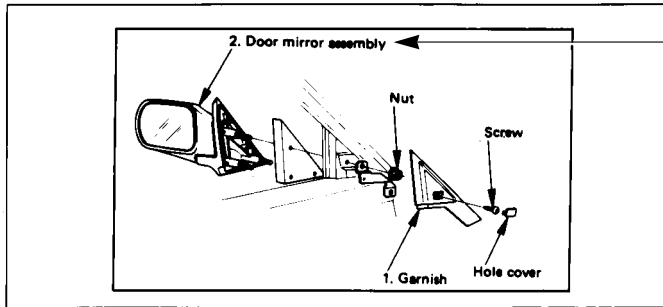


0A-4 GENERAL INFORMATION

For illustrations where there are few items to be performed:



The sequence of removal (disassembly) and the parts names will be given.

- After the illustration, the details of each operation are shown in the order the operations are carried out in the illustration. Refer to the explanations when checking important

information such as the notes in each operation, and places where special tools are to be used and their usage, and the specified service data.

REASSEMBLY

25. Pinion Shaft
 Pinion seal installer: 5-8840-0602-0 (J-38304-9)
 Slide oil seal onto shaft.

6. Adjust Plug Lock Nut
 Adjust plug lock nut wrench: 5-8840-0232-0 (J-35309)

- Tighten the adjust plug to 5 N·m (0.5 kg·m / 43 lb·in), loosen the plug and once again tighten plug to 5 N·m (0.5 kg·m / 43 lb·in).
- Back off plug 26° then tighten the lock nut.
- Check the pinion shaft preload.

| Pinion Shaft Preload | N·m (kg·cm / lb·in) |
|---------------------------------|---------------------|
| 0.6 - 1.6 (6 - 16 / 5.3 - 14.1) | |

Torque should be between 0.6-1.6 N·m (6-16 kg·cm / 5.3-14.1 lb·in)
 NOTE: Due to tolerances, some sockets will require wrapping shim stock around the stub shaft serrations to make a tight enough fit.

The symbol mark attached to the title indicates the action to be taken in the operations of each title.
 Example for this case;
 1st step - Reassemble pinion shaft

The numbers given to the installation (assembly) procedure are the same as those given in the removal (disassembly) procedure in the illustration. Therefore, start with the larger number during reassembly.

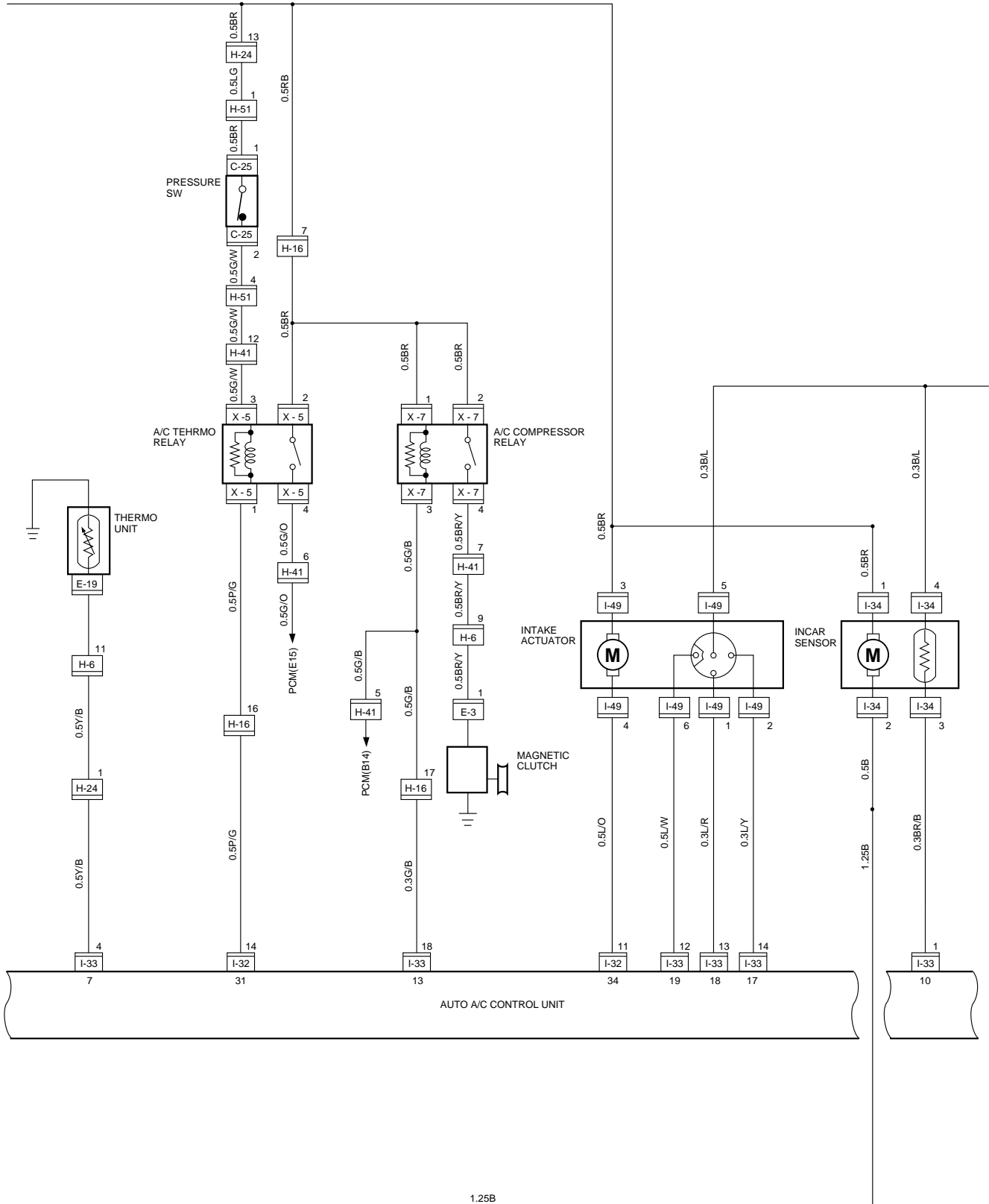
The titles of operations done in the illustration are given in bold letters. They are described in the order of the procedure of the operations.

Special tools are identified with tool name and/or tool number. The drawing illustrates how the tool is used.

