

ZR4

# OBD2 Code Reader



## OWNER'S MANUAL

The easiest and best way to  
troubleshoot 1996 and newer  
OBD2 vehicles!



# Table of Contents

<b>SAFETY PRECAUTIONS</b>	
IMPORTANT SAFETY INFORMATION .....	1
<b>ABOUT THE</b>	
VEHICLES COVERED .....	2
CONTROLS AND INDICATORS .....	3
DISPLAY FUNCTIONS .....	4
DISPLAY AND SETTINGS .....	5
<b>ONBOARD DIAGNOSTICS</b>	
OBD2 TERMINOLOGY .....	7
DIAGNOSTIC TROUBLE CODES (DTCs) .....	8
OBD2 MONITORS .....	11
<b>PREPARATION FOR TESTING</b>	
BEFORE YOU BEGIN .....	14
<b>USING THE CODE READER</b>	
CODE RETRIEVAL PROCEDURE .....	15
ERASING DIAGNOSTIC TROUBLE CODES (DTCs) .....	20
<b>ADDITIONAL FUNCTIONS</b>	
THE MAIN MENU .....	22
VIEWING VEHICLE INFORMATION .....	22
EVAP TEST .....	25
VIEWING MONITOR ICON DESCRIPTIONS .....	26
VIEWING THE LED MEANING .....	26
ADJUSTMENTS, SETTINGS AND LANGUAGE .....	27
OBD UPDATER .....	29
<b>WARRANTY AND SERVICING</b>	
TROUBLESHOOTING .....	29
LIMITED 90 DAY WARRANTY .....	30

## IMPORTANT SAFETY INFORMATION

### **WARNING**

**Read all safety warnings and all instructions.**

**Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.**

**Save all warnings and instructions for future reference.**

1. Operating a vehicle indoors CAN KILL YOU IN MINUTES. Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell. NEVER operate vehicle inside a home or garage, EVEN IF doors and windows are open. Only use OUTSIDE and far away from windows, doors, and vents.
2. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near coil, spark plug cables, or distributor of running engine. Engine should be off during distributor adjustment.
3. Keep clothing, hair, hands, tools, test equipment, etc. away from all moving or hot engine parts.
4. Put the transmission in PARK (for automatic transmission) or NEUTRAL (for manual transmission) and make sure the parking brake is engaged.
5. Put blocks in front of and behind the drive wheels.
6. Read vehicle service manual before inspecting, maintaining, or repairing a vehicle.
7. Wear ANSI-approved safety goggles.
8. Never leave the vehicle unattended while running tests.
9. Keep a fire extinguisher suitable for gasoline/chemical/electrical fires nearby.
10. Don't connect or disconnect any test equipment while the ignition is on or the engine is running.
11. This product is not a toy. Keep it out of reach of children.
12. Keep the Scan Tool dry, clean, free from oil, water or grease. Use a mild detergent on a clean cloth to clean the outside of the Scan Tool, when necessary.
13. The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.



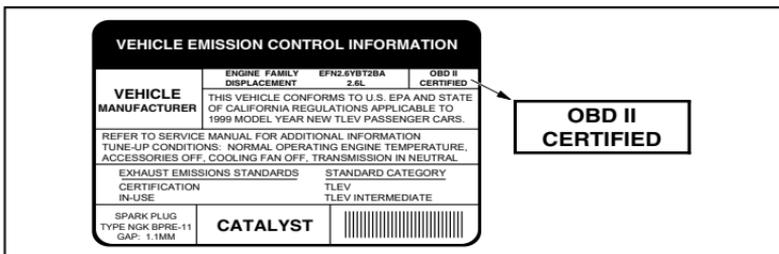
**SAVE THESE INSTRUCTIONS.**

### VEHICLES COVERED

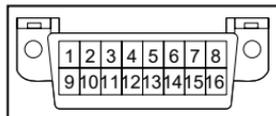
The Code Reader is designed to work on all OBD2 compliant vehicles. All 1996 and newer vehicles (cars and light trucks) sold in the United States are OBD2 compliant. This includes all Domestic, Asian and European vehicles. Coverage for new model vehicles may be limited and will be available once released by the automaker. Availability is typically 12 to 24 months after the release of the model year.

Some 1994 and 1995 vehicles are OBD2 compliant. To find out if a 1994 or 1995 vehicle is OBD2 compliant, check the following:

1. **The Vehicle Emissions Control Information (VECI) Label.** This label is located under the hood or by the radiator of most vehicles. If the vehicle is OBD2 compliant, the label will state **"OBD II Certified."**



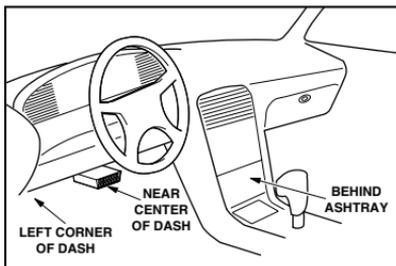
2. Government Regulations require that all OBD2 compliant vehicles must have a "common" sixteen-pin **Data Link Connector (DLC)**.



*Some 1994 and 1995 vehicles have 16-pin connectors but are not OBD2 compliant. Only those vehicles with a Vehicle Emissions Control Label stating "OBD II Certified" are OBD2 compliant.*

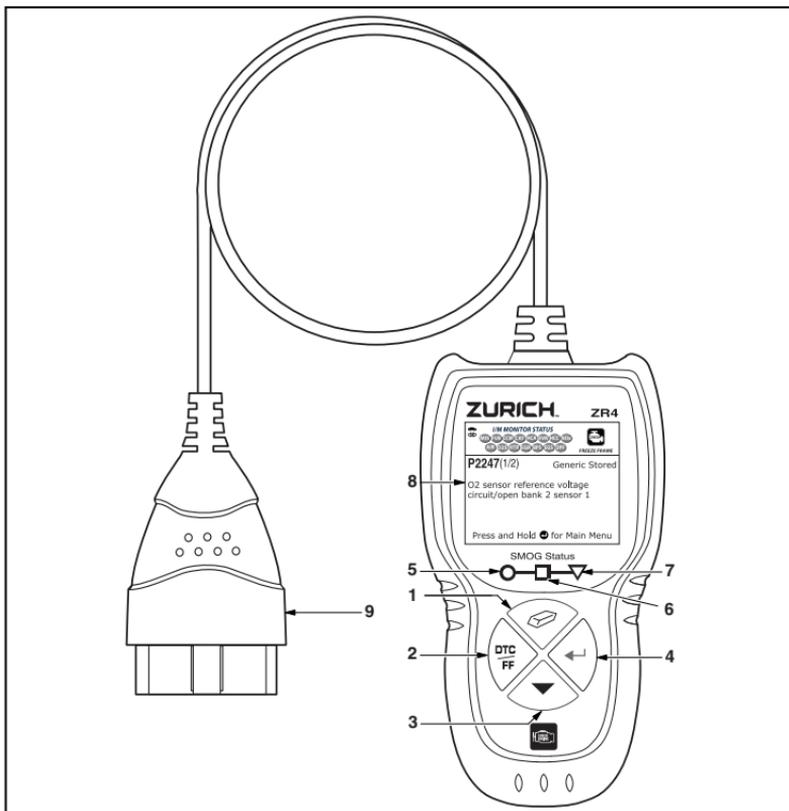
### Data Link Connector (DLC) Location

The 16-pin DLC is usually located under the instrument panel (dash), within 12 inches (300 mm) of center of the panel, on the driver's side of most vehicles. It should be easily accessible and visible from a kneeling position outside the vehicle with the door open.



