

DAIHATSU

F300

[HD-ENGINE]

IGNITION SYSTEM

PRECAUTIONS	IG-2
TROUBLE SHOOTING	IG-2
IGNITION SYSTEM	IG-3
DISTRIBUTOR	IG-9

WN88E-IG001



PRECAUTIONS

1. Do not leave the ignition key switch turned ON for more than ten minutes while the engine is stopped.
2. When a tachometer is connected to the system, connect the test probe of the tachometer to the negative (-) terminal of the ignition coil.
3. As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your unit before using.
4. Never allow the ignition coil terminals to touch ground. It could result in damage to the igniter and/or the ignition coil.
5. Do not disconnect the battery cable when the engine is running.
6. Make sure that the igniter is properly grounded to the body.

WN88E-IG002

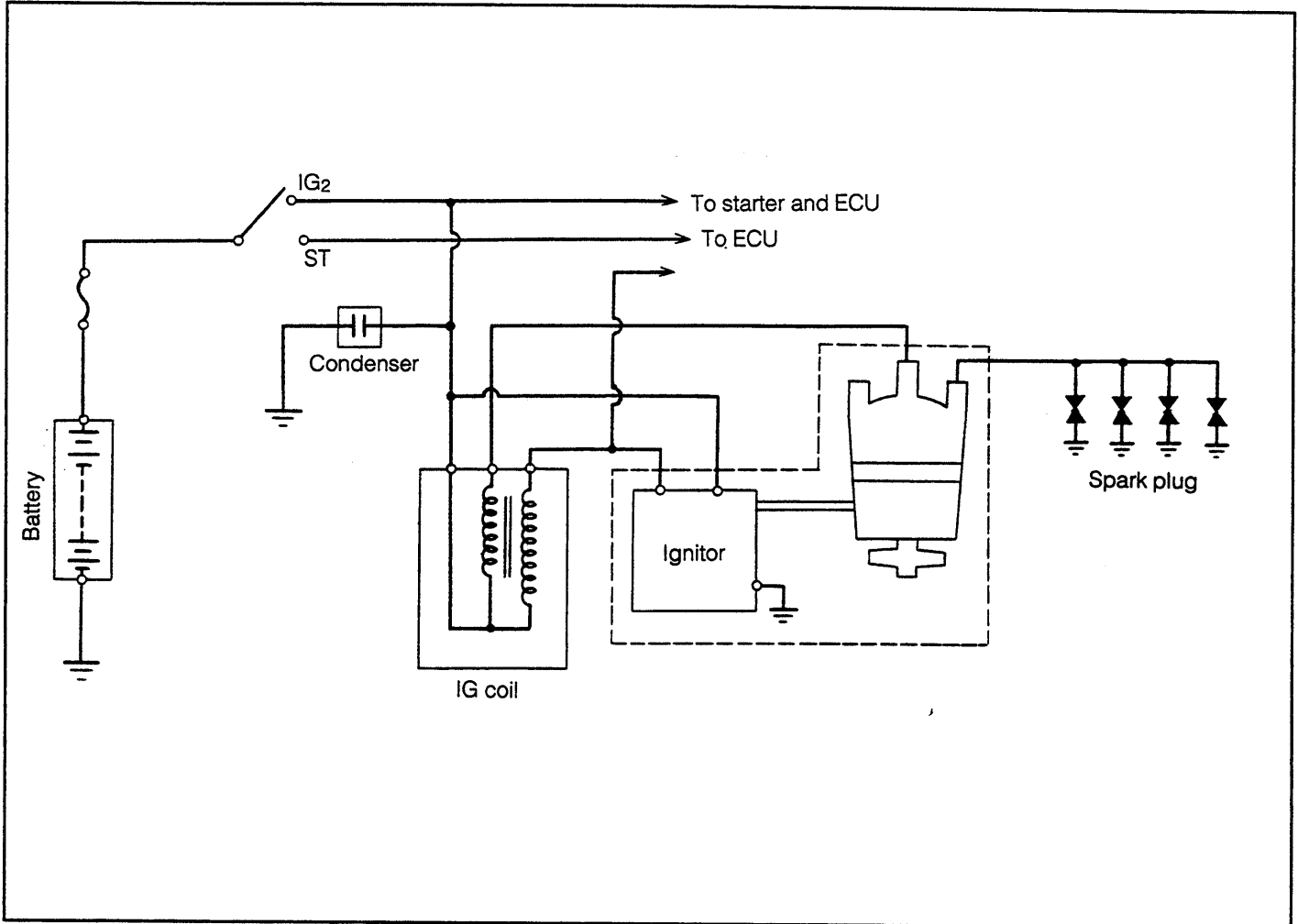
TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Engine will not start/hard to start. (Engine crank normally.)	Incorrect ignition timing Ignition coil faulty Igniter faulty Distributor faulty Resistive cords faulty Spark plugs faulty Ignition wiring disconnected or broken	Reset timing. Inspect coil. Inspect igniter. Inspect distributor. Inspect resistive cords. Inspect plugs. Inspect wiring.	IG-29 IG-8 IG-3, IG-5 IG-10, IG-15 IG-5 IG-6
Rough idle or engine stalls.	Spark plugs faulty Ignition wiring faulty Incorrect ignition timing Ignition coil faulty Igniter faulty Distributor faulty Resistive cords faulty	Inspect plugs. Inspect wiring. Reset timing. Inspect coil. Inspect igniter. Inspect distributor. Inspect resistive cords.	IG-6 IG-29 IG-8 IG-3, IG-5 IG-10, IG-15 IG-5
Engine hesitation/poor acceleration	Spark plugs faulty Ignition wiring faulty Incorrect ignition timing	Inspect plugs. Inspect wiring. Reset timing.	IG-6 IG-29
Engine dieseling (Engine runs after ignition witch is turned OFF.)	Incorrect ignition timing	Reset timing.	IG-29
Muffler explosion (after fire) all the time	Incorrect ignition timing	Reset timing.	IG-29
Engine backfire	Incorrect ignition timing	Reset timing.	IG-29
Poor fuel economy	Spark plugs faulty Incorrect ignition timing	Inspect plugs. Reset timing.	IG-6 IG-29
Engine overheating	Incorrect ignition timing	Reset timing.	IG-29

WN88E-IG003

IGNITION SYSTEM

IGNITION SYSTEM CIRCUIT

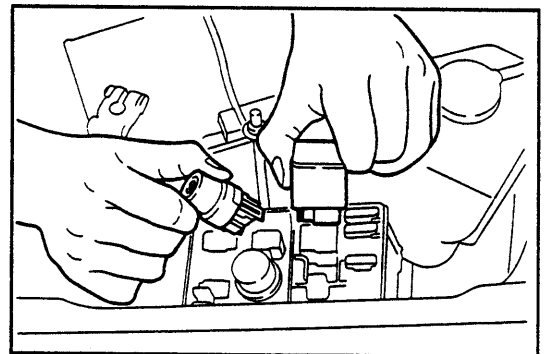


IN-VEHICLE INSPECTION

Spark Test

(Check as see if spark occurs)

1. Turn OFF the ignition key switch.
2. Disconnect the fuel pump relay and injector relay from the relay box. (Only for HD-E engine)



WN88E-IG004

WN88E-IG005

3. Connect a timing light to the resistive cord between the distributor and the ignition coil.

WR88-IG017

IGNITION SYSTEM

4. Ensure that the timing light flashes while the engine is being cranked by the starter motor.

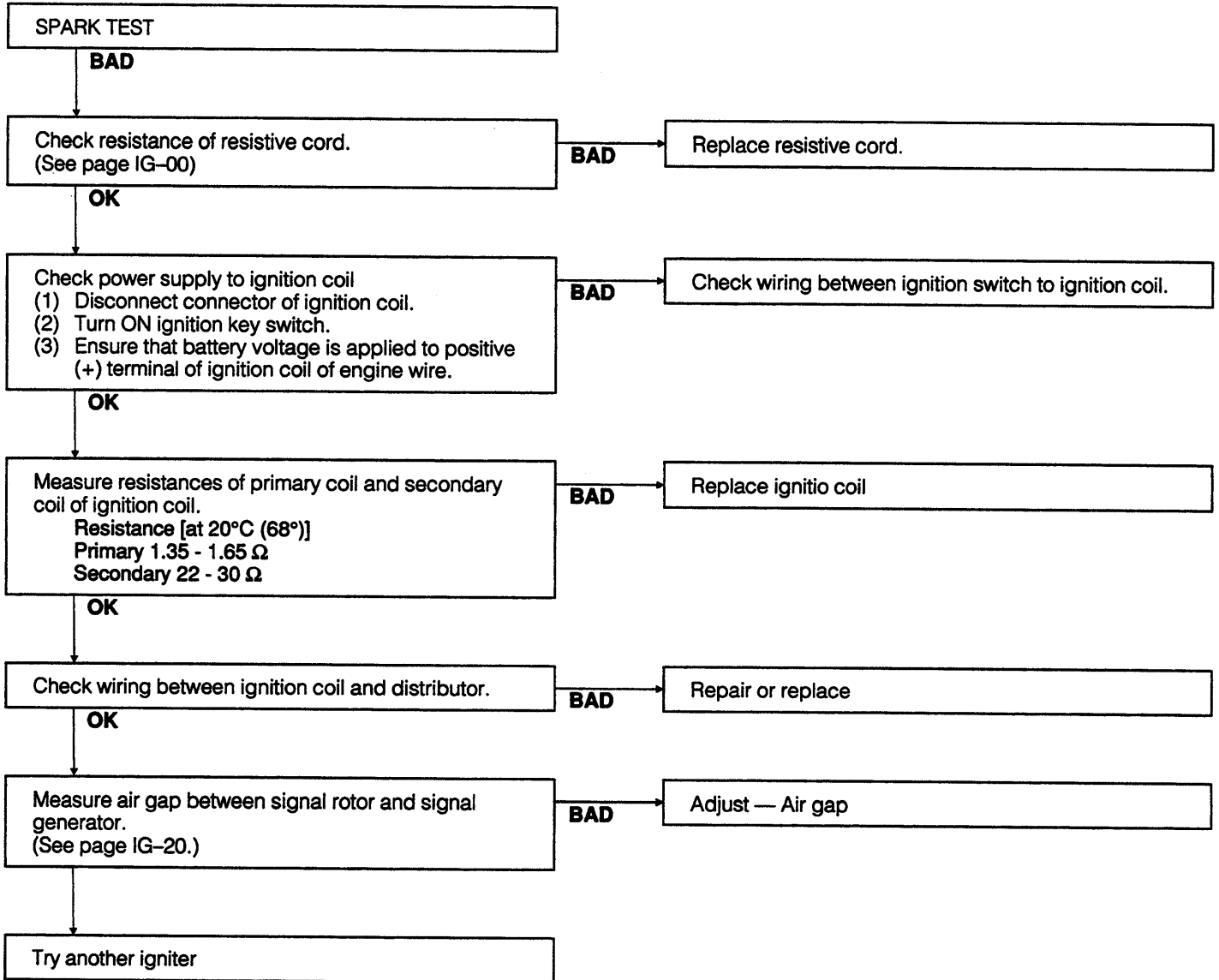
If the timing light flashes, check the resistive cord and spark plug.

If the timing light will not flash, perform the check according to the chart given below.

