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1. Safety Precautions and Warnings

To prevent personal injury or damage to vehicles and/or the scan tool, read this instruction manual first and observe the following safety precautions at a minimum whenever working on a vehicle:

- Always perform automotive testing in a safe environment.
- Wear safety eye protection that meets ANSI standards.
- Keep clothing, hair, hands, tools, test equipment, etc. away from all moving or hot engine parts.
- Operate the vehicle in a well ventilated work area: Exhaust gases are poisonous.
- Put blocks in front of the drive wheels and never leave the vehicle unattended while running tests.
- Use extreme caution when working around the ignition coil, distributor cap, ignition wires and spark plugs. These components create hazardous voltages when the engine is running.
- Put the transmission in PARK (for automatic transmission) or NEUTRAL (for manual transmission) and make sure the parking brake is engaged.
- Keep a fire extinguisher suitable for gasoline/chemical/ electrical fires nearby.
- Don't connect or disconnect any test equipment while the ignition is on or the engine is running.
- 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.

2. General Information

2.1 On-Board Diagnostics (OBD) II

The first generation of On-Board Diagnostics (called OBD I) was developed by the California Air Resources Board (ARB) and implemented in 1988 to monitor some of the emission control components on vehicles. As technology evolved and the desire to improve the On-Board Diagnostic system increased, a new generation of On-Board Diagnostic system was developed. This second generation of On-Board Diagnostic regulations is called "OBD II".

The OBD II system is designed to monitor emission control systems and key engine components by performing either continuous or periodic tests of specific components and vehicle conditions. When a problem is detected, the OBD II system turns on a warning lamp (MIL) on the vehicle instrument panel to alert the driver typically by the phrase of "Check Engine" or "Service Engine Soon". The system will also store important information about the detected malfunction so that a technician can accurately find and fix the problem. Here below follow three pieces of such valuable information:

1) **Whether the Malfunction Indicator Light (MIL) is commanded 'on' or 'off';**
2) **Which, if any, Diagnostic Trouble Codes (DTCs) are stored;**
3) **Readiness Monitor status.**

2.2 Diagnostic Trouble Codes (DTCs)

OBD II Diagnostic Trouble Codes are codes that are stored by the on-board computer diagnostic system in response to a problem found in the vehicle. These codes identify a particular problem area and are intended to provide you with a guide as to where a fault might be occurring within a vehicle. OBD II Diagnostic Trouble Codes consist of a five-digit alphanumeric code. The first character, a letter, identifies which control system sets the code. The other four characters, all numbers, provide additional information on where the DTC originated and the operating conditions that caused it to set. Here below is an example to illustrate the structure of the digits:

DTC Example
P 0 2 0 2

Systems
B=Body
C=Chassis
P=Powertrain
U=Network

Identifying specific malfunctioning section of the systems

Code Type
Generic (SAE):
P0, P2, P34-P39
B0, B3
C0, C3
U0, U3.
Manufacturer Specific:
P1, P30-p33
B1, B2
C1, C2
U1, U2

Sub-systems
1= Fuel and Air Metering
2= Fuel and Air Metering
3= Ignition System or Engine Misfire
4= Auxiliary Emission Controls
5= Vehicle Speed Control and Idle
    Controls
6= Computer Output Circuits
7= Transmission Controls
8= Transmission Controls

2.3 Location of the Data Link Connector (DLC)

The DLC (Data Link Connector or Diagnostic Link Connector) is the standardized 16-cavity connector where diagnostic scan tools interface with the vehicle's on-board computer. The DLC is usually located 12 inches from the center of the instrument panel (dash), under or around the driver's side for most vehicles. If Data Link Connector is not located under dashboard, a label should be there telling location. For some Asian and European vehicles, the DLC is located behind the ashtray and the ashtray must be removed to access the connector. If the DLC cannot be found, refer to the vehicle's service manual for the location.
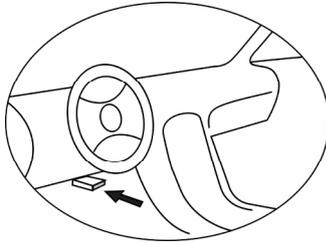
2.4 OBD II Readiness Monitors

An important part of a vehicle's OBD II system is the Readiness Monitors, which are indicators used to find out if all of the emissions components have been evaluated by the OBD II system. They are running periodic tests on specific systems and components to ensure that they are performing within allowable limits.

Currently, there are eleven OBD II Readiness Monitors (or I/M Monitors) defined by the U.S. Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles and the exact number of monitors in any vehicle depends on the motor vehicle manufacturer's emissions control strategy.

Continuous Monitors -- Some of the vehicle components or systems are continuously tested by the vehicle's OBD II system, while others are tested only under specific vehicle operating conditions. The continuously monitored components listed below are always ready:

1）**Misfire**

2）**Fuel System**

3）**Comprehensive Components (CCM)**

Once the vehicle is running, the OBD II system is continuously checking the above components, monitoring key engine sensors, watching for engine misfire, and monitoring fuel demands.

Non-Continuous Monitors -- Unlike the continuous monitors, many emissions and engine system components require the vehicle to be operated under specific conditions before the monitor is ready. These monitors are termed non-continuous monitors and are listed below:

1)　**EGR System**

2) **O2 Sensors**
3) **Catalyst**
4) **Evaporative System**
5) **O2 Sensor Heater**
6) **Secondary air**
7) **Heated Catalyst**
8) **A/C system**

2.5 OBD II Monitor Readiness Status

OBD II systems must indicate whether or not the vehicle's PCM's monitor system has completed testing on each component. Components that have been tested will be reported as "Ready", or "Complete", meaning they have been tested by the OBD II system. The purpose of recording readiness status is to allow inspectors to determine if the vehicle's OBD II system has tested all the components and/or systems.

The powertrain control module (PCM) sets a monitor to "Ready" or "Complete" after an appropriate drive cycle has been performed. The drive cycle that enables a monitor and sets readiness codes to "Ready" varies for each individual monitor. Once a monitor is set as "Ready" or "Complete", it will remain in this state. A number of factors, including erasing of diagnostic trouble codes (DTCs) with a scan tool or a disconnected battery, can result in Readiness Monitors being set to "Not Ready". Since the three continuous monitors are constantly evaluating, they will be reported as "Ready" all of the time. If testing of a particular supported non-continuous monitor has not been completed, the monitor status will be reported as "Not Complete" or "Not Ready."

In order for the OBD monitor system to become ready, the vehicle should be driven under a variety of normal operating conditions. These operating conditions may include a mix of highway driving and stop and go, city type driving, and at least one overnight-off period. For specific information on getting your vehicle's OBD monitor system ready, please consult your vehicle owner's manual.

2.6 OBD II Definitions

Powertrain Control Module (PCM) -- OBD II terminology for the on-board computer that controls engine and drive train.

Malfunction Indicator Light (MIL) -- Malfunction Indicator Light (Service Engine Soon, Check Engine) is a term used for the light on the instrument panel. It is to alert the driver and/or the repair technician that there is a problem with one or more of vehicle's systems and may cause emissions to exceed federal standards. If the MIL illuminates with a steady light, it indicates that a problem has been detected and the vehicle should be serviced as soon as possible. Under certain conditions, the dashboard light will blink or flash. This indicates a severe problem and flashing is intended to discourage vehicle operation. The vehicle onboard diagnostic system can not turn the MIL off until necessary repairs are completed or the condition no longer exists.

DTC -- Diagnostic Trouble Codes (DTC) that identify which section of the emission control system has malfunctioned.

Enabling Criteria -- Also termed Enabling Conditions. They are the vehicle-specific events or conditions that must occur within the engine before the various monitors will set, or run.   Some monitors require the vehicle to follow a prescribed "drive cycle" routine as part of the enabling criteria. Drive cycles vary among vehicles and for each monitor in any particular vehicle.

OBD II Drive Cycle -- A specific mode of vehicle operation that provides conditions required to set all the readiness monitors applicable to the vehicle to the "ready" condition. The purpose of completing an OBD II drive cycle is to force the vehicle to run its onboard diagnostics. Some form of a drive cycle needs to be performed after DTCs have been erased from the PCM's memory or after the battery has been disconnected. Running through a vehicle's complete drive cycle will "set" the readiness monitors so that future faults can be detected. Drive cycles vary depending on the vehicle and the monitor that needs to be reset. For vehicle specific drive cycle, consult the vehicle's Owner's Manual.

Freeze Frame Data -- When an emissions related fault occurs, the OBD II system not only sets a code but also records a snapshot of the vehicle operating parameters to help in identifying the problem. This set of values is referred to as Freeze Frame Data and may include important engine parameters such as engine RPM, vehicle speed, air flow, engine load, fuel pressure, fuel trim value, engine coolant temperature, ignition timing advance, or closed loop status.

3. Using the Scan Tool

3.1 Tool Description

① **LCD DISPLAY** -- Indicates test results. Backlit, 128 x 64 pixel display with contrast adjustment.

② **ENTER BUTTON** -- Confirms a selection (or action) from a menu. Starts recording live data under manual trigger mode.

③ **ESC BUTTON** -- Cancels a selection (or action) from a menu or returns to the menu. It is also used to setup system, exit DTC Lookup screen, or stop data recording when pressed.

④ **LEFT SCROLL BUTTON** -- When look up DTC definitions, moves to previous character and views additional information on previous screens if DTC definition covers more than one screen; deselect all marked PID data when viewing or recording customized live data list; views previous frames of recorded data when playing back live data. It is also used to update DTC library when pressed.

⑤ **RIGHT SCROLL BUTTON** -- When look up DTC definitions, moves to next character and view additional information on next screens if DTC definition covers more than one screen; selects/deselects PID data when viewing or recording customized live data list, and views next frames of data when playing back live data.

⑥ **UP SCROLL BUTTON** -- Moves up through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves up through the current screen to the previous screens for additional data.

