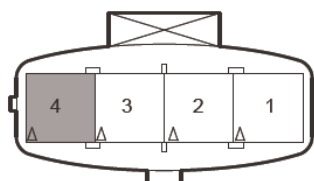


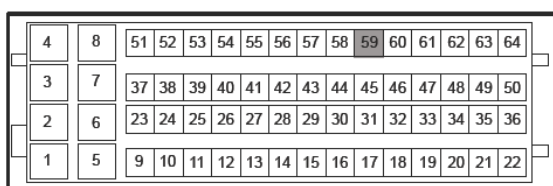
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Intake Air Pressure Temperature Sensor
Harness Connector EN16

ECM Harness Connector (479Q) EN30



LC02-5306b

- Turn the ignition switch to "OFF" position.
- Disconnect intake manifold absolute pressure sensor harness connector EN16.
- Disconnect ECM harness connector EN30.
- Measure resistance between intake manifold absolute pressure sensor harness connector EN16 terminal No.4 and ECM harness connector EN30 terminal No.59. Check whether the circuit is open. If there is no open circuit, repair faulty part.
- Measure resistance between intake manifold absolute pressure sensor harness connector EN16 terminal No.4 and a reliable ground. Check whether the circuit is short to ground. If there is no short circuit, repair faulty part.
- Measure voltage between intake manifold absolute pressure sensor harness connector EN16 terminal No.4 and a reliable ground. Check whether the circuit is short to power supply. If there is no short circuit, repair faulty part.

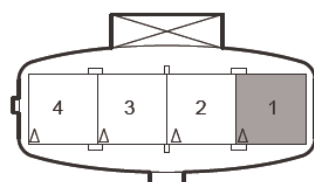
Test Items	Standard Value
Resistance Between EN16 (4) and EN30 (59)	Less than 1 Ω
Voltage Between EN16 (4) and A Reliable Ground	10k Ω or higher
Voltage Between EN16 (4) and A Reliable Ground	0 V

Normal

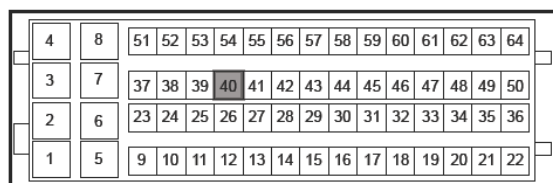
Go to step 9

Step 8

Check sensor ground circuit.

