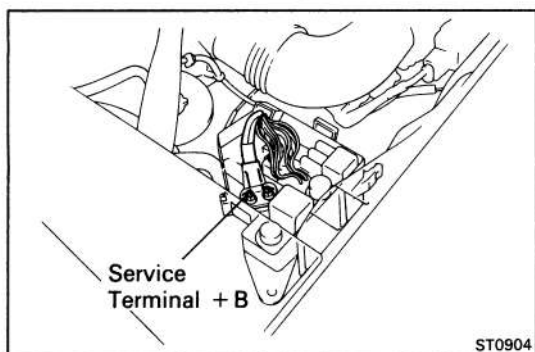
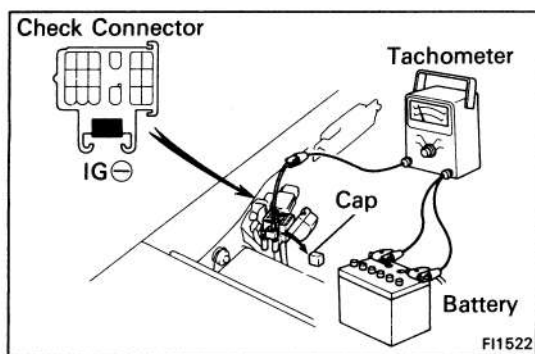


IGNITION SYSTEM

	Page
PRECAUTIONS	IG-2
TROUBLESHOOTING	IG-3
IGNITION SYSTEM CIRCUIT	IG-4
ON-VEHICLE INSPECTION (3S-GTE)	IG-5
ON-VEHICLE INSPECTION (5S-FE)	IG-10
DISTRIBUTOR (3S-GTE)	IG-14
DISTRIBUTOR (5S-FE)	IG-19



PRECAUTIONS

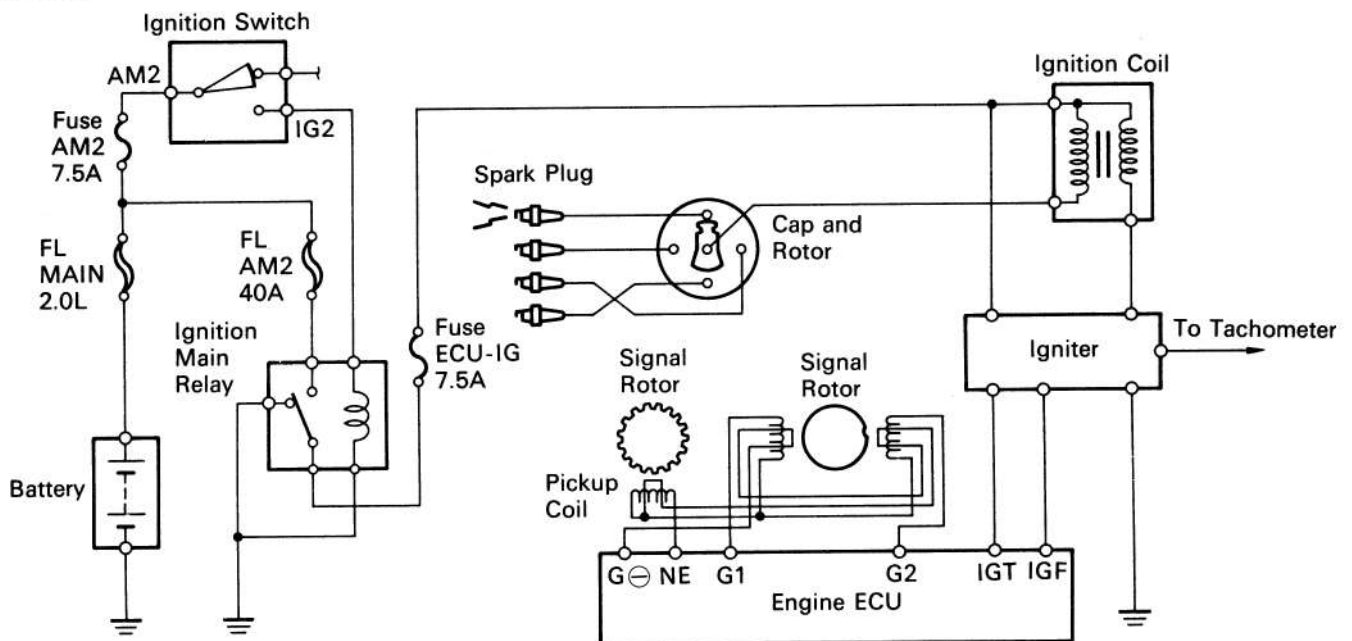
1. Do not leave the ignition switch on for more than 10 minutes if the engine will not start.
2. With a tachometer connected to the system, connect the test probe of the tachometer to terminal IG⊖ of the check connector.
3. With a tachometer connected to the system, connect the power source probe of the tachometer to service terminal +B of the engine compartment relay box.
4. As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of yours before use.
5. NEVER allow the tachometer terminal to touch ground as this could damage the igniter and/or ignition coil.
6. Do not disconnect the battery when the engine is running.
7. Check that the igniter is properly grounded to the body.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine will not start hard to start (cranks ok)	Incorrect ignition timing	Reset timing	IG-17, 22
	Ignition problems ● Ignition coil ● Igniter ● Distributor ● High-tension cords Ignition wiring disconnected or broken	Inspect coil Inspect igniter Inspect distributor Inspect high-tension cords Inspect wiring	IG-8, 12 IG-9, 13 IG-9, 13 IG-6, 11
Rough idle or stalls	Spark plug faulty	Inspect plugs	IG-6, 11
	Ignition wiring faulty Incorrect ignition timing Ignition problems ● Ignition coil ● Igniter ● Distributor ● High-tension cords	Inspect wiring Reset timing Inspect coil Inspect igniter Inspect distributor Inspect high-tension cords	 IG-17, 22 IG-8, 12 IG-9, 13 IG-9, 13 IG-6, 11
Engine hesitates/ poor acceleration	Spark plug faulty	Inspect plugs	IG-6, 11
	Ignition wiring faulty Incorrect ignition timing	Inspect wiring Reset timing	 IG-17, 22
Engine dieseling (runs after ignition) (switch is turned off)	Incorrect ignition timing	Reset timing	IG-17, 22
Muffler explosion (after fire) all the time	Incorrect ignition timing	Reset timing	IG-17, 22
Engine backfires	Incorrect ignition timing	Reset timing	IG-17, 22
Poor gasoline mileage	Spark plug faulty	Inspect plugs	IG-6, 11
	Incorrect ignition timing	Reset timing	IG-17, 22
Engine overheats	Incorrect ignition timing	Reset timing	IG-17, 22

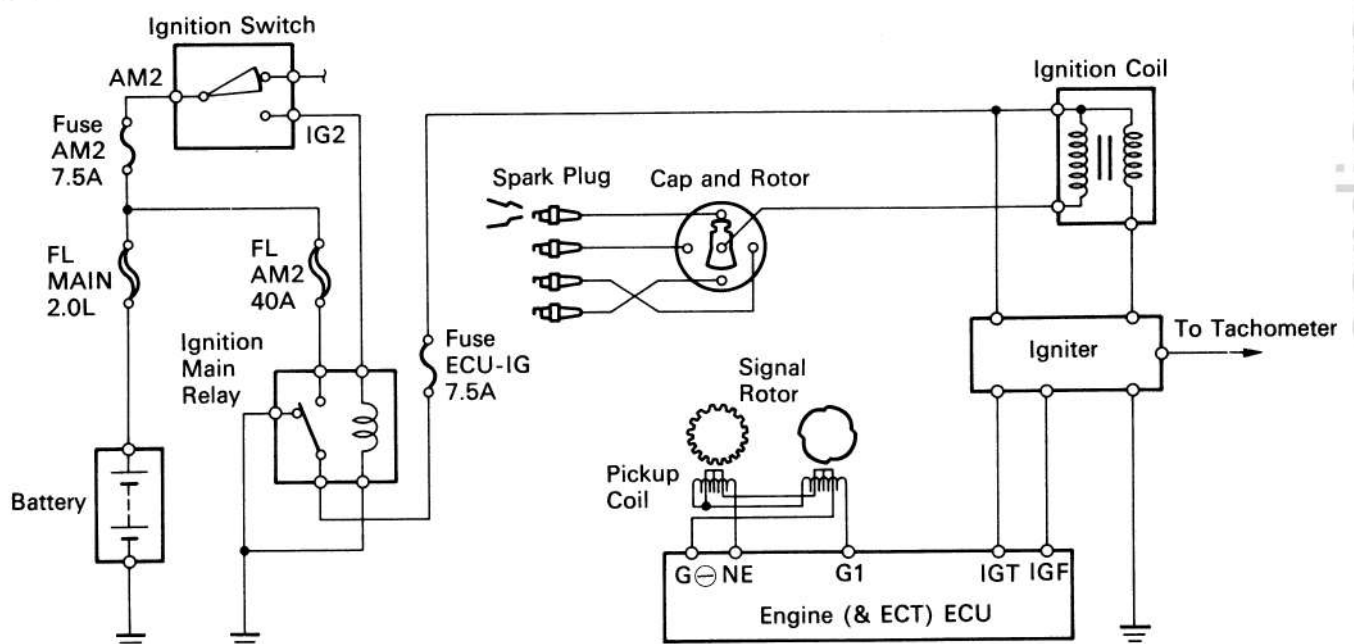
IGNITION SYSTEM CIRCUIT

3S-GTE



IG1397

5S-FE



IG1396

ELECTRONIC SPARK ADVANCE (ESA)

The ECU is programmed with data for optimum ignition timing under any and all operating conditions. Using data provided by sensors which monitor various engine functions (rpm, intake air volume, eng. temperature, etc.) the microcomputer (ECU) triggers the spark at precisely the right instant.

