift lever to P and press OFF on the Active

Test display.

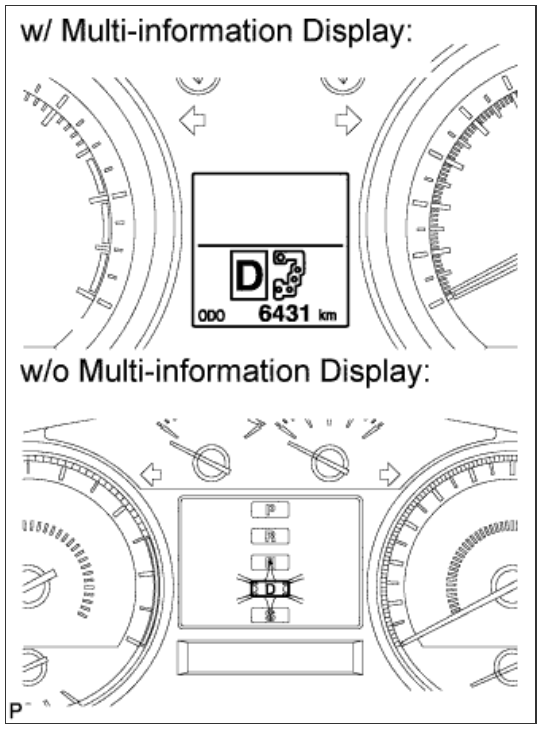
vi. When not using the intelligent tester:

1. Return the shift lever to P and disconnect terminals 13 (TC) and 4 (CG).

vii. for 1VD-FTV:
Allow the engine to idle until the fluid temperature reaches 41 to 46°C (106 to 115°F).

viii. for 3UR-FE:
Allow the engine to idle until the fluid temperature reaches 43 to 48°C (109 to 118°F).

ix. for 1VD-FTV:
The indicator (D) will come on again when the fluid temperature reaches 41°C (106°F) and will blink when it exceeds 46°C (115°F).



Indicator Indication of ATF Temperature:

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data List [A/T Oil Temperature 1] 41°C (106°F) or less	Data List [A/T Oil Temperature 1] 41 to 46°C (106 to 115°F)	Data List [A/T Oil Temperature 1] 46°C (115°F) or higher
Indicator light (D) Turn off	Indicator light (D) Turn on	Indicator light (D) Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.

x. for 3UR-FE:
The indicator (D) will come on again when the fluid temperature reaches 43°C (109°F) and will blink when it exceeds 48°C (118°F).

Indicator Indication of ATF Temperature:

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data List [A/T Oil Temperature 1] 43°C (109°F) or less	Data List [A/T Oil Temperature 1] 43 to 48°C (109 to 118°F)	Data List [A/T Oil Temperature 1] 48°C (118°F) or higher
Indicator light (D) Turn off	Indicator light (D) Turn on	Indicator light (D) Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.

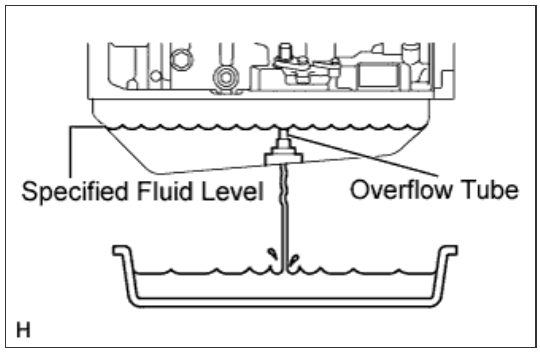
e. FLUID LEVEL CHECK

NOTICE:

- **for 1VD-FTV:**
  The fluid temperature must be between 41 and 46°C (106 and 115°F) to accurately check the fluid level.
- **for 3UR-FE:**
  The fluid temperature must be between 43 and 48°C (109 and 118°F) to accurately check the fluid level.

i. Remove the overflow plug with the engine idling.

ii. Check that fluid comes out of the overflow tube.
If fluid does not come out, proceed to the "Transmission Refill" procedures.
If fluid comes out, wait until the overflow slows to a trickle and proceed to the "Complete" procedures.



f. TRANSMISSION REFILL

i. Remove the overflow plug.

ii. Remove the refill plug and gasket.

iii. Add ATF into the refill hole until ATF flows from the overflow tube.

iv. Wait until the overflow slows to a trickle and proceed to the "Complete" procedures.

g. COMPLETE

i. Install a new gasket and the overflow plug.

Torque:
20 N*m{ 204 kgf*cm , 15 ft.*lbf }

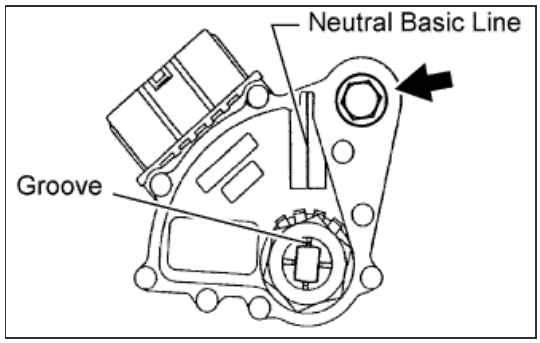
ii. Stop the engine.

iii. Install a new gasket and the refill plug.

Torque:
39 N*m{ 400 kgf*cm , 29 ft.*lbf }

ADJUSTMENT FOR PARK/NEUTRAL POSITION SWITCH (for AUTOMATIC TRANSMISSION)

a. ADJUST PARK/NEUTRAL POSITION SWITCH ASSEMBLY



i. Loosen the bolt of the park/neutral position switch and move the shift lever to N.

ii. Align the groove with the neutral basic line.

iii. Hold the switch in the position described above and tighten the bolt.

Torque:
13 N*m{ 130 kgf*cm , 10 ft.*lbf }

iv. After the adjustment, perform the on-vehicle inspection.

ADJUSTMENT FOR CLUTCH (for LHD)

a. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY

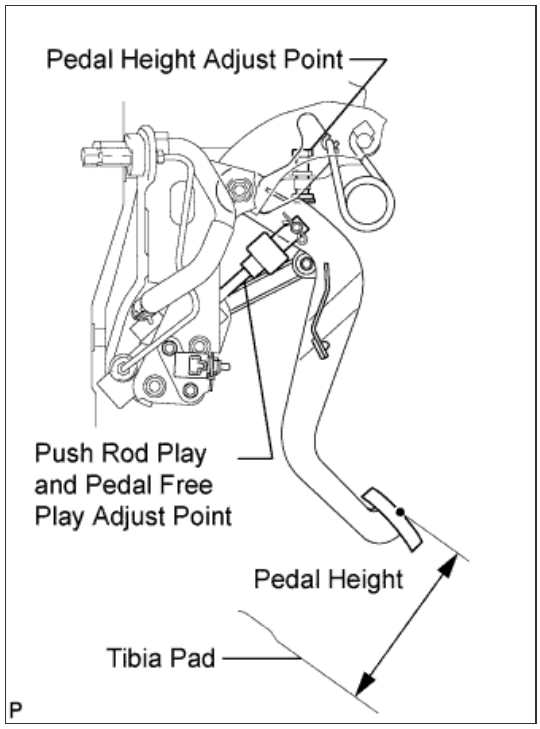
i. Check that the clutch pedal height is correct.

Standard Clutch Pedal Height from Tibia Pad:
162.7 to 172.7 mm (6.41 to 6.79 in.)

ii. Adjust the clutch pedal height.

1. Loosen the lock nut and turn the stopper bolt or clutch switch until the height is correct. Tighten the lock nut.

Torque:
16 N*m{ 160 kgf*cm , 12 ft.*lbf }



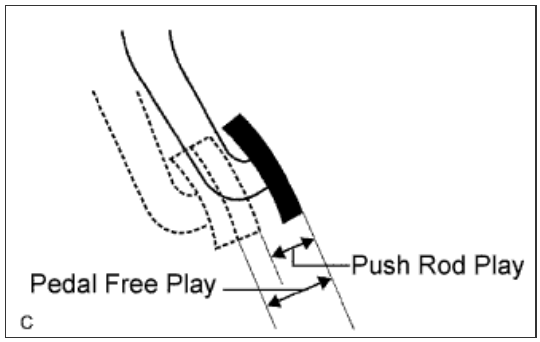
iii. Check that the clutch pedal free play and push rod play are correct.

1. Depress the clutch pedal until the clutch resistance begins to be felt.

   Standard Pedal Free Play:
   5.0 to 15.0 mm (0.197 to 0.591 in.)

2. Gently depress the clutch pedal until the resistance begins to increase a little.

   Standard Push Rod Play at Pedal Top:
   1.0 to 5.0 mm (0.0394 to 0.197 in.)



iv. Adjust the clutch pedal free play and push rod play.

1. Loosen the lock nut and turn the clutch push rod until the clutch pedal free play and push rod play are correct.
2. Tighten the lock nut.
3. After adjusting the clutch pedal free play and push rod play, check the clutch pedal height.

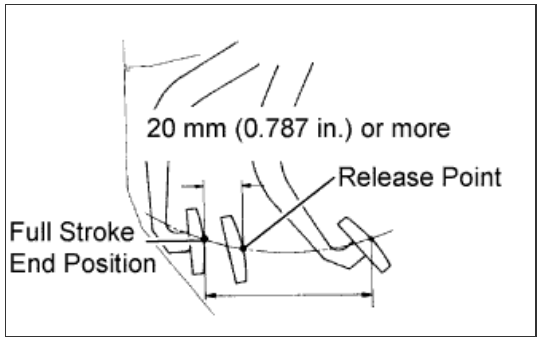
   Standard Clutch Pedal Height from Tibia Pad:
   162.7 to 172.7 mm (6.41 to 6.79 in.)

Torque:
12 N*m{ 120 kgf*cm , 9 ft.*lbf }

v. Check the clutch release point.

1. Pull the parking brake lever and chock the wheels.
2. Start the engine and allow it to idle.
3. Without depressing the clutch pedal, slowly move the shift lever to R until the gears engage.
4. Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops (release point) up to the full stroke end position.

   Standard Distance from Pedal Stroke End Position to Release Point:
   20 mm (0.787 in.) or more



If the distance is not as specified, perform the following operations:

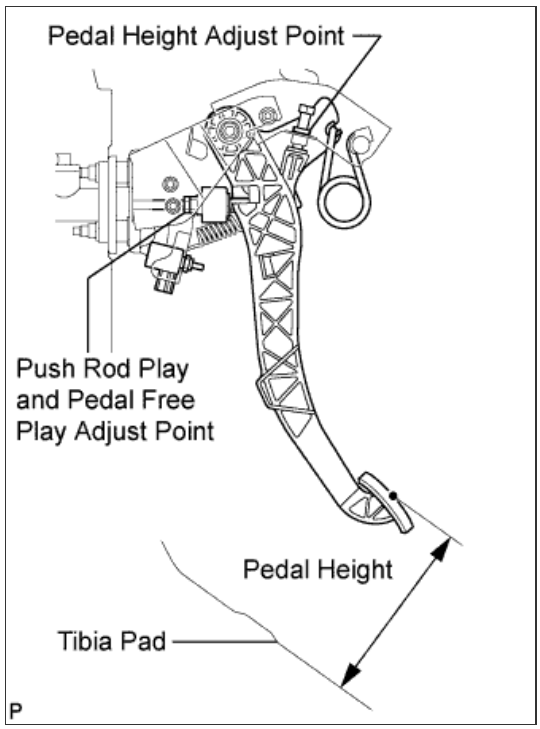
- Check the clutch pedal height.
- Check the push rod play and pedal free play.
- Bleed the clutch line.
- Check the clutch cover and disc.

ADJUSTMENT FOR CLUTCH (for RHD)

a. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY

i. Check that the clutch pedal height is correct.

Standard Clutch Pedal Height from Tibia Pad:
164.8 to 174.8 mm (6.49 to 6.88 in.)



ii. Adjust the clutch pedal height.

1. Loosen the lock nut and turn the stopper bolt or clutch switch until the height is correct. Tighten the lock nut.

Torque:
16 N*m{ 160 kgf*cm , 12 ft.*lbf }

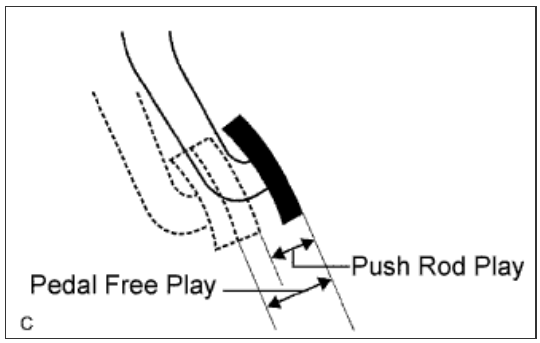
iii. Check that the clutch pedal free play and push rod play are correct.

1. Depress the clutch pedal until the clutch resistance begins to be felt.

Standard Clutch Pedal Free Play:
5.0 to 15.0 mm (0.197 to 0.591 in.)

2. Gently depress the clutch pedal until the resistance begins to increase a little.

Standard Push Rod Play at Pedal Top:
1.0 to 5.0 mm (0.0394 to 0.197 in.)



iv. Adjust the clutch pedal free play and push rod play.

1. Loosen the lock nut and turn the push rod until the clutch pedal free play and push rod play are correct.
2. Tighten the lock nut.
3. After adjusting the clutch pedal free play and push rod play, check the clutch pedal height.

Standard Clutch Pedal Height from Tibia Pad:
164.8 to 174.8 mm (6.49 to 6.88 in.)

Torque:
12 N*m{ 120 kgf*cm , 9 ft.*lbf }

v. Check the clutch release point.

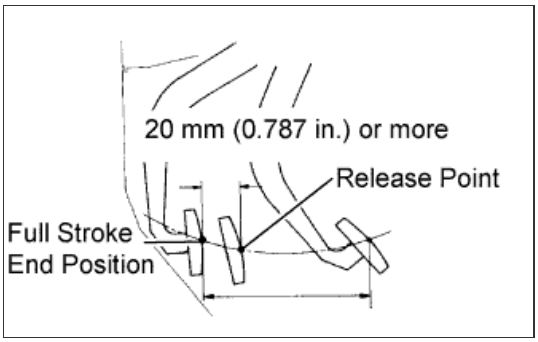
1. Pull the parking brake lever and chock the wheels.
2. Start the engine and allow it to idle.
3. Without depressing the clutch pedal, slowly move the shift lever to R until the gears engage.
4. Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops

(release point) up to the full stroke end position.

Standard Distance from Pedal Stroke End Position to Release Point:
20 mm (0.787 in.) or more

If the distance is not as specified, perform the following operations:

- Check the clutch pedal height.
- Check the push rod play and pedal free play.
- Bleed the clutch line.
- Check the clutch cover and disc.



INITIALIZATION RELATED TO SUSPENSION CONTROL

HINT:

If replacing the suspension control ECU and/or height control sensor, perform the vehicle height offset calibration.

a. PERFORM VEHICLE HEIGHT INSPECTION

i. Adjust the pressure of the tires.

ii. Stabilize the suspension by releasing the parking brake and bouncing the corners of the vehicle up and down.

iii. Start the engine.

iv. Perform the following operation twice:
Set the vehicle height to LO with the height control switch, and then return the vehicle height to NORMAL.

v. Turn the engine switch off.

vi. Connect the intelligent tester to the DLC3.

vii. Move the shift lever to N and move the vehicle forward and rearward.

viii. Turn the engine switch on (IG) and the tester on.

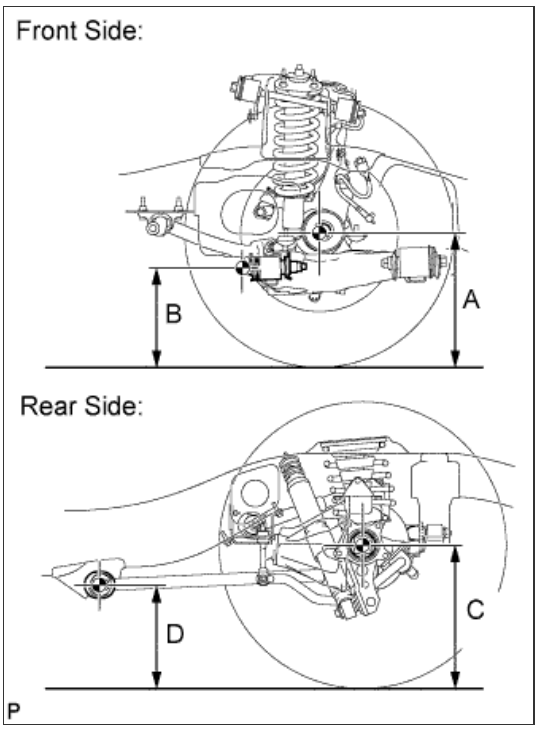
ix. Check that the vehicle height is NORMAL.

HINT:

The N of the multi-information display height control indicator in the combination meter turns on.

x. Perform the vehicle height inspection.

Measuring points:
A:
Ground clearance of front wheel center
B:
Ground clearance of the front adjusting cam bolt center
C:
Ground clearance of the rear axle shaft center
D:
Ground clearance of the rear lower control arm front side center



Standard vehicle height:

Front (A minus B)	Rear (C minus D)
101 mm (3.98 in.)	94 mm (3.70 in.)

xi. Using a jack, set the vehicle to the standard vehicle height and eliminate any difference in height between the left and right sides of the vehicle.

NOTICE:

The vehicle height may be outside the calibration range if there is a difference in height between the left and right sides of the vehicle.

xii. Using the intelligent tester, enter the following menus: Chassis / AHC / Data List. Then read and record the values for "After Height Adjust" and "Height Adjust" for each wheel.

AHC

Tester Display	Measurement Item/Range	Normal Condition	Diagnosis Note
FR Height Adjust	Display of vehicle height offset recorded value of front right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FL Height Adjust	Display of vehicle height offset recorded value of front left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RR Height Adjust	Display of vehicle height offset recorded value of rear right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RL Height Adjust	Display of vehicle height offset recorded value of rear left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FR After Height Adjust	Display of after-calibration vehicle height value of front right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
FL After Height Adjust	Display of after-calibration vehicle height value of front left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RR After Height Adjust	Display of after-calibration vehicle height value of rear right wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-
RL After Height Adjust	Display of after-calibration vehicle height value of rear left wheel / min.: -3276.8 mm (-129 in.) max.: 3276.7 mm (129 in.)	-	-

xiii. Turn the engine switch off.

b. PERFORM VEHICLE HEIGHT OFFSET CALIBRATION

NOTICE:

- **The possible vehicle height automatic adjustment value is 20 mm (0.787 in.). If the "Height Adjust value + (Standard value - Measurement value - After Height Adjust value)" is 20 mm (0.787 in.) or more, first perform the vehicle height adjustment for the front side and for the rear side.**
- **Make sure that the pressure of the tires is normal.**
- **Make sure that the vehicle is empty.**
- **Make sure that the parking brake is released and that the shift lever is in N.**

i. Turn the engine switch off.

ii. Connect the intelligent tester to the DLC3.

iii. Turn the engine switch on (IG) and the tester on.

iv. Enter the following menus: Chassis / AHC / Utility / Height offset.

v. For each wheel, follow the instructions on the tester screen and input the input value to complete the vehicle height offset calibration.

HINT:

Input value = Measurement value and standard value

vi. Remove the jack.

vii. Start the engine.

viii. Set the vehicle height to LO and check that LO of the multi-information display height control indicator stops blinking and illuminates.

ix. Set the vehicle height to NORMAL and check that N of the height control indicator stops blinking and illuminates.

x. Turn the engine switch off.

xi. Perform the vehicle height inspection. Check that the result is within +/-8 mm (+/-0.315 in.) of the standard value.

xii. Perform yaw rate and G sensor zero point calibration.

CALIBRATION RELATED TO VEHICLE STABILITY CONTROL SYSTEM

a. DESCRIPTION
After replacing the relevant VSC components, clear the sensor calibration data and perform calibration.

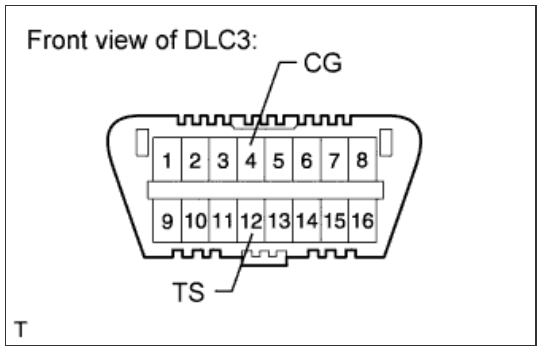
Replacement/Adjustment Part	Necessary Operation
Master cylinder solenoid (Skid control ECU)	Yaw rate and G sensor zero point calibration
Yaw rate and G sensor	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration

b. CLEAR ZERO POINT CALIBRATION (SST CHECK WIRE)
After replacing the yaw rate and G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

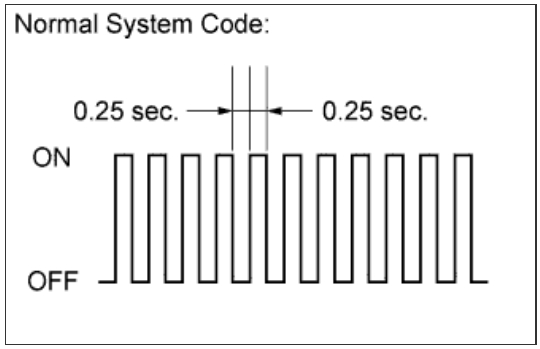
i. Turn the engine switch on (IG).

ii. Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

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iii. Check that "DIAG VSC OK" is displayed on the multi-information display and check that the ABS warning light outputs the normal system code.



iv. Using a check wire, perform zero point calibration of the yaw rate and G sensor.

c. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (SST CHECK WIRE)
After replacing the master cylinder solenoid and/or yaw rate and G sensor, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

i. Procedures for Test Mode:

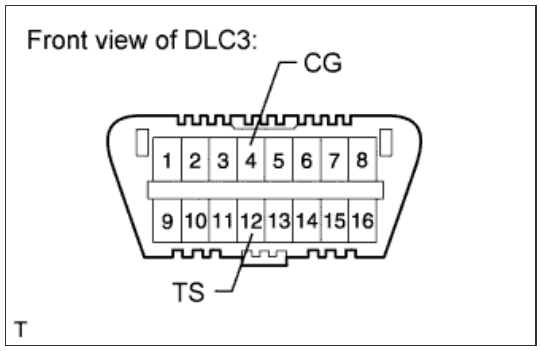
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1. Turn the engine switch off.
2. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P.

3. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
4. Check that the steering wheel is centered.
5. Turn the engine switch on (IG).
6. Keep the vehicle stationary on a level surface for 2 seconds or more.



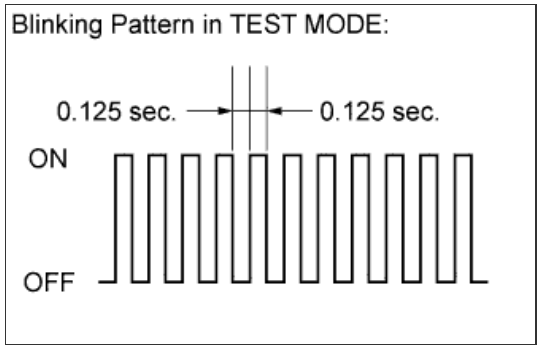
7. Check that "VSC TEST MODE" is displayed on the multi-information display and check that the ABS warning light is blinking in test mode.

NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:

- **If the ABS warning light does not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**



d. CLEAR ZERO POINT CALIBRATION (INTELLIGENT TESTER)
After replacing the yaw rate and G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

i. Connect the intelligent tester to the DLC3.

ii. Turn the engine switch on (IG).

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Reset Memory.

v. Using the intelligent tester, perform zero point calibration of the yaw rate and G sensor.

e. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (INTELLIGENT TESTER)
After replacing the master cylinder solenoid and/or yaw rate and G sensor, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

i. Procedures for Test Mode:

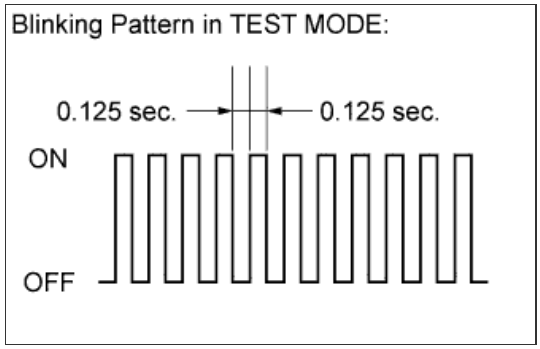
1. Turn the engine switch off.
2. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P.

3. Check that the steering wheel is centered.
4. Connect the intelligent tester to the DLC3.
5. Turn the engine switch on (IG).
6. Turn the intelligent tester on.
7. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Test Mode.
8. Keep the vehicle stationary on a level surface for 2 seconds or more.

9. Check that "VSC TEST MODE" is displayed on the multi-information display and check that the ABS warning light is blinking in test mode.



NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:

- **If the ABS warning light does not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**

ADJUSTMENT FOR BREAK PEDAL

a. CHECK BRAKE PEDAL HEIGHT

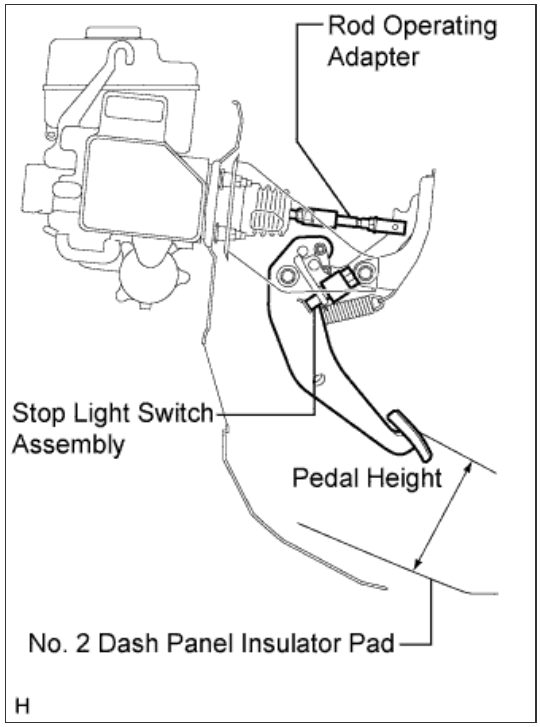
i. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
147.1 to 157.1 mm (5.80 to 6.18 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, adjust the rod operating adapter length.



ii. Adjust the rod operating adapter length.

1. Remove the clip and clevis pin.
2. Loosen the clevis lock nut.
3. Adjust the rod operating adapter length by turning the pedal push rod clevis.

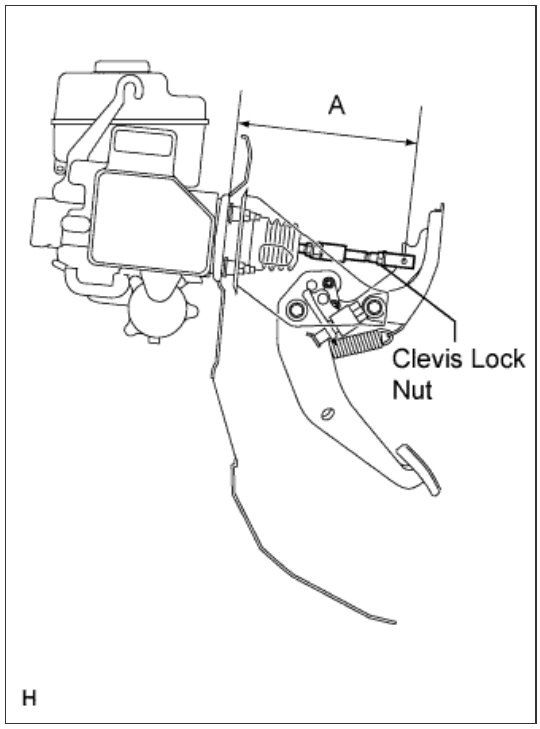
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

4. Tighten the clevis lock nut.
5. Set the master cylinder push rod clevis in place, insert the

push rod pin from the outside of the vehicle and then install a new clip.
If the pedal height is incorrect even if the rod operating adapter is adjusted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.

- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }



b. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

If the pedal height is incorrect, check and adjust the stop light switch clearance.

i. Disconnect the stop light switch assembly connector from the stop light switch assembly.

ii. Turn the stop light switch assembly counterclockwise and remove the stop light switch assembly.

iii. Insert the stop light switch assembly until the body hits the brake pedal bracket.

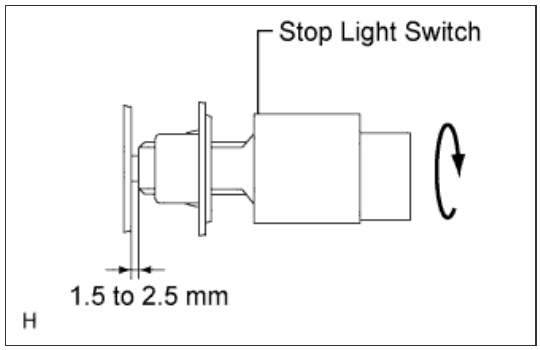
NOTICE:

When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.

iv. Turn the stop light switch assembly a quarter turn clockwise to install it.

HINT:

Turning the stop light switch assembly counterclockwise loosens the switch.



v. Connect the stop light switch connector to the stop light switch assembly.

vi. Check the protrusion of the rod.

Standard Rod Protrusion:
1.5 to 2.5 mm (0.0591 to 0.0984 in.)

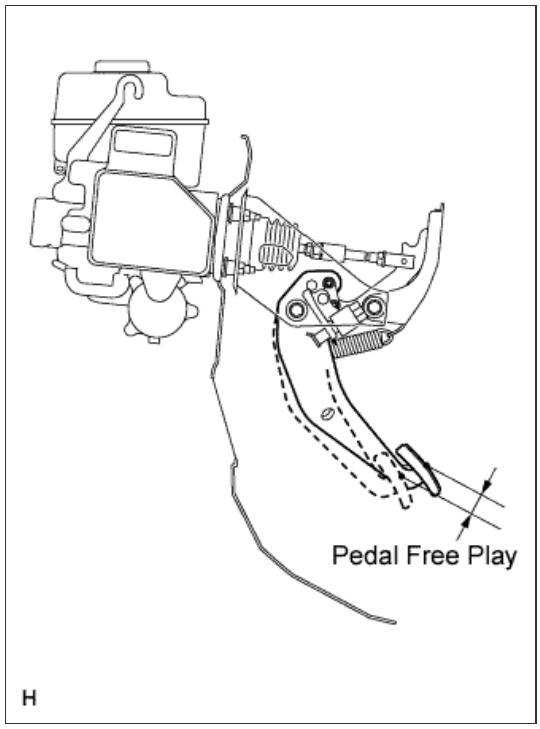
vii. After adjusting the pedal height, check the pedal free play.

c. CHECK PEDAL FREE PLAY

i. Push in the pedal until the beginning of the resistance is felt. Measure

the distance as shown in the illustration.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

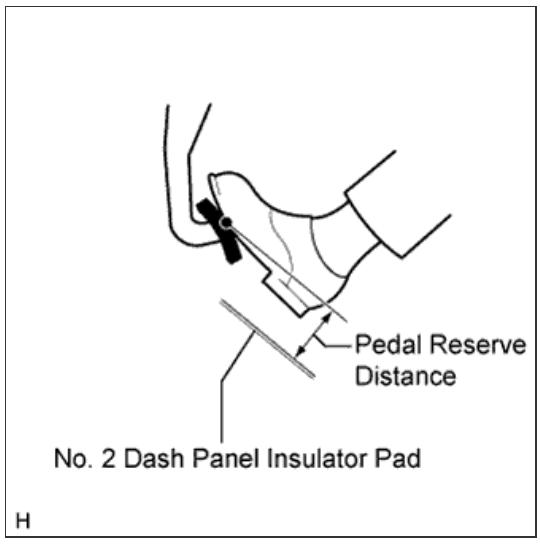


d. CHECK PEDAL RESERVE DISTANCE

i. Release the parking brake lever.
With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67 mm (2.64 in.)

If incorrect, troubleshoot the brake system.



ADJUSTMENT FOR PARKING BREAK SYSTEM

a. INSPECT PARKING BRAKE LEVER TRAVEL

i. Fully pull the parking brake lever to engage the parking brake.

ii. Release the lever to disengage the parking brake.

iii. Slowly pull the parking brake lever all the way, and count the number of clicks

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

If the parking brake lever travel is not as specified, adjust the parking brake shoe clearance and parking brake lever travel.

b. REMOVE REAR WHEEL

c. ADJUST PARKING BRAKE LEVER TRAVEL

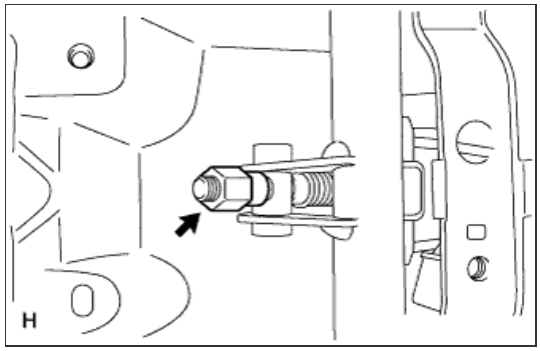
i. Remove the console cup holder box sub-assembly.

ii. Completely release the parking brake lever.

iii. Loosen the adjusting nut to completely release the parking brake cable.

iv. Temporarily install the hub nuts.

v. Remove the hole plug.

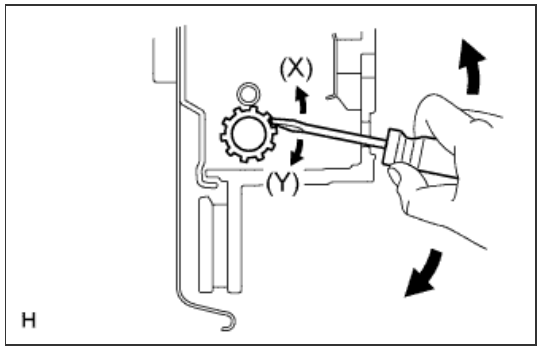


vi. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

vii. Check that the disc can be rotated lightly. If not, rotate the adjustment wheel in the "Y" direction and check again.

viii. Install the hole plug.

ix. Remove the hub nuts.

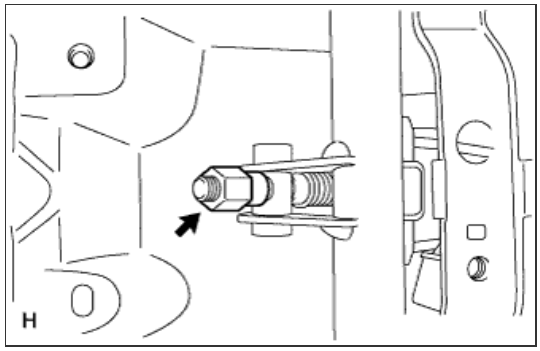


x. Turn the adjusting nut until the parking brake lever travel becomes correct.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

xi. Operate the parking brake lever 3 to 4 times, and check the parking brake lever travel.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks



xii. Check whether the parking brake drags or not.

xiii. When operating the parking brake lever, check that the brake warning light comes on.

Standard Condition:
The brake warning light always illuminates at the first click.

xiv. Install the console cup holder box sub-assembly.

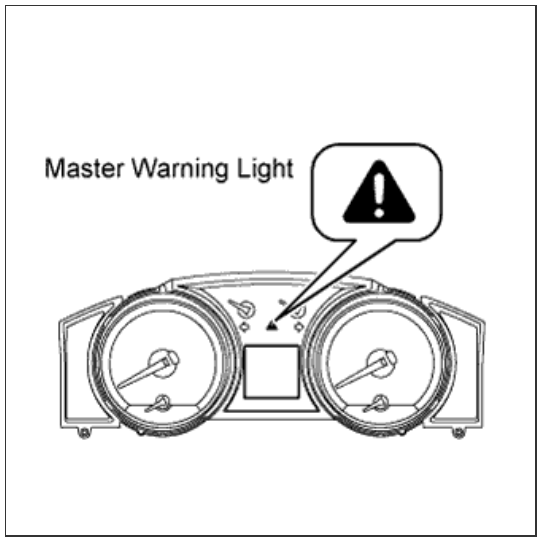
d. INSTALL REAR WHEEL

Torque:
131 N*m{ 1,336 kgf*cm , 97 ft.*lbf }

INITIALIZATION RELATED TO VGRS SYSTEM

a. STEERING ANGLE SENSOR INITIALIZATION (to obtain a tire angle (during straight-ahead driving) signal)

i. Turn the engine switch on (IG), and check that the master warning light illuminates for a few seconds.



NOTICE:

If the warning light remains on, repair the applicable system.

ii. Drive the vehicle on a straight road at 35 km/h (22 mph) or more for 5 seconds or more.

HINT:

- **At this point, the steering wheel will still remain off-center by 5 to 10°.**
- **In this step, the neutral position of the steering wheel is restored from the steering control ECU memory.**

iii. Confirm that steering angle sensor initialization is completed (using the tester).

1. Enter the VGRS menu using the tester. Select "Straight Angle Valid Flag" from "Data List". Check if the steering angle sensor has obtained a tire angle (during straight-ahead driving) signal.

Standard:
"Valid" is displayed on the tester screen.

iv. Confirm that steering angle sensor initialization is completed (not using the tester).

1. Stop the vehicle (engine running).
2. Slowly turn the steering wheel from lock to lock.
3. If it turns approximately 2.7 turns, steering angle sensor initialization is completed. If it turns approximately 3.2 turns, steering angle sensor initialization is not completed.

NOTICE:

If the steering wheel turns approximately 3.2 turns, drive the vehicle on a straight road at 35 km/h (22 mph) or more for 5 seconds or more. Then confirm the initialization again.

b. VGRS SYSTEM CALIBRATION PROCEDURE (WHEN USING SST CHECK WIRE)

NOTICE:

Use this procedure to center the steering wheel if:

- **The steering actuator assembly has been replaced.**
- **The steering control ECU has been replaced.**
- **The steering column or steering intermediate shaft has been disconnected.**
- **The steering wheel is still off-center after completing the steering angle sensor initialization.**

i. FACE TIRES STRAIGHT AHEAD (Procedure A)

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

ii. CHECK DTC (Procedure B)

1. Check for DTCs.

Result

Result	Proceed to
DTC C1591/51 is not output	Procedure C
DTC C1591/51 is output	Procedure D

iii. PERFORM ACTUATOR ANGLE INITIALIZATION (Procedure C)

SST
09843-18040

NOTICE:

If the procedures from *1 to *2 are not completed within 1 minute, or if errors are made during these procedures, perform the initialization again from the beginning.

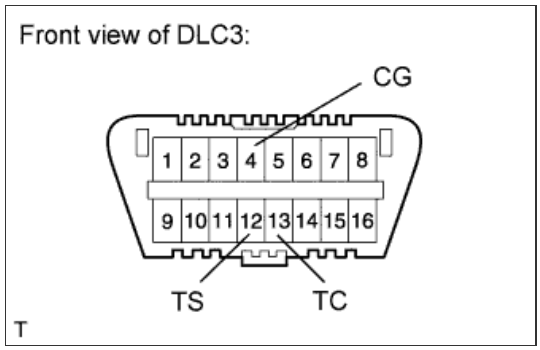
1. Start the engine.
2. Center the steering wheel.
3. Using SST, connect terminals 12 (TS) and 4 (CG), and 13

(TC) and 4 (CG) of the DLC3.*1
4. Disconnect SST from terminal 12 (TS) of the DLC3, and turn the steering wheel to the left 180° or more.
5. Connect SST to terminal 12 (TS) of the DLC3.
6. Disconnect SST from terminal 13 (TC) of the DLC3, and turn the steering wheel to the right 180° or more.
7. Connect SST to terminal 13 (TC) of the DLC3.*2

HINT:

If the master warning light comes on, DTC C1591/51 is stored.

8. Disconnect SST from the DLC3.
9. Turn the engine switch off.



iv. FACE TIRES STRAIGHT AHEAD (Procedure D)

1. Confirm that the steering wheel is centered when facing the tires straight ahead.

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

Result

Result	Proceed to
Steering wheel is off-center	Procedure E
Steering wheel is centered	Procedure H

v. UNLOCK STEERING ACTUATOR (Procedure E)

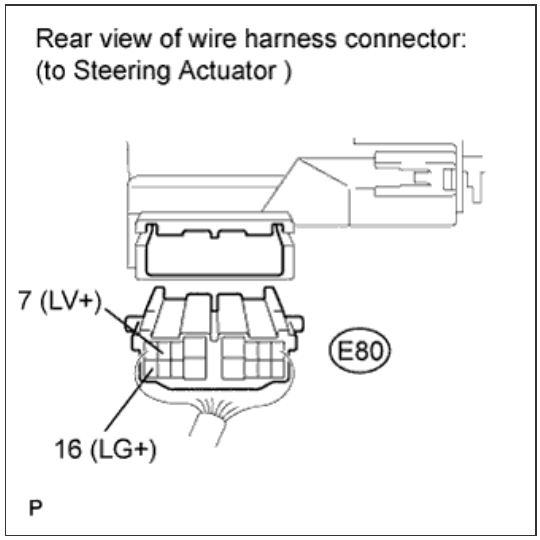
NOTICE:

Make sure the engine is not running.

1. Turn the engine switch off.
2. Disconnect the cable from the negative (-) battery terminal.
3. Disconnect the E80 connector from the steering actuator.
4. Connect a jumper wire from terminal 7 (LV+) of the steering actuator to the positive (+) 12 V battery terminal and another jumper wire from terminal 16 (LG+) of the steering actuator to the negative (-) 12 V battery terminal.

NOTICE:

Do not apply voltage for more than 3 minutes.



vi. STEERING CENTER ADJUSTMENT (Procedure F)

1. Center the steering wheel.

NOTICE:

If the centering of the spiral cable was not confirmed when the steering wheel was installed, confirm the centering of the spiral cable.

vii. LOCK STEERING ACTUATOR (Procedure G)

1. Disconnect the positive (+) and negative (-) 12 V battery jumper wires from the steering actuator.
2. Connect the E80 connector to the steering actuator.
3. Connect the cable to the negative (-) battery terminal.
4. Turn the steering wheel approximately 3° to the left and right. Confirm that the reaction force can be felt.

NOTICE:

- **If the above procedures are not followed correctly, a DTC will be stored. If a DTC is stored, perform the above procedures again and then check for DTCs.**
- **Perform these procedures with the engine switch off.**

viii. ADJUST ACTUATOR ANGLE (Procedure H)

HINT:

Activating and ending test mode will complete actuator angle adjustment.

SST

09843-18040

1. Make sure the engine switch is off.

NOTICE:

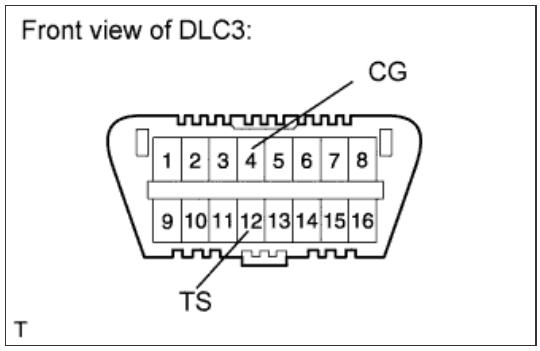
Do not touch the steering wheel during these procedures.

2. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
3. Turn the engine switch on (IG).
4. Confirm that "VGRS Test Mode" is displayed on the multi-information display when test mode is activated.

HINT:

Wait approximately 5 seconds.

5. Turn the engine switch off.
6. Disconnect SST from terminals 12 (TS) and 4 (CG) of the DLC3.
7. Turn the engine switch on (IG) again.



ix. CHECK MASTER WARNING LIGHT (Procedure I)

1. Confirm that the master warning light is off.
2. Turn the engine switch off, then on (IG).
3. Confirm that the master warning light is operating normally.

x. CHECK STEERING WHEEL OPERATION (Procedure J)

1. Start the engine.
2. Perform the steering angle sensor initialization.
3. Turn the steering wheel from lock to lock and check that it rotates approximately 2.7 turns.
4. Drive the vehicle and confirm that the steering wheel is centered.

c. VGRS SYSTEM CALIBRATION PROCEDURE (WHEN USING INTELLIGENT TESTER)

i. FACE TIRES STRAIGHT AHEAD (Procedure A)

NOTICE:

Drive the vehicle to confirm that the steering wheel is centered.

ii. PERFORM VGRS SYSTEM CALIBRATION (Procedure B)

1. Connect the intelligent tester to the DLC3.
2. Turn the engine switch on (IG).
3. Turn the tester on.
4. Enter the following menus: Chassis / VGRS / Utility / Steering Angle Adjust. Then, press "Next".
5. Follow the instructions on the tester, and press "Next".

NOTICE:

Press the "Next" key even if DTC C15B4/71 is output.

6. Follow the instructions on the tester, and press "Next".
7. Follow the instructions on the tester, and press "Next".

NOTICE:

Ensure that the engine switch is off.

8. Follow the instructions on the tester, and press "Next".
9. Follow the instructions on the tester, and press "Next".

NOTICE:

If the centering of the spiral cable was not confirmed when the steering wheel was installed, confirm the centering of the spiral cable.

10. Follow the instructions on the tester, and press "Next".

NOTICE:

Do not touch the steering wheel during these procedures.

11. Follow the instructions on the tester, and press "Next".
12. Follow the instructions on the tester, and press "Next".

NOTICE:

Do not touch the steering wheel during these procedures.

13. "NOW CALIBRATING" is displayed and the display switches automatically to the next screen.

NOTICE:

Do not touch the steering wheel during these procedures.

14. "Steering Angle Adjust is complete." is displayed. Then, check that the VGRS system calibration is completed normally.
15. Select "Exit" to return the display to the "MENU" screen.

iii. CHECK MASTER WARNING LIGHT (Procedure C)

1. Confirm that the master warning light is off.
2. Turn the engine switch off.
3. Disconnect the intelligent tester from the DLC3.
4. Turn the engine switch on (IG).
5. Confirm that the master warning light is operating normally.

iv. CHECK STEERING WHEEL OPERATION (Procedure D)

1. Start the engine.
2. Perform the steering angle sensor initialization.
3. Turn the steering wheel from lock to lock and check that it rotates approximately 2.7 turns.
4. Drive the vehicle and confirm that the steering wheel is centered.

ADJUSTMENT FOR STEERING SYSTEM

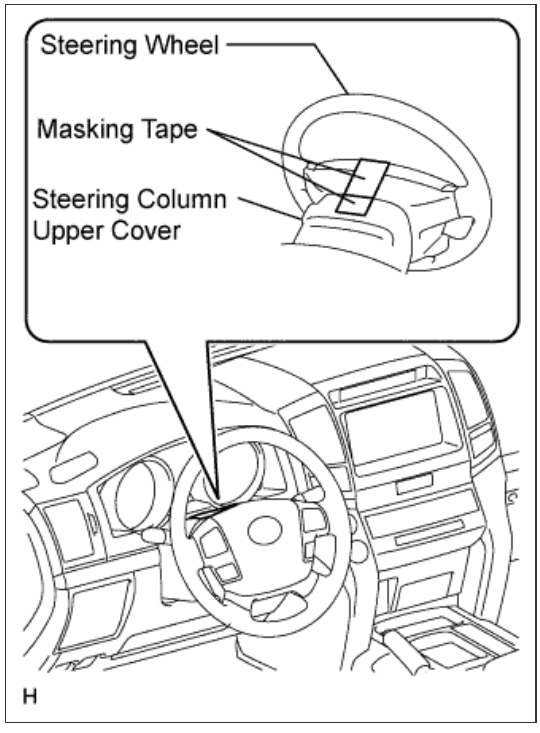
a. STEERING OFF CENTER ADJUSTMENT PROCEDURE

HINT:

This is the adjustment procedure for when the steering is off center.

i. Check if the steering wheel is off center.

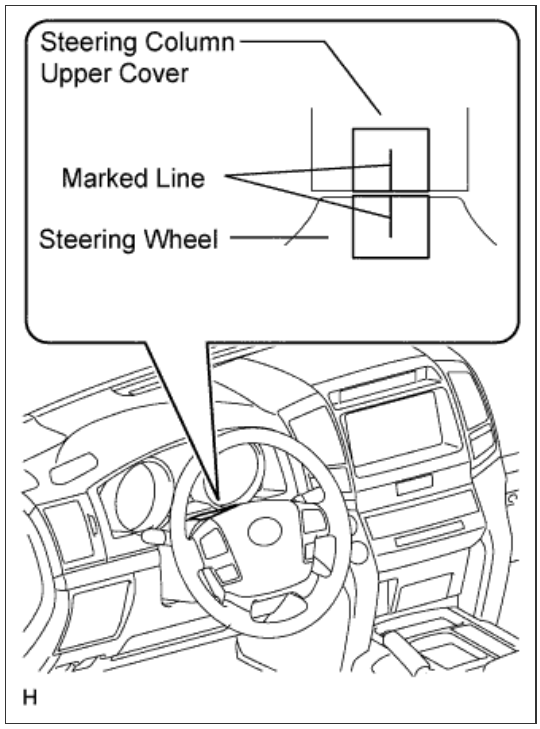
1. Apply masking tape to the top center of the steering wheel and steering column upper cover.
2. Drive the vehicle in a straight line for 100 m (328 ft.) at a constant speed of 56 km/h (35 mph), and hold the steering wheel to maintain the course.



3. Draw a line on the masking tape as shown in the illustration.
4. Turn the steering wheel to the center position.

HINT:

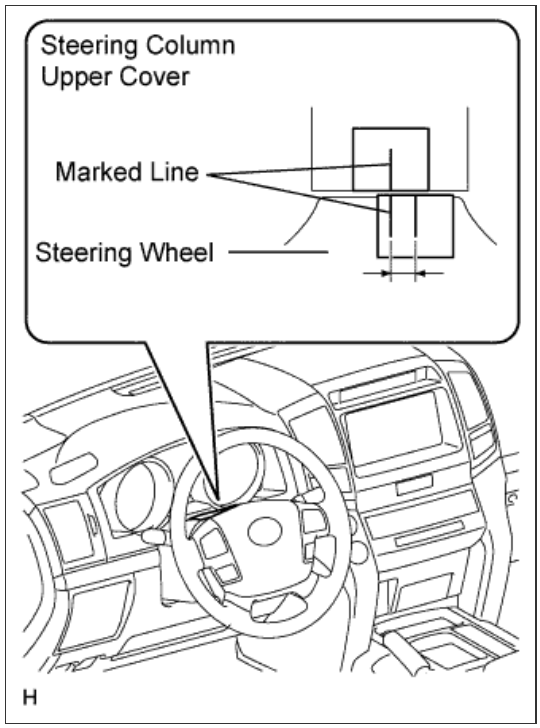
Look at the upper surface of the steering wheel, steering spoke and SRS airbag line to find the center position.



5. Draw a new line on the masking tape on the steering wheel as shown in the illustration.
6. Measure the distance between the 2 lines on the masking tape on the steering wheel.
7. Convert the measured distance to steering angle.

HINT:

- **Measured distance of 1 mm (0.0394 in.) = Steering angle of approximately 1°.**
- **Make a note of the steering angle.**

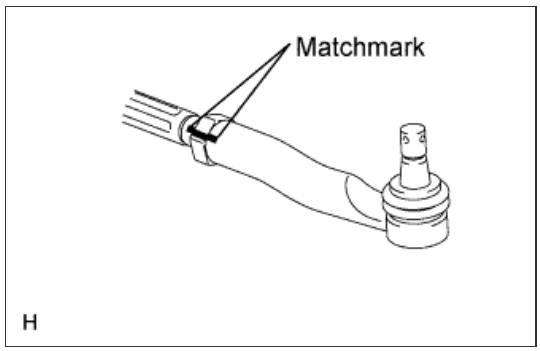


ii. Adjust the steering angle.

1. Put matchmarks on the RH and LH tie rod ends and rack ends where it can be easily seen.
2. Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.

HINT:

- **Measure both the RH and LH sides.**
- **Make a note of the measured values.**



3. Remove the RH and LH boot clips from the rack boots.
4. Loosen the RH and LH lock nuts.
5. Turn the RH and LH rack ends by the same amount (but in different directions) according to the steering angle.

HINT:

One 360° turn of the rack end (1.5 mm (0.0591 in.)

horizontal movement) equals 11° of steering angle.

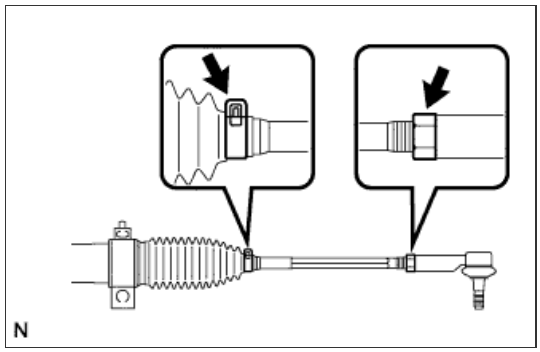
6. Tighten the RH and LH lock nuts to the specified torque.

NOTICE:

Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is within 1.5 mm (0.0591 in.).

7. Install the RH and LH boot clips.

Torque:
82 N*m{ 836 kgf*cm , 60 ft.*lbf }



INITIALIZATION RELATED TO PARKING ASSIST/MONITORING

a. INITIALIZE PARKING ASSIST MONITOR SYSTEM

i. If the following operations are performed, "SYSTEM INITIALIZING" is displayed on the display and navigation module display.

Part Name	Operation	Initialization Item
Battery cable	Disconnect	Store the steering angle neutral point in memory
Steering angle sensor connector	Disconnect	Store the steering angle neutral point in memory

b. When "SYSTEM INITIALIZING" is displayed, correct the steering angle neutral point using either of the following methods.

i. METHOD 1:
Fully turn the steering wheel to the right and left.

ii. METHOD 2:

1. Drive the vehicle at more than 20 km/h (12 mph) for more than 5 minutes on a straight road with as little traffic congestion as possible.

HINT:

While driving at a constant vehicle speed, the ECU recognizes the point where the steering angle changes the least and memorizes it as the steering angle neutral point.

2. Stop the vehicle and check whether the neutral point is stored or not. If it is not stored, drive the vehicle according to the previous step again (the neutral point is stored by driving the vehicle straight).

CALIBRATION RELATED TO PARK ASSIST/MONITORING

a. ADJUST PARKING ASSIST MONITOR SYSTEM

i. This parking assist monitor system can be set from the diagnostic screen of the display and navigation module display.

ii. If the following operations are performed, it is necessary to perform adjustments and checks on the diagnostic screen.

Part Name	Operation	Adjustment Item
Steering angle sensor	• Removal and installation of the Steering angle sensor • Removal and installation of the connector of the Steering angle sensor	Steering angle neutral point
		Steering angle setting
Steering angle sensor	Replacement	Steering angle neutral point
		Steering angle setting
Parking assist ECU	Replacement	Parking assist ECU initialization
Suspension, tires, etc.	The vehicle height changes because of suspension or tire replacement	Rear television camera optical axis (Camera position setting)
Rear television camera assembly	• Replacement • Installation angle of the rear television camera changes because of the removal and installation of the rear television	Rear television camera optical axis (Camera position setting)

	camera, etc.	

HINT:

The adjustment values stored while performing parking assist monitor system calibration are stored in the parking assist ECU.

b. PARKING ASSIST ECU INITIALIZATION

HINT:

Be sure to check for DTCs before performing this procedure.

i. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.
2. Set a target bar for optical axis adjustment of the rear television camera.

HINT:

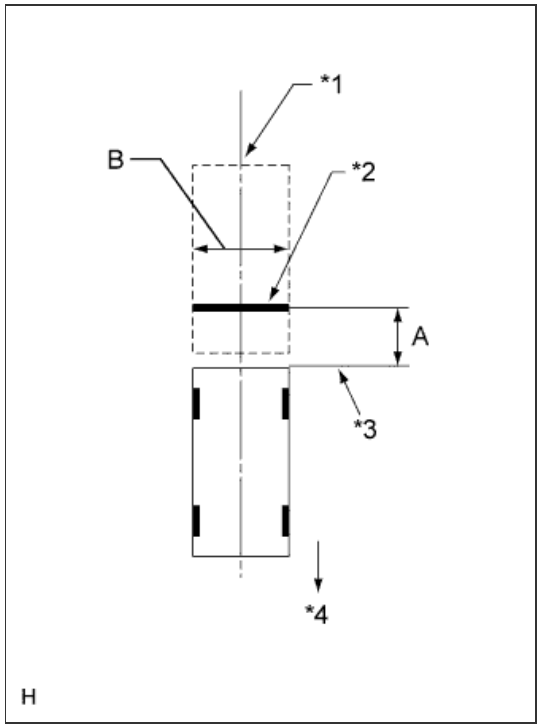
Only when adjusting the optical axis of the camera, create a target bar for adjustment.

Dimension:

Area	Specification
A	825 to 835 mm (2.71 to 2.74 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

Text in Illustration

*1	Vehicle Center
*2	Target Bar for Back Camera Adjustment
*3	Vehicle End
*4	Front Side



HINT:

- **Set a piece of tape on the ground as the target bar for adjustment. Its width and length are 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the display and navigation module display and choose a tape color which can be easily seen.**
- **Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.**
- **Check that the back door is fully closed.**

ii. Start diagnostic mode .

NOTICE:

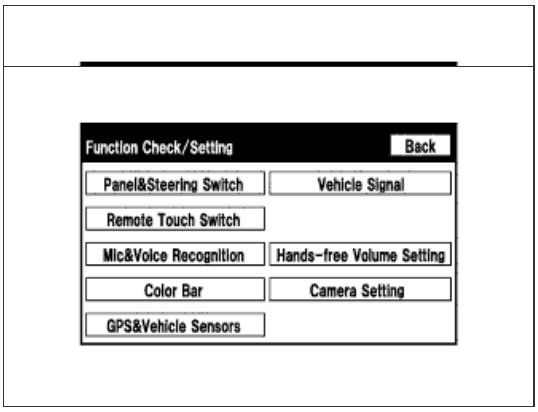
Mode setting must be carried out with the hybrid system started. Apply the parking brake, depress the brake pedal, move the shift lever to P, and ensure that the vehicle is not moving.

HINT:

The displayed items may differ depending on vehicle specifications.

1. Select "Function Check/Setting" on the Service Menu screen.

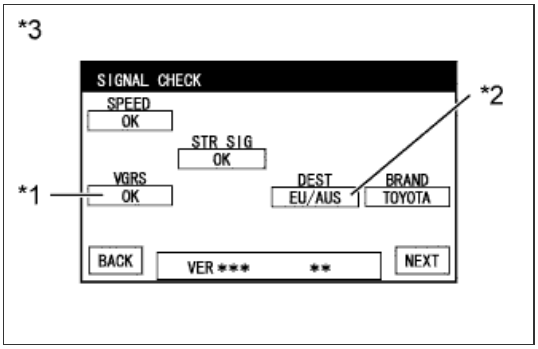
2. Select "Camera Setting" on the Function Check/Setting screen.



3. Select "NEXT" on the SIGNAL CHECK screen.

Text in Illustration

*1	w/ VGRS
*2	"EU/AUS" or "GCC/ZAF"
*3	Example

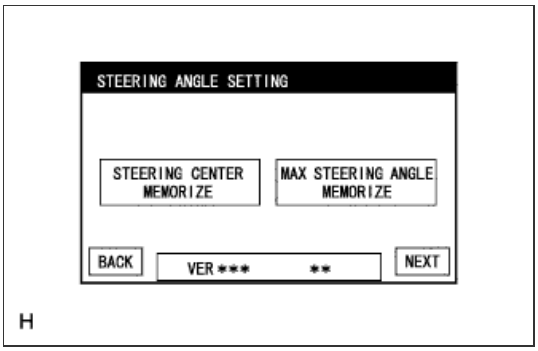


NOTICE:

When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen.

iii. STEERING ANGLE SETTING

1. Perform the STEERING CENTER MEMORIZE operation.
   - Check that the steering wheel is centered, and then select "STEERING CENTER MEMORIZE".



HINT:

When performing removal and installation, or replacement of the television camera, steering angle adjustment is not required.

2. Perform the MAX STEERING ANGLE MEMORIZE operation.
   - After adjusting the steering angle neutral point, turn the steering wheel to the left and right lock positions and select "MAX STEERING ANGLE MEMORIZE". The maximum steering angle is then stored and the screen changes to the BACK CAMERA POSITION SETTING screen.

HINT:

The "NEXT" button does not respond until the system stores the steering angle neutral point and maximum steering angle.

HINT:

- **It is also possible to start by initially turning the steering to the right side.**
- **When "MAX STEERING ANGLE MEMORIZE" is selected, a beep will sound to confirm that the steering adjustment values have been stored.**
- **The adjustment value will not be stored unless "MAX STEERING ANGLE MEMORIZE" is selected after turning the steering wheel side to side.**
- **When "BACK" is selected, the screen changes to SIDE VERIFY MODE without storing the set values.**
- **Even if no DTCs are detected, selecting "MAX STEERING ANGLE MEMORIZE" may not cause the adjustment value to be stored if the steering sensor is malfunctioning.**
- **If selecting "MAX STEERING ANGLE MEMORIZE" does not cause the adjustment value to be stored after adjusting the steering angle, replace the spiral with sensor cable sub-assembly.**

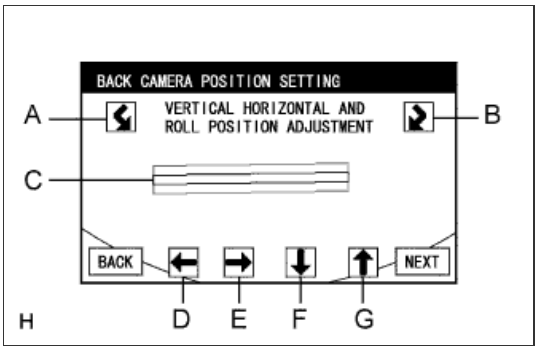
iv. BACK CAMERA POSITION SETTING

HINT:

- **When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed**

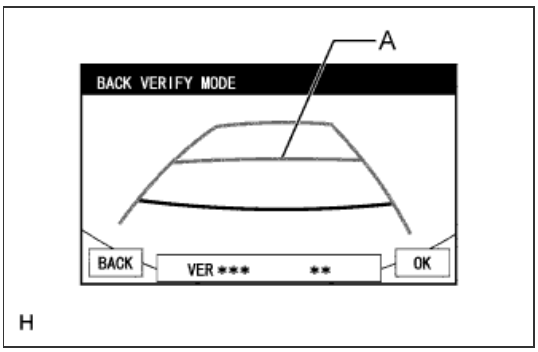
and camera position setting will not be possible.

- **If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed).**



1. Perform the roll angle adjustment.
   - Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
2. Perform the vertical and horizontal position adjustment.
   - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
3. Select the "NEXT" button on the BACK CAMERA POSITION SETTING screen.

v. BACK VERIFY MODE



1. Check that A and the target adjustment bar are overlapping.
   - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
   - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu screen, and complete the adjustment.

HINT:

- **The update is not completed until "OK" is selected.**
- **When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.**

vi. Finish diagnostic mode.

c. BACK CAMERA POSITION SETTING

HINT:

Be sure to check for DTCs before performing this procedure.

i. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.
2. Set a target bar for optical axis adjustment of the rear television camera.

HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.

Dimension:

Area	Specification
A	825 to 835 mm (2.71 to 2.74 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

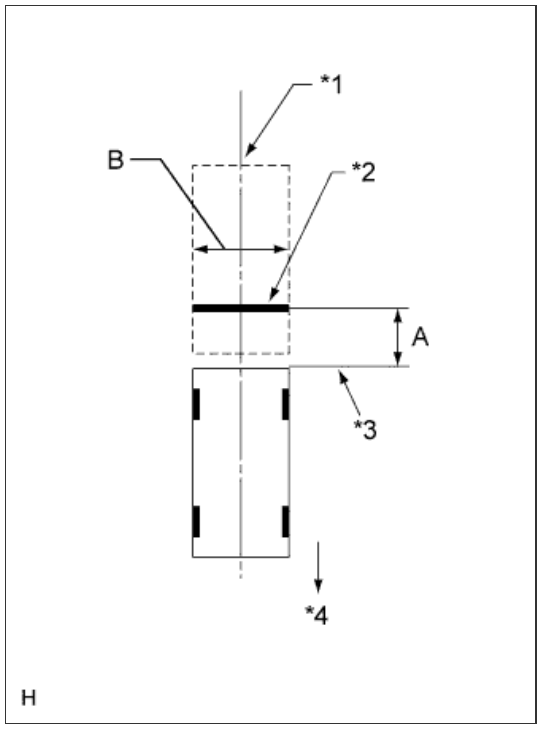
Text in Illustration

*1	Vehicle Center
*2	Target Bar for Back Camera Adjustment
*3	Vehicle End

*4 Front Side

HINT:

- **Set a piece of tape on the ground as the target bar for adjustment. Its width and length should be 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the multi-display and choose a tape color which can be easily seen.**
- **Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.**
- **Check that the back door is fully closed.**



ii. Start diagnostic mode.

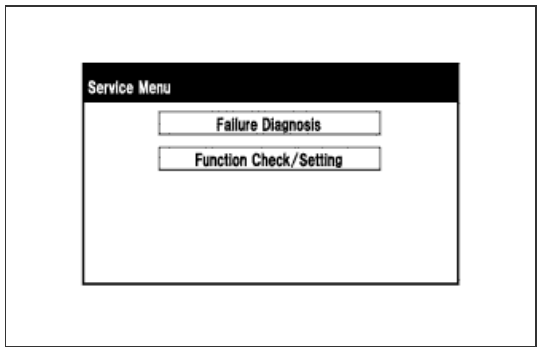
NOTICE:

Apply the parking brake, depress the brake pedal, move the shift lever to P, and ensure that the vehicle is not moving.

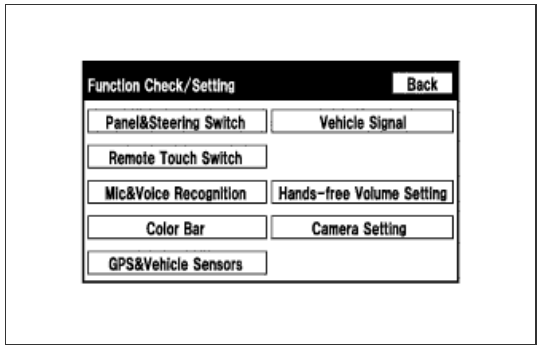
HINT:

The displayed items may differ depending on vehicle specifications.

1. Select "Function Check/Setting" on the "Service Menu" screen.



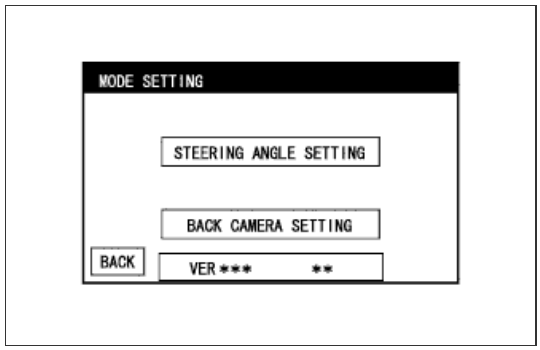
2. Select "Camera Setting" on the Function Check/Setting screen.



3. Select "BACK CAMERA SETTING" on the MODE SETTING screen.

HINT:

To select a grayed out item, select and hold the item for 2 seconds or more.



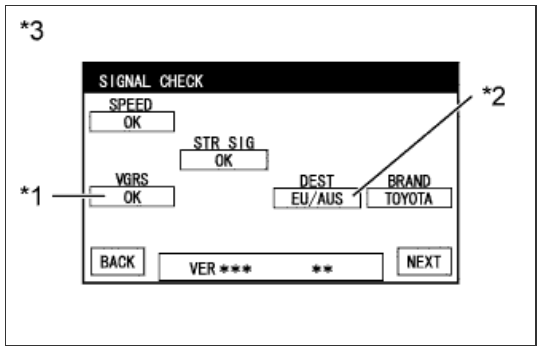
4. Select "NEXT" on the SIGNAL CHECK screen.