Intake Air Pressure Temperature Sensor
Harness Connector EN16

ECM Harness Connector (479Q) EN30



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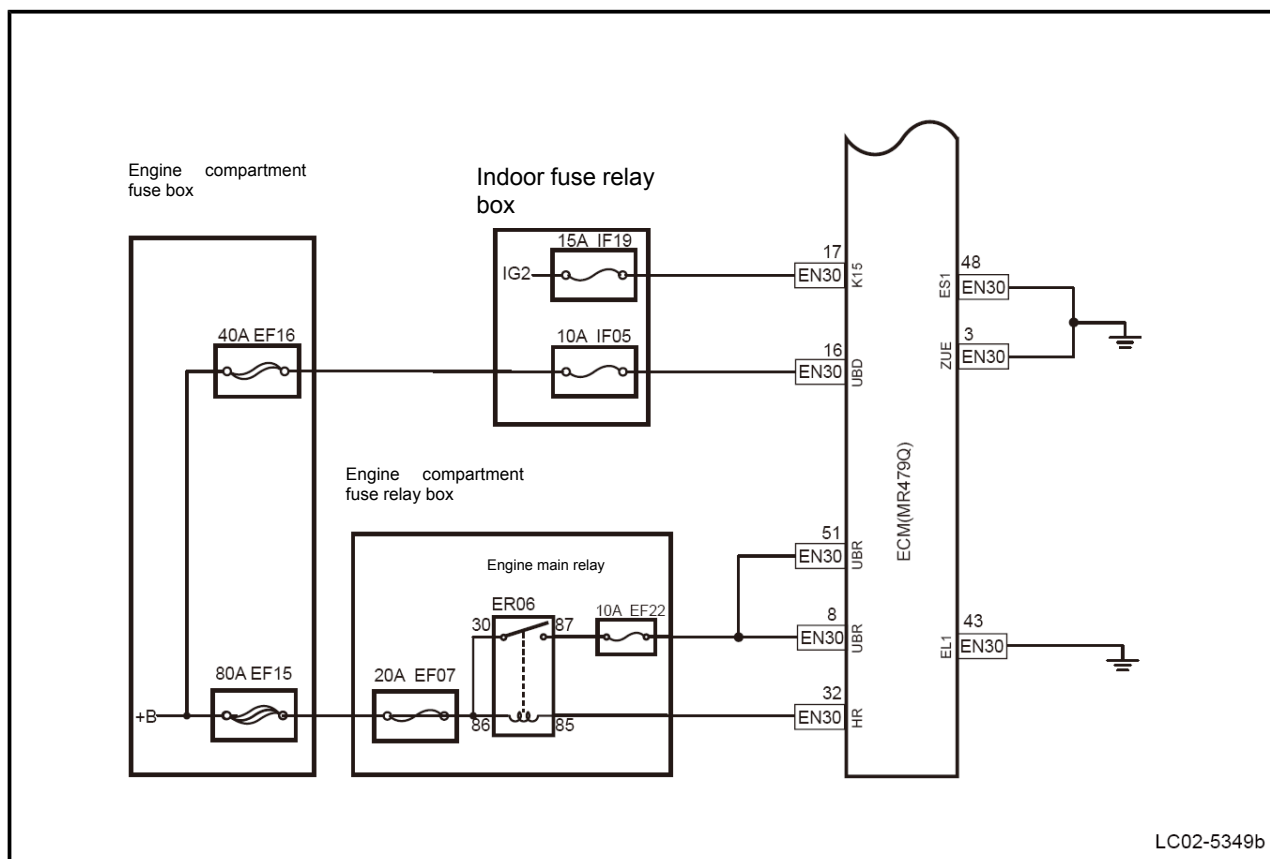
- Turn the ignition switch to "OFF" position.
- Disconnect intake manifold absolute pressure sensor harness connector EN16.
- Disconnect ECM harness connector EN30.
- Measure resistance between intake manifold absolute pressure sensor harness connector EN16 terminal No.1 and ECM harness connector EN30 terminal No.40. Check whether the circuit is open. If there is no open circuit, repair the faulty part.
- Measure voltage between intake manifold absolute pressure sensor harness connector EN16 terminal No.1 and a reliable ground. Check whether the circuit is short to power supply. If there is no short circuit repair the faulty part.

Test Items	Standard Value
Resistance Between EN16 (1) and EN30 (40)	Less than 1 Ω
Voltage Between EN16 (1) and A Reliable Ground	0 V

Execute next step as per normal.

DTC Code	DTC Detection Strategy	Conditions for Setting the DTC (Control Strategy)	Fault Locations
P0560	System check	Battery voltage is lower than 2.5 V.	1. ECM Power Supply Circuit 2. Generator 3. ECM
P0562	Lower Than the Lower Limit	1. Battery voltage is lower than 10.02 V. 2. Start time is longer than 180 s.	
P0563	Battery Voltage ADC Value	1. Battery voltage is higher than 17.02 V. 2. Vehicle speed is greater than 25 km/h. 3. Start time is longer than 180 s.	

3. Schematic:



4. Diagnostic Steps:

Step 1	Check fuses EF15, EF16, EF07, EF07, IF19.
--------	---

2.5.5.7 Vibration at Idle and When Engine Is Warming Up

Step 1	Check drive belt tension. Is it too loose or worn? Any fault?
	Yes If necessary, replace the drive belt. Confirm whether the fault is fixed.
	No
Step 2	Check whether engine oil and oil viscosity is normal?
	Yes Refill engine oil suitable for the current season temperature. Confirm whether the fault is fixed.
	No
Step 3	Check whether the generator and air-conditioning compressor is working properly. Any abnormal sound?
	Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 4	Check the valve, valve spring and other valve components. Any fault?
	Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 5	Check the piston pin gap. Does it exceed the specified value?
	Standard Value: (0.005 - 0.011 mm/0.0002 - 0.0004 in) Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 6	Check whether the connecting rod is bent?
	Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 7	Check piston to cylinder gap value. Does it exceed the specified value?
	Standard Value: (0.060 - 0.083 mm/0.0023 - 0.0033 in) Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 8	Check the piston pin offset. Does it exceed the specified value?
	Standard Value: (0.6 mm/0.0236 in) Yes Replace failed parts. Confirm whether the fault is fixed.
	No
Step 9	Confirm the fault is fixed.

