Ford
Powertrain Application

1981-2004

Vetronix Corporation

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Some Things You Should Know

WARNING!

Exhaust Gas

When performing any checks with the engine running in an enclosed space such as a garage, be sure there is proper ventilation. Never inhale exhaust gases; they contain carbon monoxide, a colorless, odorless, extremely dangerous gas which can cause unconsciousness or death.

WARNING!

Avoiding Injury

Always set the parking brake securely and block the drive wheels before performing any checks or repairs on the vehicle.

Important—Please Read

The Tech 1, Tech 1A, and MTS 3100 are designed for use by trained service personnel only. They have been developed for the sole purpose of diagnosing and repairing automotive electronic systems. With the help of the tester, the information presented in this manual and the appropriate automotive service manual, qualified personnel should be able to diagnose and repair electronic control systems.

Disclaimer

Every attempt has been made to provide complete and accurate technical information based on factory service information available at the time of publication. However, the right is reserved to make changes at any time without notice.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Using This Application with the MTS 3100

The MTS 3100 diagnoses OBD systems in a similar manner as the Tech 1/Tech 1A but with the addition of data display enhancements. All tester adapters required to perform OBD system diagnostics are described in this operator's manual. Be sure to read the vehicle coverage tables for proper adapter configuration before connecting to the vehicle's diagnostic data link connector.

When used alone in the MTS 3100, the operation of the cartridge and the vehicle identification screens, test menus, and data screens are as described in this manual.

When this application is used with the MTS 3100 in conjunction with a program card, vehicle identification screens, test menus, diagnostic trouble codes, and diagnostic data parameters can be viewed in full-screen Enhanced Mode displays. Refer to the Enhanced Mode operating instructions in the program card operator's manual for further detail.

A Note about Tech 1 and Tech 1A Testers

The Tech 1 was originally introduced as an OEM scan tool in 1984. The Tech 1 Series A (Tech 1A) was released in 1989 and is an updated version of the Tech 1. After 19 years of successful distribution Vetronix decided to retire the Tech 1 and Tech 1 A in 2003. This further established the MTS 3100's foothold in the automotive service industry.

Please note that while every attempt has been made to ensure the cartridge based software applications work on the Tech 1 and Tech 1A testers, Vetronix strongly recommends that Tech 1 and Tech 1A owners update to the MTS 3100 tester.

Tech 1 and Tech 1A owners now qualify for special discounts on any MTS 3100 tester purchase. Please contact our customer support department for program details: 800-321-4889 Ext 4.

Important—Please Read

When you are using this manual to diagnose a vehicle, take the time to determine the type of tester that you are working with and be sure you are using the correct cables and adapters. Doing so may prevent misuse of application cartridges and incorrect vehicle diagnosis. Refer to Chapter 4 for complete information on the correct cables and adapters to use depending on which tester you have and the vehicle you are diagnosing.

Using This Manual

Reading through this manual before putting your MTS 3100 to work introduces you to all of its capabilities and tell you how to use them immediately. The application software is designed to reduce time-consuming reference to manuals as much as possible. Once you are familiar with the software and its operation, you'll be able to spend more time diagnosing and less time reading. Later, if questions arise, a quick glance at the flow chart for the test you are performing is probably all you need.

The flow charts in this manual consist of screen displays enclosed in boxes. The displays are arranged in the order in which they appear while using the software. Keys on the tester keypad are shown in the manual as white letters in small black boxes. At the end of each test mode description, there is a list of the active tester keys and their functions in that particular test.

Note that if you are using the MTS 3100, the display will look different for vehicle selection and data list software. Otherwise, the diagnostic routines are the same Tech 1/1A displays as those shown in this manual. Refer to the MTS 3100 Operator's Manual for examples of MTS 3100 displays.

Most display screens require input from you, such as YES, NO, or EXIT. To respond when the tester asks for information, just press the appropriate key on the tester keypad. Although there are exceptions, pressing EXIT generally takes you back to the previous screen or to the beginning of a process.

Please read Chapter 2 before beginning diagnostics for the first time.

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1. FORD POWERTRAIN APPLICATION DESCRIPTION

The Ford Powertrain application is used to efficiently diagnose and troubleshoot the Powertrain Electronic Control Module (PTEC), Electronic Engine Control version 5 (EEC-V), Electronic Engine Control version 4 (EEC-IV), Microprocessor Control Unit (MCU), and Idle Speed Control-Electronic (ISC-E) Electronic Control Assemblies (ECAs) used in 1981-2004 computer equipped Ford, Mercury, and Lincoln vehicles. Additionally, diagnostics for Integrated Vehicle Speed Control systems used on 1986-1995 Ford, Mercury, and Lincoln vehicles are supported. The application provides extensive test prompts and code reading capability for performing Quick Tests and other diagnostic tests on MCU, EEC-IV, EEC-V, ISC-E, and cruise control (IVSC).

Also, this application supports STAR MODE diagnostics on vehicles with Mazda Engine Control System (MECS) and 4 Speed Electronic Automatic Transaxle (4EAT).

For instruction on ABS, Electronic Suspension, and Electronic Variable Orifice Steering Systems that can be diagnosed with this application, please refer to the Ford Chassis application Operator's Manual.

In addition to MCU, ISC-E, and EEC-IV, the Ford Powertrain application supports diagnosis on OBD II compliant EEC-V electronic control units (Refer to the *Vehicle Coverage* tables in Chapter 3; see the column titled **ECA** or **ECU TYPE** in the 1994 and newer passenger cars and trucks/vans selection tables for those vehicles indicated as **EEC-V**). When using the Ford Powertrain application on vehicles with EEC-V controllers, you will notice a new test mode order and new KOEO, KOER, Continuous, and Data List operations.

FORD 1981-2004 POWERTRAIN APPLICATION FEATURES

The Ford 1981-2004 Powertrain application and tester team up to become a tool far more powerful and easier to use than any similar tool on the market.

HIGHLIGHTS

- Contains datalist parameters for gasoline and diesel vehicles
- Provides diagnostic coverage for 1981-2004 vehicles that use EEC-V (enhanced OBD II) or PTEC controllers
- Contains OBD Information for gasoline and diesel vehicles
- Contains Vehicle Information for gasoline and diesel vehicles
- Contains an extended set of OBD controls for EECV Gasoline Engine and Transmissions.
- Provides Diagnostic coverage for 1995-2003 Ford 7.3L Powerstroke Diesel Output State, Glow Plug, Injector Buzz, Cylinder Balance, and Switch Test Output Control Tests
- Contains increased Data Communication Link (DCL) diagnostic data parameters (56)
- Reads data parameters on the Data Communications Link
- Uses prompts specific to the vehicle and engine being tested
- Can perform Snapshot on Data Communication Link
- Speeds up testing by reading fast codes when possible
- Decodes diagnostic codes to service manual Pinpoint Tests
- References Pinpoint Tests for both Ford and Mitchell manuals during Quick Test diagnostics
- Prevents misinterpretation of service code meaning
- Automatically checks for special exception codes that affect the interpretation of the KOEO, KOER, or CONTINUOUS codes
- Saves up to 24 diagnostic codes in each test mode
- Capable of printing a summary of all test results
- Retains data even when power is disconnected
- Allows selection of all tests from easy-to-read test menus
- Provides basic STAR MODE or advanced QUICK TEST MODE guided test diagnostics

VEHICLE COVERAGE SUMMARY

ELECTRONIC ENGINE CONTROL	
SYSTEM	**VEHICLES**
PTEC	Select 2000-2004 Lincoln LS, Thunderbird, Explorer, Mountaineer, Aviator, Expedition, and Navigator
EEC-V	All 1996-2004 Passenger cars and Light Duty trucks, selected 1994-95 Passenger Cars and Light Duty trucks
EEC-IV	Selected 1983-95 Passenger Cars and Light Duty trucks, selected 1996-97 Light Duty trucks
Microprocessor Control Unit	All 1981-82, selected 1983-91 Passenger (MCU) Cars
Idle Speed Control-Electronic (ISC-E)	1985-88 Ranger
4 Speed Electronic Automatic Transaxle (4EAT) (6 and 17pin DLC)[a]	1990-95 Probe 1991-95 Escort, Tracer 1991-94 Capri

a. Read codes in STAR MODE only; no QUICK TEST MODE or Pinpoint Test decoding is available.

CRUISE CONTROL	
SYSTEM	**VEHICLES**
Integrated Vehicle Speed Control (IVSC)	1988-90 Taurus, Sable 1989-95 Taurus SHO 1988-90 Crown Victoria, Grand Marquis 1987-90 Towncar 1987-90 Mark VII 1988-90 Continental 1988-90 Thunderbird, Cougar 1993 Mark VIII
4 Speed Electronic Automatic Transaxle (4EAT) (6 and 17pin DLC)[a]	1990-95 Probe 1991-95 Escort, Tracer 1991-94 Capri

a. Read codes in STAR MODE only; no QUICK TEST MODE or Pinpoint Test decoding is available.

FORD-MAZDA ENGINE AND TRANSAXLE	
SYSTEM	**VEHICLES**
Mazda Engine Control System (MECS) (6 and 17 pin DLC)[a]	1994-95 Aspire 1990-95 Probe 1990-95 Escort, Tracer 1990-93 Festiva 1990-94 Capri
4 Speed Electronic Automatic Transaxle (4EAT) (6 and 17pin DLC)[a]	1990-95 Probe 1991-95 Escort, Tracer 1991-94 Capri

a. Read codes in STAR MODE only; no QUICK TEST MODE or Pinpoint Test decoding is available.

OPERATING MODES

The test modes available vary according to the specific configuration of the vehicle being tested and the system you wish to test. Before testing can begin, the tester asks you to enter certain information such as the model year, the type of vehicle being tested, the system you wish to test, and other specific information. How to enter the information is explained in Chapter 4.

Once the information is entered, a Select Mode menu is displayed showing the test modes available for the selected vehicle. Only test modes available for the selected vehicle are displayed in the menus. Not all test modes described in this manual are available for every vehicle.

The Ford Powertrain application allows you to select between six basic Test Modes: DATA LIST, QUICK TEST, STAR, SNAPSHOT, OBD CONTROLS, and INFORMATION.

DATA LIST MODE

The DATA LIST mode displays engine sensor and actuator data which can inform you about the condition of critical powertrain controls. Throttle Position, Engine RPM, and EGR Feedback Voltage are three parameters that are available for display. Note that not all Ford Motor Company vehicles support DATA LIST. This function is available on selected cars starting in 1989 and selected trucks starting 1990. If the vehicle under test supports the DATA LIST option, the Ford Powertrain application automatically includes the DATA LIST selection in the Select Mode menu.

QUICK TEST MODE

In the QUICK TEST mode you are provided with much more assistance in your diagnosis. First, you are guided through the vehicle selection process, pre-test vehicle preparation, and the QUICK TEST sequences. All codes received from the vehicle are automatically decoded by the tester into prompts for action, test results, or referrals to Pinpoint tests in the Ford Service manuals or Mitchell automotive manuals. In most cases, you will not need to use the manuals until the tester directs you to a specific Pinpoint Test.

The most recent codes from each test are saved in the tester so you can review them at any time. The codes are automatically converted to Pinpoint Tests and displayed in the order that the Ford manual recommends you perform first. A printable summary is kept of the vehicle selection, test procedures, and results. The diagnostic procedures and tests which you can perform in the QUICK TEST MODE are summarized in the table on the following pages.

Tests that are available in the QUICK TEST MODE are arranged in order of operation that is consistent with Ford Service information. For example, Ford service information begins with the prepare vehicle sequence. For this reason the prepare vehicle test is the first selectable test in the QUICK TEST list, followed by the test that should be performed next.

Note that EEC-V systems have a separate mode for reading Continuous DTCs. Per Ford Service procedure, this test mode should be performed before KOEO and KOER tests. With the EEC-V systems Continuous DTCs are not read when the KOEO test is performed (as was with earlier EEC-IV engine control systems).

STAR MODE

In this mode, the tester operates like the Ford STAR Tester and is used for basic service code reading. It allows you to directly control the Self-Test Input (STI) line to read and display all slow or fast codes as they are received from the Self-Test Output (STO) line. You can record fast or slow codes. Up to 24 codes are maintained for viewing. You can then translate the codes into Pinpoint Tests so you can follow the step-by-step diagnostic procedures in the Ford Service manuals and Mitchell automotive manuals.

The STAR mode of operation must be used to test vehicles with the Mazda Engine Control System (MECS) and the 4-speed Electronic Automatic Transaxle (4EAT). In addition, the MECS or 4EAT system outputs slow codes only; therefore MECS or 4EAT codes must be read with the tester in the slow codes mode.

SNAPSHOT MODE

The SNAPSHOT mode works in conjunction with the DATA LIST mode giving you the capability to save data list information. The SNAPSHOT function uses three different ways to trigger: on Any DTC, on a Single DTC, or with a Manual Trigger. Triggering on Any DTC allows you to trigger on an event when any DTC in the PCM has been set. Single DTC allows you to select a specific DTC for the Snapshot to occur on. Manual Trigger allows you the command to trigger with a single key press. In addition, you can choose the trigger point (begin, center, end of data) which provides more flexibility in vehicle diagnosis. You also have the option to replay Snapshot data on the tester display for later diagnostic analysis. If the vehicle under test supports the DATA LIST option, the Ford 1981-2004 Powertrain Application automatically includes the SNAPSHOT selection in the Select mode menu.

OBD CONTROLS MODE

ON-BOARD DIAGNOSTIC (OBD) CONTROLS mode provides fast access to output controls supported by the vehicle OBD system. Certain vehicle systems allow the tester to command an output or actuator device to turn on and off, or allow for PCM memory resets and adaptive learn strategies. The tester that is used with this software is capable of bidirectional communication which controls the device under test, or it can cause the device under test to change state by controlling PCM input/output electronics. This mode provides quick and efficient diagnostic software tools.

INFORMATION MODE

While performing diagnostic routines on the vehicle under test, it may be necessary to be provided with quick access information. Selecting INFORMATION MODE displays helpful information about the vehicle or system under test. This information may consist of data link connector (DLC) location information, PCM software identification, or system identification information.

The DLC LOCATION mode is available on EEC-V systems (OBD II) to give you quick data link connector location (DLC) information on the vehicle under test. In some cases the DLC location is not obvious, and using this mode shortens your time for making connection to the vehicle.

DIAGNOSTIC SUMMARY

The following table gives a summary of the diagnostic tests and procedures available on the Ford Powertrain application.

QUICK TEST MODE	
TEST/PROCEDURE	**DESCRIPTION**
Prepare Vehicle for Testing: ENGINE, IVSC	The tester takes you through a checklist of component settings and other steps necessary to prepare the vehicle for testing.
Continuous DTCs: ENGINE	Specific instructions guide you through reading Continuous DTCs from EEC-V systems. 5-character DTCs are displayed and decoded to the proper Pinpoint Test.
Key On, Engine Off (KOEO) Test: ENGINE, IVSC	Specific instructions take you through reading KOEO and continuous diagnostic codes. The fast codes are used for this test to save time (except on MCU systems). The Pinpoint Test for each code received can be displayed.
Timing Check: ENGINE	This test tells you how to set up the engine to do a timing advance test on the EEC-IV engine controller. You are directed to the appropriate follow up tests after any pass/fail condition.
Key On, Engine Running (KOER) Test: ENGINE, IVSC	Like the Key On, Engine Off test, this test offers specific instructions and fast code reading (except on MCU systems). The Pinpoint Tests for each code received can be displayed.
Output Control: ENGINE	Specific to the EEC-V systems, this test allows control of PCM outputs. For gasoline engines the test modes are All Off, All On, Low Speed Fan, High Speed Fan, Idle Speed %, EGR%, Evap Purge %, O2 B1 S1 Htr, O2 B1 S2 Htr, O2 B2 S1 Htr, O2 B2 S2 Htr, Shift Sol 1, Shift Sol 2, Shift Sol 3, Shift Sol 4, and TCC Lockup. For diesel engines the test modes are Output State, Glow Plug, Injector Buzz, Cylinder Balance, and Switch Test.
Freeze Frame Data: ENGINE	Specific to the EEC-V systems, this mode allows display of PCM-stored Freeze Frame data based on the moment the PCM detected the fault.
Output State Test: ENGINE	This test allows you to toggle (turn on and off) EEC-IV control devices such as solenoids and relays. The tester will instruct you when to increase/decrease the throttle to change the state of the outputs.
Cylinder Balance Test: ENGINE	This checks the fuel injectors on the SEFI engines. The codes received from the EEC-IV are interpreted by the tester and displayed on the screen.
Wiggle Tests: ENGINE	These tests assist you in locating loose or faulty wires and connectors in the ECA.
Clear Continuous Codes: ENGINE	This allows you to erase EEC-V or EEC-IV Continuous Codes from ECA memory.

QUICK TEST MODE (CONTINUED)	
TEST/PROCEDURE	**DESCRIPTION**
Review Codes: ENGINE, IVS	Allows you to retrieve the latest codes from each test performed. A maximum of 24 codes can be saved for each test, including STAR mode. At the press of a button the codes can be translated one code at a time to Pinpoint Test designations in the Ford and Mitchell service manuals.

DATA LIST MODE	
TEST/PROCEDURE	**DESCRIPTION**
Print Summary: ENGIVE, IVSC	If you have a printer, you can print a summary of the year, model, components tested, diagnostics, codes, and test results all listed in sequential order. This provides you with a printed copy for reviewing test procedures and for assistance in maintaining customer and business records.
Data List: ENGINE (EEC-V, EEC-IV)	Displays diagnostic data parameters in pre-selected or user-selected pairs.
Snapshot: ENGINE (EEC-V, EEC-IV)	Records data before and after the occurrence of an intermittent fault condition. Selected manually by pressing either ENTER, EXIT, or F9.

INFORMATION MODE	
TEST/PROCEDURE	**DESCRIPTION**
DLC Location	This gives you quick data link connector location (DLC) information on the vehicle being tested.
MIL Status	This indicates if there is an emission related DTC in the vehicle's PCM and if the MIL is being requested to illuminate.
OBD II Monitors	This mode allows display of PCM monitor test status according to the OBD II requirements.
VIN	This mode displays the Vehicle Identification Number. It may not be supported on all vehicles.
Configuration	This gives the Calibration Identification number from the PCM. It may not be supported on all vehicles.

GENERAL KEY FUNCTIONS

The operation of this application is simple, so once you've read through the manual to get a general idea of how it operates, you won't have to refer to it very often. You simply sequence through the operation of the cartridge by pressing keys on the tester in response to messages displayed on the screen. In general, the YES, NO, and EXIT keys perform this sequencing function. Refer to the following table for a summary of the basic key functions. Each section in this manual contains a table indicating which keys are active for that mode of operation.

BASIC KEY FUNCTIONS	
YES , NO	Answer questions asked on the display.
EXIT	Return to the previous step in the program. Can go all the way back to the start.
↑ , ↓	Scroll through the test mode selection menus. Also used to move the cursor during service code displays in STAR MODE, and to cycle through Pinpoint Test displays in QUICK TEST MODE.
F0 - F9	Function keys (F0 - F9): Select test mode.
0 - 9	Numeric keys (0 - 9): Enter the year of the vehicle.
ENTER	Only used when a cursor is pointing to a service code (in STAR MODE review and decode). Pressing ENTER causes Pinpoint Test of that code to be displayed. Press EXIT to return to the code screen.
YES = ← NO = →	Used to move the cursor left or right to service code you would like to decode to Pinpoint Test in Star Mode and to cycle/select engine.

TESTS AVAILABLE

The application is capable of performing the following diagnostic tests on vehicles equipped with EEC-V, EEC-IV, ISC-E and MCU engine controllers, Cruise, Antilock Brake Systems, and Air Suspension Systems.

ENGINE CONTROLLER TESTS MCU, ISC-E, EEC-IV			
TEST MODE	**MCU**	**ISC-E**	**EEC-IV**
Data List (Select 1989-98 vehicles)			X
Quick Tests			
Prepare Vehicle			X
KOEO	X		X
Check Timing			X
KOER	X	X	X
Wiggle Tests			X
Clear Continuous DTCs			X
Review DTCs			X
Print Summary			X
Snapshot (Select 1989-98 vehicles)			X
OBD Controls			
Output State			X
Cylinder Balance (SFI/SEFI engines)			X

ENGINE CONTROLLER TESTS—EEC-V & PTEC SYSTEMS	
TEST MODE	**EEC-V**
Data List (Select 1994-2004 Vehicles)	X
Quick Tests	
Prep Vehicle (Gas Engine)	X
Continuous DTC	X
KOEO	X
Check Timing	X
KOER	X
Freeze Data	X
Clear Continuous DTC	X
Review DTCs	X
Print Summary	X
Snapshot (Select 1994-2004 vehicles)	X

ENGINE CONTROLLER TESTS—EEC-V & PTEC SYSTEMS (CONTINUED)	
TEST MODE	**EEC-V**
OBD Controls - Gas Engine	
All On	X
All Off	X
Low Speed Fan	X
High Speed Fan	X
Idle Speed %	X
EGR %	X
Evap Purge %	X
O2 B1 S1 Htr	X
O2 B1 S2 Htr	X
O2 B2 S1 Htr	X
O2 B2 S2 Htr	X
OBD Controls - Transmission	
Shift Sol 1	X
Shift Sol 2	X
Shift Sol 3	X
Shift Sol 4	X
TCC Lockup	X
OBD Controls - 7.3L Powerstroke Diesel	
Output State	X
Glow Plug	X
Injector Buzz	X
Cylinder Balance	X
Switch Test	X
Hi Speed Fan	X
Information	
DLC Location	X
MIL Status	X
OBD II Monitors	X
Diagnostic System	X
VIN (if available)	X
Configuration (if available)	X

INTEGRATED VEHICLE SPEED CONTROL TEST	
TEST MODE	**ALL**
Engine Off	X
Engine Running	X

MAZDA ENGINE CONTROL SYSTEM AND 4EAT TRANSAXLE	
TEST MODE	**STAR MODE**
Engine Off	X
Engine Running	X

2. OPERATING PRECAUTIONS

INTRODUCTION

This chapter explains precautions that are very important when using Vetronix testers and application software with a vehicle. Failure to observe these precautions could affect the operation of the tester, the accuracy of data and tests, and at times your safety.

Read all of this chapter before you operate the tester and application software (cartridges). Safeguards have been built into the tester to protect you, the vehicle, and the tester from any hazards. Misuse or improper securing of the vehicle could lead to unsafe conditions.

PRECAUTIONS FOR ALL APPLICATIONS

PROTECT AGAINST REVERSE POLARITY

CAUTION! 	If power is applied to the tester and the Tech 1A or Tech 1 display remains blank or the green LED on the MTS 3100 does not illuminate when turned off, reverse polarity in the cigarette lighter may be present. Damage to the tester could occur. **DO NOT** connect the ALDL/DLC cable to the vehicle. Verify that the center contact of the vehicle's cigarette lighter has +12 volts and that the outer contact is grounded.

PROTECT AGAINST VOLTAGE SPIKES

CAUTION!

Due to the possibility of voltage spikes that could damage the vehicle or tester, do not connect or disconnect the tester while the ignition key is ON or while the engine is running.

INSTALL/REMOVE CARTRIDGES WITH TESTER OFF

CAUTION!

Do not install or remove application or auxiliary cartridges while power is applied to the tester.

To change or add a cartridge, do the following:

1. Turn the ignition OFF.
2. Disconnect the tester power source—either the cigarette lighter power plug or the ALDL/DLC Cable—from the vehicle.
3. For the MTS 3100, press #, EXIT to turn the tester OFF.
4. Change or install the cartridge(s).
5. Reconnect the tester power source—either the cigarette lighter power plug or the ALDL/DLC Cable.
6. Turn the ignition ON.

APPLY PARKING BRAKE

WARNING!

OBD CONTROLS MODE OPERATION

Use care when performing these tests. If used incorrectly, these test can result in personal injury or damage to the PCM, ABS, GEM, FEM, RCM, ECS, IABM, or vehicle. **ALWAYS PUT THE PARKING BRAKE ON AND BLOCK THE WHEELS WHEN USING THIS TEST MODE.**

PROTECT SNAPSHOT DATA

CAUTION!

Snapshot data is retained in tester memory for up to 24 hours, even if the tester is disconnected from the vehicle.

If you remove or change master cartridges, or power up the tester without a master cartridge or with a different master cartridge, you will lose the snapshot data.

CHECK TESTER INDUCED DTCs

CAUTION!

Under some conditions the tester can cause trouble codes to be set. Generally these codes are associated with the serial data link. It is important to determine if the trouble codes are set by the tester or are due to a true malfunction in the vehicle.

Check for trouble codes at the start and at the end of testing. If there are codes set at the end of testing—but not at the start—you may assume that they are caused by the tester and should be cleared and ignored.

PRECAUTIONS FOR FORD POWERTRAIN APPLICATION

DON’T DISCONNECT WHILE RUNNING KOEO

CAUTION!

Disconnecting tester power during Key On, Engine Off (KOEO) test can clear the vehicle’s continuous codes.

3. VEHICLE COVERAGE

Use this section to assist you in operating your Vetronix tester and application software. It covers everything needed to get your tester connected to the vehicle and begin performing the diagnostic functions. It is suggested that you read this manual completely before operating the tester and the application software.

PTEC EQUIPPED VEHICLES

Beginning in 2000, Ford equipped the Lincoln LS and Focus with the new PTEC Electronic Control Unit, or Powertrain Electronic Control Module. The PTEC system is Ford's new, advanced powertrain management system. The PTEC Electronic Control Unit is an updated design of the EEC-V ECU and provides increased performance for the OBD II system. The PTEC system supports diagnostic data parameters and five-character diagnostic trouble codes for engine and transmission parameters.

EEC-V EQUIPPED VEHICLES

Beginning in 1994, Ford equipped passenger cars with the EEC-V electronic control assembly, or powertrain control module. Starting in 1995 the EEC-V system was used on light duty trucks. The EEC-V system is an advanced engine management system that outperforms earlier EEC-IV systems, and is used where compliance for OBD II is required. Diagnostic data parameters and 5-character diagnostic trouble codes are available on all vehicles that use the EEC-V powertrain control system.

The 1995 and newer VIN=F 7.3L powerstroke diesel engine is also controlled by EEC-V. However, 1995-96 VIN=F 7.3L diesel powertrains are not required to be OBD II compliant, and may not support all diagnostic test modes or OBD controls. Similarly, 1997 and newer VIN=F 7.3L diesel powertrains are required to be OBD II compliant but may not support a lengthy freeze frame data list.

EEC-IV EQUIPPED VEHICLES

Beginning in 1983, Ford equipped passenger cars with the EEC-IV electronic control assembly (or powertrain control unit). Starting in 1984 the EEC-IV system was used on light duty trucks. Diagnostic trouble codes (two and three digit) are available on all vehicles that use EEC-IV powertrain control system. Additionally, diagnostic data parameters are available from the EEC-IV system starting in 1989 for passenger cars and 1990 for light duty trucks.

DIAGNOSTIC DATA TYPE

To determine if the vehicle you are testing supports diagnostic data parameters, refer to the DATA TYPE column in the following vehicle and engine charts. DCL in the column indicates that the vehicle is equipped with Ford's Data Communication Link (DCL), SCP in the column indicates that the vehicle is equipped with Ford's Standard Corporate Protocol (SCP), and NONE indicates no diagnostic data parameter information is available. Review the table footnotes for additional application information.

IVSC EQUIPPED VEHICLES

Beginning in 1986, Ford equipped passenger cars with the Integrated Vehicle Speed Control (IVSC). Diagnostic trouble codes (two digit) are available on all vehicles that use IVSC system.

FORD-MAZDA VEHICLE DIAGNOSTICS

Ford-Mazda vehicles (Aspire, Probe, Escort, Tracer, Festiva, Capri) have the MECS and 4EAT systems. These systems are diagnosed using the 7/14 pin adapter. To read DTCs from these systems, the STAR mode must be used and set up (see Appendix E). When performing diagnostics on these systems, please reference the proper service manual information.

VEHICLE SELECTION

Certain model Ford vehicles may support DCL even if the exact vehicle powertrain configuration is not available for selection. At first, it may appear that the vehicle that you are working on does not support data list. If this happens, try a similar engine or engine/transmission combination. An example may be a California emission certified vehicle that supports data list, while a Federal vehicle does not, and there is no emission certification separation available. This may be a result of vehicle production assembly or service part installation after the vehicle has been in use then comes in for repair. Sometimes the under hood decal which describes emission certification is different than ECU calibration, causing incorrect vehicle selection within the cartridge. Remember to check the validity of the data parameters by comparing with other measurement devices (e.g., compare engine RPM with dashboard tachometer).

VEHICLE COVERAGE

1981-1982 VEHICLE COVERAGE

1981 - 1982 FORD PASSENGER CARS				
VEHICLE	**VIN**	**ENGINES**	**ECA**	**ADAPTER**
Fairmont	A D	2.3L FBC[a] 4.2L FBC	MCU MCU	Ford Ford

1981 - 1982 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Thunderbird	3 D	3.8L FBC 4.2L FBC	MCU MCU	Ford Ford
Mustang	A D F	2.3L FBC OHC[a] 4.2L FBC 5.0L FBC	MCU MCU MCU	Ford Ford Ford
Granada	A 3 D	2.3L FBC OHC[a] 3.8L FBC 4.2L FBC	MCU MCU MCU	Ford Ford Ford
Ford	D F G	4.2L FBC 5.0L FBC 5.8L FBC	MCU MCU MCU	Ford Ford Ford

a. Includes California 1980 2.3L FBC with MCU

1981 - 1982 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	3 F	3.8L FBC 5.0L FBC	MCU MCU	Ford Ford
Mark VII	F	5.0L FBC	MCU	Ford
Lincoln	F	5.0L FBC	MCU	Ford

1981 - 1982 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Zephyr	A D	2.3L FBC[a] 4.2L FBC	MCU MCU	Ford Ford
Cougar	A 3 D	2.3L FBC OHC[a] 3.8L FBC 4.2L FBC	MCU MCU MCU	Ford Ford Ford
Capri	A D F	2.3L FBC OHC[a] 4.2L FBC 5.0L FBC	MCU MCU MCU	Ford Ford Ford
Mercury	D F G	4.2L FBC 5.0L FBC 5.8L FBC	MCU MCU MCU	Ford Ford Ford

a. Includes California 1980 2.3L FBC with MCU

1981 - 1982 FORD/LINCOLN/MERCURY TRUCKS/ VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Bronco	E	4.9L FBC	MCU	Ford
E/F Series	E	4.9L FBC	MCU	Ford

1983 VEHICLE COVERAGE

1983 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	R	2.3L FBC HSC	EEC-IV	Ford
Fairmont	A R	2.3L FBC OHC 2.3L FBC HSC	MCU EEC-IV	Ford Ford
Thunderbird	T,W	2.3L EFI Turbo	EEC-IV	Ford
Escort	2 2	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
EXP	2 2	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford

1983 FORD PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Mustang	A R T,W	2.3L FBC OHC 2.3L FBC HSC 2.3L EFI Turbo	MCU EEC-IV EEC-IV	Ford Ford Ford
LTD	A R	2.3L FBC OHC 2.3L FBC HSC	MCU EEC-IV	Ford Ford
Ford	G	5.8L FBC	MCU	Ford

1983 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	R	2.3L FBC HSC	EEC-IV	Ford
Zephyr	A R	2.3L FBC OHC 2.3L FBC HSC	MCU EEC-IV	Ford Ford
Cougar	T,W	2.3L EFI Turbo	EEC-IV	Ford
Lynx	2 2	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
LN7	2 2	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
Capri	A R T,W	2.3L FBC OHC 2.3L FBC HSC 2.3L EFI Turbo	MCU EEC-IV EEC-IV	Ford Ford Ford
Marquis	A R	2.3L FBC OHC 2.3L FBC HSC	MCU EEC-IV	Ford Ford
Mercury	G	5.8L FBC	MCU	Ford

1983 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A	2.0L FBC 2.3L FBC OHC	MCU MCU	Ford Ford
Bronco[a]	E	4.9L FBC	MCU	Ford
E/F Series	E	4.9L FBC	MCU	Ford

a. 2.8L Bronco II is in the 1984 table.

1984 VEHICLE COVERAGE

1984 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	R	2.3L FBC HSC	EEC-IV	Ford
Thunderbird	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	4 5	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
EXP	4 5	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
Mustang	A T,W 3 F,M	2.3L FBC 2.3L EFI Turbo 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
LTD	A 3 F,M	2.3L FBC 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Ford	F G	5.0L CFI 5.8L FBC	EEC-IV MCU	Ford Ford

1984 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	F,M	5.0L CFI	EEC-IV	Ford
Mark VII	F,M	5.0L CFI	EEC-IV	Ford
Lincoln	F,M	5.0L CFI	EEC-IV	Ford

1984 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	R	2.3L FBC HSC	EEC-IV	Ford
Cougar	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford

1984 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Capri	A T,W 3 F,M	2.3L FBC 2.3L EFI Turbo 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
Lynx	4 5	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
Marquis	A 3 F,M	2.3L FBC 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Mercury	F G	5.0L CFI 5.8L FBC	EEC-IV MCU	Ford Ford

1984 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A S	2.0L FBC 2.3L FBC OHC 2.8L FBC	MCU MCU EEC-IV	Ford Ford Ford
Bronco	Y F G	4.9L FBC 5.0L FBC 5.8L FBC	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Bronco II[a]	S	2.8L FBC	EEC-IV	Ford
E/F Series	Y F G	4.9L FBC 5.0L FBC 5.8L FBC	EEC-IV EEC-IV EEC-IV	Ford Ford Ford

a. Includes 1983 Bronco II.

1985 VEHICLE COVERAGE

1985 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Thunderbird	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	5 6	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
EXP	5 6	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
Mustang	A T,W 3 F,M	2.3L FBC OHC 2.3L EFI Turbo 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
LTD	A 3 F,M	2.3L FBC OHC 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Crown Victoria	F G	5.0L CFI 5.8L FBC	EEC-IV MCU	Ford Ford

1985 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	F	5.0L CFI	EEC-IV	Ford
Mark VII	F M	5.0L CFI 5.0L CFI H.O.	EEC-IV EEC-IV	Ford Ford
Lincoln	F	5.0L CFI	EEC-IV	Ford

1985 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Cougar	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford

1985 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Capri	A T,W 3 F,M	2.3L FBC OHC 2.3L EFI Turbo 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
Lynx	5 6	1.6L EFI 1.6L EFI Turbo	EEC-IV EEC-IV	Ford Ford
Marquis	A 3 F,M	2.3L FBC OHC 3.8L CFI 5.0L CFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Grand Marquis	F G	5.0L CFI 5.8L FBC OHC	EEC-IV MCU	Ford Ford
Merkur	T,W	2.3L EFI Turbo	EEC-IV	Ford

1985 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A S	2.0L ISC-E 2.3L EFI 2.8L FBC	ISC-E EEC-IV EEC-IV	Ford Ford Ford
Bronco	Y F N G	4.9L FBC 5.0L FBC 5.0L EFI 5.8L FBC	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
Bronco II	S	2.8L FBC	EEC-IV	Ford
Aerostar	A S	2.3L EFI 2.8L FBC	EEC-IV EEC-IV	Ford Ford
E/F Series	Y F N G	4.9L FBC 5.0L FBC 5.0L EFI 5.8L FBC	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford

1986 VEHICLE COVERAGE

1986 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Taurus	D U	2.5L CFI HSC 3.0L EFI	EEC-IV EEC-IV	Ford Ford
Thunderbird	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	J	1.9L EFI	EEC-IV	Ford
EXP	J	1.9L EFI	EEC-IV	Ford
Mustang	A T,W 3 M	2.3L FBC OHC 2.3L EFI Turbo 3.8L CFI 5.0L SEFI H.O.	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
LTD	A 3	2.3L FBC OHC 3.8L CFI	EEC-IV EEC-IV	Ford Ford
Crown Victoria	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford

1986 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	F	5.0L SEFI	EEC-IV	Ford
Mark VII	F M	5.0L SEFI 5.0L SEFI H.O.	EEC-IV EEC-IV	Ford Ford
Town Car	F	5.0L SEFI	EEC-IV	Ford

1986 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Sable	D U	2.5L CFI HSC 3.0L EFI	EEC-IV EEC-IV	Ford Ford

1986 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Cougar	T,W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Capri	A 3 M	2.3L FBC OHC 3.8L CFI 5.0L SEFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Lynx	J	1.9L EFI	EEC-IV	Ford
Marquis	A 3	2.3L FBC OHC 3.8L CFI	EEC-IV EEC-IV	Ford Ford
Grand Marquis	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford
Merkur XR4Ti	T,W	2.3L EFI Turbo	EEC-IV	Ford

1986 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A T	2.0L ISC-E 2.3L EFI 2.9L EFI	ISC-E EEC-IV EEC-IV	Ford Ford Ford
Bronco	Y,9 N	4.9L FBC 5.0L EFI	EEC-IV EEC-IV	Ford Ford
Bronco II	A T	2.3L EFI OHC 2.9L EFI	EEC-IV EEC-IV	Ford Ford
Aerostar	A S U	2.3L EFI OHC 2.8L FBC 3.0L EFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
E/F Series	Y,9 N	4.9L FBC 5.0L EFI	EEC-IV EEC-IV	Ford Ford

1987 VEHICLE COVERAGE

1987 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Taurus 87-1/2 Police	D U 3	2.5L CFI HSC 3.0L EFI 3.8L CFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Thunderbird	W 3 F	2.3L EFI Turbo 3.8L CFI 5.0L SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	9 J	1.9L CFI 1.9L EFI	EEC-IV EEC-IV	Ford Ford
EXP	9 J	1.9L CFI 1.9L EFI	EEC-IV EEC-IV	Ford Ford
Mustang	A E,M	2.3L EFI OHC 5.0L SEFI H.O.	EEC-IV EEC-IV	Ford Ford
Crown Victoria	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford

1987 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	F	5.0L SEFI	EEC-IV	Ford
Mark VII	F	5.0L SEFI	EEC-IV	Ford
Town Car	E F	5.0L SEFI H.O. 5.0L SEFI	EEC-IV EEC-IV	Ford Ford

1987 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Sable	D U	2.5L CFI HSC 3.0L EFI	EEC-IV EEC-IV	Ford Ford
Cougar	W 3 F	2.3L EFI Turbo 3.8L CFI RWD 5.0L SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford

1987 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Lynx	9 J	1.9L CFI 1.9L EFI	EEC-IV EEC-IV	Ford Ford
Grand Marquis	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford
Merkur XR4Ti	W	2.3L EFI Turbo	EEC-IV	Ford

1987 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A T	2.0L ISC-E 2.3L EFI OHC 2.9L EFI	ISC-E EEC-IV EEC-IV	Ford Ford Ford
Bronco	Y N	4.9L EFI 5.0L EFI	EEC-IV EEC-IV	Ford Ford
Bronco II	T	2.9L EFI	EEC-IV	Ford
Aerostar	A U	2.3L EFI OHC 3.0L EFI	EEC-IV EEC-IV	Ford Ford
E/F Series	Y N G	4.9L EFI 5.0L EFI 7.5L EFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford

1988 VEHICLE COVERAGE

1988 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Taurus	D U 4	2.5L CFI HSC 3.0L EFI 3.8L EFI AXOD	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Thunderbird	W 4 F	2.3L EFI Turbo 3.8L EFI RWD 5.0L SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	9 J	1.9L CFI 1.9L EFI	EEC-IV EEC-IV	Ford Ford
Mustang	A F E	2.3L EFI OHC 5.0L SEFI M.A. 5.0L SEFI H.O.	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Crown Victoria	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford

1988 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Continental	4	3.8L EFI AXOD	EEC-IV	Ford
Mark VII	E	5.0L SEFI H.O.	EEC-IV	Ford
Town Car	F	5.0L SEFI	EEC-IV	Ford

1988 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	X S	2.3L HSC BASE 2.3L HSC PLUS	EEC-IV EEC-IV	Ford Ford
Sable	U 4	3.0L EFI 3.8L EFI AXOD	EEC-IV EEC-IV	Ford Ford
Cougar	W 4 F	2.3L EFI Turbo 3.8L EFI RWD 5.0L SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Grand Marquis	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford

1988 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Merkur XR4Ti	W	2.3L EFI Turbo	EEC-IV	Ford
Merkur Scorpio	V	2.9L EFI	EEC-IV	Ford

1988 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	C A T	2.0L ISC-E 2.3L EFI 2.9L EFI	ISC-E EEC-IV EEC-IV	Ford Ford Ford
Bronco	Y N H	4.9L EFI 5.0L EFI 5.8L EFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Bronco II	T	2.9L EFI	EEC-IV	Ford
Aerostar	U	3.0L EFI	EEC-IV	Ford
E/F Series	Y N H G	4.9L EFI 5.0L EFI 5.8L EFI 7.5L EFI	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford

1989 VEHICLE COVERAGE

1989 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Tempo	X S	2.3L EFI BASE 2.3L EFI PLUS	EEC-IV EEC-IV	Ford Ford
Taurus	D U Y 4	2.5L CFI HSC 3.0L EFI 3.0L SHO SEFI 3.8L SEFI AXOD	EEC-IV EEC-IV EEC-IV EEC-IV	Ford Ford Ford Ford
Thunderbird	4 C R	3.8L SEFI RWD 3.8L SC SEFI 3.8L SC SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Escort	9 J	1.9L CFI 1.9L EFI	EEC-IV EEC-IV	Ford Ford
Mustang	A E	2.3L EFI OHC 5.0L SEFI M.A.	EEC-IV EEC-IV	Ford Ford

1989 FORD PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Crown Victoria	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford

1989 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SEFI AXOD	EEC-IV	DCL	Ford
Mark VII	E	5.0L SEFI H.O.	EEC-IV	None	Ford
Town Car	F	5.0L SEFI	EEC-IV	None	Ford

1989 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Topaz	X S	2.3L EFI BASE 2.3L EFI PLUS	EEC-IV EEC-IV	Ford Ford
Sable	U Y 4	3.0L EFI 3.0L SHO SEFI 3.8L SEFI AXOD	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Cougar	4 C R	3.8L SEFI RWD 3.8L SC SEFI 3.8L SC SEFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Grand Marquis	F G	5.0L SEFI 5.8L FBC	EEC-IV MCU	Ford Ford
Merkur XR4Ti	W	2.3L EFI Turbo	EEC-IV	Ford

1989 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Ranger	A T	2.3L EFI 2.9L EFI	EEC-IV EEC-IV	Ford Ford
Bronco	Y N H	4.9L EFI 5.0L EFI 5.8L EFI	EEC-IV EEC-IV EEC-IV	Ford Ford Ford
Bronco II	T	2.9L EFI	EEC-IV	Ford

1989 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	ADAPTER
Aerostar	U	3.0L EFI	EEC-IV	Ford
E/F Series	Y	4.9L EFI	EEC-IV	Ford
	N	5.0L EFI	EEC-IV	Ford
	H	5.8L EFI	EEC-IV	Ford
	M	7.3L Diesel	EEC-IV	Ford
	G	7.5L EFI	EEC-IV	Ford

1990 VEHICLE COVERAGE

1990 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	9	1.9L CFI	EEC-IV	None	Ford
	J	1.9L EFI	EEC-IV	None	Ford
	J	1.9L SEFI M.A.	EEC-IV	None	Ford
Tempo	X	2.3L EFI HSC BASE	EEC-IV	None	Ford
	S	2.3L EFI HSC PLUS	EEC-IV	None	Ford
Probe	U	3.0L EFI CAL	EEC-IV	DCL[a]	Ford
Taurus	D	2.5L CFI HSC	EEC-IV	None	Ford
	U	3.0L EFI	EEC-IV	DCL[a]	Ford
	Y	3.0L SHO SEFI M.A.	EEC-IV	None	Ford
	4	3.8L SEFI AXOD	EEC-IV	DCL	Ford
Thunderbird	4	3.8L SEFI RWD	EEC-IV	DCL	Ford
	R	3.8L SC SEFI M.A.	EEC-IV	DCL	Ford
Mustang	A	2.3L EFI OHC	EEC-IV	None	Ford
	A	2.3L EFI OHC M.A. CA	EEC-IV	None	Ford
	E	5.0L SEFI HO M.A.	EEC-IV	None	Ford
Crown Victoria	F	5.0L SEFI	EEC-IV	None	Ford
	F	5.0L SEFI M.A.	EEC-IV	None	Ford
	G	5.8L CARB	MCU	None	Ford

a. California models only

1990 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SEFI AXOD	EEC-IV	DCL	Ford

1990 LINCOLN PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Mark VII	E	5.0L SEFI H.O.	EEC-IV	None	Ford
Town Car	F F	5.0L SEFI FED 5.0L SEFI M.A. CAL	EEC-IV EEC-IV	DCL DCL[a]	Ford Ford

a. California models only

1990 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Topaz	X S	2.3L EFI HSC BASE 2.3L EFI HSC PLUS	EEC-IV EEC-IV	None None	Ford Ford
Sable	Y 4	3.0L SHO SEFI 3.8L SEFI AXOD	EEC-IV EEC-IV	None DCL	Ford Ford
Cougar	4 R	3.8L SEFI RWD 3.8L SC SEFI M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford
Grand Marquis	F F G	5.0L SEFI 5.0L SEFI M.A. 5.8L CARB	EEC-IV EEC-IV MCU	None None None	Ford Ford Ford
Merkur Scorpio	T	2.9L EFI	EEC-IV	None	Ford

1990 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A T T X	2.3L EFI OHC 2.9L EFI 2.9L EFI M.A. 4.0L EFI M.A.	EEC-IV EEC-IV EEC-IV EEC-IV	DCL None DCL[a] DCL	Ford Ford Ford Ford
Bronco	Y N H	4.9L EFI M.A. 5.0L EFI 5.8L EF I	EEC-IV EEC-IV EEC-IV	DCL DCL[b] DCL[c]	Ford Ford Ford
Bronco II	T T	2.9L EFI 2.9L EFI M.A.	EEC-IV EEC-IV	None DCL[a]	Ford Ford
Aerostar	U X	3.0L EFI 4.0L EFI M.A.	EEC-IV EEC-IV	None DCL	Ford Ford

1990 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
E/F Series	Y	4.9L EFI M.A.	EEC-IV	DCL	Ford
	N	5.0L EFI	EEC-IV	DCL[b]	Ford
	H	5.8L EFI	EEC-IV	DCL[c]	Ford
	M	7.3L Diesel	EEC-IV	None	Ford
	G	7.5L EFI	EEC-IV	None	Ford

a. California models only
b. E4OD Transmission only
c. GVWR 8500 lbs. or less only

1991 VEHICLE COVERAGE

1991 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	J	1.9L SEFI M.A.	EEC-IV	DCL	Ford
Tempo	X	2.3L EFI HSC BASE	EEC-IV	None	Ford
	S	2.3L EFI HSC PLUS	EEC-IV	None	Ford
Probe	U	3.0L EFI	EEC-IV	DCL	Ford
Taurus	N	2.5L HSC SEFI M.A.	EEC-IV	None	Ford
	Y	3.0L SHO SEFI M.A.	EEC-IV	None	Ford
	U	3.0L SEFI M.A	EEC-IV	DCL	Ford
	4	3.8L SEFI AXOD M.A.	EEC-IV	DCL	Ford
Thunderbird	4	3.8L SEFI RWD	EEC-IV	DCL	Ford
	R	3.8L SC SEFI M.A.	EEC-IV	DCL	Ford
	T	5.0L SEFI H.O. M.A.	EEC-IV	DCL	Ford
Mustang	M	2.3L EFI OHC M.A.	EEC-IV	DCL	Ford
	E	5.0L SEFI H.O. M.A.	EEC-IV	None	Ford
Crown Victoria	W	4.6L SEFI M.A.	EEC-IV	None	Ford
	F	5.0L SEFI M.A.	EEC-IV	None	Ford
	F	5.0L SEFI	EEC-IV	None	Ford
	G	5.8L CARB	MCU	None	Ford

1991 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SEFI AXOD M.A.	EEC-IV	DCL	Ford
Mark VII	E	5.0L SEFI H.O.	EEC-IV	None	Ford
Town Car	W	4.6L SEFI M.A.	EEC-IV	DCL[a]	Ford

a. 2 valve engine only

1991 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L SEFI M.A.	EEC-IV	DCL	Ford
Topaz	X S	2.3L EFI HSC BASE 2.3L EFI HSC PLUS	EEC-IV EEC-IV	None None	Ford Ford
Sable	4	3.8L SEFI AXOD	EEC-IV	DCL	Ford
Cougar	4 R T	3.8L SEFI RWD 3.8L SC SEFI M.A. 5.0L SEFI H.O. M.A.	EEC-IV EEC-IV EEC-IV	DCL DCL DCL	Ford Ford Ford
Grand Marquis	W F F G	4.6L SEFI M.A. 5.0L SEFI 5.0L SEFI M.A. 5.8L CARB	EEC-IV EEC-IV EEC-IV MCU	None None None None	Ford Ford Ford Ford

1991 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A T U X	2.3L EFI OHC M.A. 2.9L EFI 3.0L EFI M.A. 4.0L EFI M.A.	EEC-IV EEC-IV EEC-IV EEC-IV	DCL None DCL DCL	Ford Ford Ford Ford
Bronco	Y N H	4.9L EFI 5.0L EFI 5.8L EFI	EEC-IV EEC-IV EEC-IV	DCL DCL[a] DCL[b]	Ford Ford Ford
Explorer	X	4.0L EFI M.A.	EEC-IV	DCL	Ford
Aerostar	U X	3.0L EFI 4.0L EFI M.A.	EEC-IV EEC-IV	None DCL	Ford Ford

1991 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
E/F Series	Y	4.9L EFI	EEC-IV	DCL	Ford
	N	5.0L EFI	EEC-IV	DCL[a]	Ford
	H	5.8L EFI	EEC-IV	DCL[b]	Ford
	J	7.0L EFI	EEC-IV	DCL	Ford
	M	7.3L Diesel	EEC-IV	None	Ford
	G	7.5L EFI	EEC-IV	None	Ford

a. E4OD Transmission
b. GVWR 8500 lbs. or less only

1992 VEHICLE COVERAGE

1992 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	J	1.9L SEFI M.A.	EEC-IV	DCL	Ford
Tempo	X	2.3L SEFI M.A. HSC BASE	EEC-IV	DCL	Ford
	S	2.3L SEFI M.A. HSC PLUS	EEC-IV	DCL	Ford
	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
Probe	U	3.0L EFI	EEC-IV	DCL	Ford
Taurus	Y	3.0L SHO SEFI M.A.	EEC-IV	None	Ford
	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
	4	3.8L SEFI AXOD M.A.	EEC-IV	DCL	Ford
Thunderbird	4	3.8L SEFI RWD	EEC-IV	DCL	Ford
	R	3.8L SC SEFI M.A.	EEC-IV	DCL	Ford
	T	5.0L SEFI H.O. M.A.	EEC-IV	DCL	Ford
Mustang	M	2.3L EFI OHC M.A.	EEC-IV	DCL	Ford
	E	5.0L SEFI H.O. M.A.	EEC-IV	None	Ford
Crown Victoria	W	4.6L SEFI M.A. AOD-E	EEC-IV	DCL[a]	Ford
	W	4.6L SEFI M.A. AOD	EEC-IV	DCL[a]	Ford

a. 2 valve engine only

1992 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SEFI AXOD M.A.	EEC-IV	DCL	Ford
Mark VII	E	5.0L SEFI H.O.	EEC-IV	None	Ford
Town Car	W	4.6L SEFI M.A. AOD-E	EEC-IV	DCL[a]	Ford
	W	4.6L SEFI M.A. AOD	EEC-IV	DCL[a]	Ford

a. 2 valve engine only

1992 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L SEFI M.A.	EEC-IV	DCL	Ford
Topaz	X	2.3L SEFI M.A. HSC BASE	EEC-IV	DCL	Ford
	S	2.3L SEFI M.A. HSC PLUS	EEC-IV	DCL	Ford
	V	3.0L SEFI M.A.	EEC-IV	DCL	Ford
	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
Sable	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
	4	3.8L SEFI AXOD	EEC-IV	DCL	Ford
Cougar	4	3.8L SEFI RWD	EEC-IV	DCL	Ford
	T	5.0L SEFI H.O. M.A.	EEC-IV	DCL	Ford
Grand Marquis	W	4.6L SEFI M.A. AOD-E	EEC-IV	DCL[a]	Ford
	W	4.6L SEFI M.A. AOD	EEC-IV	DCL[a]	Ford

a. 2 valve engine only

1992 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A	2.3L EFI OHC M.A.	EEC-IV	DCL	Ford
	T	2.9L EFI	EEC-IV	None	Ford
	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
	X	4.0L EFI M.A.	EEC-IV	DCL	Ford
Bronco	Y	4.9L EFI Manual Trans	EEC-IV	DCL	Ford
	Y	4.9L EFI	EEC-IV	DCL	Ford
	N	5.0L EFI	EEC-IV	DCL[a]	Ford
	H	5.8L EFI	EEC-IV	DCL[b]	Ford

1992 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Explorer	X	4.0L EFI M.A.	EEC-IV	DCL	Ford
Aerostar	U	3.0L SEFI M.A.	EEC-IV	DCL	Ford
	X	4.0L EFI M.A.	EEC-IV	DCL	Ford
E/F Series	Y	4.9L EFI	EEC-IV	DCL	Ford
	N	5.0L EFI	EEC-IV	DCL[a]	Ford
	H	5.8L EFI	EEC-IV	DCL	Ford
	J	7.0L EFI	EEC-IV	DCL	Ford
	M	7.3L Diesel	EEC-IV	None	Ford
	G	7.5L EFI	EEC-IV	None	Ford

a. E4OD Transmission only
b. GVWR 8500 lbs. or less only

1993 VEHICLE COVERAGE

1993 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	J	1.9L SEFI M.A.	EEC-IV	DCL	Ford
Tempo	X	2.3L SFI SB HSC/FED	EEC-IV	DCL	Ford
	S	2.3L SFI HSC/CA	EEC-IV	DCL	Ford
	U	3.0L SFI M.A.	EEC-IV	DCL	Ford
Probe	A	2.0L SFI	EEC-IV	None	Ford
Taurus	1	3.0L FF	EEC-IV	DCL	Ford
	Y	3.0L SHO SFI M.A.	EEC-IV	None	Ford
	U	3.0L SFI M.A.	EEC-IV	DCL	Ford
	P	3.2L SHO	EEC-IV	DCL	Ford
	4	3.8L SFI AXOD M.A.	EEC-IV	DCL	Ford
Thunderbird	4	3.8L SFI RWD	EEC-IV	DCL	Ford
	R	3.8L SC SEFI M.A.	EEC-IV	DCL	Ford
	T	5.0L SFI H.O. M.A.	EEC-IV	DCL	Ford
Mustang	M	2.3L MFI OHC M.A.	EEC-IV	DCL	Ford
	E	5.0L SFI H.O. M.A.	EEC-IV	None	Ford
Crown Victoria	W	4.6L SFI M.A. AOD-E	EEC-IV	DCL	Ford

1993 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SFI AXOD M.A.	EEC-IV	DCL	Ford
Mark VIII	V	4.6L SFI 4V AOD-E	EEC-IV	DCL	Ford
Town Car	W	4.6L SFI M.A.	EEC-IV	DCL	Ford

1993 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L SFI M.A.	EEC-IV	DCL	Ford
Topaz	X S U	2.3L SFI M.A. HSC/FED 2.3L SFI M.A. HSC/CA 3.0L SFI M.A.	EEC-IV EEC-IV EEC-IV	DCL DCL DCL	Ford Ford Ford
Sable	1 U 4	3.0L FF 3.0L SFI M.A. 3.8L SFI AXOD	EEC-IV EEC-IV EEC-IV	DCL DCL DCL	Ford Ford Ford
Cougar	4 T	3.8L SFI RWD 5.0L SFI H.O. M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford
Grand Marquis	W	4.6L SFI M.A. AOD-E	EEC-IV	DCL	Ford

1993 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A U X	2.3L MFI OHC M.A. 3.0L SFI M.A. 4.0L MFI M.A.	EEC-IV EEC-IV EEC-IV	DCL DCL DCL	Ford Ford Ford
Bronco	Y Y N H	4.9L EFI Manual Trans 4.9L MFI 5.0L MFI 5.8L MFI	EEC-IV EEC-IV EEC-IV EEC-IV	DCL DCL DCL DCL	Ford Ford Ford Ford
Explorer	X	4.0L MFI M.A.	EEC-IV	DCL	Ford
Aerostar	U X	3.0L SFI M.A. 4.0L MFI M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford

1993 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)					
VEHICLE	**VIN**	**ENGINES**	**ECA**	**DATA LINK**	**ADAPTER**
E/F Series	Y	4.9L MFI	EEC-IV	DCL	Ford
	N	5.0L MFI	EEC-IV	DCL[a]	Ford
	H	5.8L MFI	EEC-IV	DCL	Ford
	R	5.8L MFI HO	EEC-IV	DCL[b]	Ford
	J	7.0L MFI	EEC-IV	DCL	Ford
	M	7.3L Diesel	EEC-IV	None	Ford
	G	7.5L MFI	EEC-IV	DCL	Ford

a. E4OD Transmission only
b. F-Series trucks only

1994 VEHICLE COVERAGE

1994 FORD PASSENGER CARS					
VEHICLE	**VIN**	**ENGINES**	**ECA**	**DATA LINK**	**ADAPTER**
Escort	J	1.9L SFI M.A.	EEC-IV	DCL	Ford
Tempo	X	2.3L SFI HSC	EEC-IV	DCL	Ford
	U	3.0L SFI M.A.	EEC-IV	DCL	Ford
Probe	A	2.0L SFI M.A. CD4E	EEC-IV	DCL	Ford
	A	2.0L SFI M.A.	EEC-IV	None	Ford
Taurus	1	3.0L FF SFI	EEC-IV	DCL	Ford
	Y	3.0L SHO SFI M.A.	EEC-IV	None	Ford
	U	3.0L SFI M.A.	EEC-IV	DCL	Ford
	P	3.2L SHO	EEC-IV	DCL	Ford
	4	3.8L SFI AXOD M.A.	EEC-IV	DCL	Ford
Thunderbird	4	3.8L SFI RWD	EEC-IV	DCL	Ford
	R	3.8L SC SFI M.A.	EEC-IV	DCL	Ford
	W	4.6L SFI	EEC-IV	SCP	OBD II-C2
Mustang	4	3.8L SFI	EEC-IV	SCP	OBD II-C2
	T	5.0L SC SFI M.A.	EEC-IV	DCL	Ford
	D	5.0L Cobra SFI M.A.	EEC-IV	DCL	Ford
Crown Victoria	W	4.6L SFI M.A. 2V AOD-E	EEC-IV	DCL	Ford

1994 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	4	3.8L SFI M.A.	EEC-IV	DCL	Ford
Mark VIII	V	4.6L SFI 4V AOD-E	EEC-IV	DCL	Ford
Town Car	W	4.6L SFI M.A. AOD-E	EEC-IV	DCL	Ford

1994 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L SFI M.A.	EEC-IV	DCL	Ford
Topaz	X U	2.3L SFI M.A. HSC 3.0L SFI M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford
Sable	U 4	3.0L SFI M.A. 3.8L SFI M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford
Cougar	4 W	3.8L SFI RWD 4.6L SFI	EEC-IV EEC-V	DCL SCP	Ford OBD II-C2
Grand Marquis	W	4.6L SFI M.A. 2V AOD-E	EEC-IV	DCL	Ford

1994 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A A U X X	2.3L MFI (FED) 2.3L SFI (CA) 3.0L SFI M.A. 4.0L MFI M.A. (FED) 4.0L MFI M.A. (CA)	EEC-IV EEC-IV EEC-IV EEC-IV EEC-IV	DCL DCL DCL DCL DCL	Ford Ford Ford Ford Ford
Bronco	Y N N H	4.9L MFI 5.0L MFI 5.0L SFI 5.8L MFI	EEC-IV EEC-IV EEC-IV EEC-IV	DCL DCL DCL DCL	Ford Ford Ford Ford
Explorer	X	4.0L MFI M.A.	EEC-IV	DCL	Ford
Aerostar	U X	3.0L SFI M.A. 4.0L MFI M.A.	EEC-IV EEC-IV	DCL DCL	Ford Ford

1994 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
E/F Series	Y	4.9L MFI	EEC-IV	DCL	Ford
	N	5.0L MFI	EEC-IV	DCL	Ford
	N	5.0L SFI	EEC-IV	DCL	Ford
	H	5.8L MFI	EEC-IV	DCL	Ford
	R	5.8L MFI	EEC-IV	DCL	Ford
	J	7.0L MFI	EEC-IV	DCL	Ford
	K	7.3L Diesel (Turbo IDI)	EEC-IV	None	Ford
	M	7.3L Diesel (NAV)	EEC-IV	None	Ford
	G	7.5L MFI	EEC-IV	DCL	Ford

1995 VEHICLE COVERAGE

1995 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	J	1.9L I4 SFI MAF M/T	EEC-IV	DCL	Ford
Contour	3	2.0L I4 SFI MAF	EEC-IV	DCL	Ford
	L	2.5L V6 SFI MAF	EEC-IV	DCL	Ford
Probe	A	2.0L I4 SFI MAF M/T	EEC-IV	None	Ford
	A	2.0L I4 SFI MAF CD4E	EEC-IV	DCL	Ford
Taurus[a, b]	1	3.0L V6 SFI MAF FFV	EEC-IV	DCL	Ford
	Y	3.0L V6 SFI MAF SHO	EEC-IV	None	Ford
	U	3.0L V6 SFI MAF	EEC-IV	DCL	Ford
	P	3.2L V6 SFI MAF	EEC-IV	DCL	Ford
	4	3.8L V6 SFI MAF	EEC-IV	DCL	Ford
Thunderbird[a]	4	3.8L V6 SFI MAF RWD	EEC-IV	DCL	Ford
	R	3.8L V6 SFI MAF SC	EEC-IV	DCL	Ford
	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	T	5.0L V8 SFI MAF	EEC-IV	DCL	Ford
	D	5.0L V8 SFI MAF Cobra	EEC-IV	DCL	Ford
Crown Victoria	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

a. Optional ARC diagnostics supported
b. Optional IVSC diagnostics supported

1995 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Town Car	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Continental	V	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mark VIII	V	4.6L V8 4V SFI MAF	EEC-IV	DCL	Ford

1995 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L I4 SFI MAF M/T	EEC-IV	DCL	Ford
Mystique	3 L	2.0L I4 SFI MAF 2.5L V6 SFI MAF	EEC-IV EEC-IV	DCL DCL	Ford Ford
Sable	U 4	3.0L V6 SFI MAF 3.8L V6 SFI MAF	EEC-IV EEC-IV	DCL DCL	Ford Ford
Cougar[a]	4 W	3.8L V6 SFI MAF RWD 4.6L V8 SFI MAF	EEC-IV EEC-V	DCL SCP	Ford OBD II
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

a. Optional ARC diagnostics supported

1995 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A U X	2.3L I4 SFI MAF 3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V EEC-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2
Bronco	Y Y N H H	4.9L I6 MFI MAP 4.9L I6 SFI MAF 5.0L V8 SFI MAF 5.8L V8 MFI MAP 5.8L V8 SFI MAF	EEC-IV EEC-IV EEC-IV EEC-IV EEC-IV	DCL DCL DCL DCL DCL	Ford Ford Ford Ford Ford
Explorer	X	4.0L V6 SFI MAF	EEC-IV	DCL	Ford
Aerostar	U X	3.0L V6 SFI MAF 4.0L V6 MFI MAF	EEC-IV EEC-IV	DCL DCL	Ford Ford
Windstar	U 4	3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1995 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
E/F Series	Y	4.9L I6 MFI MAP	EEC-IV	DCL	Ford
	Y	4.9L I6 SFI MAF	EEC-IV	DCL	Ford
	N	5.0L V8 SFI MAF	EEC-IV	DCL	Ford
	H	5.8L V8 MFI MAP	EEC-IV	DCL	Ford
	R	5.8L V8 SFI MAF H.O.	EEC-IV	DCL	Ford
	F	7.3L TC Diesel	EEC-V	SCP	OBD II-C2
	G	7.5L V8 MFI MAP	EEC-IV	DCL	Ford
F/L Series	J	7.0L V8 MFI MAP	EEC-IV	DCL	Ford

1996 VEHICLE COVERAGE

1996 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	J	1.9L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Contour	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Probe	A	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Taurus	1	3.0L V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L V6 2V SFI MAF	EEC-V	SCP	OBD II-C2
	S	3.0L V6 4V SFI MAF	EEC-V	SCP	OBD II-C2
Taurus SHO	N	3.4L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L V8 2V SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L V8 4V SFI MAF	EEC-V	SCP	OBD II-C2
Thunderbird	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L V8 2V SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	6	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

1996 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L V8 SFI MAF	EEC-IV	SCP	OBD II-C2
Mark VIII	V	4.6L V8 SFI MAF	EEC-IV	SCP	OBD II-C2
Town Car	W	4.6L V8 2V SFI MAF	EEC-V	SCP	OBD II-C2

1996 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	J	1.9L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Mystique	3 L	2.0L I4 SFI MAF 2.5L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Sable	U S	3.0L V6 2V SFI MAF 3.0L V6 4V SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Cougar	4 W	3.8L V6 SFI MAF 4.6L V8 2V SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

1996 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A U X	2.3L I4 SFI MAF 3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V EEC-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2
Bronco	N H	5.0L V8 SFI MAF 5.8L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Explorer	X P	4.0L V6 SFI MAF 5.0L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Aerostar	U X	3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Windstar	U 4	3.0L V6 SFI MAF 3.8L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1996 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
E/F Series	Y	4.9L I6 SFI MAF	EEC-V	SCP	OBD II-C2
	N	5.0L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	H	5.8L V8 SFI MAF[a]	EEC-V	SCP	OBD II-C2
	H	5.8L V8 SFI MAF[b]	EEC-IV	DCL	Ford
	F	7.3L TC Diesel	EEC-V	SCP	OBD II-C2
	G	7.5L V8 SFI MAF[c]	EEC-V	SCP	OBD II-C2
	G	7.5L V8 SFI MAF[d]	EEC-IV	DCL	Ford
	G	7.5L V8 MFI MAP[e]	EEC-IV	DCL	Ford
F Series	Y	4.9L I6 MFI MAP[e]	EEC-V	SCP	OBD II-C2
	J	7.0L V8 MFI MAP[f]	EEC-IV	DCL	Ford

a. CAL/FED emissions and OBD II calibration, less than 8500 lbs. GVWR.
b. CAL/FED emissions and OBD I calibration, greater than 8500 lbs. GVWR.
c. CAL emissions and OBD II calibration, less than 14000 lbs. GVWR.
d. CAL emissions and OBD I calibration, greater than 14000 lbs. GVWR.
e. FED emissions and OBD I calibration.
f. CAL/FED emissions and OBD I calibration.

