

IGNITION SYSTEM (2AZ-FE)(From July, 2003)

ON-VEHICLE INSPECTION

1809Q-05

NOTICE:

In this section, the terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10°C (14°F) to 50°C (122°F). "Hot" means approximately 50°C (122°F) to 100°C (212°F).

1. INSPECT IGNITION COIL ASSY (WITH IGNITER) AND PERFORM SPARK TEST

- (a) Check for DTCs.

NOTICE:

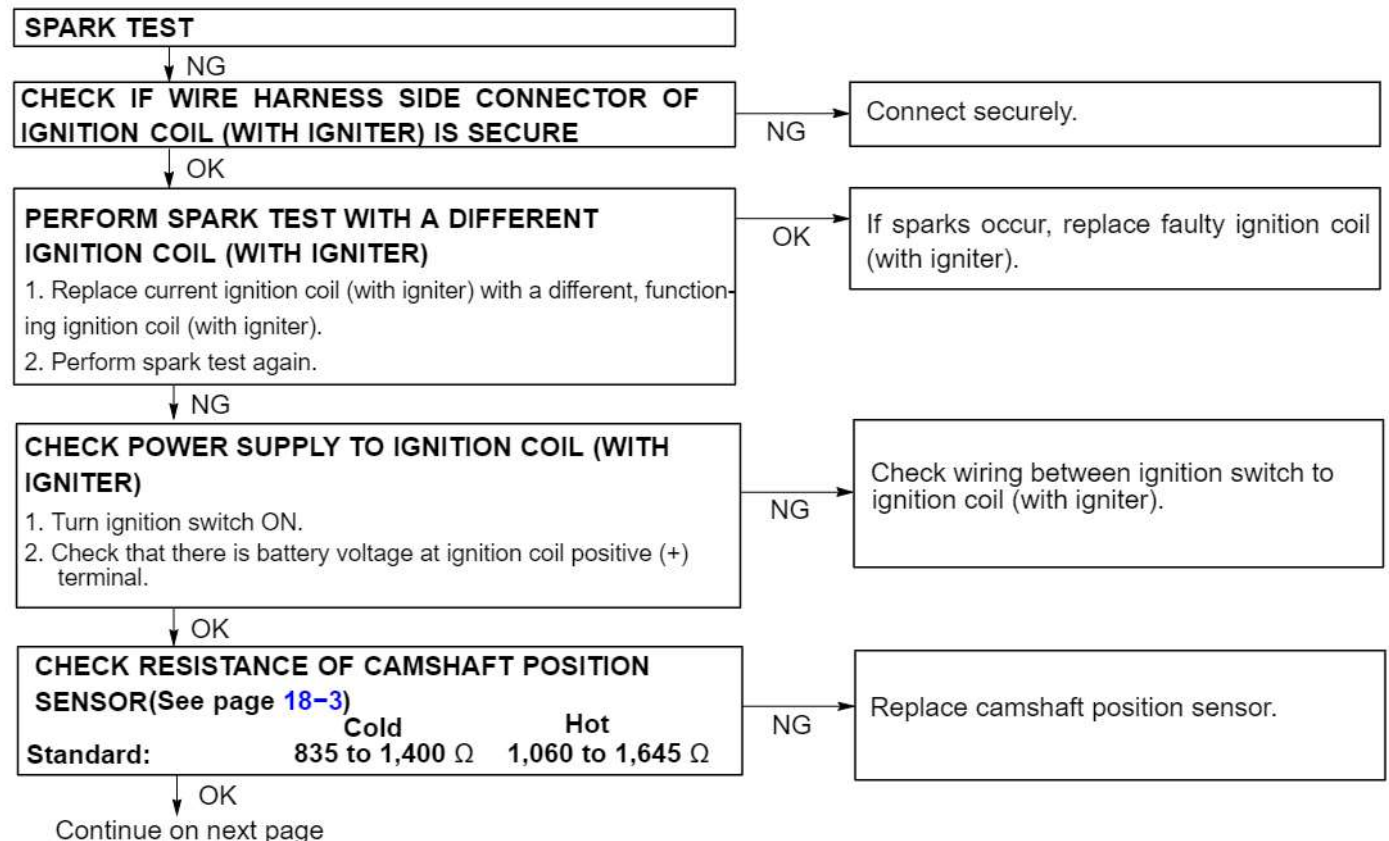
If a DTC is present, perform troubleshooting in accordance with the procedure for that DTC.