ON-VEHICLE INSPECTION (3S-GTE)

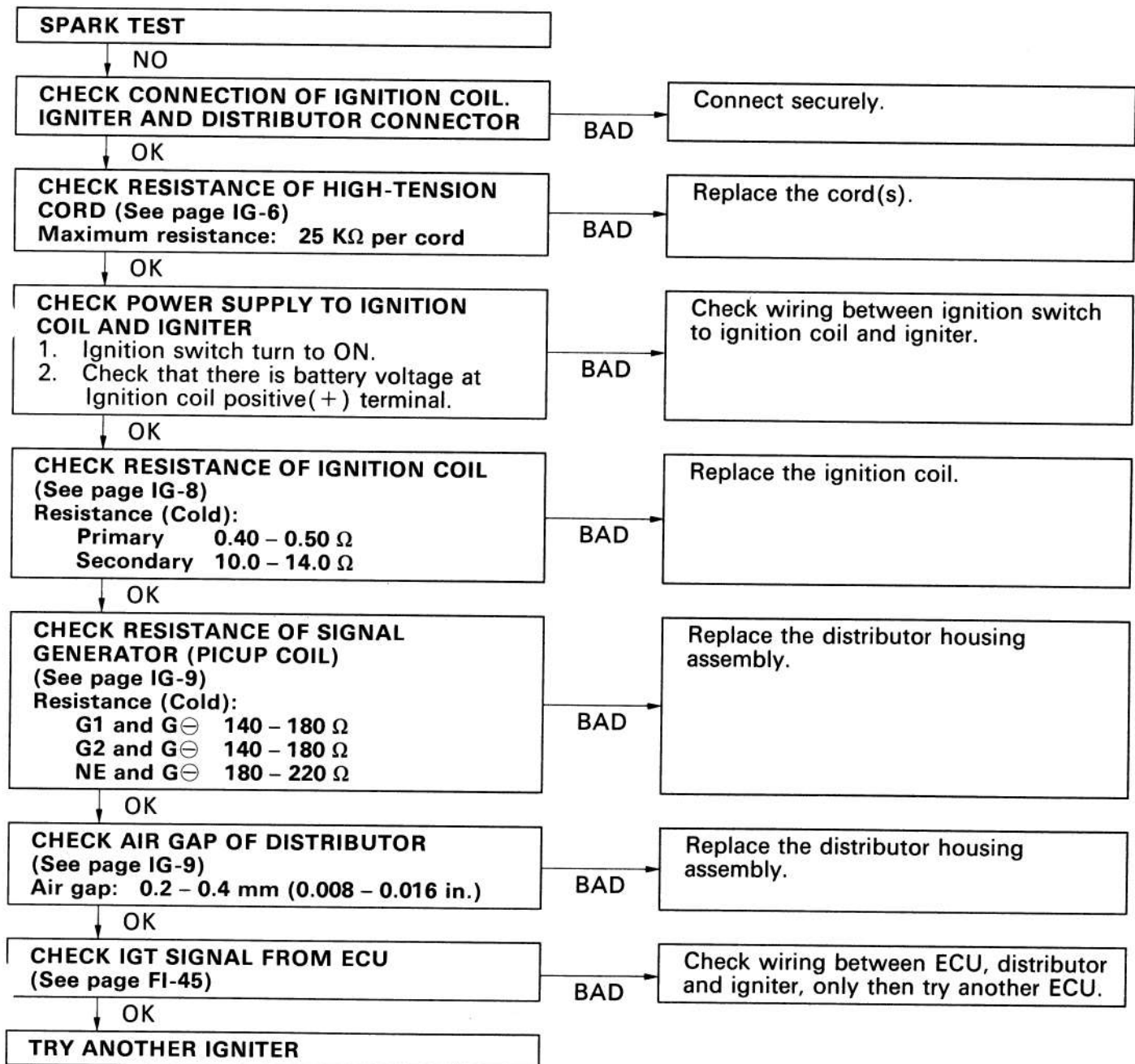
SPARK TEST

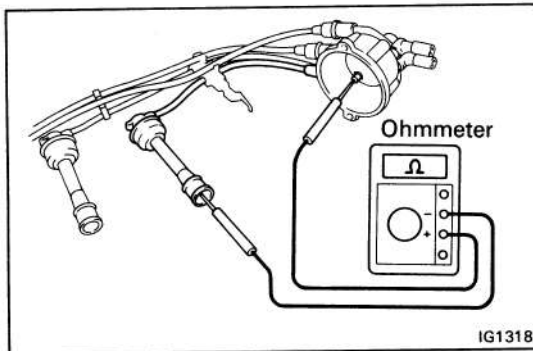
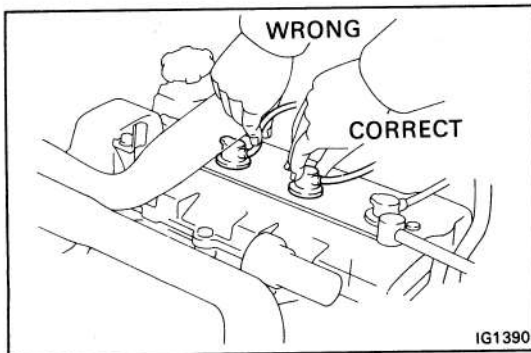
CHECK THAT SPARK OCCURS

- Disconnect the high-tension cord from the distributor.
- Hold the end about 12.5 mm (0.50 in.) from the body of car.
- 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 a time.

If the spark does not occur, perform the test as follows:





INSPECTION OF HIGH-TENSION CORDS

1. DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS

Disconnect the high-tension cords at rubber boot. DO NOT pull on the cords.

NOTICE: Pulling on or bending the cords may damage the conductor inside.

2. DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL (See step 3 on pages IG-14 and 15)

3. REMOVE DISTRIBUTOR CAP WITHOUT DISCONNECTING HIGH-TENSION CORDS

4. INSPECT HIGH-TENSION CORD RESISTANCE

Using an ohmmeter, measure the resistance without disconnecting the distributor cap.

Maximum resistance: 25 k Ω per cord

If the resistance is greater than maximum, check the terminals. If necessary, replace the high-tension cord and/or distributor cap.

5. REINSTALL DISTRIBUTOR CAP

6. RECONNECT HIGH-TENSION CORD TO IGNITION COIL (See step 5 on pages IG-16 and 17)

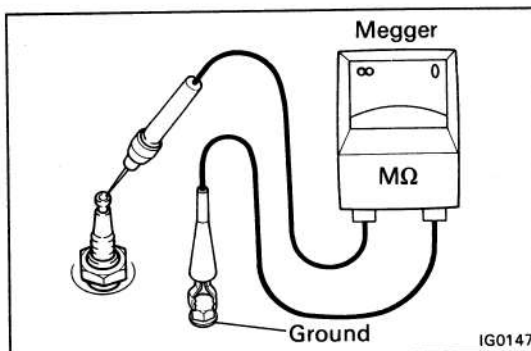
7. RECONNECT HIGH-TENSION CORDS TO SPARK PLUGS

INSPECTION OF SPARK PLUGS

NOTICE:

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

1. DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS



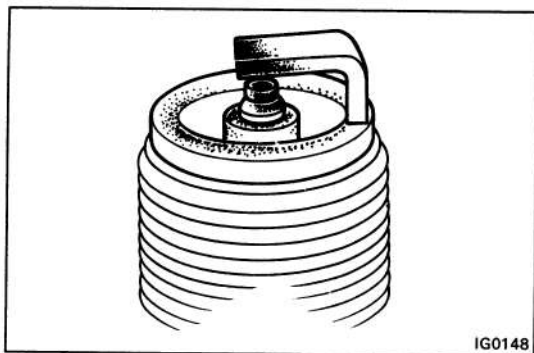
2. INSPECT ELECTRODE

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

Correct insulation resistance: 10 M Ω or more

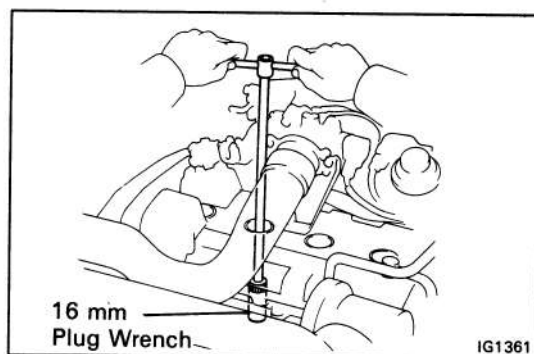
If the resistance is less than specified, proceed to step 4.

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



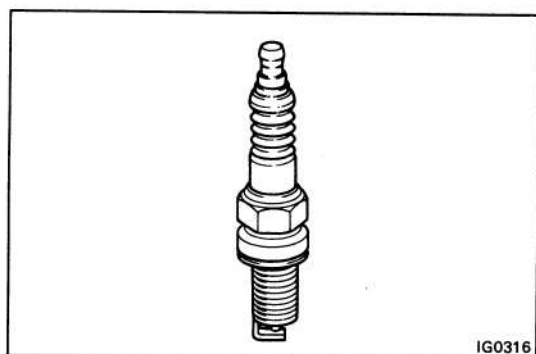
(Simple Method)

- (a) Quickly race the engine to 4,000 rpm five times.
- (b) Remove the spark plug. (See step 3)
- (c) Visually check the spark plug.
If the electrode is dry . . . Okey
If the electrode is wet . . . Proceed to step 3
- (d) Reinstall the spark plug.
(See step 7 on page IG-8)



3. REMOVE SPARK PLUGS

Using a 16 mm plug wrench, remove the spark plug.

