

INSPECTION

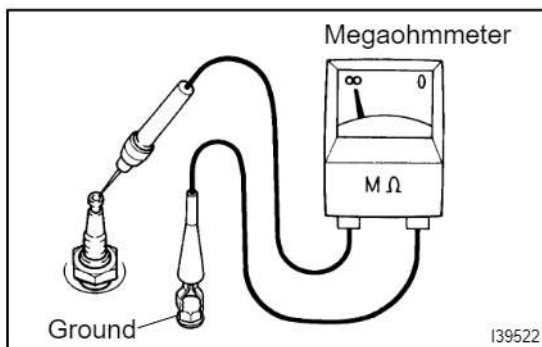
NOTICE:

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.

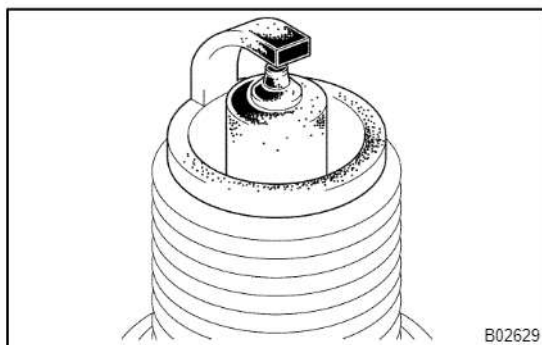
- (1) Using a megaohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 M Ω or higher

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

HINT:

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



(b) Alternative inspection method:

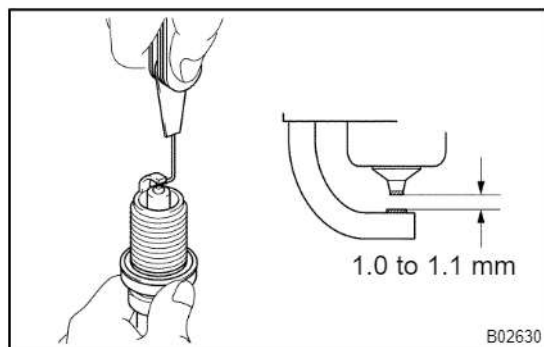
- (1) Quickly accelerate the engine to 4,000 rpm 5 times.
- (2) Remove the spark plug.
- (3) Visually check the spark plug.
- (4) If the electrode is dry, the spark plug is functioning. Proceed to step 2.
- (5) If the electrode is damp, proceed to step (c), (d), and (e).
- (6) Install the spark plug.

(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:
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:

Only use the spark plug cleaner 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 result 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 result is not as specified, replace the sensor.

INSPECTION

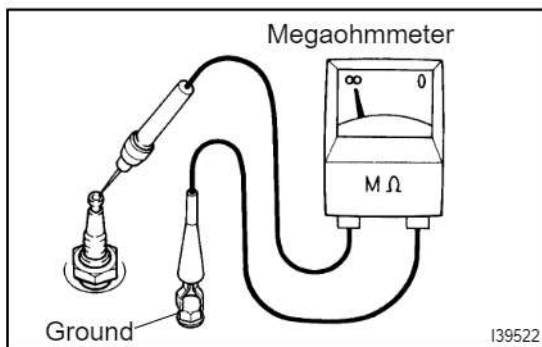
NOTICE:

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.

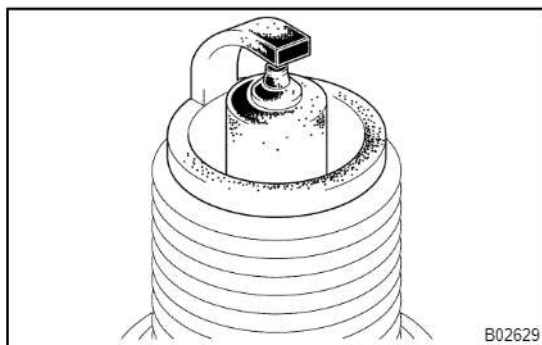
- (1) Using a megaohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 MΩ or higher

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

HINT:

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



(b) Alternative inspection method:

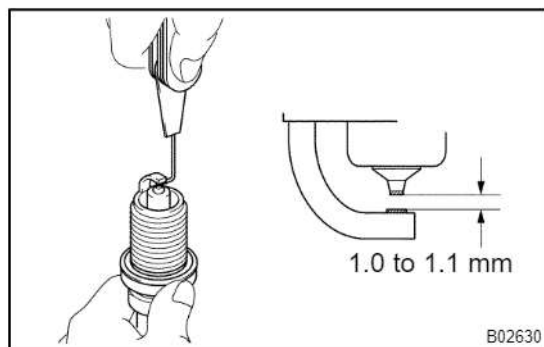
- (1) Quickly accelerate the engine to 4,000 rpm 5 times.
- (2) Remove the spark plug.
- (3) Visually check the spark plug.
- (4) If the electrode is dry, the spark plug is functioning. Proceed to step 2.
- (5) If the electrode is damp, proceed to step (c), (d) and (e).
- (6) Install the spark plug.

(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:
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:

Only use the spark plug cleaner 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 VVT 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 result 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 result is not as specified, replace the sensor.

IGNITION SYSTEM (3MZ-FE)

ON-VEHICLE INSPECTION

1807T-08

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 a troubleshooting in accordance with the procedure for that DTC.

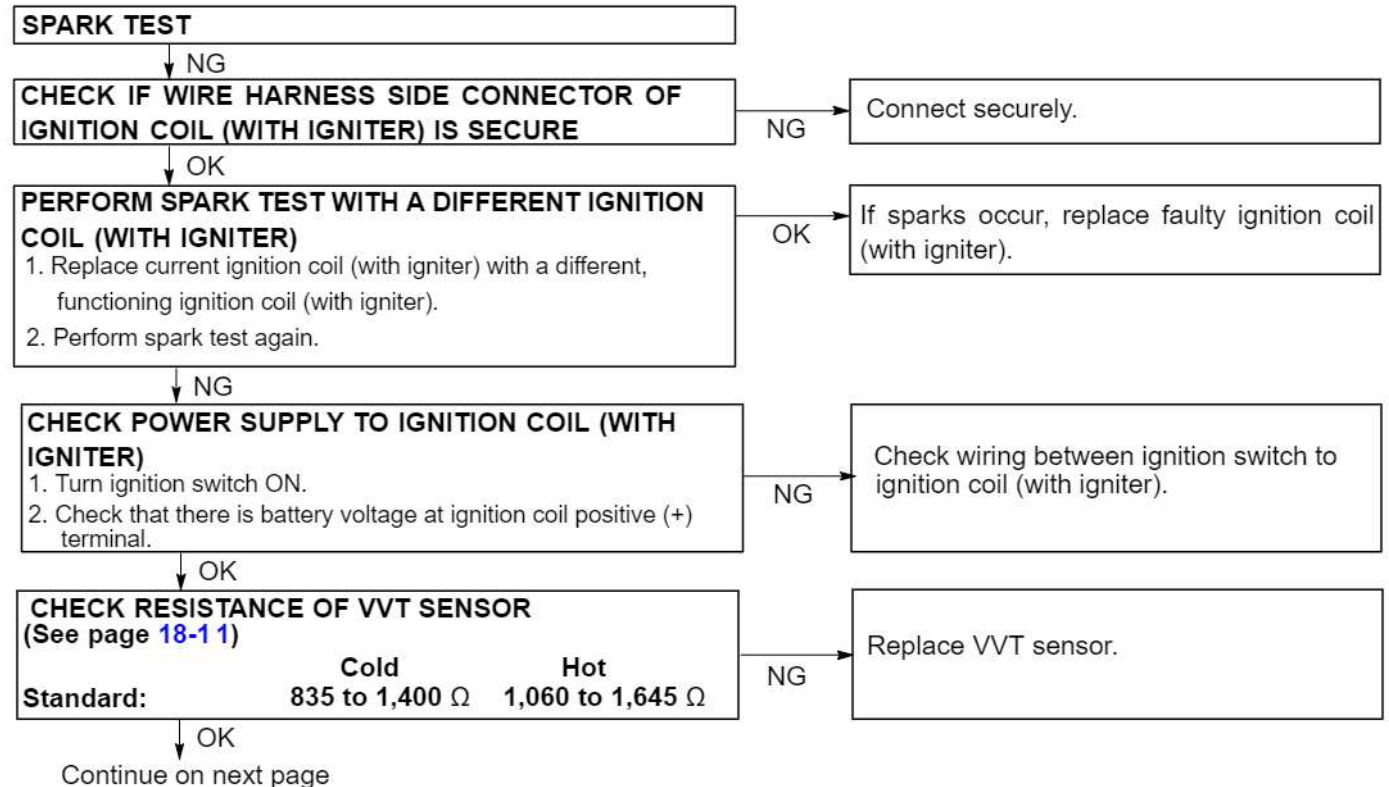
(b) Check if sparks occur.