NOTE:

After completion of the inspection, reconnect the fuel pump relay and injector relay to the relay box. (Only for HD-E engine)

WN88E-IG006



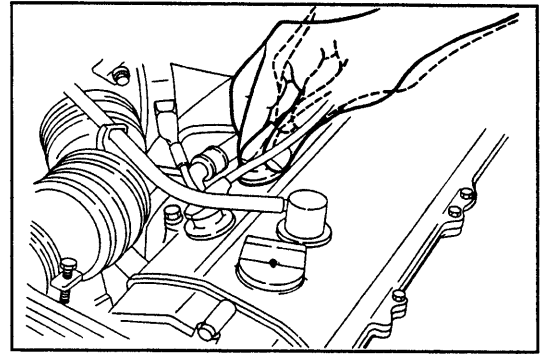
WN88E-IG007

INSPECTION OF RESISTIVE CORDS

1. Carefully remove the resistive cords from the spark plugs and ignition coil by holding their rubber boots.

CAUTION:

Do not hold the cord portion or bend the cord. Otherwise, the conductor inside the cord may be damaged.



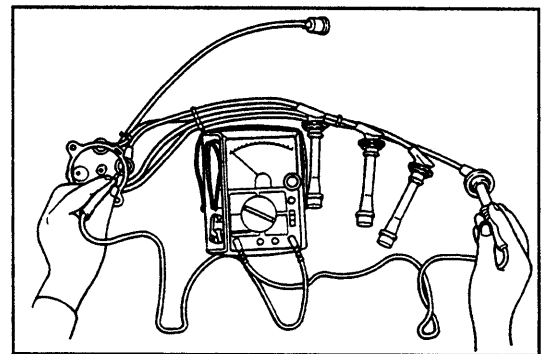
WR88-IG020

2. Disconnect the distributor connector from the connector clamp.
3. Remove the distributor cap.

WR88-IG021

4. Inspection of resistance of resistive cord and distributor cap terminal

Maximum resistance: 15 kΩ per cord



WR88-IG022

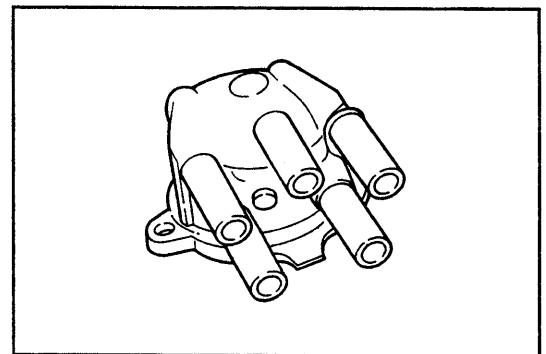
If the resistance exceeds the maximum limit, check the distributor cap terminals.

Replace the resistive cord and/or distributor cap, as required.

5. Install the distributor cap with distributor cap gasket interposed.

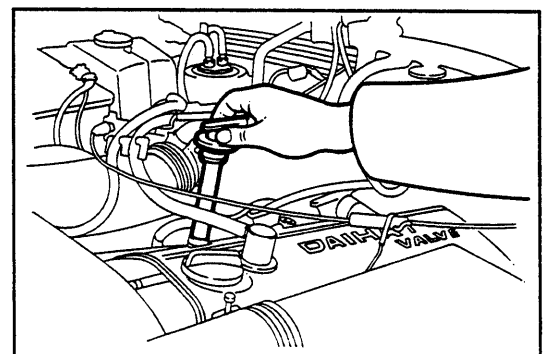
NOTE:

If the distributor gasket is damaged, replace it with a new one.



WR88-IG023

6. Connect the resistive cords to the spark plugs and ignition coil.



WR88-IG024

IGNITION SYSTEM

INSPECTION OF SPARK PLUG

1. Carefully remove the resistive cords from the spark plugs by holding their rubber boots.
2. Inspection of electrode
 - (1) When a megger (Insulation resistance meter) is used:
Measure the insulation resistance of the spark plug.
Minimum Insulation Resistance: 15 MΩ

If the measured insulation resistance is less than 15 MΩ, proceed to the step 3.

- (2) When a megger is not available:
 - ① Start the engine. Warm up the engine completely.
 - ② Race the engine at 4000 rpm for five seconds.
 - ③ Remove the spark plug, using the following SST.
SST: 09268-87703-000

CAUTION:

Since the spark plugs are hot, care must be exercised to avoid getting scalded.

- ④ Visually inspect the spark plug.
If the electrode is dry: Satisfactory
If the electrode is wet: Proceed to the step 4.

3. Removal of spark plug
Remove the spark plug, using the following SST.
SST: 09268-87703-000

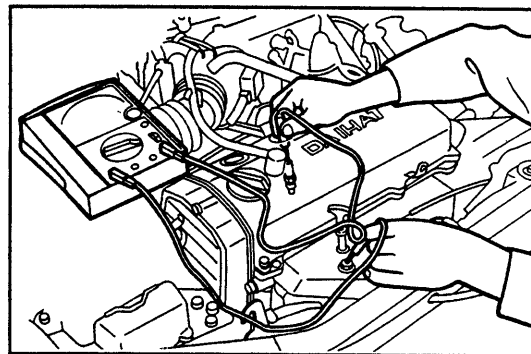
4. Visual inspection of spark plug
Visually inspect the spark plug for electrode wear, thread or insulator damage.
Replace the spark plug if it exhibits damage.

Recommended Spark Plug

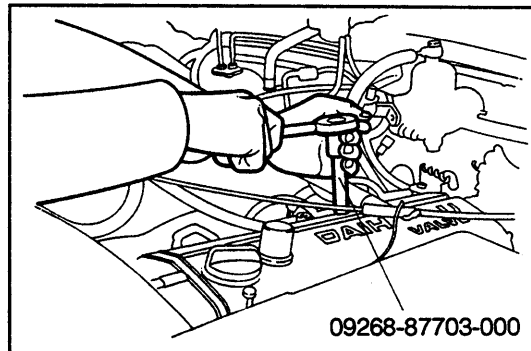
	CHAMPION	NIPPON DENSO	NGK
HD-C	RC9YC4	K20PR-U11	BKR6E-11
HD-E	RC9YC4	K20PR-U11	BKR6E-11

NOTE:

All four spark plugs should have the same heat range and be ones manufactured by the same manufacturer.

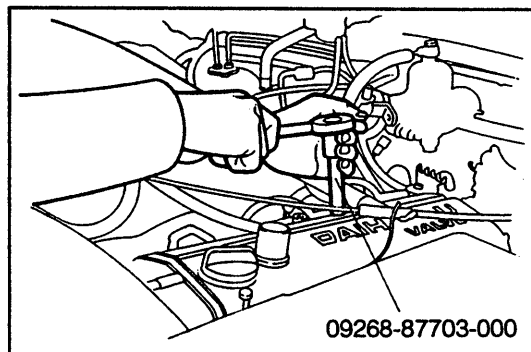


WR88-IG025



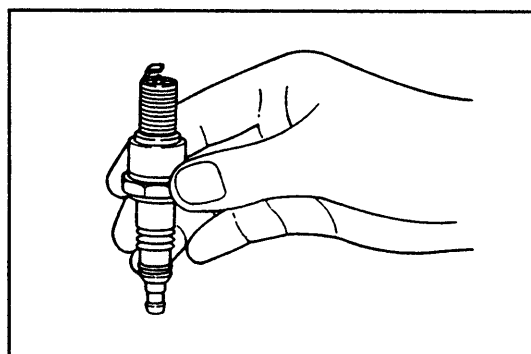
09268-87703-000

WR88-IG026



09268-87703-000

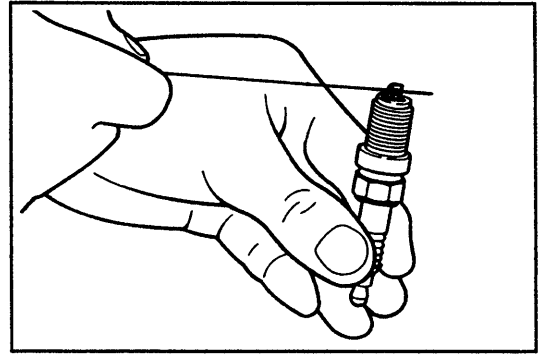
WR88-IG027



WN88E-IG008

5. Inspection of electrode gap
 Measure the electrode gap, using a plug gap gauge.
Electrode Gap: 1.0 - 1.1 mm (0.040 - 0.043 inch)

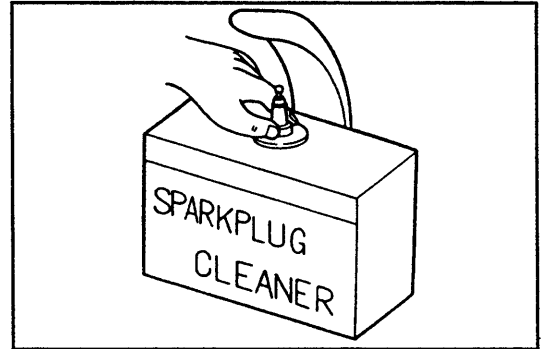
If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one.
 If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the tip.



WR88-IG029

6. Cleaning of spark plug
 If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.
Air Pressure: Not to Exceed 6 kg/cm² (85 psi)
Duration: Less Than 20 Seconds

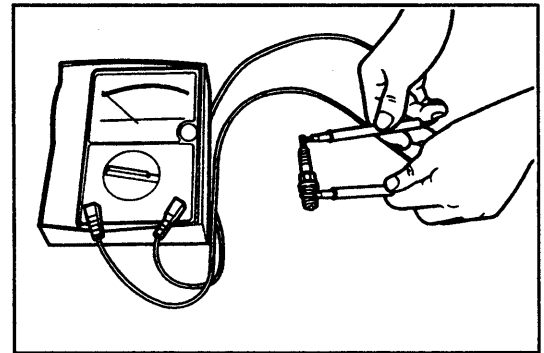
NOTE:
 If there are traces of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.



WR88-IG030

7. Inspection of spark plug insulation resistance
More Than 20 MΩ

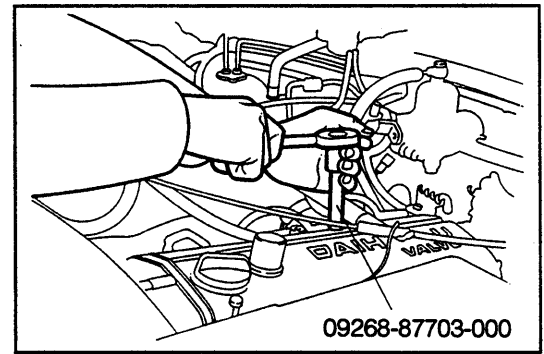
If the insulation resistance is less than the specified value, replace the spark plug.



