

***ABS/SRS Code Reader  
OBDII Scan Tool***



***User's Guide***

## Tool Information

Complete the following list. Provide this information when contacting customer support.

**Serial No:** \_\_\_\_\_

**SW ID:** \_\_\_\_\_

Refer to “View Tool Information” for information on getting the Serial Number (Serial No) and Software Identification (SW ID).

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# Section 1 – Safety Precautions

For your safety, read this manual thoroughly before operating the Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.

The safety messages presented below and throughout this user's manual are reminders to the operator to exercise care when using this test instrument.



## Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

## Safety Messages

Safety messages provide help to prevent personal injury/equipment damage. All safety messages are introduced by a signal word. The signal word indicates the level of the hazard in a situation. The types of safety messages are:



Indicates a possible hazardous situation which, if not avoided, *will* result in death or serious injury to operator or bystanders.



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



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



Indicates a condition which, if not avoided, *may* result in damage to test equipment or vehicle.

## Type Styles Used

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.

## Icons Used

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



Example:



Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

**Safety goggles and protective gloves must be worn by the operator and any bystanders. Even if everyday eye-glasses have impact resistant lenses, they are NOT safety glasses.**

*Engine systems that malfunction can cause injury.*

## Important Safety Messages



Risk of electric shock.

- **Do not exceed voltage limits between inputs indicated in the Specifications.**
- **Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.**

*Electric shock can cause injury.*



Risk of explosion.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Do not use this Tool in environments where explosive vapors may collect. These areas include:**
  - below-ground pits.
  - confined areas.
  - areas that are less than 18 inches above floor.
- **If used indoors, use the Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**



- Flammable fuel and vapors can ignite.
- Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.
- Avoid making an accidental connection between the battery terminals. Do not place anything on the battery.
- When removing battery cables, remove the ground cable first.
- Avoid sparks when connecting or disconnecting power leads to the battery.
- Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables.
  - This also helps prevent damage to on-board computer systems.
- Always disconnect the battery ground cable before servicing electrical system components.



*Explosion can cause injury.*



Risk of poisoning.

- If used indoors, use the Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless gas which can be lethal.
- Route the exhaust outside while testing with the engine running.

*Poisoning can result in death or serious injury.*



Battery acid is a highly corrosive sulfuric acid.

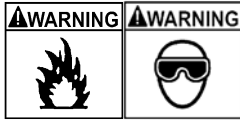
- Safety goggles and protective gloves must be worn by the operator and any bystanders.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- Make sure someone can hear you or is close enough to provide aid when working near a battery.
- Have plenty of fresh water nearby.

- If battery acid contacts skin, clothing, or eyes, flush exposed area with water for 10 minutes. Seek medical help.

- **Do not touch eyes while working near battery.**

*Battery acid can burn eyes and skin.*

Risk of fire.



- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Do not position your head directly in front of or over the throttle body.**
- **Do not pour gasoline down the throttle body when cranking or running the engine, when working with fuel delivery systems or any open fuel line.**
  - Engine backfire can occur when the air cleaner is out of position.
- **Do not use fuel injector cleaning solvents when performing diagnostic testing.**
- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**
- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in work area.**

*Fire can cause death or serious injury.*



Risk of flying particles.

- **Safety goggles must be worn by the operator and any bystanders while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

*Flying particles can cause eye injury.*



Risk of burns.

- **Batteries can produce a short-circuit current high enough to weld jewelry to metal.**
  - Remove jewelry such as rings, bracelets and watches before working near batteries.



*Short circuits can cause injury.*



Risk of burns.

- **Do not remove radiator cap unless engine is cold.**
  - Pressurized engine coolant may be hot.
- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe.**
- **Wear insulated gloves when handling hot engine components.**
- **Tester leads can become hot after extended testing in close proximity to manifolds.**

*Hot components can cause injury.*



Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Engine systems can malfunction, expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.**

*Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.*



Engine compartment contains electrical connections and hot or moving parts.

- **Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**



- Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.
- Do not place Tools or test equipment on fenders or other places in engine compartment.
- Barriers are recommended to help identify danger zones in the test area.
- Prevent personnel from walking through test area.

*Contacting electrical connections and hot or moving parts can cause injury.*



Risk of injury.

- Use the Tool only as described in the user’s manual.
- Use only manufacturer’s recommended attachments.
- Do not operate the Tool with damaged cables.
- Do not operate the Tool if it has been dropped or damaged, until examined by a qualified service representative.
- When performing a road test, NEVER operate the Tool alone while driving the vehicle. ALWAYS have one person drive the vehicle while an assistant operates the Tool.

*Using the Tool in a manner different from the instructions can result in injury.*



Risk of unexpected vehicle movement.

- Block drive wheels before performing a test with the engine running.
- Unless instructed otherwise:
  - Set parking brake
  - Put gear selector in neutral for manual transmissions
  - Put gear selector in park for automatic transmissions
  - Disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.
- Do not leave a running engine unattended.

*A moving vehicle can cause injury.*

**CAUTION**

Risk of equipment or circuit damage.

- **Unless specifically directed by manufacturer, make sure ignition is off before connecting or disconnecting connectors or any vehicle electrical terminals.**
- **Do not create a short between battery terminals with a jumper wire or Tools.**



*Improper equipment use can cause equipment or circuit damage.*

**CAUTION**

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

- **Do not rely on erratic, questionable, or obviously erroneous test information or results.**
  - If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
  - If test information or results are still suspicious, do not use them for diagnosis.

*Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.*

**DANGER**

Some vehicles are equipped with air bags.

- **Follow service manual warnings when working around air bag components or wiring.**
  - If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury.
  - Note an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.

*An air bag opening can cause injury.*



# Section 2 – Getting Started

## Introduction

The ABS/SRS Code Reader OBDII Scan Tool was developed by experts in the automotive service industry to access the information stored in the various vehicle modules. The Tool retrieves codes from the ABS and SRS systems and scans for OBDII codes. It also provides the definition of each code to help diagnose problem areas within the systems that may cause the malfunction indicator light (MIL) to turn on.

All information, illustrations and specifications contained in this manual are based on the latest information available from industry sources at the time of publication. No warranty (expressed or implied) can be made for its accuracy or completeness, nor is any responsibility assumed by the manufacturer or anyone connected with it for loss or damages suffered through reliance on any information contained in this manual or misuse of accompanying product. The manufacturer reserves the right to make changes at any time to this manual or accompanying product without obligation to notify any person or organization of such changes.



The Tool may not detect every malfunction. Do not take chances with brakes, steering, airbags, or other vital vehicle functions, as a serious accident could result. Always follow vehicle manufacturer's warnings, cautions, and service procedures.

## Automatic Braking Systems

Automatic Braking Systems (ABS) have been included in automotive applications since the 1980s. All these systems work in a similar fashion although the configuration and complexity of the systems can vary greatly.

### How ABS Works

When the brake pedal is pressed with normal force, the vehicle decelerates. If, during deceleration, the ABS computer detects wheels rotating at different speeds (wheels slipping) from data provided by the wheel speed sensors, then the vehicle enters antilock mode. During antilock mode, the ABS computer will control brake fluid hydraulic pressure delivered to the wheels. The brake fluid hydraulic pressure will be equal to or less than the value delivered by the master cylinder. By controlling pressure to the wheels, the ABS computer can prevent one wheel from locking up while others keep turning. It can also prevent wheels from turning at different rates, so the vehicle should stop in a straight line.

## ABS Configurations

ABS has had three different configurations for distribution of wheel speed sensors and hydraulic lines from the hydraulic control unit since its conception.

The earliest ABS configuration used one wheel speed sensor that monitor the speed of both rear wheels. If the rear wheels would lock up, the ABS computer would pulse a solenoid in the hydraulic control unit, which would then change the brake fluid hydraulic pressure applied to the rear wheels.

The next evolution in ABS added wheel speed sensors to both front wheels, while still having a single wheel speed sensor in the rear to monitor both rear wheels. Under this system, if the left front, right front, or both rear wheels rotate at a speed different from each other, the ABS computer could use up to three separate solenoids to control brake fluid hydraulic pressure. This allowed the ABS system to control the left front, right front, and both rear wheels together independently.

Today, some vehicles have one wheel speed sensor per wheel for a total of four. On these vehicles, the ABS computer can independently control brake fluid hydraulic pressure on every wheel.

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### ABS Repair Tips

- Before servicing the ABS, refer to the manufacturer's recommendations.
- Torque the wheel lug nuts properly to avoid bending a rotor or drum, which can cause inaccurate wheel speed sensor readings.
- Bleed the brake system properly.
- When necessary, always add fresh brake fluid to the master cylinder.
- Always replace tires with the manufacturer's recommended size.
- Always rotate tires as recommended by manufacturer.
- When interpreting DTCs retrieved from the vehicle, always follow the manufacturer's recommendations for repair.

## Supplemental Restraint System

Supplemental Restraint System (SRS) is a vehicle safety device which was introduced in the 1970s. Its purpose is to supplement the over-the-shoulder seatbelt to help prevent vehicle occupants from hitting interior objects such as steering wheels, dashboards, and the like. Vehicles can and often do contain multiple airbags in various locations throughout the vehicle.

### How SRS Works

The SRS, or airbags, are activated through a central Airbag Control Unit (ARU). The ARU monitors sensors such as wheel speed, accelerometers, brake pressure, seat occupancy, and in some cases gyroscopes, to provide a basic threshold. When the threshold is



breached by unexpected braking, wheel stoppage, or deceleration, the airbags will deploy to restrict the forward movement of the vehicle occupants.

The SRS ACU monitors itself and sensors feeding information to it. When problems in the system occur a DTC is generated in the same way as the ABS and OBDII systems. These DTCs can be read by the Tool through the Data Link Connector (DLC). Serious SRS problems will illuminate the SRS, or similar, Malfunction Indicator Lamp (MIL).

## On-Board Diagnostics

OBD II (On-Board Diagnostics version II) is a system that the Society of Automotive Engineers (SAE) developed to standardize automotive electronic diagnosis. Beginning in 1996, most new vehicles sold in the USA were OBD II compliant.

As a result of OBDII, Technicians now can use the same tool to test any OBD II compliant vehicle without special adapters. SAE established guidelines that provide:

- A universal connector, called the Data Link Connector (DLC), with dedicated pin assignments.
- A standard location for the Data Link Connector (DLC), visible under the dash on driver's side.
- A standard list of diagnostic trouble codes (DTCs) used by all manufacturers.
- A standard list of parameter identification (PID) data used by all manufacturers.
- Ability for vehicle systems to record operating conditions when fault occurs.
- Expanded diagnostic capabilities that records a code whenever a condition occurs that affects vehicle emissions.
- Ability to clear stored codes from vehicles memory with Tool.