Text in Illustration

*1	w/ VGRS
*2	"EU/AUS" or "GCC/ZAF"
*3	Example

NOTICE:

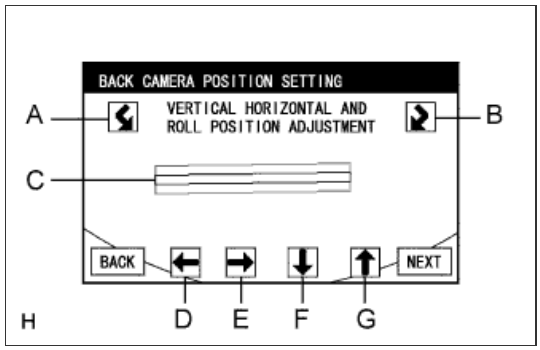
- **When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, selecting "NEXT" will not change the screen to the BACK CAMERA POSITION SETTING screen.**
- **When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen.**



iii. BACK CAMERA POSITION SETTING

HINT:

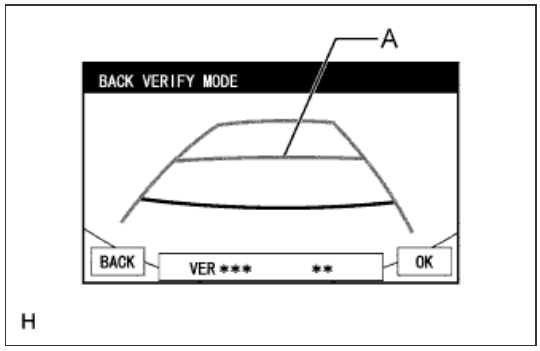
- **When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed and camera position setting will not be possible.**
- **If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed).**



1. Perform the roll angle adjustment.
   - Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
2. Perform the vertical and horizontal position adjustment.
   - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
3. Select the "NEXT" button on the "BACK CAMERA POSITION SETTING" screen.

iv. BACK VERIFY MODE

1. Check that A and the target adjustment bar are overlapping.
   - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
   - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu, and complete the adjustment.



HINT:

- **The update is not completed until "OK" is selected.**
- **When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.**

v. Finish diagnostic mode.

INITIALIZATION RELATED TO POWER WINDOW CONTROL SYSTEM

a. INITIALIZE POWER WINDOW CONTROL SYSTEM (POWER WINDOW REGULATOR MOTOR (ALL DOORS))

CAUTION:

When the power window regulator motor is reinstalled or replaced, the power window control system must be initialized. Functions such as the auto up/down, jam protection and key-off do not operate if the initialization is not performed.

HINT:

When the battery is replaced, it is not necessary to initialize the power window regulator motor.

NOTICE:

- **When the power window regulator motor is replaced, DTC B2313 is output. Clear the DTC after the initialization.**
- **When performing initialization, do not perform any other procedures.**
- **After a door glass or a door glass run has been replaced, the jam protection function may operate unexpectedly when the auto up function is used, due to detection of a value different from the operation learned value of the door glass movement speed. In such cases, the auto up function can be resumed by repeating the following operation at least 5 times:**
    1. **Open the power window by fully pushing down the power window switch.**
    2. **Close the power window by fully pulling up the power window switch and holding it at the auto up position.**
- **If the initialization is not completed properly, the LIN communication system may have a malfunction.**

i. Initialization procedures when replacing the power window regulator motor with a new one:

1. Connect the battery and turn the engine switch on (IG) (at this time, the LED on the power window switch blinks to indicate that it is ready for initialization).
2. Fully open the window by fully pushing the power window switch, and hold the switch for 1 second or more after the window is fully opened.
3. Fully close the power window by fully pulling the power window switch, and hold the switch for 1 second or more after the window is fully closed to reset the glass position. The LED on the power window switch stops blinking and illuminates to indicate that the initialization is complete.

ii. Initialization procedures when removing/installing the power window regulator motor:

1. Connect the battery and turn the engine switch on (IG).
2. Fully close the power window by fully pulling the power window switch, and hold the switch for 6 seconds or more after the window is fully closed (if the power window does not move or stops halfway even when the switch is fully pulled, release the switch and fully pull it again).
3. Fully open the window by pushing down the power window switch, and hold the switch for 1 second or more after the window is fully opened.
4. Release the power window switch. Then fully push and hold the switch for 4 seconds or more.
5. Fully close the power window by fully pulling the power window switch, and hold the switch for 1 second or more after the window is fully closed to reset the glass position and complete the initialization.

iii. Initialization procedures when the power window does not fully open:

1. Connect the battery and turn the engine switch on (IG).
2. Fully close the power window by fully pulling the power window switch, and hold the switch for 6 seconds or more after the window is fully closed (if the power window does not move or stops halfway even when the switch is fully pulled, release the switch and fully pull it again).
3. Fully open the window by pushing down the power window switch, and hold the switch for 1 second or more after the window is fully opened.
4. Release the power window switch. Then fully push and hold the switch 4 seconds or more.
5. Fully close the power window by fully pulling the power window switch, and hold the switch 1 second. or more after the window is fully closed to reset the glass position and complete the initialization.

INITIALIZATION RELATED TO INNER REAR VIEW MIRROR

a. SELECT COMPASS DISPLAY MODE

i. The compass switch allows you to select the Display or Non-display mode of the compass.

b. SET ZONE

i. Deviation between the "magnetic north" and "actual north" differs depending on the location. Therefore, adjustment of the magnetism is required. Because the magnetic condition differs depending on the area where the vehicle is used, it is necessary for each user to set the zone (refer to Compass Zone Map). The zone setting can be changed using the compass switch of the inner mirror.

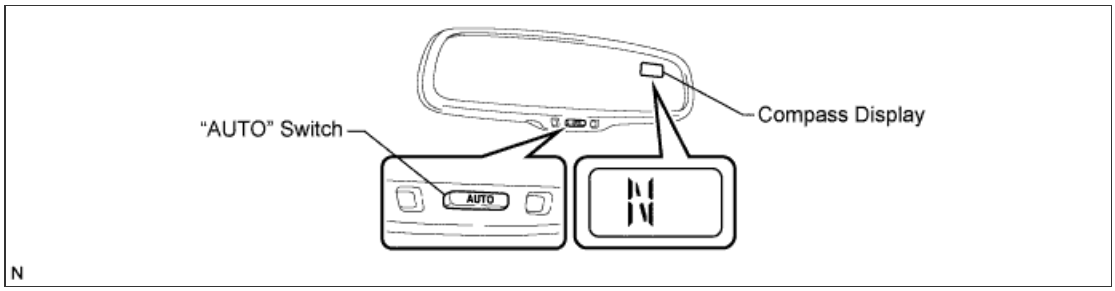
c. PERFORM CALIBRATION

i. Because each vehicle has its own magnetic field, calibration should be performed for each individual vehicle. This compass function is used when storing the record of the vehicle's magnetic field.

d. WHEN COMPASS IS MAGNETIZED

i. The compass could be magnetized during shipping by vessels or freight cars. Therefore, ensure that calibration is performed properly before delivery. If driving the vehicle in a circle several times does not complete the calibration procedure, there may be a

compass magnetization problem.

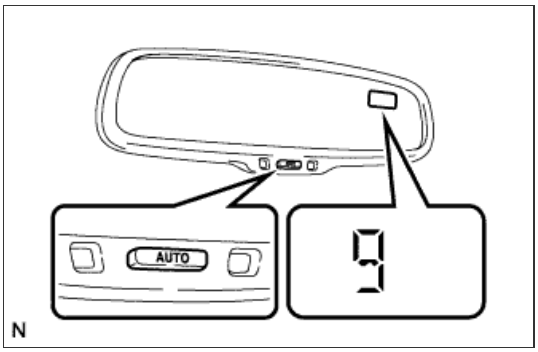


e. Deviation Calibration Procedure

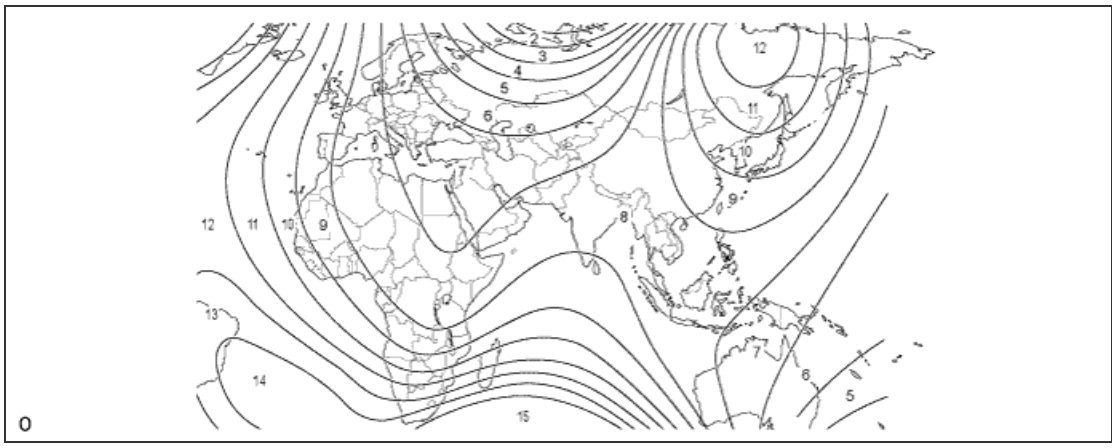
i. Turn the ignition switch to the "IG-ON" position and push and hold the "AUTO" switch for 6 seconds until the zone number appears on the display.

HINT:

Pushing the "AUTO" switch for 3 seconds turns on or off the compass display.

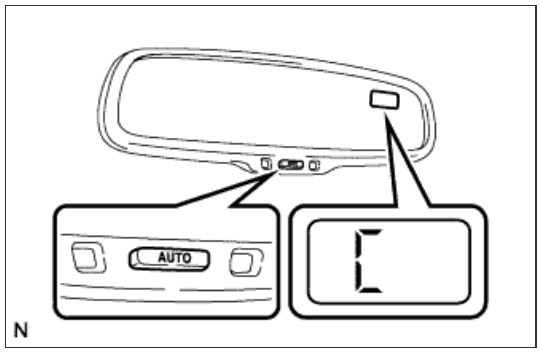


ii. Push the "AUTO" switch to select the number of the zone where the vehicle is located. See the map for zone reference.



f. Circling Calibration Procedure

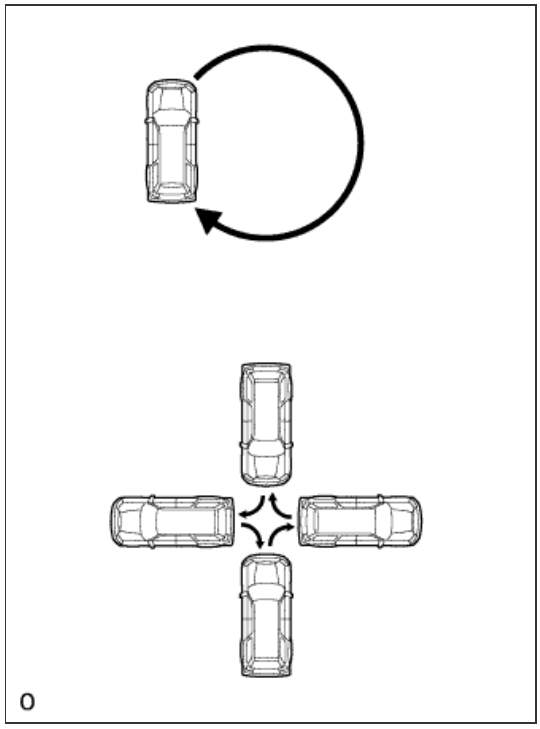
i. Start the engine and push and hold the "AUTO" switch for 9 seconds until "C" appears on the display.



ii. Drive the vehicle slowly at 8 km/h (5 mph) or lower in a circle. If there is not enough space to drive in a circle, turn the car around in the following manner, doing two three-point turns in succession. After driving in 1 to 3 circles in the above method, calibration is completed with the direction is shown on the display.

HINT:

- **Do not perform calibration of the compass in a place where the earth's magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a crossing, near a large vehicle, etc.).**
- **During calibration, do not operate electric systems (sliding roof, power windows, etc.) as they may interfere with the calibration.**



INITIALIZATION RELATED TO SLIDING ROOF SYSTEM

a. INITIALIZE SLIDING ROOF DRIVE GEAR

NOTICE:

- **When the sliding roof glass is replaced or removed and installed, or the drive gear assembly is replaced, the sliding roof drive gear requires initialization (pulse sensor initial position setting), as the glass position cannot be determined. If initialization is not performed, the auto slide open and close/tilt up and down function may not operate, or the sliding roof may move in reverse or become misaligned.**
- **During initialization, do not apply a physical shock, such as opening/closing a door or driving the vehicle at 5 km/h (3.10 mph) or more, to the vehicle and do not perform the following electrical operations:**
  1. **Cranking the engine**
  2. **Turning the engine switch from on (IG) to off**
  3. **Operating the power window switches**
  4. **Operating the window defogger switch**
  5. **Operating the blower switch**
  6. **Locking/Unlocking the door**
  7. **Operating the headlight dimmer switch**

HINT:

When the cable is disconnected and reconnected to the negative (-) battery terminal or the drive gear connector is disconnected and reconnected, the sliding roof drive gear (pulse sensor initial position setting) initialization is not necessary.

i. Perform initialization according to the table below.

Condition of Sliding Roof	Proceed to
Auto slide open and close/tilt up and down function does not operate	Procedure A
Sliding roof moves in reverse direction during tilt down operation	Procedure B
Sliding roof moves in reverse direction during slide close operation	Procedure C

1. Procedure A
    1. Turn the engine switch on (IG).
    2. Open the sliding roof to the fully tilt up position.
    3. Press and hold the UP switch to perform the following operations: tilt up → approximately 10 second pause → tilt down → slide open → slide close.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    4. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    5. The initialization is completed.
2. Procedure B
    1. Turn the engine switch on (IG).
    2. Press the UP switch until the sliding roof stops.

        HINT:

        If the glass becomes misaligned or does not fully tilt up, perform the following operations:

        1. **Operate the CLOSE switch until the sliding roof stops moving.**
        2. **Operate the UP switch until the sliding roof stops moving, then proceed to the next step.**

    3. Release the switch.
    4. Press and hold the UP switch to perform the following operations: tilt up → approximately 10 second pause → tilt down → slide open → slide close.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    5. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    6. The initialization is completed.
3. Procedure C
    1. Turn the engine switch on (IG).
    2. Press and hold the CLOSE switch to perform the following operations: slide close → move in reverse direction → 10 second pause → slide close → tilt up → tilt down.

        NOTICE:

        Make sure not to release the switch during the initialization. If the switch is released, perform the initialization again.

    3. Continue to hold the switch for 1 second or more after the sliding roof stops in the fully closed position, and then release it.
    4. Check if the auto function is operative.

ADJUSTMENT FOR HEADLIGHT ASSEMBLY (for Standard)

a. VEHICLE PREPARATION FOR HEADLIGHT AIMING ADJUSTMENT

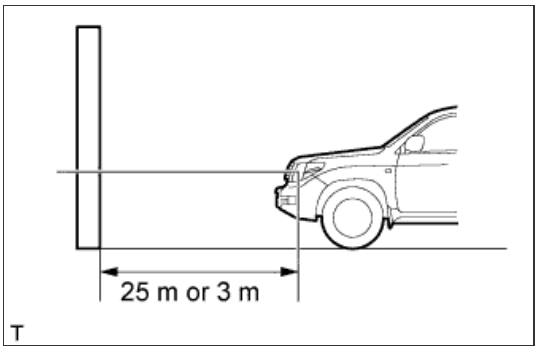
i. Prepare the vehicle:

- Ensure there is no damage to the body around the headlights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (75 kg, 165 lb) sit in the driver's seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the headlight aim.
- Vehicles with manually adjustable headlights should be adjusted to "0" (w/ headlight leveling switch).

b. PREPARATION FOR HEADLIGHT AIMING (Using a screen)

i. Prepare the vehicle:

- 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 headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82.0 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.



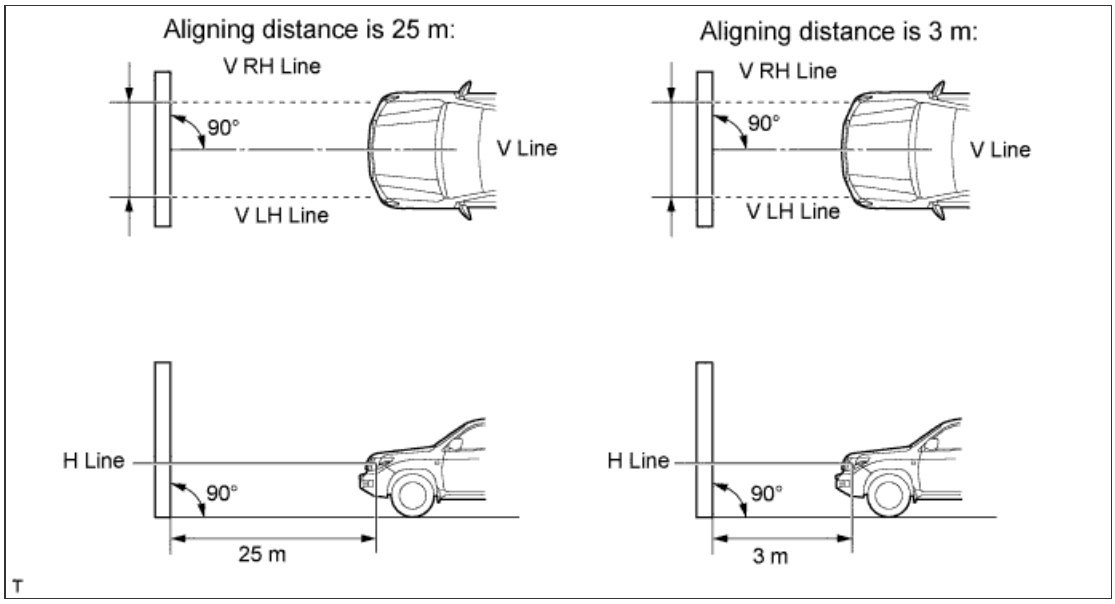
NOTICE:

A distance of 25 m (82.0 ft.) between the vehicle (headlight bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2 m (6.56 ft.) (height) x 4 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

iv. Set the screen as shown in the illustration.



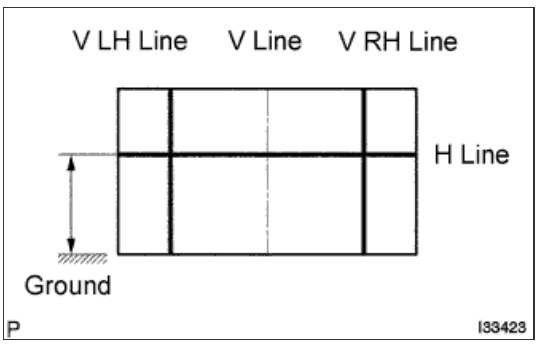
HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and V RH Lines) on the screen as shown in the illustration.

HINT:

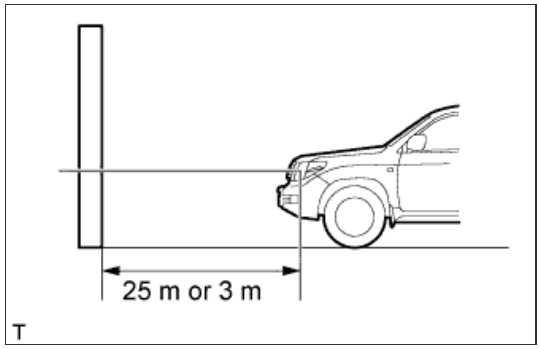
- **The base lines differ for "low beam inspection" and "high beam inspection".**
- **Mark the headlight bulb center marks on the screen. If the center mark cannot be observed on the headlight, use the center of the headlight bulb or the manufacturer's name marked on the headlight as the center mark.**



1. H Line (Headlight):
   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 headlight bulb center marks of the low beam headlights.
2. V LH Line, V RH Line (Center mark position of the left-hand (LH) and right-hand (RH) headlights):
   Draw two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low beam headlight bulbs).

c. HEADLIGHT AIMING INSPECTION

i. Cover the headlight or disconnect the connector of the headlight on the opposite side to prevent light from the headlight that is not being inspected from affecting the headlight aiming



NOTICE:

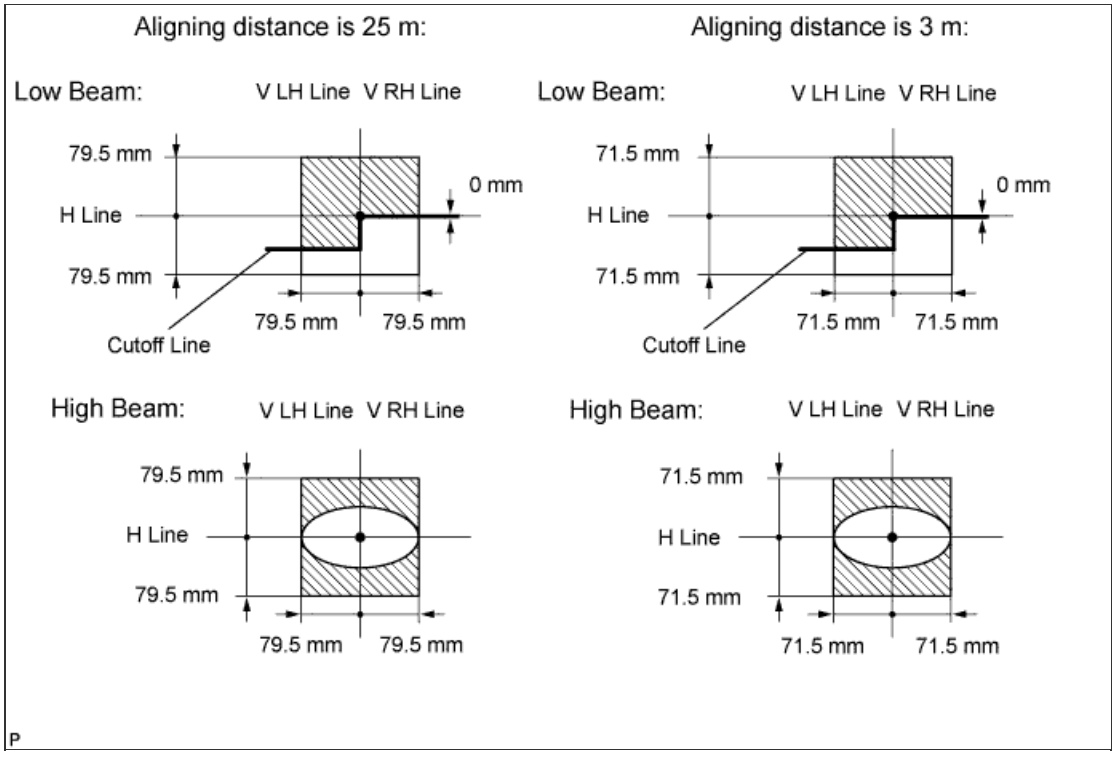
Do not keep the headlight covered for more than 3 minutes. The headlight lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

HINT:

When checking the aim of the high beam headlight, cover the low beam headlight or disconnect the connector.

ii. Start the engine.

iii. Turn on the headlight and check if the cutoff line matches the preferred cutoff line in the following illustration.

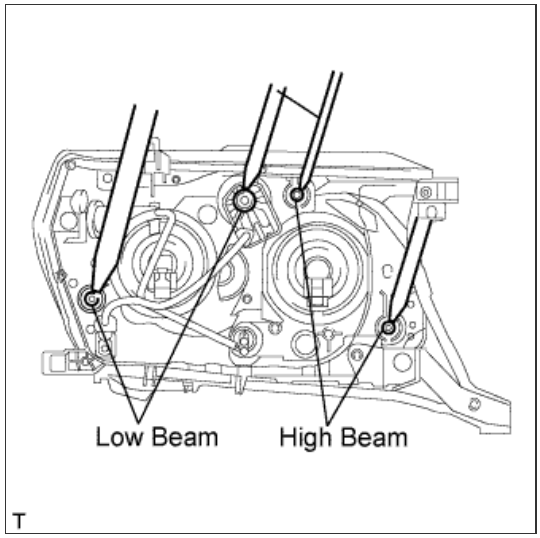


HINT:

- **Since the low beam and high beam headlight on each side have separate reflectors, it is necessary to check and adjust the aim separately for both.**
- **If the alignment distance is 25 m (82.0 ft.):**
  The low beam cutoff line should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3.0 m (9.84 ft.):**
  The low beam cutoff line should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.
- **If the alignment distance is 25 m (82.0 ft.):**
  The high beam center of intensity should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3.0 m (9.84 ft.):**
  The high beam center of intensity should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.

d. HEADLIGHT AIMING ADJUSTMENT

i. Adjust the aim vertically:



1. Adjust the aim of each headlight to the specified range by turning each 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.

HINT:

- **The low beam and high beam headlight are a unit. Adjusting the aim on the low beam to the correct position should also result in the high beam adjustment being correct.**
- **If it is not possible to correctly adjust headlight aim, check the bulb, headlight unit, and headlight unit reflector installation.**
- **The headlight aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.**

ADJUSTMENT FOR HEADLIGHT ASSEMBLY (for HID Headlight)

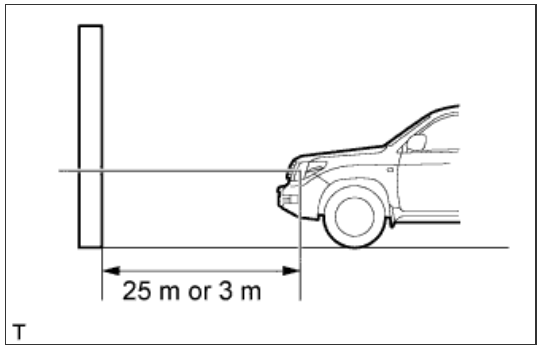
a. VEHICLE PREPARATION FOR HEADLIGHT AIMING ADJUSTMENT

i. Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the headlights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (75 kg, 165.3 lb) sit in the driver seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the headlight aim.
- Vehicles with manually adjustable headlights should be adjusted to "0" (w/ headlight leveling switch).

b. PREPARATION FOR HEADLIGHT AIMING (Using a screen)

i. Prepare the vehicle:



- 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 headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 25 m (82.0 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:

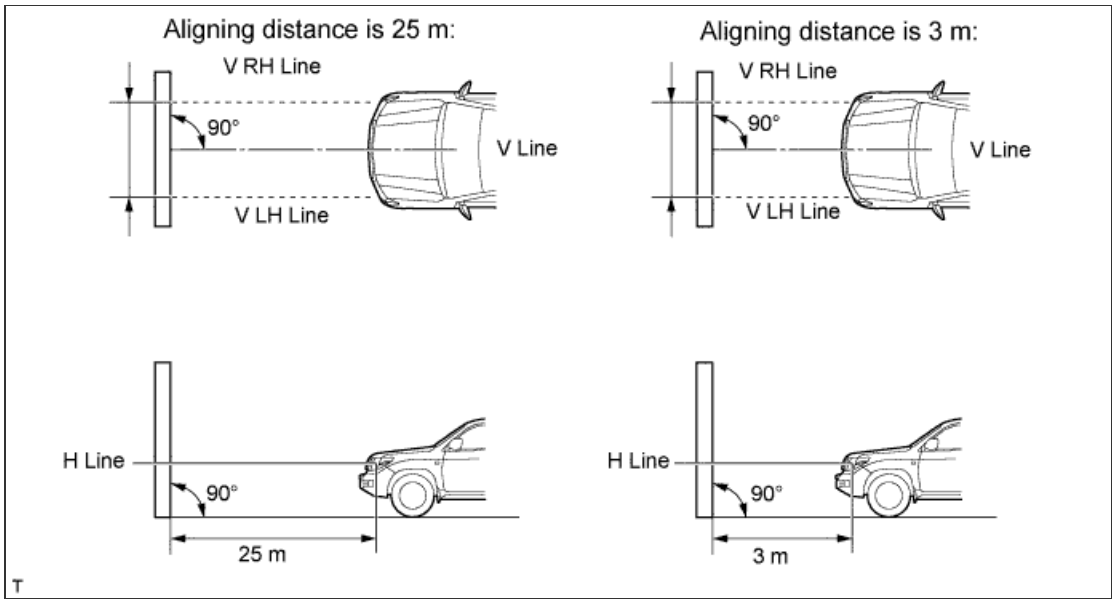
A distance of 25 m (82.0 ft.) between the vehicle (headlight bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone

will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2 m (6.56 ft.) (height) x 4 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

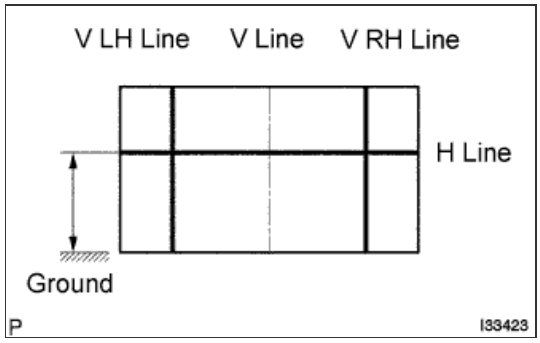
iv. Set the screen as shown in the illustration.



HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and 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 headlight bulb center marks on the screen. If the center mark cannot be observed on the headlight, use the center of the headlight bulb or the name of the manufacturer marked on the headlight as the center mark.**

1. H Line (Headlight 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 headlight bulb center marks of the low beam headlights.
2. V LH Line, V RH Line (Center mark position of the left-hand (LH) and right-hand (RH) headlights):
   Draw two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low beam headlight bulbs).

c. HEADLIGHT AIMING INSPECTION

i. Cover the headlight or disconnect the connector of the headlight on the opposite side to prevent light from the headlight that is not being inspected from affecting the headlight aiming inspection.

NOTICE:

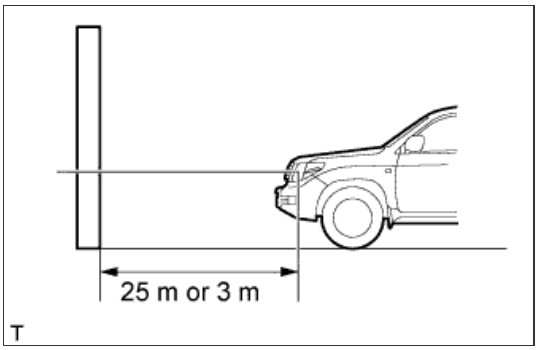
Do not keep the headlight covered for more than 3 minutes. The

headlight lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

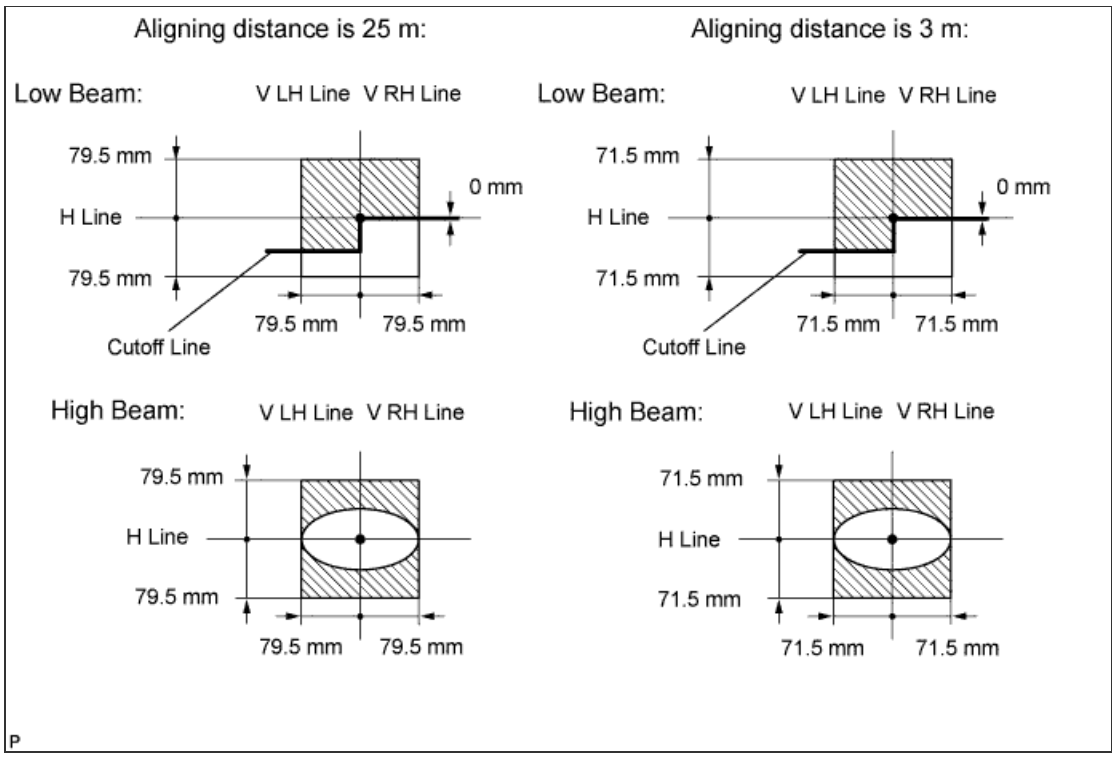
HINT:

When checking the aim of the high beam headlight, cover the low beam headlight or disconnect the connector.

ii. Start the engine.



iii. Turn on the headlight and check if the cutoff line matches the preferred cutoff line in the following illustration.



HINT:

- **Since the low beam and high beam headlight on each side have separate reflectors, it is necessary to check and adjust the aim separately for both.**
- **If the alignment distance is 25 m (82.0 ft.):**
  The low beam cutoff line should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3 m (9.84 ft.):**
  The low beam cutoff line should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.
- **If the alignment distance is 25 m (82.0 ft.):**
  The high beam center of intensity should be within 79.5 mm (3.13 in.) above or below the H line as well as 79.5 mm (3.13 in.) left or right of the V line.
- **If the alignment distance is 3 m (9.84 ft.):**
  The high beam center of intensity should be within 71.5 mm (2.81 in.) above or below the H line as well as 71.5 mm (2.81 in.) left or right of the V line.

d. HEADLIGHT AIMING ADJUSTMENT

i. Adjust the aim vertically:

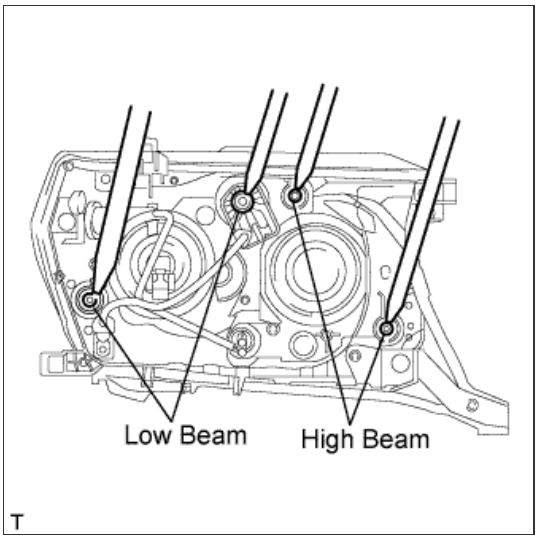
1. Adjust the aim of each headlight to the specified range by turning each aiming screw with a screwdriver.

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.

HINT:

- **The low beam and high beam headlight are a unit. Adjusting the aim on the low beam to the correct position should also result in the high beam adjustment being correct.**
- **If it is not possible to correctly adjust headlight aim, check the bulb, headlight unit, and headlight unit reflector installation.**
- **The headlight aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.**



ADJUSTMENT FOR FOG LIGHT ASSEMBLY

HINT:

It is possible that a bulb is incorrectly installed, affecting fog light aim. Bulb installation should be considered prior to performing the adjustment procedure.

a. VEHICLE PREPARATION FOR FOG LIGHT AIMING ADJUSTMENT

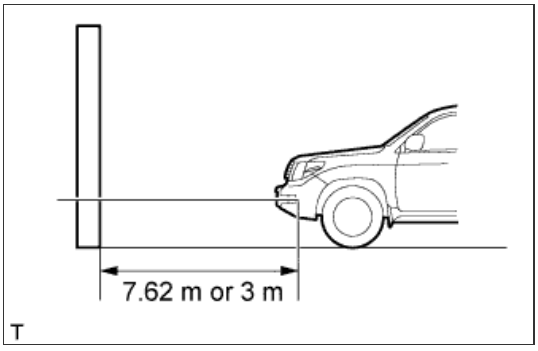
i. Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the fog lights.
- 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.
- Unload the trunk and vehicle, ensuring that the spare tire, tools, and jack are also removed.
- Have a person of average weight (68 kg, 150 lb) sit in the driver's seat.
- Vehicles with height adjustable suspension should have the vehicle height set to the lowest setting prior to adjusting the fog light aim.

b. PREPARATION FOR FOG LIGHT AIMING

i. Prepare the vehicle:

- 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 fog lights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 7.62 m (25.0 ft.) distance between the vehicle (fog light bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Bounce the vehicle up and down to settle the suspension.



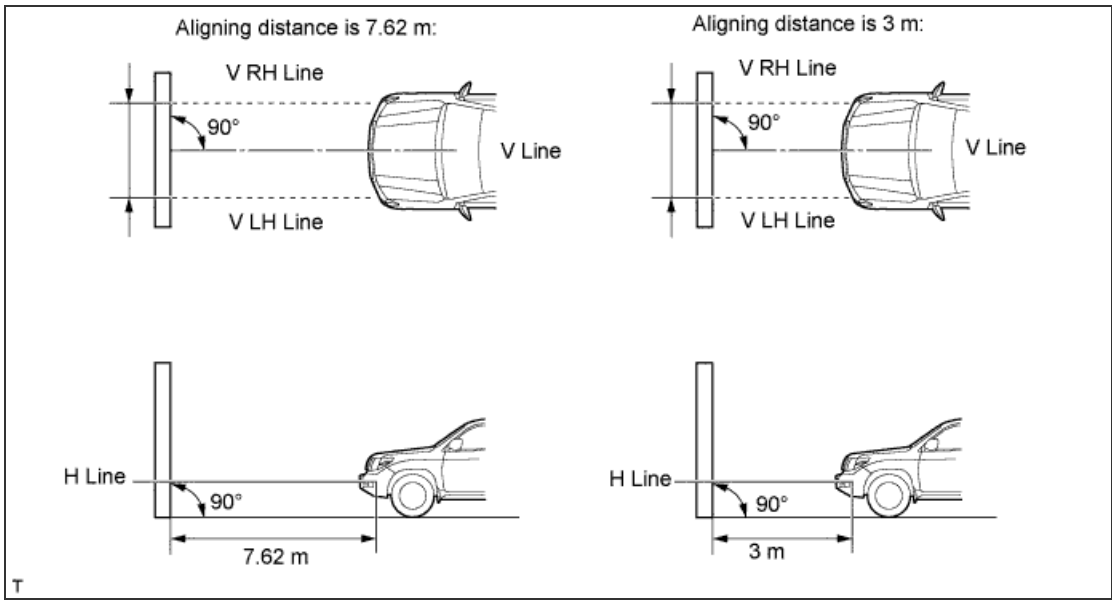
NOTICE:

A distance of 7.62 m (25.0 ft.) between the vehicle (fog light bulb center) and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for the check and adjustment. (The target zone will change with the distance, so follow the instructions in the illustration).

ii. Prepare a piece of thick white paper approximately 2.0 m (6.56 ft.) (height) x 4.0 m (13.1 ft.) (width) to use as a screen.

iii. Draw a vertical line down the center of the screen (V line).

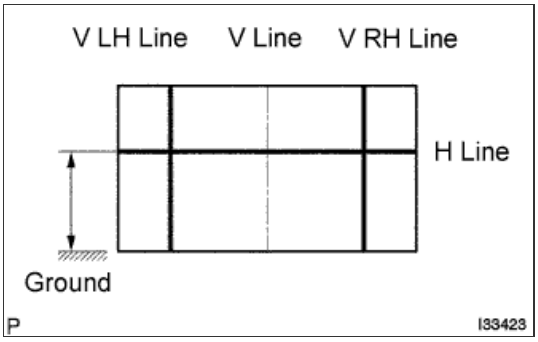
iv. Set the screen as shown in the illustration.



HINT:

- **Stand the screen perpendicular to the ground.**
- **Align the V line on the screen with the center of the vehicle.**

v. Draw base lines (H, V LH, and V RH lines) on the screen as shown in the illustration.



HINT:

Mark the fog light bulb center marks on the screen. If the center mark cannot be observed on the fog light, use the center of the fog light bulb or the manufacturer's name marked on the fog light as the center mark.

1. H line (Fog light 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 light bulb center marks of the fog lights.
2. V LH Line, V RH Line (Center mark position of left-hand (LH) and right-hand (RH) fog lights):
   Draw two vertical lines so that they intersect the H line at each center mark.

c. INSPECT FOG LIGHT AIMING

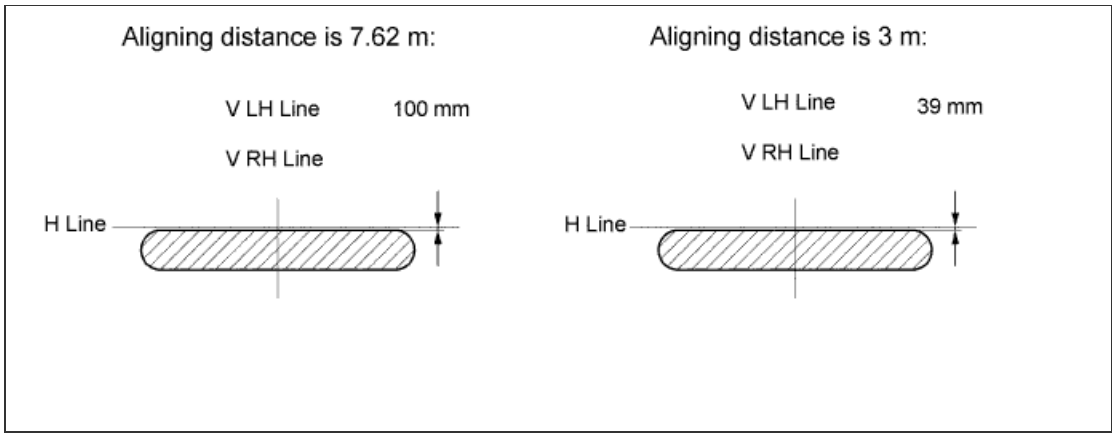
i. Cover the fog light or disconnect the connector of the fog light on the opposite side to prevent light from the fog light that is not being inspected from affecting the fog light aiming inspection.

NOTICE:

Do not keep the fog light covered for more than 3 minutes. The fog light lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

ii. Start the engine.

iii. Turn on the fog light and check if the cutoff line falls within the specified area in the following illustration.



d. ADJUST FOG LIGHT AIMING

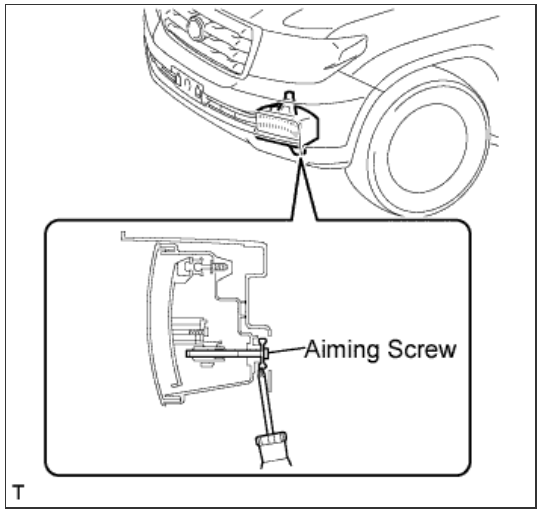
i. Adjust the aim vertically:
Adjust the aim of each fog light to the specified range by turning the aiming screw with a screwdriver.

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.

HINT:

If it is not possible to correctly adjust fog light aim, check the bulb, fog light unit, and fog light unit reflector installation.



A large number of ECU controlled systems are used in the LAND CRUISER Station Wagon. 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 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.

TROUBLESHOOTING PROCEDURES

- The troubleshooting procedures consist of diagnosis procedures for when a DTC is stored and diagnosis procedures for when no DTC is stored. The basic idea is explained in the following table.

Procedure Type	Details	Troubleshooting Method
DTC Based Diagnosis	The diagnosis procedure is based on the DTC that is stored.	The malfunctioning part is identified based on the DTC detection conditions using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the intelligent tester and inspection of related parts.
Symptom Based Diagnosis (No DTCs stored)	The diagnosis procedure is based on problem symptoms.	The malfunctioning part is identified based on the problem symptoms using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the intelligent tester and inspection of related parts.

- Vehicle systems are complex and use many ECUs that are difficult to inspect independently. Therefore, a process of elimination is used, where components that can be inspected individually are inspected, and if no problems are found in these components, the related ECU is identified as the problem and replaced.
- It is extremely important to ask the customer about the environment and the conditions present when the problem occurred (Customer Problem Analysis). This makes it possible to simulate the conditions and confirm the symptom. If the symptom cannot be confirmed or the DTC does not recur, the malfunctioning part may not be identified using the troubleshooting procedure, and the ECU for the related system may be replaced even though it is not defective. If this happens, the original problem will not be solved.
- In order to prevent endless expansion of troubleshooting procedures, the troubleshooting procedures are written with the assumption that multiple malfunctions do not occur simultaneously for a single problem symptom.
- To identify the malfunctioning part, troubleshooting procedures narrow down the target by separating components, ECUs and wire harnesses during the inspection. If the wire harness is identified as the cause of the problem, it is necessary to inspect not only the connections to components and ECUs but also all of the wire harness connectors between the component and the ECU.

FOR USING INTELLIGENT TESTER

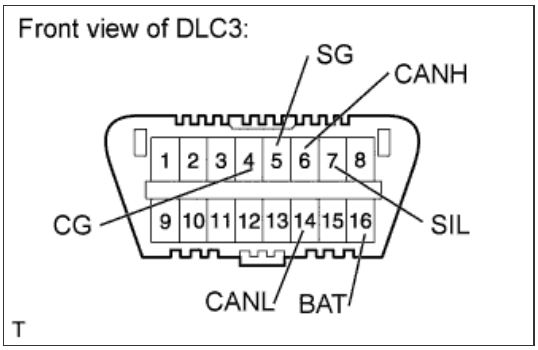
- Before using the intelligent tester, read the tester operator's manual thoroughly.
- If the tester cannot communicate with the ECU controlled systems when connected to the DLC3 with the engine switch in the on position and the tester turned on, there is a problem on the vehicle side or tester side.
    1. If communication is possible when the tester is connected to another vehicle, inspect the diagnosis data link line (bus (+) line), CANH and CANL lines, and the power circuits for the vehicle ECUs.
    2. If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Perform the Self Test procedure outlined in the tester operator's manual.

DESCRIPTION

System data and the Diagnostic Trouble Codes (DTCs) can be read from the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the intelligent tester to check for a malfunction and perform repairs.

DATA LINK CONNECTOR 3 (DLC3)

a. The vehicle ECU uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Terminal No. (Symbols)	Terminal Description	Condition	Specified Condition
7 (SIL) - 5 (SG)	Bus "+" line	During transmission	Pulse generation
4 (CG) - Body ground	Chassis ground	Always	Below 1 Ω
5 (SG) - Body ground	Signal ground	Always	Below 1 Ω
16 (BAT) - Body ground	Battery positive	Always	11 to 14 V
6 (CANH) - 14 (CANL)	CAN bus line	Engine switch off*	54 to 69 Ω
6 (CANH) - 4 (CG)	HIGH-level CAN bus line	Engine switch off*	200 Ω or higher
14 (CANL) - 4 (CG)	LOW-level CAN bus line	Engine switch off*	200 Ω or higher
6 (CANH) - 16 (BAT)	HIGH-level CAN bus line	Engine switch off*	6 kΩ or higher
14 (CANL) - 16 (BAT)	LOW-level CAN bus line	Engine switch off*	6 kΩ or higher

NOTICE:

*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the engine switch, any other switches, or the doors.

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

b. Connect the cable of the intelligent tester to the DLC3, turn the engine switch on and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

HINT:

- **If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.**
- **If communication is still not possible 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.**

OPERATION FLOW

HINT:

Perform troubleshooting in accordance with the procedures below. The following is an outline of basic troubleshooting procedures. 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.INSPECT BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

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

NEXT

4.SYMPTOM CONFIRMATION AND DTC (INCLUDING FREEZE FRAME DATA) CHECK

a. Visually check the wire harnesses, connectors and fuses for open and short circuits.

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

c. Confirm the problem symptoms and conditions, and check for DTCs.

Result

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

B. Go to step 6

A

5.DTC CHART

a. Check the results obtained in the DTC check. Then find the output DTC in the DTC chart. Look at the "Trouble Area" column for a list of potentially malfunctioning circuits and/or parts.

NEXT. Go to step 7

6.PROBLEM SYMPTOMS TABLE

a. Check the results obtained in the symptom confirmation. Then find the problem symptoms in the problem symptoms table. Look at the "Suspected Area" column for a list of potentially malfunctioning circuits and/or parts.

NEXT

7.CIRCUIT INSPECTION OR PARTS INSPECTION

a. Confirm the malfunctioning circuit or part.

NEXT

8.ADJUST, REPAIR OR REPLACE

a. Adjust, repair or replace the malfunctioning circuit or parts.

NEXT

9.CONFIRMATION TEST

a. After the adjustment, repairs or replacement, 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 the malfunction 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 make an accurate judgment. 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 the malfunction occurred.**
- **Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.**
- The following 5 questions are important points in the 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

SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

The diagnostic system in the LAND CRUISER Station Wagon 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 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 LAND CRUISER Station Wagon.**

System	DTC Check (Normal Mode)	DTC Check (Check Mode)	Freeze Frame Data	Sensor Check / Test Mode (Input Signal Check)	Data List	Active Test	Customize Parameter
SFI System (1GR-FE)	○	○	○	-	○	○	-

SFI System (2UZ-FE)	○	○	○	-	○	○	-
ECD System (1VD-FTV)	○	○	○	-	○	○	-
Cruise Control System	○	-	-	-	○	○	-
Automatic Transmission System (A750F)	○	○	-	-	○	○	-
Automatic Transmission System (AB60F)	○	○	-	-	○	○	-
Active Height Control Suspension	○	○	-	○	○	○	-
Anti-lock Brake System	○	-	○	○	○	○	-
Vehicle Stability Control System	○	-	○	○	○	○	-
Variable Gear Ratio Steering System	○	-	○	○	○	○	-
Power Tilt and Power Telescopic Steering Column System	○	-	○	-	○	○	○
Steering Lock System	○	-	-	-	○	-	-
Audio and Visual System (w/ Cassette Tape Player)	○	-	-	-	-	-	-
Audio and Visual System (w/ Navigation System)	○	-	-	-	-	-	-
Audio and Visual System (w/o Navigation System)	○	-	-	-	-	-	-
Rear Seat Entertainment System	○	-	-	-	-	-	-
Navigation System (for DVD)	○	-	-	-	-	-	-
Navigation System (for HDD)	○	-	-	-	-	-	-
Toyota Parking Assist-sensor System	○	-	-	-	○	○	○
Parking Assist Monitor System	○	-	-	-	○	-	-
LIN Communication System	○	-	-	-	○	-	-
CAN Communication System	○	-	-	-	-	-	-
Power Door Lock Control System	-	-	-	-	○	○	○
Wireless Door							

Lock Control System	○	-	-	-	○	○	○
Entry and Start System (for Entry Function)	-	-	-	-	○	○	○
Entry and Start System (for Start Function)	○	-	-	-	○	○	○
Engine Immobiliser System	○	-	-	-	○	○	-
Theft Deterrent System	○	-	-	-	○	○	○
Meter / Gauge System	○	-	-	-	○	○	○
Airbag System	○	○	-	-	○	-	-
Pre-crash Safety System	○	-	-	-	○	○	-
Front Power Seat Control System (w/ Seat Position Memory System)	-	-	-	-	○	○	-
Seat Belt Warning System	-	-	-	-	○	○	○
Air Conditioning System	○	○	-	-	○	○	○
Power Window Control System	○	-	-	-	○	○	○
Windshield Deicer System	-	-	-	-	-	○	-
Window Defogger System	-	-	-	-	-	○	-
Sliding Roof System	○	-	-	-	○	○	○
Power Mirror Control System (w/ Retract Mirror)	-	-	-	-	○	○	-
Wiper and Washer System (w/ Rain Sensor)	-	-	-	-	○	○	-
Lighting System	○	-	-	-	○	○	○

- **In the DTC check, it is very important to determine whether the problem indicated by the DTC is either: 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 related to the problem. Follow the procedures listed in the flowchart in the correct order.**
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NEXT

2.MAKE A NOTE OF DTC DISPLAYED AND THEN CLEAR MEMORY

NEXT

3.SYMPTOM CONFIRMATION

Result

Result	Proceed to
No symptoms exist	A
Symptoms exist	B

B. Go to step 5

A

4.SIMULATION TEST USING SYMPTOM SIMULATION METHODS

NEXT

5.DTC CHECK

Result

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

B. TROUBLESHOOTING OF PROBLEM INDICATED BY DTC

A

6.SYMPTOM CONFIRMATION

Result

Result	Proceed to
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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.

B. SYSTEM NORMAL

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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 a case, 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 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

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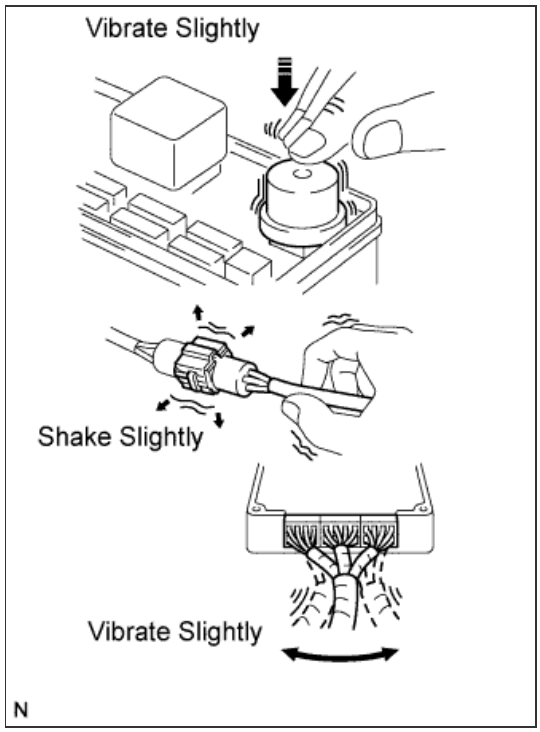
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Important points in the symptom simulation test:

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.

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When a malfunction seems to occur as a result of vibration.



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Apply slight vibration with a finger to the part of the sensor suspected to be the cause of the problem, and check whether or not the malfunction occurs.

NOTICE:

Applying strong vibration to relays may open them.

ii. CONNECTORS
Slightly shake the connector vertically and horizontally.

iii. WIRE HARNESS
Slightly shake the wire harness vertically and horizontally.

HINT:

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

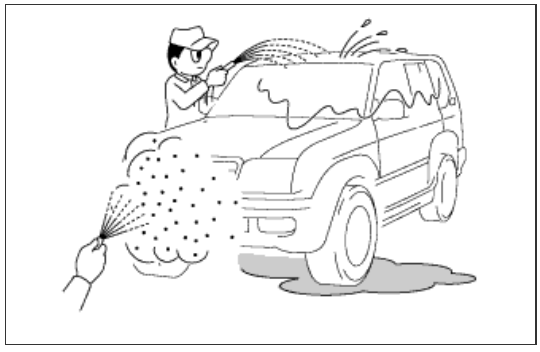
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When a malfunction seems to occur when the area in question is heated.

i. 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.**

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



i. Sprinkle water onto the vehicle and check if the malfunction occurs.

NOTICE:

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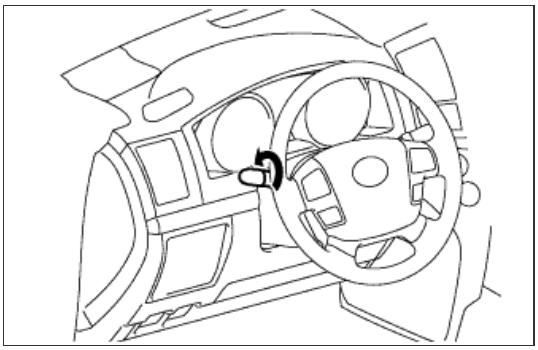
HINT:

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.

d. HIGH ELECTRICAL LOAD METHOD:

When a malfunction seems to occur when the electrical load is excessive.

i. Turn on the heater blower, headlights, rear window defogger and all other electrical loads. Check if the malfunction reoccurs.



DIAGNOSTIC TROUBLE CODE CHART

Look for output Diagnostic Trouble Codes (DTCs) (from the DTC checks) in the appropriate section's Diagnostic Trouble Code Chart. Use the chart to determine the trouble area and the proper inspection procedure. A description of each of the chart's columns is below.

Item	Description
DTC Code	Indicates the diagnostic trouble code.
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PROBLEM SYMPTOMS TABLE

When a "Normal" code is output during a DTC check but the problem is still occurring, use the Problem Symptoms Table. The suspected areas (circuits or parts) for each problem symptom are in the table. The suspected areas are listed in order of probability. A description of each of the chart columns is below.

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.

Item	Description
Symptom	-
Suspected Area	Indicates the circuit or part which needs to be checked.
See Page	Indicates the page where the flowchart for each circuit is located.

CIRCUIT INSPECTION

A description of the main areas of each circuit inspection is below.

Item	Description
Circuit Description	The major role and operation of the circuit and its component parts are explained.
DTC Code, DTC Detection Condition, Trouble Area	Indicates the diagnostic trouble codes, diagnostic trouble code detection conditions, and trouble areas of a problem.
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Inspection Procedures	Use the inspection procedures to determine if the circuit is normal or abnormal. If abnormal, use the inspection procedures to determine whether the problem is located in the sensors, actuators, wire harnesses or ECU.
Inspection Procedure Connector Illustrations	• Connector being checked is connected: Connections of tester are indicated by (+) or (-) after the terminal name. • Connector being checked is disconnected: For illustrations of inspections between a connector and body ground, information about the body ground is not shown in the illustration.

OPERATION FLOW

HINT:

Perform troubleshooting in accordance with the procedures below. The following is an outline of basic troubleshooting procedures. 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.INSPECT BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

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

NEXT

4.SYMPTOM CONFIRMATION AND DTC (INCLUDING FREEZE FRAME DATA) CHECK

a. Visually check the wire harnesses, connectors and fuses for open and short circuits.

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

c. Confirm the problem symptoms and conditions, and check for DTCs.

Result

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

B. Go to step 6

A

5.DTC CHART

a. Check the results obtained in the DTC check. Then find the output DTC in the DTC chart. Look at the "Trouble Area" column for a list of potentially malfunctioning circuits and/or parts.

NEXT. Go to step 7

6.PROBLEM SYMPTOMS TABLE

a. Check the results obtained in the symptom confirmation. Then find the problem symptoms in the problem symptoms table. Look at the "Suspected Area" column for a list of potentially malfunctioning circuits and/or parts.

NEXT

7.CIRCUIT INSPECTION OR PARTS INSPECTION

a. Confirm the malfunctioning circuit or part.

NEXT

8.ADJUST, REPAIR OR REPLACE

a. Adjust, repair or replace the malfunctioning circuit or parts.

NEXT

9.CONFIRMATION TEST

a. After the adjustment, repairs or replacement, 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 the malfunction 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 make an accurate judgment. 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 the malfunction occurred.**
- **Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.**
- The following 5 questions are important points in the 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

SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

The diagnostic system in the LAND CRUISER Station Wagon 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 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 LAND CRUISER Station Wagon.**

System	DTC Check (Normal Mode)	DTC Check (Check Mode)	Freeze Frame Data	Sensor Check / Test Mode (Input Signal Check)	Data List	Active Test	Customize Parameter
SFI System (1GR-FE)	○	○	○	-	○	○	-

SFI System (3UR-FE)	○	○	○	-	○	○	-
SFI System (2UZ-FE)	○	○	○	-	○	○	-
ECD System (1VD-FTV)	○	○	○	-	○	○	-
Cruise Control System	○	-	-	-	○	○	-
Automatic Transmission System (A750F)	○	○	-	-	○	○	-
Automatic Transmission System (AB60F)	○	○	-	-	○	○	-
Active Height Control Suspension	○	○	-	○	○	○	-
Anti-lock Brake System	○	-	○	○	○	○	-
Vehicle Stability Control System	○	-	○	○	○	○	-
Variable Gear Ratio Steering System	○	-	○	○	○	○	-
Power Tilt and Power Telescopic Steering Column System	○	-	○	-	○	○	○
Steering Lock System	○	-	-	-	○	-	-
Audio and Visual System (w/ Cassette Tape Player)	○	-	-	-	-	-	-
Audio and Visual System (w/ Navigation System)	○	-	-	-	-	-	-
Audio and Visual System (w/o Navigation System)	○	-	-	-	-	-	-
Rear Seat Entertainment System	○	-	-	-	-	-	-
Navigation System (for DVD)	○	-	-	-	-	-	-
Navigation System (for HDD)	○	-	-	-	-	-	-
Toyota Parking Assist-sensor System	○	-	-	-	○	○	○
Parking Assist Monitor System	○	-	-	-	○	-	-
LIN Communication System	○	-	-	-	○	-	-
CAN Communication System	○	-	-	-	-	-	-
Power Door Lock Control	-	-	-	-	○	○	○

System							
Wireless Door Lock Control System	○	-	-	-	○	○	○
Entry and Start System (for Entry Function)	-	-	-	-	○	○	○
Entry and Start System (for Start Function)	○	-	-	-	○	○	○
Engine Immobiliser System	○	-	-	-	○	○	-
Theft Deterrent System	○	-	-	-	○	○	○
Meter / Gauge System	○	-	-	-	○	○	○
Airbag System	○	○	-	-	○	-	-
Pre-crash Safety System	○	-	-	-	○	○	-
Front Power Seat Control System (w/ Seat Position Memory System)	-	-	-	-	○	○	-
Seat Belt Warning System	-	-	-	-	○	○	○
Air Conditioning System	○	○	-	-	○	○	○
Power Window Control System	○	-	-	-	○	○	○
Windshield Deicer System	-	-	-	-	-	○	-
Window Defogger System	-	-	-	-	-	○	-
Sliding Roof System	○	-	-	-	○	○	○
Power Mirror Control System (w/ Retract Mirror)	-	-	-	-	○	○	-
Wiper and Washer System (w/ Rain Sensor)	-	-	-	-	○	○	-
Lighting System	○	-	-	-	○	○	○

- **In the DTC check, it is very important to determine whether the problem indicated by the DTC is either: 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.**
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NEXT

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NEXT

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Result

Result	Proceed to
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B. → Go to step 5

A

4.SIMULATION TEST USING SYMPTOM SIMULATION METHODS

NEXT

5.DTC CHECK

Result

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B. → TROUBLESHOOTING OF PROBLEM INDICATED BY DTC

A

6.SYMPTOM CONFIRMATION

Result

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B. → SYSTEM NORMAL

A

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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

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The most difficult case in troubleshooting is when no problem symptoms occur. In such a case, a thorough problem analysis must be carried out. A

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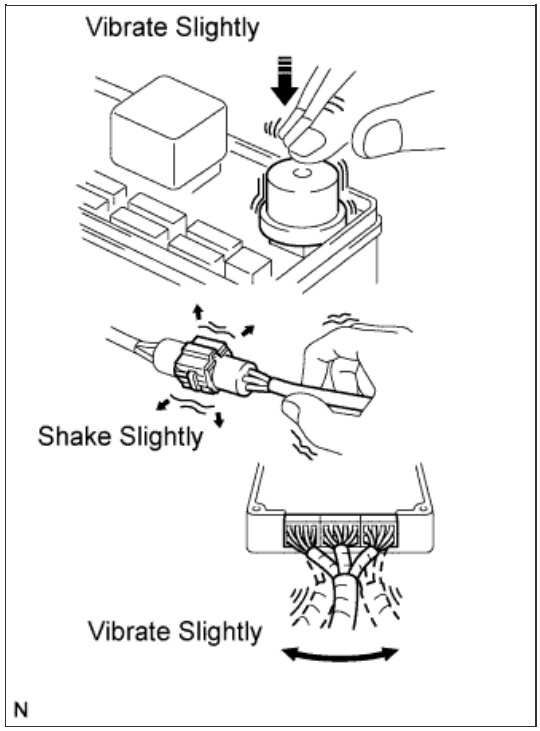
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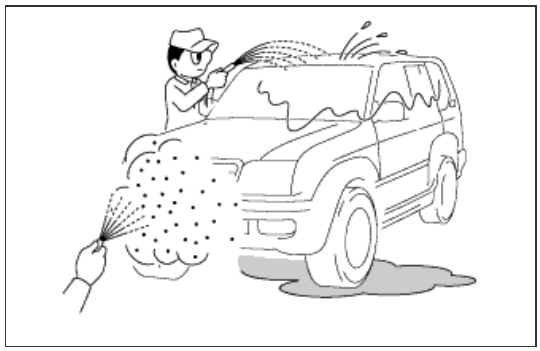
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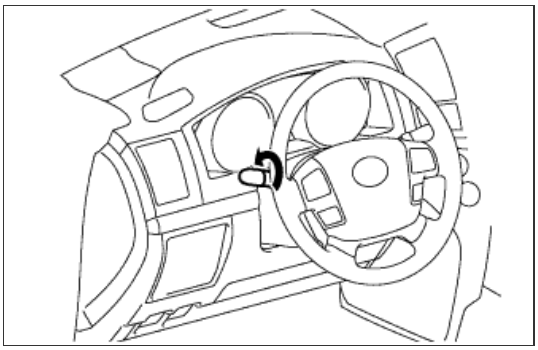
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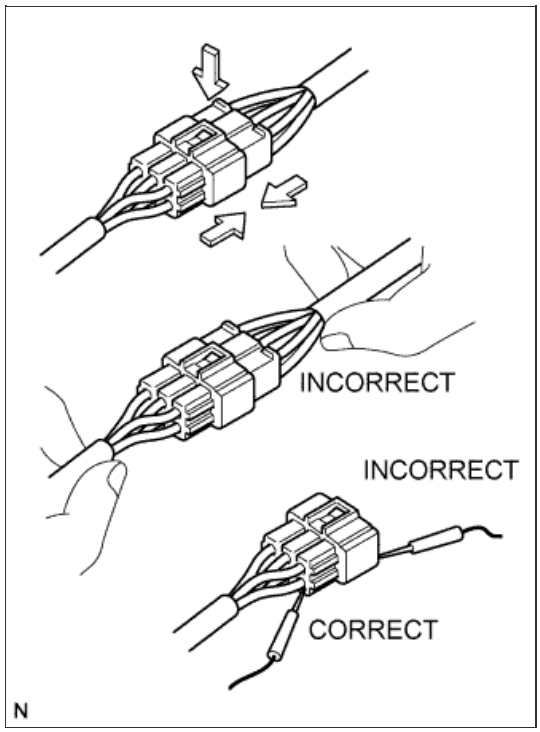
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BASIC INSPECTION

a. WHEN MEASURING RESISTANCE OF ELECTRONIC PARTS

i. Unless otherwise stated, all resistance measurements should be made at an ambient temperature of 20°C (68°F). Resistance measurements may be inaccurate 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



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

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

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

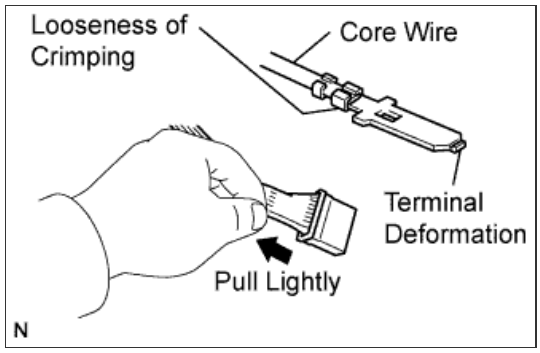
iv. When connecting a connector, press firmly until it locks with a "click" sound.