⑦ **DOWN SCROLL BUTTON** -- Moves down through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves down through the current screen to next screens for additional data. It is also used as the language setup hotkey when pressed.

⑧ **HELP BUTTON** -- Provides help information when pressed.

⑨ **POWER SWITCH** -- Turns on/off the scan tool when powered by cell battery; resets the scanner when powered by vehicle battery.

⑩ **OBD II CONNECTOR** -- Connects the scan tool to the vehicle's Data Link Connector (DLC).

⑪ **RUBBER BOOT** -- Protects the scan tool from drop, abrasion and etc.

3.2 Specifications

1) Display: Backlit, 128 x 64 pixel display with contrast adjustment
2) Operating Temperature: 0 to 60°C (32 to 140 F°)
3) Storage Temperature: -20 to 70°C (-4 to 158 F°)
4) External Power: 8.0 to 18.0 V power provided via vehicle battery
5) Internal Power: 9V cell battery
6) Dimensions:

Length	Width	Height
178 mm (7.00")	95 mm (3.74")	35 mm (1.38")

7) NW: 0.38kg (0.84lb),   GW: 0.55 kg(1.21lb)

3.3 Accessories Included

1) **User's Manual** -- Instructions on tool operations
2) **CD** -- Includes user's manual, DTC lookup software, and etc.
3) **OBD2 cable** -- Provides power to tool and communicates between tool and vehicle
4) **USB cable** -- Used to upgrade the scan tool, and to print retrieved data.
5) **Carry case** -- A nylon case to store the scan tool when not in use.
6) **Cell battery** -- Supplies power to the scan tool when disconnected from vehicle DLC.

3.4 Navigation Characters

Characters used to help navigate the scan tool are:

1) "▶" -- Indicates current selection.
2) "⬇"-- A **DOWN** Arrow indicates additional information is available on next screens.
3) "⬆"-- An **UP** Arrow indicates additional information is available on previous screens.
4) "**$**" -- Identifies the control module number from which data is retrieved.

5) **"?"** -- Indicates help information is available.

6) **"G"** -- Indicates graphic viewing is available.

7) " ☐ " -- Indicates battery volume.

3.5 Keyboard

No solvents such as alcohol are allowed to clean the keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth. Do not soak the keypad as the keypad is not waterproof.

3.6 Power

Internal Battery Power

The scan tool has a 9V cell battery that provides power for off-car reviewing and analysis. Press the power key to turn on the scan tool. When the ☐ icon appears, replace the battery as instructed in "Battery Replacement" on paragraph 3.10.

- *If the scan tool is stored for a long period of time, remove batteries to prevent battery leakage from damaging battery compartment.*

External Power

External power of the scan tool is provided via the vehicle Data Link Connector (DLC). Just follow the steps below to turn on the scan tool:

1) Connect the OBD II Cable to scan tool.

2) Find DLC on vehicle.

- *A plastic DLC cover may be found for some vehicles and you need to remove it before plugging the OBD2 cable.*

3) Plug OBD II cable to the vehicle's DLC.

3.7 DTC Lookup

The DTC Lookup function is used to search for definitions of DTCs stored in built-in DTC library.

1) From **Main Menu**, use **UP/DOWN** scroll button to select **DTC Lookup** and press **ENTER** button.

```
╔════════════════════════╗
║       Main Menu        ║
║ ===================2/6 ║
║  Diagnostics           ║
║ ▶DTC Lookup            ║
║  Review Data         ? ║
║  Print Data            ║
║  System Setup          ║
║  Tool Information      ║
╚════════════════════════╝
```
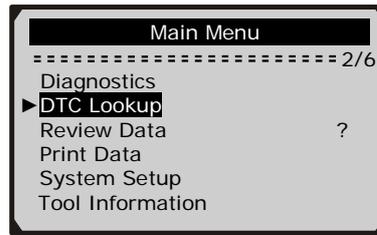
- The number "x/x" to the right indicates total number of items under this menu and sequence of highlighted item.
- The "?" to the right indicates help information available. Press **HELP** button to view help information for selected item..

2) From **DTC Lookup** menu, use **LEFT**/**RIGHT** button to move to the desired character, use **UP/DOWN** button to change selected digit/character and press **ENTER** button to confirm.

```
╔════════════════════════╗
║       DTC Lookup       ║
║ ====================== ║
║        P 0 0 0 1       ║
║ [←] – Left  [→] - Right║
║ [↑] [↓] - Change Digit ║
║ [ENTER] - Confirm      ║
║ [ESC] - Exit           ║
╚════════════════════════╝
```
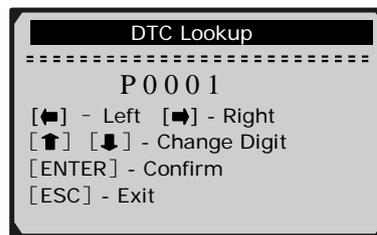
3) View the DTC definition on screen. When DTC definition covers more than one screen, use **LEFT/RIHT** button to view additional information on previous/next screens.

- For manufacturer specific codes, you need to select a vehicle make on an additional screen to look for DTC definitions.
- If definition could not be found (SAE or Manufacturer Specific), the scan tool displays "DTC definition not found! Please refer to vehicle service manual!"

4) To view next or previous DTC in the built-in DTC library, use **UP/DOWN** button.

5) To enter another DTC, press **ESC** button to return to previous screen.

6) To exit to Main Menu, press ESC button.

3.8 Product Setup

The scan tool allows you to make the following adjustments and settings:

1) **Language:** Selects the desired language.

2) **Contrast adjustment:** Adjusts the contrast of the LCD display.

3) **Unit of measure:** Sets the unit of measure to English or Metric.

4) **Auto Power-Off:** Sets automatic power-off limits.

5) **Beep Set:** Turns on/off beep.

6) **Tool self-test:** Checks if the LCD display and keyboard are working normally.

- *Settings of the unit will remain until change to the existing settings is made.*

To enter the setup menu mode

From the keyboard: Press **ESC** button to enter **System Setup** menu. Follow the instructions to make adjustments and settings as described in the following setup options.
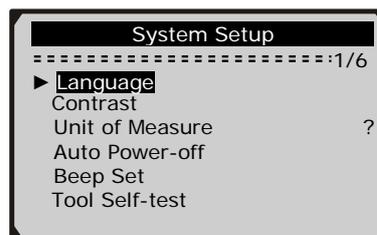
From the Main Menu: Use the **UP/DOWN** scroll button to select **System Setup**, and press **ENTER** button. Follow the instructions to

make adjustments and settings as described in the following setup options.

```
┌─────────────────────────────┐
│       Main Menu             │
│ =====================5/6    │
│  Diagnostics                │
│  DTC Lookup                 │
│  Review Data            ?   │
│  Print Data                 │
│ ►System Setup               │
│  Tool Information           │
└─────────────────────────────┘
```
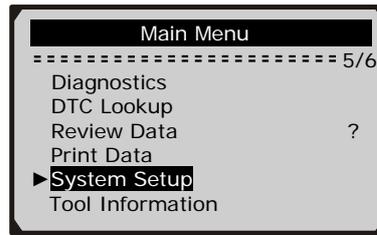
Language Setup

- *English is the default language.*

1) From **System Setup** menu, use **UP/DOWN** scroll button to select **Language**, and press **ENTER** button.

```
┌─────────────────────────────┐
│      System Setup           │
│ ====================1/6     │
│ ► Language                  │
│   Contrast                  │
│   Unit of Measure       ?   │
│   Auto Power-off            │
│   Beep Set                  │
│   Tool Self-test            │
└─────────────────────────────┘
```
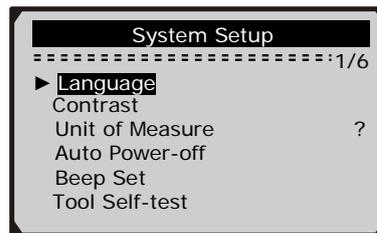
2) Use **UP/DOWN** scroll button to select the desired language and press **ENTER** button to save your selection and return to previous menu.

```
┌─────────────────────────────┐
│        Language             │
│ ====================1/3     │
│  ►English                   │
│   Français                  │
│   Español                   │
│                             │
│                             │
└─────────────────────────────┘
```

14
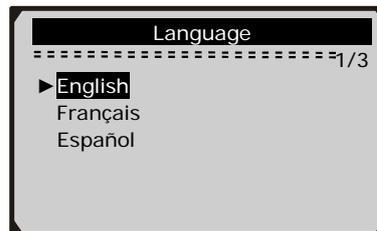
Contrast Adjustment

1) From **System Setup** menu, use **UP/DOWN** scroll button to select **Contrast**, and press **ENTER** button.

```
         System Setup
====================: 2/6
  Language
► Contrast
  Unit of Measure            ?
  Auto Power-Off
  Beep Set
  Tool Self-test
```
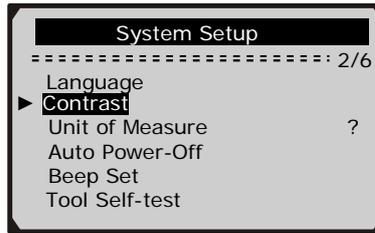
2) From **Contrast** menu, use **UP/DOWN** scroll button to increase or decrease contrast.

```
            Contrast
=========================
          （30%）

■■■■■■□□□□□□□□□□□
Use ⬆ or ⬇ to change
```
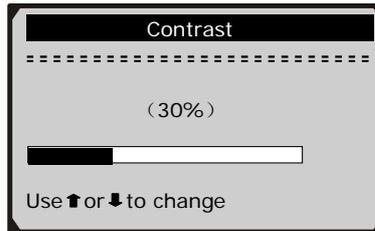
3) Press **ENTER** button to save your settings and return to previous menu.

