

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)
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(H4SO)
INTAKE (INDUCTION)	IN(H4SO)
MECHANICAL	ME(H4SO)
EXHAUST	EX(H4SO)
COOLING	CO(H4SO)
LUBRICATION	LU(H4SO)
SPEED CONTROL SYSTEMS	SP(H4SO)
IGNITION	IG(H4SO)
STARTING/CHARGING SYSTEMS	SC(H4SO)
ENGINE (DIAGNOSTICS)	EN(H4SO)
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ENGINE SECTION 1

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IGNITION

IG(H4SOw/oOBD)

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GENERAL DESCRIPTION

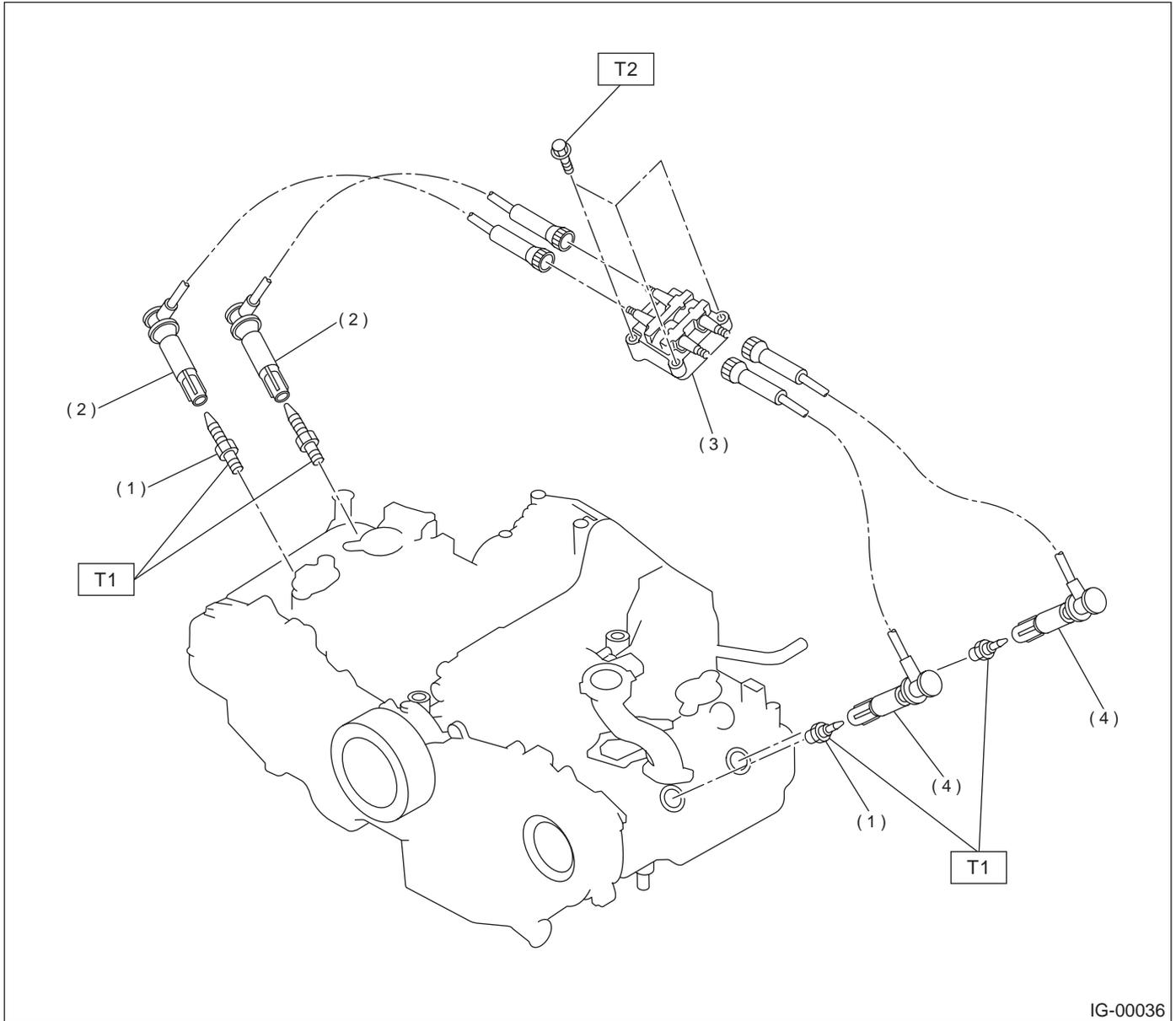
IGNITION

1. General Description

A: SPECIFICATIONS

Item		Designation	
Ignition coil and ignitor assembly	Model	FH0137	
	Manufacturer	DIAMOND	
	Primary coil resistance	0.73 Ω ±10%	
	Secondary coil resistance	12.8 k Ω ±15%	
	Insulation resistance between primary terminal and case	More than 100 M Ω	
Spark plug	Type and manufacturer	Without catalytic converter BKR6E NGK	
		With catalytic converter RC10YC4 CHAMPION BKR5E-11 NGK (Alternate)	
	Thread size	mm 14, P = 1.25	
	Spark gap	Without catalytic converter mm (in)	0.7 — 0.8 (0.028 — 0.031)