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

NOTICE:

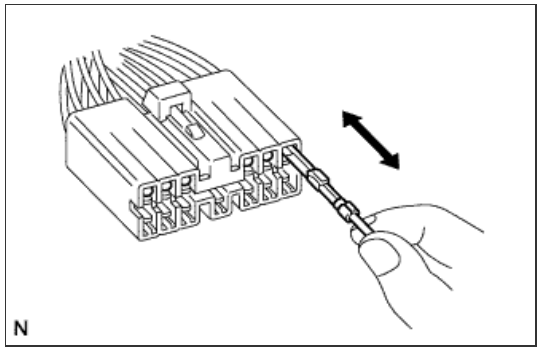
- **As a waterproof connector cannot be checked from the backside, check it by connecting a sub-harness.**
- **Do not damage the terminals by moving the inserted tester needle.**

c. CHECKING CONNECTORS



i. Checking when a connector is connected: Squeeze the connectors together to confirm that they are fully connected and locked.

ii. 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 matter and water, and bent, rusted, overheated, contaminated, or deformed terminals.



iii. 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.

NOTICE:

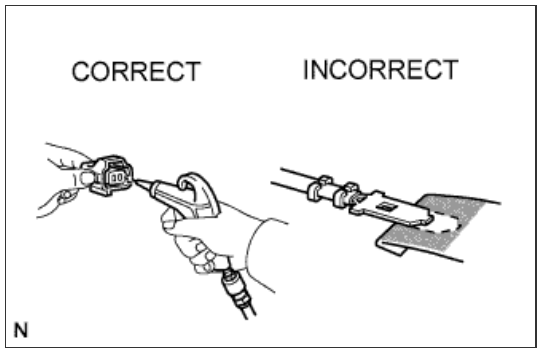
When testing a gold-plated female terminal, always use a gold-plated male terminal.

d. REPAIR METHOD OF CONNECTOR TERMINAL

i. If there is any foreign matter 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.

ii. 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.

iii. Damaged, deformed, or corroded terminals should be replaced. If the terminal does not lock into the housing, the housing may have to be replaced.



e. HANDLING OF WIRE HARNESS

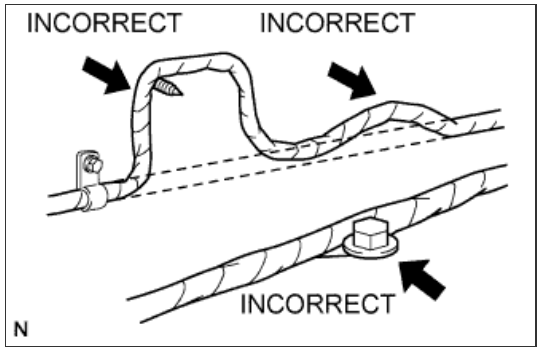
i. If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.

ii. Never twist, pull or slacken the wire harness more than necessary.

iii. 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.

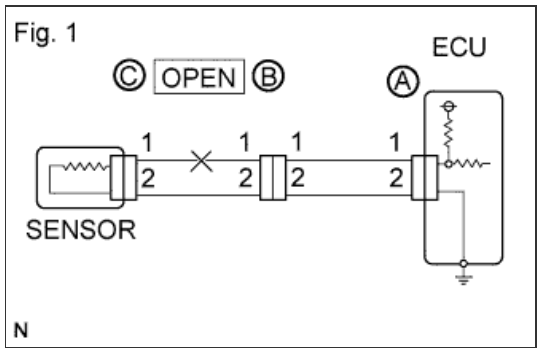
iv. When installing parts, never pinch the wire harness.

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



CHECK FOR OPEN CIRCUIT

a. For an open circuit in the wire harness in Fig. 1, check the resistance or voltage, as described below.

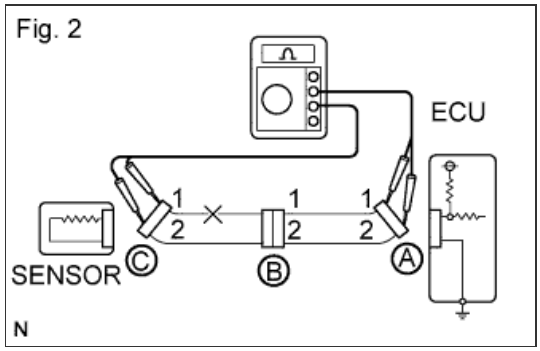


b. Check the resistance.

i. Disconnect connectors A and C and measure the resistance between them.

Standard Resistance (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.

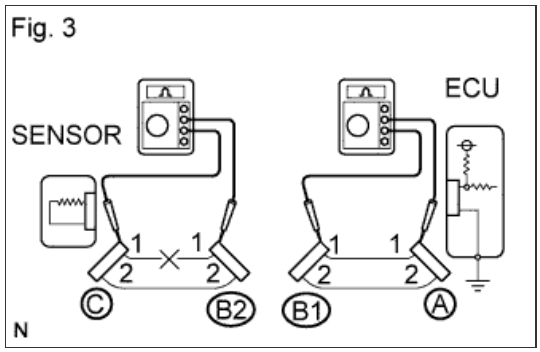
If the results match the examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

ii. Disconnect connector B and measure the resistance between the

connectors.

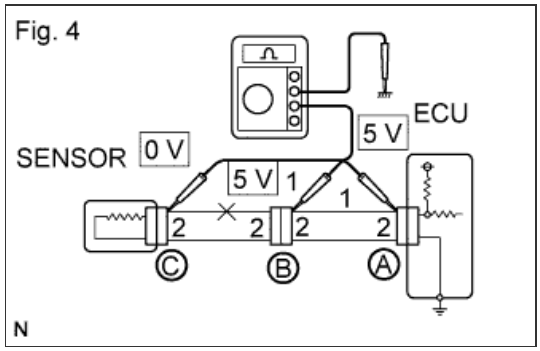
Standard Resistance (Fig. 3):

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

c. Check the voltage.



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

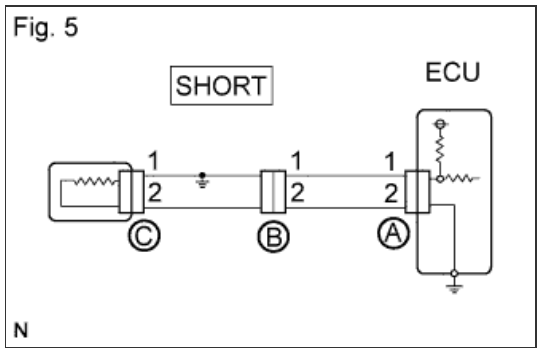
Standard Voltage (Fig. 4):

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	Below 1 V

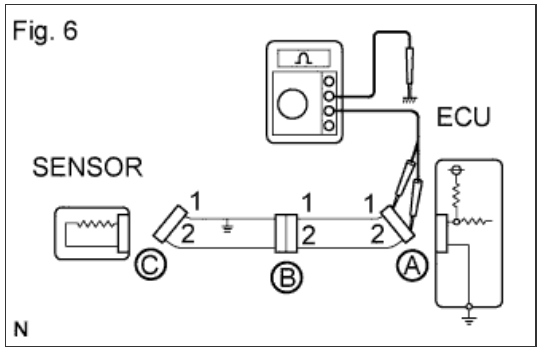
If the results match the examples above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.

CHECK FOR 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).



b. Check the resistance with the body ground.



i. Disconnect connectors A and C and measure the resistance.

Standard Resistance (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.

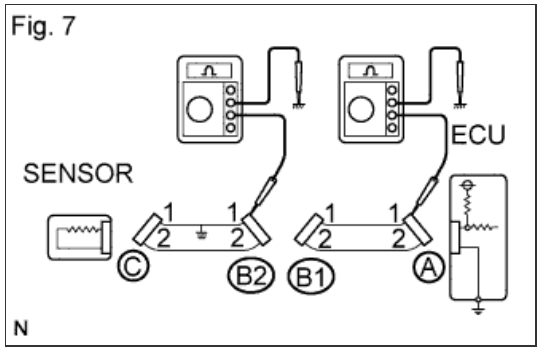
If your results match the examples above, a short circuit exists between terminal 1 of connector A and terminal 1 of connector C.

ii. Disconnect connector B and measure the resistance.

Standard Resistance (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 the results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.



CHECK AND REPLACE ECU

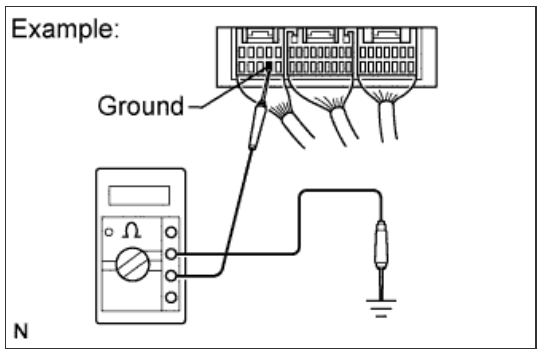
NOTICE:

- **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 engine switch on.**
- **Check that the connectors are fully seated. Check for loose, corroded or broken wires.**

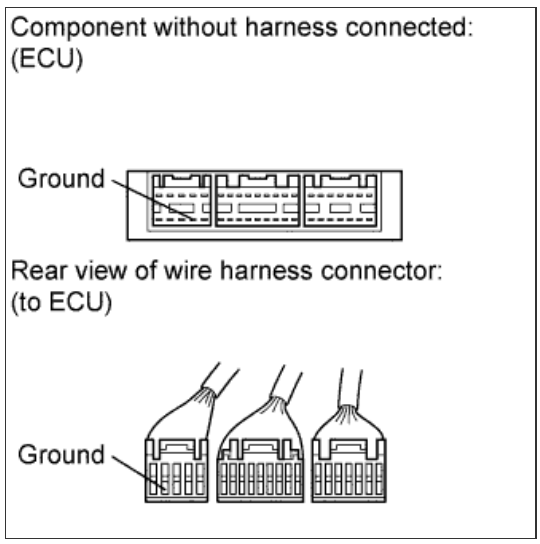
a. First, check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty. Temporarily replace the ECU with a normally functioning one and check if the symptoms occur. If the trouble symptoms disappear, replace the original ECU.

i. Measure the resistance between the ECU ground terminal and body ground.

Standard Resistance:
Below 1 Ω



ii. Disconnect the ECU connector. Check the ground terminal on the ECU side and wire harness side for bending, corrosion or foreign matter. Lastly, check the contact pressure of the female terminals.



ABBREVIATIONS	MEANING
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
A.D.D.	Automatic Disconnecting Differential
A/C	Air Conditioner
A/F	Air-Fuel Ratio
A/T, ATM	Automatic Transmission (Transaxle)
ABS	Anti-Lock Brake System
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACM	Active Control Engine Mount
ACSD	Automatic Cold Start Device
AFS	Adaptive Front-Lighting System
AHC	Active Height Control Suspension
AID	Air Injection Control Driver
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
ASL	Automatic sound levelizer
ASSB	Assembly Services Sdn. Bhd.
ASSY	Assembly
A-TRC	Active Traction Control
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
B/L	Bi-Level
B/S	Bore-Stroke Ratio
B+	Battery Voltage
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
C/V	Check Valve
Calif.	California
CAN	Controller Area Network
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
CRAWL	Crawl Control
CRS	Child Restraint System
CTR	Center
CV	Control Valve
CW	Curb Weight
D/INJ	Direct Injection
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
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 Versatile Disc
E/G	Engine
EBD	Electronic Brake Force Distribution
EC	Electrochromic
ECAM	Engine Control And Measurement System
ECD	Electronically Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Controlled Automatic Transmission/Transaxle
ECU	Electronic Control Unit
ED	Electro-Deposited Coating
EDIC	Electronic Diesel Injection Control
EDU	Electronic Driving Unit
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation
EGR-VM	EGR-Vacuum Modulator
ELR	Emergency Locking Retractor
EMPS	Electric Motor Power Steering
ENG	Engine
ES	Easy & Smooth
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
F/G	Fuel Gauge
F/P	Fuel Pump
F/W	Flywheel
FE	Fuel Economy
FF	Front-Engine Front-Wheel-Drive
FIPG	Formed In Place Gasket

FL	Fusible Link
FPU	Fuel Pressure Up
FR / Fr	Front
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
GSA	Gear Shift Actuator
H/B	Hatchback
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Headlight)
HPU	Hydraulic Power Unit
HSG	Housing
HT	Hard Top
HV	Hybrid Vehicle
HWS	Heated Windshield System
I/P	Instrument Panel
IC	Integrated Circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
IRS	Independent Rear Suspension
ISC	Idle Speed Control
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
KDSS	Kinetic Dynamic Suspension System
L/H/W	Length, Height, Width
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
LIN	Local Interconnect Network
LLC	Long-Life Coolant
LNG	Liquefied Natural Gas
LO	Low
LPG	Liquefied Petroleum Gas
LSD	Limited Slip Differential
LSP & BV	Load Sensing Proportioning and Bypass Valve
LSPV	Load Sensing Proportioning Valve
M/T, MTM	Manual Transmission (Transaxle)
MAP	Manifold Absolute Pressure
MAX.	Maximum
MG1	Motor Generator No. 1
MG2	Motor Generator No. 2
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MMT	Multi-mode Manual Transmission

MP	Multipurpose
MPI	Multipoint Electronic Injection
MPX	Multiplex Communication System
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
NO. / No.	Number
O/D	Overdrive
O/S	Oversize
O2S	Oxygen Sensor
OC	Oxidation Catalyst
OCV	Oil Control Valve
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
ORVR	On-board Refueling Vapor Recovery
P & BV	Proportioning And Bypass Valve
P/W	Power Window
PBD	Power Back Door
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PROM	Programmable Read Only Memory
PS	Power Steering
PSD	Power Slide Door
PTC	Positive Temperature Coefficient
PTO	Power Take-Off
PZEV	Partial Zero Emission Vehicle
R & P	Rack and Pinion
R/B	Relay Block
R/F	Reinforcement
RAM	Random Access Memory
RBS	Recirculating Ball Type Steering
REAS	Relative Absorber System
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory
RR / Rr	Rear
RRS	Rigid Rear Suspension
RSE	Rear Seat Entertainment
RWD	Rear-Wheel Drive
SC	Supercharger
SCV	Swirl Control Valve (for gasoline engine)
SCV	Suction Control Valve (for diesel engine)
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SPV	Spill Control Valve

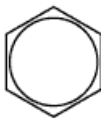
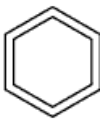
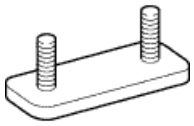
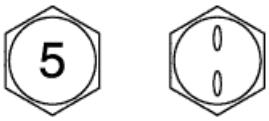
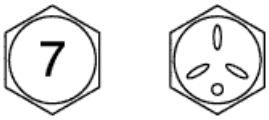
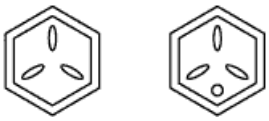
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
T/M	Transmission
TACH	Tachometer
TAM	P.T. TOYOTA-Astra Motor
TASA	TOYOTA Argentina S.A.
TAT	TOYOTA Motor Thailand Co. Ltd.
TAW	TOYOTA Auto Works Co. Ltd.
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCV	Timing Control Valve (for diesel engine)
TCV	Tumble Control Valve (for gasoline engine)
TDC	Top Dead Center
TDV	TOYOTA de Venezuela C.A.
TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TFT	TOYOTA Free-Tronic
TIS	Total Information System For Vehicle Development
TKM	TOYOTA Kirloskar Motor Ltd.
TMC	TOYOTA Motor Corporation
TMMIN	P.T. TOYOTA Motor Manufacturing Indonesia
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TMP	TOYOTA Motor Philippines Corp.
TMT	TOYOTA Motor Thailand Co. Ltd.
TRAC	Traction Control System
TRC	Traction Control System
TSAM	TOYOTA South Africa Motors (Pty) Ltd.
TURBO	Turbocharge
TVIP	TOYOTA Vehicle Intrusion Protection
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VDIM	Vehicle Dynamics Integrated Management
VENT	Ventilator
VGRS	Variable Gear Ratio Steering
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/ / w/	With
W/H	Wire Harness
W/O / w/o	Without
WGN	Wagon

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	-
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	-
DLC3	Data Link Connector 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 Electronic Control Unit (ECU)
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
		Electric Bleed Air Control Valve (EBCV)

MC	Mixture Control	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 Light
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 Catalytic 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	-

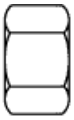
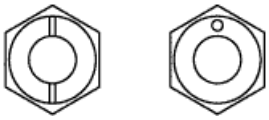
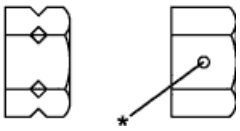
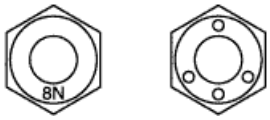
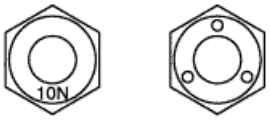
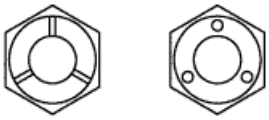
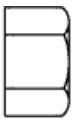
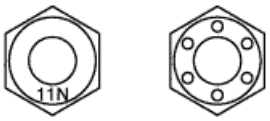
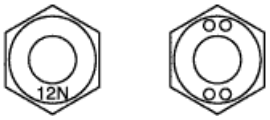
Bolt Type

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

STANDARD BOLT > 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	1150	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	1050	76
	16	1.5	140	1400	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	1100	80	125	1250	90
	16	1.5	170	1750	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	1050	76
	14	1.5	145	1500	108	165	1700	123
	16	1.5	230	2300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1100	80	120	1250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1300	94	140	1450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1450	105	155	1600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1600	116	175	1800	130

Nut Type

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

HINT:

- ***: Nut with 1 or more marks on one side surface of the nut.**
- **Use a nut with the same nut strength classification number (or more) as the bolt strength classification number when tightening parts with a bolt and nut.**

Example:

- **Bolt = 4T**
- **Nut = 4N or more**

Camshaft timing oil control valve:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	6.9 to 7.9 Ω

Crankshaft position sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Cold	1630 to 2740 Ω
	Hot	2065 to 3225 Ω

Engine coolant temperature sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Approx. 20°C (68°F)	2.32 to 2.59 kΩ
	Approx. 80°C (176°F)	0.310 to 0.326 kΩ

Throttle body:

Tester Connection	Condition	Specified Condition
2 (M+) - 1 (M-)	20°C (68°F)	0.3 to 100 Ω

Knock sensor:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	120 to 280 kΩ

Ignition relay No. 2:

Tester Connection	Condition	Specified Condition
IG2 MAIN fuse	Always	Below 1 Ω
1C-1 - 1B-8	Battery voltage is not applied to terminals 1B-6 and 1B-7	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 6 and 1B-7	Below 1 Ω

EFI relay:

Tester Connection	Condition	Specified Condition
EFI No. 1 fuse	Always	Below 1 Ω
1C-1 - 1B-4	Battery voltage is not applied to terminals 1B-2 and 1B-3)	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 2 and 1B-3)	Below 1 Ω

Circuit opening relay:

Tester Connection	Condition	Specified Condition

3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

EFI No. 2 relay:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

Accelerator pedal:

Tester display	Accelerator pedal released	Accelerator pedal depressed
Accelerator pedal position No. 1	0.5 to 1.1 V	2.6 to 4.5 V
Accelerator pedal position No. 2	1.2 to 2.0 V	3.4 to 5.0 V

Main body ECU (IG1 No.1):

Tester Connection	Condition	Specified Condition
2A-1 - 2B-17	Battery voltage is not applied to terminals 2B-5 and 2D-43	10 kΩ or higher
	Battery voltage is applied to terminals 2B-5 and 2D-43	Below 1 Ω

Air fuel ration sensor (for Bank 1 sensor 1):

Tester Connection	Condition	Specified Condition
1 (HT1A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Air fuel ration sensor (for Bank 2 sensor 1):

Tester Connection	Condition	Specified Condition
1 (HT2A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Heated oxygen sensor (for Bank 1 sensor 2):

Tester Connection	Condition	Specified Condition
1 (HT1B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

Heated oxygen sensor (for Bank 2 sensor 2):

Tester Connection	Condition	Specified Condition
1 (HT2B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

A/F sensor heater relay:

Tester Connection	Condition	Specified Condition
A/F fuse	Always	Below 1 Ω
	Battery voltage is not applied to terminals 1A-2 and 1A-3	10 kΩ or higher

1C-1 - 1A-4	Battery voltage is applied to terminals 1A- 2 and 1A-3	Below 1 Ω

Spark plug:

Recommended spark plug	Correct electrode gap for new spark plug	Maximum electrode gap for used spark plug	Standard insulation resistance
DENSO made: K20HR-U11	Correct electrode gap for new spark plug 1.0 to 1.1 mm (0.0394 to 0.0433in.)	1.3 mm (0.0512 in.)	10 MΩ or higher
NGK made: LFR6C11			

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft timing oil control valve assembly x Cylinder head	10	102	7
VVT sensor x Cylinder head	8.0	82	71 in.*lbf
Crankshaft position sensor x Cylinder block	9.0	92	80 in.*lbf
Engine coolant temperature sensor x Rear water by-pass joint	20	204	15
Throttle body x Intake manifold	11	112	8
No. 1 Water outlet pipe x Cylinder block	10	102	7
Knock sensor x Cylinder block	20	204	15
ECM x Body	8.0	82	71 in.*lbf
Connector holder block x Body	8.0	82	71 in.*lbf
Accelerator pedal rod assembly x Body	5.4	55	48 in.*lbf
Air fuel ratio sensor x Front exhaust pipe assembly (for Bank 1 Sensor 1)	40 (44)	408 (449)	30 (32)
Air fuel ratio sensor x Front No. 2 exhaust pipe assembly (for Bank 2 Sensor 1)	40 (44)	408 (449)	30 (32)
Heated oxygen sensor x Front exhaust pipe assembly (for Bank 1 Sensor 2)	40 (44)	408 (449)	30 (32)
Heated oxygen sensor x Front No. 2 exhaust pipe assembly (for Bank 2 Sensor 2)	40 (44)	408 (449)	30 (32)
Ignition coil x Cylinder head cover	9.0	92	80 in.*lbf
Spark plug x Cylinder head	20	204	15
No. 2 surge tank stay x Surge tank	21	214	15
Clutch tube bracket x No. 2 surge tank stay	20	204	15
Front No. 2 exhaust pipe assembly x Exhaust manifold sub-assembly LH	54	554	40
Front No. 2 exhaust pipe assembly x Center pipe assembly	48	489	35
Power steering oil pressure switch x Pressure feed tube	21	210	15

(): For use with SST

MAF Meter (Intake Air Temperature Sensor)

Standard resistance	4 (THA) - 5 (E2)	-20°C (-4°F)	12.5 to 16.9 kΩ
		20°C (68°F)	2.19 to 2.67 kΩ
		60°C (140°F)	0.50 to 0.68 kΩ

Camshaft Timing Oil Control Valve

Standard resistance	1 - 2	20°C (68°F)	6.9 to 7.9 Ω

Engine Coolant Temperature Sensor

Standard resistance	1 - 2	Approximately 20°C (68°F)	2.32 to 2.59 kΩ
		Approximately 80°C (176°F)	0.310 to 0.326 kΩ

Throttle Control Motor

Standard resistance	1 (M-) - 2 (M+)	20°C (68°F)	0.3 to 100 Ω

Knock Sensor

Standard resistance	1 - 2	20°C (68°F)	120 to 280 kΩ

Air Fuel Ratio Sensor (for Bank 1 sensor 1)

Standard resistance	1 (HA1A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Air Fuel Ratio Sensor (for Bank 2 sensor 1)

Standard resistance	1 (HA2A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Heated Oxygen Sensor (for Bank 1 sensor 2)

Standard resistance	1 (HT1B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

Heated Oxygen Sensor (for Bank 2 sensor 2)

Standard resistance	1 (HT2B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

Spark Plug

Recommended spark plug	DENSO made: SK20HR11
Correct electrode gap for new spark plug	1.0 to 1.1 mm (0.039 to 0.043 in.)
Maximum electrode gap for used spark plug	1.3 mm (0.051 in.)
Standard insulation resistance	10 MΩ or higher

CAMSHAFT TIMING OIL CONTROL VALVE

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft oil control valve assembly (for Bank 1) x Cylinder head cover LH	10	102	7
Camshaft oil control valve assembly (for Bank 2) x Cylinder head cover RH	10	102	7

THROTTLE BODY

Part Tightened	N*m	kgf*cm	ft.*lbf
Throttle body x Intake manifold	10	102	7

ECM

Part Tightened	N*m	kgf*cm	ft.*lbf
Connector holder block x Body	8.0	82	71 in.*lbf
ECM x Body	8.0	82	71 in.*lbf

ACCELERATOR PEDAL

Part Tightened	N*m	kgf*cm	ft.*lbf
Accelerator pedal x Body	5.4	55	48 in.*lbf

MASS AIR FLOW METER

Part Tightened	N*m	kgf*cm	ft.*lbf
Mass air flow meter x Air cleaner cap	1.7	17	15 in.*lbf

CAMSHAFT POSITION METER

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft position sensor x Cylinder head cover LH	10	102	7
VVT sensor x Cylinder head cover LH	10	102	7
VVT sensor x Cylinder head cover RH	10	102	7

CRANKSHAFT POSITION SENSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Crankshaft position sensor protector x No. 1 oil pan	10	102	7
Crankshaft position sensor x No. 1 oil pan	10	102	7

IGNITION COIL AND SPARK PLUG

Part Tightened	N*m	kgf*cm	ft.*lbf
Spark plug x Cylinder head	21	214	15
Ignition coil x Cylinder head cover	10	102	7
Water pipe hose sub-assembly x Cylinder head cover	18	184	13

ENGINE COOLANT TEMPERATURE SENSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Engine coolant temperature x Front water by-pass joint	20	200	14

KNOCK SENSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Knock sensor x Cylinder block	20	204	15

AIR FUEL RATIO SENSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Air fuel ratio sensor (for Bank 1) x Front No. 2 exhaust pipe assembly	44 (40)	449 (408)	32 (30)
Air fuel ratio sensor (for Bank 2) x Front exhaust pipe assembly	44 (40)	449 (408)	32 (30)

(): For use with SST

HEATED OXYGEN SENSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Heated oxygen sensor (for Bank 1) x Front No. 2 exhaust pipe assembly	44 (40)	449 (408)	32 (30)
Heated oxygen sensor (for Bank 2) x Front exhaust pipe assembly	44 (40)	449 (408)	32 (30)

(): For use with SST

POWER STEERING OIL PRESSURE SWITCH

Part Tightened	N*m	kgf*cm	ft.*lbf
Power steering pressure switch x Power feed tube	21	214	15

MAF meter:

Tester Connection	Condition	Specified Condition
4 (THA) - 5 (E2)	-20°C (-4°F)	12.5 to 16.9 kΩ
	20°C (68°F)	2.19 to 2.67 kΩ
	60°C (140°F)	0.50 to 0.68 kΩ

Camshaft timing oil control valve:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	6.9 to 7.9 Ω

VVT sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Cold	835 to 1400 Ω
	Hot	1060 to 1645 Ω

Crankshaft position sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Cold	1630 to 2740 Ω
	Hot	2065 to 3225 Ω

Engine coolant temperature sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Approx. 20°C (68°F)	2.32 to 2.59 kΩ
	Approx. 80°C (176°F)	0.310 to 0.326 kΩ

Throttle body:

Tester Connection	Condition	Specified Condition
1 (M-) - 2 (M+)	20°C (68°F)	0.3 to 100 Ω

Knock sensor:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	120 to 280 kΩ

Integration relay (IG2):

Tester Connection	Condition	Specified Condition
IG2 MAIN fuse	Always	Below 1 Ω
1C-1 - 1B-8	Battery voltage is not applied to terminals 1B-6 and 1B-7	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 6 and	Below 1 Ω

	1B-7	

Integration relay (EFI):

Tester Connection	Condition	Specified Condition
EFI main fuse	Always	Below 1 Ω
1C-1 - 1B-4	Battery voltage is not applied to terminals 1B-2 and 1B-3)	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 2 and 1B-3)	Below 1 Ω

Accelerator pedal:

Tester display	Accelerator pedal released	Accelerator pedal depressed
Accelerator position No. 1	0.5 to 1.1 V	2.6 to 4.5 V
Accelerator position No. 2	1.2 to 2.0 V	3.4 to 5.0 V

Circuit opening relay (C/OPN):

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

Air fuel ration sensor (for Bank 1 sensor 1):

Tester Connection	Condition	Specified Condition
1 (HT1A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Air fuel ration sensor (for Bank 2 sensor 1):

Tester Connection	Condition	Specified Condition
1 (HT2A) - 2 (+B)	20°C (68°F)	1.8 to 3.4 Ω

Heated oxygen sensor (for Bank 1 sensor 2):

Tester Connection	Condition	Specified Condition
1 (HT1B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

Heated oxygen sensor (for Bank 2 sensor 2):

Tester Connection	Condition	Specified Condition
1 (HT2B) - 2 (+B)	20°C (68°F)	11 to 16 Ω

A/F sensor heater relay:

Tester Connection	Condition	Specified Condition
A/F fuse	Always	Below 1 Ω
1C-1 - 1A-4	Battery voltage is not applied to terminals 1A-2 and 1A-3	10 kΩ or higher
	Battery voltage is applied to terminals 1A- 2 and	Below 1 Ω

	1A-3	

EFI No. 2 relay:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

Main body ECU:

Tester Connection	Condition	Specified Condition
2A-1 - 2B-17	Battery voltage is not applied to terminals 2B-5 and 2D-43	10 kΩ or higher
	Battery voltage is applied to terminals 2B-5 and 2D-43	Below 1 Ω

Spark plug:

Recommended spark plug	Correct electrode gap for new spark plug	Maximum electrode gap for used spark plug	Standard insulation resistance
DENSO made: SK20R11	Correct electrode gap for new spark plug 1.0 to 1.1 mm (0.0394 to 0.0433in.)	1.3 mm (0.0512 in.)	10 MΩ or higher
NGK made: IFR6A11			

Part Tightened	N*m	kgf*cm	ft.*lbf
Throttle body x Intake manifold	14	143	10
ECT sensor x Front water bypass joint	20	200	14
Knock sensor x Cylinder head	20	204	15
Camshaft oil control valve x Cylinder head	7.5	76	66 in.*lbf
Camshaft position sensor x Cylinder head	7.5	76	66 in.*lbf
VVT sensor x Cylinder head	7.5	76	66 in.*lbf
Crankshaft position sensor x Cylinder head	6.5	66	58 in.*lbf
Mass air flow meter x Air cleaner hose	1.7	17	15 in.*lbf
ECM x Body	8.0	82	71 in.*lbf
Accelerator pedal x body	5.4	55	48 in.*lbf
Air fuel ratio sensor x Exhaust pipe	44 (40)	449 (408)	32 (30)
Heated oxygen sensor x Exhaust pipe	44 (40)	449 (408)	32 (30)
Ignition coil x Cylinder head cover	9.0	92	80 in.*lbf
Spark plug x Cylinder head	18	184	13
Power steering oil pressure switch	21	214	15
Connector holder block x Body	8.0	82	71 in.*lbf

(): For use with SST

MAF meter:

Tester Connection	Condition	Specified Condition
4 (THA) - 5(E2)	-20°C (-4°F)	12.5 to 16.9 kΩ
	20°C (68°F)	2.19 to 2.67 kΩ
	60°C (140°F)	0.50 to 0.68 kΩ

Camshaft position sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Hot	835 to 1400Ω
	Cold	1060 to 1645Ω

Crankshaft position sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Hot	1630 to 2740Ω
	Cold	2065 to 3225Ω

Engine coolant temperature sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Approximately. 20°C (68°F)	2.32 to 2.59 kΩ
	Approximately. 80°C (176°F)	0.310 to 0.326 kΩ

Intake air temperature sensor:

Tester Connection	Condition	Specified Condition
1 - 2	Approximately. 20°C (68°F)	2.21 to 2.65 kΩ
	Approximately. 60°C (140°F)	0.55 to 0.61 kΩ

Integration relay (IG2):

Tester Connection	Condition	Specified Condition
IG2 MAIN fuse	Always	Below 1 Ω
1C-1 - 1B-8	Battery voltage is not applied to terminals 1B-6 and 1B-7	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 6 and 1B-7	Below 1 Ω

Integration relay (EFI MAIN):

Tester Connection	Condition	Specified Condition
EFI No. 1 fuse	Always	Below 1 Ω
1C-1 - 1B-4	Battery voltage is not applied to terminals 1B-2 and 1B-3)	10 kΩ or higher
	Battery voltage is applied to terminals 1B- 2 and 1B-3)	Below 1 Ω

Integration relay (EFI MAIN 2):

Tester Connection	Condition	Specified Condition
EFI No. 1 fuse	Always	Below 1 Ω
1C-1 - 1A-4	Battery voltage is not applied to terminals 1A-2 and 1A-3	10 kΩ or higher
	Battery voltage is applied to terminals 1A-2 and 1A-3	Below 1 Ω

Fuel pump relay (SUB PUMP):

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

EDU relay (EDU1, EDU2):

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

Main body ECU (IG1 No.1):

Tester Connection	Condition	Specified Condition
2A-1 - 2B-17	Battery voltage is not applied to terminals 2B-5 and 2D-43	10 kΩ or higher
	Battery voltage is applied to terminals 2B-5 and 2D-43	Below 1 Ω

No.1 vacuum switching valve:

Tester Connection	Condition	Specified Condition
1-2	20 °C	37 to 44 Ω
1 - Body ground 2 - Body ground	Always	10 kΩ or higher

Diesel turbo pressure sensor:

Tester Connection	Switch Condition	Specified Condition
C80-3 (VC) - C80-1 (E2)	Engine switch on (IG)	4.5 to 5.5V

Accelerator pedal:

Tester display	Accelerator pedal released	Accelerator pedal depressed
Accelerator pedal position No. 1	0.5 to 1.1 V	2.6 to 4.5 V
Accelerator pedal position No. 2	1.2 to 2.0 V	3.4 to 5.0 V

Part Tightened	N*m	kgf*cm	ft.*lbf
Intake air connector sub-assembly x Mass air flow meter	1.7	17	15 in.*lbf
Camshaft position sensor x Timing chain cover	5.0	51	44 in.*lbf
Crankshaft position sensor x Timing chain cover	5.0	51	44 in.*lbf
Engine coolant temperature sensor x Water outlet	20	204	15
Intake air temperature sensor x Intercooler assembly	29 (19)*1	300 (197)*1	22 (14)*1
Diesel throttle body x Intake pipe	21	214	15
Diesel throttle body x Air tube assembly LH	6.3	64	56 in.*lbf
Diesel throttle body x Air tube assembly RH	6.3	64	56 in.*lbf
Power steering oil pressure switch x Vane pump assembly	21	214	15
ECM x Body	8.0	82	71 in.*lbf
Diesel turbo pressure sensor x Intercooler assembly	5.0	51	44 in.*lbf
Accelerator pedal assembly x Accelerator pedal bracket	5.4	55	48 in.*lbf
Clutch hose x Air tube	20	204	15
Clutch tube x Bracket	20	204	15
Tube connector to flexible hose tube x No. 3 intercooler support bracket	20	204	15
Tube connector to flexible hose tube x Clutch tube to release cylinder 2 way	15 (14)*2	154 (141)*2	11 (10)*2
Clutch hose x Flexible hose tube	15 (14)*2	154 (141)*2	11 (10)*2
No. 1 vacuum switching valve x Cylinder head cover	6.0	61	53 in.*lbf
Engine mounting insulator x Bracket	80	816	59
Connector holder block x Body	8.0	82	71 in.*lbf

*1 (): For use with ball joint lock nut wrench

*2 (): For use with union nut wrench

Compression pressure

-	1300 kPa (13.3 kgf/cm^2, 189 psi)
Minimum	1000 kPa (10.2 kgf/cm^2, 145 psi)
Difference of pressure between each cylinder	100 kPa (1.0 kgf/cm^2, 15 psi)

Valve clearance

Intake	at Cold	0.15 to 0.25 mm (0.0591 to 0.00984 in.)
Exhaust	at Cold	0.29 to 0.39 mm (0.0114 to 0.0154 in.)
Valve clearance adjusting shim	No. 06	5.060 mm (0.1992 in.)
	No. 08	5.080 mm (0.2000 in.)
	No. 10	5.100 mm (0.2008 in.)
	No. 12	5.120 mm (0.2016 in.)
	No. 14	5.140 mm (0.2024 in.)
	No. 16	5.160 mm (0.2031 in.)
	No. 18	5.180 mm (0.2039 in.)
	No. 20	5.200 mm (0.2047 in.)
	No. 22	5.220 mm (0.2055 in.)
	No. 24	5.240 mm (0.2063 in.)
	No. 26	5.260 mm (0.2071 in.)
	No. 28	5.280 mm (0.2079 in.)
	No. 30	5.300 mm (0.2087 in.)
	No. 32	5.320 mm (0.2094 in.)
	No. 34	5.340 mm (0.2102 in.)
	No. 36	5.360 mm (0.2110 in.)
	No. 38	5.380 mm (0.2118 in.)
	No. 40	5.400 mm (0.2126 in.)
	No. 42	5.420 mm (0.2134 in.)
	No. 44	5.440 mm (0.2142 in.)
	No. 46	5.460 mm (0.2150 in.)
	No. 48	5.480 mm (0.2157 in.)
	No. 50	5.500 mm (0.2165 in.)
	No. 52	5.520 mm (0.2173 in.)
	No. 54	5.540 mm (0.2181 in.)
	No. 56	5.560 mm (0.2189 in.)
	No. 58	5.580 mm (0.2197 in.)
	No. 60	5.600 mm (0.2205 in.)
	No. 62	5.620 mm (0.2213 in.)
	No. 64	5.640 mm (0.2220 in.)
	No. 66	5.660 mm (0.2228 in.)
	No. 68	5.680 mm (0.2236 in.)
	No. 70	5.700 mm (0.2244 in.)
	No. 72	5.720 mm (0.2252 in.)
	No. 74	5.740 mm (0.2260 in.)

Ignition timing

with Terminals TC and CG connected of DLC3	8 to 12° BTDC @ idle
without Terminals TC and CG connected of DLC3	7 to 24° BTDC @ idle

Idle speed

Standard idling speed	650 to 750 rpm

Timing chain

No. 1 chain elongation	Maximum	146.8 mm (5.78 in.)

No. 2 chain elongation	Maximum	146.8 mm (5.78 in.)
Camshaft timing gear diameter (with No. 1 chain)	Minimum	115.5 mm (4.55 in.)
Camshaft timing gear diameter (with No. 2 chain)	Minimum	73.1 mm (2.88 in.)
Camshaft timing sprocket diameter (with No. 2 chain)	Minimum	73.1 mm (2.88 in.)
Crankshaft timing sprocket diameter (with No. 1 chain)	Minimum	61.0 mm (2.40 in.)
No. 1 idle gear diameter (with No. 1 chain)	Minimum	61.0 mm (2.40 in.)

Idle gear shaft oil clearance

Idle gear shaft diameter	Standard	22.987 to 23.000 mm (0.905 to 0.906 in.)
Idle gear inside diameter	Standard	23.02 to 23.03 mm (0.906 to 0.907 in.)
Oil clearance	Standard	0.020 to 0.043 mm (0.000787 to 0.00169 in.)
	Maximum	0.093 mm (0.00366 in.)

Chain tensioner

No. 2 chain tensioner	Maximum depth	1.0 mm (0.0394 in.)
No. 3 chain tensioner	Maximum depth	1.0 mm (0.0394 in.)
Chain tensioner slipper	Maximum depth	1.0 mm (0.0394 in.)

Vibration damper

No. 1 chain vibration damper	Maximum depth	1.0 mm (0.0394 in.)
No. 2 chain vibration damper	Maximum depth	1.0 mm (0.0394 in.)

Cylinder head

Warpage	Standard	Cylinder block side	0.05 mm (0.00197 in.)
		Intake manifold side	0.08 mm (0.00315 in.)
		Exhaust manifold side	0.08 mm (0.00315 in.)
	Maximum		0.10 mm (0.00394 in.)
Cylinder head bolt thread outside diameter		Standard	10.85 to 11.00 mm (0.427 to 0.433 in.)
		Minimum	10.7 mm (0.421 in.)
Valve guide bushing bore diameter		Standard	10.295 to 10.315 mm (0.405 to 0.406 in.)
Valve guide busing diameter		Standard	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
		O/S (0.05)	10.383 to 10.394 mm (0.4088 to 0.4092 in.)
Protrusion height		Standard	9.3 to 9.7 mm (0.366 to 0.382 in.)
Overall length	Standard	Intake	0025 to 0.060 mm (0.00984 to 0.00236 in.)
		Exhaust	0030 to 0.065 mm (0.00118 to 0.00256 in.)

Intake manifold

Intake air surge tank side	Maximum warpage	0.80 mm (0.0315 in.)
Cylinder head side	Maximum warpage	0.20 mm (0.00787 in.)

Exhaust manifold

Maximum warpage	0.70 mm (0.0276 in.)

Valve

Standard stem diameter	Intake	5.470 to 5.485 mm (0.2154 to 0.2159 in.)
	Exhaust	5.465 to 5.480 mm (0.2152 to 0.2156 in.)
Valve face angle		44.5°
Standard margin thickness		1.0 mm (0.0394 in.)
Minimum margin thickness		0.5 mm (0.0197 in.)
Standard valve overall length	Intake	106.95 mm (4.21 in.)
	Exhaust	105.80 mm (4.15 in.)
Minimum valve overall length	Intake	106.40 mm (4.19 in.)
	Exhaust	105.30 mm (4.15 in.)
Valve seat	Standard width	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
Standard stem oil clearance	Intake	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
	Exhaust	0.030 to 0.065 mm (0.00118 to 0.00256 in.)

Maximum stem oil clearance	Intake	0.08 mm (0.00315 in.)
	Exhaust	0.10 mm (0.00394 in.)

Valve spring

Maximum deviation		2.0 mm (0.0787 in.)
Standard free length		47.80 mm (1.88 in.)
Standard installed tension	at 33.3 mm (1.31 in.)	186 to 206 N (19 to 21 kgf, 42 to 46 lbf)

Valve guide bushing

Standard bush inside diameter	5.51 to 5.53 mm (0.217 to 0.218 in.)

Valve lifter

Standard lifter diameter		30.966 to 30.976 mm (1.219 to 1.220 in.)
Standard lifter bore diameter		31.009 to 31.025 mm (1.220 to 1.221 in.)
Oil clearance	Standard	0.033 to 0.059 mm (0.00130 to 0.00232 in.)
	Maximum	0.08 mm (0.00315 in.)

Camshaft

Thrust clearance		Standard	0.04 to 0.09 mm (0.0157 to 0.0354 in.)
		Maximum	0.11 mm (0.00433 in.)
Circle runout		Maximum	0.06 mm (0.00236 in.)
Cam lobe height	Standard	Intake	44.168 to 44.268 mm (1.739 to 1.742 in.)
		Exhaust	44.580 to 44.680 mm (1.75511 to 1.75905 in.)
	Minimum	Intake	44.018 mm (1.73 in.)
		Exhaust	44.430 mm (1.75 in.)
Standard journal diameter		No. 1	35.971 to 35.985 mm (1.416 to 1.417 in.)
		Other	22.959 to 22.975 mm (0.904 to 0.905 in.)
Standard oil clearance	for Cylinder head RH	No. 1 journal (Intake)	0.008 to 0.038 mm (0.000315 to 0.00150 in.)
		No. 1 journal (Exhaust)	0.040 to 0.079 mm (0.00157 to 0.00311 in.)
		Other journal	0.025 to 0.062 mm (0.000984 to 0.00244 in.)
	for Cylinder head LH	No. 1 journal	0.040 to 0.079 mm (0.00157 to 0.00311 in.)
		Other journal	0.025 to 0.062 mm (0.000984 to 0.00244 in.)
Maximum oil clearance	for Cylinder head RH	No. 1 journal (Intake)	0.07 mm (0.00276 in.)
		Other journal	0.10 mm (0.00394 in.)
	for Cylinder head LH		0.10 mm (0.00394 in.)

Connecting rod

Thrust clearance	Standard	0.15 to 0.30 mm (0.00591 to 0.0118 in.)
	Maximum	0.35 mm (0.0138 in.)
Connecting rod oil clearance	Standard	0.026 to 0.046 mm (0.00102 to 0.00181 in.)
	Maximum	0.066 mm (0.00260 in.)
Connecting rod bolt tension portion diameter	Standard	7.2 to 7.3 mm (0.283 to 0.287 in.)
	Minimum	7.0 mm (0.276 in.)
Connecting rod bearing center wall thickness	Mark 1	1.484 to 1.487 mm (0.05843 to 0.05854 in.)
	Mark 2	1.487 to 1.490 mm (0.05850 to 0.05866 in.)
	Mark 3	1.490 to 1.493 mm (0.05862 to 0.05878 in.)
	Mark 4	1.493 to 1.496 mm (0.05874 to 0.05900 in.)
Rod alignment	Maximum	0.05 mm (0.00197 in.) per 100 mm (3.94 in.)
Rod twist	Maximum	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
Bushing inside diameter	Mark A	22.005 to 22.008 mm (0.86634 to 0.86645 in.)
	Mark B	22.009 to 22.011 mm (0.86649 to 0.86657 in.)
	Mark C	22.012 to 22.014 mm (0.86661 to 0.86669 in.)
Bushing oil clearance	Standard	0.005 to 0.011 mm (0.000197 to 0.000433 in.)
	Maximum	0.050 mm (0.00197 in.)

Crankshaft

	Standard	0.04 to 0.24 mm (0.00157 to 0.00945 in.)

Thrust clearance	Maximum	0.30 mm (0.0118 in.)
Crankshaft bearing cap set bolt	Standard	10.0 to 10.2 mm (0.394 to 0.402 in.)
Circuit runout	Maximum	0.06 mm (0.00236 in.)
Main journal diameter	Standard	71.988 to 72.000 mm (2.8342 to 2.8346 in.)
Main journal taper and out-of-round	Maximum	0.02 mm (0.000787 in.)
Crank pin diameter	Standard	55.992 to 56.000 mm (2.2044 to 2.2047 in.)
Crank pin taper and out-of-round	Maximum	0.02 mm (0.000787 in.)
Oil clearance	Standard	0.018 to 0.030 mm (0.000709 to 0.00118 in.)
	Maximum	0.046 mm (0.00181 in.)
Main journal bore diameter on cylinder block	Standard	77.000 to 77.016 mm (3.03149 to 3.03211 in.)
Standard bearing center wall thickness	Mark 1	2.488 to 2.491 mm (0.0980 to 0.0981 in.)
	Mark 2	2.491 to 2.494 mm (0.0981 to 0.0982 in.)
	Mark 3	2.494 to 2.497 mm (0.0982 to 0.0983 in.)
	Mark 4	2.497 to 2.500 mm (0.0983 to 0.0984 in.)
	Mark 5	2.500 to 2.503 mm (0.0984 to 0.0985 in.)

Cylinder block

Cylinder head surface warpage	Maximum	0.05 mm (0.00197 in.)
Cylinder bore diameter	Standard	94.000 to 94.012 mm (3.7008 to 3.7013 in.)
	Maximum	94.132 mm (3.7060 in.)

Piston and piston ring

Piston diameter			93.910 to 93.920 mm (3.6972 to 3.6976 in.)
Piston oil clearance		Standard	0.080 to 0.102 mm (0.00315 to 0.00401 in.)
		Maximum	0.13 mm (0.00512 in.)
Piston pin hole inside diameter		Mark A	22.001 to 22.004 mm (0.86618 to 0.86630 in.)
		Mark B	22.005 to 22.007 mm (0.86634 to 0.86642 in.)
		Mark C	22.008 to 22.010 mm (0.86645 to 0.86653 in.)
Piston pin diameter		Mark A	21.997 to 22.000 mm (0.86602 to 0.86614 in.)
		Mark B	22.001 to 22.003 mm (0.86618 to 0.86626 in.)
		Mark C	22.004 to 22.006 mm (0.86630 to 0.86642 in.)
Bushing oil clearance		Standard	0.001 to 0.007 mm (0.0000394 to 0.000276 in.)
		Maximum	0.040 mm (0.00157 in.)
Piston ring groove clearance		No. 1	0.02 to 0.07 mm (0.000787 to 0.00276 in.)
		No. 2	0.02 to 0.06 mm (0.000787 to 0.00236 in.)
		Oil	0.07 to 0.15 mm (0.00276 to 0.00590 in.)
Piston ring end gap	Standard	No. 1	0.30 to 0.40 mm (0.0118 to 0.0157 in.)
		No. 2	0.40 to 0.50 mm (0.0157 to 0.0197 in.)
		Oil (Side rail)	0.10 to 0.40 mm (0.00394 to 0.0157 in.)
	Maximum	No. 1	1.0 mm (0.0394 in.)
		No. 2	1.1 mm (0.0433 in.)
		Oil (Side rail)	1.0 mm (0.0394 in.)

Part Tightened			N*m	kgf*cm	ft.*lbf
Spark plug x Cylinder head			20	204	15
Ignition coil x Cylinder head			10	102	7
V-bank cover x Engine			7.5	76	66 in.*lbf
No. 1 engine under cover x Body			29	296	21
Camshaft bearing cap x Cylinder head (cylinder head LH and RH)		for 10 mm head bolt	9.0	92	80 in.*lbf
		for 12 mm head bolt	24	245	18
No. 2 chain tensioner x Cylinder head			21	214	15
No. 3 chain tensioner x Cylinder head			21	214	15
Camshaft timing gear x Camshaft			100	1020	74
No. 1 chain tensioner x Cylinder head			10	102	7
Timing chain cover plate x Timing chain cover			9.0	92	80 in.*lbf
Rear water by-pass joint x Cylinder head LH and RH		for Bolt	10	102	7
		for Nut	9.0	92	80 in.*lbf
Water by-pass hose x Cylinder head		for Bolt A	9.8	100	87 in.*lbf
		for Bolt B	13	138	10
Front engine mounting insulator LH x Body		for bolt	79	806	58
		for Nut	72	734	53
Front engine mounting insulator RH x Body		for bolt	79	806	58
		for Nut	72	734	53
Front No. 2 engine mounting bracket LH x Body			32	326	24
Drive plate and ring gear x Crankshaft			83	846	61
Flywheel x Crankshaft			83	846	61
No. 1 oil cooler hose tube x Cylinder block			14	143	10
Engine hanger x Cylinder head			33	336	24
Rear No. 1 engine mounting insulator x Transfer			59	602	44
Cooler compressor x V-ribbed belt tensioner			24	250	18
Vane pump x Cylinder block			21	214	15
Hood x Hood bracket			13	133	10
Hood support x Body			18	184	13
Crankshaft bearing cap x Cylinder block	Quantity: 16	1 st	61	622	45
		2 nd	Turn 90°	Turn 90°	Turn 90°
Crankshaft bearing cap x Cylinder block		Quantity: 8	26	262	19
Connecting rod cap x Connecting rod		1 st	25	255	18
		2 nd	Turn 90°	Turn 90°	Turn 90°
Engine rear oil seal retainer x Cylinder block		for nut	9.0	92	80 in.*lbf
		for bolt	10	102	7
Knock sensor x Cylinder block			20	204	15
No. 1 water outlet pipe x Cylinder block			10	102	7
Cylinder head RH x Cylinder block		1 st	36	367	27
		2 nd	Turn 180°	Turn 180°	Turn 180°
Cylinder head LH x Cylinder block	Quantity: 8	1 st	36	367	27
		2 nd	Turn 180°	Turn 180°	Turn 180°
	Quantity: 2		30	367	27
No. 1 chain vibration damper x Cylinder head, Cylinder block			19	194	14
No. 1 idler gear shaft x Cylinder block			60	612	44
Water pump x Timing chain cover			9.0	92	80 in.*lbf
Timing chain cover x Cylinder head, Cylinder block			23	235	17
Oil pan x Cylinder block		for bolt A, B and nut	21	214	15
		for bolt C	10	102	7
Oil strainer x Oil pan			9.0	92	80 in.*lbf
Oil pan drain plug x No. 2 oil pan			40	408	30
Crankshaft pulley x Crankshaft			250	2549	184

Cylinder head cover LH x Cylinder head	for bolt A	10	102	7
	for bolt B and nut	9.0	92	80 in.*lbf
Cylinder head cover RH x Cylinder head	for bolt A	10	102	7
	for bolt B and nut	9.0	92	80 in.*lbf
Ventilation valve x Cylinder head cover		27	275	20
Oil filler cap housing x Cylinder head cover LH		9.0	92	80 in.*lbf
Oil control valve filter union x Cylinder head LH and RH		62	632	46
Crankshaft position sensor x Cylinder block		10	102	7
VVT sensor x Cylinder head LH and RH		8.0	82	71 in.*lbf
Camshaft timing control valve x Cylinder head LH and RH		10	102	7
Cylinder block water drain cock x Cylinder block		25	255	18
Water inlet housing x Timing chain cover		25	255	18
Oil filter bracket x Cylinder head LH		19	194	14
No. 1 idler pulley x Timing chain cover		54	551	40
No. 2 idler pulley x Timing chain cover		39	398	29
Front No. 1 engine mounting bracket LH x Cylinder block		43	438	32
Front No. 1 engine mounting bracket RH x Cylinder block		43	438	32
Engine oil level dipstick guide x Cylinder head		9.0	92	80 in.*lbf
V-ribbed belt tensioner x Cylinder block		36	367	27
Engine coolant temperature sensor x Rear water by-pass joint		20	204	15
Oil pressure switch x Oil filter bracket		15	150	11
Head straight screw plug x Cylinder head	for front side	85	867	63
	except front side	80	816	59
Union x Cylinder head		15	150	11
Stud bolt x Cylinder head	for stud bolt A and C	4.0	41	35 in.*lbf
	for stud bolt B	9.5	97	84 in.*lbf
Stud bolt x Cylinder block	for stud bolt A and B	11	112	8
	for stud bolt C	4.0	41	35 in.*lbf
No. 1 oil nozzle x Cylinder block		9.0	92	80 in.*lbf
Ground cable x Body	Engine side	8.0	82	71 in.*lbf
	Battery side	8.4	86	74 in.*lbf
Winch earth wire x Cylinder block		19	196	14
Winch earth wire x Body		29	300	22
No. 2 engine wire x Engine room relay block		10	102	7
Battery positive cable x Battery positive terminal	for nut type A	13	130	9
	for nut type B	7.5	76	66 in.*lbf

Part Tightened			N*m	kgf*cm	ft.*lbf
Spark plug x Cylinder head			20	204	15
Ignition coil x Cylinder head			10	102	7
V-bank cover x Engine			7.5	76	66 in.*lbf
No. 1 engine under cover x Body			29	296	21
Camshaft bearing cap x Cylinder head (cylinder head LH and RH)		for 10 mm head bolt	9.0	92	80 in.*lbf
		for 12 mm head bolt	24	245	18
No. 2 chain tensioner x Cylinder head			21	214	15
No. 3 chain tensioner x Cylinder head			21	214	15
Camshaft timing gear x Camshaft			100	1020	74
No. 1 chain tensioner x Cylinder head			10	102	7
Timing chain cover plate x Timing chain cover			9.0	92	80 in.*lbf
Rear water by-pass joint x Cylinder head LH and RH		for Bolt	10	102	7
		for Nut	9.0	92	80 in.*lbf
Water by-pass hose x Cylinder head		for Bolt A	9.8	100	87 in.*lbf
		for Bolt B	13	138	10
Front engine mounting insulator LH x Body		for bolt	79	806	58
		for Nut	72	734	53
Front engine mounting insulator RH x Body		for bolt	79	806	58
		for Nut	72	734	53
Front No. 2 engine mounting bracket LH x Body			32	326	24
Drive plate and ring gear x Crankshaft			83	846	61
Flywheel x Crankshaft			83	846	61
No. 1 oil cooler hose tube x Cylinder block			14	143	10
Engine hanger x Cylinder head			33	336	24
Rear No. 1 engine mounting insulator x Transfer			59	602	44
Cooler compressor x V-ribbed belt tensioner			24	250	18
Vane pump x Cylinder block			21	214	15
Hood x Hood bracket			13	133	10
Hood support x Body			18	184	13
Crankshaft bearing cap x Cylinder block	Quantity: 16	1 st	61	622	45
		2 nd	Turn 90°	Turn 90°	Turn 90°
Crankshaft bearing cap x Cylinder block		Quantity: 8	26	262	19
Connecting rod cap x Connecting rod		1 st	25	255	18
		2 nd	Turn 90°	Turn 90°	Turn 90°
Engine rear oil seal retainer x Cylinder block		for nut	9.0	92	80 in.*lbf
		for bolt	10	102	7
Knock sensor x Cylinder block			20	204	15
No. 1 water outlet pipe x Cylinder block			10	102	7
Cylinder head RH x Cylinder block		1 st	36	367	27
		2 nd	Turn 180°	Turn 180°	Turn 180°
Cylinder head LH x Cylinder block	Quantity: 8	1 st	36	367	27
		2 nd	Turn 180°	Turn 180°	Turn 180°
	Quantity: 2		30	367	27
No. 1 chain vibration damper x Cylinder head, Cylinder block			19	194	14
No. 1 idler gear shaft x Cylinder block			60	612	44
Water pump x Timing chain cover			9.0	92	80 in.*lbf
Timing chain cover x Cylinder head, Cylinder block			23	235	17
Oil pan x Cylinder block		for bolt A, B and nut	21	214	15
		for bolt C	10	102	7
Oil strainer x Oil pan			9.0	92	80 in.*lbf
Oil pan drain plug x No. 2 oil pan			40	408	30
Crankshaft pulley x Crankshaft			250	2549	184

Cylinder head cover LH x Cylinder head	for bolt A	10	102	7
	for bolt B and nut	9.0	92	80 in.*lbf
Cylinder head cover RH x Cylinder head	for bolt A	10	102	7
	for bolt B and nut	9.0	92	80 in.*lbf
Ventilation valve x Cylinder head cover		27	275	20
Oil filler cap housing x Cylinder head cover LH		9.0	92	80 in.*lbf
Oil control valve filter union x Cylinder head LH and RH		62	632	46
Crankshaft position sensor x Cylinder block		10	102	7
VVT sensor x Cylinder head LH and RH		8.0	82	71 in.*lbf
Camshaft timing control valve x Cylinder head LH and RH		10	102	7
Cylinder block water drain cock x Cylinder block		25	255	18
Water inlet housing x Timing chain cover		25	255	18
Oil filter bracket x Cylinder head LH		19	194	14
No. 1 idler pulley x Timing chain cover		54	551	40
No. 2 idler pulley x Timing chain cover		54	551	40
Front No. 1 engine mounting bracket LH x Cylinder block		43	438	32
Front No. 1 engine mounting bracket RH x Cylinder block		43	438	32
Engine oil level dipstick guide x Cylinder head		9.0	92	80 in.*lbf
V-ribbed belt tensioner x Cylinder block		36	367	27
Engine coolant temperature sensor x Rear water by-pass joint		20	204	15
Oil pressure switch x Oil filter bracket		15	150	11
Head straight screw plug x Cylinder head	for front side	85	867	63
	except front side	80	816	59
Union x Cylinder head		15	150	11
Stud bolt x Cylinder head	for stud bolt A and C	4.0	41	35 in.*lbf
	for stud bolt B	9.5	97	84 in.*lbf
Stud bolt x Cylinder block	for stud bolt A and B	11	112	8
	for stud bolt C	4.0	41	35 in.*lbf
No. 1 oil nozzle x Cylinder block		9.0	92	80 in.*lbf
Ground cable x Body	Engine side	8.0	82	71 in.*lbf
	Battery side	8.4	86	74 in.*lbf
Winch earth wire x Cylinder block		19	196	14
Winch earth wire x Body		29	300	22
No. 2 engine wire x Engine room relay block		10	102	7
Battery positive cable x Battery positive terminal	for nut type A	13	130	9
	for nut type B	7.5	76	66 in.*lbf

Engine

Ignition timing	Terminal TC and CG of DLC3 connected (Transmission in neutral and A/C switch OFF)	8 to 12° BTDC @ idle
	Terminals TC and CG of DLC3 disconnected (Transmission in neutral and A/C switch OFF)	7 to 24° BTDC @ idle
Idle speed (Transmission in neutral and A/C switch OFF)		650 to 750 rpm
Compression	Standard	1300 kPa (13.3 kgf/cm^2, 189 psi) or more
	Minimum	1000 kPa (10.2 kgf/cm^2, 145 psi)
	Difference	100 kPa (1.0 kgf/cm^2, 15 psi) or less

Engine Unit

Cylinder head set bolt	Outside thread diameter	Standard		10.85 to 11.00 mm (0.427 to 0.433 in.)
		Minimum		10.6 mm (0.417 in.)
Camshaft	Circle runout	Maximum		0.04 mm (0.00157 in.)
	Cam lobe height	Intake	Standard	44.291 to 44.441 mm (1.744 to 1.750 in.)
			Minimum	44.241 mm (1.742 in.)
		Exhaust	Standard	44.196 to 44.346 mm (1.740 to 1.746 in.)
			Minimum	44.146 mm (1.738 in.)
	Journal diameter	No. 1 journal	Standard	29.956 to 29.970 mm (1.179 to 1.180 in.)
		Other journals		25.959 to 25.975 mm (1.022 to 1.023 in.)
Camshaft oil clearance	No. 1 journal	Standard		0.030 to 0.065 mm (0.00118 to 0.00256 in.)
		Maximum		0.10 mm (0.00394 in.)
	Other journals	Standard		0.025 to 0.062 mm (0.000984 to 0.00244 in.)
		Maximum		0.09 mm (0.00354 in.)
Timing chain	No. 1 chain	Chain elongation	Maximum	136.9 mm (5.39 in.)
	No. 2 chain			137.6 mm (5.42 in.)
Sprocket diameter (w/ chain)	Crankshaft timing sprocket RH	Minimum		61.4 mm (2.42 in.)
	Crankshaft timing sprocket LH			61.4 mm (2.42 in.)
No. 2 chain tensioner	Depth	Maximum		0.9 mm (0.0354 in.)
No. 3 chain tensioner				0.9 mm (0.0354 in.)
Chain tensioner slipper				1.0 mm (0.0394 in.)
No. 1 chain vibration damper				1.0 mm (0.0394 in.)
Exhaust manifold	Warpage			0.7 mm (0.0276 in.)
Ring pin	Protrusion height	A		7.5 to 8.5 mm (0.295 to 0.335 in.)
		B		3.6 to 4.6 mm (0.142 to 0.181 in.)

Cylinder Head

Camshaft thrust clearance	Standard		0.08 to 0.135 mm (0.00315 to 0.00531 in.)
	Maximum		0.15 mm (0.00591 in.)
Compression spring	Free length	Standard	49.39 mm (1.94 in.)
	Deviation	Maximum	1.0 mm (0.0394 in.)
	Angle (reference)	Maximum	2°
	Valve stem diameter	Standard	5.470 to 5.485 mm (0.215 to 0.216 in.)

Intake valve	Margin thickness	Standard	1.25 mm (0.0492 in.)
		Minimum	0.50 mm (0.0197 in.)
	Overall length	Standard	105.85 mm (4.17 in.)
		Minimum	105.35 mm (4.15 in.)
	Width	Standard	1.1 to 1.5 mm (0.0433 to 0.0591 in.)
Exhaust valve	Valve stem diameter	Standard	5.465 to 5.480 mm (0.215 to 0.216 in.)
	Margin thickness	Standard	1.4 mm (0.0551 in.)
		Minimum	0.50 mm (0.0197 in.)
	Overall length	Standard	110.40 mm (4.35 in.)
		Minimum	109.90 mm (4.33 in.)
	Width	Standard	1.1 to 1.5 mm (0.0433 to 0.0591 in.)
Valve guide bush	Inside diameter	Standard	5.51 to 5.53 mm (0.217 to 0.218 in.)
Valve guide bush oil clearance	Intake	Standard	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
		Maximum	0.08 mm (0.00315 in.)
	Exhaust	Standard	0.030 to 0.065 mm (0.00118 to 0.00256 in.)
		Maximum	0.10 mm (0.00394 in.)
Cylinder head warpage	Cylinder head lower side	Standard	0.05 mm (0.00197 in.)
	Intake side		0.08 mm (0.00315 in.)
	Exhaust side		0.05 mm (0.00197 in.)
	-	Maximum	0.10 mm (0.00394 in.)
Valve guide bush	Bush bore diameter	Standard	10.285 to 10.306 mm (0.405 to 0.406 in.)

Cylinder Block

Connecting rod	Thrust clearance	Standard	0.15 to 0.55 mm (0.00591 to 0.0217 in.)
		Maximum	0.70 mm (0.0276 in.)
	Oil clearance	Standard	0.025 to 0.050 mm (0.000984 to 0.00197 in.)
		Maximum	0.070 mm (0.00276 in.)
	Standard sized bearing center wall thickness	Mark 2	1.489 to 1.492 mm (0.0586 to0.0587 in.)
		Mark 3	1.492 to 1.495 mm (0.0587 to 0.0589 in.)
		Mark 4	1.495 to 1.498 mm (0.0589 to 0.0590 in.)
		Mark 5	1.498 to 1.501 mm (0.0590 to 0.0591 in.)
		Mark 6	1.501 to 1.504 mm (0.0591 to 0.0592 in.)
		Mark 7	1.504 to 1.507 mm (0.0592 to 0.0593 in.)
	Big end inside diameter	Mark 1	59.000 to 59.006 mm (2.32283 to 2.32307 in.)
		Mark 2	59.006 to 59.012 mm (2.32307 to 2.32330 in.)
		Mark 3	59.012 to 59.018 mm (2.32330 to 2.32354 in.)
		Mark 4	59.018 to 59.024 mm (2.32354 to 2.32377 in.)
	Bend	Maximum	0.05 mm (0.00197 in.) per 100 mm (3.94 in.)
	Twist	Maximum	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
Crankshaft pin	Diameter	Mark 1	55.994 to 56.000 mm (2.20448 to 2.20472 in.)
		Mark 2	55.988 to 55.994 mm (2.20425 to 2.20448 in.)
		Mark 3	55.982 to 55.988 mm (2.20401 to 2.20425 in.)
	Warpage	Maximum	0.07 mm (0.00276 in.)

Cylinder block	Cylinder bore	Standard		94.000 to 94.012 mm (3.7008 to 3.7013 in.)
		Maximum		94.200 mm (3.7087 in.)
Piston ring	Groove clearance	No. 1		0.020 to 0.070 mm (0.000787 to 0.00276 in.)
		No. 2		0.020 to 0.060 mm (0.000787 to 0.00236 in.)
		Oil		0.070 to 0.145 mm (0.00276 to 0.00571 in.)
	End gap	Standard	No. 1	0.23 to 0.33 mm (0.00906 to 0.0130 in.)
			No. 2	0.40 to 0.50 mm (0.0157 to 0.0197 in.)
			Oil	0.10 to 0.40 mm (0.00394 to 0.0157 in.)
		Maximum	No. 1	0.42 mm (0.0165 in.)
			No. 2	0.55 mm (0.0217 in.)
			Oil	0.45 mm (0.0177 in.)
Piston	Diameter	Standard		93.950 to 93.960 mm (3.6988 to 3.6992 in.)
		Minimum		93.815 mm (3.6935 in.)
	Oil clearance	Standard		0.020 to 0.072 mm (0.000787 to 0.00283 in.)
		Maximum		0.385 mm (0.0152 in.)
Piston pin	Hole inside diameter	Mark A		21.998 to 22.001 mm (0.86606 to 0.86618 in.)
		Mark B		22.001 to 22.004 mm (0.86618 to 0.86630 in.)
		Mark C		22.004 to 22.007 mm (0.86630 to 0.86642 in.)
	Diameter	Mark A		21.998 to 22.001 mm (0.86606 to 0.86618 in.)
		Mark B		22.001 to 22.004 mm (0.86618 to 0.86630 in.)
		Mark C		22.004 to 22.007 mm (0.86630 to 0.86642 in.)
	Oil clearance	Standard		-0.002 to 0.004 mm (-0.0000787 to 0.000157 in.)
		Maximum		0.015 mm (0.000591 in.)
Connecting rod bush	Inside diameter	Mark A		22.005 to 22.008 mm (0.86634 to 0.86645 in.)
		Mark B		22.008 to 22.011 mm (0.86645 to 0.86657 in.)
		Mark C		22.011 to 22.014 mm (0.86657 to 0.86669 in.)
	Oil clearance	Standard		0.005 to 0.011 mm (0.000197 to 0.000433 in.)
		Maximum		0.03 mm (0.00118 in.)
Crankshaft	Thrust clearance	Standard		0.020 to 0.220 mm (0.000787 to 0.00866 in.)
		Maximum		0.30 mm (0.0118 in.)
	Thrust washer thickness	Standard		2.44 to 2.49 mm (0.0961 to 0.0980 in.)
	Circle runout	Maximum		0.06 mm (0.00236 in.)
	Main journal	Diameter	Standard	66.988 to 67.000 mm (2.6373 to 2.6378 in.)
		Taper and out-of-round	Maximum	0.02 mm (0.000787 in.)
	Crank pin	Diameter	Standard	55.982 to 56.000 mm (2.2040 to 2.2047 in.)
		Taper and out-of-round	Maximum	0.02 mm (0.000787 in.)
		No. 1 and No. 5 journals	Standard	0.017 to 0.030 mm (0.000669 to 0.00118 in.)
			Maximum	0.050 mm (0.00197 in.)

