

ENGINE SECTION 1

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS) FU(H4SO 2.0)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) EC(H4SO 2.0)

INTAKE (INDUCTION) IN(H4SO 2.0)

MECHANICAL ME(H4SO 2.0)

EXHAUST EX(H4SO 2.0)

COOLING CO(H4SO 2.0)

LUBRICATION LU(H4SO 2.0)

SPEED CONTROL SYSTEMS SP(H4SO 2.0)

IGNITION IG(H4SO 2.0)

STARTING/CHARGING SYSTEMS SC(H4SO 2.0)

**ENGINE (DIAGNOSTICS) EN(H4SO 2.0)
(diag)**

FUEL INJECTION (FUEL SYSTEMS) FU(H4SO 2.5)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) EC(H4SO 2.5)

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ENGINE SECTION 1

LUBRICATION LU(H4SO 2.5)

SPEED CONTROL SYSTEMS SP(H4SO 2.5)

IGNITION IG(H4SO 2.5)

STARTING/CHARGING SYSTEMS SC(H4SO 2.5)

ENGINE (DIAGNOSTICS) EN(H4SO 2.5)
(diag)

IGNITION

IG(H4SO 2.0)

	Page
1. General Description	2
2. Spark Plug.....	5
3. Ignition Coil & Ignitor ASSY	8
4. Spark Plug Cord.....	10

General Description

IGNITION

1. General Description

A: SPECIFICATION

1. 2.0 L MODEL

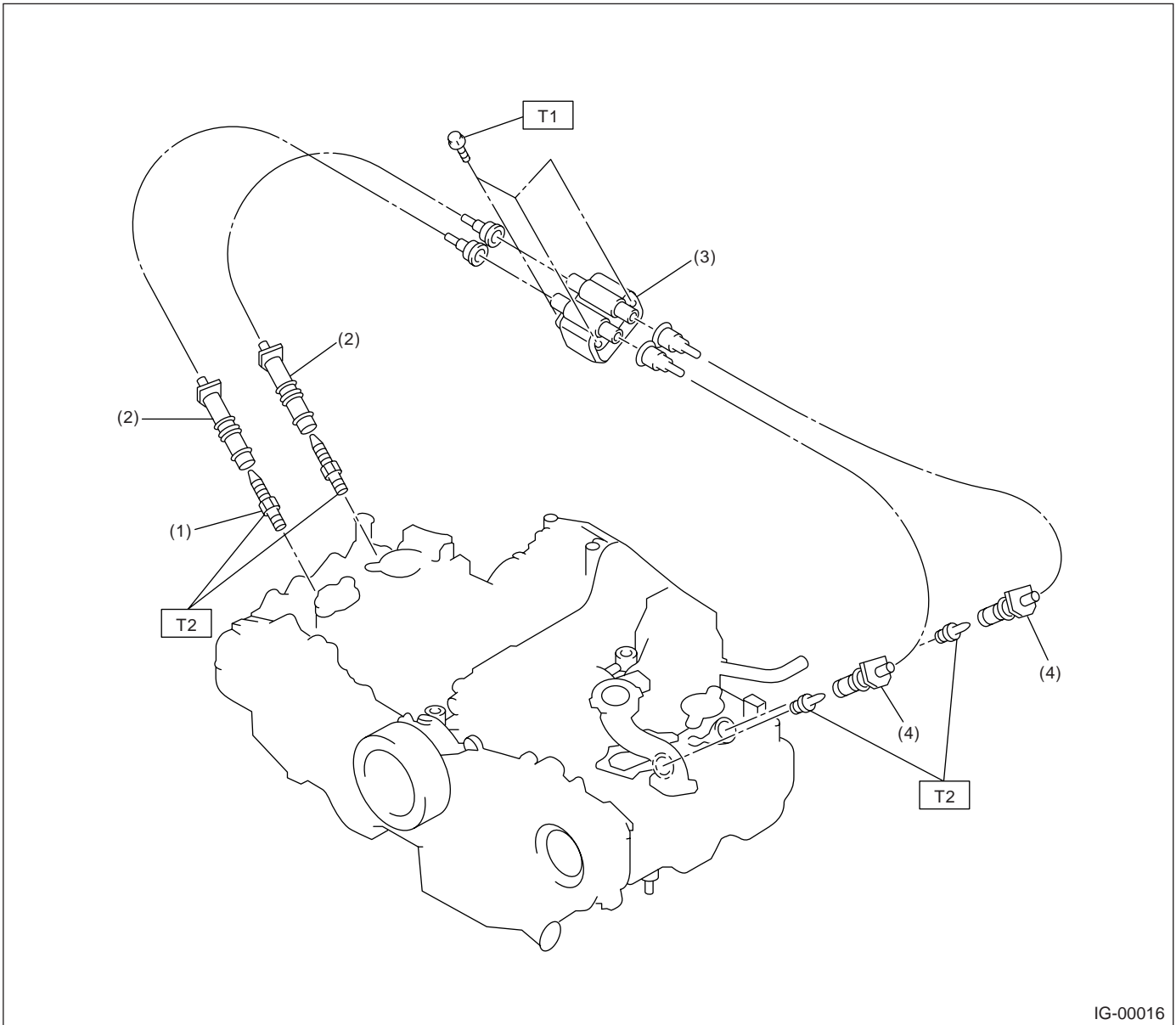
Item		Designation
Ignition coil & ignitor ASSY	Model	CM12-100C
	Manufacturer	HITACHI
	Secondary coil resistance	18.0 kΩ± 20%
Spark plug	Manufacturer and Type	CHAMPION: RC10YC4
	Thread size (diameter, pitch, length) mm	14, 1.25, 19
	Spark plug gap mm (in)	1.0 — 1.1 (0.039 — 0.043)
	Electrode	Nickel

