

## DELCO-REMY HIGH ENERGY IGNITION SYSTEM

American Motors  
4-Cylinder

General Motors  
Fed. Chevette & T1000 w/o 5-Speed

### DESCRIPTION

The Delco-Remy High Energy Ignition System (HEI) consists of a distributor with an integral electronic module, a battery, an ignition coil, an ignition switch, spark plugs, and primary and secondary wiring. The distributor combines all ignition components, except the coil, into one unit. The distributor housing encloses the following components: Vacuum and centrifugal advance mechanisms, magnetic pick-up coil, pole piece (with internal teeth), trigger wheel (with external teeth), an electronic module (with built-in radio noise suppression capacitor), rotor and distributor shaft. See Fig. 1.

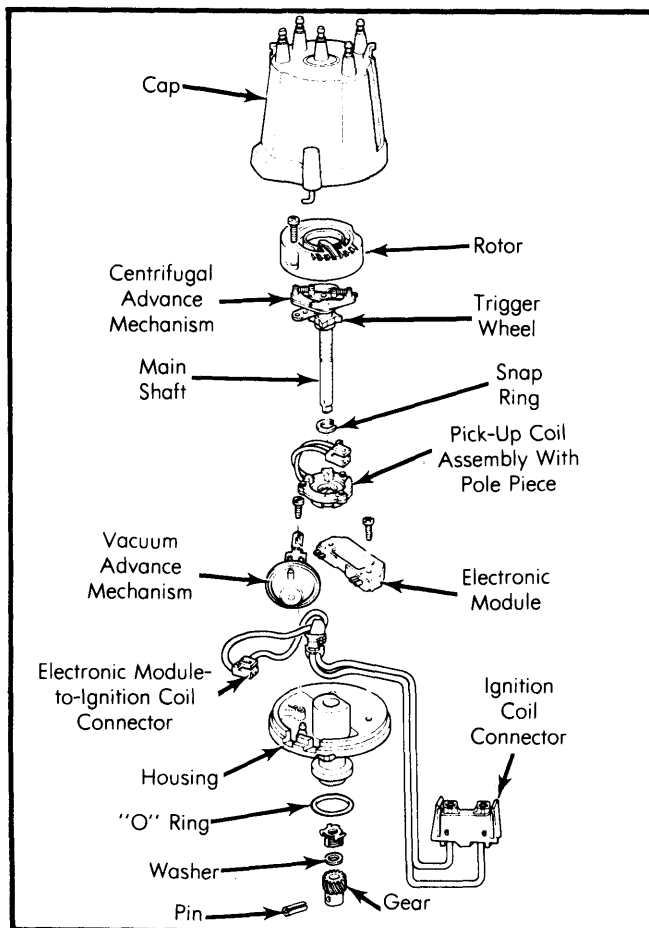


Fig. 1 Exploded View of HEI Distributor

**NOTE** — The trigger wheel and pick-up coil pole piece each have 4 teeth, one for each engine cylinder.

The ignition switch terminal and the ignition coil have full battery voltage when the ignition switch is in the "ON" or "START" position. There is no ballast resistor or resistance wire between the ignition switch and the ignition coil. The ignition coil is attached to the engine block next to the distributor.

### OPERATION

The pick-up coil assembly consists of a permanent magnet, a pole piece and a pick-up coil. The pick-up coil assembly is stationary, unless it is advanced or retarded by the vacuum diaphragm.

The timer core, mounted on the distributor shaft, rotates with the shaft inside the pole piece portion of the pick-up coil assembly. When the external teeth of the timer core line up with the internal teeth of the pole piece, a voltage is induced in the pick-up coil. This signals the electronic module inside the distributor, which opens the ignition coil primary circuit. See Fig. 2.

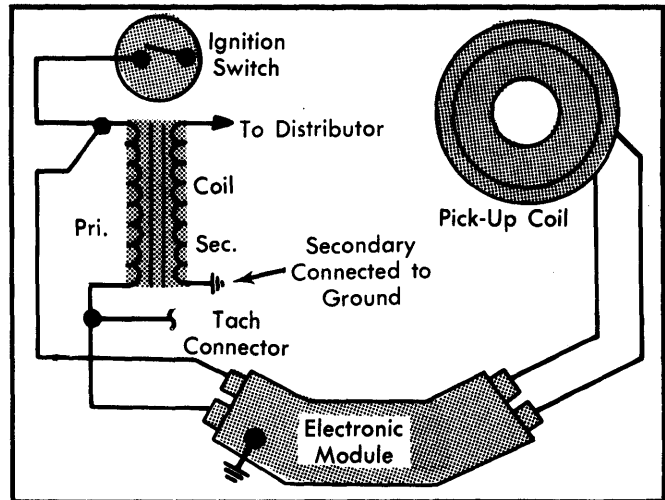


Fig. 2 Delco-Remy High Energy Ignition System Basic Wiring Diagram

Current then decreases in the primary circuit and high voltage is induced in the ignition coil's secondary circuit. This travels through the rotor, distributor cap contact and secondary wires to fire the spark plugs.