	Oil clearance	Other journals	Standard	0.024 to 0.037 mm (0.000945 to 0.00146 in.)
			Maximum	0.060 mm (0.00236 in.)
Crankshaft journal bearing center wall thickness No. 1 and No. 5 journals	Upper bearing	4		2.501 to 2.504 (0.0985 to 0.0986 in.)
		5		2.504 to 2.507 (0.0986 to 0.0987 in.)
		6		2.507 to 2.510 (0.0987 to 0.0988 in.)
		7		2.510 to 2.513 (0.0988 to 0.0989 in.)
		8		2.513 to 2.516 (0.0989 to 0.0991 in.)
		9		2.516 to 2.519 (0.0991 to 0.0992 in.)
	Lower bearing	5		2.488 to 2.491 (0.0980 to 0.0981 in.)
		6		2.491 to 2.494 (0.0981 to 0.0982 in.)
		7		2.494 to 2.497 (0.0982 to 0.0983 in.)
		8		2.497 to 2.500 (0.0983 to 0.0984 in.)
		9		2.500 to 2.503 (0.0984 to 0.0985 in.)
Bearing center wall thickness Other journal	Upper bearing	3		2.482 to 2.485 (0.0977 to 0.0978 in.)
		4		2.485 to 2.488 (0.0978 to 0.0980 in.)
		5		2.488 to 2.491 (0.0980 to 0.0981 in.)
		6		2.491 to 2.494 (0.0981 to 0.0982 in.)
		7		2.494 to 2.497 (0.0982 to 0.0983 in.)
		8		2.497 to 2.500 (0.0983 to 0.0984 in.)
	Lower bearing	4		2.501 to 2.504 (0.0985 to 0.0986 in.)
		5		2.504 to 2.507 (0.0986 to 0.0987 in.)
		6		2.507 to 2.510 (0.0987 to 0.0988 in.)
		7		2.510 to 2.513 (0.0988 to 0.0989 in.)
		8		2.513 to 2.516 (0.0989 to 0.0991 in.)
Connecting rod bolt	Tension portion diameter	Standard		8.5 to 8.6 mm (0.335 to 0.339 in.)
		Minimum		8.3 mm (0.327 in.)
Crankshaft bearing cap set bolt	Diameter	Bolt A	Standard	10.5 to 11.0 mm (0.413 to 0.433 in.)
			Minimum	10.4 mm (0.409 in.)
		Bolt B	Standard	9.5 to 10.0 mm (0.374 to 0.394 in.)
			Minimum	9.4 mm (0.370 in.)

Camshaft

Part Tightened		N*m	kgf*cm	ft.*lbf
Camshaft housing LH x Cylinder head LH	for Bolt A	10	102	7
	for Except bolt	30	306	22
Camshaft bearing cap LH x Camshaft housing LH		16	163	12
Camshaft housing RH x Cylinder head RH	for Bolt A	10	102	7
	for Except bolt	30	306	22
Camshaft bearing cap RH x Camshaft housing RH		16	163	12

Cylinder Head Gasket

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder head LH x Cylinder block	1st	36	367	27
	2nd	Turn 90°		
	3rd	Turn 90°		
	for 12 mm head	21	214	15
Cylinder head RH x Cylinder block	1st	36	367	27
	2nd	Turn 90°		
	3rd	Turn 90°		
	for 12 mm head	21	214	15

Front Crankshaft Oil Seal

Part Tightened	N*m	kgf*cm	ft.*lbf
No. 2 water by-pass pipe sub-assembly x Timing chain cover and front water by-pass pipe	10	102	7

Engine Assembly

Part Tightened		N*m	kgf*cm	ft.*lbf
Engine hanger x Cylinder head		43	438	32
No. 2 front engine mounting bracket LH x Body		32	326	24
Front engine mounting insulator LH x Front No. 1 engine mounting bracket LH		72	734	53
Front engine mounting insulator RH x Front No. 1 engine mounting bracket RH		72	734	53
Engine mounting insulator x Body		79	806	58
No. 2 water by-pass pipe x Cylinder head cover RH		18	184	13
Oil cooler pipe x No. 1 oil pan and bracket		14	143	10
Drive plate and ring gear x Crankshaft	1st	30	301	22
	2nd	Turn 90°		
Rear No. 1 engine mounting insulator x Automatic transmission		59	602	44
Front engine mounting insulator RH x Rear No. 1 engine mounting insulator		12	122	9
Engine oil level dipstick guide x Cylinder head cover RH		10	102	7
Engine wire x Engine room junction block		10	102	7
Ground wire x bracket		8.0	82	71 in.*lbf
Ground wire x Body		8.4	86	74 in.*lbf
Engine wire x Battery positive (+) battery cable		5.4	55	48 in.*lbf
Ground wire x Cylinder head cover RH		8.0	82	71 in.*lbf
Air cleaner x Body		5.0	51	44 in.*lbf
No. 2 engine under cover x Body		29	296	21
No. 1 engine under cover sub-assembly x Body		29	296	21
Engine hood x Hinge		13	133	10
Engine hood x Hood support		18	184	13

Engine Unit

Part Tightened		N*m	kgf*cm	ft.*lbf
Camshaft timing gear x Camshaft		100	1020	74
Camshaft timing exhaust gear x Camshaft		100	1020	74
Timing chain cover stud bolt		20	204	15
Oil pan stud bolt (E6 and E7 "TORX")	for stud bolt A	5.0	51	44 in.*lbf
	for stud bolt B	9.0	92	80 in.*lbf
Oil drain pipe x Cylinder block		10	102	7
Rear engine oil seal retainer x Cylinder block		10	102	7
Oil strainer x Oil pan		12	122	9
No. 1 oil pan baffle plate x Oil pan		12	122	9
No. 1 oil pan x cylinder block	for bolt A	10	102	7
	for bolt B	35	357	26
	for Nut	35	357	26
No. 2 oil pan x No. 1 oil pan		10	102	7
No. 1 heat exchanger cover x Cylinder block		21	214	15
No. 2 chain tensioner x Cylinder head RH		10	102	7
No. 1 chain vibration damper RH x Cylinder head RH and cylinder block		21	214	15
No. 1 chain tensioner RH x Cylinder head RH		10	102	7
No. 3 chain tensioner x Cylinder head LH		10	102	7
No. 1 chain tensioner LH x Cylinder block		10	102	7
No. 1 chain vibration damper LH x Cylinder head LH and cylinder block		21	214	15
Cylinder head cover spacer x Cylinder head cover		10	102	7
Camshaft oil control valve x Cylinder head cover		10	102	7
Crankshaft position sensor x No. 1 oil pan		10	102	7
Crankshaft position sensor protector x No. 1 oil pan		10	102	7
Camshaft position sensor x Cylinder head cover		10	102	7
VVT sensor x Cylinder head cover		10	102	7
Spark plug x Cylinder head		21	214	15
Oil filler cap housing x Cylinder head cover LH		10	102	7
Noise filter x Cylinder head cover		7.0	71	62 in.*lbf
Ignition coil x Cylinder head cover		10	102	7
Front No. 1 engine mounting bracket LH x Cylinder block		35	357	26
Front No. 1 engine mounting bracket RH x Cylinder block		35	357	26
Cylinder block water drain cock x Cylinder block		30	306	22
Water drain cock plug x Water drain cock		13	133	10
Knock sensor x Cylinder block		20	204	15
Separator case x No. 1 heat exchanger cover		10	102	7
Water by-pass pipe sub-assembly x Cylinder head cover RH and cylinder head RH		10	102	7
No. 2 fuel tube x Cylinder head cover		10	102	7
Intake manifold x Cylinder head		21	214	15
Wire bracket x Intake manifold		8.0	82	71 in.*lbf
Engine wire x Cylinder head		8.5	87	75 in.*lbf
Ground wire x No. 1 oil pan		20	204	15

Cylinder Head

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder head stud bolt	E7 and E8 "TORX"	9.0	92	80 in.*lbf
No. 2 straight screw plug x Cylinder head		85	867	63
No. 1 straight screw plug x Cylinder head		44	449	32

Cylinder Block

Part Tightened		N*m	kgf*cm	ft.*lbf
Connecting rod x Connecting rod cap	1st	40	408	30
	2nd	Turn 90°		

Crankshaft bearing cap x Cylinder block	for inside position	61	622	45
	for outside position	27	275	20
	2nd	Turn 90°		
	for cylinder block side position	45	459	33
Cylinder block stud bolt	for stud bolt A (E8 "TORX")	20	204	15
	for stud bolt B (E8 "TORX")	9.0	92	80 in.*lbf
No. 1 oil nozzle x Cylinder block		10	102	7

ENGINE

Ignition timing		5 to 15° BTDC @ idling (transmission in neutral and A/C switch OFF)
Engine idle speed		650 to 750 rpm (transmission in neutral and A/C switch OFF)
Compression	Standard	1373 kPa (14.0 kgf/cm^2, 199 psi) or more
	Minimum pressure	1030 kPa (10.5 kgf/cm^2, 149 psi)
	Difference between each cylinder	98 kPa (1.0 kgf/cm^2, 14.2 psi) or less

VALVE CLEARANCE

Valve clearance (Cold)	Intake		0.15 to 0.25 mm (0.00591 to 0.00984 in.)	
	Exhaust		0.25 to 0.35 mm (0.00984 to 0.0138 in.)	
Adjust shim thickness	No. 00	2.000 mm (0.0787 in.)	42	2.420 mm (0.0953 in.)
	02	2.020 mm (0.0795 in.)	44	2.440 mm (0.0961 in.)
	04	2.040 mm (0.0803 in.)	46	2.460 mm (0.0969 in.)
	06	2.060 mm (0.0811 in.)	48	2.480 mm (0.0976 in.)
	08	2.080 mm (0.0819 in.)	50	2.500 mm (0.0984 in.)
	10	2.100 mm (0.0827 in.)	52	2.520 mm (0.0992 in.)
	12	2.120 mm (0.0835 in.)	54	2.540 mm (0.1000 in.)
	14	2.140 mm (0.0843 in.)	56	2.560 mm (0.1008 in.)
	16	2.160 mm (0.0850 in.)	58	2.580 mm (0.1016 in.)
	18	2.180 mm (0.0858 in.)	60	2.600 mm (0.1024 in.)
	20	2.200 mm (0.0866 in.)	62	2.620 mm (0.1031 in.)
	22	2.220 mm (0.0874 in.)	64	2.640 mm (0.1039 in.)
	24	2.240 mm (0.0882 in.)	66	2.660 mm (0.1047 in.)
	26	2.260 mm (0.0890 in.)	68	2.680 mm (0.1055 in.)
	28	2.280 mm (0.0898 in.)	70	2.700 mm (0.1063 in.)
	30	2.300 mm (0.0906 in.)	72	2.720 mm (0.1071 in.)
	32	2.320 mm (0.0913 in.)	74	2.740 mm (0.1079 in.)
	34	2.340 mm (0.0921 in.)	76	2.760 mm (0.1087 in.)
	36	2.360 mm (0.0929 in.)	78	2.780 mm (0.1094 in.)
	38	2.380 mm (0.0937 in.)	80	2.800 mm (0.1102 in.)
	40	2.400 mm (0.0945 in.)	-	-

TIMING BELT

Timing belt tensioner	Protrusion	9.5 to 10.5 mm (0.374 to 0.413 in.)

CYLINDER HEAD

Cylinder head	Warpage	Cylinder block side	0 to 0.05 mm (0 to 0.00197 in.)
		Intake manifold side	0 to 0.08 mm (0 to 0.00315 in.)
		Exhaust manifold side	0 to 0.08 mm (0 to 0.00315 in.)
		Maximum	0.10 mm (0.00394 in.)
Intake valve	Valve stem	Standard	5.470 to 5.485 mm (0.215 to 0.216 in.)
	Valve face angle	Standard	44.5°
	Margin thickness	Standard	1.0 mm (0.0394 in.)
		Minimum	0.5 mm (0.0197 in.)
	Overall length	Standard	95.05 mm (3.74 in.)
		Minimum	94.55 mm (3.72 in.)
Exhaust valve	Valve stem	Standard	5.465 to 5.480 mm (0.215 to 0.216 in.)
	Valve face angle	Standard	44.5°
	Margin thickness	Standard	1.0 mm (0.0394 in.)
		Minimum	0.5 mm (0.0197 in.)
	Overall length	Standard	95.10 mm (3.744 in.)

		Minimum	94.60 mm (3.724 in.)
Intake valve guide bush	Bush inside diameter	Standard	5.510 to 5.530 mm (0.217 to 0.218 in.)
	Oil clearance	Standard	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
		Maximum	0.08 mm (0.00314 in.)
	Cylinder bore diameter	Standard	10.285 to 10.306 mm (0.405 to 0.406 in.)
	Bush length	Intake	34.5 mm (1.36 in.)
		Exhaust	40.5 mm (1.59 in.)
	Bush bore	Use STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
		Use O/S 0.05	10.383 to 10.394 mm (0.4087 to 0.4092 in.)
	Protrusion	Standard	9.2 to 9.8 mm (0.362 to 0.386 in.)
Exhaust valve guide bush	Bush inside diameter	Standard	5.510 to 5.530 mm (0.217 to 0.218 in.)
	Oil clearance	Standard	0.030 to 0.065 mm (0.00118 to 0.00256 in.)
		Maximum	0.10 mm (0.00394 in.)
	Cylinder bore diameter	Standard	10.285 to 10.306 mm (0.405 to 0.406 in.)
	Bush length	Intake	34.5 mm (1.36 in.)
		Exhaust	40.5 mm (1.59 in.)
	Bush bore	Use STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
		Use O/S 0.05	10.383 to 10.394 mm (0.4087 to 0.4092 in.)
	Protrusion	Standard	8.2 to 8.8 mm (0.323 to 0.346 in.)
Compression spring	Deviation	Maximum	2.0 mm (0.0787 in.)
	Free length	Standard	51.29 mm (2.02 in.)
	Installed tension	Standard	210 to 226 N (21 to 23 kgf, 47.2 to 50.7 lbf) at 33.4 mm (1.31 in.)
Valve lifter	Lifter diameter	Standard	30.968 to 30.976 mm (1.2192 to 1.2195 in.)
	Lifter bore diameter	Standard	31.000 to 31.016 mm (1.220 to 1.221 in.)
	Oil clearance	Standard	0.024 to 0.050 mm (0.000945 to 0.00197 in.)
		Maximum	0.07 mm (0.00276 in.)
Camshaft	Thrust clearance (Intake side)	Standard	0 to 0.040 mm (0 to 0.00157 in.)
		Maximum	0.12 mm (0.00472 in.)
	Thrust clearance (Exhaust side)	Standard	0.030 to 0.070 mm (0.00118 to 0.00276 in.)
		Maximum	0.10 mm (0.00394 in.)
	Gear backlash	Standard	0.020 to 0.200 mm (0.000787 to 0.00787 in.)
		Maximum	0.30 mm (0.0118 in.)
Intake valve seat	Width	Standard	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
Exhaust valve seat	Width	Standard	1.0 to 1.4 mm (0.0394 to 0.0551 in.)

CYLINDER BLOCK

Connecting rod	Thrust clearance	Standard	0.160 to 0.290 mm (0.00630 to 0.0114 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness	Standard	22.880 to 22.920 mm (0.901 to 0.902 in.)
	Oil clearance	Standard	0.021 to 0.047 mm (0.000827 to 0.00185 in.)
		Maximum	0.059 mm (0.00232 in.)
	Bend	Maximum	0.05 mm (0.00197 in.) per 100 mm (3.94 in.)
	Twist	Maximum	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
Connecting rod big end inside diameter	Mark 1		55.000 to less than 55.006 mm (2.1654 to less than 2.1656 in.)
	Mark 2		55.006 to less than 55.012 mm (2.1656 to less than 2.1658 in.)
	Mark 3		55.012 to less than 55.018 mm (2.1658 to less than 2.1661 in.)
	Mark 4		55.018 to less than 55.024 mm (2.1661 to less than 2.1663 in.)
Crankshaft crank pin diameter	Mark 1		51.994 to less than 52.000 mm (2.0470 to less than 2.0472 in.)
	Mark 2		51.988 to less than 51.994 mm (2.0468 to less than 2.0470 in.)

	Mark 3		51.982 to less than 51.988 mm (2.0465 to less than 2.0468 in.)
Standard sized bearing center wall thickness	Mark 2		1.487 to less than 1.490 mm (0.0585 to less than 0.0587 in.)
	Mark 3		1.490 to less than 1.493 mm (0.0587 to less than 0.0588 in.)
	Mark 4		1.493 to less than 1.496 mm (0.0588 to less than 0.0589 in.)
	Mark 5		1.496 to less than 1.499 mm (0.0589 to less than 0.0590 in.)
	Mark 6		1.499 to less than 1.502 mm (0.0590 to less than 0.0591 in.)
	Mark 7		1.502 to less than 1.505 mm (0.0591 to less than 0.0593 in.)
Crankshaft	Thrust clearance	Standard	0.020 to 0.220 mm (0.000787 to 0.00866 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	Standard	2.440 to 2.490 mm (0.0961 to 0.0980 in.)
		O/S (0.125)	2.565 to 2.615 mm (0.101 to 0.103 in.)
	Oil clearance	No. 1 and No. 5	0.028 to 0.046 mm (0.00110 to 0.00181 in.)
		Others	0.040 to 0.058 mm (0.00157 to 0.00228 in.)
		Maximum clearance	0.065 mm (0.00256 in.)
	Circle runout	Standard	0 to 0.06 mm (0 to 0.00236 in.)
		Maximum	0.08 mm (0.00315 in.)
	Main journal diameter	Standard	66.988 to 67.000 mm (2.6373 to 2.6378 in.)
	Crank pin diameter	Standard	51.982 to 52.000 mm (2.0465 to 2.0472 in.)
	Taper and out of round	Maximum	0.02 mm (0.000787 in.)
Cylinder block crankshaft journal bore diameter (A)	Mark 00		72.000 mm (2.83465 in.)
	Mark 01		72.001 mm (2.83469 in.)
	Mark 02		72.002 mm (2.83472 in.)
	Mark 03		72.003 mm (2.83476 in.)
	Mark 04		72.004 mm (2.83480 in.)
	Mark 05		72.005 mm (2.83484 in.)
	Mark 06		72.006 mm (2.83488 in.)
	Mark 07		72.007 mm (2.83492 in.)
	Mark 08		72.008 mm (2.83496 in.)
	Mark 09		72.009 mm (2.83500 in.)
	Mark 10		72.010 mm (2.83504 in.)
	Mark 11		72.011 mm (2.83508 in.)
	Mark 12		72.012 mm (2.83512 in.)
	Mark 13		72.013 mm (2.83516 in.)
	Mark 14		72.014 mm (2.83520 in.)
	Mark 15		72.015 mm (2.83524 in.)
	Mark 16		72.016 mm (2.83528 in.)
Crankshaft journal diameter (B)	Mark 00		67.000 mm (2.63780 in.)
	Mark 01		66.999 mm (2.63776 in.)
	Mark 02		66.998 mm (2.63772 in.)
	Mark 03		66.997 mm (2.63768 in.)
	Mark 04		66.996 mm (2.63764 in.)
	Mark 05		66.995 mm (2.63760 in.)
	Mark 06		66.994 mm (2.63756 in.)
	Mark 07		66.993 mm (2.63752 in.)
	Mark 08		66.992 mm (2.63748 in.)
	Mark 09		66.991 mm (2.63744 in.)
	Mark 10		66.990 mm (2.63740 in.)

	Mark 11		66.989 mm (2.63736 in.)
	Mark 12		66.988 mm (2.63732 in.)
Standard bearing center wall thickness	No. 1 and No. 5	Mark 3	2.487 to less than 2.490 mm (0.0979 to less than 0.0980 in.)
		Mark 4	2.490 to less than 2.493 mm (0.0980 to less than 0.0981 in.)
		Mark 5	2.493 to less than 2.496 mm (0.0981 to less than 0.0983 in.)
		Mark 6	2.496 to less than 2.499 mm (0.0983 to less than 0.0984 in.)
		Mark 7	2.499 to less than 2.502 mm (0.0984 to less than 0.0985 in.)
	Other	Mark 1	2.481 to less than 2.484 mm (0.0977 to less than 0.0978 in.)
		Mark 2	2.484 to less than 2.487 mm (0.0978 to less than 0.0979 in.)
		Mark 3	2.487 to less than 2.490 mm (0.0979 to less than 0.0980 in.)
		Mark 4	2.490 to less than 2.493 mm (0.0980 to less than 0.0981 in.)
		Mark 5	2.493 to less than 2.496 mm (0.0981 to less than 0.0983 in.)
Cylinder block	Warpage	Standard	0 to 0.05 mm (0 to 0.00197 in.)
		Maximum	0.07 mm (0.00276 in.)
Cylinder bore	Standard	Mark 1	94.002 to 94.010 mm (3.70087 to 3.70118 in.)
		Mark 2	94.011 to 94.020 mm (3.70122 to 3.70157 in.)
		Mark 3	94.021 to 94.028 mm (3.70161 to 3.70189 in.)
	Maximum		94.230 mm (3.71 in.)
Piston	Diameter	Standard	93.968 to 93.996 mm (3.670 to 3.701 in.)
		O/S (0.05)	94.468 to 94.496 mm (3.719 to 3.720 in.)
	Standard	Mark 1	93.942 to 93.952 mm (3.6985 to 3.6989 in.)
		Mark 2	93.952 to 93.960 mm (3.6989 to 3.6992 in.)
		Mark 3	93.960 to 93.970 mm (3.6992 to 3.6996 in.)
	Oil clearance	Standard	0.050 to 0.068 mm (0.00197 to 0.00268 in.)
		Maximum	0.13 mm (0.00512 in.)
Piston pin	Piston pin hole inside diameter	Mark A	21.998 to 22.001 mm (0.86606 to 0.86618 in.)
		Mark B	22.002 to 22.004 mm (0.86622 to 0.86630 in.)
		Mark C	22.005 to 22.007 mm (0.86634 to 0.86642 in.)
	piston pin diameter	Mark A	21.997 to 22.000 mm (0.86602 to 0.86614 in.)
		Mark B	22.001 to 22.003 mm (0.86618 to 0.86626 in.)
		Mark C	22.004 to 22.006 mm (0.86630 to 0.86638 in.)
	Oil clearance	Standard	-0.002 to 0.004 mm (-0.0000787 to 0.000157 in.)
	Connecting rod bush inside diameter:	A	22.005 to 22.008 mm (0.86633 to 0.86646 in.)
		B	22.009 to 22.011 mm (0.86650 to 0.86657 in.)
		C	22.012 to 22.014 mm (0.86661 to 0.86669 in.)

	Oil clearance	Standard	0.005 to 0.011 mm (0.000197 to 0.000433 in.)
		Maximum	0.05 mm (0.00197 in.)
Piston ring groove clearance	Standard	No. 1	0.030 to 0.080 mm (0.00118 to 0.00315 in.)
		No. 2	0.020 to 0.060 mm (0.000787 to 0.00236 in.)
Piston ring end gap	Standard	No. 1 piston ring	0.300 to 0.400 mm (0.0118 to 0.0157 in.)
		No. 2 piston ring	0.400 to 0.550 mm (0.0157 to 0.0217 in.)
		Oil ring (Side rail)	0.130 to 0.380 mm (0.00512 to 0.0150 in.)
	Maximum	No. 1 piston ring	1.10 mm (0.0433 in.)
		No. 2 piston ring	1.30 mm (0.0512 in.)
		Oil ring (Side rail)	0.90 mm (0.0354 in.)
Connecting rod bolt	Standard		7.200 to 7.300 mm (0.283 to 0.287 in.)
	Minimum		7.00 mm (0.276 in.)
Crankshaft bearing cap bolt	Measuring point		67.0 mm (2.64 in.)
	Standard		10.760 to 10.970 mm (0.424 to 0.432 in.)
	Minimum		10.40 mm (0.409 in.)

ENGINE UNIT

Exhaust manifold	Warpage		Maximum	0.50 mm (0.0197 in.)
Cylinder head set bolt	Measuring point		Intake side	82 mm (3.23 in.)
			Exhaust side	86 mm (3.39 in.)
	Outside diameter		Standard	9.810 to 9.960 mm (0.386 to 0.392 in.)
			Minimum	9.700 mm (0.382 in.)
Camshaft	Circle runout		Standard	0 to 0.06 mm (0 to 0.00236 in.)
			Maximum	0.08 mm (0.00315 in.)
	Cam lobe height	Intake	Standard	42.61 to 42.71 mm (1.6776 to 1.6815 in.)
			Minimum	42.46 mm (1.6717 in.)
		Exhaust	Standard	42.63 to 42.73 mm (1.6783 to 1.6823 in.)
			Minimum	42.48 mm (1.6724 in.)
	Journal diameter		Standard	26.954 to 26.970 mm (1.061 to 1.062 in.)
	Journal diameter for Camshaft timing tube		Standard	30.984 to 31.000 mm (1.2198 to 1.2204 in.)
	Oil clearance	Camshaft journal	Standard	0.030 to 0.071 mm (0.00118 to 0.00280 in.)
			Maximum	0.10 mm (0.00394 in.)
Camshaft timing tube	Journal diameter		Standard	39.955 to 39.964 mm (1.5730 to 1.5734 in.)
Camshaft gear spring	Gap distance			18.2 to 18.8 mm (0.717 to 0.740 in.)

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 2 timing belt idler sub-assembly x Cylinder block		35	352	25
No. 1 timing belt idler sub-assembly x Cylinder block		35	352	25
Timing belt tensioner x Oil pump assembly		26	265	19
No. 1 timing belt cover x Oil pump assembly		7.5	76	66 in.*lbf
Pulley bolt x Crankshaft		245	2498	181
Fan bracket sub-assembly x Cylinder block	for nut A, bolt B	16	163	12
	for nut C, bolt D	32	326	24
V-ribbed belt tensioner assembly x Cylinder block		16	163	12
No. 2 timing belt cover sub-assembly x Cylinder block		16	163	12
No. 3 timing belt cover sub-assembly LH x Cylinder head		7.5	76	66 in.*lbf
No. 3 timing belt cover sub-assembly RH x Cylinder head		7.5	76	66 in.*lbf
No. 2 idle pulley sub-assembly x Fan bracket		39	398	29
Oil cooler pipe x No. 3 timing belt cover sub-assembly LH, Fan bracket		7.5	76	66 in.*lbf
Camshaft bearing cap x Cylinder head 7.5 76 66 in.*lbf	for bolt 21, 22	7.5	76	66 in.*lbf
	for other bolt	16	163	12
Rear No. 2 timing belt plate LH x Cylinder head		7.5	76	66 in.*lbf
Rear No. 2 timing belt plate RH x Cylinder head		7.5	76	66 in.*lbf
Camshaft timing pulley x Camshaft timing tube		8.1	83	72 in.*lbf
Cylinder head cover x Cylinder head		6.0	61	53 in.*lbf
Ground wire x Air injection control driver bracket		5.0	51	44 in.*lbf
No. 1 water by-pass pipe x Cylinder head cover LH		18	184	13
Cylinder head x Cylinder block	1st	40	408	30
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
Rear timing belt plate RH x Cylinder head		7.5	76	66 in.*lbf
Rear timing belt plate LH x Cylinder head		7.5	76	66 in.*lbf
Front exhaust pipe assembly x exhaust center pipe		48	489	35
Front exhaust pipe assembly x Exhaust manifold RH		54	554	40
Exhaust manifold RH x No. 1 manifold stay		36	327	27
Front No. 2 exhaust pipe assembly x exhaust center pipe		48	489	35
Front No. 2 exhaust pipe assembly x Exhaust manifold LH		54	554	40
Exhaust manifold LH x No. 2 manifold stay		36	367	27
Engine mounting insulator x Body		79	806	58
Drive gear and ring gear x Crankshaft	1st	30	306	22
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear No. 1 engine mounting insulator x Automatic transmission		59	602	44
Wire harness x engine room relay block		10	102	7
Ground wire x Body LH side		8.4	86	76 in.*lbf
Wire harness x Positive (+) battery terminal	for type A nut	13	133	10
	for type B nut	7.6	77	67 in.*lbf
Ground wire x Body RH side		8.0	82	71 in.*lbf
w/ Winch Winch ground wire x Cylinder block, Body RH side	for bolt A	29	296	21
	for bolt B	19	194	14
Vane pump assembly x Cylinder block		21	214	15
Cooler compressor assembly x Cylinder block	for bolt	45	459	33
	for nut	25	250	18
Cooler refrigerant suction hose x No. 5 camshaft bearing cap		9.8	100	87 in.*lbf
Hood sub-assembly x Hood hinge		13	133	10

Hood stay bolt x Body		18	184	13
No. 2 engine under cover x Body		29	296	21
No. 1 engine under cover x Body		29	296	21
Front wheel	for aluminum wheel	131	1336	97
	for steel wheel	209	2131	154
Cylinder block union x Cylinder block		49	500	36
Cylinder block water drain cock x Cylinder block		49	500	36
Water drain cock plug x Water drain cock		13	130	9
Engine rear oil seal retainer x Cylinder block		8.0	82	71 in.*lbf
No. 3 oil pan baffle plate x Oil pan		7.5	76	66 in.*lbf
No. 2 oil pan baffle plate x Oil pan		7.5	76	66 in.*lbf
No. 1 oil pan baffle plate x Oil pan		7.5	76	66 in.*lbf
Camshaft drive gear x Camshaft timing tube		7.5	76	66 in.*lbf
Camshaft timing tube x Camshaft		78	795	58
Screw plug x Camshaft timing tube		5	153	11
Oil filler cap housing x Cylinder head cover LH		7.5	76	66 in.*lbf
No. 1 engine hanger x Cylinder head		37	377	27
Rear water by-pass joint x Cylinder head		18	184	13
Front water by-pass joint x Cylinder head		18	184	13
Ground wire x No.5 camshaft bearing cap		8.4	86	74 in.*lbf
Ground wire x Engine LH side		17	173	13
Ground wire x Inside left side of the V-bank		17	173	13
Ground wire x Cylinder head rear side		8.4	86	74 in.*lbf
Front engine mounting bracket x Cylinder block		36	367	27
Front engine mounting insulator x Front engine mounting bracket		72	734	53
No. 2 wiring harness heat insulator x Cylinder block		17	173	13
Stud bolt x Cylinder head	for stud bolt A, C	9.0	92	80 in.*lbf
	for stud bolt B	15	153	11
No. 1 straight screw plug x Cylinder head		85	868	63
Stud bolt x Cylinder block	for stud bolt A, B, F	8.0	82	71 in.*lbf
	for stud bolt C	20	204	15
	for stud bolt D	12	122	9
	for stud bolt E	14	143	10
No. 1 oil nozzle x Cylinder block		9.0	92	80 in.*lbf
Crank shaft bearing cap x Cylinder block	1st	27	275	20
	2nd	Turn 90°	Turn 90°	Turn 90°
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90°	Turn 90°	Turn 90°

Standard idle speed	for Manual Transmission		500 to 600 rpm
	for Automatic Transmission		550 to 650 rpm
Maximum engine speed			4700 to 4900 rpm
Compression	Standard pressure (normal condition)		2700 kPa (27.5 kgf/cm^2, 392 psi)
	Minimum pressure		2200 kPa (22.4 kgf/cm^2, 319 psi)
	Difference between end cylinder		500 kPa (5.1 kgf/cm^2, 73 psi)
for Viscous Heater: Standard belt tension	Used belt		400 to 650 N (41 to 66 kgf, 89.9 to 146.1 lbf)
	New belt		300 to 500 N (31 to 51 kgf, 67.4 to 112.4 lbf)
• A "new belt" is a belt which has been used for less than 5 minutes on a running engine. • A "used belt" is a belt which has been used on a running engine for 5 minutes or more. • After installing a new belt, run the engine for approximately 5 minutes and then recheck the tension.			
Select No. 1 and No. 2 cylinder head gasket	Standard piston protrusion		0.520 to 0.780 mm (0.0205 to 0.0307 in.)
	New installed cylinder head gasket thickness (HINT: The specified condition indicates the gaskets thickness after tightening the cylinder head.)	1 cutout (item A)	1.20 to 1.30 mm (0.0472 to 0.0512 in.)
		2 cutouts (item B)	1.25 to 1.35 mm (0.0492 to 0.0394 in.)
		3 cutouts (item C)	1.30 to 1.40 mm (0.0512 to 0.0551 in.)
		4 cutouts (item D)	1.35 to 1.45 mm (0.0531 to 0.0571 in.)
		5 cutouts (item E)	1.40 to 1.50 mm (0.0551 to 0.0591 in.)
	Piston protrusion	Item A	0.520 to 0.575 mm (0.0205 to 0.0226 in.)
		Item B	0.575 to 0.625 mm (0.0226 to 0.0246 in.)
		Item C	0.625 to 0.675 mm (0.0246 to 0.0266 in.)
		Item D	0.675 to 0.725 mm (0.0266 to 0.0285 in.)
		Item E	0.725 to 0.780 mm (0.0285 to 0.0307 in.)
Connecting rod	Standard thrust clearance		0.14 to 0.54 mm (0.00551 to 0.0213 in.)
	Maximum thrust clearance		0.60 mm (0.0236 in.)
	Standard oil clearance		0.024 to 0.042 mm (0.000945 to 0.00165 in.)
	Maximum oil clearance		0.052 mm (0.00205 in.)
	Connecting rod bolt	Standard diameter	8.7 to 8.8 mm (0.343 to 0.346 in.)
		Minimum diameter	8.5 mm (0.335 in.)
	Alignment	Maximum bend	0.07 mm (0.00276 in.) per 100 mm (3.94 in.)
		Maximum twist	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
Connecting rod bearing	Standard bearing center wall thickness	Mark 1	More than 1.485 to 1.488 mm (more than 0.05846 to 0.05858 in.)
		Mark 2	More than 1.488 to 1.491 mm (more than 0.05858 to 0.05870 in.)
		Mark 3	More than 1.491 to 1.494 mm (more than 0.05870 to 0.05882 in.)
		Mark 4	More than 1.494 to 1.497 mm (more than 0.05882 to 0.05894 in.)
		Mark 5	More than 1.497 to 1.500 mm (more than 0.05894 to 0.05910 in.)
	Standard connection rod big end inside diameter	Mark 1	58.000 to 58.006 mm (2.28346 to 2.28370 in.)
		Mark 2	More than 58.006 to 58.012 mm (more than 2.28370 to 2.28393 in.)
		Mark 3	More than 58.012 to 58.018 mm (more than 2.28393 to 2.28417 in.)
		Mark 0	More than 54.994 to 55.000 mm (more

				than 2.16511 to 2.16535 in.)
	Standard crankshaft pin diameter		Mark 1	More than 54.988 to 54.994 mm (more than 2.16488 to 2.16511 in.)
			Mark 2	54.982 to 54.988 mm (2.16464 to 2.16488 in.)
Crankshaft	Standard thrust clearance			0.02 to 0.22 mm (0.000787 to 0.00866 in.)
	Maximum thrust clearance			0.30 mm (0.0118 in.)
	Standard thrust washer thickness			2.44 to 2.49 mm (0.0960 to 0.0980 in.)
	Maximum circle runout			0.04 mm (0.00157 in.)
	Main journal	Standard diameter		74.982 to 75.000 mm (2.9520 to 2.9527 in.)
		Maximum taper and out-of-round		0.01 mm (0.000394 in.)
	Crank pin	Standard diameter		54.982 to 55.000 mm (2.1646 to 2.1653 in.)
		Maximum taper and out-of-round		0.01 mm (0.000394 in.)
	Oil clearance	Standard	No. 1 and 3 journals	0.020 to 0.038 mm (0.000787 to 0.00150 in.)
			No. 2, 4 and 5 journals	0.032 to 0.050 mm (0.00126 to 0.00197 in.)
		Maximum	1 and 3 journals	0.048mm (0.00189 in.)
			2, 4 and 5 journals	0.060mm (0.00236 in.)
	Main journal diameter	No. 1 and 3 journals	"2"	More than 74.994 to 75.000 mm (more than 2.95251 to 2.95275 in.)
			"3"	More than 74.988 to 74.994 mm (more than 2.95228 to 2.95251 in.)
			"4"	74.982 to 74.988 mm (2.95204 to 2.95228 in.)
		No. 2, 4 and 5 journals	"0"	More than 74.994 to 75.000 mm (more than 2.95251 to 2.95275 in.)
			"1"	More than 74.988 to 74.994 mm (more than 2.95288 to 2.95251 in.)
			"2"	74.982 to 74.988 mm (2.95204 to 2.95228 in.)
Crankshaft bearing	No. 1 and 5 journal bearings wide			22.5 mm (0.886 in.)
	No. 2, 3 and 4 journal bearings wide			20.5 mm (0.807 in.)
	Center wall thickness (for upper bearing)	No. 1 and 5 journal bearings	"1"	More than 1.987 to 1.990 mm (more than 0.07823 to 0.07835 in.)
			"2"	More than 1.990 to 1.993 mm (more than 0.07835 to 0.07846 in.)
			"3"	More than 1.993 to 1.996 mm (more than 0.07846 to 0.07858 in.)
			"4"	More than 1.996 to 1.999 mm (more than 0.07858 to 0.07870 in.)
			"5"	More than 1.999 to 2.002 mm (more than 0.07870 to 0.07882 in.)
			"6"	More than 2.002 to 2.005 mm (more than 0.07882 to 0.07894 in.)
			"7"	More than 2.005 to 2.008 mm (more than 0.07894 to 0.07905 in.)
		No. 2, 3 and 4 journal bearings	"1"	More than 1.975 to 1.978 mm (more than 0.07776 to 0.07787 in.)
			"2"	More than 1.978 to 1.981 mm (more than 0.07787 to 0.07799 in.)
			"3"	More than 1.981 to 1.984 mm (more than 0.07799 to 0.07811 in.)
			"4"	More than 1.984 to 1.987 mm (more than 0.07811 to 0.07823 in.)
			"5"	More than 1.987 to 1.990 mm (more than 0.07823 to 0.07835 in.)
			"6"	More than 1.990 to 1.993 mm (more than 0.07835 to 0.07846 in.)
			"7"	More than 1.993 to 1.996 mm (more than 0.07846 to 0.07858 in.)

	Center wall thickness (for lower bearing)	No. 1 and 5 journal bearings	"1"	More than 1.975 to 1.978 mm (more than 0.07776 to 0.07787 in.)
			"2"	More than 1.978 to 1.981 mm (more than 0.07787 to 0.07799 in.)
			"3"	More than 1.981 to 1.984 mm (more than 0.07799 to 0.07811 in.)
			"4"	More than 1.984 to 1.987 mm (more than 0.07811 to 0.07823 in.)
			"5"	More than 1.987 to 1.990 mm (more than 0.07823 to 0.07835 in.)
			"6"	More than 1.990 to 1.993 mm (more than 0.07835 to 0.07846 in.)
			"7"	More than 1.993 to 1.996 mm (more than 0.07846 to 0.07858 in.)
		No. 2, 3 and 4 journal bearings	"1"	More than 1.987 to 1.990 mm (more than 0.07823 to 0.07835 in.)
			"2"	More than 1.990 to 1.993 mm (more than 0.07835 to 0.07846 in.)
			"3"	More than 1.993 to 1.996 mm (more than 0.07846 to 0.07858 in.)
			"4"	More than 1.996 to 1.999 mm (more than 0.07858 to 0.07870 in.)
			"5"	More than 1.999 to 2.002 mm (more than 0.07870 to 0.07882 in.)
			"6"	More than 2.002 to 2.005 mm (more than 0.07882 to 0.07894 in.)
			"7"	More than 2.005 to 2.008 mm (more than 0.07894 to 0.07905 in.)
Cylinder head	Standard warpage		Cylinder block side	0 to 0.05 mm (0 to 0.00197 in.)
			Intake manifold side	0 to 0.08 mm (0 to 0.00315 in.)
			Exhaust manifold side	0 to 0.08 mm (0 to 0.00315 in.)
	Maximum warpage		Cylinder block side	0.05 mm (0.00197 in.)
			Intake manifold side	0.08 mm (0.00315 in.)
			Exhaust manifold side	0.08 mm (0.00315 in.)
	Inner compression spring		Maximum deviation	1.5 mm (0.0591 in.)
			Standard free length	45.9 mm (1.81 in.)
			Installed tension	219 to 242 N (22 to 25 kgf, 49.2 to 54.4 lbf) at 31 mm (1.22 in.)
	Valve guide bush oil clearance	Standard bush inside diameter		6.01 to 6.03 mm (0.2366 to 0.2374 in.)
		Standard oil clearance	Intake	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
			Exhaust	0.035 to 0.070 mm (0.00138 to 0.00276 in.)
		Maximum oil clearance	Intake	0.120 mm (0.00472 in.)
			Exhaust	0.130 mm (0.00512 in.)
	Valve	Standard valve stem diameter	Intake	5.970 to 5.985 mm (0.2350 to 0.2356 in.)
			Exhaust	5.960 to 5.975 mm (0.2346 to 0.2352 in.)
		Standard overall length	Intake	104.4 mm (4.11 in.)
			Exhaust	104.1 mm (4.10 in.)
		Minimum overall length	Intake	104.1 mm (4.10 in.)
			Exhaust	103.8 mm (4.09 in.)
		Standard valve face angle		45.5°
	Valve seat	Standard width	Intake	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
			Exhaust	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
		Standard bush bore diameter (for cylinder head)		10.985 to 11.006 mm (0.432 to 0.433 in.)
		Standard valve guide	STD	11.033 to 11.044 mm (0.434 to 0.435 in.)

	Valve guide bush	bush diameter	O/S 0.05	11.083 to 11.094 mm (0.436 to 0.437 in.)
		Standard protrusion height		9.0 to 9.4 mm (0.354 to 0.370 in.)
		Standard overall length	Intake	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
			Exhaust	0.035 to 0.070 mm (0.00138 to 0.00276 in.)
	Ring pin	Standard protrusion		4.4 to 5.6 mm (0.173 to 0.220 in.)
	Valve stem oil seal	Standard protrusion height		Below 14.7 mm (0.579 in.)
Camshaft	No. 2 and No. 3 camshaft thrust clearance (intake)		Standard thrust clearance	0.035 to 0.160 mm (0.00138 to 0.00630 in.)
			Maximum thrust clearance	0.180 mm (0.00709 in.)
	No. 1 and No. 4 camshaft thrust clearance (exhaust)		Standard thrust clearance	0.035 to 0.160 mm (0.00138 to 0.00630 in.)
			Maximum thrust clearance	0.180 mm (0.00709 in.)
	Maximum runout			0.03 mm (0.00118 in.)
	Standard cam lobe height		No. 2 and No. 3 camshaft (intake)	37.277 to 37.387 mm (1.468 to 1.472 in.)
			No. 1 and No. 4 camshaft (exhaust)	38.324 to 38.434 mm (1.509 to 1.513 in.)
	Minimum cam lobe height		No. 2 and No. 3 camshaft (intake)	37.277 mm (1.468 in.)
			No. 1 and No. 4 camshaft (exhaust)	38.324 mm (1.509 in.)
	Standard journal diameter		No. 1 journal	29.969 to 29.985 mm (1.180 to 1.181 in.)
			Other journal	26.969 to 26.985 mm (1.0618 to 1.0624 in.)
	Standard oil clearance			0.025 to 0.062 mm (0.000984 to 0.00244 in.)
	Maximum oil clearance			0.072 mm (0.00283 in.)
Cylinder head bolt	Standard outside diameter			12.8 to 13.0 mm (0.504 to 0.512 in.)
	Minimum outside diameter			12.5 mm (0.492 in.)
Crankshaft bearing cap bolt	Bolt length		Item (bolt A)	106 mm (4.17 in.)
			Item (bolt B)	90.5 mm (3.56 in.)
	Measuring area		Item (bolt A)	73 mm (2.87 in.)
			Item (bolt B)	63 mm (2.48 in.)
	Standard diameter		Item (bolt A)	10.8 to 11.0 mm (0.425 to 0.433 in.)
			Item (bolt B)	9.8 to 10.0 mm (0.386 to 0.394 in.)
	Minimum diameter		Item (bolt A)	10.5 mm (0.413 in.)
			Item (bolt B)	9.5 mm (0.374 in.)
Cylinder block	Cylinder block for flatness	Maximum warpage		0.05 mm (0.00197 in.)
	Cylinder block tight plug	Standard depth		1.7 to 2.7 mm (0.0669 to 0.106 in.)
	Cylinder bore	Standard diameter		86.000 to 86.013 mm (3.3858 to 3.3863 in.)
		Maximum diameter		86.03 mm (3.3870 in.)
	Cylinder block main journal bore diameter	for No. 1 and No. 3 journals	"1"	79.000 to 79.006 mm (3.11023 to 3.11047 in.)
			"2"	More than 79.006 to 79.012 mm (more than 3.11047 to 3.11070 in.)
			"3"	More than 79.012 to 79.018 mm (more than 3.11070 to 3.11094 in.)
		for No. 2, 4 and 5 journals	"1"	79.000 to 79.006 mm (3.11023 to 3.11047 in.)
			"2"	More than 79.006 to 79.012 mm (more than 3.11047 to 3.11070 in.)
			"3"	More than 79.012 to 79.018 mm (more than 3.11070 to 3.11094 in.)
	Straight pin	Standard protrusion	Pin "A" and "B"'	5.0 to 7.0 mm (0.197 to 0.275 in.)
			Pin "C"	10.5 to 11.5 mm (0.413 to 0.453 in.)
			Pin "D" and "F"	3.5 to 6.0 mm (0.138 to 0.236 in.)

			Pin "E"	4.5 to 7.0 mm (0.177 to 0.276 in.)
Piston	Standard piston diameter			85.932 to 85.966 mm (3.383 to 3.384 in.)
	Minimum piston diameter			85.910 mm (3.382 in.)
	Piston oil clearance	Standard oil clearance		0.034 to 0.081 mm (0.00134 to 0.00319 in.)
		Maximum oil clearance		0.091 mm (0.00358 in.)
Piston x piston pin	Standard piston pin hole inside diameter		Mark A	29.009 to 29.013 mm (1.1421 to 1.1422 in.)
			Mark B	29.013 to 29.017 mm (1.1422 to 1.1424 in.)
			Mark C	29.017 to 29.021 mm (1.1424 to 1.1426 in.)
	Standard piston pin diameter		Mark A (paint color "white")	29.000 to 29.004 mm (1.1417 to 1.1419 in.)
			Mark B (paint color "pink")	29.004 to 29.008 mm (1.1419 to 1.1420 in.)
			Mark C (paint color "blue")	29.008 to 29.012 mm (1.1420 to 1.1422 in.)
	Standard oil clearance			0.005 to 0.013 mm (0.000197 to 0.000512 in.)
	Maximum oil clearance			0.018 mm (0.000709 in.)
Connecting rod x Piston pin	Standard bush inside diameter		Mark A	29.019 to 29.023 mm (1.1425 to 1.1426 in.)
			Mark B	29.023 to 29.027 mm (1.1426 to 1.1428 in.)
			Mark C	29.027 to 29.031 mm (1.1428 to 1.1430 in.)
	Standard oil clearance			0.015 to 0.023 mm (0.000591 to 0.000906 in.)
	Maximum oil clearance			0.028 mm (0.00110 in.)
Piston ring	Standard ring groove clearance		No. 1 compression ring	0.11 to 0.15 mm (0.00433 to 0.00591 in.)
			No. 2 compression ring	0.08 to 0.12 mm (0.00315 to 0.00472 in.)
			Oil ring	0.03 to 0.07 mm (0.00118 to 0.00276 in.)
	Standard end gap		No. 1 compression ring (w/ EGR System)	0.22 to 0.32 mm (0.00866 to 0.0126 in.)
			No. 1 compression ring (w/o EGR System)	0.20 to 0.30 mm (0.00787 to 0.0118 in.)
			No. 2 compression ring	0.47 to 0.62 mm (0.0185 to 0.0244 in.)
			Oil ring	0.10 to 0.40 mm (0.00394 to 0.0157 in.)
	Maximum end gap		No. 1 compression ring	0.40 mm (0.0157 in.)
			No. 2 compression ring	0.75 mm (0.0295 in.)
			Oil ring	0.50 mm (0.0197 in.)
Chain	No. 1 chain	Maximum chain elongation		143.95 mm (5.67 in.)
	No. 2 chain	Maximum chain elongation		143.95 mm (5.67 in.)
Fuel supply pump shaft sprocket	Minimum gear diameter (with chain)		No. 1 chain	101.55 mm (4.00 in.)
			No. 2 chain	101.55 mm (4.00 in.)
Camshaft timing sprocket	Minimum gear diameter (with chain)		No. 1 chain	134.90 mm (5.31 in.)
			No. 2 chain	134.90 mm (5.31 in.)
No. 1 idle gear shaft and No. 1 idle gear	Standard idle gear shaft diameter			44.947 to 44.975 mm (1.770 to 1.771 in.)
	Standard idle gear inside diameter			45.000 to 45.025 mm (1.772 to 1.773 in.)
	Standard oil clearance			0.025 to 0.078 mm (0.000984 to 0.00307 in.)

	Maximum oil clearance			0.078 mm (0.00307 in.)
Chain tensioner slipper	Maximum depth	No. 1		1.0 mm (0.0394 in.)
		No. 2		1.0 mm (0.0394 in.)
Chain vibration damper	Maximum depth	No. 1		1.0 mm (0.0394 in.)
		No. 2		1.0 mm (0.0394 in.)
Intake manifold for flatness	Maximum warpage	No.1 intake manifold	No. 3 intake manifold	0.10 mm (0.00394 in.)
			Cylinder head	0.10 mm (0.00394 in.)
		No. 2 intake manifold	No. 3 intake manifold	0.10 mm (0.00394 in.)
			Cylinder head	0.10 mm (0.00394 in.)
		No. 3 intake manifold	Intake pipe	0.10 mm (0.00394 in.)
			No. 2 and No. 3 intake manifold	0.15 mm (0.00591 in.)
Exhaust manifold for flatness	Maximum warpage			0.80 mm (0.0315 in.)

Engine

Part Tightened	N*m	kgf*cm	ft.*lbf
SST (attachment) x Glow plug hole	13	133	10

Drive Belt

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 3 idler pulley x No. 1 idler pulley	(w/ Viscous Heater)	88	898	64
No. 1 idler pulley x Timing chain cover	(w/ Viscous Heater)	49	495	36
Idler pulley nut x No. 2 idler pulley bracket	(w/ Viscous Heater)	40	408	30

Camshaft

Part Tightened		N*m	kgf*cm	ft.*lbf
Service bolt x No. 1 and No. 4 camshaft		8.0	82	71 in.*lbf
No. 1 and No. 4 camshaft bearing cap x Cylinder head		21	214	15
No. 3 camshaft bearing cap x Cylinder head		10	102	7
No. 1, No. 2, No. 3 and No. 4 camshaft oil feed pipes x Cylinder head	for union bolt	17	173	13
	for 10 mm head bolt	10	102	7
No. 2 camshaft timing sprocket x No. 3 camshaft		25	250	18
Pump drive shaft gear x No. 1 camshaft timing sprocket x No. 2 camshaft		25	250	18
Taper screw plug x Timing chain cover		15	153	11

Cylinder Head Gasket

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder head RH and LH x Cylinder block	1st	80	816	59
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	4th	Turn 90°	Turn 90°	Turn 90°
No. 1 and No. 4 camshaft bearing cap x Cylinder head		21	214	15
No. 3 camshaft bearing cap x Cylinder head		10	102	7
No. 1, No. 2, No. 3 and No. 4 camshaft oil feed pipes x Cylinder head	for union bolt	17	173	13
	for 10 mm head bolt	10	102	7
Timing gear case x Cylinder block	for 14 mm head bolt (case is "dry")	46	469	34
	for 14 mm head bolt (case is "wet")	42	428	31
	• The case is "dry" when there is absolutely no engine oil on the 14 mm head bolts and cylinder head bolt holes. • The case is "wet" when there is any engine oil on the 14 mm head bolts and cylinder head bolt holes.			
	for 12 mm head bolt	29	296	21
	for nut	29	296	21
Fuel supply pump x Timing gear case	for 6 mm hexagon bolt	21	214	15
	for nut	21	214	15
Idle gear x No. 1 idle gear shaft		47	479	35
Fuel supply pump drive gear x Fuel supply pump		68	693	50

No. 2 camshaft timing sprocket x No. 3 camshaft	25	250	18
Pump drive shaft gear x No. 1 camshaft timing sprocket x No. 2 camshaft	25	250	18
No. 2 chain vibration damper x Timing gear case	21	214	15
No. 2 chain tensioner x Timing gear case	10	102	7
No. 1 chain vibration damper x Timing gear case	21	214	15
No. 1 chain tensioner x Timing gear case	10	102	7
No. 1 crankshaft position sensor plate x Crankshaft	10	102	7
Timing chain cover x Timing gear case x Cylinder head	25	250	18
Clutch flexible hose bracket x Cylinder head LH (for Manual Transmission)	20	204	15
Starter hose bracket x Cylinder head RH	10	102	7

Engine Assembly

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 1 and No. 2 engine hanger x Cylinder head		25	255	18
Drive plate and ring gear x Crankshaft	(for Automatic Transmission)	182	1856	134
Flywheel x Crankshaft	(for Manual Transmission)	182	1856	134
Front engine mounting insulator LH and RH x Frame		58	591	43
Clutch release cylinder to flexible hose tube x Cylinder head LH		20	204	15
No. 2 intake air connector pipe x No. 2 inlet compressor elbow	(hose clamp)	6.0	61	53 in.*lbf
No. 2 intake air connector pipe x No. 2 intake air connector bracket		21	214	15
Cooler compressor x Timing gear case x Timing chain cover x Compressor bracket		25	250	18
No. 2 air tube x No. 2 turbocharger		21	214	15
No. 1 air tube x No. 1 turbocharger		21	214	15
Air cleaner case x Body panel		5.0	51	44 in.*lbf
No. 2 engine under cover x Frame		29	296	21
No. 1 engine under cover x Frame		29	296	21
Hood x Hood hinge		13	133	10
Hood support x Body panel		18	184	13

Engine Unit

Part Tightened		N*m	kgf*cm	ft.*lbf
Stud bolt	Intake pipe	6.0	61	53 in.*lbf
	No. 3 intake manifold 41 mm (1.61 in.) bolt length	6.0	61	53 in.*lbf
	No. 3 intake manifold 24 mm (0.945 in.) bolt length	5.0	51	44 in.*lbf
	No. 3 intake manifold 39 mm (1.54 in.) bolt length	4.0	41	35 in.*lbf
	Oil filter bracket	6.0	61	53 in.*lbf
	No. 1 oil pan 41 mm (1.61 in.) bolt length	6.0	61	53 in.*lbf
	No. 1 oil pan 27 mm (1.06 in.) bolt length	5.2	53	46 in.*lbf
	Timing chain cover 54 mm (2.13 in.) bolt length	6.0	61	53 in.*lbf
	Timing chain cover 45 mm (1.77 in.) bolt length	12	120	9

	Timing gear case 42 mm (1.65 in.) bolt length	6.0	61	53 in.*lbf
	Timing gear case 40 mm (1.57 in.) bolt length	10	102	7
Straight screw plug	No. 1 oil pan (using a 10 mm hexagon wrench of plug)	50	510	37
	No. 1 oil pan (using a 14 mm hexagon wrench of plug)	86	877	63
	Oil filter bracket	50	510	37
	Timing gear case	40	408	30
	Cylinder block	38	387	28
Cylinder head RH x Cylinder block	1st	80	816	59
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	4th	Turn 90°	Turn 90°	Turn 90°
Cylinder head LH x Cylinder block	1st	80	816	59
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	4th	Turn 90°	Turn 90°	Turn 90°
No. 1 camshaft bearing cap x Cylinder head RH		21	214	15
No. 3 camshaft bearing cap x Cylinder head RH		10	102	7
No. 1 and No. 2 camshaft oil feed pipes x Cylinder head RH	for union bolt	17	173	13
	for 10 mm head bolt	10	102	7
No. 4 camshaft bearing cap x Cylinder head LH		21	214	15
No. 3 camshaft bearing cap x Cylinder head LH		10	102	7
No. 3 and No. 4 camshaft oil feed pipes x Cylinder head LH	for union bolt	17	173	13
	for 10 mm head bolt	10	102	7
No. 2 vacuum transmitting pipe x Timing gear case		6.0	61	53 in.*lbf
No. 1 vacuum transmitting pipe x Timing gear case		6.0	61	53 in.*lbf
Timing gear case x Cylinder block	for 14 mm head bolt (case is "dry")	46	469	34
	for 14 mm head bolt (case is "wet")	42	428	31
	• The case is "dry" when there is absolutely no engine oil on the 14 mm head bolts and cylinder head bolt holes. • The case is "wet" when there is any engine oil on the 14 mm head bolts and cylinder head bolt holes.			
	for 12 mm head bolt	29	296	21
	for nut	29	296	21
Fuel supply pump x Timing gear case	for 6 mm hexagon bolt	21	214	15
	for nut	21	214	15
Fuel supply pump drive gear x Fuel supply pump shaft sprocket		25	250	18
Idle gear x sub idle gear (service bolt)		13	133	10
Idle gear x No. 1 idle gear shaft		47	479	35
Fuel supply pump drive gear x Fuel supply pump		68	693	50
No. 2 camshaft timing sprocket x No. 3 camshaft		25	250	18
Pump drive shaft gear x No. 1 camshaft timing sprocket x No. 2 camshaft		25	250	18
No. 2 chain vibration damper x Timing gear case		21	214	15
No. 2 chain tensioner x Timing gear case		10	102	7
No. 1 chain vibration damper x Timing gear case		21	214	15
No. 1 chain tensioner x Timing gear case		10	102	7
No. 1 crankshaft position sensor plate x Crankshaft		10	102	7
Timing chain cover x Timing gear case	for bolt	25	250	18
	for nut	25	250	18

Timing chain cover plate x Timing chain cover		9.1	93	81 in.*lbf
Nozzle holder clamp x Fuel injector LH and RH x Cylinder head		25	255	18
Nozzle leakage pipe x Fuel injector LH and RH	for hollow screw	18	184	13
	for union bolt	21	214	15
Scavenging pump x Cylinder block		10	102	7
Oil pump x Cylinder block		10	102	7
Rear engine oil seal retainer x Cylinder block		10	102	7
Oil regulator x Scavenging pump		10	102	7
Inlet oil pump pipe x No. 1 oil pan		10	102	7
No. 1 oil pan baffle plate x No. 1 oil pan		10	102	7
No. 1 oil pan x Cylinder block		25	250	18
Oil strainer x No. 1 oil pan		10	102	7
No. 2 oil pan x No. 1 oil pan		10	102	7
Oil pan drain plug x No. 1 oil pan		38	387	28
Engine oil level sensor x No. 1 oil pan		10	102	7
Oil filter bracket x No. 1 oil pan		21	214	15
Oil cooler relief valve x Oil filter bracket		25	250	18
Oil cooler x Oil filter bracket		21	214	15
Oil pressure sender gauge x Oil filter bracket		15	153	11
Timing gear cover spacer x Timing gear case		21	214	15
Crankshaft pulley x Crankshaft		115	1168	84
Crankshaft position sensor x Timing gear case		5.0	51	44 in.*lbf
Camshaft position sensor x Timing gear case		5.0	51	44 in.*lbf
Compressor bracket x Timing gear case		21	214	15
Oil pressure regulator	Oil relief valve plug x Oil pressure regulator body	50	510	37
	Oil pressure regulator x No. 1 oil pan	86	877	63
Oil filter bracket drain cock x Oil filter bracket	1st	20	204	15
	2nd	Set angle within 360°	Set angle within 360°	Set angle within 360°
	As the oil filter bracket may be damaged, the maximum tightening torque should be 80 N*m (816 kgf*cm, 59 ft.*lbf) or less.			
Oil filter drain cock plug x Oil filter bracket drain cock		13	133	9
Oil tank bracket x No. 1 oil pan		10	102	7
Engine mounting bracket LH and RH x Cylinder block		80	816	59
No. 2 water by-pass pipe x Cylinder block	for union bolt	35	357	26
	for bolt	10	102	7
No. 3 vacuum transmitting pipe x Cylinder block		6.0	61	53 in.*lbf
Turbocharger wire x Timing gear case and Engine mounting bracket LH		21	214	15
No. 2 intake air connector bracket x Timing gear case		21	214	15
No. 4 vacuum transmitting pipe x Cylinder block		6.0	61	53 in.*lbf
No. 1 water by-pass pipe x Cylinder block	for union bolt	35	357	26
	for bolt	10	102	7
Air tube support x Timing gear cover		21	214	15
No. 1 intake air connector bracket x Timing gear cover		21	214	15
Rear cylinder head plate LH and RH x Cylinder head	(w/o EGR System)	29	296	21
No. 3 engine hanger x Timing gear case		43	438	32
No. 1 intercooler support bracket x No. 3 engine hanger		21	214	15
No. 2 intercooler support bracket x Timing gear case		43	438	32
Fuel pump motor wire x Timing gear case		10	102	7
Clutch flexible hose bracket x Cylinder head LH	(for Manual Transmission)	20	204	15
No. 1 water outlet pipe x No. 2 water outlet pipe		21	214	15
Water outlet pipe x Cylinder head LH and RH		21	214	15
Water outlet x Water pump		21	214	15
Starter hose bracket x Cylinder head RH		10	102	7

Starter x Cylinder block		80	816	59
Timing gear cover insulator x Timing gear cover	(w/o Viscous Heater)	21	214	15
No. 2 turbocharger with exhaust manifold LH x Cylinder head LH		36	367	27
No. 2 inlet turbo oil pipe x No. 1 oil pan		29	296	21
No. 1 turbocharger with exhaust manifold RH x Cylinder head RH		36	367	27
No. 1 inlet turbo oil pipe x Cylinder block	(case is "dry")	29	296	21
	(case is "wet")	23	235	17
	• The case is "dry" when there is absolutely no engine oil on the union bolts and cylinder block bolt hole. • The case is "wet" when there is any engine oil on the union bolts and cylinder block bolt hole.			