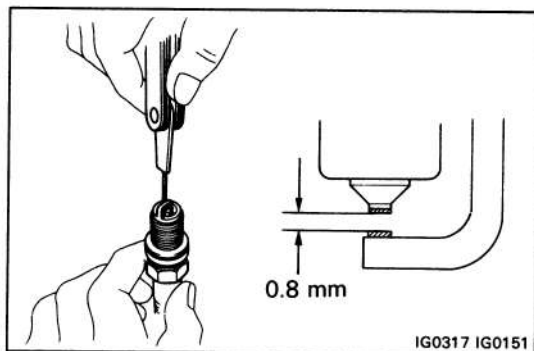


4. VISUALLY INSPECT SPARK PLUGS

Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

**Recommended spark plug: ND PK20R8
NGK BKR6EP8**



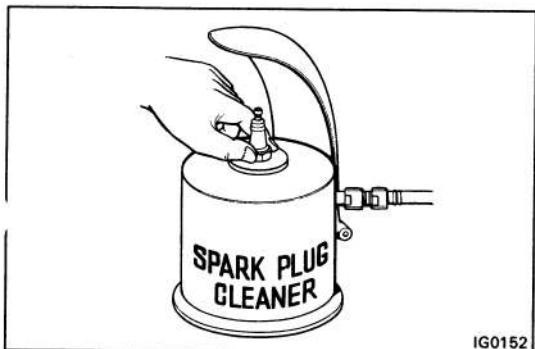
5. INSPECT ELECTRODE GAP

Maximum electrode gap: 1.0 mm (0.39 in.)

If the gap is greater than maximum, replace the spark plug.

**Correct electrode gap of new spark plug:
0.8 mm (0.31 in.)**

NOTICE: If adjusting the gap of a new spark plug, bent only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on the used plug.



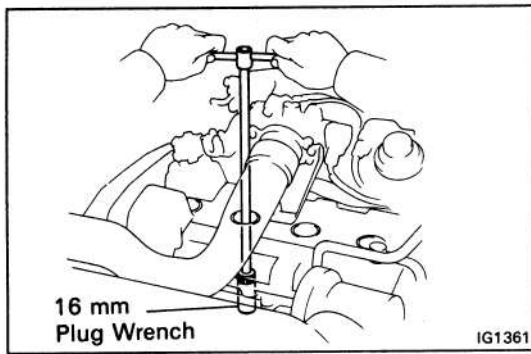
6. CLEAN SPARK PLUGS

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

Air pressure: Below 6 kg/cm² (85 psi, 588 kPa)

Duration: 20 seconds or less

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



7. INSTALL SPARK PLUGS

Using a 16 mm plug wrench, install the spark plug.

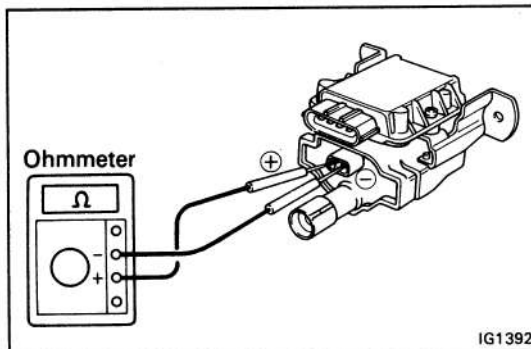
Torque: 180 kg-cm (13 ft-lb, 18 N·m)

8. RECONNECT HIGH-TENSION CORDS TO SPARK PLUGS

INSPECTION OF IGNITION COIL

1. DISCONNECT IGNITION COIL CONNECTOR

2. DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL (See step 3 on pages IG-14 and 15)

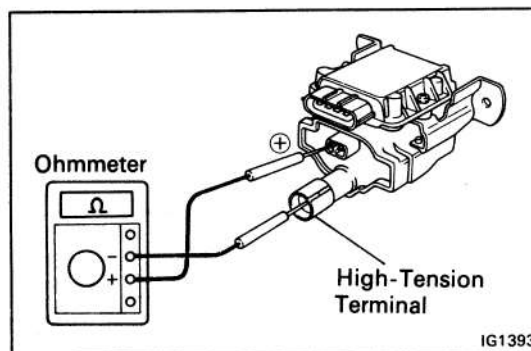


3. INSPECT PRIMARY COIL RESISTANCE

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

Primary coil resistance (Cold): 0.41 – 0.50 Ω

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



4. INSPECT SECONDARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between positive (+) and high-tension terminals

Secondary coil resistance (Cold): 10.0 – 14.0 kΩ

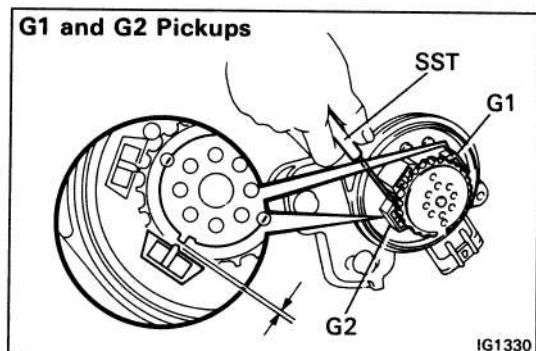
If the resistance is not as specified, replace the ignition coil.

5. RECONNECT HIGH-TENSION CORD TO IGNITION COIL (See step 5 on pages IG-16 and 17)

6. RECONNECT IGNITION COIL CONNECTOR

INSPECTION OF DISTRIBUTOR

1. DISCONNECT DISTRIBUTOR CONNECTOR
2. REMOVE DISTRIBUTOR CAP
3. REMOVE ROTOR



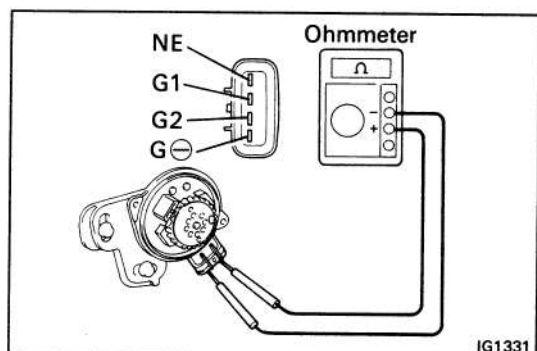
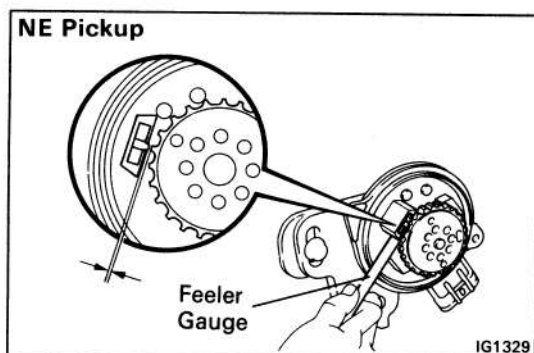
4. INSPECT AIR GAP

Using SST (G1 and G2 pickups) and a feeler gauge (NE pickup), measure the air gap between the signal rotor and pickup coil projection.

SST 09240-00020 for G1 and G2 pickups

Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)

If the air gap is not as specified, replace the distributor housing assembly.



5. INSPECT SIGNAL GENERATOR (PICKUP COIL) RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Pickup coil resistance (Cold):

G1 and G⁻ 140 – 180 Ω

G2 and G⁻ 140 – 180 Ω

NE and G⁻ 180 – 220 Ω

If the resistance is not as specified, replace the distributor housing assembly.