A vacuum advance unit adjusts position of pick-up coil and pole piece, providing vacuum spark advance. Conventional centrifugal advance weights shift the trigger wheel on the distributor shaft, providing centrifugal spark advance.

The electronic module automatically controls dwell period, extending it with increased engine speed. Dwell is not adjustable and periodic checks are not necessary. The HEI system features a longer spark duration, which is desirable for firing lean air/fuel mixtures.

### TESTING

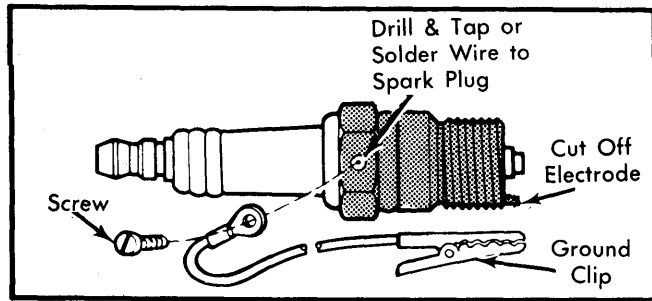
**NOTE** — During testing procedures, the following precautions must be observed. Do not ground tachometer terminal of distributor connector. Disconnect ignition switch connector at distributor before making compression checks. To remove spark plug wires, twist boot 1/2 turn and pull on boot (not on wire). When using a timing light connect at plug end of number 1 spark plug wire (do not pierce plug boot).

Check that wiring connector is properly attached to connector at side of distributor cap and that spark plug leads are properly connected at both ends before continuing with test procedures.

### SYSTEM VOLTAGE CHECK WITH MODIFIED SPARK PLUG

1) Using spark tester or modified spark plug (side electrode cut off), check for spark at each spark plug. See Fig. 3. If spark occurs, check fuel system and spark plugs. If no spark occurs, check voltage at ignition coil terminal B+ while cranking engine.

## DELCO-REMY HIGH ENERGY IGNITION SYSTEM (Cont.)



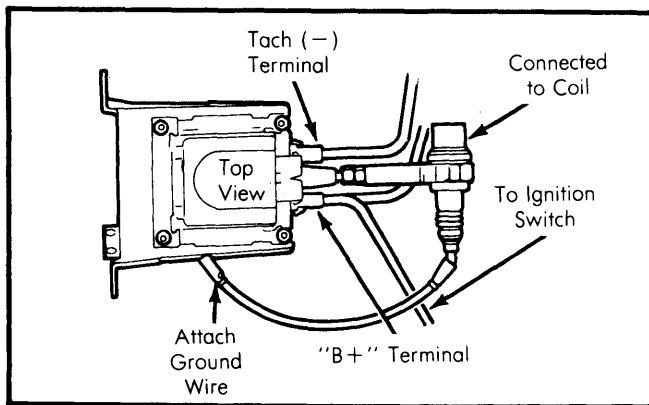
**Fig. 3 Modifying Spark Plug for Testing**

2) If reading is under 7 volts while cranking engine, repair primary circuit to ignition switch. If reading is 7 volts or more, connect positive voltmeter lead to "TACH" terminal of ignition coil and negative lead to ground.

3) Turn ignition switch "ON". If reading is more than 10 volts, proceed to step 5). If voltage reading is less than 1 volt, replace ignition coil. If 1-10 volts, replace electronic module in distributor and proceed to step 4).

4) Again check for spark as described in step 1). If spark occurs, system is operating properly. If no spark occurs, replace ignition coil as it is also defective.

5) If in step 3), the reading was more than 10 volts, attach modified spark plug again to coil secondary terminal. See Fig. 4. Leave wires between distributor and ignition coil connected. Crank engine and check for spark at modified spark plug. If spark occurs, inspect distributor cap for water, cracks or other damage. If OK, replace rotor.