- (b) Check if sparks occur.
- (1) Remove the engine cover No. 1 (see page 14-29).
 - (2) Remove the ignition coils.
 - (3) Using a 16 mm (0.63 in.) plug wrench, remove the spark plugs.
 - (4) Install the spark plugs to each ignition coil and connect the ignition coil connectors.
 - (5) Disconnect the 4 injector connectors.
 - (6) Ground the spark plugs.
 - (7) Check if sparks occur at each spark plug while the engine is being cranked.

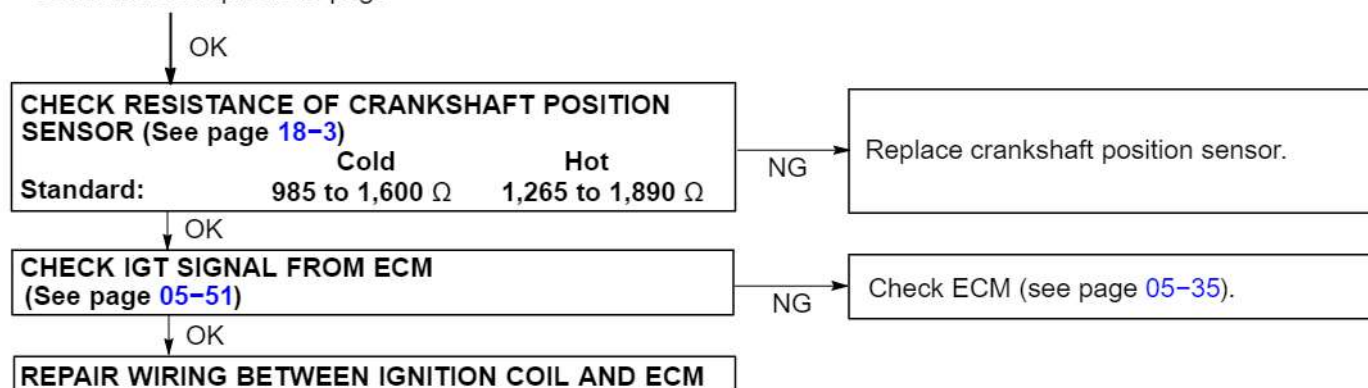
NOTICE:

Do not crank the engine for more than 2 seconds.

If the sparks do not occur, perform the following test:



Continued from previous page



(8) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

(9) Install the ignition coils.

Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

(10) Install the engine cover No. 1.

Torque: 7.0 N·m (71 kgf·cm, 62 in·lbf)

VVT SENSOR (1MZ-FE/3MZ-FE)

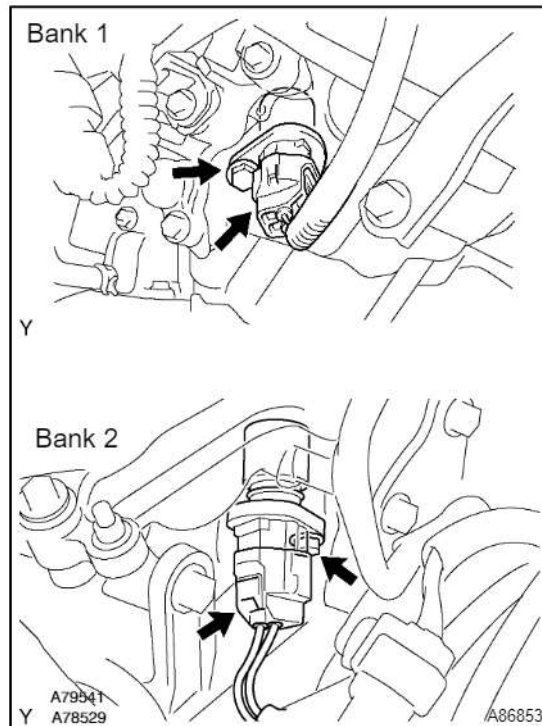
REPLACEMENT

1809W-02

HINT:

A bolt without torque specification is a standard bolt (see page 03-2).