6. REINSTALL ROTOR
7. REINSTALL DISTRIBUTOR CAP
8. RECONNECT DISTRIBUTOR CONNECTOR

INSPECTION OF IGNITER

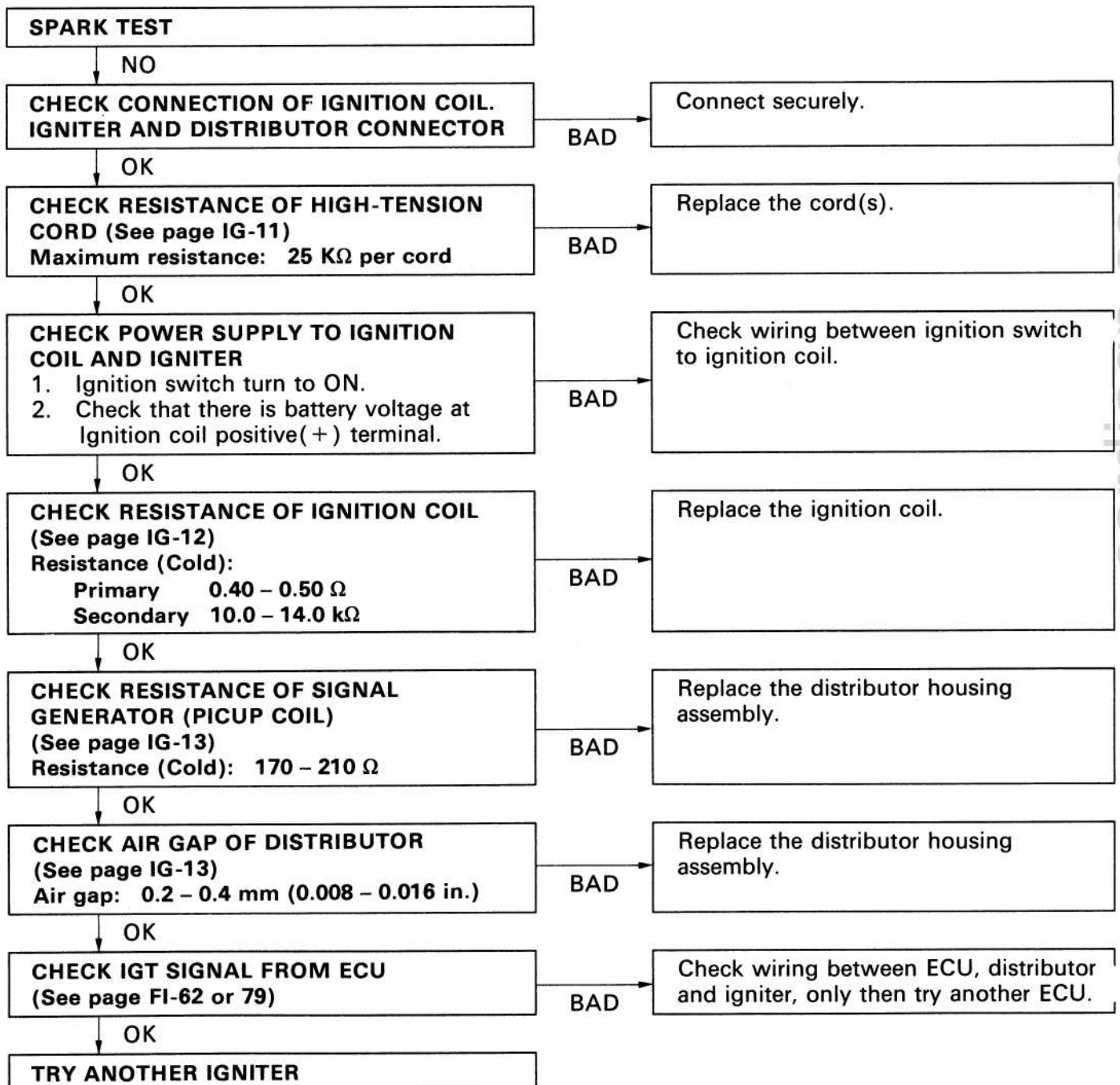
(See procedure Spark Test on page IG-5)

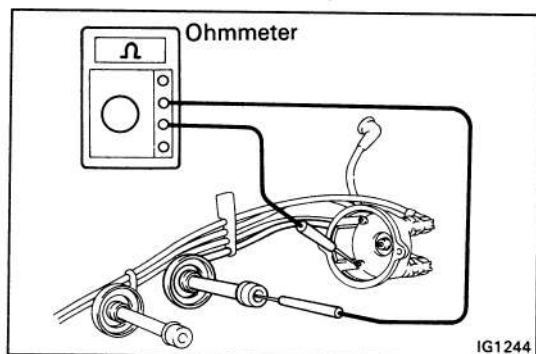
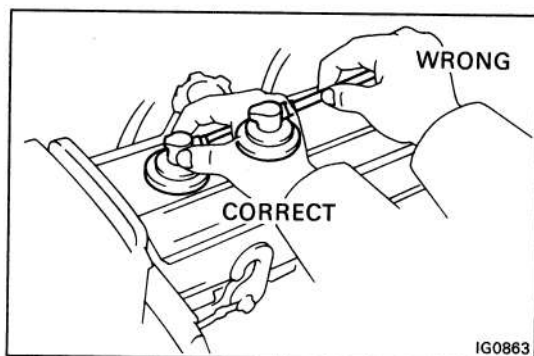
ON-VEHICLE INSPECTION (5S-FE)**SPARK TEST****CHECK THAT SPARK OCCURS**

- (a) Disconnect the high-tension cord from the distributor.
- (b) Hold the end about 12.5 mm (0.50 in.) from the body of car.
- (c) 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 a time.

If the spark does not occur, perform the test as follows:





INSPECTION OF HIGH-TENSION CORDS

1. DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS

Disconnect the high-tension cords at rubber boot. DO NOT pull on the cords.

NOTICE: Pulling on or bending the cords may damage the conductor inside.

2. DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL (See procedure step 3 on pages IG-14 and 15)

3. REMOVE DISTRIBUTOR CAP WITHOUT DISCONNECTING HIGH-TENSION CORDS

4. INSPECT HIGH-TENSION CORD RESISTANCE

Using an ohmmeter, measure the resistance without disconnecting the distributor cap.

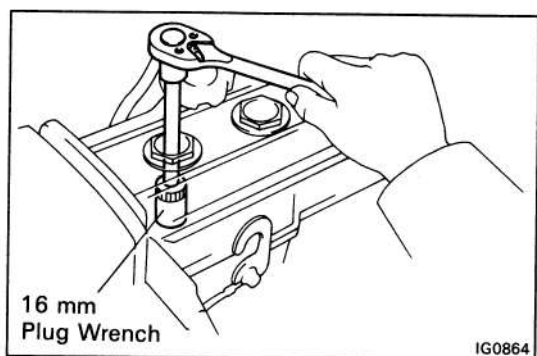
Maximum resistance: 25 k Ω per cord

If the resistance is greater than maximum, check the terminals. If necessary, replace the high-tension cord and/or distributor cap.

5. REINSTALL DISTRIBUTOR CAP

6. RECONNECT HIGH-TENSION CORD TO IGNITION COIL (See procedure step 5 on pages IG-16 and 17)

7. RECONNECT HIGH-TENSION CORDS TO SPARK PLUGS



INSPECTION OF SPARK PLUGS

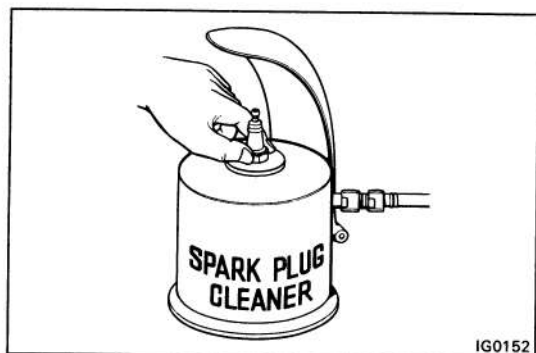
1. DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS

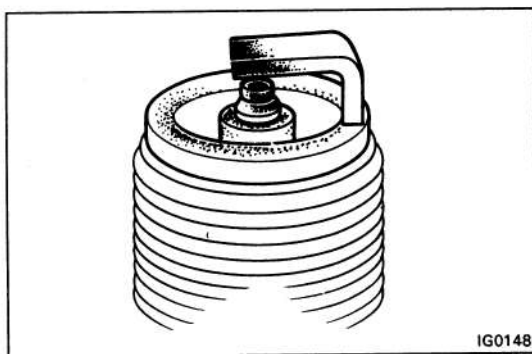
2. REMOVE SPARK PLUGS

Using a 16 mm plug wrench, remove the spark plug.

3. CLEAN SPARK PLUGS

Using a spark plug cleaner or wire brush, clean the spark plug.



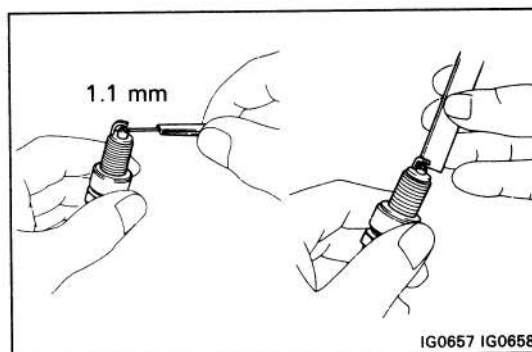


4. VISUALLY INSPECT SPARK PLUGS

Check the spark plug for electrode wear, thread damage and insulator damage.

If abnormal, replace the spark plug.

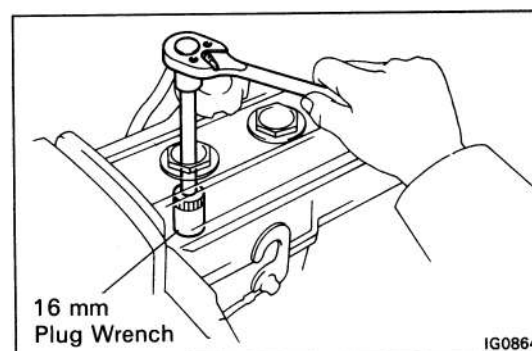
Recommended spark plug: ND K16R-U11
NGK BKR5EYA11



5. ADJUST ELECTRODE GAP

Carefully bent the outer electrode to obtain the correct electrode gap.

Correct electrode gap: 1.1 mm (0.43 in.)



6. INSTALL SPARK PLUGS

Using a 16 mm plug wrench, install the spark plug.

