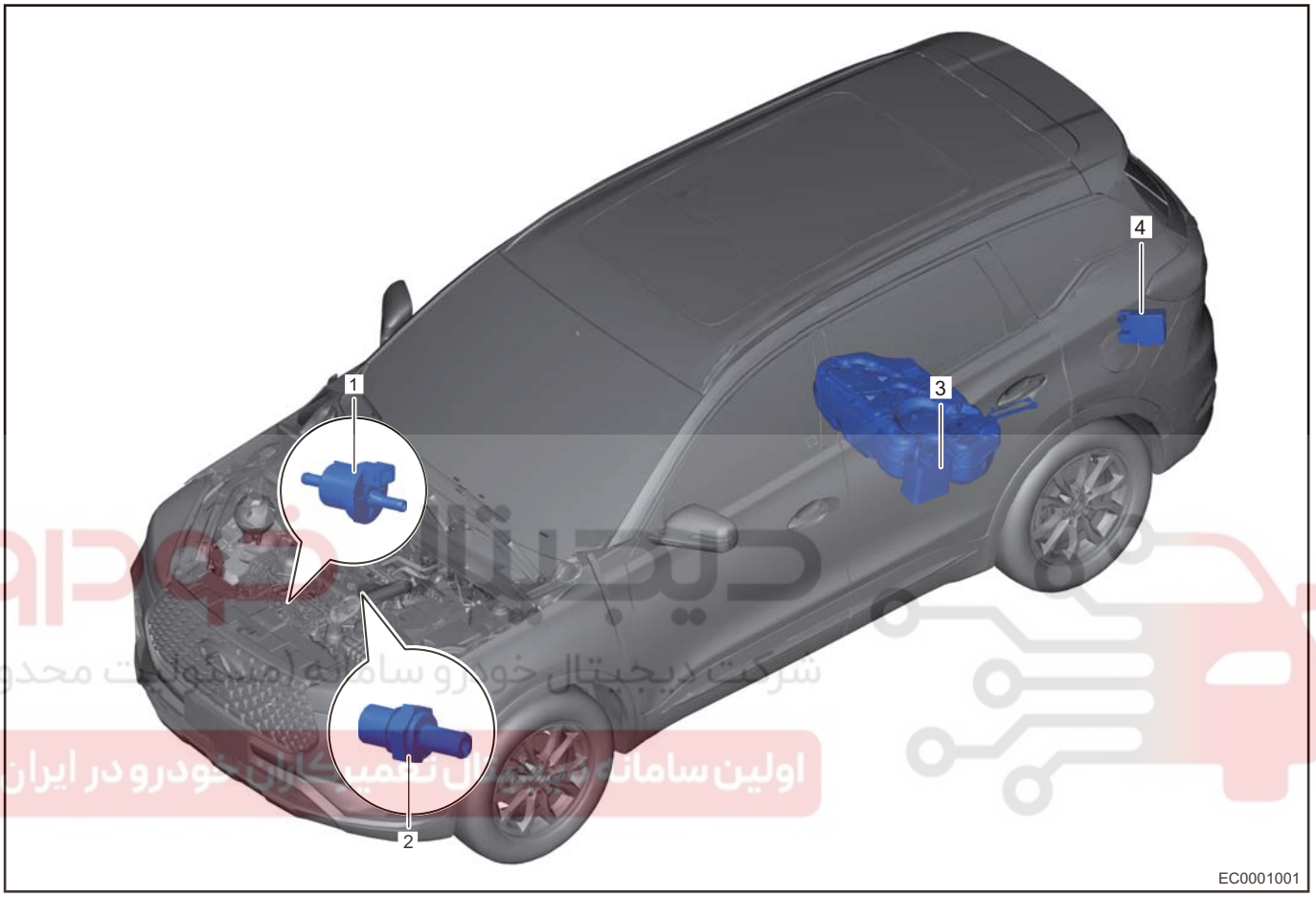
SQRE4T15C EMISSION CONTROL SYSTEM

GENERAL INFORMATION

Overview

Components

Description



1 - Activated Charcoal Canister Solenoid Valve	2 - PCV Valve
3 - Activated Charcoal Canister Assembly	4 - Activated Charcoal Canister Filter

