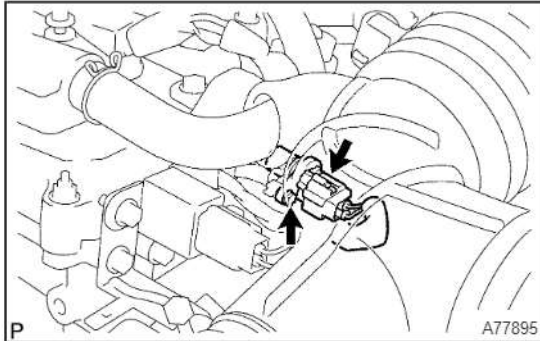


CAMSHAFT POSITION SENSOR (1AZ-FE/1AZ-FSE) REPLACEMENT

1807K-01

1. REMOVE RADIATOR SUPPORT OPENING COVER (See page 10-26)



2. REMOVE CAMSHAFT POSITION SENSOR

- (a) Disconnect the camshaft position sensor connector.
- (b) Remove the bolt, and then remove the camshaft position sensor.

3. 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)
- (c) Connect the camshaft position sensor connector.

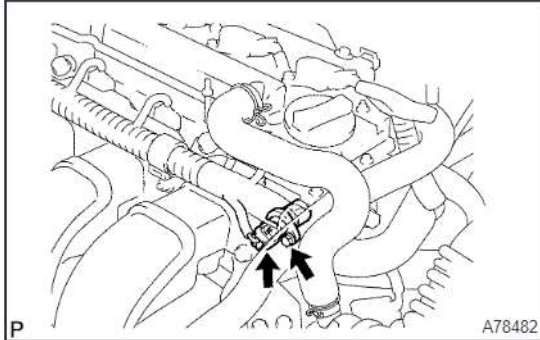
4. INSTALL RADIATOR SUPPORT OPENING COVER

CAMSHAFT POSITION SENSOR (1ZZ-FE/3ZZ-FE)

REPLACEMENT

18071-01

1. REMOVE RADIATOR SUPPORT OPENING COVER (See page 10-9)
2. REMOVE CYLINDER HEAD COVER NO.2 (See page 10-9)



3. REMOVE CAMSHAFT POSITION SENSOR
 - (a) Disconnect the camshaft position sensor connector.
 - (b) Remove the bolt, and then remove the camshaft position sensor.

4. 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, 80 in. lbf)
 - (c) Connect the camshaft position sensor connector.
5. INSTALL CYLINDER HEAD COVER NO.2 (See page 10-9)
6. INSTALL RADIATOR SUPPORT OPENING COVER

CRANKSHAFT POSITION SENSOR (1AZ-FE/1AZ-FSE) REPLACEMENT

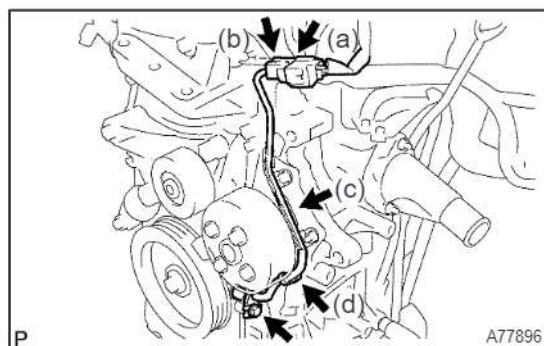
1807L-01

1. REMOVE ENGINE UNDER COVER LH (See page 19-20)
2. REMOVE ENGINE UNDER COVER RH (See page 19-20)
3. REMOVE RADIATOR SUPPORT OPENING COVER (See page 10-26)
4. REMOVE ENGINE ROOM COVER SIDE (See page 10-26)
5. REMOVE FAN AND GENERATOR V BELT
6. REMOVE GENERATOR ASSY (See page 19-20)

SST 09249-63010

HINT:

- ▲ 1AZ-FE: 14-105
- ▲ 1AZ-FSE: 14-185



7. REMOVE CRANKSHAFT POSITION SENSOR

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

8. 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)
- (c) Install the wire harness clamp.
- (d) Install the connector clamp.
- (e) Install the wire harness of the crankshaft position sensor to the the wire harness clamp bracket.
- (f) Connect the crankshaft position sensor connector.

