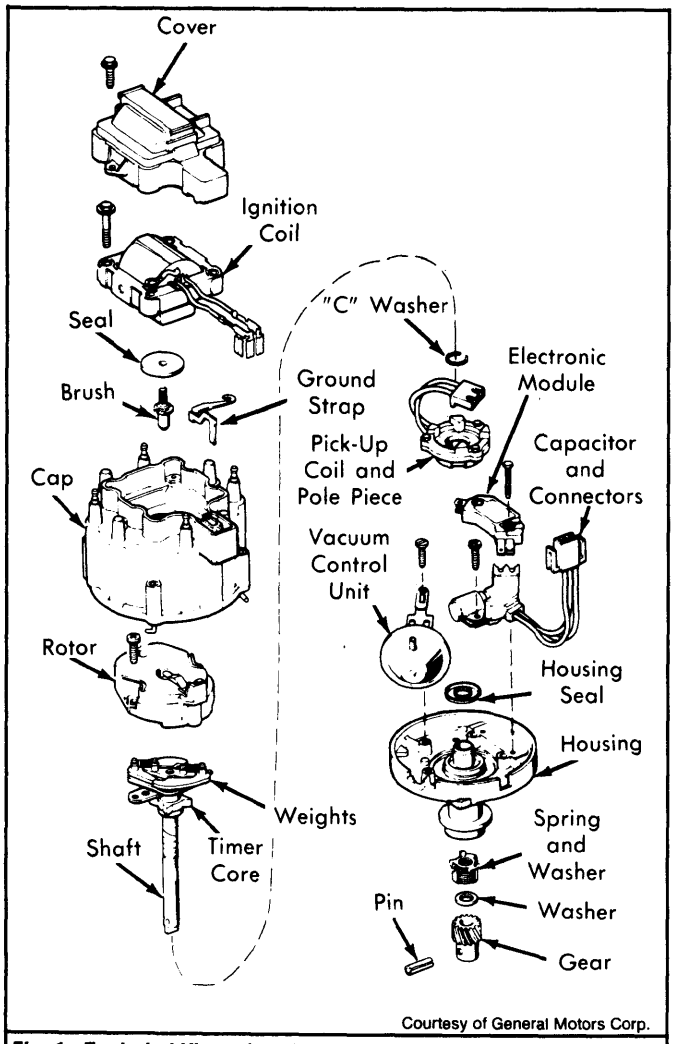
Delco-Remy High Energy Ignition

General Motors

DESCRIPTION

The Delco-Remy High Energy Ignition (HEI) system consists of a distributor assembly which combines all ignition components into a solid-state electronic unit. The distributor housing contains the vacuum and centrifugal advance mechanisms, electronic module, pick-up coil, pole piece (with internal teeth), timer core (with external teeth), rotor, distributor shaft and a capacitor for radio noise suppression. Ignition coil is enclosed in distributor cap. *See Fig. 1.*



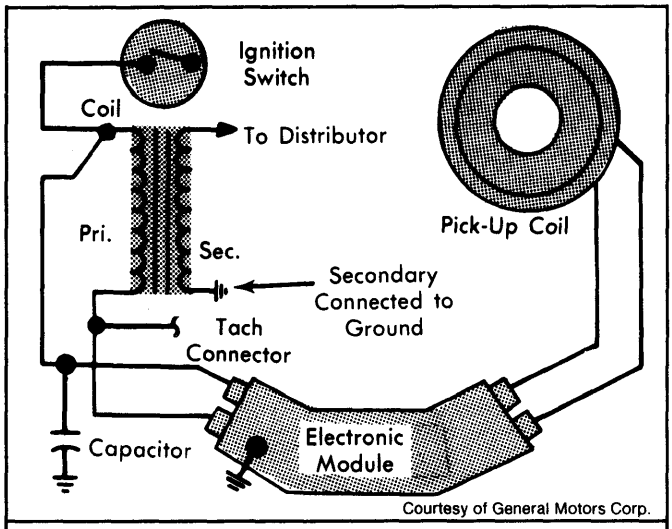
Courtesy of General Motors Corp.

Fig. 1: Exploded View of High Energy Ignition Distributor

OPERATION

The magnetic pick-up assembly consists of a permanent magnet, pole piece and a pick-up coil. The pole piece is stationary (unless advanced or retarded by vacuum advance unit) while timer core rotates with distributor shaft. When teeth of timer core line up with teeth of pole piece a voltage is induced in pick-up coil. This signals the electronic module to open coil primary circuit and fire spark plug. *See Fig. 2.*

The module automatically controls dwell, increasing dwell with increasing engine speed. Dwell is not adjustable and periodic checks of dwell are not necessary. The HEI system features a longer spark duration which is desirable for firing lean and EGR diluted air/fuel mixtures.



