

SQRE4G15B IGNITION SYSTEM

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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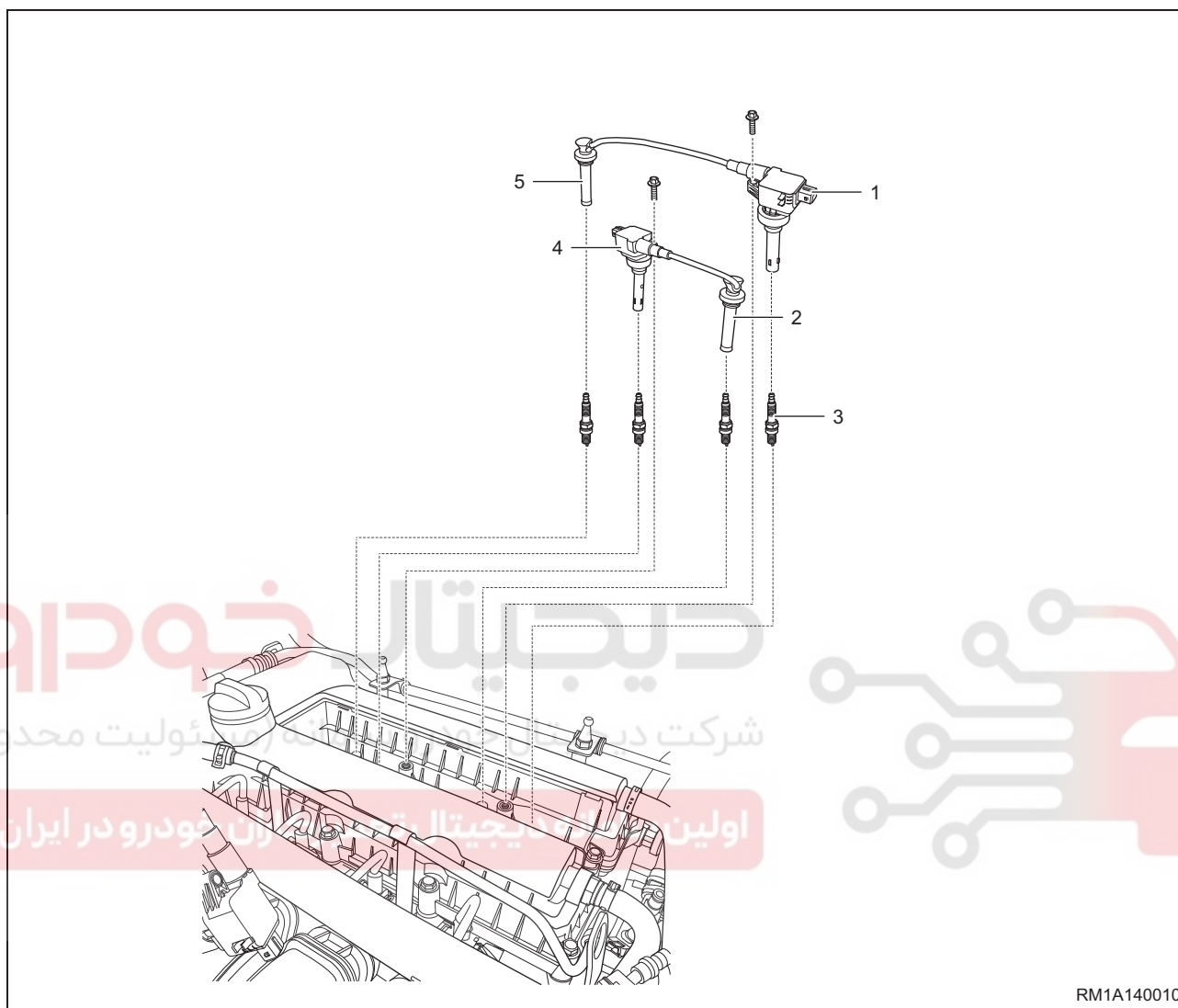
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اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description