WR88-IG031

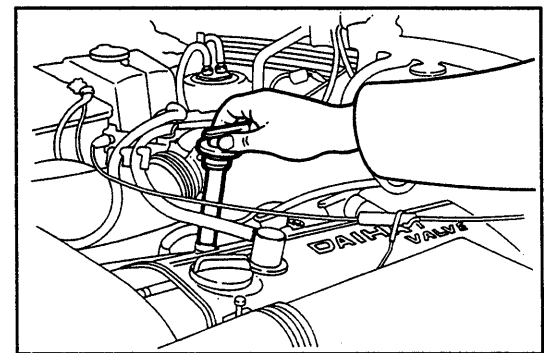
8. Installation of spark plug
 Install the spark plugs. Tighten them to the specified torque, using the following SST.
SST: 09268-87703-000
Tightening Torque: 1.5 - 2.2 kg-m (10.8- 15.9 ft-lb)

NOTE:
 Since the insulator strength of a small spark plug is comparatively smaller than that of regular spark plugs, when tightening, be sure to use the tool exclusively used for this application. Also, when tightening, never use the wrench in a crooked way.



WR88-IG032

9. Connect the resistive cord to the spark plug.



WR88-IG033

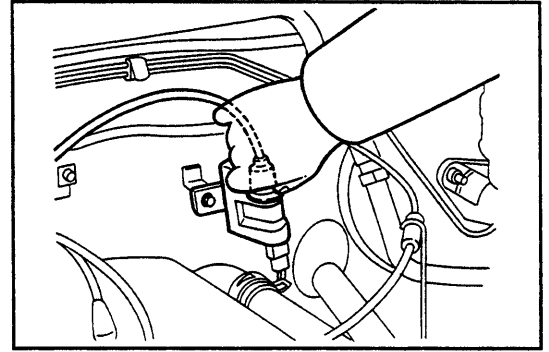
IGNITION SYSTEM

INSPECTION OF IGNITION COIL

1. Disconnect the resistive cord from the ignition coil.

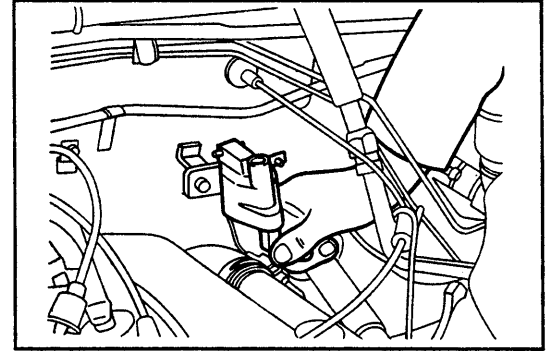
NOTE:

Do not hold the cord portion during disconnection. Be sure to disconnect the cord by holding the rubber boot.



WN88-IG009

2. Disconnect the coil wire connector from the ignition coil.



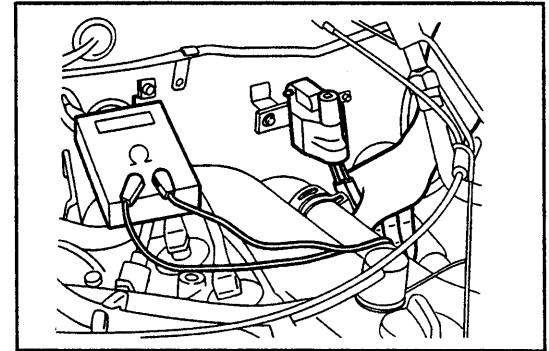
WR88-IG035

3. Check of primary coil resistance

Measure the resistance of the primary coil across the ignition coil terminals, as shown in the right figure.

Primary Coil Resistance at 20°C (68°F):
1.35 - 1.65 Ω

If the measured value fails to conform to the specification, replace the ignition coil.



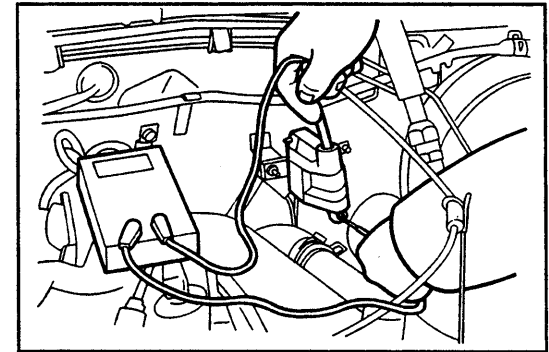
WR88-IG036

4. Check of secondary coil resistance

Measure the resistance of the secondary coil between the positive (+) terminal of the ignition coil and the resistive cord terminal, as shown in the right figure.

Secondary Coil Resistance at 20°C (68°F):
22 - 30 k Ω

If the measured value fails to conform to the specification, replace the ignition coil.



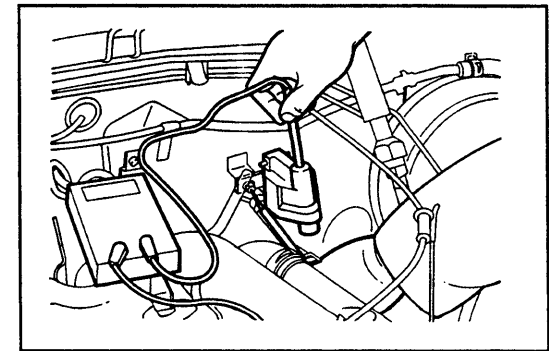
WR88-IG037

5. Check of insulation resistance

Measure the insulation resistance between positive (+) terminal of the ignition coil and coil case.

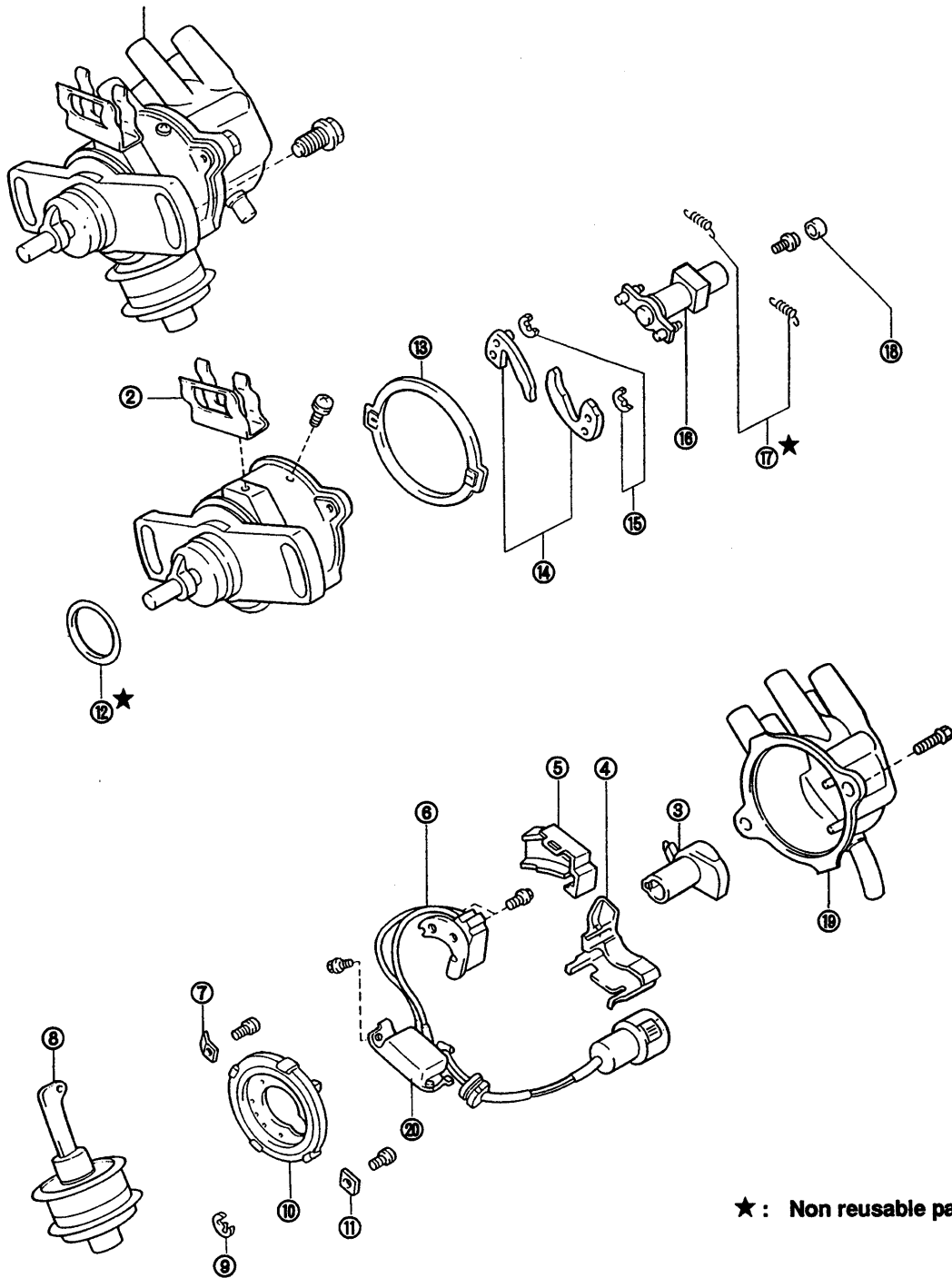
Insulation resistance: More than 1000 k Ω
(Infinity)

If the measured value fails to conform to the specification, replace the ignition coil.



WR88-IG038

**DISTRIBUTOR
COMPONENTS**



★ : Non reusable parts

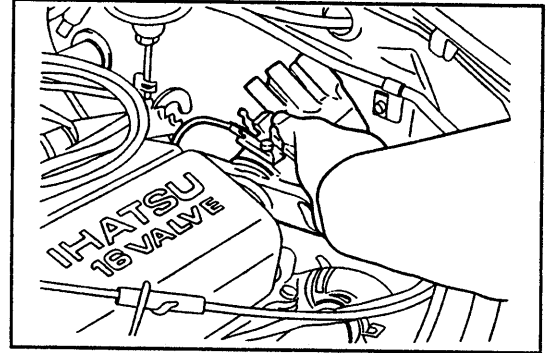
- ① Distributor assembly
- ② Distributor connector clamp
- ③ Distributor rotor
- ④ Dust-proof cover
- ⑤ Dust-proof cover
- ⑥ Pick-up coil
- ⑦ Plate washer
- ⑧ Distributor vacuum advancer
- ⑨ Snap washer
- ⑩ Stationary plate

- ⑪ Plate washer
- ⑫ "O" ring
- ⑬ Distributor gasket
- ⑭ Governor weight
- ⑮ Snap washer
- ⑯ Signal rotor assembly
- ⑰ Governor spring
- ⑱ Grease stopper
- ⑲ Distributor cap
- ⑳ Ignitor

INSPECTION OF DISTRIBUTOR

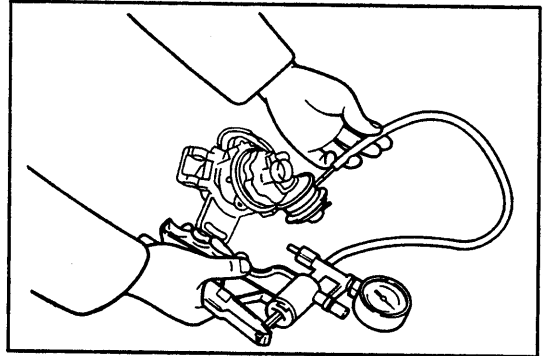
Check and Adjustment of Air Gap

1. Remove the resistive cord from the distributor cap.
2. Remove the distributor. (See page IG-12.)
3. Remove the distributor cap.



