DISTRIBUTORLESS IGNITION SYSTEM

General Information

ELECTRONIC DISTRIBUTORLESS IGNITION SYSTEM (EDIS)

See Figure 24

The Integrated Electronic Ignition (EI) system consists of a Crankshaft Position (CKP) Sensor, coil packs, connecting wiring and the PCM. The Coil On Plug (COP) Integrated EI System eliminates the need for spark plug wires but does require input from the Camshaft Position (CMP) Sensor. Operation of the components is as follows:

➡Electronic ignition engine timing is entirely controlled by the PCM. Electronic ignition engine timing is NOT adjustable. Do not attempt to check base timing. You will receive false readings.

1. The CKP Sensor is used to indicate crankshaft position and speed by sensing a missing tooth on a pulse wheel mounted to the crankshaft. The CMP Sensor is used by the COP Integrated EI System to identify top dead center of compression of cylinder #1 to synchronizer the firing of the individual coils.
2. The PCM uses the CKP signal to calculate a spark target and then fires the coil packs to that target. The PCM uses the CMP sensor on COP Integrated EI System to identify top dead center of the compression of cylinder #1 to synchronizer the firing of the individual coils.
3. The coils and coil packs receive their signal from the PCM to fire at a calculated spark target. Each coil within the pack fires two spark plugs at the same time. The plugs are paired so that as one fires during the compression stroke the other fires during the exhaust stroke. The next time the coil is fired the situation is reversed. The COP system fires only one spark plug per coil and only on the compression stroke.

The PCM acts as an electronic switch to ground in the coil primary circuit. When the switch is closed, battery power applied to the coil primary circuit builds a magnetic field around the primary coil;. When the switch opens, the power is interrupted and the primary field collapses inducing the high voltage in the secondary coil windings and the spark plug is fired. A kickback voltage spike to generate an Ignition Diagnostic Monitor (IDM) signal. IDM communicates information by pulse width modulation in the PCM.

4. The PCM processes the CKP signal and uses it to drive the tachometer as the Clean Tach Out signal.

OBD II—EEC V

The clean air act of 1990 requires that all vehicles sold in the United States meet On-Board Diagnostic (OBD)II requirements by the 1996 model year. Ford's fifth generation of electronic engine control systems, known as EEC V, is designed to meet OBD II requirements. The primary difference between EEC IV and EEC V are the monitors. EEC IV monitors are designed to detect system and component failure. EEC V monitors are designed to monitor the efficiency of engine and emission systems. The Malfunction Indicator Lamp (MIL) illuminates if the vehicle emissions exceed 1.5 times the allowable standard based on federal test procedures. If any single component or strategy failure permits emissions to exceed this level, the MIL illuminates to alert the operator and a Diagnostic Trouble Code (DTC) will be stored the Powertrain Control Module (PCM).

Lincoln vehicles produced by Ford in North America could come equipped (depending on the year) with either of two types of ignition systems. A (DI) distributor ignition (discussed earlier in this section), or an (EI) electronic ignition. EI systems are Distributorless. They contain multiple coils, known as coil packs. Secondary voltage is delivered directly from the coils to the spark plugs via spark plug wires. This ignition system also uses the EEC system to control spark timing.

There are two types of EI ignition systems:

- Low data rate
- High data rate

The vehicles discussed here use a high data rate system, on the 4.6L engine.

There are many similarities between the EI—low data rate and high data rate ignition systems. Both systems have the following similar features:

- Coil packs that contain multiple coils
- Spark plugs that are fired in paired cylinders
- Do not use distributors to distribute secondary voltage.

The components in the EI—high data rate system include:

- The PCM
- An Ignition Control Module (ICM)
- The Crankshaft Position (CKP) sensor
- A Trigger wheel
- Coil packs
- The Secondary Wires (Spark Plug Wires)
- The Spark plugs

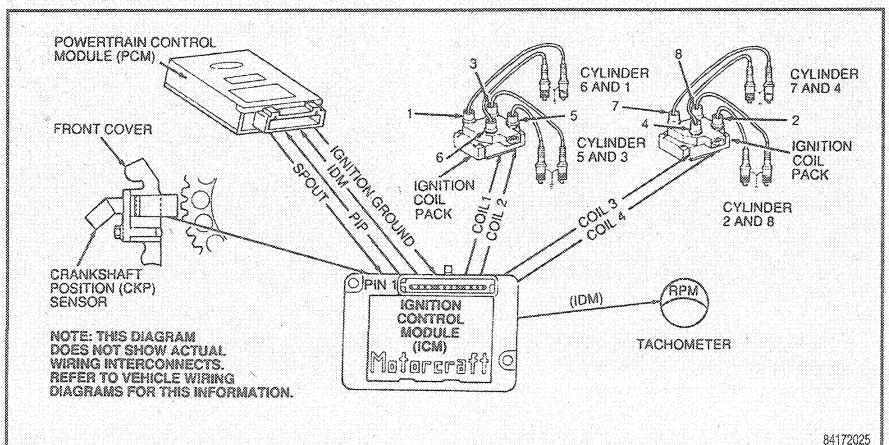

Fig. 24 Electronic Distributorless Ignition System

Diagnosis and Testing

Refer to Diagnosis and Testing under Distributor Ignition in this section.

Adjustments

All adjustments in the ignition system are controlled by the Powertrain Control Module (PCM) for optimum performance. No adjustments are possible.

Ignition Coil Pack

TESTING

Primary Winding Resistance

See Figure 25

1. Turn the ignition **OFF**.
2. Disconnect the negative battery cable.
3. Disconnect the wiring harness from the ignition coil.
4. Check for dirt, corrosion or damage on the terminals and repair as necessary.
5. Measure coil primary resistance between ignition coil pin 2 (B+) and pins 1 (coil 2), 2 (coil 3) and 3 (coil 1).
6. Resistance should be 0.3–1.0 ohms. If resistance is out of specifications, replace the coil pack. If resistance is within specifications, proceed to secondary windings testing.

Secondary Winding Resistance

See Figure 26

1. Measure coil secondary resistance between the corresponding spark plug wire towers on the coil.
   - Coil 1—cylinders 1 and 6
   - Coil 2—cylinders 3 and 5
   - Coil 3—cylinders 4 and 7
   - Coil 4—cylinders 2 and 8
2. Resistance should be 12.8–13.1 kilohms. If secondary resistance is not within specification, replace the coil pack.

REMOVAL & INSTALLATION

See Figures 27, 28, 29 and 30

➡Two ignition coil packs are used, one for each bank of cylinders. This procedure is for removing 1 ignition coil pack, but the procedure remains the same for either side.