*On some Asian and European vehicles the DLC is located behind the "ashtray" (the ashtray must be removed to access it) or on the far left corner of the dash. If the DLC cannot be located, consult the vehicle's service manual for the location.*

## CONTROLS AND INDICATORS



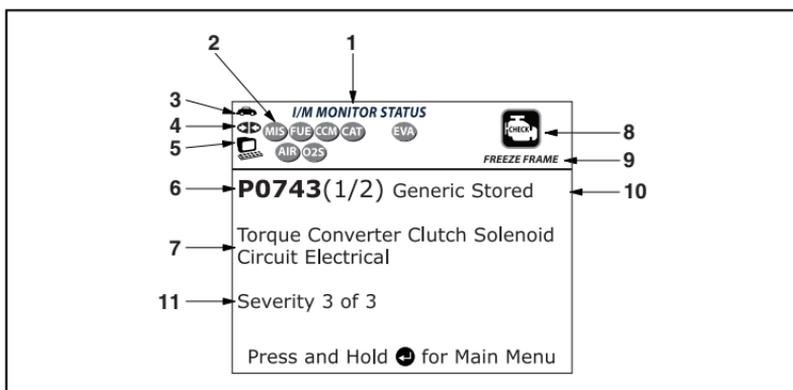
**Figure 1. Controls and Indicators**

See Figure 1 for the locations of items 1 through 9, below.

1. **ERASE button** - Erases Diagnostic Trouble Codes (DTCs) and "Freeze Frame" data from your vehicle's computer, and resets Monitor status.
2. **DTC/FF button** - Displays the DTC View screen and/or scrolls the LCD display to view DTCs and Freeze Frame data.
3. **DOWN button** - When in MENU mode, scrolls down through the menu and submenu selection options. When LINKED to a vehicle, scrolls down through the current display screen to display any additional data.
4. **ENTER button** - When in MENU mode, confirms the selected option or value.
5. **GREEN LED** - Indicates that all engine systems are running normally (all Monitors on the vehicle are active and performing their diagnostic testing, and no DTCs are present).

- YELLOW LED** - Indicates there is a possible problem. A "Pending" DTC is present and/or some of the vehicle's emission monitors have not run their diagnostic testing.
- RED LED** - Indicates there is a problem in one or more of the vehicle's systems. The red LED is also used to show that DTC(s) are present. DTCs are shown on the Code Reader's LCD display. In this case, the Multifunction Indicator ("Check Engine") lamp on the vehicle's instrument panel will light steady on.
- LCD Display** - Displays test results, Code Reader functions and Monitor status information. See DISPLAY FUNCTIONS, below, for details.
- CABLE** - Connects the Code Reader to the vehicle's Data Link Connector (DLC).

## DISPLAY FUNCTIONS



**Figure 2. Display Functions**

See Figure 2 for the locations of items 1 through 10, below.

- I/M MONITOR STATUS field** - Identifies the I/M Monitor status area.
- Monitor icons** - Indicate which Monitors are supported by the vehicle under test, and whether or not the associated Monitor has run its diagnostic testing (Monitor status). When a Monitor icon is solid, it indicates that the associated Monitor has completed its diagnostic testing. When a Monitor icon is flashing, it indicates that the vehicle supports the associated Monitor, but the Monitor has not yet run its diagnostic testing.
- Vehicle icon** - Indicates whether or not the Code Reader is being properly powered through the vehicle's Data Link Connector (DLC). A visible icon indicates that the Code Reader is being powered through the vehicle's DLC connector.

-  **Link icon** - Indicates whether or not the Code Reader is communicating (linked) with the vehicle's on-board computer. When visible, the Code Reader is communicating with the computer. If the Link icon is not visible, the Code Reader is not communicating with the computer.
-  **Computer icon** - When this icon is visible it indicates that the Code Reader is linked to a personal computer.
- DTC Display Area** - Displays the Diagnostic Trouble Code (DTC) number.
- Test Data Display Area** - Displays DTC definitions, Freeze Frame data and other pertinent test information messages.
- SYSTEM icon** - Indicates the system with which the code is associated:



- FREEZE FRAME icon** - Indicates that there is Freeze Frame data from "Priority Code" (Code #1) stored in the vehicle's computer memory.
- Code type** - Indicates the type of code being displayed; Generic Stored, Generic Pending, Generic permanent, etc.
- Severity** - Indicates the level of severity for the priority code (code number "1"), as follows:
  - 1 - Service should be scheduled and repairs made when convenient. This DTC typically has no immediate threat to essential system components in the short term.
  - 2 - Repair immediately if drivability issues are present. Threat to essential system components if not repaired as soon as possible.
  - 3 - Stop and repair vehicle immediately to prevent interrelated failures. Harmful and damaging to essential system components.

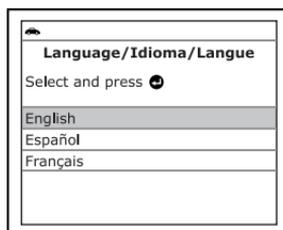


The I/M Monitor Status icons are associated with INSPECTION and MAINTENANCE (I/M) READINESS STATUS. Some states require that all vehicle Monitors have run and completed their diagnostic testing before a vehicle can be tested for Emissions (Smog Check). A maximum of fifteen Monitors are used on OBD2 systems. Not all vehicles support all fifteen Monitors. When the Code Reader is linked to a vehicle, only the icons for Monitors that are supported by the vehicle under test are visible on the display.

## DISPLAY AND SETTINGS

The first time the unit is connected to a vehicle, you must select the desired display language (English, French or Spanish) and unit of measurement (USA or Metric) as follows:

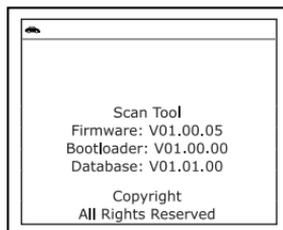
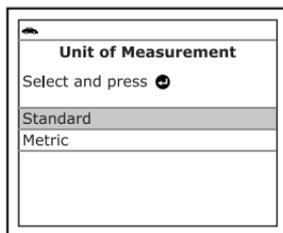
- Use the **DOWN** ▼ button to highlight the desired display language.



2. When the desired display language is selected, press the **ENTER**  button to confirm your selection.
  - The Unit of Measurement screen displays.
3. Use the **DOWN**  button to highlight the desired unit of measurement.
4. When the desired unit of measurement is selected, press the **ENTER**  button to confirm your selection.
  - The Firmware Screen displays for three seconds.



*After the initial language and unit of measurement selections are performed, these, as well as other settings, can be changed as desired. Proceed to **ADJUSTMENTS, SETTINGS AND LANGUAGE** on page 27 for further instructions.*



### OBD2 TERMINOLOGY

The following terms and their definitions are related to OBD2 systems. Read and reference this list as needed to aid in the understanding of OBD2 systems.

- **Powertrain Control Module (PCM)** - The PCM is the OBD2 accepted term for the vehicle's "on-board computer." In addition to controlling the engine management and emissions systems, the PCM also participates in controlling the powertrain (transmission) operation. Most PCMs also have the ability to communicate with other computers on the vehicle (ABS, ride control, body, etc.).
- **Monitor** - Monitors are "diagnostic routines" programmed into the PCM. The PCM utilizes these programs to run diagnostic tests, and to monitor operation of the vehicle's emissions-related components or systems to ensure they are operating correctly and within the vehicle's manufacturer specifications. Currently, up to fifteen Monitors are used in OBD2 systems. Additional Monitors will be added as the OBD2 system is further developed.



*Not all vehicles support all fifteen Monitors.*

- **Enabling Criteria** - Each Monitor is designed to test and monitor the operation of a specific part of the vehicle's emissions system (EGR system, oxygen sensor, catalytic converter, etc.). A specific set of "conditions" or "driving procedures" must be met before the computer can command a Monitor to run tests on its related system. These "conditions" are known as "**Enabling Criteria**." The requirements and procedures vary for each Monitor. Some Monitors only require the ignition key to be turned "**On**" for them to run and complete their diagnostic testing. Others may require a set of complex procedures, such as starting the vehicle when cold, bringing it to operating temperature, and driving the vehicle under specific conditions before the Monitor can run and complete its diagnostic testing.
- **Monitor Has/Has Not Run** - The terms "Monitor has run" or "Monitor has not run" are used throughout this manual. "**Monitor has run**," means the PCM **has** commanded a particular Monitor to perform the required diagnostic testing on a system to ensure the system is operating correctly (within factory specifications). The term "**Monitor has not run**" means the PCM **has not** yet commanded a particular Monitor to perform diagnostic testing on its associated part of the emissions system.
- **Trip** - A Trip for a particular Monitor requires that the vehicle is being driven in such a way that all the required "Enabling Criteria" for the Monitor to run and complete its diagnostic testing are met. The "Trip Drive Cycle" for a particular Monitor begins when the ignition key is turned "**On**." It is successfully completed when all the "Enabling Criteria" for the Monitor to run and complete its diagnostic testing are met by the time the ignition key is turned "**Off**." Since each of the fifteen monitors is designed to run diagnostics and testing on a different part of the engine or emissions system, the "Trip Drive Cycle" needed for each individual Monitor to run and complete varies.