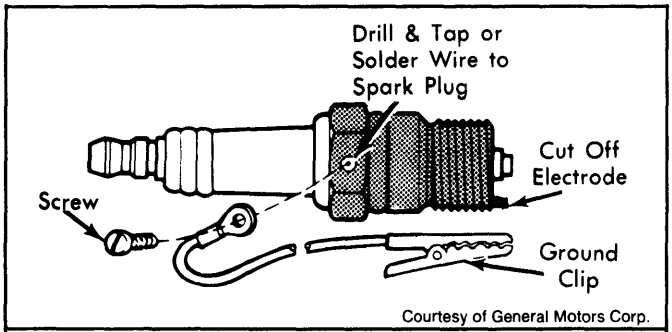
Courtesy of General Motors Corp.

Fig. 2: HEI System Basic Schematic

TROUBLE SHOOTING

ENGINE WILL NOT START

Connect voltmeter between battery terminal lead wire at distributor connector and ground. Turn ignition switch on. If voltage is zero, check system for open circuit. If reading is battery voltage, check for spark using Spark Tester (ST-125) connected to one spark plug wire. If spark tester is not available, fabricate one using an old spark plug. *See Fig. 3.* Crank engine while observing spark tester. If sparking occurs, check spark plugs and fuel system. If sparking does not occur, follow procedures under COMPONENT TESTING.



Courtesy of General Motors Corp.

Fig. 3: Modifying Spark Plug for Testing

ENGINE STARTS BUT RUNS ROUGH

Check for proper fuel delivery to carburetor, vacuum hoses for leaks, ignition timing, centrifugal advance for proper operation, spark plugs for defects, and visually inspect and listen for sparks jumping to ground or to other wires. If no defects are found or condition continues after correction, follow procedures under COMPONENT TESTING.

TESTING

NOTE: During testing procedures, the following precautions must be observed: Do not ground tachometer terminal of distributor connector. Disconnect the ignition switch connector wire at distributor before making compression checks. Always twist spark plug boot ½ turn and pull on boot (not secondary lead) to remove. When using a timing light, connect at plug end of number 1 spark plug (do not pierce plug lead).

1975-79 DISTRIBUTORS & IGNITION SYSTEMS
Delco-Remy High Energy Ignition (Cont.)

COMPONENT TESTING

Cap & Coil Testing - **1)** Remove cap and coil assembly by removing wiring harness connector and battery lead and by turning 4 cap-to-housing latches. Inspect rotor, cap and coil assembly for arcking. Replace cap or rotor as required.

2) To test coil primary resistance, connect ohmmeter leads to battery terminal and "TACH" terminal on distributor cap. *See Fig. 4.* Ohmmeter reading should be .4-1.0 ohm. Connect ohmmeter leads to "TACH" terminal and ground. Reading should be infinity. If either reading is not to specification, replace ignition coil.

3) To test coil secondary resistance, connect ohmmeter leads to "TACH" terminal and coil secondary contact (cap button). Ohmmeter reading should be infinity. Move ohmmeter lead from "TACH" terminal to ground terminal on cap. Secondary-to-ground reading should be 6000-30,000 ohms. If either reading is not within specification, replace ignition coil.