1. **REMOVE AIR CLEANER INLET ASSY**
2. **REMOVE AIR CLEANER ASSY (See page 14-164)**



3. **REMOVE VVT SENSOR**

- (a) Disconnect the sensor connector.
- (b) Remove the bolt and sensor.

4. **INSTALL VVT SENSOR**

- (a) Apply a light coat of engine oil to the O-ring on the sensor.
- (b) Install the sensor with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

- (c) Connect the sensor connector.

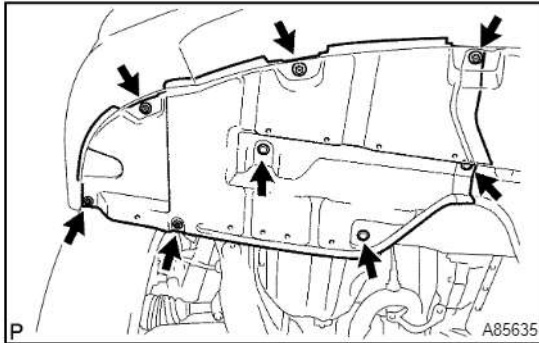
5. **INSTALL AIR CLEANER ASSY (See page 14-164)**
6. **INSTALL AIR CLEANER INLET ASSY**
7. **CHECK CONNECTION OF VACUUM HOSE**

CRANKSHAFT POSITION SENSOR (1MZ-FE/3MZ-FE) REPLACEMENT

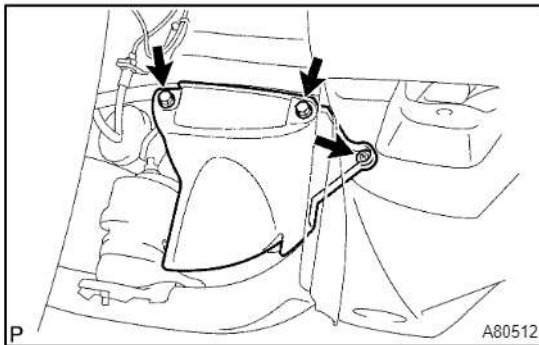
1809X-02

HINT:

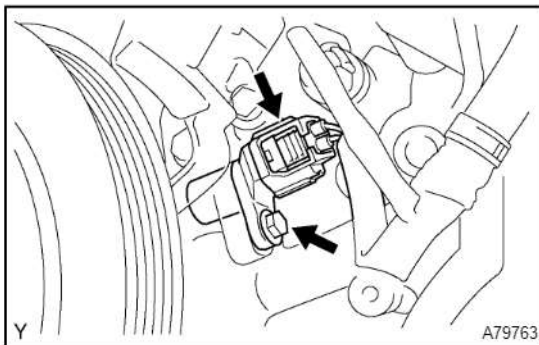
A bolt without torque specification is a standard bolt (see page 03-2).

**1. REMOVE ENGINE UNDER COVER RH**

- (a) Remove the 5 screws, 3 clips and the under cover.

**2. REMOVE FRONT FENDER APRON SEAL RH**

- (a) Remove the clip, 2 bolts and apron seal.

**3. REMOVE CRANKSHAFT POSITION SENSOR**

- (a) Disconnect the sensor connector.
(b) Remove the bolt and sensor.

4. INSTALL CRANKSHAFT POSITION SENSOR

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

5. INSTALL FRONT FENDER APRON SEAL RH**6. INSTALL ENGINE UNDER COVER RH**

INSPECTION

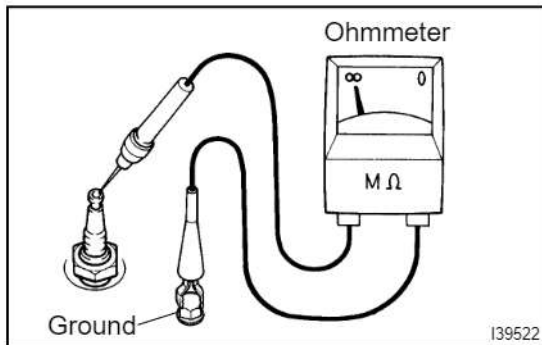
NOTICE:

In this section, the terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10°C (14°F) to 50°C (122°F). "Hot" means approximately 50°C (122°F) to 100°C (212°F).

1. INSPECT SPARK PLUG

NOTICE:

- Do not use a wire brush for cleaning.
- Do not attempt to adjust the electrode gap of a used spark plug.