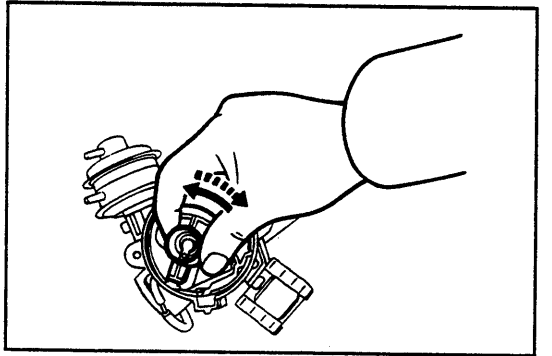
WN88E-IG011

4. Check of vacuum advancer
Apply a negative pressure of more than 150 mmHg (7.87 inchHg).
Ensure that vacuum advancer operates.
Repair or replace the vacuum advancer, as required, if it will not operate.



WN88E-IG012

5. Check of governor advancer
 - (1) Turn the rotor clockwise and release it. Ensure that the rotor returns counterclockwise rapidly.
Repair or replace the rotor, as required, if it will not return to the original position.
 - (2) Check the rotor for excessive play.
6. Pull out the rotor.

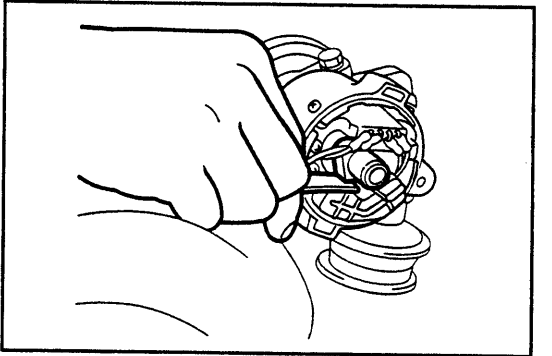


WN88E-IG013

7. Turn the crankshaft until the signal generator faces toward the signal rotor.
8. At all four points check to see if the air gap between the signal generator and the signal rotor conforms to the specified value.

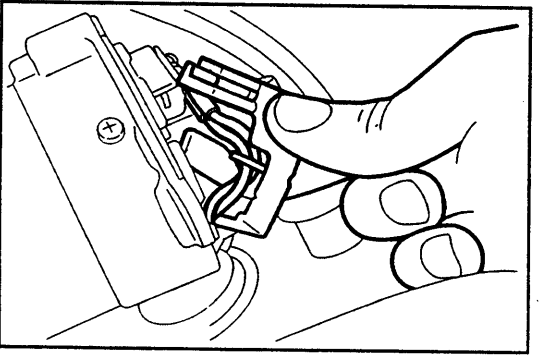
Specified Gap: 0.2 - 0.4 mm (0.0079 - 0.015 inch)

If the air gap fails to conform to the specified value, adjust the air gap.



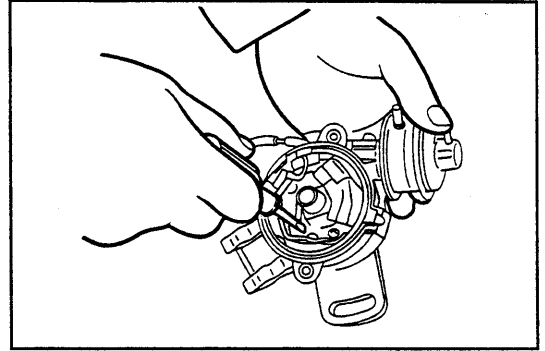
WN88E-IG014

9. Adjustment of air gap
 - (1) Remove the lock, being very careful not to damage the ignitor dust-proof cover. Then, pull out the wire from the signal generator, making sure that no damage is made to the wire.
 - (2) From the dust-proof cover, remove the wire led from the signal generator. Be very careful not to damage the wire.



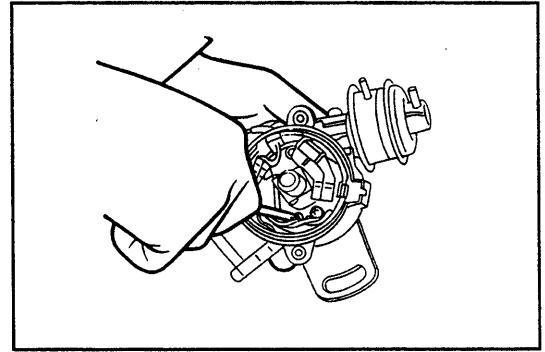
WN88E-IG015

- (3) Loosen the attaching screws of the signal generator.
- (4) Adjust the air gap between the signal generator and the signal rotor to the specified value.



WN88E-IG016

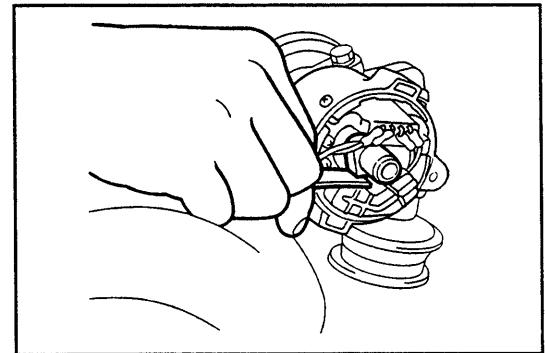
- (5) Tighten the attaching screws of the signal generator.
Specified Value: 12 - 21 kg-cm



WN88E-IG017

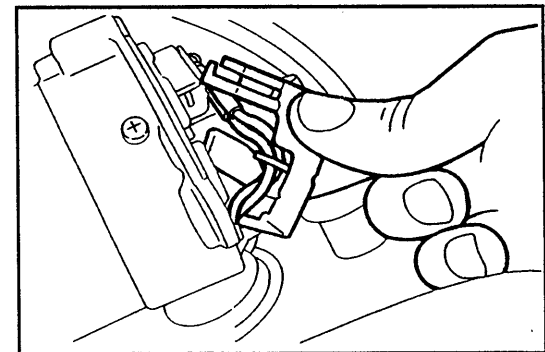
- (6) Check the air gap.
Specified Value: 0.2 - 0.4 mm (0.0079 - 0.015 inch)

If the air gap fails to conform to the specified value, adjust the air gap again.



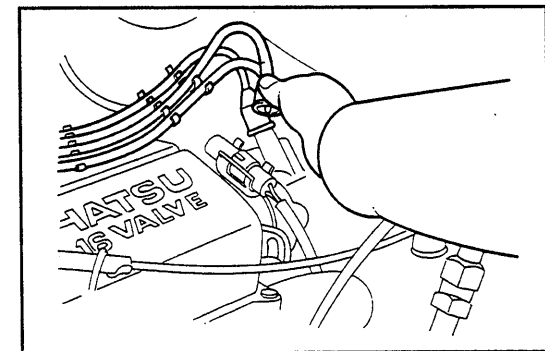
WN88E-IG018

10. Install the wire from the signal generator to dust proof cover.
11. Install the dust proof cover to the ignitor.
12. Install the rotor.
13. Check the distributor cap gasket for cracks or damage.
If it exhibits cracks or damage, replace the gasket with new one.



WN88E-IG019

14. Install the distributor cap gasket and distributor cap.
15. Install the distributor to the cylinder head. (See page IG-22.)
16. Connect the distributor connector.
17. Connect the resistive cord to the distributor cap.
18. Perform the ignition timing adjustment.
(See page IG-23.)



WN88E-IG020

IGNITION SYSTEM

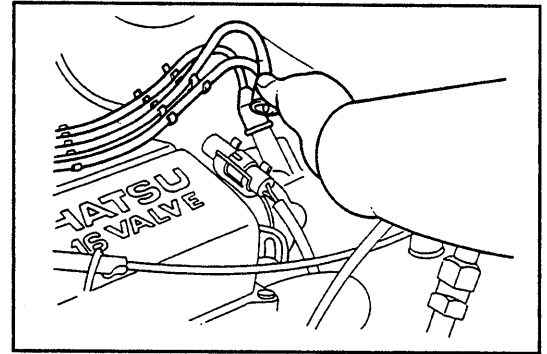
REMOVAL OF DISTRIBUTOR

1. Disconnect the battery ground cable from the negative terminal of the battery.

2. Disconnect the resistive cords from the distributor cap.

NOTE:

Do not hold the cord during disconnection. Be sure to disconnect the cord by holding the rubber boot.



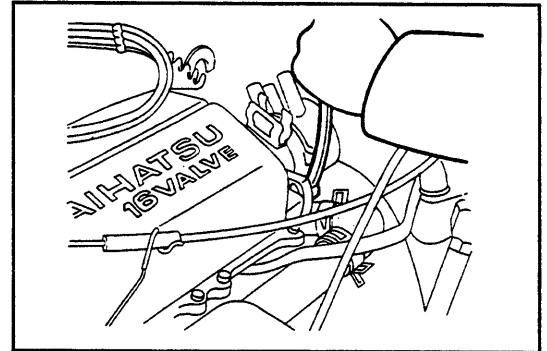
WR88-IG113

3. Disconnect the distributor connector.
4. Disconnect the vacuum advancer hoses.

NOTE:

Prior to the disconnection, put a tag so that the original installation position may be identified readily.

5. Remove the distributor set bolt.

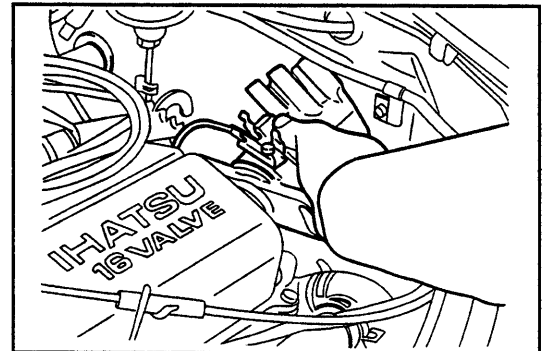


WN88E-IG021

6. Pull out the distributor from the cylinder head.

NOTE:

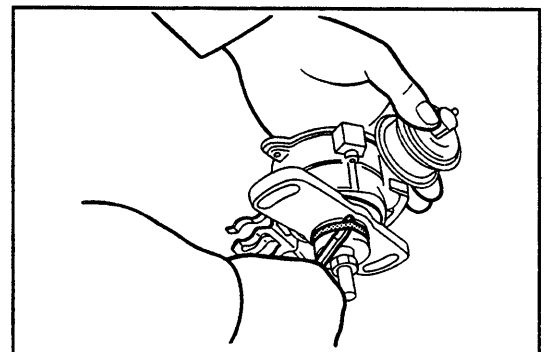
Since the engine oil flows out, insert a suitable cloth under the distributor connecting section.



