

IGNITION SYSTEM

Subject	Page	Subject	Page
Precautions	206	V8 Ignition	209
On Vehicle Inspection	206	Timing Adjustment	209
Spark Test	206	Initial Timing	209
Inspection of High Tension Lead	206	Check EST Ignition Timing	209
Inspection of Spark Plugs 6 Cylinder & V8	207	Test Ignition Coil	209
V6 Ignition	207	General Information	209
Timing Adjustment	207	Safety Procedures	209
Ignition Coils	207	Remove Distributor	209
Remove	207	Dismantle of Distributor	210
Install	208	Inspection and Replacement of Distributor	210
DFI Module	208	Assembly of Distributor	210
Remove	208	Installation of Distributor	210
Install	208	System Testing	211
Coil Attaching Screws	208	Ignition System Testing Equipment	211
Crankshaft Sensor V6	208	Test Procedures	211
Remove	208	Firing Order	211
Install	208	Problem Diagnosis	211
		Specifications	211

IGNITION SYSTEM

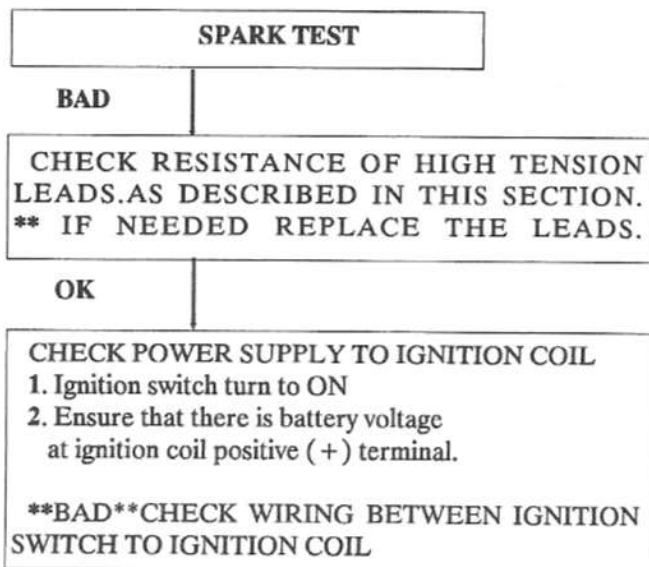
Precautions.

1. Do not leave the ignition switch on for more than 10 minutes after the engine does not start.
2. When a tachometer is connected to the system, connect the tachometer positive (+) terminal to the DFI modual (E) tachometer terminal or the tachometer connector on the brown wire circuit 121. The tachometer negative (-) to earth.
3. When a tachometer is connected to the system, connect the tachometer test probe to the service connector brown wire at the distributor.
4. As some tachometers are not compatible with this ignition system, we suggest that you confirm compatibility of your unit before using it.
5. NEVER allow the ignition coil terminals to touch ground as it could result in damage to the (V6) crank sensor (V8) distributor and/or ignition coil.
6. When engine is running do not disconnect the battery.
7. Ensure that the (V8) distributor is properly grounded to the body.

On Vehicle Inspection.

Spark Test.

Use a spark tester, as checking by jumping the spark to earth is not sufficient because this only requires low voltage.



OK

CHECK RESISTANCE TO IGNITION COILS
Resistance (Cold)
Primary (See below)
Secondary (See below)
****BAD**REPLACE THE FAULTY COIL**