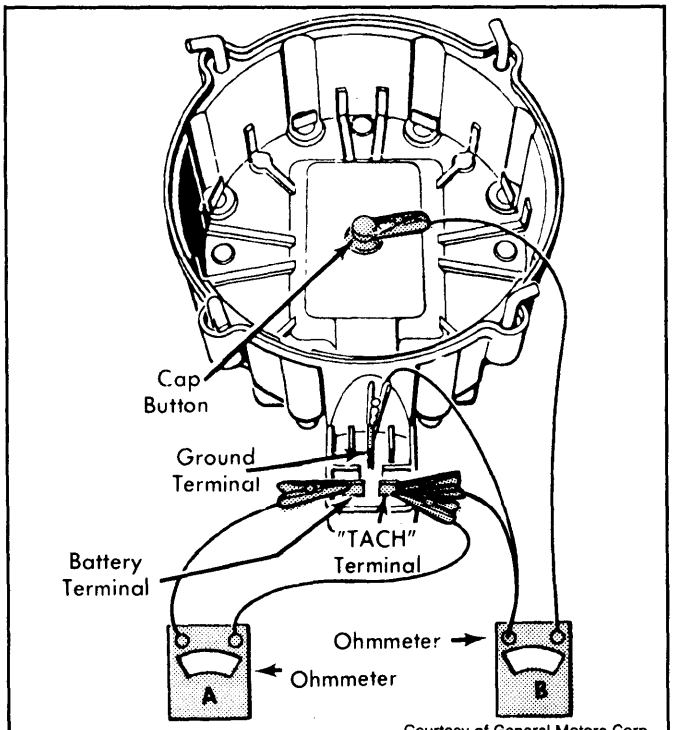


Fig. 4: Distributor Cap & Coil Testing Connections

Pick-up Coil - **1)** Connect external vacuum source to distributor vacuum advance. Connect ohmmeter leads as shown by meter "A". *See Fig. 5.* Apply vacuum and operate advance unit through entire range while observing ohmmeter. Reading should be infinity at all times. If ohmmeter reading fluctuates, replace pick-up coil.

2) Connect ohmmeter leads as shown by meter "B". Operate vacuum advance through entire range while observing ohmmeter. Reading should be 500-1500 ohms. If ohmmeter reading fluctuates from specification replace pick-up coil.

Capacitor - Set ohmmeter on x1000 scale. Disconnect capacitor. Touch ohmmeter leads to capacitor terminal and ground. Ohmmeter needle should move slightly, then return to infinity. Any continuous reading other than infinity indicates a defective capacitor.

Electronic Control Module - If engine operation remains rough after preceding test procedures are completed, replace electronic control module.

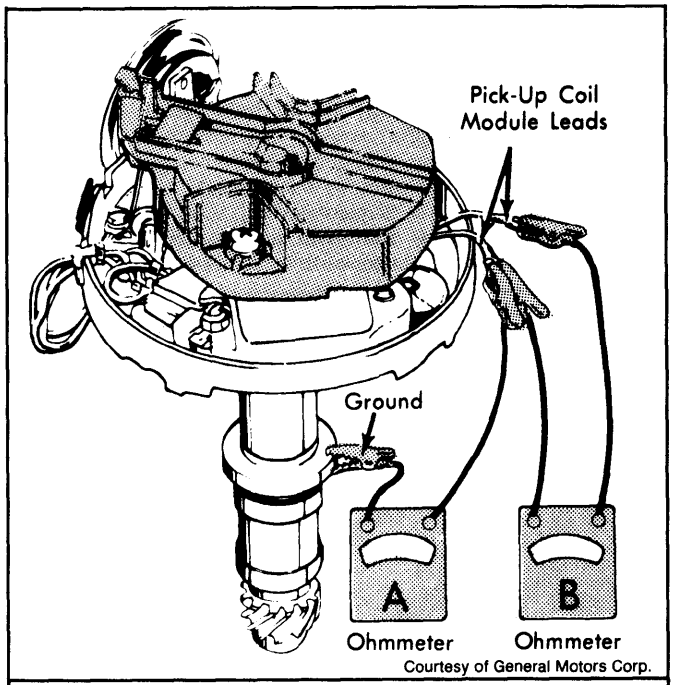


Fig. 5: Distributor Pick-up Coil Testing Connections

OVERHAUL

DISASSEMBLY

1) Disconnect wiring harness connector at distributor cap, remove cap and disconnect vacuum hose from vacuum advance mechanism. Mark rotor position and distributor housing position in relation to engine to aid in reassembly. Remove hold-down nut and clamp and lift distributor from engine.

2) Remove rotor, 2 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 to avoid damage to distributor shaft. Remove gear, shim and tanged washer from distributor shaft. 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 to disconnect pick-up coil and wiring harness connectors. Remove washer from upper end of distributor housing, 3 screws securing pole piece to housing. Remove pole piece, magnet and pick-up coil. Remove lock ring at top of housing, pick-up coil retainer, shim and felt washer. *See Fig. 1.*

4) Remove 2 attaching screws and remove vacuum advance mechanism. Disconnect capacitor lead, remove attaching screw and capacitor. Remove wiring harness from position in distributor housing.

5) Remove 3 coil cover attaching screws and lift off cover. Remove 4 ignition coil attaching screws, disconnect coil leads, and remove coil from cap. Remove ignition coil and seal.

REASSEMBLY

Ensure there is silicone lubricant between module and distributor base to provide heat transfer for module cooling. Lubricate felt washer with a few drops of engine oil. After installation of distributor shaft, rotate to check for even clearance between pole piece and shaft projections. Notch on side of rotor must engage tab on cam weight base.