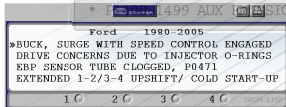
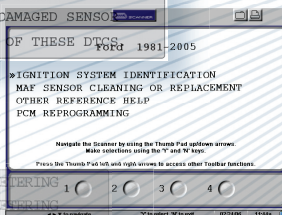
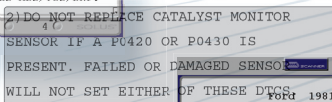
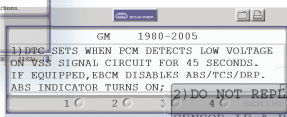
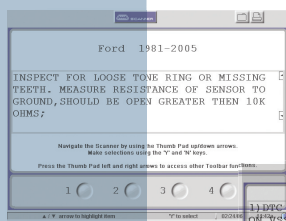


Fast-Track® Troubleshooter Quick Reference Guide



Fast-Track[®]
**Troubleshooter
Quick Reference
Guide**

March 2007

Snap-on[®]

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Form 8-13963A03 Rev. A



Safety Information

For your own safety and the safety of others, and to prevent damage to the equipment and vehicles upon which it is used, it is important that the accompanying Diagnostic Safety Manual be read and understood by all persons operating, or coming into contact with, the equipment.

This product is intended for use by properly trained and skilled professional automotive technicians. The safety messages presented throughout this manual are reminders to the operator to exercise extreme care when using this test instrument.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, we cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the system being tested. It is essential to use proper service methods and test procedures. It is important to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, the equipment being used, or the vehicle being tested.

It is assumed that the operator has a thorough understanding of vehicle systems before using this product. Understanding of these system principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using the equipment, always refer to and follow the safety messages and applicable test procedures provided

by the manufacturer of the vehicle or equipment being tested. Use the equipment only as described in this manual.

Read, understand and follow all safety messages and instructions in this manual, the accompanying *Diagnostic Safety Manual*, and on the test equipment.

Safety Conventions

Safety messages are provided to help prevent personal injury and equipment damage. Safety messages in this manual contain a signal word with an icon. The signal word indicates the level of the hazard in a situation. Signal words used in this manual are explained below.

 DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

 WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

 CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to bystanders.

Safety messages contain three different type styles:

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard.

SAVE THESE INSTRUCTIONS

Contents

SNAP-ON INCORPORATED SOFTWARE LICENSE AGREEMENT ..	iii
EXHIBIT A: SNAP-ON INCORPORATED PRIVACY POLICY	vii
Safety Information.....	xi
Safety Conventions	xii
Contents.....	1
Chapter 1: Using This Manual.....	3
Conventions	3
Bold Text.....	3
Terminology	3
Select.....	3
Scroll.....	4
Scan Tool.....	4
Notes and Important Messages.....	4
Procedures	5
Chapter 2: Introduction.....	7
Fast-Track® Troubleshooter Software	8
Troubleshooter Categories	9
Additional Troubleshooter Features.....	12
Troubleshooter Reference Manuals	13
Chapter 3: Getting Started.....	15
Installing the Fast-Track® Troubleshooter References DVD	15
Minimum System Requirements.....	15
Fast-Track® Troubleshooter References DVD Installation.....	16
Accessing Fast-Track® Troubleshooter.....	17
Making Selections	18
Exiting Troubleshooter	19
Chapter 4: Diagnostic Practices	21
Trouble Code Diagnosis.....	21
OBD-II Diagnostic Trouble Codes (DTCs).....	21

Technical Service Bulletins.....	22
Vehicle Modifications.....	23

This manual contains instructions for using the Fast-Track® Troubleshooter. The following conventions are used.

Conventions

Bold Text

Bold text is used for emphasis and to highlight selectable items such as buttons and menu options.

Example:

Press the **Exit** button.

Terminology

Certain terms are used to command specific actions throughout this manual. Those terms are described below.

Select

The term “select” will be used to mean selecting a menu item or other option and confirming the selection using the input device.

Example:

Select **Exit**.

Scroll

The term “scroll” will be used to mean moving the cursor or changing data by turning the Thumbwheel, pressing the Thumb Pad, or pressing the arrow keys.

Example:

Scroll to see any other codes and the data list.

Scan Tool

The term “scan tool” will be used to refer to any diagnostic tool that can access information from the vehicle data stream. When necessary, the term “Scanner™” will be used to distinguish our equipment from another diagnostic device, such as the manufacturer’s scan tool.

