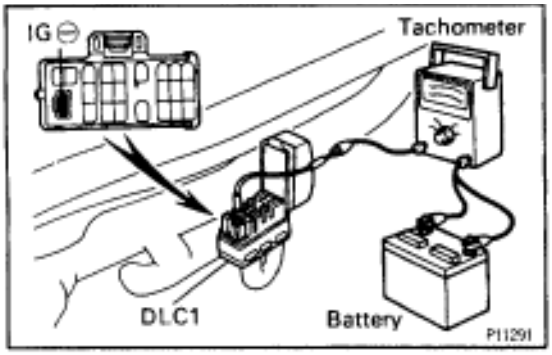
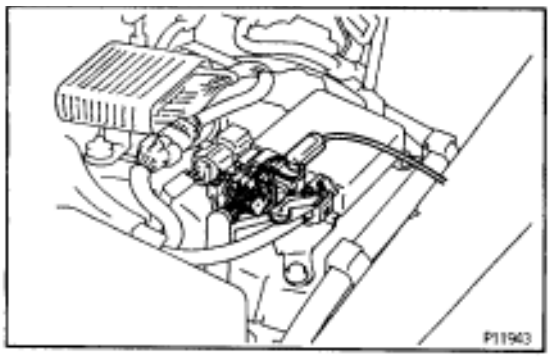


(2JZ–GTE)

PRECAUTION

1. **With a tachometer connected to the system, connect the tester probe of the tachometer to terminal IG⊖ of the DLC1.**



2. **With a timing light connected to the system, connect the tester probe to the green wire of the igniter**
3. **As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.**
4. **Never allow the tachometer terminals to touch ground as it could result in damage to the igniter and/or ignition coil.**
5. **Do not disconnect the battery while the engine is running.**
6. **Check that the igniter is properly grounded to the body.**

PREPARATION

SST(SPECIAL SERVICE TOOLS)

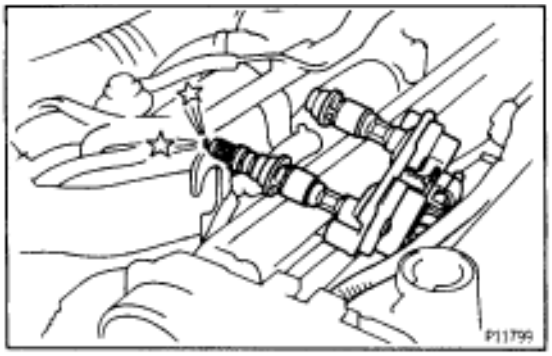
	09240–00020 Wire Gauge Set	

RECOMMENDED TOOLS

	09082–00050 TOYOTA Electrical Tester Set ◆	
	09200–00010 Engine Adjust Kit ◆	

EQUIPMENT

Megger insulation resistance meter	Spark plug
Spark plug cleaner	
Thermometer	



ON–VEHICLE INSPECTION

SPARK TEST

CHECK THAT SPARK OCCURS

(a) Remove the ignition coil. (See ignition coil removal)
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil, and connect the ignition coil connecter.
(d) Ground the spark plug.
(e) Check if spark occurs while engine is being cranked.
HINT: To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 1–2 seconds at time.
If the spark does not occur, do the test as follows:

SPARK TEST

↓ NO

CHECK CONNECTION OF IGNITION COIL, IGNITER → BAD → Connect securely.

↓ OK

CHECK POWER SUPPLY TO IGNITION COIL AND IGNITER
1. Turn ignition switch to ON.
2. Check that there is battery voltage at ignition coil positive (+) terminal.

→ BAD → Check wiring between ignition switch to ignition coil and igniter.

↓ OK

CHECK RESISTANCE OF IGNITION COIL (See page IG–23)

Resistance:	Cold	Hot
Primary	0.54 – 0.84 Ω	0.68 – 0.98 Ω

→ BAD → Replace the ignition coil.

↓ OK

CHECK RESISTANCE OF CAMSHAFT AND CRANKSHAFT POSITION SENSOR (See page IG–24)

Resistance:	Cold	Hot
NIPPONDENSO	835 – 1,400 Ω	1,060 – 1,645 Ω
AISAN	985 – 1,600 Ω	1,265 – 1,890 Ω

→ BAD → Replace the camshaft and crankshaft position sensor.

