SQRE4T15/SQRE4T15B IGNITION SYSTEM

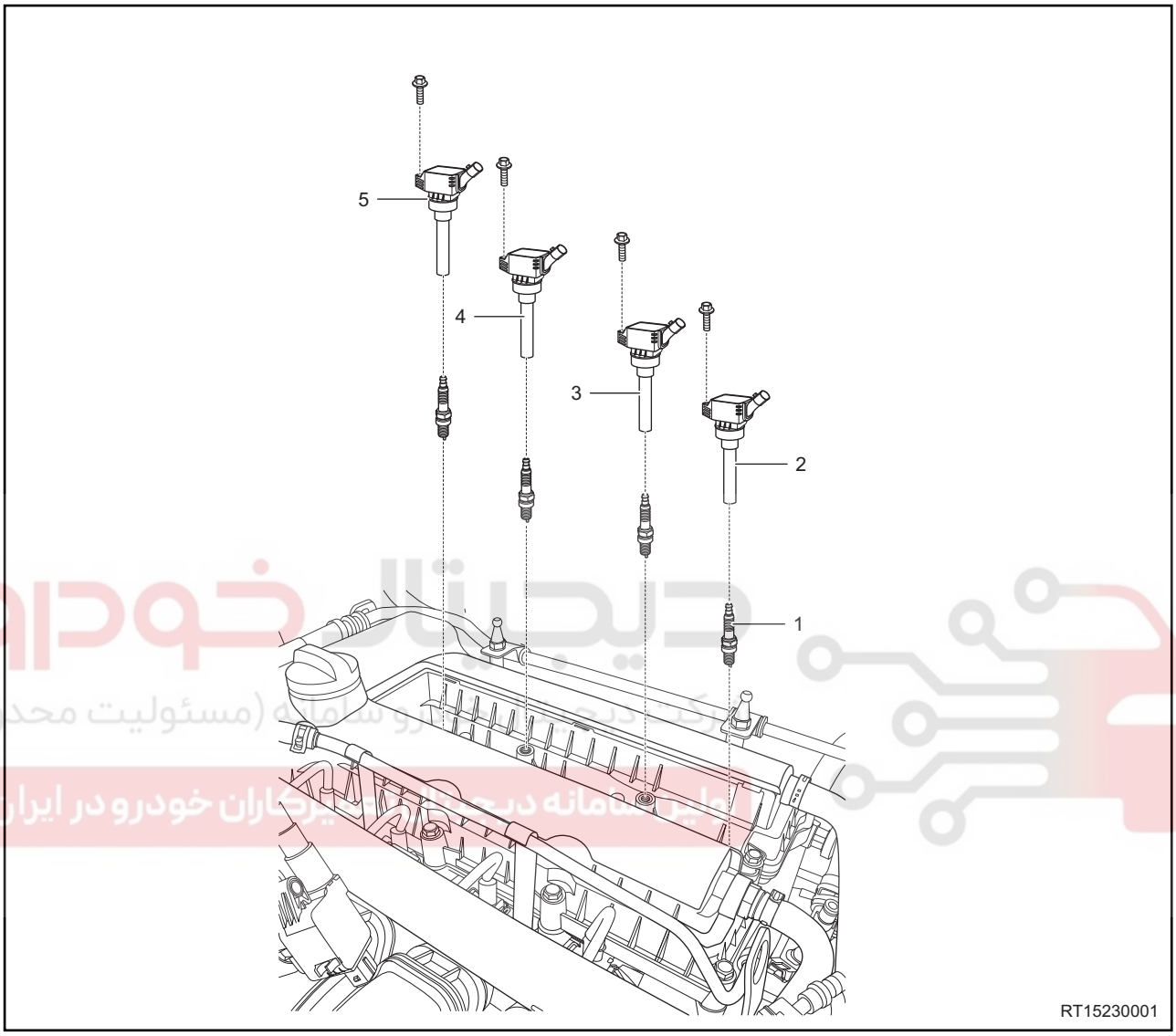
GENERAL INFORMATION 24-3
- **Description** 24-3
- **Operation** 24-3
- **Specifications** 24-4
- **Tools** 24-4
- **Circuit Diagram** 24-5

DIAGNOSIS & TESTING 24-7
- **Problem Symptoms Table** 24-7
- **Service Precautions** 24-8

ON-VEHICLE SERVICE 24-9
- **Ignition Coil** 24-9
  - Removal 24-9
  - Inspection 24-9
  - Installation 24-10
- **Spark plug** 24-11
  - Removal 24-11
  - Inspection 24-11
  - Installation 24-12

GENERAL INFORMATION

Description



1 - Spark Plug	2 - Cylinder 4 Ignition Coil Assembly
3 - Cylinder 3 Ignition Coil Assembly	4 - Cylinder 2 Ignition Coil Assembly
5 - Cylinder 1 Ignition Coil Assembly	

Operation

Ignition system mainly consists of sensors, Engine Control Module (ECM), ignition coils, spark plugs, etc. Ignition advance angle is controlled by Engine Control Module (ECM) directly.