OK

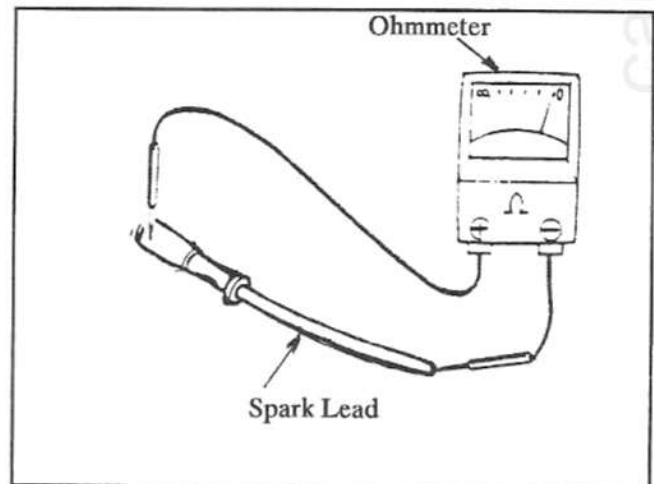
CHECK AIR GAP OF SENSOR or DISTRIBUTOR
Air Gap: 0.3-0.5 mm

OK

TRY ANOTHER IGNITION MODUAL

Inspection of High Tension Lead.

1. Carefully Remove High Tension Lead by Rubber Boot from Spark Plugs.
* Pulling on or bending the cords may damage the conductor inside.
2. Examine Resistance of High Tension Lead with Distributor Cap.
Check that the resistance does not exceed the maximum using an ohmmeter.

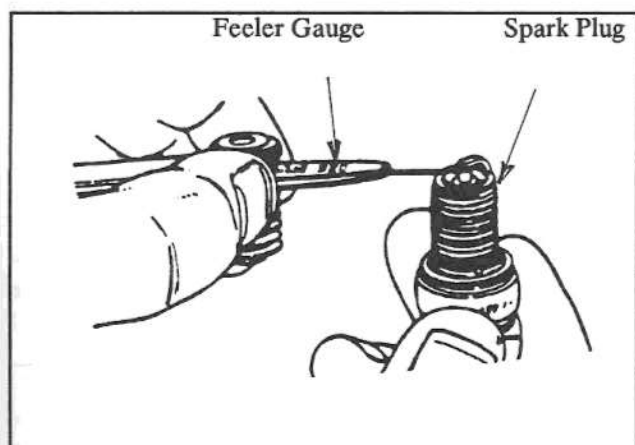


Maximum resistance: 25 k ohms/ cord.
Inspect the terminals, and replace the high tension lead and/or distributor cap if more than maximum specified.

IGNITION SYSTEM

PAGE 207

Inspection of Spark Plugs. 6 Cylinder & V8



1. Clean and Inspect Spark Plugs.

(a) Clean the spark plugs using a spark plug cleaner or wire brush.

(b) Examine the spark plugs for electrode wear, thread damage and insulator damage. Replace the plugs if a problem is found.

2. Adjust Electrode Gap.

Bend the outer electrode carefully to obtain the correct electrode gap.

Spark Plug Gap

V6 Correct electrode gap: 1.5 mm

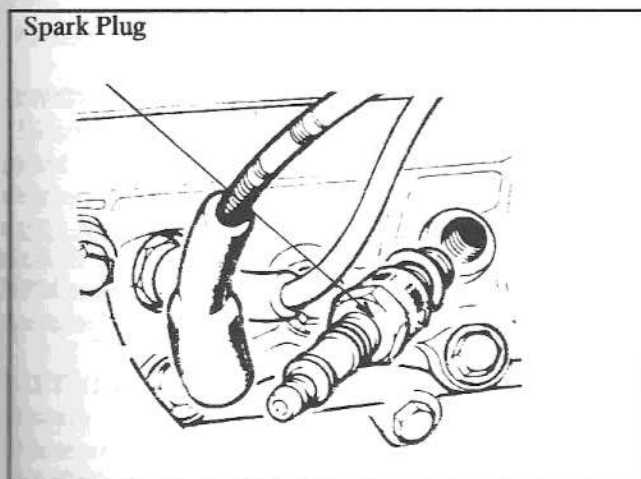
V8 Correct electrode gap: 1.0 mm

3. Spark plug type.

Spark Plug Type

V6 Specified Spark Plug: R44LTS6

V8 Specified Spark Plug: R42LTS



4. Torque plug to correct specification.

Spark Plug Torque specification: 14-20Nm

V6 IGNITION

TIMING ADJUSTMENT

The ignition timing can not be adjusted, however it is monitored by the Direct Fire Ignition (DFI). Clearance adjustments of the crankshaft sensor is only for proper

clearance of the sensor and the interrupter rings, this has no effect on the timing of the ignition.

