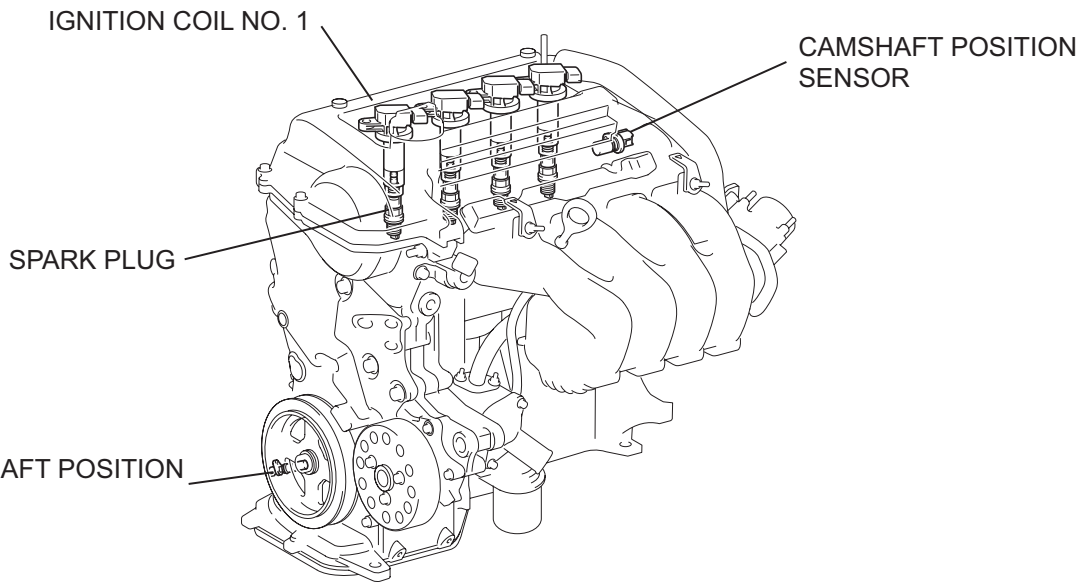
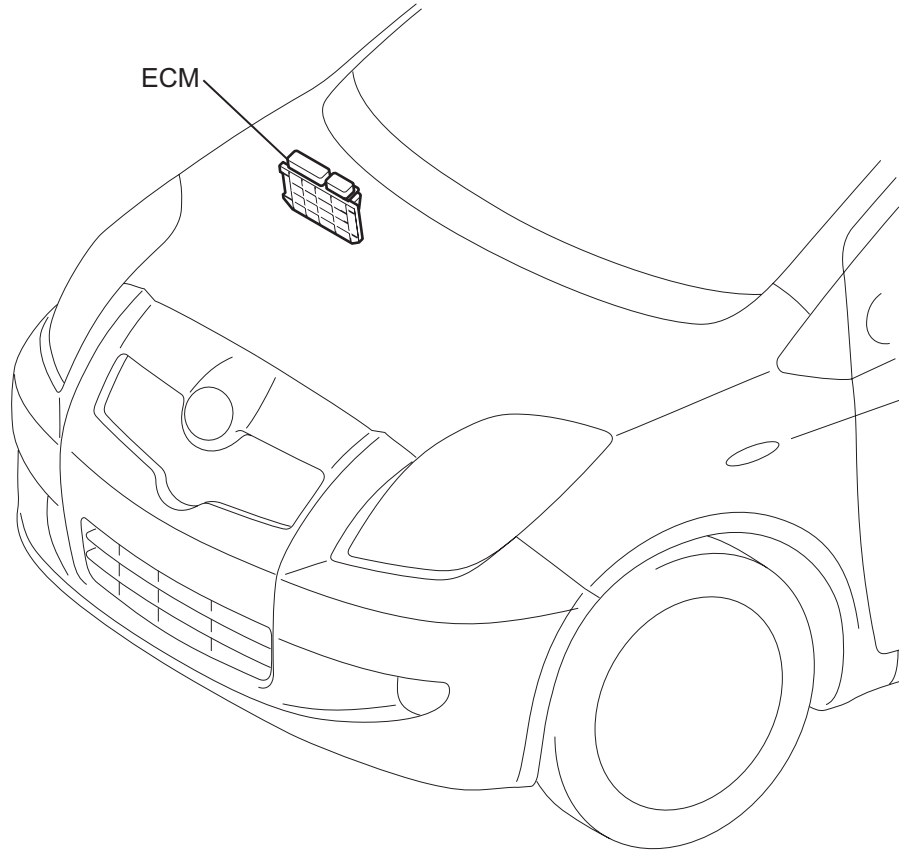