1997 VEHICLE COVERAGE

1997 FORD PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2 OBD II-C2
Contour GFP	Z	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
Contour	3	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Probe	A	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
Taurus	1	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Taurus SHO	N	3.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Thunderbird	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

1997 FORD PASSENGER CARS (CONTINUED)

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Crown Victoria	9 W	4.6L V8 CNG SFI MAF 4.6L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1997 LINCOLN PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mark VIII	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Town Car	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

1997 MERCURY PASSENGER CARS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Mystique	3 L	2.0L DOHC I4 SFI MAF 2.5L 4V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Sable	U S	3.0L 2V V6 SFI MAF 3.0L 4V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Cougar	4 W	3.8L V6 SFI MAF 4.6L 2V V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

1997 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	A U X	2.3L I4 SFI MAF 3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V EEC-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2
Explorer	X	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer, Mountaineer	E P	4.0L SOHC V6 SFI MAF 5.0L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Expedition, Navigator	W L	4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
E/F Series	2 6 W L	4.2L V6 SFI MAF 4.6L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF	EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
E Series	5	6.8L SOHC V10 SFI MAF	EEC-V	SCP	OBD II-C2
F Series	H H J F G G G	5.8L V8 SFI MAF[a] 5.8L V8 MFI MAP[b] 7.0L V8 MFI MAP[c] 7.3L TC Diesel 7.5L V8 SFI MAF[d] 7.5L V8 MFI MAP[e] 7.5L V8 MFI MAP[f]	EEC-V EEC-IV EEC-IV EEC-IV EEC-V EEC-IV EEC-IV	SCP DCL DCL SCP SCP DCL DCL	OBD II-C2 Ford Ford OBD II-C2 OBD II-C2 Ford Ford
F/L Series	J	7.0L V8 MFI MAP[c]	EEC-IV	DCL	Ford
Aerostar	U X	3.0L 2V V6 SFI MAF 4.0L 2V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Windstar	U 4	3.0L V6 SFI MAF 3.8L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2

a. CAL/FED emissions and OBD II calibration, less than 8500 lbs. GVWR.
b. CAL/FED emissions and OBD I calibration, greater than 8500 lbs. GVWR.
c. CAL/FED emissions and OBD I calibration.
d. CAL emissions and OBD II calibration, less than 14000 lbs. GVWR.
e. CAL emissions and OBD I calibration, greater than 14000 lbs. GVWR
f. FED emissions and OBD I calibration.

1998 VEHICLE COVERAGE

1998 FORD PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Escort ZX2	3	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
Contour GFP Z	Z	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
Contour GFP	3 L	2.0L DOHC I4 SFI MAF 2.5L 4V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Taurus	1 2 U S	3.0L 2V V6 FFV SFI MAF 3.0L 2V V6 FFV SFI MAF 3.0L 2V V6 SFI MAF 3.0L 4V V6 SFI MAF	EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
Taurus SHO	N	3.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	9 W	4.6L V8 CNG SFI MAF 4.6L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1998 LINCOLN PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mark VIII	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Town Car	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

1998 MERCURY PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Tracer	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Mystique	3 L	2.0L DOHC I4 SFI MAF 2.5L 4V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1998 MERCURY PASSENGER CARS (CONTINUED)

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Sable	U S	3.0L 2V V6 SFI MAF 3.0L 2V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

1998 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	C U X	2.5L I4 SFI MAF 3.0L V6 SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V EEC-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2
Explorer	X	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer, Mountaineer	E P	4.0L SOHC V6 SFI MAF 5.0L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Expedition, Navigator	W L	4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
E/F Series	2 6 W L M F S	4.2L V6 SFI MAF 4.6L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF 5.4L SOHC V8 NGV 7.3L TC Diesel 6.8L SOHC V10 SFI MAF	EEC-V EEC-V EEC-V EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
F Series	H H J G G G	5.8L V8 SFI MAF[a] 5.8L V8 MFI MAP[b] 7.0L V8 MFI MAP[c] 7.5L V8 SFI MAF[d] 7.5L V8 SFI MAP[e] 7.5L V8 SFI MAP[f]	EEC-V EEC-IV EEC-IV EEC-V EEC-IV EEC-IV	SCP DCL DCL SCP DCL DCL	OBD II/OBD II - CII Ford Ford OBD II-C2 Ford Ford
F/L Series	J	7.0L V8 MFI MAP[c]	EEC-IV	DCL	Ford
Windstar	U 4	3.0L V6 SFI MAF 3.8L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

a. CAL/FED emissions and OBD II calibration, less than 8500lbs. GVWR.
b. CAL/FED emissions and OBD I calibration, greater than 8500lbs. GVWR.
c. CAL/FED emissions and OBD I calibration.
d. CAL emissions and OBD II calibration, less than 14000lbs. GVWR.
e. CAL emissions and OBD I calibration, greater than 14000lbs. GVWR.
f. FED emissions and OBD I calibration.

1999 VEHICLE COVERAGE

1999 FORD PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Escort ZX2 ZETEC	3	2.0L DOHC 16V SFI MAF	EEC-V	SCP	OBD II-C2
Contour GFP	Z	2.0L DOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
Contour	3 L	2.0L I4 SFI MAF 2.5L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Contour SVT	G	2.5L DOHC V6	EEC-V	SCP	OBD II-C2
Taurus	1 2 U S	3.0L 2V V6 FFV SFI MAF 3.0L 2V V6 FFV SFI MAF 3.0L 2V V6 SFI MAF 3.0L 4V V6 SFI MAF	EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
Taurus SHO	N	3.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	W 9	4.6L V8 SFI MAF 4.6L V8 CNG SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1999 LINCOLN PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Town Car	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

1999 MERCURY PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Mystique	3 L	2.0L I4 SFI MAF 2.5L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

1999 MERCURY PASSENGER CARS (CONTINUED)

Cougar	3 L	2.0L I4 SFI MAF 2.5L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Sable	S U	3.0L 4V V6 SFI MAF 3.0L 2V V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2

1999 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	C U V X	2.5L SOHC I4 SFI MAF 3.0L SFI MAF 3.0L FFV SFI MAF 4.0L V6 SFI MAF	EEC-V EEC-V EED-V EEC-V	SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
Explorer	X E P	4.0L V6 SFI MAF 4.0L SOHC V6 SFI MAF 5.0L V8 SFI MAF	EEC-V EEC-V EED-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2
Mountaineer	E P	4.0L SOHC V6 SFI MAF 5.0L V8 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2
Expedition	6 W L M A	4.6L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF 5.4L SOHC V8 NGV SFI MAF 5.4L 4V V8 SFI MAF	EEC-V EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
Navigator	6 W L M A	4.6L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF 5.4L SOHC V8 NGV SFI MAF 5.4L 4V V8 SFI MAF	EEC-V EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
E/F Series	2 6 W L M F Z	4.2L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 4.6L SOHC V8 SFI MAF 5.4L SOHC V8 SFI MAF 5.4L SOHC V8 NGV SFI MAF 7.3L V8 TC Diesel 5.4L SFI MAF Bi-Fuel	EEC-V EEC-V EEC-V EEC-V EEC-V EEC-V EEC-V	SCP SCP SCP SCP SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2 OBD II-C2
F Series Lightning	3	5.4L Super Charged V8	EEC-V	SCP	OBD II-C2
F Series Super Duty	L S F	5.4L SOHC V8 SFI MAF 6.8L V10 SFI MAF 7.3L V8 TC Diesel	EEC-V EEC-V EEC-V	SCP SCP SCP	OBD II-C2 OBD II-C2 OBD II-C2

1999 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)					
VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Windstar	U 4	3.0L V6 SFI MAF 3.8L V6 SFI MAF	EEC-V EEC-V	SCP SCP	OBD II-C2 OBD II-C2

2000 VEHICLE COVERAGE

2000 FORD PASSENGER CARS					
VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Escort ZX2	3	2.0L DOHC 16V SFI MAF	EEC-V	SCP	OBD II-C2
Focus	3	2.0L I4 SFI MAF	PTEC	SCP	OBD II-C2
	P	2.0L DOHC 16V SFI MAF	PTEC	SCP	OBD II-C2
Contour	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Taurus	2	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2

2000 LINCOLN PASSENGER CARS					
VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Town Car	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
LS	S	3.0L SFI MAF	PTEC	SCP	OBD II-C2
	A	3.9L SFI MAF	PTEC	SCP	OBD II-C2

2000 MERCURY PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Mystique	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Cougar	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Sable	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2

2000 FORD/LINCOLN/MERCURY TRUCKS/VANS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	C	2.5L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L SFI MAF	EEC-V	SCP	OBD II-C2
	V	3.0L FFV SFI MAF	EED-V	SCP	OBD II-C2
	X	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer	X	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
	P	5.0L V8 SFI MAF	EED-V	SCP	OBD II-C2
Mountaineer	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
	P	5.0L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Expedition	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
	A	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2

2000 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Navigator	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
	A	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
E/F Series	2	4.2L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
	Z	5.4L SFI MAF Bi-Fuel	EEC-V	SCP	OBD II-C2
F Series Lightning	3	5.4L Super Charged V8	EEC-V	SCP	OBD II-C2
F Series Super Duty	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
Windstar	U	3.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Excursion	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2

2001 VEHICLE COVERAGE

2001 FORD PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Escort	P	2.0l I4 SFI MAF	EEC-V	SCP	OBD II-C2
Escort ZX2	3	2.0L DOHC 16V SFI MAF	EEC-V	SCP	OBD II-C2
Focus	3	2.0l I4 SFI MAF	PTEC	SCP	OBD II-C2
	P	2.0L DOHC 16V SFI MAF	PTEC	SCP	OBD II-C2
Taurus	2	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	4	3.8L V6	EEC-V	SCP	OBD II-C2
Mustang GT	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2

2001 LINCOLN PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Continental	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Towncar	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
LS	S	3.0L SFI MAF	PTEC	SCP	OBD II-C2
	A	3.9L SFI MAF	PTEC	SCP	OBD II-C2

2001 MERCURY PASSENGER CARS

VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Cougar	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2

2001 MERCURY PASSENGER CARS (CONTINUED)					
Sable	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Grand Marquis	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
	9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2

2001 FORD/LINCOLN/MERCURY TRUCKS/VANS					
VEHICLE	8TH VIN	ENGINES	ECA	DATA LINK	ADAPTER
Ranger	C	2.5L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
	D	2.5L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
	V	3.0L FFV SFI MAF	EEC-V	SCP	OBD II-C2
	U	3.0L SFI MAF	EEC-V	SCP	OBD II-C2
	E	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Escape	B	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
	1	3.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer Sport Trac	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer	X	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
	P	5.0L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mountaineer	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
	P	5.0L V8 SFI MAF	EEC-V	SCP	OBD II-C2
Expedition	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	A	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
Navigator	A	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
	R	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2

2001 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)					
VEHICLE	**8TH VIN**	**ENGINES**	**ECA**	**DATA LINK**	**ADAPTER**
E/F Series	2	4.2L V6 SFI MAF	EEC-V	SCP	OBD II-C2
	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
E Series	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
F Series Super Duty	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
Windstar	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
F Series Lighting	Z	5.4L Super Charged V8	EEC-V	SCP	OBD II-C2
Excursion	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
	S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
	F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
F650-F750	5	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
	6	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2

2002 VEHICLE COVERAGE

2002 FORD PASSENGER CARS						
MODEL	**BODY VIN (5th & 6th)**	**ENGINE VIN (8th)**	**ENGINE**	**ECU TYPE**	**DATA LINK**	**ADAPTER CONFIG.**
Escort	P1	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
Focus	P3	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		3	2.0L DOHC 16V SFI MAF	EEC-V	SCP	OBD II-C2

2002 FORD PASSENGER CARS (CONTINUED)

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Taurus	P5	2	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
		S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	P4	4	3.8L V6	EEC-V	SCP	OBD II-C2
Mustang GT	P4	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	P4	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	P7	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2
Thunderbird	P6	A	3.9L SFI MAF	PTEC	SCP	OBD II-C2

2002 LINCOLN PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Continental	M9	V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Towncar	M8	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
LS	M8	S	3.0L SFI MAF	PTEC	SCP	OBD II-C2
		A	3.9L SFI MAF	PTEC	SCP	OBD II-C2

2002 MERCURY PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Cougar	M6	3	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		L	2.5L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Sable	M5	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Grand Marquis	M7	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2

2002 FORD/LINCOLN/MERCURY TRUCKS/VANS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Ranger	R0, R1, R4	C	2.5L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
		D	2.3L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
		V	3.OL FFV SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.OL SFI MAF	EEC-V	SCP	OBD II-C2
		E	4.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Escape	U0	B	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		1	3.0L V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer Sport Trac	U7	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer	U6, U7	E	4.0L SOHC V6 SFI MAF	PTEC	SCP	OBD II-C2
		W	4.6L V8 SFI MAF	PTEC	SCP	OBD II-C2
Mountaineer	U6, U8	E	4.0L SOHC V6 SFI MAF	PTEC	SCP	OBD II-C2
		W	4.6L V8 SFI MAF	PTEC	SCP	OBD II-C2

2002 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Expedition	U1	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
Navigator	U2	A	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
		R	5.4L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
E/F Series	E1, E2, S2, F0, F1, F2, W1, W2, X0, X1, X2	2	4.2L V6 SFI MAF	EEC-V	SCP	OBD II-C2
		W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
		F	7.3L V8 TC DIESEL	EEC-V	SCP	OBD II-C2
E Series	E2, E3, S2, S3	6	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
F Series Super Duty Bi-Fuel	F2, F3, F4, F5, F6, F7, F8, W2, W3, W4, W5, W6, W7, X2, X3, X4, X5, X6, X7	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
		5	7.3L Diesel	EEC-V	SCP	OBD II-C2
		F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
		Z	5.4L SFI MAF Bi-Fuel	EEC-V	SCP	OBD II-C2
		6	7.3L	EEC-V	SCP	OBD II-C2
Windstar	A5	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
F Series Lightning, Harley	F0	3	5.4L Super Charged V8	EEC-V	SCP	OBD II-C2

2002 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)						
MODEL	**BODY VIN (5th & 6th)**	**ENGINE VIN (8th)**	**ENGINE**	**ECU TYPE**	**DATA LINK**	**ADAPTER CONFIG.**
Excursion	U4	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
		F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
Blackwood	W0	A	5.4L SFI MAF	EEC-V	SCP	OBD II-C2

2003 VEHICLE COVERAGE

2003 FORD PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Escort	P1	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		3	2.0L SFI MAF	EEC-V	SCP	OBD II-C2
Focus	P3	P	2.0L I4 SFI MAF	EEC-V	SCP	OBD II-C2
		3	2.0L SFI MAF	EEC-V	SCP	OBD II-C2
Taurus	P5	2	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
		S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	P4	4	3.8L V6	EEC-V	SCP	OBD II-C2
Mustang GT	P4	X	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2
		V	4.6L 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	P4	Y	4.6L V8 DOHC Super Charged	EEC-V	SCP	OBD II-C2
Mustang Mach 1	P4	R	4.6L DOHC V8	EEC-V	SCP	OBD II-C2
Crown Victoria	P7	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2
		V	4.6L DOHC	EEC-V	SCP	OBD II-C2

2003 LINCOLN PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Towncar	M8	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

2003 MERCURY PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Sable	M5	S	3.0L 4V V6 SFI MAF	EEC-V	SCP	OBD II-C2
		2	3.0L 2V V6 FFV SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L 2V V6 SFI MAF	EEC-V	SCP	OBD II-C2
Grand Marquis, Marauder	M7	W	4.6L V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2
		V	4.6L DOHC	EEC-V	SCP	OBD II-C2

2003 FORD/LINCOLN/MERCURY TRUCKS/VANS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Ranger	R0, R1, R4	D	2.3L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L V6 SFI OHV MAF	EEC-V	SCP	OBD II-C2
		V	3.0L V6 Flex Fuel	EEC-V	SCP	OBD II-C2
		E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Escape	U0, U9	B	2.0L I4 SFI MAF ZETEC	EEC-V	SCP	OBD II-C2
		1	3.0L V6 SFI MAF DURETEC	EEC-V	SCP	OBD II-C2
Explorer Sport/ Sport Trac	U6, U7	E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Explorer	U6, U7, U8	E	4.0L SOHC V6 SFI MAF	PTEC	SCP	OBD II-C2
		W	4.6L V8 SFI MAF	PTEC	SCP	OBD II-C2
		K	4.0L SOHC V6 EFI Flex Fuel	PTEC	SCP	OBD II-C2
Mountaineer	U6, U8	E	4.0L SOHC V6 SFI MAF	PTEC	SCP	OBD II-C2
		W	4.6L V8 SFI MAF	PTEC	SCP	OBD II-C2
		K	4.0L SOHC V6 EFI Flex Fuel	PTEC	SCP	OBD II-C2

2003 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Expedition	U1	W	4.6L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		L/E	5.4L SOHC 2V V8 SFI MAF	PTEC	SCP	OBD II-C2
		R	5.4L SOHC 4V V8 SFI MAF	PTEC	SCP	OBD II-C2
Navigator	U2	W	4.6L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		L/E	5.4L SOHC 2V V8 SFI MAF	PTEC	SCP	OBD II-C2
		R	5.4L DOHC V8	EEC-V	SCP	OBD II-C2
E Series	C3, C4, C5, E1, E2, E3, E4, E5, S2, S3	2	4.2L V6 SFI MAF	EEC-V	SCP	OBD II-C2
		W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		6	4.6L SOHC V8	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
		F	7.3L V8 TC DIESEL	EEC-V	SCP	OBD II-C2
		S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
F 150	F0, F1, W0, X0, X1	2	4.2L OHV V6 SFI	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC V8 EFI	EEC-V	SCP	OBD II-C2
		W	4.6L SOHC V8 EFI	EEC-V	SCP	OBD II-C2
		6	4.6L SOHC V8	EEC-V	SCP	OBD II-C2
		Z	5.4L V8 SFI MAF Bi-Fuel	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 EFI CNG	EEC-V	SCP	OBD II-C2
Windstar	A5	4	3.8L V6 SFI MAF	EEC-V	SCP	OBD II-C2
F Series 150 Lightning, Harley	F0	3	5.4L Super Charged V8	EEC-V	SCP	OBD II-C2

2003 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
F Super Duty 250-550	F2, F3, F4, F5, X2, X3, X4, X5, W2, W3, W4, W5	F	7.3L OHV DI Turbo Diesel V8	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC EFI V8	EEC-V	SCP	OBD II-C2
		S	6.8L SOHC EFI V10	EEC-V	SCP	OBD II-C2
		Z	6.8L SOHC EFI NGV	EEC-V	SCP	OBD II-C2
F650 - F750	F6, F7, X6, X7, W6, W7	5	7.3L Navistar 210 HP Diesel	EEC-V	SCP	OBD II-C2
		6	7.3L Navistar 210 HP Diesel	EEC-V	SCP	OBD II-C2
Excursion	U4	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L V10 SFI MAF	EEC-V	SCP	OBD II-C2
		F	7.3L V8 TC Diesel	EEC-V	SCP	OBD II-C2
		Z	6.8L SOHC EFI NGV	EEC-V	SCP	OBD II-C2
Blackwood	W0	A	5.4L 4V EFI V8	EEC-V	SCP	OBD II-C2
Aviator	U6, U7, U8	H	4.6L V8	PTEC	SCP	OBD II-C2

2004 VEHICLE COVERAGE

2004 FORD PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Focus	P3	P	2.0L SOHC I4 SPI SFI MAF	EEC-V	SCP	OBD II-C2
		3	2.0L DOHC I4 Zetec SFI MAF	EEC-V	SCP	OBD II-C2
Mustang	P4	4	3.8L OHV V6	EEC-V	SCP	OBD II-C2
Mustang GT	P4	X	4.6L DOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Cobra	P4	Y	4.6L V8 DOHC Supercharged SFI MAF	EEC-V	SCP	OBD II-C2
Mustang Mach 1	P4	R	4.6L DOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
Crown Victoria	P7	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L SOHC V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2

2004 LINCOLN PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Towncar	M8	W	4.6L 2V V8 SFI MAF	EEC-V	SCP	OBD II-C2

2004 MERCURY PASSENGER CARS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Grand Marquis	M7	W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		9	4.6L V8 NGV SFI MAF	EEC-V	SCP	OBD II-C2
Marauder	M7	V	4.6L DOHC V8	EEC-V	SCP	OBD II-C2

2004 FORD/LINCOLN/MERCURY TRUCKS/VANS

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
Ranger	R0, R1, R4	D	2.3L SOHC I4 SFI MAF	EEC-V	SCP	OBD II-C2
		U	3.0L OHV V6 SFI MAF	EEC-V	SCP	OBD II-C2
		E	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Escape	U0, U9	B	2.0L DOHC I4 Zetec SFI MAF	EEC-V	SCP	OBD II-C2
		1	3.0L DOHC V6 Duretec SFI MAF	EEC-V	SCP	OBD II-C2
Explorer Sport Trac	U6, U7	K	4.0L SOHC V6 SFI MAF	EEC-V	SCP	OBD II-C2
Expedition	U1	W	4.6L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		L	5.4L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		R	5.4L DOHC 4V V8 SFI MAF	PTEC	SCP	OBD II-C2
Navigator	U2	W	4.6L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		L	5.4L SOHC V8 SFI MAF	PTEC	SCP	OBD II-C2
		R	5.4L DOHC 4V V8 SFI MAF	EEC-V	SCP	OBD II-C2
E Series	C3, C4, C5, E1, E2, E3, E4, E5, S2, S3	W	4.6L SOHC V8 EFI	EEC-V	SCP	OBD II-C2
		L	5.4L SOHC V8 EFI	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 CNG EFI	EEC-V	SCP	OBD II-C2
		S	6.8L SOHC V10 EFI	EEC-V	SCP	OBD II-C2

2004 FORD/LINCOLN/MERCURY TRUCKS/VANS (CONTINUED)

MODEL	BODY VIN (5th & 6th)	ENGINE VIN (8th)	ENGINE	ECU TYPE	DATA LINK	ADAPTER CONFIG.
F 150 Heritage	F0, F1, W0, X0, X1	2	4.2LV6 OHV SFI MAF	EEC-V	SCP	OBD II-C2
		W	4.6L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		3	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		M	5.4L SOHC V8 CNG SFI MAF	EEC-V	SCP	OBD II-C2
F Series 150 Heritage Lightning/ Bi-Fuel	F0	3	5.4L SOHC V8 Supercharged SFI MAF	EEC-V	SCP	OBD II-C2
		Z	5.4L SOHC V8 BIF	EEC-V	SCP	OBD II-C2
F Super Duty 250-550	F2, F3, F4, F5, X2, X3, X4, X5, W2, W3, W4, W5	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L SOHC V10 SFI MAF	EEC-V	SCP	OBD II-C2
		D	6.8L SOHC V10 SFI MAF	EEC-V	SCP	OBD II-C2
Excursion	U4	L	5.4L SOHC V8 SFI MAF	EEC-V	SCP	OBD II-C2
		S	6.8L SOHC V10 SFI MAF	EEC-V	SCP	OBD II-C2
Aviator	U6, U7, U8	H	4.6L V8 DOHC SFI MAF	PTEC	SCP	OBD II-C2
Freestar/ Monterey	A5, A2	6	3.9L OHV V6 EFI	EEC-V	SCP	OBD II-C2
		2	4.2L OHV V6 EFI	EEC-V	SCP	OBD II-C2

4. GETTING STARTED

This chapter provides information to assist you in operating your Vetronix tester and software application. In addition to helping you identify vehicles covered by the software, it shows you how to connect your tester to the vehicle and explains how to begin performing system diagnostic functions. It is suggested that you read this manual completely before operating the tester and the system software.

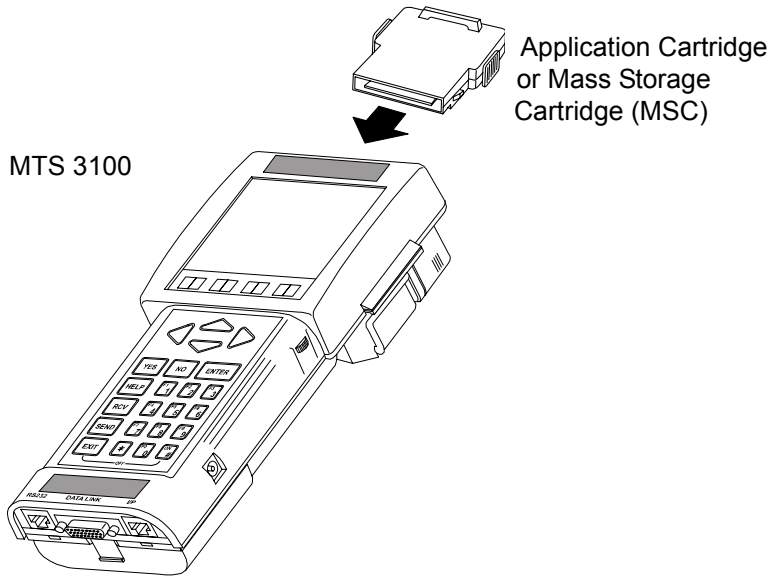
SETTING UP THE TESTER

MTS 3100

Before operating the MTS 3100 tester, perform the following steps:

1. Make sure the vehicle ignition is OFF.
2. Connect the DLC cable to the tester and tighten the screws.
3. Insert the application cartridge into the slot at the top rear of the tester.

FIGURE 4-1. Inserting Cartridge into the MTS 3100



4a. EEC-IV, MCU, ISC-E, IVSC, ES Systems.

Attach the Ford 7-pin adapter to the vehicle end of the DLC cable. Connect the 7-pin end (larger end) of the adapter to the vehicle quick-test connector. In addition, if you are testing a MECS or 4EAT system, you need to connect two jumper wires between the Ford adapter and the vehicle self-test connector. Refer to the wiring diagram(s) *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253* of this manual for proper connection.

DLC Location: On most vehicles the engine self-test connector is located under the hood, near the top of the firewall or around the left or right wheel well. Refer to the vehicle service manual if in doubt.

4b. **EEC-V Systems.**

Requires OBD II compliant MTS 3100.

DLC Location: On most vehicles the 16-pin DLC (J1962) is located under the dashboard, on the drivers side. For Thunderbird, it can be located under dash on the passenger side.

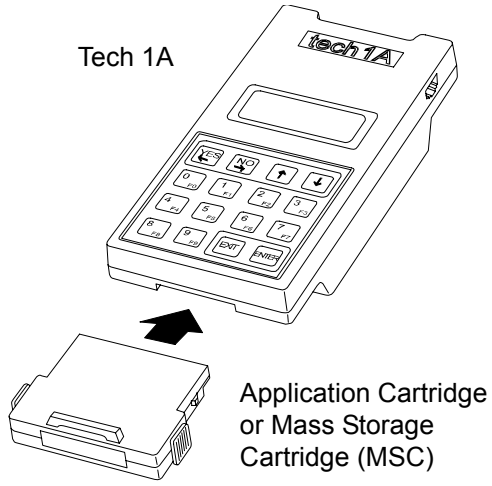
5. If the vehicle has an EEC-IV engine or IVSC system, there will be a small STI connector pigtailed off of the Ford 6-pin Self-test connector. Insert the small STI connector into the open slot on the Ford adapter. Continue to *Powering Up the Tester on page 73.*

TECH 1A

Before operating the Tech 1A tester, perform the following steps:

1. Make sure the vehicle ignition is OFF.
2. Connect the DLC cable to the tester and tighten the screws.
3. Insert the application cartridge into the Master Cartridge slot on the bottom, rear of the tester.

FIGURE 4-2. Inserting Cartridge into the Tech 1A



4a. **EEC-IV, MCU, ISC-E, IVSC, ES Systems.**

Attach the Ford 7-pin adapter to the vehicle end of the DLC cable. Connect the 7-pin end (larger end) of the adapter to the vehicle quick-test connector. In addition, if you are testing a MECS or 4EAT system, you need to connect two jumper wires between the Ford adapter and the vehicle self-test connector. Refer to the wiring diagram(s) *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253* of this manual for proper connection.

DLC Location: On most vehicles the engine self-test connector is located under the hood, near the top of the firewall or around the left or right wheel well. Refer to the vehicle service manual if in doubt.

4b. **EEC-V Systems.**

Install the OBD II Interface Cartridge into the Auxiliary Cartridge slot on the top of the tester.

Attach the 16/14-pin OBD II adapter cable to the vehicle end of the DLC cable. Connect the 16-pin end of the adapter cable to the vehicle 16-pin DLC (J1962).

DLC Location: On most vehicles the 16-pin DLC (J1962) is located under the dashboard, on the drivers side. For Thunderbird, it can be located under dash on the passenger side.

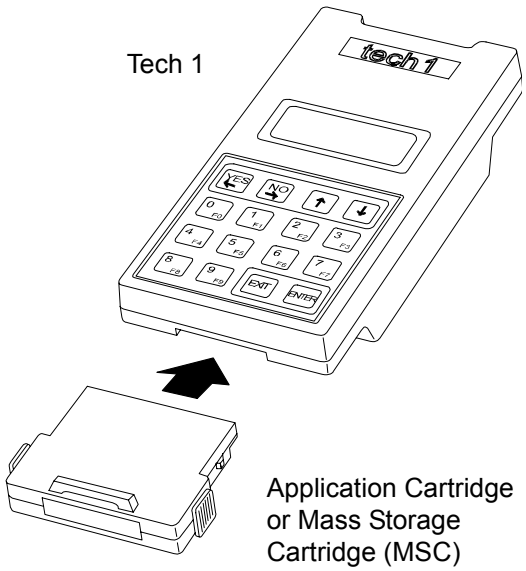
5. If the vehicle has an EEC-IV engine or IVSC system, there will be a small STI connector pigtailed off of the Ford 6-pin self-test connector. Insert the small STI connector into the open slot on the Ford adapter. Continue to *Powering Up the Tester on page 73.*

TECH 1

Before operating the Tech 1 tester, perform the following steps:

1. Make sure the vehicle ignition is OFF.
2. Connect the DLC cable to the tester and tighten the screws.
3. Insert the application cartridge into the Master Cartridge slot on the bottom, rear of the tester.

FIGURE 4-3. Inserting Cartridge into the Tech 1



4. **EEC-IV, MCU, ISC-E, IVSC, ES Systems.**

   Attach the Ford 7-pin adapter to the vehicle end of the DLC cable. Connect the 7-pin end (larger end) of the adapter to the vehicle quick-test connector. In addition, if you are testing a MECS or 4EAT system, you need to connect two jumper wires between the Ford adapter and the vehicle self-test connector. Refer to the wiring diagram(s) *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253* of this manual for proper connection.

   DLC Location: On most vehicles the engine self-test connector is located under the hood, near the top of the firewall or around the left or right wheel well. Refer to the vehicle service manual if in doubt.

4a. **EEC-V Systems.**

   Attach the OBD II Vehicle Interface Module and the 16/24-pin adapter cable to the vehicle end of the DLC cable. Connect the 16-pin end of the adapter cable to the vehicle 16-pin DLC (J1962).

   DLC Location: On most vehicles the 16-pin DLC (J1962) is located under the dashboard, on the drivers side. For Thunderbird, it can be located under dash on the passenger side.

5. If the vehicle has an EEC-IV engine or IVSC system, there will be a small STI connector pigtailed off of the Ford 6-pin self-test connector. Insert the small STI connector into the open slot on the Ford adapter. Continue to *Powering Up the Tester on page 73.*

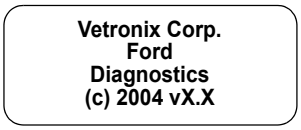
POWERING UP THE TESTER

Plug the DC power cable into the vehicle cigarette lighter or connect the optional battery adapter cable to the battery, then plug the power cable into the adapter. You need to plug into the rear seat cigarette lighter during some ABS and Air Suspension tests, or use a cigarette lighter cable extension. Continue to *Selecting the Application on page 73*.

SELECTING THE APPLICATION

1. Once the tester is powered, the following screen is displayed:

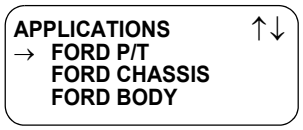
16MB Mass Storage Cartridge (MSC)



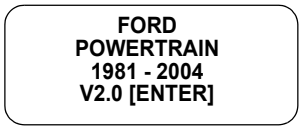
Ford Diagnostic Cartridge

2. Press ↑ or wait two seconds to proceed to the Applications menu screen. If the display is not correct, refer to Appendix B.

   The available software applications are displayed:



3. Select the application. If your application is on a MSC, use the ↑ and ↓ keys to move the cursor, then press ENTER. If the application is on a MAC, select the function key next to the desired application.
4. If data from a previously tested vehicle is stored in the tester memory, you can press F3 to go to the previous software application.
5. The Ford Powertrain identification screen is displayed. See *Perform Vehicle and/or System Selection on page 74* for vehicle and system selection.



6. If the display is correct, please read *Operating Precautions on page 12* before proceeding to *Perform Vehicle and/or System Selection on page 74*.
7. To operate in MTS 3100 Enhanced Mode, refer to the Program Card Operator's Manual.

ACTIVE KEYS	
ENTER	Confirm displayed information is correct. Advance to next display. Select previously tested vehicle.
↑ , ↓	Used to select a menu item. Stop automatic menu scroll. Manually scroll menu.
EXIT	Return to previous display.

NOTE

- For non-OBD II Ford Vehicles, make sure the Ford 7/14-pin adapter you are using is P/N 02002042.
- When testing 1994 and newer OBD II compliant vehicles with the MTS 3100 or Tech 1A, make sure the adapter cable you are using is P/N 02001969.

PERFORM VEHICLE AND/OR SYSTEM SELECTION

SELECTING VEHICLE USING F0: VIN

Once you've connected the tester to the vehicle and the Power-up menu is on the screen, you are ready to select a vehicle for diagnostics. Make sure you have the vehicle's model year, eighth VIN character, or are sure of the engine package that you are testing before you begin testing.

NOTE

In some cases the differences between the same engine packages may be subtle. Examples of screen differences might be M/T (Manual Transmission) or FF (Flexible Fuel), so pay attention to the accuracy of vehicle selection.

The vehicle selection process is critical to the 1981-2004 Ford Powertrain Application as you do not want to make the mistake of choosing the wrong vehicle.

To select a vehicle using the VIN, do the following:

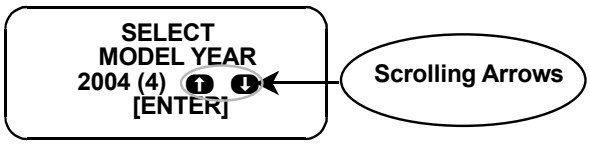
1. From the power-up menu, press ENTER to enter the vehicle selection mode.
2. If the tester remembers the last vehicle you tested, it will give you the option of continuing with the testing of that vehicle. Generally, the tester remembers the previous vehicle under test if it has been less than 24 hours and you have not removed the 1981-2004 Ford Powertrain Application from the tester.

NOTE

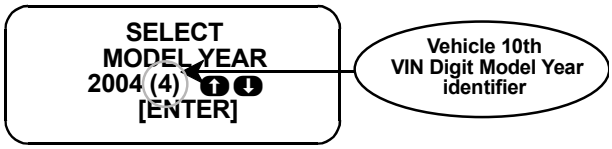
If you select a new vehicle, or the same vehicle as before but not using YES, any data saved from previous testing is erased. This includes Snapshot, Review Codes, and EEC-V/SCP Custom List parameter information.

3. The model year selection screen defaults to the current year. The ↑ or ↓ arrow keys scrolls through the available model years.

> **NOTE**
>
> Holding down the ↑ or ↓ arrow key results in fast scrolling.



The brackets to the right of the model year represent the 10th VIN digit (year identifier) for easier model year identification.



When the correct model year appears on the screen, press the ENTER key to advance the software to the next vehicle selection screen.

Quick keys are also available for entering the model year. From the SELECT MODEL YEAR screen, select the last two digits of the model year from the key pad to advance to the next vehicle selection screen (For example, pressing 9 and 2 selects 1992). Pressing the EXIT key returns the software to the SELECT MODEL YEAR screen.

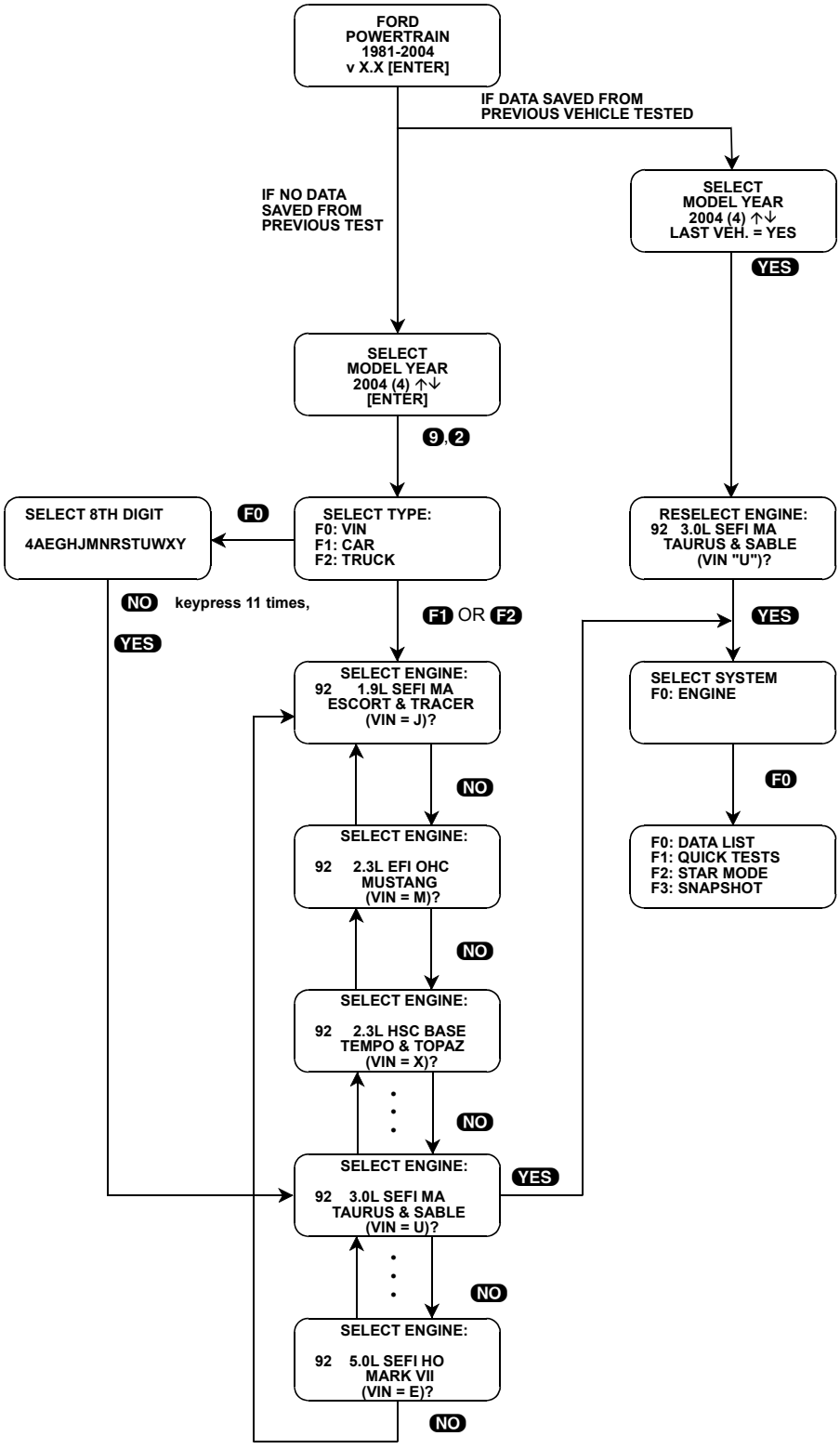
4. Press F0 to select the vehicle by the VIN.
5. Select the engine to be tested. Identify the eighth digit of the vehicle's Vehicle Identification Number and locate the character on the display. (See *Vehicle Identification Number (VIN) on page 87.* for more about Vehicle Identification Numbers.) Select the vehicle engine by pressing the NO key until the matching engine VIN character is highlighted by the cursor, then press YES.
6. If the vehicle under test is different from the model selection screen that appears on the tester, select the vehicle model by pressing NO until the correct vehicle model is displayed, then press YES to enter your current model and engine configuration. (Note: look at the display carefully, as the differences can be subtle.)

   In the example, if there was more than one Ford model equipped with the 3.0L engine you would have pressed NO once (or more) to select the correct model with the 3.0L engine. Remember that NO gets you to the next selection, and YES chooses the current selection.

7. Once the year, model, and engine size have been selected, the tester may display a Select System menu. In certain year/model/engine configurations there are additional systems other than the Engine system. An example is Cruise Control. The 1981-2004 Ford Powertrain software displays the system options for your current vehicle under test. Press the appropriate function key to select Engine or Cruise Control tests.

   If Cruise Control is not available, Engine system is automatically selected.

FIGURE 4-4. Example of Vehicle Selection Process



8. When the appropriate system has been selected, the tester displays the Test Selection menu of tests available for the vehicle you have selected. In the example, you would be ready to begin testing a 1992 Ford Taurus/Sable with a 3.0L SEFI MA engine.

   Different tests are available for different models, so the Test Selection menu varies from vehicle to vehicle. If there are more than three tests available within the chosen system, press the ↓ key to view all of the tests available for the selected model configuration.

9. To select a different vehicle for testing, press the EXIT key several times to take you backward through the selection process until your change can be made. Then complete the selection process for the new vehicle under test using the above manner.

10. You have successfully informed the tester of the current application and can begin testing by selecting the test you wish to perform. At this point refer to Chapter 5 for instructions.

> **NOTE**
>
> If you have tested a vehicle and are ready to test a different vehicle (not just correct a vehicle selection), go back to the Enter Model Year menu and enter the model year to select a new vehicle. Otherwise, your print summary information will contain data from both vehicles tested.

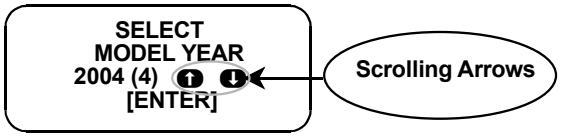
SELECTING VEHICLE USING F1: CAR OR F2: TRUCK

To select a vehicle using F1 or F2, do the following:

1. From the power-up menu, press ENTER to enter the vehicle selection mode.
2. If the tester remembers the last vehicle you tested, it gives you the option of continuing with the testing of that vehicle. The tester remembers the previous vehicle under test if it has been less than 24 hours and you have not removed the 1981-2004 Ford Powertrain application from the tester.

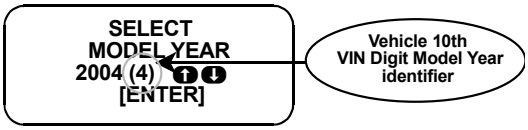
> **NOTE**
>
> If you select a new vehicle, or the same vehicle as before but not using YES, any data saved from previous testing is erased. This includes Snapshot, Review Codes, and EEC-V/SCP Custom List parameter information.

3. The model year selection screen defaults to the current year. The ↑ or ↓ arrow keys scrolls through the available model years.



> **NOTE**
>
> Holding down the ↑ or ↓ arrow key will result in fast scrolling.

The brackets to the right of the model year represent the 10th VIN digit (year identifier) for easier model year identification.



When the correct model year appears on the screen, press the ENTER key to advance the software to the next vehicle selection screen.

Quick keys are also available for entering the model year. From the SELECT MODEL YEAR screen, select the last two digits of the model year from the key pad to advance to the next vehicle selection screen (For example, pressing 9 and 2 selects 1992). Pressing the EXIT key returns the software to the SELECT MODEL YEAR screen.

4. Press F1: CAR or F2: TRUCK, depending on your application (the software flow is similar for each selection method).
5. Select the vehicle model by pressing NO until the correct vehicle model and engine configuration is displayed, then press YES to enter your current model and engine configuration. (Note: look at the display carefully, as the differences can be subtle.)

   In the example, if there was more than one Ford model equipped with the 3.0L engine you would have pressed NO once (or more) to select the correct model with the 3.0L engine. Remember that NO gets you to the next selection, and YES chooses the current selection.
6. Once the year, model, and engine size have been selected, the tester may display a Select System menu. In certain year/model/engine configurations there are additional systems other than the Engine system. An example is Cruise Control. The 1981-2004 Ford Powertrain software displays the system options for your current vehicle under test. Press the appropriate function key to select Engine or Cruise Control tests.

   If Cruise Control is not available, Engine system is automatically selected.
7. When the appropriate system has been selected, the tester displays the Test Selection menu of tests available for the vehicle you have selected. In the example, you would be ready to begin testing a 1992 Ford Taurus/Sable with a 3.0L SEFI MA engine.

   Different tests are available for different models, so the Test Selection Menu varies from vehicle to vehicle. If there are more than three tests available within the chosen system, press the ↓ arrow key to view all of the tests available for the selected model configuration.
8. To select a different vehicle for testing, press the EXIT key several times to take you backward through the selection process until your change can be made. Then complete the selection process for the new vehicle under test using the above sequence.
9. You have successfully informed the tester to the current application and can begin testing by selecting the test you wish to perform. At this point refer to Chapter 5 for instructions.

ADAPTER AND ADAPTER CABLE CONFIGURATIONS

The proper Data Link Connector (DLC) adapter or adapter cable for the vehicle being tested must be connected to the tester DLC Cable in order to connect the tester to the vehicle.

The following table identifies which adapters and cables are required to connect each type of tester to the various Ford vehicles.

All adapters, cables, and any other hardware required to connect the tester to the vehicle are listed in the table. The Figure Number in the table refers to the illustrations on the following pages.

FORD SYSTEMS	ADAPTER	TESTER	ADAPTER DESCRIPTION	FIG. NO.
All 1981-1993 MCU/EEC-IV and select 1994-1998 EEC-IV Powertrain Systems	FORD	MTS 3100	7/14-pin (P/N 02002042)	Figure 4-5
		Tech 1A	7/14-pin (P/N 02002042)	Figure 4-6
		Tech 1	Tech 1 14/12 VIM adapter (P/N 02001198) and 7/14-pin (P/N 02002042)	Figure 4-7
All 1986-1995 IVSC (with 6-pin DLC)	FORD	MTS 3100	7/14-pin (P/N 02002042)	Figure 4-5
		Tech 1A	7/14-pin (P/N 02002042)	Figure 4-6
		Tech 1	Tech 1 14/12 VIM adapter (P/N 02001198) and 7/14-pin (P/N 02002042)	Figure 4-7
1990-1995 MECS and 4EAT Systems (6 or 17-pin DLC)	FORD	MTS 3100	7/14-pin[a] (P/N 02002042)	Figure 4-5
		Tech 1A	7/14-pin[a] (P/N 02002042)	Figure 4-6
		Tech 1	Tech 1 14/12 VIM adapter (P/N 02001198) and 7/14-pin (P/N 02002042)	Figure 4-7
All 1994 and newer with 16-pin DLC (OBD II) plus 2002 and newer Body Systems (UBP, MS CAN)	OBD II-C2	MTS 3100	Controller Area Network VIM (P/N F-00K-108-115) and 16/24-pin DLC Adapter Cable (P/N 02001744)	Figure 4-8
Select 1994-1998 and all 1999 and newer Powertrain Systems (16-pin DLC)	OBD II-C[b]	MTS 3100	Controller Area Network VIM (P/N 02003211) and 16/24-pin adapter cable (P/N 02001744 or P/N 3000081)	Figure 4-9
	OBD II[b]	Tech 1A	OBD II Interface cartridge (P/N 02002178) and 16/14-pin adapter cable (P/N 02001969)	Figure 4-10
		Tech 1	OBD II Vehicle Interface Module and 16/24-pin adapter cable (P/N 02000177) (Tech 1 OBD II Interface Kit P/N 01002172)	Figure 4-11

a. Jumper wires are required and not included. Refer to Appendix E of this manual.

b. OBD II and OBD II-C are early adapter cable configurations utilized by the tester to communicate with systems connected to the OBD II DLC. If you have one of these configurations, please reference OBD II-C2 in the Adapter Config. column of the vehicle coverage tables for the vehicle you are diagnosing.