Notes and Important Messages

The following messages appear throughout this manual.

Notes

A NOTE provides helpful information such as explanations, tips, and comments.

Example:

**NOTE:**

For additional information refer to...

Important

IMPORTANT indicates a situation which, if not avoided, may result in damage to the test equipment or vehicle.

Example:

IMPORTANT:

Disconnecting the USB cable during vehicle communication can cause damage to the ECU.

Procedures

An arrow icon indicates a procedure.

Example:



To change screen views:

1. Select **View**.
The drop-down menu displays.
2. Select an option from the menu.
The screen layout changes to the format you selected.

The Fast-Track® Troubleshooter system simplifies the time consuming part of diagnosis. The system contains information on common diagnostic trouble code (DTC) problems and driveability symptoms for most vehicles covered by the vehicle communication software (VCS).

Information in the Fast-Track® Troubleshooter is organized into a series of diagnostic tips that are designed to quickly lead you to the root cause of a particular problem on the test vehicle. Tips are vehicle specific, which means that only those tips that relate to the vehicle identified to the scan tool are presented. The Fast-Track® Troubleshooter system consists of two parts:

- Fast-Track® Troubleshooter Software
- Fast-Track® Troubleshooter Reference Manuals

While the system does not cover every possible DTC and every problem that could occur in every vehicle, the tips that are in Troubleshooter were developed and verified by a team of master automotive technicians. Tips are based on the experience of these technicians using original equipment manufacturer (OEM) service manuals and technical service bulletins, aftermarket resources, and pattern failures that have been experienced and successfully resolved in the field.

The following Troubleshooter applications are available:

- US Domestic Driveability
- Asian Import Driveability
- US Domestic Transmission
- Asian Import Transmission
- Antilock Brake Systems (ABS), US Domestic and Asian Import

Fast-Track® Troubleshooter Software

If coverage is available for the identified vehicle, the Troubleshooter selection appears on the main menu (Figure 2-1).

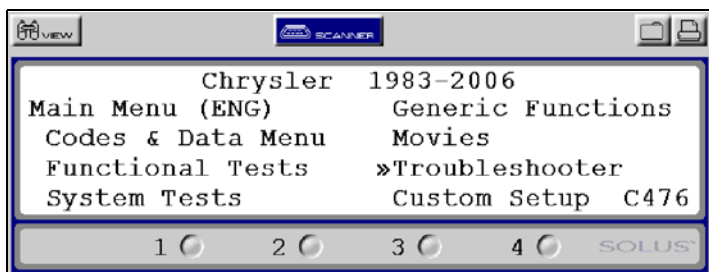


Figure 2-1 Sample Main Menu

Selecting Troubleshooter establishes a link to the vehicle communication software that allows you to switch back and forth between the Troubleshooter application and the vehicle communication software application without disconnecting or powering off.

Fast-Track® Troubleshooter displays “live” vehicle parameter readings¹. They are the same values that display in the Codes & Data or Sensor Test mode in the vehicle communication software. Data readings change as vehicle operating conditions change.

The steps in each Troubleshooter tip begin with the most likely cause of a problem, or with the first test that should be performed. Steps then progress through other possible causes and tests.

¹ Limited to Fast-Track Data Scan (Normal Values), Tests & Procedures, and some Code Tips.

Troubleshooter Categories

A selection menu displays when you enter Troubleshooter. Selections vary based on the identified vehicle and on the system being tested.

Available selections and the systems they apply to are listed in the [Table 2-1](#).

Table 2-1 *Troubleshooter Categories*

Category	Troubleshooter		
	Driveability	Transmission	ABS
Read First	✓	✓	
Warning Lights and Initial Check			✓
ABS Brake Service—Caution Areas			✓
Code Tips	✓	✓	✓
Service Advice and Specifications		✓	
Symptom Tips	✓	✓	
Tests and Procedures	✓	✓	✓
Technical Assistance	✓	✓	✓
Training			✓
Fast-Track Data Scan	✓	✓	✓
Overhaul Tips		✓	
Emissions Tips (OBD I only)	✓		

Read First

The **Read First** selection contains basic system and component information, or general details about how the Fast-Track® Troubleshooter information is organized.