↓ OK

CHECK IGT SIGNAL FROM ECM (See page EG–519)

→ BAD → Check wiring between ECM,and igniter, and then try another ECM.

↓ OK

TRY ANOTHER IGNITER

ADJUST IGNITION TIMING

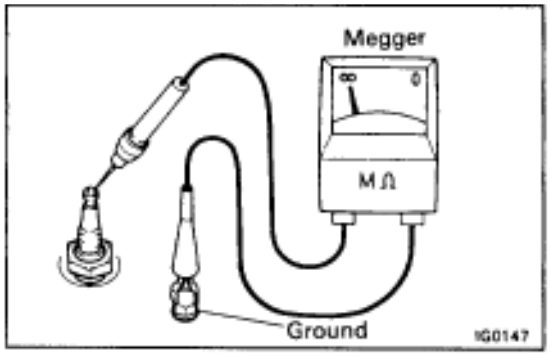
(See ignition timing inspection and adjustment)

SPARK PLUGS INSPECTION

NOTICE:

- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on used a spark plug.**
- **Spark plugs should be replaced every 100,000 km (60,000 miles).**

1. REMOVE IGNITION COILS ASSEMBLIES
(See ignition coils removal)



2. INSPECT ELECTRODE

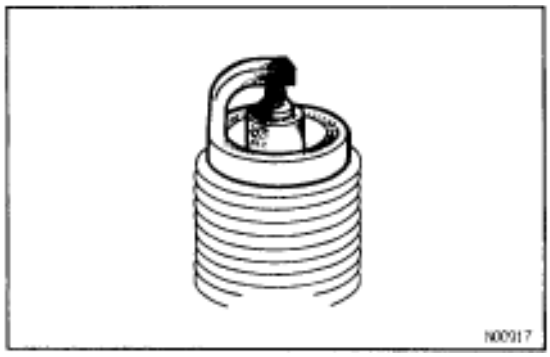
Using a megger (insulation resistance meter), measure the insulation resistance.

Standard correct insulation resistance:

10 M Ω or more

If the resistance is less than specified, proceed to step 4.

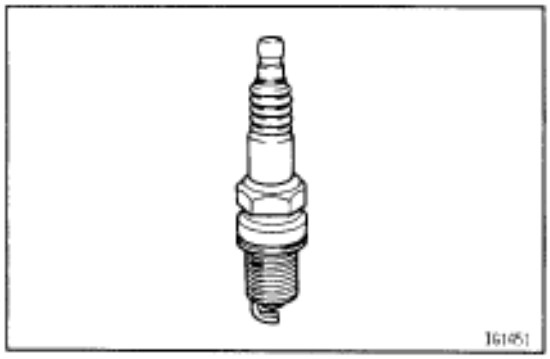
HINT: If a megger is not available, the following simple method of inspection provides fairly accurate results.



Simple Method:

(a) Quickly race the engine 5 times to 4,000 rpm.
(b) Remove the spark plug.
(c) Visually check the spark plug.
If the electrode is dry...OK
If the electrode is wet...Proceed to step 4
(d) Reinstall the spark plug.

3. REMOVE SPARK PLUGS



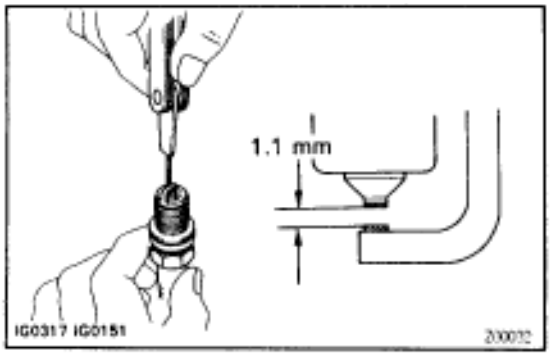
4. VISUALLY INSPECT SPARK PLUGS

Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

ND
PK20R11
NGK
BKR6EP11



5. INSPECT ELECTRODE GAP

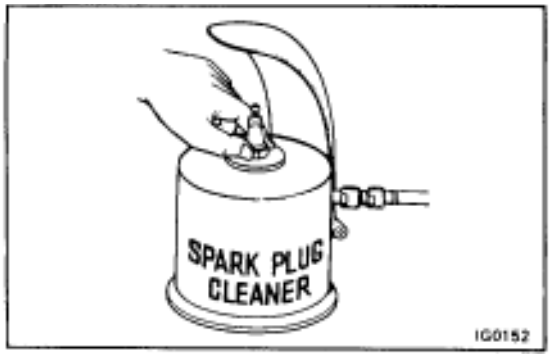
Maximum electrode gap for used spark plug:

1.3 mm (0.051 in.)