9. INSTALL GENERATOR ASSY (See page 19-20)

10. INSTALL FAN AND GENERATOR V BELT

SST 09249-63010

HINT:

- ▲ 1AZ-FE: 14-105
- ▲ 1AZ-FSE: 14-185

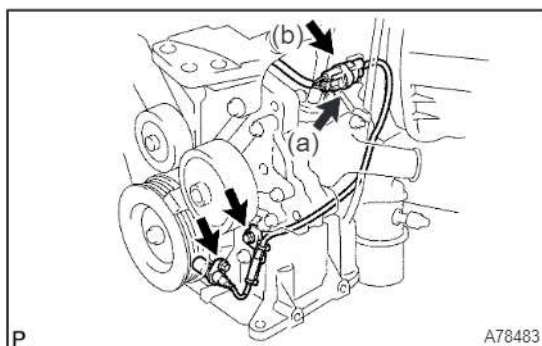
11. INSTALL ENGINE ROOM COVER SIDE
12. INSTALL RADIATOR SUPPORT OPENING COVER
13. INSTALL ENGINE UNDER COVER RH
14. INSTALL ENGINE UNDER COVER LH

CRANKSHAFT POSITION SENSOR (1ZZ-FE/3ZZ-FE)

1807J-01

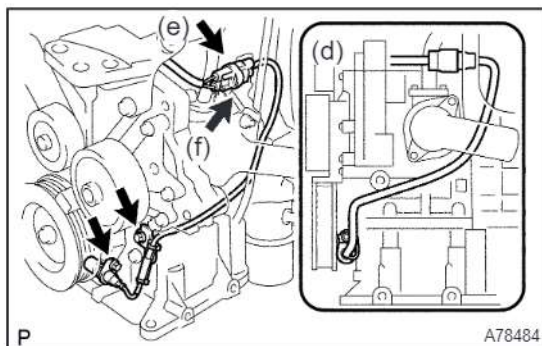
REPLACEMENT

1. REMOVE ENGINE UNDER COVER LH (See page 19-20)
2. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1 (See page 10-17)
3. REMOVE ENGINE UNDER COVER RH (See page 19-20)
4. REMOVE RADIATOR SUPPORT OPENING COVER (See page 10-9)
5. REMOVE ENGINE ROOM COVER SIDE (See page 10-9)
6. REMOVE FAN AND GENERATOR V BELT (See page 14-5)
7. REMOVE GENERATOR ASSY (See page 19-7)



8. REMOVE CRANKSHAFT POSITION SENSOR

- (a) Disconnect the crankshaft position sensor connector.
- (b) Remove the connector clamp.
- (c) Remove the 2 bolts, and then remove the crankshaft position sensor.
- (d) Remove the cord clamp from the crankshaft position sensor.



9. INSTALL CRANKSHAFT POSITION SENSOR

- (a) Install the cord clamp to the crankshaft position sensor.
- (b) Apply a light coat of engine oil on the O-ring of the crankshaft position sensor.
- (c) Install the crankshaft position sensor with the 2 bolts.
Torque: 9.0 N m (92 kgf cm, 80 in. lbf)
- (d) Install the wire harness as shown in the illustration.
- (e) Install the connector clamp.
- (f) Connect the crankshaft position sensor connector.

10. INSTALL GENERATOR ASSY (See page 19-7)
11. INSTALL FAN AND GENERATOR V BELT (See page 14-5)
12. INSTALL ENGINE ROOM COVER SIDE
13. INSTALL RADIATOR SUPPORT OPENING COVER
14. INSTALL ENGINE UNDER COVER RH
15. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1
16. INSTALL ENGINE UNDER COVER LH

IGNITION SYSTEM (1AZ-FE)

ON-VEHICLE INSPECTION

1807M-01

NOTICE:

"Cold" and "Hot" in this section mean the 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 (WITH IGNITER) AND SPARK TEST

- (a) Check for DTCs.

NOTICE:

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

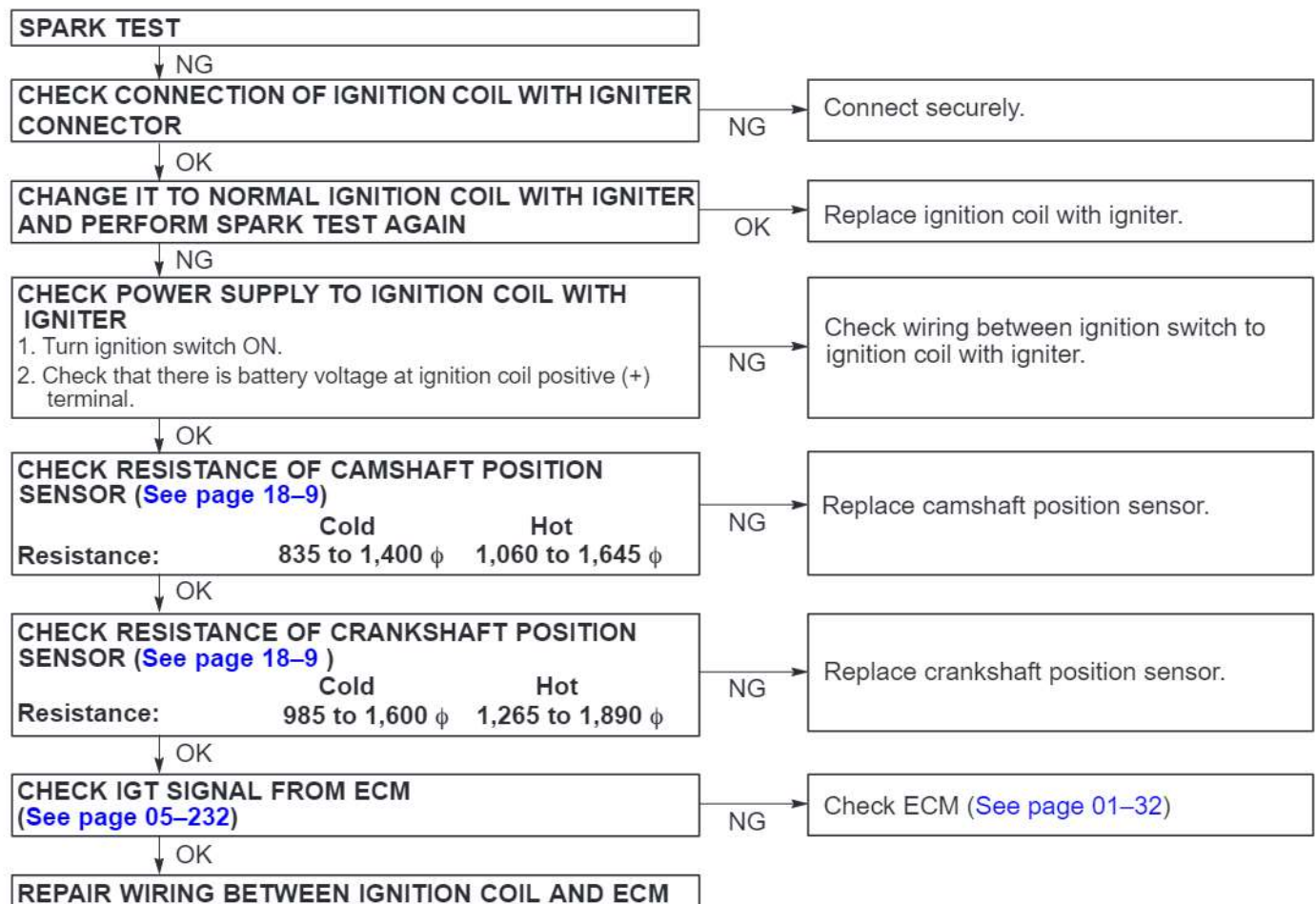
- (b) Check that spark occurs.

- (1) Remove the cylinder head cover No. 1. (See page 14-106)
- (2) Remove the ignition coils (with igniter).
- (3) Using a 16mm (0.63 in) plug wrench, remove the spark plugs.
- (4) Install the spark plugs to each ignition coil (with igniter) and connect the ignition coil connectors.
- (5) Disconnect the 4 injector connectors.
- (6) Ground the spark plugs.
- (7) Check if 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 it is given physical impact.
- ▲ Do not crank the engine for more than 2 seconds.

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



- (c) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.
Torque: 19 N m (194 kgf cm, 14 ft lbf)
- (d) Install the ignition coil with igniter.
Torque: 9.0 N m (92 kgf cm, 80 in. lbf)
- (e) Install the cylinder head cover No. 1. ([See page 14-106](#))

INSPECTION

1867N-01

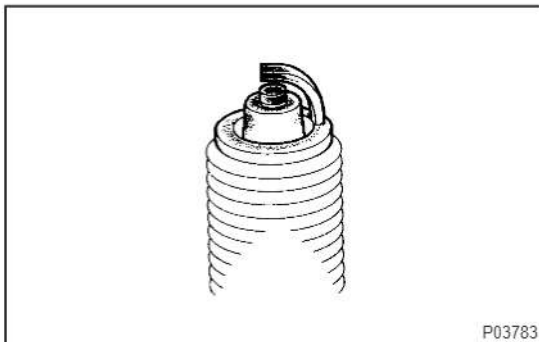
**1. INSPECT SPARK PLUG (EXCEPT EUROPE)**