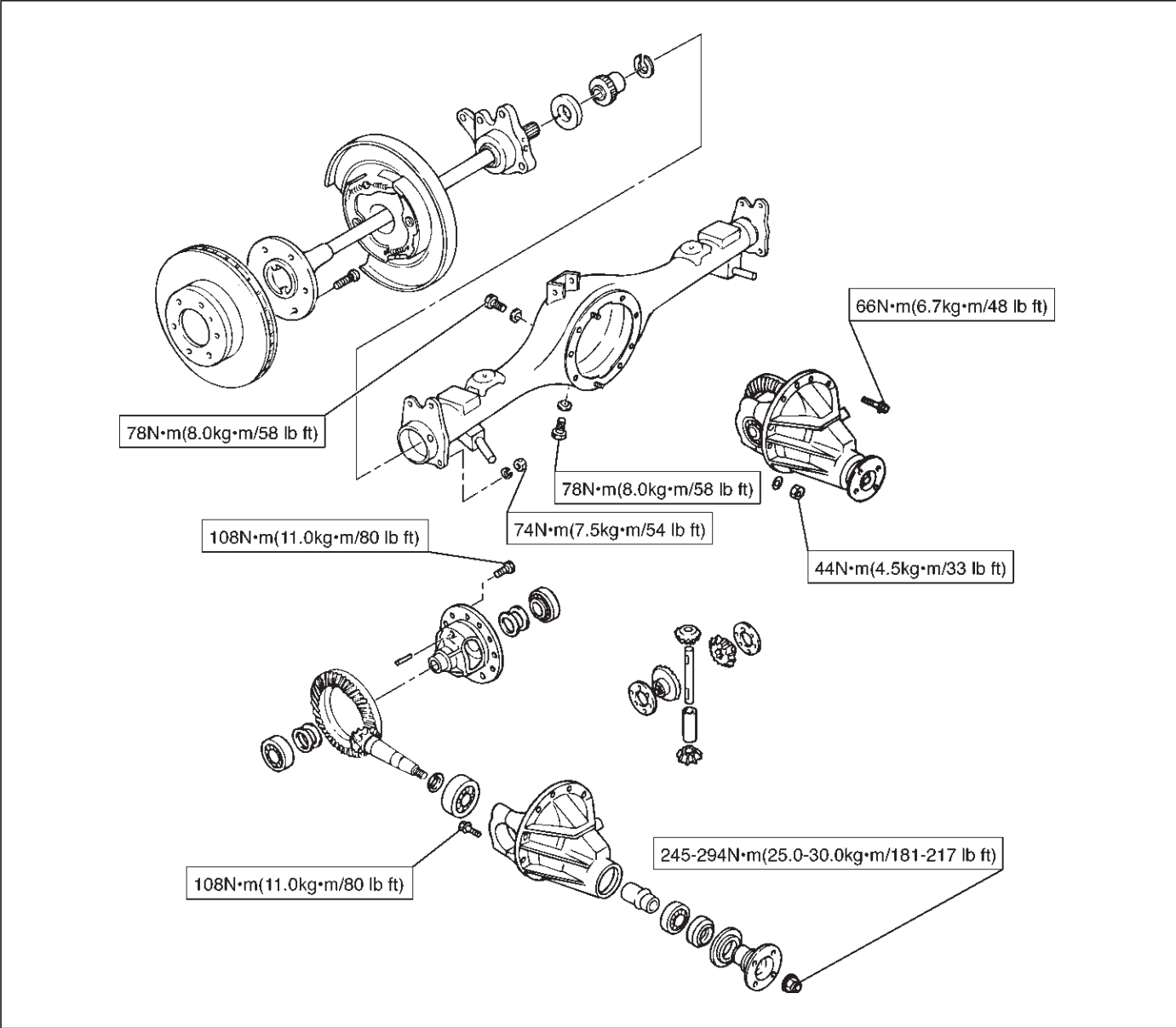
Service data and specifications are listed in table.

Important note.

The action symbol indicates the step of service to be followed. Refer to the following paragraph for the meaning of each symbol.



Torque Specifications



Fuel System Diagnosis

| Step | Action | Value(s) | Yes | No |
|------|--|----------------------------|---------------|-------------------------------|
| 1 | Was the "On-Board Diagnostic (OBD) System Check" performed? | — | Go to Step 2 | Go to <i>OBD System Check</i> |
| 2 | 1. Turn the ignition "OFF." 2. Turn the air conditioning system "OFF." 3. Relieve fuel system pressure and install the fuel pressure gauge. 4. Turn the ignition "ON." NOTE: The fuel pump will run for approximately 2 seconds. Use Tech 2 to command the fuel pump "ON". 5. Observe the fuel pressure indicated by the fuel pressure gauge with the fuel pump running. Is the fuel pressure within the specified limits? | 290-376 kPa (42-55 psi) | Go to Step 3 | Go to Step 17 |
| 3 | NOTE: The fuel pressure will drop when the fuel pump stops running, then it should stabilize and remain constant. Does the fuel pressure indicated by the fuel pressure gauge remain constant? | — | Go to Step 4 | Go to Step 12 |
| 4 | 1. When the vehicle is at normal operation temperature, turn the ignition "ON" to build fuel pressure and observe the measurement on the gauge. 2. Start the engine and observe the fuel pressure gauge. Did the reading drop by the amount specified after the engine was started? | 21-105 kPa (3-15 psi) | Go to Step 5 | Go to Step 9 |
| 5 | Is fuel pressure dropping off during acceleration, cruise, or hard cornering? | — | Go to Step 6 | Check for improper fuel |
| 6 | Visually and physically inspect the following items for a restriction: <ul style="list-style-type: none"> ● The in-pipe fuel filter. ● The fuel feed line. Was a restriction found? | — | Verify repair | Go to Step 7 |
| 7 | Remove the fuel tank and visually and physically inspect the following items: <ul style="list-style-type: none"> ● The fuel pump strainer for a restriction. ● The fuel line for a leak. ● Verify that the correct fuel pump is in the vehicle. Was a problem found in any of these areas? | — | Verify repair | Go to Step 8 |
| 8 | Replace the fuel pump. Is the action complete? | — | Verify repair | — |
| 9 | 1. Disconnect the vacuum hose from the fuel pressure regulator. 2. With the engine idling, apply 12-14 inches of vacuum to the fuel pressure regulator. Does the fuel pressure indicated by the fuel pressure gauge drop by the amount specified? | 21-105 kPa (3-15 psi) | Go to Step 10 | Go to Step 11 |