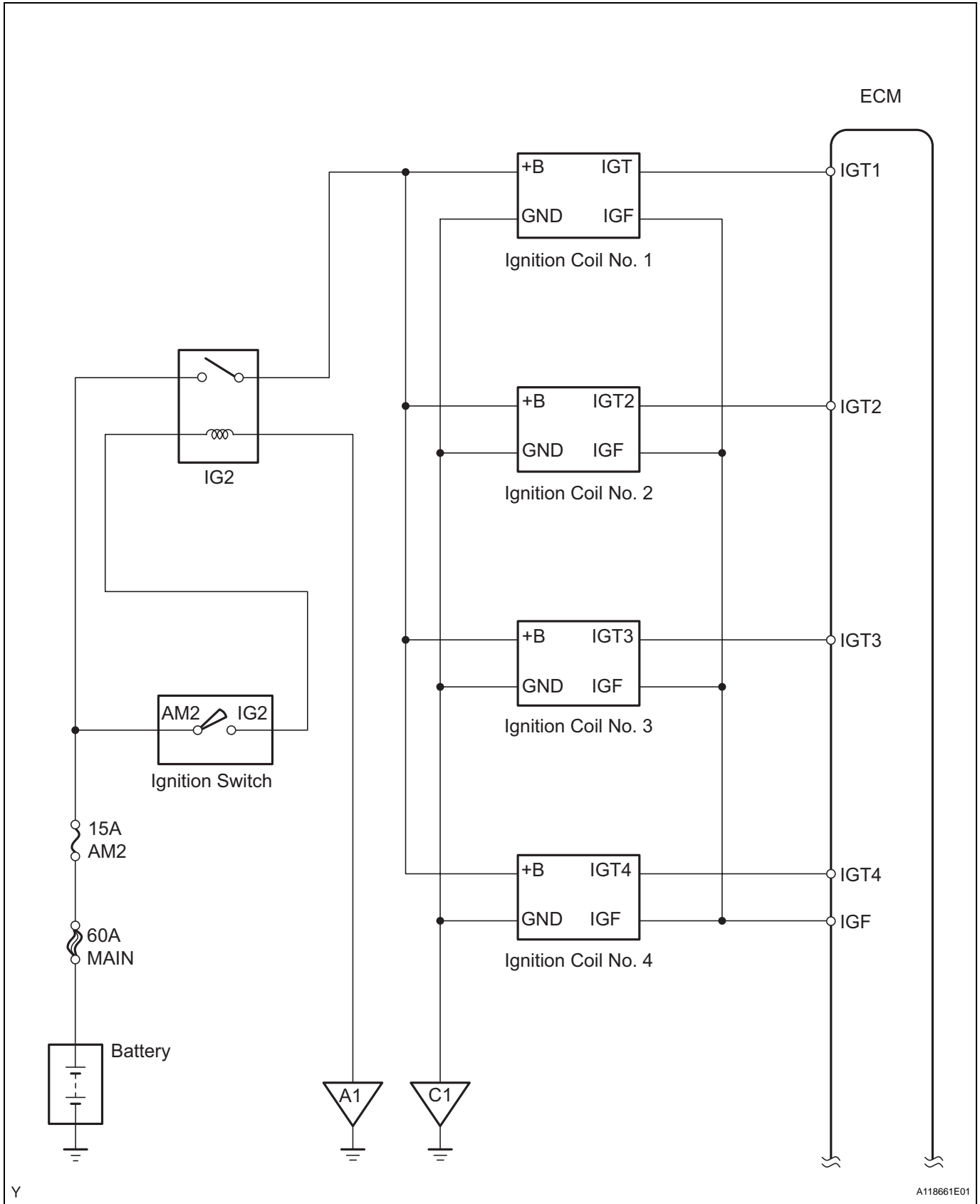
# IGNITION SYSTEM

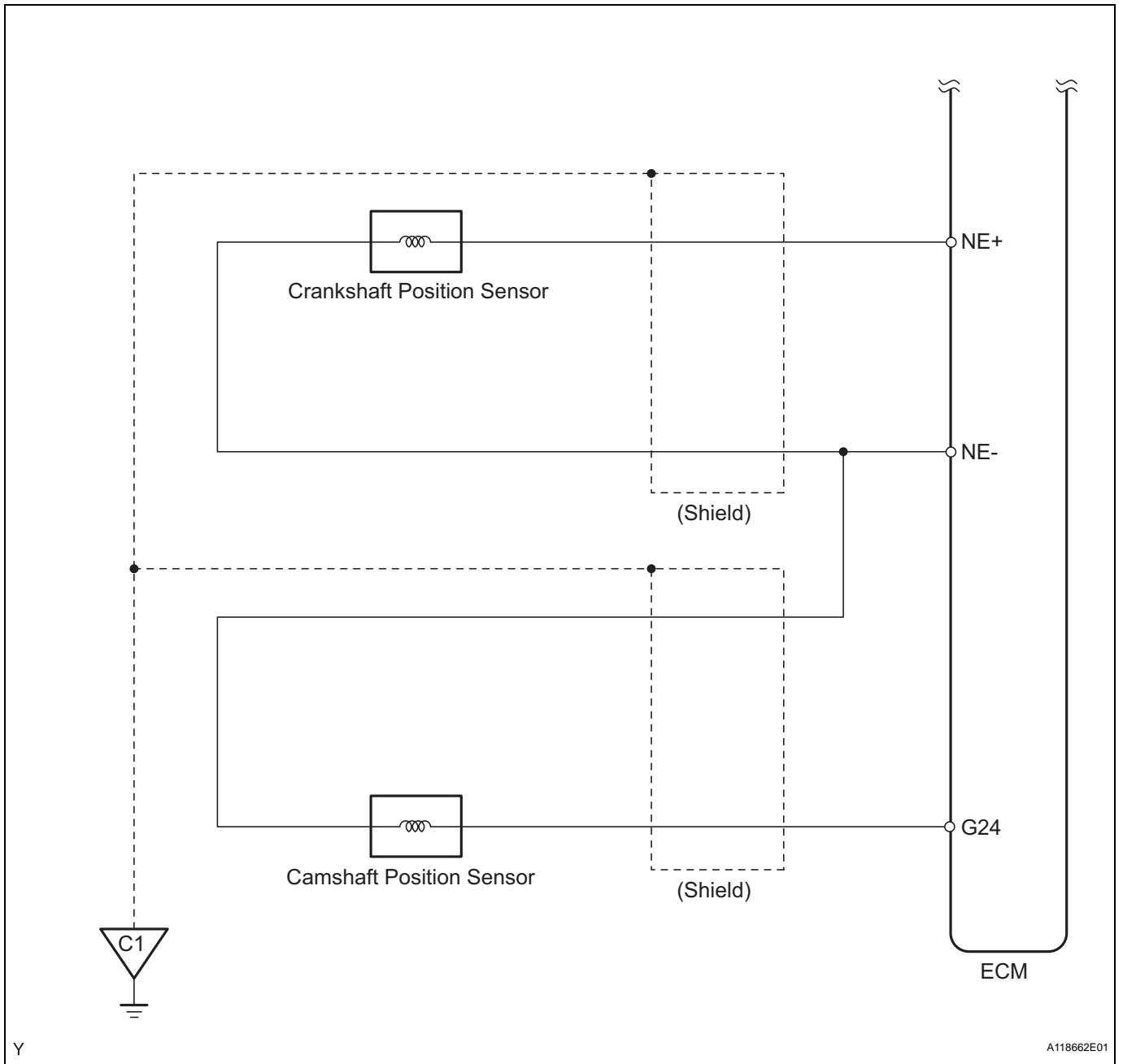
## PARTS LOCATION



IG

# SYSTEM DIAGRAM





IG

Y

A118662E01

## ON-VEHICLE INSPECTION

### HINT:

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. INSPECT IGNITION COIL AND SPARK TEST

- (a) Check for DTCs.