Cylinder Head

Part Tightened	N*m	kgf*cm	ft.*lbf
Head straight screw plug x Cylinder head	25	255	18
Stud bolt of exhaust manifold x Cylinder head	12	122	9
Nozzle holder clamp seat x Cylinder head	10	102	7

Cylinder block

Part Tightened			N*m	kgf*cm	ft.*lbf
Cylinder block straight screw plug x Cylinder block			38	387	28
No. 1 oil nozzle x Cylinder block			10	102	7
Crankshaft bearing cap x Stiffening plate x Cylinder block	Step 1	Bolt A	35	357	26
		Bolt B	60	612	44
	Step 2	Bolt A	Turn 90°	Turn 90°	Turn 90°
		Bolt B	Turn 90°	Turn 90°	Turn 90°
	Step 3	Bolt A	Turn 90°	Turn 90°	Turn 90°
	Step 4	Bolt C	56	571	41
• Bolt A: 11 mm (0.433 in.) diameter x 106 mm (4.17 in.) length • Bolt B: 10 mm (0.394 in.) diameter x 90.5 mm (3.56 in.) length • Bolt C: 10 mm (0.394 in.) diameter x 22 mm (0.866 in.) length					
Connecting rod cap x Connecting rod		Step 1	35	357	26
		Step 2	Turn 90°	Turn 90°	Turn 90°
Stud bolt	55 mm (2.17 in.) bolt length (using an E7 "TORX" wrench)		10	102	7
	34 mm (1.34 in.) bolt length (using an E8 "TORX" wrench)		10	102	7

Fuel pressure		Standard fuel pressure	at idle	281 to 287 kPa (2.87 to 2.93 kgf/cm^2, 41 to 42 psi)
			remains for 5 minutes after engine has stopped	147kPa (1.5 kgf/cm^2, 21 psi) or more
Fuel injector	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	11.6 to 12.4 Ω
	Injection volume		71 to 86 cm^3 (4.3 to 5.2 cu. in.) per 15 seconds	
	Difference between each cylinder		15 cm^3 (0.9 cu. in.) or less	
	Fuel leakage		1 drop or less per 12 minutes	
Fuel pump (for Single Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel pump (for Double Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω

Fuel pressure		Standard fuel pressure	at idle	281 to 287 kPa (2.87 to 2.93 kgf/cm^2, 41 to 42 psi)
			remains for 5 minutes after engine has stopped	147kPa (1.5 kgf/cm^2, 21 psi) or more
Fuel injector	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	11.6 to 12.4 Ω
	Injection volume		71 to 86 cm^3 (4.3 to 5.2 cu. in.) per 15 seconds	
	Difference between each cylinder		15 cm^3 (0.9 cu. in.) or less	
	Fuel leakage		1 drop or less per 12 minutes	
Fuel pump (for Single Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel pump (for Double Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	Float level is F (upper)	13.5 to 16.5 Ω
			Float level is E (lower)	405.5 to 414.5 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω

Fuel injector

Part tightened	N*m	kgf*cm	ft.*lbf
Fuel delivery pipe x Intake manifold	15	153	11

Fuel pressure regulator

Part tightened	N*m	kgf*cm	ft.*lbf
Fuel pressure regulator x Fuel delivery pipe	9.0	92	80 in.*lbf

Fuel filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel filter assembly x Frame	20	199	14
No. 1 fuel tube protector x Fuel filter assembly x Frame	29	296	21

Fuel pump ECU

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pump ECU x Frame	31	316	23

Fuel tank

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel tank band x Body	40	408	30
No. 1 fuel tank protector x Body	20	204	15

Fuel sub tank

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel and evaporation vent tube sub-assembly x Fuel sub tank		3.5	36	31 in.*lbf
Fuel sender gauge assembly x Fuel sub tank		1.5	15	13 in.*lbf
Fuel tank band x Body		40	408	30
No. 1 spare wheel stopper x Frame		32	326	24
Spare wheel carrier crossmember and Spare wheel carrier bracket x Frame	for bolt A	29	296	21
	for bolt B	20	204	15
	for bolt C	20	204	15

Fuel sender gauge assembly (for Fuel Sub Tank)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel sender gauge assembly x Fuel sub tank	1.5	15	13 in.*lbf

Fuel pressure	Standard fuel pressure	at idle	281 to 287 kPa (2.87 to 2.93 kgf/cm^2, 41 to 42 psi)
		remains for 5 minutes after engine has stopped	147 kPa (1.5 kgf/cm^2, 21 psi) or more
Fuel injector	Standard resistance	20°C (68°F)	11.6 to 12.4 Ω
	Standard Injection volume	87 to 105 cm^3 (5.3 to 6.4 cu in.) per 15 seconds	
	Difference between each cylinder	18 cm^3 (1.1 cu in.) or less	
	Fuel leakage	1 drop or less per in 12 minutes	
Fuel pump	Standard resistance	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly	Standard resistance	Float level is F (upper)	13.5 to 16.5 Ω
		Float level is E (lower)	405.5 to 414.5 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)	Standard resistance	Float level is F (upper)	12 to 18 Ω
		Float level is E (lower)	405 to 415 Ω

Fuel Injector

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel delivery pipe sub-assembly LH x Cylinder head LH	21	214	15
Fuel delivery pipe sub-assembly RH x Cylinder head RH	21	214	15

Fuel Pressure Regulator

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pressure regulator assembly x Fuel delivery pipe sub-assembly RH	10	102	7

Fuel Pump ECU

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pump ECU x Frame	31	316	23

Fuel Tank

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel tank band x Body	40	408	30
No. 1 fuel tank protector x Body	20	204	15

Fuel Sub Tank

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel and evaporation vent tube sub-assembly x Fuel sub tank		3.5	36	31 in.*lbf
Fuel sender gauge assembly x Fuel sub tank		1.5	15	13 in.*lbf
Fuel tank band x Body		40	408	30
No. 1 spare wheel stopper x Frame		32	326	24
Spare wheel carrier crossmember and Spare wheel carrier bracket x Frame	for bolt A	29	296	21
	for bolt B	20	204	15
	for bolt C	20	204	15

Fuel Sender Gauge Assembly (for Fuel Sub Tank)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel sender gauge assembly x Fuel sub tank	1.5	15	13 in.*lbf

Fuel pressure		Standard fuel pressure	at idle	265 to 304 kPa (2.7 to 3.1 kgf/cm^2, 38 to 44 psi)
			remains for 5 minutes after engine has stopped	147kPa (1.5 kgf/cm^2, 21 psi) or more
Fuel injector	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	11.6 to 12.4 Ω
	Injection volume		56 to 69 cm^3 (3.4 to 4.2 cu. in.) per 15 seconds	
	Difference between each cylinder		13 cm^3 (0.8 cu. in.) or less	
	Fuel leakage		1 drop or less per 12 minutes	
Fuel pump (for Single Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel pump (for Double Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω

Fuel pressure		Standard fuel pressure	at idle	265 to 304 kPa (2.7 to 3.1 kgf/cm^2, 38 to 44 psi)
			remains for 5 minutes after engine has stopped	147kPa (1.5 kgf/cm^2, 21 psi) or more
Fuel injector	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	11.6 to 12.4 Ω
	Injection volume		56 to 69 cm^3 (3.4 to 4.2 cu. in.) per 15 seconds	
	Difference between each cylinder		13 cm^3 (0.8 cu. in.) or less	
	Fuel leakage		1 drop or less per 12 minutes	
Fuel pump (for Single Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel pump (for Double Tank Type)	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly	Standard resistance	Tester Connection	Condition	Specified Condition
		1 - 2	Float level is F (upper)	13.5 to 16.5 Ω
			Float level is E (lower)	405.5 to 414.5 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)	Standard resistance	Tester Connection	Condition	Specified Condition
		2 - 3	Float level is F (upper)	12 to 18 Ω
			Float level is E (lower)	405 to 415 Ω

Fuel injector

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 1 fuel pipe x Intake manifold and Fuel delivery pipe LH, RH	for union bolt	39	398	29
	for bolt	7.5	76	66 in.*lbf
No. 3 fuel pipe x Intake manifold and Fuel delivery pipe LH		7.5	76	66 in.*lbf
Fuel delivery pipe LH, RH and Intake manifold		21	214	15
Engine wire protector x Intake manifold x Cylinder head RH		8.2	84	73 in.*lbf
Purge VSV x Intake manifold		18	184	13

Fuel pressure regulator

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pressure regulator x Fuel delivery pipe LH	7.5	76	66 in.*lbf

Fuel pressure pulsation damper

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pressure pulsation damper x Fuel hose x Fuel delivery pipe LH	33 (39)	340 (398)	24 (29)

( ): For use without SST

Fuel filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel filter assembly x Frame	20	199	14
No. 1 fuel tube protector x Fuel filter assembly x Frame	29	296	21

Fuel pump ECU

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pump ECU x Frame	31	316	23

Fuel pump ECU (w/ Active Height Control)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel pump ECU x Frame	31	316	23

Fuel tank

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel tank band x Body	40	408	30
No. 1 fuel tank protector x Body	20	204	15

Fuel sub tank

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel and evaporation vent tube sub-assembly x Fuel sub tank		3.5	36	31 in.*lbf
Fuel sender gauge assembly x Fuel sub tank		1.5	15	13 in.*lbf
Fuel tank band x Body		40	408	30
No. 1 spare wheel stopper x Frame		32	326	24
Spare wheel carrier crossmember and Spare wheel carrier bracket x Frame	for bolt A	29	296	21
	for bolt B	20	204	15
	for bolt C	20	204	15

Fuel sender gauge assembly (for Fuel Sub Tank)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel sender gauge assembly x Fuel sub tank	1.5	15	13 in.*lbf

Fuel injector		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	0.85 to 1.05 Ω
Fuel supply pump	Suction control valve	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	1.9 to 2.3 Ω
	Standard thrust clearance		0.05 to 0.30 mm (0.00197 to 0.0118 in.)		
Common rail	Fuel pressure sensor	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	25°C (77°F)	16.4 kΩ or less
			2 - 3	25°C (77°F)	3 kΩ or less
Fuel filter	Level warning switch	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	Float upper end position	Below 1 Ω
			1 - 2	Float lower end position	1 MΩ or higher
	Clogging switch	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	Below 1 Ω
Fuel temperature sensor		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	2.32 to 2.59 Ω
			1 - 2	80°C (176°F)	0.310 to 0.326 Ω
Fuel pump (for Double Tank Type)		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly		Standard resistance	Tester Connection	Condition	Specified Condition
			2 - 3	Float level is F (upper)	12 to 18 Ω
				Float level is E (lower)	405 to 415 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)		Standard resistance	Tester Connection	Condition	Specified Condition
			2 - 3	Float level is F (upper)	12 to 18 Ω
				Float level is E (lower)	405 to 415 Ω

Fuel injector		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	0.85 to 1.05 Ω
Fuel supply pump	Suction control valve	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	1.9 to 2.3 Ω
	Standard thrust clearance		0.05 to 0.30 mm (0.00197 to 0.0118 in.)		
Common rail	Fuel pressure sensor	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	25°C (77°F)	16.4 kΩ or less
			2 - 3	25°C (77°F)	3 kΩ or less
Fuel filter	Level warning switch	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	Float upper end position	Below 1 Ω
			1 - 2	Float lower end position	1 MΩ or higher
	Clogging switch	Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	Below 1 Ω
Fuel temperature sensor		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	2.32 to 2.59 Ω
			1 - 2	80°C (176°F)	0.310 to 0.326 Ω
Fuel pump (for Double Tank Type)		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	20°C (68°F)	0.2 to 3.0 Ω
Fuel sender gauge assembly		Standard resistance	Tester Connection	Condition	Specified Condition
			1 - 2	Float level is F (upper)	13.5 to 16.5 Ω
				Float level is E (lower)	405.5 to 414.5 Ω
Fuel sender gauge assembly (for Fuel Sub Tank)		Standard resistance	Tester Connection	Condition	Specified Condition
			2 - 3	Float level is F (upper)	12 to 18 Ω
				Float level is E (lower)	405 to 415 Ω

Fuel injector

Part Tightened		N*m	kgf*cm	ft.*lbf
Nozzle holder clamp x Cylinder head sub-assembly LH		25	255	18
No. 2 nozzle leakage pipe x Fuel injector LH		18	184	13
No. 2 nozzle leakage pipe x Cylinder head sub-assembly LH	for union bolt	21	214	15
Nozzle holder clamp x Cylinder head sub-assembly RH		25	255	18
Nozzle leakage pipe x Fuel injector RH		18	184	13
Nozzle leakage pipe x Cylinder head sub-assembly RH	for union bolt	21	214	15
Cylinder head cover sub-assembly RH x Cylinder head sub-assembly RH		10	102	7
Cylinder head cover silencer RH x Cylinder head cover sub-assembly RH		5.0	51	44 in.*lbf
Cylinder head cover sub-assembly LH x Cylinder head sub-assembly LH		10	102	7
Oil separator assembly x Cylinder head cover sub-assembly LH		10	102	7
Cylinder head cover silencer LH x Cylinder head cover sub-assembly LH		5.0	51	44 in.*lbf
No. 1 vacuum transmitting pipe sub-assembly x Cylinder head cover sub-assembly LH		6.0	61	53 in.*lbf
No. 1 vacuum switching valve x Cylinder head cover sub-assembly LH		6.0	61	53 in.*lbf

Fuel supply pump

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel supply pump x Timing gear case sub-assembly	hexagon bolt	21	214	15
	nut	21	214	15
Fuel supply pump x Fuel supply pump drive gear		68	693	50
No. 1 fuel pipe x Fuel supply pump	for union bolt	17	175	13
Timing chain cover plate x Timing chain cover sub-assembly		9.1	93	81 in.*lbf

Common rail

Part Tightened		N*m	kgf*cm	ft.*lbf
Common rail assembly RH x No. 3 intake manifold		21	214	15
Common rail assembly LH x No. 3 intake manifold		21	214	15
No. 5 nozzle leakage pipe x Common rail assembly LH	for union bolt	20	204	15

Fuel filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel filter assembly x Body	20	199	14
Fuel filer cap x Fuel filter case x Guide plate	4.5	46	40 in.*lbf

Fuel temperature sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel temperature sensor x Fuel supply pump	22	224	16

Fuel cooler (for Engine Room Side)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel cooler assembly x Intake manifold	10	102	7

Fuel cooler (for Under Floor Side)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel cooler assembly x Body	8.0	82	71 in.*lbf
No. 3 front floor heat insulator x Body	5.0	51	44 in.*lbf

Injector driver

Part Tightened	N*m	kgf*cm	ft.*lbf
No. 2 injector driver bracket x Injector driver bracket x No. 2 injector driver	2.0	20	18 in.*lbf
No. 1 injector driver bracket x Injector driver bracket x No. 1 injector driver	2.0	20	18 in.*lbf
No. 2 injector driver bracket x No. 1 injector driver bracket	3.0	31	27 in.*lbf
Injector driver assembly x Body	8.0	82	71 in.*lbf

Fuel tank

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel tank band x Body	40	408	30
No. 1 fuel tank protector x Body	20	204	15

Fuel sub tank

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel and evaporation vent tube sub-assembly x Fuel sub tank		3.5	36	31 in.*lbf
Fuel sender gauge assembly x Fuel sub tank		1.5	15	13 in.*lbf
Fuel tank band x Body		40	408	30
No. 1 spare wheel stopper x Frame		32	326	24
Spare wheel carrier crossmember and Spare wheel carrier bracket x Frame	for bolt A	29	296	21
	for bolt B	20	204	15
	for bolt C	20	204	15

Fuel sender gauge assembly (for Fuel Sub Tank)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel sender gauge assembly x Fuel sub tank	1.5	15	13 in.*lbf

Purge VSV:

Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	26 to 30 Ω
1 - Body ground	Always	10 MΩ or higher
2 - Body ground		

Part Tightened	N*m	kgf*cm	ft.*lbf
Canister x Body	20	199	14
Purge VSV x Intake air surge tank	9.0	92	80 in.*lbf
Ventilation valve sub-assembly x Cylinder head cover sub-assembly LH	27	275	20

Purge VSV	Standard resistance	20°C (68°F)	23 to 26 Ω

Part Tightened	N*m	kgf*cm	ft.*lbf
Canister x Body panel			
P ge x take manifold			
PC ve x Separator case	3.5	36	31 in.*lbf

Air pump:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	0.4 to 1.0 Ω
1 - Body ground	Always	10 kΩ or higher
2 - Body ground		

Air switching valve assembly:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	4.5 to 5.5 Ω
1 - Body ground	Always	1 MΩ or higher
2 - Body ground		

Purge VSV:

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	23 to 26 Ω
1 - Body ground	Always	10 MΩ or higher
2 - Body ground		

Part Tightened	N*m	kgf*cm	ft.*lbf
Air pump assembly x Air pump Bracket	10	102	7
Air pump with bracket and air switching valve x Cylinder block	16	163	12
Water by-pass pipe sub-assembly x Rear water by-pass joint	18	184	13
No. 1 air switching valve assembly x Rear water by-pass joint	10	102	7
No. 2 air switching valve assembly x Rear water by-pass joint	10	102	7
No. 3 air tube x Exhaust manifold sub-assembly LH	10	102	7
No. 3 air tube x No. 2 air switching valve assembly	10	102	7
Air tube sub-assembly RH x Exhaust manifold sub-assembly LH	10	102	7
Air tube sub-assembly RH x No. 1 air switching valve assembly	10	102	7
Air switching valve assembly x Air pump bracket	16	163	12
Air switching valve assembly x Air pressure sensor	5.0	51	44 in.*lbf
Air injection control driver assembly x Body	8.0	82	71 in.*lbf
Air injection control bracket x Ground wire	5.0	51	44 in.*lbf
Air injection control driver x Air injection control bracket	2.0	20	18 in.*lbf
Canister x Body	20	199	14
Purge VSV x Intake manifold	18	184	13
Ventilation valve sub-assembly x Cylinder head cover sub-assembly LH	27	275	20

EGR valve assembly:

Tester Connection	Condition	Specified Condition
1 (+B) - 5 (EGR)	20°C (68°F)	6.5 to 7.5 Ω
3 (VC) - 2 (E2)	Always	2.45 to 4.55 kΩ

Part Tightened		N*m	kgf*cm	ft.*lbf
EGR valve with EGR cooler x No. 1 intake manifold		21	214	15
EGR valve with EGR cooler x No. 2 intake manifold		21	214	15
No. 3 EGR pipe x EGR cooler		21	214	15
No. 2 EGR pipe sub-assembly x EGR cooler		29	296	21
No. 2 EGR pipe sub-assembly x Cylinder head sub-assembly LH		29	296	21
No. 1 EGR pipe sub-assembly x EGR cooler		29	296	21
No. 1 EGR pipe sub-assembly x Cylinder head sub-assembly RH		29	296	21
EGR pipe insulator x No. 1 and No. 2 EGR pipe sub-assembly		21	214	15
EGR cooler x No. 5 water by-pass pipe		10	102	7
Intake pipe x No. 3 intake manifold		21	214	15
Intake pipe x No. 4 EGR pipe		21	214	15
No. 3 EGR pipe x No. 4 EGR pipe		21	214	15
No. 3 intercooler support bracket x Intake pipe		21	214	15
No. 3 intercooler support bracket x Clutch tube to release cylinder 2 way	for Manual Transmission:	20	204	15
Clutch tube to release cylinder 2 way x clutch tube		14 (15)	141 (154)	10 (11)
Stud bolt x EGR cooler		6.0	61	53 in.*lbf
No. 3 water by-pass pipe x EGR cooler		10	102	7

( ): For use without union nut wrench

Vacuum Switching Valve (for ACIS):

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	37 to 44 Ω
1 - Body ground	Always	1 MΩ or higher
2 - Body ground		

I

Part tightened		N*m	kgf*cm	ft.*lbf
Intake manifold x Cylinder head sub-assembly LH, RH		26	265	19
Intake air surge tank x Intake manifold		28	286	21
No. 2 surge tank stay x Intake air surge tank		21	214	15
No. 2 surge tank stay x Cylinder head sub-assembly LH		21	214	15
Clutch tube bracket x No. 2 surge tank stay	for Manual transmission	20	204	15
No. 1 surge tank stay x Intake air surge tank		21	214	15
No. 1 surge tank stay x Cylinder head sub-assembly LH		21	214	15
Oil baffle plate x No. 1 surge tank stay		9.0	92	80 in.*lbf
Bracket x No. 1 surge tank stay		8.0	82	71 in.*lbf
Throttle body bracket x Intake air surge tank		21	214	15
Throttle body bracket x Cylinder head sub-assembly LH		21	214	15
Air cleaner assembly x Intake air surge tank x Hose clamp		8.0	82	71 in.*lbf
No. 2 air cleaner hose x Intake air surge tank x Hose clamp		4.0	41	35 in.*lbf
V-bank cover x Intake air surge tank		7.5	76	66 in.*lbf

E

Part tightened	N*m	kgf*cm	ft.*lbf
Exhaust manifold sub-assembly LH x Cylinder head LH	30	306	22
No. 2 manifold stay x Exhaust manifold sub-assembly LH x Clutch housing	40	408	30
No. 2 manifold stay x Exhaust manifold sub-assembly LH x Automatic transmission housing	40	408	30
Exhaust manifold sub-assembly RH x Cylinder head RH	30	306	22
No. 1 manifold stay x Exhaust manifold sub-assembly RH x Clutch housing	40	408	30
No. 1 manifold stay x Exhaust manifold sub-assembly RH x Automatic transmission housing	40	408	30
Front exhaust pipe assembly x Exhaust manifold sub-assembly RH	54	554	40
Front exhaust pipe assembly x Center exhaust pipe assembly	43	438	32
Front No. 2 exhaust pipe assembly x Exhaust manifold sub-assembly LH	54	554	40
Front No. 2 exhaust pipe assembly x Center exhaust pipe assembly	48	489	35

E

Part tightened	N*m	kgf*cm	ft.*lbf
Front exhaust pipe assembly x Exhaust manifold sub-assembly RH	54	554	40
Front No. 2 exhaust pipe assembly x Exhaust manifold sub-assembly LH	54	554	40
Center exhaust pipe assembly x Front exhaust pipe assembly	43	438	32
Center exhaust pipe assembly x Front No. 2 exhaust pipe assembly	48	489	35
Clamp	32	326	24

Vacuum Switching Valve (for ACIS)

Standard resistance	1 - 2	20°C (68°F)	37 to 44 Ω
	1 - Body ground	Always	1MΩ or higher
	2 - Body ground		

In

Part Tightened		N*m	kgf*cm	ft.*lbf
Wire harness clamp bracket x Intake manifold		8.0	82	71 in.*lbf
Purge VSV x Intake manifold		21	214	15
Vacuum switching valve assembly (for ACIS) x Intake manifold		9.0	92	80 in.*lbf
Throttle body assembly x Intake manifold		10	102	7
No. 2 V-bank cover bracket sub-assembly x Intake manifold		10	102	7
V-bank cover bolt x Intake manifold		10	102	7
No. 1 V-bank cover bracket x Intake manifold		10	102	7
Ventilation hose assembly x Intake manifold	for bolt A	21	214	15
	for bolt B	10	102	7
Intake manifold x Cylinder head		21	214	15
Wire bracket x Intake manifold		8.0	82	71 in.*lbf
Air cleaner hose assembly x Throttle body assembly		5.0	51	44 in.*lbf

E

Part Tightened	N*m	kgf*cm	ft.*lbf
Exhaust manifold sub-assembly LH and RH x Cylinder head	30	306	22
No. 1 and No. 2 exhaust manifold heat insulator x Exhaust manifold	10	102	7
No. 1 and No. 2 manifold stay x Transmission x exhaust manifold LH and RH	40	408	30

E

Part Tightened	N*m	kgf*cm	ft.*lbf
• Front exhaust pipe x Exhaust manifold RH • Front No. 2 exhaust pipe x Exhaust manifold LH	54	551	40
Oxygen sensor bracket x Transmission	29	296	21
Center exhaust pipe x Front exhaust pipe and front No. 2 exhaust pipe	48	489	35
Exhaust pipe damper x Tailpipe	19	194	14
Clamp (Tailpipe x Center exhaust pipe)	32	326	24

Vacuum Switching Valve (for ACIS):

Tester Connection	Condition	Specified Condition
1 - 2	20°C (68°F)	33 to 39 Ω
1 - Body ground	Always	1 MΩ or higher
2 - Body ground		

Intake manifold

Part tightened		N*m	kgf*cm	ft.*lbf
Engine cover joint x Intake manifold		7.5	76	66 in.*lbf
No. 4 V-bank cover bracket x Intake manifold		7.5	76	66 in.*lbf
Wire harness clamp bracket x Intake manifold		8.0	82	71 in.*lbf
Purge VSV x Intake manifold		18	184	13
Stud bolt x Intake manifold		7.0	71	62 in.*lbf
Throttle body x Intake manifold		14	143	10
Intake manifold x Cylinder head sub-assembly LH, RH		18	184	13
Engine wire protector x Intake manifold x Cylinder head sub-assembly RH		8.2	83	72 in.*lbf
Vacuum control valve set x Intake manifold	w/ Secondary Air Injection System	7.5	76	66 in.*lbf
No. 2 water by-pass pipe x Intake manifold		10	102	7
No. 2 V-bank cover bracket x Intake manifold		7.5	76	66 in.*lbf
Air cleaner hose x Throttle body x Hose clamp		5.0	51	44 in.*lbf
V-bank cover x Engine cover joint		7.5	76	66 in.*lbf

Vacuum switching valve (for ACIS)

Part tightened	N*m	kgf*cm	ft.*lbf
Vacuum switching valve (for ACIS) x Intake manifold	7.5	76	66 in.*lbf
VSV connector x Intake manifold	7.5	76	66 in.*lbf

Exhaust manifold (w/ Secondary Air Injection System)

Part tightened		N*m	kgf*cm	ft.*lbf
Exhaust manifold sub-assembly LH x Cylinder head LH		44	449	32
No. 2 exhaust manifold heat insulator x Exhaust manifold sub-assembly LH		7.5	76	66 in.*lbf
No. 2 manifold stay x Exhaust manifold sub-assembly LH		36	367	27
No. 2 manifold stay x Automatic transmission housing		71	724	52
Exhaust manifold sub-assembly RH x Cylinder head RH		44	429	32
No. 1 exhaust manifold heat insulator x Exhaust manifold sub-assembly RH		7.5	76	66 in.*lbf
No. 1 manifold stay x Exhaust manifold sub-assembly RH		36	367	27
No. 1 manifold stay x Automatic transmission housing		71	724	52
Transmission Oil Cooler x Automatic transmission	w/o Air Cooled Transmission Oil Cooler	21	214	15
Hose heat protector x Transmission oil cooler x Automatic transmission	w/o Air Cooled Transmission Oil Cooler	21	214	15
No. 1 water by-pass pipe x Cylinder head Cover RH	w/o Air Cooled Transmission Oil Cooler	18	184	13

Exhaust manifold (w/o Secondary Air Injection System)

Part tightened	N*m	kgf*cm	ft.*lbf
Exhaust manifold sub-assembly LH x Cylinder head LH	44	449	32
No. 2 exhaust manifold heat insulator x Exhaust manifold sub-assembly LH	7.5	76	66 in.*lbf
No. 2 manifold stay x Exhaust manifold sub-assembly LH	36	367	27
No. 2 manifold stay x Automatic transmission housing	71	724	52
Exhaust manifold sub-assembly RH x Cylinder head RH	44	429	32
No. 1 exhaust manifold heat insulator x Exhaust manifold sub-assembly RH	7.5	76	66 in.*lbf
No. 1 manifold stay x Exhaust manifold sub-assembly RH	36	367	27

No. 1 manifold stay x Automatic transmission housing	71	724	52

E haust pipe

Part tightened	N*m	kgf*cm	ft.*lbf
Front exhaust pipe assembly x Exhaust manifold sub-assembly RH	54	554	40
Front No. 2 exhaust pipe assembly x Exhaust manifold sub-assembly LH	54	554	40
Center exhaust pipe assembly x Front exhaust pipe assembly	48	489	35
Center exhaust pipe assembly x Front No. 2 exhaust pipe assembly	48	489	35
Clamp	32	326	24

Turbocharging pressure		Standard (at 4700 to 4900 rpm)	30 to 60 kPa (0.30 to 0.61 kgf/cm^2, 4.3 to 8.7 psi)
No. 1 and No. 2 intake manifold for flatness	No. 3 intake manifold side Cylinder head side	Maximum warpage	0.10 mm (0.00394 in.)
No. 3 intake manifold for flatness	Intake pipe side	Maximum warpage	0.10 mm (0.00394 in.)
	No. 2 and No. 3 intake manifold side	Maximum warpage	0.15 mm (0.00591 in.)
Exhaust manifold RH and LH		Maximum warpage	0.80 mm (0.0315 in.)
Axial play of turbine shaft	No. 1 turbocharger No. 2 turbocharger	Maximum	0.09 mm (0.00354 in.)
Radial play of turbine shaft	No. 1 turbocharger No. 2 turbocharger	Maximum	0.16 mm (0.00630 in.)

Snorkel Air Cleaner

Part Tightened	N*m	kgf*cm	ft.*lbf
Inlet air cleaner seal bracket x Body panel	6.5	70	58 in.*lbf
No. 2 inlet air cleaner x Body panel	5.5	56	49 in.*lbf
ir cleaner x Body panel	5.0	51	44 in.*lbf
No. 1 inlet air cleaner x Body panel	5.5	56	49 in.*lbf

Intake Manifold

Part Tightened		N*m	kgf*cm	ft.*lbf
t tbolt • Intake pipe	41 mm (1.61 in. length	6.0	61	53 in.*lbf
t tbolt • No. 3 intake manifold	41 mm (1.61 in. length	6.0	61	53 in.*lbf
	24 mm (0.945 in. length	5.0	51	44 in.*lbf
	39 mm (1.54 in. length	4.0	41	35 in.*lbf
No. 1 intake manifold x ylinder head		21	214	15
No. 2 intake manifold x ylinder head		21	214	15
No. 1 ater bypass pipe x ylinder block	for nion bolt	59	600	43
	for bolt	10	102	7
No. 4 no le leakage pipe x ylinder head	for nion bolt	21	214	15
	for bolt	10	102	7
No. 3 no le leakage pipe x ylinder head	for nion bolt	21	214	15
	for bolt	10	102	7
E al e ith cooler and No. (No. 2 intake manifold	ystem	21	214	15
E al e ith cooler x ylinder head • No. 1 and No. 2 E pipe x ylinder head	(ystem	29	296	21
No. 3 intake manifold x No. 1 and No. 2 intake manifold		21	214	15
No. 2 engine ire x Timing gear case		32	326	24
No. 2 engine ire x No3 intake manifold		13	133	10
Intake pipe x No. 3 intake manifold		21	214	15
Injection pipe x ommon rail x in ector	itho t nion t rench	34	347	25
	ith nion n t rench	31	316	23
Injection pipe clamp x Injection pipe		5.0	51	44 in.*lbf
No. 5 injection pipe x ommon rail x fel injection p mp	itho t nion n t rench	34	347	25
	ith nion n t rench	31	316	23
el p mp motor ire x No3 intake manifold		10	102	7
el filter to injection p mp f el pipe x ylinder head co er		10	102	7
Injection pipe x ommon rail x in ector	itho t nion t rench	34	347	25
	ith nion n t rench	31	316	23
Injection pipe clamp x Injection pipe		5.0	51	44 in.*lbf
No. 6 injection pipe x No. 2 injection pipe clamp		5.0	51	44 in.*lbf
No. 6 injection pipe x ommon rail	itho t nion n t rench	34	347	25
	ith nion n t			

	rench	31	316	23
No. 2 injection pipe clamp x No. 6 injection pipe x No. 3 intake manifold	ystem	5.0	51	44 in.*lbf
No. 6 injection pipe bracket x No. 3 intake manifold	o ystem	10	102	7
No. 2 f el pipe x el injection pipe	for nion bolt	10	105	7
No. 2 f el pipe x ylinder head co er	for bolt and n t	10	102	7
No. 2 f el pipe x No. 2 injection pipe clamp x No. 5 injection pipe		5.0	51	44 in.*lbf
No. 4 ater bypass pipe x ylinder head and timing gear case	for bolt and n t	10	102	7
No. 3 ater bypass pipe x ylinder head co er		10	102	7
No. 1 air cleaner pipe x Timing gear case		21	214	15
No. 1 air cleaner pipe x No. 1 intake air connector pipe	for hose clamp	6.3	64	56 in.*lbf
Heater atepipe x ylinder head co er x iss o No. 1 air cleaner pipe	Heater	9.8	100	87 in.*lbf
No. 2 air cleaner pipe x Timing gear case		21	214	15
No. 2 air cleaner pipe x No. 2 intake air connector pipe	for hose clamp	6.3	64	56 in.*lbf
No. 4 air t be x ir t be s pport		21	214	15
No. 4 air t be x No. 2 air t be	for hose clamp	6.3	64	56 in.*lbf
ction hose x No. 4 air t be (for air conditioning		9.8	100	87 in.*lbf
No. 2 air hose x Intercooler	for hose clamp	6.3	64	56 in.*lbf
No. 3 air t be x No. 1 intake air connector bracket		21	214	15
No. 3 air t be x No. 1 air t be	for hose clamp	6.3	64	56 in.*lbf
No. 1 air hose x Intercooler	for hose clamp	6.3	64	56 in.*lbf
Intake air connector x Timing chain co er and No3 engine hanger		21	214	15
Intake air connector x No. 1 and No. 2 air cleaner pipe	for hose clamp	6.3	64	56 in.*lbf
No. 1 air cleaner hose x ir cleaner case and intake air connector	for hose clamp	5.0	51	44 in.*lbf
No. 2 engine oil le el dipstick g id x ylinder head co er and air t be		10	102	7

Exhaust Manifold w/ Turbocharger

Part Tightened		N*m	kgf*cm	ft.*lbf
t bolt • No. 1 t rbocharger	41.4 mm (1.63 in. length 39.5 mm (1.56 in. length	20	204	15
	23.5 mm (0.925 in. length	6.0	61	53 in.*lbf
t bolt • No. 1 t rbocharger	39.5 mm (1.56 in. length	20	204	15
t bolt • Exha st manifold	39.5 mm (1.56 in. length	20	204	15
No. 2 inlet t rbo oil pipe x No. 2 t rbocharger	for nion bolt	29	296	21
	for bolt	10	102	7
No. 2 t rbo oil pipe x No. 2 t rbocharger		10	102	7
No. 2 inlet compressor elbo x No2 t rbocharger		21	214	15
No. 2 t rbocharger x Exha st manifold		60	612	44
No. 2 t rbocharger ith exhast manifold x ylinder head		36	367	27

No. 2 inlet t rbo oil pipe x No. 1 oil pan		29	296	21
No. 2 entilation tbe x No. 2 t rbo oil pipe		29	296	21
No. 2 entilation tbe x Exha st manifold		10	102	7
No. 2 t rbocharger stay x No. 2 t rbocharger and cylinder block		49	495	36
No. 2 t rbo ate pipe x No. 2 t rbocharger	for nion bolt	29	296	21
	for bolt	10	102	7
ront ater bypass joint x No. 2 t rbocharger		50	510	37
No. 3 t rbo ate pipe x No. 2 t rbocharger xhaust manifold	for nion bolt	29	296	21
	for bolt	10	102	7
No. 2 exha st manifold heat ins lator x Exha st manifold		25	255	18
No. 1 inlet t rbo oil pipe x No. 1 t rbocharger	for nion bolt	29	296	21
	for bolt	10	102	7
No. 1 t rbo oil pipe x No. 1 t rbocharger		10	102	7
No. 1 inlet compressor elbo x No. 1 t rbocharger		21	214	15
No. 1 t rbocharger x Exha st manifold		60	612	44
No. 1 t rbocharger ith exhast manifold x ylinder head		36	367	27
No. 1 inlet t rbo oil pipe x ylinder block	ase is dry	29	296	21
	ase is et	23	235	17
	• The case is dry hen there is absolutely no engine oil on the nion bolt and cylinder block bolt hole. • The case is et hen there is engine oil on the nion bolt and cylinder block bolt hole.			
No. 1 entilation tbe x No. 1 t rbo oil pipe	for nion bolt	29	296	21
No. 1 entilation tbe x Exha st manifold		10	102	7
No. 1 t rbo charger stay x No. 1 t rbocharger and cylinder block		49	495	36
No. 1 t rbo ate pipe x No. 1 t rbocharger and cylinder block		10	102	7
No. 1 exha st manifold heat ins lator x Exha st manifold		25	255	18
No. 1 intake air connector pipe x No. 1 intake air connector bracket		21	214	15
No. 1 intake air connector pipe x No. 1 inlet compressor elbo	for hose clamp	6.0	61	53 in.*lbf
No. 1 engine oil le el gauge pistick guide x ylinder head and No. 1 oil pan		10	102	7

Turbo Motor Driver

Part Tightened	N*m	kgf*cm	ft.*lbf
T rbo motor dri er x Bracket	2.0	20	18 in.*lbf
T rbo motor dri er ith bracket x Body panel	20	199	14

Intercooler

Part Tightened	N*m	kgf*cm	ft.*lbf
Engine co er bracket x Intercooler	9.0	92	80 in.*lbf
Intercooler x Intercooler s pport bracket	21	214	15
Intercooler x ir t be and	21	214	15
No. 1 and No. 2 air hose x Intercooler	6.3	64	56 in.*lbf
No. 1 engine co er x Intercooler	8.0	82	71 in.*lbf

Exhaust Pipe

Part Tightened		N*m	kgf*cm	ft.*lbf
let t rbine elbo x No. 2 t rbocharger	(o ystem	47	479	35
anifold stay x Transmission case and o let t rbine elbo		43	438	32
let t rbine elbo x No. 1 t rbocharger		47	479	35

anifold stay x Transmission case let t rbine elbo		43	438	32
onolithic con erter x2 Norbocharger		47	479	35
anifold stay x Transmission case onolithic con erter	(ystem	43	438	32
onolithic con erter x2 No. t rbocharger		47	479	35
anifold stay x Transmission case onolithic con erter		43	438	32
ront No2 exha st pipe x onolithic con erter and let t rbine elbo and		54	554	40
ront No1 exha st pipe x onolithic con erter and let t rbine elbo and		54	554	40
enter exhast pipe x ront No1 exha st pipe		49	496	36
enter exhast pipe x ront No2 exha st pipe		48	489	35
Tailpipe x enter exhast pipe x lamp		32	326	24
No. 2 engine nder co er x rame		29	296	21

Water inlet with thermostat	Standard valve opening temperature		80 to 84°C (176 to 183°F)
	Standard valve lift	at 95°C (203°F)	8.0 mm (0.315 in.) or more
Radiator cap	Standard valve (for brand-new cap)	93 to 123 kPa (1.0 to 1.3 kgf/cm^2, 13.5 to 18 psi)	
	Minimum standard valve (after using cap)	79 kPa (0.8 kgf/cm^2, 11.4 psi)	
Fin for blockage	300 mm (11.8 in.)	2942 to 4903 kPa (30.0 to 50.0 kgf/cm^2, 427 to 711 psi)	
	500 mm (19.7 in.)	4903 to 7845 kPa (50.0 to 80.0 kgf/cm^2, 711 to 1138 psi)	

Part Tightened	N*m	kgf*cm	ft.*lbf
Cylinder block drain cock plug x Cylinder block	13	133	10
No. 2 idler pulley x Timing chain cover	39	398	29
Water inlet housing x Timing chain cover	9.0	92	80 in.*lbf
Water inlet with thermostat x Water inlet housing	9.0	92	80 in.*lbf
Radiator x Radiator support	18	184	13
Fan shroud x Radiator	8.0	82	71 in.*lbf
Fluid coupling x Fan pulley	21	214	15
Oil cooler tube x Fan shroud	5.0	51	44 in.*lbf
Transmission oil cooler air duct x Oil cooler	4.9	50	43 in.*lbf
V-bank cover x V-bank cover bracket	7.5	76	66 in.*lbf

Part Tightened	N*m	kgf*cm	ft.*lbf
Cylinder block drain cock plug x Cylinder block	13	133	10
Water inlet housing x Timing chain cover	9.0	92	80 in.*lbf
Water inlet with thermostat x Water inlet housing	9.0	92	80 in.*lbf
Radiator x Radiator support	18	184	13
Fan shroud x Radiator	8.0	82	71 in.*lbf
Fluid coupling x Fan pulley	21	214	15
Oil cooler tube x Fan shroud	5.0	51	44 in.*lbf
Transmission oil cooler air duct x Oil cooler	4.9	50	43 in.*lbf
V-bank cover x V bank cover bracket	7.5	76	66 in.*lbf

Coolant

With rear heater	16.2 liters (17.1 US qts, 14.3 Imp. qts)
Without rear heater	13.4 liters (14.2 US qts, 11.8 Imp. qts)

Water Inlet with Thermostat

Standard valve opening temperature	80 to 84°C (176 to 183°F)
Standard valve lift	10.0 mm (0.394 in.) or more at 95°C (203°F)

Radiator Cap

Standard value (for brand-new cap)	93 to 123 kPa (1.0 to 1.3 kgf/cm^2, 13.5 to 18 psi)
Minimum standard value (after using cap)	79 kPa (0.8 kgf/cm^2, 11.4 psi)

Fin for blockage

300 mm (11.8 in.)	2942 to 4903 kPa (30.0 to 50.0 kgf/cm ^{2}, 427 to 711 psi)
500 mm (19.7 in.)	4903 to 7845 kPa (50.0 to 80.0 kgf/cm ^{2}, 711 to 1138 psi)

Cylinder Block Drain Cock Plug

Part Tightened	N*m	kgf*cm	ft.*lbf
Drain cock plug x Cylinder block water drain cock sub-assembly	13	130	10

Water Pump

Part Tightened		N*m	kgf*cm	ft.*lbf
Water pump x Timing chain cover	for bolt A	47	479	35
	for bolt B	23	235	17
	for bolt C	20	204	15
Water pump pulley x Water pump		21	214	15
Water inlet housing x Timing chain cover		21	214	15
No. 2 water by-pass pipe sub-assembly x Timing chain cover and front water by-pass joint		10	102	7

Thermostat

Part Tightened	N*m	kgf*cm	ft.*lbf
Water inlet with thermostat x Water inlet housing	10	102	7

Radiator

Part Tightened	N*m	kgf*cm	ft.*lbf
Radiator x Radiator support	18	184	13
Fan shroud x Radiator	8.0	82	71 in.*lbf
Oil cooler tube x Fan shroud	5.0	51	44 in.*lbf
Fluid coupling x Fluid coupling bracket	21	214	15

Standard valve opening temperature	80 to 84°C (176 to 183°F)
Standard valve lift	10.0 to 11.3 mm (0.394 to 0.445 in.) or more at 95°C (203°F)

R or

Standard valve (for brand-new cap)	93 to 123 kPa (1.0 to 1.3 kgf/cm^2, 13.5 to 18 psi)
Minimum standard valve (after using cap)	79 kPa (0.8 kgf/cm^2, 11.4 psi)

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder block drain cock plug x Cylinder block		13	130	10
Water pump x Cylinder block	Bolt	21	214	15
	Stud bolt and nut	18	184	13
Water inlet housing x water pump		18	184	13
Water inlet x Water inlet housing		19	194	14
Cooling fan x Fan bracket		29	296	21
Radiator x Radiator support		18	184	13
Fan shroud x Radiator		8.0	82	71 in.*lbf
Radiator bracket x Radiator support		18	184	13
Oil cooler tube x Fan shroud		5.0	51	44 in.*lbf
Transmission oil cooler air duct x Radiator support		4.9	50	43 in.*lbf

Thermostat

Condition	Specified Condition
Valve opening temperature	74 to 78°C (165 to 172°F)
Valve lift	10 mm (0.394 in.) or more at 90°C (194°F)

Radiator Reservoir Cap

Item	Specified Condition
Standard value (for brand-new cap)	93 to 123 kPa (0.95 to 1.25 kgf/cm ^{2}, 13.5 to 17.8 psi)
Minimum standard value (after using cap)	79 kPa (0.8 kgf/cm^2, 11.4 psi)

C

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil filter bracket drain cock plug x Oil filter bracket	13	133	10
Vent plug x Upper radiator tank	2.0	20	18 in.*lbf

Part Tightened		N*m	kgf*cm	ft.*lbf
Water pump x Timing chain cover		25	250	18
Water outlet x Water pump		21	214	15
Fan bracket x Timing chain cover		21	214	15
No. 2 idler pulley bracket x Timing chain cover	(w/ Viscous Heater)	49	495	36
No. 2 idler pulley x No. 2 idler pulley bracket	(w/ Viscous Heater)	49	495	36

T er

Part Tightened		N*m	kgf*cm	ft.*lbf
Water inlet x Water pump		21	214	15
Water inlet x Timing chain cover		25	250	18
No. 1 idler pulley bracket x Timing chain cover	(w/ Viscous Heater)	49	495	36
Heater water pipe x No. 1 air cleaner pipe	(w/ Viscous Heater)	9.8	100	87 in.*lbf
Fan shroud x Radiator		8.0	82	71 in.*lbf
Fluid coupling fan x Fan bracket		21	214	15
Vane pump x Timing chain cover		29	296	21
No. 1 oil reservoir bracket x Radiator reservoir		4.5	46	40 in.*lbf
No. 3 engine room wire x Battery terminal		7.6	77	67 in.*lbf

R

Part Tightened		N*m	kgf*cm	ft.*lbf
Radiator side support plate RH x Radiator tank upper and lower		18	184	13
Oil cooler tube x Fan shroud	(for Automatic Transmission)	5.0	51	44 in.*lbf
Transmission oil cooler air duct x Oil cooler	(for Automatic Transmission)	4.9	50	43 in.*lbf
Radiator x Radiator support		18	184	13

Oil pressure	Standard	at idling	29 kPa (0.3 kgf/cm^2, 4.3 psi) or more	
		at 3000 rpm	294 to 588 kPa (3.0 to 6.0 kgf/cm ^{2}, 43 to 85 psi)	
Oil pump	Tip clearance	Standard	0.06 to 0.16 mm (0.00236 to 0.00630 in.)	
		Maximum	0.16 mm (0.00630 in.)	
	Side clearance	Standard	0.03 to 0.09 mm (0.00118 to 0.00354 in.)	
		Maximum	0.09 mm (0.00354 in.)	
	Body clearance	Standard	0.250 to 0.325 mm (0.00984 to 0.0128 in.)	
		Maximum	0.325 mm (0.0128 in.)	
Engine oil level sensor	Standard resistance	1 -2	at ON, 20°C (68°F)	Below 1 Ω
			at OFF, 20°C (68°F)	Below 1 Ω
			at ON, 60°C (140°F)	Below 1 Ω
			at OFF, 60°C (140°F)	10 kΩ or higher

Part Tightened		N*m	kgf*cm	ft.*lbf
Oil pressure sensor x Oil filter bracket		15	150	11
Drain plug x No. 2 Oil pan		40	408	30
Oil filter x Oil filter bracket		17	173	13
Service hole cover x No. 2 engine under cover		10	102	7
Oil level sensor x Oil pan		7.0	71	62 in.*lbf
No. 2 engine under cover x Body		29	296	21
Oil pump relief valve plug x Oil pump cover		49	500	36
Oil pump cover x Timing chain cover		9.0	92	80 in.*lbf
Oil pump outlet pipe x Timing chain cover		9.0	92	80 in.*lbf
Oil cooler union bolt x Oil filter bracket		68	693	50
Oil filter bracket x Timing chain cover		19	194	14
Oil pan x Cylinder block	for bolt A, B and nut	21	214	15
	for bolt C	10	102	7

Oil Pressure

at idle speed	70 kPa (0.7 kgf/cm^2, 10.1 psi) or more
at 2500 rpm	220 kPa (2.2 kgf/cm^2, 32 psi) or more

Oil Pump

Tip clearance	Standard: 0.180 to 0.300 mm (0.00709 to 0.0118 in.)
	Maximum: 0.300 mm (0.0118 in.)
Side clearance	Standard: 0.030 to 0.090 mm (0.00118 to 0.00354 in.)
	Maximum: 0.090 mm (0.00354 in.)
Body clearance	Standard: 0.175 to 0.250 mm (0.00689 to 0.00984 in.)
	Maximum: 0.250 mm (0.00984 in.)

Oil and Oil Filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pan drain plug x No. 2 oil pan	40	408	30
Oil filter cap x Oil filter bracket	25	255	18
Oil filter drain plug x Oil filter cap	13	127	9
No. 2 engine under cover seal x No. 2 engine under cover	10	102	7
No. 1 engine under cover x Body	29	296	21

Oil Pressure Sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pressure sender gauge x Oil filter bracket	15	153	11

Oil Pump

Part Tightened		N*m	kgf*cm	ft.*lbf
Relief valve plug x Oil pump cover		53	540	39
Oil pump cover x Timing chain cover		10	105	8
Timing chain cover x Cylinder block and cylinder head	for bolt A, B, C, nut	23	235	17
	for bolt D, E, F	47	479	35
Cylinder head cover LH x Camshaft housing LH and timing chain cover	for bolt A	21	214	15
	except bolt A	12	122	9
Cylinder head cover RH x Camshaft housing RH and timing chain cover	for bolt A	21	214	15
	except bolt A	12	122	9
Cylinder head cover RH x Noise filter		7.0	71	62 in.*lbf
Ignition coil x Cylinder head cover		10	102	7
Crankshaft pulley x Crankshaft		300	3059	221
Wire harness clamp bracket x Timing chain cover		8.0	82	71 in.*lbf
No. 1 idler pulley x Timing chain cover		43	438	32
Water pump pulley x Water pump		21	214	15
Water inlet housing x Timing chain cover		21	214	15
Front water by-pass joint x Cylinder head		21	214	15
Water by-pass pipe x Cylinder head cover and timing chain cover		10	102	7
Vane pump x Cylinder head		21	214	15
No. 2 water by-pass pipe sub-assembly x Timing chain cover and front water by-pass joint		10	102	7
No. 2 fuel tube x Cylinder head cover		10	102	7
Cooler compressor x Timing chain cover and Cylinder block	for stud bolt	10	102	7
	for bolt and nut	25	250	18
No. 2 water by-pass pipe x Cylinder head cover RH and Automatic transmission		18	184	13
Ground wire x Body		8.0	82	71 in.*lbf

Engine Oil Cooler

Part Tightened	N*m	kgf*cm	ft.*lbf
Relief valve plug x Oil filter bracket	37	375	27
Oil cooler spacer x Oil filter bracket	10	102	7
Oil cooler x Oil filter bracket	21	214	15
Oil filter bracket x Timing chain cover	35	357	26
No. 1 oil cooler bracket x Oil filter bracket and No. 1 oil pan	21	214	15

Oil pressure

at Idle	29 kPa (0.3 kgf/cm^2, 4.2 psi) or more
at 3000 rpm	294 to 588 kPa (3.0 to 6.0 kgf/cm ^{2}, 43 to 85 psi)

Oil level sensor

Tester Connection	Condition	Specified Condition
1 - 2	ON, 20°C (68°F)	Below 1 Ω
	OFF, 20°C (68°F)	Below 1 Ω
	ON, 60°C (140°F)	Below 1 Ω
	OFF, 60°C (140°F)	10 kΩ or higher

Oil pump

Tip clearance	Standard	0.060 to 0.180 mm (0.00236 to 0.00709 in.)
	Maximum	0.18 mm (0.00709 in.)
Side clearance	Standard	0.030 to 0.090 mm (0.00118 to 0.00354 in.)
	Maximum	0.09 mm (0.00354 in.)
Body clearance	Standard	0.250 to 0.325 mm (0.00984 to 0.0128 in.)
	Maximum	0.325 mm (0.0128 in.)

Part Tightened		N*m	kgf*cm	ft.*lbf
Oil filter x Oil filter bracket		17	175	13
No. 2 oil pan x Drain plug		39	398	29
No. 1 engine under cover x Body		29	296	21
Oil pressure sender gauge x Oil filter bracket		15	153	11
Oil pan x Engine oil level sensor		7.0	71	62 in.*lbf
Oil pump cover x Oil pump body		10	102	7
Relief valve x Oil pump body		49	500	36
Oil pump x Cylinder block	for Bolt D	31	316	23
	for Bolt A, B, C, E	16	163	12
Oil strainer x Cylinder block and Oil pump		8.0	82	71 in.*lbf
Oil pan x Oil pump, Oil seal retainer, Cylinder block	for Bolt A, D, E	7.5	76	66 in.*lbf
	for Bolt B, C, nut	28	286	21
No. 2 oil pan x Oil pan		7.5	76	66 in.*lbf
Oil filter bracket x Oil pump		18	184	13
Engine oil level dipstick guide x Cylinder head		8.0	82	71 in.*lbf
Oil cooler x Oil filter bracket		69	700	51

Oil Pressure

Condition	Specified Condition
Idle	50 kPa (0.5 kgf/cm^2, 7.3 psi) or more
2500 rpm	230 kPa (2.3 kgf/cm^2, 33 psi) or more

Oil Pressure Sender Gauge

Test LED Connection	Condition	Specified Condition
Apply battery positive (+) voltage to the oil pressure sender gauge terminal through a test LED.	Engine stopped	LED does not illuminate
	Engine is running	Number of flashes varies with engine speed

Oil Level Sensor

Tester Connection	Switch Condition	Specified Condition
1 - 2	ON at 60°C (140°F)	Below 1 Ω
1 - 2	OFF at 60°C (140°F)	10 kΩ or higher

Oil and Oil Filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pan drain plug x No. 2 oil pan	38	387	28
Oil filter drain plug x Oil filter cap	13	127	9
Oil filter cap x No. 1 oil pan	25	255	18
No. 2 engine under cover seal of No. 2 engine under cover x No. 2 engine under cover	10	102	7

Oil Pressure Sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pressure sender gauge x Oil filter bracket	15	153	11

Oil Level Sensor

Part Tightened		N*m	kgf*cm	ft.*lbf
Engine oil level sensor x No. 1 oil pan		10	102	7
Oil cooler tube x No. 1 oil pan	for Automatic Transmission	14	143	10

Oil Pump

Part Tightened		N*m	kgf*cm	ft.*lbf
Oil relief valve x Oil relief valve body		50	510	37
Oil pump x Cylinder block		10	102	7
Rear engine oil seal retainer x Cylinder block		10	102	7
Oil regulator x Oil pump		10	102	7
No. 1 oil pan x Cylinder block		25	250	18
Oil strainer x No. 1 oil pan		10	102	7
No. 2 oil pan x No. 1 oil pan		10	102	7
Engine oil level sensor x No. 1 oil pan		10	102	7
Oil filter bracket x No. 1 oil pan		21	214	15
Timing gear cover spacer x Timing gear cover		21	214	15
V-ribbed belt tensioner x Timing chain cover	Bolt length: 116 mm (4.57 in.) and 95 mm (3.74 in.)	43	438	32
	Bolt length: 40 mm (1.58 in.)	21	214	15
No. 1 idler pulley x V-ribbed belt tensioner		43	438	32
V-ribbed belt tensioner bracket x V-ribbed belt tensioner		10	102	7
Stiffener insulator RH x No. 1 oil pan		10	102	7
No. 2 inlet turbo oil pipe x No. 1 oil pan		29	296	21
No. 1 engine oil level dipstick guide x No. 1 oil pan and cylinder head		10	102	7

Scavenging Pump

Part Tightened	N*m	kgf*cm	ft.*lbf
Scavenging pump x Cylinder block	10	102	7

Engine Oil Cooler

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil cooler x No. 1 oil pan	21	214	15

Starter assembly for 1.4 kW Type	No-load characteristics current			90 A or less at 11.5 V
	Starter armature assembly	Standard resistance	Segments	Below 1 Ω
			Segment - Coil core	10 kΩ or higher
	Starter armature assembly		Standard diameter	30.0 mm (1.18 in.)
			Minimum diameter	29.0 mm (1.14 in.)
			Standard undercut depth	0.6 mm (0.0236 in.)
			Minimum undercut depth	0.2 mm (0.00787 in.)
			Maximum circle runout	0.05 mm (0.00197 in.)
	Brush length		Standard brush length	15.5 mm (0.610 in.)
			Minimum brush length	8.5 mm (0.355 in.)
	Brush spring		Standard spring load	18 to 24 N (1.8 to 2.4 kgf, 4.0 to 6.3 lbf)
			Minimum spring load	12 N (1 kgf, 2.7 lbf)
	Starter yoke assembly	Standard resistance	Lead wire - Brush	Below 1 Ω
			Lead wire - Starter yoke body	10 kΩ or higher
	Magnet starter switch assembly	Standard resistance	Terminal 50 - Terminal C	Below 1 Ω
			Terminal 50 - Switch body	Below 2 Ω
	Starter brush holder assembly	Standard resistance	Positive (+) brush holder - Negative (-) brush holder	10 kΩ or higher
Starter assembly for 1.6 kW Type	No-load characteristics current			90 A or less at 11.5 V
	Starter armature assembly	Standard resistance	Segments	Below 1 Ω
			Segment - Coil core	10 kΩ or higher
	Starter armature assembly		Standard length	3.1 mm (0.122 in.)
			Maximum length	3.8 mm (0.150 in.)
	Starter commutator end frame assembly	Standard brush length		9.0 mm (0.354 in.)
		Minimum brush length		4.0 mm (0.158 in.)
		Standard resistance	Positive (+) brush - Negative (-) brush	10 kΩ or higher
	Repair service starter kit	Standard resistance	Terminal 50 - Terminal C	Below 1 Ω
			Terminal 50 - Switch body	Below 2 Ω
	Snap ring length		Maximum length	5.0 mm (0.197 in.)
Starter assembly for 2.0 kW Type	No-load characteristics current			100 A or less at 11.5 V
	Starter armature assembly	Standard resistance	Commutator	Below 1 Ω
			Commutator - Armature	10 kΩ or higher
	Starter armature assembly		Standard diameter	35.0 mm (1.38 in.)
			Minimum diameter	34.0 mm (1.34 in.)
			Standard undercut depth	0.7 mm (0.0276 in.)
			Minimum undercut depth	0.2 mm (0.00787 in.)
			Maximum circle runout	0.05 mm (0.00197 in.)
	Brush length		Standard brush length	15.0 mm (0.591 in.)
			Minimum brush length	9.0 mm (0.354 in.)
	Starter brush holder assembly	Standard resistance	Positive brush holder - Negative brush holder	10 kΩ or higher
	Brush spring		Standard spring installed load	21.5 to 27.5 N (2.2 to 2.8 kgf, 4.8 to 6.2 lbf)
			Minimum spring installed load	12.7 N (1.3 kgf, 2.9 lbf)
	Starter yoke assembly	Standard resistance	Terminal C wire - Brush	Below 1 Ω
			Shunt coil terminal (A) - Shunt coil terminal (B)	1.5 to 1.9 Ω at 20°C (68°F)
	Magnet starter switch assembly	Standard resistance	Terminal 50 - Terminal C	Below 1 Ω
			Terminal 50 - Switch body	Below 2 Ω
Starter relay		Standard resistance	3 - 5	10 kΩ or higher (Battery voltage is not applied to terminals 1 and 2)

			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
Starter cut relay	Standard resistance	3 - 5	10 kΩ or higher (Battery voltage is not applied to terminals 1 and 2)
			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
ACC relay (Main body ECU)	Standard resistance	2A-1 - 2D-8	10 kΩ or higher (Battery voltage is not applied between 2D45 and 2D62)
			Below 1 Ω (Battery voltage is applied between 2D45 and 2D62)
Engine switch	Standard resistance	7 - 5	Below 1 Ω (Engine switch is pushed)
		2 - 5	Below 1 Ω (Engine switch is pushed)
		7 - 5	Below 10 kΩ or higher (Engine switch is not pushed)
		2 - 5	Below 10 kΩ or higher (Engine switch is not pushed)

for 1.6 kW Type:

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Transmission housing	58	591	43
Starter wire x Terminal 30	9.8	100	87 in.*lbf
Lead wire x Terminal C	10	102	7
Starter commutator end frame assembly x Starter drive housing assembly	6.0	61	53 in.*lbf
Starter drive housing assembly x Repair service starter kit	7.5	76	66 in.*lbf

for 2.0 kW Type:

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Transmission housing	58	591	43
Starter wire x Terminal 30	9.8	100	87 in.*lbf
Lead wire x Terminal C	5.9	60	52 in.*lbf
Commutator end frame x Starter brush holder assembly	3.8	39	34 in.*lbf
Starter housing assembly x Magnet starter switch assembly	9.3	95	82 in.*lbf
Commutator end frame x Starter housing assembly	9.3	95	82 in.*lbf

for 1.4 kW Type:

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Transmission housing	58	591	43
Starter wire x Terminal 30	9.8	100	87 in.*lbf
Lead wire x Terminal C	5.9	60	52 in.*lbf
Commutator end frame x Starter brush holder assembly	1.5	15	13 in.*lbf
Starter housing assembly x Magnet starter switch assembly	5.9	60	52 in.*lbf
Commutator end frame x Starter housing assembly	5.9	60	52 in.*lbf

Starter assembly	Specified current: 190 A or less at 11.5 V
Starter armature assembly	Standard diameter: 35.0 mm (1.38 in.) Minimum diameter: 34.0 mm (1.34 in.) Standard undercut depth: 0.7 mm (0.0276 in.) Minimum undercut depth: 0.2 mm (0.00787 in.) Maximum circle runout: 0.05 mm (0.00197 in.)
Brush	Standard brush length: 15.0 mm (0.591 in.) Minimum brush length: 9.0 mm (0.354 in.)
Starter brush holder assembly	Standard spring installed load: 22 to 28 N (2.2 to 2.8 kgf, 4.8 to 6.2 lbf) Minimum spring installed load: 12 N (1 kgf, 2.8 lbf)

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Cylinder block	37	377	27
Starter cover x Starter assembly	12	122	9
Starter commutator end frame cover x Starter brush holder assembly	3.8	39	33 in.*lbf
Starter drive housing assembly x Magnet starter switch assembly	7.5	76	66 in.*lbf
Starter commutator end frame cover x Starter drive housing assembly	6.0	61	53 in.*lbf

Starter assembly for 1.4 kW Type	No-load characteristics current			90 A or less at 11.5 V
	Starter armature assembly	Standard resistance	Commutator	Below 1 Ω
			Commutator - Armature core	10 kΩ or hi her
	Starter armature assembly		Standard diameter	30.0 mm (1.18 in.)
			Minimum diameter	29.0 mm (1.14 in.)
			Standard undercut depth	0.6 mm (0.0236 in.)
			Minimum undercut depth	0.2 mm (0.00787 in.)
			Maximum circle runout	0.05 mm (0.00197 in.)
	Brush len ht		Standard brush len ht	15.5 mm (0.610 in.)
			Minimum brush len ht	8.5 mm (0.335 in.)
	Starter brush holder assembly	Standard resistance	ositive brush holder - Ne ative brush holder	10 kΩ or hi her
		Standard sprin installed load		18 to 24 N (1.8 to 2.4 k f 4.0 to 5.3 lbf)
		Minimum sprin installed load		12 N (1 k f 2.7 lbf)
	Starter yoke assembly	Standard resistance	Terminal C wire - Brushes	Below 1 Ω
			Brushes - Starter yoke body	10 kΩ or hi her
	Ma net starter switch assembly	Standard resistance	Terminal 50 - Terminal C	Below 1 Ω
			Terminal 50 - Switch body	Below 2 Ω
Starter assembly for 2.0 kW type	No-load characteristics current			100 A or less at 11.5 V
	Starter armature assembly	Standard resistance	Commutator	Below 1 Ω
			Commutator - Armature core	10 kΩ or hi her
	Starter armature assembly		Standard diameter	35.0 mm (1.38 in.)
			Minimum diameter	34.0 mm (1.34 in.)
			Standard undercut depth	0.7 mm (0.0276 in.)
			Minimum undercut depth	0.2 mm (0.00787 in.)
			Maximum circle runout	0.05 mm (0.00197 in.)
	Brush len ht		Standard brush len ht	15.0 mm (0.591 in.)
			Minimum brush len ht	9.0 mm (0.354 in.)
	Starter brush holder assembly	Standard resistance	ositive brush holder - Ne ative brush holder	10 kΩ or hi her
		Standard sprin installed load		22 to 28 N (2 to 3 k f 4.8 to 6.2 lbf)
		Minimum sprin installed load		13 N (1 k f 2.9 lbf)
	Starter yoke assembly	Standard resistance	Terminal C wire - Brushes	Below 1 Ω
			Terminal (A) - Terminal (B)	1.5 to 1.9 Ω at 20 C (68)
	Ma net starter switch assembly	Standard resistance	Terminal 50 - Terminal C	Below 1 Ω
			Terminal 50 - Switch body	Below 2 Ω
Starter relay		Standard resistance	3 - 5	10 kΩ or hi her (Battery volta e is not applied to terminals 1 and 2)
				Below 1Ω (Battery volta e is applied to terminals 1 and 2)
Starter cut relay		Standard resistance	3 - 5	10 kΩ or hi her (Battery volta e is not applied to terminals 1 and 2)
				Below 1 Ω (Battery volta e is applied to terminals 1 and 2)
ACC relay (Main body CU)		Standard resistance	2A-1 - 2 -8	10 kΩ or hi her (Battery volta e is not applied between 2 45 and 2 62)
				Below 1 Ω (Battery volta e is applied between 2 45 and 2 62)
			7 - 5	Below 1 Ω (n ine switch is pushed)

n ine switch	Standard resistance	2 - 5	Below 1 Ω (n ine switch is pushed)
		7 - 5	Below 10 kΩ or hi her (n ine switch is not pushed)
		2 - 5	Below 10 kΩ or hi her (n ine switch is not pushed)

T

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Cylinder block	25	255	18
Engine wire protector x Starter assembly	17	173	13
Starter wire x Terminal 30	9.8	100	87 in.*lbf
Ground wire x Cylinder head	17	173	13
Lead wire x Terminal C	5.9	60	52 in.*lbf
Starter commutator end frame x Starter brush holder assembly	1.5	15	13 in.*lbf
Starter housing assembly x Magnet starter switch assembly	5.9	60	52 in.*lbf
Starter commutator end frame x Starter housing assembly	5.9	60	52 in.*lbf
Rear water by-pass joint x Cylinder head	18	184	13

2 T

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Cylinder block	25	255	18
Engine wire protector x Starter assembly	17	173	13
Starter wire x Terminal 30	9.8	100	87 in.*lbf
Ground wire x Cylinder head	17	173	13
Lead wire x Terminal C	5.9	60	52 in.*lbf
Starter commutator end frame x Starter brush holder assembly	3.8	39	34 in.*lbf
Starter housing assembly x Magnet starter switch assembly	9.3	95	82 in.*lbf
Starter commutator end frame x Starter housing assembly	9.3	95	82 in.*lbf
Rear water by-pass joint x Cylinder head	18	184	13

Starter assembly		No-load characteristics current	200 A or less at 11 V
Starter armature assembly	Standard resistance	Commutator	Below 1 Ω
		Commutator - Armature coil core	10 kΩ or higher
Starter armature assembly		Maximum circle runout	0.05 mm (0.00197 in.)
		Standard commutator diameter	36.0 mm (1.42 in.)
		Minimum commutator diameter	35.0 mm (1.38 in.)
		Standard undercut depth	0.7 mm (0.0276 in.)
		Minimum undercut depth	0.2 mm (0.00787 in.)
Starter yoke assembly	Standard resistance	Terminal C plate - Brushes	Below 1 Ω
		Brushes - Starter yoke body	10 kΩ or higher
Brush length		Standard length	21.0 mm (0.872 in.)
		Minimum length	12.0 mm (0.472 in.)
Starter brush holder assembly	Standard resistance	Positive (+) brush holder - Negative (-) brush holder	10 kΩ or higher
Brush spring		Standard spring installed load	36 N (3.6 kgf, 8.0 lbf)
		Minimum spring installed load	12 N (1.2 kgf, 2.7 lbf)
Magnet starter switch assembly	Standard resistance	Terminal 50 - Terminal C	Below 0.3 Ω
		Terminal 50 - Housing body	Below 0.8 Ω
Glow plug	Standard resistance	Glow plug terminal - Body ground	Approximately 1 Ω at 20°C (68°F)
Starter relay	Standard resistance	3 - 5	10 MΩ or higher (Battery voltage is not applied to terminals 1 and 2)
			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
Starter cut relay	Standard resistance:	3 - 5	10 kΩ or higher (Battery voltage is not applied to terminals 1 and 2)
			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
ACC relay (Main body ECU)	Standard resistance:	2A-1 - 2D-8	10 kΩ or higher (Battery voltage is not applied between 2D45 and 2D62)
			Below 1 Ω (Battery voltage is applied between 2D45 and 2D62)
No. 1 glow relay	Standard resistance	3 - 5	10 MΩ or higher (Battery voltage is not applied to terminals 1 and 2)
			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
No. 2 Glow relay	Standard resistance	3 - 5	10 MΩ or higher (Battery voltage is not applied to terminals 1 and 2)
			Below 1 Ω (Battery voltage is applied to terminals 1 and 2)
Engine switch	Standard resistance:	7 - 5	Below 1 Ω (Engine switch is pushed)
		2 - 5	Below 1 Ω (Engine switch is pushed)
		7 - 5	Below 10 kΩ or higher (Engine switch is not pushed)
		2 - 5	Below 10 kΩ or higher (Engine switch is not pushed)

Part Tightened	N*m	kgf*cm	ft.*lbf
Magnet starter switch x Starter drive housing	6.0	61	53 in.*lbf
Commutator end frame x Starter brush holder	3.9	40	35 in.*lbf
Commutator end frame x Starter drive housing	17	173	12
Terminal C x Starter assembly	21	214	15
Starter assembly x Cylinder Block	80	816	59
Terminal 30 x Starter assembly	21	214	15
Glow plug x Cylinder head	12	125	9
Glow plug connector x Glow plug	2.2	22	19 in.*lbf
Wire harness x Glow plug connector	4.0	41	35 in.*lbf
Engine wire x Cylinder head cover	13	133	10
Water by-pass pipe x Intake manifold	10	102	7

CRUISE CONTROL MAIN SWITCH

Part Tightened	N*m	kgf*cm	ft.*lbf
Steering pad assembly x Steering wheel assembly	8.8	90	78 in.*lbf

CLUTCH SWITCH (for LHD)

Part Tightened	N*m	kgf*cm	ft.*lbf
Clutch switch assembly x Clutch pedal bracket sub-assembly	16	163	12

CLUTCH SWITCH (for RHD)

Part Tightened	N*m	kgf*cm	ft.*lbf
Clutch switch assembly x Clutch pedal bracket sub-assembly	16	163	12

for 1GR-FE: Line pressure (Wheel locked) Engine idling	D position	355 to 425 kPa (3.6 to 4.3 kgf/cm ^{2}, 51 to 62 psi)
	R position	522 to 622 kPa (5.3 to 6.3 kgf/cm ^{2}, 76 to 90 psi)
for 1GR-FE: AT stall (Throttle valve fully opened)	D position	1367 to 1477 kPa (13.9 to 15.1 kgf/cm ^{2}, 198 to 214 psi)
	R position	1290 to 1518 kPa (13.2 to 15.5 kgf/cm ^{2}, 187 to 220 psi)
for 1GR-FE: Engine stall revolution	D positions	2250 to 2550 rpm
for 2UZ-FE: Line pressure (Wheel locked) Engine idling	D position	355 to 425 kPa (3.6 to 4.3 kgf/cm ^{2}, 51 to 62 psi)
	R position	493 to 611 kPa (5.0 to 6.2 kgf/cm ^{2}, 71 to 88 psi)
for 2UZ-FE: AT stall (Throttle valve fully opened)	D position	1284 to 1429 kPa (13.1 to 14.6 kgf/cm ^{2}, 186 to 207 psi)
	R position	1290 to 1518 kPa (13.2 to 15.5 kgf/cm ^{2}, 187 to 220 psi)
for 2UZ-FE: Engine stall revolution	D positions	2150 to 2450 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	650 to 750 rpm
Drive plate runout	max.	0.20 mm (0.0079 in.)
Torque converter	max.	0.30 mm (0.0118 in.)
Shift schedule (for 1GR-FE:)		
D, 5 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	3 → 4	126 to 139 km/h (78 to 86 mph)
	4 → 5	165 to 179 km/h (103 to 111 mph)
	5 → 4	159 to 170 km/h (99 to 106 mph)
	4 → 3	115 to 126 km/h (71 to 78 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	43 to 48 km/h (27 to 30 mph)
	5 → 4	25 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	3 → 4	126 to 139 km/h (78 to 86 mph)
	5 → 4	177 to 190 km/h (110 to 118 mph)
	4 → 3	115 to 126 km/h (71 to 78 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
3 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	4 → 3	124 to 135 km/h (77 to 84 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
2 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	3 → 2	84 to 90 km/h (52 to 56 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
L position (Throttle valve fully opened)	2 → 1	36 to 41 km/h (22 to 25 mph)
Shift schedule (for 2UZ-FE:)		
D, 5 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	3 → 4	125 to 139 km/h (78 to 86 mph)
	4 → 5	174 to 190 km/h (108 to 118 mph)
	5 → 4	169 to 183 km/h (105 to 114 mph)
	4 → 3	118 to 130 km/h (73 to 81 mph)

	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	42 to 48 km/h (26 to 30 mph)
	5 → 4	24 to 29 km/h (15 to 18 mph)
4 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	3 → 4	125 to 139 km/h (78 to 86 mph)
	5 → 4	185 to 200 km/h (115 to 124 mph)
	4 → 3	118 to 130 km/h (73 to 81 mph)
	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
3 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	4 → 3	129 to 142 km/h (80 to 87 mph)
	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
2 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	3 → 2	87 to 95 km/h (54 to 59 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
L position (Throttle valve fully opened)	2 → 1	37 to 43 km/h (23 to 27 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	42 to 48 km/h (26 to 30 mph)
	5 → 4	24 to 29 km/h (15 to 18 mph)
Lock-up point (for 1GR-FE:) (Throttle valve opening 5 %)		
D position 5th	Lock-up ON	63 to 70 km/h (39 to 43 mph)
	Lock-up OFF	57 to 62 km/h (35 to 39 mph)
4 position 4th gear	Lock-up ON	63 to 70 km/h (39 to 43 mph)
	Lock-up OFF	57 to 62 km/h (35 to 39 mph)
Lock-up point (for 2UZ-FE:) (Throttle valve opening 5 % at Normal mode)		
D position 5th	Lock-up ON	64 to 71 km/h (40 to 44 mph)
	Lock-up OFF	57 to 64 km/h (35 to 40 mph)
4 position 4th gear	Lock-up ON	108 to 119 km/h (67 to 74 mph)
	Lock-up OFF	54 to 61 km/h (34 to 38 mph)
Lock-up point (for 2UZ-FE:) (Throttle valve opening 5 % at Power mode)		
D position 5th	Lock-up ON	64 to 71 km/h (40 to 44 mph)
	Lock-up OFF	60 to 67 km/h (37 to 42 mph)
4 position 4th gear	Lock-up ON	108 to 119 km/h (67 to 74 mph)
	Lock-up OFF	54 to 61 km/h (34 to 38 mph)

OIL PUMP

Body clearance	STD	0.10 to 0.17 mm (0.0039 to 0.0067 in.)
	Maximum	0.17 mm (0.0067 in.)
Tip clearance	STD	0.070 to 0.150 mm (0.0028 to 0.0059 in.)
	Maximum	0.150 mm (0.0059 in.)
Side clearance	STD	0.02 to 0.05 mm (0.0008 to 0.0020 in.)
	Maximum	0.05 mm (0.0020 in.)
Driver and driven gear thickness	0	10.74 to 10.749 mm (0.42283 to 0.42319 in.)
	1	10.75 to 10.759 mm (0.42323 to 0.42358 in.)
	2	10.76 to 10.77 mm (0.42362 to 0.42401 in.)
	3	10.771 to 10.78 mm (0.42405 to 0.42441 in.)
	4	10.781 to 10.79 mm (0.42445 to 0.42480 in.)
Pump body bushing inside diameter	Maximum	38.188 mm (1.504 in.)
Stator shaft bushing inside diameter	(Front side) Maximum	21.577 mm (0.849 in.)
	(Rear side) Maximum	32.08 mm (1.26 in.)