- **OBD2 Drive Cycle** - An OBD2 Drive Cycle is an extended set of driving procedures that takes into consideration the various types of driving conditions encountered in real life. These conditions may include starting the vehicle when it is cold, driving the vehicle at a steady speed (cruising), accelerating, etc. An OBD2 Drive Cycle begins when the ignition key is turned "On" (when cold) and ends when the vehicle has been driven in such a way as to have all the "Enabling Criteria" met for all its applicable Monitors. Only those trips that provide the Enabling Criteria for all Monitors applicable to the vehicle to run and complete their individual diagnostic tests qualify as an OBD2 Drive Cycle. OBD2 Drive Cycle requirements vary from one model of vehicle to another. Vehicle manufacturers set these procedures. Consult your vehicle's service manual for OBD2 Drive Cycle procedures.



*Do not confuse a "Trip" Drive Cycle with an OBD2 Drive Cycle. A "Trip" Drive Cycle provides the "Enabling Criteria" for one specific Monitor to run and complete its diagnostic testing. An OBD2 Drive Cycle must meet the "Enabling Criteria" for all Monitors on a particular vehicle to run and complete their diagnostic testing.*

- **Warm-up Cycle** - Vehicle operation after an engine off period where engine temperature rises at least 40°F (22°C) from its temperature before starting, and reaches at least 160°F (70°C). The PCM uses warm-up cycles as a counter to automatically erase a specific code and related data from its memory. When no faults related to the original problem are detected within a specified number of warm-up cycles, the code is erased automatically.

## DIAGNOSTIC TROUBLE CODES (DTCs)

Diagnostic Trouble Codes (DTCs) are meant to guide you to the proper service procedure in the vehicle's service manual. **DO NOT** replace parts based only on DTCs without first consulting the vehicle's service manual for proper testing procedures for that particular system, circuit or component.

**Diagnostic Trouble Codes (DTCs) are codes that identify a specific problem area.**

DTCs are alphanumeric codes that are used to identify a problem that is present in any of the systems that are monitored by the on-board computer (PCM). Each trouble code has an assigned message that identifies the circuit, component or system area where the problem was found.



OBD2 diagnostic trouble codes are made up of five characters:

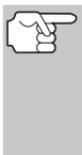
- The 1st character is a **letter** (B, C, P or U). It identifies the "main system" where the fault occurred (Body, Chassis, Powertrain, or Network).
- The 2nd character is a **numeric digit** (0 thru 3). It identifies the "type" of code (Generic or Manufacturer-Specific).

# Onboard Diagnostics

## DIAGNOSTIC TROUBLE CODES (DTCs)



**Generic DTCs** are codes that are used by all vehicle manufacturers. The standards for generic DTCs, as well as their definitions, are set by the Society of Automotive Engineers (SAE).

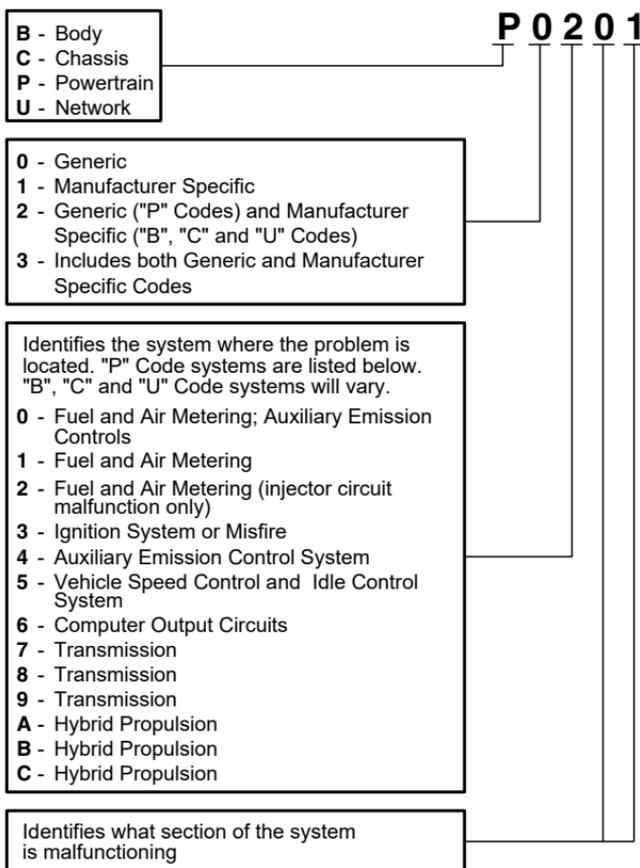


**Manufacturer-Specific DTCs** are codes that are controlled by the vehicle manufacturers. The Federal Government does not require vehicle manufacturers to go beyond the standardized generic DTCs in order to comply with the new OBD2 emissions standards. However, manufacturers are free to expand beyond the standardized codes to make their systems easier to diagnose.

- The 3rd character is a letter or a numeric digit (0 thru 9, A thru F). It identifies the specific system or sub-system where the problem is located.
- The 4th and 5th characters are letters or numeric digits (0 thru 9, A thru F). They identify the section of the system that is malfunctioning.

### OBD2 DTC EXAMPLE

P0201 - Injector Circuit Malfunction, Cylinder 1



### DTCs and MIL Status

When the vehicle's on-board computer detects a failure in an emissions-related component or system, the computer's internal diagnostic program assigns a diagnostic trouble code (DTC) that points to the system (and subsystem) where the fault was found. The diagnostic program saves the code in the computer's memory. It records a "Freeze Frame" of conditions present when the fault was found, and lights the Malfunction Indicator Lamp (MIL). Some faults require detection for two trips in a row before the MIL is turned on.



*The "Malfunction Indicator Lamp" (MIL) is the accepted term used to describe the lamp on the dashboard that lights to warn the driver that an emissions-related fault has been found. Some manufacturers may still call this lamp a "Check Engine" or "Service Engine Soon" light.*

There are two types of DTCs used for emissions-related faults: Type "A" and Type "B." Type "A" codes are "One-Trip" codes; Type "B" DTCs are usually Two-Trip DTCs.

When a **Type "A"** DTC is found on the First Trip, the following events take place:

- The computer commands the MIL "On" when the failure is first found.
- If the failure causes a severe misfire that may cause damage to the catalytic converter, the MIL "flashes" **once per second**. The MIL continues to flash as long as the condition exists. If the condition that caused the MIL to flash is no longer present, the MIL will light "steady" On.
- A DTC is saved in the computer's memory for later retrieval.
- A "Freeze Frame" of the conditions present in the engine or emissions system when the MIL was ordered "On" is saved in the computer's memory for later retrieval. This information shows fuel system status (closed loop or open loop), engine load, coolant temperature, fuel trim value, MAP vacuum, engine RPM and DTC priority.

When a **Type "B"** DTC is found on the First Trip, the following events take place:

- The computer sets a Pending DTC, but the MIL is not ordered "On." "Freeze Frame" data may or may not be saved at this time depending on manufacturer. The Pending DTC is saved in the computer's memory for later retrieval.
- If the failure **is found** on the second consecutive trip, the MIL is ordered "On." "Freeze Frame" data is saved in the computer's memory.
- If the failure **is not found** on the second Trip, the Pending DTC is erased from the computer's memory.