Warning Lights and Initial Check

The information contained in this selection provide a starting point for ABS diagnosis. Tips explain how the malfunction indicator lamp (MIL) circuits function during normal operation, and how to diagnose ABS problems based on MIL conditions.

ABS Brake Service - Caution Areas

These tips alert you to sensitive areas that should be avoided, or that you should be aware of during routine brake services. Information on pad replacement, bleeding, or rotor machining is included.

Code Tips

These tips are based on the diagnostic trouble code (DTC), and contain specific repair information. Code tips are organized either numerically or alphanumerically.

A Code Summary line on the top line of each tip menu lists any codes present in the vehicle during testing. If no codes are present at the time of testing, the Code Summary line reads "no codes present". A list of DTC code tips available for the identified vehicle displays below the summary line.

Symptom Tips

This selection provides repair tips for frequently occurring operating problems that cause driveability complaints but do not generate codes. Symptom tips are arranged alphabetically.

Service Advice and Specifications

This selection contains general guidelines and information for testing and servicing transmissions.

Service tips include fluid type and capacity, service intervals, and areas that may need special attention during a routine service.

Specification tips contain information on line pressure, solenoid resistance, tightening torques, and other measurable criteria.

Tests and Procedures

This selection contains tests and procedures based on frequently suspected components or symptoms that may or may not be accompanied by codes.

Scroll through the entire tip list, as a Test and Procedure may include more than one tip. Follow on-screen instructions to perform the test or view data.

Technical Assistance

The Technical Assistance selection provides a variety of helpful and technical data. Topics may include information from factory service bulletins, procedures for reading and clearing codes, adaptive relearn strategies, system operating information, OBD-II drive cycle requirements, and other useful material.

Training

Available only in the ABS Troubleshooter, this selection combines training and technical assistance. Tips provide system design and theory of operation information, and explain the cause of pattern failures for ABS and traction control systems.

Fast-Track Data Scan

The Fast-Track Data Scan selection contains information and guidelines on how to quickly validate data stream readings for important sensors and actuators. Normal data values are provided for comparison. Information is included to allow you to see at a glance whether the data stream values are reliable. Tips are vehicle-specific and are listed alphabetically by component. Operating ranges for specific components may also be included.

Overhaul Tips

Available only in the Transmission Troubleshooter, this selection provides detailed procedures for disassembling and assembling transmission components and subassemblies. Inspection hints, assembly instructions, lists of selectively sized components, test procedures, and measurement procedures and specifications may be included.

Additional Troubleshooter Features

In addition to the extensive experienced based information it offers, the Fast-Track® Troubleshooter application also provides the additional time-saving features described below.

Tips with Functional Tests

Some Troubleshooter tips direct you to perform a functional test to check components. Although the test is typically performed in the vehicle communication application, in most cases when the test is available, you are able to perform the procedures from within the Troubleshooter application. In a few cases, you may be directed to exit

Troubleshooter and return to the VCS menus to perform the test. If so, follow the screen prompts.

Automatic Tip Finder

Many Fast-Track® Troubleshooter tips direct you to a related tip for additional information that may be used to solve a particular repair problem. The Troubleshooter software includes an automatic tip finder that lets you jump quickly from one tip to a related tip, or from the tip to a test, without having to return to the previous menu, or without having to navigate to and select another item.

Troubleshooter Reference Manuals

Fast-Track® Troubleshooter reference manuals contain additional diagnostic information that supports the tips in the Troubleshooter software. The manuals are the second part of the Troubleshooter system and must be used in combination with the software. Tips in the software are linked to specific references in a Troubleshooter reference manual.

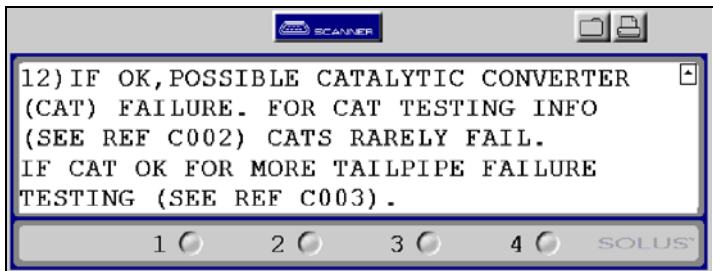


Figure 2-2 *Sample reference message*

Like the information in the software, the references in the manual are compiled from the experience of master technicians, information in service manuals, technical

service bulletins, and various independent sources of service data. References may include special instructions, detailed test and repair procedures, service specifications, circuit and wiring diagrams, and other pertinent information.