Correct electrode gap for new spark plug:

1.1 mm (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 the used plug.



6. CLEAN SPARK PLUGS

If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

Air pressure:

Below 588 kPa (6 kgf/cm^2, 85 psi)

Duration:

20 seconds or less

HINT: If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

7. REINSTALL SPARK PLUGS

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

8. REINSTALL IGNITION COILS ASSEMBLIES

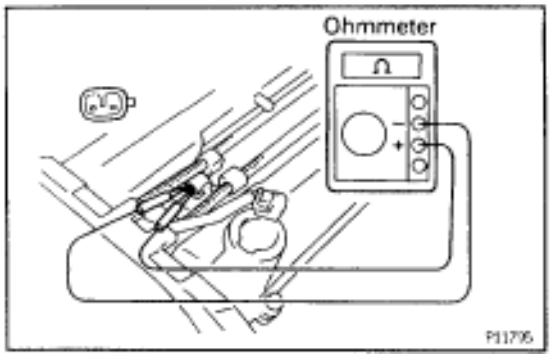
(See ignition coils installation)

IGNITION COIL INSPECTION

NOTICE: ”Cold” and ”Hot” in the following sentences express 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).

1. REMOVE NO.3 TIMING BELT COVER

2. DISCONNECT IGNITION COIL CONNECTORS



3. INSPECT PRIMARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between the positive (+) and negative (–) terminals.

Primary coil resistance:

Cold

0.54 – 0.84 Ω

Hot

0.68 – 0.98 Ω

If the resistance is not as specified, replace the ignition coil.

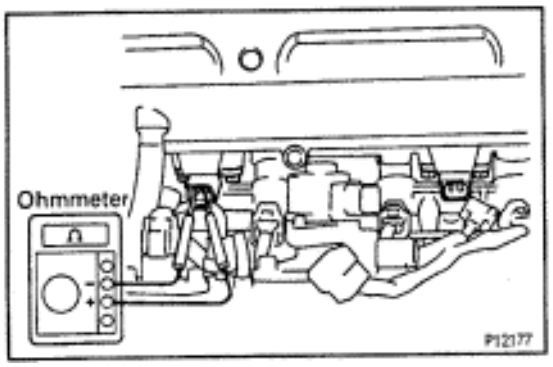
4. RECONNECT IGNITION COIL CONNECTORS

5. REINSTALL NO.3 TIMING BELT COVER

CAMSHAFT POSITION SENSORS INSPECTION

NOTICE: ”Cold” and ”Hot” in the following sentences express the temperature of the sensors 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).

1. DISCONNECT CAMSHAFT POSITION SENSOR CONNECTORS



2. INSPECT CAMSHAFT POSITION SENSOR RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold

NIPPONDENSO

835–1,400 Ω

AISAN

985–1,600 Ω

Hot

NIPPONDENSO

1,060–1,645 Ω

AISAN

1,265–1,890 Ω

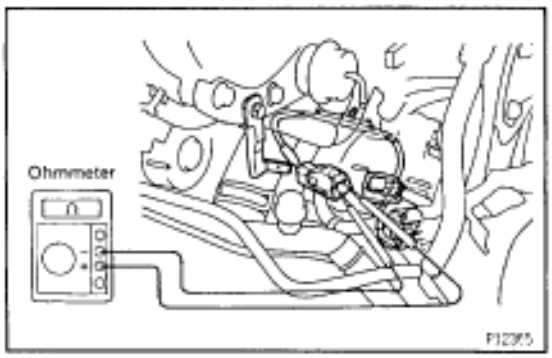
If the resistance is not as specified, replace the camshaft position sensor.

