# ON-VEHICLE INSPECTION

**NOTICE:**
**In the following 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 ASSEMBLY (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 EM-65).
(2) Remove the intake air surge tank (See page EM-70).
(3) Remove the ignition coils.
(4) Using a 16 mm 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.**
HINT:
If sparks do not occur, do the following test (See procedure "A"):
(9) Using a 16 mm plug wrench, install the spark plugs.
**Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)**
(10) Install the ignition coils.
**Torque: 8 N*m (82 kgf*cm, 71 in.*lbf)**
(11) Install the intake air surge tank (See page EM-76).
(12) Install the V-bank cover (See page EM-82).

(c) Spark test (Procedure "A")
(1) Check if wire harness side connector of ignition coil (with igniter) is secure.
**Result:**

| Result | Proceed to |
|---|---|
| NG | Connect securely. |
| OK | Go to next step. |

(2) Perform spark test with a different ignition coil (with igniter).
1. Replace current ignition coil (with igniter) with a different functioning ignition coil (with igniter).
2. Perform spark test again.

**Result:**

| Result | Proceed to |
|---|---|
| OK | Replace faulty ignition coil (with igniter). |
| NG | Go to next step. |

(3) Check 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 ignition switch to ignition coil (with igniter). |
| OK | Go to next step. |

(4) Check resistance of VVT sensor (See page IG-7).

**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 resistance of crankshaft position sensor (See page IG-7).

**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 IGT signal from ECM (See page ES-38).

**Result:**

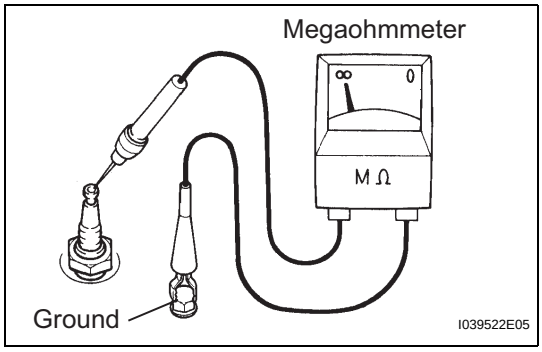
| Result | Proceed to |
|---|---|
| NG | Check ECM (See page). |
| OK | Repair wiring between ignition coil and ECM. |

# INSPECTION

**NOTICE:**
**In the following 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).**

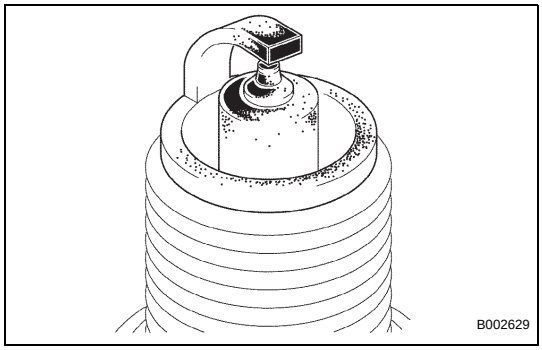
**1. INSPECT SPARK PLUG**

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



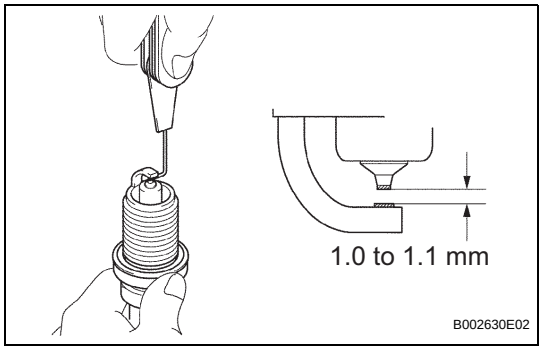

(a) Check the electrode.
  (1) Using an megaohmmeter, measure the insulation resistance.
  **Correct insulation resistance:**
  **10 MΩ or more**
  **If the resistance is less than the specified value, proceed to step (d).**
  HINT:
  If the megaohmmeter is not available, do the following simple inspection 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.