Unit of Measurement

- *Metric is the default measurement unit.*

1) From **System Setup** menu, use **UP/DOWN** scroll button to select **Unit of Measure** and press **ENTER** button.

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```
          System Setup
=====================: 3/6
   Language
   Contrast
 ► Unit of Measure          ?
   Auto Power-off
   Beep Set
   Tool Self-test
```
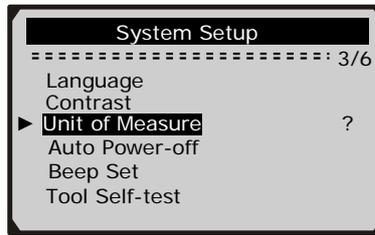
2) From **Unit of Measure** menu, use **UP/DOWN** scroll button to
    select the desired unit of measurement.

```
          Unit of Measure
=====================:2/2
   English
 ► Metric                   ?
```
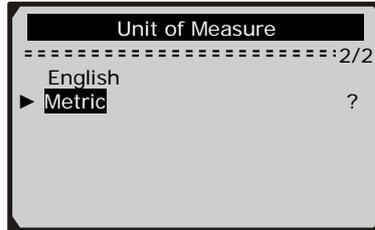
3) Press **ENTER** button to save your selection and return to
previous menu.

Auto Power-off

- *The minimum automatic power-off time is 1 minute, and the
  maximum is 20 minutes.*
- *The Auto Power-Off function can be available only when the
  scanner is powered by cell battery.*

1) From **System Setup** menu, use **UP/DOWN** scroll button to
    select **Auto Power-Off** and press **ENTER** button.

```
          System Setup
=====================: 4/6
 Language
 Contrast
 Unit of Measure              ?
► Auto Power-off
  Beep Set
  Tool Self-test
```
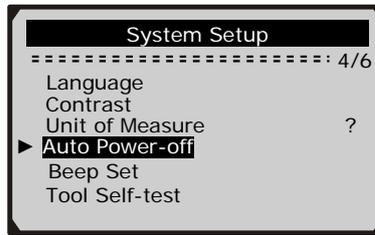
2)   From **Auto Power-off** menu, use **UP/DOWN** scroll button to increase or decrease time.

```
          Auto Power-off
==========================

   01 Minute
  [↑] – Increase time
  [↓] – Decrease time
  [ENTER] - Confirm
```
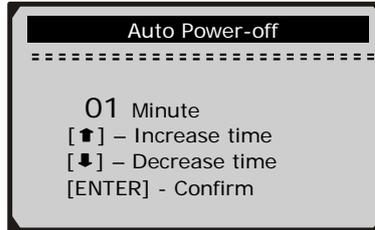
3)   Press **ENTER** button to save your setting and return to previous menu.

Beep Set

- *The default setting is Beep On.*

1)   From **System Setup** menu, use **UP/DOWN** scroll button to select **Beep Set** and press **ENTER** button.

```
          System Setup
=====================: 5/6
 Language
 Contrast
 Unit of Measure              ?
 Auto Power-off
► Beep Set
  Tool Self-test
```

17
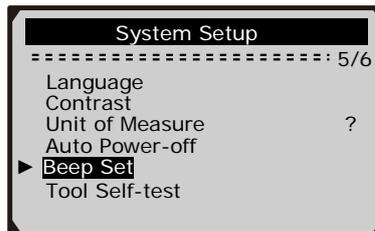
2) From **Beep Set** menu, use **UP/DOWN** scroll button to select Beep ON or Beep OFF to turn on/off the beep.

```
┌─────────────────────────────┐
│        Beep Set             │
│ = = = = = = = = = = = = = = = = = = = = = 2/2 │
│   Beep ON                   │
│ ►Beep OFF                  ? │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```

3) Press **ENTER** button to save your selection and return to previous menu.

Tool Self-test

The Tool Self-test function checks if the display and keyboard are working properly.

A. Display test

The Display Test function checks if the LCD display is working normally.

1) From **System Setup** menu, use **UP/DOWN** scroll button to select **Tool Self-tes**t, and press **ENTER** button.

```
┌─────────────────────────────┐
│       System Setup          │
│ = = = = = = = = = = = = = = = = = = = = = : 6/6 │
│   Language                  │
│   Contrast                  │
│   Unit of Measure        ?  │
│   Auto Power-off            │
│   Beep Set                  │
│ ► Tool Self-test            │
└─────────────────────────────┘
```
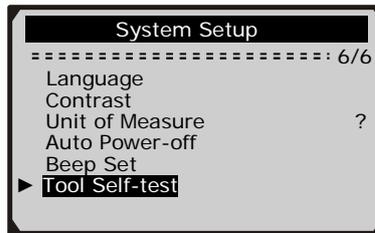
2) Select **Display Test** from **Tool Self-test** menu and press **ENTER** button.

18

```
           Tool Self-test
=======================  1/2
► Display Test
   Keyboard Test                ?
```

3) Press **ENTER** button again to start test. Look for missing spots in the solid black characters.

4) When completed, press **ESC** button to return.

B.   Keyboard Test

The Keyboard Test function verifies if the keys are functioning properly.

1) Use **UP/DOWN** scroll button to select **Keyboard Test** from the **Tool Self-test** menu, and then press **ENTER** button.

```
           Tool Self-test
=======================  2/2
   Display Test
► Keyboard Test                ?
```
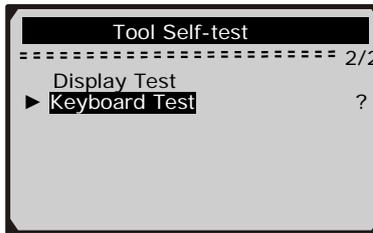
2) Press any key to start test. When you press a key, the key name should be observed on the display. If the key name does not show up, then the key is not functioning properly.

```
         Keyboard Test
=========================
       Press any key to
         start test

            key:

      Double [ESC] to return
```
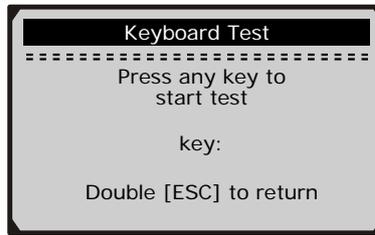
- If you press and hold the power switch, the key name does not show on the screen, but resets the scanner when powered by vehicle battery, or turns off the scanner when powered by cell battery. If it does not restart the scanner or power off the scanner, the key is not working properly.

3) Double press **ESC** to return to previous menu.

3.9 Tool Information

The Tool Information function allows viewing of some important information such as serial number and software version number of the scanner.

1) From **Main Menu**, use **UP/DOWN** scroll button to select **Tool Information** and press **ENTER** button.

```
          Main Menu
===================== 6/6
   Diagnostics
   DTC Lookup
   Review Data              ?
   Print Data
   System Setup
 ▶ Tool Information
```
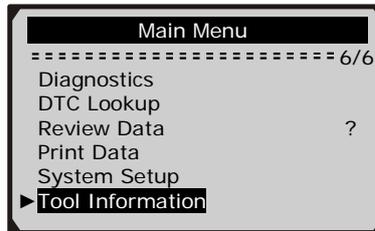
2) View tool information on screen.

20

```
          Tool Information
========================
Serial No. :   MS083462
Burn Date:     11/12/07
S/W Ver  :     V1.00
H/W Ver  :     V1.01
LIB Ver  :     V1.00
```
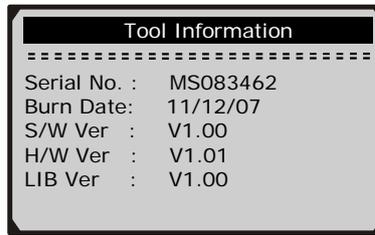
3.10 Battery Replacement

The scan tool requires a 9V cell battery to operate when disconnected from vehicle power. When the icon ▯ appears on the screen, replace the battery.

1) Locate the battery cover on the back of the scan tool.
2) Remove the battery cover screw and slide the battery cover off.
3) Remove discharged batteries and install a new 9V cell battery.
4) Reinstall battery cover by sliding battery cover on and installing screw.

3.11 Vehicle Coverage

The Maxiscan^{TM} MS509 OBDII/EOBD Scanner is specially designed to work with all OBD II compliant vehicles, including those equipped with next-generation protocol -- Control Area Network (CAN). It is required by EPA that all 1996 and newer vehicles (cars and light trucks) sold in the United States must be OBD II compliant and this includes all Domestic, Asian and European vehicles.

A small number of 1994 and 1995 model year gasoline vehicles are OBD II compliant. To verify if a 1994 or 1995 vehicle is OBD II compliant, check the Vehicle Emissions Control Information (VECI) Label which is located under the hood or by the radiator of most vehicles. If the vehicle is OBD II compliant, the label will designate "OBD II Certified". Additionally, Government regulations mandate that all OBD II compliant vehicles must have a "common" sixteen-pin Data Link Connector (DLC).

For your vehicle to be OBD II compliant it must have a 16-pin DLC (Data Link Connector) under the dash and the Vehicle Emission Control Information Label must state that the vehicle is OBD II compliant.

3.12 Product Troubleshooting

Vehicle Linking Error

A communication error occurs if the scan tool fails to communicate with the vehicle's ECU (Engine Control Unit). You need to do the following to check up:

- ✓ Verify that the ignition is ON;
- ✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC;
- ✓ Verify that the vehicle is OBD2 compliant;
- ✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.
- ✓ Verify the control module is not defective

Operating Error

If the scan tool freezes, then an exception occurs or the vehicle's ECU (Engine Control Unit) is too slow to respond to requests. You need to do the following to reset the tool:

- ✓ Press and hold **POWER** button for at least 2 seconds to reset the scan tool.
- ✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.

Scan tool doesn't power up

If the scan tool won't power up or operates incorrectly in any other way, you need to do the following to check up:

- ✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC;
- ✓ Check if the DLC pins are bent or broken. Clean the DLC pins if necessary.

✓ Check vehicle battery to make sure it is still good with at least 8.0 volts.