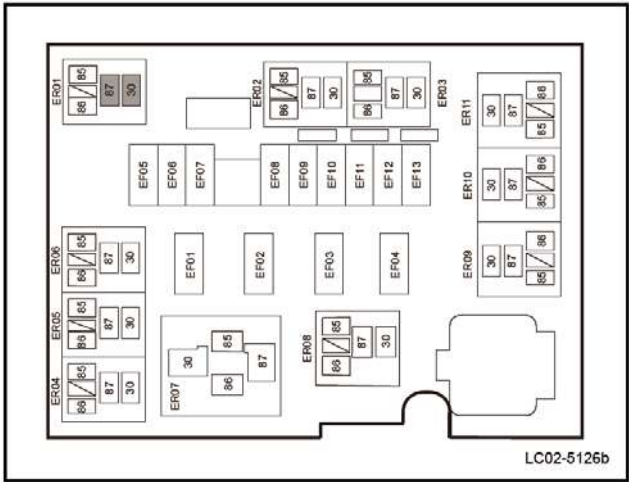
- (b) Connect fault diagnosis tester to diagnosis testing interface.
 - (c) Turn off A/C switch.
 - (d) Turn ignition switch to "ON".
 - (e) Select in sequence: engine/data list/ engine coolant temperature.
 - (f) Observe the temperature displayed on engine coolant temperature sensor. When the engine is completely cool, the temperature displayed shall be higher than ambient temperature.
- Confirm if the temperature displayed is normal.

No

Water temperature sensor or other circuit fault.
Refer to [2.2.7.16 DTC P0117 P0118](#)

Yes

Step 3	Remove and check cooling fan high speed relay ER01.
--------	---



- (a) Measure the resistance between high speed relay 1 terminal No. 87 and No. 30
- Standard resistance: 10kΩ or higher
- Check if the resistance conforms to standard value.