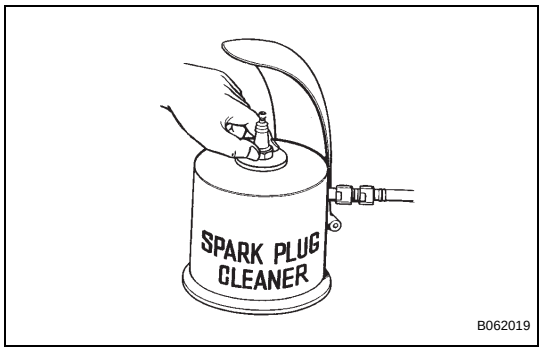



(c) Check the spark plug for any damage on its thread and insulator.
  If there is any damage, replace the spark plug.
  **Recommended spark plug**

| Manufacturer | Type |
|---|---|
| DENSO | SK20R11 |
| NGK | IFR6A11 |



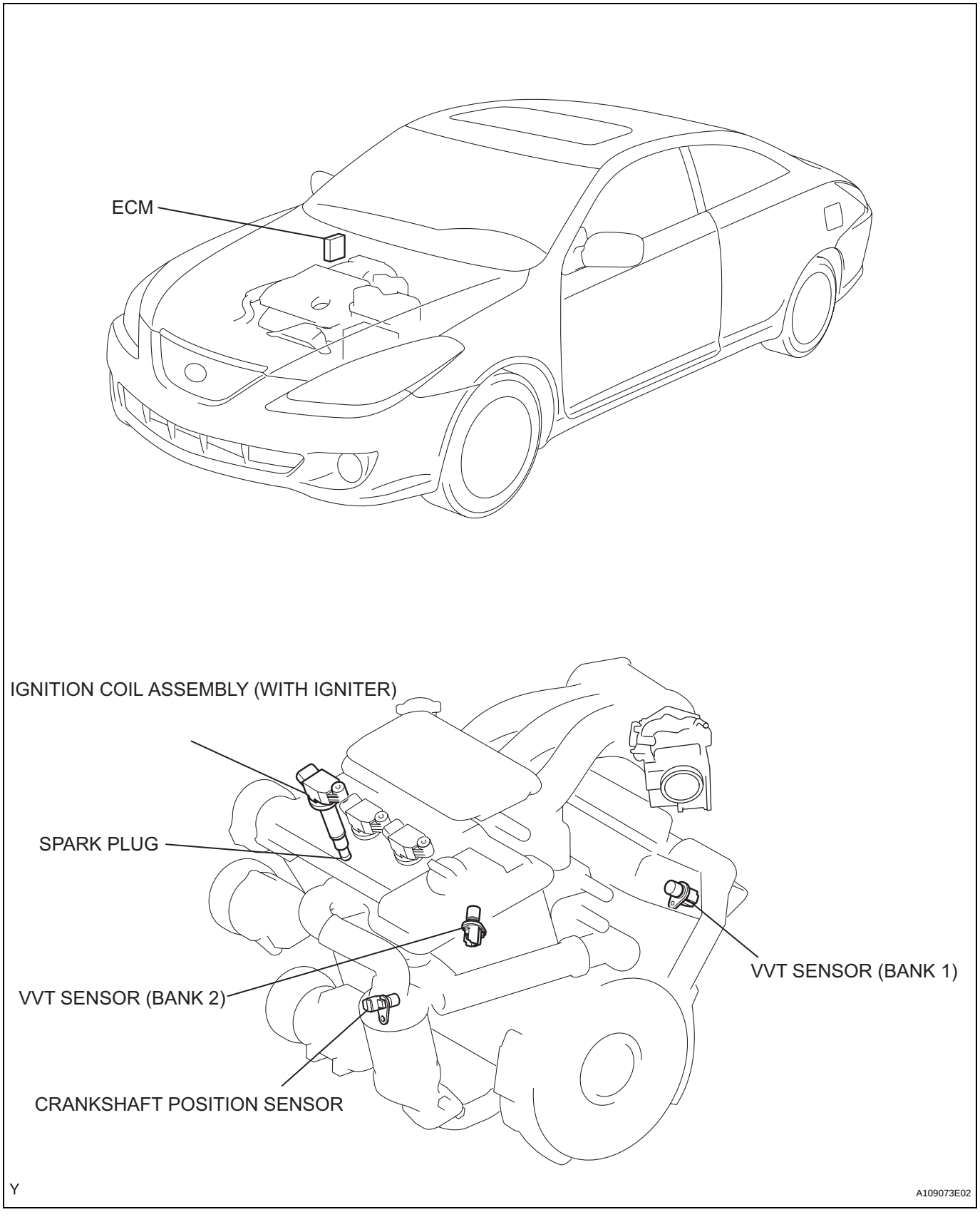

(d) Check the spark plug electrode gap.
  **Maximum electrode gap for used spark plug:**
  **1.3 mm (0.051 in.)**
  If the gap is greater than the maximum, replace the spark plug.
  **Correct electrode gap for new spark plug:**
  **1.0 to 1.1 mm (0.039 to 0.043 in.)**
  **NOTICE:**
  **If adjusting the 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/cm$^2$, 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 trace of oil, use gasoline to clean off the oil before using the spark plug cleaner.