3. RECONNECT CAMSHAFT POSITION SENSOR CONNECTORS

CRANKSHAFT POSITION SENSOR INSPECTION

NOTICE: ”Cold” and ”Hot” in the following sentences express the temperature of the sensors 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).

1. **REMOVE NO.2 AIR TUBE FOR CAC**
2. **DISCONNECT CRANKSHAFT POSITION SENSOR CONNECTOR**
3. **INSPECT CRANKSHAFT POSITION SENSOR RESISTANCE**



Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold

NIPPONDENSO

835–1,400 Ω

AISAN

985–1,600 Ω

Hot

NIPPONDENSO

1,060–1,645 Ω

AISAN

1,265–1,890 Ω

If the resistance is not as specified, replace the crankshaft position sensor.

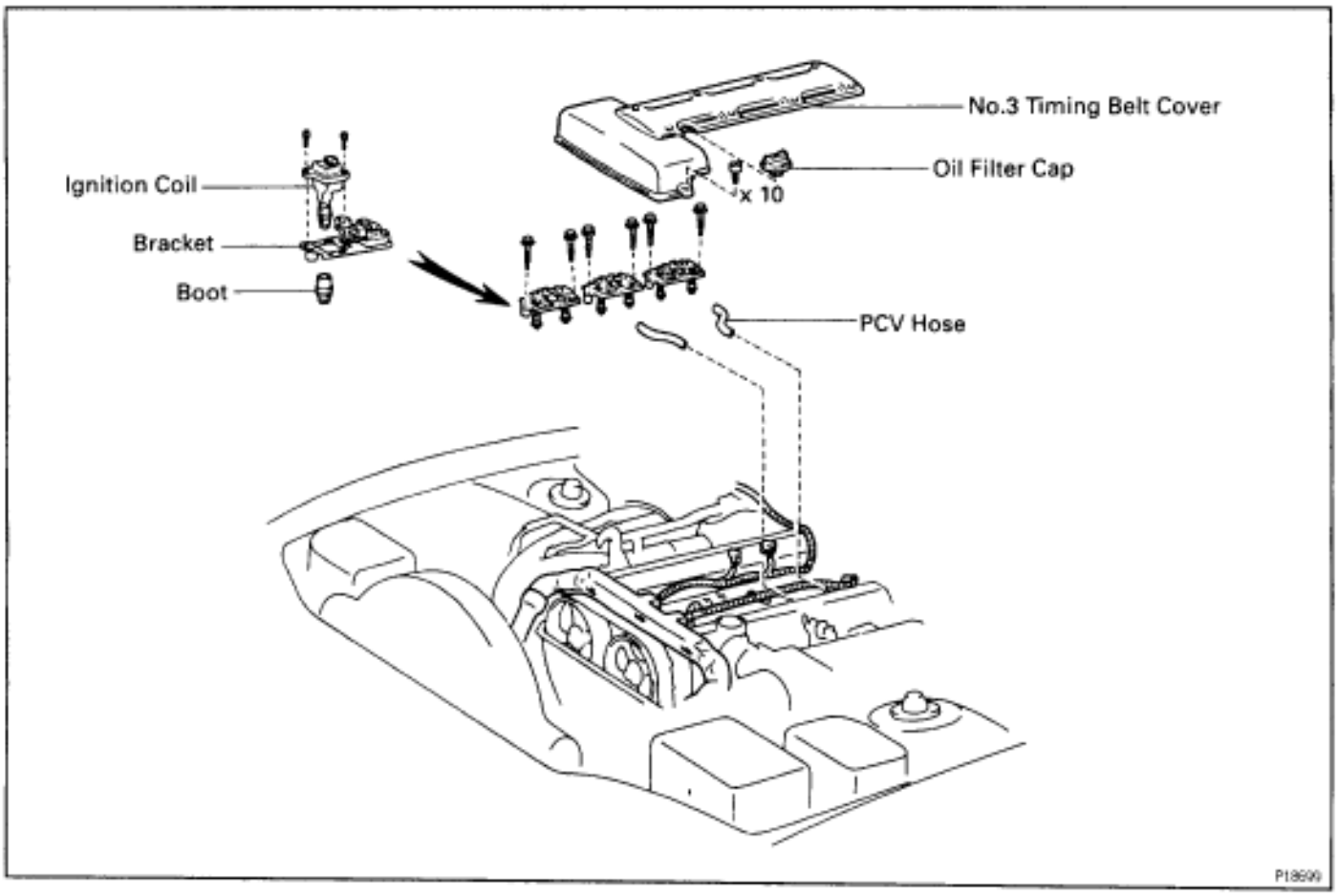
4. **RECONNECT CRANKSHAFT POSITION SENSOR CONNECTOR**
5. **REINSTALL NO.2 AIR TUBE FOR CAC**