Operation

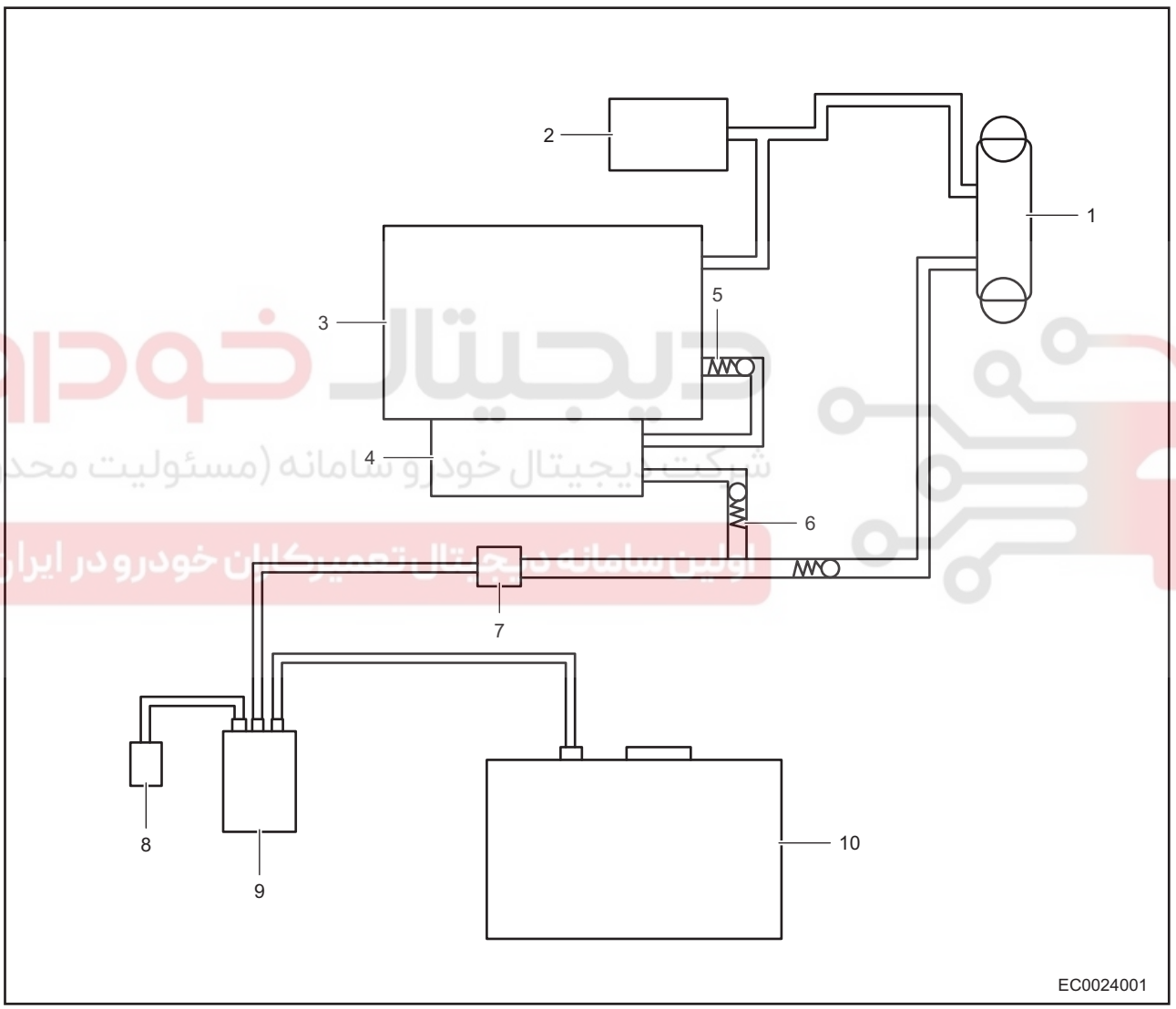
- Emission control system recovers and burns fuel vapor to prevent the vapor in fuel tank from being discharged into the atmosphere. It monitors the oxygen content in exhaust gas, so as to guarantee the maximum efficiency of catalytic converter assembly in converting the HC, CO and NOx in exhaust gas. Activated charcoal canister assembly plays an important role in the emission control system and it is used to absorb and filter moisture and fuel vapor. Fresh air enters the bottom of activated charcoal canister assembly while fuel vapor enters the top of activated charcoal canister through fuel vapor pipe. When engine stops operating, the fuel vapor and fresh air will be stored in the activated charcoal canister assembly. When engine runs and canister solenoid valve opens, the fuel vapor will enter intake manifold and burns in the cylinder.
- Oxygen sensor consists of upstream oxygen sensor and downstream oxygen sensor. Upstream oxygen sensor is installed on exhaust manifold assembly, and downstream oxygen sensor is installed on front exhaust pipe assembly. Oxygen sensor can detect the oxygen content in exhaust gas, and determine whether combustible air-fuel mixture is completely burnt out or not, so as to guarantee the maximum efficiency of catalytic converter assembly in converting the HC, CO and NOx in exhaust gas.

