CHRYSLER CORP. HALL EFFECT ELECTRONIC SPARK CONTROL SYSTEM

Chrysler Corp.
Aries, Dodge 400, LeBaron,
Rampage & Reliant (2.2L Only)
Horizon & Omni (1.7L & 2.2L)

DESCRIPTION

The Electronic Spark Control system used on Chrysler Corp. front wheel drive vehicles with 1.7L and 2.2L engines features a Hall Effect distributor and a spark control computer.

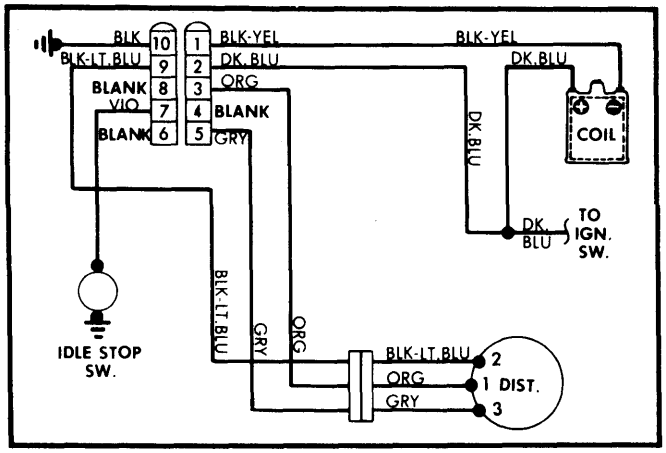

Fig. 1 Wiring Diagram of Chrysler Corp. Hall Effect Electronic Spark Control System

The computer is really the heart of the system, providing capability of igniting a lean air/fuel mixture according to different modes of engine operation. It provides an infinite number of variable advance curves. The computer contains an electronic printed circuit board, which simultaneously receives signals from various engine sensors, analyzes them to determine how the engine is operating and then advances or retards ignition timing.

The computer determines the exact instant when ignition is required, and then signals the ignition coil to produce the electrical impulses to fire the spark plugs. The computer is located on the fenderwell, near the battery.

The computer is connected to other fuel/ignition components by a 10-wire dual connector. Five engine sensors feed information to the computer. These include a vacuum transducer, mounted on the computer housing, the Hall Effect pick-up assembly in the distributor, an engine coolant temperature sensor, a carburetor switch, and an oxygen sensor.

The computer used with the spark control system eliminates need for either vacuum advance units or centrifugal advance weights. The Hall Effect distributor is connected to the rest of the system by a 3-terminal connector. See *Fig. 2*. It sends small alternating current signals to the computer as rotor shutter blades enter and leave the gap in the Hall Effect switching unit pick-up assembly.

The carburetor switch reports when the engine is at idle. The coolant temperature switch or sensor keeps the computer posted on engine operating temperatures. The vacuum transducer informs the computer of engine manifold vacuum.

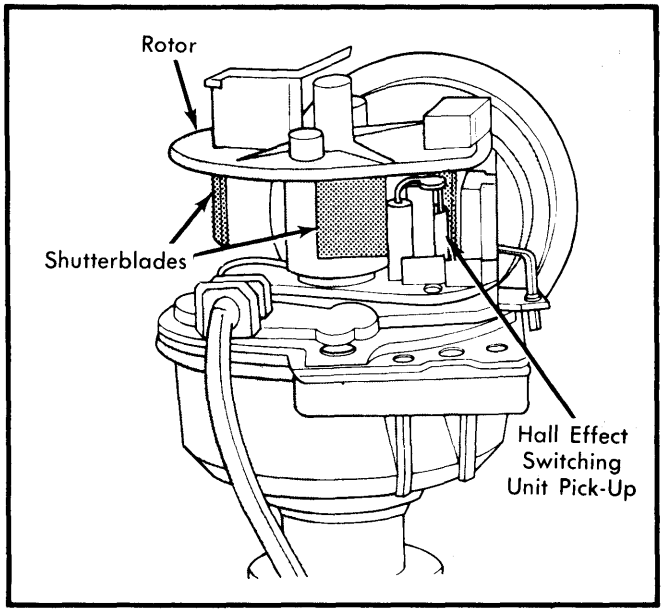

Fig. 2 Components of Hall Effect Distributor for Electronic Spark Control System

OPERATION

The computer has 2 functional modes, the start and run modes. The start mode functions only during engine cranking and starting. A fixed amount of spark advance is provided, based on distributor position. The run mode only functions when the engine starts and is operating normally. The Hall Effect pick-up assembly and the other 4 sensors provide information to the computer, which then varies spark advance to match engine operating conditions. Spark timing and dwell cannot be adjusted in the run mode.