2. 2.5 L MODEL

Item		Designation	
Ignition coil & ignitor ASSY	Model	FH 0286	
	Manufacturer	DIAMOND	
	Secondary coil resistance	11.2 kΩ±15%	
Spark plug	Manufacturer and Type	EC, EK, K4 model	NGK: PFR5B-11
		Except for EC, EK, K4 model	CHAMPION: RC10YC4
	Thread size (diameter, pitch, length) mm	14, 1.25, 19	
	Spark plug gap mm (in)	1.0 — 1.1 (0.039 — 0.043)	
	Electrode	EC, EK, K4 model	Platinum
		Except for EC, EK, K4 model	Nickel

B: COMPONENT

- 2.0 L model



- (1) Spark plug
- (2) Spark plug cord (#1, #3)
- (3) Ignition coil & ignitor ASSY

- (4) Spark plug cord (#2, #4)

Tightening torque: N·m (kgf·m, ft·lb)

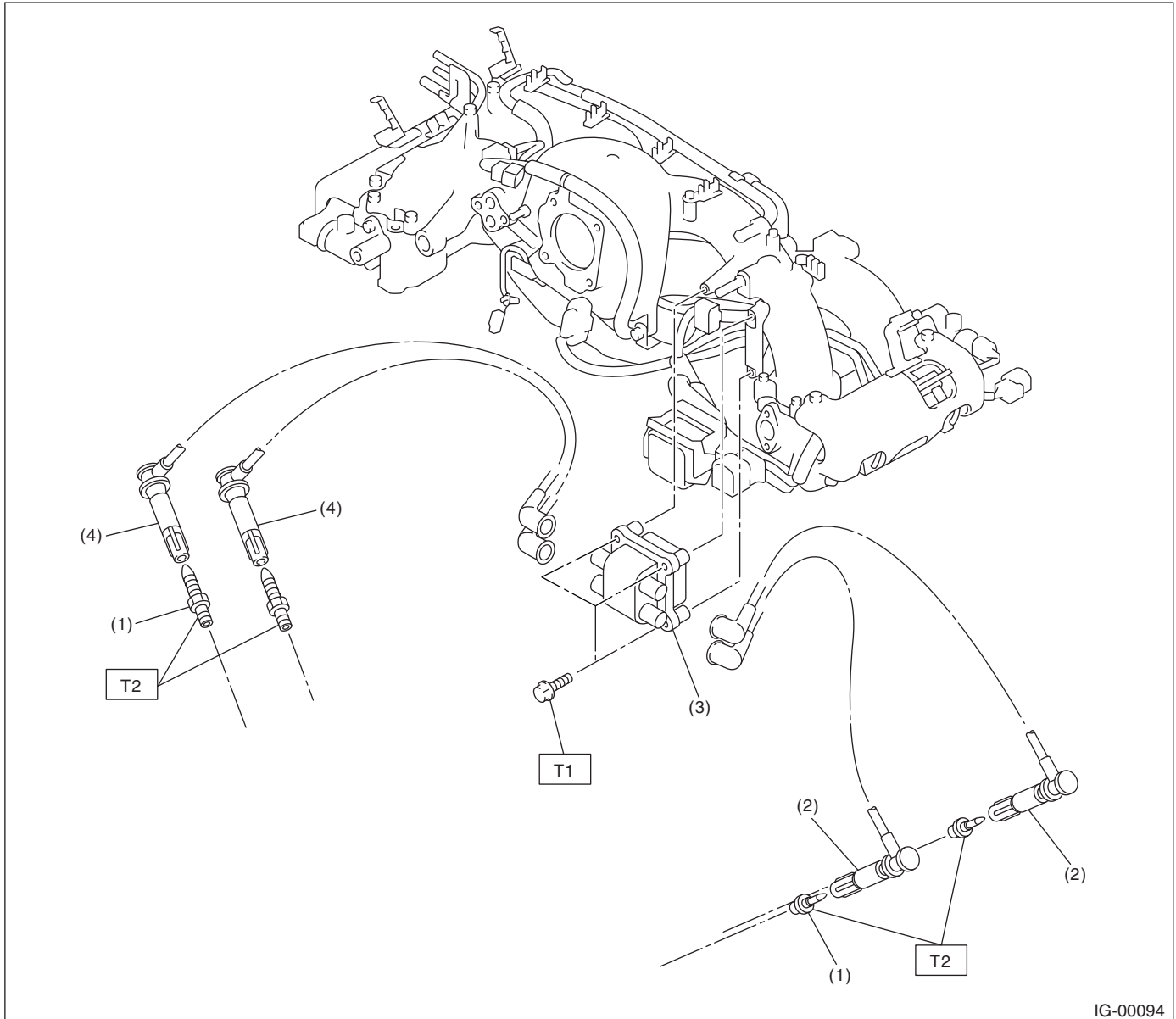
T1: 6.4 (0.65, 4.7)