### Malfunction Indicator Lamp (MIL)

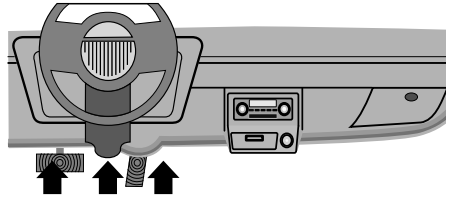
The dashboard or instrument panel of your vehicle contains several lights labeled something similar to ABS, or Anti-Lock, SRS, or Airbag, and Check Engine. These lights indicate problems with the systems being represented. Refer to your owner's manual for a description of the lights in your vehicle. Each time your vehicle is started, the computers perform a self-test to make sure the components are working correctly. If the any computer detects a malfunction, an MIL will turn on. When the MIL is on, a DTC is stored in the respective computer.

## Data Link Connector

The Tool uses a Data Link Connector (DLC) to communicate with the vehicle's control module.

The DLC location is always inside the vehicle. It may be:

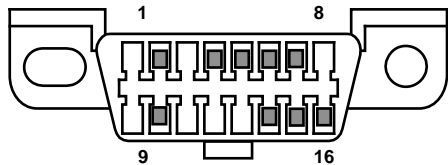
- Under dashboard on driver side of vehicle.
- If DLC is not located under dashboard, a label should be there telling where the connector can be found.



For helpful images of where you can find the location of the OBDII DLC in the vehicle, visit: [www.obdclearinghouse.com/oemdb](http://www.obdclearinghouse.com/oemdb).

### Data Link Connector (DLC) Pins

- 1 - Manufacturer Reserved
- 2 - J1850 Bus+
- 3 - Manufacturer Reserved
- 4 - Chassis Ground
- 5 - Signal Ground
- 6 - CAN High, J-2284
- 7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
- 8 - Manufacturer Reserved
- 9 - Manufacturer Reserved
- 10 - J1850 Bus-
- 11 - Manufacturer Reserved
- 12 - Manufacturer Reserved



- 13 - Manufacturer Reserved
- 14 - CAN Low, J-2284
- 15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
- 16 - Battery Power

## Vehicle Service Information

The following is a list of web sites and phone numbers where diagnostic information is available. Some manuals may be available at your local dealer, auto parts stores, or local public libraries.

<b>Domestic Vehicles</b>	<b>Web Site</b>	<b>Phone Number</b>
<b>General Motors</b>		
Chevrolet	www.chevrolet.com	1-800-551-4123
Pontiac	www.pontiac.com	1-800-551-4123
Oldsmobile	www.oldsmobile.com	1-800-551-4123
Buick	www.buick.com	1-800-551-4123
Cadillac	www.cadillac.com	1-800-333-4CAD
Saturn	www.saturn.com	1-800-553-6000

### **Ford**

Ford	www.ford.com	1-800-392-3673
Lincoln	www.lincoln.com	1-800-392-3673
Mercury	www.mercury.com	1-800-392-3673

### **Chrysler**

Chrysler	www.chrysler.com	1-800-348-4696
Dodge	www.dodge.com	1-800-348-4696
Plymouth	Not Available	1-800-348-4696
Eagle	Not Available	1-800-348-4696

### **Other Manuals**

Chilton Book Company	www.chiltonsonline.com	1-800-347-7707
Haynes Publications	www.haynes.com	1-800-242-4637
Bentley Publishers	www.bentleypublishers.com	1-800-423-4595

### **Repair Information Programs**

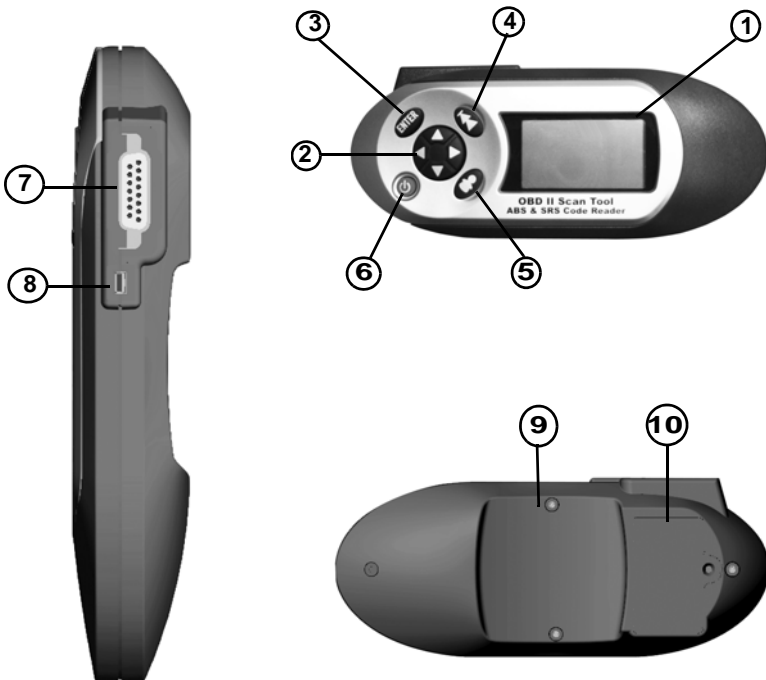
Mitchell	www.mitchell1.com	1-888-724-6742
ALLDATA	www.alldata.com	1-800-697-2533

**2**

# Section 3 – Using the Tool

## The Tool

- ① LCD Display - Backlit, 128 x 64 pixel display with contrast adjustment.
- ② ◀/▶ LEFT/RIGHT and ▲/▼ UP/DOWN arrow keys - Moves the cursor to select functions or to select YES or NO.
- ③ ENTER key - Selects displayed items.
- ④ ⏪ BACK key - Goes to the previous screen or level.
- ⑤ 👤 USER key - allows the operator to perform Read Codes with a touch of a key.
- ⑥ ⏻ ON/OFF - turns the Tool power ON or OFF.
- ⑦ DLC Port - Provides a connection for interfacing with the vehicle.
- ⑧ USB Port - Provides a USB connection to the computer.
- ⑨ Serial Number Decal - Provides serial number of the Tool.
- ⑩ Battery Compartment - Provides power to the Tool when reprogramming the Tool or printing from a personal computer or for off-vehicle use such as reviewing of codes, code lookup, and system setup. (Battery not required to use Tool for reading codes.)



# Specifications

**Table 1: Specifications**

**Display:** 128 x 64 pixel display with contrast adjust

**Operating Temperature:** 0 to 50°C (32 to 122°F)

**Storage Temperature:** -20 to 70°C (-4 to 158°F)

**Internal Power:** 9V Battery (not required to read codes)

**External Power:** 7 to 16 Volts

- ✓ A minimum of 8.0 V is required for most vehicle control modules to operate properly.

**Power Dissipation:** 5 Watts maximum.

**Dimensions:** Height x Width x Length

7/8" (22.56 mm) x 3.50" (89 mm) x 8.25" (210 mm)

## Included with the Tool

**Table 2: Package Contents**

Part	Part Description	Part Number
<b>Vehicle Diagnostics Cable</b>	Provides a link between the vehicle and Tool so the Tool can communicate with the vehicle. Also supplies power to the Tool.	0038-000-3458
<b>Carry Case</b>	Place to store the Tool when not in use.	0400-000-2080
<b>Quick Start Manual</b>	Provides basic step-by-step instructions for using the Tool.	0002-000-3142

- ✓ **Replacement Parts** are available from the manufacturer by contacting customer service at **1-800-533-6127** (8:00 - 6:00 CST Monday - Friday)

## Display

The display has a large viewing area for posting messages, instructions, and diagnostic information. The back-lit liquid crystal display (LCD) is a 128 x 64 pixel display.

The following symbols may appear on the display. The chart below describes what each symbol means:



Indicates that additional information is available on the previous screen. Press the ▲ UP arrow key to view the data.



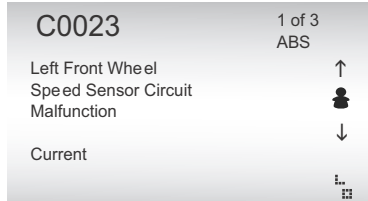
Indicates that additional information is available on the next screen. Press the ▼ DOWN arrow key to view the data.



Indicates that the internal battery needs replacing or is not installed. Replace or install the internal battery.



Indicates that the 👤 USER key is active. Press the 👤 USER key to read codes.



## Keypad

The keypad is used to move through the different menus of the Tool. The Tool is designed for easy operation with an intuitive navigation system.



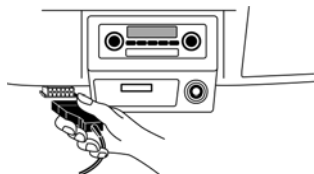
Do not use solvents such as alcohol to clean the keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.



Do not soak the keypad in water because the water might find its way inside the Tool.

# Tool Power Up

Power for the Tool can come from the vehicle or an internal 9V battery. All functions work when the Tool is connected to the car. The Review Data, Print Data, Code Lookup, and System Setup functions will also work on internal battery power.



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## Vehicle Power


The Tool will automatically turn on when connected to the vehicle.

1. Connect the Vehicle Diagnostics Cable to the Tool.
2. Connect the other end of the Vehicle Diagnostics Cable to the DLC on the vehicle.

The Tool receives power from the vehicle when the Vehicle Diagnostics Cable is plugged into the vehicle DLC. If there are power up problems, see “**Tool Does Not Power Up**” on page 5-1.

## Internal Battery

The  ON/OFF key turns the Tool ON and OFF when operating on battery power.

- Press and hold the  ON/OFF key for at least 1 second to turn the Tool on or off.

The Tool will automatically turn off after 2 minutes of inactivity when powered from the internal 9V battery.




When powered from the internal battery, the Tool turns off the backlighting for the display if no key presses are made during a 1-minute period.

If a key is pressed prior to the Tool powering off, the backlighting for the display will turn back on.

The Tool must be attached to the vehicle to perform diagnostic functions. The Tool disables the diagnostic functions when powered from the internal battery.

Each time the Tool is powered up, the voltage of the internal battery is checked.