#### NOTICE:

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

- (b) Check whether sparks occur.

- (1) Remove cylinder head cover No. 2 (See page [IG-9](#)).
- (2) Remove the 4 ignition coils (See page [IG-9](#)).
- (3) Using a 16 mm (0.63 in) plug wrench, remove the 4 spark plugs.
- (4) Install the spark plug onto each ignition coil and connect the ignition coil connectors.
- (5) Disconnect the 4 injector connectors.
- (6) Ground the spark plugs.
- (7) Check that sparks occur while the engine is being cranked.

#### NOTICE:

- **Ground the spark plug when checking it.**
- **Replace any ignition coils that have been subjected to any physical impact.**
- **Do not crank the engine for more than 2 seconds.**

If sparks do not occur, perform the following procedure.

- (c) Perform the spark test in accordance with the following procedure.

- (1) Check that the wire harness side connector of the 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 functioning one.
  2. Perform the spark test again.

#### Result

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

- (3) Check that the power is supplied to the ignition coil with igniter.
1. Turn the engine switch ON.
  2. Check that the battery voltage is applied to the positive (+) terminal of the ignition coil (See page [ES-172](#)).

**Result**

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

- (4) Check the resistance of the camshaft position sensor.

**Standard resistance**

Temperature	Specified Condition
Cold	1,630 to 2,740 $\Omega$
Hot	2,065 to 3,225 $\Omega$

**Result**

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

- (5) Check the resistance of the crankshaft position sensor.

**Standard resistance**

Temperature	Specified Condition
Cold	985 to 1,600 $\Omega$
Hot	1,265 to 1,890 $\Omega$

**Result**

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

- (6) Check the IGT from the ECM (See page [ES-172](#)).

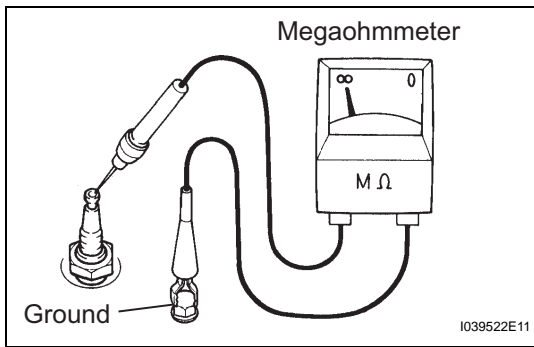
**Result**

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

- (d) Connect the 4 injector connectors.
- (e) Using a 16 mm (0.63 in) plug wrench, install the 4 spark plugs.
- Torque: 18 N\*m (184 kgf\*cm, 13 ft.\*lbf)**
- (f) Install the 4 ignition coils (See page [IG-9](#)).
- (g) Install cylinder head cover No. 2 (See page [IG-10](#)).

**2. INSPECT SPARK PLUG****NOTICE:**

**Do not use a wire brush for cleaning.**



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

**Standard resistance:**  
**10 MΩ or more**

**HINT:**

- If the result is not as specified, clean the spark plug with a spark plug cleaner and measure the resistance again.
- If a megaohmmeter is not available, perform the following simple inspection instead.

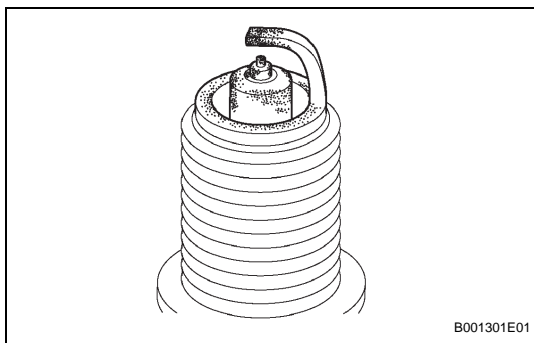
- (b) Alternative inspection method:

- (1) Quickly accelerate the engine to 4,000 rpm 5 times.  
 (2) Remove the spark plug.  
 (3) Visually check the spark plug.  
 If the electrode is dry, the spark plug is functioning properly. If the electrode is damp, proceed to the next step.

