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 engine cover No.1 (See page EM-61).
(2) Remove the intake air surge tank.
(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 4 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 does not occur, do the following test (See procedure "A").
(9) Using a 16 mm plug wrench, install the spark plugs.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
(10) Install the ignition coils.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
(11) Install the engine cover No. 1.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

(c) Spark test (Procedure "A")
(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 spark test on each ignition coil with igniter.
1. Replace ignition coil with igniter with a normal one.
2. Perform spark test again.

IG

Result:

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

(4) Check resistance of camshaft position sensor.

Standard resistance

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

Result:

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

(5) Check resistance of crankshaft position sensor.

Standard resistance

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

Result:

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

(6) Check IGT signal from ECM

Result:

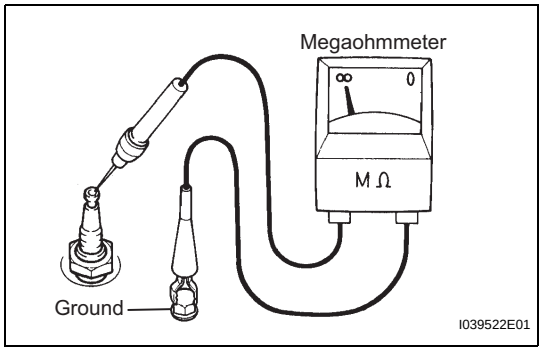
Result	Proceed to
NG	Check ECM
OK	Repair wiring between ignition coil and ECM.

INSPECTION

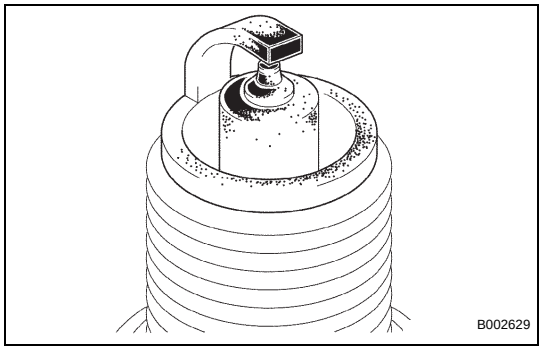
NOTICE:
In the following section, the terms "cold " and "hot" refer to the temperature of the coils. "Cold" means approximately -10°C (14°F) to 50°C (122°F). "Hot" means approximately 50°C (122°F) to 100°C (212°F).

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.**



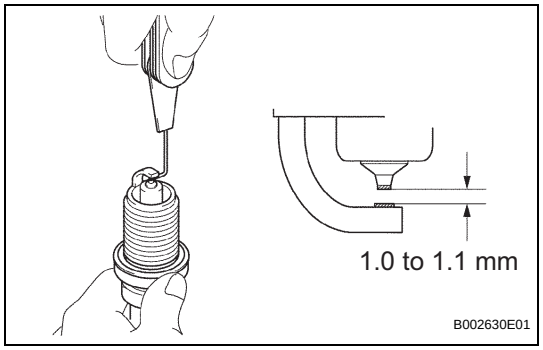
(a) Check the electrode.
  (1) Using a megaohmmeter, measure the insulation resistance.
  Correct insulation resistance:
  10 MΩ or more
  If the resistance is less than the specified value, proceed to step (d).
  HINT:
  If the megaohmmeter is not available, do the following simple inspection instead.



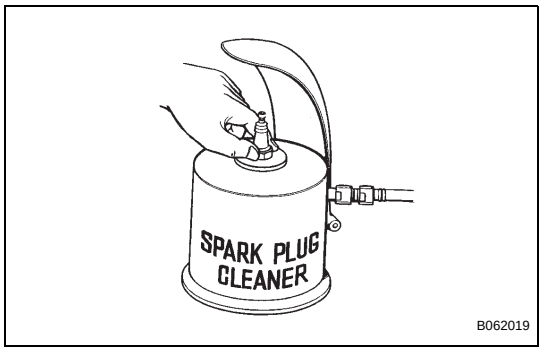
(b) Alternative inspection method:
  (1) Quickly accelerate the engine to 4,000 rpm 5 times.
  (2) Remove the spark plug.
  (3) Visually check the spark plug.
  (4) If the electrode is dry, the spark plug is functioning. Proceed to step 2.
  (5) If the electrode is damp, proceed to step (c), (d) and (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