SECTION 6B

ENGINE COOLING

CONTENTS

| | PAGE |
|-----------------------------|-------|
| General Description | 6B- 1 |
| On-Vehicle Service | 6B- 5 |
| Water Pump | 6B- 5 |
| Thermostat | 6B- 7 |
| Radiator | 6B- 9 |
| Drive Belt Adjustment | 6B-15 |

GENERAL DESCRIPTION

(4JG2-T)

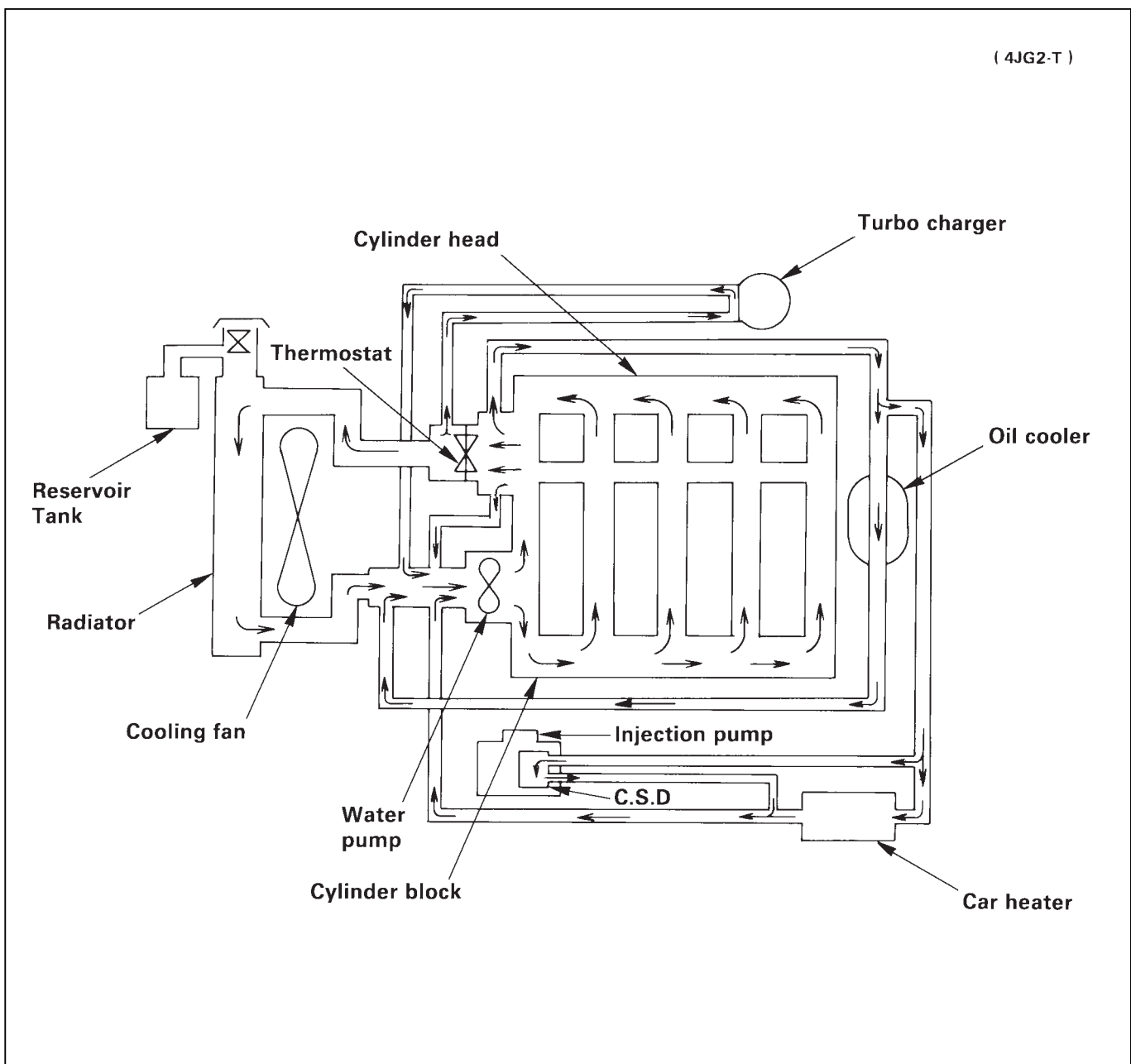


Chart 13: Shudder Only During Torque Converter Clutch (TCC) Applying

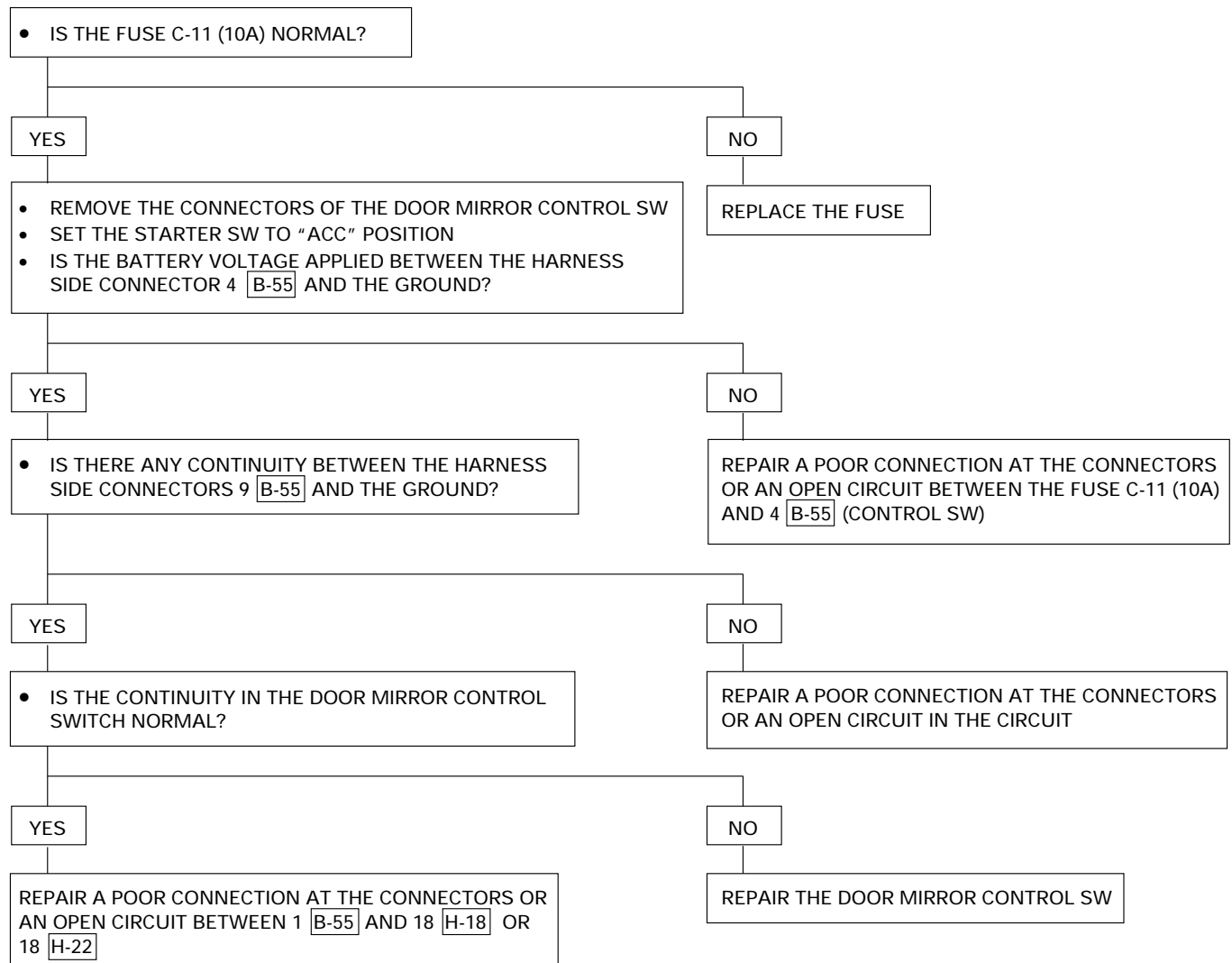
| Step | Action | Yes | No |
|------|--|--|--|
| 1 | <p>1. TCC shudder is one of the most commonly misdiagnosed conditions in an automatic transmission. The key to diagnosing TCC shudder is to note when it happens and under what conditions. Once the TCC has been fully applied, it is nearly impossible to make it shudder. TCC shudder (short burst of noise normally less than 1 second) will only occur during clutch applying. It is not a steady state condition.</p> <p>2. Drive until whole drivetrain is at normal operating temperature.</p> <ul style="list-style-type: none"> – On 4WD vehicles, the test must be performed with transfer case selector lever in “2H” position. – Shudder is a short burst of noise normally less than 1 second in duration, and can be induced by the following maneuver: <p>3. From coast condition at 50 mph in “D” range (Normal mode), depress the throttle to 1/4-1/3 throttle. If present, shudder will occur within 5 seconds together with TCC application. (The scan tool may be used to determine the exact time of TCC applying)</p> <p>Was the problem found?</p> | <p>Replace transmission fluid and filter (remove both pans) and flush cooler lines. Replace converter assembly and O-ring on turbine shaft</p> | <p>Perform mechanical inspection of other drivetrain components.</p> |

Chart 14: Possible Causes Of Transmission Noise

CAUTION: Before checking transmission for what is believed to be transmission noise, ensure presence and positioning of insulating plugs, pads etc. Also make sure that noise does not come from other drivetrain components.

| Condition | Possible cause | Correction |
|---|---------------------------------------|--|
| Whine or Buzz | Oil level low | Fill with ATF, check for external leaks. |
| | Plugged or restricted oil filter | Inspect oil filter. Replace oil filter or ATF as necessary. |
| | Damaged oil filter gasket | Replace oil filter gasket. |
| Knocking noise from front of transmission. | Loose bolts (Converter to flex plate) | Tighten to specifications. |
| | Cracked or broken flex plate | Replace flex plate. |
| | Converter damaged | Replace converter. |
| Knocking noise while driving, mostly on acceleration. | Transmission mount loose or broken | Tighten mount bolts or replace transmission mount. |
| | Cooler line mounts loose or broken | Tighten or replace cooler line mounts. |
| | Cooler lines touching body or frame | Repair or replace as necessary. |
| Knocking noise when vehicle is stationary. | Loose flex plate mounting bolts | Tighten to specifications. |
| | Cracked or broken flex plate | Replace flex plate. |
| | Damaged converter | Replace converter. |

