

IGNITION SYSTEM (2AZ-FSE)
ON-VEHICLE INSPECTION

180AY-01

NOTICE:

"Cold" and "Hot" in this section mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

1. INSPECT IGNITION COIL AND SPARK TEST

- (a) Check for DTCs (see page 05-19).

NOTICE:

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

- (b) Check that spark occurs.
(1) Remove the engine cover No. 1 (see page 10-8).

- (2) Remove the ignition coils.

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

- (3) Using a 16mm (0.63 in.) plug wrench, remove the spark plugs.

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

- (4) Install the spark plugs to each ignition coil, then connect the ignition coil connectors.

- (5) Disconnect the 4 fuel injector connectors.

- (6) Ground the spark plugs.

- (7) Check that spark occurs at each spark plug while engine is being cranked.

NOTICE:

- Be sure to ground the spark plug when checking.
- Replace the ignition coil if any physical impact is felt.
- Do not crank the engine for more than 2 seconds.

If the sparks do not occur, do the following test.

1	SPARK TEST
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2	CHECK CONNECTION OF IGNITION COIL CONNECTOR
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OK	CONNECT SECURELY
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3	REPLACE IGNITION COIL ASSY
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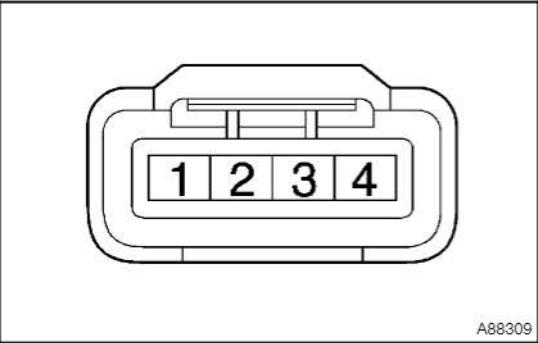
- (a) Replace the normal ignition coil, then perform spark test.

OK	REPLACE IGNITION COIL ASSY
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4 INSPECT IGNITION COIL ASSY (POWER SUPPLY)



- (a) Disconnect the ignition coil connector.
- (b) Turn the ignition switch to ON.
- (c) Using a voltmeter, measure the voltage between the terminals of the wire harness side and the body ground.

Standard:

Tester Connection	Specified Condition
1 (+B) - 4 (GND)	9.0 to 14 V

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CHECK HARNESS AND CONNECTOR (IGNITION COIL ASSY - IGNITION OR START SWITCH ASSY)

OK

5 INSPECT CAMSHAFT POSITION SENSOR (See page 18-3)

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REPLACE CAMSHAFT POSITION (See page 18-5)

OK

6 INSPECT CRANKSHAFT POSITION SENSOR (See page 18-3)

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REPLACE CRANKSHAFT POSITION SENSOR (See page 18-6)

OK

7 INSPECT ECM (IGT SIGNAL) (See page 05-12)

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REPLACE ECM (See 10-29)

OK

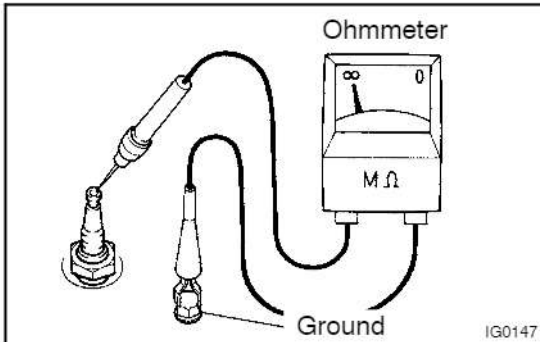
REPAIR OR REPLACE HARNESS AND CONNECTOR (IGNITION COIL ASSY - ECM)

INSPECTION

1. INSPECT SPARK PLUG

NOTICE:

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



(a) Inspect the electrode.