WR88-IG117

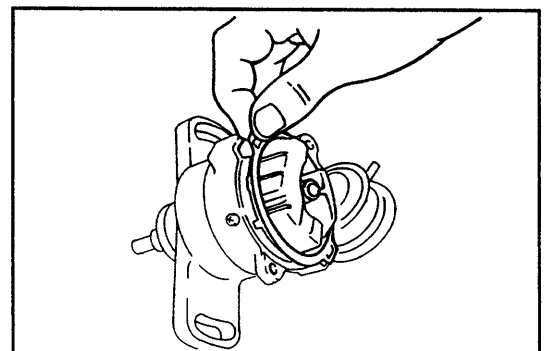
DISASSEMBLY OF DISTRIBUTOR

1. Remove the "O" ring from the distributor housing.
2. Remove the distributor cap from the distributor housing.



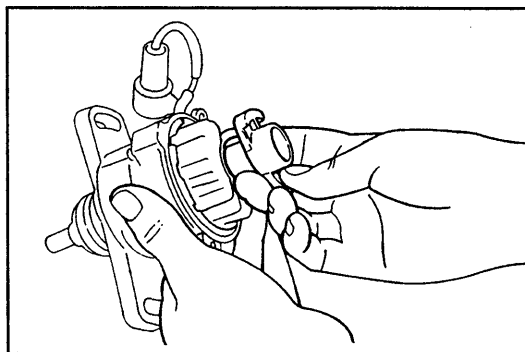
WR88-IG118

3. Remove the distributor cap gasket.



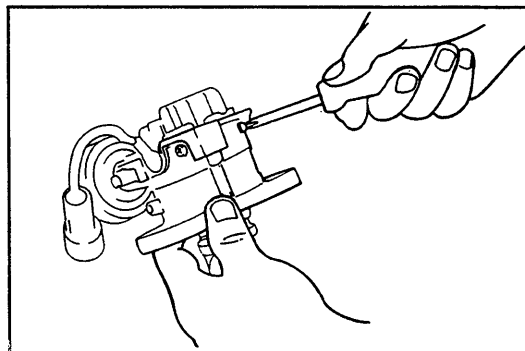
WR88-IG119

4. Remove the rotor.



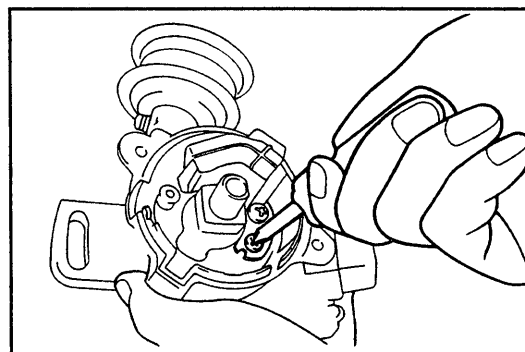
WR88-IG120

5. Remove the ignitor by removing the two attaching screws.



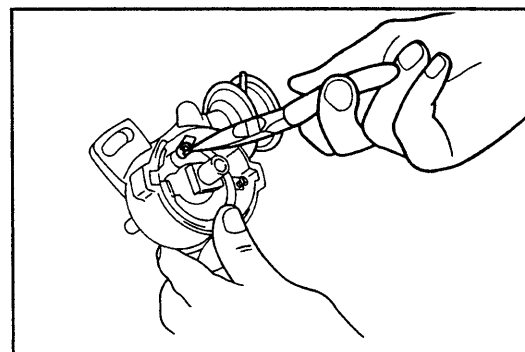
WR88-IG121

6. Remove the signal generator by removing the two attaching screws.



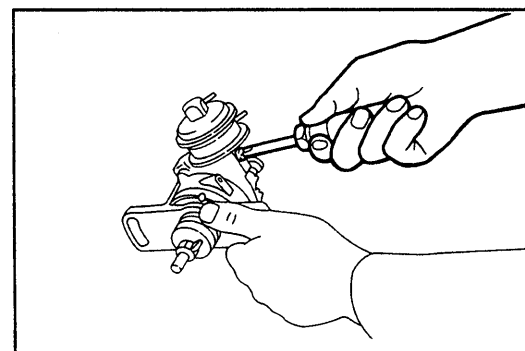
WR88-IG122

7. Remove the snap washer of the vacuum advancer.



WR88-IG123

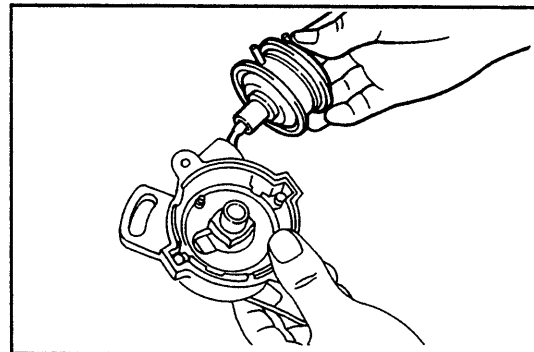
8. Remove the attaching screw of the vacuum advancer.



WR88-IG124

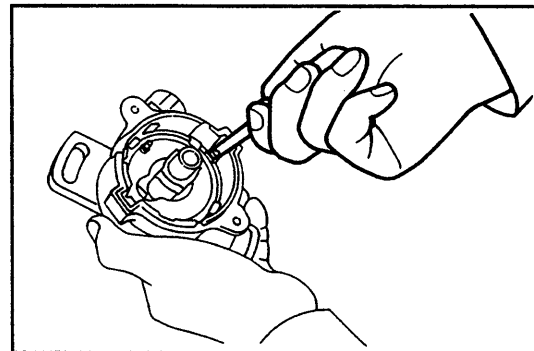
IGNITION SYSTEM

9. Remove the "E" ring and remove the vacuum advancer from the pin of the stationary plate.
Pull out the vacuum advancer from the distributor housing.



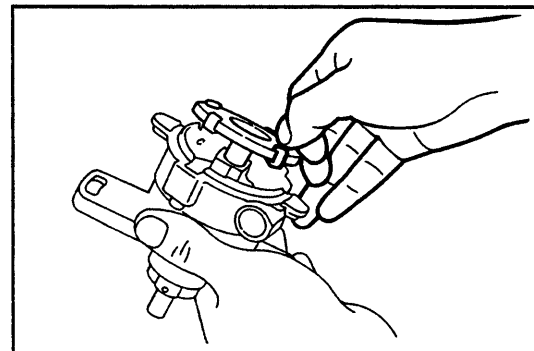
WR88-IG125

10. Remove the attaching screws and plate of the distributor stationary plate.



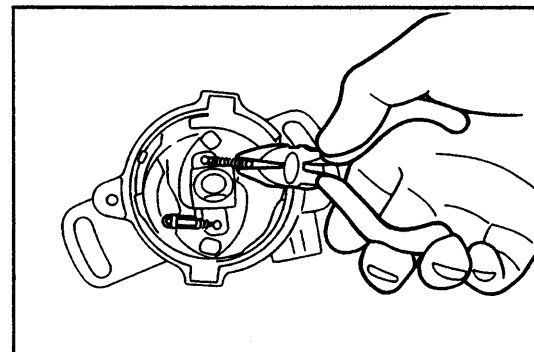
WR88-IG126

11. Remove the stationary plate from the distributor housing.



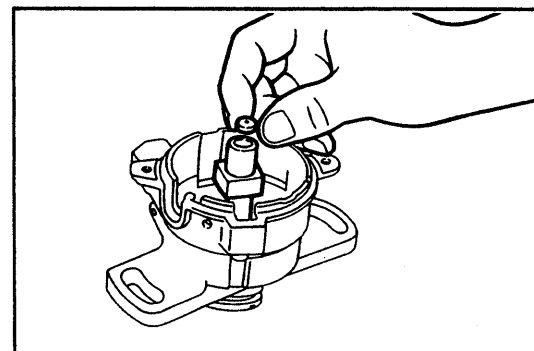
WR88-IG127

12. Remove the governor springs.



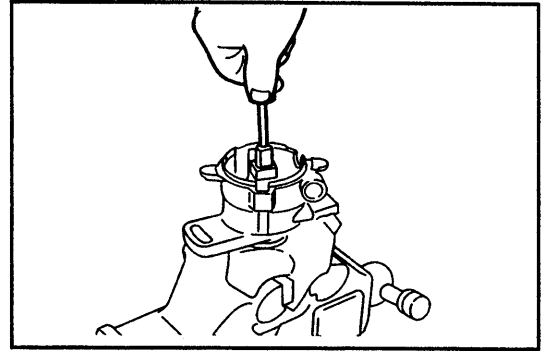
WR88-IG128

13. Removal of signal rotor assembly
(1) Remove the grease stopper.



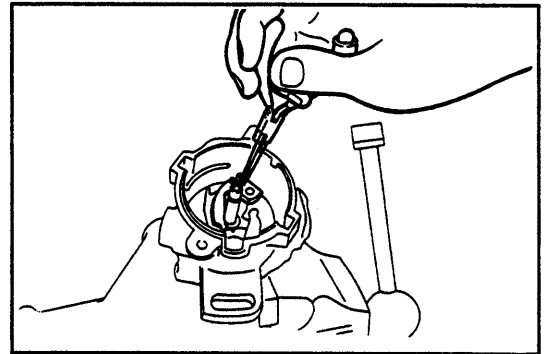
WR88-IG129

- (2) Remove the attaching screws of the signal rotor assembly.
- (3) Remove the signal rotor assembly.



WR88-IG131

14. Remove the snap washer of the governor weight. Remove the governor weight.

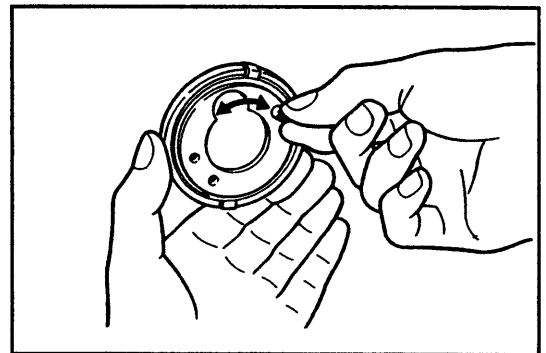


WR88-IG132

INSPECTION OF DISTRIBUTOR COMPONENTS

1. Inspect the stationary plate.

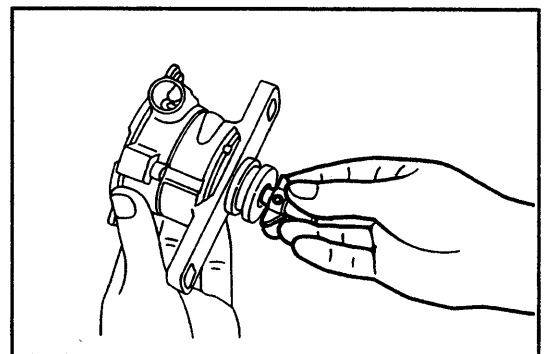
Check to see if the stationary inner plate rotates on the outer plate smoothly.
If the inner plate will not rotate smoothly, replace the stationary plate.



WR88-IG133

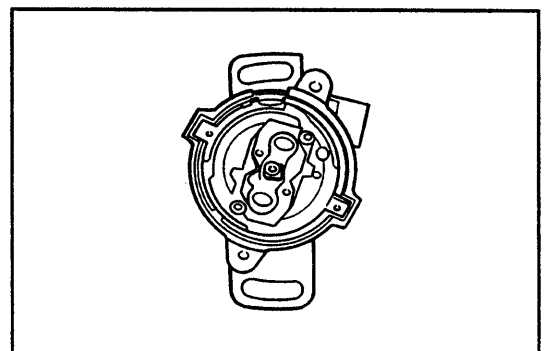
2. Inspection of Distributor Housing

(1) Check to see if the governor shaft rotates smoothly.
If it will not rotate smoothly, replace the distributor housing.