		With catalytic converter mm (in)	1.0 — 1.1 (0.039 — 0.043)

B: COMPONENT



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

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

Tightening torque: N·m (kgf·m, ft·lb)

T1: 21 (2.1, 15)

T2: 6.4 (0.65, 4.7)

GENERAL DESCRIPTION

IGNITION

C: CAUTION

- Wear working 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 or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, 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 safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect 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:

With catalytic converter

CHAMPION: RC10YC4

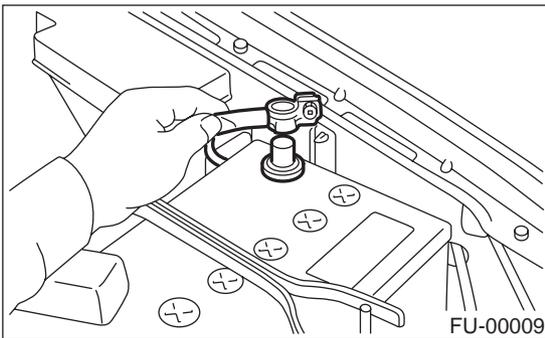
NGK: BKR5E-11 (Alternate)

Without catalytic converter

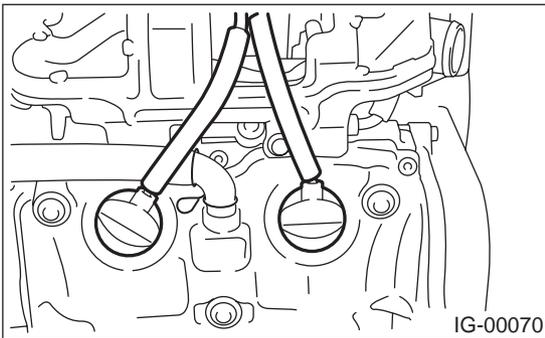
NGK: BKR6E

1. RH SIDE

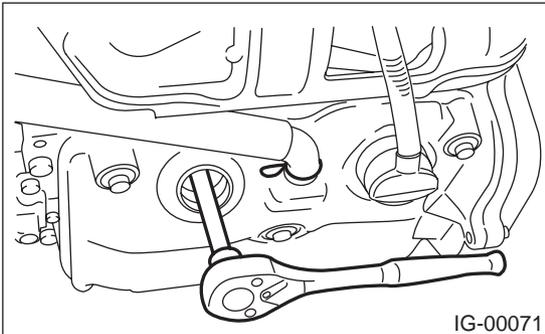
- 1) Disconnect battery ground cable.



- 2) Remove resonator chamber. <Ref. to IN(H4SO)-8, REMOVAL, Resonator Chamber.>
- 3) Remove spark plug cords by pulling boot, not cord itself.

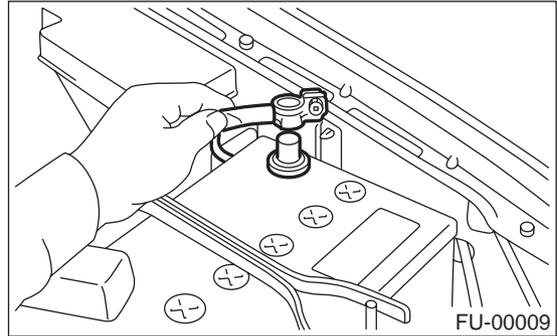


- 4) Remove spark plugs with the spark plug socket.