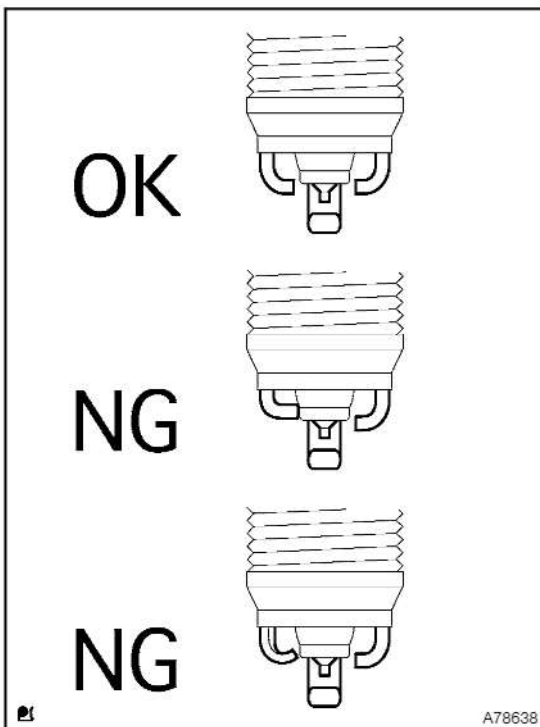
- (1) Using an ohmmeter, measure the insulation resistance.

Standard: 10 MΩ or more

If the resistance is less than the specified value, check the spark plug electrode gap.

HINT:

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

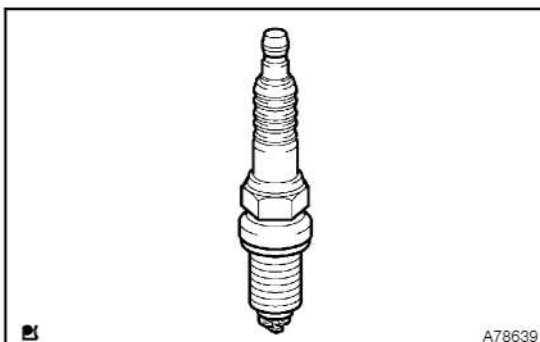


(b) Alternative inspection method:

- (1) Quickly accelerate the engine speed up to 4,000 rpm 5 times.
- (2) Remove the spark plug.
- (3) Visually check the spark plug.

If a kink or twist as shown in the illustration on the left is found on the spark plug, replace it with a new one.

- (4) If the electrode is dry...OK.
- (5) If the electrode is wet...Check the spark plug for any damage on its thread and insulator.
- (6) Reinstall the spark plug.

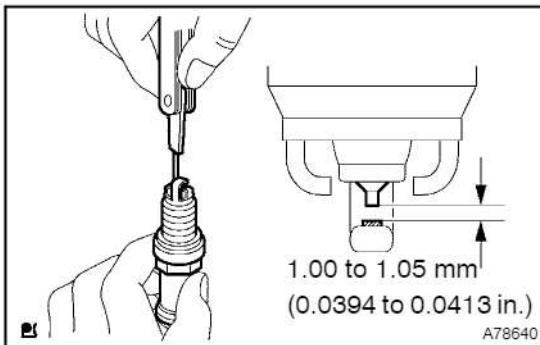


(c) Check the spark plug for any damage on its thread and insulator.

If there is damage, replace the spark plug.

Recommended spark plug:

Made	Type
DENSO	SK20BR11



- (d) Check the spark plug electrode gap.

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

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

Standard electrode gap for new spark plug:
1.00 to 1.10 mm (0.0394 to 0.0433 in.)



- (e) Clean the spark plugs.