No
Yes

Replace relay

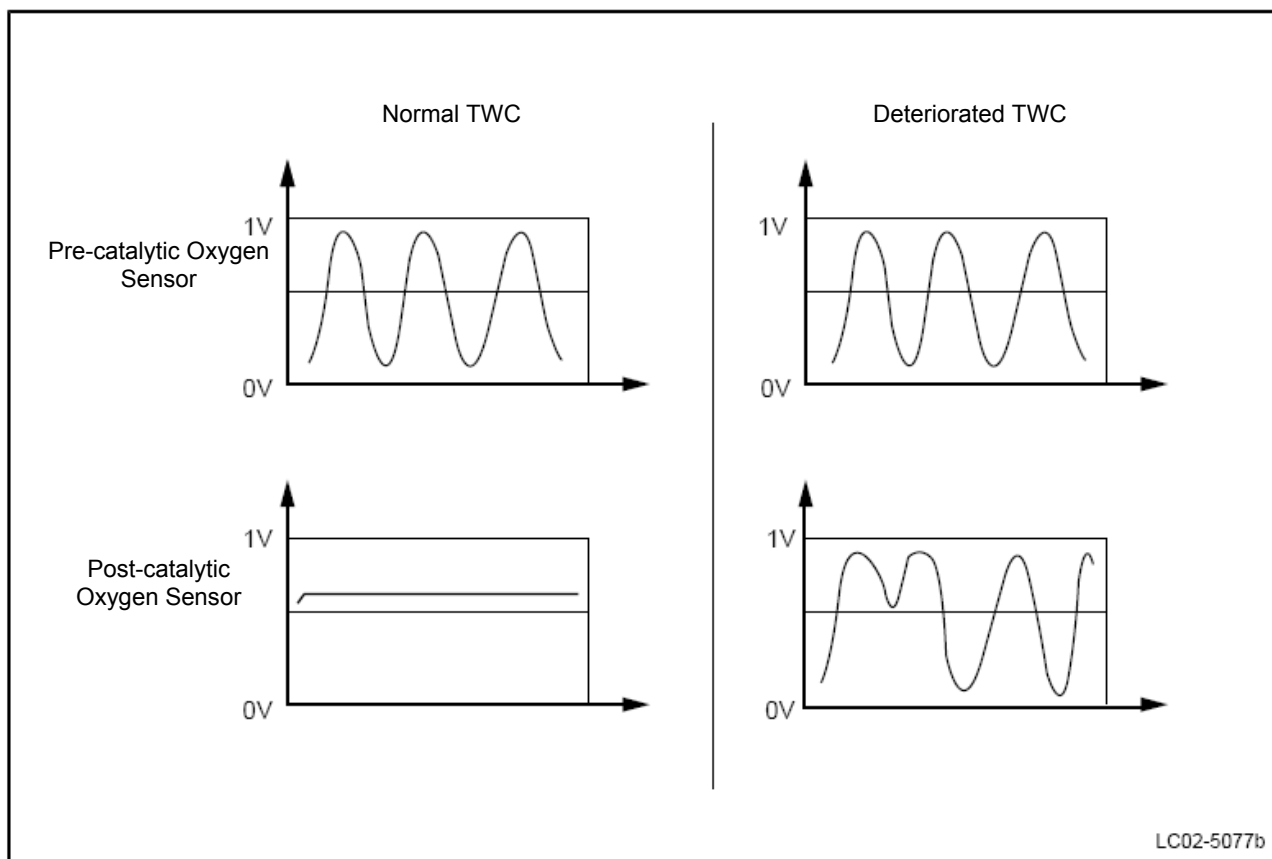
Yes

Step 4	Check the circuit between high speed relay ER01 plug No. 85 and ECM harness connector EN30 terminal No. 52.
--------	---

Step 2	Turn both vehicles' ignition switch to "OFF" position and turn off headlights and all the accessories power supplies.
Next	
Step 3	Press the hazard warning lamp switch, so that hazard warning lamps are on.
Next	
Step 4	Apply two vehicles parking brake.
Next	
Step 5	Make sure that the transmission gears are in neutral gear position.
	Warning! The jumper cable must be intact without exposed wires, otherwise it will cause unnecessary personal injury or vehicle damage.
Next	
Step 6	Connect one end of the red cable to the positive terminal of the battery with sufficient capacity providing the power, and confirm that there is no contact with other metal parts.
Next	
Step 7	Connect the other end of the red cable the positive terminal of the flat battery. Do not connect the red cable to the negative terminal of flat battery.
	Warning! Do not connect the jumper cable directly to a flat battery negative terminal to prevent the spark and possible battery gas explosion.
Next	
Step 8	Connect one end of the black cable to the negative terminal of the battery with sufficient capacity providing the power.
Next	
Step 9	Finally, connect the other end of the black cable to the flat battery engine ground, and at least 500mm (19.7 in) away form the flat battery.
Next	
Step 10	Start the vehicle, which has a battery with sufficient power, and run the engine speed at intermediate speed for more than 3min.
Next	
Step 11	Start the vehicle with the flat battery.
Next	
Step 12	Remove the by jumper cables in reverse order.

Note

Next



Yes

Step 5 Observe pre-catalytic oxygen sensor and post-catalytic oxygen sensor output voltages.

Whether pre-catalytic oxygen sensor and Post-catalytic oxygen sensor signal voltage is matching "Normal TWC" in the figure?

Yes

Intermittent Fault. Refer to [2.29.6.3 Intermittent Fault Check](#)

No

Warning!

Propane gas is a flammable gas. It is strictly prohibited to operate propane gas near a fire, otherwise it will cause a fire.