- If the voltage is low, the Low Battery Symbol  displays on the screen.
- Replace the battery using instructions provided in “**Battery Replacement**” on page 5-2.





If the Tool will not be used for an extended period of time, remove the battery to prevent battery leakage from damaging the battery compartment.

## User Key

The USER key allows you to read codes from the Diagnostic menu without having to select Read Codes. Press the USER key to update or read codes from the vehicle.

- When the USER key is active, the icon appears on the display.
- When the appears, you can perform read codes by pressing the USER key.
- The USER key remains inactive until a vehicle has been selected.

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**Note:** The USER key is not active when the Tool is powered from the internal 9V battery.

## Installing Scanning Suite

1. Go to [www.otctools.com/updates](http://www.otctools.com/updates) and download the Scanning Suite PC application.

✓ Scanning Suite is **NOT** required to operate the Scan Tool.

2. Install the downloaded Scanning Suite application prior to connecting the Scan Tool to the PC.

Some of the items included in Scanning Suite are:

- Manuals included with Scan Tool
- Tool update software
- Adobe Acrobat Reader Installer
- Print Capture
- Other product information

To be able to use Scanning Suite, the PC must meet the following minimum requirements:

- Microsoft Windows 2000, XP, and Vista
- Adobe Acrobat Reader
- Internet Explorer 4.0 or newer
- Screen Resolution of 800 X 600

3. If screen resolution is 800 x 600, in Display Properties, Settings Tab, set Font Size to Small Fonts.
4. Use Scanning Suite to determine if any updates are available for your tool by clicking Check for Update button.

✓ You can also configure the Scanning Suite Frequency (SS Frequency) to automatically check every xx minutes. The default frequency is 30 minutes.

5. Refer to instructions provided on [www.otctools.com/updates](http://www.otctools.com/updates) for how to install Scanning Suite and Tool updates.

**3**

## System Setup

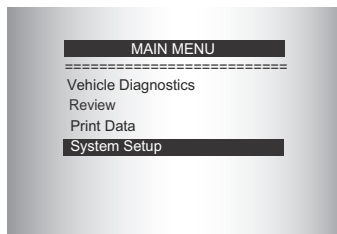
**System Setup** allows you to:

- Adjust Contrast
- Select Language
- Test the Display
- Test the Keypad
- Test the Memory
- View Tool Information
- Reprogram the Tool

✓ **System Setup** settings are retained even if the internal battery becomes discharged or is removed.

From the **Main Menu**:

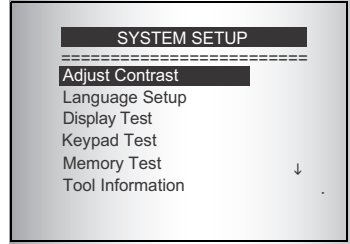
1. Select **System Setup**.
2. Press the ▲ UP or ▼ DOWN arrow key until **System Setup** is highlighted.
3. Press ENTER.



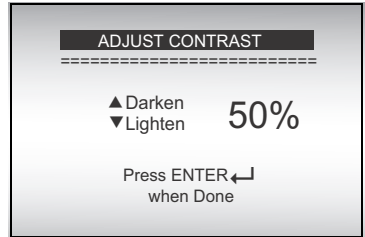
## Adjust Display Contrast

From the **System Setup** menu:

1. **Select *Adjust Contrast*.**
  - a. Press the ▲ UP or ▼ DOWN arrow key until ***Adjust Contrast*** is highlighted.
  - b. Press ENTER.



2. **Adjust *Display Contrast*.**
  - a. Press the ▲ UP arrow key to darken.
  - b. Press the ▼ DOWN arrow key to lighten.



3. **To save the *Contrast setting*, press ENTER.**



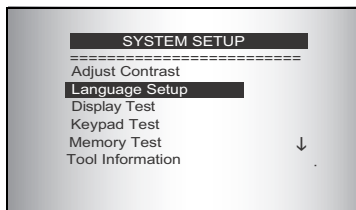
# Language Setup

**Language Setup** is used to change the language used by the Tool.

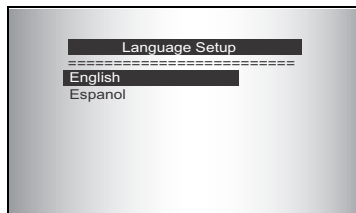
- ✓ English is the default language.

From **System Setup** menu:

1. **Choose *Language Setup*.**
  - a. Use ▲ UP or ▼ DOWN arrow key to highlight **Language Setup**.
  - b. Press ENTER.



2. **Select Desired Language.**
  - Use ▲ UP or ▼ DOWN arrow key to highlight desired language.



3. **To save Language Setting, press ENTER.**

Or,

4. **To keep the old setting and return to the *Main Menu*, press the ◀◀ BACK key.**



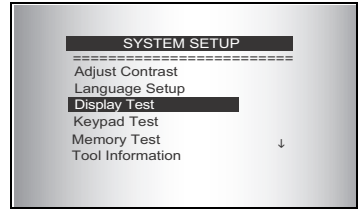
## Display Test

The **Display Test** is used to check the display.

- ✓ The test turns on every pixel of the display.

From the **System Setup** menu:

1. **Select *Display Test*.**
  - Press the ▲ UP or ▼ DOWN arrow key until **Display Test** is highlighted.

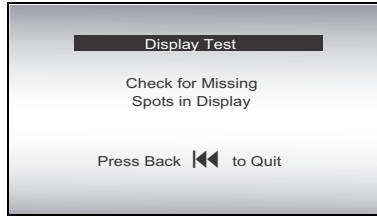
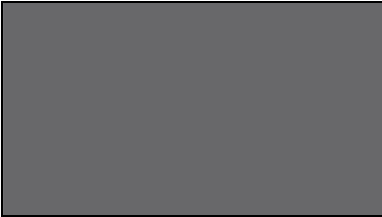


3

2. **To start *Display Test*, press ENTER.**

3. **Look for *Missing Pixels*.**

- All pixels display in solid black if there are no concerns.
- Screen flips back and forth between screens shown below.



4. **To return to *System Setup*, press the ◀◀ BACK Key.**



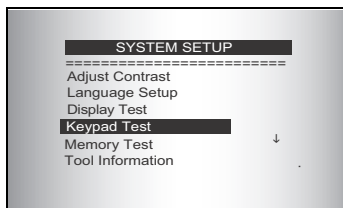
## Keypad Test

The **Keypad Test** is used to verify that the keys are working correctly.

From the **System Setup** menu:

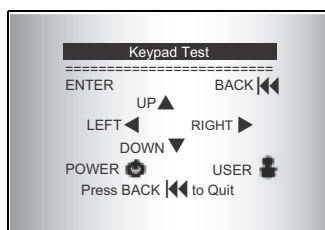
### 1. Select Keypad Test.

- Press the ▲ UP or ▼ DOWN arrow key until **Keypad Test** is highlighted.
- Press ENTER.



### 2. Press a Key.

- Key name or scroll direction should inverse colors on the display.
- The only exception is the ⏪ BACK key. When ⏪ BACK key is pressed, the **System Setup** menu appears.



**Note:** If the **System Setup** menu does not appear, then the ⏪ BACK key is not working correctly. Contact Technical Support for assistance. The phone number for Technical Support is provided on the back side of the title page.



# Memory Test

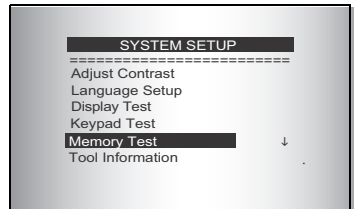
The **Memory Test** will test the Tool's internal memory. Run the **Memory Test** if the Tool:

- Has trouble displaying trouble code definitions.
- Operates abnormally.

From the **System Setup** menu:

## 1. Select **Memory Test**.

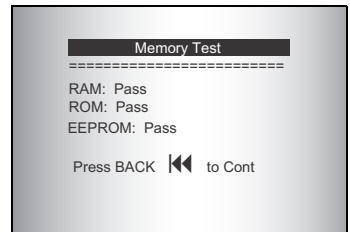
- Press the ▲ UP or ▼ DOWN arrow key until **Memory Test** is highlighted.
- Press ENTER.



3

✓ The Tool reports its progress on the bottom of the display.

- The **Memory Test** may take several minutes to complete.
- The **Memory Test** results display:
  - If no problems were detected, then PASS is displayed.
  - If RAM fails, an error message is shown.
  - If ROM fails, a checksum is shown.
  - If the **Memory Test** fails, contact Technical Support. The phone number for Technical Support is provided on the back side of the title page.



## 2. To return to **System Setup**, press ⏪ BACK.

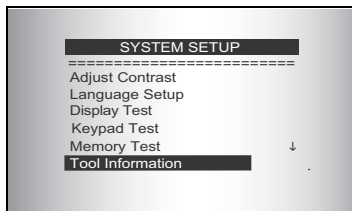


# View Tool Information

This function allows you to view specific Tool information that may be needed when contacting customer service.

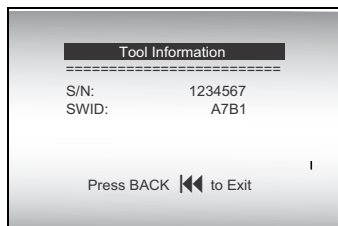
From **System Setup** menu:

1. **Select Tool Information.**
  - a. Press the ▲ UP or ▼ DOWN arrow key until **Tool Information** is highlighted.
  - b. Press ENTER.



2. **View the Tool Information.**

- S/N (Serial No:)
- Software ID (SW ID:)



3. **Write Down the Tool Information.**

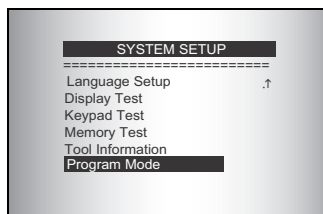
- Space is provided on inside front cover of this guide to record the Tool information.

4. **To return to System Setup, press <<< BACK.**



## Program Mode

The Program Mode is used to reprogram the Tool. Instructions are provided with the software upgrades.





# Connecting the Tool

To diagnose a vehicle, connect the Vehicle Diagnostics Cable to the Tool.

**Tip:** If you just want to power up the Tool to review data, lookup codes, or print the data from the last vehicle tested, then you do not need to attach the Vehicle Diagnostics Cable to the vehicle. The internal battery provides power for this.