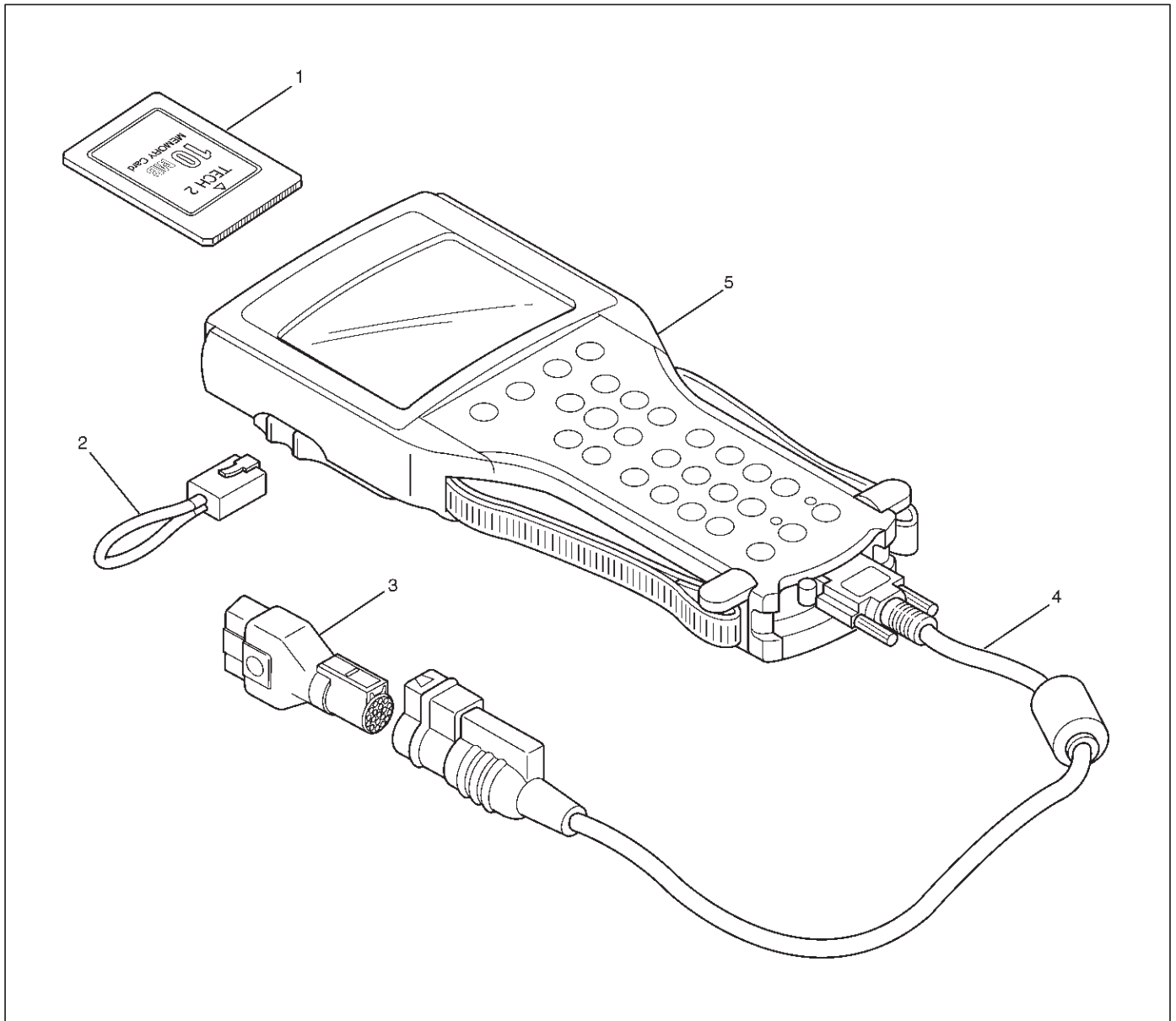
1. Mirrors On Both Sides Do Not Operate



4B2-40 DRIVE LINE CONTROL SYSTEM (TOD)

Tech 2 Scan Tool

From 98 MY, Isuzu dealer service departments are recommended to use Tech 2. Please refer to Tech 2 scan tool user guide.



Legend

- (1) PCMCIA Card
- (2) RS 232 Loop Back Connector

- (3) SAE 16/19 Adaptor
- (4) DLC Cable
- (5) Tech-2

On-Board Diagnostic (OBD) System Check

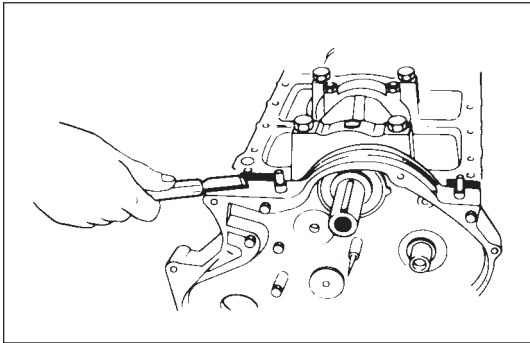
| Step | Action | Value(s) | Yes | No |
|------|--|----------|--|--|
| 1 | 1. Ignition "ON," engine "OFF." 2. Observe the malfunction indicator lamp (MIL or "Check Engine" lamp). Is the MIL ("Check Engine" lamp) "ON?" | — | Go to Step 2 | Go to No MIL ("Check Engine" lamp) |
| 2 | 1. Ignition "OFF." 2. Install a Tech 2. 3. Ignition "ON." 4. Attempt to display PCM engine data with the Tech 2. Does the Tech 2 display PCM data? | — | Go to Step 3 | Go to Step 8 |
| 3 | 1. Using the Tech 2 output tests function, select MIL ("Check Engine" lamp) dash lamp control and command the MIL ("Check Engine" lamp) "OFF." 2. Observe the MIL ("Check Engine" lamp). Did the MIL ("Check Engine" lamp) turn "OFF?" | — | Go to Step 4 | Go to MIL ("Check Engine" lamp) On Steady |
| 4 | Attempt to start the engine. Did the engine start and continue to run? | — | Go to Step 5 | Go to Cranks But Will Not Run |
| 5 | Select "Display DTCs" with the Tech 2. Are any DTCs stored? | — | Go to Step 6 | Go to Step 7 |
| 6 | Are two or more of the following DTCs stored? P0107, P0108, P0113, P0118, P0122, P0123, P0712.? | — | Go to "Multiple PCM Information Sensor DTCs Set" | Go to applicable DTC table |
| 7 | Compare PCM data values displayed on the Tech 2 to the typical engine scan data values. Are the displayed values normal or close to the typical values? | — | Refer to Typical scan data value | Refer to indicated Component System Checks |
| 8 | 1. Ignition "OFF," disconnect the PCM. 2. Ignition "ON," engine "OFF." 3. Check the Class 2 data circuit for an open, short to ground, or short to voltage. Also, check the DLC ignition feed circuit for an open or short to ground and the DLC ground circuit for an open. 4. If a problem is found, repair as necessary. Was a problem found? | — | Go to Step 2 | Go to Step 9 |
| 9 | Attempt to display PCM data with the Tech 2. Does the Tech 2 display PCM engine data? | — | Go to Step 2 | Go to Step 10 |
| 10 | Replace the PCM. IMPORTANT: The replacement PCM must be programmed. Refer to <i>Powertrain Control Module (PCM) in On-Vehicle Service</i> . Is the action complete? | — | Go to Step 2 | — |

- 2) Tighten the timing gear case bolt together with the timing gear case gasket to the specified torque.

