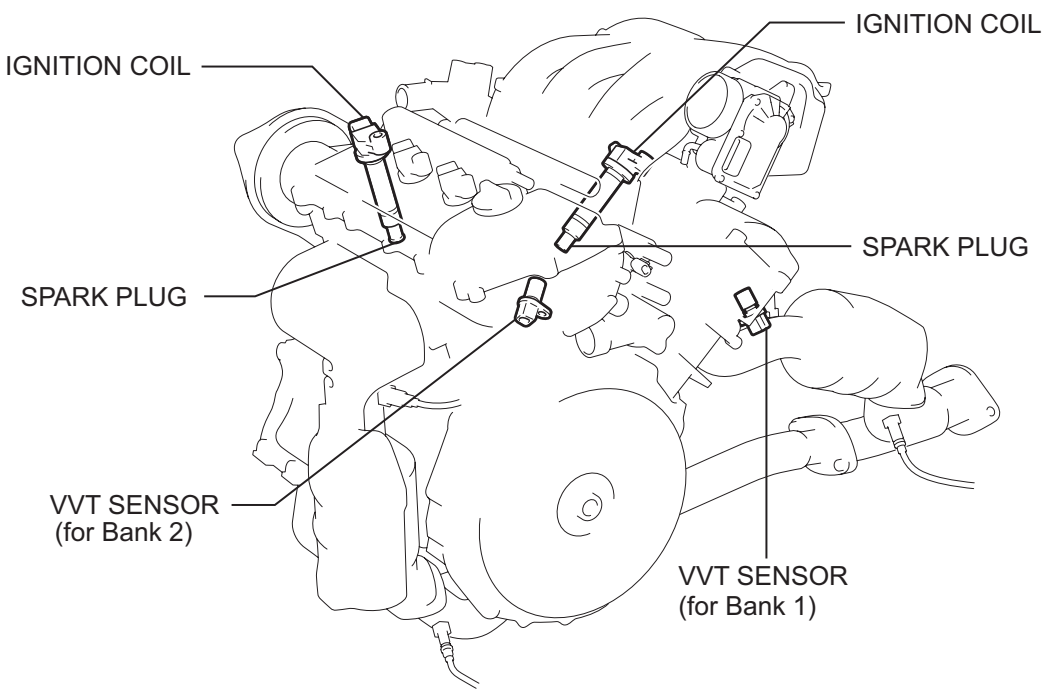
IGNITION SYSTEM

PARTS LOCATION



P

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ON-VEHICLE INSPECTION

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

1. PERFORM SPARK TEST

(a) Check for DTCs.
NOTICE:
If a DTC is present, perform troubleshooting procedures for that DTC.

(b) Check if sparks occur.
(1) Remove the intake air surge tank (See page FU-11).
(2) Remove the ignition coils (with igniter).
(3) Using a 16 mm plug wrench, remove the spark plugs.
(4) Install the spark plugs to each ignition coil (with igniter) and connect the ignition connectors.
(5) Disconnect the 6 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.**
- **If the ignition coil has been struck or dropped, replace it.**
- **Do not crank the engine for more than 2 seconds.**

(c) Perform the spark test according to the flowchart below.
(1) Check that the wire harness side connector of ignition coil with igniter is securely connected.
Result

Result	Proceed to
NG	Connect securely
OK	Go to next step

(2) Perform a spark test on each ignition coil with igniter.
1. Replace the ignition coil with igniter with a normal one.
2. Perform spark test again.
Result

Result	Proceed to
OK	Replace ignition coil with igniter
NG	Go to next step

(3) Check the power supply to ignition coil with igniter.
1. Turn the ignition switch on.

2. Check that there is battery voltage at ignition coil positive (+) terminal.
Result

Result	Proceed to
NG	Check wiring between engine switch and ignition coil with igniter
OK	Go to next step

(4) Check the resistance of the VVT sensor (See page IG-8).
Standard resistance

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

Result

Result	Proceed to
NG	Replace VVT sensor
OK	Go to next step

(5) Check the resistance of the crankshaft position sensor (See page ES-368).
Standard resistance

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

Result

Result	Proceed to
NG	Replace crankshaft position sensor
OK	Go to next step

(6) Check the IGT signal from the ECM (See page ES-182).
Result

Result	Proceed to
NG	Check ECM
OK	Repair wiring between ignition coil and ECM

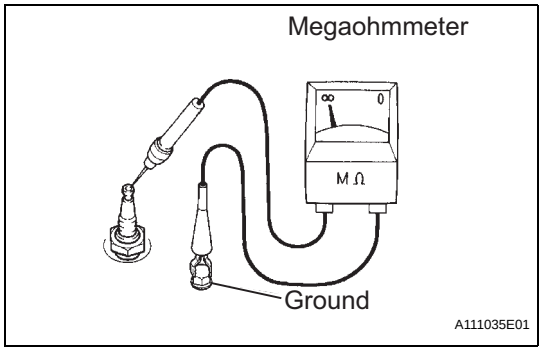
(d) Using a 16 mm plug wrench, install the spark plug.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)
(e) Install the ignition coils (with igniter).
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
(f) Install the intake air surge tank (See page FU-15).