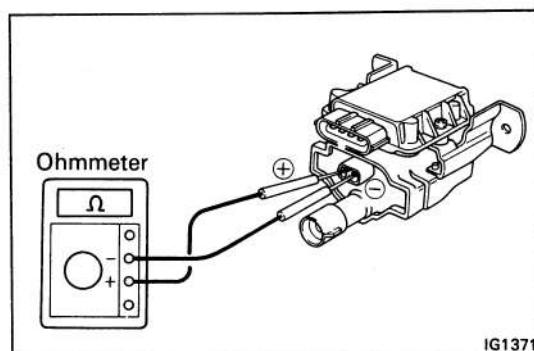
Torque: 180 kg-cm (13 ft-lb, 18 N·m)

7. RECONNECT HIGH-TENSION CORDS TO SPARK PLUGS

INSPECTION OF IGNITION COIL

1. DISCONNECT IGNITION COIL CONNECTOR

2. DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL (See procedure step 3 on pages IG-16 and 17)

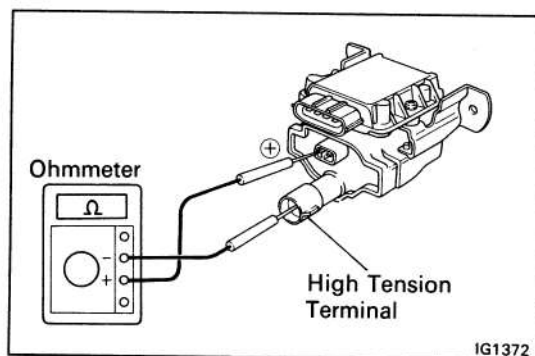


3. INSPECT PRIMARY COIL RESISTANCE

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

Primary coil resistance (Cold): 0.40 – 0.50 Ω

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



4. INSPECT SECONDARY COIL RESISTANCE

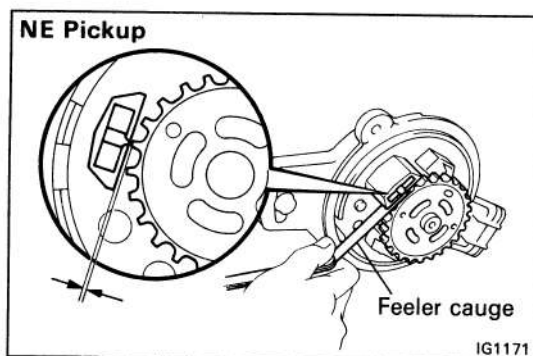
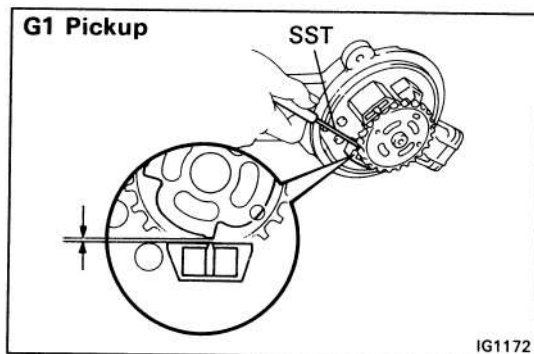
Using an ohmmeter, measure the resistance between positive (+) and high-tension terminals

Secondary coil resistance (Cold): 10.0 – 14.0 kΩ

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

5. RECONNECT HIGH-TENSION CORD TO IGNITION COIL (See procedure step 5 on pages IG-16 and 17)

6. RECONNECT IGNITION COIL CONNECTOR



INSPECTION OF DISTRIBUTOR

1. DISCONNECT DISTRIBUTOR CONNECTOR

2. REMOVE DISTRIBUTOR CAP

3. REMOVE ROTOR

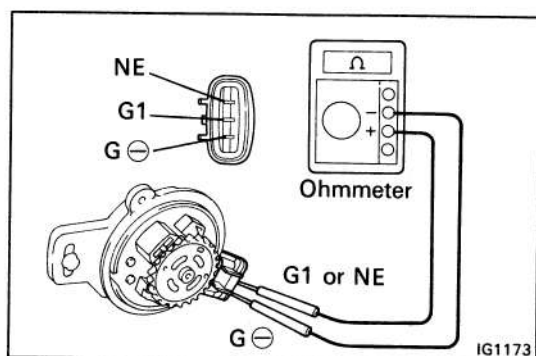
4. INSPECT AIR GAP

Using SST (G1 pickup) and a feeler gauge (NE pickup), measure the air gap between the signal rotor and pickup coil projection.

SST 09240-00020 for G1 pickup

Air gap: 0.2 mm – 0.4 mm (0.008 – 0.016 in.)

If the air gap is not as specified, replace the distributor housing assembly.



5. INSPECT SIGNAL GENERATOR (PICKUP COIL) RESISTANCE

Using an ohmmeter, measure the resistance between terminals (G1 and G⁻, NE and G⁻).

Pickup coil resistance (Cold): 170 – 210 Ω

If the resistance is not as specified, replace the distributor housing assembly.

6. REINSTALL ROTOR

7. REINSTALL DISTRIBUTOR CAP

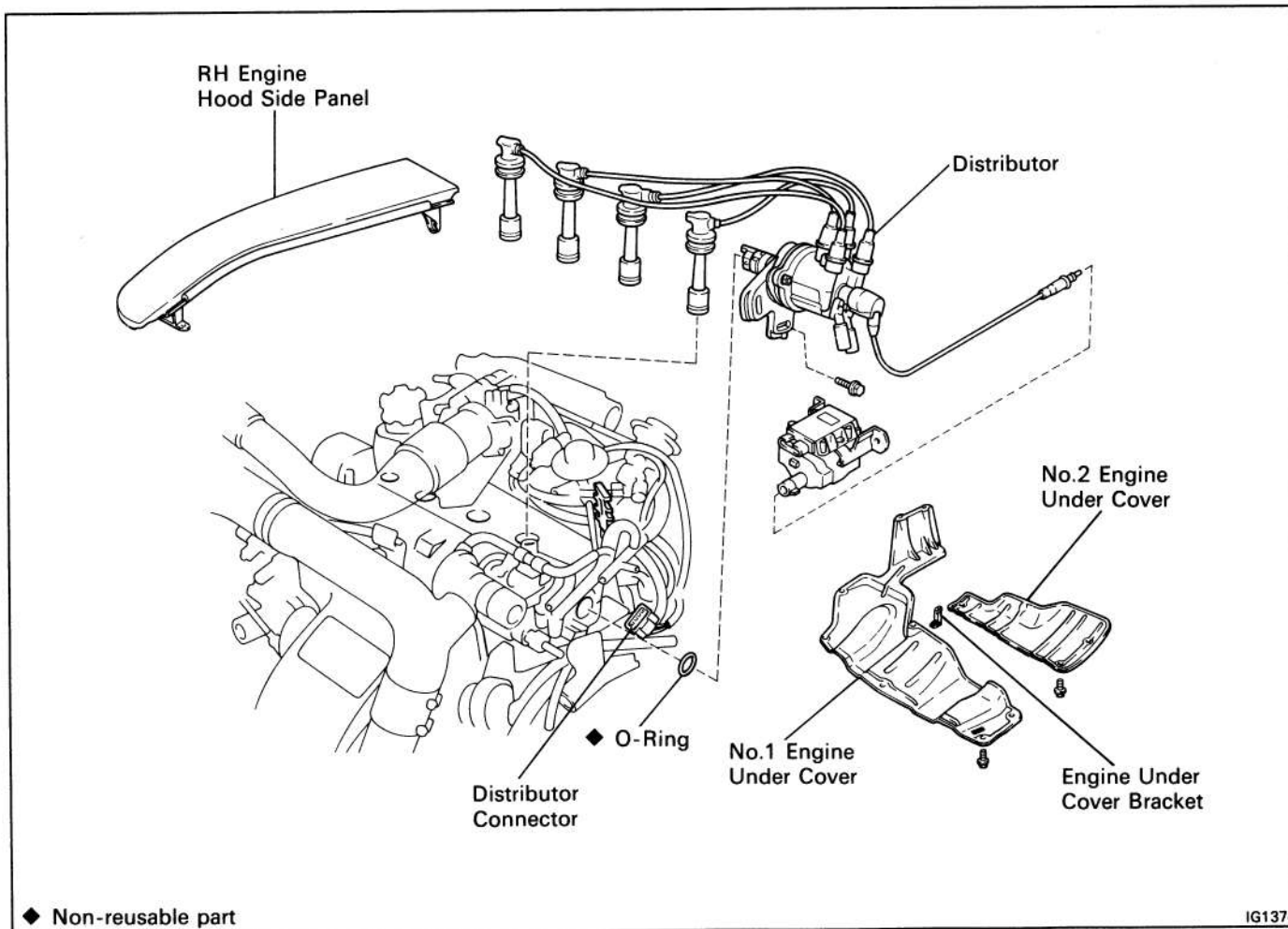
8. RECONNECT DISTRIBUTOR CONNECTOR

INSPECTION OF IGNITER

(See procedure Spark Test on page IG-10)

DISTRIBUTOR (3S-GTE)

REMOVAL OF DISTRIBUTOR



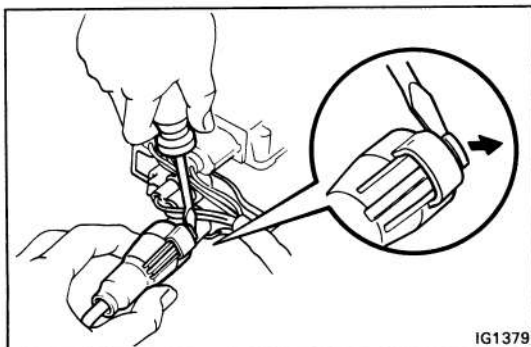
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**

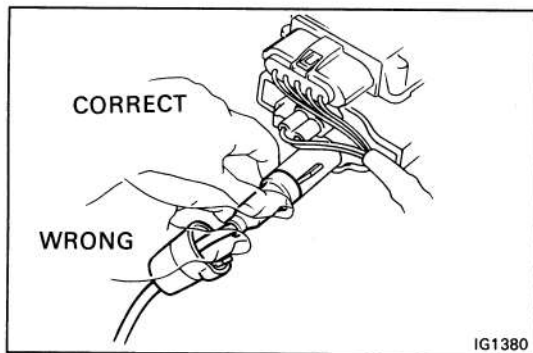
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. **DISCONNECT DISTRIBUTOR CONNECTOR**

3. **DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL**

(a) Using a screwdriver, lift up the lock claw and disconnect the holder from the ignition coil.