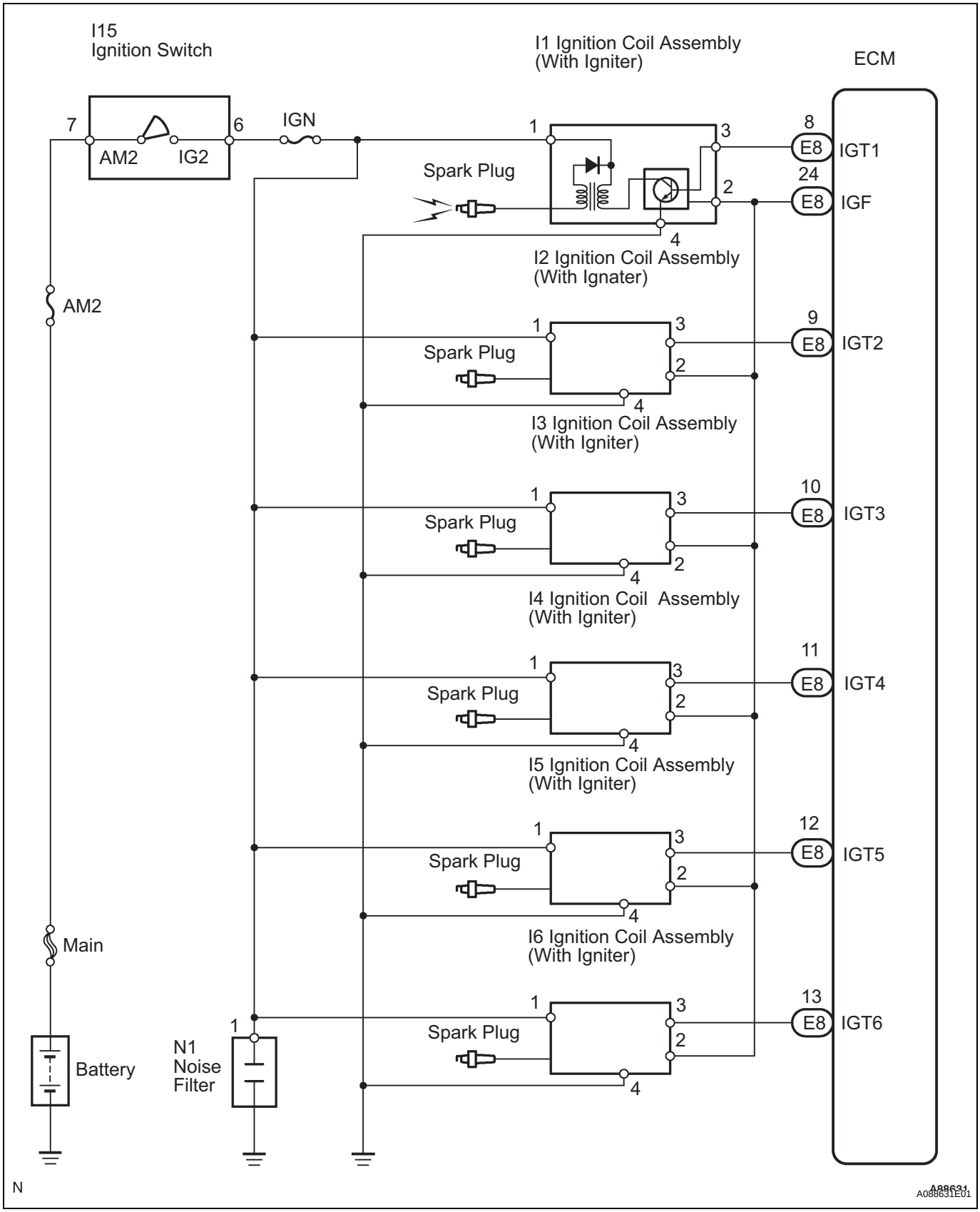
# IGNITION SYSTEM

## PARTS LOCATION



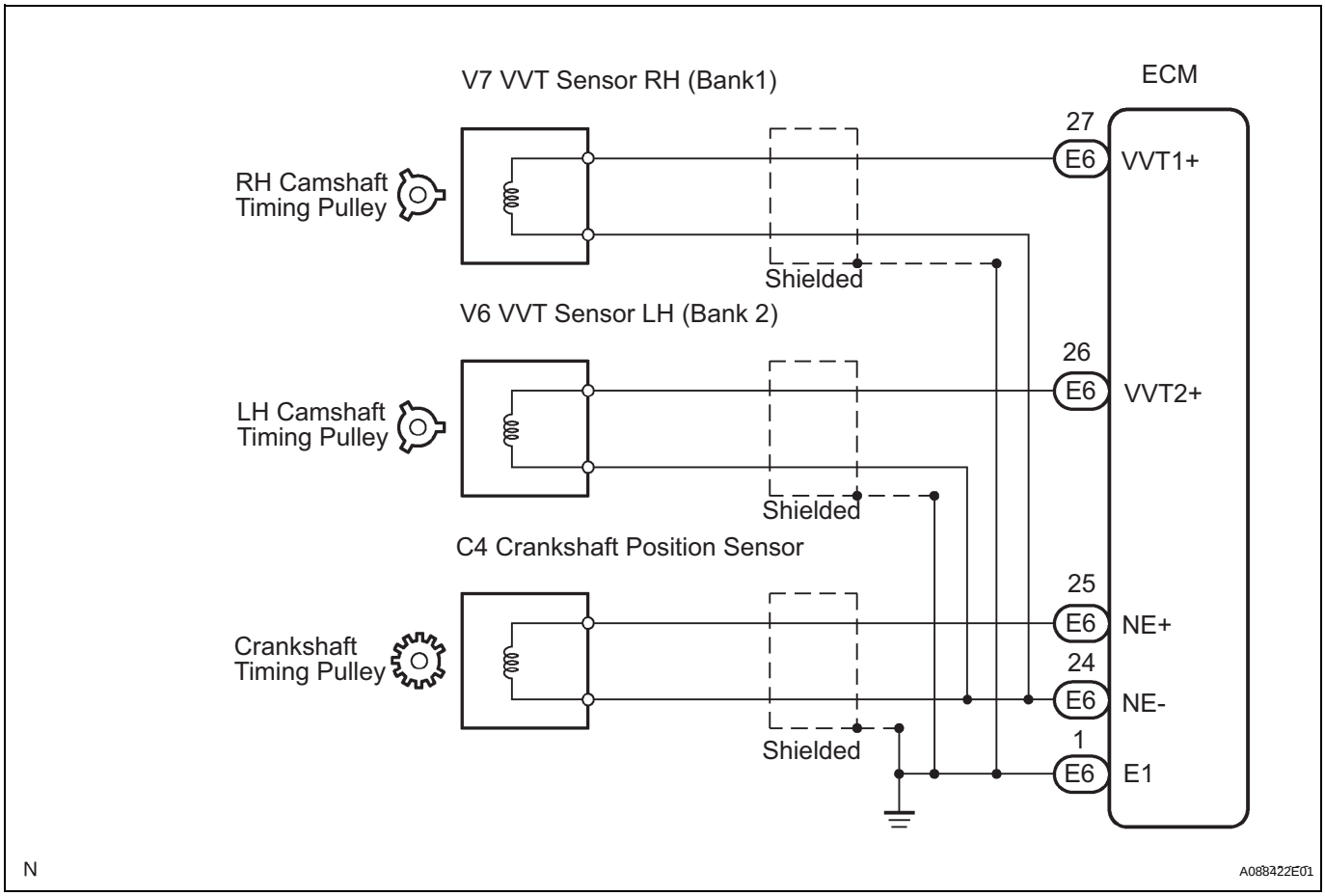
# SYSTEM DIAGRAM

Ignition timing is determined by the ECM based on signals from various sensors.




IG

N


V7 VVT Sensor RH (Bank1)
ECM
27
E6
VVT1+
RH Camshaft
Timing Pulley
Shielded
V6 VVT Sensor LH (Bank 2)
26
E6
VVT2+
LH Camshaft
Timing Pulley
Shielded
C4 Crankshaft Position Sensor
25
E6
NE+
24
E6
NE-
Crankshaft
Timing Pulley
Shielded
1