- (1) Remove the V-bank cover (see page 14-24).
- (2) Remove the intake air surge tank (see page 14-24).
- (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.

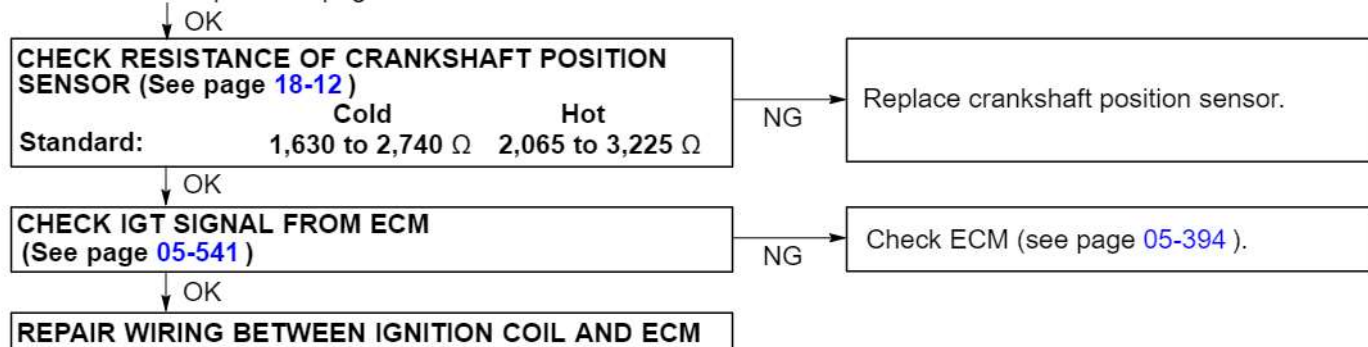
NOTICE:

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

If sparks do not occur, do the following test:



Continued from previous page



(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 14-24).

(12) Install the V-bank cover (see page 14-24).

IGNITION SYSTEM (2AZ-FE)

ON-VEHICLE INSPECTION

18091-05

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 a troubleshooting in accordance with the procedure for that DTC.