- (b) Disconnect the high-tension cord at the grommet. DO NOT pull on the cord.

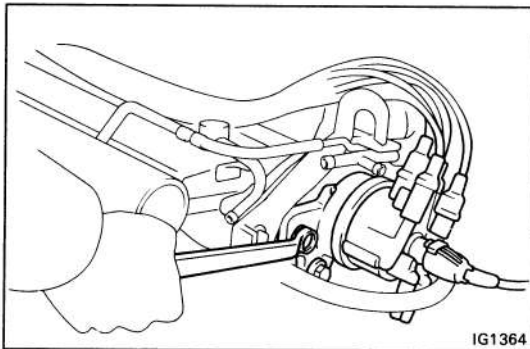
NOTICE: Pulling on or bending the cords may damage the conductor inside.

4. DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS

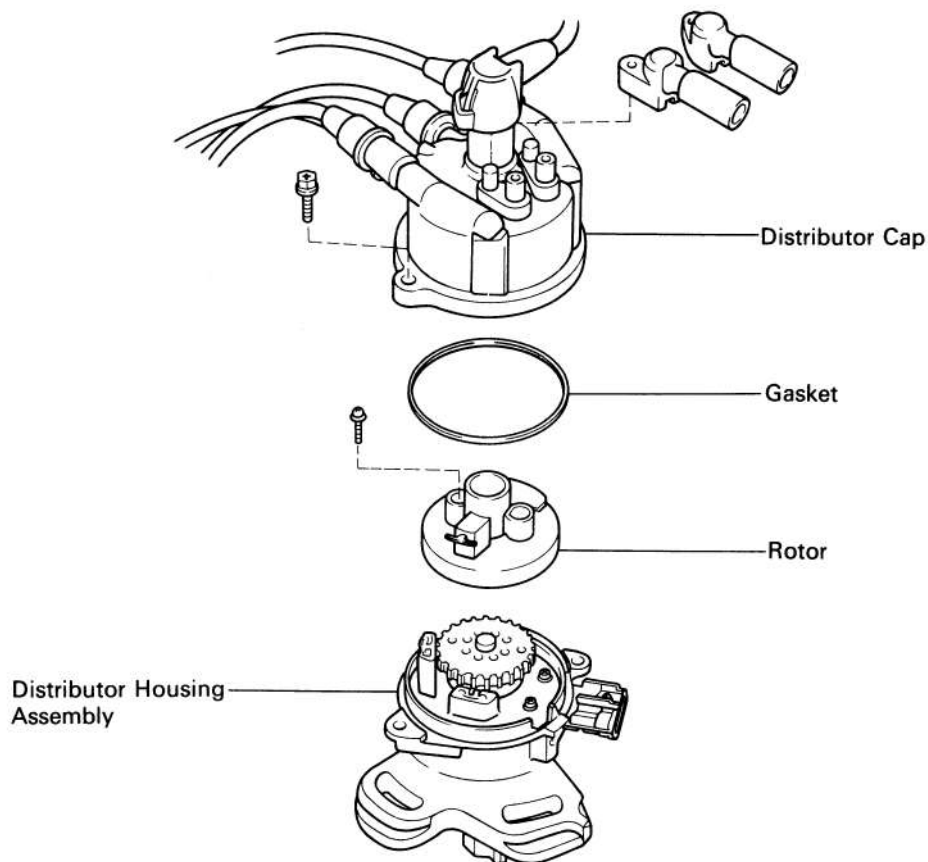
- (a) Disconnect the four high-tension cords from the cord clamp.
- (b) Disconnect the four high-tension cords from the spark plugs. (See page IG-6)

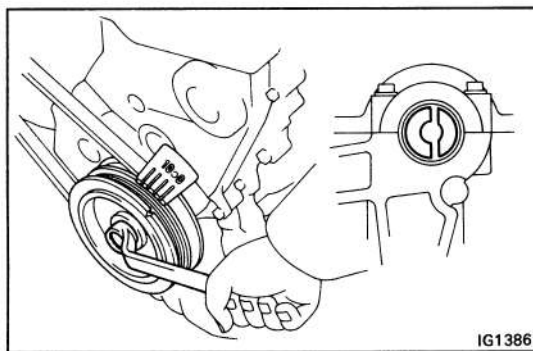
5. REMOVE DISTRIBUTOR

- (a) Remove the two hold-down bolts, and pull out the distributor.
- (b) Remove the O-ring from the distributor housing.



COMPONENTS



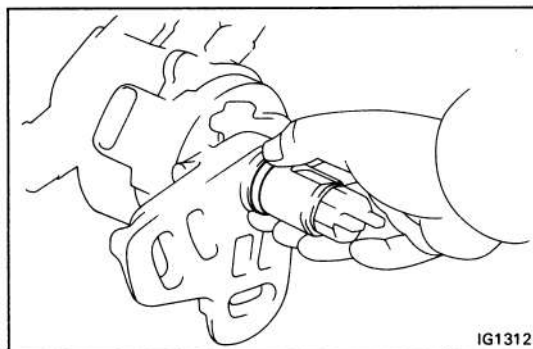


IG1386

INSTALLATION OF DISTRIBUTOR

1. REMOVE ENGINE UNDER COVERS
2. REMOVE RH ENGINE HOOD SIDE PANEL
3. SET NO.1 CYLINDER TO TDC/COMPRESSION

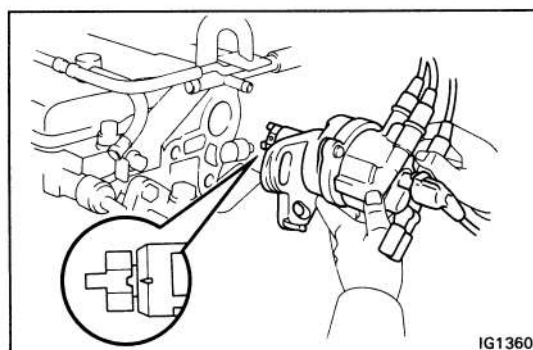
Turn the crankshaft clockwise, and position the slit of the intake camshaft as shown.



IG1312

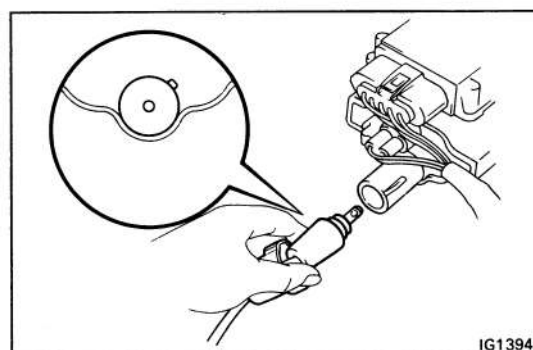
4. INSTALL DISTRIBUTOR

- (a) Install a new O-ring to the housing.
- (b) Apply a light coat of engine oil on the O-ring.



IG1360

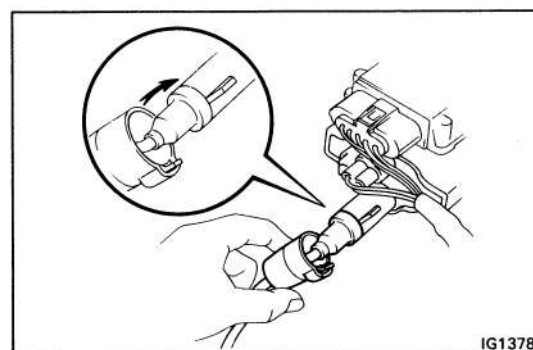
- (c) Align the cutout portion of the coupling with the groove of the housing.
- (d) Insert the distributor, aligning the center of the flange with that of the bolt hole on the cylinder head.
- (e) Lightly tighten the two hold-down bolts.



IG1394

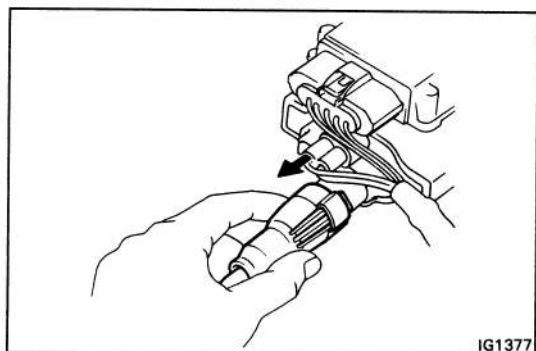
5. CONNECT HIGH-TENSION CORD TO IGNITION COIL

- (a) Insert the grommet portion into the terminal hole of the ignition coil.



IG1378

- (b) Align the spline of the ignition coil with the spline of the holder, and slide on the holder.



(c) Check that the lock claw of the holder is by lightly pulling the holder.

6. CONNECT HIGH-TENSION CORDS TO SPARK PLUGS

(a) Connect the four high-tension cords to the spark plugs.

Firing order: 1 – 3 – 4 – 2

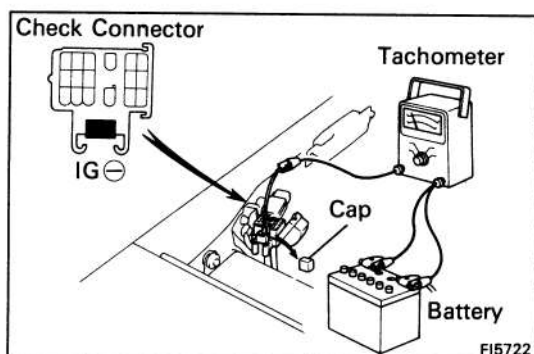
(b) Install the four high-tension cords to the cord clamp.