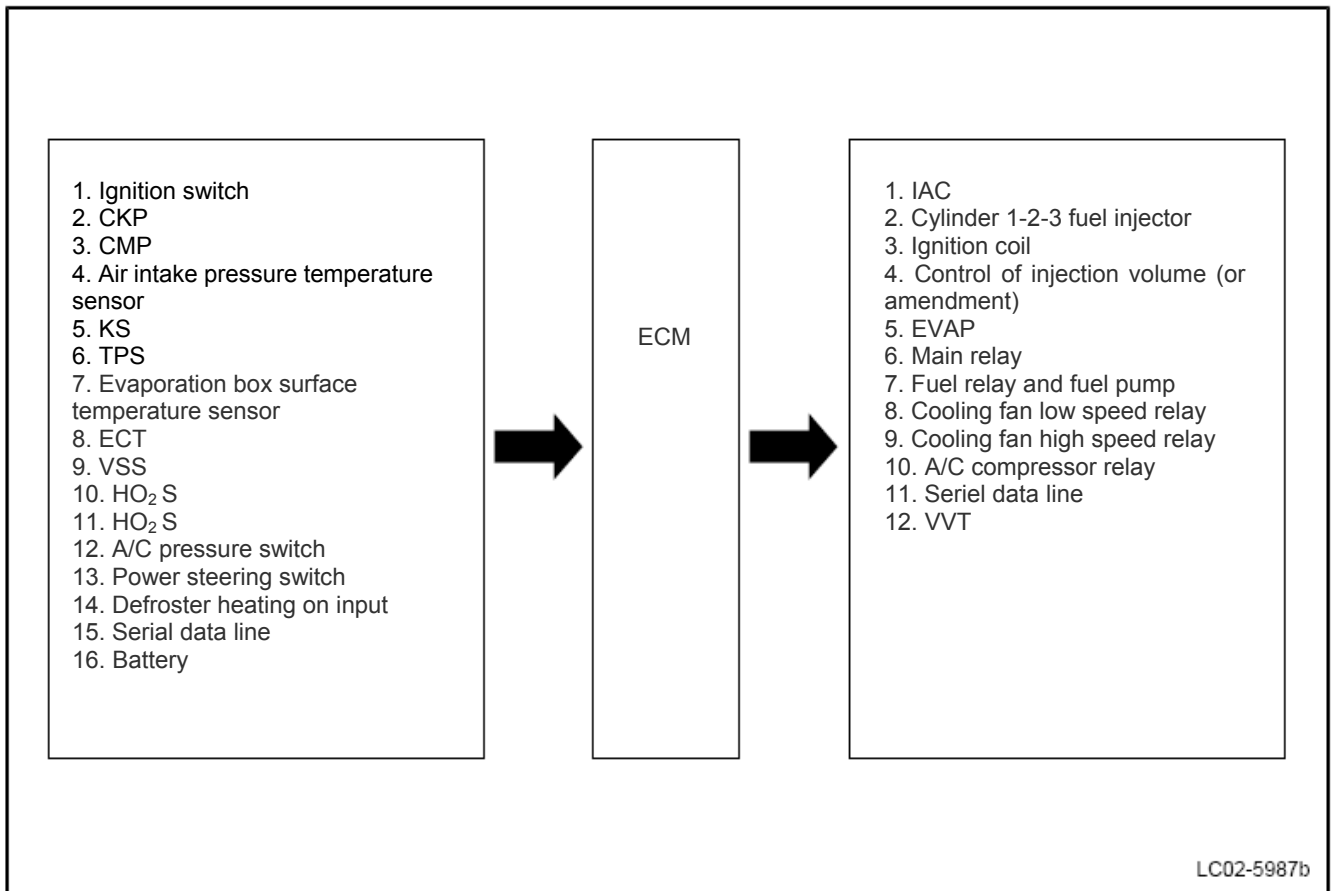
Step 6 Test the oxygen sensor signal.

- (a) If the voltage data is consistently below 0.45 V (mixture too lean), carry out the steps as following:
- Spray proper amount of propane gas into the intake.
 - Inspect whether the sensor voltage data changes significantly, as the signal voltage will increase rapidly.

Pre-catalytic Oxygen Sensor Signal Voltage	Post-catalytic Oxygen Sensor Signal Voltage	To Step
Obvious Change	No Change	A

2.29.5 Electric Diagram

2.29.5.1 Electric Diagram



Pre-catalytic Oxygen Sensor Signal Voltage	Post-catalytic Oxygen Sensor Signal Voltage	To Step
No Change	Obvious Change	B
Obvious Change	No Change	C
No Change	No Change	D

B

Replace the pre-catalytic oxygen sensor. Refer to [2.31.7.2 Pre-catalytic Oxygen Sensor Replacement](#). Go to step 11

C

Go to step 9

D

Check the cause for engine Air-fuel ratio too lean/too rich. Refer to [2.29.6.4 Fault Symptom Table](#)

A

Step 7	Check whether there is exhaust leakage.
--------	---

Yes

Repair the faulty part. Go to step 11

No

Step 8	Replace the three-way catalytic converter.
--------	--

Next

Go to step 11

Step 9	Check whether there is exhaust leakage.
--------	---

Yes

Repair the faulty part. Go to step 11

No

Step 10	Replace the post-catalytic oxygen sensor. Refer to 2.31.7.1 Post-catalytic Oxygen Sensor Replacement .
---------	--

Next

Step 11	Use scan tool to confirm whether the DTC code is stored again.
---------	--

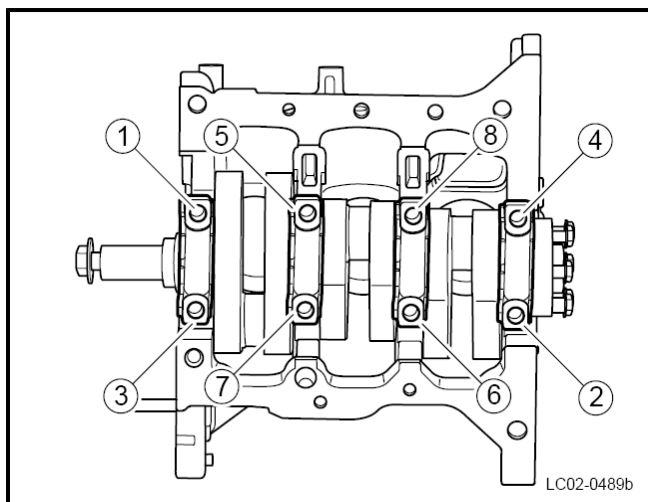
- Connect scan tool to the datalink connector.
- Turn the ignition switch to "ON" position.
- Clear DTC code.
- Start and run the engine at idle speed to warm up the engine for at least 5 min.
- Road test the vehicle for at least 10 min.
- Read control system DTC code again to confirm that the system has no DTC code.