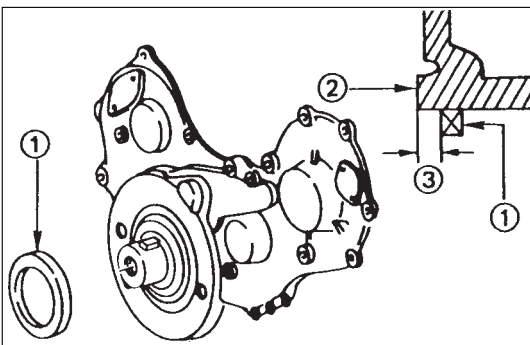
N·m(kg·m/lb·ft)



19 (1.9/14)



- 3) Cut away the gasket protruding above the fitting surfaces (as shown in the illustration).



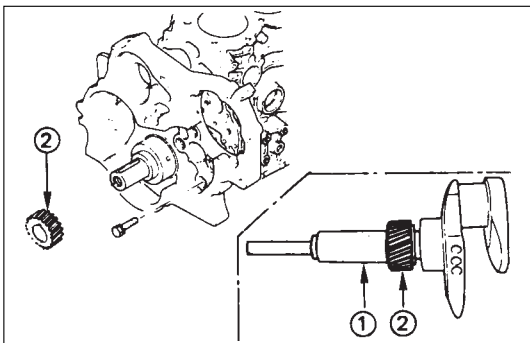
4. Crankshaft Front Oil Seal

- Use the installer to install the front oil seal (1) to the gear case cover (2).

Oil Seal Installer: 5-8840-2061-0

Note the oil seal installation depth (3) shown in the illustration.

Depth (3) = 1 mm (0.0394 in.)



3. Crankshaft Timing Gear

Use the crankshaft timing gear installer (1) to install the timing gear (2).

The crankshaft timing mark ("X - X") must be facing outward.

Crankshaft Timing Gear Installer: 5-8522-0024-0



2. Camshaft Timing Gear

- Tighten the fixing bolt to the specified torque.

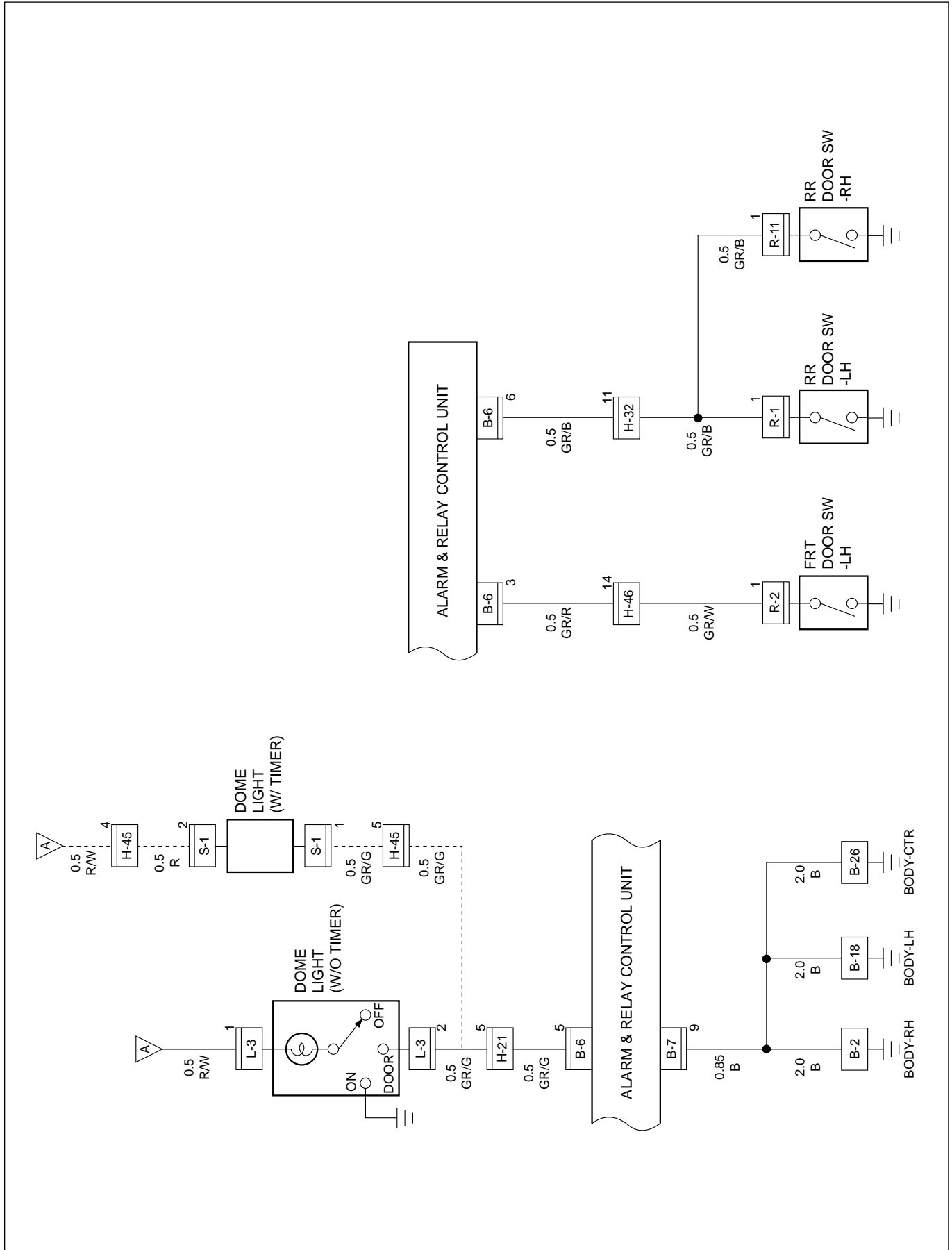
N·m(kg·m/lb·ft)

64 (6.5/47)

1. Cylinder Head

- Refer to "Cylinder head" in Section 6A2.

Circuit Diagram (LHD)-2



3. Transponder

If a transponder key is lost;

If a transponder key is lost, all transponder keys in the immobilizer control system must be erased. Transponder keys can be ordered via the “Your proper organization name such as Parts and accessory department” as previously by providing the mechanical key number.

The mechanical key number is provided on the car pass.

Thereafter, existing and new transponder keys are programmed consecutively using Tech-II. The vehicle can then no-longer be started using lost key.