Specifications

Torque Specifications

Description	Torque (N·m)
Coupling Bolt Between Activated Charcoal Canister Assembly and Fuel Tank	7 ± 1
Upstream Oxygen Sensor	45 ± 5
Downstream Oxygen Sensor	45 ± 5
Coupling Bolt Between Activated Charcoal Canister Filter and Body	7 ± 1
PCV Valve Tightening Torque	4 ± 1

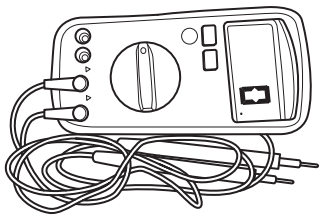
Emission Control System Schematic Diagram



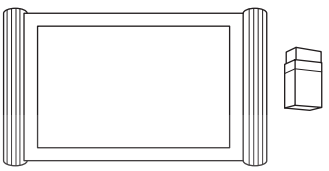
1 - Intake Hose	2 - Turbocharger
3 - Engine	4 - Intake Manifold
5 - PCV Valve	6 - Check Valve
7 - Charcoal Canister Solenoid Valve	8 - Charcoal Canister Filter
9 - Activated Charcoal Canister	10 - Fuel Tank

Tools

General Tool

Digital Multimeter	 RCH0002006

Special Tool

X-431 PAD Diagnostic Tester	 RCH000106

DIAGNOSIS & TESTING

Diagnostic Content

Leakage Inspection

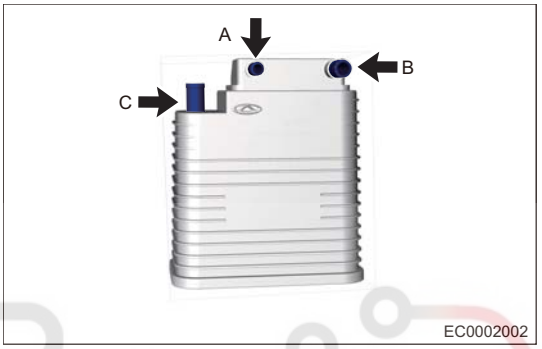
Visually check that hoses and connections have no leaks or damage.

Caution:

- Removal of engine oil dipstick, filler cap, PCV hose and other components or other problems in them may cause the engine to run improperly. Air suction caused by disconnections, looseness or cracks in intake system pipes related to throttle assembly will result in engine failure or abnormal operation. Replace the parts as necessary.

Activated Charcoal Canister Inspection

1. Close port C and blow compressed air into port A, check that air flows from port B. If result is not as specified, replace the canister.



2. Close port C and blow compressed air into port B, check that air flows from port A. If result is not as specified, replace the canister.
3. Close port A and use vacuum pump to pump the vacuum from port B, check that air enters from port C. If it is not as specified, replace the filter and canister.

Fuel Tank Cap Assembly Inspection

1. Visually check that fuel tank cap assembly is not deformed or damaged.
2. If result is not as specified, replace the fuel tank cap assembly.

ON-VEHICLE SERVICE

Charcoal Canister Solenoid Valve

Removal

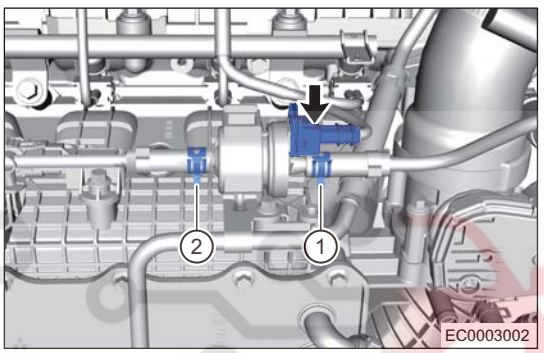
Warning/Caution/Hint

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.
- Before removal, mark the fuel vapor pipe assembly II and activated charcoal canister breather pipe to avoid confusion.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the charcoal canister solenoid valve.