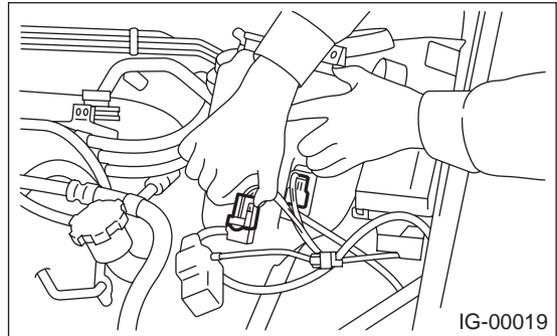


2. LH SIDE

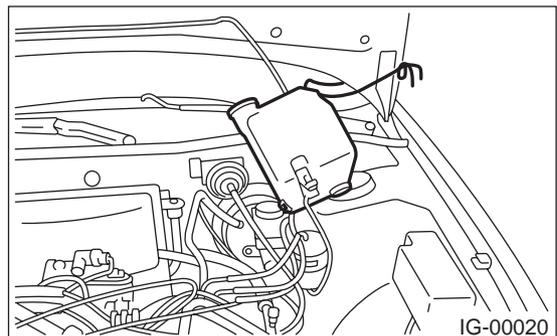
- 1) Disconnect battery ground cable.



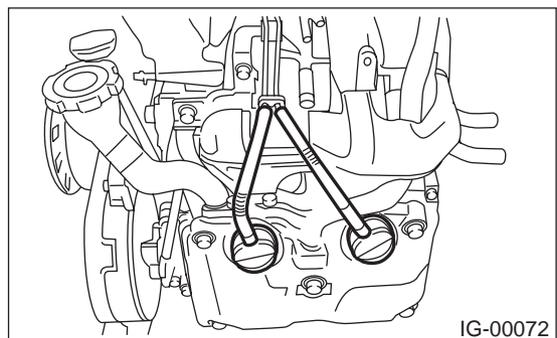
- 2) Disconnect washer motor connector.



- 3) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.
- 4) Remove the two bolts which hold the washer tank, then take the tank away from the working area.



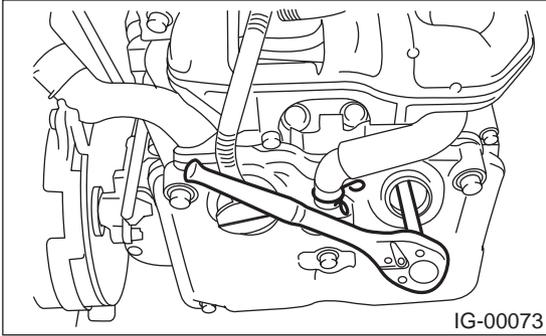
- 5) Remove spark plugs cord by pulling boot, not cord itself.



SPARK PLUG

IGNITION

6) Remove spark plug with the spark plugs socket.



B: INSTALLATION

1. RH SIDE

1) Install in the reverse order of removal.

Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 ft-lb)

CAUTION:

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 approximately 1/3 of the specified torque in order to avoid over-stressing.

Tightening torque (Resonator chamber):
33 N·m (3.4 kgf-m, 24.6 ft-lb)

2. LH SIDE

1) Install in the reverse order of removal.

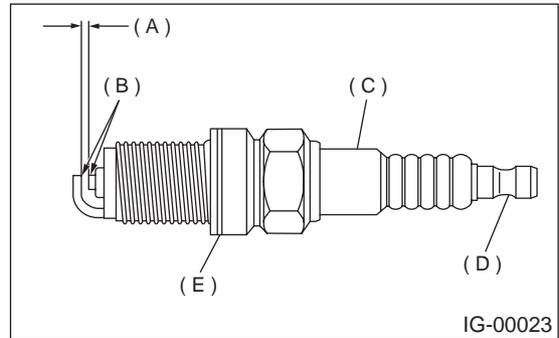
Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 ft-lb)

CAUTION:

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 approximately 1/3 of the specified torque in order to avoid over-stressing.

C: INSPECTION

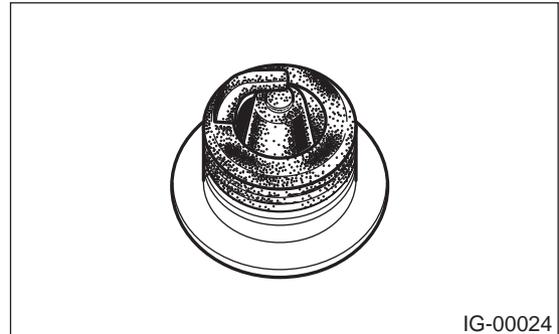
Check electrodes and inner and outer porcelain of plugs, noting the type of deposits and the degree of electrode erosion.



