

CHAPTER 8



SERVICE INFORMATION

OBJECTIVES

After studying Chapter 8, the reader will be able to:

1. Discuss the importance of vehicle history.
2. Retrieve vehicle service information.
3. Read and interpret service manuals and electronic service information.
4. Describe the use of the vehicle owner's manual.

KEY TERMS

Julian Date (JD) (p. 105)
Service Information (p. 98)

Technical Service Bulletin (TSB) (p. 103)

VEHICLE SERVICE HISTORY RECORDS

Whenever service work is performed, the record of what was done is usually kept on file by the shop or service department for a number of years. The wise service technician will check the vehicle service history if working on a vehicle with an unusual problem. Often, a previous repair may indicate the reason for the current problem or it could be related to the same circuit or components.

OWNER'S MANUALS

It has been said by many automotive professional technicians and service advisors that the owner's manual is not read by many vehicle owners. Most owner's manuals contain all or most of the following information:

1. How to reset the maintenance reminder light
2. Specifications, including viscosity of oil needed and number of quarts (liters)
3. Tire pressures and standard and optional tire sizes
4. Maintenance schedule for all fluids, including coolant, brake fluid, automatic transmission fluid, and differential fluid
5. How to program the remote control as well as the power windows and door locks
6. How to reset the tire pressure monitoring system after a tire rotation

LUBRICATION GUIDES

Lubrication guides, such as those published by Chek-Chart and Chilton, include all specifications for lubrication-related service including:

- Hoisting location
- Lubrication points
- Grease and oil specifications
- Capacities for engine oil, transmission fluid, coolant for cooling systems, and differential fluid

SERVICE MANUALS

Factory and aftermarket service manuals contain specifications and service procedures. While factory service manuals cover just one year and one or more models of the same vehicle, most aftermarket service manuals cover multiple years and/or models in one manual. See Figure 8-1.

Included in most service manuals are the following:

- Capacities and recommended specifications for all fluids
- Specifications including engine and routine maintenance items

- Testing procedures
- Service procedures including the use of special tools when needed

While some factory service manuals are printed in one volume, most factory **service information** is printed in several



REAL WORLD FIX

OWNER'S MANUAL IS THE KEY TO PROPER OPERATION

A customer purchased a used Pontiac Vibe and complained to a shop that the cruise control would disengage and had to be reset if driven below 25 mph (40 km/h). The service technician was able to verify that in fact this occurred, but did not know if this feature was normal or not. The technician checked the owner's manual and discovered that this vehicle was designed to operate this way. Unlike other cruise control systems, those systems on Toyota-based vehicles are designed to shut off below 25 mph, requiring the driver to reset the desired speed. The customer was informed that nothing could be done to correct this concern and the technician also learned something. Vehicles that use the Toyota cruise control system include all Toyotas, plus Lexus, Pontiac Vibe, and Chevrolet Prism.

NOTE: Many vehicle manufacturers offer owner's manuals on their website for a free download.



FIGURE 8-1 Many service manuals include diagnostic information as well as specifications and repair procedures.

volumes due to the amount and depth of information presented. The typical factory service manual is divided into sections.

General Information

General information includes topics such as:

- Warnings and cautions
- VIN identification numbers on engine, transmission/transaxle, and body parts
- Lock cylinder coding
- Fastener information
- Decimal and metric equivalents
- Abbreviations and standard nomenclature used
- Service parts identification label and process code information

Maintenance and Lubrication Information

Maintenance and lubrication information includes topics such as:

- Schedule for “normal” as well as “severe” usage time and mileage charts
- Specified oil and other lubricant specifications
- Chassis lubrication points
- Tire rotation methods
- Periodic vehicle inspection services (items to check and time/mileage intervals)
- Maintenance item part numbers, such as oil and air filter numbers, and specifications, such as oil capacity and tire pressures

Engines

- Engine electrical diagnosis (battery, charging, cranking, ignition, and wiring)
- Engine mechanical diagnosis
- Specific engine information for each engine that may be used in the vehicle(s) covered by the service manual, including:
 - Engine identification
 - On-vehicle service procedures
 - Description of the engine and the operation of the lubrication system
 - Exploded views showing all parts of the engine
 - Disassembly procedures
 - Inspection procedures and specifications of the parts and subsystems
 - Assembly procedures
 - Torque specifications for all fasteners, including the torque sequence



TECH TIP

EXPLODED VIEWS

Exploded views of components such as engines and transmissions are available in shop manuals and electronic service information, as well as in parts and labor time guides. These views, showing all of the parts as if the assembly was blown apart, give the service technician a clear view of the various parts and their relationship to other parts in the assembly. See Figure 8-2.