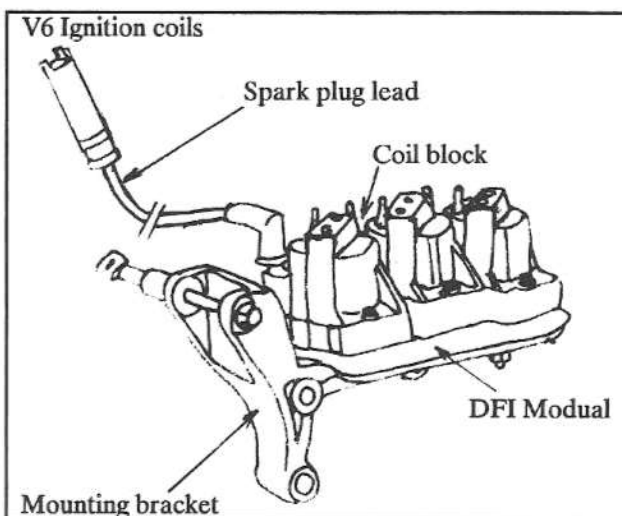
CHECK EST IGNITION TIMING

Electronic Spark Timing (EST) spark advance is adjusted by the ECM (electronic control module) to 10 degrees when the ALDL diagnostic "test" terminal is earthed while the engine is running at less than 2000 rpm.

EST test can be carried out by earthing the ALDL test terminal while the engine is running at a constant RPM of 1600-1800. The RPM should drop if the EST is operating satisfactory. The engine management system will give a fault code number 42.

IGNITION COIL BLOCK

Remove



1. The coil block has the terminals numbered, identify the leads if required and remove.

2. Remove coil block by removing the attaching screws disconnect the wires underneath the coils.

Inspection of Ignition Coil Block.

1. Use a digital ohmmeter.

2. Check Primary Coil Resistance. V6 - Disconnect the coil block, and turn upside down. Measure the resistance between the two terminals for each coil.

Primary coil resistance (cold):

V6 0.3 - 1.5 Ohms

3. Check Secondary Oil Resistance. V6 - Measure the resistance between the two terminals on top of coil block.

Secondary coil resistance (cold):

V6 5000-10000 Ohms

4. Examine Power Source Line.

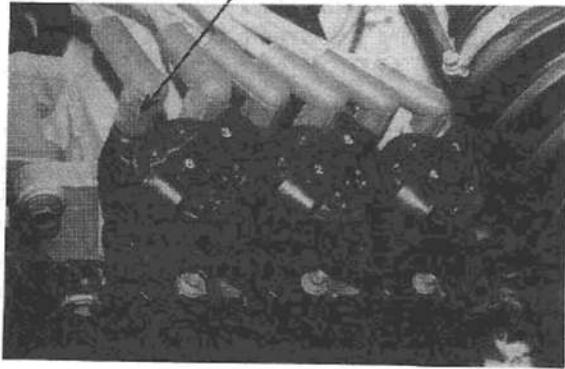
With the ignition at ON and using a voltmeter, connect the positive (+) probe to the (+) terminal of the coil and the negative (-) probe to the body ground.

Voltage: Approx. 12V

Examine the ignition switch and wire harness if a problem is found.