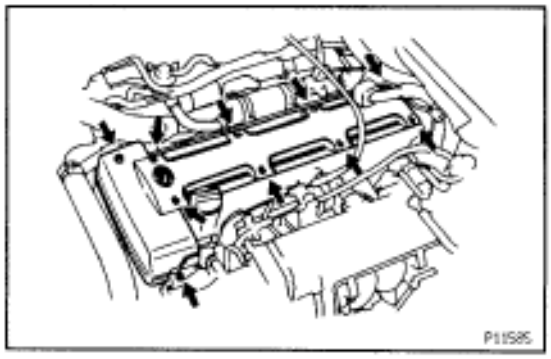
IGNITER INSPECTION

(See procedure Spark Test on page IG–22)

IGNITION COIL

COMPONENTS FOR REMOVAL AND INSTALLATION





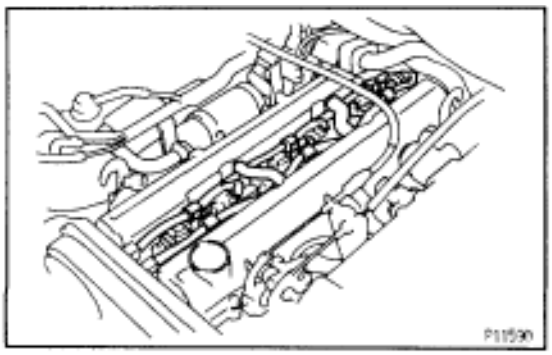
IGNITION COILS REMOVAL

Installation is in the reverse order of removal.

1. REMOVE NO.3 TIMING BELT COVER

(a) Remove the oil filler cap.

(b) Using a 5 mm hexagon wrench, remove the 10 bolts, belt cover and gasket.



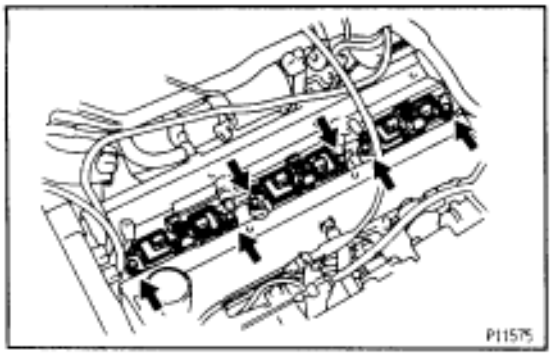
2. REMOVE PCV HOSES

Remove the 2 PCV hoses.

3. DISCONNECT IGNITION COIL CONNECTORS

(a) Disconnect the engine wire from the 6 clamps on the ignition coils.

(b) Disconnect the 6 ignition coil connectors.



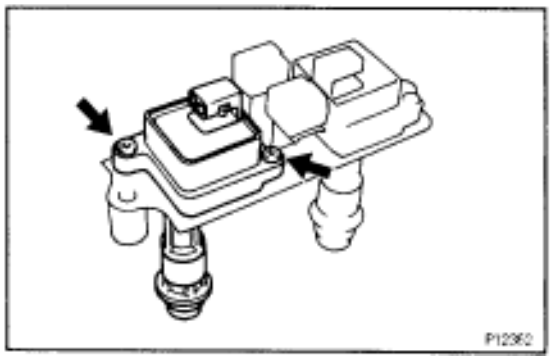
4. REMOVE BRACKET IGNITION COILS ASSEMBLIES

Remove the 2 bolts and 2 ignition coils assembly.