- (a) 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: Below 588 kPa (6kg/cm², 85 psi)

Duration: 20 seconds or less

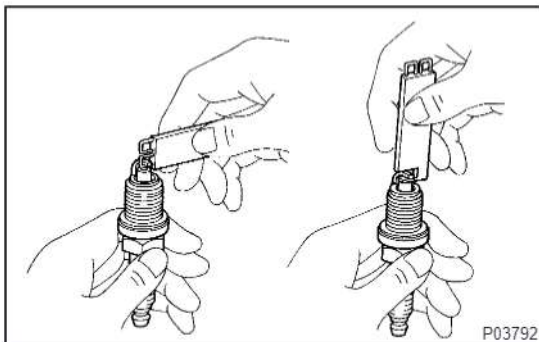


- (b) Check the spark plug for any damage on its thread and insulator damage.

If there is damage, replace the spark plug.

Recommended spark plug:

DENSO made	K20R-U11
NGK made	BKR6EYA11



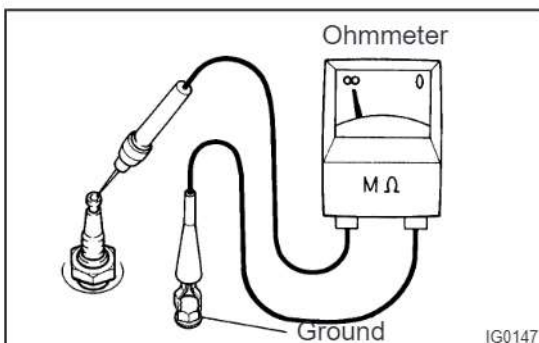
- (c) Adjust electrode gap.

Electrode gap: 1.0 to 1.1 mm (0.039 to 0.043 in.)

2. INSPECT SPARK PLUG (FOR EUROPE)

NOTICE:

- ▲ Do not use a wire brush for cleaning.
- ▲ Do not attempt to adjust the electrode gap of a used spark plug.
- ▲ Spark plug should be replaced every 100,000 km (60,000 miles).



- (a) Check the electrode.

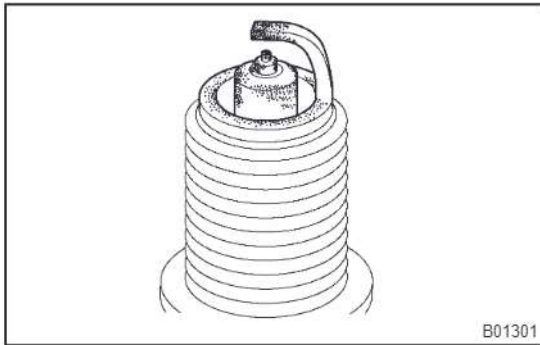
- (1) Using an ohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 M Ω or more

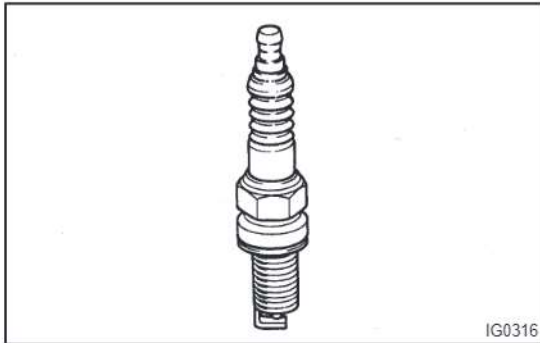
If the resistance is less than the specified value, proceed to step (d).

HINT:

If the ohmmeter is not available, perform the following alternative inspection. This provides also fairly accurate results.



- (b) Alternative inspection:
- (1) Quickly accelerate the engine to 4,000 rpm 5 times.
 - (2) Remove the spark plug.
 - (3) Visually check the spark plug.
 - (4) If the electrode is dry...OK.
 - (5) If the electrode is wet...Proceed to step (C).
 - (6) Reinstall the spark plug.