T2: 21 (2.1, 15.2)

General Description

IGNITION

- 2.5 L model



- (1) Spark plug
- (2) Spark plug cord (#1, #3)
- (3) Ignition coil & ignitor ASSY
- (4) Spark plug cord (#2, #4)

Tightening torque: N·m (kgf·m, ft·lb)

T1: 6.4 (0.65, 4.7)

T2: 21 (2.1, 15.2)

C: CAUTION

- Wear work clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Be careful not to burn yourself, because each part on the vehicle is hot after running.

- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect the ground cable from battery.

2. Spark Plug

A: REMOVAL

CAUTION:

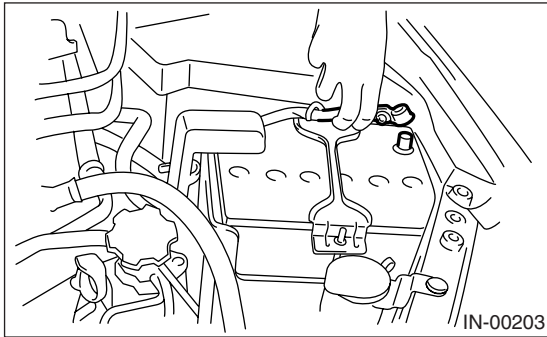
All spark plugs installed on an engine must be of the same heat range.