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 200,000 km (120,000 miles).**



(a) Check the electrode.

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

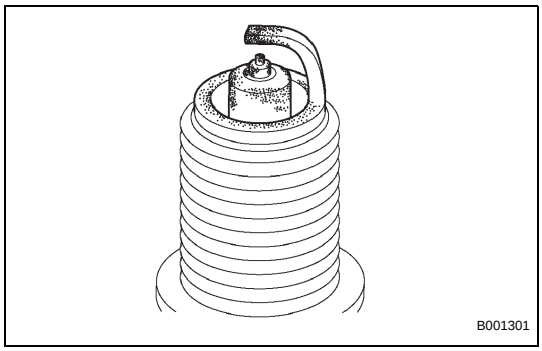
Correct insulation resistance:

10 MΩ or higher

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

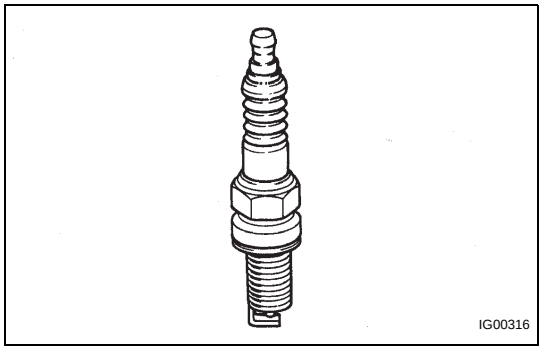
HINT:

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...OK.
(5) If the electrode is wet...Proceed to step (c).
(6) Reinstall the spark plug.

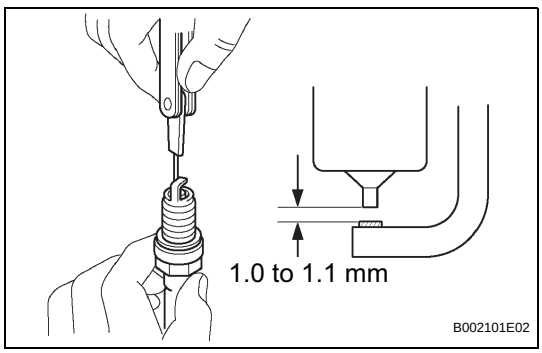


(c) Check the spark plug for any damage to its thread and insulator.

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:

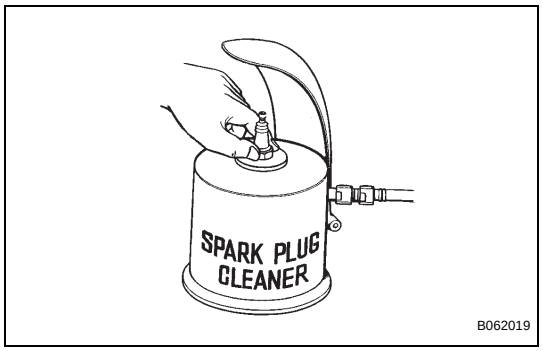
1.3 mm (0.051 in.)

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.)