4. Review Data

The Review Data function allows viewing of data from last test recorded by the scan tool.

1) Use **UP/DOWN** scroll button to select **Review Data** from **Main Menu**, and press **ENTER** button

```
┌─────────────────────────────┐
│        Main Menu            │
│======================3/6    │
│   Diagnostics               │
│   DTC Lookup                │
│ ►Review Data           ?    │
│   Print Data                │
│   System Setup              │
│   Tool Information          │
└─────────────────────────────┘
```
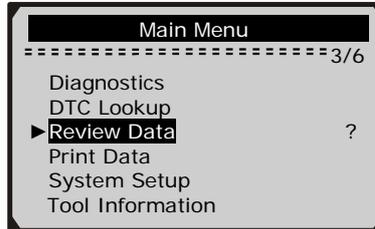
2) Use **UP/DOWN** scroll button to select the desired item from **Review Data** menu, and press **ENTER** button.

```
┌─────────────────────────────┐
│        Review Data          │
│=====================  1/9   │
│ ►Stored Codes          ↑    │
│   Pending Codes             │
│   Live Data            ?    │
│   Freeze Frame              │
│   I/M Readiness             │
│   O2 Monitor Test      ↓    │
└─────────────────────────────┘
```
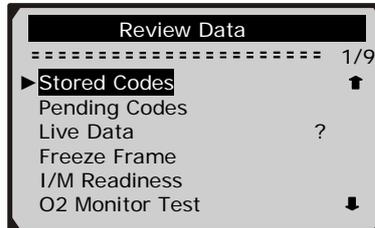
● If no data from previously tested vehicle is recorded, only **Module Present** data containing module ID and protocol type can be reviewed.

```
┌─────────────────────────────────────┐
│           Review Data               │
│ = = = = = = = = = = = = = = = = 1/1 │
│ ►Modules Present                    │
│                                     │
│                               ?     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```
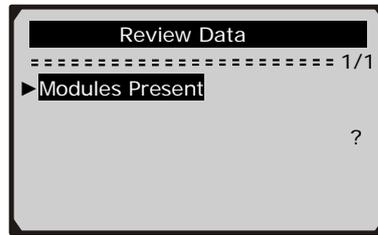
3)   Review selected data on screen.

```
┌─────────────────────────────────────┐
│                 $09          1/6    │
│ P0118                    Generic    │
│ = = = = = = = = = = = = = = = = = = │
│                                     │
│ Engine Coolant Temperature          │
│ Sensor 1 Circuit High               │
│                                     │
└─────────────────────────────────────┘
```
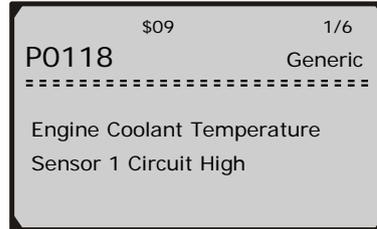
● If there is no data stored for selected item, a "Not Supported or Stored No Data!" message shows on the screen.

5. OBD II Diagnostics

When more than one vehicle control module is detected by the scan tool, you will be prompted to select the module where the data may be retrieved. The most often to be selected are the Powertrain Control Module [PCM] and Transmission Control Module [TCM].

CAUTION: Don't connect or disconnect any test equipment with ignition on or engine running.

1）   Turn the ignition off.
2）   Locate the vehicle's 16-pin Data Link Connector (DLC).
3）   Plug into the scan tool cable connector to the vehicle's DLC.
4）   Turn the ignition on. Engine can be off or running.

5） Press **ENTER** button to enter **Main Menu**. Use **UP/DOWN** scroll button to select **Diagnostics** from the menu.

```
┌─────────────────────────────┐
│        Main Menu            │
│ = = = = = = = = = = = = 1/6 │
│ ► Diagnostics               │
│   DTC Lookup                │
│   Review Data          ?    │
│   Print Data                │
│   System Setup              │
│   Tool Information          │
└─────────────────────────────┘
```
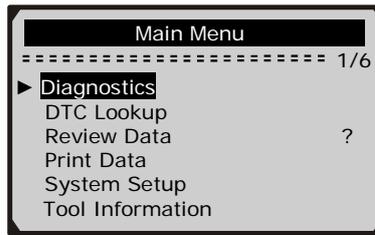
6） Press **ENTER** button to confirm. A sequence of messages displaying the OBD2 protocols will be observed on the display until the vehicle protocol is detected.

- *If the scan tool fails to communicate with the vehicle's ECU (Engine Control Unit), a "LINKING ERROR!" message shows up on the display.*
- ✓ Verify that the ignition is ON;
- ✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC;
- ✓ Verify that the vehicle is OBD2 compliant;
- ✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and repeat the procedure from step 5.

- *If the "LINKING ERROR" message does not go away, then there might be problems for the scan tool to communicate with the vehicle. Contact your local distributor or the manufacturer's customer service department for assistance.*

7） You will be prompted to erase previously stored data.

- *Review previously stored data thoroughly before erasing.*

```
┌─────────────────────────────────┐
│           Diagnostic            │
│ ═══════════════════════════════ │
│        Erase previously         │
│        stored data to save      │
│        data from this test?     │
│                                 │
│                                 │
│       YES          NO           │
│                                 │
└─────────────────────────────────┘
```
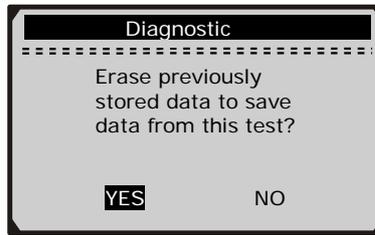
- If no data is stored in the scan tool, above prompt will not show up.

8） If you wish to erase the data, press **ENTER** button; if you do not want to erase the data, press **ESC** or use **LEFT/RIGHT** button to select **NO** and press **ENTER** to continue.

9） View a summary of system status (MIL status, DTC counts, Monitor status) on screen. Wait a few seconds or press any key for **Diagnostic Menu** to come up.

```
┌─────────────────────────────────┐
│          System Status          │
│ ═══════════════════════════════ │
│ MIL Status           ON         │
│ Codes Found          6          │
│ Monitors N/A         3          │
│ Monitors OK          3          │
│ Monitors INC         5          │
│                                 │
└─────────────────────────────────┘
```
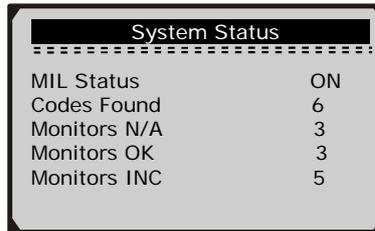
- If more than one module is detected, you will be prompted to select a module before testing.

```
┌─────────────────────────────────┐
│         Control Module          │
│ ═══════════════════════════ 1/2 │
│ ► Engine                        │
│   Module $A4              ?      │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```

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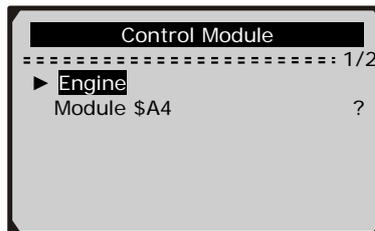
● Use **UP/DOWN** scroll button to select a module and press **ENTER** button.

5.1 Reading Codes

◆ *Reading Codes can be done with the key on engine off (KOEO) or with the key on engine running (KOER).*

◆ *Stored Codes are also known as "hard codes" or "permanent codes". These codes cause the control module to illuminate the malfunction indicator lamp (MIL) when emission-related fault occurs.*

◆ *Pending Codes are also referred to as "maturing codes" or "continuous monitor codes". They indicate problems that the control module has detected during the current or last driving cycle but are not considered serious yet. Pending Codes will not turn on the malfunction indicator lamp (MIL). If the fault does not occur within a certain number of warm-up cycles, the code clears from memory.*

1) Use **UP/DOWN** scroll button to select **Read Codes** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│        Diagnostic Menu      │
│ ==================== 1/11   │
│ ► Read Codes           ⬆    │
│   Erase Codes               │
│   Live Data            ?    │
│   View Freeze Frame         │
│   I/M Readiness             │
│   O2 Monitor Test      ⬇    │
└─────────────────────────────┘
```
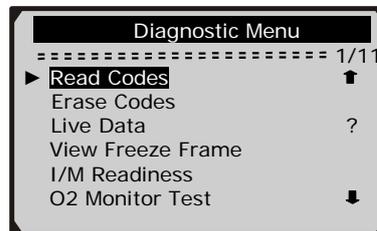
2) Use **UP/DOWN** scroll button to select **Stored Codes** or **Pending Codes** from the **Trouble Codes** menu and press **ENTER** button.

```
┌─────────────────────────────────┐
│        Trouble Codes            │
│ ===================== 1/2       │
│ ►Stored Codes                   │
│  Pending Codes            ?     │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```
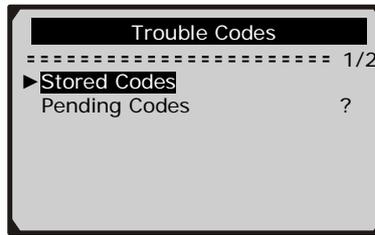
- If there are no Diagnostic Trouble Codes present, the display indicates "**No (pending) codes are stored in the module!**" Wait a few seconds or press any key to return to **Diagnostic Menu**.

3) View DTCs and their definitions on screen.

```
┌─────────────────────────────────┐
│           $09          1/5      │
│  P0118              Generic     │
│ =========================       │
│                                 │
│  Engine Coolant Temperature     │
│  Sensor 1 Circuit High          │
│                                 │
└─────────────────────────────────┘
```
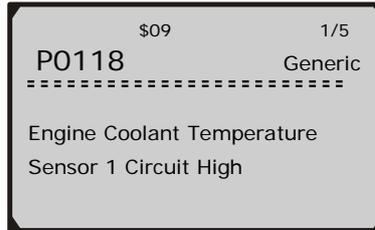
- The control module number, sequence of the DTCs, total number of codes detected and type of codes (Generic or Manufacturer specific) will be observed on the upper right hand corner of the display.