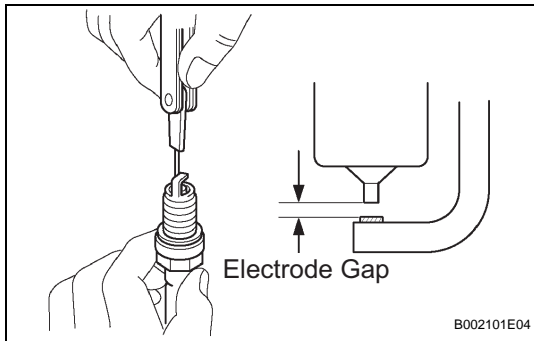
- (c) Check the spark plug for any damage to its thread and insulator.  
 If there is damage, replace the spark plug.

**Recommended spark plug**

Manufacturer	Product
DENSO	SK16R11
NGK	IFR5A11



IG

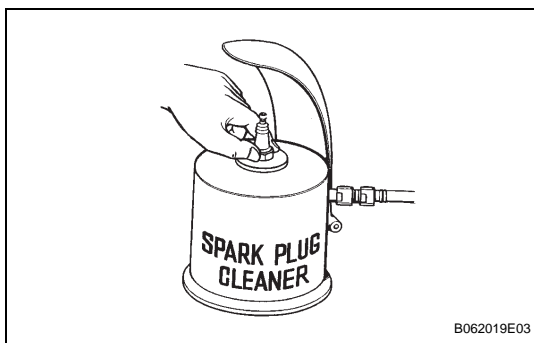


- (d) Check the spark plug electrode gap.

**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.

**Electrode gap for new spark plug:**  
**1.0 to 1.1 mm (0.039 to 0.043 in.)**



- (e) Clean the spark plug.