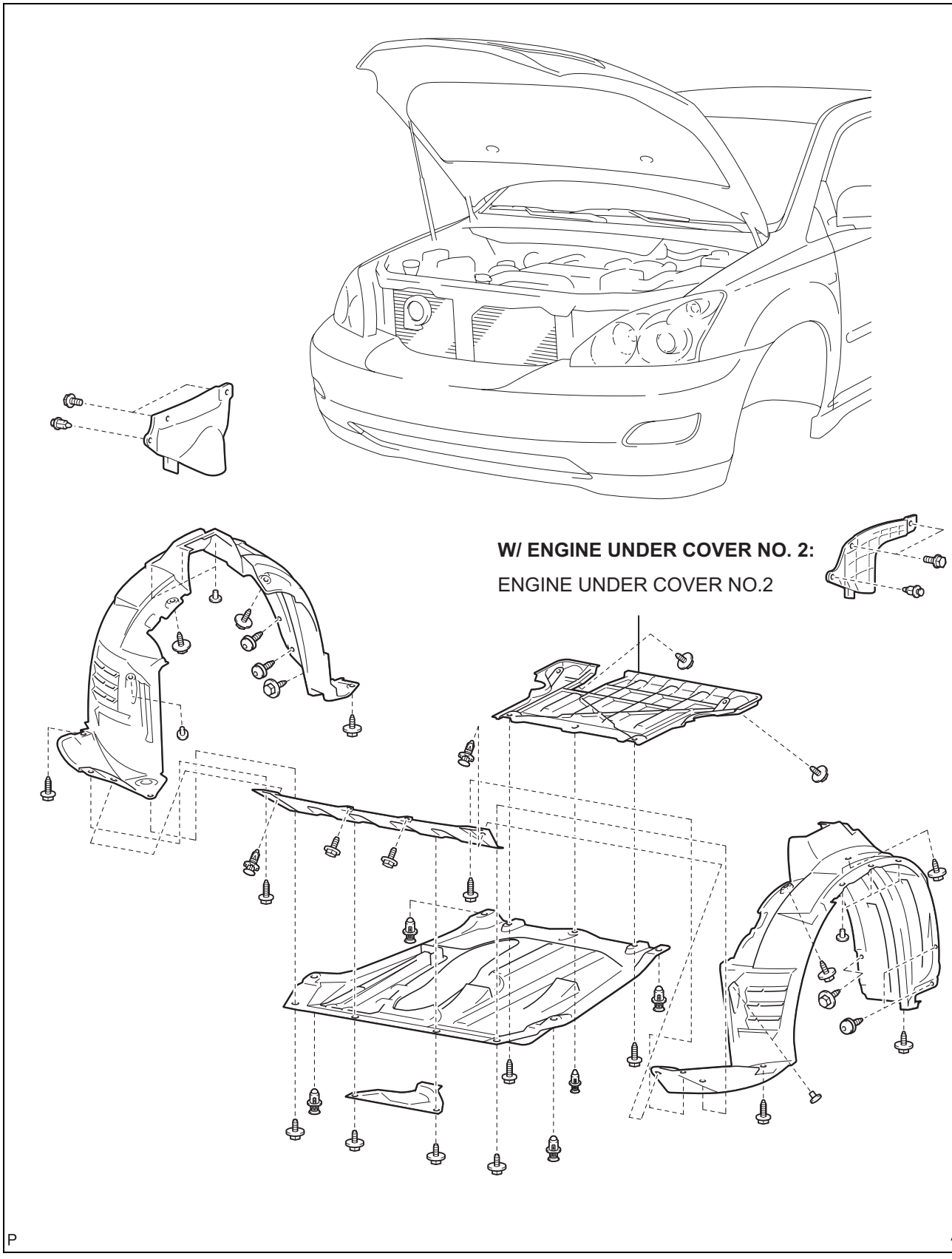
IG



(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/cm^2, 85 psi)
Duration:
20 seconds or less
HINT:
If there are traces of oil, remove them with gasoline before using the spark plug cleaner.