2nd BRAKE

Piston return spring free length	STD	17.45 mm (0.687 in.)

B3 BRAKE

Piston return spring free length	STD	15.72 mm (0.619 in.)
Piston stroke		0.42 to 0.72 mm (0.017 to 0.028 in.)
Flange thickness	No. 0	2.0 mm (0.079 in.)
	No. 1	2.2 mm (0.087 in.)
	No. 2	2.4 mm (0.094 in.)
	No. 3	2.6 mm (0.102 in.)

FRONT PLANETARY GEAR

Planetary gear bushing inside diameter	Maximum	57.48 mm (2.26 in.)
Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.008 to 0.024 in.)
	Maximum	0.65 mm (0.026 in.)

BRAKE PISTON No. 1

Piston return spring free length	STD	17.05 mm (0.671 in.)

CENTER PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.12 to 0.68 mm (0.005 to 0.027 in.)
	Maximum	0.73 mm (0.029 in.)

B2 BRAKE

Piston return spring free length	STD	17.45 mm (0.687 in.)

REAR PLANETARY RING GEAR FLANGE

Planetary ring gear flange bushing inside diameter	Maximum	32.175 mm (1.267 in.)

INTERMEDIATE SHAFT

Intermediate shaft run out	Maximum	0.08 mm (0.003 in.)
Intermediate shaft diameter	STD A:	25.962 to 25.975 mm (1.022 to 1.023 in.)
	STD B:	25.962 to 25.975 mm (1.022 to 1.023 in.)
	STD C:	32.062 to 32.075 mm (1.262 to 1.263 in.)
	STD D:	32.062 to 32.075 mm (1.262 to 1.263 in.)
Intermediate shaft diameter	Min A:	25.912 mm (1.020 in.)
	Min B:	25.912 mm (1.020 in.)
	Min C:	32.012 mm (1.260 in.)
	Min D:	32.012 mm (1.260 in.)

REAR PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.008 to 0.024 in.)
	Maximum	0.65 mm (0.026 in.)
Planetary gear bushing inside diameter	Maximum	20.075 mm (0.790 in.)

1ST AND REVERSE BRAKE

Pack clearance		0.8 to 1.1 mm (0.032 to 0.043 in.)
Piston return spring free length	STD	23.74 mm (0.935 in.)
H thickness	No. 0	0 mm (0 in.)
	No. 2	0.2 mm (0.00787 in.)
	No. 4	0.4 mm (0.01575 in.)
	No. 6	0.6 mm (0.02362 in.)
	No. 8	0.8 mm (0.03150 in.)
	No. 10	1.0 mm (0.03937 in.)
	No. 12	1.2 mm (0.04724 in.)
	No. 14	1.4 mm (0.05512 in.)

DIRECT CLUTCH

Pack clearance		0.50 to 0.80 mm (0.020 to 0.032 in.)
Clutch piston return spring free length	STD	19.51 mm (0.768 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)

REVERSE CLUTCH

Reverse clutch drum bushing inside diameter	STD	35.812 to 35.837 mm (1.4099 to 1.4109 in.)
	Maximum	35.887 mm (1.4129 in.)
Pack clearance		0.50 to 0.80 mm (0.020 to 0.032 in.)
Clutch piston return spring free length	STD	21.04 mm (0.828 in.)
Flange thickness	No. 0	2.8 mm (0.110 in.)
	No. 1	2.9 mm (0.114 in.)
	No. 2	3.0 mm (0.118 in.)
	No. 3	3.1 mm (0.122 in.)
	No. 4	3.2 mm (0.126 in.)
	No. 5	3.3 mm (0.130 in.)
	No. 6	3.4 mm (0.134 in.)
	No. 7	3.5 mm (0.138 in.)
	No. 8	3.6 mm (0.142 in.)
	No. 9	3.7 mm (0.146 in.)
	No. A	3.8 mm (0.150 in.)

FORWARD CLUTCH

Forward clutch drum bushing inside diameter	STD	26.037 to 26.062 mm (1.0251 to 1.0261 in.)
	Maximum	26.112 mm (1.028 in.)
Pack clearance		0.60 to 0.90 mm (0.0236 to 0.0354 in.)
Clutch piston return spring free length	STD	26.74 mm (1.053 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)
	No. 9	3.9 mm (0.154 in.)
	No. A	4.0 mm (0.158 in.)

OUTPUT SHAFT BEARING

Clearance		0.05 to 0.33 mm (0.002 to 0.013 in.)
Flange thickness	No. 1	3.7 mm (0.146 in.)
	No. 2	3.8 mm (0.150 in.)
	No. 3	3.9 mm (0.154 in.)
	No. 4	4.0 mm (0.158 in.)
	No. 5	4.1 mm (0.161 in.)
	No. 6	4.2 mm (0.165 in.)

ACCUMULATOR

Spring	Color	Free length / Outer diameter [mm (in.)]
B_3	Purple	70.5 (2.776) / 19.7 (0.776)
C_2	White	62.0 (2.441) / 15.9 (0.626)
C_1 inner	Pink	30.4 (1.197) / 11.4 (0.449)
C_1 outer	Light green	48.76 (1.920) / 16.6 (0.654)
C_3 inner	Yellow	44.0 (1.732) / 14.0 (0.551)
C_3 outer	Red	73.35 (2.888) / 19.9 (0.784)

for 1GR-FE: Line pressure (Wheel locked) Engine idling	D position	350 to 430 kPa (3.6 to 4.4 kgf/cm ^{2}, 51 to 62 psi)
	R position	520 to 630 kPa (5.3 to 6.4 kgf/cm ^{2}, 75 to 91 psi)
for 1GR-FE: AT stall (Throttle valve fully opened)	D position	1360 to 1480 kPa (13.9 to 15.1 kgf/cm ^{2}, 197 to 215 psi)
	R position	1290 to 1520 kPa (13.2 to 15.5 kgf/cm ^{2}, 187 to 220 psi)
for 1GR-FE: Engine stall revolution	D positions	2250 to 2550 rpm
for 2UZ-FE: Line pressure (Wheel locked) Engine idling	D position	350 to 430 kPa (3.6 to 4.4 kgf/cm ^{2}, 51 to 62 psi)
	R position	490 to 620 kPa (5.0 to 6.3 kgf/cm ^{2}, 71 to 90 psi)
for 2UZ-FE: AT stall (Throttle valve fully opened)	D position	1280 to 1430 kPa (13.1 to 14.6 kgf/cm ^{2}, 186 to 207 psi)
	R position	1290 to 1520 kPa (13.2 to 15.5 kgf/cm ^{2}, 187 to 220 psi)
for 2UZ-FE: Engine stall revolution	D positions	2150 to 2450 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	650 to 750 rpm
Drive plate runout	max.	0.20 mm (0.0079 in.)
Torque converter	max.	0.30 mm (0.0118 in.)
Shift schedule (for 1GR-FE:)		
D, 5 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	3 → 4	126 to 139 km/h (78 to 86 mph)
	4 → 5	165 to 179 km/h (103 to 111 mph)
	5 → 4	159 to 170 km/h (99 to 106 mph)
	4 → 3	115 to 126 km/h (71 to 78 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	43 to 48 km/h (27 to 30 mph)
	5 → 4	25 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	3 → 4	126 to 139 km/h (78 to 86 mph)
	5 → 4	177 to 190 km/h (110 to 118 mph)
	4 → 3	115 to 126 km/h (71 to 78 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
3 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	2 → 3	86 to 96 km/h (53 to 60 mph)
	4 → 3	124 to 135 km/h (77 to 84 mph)
	3 → 2	77 to 84 km/h (48 to 52 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
2 position (Throttle valve fully opened)	1 → 2	46 to 57 km/h (29 to 35 mph)
	3 → 2	84 to 90 km/h (52 to 56 mph)
	2 → 1	36 to 41 km/h (22 to 25 mph)
L position (Throttle valve fully opened)	2 → 1	36 to 41 km/h (22 to 25 mph)
Shift schedule (for 2UZ-FE:)		
D, 5 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	3 → 4	125 to 139 km/h (78 to 86 mph)
	4 → 5	174 to 190 km/h (108 to 118 mph)
	5 → 4	169 to 183 km/h (105 to 114 mph)
	4 → 3	118 to 130 km/h (73 to 81 mph)

	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	42 to 48 km/h (26 to 30 mph)
	5 → 4	24 to 29 km/h (15 to 18 mph)
4 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	3 → 4	125 to 139 km/h (78 to 86 mph)
	5 → 4	185 to 200 km/h (115 to 124 mph)
	4 → 3	118 to 130 km/h (73 to 81 mph)
	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
3 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	2 → 3	87 to 98 km/h (54 to 61 mph)
	4 → 3	129 to 142 km/h (80 to 87 mph)
	3 → 2	80 to 87 km/h (50 to 54 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
2 position (Throttle valve fully opened)	1 → 2	48 to 60 km/h (30 to 37 mph)
	3 → 2	87 to 95 km/h (54 to 59 mph)
	2 → 1	37 to 43 km/h (23 to 27 mph)
L position (Throttle valve fully opened)	2 → 1	37 to 43 km/h (23 to 27 mph)
D, 5 position (Throttle valve fully closed)	4 → 5	42 to 48 km/h (26 to 30 mph)
	5 → 4	24 to 29 km/h (15 to 18 mph)
Lock-up point (for 1GR-FE:) (Throttle valve opening 5 %)		
D position 5th	Lock-up ON	63 to 70 km/h (39 to 43 mph)
	Lock-up OFF	57 to 62 km/h (35 to 39 mph)
4 position 4th gear	Lock-up ON	63 to 70 km/h (39 to 43 mph)
	Lock-up OFF	57 to 62 km/h (35 to 39 mph)
Lock-up point (for 2UZ-FE:) (Throttle valve opening 5 % at Normal mode)		
D position 5th	Lock-up ON	64 to 71 km/h (40 to 44 mph)
	Lock-up OFF	57 to 64 km/h (35 to 40 mph)
4 position 4th gear	Lock-up ON	108 to 119 km/h (67 to 74 mph)
	Lock-up OFF	54 to 61 km/h (34 to 38 mph)
Lock-up point (for 2UZ-FE:) (Throttle valve opening 5 % at Power mode)		
D position 5th	Lock-up ON	64 to 71 km/h (40 to 44 mph)
	Lock-up OFF	60 to 67 km/h (37 to 42 mph)
4 position 4th gear	Lock-up ON	108 to 119 km/h (67 to 74 mph)
	Lock-up OFF	54 to 61 km/h (34 to 38 mph)

OIL PUMP

Body clearance	STD	0.10 to 0.17 mm (0.0039 to 0.0067 in.)
	Maximum	0.17 mm (0.0067 in.)
Tip clearance	STD	0.070 to 0.150 mm (0.0028 to 0.0059 in.)
	Maximum	0.150 mm (0.0059 in.)
Side clearance	STD	0.02 to 0.05 mm (0.0008 to 0.0020 in.)
	Maximum	0.05 mm (0.0020 in.)
Driver and driven gear thickness	0	10.74 to 10.749 mm (0.42283 to 0.42319 in.)
	1	10.75 to 10.759 mm (0.42323 to 0.42358 in.)
	2	10.76 to 10.77 mm (0.42362 to 0.42401 in.)
	3	10.771 to 10.78 mm (0.42405 to 0.42441 in.)
	4	10.781 to 10.79 mm (0.42445 to 0.42480 in.)
Pump body bushing inside diameter	Maximum	38.188 mm (1.504 in.)
Stator shaft bushing inside diameter	(Front side) Maximum	21.577 mm (0.849 in.)
	(Rear side) Maximum	32.08 mm (1.26 in.)

2nd BRAKE

Piston return spring free length	STD	17.45 mm (0.687 in.)

B3 BRAKE

Piston return spring free length	STD	15.72 mm (0.619 in.)
Piston stroke		0.42 to 0.72 mm (0.017 to 0.028 in.)
Flange thickness	No. 0	2.0 mm (0.079 in.)
	No. 1	2.2 mm (0.087 in.)
	No. 2	2.4 mm (0.094 in.)
	No. 3	2.6 mm (0.102 in.)

FRONT PLANETARY GEAR

Planetary gear bushing inside diameter	Maximum	57.48 mm (2.26 in.)
Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.008 to 0.024 in.)
	Maximum	0.65 mm (0.026 in.)

BRAKE PISTON No. 1

Piston return spring free length	STD	17.05 mm (0.671 in.)

CENTER PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.12 to 0.68 mm (0.005 to 0.027 in.)
	Maximum	0.73 mm (0.029 in.)

B2 BRAKE

Piston return spring free length	STD	17.45 mm (0.687 in.)

REAR PLANETARY RING GEAR FLANGE

Planetary ring gear flange bushing inside diameter	Maximum	32.175 mm (1.267 in.)

INTERMEDIATE SHAFT

Intermediate shaft run out	Maximum	0.08 mm (0.003 in.)
Intermediate shaft diameter	STD A:	25.962 to 25.975 mm (1.022 to 1.023 in.)
	STD B:	25.962 to 25.975 mm (1.022 to 1.023 in.)
	STD C:	32.062 to 32.075 mm (1.262 to 1.263 in.)
	STD D:	32.062 to 32.075 mm (1.262 to 1.263 in.)
Intermediate shaft diameter	Min A:	25.912 mm (1.020 in.)
	Min B:	25.912 mm (1.020 in.)
	Min C:	32.012 mm (1.260 in.)
	Min D:	32.012 mm (1.260 in.)

REAR PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.008 to 0.024 in.)
	Maximum	0.65 mm (0.026 in.)
Planetary gear bushing inside diameter	Maximum	20.075 mm (0.790 in.)

1ST AND REVERSE BRAKE

Pack clearance		0.8 to 1.1 mm (0.032 to 0.043 in.)
Piston return spring free length	STD	23.74 mm (0.935 in.)
H thickness	No. 0	0 mm (0 in.)
	No. 2	0.2 mm (0.00787 in.)
	No. 4	0.4 mm (0.01575 in.)
	No. 6	0.6 mm (0.02362 in.)
	No. 8	0.8 mm (0.03150 in.)
	No. 10	1.0 mm (0.03937 in.)
	No. 12	1.2 mm (0.04724 in.)
	No. 14	1.4 mm (0.05512 in.)

DIRECT CLUTCH

Pack clearance		0.50 to 0.80 mm (0.020 to 0.032 in.)
Clutch piston return spring free length	STD	19.51 mm (0.768 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)

REVERSE CLUTCH

Reverse clutch drum bushing inside diameter	STD	35.812 to 35.837 mm (1.4099 to 1.4109 in.)
	Maximum	35.887 mm (1.4129 in.)
Pack clearance		0.50 to 0.80 mm (0.020 to 0.032 in.)
Clutch piston return spring free length	STD	21.04 mm (0.828 in.)
Flange thickness	No. 0	2.8 mm (0.110 in.)
	No. 1	2.9 mm (0.114 in.)
	No. 2	3.0 mm (0.118 in.)
	No. 3	3.1 mm (0.122 in.)
	No. 4	3.2 mm (0.126 in.)
	No. 5	3.3 mm (0.130 in.)
	No. 6	3.4 mm (0.134 in.)
	No. 7	3.5 mm (0.138 in.)
	No. 8	3.6 mm (0.142 in.)
	No. 9	3.7 mm (0.146 in.)
	No. A	3.8 mm (0.150 in.)

FORWARD CLUTCH

Forward clutch drum bushing inside diameter	STD	26.037 to 26.062 mm (1.0251 to 1.0261 in.)
	Maximum	26.112 mm (1.028 in.)
Pack clearance		0.60 to 0.90 mm (0.0236 to 0.0354 in.)
Clutch piston return spring free length	STD	26.74 mm (1.053 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)
	No. 9	3.9 mm (0.154 in.)
	No. A	4.0 mm (0.158 in.)

OUTPUT SHAFT BEARING

Clearance		0.05 to 0.33 mm (0.002 to 0.013 in.)
Flange thickness	No. 1	3.7 mm (0.146 in.)
	No. 2	3.8 mm (0.150 in.)
	No. 3	3.9 mm (0.154 in.)
	No. 4	4.0 mm (0.158 in.)
	No. 5	4.1 mm (0.161 in.)
	No. 6	4.2 mm (0.165 in.)

ACCUMULATOR

Spring	Color	Free length / Outer diameter [mm (in.)]
B_3	Purple	70.5 (2.776) / 19.7 (0.776)
C_2	White	62.0 (2.441) / 15.9 (0.626)
C_1 inner	Pink	30.4 (1.197) / 11.4 (0.449)
C_1 outer	Light green	48.76 (1.920) / 16.6 (0.654)
C_3 inner	Yellow	44.0 (1.732) / 14.0 (0.551)
C_3 outer	Red	73.35 (2.888) / 19.9 (0.784)

Part Tightened		N*m	kgf*cm	ft.*lbf
Drain plug x Oil pan		20	204	15
Overflow plug x Oil pan		20	204	15
Refill plug x Transmission case		39	400	29
Speed sensor NT x Automatic transmission		5.4	55	48 in.*lbf
Speed sensor SP2 x Automatic transmission		5.4	55	48 in.*lbf
No. 1 and No. 2 engine under cover x frame		29	296	21
Transmission wire set bolt x Automatic transmission		5.4	55	48 in.*lbf
Transmission wire clamp	12 mm (0.472 in.) length	10	102	7
	36 mm (1.41 in.) length	11	112	8
Transmission oil pan x Transmission case		4.4	45	39 in.*lbf
Valve body oil strainer x Valve body		10	102	7
Valve body x Transmission case		11	112	8
Detent spring and Detent spring cover x valve body		10	102	7
Shift solenoid valve S1 x Valve body		6.4	65	56 in.*lbf
Shift solenoid valve S2 x Valve body		10	102	7
Shift solenoid valve SR x Valve body		6.4	65	56 in.*lbf
Solenoid lock plate x Valve body		6.4	65	56 in.*lbf
Park/neutral position switch	Bolt:	13	133	10
	Nut:	6.9	70	61 in.*lbf
Transmission control shaft lever RH		16	163	12
Oil cooler assembly x Body		12	122	9
Transmission oil cooler air duct x oil cooler assembly		4.9	50	43 in.*lbf
Rear transmission oil cooler air duct x Oil cooler assembly		4.9	50	43 in.*lbf
Air cooled oil cooler tube x Rear transmission oil cooler air duct		4.9	50	43 in.*lbf
Oil cooler tube x Radiator fan shroud		5.0	51	44 in.*lbf
Floor shift assembly x Body		14	143	10
Transmission floor shift assembly x Floor shift gear shifting rod		13	130	9
Wire harness clamp bracket x Automatic transmission (for 1GR-FE:)	Rear left:	29	296	21
	Front right:	29	296	21
Wire harness clamp bracket x Automatic transmission (for 2UZ-FE:)	Front left:	8.0	82	71 in.*lbf
	Rear left:	29	296	21
	Front right	29	296	21
	Rear right	29	296	21
Automatic transmission assembly x Engine	17 mm head bolt:	71	724	52
	14 mm head bolt:	37	377	27
Torque converter clutch x Drive plate		48	489	35
Wire harness x Automatic transmission		8.0	82	71 in.*lbf
Rear No. 1 engine mounting insulator x Crossmember		37	377	27
Crossmember x Frame		110	1122	81
Oil cooler tube x Engine		14	143	10
Flywheel housing under cover x Transmission (for 2UZ-FE)		18	184	13
Propeller shaft heat insulator x Crossmember		16	163	12
Engine rear mounting insulator x Automatic transmission assembly		59	602	44
Transfer case lower protector x Transfer		14	143	10
Transfer x Automatic transmission		40	408	30
Transmission oil thermostat and Hose heat protector x Transmission (for 2UZ-FE)		21	214	15
Transmission oil cooler x Transmission oil thermostat (for 2UZ-FE)		8.0	82	71 in.*lbf
No. 2 water by-pass pipe x Transmission (for 2UZ-FE)		18	184	13
Automatic transmission unit				

Transmission housing x Transmission case	for 14 mm head	34	345	25
	for 17 mm head	57	581	42
Automatic transmission breather tube x Transmission case		5.4	55	48 in.*lbf
Rear adaptor transfer x transmission case		34	345	25
Parking lock pawl bracket x Transmission case		7.4	75	65 in.*lbf
Oil pump x Transmission case		21	214	15
Oil pump body x Stator shaft		11	112	8

Line pressure (Wheel locked) Engine idling	D position	355 to 425 kPa (3.6 to 4.3 kgf/cm ^{2}, 51 to 62 psi)
	R position	552 to 652 kPa (5.6 to 6.6 kgf/cm ^{2}, 80 to 94 psi)
AT stall (Throttle valve fully opened)	D position	1231 to 1386 kPa (12.6 to 14.1 kgf/cm ^{2}, 178 to 201 psi)
	R position	1475 to 1683 kPa (15.0 to 17.2 kgf/cm ^{2}, 213 to 244 psi)
Engine stall revolution	D and R positions	2600 to 2900 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	500 to 600rpm
Drive plate runout	max.	0.20 mm (0.0079 in.)
Torque converter	max.	0.30 mm (0.0118 in.)
Shift schedule (for Europe)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	4 → 5	138 to 153 km/h (86 to 95 mph)
	5 → 6	199 to 211 km/h (124 to 131 mph)
	6 → 5	155 to 167 km/h (96 to 104 mph)
	5 → 4	131 to 142 km/h (81 to 88 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 100 km/h (58 to 62 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
5 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	4 → 5	138 to 153 km/h (86 to 95 mph)
	6 → 5	199 to 211 km/h (124 to 131 mph)
	5 → 4	131 to 142 km/h (81 to 88 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	5 → 4	139 to 150 km/h (86 to 93 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
1 position (Throttle valve fully opened)	2 → 1	33 to 38 km/h (21 to 24 mph)
Shift schedule (for Australia)		
	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)

D, 6 position (Throttle valve fully opened)	4 → 5	138 to 154 km/h (86 to 96 mph)
	5 → 6	199 to 212 km/h (124 to 132 mph)
	6 → 5	192 to 205 km/h (119 to 127 mph)
	5 → 4	131 to 143 km/h (81 to 89 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	4 → 5	138 to 154 km/h (86 to 96 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	131 to 143 km/h (81 to 89 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Shift schedule (for General at Normal mode)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	5 → 6	184 to 196 km/h (114 to 122 mph)
	6 → 5	176 to 189 km/h (109 to 117 mph)
	5 → 4	117 to 129 km/h (73 to 80 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	117 to 129 km/h (73 to 80 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)

4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Shift schedule (for General at Power mode)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	5 → 6	184 to 196 km/h (114 to 122 mph)
	6 → 5	176 to 189 km/h (109 to 117 mph)
	5 → 4	120 to 131 km/h (75 to 81 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	120 to 131 km/h (75 to 81 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Lock-up point (for Europe)		

(Throttle valve opening 5 %) D, 6, 5 position 6th	Lock-up ON	94 to 100 km/h (58 to 62 mph)
	Lock-up OFF	81 to 87 km/h (50 to 54 mph)
D, 6, 5 position 5th	Lock-up ON	87 to 93 km/h (54 to 58 mph)
	Lock-up OFF	81 to 87 km/h (50 to 54 mph)
4 position 4th gear	Lock-up ON	67 to 73 km/h (42 to 45 mph)
	Lock-up OFF	62 to 68 km/h (39 to 42 mph)
Lock-up point (for Australia and General) (Throttle valve opening 5 %)		
D, 6, 5 position 6th	Lock-up ON	94 to 101 km/h (58 to 63 mph)
	Lock-up OFF	81 to 88 km/h (50 to 55 mph)
D, 6, 5 position 5th	Lock-up ON	87 to 93 km/h (54 to 58 mph)
	Lock-up OFF	81 to 88 km/h (50 to 55 mph)
4 position 4th gear	Lock-up ON	67 to 73 km/h (42 to 45 mph)
	Lock-up OFF	62 to 68 km/h (39 to 42 mph)

REVERSE CLUTCH

Reverse clutch hub bushing inside diameter	STD	41.912 to 41.937 mm (1.410 to 1.411 in.)
Clutch piston return spring free length	STD	21.24 mm (0.836 in.)
Flange thickness	Mark. 0	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 1	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 2	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 3	2.65 to 2.75 mm (0.104 to 0.108 in.)
	Mark. 4	2.75 to 2.85 mm (0.108 to 0.112 in.)
	Mark. 5	2.85 to 2.95 mm (0.112 to 0.116 in.)
	Mark. 6	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 7	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 8	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. A	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. B	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. C	3.45 to 3.55 mm (0.136 to 0.140 in.)

FORWARD CLUTCH

Forward clutch hub bushing inside diameter	STD	30.200 to 30.225 mm (1.189 to 1.0261 in.)
Clutch piston return spring free length	STD	29.65 mm (1.17 in.)
Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. C	4.05 to 4.15 mm (0.159 to 0.163 in.)

DIRECT CLUTCH

Clutch piston return spring free length	STD	19.46 mm (0.766 in.)
Flange thickness	Mark. 0	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 1	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 2	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 3	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. 4	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. 5	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. 6	4.05 to 4.15 mm (0.159 to 0.163 in.)

	Mark. 7	4.15 to 4.25 mm (0.163 to 0.167 in.)
	Mark. 8	4.25 to 4.35 mm (0.167 to 0.171 in.)

COAST CLUTCH

Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)

NO. 3 BRAKE

Brake piston return spring free length	STD	15.72 mm (0.619 in.)

FRONT PLANETARY GEAR

Planetary gear bushing inside diameter	STD	61.005 to 61.030 mm (2.402 to 2.403 in.)
Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)

NO. 1 BRAKE

Piston return spring free length	STD	17.05 mm (0.671 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 2	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 3	2.55 to 2.65 mm (0.100 to 0.104 in.)

NO. 2 BRAKE

Piston return spring free length	STD	22.66 mm (0.892 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.05 to 2.15 mm (0.0807 to 0.0846 in.)
	Mark. 2	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 3	2.25 to 2.35 mm (0.0886 to 0.0925 in.)
	Mark. 4	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 5	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 6	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 7	2.65 to 2.75 mm (0.104 to 0.108 in.)

CENTER PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.20 to 0.60 mm (0.00787 to 0.0236 in.)

INTERMEDIATE SHAFT

Intermediate shaft run out	STD	0.03 mm (0.00118 in.)
Intermediate shaft diameter	STD A:	19.963 to 19.976 mm (0.7859 to 0.7863 in.)
	STD B, C:	30.150 to 30.163 mm (1.187 to 1.188 in.)
	STD D, E:	36.404 to 36.420 mm (1.433 to 1.434 in.)

REAR PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)
Planetary gear bushing inside diameter	Maximum	20.0 to 20.025 mm (0.787 to 0.788 in.)

NO. 4 BRAKE

Piston return spring free length	STD	23.54 to 23.94 mm (0.927 to 0.943 in.)
	Mark. 0	0 mm (0 in.)

Flange H thickness	Mark. 2	0.15 to 0.25 mm (0.00590 to 0.00984 in.)
	Mark. 4	0.35 to 0.45 mm (0.0138 to 0.0177 in.)
	Mark. 6	0.55 to 0.65 mm (0.0217 to 0.0256 in.)
	Mark. 8	0.75 to 0.85 mm (0.0295 to 0.0335 in.)
	Mark. 10	0.95 to 1.05 mm (0.0374 to 0.0413 in.)

ACCUMULATOR

Spring	Color	Free length / Outer diameter [mm (in.)]
B-1 Inner	Natural	44.98 mm (1.77 in.) / 11.30 mm (0.445 in.)
B-1 Outer	Natural	46.36 mm (1.83 in.) / 17.10 mm (0.673 in.)
C-3	Red	73.35 mm (2.89 in.) / 19.9 mm (0.783 in.)
B-3	Orange	64.50 mm (2.54 in.) / 19.5 mm (0.768 in.)
C-2	Light green	68.0 mm (2.68 in.) / 16.1 mm (0634 in.)

OIL PUMP

Body clearance	STD	0.10 to 0.17 mm (0.00394 to 0.00669 in.)
	Maximum	0.170 mm (0.00669 in.)
Tip clearance	STD	0.070 to 0.150 mm (0.00276 to 0.00591 in.)
	Maximum	0.150 mm (0.00591 in.)
Side clearance	STD	0.03 to 0.05 mm (0.000118 to 0.00197 in.)
	Maximum	0.05 mm (0.00197 in.)
Driver and driven gear thickness	0	11.636 to 11.642 mm (0.4581 to 0.4583 in.)
	1	11.643 to 11.649 mm (0.4584 to 0.4586 in.)
	2	11.650 to 11.656 mm (0.4587 to 0.4589 in.)
	3	11.657 to 11.663 mm (0.4589 to 0.4592 in.)
	4	11.664 to 11.670 mm (0.4592 to 0.4594 in.)
	5	11.671 to 11.677 mm (0.4595 to 0.4597 in.)
	6	11.678 to 11.684 mm (0.4598 to 0.4600 in.)
Pump body bushing inside diameter	STD	45.064 to 45.078 mm (1.774 to 1.775 in.)
Stator shaft bushing inside diameter	STD	25.900 to 25.921 mm (1.020 to 1.021 in.)

Line pressure (Wheel locked) Engine idling	D position	350 to 430 kPa (3.6 to 4.4 kgf/cm ^{2}, 51 to 62 psi)
	R position	550 to 660 kPa (5.6 to 6.7 kgf/cm ^{2}, 80 to 96 psi)
AT stall (Throttle valve fully opened)	D position	1230 to 1390 kPa (12.5 to 14.2 kgf/cm ^{2}, 178 to 202 psi)
	R position	1470 to 1690 kPa (15.0 to 17.2 kgf/cm ^{2}, 213 to 245 psi)
Engine stall revolution	D and R positions	2600 to 2900 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	500 to 600rpm
Drive plate runout	max.	0.20 mm (0.0079 in.)
Torque converter	max.	0.30 mm (0.0118 in.)
Shift schedule (for Europe)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	4 → 5	138 to 153 km/h (86 to 95 mph)
	5 → 6	199 to 211 km/h (124 to 131 mph)
	6 → 5	155 to 167 km/h (96 to 104 mph)
	5 → 4	131 to 142 km/h (81 to 88 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 100 km/h (58 to 62 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
5 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	4 → 5	138 to 153 km/h (86 to 95 mph)
	6 → 5	199 to 211 km/h (124 to 131 mph)
	5 → 4	131 to 142 km/h (81 to 88 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	3 → 4	96 to 106 km/h (60 to 66 mph)
	5 → 4	139 to 150 km/h (86 to 93 mph)
	4 → 3	88 to 94 km/h (55 to 58 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	2 → 3	67 to 77 km/h (42 to 48 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	58 to 63 km/h (36 to 39 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 49 km/h (24 to 30 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
1 position (Throttle valve fully opened)	2 → 1	33 to 38 km/h (21 to 24 mph)
Shift schedule (for Australia)		
	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)

D, 6 position (Throttle valve fully opened)	4 → 5	138 to 154 km/h (86 to 96 mph)
	5 → 6	199 to 212 km/h (124 to 132 mph)
	6 → 5	192 to 205 km/h (119 to 127 mph)
	5 → 4	131 to 143 km/h (81 to 89 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	4 → 5	138 to 154 km/h (86 to 96 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	131 to 143 km/h (81 to 89 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	88 to 95 km/h (55 to 59 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	58 to 64 km/h (36 to 40 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Shift schedule (for General at Normal mode)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	5 → 6	184 to 196 km/h (114 to 122 mph)
	6 → 5	176 to 189 km/h (109 to 117 mph)
	5 → 4	117 to 129 km/h (73 to 80 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	117 to 129 km/h (73 to 80 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)

4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Shift schedule (for General at Power mode)		
D, 6 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	5 → 6	184 to 196 km/h (114 to 122 mph)
	6 → 5	176 to 189 km/h (109 to 117 mph)
	5 → 4	120 to 131 km/h (75 to 81 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
D, 6 position (Throttle valve fully closed)	5 → 6	94 to 101 km/h (58 to 63 mph)
	6 → 5	88 to 95 km/h (55 to 59 mph)
D, 5 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	4 → 5	127 to 143 km/h (79 to 89 mph)
	6 → 5	199 to 212 km/h (124 to 132 mph)
	5 → 4	120 to 131 km/h (75 to 81 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
4 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	3 → 4	88 to 99 km/h (55 to 62 mph)
	5 → 4	139 to 151 km/h (86 to 94 mph)
	4 → 3	80 to 87 km/h (50 to 54 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
3 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	63 to 74 km/h (39 to 46 mph)
	4 → 3	95 to 102 km/h (59 to 63 mph)
	3 → 2	54 to 60 km/h (34 to 37 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
2 position (Throttle valve fully opened)	1 → 2	39 to 50 km/h (24 to 31 mph)
	3 → 2	65 to 71 km/h (40 to 44 mph)
	2 → 1	26 to 31 km/h (16 to 19 mph)
L position (Throttle valve fully opened)	2 → 1	33 to 39 km/h (21 to 24 mph)
Lock-up point (for Europe)		

(Throttle valve opening 5 %) D, 6, 5 position 6th	Lock-up ON	94 to 100 km/h (58 to 62 mph)
	Lock-up OFF	81 to 87 km/h (50 to 54 mph)
D, 6, 5 position 5th	Lock-up ON	87 to 93 km/h (54 to 58 mph)
	Lock-up OFF	81 to 87 km/h (50 to 54 mph)
4 position 4th gear	Lock-up ON	67 to 73 km/h (42 to 45 mph)
	Lock-up OFF	62 to 68 km/h (39 to 42 mph)
Lock-up point (for Australia and General) (Throttle valve opening 5 %)		
D, 6, 5 position 6th	Lock-up ON	94 to 101 km/h (58 to 63 mph)
	Lock-up OFF	81 to 88 km/h (50 to 55 mph)
D, 6, 5 position 5th	Lock-up ON	87 to 93 km/h (54 to 58 mph)
	Lock-up OFF	81 to 88 km/h (50 to 55 mph)
4 position 4th gear	Lock-up ON	67 to 73 km/h (42 to 45 mph)
	Lock-up OFF	62 to 68 km/h (39 to 42 mph)

REVERSE CLUTCH

Reverse clutch hub bushing inside diameter	STD	41.912 to 41.937 mm (1.410 to 1.411 in.)
Clutch piston return spring free length	STD	21.24 mm (0.836 in.)
Flange thickness	Mark. 0	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 1	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 2	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 3	2.65 to 2.75 mm (0.104 to 0.108 in.)
	Mark. 4	2.75 to 2.85 mm (0.108 to 0.112 in.)
	Mark. 5	2.85 to 2.95 mm (0.112 to 0.116 in.)
	Mark. 6	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 7	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 8	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. A	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. B	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. C	3.45 to 3.55 mm (0.136 to 0.140 in.)

FORWARD CLUTCH

Forward clutch hub bushing inside diameter	STD	30.200 to 30.225 mm (1.189 to 1.0261 in.)
Clutch piston return spring free length	STD	29.65 mm (1.17 in.)
Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. C	4.05 to 4.15 mm (0.159 to 0.163 in.)

DIRECT CLUTCH

Clutch piston return spring free length	STD	19.46 mm (0.766 in.)
Flange thickness	Mark. 0	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 1	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 2	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 3	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. 4	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. 5	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. 6	4.05 to 4.15 mm (0.159 to 0.163 in.)

	Mark. 7	4.15 to 4.25 mm (0.163 to 0.167 in.)
	Mark. 8	4.25 to 4.35 mm (0.167 to 0.171 in.)

COAST CLUTCH

Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)

NO. 3 BRAKE

Brake piston return spring free length	STD	15.72 mm (0.619 in.)

FRONT PLANETARY GEAR

Planetary gear bushing inside diameter	STD	61.005 to 61.030 mm (2.402 to 2.403 in.)
Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)

NO. 1 BRAKE

Piston return spring free length	STD	17.05 mm (0.671 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 2	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 3	2.55 to 2.65 mm (0.100 to 0.104 in.)

NO. 2 BRAKE

Piston return spring free length	STD	22.66 mm (0.892 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.05 to 2.15 mm (0.0807 to 0.0846 in.)
	Mark. 2	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 3	2.25 to 2.35 mm (0.0886 to 0.0925 in.)
	Mark. 4	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 5	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 6	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 7	2.65 to 2.75 mm (0.104 to 0.108 in.)

CENTER PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.20 to 0.60 mm (0.00787 to 0.0236 in.)

INTERMEDIATE SHAFT

Intermediate shaft run out	STD	0.03 mm (0.00118 in.)
Intermediate shaft diameter	STD A:	19.963 to 19.976 mm (0.7859 to 0.7863 in.)
	STD B, C:	30.150 to 30.163 mm (1.187 to 1.188 in.)
	STD D, E:	36.404 to 36.420 mm (1.433 to 1.434 in.)

REAR PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)
Planetary gear bushing inside diameter	Maximum	20.0 to 20.025 mm (0.787 to 0.788 in.)

NO. 4 BRAKE

Piston return spring free length	STD	23.54 to 23.94 mm (0.927 to 0.943 in.)
	Mark. 0	0 mm (0 in.)

Flange H thickness	Mark. 2	0.15 to 0.25 mm (0.00590 to 0.00984 in.)
	Mark. 4	0.35 to 0.45 mm (0.0138 to 0.0177 in.)
	Mark. 6	0.55 to 0.65 mm (0.0217 to 0.0256 in.)
	Mark. 8	0.75 to 0.85 mm (0.0295 to 0.0335 in.)
	Mark. 10	0.95 to 1.05 mm (0.0374 to 0.0413 in.)

OUTPUT SHAFT BEARING

End play	STD	0.02 to 0.12 mm (0.000787 to 0.00472 in.)
Flange thickness	Mark. A	3.775 to 3.824 mm (0.14862 to 0.15055 in.)
	Mark. B	3.825 to 3.874 mm (0.15059 to 0.15252 in.)
	Mark. C	3.875 to 3.924 mm (0.15256 to 0.15449 in.)
	Mark. F	3.925 to 3.974 mm (0.15453 to 0.15646 in.)
	Mark. H	3.975 to 4.024 mm (0.15650 to 0.15842 in.)
	Mark. J	4.025 to 4.074 mm (0.15846 to 0.16039 in.)
	Mark. L	4.075 to 4.124 mm (0.16043 to 0.16236 in.)
	Mark. M	4.125 to 4.174 mm (0.16240 to 0.16433 in.)
	Mark. S	4.175 to 4.224 mm (0.16437 to 0.16630 in.)
	Mark. T	4.225 to 4.274 mm (0.16634 to 0.16827 in.)
	Mark. X	4.275 to 4.324 mm (0.16831 to 0.17024 in.)
	Mark. Z	4.325 to 4.374 mm (0.17028 to 0.17220 in.)

ACCUMULATOR

Spring	Color	Free length / Outer diameter [mm (in.)]
B-1 Inner	Natural	44.98 mm (1.77 in.) / 11.30 mm (0.445 in.)
B-1 Outer	Natural	46.36 mm (1.83 in.) / 17.10 mm (0.673 in.)
C-3	Red	73.35 mm (2.89 in.) / 19.9 mm (0.783 in.)
B-3	Orange	64.50 mm (2.54 in.) / 19.5 mm (0.768 in.)
C-2	Light green	68.0 mm (2.68 in.) / 16.1 mm (0634 in.)

OIL PUMP

Body clearance	STD	0.10 to 0.17 mm (0.00394 to 0.00669 in.)
	Maximum	0.170 mm (0.00669 in.)
Tip clearance	STD	0.070 to 0.150 mm (0.00276 to 0.00591 in.)
	Maximum	0.150 mm (0.00591 in.)
Side clearance	STD	0.03 to 0.05 mm (0.000118 to 0.00197 in.)
	Maximum	0.05 mm (0.00197 in.)
Driver and driven gear thickness	0	11.636 to 11.642 mm (0.4581 to 0.4583 in.)
	1	11.643 to 11.649 mm (0.4584 to 0.4586 in.)
	2	11.650 to 11.656 mm (0.4587 to 0.4589 in.)
	3	11.657 to 11.663 mm (0.4589 to 0.4592 in.)
	4	11.664 to 11.670 mm (0.4592 to 0.4594 in.)
	5	11.671 to 11.677 mm (0.4595 to 0.4597 in.)
	6	11.678 to 11.684 mm (0.4598 to 0.4600 in.)
Pump body bushing inside diameter	STD	45.064 to 45.078 mm (1.774 to 1.775 in.)
Stator shaft bushing inside diameter	STD	25.900 to 25.921 mm (1.020 to 1.021 in.)

for 3UR-FE

AT stall (Throttle valve fully opened)	D position	1370 to 1530 kPa (14.0 to 15.6 kgf/cm ^{2}, 199 to 222 psi)
	R position	1540 to 1750 kPa (15.7 to 17.8 kgf/cm ^{2}, 223 to 254 psi)
Engine stall speed	D and R positions	2150 to 2550 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	650 to 750 rpm
Drive plate runout	Max.	0.30 mm (0.0118 in.)
Shift schedule		
D position		
Throttle valve fully open (Normal)	1 → 2	51 to 64 km/h (32 to 40 mph)
	2 → 3	102 to 116 km/h (63 to 72 mph)
	3 → 4	146 to 165 km/h (91 to 103 mph)
	4 → 5	193 to 216 km/h (120 to 134 mph)
	5 → 6	270 to 293 km/h (168 to 182 mph)
Throttle valve opening 6% (Normal)	1 → 2	6 to 11 km/h (4 to 7 mph)
	2 → 3	19 to 24 km/h (12 to 15 mph)
	3 → 4	27 to 33 km/h (24 to 28 mph)
	4 → 5	44 to 51 km/h (27 to 32 mph)
	5 → 6	69 to 78 km/h (43 to 48 mph)
	Lock-up	80 km/h (50 mph) or higher
5, 4, 3, 2, 1 gear range		
Manual downshift speed	→ 5	264 to 288 km/h (164 to 179 mph)
	→ 4	192 to 211 km/h (119 to 131 mph)
	→ 3	141 to 157 km/h (88 to 98 mph)
	→ 2	97 to 107 km/h (60 to 66 mph)
	→ 1	38 to 45 km/h (24 to 28 mph)

for 1VD-FTV

AT stall (Throttle valve fully opened)	D position	1230 to 1390 kPa (12.5 to 14.2 kgf/cm ^{2}, 178 to 202 psi)
	R position	1470 to 1690 kPa (15.0 to 17.2 kgf/cm ^{2}, 213 to 245 psi)
Engine stall speed	D and R positions	2600 to 2900 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	550 to 650 rpm
Drive plate runout	Max.	0.30 mm (0.0118 in.)
Shift schedule (for Europe and Australia)		
D position		
Throttle valve fully open (Normal)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	4 → 5	138 to 154 km/h (86 to 96 mph)
	5 → 6	199 to 212 km/h (124 to 132 mph)
Shift schedule (for General at Normal mode)		
D position		
Throttle valve fully open (Normal)	1 → 2	39 to 50 km/h (24 to 31 mph)
	2 → 3	67 to 78 km/h (42 to 48 mph)
	3 → 4	96 to 107 km/h (60 to 66 mph)
	4 → 5	138 to 154 km/h (86 to 96 mph)
	5 → 6	199 to 212 km/h (124 to 132 mph)
Shift schedule		
D position		
	1 → 2	5 to 10 km/h (3 to 6 mph)

Throttle valve opening 6% (Normal)	2 → 3	16 to 21 km/h (10 to 13 mph)
	3 → 4	28 to 33 km/h (17 to 21 mph)
	4 → 5	40 to 46 km/h (25 to 29 mph)
	5 → 6	94 to 101 km/h (25 to 29 mph)
	Lock-up	80 km/h (50 mph) or higher
5, 4, 3, 2, 1 gear range		
Manual downshift speed	→ 5	215 to 229 km/h (134 to 142 mph)
	→ 4	155 to 168 km/h (96 to 104 mph)
	→ 3	116 to 123 km/h (72 to 76 mph)
	→ 2	79 to 86 km/h (49 to 53 mph)
	→ 1	41 to 47 km/h (24 to 28 mph)

REVERSE CLUTCH

Reverse clutch hub bushing inside diameter	STD	41.912 to 41.937 mm (1.410 to 1.411 in.)
Clutch piston return spring free length	STD	21.24 mm (0.836 in.)
Flange thickness	Mark. 0	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 1	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 2	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 3	2.65 to 2.75 mm (0.104 to 0.108 in.)
	Mark. 4	2.75 to 2.85 mm (0.108 to 0.112 in.)
	Mark. 5	2.85 to 2.95 mm (0.112 to 0.116 in.)
	Mark. 6	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 7	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 8	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. A	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. B	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. C	3.45 to 3.55 mm (0.136 to 0.140 in.)

FORWARD CLUTCH

Forward clutch hub bushing inside diameter	STD	30.200 to 30.225 mm (1.189 to 1.0261 in.)
Clutch piston return spring free length	STD	29.65 mm (1.17 in.)
Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. C	4.05 to 4.15 mm (0.159 to 0.163 in.)

DIRECT CLUTCH (for 3UR-FE

Clutch piston return spring free length	STD	19.46 mm (0.766 in.)
Flange thickness	Mark. 0	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 1	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 2	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 3	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. 4	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. 5	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. 6	4.05 to 4.15 mm (0.159 to 0.163 in.)
	Mark. 7	4.15 to 4.25 mm (0.163 to 0.167 in.)
	Mark. 8	4.25 to 4.35 mm (0.167 to 0.171 in.)

DIRECT CLUTCH (for 1VD-FTV)

Clutch piston return spring free length	STD	19.46 mm (0.766 in.)
Flange thickness	Mark. 0	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 1	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 2	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 3	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. 4	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. 5	3.95 to 4.05 mm (0.156 to 0.159 in.)
	Mark. 6	4.05 to 4.15 mm (0.159 to 0.163 in.)
	Mark. 7	4.15 to 4.25 mm (0.163 to 0.167 in.)
	Mark. 8	4.25 to 4.35 mm (0.167 to 0.171 in.)
	Mark. A	4.35 to 4.45 mm (0.171 to 0.175 in.)

COAST CLUTCH

Flange thickness	Mark. 0	2.95 to 3.05 mm (0.116 to 0.120 in.)
	Mark. 1	3.05 to 3.15 mm (0.120 to 0.124 in.)
	Mark. 2	3.15 to 3.25 mm (0.124 to 0.128 in.)
	Mark. 3	3.25 to 3.35 mm (0.128 to 0.132 in.)
	Mark. 4	3.35 to 3.45 mm (0.132 to 0.136 in.)
	Mark. 5	3.45 to 3.55 mm (0.136 to 0.140 in.)
	Mark. 6	3.55 to 3.65 mm (0.140 to 0.144 in.)
	Mark. 7	3.65 to 3.75 mm (0.144 to 0.148 in.)
	Mark. 8	3.75 to 3.85 mm (0.148 to 0.152 in.)
	Mark. A	3.85 to 3.95 mm (0.152 to 0.156 in.)
	Mark. B	3.95 to 4.05 mm (0.156 to 0.159 in.)

NO. 3 BRAKE

Brake piston return spring free length	STD	15.72 mm (0.619 in.)

FRONT PLANETARY GEAR

Planetary gear bushing inside diameter	STD	61.005 to 61.030 mm (2.402 to 2.403 in.)
Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)

NO. 1 BRAKE

Piston return spring free length	STD	17.05 mm (0.671 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 2	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 3	2.55 to 2.65 mm (0.100 to 0.104 in.)

NO. 2 BRAKE

Piston return spring free length	STD	22.66 mm (0.892 in.)
Flange thickness	Mark. 0	1.95 to 2.05 mm (0.0768 to 0.0807 in.)
	Mark. 1	2.05 to 2.15 mm (0.0807 to 0.0846 in.)
	Mark. 2	2.15 to 2.25 mm (0.0846 to 0.0886 in.)
	Mark. 3	2.25 to 2.35 mm (0.0886 to 0.0925 in.)
	Mark. 4	2.35 to 2.45 mm (0.0925 to 0.0965 in.)
	Mark. 5	2.45 to 2.55 mm (0.0965 to 0.100 in.)
	Mark. 6	2.55 to 2.65 mm (0.100 to 0.104 in.)
	Mark. 7	2.65 to 2.75 mm (0.104 to 0.108 in.)

CENTER PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.20 to 0.60 mm (0.00787 to 0.0236 in.)

INTERMEDIATE SHAFT

Intermediate shaft run out	STD	0.03 mm (0.00118 in.)

Intermediate shaft diameter	STD A:	19.963 to 19.976 mm (0.7859 to 0.7863 in.)
	STD B, C:	30.150 to 30.163 mm (1.187 to 1.188 in.)
	STD D, E:	36.404 to 36.420 mm (1.433 to 1.434 in.)

REAR PLANETARY GEAR

Planetary pinion gear thrust clearance	STD	0.2 to 0.6 mm (0.00787 to 0.0236 in.)
Planetary gear bushing inside diameter	Maximum	20.0 to 20.025 mm (0.787 to 0.788 in.)

NO. 4 BRAKE

Flange H thickness	Mark. 0	0 mm (0 in.)
	Mark. 2	0.15 to 0.25 mm (0.00590 to 0.00984 in.)
	Mark. 4	0.35 to 0.45 mm (0.0138 to 0.0177 in.)
	Mark. 6	0.55 to 0.65 mm (0.0217 to 0.0256 in.)
	Mark. 8	0.75 to 0.85 mm (0.0295 to 0.0335 in.)
	Mark. 10	0.95 to 1.05 mm (0.0374 to 0.0413 in.)

1ST AND REVERSE BRAKE

1st and reverse brake return spring sub-assembly	STD	23.54 to 23.94 mm (0.927 to 0.943 in.)

ACCUMULATOR

Spring		Color	Free length / Outer diameter [mm (in.)]
B-1 Inner		Natural	44.98 mm (1.77 in.) / 11.30 mm (0.445 in.)
B-1 Outer		Natural	46.36 mm (1.83 in.) / 17.10 mm (0.673 in.)
C-3	for 3UR-FE	Natural	76.65 mm (3.02 in.) / 20.1 mm (0.791 in.)
	for 1VD-FTV	White	
B-3		Orange	64.50 mm (2.54 in.) / 19.5 mm (0.768 in.)
C-2	for 3UR-FE	Blue	68.0 mm (2.68 in.) / 16.1 mm (0634 in.)
	for 1VD-FTV	Light green	

OIL PUMP

Body clearance	STD	0.10 to 0.17 mm (0.00394 to 0.00669 in.)
	Maximum	0.170 mm (0.00669 in.)
Tip clearance	STD	0.070 to 0.150 mm (0.00276 to 0.00591 in.)
	Maximum	0.150 mm (0.00591 in.)
Side clearance	STD	0.03 to 0.05 mm (0.000118 to 0.00197 in.)
	Maximum	0.05 mm (0.00197 in.)
Driver and driven gear thickness	0	11.636 to 11.650 mm (0.4581 to 0.4586 in.)
	1	11.643 to 11.649 mm (0.4584 to 0.4586 in.)
	2	11.650 to 11.656 mm (0.4587 to 0.4589 in.)
	3	11.657 to 11.663 mm (0.4589 to 0.4592 in.)
	4	11.664 to 11.670 mm (0.4592 to 0.4594 in.)
	5	11.671 to 11.677 mm (0.4595 to 0.4597 in.)
	6	11.678 to 11.684 mm (0.4598 to 0.4600 in.)
Pump body bushing inside diameter	STD	45.064 to 45.078 mm (1.774 to 1.775 in.)
Stator shaft bushing inside diameter	STD	25.900 to 25.921 mm (1.020 to 1.021 in.)

Part Tightened		N*m	kgf*cm	ft.*lbf
Drain plug x Oil pan		20	204	15
Overflow plug x Oil pan		20	204	15
Refill plug x Transmission case		39	400	29
Speed sensor NT x Automatic transmission		5.4	55	48 in.*lbf
Speed sensor SP2 x Automatic transmission		5.4	55	48 in.*lbf
No. 1 and No. 2 engine under cover x frame		29	296	21
Oil pan protector x rame		63	642	46
No. 1 transmission wire set bolt x Automatic transmission		5.4	55	48 in.*lbf
No. 2 transmission wire set bolt x Automatic transmission		5.4	55	48 in.*lbf
Transmission wire clamp	12 mm (0.472 in.) length	10	102	7
	36 mm (1.41 in.) length	11	112	8
Transmission oil pan x Transmission case		7.4	75	65 in.*lbf
Valve body oil strainer x Valve body		10	102	7
Valve body x Transmission case		11	112	8
Detent spring and Detent spring cover x valve body		10	102	7
Shift solenoid valve S1 and S 2 x Valve body		10	102	7
Shift solenoid valve S3 x Valve body		10	102	7
Shift solenoid valve SR x Valve body		10	102	7
Solenoid lock plate x Valve body		6.4	65	57 in.*lbf
Oil pan x Transmission case		7.4	75	65 in.*lbf
Park neutral position switch	olt	13	133	10
	Nut	6.9	70	61 in.*lbf
Transmission control shaft lever RH		16	163	12
Oil cooler assembly x ody		12	122	9
Transmission oil cooler air duct x oil cooler assembly		4.9	50	43 in.*lbf
Rear transmission oil cooler air duct x Oil cooler assembly		4.9	50	43 in.*lbf
Air cooled oil cooler tube x Rear transmission oil cooler air duct		4.9	50	43 in.*lbf
Oil cooler tube x Radiator fan shroud		5.0	51	44 in.*lbf
loor shift assembly x ody		14	143	10
Transmission floor shift assembly x loor shift gear shifting rod		13	130	9
Automatic transmission assembly x ngine	17 mm head bolt	71	724	52
	14 mm head bolt	37	377	27
Tor ue converter clutch x Drive plate		53	540	39
ire harness x Automatic transmission		8.0	82	71 in.*lbf
Rear No. 1 engine mounting insulator x ossmember		37	377	27
Transmission housing cover x Transmission		12	122	9
Oil pan cover x Transmission		21	214	15
ossmember x rame		110	1122	81
Oil cooler tube x ngine		14	143	10
Oil pan insulator x ngine		21	214	15
Propeller shaft heat insulator x ossmember		16	163	12
ngine rear mounting insulator x Automatic transmission assembly		59	602	44
Transfer case lower protector x Transfer		14	143	10
Transfer x Automatic transmission		40	408	30
Automatic transmission unit				
Transmission housing x Transmission case		34	345	25
Automatic transmission breather tube x Transmission case		5.4	55	48 in.*lbf
Rear adaptor transfer x transmission case		34	345	25
Parking lock pawl bracket x Transmission case		18	184	13

Oil pump x Transmission case	21	214	15
Oil pump body x Stator shaft	11	112	8

Part Tightened		N*m	kgf*cm	ft.*lbf
Drain plug x Oil pan		20	204	15
Overflow plug x Oil pan		20	204	15
Refill plug x Transmission case		39	400	29
Speed sensor NT x Automatic transmission		5.4	55	48 in.*lbf
Speed sensor SP2 x Automatic transmission		5.4	55	48 in.*lbf
No. 1 and No. 2 engine under cover x frame		29	296	21
Oil pan protector x rame		63	642	46
No. 1 transmission wire set bolt x Automatic transmission		5.4	55	48 in.*lbf
No. 2 transmission wire set bolt x Automatic transmission		5.4	55	48 in.*lbf
Transmission wire clamp	12 mm (0.472 in.) length	10	102	7
	36 mm (1.41 in.) length	11	112	8
Transmission oil pan x Transmission case		7.4	75	65 in.*lbf
Valve body oil strainer x Valve body		10	102	7
Valve body x Transmission case		11	112	8
Detent spring and Detent spring cover x valve body		10	102	7
Shift solenoid valve S1 and S 2 x Valve body		10	102	7
Shift solenoid valve S3 x Valve body		10	102	7
Shift solenoid valve SR x Valve body		10	102	7
Solenoid lock plate x Valve body		6.4	65	57 in.*lbf
Park neutral position switch	olt	13	133	10
	Nut	6.9	70	61 in.*lbf
Transmission control shaft lever RH		16	163	12
Oil cooler assembly x ody		12	122	9
Transmission oil cooler air duct x oil cooler assembly		4.9	50	43 in.*lbf
Rear transmission oil cooler air duct x Oil cooler assembly		4.9	50	43 in.*lbf
Air cooled oil cooler tube x Rear transmission oil cooler air duct		4.9	50	43 in.*lbf
Oil cooler tube x Radiator fan shroud		5.0	51	44 in.*lbf
loor shift assembly x ody		14	143	10
Transmission floor shift assembly x loor shift gear shifting rod		13	130	9
Automatic transmission assembly x ngine	17 mm head bolt	71	724	52
	14 mm head bolt	37	377	27
Tor ue converter x Drive plate		53	540	39
ire harness x Automatic transmission	for 1VD- TV	8.0	82	71 in.*lbf
Rear No. 1 engine mounting insulator x ossmember		37	377	27
Transmission housing cover x Transmission		12	122	9
Oil pan cover x Transmission		21	214	15
ossmember x rame	for 1VD- TV	110	1122	81
Oil cooler tube x ngine		14	143	10
Oil pan insulator x ngine	or 1VD- TV	21	214	15
Rear No. 1 engine mounting insulator x Automatic transmission assembly		59	602	44
Transfer case lower protector x Transfer		14	143	10
Transfer x Automatic transmission		40	408	30
Transmission housing x Transmission case		34	345	25
Automatic transmission breather tube x Transmission case		5.4	55	48 in.*lbf
Rear transfer adaptor x transmission case		34	345	25
Parking lock pawl bracket x Transmission case		18	184	13
Oil pump x Transmission case		21	214	15
Oil pump body x Stator shaft		11	112	8
round cable		8.4	86	74 in.*lbf
ngine rounting heat insulator x Rear No. 1 engine mounting insulator	for 3UR-	12	122	9
AT temperature sensor clamp x Valve body	olt A	10	102	7

	olt	11	112	8
ire harness clamp bracket x Transmission assembly	olt A	8.0	82	71 in.*lbf
	olt	29	296	21
	olt Type A	8.0	82	71 in.*lbf
	olt Type	12	122	9
Oil cooler tube union x Transmission assembly		29 (26)	296 (265)	21 (19)

() or use with union nut wrench

Pedal height from tibia pad	LHD	162.7 to 172.7 mm (6.41 to 6.79 in.)
	RHD	164.8 to 174.8 mm (6.49 to 6.88 in.)
Clutch pedal free play		5.0 to 15.0 mm (0.197 to 0.591 in.)
Clutch pedal push rod play at pedal top		1.0 to 5.0 mm (0.039 to 0.197 in.)
Clutch release point from pedal full stroke end position		20 mm (0.787 in.) or more
Clutch disc rivet head depth	Minimum	0.3 mm (0.0118 in.)
Clutch disc runout	Maximum	1GR-FE: 0.9 mm (0.0354 in.)
	Maximum	1VD-FTV: 1.0 mm (0.0394 in.)
Flywheel runout	Maximum	0.1 mm (0.00394 in.)
Clutch cover diaphragm spring	Maximum depth	0.6 mm (0.0236 in.)
	Minimum width	5.0 mm (0.197 in.)
Clutch start switch	ON (pushed)	Blow 1 Ω
	OFF (released)	10 kΩ or higher

Part tightened		N*m	kgf*cm	ft.*lbf
Clutch pedal support assembly x Body for LHD	Nut	14	145	10
	Bolt	18	184	13
Clutch pedal support assembly x Body x Clutch master cylinder for RHD	Nut	1	1 0	9
	Bolt	18	184	13
Clutch pedal support ay x Clutch master cylinder to flexible hose tube for LHD	ithout	15	155	11
	ith	14	1443	10
Clutch pedal support ay x Clutch master cylinder to ay tube x Clutch master cylinder for LHD	ithout	15	155	11
	ith	14	144	10
Clutch master cylinder x lexible hose tube RHD	ithout	15	155	11
	ith	14	144	10
Clutch pedal x Clutch pedal support		34	350	25
Clutch pedal assembly x Clutch master cylinder for LHD	Nut	1	1 0	9
Clutch master cylinder x Clutch pedal support for LHD		1	1 0	9
Clutch pedal stopper bolt lock nut x Clutch pedal support for LHD		1	1 0	1
Lock nut of clutch pedal stopper bolt or clutch s itch x Clutch pedal support for RHD		1	1 0	1
Clutch master cylinder push rod x Clevis lock nut		1	1 0	9
Release cylinder bleeder plug x Clutch release cylinder assembly		11	110	8
Clutch release cylinder x ransmission housing		1	1 0	9
Clutch release cylinder to accumulator tube x Clutch release cylinder	ithout	1	158	11
	ith	14	14	11
Clutch release cylinder to accumulator tube x Clutch accumulator	ithout	1	158	11
	ith	14	14	11
Clutch release cylinder to flexible hose tube x Clutch accumulator	ithout	15	155	11
	ith	14	144	10
Clutch accumulator x ransmission		1	1 0	9
Clutch cover assembly x ly heel for 1 R		19	195	14
Clutch cover assembly x ly heel for 1VD		39	400	29
Release fork support x ransmission housing		4	480	35

TRANSMISSION ASE OIL SEAL

transmission case oil seal	15.4 to 16.2 mm (0.607 to 0.637 in.)

MANUAL TRANSMISSION UNIT

No. 3 transmission clutch hub shaft snap ring clearance		0.1 mm (0.0039 in.) or less
No. 3 transmission clutch hub shaft snap ring thickness	A	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	B	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	C	2.50 to 2.55 mm (0.0984 to 0.100 in.)
	D	2.55 to 2.60 mm (0.100 to 0.102 in.)
	E	2.60 to 2.65 mm (0.102 to 0.104 in.)
	F	2.65 to 2.70 mm (0.104 to 0.106 in.)
Reverse gear thrust clearance	Standard	0.15 to 0.52 mm (.0.00591 to 0.0204 in.)
Intermediate plate straight pin		7.0 to 9.0 mm (.0.276 to 0.354 in.)
Transfer adapter straight pin	Upper side	4.0 to 6.0 mm (.0.158 to 0.236 in.)
	Front side	9.0 to 11.0 mm (.0.355 to 0.433 in.)
Transfer adapter ring pin		4.0 to 6.0 mm (.0.157 to 0.236 in.)

IN UT SHAFT

No. 2 synchronizer ring clearance	Standard	0.08 to 0.16 mm (0.0315 to 0.0629 in.)
	Minimum	0.08 mm (0.0315 in.)
Front bearing shaft snap ring clearance		0.10 mm (0.00393 in.) or less
Front bearing shaft snap ring thickness	A	2.50 to 2.55 mm (0.0984 to 0.100 in.)
	B	2.55 to 2.60 mm (0.100 to 0.102 in.)
	C	2.60 to 2.65 mm (0.102 to 0.104 in.)
	D	2.65 to 2.70 mm (0.104 to 0.106 in.)
	E	2.70 to 2.75 mm (0.106 to 0.108 in.)
	F	2.75 to 2.80 mm (0.108 to 0.110 in.)

OUT UT SHAFT

3rd gear thrust clearance		0.10 to 0.45 mm (0.00394 to 0.0177 in.)
5th gear thrust clearance		0.10 to 0.35 mm (0.00394 to 0.0137 in.)
2nd gear thrust clearance		0.10 to 0.35 mm (0.00394 to 0.0137 in.)
1st gear thrust clearance		0.10 to 0.45 mm (0.00394 to 0.0177 in.)
3rd gear radial clearance		0.020 to 0.073 mm (0.000788 to 0.00287 in.)
5th gear radial clearance		0.015 too 0.068 mm (0.000591 to 0.00267 in.)
2nd gear radial clearance		0.015 too 0.068 mm (0.000591 to 0.00267 in.)
1st gear radial clearance		0.020 to 0.073 mm (0.000788 to 0.00287 in.)
Output shaft runout	Maximum	0.03 mm (0.00118 in.)
Output shaft outer diameter	Standard: Part A	37.979 to 37.995 mm (1.4952 to 1.4959 in.)
	Standard: Part B	45.984 to 46.000 mm (1.8104 to 1.8110 in.)
	Standard: Part C	57.984 to 58.000 mm (2.2828 to 2.2835 in.)
	Standard: Part D	49.979 to 49.995 mm (1.9677 to 1.9683 in.)
	Minimum: Part A	37.979 mm (1.4952 in.)
	Minimum: Part B	45.984 mm (1.8104 in.)
	Minimum: Part C	57.984 mm (2.2828 in.)
	Minimum: Part D	49.979 mm (1.9677 in.)
3rd gear inner diameter	Standard	44.015 to 44.040 mm (1.733 to 1.734 in.)
	Maximum	44.040 mm (1.734 in.)
5th gear inner diameter	Standard	53.015 to 53.040 mm (2.087 to 2.088 in.)
	Maximum	53.040 mm (2.088 in.)
2nd gear inner diameter	Standard	65.015 to 65.040 mm (2.560 to 2.561in.)
	Maximum	65.040 mm (2.561in.)
1st gear inner diameter	Standard	57.015 to 57.040 mm (2.2447 to 2.2457 in.)