As an integrated module, ignition coil cannot be disassembled. SQRE4T15 uses independent ignition system. The secondary high-voltage terminal of each ignition coil is connected to spark plug in each engine cylinder via high-voltage post. Ignition coil primary low-voltage terminal connects to Engine Control Module (ECM) via wire harness.

Engine Control Module (ECM) uses the phase sensor input to decide the Top Dead Center (TDC) position of cylinder 1 piston, and uses the speed sensor to decide which ignition coil is to be energized.

Specifications

Torque Specifications

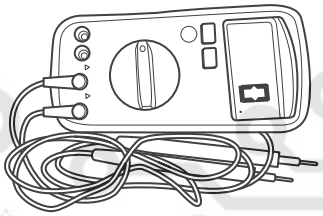
Description	Torque (N·m)
Spark plug	20 ± 3
Ignition Coil Fixing Bolt	8 ± 2

Spark Plug Specifications

Engine Type	SQRE4T15/B
Spark Plug Type	3707AAG
Spark Plug Gap (mm)	0.8 - 0.9

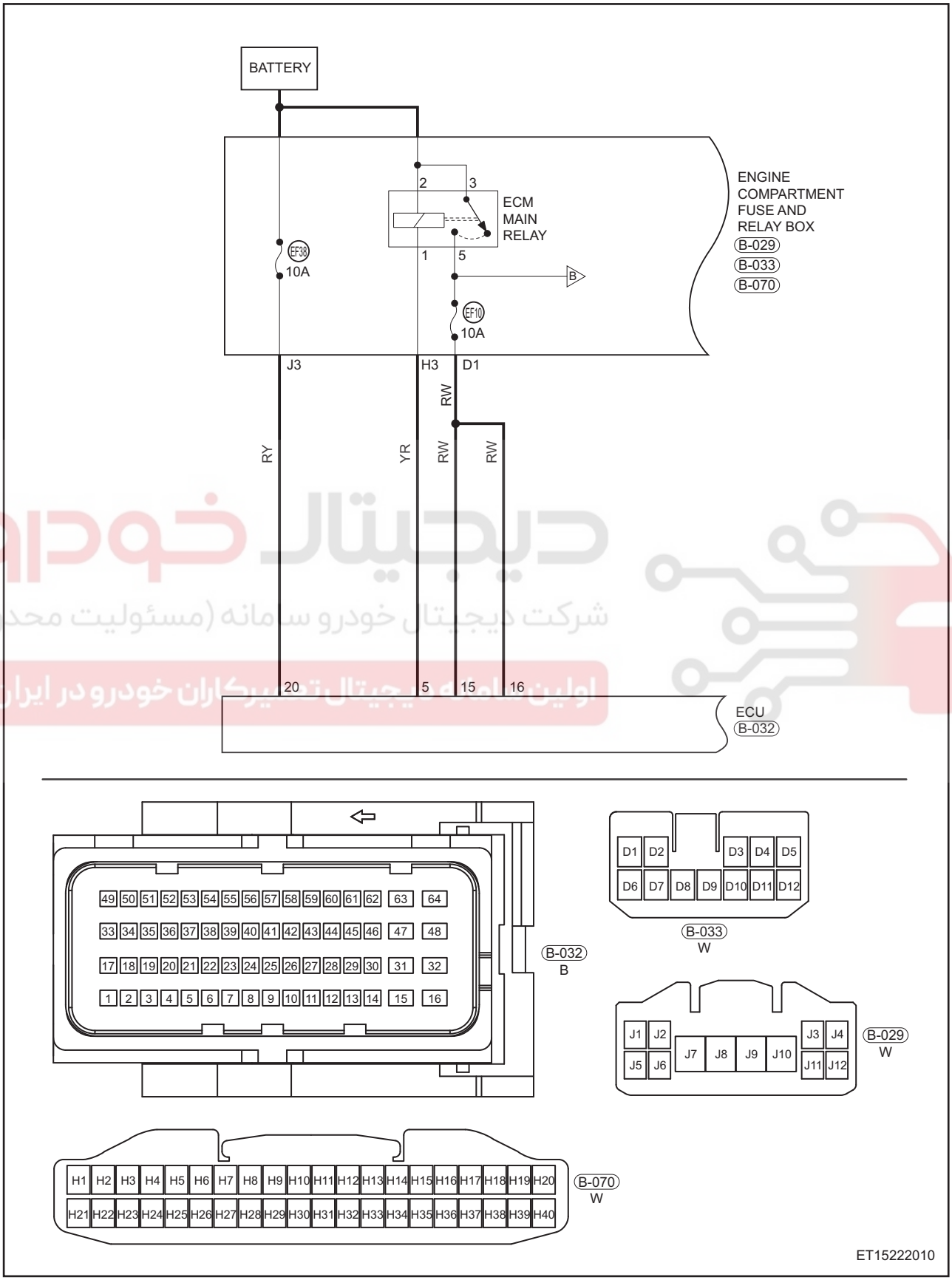
Tools

General Tool

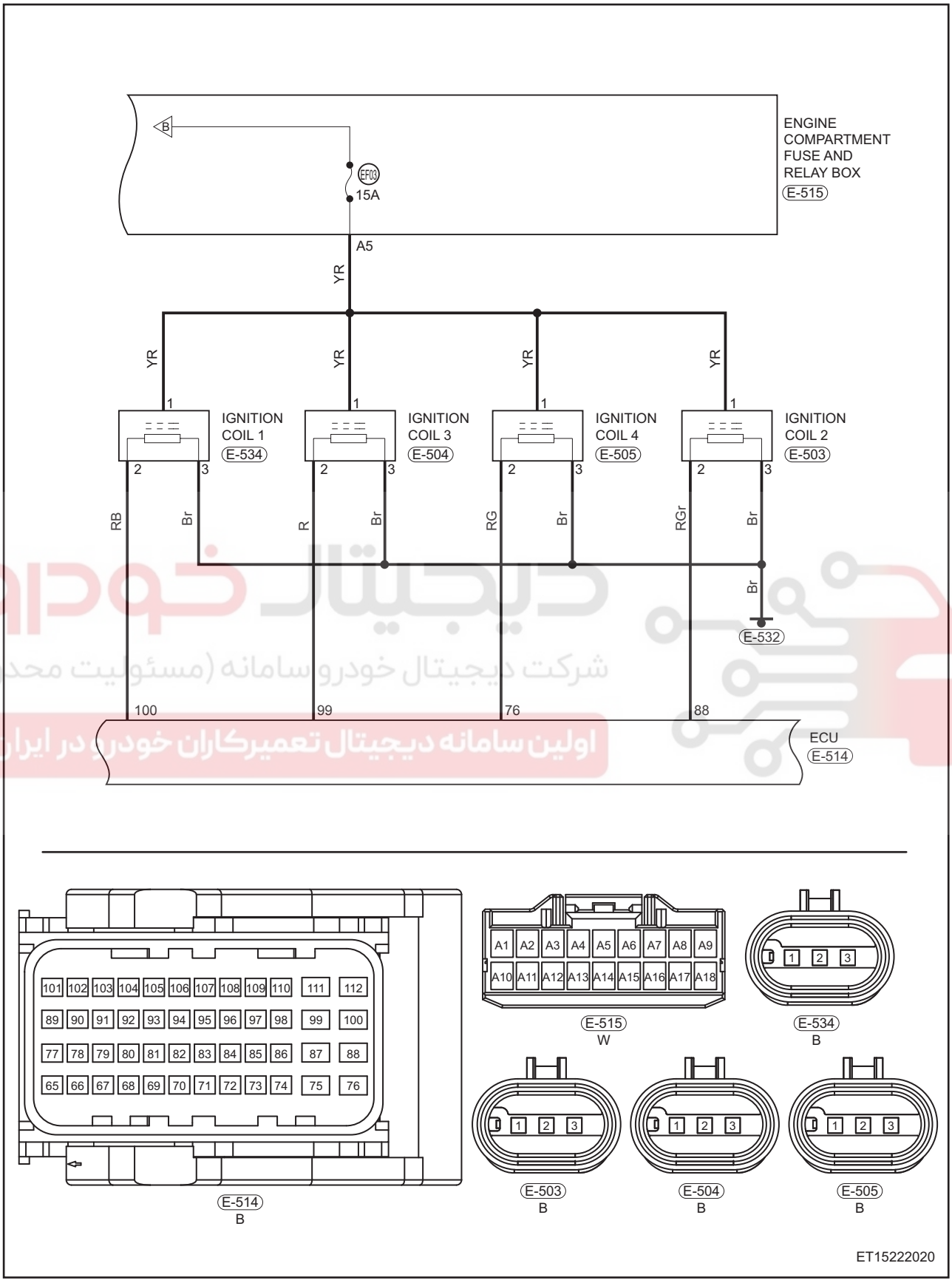
Digital Multimeter	 RCH0000002

Circuit Diagram

Ignition System (page 1 of 2)



Ignition System (page 2 of 2)



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Suspected Area	See page
Stall	Ignition coil and high-voltage cable	23-8
	Camshaft position sensor	07-300
	Spark plug	23-12
	Intake camshaft phaser control valve	-
	Exhaust camshaft phaser control valve	-
	Wire harness	-
	ECM	-
Knock	Ignition coil and ignition high-voltage cable	23-8
	Knock sensor	07-298
	ECM	-
Difficult to start	Battery	27-7
	Ignition coil and high-voltage cable	23-8
	Spark plug	23-12