No

Intermittent Fault. Refer to [2.29.6.3 check the intermittent fault](#)

Yes

Step 12	Make troubleshooting.
---------	-----------------------



2.32.7.17 Crankshaft Replacement

Removal Procedure:

1. Remove the engine Assembly. Refer to [2.32.7.12 Engine Assembly Replacement](#).
2. Remove the gearbox Assembly. Refer to [3.3.8.3 Transmission Assembly Replacement](#).
3. Remove the flywheel. Refer to [2.32.7.16 Flywheel Replacement](#).
4. Remove the crankshaft oil seals.
5. Remove the cylinder head cover. Refer to [2.32.7.13 Cylinder Head Assembly Replacement](#).
6. Remove the oil pump. Refer to [2.35.8.1 Oil Pump Replacement](#).
7. Remove the oil pan. Refer to [2.35.8.3 Oil Pan Replacement](#).
8. Remove the piston connecting rod and bearing. Refer to [2.32.7.15 Piston Connecting Rod and Bearing Replacement](#).
9. Remove the oil filter bolts.
10. Remove the crankshaft bearing cap bolts according to the sequence in the graphic.

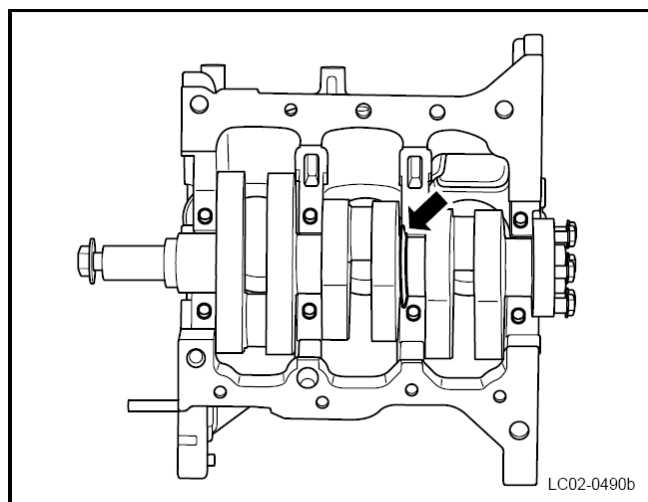
Note

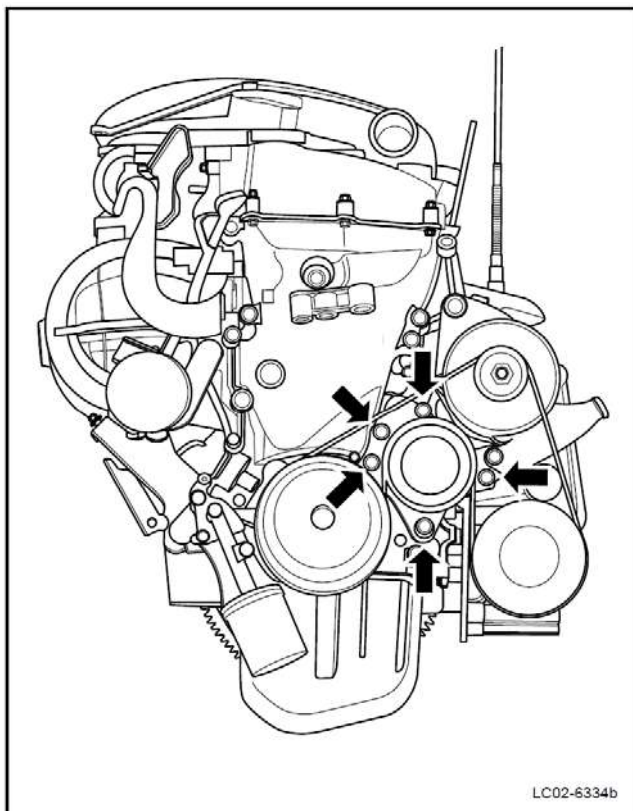
Do not loose a single bolt completely. Remove the bolt in multiple operations; otherwise it may cause damage to the crankshaft.