FIGURE 4-5. Ford Configuration for MTS 3100

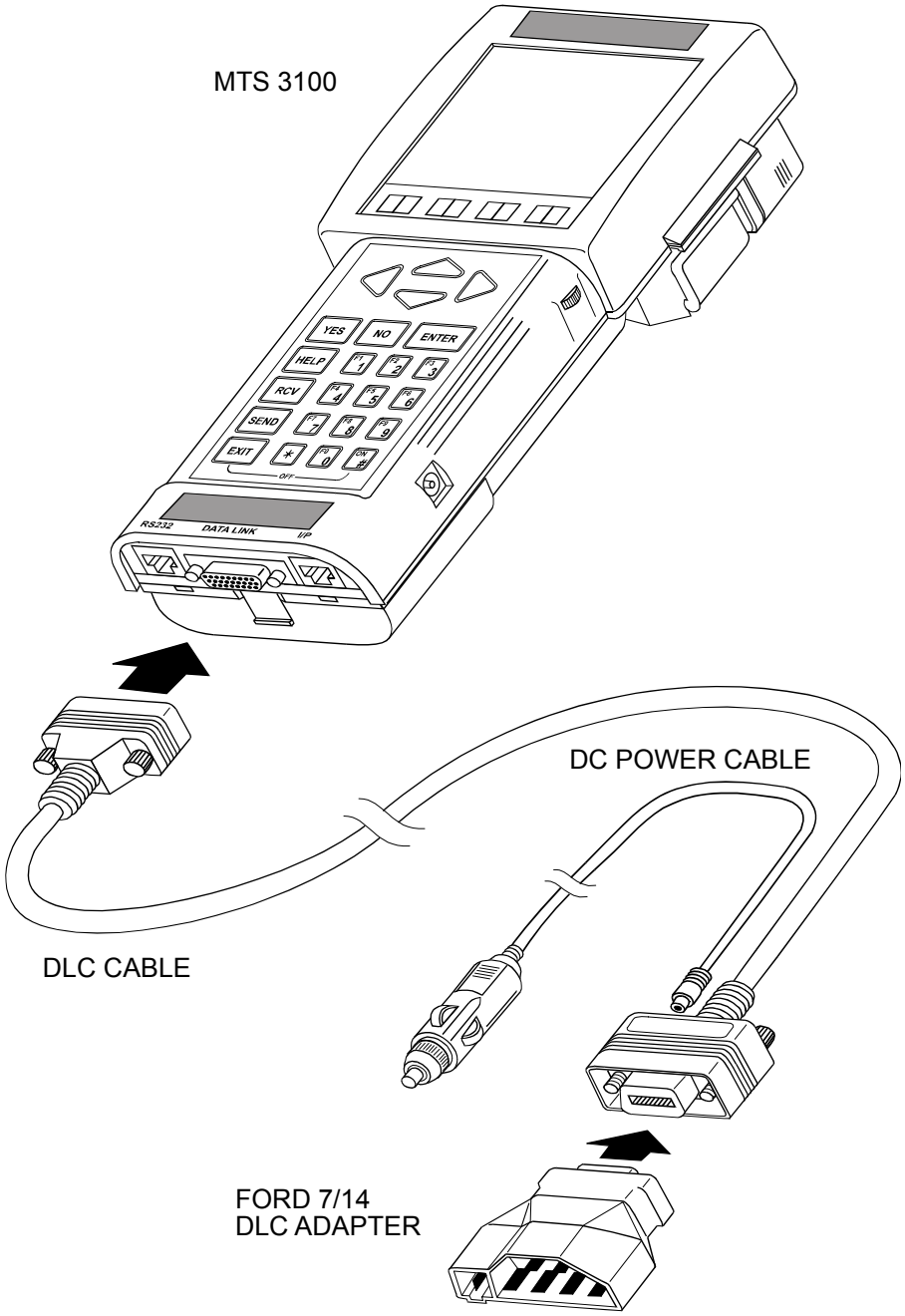


FIGURE 4-6. Ford Configuration for Tech 1A

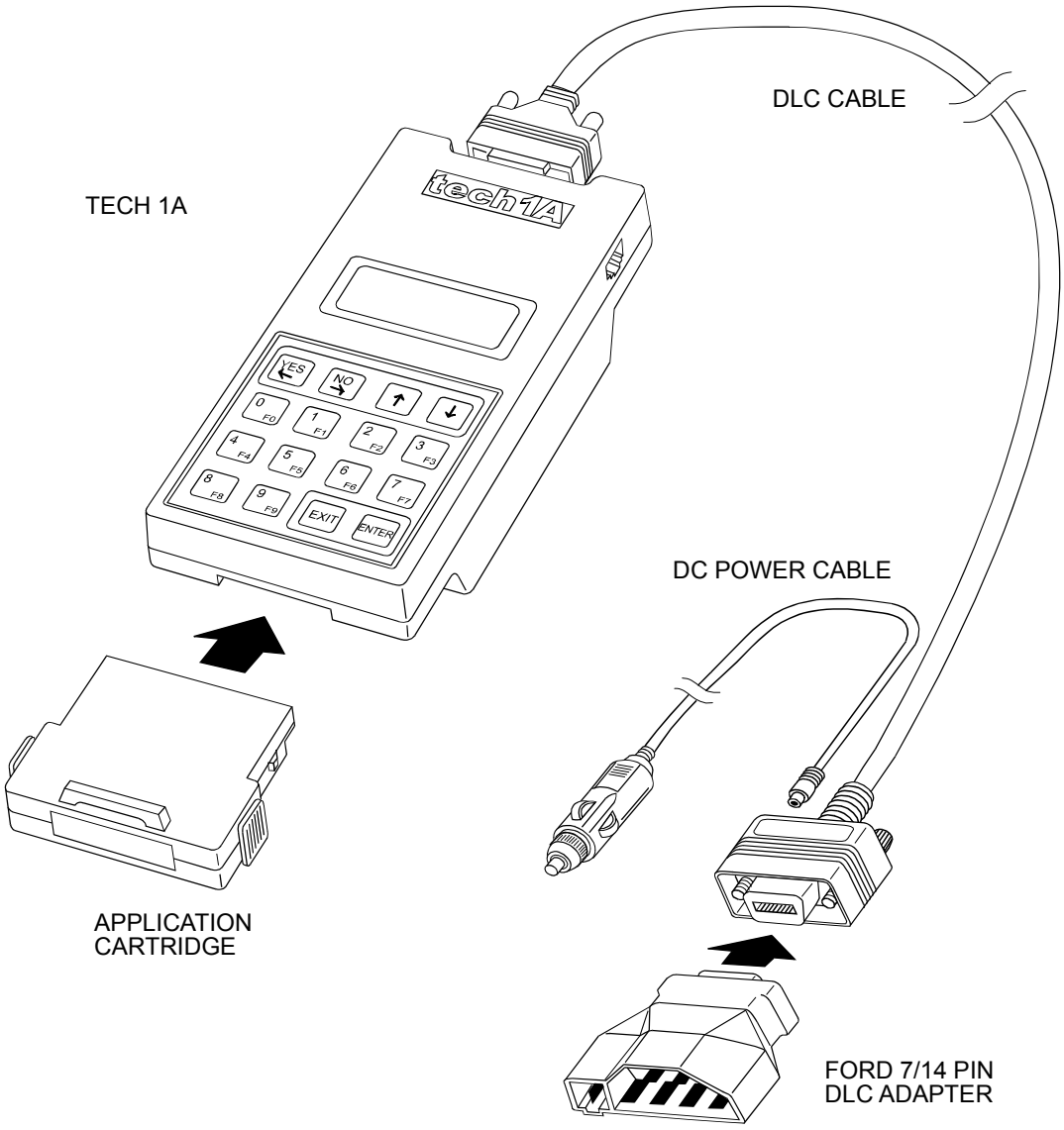


FIGURE 4-7. Ford Configuration for Tech 1

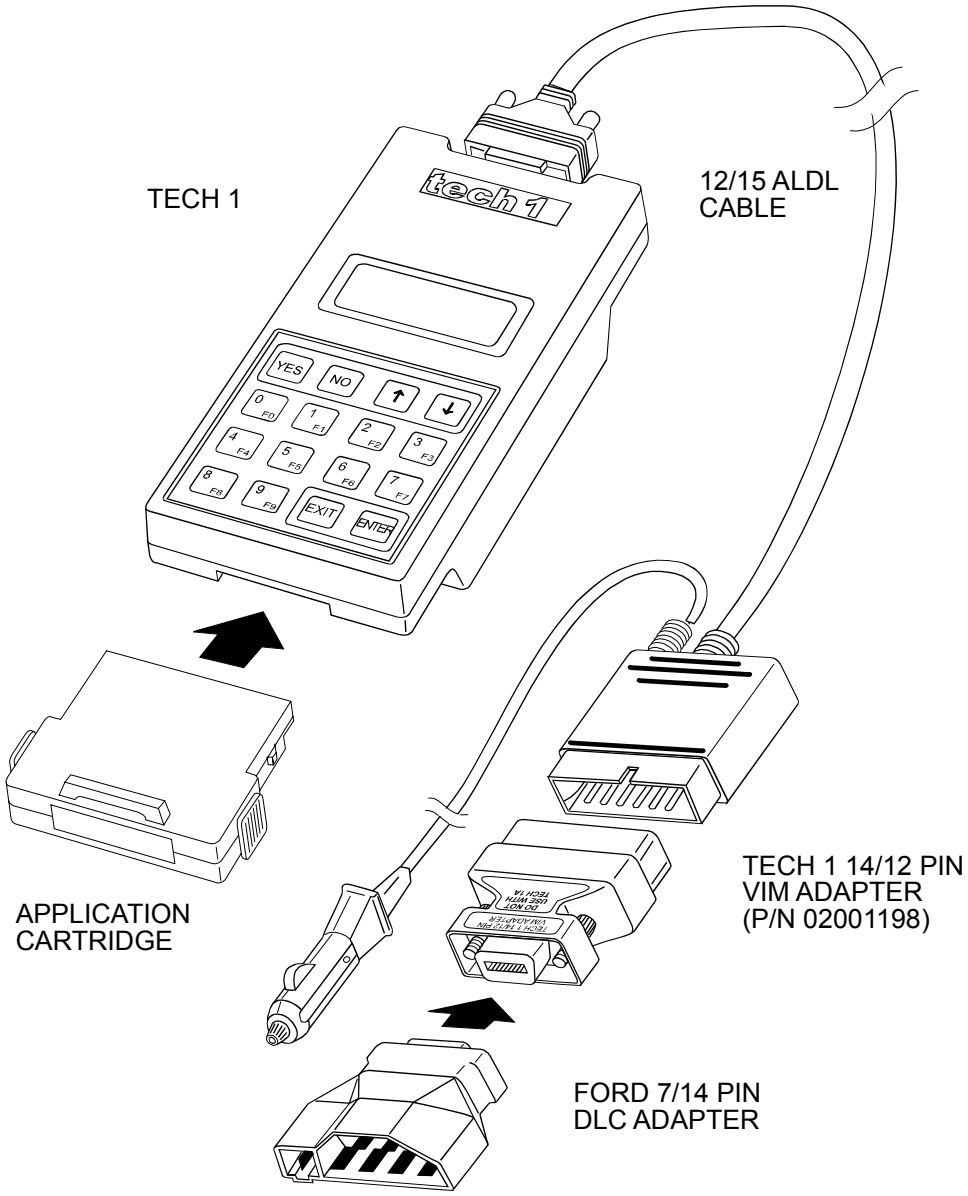


FIGURE 4-8. OBD II-C2 Configuration for MTS 3100

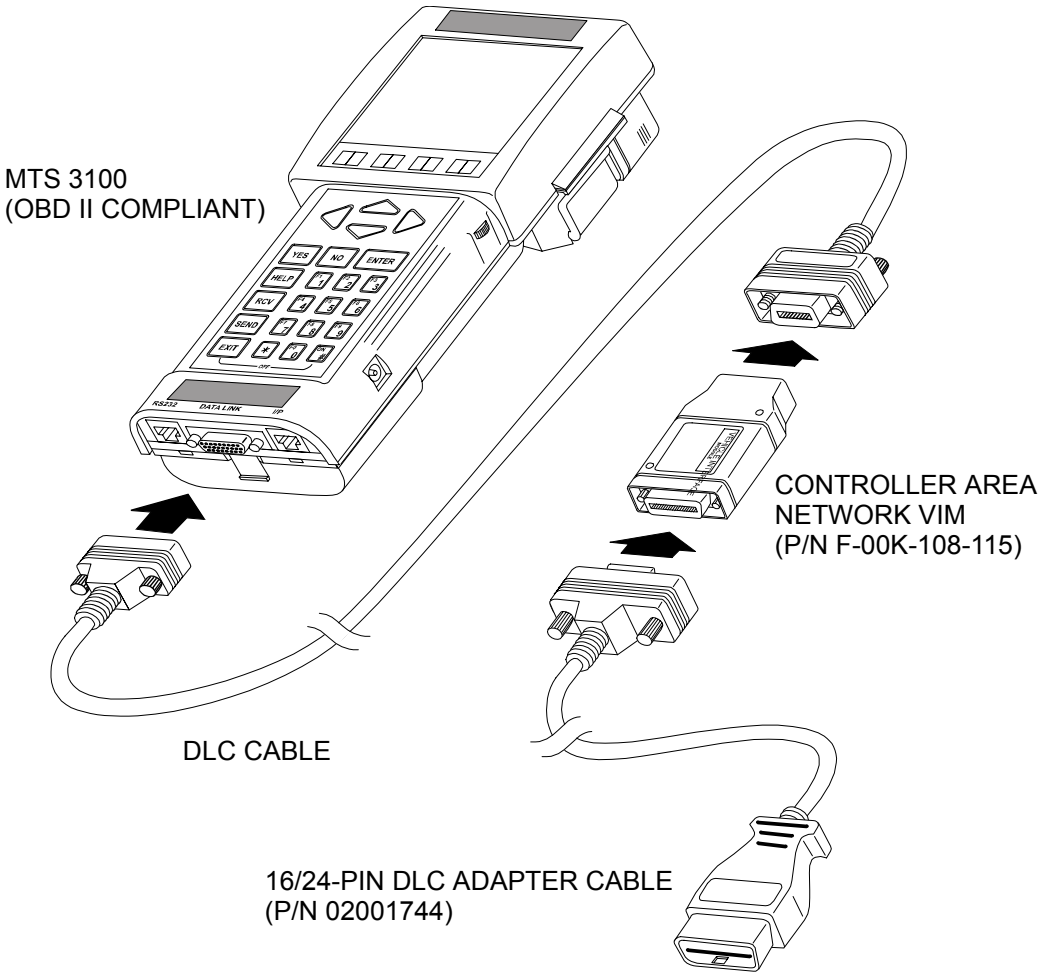


FIGURE 4-9. OBD II-C Configuration for MTS 3100

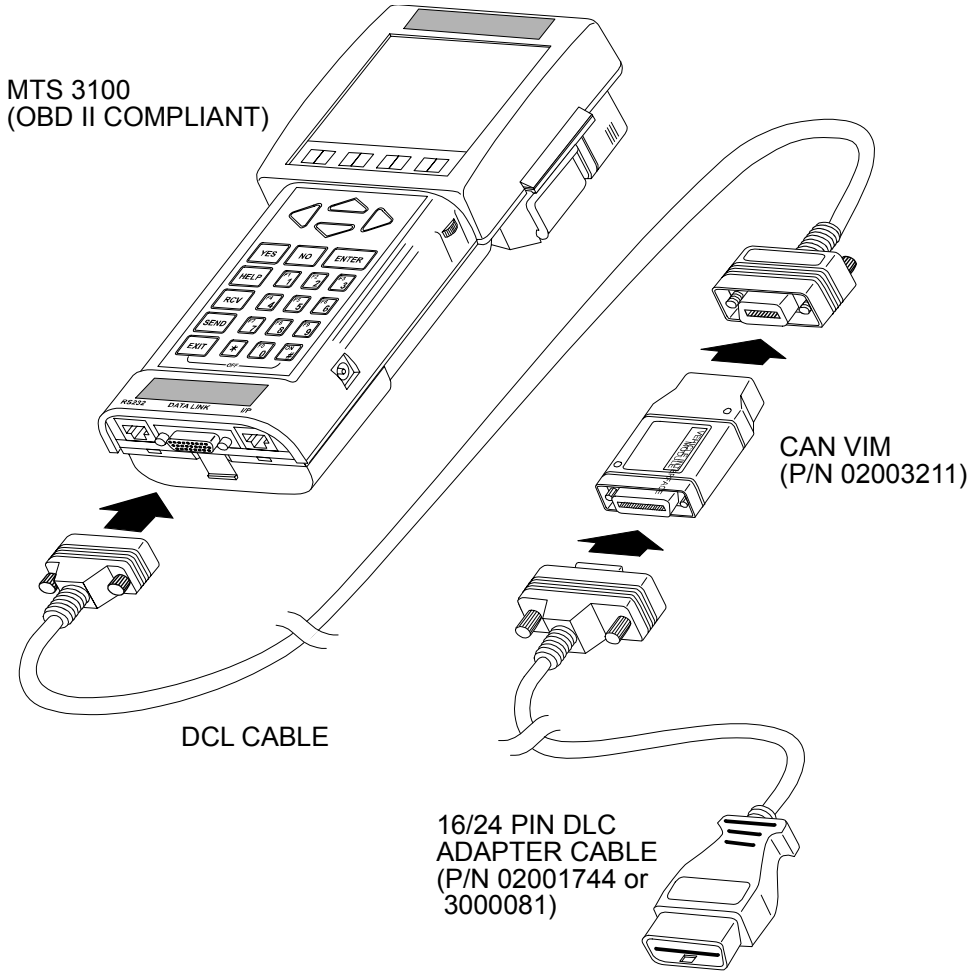


FIGURE 4-10. OBD II Configuration for Tech 1A

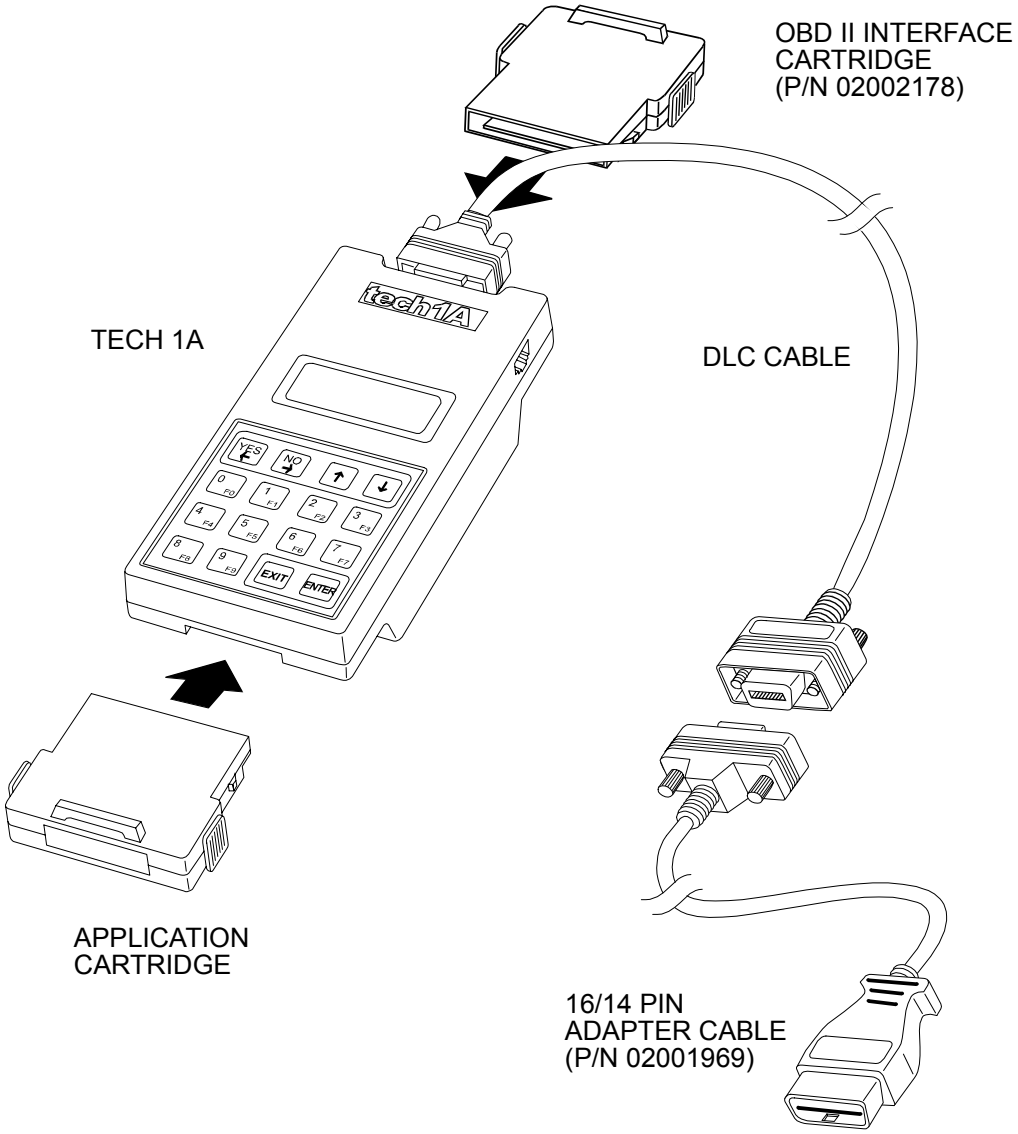
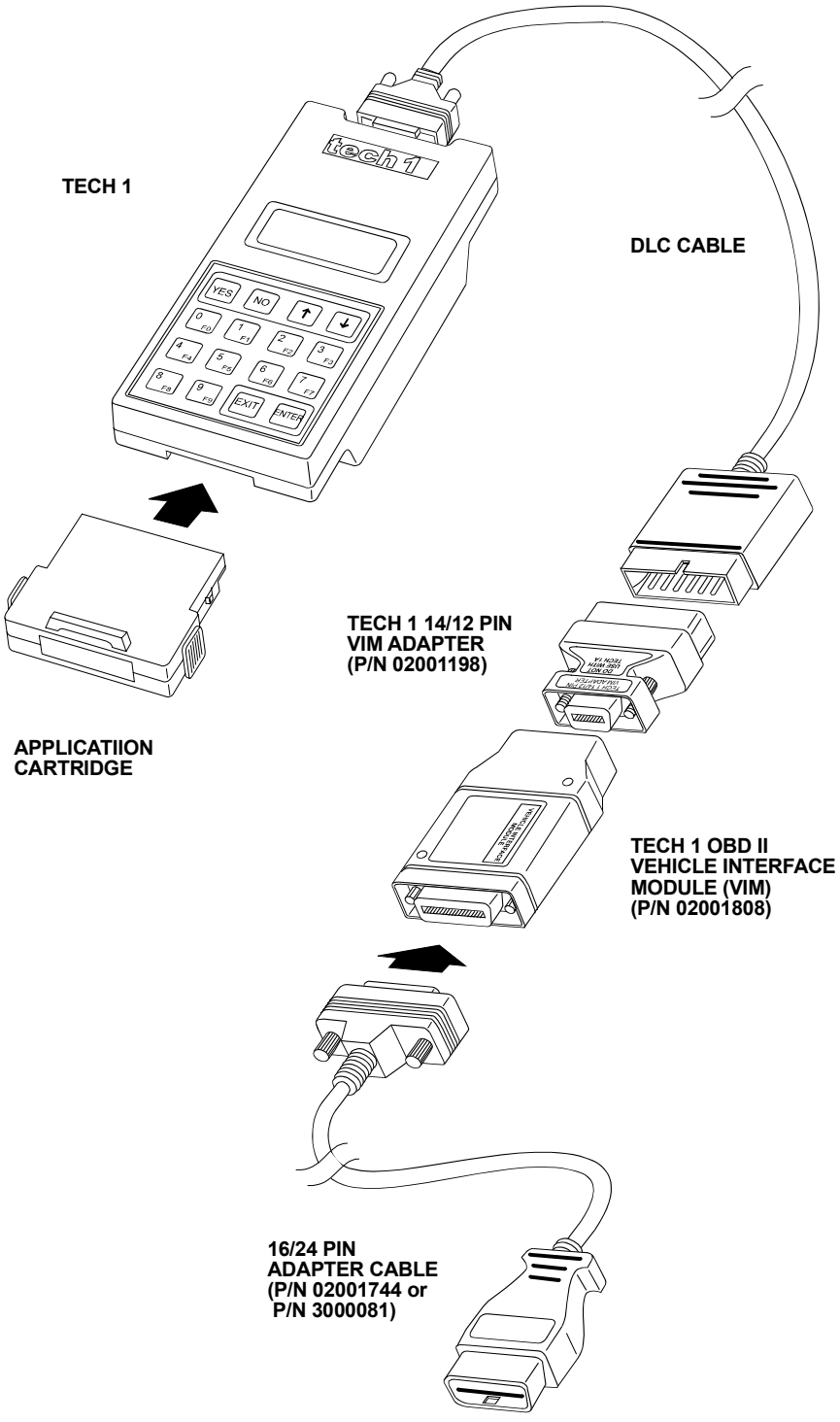


FIGURE 4-11. OBD II Configuration for Tech 1



VEHICLE IDENTIFICATION NUMBER (VIN)

It is important to be able to identify the vehicle identification number (VIN) in order to properly select a vehicle on which to run diagnostics. Figure 4-12 is an example of a Ford Motor Company VIN. The location of the engine type and model year characters are indicated.

TYPICAL VIN	1	F	A	B	P	5	0	D	2	K	F	1	0	0	0	1
VIN CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

8th Character
(Engine Type)

10th Character
(Model Year)

B = 1981
C = 1982
D = 1983
E = 1984
F = 1985
G = 1986
H = 1987
J = 1988
K = 1989
L = 1990
M = 1991
N = 1992
P = 1993
R = 1994
S = 1995
T = 1996
V = 1997
W = 1998
X = 1999
Y = 2000
1 = 2001
2 = 2002
3 = 2003
4 = 2004

FIGURE 4-12. Typical Ford Motor Co. Vehicle Identification Number (VIN)

5. SELECTING AND OPERATING TEST MODES

This chapter provide. a detailed description of each test available in this application. Following the test descriptions, step-by-step instructions tell you how to quickly perform the test. A list of the active keys for each test is included at the end of each test mode.

TEST MODES SUMMARY

The following table gives you a quick summary of the test modes available within this application. Detailed descriptions of the test modes are given in the appropriate sections of this chapter. The tester only displays the test modes that are applicable to the vehicle being tested.

SYSTEM	MODE	SUBMODE	DESCRIPTION
EEC-IV, IVSC, and Star	F0: Data List		Monitors available diagnostic data parameters from the powertrain controller. Use these parameters to quickly analyze the critical inputs and outputs from the powertrain controller. The Ford Powertrain Application is capable of either pre-selected or user-selected data parameters pairs.
	F1: Quick Test	F0: Prepare Vehicle F1: KOEO Test F1: KOEO Test (IVSC) F2: Check Timing F3: KOER Test F3: KOER Test (IVSC) F4: Wiggle Test F7: Clear Cont Codes F8: Service Codes F9: Print Summary F9: Print Summary (IVSC)	Displays Diagnostic Trouble Codes recorded by the powertrain controller. The ability to clear DTC information is also found in this mode.
	F2: Star Mode (IVSC, MECS)		Is used to perform diagnostic procedures on Ford vehicles and to read Ford service codes. Service codes can be decoded to specific Pinpoint Tests unique to the vehicle being tested.
	F3: Snapshot		Works with the Data List mode to save data list information for later analysis. You can select trigger points and trigger types.
	F4: OBD Controls	F0: Output State Test F1: Cylinder Balance Test	Allows you to perform diagnostic routines that return status information after the function has been performed. The results of the test/function are displayed.

SYSTEM	MODE	SUBMODE	DESCRIPTION
EEC-V.PTEC	F0: Data List		Monitors available diagnostic data parameters from the powertrain controller. Use these parameters to quickly analyze the critical inputs and outputs from the powertrain controller. The Ford Powertrain Application is capable of either pre-selected or user-selected data parameters pairs.
	F1: Quick Test	F0: Prepare Vehicle F1: Cont DTC Test F2: KOEO Test F3: Check Timing F4: KOER Test F5: Freeze Frame Data F7: Clear Cont Codes F8: Service Codes F9: Print Summary	Displays Diagnostic Trouble Codes recorded by the powertrain controller. Freeze Frame information is available for applicable model years. The ability to clear DTC information is also found in this mode.
	F3: Snapshot		Works with the Data List mode to save data list information for later analyzes. You can select trigger points and trigger types.
	F4: OBD Controls (Gasoline) F0: Output Tests	F0: All Outputs On F1: All Outputs Off F2: Low Speed Fan F3: High Speed Fan	Bi-directional control of a component or device regardless of whether it is on or off. Examples include All Outputs, Low Speed Fan, and High Speed Fan.
	F4: OBD Controls (Gasoline) F1: Engine	F0: EGR % F1: Evap Purge % F2: O2 B1 S1 Htr F3: O2 B1 S2 Htr F4: O2 B2 S1 Htr F5: O2 B2 S2 Htr	Control the state or value of specific Engine components.
	F4: OBD Controls (Gasoline) F2: Transmission	F0: Shift Sol 1 F1: Shift Sol 2 F2: Shift Sol 3 F3: Shift Sol 4 F4: TCC Lockup	Control the state of specific Transmission components.
	F4: OBD Controls (Diesel)	F0: Output State Test F2: Glow Plug Test F2: Injector Buzz Test F3: Cylinder Balance Test F4: Switch Test	Perform diagnostic routines that return status information after the function has been performed. The results of the test/function are displayed.
	F8: Information	F1: DLC Location F2: OBD Information F4: Vehicle Information	Displays useful information about the vehicle and/or the tested system. This may consist of data link connector (DLC) location, ECU Software identification or system identification information.

The following table summarizes the test modes by system.

TEST MODE	EEC-IV	EEC-V/ PTEC	ELECTRONIC SUSPENSION	MAZDA MECS, 4EAT
Data List	• 1989-98 only	•		
Snapshot	• 1989-98 only	•		
Quick Tests	•	•		
Prepare Vehicle	•	•		
Continuous DTC		•		
KOEO	•	•		
Check Timing	•	•		
KOER	•	•		
Wiggle Test	•			
KOEO	•			
KOER	•			
OBD Controls	•	•		
Output Control		•		
Output State	•	•		
Glow Plugs	•	•		
Injector Buzz	•	•		
Switch Test	•	•		
Cylinder Balance (SFI)	•			
Freeze Frame Data		•		
Clear Continuous DTCs	•	•		
Review DTCs	•	•		
Print Summary	•	•		
Information		•		
DLC Location		•		
OBD II Monitors		•		
Diagnostic System		•		
VIN		•		
Configuration		•		
STAR Mode	•		•	•
Review codes	•		•	•
STI Hold/Test Toggle	•		•	•
Fast/Slow Codes Toggle	•		•	•
Erase Tester Codes	•		•	•

SELECTING A TEST MODE

Once the vehicle and system selection has been completed, the tester displays the Test Selection menu which shows you all the test modes available for the selected vehicle. Figure 5-1 is an example of this menu for an EEC-IV engine controller.

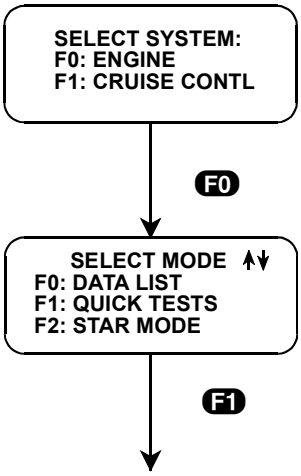


FIGURE 5-1. Example of Quick Test Mode Selection

EEC-IV, IVSC, AND STAR TEST MODES

MODE F0: DATA LIST

The purpose of the DATA LIST mode is to monitor diagnostic data parameters which are being transmitted on Ford's Data Communication Link (DCL) from the ECM during normal operation of the vehicle. This mode does not affect vehicle operation, and you can use it to read data to see if it is correct or at least reasonable. The current value of the parameter is displayed with the parameter units.

The data parameters are displayed in pre-programmed pairs. You can also create your own data pairs through the process explained on page 95.

To select Data List, do the following:

1. Select the DATA LIST mode from the Test Mode menu by pressing F0.
2. Select the data parameters to be displayed by scrolling through the parameters with the YES and NO keys.
3. Return to the select mode menu at any time by pressing EXIT.

Operation of the DATA LIST mode is summarized in Figure 5-2.

ACTIVE KEYS	
YES , NO	Scroll through displayed data parameters.
F0	Mark top displayed parameter as fixed for creating your own data pairs.
F1	Mark bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Return to Test Mode menu.

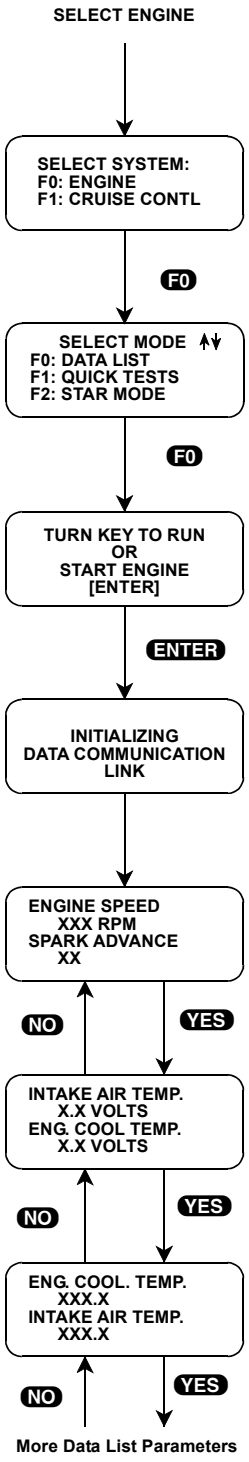


FIGURE 5-2. Data List Mode

VIEWING ECA DIAGNOSTIC DATA PARAMETERS

In order to maximize the information that can be seen at one time, the Tech 1 displays data parameters in preassigned pairs. The first data pair is displayed after you press F0. You can scroll through the Data List with the YES and NO keys. See *Create Your Own Data Pairs* for creating your own data pairs with the F0 and F1 keys.

To see other preassigned pairs, press either the YES or NO key. The YES key causes the Tech 1 to scroll forward through the list of preassigned pairs, while the NO key causes scrolling backwards.

Appendix D contains descriptions of all engine data parameters.

CREATE YOUR OWN DATA PAIRS

You can create data parameter pairs which are different from the preassigned pairs. Any two parameters can be displayed as a pair by simply scrolling either the bottom or top display parameter, while the other display parameter is fixed. To fix the top parameter press F0, and an asterisk appears by the fixed parameter. Press F1 to fix the lower parameter. The Tech 1 does not allow both the top and bottom parameters to be fixed at the same time.

As an example, let's say you wish to create a pair with ENGINE SPEED and BRAKE SWITCH. To do so, scroll through the preassigned pairs with the YES and NO key until you find a pair with ENGINE SPEED. Fix the ENGINE SPEED by pressing the F0 key if ENGINE SPEED is the top parameter, or the F1 key if it is the bottom. Then scroll the other half of the display with either the YES or NO key until BRAKE SWITCH is displayed.

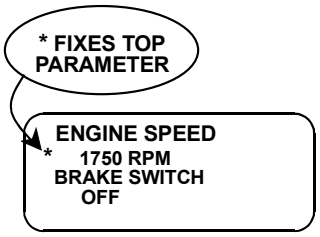


Figure A

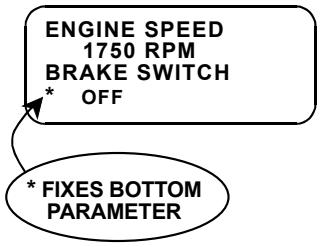


Figure B

ACTIVE KEYS FOR CREATING DATA PAIRS	
YES , NO	Scroll through displayed data parameters.
EXIT	Return to the select mode menu.
F0 , F1	FIX the upper or lower parameter.

PRINTING DATA

The currently displayed sample may be printed if the tester is connected to a compatible printer.

MODE F1: QUICK TEST

SUBMODE F0: PREPARE VEHICLE AND ENGINE

The Ford diagnostic procedures specify that before performing any of the Quick Tests, certain vehicle and engine preparations must be performed. The Prepare Vehicle and Engine function provides screen prompts to aid you in this procedure.

Properly preparing the vehicle may prevent receiving service codes that are not related to a fault condition. An example of this is engine coolant temperature that is not hot enough to prevent the vehicle ECA from setting a service code related to the Engine Coolant Temperature (ECT) sensor. Also, there are engine modifications for certain models that must be done prior to running engine Quick Tests. This is especially true of earlier model vehicles. Therefore, you will find that the checks in Prepare Vehicle are specific to the vehicle under service.

NOTE

The Pinpoint Test for a vehicle that does not start is also displayed in Prepare Vehicle.

To select Prepare Vehicle, do the following:

1. Select Quick Tests by pressing F1 from the Test Mode menu.
2. Select Prepare Vehicle by pressing F0 from the Test Selection menu. **It is important to do these setup procedures before doing the Quick Tests.**
3. You may now scroll up or down through the Prepare Vehicle steps. The ↑ and ↓ keys are used for scrolling. It is suggested that you use the ↑ key to scroll in the logical sequence of preparations, and use the ↓ key for looking backwards. When you reach the last of the preparation displays, the next ↑ key jumps back to the first display.
4. When you are finished, use the EXIT key to return to the Test Selection menu.

ACTIVE KEYS	
EXIT	Return to Test Selection menu.
↑	Scroll forward through the preparation displays.
↓	Scroll backwards through the preparation displays.
YES , NO	Answers questions.
F1	Selects Quick Test Mode.
F0	Selects Prep Vehicle Test.

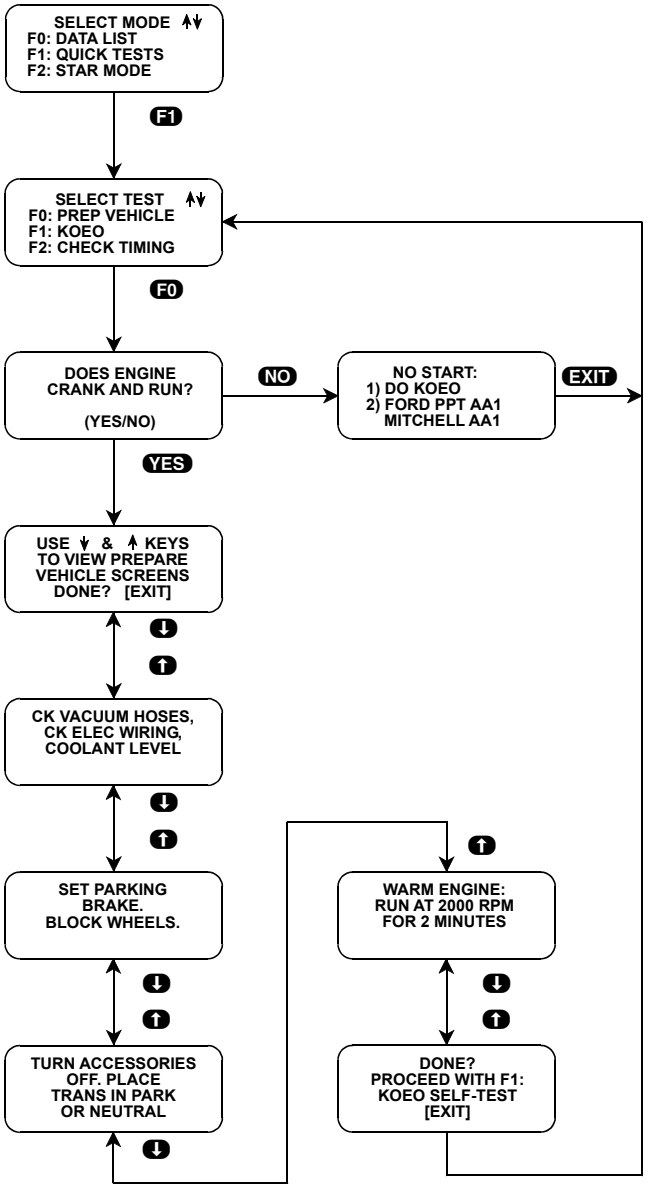


FIGURE 5-3. Prep Vehicle

SUBMODE F1: KEY ON, ENGINE OFF TEST

The Key On, Engine Off (KOEO) test is the first engine Quick Test to be done after preparing the vehicle for testing. Initiating the KOEO test puts the ECA into a self-test mode where it tests input and output actuators without running the engine. The KOEO test looks for *hard faults* (faults that are currently present). Even if a vehicle does not start, a KOEO test should be attempted to see if any useful service codes are available. KOEO service codes are received from the ECA and can give an indication of which vehicle system caused a failure.

If you want results from both KOEO and Output State tests, do the Output State test, then read KOEO and Continuous codes from the Review codes function.

For the EEC-IV, Continuous service codes are also read in the KOEO sequence. Continuous codes document intermittent problems recorded by the EEC-IV during normal operation. It is imperative to run the KOEO Test before doing any other diagnostic Quick Test procedures, especially Wiggle testing, because of the possibility of erasing or creating additional Continuous codes.

All hard faults should be corrected before servicing Continuous codes. This means that all KOEO, Timing Check, and KOER codes should be fixed before trying to diagnose Continuous codes. You will often find that the Continuous code repairs have already been serviced and a driveability problem has been eliminated.

Ford recommends that you repair the first KOEO service code received and then rerun the KOEO test to be sure you have eliminated that problem before repairing any other service codes. The first code may create other service codes following it. These often disappear after fixing the first service code and rerunning KOEO. It is also recommended that you use the first set of Continuous codes read in KOEO for later intermittent repair problems, because the originals might be erased during subsequent testing. You should get a KOEO code 11 that decodes to a pass before continuing on to other Quick Tests. Do not assume code 11 always means the system has passed the KOEO test. Certain Continuous codes, when received, override KOEO code 11 to a Pinpoint Test. Also, on some MCU vehicles with altitude sensors, code 11 may be a fail above a certain altitude. The tester makes the right interpretation of code 11.

As well as reading the KOEO and Continuous codes, the KOEO test prompts you for the proper operations to get these codes and allows all service codes from the test to be translated into Pinpoint Test results.

NOTE

The ISC-E controller does not have a KOEO test.

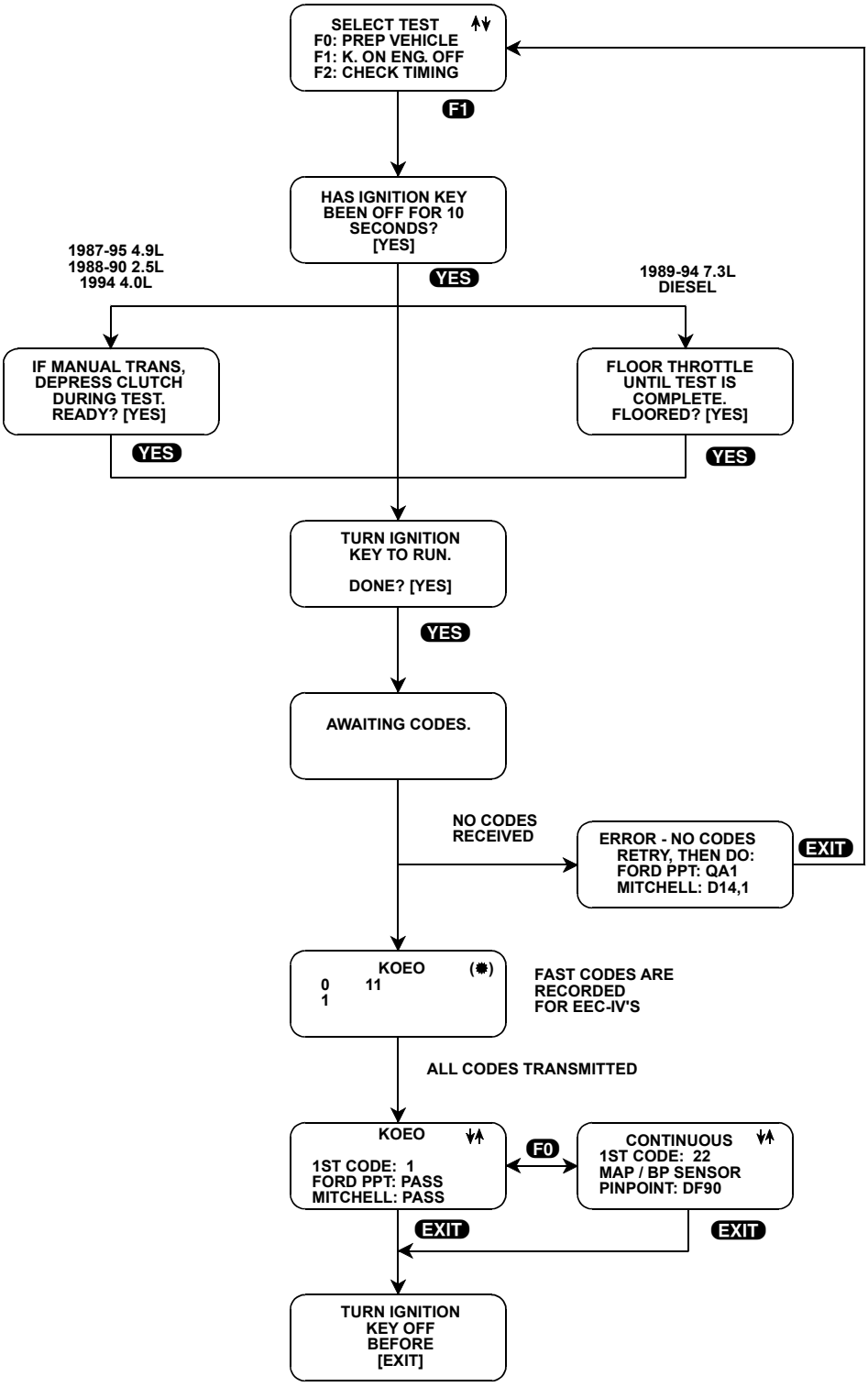


FIGURE 5-4. KOEO

To select KOEO Test, do the following:

1. Start the KOEO tests by pressing F1 from the Test Selection menu.
2. You are prompted to perform certain actions to initiate KOEO. Press YES after completing each request. Requests vary depending on the vehicle under test, but usually you are asked: HAS IGNITION KEY BEEN OFF FOR 10 SECONDS? and then instructed to TURN IGNITION KEY TO RUN. The tester then begins reading service codes. Codes are displayed as KOEO and CONTINUOUS. You can toggle between these displays after all codes are received by the tester.
3. If no codes are received within approximately 2 minutes, an error message is displayed prompting you to retry the test or to perform a specified Pinpoint Test. Pressing EXIT returns you to the Test Selection menu. Before repeating KOEO, recheck your ALDL cable connections, Ford adapter plug and the Ford self-test connector. If the tester still fails to communicate with the vehicle, perform the tester self-test procedures before performing the recommended Pinpoint Tests.
4. If operating properly, the ECA goes through a series of tests for 15 to 60 seconds and then begins service code transmission. Fast codes are read on EEC-IVs and slow codes are read on MCUs. The ECA transmits slow codes twice.
5. When all codes are read, the KOEO codes are displayed, and the first service code received is displayed. This is the recommended code to begin servicing. All other codes are automatically displayed, 1 every 3 seconds, until a key is pressed.
6. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE [EXIT]. Turn the key off, then press EXIT again to return to the Test Selection menu. This sequence prevents Continuous codes from being erased.

NOTE

On some Ford vehicles it is necessary to wait until 10 seconds after all slow codes are flashed on dashboard MIL before exiting KOEO test. Failure to do so may clear continuous DTCs stored in the ECA.

ACTIVE KEYS	
EXIT	Return to Test Selection menu.
YES	Confirms that requested test sequence has been finished.
↑	Show next code received.
↓	Stop auto-display or show previous code.
F1	Selects Key On, Engine Off test.
F0	Toggle between KOEO and CONTINUOUS code pages.

SUBMODE F1: KEY ON, ENGINE OFF TEST (IVSC)

Integrated Vehicle Speed Control (IVSC) is Ford's computerized cruise control system. Engine off and engine running Quick Tests on the IVSC system can be performed via the same Quick Test connector used by the EEC-IV engine control assembly.

As with the engine Quick Tests, all items in the Prepare Vehicle directions should be done before diagnosing the IVSC.

Since some engine related components affect the IVSC, all engine related Quick Tests should have a pass condition before trying to diagnose the IVSC. You get the Pinpoint Test message *Do KOEO* if any EEC-IV related service codes are received from the vehicle while doing IVSC engine off tests. This is because the codes are KOEO service codes, and the Pinpoint Tests for these codes are in the Engine/Emissions Diagnosis manuals, not the manuals containing IVSC diagnostics.

To select KOEO (IVSC) Test, do the following:

1. Press F1 from the Select System menu to select Cruise Control tests.
2. From the Select Mode menu, press F1 to perform the IVSC engine off test.
3. Answer YES to the test initialization prompts after each action is completed.
4. After turning the ignition on, PRESS SPEED CONTROL ON and AVOID THROTTLE are displayed. Pressing the speed control ON button must occur within 10 seconds after turning the ignition on. The tester then asks that all IVSC buttons located on the steering wheel be pressed once and that the brakes be tapped. This sequence must also be done within approximately 10 seconds or the IVSC switch related service code is set. The tester awaits service codes at the completion of these actions.
5. The tester reads and displays IVSC fast codes.
6. Usually the next display is the service codes display. The codes and associated Pinpoint Tests are automatically displayed, one every 3 seconds, until a key is pressed. Refer to *Submode F8: Review Service Codes, Decode to Pinpoint Tests (IVSC) on page 115*.

> **NOTE**
>
> 
>
> A bad connection or not receiving codes condition results in an error display containing a Pinpoint Test designation. As stated earlier, always recheck connections and repeat the test before performing the Pinpoint Test.

7. When you finish reviewing and decoding service codes, press EXIT.
8. TURN IGNITION KEY OFF BEFORE [EXIT] is displayed. Turn the key off, then press EXIT again. This takes you back to the Test Selection menu.

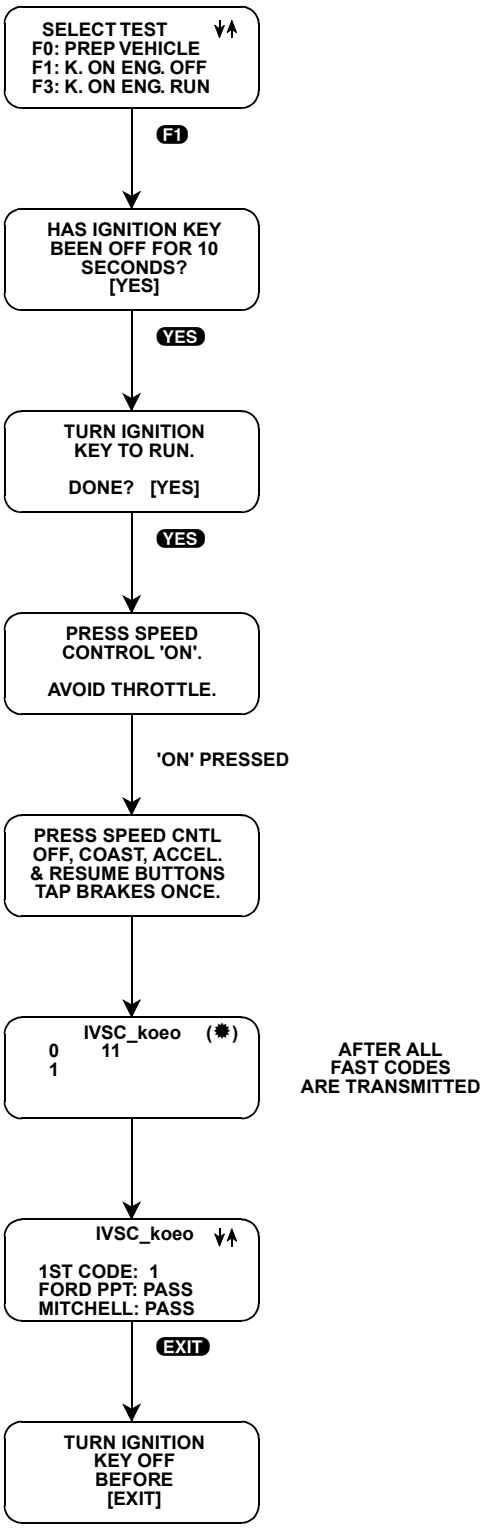


FIGURE 5-5. IVSC KOEO

ACTIVE KEYS	
F1	Enter the Cruise Control Tests menu.
F1	Do IVSC, engine off tests.
YES	Confirm that a test initialization action has been completed.
YES	Move cursor left.
NO	Move cursor right.
↑	Show next code received.
↓	Stop auto-display or show previous code.
EXIT	Return to Test Selection menu.

SUBMODE F2: CHECK TIMING

The Check Timing test is available on all Ford vehicles with EEC-IV controllers, and not on vehicles with an MCU or ISC-E controller.

The Ford 1981-2004 Powertrain Application supports two versions of the check timing test. Version one supports EEC-IV controllers through 1991 vehicles, while version two supports 1992-98 EEC-IV controllers. Version one is a Quick Test procedure that checks the EEC-IVs ability to properly advance ignition timing. Information on the tester display guides you through the test and gives you the proper Pinpoint Tests or Quick Test to perform next (for example, after performing KOEO test, the check timing test should be performed).

Version two is also a guided test where information on the tester display guides you through performing the test. This test is not a Ford Quick Test, but represents the method of checking ignition timing on DI (distributor ignition) and EI (electronic, or distributorless ignition) as described in Ford's Powertrain Control and Emission Diagnosis manual. Note that an inductive timing lamp is required to perform the version two Check Timing test.

NOTE

The 1989-94 7.3 liter truck engines are diesel and do not have timing check, even though they have EEC-IV engine control.

To select Timing Check (1981-1991 vehicles), do the following:

1. Select Timing Check by pressing F2 from the Test Selection menu. Run this test only after getting a pass in the KOEO test for EEC-IV engine controllers.
2. The tester prompts you to ADJUST TIMING TO VECI DECAL SPECS. The Vehicle Emission Control Information (VECI) decal is present under the hood of all Ford vehicles. The decal is usually found on or near the radiator or fan shroud. The VECI decal gives timing specifications and directions for how to get a proper timing measurement. Press YES when finished. Make sure to reconnect any disconnected components at this time.

3. If the engine stalls, press **YES** in response to the ENGINE STALLS? query and you are referred to a Pinpoint Test. Press **EXIT** after reading and performing the Pinpoint Test. Return to Timing Check after any necessary repairs are made. If the engine does not stall and timing is correct, press **NO**.

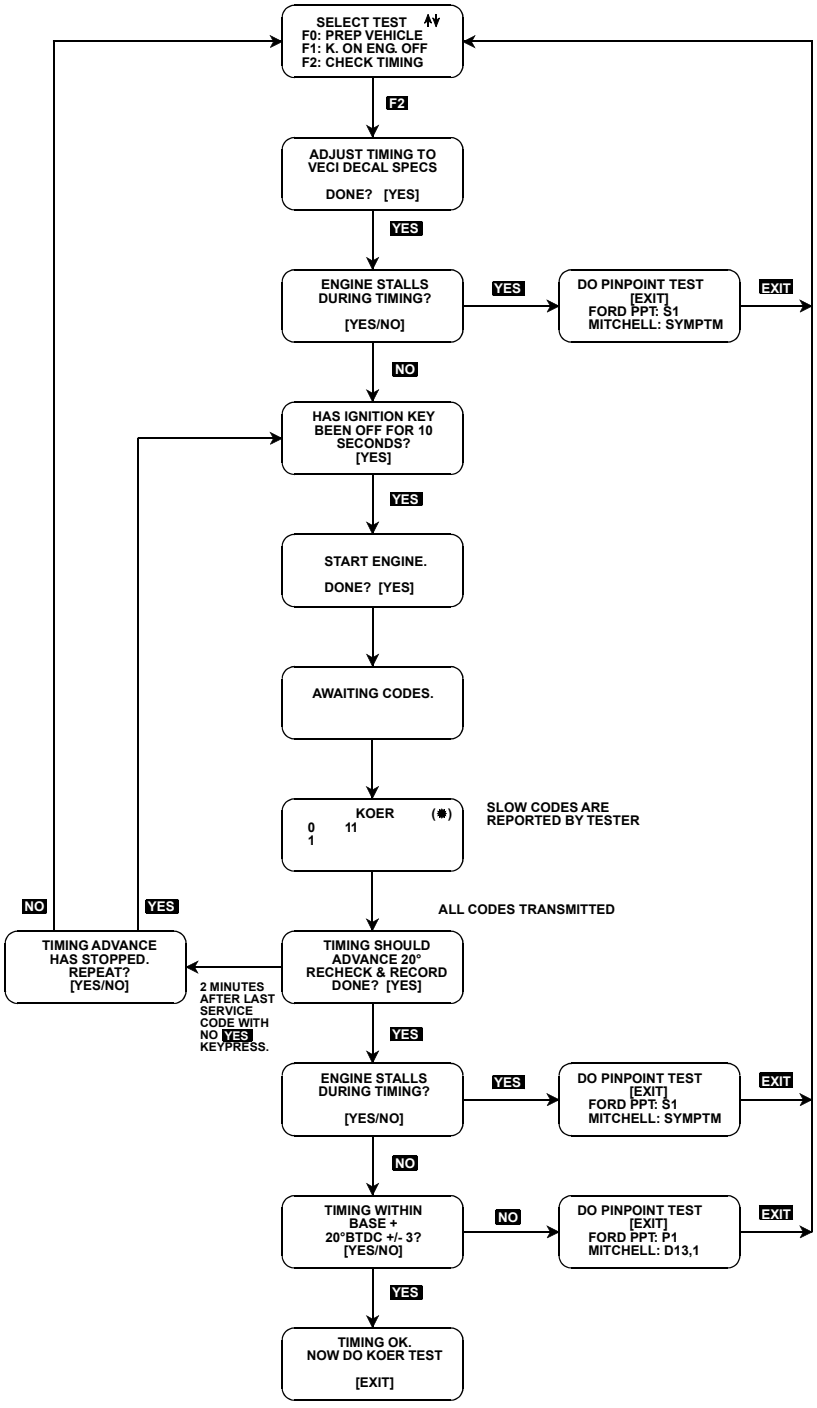


FIGURE 5-6. Timing Check (1981-91)

4. The tester now displays HAS IGNITION KEY BEEN OFF FOR 10 SECONDS? and START ENGINE. Answer YES to both of these displays when the action is completed.
5. The display changes to AWAITING CODES. When the KOER codes are received, they are displayed on the screen. Follow all of the prompts during the test, as described in KOER (*Submode F3: Key On, Engine Running Test on page 106*). This reduces the time it takes to read the KOER slow codes prior to rechecking the timing.
6. After the last KOER code is transmitted, you are prompted to recheck the timing. If operating properly, the EEC-IV has advanced the timing 17 to 23 degrees more than the base timing you just measured. Remember that anything that was disconnected to measure base timing needs to be reconnected. When you are finished, press YES.

   If you do not finish checking the timing within 2 minutes, the tester shows a new display, indicating that the timing advance has stopped. This is because the EEC-IV controller does not advance timing indefinitely. By pressing YES, you can repeat the timing advance portion of the test, starting at Step 4. Pressing NO puts the tester into the Test Selection mode.
7. After reading the timing advance, you are again asked if the engine stalled. This is the same as Step 3.
8. You are then asked if the timing advanced 17 to 23 degrees. If it did not, press NO and the appropriate Pinpoint Test is displayed. Press YES if the timing advanced properly.
9. If the timing advance operated properly, you are prompted to continue the Quick Test procedures by doing the Key On, Engine Running (KOER) test. Press EXIT to return to the Test Selection menu.

> **NOTE**
>
> If the Check Timing passes and you get a passing KOER code 11, there is no need to do KOER (the next test).

To select Check Timing (1992-1998 vehicles), do the following:

1. Select Check Timing test by pressing F2 from the test selection menu.
2. The tester display indicates the type of test (DI or EI) sequence. EI systems do not have adjustable timing. After performing the request on each display, press ENTER to advance each screen.
3. For DI equipped engines, the tester asks you if the timing changed from initial check. Press YES or NO, depending on your result.
4. If there is a check timing problem, the tester displays which section of the Ford's Powertrain Control and Emission Diagnosis manual to reference. Press EXIT to return to the Quick Test selection menu(s).

ACTIVE KEYS	
EXIT	Return to test menus.
YES or ENTER	Confirm that a test query is true or that a prompt for action has been completed.
NO	Confirm that a test query is false.
F2	Select Timing Check test.

SUBMODE F3: KEY ON, ENGINE RUNNING TEST

The Key On, Engine Running Test (KOER) is a Quick Test that checks for engine faults during actual operating conditions. This test is available for engines with EEC-IV, MCU and ISC-E engine controllers. Where KOEO and Timing Check are available, KOER should be done after the vehicle passes these preceding tests. If you want results from both KOER and Cylinder Balance tests, do the Cylinder Balance test, then review KOER results from the Review Codes function.

To select KOER Test, do the following:

The following description is for an EEC-IV engine controller. Some prompts vary for 4, 6, and 8 cylinder MCUs, but the procedure is very similar. The prompts are related to specific features that change from vehicle to vehicle. Not all vehicles request a Dynamic Response.

NOTE

Do not touch the throttle unless instructed to do so. This can result in unwanted service codes.

1. Select the KOER test from the Test Selection menu by pressing F3.
2. Answer YES to prompts for warming the engine, turning the ignition off, and starting the engine when each is done. It is important to warm the engine sufficiently to assure that the exhaust manifold oxygen sensor is operating correctly. Press YES after the engine is running. The tester uses these prompts to assure that the KOER test is initiated properly.
3. AWAITING CODES is the next display. During this time the engine controller initializes the KOER test. The tester is waiting for the cylinder identification code.
4. If no code is received within a minute, the tester displays an error message that directs you to retry the test, and then perform the indicated Pinpoint Test if the message reoccurs. To retry the test, press EXIT to return to the Test Selection menu. Recheck the connections on the ALDL cable, the Ford Adapter and Ford Self-test connector. Retry the KOER test. If the error message is displayed again, refer to the designated Pinpoint Test.
5. The first code received during the KOER test is the cylinder identification code. There are four possible responses to this code each requesting a different action:

DEPRESS/RELEASE BRAKE PEDAL TURN WHEEL 1/2 CIRCLE & RELEASE	**All models without TCS/OCS:** This is the display if the correct cylinder identification occurs. Performing these actions allows the ECA to verify the operation of the Brake Off/On Switch (BOO) and the Power Steering Pressure Sensor (PSPS). Do so promptly and wait for the next prompt, described in Step 6. After 20 seconds, an AWAITING CODES message is displayed.
DPR/REL. BRAKE, TURN WHEEN 1/2 CIRCLE & RELEASE TOGGLE OCS/TCS	**All models with TCS/OCS:** These vehicles may have a Transmission Control Switch or Overdrive Cancel Switch. If the vehicle does not have a TCS or OCS, you should ignore the prompt. If it has one, flip the switch both directions and wait for the next prompt, described in Step 6.

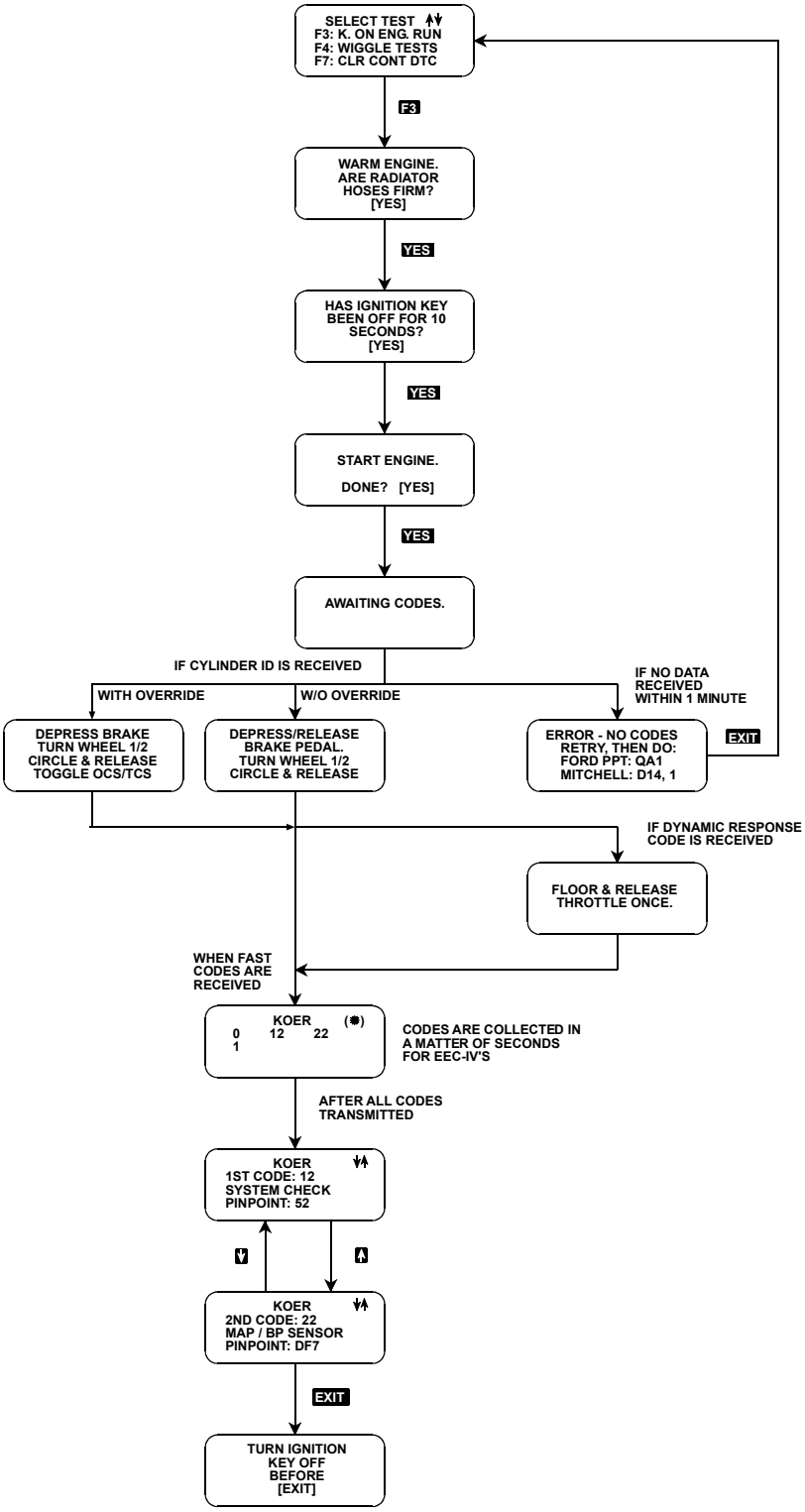


FIGURE 5-7. KOER

ENGINE SELECTION DOES NOT MATCH CYLINDER I.D. [EXIT]

This is the display if an incorrect cylinder identification code is received. You should recheck the engine selection process very closely to see that it is correct. A second check can be made to verify that there is indeed a mismatch by reading the raw service codes using the STAR MODE. A 4, 6, or 8 cylinder engine has a code 20, 30, or 40, respectively, for gasoline engines or a code 50 for diesels. Make these checks because the Pinpoint Test directions suggest replacing the ECA with the proper one for the engine.

CODE 98 FIX KEY ON, ENG. OFF CODES FIRST. [EXIT]

On late model vehicles, a code 98 instead of a Cylinder Identification code indicates that service codes from KOEO test are something other than a pass condition. You must resolve those service code problems first. For 3-digit codes, a code 998 is displayed instead of code 98.

6. If the vehicle sends a Dynamic Response code, you are prompted to FLOOR AND RELEASE THROTTLE ONCE. Do so immediately. This allows the ECA to check for throttle movement, RPM changes, and intake airflow changes.
7. Wait for all the service codes to be transmitted. For EEC-IVs and ISC-Es, fast codes are recorded. MCUs only transmit slow codes. The first code displayed is the recommended code to service first. All other codes are automatically displayed until a key is pressed.
8. When you have finished decoding, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the key off, then press EXIT again.

ACTIVE KEYS	
EXIT	Return to Test Selection menu.
YES	Acknowledge that requested test sequence is done.
↑	Show next code received.
↓	Stop auto-display or show previous code.
F3	Select Key On, Engine Running test.

SUBMODE F3: KEY ON, ENGINE RUNNING TEST (IVSC)

Integrated Vehicle Speed Control (IVSC) is Ford's computerized cruise control system. Engine off and engine running Quick Tests on the IVSC system can be performed via the same Quick Test connector used by the EEC-IV engine control assembly.

As with the engine Quick Tests, all items in the Prepare Vehicle directions should be completed before diagnosing the IVSC.

Since some engine-related components affect the IVSC, all engine related Quick Tests should have a pass condition before trying to diagnose the IVSC. You get the Pinpoint Test message *Do KOEO* if any EEC-IV related service codes are received from the vehicle while doing IVSC engine off tests. This is because the codes are KOEO service codes, and the Pinpoint Tests for these codes are in the Engine/Emissions Diagnosis manuals, not the manuals containing IVSC diagnostics.

To select KOER Test (IVSC), do the following:

1. Press F1 from the Select System menu to select Cruise Control tests.
2. From the Select mode menu, press F3 to perform the IVSC engine running test.
3. Answer YES to the test initialization prompts after each action is completed.
4. After the engine is started, you have 30 seconds to press the IVSC speed control ON button. Press YES when done. While AWAITING CODES, do not touch the brake or throttle pedal.
5. The tester reads and displays IVSC fast codes.
6. Usually the next display is the service codes display. The codes and associated Pinpoint Tests are automatically displayed, one every 3 seconds, until a key is pressed. Refer to *Submode F8: Review Service Codes, Decode to Pinpoint Tests (IVSC) on page 115*.

> **NOTE**
>
> A bad connection or not receiving codes condition results in an error display containing a Pinpoint Test designation. Always recheck connections and repeat the test before performing the Pinpoint Test.

7. When you finish reviewing and decoding service codes, press EXIT.
8. TURN IGNITION KEY OFF BEFORE [EXIT] is displayed. Turn the key off, then press EXIT again. This takes you back to the Test Selection menu.

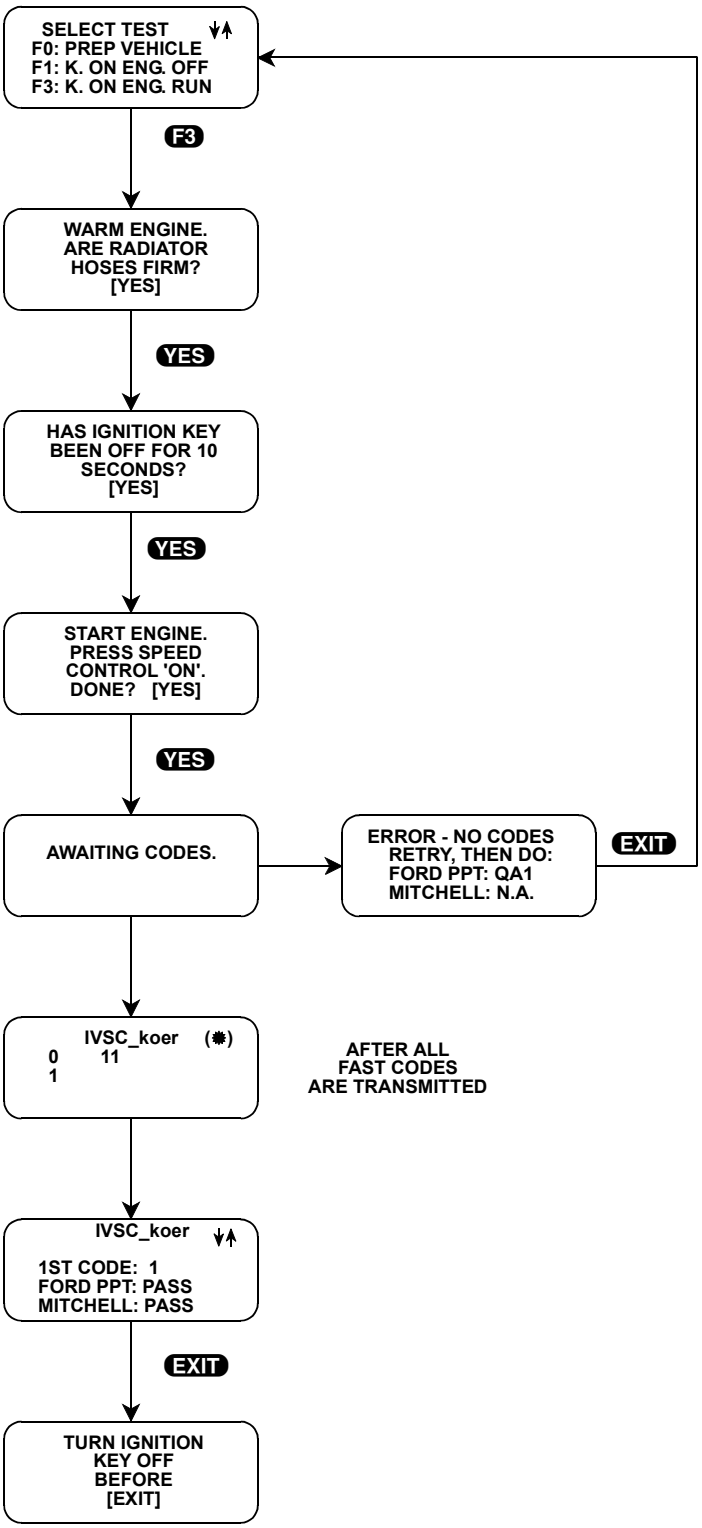


FIGURE 5-8. IVSC KOER

ACTIVE KEYS	
F1	Enter the Cruise Tests menu.
F3	Do IVSC, engine running tests.
YES	Confirm that a test initialization action has been completed.
YES	Move cursor left.
NO	Move cursor right.
↑	Show next code received.
↓	Stop auto-display or show previous code.
EXIT	Return to Test Selection menu.