(a) Check the electrode.

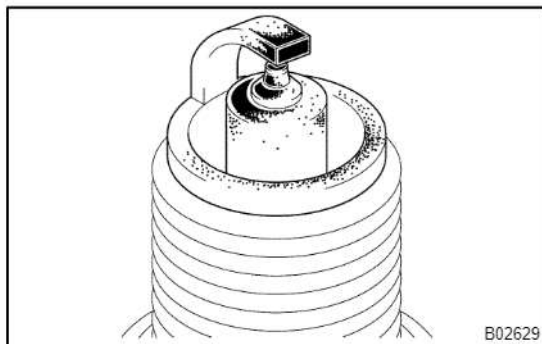
- (1) Using an ohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 MΩ or more

If the resistance is less than the specified value, proceed to step (d).

HINT:

If the ohmmeter is not available, perform the following simple inspection instead.



(b) Alternative inspection method:

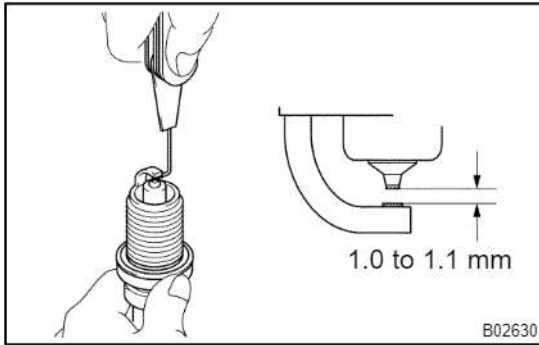
- (1) Quickly accelerate the engine to 4,000 rpm 5 times.
- (2) Remove the spark plug.
- (3) Visually check the spark plug.
 - If the electrode is dry, the spark plug is functioning. Proceed to step 2.
 - If the electrode is damp, proceed to steps (c), (d), and (e).
- (4) Install the spark plug.

(c) Check the spark plug for any damage on its thread and insulator.

If there is damage, replace the spark plug.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11



- (d) Check the spark plug electrode gap.

Maximum electrode gap for used spark plug:

P-ZEV	1.33 mm (0.052 in.)
Except P-ZEV	1.3 mm (0.051 in.)

If the gap is greater than the maximum, replace the spark plug.

Correct electrode gap for new spark plug:

1.0 to 1.1 mm (0.039 to 0.043 in.)

NOTICE:

If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.



- (e) Clean the spark plugs.

If the electrode has traces of wet carbon, clean the electrode with a spark plug cleaner and then dry it.

Air pressure: 588 kPa (6 kgf/cm², 85 psi)

Duration: 20 seconds or less

HINT:

Use the spark plug cleaner only when the electrode is free of oil. If the electrode has traces of oil, use gasoline to clean off the oil before using the spark plug cleaner.

2. INSPECT CAMSHAFT POSITION SENSOR

- (a) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Temperature	Specified Condition
Cold	835 to 1,400 Ω
Hot	1,060 to 1,645 Ω

If the resistance is not as specified, replace the sensor.

3. INSPECT CRANKSHAFT POSITION SENSOR

- (a) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Temperature	Specified Condition
Cold	985 to 1,600 Ω
Hot	1,265 to 1,890 Ω

If the resistance is not as specified, replace the sensor.

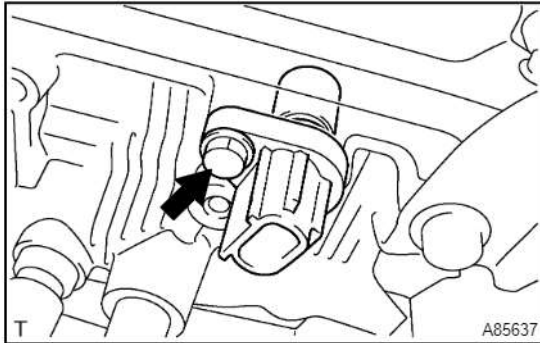
CAMSHAFT POSITION SENSOR (2AZ-FE)(From July, 2003) REPLACEMENT

1809S-03

HINT:

A bolt without torque specification is a standard bolt (see page 03-2).

1. REMOVE AIR CLEANER ASSY (See page 14-29)



2. REMOVE CAMSHAFT POSITION SENSOR

- (a) Disconnect the sensor connector.
- (b) Remove the bolt and sensor.