	Engine speed sensor	07-301
Engine hesitation, power drop, unstable performance	Ignition coil and high-voltage cable	23-8
	Engine speed sensor	07-301
	Intake camshaft phaser control valve	-
	Exhaust camshaft phaser control valve	-
	Spark plug	23-12
	Camshaft position sensor	07-300
	ECM	-
Rough, unstable idling or stall	Ignition coil and high-voltage cable	23-8
	Camshaft position sensor	07-300
	Spark plug	23-12
	ECM	-

Service Precautions

Visual inspection can reduce the unnecessary test and diagnostic time, so pay attention to the following inspection items:

1. Check the line and hose for obvious looseness, and if they are disconnected or routed improperly.
2. Make sure that the battery connections are clean and fixed firmly.
3. Check if the alternator wire and belt are installed correctly and securely.
4. Confirm that the ignition coils and high-voltage cables are installed securely.
5. Check if the engine wire harness connectors are inserted fully.
6. Check if all electrical connectors are installed correctly and securely.
7. Check the following electrical connections:
   a. Engine speed sensor;
   b. Oxygen sensor;
   c. Intake pressure/temperature sensor;
   d. Oil pressure switch;
   e. Ignition coil;
   f. Canister solenoid valve;
   g. Camshaft position sensor;
   h. Electronic throttle;
   i. Intake Variable Valve Timing (VVT) control valve;
   j. Exhaust Variable Valve Timing (VVT) control valve;
   k. Fuel injector.
8. Check the routing of all vacuum hoses.