Spark plug:

<Ref. to IG(H4SO 2.0)-2, SPECIFICATION, General Description.>

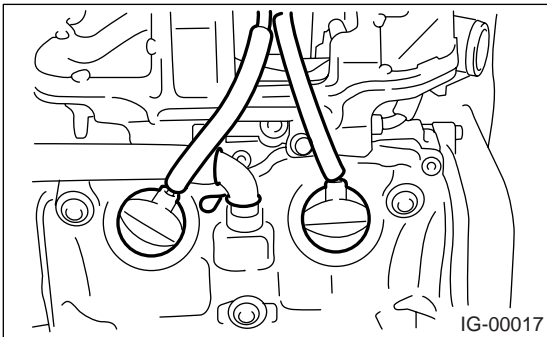
1. RH SIDE

- 1) Disconnect the ground cable from battery.

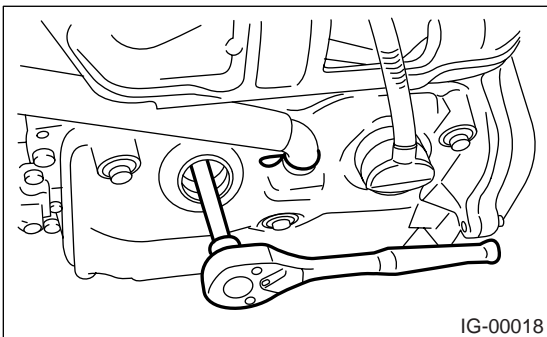


- 2) Remove the air cleaner case. <Ref. to IN(H4SO 2.0)-6, REMOVAL, Air Cleaner Case.>

- 3) Remove the spark plug cords by pulling the boot. (Do not pull the cord itself.)

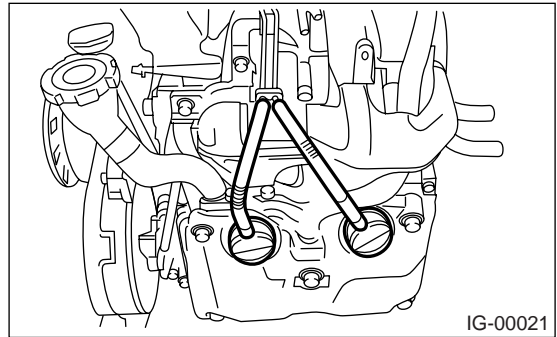


- 4) Remove the spark plug with a spark plug socket.

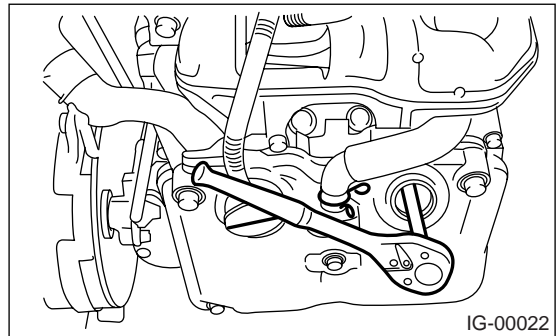


2. LH SIDE

- 1) Remove the battery.
- 2) Remove the spark plug cords by pulling the boot. (Do not pull the cord itself.)



- 3) Remove the spark plug with a spark plug socket.



B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

Tightening torque:

21 N·m (2.1 kgf-m, 15.2 ft-lb)

NOTE:

The above torque should be only applied to new spark plugs without oil on their threads.

In case their threads are lubricated, the torque should be reduced by approx. 1/3 of the specified torque in order to avoid over-stressing.

2. LH SIDE

Install in the reverse order of removal.