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<sup>2</sup>, 85 psi)**

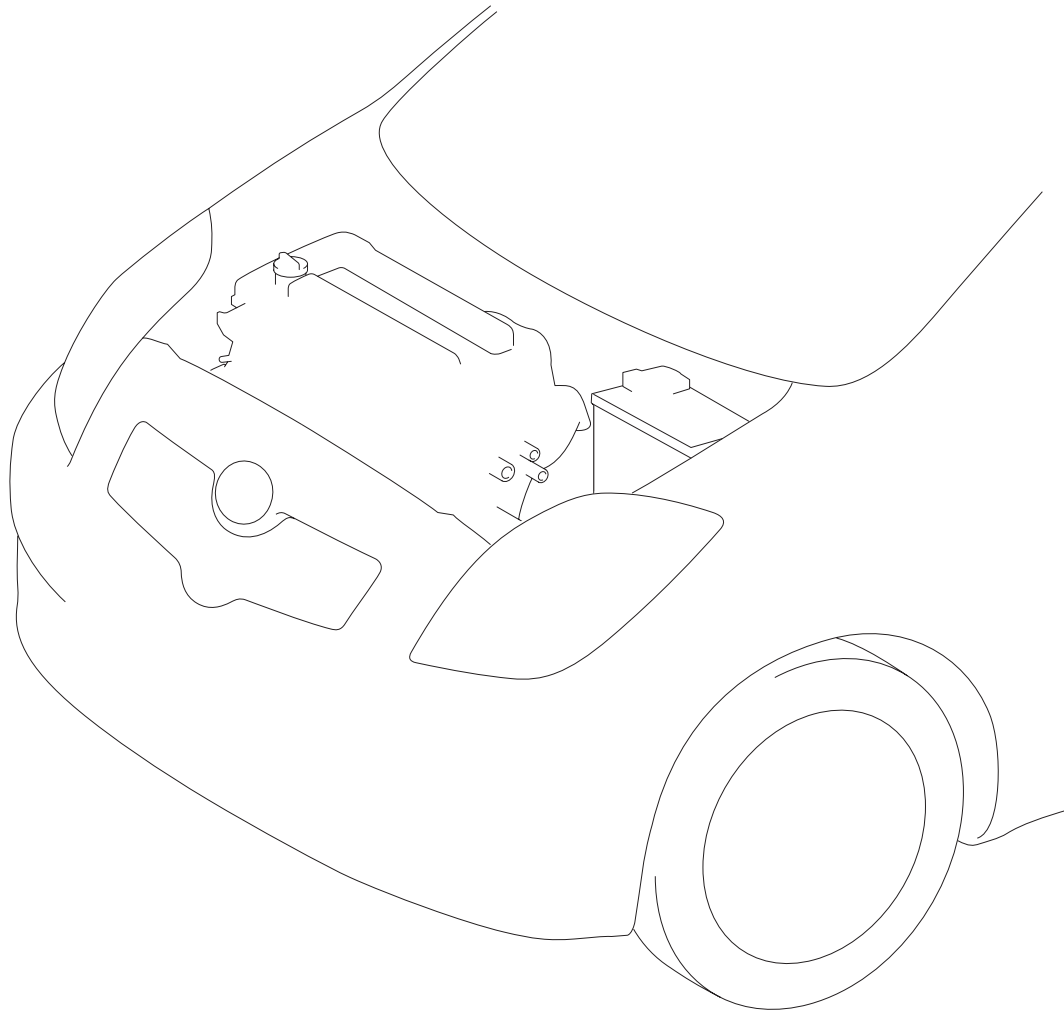
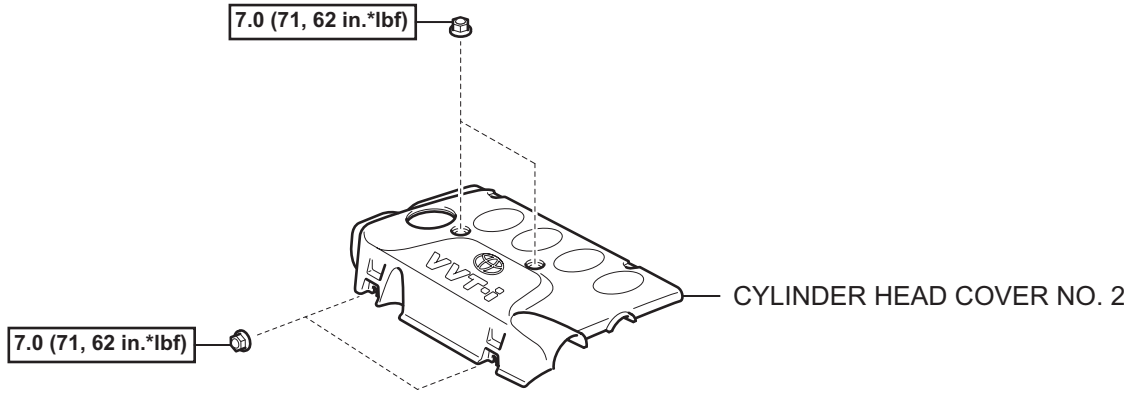
**Duration:**