## 1. Connect the Vehicle Diagnostics Cable to the Tool.

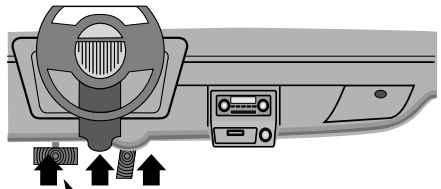
- Make sure the pins on the cable are not bent.



3

## 2. Find the DLC on the vehicle.

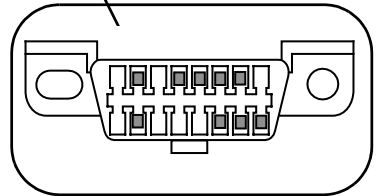
- Look under the dashboard on the driver's side of the vehicle.
- If the DLC is not located under the dashboard, a label should be there telling you where it is located.



## 3. Remove the DLC cover if required.

## 4. Connect the Vehicle Diagnostics Cable to vehicle.

- Make sure the pins are not bent.



# Vehicle Selection

Selecting a vehicle is required to communicate with the vehicle and to correctly display DTC definitions. The Tool keeps all data received from the last vehicle selected until a new vehicle is selected or the Tool is reprogrammed to update software.

During vehicle selection, the Tool may ask for the following information:

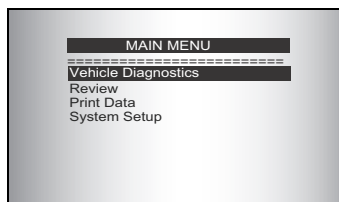
- Manufacturer
- Car/Truck
- Year
- Make
- Model
- Engine
- Special Information

From the *Main Menu*:

## 1. Choose *Vehicle Diagnostics*.

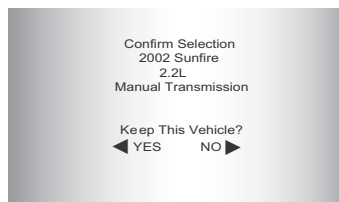
a. Press the ▲ UP or ▼ DOWN arrow key until **Vehicle Diagnostics** is highlighted.

b. Press ENTER.



## 2. Select to *KEEP* or *CHANGE* vehicle.

- To run or review diagnostics on the same vehicle, press ◀ LEFT for **YES**. Continue these instructions with Step 3.
- To run diagnostics on a different vehicle, press ▶ RIGHT for **NO**. Continue these instructions with Step 4.
- If this is the first time that you are using the Tool or no vehicle identification information is stored in memory, the Tool will ask you to provide vehicle identification information. Go to Step 5 below to continue.



The vehicle identification information is used by the Tool to perform diagnostics. Enter or confirm vehicle identification information.

### 3. Select to **KEEP** or **ERASE** diagnostic data.

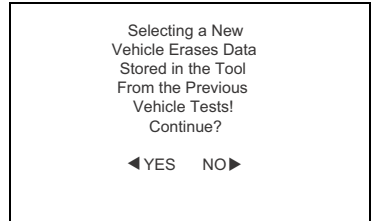
- To erase data stored from the previous vehicle test, press ◀ **LEFT** for **YES**. Then go to “**Read Codes**” on page 4-1 of **Vehicle Diagnostics** for instructions on running Vehicle Diagnostics.
- To keep the existing diagnostic data to review, press ▶ **RIGHT** for **NO**. Then go to “**Review Data**” in **Vehicle Diagnostics**.



3

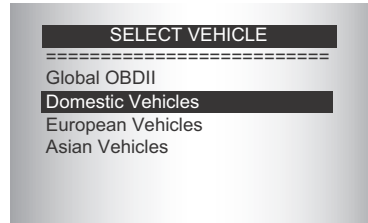
### 4. Select **New Vehicle?**

- To erase the data stored on the Tool, press ◀ **LEFT** for **YES**. Then go to Step 5 to enter the new vehicle identification information.
- To keep the data stored in the Tool, press ▶ **RIGHT** for **NO**. Then repeat these instructions from Step 2.



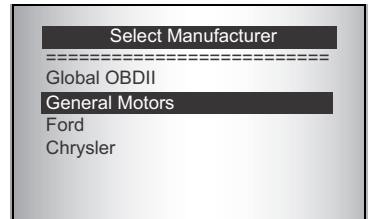
### 5. Select **Vehicle**.

- Press the ▲ UP or ▼ DOWN arrow key to select vehicle.
- Press ENTER.



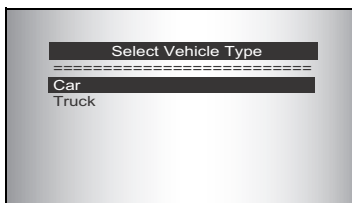
### 6. Select **Vehicle Manufacturer**.

- Press the ▲ UP or ▼ DOWN arrow key to select vehicle manufacturer.
- Press ENTER.



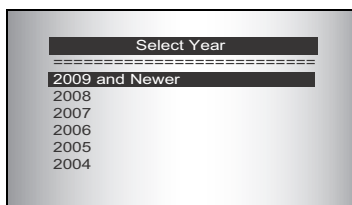
**7. Select the *Vehicle Type*.**

- a. Press the ▲ UP or ▼ DOWN arrow key to select vehicle type.
- b. Press ENTER.



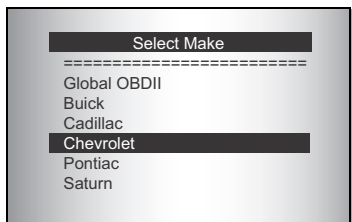
**8. Select the *Year*.**

- a. Press the ▲ UP or ▼ DOWN arrow key to select the Year.
- b. Press ENTER.



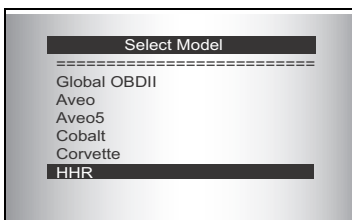
**9. Select the *Make*.**

- a. Press the ▲ UP or ▼ DOWN arrow key to select the Make.
- b. Press ENTER.



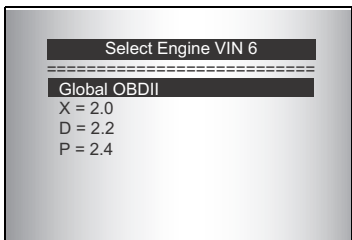
**10. Select the *Model*.**

- a. Press the ▲ UP or ▼ DOWN arrow key to select the Model.
- b. Press ENTER.



**11. Select the *Engine*.**

- a. Press the ▲ UP or ▼ DOWN arrow key to select the Engine.
- b. Press ENTER.



- ✓ In some instances, the vehicle information applies to all but a few engine sizes.
- ✓ When provided, select the exact engine size, otherwise select Global OBDII.

- ✓ If a specific engine size is selected, you may also need to select additional information (called Special). If Special information is required to identify the ABS system, go to Step 12 to continue these instructions.

## 12. Confirm Selections.

- Press ◀ **LEFT** for **YES**.
- Press ▶ **RIGHT** for **NO**.



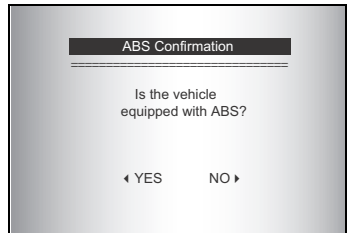
3

- ✓ If **YES** is selected, the Tool confirms the vehicle information and then goes to Step 13.
- ✓ If **NO** is selected, the Tool returns to the Select Manufacturer screen. Repeat these instructions from Step 5.

If the Tool is capable of supporting ABS or SRS of the selected vehicle, you will be prompted to confirm ABS or SRS availability.

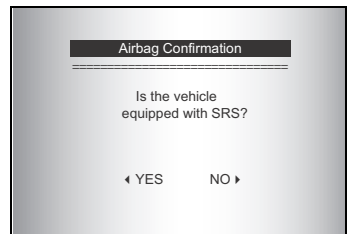
## 13. Confirm ABS Availability.

- Press ◀ **LEFT** for **YES**.
- Press ▶ **RIGHT** for **NO**.



## 14. Confirm SRS Availability.

- Press ◀ **LEFT** for **YES**.
- Press ▶ **RIGHT** for **NO**.



- ✓ Following Vehicle Selection, tool goes to the Diagnostic Menu. See Section 4 - Vehicle Diagnostics for instructions.

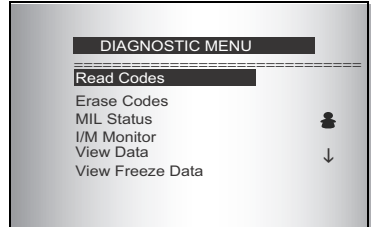


# Section 4 – Vehicle Diagnostics

## Diagnostic Menu

From the **Diagnostic Menu**, you can:

- Read Codes
- Erase Codes
- MIL Status
- I/M Monitors
- View Data
- View Freeze Data
- Review
- Print Data
- Code Lookup
- System Setup



4

The Tool keeps all data received from the last vehicle selected until any of the following occurs:

- The Tool is reprogrammed to update software.
- A new vehicle is selected.

## Read Codes

The **Read Codes** function allows the Tool to read the diagnostic trouble codes (DTCs) from the vehicle control modules. DTCs are used to help determine the cause of a problem or problems with a vehicle. The anti-lock brake control module reports DTCs pertaining to the brake system.

**Read Codes** can be done with the Key On Engine Off (KOEO) or with the Key On Engine Running (KOER).

If no DTCs are present, a message stating **Pass: No Codes Found** is displayed.

To access the **Diagnostic Menu**, select **Vehicle Diagnostics** from the **Main Menu** and select a vehicle.

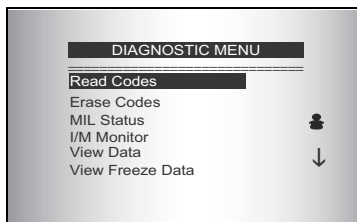
When codes are viewed, the Tool displays Diagnostic Trouble Codes (DTCs). DTCs are reported when a component, sensor, or other part of the vehicle is indicating a malfunction is present. The malfunction must be present for a sufficient amount of time before the Tool will display a Confirmed Trouble Code.

Pending Codes are only reported if a problem occurs during the current or last completed drive cycle. Pending Codes do not necessarily indicate a faulty component or system. Pending Codes convert to Confirmed Trouble Codes when an emissions problem persists long enough to be considered a real problem, not an anomaly. Pending Codes are indicated with a PENDING descriptor.