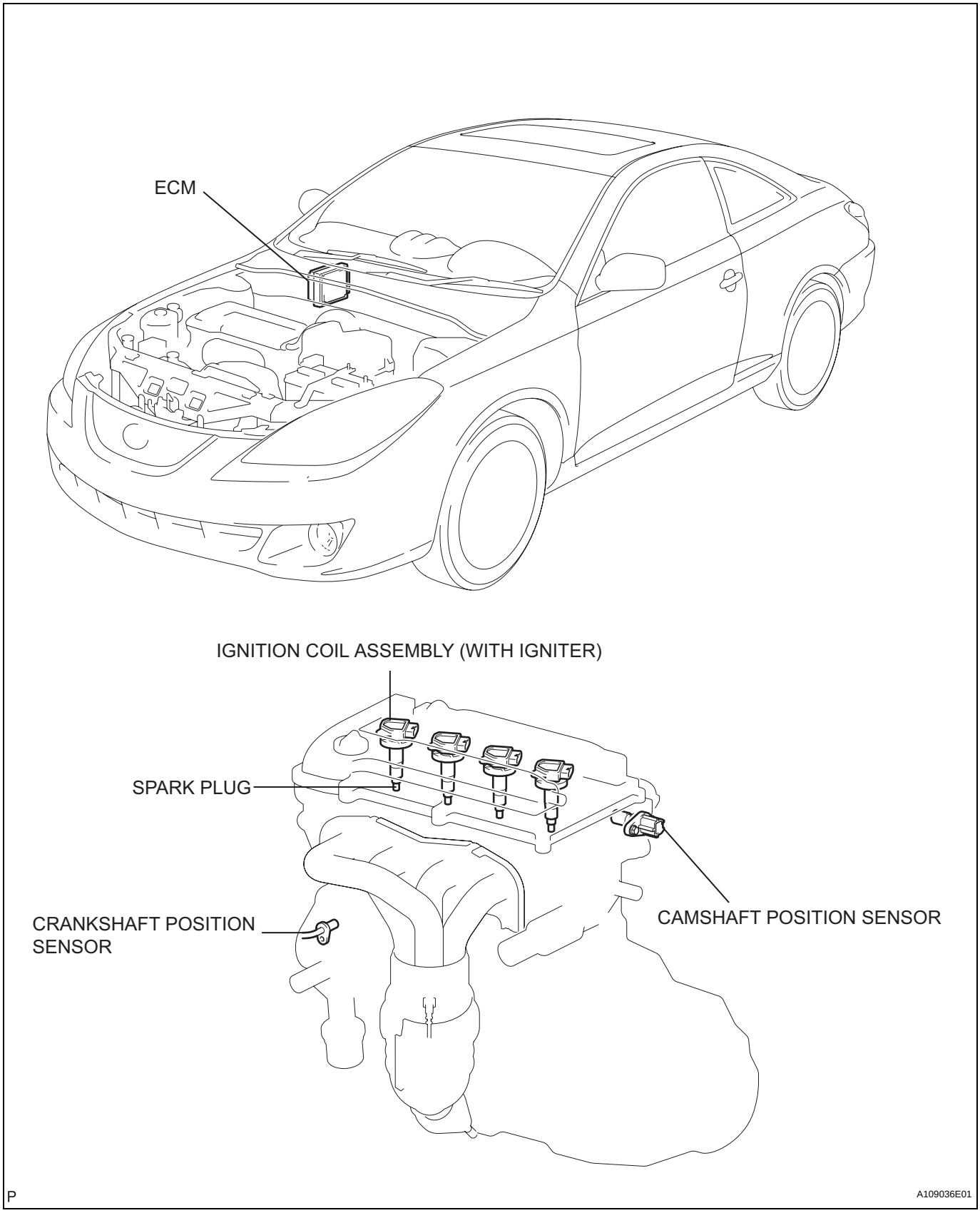
(d) Check the spark plug electrode gap.
  Maximum electrode gap for used spark plug:
  1.3 mm (0.051 in.)
  If the gap is greater than the maximum, replace the spark plug.
  Correct electrode gap for new spark plug:
  1.0 to 1.1 mm (0.039 to 0.043 in.)
  NOTICE:
  If adjusting the gap of a new spark 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.