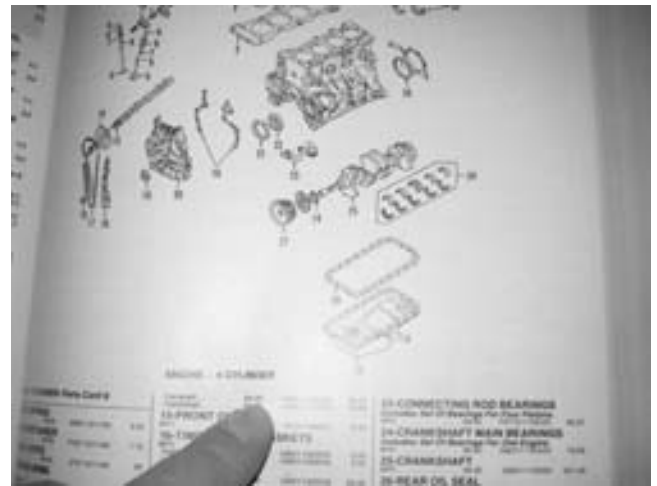


FIGURE 8-2 An exploded view of an engine as shown in a time and parts guide.

Automatic Transmission/Transaxle

- General information (identification and specifications)
- Diagnosis procedures, including preliminary checks and fluid level procedures
- General service, including leak detection and correction
- Cooler flushing procedures
- Unit removal procedures
- Unit disassembly procedures and precautions
- Unit assembly procedures and torque specifications

Electrical Systems

- Symbols used
- Troubleshooting procedures
- Repair procedures (wire repair, connectors, and terminals)
- Power distribution
- Ground distribution

- Component location views
- Harness routing views
- Individual electrical circuits, including circuit operation and schematics

Heating, Ventilation, and Air Conditioning

- Heater system
 - General description
 - Heater control assembly
 - Diagnosis, including heater electrical wiring and vacuum system
 - Blower motor and fan assembly diagnosis and servicing procedures
 - Air distribution values
 - Fastener torque specifications
- Air-conditioning system
 - General description and system components
 - Air-conditioning system diagnosis, including leak detection
 - Air-conditioning and heater function tests
 - Air-conditioning service procedures
 - Refrigerant recovery, recycling, adding oil, evacuating procedures, and charging procedures
 - Troubleshooting guide

Engine Performance (Driveability and Emissions)

- Vehicle emission control information (VECI) label, visual/physical under-hood inspection
- On-board diagnostic system



TECH TIP

PRINT IT OUT

It is often a benefit to have the written instructions or wiring diagrams at the vehicle while diagnosing or performing a repair. One advantage of a hard copy service manual is that it can be taken to the vehicle and used as needed. However, dirty hands can often cause pages to become unreadable. The advantage of electronic format service information is that the material can be printed out and taken to the vehicle for easy access. This also allows the service technician to write or draw on the printed copy, which can be a big help when performing tests such as electrical system measurements. These notes can then be used to document the test results on the work order.