From the **Diagnostic Menu**:

**1. Select Read Codes.**

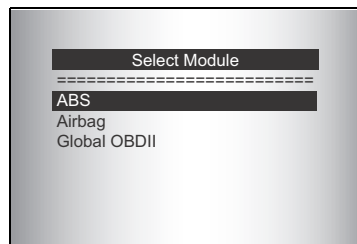
- a. Press the ▲ UP or ▼ DOWN arrow key until **Read Codes** is highlighted.
- b. Press ENTER.





**2. Select Module.**

If the Tool supports ABS and SRS for the user selected vehicle, the Select Module menu is shown. If no menu is shown, only Global OBDII codes are read.

- a. Press the ▲ UP or ▼ DOWN arrow key to highlight module.
- b. Press ENTER.



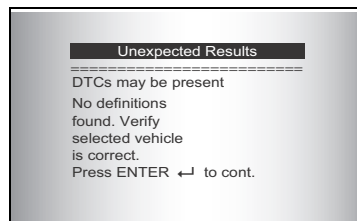
**Note:** When the  symbol appears on the display, you can read codes by pressing the  User key.

If an Error message displays, make sure the vehicle diagnostics cable is attached. Turn the ignition key off for 10 seconds, then on. (This may be required to reset the vehicle computer. If the problem still exists, see "Error Messages" on page 5-1.)

**3. View diagnostic results and write down the DTCs.**

Four possible results can occur:

- a. If the information returned by the vehicle does not match the vehicle selected, you may get an **Unexpected Results** message.

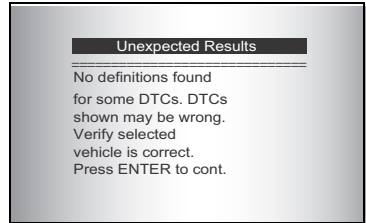




- To return to the **Diagnostic Menu**, press ENTER.
- To examine the selected vehicle information stored in the Tool, press **BACK** to return to the **Main Menu** and then select **Vehicle Diagnostics**.



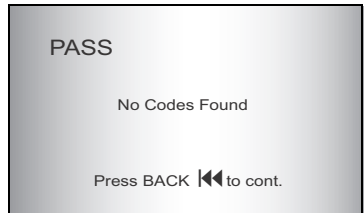
- b. If the Tool is unable to display a definition for all the DTCs returned by the vehicle, you may get an **Unexpected Results - No definitions found for some DTCs** error message.



4

- To view the **DTCs**, press ENTER.
- Press the **▲ UP** or **▼ DOWN** arrow keys to scroll through the DTCs.

- c. If no codes are found, a message appears indicating that No Codes were Found.



- d. If DTCs are found, the code and a definition will appear. For more information about the structure of the DTCs, see "Understanding DTCs" on page A-1.

- Press the **▲ UP** or **▼ DOWN** arrow keys to scroll through the DTCs.

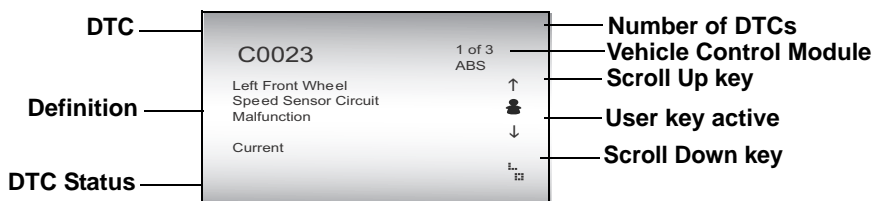
**4. To return to the Diagnostic Menu, press the **BACK** key.**

**Note:** On most vehicles, if you successfully repair the cause of the DTC, then the MIL should turn off after the vehicles successfully runs its self tests.



# DTC Examples

Several ABS DTC examples are shown below. SRS and Global OBDII DTCs are presented similarly..

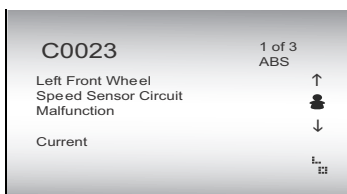


4

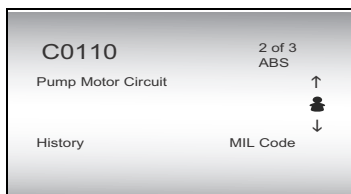
General Motors provides additional information along with the DTCs:

- **Current** - A current DTC indicates that a failure is currently present. A current code may have just occurred or may have been present over time.
- **History** - A DTC with a History designation is one that has been detected by the anti-lock brake control module over a span of time. It is a current failure that has been present long enough to be stored in long-term memory.
- **CURR/HIST** - A CURR/HIST DTC indicates that a failure is both current and historical as defined above.
- **Intermittent** - An intermittent status indicates that the DTC has appeared intermittently since the anti-lock brake control module was reset. (Control modules are reset by mechanics after a repair has been completed.)

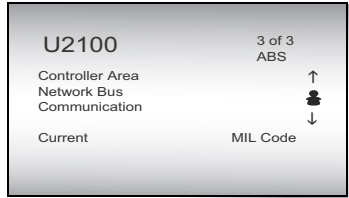
This code indicates that you currently have a problem with the Left Front Wheel Speed Sensor Circuit and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard.



This code indicates that you have had a problem with the Pump Motor Circuit long enough to be stored in long-term memory and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard. ABS systems rely on a pump to regulate brake fluid distribution.



This code indicates that you have a current problem with the Network Bus Communication for the ABS controller and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard.



## Erase Codes

The **Erase Codes** function deletes DTC data from the control modules. **Do not perform this function while the vehicle is in motion.** The Tool must be connected to the vehicle to run this function.

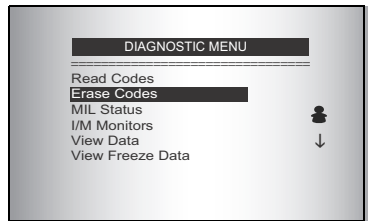
Perform **Erase Codes** function **only** after a system has been checked completely and the DTCs have been written down or printed.

After servicing the vehicle, erase stored DTCs and verify that the codes have been cleared. If a DTC returns, the problem has not been fixed or other faults are present.

The vehicle may need to be driven to conclude that a fault is repaired.

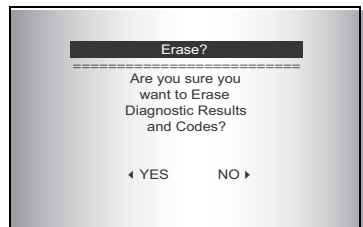
From the **Diagnostic Menu**:

1. **Select Erase Codes.**
  - a. From the **Diagnostic Menu**, press the ▲ UP or ▼ DOWN arrow key until **Erase Codes** is highlighted.
  - b. Press ENTER.



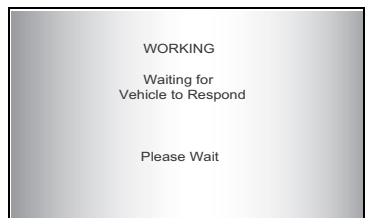
If diagnostic results and codes are not to be erased, select **No ▶**.

- Selecting No ▶ takes you back to the **Diagnostic Menu**.



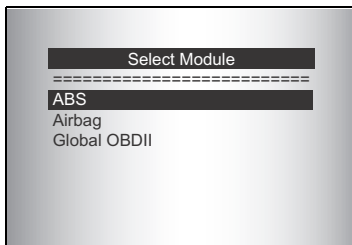
2. **Erase the diagnostic results and codes.**

- Press the ◀ LEFT arrow for **Yes**.



3. **Select Module.**

If the Tool supports ABS and SRS for the user selected vehicle, the Select Module menu is shown. If no menu is shown, only Global OBDII codes are read.



- a. Press the ▲ UP or ▼ DOWN arrow key to highlight module.
- b. Press ENTER.

4. **Observe Command Sent message**

5. **To return to the Diagnostic Menu, press ◀◀ BACK.**



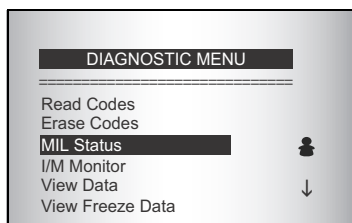
## MIL Status

**Malfunction Indicator Lamp (MIL) Status** displays the state of the vehicles computer module(s). **MIL Status** is most useful if the engine is running. Some manufacturers turn the MIL off if a certain number of drive cycles occur without a fault.

The computer's memory erases Trouble Codes and resets MIL from memory if fault does not occur after 40 warm-up cycles.

1. **Select MIL Status.**

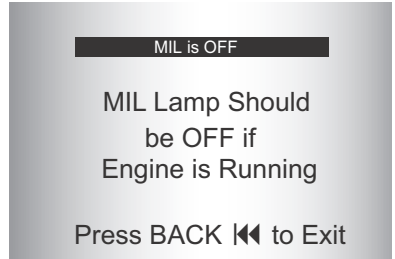
- Use ▲ UP or ▼ DOWN arrow key to highlight **MIL Status**.
- Press ENTER.



**2. Review Results.**

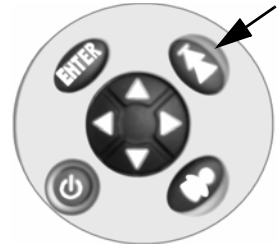


OR



**3. Return to *DIAGNOSTIC MENU*.**

Press BACK.



**4**

**I/M Monitors (Emission Systems)**

The *I/M Monitors* (Inspection / Maintenance) function is used to view a snapshot of the operations for the Emission System on OBD II vehicles since the Diagnostic Trouble Codes were cleared.

I/M Monitors is a very useful function. To guarantee no faults make sure all monitors are "ok" or "n/a" and no DTC's exist.

During normal driving conditions, the vehicle's computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time required), the computer's "monitors" will decide if the vehicles emission system is working correctly or not as well as detecting out of range values. When the "monitor's" status is:

- "ok" - vehicle was driven enough to complete the monitor.
- "inc" (**Incomplete**) - vehicle was not driven enough to complete the monitor.
- "n/a" (**Not Applicable**) - vehicle does not support that monitor.

Some states **MAY NOT** require all monitors listed to be ready to pass the emissions test. Check with state testing site for exact requirements. All states will fail a vehicle that has the MIL Light lit at time of test.

Refer to the vehicles service manual for the drive cycle operation.