11. Remove crankshaft thrust spacer in the third bearing seat.

Note

When removing, rotate crankshaft to make it out together with thrust spacer.





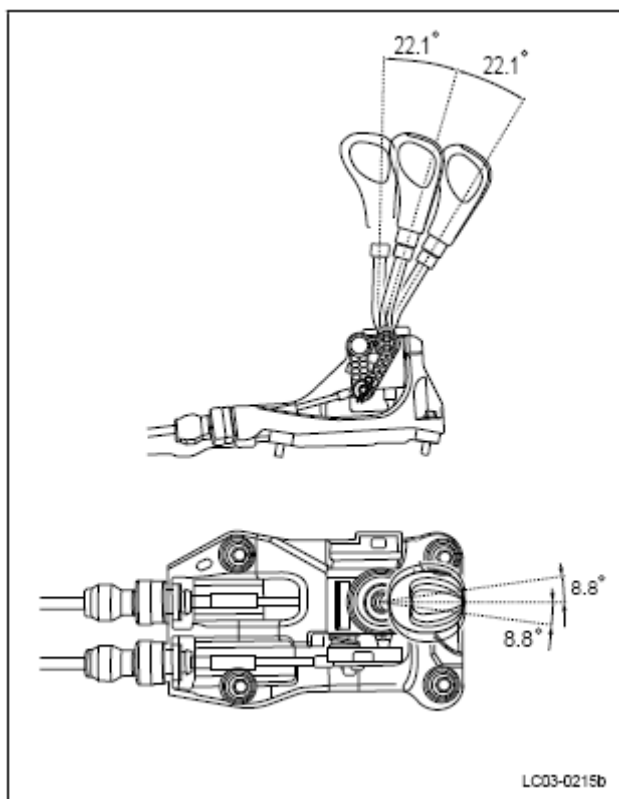
1. Discharge the engine coolant, refer to [2.7.8.1 emission and filling of engine coolant](#).
2. Remove the engine drive belt; refer to [2.5.6.3 drive belt replacement](#).
3. Remove the water pump belt plate.
4. Water Pump Bolts
5. Remove the water pump seals.

Water Pump Inspection:

Warning!

Refer to "Protective Goggles and Glove Warning" in "Warnings and Notices".

1. Check whether the pump body is cracking and leaking.
2. Check whether the water pump bearing has a gap or abnormal sound.
3. Check whether the water pump pulley has serious wear and tear. If the pump is damaged, replace the pump.



- (a) Disconnect manual shift control cable and transmission control assembly connections.
- (b) Operate the shift lever. Check whether the shift control cable can stretch freely and easily.
- (c) Transmission shift lever selectional force is < 8 N (1.8 LB), shifting force is < 4 N (0.9 LB). Transmission shift control travel should meet the range shown in the graphic.

Yes

Adjust or replace the gear control cable. Repair or replace the transmission shift control assembly or fork.

Yes

Step 4	Check transmission shift control cable movement.
--------	--

- (a) Disconnect cable between the shift lever and the transmission control cable connection.
- (b) Check whether the transmission control cable is difficult to stretch or broken.

Yes

Replace the transmission shift control cable.

No

Step 5	Replace the shift lever.
--------	--------------------------

- (a) Is shifting problem resolved?

Yes

System normal

No

Step 6	Check the clutch
--------	------------------

- (a) With the engine running, transmission is placed in neutral gear.
- (b) Press the clutch pedal to the end, check whether the lever can easily engage or disengage the reverse gear.