WR88-IG134

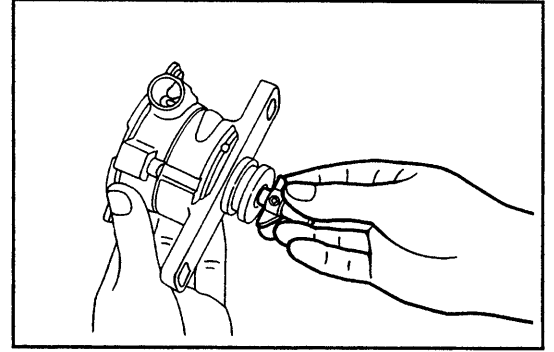
(2) Check the sliding section of the governor weight for wear or damage.
Replace the distributor housing if it exhibits wear or damage.



WR88-IG135

IGNITION SYSTEM

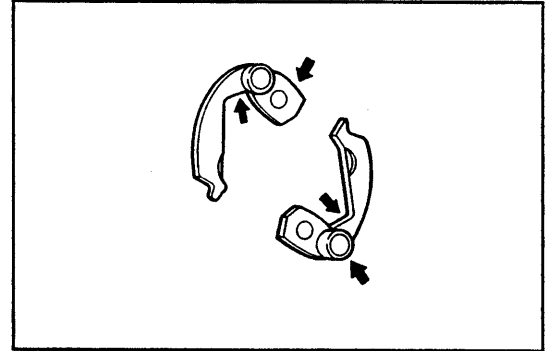
- (3) Check the coupling section of the governor shaft for wear or damage. Also, check to see if any excessive play is present in the turning direction.
Replace the distributor housing if it exhibits wear, damage and/or excessive play in the turning direction.



WR88-IG136

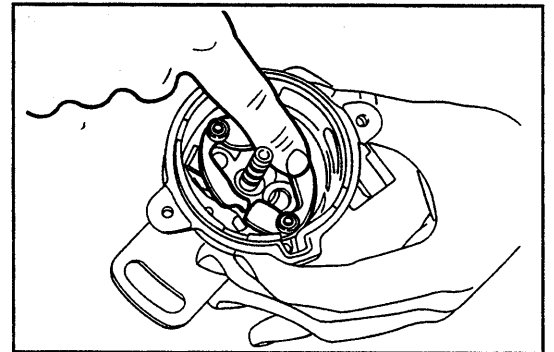
3. Inspection of Governor Weight for Damage or Wear

- (1) Visually inspect the governor weight for damage or wear.
Replace the governor weight if it exhibits damage or wear.



WR88-IG137

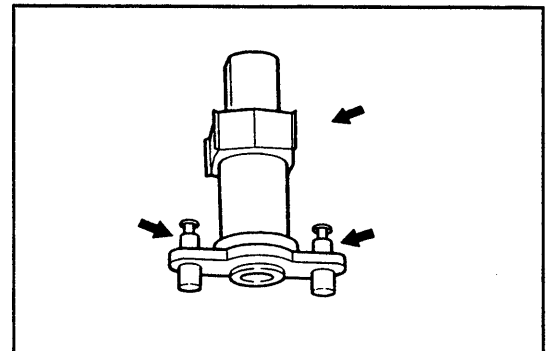
- (2) Install the governor weight to the governor shaft. Check to see if any excessive play is present.
If excessive play is present, replace the governor weight and/or distributor housing, as required.



WR88-IG138

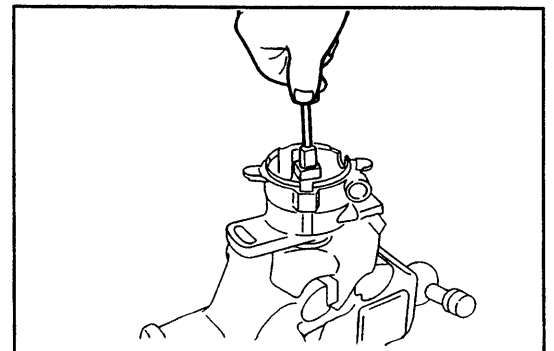
4. Inspection of Signal Rotor Assembly

- (1) Visually inspect the signal rotor for damage.
Replace the signal rotor assembly if it exhibits damage.
- (2) Check the pin section of the signal rotor assembly for wear or damage.
Replace the signal rotor assembly if the pin section exhibits wear or damage.



WR88-IG139

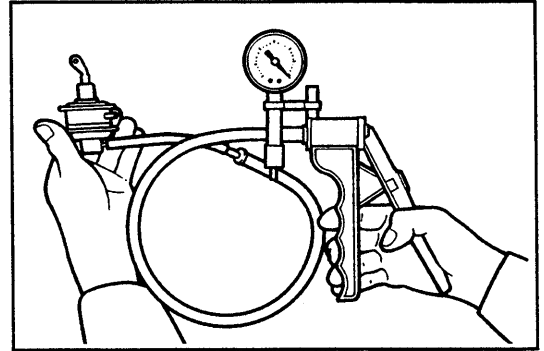
- (3) Install the signal rotor assembly to the governor shaft temporarily. Check to see if the signal rotor is tilted.
Replace the signal rotor assembly and/or distributor housing if it is tilted.



WR88-IG140

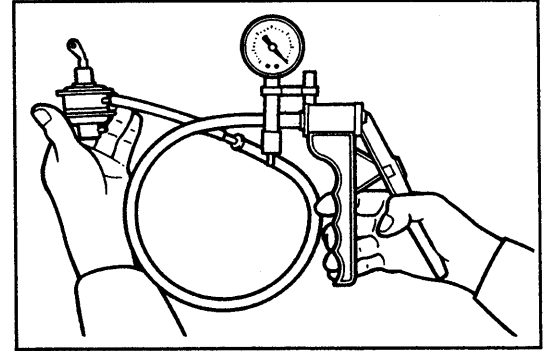
5. Inspection of Vacuum Advancer

(1) Gradually apply a negative pressure to the main diaphragm of the vacuum advancer. Ensure that the rod of the vacuum advancer is drawn into the diaphragm room side, corresponding to the negative pressure. Replace the vacuum advancer if the rod will not be drawn.



WR88-IG141

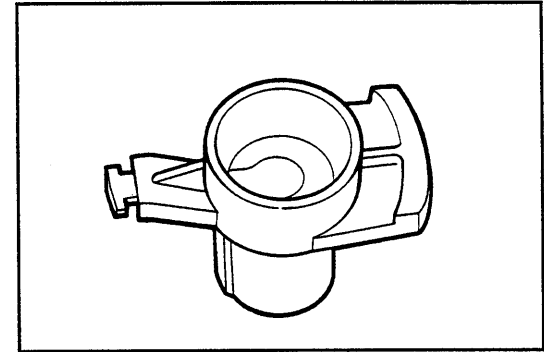
(2) Gradually apply a negative pressure to the sub diaphragm of the vacuum advancer. Ensure that the rod of the vacuum advancer is drawn into the diaphragm room side, corresponding to the negative pressure. Replace the vacuum advancer if the rod will not be drawn.



WR88-IG142

6. Inspection of Rotor

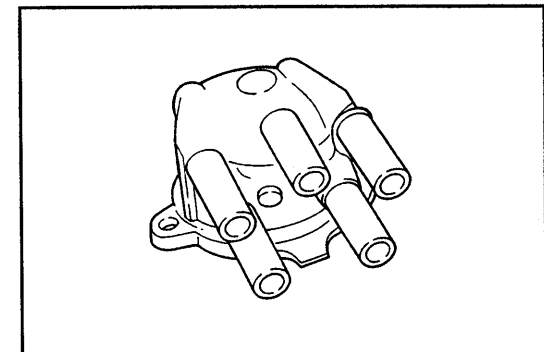
Check the center carbon contacting surface and electrode for damage, such as wear, electrolytic corrosion and cracks. If the surface or electrode exhibits damage, replace the rotor, as required.



WR88-IG143

7. Inspection of Distributor Cap

Check the distributor cap for cracks. Also, check the electrode and center carbon for damage, such as wear. Replace the distributor cap if the cap, electrode or carbon exhibits damage.



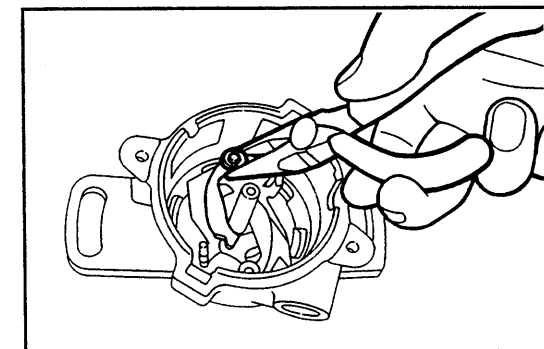
WR88-IG144

ASSEMBLY OF DISTRIBUTOR

1. Install the governor weight to the distributor housing. Install the snap washer.

NOTE:

Thinly apply high-temperature grease to the sliding section.

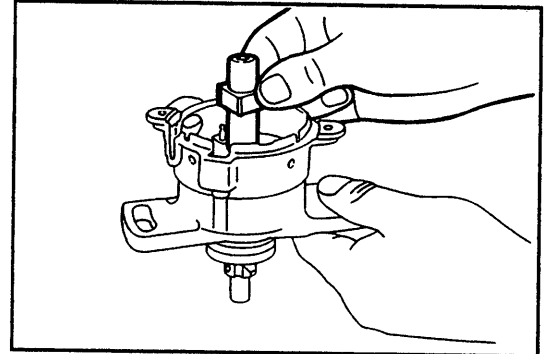


WR88-IG145

IGNITION SYSTEM

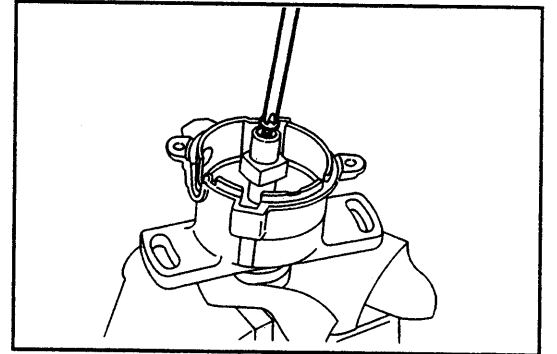
2. Installation of signal rotor assembly

(1) Thinly apply high-temperature grease to the sliding section of the signal rotor assembly. Install the signal rotor assembly to the distributor housing.



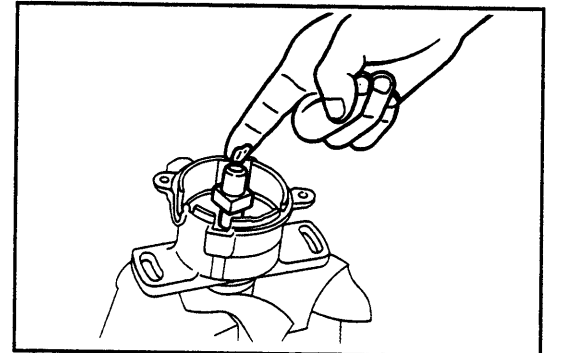
WR88-IG146

(2) Tighten the attaching screw.



WR88-IG147

(3) Pack high-temperature grease in the signal rotor assembly.

