TROUBLE CODES —EEC-IV SYSTEM

General Information

The Powertrain Control Module (PCM) is devoted to monitoring both input and output functions within the system. This ability forms the core of the self-diagnostic system. If a problem is detected within a circuit, the controller will recognize the fault, assign it an identification code, and store the code in a memory section. Depending on the year and model, the fault code(s) may be represented by two or three-digit numbers. The stored code(s) may be retrieved during diagnosis.

While the EEC-IV system is capable of recognizing many internal faults, certain faults will not be recognized. Because the computer system sees only electrical signals, it cannot sense or react to mechanical or vacuum faults affecting engine operation. Some of these faults may affect another component which will set a code. For example, the PCM monitors the output signal to the fuel injectors, but cannot detect a partially clogged injector. As long as the output driver responds correctly, the computer will read the system as functioning correctly. However, the improper flow of fuel may result in a lean mixture. This would, in turn, be detected by the oxygen sensor and noticed as a constantly lean signal by the PCM. Once the signal falls outside the pre-programmed limits, the engine control assembly would notice the fault and set an identification code.

FAILURE MODE EFFECTS MANAGEMENT (FMEM)

The PCM contains back-up programs that allow the engine to operate if a sensor signal is lost. If sensor input is seen to be out of range —either high or low —the FMEM program is used. The processor substitutes a fixed value for the missing sensor signal. The engine will continue to operate, although performance and driveability may be noticeably reduced. This function of the controller is sometimes referred to as the limp-in or fail-safe mode. If the missing sensor signal is restored, the FMEM system immediately returns the system to normal operation. The dashboard-warning lamp will be lit when FMEM is in effect.

HARDWARE LIMITED OPERATION STRATEGY (HLOS)

This mode is only used if the fault is too extreme for the FMEM circuit to handle. In this mode, the processor has ceased all computation and control; the entire system is run on fixed values. The vehicle may be operated but performance and driveability will be greatly reduced. The fixed or default settings provide minimal calibration, allowing the vehicle to be carefully driven in for service. The dashboard-warning lamp will be lit when HLOS is engaged. Codes cannot be read while the system is operating in this mode.

Diagnostic Link Connector

With the advent of OBD-II, the Federal Government has mandated the location of the DLC (Data Link Connector) .The Data Link Connector is located in the passenger compartment. It is attached to the instrument panel and accessible from the driver's seat.

The DLC is rectangular in design and capable of allowing access to 16 terminals. The connector has keying features that allow easy connection. The test equipment and the DLC have a latching feature to ensure a good mated connection. The Scan tool uses the DLC as a pathway to communicate with the on board computer system.

If the DLC is not located under the dash, the vehicle is using OBD-I. This is a slightly different management system in its operation and diagnosis. Look for DLC under the hood near the left front headlight on the Town Car and Mark VII, near the right side firewall on the Continental.

HAND-HELD SCAN TOOLS

See Figures 66, 67, 68 and 69

Although stored codes may be read through the flashing of the CHECK ENGINE or SERVICE ENGINE SOON lamp, the use of hand-held scan tools such as Ford's Self-Test Automatic Readout (STAR) tester or the second generation SUPER STAR II tester or their equivalent is highly recommended. There are many manufacturers of these tools; the purchaser must be certain that the tool is proper for the intended use.

The scan tool allows any stored faults to be read from the engine controller memory. Use of the scan tool provides additional data during trouble-shooting, but does not eliminate the use of the charts. The scan tool makes collecting information easier, but an operator familiar with the system must correctly interpret the data.

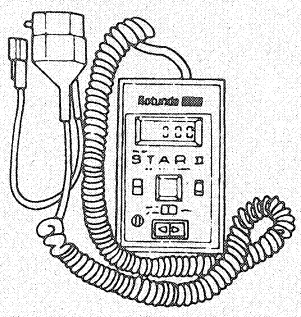

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Fig. 66 Super Star II tester —Ford Motor Co.

TCCS4P11

Fig. 67 Inexpensive scan tools, such as this Auto Xray ®, are available to interface with your Ford vehicle

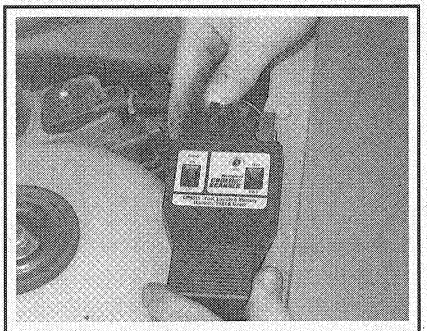

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Fig. 68 An economically friendly alternative is this Code Scanner® from SunPro. They are purchased according to manufacturer and are available at many parts stores

91054P16

Fig. 69 The Code Scanner® from SunPro has no LCD display, just a LED that will flash out the codes and an audible buzzer to alert that the test is in progress

ELECTRICAL TOOLS

The most commonly required electrical diagnostic tool is the digital multimeter; also known as a Digital Volt Ohmmeter (DVOM), which permits voltage, resistance (ohms) and amperage to be read by one instrument.

The multimeter must be a high impedance unit, with 10 megaohms of impedance in the voltmeter. This type of meter will not place an additional load on the circuit it is testing; this is extremely important in low voltage circuits. The multimeter must be of high quality in all respects. It should be handled carefully and protected from impact or damage. Replace the batteries frequently in the unit.

Additionally, an analog (needle type) voltmeter may be used to read stored fault codes if the STAR tester is not available. The codes are transmitted as visible needle sweeps on the face of the instrument.

Nearly all the diagnostic procedures will require