SUBMODE F4: WIGGLE TESTS

The Wiggle Test is used to detect faulty wiring, connectors, and intermittently operating sensors associated with the EEC-IV engine controllers. The test can be done with the engine either off or on. By wiggling wires and connections and tapping lightly on sensors, intermittent wiring problems may be located.

You should do the Wiggle Tests when directed to do so by a Pinpoint Test, or after KOEO, Timing Check, and KOER codes have been corrected. If any Continuous codes remain unfixed, or you think something is intermittently malfunctioning, use these clues as a beginning point for the Wiggle Test.

During wiggling, the intermittent faults result in an output pulse on the STO line. The tester highlights these pulses with a **** FAULT! **** display. The tester also displays a count of all wiggle pulses. If faults are detected, rerun KOEO and read the Continuous codes to determine which system caused the wiggle faults. The Pinpoint Test then helps you determine which part of the system is faulty.

NOTE

A few vehicles, such as the 1989 Merkur, do not save Continuous codes during Wiggle testing. Other vehicles output fault pulses when none exist. Read Continuous codes for these vehicles to determine problems.

To select Wiggle Test, do the following:

1. Press F4 from Test Selection menu.
2. From the WIGGLE TESTS menu, select either F0: Key On, Engine Off Wiggle Test or F1: Key On, Engine Running Wiggle Test.
3. Answer YES to the test initialization displays, after the requested action has been done.
4. You see the display INITIALIZING WIGGLE TEST for six seconds.
5. The next display for some vehicles reads STO TRANSITIONS MAY NOT INDICATE FAULT CONDITIONS. On these vehicles, the STO line output goes from 12 volts to ground and back, irrespective of a wiggle fault. If you are diagnosing such a vehicle, complete your Wiggle testing, then refer to the Continuous codes for diagnosis.
6. If no faults occur, the tester displays WIGGLE TEST, 00, IF DONE [EXIT]. If faults occur, the tester displays ****FAULT!**** and the counter increases by one every time a fault is detected.

7. When finished, press EXIT. The tester then displays DO KOEO TEST TO SEE FAULT CODES GENERATED FROM WIGGLE TEST.
8. After 6 seconds the display is replaced with TURN IGNITION KEY OFF BEFORE [EXIT], or you can press EXIT immediately if you do not want to wait 6 seconds. Pressing EXIT one more time takes you to the Test Selection menu.
9. Remember to perform the KOEO test for any new service codes that are a result of Wiggle Tests.

Wiggle Test Notes:

When performing the KOER Wiggle Test on selected EEC-IV vehicles, the FAULT COUNTS may appear as counting up after a wiggle fault is detected. This occurs only when certain wiggle faults are stored as DTCs (example: MAF Sensor). The fault count may be observed to go over 50 fault counts.

Certain On-Demand tests check component or circuit failures and set DTCs depending on the results. If a DTC is stored, the EEC-IV PCM begins to issue DTCs on the STO line, rather than toggling the STO line to indicate a fault (normal Wiggle Test operation). The DTCs are then decoded by the tester as STO circuit high to low to high, etc. signal transitions as they are being transmitted, which cause the fault counter to count up. This is tied to the EEC-IV PCM calibrated strategy and is considered normal operation.

ACTIVE KEYS	
F4	Select Wiggle Test.
F0	Select engine off Wiggle Test.
F1	Select engine running Wiggle Test.
YES	Indicate test initialization action has been done.
EXIT	Terminate Wiggle Test and return to the Test Selection menu.

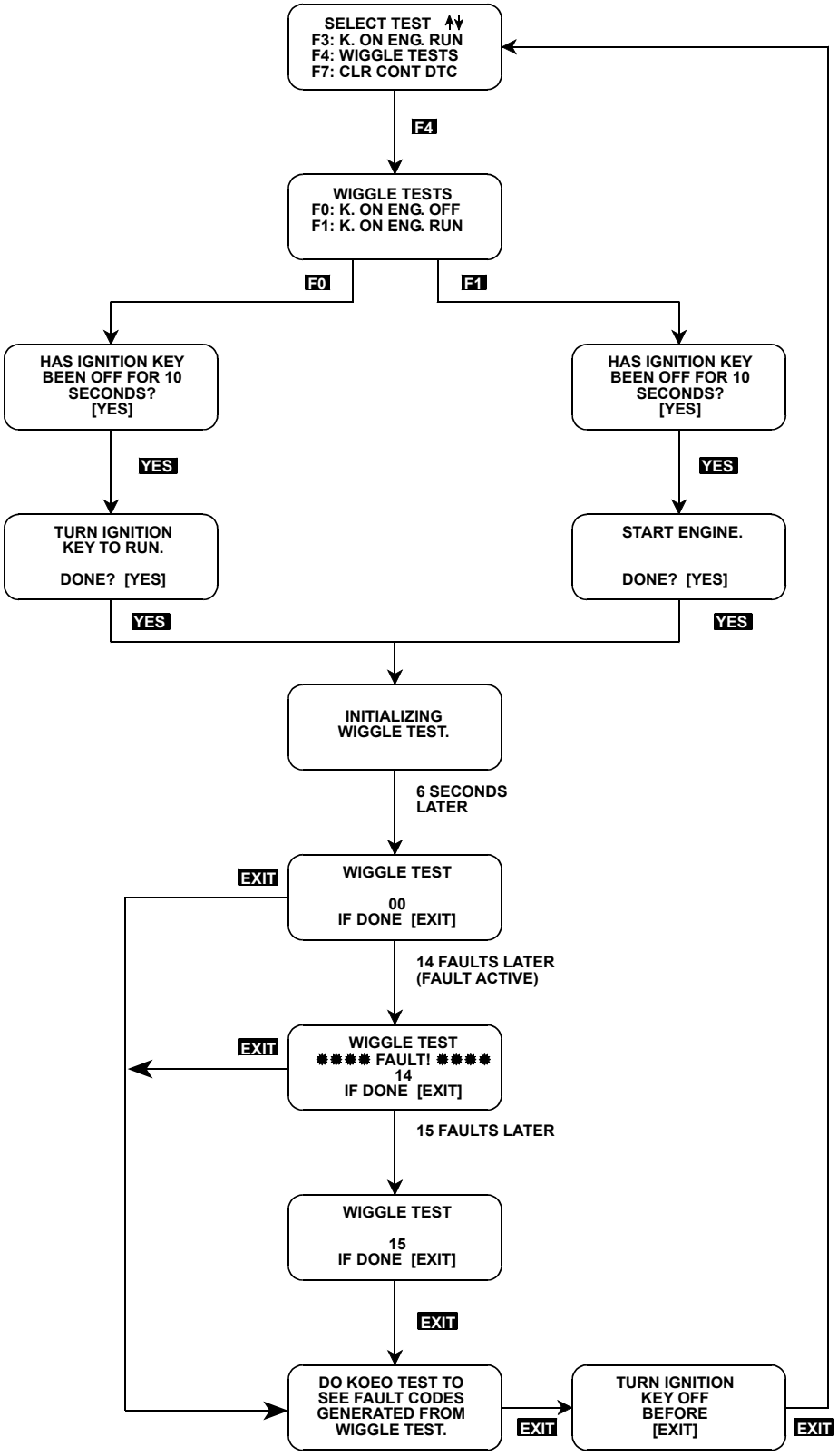


FIGURE 5-9. Wiggle Test

SUBMODE F7: CLEAR CONTINUOUS CODES

This mode allows you to clear Continuous Codes from the ECA memory. The following is a description of how Continuous Codes get into memory, what to do when they are present, and how to erase them.

Remember that service codes stored in the tester memory are not cleared when performing F7: CLEAR CONTINUOUS CODES.

During the F1: KOEO and F6, F0: OUTPUT STATE tests sensors within the EEC-IV system are continuously monitored by the Electronic Control Assembly (ECA). Any hard fault detected is stored in the ECA memory as a Continuous Code. Continuous Codes are automatically erased after 80 (or 40, depending on vehicle) engine temperature warm-up cycles from the last time the fault was detected.

Continuous codes are displayed during the KOEO test and should only be used for diagnosis after all KOEO and KOER trouble codes have been corrected. When a Code 11 (PASS) is present for both KOEO and KOER self-tests, perform repair procedures only on Continuous Codes that have not been corrected in KOEO and KOER modes.

NOTES

- There are exceptions where the Continuous Codes take precedence. The tester looks for these exceptions and decodes them correctly. Consequently, it is recommended that you decode service codes in KOEO, even though you have a code 11 (PASS).
- Continuous Codes generated during Wiggle testing can be read by performing the KOEO test. You can erase these codes with the Clear Continuous Codes function of the tester.

To select Clear Continuous Codes, do the following:

1. From the Test Selection menu, press F7 to enter Clear Continuous Codes mode.
2. Turn the ignition key OFF for at least 10 seconds, then press the YES key.
3. Turn the ignition key to run (don't start the engine), then press the YES key again.
4. This display informs you that the tester is clearing codes. When finished, press EXIT to return to the Test Selection menu.

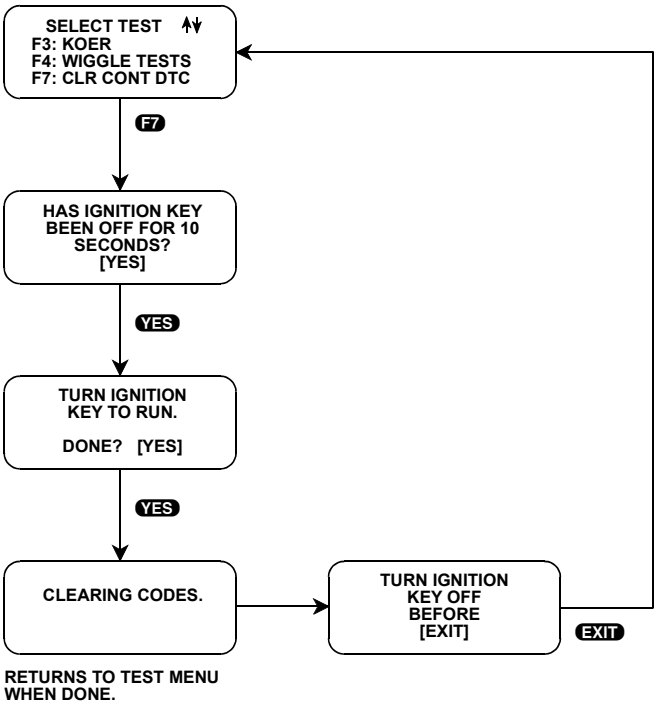


FIGURE 5-10. Clear Continuous Codes

ACTIVE KEYS	
F7	Select Clear Continuous Codes from the Test Selection menu.
YES	Confirm that requested test sequence is done.
EXIT	Return to Test Selection menu.

SUBMODE F8: REVIEW SERVICE CODES, DECODE TO PINPOINT TESTS (IVSC)

This function enables you to review service code number and title, plus provides service code to Pinpoint Test decoding. The tester stores all service codes recorded while performing KOEO (includes Continuous), KOER, IVSC, and STAR tests.

The tester has the capability to review Diagnostic Trouble Codes (DTCs) obtained in the Quick Test Mode or DTCs obtained in the STAR MODE. To review codes obtained in the STAR Mode, press F8 from the QUICK TESTS test selection menu, then F0 from the REVIEW and DECODE menu. To review codes obtained in the QUICK TESTS mode, press F8 from the QUICK TESTS test selection menu, then F1 from the REVIEW and DECODE menu.

In F1: Quick Test code review, press F0 to change the code type from KOER, KOEO, and CONTINUOUS, and answer the IS ENGINE RUNNING ROUGH? screen with a YES or NO reply (this changes the pinpoint strategy). Then use YES, NO, ↑, and ↓ to move through the KOER, KOEO, and CONTINUOUS code displays to view other codes. See the following procedure for more guidance. Note that when the Output State test is run, KOEO codes are updated (since you must run the KOEO test to do the Output State test). Similarly, for the Timing Check and Cylinder Balance test, KOER codes are updated and may be decoded.

In F0: STAR MODE code review, codes read during the STAR MODE may be decoded. When you choose to decode STAR codes from Review Codes, STAR codes from all performed tests can be displayed on the code list screen. Press F0 to change the code type from KOER, KOEO, and CONTINUOUS. Then use the YES, NO, ↑, and ↓ keys to place the cursor on the service code that you want to decode. Then press ENTER to display the code title and Pinpoint Test. Press EXIT to return to the code list screen. (Note that on ABS the code number, title, and Pinpoint Test are on one screen.) See the following procedure for more guidance. Since there is no separation of the different codes, you must know what test was performed for each code; otherwise your Pinpoint Test designations is incorrect.

Always read the beginning pages of each Pinpoint Test (e.g., read text for PA1, even if you are doing a PA55 Pinpoint Test). The first page always has a warning about which components in the system are diagnosed by the Pinpoint Test, and which other components, if not operating properly, can result in the same service code. Be sure these other components are operating properly before beginning the Pinpoint Test.

NOTE

All tests are year and vehicle dependent; Pinpoint Test designations vary from year to year. Therefore, you must accurately complete the vehicle and engine selection process to be referred to the correct Pinpoint Test. You must also refer to the appropriate year Ford or Mitchell Shop Manual for the Pinpoint Tests. Unfortunately, consistency has not been maintained for all tests in the manuals through the years.

To select Review Codes, do the following:

1. Press F8 from the F1: Quick Tests Test Selection menu to use Review Codes.
2. Press F0 to review codes obtained from using Star Mode or press F1 to review codes obtained from the Quick Test mode. If no codes are available in either mode, the display tells you. Press EXIT to return to the Test Selection menu.
3. The first codes displayed are KOER for ENGINE or KOEO for IVSC, if available. If you are using Star Mode, the first code received in the test is indicated with the cursor. If you are decoding codes obtained in the Quick Test mode, the first code that was received in the Quick Test is displayed. This is the recommended code from which to start Pinpoint Testing.
4. In Star Mode Review and Decode, whatever code is currently indicated is the one that is decoded. ENTER toggles you to the Pinpoint screen, and EXIT toggles you back to the code list. In Quick Test mode Review and Decode, use the ↑ and ↓ keys to move through additional codes that were received in the Quick Test.
5. If you want to look at codes obtained from another ENGINE or IVSC Quick Test, press F0 until you find the codes you want to review. If all tests have been run, the display cycles between KOER, CONTINUOUS, and KOEO in ENGINE and IVSC_KOEO and IVSC_KOER in IVSC.
6. In Star Mode if you want to decode another service code on the same line, use YES and NO to move the cursor left and right.
7. In Star Mode if there is more than one line of service codes, use the ↑ and ↓ keys to move the cursor between lines.

8. When you are finished reviewing and decoding, press EXIT to return to the Test Selection menu.

Pinpoint Test Exceptions

Most Pinpoint Test decoding refers you to the actual Pinpoint Test recommended by Ford and Mitchell. The following table lists Pinpoint Test results that do not point to an actual Pinpoint Test, but try to direct you to the proper non-pinpoint action or reference.

TEST RESULT	ACTION OR REFERENCE
N.A.	Pinpoint Test not available.
DO KOEO	Do KOEO test for this vehicle before performing IVSC tests. A KOEO service code needs to be resolved.
BAD EEC-IV	Be very careful that all other parts of the system have been examined. Rarely do the ECAs need replacement. Also, if battery voltage has been removed from the ECA and a Quick Test is attempted before running the engine, a BAD EEC-IV display may result.
PASS	This means the tester has checked all overriding codes and conditions that would change the interpretation of a code 11, 111, or code 62 in some instances, and the immediate test has passed with no problem detected.
NO TEST	Some Mitchell codes decode to NO TEST. This is because there is no corresponding Mitchell Pinpoint Test for the Ford Pinpoint Test.
NO STRT	This service code decodes to a NO START TEST, instead of a Pinpoint Test.
RERUN KOEO	Repeat the KOEO test. The ECA needs the test repeated to run Quick Tests properly.
SECTXXX	Go to the indicated chapter in the H Manual.
SYMPTM	Refer to the part of the manual that covers Diagnosis by Symptoms, to continue trouble shooting.

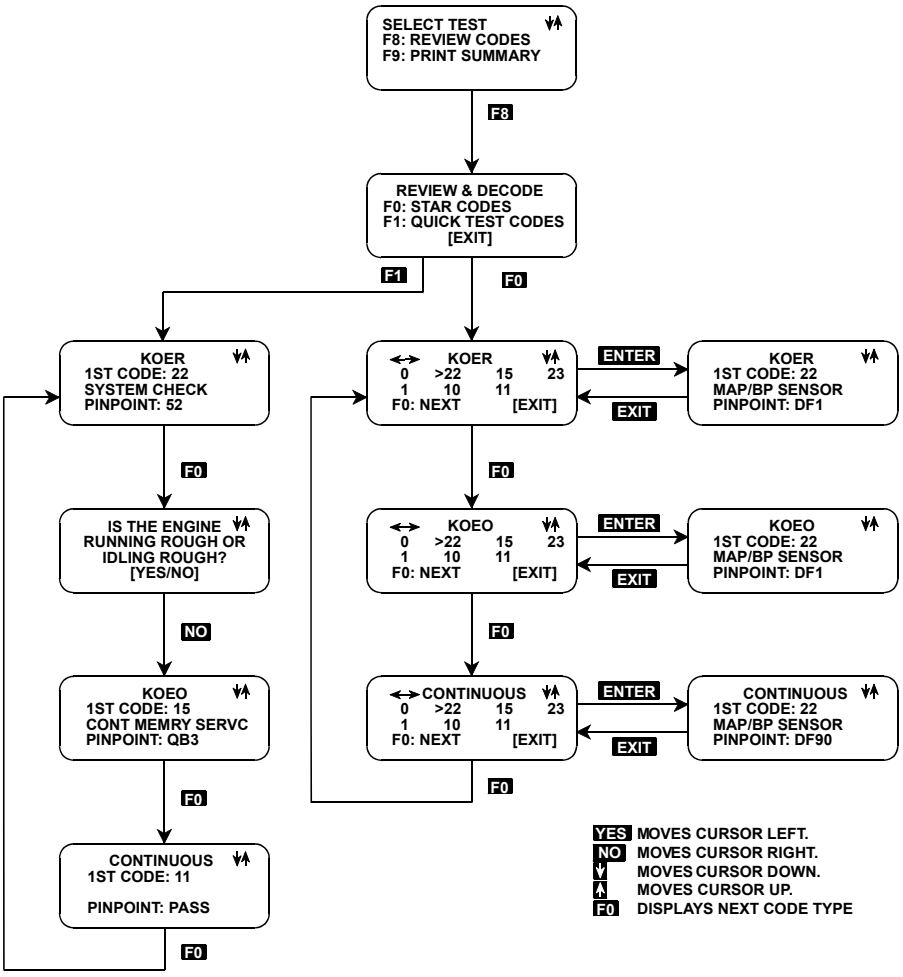


FIGURE 5-11. Example of Reviewing and Decoding Engine Codes.

ACTIVE KEYS	
F8	Select Review Codes from Test Selection menu.
F0	Review Star codes. Cycles between KOER, Continuous and KOEO Codes.
F1	Review Quick Test codes.
YES	Move cursor left for Star codes.
NO	Move cursor right for Star codes.
↑	Move cursor up for Star codes. For other codes, show next code received.
↓	Move cursor down for Star codes. For other codes, stop auto-display or show previous code.
ENTER	Toggle from the code list display to the Pinpoint Test for the code next to the cursor in the Star mode.
EXIT	Toggle from the Pinpoint Test screen to the code list display (in Star mode), and returns to test selection menu.

SUBMODE F9: PRINT SUMMARY

Print Summary is a tester feature, not a Ford Quick Test. While you are in the Quick Test Mode, a record is kept of all tests performed and the results or service codes received in each test. In the STAR MODE, the Star service codes are saved by the tester at entry, exit, and before erasing codes. When a summary is printed, you get a chronological record of the vehicle selection and all tests that were run.

If you are using a Tech 1 tester, the optional RS232C I/F Cartridge and Tech 1 Printer (or equivalent serial printer) are required for printing. Refer to the RS232 Cartridge manual if you haven't used a printer with the Tech 1 before.

If you are using a Tech 1A or MTS 3100, refer to the tester operator's manual and the printer operator's manual for printer setup.

The order of DTC display is KOER, KOEO, Continuous, or On-Demand tests (if the tester has read DTCs from each test as a result of performing the KOER, KOEO, Continuous, or On-Demand tests).

NOTE

On-Demand DTCs stored in the tester are the result of performing the 7.3L Diesel engine's Output State, Glow Plug, Injector Buzz, Cylinder Balance, or Switch Test, with DTCs read from the PCM. The tester always displays DTC results from the most recent On-Demand test performed, and if no DTCs are received after performing an On-Demand test, the tester does not display On-Demand DTCs in Review Codes mode.

NOTE

Tech 1 Users Only

Be sure the Tech 1 power is off before installing the RS232 Cartridge. The RS232 Cartridge can remain in the Tech 1 during normal operation. In this case, you may always plug into the Tech 1 Printer with the power on. However, installation of a cartridge while power is applied often causes abnormal operation of the Tech 1. Therefore, it is important that after installing the cartridge, you reset the Tech 1 by removing the power connector from the cigarette lighter and reconnecting it.

SUBMODE F9: PRINT SUMMARY (IVSC))

To select Print Summary, do the following:

From the Power-up screen:

1. Select ENTER to get to the Model Year selection screen.
2. Select ENTER for Last Vehicle Continuation.
3. Press YES if the vehicle selection displayed is correct.
4. Select system that you are testing (F0: ENGINE or F1: CRUISE CONTROL).
5. Select F1: QUICK TESTS.
6. From the Test Selection menu, press F9 to select PRINT SUMMARY.

7. The tester should display NOW PRINTING while a summary of the tests that have been done on the vehicle is printed. PRINTER IS NOT READY is displayed if the printer is OFF LINE, if the power is turned off, or if the RS232 Cable is not connected. Just turn the printer on or put it ON LINE.

   When the Print Summary is complete, the tester returns you to the Test Selection menu.

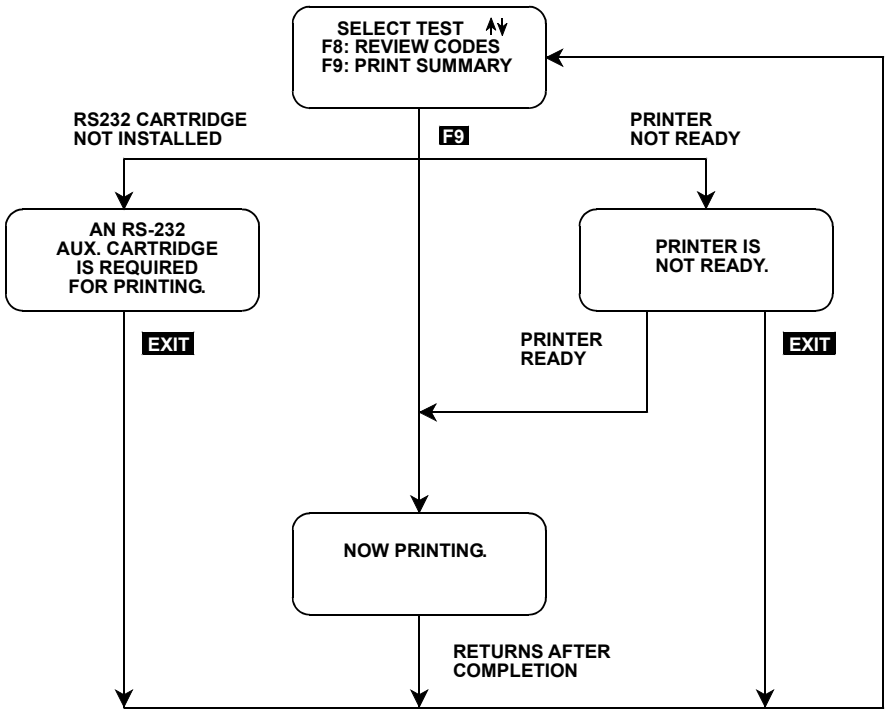


FIGURE 5-12. Print Summary (Engine System Example)

ACTIVE KEYS	
F9	Select PRINT SUMMARY from Test Selection menu.
EXIT	Returns you to Test Selection menu if RS232 Cartridge is missing or installed incorrectly, or if you do not want to print.

MODE F2: STAR MODE (IVSC, MECS)

The STAR MODE is intended primarily for the technician who is used to performing diagnostic procedures on Ford vehicles using Ford's STAR Tester. It allows you to test EEC-IV, MCU, IVSC, Antilock Brake, and Electronic Suspension Systems.

STAR MODE allows you to read Ford service codes. If you are familiar with doing Ford Quick Tests in this manner, you will find STAR MODE very useful. Service codes can be decoded to specific Pinpoint Tests unique to the vehicle being tested.

CONNECTION TO ELECTRONIC SUSPENSION, MECS, AND 4EAT SYSTEMS

STAR MODE is used to read DTCs on Electronic Suspension, Mazda Engine Control System (MECS), Four Speed Electronic Automatic Transmission (4EAT) systems, and Mazda ABS. When diagnosing the Electronic Suspension system, the Ford 7/14-pin adapter is used. When diagnosing the MECS, 4EAT, or Mazda ABS system, the Ford 7/14-pin adapter and jumper leads are used.

For jumper lead connection information on MECS and 4EAT systems refer to *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253*.

STAR MODE

Press F2 to enter the STAR MODE. If you are testing an EEC-IV, MCU, or IVSC system, press F0. If you are testing a MECS, 4EAT, or Mazda ABS equipped vehicle, press F1. The tester displays the STAR MODE options.

NOTE

To access STAR MODE, a vehicle needs to be selected. While it is not required to select the actual vehicle under test, it is the recommended practice.

There are two basic displays in STAR MODE. The first display is a Help menu showing the active keys that may be used and their current state. The second display shows you all codes transmitted, including service code, code separator, and dynamic response codes. Up to 24 codes are held in the STAR MODE before you are prompted to review and record any codes you want to save on paper. Then you need to erase codes before any more codes may be read.

Codes received in the STAR MODE can be decoded under Quick Test (press F8, F0 in the Quick Test Selection menu), and a STAR CODE Print Summary can be performed under Quick Test (press F9 in the Quick Test Selection menu).

To read Air Suspension, Ford ABS, MECS, 4EAT, and Mazda ABS slow service codes, the tester should be set up to read slow service codes.

NOTE

For 1988 Thunderbird and Cougar ABS systems, use the tester to initiate the Quick Test (using the F1 key in the STAR MODE) and read the ABS codes on the amber ABS lamp on the dash.

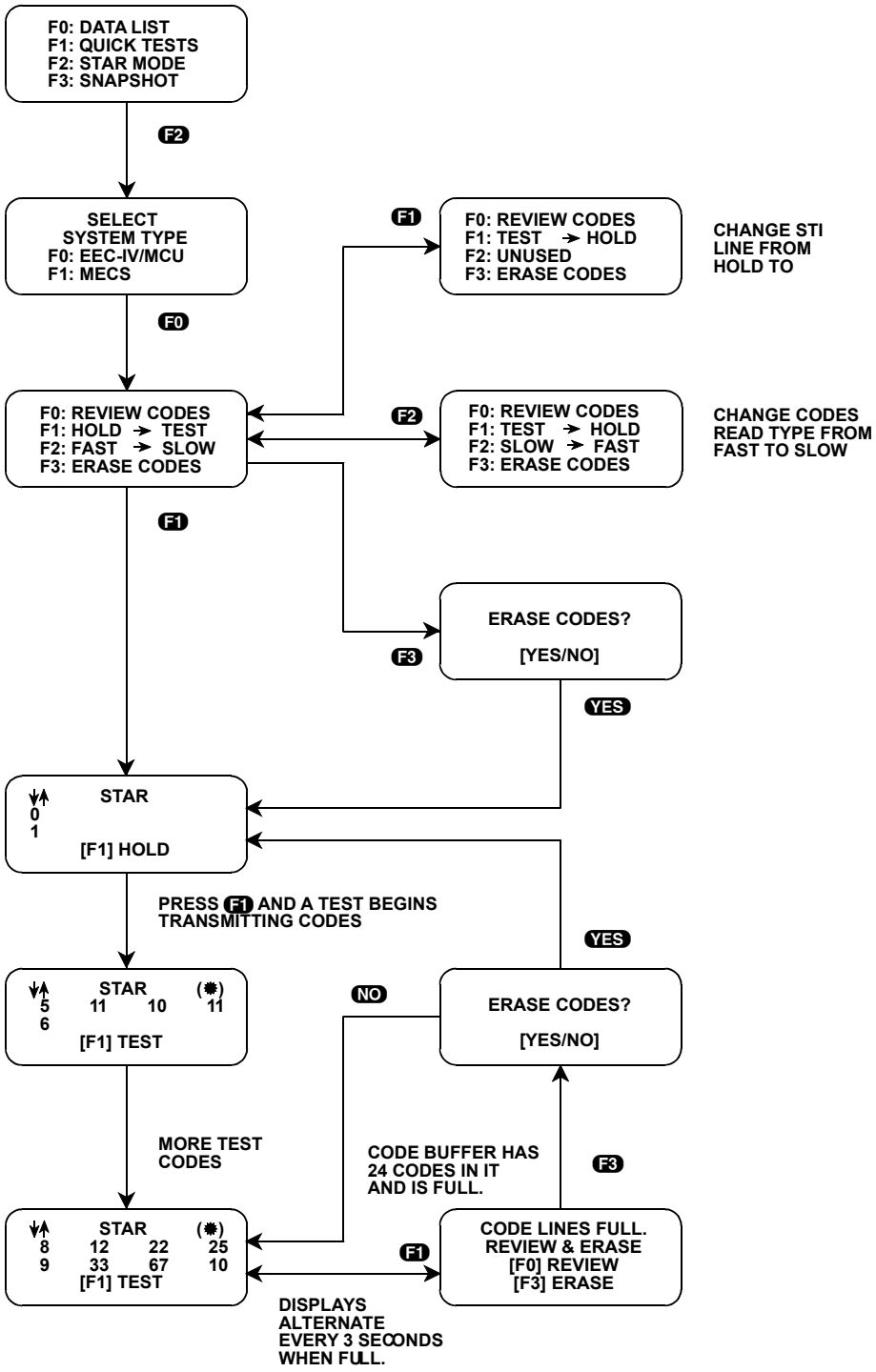


FIGURE 5-13. Star Mode

To select Star Mode, do the following:

1. Select the STAR MODE from the Test Mode Menu, then select the system type by pressing F0 or F1 for EEC-IV or MECS system. The Star Help menu is present showing active keys.
2. Pressing F0: REVIEW CODES changes the display to the code screen. The left side of this display shows the code line numbers from 0-9. You may scroll up and down examining codes anytime you are in this menu. The ↑ and ↓ keys scroll the code lines.
3. If you are starting to test a new vehicle, check to see if any codes are displayed on the tester. If codes are displayed, they are left over from the previous vehicle testing and should be erased by pressing F3 (see Step 6).
4. The F1 key performs the same function as the push button on the STAR Tester; it toggles the state of the STI line. If you are ready to do a Quick Test, pressing F1 grounds the STI line, and the tester displays F1:TEST. If you press F1 again, the STI line is floated and F1:HOLD is displayed. You can see codes on the display as they are transmitted. In addition, you can watch the pulse sequences for all codes transmitted in the upper right corner by watching the asterisk. When the asterisk is visible, the STO line is low, indicating a code pulse.

   When testing EEC-IV, AS, and Probe ABS, the ignition key should be turned on **before** STI is grounded (change F1: HOLD to F1: TEST).

   When testing Ford ABS, MECS, and 4EAT systems, the ignition key should be turned on **after** STI is grounded (change F1: HOLD to F1: TEST).

   Consult the appropriate service manual for further instructions on performing Quick Tests on the Ford system that you are working on.

   In addition, on vehicles equipped with the 1.8L and 1.9L engines and 4EAT transaxles it is important to note that the STI line is grounded within the 4EAT controller. The tester begins to retrieve codes after all connections are made and the ignition key is turned on (refer to *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253* for wiring diagrams).

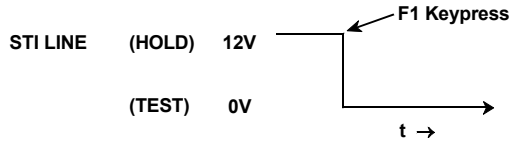


FIGURE 5-14. Changing STI LINE State with F1 Keypress Causes DTC Output

5. Press F2 to toggle between fast and slow service codes. The type of codes you are currently set up to read can be determined by viewing the Help menu. From the code display, press EXIT to return to the Help menu.
6. Codes stored in the tester memory are erased by pressing F3 and selecting YES to the query, ERASE CODES?. If you erase codes, all code lines are erased at once, returning you to the code screen with lines 0 and 1 visible and blank. You may want to do this before testing any new vehicle, so codes from the previous vehicle tested are not confused with codes from the present vehicle tests. This function has no effect on any Continuous codes saved within the ECA.
7. Pressing EXIT once or twice (depending on the present display), allows you to return to the Test Mode Menu.
8. Decoding of service codes to Pinpoint Tests is possible in the STAR MODE. Simply do your Quick Tests in the STAR MODE, then exit from the STAR MODE and enter the Quick Test Mode, then select Review Codes.

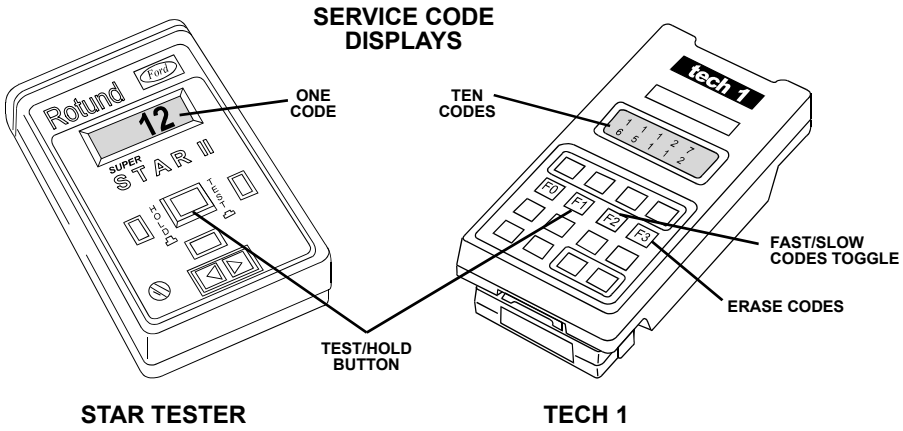


FIGURE 5-15. Tester Service Code Display

NOTE

Remember that the Star Mode emulates a Star II tester. If you need help on how to read DTCs in the Star Mode for any Ford system, the diagnostic procedures in the Ford Service Manual can be followed.

ACTIVE KEYS	
EXIT	Return to Test Mode menu or return to Help menu.
F0	Go to the codes display.
F1	Toggle STI line between TEST and HOLD (Star Tester push button).
F2	Toggle between reading fast and slow service codes.
F3	Begin process of erasing stored STAR codes. Does not erase codes stored in the vehicle.
YES	Erase codes if in ERASE CODES? query.
NO	From ERASE CODES?, return to the code display.
↑	Scroll code lines up.
↓	Scroll code lines down.

MODE F3: SNAPSHOT

The Snapshot test mode provides a diagnostic data parameter storage feature on Ford's Diagnostic Communication Link (DCL). Using Snapshot can help to isolate intermittent circuit failure or invalid component operation, in the service bay or out on a road test. Once the Snapshot is saved in the tester, the DCL diagnostic data parameters can be reviewed later for Snapshot replay or hardcopy print options.

To start the Snapshot process, the tester waits for a keypress. But first you should select the trigger point. The 1981-2004 Ford Powertrain Application has the capability to start a Snapshot sequence at the beginning, center, or end of data capture. If you set up your trigger point to match the type of driveability fault that you are observing, this function can be a great diagnostic time saver.

After the data has been captured, you can scroll through all of the stored data for display. Data parameters are displayed in a manner identical to that of the Data List mode. You can also specify the data sample you wish to display.

In addition, the 1981-2004 Ford Powertrain Application can print the captured data providing a hard copy of any selected data sample. Refer to the printer Operator's Manual and the tester Operator's Manual for printing instructions.

SELECTING SNAPSHOT MODE

The operation of the SNAPSHOT mode is divided into three phases: Setup, Data Capture, and Data Replay.

To select Setup Phase of Snapshot Mode, do the following:

1. Select the SNAPSHOT mode from the Test Mode menu by pressing F3.
2. Select the trigger point by pressing F9, then select the desired point: beginning, center, or end of data. When the trigger point is selected, the tester automatically returns to the previous menu.

ACTIVE KEYS—SNAPSHOT SETUP PHASE	
F0	Set trigger point at beginning.
F1	Set trigger point at center.
F2	Set trigger point at end.
F3	Selects Snapshot mode or Snapshot Replay.
F9	Select trigger point and manual trigger.
YES , NO	Scroll through displayed data parameters.
ENTER	Manual trigger.
EXIT	Manual trigger. Go to data display phase of Snapshot mode. Return to test mode menu.

To select Data Capture Phase of Snapshot Mode, do the following:

3. Press F2 to Select Snapshot Manual trigger data capture. All data captured during Snapshot is retained in the tester until it is overwritten by a new Snapshot or if the tester power is disconnected for more than 30 minutes. Press F3 to replay data from a previously captured Snapshot.
4. Once Manual trigger is selected, the tester starts saving diagnostic data in its memory while displaying the data list.
5. While the tester is waiting for a trigger, it is continuously storing engine data parameters in its memory. The data is organized as a number of data samples.

   The value or state of each parameter is saved for each sample. Once the maximum number of samples has been recorded, the oldest data is discarded. The data display indicates the waiting for trigger condition with a flashing W in the lower right-hand corner of the display. While waiting for the selected trigger, the EXIT, ENTER, or F9 keys must be pressed to begin manual trigger data capture.
6. Once the trigger occurs, the tester beeps and then continues to save data samples until its memory is full. The data display indicates that the trigger has occurred by replacing the flashing W with a fixed T. As soon as the memory is full, the data capture terminates automatically and the tester goes on to the data display phase.
7. Pressing EXIT after the trigger has occurred terminates the Data Capture phase early, and the Snapshot mode moves to the Data Display phase.

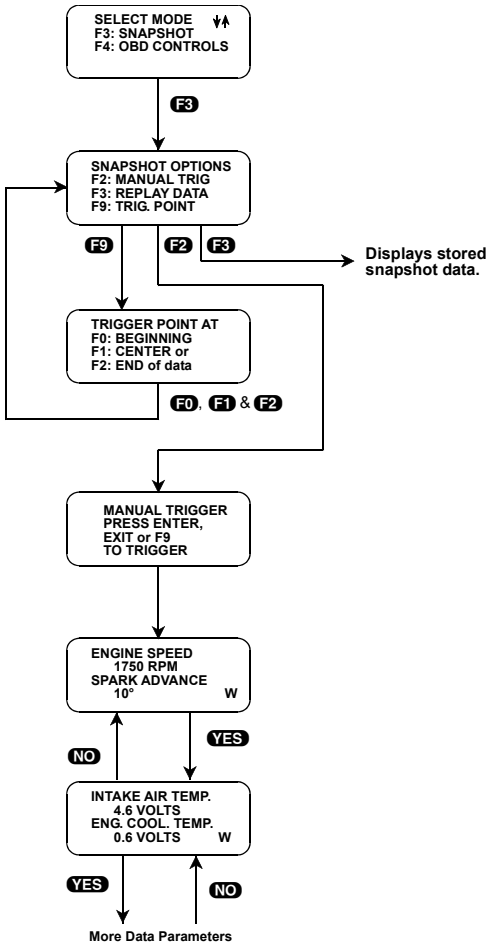


FIGURE 5-16. Snapshot

To select Data Replay Phase of Snapshot Mode, do the following:

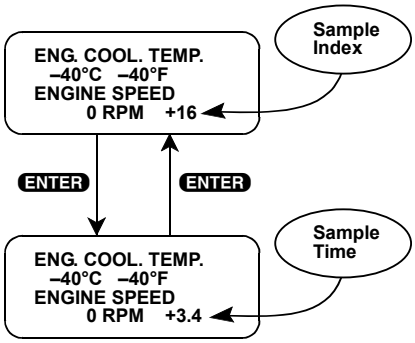
8. The Data Replay phase is indicated with a number (initially zero) in the lower right hand corner of the display. Select the data parameter to be displayed using **YES** and **NO**.
9. Use the ↑ and ↓ keys to select the desired sample. An index is displayed in the lower right-hand corner of the tester display. Sample 0 corresponds to the trigger sample; sample -1 is the sample immediately proceeding the trigger; sample +1 is immediately after the trigger; and so on. The index range may be less than the maximum number of samples if enough time was not allowed for data capture before or after the trigger.

   The following keys can be used to move about more quickly in the data samples:

   F4 : Display first (earliest) sample

   F5 : Display Trigger sample

   F6 : Display last (most recent) sample
10. Pressing **ENTER** causes the sample time to be displayed instead of the sample index:



The sample time display gives the time in seconds (relative to the trigger sample) at which the tester received the currently displayed sample. For example, a sample time of +3.4 means the sample was received 3.4 seconds after the trigger sample. A sample time of -0.6 seconds means the sample was received 0.6 seconds before the trigger.

Pressing **ENTER** toggles between the sample index and sample time displays.

11. The data parameters can be printed if the tester is connected to a compatible printer.

    For instructions on connecting the printer to the tester and printing the data parameters, refer to the tester operator's manual if you are using a Tech 1A or MTS 3100. If you are using a Tech 1, refer to the RS232C I/F Operator's Manual.

12. When you are finished viewing the sampled data, press **EXIT** to return to the Snapshot options menu. If you are finished with the SNAPSHOT mode, press **EXIT** again to return to the test mode menu.

ACTIVE KEYS—SNAPSHOT DATA REPLAY PHASE	
YES , **NO**	Scroll through displayed data parameters.
↑ , **↓**	Scroll through selected samples.
F0 , **F1**	Fix top or bottom display parameter respectively.
F3	Select Snapshot Replay.
F4	Advance to first (earliest) sample.
F5	Advance to trigger sample (sample 0).
F6	Advance to last (most recent) sample.
ENTER	Toggle between sample index and sample time display.
EXIT	Return to trigger select menu.

MODE F4: OBD CONTROLS

SUBMODE F0: OUTPUT STATE TEST

The Output State test enables you to check output actuators within the EEC-IV system. This test is available on EEC-IV systems only after the last slow code has been received in the KOEO test. The actual test involves fully depressing and releasing the throttle to change the state of all output solenoids at once. You can then check to see if all actuators have changed state. If not, use a DVOM to trace back to where the activating circuit is failing.

NOTE

Some vehicles use the Check Engine lamp or other dash lamps to show that the solenoids' changed state. Other vehicles (such as some Continentals), only change state once per test.

To select Output State, do the following:

1. Press F4 to enter the OBD Controls mode from the Test Selection menu.
2. Press F0 to select the Output State test.
3. The tester goes through the KOEO tests receiving any slow codes sent by the EEC-IV (see *Submode F1: Key On, Engine Off Test on page 98*).
4. After all service codes have been received, the screen informs you that GOOSING THROTTLE CHANGES STATE OF ENG. ACTUATORS. Fully depressing and releasing (goosing) the throttle changes the state of the output actuators from OFF to ON or from ON to OFF. An asterisk in the lower right corner of the screen indicates the status change each time the throttle is goosed.
5. Press EXIT to return to the Test Selection menu.

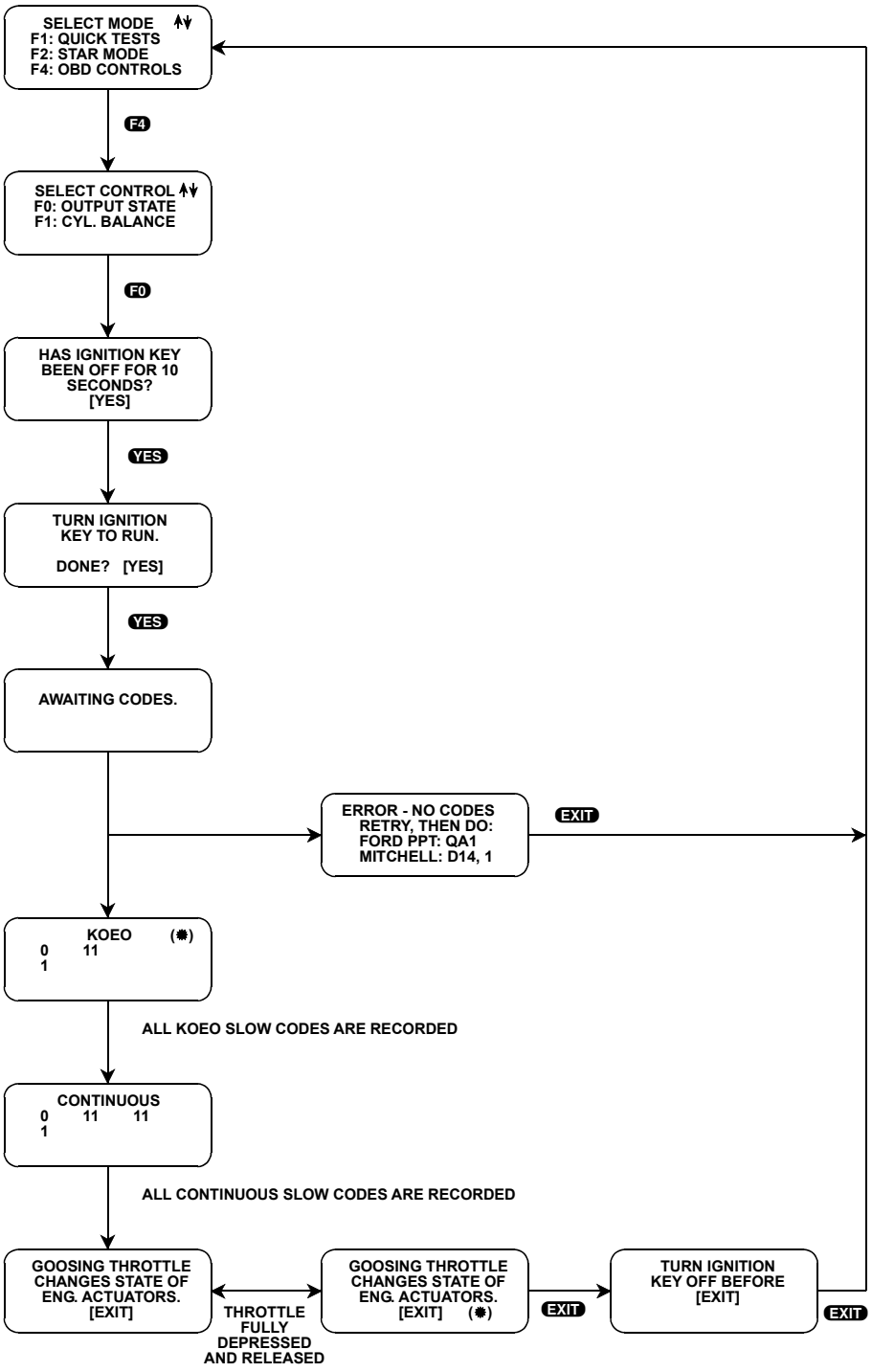


FIGURE 5-17. Output State

ACTIVE KEYS	
F4	Select OBD Controls.
F0	Select Output State test.
EXIT	Return to Test Selection menu.

SUBMODE F1: CYLINDER BALANCE TEST

This test is only available for vehicles equipped with Sequential Electronic Fuel Injection (SEFI). SEFI systems have one independently controlled fuel injector for each cylinder. After performing KOEO and KOER tests, the performance level of each fuel injector can be checked in the Cylinder Balance test.

NOTE

Some Ford vehicles sold in California are indicated by Ford as being equipped with a SFI or SEFI system, but are actually equipped with the MFI system. Make sure the engine that you are testing is equipped with SFI or SEFI before running the cylinder balance test (verify injector wiring harness). Invalid test results may result if the cylinder balance test is performed on a MFI system.

Once the Cylinder Balance test begins, the engine idle speed is fixed. When the engine has stabilized, the RPM is measured and stored for reference. Then, one at a time, each injector is turned off and the engine is allowed to stabilize. The RPM is again measured and stored, then the injector is turned back on.

The test can be run three times, each time the EEC-IV changes the PASS/FAIL criteria. Since the criteria has changed over the years, you'll have to check the Service Manual for the test specifications for the year of vehicle being tested. For any tests performed after the third test, use the same criteria used for the third test.

Here's an example of how the Cylinder Balance Test works on a 1989 model. To pass the first test, the RPM drop for a cylinder must be at least 65% of the RPM drop for the cylinder with the greatest RPM drop. In the second test, each cylinder must drop at least 43% of the cylinder that dropped the most. And in the third test, each cylinder must drop at least 20% of the cylinder that dropped the most. If the RPM drop for one or more cylinders is less than the PCM calibrated PASS/FAIL criteria, a cylinder identification code (or codes) is sent from the PCM to the tester, indicating which cylinders are weak or noncontributing. Examples of cylinder ID codes are 1 for cylinder #1, 2 for cylinder #2, etc. The cylinder ID number is displayed twice, like 1-1. If all cylinders pass, a pass message is displayed.

If an injector fails all three tests, it is considered to be a noncontributing cylinder. If it fails two tests but passes the third, it is considered a very weak cylinder. If it fails only one test, it is considered to be a weak cylinder.

While performing the Cylinder Balance test, the throttle must not be touched unless the tester instructs you to TAP THROTTLE ONCE TO ACTIVATE. Touching the throttle at any other time during the test causes the test to abort, sending Code 7-7, and require that you return to the Test Selection menu to rerun the Cylinder Balance test.

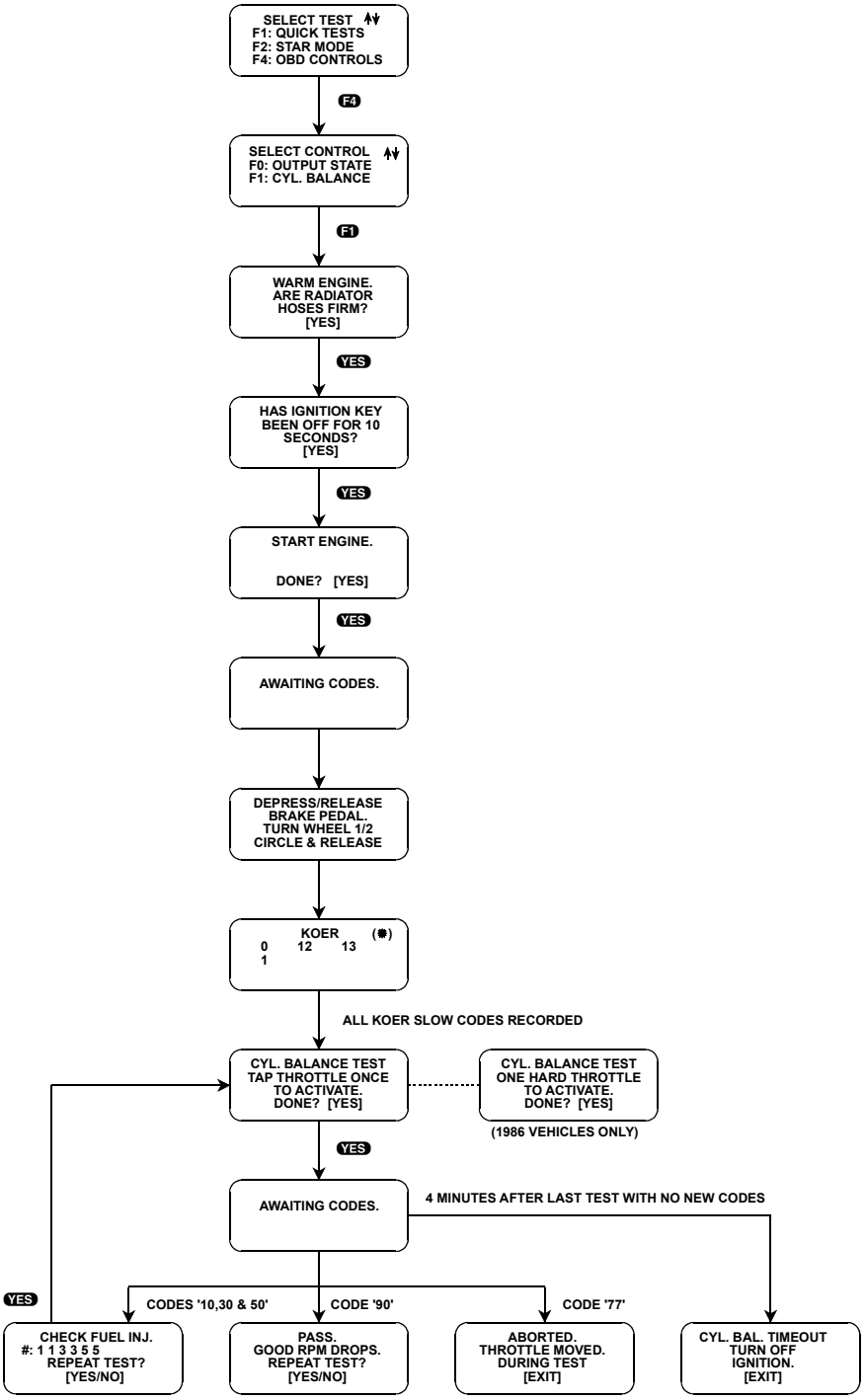


FIGURE 5-18. Cylinder Balance Test

To select Cylinder Balance, do the following:

1. From the Test Selection Menu, press F4 to enter the OBD Controls Tests.
2. Press F1 to select the Cylinder Balance Test.
3. Answer YES after performing each of the preparatory steps for the Cylinder Balance Test. The tester goes through the KOER test, then displays any slow codes that were transmitted.
4. The screen changes to the CYLINDER BALANCE TEST and asks you to TAP THROTTLE ONCE TO ACTIVATE. Tap the throttle, then press the YES key to begin the Cylinder Balance Test. You have two minutes to run a cylinder balance test after the last KOER code or the last Cylinder Balance test code was received.
5. Depending on the results of the Cylinder Balance Test, you see one of the following displays on the screen:

PASS GOOD RPM DROP? REPEAT TEST? [YES/NO]	All fuel injectors passed the Cylinder Balance Test. Press YES to repeat the test. You don't have to repeat the KOER test.
CHECK FUEL INJ. #: REPEAT TESTS? [YES/NO]	Check the mechanical or fuel system condition for the cylinders listed on the screen. Press YES to repeat the test. You don't have to repeat the KOER test.
ABORTED THROTTLE MOVED DURING TEST [EXIT]	If the throttle is moved during the Cylinder Balance Test, a code 7-7 is sent to the tester and the test is aborted. Press the EXIT key and you are returned to the Test Selection Menu.
CYL. BAL. TIMEOUT TURN OFF IGNITION [EXIT]	Over two minutes elapsed since the last test and a new test was not initiated, or over four minutes elapsed since the last test was initiated and no codes were received. The throttle tap to start the test may not have been strong enough. EXIT, then do the Cylinder Balance test again.

ACTIVE KEYS	
F4	Select OBD Controls.
F1	Select Cylinder Balance test.
EXIT	Return to Test Selection menu.
YES	Affirm that requested test sequence is done.
NO	Do not repeat Cylinder Balance Test. Returns you to Test Selection menu.

EEC-V TEST MODES

MODE F0: DATA LIST

The DATA LIST mode monitors diagnostic data parameters available from the vehicle Powertrain Control Module (PCM) on Ford's Standard Corporate Protocol (Ford-SCP) communication link. This mode does not affect vehicle operation, and diagnostic data parameters can be read from the PCM to allow for quick analysis of critical input and output parameter values. The diagnostic data parameter current value is displayed along with parameter units.

NOTE 	Some Ford PCMs indicate support of a diagnostic data parameter (or PID, in Ford terms) to the tester. In this case, the parameter is listed, but its data is not correct. Examples are voltages reading 0.00v or transmission range sensor, commanded gear, park/neutral, and other parameters showing up in the data list when connected to a vehicle equipped with a manual transmission. Remember to check the vehicle's engine and transmission configuration for components that are in the data list but not actually on the vehicle under test.

On the 1995 and newer 7.3L VIN=F diesel engine, the PCM may not respond to data parameter requests. When this happens, the *No data or PCM* response is displayed. Exit the mode that is currently selected and again select the mode. This method then allows communications to the PCM for data display.

FORD-SCP DIAGNOSTIC DATA PARAMETER NOTES

While viewing Data List parameters on vehicles which use the Cylinder Head Temperature (CHT) sensor for determining loop status, the Engine Coolant Temperature sensor parameter values may appear incorrect. ECT (°) displays values of -34°F and -37°C, and ECT (V) is greater than 4.50v. This is due to a new EEC-V strategy which uses a Cylinder Head Temperature sensor, not the Engine Coolant Temperature sensor, to obtain engine temperature information.

On these applications the Powertrain Control Module supports the CHT (°) and CHT (V) diagnostic data parameters. Refer to those parameters for reading engine temperature data.

To select Data List, do the following:

1. Press F0 to select DATA LIST mode from the Test Mode Menu.
2. The message WAITING FOR DATA appears. After 6-10 seconds the SELECT DATA menu is displayed. If an error or reminder message appears, perform the action that is presented by the display (refer to the communication error message screen definition within this section of the manual).
3. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.

   While in the Data List mode, press F7 to go to the next Data List.
4. Select F0: ALL DATA or F1: CUSTOM LIST from the SELECT LIST menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER. The message BUILDING DATA LIST is displayed. The tester displays either All Data parameters or Custom List parameters depending on which selection was made. Refer to the Data List Setup section for instruction on how to select the data list (next section).

5. Use the YES and NO keys to scroll through the parameters.
6. The diagnostic data parameters can be printed if the tester is connected to a compatible serial printer by pressing the F8 key.

   For instructions on connecting a Vetronix printer to the tester and print the data parameters, refer to the tester operator's manual if you are using the MTS 3100 or Tech 1A. If you are using a Tech 1, refer to the RS232C I/F operators manual.
7. Press EXIT to return to the Test Mode Menu.

Operation of the Data List mode is summarized in the flow diagram in Figure 5-19.

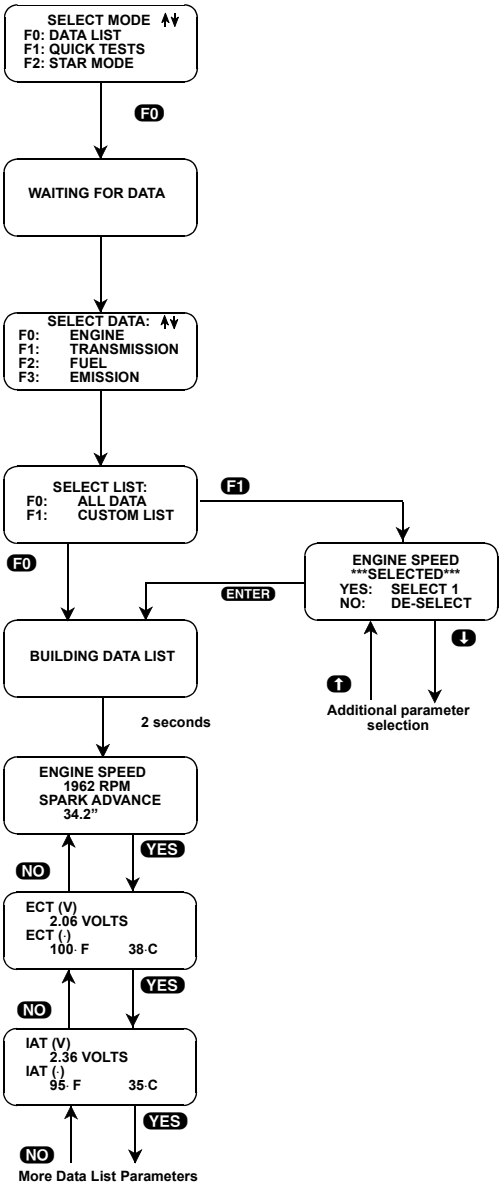


FIGURE 5-19. Data List

ACTIVE KEYS—DATA LIST	
YES , NO	Scroll through displayed data parameters.
F0	Mark top displayed parameter as fixed for creating your own data pairs and select the Engine Data List.
F1	Mark bottom displayed parameter as fixed for creating your own data pairs and select the Transmission Data List.
F2	Select the Fuel Data List.
F3	Select the Emission Data List.
F7	Go to the next Data List.
EXIT	Return to Test Mode menu.

DATA LIST SETUP

The data list can be set up to view All Data parameters or Custom List parameters. The two types of data list set up are defined as follows:

F0: ALL DATA: The selection of F0: ALL DATA monitors all of the diagnostic data parameters available from the PCM. Depending on the number of diagnostic data parameters in the data list, the update rate can be 3 seconds or longer.

F1: CUSTOM LIST: The selection of F1: CUSTOM LIST displays a list of parameters from which to select. F1: CUSTOM LIST parameters allows you to select any combination of diagnostic data parameters to monitor (from one parameter to all parameters). A single parameter can be sampled at a high rate, and selecting more parameters reduces the update rate. Parameters are selected by scrolling through the list using the ↑ and ↓ keys and then pressing YES and NO to select and deselect the listed parameter. When the parameters have been selected, press ENTER to go to the display mode. The tester remembers the selected parameters (until another vehicle is selected or the tester is powered down) so you won't have to re-select them every time.