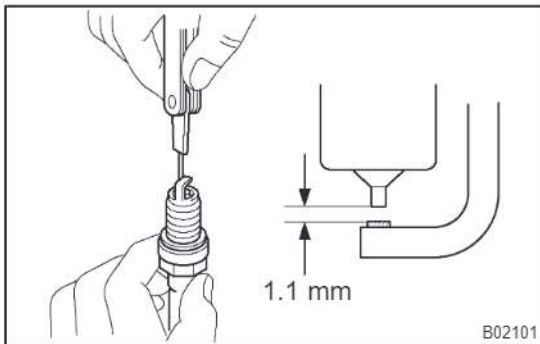


- (c) Check the spark plug for any damage on its thread and insulator.

If there is damage, replace the spark plug.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11



- (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.

Correct electrode gap for new spark plug:
1.0 to 1.1 mm (0.039 to 0.043 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 it with gasoline before using the spark plug cleaner.

3. INSPECT CAMSHAFT POSITION SENSOR

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

RESISTANCE:

835 to 1,400 Ω at cold

1,060 to 1,645 Ω at hot

NOTICE:

"Cold" and "Hot" mean the 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).

4. INSPECT CRANKSHAFT POSITION SENSOR

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

RESISTANCE:

985 to 1,600 Ω at cold

1,265 to 1,890 Ω at hot

NOTICE:

"Cold" and "Hot" mean the 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).

IGNITION SYSTEM (1AZ-FSE)

ON-VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in this section mean the 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 (WITH IGNITER) AND SPARK TEST

(a) Check for DTCs.

NOTICE:

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

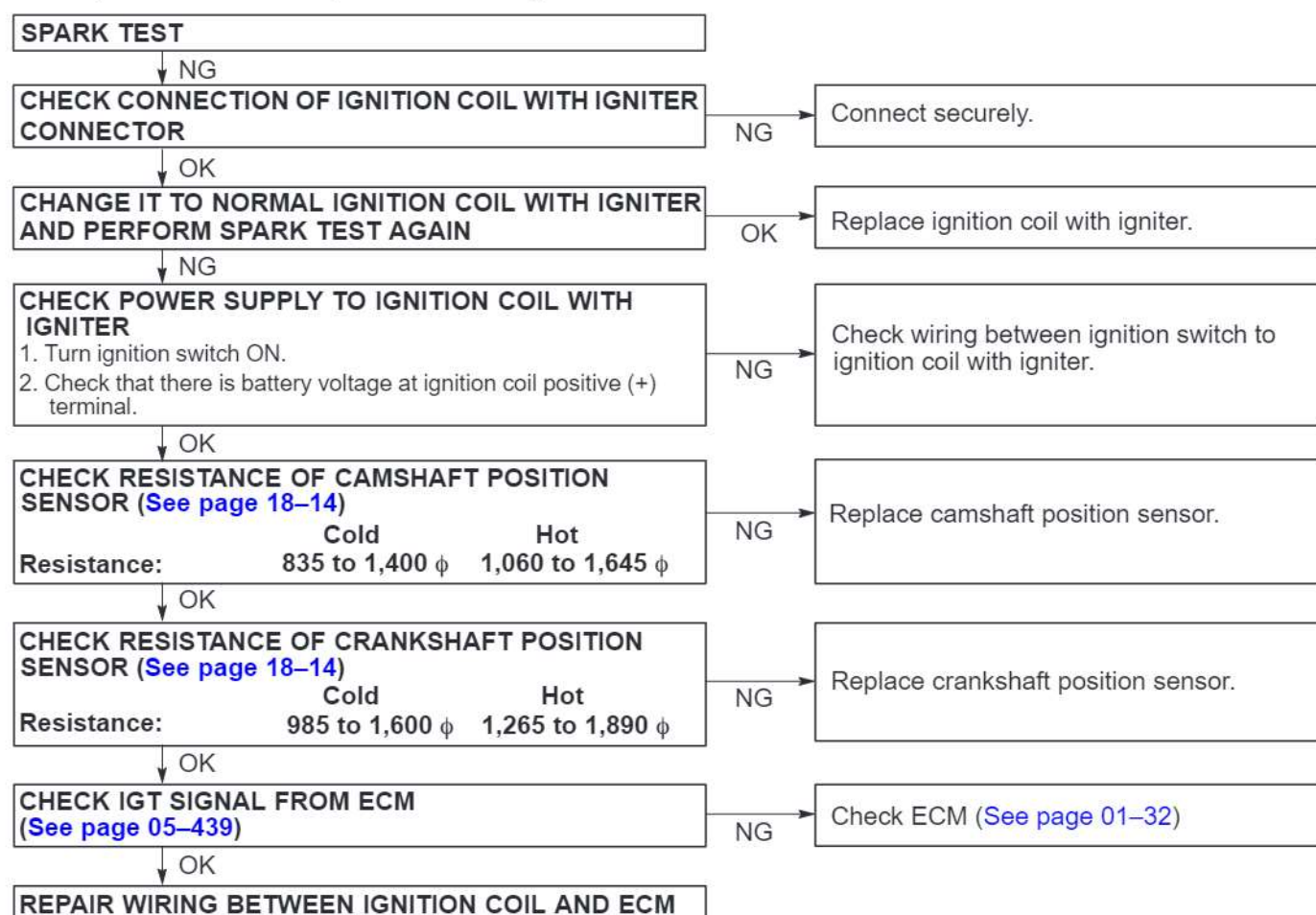
(b) Check that spark occurs.