9. Confirm that the following vacuum hoses are connected securely without any leakage:
   a. Canister solenoid valve;
   b. Charcoal canister;
   c. PCV valve;
   d. Warm damper vacuum system;
   e. Brake booster.
10. Check the fuel pump hose and wire connection to make sure that they are connected securely.

ON-VEHICLE SERVICE

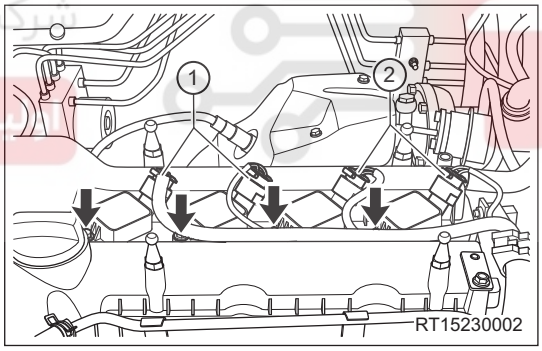
Ignition Coil

Removal

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.
- It is prohibited to use high-voltage cable to perform ignition spark test during repair; otherwise it may cause personal injury and damage the module.
- During using, do not remove spark plug with bare hands with power on, and do not contact the metal part and rubber guide rod directly, to avoid electric shock.
- When replacing spark plug, take care to remove the ignition coil and do not rotate it (avoid scratching the rubber guide rod). Do not separate rubber guide rod and ignition coil. If separated, it will reduce the sealing performance when installation is resumed, which will cause fuel gas to be entered, resulting in corroding the internal structure.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the ignition coil.
   a. Disconnect ignition coil connectors (1), and move away wire harness from ignition coil.
   b. Disconnect ignition coil connectors (2), and move away wire harness from ignition coil.
   c. Remove 4 fixing bolts (arrow) from ignition coil.
      (Tightening torque: 8 ± 2 N·m)