3. INSTALL CAMSHAFT POSITION SENSOR

- (a) Apply a light coat of engine oil to the O-ring on the sensor.
- (b) Install the sensor with the bolt.

Torque: 9.0 N·m (92 kgf·cm, 80in.·lbf)

4. INSTALL AIR CLEANER ASSY (See page 14-29)

5. CHECK CONNECTION OF VACUUM HOSE

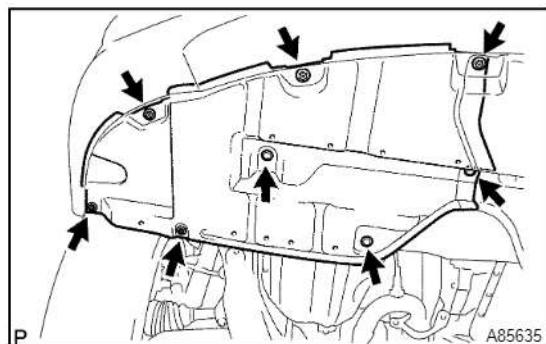
CRANKSHAFT POSITION SENSOR (2AZ-FE)(From July, 2003)

REPLACEMENT

HINT:

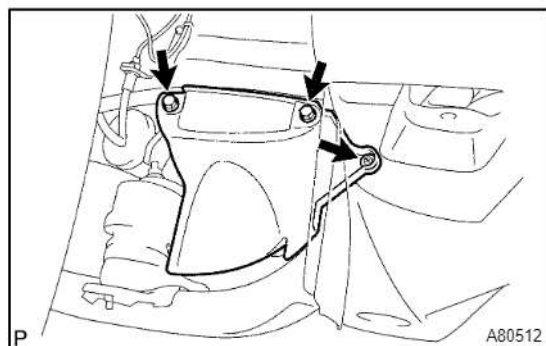
A bolt without torque specification is a standard bolt (see page 03-2).

1809T-03



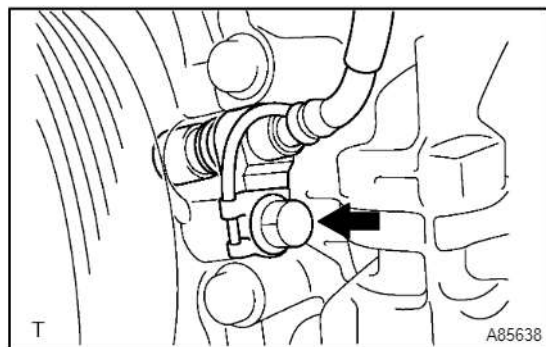
1. REMOVE ENGINE UNDER COVER RH

- (a) Remove the 5 screws, 3 clips and the under cover.



2. REMOVE FRONT FENDER APRON SEAL RH

- (a) Remove the clip, 2 bolts and apron seal.



3. REMOVE CRANKSHAFT POSITION SENSOR

- (a) Disconnect the sensor connector.
(b) Remove the bolt, clamp and sensor.

4. INSTALL CRANKSHAFT POSITION SENSOR

Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

5. INSTALL FRONT FENDER APRON SEAL RH

6. INSTALL ENGINE UNDER COVER RH

IGNITION SYSTEM (1MZ-FE/3MZ-FE)

ON-VEHICLE INSPECTION

1809U-03

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1. INSPECT IGNITION COIL ASSY (WITH IGNITER) AND PERFORM SPARK TEST

- (a) Check for DTCs.

NOTICE:

If a DTC is present, perform troubleshooting in accordance with the procedure for that DTC.