NOTE

If a different vehicle is selected or the same vehicle is selected without using LAST VEH. = YES, all parameters selected in Custom List are erased. Make sure to press YES from the select model year screen to select the last vehicle tested to keep the current Custom List parameter setup. A maximum of 30 data parameters can be selected in Custom List.

VIEWING PCM DIAGNOSTIC DATA PARAMETERS

In order to maximize the information that can be seen at one time, the Tech 1 displays data parameters in preassigned pairs. The first data pair is displayed after you press F0. You can scroll through the Data List with the YES and NO keys. See *Create Your Own Data Pairs* for creating your own data pairs with the F0 and F1 keys.

To see other preassigned pairs, press either the YES or NO key. The YES key scrolls forward through the list of preassigned pairs, while the NO key causes scrolling backwards.

Appendix D contains descriptions of all engine data parameters.

Create Your Own Data Pairs

You can create data parameter pairs which are different from the preassigned pairs. Any two parameters can be displayed as a pair by simply scrolling either the bottom or top display parameter, while the other display parameter is fixed. To fix the top parameter press F0, an asterisk appears by the fixed parameter. Press F1 to fix the lower parameter. The Tech 1 does not allow both the top and bottom parameters to be fixed at the same time.

As an example, let's say you wish to create a pair with ENGINE SPEED and BRAKE SWITCH. To do so, scroll through the preassigned pairs with the YES and NO key until you find a pair with ENGINE SPEED. Fix the ENGINE SPEED by pressing the F0 key if ENGINE SPEED is the top parameter, or the F1 key if it is the bottom. Then scroll the other half of the display with either the YES or NO key until BRAKE SWITCH is displayed.

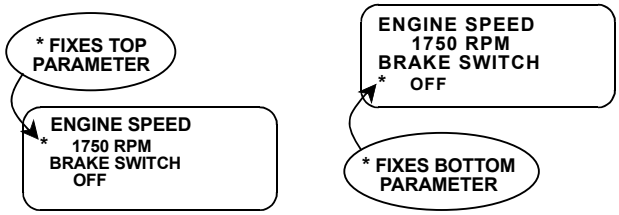


FIGURE 5-20. Data Parameter Pairs

PRINTING DATA

The currently displayed sample may be printed if the tester is connected to a compatible printer by pressing the F8 key.

ACTIVE KEYS—CREATING DATA PAIRS	
YES , NO	Scroll through displayed data parameters, or for Custom List setup, select or deselect parameters.
EXIT	Return to the select mode menu.
F0 , F1	FIX the upper or lower parameter.
↑ , ↓	Scroll through parameters in Custom List.
ENTER	Start Custom List Data.

MODE F1: QUICK TEST

SUBMODE F0: PREPARE VEHICLE AND ENGINE

The Ford diagnostic procedures specify that before performing any of the Quick Tests, certain vehicle and engine preparations must be performed. The Prepare Vehicle test provides screen prompts for properly readying gasoline and diesel engine powertrain systems for diagnostic testing.

Properly preparing the vehicle may prevent receiving service codes that are not related to a fault condition. An example of this is engine coolant temperature that is not hot enough to prevent the vehicle ECA from setting a service code related to the Engine Coolant Temperature (ECT) sensor. Also, there are engine modifications for certain models that must be done prior to running engine Quick Tests. This is especially true of earlier model vehicles. Therefore, you find that the checks in Prepare Vehicle are specific to the vehicle under service.

NOTE

The Pinpoint Test for a vehicle that does not start is also displayed in Prepare Vehicle.

To select Prepare Vehicle, do the following:

1. Select Quick Tests by pressing F1 from the Select Mode Menu.
2. Select Prepare Vehicle by pressing F0 from the Test Selection Menu. It is important to perform the Prepare Vehicle test before doing any other EEC-V Systems Quick Tests.
3. Use ↑ and ↓ to scroll through the Prepare Vehicle steps. Use YES and NO to answer diagnostic questions. It is suggested that you use the ↑ key to scroll in the logical sequence of preparations, and use the ↓ key for looking backwards. When you reach the last of the preparation displays, the next ↑ key returns you to the first display.
4. Use the EXIT key to return to the Test Selection Menu.

ACTIVE KEYS	
↑ , ↓	Scroll through the preparation displays.
YES , NO	Answers questions.
F1	Selects Quick Test Mode.
F0	Selects Prep Vehicle Test.
EXIT	Return to Test Selection menu.

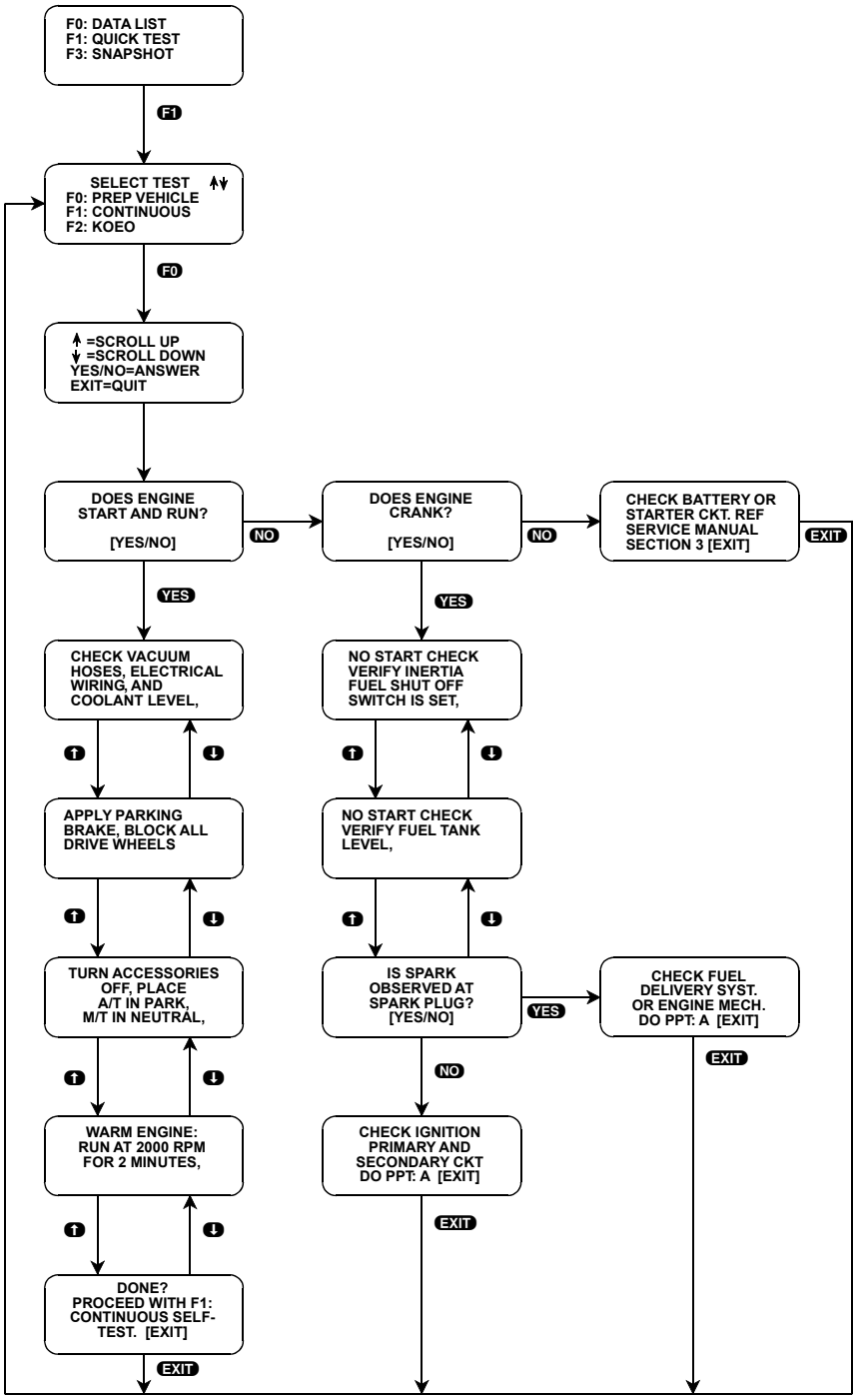


FIGURE 5-21. Prep Vehicle, Gas Engine

SUBMODE F1: CONTINUOUS DTC TEST

Performing the Continuous Memory DTC test causes the PCM to output emission related DTCs [those that cause Malfunction Indicator Lamp (MIL) illumination] or non-emission related DTCs stored in the PCM memory. The Continuous Diagnostic Trouble Code read test is the first EEC-V and powertrain Quick Test to be done after preparing the vehicle for testing.

Continuous DTCs should be read before performing the KOEO and KOER tests, to ensure that Continuous DTCs are not lost while performing diagnosis or service procedures.

The powertrain control system can store Continuous DTCs at any time, which makes it valuable when diagnosing intermittent failures. This is possible because the PCM is always actively performing the Continuous Self-Test. Additionally, during the Continuous Self-Test the PCM is performing all OBD II monitors, which when failed or incomplete due to component, driveability, or emission problems, cause a Diagnostic Trouble Code to be set in the PCM memory.

NOTE

Reading Continuous Memory DTCs is no longer done using the KOEO test (unlike earlier Self-Test systems).

To select Continuous DTC Test, do the following:

1. Press F1 to select the Continuous Memory DTC test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Continuous Memory DTC test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. TURN IGNITION KEY TO RUN and press YES. An information screen is displayed which outlines available key presses when in the Continuous Memory test.

   If there are no DTCs to report, NO DTCs is displayed. Press EXIT or wait 5 seconds to advance to the next display. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

   If there are DTCs to report, the tester displays TEST IN PROCESS and then displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, →, and ← keys, the cursor can be scrolled through the list of reported DTCs.

5. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Continuous DTC list screen. Pressing EXIT again returns you to the Test Selection menu.
6. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
7. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to the communication error message screen definition within this section of the manual).
8. If operating properly, the PCM goes through a series of tests and then begins DTC transmission.

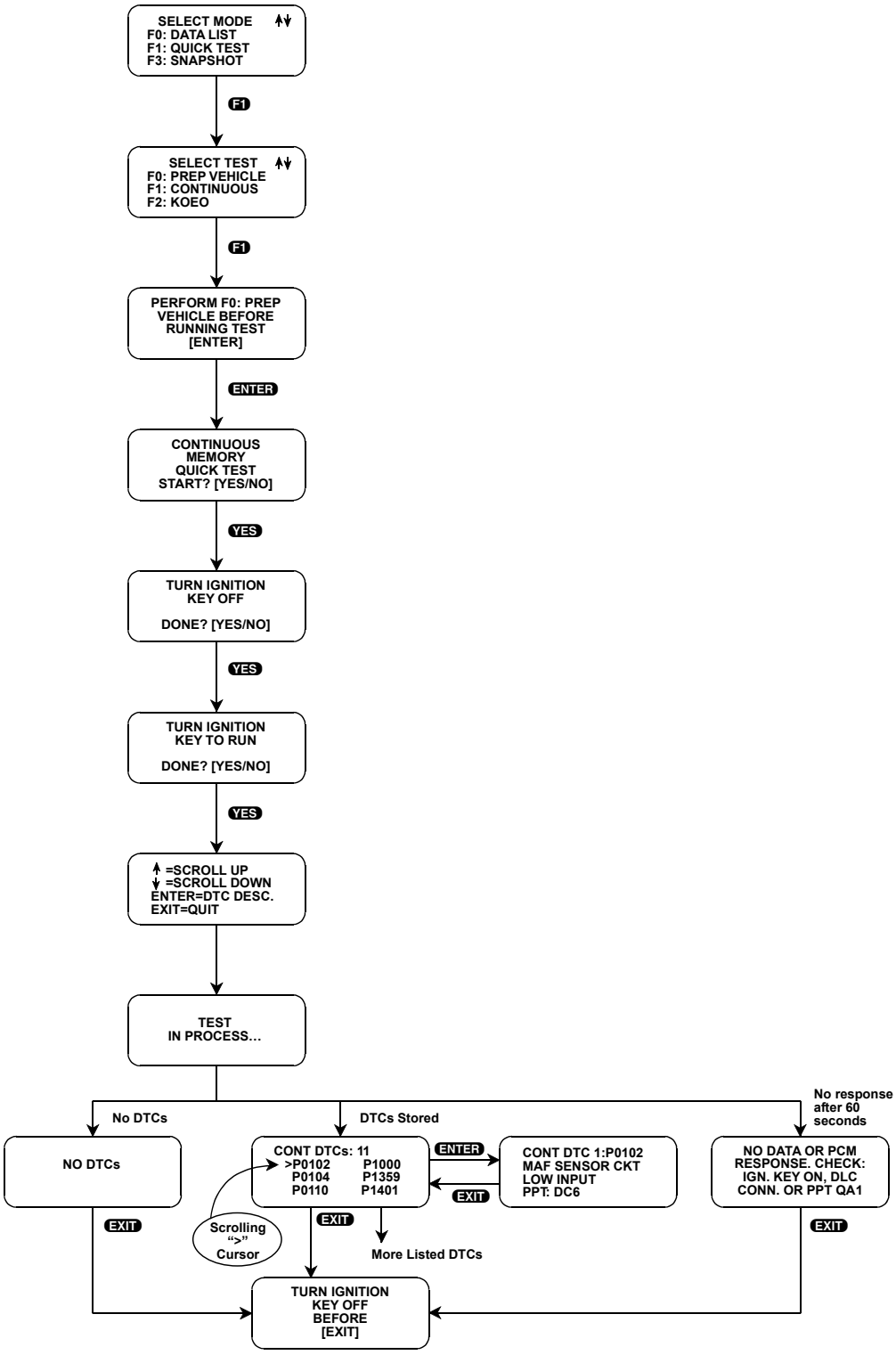


FIGURE 5-22. Continuous DTC Test

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Select test or change to DTC description display.
YES	Confirm that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes DTC information display.
F1	Select Continuous DTC test.

SUBMODE F2: KEY ON, ENGINE OFF TEST

Performing the Key On, Engine Off (KOEO) Diagnostic Trouble Code read test causes the PCM to output key on, engine off on-demand DTCs. For a KOEO DTC to occur, a fault must be present while performing the KOEO DTCs test. KOEO DTCs are not stored in the PCM memory. The Key On, Engine Off Diagnostic Trouble Code read test should be the second EEC-V powertrain Quick Test to be performed, after the Continuous DTC test.

The powertrain control system can output KOEO DTCs when the ignition key is on and the engine is off, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Key On, Engine Off Self-Test.

To select KOEO Test, do the following:

1. Press F2 to select the Key On, Engine Off Test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Key On, Engine Off test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. TURN IGNITION KEY TO RUN and press YES. An information screen is displayed which outlines available key presses when in the Key On, Engine Off test. TEST IN PROCESS appears, then the results of the test are displayed.

   If there are no DTCs to report, NO DTCs is displayed. Press EXIT or wait 5 seconds to advance to the next display. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

   If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, →, and ← keys, the cursor can be scrolled through the list of reported DTCs.
5. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Key On, Engine Off DTC list screen. Pressing EXIT again returns you to the Test Selection menu.

6. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
7. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to the communication error message screen definition within this section of the manual).
8. If operating properly, the PCM goes through a series of tests and then begins DTC transmission.

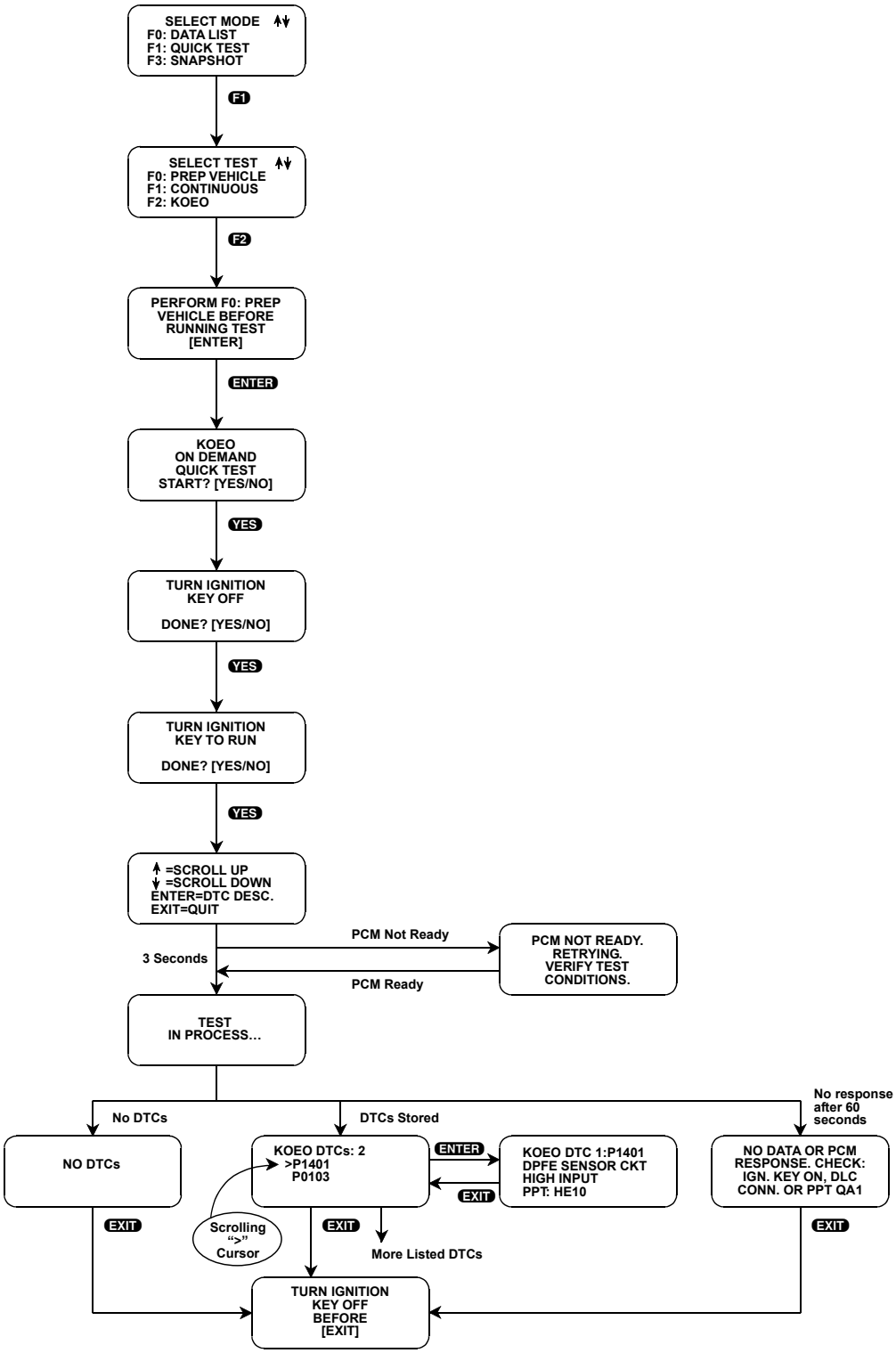


FIGURE 5-23. Key On, Engine Off Test

ACTIVE KEYS	
EXIT	Return to Select Test menu.
ENTER	Advance through test screens or change to DTC description display.
YES	Confirms that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes DTC information display.
F2	Selects Key On, Engine Off test.

SUBMODE F3: CHECK TIMING

Performing the Check Timing Test checks the PCMs ability to control computed timing advance. This test is available on 1996-1998 engines with Distributor Ignition (DI) applications, since EI systems do not have adjustable timing. For gasoline engines, the Check Timing test should be the third EEC-V powertrain Quick Test to be performed, after the Key On, Engine Off test.

WARNING!

Before performing this test, make sure that:

- all electrical loads are off,
- engine is at normal operating temperature,
- drive wheels are blocked,
- gear shift lever is in Park on Automatic Transmission, Neutral for Manual Transmission.

To select Check Timing, do the following:

1. Press F3 to select the Check Timing Test from the Select Test menu. The tester indicates the type of test (DI or EI). If an engine with DI has been selected, you are informed that this test is for engines with DI and OBD II. If an engine with EI has been selected, you are informed that ignition timing is not adjustable. Press ENTER.
2. Press ENTER to advance through each screen. Make sure that you follow the instructions on each display.
3. For DI equipped engines, the tester asks you if the timing changed from initial check. Press YES or NO, depending on your result.
4. If there is a check timing problem, the tester displays which section of the Ford's Powertrain Control and Emission Diagnosis manual to reference. Press EXIT to return to the Quick Test selection menu(s).

ACTIVE KEYS	
EXIT	Return to Select Test menu.
ENTER	Advance through display screens.
YES	Confirm that a test query is true or that a prompt for action has been completed.
NO	Confirm that a test query is false.
F3	Select Timing Check test.

SUBMODE F4: KEY ON, ENGINE RUNNING TEST

Performing the Key On, Engine Running Test (KOER) Diagnostic Trouble Code read test causes the PCM to output key on, engine running on-demand DTCs. For a KOER DTC to occur, a fault must be present while performing the KOER DTCs test. KOER DTCs are not stored in the PCM memory. The Key On, Engine Running Test Diagnostic Trouble Code read test should be the fourth EEC-V powertrain Quick Test to be performed, after the Check Timing Test.

The powertrain control system can output KOER DTCs when the ignition key is on and the engine is running, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Key On, Engine Running Self-Test.

NOTE

Transmission Control Switch may be on the end of the gear shift lever, which may not appear obvious at first glance.

To select KOER Test, do the following:

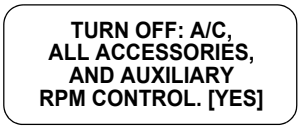
1. Press F4 to select the Key On, Engine Running test from the Select Test menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Key On, Engine Running test. Press YES to perform or NO to exit to the Test Selection Menu.
3. START ENGINE and press YES. An information screen is displayed which outlines available key presses when in the Key On, Engine Running test.
4. Warm the engine to normal operating temperature (use temperature gauge on instrument panel). Press YES when ready.
5. On gasoline engines, actuate Brake, Power Steering, 4x4 Low, and Transmission Control Switch (Overdrive) PCM inputs by depressing and releasing the brake pedal, turning the steering wheel 1/2 circle, toggling the 4x4 low range and transmission control switches. Press YES when done. An information screen is displayed which outlines available key presses when in the Key On, Engine Running test. The message TEST IN PROCESS appears, then the results of the test are displayed.

   On diesel engines, follow the directions contained in the text prompt.

   DPR/REL BRAKE, TURN WHEEL 1/2 CIRCLE, TOGGLE 4X4L, TCS [YES]

   All models with TCS/OCS: These vehicles may have a Transmission Control Switch or Overdrive Cancel Switch. If the vehicle does not have

an TCS or OCS, you should ignore the prompt. If it has one, toggle the switch both directions, press YES and wait for the next prompt, described in Step 6.



All 1995 and newer 7.3L VIN=F Diesel powerstroke engines: Ensure that air conditioning, all accessories, and auxiliary RPM control is turned off.

If there are no DTCs to report, NO DTCs is displayed. Press EXIT or wait 5 seconds to advance to the next display. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, →, and ← keys, the cursor can be scrolled through the list of reported DTCs.

6. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Key On, Engine Running DTC list screen. Pressing EXIT again returns you to the Test Selection menu.
7. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
8. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to the communication error message screen definition within this section of the manual).
9. If operating properly, the PCM goes through a series of tests and then begins DTC transmission.

ACTIVE KEYS	
EXIT	Return to Select Test menu.
ENTER	Select test or change to DTC description display.
YES	Confirms that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes DTC information display.
F4	Selects Key On, Engine Running test.

SUBMODE F5: FREEZE FRAME DATA (FORD-SCP)

The Freeze Frame Data mode displays diagnostic data information about the state of the vehicle EEC-V systems when a Diagnostic Trouble Code (DTC) occurs. Display of Diagnostic Data Information includes the DTC that caused the Freeze Frame and diagnostic data parameters (per SAE J1979). Freeze Frame data is read from the EEC-V Powertrain Control Modules (PCM) using Ford's Standard Corporate Protocol (Ford-SCP) communication link. This mode does not affect vehicle operation, and diagnostic data information can be read from the PCM to allow for quick analysis of critical input and output parameter values.

Freeze Frame Data mode is not supported on 1995-96 7.3L VIN=F powerstroke diesel powertrains. Also,1997 and newer 7.3L VIN=F powerstroke diesel powertrains support a limited freeze frame data list.

NOTE

The diagnostic data parameters that are displayed in Freeze Frame Data mode are defined by SAE J1979. The parameter labels may appear different that those displayed in Data List mode. For definition of the parameters, please refer to Appendix D of this Operator's Manual.

To select Freeze Frame Data, do the following:

1. Press F1 to select Quick Test from the Select Test menu.
2. Press F5 to select Freeze Frame Data.
3. WAITING FOR DATA appears followed by Freeze Frame data information. If an error or reminder message appears, perform the action presented by the display (refer to the error screen definition within this section of the manual).
4. Use the YES and NO keys to scroll through the parameters. The data can be displayed as described in the Mode F0: Data List description of this manual.
5. The diagnostic data parameters can be printed if the tester is connected to a compatible serial printer. Refer to the tester operator's manual if you are using the MTS 3100 or Tech 1A. If you are using a Tech 1, refer to the RS232C I/F Operator's Manual.
6. Press EXIT to return to the Test Mode Menu.

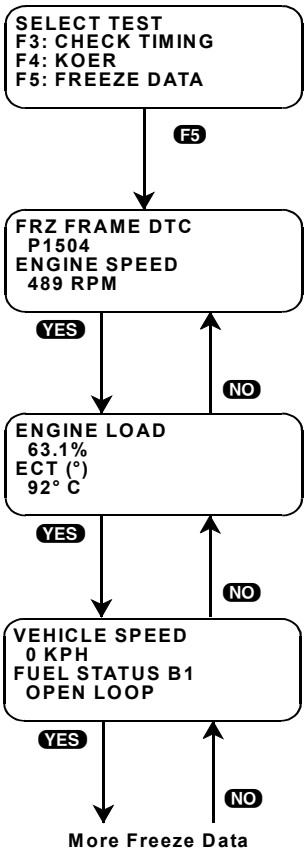


FIGURE 5-24. Freeze Frame Data

ACTIVE KEYS—FREEZE FRAME DATA MODE	
YES , NO	Scroll through displayed data parameters.
F0	Mark top displayed parameter as fixed for creating your own data pairs.
F1	Mark bottom displayed parameter as fixed for creating your own data pairs.
F5	Select Freeze Frame Data.
EXIT	Return to the Test Mode menu.

SUBMODE F7: CLEAR CONTINUOUS DTCS

Performing the Continuous Memory DTC clear test causes the PCM to clear emission related DTCs [those that cause Malfunction Indicator Lamp (MIL) illumination] and non-emission related DTCs stored in the PCM memory.

When Continuous DTCs are cleared from the PCMs memory, all OBD II Monitor and Freeze Frame information gets erased and DTC P1000 is set in PCM memory.

To select Clear Continuous DTCs, do the following:

1. Press F7 to enter Clear Continuous DTCs test from the Select Test menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Clear Continuous DTC Test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. TURN IGNITION KEY TO RUN and press YES.

   If there are no DTCs to report, NO DTCs is displayed. Pressing EXIT or waiting 5 seconds returns you to the Select Test menu. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

   If the stored DTCs are cleared from the PCM, DTCs CLEARED is displayed. If the stored DTCs are not cleared, DTCs NOT CLEARED is displayed. Pressing EXIT or waiting 5 seconds returns you to the Select Test menu.
5. Press EXIT to quit the test, or an automatic exit occurs after 5 seconds.

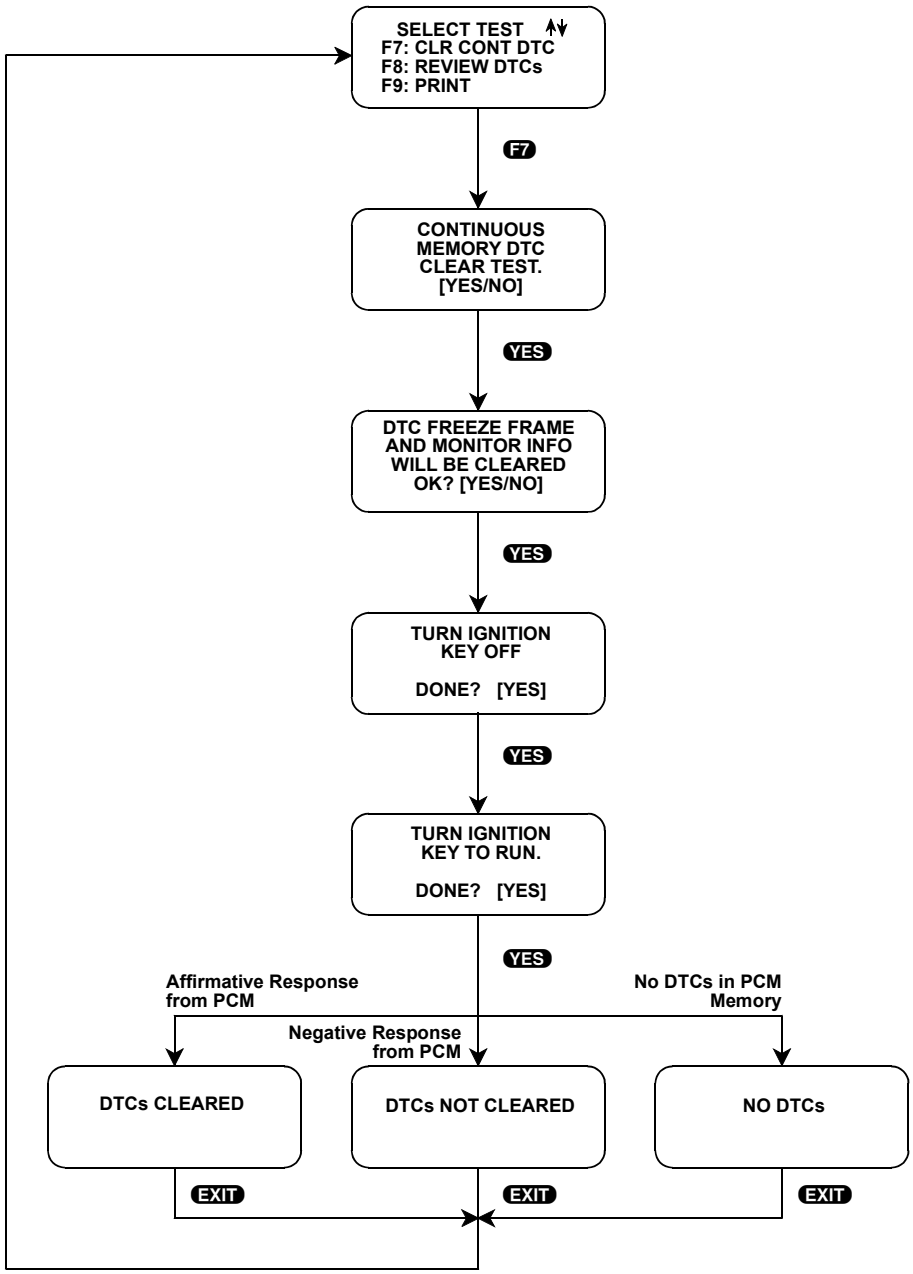


FIGURE 5-25. Clear Continuous DTCs

ACTIVE KEYS	
F7	Selects Clear Continuous Codes from the Select Test menu.
EXIT	Return to Select Test menu.
YES	Acknowledges that requested test sequence is done.

SUBMODE F8: REVIEW SERVICE CODES, DECODE TO PINPOINT TESTS

The Review DTCs mode provides a method to easily review diagnostic trouble code number, description, and applicable Pinpoint Test decoding, after performing the Continuous, KOEO, or KOER diagnostic trouble code read tests.

NOTES

- All tests are year and vehicle dependent; that is, Pinpoint Test designations vary from year to year. Therefore, you must accurately complete the vehicle and engine selection process to be referred to the correct Pinpoint Test. Please reference the appropriate year Ford or Mitchell Shop Manual for Pinpoint Test description and operating procedure.
- Connection to the vehicle is not required to use this mode.

To select Review DTCs, do the following:

1. Press F8 to enter Review DTCs mode from the Select Test menu. The REVIEW and DECODE display appears. If there are no diagnostic trouble codes stored in the tester, the tester displays NO QCK TST CODES. This is a result of not performing the Continuous, KOEO, or KOER DTC read Quick Tests.
2. Press F1 to review diagnostic trouble codes received in the Continuous, KOEO, KOER, or Diesel On-Demand Quick Tests from the Review and Decode Selection menu. The order of DTC display is KOER, KOEO, Continuous, or On-Demand tests (if the tester has read DTCs from each test as a result of performing the KOER, KOEO, Continuous, or On-Demand tests).

NOTE

On-Demand DTCs stored in the tester are the result of performing the 7.3L Diesel engine's Output State, Glow Plug, Injector Buzz, Cylinder Balance, or Switch Test, with DTCs read from the PCM. The tester always displays DTC results from the most recent On-Demand test performed, and if no DTCs are received after performing an On-Demand test, the tester does not display On-Demand DTCs in Review Codes mode.

3. The Review DTCs mode keypress functions screen is displayed. This screen describes available keypress functions when in Review DTCs mode. After viewing, use the ↑ and ↓ keys to scroll through the DTC list (if multiple codes of one type have been received), and use the F0 key to change the DTC type (Continuous, KOEO, or KOER).

   If there are only DTCs of one type available for review, pressing F0 does not change the code type. An F0 keypress only changes DTC type if other types of DTCs are available to review. This operation ensures that you are decoding the proper DTC type for the current vehicle that you are working on.
4. DTCs received as a result of performing the Continuous, KOEO, or KOER DTC read Quick Tests are displayed. Use the ↑, ↓, →, and ← keys to scroll the cursor through the list of reported DTCs.
5. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the DTC list screen. Pressing EXIT again returns you to the Review and Decode Selection menu.

NOTE

Always read the beginning pages of each Pinpoint Test (e.g., read text for DC1, even if you are doing a DC9 Pinpoint Test). The first page may contain specific diagnostic information about which components in the system are diagnosed when following the Pinpoint Test procedures. Plus, it may describe which other components, if not operating properly, can result in the same diagnostic trouble code.

6. Press EXIT to return to the Select Test Menu.
7. If a DTC is not applicable for a vehicle under test, the message IS NOT A KNOWN DTC FOR THIS VEHICLE is displayed.

NOTE

If a different vehicle is selected or the same vehicle is selected without using LAST VEH.=YES, all Review DTCs information is erased. Make sure to press YES from the select model year screen to select the last vehicle tested when reviewing DTCs from previous tests.

TEST RESULT	ACTION OR REFERENCE
IS NOT A KNOWN DTC FOR THIS VEHICLE	Diagnostic trouble code not applicable for the vehicle under test.
IGNORE P1000 IN KOEO & KOER SELF TEST & CONTINUE	Ignore if DTC P1000 is received when performing KOEO and KOER tests.
GO TO SERVICE MANUAL SECTION MOD COMM NETWORK	For diagnostic information, refer to the Module Communication Network section of the Service Manual for the vehicle under test. Applicable to U1xxx DTCs.
GO TO TRANS SERV MANUAL, DIAGN. BY SYMPTOM CHART	For diagnostic information, refer to the Diagnosis By Symptom chart in the Transmission Service Manual for the vehicle under test. Applicable to P17xx DTCs.

ACTIVE KEYS	
F8	Selects Review DTCs from the Select Test menu.
F1	Selects Review and Decode Quick Test DTCs from the Review and Decode menu.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes DTC information display.
ENTER	Select test or change to DTC description display.
EXIT	Return to Select Test menu.

SUBMODE F9: PRINT SUMMARY

Print Summary is a tester feature, not a Ford Quick Test. While you are in Quick Test mode, a record is kept of all tests performed and the results of Diagnostic Trouble Codes received in each test. When a summary is printed, you get a chronological record of all tests that were performed and a selected vehicle header message.

If you are using a Tech 1 tester, the optional RS232C Interface Cartridge and a Tech 1 printer (or equivalent serial printer) are required for printing. Refer to the RS232C I/F Cartridge Operator's Manual for printer setup instructions.

When using a Tech 1A or MTS 3100 tester, refer to the tester and printer operator's manuals for printer setup.

NOTE

Selecting a new vehicle erases the contents of the print summary record for the previously selected vehicle.

NOTE

Tech 1 Users Only

Be sure the Tech 1 power is off before installing the RS232 Cartridge. The RS232 Cartridge can remain in the Tech 1 during normal operation. In this case, you may always plug into the TECH1 Printer with the power on. Installation of a cartridge while power is applied often causes abnormal operation of the TECH1.

To select Print Summary, do the following:

From the Power-up screen:

1. Press ENTER to get to the Model Year selection screen.
2. Press YES for Last Vehicle Continuation.
3. Press YES if the vehicle selection displayed is correct.
4. Select the system you are testing (F0: ENGINE or F1: CRUISE CONTROL)
5. Press F1 to select F1: QUICK TESTS.
6. From the Select Test menu, press F9 to select PRINT SUMMARY.
7. The tester should display NOW PRINTING while a summary of the tests that have been done on the vehicle is printed. PRINTER IS NOT READY is displayed if the printer is OFF LINE, if the power is turned off, or if the RS232 Cable is not connected. Just turn the printer on or put it ON LINE.
8. When the Print Summary is complete, the tester returns to the Select Test menu.

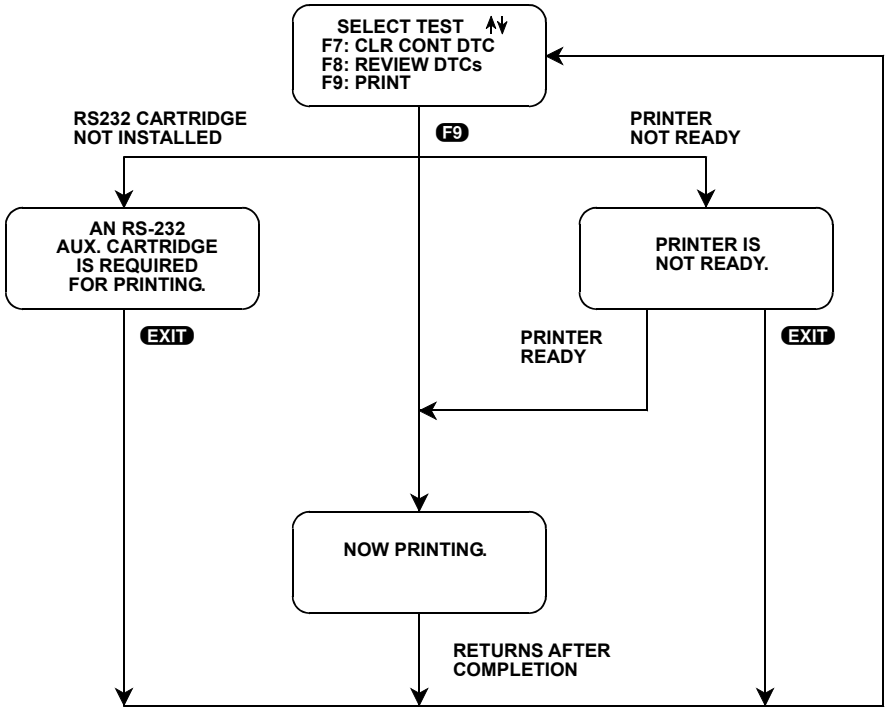


FIGURE 5-26. Print Summary

ACTIVE KEYS—PRINT SUMMARY MODE	
F9	Select Print Summary from the Select Test menu.
EXIT	Returns to the Select Test menu.

MODE F3: SNAPSHOT

The Snapshot test mode can be used to capture and store in the tester diagnostic data parameters that are read from the Powertrain Control Module (PCM). If you are trying to capture an intermittent problem on the EEC-V systems, using the Snapshot mode while in the service bay or on a road test helps to isolate the problem. The Snapshot can be replayed for review at a later time or a hardcopy of the data can be printed.

The Snapshot mode monitors diagnostic data parameters available from the vehicle Powertrain Control Module (PCM) on Ford's Standard Corporate Protocol (Ford-SCP) communication link. This mode does not affect vehicle operation, and diagnostic data parameters can be read from the PCM to allow for quick analysis of critical input and output parameter values. The diagnostic data parameter current value is displayed along with parameter units, the sample frame number, and a time stamp.

The 1981-2004 Ford Powertrain Application allows you to specify a trigger condition: on Any DTC, on a Single DTC, or with a Manual Trigger. Triggering on Any DTC allows you to trigger on an event when any DTC in the PCM has been set. Single DTC allows you to select a specific DTC for the Snapshot to occur on. Manual Trigger allows you the command to trigger with a single key press. Also, the 1981-2004 Ford Powertrain Application has the capability to start a Snapshot sequence at the beginning, center, or end of data capture. If you set up the trigger point to match the type of driveability fault that you are observing, this function can be a great diagnostic time saver.

After the data has been captured, you can view all of the stored data. Data parameters are displayed in a manner identical to that of the Data List mode. You can also specify the data sample you wish to display.

In addition, the 1981-2004 Ford Powertrain Application can print the captured data providing a hard copy of any selected data sample. Refer to the printer operator's manual and the tester operator's manual for printing instructions.

NOTE

Some Ford PCMs indicate support of a diagnostic data parameter (or PID, in Ford terms) to the tester, but the data displayed is not correct. Examples of incorrect data are: voltages reading 0.00v; Transmission Range Sensor, Commanded Gear, Park/Neutral, and other A/T parameters displayed when the tester is connected to a vehicle equipped with a manual transmission. Remember to check the vehicle's engine and transmission configuration for components that are in the data list but not actually on the vehicle under test.

On the 1995 and newer 7.3L VIN=F diesel engines, the PCM may not respond to data parameter requests. When this happens, the *No data or PCM* response is displayed. Exit the mode that is currently selected and again select the mode. This method then allows communications to the PCM for data display.

SELECTING SNAPSHOT MODE

The operation of the SNAPSHOT mode is divided into two phases: Setup and Data Replay. The Setup Phase is illustrated in Figure 5-27.

If a different vehicle is selected or the same vehicle is selected without using YES: LAST VEH., all Snapshot and parameters selected in Custom List are erased. Be sure to press YES from the select model year screen to select the last vehicle tested when replaying a stored Snapshot or to keep the current Custom List parameter setup.

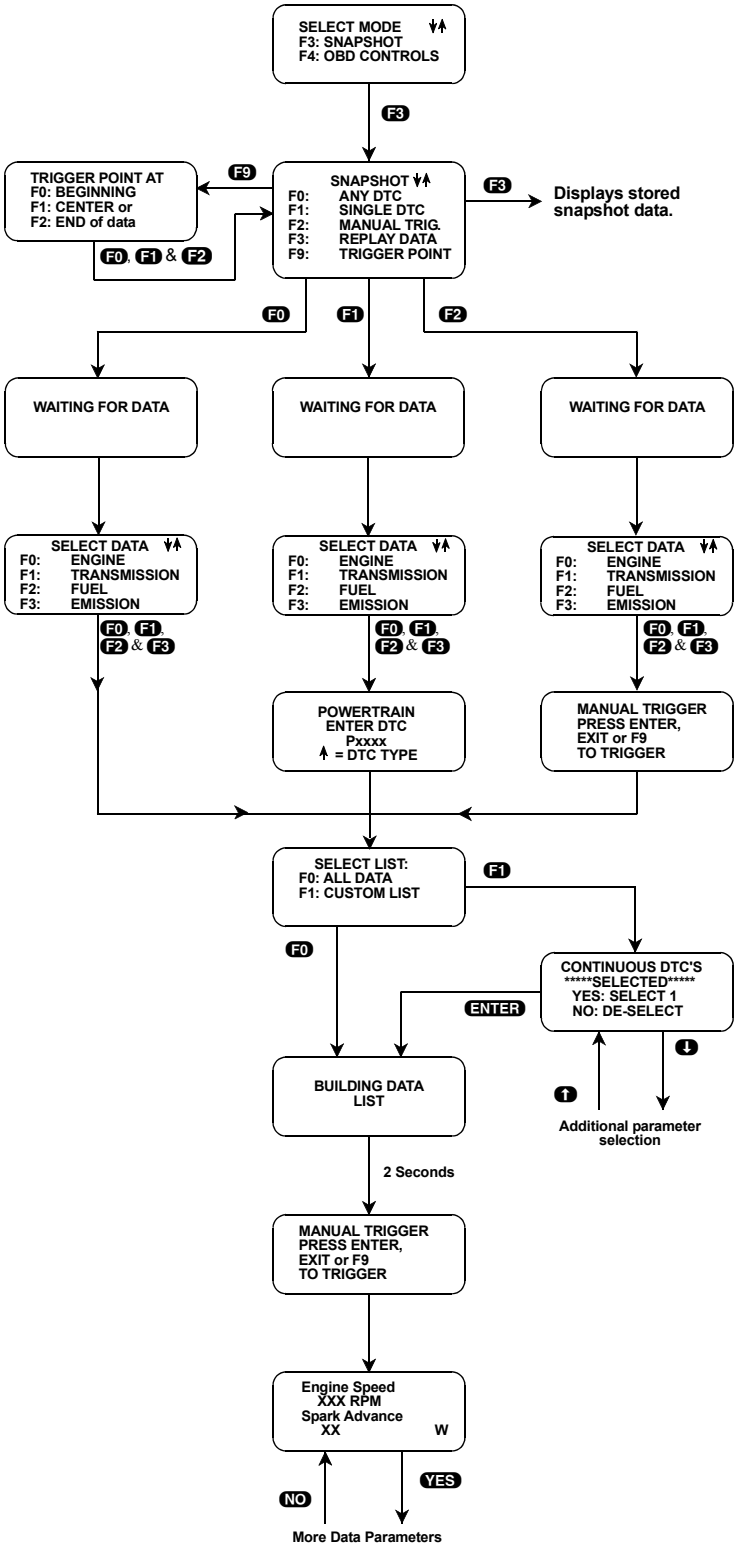


FIGURE 5-27. Snapshot

To select Snapshot Setup Phase, do the following:

1. Press F3 to select SNAPSHOT from the Select Test menu.
2. Press F9 to select Trigger Point, then select the desired point: beginning, center, or end of data. When the trigger point is selected, the tester automatically returns to the Select Test menu.
3. Select one of the trigger options by pressing the Function Key displayed to the left of the desired trigger conditions.

   Press F0 to select **ANY DTC**. The tester continues to store data until any trouble code is detected in the PCM, or until you press the F9, ENTER, or EXIT key.

   Press F1 to select **SINGLE DTC**. When the tester screen displays ENTER DTC: Pxxx, use the numeric key **0-9** to enter the DTC number that you have selected, then press ENTER. Press the up arrow key to change the type of DTC, etc. U, B, P or C (see *EEC-V DTCs on page 215*). The tester continues to store data until the specified trouble code is detected in the PCM or until you press the F9, ENTER, or EXIT key.

   Press F2 to select a **MANUAL TRIGGER**. The tester continues to store data until you press the F9, ENTER, or EXIT key.
4. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.

   While in the Data List mode, press F7 to go to the next Data List.
5. Select F0 ALL DATA or F1 CUSTOM LIST from the SELECT LIST menu. If F1: CUSTOM LIST is selected, choose the parameters for display, then press ENTER. The message BUILDING DATA LIST is displayed. The tester displays either All Data parameters or Custom List parameters depending on which selection was made.

   F0: ALL DATA The selection of F0: ALL DATA displays all of the diagnostic data parameters available from the PCM. Depending on the number of diagnostic data parameters in the data list, the update rate can be 3 seconds or longer.

   F1: CUSTOM LIST The selection of F1: CUSTOM LIST displays a list of parameters from which to select. F1: CUSTOM LIST parameters allows you to select any combination of diagnostic data parameters to monitor (from one parameter to all parameters). A single parameter can be sampled at a high rate, and selecting more parameters reduces the update rate. Parameters are selected by scrolling through the list using the ↑ and ↓ keys and then pressing YES and NO to select and deselect the listed parameter. When the parameters have been selected, press ENTER to go to the display mode. The tester remembers the selected parameters (until another vehicle is selected or the tester is powered down) so you won't have to re-select them every time.

   All data captured during Snapshot is retained in the tester memory until another vehicle is selected, or it is overwritten by a new Snapshot, or if the tester power is disconnected for more than 24 hours. Press F3 to Replay Data from a previously captured Snapshot.
6. While the tester is waiting for a trigger, Powertrain diagnostic data is continuously being stored in its memory. The data is organized as a number of data samples.

   The value or state of each parameter is saved for each sample. Once the maximum number of samples has been recorded, the oldest data is discarded. The data display indicates the waiting for trigger condition with a flashing W in the lower right-hand corner of the display. While waiting for the selected trigger, the EXIT, ENTER, or F9 keys must be pressed to begin manual trigger data capture.
7. Once the trigger occurs, the tester beeps and then continues to save data samples until its memory is full. The data display indicates that the trigger has occurred by replacing the flashing W with a fixed T. As soon as the memory is full, the data capture terminates automatically and the tester advances to the Data Display phase.

8. Pressing EXIT after the trigger has occurred terminates the Data Capture phase early and advances to the Data Display phase.

ACTIVE KEYS—SNAPSHOT SETUP PHASE	
F0	Set trigger point at beginning, or select all parameters to display.
F1	Set trigger point at center, or select custom list parameters to display.
F2	Set trigger point at end.
F3	Select Snapshot mode.
F9	Select trigger point and start manual trigger.
YES , NO	Scroll through displayed data parameters, or for custom list setup, select or deselect parameters.
ENTER	Start manual trigger or Custom List data.
EXIT	Start manual trigger. Go to data display phase of Snapshot mode. Return to test mode menu.
↑ , ↓	Scroll through parameters in Custom List.

To select Data Replay Phase, do the following:

9. The Data Replay phase is indicated with a number (initially zero) in the lower right hand corner of the display. Select the data parameter to be displayed using YES and NO.
10. Use the ↑ and ↓ keys to select the desired sample. An index is displayed in the lower right-hand corner of the tester display. Sample 0 corresponds to the trigger sample; sample -1 is the sample immediately proceeding the trigger; sample +1 is immediately after the trigger; and so on. The index range may be less than the maximum number of samples if enough time was not allowed for data capture before or after the trigger.

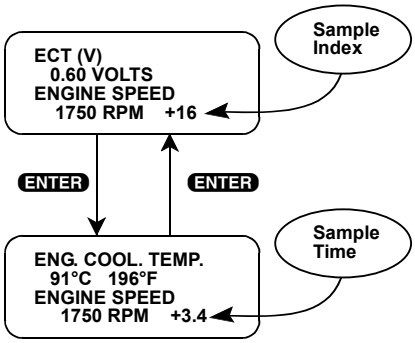
    The following keys can be used to move about more quickly in the data samples:

    F4 Display first (earliest) sample

    F5 Display Trigger sample

    F6 Display last (most recent) sample

11. Pressing ENTER toggles between the sample index and sample time displays.



The sample time display gives the time in seconds (relative to the trigger sample) at which the tester received the currently displayed sample. For example, a sample time of +3.4 means the sample was received 3.4 seconds after the trigger sample. A sample time of -0.6 seconds means the sample was received 0.6 seconds before the trigger.

12. The data parameters can be printed if the tester is connected to a compatible printer.

    For instructions on connecting the printer to the tester and printing the data parameters, refer to the tester operator's manual if you are using a Tech 1A or MTS 3100. If you are using a Tech 1, refer to the RS232C I/F Operator's Manual.

13. When you are finished viewing the sampled data, press EXIT to return to the Select List menu. If you are finished with the SNAPSHOT mode, press EXIT twice to return to the test mode menu.

ACTIVE KEYS—SNAPSHOT DATA REPLAY PHASE	
YES , NO	Scroll through displayed data parameters.
↑ , ↓	Scroll through selected samples.
F0 , F1	Fix top or bottom display parameter respectively.
F4	Advance to first (earliest) sample.
F5	Advance to trigger sample (sample 0).
F6	Advance to last (most recent) sample.
ENTER	Toggle between sample index and sample time display.
EXIT	Return to the Select List menu.

MODE F4: OBD CONTROLS (GASOLINE)

SUBMODE F0: OUTPUT TESTS

Submode F0: All Outputs On

This test is available on all 1994 and newer vehicles with gasoline engines and the EEC-V powertrain systems.

Once the output test begins, the test commands selected output actuators, except for cooling fans and fuel injectors, to run in the key on, engine off state. If an output actuator is normally in the OFF state, running this test changes the output actuator to the ON state. This mode is described in Ford service information as Output Test Mode.

NOTE

Use this mode to check output actuator and fuel system circuit condition.

CAUTION!	Remember to check for and make sure that the fuel system is intact and its fuel lines or fittings are not open or loose. Keep all areas of the vehicle and shop work space free of combustible materials and sparks before the test is performed.

To select All Outputs On, do the following:

1. Press F4 to enter OBD Controls mode from the Select Test menu.
2. Press F0 to select All Outputs On.
3. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
4. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up data list, see *Mode F0: Data List on page 134*).
5. Once the tester displays the data list you are ready to begin the output test. The output control can be in one of two controlled states:
   a. Test enters with output off. Press the ↑ key to override EEC-V PCM controls and turn the test on.
   b. Press the ↓ key to return the output test to normal EEC-V PCM controls and turn the test off.
6. If you leave the output test on indefinitely, the relay is automatically turned off by the tester after 3 minutes (prevent low battery condition). Additionally, the output test is turned off by the PCM after 10 minutes (if the tester becomes disconnected from the DLC), after the engine is started, or after the ignition key is cycled.
7. The data list parameters are displayed while the output control test is selected. A three character message is displayed at the end of line 2 of the display (AON). These characters serve as a reminder as to which output control is being performed. The last two characters of line 4 of the display read ON if the EEC-V PCMs normal state is being overridden by the tester.
8. Press YES or NO to scroll through parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
9. Press EXIT to quit the Output Test and return control of the selected output to the EEC-V or PCMs.

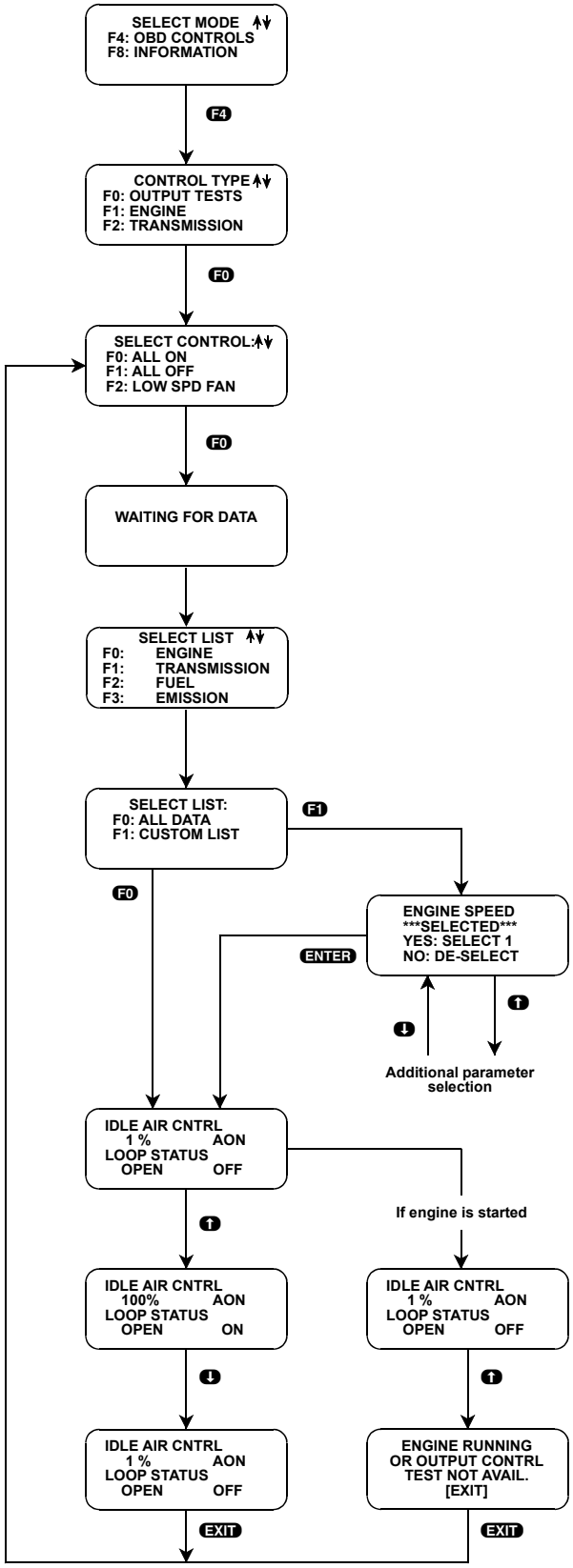


FIGURE 5-28. All Outputs On

ACTIVE KEYS	
F0	Select All Outputs On output control test.
↑	Turn test ON.
↓	Turn test OFF.
YES , NO	Scroll through displayed diagnostic data parameters.
F0 , F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from output control test.

Submode F1: All Outputs Off

This test is available on all 1994 and newer vehicles with gasoline engines and the EEC-V powertrain systems.

Once the output test begins, the test commands selected output actuators to run in the key on, engine off state. If an output actuator is normally in the ON state, running this test changes the output actuator to the OFF state. This mode is described in Ford service information as Output Test Mode.

NOTE

Use this mode to check output actuator circuit condition.

To select All Outputs Off, do the following:

1. Press F4 to enter OBD Controls mode from the Select Test Menu.
2. Press F1 to select All Outputs Off.
3. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
4. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up data list, see *Mode F0: Data List on page 134*).
5. Once the tester displays data list you are ready to begin the output test. The output control can be in one of two controlled states:
   a. Test enters with output off. Press the ↑ key to override EEC-V PCM control and turn the test on.
   b. Press the ↓ key to return the output test to normal EEC-V PCMs control and turn the test off.
6. If you leave the output test on indefinitely, the relay is automatically turned off by the tester after 3 minutes (prevent low battery condition). Additionally, the output test is turned off by the PCM after 10 minutes (if the tester becomes disconnected from the DLC), after the engine is started, or after the ignition key is cycled.
7. The data list parameters are displayed while the output control test is selected. A three character message is displayed at the end of line 2 of the display (AOF). These characters serve as a reminder as to which output control is being performed. The last three characters of line 4 of the display read ON if the EEC-V PCMs normal state is being overridden by the tester.

8. Press **YES** or **NO** to scroll through parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
9. Press **EXIT** to quit the Output Test and return control of the selected output to the EEC-V or PCMs.

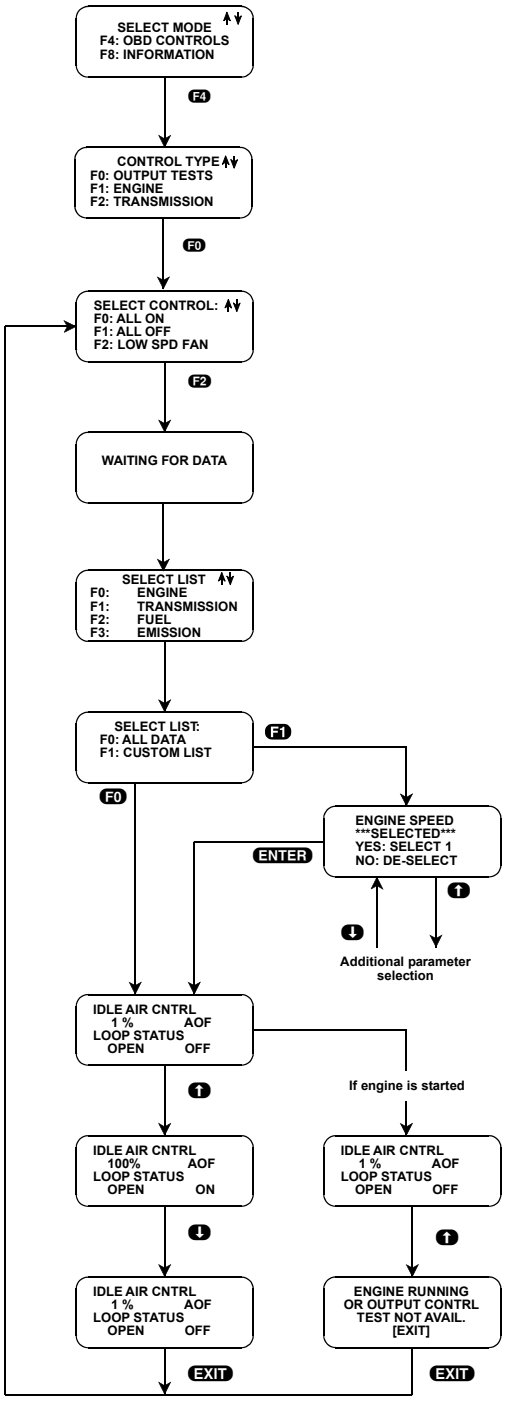


FIGURE 5-29. All Outputs Off

ACTIVE KEYS	
F1	Select All Outputs Off output control test.
↑	Turn test ON.
↓	Turn test OFF.
YES , NO	Scroll through displayed diagnostic data parameters.
F0 , F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from output control test.

Submode F2: Low Speed Fan

This test is available on all 1994 and newer vehicles with gasoline engines and a low speed cooling fan and the EEC-V powertrain systems.

Once the output test begins, test commands the cooling fan relay to run in the key on, engine off state. This mode is described in Ford service information as Output Test Mode.

NOTE

Use this mode to check low speed fan circuit condition.

CAUTION!

Cooling Fan Rotation

Remember to check for and keep all body parts, wire harness, test leads, and shop lamps out of the fan blades before the test is performed.

To select Low Speed Fan, do the following:

1. Press F4 to enter OBD Controls mode from the Select Test menu.
2. Press F2 to select Low Speed Fan.
3. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
4. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up data list, see *Mode F0: Data List on page 134*).
5. Once the tester displays the Data List you are ready to begin the output test. The output control can be in one of two controlled states:
   a. Test enters with output off. Press the ↑ key to override EEC-V PCM control and turn the fan relay on.
   b. Press the ↓ key to return the output test to normal EEC-V PCM controls and turns the fan relay off.
6. If you leave the output test on indefinitely, the relay is automatically turned off by the tester after 3 minutes (prevent low battery condition). Additionally, the output test is turned off by the PCM after 10 minutes (if the tester becomes disconnected from the DLC), after the engine is started, or after the ignition key is cycled.