**20 seconds or less**

**HINT:**

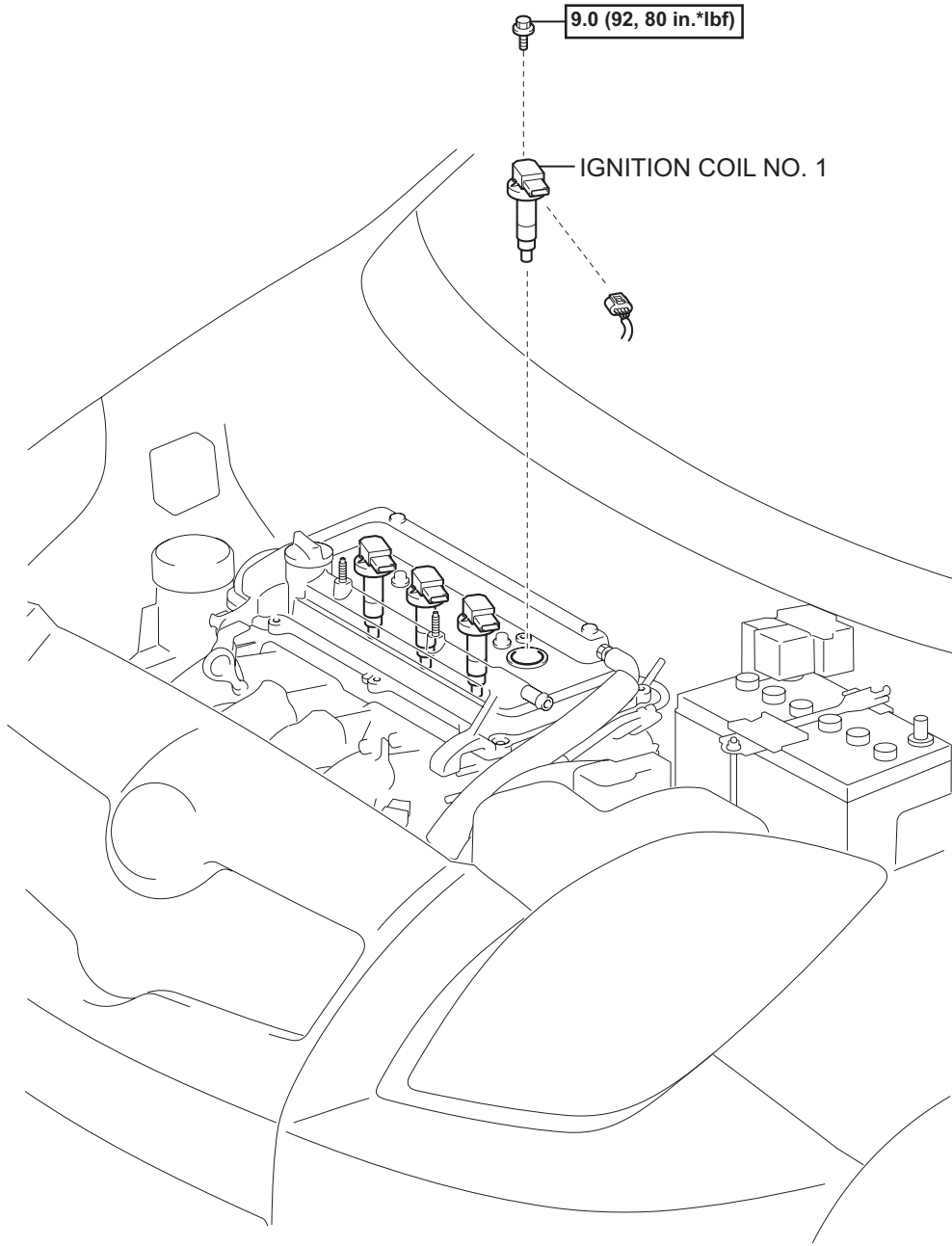
Only use the spark plug cleaner when the electrode is free of oil. If the electrode has traces of oil, use gasoline to clean off the oil before using the spark plug cleaner.

# IGNITION COIL COMPONENTS



**N\*m (kgf\*cm, ft.\*lbf)** : Specified torque

IG



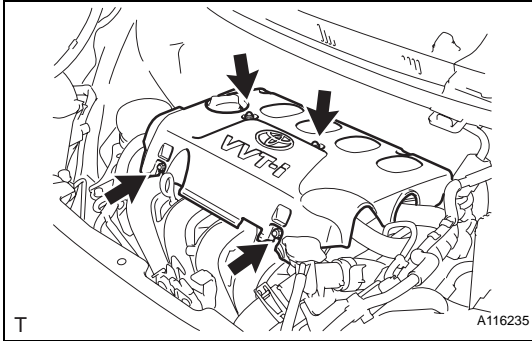
IG

$\boxed{\text{N}^*\text{m (kgf}^*\text{cm, ft.}^*\text{lbf)}}$  : Specified torque