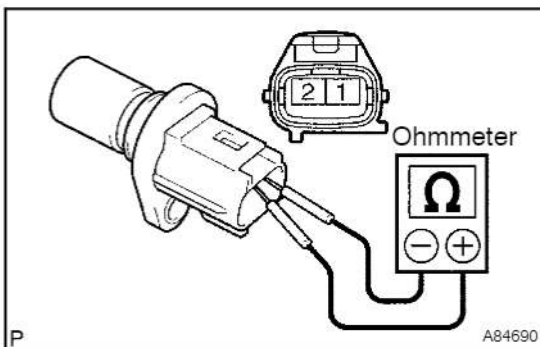
If the electrode has traces of wet carbon, clean the electrode with a spark plug cleaner, then dry it.

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

Duration: 20 seconds or less

HINT:

If there are traces of oil, remove them with gasoline before using the spark plug cleaner.



2. INSPECT CAMSHAFT POSITION SENSOR

- (a) Inspect the resistance.

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

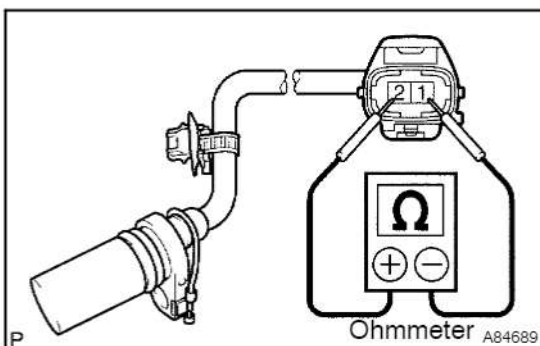
Standard:

Tester Connection	Specified Condition
1 (G+) - 2 (G-)	835 to 1,400 Ω at cold
1 (G+) - 2 (G-)	1,060 to 1,645 Ω at hot

NOTICE:

"Cold" and "Hot" mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

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



3. INSPECT CRANKSHAFT POSITION SENSOR

- (a) Inspect the resistance.

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

Standard:

Tester Connection	Specified Condition
1 (NE+) - 2 (NE-)	985 to 1,600 Ω at cold
1 (NE+) - 2 (NE-)	1,265 to 1,890 Ω at hot

NOTICE:

"Cold" and "Hot" mean temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

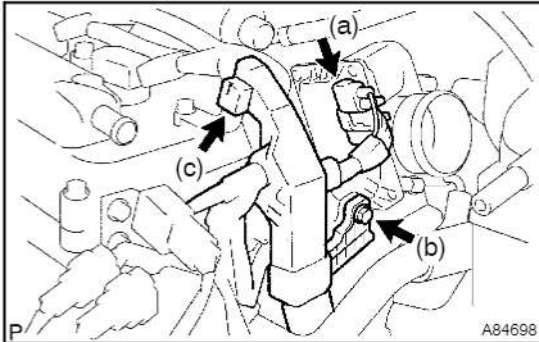
If the resistance is not as specified, replace the crankshaft position sensor.

CAMSHAFT POSITION SENSOR (2AZ-FSE)

REPLACEMENT

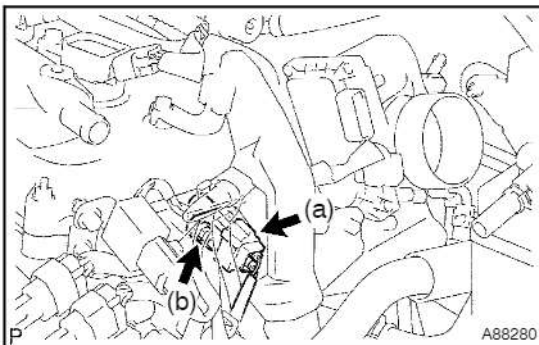
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1. REMOVE RADIATOR SUPPORT OPENING COVER (See page 10-8)
2. DISCONNECT ENGINE WIRE NO.3 (BATTERY NEGATIVE TERMINAL)
3. REMOVE ENGINE COVER SUB-ASSY NO.1 (See page 10-8)
4. REMOVE AIR CLEANER CAP SUB-ASSY (See page 10-8)



5. REMOVE CAMSHAFT POSITION SENSOR

- (a) Disconnect the throttle control motor connector.
- (b) Remove the bolt.
- (c) Unfasten the clip, then remove the wiring harness protector.