4) If more than one DTC is found, use **UP/DOWN** scroll button, as necessary, until all the codes have been shown up.

- If retrieved DTCs contain any manufacturer specific or enhanced codes, a "**Manufacturer specific codes are found! Press any key to select vehicle make!**" message comes up prompting you to select vehicle manufacturer to view DTC definitions. Use **UP/DOWN** scroll button to select manufacturer and then press **ENTER** button to confirm.

```
        Vehicle Manufacturer
=====================1/51
▶ Alfa Romeo                    ⬆
  Audi/VW
  BMW                      ?
  Buick
  Cadillac
  Chevrolet                     ⬇
```
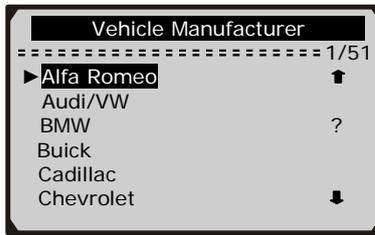
● If the manufacturer for your vehicle is not listed, use **UP/DOWN** scroll button to select **Other** and press **ENTER** button.

5.2 Erasing Codes

CAUTION: Erasing the Diagnostic Trouble Codes may allow the scan tool to delete not only the codes from the vehicle's on-board computer, but also "Freeze Frame" data and manufacturer specific enhanced data. Further, the I/M Readiness Monitor Status for all vehicle monitors is reset to Not Ready or Not Complete status. Do not erase the codes before the system has been checked completely by a technician.

◆ *This function is performed with key on engine off (KOEO). Do not start the engine.*

1) Use **UP/DOWN** scroll buttons to select **Erase Codes** from **Diagnostics Menu** and press **ENTER** button.

```
        Diagnostic Menu
=====================2/11
▶ Read Codes                    ⬆
  Erase Codes
  Live Data                ?
  View Freeze Frame
  I/M Readiness
  O2 Monitor Test               ⬇
```
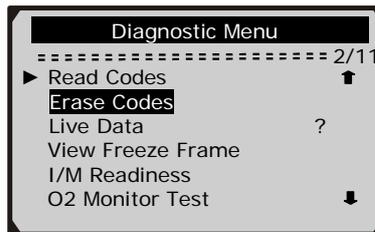
2) A warning message comes up asking for your confirmation.

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```
┌─────────────────────────────────┐
│ ███████ Erase Codes ███████████ │
│ = = = = = = = = = = = = = = = = |
│        Erase trouble codes!     │
│          Are you sure?          │
│                                 │
│                                 │
│        ███████      NO          │
│        ▐YES▌                    │
└─────────────────────────────────┘
```
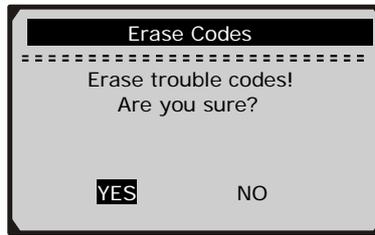
- If you do not want to proceed with erasing codes, press **ESC** button or use **LEFT/RIGHT** scroll button to select **NO** to exit. A message of **"Command Cancelled!"** show ups. Wait a few seconds or press any key to return to **Diagnostic Menu**.

3) Press **ENTER** button to confirm.

- If the codes are cleared successfully, an "**Erase Done!**" confirmation message shows on the display.

```
┌─────────────────────────────────┐
│ ███████ Erase Codes ███████████ │
│ = = = = = = = = = = = = = = = = |
│                                 │
│          Erase Done!            │
│                                 │
│                                 │
│       Press any key to con.     │
└─────────────────────────────────┘
```
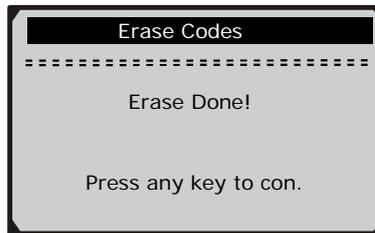
- If the codes are not cleared, then an "**Erase Failure. Turn Key on with Engine off!**" message appears.

```
┌─────────────────────────────────┐
│ ███████ Erase Codes ███████████ │
│ = = = = = = = = = = = = = = = = |
│        Erase Failure.           │
│        Turn Key on with         │
│        Engine Off!              │
│                                 │
│       Press any key to con.     │
└─────────────────────────────────┘
```
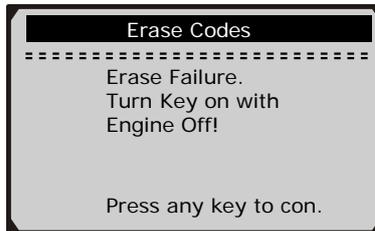
4) Press any button to return to **Diagnostic Menu.**

5.3 Live Data

Viewing Data

The View Data function allows viewing of live or real time PID data of vehicle's computer module(s).

1) To view live data, use **UP/DOWN** scroll button to select **Live Data** from **Diagnostic Menu** and press **ENTER** button.
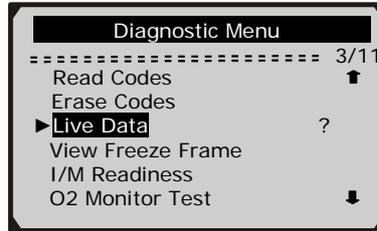
```
┌─────────────────────────────┐
│      Diagnostic Menu        │
├─────────────────────────────┤
│ ==================== 3/11   │
│   Read Codes            ↑   │
│   Erase Codes               │
│ ►Live Data              ?   │
│   View Freeze Frame         │
│   I/M Readiness             │
│   O2 Monitor Test       ↓   │
└─────────────────────────────┘
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
┌─────────────────────────────┐
│         Live Data           │
├─────────────────────────────┤
│ ========================    │
│                             │
│      Reading PID.01         │
│      - Please Wait -        │
│                             │
│                             │
└─────────────────────────────┘
```
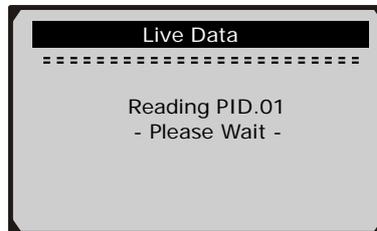
3) Use **UP/DOWN** scroll button to select **View Data** from **Live Data** menu and press **ENTER** button.

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```
┌─────────────────────────────┐
│        Live Data            │
│ ==================== 1/3    │
│►View Data                   │
│ Record Data            ?    │
│ Playback Data               │
│                             │
│                             │
└─────────────────────────────┘
```
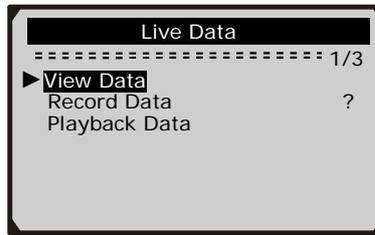
Viewing Complete Data Set

4) To view complete set of data, use **UP/DOWN** scroll button to select **Complete Data Set** from **View Data** menu and press **ENTER** button.

```
┌─────────────────────────────┐
│        View Data            │
│ ==================== 1/3    │
│►Complete Data Set           │
│ Custom Data Set             │
│ Unit of Measure        ?    │
│                             │
│                             │
└─────────────────────────────┘
```
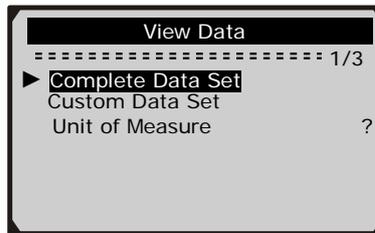
5) View live PIDs on the screen. Use **UP/DOWN** scroll button for more PIDs if an ↑ or ↓ arrow appears on the screen.

```
┌─────────────────────────────┐
│        Live Data            │
│ ==================== 6      │
│ DTC_CNT        6       ↑    │
│ FUELSYS1       OL           │
│ FUELSYS2       N/A     ?    │
│ LOAD_PCT (%)   0.0     G    │
│ ETC(℃)         -40          │
│►SHRTFT1 (%)    0.0     ↓    │
│                             │
└─────────────────────────────┘
```
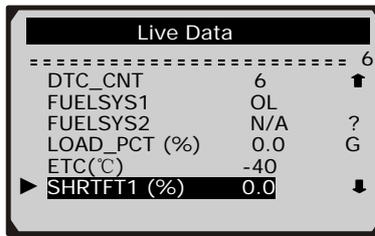
- The number "x" to the right of the screen indicates sequence of highlighted item.

- If you want to view full name of the highlighted PID, press **Help** button.

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- If the "G" icon appears when a PID is highlighted, it indicates graphic information is available. Press **ENTER** to view graph.

```
┌─────────────────────────────────┐
│ RPM (/min)                  975 │
│                                 │
│ 1725 ─                          │
│         ┌─┐      ┌──┐           │
│        ╱  ╲    ╱    ╲     ╱╲    │
│       ╱    ╲  ╱      ╲   ╱  ╲   │
│      ╱      ╲╱        ╲ ╱    ╲  │
│     ╱                  ╲╱        │
│ 925 ─                           │
└─────────────────────────────────┘
```

6) Press **ESC** button to return to previous menu.