- Scan tool values
- Wiring harness service
- Symptom charts

ADVANTAGES OF HARD COPY VERSUS ELECTRONIC SERVICE INFORMATION

All forms of service information have some advantages, including:

Hard Copy

- Easy to use—no hardware or expensive computers needed
- Can be taken to the vehicle for reference
- Can view several pages easily for reference

Electronic Service Information

- Information can be printed out and taken to the vehicle
- Has a search function for information
- Internet or network access allows use at several locations in the shop

DISADVANTAGES OF HARD COPY VERSUS ELECTRONIC SERVICE INFORMATION

All forms of service information have some disadvantages, including:

Hard Copy

- Can be lost or left in the vehicle
- Cost is high for each manual
- Can get dirty and unreadable

Electronic Service Information

- Requires a computer and printer
- Internet or network access can be a challenge
- Cost can be high



TECH TIP

LOOK FOR SEVERE SERVICE TIMES

Many time guides provide additional time for vehicles that may be excessively rusted due to climate conditions or have been subjected to abuse. Be sure to quote the higher rate if any of these conditions are present on the customer's vehicle. See Figure 8-3.

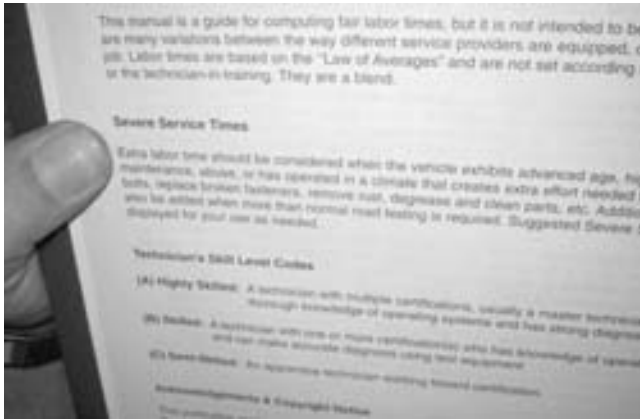


FIGURE 8-3 Extra time should be added if work is being performed on a vehicle that has excessive rust or other factors as stated in the time guide.



FIGURE 8-5 Typical vacuum diagram as shown in a factory service manual.



FIGURE 8-4 Often wiring diagrams and vacuum diagrams are combined into one manual.

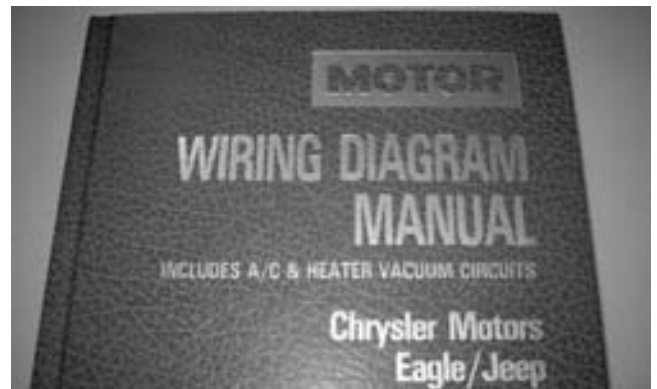


FIGURE 8-6 A typical electrical wiring diagram manual.

TYPES OF SERVICE INFORMATION

Various hard copy manuals are available, including:

- Wiring diagrams—see Figure 8-4.
- Vacuum hose diagrams—see Figure 8-5.
- Electrical troubleshooting and/or schematic manuals—see Figures 8-6 and Figure 8-7.
- Electrical component location guide—see Figures 8-8 and 8-9.

LABOR GUIDE MANUALS

Labor guides, also called flat-rate manuals, list vehicle service procedures and the time it should take an average technician to complete the task. This flat-rate time is then the basis for estimates and for pay for technicians. Some manuals also include

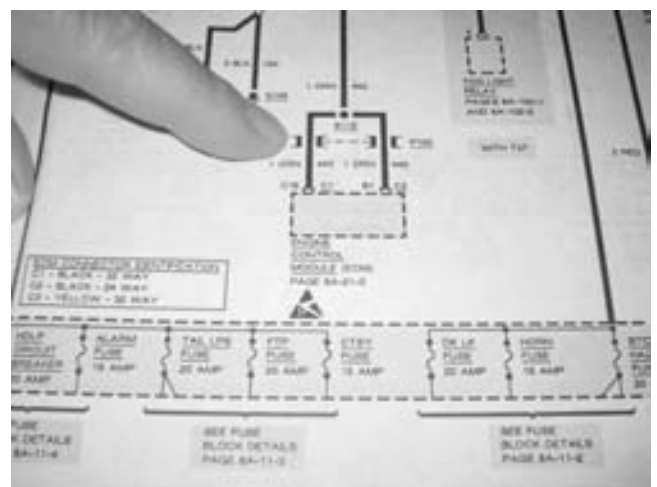


FIGURE 8-7 Typical factory service manual wiring schematic.



