

SQR484F IGNITION SYSTEM

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



دیجیتال خودرو

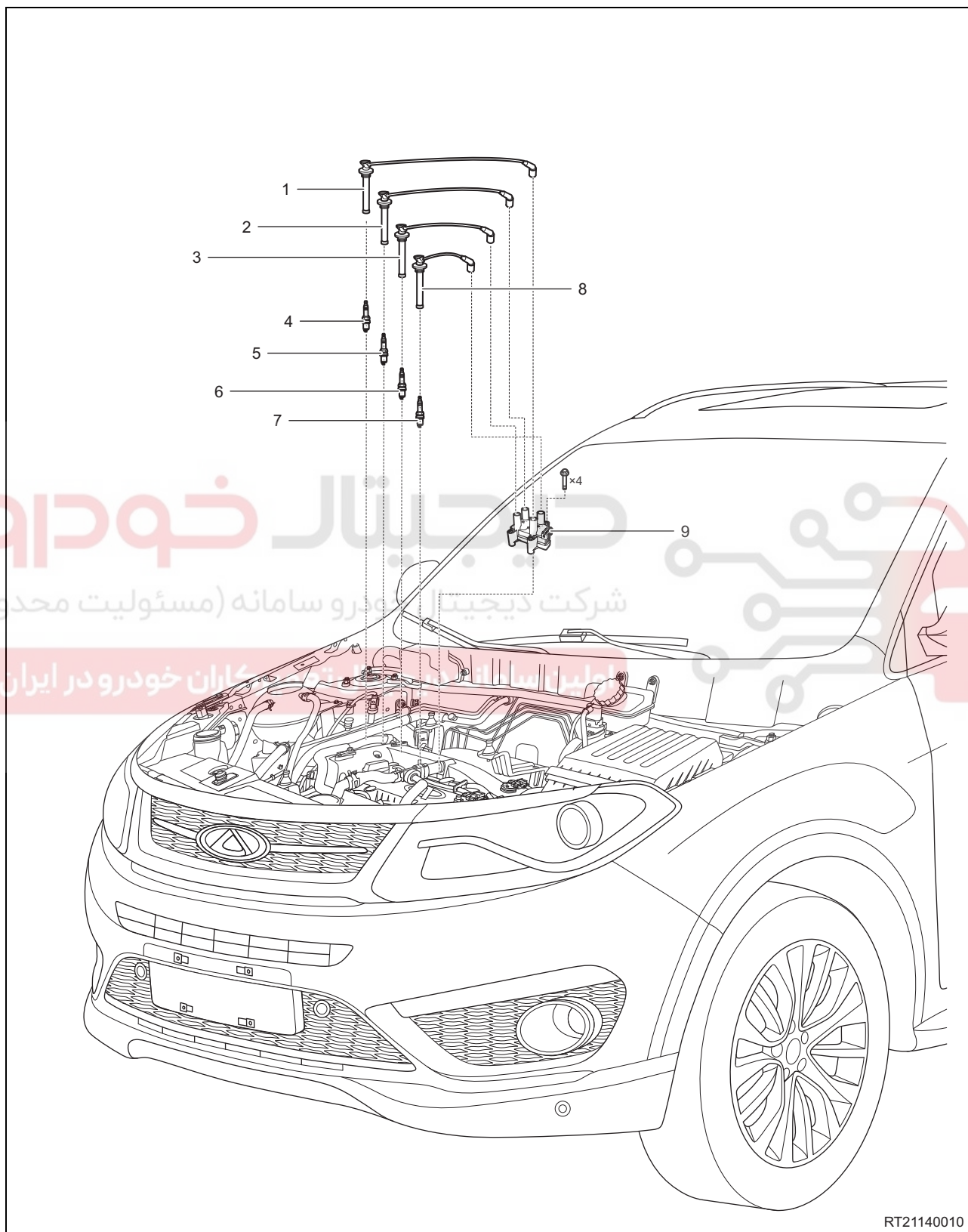
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GENERAL INFORMATION

Description



22 - SQR484F IGNITION SYSTEM

1 - Cylinder 1 High-voltage Cable Assembly	2 - Cylinder 2 High-voltage Cable Assembly
3 - Cylinder 3 High-voltage Cable Assembly	4 - Cylinder 1 Spark Plug
5 - Cylinder 2 Spark Plug	6 - Cylinder 3 Spark Plug
7 - Cylinder 4 Spark Plug	8 - Cylinder 4 High-voltage Cable Assembly
9 - Ignition Coil	

Operation

This model uses the distributorless ignition system which mainly consists of ignition coils, spark plugs, etc. Ignition advance angle is controlled by Engine Control Module (ECM) directly.