The MIL will stay lit for both Type "A" and Type "B" codes until one of the following conditions occurs:

- If the conditions that caused the MIL to light are no longer present for the next three trips in a row, the computer automatically turns the MIL "Off" if no other emissions-related faults are present. However, the DTCs remain in the computer's memory as a history code for 40 warm-up cycles (80 warm-up cycles for fuel and misfire faults). The DTCs are automatically erased if the fault that caused them to be set is not detected again during that period.
- Misfire and fuel system faults require three trips with "similar conditions" before the MIL is turned "Off." These are trips where the engine load, RPM and temperature are similar to the conditions present when the fault was first found.



*After the MIL has been turned off, DTCs and Freeze Frame data stay in the computer's memory.*

- Erasing the DTCs from the computer's memory can also turn off the MIL. See ERASING DIAGNOSTIC TROUBLE CODES (DTCs) on page 20, before erasing codes from the computer's memory. If a Diagnostic Tool or Code Reader is used to erase the codes, Freeze Frame data will also be erased.

## OBD2 MONITORS

Currently, fifteen Monitors are supported by OBD2 systems. Additional monitors may be added as a result of Government regulations as the OBD2 system grows and matures. Not all vehicles support all fifteen Monitors. Additionally, some Monitors are supported by "spark ignition" vehicles only, while others are supported by "compression ignition" vehicles only.

Monitor operation is either "**Continuous**" or "**Non-Continuous**," depending on the specific monitor.

### Continuous Monitors

Three of these Monitors are designed to constantly monitor their associated components and/or systems for proper operation. Continuous Monitors run constantly when the engine is running. The Continuous Monitors are:

Comprehensive Component Monitor (CCM)

Misfire Monitor

Fuel System Monitor

### Non-Continuous Monitors

The other twelve Monitors are "non-continuous" Monitors. "Non-continuous" Monitors perform and complete their testing once per trip. The "non-continuous" Monitors are:

-  Oxygen Sensor Monitor
-  Oxygen Sensor Heater Monitor
-  Catalyst Monitor
-  Heated Catalyst Monitor
-  EGR System Monitor
-  EVAP System Monitor
-  Secondary Air System Monitor



*The following Monitors will be standard beginning in 2010. The majority of vehicles produced before this time will not support these Monitors*

-  NMHC Monitor
-  NOx Adsorber Monitor
-  Boost Pressure System Monitor
-  Exhaust Gas Sensor Monitor
-  PM Filter Monitor

### OBD2 Reference Table

The table below lists current OBD2 Monitors, and indicates the following for each Monitor:

- A. Monitor Type (how often does the Monitor run; Continuous or Once per trip)
- B. Number of trips needed, with a fault present, to set a pending DTC
- C. Number of consecutive trips needed, with a fault present, to command the MIL "On" and store a DTC
- D. Number of trips needed, with no faults present, to erase a Pending DTC
- E. Number and type of trips or drive cycles needed, with no faults present, to turn off the MIL
- F. Number of warm-up periods needed to erase the DTC from the computer's memory after the MIL is turned off

<b>Name of Monitor</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
Comprehensive Component Monitor	Continuous	1	2	1	3	40
Misfire Monitor (Type 1 and 3)	Continuous	1	2	1	3 - similar conditions	80
Misfire Monitor (Type 2)	Continuous		1		3 - similar conditions	80
Fuel System Monitor	Continuous	1	1 or 2	1	3 - similar conditions	80
Catalytic Converter Monitor	Once per trip	1	2	1	3 trips	40
Oxygen Sensor Monitor	Once per trip	1	2	1	3 trips	40
Oxygen Sensor Heater Monitor	Once per trip	1	2	1	3 trips	40
Exhaust Gas Recirculation (EGR) Monitor	Once per trip	1	2	1	3 trips	40
Evaporative Emissions Controls Monitor	Once per trip	1	2	1	3 trips	40
Secondary Air System (AIR) Monitor	Once per trip	1	2	1	3 trips	40
NMHC Monitor	Once per trip	1	2	1	3 trips	40
NOx Adsorber Monitor	Once per trip	1	2	1	3 trips	40
Boost Pressure System Monitor	Once per trip	1	2	1	3 trips	40
Exhaust Gas Sensor Monitor	Once per trip	1	2	1	3 trips	40
PM Filter Monitor	Once per trip	1	2	1	3 trips	40

### BEFORE YOU BEGIN

Fix any known mechanical problems before performing any test. See your vehicle's service manual or a mechanic for more information. Check the following areas **before** starting any test:

- Check the engine oil, power steering fluid, transmission fluid (if applicable), engine coolant and other fluids for proper levels. Top off low fluid levels if needed.
- Make sure the air filter is clean and in good condition. Make sure all air filter ducts are properly connected. Check the air filter ducts for holes, rips or cracks.
- Make sure all engine belts are in good condition. Check for cracked, torn, brittle, loose or missing belts.
- Make sure mechanical linkages to engine sensors (throttle, gearshift position, transmission, etc.) are secure and properly connected. See your vehicle's service manual for locations.
- Check all rubber hoses (radiator) and steel hoses (vacuum/fuel) for leaks, cracks, blockage or other damage. Make sure all hoses are routed and connected properly.
- Make sure all spark plugs are clean and in good condition. Check for damaged, loose, disconnected or missing spark plug wires.
- Make sure the battery terminals are clean and tight. Check for corrosion or broken connections. Check for proper battery and charging system voltages.
- Check all electrical wiring and harnesses for proper connection. Make sure wire insulation is in good condition, and there are no bare wires.
- Make sure the engine is mechanically sound. If needed, perform a compression check, engine vacuum check, timing check (if applicable), etc.

### CODE RETRIEVAL PROCEDURE

**Never** replace a part based only on the DTC definition. Each DTC has a set of testing procedures, instructions and flow charts that must be followed to confirm the location of the problem. This information is found in the vehicle's service manual. Always refer to the vehicle's service manual for detailed testing instructions.



Check your vehicle thoroughly before performing any test. See **Preparation for Testing** on page 14 for details.

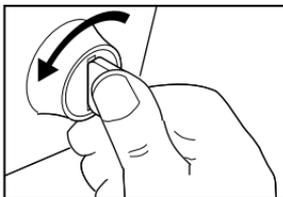


**ALWAYS** observe safety precautions whenever working on a vehicle. See **Safety Precautions** on page 1 for more information.

1. Turn the ignition off.
2. Locate the vehicle's 16-pin Data Link Connector (DLC). See page 2 for connector location.

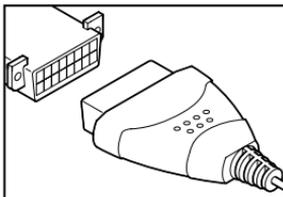


Some DLCs have a plastic cover that must be removed before connecting the Code Reader cable connector.



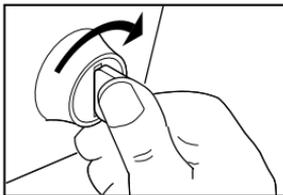
3. Connect the Code Reader's cable connector to the vehicle's DLC. The cable connector is keyed and will only fit one way.

- If you have problems connecting the cable connector to the DLC, rotate the connector 180° and try again.
- If you still have problems, check the DLC on the vehicle and on the Code Reader. Refer to your vehicle's service manual to properly check the vehicle's DLC.



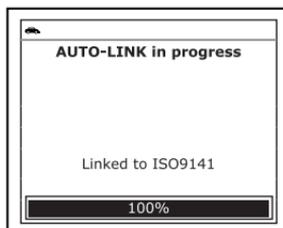
- After the Code Reader's test connector is properly connected to the vehicle's DLC, the Vehicle icon  should display to confirm a good power connection.

4. Turn the ignition on. **DO NOT** start the engine.
5. When the Code Reader's cable connector is properly connected to the vehicle's DLC, the unit automatically turns ON.