7. The data list parameters are displayed while the output control test is selected. A three character message is displayed at the end of line 2 of the display (LSF). These characters serve as a reminder as to which output control is being performed. The last three characters of line 4 of the display read ON if the EEC-V PCMs normal state is being overridden by the tester.
8. Press YES or NO to scroll through parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
9. Press EXIT to quit the Output Test and return control of the selected output to the EEC-V PCMs.

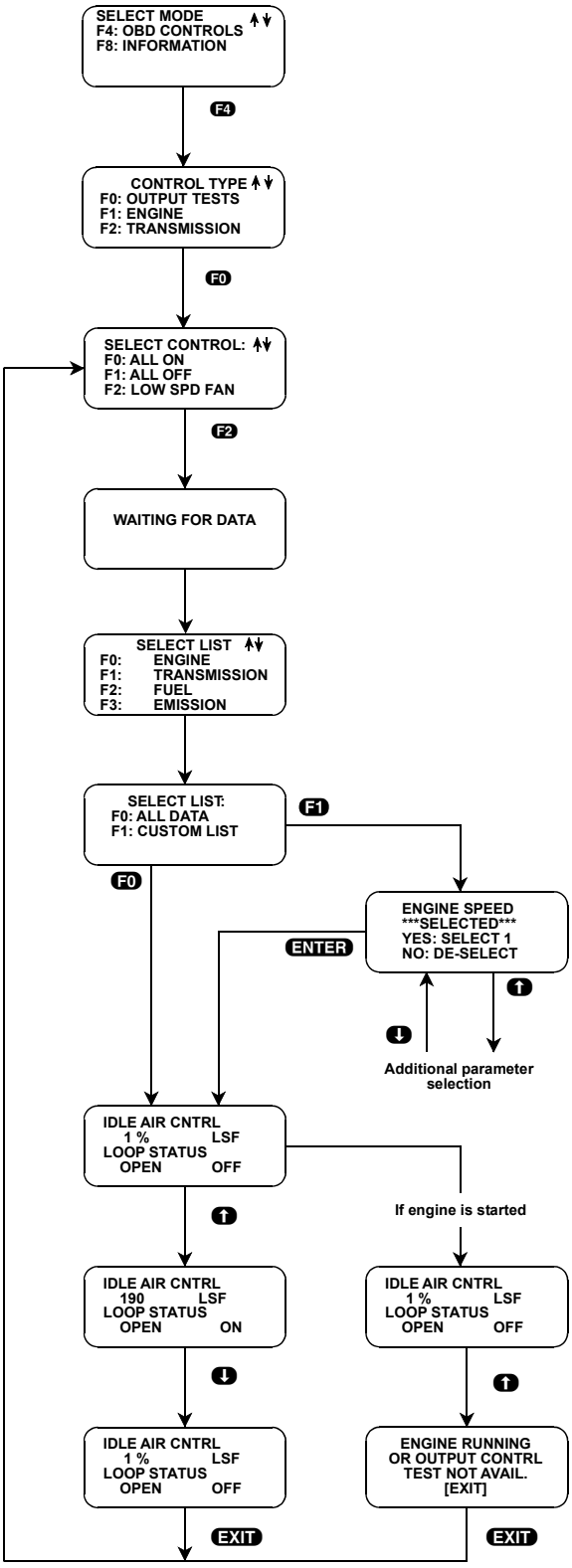


FIGURE 5-30. Low Speed Fan

ACTIVE KEYS	
F2	Select Low Speed Fan Output Control test.
↑	Turn test ON.
↓	Turn test OFF.
YES , NO	Scroll through displayed diagnostic data parameters.
F0 , F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from Output Control test.

Submode F3: High Speed Fan

This test is available on all 1994 and newer vehicles with gasoline engines and a high speed cooling fan and the EEC-V powertrain systems.

Once the output test begins, test commands the cooling fan relay to run in the key on, engine off state. This mode is described in Ford service information as Output Test Mode.

NOTE

Use this mode to check high speed fan circuit condition.

CAUTION!

Cooling Fan Rotation

Remember to check for and keep all body parts, wire harness, test leads, and shop lamps out of the fan blades before the test is performed.

To select High Speed Fan, do the following:

1. Press F4 to enter the OBD Controls mode from the Select Test menu.
2. Press F3 to select High Speed Fan.
3. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
4. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up data list, see *Mode F0: Data List on page 134*).
5. Once the tester displays the Data List you are ready to begin the output test. The output control can be in one of two controlled states:
   a. Test enters with output off. Press the ↑ key to override EEC-V PCM control and turn the test on.
   b. Press the ↓ key to return the output test to normal EEC-V PCMs control and turns the test off.
6. If you leave the output test on indefinitely, the relay is automatically turned off by the tester after 3 minutes (prevent low battery condition). Additionally, the output test is turned off by the PCM after 10 minutes (if the tester becomes disconnected from the DLC), after the engine is started, or after the ignition key is cycled.

7. The data list parameters are displayed while the output control test is selected. A three character message is displayed at the end of line 2 of the display (HSF). These characters serve as a reminder as to which output control is being performed. The last three characters of line 4 of the display read ON if the PCM normal state is being overridden by the tester.
8. Press YES or NO to scroll through parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
9. Press EXIT to quit the Output Test and return control of the selected output to the PCM.

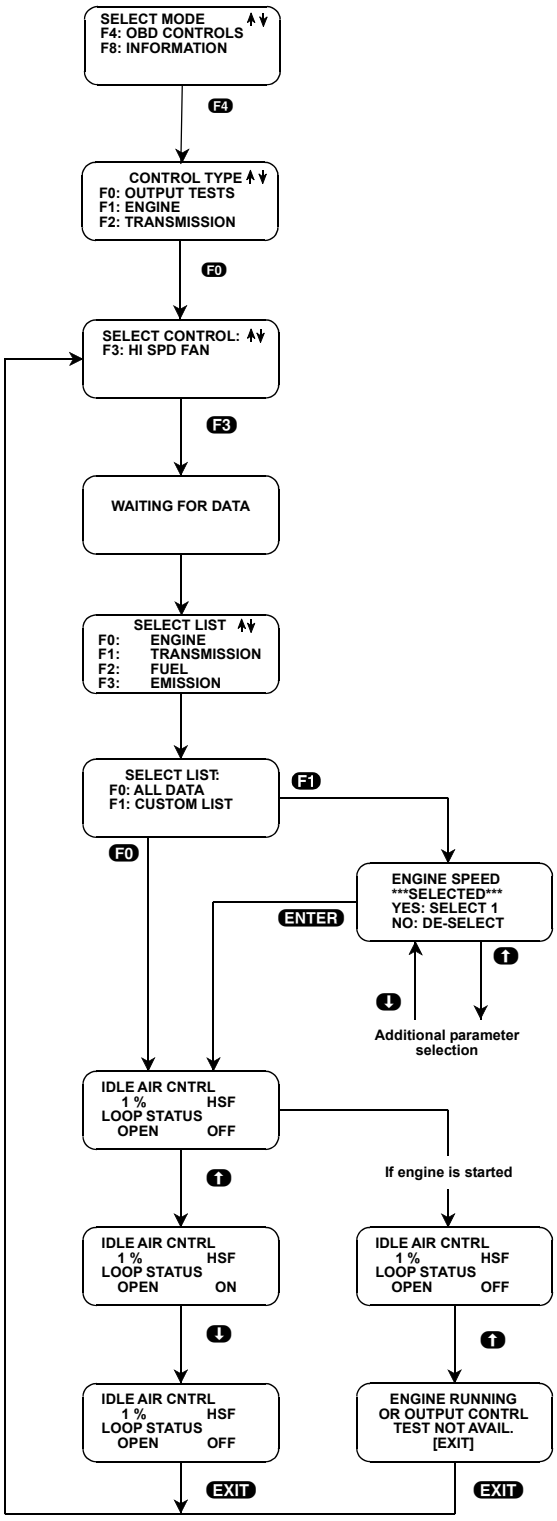


FIGURE 5-31. High Speed Fan

ACTIVE KEYS	
F3	Select High Speed Fan output control test.
↑	Turn test ON.
↓	Turn test OFF.
YES , NO	Scroll through displayed diagnostic data parameters.
F0 , F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from Output Control test.

SUBMODE F1: ENGINE

Engine tests are available on many 1996 and newer gasoline engine vehicles with EEC-V powertrain control systems.

CAUTION!

These tests should only be performed with the Key ON Engine OFF (KOEO) or Key On Engine Running (KOER) with the vehicle in park.

To select Engine Tests, do the following:

1. Press F4 to enter OBD Controls mode from the Select Test menu.
2. Press F1 to select ENGINE.
3. Select the Engine component that you wish to test from the Engine Controls list.

ENGINE CONTROLS		
KEY	**DESCRIPTION**	**RANGE**
F0: Idle Speed %	Adjusts the duty cycle of the ISC motor	0-100%
F1: EGR%	Adjusts the duty cycle of the EGR Vacuum Regulator	0-100%
F2: Evap Purge %	Adjusts the duty cycle of the Evap Purge valve	0-100%
F3: O2 B1 S1 Htr	Toggles the Upstream bank 1 O2 sensor heater	ON/OFF
F4: O2 B1 S2 Htr	Toggles the Downstream Bank 1 O2 sensor heater	ON/OFF
F5: O2 B2 S1 Htr	Toggles the Upstream Bank 2 O2 sensor heater	ON/OFF
F6: O2 B2 S2 Htr	Toggles the Downstream Bank 2 O2 sensor heater	ON/OFF

TABLE 5-1. Engine Controls

NOTE

Component coverage is vehicle dependent. If a component is not supported the tester will display an error message.

4. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
5. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up data list, see *Mode F0: Data List on page 134*.
6. You are prompted with a message that identifies the vehicle conditions that must be met for the Engine control to be performed safely and accurately.
7. Select YES at the conditions screen to begin the Engine control test.
8. Once the tester displays the data list you are ready to begin controlling the Engine component. Depending on the component that is selected, it can either be turned on or off, or the component can be adjusted through its range. (See *Table 5-1, Engine Controls,* for a list of Engine components and their available adjustment ranges).
    a. Press the ↑ key to turn the component ON, or to adjust it up through its range.
    b. Press the ↓ key to turn the component OFF, or to adjust it down through its range.
9. The data list parameters are displayed while the Engine control is selected. A three character description of the selected component is displayed at the end of line 2 of the display. These characters serve as a reminder as to which control is being performed. The last two characters of line 4 of the display indicate the commanded value of the component.
10. Press YES or NO to scroll through the displayed parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
11. Press EXIT to quit the Engine Control and return control of the selected component to the PCM.

ACTIVE KEYS	
↑	Turn the component ON, or to adjust it up through its range
↓	Turn the component OFF, or to adjust it down through its range.
YES/NO	Scroll through displayed diagnostic data parameters.
F0, F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from test and return control to PCM.

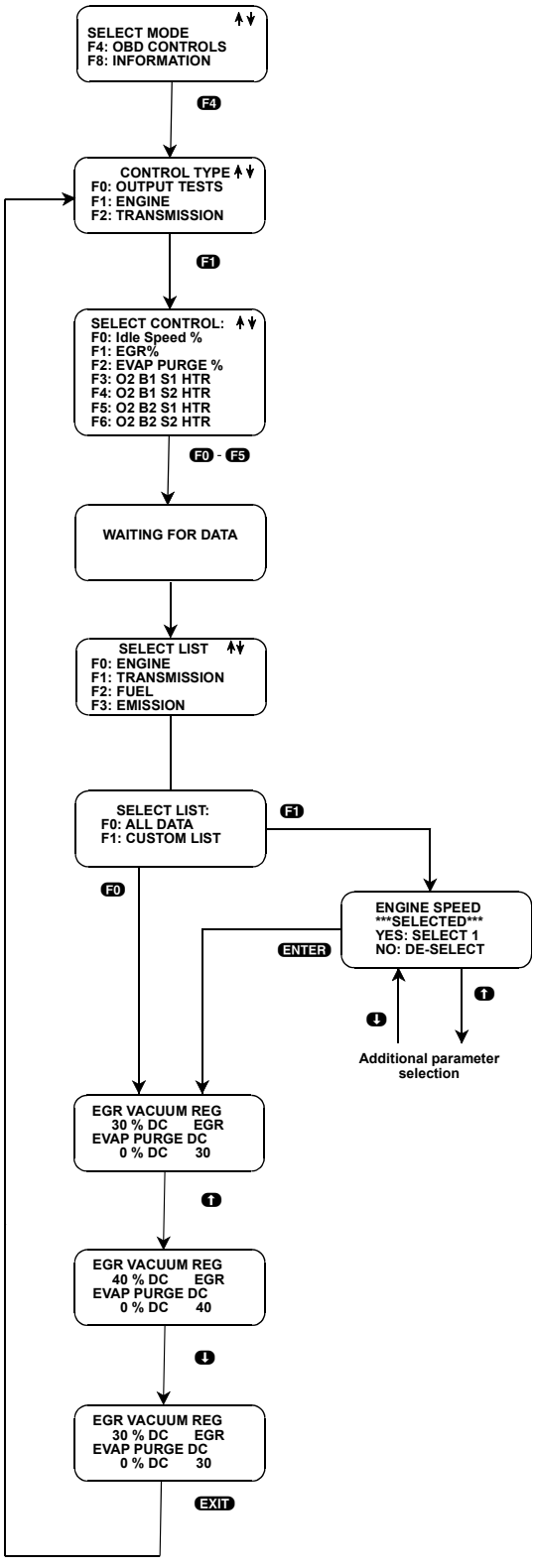


FIGURE 5-32. Submode F1: Engine

SUBMODE F2: TRANSMISSION

Transmission tests are available on many 1996 and newer gasoline engine vehicles with EEC-V powertrain control systems.

CAUTION!

These tests should only be performed with the Key ON Engine OFF (KOEO) or Key On Engine Running (KOER) with the vehicle in park.

To select Transmission Tests, do the following:

1. Press F4 to enter OBD Controls mode from the Select Test menu.
2. Press F2 to select TRANSMISSION.
3. Select the Transmission component that you wish to test from the Transmission Control list.

TRANSMISSION CONTROLS		
KEY	**DESCRIPTION**	**RANGE**
F0: Shift Sol 1	Toggles Shift Solenoid 1	ON/OFF
F1: Shift Sol 2	Toggles Shift Solenoid 2	ON/OFF
F2: Shift Sol 3	Toggles Shift Solenoid 3	ON/OFF
F3: Shift Sol 4	Toggles Shift Solenoid 4	ON/OFF
F4: TCC Lockup	Toggles the Torque Converter Clutch Solenoid	ON/OFF

TABLE 5-2. Transmission Controls

NOTE

Component coverage is vehicle dependent. If a component is not supported the tester will display an error message.

4. Select one of the Data Lists. Press F0 for ENGINE, F1 for TRANSMISSION, F2 for FUEL, or F3 for EMISSION. Each Data List has different data parameters to view.
5. Select F0: ALL DATA or F1: CUSTOM LIST from the select list menu. If F1: CUSTOM LIST is selected, choose the parameters for display and press ENTER (for more information on setting up datalist, see *Mode F0: Data List on page 134*.
6. You are prompted with a message that identifies the vehicle conditions that must be met for the Transmission control to be performed safely and accurately.
7. Select YES at the conditions screen to begin the Transmission control test.
8. Once the tester displays the data list you are ready to begin controlling the Transmission component. Depending on the component that is selected, it can either be turned on or off, or the component can be

adjusted through its range. See *Table 5-2, Transmission Controls,* for a list of Transmission components and their available adjustment ranges).

a. Press the ↑ key to turn the component ON, or to adjust it up through its range.

b. Press the ↓ key to turn the component OFF, or to adjust it down through its range.

9. The data list parameters are displayed while the Transmission control is selected. A three character description of the selected component is displayed at the end of line 2 of the display. These characters serve as a reminder as to which control is being performed. The last two characters of line 4 of the display indicate the commanded value of the component.
10. Press YES or NO to scroll through the displayed parameters (all data list functions are available). Refer to Mode F0: DATA LIST for instructions on viewing and printing the data list parameters.
11. Press EXIT to quit the Transmission Control and return control of the selected component to the PCM.

ACTIVE KEYS	
↑	Turn the component ON, or to adjust it up through its range
↓	Turn the component OFF, or to adjust it down through its range.
YES/NO	Scroll through displayed diagnostic data parameters.
F0, F1	Mark top or bottom displayed parameter as fixed for creating your own data pairs.
EXIT	Exit from test and return control to PCM.

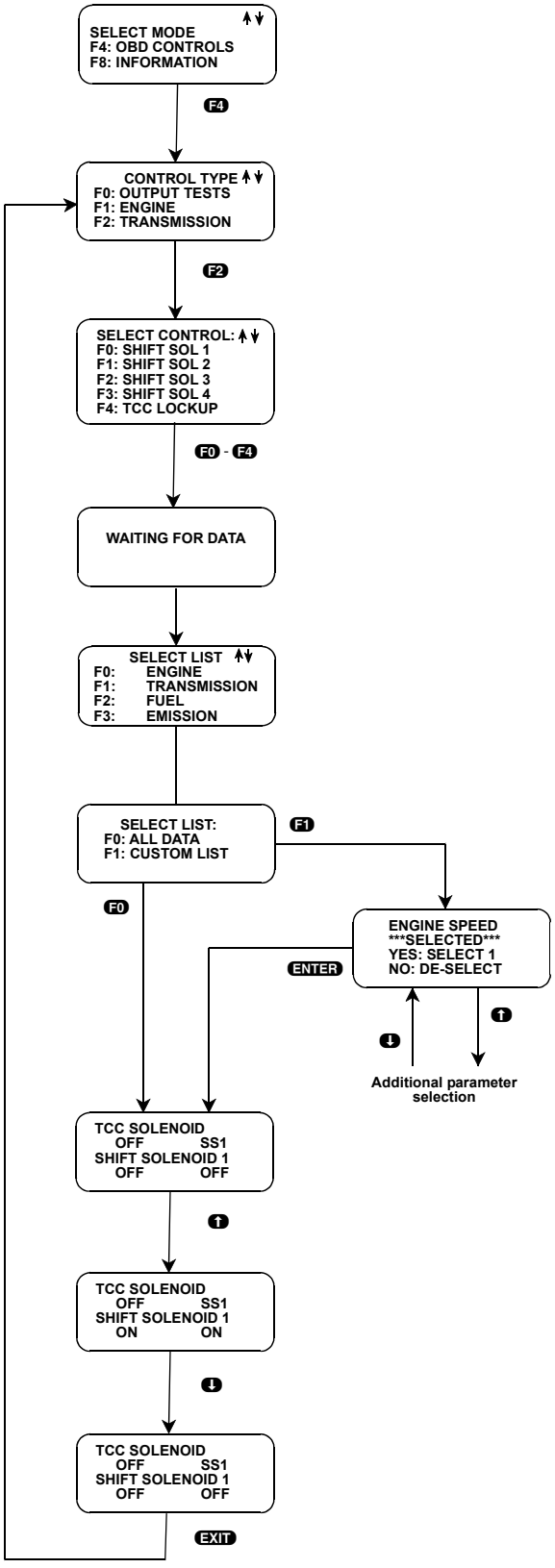


FIGURE 5-33. Submode F2: Transmission

MODE F4: OBD CONTROLS (DIESEL)

SUBMODE F0: OUTPUT STATE TEST

Performing the Output State key on, engine off On-Demand test causes the PCM to command all outputs On or all outputs Off. The Output State test allows you to check the operation of outputs within the diesel engine EEC-V systems. The test involves depressing and releasing the accelerator pedal to turn all outputs On, then depressing and releasing the accelerator pedal to turn all outputs Off. This cycle can be repeated until the test is stopped by the user.

The *Wait to Start* lamp can be used to determine if the PCM is controlling PCM outputs (and on some vehicles with automatic transmissions the TCS lamp may also toggle On and Off while the test is being performed).

NOTE

Some 1995-96 7.3L Powerstroke Diesel engines may not support this test. Consult Ford Service information for test application.

To select Output State Test, do the following:

1. Press F0 to select the Output State test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Output State test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. TURN IGNITION KEY TO RUN and press YES. An information screen is displayed which outlines available key presses when in the Output State test.
5. The message DEPRESS/RELEASE ACCELERATOR PEDAL TO CYCLE OUTPUTS is displayed. The message TEST IN PROCESS appears. The tester is initializing communication with the PCM.
6. When the message OUTPUT STATE IS ACTIVE appears, cycle the actuators on and off and on by depressing and releasing the accelerator pedal.
7. When you are finished with the Output State test, press YES. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
8. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to error screen definition within this section of the manual).

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Advance through test screens.
YES	Confirm that requested test sequence has been finished.
F0	Select Output State Test.

SUBMODE F2: GLOW PLUG TEST

Performing the Glow Plug key on, engine running On-Demand test causes the PCM to run a test of all glow plugs and glow plug circuits. For a Glow Plug DTC to occur, a fault must be present while performing the Glow Plug on-demand test. Glow Plug related KOER DTCs are not stored in the PCM memory. The Glow Plug test should be performed if a problem with the glow plug(s) or glow plug circuit is suspected.

The powertrain control system can output Glow Plug DTCs when the ignition key is on and the engine is running, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Glow Plug On-Demand test.

NOTE

Some 1995-96 7.3L Powerstroke Diesel engines may not support this test. Consult Ford Service information for test application.

To select Glow Plug Test, do the following:

1. Press F1 to select the Glow Plug test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Glow Plug test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. START ENGINE and press YES. An information screen is displayed which outlines available key presses when in the Glow Plug test.
5. Warm the engine to normal operating temperature (use temperature gauge on instrument panel). Press YES when the engine is at normal operating temperature.

NOTE

On a diesel engine it takes a while to get the engine up to normal operating temperature. Ensuring that the engine is at normal operating temperature is vital for this test to operate properly.

6. A tester key help information screen is displayed which outlines available key presses when in the Glow Plug test. The message TEST IN PROCESS appears, then the results of the test are displayed.

NOTE

The PCM may take up to 1 minute or more to complete this test. The tester displays test results when the PCM is finished with the test.

If there are no DTCs to report, you see NO DTCs and pressing EXIT or waiting 5 seconds returns you to the Test Selection Menu. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, →, and ← keys, the cursor can be scrolled through the list of reported DTCs.

7. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out,

selecting another DTC, then entering back in). Pressing EXIT returns you to the Glow Plug Key On, Engine Running On-Demand (OD) DTC list screen. Pressing EXIT again returns you to the Test Selection menu.

8. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
9. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to error screen definition within this section of the manual).
10. If operating properly, the PCM runs through a series of glow plug circuit tests and then begins DTC transmission.

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Advance through test screens or change to DTC description display.
YES	Confirm that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes to DTC information display.
F1	Select Glow Plug Test.

SUBMODE F2: INJECTOR BUZZ TEST

Performing the Injector Buzz key on, engine off On-Demand test causes the PCM to run a test of all fuel injectors and fuel injector circuits. The Injector Buzz test allows you to check the operation of the fuel injector driver outputs within the diesel engine EEC-V system.

Performing the Injector Buzz key on, engine off test On-Demand test causes the PCM to output key on, engine off DTCs. For a Injector Buzz DTC to occur, a fault must be present while performing the Injector Buzz on-demand test. Injector Buzz related DTCs are not stored in the PCM memory. The Injector Buzz key on, engine off test should be performed if a problem with the fuel injector(s) or fuel injector circuit(s) are suspected.

The powertrain control system can output Injector Buzz DTCs when the ignition key is on and the engine is off, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Injector Buzz On-Demand test.

NOTE

Some 1995-96 7.3L Powerstroke Diesel engines may not support this test. Consult Ford Service information for test application.

To select Injector Buzz Test, do the following:

1. Press F2 to select the Injector Buzz test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Output State test. Press YES to perform or NO to exit to the Test Selection Menu.
3. Perform the instruction TURN IGNITION KEY OFF, then press YES.
4. TURN IGNITION KEY TO RUN and press YES. An information screen is displayed which outlines available key presses when in the Injector Buzz test.
5. A tester key help information screen is displayed which outlines available key presses when in the Injector Buzz test. The message TEST IN PROCESS appears, then the results of the test are displayed.

   If there are no DTCs to report, you see NO DTCs and pressing EXIT or waiting 5 seconds returns you to the Test Selection Menu. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

   If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, → and ← keys, the cursor can be scrolled through the list of reported DTCs.
6. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Injector Buzz Key On, Engine Off On-Demand (OD) DTC list screen. Pressing EXIT again returns you to the Test Selection menu.
7. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
8. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to error screen definition within this section of the manual).

9. If operating properly, the PCM runs through a series of glow plug circuit tests and then begins DTC transmission.

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Advance through test screens or change to DTC description display.
YES	Confirm that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes to DTC information display.
F2	Select Injector Buzz Test.

SUBMODE F3: CYLINDER BALANCE TEST

Performing the Cylinder Balance key on, engine running On-Demand test causes the PCM to perform a cylinder balance test to determine cylinder contribution. If the PCM detects a problem with any cylinder then the PCM outputs key on, engine running DTCs. For a Cylinder Balance DTC to occur, a fault must be present while performing the Cylinder Balance On-Demand test. Cylinder Balance related KOER DTCs are not stored in the PCM memory. The Cylinder Balance test should be performed if a problem with any cylinder's fuel or mechanical systems is suspected.

The powertrain control system can output Cylinder Balance DTCs when the ignition key is on and the engine is running, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Cylinder Balance On-Demand test.

NOTE

Some 1995-96 7.3L Powerstroke Diesel engines may not support this test. Consult Ford Service information for test application.

To select Cylinder Balance Test, do the following:

1. Press F3 to select the Cylinder Balance test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Cylinder Balance test. Press YES to perform or NO to exit to the Test Selection Menu.
3. START ENGINE and press YES. An information screen is displayed which outlines available key presses when in the Cylinder Balance test.
4. Warm the engine to normal operating temperature (use temperature gauge on instrument panel). Press YES when the engine is at normal operating temperature.

NOTE

On a diesel engine it takes a while to get the engine up to normal operating temperature. Ensuring that the engine is at normal operating temperature is vital for this test to operate properly.

5. Turn off all accessories, including A/C and auxiliary RPM control. Press YES when all accessories have been turned off.
6. A tester key help information screen is displayed which outlines available key presses when in the Cylinder Balance test. The message TEST IN PROCESS appears, then the results of the test are displayed.

> **NOTE**
>
> 
>
> The PCM may take up to 1 minute or more to complete this test. The tester displays test results when the PCM is finished with the test.

   If there are no DTCs to report, you see NO DTCs and pressing EXIT or waiting 5 seconds returns you to the Test Selection Menu. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT.

   If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, → and ← keys, the cursor can be scrolled through the list of reported DTCs.
7. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Cylinder Balance key on, engine running On-Demand (OD) DTC list screen. Pressing EXIT again returns you to the Test Selection menu.
8. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
9. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to error screen definition within this section of the manual).
10. If operating properly, the PCM runs through a series of injector circuit (1995-1998 engines) or crankshaft trigger (1999-2004 engines) tests and then begins DTC transmission.

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Advance through test screens or change to DTC description display.
YES	Confirm that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes to DTC information display.
F3	Select Cylinder Balance Test.

SUBMODE F4: SWITCH TEST

Performing the Switch Test key on, engine running On-Demand test causes the PCM to perform a switch test to determine the operation of the PCMs switched inputs. If the PCM detects a problem with any switch (Service Brake, Parking Brake, Transmission Control, Clutch, or Cruise Control) then the PCM outputs

related key on, engine running DTCs. For a Switch Test DTC to occur, a fault must be present while performing the Switch Test on-demand test. Switch Test related KOER DTCs are not stored in the PCM memory. The Switch Test test should be performed if a problem with any cylinder's fuel or mechanical systems is suspected.

The powertrain control system can output Switch Test DTCs when the ignition key is on and the engine is running, which makes it valuable when diagnosing hard failures. This is possible because the PCM is commanded to perform the Switch Test On-Demand test.

NOTE

Some 1995-96 7.3L Powerstroke Diesel engines may not support this test. Consult Ford Service information for test application.

To select Switch Test, do the following:

1. Press F4 to select the Switch Test from the Test Selection Menu. You are reminded to PERFORM F0: PREP VEHICLE BEFORE RUNNING TEST. Press ENTER.
2. You are prompted to initiate the Switch Test. Press YES to perform or NO to exit to the Test Selection Menu.
3. START ENGINE and press YES. An information screen is displayed which outlines available key presses when in the Switch Test.
4. Warm the engine to normal operating temperature (use temperature gauge on instrument panel). Press YES when the engine is at normal operating temperature.

NOTE

On a diesel engine it takes a while to get the engine up to normal operating temperature. Ensuring that the engine is at normal operating temperature is vital for this test to operate properly.

5. Turn off all accessories, including A/C and auxiliary RPM control. Press YES when all accessories have been turned off.
6. Block the vehicle's drive wheels to ensure that the vehicle does not roll when the parking brake switch is toggled. Press YES when the drive wheels are appropriately blocked.
7. To start the switch test snap accelerate the accelerator pedal. Press YES when complete.
8. Next, cycle the parking brake, transmission control (A/T applications), or clutch (M/T applications) switches. Press YES when complete.
9. Next, cycle the cruise control (on, off, set, accelerate, and resume) switches. Press YES when complete.
10. To finish the test depress and release the brake pedal. Press YES when complete.
11. A tester key help information screen is displayed which outlines available key presses when in the Switch Test. The message TEST IN PROCESS appears, then the results of the test are displayed.

NOTE

The PCM expects all the switches to be cycled within 1 minute. Make sure that all switches are cycled within that time; otherwise inaccurate results may be displayed.

If there are no DTCs to report, you see NO DTCs and pressing EXIT or waiting 5 seconds returns you to the Test Selection Menu. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. If there are DTCs to report, the tester displays DTCs in a column list format. This screen shows the total number of DTCs and the DTC numbers read from the vehicle PCM. Using the ↑, ↓, →, and ← keys, the cursor can be scrolled through the list of reported DTCs.

12. When the cursor is next to a DTC number, pressing ENTER displays the DTC order as received from the PCM, DTC number, text description, and applicable Pinpoint Test. If there are multiple DTCs read from the PCM, the ↑ and ↓ keys change the DTC information display (saves time from exiting out, selecting another DTC, then entering back in). Pressing EXIT returns you to the Switch Test key on, engine running On-Demand (OD) DTC list screen. Pressing EXIT again returns you to the Test Selection menu.
13. When you are finished decoding the service codes, press EXIT. You are prompted to TURN IGNITION KEY OFF BEFORE EXIT. Turn the ignition key off, then press EXIT again to return to the Test Selection Menu.
14. If no messages are received within approximately 60 seconds, an error message is displayed with a Pinpoint Test number to perform (refer to error screen definition within this section of the manual).
15. If operating properly, the PCM runs through a series of switched input tests and then begins DTC transmission.

ACTIVE KEYS	
EXIT	Return to Test Selection Menu.
ENTER	Advance through test screens or change to DTC description display.
YES	Confirm that requested test sequence has been finished and page down when in DTC number screen.
→, ←	Scroll left or right when in DTC list screen.
↑, ↓	Scroll up or down when in DTC list screen, or changes to DTC information display.
F4	Select Switch Test.

MODE F8: INFORMATION

The Information mode displays useful information about the vehicle and system under test. This information may include: MIL Status, System Status, VIN Identification, and Calibration Identification.

SUBMODE F1: DLC LOCATION

The DLC Location mode provides the location of the vehicle mounted Data Link Connector (DLC). This mode displays DLC location information on EEC-V vehicles, which assist in fast DLC location when performing EEC-V diagnostics.

To select DLC Location, do the following:

1. Press F8 to select INFORMATION from the Select Test menu.

2. Press F1 to select DLC LOCATION mode from the Select Information menu.

   The tester displays the location of the DLC for the selected vehicle. Two examples of DLC Location information are shown below. Displays for other vehicles may be different.

3. Press EXIT to return to the Select Information menu.

Operation of the DLC Location mode is summarized in Figure 5-34.

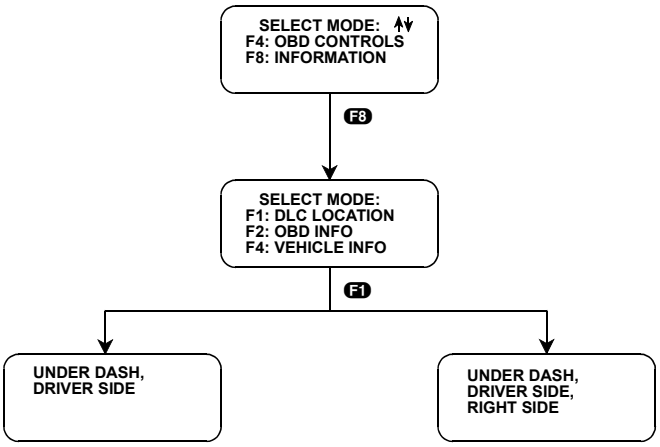


FIGURE 5-34. DLC Location

ACTIVE KEYS—DLC LOCATION	
F8	Select Information.
F1	Select DLC Location.
EXIT	Return to Select Information mode menu.

SUBMODE F2: OBD INFORMATION

The OBD Information mode provides the On-Board Diagnostic (OBD) information of the vehicle. This information may include:

- The number of reported emission related powertrain trouble codes
- Malfunction Indicator Lamp (MIL) status
- OBD II Diagnostic Monitors Status (Readiness Test)
- The vehicle's diagnostic system

Automobile manufacturer support for OBD II information is required by California Air Resource Board. Ford supports EEC-V systems with OBD II monitors on all OBD II certified vehicles.

Submode F0: MIL Status

MIL Status mode displays any emission related powertrain trouble codes that have been set and whether the Malfunction Indicator Lamp (MIL) has been commanded ON or OFF.

To select MIL Status, do the following:

1. Press F8 to select INFORMATION from the Select Test menu.
2. Press F2 to select OBD INFO mode from the Select Information menu.
3. Press F0 to select MIL STATUS mode from the OBD Information Select Information menu.

   The tester displays the number of emission related Powertrain Diagnostic Trouble Codes (DTCs) and whether the Malfunction Indicator Lamp (MIL) has been commanded ON or OFF.
4. Press EXIT to return to the OBD Information Select Information menu.

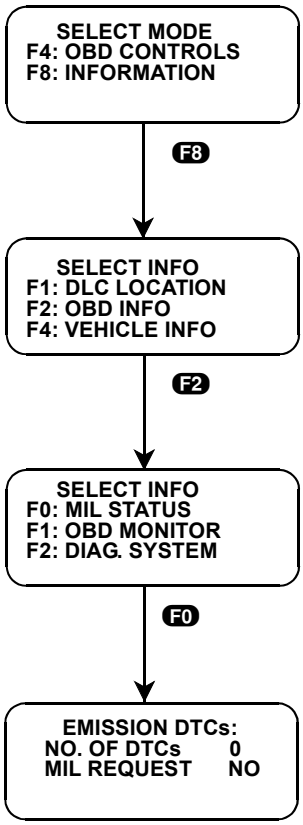


FIGURE 5-35. MIL Status Mode

Submode F1: OBD II Monitor

The OBD II Monitors mode displays OBD II Diagnostic Monitors Status (Readiness Test) information. Ford's EEC-V systems are capable of identifying the likely area of a malfunction within the electronic engine control system, and some vehicle problems can be determined by checking the status of the OBD II monitors. The status of the OBD II monitors is the information that is displayed in this mode. Automobile Manufacturer support for the OBD II monitors are part of the California Air Resources Board OBD II regulation and Ford's EEC-V systems supports OBD II monitors on all vehicles that are OBD II certified.

OBD II Monitors mode is not supported on 1995-96 7.3L VIN=F powerstroke diesel powertrains.

There are two types of OBD II monitors - Continuous and Non-Continuous. Continuous monitors are performed by the PCM all the time and never complete.

The following options are part of the OBD II regulation and are available to the automobile manufacturer for vehicle PCM development. In the case of some of these monitors, a manufacturer may have determined that a monitor is unreliable or not complete when certain conditions exist, therefore not enabling proper operation.

MIL Operation

When excessive tailpipe emissions or powertrain component failure is detected by the OBD II system, the Malfunction Indicator Lamp (MIL) illuminates.

Low Fuel Tank Level

Automobile manufacturers may disable OBD II monitors which can be affected by running the vehicle out of fuel (example: a monitor may become disabled when fuel tank volume is below 15% of maximum fuel tank capacity).

Altitude

Automobile manufacturers may disable OBD II monitors which can be affected by altitude (example: a monitor may become disabled when vehicle is operated above 8000ft elevation).

Ambient Temperature

Automobile manufacturers may disable OBD II monitors which can be affected by ambient temperature (example: a monitor may become disabled when a vehicle is started below 20° F ambient).

Power Takeoff Unit

Automobile manufacturers may disable OBD II monitors which can be affected by power takeoff unit operation (example: a monitor may become disabled when a vehicle power takeoff is engaged or active).

To select OBD II Monitor, do the following:

1. Press F8 to select INFORMATION from the Select Test menu.
2. Press F2 to select OBD INFO mode from the Select Information menu.
3. Press F1 to select OBD MONITOR from the Select Information menu.
4. The message WAITING FOR DATA is followed by EEC-V OBD II monitor status information. If an error or reminder message appears, perform the action that is presented by the display (refer to Appendix B).

5. Use the ↑ or ↓ keys to scroll through the display screens.
6. The first display screen indicates the vehicle's monitoring capability for Continuously monitored systems:
   - Misfire Monitoring
   - Fuel System Monitoring
   - Comprehensive Component Monitoring

   The status for Continuous monitors is displayed as CONT for Continuously Running or N/A for Not Available (e.g., PCM does not support).

   The next three display screens indicate the vehicle's monitoring capability for Non-Continuously monitored systems:
   - Catalyst Monitoring
   - Heated Catalyst Monitoring
   - Evaporative Monitoring
   - Secondary Air System Monitoring
   - A/C System Monitoring
   - O2 Sensor Monitoring
   - O2 Sensor Heater Monitoring
   - Exhaust Gas Recirculation (EGR) System Monitoring

   The status for Non-Continuous monitors is displayed as YES for monitor is currently supported and has completed, NO for monitor is currently supported and has not completed, or N/A for Not Available (e.g., PCM does not support).
7. Press EXIT to return to the Test Mode Menu.

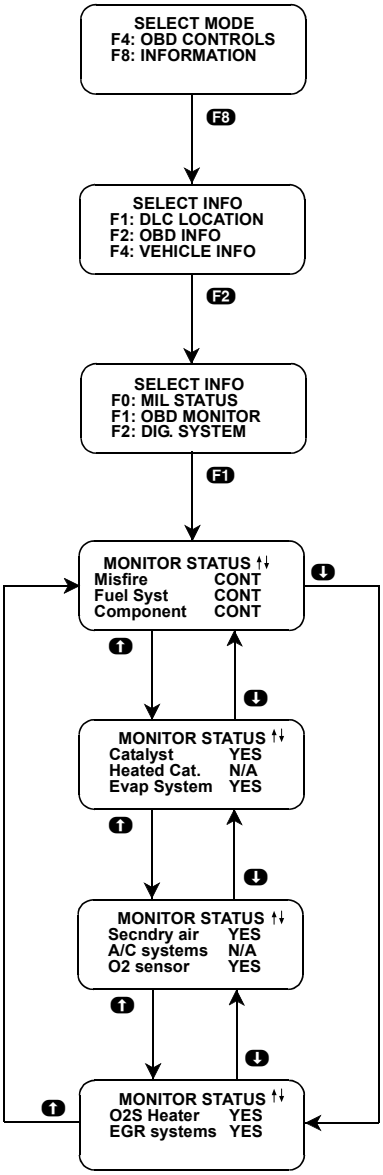


FIGURE 5-36. OBD II Monitor

ACTIVE KEYS	
F1	Select OBD Monitor.
↑, ↓	Scroll through displayed data parameters.
EXIT	Return to Test Mode menu.

Submode F2: Diagnostic System

Diagnostic System mode displays the type of OBD or system for the vehicle. The different systems are: OBD I, OBD II, OBD II California ARB, OBD Federal EPA or OBD, and OBD II.

To select Diagnostic System, do the following:

1. Press F8 to select the INFORMATION from the Select Test menu.
2. Press F2 to select OBD INFO mode from the Select Information menu.
3. Press F2 to select DIAG SYSTEM mode from the OBD Information Select Information menu. The tester displays the On-Board Diagnostic system available for the vehicle.
4. Press EXIT to return to the OBD Information Select Information menu.

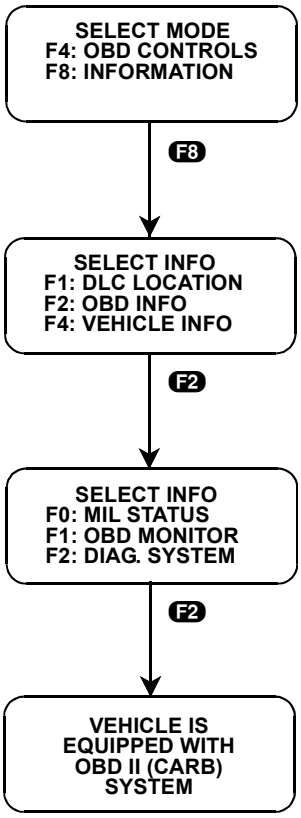


FIGURE 5-37. Diagnostic System

SUBMODE F4: VEHICLE INFORMATION

The Vehicle Information mode provides information about the vehicle. This information may include Vehicle Identification Number (VIN) and Calibration IDs. If the vehicle does not support these modes a *Not Supported* message is displayed.

Submode F0: VIN

The VIN mode displays the Vehicle's Identification Number found in the vehicle's PCM. The VIN mode is not supported on all vehicles.

To select the VIN mode, do the following:

1. Press F8 to select INFORMATION from the Select Test menu.
2. Press F4 to select VEHICLE INFORMATION mode from the Select Information menu.
3. Press F0 to select VIN mode from the Vehicle Information Select Information menu.

   The tester displays the vehicle VIN.
4. Press EXIT to return to the Vehicle Information Select Information menu.

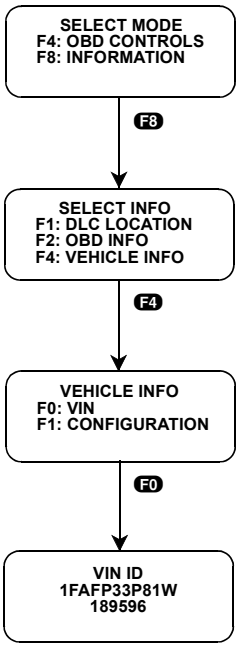


FIGURE 5-38. VIN

No VIN Or Data Received

If the vehicle does not contain an electronic VIN, the tester displays:

Submode F1: CONFIGURATION

The Configuration mode displays the Calibration ID found in the vehicle's PCM. The Configuration mode is not supported on all vehicles.

To select the Configuration mode, do the following:

1. Press F8 to select INFORMATION from the Select Test menu.
2. Press F4 to select VEHICLE INFORMATION mode from the Select Information menu.
3. Press F1 to select CONFIGURATION mode from the Vehicle Information Select Information menu.

   The tester displays Calibration ID of the vehicle's PCM.
4. Press EXIT to return to the Vehicle Information Select Information menu.

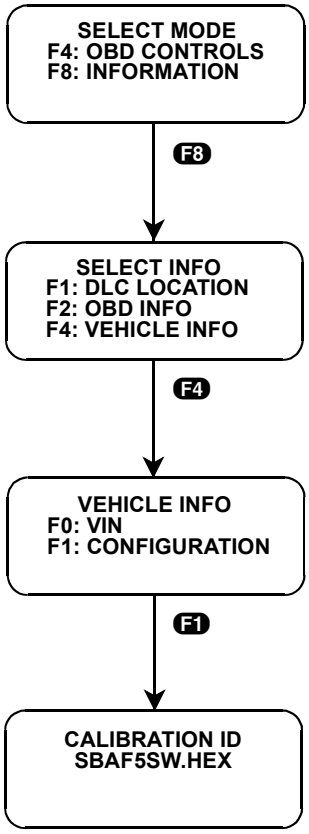
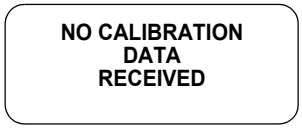


FIGURE 5-39. Configuration Mode

No Calibration Data Received

If the vehicle does not contain an electronic Calibration ID, the tester displays:



6. FINISHING UP

After using the application, do the following:

1. If the repairs are complete, clear the codes from memory before test driving to see if they recur or before releasing the vehicle to the customer.
   - If you have cleared the codes for a component but the codes are still set, then the conditions which caused the codes to be set may still be present. Refer to the OEM service manual to isolate the problem.
2. If the repairs are not yet complete, or if you want to continue testing at a later time, do not clear the codes from memory. Print a copy of the codes or write the codes down for comparison to the codes displayed when testing is resumed.
3. Disconnect the tester from the cigarette lighter plug or the battery terminal adapter.
4. Disconnect the cables and adapters from the vehicle's DLC. You may want to inspect the cable, connector, and cigarette lighter for any damage or corrosion.
5. Store all hardware components in the tester storage case.

NOTE	
	If the tester becomes dirty, clean it by wiping it with a rag dampened with mild detergent or hand soap. Avoid using harsh, petroleum-based cleaning solvents such as acetone, benzene, and trichloroethylene, as they may damage the tester. Although the tester is water resistant, it is not waterproof, so be sure to thoroughly dry off the tester prior to storage. Do not submerge the tester in water.

A. VEHICLE NETWORK COMMUNICATION STATUS

The Ford communication link supports communication error or status messages that may be displayed on the tester. These messages can be caused by operator error, the PCM, vehicle wiring harness, wiring connector, or other electronic control modules that are connected to the communication link. Status messages are responses to normal PCM responses, and Error messages are responses to abnormal PCM responses.

COMMUNICATION MESSAGE DEFINITION

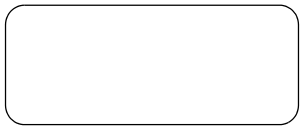
MESSAGE	DESCRIPTION
NO DATA OR ECU RESPONSE. CHECK: IGN. KEY ON, DLC CONN. OR PPT QA1	Displayed if the tester receives no data from the PCM. Most likely causes: the ignition key is not ON; The data link cable and 16-pin adapter are not firmly connected to the vehicle Data Link Connector (DLC); or the Standard Protocol link circuit may have failed and Pinpoint Test QA1 should be performed.
ECU NOT READY. RETRYING. VERYIFY TEST CONDITIONS.	Displayed if the test conditions are not correct (e.g., PCM not ready to respond, engine not running, etc.).
ENGINE RUNNING OR OUTPUT CONTROL TEST NOT AVAIL. [EXIT]	Displayed if the Output Control test conditions are not correct (e.g., PCM does not support the test or engine is started or running during the test).
ERROR TEST CONDITIONS NOT CORRECT. RETRY TEST.	Displayed if the test conditions are not correct (e.g., PCM already performing another test, PCM not ready to respond, or conditions to perform test are not set up properly).

MESSAGE	DESCRIPTION
ERROR TEST REJECTED BY VEHICLE ECU.	Displayed if the PCM does not respond to a request (e.g., PCM will not respond to the tester).
ERROR ECU NOT CAPABLE OF PERFORMING TEST.	Displayed if the PCM cannot perform a requested test (e.g., PCM is incapable of turning the Low Speed Fan relay on and off).
ERROR ECU TEST OR DATA FORMAT ABNORMAL OR INCOMPLETE.	Displayed if, while performing a test: • an error occurred and test results (DTCs) are available. • no test results are available (aborted test). • PCM is not ready to respond. • SCP data message format is incomplete. • the request is out of the PCM expected data message format range.

B. IF YOU'RE HAVING A PROBLEM

Although the testers were designed to give you years of trouble-free service, occasional problems may occur that require special attention. Some of these problems may be corrected with a few simple steps. Examples of most of the displays which you might see under abnormal conditions are shown. In addition, the most likely cause for the condition is given as well as other possible causes and recommendations on how to isolate or eliminate the problem. If the problem appears to be in the tester, perform the tester Self-test.

BLANK SCREEN



Most Likely Cause

- Faulty cable.
- Blown power cable fuse (replace with 3A fuse).

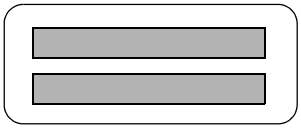
Other Possible Causes

- No power is applied to the tester.
- Tester power supply is malfunctioning.

Recommendations

- Plug the tester into another vehicle to verify proper operation.
- Check the 12 volt power at the cigarette lighter.
- Check for proper polarity of 12 volt power (center conductor should be positive).
- Check DLC cables and Ford adapter for continuity.

SCREEN DISPLAYS SOLID BARS



Most Likely Cause

- Two master cartridges are installed.

Other Possible Causes

- Master cartridge is malfunctioning.
- Tester is malfunctioning.

Recommendations

- Make sure that only one master cartridge is installed in the tester.
- Remove all cartridges and see if MASTER CARTRIDGE MISSING OR MALFUNCTIONING message is displayed. If it is, try installing another master cartridge.

APPLICATION CARTRIDGE NOT RECOGNIZED OR MALFUNCTIONING

Most Likely Cause

- Master cartridge is not installed.

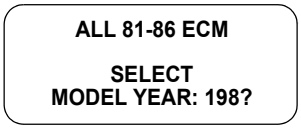
Other Possible Causes

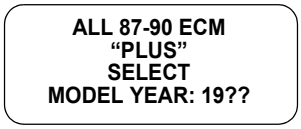
- Master cartridge is malfunctioning.

Recommendations

- Verify that a master cartridge is installed.
- Disconnect, then reconnect the power cord.
- Clean contacts on master cartridge connector with alcohol.
- Try a different master cartridge.

WRONG DISPLAY AFTER POWER IS APPLIED





Most Likely Cause

- Wrong master cartridge is installed.

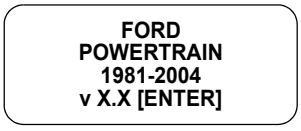
Other Possible Causes

- Cartridge is mislabeled.

Recommendations

- Install 1981-2004 Ford Powertrain application.
- Try another cartridge.

KEYBOARD OR DISPLAY LOCKED OR PROGRAM INTERMITTENTLY RETURNS TO TITLE SCREEN



Most Likely Cause

- If using cigarette lighter for power, the vehicle is intermittently turning off cigarette lighter during ignition switching cycles.

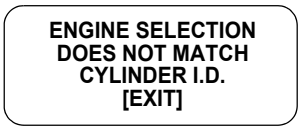
Other Possible Causes

- Tech 1 DLC cable, power cable, or Ford adapter plug is loose or bad.
- Master Cartridge is loose or has dirty contacts.
- Cigarette lighter power intermittent.
- Battery voltage dipping below 5.6 volts during cranking.
- Tech 1 is malfunctioning.

Recommendations

- Charge the battery.
- Power tester by using battery adapter cable.
- If Locked Up, cycle power to the tester (unplug and replug the cigarette lighter adapter).
- Check cartridge socket and cartridge edge connector.
- Check DLC power cable and connector, and the Ford adapter plug for wear or corrosion.

ENGINE SELECTION DOES NOT MATCH CYLINDER ID



Most Likely Cause

- Vehicle being tested does not match the vehicle selected in the Model Year, Make, Model, and Engine Selection process.

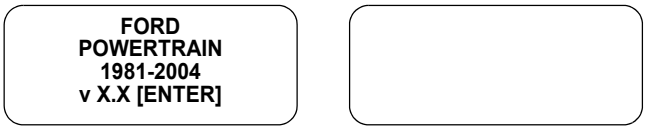
Other Possible Causes

- Loose cable connectors.
- Engine ECA is not correct for this vehicle.

Recommendations

- Reselect Model Year, Make Model, and Engine. Check VIN charts again.
- Remember that even if this message does not appear, the wrong ECA may still be selected. Engine types are supported for years in which Pinpoint Tests were available in Ford H manuals. In rare cases vehicles with carry-over engines and 1/2 year model changes will have to be selected by choosing a year forward or a year backward from the actual model year of the vehicle.

TESTER OR POWER INPUT INTERRUPTIONS



Screen ↔ Blank Screen

Tester power or data input is being intermittently interrupted.

Most Likely Cause

- Loose DLC cable or Ford adapter connection.

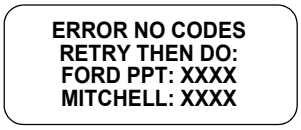
Other Possible Causes

- Test Connector cables loose or bad, or connector pins loose or corroded.
- Master Cartridge is loose or has dirty contacts.
- Cigarette lighter power intermittent.
- Tester is malfunctioning.

Recommendations

- Verify a good Test Connector/Ford Adapter/Tester Connector cable connection.
- Check DLC power cable and connector and the Ford adapter plug for wear and corrosion.
- Check Tech 1 cartridge socket and cartridge edge connector.
- Cycle power to the tester.
- Run the tester Self-test as described in the Operator's Manual.

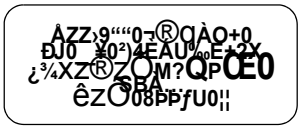
ERROR CODES



Recommendations

- See Chapter 5, *Submode F1: Key On, Engine Off Test on page 98*.
- See Chapter 5, *Submode F3: Key On, Engine Running Test on page 106*.
- If no codes are coming from the vehicle to the tester, use the service manual to assure that codes are being transmitted by one of the following methods:
  - 12 volt continuity light or analog volt meter
  - Check engine light
  - Continental Message Center
  - Overdrive cancel indicator (7.3L 89 diesel)

GARBAGE DISPLAY AFTER POWER-UP



Most Likely Cause

- Master Cartridge is not fully installed.
- Master Cartridge is malfunctioning.
- Tester is malfunctioning.

Recommendations

- Unplug and replug cigarette lighter.
- Remove and reinstall Master Cartridge.
- Try another cartridge.
- Remove the Master Cartridge and perform the Self-test.

C. DIAGNOSTIC TROUBLE CODE DESCRIPTIONS

EEC-IV DTCS

The 1981-2004 Ford Powertrain application supports displaying Diagnostic Trouble Codes for 1981-2004 Ford vehicles with the EEC-IV system. DTC lists and general descriptions for Ford passenger cars and light duty trucks are included in the following tables.

NOTE

The tables in this chapter are for general reference only. Please refer to the appropriate service manual for more accurate DTC descriptions.