A Fast-Track® Troubleshooter Reference Manual digital video disc (DVD) is supplied with your Troubleshooter kit. Before using Troubleshooter for the first time, follow the steps in [“Installing the Fast-Track® Troubleshooter References DVD”](#) on page AA15 to install the DVD information onto your personal computer. That way the information is readily available when you need it.

This chapter explains how to begin using the Fast-Track® Troubleshooter system. It contains the following sections:

- [“Installing the Fast-Track® Troubleshooter References DVD”](#)
- [“Accessing Fast-Track® Troubleshooter”](#)
- [“Making Selections”](#)
- [“Exiting Troubleshooter”](#)

Installing the Fast-Track® Troubleshooter References DVD

Before you begin using the Fast-Track® Troubleshooter software, install the references digital video disc (DVD) on your personal computer (PC).

Minimum System Requirements

- Pentium® 100 CPU
- 1GB of hard drive available
- 23 MB of RAM
- DVD-ROM drive
- Windows® 2000, XP, or Vista
- SVGA monitor running 800 x 600 resolution
- Mouse and keyboard

Fast-Track® Troubleshooter References DVD Installation

The new Fast-Track® Troubleshooter References DVD contains all of the information that was previously supplied on five CDs.



NOTE:

The new DVD version of the references contains all of the information included on the previous versions. Once the DVD in this packet has been installed, do not attempt to install any old (CD) versions of the Fast-Track® Troubleshooter Reference Manual Viewer.

**To install the new Fast-Track® Troubleshooter References DVD:**

1. Insert the DVD into the DVD-ROM drive of your computer.
2. The DVD should autorun. If not, from the desktop, select **Start > Run**.
Previous versions of the reference manuals must be uninstalled from your PC before the new version can be installed. The installation software should perform this task automatically.
3. Click **Yes** to uninstall previous versions if prompted to do so, then click **OK** to confirm.
4. When the Install Wizard displays, follow the on-screen instructions. Click **Next** as needed to proceed.
When prompted, allow the programs to install into the default directory.
5. Click **Install**.
6. Click **Finish** once the installation is complete.
7. Store the new Fast-Track® Troubleshooter References DVD in a safe location. All previous versions of the Reference Manual CDs can be discarded.

Accessing Fast-Track® Troubleshooter

Before selecting Troubleshooter for the first time on any vehicle, it is advisable to first check Codes & Data or perform system tests to see if codes are present and to look for obvious system abnormalities.

The vehicle communication and Troubleshooter software work interactively. You can switch back and forth between Troubleshooter and the vehicle communication software to perform any available diagnostic reading or test function.



To access the Troubleshooter software:

1. Enter the identification (ID) of the test vehicle in the usual manner.
2. If prompted, select a system for testing, then select Troubleshooter from the list of options.

The Troubleshooter selection does not appear on the menu when the software does not contain information for the vehicle you have identified.

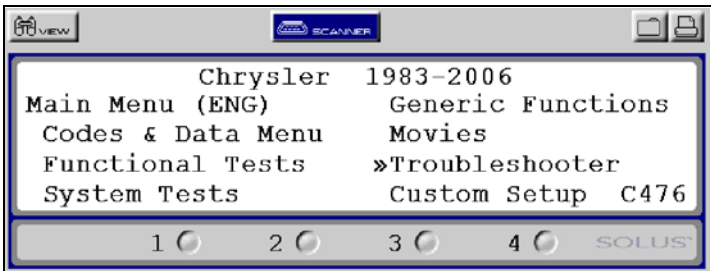


Figure 3-1 Sample Main Menu

Menu selections vary slightly by manufacturer and system availability.

Making Selections

Each tip listed on the menu contains one or more steps. Steps may include instructions to read one or more parameters, take voltage measurements, inspect and test various components, replace components, or make certain repairs. Steps within a tip are presented in the order in which the components should be checked or the tests should be performed.



To make a selection:

1. From the main menu, select **Troubleshooter**:
For Driveability Troubleshooters, the category selection screen displays.
For ABS and Transmission Troubleshooters, the system identification screen displays.
System identification selections offer assistance in identifying the ABS or transmission on the test vehicle, to access the category selection menu:
 - a. Scroll to the system.
 - b. Select to open the menu.
2. Select a category.
A menu of tips available for the vehicle displays. All of the tips and information available for the test vehicle (in the selected category) are listed. The list is not limited by codes that may or may not be present.
3. Select a tip that most closely matches the problem with the vehicle.
4. Exit the tip to return to the tip menu.
5. Select another tip from the menu.