V6

Coil Terminals

**Install**

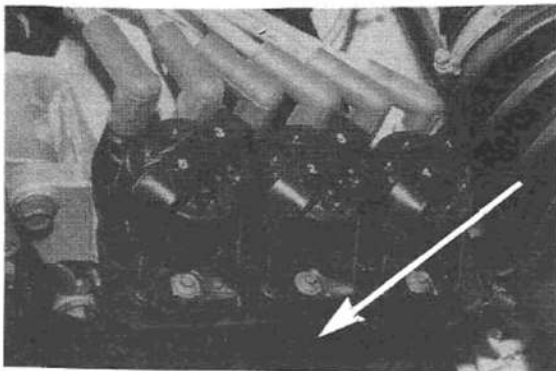
1. Carefully install coils onto module and tighten attaching screws to specified torque.

Coil Attaching Screws: 4-5 Nm.

2. Connect spark plug leads to correct spark plugs & coil.

Firing Order: 1 - 6 - 5 - 4 - 3 - 2

3. Connect battery earth lead, start engine and ensure engine operates correctly.

DFI MODULE**DFI Modul V6****Remove**

1. Remove harness connector to module.
2. Label the spark plug leads to the coil block and remove.

Coil block has the terminals numbered, identify the leads if required and remove.

3. Remove coil block by removing the attaching screws disconnect the wires underneath the coils.

4. Remove module assembly.

Install**Install**

1. Install modul assembly
2. Carefully install coils onto module and tighten attaching screws to specified torque.

Coil Attaching Screws: 4-5 Nm.

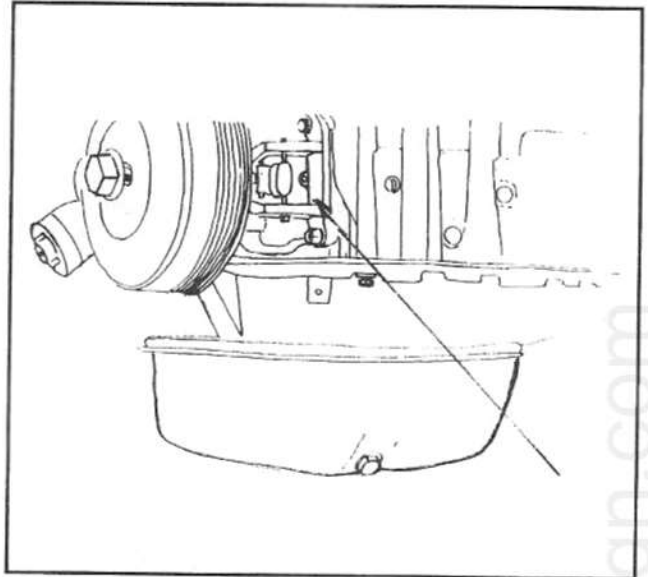
3. Connect spark plug leads to correct spark plugs and coil.

Firing Order: 1 - 6 - 5 - 4 - 3 - 2

4. Reconnect electrical harness to DFI modul.

CRANKSHAFT SENSOR V6**Remove**

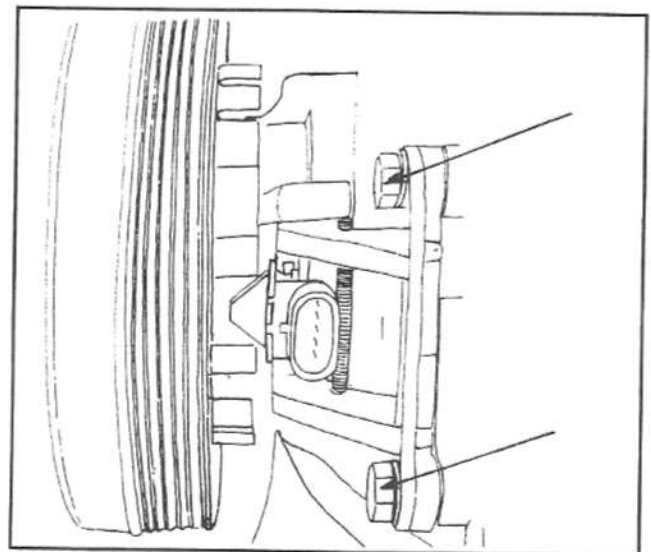
1. Disconnect battery earth lead.
2. Loosen the bolt on the automatic adjusting idler pulley mounting stud and turning the stud, relieve the tension on the drive belt.