PASSENGER CAR DIAGNOSTIC TROUBLE CODE DEFINITIONS

PASSENGER CAR DTCs	
DTC	**DEFINITION**
11	System PASS
12	Cannot control RPM during KOER Self-Test high RPM check
13	Cannot control RPM during KOER Self-Test low RPM check
14	PIP circuit failure
15	PCM Read Only Memory (ROM) test failed
15	PCM Keep Alive Memory (KAM) test failed
16	RPM too low to perform HO2S test
18	SPOUT circuit open

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
18	IDM circuit failure / SPOUT circuit grounded
19	Failure in PCM internal voltage
21	ECT or Flex Fuel sensor out of Self-Test range
22	MAP / BARO out of Self-Test range
23	TP out of Self-Test range
24	IAT out of Self-Test range
26	MAF out of Self-Test range
29	Insufficient input from the Vehicle Speed Sensor (VSS)
31	EVP circuit below minimum voltage
32	EVP voltage below closed limit
33	EGR valve opening not detected
34	EVP voltage above closed limit
35	EVP circuit above maximum voltage
41	HO2S circuit indicates system lean (right HO2S)
41	No HO2S switch detected (right HO2S)
42	HO2S circuit indicates system rich (right HO2S)
44	Secondary Air Injection system inoperative (right side)
45	Secondary Air Injection upstream during Self-Test
46	Secondary Air Injection not bypassed during Self-Test
51	ECT indicated -40°C (-40°F)/circuit open
53	TP circuit above maximum voltage
54	IAT indicated -40°C (-40°F)/circuit open
56	MAF circuit above maximum voltage
61	ECT indicated 123° C (254° F)/circuit grounded
63	TP circuit below minimum voltage
64	IAT indicated 123° C (254° F)/circuit grounded
66	MAF circuit below minimum voltage
67	Park/Neutral Position (PNP) switch circuit open - A/C ON during Self-Test
77	Brief WOT not sensed during Self-Test/Operator error
79	A/C on/Defrost on during Self-Test
81	Secondary Air Injection Diverter (AIRD) solenoid circuit failure

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
82	Secondary Air Injection Bypass (AIRB) solenoid circuit failure
84	EGR Vacuum Regulator (EVR) circuit failure
85	Canister Purge (CANP) circuit failure
87	Fuel pump primary circuit failure
91	HO2S circuit indicates system lean (left HO2S)
91	No HO2S switching detected (left HO2S)
92	HO2S circuit indicates system rich (left HO2S)
94	Secondary Air Injection system inoperative (left side)
95	Fuel pump secondary circuit failure
96	Fuel pump secondary circuit failure
98	Hard fault is present - FMEM mode
111	System Pass
112	IAT/ACT sensor circuit (GROUNDED)
113	IAT/ECT sensor circuit (OPEN)
114	IAT/ACT sensor circuit
116	Engine Coolant Temp (ECT) sensor circuit
117	Engine Coolant Temp (ECT) sensor circuit (GROUNDED)
118	Engine Coolant Temp (ECT) sensor circuit (OPEN)
121	Closed throttle voltage or throttle position voltage
122	Throttle Position (TP) sensor circuit below minimum voltage
123	Throttle Position (TP) sensor circuit above maximum voltage
124	Throttle Position (TP) sensor voltage higher than expected
125	Throttle Position (TP) sensor voltage lower than expected
126	MAP / BARO sensor higher or lower than expected
128	MAP sensor vacuum hose damaged / disconnected
129	Insufficient MAP / Mass Air Flow (MAF) change during dynamic response test
136	Lack of Heated Oxygen Sensor (HO2S-2) switch during KOER, indicates lean (Bank #2)
137	Lack of Heated Oxygen Sensor (HO2S-2) switch during KOER, indicates rich (Bank #2)
138	Cold Start Injector (CSI) flow insufficient
139	No Heated Oxygen Sensor (HO2S-2) switches detected (Bank #2)
141	Fuel System indicates lean

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
144	No Heated Oxygen Sensor (HO2S-1) switches detected
157	Mass Air Flow (MAF) sensor circuit
158	Mass Air Flow (MAF) sensor circuit
159	Mass Air Flow (MAF) sensor circuit
167	Insufficient throttle position change during dynamic response test
171	Fuel system at adaptive limits, Heated Oxygen Sensor (HO2S-1) unable to switch
172	Lack of Heated Oxygen Sensor (HO2S-1) switches, indicates lean
173	Lack of Heated Oxygen Sensor (HO2S-1) switches, indicates rich
175	Fuel system at adaptive limits, Heated Oxygen Sensor (HO2S-2) unable to switch
176	Lack of Heated Oxygen Sensor (HO2S-2) switches, indicates lean
177	Lack of Heated Oxygen Sensor (HO2S-2) switches, indicates rich
179	Fuel system at lean adaptive limit at part throttle, system rich
181	Fuel system at rich adaptive limit at part throttle, system lean
184	Mass Air Flow (MAF) sensor voltage higher than expected
185	Mass Air Flow (MAF) sensor voltage lower than expected
186	Injector pulsewidth higher than expected (with BARO sensor) or MAF lower than expected (without BARO sensor)
187	Injector pulsewidth lower than expected (with BARO sensor) or MAF higher than expected (without BARO sensor)
188	Fuel system at lean adaptive limit at part throttle, system rich
189	Fuel system at rich adaptive limit at part throttle, system lean
193	Flexible Fuel (FF) sensor circuit failure
211	Profile Ignition Pickup (PIP) circuit failure
212	Loss of Tachometer/Ignition Diagnostic Monitor (IDM) input to PCM/SPOUT circuit grounded
213	SPOUT circuit open
214	Cylinder Identification (CID) circuit failure
215	PCM detected coil 1 primary circuit failure
216	PCM detected coil 2 primary circuit failure
217	PCM detected coil 3 primary circuit failure
218	Loss of Ignition Diagnostic Monitor (IDM) signal-left side
219	Spark timing defaulted to 10 degrees-SPOUT circuit open
221	Spark timing error

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
222	Loss of Ignition Diagnostic Monitor (IDM) signal-right side
223	Loss of Dual Plug Inhibit (DPI) control
224	PCM detected coil 1, 2, 3 or 4 primary circuit failure or IDM failure
225	Knock not sensed during dynamic response test KOER
226	Ignition Diagnostic Module (IDM) signal not received
232	PCM detected coil 1,2,3 or 4 primary circuit failure
238	PCM detected coil 4 primary circuit failure
241	ICM to PCM IDM pulsewidth transmission error
244	CID circuit fault present when cylinder balance test requested
311	AIR system inoperative during KOER
312	AIR misdirected during KOER
313	AIR not bypassed during KOER
314	AIR system inoperative during KOER
326	EGR (PFE/DPFE)/EGRT circuit voltage lower than expected
327	EGR (EVP/PFE /DPFE)/EGRT circuit below minimum voltage
328	EGR closed valve voltage lower than expected
332	Insufficient EGR flow detected
334	EGR closed valve voltage higher than expected
335	EGR sensor voltage higher or lower than expected during KOEO
336	Exhaust pressure high /EGR (PFE/DPFE) circuit voltage higher than expected
337	EGR (EVP/PFE/DPFE)/EGRT circuit above maximum voltage
338	Engine Coolant Temperature (ECT) lower than expected
339	Engine Coolant Temperature (ECT) higher than expected
341	Octane adjust circuit open or in use
411	Cannot control RPM during KOER low RPM check
412	Cannot control RPM during KOER high RPM check
415	Idle Air Control (IAC) system at maximum adaptive lower limit
416	Idle Air Control (IAC) system at upper adaptive learning limit
452	Insufficient input from Vehicle Speed Sensor (VSS)
453	Servo leaking down (KOER IVSC test)
454	Servo leaking up (KOER IVSC test)

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
455	Insufficient RPM increase (KOER IVSC test)
456	Insufficient RPM decrease (KOER IVSC test)
457	Speed control command switch(s) circuit not functioning (KOEO IVSC test)
458	Speed control command switch(s) stuck/circuit grounded (KOEO IVSC test)
459	Speed control ground circuit open (KOEO IVSC test)
511	PCM Read Only Memory (ROM) test failure KOEO
512	PCM Keep Alive Memory (KAM) test failure
513	PCM internal voltage failure (KOEO)
519	Power Steering Pressure (PSP) switch circuit open
521	Power Steering Pressure (PSP) switch circuit did not change states
522	Vehicle not in PARK or NEUTRAL during KOEO/PNP or NDS switch circuit open
524	Low speed fuel pump circuit open battery to PCM
525	Indicates vehicle in gear/A/C on
527	Park/Neutral Position (PNP) switch circuit open A/C on
528	Clutch Pedal Position (CPP)/Clutch Engage Switch (CES) switch circuit failure
529	Data Communication Link (DCL) or PCM circuit failure
532	Cluster Control Assembly (CCA) circuit failure
533	Data Communication Link (DCL) or Electronic Instrument Cluster (EIC) circuit failure
536	Brake On/Off (BOO) circuit failure/not actuated during KOER
538	Insufficient RPM change during KOER dynamic response test / Invalid cylinder balance test due to throttle movement during test (SFI only) or CID circuit failure
539	A/C on/Defrost on during Self-Test or Neutral Drive Switch (NDS) circuit OPEN
542	Fuel pump secondary circuit failure or Fuel Pump circuit OPENPCM to motor ground
543	Fuel pump secondary circuit failure or Fuel Pump circuit OPENBattery to PCM
551	Idle Air Control (IAC) circuit failure
552	Secondary Air Injection Bypass (AIRB) circuit failure or Air Management 1 (AM1) circuit failure
553	Secondary Air Injection Diverter (AIRD) circuit failure
554	Fuel Pressure Regulator Control (FPRC) circuit failure
556	Fuel pump relay primary circuit failure
557	Low speed fuel pump primary circuit failure
558	EGR Vacuum Regulator (EVR) circuit failure

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
559	Air Conditioning On (ACON) relay circuit failure
563	High Fan Control (HFC) or High Speed Electro Drive Fan (HEDF) circuit failure
564	Fan Control (FC)/Electro Drive Fan (EDF) circuit failure
565	Canister Purge (CANP) circuit failure
566	3-4 shift solenoid circuit failure KOEO
567	Speed Control Vent (SCVNT) circuit failure (KOEO IVSC test)
568	Speed Control Vacuum (SCVAC) circuit failure (KOEO IVSC test)
569	Auxiliary Canister Purge (CANP2) circuit failure
578	A/C pressure sensor circuit shorted
579	Insufficient A/C pressure change
581	Power to Fan circuit over current
582	Fan circuit open
583	Power to Fuel pump over current
584	Power ground circuit open (Pin 1) (VCRM module)
585	Power to A/C clutch over current
586	A/C clutch circuit open
587	Variable Control Relay Module (VCRM) communication failure
617	1-2 shift error
618	2-3 shift error
619	3-4 shift error
621	Shift Solenoid 1 (SS1) circuit failure
622	Shift Solenoid 2 (SS2) circuit failure
624	Electronic Pressure Control (EPC) circuit failure
625	Electronic Pressure Control (EPC) driver open in PCM
626	Coast Clutch Solenoid (CCS) circuit failure
627	Torque Converter Clutch (TCC) solenoid circuit failure
628	Excessive converter clutch slippage
629	Torque Converter Clutch (TCC) solenoid circuit failure
631	Transmission Control Indicator Lamp (TCIL) circuit failure
632	Transmission Control Switch (TCS) circuit did not change states during KOER
633	4x4L switch closed during KOEO

PASSENGER CAR DTCs (CONTINUED)	
DTC	**DEFINITION**
634	Manual Lever Position (MLP)/Transmission range voltage higher or lower than expected or error in Transmission Select Switch (TSS) circuits
636	Transmission Oil Temp (TOT) higher or lower than expected
637	Transmission Oil Temp (TOT) sensor circuit above maximum voltage
638	Transmission Oil Temp (TOT) sensor circuit below minimum voltage
639	Insufficient input from Transmission Speed Sensor (TSS) /Turbine Shaft Speed Sensor
641	Shift Solenoid 3 (SS3) circuit failure
643	Torque Converter Clutch (TCC)/Converter Clutch Control (CCC) circuit failure
645	Incorrect gear ratio obtained for first gear
646	Incorrect gear ratio obtained for second gear
647	Incorrect gear ratio obtained for third gear
648	Incorrect gear ratio obtained for fourth gear
649	Electronic Pressure Control (EPC) higher or lower than expected
651	Electronic Pressure Control (EPC) circuit failure
652	Torque Converter Clutch (TCC) solenoid circuit failure
654	Manual Lever Position (MLP)/Transmission Range (TR) sensor not indicating PARK during KOEO
656	Torque Converter Clutch continuous slip error
657	Transmission over temperature condition occurred
659	High vehicle speed in park indicated
667	Transmission Range sensor circuit voltage below minimum voltage
668	Transmission Range circuit voltage above maximum voltage
675	Transmission Range sensor circuit voltage out of range
998	Hard fault present ****FMEM MODE****
DTCs NOT LISTED	DTCs displayed are not applicable to the vehicle being tested

TRUCK DIAGNOSTIC TROUBLE CODE DEFINITIONS

TRUCK DTCs	
DTC	**DEFINITION**
11	System PASS
12	Cannot control RPM during Self-Test high RPM check
13	Cannot control RPM during Self-Test low RPM check
14	PIP circuit failure or Engine RPM (RPM) sensor circuit fault
15	PCM Read Only Memory (ROM) test failed or PCM Keep Alive Memory (KAM) test failed
18	SPOUT circuit open or Loss of IDM input to PCM/ SPOUT circuit grounded
19	Failure in PCM internal voltage
21	Engine Cooling Temperature (ECT) sensor out of Self-Test range
22	Manifold Absolute Pressure (MAP) sensor out of Self-Test range or BARO sensor out of Self-Test range (Diesel)
23	Throttle Position (TP) sensor out of Self-Test range
24	Intake Air Temperature (IAT) sensor out of Self-Test range
25	Knock not sensed during Dynamic Response Test
26	Transmission Oil Temp (TOT) out of Self-Test range
29	Insufficient input from Programmable Speedometer/ Odometer Module (PSOM)
31	EVP circuit below minimum voltage
32	EVP voltage below closed limit
33	EGR valve opening not detected or Throttle Position (TP) sensor noisy/ harsh on line
34	EVP voltage above closed limit
35	EVP circuit above maximum voltage
41	System indicates lean or No HO2S switching detected
42	System indicates rich
43	Throttle Position (TP) sensor below idle spec
44	Secondary air system inoperative
45	Secondary air upstream during Self-Test
46	Secondary air not bypassed during Self-Test
47	4 x 4 switch is closed
49	1-2 Shift error
51	ECT indicated -40°C (-40°F)/circuit open

TRUCK DTCs (CONTINUED)	
DTC	**DEFINITION**
52	Power Steering Pressure (PSP) switch circuit open or PSP circuit did not change states
53	TP above maximum voltage
54	IAT indicated -40°C (-40°F)/circuit open
56	Transmission Oil Temp (TOT) indicated -40° C (-40° F) /circuit open
59	2-3 Shift error
61	ECT indicated 123°C (254°F)/circuit grounded
62	Torque Converter Clutch error
63	TP circuit below minimum voltage
64	IAT indicated 123°C (254°F)/circuit grounded
65	Transmission Control Switch (TCS) circuit did not change states
66	Transmission Oil Temp (TOT) indicated 143°C (290°F)/circuit grounded
67	Park/Neutral Position (PNP) switch circuit open; A/C ON (Manual) or Manual Lever Position (MLP) sensor out of range/A/C ON
68	Transmission Oil Temp (TOT) transmission over temp (overheated)
69	3-4 Shift error
72	Insufficient MAP change during Dynamic Response Test
73	Insufficient TP change during Dynamic Response Test
74	Brake On /Off (BOO) circuit open not actuated during Self-Test
77	Operator error Dynamic Response Test
81	Secondary Air Injection Diverter (AIRD) circuit failure
82	Secondary Air Injection Bypass (AIRB) circuit failure
84	EGR Vacuum Regulator (EVR) circuit failure
85	Canister Purge (CANP) circuit failure
87	Primary fuel pump circuit failure
91	Shift Solenoid 1 (SS 1) circuit failure
92	Shift Solenoid 2 (SS2) circuit failure
93	Coast Clutch Solenoid (CCS) circuit failure
94	Torque Converter Clutch (TCC) solenoid circuit failure
95	Fuel Pump circuit open - PCM to motor ground
96	Fuel Pump circuit open - battery to PCM
97	Transmission Control Indicator Lamp (TCIL) circuit failure

TRUCK DTCs (CONTINUED)	
DTC	**DEFINITION**
98	Hard fault present or Electronic Pressure Control (EPC) driver open in PCM
99	Electronic Pressure Control (EPC) circuit failure
111	System pass
112	Intake Air Temp (IAT)/Air Charge Temperature (ACT) sensor circuit below minimum voltage
113	Intake Air Temp (IAT)/Air Charge Temperature (ACT) sensor circuit above maximum voltage
114	Intake Air Temp (IAT)/Air Charge Temperature (ACT) higher or lower than expected
116	Engine Coolant Temp (ECT) higher or lower than expected
117	Engine Coolant Temp (ECT) sensor circuit below minimum voltage
118	Engine Coolant Temp (ECT) sensor circuit above maximum voltage
121	Closed throttle voltage higher or lower than expected or throttle position voltage inconsistent with the MAF sensor
122	Throttle Position (TP) sensor circuit below minimum voltage
123	Throttle Position (TP) sensor circuit above maximum voltage
124	Throttle Position (TP) sensor voltage higher than expected
125	Throttle Position (TP) sensor voltage lower than expected
126	MAP/BARO sensor higher or lower than expected
128	MAP sensor vacuum hose damaged/disconnected
129	Insufficient MAP/Mass Air Flow (MAF) change during dynamic response test
136	System indicates lean (Bank #2)
137	System indicates rich (Bank #2)
157	Mass Air Flow (MAF) sensor circuit below minimum voltage
158	Mass Air Flow (MAF) sensor circuit above maximum voltage
159	Mass Air Flow (MAF) higher or lower than expected
167	Insufficient throttle position change during dynamic response test KOER
171	Fuel system at adaptive limits, Oxygen Sensor (HEGO) unable to switch
172	System indicates lean, lack of Oxygen Sensor (HEGO) switches
173	System indicates rich, lack of Oxygen Sensor (HEGO) switches
175	Fuel system at adaptive limits (Bank #2)
176	System indicates lean (Bank #2)
177	System indicates rich (Bank #2)
179	Fuel system at lean adaptive limit at part throttle, system rich

TRUCK DTCs (CONTINUED)	
DTC	**DEFINITION**
181	Fuel system at rich adaptive limit at part throttle, system lean
184	Mass Air Flow (MAF) higher than expected
185	Mass Air Flow (MAF) lower than expected
186	Injector pulsewidth higher than expected or MAF lower than expected
187	Injector pulsewidth lower than expected or MAF higher than expected
188	Fuel system at lean adaptive limit at part throttle, system rich (Bank #2)
189	Fuel system at rich adaptive limit at part throttle, system lean (Bank #2)
211	Profile Ignition Pickup (PIP) circuit failure
212	Loss of Ignition Diagnostic Monitor (IDM) input to PCM/SPOUT circuit grounded
213	SPOUT circuit open
214	Cylinder Identification (CID) circuit failure
215	PCM detected coil 1 primary circuit failure (El)
216	PCM detected coil 2 primary circuit failure (El)
217	PCM detected coil 3 primary circuit failure (El)
218	Loss of Ignition Diagnostic Monitor (IDM) signal-left side
222	Loss of Ignition Diagnostic Monitor (IDM) signal-right side
223	Loss of Dual Plug Inhibit (DPI)/Dual Plug Input control
224	PCM detected coil 1, 2, 3 or 4 primary circuit failure or erratic IDM input to processor
225	Knock not sensed during dynamic response test
226	Ignition Diagnostic Monitor (IDM) signal not received (El)
232	PCM detected coil 1, 2, 3 or 4 primary circuit failure (El)
311	Secondary Air Injection (AIR) system inoperative during KOER (Bank #1 w/dual HO2S)
312	Secondary Air Injection (AIR) misdirected during KOER
313	Secondary Air Injection (AIR) not bypassed during KOER
327	EGR (EVP/PFE/DPFE) circuit below minimum voltage
328	EGR (EVP) closed valve voltage lower than expected
332	Insufficient EGR flow detected
334	EGR (EVP) closed valve voltage higher than expected
335	EGR (PFE) sensor voltage higher or lower than expected during KOEO
336	Exhaust pressure high /EGR (PFE) circuit voltage higher than expected
337	EGR (EVP / PFE) circuit above maximum voltage

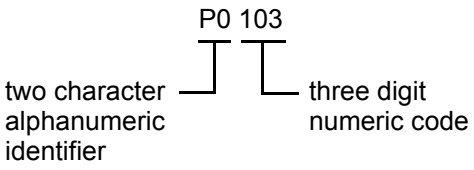
TRUCK DTCs (CONTINUED)	
DTC	**DEFINITION**
341	Octane adjust service pin/circuit open
411	Cannot control RPM during KOER low RPM check
412	Cannot control RPM during KOER high RPM check
452	Insufficient input from Vehicle Speed Sensor (VSS)
511	PCM Read Only Memory (ROM) test failure
512	PCM Keep Alive Memory (KAM) test failure
513	PCM internal voltage failure
519	Power Steering Pressure (PSP) switch circuit open
521	Power Steering Pressure (PSP) switch circuit did not change states
522	Vehicle not in PARK or NEUTRAL during KOEO
528	Clutch Pedal Position (CPP) switch circuit failure
536	Brake On/Off (BOO) circuit failure/not actuated during KOER
538	Insufficient RPM change during KOER dynamic response test / Invalid cylinder balance test due to throttle movement during test/Invalid cylinder balance test due to CID circuit failure
539	A/C on/Defrost on during KOEO
542	Fuel pump circuit open PCM to motor ground
543	Fuel pump circuit open battery to Powertrain Control Module (PCM)
551	Idle Air Control (IAC) circuit failure
552	Secondary Air Injection Bypass (AIRB) circuit failure
553	Secondary Air Injection Diverter (AIRD) circuit failure
556	Fuel pump relay primary circuit failure
558	EGR Vacuum Regulator (EVR) circuit failure
565	Canister Purge (CANP) circuit failure
566	Shift solenoid circuit failure
569	Auxiliary Canister Purge (CANP2) circuit failure
617	1-2 shift error
618	2-3 shift error
619	3-4 shift error
621	Shift Solenoid 1 (SS1) circuit failure
622	Shift Solenoid 2 (SS2) circuit failure
624	Electronic Pressure Control (EPC) circuit failure

TRUCK DTCs (CONTINUED)	
DTC	**DEFINITION**
625	Electronic Pressure Control (EPC) driver open in PCM
626	Coast Clutch Solenoid (CCS) circuit failure
628	Excessive torque converter clutch slippage
629	Torque Converter Clutch (TCC)/Clutch Converter Override (CCO) solenoid circuit failure
631	Transmission Control Indicator Lamp (TCIL) circuit failure
632	Transmission Control Switch (TCS) circuit did not change states during
633	4x4L switch closed during
634	Manual Lever Position (MLP) voltage higher or lower than expected
636	Transmission Oil Temp (TOT) higher or lower than expected
637	Transmission Oil Temp (TOT) sensor circuit above maximum voltage/-40° F indicated
638	Transmission Oil Temp (TOT) sensor circuit below minimum voltage/290° F indicated
639	Insufficient input from Transmission Speed Sensor (TSS)
653	Transmission Clutch Converter Control Switch (TCS) did not change states during KOER test
654	Manual Lever Position (MLP) sensor indicating not in PARK during Self-Test
655	Manual Lever Position (MLP) sensor indicating not in NEUTRAL during Self-Test
656	Torque Converter Clutch slippage error
998	Hard Fault Present
DTCs NOT LISTED	DTCs displayed are not applicable to the vehicle being tested

EEC-V DTCS

The 1981-2004 Ford Powertrain Application supports displaying Diagnostic Trouble Codes (DTCs) for 1994 and newer Ford vehicles equipped with the EEC-V system. The EEC-V system can output Powertrain or Network (Standard Corporate Protocol) DTCs. Because the EEC-V system is designed to detect and identify emission related problems in great detail, the number of EEC-V DTCs exceeds several hundred code numbers and descriptions. The 1981-2004 Ford Powertrain Application is capable of reading and displaying DTC number and descriptions read from the EEC-V Powertrain Control Module (PCM).

DTCs that are output from the EEC-V Powertrain Control Module are 5 characters in length; a two character alphanumeric identifier followed by a three digit numeric diagnostic trouble code.



The two character alphanumeric identifier can have a P, U, B, or C for its first character. Each letter is defined as:

P = Powertrain System

U = Network System

B = Body System

C = Chassis System

The two character alphanumeric identifier can have a 0 or 1 for the second character. Each number is defined as:

0 = Society of Automotive Engineers (SAE) defined DTCs

1 = Manufacturer defined DTCs

Referring to the above, a DTC with 0 for the second character (e.g., P0102) defines a DTC that has been defined by the Society of Automotive Engineers (SAE), and whose definition should be uniform for all automotive manufacturers. A DTC with 1 for the second character (e.g., P1023) defines a DTC that has been defined by the vehicle manufacturer, and whose definition may not be uniform for all automotive manufacturers.

The three character numeric diagnostic trouble code is separated into categories that best represent specific systems on the vehicle. The Ford EEC-V system uses seven of ten available categories for DTC groups. The groups are defined as:

1xx = Fuel and Air Metering

2xx = Fuel and Air Metering

3xx = Ignition System or Misfire

4xx = Auxiliary Emission Controls

5xx = Vehicle Speed and Idle Speed Control

6xx = Computer and Output Circuits

7xx = Transmission

The information described in this section is further described in the Society of Automotive Engineers (SAE) recommended practice J2012, which outlines recommended uniformity for diagnostic trouble code and descriptions for manufacturer product lines that are equipped with OBD II systems.

D. DATA LIST PARAMETER DESCRIPTIONS

INTRODUCTION

The tester is capable of displaying a wide variety of diagnostic data parameters when displaying Data List. The data list information is communicated to the tester using Ford's Data Communication Link (DCL) and Standard Corporate Protocol (Ford-SCP). Using one of the two communication methods, the EEC-IV and EEC-V Powertrain Control Modules (PCMs) send diagnostic data parameter information (e.g., values of the system inputs and outputs) to the tester. The diagnostic data parameters displayed on the tester are the same data that the PCM is using to determine the system operation. The tester then translates and displays this information in the form of diagnostic data parameters. This section contains descriptions of the diagnostic data parameters.

Every vehicle PCM has a set of supported diagnostic data parameters that are unique to the vehicle under test. The tester reads and displays parameters that are supported by each PCM. While the tester is capable of displaying any parameter described in this section, all diagnostic data parameters may not be available on all vehicles.

There are two basic types of parameters: discrete and analog. Discrete parameters are bits of information and can be in only one of two distinct states (high/low, energized/de-energized). Switches and solenoids are examples of discrete parameters. Analog parameters are used to represent quantities and are displayed as a value with appropriate units. Examples of analog parameters include Engine Speed and Coolant Temperature.

To access the Data List function, go to the Select Mode menu and enter F0: DATA LIST.

DESCRIPTOR FORMAT

Following is a description of Ford diagnostic data parameters that can be displayed with the 1981-2004 Ford Powertrain Application.

Note that not all parameters are displayed on every vehicle that is equipped with DCL or Ford-SCP (see Chapter 4 of this manual, 1989-2004 vehicle/engine selection tables column titled DATA TYPE for a list of Ford vehicles that are equipped with DCL or Ford-SCP). In the data list and Snapshot modes, all diagnostic

parameters defined by Ford Motor Company can be displayed. Sensors, actuators, and ECA operating modes to support these parameters must be present on the vehicle for the displayed data to be valid. For example, if a MAP sensor is not present, the displayed value is 0.0 Hz.

ABNORMAL DATA

If any parameter data appears abnormal, please verify that the vehicle is equipped with the component (sensor or actuator) before concluding that the device is faulty.

DATA LIST PARAMETERS

NUMERIC PARAMETERS

3/2 PRES SWITCH

STATES
ON/OFF

Third/Second (3/2) Pressure Switch is an input to the ECA about the transmission 3/2 hydraulic circuit. The hydraulic switch changes ON/OFF depending on pressure in the 3/2 hydraulic circuit.

4/3 PRES SWITCH

STATES
ON/OFF

Fourth/Third (4/3) Pressure Switch is an input to the ECA about the transmission 4/3 hydraulic circuit. The hydraulic switch changes ON/OFF depending on pressure in the 4/3 hydraulic circuit.

4X4 LOW SWITCH

(Diesel Engine)

STATES
ON/OFF

For vehicles that have 4-wheel drive. 4X4 LOW SWITCH parameter displays the output from the PCM and tells if the vehicle is in 4X4 low or not.

A TO C PARAMETERS

A/C CYCLE SW

(Diesel Engine)

STATES
ON/OFF

The A/C Cycling switch cycles compressor operation before the external temperature of the A/C evaporator core gets low enough to cause the condensed water vapor (excess humidity) to turn to ice. It does this by monitoring low side line pressure. This parameter states when the switch is ON or OFF.

A/C SWITCH

STATES
ON/OFF

The Air Conditioning (A/C) switch informs the ECA when the air conditioning has been turned on by the operator. Once the A/C Switch has been turned on, A/C Switch cycles on/off with the A/C clutch. In some cases, the ECA can increase engine idle speed to compensate for the additional compressor load on the engine.

AP MODE
(Diesel Engine)

STATES
CLOSED/PARTIAL/WOT

Accelerator Pedal Position (AP) Mode displays the operating mode of the accelerator pedal position sensor (the sensor range is divided up into three modes). The three modes are closed, partial, and wide open throttle (WOT).

ARC ACCEL SW

STATES
ON/OFF

When the vehicle is under acceleration, an acceleration switch signal is sent to the Automatic Ride Control system from the engine ECA. This informs the ARC system that vehicle speed is changing.

BARO (F)

UNITS	RANGE
Hz	95 - 165

Barometric Pressure sensor is a measure of outside ambient pressure. Information from the barometric pressure sensor is used by the PCM to determine fuel and exhaust gas recirculation strategies. The barometric sensor is an input to the PCM and the sensor itself outputs a frequency value. Barometric pressure is normally above 150Hz (sea level). Note that the (F) in parenthesis indicates the parameter is frequency related.

BARO (P)
(Gasoline Engine)

UNITS	RANGE
in. Hg	0 - 106

The Barometric Absolute (BARO) Pressure is an indication of current atmospheric pressure that the ECA uses to determine altitude. In some cases, the BARO value is updated during key on, engine off. Note that the (P) in parenthesis indicates the parameter is pressure related.

BARO (P)
(Diesel Engine)

UNITS	RANGE	ECA
PSI	14 - 16	EEC-V

Barometric Pressure is a variable capacitance sensor that measures barometric pressure so that the PCM can determine altitude then calculating proper injection timing and quantity. Barometric Pressure is also used to calculate glow plug on time. Expected values for this parameter are 14psi KOEO and 14psi while driving with low to medium load. Note that the (P) in parenthesis indicates the parameter is pressure related.

BARO (V)

(Diesel Engine)

UNITS	RANGE
Volts	0 - 5V

Barometric Pressure sensor measures ambient pressure, allowing the PCM to compensate for altitudes. The PCM uses this information to calculate injection timing and glow plug control. Note that the (V) in parenthesis indicates the parameter is voltage related. **With 1999 1/2 model year trucks, the BARO sensor is no longer a stand-alone component, but has been incorporated into the PCM as a calculated value.**

BRAKE PRESS SW.

UNITS	ECA
ON/OFF	EEC-V

Brake Pressure Applied Switch is a pressure switch used to determine brake pressure as a result from the applied force from the driver's foot. This is a backup to the BOO switch for speed control deactivation. Expected values for this parameter are OFF when brake pedal is not depressed, and ON when the brake pedal is depressed.

BRAKE SWITCH

(Diesel Engine)

STATES
ON/OFF

The brake switch signals the ECA the position of the brake pedal, ON (depressed) or OFF (released). This is used for idle and transmission drive strategies.

BRAKE SWITCH

(Gasoline Engine)

STATES
RELEASED/DEPRESSED

The brake switch signals the ECA of the position of the brake pedal (depressed or released). This is used for idle and transmission drive strategies.

CAM POS ADV 1

UNITS
Degrees

The camshaft position advance bank 1 displays the Variable Cam Timing (VCT) position of the bank 1 camshaft.

CAM POS ADV 2

UNITS
Degrees

The camshaft position advance bank 2 displays the Variable Cam Timing (VCT) position of the bank 2 camshaft.

CAM POS CMD1 (DC)

UNITS	RANGE
%	0 - 100%

The camshaft position command bank 1 duty cycle displays the duty cycle of the bank 1 VCT solenoid valve.

CAM POS CMD2 (DC) - %

UNITS	RANGE
%	0 - 100%

The camshaft position command bank 2 duty cycle displays the duty cycle of the bank 2 VCT solenoid valve.

CAM POS ERROR 1

UNITS
Degrees

The camshaft position error bank 1 displays the Variable Cam Timing (VCT) advance or retard error of the bank 1 camshaft. The error is the difference between the desired and actual camshaft position.

CAM POS ERROR 2

UNITS
Degrees

The camshaft position error bank 2 displays the Variable Cam Timing (VCT) advance or retard error of the bank 1 camshaft. The error is the difference between the desired and actual camshaft position.

CAM POS SOLENOID

STATES
ON/OFF

The camshaft position solenoid displays the state of the Variable Cam Timing (VCT) solenoid.

CLOSED TP (V)

UNITS	RANGE	ECA
Volts	0 - 5	EEC-V

The closed Throttle Position (TP) voltage is a voltage range valid for idle conditions only. Closed Throttle Position voltage has increased accuracy than TPS Voltage, and the ECA uses this data for determination of TPS operation.

CLUTCH PEDAL SW

(Diesel Engine)

STATES
ON/OFF

The Clutch Pedal Position Switch is an input to the PCM indicating the clutch pedal position. The clutch pedal position switch sends battery voltage to the PCM when the clutch is engaged (foot off of pedal) and zero voltage when the clutch is disengaged (pedal depressed).

COAST CLUTCH SOL)

STATES
ON/OFF

The Coast Clutch Solenoid indicates the state of the Coast Clutch Solenoid in the transmission.

COMMANDED GEAR

(Diesel Engine)

STATES
1/2/3/4/ERROR

Commanded Gear displays the gear that the automatic transmission is being commanded to be in from the PCM. The PCM controls the shift strategy and commands gear operation during.

CONTINUOUS DTCS

UNITS	RANGE	ECA
n/a	0 - 255	EEC-V

Continuous Diagnostic Trouble Codes (DTCs) is a numeric count for the number of Continuous DTCs that are stored in the PCM. Continuous DTCs can be used to determine if the PCM has Continuous DTCs stored in memory without performing the Continuous DTC read test. Expected values are 0 for no Continuous DTCs stored and 1 or higher for Continuous DTCs stored in the PCM.

CTP VOLTAGE

UNITS	RANGE
Volts	0 - 1.25

Closed Throttle Position (CTP) Voltage is a voltage range valid for idle conditions only. CTP voltage has increased accuracy than TP Voltage, and the ECA uses this data for determination of TPS operation.

CUMUL MISFIRE

UNITS	RANGE
Counts	0 - 65535

Cumul Misfire displays a count of the cumulative number of misfire events.

CURRENT GEAR

STATES
PRND/DRIVE2/DRIVE3/DRIVE4

Current Gear displays the gear that the automatic transmission is currently in. The ECA controls the shift strategy and commands gear operation during normal drive conditions.

CYL HEAD (V)

UNITS	RANGE
Volts	0 - 5V

Cylinder Head Temperature (CHT) Voltage is an analog input to the ECU. This parameter provides a voltage indication of the engine cylinder head temperature sensor. The CHT sensor is designed to alert the PCM of a possible engine over temperature condition. CHT sensors can be located in the aluminum cylinder head. Typical CHT voltage is 0.60v (warm engine at idle, ECT=200°F). Note that the (V) in parenthesis indicates the parameter is voltage related.

CYL 1-8 MISFIRE CNT

UNITS	RANGE
Counts	0 - 65535

Displays the number of misfire events on a particular cylinder.

CYL HEAD (°)

UNITS	RANGE
Degrees C	0 - 200

Cylinder Head Temperature (CHT) is an analog input to the ECU. This parameter provides a temperature indication of the engine cylinder head near the CHT sensor. The CHT sensor is designed to alert the PCM of a possible engine over-temperature condition. CHT sensors can be located in the intake manifold or cylinder head. Typical CHT is 325°F (warm engine at idle, ECT=200°C). Note that the (°) in parenthesis indicates the parameter is temperature related.

D TO F PARAMETERS

DESIRED FUEL VOL

UNITS	RANGE	ECA
mm^3	0 - 250	EEC-V

Desired Fuel Volume is a PCM calculation of fuel volume for the current diesel engine operating conditions. Expected values for this parameter are 0.0mm^3 KOEO, 7-10.0mm^3 at idle, and greater than 10mm^3 while driving with low to medium load.

DESIRED MASSFUEL

UNITS	RANGE	ECA
mg	0 - 250	EEC-V

Desired Mass Fuel is a PCM calculation of fuel mass for a particular fuel volume for the current diesel engine operating conditions. Expected values for this parameter are 0.0mg KOEO, 7.0-12.0mg at idle, and greater than 12.0mg while driving with low to medium load.

DPF EGR

UNITS	RANGE
Volts	0 - 5V

Delta Pressure Feedback (DPF) Exhaust Gas Recirculation (EGR) is a measure of EGR flow as detected by the delta pressure feedback EGR sensor. DPF EGR is supplied with an upstream pressure value and a downstream pressure value, which are above and below a calibrated metering orifice. Monitoring these pressures enables the ECA to determine EGR flow rate. DPF EGR sensor signal is an input to the ECA.

ECT (V)

UNITS	RANGE
Volts	0 - 5V

Engine Coolant Temperature (ECT) is an analog input to the ECA. This parameter provides a voltage indication of the engine coolant sensor, which changes with the change in engine coolant temperature.

ECT (°)

UNITS	RANGE
Degrees F	0 - 255

Engine Coolant Temperature (ECT) is an analog input to the ECA. This parameter provides a temperature indication of engine coolant near the ECT sensor.

EGR VACUUM REG

UNITS	RANGE
%	0 - 100

Exhaust Gas Recirculation (EGR) Vacuum Regulator displays the amount (in percentage) that the vacuum supply to the EGR is being regulated (or vented to atmosphere).

EGR VLV POSITION

UNITS	RANGE
Volts	0 - 1.25

Exhaust Gas Recirculation (EGR) Valve Position voltage is an input to the ECA to give the controller information about the EGR valve pintle position. The ECA uses this information to compute EGR flow value.

ELEC PRES CONT

UNITS	RANGE
PSI	0 - 128

Electronic Pressure Control (EPC) is a measure of transmission hydraulic pressure controlled by the electronic pressure control solenoid. The EPC solenoid is used on AXODE, AX4S, AODE, 4R70W, 4R100, and E4OD electronic transmissions that are used on selected Ford cars and trucks.

ENGINE LOAD

UNITS	RANGE
%	0 - 100

Engine load is derived by the ECU from a measure of current engine airflow divided by engine peak airflow. Engine load directly increases with throttle angle and drive conditions and is an indicator of percent engine capacity in any given operating mode. Engine load is typically 5% at engine idle, and 80% or greater during Wide Open Throttle (warm engine).

ENGINE SPEED

UNITS	RANGE
RPM	0 - 6000

Engine Speed is an indication of crankshaft revolutions per minute. The ECA uses engine speed to make determinations about the operation of various engine management components.

EOT (T)

(Diesel Engine)

UNITS	RANGE
Degrees F	0 - 250

Engine Oil Temperature displays the temperature of the oil in the engine. At oil temperatures below 50°C (122°F), low idle is increased to a maximum of 900 RPM to increase engine warm-up time. An engine oil temperature signal detected out of range by the PCM (High or low) causes the PCM to assume an engine oil temperature of 20° C (68°F) for starting purposes and 100°C (212°F) for operating purposes. The malfunction indicator lamp in the instrument cluster is illuminated as long as the fault condition exists. Note that the (T) in parenthesis indicates the parameter is temperature related.

EOT (V)

(Diesel Engine)

UNITS	RANGE
Volts	0 - 5

The Engine Oil Temperature sensor is a thermistor mounted to the oil reservoir. The resistance of the sensor decreases as engine oil temperature increases. The engine oil temperature signal is used by the PCM to calculate fuel quantity, injector timing, glow plug operation, and exhaust back pressure. Note that the (V) in parenthesis indicates the parameter is voltage related.

EPC (P)

(Diesel Engine)

UNITS	RANGE
PSI	1 - 100

The Electronic Pressure Control (EPC) solenoid is a variable force type solenoid that regulates transmission line pressure. Note that the (P) in parenthesis indicates the parameter is pressure related.

EPC (V)

(Diesel Engine)

UNITS	RANGE
Volts	0 - 14

Electronic Pressure Control (EPC) Voltage is a measure of the PCMs commanded voltage that is driving the Electronic Pressure Control Solenoid. The EPC Solenoid is used on AXODE, AX4S, AODE, 4R70W, 4R100, and E4OD electronic transmissions that are used on selected Ford Cars and Trucks.

EPC (V)

(Gasoline Engine)

UNITS	RANGE	ECA
Volts	0 - 5	EEC-V

Electronic Pressure Control (EPC) Voltage is a measure of the PCMs commanded voltage that is driving the Electronic Pressure Control Solenoid. The EPC Solenoid is used on AXODE, AX4S, AODE, 4R70W, 4R100, and E4OD electronic transmissions that are used on selected Ford Cars and Trucks.

EVAP PURGE DC

UNITS	RANGE
%	0 - 50%

Evaporative Purge Duty Cycle is a measure of the percent on (or open) time for the Evaporative Canister Purge Solenoid. The Evaporative Canister Purge Solenoid is an output controlled by the PCM, and it controls the flow of vapors that are purged from the carbon canister in to the intake manifold (various engine operating modes only). Expected values for this parameter are 0% KOEO or idle (hot engine) and 0-50% while driving with low to medium load.

EVAP PURGE FLOW

UNITS	RANGE
Volts	0 - 5V

Evaporative Purge Flow is a measure of evaporative canister purge flow when the Evaporative Canister Purge Solenoid is allowing vapors to flow. Based on the Evaporative Canister Purge Solenoid open (flow) or closed (no flow) status, the Evaporative Purge Flow Sensor monitors the vapor flow through the evaporative system and is an input to the PCM. Expected values for this parameter are 0-0.1 volts KOEO or idle (hot engine) and 0.1-4.9 volts while driving with low to medium load.

EVAP SOLENOID

STATES
ON/OFF

Evaporative Purge Solenoid is used to control the vacuum signal that operates the evaporative purge canister. On some Ford vehicles, canister purge operates off idle (engine at normal operating temp).

EXH BACKPRES (P)

UNITS	RANGE	ECA
PSIA	0 - 60	EEC-V

Exhaust Pressure Absolute is a variable capacitance sensor that measures exhaust back pressure so that the PCM can properly and timely control the exhaust back pressure regulator. Expected values for this parameter are 0 PSIA KOEO and 0-20 PSIA while driving with low to medium load. Note that the (P) in parenthesis indicates the parameter is pressure related.

EXHAUST (P)
(Diesel Engine)

UNITS	RANGE
PSI	1 - 50

The Exhaust Back Pressure sensor is an analog signal that indicates the exhaust back pressure in the RH exhaust manifold. A normal operation range of exhaust back pressure is 0 PSI for idle to low loads. Note that the (P) in parenthesis indicates the parameter is pressure related.

EXHAUST (V)
(Diesel Engine)

UNITS	RANGE
PSI	1 - 50

The Exhaust Back Pressure sensor is an analog voltage signal that indicates the exhaust back pressure in the RH exhaust manifold. A normal operation range for exhaust back pressure sensor is 4.5 - 5.0 volts for idle to low loads. Note that the (V) in parenthesis indicates the parameter is voltage related.

EXHAUST BP REG

UNITS	RANGE	ECA
%	0 - 100	EEC-V

Exhaust Backpressure Regulator is a measure of the percent on (or open) time for the Exhaust Backpressure Regulator valve. The Exhaust Backpressure Regulator valve is an output controlled by the PCM, and it controls exhaust back pressure during cold ambient temperatures to increase cab heat and decrease windshield defrost time. Expected values for this parameter are 0% KOEO or idle (hot engine) and 0-20% while driving with low to medium load.

FUEL PRESS (P)

UNITS	RANGE
PSI	0 - 250

Fuel Injection Pressure diagnostic data parameter is a gage measure of the engine fuel rail pressure. The fuel pressure parameter may or may not be available on all vehicles with the EEC-V system, since it is new for 1997 vehicles. Note that the (P) in parenthesis indicates the parameter is pressure related.

FUEL PRESS (V)

UNITS	RANGE
Volts	0 - 5V

Fuel Injection pressure sensor Voltage is a voltage output of the fuel injection pressure sensor and input to the PCM. The fuel injection pressure sensor voltage diagnostic data parameter is a gage measure of engine fuel rail pressure. The fuel injection pressure sensor voltage parameter may or may not be available on all vehicles with the EEC-V system, since it is new for 1997 vehicles. Note that the (V) in parenthesis indicates the parameter is voltage related.

FUEL PULSE WIDTH

UNITS	RANGE	ECA
ms	0 - 5	EEC-V

Fuel Pulse Width is a measure of the on time for the group of fuel injectors. The Fuel Pulse Width is an output controlled by the PCM. Expected values for this parameter are 0.00sec KOEO (just before engine start) and 1.00-3.00sec while driving with low to medium load.

FUEL PUMP DC

UNITS	RANGE	ECA
%	0 - 100	EEC-V

Fuel Pump Duty Cycle (DC) is output by the ECU for control of the Fuel Pump. Fuel Pump Duty Cycle is typically 0% at key on, engine off, and 100% during key on, engine running.

FUEL PUMP RELAY

STATES
ON/OFF

Fuel Pump Relay is a state indication of the fuel pump signal (commanded by the ECA).

FUEL TEMP (V)-B1
FUEL TEMP (V)-B2

UNITS	RANGE	ECA
Volts	0 - 5	EEC-V

Fuel Temperature Bank 1/Bank 2 is a thermistor voltage input to the PCM. It represents the thermistor voltage signal which indicates the temperature of the fuel contained inside the fuel system. This information is used for alternative fueled Ford vehicles and may not appear on every Ford vehicle. Note that the (V) in parenthesis indicates the parameter is voltage related.

FUEL TEMP (°)-B1
FUEL TEMP (°)-B2

UNITS	RANGE	ECA
Degrees F	0 - 240	EEC-V

Fuel Temperature Bank 1/Bank 2 is a temperature value based on a thermistor voltage input to the PCM. It represents the temperature of the fuel contained inside the fuel system. This information is used for alternative fueled Ford vehicles and may not appear on every Ford vehicle. Note that the (°) in parenthesis indicates the parameter is temperature related.

FUEL TNK SNSR (V)
FUEL TNK SNSR (P)

UNITS	RANGE	ECA
H2O	+/- 16	EEC-V
Volts	0 - 5	EEC-V

Fuel Tank Voltage (V) is a reading of the pressure in the fuel tank supply system that is measured by a transducer. Fuel Tank Pressure (P) is a gage measure of the pressure in the fuel tank supply system. Note that the (P) in parenthesis indicates the parameter is pressure related and the (V) in parenthesis indicates the parameter is voltage related.

G TO I PARAMETERS

GLOW PLUG CNTRL

UNITS	RANGE	ECA
s on	0 - 50	EEC-V

Glow Plug Control represents the ON time that the glow plug relay is being energized by the PCM. The Glow Plug Control is an output controlled by the PCM, and it controls the current flow to the glow plugs. Expected values for this parameter are 1-1.5sec KOEO (just before engine start) and 0sec while driving with low to medium load.

GLOW PLUG DC

UNITS	RANGE	ECA
%	0 - 100	EEC-V

Glow Plug Duty Cycle is a measure of the percent on (or open) time for the Glow Plug Duty Cycle. The Glow Plug Duty Cycle is an output controlled by the PCM, and it controls the current flow to the glow plugs. Expected values for this parameter are 5-15% KOEO (just before engine start) and 0% while driving with low to medium load.

GLOW PLUG LAMP

UNITS	RANGE	ECA
s on	0 - 10	EEC-V

Glow Plug Lamp represents the ON time that the glow plug relay is energizing the glow plug lamp. The Glow Plug Lamp is an output controlled by the PCM, and it controls the current flow to the glow plugs. Expected values for this parameter are 1-1.5sec KOEO (just before engine start) and 0 sec while driving with low to medium load.

HEATED O2S 1

UNITS	RANGE
Volts	0 - 1

Heated Oxygen Sensor 1 is the output voltage of the HO2S that is input to the ECA. The HO2S signal is a measure of the oxygen portion of the exhaust emission gases that surround the sensor tip.

HEATED O2S 2

UNITS	RANGE
Volts	0 - 1

Heated Oxygen Sensor 2 is the output voltage of the HO2S that is input to the ECA. The HO2S signal is a measure of the oxygen portion of the exhaust emission gases that surround the sensor tip.

HIGH SPD FAN

STATES
ON/OFF

For vehicles that have the high speed cooling fan, High Speed Fan displays the state of the high speed fan control signal sent out by the ECA.

IAT (V)

UNITS	RANGE
Volts	0 - 5

Intake Air Temperature sensor is a measure of the intake air temperature in voltage and is an input to the ECA. The ECA uses this input to determine the fuel, timing, and idle strategies. Normal operating voltage is 1 to 2 volts.

IAT (°)

UNITS	RANGE
Degrees F	0 - 225

Intake Air Temperature sensor is a measure of the intake air temperature in degrees and is an input to the ECA. The ECA uses this input to determine the fuel, timing, and idle strategies. Normal operating temperature is 185 to 212 degrees F.

IDLE AIR CONT.

UNITS	RANGE
%	0 - 100

Idle Air Control is a commanded output by the ECA. Depending on the idling conditions of the engine, ISC controls idle speeds for a smooth and adequate idle.

IDLE VALID SW.

STATES	ECA
IDLE/OFF IDLE	EEC-V

Idle Validation Switch is a switch used to determine the position of the idle validation switch which is connected to the throttle mechanism. The Idle Validation Switch is an input to the PCM. Expected values for this parameter are Idle when the throttle is at idle, and Off Idle when the throttle is Off Idle.

IMRC MONITOR B1
IMRC MONITOR B2

UNITS	RANGE
Volts	0 - 5V

Intake Manifold Runner Control (IMRC) Monitor Bank 1 and Bank 2 is a monitor voltage indication which describes the position of the Hall effect switch in the IMRC. When the IMRC motor is engaged, the Hall effect switch in the IMRC closes. This grounds the IMRC monitor voltage signal from the PCM and informs the PCM that the secondary throttle plates are open. The IMRC uses two air intake runners (primary and secondary) that feed one cylinder, with the secondary runner under control by throttle plates that are mechanically tied to the IMRC motor. Although it varies between application, the IMRC system actuates between 2700 and 3200 RPM. The IMRC motor and linkage can generate substantial torque - keep hands, fingers, and loose objects away from the IMRC actuator linkage. Engine dependent normal values can be 5.0v (low to moderate engine load), 0.0v (high engine load).

IMTV CONTROL

UNITS	RANGE
%	0 - 100

Intake Manifold Tuning Valve (IMTV) Control is an indication of the amount in percentage that the intake manifold tuning valve is currently being commanded open. Normally closed at low engine speeds, the PCM outputs the IMTV control signal to command open the IMTV for increased low speed engine torque. The IMTV is used on engines that have dual plenum intake manifolds to control intake air flow. Although it varies between application, the IMTV actuates around 2500 RPM. Normal values are close to 0% (engine speed less than 2500 RPM) and close to 100% (engine speed greater than 2500 RPM)

INJ CONTROL (P)

UNITS	RANGE	ECA
PSIA	0 - 3600	EEC-V

Injection Control Pressure (Absolute) is a variable capacitance sensor that measures fuel rail pressure so that the PCM can properly and timely control the injection timing and pulse width. Expected values for this parameter are 0-20 PSIA KOEO and 100-500 PSIA while driving with low to medium load. Note that the (P) in parenthesis indicates the parameter is pressure related.

INJ CONTROL (V)
(Diesel Engine)

UNITS	RANGE
Volts	0 - 5

Injector Control Pressure Sensor Voltage is a variable capacitance sensor that measures fuel rail pressure so that the PCM can properly control the injector timing and pulse width.

INJ CONTROL REG

UNITS	RANGE	ECA
%	0 - 100	EEC-V

Injection Control Pressure Regulator is a measure of the percent on (or open) time for the Injection Control Pressure Regulator valve. The Injection Control Pressure Regulator valve is an output controlled by the PCM, and it controls injection control pressure. Expected values for this parameter are 10-15% KOEO or idle (hot engine) and 15-50% while driving with low to medium load.

INJECTOR PW 1

UNITS	RANGE
mS	0 - 100

Injector Pulse Width (PW) 1 is the average fuel injector pulse width of group 1 fuel injectors. The pulse width is the on-time of the fuel injector and changes with engine operating conditions.

INJECTOR PW 2

UNITS	RANGE
mS	0 - 100

Injector Pulse Width (PW) 2 is the average fuel injector pulse width of group 2 fuel injectors. The pulse width is the on-time of the fuel injector and changes with engine operating conditions. This parameter is typically found on V8 and V6 engines only.

J TO L PARAMETERS

L.T. FUEL TRIM 1

UNITS	RANGE
%	0 - 100

Long Term Fuel Trim 1 is the measure of adaptive fuel correction strategy for group 1 fuel injectors. Long Term Fuel Trim 1 represents the ECAs long term adjustment to fuel strategy determined from a lookup table in its memory. This parameter is continually changing (but slower that short term fuel trim) and changes with engine operating conditions.

L.T. FUEL TRIM 2

UNITS	RANGE
%	0 - 100

Long Term Fuel Trim 2 is the measure of adaptive fuel correction strategy for group 2 fuel injectors. Long Term Fuel Trim 1 represents the ECAs long term adjustment to fuel strategy determined from a lookup table in its memory. This parameter is continually changing (but slower that short term fuel trim) and changes with engine operating conditions.

LONG TERM FT B1
LONG TERM FT B2

UNITS	RANGE
%	-50 to +50

Long Term Fuel Trim Bank 1 or 2 is the measure of adaptive or feedback fuel correction strategy for the injection of fuel into the engine. Long Term Fuel Trim represents the PCMs steady long term adjustment to fuel strategy determined from a lookup table in its memory. This parameter changes slowly over time (at a rate slower than short term fuel trim) and varies with engine design and engine operating conditions. The numeric character in LONG TERM FT B1 and LONG TERM FT B2 define the cylinders that are grouped as a bank for fuel feedback correction. Bank 1 is the bank which contains cylinder number 1. Expected values for this parameter can be ±20.0% (warm engine at idle or driving).

LOOP STATUS

STATES
OPEN/CLOSED/OL DRIVE OL FAULT/CL FAULT/ERROR

Loop Status represents fuel control status of the feedback loop between the vehicle ECU and the oxygen sensor. The states of Loop Status can be Open Loop (OPEN), Closed Loop (CLOSED), Open Loop due to vehicle being Driven at wide open throttle or coasting (OL DRIVE), Open Loop due to a Fault with the OBD II system (OL FAULT), or Closed Loop with only one oxygen sensor being used for fuel control and a fault with at least one oxygen sensor (CL FAULT).

LOW SPD FAN

STATES
ON/OFF

For vehicles that have the low speed cooling fan, Low Speed Fan displays the state of the low speed fan control signal sent out by the ECA.

M TO O PARAMETERS

MAF (V)

UNITS	RANGE
Volts	0 - 5V

Mass Air Flow (MAF) sensor is an input to the ECA and represents the amount of air that the engine is taking into the manifold in voltage. MAF voltage increases with engine load, and is typically 0.5-1.5 volts at idle (warm engine).

MANIFOLD (P)

UNITS	RANGE	ECA
PSIG	0 - 140	EEC-V

Manifold Gauge Pressure is a variable capacitance sensor that measures manifold pressure so that the PCM can determine boost pressure in the intake manifold. Expected values for this parameter are 0.0psi KOEO, 0.0-1.0 PSIG Idle (hot engine) and 1.0-14 PSIG while driving with medium to high load. Note that the (P) in parenthesis indicates the parameter is pressure related.

MANIFOLD VACUUM

UNITS	RANGE
in Hg	0 - 30

Manifold vacuum is a measure of the pressure within the intake manifold relative to atmospheric pressure. Manifold vacuum is the value of manifold absolute pressure subtracted from atmospheric pressure (VAC=ATM-MAP). Manifold vacuum decreases with engine load, and depending on altitude is typically 17-19in. Hg. at idle (warm engine). This parameter is available on MAP sensor equipped vehicles only.

MAP (F)
(Diesel Engine)

UNITS	RANGE
Hz	95 - 165

The Manifold Absolute Pressure (MAP) sensor is a variable capacitance sensor that supplies the PCM with the intake manifold pressure. Note that the (F) in parenthesis indicates the parameter is frequency related.

MAP (F)

(Gasoline Engine)

UNITS	RANGE
Hz	0 - 160

Manifold Air Pressure sensor is a measure of the pressure within the intake manifold relative to atmospheric. Ford MAP sensors output a signal that is measured in frequency. Atmospheric pressure equals the addition of manifold and vacuum pressures. MAP frequency increases with engine load, and depending on altitude is typically 100-110Hz at idle (warm engine).

MAP (P)

(Diesel Engine)

UNITS	RANGE	ECA
PSI	14 - 30	EEC-V

Manifold Absolute Pressure is a variable capacitance sensor that measures manifold pressure so that the PCM can determine manifold pressure which enables it to control smoke by limiting injection timing during acceleration until a specified boost pressure is reached. Expected values for this parameter are 14psi KOEO and 14psi while driving with low to medium load. Note that the (P) in parenthesis indicates the parameter is pressure related.

MAF (R)

UNITS	RANGE
gm/sec	0 - 120

Mass Air Flow sensor is an input to the ECA and represents the amount of air entering the engine. Typical value of Mass Air Flow rate (gm/sec) is 2 to 7 (warm engine at idle).

MISFIRE-EGR DPFE

UNITS	RANGE
Volts	0 - 5

Misfire EGR DPFE displays the EGR position at the time of a misfire event.

MISFIRE-ENG LOAD

UNITS	RANGE
%	0 - 100

Misfire Eng Load displays the engine load percent at the time of a misfire event.

MISFIRE-ENG OFF

UNITS
Min

Misfire Eng Off displays the engine off soak time at the time of a misfire event.

MISFIRE-ENG RPM

UNITS	RANGE
RPM	0 - 6000

Misfire Eng RPM displays the engine RPM at the time of a misfire event.

MISFIRE-ENG RUN

UNITS
Min

Misfire Eng Run displays the engine running time at the time of a misfire event.

MISFIRE-IAT

UNITS	RANGE
Degrees F	0 - 255

Misfire IAT displays the Intake Air Temperature at the time of a misfire event.

MISFIRE NOCALL

UNITS	RANGE
Counts	0 - 65535

Misfire NOCALL displays a count of the misfire events.

MISFIRE STATUS

STATES
YES/NO

Misfire Status displays the status of current engine misfires. If an engine misfire exists, the Misfire Monitor identifies the misfire condition and Misfire Status displays YES. Otherwise, Misfire Status displays NO. During a misfire the Malfunction Indicator Lamp (MIL) may blink or turn on constantly. Type A misfires blink the MIL while type B misfires turn the MIL on. In both cases, a DTC can be stored. Expected values are NO for no misfire and YES for current engine misfire.

MISFIRE-TPS

UNITS	RANGE
Volts	0 - 5

Misfire TPS displays the throttle position at the time of a misfire event.

MISFIRE-VEH SPD

UNITS	RANGE
MPH	0 - 100

Misfire Veh Spd displays the vehicle speed at the time of a misfire event.

ML POSITION

STATES
MAN1/MAN2/DRIVE/ O/D NEUT/REV/PARK

Manual Lever Position sensor is an indication of the gear selector chosen by the vehicle operator. This signal is input to the ECA for information about transmission or transaxle gear selection.

MLP VOLTAGE

UNITS	RANGE
Volts	0 - 5

Manual Lever Position Voltage is an analog indication of the gear selector chosen by the vehicle operator. This signal is input to the ECA for information about transmission or transaxle gear selection.

NET ENG TORQUE

UNITS	RANGE	ECA
lb/ft	0 - 500	EEC-V

Net Engine Torque is a calculated measurement of engine output torque. Expected values for this parameter are 104lb/ft KOEO and 64-400lb/ft while driving with low to medium load.

OBD II DRIVE CYCLE

UNITS	RANGE
n/a	0 - 9999

On-Board Diagnostics version II (OBD II) Drive Cycle is a numeric count for the number of completed OBD II Drive Cycles. An OBD II Drive Cycle is a method used to drive the vehicle to initiate and complete a specific OBD II monitor. The OBD II Drive Cycle requires the vehicle to be driven in specific modes, such as accelerations at certain throttle angles, number of engine idle periods, and steady vehicle speeds. Performing an OBD II Drive Cycle is used to clear I/M Maintenance Readiness DTC P1000. Expected values are 0 for no completed OBD II Drive Cycles (or after Continuous DTCs have been cleared from memory) and 1 or higher for completed OBD II Drive Cycles.

OBD II TRIP COMP?

STATES
YES/NO

On-Board Diagnostics version II (OBD II) Trip Completed displays the completion status of a currently performed OBD II Trip. An OBD II Trip refers to a drive cycle, which after completion, satisfies the requirement for diagnostic monitor test execution. Certain diagnostic monitor tests are executed and completed after one trip, while others are performed and completed more than once per trip. Expected values are Yes for OBD II Trip completed and No for a non-completed OBD II Trip.

OBD II TRIPS

UNITS	RANGE
n/a	0 - 255

On-Board Diagnostics version II (OBD II) Trips is a numeric count for the number of OBD II Trips. An OBD II Trip refers to a drive cycle, which after completion, satisfies the requirement for diagnostic monitor test execution. Certain diagnostic monitor tests are executed and completed after one trip, while others are performed and completed more than once per trip. OBD II diagnostic monitor tests that are completed once per trip are Heated O2S Monitor, Secondary Air Monitor, Catalyst Efficiency Monitor, and Evaporative Purge Monitor. Expected values are 0 for no completed OBD II Trips and 1 or higher for completed OBD II Trips.

OD/CANCEL SW.

STATES
ON/OFF

Overdrive Cancel Switch is a two state input to the ECA about transmission overdrive on/off condition. This switch is controlled by the vehicle operator.

OUTPUT SHAFT

UNITS	RANGE
RPM	0 - 5000

Output Shaft is an indication of transmission output shaft speed in revolutions per minute. The Output Shaft signal is an input to the PCM. The input signal is used by the PCM to determine shift and torque convertor clutch schedules, and electronic pressure control values. Expected values are 0 RPM at idle and 2200-2500 RPM at 55 MPH (depends on current transmission gear and type).

P TO R PARAMETERS

P/S PRESS. SW

STATES
ON/OFF

Power Steering (P/S) Pressure Switch is an input to the ECA and provides an indication to the ECA if the steering wheels are causing a load on the power steering pump. In this case, the ECA increases idle RPM to maintain smooth idle.

PARK/NEUTRAL

STATES
P-N--/-R-DL

The Park Neutral parameter is an indication of selected transmission gear range. When in park or neutral gear range, the display reads P-N--. When in reverse, drive, second, or low, the display reads -R-DL.

PARKING BRK SW.

STATES	ECA
OFF/ON	EEC-V

Parking Brake Switch is a switch used to determine parking brake lever position. Expected values for this parameter are OFF when the parking brake pedal is not depressed, and ON when the parking brake pedal is depressed.

PF EGR

UNITS	RANGE
Volts	0 - 5

Pressure Feedback (PF) Exhaust Gas Recirculation (EGR) is a measure of EGR flow as detected by the pressure feedback EGR sensor. PF EGR is an input to the ECA.

PSP SNSR (V)

UNITS	RANGE
Volts	0 - 5

Power Steering Pressure Sensor (PSPS) Voltage provides a voltage signal to the PCM. The power steering pressure signal is an indication of hydraulic pressure within the power steering system, and the sensor is normally closed and opens as the hydraulic pressure increases. The PCM uses PSP sensor data to compensate for loads placed on the engine (Air Conditioning On at idle, etc.) and electronic pressure control pressure adjustments. Note that the (V) in parenthesis indicates the parameter is voltage related.

S TO U PARAMETERS

S/C-CMD SW (V)

(Gasoline Engine)

UNITS	RANGE
Volts	0 - 5

Speed Control Command Switch Voltage is the voltage value that is input to the ECA. Since speed control systems have different settings (on, off, set, resume) depending on what setting the speed control switch is in, a different voltage value is sent to the ECA.

S/C-CMD SW (V)

(Diesel Engine)

UNITS	RANGE	ECA
Volts	0 - 10	EEC-V

Speed Control Command Switch voltage is a representation of the momentary speed control switch position. Approximate expected values for this parameter are 6.59 volts with no switch depressed, 10.00 volts with On depressed, 4.64 volts with Resume depressed, 2.80 volts with Accel depressed, 0.77 volts with Coast depressed, and 0.01 volts with Off depressed.

S/C-COMMAND SW.

STATES	ECA
ON/PUSH SWITCH/ RESUME/ACCEL/ COAST/OFF	EEC-V

Speed Control Command Switch is a state representation of the momentary speed control switch position. Approximate expected values for this parameter are Push Switch with no switch depressed, On with On switch depressed, Resume with Resume switch depressed, Accel with Accel switch depressed, Coast with Coast switch depressed, and Off with Off switch depressed.

S/C-ENGINE SPD

UNITS	RANGE	ECA
RPM	0 - 5000	EEC-V

Speed Control Engine Speed is a measurement of the engine speed required to maintain the current cruise control conditions. This value is dependent on cruise control operation and displays 0 RPM when cruise is not engaged.

S/C-MODE

STATES	ECA
COAST/TAP-DOWN/ SET-ACCEL/TAP-UP/ ACTIVE/STAND-BY/OFF	EEC-V

Speed Control Mode is a state representation of speed control operation and only reads values other than Off when the speed control is turned on and the vehicle is moving. Values for this parameter are dependent on system operation, which can be Coast, Tap-Down, Set-Accel, Tap-Up, Active, Stand-By, and Off.

S/C-SET SPEED

UNITS	RANGE	ECA
MPH	0 - 80	EEC-V

Speed Control Set Speed is a measurement of the vehicle speed required to maintain the current cruise control conditions. This value is dependent on cruise control operation and displays 0 mph when cruise is not engaged.

S/C-VACUUM SOL.

STATES
ON/OFF

Speed Control Vacuum Solenoid is the commanded condition of the vacuum solenoid that is used to control the speed control system operation. This is an input to the ECA.

S/C-VENT SOL.

STATES
ON/OFF

Speed Control Vent Solenoid is the commanded condition of the vent solenoid that is used to control the speed control system operation. This is an input to the ECA.

SECONDARY TPS (V)

UNITS	RANGE
Volts	0 - 5

Secondary Throttle Position Sensor (TPS) is an indication of the voltage input to the PCM for the Secondary Throttle Position Sensor (or TP-B). This sensor is used specifically for the Traction Control System. During a key power up, the traction control system Series Throttle Controller cycles the series throttle between open rest to full closed. At that time the PCM updates its adaptive value for the STC from the Secondary Throttle Position sensor feedback signal. After the adaptive learn sequence, the Secondary Throttle Position sensor signal is used for diagnostic purposes. Expected value for this parameter is 0.5-0.7 volts at idle or driving (TCS not engaged). Note that the (V) in parenthesis indicates the parameter is voltage related.

SHIFT SOLENOID 1

(Gas Engine)
(Diesel Engine)

STATES
ON/OFF

Shift Solenoid 1 tells the state of the first shift solenoid in the transmission.

SHIFT SOLENOID 2

(Gas Engine)
(Diesel Engine)

STATES
ON/OFF

Shift Solenoid 2 tells the state of the second shift solenoid in the transmission.

SHIFT SOLENOID 3

(Gas Engine)
(Diesel Engine)

STATES
ON/OFF

Shift Solenoid 3 tells the state of the third shift solenoid in the transmission.

SHIFT SOLENOID 4

(Gas Engine)

STATES
ON/OFF

Shift Solenoid 4 tells the state of the fourth shift solenoid in the transmission.

SHORT TERM FT B1
SHORT TERM FT B2

UNITS	RANGE
%	+/- 50

Short Term Fuel Trim Bank 1 or 2 is the measure of adaptive or feedback fuel correction strategy for the injection of fuel into the engine. Short Term Fuel Trim represents the PCMs dynamic short term adjustment to fuel strategy determined from a lookup table in its memory. This parameter is continually changing over time (at a rate faster than long term fuel trim) and varies with engine design and engine operating conditions. The numeric character in SHORT TERM FT B1 and SHORT TERM FT B2 define the cylinders that are grouped as a bank for fuel feedback correction. Bank 1 is the bank which contains cylinder number 1. Expected values for this parameter can be -10.0% (warm engine at idle or driving).

SPARK ADVANCE

UNITS	RANGE
Degrees C	0 - 100

Spark Advance is the amount of ignition spark advance that the ECA is currently using. The amount of ignition spark advance is based on several inputs to the ECA (engine load, throttle angle, engine temperature, etc.) and a lookup table in the ECAs memory. Typically, spark advance increases with engine RPM.

SS1 FAULT
(Diesel Engine)

STATES
YES/NO

Shift Solenoid 1 Fault displays if a fault has occurred in the operation of the first shift solenoid.

SS2 FAULT
(Diesel Engine)

STATES
YES/NO

Shift Solenoid 2 Fault displays if a fault has occurred in the operation of the second shift solenoid.

TCC APPLY

STATES
ON/OFF

Torque Converter Clutch (TCC) Apply is an indication of the TCC system condition. The TCC system can be on (TCC engaged) or off. The conditions for lockup vary, but likely TCC lockup happens in 3rd or 4th gear ranges.

TCC FAULT
(Diesel Engine)

STATES
NO FAULT/FAULT

Torque Converter Clutch (TCC) Fault displays if a fault has occurred in the engaging of the TCC solenoid.

TCC MODULATION

UNITS	RANGE
%	0 - 100

Torque Converter Clutch (TCC) Modulation is a measure of TCC applied or partially applied condition. The ECA controls how much TCC apply pressure during certain powertrain operating conditions.

TCC PRES SWTCH

STATES
ON/OFF

Torque Converter Clutch (TCC) Pressure Switch is a pressure switch that measures transmission hydraulic pressure for the TCC circuit. This is an input to the ECA.