FIGURE 8-8 A component locator manual is a helpful manual to have, especially if work is being performed on a vehicle with which you are not familiar.

13-138 Connector A Location	Page No. 13-	Fig. No.
Connector A-41 (2.4L/4-143 Engine): LH Side Of Engine Compartment	157	23
Connector A-41 (3.0L/V6-181 Engine): LH Side Of Engine Compartment	158	24
Connector A-41 (2.8L/4-121 Engine): LH Side, Behind Front Bumper	156	21
Connector A-41 (2.8L/4-155 Engine): LH Side, Behind Front Bumper	157	22
Connector A-42 (2.8L/4-121): LH Front Corner Of Engine Compartment	156	21
Connector A-42 (2.8L/4-155 Engine): LH Front Corner Of Engine Compartment	157	22
Connector A-43 (2.4L/4-143 Engine): LH Side Of Engine Compartment	157	23
Connector A-43 (3.0L/V6-181 Engine): LH Side Of Engine Compartment	158	24
Connector A-43 (2.8L/4-121): LH Side Of Engine Compartment	156	21
Connector A-43 (2.8L/4-155 Engine): LH Front Corner Of Engine Compartment	157	22
Connector A-44 (2.4L/4-143 Engine): LH Side Of Engine Compartment	157	23

FIGURE 8-9 A component location guide typically shows the location of components in words and in figures.



FIGURE 8-10 Some guides include labor information only.

a parts list, including the price of the part to help service advisors create complete estimates for both labor and parts. These manuals are usually called “parts and time guides.” Some guides include labor time only. See Figure 8-10.

See Figure 8-11 for an example of a time guide showing both standard and severe service times.

HOW TO USE HARD COPY MANUALS

The most efficient way to find information in a manual is to look at the table of contents in the front of the book first. See Figure 8-12.

 A black and white photograph of a page from a manual showing a table of times. The table has multiple columns and rows of data, including component names and associated time values.

FIGURE 8-11 A typical time guide showing the times specified for the replacement or reconditioning of components.



FIGURE 8-12 The wise service technician starts to look for service information at the front of the manual in the table of contents.

Next, go to the page (or pages) where the desired information is located. See Figure 8-13.

If bulb information or location of a component is needed, check the table of contents for the location of this information. See Figure 8-14.

Service information and testing procedures should be closely followed including any symptom charts or flow charts. A sample of a symptom information chart is shown in Table 8-1.

ELECTRONIC SERVICE INFORMATION

There are many programs available that will provide service information for the automotive industry. Sometimes the vehicle makers make information available online. However, many shops choose to purchase software from an aftermarket supplier. ALL Data and Mitchell On-Demand are commonly used software programs that include service information for many vehicles.



FIGURE 8-13 Many pages are numbered with the section, as in this case 11, followed by the page number 27 in that section.



FIGURE 8-14 The component location section of a service manual is very helpful, especially when working on an unfamiliar vehicle.

Home Screen

The Home screen is the first screen displayed when you start. It displays buttons that represent the major sections of the program. Access to the Home screen is available from anywhere within the program by clicking the Home button on the toolbar.

Toolbars

A main toolbar is displayed on most screens, providing quick access to certain functions. This toolbar varies somewhat, depending upon what information is being accessed.

Electronic Service Information

Electronic service information is available mostly by subscription and provides access to an Internet site where service manual-type information is available. Most vehicle manufacturers also offer electronic service information to their dealers and to most schools and colleges that offer corporate training programs.

Technical Service Bulletins

Technical service bulletins, often abbreviated **TSBs**, are issued by the vehicle manufacturer to notify service technicians of a problem and include the necessary corrective action. Technical service bulletins are designed for dealership technicians but are republished by aftermarket companies and made available along with other service information to shops and vehicle repair facilities.