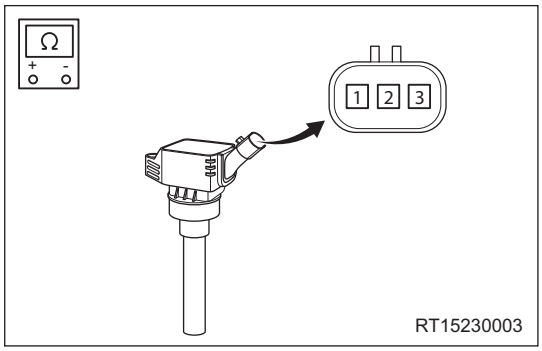


   d. Remove the ignition coil.

Inspection

1. Check resistance of ignition coil primary winding.
   a. Turn digital multimeter to ohm band, and check resistance between terminals 1 and 2.
      If result is not as specified, replace the ignition coil.

Multimeter Connection	Condition	Specification (Ω)
Terminal 1 - Terminal 2	Normal temperature	0.5 - 0.64



Installation

Installation is in the reverse order of removal.

CAUTION

- Do not put ignition coil on ground or places with excessive dirt and foreign matter directly when replacing ignition coil, to prevent dust and foreign matter from entering internal rubber guide rod, resulting in ignition coil failure.
- Make sure that the connection between ignition coil high-voltage output terminal and spark plug is reliable during installation, or it may cause high-voltage leakage, resulting in poor ignition.

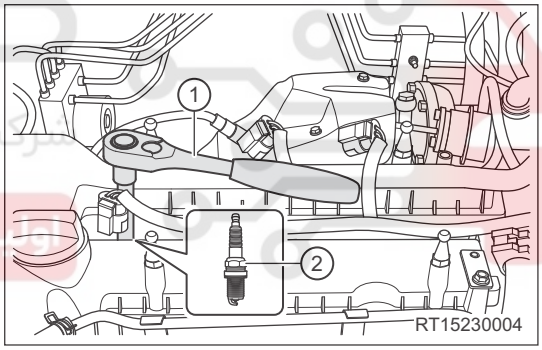
Spark plug

Removal

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.
- It is prohibited to use high-voltage cable to perform ignition spark test during repair; otherwise it may cause personal injury and damage the module.
- DO NOT remove the spark plugs when engine is hot; failure to do this may cause damage to the spark plug thread holes on cylinder head.
- Before removal, remove the dirt and foreign matter around spark plug holes to prevent them from dropping into cylinders.

1. Turn off all electrical equipment and the engine switch. Wait until engine cools down.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly.
4. Remove the ignition coil.
5. Remove the spark plug.
   a. Using a special spark plug socket wrench (1), loosen the spark plug.
   b. Remove the spark plug (2).

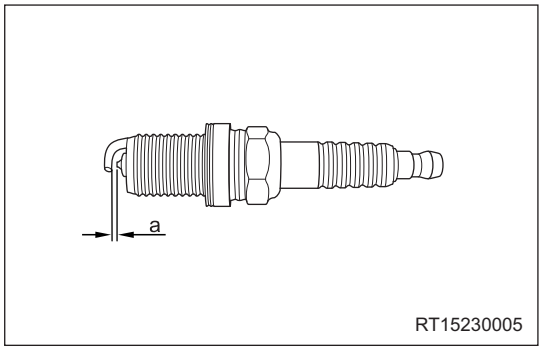


CAUTION

- Be careful not to damage the ignition coil when pulling them upward.

Inspection

Check spark plug gap a: 0.8 - 0.9 mm.



Installation

CAUTION

- Check spark plug type to confirm if it is suitable.
- Please install spark plug with a special spark plug socket wrench, and never touch the spark plug socket. DO NOT damage the normal spark plug gap.
- Always tighten the spark plug according to specified torque using a torque wrench when installing and replacing it.

1. Install 4 spark plugs respectively into cylinder head mounting holes for pre-tightening, and then retighten spark plugs with a torque wrench.
   (Tightening torque: 20 ± 3 N·m)
2. Other procedures are in the reverse order of removal.