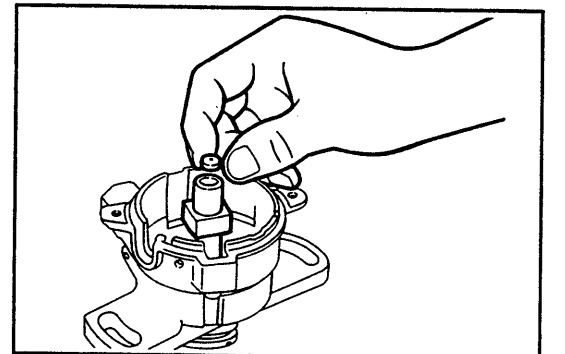


WR88-IG148

(4) Press the grease stopper by your hand.

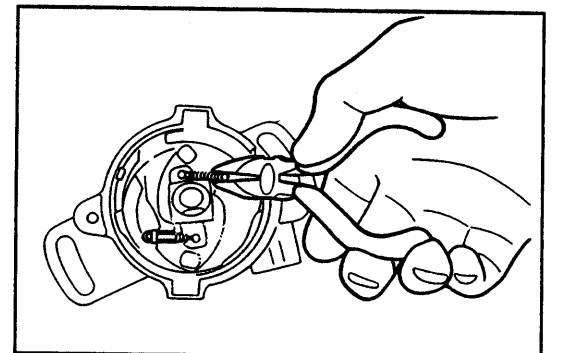
NOTE:

Wipe off any excess grease which has oozed out.



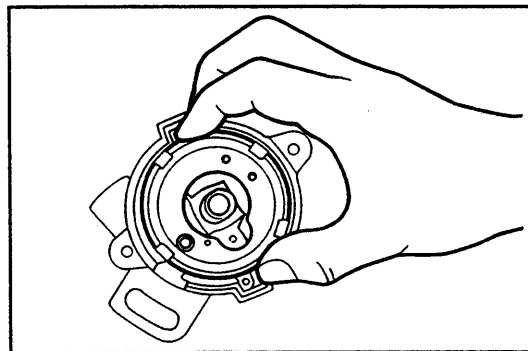
WR88-IG149

3. Install the new governor spring to the distributor.



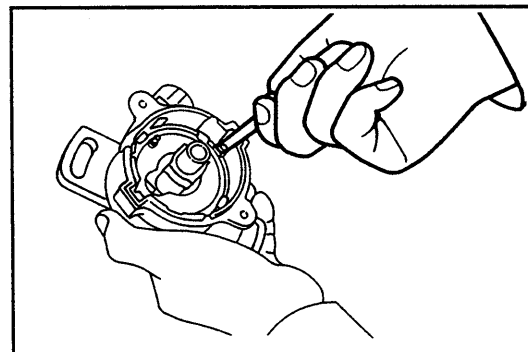
WR88-IG150

4. Assemble the stationary plate, lining up the cut-out section of the distributor housing.



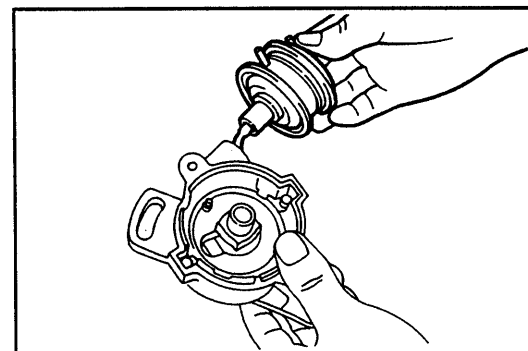
WR88-IG151

5. Secure the stationary plate installation seat and stationary plate with the screws.



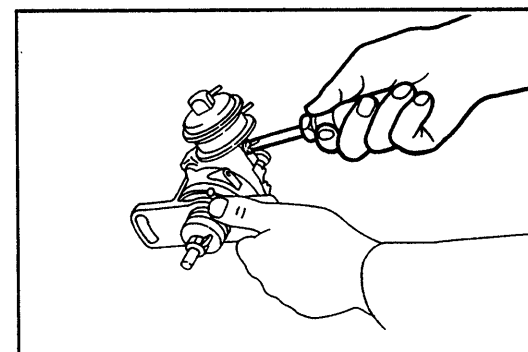
WR88-IG152

6. Insert the vacuum advancer into the distributor housing. Connect it to the pin of the stationary inner plate.



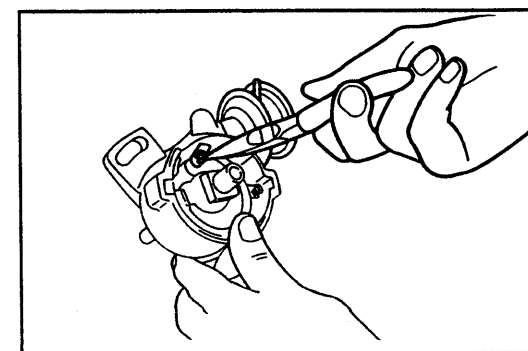
WR88-IG153

7. Align the screw hole of the vacuum advancer with the screw hole of the distributor housing. Install and tighten the attaching screw.



WR88-IG154

8. Attach the snap washer of the vacuum advancer.

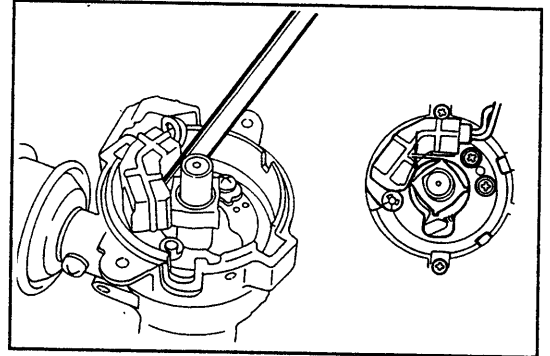


WR88-IG155

IGNITION SYSTEM

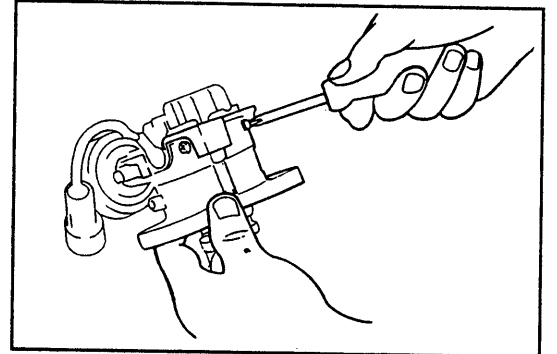
9. Installation of signal generator

Install the signal generator to the stationary plate. Adjust the air gap in such a way that the air gap in relation to the signal rotor is 0.2 - 0.4 mm (0.0079 - 0.015 inch).



WR88-IG156

10. Install the ignitor to the distributor with the screw.



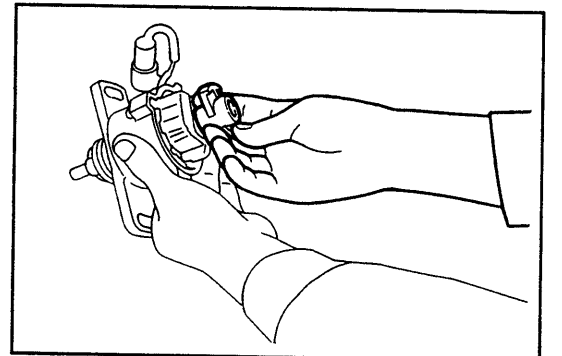
WR88-IG157

11. Attach the rotor.

12. Install a distributor cap gasket to distributor body.

NOTE:

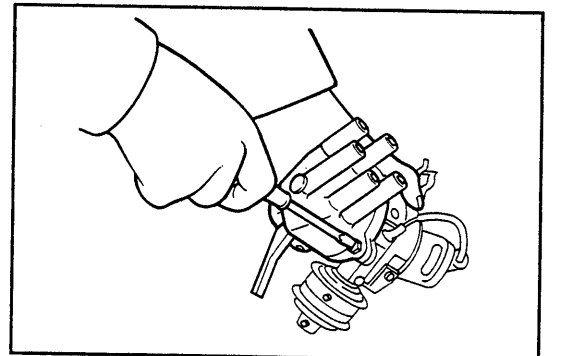
If the gasket is damaged, replace it with a new one.



WR88-IG159

13. Install the distributor cap to the distributor housing.

Also, tighten the clamp of the distributor connector, too, at the vacuum advancer side of the distributor cap attaching screw.

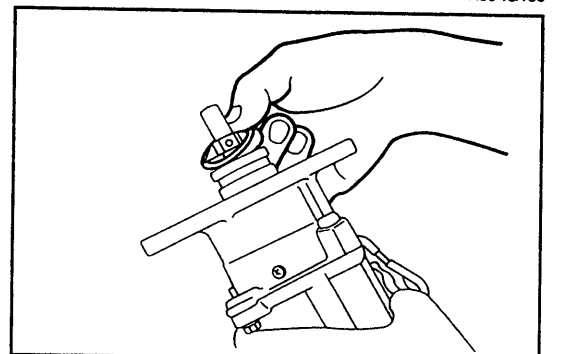


WR88-IG160

14. Install a new "O" ring to the distributor housing.

NOTE:

- Be very careful not to damage the "O" ring.
- When the distributor is pulled from the cylinder head once, be sure to replace the "O" ring with a new part.



WR88-IG161

INSTALLATION OF DISTRIBUTOR

1. Turn the crankshaft, until the No.1 cylinder (at the timing belt side) comes at the top dead center at the end of the compression stroke.
Under this conditions, the crankshaft timing marks should be aligned and the valve rocker arms should be inoperative (the rocker arms actuated by the camshaft are not pushing down the valves).

NOTE:

Ensure that the No.1 rocker arms are not operating. This check can be performed by moving the rocker arms with your fingers after removing the oil filler cap.

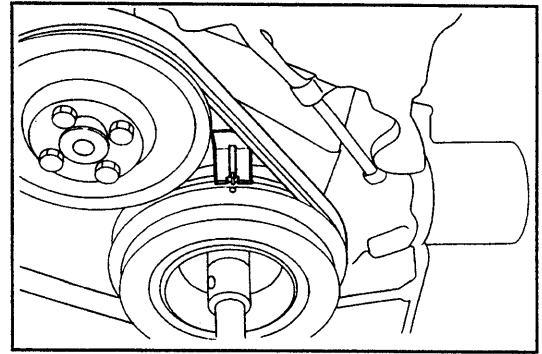
2. Align the cut-out section of the distributor housing with the cut-out section of the coupling.

3. Insert the distributor into the cylinder head. At this time, ensure that the distributor attaching hole of the cylinder head comes at the center of the elongated hole for the distributor bolt.

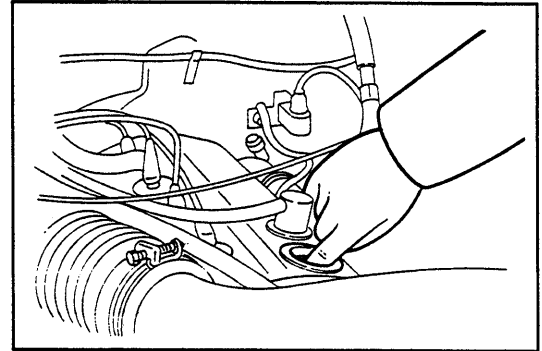
4. Tighten the distributor attaching bolts temporarily.