RM1A140010

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1 - Cylinder 1 and 4 Ignition Coil Assembly	2 - Cylinder 3 High-voltage Cable
3 - Spark Plug	4 - Cylinder 2 and 3 Ignition Coil Assembly
5 - Cylinder 1 High-voltage Cable	

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Operation

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

As an integrated module, ignition coil cannot be disassembled. SQRE4G15B ignition system has 2 ignition coils, and the 2 secondary high-voltage terminals of each ignition coil are connected to spark plugs in 2 engine cylinders respectively via high-voltage posts and high-voltage cables, which makes cylinder 1 and 4 ignite simultaneously, cylinder 2 and 3 ignite simultaneously. Ignition coil primary low-voltage terminal is connected to Engine Control Module (ECM) via wire harness.

Engine Control Module (ECM) uses phase sensor input to decide Top Dead Center (TDC) position of cylinder 1 piston, and uses 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

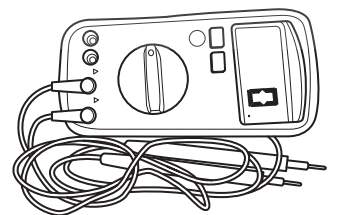
Spark Plug Specifications

Engine Type	SQRE4G15B
Spark Plug Type	3707AAG
Spark Plug Gap (mm)	0.8 - 0.9

Tool

General Tool

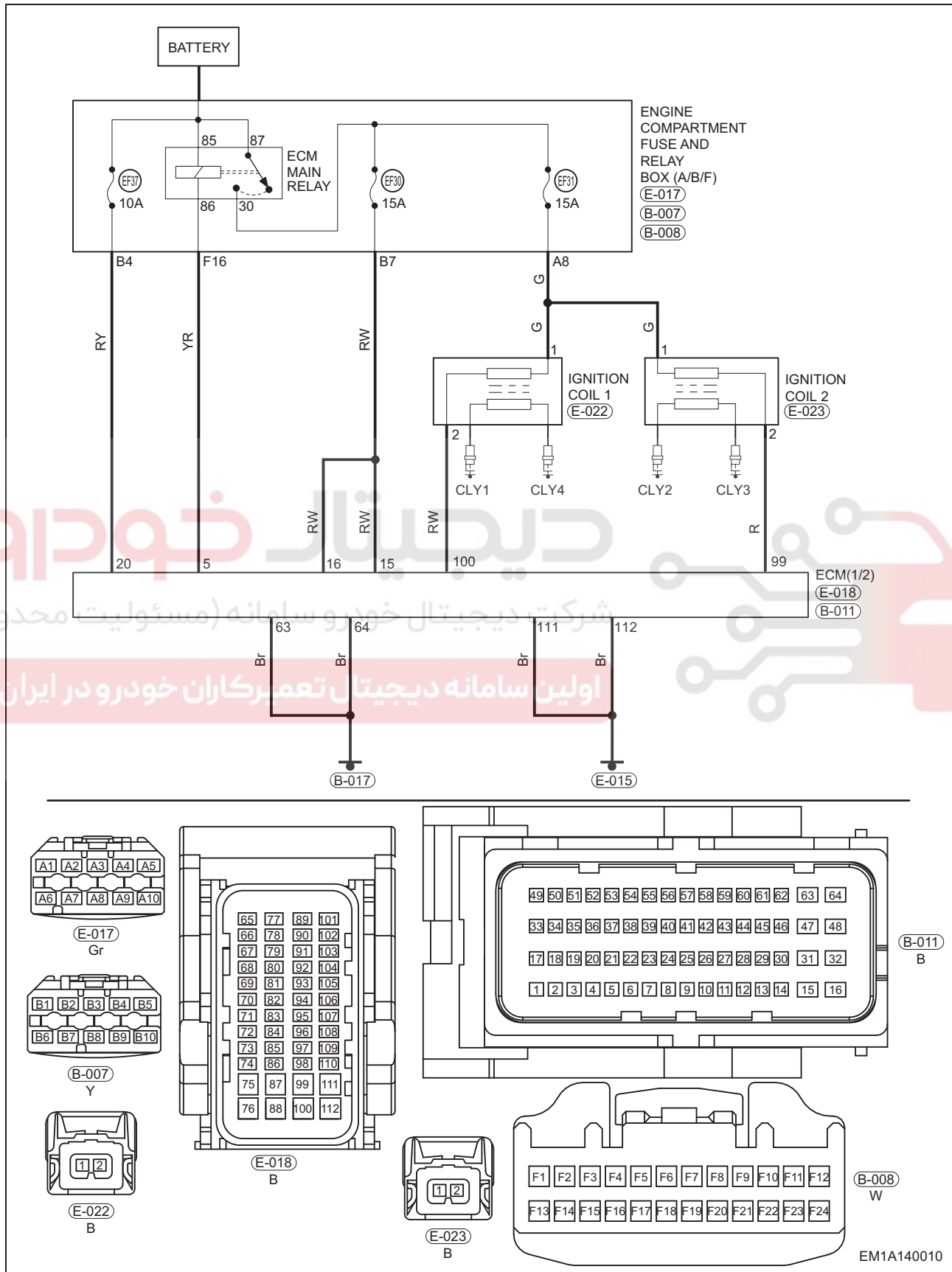
Digital Multimeter



RCH0000002

Circuit Diagram

Ignition System



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See Page
Stall	Ignition coil and high-voltage cable	14-8
	Camshaft position sensor	06-280
	Spark plug	14-11
	Intake camshaft phaser control valve	06-276
	Exhaust camshaft phaser control valve	06-276
	Wire harness	-
	ECM	06-290
Knock	Ignition coil and ignition high-voltage cable	14-8