3. Remove crankshaft balancer attaching nut, remove balancer.

4. With a small bar pry the sensor shield from the front cover studs and remove electrical wiring connector.

5. Remove crankshaft sensor bracket bolts and remove assemblies.

Install

IGNITION SYSTEM

PAGE 209

1. Connect the crankshaft sensor assembly onto front cover dowel pin and install, but do not fully tighten attaching studs.

2. Loosen sensor bracket bolt to allow sensor to move in mounting bracket.

3. Install sensor, it may require a sensor adjusting tool to help achieve the correct air gap. Tighten sensor bracket to front cover attaching studs to specification.

Sensor Bracket front Cover Studs: 25 - 35 Nm.

4. Move sensor in or out so that vanes are in the correct position with sufficient air gap, fit wiring connector. Tighten sensor clamping bolt to specification.

Sensor Bolt: 3 - 5 Nm

5. Check that the sensor and vanes do not make any contact, if contact is made because of damage to any component, replace that component.

6. Install drive belt and earth cable, test drive vehicle.

V8 IGNITION**TIMING ADJUSTMENT****IMPORTANT**

The initial timing adjustment of the distributor must be correct for the ECM to give the correct adjustment to the ignition timing while the engine is running.

INITIAL TIMING

1. With the engine idling at normal operating temperature, earth the ALDL test terminal.

2. Check that the timing is at 10 degrees BTDC (advanced) by using a timing light connected to cylinder number 1 plug lead.

5. If adjustment is necessary, loosen distributor bolt, and rotate distributor until timing is at 10 degrees BTDC. Retighten bolt.

6. Remove earth jumper at ALDL connector.

CHECK EST IGNITION TIMING

Electronic Spark Timing (EST) spark advance is adjusted by the ECM (electronic control modual)to 10 degrees. To carry out this test the ECM must be in diagnostic mode, that is the test terminal on the ALDL earthed. If the engine is operating at approximately 1750 RPM and the ALDL terminal is earthed the RPM should decrease.

TEST IGNITION COIL**Primary Coil Test**

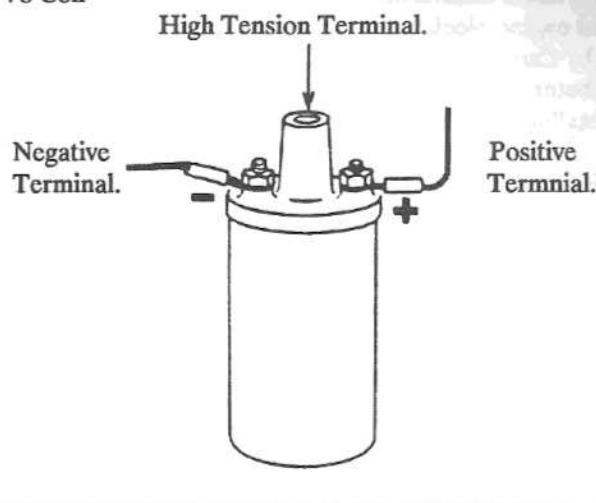
Measure the resistance between the + and - terminals.

V8 (Solid State) 0.75 - 1.5 Ohms

Secondary Coil Test

Measure the resistance between the positive (+) and high-tension terminal, using an ohmmeter at idling.

V8 (Solid State) 5000-7000Ohms

V8 Coil**DISTRIBUTOR (Solid State Type)****GENERAL INFORMATION**

The ignition system is a "High Energy" system which features an ignition modual on the front left side of the engine compartment an EST unit behind passenger kick trim, which is connected to various sensors on the engine.