E6
E1
N
A088422E01

# INSTALLATION

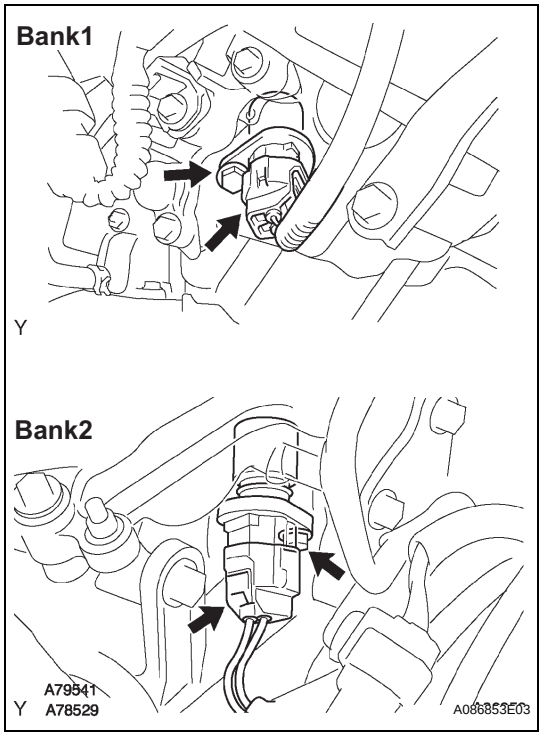
1. **INSTALL VVT SENSOR**
   (a) Apply a light coat of engine oil to the O-ring on the sensor.
   (b) Install the sensor with the bolt.
   **Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)**
   (c) Connect the sensor connector.
2. **INSTALL AIR CLEANER ASSEMBLY**
   HINT:
   See page EM-81
3. **INSTALL AIR CLEANER INLET ASSEMBLY**
4. **CHECK CONNECTION OF VACUUM HOSE**

# VVT SENSOR

## REMOVAL

HINT:
A bolt without a torque specification is shown in the standard bolt chart (See page SS-2).

1. **REMOVE AIR CLEANER INLET ASSEMBLY**
2. **REMOVE AIR CLEANER ASSEMBLY**
3. **REMOVE VVT SENSOR**
   (a) Disconnect the sensor connector.
   (b) Remove the bolt and sensor.



# INSPECTION

**1. INSPECT VVT SENSOR**

(a) Measure the resistance between the terminals.

**Standard Resistance**

| 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.