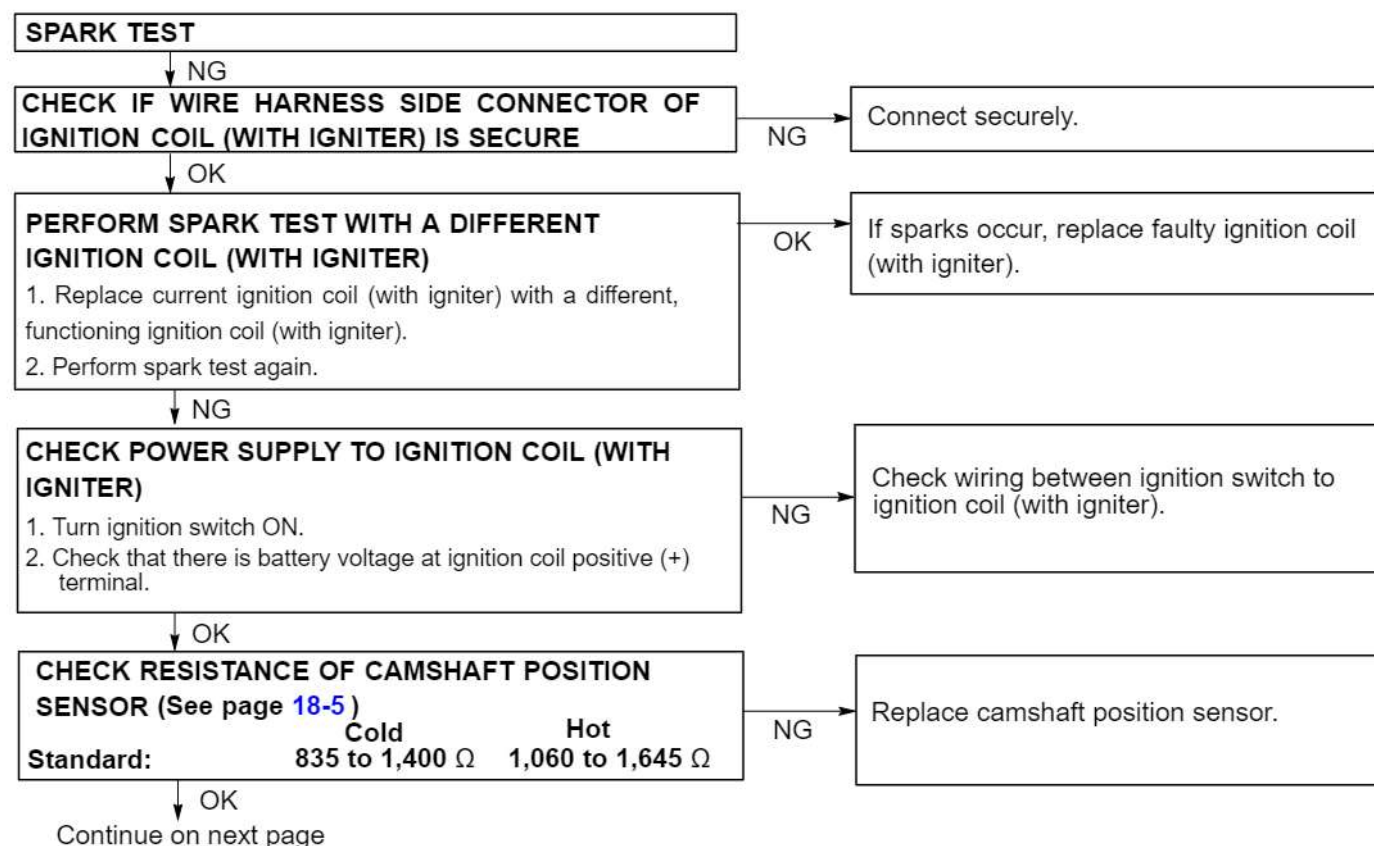
(b) Check if sparks occur.

- (1) Remove the engine cover No. 1 (see page 14-24).
- (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.

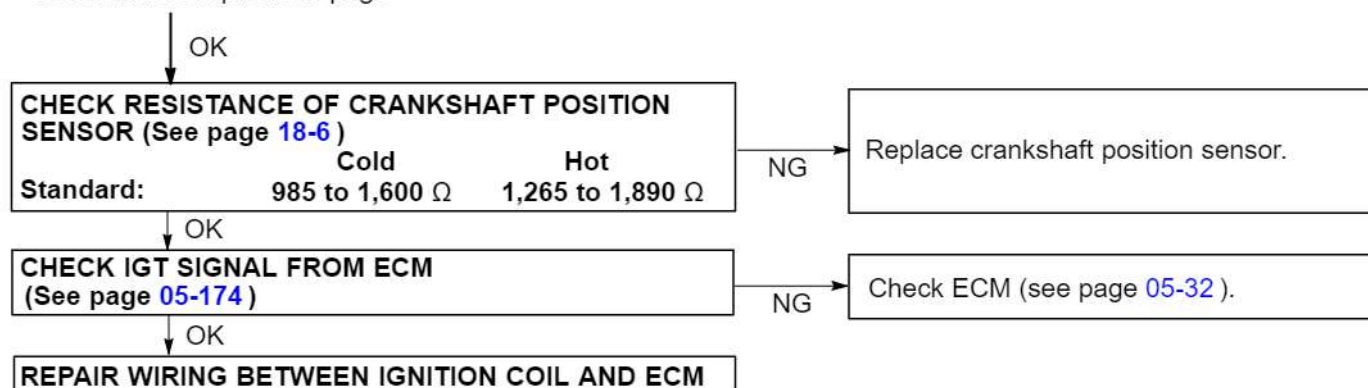
NOTICE:

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

If the sparks do not occur, do 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: 9.0 N·m (92 kgf·cm, 80 in·lbf)

VVT SENSOR (3MZ-FE)

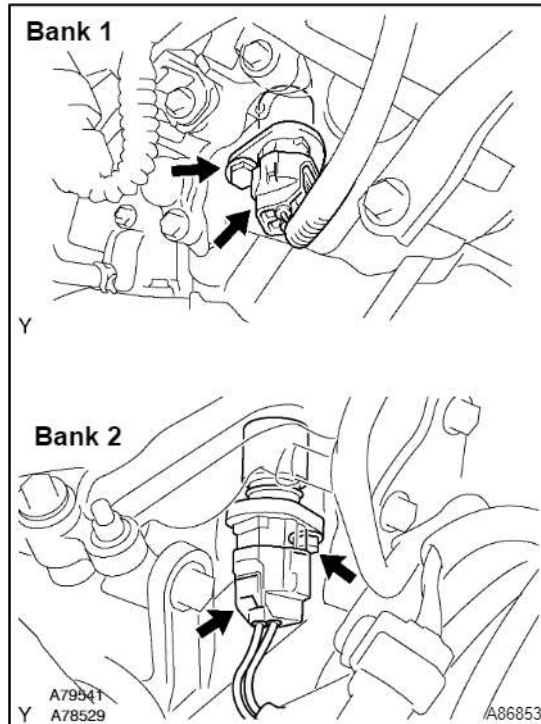
REPLACEMENT

180BK-01

HINT:

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

1. REMOVE AIR CLEANER ASSY



2. REMOVE VVT SENSOR

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

3. INSTALL VVT SENSOR

- (a) Apply a light coat of engine oil to a new O-ring. Install the O-ring onto 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.

4. INSTALL AIR CLEANER ASSY (See page 14-24)

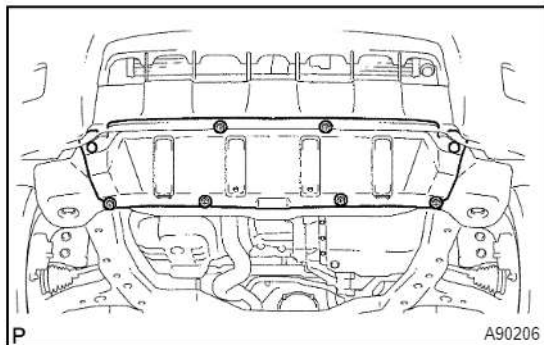
CRANKSHAFT POSITION SENSOR (3MZ-FE)

REPLACEMENT

180BL-01

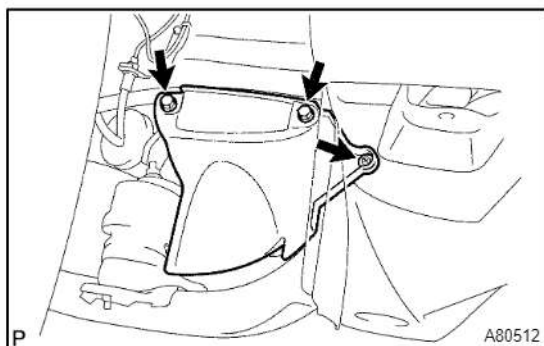
HINT:

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



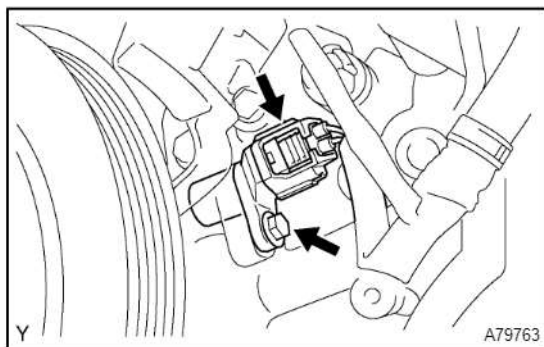
1. REMOVE ENGINE UNDER COVER NO.1

- (a) Remove the 6 screws, 2 clips and 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

- (a) Install the sensor with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
(b) Connect the sensor connector.