7. CONNECT DISTRIBUTOR CONNECTOR

8. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

9. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

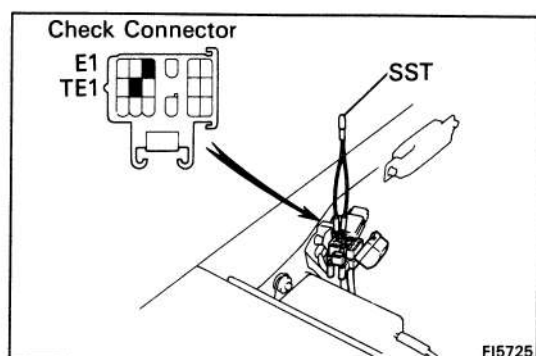


10. CONNECT TACHOMETER

Connect the test probe of a tachometer to terminal IG $\ominus$ of the check connector.

NOTICE:

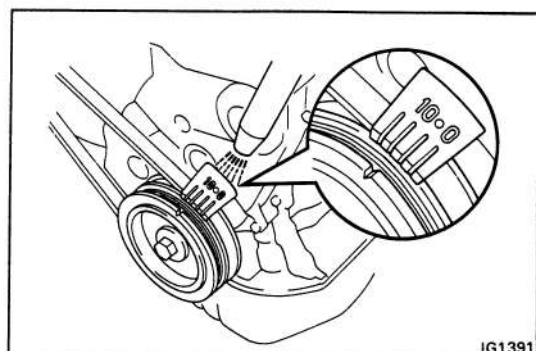
- **NEVER** allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of yours before use.



11. ADJUST IGNITION TIMING

(a) Using SST, connect terminals TE1 and E1 of the check connector.

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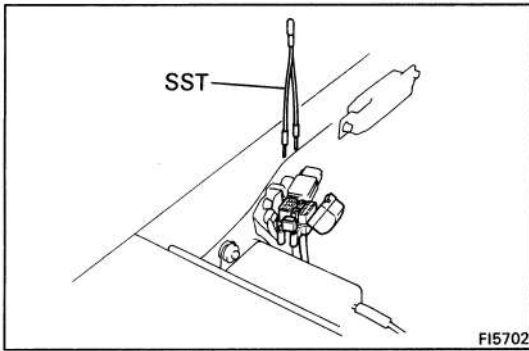
(b) Using a timing light, check the ignition timing.

Ignition timing: 10° BTDC @ idle
(Transmission in neutral range)

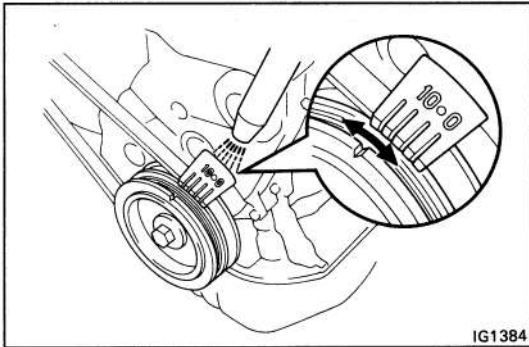
(c) Loosen the two hold-down bolts, and adjust by turning the distributor.

(d) Tighten the two hold-down bolts, and recheck the ignition timing.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)



(e) Remove the SST.
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12. FURTHER CHECK IGNITION TIMING

Ignition timing: 12 – 21° BTDC @ idle
(Transmission in neutral range)

HINT: The timing mark moves in a range between 12° and 21°.

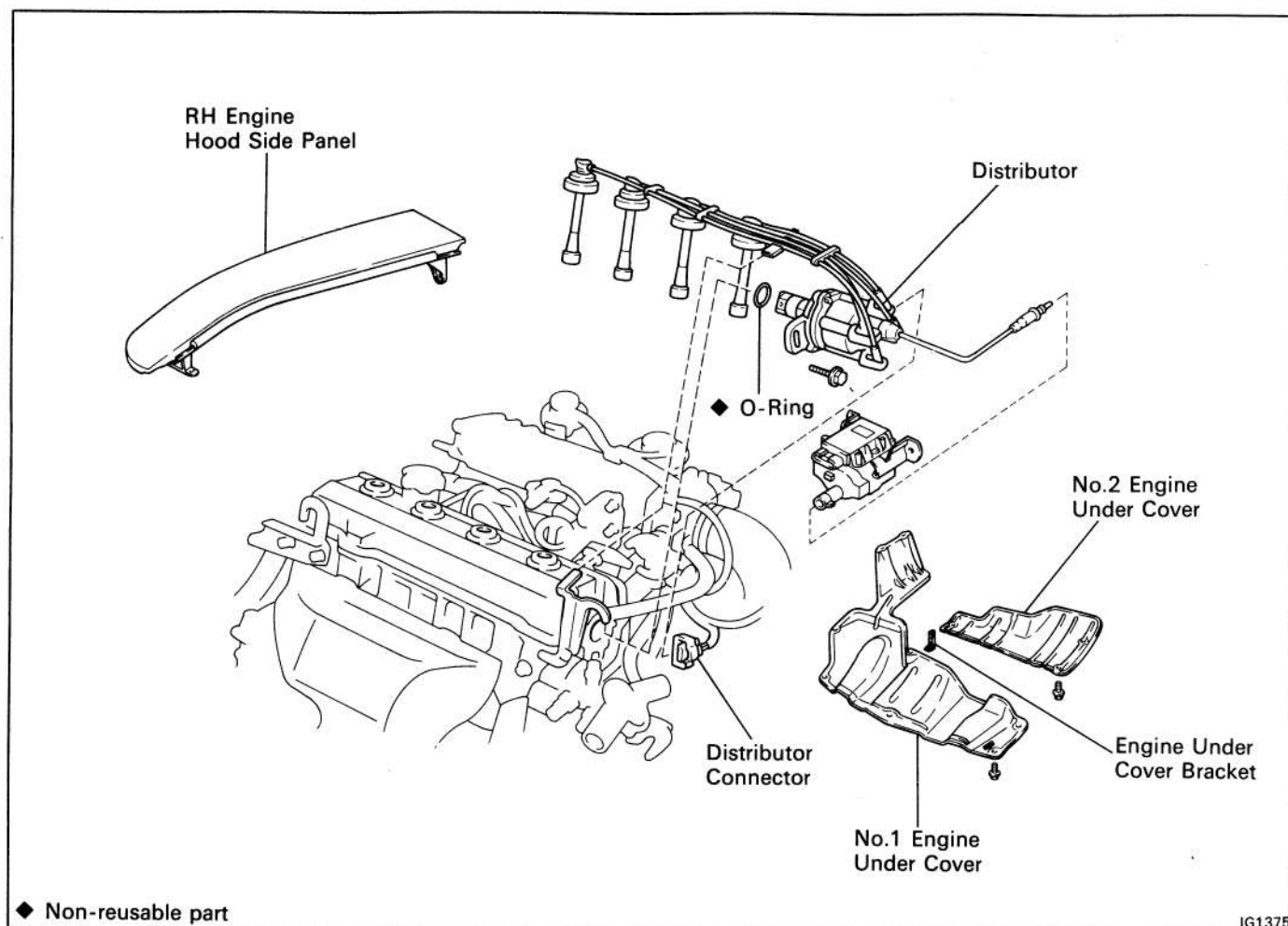
13. DISCONNECT TACHOMETER AND TIMING LIGHT FROM ENGINE

14. REINSTALL RH ENGINE HOOD SIDE PANEL

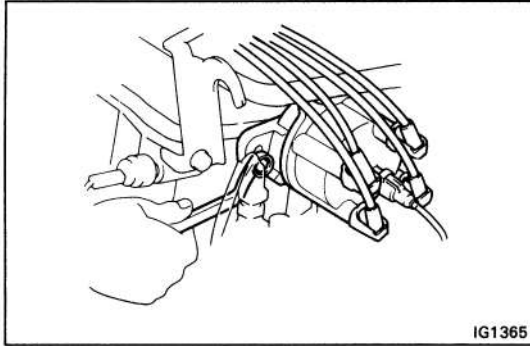
15. REINSTALL ENGINE UNDER COVERS

DISTRIBUTOR (5S-FE)