Tightening torque:

21 N·m (2.1 kgf-m, 15.2 ft-lb)

NOTE:

The above torque should be only applied to new spark plugs without oil on their threads.

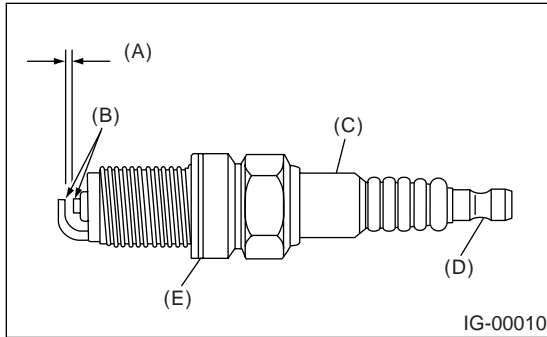
In case their threads are lubricated, the torque should be reduced by approx. 1/3 of the specified torque in order to avoid over-stressing.

Spark Plug

IGNITION

C: INSPECTION

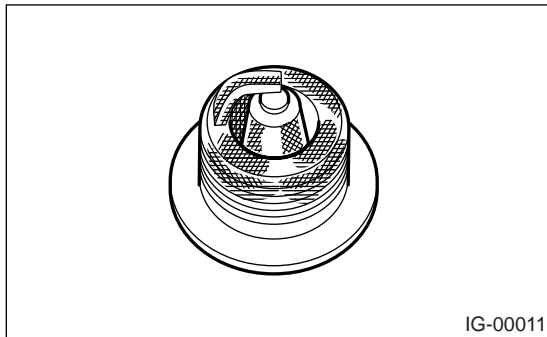
Check the electrodes and inner and outer ceramic insulator of plugs, noting the type of deposits and the degree of electrode erosion.



- (A) Spark plug gap
- (B) Carbon accumulation or wear
- (C) Crack
- (D) Damage
- (E) Damaged gasket

1) Normal:

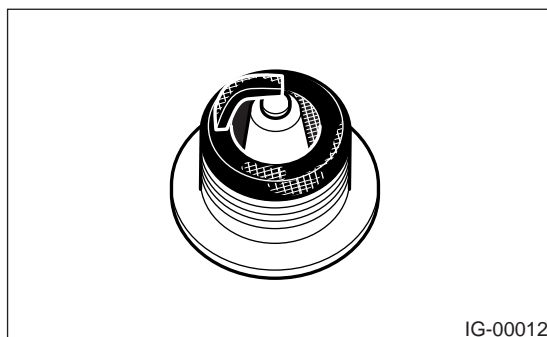
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



2) Carbon fouled:

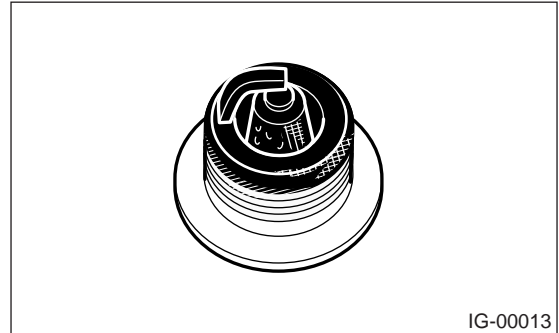
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in the city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.

It is advisable to replace with plugs having hotter heat range.



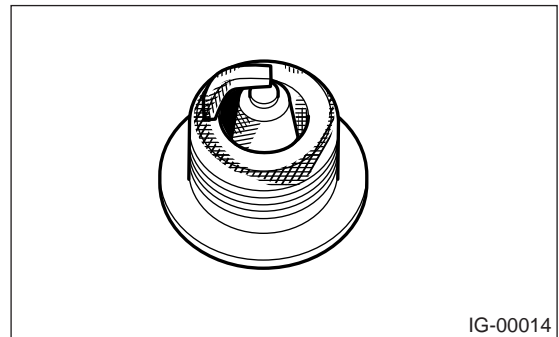
3) Oil fouled:

Wet black deposits show excessive oil entrance into combustion chamber through worn rings and pistons or excessive clearance between valve guides and stems. If the same condition remains after repair, use a hotter plug.