Ignition coil consists of two primary windings, two secondary windings, iron core, housing, etc. When the primary winding is connected to ground, it is charged. Once ECM cuts off the primary winding circuit, charging stops, and at the same time, a high voltage is induced in the secondary winding to enable the spark plug to discharge. This ignition system's difference from the ignition coil with distributor is that a spark plug is connected to the ignition coil secondary winding at each end, which makes two spark plugs ignite simultaneously. Two primary windings turn on/off alternately. Two secondary windings alternately discharge accordingly.

Specifications

Torque Specifications

Description	Torque (N·m)
Spark Plug	30 ± 3
Ignition Coil Fixing Bolt	$8 + 3$

Spark Plug Specifications

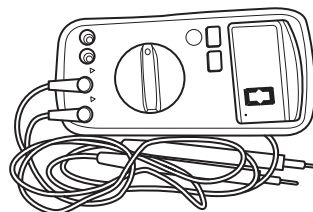
Engine Type	SQR484F
Spark Plug Type	FR7DTC
Spark Plug Gap (mm)	0.8 - 0.9

Tool

General Tool

22

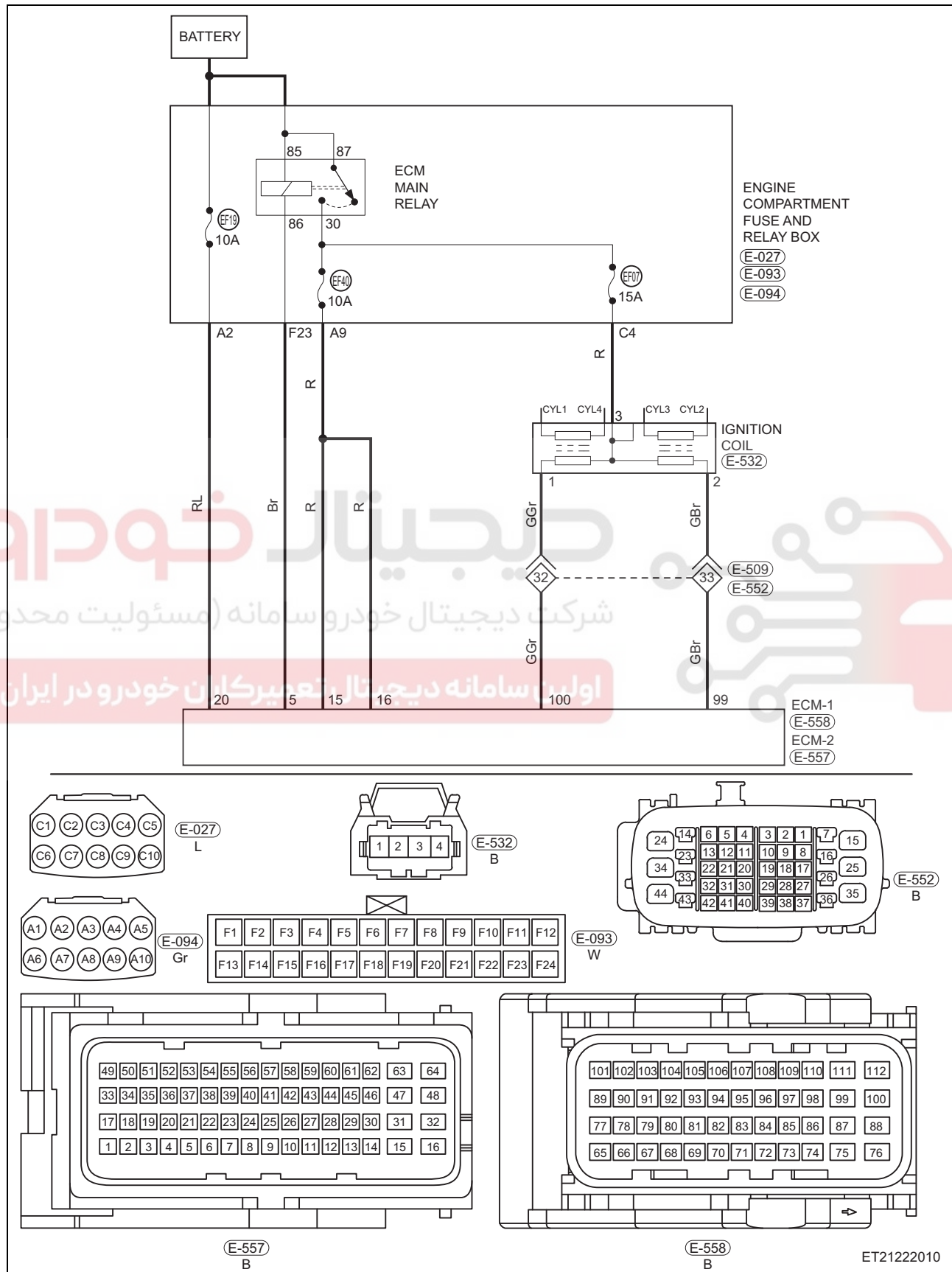
Digital Multimeter



RCH0000002

Circuit Diagram

Ignition System



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
Stall	Ignition coil	22-10
	Spark plug	22-12
	Camshaft position sensor	06-250
	Intake VVT control valve	06-244
	Exhaust VVT control valve	06-244
	Wire harness	-
Knock	Ignition coil	22-10
	Knock sensor	06-246
	ECM	06-257
Difficult to start	Battery	26-7
	Ignition coil	22-10
	Spark plug	22-12
Engine hesitation, power drop, unstable performance	Spark plug	22-12
	Engine speed sensor	06-250
	Intake VVT control valve	06-243
	Exhaust VVT control valve	06-243
	Camshaft position sensor	06-249