	Maximum	57.040 mm (2.2457 in.)
No. 3 synchronizer ring (For 3rd gear) clearance	Standard	1.15 to 2.05 mm (0.0453 to 0.0807 in.)
	Minimum	1.15 mm (0.0453 in.)
No. 3 synchronizer ring (For 5th gear) clearance	Standard	0.80 to 1.60 mm (0.0315 to 0.0629 in.)
	Minimum	0.80 mm (0.0315 in.)
No. 2 synchronizer ring (For 2nd gear) clearance	Standard	1.23 to 2.13 mm (0.0485 to 0.0838 in.)
	Minimum	1.23 mm (0.0485 in.)
No. 1 synchronizer ring (For 1st gear) clearance	Standard	1.25 to 2.15 mm (0.0493 to 0.0846 in.)
	Minimum	1.25 mm (0.0493 in.)
No. 3 transmission clutch hub shaft snap ring clearance		0.10 mm (0.00393 in.) or less
No. 3 transmission clutch hub shaft snap ring thickness	A	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	B	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	C	2.50 to 2.55 mm (0.0984 to 0.100 in.)
	D	2.55 to 2.60 mm (0.100 to 0.102 in.)
	E	2.60 to 2.65 mm (0.102 to 0.104 in.)
	F	2.65 to 2.70 mm (0.104 to 0.106 in.)
No. 2 clutch hub setting shaft snap ring clearance		0.10 mm (0.00393 in.) or less
No. 2 clutch hub setting shaft snap ring thickness	4	1.90 to 1.95 mm (0.0748 to 0.0768 in.)
	5	1.95 to 2.00 mm (0.0768 to 0.0787 in.)
	6	2.00 to 2.05 mm (0.0787 to 0.0807 in.)
	7	2.05 to 2.10 mm (0.0807 to 0.0827 in.)
	8	2.10 to 2.15 mm (0.0827 to 0.0847 in.)
	9	2.15 to 2.20 mm (0.0847 to 0.0866 in.)
No. 1 clutch hub shaft snap ring clearance		0.10 mm (0.00393 in.) or less
No. 1 clutch hub shaft snap ring thickness	A	2.90 to 2.95 mm (0.114 to 0.116 in.)
	B	2.95 to 3.00 mm (0.116 to 0.118 in.)
	C	3.00 to 3.05 mm (0.118 to 0.120 in.)
	D	3.05 to 3.10 mm (0.120 to 0.122 in.)
	E	3.10 to 3.15 mm (0.122 to 0.124 in.)
	F	3.15 to 3.20 mm (0.124 to 0.126 in.)
Reverse gear snap ring clearance		0.10 mm (0.00393 in.) or less
Reverse gear snap ring thickness	A	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	B	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	C	2.50 to 2.55 mm (0.0984 to 0.100 in.)
	D	2.55 to 2.60 mm (0.100 to 0.102 in.)
	E	2.60 to 2.65 mm (0.102 to 0.104 in.)
	F	2.65 to 2.70 mm (0.104 to 0.106 in.)
	G	2.70 to 2.75 mm (0.106 to 0.108 in.)
	H	2.75 to 2.80 mm (0.108 to 0.110 in.)

OUNTER EAR AN REVERSE I LER EAR

Counter gear journal outer diameter	Standard	35.957 to 35.970 mm (1.41562 to 1.41613 in.)
	Minimum	35.957 mm (1.41562 in.)
Counter gear runout	Maximum	0.03 mm (0.00118 in.)
Reverse idler gear radial clearance	Standard	0.015 to 0.059 mm (0.000591 to 0.0232 in.)
	Maximum	0.059 mm (0.0232 in.)
Front No. 1 counter gear bearing snap ring clearance		0.1 mm (0.00393 in.) or less
Front No. 1 counter gear bearing snap ring thickness	A	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	B	2.50 to 2.55 mm (0.0984 to 0.100 in.)
	C	2.55 to 2.60 mm (0.100 to 0.102 in.)
	D	2.60 to 2.65 mm (0.102 to 0.104 in.)
	E	2.65 to 2.70 mm (0.104 to 0.106 in.)
	F	2.70 to 2.75 mm (0.106 to 0.108 in.)

OIL UM

Tip clearance	Standard	0.10 to 0.22 mm (0.00394 to 0.00866 in.)
	Maximum	0.22 mm (0.00866 in.)

Body clearance	Standard	0.075 to 0.170 mm (0.00296 to 0.00669 in.)
	Maximum	0.170 mm (0.00669 in.)

Part tightened	N*m	kgf*cm	ft.*lbf
Back-up light switch x Manual transmission assembly	44	450	33
Engine (1GR-FE) x Manual transmission assembly Bolt A	72	730	53
Engine (1GR-FE) x Manual transmission assembly Bolt B	37	380	28
Engine (1VD-FTV) x Manual transmission assembly Bolt A,B	72	730	53
Engine (1VD-FTV) x Manual transmission assembly Bolt C	39	400	29
Oil pan cover x Manual transmission assembly	21	214	15
Clutch release cylinder to flexible hose tube x Manual transmission assembly	20	204	15
Clutch release cylinder x Manual transmission assembly	12	120	9
Rear No. 1 engine mounting insulator x Manual transmission assembly	59	602	44
No. 2 frame crossmember sub-assembly set bolt	37	377	27
Transfer assembly x Lower transfer case protector	14	139	10
Transfer assembly x Transfer dynamic damper	12	122	9
Output shaft rear bearing retainer x Intermediate plate	18	185	13
No. 2 gear shift fork shaft x No. 2 gear shift fork	46	472	34
No. 1 gear shift fork shaft x No. 2 gear shift fork	46	472	34
No. 3 gear shift fork shaft x No. 3 gear shift fork	46	472	34
No. 4 gear shift fork shaft x Reverse gear shift fork	34	350	25
Manual transmission case receiver x Intermediate shaft	18	185	13
No. 1 oil receiver pipe x Transmission case	12	120	9
Manual transmission oil strainer x Transfer adapter	12	120	9
Transmission case x Transfer adapter	37	380	27
Front bearing retainer x Transmission case	17	170	12
Transmission oil pump cover x Transfer adapter	17	170	12
Floor shift control shift lever retainer x Transfer adapter	17	170	12
Control shaft cover x Manual transmission	17	170	12
Shift position switch x Manual transmission	44	450	33

Input shaft

Input shaft snap ring thickness	C	2.13 to 2.18 mm (0.0839 to 0.0858 in.)
	D	2.18 to 2.23 mm (0.0858 to 0.0878 in.)
	E	2.23 to 2.28 mm (0.0878 to 0.0898 in.)
	F	2.28 to 2.33 mm (0.0898 to 0.0917 in.)
	G	2.33 to 2.38 mm (0.0917 to 0.0937 in.)
	H	2.38 to 2.43 mm (0.0937 to 0.0957 in.)
	J	2.43 to 2.48 mm (0.0957 to 0.0976 in.)
Input shaft journal outer diameter	Minimum	68 mm (2.68 in.)
Input shaft bushing inside diameter	Maximum	46 mm (1.81 in.)

Rear output shaft

Rear output shaft journal outer diameter	Part A Minimum	38 mm (1.50 in.)
	Part B Minimum	42 mm (1.65 in.)
	Part C Minimum	49 mm (1.93 in.)
No. 1 transfer gear shift fork to clutch sleeve	clearance Maximum	0.8 mm (0.0315 in.)
No. 2 transfer gear shift fork to clutch sleeve	clearance Maximum	3.15 mm (0.124 in.)

Planetary gear

Pinion gear thrust clearance	Standard	0.11 to 0.85 mm (0.00434 to 0.0334 in.)
	Maximum	0.85 mm (0.0334 in.)
Pinion gear radial clearance	Standard	0.01 to 0.04 mm (0.000434 to 0.00150 in.)
	Maximum	0.04 mm (0.00150 in.)

Synchronizer ring

No. 1 synchronizer ring to input shaft	Standard	0.86 to 1.54 mm (0.0339 to 0.0606 in.)
	Minimum	0.86 mm (0.0339 in.)

Part Tightened	N*m	kgf*cm	ft.*lbf
Transfer heat insulator x Transfer	30	306	22
Lower transfer case protector x Transfer	14	139	10
Transfer oil pump plate x Transfer case plug	29	300	22
Transfer oil pump plate x Front transfer case	12	117	9
Transfer case plug x Front transfer case	37	377	27
Transfer case plug x Front transfer case	39	400	29
No. 1 transfer case plug x Front transfer case	19	190	14
Filler plug x Front transfer case	37	377	27
Drain plug x Front transfer case	37	377	27
Companion flange lock nut x Driven sprocket	127	1299	94
Companion flange lock nut x Rear transfer output shaft	127	1299	94
Heat insulator bracket x Transfer	20	204	15
No. 1 transfer gear shift fork x Transfer shift actuator assembly	24	245	18
No. 2 transfer gear shift fork x Transfer shift actuator assembly	24	245	18
Rear transfer case x Transfer shift actuator assembly	20	204	15
Front transfer case x Rear transfer case	28	286	21
Four wheel drive control ECU x Body	13	127	9

Drive shaft

Standard drive shaft length	583 mm (1.91 ft.)

Front propeller shaft

Propeller shaft runout	Maximum	0.8 mm (0.031 in.)
Bearing axial play	Maximum	0 mm (0 in.)
Snap ring thickness	J	2.18 to 2.20 mm (0.0858 to 0.0866 in.)
	K	2.20 to 2.22 mm (0.0866 to 0.0874 in.)
	F	2.22 to 2.24 mm (0.0874 to 0.0882 in.)
	G	2.24 to 2.26 mm (0.0882 to 0.0890 in.)
	H	2.26 to 2.28 mm (0.0890 to 0.0898 in.)
	1	2.28 to 2.30 mm (0.0898 to 0.0906 in.)
	2	2.30 to 2.32 mm (0.0906 to 0.0913 in.)
	-	2.32 to 2.34 mm (0.0913 to 0.0921 in.)
	Brown	2.34 to 2.36 mm (0.0921 to 0.0929 in.)
	Blue	2.36 to 2.38 mm (0.0929 to 0.0937 in.)
	6	2.38 to 2.40 mm (0.0937 to 0.0945 in.)
	7	2.40 to 2.42 mm (0.0945 to 0.0953 in.)
	8	2.42 to 2.44 mm (0.0953 to 0.0961 in.)
	九	2.44 to 2.46 mm (0.0961 to 0.0969 in.)
	10	2.46 to 2.48 mm (0.0969 to 0.0976 in.)
	A	2.48 to 2.50 mm (0.0976 to 0.0984 in.)
	B	2.50 to 2.52 mm (0.0984 to 0.0992 in.)
	C	2.52 to 2.54 mm (0.0992 to 0.1000 in.)
	D	2.54 to 2.56 mm (0.1000 to 0.1008 in.)
	E	2.56 to 2.58 mm (0.1008 to 0.1016 in.)

Rear propeller shaft

Propeller shaft runout	Maximum	0.8 mm (0.031 in.)
Bearing axial play	Maximum	0 mm (0 in.)
Snap ring thickness	J	2.18 to 2.20 mm (0.0858 to 0.0866 in.)
	K	2.20 to 2.22 mm (0.0866 to 0.0874 in.)
	F	2.22 to 2.24 mm (0.0874 to 0.0882 in.)
	G	2.24 to 2.26 mm (0.0882 to 0.0890 in.)
	H	2.26 to 2.28 mm (0.0890 to 0.0898 in.)
	1	2.28 to 2.30 mm (0.0898 to 0.0906 in.)
	2	2.30 to 2.32 mm (0.0906 to 0.0913 in.)
	-	2.32 to 2.34 mm (0.0913 to 0.0921 in.)
	Brown	2.34 to 2.36 mm (0.0921 to 0.0929 in.)
	Blue	2.36 to 2.38 mm (0.0929 to 0.0937 in.)
	6	2.38 to 2.40 mm (0.0937 to 0.0945 in.)
	7	2.40 to 2.42 mm (0.0945 to 0.0953 in.)
	8	2.42 to 2.44 mm (0.0953 to 0.0961 in.)
	九	2.44 to 2.46 mm (0.0961 to 0.0969 in.)
	10	2.46 to 2.48 mm (0.0969 to 0.0976 in.)
	A	2.48 to 2.50 mm (0.0976 to 0.0984 in.)
	B	2.50 to 2.52 mm (0.0984 to 0.0992 in.)
	C	2.52 to 2.54 mm (0.0992 to 0.1000 in.)
	D	2.54 to 2.56 mm (0.1000 to 0.1008 in.)

	E	2.56 to 2.58 mm (0.1008 to 0.1016 in.)

Dri s

Part Tightened	N*m	kgf*cm	ft.*lbf
Drive shaft assembly x Steering knuckle	340	3467	251

Front prope er s

Part Tightened	N*m	kgf*cm	ft.*lbf
Pr eller shaft heat insulat r x B dy	40	408	30
Fr tpr eller shaft x Fr tdifferential carrier assembly	88	900	65
Fr tpr eller shaft x Transfer assembly	88	900	65

Rear prope er s

Part Tightened	N*m	kgf*cm	ft.*lbf
Transfer heat insulat r x Transfer assembly	30	302	22
Rear pr eller shaft x Transfer assembly	88	900	65
Rear pr eller shaft x Rear differential carrier assembly	88	900	65

Front axle hub

Axle hub bearing looseness	Maximum	0.05 mm (0.00197 in.)
Axle hub runout	Maximum	0.08 mm (0.00315 in.)

Front differential (for standard)

Companion flange runout	Vertical	Maximum: 0.10 mm (0.00394 in.)
	Lateral	
Drive pinion preload (at starting)	New bearing	3.0 to 3.5 N*m (31 to 35 kgf*cm, 27 to 50 in.*lbf)
	Reused bearing	2.1 to 2.5 N*m (22 to 24 kgf*cm, 19 to 21 in.*lbf)
Total preload (at starting)	New bearing	Drive pinion preload plus 1.6 to 2.4 N*m (17 to 24 kgf*cm, 15 to 21 in.*lbf)
	Reused bearing	Drive pinion preload plus 1.3 to 2.1 N*m (14 to 21 kgf*cm, 12 to 18 in.*lbf)
Drive pinion to ring gear backlash		0.17 to 0.27 mm (0.00670 to 0.01064 in.)
Side gear backlash		0 to 0.15 mm (0 to 0.00591 in.)
Front oil seal drive in depth		5.6 to 6.6 mm (0.221 to 0.259 in.)
Side oil seal drive in depth	LH side	-0.45 to 0.45 mm (-0.0177 to 0.0177 in.)
	RH side	4.8 to 5.8 mm (0.189 to 0.228 in.)
Differential carrier straight pin in height		9.5 to 10.0 mm (0.374 to 0.394 in.)
Side gear thrust washer thickness		1.43 to 1.47 mm (0.0563 to 0.0579 in.)
		1.48 to 1.52 mm (0.0583 to 0.0598 in.)
		1.53 to 1.57 mm (0.0602 to 0.0618 in.)
		1.58 to 1.62 mm (0.0622 to 0.0638 in.)
		1.63 to 1.67 mm (0.0642 to 0.0657 in.)
		1.68 to 1.72 mm (0.0661 to 0.0677 in.)
		1.73 to 1.77 mm (0.0681 to 0.0697 in.)
		1.78 to 1.82 mm (0.0701 to 0.0717 in.)
		1.83 to 1.87 mm (0.0720 to 0.0736 in.)
Plate washer thickness		1.49 to 1.51 mm (0.0587 to 0.0594 in.)
		1.51 to 1.53 mm (0.0594 to 0.0602 in.)
		1.53 to 1.55 mm (0.0602 to 0.0610 in.)
		1.55 to 1.57 mm (0.0610 to 0.0618 in.)
		1.57 to 1.59 mm (0.0618 to 0.0626 in.)
		1.59 to 1.61 mm (0.0626 to 0.0634 in.)
		1.61 to 1.63 mm (0.0634 to 0.0642 in.)
		1.63 to 1.65 mm (0.0642 to 0.0650 in.)
		1.65 to 1.67 mm (0.0650 to 0.0657 in.)
		1.67 to 1.69 mm (0.0657 to 0.0665 in.)
		1.69 to 1.71 mm (0.0665 to 0.0673 in.)
		1.71 to 1.73 mm (0.0673 to 0.0681 in.)
		1.73 to 1.75 mm (0.0681 to 0.0689 in.)
		1.75 to 1.77 mm (0.0689 to 0.0697 in.)
		1.77 to 1.79 mm (0.0697 to 0.0705 in.)
		1.79 to 1.81 mm (0.0705 to 0.0713 in.)
		1.81 to 1.83 mm (0.0713 to 0.0720 in.)
		1.83 to 1.85 mm (0.0720 to 0.0728 in.)
		1.85 to 1.87 mm (0.0728 to 0.0736 in.)
		1.87 to 1.89 mm (0.0736 to 0.0744 in.)
		1.89 to 1.91 mm (0.0744 to 0.0752 in.)
		1.91 to 1.93 mm (0.0752 to 0.0760 in.)
		1.93 to 1.95 mm (0.0760 to 0.0768 in.)
		1.95 to 1.97 mm (0.0768 to 0.0776 in.)
		1.97 to 1.99 mm (0.0776 to 0.0783 in.)
		1.99 to 2.01 mm (0.0783 to 0.0791 in.)

	.01 to 2.03 mm (0.0791 to 0.0799 in.)
	2.03 to 2.05 mm (0.0799 to 0.0807 in.)
	2.05 to 2.07 mm (0.0807 to 0.0815 in.)
	2.07 to 2.09 mm (0.0815 to 0.0823 in.)
	2.09 to 2.11 mm (0.0823 to 0.0831 in.)
	2.11 to 2.13 mm (0.0831 to 0.0839 in.)
	2.13 to 2.15 mm (0.0839 to 0.0846 in.)
	2.15 to 2.17 mm (0.0846 to 0.0854 in.)
	2.17 to 2.19 mm (0.0854 to 0.0862 in.)
	2.19 to 2.21 mm (0.0862 to 0.0870 in.)
	2.21 to 2.23 mm (0.0870 to 0.0878 in.)
	2.23 to 2.25 mm (0.0878 to 0.0886 in.)
	2.25 to 2.27 mm (0.0886 to 0.0894 in.)
	2.27 to 2.29 mm (0.0894 to 0.0902 in.)
	2.29 to 2.31 mm (0.0902 to 0.0909 in.)
	2.31 to 2.33 mm (0.0909 to 0.0917 in.)
	2.33 to 2.35 mm (0.0917 to 0.0925 in.)
Drive pinion washer thickness	1.815 to 1.835 mm (0.0715 to 0.0722 in.)
	1.840 to 1.860 mm (0.0724 to 0.0732 in.)
	1.865 to 1.885 mm (0.0734 to 0.0742 in.)
	1.890 to 1.910 mm (0.0744 to 0.0752 in.)
	1.915 to 1.935 mm (0.0754 to 0.0762 in.)
	1.940 to 1.960 mm (0.0764 to 0.0772 in.)
	1.965 to 1.985 mm (0.0774 to 0.0781 in.)
	1.990 to 2.010 mm (0.0783 to 0.0791 in.)
	2.015 to 2.035 mm (0.0793 to 0.0801 in.)
	2.040 to 2.060 mm (0.0803 to 0.0811 in.)
	2.065 to 2.085 mm (0.0813 to 0.0821 in.)
	2.090 to 2.110 mm (0.0823 to 0.0831 in.)
	2.115 to 2.135 mm (0.0793 to 0.0841 in.)
	2.140 to 2.160 mm (0.0843 to 0.0850 in.)
	2.165 to 2.185 mm (0.0852 to 0.0860 in.)
	2.190 to 2.210 mm (0.0862 to 0.0870 in.)
	2.215 to 2.235 mm (0.0872 to 0.0870 in.)
	2.240 to 2.260 mm (0.0882 to 0.0890 in.)
	2.265 to 2.285 mm (0.0892 to 0.0900 in.)

Rear differential (for Standard)

Companion flange runout	Vertical	Maximum: 0.10 mm (0.00394 in.)
	Lateral	
Ring gear runout		Maximum: 0.05 mm (0.00197 in.)
Drive pinion to ring gear backlash		0.10 to 0.20 mm (0.00394 to 0.00787 in.)
Drive pinion preload (at starting)	New bearing	1.0 to 1.7 N*m (11 to 17 kgf*cm, 10 to 14 in.*lbf)
	Reused bearing	0.9 to 1.4 N*m (9 to 13 kgf*cm, 8 to 12 in.*lbf)
Total preload (at starting)		Drive pinion preload plus 0.4 to 0.6 N*m (4 to 6 kgf*cm, 4 to 5 in.*lbf)
Differential case runout		Maximum: 0.04 mm (0.00157 in.)
Side gear backlash		0.02 to 0.15 mm (0.00787 to 0.00591 in.)
Adjusting shim thickness		1.53 to 1.57 mm (0.0602 to 0.0618 in.)
		1.58 to 1.62 mm (0.0622 to 0.0638 in.)
		1.63 to 1.67 mm (0.0642 to 0.0657 in.)
		1.68 to 1.72 mm (0.0661 to 0.0677 in.)
		1.73 to 1.77 mm (0.0681 to 0.0697 in.)
		1.78 to 1.82 mm (0.0701 to 0.0171 in.)
		1.83 to 1.87 mm (0.0720 to 0.0736 in.)
		1.88 to 1.92 mm (0.0740 to 0.0756 in.)
		1.93 to 1.97 mm (0.0760 to 0.0776 in.)

	.03 to 2.07 mm (0.0799 to 0.0815 in.)
	2.08 to 2.12 mm (0.0820 to 0.0835 in.)
Plate washer thickness	1.04 to 1.06 mm (0.0409 to 0.0417 in.)
	1.065 to 1.085 mm (0.0420 to 0.0427 in.)
	1.09 to 1.11 mm (0.0419 to 0.0437 in.)
	1.115 to 1.135 mm (0.0439 to 0.0447 in.)
	1.14 to 1.16 mm (0.0449 to 0.0457 in.)
	1.165 to 1.185 mm (0.0459 to 0.0467 in.)
	1.19 to 1.21 mm (0.0469 to 0.0476 in.)
	1.215 to 1.235 mm (0.0478 to 0.0486 in.)
	1.24 to 1.26 mm (0.0488 to 0.0496 in.)
	1.265 to 1.285 mm (0.0498 to 0.0506 in.)
	1.29 to 1.31 mm (0.0508 to 0.0516 in.)
	1.315 to 1.335 mm (0.0518 to 0.0526 in.)
	1.34 to 1.36 mm (0.0528 to 0.0535 in.)
	1.365 to 1.385 mm (0.0537 to 0.0545 in.)
	1.39 to 1.41 mm (0.0547 to 0.0555 in.)
	1.415 to 1.435 mm (0.0558 to 0.0565 in.)
	1.44 to 1.46 mm (0.0567 to 0.0575 in.)
	1.465 to 1.485 mm (0.0577 to 0.0585 in.)
	1.49 to 1.51 mm (0.0587 to 0.0595 in.)
	1.515 to 1.535 mm (0.0597 to 0.0605 in.)
	1.54 to 1.56 mm (0.0607 to 0.0615 in.)

Rear differential (w/ LSD)

Companion flange runout	Vertical	Maximum: 0.10 mm (0.00394 in.)
	Lateral	
Ring gear runout		Maximum: 0.05 mm (0.00197 in.)
Drive pinion to ring gear backlash		0.10 to 0.20 mm (0.00394 to 0.00787 in.)
Drive pinion preload (at starting)	New bearing	1.0 to 1.7 N*m (11 to 17 kgf*cm, 10 to 14 in.*lbf)
	Reused bearing	0.9 to 1.4 N*m (9 to 13 kgf*cm, 8 to 12 in.*lbf)
Total preload (at starting)		Drive pinion preload plus 0.4 to 0.6 N*m (4 to 6 kgf*cm, 4 to 5 in.*lbf)
Differential case runout		Maximum: 0.04 mm (0.00157 in.)
Side gear thrust washer thickness (reference)		1.97 to 2.06 mm (0.0776 to 0.0811 in.)
Clutch plate thickness (reference)		1.97 to 2.03 mm (0.0776 to 0.0799 in.)
Compression spring length (reference)		32.8 mm (1.29134 in.)
Differential carrier oil seal depth		0.05 to 0.95 mm (0.00197 to 0.0374 in.)
Side gear backlash		0.02 to 0.15 mm (0.00787 to 0.00591 in.)
Adjusting shim thickness		1.53 to 1.57 mm (0.0602 to 0.0618 in.)
		1.58 to 1.62 mm (0.0622 to 0.0638 in.)
		1.63 to 1.67 mm (0.0642 to 0.0657 in.)
		1.68 to 1.72 mm (0.0661 to 0.0677 in.)
		1.73 to 1.77 mm (0.0681 to 0.0697 in.)
		1.78 to 1.82 mm (0.0701 to 0.0171 in.)
		1.83 to 1.87 mm (0.0720 to 0.0736 in.)
		1.88 to 1.92 mm (0.0740 to 0.0756 in.)
		1.93 to 1.97 mm (0.0760 to 0.0776 in.)
		1.04 to 1.06 mm (0.0409 to 0.0417 in.)
		1.065 to 1.085 mm (0.0420 to 0.0427 in.)
		1.09 to 1.11 mm (0.0419 to 0.0437 in.)
		1.115 to 1.135 mm (0.0439 to 0.0447 in.)
		1.14 to 1.16 mm (0.0449 to 0.0457 in.)
		1.165 to 1.185 mm (0.0459 to 0.0467 in.)
		1.19 to 1.21 mm (0.0469 to 0.0476 in.)
		1.215 to 1.235 mm (0.0478 to 0.0486 in.)
		1.24 to 1.26 mm (0.0488 to 0.0496 in.)

late washer thickness	1.265 to 1.285 mm (0.0498 to 0.0506 in.)
	1.29 to 1.31 mm (0.0508 to 0.0516 in.)
	1.315 to 1.335 mm (0.0518 to 0.0526 in.)
	1.34 to 1.36 mm (0.0528 to 0.0535 in.)
	1.365 to 1.385 mm (0.0537 to 0.0545 in.)
	1.39 to 1.41 mm (0.0547 to 0.0555 in.)
	1.415 to 1.435 mm (0.0558 to 0.0565 in.)
	1.44 to 1.46 mm (0.0567 to 0.0575 in.)
	1.465 to 1.485 mm (0.0577 to 0.0585 in.)
	1.49 to 1.51 mm (0.0587 to 0.0595 in.)
	1.515 to 1.535 mm (0.0597 to 0.0605 in.)
	1.54 to 1.56 mm (0.0607 to 0.0615 in.)

Rear differential (w/ Differential Lock)

Companion flange runout	Vertical	Maximum: 0.10 mm (0.00394 in.)
	Lateral	
Ring gear runout		Maximum: 0.05 mm (0.00197 in.)
Drive pinion to ring gear backlash		0.10 to 0.20 mm (0.00394 to 0.00787 in.)
Drive pinion preload (at starting)	New bearing	1.0 to 1.7 N*m (11 to 17 kgf*cm, 10 to 14 in.*lbf)
	Reused bearing	0.9 to 1.4 N*m (9 to 13 kgf*cm, 8 to 12 in.*lbf)
Total preload (at starting)		Drive pinion preload plus 0.29 to 0.49 N*m (3 to 5 kgf*cm, 3 to 4 in.*lbf)
Differential case runout		Maximum: 0.04 mm (0.00157 in.)
Side gear backlash		0.02 to 0.15 mm (0.00787 to 0.00591 in.)
Differential carrier oil seal depth		0.05 to 0.95 mm (0.00197 to 0.0374 in.)
Thrust washer thickness		1.53 to 1.57 mm (0.0602 to 0.0618 in.)
		1.58 to 1.62 mm (0.0622 to 0.0638 in.)
		1.63 to 1.67 mm (0.0642 to 0.0657 in.)
		1.68 to 1.72 mm (0.0661 to 0.0677 in.)
		1.73 to 1.77 mm (0.0681 to 0.0697 in.)
		1.78 to 1.82 mm (0.0701 to 0.0171 in.)
		1.83 to 1.87 mm (0.0720 to 0.0736 in.)
		1.88 to 1.92 mm (0.0740 to 0.0756 in.)
		1.93 to 1.97 mm (0.0760 to 0.0776 in.)
		1.98 to 2.02 mm (0.0780 to 0.0795 in.)
		2.03 to 2.07 mm (0.0799 to 0.0815 in.)
		2.08 to 2.12 mm (0.0820 to 0.0835 in.)
Side plate washer thickness	01	2.66 to 2.68 mm (0.1048 to 0.1056 in.)
	02	2.69 to 2.71 mm (0.1060 to 0.1068 in.)
	03	2.72 to 2.74 mm (0.1072 to 0.1080 in.)
	04	2.75 to 2.77 mm (0.1084 to 0.1091 in.)
	05	2.78 to 2.80 mm (0.1095 to 0.1103 in.)
	06	2.81 to 2.83 mm (0.1107 to 0.1115 in.)
	07	2.84 to 2.86 mm (0.1119 to 0.1127 in.)
	08	2.87 to 2.89 mm (0.1131 to 0.1139 in.)
	09	2.90 to 2.92 mm (0.1143 to 0.1150 in.)
	10	2.93 to 2.95 mm (0.1154 to 0.1162 in.)
	11	2.96 to 2.98 mm (0.1166 to 0.1174 in.)
	12	2.99 to 3.01 mm (0.1178 to 0.1186 in.)
	13	3.02 to 3.04 mm (0.1190 to 0.1198 in.)
	14	3.05 to 3.07 mm (0.1202 to 0.1210 in.)
	15	3.08 to 3.10 mm (0.1212 to 0.1220 in.)
	16	3.11 to 3.13 mm (0.1225 to 0.1233 in.)
	17	3.14 to 3.16 mm (0.1237 to 0.1245 in.)
	18	3.17 to 3.19 mm (0.1249 to 0.1257 in.)
	19	3.20 to 3.22 mm (0.1261 to 0.1269 in.)
	20	3.23 to 3.25 mm (0.1273 to 0.1281 in.)

	1	3.26 to 3.28 mm (0.1284 to 0.1292 in.)
	22	3.29 to 3.31 mm (0.1296 to 0.1304 in.)
	23	3.32 to 3.34 mm (0.1308 to 0.1316 in.)
Plate washer thickness		1.04 to 1.06 mm (0.0409 to 0.0417 in.)
		1.065 to 1.085 mm (0.0420 to 0.0427 in.)
		1.09 to 1.11 mm (0.0419 to 0.0437 in.)
		1.115 to 1.135 mm (0.0439 to 0.0447 in.)
		1.14 to 1.16 mm (0.0449 to 0.0457 in.)
		1.165 to 1.185 mm (0.0459 to 0.0467 in.)
		1.19 to 1.21 mm (0.0469 to 0.0476 in.)
		1.215 to 1.235 mm (0.0478 to 0.0486 in.)
		1.24 to 1.26 mm (0.0488 to 0.0496 in.)
		1.265 to 1.285 mm (0.0498 to 0.0506 in.)
		1.29 to 1.31 mm (0.0508 to 0.0516 in.)
		1.315 to 1.335 mm (0.0518 to 0.0526 in.)
		1.34 to 1.36 mm (0.0528 to 0.0535 in.)
		1.365 to 1.385 mm (0.0537 to 0.0545 in.)
		1.39 to 1.41 mm (0.0547 to 0.0555 in.)
		1.415 to 1.435 mm (0.0558 to 0.0565 in.)
		1.44 to 1.46 mm (0.0567 to 0.0575 in.)
		1.465 to 1.485 mm (0.0577 to 0.0585 in.)
		1.49 to 1.51 mm (0.0587 to 0.0595 in.)
		1.515 to 1.535 mm (0.0597 to 0.0605 in.)
		1.54 to 1.56 mm (0.0607 to 0.0615 in.)

Front axle hub

Part Tightened		N*m	kgf*cm	ft.*lbf
Front axle with ABS rotor bearing assembly x steering knuckle		99	1010	73
Front axle shaft nut x Front drive shaft	1 st:	200	2039	148
	2 nd:	340	3467	251
Steering knuckle x Front disc brake caliper		99	1010	73
Steering knuckle x Front disc brake caliper hose bracket	for bolt	31	316	23
	for nut	13	132	10

Steering knuckle

Part Tightened	N*m	kgf*cm	ft.*lbf
Front speed sensor x Steering knuckle	8.5	87	75 in.*lbf
Front speed sensor bracket x Steering knuckle	13	132	10
Steering knuckle x Upper arm	110	1122	81
Steering knuckle x Lower ball joint attachment	300	3059	221
Steering knuckle x Tie rod end	69	704	51

Rear axle shaft

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear axle shaft x housing	60	612	44
Parking cable x Axle housing	8.0	82	71 in.*lbf
Rear speed sensor x Rear axle hub and bearing assembly	8.3	85	73 in.*lbf
Stud bolt x Rear axle hub and bearing assembly	7.0	71	62 in.*lbf
Rear disc brake cylinder x Axle housing	95	969	70

Front differential

Part Tightened	N*m	kgf*cm	ft.*lbf
Front suspension rebound stopper sub-assembly x Chassis frame	58	591	43
Differential support assembly x Chassis frame	120	1224	89
Front differential front support assembly LH x Differential carrier assembly	155	1581	114
Differential support assembly x Differential extension flange tube	100	1020	74
Front differential rear support assembly x Differentia carrier	120	1224	89
Front differential breather plug oil deflector x Differential carrier	7.0	71	62 in.*lbf
Ring gear x Differential case	137	1397	101
Companion flange sub assembly x Differential drive pinion	451 or less	4599 or less	332 or less
Differential carrier x Differential extension flange tube	65	663	48
Differential carrier x Front differential cross shaft bearing retainer	65	663	48
Differential carrier x Front propeller shaft	88	900	65
Automatic disconnecting differential actuator x Differential tube	21	210	15
Front differential breather tube x Differential carrier	17	169	12
Drain plug	39	400	29
Filler plug	39	400	29

Rear differential (for Standard)

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear differential carrier assembly x Propeller shaft assembly	88	900	65
Rear differential carrier assembly x Rear axle carrier	72	734	53
Differential case x Ring gear	137	1397	101
Differential case RH x Differential case LH	47	479	35
Bearing cap x Rear differential bearing adjusting nut lock differential	13	133	10
Companion flange sub assembly x Differential drive pinion	441 or less	4497 or less	325 or less
Bearing cap x Differential carrier	90	918	66
Drain plug	49	500	36

Filler plug	49	500	36

Rear differential (for LSD)

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear differential carrier assembly x Propeller shaft assembly	88	900	65
Rear differential carrier assembly x Rear axle carrier	72	734	53
Differential case x Ring gear	137	1397	101
Differential case RH x Differential case LH	47	479	35
Bearing cap x Rear differential bearing adjusting nut lock differential	13	133	10
Companion flange sub assembly x Differential drive pinion	441 or less	4497 or less	325 or less
Bearing cap x Differential carrier	90	918	66
Drain plug	49	500	36
Filler plug	49	500	36

Rear differential (w/ Differential lock)

Part Tightened		N*m	kgf*cm	ft.*lbf
Rear differential carrier assembly x Propeller shaft assembly		88	900	65
Differential protector assembly x differential lock shift actuator		15	150	11
Differential lock shift actuator x Differential carrier		24	245	18
Rear differential lock actuator protector x Differential carrier		35	367	26
No. 1 transfer indicator switch x Rear differential lock cover	Use with out SST	40	408	30
	Use with SST	28	283	20
Rear differential lock cover x Differential carrier		18	184	13
Sift fork x Differential lock shift actuator		20	204	15
Rear differential carrier assembly x Rear axle carrier		72	734	53
Differential case x Ring gear		137	1397	101
Differential cover x Differential case		58	591	43
Companion flange sub assembly x Differential drive pinion		441 or less	4497 or less	325 or less
Bearing cap x Differential carrier		113	1152	83
Drain plug		49	500	36
Filler plug		49	500	36

Part tightened	N*m	kgf*cm	ft.*lbf
Height control pump and motor x Frame	31	316	23
Height control pump and motor x Rear No. 6 height control tube	14 (15)	143 (155)	10 (11)
Height control cap to reservoir hose x Height control tube clamp	20	204	15
Height control reservoir x Skid control motor	5.5	56	49 in.*lbf
Height control compressor bracket x Skid control motor	5.5	56	49 in.*lbf
Height control accumulator x Bleeder plug	6.9	70	61 in.*lbf
No. 5 height control tube x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 5 height control tube LH x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 6 height control tube x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 6 height control tube LH x No. 1 height control valve	14 (15)	143 (155)	10 (11)
Rear No. 4 height control tube x No. 1 height control valve	25	255	18
No. 5 height control tube x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 5 height control tube LH x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 6 height control tube x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 6 height control tube LH x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 1 height control valve x Active height control center unit	5.5	56	49
No. 1 height control valve x No. 7 height control tube	14 (15)	143 (155)	10 (11)
Suspension control pump accumulator x No. 7 height control tube	14 (15)	143 (155)	10 (11)
Height control unit insulator x Active height control center unit	31	316	23
Suspension control pump accumulator x Active height control center unit	31	316	23
No. 3 height control tube LH x Height control bracket with cylinder	50	510	37
No. 4 height control tube x Height control bracket with cylinder	50	510	37
No. 4 height control tube LH x Height control bracket with cylinder	50	510	37
No. 3 height control tube x Height control bracket with cylinder	50	510	37
Height control bracket with cylinder x Frame	31	316	23
Center suspension control cylinder x Height control cylinder bracket	31	316	23
Stabilizer control with accumulator housing x Bleeder plug	9.5	97	84 in.*lbf
Front stabilizer control cylinder x Bleeder plug	9.5	97	84 in.*lbf
Rear stabilizer control cylinder x Bleeder plug	9.5	97	84 in.*lbf
stabilizer control with accumulator housing x stabilizer control with accumulator housing shutter valve	14	143	10
Stabilizer control tube protector x Front stabilizer control cylinder	15	153	11
Rear stabilizer control tube insulator x Rear stabilizer control cylinder	18	184	13
Front No. 1 stabilizer control tube x Front No. 2 stabilizer control tube	40 (44)	408 (450)	30 (33)
Front No. 2 stabilizer control tube x Frame	29	296	21
Front No. 2 stabilizer control tube x Stabilizer control adapter	40 (44)	408 (450)	30 (33)
Stabilizer control adapter x Frame	32	326	24
Rear No. 1 stabilizer control tube x Stabilizer control adapter	40 (44)	408 (450)	30 (33)

Rear No. 1 stabilizer control tube x Stabilizer Control with Accumulator Housing		40 (44)	408 (450)	30 (33)
Rear No. 1 stabilizer control tube x Frame		29	296	21
Rear No. 2 stabilizer control tube x Stabilizer Control with Accumulator Housing		40 (44)	408 (450)	30 (33)
Stabilizer control valve protector x Frame		18	184	13
Stabilizer Control with Accumulator Housing x Frame		32	326	24
Oil nozzle valve x Stabilizer control adapter housing		12	122	9
Service valve cap x Oil nozzle valve		0.6	6.0	5.0 in.*lbf
Stabilizer control adapter housing x Stabilizer control adapter shutter valve		14	143	10
Height control cylinder bracket x Height control protector pipe		16	163	12
Height control protector pipe x Frame		31	316	23
Height control cylinder bracket x Frame		31	316	23
Front No. 1 suspension control accumulator x Frame		31	316	23
No. 1 height control tube x Front No. 1 suspension control accumulator		43	438	32
Front shock absorber control valve x No. 1 height control tube		40 (44)	408 (450)	30 (33)
No. 2 suspension control pressure hose x Front shock absorber control valve		50	510	37
Front shock absorber control valve x Frame		31	316	23
Front shock absorber control valve x Bleeder plug		8.3	85	73 in.*lbf
Front shock absorber control valve x No. 2 height control tube		40 (44)	408 (450)	30 (33)
Front shock absorber control valve x Front No. 2 suspension control accumulator		57	585	42
No. 2 height control tube x Frame		31	316	23
Front suspension control valve x Frame		31	316	23
Front suspension control valve x No. 2 height control tube		40 (44)	408 (450)	30 (33)
Front suspension control valve x Front No. 3 suspension control accumulator		150	1530	111
No. 4 height control tube x Rear shock absorber control valve		40 (44)	408 (450)	30 (33)
No. 4 suspension control pressure hose x Rear shock absorber control valve		50	510	37
Rear No. 2 suspension control accumulator bracket x Frame		31	316	23
Rear No. 1 suspension control accumulator bracket x Frame		31	316	23
Rear shock absorber control valve x Rear No. 2 suspension control accumulator bracket		18	184	13
Rear shock absorber control valve x Bleeder plug		8.3	85	73 in.*lbf
Rear shock absorber control valve x Rear suspension control accumulator		57	585	42
Rear shock absorber control valve x Rear No. 3 suspension control accumulator		150	1530	111
Front height control sensor x Frame	Bolt:	13	127	9
	Nut:	5.6	57	50 in.*lbf
Rear height control sensor x Frame	Bolt:	13	127	9
	Nut:	5.6	57	50 in.*lbf
Suspension control ECU x Body		8.0	82	71 in.*lbf
Rear side No. 2 air duct x Body		5.4	55	48 in.*lbf
Steering control ECU with junction block x Body	Bolt:	8.0	82	71 in.*lbf
	Nut:	8.0	82	71 in.*lbf
Acceleration sensor x Body		8.0	82	71 in.*lbf

(): For use without SST

Part tightened	N*m	kgf*cm	ft.*lbf
Height control pump and motor x Frame	31	316	23
Height control pump and motor x Rear No. 6 height control tube	14 (15)	143 (155)	10 (11)
Height control cap to reservoir hose x Height control tube clamp	20	204	15
Height control reservoir x Skid control motor	5.5	56	49 in.*lbf
Height control compressor bracket x Skid control motor	5.5	56	49 in.*lbf
Height control accumulator x Bleeder plug	6.9	70	61 in.*lbf
No. 5 height control tube x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 5 height control tube LH x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 6 height control tube x No. 1 height control valve	14 (15)	143 (155)	10 (11)
No. 6 height control tube LH x No. 1 height control valve	14 (15)	143 (155)	10 (11)
Rear No. 4 height control tube x No. 1 height control valve	25	255	18
No. 5 height control tube x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 5 height control tube LH x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 6 height control tube x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 6 height control tube LH x Center suspension control cylinder	14 (15)	143 (155)	10 (11)
No. 1 height control valve x Active height control center unit	5.5	56	49
No. 1 height control valve x No. 7 height control tube	14 (15)	143 (155)	10 (11)
Suspension control pump accumulator x No. 7 height control tube	14 (15)	143 (155)	10 (11)
Height control unit insulator x Active height control center unit	31	316	23
Suspension control pump accumulator x Active height control center unit	31	316	23
No. 3 height control tube LH x Height control bracket with cylinder	50	510	37
No. 4 height control tube x Height control bracket with cylinder	50	510	37
No. 4 height control tube LH x Height control bracket with cylinder	50	510	37
No. 3 height control tube x Height control bracket with cylinder	50	510	37
Height control bracket with cylinder x Frame	31	316	23
Center suspension control cylinder x Height control cylinder bracket	31	316	23
Stabilizer control with accumulator housing x Bleeder plug	8.3	85	73 in.*lbf
Front stabilizer control cylinder x Bleeder plug	8.3	85	73 in.*lbf
Rear stabilizer control cylinder x Bleeder plug	8.3	85	73 in.*lbf
stabilizer control with accumulator housing x stabilizer control with accumulator housing shutter valve	14	143	10
Stabilizer control tube protector x Front stabilizer control cylinder	15	153	11
Rear stabilizer control tube insulator x Rear stabilizer control cylinder	18	184	13
Front No. 1 stabilizer control tube x Front No. 2 stabilizer control tube	40 (44)	408 (450)	30 (33)
Front No. 2 stabilizer control tube x Frame	29	296	21
Front No. 2 stabilizer control tube x Stabilizer control adapter	40 (44)	408 (450)	30 (33)
Stabilizer control adapter x Frame	32	326	24
Rear No. 1 stabilizer control tube x Stabilizer control adapter	40 (44)	408 (450)	30 (33)

Rear No. 1 stabilizer control tube x Stabilizer Control with Accumulator Housing		40 (44)	408 (450)	30 (33)
Rear No. 1 stabilizer control tube x Frame		29	296	21
Rear No. 2 stabilizer control tube x Stabilizer Control with Accumulator Housing		40 (44)	408 (450)	30 (33)
Stabilizer control valve protector x Frame		18	184	13
Stabilizer Control with Accumulator Housing x Frame		32	326	24
Oil nozzle valve x Stabilizer control adapter housing		12	122	9
Service valve cap x Oil nozzle valve		0.6	6.0	5.0 in.*lbf
Stabilizer control adapter housing x Stabilizer control adapter shutter valve		14	143	10
Height control cylinder bracket x Height control protector pipe		16	163	12
Height control protector pipe x Frame		31	316	23
Height control cylinder bracket x Frame		31	316	23
Front No. 1 suspension control accumulator x Frame		31	316	23
No. 1 height control tube x Front No. 1 suspension control accumulator		43	438	32
Front shock absorber control valve x No. 1 height control tube		40 (44)	408 (450)	30 (33)
No. 2 suspension control pressure hose x Front shock absorber control valve		50	510	37
Front shock absorber control valve x Frame		31	316	23
Front shock absorber control valve x Bleeder plug		8.3	85	73 in.*lbf
Front shock absorber control valve x No. 2 height control tube		40 (44)	408 (450)	30 (33)
Front shock absorber control valve x Front No. 2 suspension control accumulator		57	585	42
No. 2 height control tube x Frame		31	316	23
Front suspension control valve x Frame		31	316	23
Front suspension control valve x No. 2 height control tube		40 (44)	408 (450)	30 (33)
Front suspension control valve x Front No. 3 suspension control accumulator		150	1530	111
No. 4 height control tube x Rear shock absorber control valve		40 (44)	408 (450)	30 (33)
No. 4 suspension control pressure hose x Rear shock absorber control valve		50	510	37
Rear No. 2 suspension control accumulator bracket x Frame		31	316	23
Rear No. 1 suspension control accumulator bracket x Frame		31	316	23
Rear shock absorber control valve x Rear No. 2 suspension control accumulator bracket		18	184	13
Rear shock absorber control valve x Bleeder plug		8.3	85	73 in.*lbf
Rear shock absorber control valve x Rear suspension control accumulator		57	585	42
Rear shock absorber control valve x Rear No. 3 suspension control accumulator		150	1530	111
Front height control sensor x Frame	Bolt:	13	127	9
	Nut:	5.6	57	50 in.*lbf
Rear height control sensor x Frame	Bolt:	13	127	9
	Nut:	5.6	57	50 in.*lbf
Suspension control ECU x Body		8.0	82	71 in.*lbf
Rear side No. 2 air duct x Body		5.4	55	48 in.*lbf
Steering control ECU with junction block x Body	Bolt:	8.0	82	71 in.*lbf
	Nut:	8.0	82	71 in.*lbf
Acceleration sensor x Body		8.0	82	71 in.*lbf

(): For use without SST

Standard Vehicle Height (Unloaded Vehicle)

Vehicle Model		Front A - B	Rear C - D
GRJ200L/R-GMMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L/R-GNMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L-GPMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200L-GNAEK		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L-GMMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNTEZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNTNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GPMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GMMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L-GNANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GNMNKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GPANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GPMNKV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200L-GNANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200L-GNAEKV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GNMNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GPMNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GNTNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200R-GNAEKQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200R-GNANKQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GNTEZQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GNTNZQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200L-GMAEKW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
UZJ200L/R-GNAEKW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
VDJ200L-GMTEZW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
VDJ200L/R-GNTEZW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
UZJ200L-GNAEKC	w/ KDSS	100.7 mm (3.96 in.)	55.6 mm (2.19 in.)
UZJ200L-GNANKC	Option Less	94.9 mm (3.74 in.)	66.2 mm (2.61 in.)
	Winch	96.3 mm (3.79 in.)	65.2 mm (2.57 in.)
	Full Option	98.1 mm (3.86 in.)	65.5 mm (2.58 in.)
GRJ200L-GNANKC	Option Less	92.3 mm (3.63 in.)	66.0 mm (2.60 in.)
	Winch	92.6 mm (3.65 in.)	64.8 mm (2.55 in.)
	Full Option	94.5 mm (3.72 in.)	65.1 mm (2.56 in.)
GRJ200L-GNMNKC	Option Less	90.9 mm (3.58 in.)	64.7 mm (2.55 in.)
	Winch	91.3 mm (3.59 in.)	63.5 mm (2.50 in.)
	Full Option	93.2 mm (3.67 in.)	64.7 mm (2.55 in.)

Standard Camber Inclination (Unloaded Vehicle)

Vehicle Model	Camber Inclination	
GRJ200L/R-GMMNK	Camber Left - right error	-0°10' +/-45' (-0.16° +/-0.75°) 45' (0.75°) or less
GRJ200L/R-GNMNK	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less

GRJ200L-GPMNK		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEK		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMMNZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNMNZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTNZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GPMNZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GMMNZ		Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPANKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNMNZV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GPMNZV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNTNZV		Camber Left - right error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNAEKQ	w/o Bull Bar	Camber Left - right error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNANKQ	w/o Bull Bar	Camber Left - right error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTEZQ	w/o Bull Bar	Camber Left - right error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTNZQ	w/o Bull Bar	Camber Left - right error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200L-GMAEKW	w/o Active Height Control	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Left - right error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
UZJ200L/R-GNAEKW	w/o Active Height Control	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Left - right error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMTEZW	w/o Active Height Control	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Left - right error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZW	w/o Active Height Control	Camber Left - right error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
		Camber	0°00' +/-45' (0.00° +/-0.75°)

	w/ Active Height Control	Left - right error	45' (0.75°) or less
UZJ200L-GNAEKC	w/ KDSS	Camber Left - right error	0°6' +/-45' (0.10° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKC	Option Less	Camber Left - right error	0°12' +/-45' (0.20° +/-0.75°) 45' (0.75°) or less
	Winch	Camber Left - right error	0°10' +/-45' (0.17° +/-0.75°) 45' (0.75°) or less
	Full Option	Camber Left - right error	0°8' +/-45' (0.13° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKC	Option Less	Camber Left - right error	0°15' +/-45' (0.25° +/-0.75°) 45' (0.75°) or less
	Winch	Camber Left - right error	0°15' +/-45' (0.25° +/-0.75°) 45' (0.75°) or less
	Full Option	Camber Left - right error	0°13' +/-45' (0.21° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKC	Option Less	Camber Left - right error	0°17' +/-45' (0.28° +/-0.75°) 45' (0.75°) or less
	Winch	Camber Left - right error	0°16' +/-45' (0.27° +/-0.75°) 45' (0.75°) or less
	Full Option	Camber Left - right error	0°14' +/-45' (0.23° +/-0.75°) 45' (0.75°) or less

Standard Caster Inclination (Unloaded Vehicle)

Vehicle Model		Caster Inclination	
GRJ200L/R-GMMNK		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L/R-GNMNK		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNK		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEK		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMMNZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNMNZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTNZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GPMNZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GMMNZ		Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPANKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNMNZV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
VDJ200L-GPMNZV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNTNZV		Caster Left - right error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNAEKQ	w/o Bull Bar	Caster Left - right error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less

	w/ Bull Bar	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNANKQ	w/o Bull Bar	Caster Left - right error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTEZQ	w/o Bull Bar	Caster Left - right error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTNZQ	w/o Bull Bar	Caster Left - right error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200L-GMAEKW	w/o Active Height Control	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Left - right error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
UZJ200L/R-GNAEKW	w/o Active Height Control	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Left - right error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMTEZW	w/o Active Height Control	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Left - right error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZW	w/o Active Height Control	Caster Left - right error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Left - right error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKC	w/ KDSS	Caster Left - right error	2°21' +/-45' (2.35° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKC	Option Less	Caster Left - right error	2°38' +/-45' (2.64° +/-0.75°) 45' (0.75°) or less
	Winch	Caster Left - right error	2°34' +/-45' (2.57° +/-0.75°) 45' (0.75°) or less
	Full Option	Caster Left - right error	2°34' +/-45' (2.57° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKC	Option Less	Caster Left - right error	2°41' +/-45' (2.69° +/-0.75°) 45' (0.75°) or less
	Winch	Caster Left - right error	2°37' +/-45' (2.61° +/-0.75°) 45' (0.75°) or less
	Full Option	Caster Left - right error	2°37' +/-45' (2.61° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKC	Option Less	Caster Left - right error	2°39' +/-45' (2.65° +/-0.75°) 45' (0.75°) or less
	Winch	Caster Left - right error	2°34' +/-45' (2.57° +/-0.75°) 45' (0.75°) or less
	Full Option	Caster Left - right error	2°37' +/-45' (2.61° +/-0.75°) 45' (0.75°) or less

Standard Steering Axis Inclination (Unloaded Vehicle)

Vehicle Model	Steering Axis Inclination: Reference	
GRJ200L/R-GMMNK	Steering Axis	12°50' (12.83°)
GRJ200L/R-GNMNK	Steering Axis	12°50' (12.83°)
GRJ200L-GPMNK	Steering Axis	12°50' (12.83°)
UZJ200L-GNAEK	Steering Axis	12°50' (12.83°)
VDJ200L-GMMNZ	Steering Axis	12°50' (12.83°)
VDJ200L/R-GNMNZ	Steering Axis	12°50' (12.83°)
VDJ200L/R-GNTEZ	Steering Axis	12°50' (12.83°)
VDJ200L/R-GNTNZ	Steering Axis	12°50' (12.83°)
VDJ200L/R-GPMNZ	Steering Axis	12°50' (12.83°)
VDJ200R-GMMNZ	Steering Axis	12°50' (12.83°)

GRJ200L-GNANKV		Steering Axis	12°41' (12.68°)
GRJ200L-GNMNKV		Steering Axis	12°41' (12.68°)
GRJ200L-GPANKV		Steering Axis	12°41' (12.68°)
GRJ200L-GPMNKV		Steering Axis	12°41' (12.68°)
UZJ200L-GNANKV		Steering Axis	12°41' (12.68°)
UZJ200L-GNAEKV		Steering Axis	12°41' (12.68°)
VDJ200L-GNMNZV		Steering Axis	12°41' (12.68°)
VDJ200L-GPMNZV		Steering Axis	12°41' (12.68°)
VDJ200L-GNTNZV		Steering Axis	12°41' (12.68°)
UZJ200R-GNAEKQ	w/o Bull Bar	Steering Axis	12°38' (12.64°)
	w/ Bull Bar	Steering Axis	12°50' (12.83°)
UZJ200R-GNANKQ	w/o Bull Bar	Steering Axis	12°38' (12.64°)
	w/ Bull Bar	Steering Axis	12°50' (12.83°)
VDJ200R-GNTEZQ	w/o Bull Bar	Steering Axis	12°38' (12.64°)
	w/ Bull Bar	Steering Axis	12°50' (12.83°)
VDJ200R-GNTNZQ	w/o Bull Bar	Steering Axis	12°38' (12.64°)
	w/ Bull Bar	Steering Axis	12°50' (12.83°)
UZJ200L-GMAEKW	w/o Active Height Control	Steering Axis	12°50' (12.83°)
	w/ Active Height Control	Steering Axis	13°00' (13.00°)
UZJ200L/R-GNAEKW	w/o Active Height Control	Steering Axis	12°50' (12.83°)
	w/ Active Height Control	Steering Axis	13°00' (13.00°)
VDJ200L-GMTEZW	w/o Active Height Control	Steering Axis	12°50' (12.83°)
	w/ Active Height Control	Steering Axis	13°00' (13.00°)
VDJ200L/R-GNTEZW	w/o Active Height Control	Steering Axis	12°50' (12.83°)
	w/ Active Height Control	Steering Axis	13°00' (13.00°)
UZJ200L-GNAEKC	w/ KDSS	Steering Axis	12°54' (12.90°)
UZJ200L-GNANKC	Option Less	Steering Axis	12°47' (12.79°)
	Winch	Steering Axis	12°49' (12.82°)
	Full Option	Steering Axis	12°52' (12.86°)
GRJ200L-GNANKC	Option Less	Steering Axis	12°44' (12.74°)
	Winch	Steering Axis	12°44' (12.74°)
	Full Option	Steering Axis	12°47' (12.79°)
GRJ200L-GNMNKC	Option Less	Steering Axis	12°43' (12.71°)
	Winch	Steering Axis	12°43' (12.71°)
	Full Option	Steering Axis	12°45' (12.75°)

Standard Toe-in (Unloaded Vehicle)

Vehicle Model	Item	A + B C - D
w/o Active Height Control	Toe-in (total)	A + B: 0°13' +/-10' (0.22° +/-0.17°) C - D: 3 +/-2 mm (0.118 +/-0.0787 in.)
w/ Active Height Control	Toe-in (total)	A + B: 0°00' +/-10' (0.00° +/-0.17°) C - D: 0 +/-2 mm (0 +/-0.0787 in.)

Standard Wheel Turning Angle (Unloaded Vehicle)

Vehicle Model	Inside wheel angle	Outside wheel angle (reference)
GRJ200L/R-GMMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L/R-GNMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L-GPMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
UZJ200L-GNAEK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L-GMMNZ	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GNMNZ	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	33°31' to 36°31'	32°14'

VDJ200L/R-GNTEZ		(33.52°to 36.52°)	(32.24°)
VDJ200L/R-GNTNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GPMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GMMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L-GNANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GNMNKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GPANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GPMNKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200L-GNANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200L-GNAEKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GNMNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GPMNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GNTNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200R-GNAEKQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
UZJ200R-GNANKQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GNTEZQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GNTNZQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
UZJ200L-GMAEKW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
UZJ200L/R-GNAEKW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
VDJ200L-GMTEZW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
VDJ200L/R-GNTEZW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
UZJ200L-GNAEKC	w/ KDSS	33°29' to 36°29' (33.49° to 36.49°)	32°9' (32.15°)
UZJ200L-GNANKC	Option Less	33°32' to 36°32' (33.53° to 36.53°)	32°17' (32.29°)
	Winch	33°31' to 36°31' (33.52° to 36.52°)	32°15' (32.25°)
	Full Option	33°31' to 36°31' (33.51° to 36.51°)	32°12' (32.20°)

GRJ200L-GNANKC	Option Less	33°33' to 36°33' (33.55° to 36.55°)	32°22' (32.36°)
	Winch	33°33' to 36°33' (33.55° to 36.55°)	32°22' (32.36°)
	Full Option	33°32' to 36°32' (33.53° to 36.53°)	32°18' (32.30°)
GRJ200L-GNMNKC	Option Less	33°34' to 36°34' (33.56° to 36.56°)	32°24' (32.40°)
	Winch	33°33' to 36°33' (33.55° to 36.55°)	32°23' (32.39°)
	Full Option	33°32' to 36°32' (33.54° to 36.54°)	32°20' (32.34°)

Standard Vehicle Height (Unloaded Vehicle)

Vehicle Model		Front A - B	Rear C - D
GRJ200L/R-GMMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L/R-GNMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L-GPMNK		97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200L-GNAEK		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L-GMMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNTEZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GNTNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200L/R-GPMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GMMNZ		97 mm (3.82 in.)	60 mm (2.36 in.)
GRJ200L-GNANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GNMNKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GPANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
GRJ200L-GPMNKV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200L-GNANKV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200L-GNAEKV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GNMNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GPMNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
VDJ200L-GNTNZV		88 mm (3.46 in.)	80 mm (3.15 in.)
UZJ200R-GNAEKQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200R-GNANKQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GNTEZQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
VDJ200R-GNTNZQ	w/o Bull Bar	88 mm (3.46 in.)	60 mm (2.36 in.)
	w/ Bull Bar	97 mm (3.82 in.)	60 mm (2.36 in.)
UZJ200L-GMAEKW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
UZJ200L/R-GNAEKW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
VDJ200L-GMTEZW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
VDJ200L/R-GNTEZW	w/o Active Height Control	97 mm (3.82 in.)	60 mm (2.36 in.)
	w/ Active Height Control	101 mm (3.98 in.)	94 mm (3.70 in.)
URJ200L-GNTEKV	w/ KDSS Option Less	88.5 mm (3.48 in.)	79.2 mm (3.12 in.)
	w/ KDSS Spare Tire 2	8 . mm (3.37 in.	0. mm (3. in.
	/ KDSS Full Option	94.6 mm (3.72 in.)	81.3 mm (3.20 in.)
UZJ200L-GNAEKC	w/ KDSS	100.7 mm (3.96 in.)	55.6 mm (2.19 in.)
UZJ200L-GNANKC	Option Less	94.9 mm (3.74 in.)	66.2 mm (2.61 in.)
	Winch	96.3 mm (3.79 in.)	65.2 mm (2.57 in.)
	Full Option	98.1 mm (3.86 in.)	65.5 mm (2.58 in.)
GRJ200L-GNANKC	Option Less	92.3 mm (3.63 in.)	66.0 mm (2.60 in.)
	Winch	92.6 mm (3.65 in.)	64.8 mm (2.55 in.)
	Full Option	94.5 mm (3.72 in.)	65.1 mm (2.56 in.)

Standard Camber Inclination (Unloaded Vehicle)

Vehicle Model	Cam er nclination	
	Camber	-0 0 /-45' (-0.16° +/-0.75°)

GRJ200L/R-GMMNK		Le t - ri ht error	45' (0.75°) or less
GRJ200L/R-GNMNK		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNK		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEK		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMMNZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNMNZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTNZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GPMNZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GMMNZ		Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPANKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNMNZV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GPMNZV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNTNZV		Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNAEKQ	w/o Bull Bar	Camber Le t - ri ht error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNANKQ	w/o Bull Bar	Camber Le t - ri ht error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTEZQ	w/o Bull Bar	Camber Le t - ri ht error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTNZQ	w/o Bull Bar	Camber Le t - ri ht error	0°20' +/-45' (0.34° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
UZJ200L-GMAEKW	w/o Active Height Control	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Le t - ri ht error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
UZJ200L/R-GNAEKW	w/o Active Height Control	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Le t - ri ht error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMTEZW	w/o Active Height Control	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Le t - ri ht error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less

VDJ200L/R-GNTEZW	w/o Active Height Control	Camber Le t - ri ht error	0°10' +/-45' (0.16° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Camber Le t - ri ht error	0°00' +/-45' (0.00° +/-0.75°) 45' (0.75°) or less
URJ200L-GNTEKV	w/ KDSS Option Less	Camber Le t - ri ht error	0°18' +/-45' (0.30° +/-0.75°) 45' (0.75°) or less
	w/ KDSS Spare Tire 2	Camber Le t - ri ht error	0°22' +/-45' (0.36° +/-0.75°) 45' (0.75°) or less
	w/ KDSS Full Option	Camber Le t - ri ht error	0°10' +/-45' (0.17° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKC	w/ KDSS	Camber Le t - ri ht error	0°6' +/-45' (0.10° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKC	Option Less	Camber Le t - ri ht error	0°12' +/-45' (0.20° +/-0.75°) 45' (0.75°) or less
	Winch	Camber Le t - ri ht error	0°10' +/-45' (0.17° +/-0.75°) 45' (0.75°) or less
	Full Option	Camber Le t - ri ht error	0°8' +/-45' (0.13° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKC	Option Less	Camber Le t - ri ht error	0°15' +/-45' (0.25° +/-0.75°) 45' (0.75°) or less
	Winch	Camber Le t - ri ht error	0°15' +/-45' (0.25° +/-0.75°) 45' (0.75°) or less
	Full Option	Camber Le t - ri ht error	0°13' +/-45' (0.21° +/-0.75°) 45' (0.75°) or less

Standard Caster Inclination (Unloaded Vehicle)

Vehicle Model	Caster linination	
GRJ200L/R-GMMNK	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L/R-GNMNK	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNK	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEK	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMMNZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNMNZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTNZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GPMNZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GMMNZ	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNMNKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPANKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
GRJ200L-GPMNKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
VDJ200L-GNMNZV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
VDJ200L-GPMNZV	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
	Caster	3°02' +/-45' (3.04° +/-0.75°)

VDJ200L-GNTNZV		Le t - ri ht error	45' (0.75°) or less
UZJ200R-GNAEKQ	w/o Bull Bar	Caster Le t - ri ht error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200R-GNANKQ	w/o Bull Bar	Caster Le t - ri ht error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTEZQ	w/o Bull Bar	Caster Le t - ri ht error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
VDJ200R-GNTNZQ	w/o Bull Bar	Caster Le t - ri ht error	2°28' +/-45' (2.47° +/-0.75°) 45' (0.75°) or less
	w/ Bull Bar	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
UZJ200L-GMAEKW	w/o Active Height Control	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Le t - ri ht error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
UZJ200L/R-GNAEKW	w/o Active Height Control	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Le t - ri ht error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
VDJ200L-GMTEZW	w/o Active Height Control	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Le t - ri ht error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
VDJ200L/R-GNTEZW	w/o Active Height Control	Caster Le t - ri ht error	2°26' +/-45' (2.44° +/-0.75°) 45' (0.75°) or less
	w/ Active Height Control	Caster Le t - ri ht error	3°23' +/-45' (3.38° +/-0.75°) 45' (0.75°) or less
URJ200L-GNTEKV	w/ KDSS Option Less	Caster Le t - ri ht error	2°58' +/-45' (2.97° +/-0.75°) 45' (0.75°) or less
	w/ KDSS Spare Tire 2	Caster Le t - ri ht error	3°02' +/-45' (3.04° +/-0.75°) 45' (0.75°) or less
	w/ KDSS Full Option	Caster Le t - ri ht error	3°02' +/-45' (3.03° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNAEKC	w/ KDSS	Caster Le t - ri ht error	2°21' +/-45' (2.35° +/-0.75°) 45' (0.75°) or less
UZJ200L-GNANKC	Option Less	Caster Le t - ri ht error	2°38' +/-45' (2.64° +/-0.75°) 45' (0.75°) or less
	Winch	Caster Le t - ri ht error	2°34' +/-45' (2.57° +/-0.75°) 45' (0.75°) or less
	Full Option	Caster Le t - ri ht error	2°34' +/-45' (2.57° +/-0.75°) 45' (0.75°) or less
GRJ200L-GNANKC	Option Less	Caster Le t - ri ht error	2°41' +/-45' (2.69° +/-0.75°) 45' (0.75°) or less
	Winch	Caster Le t - ri ht error	2°37' +/-45' (2.61° +/-0.75°) 45' (0.75°) or less
	Full Option	Caster Le t - ri ht error	2°37' +/-45' (2.61° +/-0.75°) 45' (0.75°) or less

Standard Steering Axis Inclination (Unloaded Vehicle)

Vehicle Model	Steering A i olination: Re ence	
GRJ200L/R-GMMNK	Steering A i	2 0 (2.83
GRJ200L/R-GNMNK	Steering A i	2 0 (2.83
GRJ200L-GPMNK	Steering A i	2 0 (2.83
J200L-GNAEK	Steering A i	2 0 (2.83
VDJ200L-GMMNZ	Steering A i	2 0 (2.83)
VDJ200L/R-GNMNZ	Steering A i	2 0 (2.83)
VDJ200L/R-GNTEZ	Steering A i	2 0 (2.83)

VDJ200L/R-GNTNZ		Steering A i	2 0 (2.83)
VDJ200L/R-GPMNZ		Steering A i	2 0 (2.83)
VDJ200R-GMMNZ		Steering A i	2 0 (2.83)
GRJ200L-GNANKV		Steering A i	2 (2.68)
GRJ200L-GNMNKV		Steering A i	2 (2.68)
GRJ200L-GPANKV		Steering A i	2 (2.68)
GRJ200L-GPMNKV		Steering A i	2 (2.68)
UZJ200L-GNANKV		Steering A i	2 (2.68)
UZJ200L-GNAEKV		Steering A i	2 (2.68)
VDJ200L-GNMNZV		Steering A i	2 (2.68)
VDJ200L-GPMNZV		Steering A i	2 (2.68)
VDJ200L-GNTNZV		Steering A i	2 (2.68)
UZJ200R-GNAEKQ	w/o Bull Bar	Steering A i	2 38 (2.64)
	w/ Bull Bar	Steering A i	2 0 (2.83)
UZJ200R-GNANKQ	w/o Bull Bar	Steering A i	2 38 (2.64)
	w/ Bull Bar	Steering A i	2 0 (2.83)
VDJ200R-GNTEZQ	w/o Bull Bar	Steering A i	2 38 (2.64)
	w/ Bull Bar	Steering A i	2 0 (2.83)
VDJ200R-GNTNZQ	w/o Bull Bar	Steering A i	2 38 (2.64)
	w/ Bull Bar	Steering A i	2 0 (2.83)
UZJ200L-GMAEKW	w/o Active Height Control	Steering A i	2 0 (2.83)
	w/ Active Height Control	Steering A i	3 00 (3.00)
UZJ200L/R-GNAEKW	w/o Active Height Control	Steering A i	2 0 (2.83)
	w/ Active Height Control	Steering A i	3 00 (3.00)
VDJ200L-GMTEZW	w/o Active Height Control	Steering A i	2 0 (2.83)
	w/ Active Height Control	Steering A i	3 00 (3.00)
VDJ200L/R-GNTEZW	w/o Active Height Control	Steering A i	2 0 (2.83)
	w/ Active Height Control	Steering A i	3 00 (3.00)
URJ200L-GNTEKV	w/ KDSS Option Less	Steering A i	2 (2.68)
	w/ KDSS Spare Tire 2	teerin A i	2 38 (2.63)
	w/ KDSS Full Option	Steering A i	2 9 (2.82)
UZJ200L-GNAEKC	w/ KDSS	Steering A i	2 (2.90)
UZJ200L-GNANKC	Option Less	Steering A i	2 7 (2.79)
	Winch	Steering A i	2 9 (2.82)
	Full Option	Steering A i	2 2 (2.86)
GRJ200L-GNANKC	Option Less	Steering A i	2 (2.74)
	Winch	Steering A i	2 (2.74)
	Full Option	Steering A i	2 7 (2.78)

Standard Toe-in (Unloaded Vehicle)

Vehicle Model	tem	A + B C - D
w/o Active Height Control	Toe-in (total)	A + B: 0°13' +/-10' (0.22° +/-0.17°) C - D: 3 +/-2 mm (0.118 +/-0.0787 in.)
w/ Active Height Control	Toe-in (total)	A + B: 0°00' +/-10' (0.00° +/-0.17°) C - D: 0 +/-2 mm (0 +/-0.0787 in.)