NOTE:

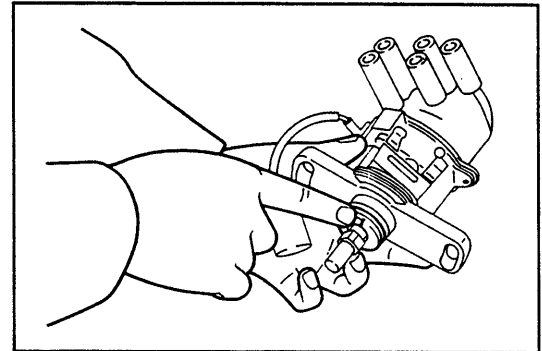
The final tightening should be performed after the check and adjustment of the ignition timing have been completed.



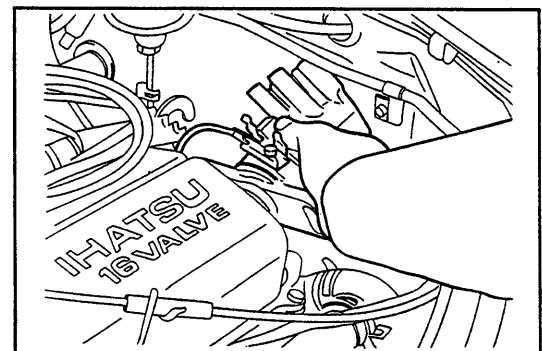
WR88-IG162



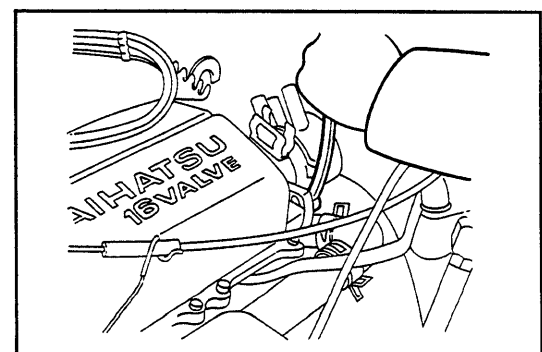
WR88-IG163



WR88-IG164



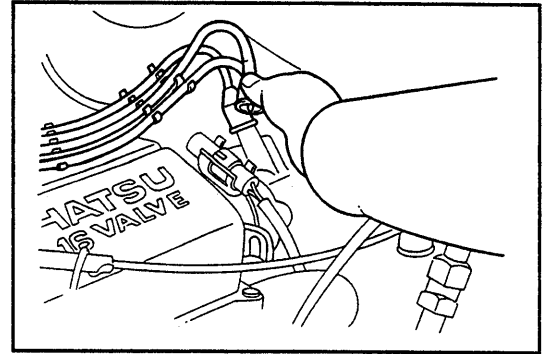
WR88-IG165



WR88-IG166

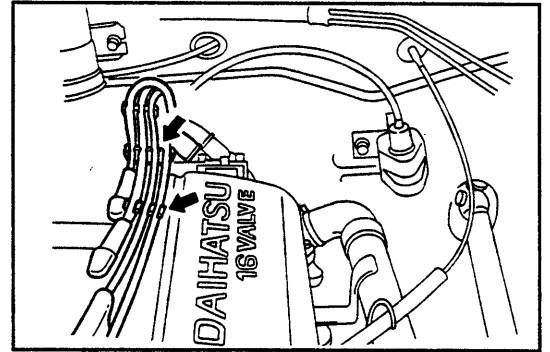
IGNITION SYSTEM

5. Connect the vacuum advancer hoses.
6. Connect the distributor connector. Install it to the clamp.
7. Connect the resistive cords to the distributor cap.



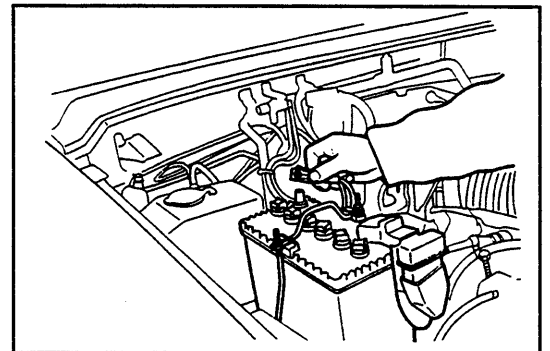
WN88E-IG022

8. Install the clamp to the resistive cord.



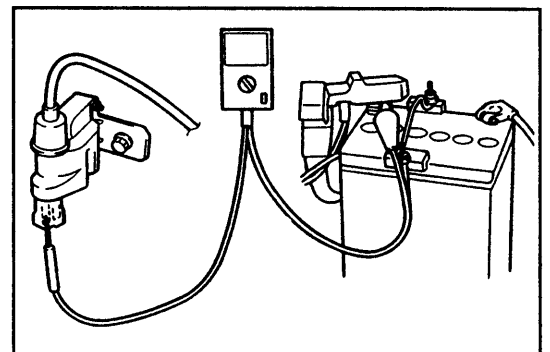
WR88-IG170

9. Connect the ground cable terminal to the negative (-) terminal of the battery.



WR88-IG171

10. Check and adjustment of ignition timing
 - (1) Start the engine. Warm up the engine.
 - (2) Connection of tachometer and timing light
 - 1) Connect the cable for measuring tachometer use to the negative terminal of the ignition coil.



WR88-IG172

NOTE:

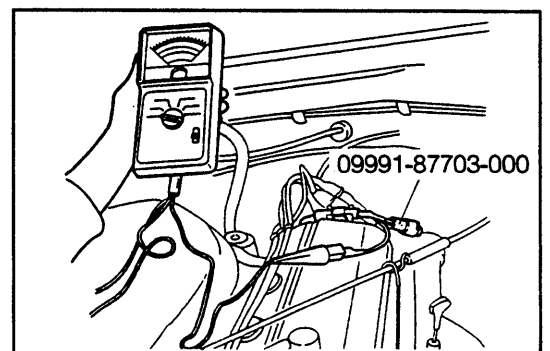
Fully use the following SST which is capable of connecting tachometers other than a clamp-on type tachometer.

SST: 09991-87703-000

CAUTION:

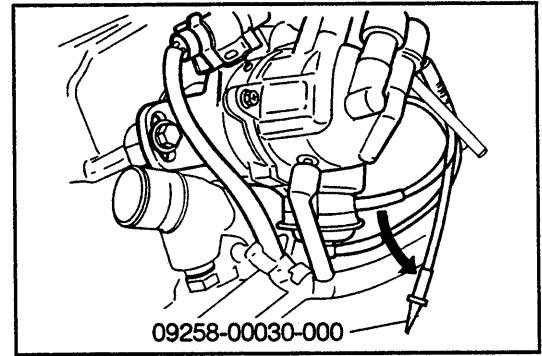
- Never allow the tachometer terminal to touch ground. It could result in damage to the ignitor and/or ignition coil.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your unit before using.

- 2) Connect the timing light to the resistive cord of the No.1 cylinder (at the timing belt side).



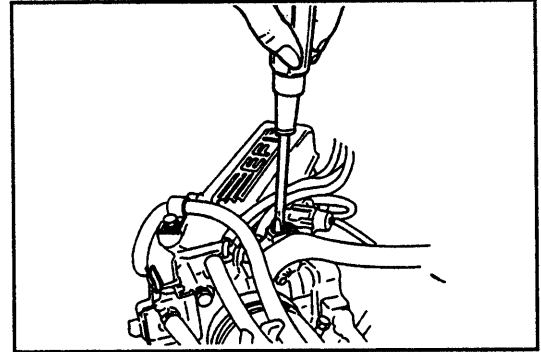
09991-87703-000
WR88-IG173

- (3) Disconnect the vacuum hose at the sub side of the vacuum advancer of the distributor. Plug the disconnected vacuum hose, using the following SST (stopper).
SST: 09258-00030-000



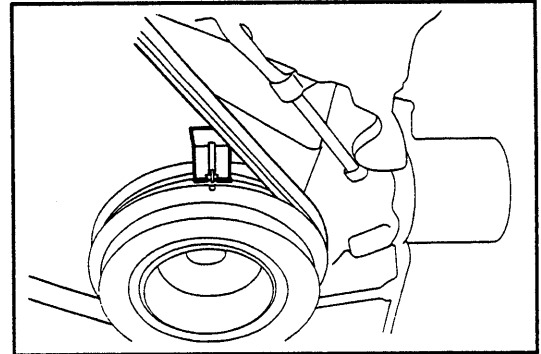
WR88-IG174

- (4) Ensure that the engine revolution is under 1000 rpm and stable.
If the engine revolution exceeds 1000 rpm or is unstable, adjust the engine idle speed.
(See page MA-10.)



WR88E-IG023

- (5) Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.
Tighten the distributor attaching bolts to the specified torque if the ignition timing mark is aligned with the indicator.

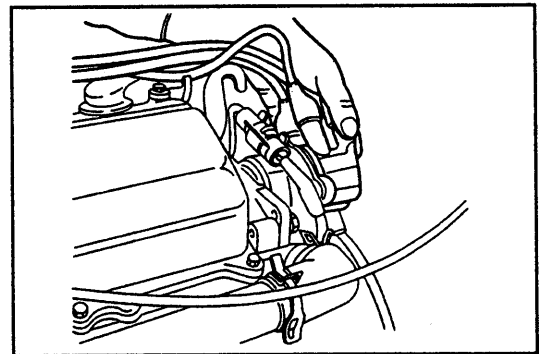


WR88-IG176

- (6) Loosen the distributor attaching bolts. Adjust the distributor installation position, until the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.

Reference

If the distributor is turned clockwise, the timing will be advanced. Conversely, if the distributor is turned counterclockwise, the timing will be retarded.

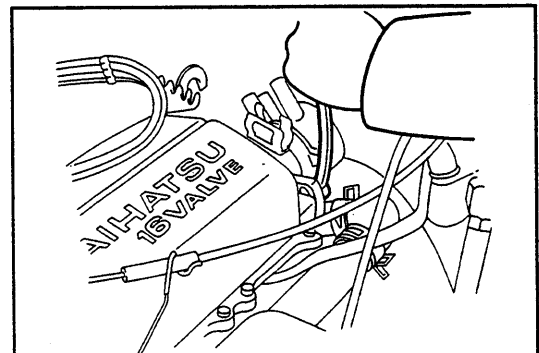


WR88-IG177

- (7) Tighten the distributor attaching bolts to the specified torque, making sure that the ignition timing is not disturbed.

Tightening Torque: 1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb)

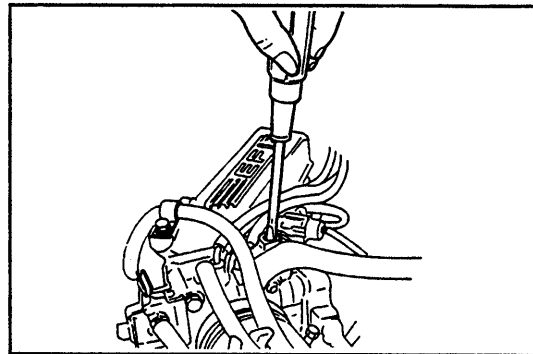
11. Connect the vacuum hose at the sub side of the vacuum advancer to the vacuum advancer.



WR88-IG178

IGNITION SYSTEM

12. Adjust the engine idle speed.
(See page MA-10.)
13. Check the oil level.
(See page LU-2.)



WN88E-IG024