4) Overheating:

White or light gray insulator with black or brown spots and bluish burnt electrodes indicate engine overheating. Moreover, the appearance results from incorrect ignition timing, loose spark plugs, wrong selection of fuel, hotter range plug, etc. It is advisable to replace with plugs having colder heat range.



CAUTION:

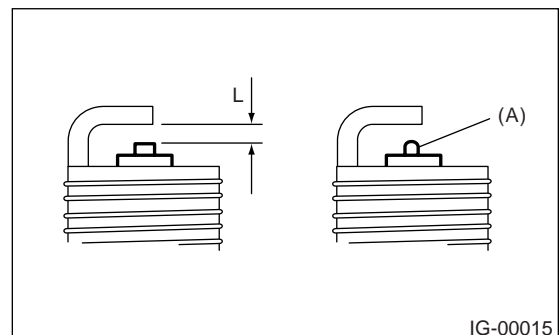
Avoid using a plug cleaner because of the spark plug with a platinum tip. (2.5 L model)

D: ADJUSTMENT

Adjust the spark plug gap, if necessary, by measuring with a gap gauge. (2.0 L model)

Spark plug gap: L

1.0 — 1.1 mm (0.039 — 0.043 in)



NOTE:

Replace with a new spark plug if the area (A) is worn to spherical shape.

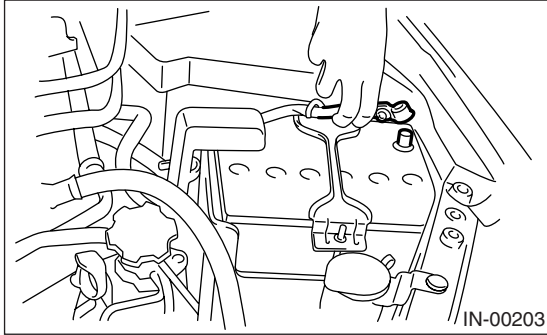
Ignition Coil & Ignitor ASSY

IGNITION

3. Ignition Coil & Ignitor ASSY

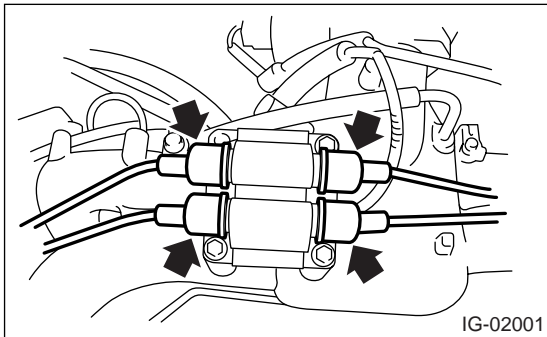
A: REMOVAL

1) Disconnect the ground cable from battery.

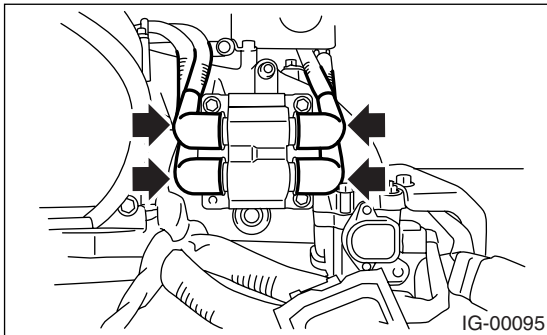


2) Disconnect the spark plug cords from ignition coil & ignitor ASSY.