Standard Wheel Turning Angle (Unloaded Vehicle)

Vehicle Model	nide wheel angle	Outside wheel angle (re ence)
GRJ200L/R-GMMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L/R-GNMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L-GPMNK	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	33°31' to 36°31'	32°14'

U J200L-GNAEK		(33.52°to 36.52°)	(32.24°)
VDJ200L-GMMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GNMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GNTEZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GNTNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200L/R-GPMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GMMNZ		33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
GRJ200L-GNANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GNMNKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GPANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
GRJ200L-GPMNKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200L-GNANKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200L-GNAEKV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GNMNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GPMNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
VDJ200L-GNTNZV		33°34' to 36°34' (33.56°to 36.56°)	32°26' (32.44°)
UZJ200R-GNAEKQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
UZJ200R-GNANKQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GNTEZQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
VDJ200R-GNTNZQ	w/o Bull Bar	33°35' to 36°35' (33.58°to 36.58°)	32°29' (32.49°)
	w/ Bull Bar	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
UZJ200L-GMAEKW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
UZJ200L/R-GNAEKW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
VDJ200L-GMTEZW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
VDJ200L/R-GNTEZW	w/o Active Height Control	33°31' to 36°31' (33.52°to 36.52°)	32°14' (32.24°)
	w/ Active Height Control	33°28' to 36°28' (33.46°to 36.46°)	32°02' (32.03°)
	w/ KDSS Option Less	33°34' to 36°34' (33.56° to 36.56°)	32°26' (32.43°)

URJ200L-GNTEKV	w/ KDSS Spare Tire 2	33 3 to 36 3 (33. 8 to 36. 8)	32°31' (32.51°)
	w/ KDSS Full Option	33°31' to 36°31' (33.52° to 36.52°)	32°15' (32.25°)
UZJ200L-GNAEKC	w/ KDSS	33°29' to 36°29' (33.49° to 36.49°)	32°9' (32.15°)
UZJ200L-GNANKC	Option Less	33°32' to 36°32' (33.53° to 36.53°)	32°17' (32.29°)
	Winch	33°31' to 36°31' (33.52° to 36.52°)	32°15' (32.25°)
	Full Option	33°31' to 36°31' (33.51° to 36.51°)	32°12' (32.20°)
GRJ200L-GNANKC	Option Less	33°33' to 36°33' (33.55° to 36.55°)	32°22' (32.36°)
	Winch	33°33' to 36°33' (33.55° to 36.55°)	32°22' (32.36°)
	Full Option	33°32' to 36°32' (33.53° to 36.53°)	32°18' (32.30°)

Part Tightened	N*m	kgf*cm	ft.*lbf
Tie rod end lock nut	82	836	60

Front suspension	Turning torque
Upper ball joint	0.98 to 4.41 N*m (1.0 to 45 kgf*cm, 9 to 39 in.*lbf)
Lower ball joint	3.0 to 10.0 N*m (31 to 102 kgf*cm, 27 to 89 in.*lbf)
Stabilizer link ball joint	0.5 to 3.4 N*m (5.1 to 36 kgf*cm, 4.4 to 30 in.*lbf)

Front

Part Tightened	N*m	kgf*cm	ft.*lbf
Hub nut	131	1336	97
Front shock absorber with coil spring x Chassis frame	45	459	33
Front shock absorber x No. 2 control pressure hose	18	184	13
Lower suspension arm x Shock absorber	180	1835	133
Skid control sensor wire clamp x Upper arm	13	133	9.6
Skid control sensor wire clamp x Steering knuckle	13	133	9.6
Upper arm x Steering knuckle	110	1122	81
Piston rod x Suspension support	65	663	48
Upper arm x Chassis frame	185	1886	136
Lower suspension arm x Chassis frame	280	2855	207
Lower suspension arm x Front lower ball joint attachment	167	1703	123
Steering knuckle x Front lower ball joint attachment	300	3059	221
Lower suspension arm x Stabilizer bar link	135	1376	100
Stabilizer bar x Stabilizer bar link	128	1305	94
Stabilizer bar x Stabilizer bracket	87	887	64
Stabilizer control arm x Stabilizer bar link	140	1428	103
Stabilizer bar x Stabilizer control arm	230	2345	170
Stabilizer control cylinder x Stabilizer control arm	190	1937	140
Stabilizer control cylinder x Chassis frame	275	2804	203
Stabilizer control cylinder x Stabilizer control tube protector	15	152	11
Stabilizer control cylinder x No. 1 stabilizer control tube	69	704	51
Stabilizer control cylinder x No. 1 suspension control bleeder plug	10	102	7
No. 1 stabilizer control tube x Chassis frame	29	296	21

Front

Part Tightened	N*m	kgf*cm	ft.*lbf
Hub nut	131	1336	97
Front shock absorber with coil spring x Chassis frame	45	459	33
Front shock absorber x No. 2 control pressure hose	18	184	13
Lower suspension arm x Shock absorber	180	1835	133
Skid control sensor wire clamp x Upper arm	13	133	9.6
Skid control sensor wire clamp x Steering knuckle	13	133	9.6
Upper arm x Steering knuckle	110	1122	81
Piston rod x Suspension support	65	663	48
Upper arm x Chassis frame	185	1886	136
Lower suspension arm x Chassis frame	280	2855	207
Lower suspension arm x Front lower ball joint attachment	167	1703	123
Steering knuckle x Front lower ball joint attachment	300	3059	221
Lower suspension arm x Stabilizer bar link	135	1376	100
Stabilizer bar x Stabilizer bar link	128	1305	94
Stabilizer bar x Stabilizer bracket	87	887	64
Stabilizer control arm x Stabilizer bar link	140	1428	103
Stabilizer bar x Stabilizer control arm	230	2345	170
Stabilizer control cylinder x Stabilizer control arm	190	1937	140
Stabilizer control cylinder x Chassis frame	275	2804	203
Stabilizer control cylinder x Stabilizer control tube protector	15	152	73
Stabilizer control cylinder x No. 1 stabilizer control tube	69	704	51
Stabilizer control cylinder x No. 1 suspension control bleeder plug	8.3	85	73 in.*lbf
No. 1 stabilizer control tube x Chassis frame	29	296	21

Rear suspension	Turning torque
Stabilizer link ball joint	0.5 to 3.4 N*m (5.1 to 36 kgf*cm, 4.4 to 30 in.*lbf)

Rear suspension

Part Tightened	N*m	kgf*cm	ft.*lbf
Hub nut	131	1336	97
Shock absorber x Chassis frame	53	540	39
Shock absorber x No. 4 suspension control pressure hose	18	184	13
Shock absorber x Axle housing	98	999	72
No. 2 parking brake cable x Chassis frame	13	127	9
No. 3 parking brake cable x Chassis frame	13	127	9
Stabili er control tube insulator x Chassis frame	18	184	13
Upper control arm x Chassis frame	150	1530	111
Upper control arm x Axle housing	150	1530	111
Upper control arm x Speed sensor wire harness	13	127	9
ower control arm x Chassis frame	150	1530	111
ower control arm x Axle housing	150	1530	111
ateral control arm x Chassis frame	150	1530	111
ateral control arm x Axle housing	150	1530	111
Stabili er end bracket x Chassis frame	30	306	22
Stabili er end bracket x Stabili er link	30	306	22
Stabili er rik x Stabili er bar	48	489	35
Stabili er bar x Axle housing	58	591	43
Stabili er bar x Rear stabili er link assembly	100	1020	74
Stabili er control cylinder x Rear stabili er link assembly	208	2121	153
Stabili er control cylinder x Rear No. 2 stabili er link	97	989	72
Stabili er control cylinder x Chassis frame	90	918	66
Stabili er control cylinder x Stabili er control tube	69	704	51
Stabili er control cylinder x Stabili er control tube	29	296	21
Stabili er control cylinder x Bleeder plug	10	102	7

Rear suspension

Part Tightened	N*m	kgf*cm	ft.*lbf
Hub nut	131	1336	97
Shock absorber x Chassis frame	53	540	39
Shock absorber x No. 4 suspension control pressure hose	18	184	13
Shock absorber x Axle housing	98	999	72
No. 2 parking brake cable x Chassis frame	13	127	9
No. 3 parking brake cable x Chassis frame	13	127	9
Stabili er control tube insulator x Chassis frame	18	184	13
Upper control arm x Chassis frame	150	1530	111
Upper control arm x Axle housing	150	1530	111
Upper control arm x Speed sensor wire harness	13	127	9
ower control arm x Chassis frame	150	1530	111
ower control arm x Axle housing	150	1530	111
ateral control arm x Chassis frame	150	1530	111
ateral control arm x Axle housing	150	1530	111
Stabili er end bracket x Chassis frame	30	306	22
Stabili er end bracket x Stabili er link	30	306	22
Stabili er rik x Stabili er bar	48	489	35
Stabili er bar x Axle housing	58	591	43
Stabili er bar x Rear stabili er link assembly	100	1020	74
Stabili er control cylinder x Rear stabili er link assembly	208	2121	153
Stabili er control cylinder x Rear No. 2 stabili er link	97	989	72
Stabili er control cylinder x Chassis frame	90	918	66
Stabili er control cylinder x Stabili er control tube	69	704	51
Stabili er control cylinder x Stabili er control tube	29	296	21
Stabili er control cylinder x Bleeder plug	8.3	85	73 in.*lbf

Cold tire inflation pressure

Vehicle Model	Tire Size	Front	Rear
GRJ200L-GMMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200R-GMMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200R-GNMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNAEK	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GMMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTEZ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GPMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi)

			*2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GMMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTEZ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GPMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNMNKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPMNKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNAEKV	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1

VDJ200L-GNMNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GPMNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200R-GNAEKQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200R-GNANKQ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTEZQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTNZQ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GMAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
UZJ200L-GNAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
UZJ200R-GNAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1

VDJ200L-GMTEZW	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
VDJ200L-GNTEZW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
VDJ200R-GNTEZW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2

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

Specification

Tire runout	3.0 mm (0.118 in.) or less

Standard imbalance after adjustment

Tire Size	Wheel Size	Balance Weight
245/75R17	17 x 7J (Steel Wheel)	12 g (0.0265 lb) or less
285/65R17	17 x 8J (Steel Wheel)	12 g (0.0265 lb) or less
	17 x 8J (Aluminum Wheel)	7.5 g (0.0165 lb) or less
285/60R18	18 x 8J (Aluminum Wheel)	7.0 g (0.0154 lb) or less
285/50R20	20 x 8 1/2J (Aluminum Wheel)	6.5 g (0.0143 lb) or less

Cold tire inflation pressure

Vehicle Model	Tire Size	Front	Rear
GRJ200L-GMMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200R-GNMNK	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNAEK	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GMMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTEZ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GPMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi)	230 kPa (2.3 kgf/cm^2, 33 psi)

		*1	*1
VDJ200R-GMMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTEZ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GPMNZ	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GNMNKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
GRJ200L-GPMNKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNAEKV	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GNANKV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2

	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNMNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GNTNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200L-GPMNZV	245/75R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200R-GNAEKQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200R-GNANKQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTEZQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
VDJ200R-GNTNZQ	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
UZJ200L-GMAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
UZJ200L-GNAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
UZJ200R-GNAEKW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
VDJ200L-GMTEZW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1

	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
VDJ200L-GNTEZW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
VDJ200R-GNTEZW	285/60R18	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/65R17	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
	285/50R20	240 kPa (2.4 kgf/cm^2, 35 psi) *1	240 kPa (2.4 kgf/cm^2, 35 psi) *1
			260 kPa (2.6 kgf/cm^2, 38 psi) *2
URJ200L-GNTEKV	285/65R17	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1
	285/60R18	230 kPa (2.3 kgf/cm^2, 33 psi) *1	230 kPa (2.3 kgf/cm^2, 33 psi) *1

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

Specification

Tire runout	3.0 mm (0.118 in.) or less

Standard imbalance after adjustment

Tire Size	Wheel Size	Balance Weight
245/75R17	17 x 7J (Steel Wheel)	12 g (0.0265 lb) or less
285/65R17	17 x 8J (Steel Wheel)	12 g (0.0265 lb) or less
	17 x 8J (Aluminum Wheel)	7.5 g (0.0165 lb) or less
285/60R18	18 x 8J (Aluminum Wheel)	7.0 g (0.0154 lb) or less
285/50R20	20 x 8 1/2J (Aluminum Wheel)	6.5 g (0.0143 lb) or less

Skid Control Buzzer

Item	Measurement Condition	Specified Condition
Skid control buzzer assembly	Battery positive (+) voltage → Terminal 2	Skid control buzzer sounds
	Battery negative (-) → Terminal 1	

VSC OFF Switch

Item	Tester Connection	Switch Condition	Specified Condition
VSC OFF Switch	3 - 6	Pressed	Below 1 Ω
		Not Pressed	10 kΩ or higher

Downhill Assist Control switch

Item	Tester Connection	Switch Condition	Specified Condition
Downhill assist control switch	1 - 4	Pressed	Below 1 Ω
		Not Pressed	10 kΩ or higher

CRAWL Switch

Item	Tester Connection	Switch Condition	Specified Condition
CRAWL Switch	3 (ECU1) - 20 (E)	Speed Selector switch: MID	10 kΩ or higher
		Speed Selector switch: HI	
		Speed Selector switch: LO	Below 1 Ω
	4 (ECU2) - 20 (E)	Speed Selector switch: MID	10 kΩ or higher
		Speed Selector switch: HI	Below 1 Ω
		Speed Selector switch: LO	
	2 (HSW) - 20 (E)	ON/OFF switch: Pressed	Below 1 Ω
		ON/OFF switch: Not pressed	10 kΩ or higher

BRK LP Relay

Item	Tester Connection	Condition	Specified Condition
BRK LP Relay	3 - 4	Battery positive voltage applied to terminal 1 and battery negative voltage to terminal 2	10 kΩ or higher
		Battery positive voltage not applied to terminal 1 and battery negative voltage applied to terminal 2	Below 1 Ω
	3 - 5	Battery positive voltage applied to terminal 1 and battery negative voltage to terminal 2	Below 1 Ω
		Battery positive voltage not applied to terminal 1 and battery negative voltage applied to terminal 2	10 kΩ or higher

Fron S S

Part tightened	N*m	kgf*cm	ft.*lbf
Front speed sensor bolt (Type A)	8.5	87	75 in.*lbf
Front speed sensor bolt (Type B)			
Front skid control sensor wire clamp bolt	13	127	9
Front skid control sensor wire clamp nut			
Front skid control sensor wire clamp x Body	5.0	51	44 in.*lbf

Re S S

Part tightened	N*m	kgf*cm	ft.*lbf
Rear speed sensor nut	8.3	85	73 in.*lbf
Rear skid control sensor wire clamp bolt	13	127	9

Deceler S

Part tightened	N*m	kgf*cm	ft.*lbf
Deceleration sensor bolt	15	148	11

Y R S

Part tightened	N*m	kgf*cm	ft.*lbf
Yaw rate sensor bolt	15	148	11

Brake Pedal

Brake pedal height from No. 2 dash panel insulator pad	LHD	147.1 to 157.1 mm (5.80 to 6.18 in.)
Brake pedal height from No. 2 dash panel insulator pad	RHD	149.1 to 159.1 mm (5.87 to 6.26 in.)
Rod operating adapter length		201.7 to 202.7 mm (7.94 to 7.98 in.)
Stop light switch protrusion		1.5 to 2.5 mm (0.0591 to 0.0984 in.)
Brake pedal free play		1 to 6 mm (0.0394 to 0.236 in.)
Brake pedal reserve distance from No. 2 dash panel insulator pad <Depressing force: 490 N (50 kgf, 110.2 lbf)>	LHD	More than 67 mm (2.64 in.)
Brake pedal reserve distance from No. 2 dash panel insulator pad <Depressing force: 490 N (50 kgf, 110.2 lbf)>	RHD	More than 67.5 mm (2.66 in.)

Hydraulic Brake Booster

Measurement Condition	Specified Condition
Battery positive (+) voltage → Red cable terminal	Brake booster pump motor operates
Battery negative (-) voltage → Black cable terminal	

Brake Pedal

Part tightened	N*m	kgf*cm	ft.*lbf
Brake pedal sub-assembly x Brake pedal support sub-assembly	23	239	17
Hydraulic brake booster assembly x Brake pedal support sub-assembly	14	145	10
Brake pedal support reinforcement set bolt	16	163	12

Hydraulic Brake Booster

Part tightened	N*m	kgf*cm	ft.*lbf
Brake master cylinder side lock nut x Rod operating adapter	26	260	19
Master cylinder body x Master cylinder solenoid	32	325	24
Brake booster accumulator assembly	57	585	42
No. 1 brake booster pump bracket x Master cylinder body	7.8	80	69 in.*lbf
Pin x Master cylinder body	7.8	80	69 in.*lbf
Wire harnesses x screw	2.9	30	26 in.*lbf
No. 1 brake actuator tube flare nut	14 (15)	145 (155)	10 (11)
Brake master cylinder reservoir sub-assembly x Master cylinder body	1.7	17	15 in.*lbf
Hydraulic brake booster assembly x Brake pedal support sub-assembly	14	145	10
Hydraulic brake booster assembly x Brake tube flare nut	14 (15)	145 (155)	10 (11)
Hydraulic brake booster assembly x Clamp	8.7	87	75 in.*lbf

Vacuum Pump

Part tightened	N*m	kgf*cm	ft.*lbf
Vacuum pump x Engine	21	214	15

( ): For use without union nut wrench

Front Brake

Pad lining thickness	Standard	11.9 mm (0.469 in.)
	Minimum	1.0 mm (0.0394 in.)
Disc thickness	Standard	32.0 mm (1.26 in.)
	Minimum	29.0 mm (1.15 in.)
Disc runout	Maximum	0.05 mm (0.00196 in.)

Front Brake

Part tightened	N*m	kgf*cm	ft.*lbf
Front disc brake caliper bolt	99	1,010	73
Flexible hose x Disc brake caliper	30	306	22
Bleeder plug	11	110	8

Front Brake Flexible Hose

Part tightened	N*m	kgf*cm	ft.*lbf
Flexible hose x Disc brake caliper	30	306	22
Flexible hose clamp bolt	31	316	23
Brake tube x Flexible hose	14 (15)	145 (155)	10 (11)

( ): For use without union nut wrench

Rear Brake

Pad lining thickness	Standard	12.0 mm (0.472 in.)
	Minimum	1.0 mm (0.0394 in.)
Disc thickness	Standard	18.0 mm (0.709 in.)
	Minimum	16.0 mm (0.630 in.)
Disc runout	Maximum	0.15 mm (0.00590 in.)

Rea B

Part tightened	N*m	kgf*cm	ft.*lbf
Rear disc brake cylinder x Rear disc brake cylinder mounting	88	897	65
Flexible hose x Disc brake cylinder	30	306	22
Bleeder plug	11	110	8
Rear disc brake cylinder mounting bolt	95	969	70

R B F

Part tightened	N*m	kgf*cm	ft.*lbf
Flexible hose x Disc brake cylinder	30	306	22
Brake tube x Flexible hose	14 (15)	145 (155)	10 (11)
No. 6 flexible hose bracket bolt	29	296	21

( ): For use without union nut wrench

Parking Brake Lever

Parking brake lever travel when pull with a force of 200 N (20 kgf, 45 lbf):	5 to 7 clicks

Parking Brake

Brake disc inside diameter	Standard	240 mm (9.45 in.)
	Maximum	241 mm (9.48 in.)
Parking brake shoe lining	Standard	3.75 mm (0.148 in.)
	Maximum	1.0 mm (0.0394 in.)

Parking Brake Lever

Part Tightened	N*m	kgf*cm	ft.*lbf
Parking brake switch x Parking brake lever sub-assembly	0.9	9	8 in.*lbf
Parking brake lever sub-assembly x Body	25	255	18

Parking Brake Cable

Part Tightened	N*m	kgf*cm	ft.*lbf
No. 2 parking brake cable clamp x Body	13	127	9
No. 2 parking brake cable x Body	13	127	9
No. 3 parking brake cable clamp x Body	13	127	9
No. 3 parking brake cable x Body	13	127	9
No. 2 parking brake cable x Parking brake	8.0	82	71 in.*lbf
No. 3 parking brake cable x Parking brake	8.0	82	71 in.*lbf

Parking Brake Assembly

Part Tightened	N*m	kgf*cm	ft.*lbf
Parking brake anchor block	86	877	63
No. 3 parking brake cable x Parking brake	8.0	82	71 in.*lbf
Rear disc brake cylinder assembly bolt	95	969	70

POWER STEERING I

Fluid level rise (Maximum)	5 mm (0.197 in.)
Fluid pressure at idle speed with valve closed	10000 to 10700 kPa (102 to 109 kgf/cm ^{2}, 1450 to 1552 psi)
Fluid pressure at idle speed with valve fully open and turn the steering wheel to the full lock position	10000 to 10700 kPa (102 to 109 kgf/cm ^{2}, 1450 to 1552 psi)

VANE P MP

Vane pump shaft and vane pump housing oil clearance (Maximum)	0.07 mm (0.00276 in.)
Vane plate thickness (Standard)	1.405 to 1.411 mm (0.0553 to 0.0556 in.)
Clearance between the vane pump rotor groove and vane pump plate (Maximum)	0.03 mm (0.00118 in.)
Compression spring free length (Minimum)	31.3 mm (1.23 in.)
Vane pump rotating torque	0.3 N*m (3 kgf*cm, 2 in.*lbf) or less

Part tightened	N*m	kgf*cm	ft.*lbf
VANE PUMP (1GR-FE)			
V-bank cover sub-assembly set nut	7.5	76	66 in.*lbf
Pressure feed tube x Union bolt	50	510	37
Vane pump assembly x Engine	21	214	15
Pressure port union	69	704	51
Front housing x Rear housing	22	224	16
VANE PUMP (2UZ-FE)			
Air cleaner assembly set bolt	5.0	50	44 in.*lbf
Air cleaner hose clamp	5.0	50	44 in.*lbf
Union bolt x Pressure feed tube	50	510	37
Vane pump assembly set bolt	21	214	15
Suction port union set bolt	12	122	9
Pressure port union	69	704	51
Front housing x Rear housing	22	224	16
VANE PUMP (1VD-FTV)			
Radiator reservoir assembly set bolt	8.0	82	71 in.*lbf
Union bolt x Pressure feed tube	50	510	37
Vane pump assembly x Engine	29	296	21
Suction port union Set bolt	12	122	9
Pressure port union x Set bolt	69	704	51
Front housing x Rear housing	22	224	16

Part tightened	N*m	kgf*cm	ft.*lbf
VANE PUMP (1GR-FE)			
V-bank cover sub-assembly set nut	7.5	76	66 in.*lbf
Pressure feed tube x Union bolt	50	510	37
Vane pump assembly x Engine	21	214	15
Pressure port union	69	704	51
Front housing x Rear housing	22	224	16
VANE PUMP (2UZ-FE)			
Air cleaner assembly set bolt	5.0	50	44 in.*lbf
Air cleaner hose clamp	5.0	50	44 in.*lbf
Union bolt x Pressure feed tube	50	510	37
Vane pump assembly set bolt	21	214	15
Suction port union set bolt	12	122	9
Pressure port union	69	704	51
Front housing x Rear housing	22	224	16
VANE PUMP (1VD-FTV)			
Radiator reservoir assembly set bolt	8.0	82	71 in.*lbf
Union bolt x Pressure feed tube	50	510	37
Vane pump assembly x Engine	29	296	21
Suction port union Set bolt	12	122	9
Pressure port union x Set bolt	69	704	51
Front housing x Rear housing	22	224	16
VANE PUMP (3FR-FE)			
Air cleaner assembly set bolt	5.0	51	44 in.*lbf
Air cleaner hose clamp	5.0	51	44 in.*lbf
Union bolt x Pressure feed tube	50	510	37
Vane pump assembly x Engine	21	214	15
Suction port union Set bolt	12	122	9
Pressure port union x Set bolt	69	704	51
Front housing x Rear housing	22	224	16

Part tightened	N*m	kgf*cm	ft.*lbf
Steering column assembly x Steering actuator	35	360	26
Steering actuator x No. 2 steering intermediate shaft	35	360	26
Steering control ECU x Junction block	8.0	82	71 in.*lbf
Steering control ECU with junction block x Vehicle	8.0	82	71 in.*lbf

STEERING WHEEL

Steering wheel freeplay	30 mm (1.18 in.)

Part tightened	N*m	kgf*cm	ft.*lbf
STEERING COLUMN			
Steering wheel pad set screw ("Torx" screw)	8.8	90	78 in.*lbf
Steering wheel set nut	50	510	37
Control valve shaft x No. 2 intermediate shaft assembly	35	357	26
Steering intermediate shaft assembly x No. 2 intermediate shaft assembly	35	357	26
Steering column assembly x steering intermediate shaft assembly	35	357	26
Steering column assembly set nut and bolt	26	265	19
Column hole cover set bolt	5.0	51	44 in.*lbf
Multiplex tilt and telescopic ECU set screw	1.5	15	13 in.*lbf

PO ER STEERING LIN

Tie rod end sub-assembly stud bolt turning torque	0.98 to 3.92 N*m (10 to 35 kgf*cm, 8.67 to 30.36 in.*lbf)
Total preload (Control valve rotating torque)	2.4 N*m (24 kgf*cm, 21 in.*lbf) or less

Part tightened	N*m	kgf*cm	ft.*lbf
POWER STEERING LINKAGE			
No. 1 Engine under cover sub-assembly x Vehicle	29	296	21
Front stabilizer link assembly RH x Front stabilizer bar	128	1305	94
Front stabilizer bar x Front stabilizer control arm	230	2345	170
Front stabilizer link assembly set bolt	135	1376	100
Front No. 1 stabilizer bracket set bolt	87	887	64
Turn pressure tube union nut	44 (40)	449 (409)	32 (30)
Tie rod end lock nut	82	836	60
Rack x Rack end	147 (110)	1499 (1122)	108 (81)
Power steering gear assembly set bolt and nut	120	1,224	89
Front suspension rebound stopper sub-assembly x Vehicle	58	591	43
Control valve shaft x No. 2 intermediate shaft assembly	35	360	26
Tie rod end x Lower arm	69	704	51

( ): For use without SST

Radio Receiver (w/ Multi-display)

Part Tightened	N*m	kgf*cm	ft.*lbf
Radio receiver assembly with bracket x Instrument panel	12	122	8
Radio receiver assembly X Bracket	3.0	30	26 in.*lbf

Radio Receiver (w/o Multi-display)

Part Tightened	N*m	kgf*cm	ft.*lbf
Radio receiver assembly with bracket x Instrument panel	12	122	8
Radio receiver assembly x Bracket	3.0	30	26 in.*lbf

Stereo Component Amplifier

Part Tightened	N*m	kgf*cm	ft.*lbf
Stereo component amplifier assembly with bracket x Body	7.5	76	66 in.*lbf
Stereo component amplifier assembly x Bracket	3.0	30	26 in.*lbf

Navigation ECU

Part Tightened	N*m	kgf*cm	ft.*lbf
Navigation module board with disc player bracket x Instrument panel	12	122	8
Navigation module board x Disc player bracket	3.0	30	26 in.*lbf

Battery	Standard specific gravity		1.25 to 1.29 at 20°C (68°F)
Charging circuit without load	Standard amperage		10 A or less
	Standard voltage		13.2 to 14.8 V (when engine speed at 2,000 rpm)
Charging circuit with load	Standard amperage		30 A or higher
Generator rotor	Standard resistance	between the slip rings	2.3 to 2.7 Ω at 20°C (68°F)
		between the slip ring and rotor	10 kΩ or higher
	Standard diameter		14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum diameter		14.0 mm (0.551 in.)
Generator brush holder	Standard exposed length		10.5 mm (0.413 in.)
	Minimum exposed length		4.5 mm (0.177 in.)

Part Tightened	N*m	kgf*cm	ft.*lbf
Generator x V-ribbed belt tensioner	43	438	32
Wire harness clamp bracket x Generator	8.0	82	71 in.*lbf
Generator wire x Generator	9.8	100	87 in.*lbf
Wire harness clamp bracket x Body	8.0	82	71 in.*lbf
Retainer plate x Generator drive end frame assembly	2.3	23	20 in.*lbf
Generator coil assembly x Generator drive end frame assembly	5.9	60	52 in.*lbf
Generator brush holder assembly x Generator coil assembly	1.8	18	16 in.*lbf
Generator rear end cover x Generator coil assembly	4.6	46	40 in.*lbf
Generator pulley x Generator rotor assembly	133	1351	98

Battery	Standard specific gravity		1.25 to 1.29 at 20°C (68°F)
Charging circuit without load	Standard amperage		10 A or less
	Standard voltage		13.2 to 14.8 V (when engine speed at 2000 rpm)
Charging circuit with load	Standard amperage		30 A or higher
Generator rotor	Standard resistance	Slip ring - Slip ring	1.36 to 1.76 Ω at 20°C (68°F)
		Slip ring - Rotor	10 MΩ or higher
	Standard diameter		14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum diameter		14.0 mm (0.551 in.)
Generator brush holder	Standard exposed length		9.5 to 11.5 mm (0.374 to 0.453 in.)
	Minimum exposed length		4.5 mm (0.177 in.)

Part Tightened	N*m	kgf*cm	ft.*lbf
Retainer plate x Generator drive end frame	3.0	30	26 in.*lbf
Generator coil x Generator drive end frame	7.5	76	66 in.*lbf
Generator brush holder x Generator coil	1.8	18	16 in.*lbf
Generator rear end cover x Generator coil	4.6	46	40 in.*lbf
Generator pulley x Generator rotor	133	1351	98
Generator x ribbed belt tensioner	43	438	32
Generator wire x Generator	12	122	9
ire harness bracket x Generator	31	316	23

Battery	Standard specific gravity			1.25 to 1.29 at 20°C (68°F)
Charging circuit without load	Standard amperage			10 A or less
	Standard voltage			13.2 to 14.8 V (when engine speed at 2,000 rpm)
Charging circuit with load	Standard amperage			30 A or higher
Generator rotor	Standard resistance	between the slip rings	130 A type	2.3 to 2.7 Ω at 20°C (68°F)
			150 A type	1.5 to 1.9 Ω at 20°C (68°F)
		between the slip ring and rotor		10 Ω or higher
	Standard diameter			14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum diameter			14.0 mm (0.551 in.)
Generator brush holder	Standard e posed length			10.5 mm (0.413 in.)
	Minimum e posed length			4.5 mm (0.177 in.)

Part Tightened		N*m	kgf*cm	ft.*lbf
Generator x V-ribbed belt tensioner	for bolt and nut (A)	39	398	29
	for nut (B)	16	158	11
Generator ire x Generator		9.8	100	87 in.*lbf
ire harness bracket x Generator		8.0	82	71 in.*lbf
Retainer late x Generator dri e end frame assembl		2.3	23	20 in.*lbf
Generator coil assembl x Generator dri e end frame assembl		5.9	60	52 in.*lbf
Generator brush holder assembly x Generator coil assembl		1.8	18	16 in.*lbf
Generator rear end co er x Generator coil assembl		.6	6	0 in.*lbf
Generator ulley x Generator rotor assembl		133	1351	98

Battery	Standard specific gravity			1.25 to 1.29 at 20°C (68°F)
Charging circuit without load	Standard amperage			10 A or less
	Standard voltage			13.2 to 14.8 V (when engine speed at 2,000 rpm)
Charging circuit with load	Standard amperage			30 A or higher
Generator rotor	Standard resistance	between the slip rings	130 A type	2.3 to 2.7 Ω at 20°C (68°F)
			150 A type	1.5 to 1.9 Ω at 20°C (68°F)
			180 A type	1.36 to 1.76 Ω at 20°C (68°F)
		between the slip ring and rotor		10 Ω or higher
	Standard diameter			14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum diameter			14.0 mm (0.551 in.)
Generator brush holder	Standard e posed length			10.5 mm (0.413 in.)
	Minimum e posed length			4.5 mm (0.177 in.)

Part Tightened		N*m	kgf*cm	ft.*lbf
Stud bolt x V-ribbed belt tensioner		6.0	61	53 in.*lbf
Generator x V-ribbed belt tensioner		21	214	15
Generator x Stud bolt		21	214	15
Generator wire x Generator	130 A Type and 150 A Type:	9.8	100	87 in.*lbf
	180 A Type:	12	122	9
No. 1 intake air connector pipe x No. 1 intake air connector bracket		21	214	15
Retainer plate x Generator drive end frame	130 A Type and 150 A Type:	2.3	23	20 in.*lbf
	180 A Type:	3.0	30	26 in.*lbf
Generator coil x Generator drive end frame	130 A Type and 150 A Type:	5.8	59	51 in.*lbf
	180 A Type:	7.5	76	66 in.*lbf
Generator brush holder x Generator coil		1.8	18	16 in.*lbf
Generator rear end cover x Generator coil		4.6	46	40 in.*lbf
Generator pulley x Generator rotor		133	1351	98

FRONT DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
Door lock x Door panel	5.0	51	44 in.*lbf

REAR DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
Door lock x Door panel	5.0	51	44 in.*lbf

BACK DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
Back door lock assembly x Back door panel	13	133	10

DOOR CONTROL RECEIVER

Part tightened	N*m	kgf*cm	ft.*lbf
Door Control Receiver x Body	15	153	11

COURTESY SWITCH

Part Tightened	N*m	kgf*cm	ft.*lbf
Hood Lock Assembly x Vehicle Body	5.5	56	49 in.*lbf

Part Tightened	N*m	kgf*cm	ft.*lbf
Inner rear view mirror assembly x Windshield glass	1.5	15	13 in.*lbf

Part Tightened	N*m	kgf*cm	ft.*lbf
Steering wheel x Steering pad	8.8	90	78 in.*lbf
Driver side knee airbag assembly x Instrument panel	10	102	7
Front passenger side knee airbag assembly x Instrument panel	10	102	7
Curtain shield airbag assembly x Body	10	102	7
Center airbag sensor assembly x Body	18	184	13
Front airbag sensor x Body	9.0	92	80 in.*lbf
Side airbag sensor assembly x Body	9.0	92	80 in.*lbf
Rear airbag sensor x Body	9.0	92	80 in.*lbf
Rear floor airbag sensor x Body	9.0	92	80 in.*lbf
Seat position airbag sensor x Front seat	8.0	82	71 in.*lbf

SEAT BELT CONTROL ECU (for LHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Certification ECU x Seat belt control ECU	5.5	56	49 in.*lbf
Seat belt control ECU x Instrument panel reinforcement	5.5	56	49 in.*lbf

SEAT BELT CONTROL ECU (for RHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Seat belt control ECU x Instrument panel reinforcement	7.0	71	62 in.*lbf

Front Seat Assembly (for Manual Seat)

Part Tightened			N*m	kgf*cm	ft.*lbf
Front seat assembly x Vehicle body			37	377	27
Seatback cover bracket x Front seat with adjuster frame assembly			5.0	51	44 in.*lbf
Front seat inner belt assembly x Front seat with adjuster frame assembly			42	428	31
Lower active headrest unit x Upper active headrest unit			5.0	51	44 in.*lbf
Upper active headrest unit x Front seat with adjuster frame assembly			14	143	10
Lower active headrest unit x Front seat with adjuster frame assembly			5.0	51	44 in.*lbf
Seat position airbag sensor x Front seat with adjuster frame assembly			8.0	82	71 in.*lbf
Inner seat track bracket x Front inner seat track assembly LH			25	255	18
Front inner seat track assembly LH x Seat cushion reinforcement			25	255	18
Front outre seat track assembly LH x Seat cushion reinforcement			25	255	18
Front inner seat track assembly LH x Seat frame with adjuster	for 4 Way Seat Type	Front side	13	133	10
Front outer seat track assembly LH x Seat frame with adjuster	for 4 Way Seat Type	Rear side	25	255	18
Front inner seat track assembly LH x Seat frame with adjuster	for 8 Way Seat Type		25	255	18
Front outer seat track assembly LH x Seat frame with adjuster	for 8 Way Seat Type		25	255	18

Front Seat Assembly (for Power Seat)

Part Tightened	N*m	kgf*cm	ft.*lbf
Front seat assembly x Vehicle body	37	377	27
Seatback cover bracket x Front seat with adjuster frame assembly	5.0	51	44 in.*lbf
Front seat inner belt assembly x Front seat with adjuster frame assembly	42	428	31
Lower active headrest unit x Upper active headrest unit	5.0	51	44 in.*lbf
Upper active headrest unit x Front seat with adjuster frame assembly	14	143	10
Lower active headrest unit x Front seat with adjuster frame assembly	5.0	51	44 in.*lbf
Seat position airbag sensor x Front seat with adjuster frame assembly	8.0	82	71 in.*lbf

Rear No. 1 Seat Assembly (for 60/40 Split Seat Type 40 Side)

Part Tightened		N*m	kgf*cm	ft.*lbf
Rear No. 1 seat assembly RH x Vehicle body		37	377	27
Seat belt anchor x Vehicle body		42	428	31
Rear seat cushion lock striker sub-assembly x Vehicle body		37	377	27
Rear No. 1 seat hinge sub-assembly x Rear seat reclining adjuster assembly		42	428	31
Rear No. 1 seat inner belt assembly RH x Rear seat cushion frame sub-assembly RH		42	428	31
Seatback cover bracket x Rear seatback frame sub-assembly RH		5.5	56	49 in.*lbf
Rear seatback frame sub-assembly RH x Rear seat cushion frame sub-assembly RH		42	428	31
Lower seat track bracket x Rear seat reclining adjuster assembly		21	214	15
Rear seat cushion frame sub-assembly RH x Rear seat reclining adjuster assembly	for "TORX" bolt	21	214	15
Rear seat cushion frame sub-assembly RH x Rear seat reclining adjuster assembly	for nut	42	428	31
Rear seat lock control lever LH x Rear seat reclining adjuster assembly		13	133	10

INT:

"TORX" is a registered trademark of Textron Inc.

Rear No. 1 Seat Assembly (for 60/40 Split Seat Type 60 Side)

Part Tightened		N*m	kgf*cm	ft.*lbf
Rear No. 1 seat assembly LH x Vehicle body		37	377	27
Seat belt anchor x Vehicle body		42	428	31
Rear seat cushion lock striker sub-assembly x Vehicle body		37	377	27
Rear No. 1 seat hinge sub-assembly x Rear seat reclining adjuster assembly		42	428	31
Rear No. 1 seat inner belt assembly LH x Rear seat cushion frame sub-assembly LH		42	428	31
Seatback cover bracket x Rear seatback frame sub-assembly LH		5.5	56	49 in.*lbf
Rear center seat armrest assembly x Rear seatback frame sub-assembly LH		42	428	31
Seatback stopper plate x Rear center seat armrest assembly		15	153	11
Seatback stopper plate x Rear seat cushion frame sub-assembly LH		42	428	31
Rear seatback frame sub-assembly LH x Rear seat cushion frame sub-assembly LH		42	428	31
No. 1 seat 3 point type belt assembly LH x Rear seatback frame sub-assembly LH		42	428	31
Rear seat inner belt assembly x Rear seat cushion frame sub-assembly LH		42	428	31
Lower seat track bracket x Rear seat reclining adjuster assembly		21	214	15
Rear seat cushion frame sub-assembly LH x Rear seat reclining adjuster assembly	for "TORX" bolt	21	214	15
	for nut	42	428	31
Rear seat lock control lever LH x Rear seat reclining adjuster assembly		13	133	10
No. 1 seat leg assembly LH x Rear seat reclining adjuster assembly		21	214	15

HINT:

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Rear No. 2 Seat Assembly (for Face to Face Seat Type)

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear No. 2 seat assembly x Vehicle body	37	377	27

Rear No. 2 Seat Assembly (except Face to Face Seat Type)

Part Tightened		N*m	kgf*cm	ft.*lbf
Rear No. 2 seat assembly x Vehicle body		37	377	27
Rear seat lock control lever sub-assembly x Vehicle body		12	122	9
Fold seat leg lock sub-assembly x Vehicle body		12	122	9
Seat belt anchor x Vehicle body		42	428	31
Rear seat lock striker sub-assembly x Vehicle body		37	377	27
Rear seat inner belt sub-assembly x No. 2 seat cushion spring assembly		42	428	31
Rear No. 2 seat inner belt sub-assembly x No. 2 seat cushion spring assembly		42	428	31
3rd seat link sub-assembly x No. 2 seat cushion spring assembly	for bolt	8.5	87	75 in.*lbf
	for nut	8.5	87	75 in.*lbf

Rear seatback lock striker assembly x No. 2 seat cushion spring assembly	14	138	10

Front Seat Belt

Part Tightened	N*m	kgf*cm	ft.*lbf
Front seat inner belt assembly x Front seat	42	428	31
Front seat outer belt assembly (shoulder anchor) x Front shoulder belt anchor plate sub assembly	42	428	31
Front seat outer belt assembly (upper part of retractor) x Body	8.5	87	75 in.*lbf
Front seat outer belt assembly (lo er art of retract)x Body	42	428	31
Front shoulder belt anchor plate sub assembly x Body	42	428	31

Rear No. 1 Seat Belt

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear No. 1 seat outer belt assembly (floor anchor) x Body	42	428	31
Rear No. 1 seat outer belt assembly (shoulder anchor) x Body	42	428	31
Rear No. 1 seat outer belt assembly (upper part of retractor) x Body	8.5	87	75 in.*lbf
Rear No. 1 seat outer belt assembly (lo er art of retract)x Body	42	428	31
Rear shoulder belt anchor plate sub assembly x Body	42	428	31
Rear No. 1 seat inner belt assembly (for)ide Rear No. 1 seat assembly	42	428	31
Rear seat inner belt assembly (for)ide Rear No. 1 seat assembly	42	428	31
No. 1 seat 3 point type belt assembly (anchor) x Rear No. 1 seat assembly	42	428	31
No. 1 seat 3 point type belt assembly (retractor) x Rear No. 1 seat assembly	42	428	31
No. 1 seat 3 point type belt assembly (belt sensor) x Rear No. 1 seat assembly	42	428	31
Rear No. 1 seat inner belt assembly R (for R Side) x Rear No. 1 seat assembly R	42	428	31

Rear No. 2 Seat Belt

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear No. 2 seat outer belt assembly (floor anchor) x Body	42	428	31
Rear No. 2 seat outer belt assembly (shoulder anchor) x Body	42	428	31
Rear No. 2 seat outer belt assembly (retractor) x Body	42	428	31
Rear seat inner belt sub assembly x Rear No. 2 seat assembly	42	428	31
Rear seat outer belt sub assembly x Rear No. 2 seat assembly R	42	428	31
Rear No. 2 seat inner belt sub assembly x Rear No. 2 seat assembly	42	428	31
Rear No. 2 seat belt assembly 3 point type (upper part of retractor) x Body	42	428	31
Rear No. 2 seat belt assembly 3 point type (lo er art of retract)x Body	42	428	31
Rear No. 2 seat belt assembly 3 point type (through anchor)x Body	42	428	31

Refrigerant c arge e

Condenser Core Thickness	Air Conditioning Type	Cool Box	Refrigerant Charge Amount
22 mm (0.866 in.)	w/o Rear Cooler	w/ Cool Box	Standard: 870 +/-30 g (30.7 +/-1.1 oz.)
		w/o Cool Box	Standard: 870 +/-30 g (30.7 +/-1.1 oz.)
	w/ Rear Cooler	w/ Cool Box	Standard: 1010 +/-30 g (35.6 +/-1.1 oz.)
		w/o Cool Box	Standard: 960 +/-30 g (33.9 +/-1.1 oz.)
16 mm (0.630 in.)	w/o Rear Cooler	w/ Cool Box	Standard: 770 +/-30 g (27.2 +/-1.1 oz.)
		w/o Cool Box	Standard: 770 +/-30 g (27.2 +/-1.1 oz.)
	w/ Rear Cooler	w/ Cool Box	Standard: 970 +/-30 g (34.2 +/-1.1 oz.)
		w/o Cool Box	Standard: 920 +/-30 g (32.5 +/-1.1 oz.)

REFRIGERANT LINE

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler condenser assembly	5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe A x Cooler condenser assembly	5.4	55	48 in.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Cool box assembly	5.4	55	48 in.*lbf
w/ Cool Box quid hose x Cool box assembly	5.4	55	48 in.*lbf
w/ Cool Box quid hose x Air conditioner tube and accessory assembly	5.4	55	48 in.*lbf
Air conditioner tube and accessory assembly x Body	9.8	1	87 in.*lbf

FRONT AIR CONDITIONING UNIT (for LHD)

Part tightened		N*m	kgf*cm	ft.*lbf
Instrument panel reinforcement assembly x Body		18	184	1
nstrument panel reinforcement assembly x Body Floor panel		9.8	1	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioning unit assembly	Bolt	9.8	1	87 in.*lbf
	crew	6.0	61	53 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Body		9.8	1	87 in.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf

FRONT AIR CONDITIONING UNIT (for RHD)

Part tightened		N*m	kgf*cm	ft.*lbf
Instrument panel reinforcement assembly x Body		18	184	1
nstrument panel reinforcement assembly x Body Floor panel		9.8	1	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioning unit assembly	Bolt	9.8	1	87 in.*lbf
	crew	6.0	61	53 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Body		9.8	1	87 in.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf

REAR AIR CONDITIONING UNIT (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

REAR AIR CONDITIONING UNIT (w/o Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

REAR BLOWER MOTOR

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

BLOWER MOTOR CONTROLLER (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

BLOWER RESISTOR (w/o Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

COMPRESSOR (for 1GR-FE)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	4.5	50	18

COMPRESSOR (for 2UZ-FE)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	45	459	33

COMPRESSOR (for 1VD-FTV)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	4.5	50	18

CONDENSER

Part tightened		N*m	kgf*cm	ft.*lbf
gh pitched horn assembly x Body		18	194	14
ow pitched horn assembly x Body		18	194	14
diator support sub-assembly x Body		1.7	1	1
ood lock assembly x diator support sub-assembly		5.5	56	49 in.*lbf
hroud blower assembly x diator support sub-assembly		9.8	1	87 in.*lbf
ood lock support brace sub-assembly x Body	for nut	5.5	56	49 in.*lbf
	for bolt	1.7	1	1
rasmission oil cooler air duct x licooler assembly		4.9	50	43 in.*lbf
licooler assembly x Body		1	1	9
Cooler condenser assembly x Body		9.8	1	87 in.*lbf
No. 1 cooler refrigerant discharge hose x Cooler condenser assembly		5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe A x Cooler condenser assembly		5.4	55	48 in.*lbf
Cap x Cooler condenser assembly		9	30	n.ŧlbf

FRONT EVAPORATOR TEMPERATURE SENSOR (for LHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf

FRONT EVAPORATOR TEMPERATURE SENSOR (for RHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf

REAR EVAPORATOR TEMPERATURE SENSOR (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

HEATER WATER PUMP (w/ Viscous Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
Idler pulley bracket x Engine assembly	48.5	495	3
Idler pulley assembly x Engine assembly	48.5	495	3
isous with magnet clutch heater assembly x Engine assembly	48.5	495	3

PRESSURE SWITCH

Part tightened	N*m	kgf*cm	ft.*lbf
Pressure switch x Cooler refrigerant liquid pipe A	1 .8	11	8

REFRIGERANT LINE

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler condenser assembly	5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe A x Cooler condenser assembly	5.4	55	48 in.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Cool box assembly	5.4	55	48 in.*lbf
w/ Cool Box quid hose x Cool box assembly	5.4	55	48 in.*lbf
w/ Cool Box quid hose x Air conditioner tube and accessory assembly	5.4	55	48 in.*lbf
Air conditioner tube and accessory assembly x Body	9.8	1	87 in.*lbf

FRONT AIR CONDITIONING UNIT (for LHD)

Part tightened		N*m	kgf*cm	ft.*lbf
Instrument panel reinforcement assembly x Body		18	184	1
nstrument panel reinforcement assembly x Body Floor panel		9.8	1	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioning unit assembly	Bolt	9.8	1	87 in.*lbf
	crew	6.0	61	53 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Body		9.8	1	87 in.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf

FRONT AIR CONDITIONING UNIT (for RHD)

Part tightened		N*m	kgf*cm	ft.*lbf
Instrument panel reinforcement assembly x Body		18	184	1
nstrument panel reinforcement assembly x Body Floor panel		9.8	1	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioning unit assembly	Bolt	9.8	1	87 in.*lbf
	crew	6.0	61	53 in.*lbf
w/ Cool Box Air conditioning hose and accessory x Body		9.8	1	87 in.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly		3.5	3	3 in.*lbf

REAR AIR CONDITIONING UNIT (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

REAR AIR CONDITIONING UNIT (w/o Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

REAR BLOWER MOTOR

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

BLOWER MOTOR CONTROLLER (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

BLOWER RESISTOR (w/o Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Body	5.4	55	48 in.*lbf

COMPRESSOR (for 1GR-FE)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	4.5	50	18

COMPRESSOR (for 2UZ-FE)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	45	459	33

COMPRESSOR (for 1VD-FTV)

Part tightened	N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly	9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly	9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly	18	184	1
Cooler compressor assembly x Engine	4.5	50	18

COMPRESSOR (for UR-FE)

Part tightened		N*m	kgf*cm	ft.*lbf
No. 1cooler refrigerant discharge hose x Cooler compressor assembly		9.8	1	87 in.*lbf
uction hose sub-assembly x Cooler compressor assembly		9.8	1	87 in.*lbf
gnet clutch assembly x Cooler compressor assembly		18	184	1
Cooler compressor assembly x Engine	ud bolt	1	1	
	olt	4.5	50	18
	Nut	4.5	50	18

CONDENSER

Part tightened		N*m	kgf*cm	ft.*lbf
gh pitched horn assembly x Body		18	194	14
ow pitched horn assembly x Body		18	194	14
diator support sub-assembly x Body		1.7	1	1
ood lock assembly x diator support sub-assembly		5.5	56	49 in.*lbf
hroud blower assembly x diator support sub-assembly		9.8	1	87 in.*lbf
ood lock support brace sub-assembly x Body	for nut	5.5	56	49 in.*lbf

for bolt	1.7	1	1
rasmission oil cooler air duct x licooler assembly	4.9	50	43 in.*lbf
licooler assembly x Body	1	1	9
Cooler condenser assembly x Body	9.8	1	87 in.*lbf
No. 1 cooler refrigerant discharge hose x Cooler condenser assembly	5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe A x Cooler condenser assembly	5.4	55	48 in.*lbf
Cap x Cooler condenser assembly	9	30	n.*lbf

FRONT EVAPORATOR TEMPERATURE SENSOR (for LHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf

FRONT EVAPORATOR TEMPERATURE SENSOR (for RHD)

Part tightened	N*m	kgf*cm	ft.*lbf
Air conditioner tube and accessory assembly x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf
w/ Cool Box No. 1 connector tube x No. 1 cooler evaporator sub-assembly	3.5	3	3 in.*lbf

REAR EVAPORATOR TEMPERATURE SENSOR (w/ Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
ear cooling unit assembly x Air conditioning accessory assembly	5.4	55	48 in.*lbf
ear side No. aiduct x ear cooling unit assembly	5.4	55	48 in.*lbf
ear cooling unit expansion valve x Evaporator sub-assembly	3.5	3	3 in.*lbf
Air conditioner accessory assembly x ear cooling unit assembly	5.4	55	48 in.*lbf

HEATER WATER PUMP (w/ V Heater)

Part tightened	N*m	kgf*cm	ft.*lbf
Idler pulley bracket x Engine assembly	48.5	495	3
Idler pulley assembly x Engine assembly	48.5	495	3
isous with magnet clutch heater assembly x Engine assembly	48.5	495	3

PRESSURE SWITCH

Part tightened	N*m	kgf*cm	ft.*lbf
Pressure switch x Cooler refrigerant liquid pipe A	1 .8	11	8

INSTRUMENT PANEL SAFETY PAD

Part Tightened	N*m	kgf*cm	ft.*lbf
Steering wheel assembly x Steering column assembly	50	510	37
Steering wheel assembly x Steering pad assembly	8.8	90	78 in.*lbf
Front passenger airbag assembly x Instrument panel reinforcement	20	204	15
ri eside knee airbag assembly x Instrument panel reinforcement	10	102	7
Front passenger side knee airbag assembly x Instrument panel reinforcement	10	102	7
Air conditioning hose and accessory x No. 2 cooler evaporator sub-assembly	9.8	100	87 in.*lbf
Liquid hose x Air conditioner tube and accessory assembly	9.8	100	87 in.*lbf

FRONT CONSOLE BOX (w/ Cool Box)

Part Tightened	N*m	kgf*cm	ft.*lbf
Air conditioning hose and accessory x No. 2 cooler evaporator sub-assembly	9.8	100	87 in.*lbf
Liquid hose x Air conditioner tube and accessory assembly	9.8	100	87 in.*lbf
Liquid hose x No. 2 cooler evaporator sub-assembly	5.4	55	48 in.*lbf

ROOF HEADLINING (w/ Sliding Roof)

Part Tightened	N*m	kgf*cm	ft.*lbf
Seat belt shoulder anchor x body	42	428	31
No. 2 seat belt anchor x body	42	428	31
No. 1 seat belt anchor x body	42	428	31
Seat belt anchor x body	42	428	31
Front quarter trim panel assembly LH x ody (w earcN2 Seat xcept Face to Face Seat Type	12	122	9
Front quarter trim panel assembly x ody (w earcN2 Seat xcept Face to Face Seat Type	12	122	9

ROOF HEADLINING (w/o Sliding Roof)

Part Tightened	N*m	kgf*cm	ft.*lbf
Seat belt shoulder anchor x body	42	428	31
No. 2 seat belt anchor x body	42	428	31
No. 1 seat belt anchor x body	42	428	31
Seat belt anchor x body	42	428	31
Front quarter trim panel assembly LH x ody (w earcN2 Seat xcept Face to Face Seat Type	12	122	9
Front quarter trim panel assembly x ody (w earcN2 Seat xcept Face to Face Seat Type	12	122	9

POWER WINDOW REGULATOR MOTOR (for Front Door)

Part Tightened	N*m	kgf*cm	ft.*lbf
Front power window regulator motor assembly x Front door window regulator	5.4	55	48 in.*lbf
Front door window regulator sub-assembly x Body	8.0	82	in.*lbf
Front door glass sub-assembly x Body	8.0	82	in.*lbf

POWER WINDOW REGULATOR MOTOR (for Rear Door)

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear power window regulator motor assembly x ear doorwindow regulator	5.4	55	48 in.*lbf
Rear door window regulator sub-assembly x Body	8.0	82	in.*lbf

WINDSHIELD GLASS

Part Tightened	N*m	kgf*cm	ft.*lbf
Front wiper arm LH x Body	25	255	18
Front wiper arm RH x Body	25	255	18

BACK WINDOW GLASS

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear wiper motor assembly x Body	5.5	56	49 in.*lbf
Rear wiper arm x Body	5.5	56	49 in.*lbf

SLIDING ROOF HOUSING

Part Tightened		N*m	kgf*cm	ft.*lbf
Sliding roof glass sub-assembly x Sliding roof housing		5.5	56	49 in.*lbf
Sliding roof housing x Body	for Bolt	5.5	56	49 in.*lbf
	for Nut	5.5	56	49 in.*lbf
Sliding roof drive gear x Sliding roof housing		5.4	55	48 in.*lbf

HOOD

Part tightened	N*m	kgf*cm	ft.*lbf
Hood x Hinge	13	133	10
Hood lock x Body	5.5	56	49 in.*lbf

HOOD SUPPORT

Part tightened	N*m	kgf*cm	ft.*lbf
Back door stay bolt x Body	18	184	13
Back door stay bolt x Hood	18	184	13

HOOD LOCK CONTROL CABLE ASSEMBLY

Part tightened	N*m	kgf*cm	ft.*lbf
Hood lock x Body	5.5	56	49 in.*lbf

FRONT DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
Body hinge x Body	26	265	19
oor hinge x oor panel	26	265	19
trik r mounting x Body	23	235	17
oor check x oor panel	8.0	82	71 in.*lbf
oor check x Body	27	275	20
Front door outside handle frame sub-assembly LH x Body	4.0	41	35 in.*lbf
oor lock x oor panel	5.0	51	44 in.*lbf
Front door outside handle co e LH x Body	4.0	41	35 in.*lbf
Front power window regulator motor assembly LH x Front door window regulator sub-assembly LH	5.4	55	48 in.*lbf
Front door window regulator sub-assembly LH x oor panel	8.0	82	71 in.*lbf
Front door glass sub-assembly LH x Front door window regulator assembly	8.0	82	71 in.*lbf
Body ground x oor panel	8.4	86	74 in.*lbf

REAR DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
Body hinge x Body	26	265	19
oor hinge x oor panel	26	265	19
trik r mounting x Body	23	235	17
oor check x oor panel	8.0	82	71 in.*lbf
oor check x Body	27	275	20
ear door outside handle frame sub-assembly LH x Body	4.0	41	35 in.*lbf
oor lock x oor panel	5.0	51	44 in.*lbf
ear no. 1 power window regulator motor assembly LH x ear door window regulator sub-assembly LH	5.4	55	48 in.*lbf
ear door window regulator sub-assembly LH x oor panel	8.0	82	71 in.*lbf
Body ground x oor panel	8.4	86	74 in.*lbf

BACK DOOR

Part tightened	N*m	kgf*cm	ft.*lbf
ai gate hinge x Body	28	286	21
ai gate hinge x ai gate panel	31	316	23
trik r mounting x Body	12	122	9
ng gate striker mounting x ai gate panel	12	122	9
Back door hinge x Body	19	286	21
Back door hinge x Back door panel	19	286	21
Lower tail gate lock assembly LH x ai gate panel	5.0	51	44 in.*lbf
Back door remote control assembly x ai gate panel	5.0	51	44 in.*lbf
Lower tail gate lock assembly H x ai gate panel	5.0	51	44 in.*lbf

Back door opener switch assembly x Back door panel	5.0	51	44 in.*lbf
Back door lock assembly x Back door panel	13	133	10
ear wiper motor assembly x Back door panel	5.5	56	49 in.*lbf
ear wiper arm x Back door panel	5.5	56	49 in.*lbf
eaplate sub-assembly x Back door panel	12	122	9
eawheel carrier lock striker assembly x eaplate sub-assembly	5.0	51	44 in.*lbf
eawheel carrier auxiliary stopper x Back door panel	12	122	9
eawheel carrier lock control cable assembly x eawheel carrier assembly	5.0	51	44 in.*lbf
eawheel carrier lock control cable assembly x Body	28.4	290	21
eatire x eawheel carrier assembly	90	918	66

BACK DOOR OPENER SWITCH

Part tightened	N*m	kgf*cm	ft.*lbf
Back door opener switch assembly x Back door panel	5.0	51	44 in.*lbf

BACK DOOR SUPPORT

Part tightened	N*m	kgf*cm	ft.*lbf
Back door stay bolt x Body	22	224	16
Back door stay bolt x Back door panel	22	224	16

FUEL LID LOCK CONTROL CABLE ASSEMBLY (for LHD)

Part tightened	N*m	kgf*cm	ft.*lbf
eat belt anchor x Body	42	428	31

FUEL LID LOCK CONTROL CABLE ASSEMBLY (for RHD)

Part tightened	N*m	kgf*cm	ft.*lbf
eat belt anchor x Body	42	428	31

Outer Rear View Mirror

Part tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Front door panel	8.0	82	71 in.*lbf

FRONT WIPER MOTOR

Part Tightened	N*m	kgf*cm	in.*lbf
Windshield wiper motor assembly x Windshield wiper link assembly	7.5	76	66 in.*lbf
Windshield wiper link assembly x Body	7.0	71	62 in.*lbf
ont wiper arm L x Windshield wiper link assembly	25	255	18
ont wiper arm R x Windshield wiper link assembly	25	255	18

REAR WIPER MOTOR

Part Tightened	N*m	kgf*cm	in.*lbf
Rear wiper motor assembly x Back door panel	5.5	56	49 in.*lbf
Rear wiper arm x Rear wiper motor assembly	5.5	56	49 in.*lbf

WIPER SWITCH

Part Tightened	N*m	kgf*cm	in.*lbf
Lower steering column co er x Upper steering column co er	2.0	20	18 in.*lbf

WASHER MOTOR (for Front Side)

Part Tightened	N*m	kgf*cm	in.*lbf
Windshield washer ar assembly x Body	8.0	82	71 in.*lbf
Side step assembly x Body	30	306	22

WASHER MOTOR (for Rear Side)

Part Tightened	N*m	kgf*cm	in.*lbf
Windshield washer ar assembly x Body	8.0	82	71 in.*lbf
Side step assembly x Body	30	306	22

WASHER NOZZLE (for Front Side)

Part Tightened	N*m	kgf*cm	in.*lbf
ont wiper arm L x Windshield wiper link assembly	25	255	18
ont wiper arm R x Windshield wiper link assembly	25	255	18

HEADLIGHT CLEANER ACTUATOR

Part Tightened	N*m	kgf*cm	in.*lbf
eadlightwasher actuator sub assembly x ont bumper co er	1.1	11	10 in.*lbf

HEADLIGHT CLEANER MOTOR

Part Tightened	N*m	kgf*cm	in.*lbf
Windshield washer ar assembly x Body	8.0	82	71 in.*lbf
Side step assembly x Body	30	306	22

RELAY (w/ Headlight Cleaner System)

Part Tightened	N*m	kgf*cm	in.*lbf
Windshield washer ar assembly x Body	8.0	82	71 in.*lbf
Side step assembly x Body	30	306	22

Part Tightened	N*m	kgf*cm	ft.*lbf
Fog light x Bumper	5.0	51	44 in. lbf

LOW PITCHED HORN

Part Tightened	N*m	kgf*cm	ft.*lbf
Low pitched horn x Body	19	194	14

HIGH PITCHED HORN

Part Tightened	N*m	kgf*cm	ft.*lbf
High pitched horn x Body	19	194	14

FRONT BUMPER (for Standard)

Part Tightened	N*m	kgf*cm	ft.*lbf
Front bumper reinforcement sub-assembly x Front No. 2 bumper extension sub-assembly	71	724	52
Front No. 2 bumper extension sub-assembly x Body	67	683	49
Fog light assembly x Front bumper cover	5.0	51	44 in.*lbf
Front bumper hole cover x Front bumper cover	5.0	51	44 in.*lbf
Headlight washer actuator sub-assembly x Front bumper cover (w/ Headlight Cleaner System	1.1	10	10 in.*lbf

FRONT BUMPER (w/ Winch)

Part Tightened	N*m	kgf*cm	ft.*lbf
Fog light assembly x Front bumper cover	5.0	51	44 in.*lbf
Front bumper hole cover x Front bumper cover	5.0	51	44 in.*lbf

REAR BUMPER (for Standard)

Part Tightened	N*m	kgf*cm	ft.*lbf
Spare wheel carrier sub-assembly x Body (w/ Tire Carrier)	28.4	290	21

REAR BUMPER (w/ Pintle Hook)

Part Tightened	N*m	kgf*cm	ft.*lbf
Pintle hook assembly x Body	65	663	48
Spare wheel carrier sub-assembly x Body (w/ Tire Carrier)	28.4	290	21

ROOF RACK

Part Tightened	N*m	kgf*cm	ft.*lbf
ack ladder sub-assembly x oof rack assembly	28	286	21
oof rack assembly x Body	45	459	33
No.1 roof rack deck board x No. 1 roof rack support plate	8.3	85	73 in.*lbf
No. 1 roof rack support plate x o er roof rack side rail frame	8.3	85	73 in.*lbf
No. 1 roof rack end cover x oof rack side rail frame	8.3	85	73 in.*lbf
No. 1 roof rack end cover x oof rack frame sub assembly	8.3	85	73 in.*lbf
oof rack side frame support x o er roof rack side rail frame	8.3	85	73 in.*lbf
Front roof rack leg x o er roof rack side rail frame	8.3	85	73 in.*lbf
ear roof rack leg x o er roof rack side rail frame	8.3	85	73 in.*lbf
Center roof rack leg x o er roof rack side rail frame	8.3	85	73 in.*lbf

ROOF RACK LADDER

Part Tightened	N*m	kgf*cm	ft.*lbf
ack ladder sub-assembly x oof rack assembly	28	286	21
No. 2 quarter panel step sub-assembly H x Body (w/o Tire Carrier)	28	286	21

ROOF CARRIER

Part Tightened	N*m	kgf*cm	ft.*lbf
oof carrier assembly x Body	39	398	29

FRONT DOOR BELT MOULDING

Part Tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Body	8.0	82	71 in.*lbf
Front door glass sub-assembly x Body	8.0	82	71 in.*lbf

ROOF DRIP SIDE FINISH MOULDING

Part Tightened	N*m	kgf*cm	ft.*lbf
oof rack bracket x Body	10	102	7

No. 2 roof drip side finish moulding retainer x Body (w/ oof Carrier	10	102	7

ROCKER PANEL MOULDING

Part Tightened	N*m	kgf*cm	ft.*lbf
Side step assembly x Body	30	306	22

FRONT DOOR WINDOW FRAME MOULDING

Part Tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Body	8.0	82	71 in.*lbf
Front door glass sub-assembly x Body	8.0	82	71 in.*lbf

SIDE STEP

Part Tightened	N*m	kgf*cm	ft.*lbf
Side step assembly x Body	30	306	22

BLACK OUT TAPE (for Front Door)

Part Tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Body	8.0	82	71 in.*lbf
Front door glass sub-assembly x Body	8.0	82	71 in.*lbf

Winch	Wire diameter Minimum	7.5 mm (0.295in.)

Win Unit

Part Tightened	N*m	kgf*cm	ft.*lbf
Winch assembly x Body	33	336	24
Winch roller bracket assembly x Front base member	21.6	220	15
Winch roller bracket assembly x Front base member	28.4	289	20
Front base member x Winch	21.6	220	15
Winch base x Winch	32.3	329	23
Winch base x Winch	58.8	599	43
No. 2 winch earth wire x Winch base	19	194	15
No. 2 winch earth wire x Winch motor assembly	17.5	178	12
Vehicle wire x Winch motor assembly	9.3	95	83 in.*lbf
Winch x Winch motor assembly	15.7	160	12
Magnet switch winch cover x Winch motor magnet switch assembly	1.5	15	13 in.*lbf
Winch x Winch motor magnet switch assembly	4.9	50	43 in.*lbf
Winch motor magnet switch assembly x Wire harness	9.3	95	82 in.*lbf
Winch motor brush x Winch motor brush holder assembly	3.4	35	30 in.*lbf

Win Flui

Part Tightened	N*m	kgf*cm	ft.*lbf
Winch x Drain plug	14.7 to 19.6	150 to 199	11 to 14