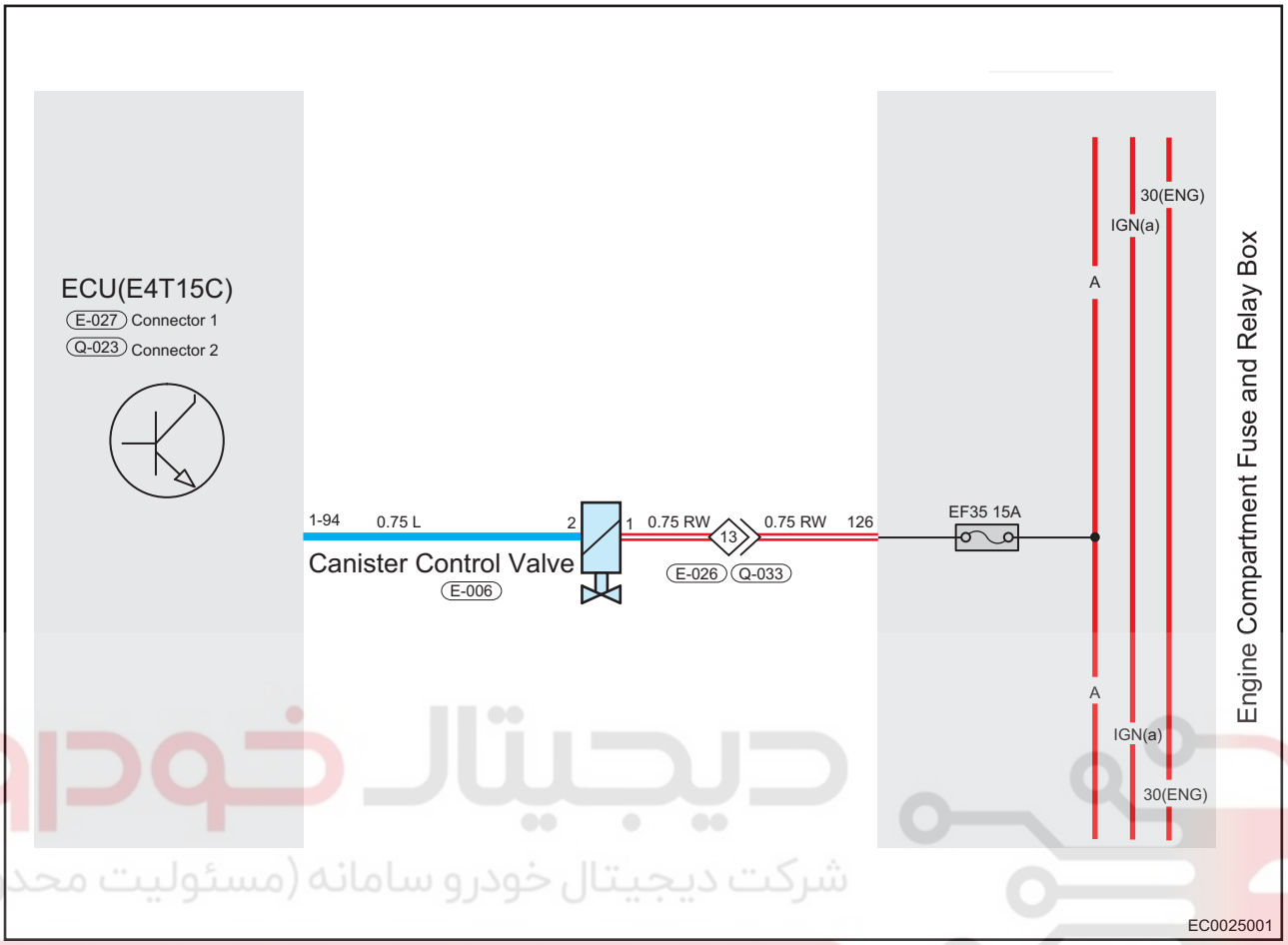
(a) Disconnect the charcoal canister solenoid valve connector (arrow).



(b) Loosen the elastic clamp (1) and (2), and disconnect the connection between charcoal canister solenoid valve assembly and air outlet pipe, fuel vapor pipe.

(c) Remove the charcoal canister solenoid valve assembly.

Charcoal Canister Solenoid Valve Circuit Diagram

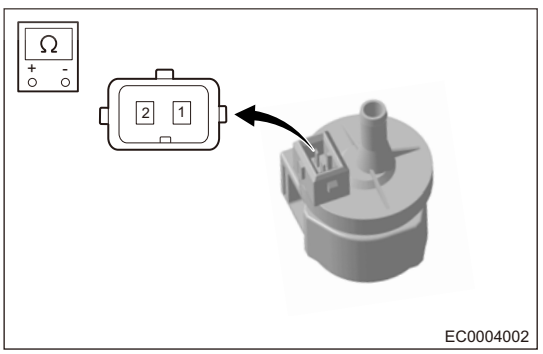


Inspection

1. Check the resistance of charcoal canister solenoid valve.

   (a) Measure the resistance between 2 terminals of charcoal canister solenoid valve with a digital multimeter.

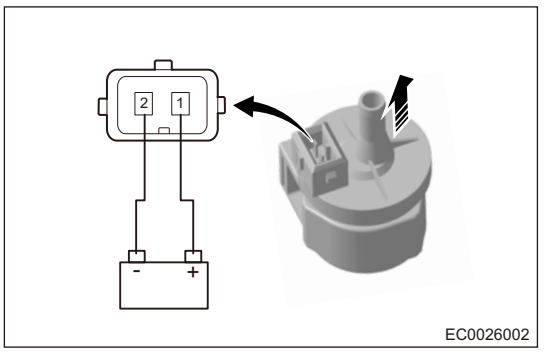
Multimeter Connection	Measurement Temperature	Specification (Ω)
Terminal 1 - Terminal 2	20°C	26 ± 4



Hint:
If resistance is not as specified, replace the charcoal canister solenoid valve assembly.

2. Check if the charcoal canister solenoid valve opens normally and is blocked.

(a) Connect the positive battery (+) to charcoal canister solenoid valve pin (1) and connect the negative battery (-) to charcoal canister solenoid valve pin (2). Check if the charcoal canister solenoid valve opens. After it opened, bleed air to direction of charcoal canister solenoid valve (arrow), and air flows easily.



Installation

1. Installation is in the reverse order of removal.

Caution:

- Positioning distance from hose end to elastic clamp is 3 to 5 mm.