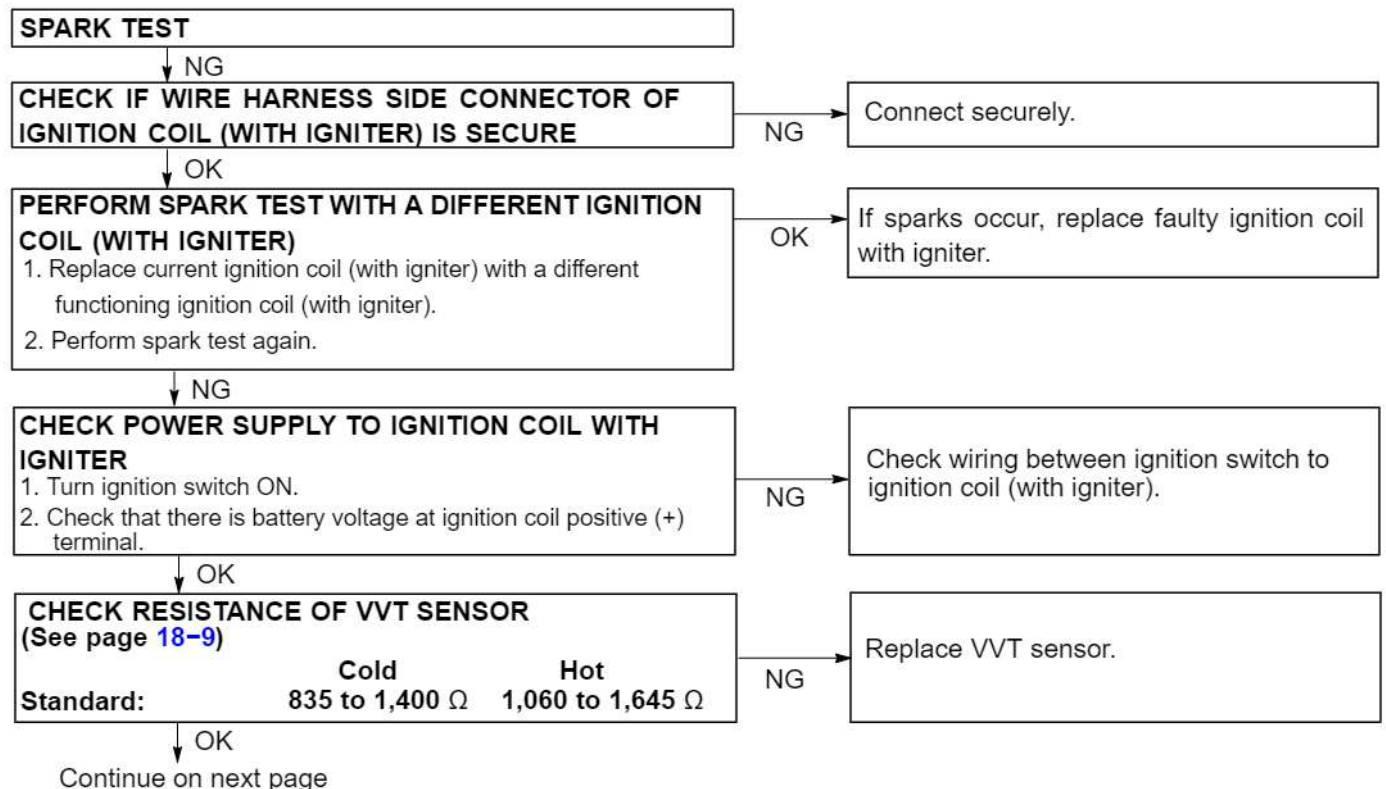
- (b) Check if sparks occur.

- (1) Remove the V-bank cover (see page 14-164).
- (2) Remove the intake air surge tank (see page 14-164).
- (3) Remove the ignition coils.
- (4) Using a 16 mm (0.63 in.) plug wrench, remove the spark plugs.
- (5) Install the spark plugs to each ignition coil and connect the ignition coil connectors.
- (6) Disconnect the 6 injector connectors.
- (7) Ground the spark plugs.
- (8) Check if sparks occur at each spark plug while the engine is being cranked.