The distributor incorporates an inductive type pulse generator which signals the control unit to switch primary current at ignition coil. The dwell angle is regulated by control unit and can not be adjusted. The control unit also incorporates a current control circuit which automatically maintains the optimum current for operating conditions.

SAFETY PROCEDURES

1 The "High Energy" ignition system produces extremely high voltages. These high voltages occur not only in components but also in wiring between components. EXTRA CARE should be taken when working on entire ignition system.

2 DON'T open circuit the high tension leads as damage can occur to control unit.

3. When connecting a battery charger, BE SURE the ignition is switched off and battery leads are disconnected.

4. While carrying out test procedures leave ignition switched OFF until required and switch OFF immediately after the test is finished.

Remove Distributor.

1. Set No.1 Cylinder to TDC/Compression.

Set to TDC/Compression in the following way:

(a) Remove the No.1 spark plug.

(b) Place your finger over the hole of the No.1 spark plug and turn the crankshaft clockwise to TDC. If pressure is felt on your finger, this is TDC/compression of the No.1 cylinder. If not, repeat the process.

(c) Install the No.1 spark plug.

2. Disconnect ignition wire connector.

3. Remove high tension leads.

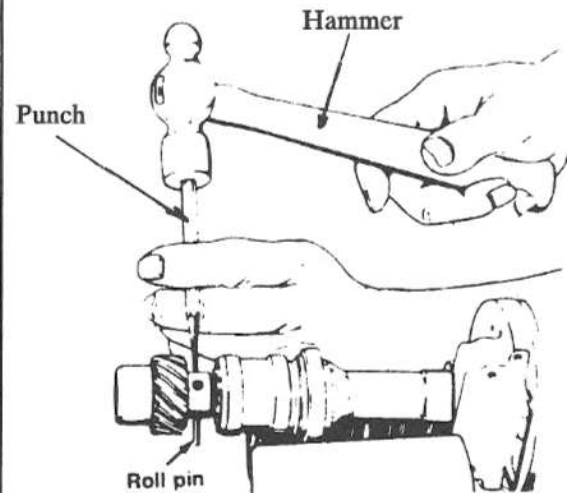
4. Remove distributor.

- (a) Make scratch marks or felt pen marks on distributor and engine block to help when installing distributor.
 (b) Carefully remove distributor, mark the edge of distributor to note position of rotor as this will help when installing distributor.

Dismantle of Distributor.

1. Remove Distributor Cap, Rotor.
 2. Remove adaptor
 3. Remove the Driven Gear.
- * Ensure not to damage the distributor shaft and housing.
- (a) Drive out the pin using a punch and hammer and remove the driven gear.
4. Remove side electrical terminal and clip.

If necessary, replace the driven gear.



5. Remove the Hall rotor. (It may be easier to remove the hall rotor from the shaft if the shaft is removed from the distributor.

- (a) Remove the top circlip.
 - (b) Remove lower circlip.
 - (c) Remove the Hall rotor, it may be firmly attached to the shaft, if tap off with the aid of two blocks of wood.
6. Remove the stator and base plate.
 - (a) Remove two screws.
 - (b) Remove stator and base plate.

Inspection and Replacement of Distributor.

1. Examine Hall rotor. Rotate the Hall rotor and examine for contamination, burns, or cracks replace if defective.
2. Examine distributor shaft bearing. Rotate the distributor shaft and ensure that the bearing is not rough or worn. Replace the distributor shaft or bearing if necessary.