No

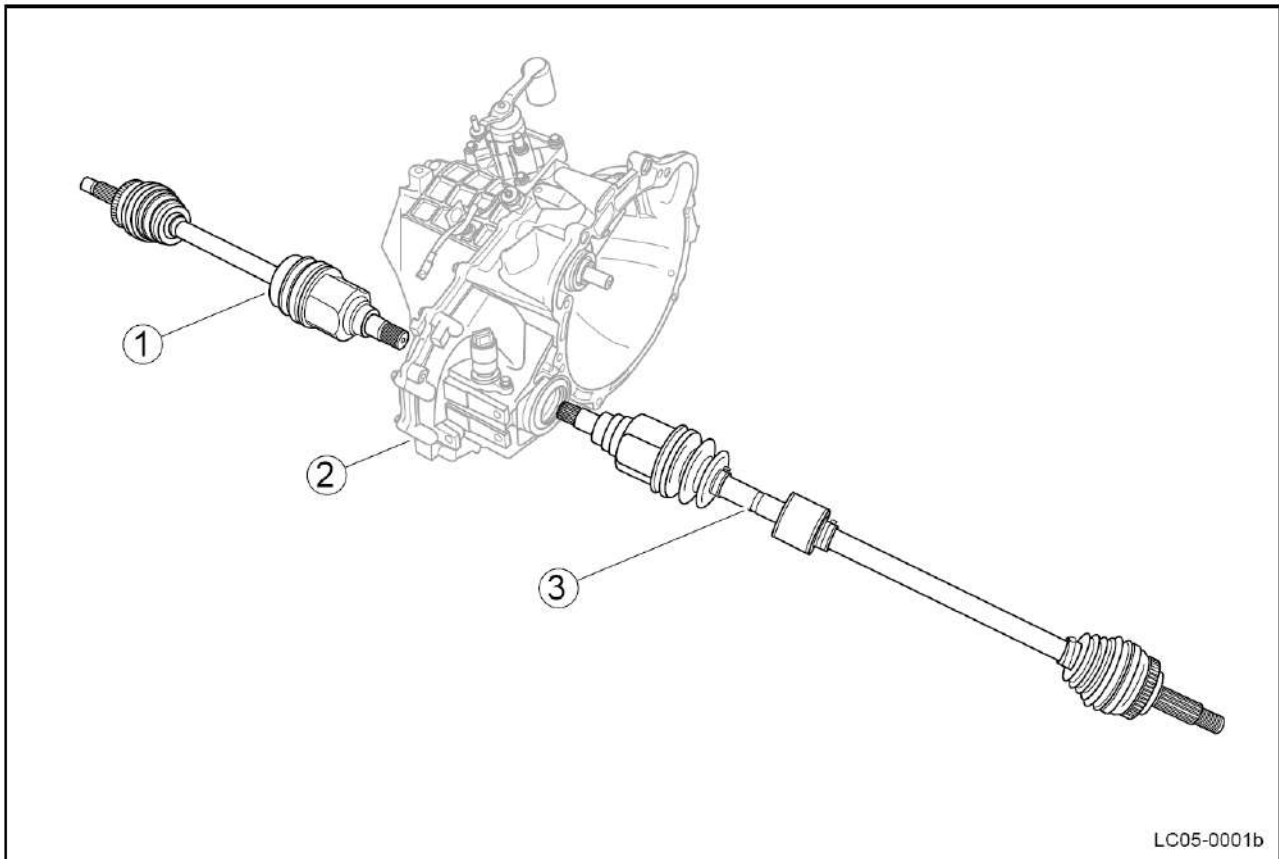
Repair the clutch. Repair or replace the reverse gear.

Yes

Step 7	Check the faulty gear.
--------	------------------------

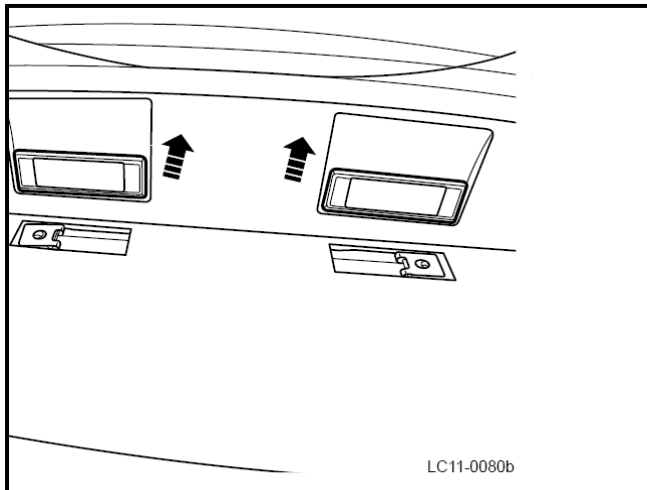
5.3.2 Disassemble View

5.3.2.1 Disassemble View



Legend

- 1. Left Drive Shaft
- 2. Transmission
- 3. Right Drive Shaft



3. Press the license plate lamp into rear bumper mounting hole.

4. Connect the battery negative cable.

11.3.8.10 Reverse Switch Replacement

Removal Procedure

Warning!

Refer to "Battery Disconnect Warning" in "Warnings and Notices".

1. Disconnect the battery negative cable. Refer to [2.10.8.1 Battery Cable Disconnection/Connection Procedures](#).
2. Disconnect the reverse switch wiring harness connector
3. Use proper tools to remove the reverse lamp switch.