	ECM	06-257
Rough, unstable idling or stall	Spark plug	22-12
	Ignition coil	22-10
	ECM	06-257

Service Precautions

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

1. Check the lines and hoses for obvious looseness, and if they are disconnected or routed improperly.
2. Make sure battery connections are clean and firm.
3. Check if alternator wire and belt are installed correctly and securely.
4. Confirm that ignition coils are installed securely.
5. Check if 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 valve;
 - i. Intake VVT control valve;
 - j. Exhaust 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 they are connected securely.

ON-VEHICLE SERVICE

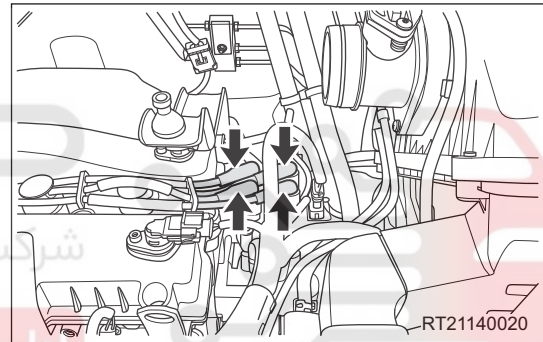
High-voltage Cable

Removal

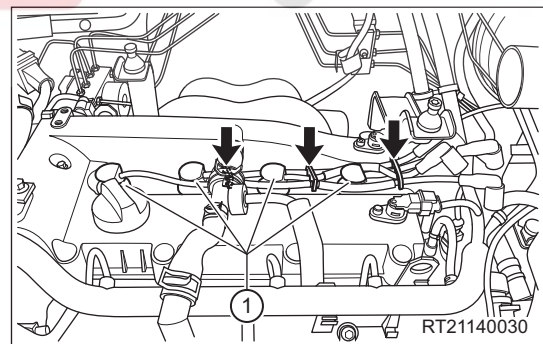
CAUTION

- 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 short circuit spark test to test ignition function during repair; otherwise it may cause personal injury and damage the module.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the high-voltage cable.
 - a. Disconnect the high-voltage cables (arrow) for each cylinder in order from the ignition coil, and move the high-voltage cable on the ignition coil side to one side.



- b. Remove 3 high-voltage cable clips (arrow).
- c. Loosen the high-voltage cables (1) in order and pull them upward to remove them from the spark plug holes.



- d. Remove the high-voltage cable.

CAUTION

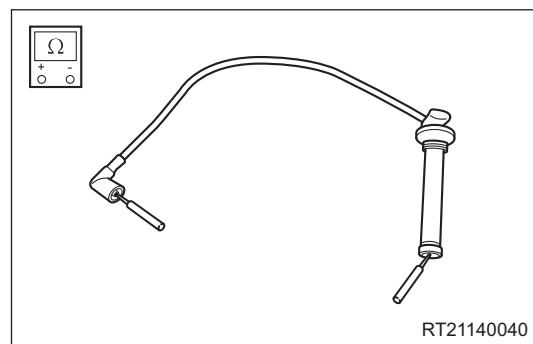
- Be careful not to damage the high-voltage cables when pulling them upward.