Viewing Custom Data Set

7) To view customized PID data, use **UP/DOWN** scroll button to select **Custom Data Set** from **View Data** menu and press **ENTER** button.

```
┌─────────────────────────────────┐
│         View Data               │
│ ======================= 2/3     │
│   Complete Data Set             │
│ ► Custom Data Set               │
│   Unit of Measure           ?   │
│                                 │
│                                 │
└─────────────────────────────────┘
```

8) Observe on-screen instructions.

```
┌─────────────────────────────────┐
│        Custom Data Set          │
│ ========================        │
│ [➡] – Select/Deselect          │
│ [⬅] – Deselect all             │
│ [ENTER] – Confirm               │
│ [ESC] - Cancel                  │
│                                 │
└─────────────────────────────────┘
```

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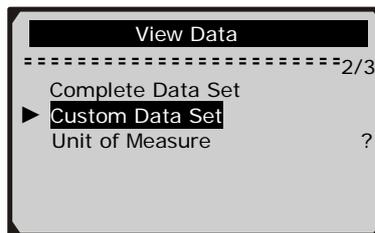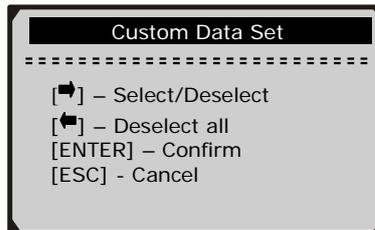
9) Use **RIGHT** button to deselect/select data parameters, and use **UP/DOWN** scroll button to move up and down. Selected parameters are marked with solid squares.

```
┌──────────────────────────────┐
│        Custom Data Set        │
│= = = = = = = = = = = = = = = = = = = = = =  6│
│  ■DTC_CNT          #01      ↑ │
│  □FUELSYS1                    │
│  ■FUELSYS2         #02      ? │
│  ■LOAD_PCT(%)      #03        │
│  □ETC(℃)                     │
│ ▶□SHRTFT1(%)               ↓ │
└──────────────────────────────┘
```
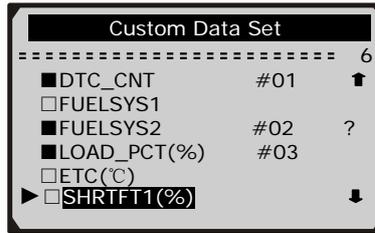
- The number "x" to the upper right corner of the screen indicates sequence of highlighted item; and "#x" are the order that the parameters are selected and will be displayed.
- You are allowed to pick up a maximum of 18 PIDs. If the selected PIDs exceed 18, a "**The selected data list is full!**" message displays on the screen.
- If you want to deselect all marked items, press **LEFT** button.
- A message comes up to ask for your confirmation.

```
┌──────────────────────────────┐
│         Deselect All          │
│= = = = = = = = = = = = = = = = = = = = = = = =│
│          Deselect all         │
│         selected PIDs?        │
│                               │
│                               │
│        YES        NO          │
└──────────────────────────────┘
```

- If you decide to deselect these items, press **ENTER;** if you decide not to, press **ESC** or use **UP/DOWN** scroll button to select **NO** to continue PID selections.

10) Press **ENTER** button to view selected PIDs on screen.

```
                Live Data
========================= 4
  DTC_CNT              6
  FUELSYS2             N/A
  ETC(℃)              -40       ?
 ►SHRTFT1 (%)          0.0       G
```
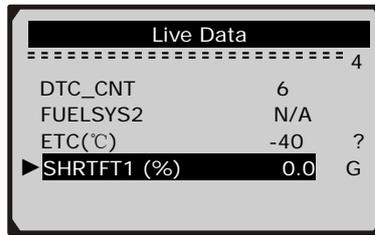
11) Use **ESC** button to return to **View Data** menu and/or return to **Live Data** menu.

Recording Data

The Record Data function allows recording vehicle modules' Parameter Identification (PID) data to help diagnose intermittent vehicle problems. A recording includes 5 frames of live data before trigger event and several frames after trigger event.

There are two trigger modes used to record data:

 A. **Manual Trigger -** allows user to press **ENTER** button to start recording.

 B. **DTC Trigger -** automatically records PID data when a fault that causes a DTC to set is detected by vehicle.

CAUTION: DO NOT try to drive and operate the scan tool at the same time! Always have another person operate the scan tool while driving.

1) To record live data, use **UP/DOWN** scroll button to select **Record Data** from **Live Data** menu and press **ENTER** button.

```
                Live Data
===================== 2/3
   View Data
 ►Record Data
   Playback Data          ?
```
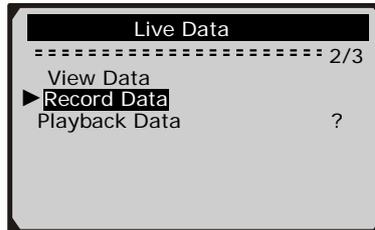
Recording Complete Data Set

2) To record complete set of live data, use **UP/DOWN** scroll button to select **Complete Data Set** from **Record Data** menu and press **ENTER** button.
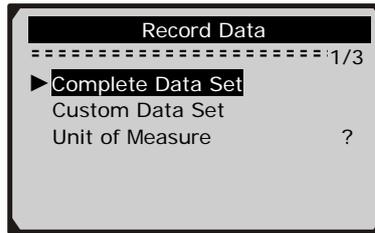
```
┌─────────────────────────────────┐
│         Record Data             │
│=====================1/3         │
│►Complete Data Set               │
│ Custom Data Set                 │
│ Unit of Measure          ?      │
│                                 │
│                                 │
└─────────────────────────────────┘
```
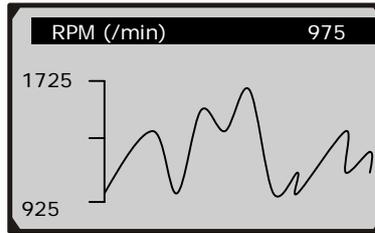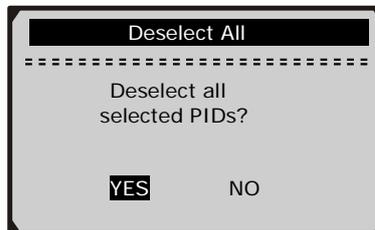
3) Use **UP/DOWN** scroll button to select a trigger mode and press **ENTER** button.

```
┌─────────────────────────────────┐
│       Pick Trigger Mode         │
│===================== 1/2        │
│► Manual Trigger                 │
│  DTC Trigger             ?      │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```
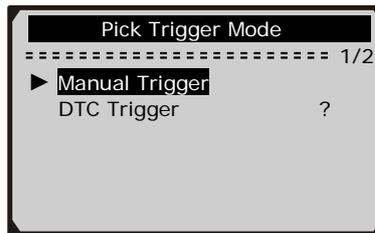
● If data from previously tested vehicle is not erased, data from current test will be stored in a temporary cache.Following screen shows when **Manual Trigger** is selected:

```
┌─────────────────────────────────┐
│        Manual Trigger           │
│=========================        │
│       Ready to record!          │
│       Press [ENTER] to          │
│       start recording…          │
│                                 │
│       Press [ESC] to exit       │
└─────────────────────────────────┘
```

Or following screen shows when **DTC Trigger** is selected:

```
┌─────────────────────────────────┐
│  ████████ DTC Trigger ████████  │
│ ═══════════════════════════════ │
│                                 │
│         Waiting for DTC to      │
│         trigger recording...    │
│                                 │
│                                 │
│         Press [ESC] to exit     │
│                                 │
└─────────────────────────────────┘
```

4) Use **UP/DOWN** scroll button to select a memory location and press **ENTER** button.

```
┌─────────────────────────────────┐
│  ████████ Select Memory ██████  │
│ ═══════════════════════ 1/3     │
│  ► Location #1          *        │
│    Location #2                   │
│    Location #3          ?        │
│                                 │
│                                 │
└─────────────────────────────────┘
```
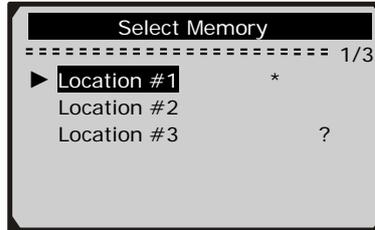
- The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.
- If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording displays.

```
┌─────────────────────────────────┐
│  ████████ Select Memory ██████  │
│ ═══════════════════════════════ │
│       A previous recording      │
│       exists! Do you want       │
│        to overwrite it?         │
│                                 │
│                                 │
│     YES            NO           │
│                                 │
└─────────────────────────────────┘
```
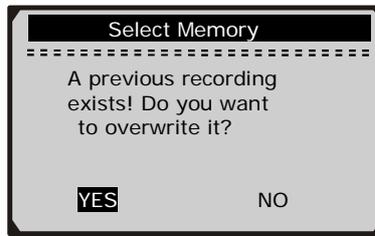
- If you wish to proceed with overwriting the old recording, press **ENTER** button; if you do not wish to overwrite it, use **LEFT/RIGHT** button to select **NO** or press **ESC** button to pick another memory location.

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5) Observe on-screen instructions.

- If **Manual Trigger** is selected, following screen shows:

```
================================
          Manual Trigger
================================
          Ready to record!
          Press [ENTER] to
          start recording...


          Press [ESC] to exit
```

- If **DTC Trigger** is selected, following screen shows:

```
================================
           DTC Trigger
================================
          Waiting for DTC to
          trigger recording...


          Press [ESC] to exit
```

6) Wait for DTC to trigger recording or press **ENTER** to start recording.

◆ *Drive till a DTC is detected when DTC Trigger is selected. If no DTCs are detected, press ESC to exit recording.*

```
 Recording...              5/60
================================ 6
  DTC_CNT             6         ↑
  FUELSYS1            OL
  FUELSYS2            N/A
  LOAD_PCT(%)         0.0
  ETC(℃)             -40
► SHRTFT1(%)          0.0        ↓
```
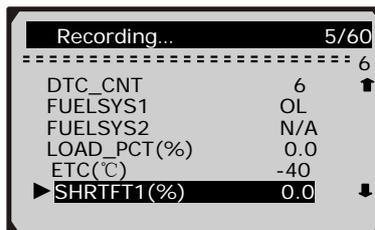
- The number "x/x..." to the upper right corner of the screen indicates the maximum frames that can be recorded and the number of recorded frames.

7) The scan tool keeps recording PID data until user presses **ESC** button, selected memory location is full, or it completes recording. A message prompting to playback data shows on the screen.