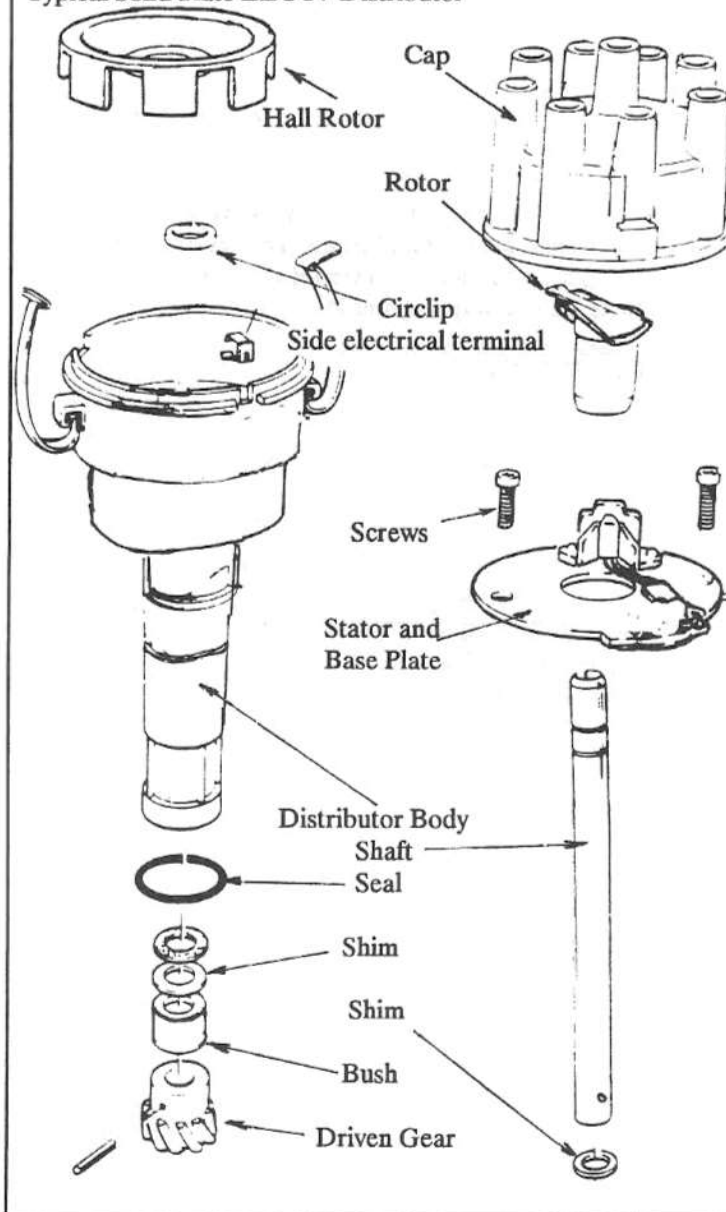
Assembly of Distributor.

1. Coat the distributor shaft lightly with high-temperature grease.
2. Replace the stator and base plate.
- (a) Replace stator and base plate.
- (b) Replace two screws.
3. Replace the side electronic terminal and clip.
4. Replace the Hall rotor.
- (a) Replace lower circlip.
- (b) Replace the Hall.
- (c) Replace the top circlip.
5. Replace the driven gear.
- (a) Line up the pin holes of the driven gear and distributor shaft.
- (b) Replace the pin.

Installation of Distributor.

1. Set No.1 Cylinder to TDC/Compression.

Typical Solid State EEC IV Distributor



IGNITION SYSTEM

PAGE 211

Set to TDC/Compression in the following way:

- (a) Remove the No.1 spark plug.
 - (b) Place your finger over the hole of the No.1 spark plug and turn the crankshaft clockwise to TDC. If pressure is felt on your finger, this is TDC/compression of the No.1 cylinder. If not, repeat the process.
 - (c) Install the No.1 spark plug.
2. Install Distributor.
- (a) Coat the spiral gear and governor shaft tip with engine oil.
 - (b) Install distributor so that the rotor is at the mark on the distributor that was made during removal.(No 1 cylinder spark plug lead).
 - (c) Insert the distributor, lining up the scratch marks or felt pen marks on the distributor and engine block which you made when removing distributor.
 - (d) Lightly tighten the hold-down bolt.
3. Connect High Tension Leads.
- Firing order:**
V6 1 - 2 - 7 - 8 - 4 - 5 - 6 - 3
 4. Connect Ignition Wire Connector.
 5. Adjust ignition timing by turning the distributor to obtain 10° BTDC using a timing light designed for use with a semi conductor type of ignition system.