Torque:

Bracket to cylinder head cover

8.8 N·m (90 kgf·cm, 78 in.·lbf)

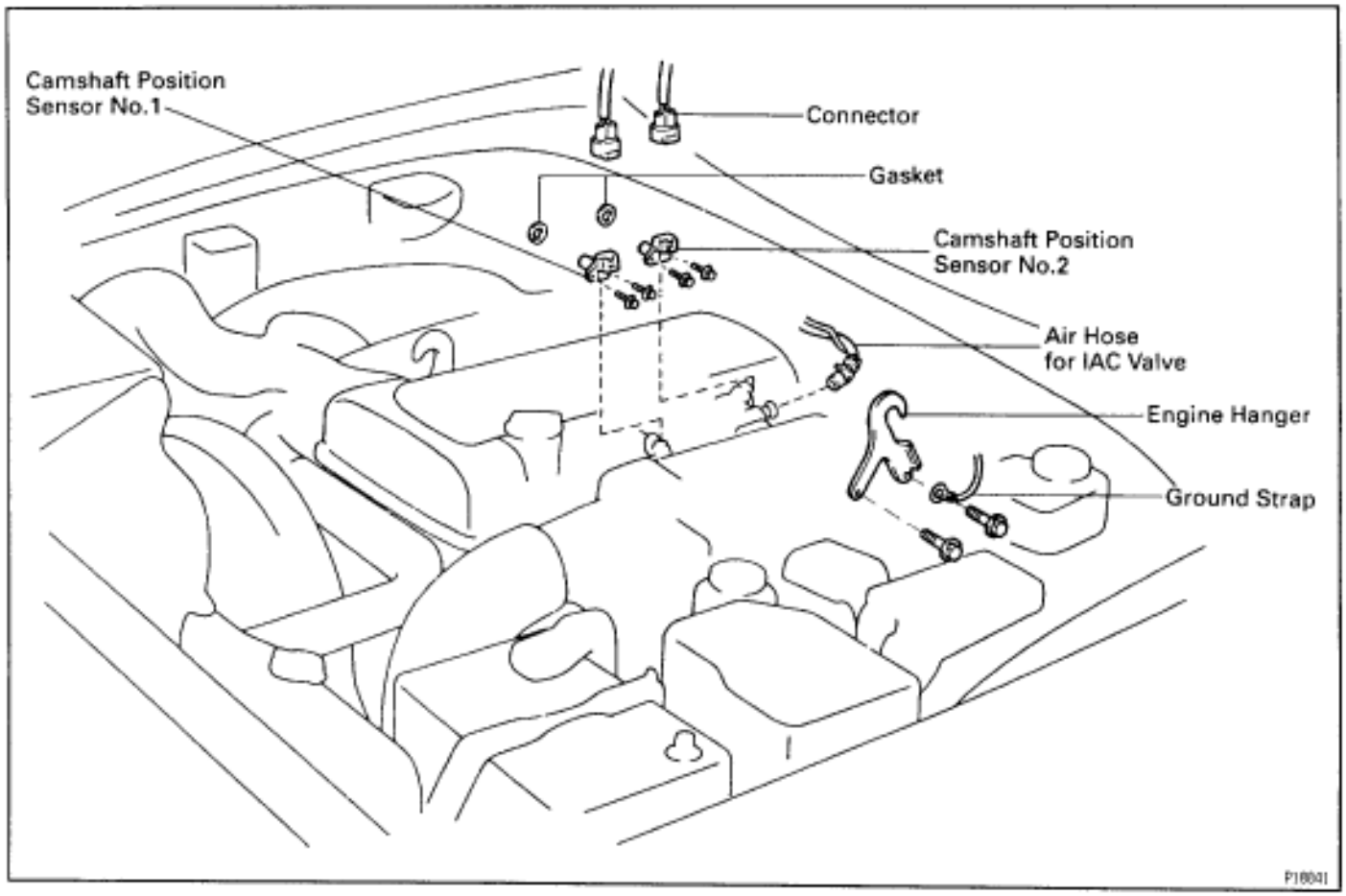


5. REMOVE IGNITION COILS FROM BRACKET

(a) Remove the rubber boot from the ignition coil.

(b) Remove the 2 screws and ignition coil.