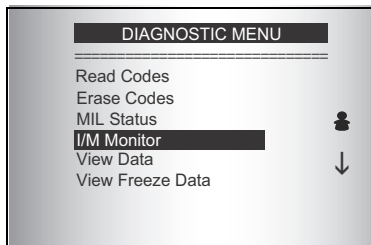
Depending on vehicle, disconnecting or a discharged battery may erase trouble codes and clear monitor status. Clear Monitors by:

- Erasing Codes.
- Vehicle Computer Module losing power (on some vehicles.)

**I/M Monitors** function can be done with the Key On, Engine Running or Off.

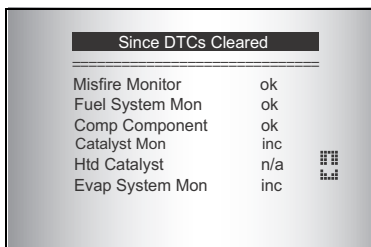
**1. Select I/M Monitors.**

- a. Use ▲ UP or ▼ DOWN arrow key to highlight **I/M Monitors**.
- b. Press ENTER.



**2. View Summary of Monitor Status.**

- Use ▲ UP or ▼ DOWN arrow key.



Abbreviate Name	Expanded Name
Misfire Monitor	Misfire Monitor
Fuel System Mon	Fuel System Monitor
Comp Component	Comprehensive Components Monitor
Catalyst Mon	Catalyst Monitor
Htd Catalyst	Heated Catalyst Monitor
Evap System Mon	Evaporative System Monitor
Sec Air System	Secondary Air System Monitor
A/C Refrig Mon	Air Conditioning Refrigerant Monitor
Oxygen Sens Mon	Oxygen Sensor Monitor
Oxygen Sens Htr	Oxygen Sensor Heater Monitor
EGR System Mon	Exhaust Gas Recirculation System Monitor

Two types of I/M Monitors tests are:

**Since DTCs Cleared** - shows status of the monitors since the DTCs were last erased.

**This Drive Cycle** - shows status of monitors since the start of the current drive cycle. Refer to the vehicle service manual for more detailed information on emission-related monitors and their status.

- ✓ Some vehicles **do not** support **This Drive Cycle**. If vehicle supports both types of monitors the **I/M Monitors Menu** displays.

**3. Return to *DIAGNOSTIC MENU*.**

- Press **⏪** BACK.



## View Data

The View Data function allows real time viewing of the vehicle computer module PID data. As the computer monitors the vehicle, information is simultaneously transmitted to the Tool.

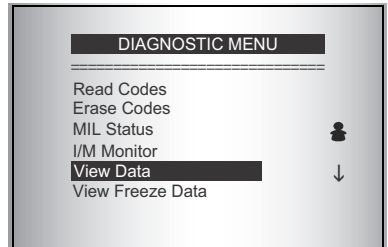
View Data allows these items to be viewed on the Tool:

- Sensor data
- Operation of switches
- Operation of solenoids
- Operation of relays

Multiple PIDs may be sent if vehicle is equipped with more than one computer module. (for example a powertrain control module [PCM] and a transmission control module [TCM]. The Tool identifies them by their identification names (ID) assigned by the manufacturer (i.e. \$10 or \$1A).

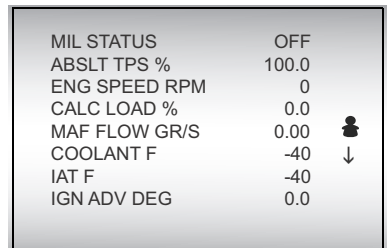
**1. Select *View Data*.**

- Use **▲** UP or **▼** DOWN arrow key to highlight ***View Data***.
- Press ENTER.



While data is collected, several screens show.

**2. *View Data*.**



3. To return to **DIAGNOSTIC MENU**, press **⏪ BACK**.



## View Freeze Data

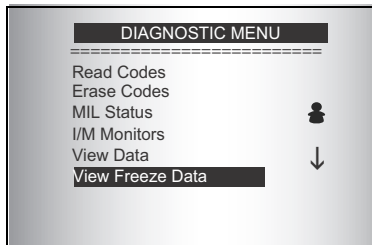
**View Freeze Data** is a “snapshot” of the operating conditions at the time of an emission-related fault. Faults with higher priority can overwrite **View Freeze Data**.

Depending on when vehicle DTCs were last erased, **Freeze Frame Data** may not be stored in vehicles memory.

### 1. Select **View Freeze Data**.

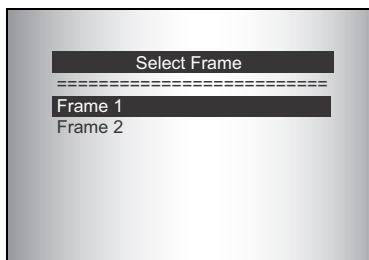
- a. Use **▲ UP** or **▼ DOWN** arrow key to highlight **View Freeze Data**.
- b. Press **ENTER**.

While collecting data, several screens show.

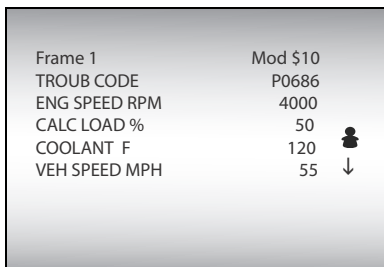


### 2. Select DTC (if more than 1 DTC is present.)

- a. Use **▲ UP** or **▼ DOWN** arrow key to highlight desired frame.
- b. Press **ENTER**.



### 3. View Freeze Data.



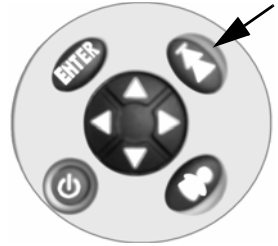


**4. Select another frame to view (if available.)**

- Press **⏪** BACK.



**5. To return to *DIAGNOSTIC MENU*, press **⏪** BACK.**



**Review**

The **Review** function allows the user to view the data reported from the previous vehicle tested. **Review** has three types of data.

- **Codes**
- **I/M Monitors**
- **View Freeze Data**

You cannot review data until you have run the respective function. For instructions on running the **Read Codes** function, see “**Read Codes**” on page 4-1.

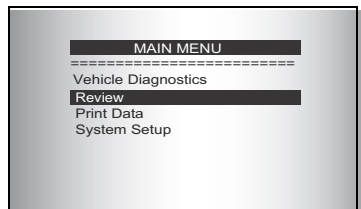
The Tool does not require power from the vehicle to use the **Review** function.

**1. Select *Review*.**

The Review function is available from both the **Main Menu** and the **Diagnostic Menu** for your convenience.

**To Review from the *Main Menu*:**

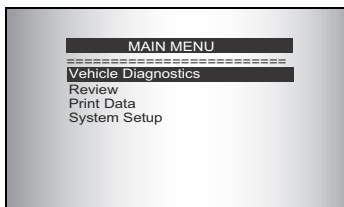
- From the **Main Menu**, press the **▲** UP or **▼** DOWN arrow key until **Review Data** is highlighted then press ENTER.



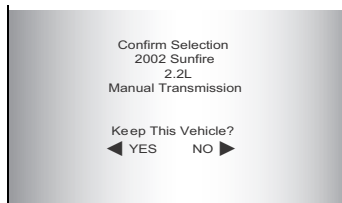
Or,

☐ To Review from the *Diagnostic Menu*:

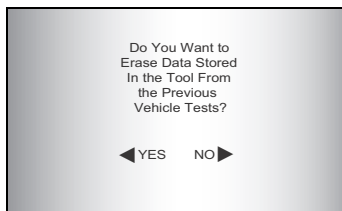
- From the *Main Menu*, press the ▲ UP or ▼ DOWN arrow key until **Vehicle Diagnostics** is highlighted and then press ENTER.



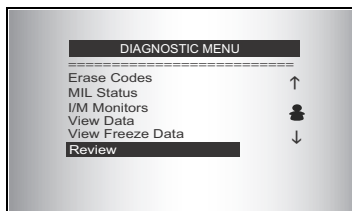
- When the Confirm Selection screen appears, press ◀ LEFT for **Yes** to keep the current vehicle.



- Keep the existing data stored in the Tool, press ▶ RIGHT for **No** to continue.



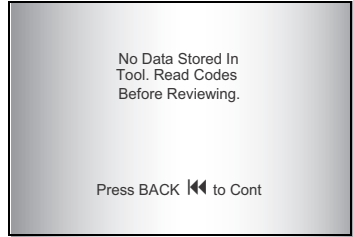
- From the *Diagnostic Menu*, use the arrow keys to highlight **Review** and then press ENTER.



2. After selecting Codes, I/M Monitors, or View Freeze Frame, observe the data provided by the Tool.

Press the ▲ UP or ▼ DOWN arrow key to review the data.

If data does not exist, a message informs the user to run the **Read Code** function before reviewing data.



3. To return to the prior menu, press ⏪ BACK.



## Print Data

The **Print Data** function allows the printing of diagnostic information stored in the Tool.

The Tool's internal battery power can be used to print data.

**Print Data** is available from both the **Main Menu** and **Diagnostic Menu**.

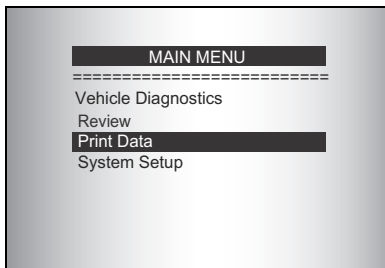
To use the **Print Data** function, you must install the PC Scanning Suite software found at [www.otctools.com/updates](http://www.otctools.com/updates). Launch the Scanning Suite and then start the printing application.

Follow all instructions on the PC.

1. **Connect the Tool to your PC.**
  - Take the USB cable and attach the Mini B Connector to the Device Port on the Tool.
  - Attach the Host Connector to a USB Port on the personal computer (PC).

❑ To Print Data from the **Main Menu:**

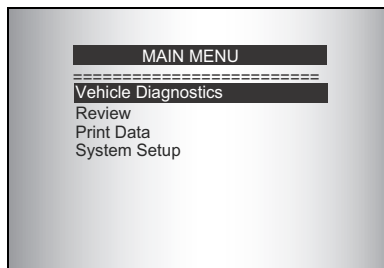
- a. From the **Main Menu**, press the ▲ UP or ▼ DOWN arrow key until **Print Data** is highlighted.
- b. Press ENTER., and then go to Step 2.



