DISTRIBUTOR IGNITION

➡For information on understanding electricity and troubleshooting electrical circuits, please refer to Section 6 of this manual.

Distributors are used in the Town Car with a 5.0L engine up until the 1991 model year. The Mark VII employed a distributor until the end of the model run in 1992. The 3.8L Continental also incorporated the TFI-IV ignition system and the use of a distributor until 1994.

General Information

THICK FILM INTEGRATED (TFI-IV) IGNITION SYSTEM

◗ See Figures 1, 2, 3, 4 and 5

The Thick Film Integrated (TFI-IV) ignition system uses a camshaft driven distributor with no centrifugal or vacuum advance. The distributor has a diecast base, incorporating a Hall effect stator assembly. The TFI-IV system module is mounted on the distributor base, it has 6 pins and uses an E-Core ignition coil, named after the shape of the laminations making up the core.

The TFI-IV module supplies voltage to the Profile Ignition Pick-up (PIP) sensor, which sends the crankshaft position information to the TFI-IV module. The TFI-IV module then sends this information to the EEC-IV module, which determines the spark timing and sends an electronic signal to the TFI-IV ignition module to turn off the coil and produce a spark to fire the spark plug.

The operation of the universal distributor is accomplished through the Hall effect stator assembly, causing the ignition coil to be switched off and on by the EEC-IV computer and TFI-IV modules. The vane switch is an encapsulated package consisting of a Hall sensor on one side and a permanent magnet on the other side.

A rotary vane cup, made of ferrous metal, is used to trigger the Hall effect switch. When the window of the vane cup is between the magnet and the Hall effect device, a magnetic flux field is completed from the magnet through the Hall effect device back to the magnet. As the vane passes through the opening, the flux lines are shunted through the vane and back to the magnet. A voltage is produced while the vane passes through the opening. When the vane clears the opening, the window causes the signal to go to 0 volts. The signal is then used by the EEC-IV system for crankshaft position sensing and the computation of the desired spark advance based on the engine demand and calibration. The voltage distribution is accomplished through a conventional rotor, cap and ignition wires.

Diagnosis and Testing

SECONDARY SPARK TEST

◗ See Figures 6, 7, 8 and 9

The best way to perform this procedure is to use a spark tester (available at most automotive parts stores). Three types of spark testers are commonly available. The Neon Bulb type is connected to the spark plug wire and flashes with each ignition pulse. The Air Gap type must be adjusted to the individual spark plug gap specified for the engine. The last type of spark plug tester looks like a spark plug with a grounding clip on the side, but there is no side electrode for the spark to jump to. The last two types of testers allows the user to not only detect the presence of spark, but also the intensity (orange/yellow is weak, blue is strong).

1. Disconnect a spark plug wire at the spark plug end.
2. Connect the plug wire to the spark tester and ground the tester to an appropriate location on the engine.
3. Crank the engine and check for spark at the tester.
4. If spark exists at the tester, the ignition system is functioning properly.
5. If spark does not exist at the spark plug wire,

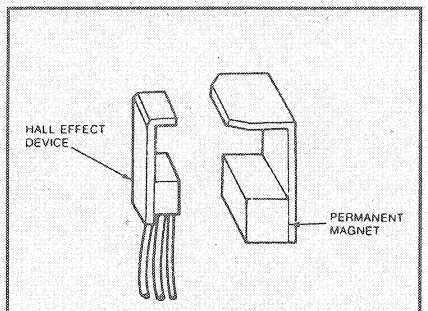

Fig. 1 Hall effect vane switch assembly

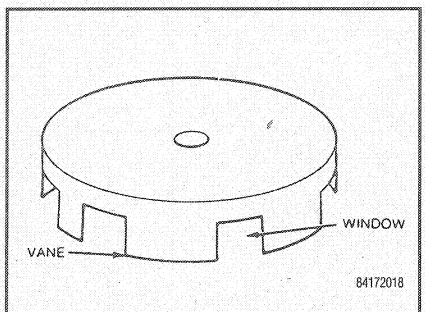

Fig. 2 Rotary vane cup

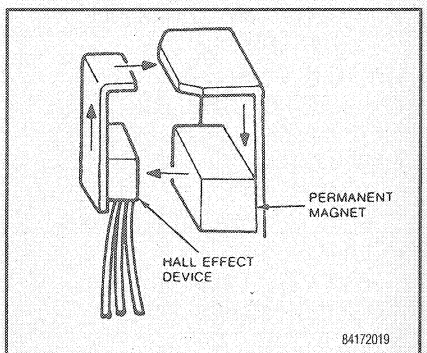

Fig. 3 Hall effect response to vane cup window

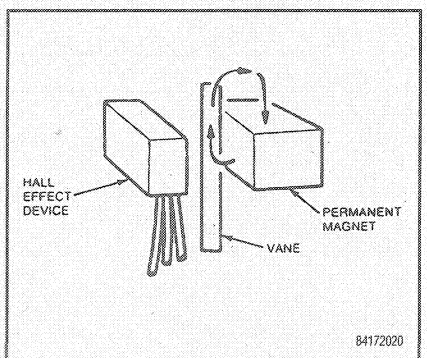

Fig. 4 Hall effect response to vane

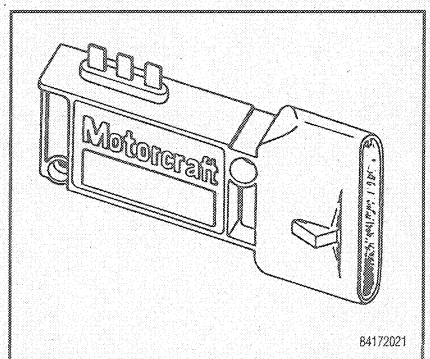

Fig. 5 TFI-IV module

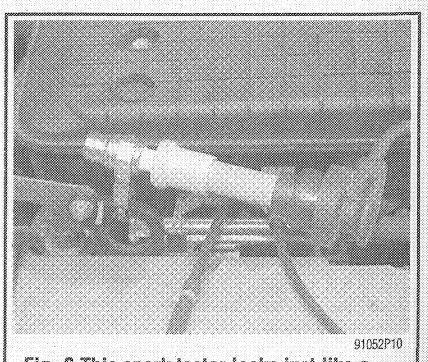

Fig. 6 This spark tester looks just like a spark plug, attach the clip to ground and crank the engine to check for spark