Inspection

Turn digital multimeter to ohm band, and measure resistance of high-voltage cables in the method shown in the illustration.

If result is not as specified, replace the high-voltage cables.

Measurement Item	Condition	Specification (k Ω)
Cylinder 1 High-voltage Cable	Normal temperature	7.5 - 11.2
Cylinder 2 High-voltage Cable	Normal temperature	5.8 - 8.3
Cylinder 3 High-voltage Cable	Normal temperature	4.2 - 6.7
Cylinder 4 High-voltage Cable	Normal temperature	4 - 6.5



Installation

Installation is in the reverse order of removal.

CAUTION

- Install cylinder 1 to 4 high-voltage cables to spark plug hole and ignition coil in accordance with the marks on high-voltage cables.

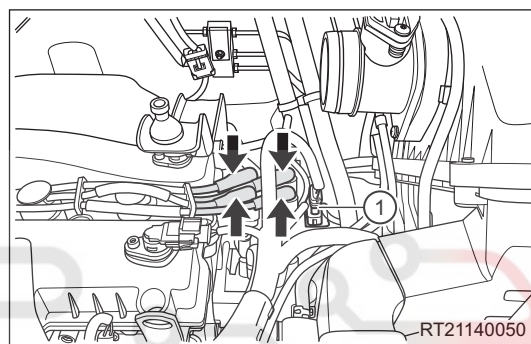
Ignition Coil

Removal

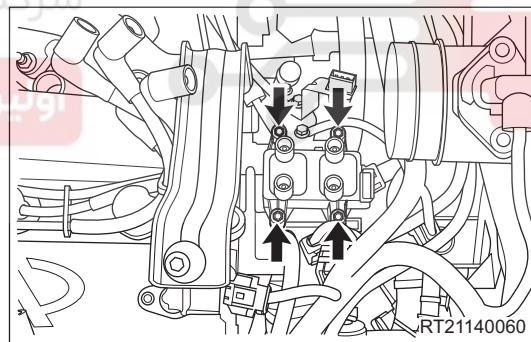
CAUTION

- 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 short circuit spark test to test ignition function during repair; otherwise it may cause personal injury and damage the module.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the ignition coil.
 - a. Disconnect the ignition coil connector (1).
 - b. Disconnect the high-voltage cables (arrow) for each cylinder, and put them aside.



- c. Loosen and remove 4 fixing bolts (arrow) from the ignition coil assembly.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

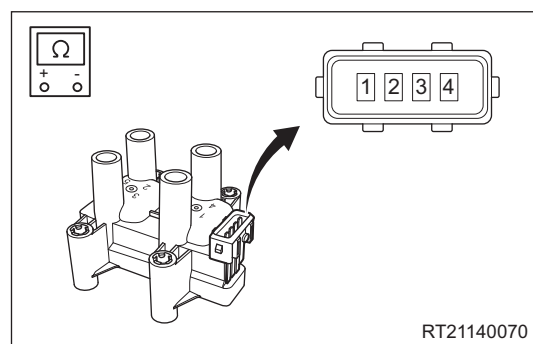


- d. Remove the ignition coil.

Inspection

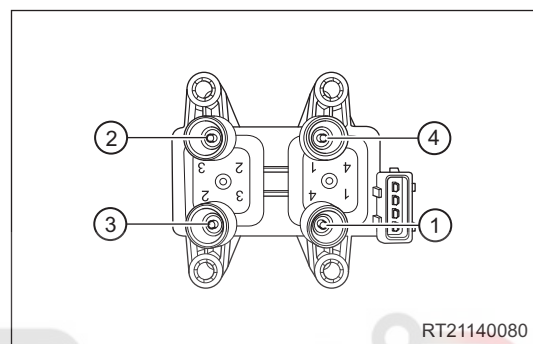
1. Inspect resistance of ignition coil primary winding.
Turn digital multimeter to ohm band, and check resistance between terminals 1 and 3 or 1 and 4, 2 and 3 or 2 and 4.
If result is not as specified, replace the ignition coil.