Activated Charcoal Canister Assembly and Filter

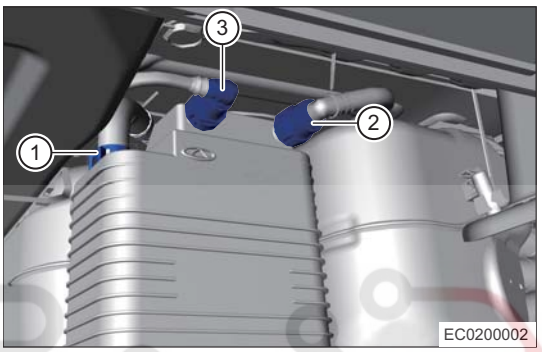
Removal

Warning/Caution/Hint

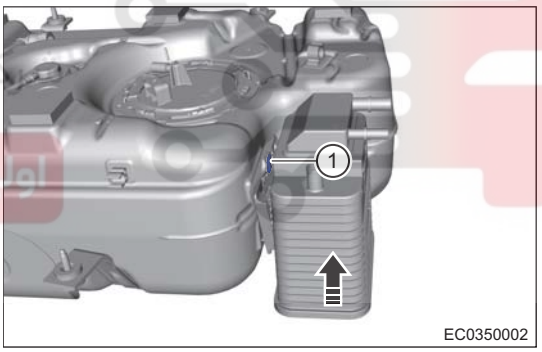
Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the ignition switch. Wait until engine cools down.
2. Disconnect the negative battery cable.
3. Remove the activated charcoal canister assembly.
   (a) Loosen the elastic clamp (1), and disconnect the activated charcoal canister breather pipe.
   (b) Disconnect the connection between fuel vapor pipe III (2) and activated charcoal canister assembly.
   (c) Disconnect the connection between fuel vapor pipe IV (3) and activated charcoal canister assembly.



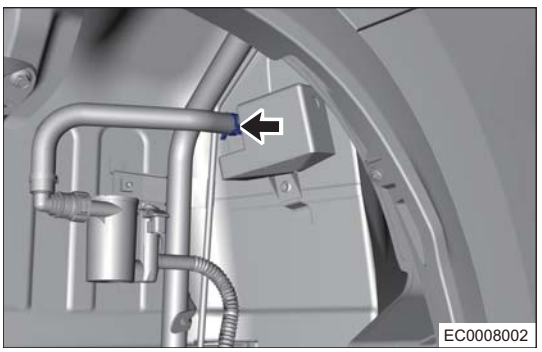
   (d) Using a screwdriver, pry off fixing clips (1) of activated charcoal canister, and push upwards in the direction of arrow to remove activated charcoal canister assembly.



Caution:

- Positioning distance from hose end to elastic clamp is 3 to 5 mm.
- Unneeded activated charcoal canister assembly should be handled by the specialized department according to local laws and regulations. Never discard it at will.

4. Remove the activated charcoal canister filter.
   (a) Remove the rear left tire.
   (b) Remove the rear left wheel house protector.
   (c) Loosen elastic clamp (arrow), and disconnect the connection between filter and breather hose.



(d) Remove the fixing bolt (arrow) from activated charcoal canister filter.

Tightening torque

7 ± 1 N·m

(e) Remove the activated charcoal canister filter assembly.

Caution:

- Unneeded activated charcoal canister filter assembly should be handled by the specialized department according to local laws and regulations. Never discard it at will.

Installation

Warning/Caution/Hint

Caution:

- Positioning distance from hose end to elastic clamp is 3 to 5 mm.

1. Installation is in the reverse order of removal.

PCV Valve

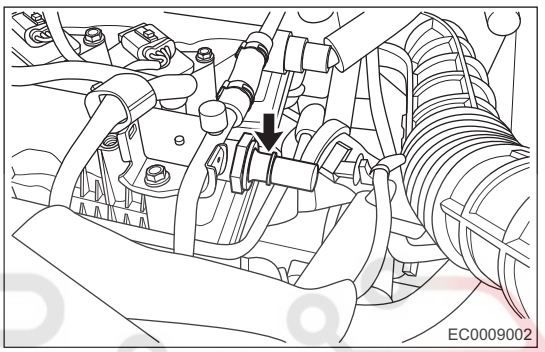
Removal

Warning/Caution/Hint

Caution:

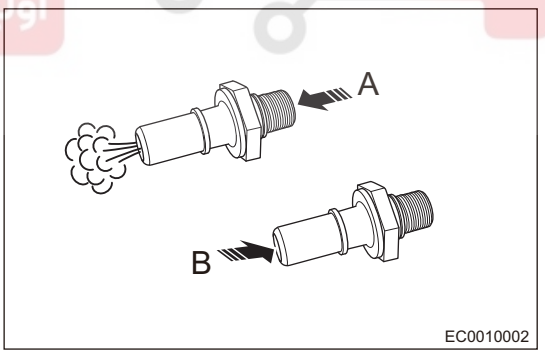
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the muffler assembly.
5. Remove the PCV valve.
   (a) Disconnect the connection between crankcase ventilation hose and PCV valve.
   (b) Loosen and remove the PCV valve (arrow) from cylinder head cover.
   Tightening torque
   4 ± 1 N·m



Inspection

1. Install a clean hose to PCV valve.
2. Check the PCV valve operation.
   (a) Bleed air into the cylinder head cover side, and check that air A flows easily.