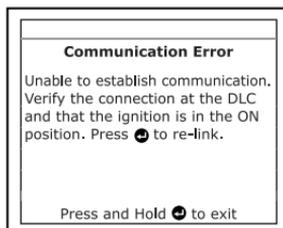


- If the unit does not power on automatically when connected to the vehicle's DLC connector, it usually indicates there is no power present at the vehicle's DLC connector. Check your fuse panel and replace any burned-out fuses.
- If replacing the fuse(s) does not correct the problem, consult your vehicle's repair manual to identify the proper computer (PCM) fuse/circuit, and perform any necessary repairs before proceeding.

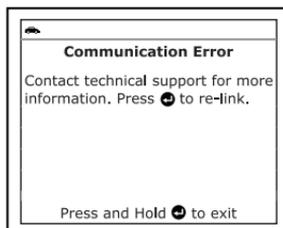
6. The Code Reader will automatically start a check of the vehicle's computer to determine which type of communication protocol it is using. When the Code Reader identifies the computer's communication protocol, a communication link is established.



- If the Code Reader fails to link to the vehicle's computer a "Communication Error" message shows on the Code Reader's display.
  - Ensure the vehicle is OBD2 compliant. See VEHICLES COVERED on page 2 for vehicle compliance verification information.
  - Verify the connection at the DLC, and verify the ignition is ON.
  - Turn the ignition OFF, wait five seconds, then turn back ON to reset the computer.
  - Press the **ENTER** button to continue.

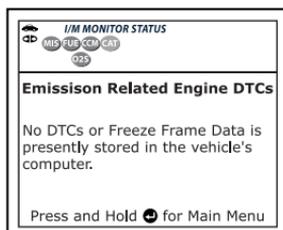


- If the Code Reader cannot link to the vehicle's computer after three attempts, the message "Contact Technical Support" displays.
  - Press and hold the **ENTER** button to return to the Main Menu.
  - Turn the ignition off, and disconnect the Code Reader.
  - Contact Technical Support for assistance.



7. After approximately 10~60 seconds, the Code Reader will **retrieve** and **display** any Diagnostic Trouble Codes, Monitor Status and Freeze Frame Data retrieved from the vehicle's computer memory.

- The Code Reader will display a code only if codes are present in the vehicle's computer memory. If no codes are present, a "No DTC's or Freeze Frame data presently stored in the vehicle's computer" message is displayed.
- The Code Reader is capable of retrieving and storing up to 32 codes in memory, for immediate or later viewing.

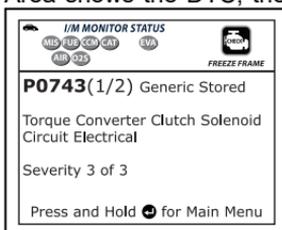


### 8. To read the display:



Refer to **DISPLAY FUNCTIONS** on page 4 for a description of display elements.

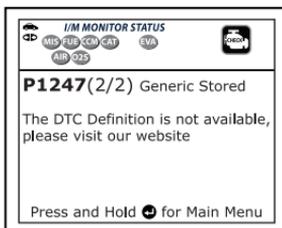
- A visible icon indicates that the Code Reader is being powered through the vehicle's DLC connector.
- A visible icon indicates that the Code Reader is linked to (communicating with) the vehicle's computer.
- The I/M Monitor Status icons indicate the type and number of Monitors the vehicle supports, and provides indications of the current status of the vehicle's Monitors. A **solid** Monitor icon indicates the associated Monitor **has run** and completed its testing. A **blinking** Monitor icon indicates the associated Monitor **has not run** and completed its testing.
- The top line in the Test Data Display Area shows the DTC, the number of the code currently being displayed and the total number of codes retrieved, and the type of code being displayed (Generic Stored, Generic Pending, Generic Permanent, etc).
- The upper right hand corner shows whether or not the displayed code commanded the MIL on and whether Freeze Frame data was stored for the "priority" code.
- The Diagnostic Trouble Code (DTC) and related code definition are shown in the lower section of the display.



In the case of long code definitions, or when viewing Freeze Frame Data, a small arrow is shown in the upper/lower right-hand corner of the Code Reader display area to indicate the presence of additional information. Use the button, as necessary, to view the additional information.



If a definition for the currently displayed code is not available, an advisory message shows on the Code Reader's display.



### 9. Read and interpret the Diagnostic Trouble Codes using the LCD display and the green, yellow and red LEDs.



The green, yellow and red LEDs are used (with the LCD display) as visual aids to make it easier to determine engine system conditions.



- DTC's that start with "P1" and some "P3" are Manufacturer specific codes and their code definitions vary with each vehicle manufacturer. When a Manufacturer specific DTC is retrieved, the LCD display shows a list of vehicle manufacturers. Use the **DOWN** ▼ button, as necessary, to highlight the appropriate manufacturer, then press the **ENTER** ↵ button to display the correct code definition for your vehicle. A confirmation message shows on the Code Reader's display.

Vehicle Selection	
Select and press ⏻	
Back	Acura
Audi	BMW
Buick	Cadillac
Chevrolet	Chrysler
Dodge	Eagle
Previous Page	Next Page

- If the correct manufacturer is shown, use the **DOWN** ▼ button, as necessary, to highlight **Yes**, then press the **ENTER** ↵ button.
- If the correct manufacturer is not shown, use the **DOWN** ▼ button, as necessary, to highlight **No**, then press the **ENTER** ↵ button to return to the list of manufacturers.

Vehicle Confirm Ford	
Is this your vehicle?	
Select and press ⏻	
Yes	
No	

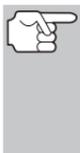


*If the manufacturer for your vehicle is not shown, select **Previous Page** or **Next Page** and press the **ENTER** ↵ button to view other pages of the list.*

10. If more than one DTC was retrieved, and to view Freeze Frame Data, press and release the **DTC/FF** button, as necessary.

- Each time the **DTC/FF** button is pressed and released, the Code Reader will scroll and display the next DTC in sequence until all DTCs in its memory have displayed.
- Freeze Frame Data (if available) will display after DTC #1

FREEZE FRAME	
P1639	Generic Stored
	1/9
Fuel Sys 1	OL
Fuel Sys 2	NA
Calc Load(%)	0.0 (%)
ECT	-40.0 (°F)
STFT B1(%)	0.0 (%)
Press and Hold ⏻ for Main Menu	



*If more than one malfunction is present that causes more than one DTC to be set, only the code with the highest priority will contain Freeze Frame data. The code designated "01" on the Code Reader display is referred to as the **PRIORITY** code, and Freeze Frame data always refers to this code. The priority code is also the one that has commanded the MIL on.*

11. When the last retrieved DTC has been displayed and the **DTC/FF** button is pressed, the Code Reader returns to the "Priority" Code.
12. Determine engine system(s) condition by viewing the Code Reader's display for any retrieved Diagnostic Trouble Codes, code definitions and Freeze Frame data, and interpreting the green, yellow and red LEDs.

- If DTC's were retrieved and you are going to perform the repairs yourself, proceed by consulting the Vehicle's Service Repair Manual for testing instructions, testing procedures, and flow charts related to retrieved code(s).

### ERASING DIAGNOSTIC TROUBLE CODES (DTCs)



*When the Code Reader's ERASE function is used to erase the DTCs from the vehicle's on-board computer, "Freeze Frame" data and manufacturer-specific enhanced data are also erased. Unlike other codes which can be removed from the vehicle's control module, PERMANENT codes cannot. This holds true regardless of the tool being used or color of the status LED display. PERMANENT codes will automatically erase when the control module no longer detects the fault that originally caused the code.*

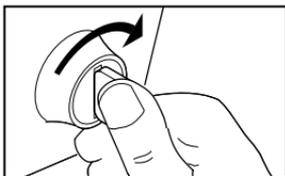
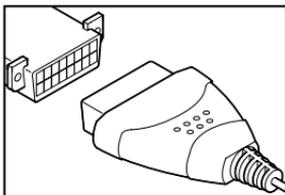
If you plan to take the vehicle to a Service Center for repair, **DO NOT** erase the codes from the vehicle's computer. If the codes are erased, valuable information that might help the technician troubleshoot the problem will also be erased.

