
Introduction

Note: The descriptions and specifications contained in this manual were in effect at the time this manual was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design without notice and without incurring obligation.

Important Safety Notice

Appropriate service methods and procedures are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual doing the work. This manual provides general directions for performing service with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

Notes, Cautions, and Warnings

As you read through the procedures, you will come across NOTES, CAUTIONS and WARNINGS. Each one is there for a specific purpose. NOTES give you added information that will help you to complete a particular procedure. CAUTIONS are given to prevent you from making an error that could damage the vehicle. WARNINGS remind you to be especially careful in those areas where carelessness can cause you personal injury. The following list contains some general WARNINGS that you should follow when you work on a vehicle.

- Always wear safety glasses for eye protection
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Make sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle. If you have an automatic transmission, set it in PARK unless instructed otherwise for a specific operation. If you have a manual transmission, it should be in REVERSE (engine OFF) or NEUTRAL (engine ON) unless instructed otherwise for a specific operation. Place wood blocks (4" x 4" or larger) against the front and rear surfaces of the tires to help prevent the vehicle from moving.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide poisoning.
- Keep yourself and your clothing away from moving parts when the engine is running, especially the drive belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, three-way catalytic converter and muffler.
- Do not smoke while working on a vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle.
- When it is necessary to work under the hood, keep hands and other objects clear of the radiator fan blades!

Where To Begin Diagnostics

To begin Diagnostics refer to Section 3A, 3B, or 3C depending on the type of vehicle as listed below. These sections contain the necessary information for establishing a systematic approach to diagnostics.

Vehicles Diagnosed in Section A

Passenger Cars

- Escort/Tracer
- 2.0L Probe
- Contour/Mystique

- Taurus/Sable
- Mustang
- Thunderbird/Cougar
- Crown Victoria/Grand Marquis
- Continental
- Town Car
- Mark VIII

Light Trucks

- Ranger
- Aerostar
- Windstar (1998)
- Explorer/Mountaineer
- Expedition/Navigator
- 4.2L E/F-Series
- 4.6L E/F-Series
- 5.4L E/F-Series
- 5.8L F-Series (Calif. over 8,500 GVW)
- 6.8L E/F-Series
- 7.5L F-Series (Calif. under 14,000 GVW)

Vehicles Diagnosed in Section B

- Aspire
- 2.5L Probe
- Villager

Vehicles Diagnosed in Section C

- 7.3L Diesel E/F-Series

Note: Refer to the 1996 Powertrain Control/Emissions Diagnosis (OBDI) Manual when diagnosing the following 1997 OBD I vehicles: 5.8L F-Series (49 states over 8,500 GVW), 7.0L F-Series (over 14,000 GVW), 7.5L F-Series (49 states over 8,500 GVW and 50 states over 14,000 GVW).

How To Use The Diagnostic Procedures

- Use the information about the vehicle driveability or emission concern (from the service write-up, Customer Information Worksheet, etc.) to attempt to verify/re-create the symptom. Look for any vehicle modifications or aftermarket items that may contribute to the symptom. A check of any applicable TSBs or OASIS messages may be useful, if this information is available.
- Refer to the Symptom Index (Section 3A, 3B or 3C) and select the symptom that best describes the vehicle symptom (for multiple symptoms, select the one that is most noticeable).
- Go to the Symptom Chart indicated in the Symptom Index.
- Begin the Chart at step number "1."
- Follow the instructions in the step (including Preliminary Checks, etc.)
 - If the step contains a test procedure or question (without a reference outside the step), perform the test step/answer the question and continue as directed.
 - If the step sends you to a specific area for testing (ex. Diagnostic Subroutines, a Pinpoint Test Step in this manual or a service manual group), go to the procedures. Follow the directions given in those procedures, including directions to other tests, sections, etc. If a damaged part is found, service/replace as directed. If no fault is found, and diagnosis in that area is complete, return to the Symptom Chart and continue as directed.
- During diagnosis, if directed to test a system/component that is not contained on that vehicle, proceed to the next step.