```
┌─────────────────────────────┐
│        Record Data          │
│=========================    │
│        Record Done!         │
│        Playback data?       │
│                             │
│                             │
│                             │
│   YES            NO         │
└─────────────────────────────┘
```
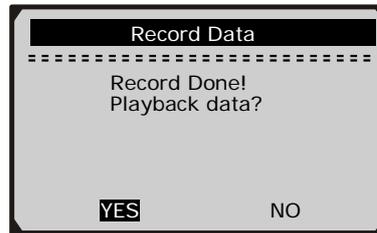
- If you wish to playback recorded data, press **ENTER** button; if you do not wish to playback, press **ESC** button, or use **LEFT/RIGHT** button to select **NO** and press **ENTER** button to return to **Record Data** menu.

```
┌─────────────────────────────┐
│        Record Data          │
│====================1/3      │
│►Complete Data Set           │
│ Custom Data Set             │
│ Unit of Measure        ?    │
│                             │
│                             │
└─────────────────────────────┘
```
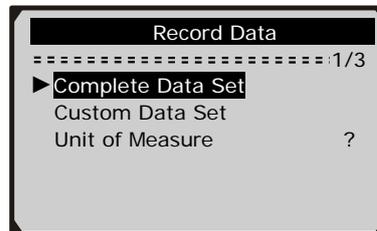
Recording Custom Data Set

8) To record customized data, use **UP/DOWN** scroll button to select **Custom Data Set** from **Record Data** menu and press **ENTER** button.

```
┌─────────────────────────────────┐
│         Record Data             │
│ ===================== 2/3       │
│   Complete Data Set             │
│ ► Custom Data Set               │
│   Unit of Measure            ?  │
│                                 │
│                                 │
└─────────────────────────────────┘
```
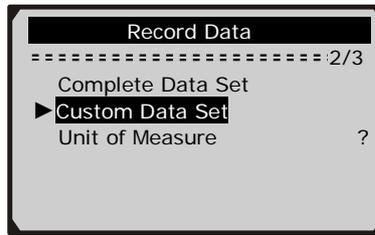
9) Observe on-screen instructions. Wait a few seconds or press any key to continue.

```
┌─────────────────────────────────┐
│        Custom Data Set          │
│ =============================   │
│  [➡] – Select/deselect          │
│  [⬅] – Deselect all             │
│    [ENTER] – Confirm            │
│    [ESC] - Cancel               │
│                                 │
└─────────────────────────────────┘
```

10) Use **RIGHT** button select/deselect data parameters. Selected parameters are marked with solid squares. Press **ENTER** button to confirm.
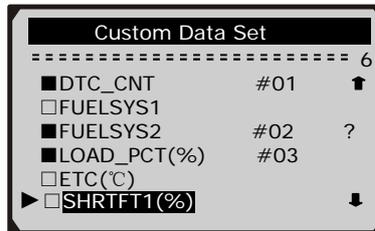
```
┌─────────────────────────────────┐
│        Custom Data Set          │
│ ====================== 6        │
│  ■DTC_CNT         #01      ↑    │
│  □FUELSYS1                      │
│  ■FUELSYS2        #02      ?    │
│  ■LOAD_PCT(%)     #03           │
│  □ETC(℃)                        │
│ ►□SHRTFT1(%)               ↓    │
└─────────────────────────────────┘
```
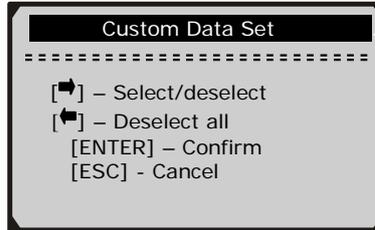
- You are allowed to pick up a maximum of 18 PIDs. If the selected PIDs exceed 18, a "**The selected data list is full!**" message displays on the screen.
- If you wish to deselect all marked items, press **LEFT** button.
- A message comes up to ask for your confirmation.

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```
          ┌─────────────────────────────┐
          │        Deselect All         │
          │ ========================== │
          │        Deselect all         │
          │      selected PIDs?         │
          │                             │
          │                             │
          │      [YES]       NO         │
          └─────────────────────────────┘
```
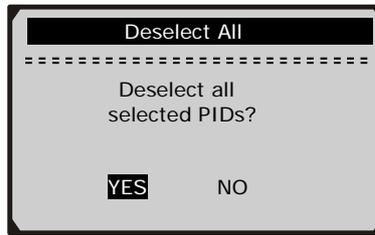
- If you decide to deselect these items, press **ENTER**; if you decide not to, press **ESC** button, or use **UP/DOWN** button to select **NO** and press **ENTER** to continue PID selections.
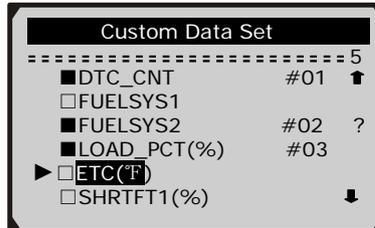
```
          ┌─────────────────────────────┐
          │       Custom Data Set       │
          │ =======================5   │
          │ ■DTC_CNT          #01   ↑  │
          │ □FUELSYS1                   │
          │ ■FUELSYS2         #02   ?  │
          │ ■LOAD_PCT(%)      #03      │
          │ ►□[ETC(°F)]                │
          │ □SHRTFT1(%)            ↓   │
          └─────────────────────────────┘
```
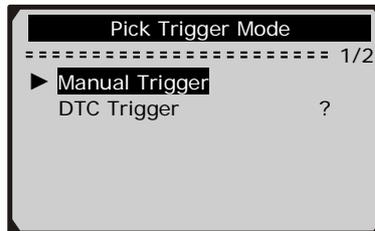
11) Use **UP/DOWN** scroll button to select a trigger mode and press **ENTER** button.

```
          ┌─────────────────────────────┐
          │       Pick Trigger Mode     │
          │ ===================== 1/2  │
          │ ► [Manual Trigger]         │
          │   DTC Trigger        ?     │
          │                             │
          │                             │
          │                             │
          └─────────────────────────────┘
```

- If data from previously tested vehicle is not erased, data from current test will be stored in temporary cache. Following screen shows when **Manual Trigger** is selected:

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```
        Manual Trigger
========================
    Ready to record!
    Press [ENTER] to
    start recording…


    Press [ESC] to exit
```

Or following screen shows when **DTC Trigger** is selected:

```
        DTC Trigger
========================
    Waiting for DTC to
    trigger recording…


    Press [ESC] to exit
```

12) Use **UP/DOWN** scroll button to select a memory location and press **ENTER** button.

```
        Select Memory
==================== 1/3
  ► Location #1        *
    Location #2
    Location #3          ?
```
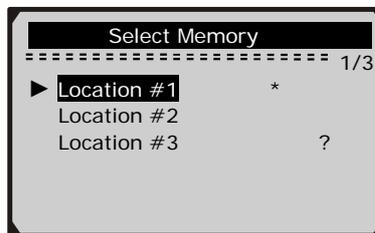
- The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.
- If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording is displayed.

```
┌─────────────────────────────┐
│       Select Memory         │
│ = = = = = = = = = = = = = = │
│     A previous recording    │
│     exists! Do you want     │
│      to overwrite it?       │
│                             │
│   ▮YES▮          NO         │
└─────────────────────────────┘
```
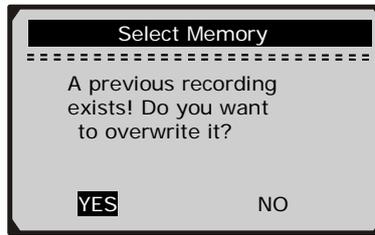
- If you do not wish to proceed with overwriting old recording, press **ENTER** button; if you do not wish to overwrite it, press **ESC** button, or use **LEFT/RIGHT** button to select **NO** and press **ENTER** to pick another memory location.
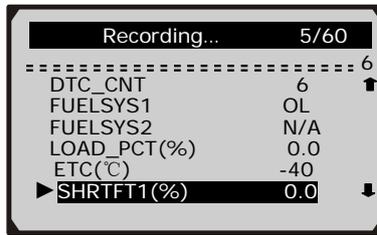
13) Observe on-screen instructions.

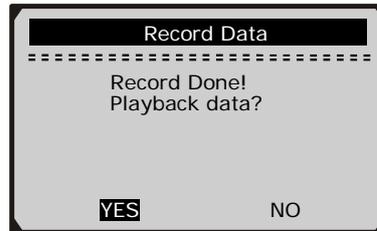- If **Manual Trigger** is selected, following screen shows:

```
┌─────────────────────────────┐
│       Manual Trigger        │
│ = = = = = = = = = = = = = = │
│      Ready to record!       │
│       Press [ENTER] to      │
│       start recording…      │
│                             │
│      Press [ESC] to exit    │
└─────────────────────────────┘
```

- If **DTC Trigger** is selected, following screen shows:

```
┌─────────────────────────────┐
│        DTC Trigger          │
│ = = = = = = = = = = = = = = │
│      Waiting for DTC to     │
│      trigger recording…     │
│                             │
│                             │
│      Press [ESC] to exit    │
└─────────────────────────────┘
```

14) Wait for DTC to trigger recording or press **ENTER** to start recording.