VVT SENSOR

COMPONENTS



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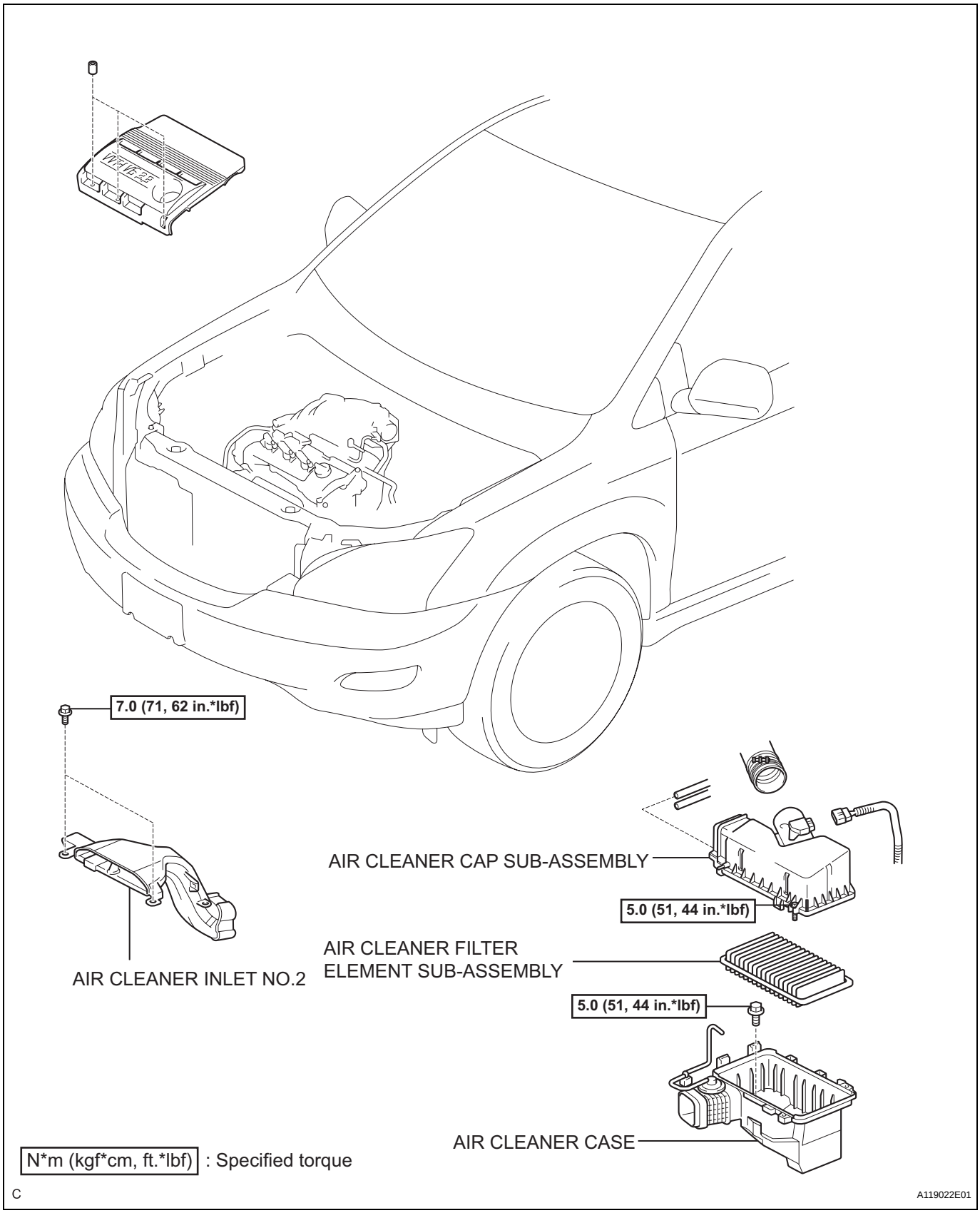
7.0 (71, 62 in.*lbf)
AIR CLEANER INLET NO.2
AIR CLEANER CAP SUB-ASSEMBLY
5.0 (51, 44 in.*lbf)
AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY
5.0 (51, 44 in.*lbf)
AIR CLEANER CASE
N*m (kgf*cm, ft.*lbf) : Specified torque
C
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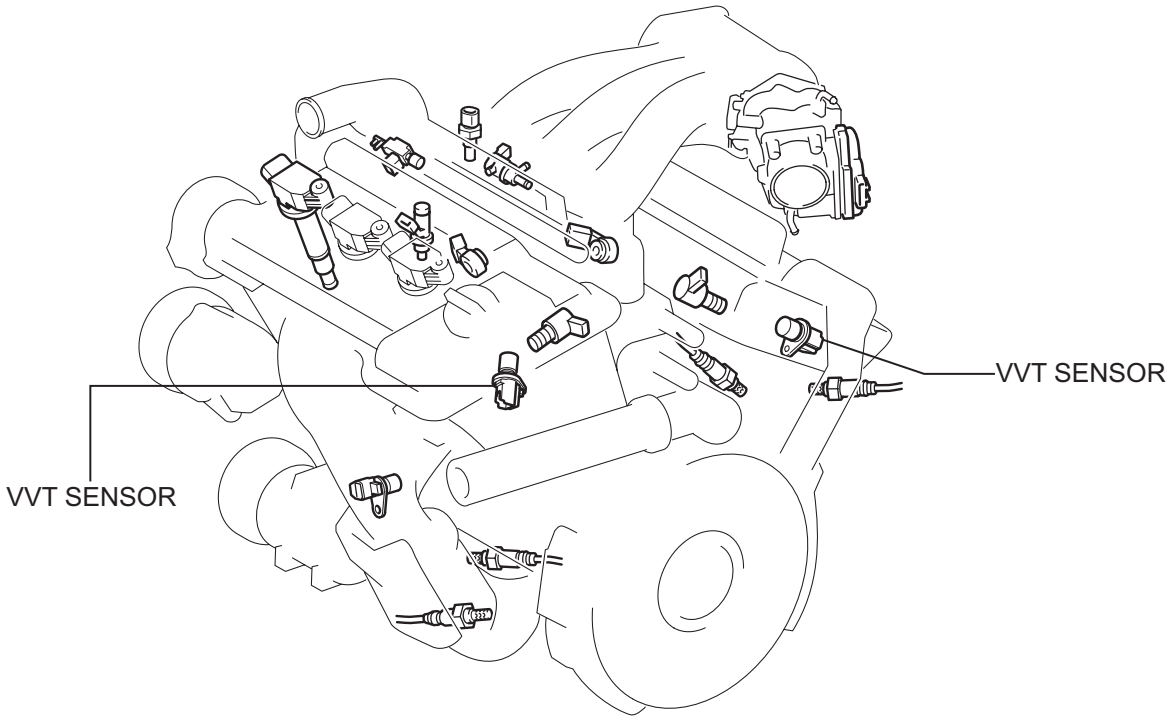