	Knock sensor	06-278
	ECM	06-290
Difficult to start	Battery	16-7
	Ignition coil and high-voltage cable	14-8
	Spark plug	14-11
Engine hesitation, power loss, unstable performance	Ignition coil and high-voltage cable	14-8
	Engine speed sensor	06-281
	Intake camshaft phaser control valve	06-276
	Exhaust camshaft phaser control valve	06-276
	Spark plug	14-11
	Camshaft position sensor	06-280
	ECM	06-290
Rough, unstable idling or stall	Ignition coil and high-voltage cable	14-8
	Camshaft position sensor	06-280
	Spark plug	14-11
	ECM	06-290

Service Precautions

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

1. Check if line and hose are obviously loose, disconnected or improperly routed.
2. Make sure that battery connections are clean and fixed firmly.
3. Check if generator wire and belt are installed correctly and securely.
4. Confirm that ignition coils and high-voltage cables 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 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 routings of all vacuum hoses.
9. Confirm that following vacuum hoses are connected securely without any leakage:
 - a. Canister solenoid valve;
 - b. Charcoal canister;
 - c. PCV valve;
 - d. VIS vacuum system;
 - e. Brake booster.
10. Check fuel pump hose and wire connections to make sure that they are connected securely.

ON-VEHICLE SERVICE

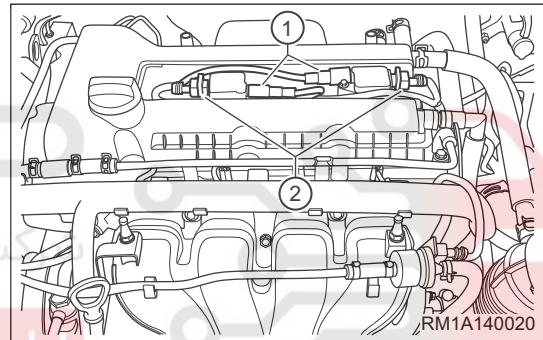
Ignition Coil and High-voltage Cable

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 high-voltage cable to perform ignition spark test during repair; otherwise, it may damage electronic controllers.