TCC SOLENOID

STATES
ON/OFF

Torque Converter Clutch (TCC) Solenoid is an indication of the engaging of the TCC solenoid. The TCC solenoid can be ON (TCC engaged) or OFF (TCC disengaged).

TFT (°)

(Diesel Engine)

UNITS	RANGE
Degrees F	0 - 220

Transmission Fluid Temperature displays the temperature of the transmission fluid. Note that the (°) in parenthesis indicates the parameter is temperature related.

TFT (V)

(Diesel Engine)

UNITS	RANGE
Volts	0 - 5

The Transmission Fluid Temperature sensor is a thermistor mounted to transmission whose resistance decreases as transmission fluid temperature increases. Note that the (V) in parenthesis indicates the parameter is voltage related.

TOT SENSOR (V)

UNITS	RANGE
Volts	0 - 5

Transmission Oil Temperature (TOT) is an analog voltage input to the ECA from the TOT sensor. Available on selected Ford vehicles only, the TOT can be used to determine proper transmission operation.

TOT SENSOR (°)

UNITS	RANGE
Degrees F	0 - 255

Transmission Oil Temperature (TOT) displays the temperature of the automatic transmission fluid. Available on selected Ford vehicles only, the TOT can be used to determine proper transmission operation.

TOTAL CYL EVENTS

UNITS	RANGE
Counts	0 - 65535

Total Cyl Events displays a count of the total number of cylinder misfire events.

TP MODE

STATES	ECA
CLOSED/PARTIAL/ Wide Open Throttle (WOT)/Error	EEC-V

Throttle Position (TP) Mode displays the operating mode of the throttle position sensor (the sensor range is divided into three operating modes). The three modes are Closed, Partial, Wide Open Throttle (WOT), and Error (Error occurs when the PCM cannot determine the current TP position from the TPS data). Normal values are Closed at engine idling, Partial during cruise operation, and WOT for wide open throttle.

TPS (V)
AP SENSOR (V)

UNITS	RANGE
Volts	0 - 5

Throttle Position (TP) (Gasoline engine) and Accelerator Pedal (AP) (Diesel engine) Sensor are voltage inputs to the ECA and represent throttle position. TP or AP sensor voltage changes with the movement of the accelerator pedal. Typical TP sensor voltage at idle is below 1 volt.

TPS MODE

STATES
CLOSED/PARTIAL/WOT

Throttle Position Sensor (TPS) Mode displays the operating mode of the throttle position sensor: closed, partial, and wide open throttle (WOT).

TR SELECTOR

STATES
PARK/REVERSE/NEUTRAL/ OVERDRIVE/DRIVE/MAN1/MAN2/ERROR

Transmission Range (TR) Selector describes the gear position of the digital transmission range sensor as input to the vehicle PCM. The digital transmission range sensor is used to input driver selected gear range and is used by the PCM to determine fuel and shift strategies for engine idle and cruise operating conditions. Proper adjustment of the digital transmission range sensor is important and can be done while displaying this parameter.

TR SENSOR

(Gasoline Engine)
(Diesel Engine)

UNITS	RANGE
Volts	0 - 5V

Transmission Range (TR) Sensor indicates the position of the manual lever (transmission shift lever). The Transmission Range sensor voltage signal is an input to the PCM. The PCM uses the sensor's input to determine the manual (shift) lever position and the desired gear range for the transmission. The Transmission Range Sensor can be in one of six valid positions, with each position utilizing a specific voltage range. If the voltage is not valid, Error is displayed.

MANUAL (SHIFT) LEVER POSITION	TRANSMISSION RANGE (TR) SENSOR VOLTAGE RANGE
Park	greater than 4.03 to 4.74v
Reverse	greater than 3.23 to 4.03v
Neutral	greater than 2.45 to 3.23v
Overdrive	greater than 1.70 to 2.45v
Drive/2	greater than 0.99 to 1.70v
Manual Low 1	greater than 0.29 to 0.99v
Error	0.00 to 0.29v, greater than 4.74 to 5.00v

TRANS CNTRL LAMP

(Diesel Engine)

STATES
ON/OFF

On vehicles with a transmission control switch, the Transmission Control Indicator Lamp lights when the transmission control switch is pressed to disengage overdrive. This parameter indicates if the lamp is commanded ON or OFF.

TRANS CNTRL SW.

STATES	ECA
OFF/ON	EEC-V

Transmission Control Switch (TCS) describes the state of the TCS. The TCS information is input to the PCM so the PCM can make determinations about vehicle operator desired transmission range selection. The EEC-V system uses the TCS to allow transmission overdrive operation.

TRANS CNTRL SW
(Diesel Engine)

STATES
ON/OFF

Transmission Control Switch (TCS) describes the state of the TCS. The TCS information is input to the PCM so the PCM can make determinations about vehicle operations. The EEC-V system uses the TCS to allow transmission overdrive operation or not.

TURBINE SPEED

UNITS	RANGE
RPM	0 - 6000

Turbine Speed is the speed at which the transmission input shaft is turning in revolutions per minute. Turbine speed is important for transmission operation as commanded by the ECA.

UP O2S BANK 1
UP O2S BANK 2
DOWN O2S BANK 1
DOWN O2S BANK 2

UNITS	RANGE
Volts	-0.1 to +1.1

Up or Down Stream Oxygen Sensor (UP O2S or DOWN O2S Bx) is the output voltage of the heater O2S that is input to the ECU. The O2S signal is a measure of the oxygen content in the exhaust emission gases that surround the sensor tip and is a primary input to the ECU for fuel control. Once the O2S is warmed up (>500 degrees), its output voltage fluctuates above and below a threshold of 0.450 volts. Values greater than 0.450v indicate a rich condition, while values less than 0.450v indicate a lean condition. If the O2S has not achieved its normal operating temperature, its value may remain at 0.450v. The up or down stream O2S parameter label also defines the cylinder bank that is feeding the O2S. Part of the label is a term Bx and Bx refers to engine cylinder bank 1 or 2. Refer to Appendix E for a more complete description of the O2S naming convention.

UP O2S HEATER B1
UP O2S HEATER B2
DN O2S HEATER B1
DN O2S HEATER B2

STATES
OFF/ON

Up or Down O2S Heater Bank 1 or Bank 2 describes the state of the O2S heater. The PCM commands the O2S heater ON or OFF, depending on current engine operating conditions. The EEC-V system uses heated oxygen sensors to allow for starting the fuel control process earlier in the engine start-up cycle. Proper operation of the oxygen sensor heater is necessary for the fuel control system to reduce tailpipe emissions during cold starts or prolonged idling. Normal values are On (KOER) or Off (KOEO).

UPO2S HTR MON B1
UPO2S HTR MON B2

DNO2S HTR MON B1
DNO2S HTR MON B2

UNITS	RANGE	ECA
Milliamps	0 - 5000	EEC-V

Upstream or Downstream Oxygen Sensor (O2S) Heater Monitor Bank 1/Bank 2 represents the current that is flowing through the oxygen sensor heater circuit. O2S heater current information is displayed for upstream or downstream O2Ss and for Bank 1 or Bank 2 O2Ss. Since this parameter is a monitor, it is an indication of the actual current flowing through the oxygen sensor heater circuit.

V TO Z PARAMETERS

VEHICLE SPEED

UNITS	RANGE
MPH	0 - 100

Vehicle Speed is an indication of vehicle speed in mile per hour. The ECA uses vehicle speed to make determinations about the operation of various engine management and speed control components.

VPWR VOLTAGE

UNITS	RANGE
Volts	0 - 25

Vehicle Power (VPWR) Voltage is the battery system voltage as read by the supply wire to the ECA. This value is the same as charging system voltage.

VPWR VOLTAGE
(Diesel Engine)

UNITS	RANGE
Volts	9.5 - 16

Vehicle Power (VPWR) Voltage is battery system voltage as read by the supply wire to the PCM. This value should be the same as charging system voltage.

VREF VOLTAGE

UNITS	RANGE
Volts	0 - 5V

Vehicle Reference (VREF) Voltage is the sensor circuit voltage as read by the supply wire from the ECA. This value is output to the sensors that the ECA uses to get information about the engine management system.

WOT A/C CUTOFF

STATES
ON/OFF

Wide Open Throttle (WOT) Air Conditioning (A/C) Cutoff displays the state of the ECAs decision to momentarily turn off the A/C clutch during a wide open throttle condition. This provides more power for the engine to use during the wide open condition. Once the condition is removed, A/C operation is resumed to normal. During non-wide open throttle conditions, WOT A/C Cutoff displays the opposite on/off status as A/C Switch.

FREEZE FRAME PARAMETER DESCRIPTIONS

EEC-V Powertrain Control Modules can store Freeze Frame data in memory. This information can be accessed using Miscellaneous Test Mode F2: FREEZE DATA.

Each diagnostic data parameter that is displayed in Mode F5: FREEZE DATA is defined in the following information. These parameters are defined by Society of Automotive Engineers (SAE) Recommended Practice J1979 and automobile manufacturer support of these parameters is required by California Air Resources Board OBD II regulation. Some of the parameters are different that those that are available in Data List Mode, but the definition for Freeze Frame parameters is included for the readers understanding.

Please note that not all of the Freeze Frame parameters defined below are available on every vehicle. Consult Ford service material for additional service information.

ECT (°)

UNITS	RANGE
Degrees F	-40 to +419
Degrees C	-40 to +215

Engine Coolant Temperature (ECT) is an analog input to the ECU. This parameter provides a temperature indication of engine coolant near the ECT sensor. ECT sensors can be located in the intake manifold, cylinder head, or water pump housing. Typical ECT is 200 °F (warm engine at idle). Note that the degrees indicates the parameter is temperature related.

ENGINE LOAD

UNITS	RANGE
%	0 - 100

Engine load is derived by the ECU from a measure of current engine airflow divided by engine peak airflow. Engine load directly increases with throttle angle and drive conditions and is an indicator of percent engine capacity in any given operating mode. Engine load is typically 20% at engine idle, and 80% or greater during Wide Open Throttle (warm engine).

ENGINE SPD

UNITS	RANGE
RPM	0 - 8000

Engine Speed is an indication of crankshaft revolutions per minute. The ECU uses input engine speed to make determinations about current engine operating conditions and the operation of various engine management system output components.

FRZ FRAME DTC

UNITS
DTC NUMBER

Freeze Frame DTC is the type and number of the DTC that caused Freeze Frame data to be stored in the vehicle Powertrain Control Module (PCM). Examples are DTC P0500 or DTC P1549.

FUEL STATUS B1
FUEL STATUS B2

STATES
OPEN LOOP/CLOSED LOOP/ OL DRIVE/OL FAULT/CL FAULT/ RSRVD/UNUSED

Fuel Status Bank 1/Bank 2 represents fuel control status of the feedback loop between the vehicle ECU and the oxygen sensor. The states of fuel status can be Open Loop (OL), Closed Loop (CL), Open Loop due to vehicle being Driven at wide open throttle or coasting (OLDRIVE), Open Loop due to a Fault with the OBD II system (OLFAULT), Closed Loop with only one oxygen sensor being used for fuel control and a fault with at least one oxygen sensor (CLFAULT), or a display of a Reserved status (RSRVD), which is used for future support.

FUEL PRESSURE

UNITS	RANGE	ECA
kPaG	0 - 765	EEC-V

Fuel Injection Pressure diagnostic data parameter is a gauge measure of the engine fuel rail pressure. Note that the (P) in parentheses indicates the parameter is pressure related.

LONG TERM FT B1
LONG TERM FT B2

UNITS	RANGE
%	-100 to +100

Long Term Fuel Trim Bank 1/Bank 2 is the measure of adaptive or feedback fuel correction strategy for the injection of fuel into the engine. Long term fuel trim represents the ECUs steady long term adjustment to fuel strategy determined from a lookup table in its memory. This parameter is changes slowly over time (at a rate slower than short term fuel trim) and varies with engine design and engine operating conditions. The numeric character in LONG TERM FT B1 and LONG TERM FT B2 define the cylinders that are grouped as a bank for fuel feedback correction. Bank 1 is the bank which contains cylinder number 1. Expected values for this parameter can be ±10.0% (warm engine at idle).

MAP (P)

UNITS	RANGE	ECA
kPaA	0 - 255	EEC-V

Manifold Absolute Pressure is a variable capacitance sensor that measures manifold pressure so that the PCM can determine manifold pressure which enables it to control smoke by limiting injection timing during acceleration until a specified boost pressure is reached. Expected values for this parameter are 14psi KOEO and 14psi while driving with low to medium load. Note that the (P) in parentheses indicates the parameter is pressure related.

SHORT TERM FT B1
SHORT TERM FT B2

UNITS	RANGE
%	+/- 100

Short Term Fuel Trim Bank 1/Bank 2 is the measure of adaptive or feedback fuel correction strategy for the injection of fuel into the engine. Short term fuel trim represents the ECUs dynamic short term adjustment to fuel strategy determined from a lookup table in its memory. This parameter is continually changing over time (at a rate faster than long term fuel trim) and varies with engine design and engine operating conditions. The numeric character in SHORT TERM FT B1 and SHORT TERM FT B2 define the cylinders that are grouped as a bank for fuel feedback correction. Bank 1 is the bank which contains cylinder number 1. Expected values for this parameter can be ±20% (warm engine at idle).

VEHICLE SPD

UNITS	RANGE
MPH	0 - 158
km/h	0 - 255

Vehicle Speed is an indication of vehicle speed in mile per hour. The ECU uses vehicle speed to make determinations about current engine operating conditions and the operation of various engine management system output components.

E. FORD/MAZDA POWERTRAIN MODULES AND DIAGNOSTICS

E 1: WHAT IS OBD II?

The California Air Resource Board (CARB) required that by 1996, all vehicles sold in California contain a certain minimum On Board Diagnostic capability to diagnose emissions related failures of the engine control system. These diagnostic requirements have been designated as OBD II (On Board Diagnostics, Phase II) with a goal of monitoring all of the emissions-related components on-board the vehicle for proper operation. CARB's intent with the OBD II program is to "permit the State's Inspection and Maintenance Program to evolve into a check of the on-board computer for the presence of diagnostic trouble codes; underhood and tailpipe inspections would no longer be required."

Part of the OBD II program is for the vehicle to provide a standard interface for off-board diagnostic test equipment. This standard interface includes a standard test connector (referred to as the J1962 connector), a standard communication protocol (Ford-SCP, Ford-9141, or ISO 14230), and a standard set of diagnostic test modes (defined by SAE J1979).

The intention of CARB's OBD II program was that a single diagnostic tester could be used to read the diagnostic information from any OBD II compliant vehicle. A tester which satisfies this requirement can be designated as an **OBD II Scan Tool** and is defined by the SAE document J1978. One of the requirements of the OBD II Scan Tool is that it has to work with any OBD II compliant vehicle and that it must be able to automatically determine all information required to communicate with the vehicle. The operator cannot be required to enter such vehicle specific information as the vehicle manufacturer, model year, or engine. The OBD II Scan Tool must determine what protocol the vehicle uses, what diagnostic parameters can be read from the vehicle, and what tests are supported by the vehicle.

When used with Generic OBD II software, Tech 1, Tech 1A, and MTS 3100 testers support the basic requirements of the SAE's J1978 document including automatic determination of vehicle protocol and data parameters, display of Current Diagnostic Data Parameters, display of Diagnostic Trouble Codes (DTCs), display of Freeze Frame Data captured by the vehicle PCM along with a DTC, clear DTCs and Freeze Frame Data from the on-board electronic control module's memory, and the capability to display results of various on-board monitoring tests (e.g., oxygen sensor tests).

In addition to these required OBD II Scan Tool functions, the Tech 1, Tech 1A, and MTS 3100 testers provide a number of enhancements to the OBD II diagnostic functions, including Road Test support through

the capture of sequences of data parameters (Snapshot), user selectable parameter list allowing the user to trade-off update rate for amount of data, plot of data parameters (MTS 3100 only), and print a hardcopy of data parameters.

E 2: SERIAL DATA COMMUNICATION

Ford electronics support two types of serial data communication. They are Data Communication Link (DCL) and Standard Corporate Protocol (Ford-SCP). DCL was first used for communication to test devices in 1989 and Ford-SCP was first used in 1994.

Ford-SCP is a two wire multiplexed data bus that communicates electronic signals from one device to another. The Ford Electronic Engine Control Version 5 Powertrain Control Module (PCM) and the Powertrain Electronic Control Module (PTEC) uses the Ford-SCP communication bus to share information with other electronic control modules (e.g., ABS or GEM) and diagnostic testers. The Ford-SCP communication bus supports 41.6K bits/second information transfer, using a Pulse Width Modulation technique. The Ford-SCP 41.6K bits/second protocol is used to meet the On-Board Diagnostics version II requirements.

The Data Communication Link is an electronic two-wire data bus designed to carry digital messages from one electronic controller to another (the term *bus* refers to a electrical wire link that connects to several electronic controllers, on which information is carried and shared). Currently, users of the DCL include the EEC-IV control module, Electronic Instrument Cluster, Variable Relay Control Module, and the Service Bay Diagnostic System. Each device has an identification code assigned to it that other controllers use to know who is sending data information.

How does this play a role in vehicle system diagnostics? Previously, not having data list information on Ford cars and trucks gave you less data to make an accurate diagnosis. That has changed because now you have a diagnostic tester that has the capability to read and display powertrain diagnostic data parameters of the vehicle under test. The tester software displays the necessary action for you to perform, with prompts to guide you in reading, displaying, and taking a Snapshot of diagnostic data. An example of data parameters include Engine Speed, Throttle Position Sensor Voltage, Throttle Position Sensor Angle, and Brake Switch.

Since Ford-SCP and DCL provide electronic communication of diagnostic data parameters between controllers, it facilitates the diagnostics of vehicle systems via the Data Link connector. You need to remember that Ford-SCP and DCL are method for the vehicle controllers to share information, from which you can use your tester to read this data on the Ford-SCP and DCL, which can increase your diagnostic capability. Spend some time reviewing this and other service manuals that explain more about Ford-SCP and DCL. Doing so speeds up your diagnostic productivity and increases your knowledge of vehicle electronics.

E 3: FORD OBD II DRIVE CYCLE

An OBD II drive cycle consists of following a specific vehicle driving pattern over time. This requires the vehicle to be driven under specific conditions. The Ford OBD II drive cycle must be performed so the EEC-V controllers can perform all trip monitor tests. Once the Ford OBD II drive cycle is complete, the EEC-V or PTEC controller should clear DTC P1000.

Use the Ford OBD II drive cycle to help identify any problems with the OBD II system and clear DTC P1000. Individual monitor completion status (on-board readiness tests) can be checked at any time with the tester during the Ford OBD II drive cycle.

If DTC P1000 is present in EEC-V controllers memory, then all OBD II monitors have not been successfully completed, and a Ford OBD II drive cycle must be performed.

Ford OBD II compliant vehicles support the following monitors: Exhaust Gas Recirculation, Heated O2S, Catalyst Efficiency, Misfire Detection, Fuel System, Comprehensive Component, and Secondary Air Injection.

For more information on the Ford OBD II drive cycle, please refer to the Ford Powertrain Control/ Emissions Diagnosis, On-Board Diagnostics II, Car/Truck manual.

To run the Ford OBD II Drive Cycle, do the following:

1. Start the engine.
2. Drive the vehicle in any practical manner for 4 to 6 minutes.
3. Drive the vehicle until the engine coolant temperature (check parameter ECT°) is greater than 180°F (82°C).
4. Idle engine for 45 seconds.
5. Accelerate from 0 to 45 MPH at 1/4 throttle (take about 10 seconds to reach 45 MPH).
6. Drive vehicle between 30 and 45 MPH for 4 minutes (if stop and go conditions occur, total cumulative time must be within 20 and 45 MPH), with no wide open throttle (WOT) conditions.
7. Maintaining steady throttle position, drive vehicle between 30 and 40 MPH for a minimum of 1 minute.
8. Decelerate, stop vehicle, and idle engine for a minimum of 1 minute.
9. Accelerate from 0 to 55 MPH at 1/2 throttle (take about 10 seconds to reach 55 MPH).
10. Maintaining steady throttle position, drive vehicle between 40 and 65 MPH for a minimum of 80 seconds, being sure to follow local speed limit laws for your area.
11. Decelerate, stop vehicle, and idle engine.
12. Check Continuous Memory DTCs. If DTC P1000 is read from EEC-V controllers memory, check the OBD II readiness test(s) results and repeat the drive cycle. If no DTCs are in memory, then all EEC-V controllers monitor tests were successfully completed.

E 4: SIGNAL LINES

Ford Electronic Control Assemblies (ECA) with Quick Test capability use two signal lines (STI and STO) to communicate between a diagnostic tester and the ECA under test. A common ground is also needed.

Self Test Input (STI) initiates and terminates Quick Tests in Electronic Control Assemblies. During normal operating conditions, the STI line is at approximately battery voltage. To force the vehicle to enter a Quick Test, STI must be grounded. Grounding must occur before or just after turning the ignition on, depending on the ECA.

The use of STI has evolved to other uses. During the air suspension system's Service Bay Test, STI also is used to select a shock absorber to vent or fill by floating STI when the desired identifier code is received during the Service Bay Test.

In the STAR MODE, you control STI by pressing F1 to toggle between HOLD and TEST. STI is floating when in HOLD. STI is grounded when in TEST. When using the QUICK TEST MODE of operation, the control of STI is taken care of for you.

Self Test Output (STO) is the ECA code output line. During testing, STO is normally at battery voltage. During a code pulse, the ECA temporarily brings the STO line to ground. Codes are never transmitted to the ECA. Some vehicles use STO for other signals (e.g., crank revolution pulses) during testing and normal operation. The tester distinguishes these signals from codes.

The tester looks for codes being transmitted by the ECA any time you are operating in one of the Quick Test modes. When you are operating the tester in vehicle selection, test selection, code review or print summary mode, Quick Test requests are disabled.

E 5: CODE DESCRIPTION

Codes are transmitted from Ford's ECAs as sequences of pulses. Each code is two or three digits long. The length of time between pulses determines if it is a new digit, a new code or a separator between different code types, such as KOEO and Continuous Codes. If a second digit is not transmitted, then it is considered to be a zero.

While the ECA is busy running a diagnostic test, the STO line is at battery voltage. Through most of the test you are waiting for the ECA to send its codes. This test time may be a fraction of a minute to almost 4 minutes long.

Some ECA controllers transmit fast and slow codes. Slow codes are always available. Fast codes are available on EEC-IVs, ISC-Es, and IVSCs. In the Quick Test Mode, the tester reads fast codes when available, except when a test occurs after all slow codes are transmitted. An example of such tests are Output State, Timing Check and Cylinder Balance.

In the STAR MODE, you select whether you want to read fast or slow codes. Slow Code examples are MECS, 4EAT, and ABS.

Fast codes precede slow codes. Each fast code is transmitted once, each slow code is sent twice before another unique code is transmitted. Reading fast codes is a real time saver. Typically, all fast codes are transmitted in a second. It takes 16 seconds for a controller to send two slow code 11s, and a code 98 takes about 25 seconds to be sent.

There are other codes transmitted by ECAs in certain tests. All of these extra information codes are transmitted in slow mode only. For example, KOER tests begin with a Cylinder Identification code. This code identifies the number of cylinders or whether the vehicle is a diesel. Following that, some ECAs send a Dynamic Response code. These pre-service codes usually are markers for you to perform some action to the vehicle that help the ECA check out systems it cannot do by itself. If you use the Quick Test Mode, these codes are interpreted and a display requests the proper action. In the STAR MODE, you see the two digit code, and you must interpret the action to take.

E 6: FORD/MAZDA ENGINE CONTROL SYSTEM (MECS) CODES

MECS codes are very similar to the Ford EEC-IV system codes, and the MECS tests are much like the Ford ECA tests. The difference in MECS codes are:

- The MECS controller only outputs SLOW codes,
- Time durations for MECS code digits are 1.6 seconds for the first and 0.8 seconds for the second digit.

In addition, the MECS codes are accessed through the MECS self-test connector, which is physically different from the EEC-IV quick-test connector. To connect your tester to the MECS self-test connector, please refer to the wiring diagrams on page 253 of this manual. The wiring diagrams show how to properly connect the Ford adapter to the vehicle self-test connector.

After all connections have been made, set the tester to read SLOW codes in the STAR MODE, then press F3 to erase any existing codes in the STAR MODE memory. Begin the code retrieval process by turning the ignition key on and press F1 to TEST. If any MECS codes are stored in memory, the tester retrieves them and displays codes on the screen. You can now perform KOEO, KOER, and Switch Monitor tests. Refer to Ford or Mitchell diagnosis manuals for more information.

To clear MECS codes from controller memory, disconnect the vehicle negative battery cable and step on the brake pedal for 10 seconds.

Note that on some 2.2L MECS equipped engines, the self-test input (STI) connector is not found next to the self-test output (STO) connector (like most EEC-IV systems). Generally the STI connector can be found about 6" away from the STO connector on the main diagnostic wiring harness. Consult a vehicle wiring diagram if you are unsure. Failure to connect the tester to STI does not permit MECS code retrieval.

E 7: FORD/MAZDA 4EAT CODES

4EAT codes are identical to MECS codes since only SLOW codes are produced by the controller and similarly service code time duration/structure. Note that depending on application this transaxle is used with Ford or Mazda engines, and has its own transaxle controller (vehicles with 2.2L non-turbo and 4EAT have electronics integrated into one controller and share one diagnostic connector).

4EAT codes are accessed through the 4EAT self-test connector, which is physically different from the EEC-IV quick-test connector. To connect your tester to the 4EAT self-test connector, please refer to *Using Jumper Cables to Connect MECS Vehicles to the Tester on page 253*. The wiring diagrams shows how to properly connect the Ford adapter to the vehicle self-test connector.

After all connections have been made, set the tester to read SLOW codes in the STAR MODE, then press F3 to erase any existing codes in the STAR MODE memory. Begin the code retrieval process by turning the ignition key on and press F1 to TEST. If any 4EAT codes are stored in memory, the tester retrieves them and displays codes on the screen. You can now perform KOEO and KOER tests. Refer to Ford or Mitchell diagnosis manuals for more information.

To clear 4EAT codes from controller memory, disconnect the vehicle negative battery cable and step on the brake pedal for 10 seconds.

Note that on 1.9L engines equipped with the 4EAT system there is no STI connector. That is because STI is grounded inside the 4EAT controller. As a result, you should have the tester connected per the wiring diagrams on page 253, but do not worry about the STI connection. The instant that the key is turned on, the tester begins to read 4EAT service codes (if any are stored in controller memory).

E 8: MECS/4EAT TIMING INTERVALS

Table E-1 and Table E-2 show the timing intervals on which Ford codes are based. Later in this section there is an example of the STO signal for EEC-IV KOEO code 21 transmitted, followed by a Continuous Code 11. Notice that fast and slow codes are transmitted and the slow codes are transmitted twice. *Figure E-2, Example of MECS/4EAT KOEO/KOER Service Codes, on page 252* shows Codes 8 and 11. Notice the timing interval changes for 1st or 2nd code digits.

INTERVAL	FAST	SLOW
A	5 ms[a]	0.5 s
B	20 ms	2.0 s
C	40 ms	4.0 s
D	60 ms	6.0 s

TABLE E-1. Timing Intervals for Ford Diagnostic Codes

a. ms = milliseconds s = seconds

INTERVAL	FAST	SLOW
A	5 ms[a]	0.5 s
B	20 ms	2.0 s
C	40 ms	4.0 s
D	60 ms	6.0 s

TABLE E-2. Timing Intervals for MECS Diagnostic Codes

a. ms = milliseconds s = seconds

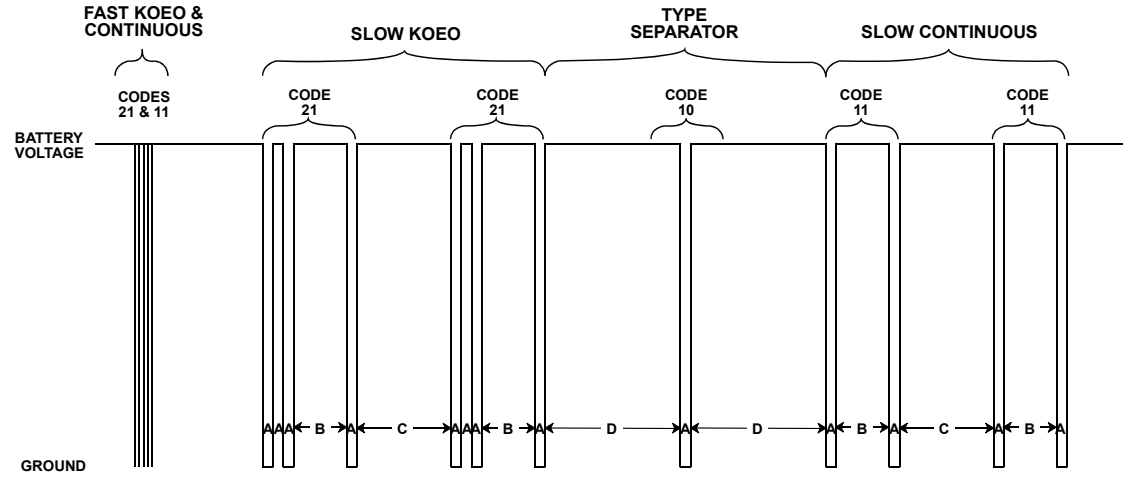


FIGURE E-1. Example of EEC-IV Fast and Slow KOEO and Continuous Codes

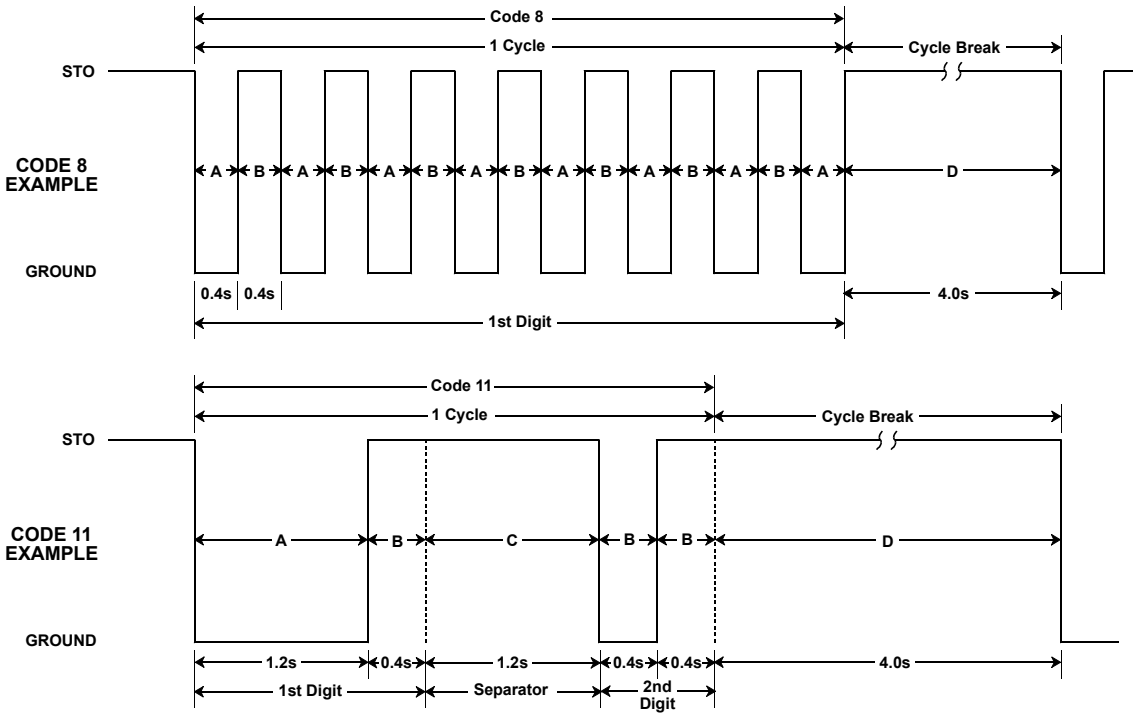


FIGURE E-2. Example of MECS/4EAT KOEO/KOER Service Codes

E 9: FORD ADAPTER

The Ford Adapter allows the standard cable to operate with Ford ECAs. This adapter connects to Ford's 6- and 7-pin Self-Test Connectors. Table E-3 shows how the Ford Adapter connects the DLC cable to the Ford vehicle.

DLC CABLE	FORD ADAPTER	VEHICLE
A ----------	A ---------- 1 --	VEHICLE GROUND
M ----------	M ---------- 5 --	STO
C ----------	C ---------- 4 --	STI, 6-PIN
D ----------	D ---------- 7 --	STI, 7-PIN

TABLE E-3. Tester to Ford Vehicle Electrical Connection

E 10: USING JUMPER CABLES TO CONNECT MECS VEHICLES TO THE TESTER

CAUTION!

CAUTION

Be careful not to touch any jumpers to the pin marked VPWR as damage to the tester may result.

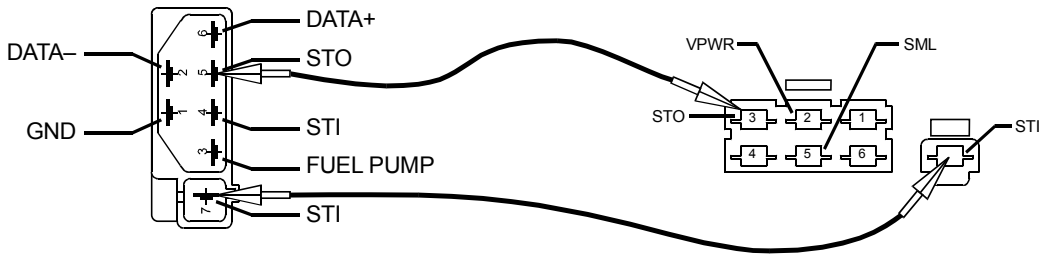


FIGURE E-3. Standard Connection

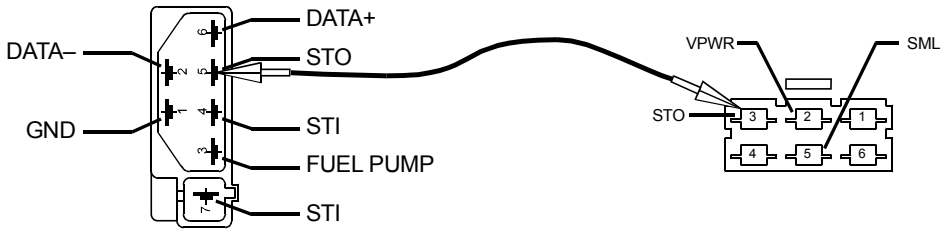


FIGURE E-4. 1.9L with 4EAT

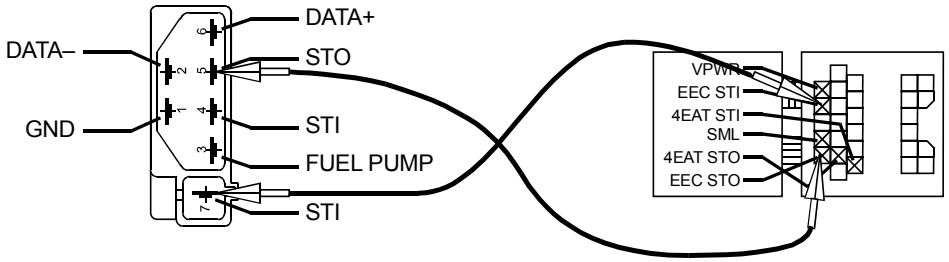


FIGURE E-5. 1.8L, 2.0L MECS

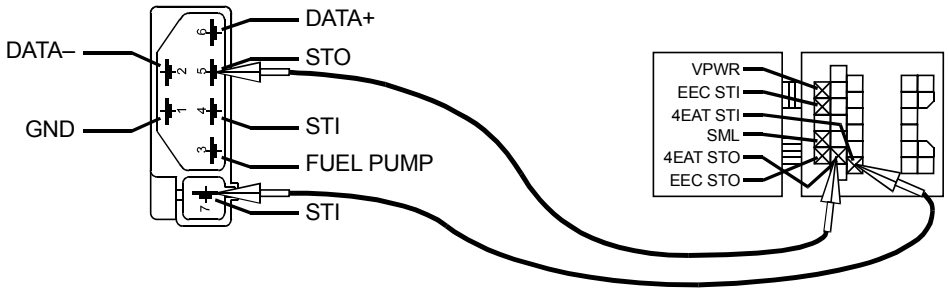


FIGURE E-6. 1.8L with 4EAT MECS Jumpers

E 11: MECS JUMPER CONNECTIONS (FESTIVA, PROBE, TRACER, CAPRI)

When connecting jumper wires to a Festiva, Probe, Tracer, or Capri, it is possible to connect to the incorrect STI connector. This is because the STI connector is NOT the connector closest to the STO connector; the connector closest to the STO connector contains a Tach circuit, which can cause a tester malfunction.

Reminder: on 1991-93 Escort/Tracer and 1993 Probe, the STI and Tach circuits are integrated into a 17-pin DLC. There are no single wire connectors for the STI and Tach circuits.

CAUTION!

Do not connect the STI jumper to the engine Tach test connector. Refer to Table E-4 to prevent this from occurring.

NOTE

Source for information contained in following table is Ford TSB 93-2-4.

MODEL	YEAR	ENGINE	CONNECTOR	WIRE COLOR	CONNECTOR COLOR	CONNECTOR LOCATION
Tracer	1988-89	1.6 EFI	Tach	Yellow/Black	White	At ignition coil
			STI	Yellow	Green	Left rear corner of engine compartment
Festiva	1988-89	1.3L Carb	Tach	None	None	Left rear corner of engine compartment
			STI	Yellow/Black	White	
	1988-89	1.3L EFI	Tach	Yellow/Green	Black	
			STI	Yellow/Black	White	
	1990-93	1.3L EFI	Tach	Yellow/Green	White	
			STI	Yellow/Green	Black	
Capri	1991-93	1.6L EFI Turbo/Non-Turbo	Tach	Yellow/Black	White	At ignition coil
			STI	Yellow	Green	Right rear of engine compartment
Probe	1989	2.2L EFI Turbo	Tach	Yellow/Black	White	Left rear corner of engine compartment
			STI	Red/White	Black	
	1989	2.2L EFI Non-Turbo	Tach	None	None	
			STI	Red/White	Black	
	1990-92	2.2L EFI	Tach	Yellow	Black	
			STI	Red/White	Black	
	1990-92	2.2 EFI Non-Turbo	Tach	Yellow/Black	Black	
			STI	Red/White	Black	

TABLE E-4. MECS Jumper Connection for Tracer, Festiva, Capri, and Probe

E 12: EXAMINING CODES FROM A TEST

Ford systems that utilize Electronic Control Actuators (ECAs) include Engine, ABS, Cruise Control, and Air Suspension Systems. The automated test sequence(s) associated with each ECA is called Quick Test, and the outcome of these test results is displayed in the form of service codes. You should follow the Quick Test sequences designed for each ECA type to properly interpret and service the system under test. Be prepared to test the vehicle at normal operating temperature (drive the vehicle or warm for 3 minutes @ 3000 RPM) and do not be afraid to rerun tests if you have doubts as to the resulting codes.

For example, when diagnosing as EEC-IV engine system, the sequence should be as follows: 1) Prepare the vehicle for testing, 2) Perform KOEO, 3) Run Timing Check, 4) Perform KOER, and 5) Repair Service codes that have not already been repaired. And remember to diagnose the **first** code of each test if more than one service code is retrieved.

Using the tester, you should diagnose the system under test until a KOEO/KOER pass code is received. Thus, the Pinpoint Test trouble tree should be followed and repairs made until a pass condition exists. This requires you to rerun the test you used to find the service code. When a pass condition (code 11 or 111) is received, you know that your repair has eliminated the cause of the service code. Then advance to the next test.

E 13: USING PINPOINT TESTS

Service Codes are pointers to Pinpoint Tests. When a service code is received, it means a system within the ECA's control has been detected to be malfunctioning. A Pinpoint Test is a sequence of directions that help you narrow a malfunctioning system down to the faulty unit that must be repaired or replaced.

There is a unique set of tables for decoding service codes to Pinpoint Test for every engine and model year. There is also a different table for every test. If two different engine controllers output the same service code, they may have different Pinpoint Tests. The tables determine the Pinpoint Test to be done from the year, engine, fuel delivery system, test and service code. The cartridge contains all of these tables for all vehicles from 1981 to 2004. When you press ENTER from a code display, the indicated service code's Pinpoint Test is found in the appropriate table and displayed.

Often, you are directed to start a Pinpoint Test somewhere other than at the beginning. Before continuing, you should always refer to the beginning of the Pinpoint Test. You will find a list of other systems that can cause the ECA to transmit the service code for this Pinpoint Test. These systems are not checked in the Pinpoint Test. It is your job to guarantee that they are in working order before beginning the Pinpoint Test. The beginning of a Pinpoint Test also mentions switch settings and manipulations that you should have done during the Quick Test, so make sure that you follow these necessary steps before starting your pinpoint diagnosis.

E 14: OBD II OXYGEN SENSOR LOCATION INFORMATION

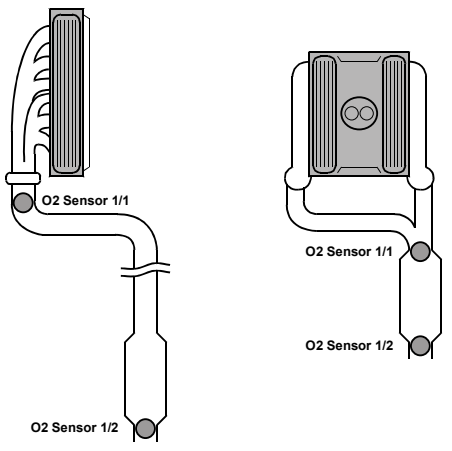
OBD II compliant engine management systems use a new naming convention for Oxygen Sensors (O2S). The need for this sensor convention was required because of the OBD II system's use of a downstream O2S.

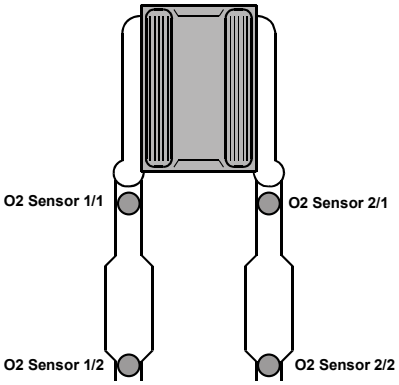
O2S location information is divided into cylinder bank and O2S location. Bank 1 contains the sensor that is downstream from the engine cylinder bank which has number 1 cylinder. Bank 2 contains the sensor opposite the cylinder Bank 1.

Additionally, O2S location is separated into upstream and downstream, relative to the catalytic converter. For in-line engines and V-configuration engines with Wye exhaust systems and two O2S ahead of the catalytic converter, O2S 1 is the upstream sensor and O2S 2 is the downstream sensor. This results in the naming convention bank/location. Examples are:

O2S 1/1=bank 1, upstream

O2S 1/2=bank 1, downstream





For V-configuration engines with dual exhaust systems, there may be separate upstream and downstream O2S for each bank. This results in the following naming convention:

O2S 1/1=bank 1, upstream

O2S 1/2=bank 1, downstream

O2S 2/1=bank 2, upstream

O2S 2/2=bank 2, downstream

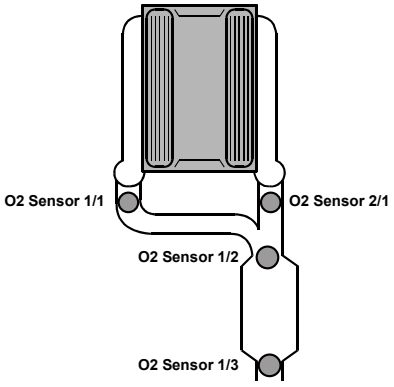
On some V-configuration engines with 2 upstream O2S, there may be an O2S 3. O2S 3 is the downstream O2S after the catalytic converter. This configuration may have a third O2S ahead of the catalytic converter, and results in the following naming convention:

O2S 1/1=bank 1, upstream

O2S 1/2=bank 1, upstream

O2S 2/1=bank 2, upstream

O2S 1/3=bank 1, downstream



Together, these conventions are all used to identify the O2S that may be causing a DTC or producing a faulty signal. The O2S naming conventions shown here are consistent with J1979. Please consult the appropriate service manual for more information on the vehicle that you are working on.

F. 1993-2002 MERCURY VILLAGER (NISSAN)

This chapter describes how to manually read and clear Engine Electronic Control Unit (ECU) DTCs on the 1993-98 Mercury Villager 3.0L VIN=W. The engine ECU on this vehicle is manufactured by Nissan and requires a different method to automatically read and clear DTCs.

The 1993-95 Mercury Villager is OBD I certified and illuminates the Malfunction Indicator Lamp (MIL) when there is a system fault. If the MIL is on, perform the manual DTC tests as outlined in this section.

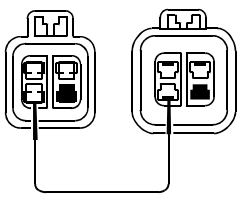
The 1996-2002 Mercury Villager is OBD II certified and illuminates the Malfunction Indicator Lamp (MIL) when an emission related fault occurs in two consecutive trips. If the emission related malfunction is not present for three or more trips, then the engine ECU turns the MIL off. Also, the MIL is illuminated or flashed during the first trip when tailpipe emissions (misfire, catalytic convertor, or closed loop operation problems) exceed the federal limit. If the MIL is on, perform the manual DTC tests as outlined in this section.

For DTC descriptions and Pinpoint Tests, refer to manufacturer service information.

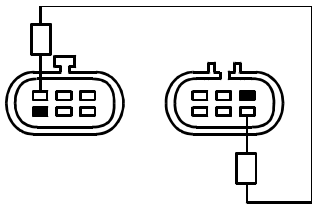
MANUALLY READING DTCS ON 1993-2002 MERCURY VILLAGER 3.0L VIN=W

To manually read DTCs, do the following:

1. Locate the Diagnostic Jumper Connector (under hood, below MAF sensor, on bracket bolted to transaxle).
2. Turn the ignition key to ON.
3. Disconnect the Diagnostic Jumper Connector (DJC).
4. Referring to the illustration, use a jumper wire to short the Blue/White wire and Grey/Blue wire between the DJC halves.



1993-95 Mercury Villager



1996-2002 Mercury Villager

5. Wait 2 seconds.
6. Disconnect the jumper wire and reconnect the DJC.
7. Record the DTCs by reading the flashing dashboard MIL (see Figure F-1).

   The 1996-2002 Villager MIL flash indicates DTC timing output. This is similar to earlier OBD I Villagers, except that decoding the MIL flash for each DTC is different. On the 1996-2002 Villager, DTC output timing can be best understood by separating each DTC into 2 groups - the first group is indicated by long flashes (0.6s) of the MIL and the second by short flashes (0.3s) of the MIL. For example, if the MIL flashes 12 long flashes (0.6s each) followed by three short flashes (0.3s each) that would indicate DTC 1203. Or referring to the example diagram, DTC 0103 is indicated by one long flash and three short flashes, and DTC 0702 is indicated by seven long flashes and two short flashes.

   On 1993-95 Mercury Villagers DTC 55 indicates no malfunction. For 1996-2002 Mercury Villagers DTC 0505 indicates no malfunction.
8. When finished, turn the key off.

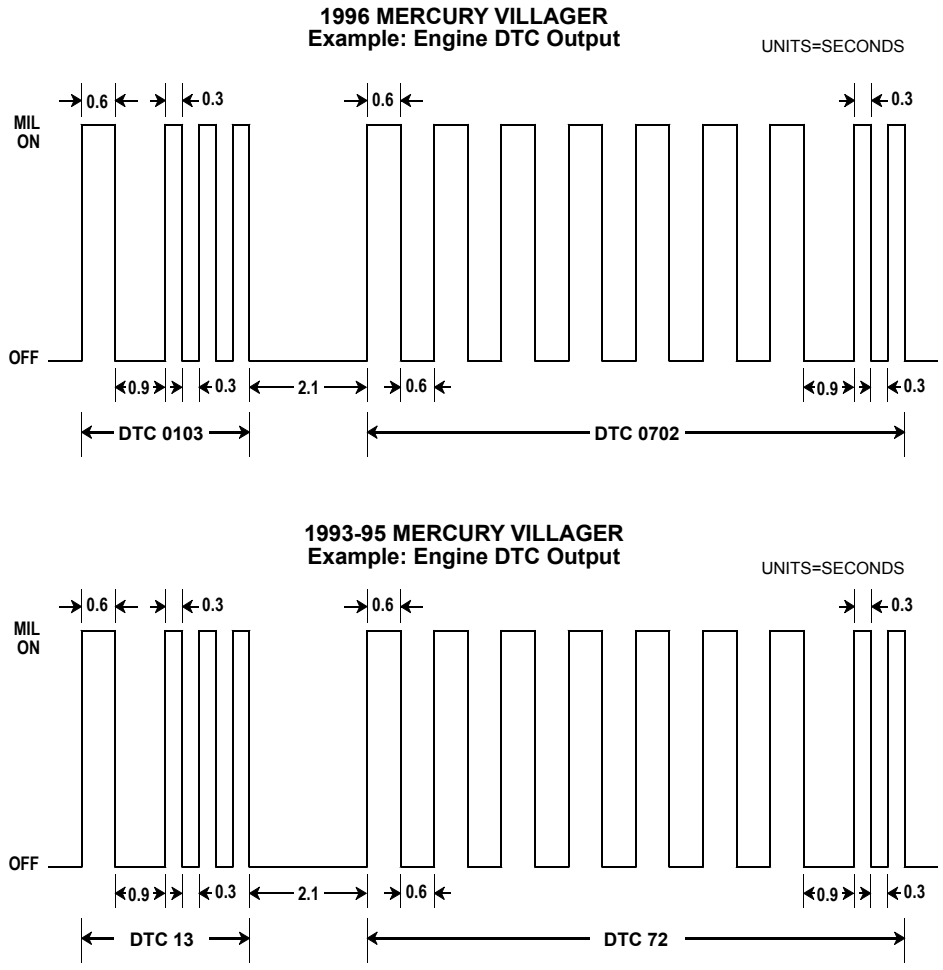


FIGURE F-1. Engine DTC Output

MANUALLY CLEARING DTCS ON 1993-2002 MERCURY VILLAGER 3.0L VIN=W

To manually clear DTCs, do the following:

1. Perform the manually reading DTCs function.
2. Referring to the illustration, use a jumper wire to short the Blue/White wire and Grey/Blue wire between the DJC halves.
3. Wait 2 seconds.
4. Disconnect the jumper wire and reconnect the DJC.
5. The MIL illuminates constantly, indicating the DTCs have been erased.
6. When finished, turn the key off.

G. GLOSSARY AND ABBREVIATIONS

This appendix contains terms and abbreviations found in the Ford body, chassis, and powertrain manuals.

4EAT	Mazda 4-speed Electronic Automatic Transaxle
4WABS	4 Wheel Antilock Braking System
ABS	Antilock Brake System
A/C	Air Conditioning
ACON	Air Conditioning On
ACT	Air Charge Temperature
AIR	Secondary Air Injection
AIRB	Secondary Air Injection Bypass
AIRD	Secondary Air Injection Diverter
ALDL	Assembly Line Data Link
AM1	Air Management 1
Antilock Brake System	Computerized system that keeps wheels from locking during braking.
Air Suspension System	A computerized suspension system on late model Ford and Lincoln Vehicles.
AODE	Ford electronic transmission with overdrive
AOF	All Outputs Off
AON	All Outputs On
AP	Accelerator Pedal
ARC	Automatic Ride Control
ASCM	Air suspension control module
A/T	Automatic Transmission
ATM	Atmospheric Pressure
AXOD	Ford automatic transaxle with overdrive
AXODE	Ford electronic transaxle with overdrive
BARO	Barometric, Barometer
BOO	Brake On or Off switch
BTDC	Vehicle spark timing, before top dead center
C.	Continuous Codes
CA	California
CAN	Controller Area Network
CANP	Canister Purge
CANP2	Auxiliary Canister Purge
CARB	California Air Resource Board
Cartridge	A Tech 1 module that contains vehicle specific software or other specialized features.
CCA	Cluster Control Assembly
CCC	Converter Clutch Control

CCS	Coast Clutch Solenoid
CES	Clutch Engage Switch
CFI	Central Fuel Injection
CHK	Check
CHT	Cylinder Head Temperature
CID	Cylinder Identification
CL	Closed Loop
CMD	Command
CNG	Compressed Natural Gas
CONN	Connector
CONT	Continuous
CPP	Clutch Pedal Position
CSI	Cold Start Injector
CTE	Closed Throttle Position
Cursor	To move up, down, left or right on a display. Typically a highlighted service code is being changed.
CYL BAL	Cylinder Balance Test
Cylinder Balance Test	A Quick Test available on EEC-IV engine with SEFI systems. The test is available after KOER codes have been transmitted. The test determines the operating state of each fuel injector.
CYLINDER ID	Cylinder Identification Code
Cylinder Identification Code	First code transmitted in KOER test: 20 = 4 cylinders 30 = 6 cylinders 40 = 8 cylinders 50 = diesel engine
DC	Duty Cycle
DCL	Data Communication Link
DEP/REL	Depress/Release
DI	Distributor Ignition
Display	Refers to the liquid crystal display (LCD)
DJC	Diagnostic Jumper Connector
DLC	Data Link Connector
DLC Cable	Standard connector cable to vehicles. Uses adapter plugs to modify for use on different manufacturer's vehicles.
DPF	Delta Pressure Feedback
DOHC	Dual Overhead Cam
DPFE	Differential Pressure Feedback EGR Valve
DPI	Dual Plug Inhibit
DTC	Diagnostic Trouble Code
DVOM	Digital Volt Ohmmeter
Dynamic Response Code	If transmitted, it is the second code in KOER test. Its value = 10. It is a signal to fully depress and release the throttle once.
ECA	Electronic Control Assembly
ECS	Electronic Crash Sensor
ECT	Engine Coolant Temperature
ECU	Electronic Control Unit
EDF	Electro Drive Fan
EEC-IV	Electronic Engine Control, version 4
EEC-V	Electronic Engine Control, version 5
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation. An emissions pollution control strategy, where exhaust gas is recirculated to the combustion chambers.
EGRT	Exhaust Gas Recirculation Temperature
EI	Electronic Ignition (aka Distributorless Ignition)
EIC	Electronic Instrument Cluster
ENG.	Engine
EO	Engine Off
EPC	Electronic Pressure Control
ER	Engine Running

ES	Electronic Suspension System. Used in this manual to refer to various Ford suspension systems, including Computer Controlled Suspension, Shock Damping Control, Air Suspension, Automatic Ride Control, and Electronic Variable Orifice Steering.
EVP	Evaporative
EVR	Electronic Vacuum Regulator
FBC	Feedback Carburetor. The carburetor is controlled by a computer that uses engine sensor information to control air fuel mixture.
FC	Fan Control
FCC	Federal Communications Commission
FED	Federal
FEM	Front End Module
FF	Flexible Fuel
FFV	Flexible Fuel Vehicle
Float	Refers to allowing an electrical signal, such as STI, to return to its uninterrupted voltage level, instead of grounding it.
FMEM	Failure Mode Effect Module
FPRC	Fuel Pressure Regulator Control
FT	Fuel Trim
GEM	Generic Electronic Module
gm/sec	Grams per Second
Ground	An electronic voltage baseline that all electronic systems in the vehicle refer to. It is in common with the negative battery terminal.
GVWR	Gross Vehicle Weight Ratio
HEDF	High Speed Electro Drive Fan
HEGO	Heated Exhaust Gas Oxygen Sensor
HFC	High Fan Control
HO	High Output
HO2S	Heated Oxygen Sensor
Hold	Voltage level of the ECA's STI line when no request for Quick Test is made. It has a voltage near the positive battery terminal.
HSC	High Swirl Combustion
HSF	High Speed Fan
HTR	Heater
Hz	Hertz
IABM	Integrated Air Bag Module
IAC	Idle Air Control
IAT	Intake Air Temperature
ICM	Instrument Cluster Module
IDM	Ignition Diagnostic Monitor
I/F	Interface
IGN	Ignition
IMRC	Intake Manifold Runner Control
IMTV	Intake Manifold Turning Valve
INJ	Injector, as in fuel injector
ISC-E	Idle Speed Controller - Electronic. The carburetor controller on 1985-89 2.0L Ranger trucks.
IVSC	Integrated Vehicle Speed Controller. A computerized cruise control system.
IVSC-KOEO	Refers to the IVSC Quick Test with the engine off and its results.
IVSC-KOER	Refers to the IVSC Quick Test with the engine running and its results.
K	Ignition Key
KAM	Keep Alive Memory
Key On, Engine Off Test	Engine Quick Test where the ECA sensors and control systems are tested under battery voltage only.
Key On, Engine Running Test	Engine Quick Test where the ECA sensors and control systems are tested under operating conditions.
KOEO or K.ON ENG.OFF	Key On, Engine Off Test

KOER or K.ON ENG.RUN	Key On, Engine Running Test
L	Liter, a metric unit, approximately 60.5 in^3.
LCD	Liquid Crystal Display
LF	Left Front
LSF	Low Speed Fan
LT	Long Term
MAF	Mass Air Flow
MAP	Manifold Absolute Pressure
MCU	Microprocessor Control Unit. An engine controller, less sophisticated than the EEC-IV.
MECS	Mazda Engine Control System
MFI	Multiport electric Fuel Injection
MIL	Malfunction Indicator Lamp
MISC	Miscellaneous
MITCHELL	Used in the Ford cartridge in reference to Mitchell automotive manuals and their corresponding Pinpoint Tests.
ML	Manual Lever
MLP	Manual Lever Position
MON	Monitor
ms	Milliseconds
M/T	Manual Transmission
N/A	Not Available, such as, some Pinpoint Test information is not published yet.
NDS	Neutral Drive Switch
NGV	Natural Gas Vehicle
O2S	Oxygen Sensor
OBD II	On-Board Diagnostics (Phase II). The California Air Resource Board (CARB) required that, by 1996, all vehicles sold in California (under 8500 GVWR) contain a certain minimum “on- board diagnostic” capability to diagnose emissions-related failures of the engine control system. These diagnostic requirements have been designated as OBD II with a goal of monitoring “all of the emissions-related components on-board the vehicle for proper operation.”
OCS	Overdrive Cancel Switch
OD	On-Demand, Overdrive
OHC	Overhead Cam
OL	Open Loop
Output State Test	A Quick Test available after all KOEO and Continuous Codes have been transmitted, where depressing the throttle changes the state of an EEC-IV's output control solenoids and relays.
PCED	Powertrain Control Emission Diagnostics manual
PCM	Powertrain Control Module
PCV	Positive Crankcase Ventilation Crankcase fumes are vented to the combustion chambers to reduce emissions.
PF	Pressure Feedback
PFE	Pressure Feedback EGR Valve
PID	Parameter ID
Pinpoint Test	Step-by-step directions to aid in diagnosing the unit responsible for causing an ECA to transmit a service code during a Quick Test.
PIP	Profile Ignition Pickup
PNP	Park/Neutral Position
PPT	Pinpoint Test
PREP	Prepare
PRES	Pressure
P/S	Power Steering
PSI	Pounds per Square Inch

PSIA	Pounds per Square Inch Absolute
PSIG	Pounds per Square Inch Gauge
PSOM	Programmable Speedometer/Odometer Module
PSP	Power Steering Pressure
PSPS	Power Steering Pressure Sensor
PTEC	Powertrain Electronic Control Module
PW	Pulse Width
QCK TST	Quick Test
Quick Test	A diagnostic self-test mode that an ECA can be forced to enter. Intended to assist servicing and repair of electrical systems in Ford vehicles.
RCM	Restraint Control Module
REST	Restrictor
RF	Right Front
ROM	Read Only Memory
RPM	Revolutions per Minute
RS-232 or RS232	A serial data transmission standard between computers and accompanying systems which uses one signal line for data.
RS232 I/F Cartridge	An auxiliary cartridge that works in conjunction with a vehicle cartridge. The cartridge gives RS232 capability to the **Tech 1** so it can communicate with computers and printers.
RSRVD	Reserved
RWD	Rear Wheel Drive
s	Seconds
SAE	Society of Automotive Engineers
SC or S/C	Super Charged, Super Coupe, Speed Control
SCP	Standard Corporate Protocol
SCVAC	Speed Control Vacuum
SCVNT	Speed Control Vent
SEFI/SFI	Sequential Electronic Fuel Injection. One fuel injector for each cylinder in the engine.
S/T	Self Test
Self-Test Input	ECA input line. Grounding and floating this line stimulate the ECA to do various Quick Test related operations.
Self-Test Output	ECA data transmission line. Used for sending service codes to diagnostic test equipment.
Service Codes	Two or three digit numbers transmitted after an ECA does a Quick Test that signify the results of doing the test.
SFI	Sequential Fuel Injection
SHO	Super High Output
SNAPSHOT	Application cartridge function that lets you isolate and record an intermittent problem by storing data parameters.
SOHC	Single Overhead Cam
SOL	Solenoid
SPD	Speed
SPECS	Specifications
SS1	Shift Solenoid 1
ST	Short Term
STI	Self-Test Input
STO	Self-Test Output
SVO	Special Vehicle Operations
SYMPTM	Symptom, as in Ford's Diagnostic Section, and Diagnostics by Symptom Tables.
TC	Turbo Charged
TCC	Torque Converter Clutch
TCIL	Transmission Control Indicator Lamp
TCM	Traction Control System
TCS	Transmission Control Switch
TEST	Condition of STI line, in a grounded state. This is the typical level of the line when requesting and during Quick Tests.
TFT	Transmission Fluid Temperature

TIMING CHECK	Refers to the Quick Test mode: Computerized Timing Check Test
TNK	Tank
TOT	Transmission Oil Temperature
TP	Throttle Position
TP-B	Secondary Throttle Position Sensor
TPS	Throttle Position Sensor
TR	Transmission Range
TRANS	Transmission
TSS	Transmission Select Switch, Transmission Speed Sensor
TURBO	A turbine system that increases the air pressure in the intake manifold to make more oxygen available for combustion.
UNLCK	Unlock
V	Volts
VAC	Vacuum
VCRM	Variable Control Relay Module
VECI	Vehicle Emission Control Information Decal, usually located in the engine compartment around the radiator and fan shroud.
VEH	Vehicle
VIM	Vehicle Interface Module. An in-line interface that expands tester functionality.
VIN	Vehicle Identification Number
VPWR	Vehicle Power
VREF	Vehicle Reference
VSS	Vehicle Speed Sensor
WOT	Wide Open Throttle
ZP	Zero Pressure

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