- (1) Remove the cylinder head cover No. 1. (See page 14-186)
- (2) Remove the ignition coils (with igniter).
- (3) Using a 16mm (0.63 in) plug wrench, remove the spark plugs.
- (4) Install the spark plugs to each ignition coil (with igniter) and connect the ignition coil connectors.
- (5) Disconnect the 4 injector connectors.
- (6) Ground the spark plugs.
- (7) Check if 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 it is given physical impact.
- ▲ Do not crank the engine for more than 2 seconds.

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



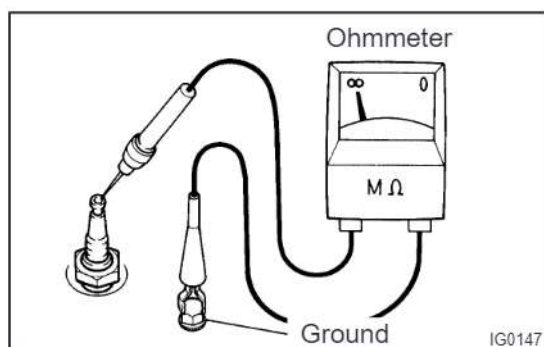
- (c) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.
Torque: 19 N m (194 kgf cm, 14 ft lbf)
- (d) Install the ignition coil with igniter.
Torque: 9.0 N m (92 kgf cm, 80 in. lbf)
- (e) Install the cylinder head cover No. 1. ([See page 14-186](#))

INSPECTION

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.
- ▲ Spark plug should be replaced every 100,000 km (60,000 miles).



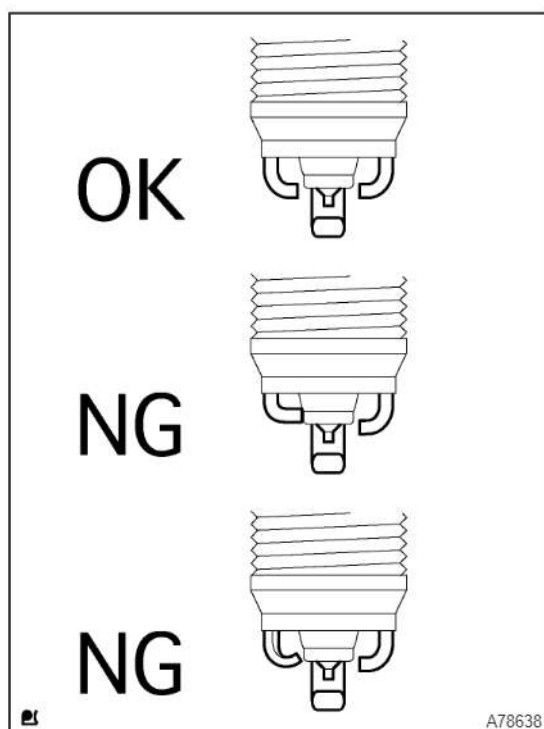
- (a) Check the electrode.
- (1) Using an ohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 MΩ or more

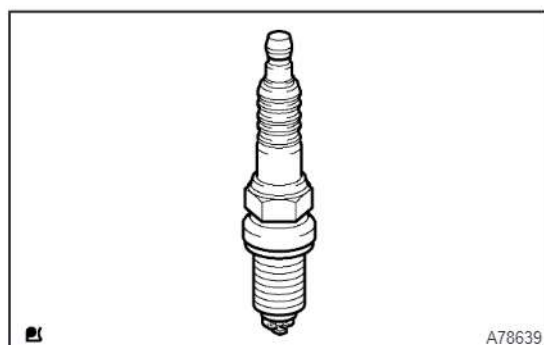
If the resistance is less than the specified value, proceed to step (d).