NOTE:

If you select the same tip again, you return to the same point in the same step from which you exited.

Exiting Troubleshooter



To exit Troubleshooter:

1. Press **N** to exit any Troubleshooter tip and return to the selection menu.
2. Press **N** again to exit the selection menu and return to the VCS main menu.

This chapter contains basic information for developing an organized approach to diagnosis.

Trouble Code Diagnosis

Manufacturers advise that trouble codes be diagnosed and serviced in a specific order: first, diagnose hard codes for currently present problems; then diagnose soft, or memory, codes (if the vehicle transmits them) for intermittent problems.

Different vehicles record and transmit hard or soft codes in different ways. Vehicle communication software manuals contain information on reading and interpreting codes from vehicles that are covered by Fast-Track® Troubleshooter. Information is also included in the Training & Technical Assistance selection on the Troubleshooter main menu.

OBD-II Diagnostic Trouble Codes (DTCs)

OBD-II diagnostic trouble codes (DTCs) display in a 5-character alphanumeric format. The first character of the DTC, a letter, defines the system where a code was set. Four letters are currently used: “P” for powertrain, “B” for body, “C” for chassis, and “U” for network communication.

The second character of the DTC is a number (0, 1, 2, or 3). If the second character is 0, it is an SAE defined (generic) code, and 1 indicates a manufacturer-defined (enhanced) code. The meaning of a 2 or 3 varies according to the system character (P, B, C, or U).

The third DTC character indicates the system where the fault occurred:

Third DTC Character	Indicated System
1	Fuel or air metering system
2	
3	Ignition malfunction or engine misfire
4	Auxiliary emission control system
5	Vehicle or idle speed control system
6	Computer or output circuit fault
7	Transmission control system
8	

The final characters in the DTC indicate the conditions that triggered the code. Different sensors, actuators and circuits are assigned blocks of numbers; and the lowest number in the block is used to indicate a general malfunction. Higher numbers in the block—also called enhanced codes—provide more specific information, such as low or high voltage, a slow response time, or an out-of-range signal.

Technical Service Bulletins

Many of the Fast-Track® Troubleshooter references list one or more technical service bulletins (TSB) from the vehicle manufacturer as a contributing source of information. Copies of original vehicle TSBs can be obtained from the following sources:

- Dealership service departments
- Distribution services for factory service manuals
- Independent aftermarket service manual publishers
- Computer-based service information systems
- Telephone “hotline” information services

Vehicle Modifications

Some Troubleshooter tips may refer to manufacturer technical service bulletins (TSB) that call for:

- Modifying the idle speed, base ignition timing, or spark plug gap
- Installing a new electronic control module (ECM)
- Installing different emissions related parts
- Re-routing vacuum lines
- Altering the original calibration of the emission controls

Ford, Chrysler and some import manufacturers provide dealership technicians with “authorized modifications” labels as shown in [Figure 4-1](#) and [Figure 4-2](#).

DaimlerChrysler	AUTHORIZED MODIFICATIONS	THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE, BY EPA AND CARB.
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:		
CHANGE AUTHORITY	DEALER CODE	DATE
04275086AB		

Figure 4-1 *Sample Chrysler modifications label*

 AUTHORIZED MODIFICATIONS	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:	
THESE MODIFICATIONS HAVE BEEN APPROVED, AS APPROPRIATE, BY EPA AND CARB.	
DEALER NUMBER:	DATE:
CHANGE AUTHORITY:	
FPS 8262 9/78	FORD MOTOR COMPANY
PRINTED IN USA	

Figure 4-2 *Sample Ford modifications label*

Add a short description of the change, the related TSB number, the dealer code, and the date in the section provided on the label.

Labels can often be obtained from Ford or Chrysler parts departments. Other manufacturers do not use an “authorized modifications” label. However, some service kits may include a label that describes calibration changes.

IMPORTANT:

Whenever a vehicle is modified by an approved calibration change, it is good practice to obtain or make a label that describes the change. Place the label in a highly-visible location, such as on the bulkhead, radiator shroud, or near the original VECI label on the engine. Cover the label with transparent tape for protection.