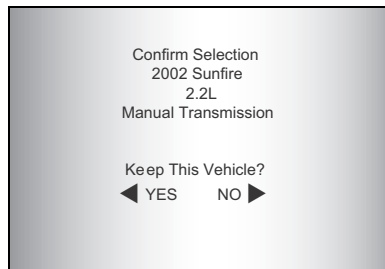
Or,

❑ To Print Data from the **Diagnostic Menu:**

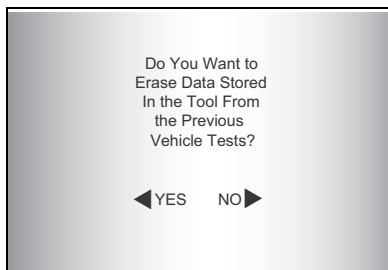
- a. From the **Main Menu**, press the ▲ UP or ▼ DOWN arrow key until **Vehicle Diagnostics** is highlighted.
- b. Press ENTER.



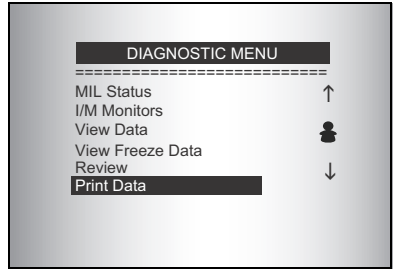
2. When the Confirm Selection screen appears, press ◀LEFT for Yes to keep the current vehicle.



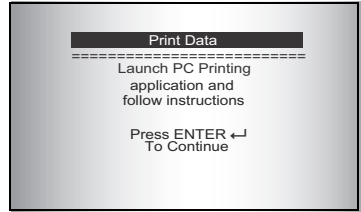
- a. Keep the existing data stored in the Tool, press ▶RIGHT for **No** to continue.



- b. On the **Diagnostic Menu**, press the ▲ UP or ▼ DOWN arrow key until **Print Data** is highlighted.
- c. Press ENTER.

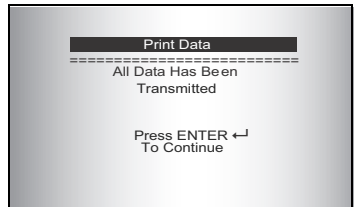


3. **Start the PC Printing application.**
  - Follow the instructions on the personal computer.



4

4. **Send the data to the PC.**
  - Press ENTER on the Tool.



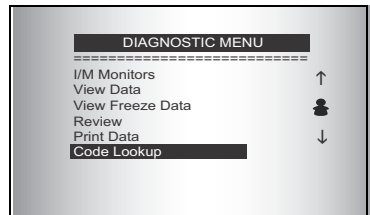
5. **To return to the previous menu, press ENTER on the Tool.**

## Code Lookup

**Code Lookup** accesses a library of possible DTCs for the selected vehicle. The Tool does not require power from the vehicle to perform this function. **Code Lookup** is only available from the **Diagnostic Menu** because the user must select a vehicle prior to accessing the library.

From the **Diagnostic Menu**:

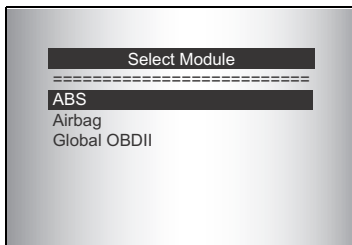
1. **Select Code Lookup.**
  - a. Press the ▲ UP or ▼ DOWN arrow key until **Code Lookup** is highlighted.
  - b. Press ENTER.



## 2. Select Module.

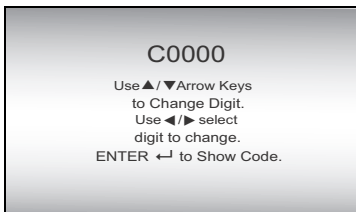
If the Tool supports ABS and SRS for the user selected vehicle, the Select Module menu is shown. If no menu is shown, only Global OBDII codes are read.

- a. Press the ▲ UP or ▼ DOWN arrow key to highlight module.
- b. Press ENTER.



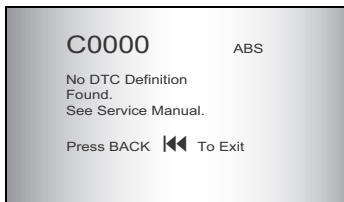
## 3. Enter a Code.

- Codes come in two formats: **OBDDII** and **Non-OBDDII**. (For more information about the possible formats, see “**Understanding DTCs**” on page A-1.)
- All characters must be entered.
- Only one character can be changed at a time.
- Use ◀ **LEFT** or ▶ **RIGHT** arrow keys to move to desired character.
- Use ▲ UP or ▼ DOWN arrow keys to change or select a character.
- Press ENTER.



If the definition can not be found, the Tool displays the message No Definition Found.

Check the Service Manual for the vehicle for DTC definitions as well.



**4. Enter another DTC or exit the Code Lookup function.**

- Press **⏪** BACK once then repeat these instructions from Step 2.

Or,

- Press **⏪** BACK twice to return to the prior menu.







## Section 5 – Troubleshooting

### Error Messages

Check the following if an error message displays:

- Verify ignition key is in the ON and not in the ACCESSORIES position.
- Make sure Vehicle Diagnostics Cable is attached to vehicle's data link connector (DLC) and Tool.
- Look at DLC and check for cracked or recessed pins, or for any substance that could prevent a good electrical connection.
- Test for continuity between the DLC wiring and the vehicle computers. In an extreme case, there may be a broken wire.
- Check for bent or broken pins.
- With the key on engine off (KOEO), check for blown fuses.
- Make sure the vehicle's control module has a good ground. If the computer case for the vehicle is grounded, then clean the connection and apply a conductive (dielectric) grease to the mating surfaces.
- With the KOEO, verify battery voltage is at least 8V.
- Verify the control module is not defective. Refer to the service manual to diagnose the control module.

5

### Tool Does Not Power Up

Review **Safety Precautions** before troubleshooting. If Tool will not power up, communicate with vehicle's control module, pass Tool self-tests, or functions incorrectly in any other way, do the following:

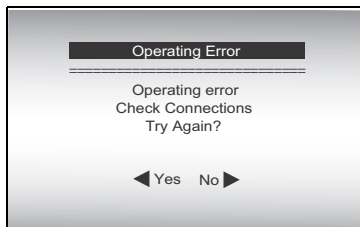
- Check and replace the 9V battery if needed.
- Clean the DLC pins.
- Disconnect and reconnect DLC making sure it is connected correctly.
- Check vehicle battery to make sure at least 8 volts is present.
- Contact customer service.

# Operating Error or Erroneous Data

An **Operating Error** or **Erroneous Data** error occurs if vehicle computer(s) stop(s) communicating with Tool.

## 1. Make Selection.

- Press the ◀ LEFT or ▶ RIGHT arrow key.




**Note:** See “Error Messages” on page 5-1 for possible causes.

5

# Battery Replacement

The Tool requires a 9V alkaline battery to operate without vehicle power. **Review**, **Print Data**, **Code Lookup**, and **System Setup** functions work on internal battery and vehicle power. All other functions work on vehicle power only.

## Notes:

1. When the battery needs to be replaced, the low-battery icon  displays.
2. Rechargeable batteries do not last as long as alkaline types and are not recommended.
3. Non-rechargeable Lithium (Li) battery can be used. While Lithium batteries last longer than alkaline batteries, they are more expensive.
4. The Tool does not charge rechargeable batteries.

1. Place *Display* face down, on a non-abrasive surface.

2. Remove **Battery Cover**.
- a. Turn the phillips screw counterclockwise.
  - b. Slide battery cover off.



3. Remove **Battery** and properly discard.

4. Install new **9 Volt** battery.

5. Reinstall **Battery cover**.
- a. Slide battery cover on.
  - b. Install phillips screw turning it clockwise.

**Note:** Do not overtighten screw.

## Tool Self-Tests

**Tool Self-Tests** check the display, keys, and internal memory.

Refer to “**System Setup**” on page 3-6 of the manual for the operational procedures for the Tool self-tests.



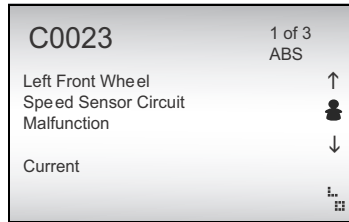
# Appendix A – Understanding DTCs

## Diagnostic Trouble Code (DTC) Formats

DTCs are used to help determine the cause of a problem or problems with a vehicle.

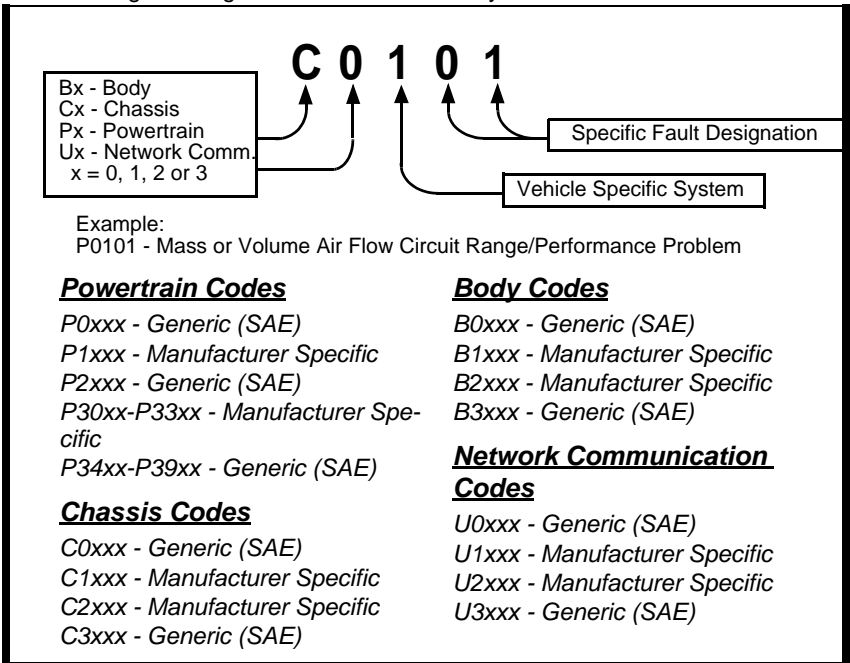
### OBD II Format Codes

- OBD II DTCs consist of a five-digit alphanumeric code.
- The DTCs format and general code types are shown below.
- ABS Codes are typically chassis (Cxxxx) codes.