HINT:

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



- (b) Alternative inspection:
- (1) Quickly accelerate the engine 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...Proceed to step (e).
- (6) Reinstall the spark plug.

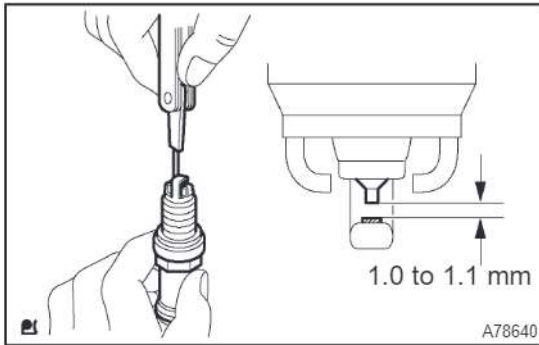


- (c) Check the spark plug for any damage on its thread and insulator.

If there is damage, replace the spark plug.

Recommended spark plug:

DENSO made	SK20BR11
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- (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.

Correct electrode gap for new spark plug:
1.0 to 1.1 mm (0.039 to 0.043 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) Using an ohmmeter, measure the resistance between the terminals.

RESISTANCE:

835 to 1,400 Ω at cold

1,060 to 1,645 Ω at hot

NOTICE:

"Cold" and "Hot" mean the 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).

3. INSPECT CRANKSHAFT POSITION SENSOR

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

RESISTANCE:

985 to 1,600 Ω at cold

1,265 to 1,890 Ω at hot

NOTICE:

"Cold" and "Hot" mean the 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).

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

ON-VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in this section mean the 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 (WITH IGNITER) AND SPARK TEST

- (a) Check for DTCs.

NOTICE:

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

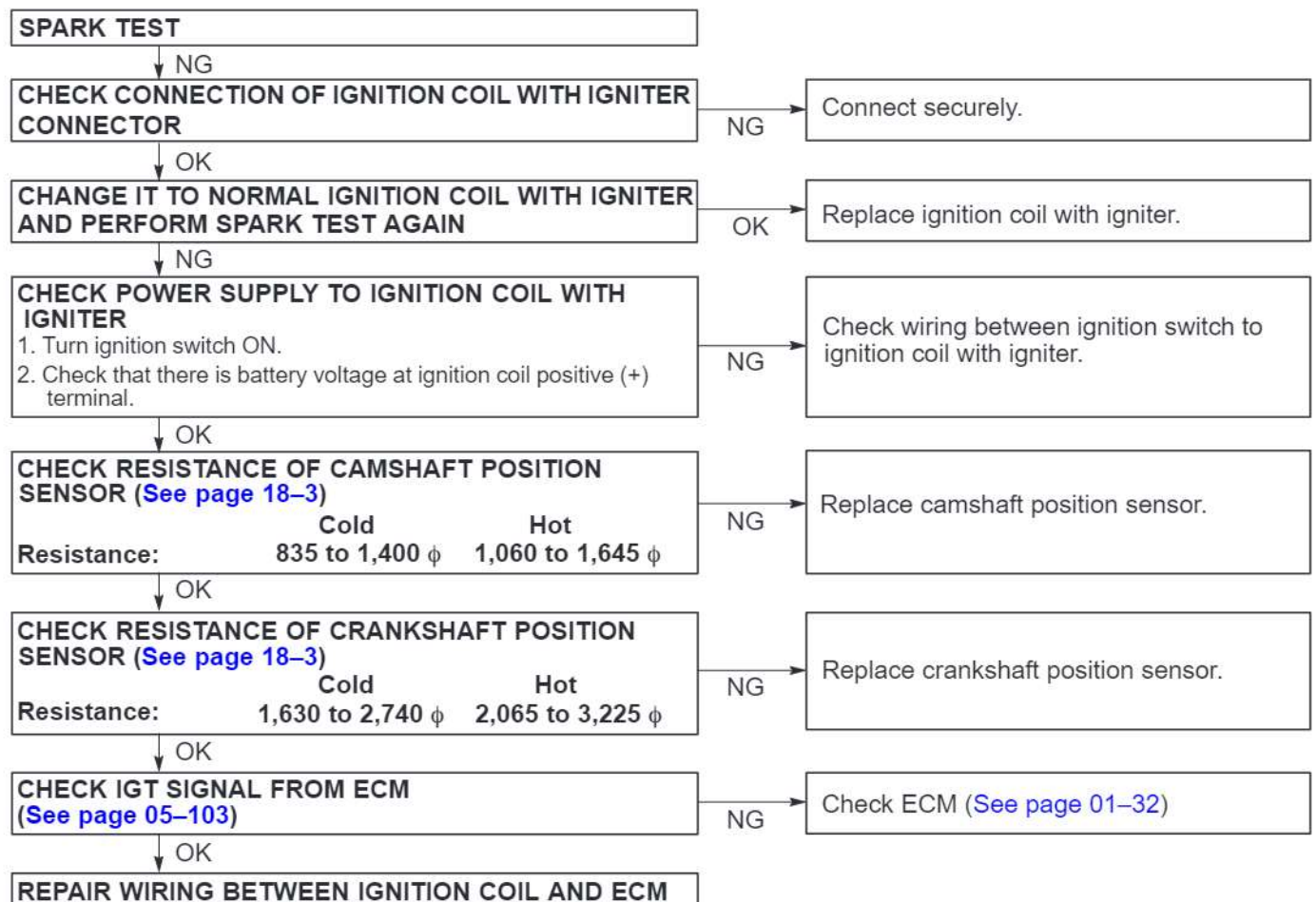
- (b) Check that spark occurs.