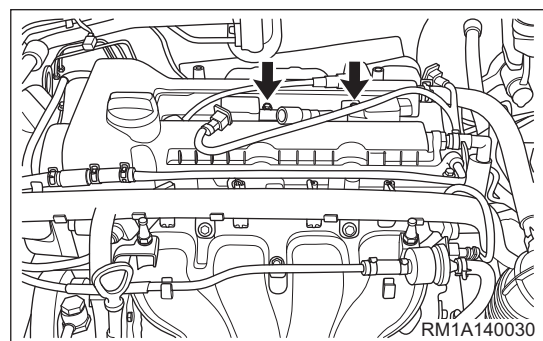
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the ignition coils.
 - a. Disconnect ignition coil connectors (1), and move away wire harness from ignition coils.
 - b. Disconnect connectors (2) between high-voltage cables and ignition coils.



CAUTION

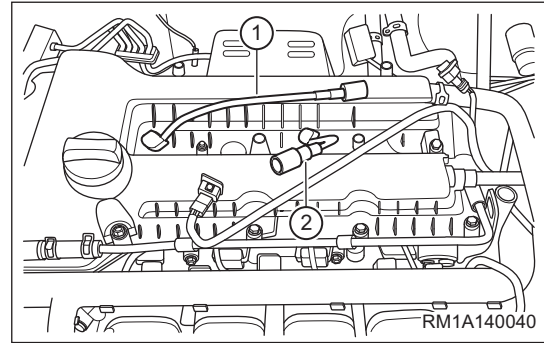
- Be careful not to damage or break high-voltage cables, when disconnecting high-voltage cable connectors from ignition coils.

- c. Loosen and remove 2 fixing bolts (arrow) from ignition coils.
(Tightening torque: 8 + 2 N·m)



- d. Remove the ignition coils.

5. Remove the high-voltage cables.
 - a. Pull cylinder 1 high-voltage cable (1) and cylinder 3 high-voltage cable (2) upward from spark plug holes.



CAUTION

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

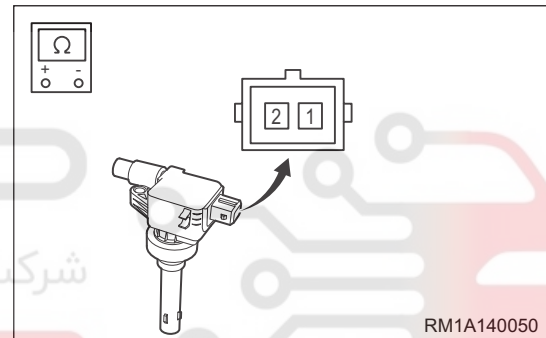
Inspection

1. Check resistance of ignition coil primary winding.

Turn digital multimeter to ohm band, and check resistance between terminals 1 and 2.

If result is not as specified, replace ignition coil.

Multimeter Connection	Condition	Specification (Ω)
Terminal 1 - Terminal 2	Normal temperature	0.7 - 0.9

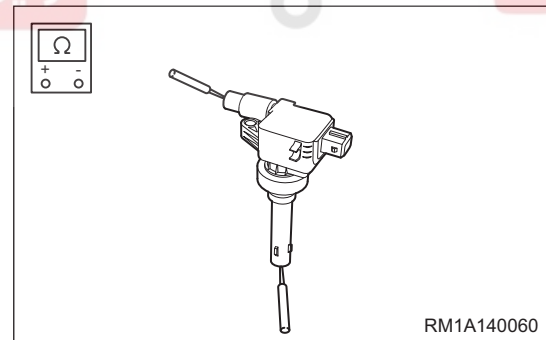


2. Check resistance of ignition coil secondary winding.

Turn digital multimeter to ohm band, and check resistance between 2 high-voltage terminals of ignition coil secondary winding.

If result is not as specified, replace ignition coil.