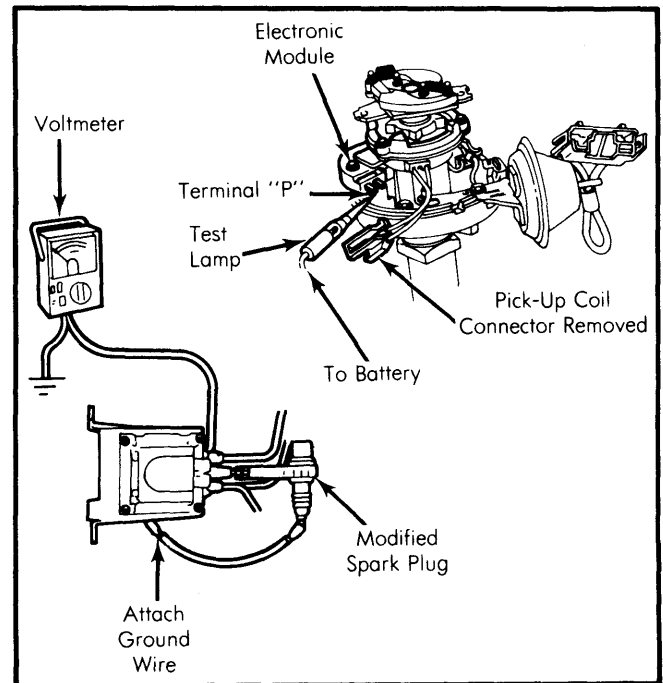
**Fig. 4 Checking Distributor Operation**

6) If in step 5), no spark occurred, remove pick-up coil leads from electronic module. Turn ignition switch "ON". Connect positive voltmeter lead to ignition coil "TACH" terminal and negative lead to ground. Watch voltmeter as test lamp is connected from battery power to electronic module's terminal "P" for 5 seconds. See Fig. 5.

7) If voltage does not drop, check electronic module ground connection. Also check for open wires from ignition coil to distributor. If OK, replace electronic module. If in step 6), voltage dropped, check for spark at modified spark plug when test lamp is removed from electronic module's terminal "P". If spark occurs, replace pick-up coil.

8) If no spark occurred when lamp was removed, check module with tester. If bad, replace electronic module. If OK, check ignition coil ground. If ground is OK, replace ignition coil.

9) If no module tester is available, check ignition coil ground. If OK, replace ignition coil. Then, again attach voltmeter positive lead to



**Fig. 5 Testing Electronic Module**

"TACH" terminal and negative lead to ground. Connect modified spark plug to ignition coil secondary terminal. See Fig. 5. Connect test lamp between battery power and module's terminal "P". Remove test lamp and spark should occur at gap of modified spark plug.

10) If spark occurs, system is operating properly. If no spark occurs, reinstall original ignition coil and replace electronic module.

### INTERMITTENT PROBLEMS

1) Attach modified spark plug, in turn, to 2 different spark plug wires and crank engine. If no spark, repeat previous test, System Voltage Check with Modified Spark Plug.

2) If spark occurs from one or both wires, check pick-up coil resistance for 500-1500 ohms. If not to specifications, replace pick-up coil. If OK, check for dwell increase from a high to low RPM.

3) If dwell increases, check fuel system, spark plug wires, distributor cap and spark plugs. If no increase occurs, replace electronic module.

### IGNITION COIL

**Short Check** — Connect an ohmmeter between coil positive terminal and coil frame (ground). With ohmmeter in high scale, it should indicate infinite resistance. If not, replace ignition coil.

**Primary Resistance Check** — Connect ohmmeter between positive and negative terminals of ignition coil. With ohmmeter in low scale, resistance should be 0-1 ohm. If not, replace ignition coil.

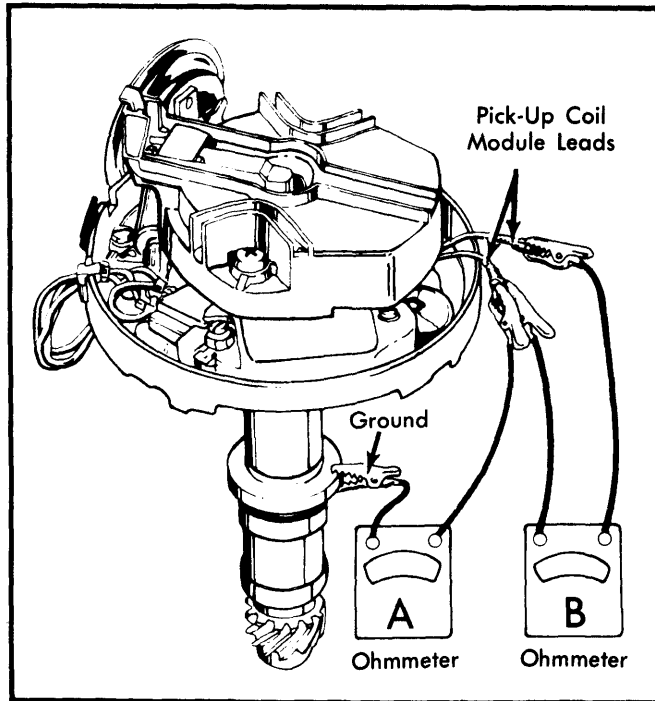
**Secondary Resistance** — Connect ohmmeter between negative and secondary terminals of ignition coil. With ohmmeter in low scale, resistance should be less than infinite. If not, replace ignition coil.