- If the Symptom Chart for the vehicle symptom is completed and no problem is found, return to the Symptom Index to address the next most prominent symptom. For gasoline engines, if all diagnosis is complete and no problem is found, it may be helpful to go to Section 5A/5B, Pinpoint Test Step Z1, for further diagnosis.
- After service, verify that the vehicle is operating properly and the original complaint is eliminated.

Note: If a symptom is determined to be intermittent, careful visual and physical underhood inspection of connectors, wiring harnesses, vacuum lines, components, etc. is required. The Customer Information Worksheet may contain more detailed symptom information. Before an in-depth diagnosis begins, start the engine and wiggle wires, tap on components, etc., while listening for an indication of a problem (ex. rpm change, relay clicking).

Information about engine conditions is stored when a Diagnostic Trouble Code (DTC) that lights the Malfunction Indicator Lamp (MIL) is set. This information is called Freeze Frame Data and may be helpful in diagnosing intermittents. (Refer to Section 2A/2B, Freeze Frame Data, for more information.)

Preface

This manual provides a step-by-step approach for diagnosing drivability, emission and powertrain control system symptoms. Before beginning diagnosis, it may be helpful to reference any Technical Service Bulletins (TSBs) or On-line Automotive Service Information System (OASIS) information when this is available.

Refer to "Where to Begin Diagnostics," contained in this Section, for diagnostic starting point information.

This manual is used in conjunction with the Body, Chassis, Electrical, Powertrain Service Manuals and the Electrical Vacuum Troubleshooting Manuals (EVTM). The Service Manuals are used to provide additional diagnostics when directed by this manual. The Service Manuals are also used for component removal and replacement information. The EVTMs can be referenced for vehicle specific wiring information and component, connector and splice location.

All references to specific "Groups" refer to groups in the Body, Chassis, Electrical, Powertrain Service Manuals. The following is a description of the information contained in each section of this manual.

Section 1: Description And Operation

This section contains description and operation information on powertrain control systems and components. This section is designed to give the technician a general knowledge of the powertrain control system. It should be used when general information about the powertrain control system is desired, and is rarely referenced from other sections of the manual.

Section 2A/B/C: Diagnostic Methods

The Diagnostic Methods section contains information on specific diagnostic tasks that are used during diagnosis. Descriptions of specific diagnostic methods are included, as well as detailed instructions on how to access or perform the tasks. This section provides the technician with step-by-step instructions for performing routine diagnostic tasks.

Section 3A/C: Symptom Charts, Section 3B: Diagnostic Routines

All diagnosis begins in Section 3A, 3B or 3C with the Symptom Index (Refer to "Where to Begin Diagnostics" information). The Symptom Index contains the list of symptoms addressed in this manual. The Symptom Index will refer the technician to the appropriate Symptom chart, which guides the technician through diagnosis.

Section 4A/C: Diagnostic Subroutines, Section 4B: Diagnostic Quick Tests

Section 4A/B contains specific tests called Diagnostic Subroutines that are used to obtain quick diagnostic information. For diesel, Section 4C contains the Hard Start/No Start and Performance Diagnostic Procedures. This section (4A/B/C) also contains the Powertrain Diagnostic Trouble Code (DTC) "Go To" Charts. Section 3A/B/C will direct the technician to these tests when required.

Section 5A/B/C: Pinpoint Tests

All the pinpoint tests are included in Section 5A/B/C. Never enter a Pinpoint Test unless directed there. When directed to a Pinpoint Test, always read the information and look at the schematic included at the beginning of the Pinpoint Test.

Section 6A/B/C: Reference Values

Section 6A and 6B contain the "Typical Diagnostic Reference Values" charts. The technician will be directed to these charts from Pinpoint Test Z in Section 6A/B. Section 6C contains the Control System Diagnostic Sheet Reference Chart and the Powertrain Control System Electronic Diagnostic Guide.