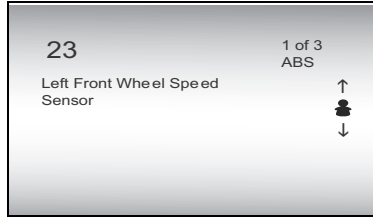
**A**

Within each category (Powertrain, Chassis, Body and Network) of DTCs there are assigned ranges for different vehicle systems.



## Non-OBD II Format Codes

- ❑ DTCs consist of a 2- or 3-digit alphanumeric code.
- ❑ The DTCs format and general code types are shown below:



A

## Appendix B – Glossary

**A/C:**

Air Conditioner

**A/D:**

Analog to Digital

**A/F:**

Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. Ideally the A/F ratio is 14.7:1.

**ABS:**

Anti-lock Brake System

**A/C Clutch Relay:**

The PCM uses this relay to energize the A/C clutch, turning the A/C compressor on or off.

**A/C Pressure Sensor:**

Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.

**A/C Pressure Switch:**

A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low or high.

**Actuator:**

Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.

**Air Injection Reaction (AIR) System:**

An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be dumped back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.

**APP:**

Acceleration Pedal Position (Sensor)

**ASR:**

Acceleration Slip Regulation

**Bank x:**

The standard way of referring to the bank of cylinders containing cylinder #x. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor x**, **Sensor x**.

**BARO:**

Barometric Pressure Sensor. See **MAP Sensor**.

**BBV:**

Brake Boost Vacuum (Sensor)

**BCM:**

Body Control Module

**Boost Control Solenoid:**

A solenoid that is energized by the PCM, in order to control turbo/supercharger boost pressure.

**Brake Switch Signal:**

An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

**CAM:**

Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.

**Catalytic Converter:**

Designed to reduce exhaust emissions.

**CAN:**

Controller Area Network

**CARB:**

California Air Resources Board. Governing body for emissions control in California.

**B**

**CKP REF:**

Crankshaft Position Reference.

**CKP:**

Crankshaft Position. See **CPS**.

**CKT:**

Circuit

**Closed Loop (CL):**

A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can fine tune control of a system to achieve an exact result.

**CMP:**

Camshaft Position Sensor

**CO:**

Carbon Monoxide; odorless gas produced by incomplete combustion.

**Tool:**

A device that interfaces with and communicates information via a data link.

**Continuous Memory Codes:**

See **Pending Codes**.

**CPS:**

Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).



**CTS:**

Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is cold or warm.

**CVRTD:**

Continuous Variable Real Time Damping

**D/R:**

Drive/Reverse

**Data Link Connector (DLC):**

Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.

**Data Stream:**

The actual data communications sent from the vehicle's PCM to the data connector.

**DEPS:**

Digital Engine Position Sensor.

**Detonation:**

See **Knock**.

**DI/DIS:**

Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.

**DPFE:**

Differential Pressure Feedback – Exhaust Gas Recirculation Sensor

**DTC:**

Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.

**Duty Cycle:**

A term applied to signals that switch between on and off. Duty cycle is the percentage of time the signal is on. For example, if the signal is on only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.

**EBCM:**

Electronic Brake Control Module

**EBTCM:**

Electronic Brake/Traction Control Module

**ECM**

Engine Control Module or Electronic Control Module

**ECT:**

Engine Coolant Temperature sensor. See **CTS**.

**ECU:**

Electronic Control Unit.

**EEPROM:**

Electrically Erasable Programmable Read Only Memory

**EFE:**

Early Fuel Evaporation

**EFI:**

Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.

**EGR:**

Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR is used only during warm engine cruise conditions.

**EOP:**

Engine Oil Pressure (Switch)

**EOT**

Engine Oil Temperature (Sensor)

**EPA:**

Environmental Protection Agency.

**ESC:**

Electronic Spark Control. An ignition system function that warns the PCM when knock is detected. The PCM then retards spark timing to eliminate the knocking condition.

**EST:**

Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.

**EVAP:**

Evaporative Emissions System.

**FC:**

Fan Control

**Freeze Frame:**

A block of memory containing DTCs of the vehicle operating conditions for a specific time.

**FTP:**

Federal Test Procedure. Strict test of vehicle's emissions.

**Ground (GND):**

An electrical conductor used as a common return for an electric circuit(s) and with a relative zero potential (voltage).

**Hall Effect Sensor:**

Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.

**HO2S:**

Heated Oxygen Sensor. See **O2S**.

**HVAC:**

Heating, Ventilation & Air Conditioning (System)

**I/M:**

Inspection and Maintenance. An emission control program.

**IAC:**

Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.

**IAT:**

Intake Air Temperature (Sensor)

**ICM:**

Ignition Control Module.

**IMRC:**

Intake Manifold Runner Control

**IPC:**

Instrument Panel Cluster

**ISC:**

Idle Speed Control. A small electric motor mounted on the throttle body and controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

**ISO:**

International Organization of Standardization also know as International Standards Organization.

**KAM:**

Keep Alive Memory

**Knock Sensor (KS):**

Used to detect engine detonation or knock. The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

**Knock:**

Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or "hotspots" which are causing the air/fuel mixture to detonate prematurely.

**KOEO:**

Key On Engine Off. Turn the ignition key to on, but don't start engine.

**KOER:**

Key On Engine Running. Start the vehicle.

**LCD:**

Liquid Crystal Display

**LTFT:**

Long Term Fuel Trim

**M/T:**

Manual transmission or manual transaxle.

**MAF:**

Mass Air Flow (sensor). Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.

**MAP:**

Manifold Absolute Pressure (sensor). Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.

**MAT:**

Manifold Air Temperature (sensor). A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.

**MIL:**

Malfunction Indicator Lamp. The MIL is most commonly known as the Check Engine or Service Engine Soon light. A required on-board indicator to alert the driver of an emission-related malfunction.

**Misfire:**

Caused by the air fuel ratio being incorrect.

**Monitor:**

A test performed by the on-board computer to verify proper operation of emission-related systems or components.

**MPFI or MFI:**

Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors are mounted in the intake manifold, and fired in groups rather than individually.

**NOx:**

Oxides of Nitrogen. The system EGR and Camshafts injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

**O2S:**

Oxygen Sensor. Generates a voltage of 0.6 to 1.1 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349°C (660°F). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.

**OBD II:**

On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, connector location, communication protocol, DTCs and code definitions. OBD II first appeared on vehicles in late 1994, and is required to be present on all cars sold in the US after January 1, 1996.

**ODM:**

Output Device Monitor.

**Open Loop (OL):**

A control system mode that does not monitor the output to verify if the desired results were achieved. A fuel delivery system usually operates in open loop mode during cold engine warm-up because the oxygen sensors are not yet ready to send a signal. Without the oxygen sensor signal, the computer cannot check the actual results of combustion.

**PCM:**

Powertrain Control Module. The brains of the engine and transmission control systems housed in a metal box with a number of sensors and actuators connected via a wiring harness. Its job is to control fuel delivery, idle speed, spark advance timing, and emission systems. The PCM receives information from sensors, then energizes various actuators to control the engine. The PCM is also known as the ECM (Engine Control Module).

**Pending Codes:**

Also referred to as Continuous Memory codes and Maturing Diagnostic Trouble Codes. Pending Codes may be set by emission related powertrain components and systems. If the fault does not occur after a certain number of drive cycles, the code is erased from memory.

**PID:**

Parameter Identification. Identifies an address in memory which contains vehicle operating information.

**PNP:**

Park/Neutral Position. A switch that tells the PCM when the gear shift lever is in the Park or Neutral position. When in Park or Neutral, the PCM operates the engine in an idle mode.

**PROM:**

Programmable Read-Only Memory. The PROM contains programming information the PCM needs to operate a specific vehicle model/engine combination.

**PSPS:**

Power Steering Pressure Switch

**Purge Solenoid:**

Controls the flow of fuel vapors from the carbon canister to the intake manifold. The canister collects vapors evaporating from the fuel tank, preventing them from escaping to the atmosphere and causing pollution. During warm engine cruise conditions, the PCM energizes the Purge Solenoid so the trapped vapors are drawn into the engine and burned.

**PWM:**

Pulse Width Modulated

**PZM:**

Platform Zone Module

**QDM:**

Quad Driver Module

**RAM:**

Random Access Memory

**Relay:**

An electromechanical device in which connections in one circuit are switched.

**Reluctance Sensor:**

A type of sensor typically used to measure crankshaft or camshaft speed and/or position, driveshaft speed, and wheel speed.

**ROM:**

Read-Only Memory. Permanent programming information stored inside the PCM, containing the information the PCM needs to operate a specific vehicle model/engine combination.

**RPM:**

Revolutions Per Minute

**SAE:**

Society of Automotive Engineers.

**Tool:**

A device that interfaces with and communicates information on a data link.

**SDM:**

Sensing and Diagnostic Module

**Sensor x:**

A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S, Bank 1, Bank 2.**

**Sensor:**

Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.

**SFI or SEFI:**

Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.

**Solenoid:**

A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

**STFT:**

Short Term Fuel Trim.

**STS:**

Service Throttle Soon

**TAC:**

Throttle Actuator Control

**TBI:**

Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. TBI is also called Central Fuel Injection (CFI) in some vehicles.

**TCC:**

Torque Converter Clutch

**TCM:**

Transmission Control Module

**TCS:**

Traction Control System for PCM and brakes

**TDC:**

Top Dead Center. When a piston is at its uppermost position in the cylinder.

**TFP:**

Transmission Fluid Pressure

**TFT:**

Transmission Fluid Temperature (Sensor)

**Throttle Body:**

A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Fuel is not added until the injectors at each intake port are activated. In each case, the throttle body is attached to the accelerator pedal.

**TPS:**

Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle is opened. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.

**Traction Assist:**

Assist in traction with brakes only.

**Trip:**

Vehicle operation for a period of time so the systems can be monitored.

**TTS:**

Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

**VECI:**

Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II compliant.

**VIN:**

Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

**VSS:**

Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

**VTD:**

Vehicle Theft Deterrent

**Warm-up Cycle:**

Warm-up cycle is when the engine coolant temperature rises at least 40 degrees above that at engine start up.

**WOT:**

Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM typically delivers extra fuel to the engine and de-energizes the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the TPS to identify the WOT condition.



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- 5) If possible, return the product in its original package with cables and accessories.
- 6) Include your return address on the outside of the package and send the unit to the address provided by your Technical Service Representative.
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