- (d) Disconnect the camshaft position sensor connector.
- (e) Remove the bolt, then remove the camshaft position sensor.

6. INSTALL CAMSHAFT POSITION SENSOR

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

Torque: 9.0 N·m (92 kgf·cm, 79 in·lbf)

NOTICE:

Be careful not to twist the O-ring.

- (c) Connect the camshaft position sensor connector.
- (d) Install the wiring harness protector with the clip.
- (e) Tighten the bolt.

Torque: 8.4 N·m (86 kgf·cm, 74 in·lbf)

- (f) Connect the throttle control motor connector.

7. INSTALL AIR CLEANER CAP SUB-ASSY (See page 10-8)

8. CONNECT ENGINE WIRE NO.3 (BATTERY NEGATIVE TERMINAL)

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

9. CHECK FOR ENGINE OIL LEAKS

10. INSTALL ENGINE COVER SUB-ASSY NO.1 (See page 10-8)

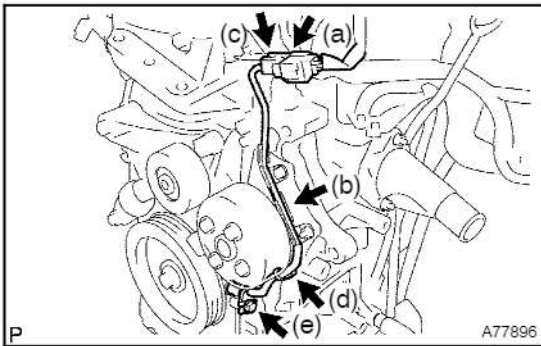
11. INSTALL RADIATOR SUPPORT OPENING COVER

CRANKSHAFT POSITION SENSOR (2AZ-FSE)

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REPLACEMENT

1. REMOVE ENGINE UNDER COVER LH(See page 19-8)
2. REMOVE ENGINE UNDER COVER RH(See page 19-8)
3. REMOVE RADIATOR SUPPORT OPENING COVER(See page 10-8)
4. REMOVE ENGINE ROOM COVER SIDE (See page 10-8)
5. DISCONNECT ENGINE WIRE NO.3 (BATTERY NEGATIVE TERMINAL)
6. REMOVE FAN AND GENERATOR V BELT(See page 14-5)
SST 09249-63010
7. REMOVE GENERATOR ASSY(See page 19-8)



8. REMOVE CRANKSHAFT POSITION SENSOR

- (a) Disconnect the crankshaft position sensor connector.
- (b) Remove the wiring harness of the crankshaft position sensor from the wiring harness clamp bracket.
- (c) Remove the connector clamp.
- (d) Remove the wiring harness clamp.
- (e) Remove the bolt, then remove the crankshaft position sensor.

9. INSTALL CRANKSHAFT POSITION SENSOR

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

Torque: 9.0 N·m (92 kgf·cm, 79 in.·lbf)

NOTICE:

Be careful not to twist the O-ring.

- (c) Install the wiring harness clamp.
- (d) Install the connector clamp.
- (e) Install the wiring harness of the crankshaft position sensor to the wire harness clamp bracket.
- (f) Connect the crankshaft position sensor connector.

10. INSTALL GENERATOR ASSY(See page 19-8)

11. INSTALL FAN AND GENERATOR V BELT(See page 14-5)

SST 09249-63010

12. CONNECT ENGINE WIRE NO.3 (BATTERY NEGATIVE TERMINAL)

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

13. CHECK FOR ENGINE OIL LEAKS

14. INSTALL ENGINE ROOM COVER SIDE

15. INSTALL RADIATOR SUPPORT OPENING COVER

16. INSTALL ENGINE UNDER COVER RH

17. INSTALL ENGINE UNDER COVER LH