REMOVAL OF DISTRIBUTOR



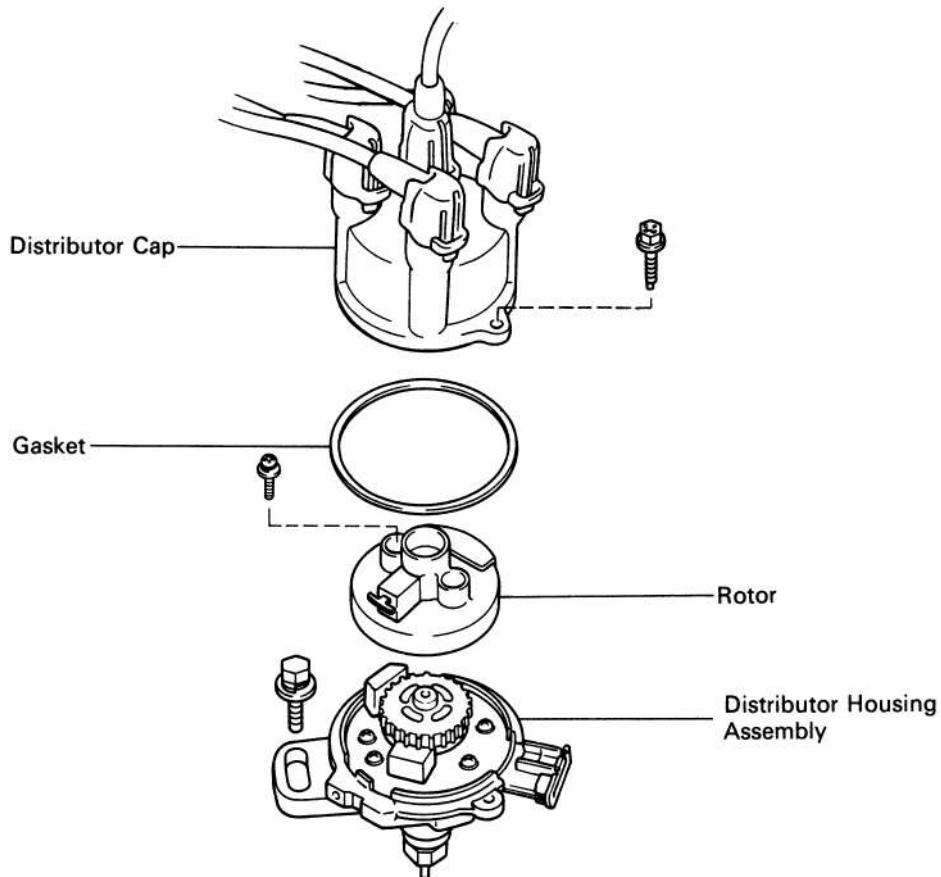
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DISCONNECT DISTRIBUTOR CONNECTOR**
3. **DISCONNECT HIGH-TENSION CORD FROM IGNITION COIL (See procedure step 3 on pages IG-14 and 15)**
4. **DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS**
 - (a) Disconnect the cord clamp from the engine hanger.
 - (b) Disconnect the four high-tension cords from the spark plugs. (See page IG-11)



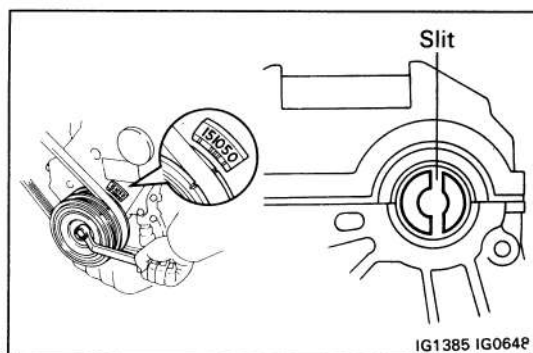
IG1365

5. REMOVE DISTRIBUTOR

- (a) Remove the hold-down bolt and pull out the distributor.
- (b) Remove the O-ring from the distributor housing.

COMPONENTS

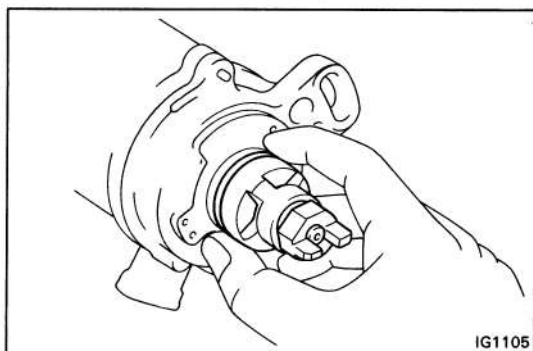
IG1395



INSTALLATION OF DISTRIBUTOR

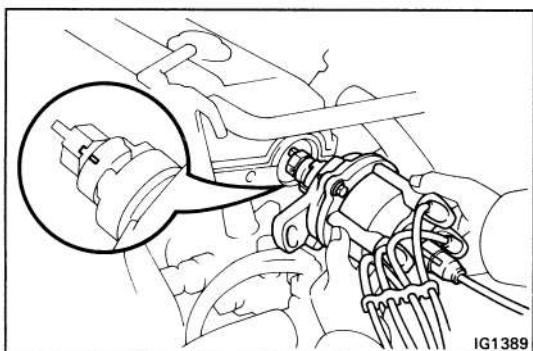
1. REMOVE ENGINE UNDER COVERS
2. REMOVE RH ENGINE HOOD SIDE PANEL
3. SET NO.1 CYLINDER TO TDC/COMPRESSION

Turn the crankshaft clockwise, and position the slit of the intake camshaft as shown.



4. INSTALL DISTRIBUTOR

- (a) Install a new O-ring to the housing.
- (b) Apply a light coat of engine oil on the O-ring.



- (c) Align the cutout portion of the coupling with the groove of the housing.
- (d) Insert the distributor, aligning the center of the flange with that of the bolt hole on the cylinder head.
- (e) Lightly tighten the hold-down bolt.
- (f) Install the high-tension cord clamp to the rear engine hanger.

5. CONNECT HIGH-TENSION CORD TO IGNITION COIL
(See procedure step 5 on pages IG-16 and 17)
6. CONNECT HIGH-TENSION CORDS TO SPARK PLUGS
Firing order: 1 – 3 – 4 – 2

7. CONNECT DISTRIBUTOR CONNECTOR

8. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

9. WARM UP ENGINE

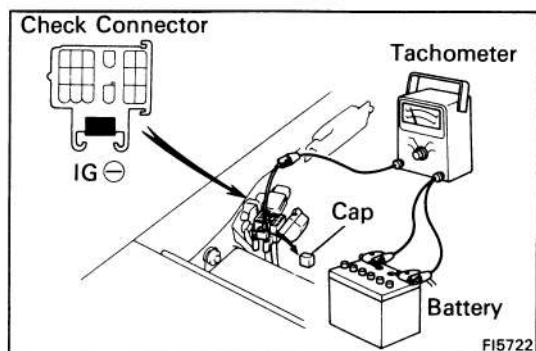
Allow the engine to warm up to normal operating temperature.

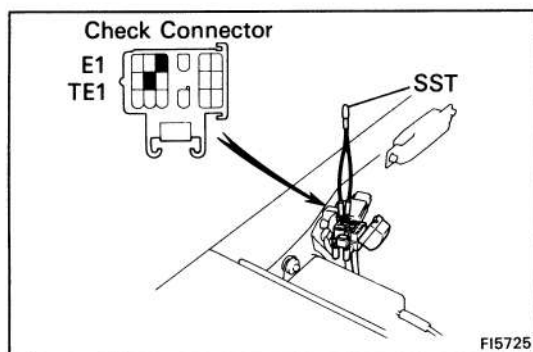
10. CONNECT TACHOMETER

Connect the test probe of a tachometer to terminal IG $\ominus$ of the check connector.

NOTICE:

- NEVER allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of yours before use.



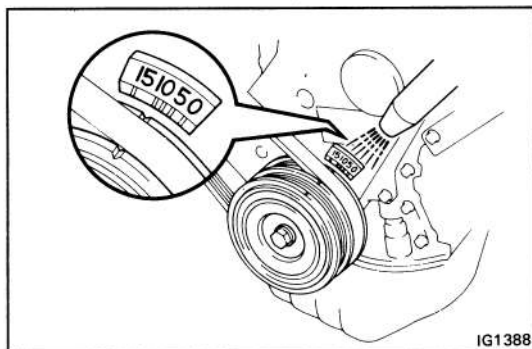


11. ADJUST IGNITION TIMING

- (a) Using SST, connect terminals TE1 and E1 of the check connector.

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HINT: After engine rpm are kept at 1,000 – 1,300 rpm for 5 seconds, check that they return to idle speed.

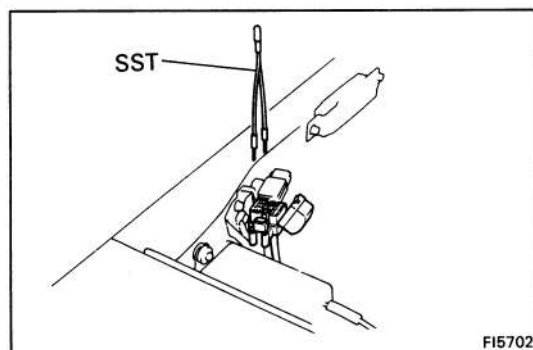


- (b) Using a timing light, check the ignition timing.

Ignition timing: 10° BTDC @ idle
(Transmission in neutral range)

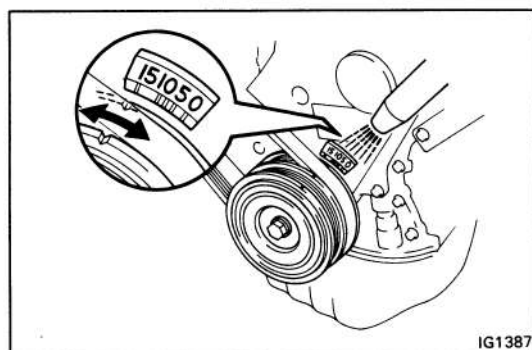
- (c) Loosen the hold-down bolt, and adjust by turning the distributor.
(d) Tighten the hold-down bolt, and recheck the ignition timing.

Torque: 130 kg-cm (9 ft-lb, 13 N-m)



- (e) Remove the SST.

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12. FURTHER CHECK IGNITION TIMING

Ignition timing: 13 – 22° BTDC @ idle
(Transmission in neutral range)

HINT: The timing mark moves in a range between 13° and 22°.

13. DISCONNECT TACHOMETER AND TIMING LIGHT FROM ENGINE

14. REINSTALL RH ENGINE HOOD SIDE PANEL

15. REINSTALL ENGINE UNDER COVERS