   (b) Blow air into the intake manifold side, and check that air B flows difficultly.
   Hint:
   - If result is not as specified, replace PCV valve.

   Caution:
   - DO NOT suck air through PCV valve. Petroleum substances inside the PCV valve are hazardous to your health.
3. Remove the clean hose from PCV valve.

Installation

Warning/Caution/Hint

Caution:

- Positioning distance from hose end to clamping ring is 3 to 5 mm.

1. Installation is in the reverse order of removal.

Upstream Oxygen Sensor

Removal

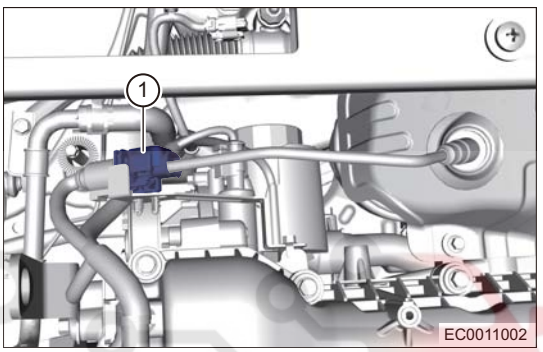
Warning/Caution/Hint

Caution:

- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the upstream oxygen sensor.

(a) Disconnect and remove upstream oxygen sensor connector (1) from bracket.



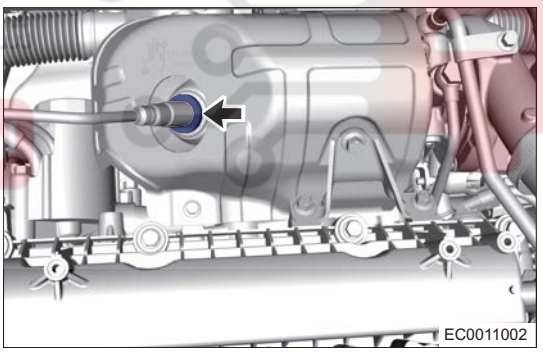
(b) Remove the upstream oxygen sensor (arrow) from tip of precatalytic converter.

Hint:

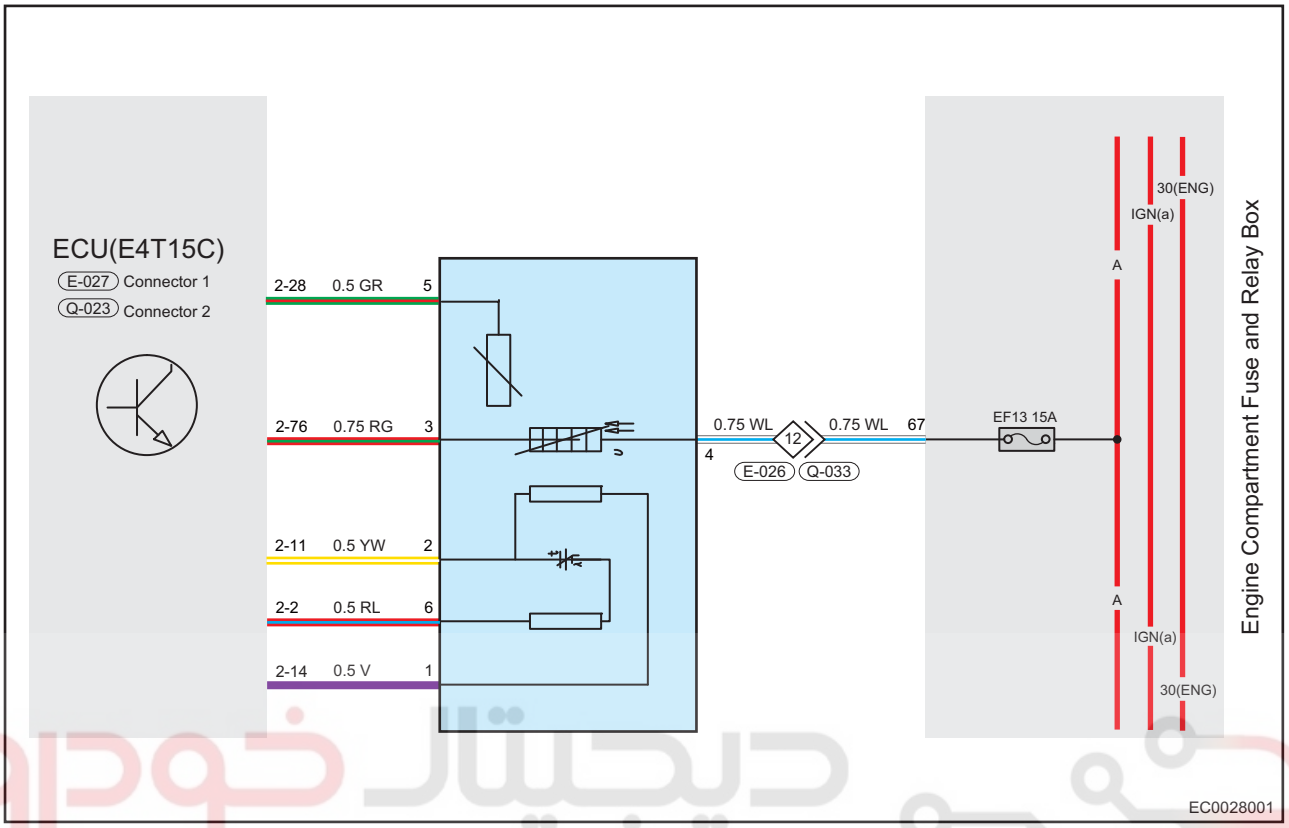
Remove it with special tool oxygen sensor socket.