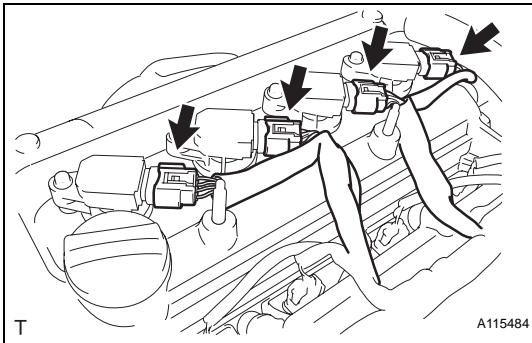


## REMOVAL

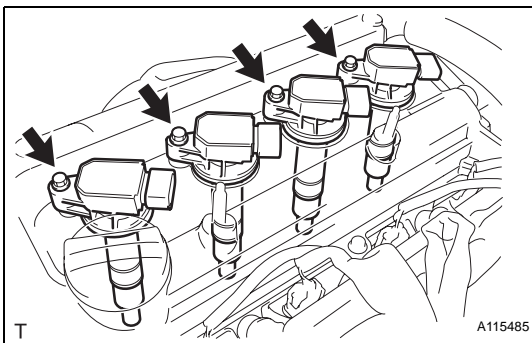
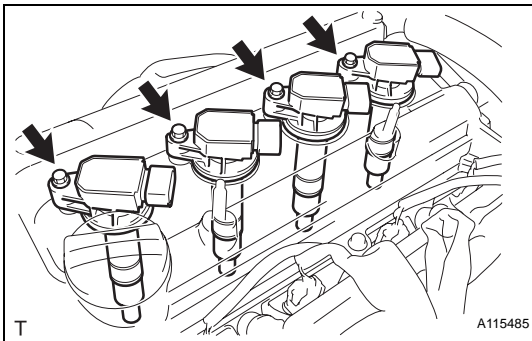
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE CYLINDER HEAD COVER NO. 2**
  - (a) Remove the 4 nuts and cylinder head cover No. 2.



3. **REMOVE IGNITION COIL NO. 1**
  - (a) Disconnect the 4 ignition coil connectors.

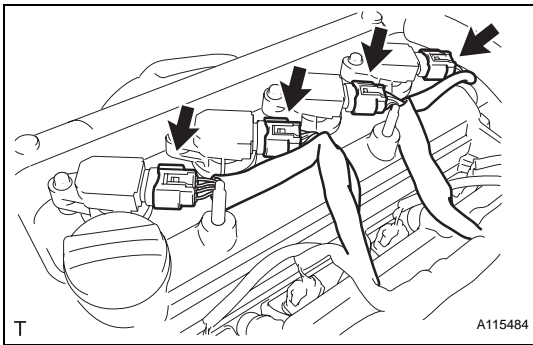


- (b) Remove the 4 bolts and 4 ignition coils.

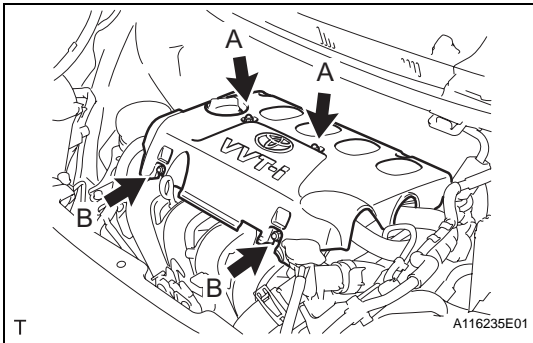


## INSTALLATION

1. **INSTALL IGNITION COIL NO. 1**
  - (a) Install the 4 ignition coils with the 4 bolts.  
**Torque: 9.0 N\*m (92 kgf\*cm, 80 in.\*lbf)**



(b) Connect the 4 ignition coil connectors.



**2. INSTALL CYLINDER HEAD COVER NO. 2**

(a) Tighten the 2 A nuts, then the 2 B nuts.

**Torque: 7.0 N\*m (71 kgf\*cm, 62 in.\*lbf)**

**3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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