5 transponder keys can be provided;

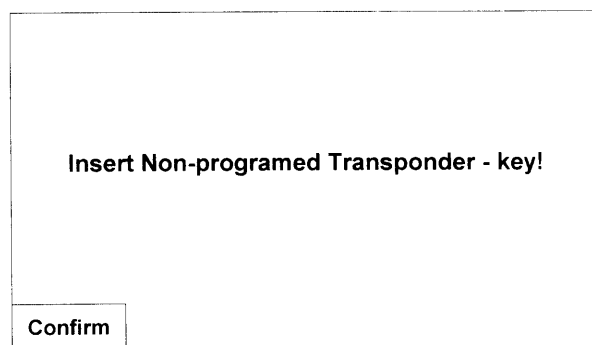
Each transponder has different Identifications. If a customer wants more than 2 transponder keys, maximum 5 transponder keys can be provided by additional programming by Tech-II.

If a new ignition key with different mechanical key number needs to be installed; If installation of an ignition lock with a different mechanism key number is necessary (an ignition lock which belongs to the mechanical key number has to be ordered first), all transponder keys must first be erased and the two transponder keys which belong to the ignition lock that is now installed must be programmed.

The new mechanical key number must be programmed now into the immobilizer. The mechanical key number in the car pass is to be changed as well.

Transponder program

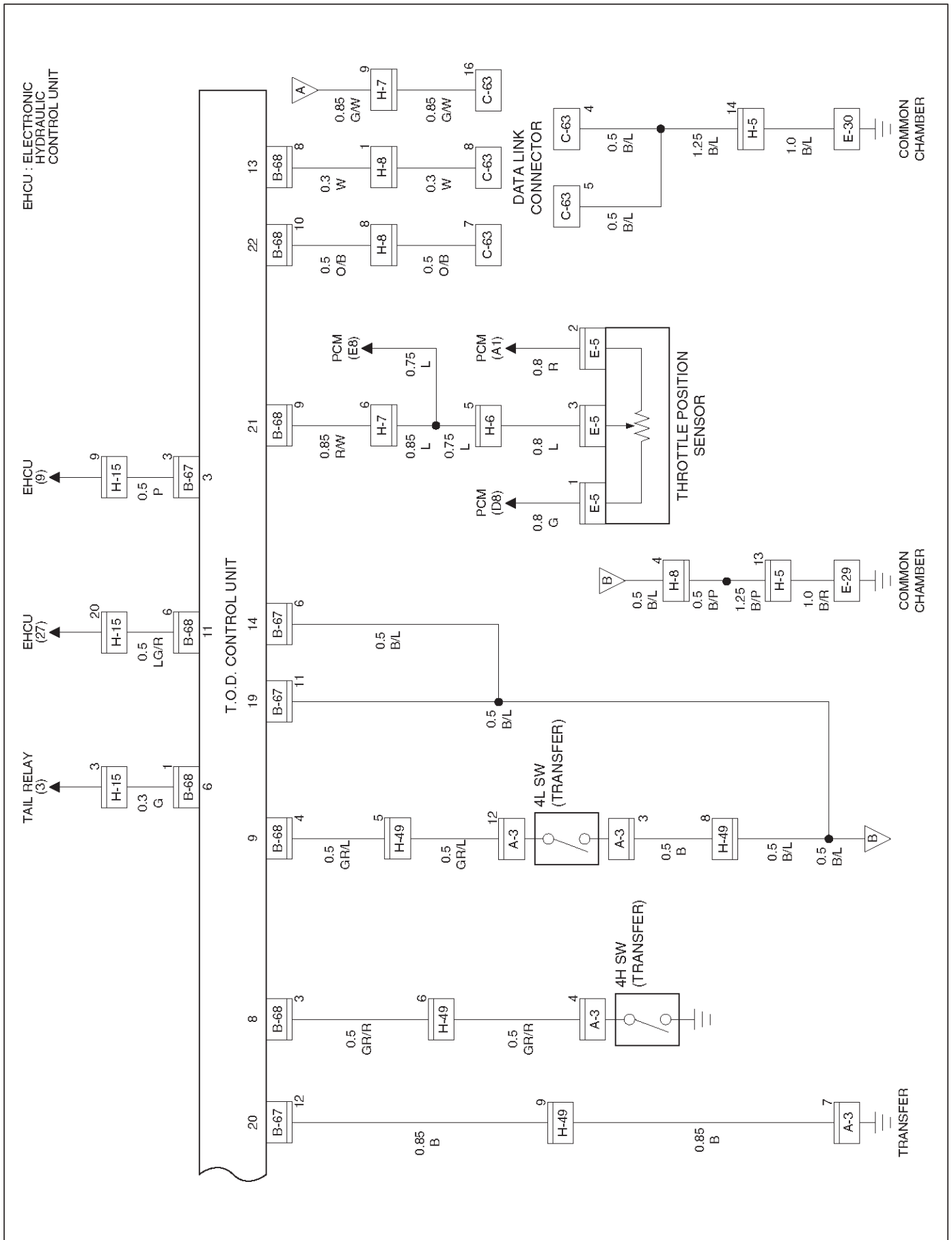
1. Connect Tech-II, select “Body” and “Immobilizer”.
2. Select program TP-Key mode.
3. See immobilizer status on Tech-II screen, and enter security code. If the status does not allow the programming, only immobilizer status is displayed.
4. Insert Non-programed Transponder-key and press soft key of “Confirm”.

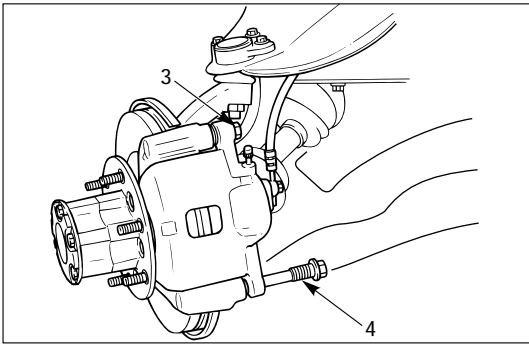


5. “Turn On ignition key”, is displayed if the ignition is off.
6. The transponder status is displayed if the status does not allow the programming.
7. When programming starts “Programming Transponder - key!” is displayed.