SYSTEM TESTING

IGNITION SYSTEM TESTING EQUIPMENT

When conducting electrical checks on vehicle always use commercial type equipment (timing lights, oscilloscopes, tachometers, battery chargers, etc.). Older equipment can produce transient voltages which will cause damage to ignition modual unit. Check with manufacturer to determine if your test equipment is suitable for use with semi-conductor devices.

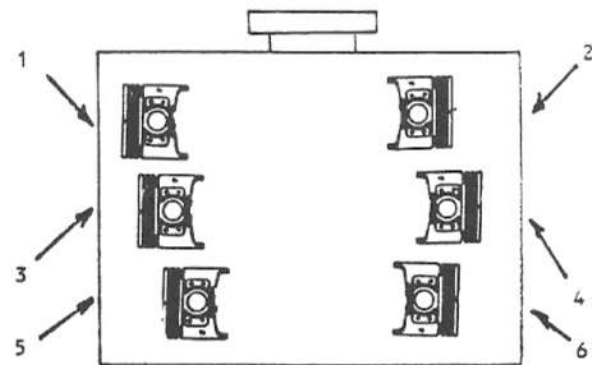
TEST PROCEDURES

- 1 The battery must be fully charged before ignition system testing.
- 2 Manufacture test leads and only use test equipment as outlined in "IGNITION SYSTEM TESTING."
- 3 DO NOT OPEN CIRCUIT any high tension cable with ignition switched on or with engine running as the ignition modual unit can be damaged.
- 4 When testing leave the ignition switched off until voltage or current check is necessary and switch off immediately check is complete.
- 5 AVOID CONTACT WITH PRIMARY AND SECONDARY WIRING WITH IGNITION SYSTEM ENERGISED. THE HIGH VOLTAGES PRESENT MAY BE HAZARDOUS.

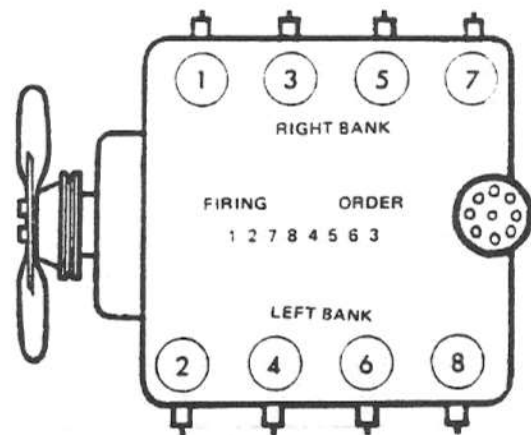
FIRING ORDER

V6 1 - 6 - 5 - 4 - 3 - 2
V8 1 - 2 - 7 - 8 - 4 - 5 - 6 - 3

V6 1 - 6 - 5 - 4 - 3 - 2



V8 1 - 2 - 7 - 8 - 4 - 5 - 6 - 3



Problem Diagnosis.

Problem diagnosis should be checked in Tune-up and Emission chaptersaulty.

SPECIFICATIONS

Firing order:

V6 1 - 6 - 5 - 4 - 3 - 2
V8 1 - 2 - 7 - 8 - 4 - 5 - 6 - 3

Spark Plug Gap

V6 Correct electrode gap: 1.5 mm
V8 Correct electrode gap: 1.0 mm

Spark Plug Type

V6 Specified Spark Plug: R44LTS6
V8 Specified Spark Plug: R42LTS

Spark Plug Torque specification: 14-20Nm

IGNITION SYSTEM

Hall Rotor Air Gap

Air Gap at Hall rotorPoint gap: 0.3 - 0.5 mm

Spark Plug Lead

Maximum resistance: 25 k ohms/ cord.

8/9