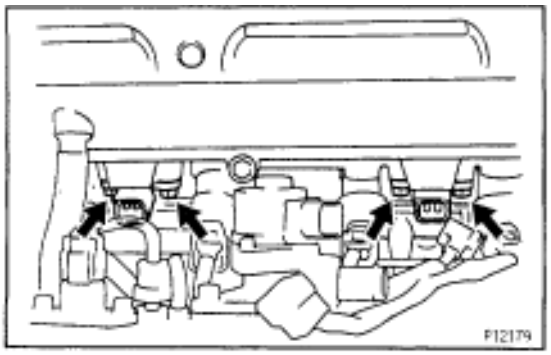
CAMSHAFT POSITION SENSOR
COMPONENTS FOR REMOVAL AND INSTALLATION



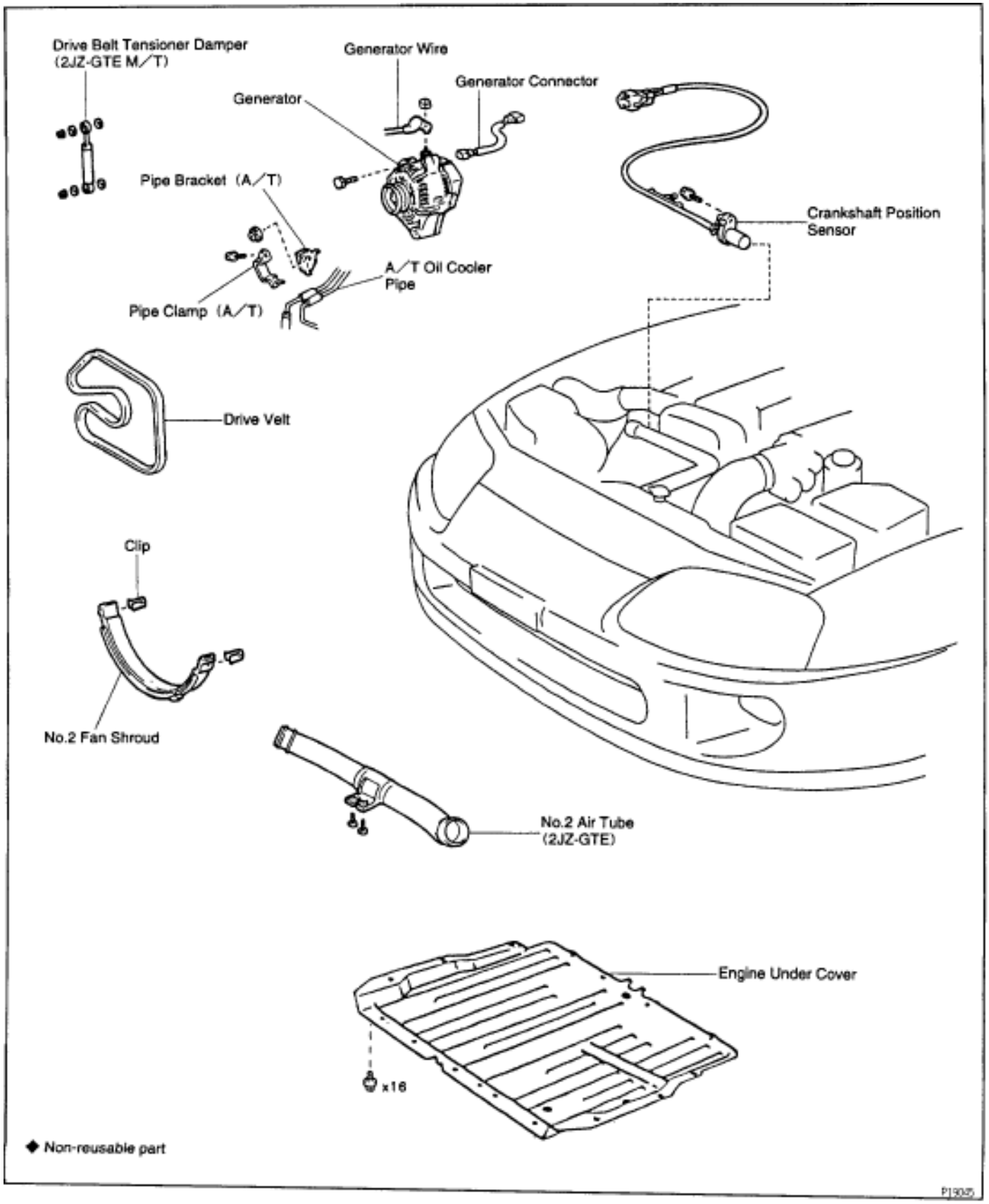
CAMSHAFT POSITION SENSOR REMOVAL

Installation is in the reverse order of removal.