Inspection Item	Condition	Specification (k Ω)
Resistance of ignition coil secondary winding	Normal temperature	9.68 - 12.32



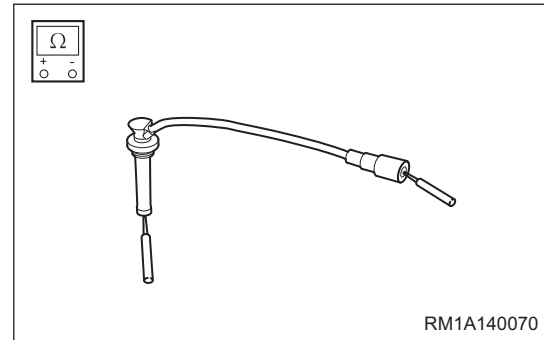
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3. Check resistances of high-voltage cables.

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

If results are not as specified, replace high-voltage cables.

Inspection Item	Condition	Specification (kΩ)
Resistance of cylinder 1 high-voltage cable	Normal temperature	3.67 - 7.24
Resistance of cylinder 3 high-voltage cable	Normal temperature	2.25 - 4.98



Installation

Installation is in the reverse order of removal.

CAUTION

- Install cylinder 1 and 3 high-voltage cables to spark plug holes according to the marks on high-voltage cables.
- Make sure that connections between high-voltage cable and ignition coil high-voltage output terminal, high-voltage cable and spark plug are reliable, or it may cause high-voltage leakage, resulting in poor ignition.

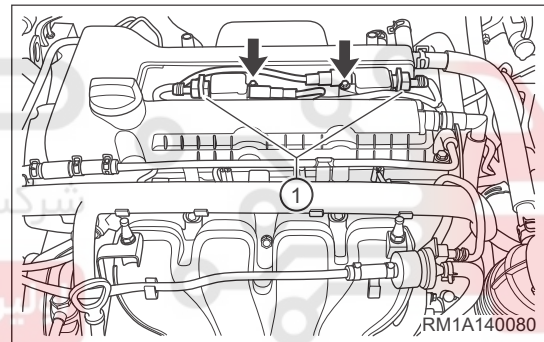
Spark Plug

Removal

CAUTION

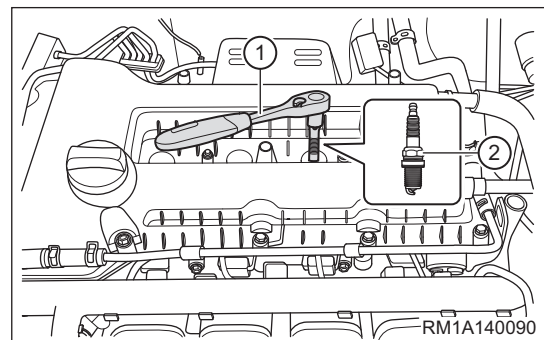
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.
- It is prohibited to use high-voltage cable to perform ignition spark test during repair; otherwise, it may damage electronic controllers.
- DO NOT remove spark plugs when engine is hot; failure to do this may cause damage to 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 ignition switch, and wait until engine cools down.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly.
4. Remove the ignition coil with high-voltage cable assembly.
 - a. Disconnect ignition coil connectors (1), and move away wire harness from ignition coils.
 - b. Loosen and remove 2 fixing bolts (arrow) from ignition coils.
(Tightening torque: 8 + 2 N·m)



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- c. Remove the ignition coil with high-voltage cable assembly.
5. Remove the spark plug.
 - a. Using a special spark plug socket wrench (1), loosen spark plug.
 - b. Remove the spark plug (2).



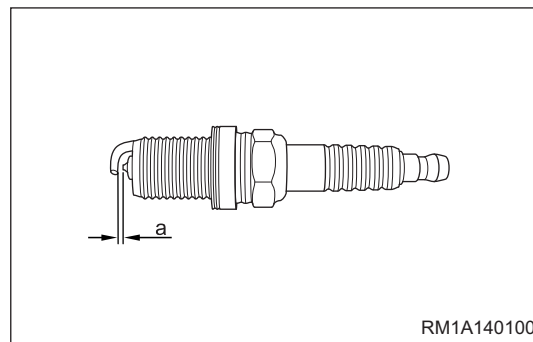
CAUTION

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

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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 a 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 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.