- 2.0 L model



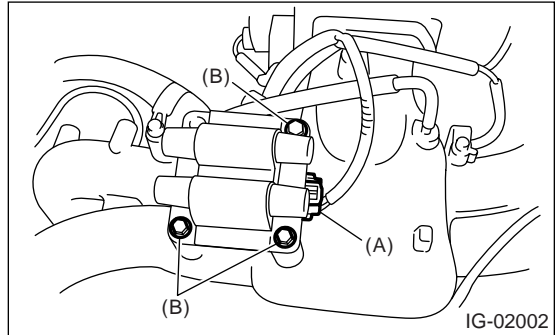
- 2.5 L model



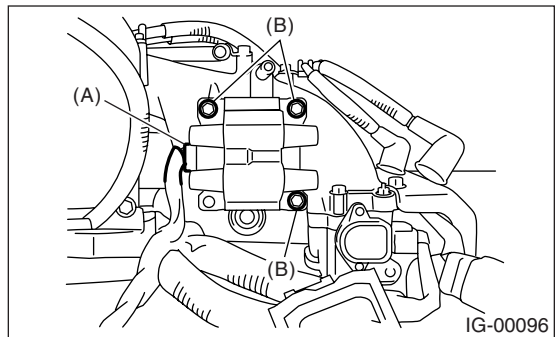
3) Disconnect the connector (A) from ignition coil & ignitor ASSY.

4) Remove the bolt (B) which secures the ignition coil & ignitor ASSY to intake manifold.

- 2.0 L model



- 2.5 L model



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

CAUTION:

Connect the spark plug cords to correct positions. Failure to do so will damage the unit.

C: INSPECTION

Check the following using a tester. Replace if defective.

- Secondary coil resistance

CAUTION:

• If the resistance is extremely low, it indicates the presence of a short-circuit.

• Ignitor is integrated with the coil. Therefore the resistance of primary side coil cannot be measured.

Specified resistance (2.0 L model):

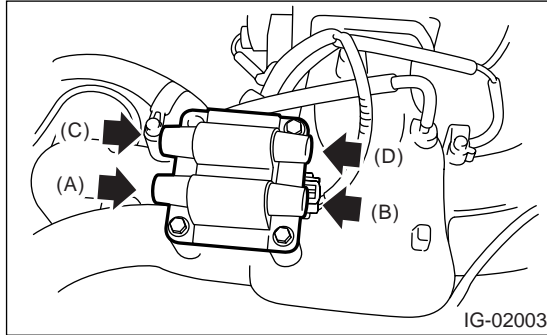
[Secondary side]

Between (A) and (B)

18.0 k Ω ±20%

Between (C) and (D)

18.0 k Ω ±20%



Specified resistance (2.5 L model):

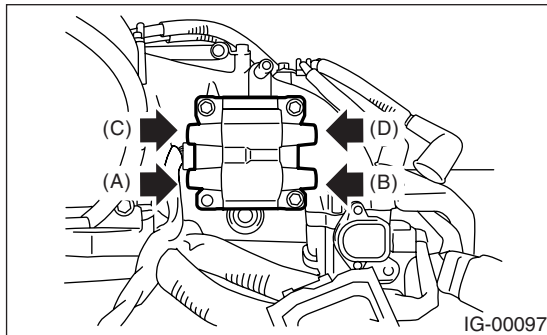
[Secondary side]

Between (A) and (B)

11.2 k Ω ±15%

Between (C) and (D)

11.2 k Ω ±15%



4. Spark Plug Cord

A: INSPECTION

Check the following items:

- Damage to cords, deformation, burning or rust formation of terminals
- Resistance values of cords

Resistance value (2.0 L model):

#1 cord: 5.9 — 11.1 k Ω

#2 cord: 8.8 — 14.8 k Ω

#3 cord: 6.8 — 11.7 k Ω

#4 cord: 8.8 — 14.8 k Ω

Resistance value (2.5 L model):

#1 cord: 7.1 — 12.1 k Ω

#2 cord: 12.1 — 19.9 k Ω

#3 cord: 7.7 — 13.0 k Ω

#4 cord: 12.3 — 20.2 k Ω