- (1) Remove the cylinder head cover No. 2. (See page 14-6)
- (2) Remove the ignition coils (with igniter).
- (3) Using a 16mm (0.63 in) plug wrench, remove the spark plugs.
- (4) Install the spark plugs to each ignition coil (with igniter) and connect the ignition coil connectors.
- (5) Disconnect the 4 injector connectors.
- (6) Ground the spark plugs.
- (7) Check if 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 it is given physical impact.
- ▲ Do not crank the engine for more than 2 seconds.

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



- (c) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.
Torque: 18 N m (184 kgf cm, 13 ft lbf)
- (d) Install the ignition coil with igniter.
Torque: 9.0 N m (92 kgf cm, 80 in. lbf)
- (e) Install the cylinder head cover No. 2. ([See page 14-6](#))

INSPECTION



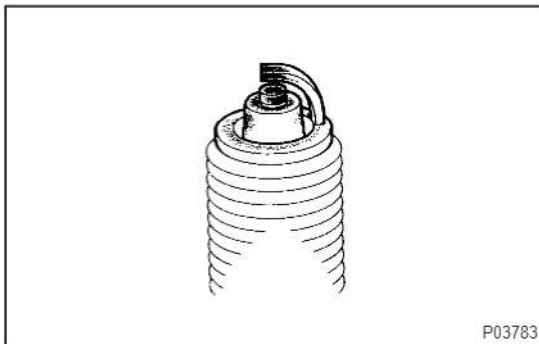
1. INSPECT SPARK PLUG

- (a) 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: Below 588 kPa (6kg/cm², 85 psi)

Duration: 20 seconds or less

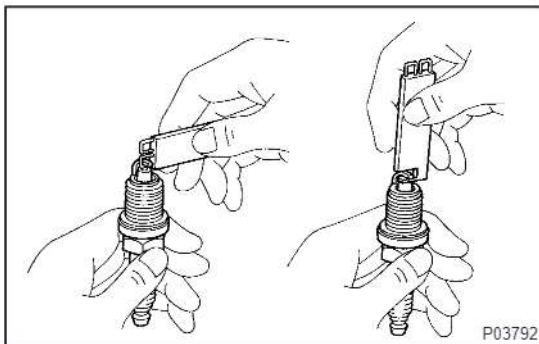


- (b) Check the spark plug for any damage on its thread and insulator damage.

If there is damage, replace the spark plug.

Recommended spark plug:

DENSO made	K16R-U11
NGK made	BKR5EYA11



- (c) Adjust electrode gap.

Electrode gap: 1.0 to 1.1 mm (0.039 to 0.043 in.)

2. INSPECT CAMSHAFT POSITION SENSOR

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

RESISTANCE:

835 to 1,400 (at cold

1,060 to 1,645 (at hot

NOTICE:

"Cold" and "Hot" mean the 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).

3. INSPECT CRANKSHAFT POSITION SENSOR

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

RESISTANCE:

1,630 to 2,740 (at cold

2,065 to 3,225 (at hot

NOTICE:

"Cold" and "Hot" mean the 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).