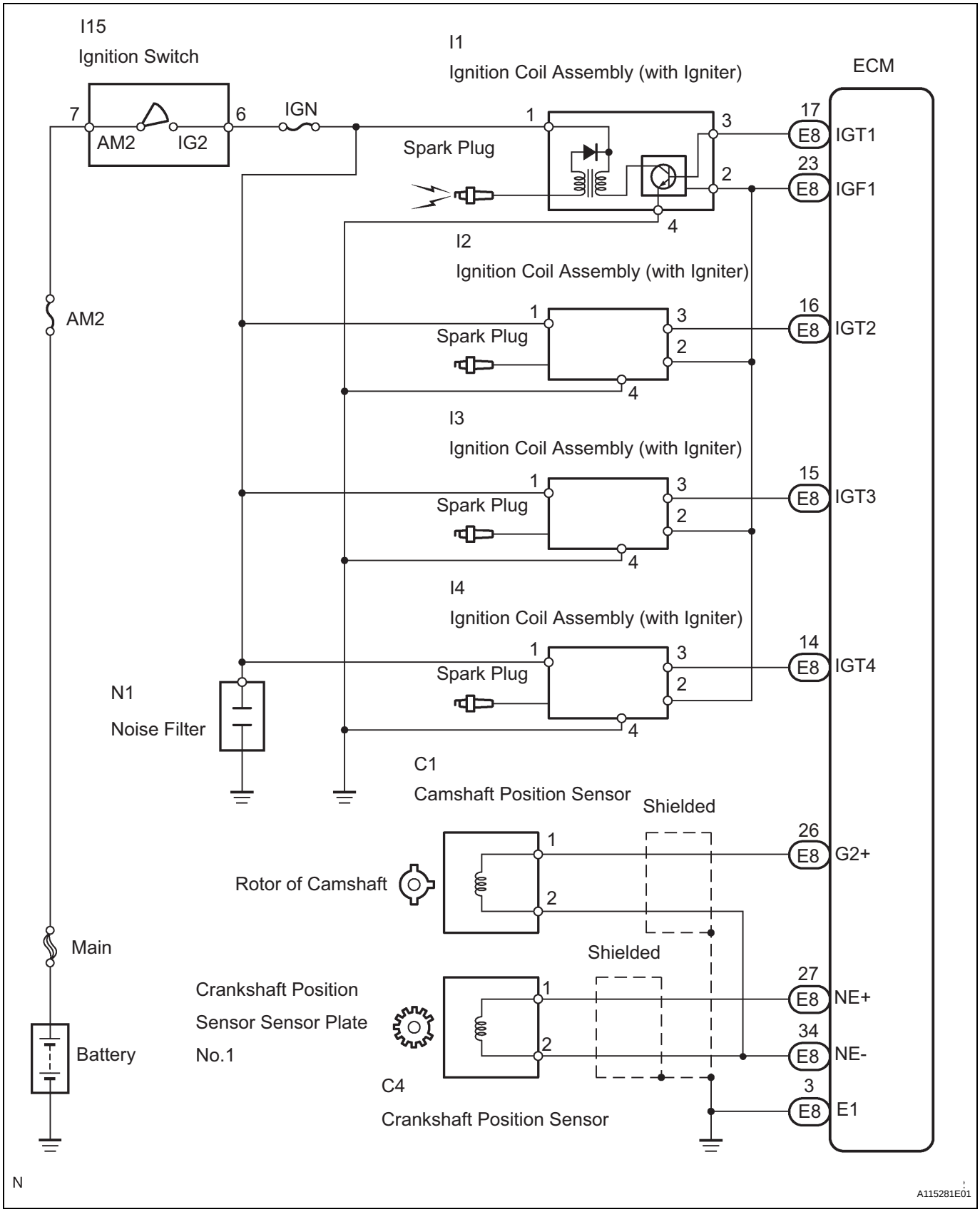
IGNITION SYSTEM

PARTS LOCATION



SYSTEM DIAGRAM

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



IG