Engine sensors work together. If engine temperature drops below a predetermined temperature, the coolant temperature switch signals the computer to prevent additional advance from the vacuum transducer signal. As temperatures rise, vacuum increases, and additional advance is called for. For maximum advance, the carburetor switch must remain open. During the time when advance will not occur quickly, vacuum advance is controlled by engine RPM and will build up at a slow rate. If the carburetor switch closes, this build up of advance will be cancelled.

The Hall Effect pick-up signal is a reference signal, providing maximum amount of advance, based on sensor input. At the proper time, the computer shuts off current to the ignition coil primary circuit. As the magnetic field there collapses, a high voltage surge occurs in the secondary, firing the spark plugs.

If the computer fails, the system will go into the start mode. This enables the vehicle to be driven in for repair. Performance and fuel ecomomy will be poor, however. If the Hall Effect pick-up or the start mode of the computer fails, the engine will not start or run.

ADJUSTMENTS

NOTE – *No adjustments can be made to the Hall Effect pick-up unit. Dwell and spark timing cannot be adjusted in the run mode. Fixed timing (start mode) can be adjusted by changing distributor position.*

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TESTING

NOTE – *Testing procedures for the Chrysler Corp. Electronic Spark Control System are the same as for the Chrysler Corp. Electronic Fuel Control. See Chrysler Corp. Electronic Fuel Control article in 1982 COMPUTERIZED ENGINE CONTROLS section.*

OVERHAUL

Disassembly – **1)** Remove distributor from vehicle. Lightly clamp distributor in soft jaws of vise. Remove distributor cap and rotor from shaft. Remove screw holding pick-up lead on 1.7L engines; remove pick-up connector on 2.2L engines.

NOTE – *When removing spark plug wires from distributor cap, do not pull on wires. Positive-locking wires must be released from inside cap. See Fig. 3.*

2) Remove Hall Effect pick-up assembly lock springs (or clips) and lift out pick-up assembly. Remove 2 screws holding splash shield to distributor housing. Mark drive gear (or distributor drive) position on distributor shaft. Using a pin punch, drive roll pin from shaft.

NOTE – *Hall Effect pick-up assembly may be replaced without removing distributor from engine.*

3) Remove drive gear (or distributor drive) and remove shaft from housing. If equipped, remove thrust washers, nylon spacers and block seals.

Reassembly – To reassemble, reverse disassembly procedure. Correct rotor has "E.S.A." stamped in its top. Check rotor for proper grounding of shutterblades.

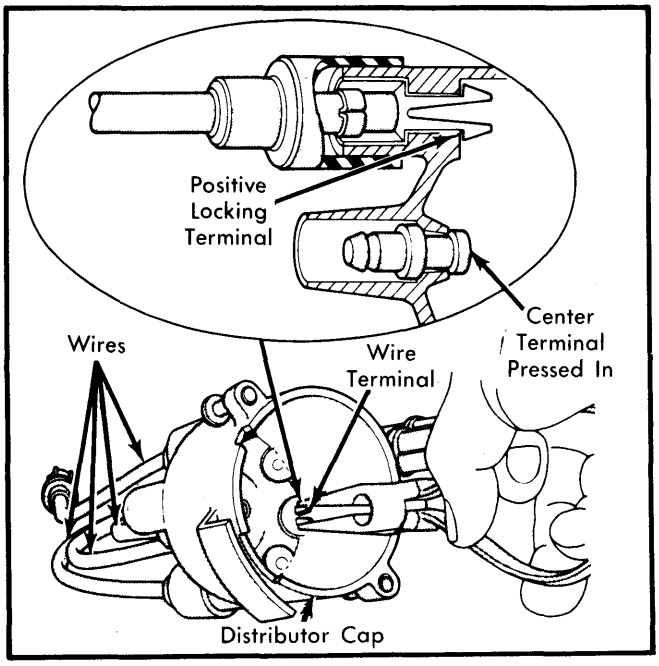

Fig. 3 Use Pliers to Release Positive-Locking Spark Plug Wire Terminals