Internet

The Internet has opened the field for information exchange and access to technical advice. One of the most useful websites is the International Automotive Technician's network at www.iatn.net. This is a free site but service technicians need to register to join. For a small monthly sponsor fee, the shop or service technician can gain access to the archives, which include thousands of successful repairs in the searchable database.

Recalls and Campaigns

A recall or campaign is issued by a vehicle manufacturer and a notice is sent to all owners in the event of a safety- or emission-related fault or concern. While these faults may be repaired by independent shops, it is generally handled by a local dealer. Items that have created recalls in the past have included potential fuel system leakage problems, exhaust leakage, or electrical malfunctions that could cause a possible fire or the engine to stall. Unlike technical service bulletins whose cost is only covered when the

TABLE 8-1 Hesitation

Possible Cause	Reason
Throttle-position (TP) sensor	<ul style="list-style-type: none"> ▪ The TP sensor should be within the specified range at idle. If too high or too low, the computer may not provide a strong enough extra pulse to prevent a hesitation. ▪ An open or short in the TP sensor can result in hesitation because the computer would not be receiving correct information regarding the position of the throttle.
Throttle-plate deposit buildup (port fuel-injected engines)	An airflow restriction at the throttle plates creates not only less air reaching the engine but also swirling air due to the deposits. This swirling or uneven airflow can cause an uneven air-fuel mixture being supplied to the engine, causing poor idle quality and a sag or hesitation during acceleration.
Manifold absolute pressure (MAP) sensor fault	The MAP sensor detects changes in engine load and signals to the computer to increase the amount of fuel needed for proper operation. Check the vacuum hose and the sensor itself for proper operation.
Check the throttle linkage for binding	A kinked throttle cable or cruise (speed) control cable can cause the accelerator pedal to bind.
Contaminated fuel	Fuel contaminated with excessive amounts of alcohol or water can cause a hesitation or sag during acceleration. HINT: To easily check for the presence of alcohol in gasoline, simply get a sample of the fuel and place it in a clean container. Add some water and shake. If no alcohol is in the gasoline, the water will settle to the bottom and be clear. If there is alcohol in the gasoline, the alcohol will absorb the water. The alcohol-water combination will settle to the bottom of the container, but will be cloudy rather than clear.
Clogged, shorted, or leaking fuel injectors	Any injector problem that results in less than an ideal amount of fuel being delivered to the cylinders can result in a hesitation, a sag, or stumble during acceleration.
Spark plugs or spark plug wires	Any fault in the ignition system such as a defective spark plug wire or cracked spark plug can cause hesitation, a sag, or stumble during acceleration. At higher engine speeds, a defective spark plug wire is not as noticeable as it is at lower speeds, especially in vehicles equipped with a V-8 engine.
EGR valve operation	Hesitation, a sag, or stumble can occur if the EGR valve opens too soon or is stuck partially open.
False air	A loose or cracked intake hose between the mass airflow (MAF) sensor and the throttle plate can be the cause.

vehicle is within the warranty period, a recall or campaign is always done at no cost to the vehicle owner.

HOTLINE SERVICES

A hotline service provider is a subscription-based helpline to assist service technicians solve technical problems. While services vary, most charge a monthly fee for a certain amount of time each month to talk to an experienced service technician who has

a large amount of resource materials available for reference. Often, the technician hired by the hotline services specializes in one vehicle make and is familiar with many of the pattern failures that are seen by other technicians in the field. Hotline services are an efficient way to get information on an as-needed basis.

Some examples of hotline automotive service providers include:

- Identifix
- Autohotlineusa



FREQUENTLY ASKED QUESTION

JULIAN DATE

The **Julian date** (abbreviated **JD**) is the number of the day of the year. January 1 is day 001. The Julian date is named for Julius Caesar, who developed the current calendar.