Multimeter Connection	Condition	Specification (Ω)
Terminal 1 - Terminal 3 or 4	Normal temperature	0.50 - 0.64
Terminal 2 - Terminal 3 or 4	Normal temperature	0.50 - 0.64



2. Inspect resistance of ignition coil secondary winding.
Turn digital multimeter to ohm band, and check resistance between the high-voltage posts 1 and 4, 2 and 3 of ignition coil secondary winding.
If result is not as specified, replace the ignition coil.

Multimeter Connection	Condition	Specification ($k\Omega$)
Post 1 - Post 4	Normal temperature	9.50 - 12.10
Post 2 - Post 3	Normal temperature	9.50 - 12.10



Installation

Installation is in the reverse order of removal.



CAUTION

- Make sure the connection between ignition coil and ignition coil high-voltage post, spark plug is reliable during installation, or it may cause the high-voltage leakage, resulting in poor ignition.

Spark Plug

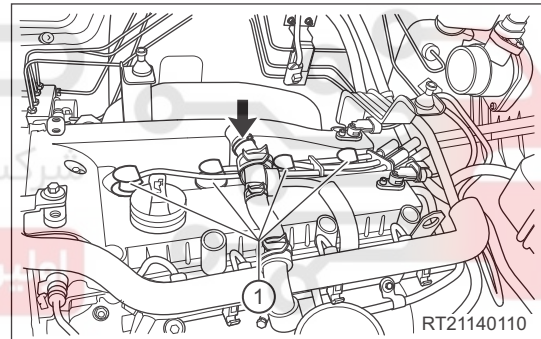
Removal

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 short circuit spark test to test ignition function during repair; otherwise it may cause personal injury and damage the module.
- DO NOT remove the spark plugs when the engine is hot; failure to do this may cause damage to the spark plug thread holes on the cylinder head.
- Remove the high-voltage cables from the spark plugs in order, and mark them to prevent incorrect installation.
- Before removal, remove the dirt and foreign matter around the spark plug holes to prevent them from dropping into cylinders.

1. Turn off all the electrical equipment and ignition switch. Wait until the engine cools down.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Move away the high-voltage cables for each cylinder.

- a. Remove the clamp (arrow) from the crankcase ventilation hose, and disconnect the connection between crankcase ventilation hose and valve chamber cover.
- b. Move away the crankcase ventilation hose.
- c. Loosen the high-voltage cables (1) in order and pull them upward to remove them from the spark plug holes.

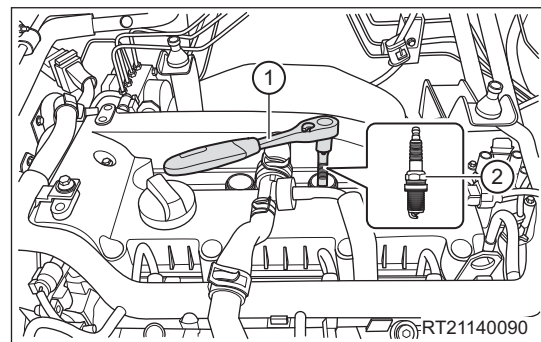


- d. Move the high-voltage cable to one side.

CAUTION

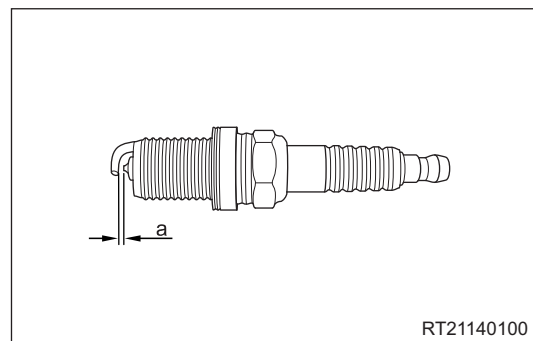
- Be careful not to damage the high-voltage cables when pulling them upward.

5. Remove the spark plug.
 - a. Using a special spark plug socket wrench (1), loosen the spark plug (2).
 - b. Remove the spark plug (2).



Inspection

Check the spark plug gap "a": 0.8 - 0.9 mm.



Installation

CAUTION

- Check the spark plug type to confirm if it is suitable.
- Please install spark plug with the special spark plug socket wrench, and never touch the spark plug socket. DO NOT damage the normal spark plug gap.

1. Install 4 spark plugs respectively into the cylinder head mounting holes for pre-tightening, and then retighten the spark plugs with a torque wrench. (Tightening torque: $30 \pm 3 \text{ N}\cdot\text{m}$)
2. Other procedures are in the reverse order of removal.

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