Erase DTCs from the computer's memory as follows:

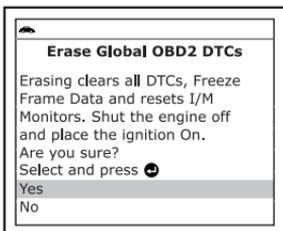


*When DTCs are erased from the vehicle's computer memory, the I/M Readiness Monitor Status program resets status of all the Monitors to a not run "flashing" condition. To set all of the Monitors to a DONE status, an OBD2 Drive Cycle must be performed. Refer to your vehicle's service manual for information on how to perform an OBD2 Drive Cycle for the vehicle under test.*

1. If not connected already, connect the Code Reader to the vehicle's DLC. (If the Code Reader is already connected and linked to the vehicle's computer, proceed directly to step 4. If not, continue to step 2.)
2. Turn the ignition on. **DO NOT** start the engine. The Code Reader will automatically link to the vehicle's computer.
3. Once codes have been retrieved, press and release the Code Reader's **ERASE**  button. A confirmation message shows on the display.

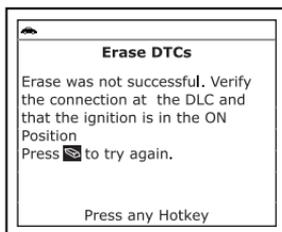
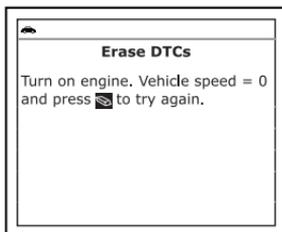
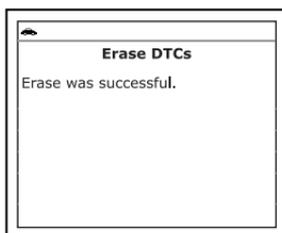
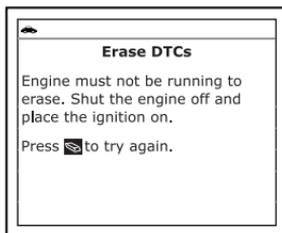


- If you change your mind and do not wish to erase the codes, use the **DOWN**  button, as necessary, to highlight **No**, then press the **ENTER**  button.
- If you wish to continue, use the **DOWN**  button, as necessary, to highlight **Yes**, then press the **ENTER**  button.



4. A “One moment please...” message displays while the erase function is in progress.

- If the engine is running, an advisory dialog displays. Turn the engine off, place the ignition in the ON position, then press the **ERASE**  button to continue.
- If the erase was successful, a confirmation message shows on the display. The Tool will relink to the vehicle and display the DTC screen.
- If the erase was not successful and ECU error code \$22 is present, an advisory message shows on the display. Start the engine, hold vehicle speed at 0, then press the **ERASE**  button to continue.
- If the erase was not successful and ECU error code \$22 is not present, an advisory message shows on the display. Verify that the Code Reader is properly connected to the vehicle's DLC and that the ignition is on, then press the **ERASE**  button to continue.

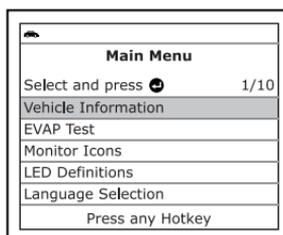


*Erasing DTCs does not fix the problem(s) that caused the code(s) to be set. If proper repairs to correct the problem that caused the code(s) to be set are not made, the code(s) will appear again (and the check engine light will illuminate) as soon as the vehicle is driven long enough for its Monitors to complete their testing.*

### THE MAIN MENU

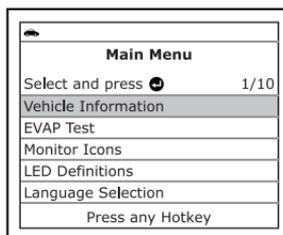
In addition to retrieving Diagnostic Trouble Codes (DTCs), you can use the Code Reader to perform additional diagnostic tests, to view diagnostic and vehicle information stored in your vehicle's on-board computer, and to configure the Code Reader for your particular needs. Additional tests and related functions are accessed through the Main Menu. The following functions are available:

- **Vehicle Information** – Displays the Vehicle Info menu, which lets you retrieve and view reference information for the vehicle under test.
- **EVAP Test** – Performs a leak test for the vehicle's EVAP system.
- **Monitor Icons** – Shows the full names for the **IM MONITOR STATUS** icons shown on the Code Reader's display.
- **LED Definitions** – Provides descriptions of the meaning of the Code Reader **SYSTEM STATUS** LEDs.
- **Language Selection**: Sets the display language for the Code Reader to English, French or Spanish.
- **Adjust Brightness**: Adjusts the brightness of the display screen.
- **Audible Tone**: Turns the Code Reader's audible tone "on" and "off." When turned "on," a tone sounds each time a button is pressed.
- **Footer**: Turns the navigational "footers" at the bottom of most display screens "on" and "off."
- **Hotkeys Legends**: Shows functional descriptions for the Code Reader's hotkeys.
- **Unit of Measurement**: Sets the Unit of Measurement for the Code Reader's display to USA or metric.



#### To access the Main Menu:

1. While linked to the vehicle, press and hold the **ENTER** button.
  - The Main Menu displays.
2. Use the **DOWN** button, as necessary, to select the desired option, then press the **ENTER** button.
3. Available functions are described in the following paragraphs.



### VIEWING VEHICLE INFORMATION

The **Vehicle Information** function offers three options for retrieving reference information for the vehicle under test; **Vehicle ID**, **Available Modules** and **IPT** (In-Use Performance Tracking).

### Retrieving Vehicle ID Information



The Vehicle ID function is applicable to model year 2000 and newer OBD2-compliant vehicles.

The Code Reader can retrieve a list of information (provided by the vehicle manufacturer), unique to the vehicle under test, from the vehicle's on-board computer. This information may include:

- The vehicle's VIN number
- The control module identification number
- The vehicle's calibration ID(s). These IDs uniquely identify the software version(s) for the vehicle's control module(s).
- The Vehicle's Calibration Verification Number(s) (CVNs) required by OBD2 regulations. CVNs are used to determine if emission-related calibrations for the vehicle under test have been changed. One or more CVNs may be returned by the vehicle's computer.

1. While linked to the vehicle, press and hold the **ENTER** button.

- The Main Menu displays.

2. Use the **DOWN** button, as necessary, to highlight **Vehicle Information**, then press the **ENTER** button.

- The Vehicle Information menu displays.

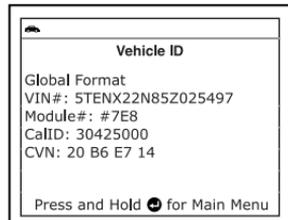
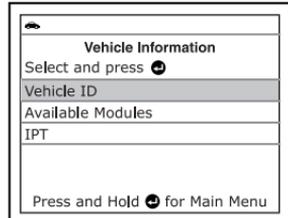
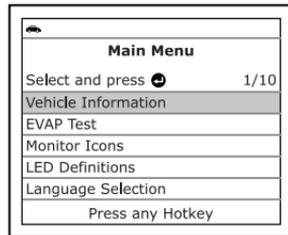
3. Use the **DOWN** button, as necessary, to highlight **Vehicle ID**, then press the **ENTER** button.



The first time the **Vehicle ID** function is used, it may take several minutes to retrieve the information from the vehicle's computer.

4. When the retrieval process is completed, the vehicle ID information is shown on the Code Reader's display. Use the **DOWN** button, as necessary, to view the entire list.

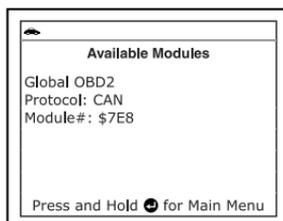
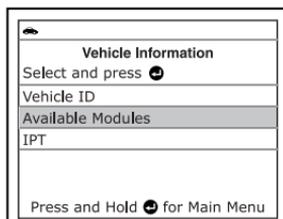
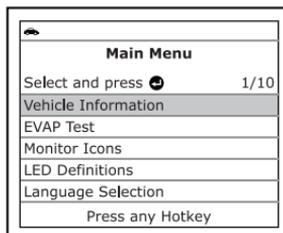
5. When you have finished viewing the retrieved vehicle ID information, press and hold the **ENTER** button to return to the Main Menu.