1. **DISCONNECT IAC VALVE CONNECTOR**
2. **DISCONNECT AIR HOSE FROM IAC VALVE**
3. **REMOVE ENGINE HANGER**
   Remove the 2 bolts, ground strap and engine hanger.
   Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
4. **DISCONNECT CAMSHAFT POSITION SENSOR CONNECTORS**
5. **REMOVE CAMSHAFT POSITION SENSORS**
   Remove the 4 bolts, 2 camshaft position sensors and 2 gaskets.
   Torque: 6.4 N·m (65 kgf·cm, 56 in.·lbf)



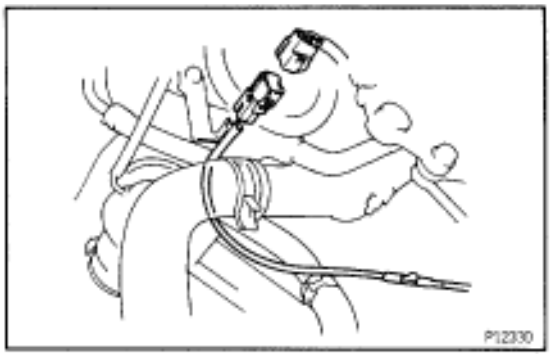
CRANKSHAFT POSITION SENSOR
COMPONENTS FOR REMOVAL AND INSTALLATION



CRANKSHAFT POSITION SENSOR REMOVAL

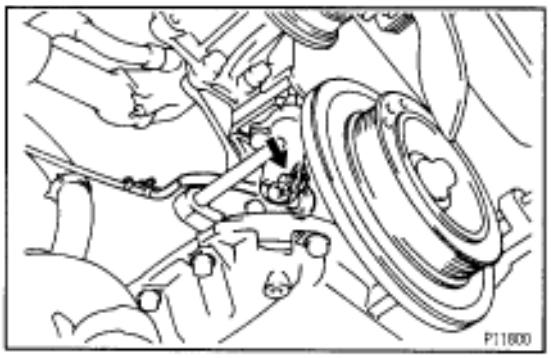
Installation is in the reverse order of removal.

1. REMOVE GENERATOR
(See generator removal in Charging System)



2. DISCONNECT CRANKSHAFT POSITION SENSOR CONNECTOR

(a) Disconnect the sensor connector from the bracket.
(b) Disconnect the sensor connector from the wiring connector.



3. REMOVE CRANKSHAFT POSITION SENSOR

(a) Disconnect the wire clamp from the cylinder block.
(b) Remove the bolt and crankshaft position sensor.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

SERVICE SPECIFICATIONS

SERVICE DATA

Firing order	–		1 – 5 – 3 – 6 – 2 – 4
Spark plug	Recommended spark plug	ND	PK20R11
		NGK	BKR6EP11
	Correct electrode gap for new plug		1.1 mm (0.043 in.)
	Maximum electrode gap for used plug		1.3 mm (0.051 in.)
Ignition coil	Primary coil resistance	at cold	0.54–0.84 Ω
		at hot	0.68–0.98 Ω
Camshaft position sensor	Resistance	at cold	835–1,400 Ω for NIPPONDENSO 985–1,600 Ω for AISAN
		at hot	1,060–1,645 Ω for NIPPONDENSO 1,265–1,890 Ω for AISAN
Crankshaft position sensor	Resistance	at cold	835–1,400 Ω for NIPPONDENSO 985–1,600 Ω for AISAN
		at hot	1,060–1,645 Ω for NIPPONDENSO 1,265–1,890 Ω for AISAN

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Ignition coil bracket x Cylinder head	8.8	90	78 in.·lbf
Ignition coil x Ignition coil bracket	2.5	35	3.4 in.·lbf
Camshaft position sensor x Cylinder head	8.8	90	78 in.·lbf
Engine hanger x Cylinder head	39	400	29
Crankshaft position sensor x Oil pump	8.8	90	78 in.·lbf