Tightening torque

45 ± 5 N·m



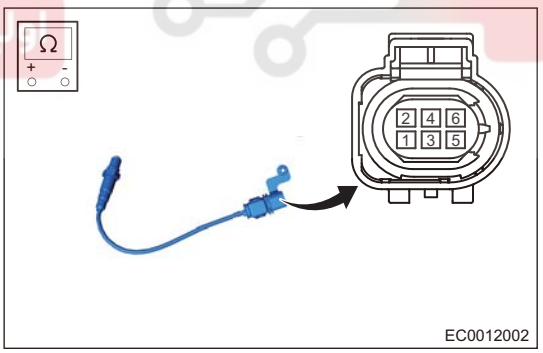
Upstream Oxygen Sensor Circuit Diagram



Inspection

1. Check the upstream oxygen sensor.

   (a) Measure the resistance of upstream oxygen sensor with a digital multimeter.



Multimeter Connection	Specified Condition
Terminal 1	Pump Current
Terminal 2	Analog Ground
Terminal 3	Heater Negative
Terminal 4	Heater Positive
Terminal 5	Correction Resistance
Terminal 6	Nernst Voltage

Multimeter Connection	Condition	Specified Condition
Terminal 3 - Terminal 4	Normal Temperature	3 - 4 Ω
Terminal 1 - Terminal 5	Normal Temperature	110 - 115 Ω

Hint:

- If result is not as specified, replace the upstream oxygen sensor.

Installation

1. Installation is in the reverse order of removal.

Caution:
The specified grease must be used. Use of other grease will lead to oxygen sensor poisoning. The new sensor has been applied with grease and the grease must be applied to the mounting threads when reassembling.

Material No.
5964080112 (120 g/pot) or 5964080145 (450 g/pot)

Warning:
If the oxygen sensor falls, never pick it up to install and it needs to return to factory for testing.

Downstream Oxygen Sensor

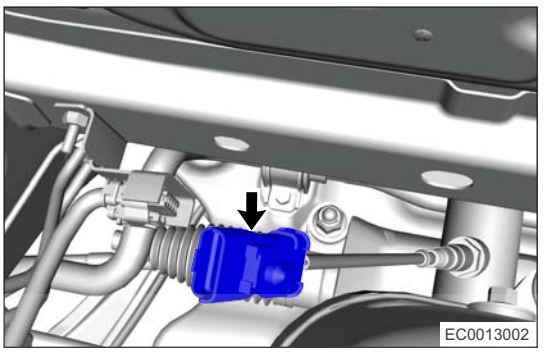
Warning/Caution/Hint

Caution:

- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the downstream oxygen sensor.

(a) Take off and disconnect the downstream oxygen sensor connector (arrow) from bracket.



(b) Raise the vehicle to a proper position.

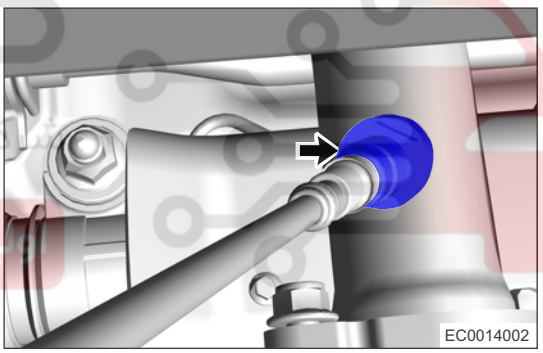
(c) Remove downstream oxygen sensor (arrow) from front exhaust pipe assembly.