- (A) Electrode gap
- (B) Carbon accumulation or wear
- (C) Cracks
- (D) Damage
- (E) Damaged gasket

1) Normal

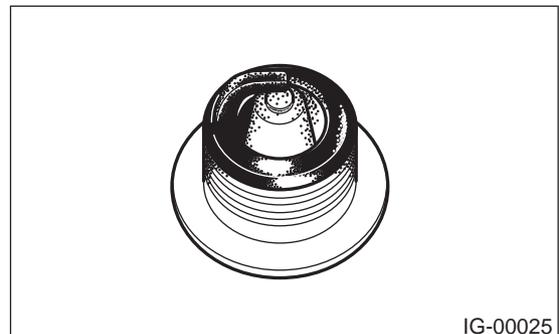
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



2) Carbon fouled

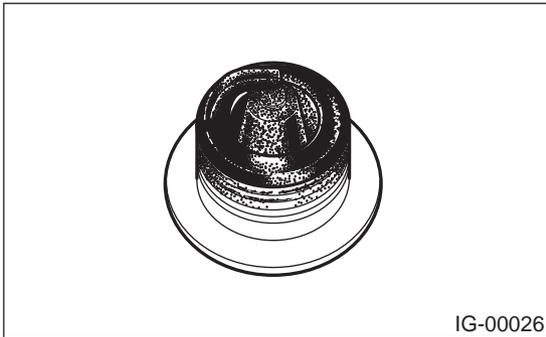
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.

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



3) Oil fouled

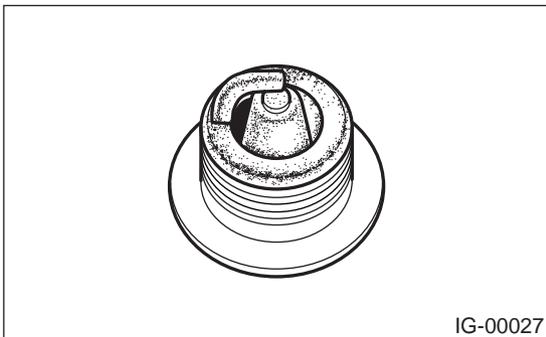
Wet black deposits show excessive oil entrance into combustion chamber through worn rings and pistons or excessive clearance between valve guides and stems. If same condition remains after repair, use a hotter plug.



IG-00026

4) Overheating

White or light gray insulator with black or gray 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.



IG-00027

D: CLEANING

Clean spark plugs in a sand blast type cleaner. Avoid excessive blasting. Clean and remove carbon or oxide deposits, but do not wear away porcelain. If deposits are too stubborn, replace plugs.

E: ADJUSTMENT

Correct it if the spark plug gap is measured with a gap gauge, and it is necessary.

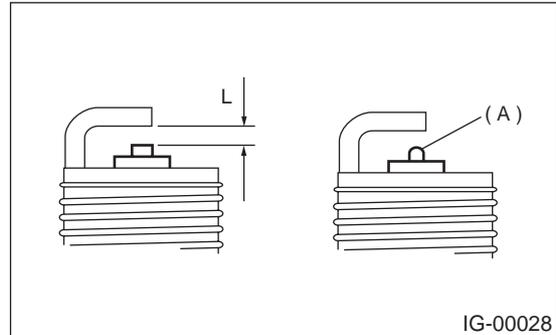
Spark plug gap: L

Without catalytic converter

0.7 — 0.8 mm (0.028 — 0.031 in)

With catalytic converter

1.0 — 1.1 mm (0.039 — 0.043 in)



IG-00028

NOTE:

Replace with new spark plug if this area (A) is worn to "ball" shape.