5. INSTALL FRONT FENDER APRON SEAL RH

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

6. INSTALL ENGINE UNDER COVER NO.1

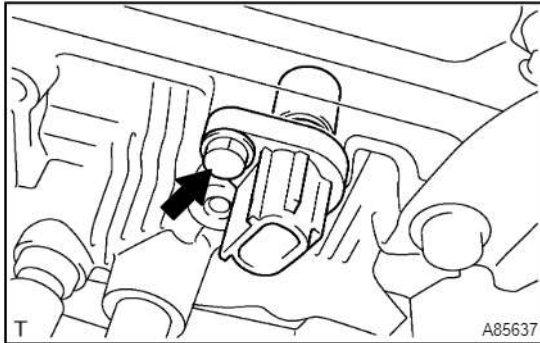
- (a) Install the 6 screws, 2 clips and under cover.

CAMSHAFT POSITION SENSOR (2AZ-FE) REPLACEMENT

18094-02

HINT:

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

1. REMOVE AIR CLEANER ASSY (See page 14-24)**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 a new O-ring. Install the O-ring onto the sensor.
- (b) Install the sensor with the bolt.

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

4. INSTALL AIR CLEANER ASSY (See page 14-24)

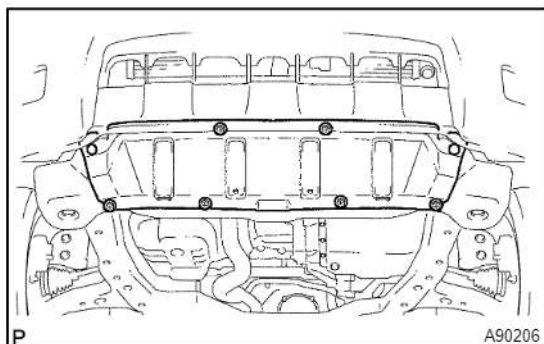
CRANKSHAFT POSITION SENSOR (2AZ-FE)

REPLACEMENT

18093-02

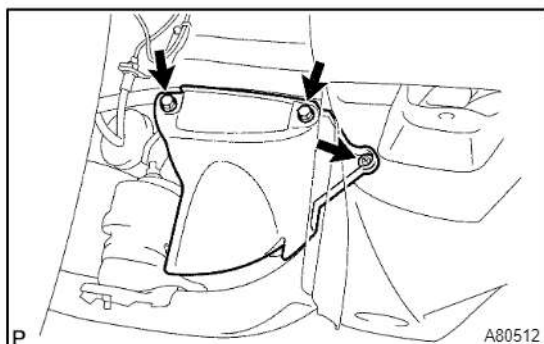
HINT:

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



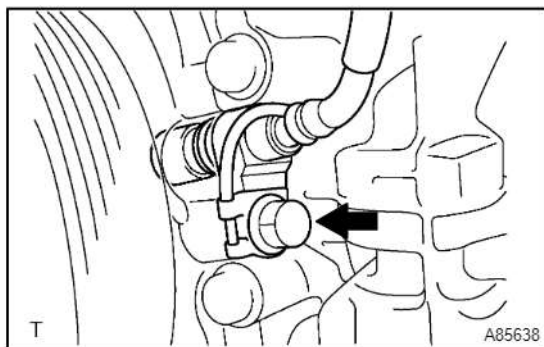
1. REMOVE ENGINE UNDER COVER NO.1

- (a) Remove the 6 screws, 2 clips and 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

- (a) Install the sensor and clamp with the bolt.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
(b) Connect the sensor connector.

5. INSTALL FRONT FENDER APRON SEAL RH

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

6. INSTALL ENGINE UNDER COVER NO.1

- (a) Install the 6 screws, 2 clips and under cover.