### Viewing Available Modules

The Code Reader can retrieve a list of modules supported by the vehicle under test.

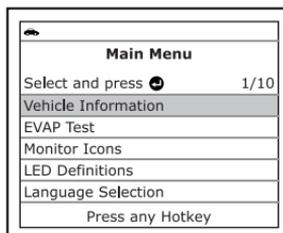
1. While linked to the vehicle, press and hold the **ENTER**  $\leftarrow$  button.
  - The Main Menu displays.
2. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to highlight **Vehicle Information**, then press the **ENTER**  $\leftarrow$  button.
  - The Vehicle Information menu displays.
3. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to highlight **Available Modules**, then press the **ENTER**  $\leftarrow$  button.
4. When the retrieval process is completed, a complete list of modules supported by the vehicle under test is shown on the Code Reader's display. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to view the entire list.
5. When you have finished viewing the list of available modules, press and hold the **ENTER**  $\leftarrow$  button to return to the Main Menu.



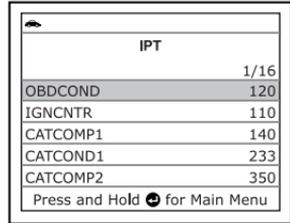
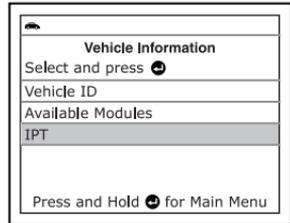
### Viewing In-use Performance Tracking (IPT)

The Code Reader can retrieve In-use Performance Tracking (IPT) statistics for monitors supported by the vehicle under test. Two values are returned for each monitor; the number of times that all conditions necessary for a specific monitor to detect a malfunction have been encountered (XXXCOND), and the number of times that the vehicle has been operated under the specific conditions for the monitor (XXXCOMP). Statistics are also provided for the number of times the vehicle has been operated in OBD monitoring conditions (OBDCOND), and the number of times the vehicle's engine has been started (IGNCNTR).

1. While linked to the vehicle, press and hold the **ENTER**  $\leftarrow$  button.
  - The Main Menu displays.
2. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to highlight **Vehicle Information**, then press the **ENTER**  $\leftarrow$  button.



- The Vehicle Information menu displays.
3. Use the **DOWN** ▼ button, as necessary, to highlight **IPT**, then press the **ENTER** ↵ button.
  4. When the retrieved process is completed, In-use Performance Tracking statistics for monitors supported by the vehicle under test are shown on the Code Reader's display. Use the **DOWN** ▼ button, as necessary, to view the entire list.
    - If In-use Performance Tracking is not available for your vehicle, an advisory message shows on the Code Reader's display. Press and hold the **ENTER** ↵ button to return to the Main Menu.
  5. When you have finished viewing the statistics, press and hold the **ENTER** ↵ button to return to the Main Menu.



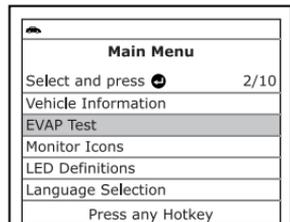
## EVAP TEST

The **EVAP Test** function lets you initiate a leak test for the vehicle's EVAP system.



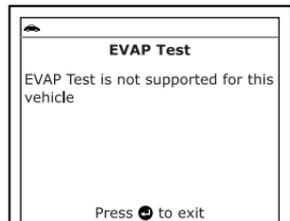
*The Code Reader does not perform the leak test, but signals to vehicle's on-board computer to initiate the test. The vehicle manufacturer determines the criteria and method for stopping the test once it has been started. BEFORE using the **EVAP Test** function, refer to the vehicle's service repair manual to determine the procedures necessary to stop the test.*

1. From the Main Menu, use the **DOWN** ▼ button as necessary, to highlight **EVAP Test**, then press the **ENTER** ↵ button.
2. A "One moment please..." message displays while the request is sent to the vehicle's on-board computer.

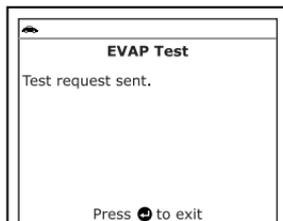


*Some vehicle manufacturers do not allow Code Reader's or other external devices to control vehicle systems. If the **EVAP Test** is not supported by the vehicle under test, an advisory message shows on the Code Reader's display. Press the **ENTER** ↵ button to return to the*

*Main Menu.*



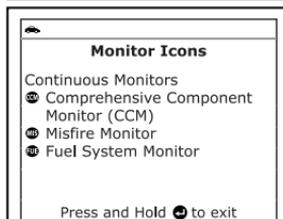
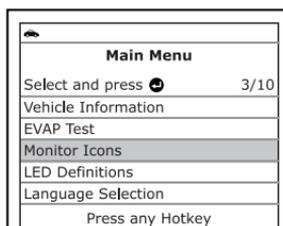
- When the EVAP leak test has been initiated by the vehicle's on-board computer, a confirmation message shows on the Code Reader's display. Press the **ENTER**  $\leftarrow$  button to return to the Main Menu.



## VIEWING MONITOR ICON DESCRIPTIONS

The **I/M MONITOR STATUS** icons on the Code Reader's LCD display provide an indication of the "Completed / Not Complete" status for all I/M Monitors supported by the vehicle under test. The **Monitor Icons** function displays the full name for each Monitor icon.

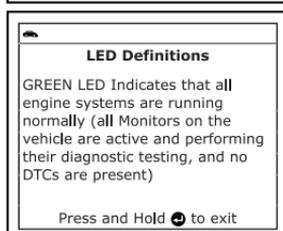
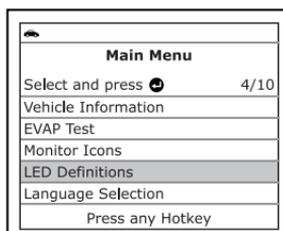
- From the Main Menu, use the **DOWN**  $\blacktriangledown$  button, as necessary, to highlight **Monitor Icons**, then press the **ENTER**  $\leftarrow$  button.
  - The Monitor Icon screen displays.
  - The screen shows a list of the 15 Monitor icons, along with the full name for each icon. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to scroll the list.
- When you have finished viewing the Monitor icon descriptions, press the **ENTER**  $\leftarrow$  button to return to the Main Menu.



## VIEWING THE LED MEANING

The **SYSTEM STATUS** LEDs on the Code Reader provide a visual indication of the I/M Readiness status of the vehicle under test. The **LED Definitions** function provides a description of the meanings of the green, yellow and red **SYSTEM STATUS** LEDs.

- From the Main Menu, use the **DOWN**  $\blacktriangledown$  button, as necessary, to highlight **LED Definitions**, then press the **ENTER**  $\leftarrow$  button.
  - The LED Definitions screen displays.
  - The screen provides a description of the meanings of the green, yellow and red **SYSTEM STATUS** LEDs. Use the **DOWN**  $\blacktriangledown$  button, as necessary, to scroll the display.

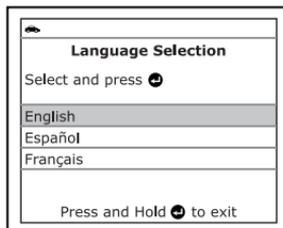
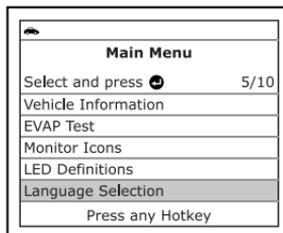


- When you have finished viewing the LED definitions, press the **ENTER**  button to return to the Main Menu.