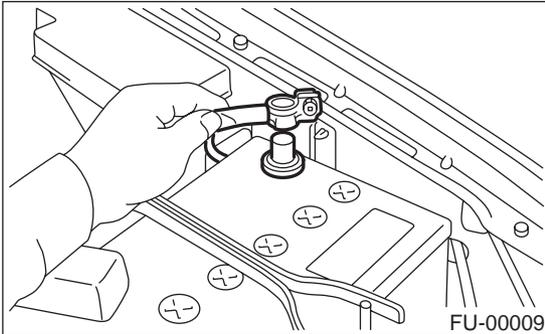
IGNITION COIL AND IGNITOR ASSEMBLY

IGNITION

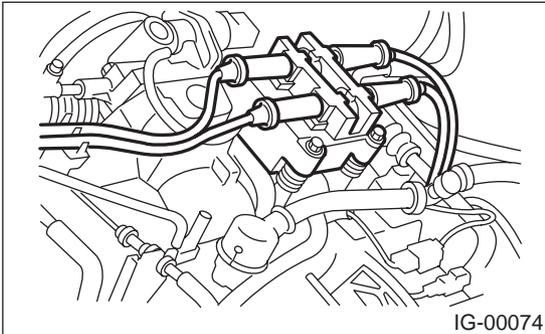
3. Ignition Coil and Ignitor Assembly

A: REMOVAL

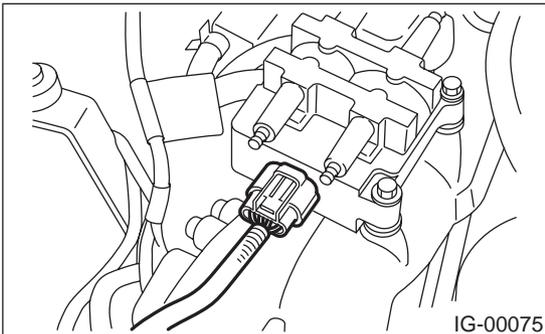
- 1) Disconnect battery ground cable.



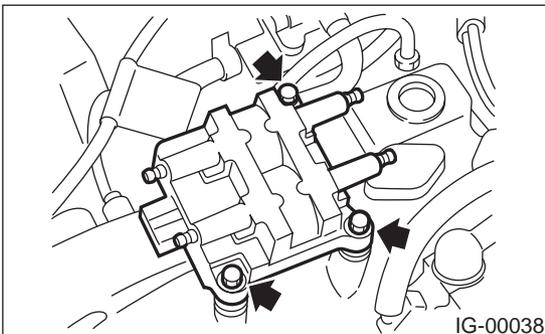
- 2) Disconnect spark plug cords from ignition coil and ignitor assembly.



- 3) Disconnect connector from ignition coil and ignitor assembly.



- 4) Remove ignition coil and ignitor assembly.



B: INSTALLATION

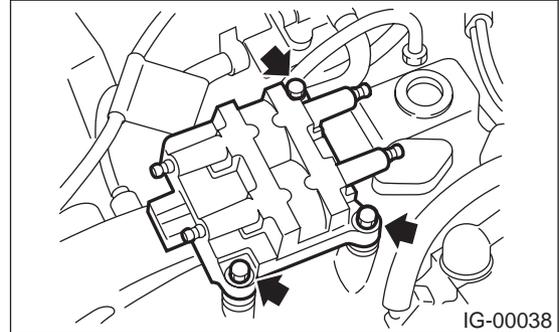
Install in the reverse order of removal.

Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)

CAUTION:

Be sure to connect wires to their proper positions. Failure to do so will damage unit.



C: INSPECTION

Using accurate tester, inspect the following items, and replace if defective.

- 1) Primary resistance
- 2) Secondary coil resistance

CAUTION:

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

Specified resistance:

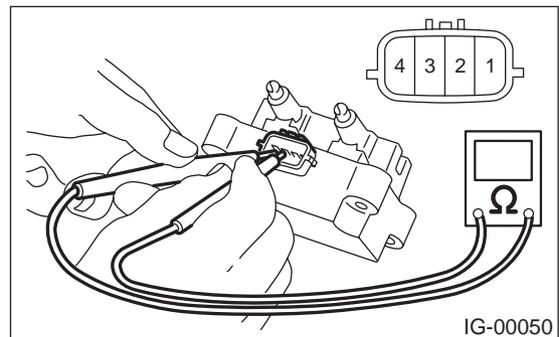
[Primary side]

Between terminal No. 1 and No. 2

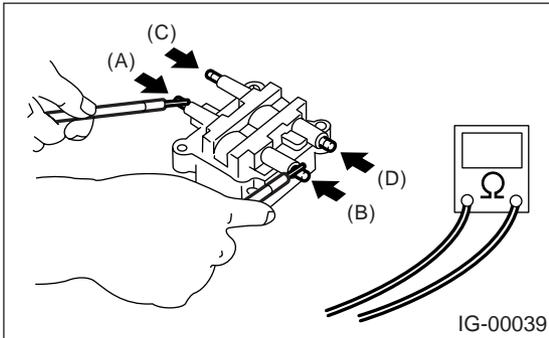
0.73 Ω±10%

Between terminal No. 2 and No. 4

0.73 Ω±10%



[Secondary side]
Between (A) and (B)
12.8 k Ω ±15%
Between (C) and (D)
12.8 k Ω ±15%



3) Insulation between primary terminal and case:
100 M Ω or more.

4. Spark Plug Cord

A: INSPECTION

Check for:

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

Resistance value:

#1 cord: 5.6 — 10.6

#2 cord: 7.3 — 13.7

#3 cord: 5.9 — 11.1

#4 cord: 7.3 — 13.7