Hint:

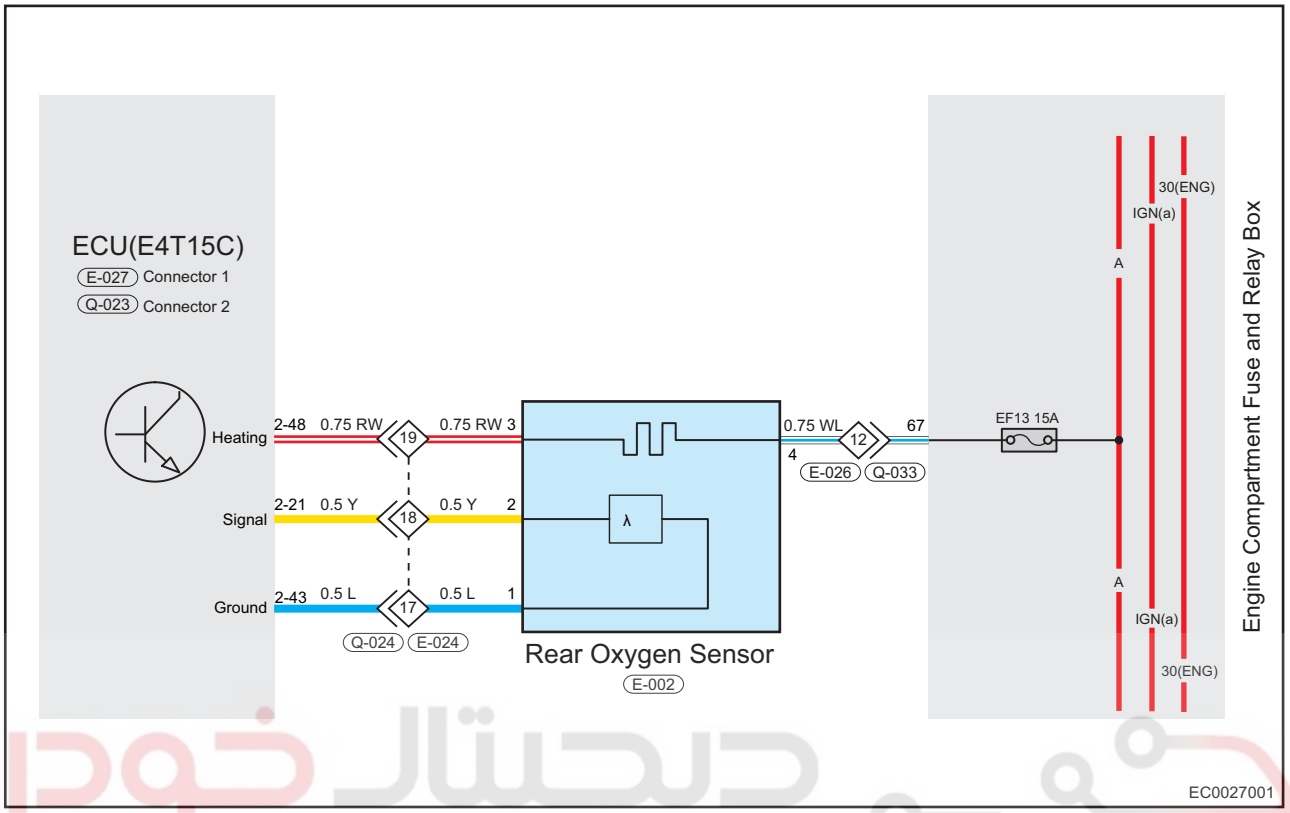
Remove it with special tool oxygen sensor socket.

Tightening torque

45 ± 5 N·m



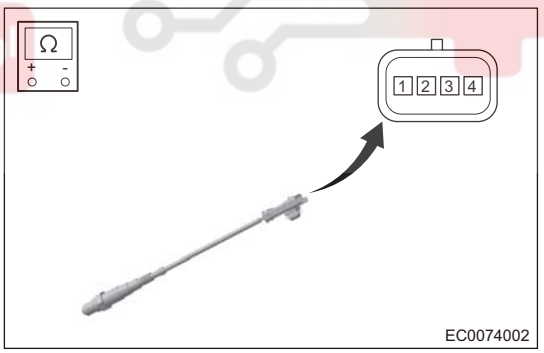
Downstream Oxygen Sensor Circuit Diagram



Inspection

1. Check the downstream oxygen sensor.

   (a) Measure the heating resistance of downstream oxygen sensor with a digital multimeter.



Multimeter Connection	Specified Condition
Terminal 1	Ground
Terminal 2	Signal
Terminal 3	Heat Control
Terminal 4	Power Supply

Multimeter Connection	Condition	Specified Condition
Terminal 3 - Terminal 4	20°C	5 - 22Ω
Terminal 1 - Terminal 2 Terminal 1 - Terminal 4 Terminal 2 - Terminal 3 Terminal 2 - Terminal 4	Always	No continuity

Hint:

- If result is not as specified, replace the downstream oxygen sensor.

Installation

1. Installation is in the reverse order of removal.

   Caution:
   The specified grease must be used. Use of other grease will lead to oxygen sensor poisoning. The new sensor has been applied with grease and the grease must be applied to the mounting threads when reassembling.

   Material No.
   5964080112 (120 g/pot) or 5964080145 (450 g/pot)

   Warning:
   If the oxygen sensor falls, never pick it up to install and it needs to return to factory for testing.