### PICK-UP COIL

1) Connect vacuum pump to vacuum advance unit. If vacuum unit is inoperative, replace unit. Remove pick-up coil connector (Green and White wires) from electronic module. Connect ohmmeter leads to ei-

## DELCO-REMY HIGH ENERGY IGNITION SYSTEM (Cont.)

ther pick-up coil lead and to distributor housing. See "A" in Fig. 6. Set ohmmeter in middle scale. Operate vacuum advance throughout vacuum range. Reading should be infinite at all times.



**Fig. 6 Distributor Pick-Up Coil Testing Connections**

2) Connect ohmmeter leads to pick-up coil leads (Green and White wires shown in "B" of Fig. 6). Again use middle scale of ohmmeter. Operate vacuum advance throughout vacuum range. Ohmmeter should read 500-1500 ohms in all advance positions. If either reading is not to specifications, replace pick-up coil.

### ELECTRONIC MODULE

If engine still does not run or operation is still rough after all preceding tests are completed, replace the electronic module.

## OVERHAUL

### DISASSEMBLY

1) Disconnect wiring harness from distributor cap. Disconnect coil connectors from cap. Remove distributor cap and disconnect vacuum hose from vacuum advance mechanism. Mark rotor position to distributor housing and distributor housing to engine for later reassembly reference. Remove hold-down bolt and remove distributor housing from engine.

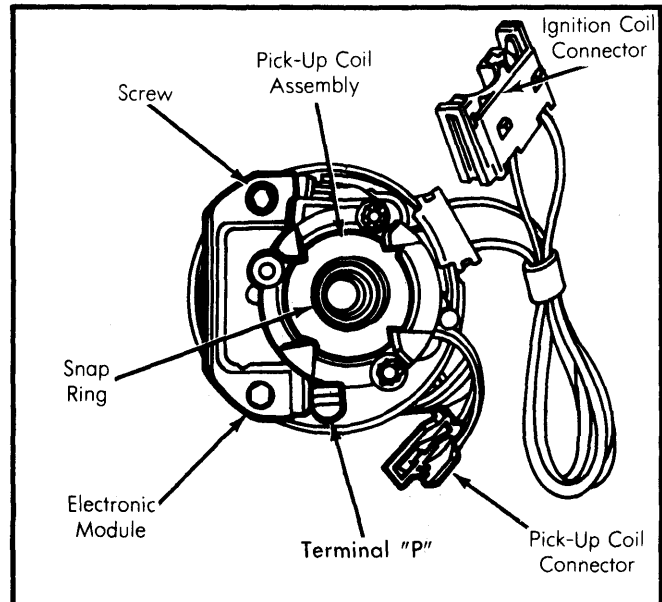
2) Remove rotor, two advance springs, weight retainer and advance weights. Mark distributor shaft and gear so they may be assembled in same position. Drive out roll pin from drive gear while supporting gear so no damage will occur to distributor shaft. Remove gear, shim and tanged washer from distributor shaft and clean any burrs from shaft. Remove distributor shaft from housing.

**NOTE**— Do not attempt to service shaft bushings in housing.

3) Remove 2 attaching screws holding module to housing and position module so pick-up coil leads can be removed. Remove electronic module. Remove snap ring from housing and lift out pick-up coil assembly. Remove 2 attaching screws and lift out vacuum advance mechanism.

### REASSEMBLY

Reverse disassembly procedures while noting the following: Ensure that there is special silicone lubricant between module and distributor housing to provide heat transfer for electronic module cooling. After installation of distributor shaft, rotate to check for even clearance between external trigger wheel teeth and internal pole piece teeth.



**Fig. 7 Internal Components of HEI Distributor**