## ADJUSTMENTS, SETTINGS AND LANGUAGE

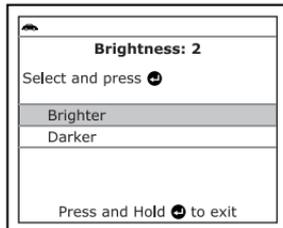
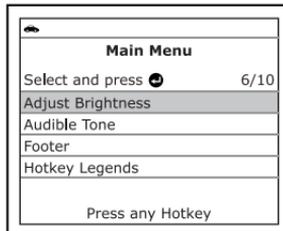
### Selecting the Display Language

- Use the **DOWN**  button, as necessary, to highlight **Language Selection** in the Main Menu, then press the **ENTER**  button.
  - The Select Language screen displays.
  - The currently selected display language is highlighted.
- Use the **DOWN**  button, as necessary, to highlight the desired display language.
- When the desired display language is highlighted, press the **ENTER**  button to save your changes and return to the Main Menu (shown in the selected display language).



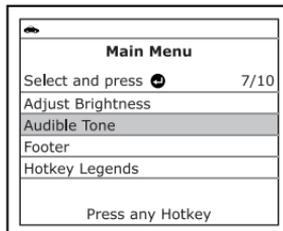
### Adjusting Display Brightness

- Use the **DOWN**  button, as necessary, to highlight **Adjust Brightness** in the Main Menu, then press the **ENTER**  button.
  - The Adjust Brightness screen displays.
  - The **Brightness** field shows the current brightness setting, from 1 to 4.
- Use the **DOWN**  button, as necessary, to select **Brighter** or **Darker**, as desired, then press the **ENTER**  button.
- Repeat steps 1 and 2 until the desired display brightness is obtained.

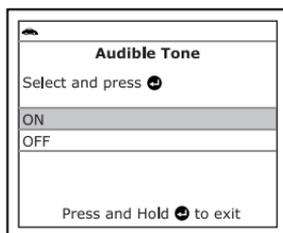


### Enabling the Audible Tone

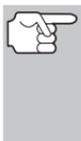
- Use the **DOWN**  button, as necessary, to highlight **Audible Tone** in the Main Menu, then press the **ENTER**  button.



- The Audible Tone screen displays.
2. Use the **DOWN** ▼ button, as necessary, to highlight **On** or **Off** as desired.
  3. When the desired option is selected, press the **ENTER** ↵ button to save your changes and return to the Main Menu.

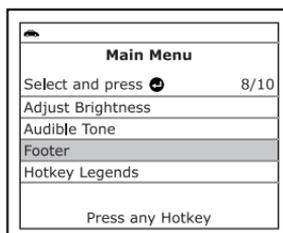


### Disabling Navigational Footers



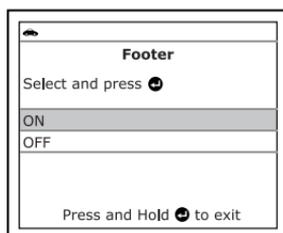
Navigational “footers” are shown at the bottom of most display screens. They show which hotkey to press to return to the topmost menu for the current function.

1. Use the **DOWN** ▼ button, as necessary, to highlight **Footer** in the Main Menu, then press the **ENTER** ↵ button.



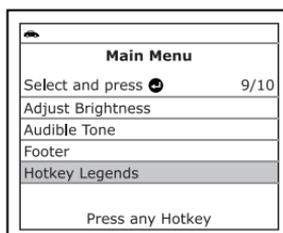
- The Footer screen displays.

2. Use the **DOWN** ▼ button, as necessary, to highlight **On** or **Off** as desired.
3. When the desired option is selected, press the **ENTER** ↵ button to save your changes and return to the Main Menu.



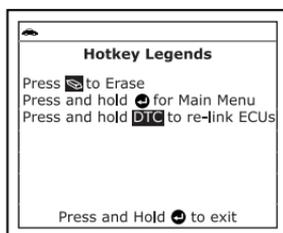
### Viewing Hotkey Legends

1. Use the **DOWN** ▼ button, as necessary, to highlight **Hotkey Legends** in the Main Menu, then press the **ENTER** ↵ button.



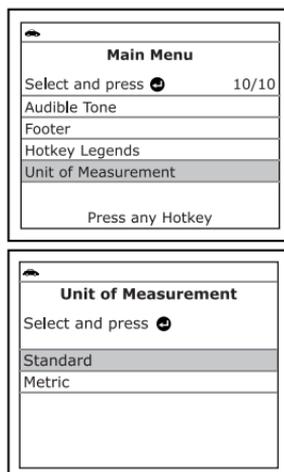
- The Hotkey Legends screen displays.
- The screen shows a functional description of each of the Code Reader's hotkeys. Use the **DOWN** ▼ button, as necessary, to scroll the list.

2. When you have finished viewing the Hotkey Legends, press the **ENTER** ↵ button to return to the Main Menu.



### Setting the Unit of Measurement

1. Use the **DOWN** ▼ button, as necessary, to highlight **Unit of Measurement** in the Main Menu, then press the **ENTER** ◀ button.
2. Use the **DOWN** ▼ button, as necessary, to highlight the desired unit of measurement.
3. When the desired unit of measurement value is selected, press the **ENTER** ◀ button to save your changes and return to the Main Menu.



### Exiting the MENU Mode

- Press and hold the **ENTER** ◀ button to exit the Menu mode.

## OBD UPDATER

Use these procedures to verify your tool's firmware is current, and to perform firmware updates when available.

1. Visit [www.ZurichDiagnostics.com](http://www.ZurichDiagnostics.com), download and install the latest version of OBD Updater.
2. Connect your tool to your PC using a Mini USB cable and run the OBD Updater software.
3. Follow the on-screen prompts to install the firmware update.



*If no update is available, the software displays the message "No updates available."*

## TROUBLESHOOTING

### Q: Why can I not erase some codes?

- A: Unlike other codes which can be removed from the vehicle's control module, PERMANENT codes cannot. This holds true regardless of the tool being used or color of the status LED display. PERMANENT codes will automatically erase when the control module no longer detects the fault that originally caused the code.

## LIMITED 90 DAY WARRANTY

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

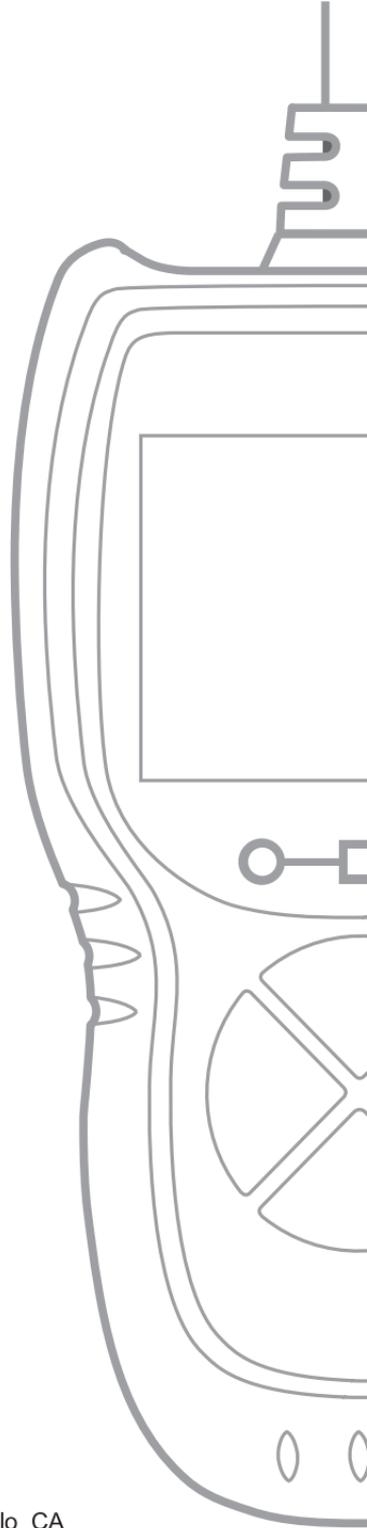
To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

## SERVICE PROCEDURES

If you have any questions, require product use or general information please contact:

Harbor Freight Technical Support – 888-866-5797  
Web: [www.zurichdiagnostics.com](http://www.zurichdiagnostics.com)



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