Y

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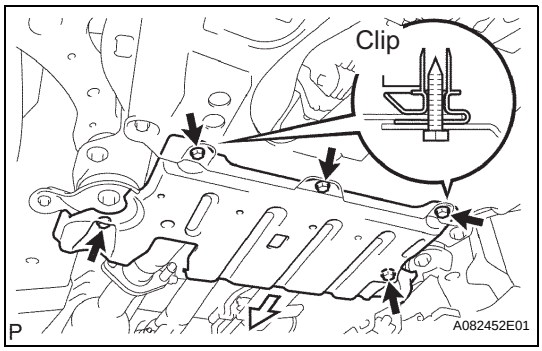

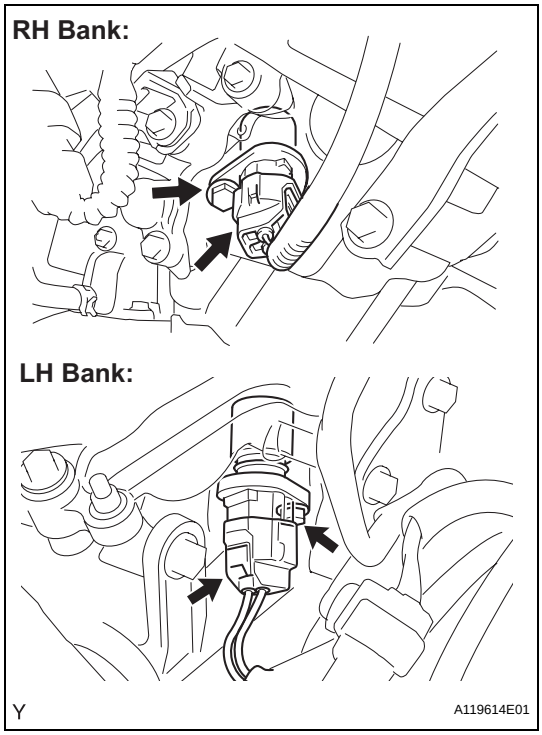

REMOVAL

1. **REMOVE ENGINE UNDER COVER NO.2**
   (a) w/ engine under cover No. 2.
      (1) Remove the clip, 2 screws and 2 bolts
      (2) Slide the engine under cover No. 2 toward the rear to detach it from the retainers, and then remove the engine under cover No. 2.
2. **REMOVE AIR CLEANER INLET NO.2 (See page ST-5)**
3. **REMOVE AIR CLEANER ASSEMBLY (See page ST-5)**
4. **REMOVE VVT SENSOR**
   (a) Disconnect the 2 VVT sensor connectors.
   (b) Remove the 2 bolts, and then remove the 2 VVT sensors.

INSPECTION

1. INSPECT VVT 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).

INSTALLATION

1. INSTALL VVT SENSOR

(a) Apply a light coat of engine oil to the O-ring on the VVT sensor.

(b) Install the 2 VVT sensors with the 2 bolts.
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

(c) Connect the 2 VVT sensor connectors.

2. INSTALL AIR CLEANER ASSEMBLY (See page ST-12)

3. INSTALL AIR CLEANER INLET NO.2 (See page ST-12)

4. CHECK CONNECTION OF VACUUM HOSE

HINT:
See page EM-127.

5. INSTALL ENGINE UNDER COVER NO.2

(a) w/ engine under cover No. 2.