TECH TIP

USE A BLUETOOTH HANDS-FREE TELEPHONE

When talking to a hotline service provider, it is wise to be looking at the vehicle during the call to be able to provide information about the vehicle and perform the suggested tests. This makes the job of troubleshooting easier and faster for both the technician and the service provider, resulting in shorter length calls. Using a Bluetooth hands-free telephone should help shorten the length of calls, which means the cost will be less for the help service.

- Taylor Automotive Tech-Line
- Aspire

SPECIALTY REPAIR MANUALS

Examples of specialty repair manuals include unit repair for assembled components, such as automatic transmission/transaxle, manual transmission/transaxle, differentials, and engines. Some specialty repair manuals cover older or antique vehicles, which may include unit repair sections.

AFTERMARKET SUPPLIER'S GUIDES AND CATALOGS

Aftermarket supplier's guides and catalogs often include expanded views of assembled parts along with helpful hints and advice. Sometimes the only place where this information is available is at trade shows associated with automotive training conferences and expos. Go to the following websites for examples of training conferences with trade shows:

- www.lindertech.com
- www.avtechexpo.com
- www.visionkc.com (*Vision Expo*)

SUMMARY

1. Vehicle history records are sometimes very helpful in determining problems that may be related to a previous fault or repair.
2. The vehicle owner's manual is very helpful to the service technician because it includes the procedures for resetting the maintenance reminder light (oil change light), as well as how to reset the tire pressure monitoring system after a tire rotation, and other important settings and specifications.
3. Lubrication guides provide information on the specified oil and lubricants needed along with the capacities and the location of lubrication points.
4. Factory service manuals or electronic services include information that is vehicle and year specific and very detailed.
5. Other types of service information are labor and parts guides, vacuum hose and wiring diagrams, component locator manuals, specialty manuals, and aftermarket supplies guides and catalogs.
6. Hotline services are subscription based and allow a technician to talk to an experienced technician who has many resources.

REVIEW QUESTIONS

1. What is included in the vehicle owner's manual that could be helpful for a service technician?
2. Lubrication service guides include what type of information?
3. Explain why factory service manuals or factory electronic service information is the most detailed of all service information.
4. Explain how flat-rate and parts guides are useful to customers.
5. List additional types of service manuals that are available.
6. Describe how hotline services and Internet sites assist service technicians.

CHAPTER QUIZ

1. What type of information is commonly included in the owner's manual that would be a benefit to service technicians?
 - a. Maintenance reminder light reset procedures
 - b. Tire pressure monitoring system reset procedures
 - c. Maintenance items specifications
 - d. All of the above
2. Two technicians are discussing the need for the history of the vehicle. Technician A says that an accident could cause faults to occur after the repair due to hidden damage. Technician B says that some faults could be related to a previous repair. Which technician is correct?
 - a. Technician A only
 - b. Technician B only
 - c. Both Technicians A and B
 - d. Neither Technician A nor B
3. The viscosity of engine oil is found where?
 - a. Owner's manual
 - b. Factory service manual or service information
 - c. Lubrication guide
 - d. All of the above
4. Wiring diagrams are usually found where?
 - a. Owner's manuals
 - b. Factory service manuals
 - c. Unit repair manuals
 - d. Lubrication guides
5. What type of manual includes time needed to perform service procedures?
 - a. Flat-rate manuals
 - b. Owner's manuals
 - c. Factory service manuals
 - d. Parts guide
6. Component location can be found in _____.
 - a. Factory service manuals
 - b. Owner's manuals
 - c. Component location manuals
 - d. Both a and c
7. Aftermarket service information is available in what format?
 - a. Manuals
 - b. CDs or DVDs
 - c. Internet
 - d. All of the above are possible source formats
8. Hotline services are _____.
 - a. Free
 - b. Available for a service fee
 - c. Available on CD or DVD format
 - d. Accessed by the Internet
9. Aftermarket parts catalogs can be a useful source of information and they are usually _____.
 - a. Free
 - b. Available by paid subscription
 - c. Available on CD or DVD
 - d. Available for a fee on a secured Internet site
10. Which type of manual or service information includes the flat-rate time and the cost of parts?
 - a. Parts and time guides
 - b. Factory service manuals
 - c. Component location guides
 - d. Free Internet site