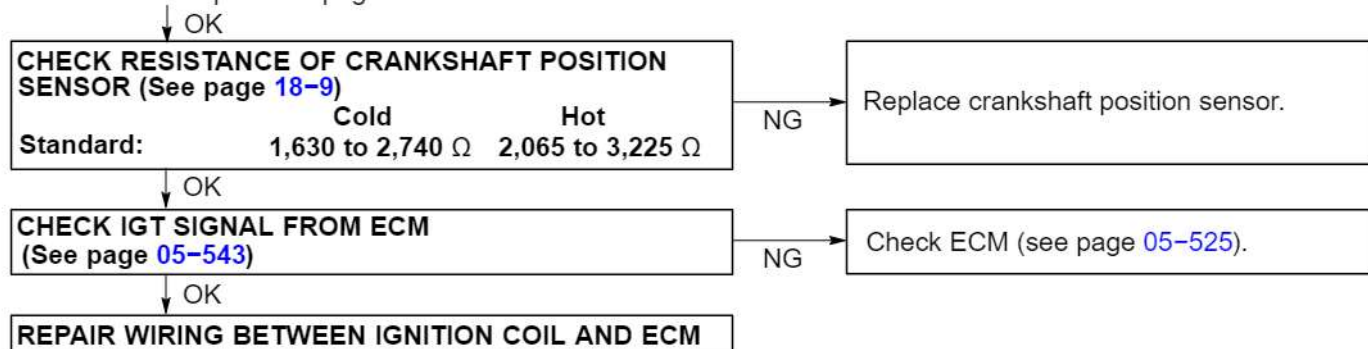
NOTICE:

Do not crank the engine for more than 2 seconds.

If sparks do not occur, perform the following test:



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(9) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.

Torque: 25 N·m (255 kgf·cm, 18.5 ft·lbf)

(10) Install the ignition coil.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

(11) Install the intake air surge tank (see page 14-164).

(12) Install the V-bank cover (see page 14-164).

INSPECTION

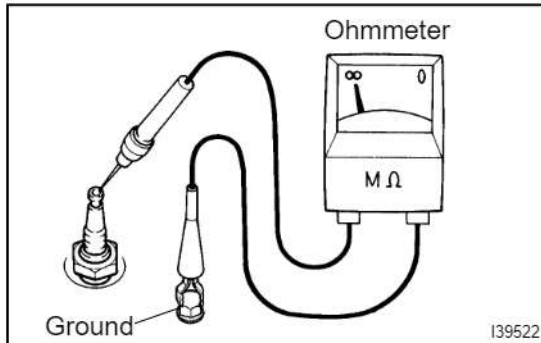
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(a) Check the electrode.

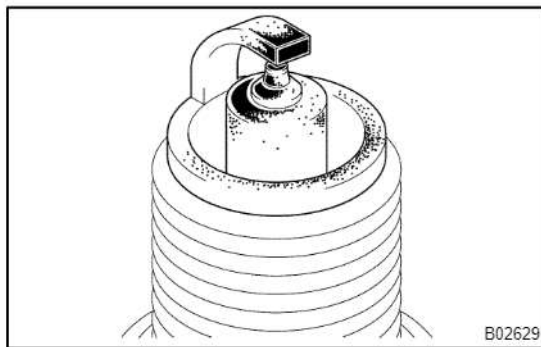
- (1) Using an ohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 MΩ or more

If the resistance is less than the specified value, proceed to step (d).

HINT:

If the ohmmeter is not available, perform the following simple inspection instead.



(b) Alternative inspection method:

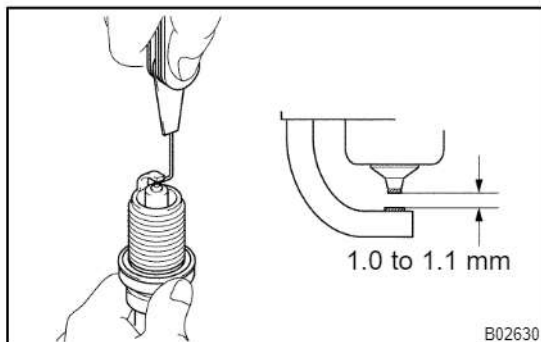
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- (4) Install the spark plug.

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Recommended spark plug:

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NGK made	IFR6A11



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Maximum electrode gap for used spark plug:
1.3 mm (0.051 in.)

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Correct electrode gap for new spark plug:
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Air pressure: 588 kPa (6 kgf/cm², 85 psi)

Duration: 20 seconds or less

HINT:

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2. INSPECT VVT SENSOR (CAMSHAFT POSITION SENSOR)

(a) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Temperature	Specified Condition
Cold	835 to 1,400 Ω
Hot	1,060 to 1,645 Ω

If the resistance is not as specified, replace the sensor.

3. INSPECT CRANKSHAFT POSITION SENSOR

(a) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Temperature	Specified Condition
Cold	1,630 to 2,740 Ω
Hot	2,065 to 3,225 Ω

If the resistance is not as specified, replace the sensor.