4B2-24 DRIVE LINE CONTROL SYSTEM (TOD)

Circuit Diagram-3 (RHD 6VE1)





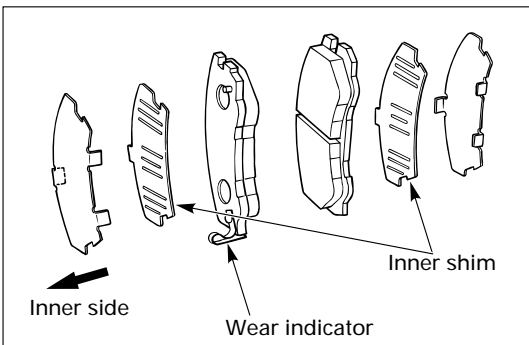
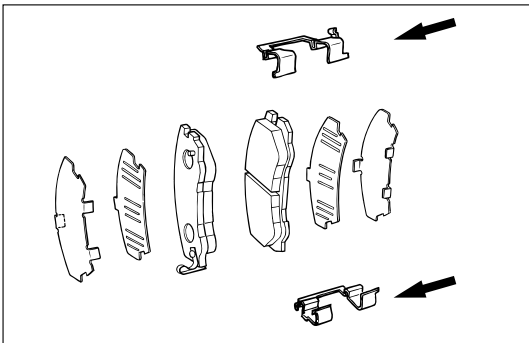
- 3. Guide Bolt
- 4. Lock Bolt

- 5. Caliper Assembly
- 6. Support Bracket with Pad Assembly
 - Take care not to damage the flexible brake hose when removing the support bracket.
- 7. Pad Assembly with Shim
 - Mark the lining locations if they are to be reinstalled.
- 8. Clip

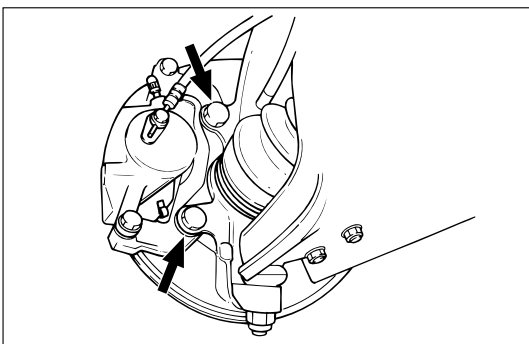


INSTALLATION

- 8. Clip



- 7. Pad Assembly with Shim
 - Apply special greae (approx 0.2 g) to the both contacting surfaces of inner shims. Wipe off extruded grease after installing.



- 6. Support Bracket

| Support Bracket Torque | N·m (kg·m / lb·ft) |
|------------------------|--------------------|
| | 155 (15.8 / 115) |

REMOVAL

Prior to removal, be sure to confirm and record the group code of the injector installed using Tech2.

1. Disconnect battery ground cable.
2. Remove air cleaner cover and air duct.
3. Remove intercooler.
Refer to "Intercooler" in this manual.
4. Remove PCV hose and pipe.
5. Remove cylinder head noise insulator cover.
6. Remove high pressure oil pipe.

CAUTION:

- 1) **Sleeve nut should be loosened with cloth tied around to prevent oil from spurting due to the remaining pressure.**
- 2) **High oil pressure pipe should be disconnected with cloth tied around the intake manifold glow plug to prevent oil from flowing out of the oil rail.**
7. Loosen eye bolt of fuel pipe at fuel pump side.

NOTE: Cloth should be put around the loosened eye bolt to prevent fuel from flowing out.

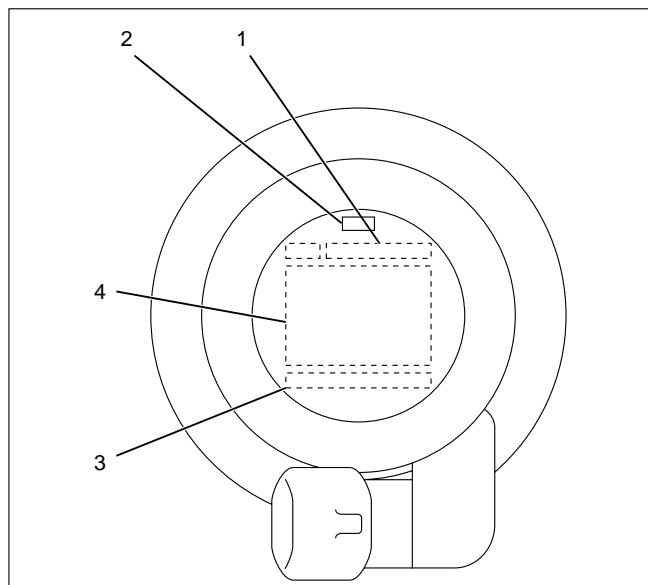
8. Remove fuel return hose at chassis side.
9. Remove PCV hose to cylinder head cover.
10. Remove cylinder head cover.
11. Drain the oil from oil rail assembly.

NOTE: Do not drop O-ring

12. Record the grade code of injector for each cylinder that is indicated on the upper portion of injector.
There are nine kinds of grade code available, one alphabet letter and one numeral letter.

Grade code

| Category number |
|-----------------|
| A – 1 |
| A – 2 |
| A – 3 |
| B – 1 |
| B – 2 |
| B – 3 |
| C – 1 |
| C – 2 |
| C – 3 |



055RW00001

Legend

- (1) Part Number
- (2) Category Number (Grade code)
- (3) Serial Number
- (4) Bar Code

13. Remove harness connector from each injector.
14. Loosen nuts and bolts for oil rail.
15. Remove injector fixing bolts.
16. Remove injector clamp.
17. Remove injector assembly.

INSTALLATION

1. Install oil rail, tighten temporarily
2. Install injector assembly.

NOTE:

- 1) Do not forget to install O-ring between injector and oil rail.
- 2) Use new O-ring
- 3) Clean O-ring groove and fitting surface of parts.
- 4) Apply engine oil to O-ring.
3. Install injector fixing bolts, tighten temporarily.
4. Install injector clamp, tighten nut temporarily.
- Apply engine oil to washer both side.
5. Tighten injector fixing bolts to the specified torque.

Torque: 7 N·m (0.7 kg·m / 61 lb in)

6. Tighten injector clamp nut to the specified torque with special method.

Torque: 30 N·m (3.1 kg·m / 22 lb ft) then loosen a time again tighten as following torque.

Torque: 25 N·m (2.5 kg·m / 18 lb ft)

7. Tighten oil rail to the specified torque.

Torque: 20 N·m (2.0 kg·m / 14 lb ft)