```
 ╔═══════════════════════════════╗
 ║   Recording...        5/60    ║
 ╟───────────────────────────── 6 ║
 ║  DTC_CNT              6      ⬆ ║
 ║  FUELSYS1             OL       ║
 ║  FUELSYS2             N/A      ║
 ║  LOAD_PCT(%)          0.0      ║
 ║  ETC(℃)              -40      ║
 ║ ▶SHRTFT1(%)           0.0    ⬇ ║
 ╚═══════════════════════════════╝
```

15) The scan tool keep recording PID data until user presses **ESC** button, the selected memory location is full, or it completes recording. A message prompting to playback data shows on the screen.
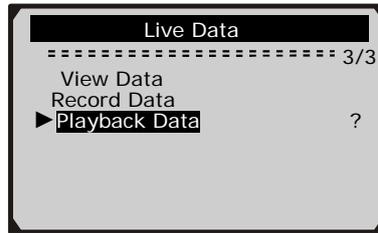
```
 ╔═══════════════════════════════╗
 ║         Record Data           ║
 ╟───────────────────────────────║
 ║         Record Done!          ║
 ║         Playback data?        ║
 ║                               ║
 ║                               ║
 ║   YES              NO         ║
 ╚═══════════════════════════════╝
```

● If you wish to playback recorded data, press **ENTER** button; if you do not wish to playback, press **ECS** button, or use **LEFT/RIGHT** button to select **NO** and press **ENTER** button to return to **Record Data** menu.
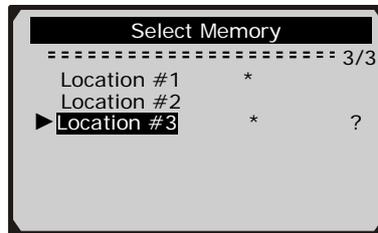
```
 ╔═══════════════════════════════╗
 ║         Record Data           ║
 ╟─────────────────────────── 1/3 ║
 ║ ▶Complete Data Set            ║
 ║   Custom Data Set             ║
 ║   Unit of Measure         ?   ║
 ║                               ║
 ║                               ║
 ╚═══════════════════════════════╝
```
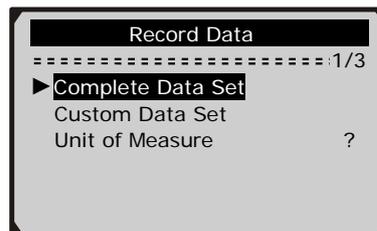
Playing Back Data

The Playback Data function allows viewing of previously stored PID data.

1) To playback recorded data, use **UP/DOWN** scroll button to select **Playback Data** from **Live Data** menu and press **ENTER** button.

```
┌─────────────────────────────┐
│        Live Data            │
│ ===================== 3/3   │
│    View Data                │
│    Record Data              │
│  ►Playback Data        ?    │
│                             │
│                             │
└─────────────────────────────┘
```

- You are also allowed to playback recorded data immediately after recording.

2) Use **UP/DOWN** button to select the memory location marked with an asterisk (*) icon.

```
┌─────────────────────────────┐
│       Select Memory         │
│ ===================== 3/3   │
│    Location #1      *        │
│    Location #2              │
│  ►Location #3      *    ?    │
│                             │
│                             │
└─────────────────────────────┘
```

- If there is no recording in selected location, a message "**Not Supported or Stored No Data**" displays on the screen.
- For data stored in temporary cache, you do not have to select memory location.

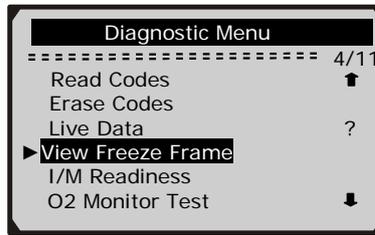3) Use **UP/DOWN** button to view recorded PIDs of each frame.

45

```
 ┌──────────────────────────┐
 │ Playback            -5/16 │
 │ ========================= 6│
 │ DTC_CNT            6     ⬆ │
 │ FUELSYS1          OL      │
 │ FUELSYS2          N/A     │
 │ LOAD_PCT (%)      0.0    ? │
 │ ETC(℃)           -40     │
 │ ▶SHRTFT1(%)        0.0   ⬇ │
 │                          │
 └──────────────────────────┘
```

- The number "x/x" to the upper right corner of the screen indicates total number of recorded frames and sequence of frame being displayed.

- Negative frames indicate data recorded prior to trigger event; and positive frames indicate data recorded after trigger event.

4) Use **LEFT/RIGHT** button to view PIDs of next or previous frames.

```
 ┌──────────────────────────┐
 │ Playback            6/16  │
 │ ========================= 4│
 │ DTC_CNT            6     ⬆ │
 │ FUELSYS1          OL      │
 │ FUELSYS2          N/A     │
 │ ▶LOAD_PCT(%)       0.0   ? │
 │ ETC(℃)           -40     │
 │ SHRTFT1(%)        0.0    ⬇ │
 │                          │
 └──────────────────────────┘
```
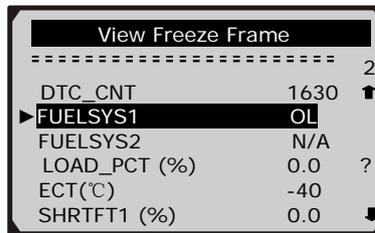
5.4 Viewing Freeze Frame Data

1) To view freeze frame data, use **UP/DOWN** scroll button to select **View Freeze Frame** from **Diagnostic Menu** and press **ENTER** button.
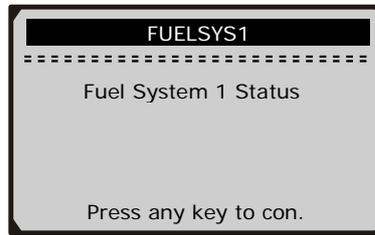
```
                Diagnostic Menu
    ======================  4/11
        Read Codes                ⬆
        Erase Codes
        Live Data                 ?
    ► View Freeze Frame
        I/M Readiness
        O2 Monitor Test           ⬇
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
              View Freeze Frame
    ========================

                Reading PID.01
                - Please Wait -

```
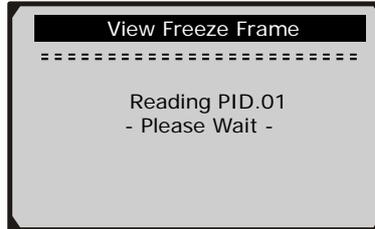
3) If retrieved information covers more than one screen, then a down arrow will appear. Use **DOWN** scroll button, as necessary, until all the data have been shown up.

```
              View Freeze Frame
    =====================      2
        DTC_CNT          1630   ⬆
    ► FUELSYS1           OL
        FUELSYS2         N/A
        LOAD_PCT (%)     0.0    ?
        ECT(℃)           -40
        SHRTFT1 (%)      0.0    ⬇
```

● If there is no freeze frame data available, an advisory message "**No freeze frame data stored!**" shows on the display.

4) If you want to view full name of a PID, use **UP/DOWN** scroll button to select the PID, and press **HELP** button.

47

```
================================
            FUELSYS1
================================
         Fuel System 1 Status



       Press any key to con.
================================
```

5) Wait a few seconds or press any button to return to previous screen.
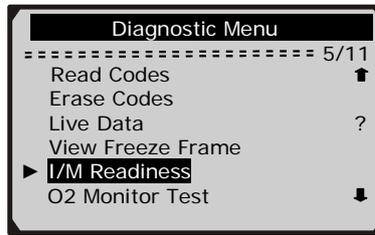
5.5 Retrieving I/M Readiness Status

I/M Readiness function is used to check the operations of the Emission System on OBD2 compliant vehicles. It is an excellent function to use prior to having a vehicle inspected for compliance to a state emissions program.

Some latest vehicle models may support two types of I/M Readiness tests:

A. *Since DTCs Cleared* - indicates status of the monitors since the DTCs are erased.

B. *This Drive Cycle* - indicates status of monitors since the beginning of the current drive cycle.

An I/M Readiness Status result of "NO" does not necessarily indicate that the vehicle being tested will fail the state I/M inspection. For some states, one or more such monitors may be allowed to be "Not Ready" to pass the emissions inspection.

- **"OK"** -- Indicates that a particular monitor being checked has completed its diagnostic testing.

- **"INC"** -- Indicates that a particular monitor being checked has not completed its diagnostic testing.

- **"N/A"** -- The monitor is not supported on that vehicle.

1) Use **UP/DOWN** scroll button to select **I/M Readiness** from **Diagnostic Menu** and press **ENTER** button.

```
          Diagnostic Menu
================= 5/11
    Read Codes              ⬆
    Erase Codes
    Live Data               ?
    View Freeze Frame
  ► I/M Readiness
    O2 Monitor Test         ⬇
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
          I/M Readiness
=======================

          Reading PID...
          - Please Wait -
```
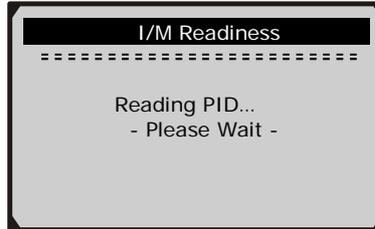
3) If the vehicle supports both types of tests, then both types will be
   shown on the screen for selection.

```
          I/M Readiness
====================1/2

  ►Since DTCs Cleared
   This Drive Cycle         ?
```
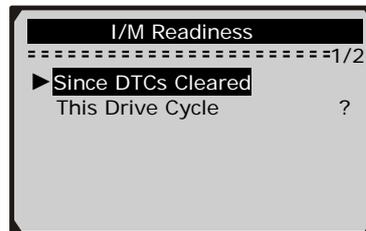
4) Use **UP/DOWN** scroll button, as necessary, to view the status of
   the MIL light (**"ON" or "OFF"**) and the following monitors:
   - **Misfire monitor** -- Misfire monitor
   - **Fuel System Mon --** Fuel System Monitor
   - **Comp. Component** -- Comprehensive Components   Monitor
   - **EGR** -- EGR System Monitor
   - **Oxygen Sens Mon** -- O2 Sensors Monitor

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- **Catalyst Mon** -- Catalyst Monitor
- **EVAP System Mon** -- Evaporative System Monitor
- **Oxygen Sens htr** --O2 Sensor Heater Monitor
- **Sec Air System** -- Secondary Air Monitor
- **Htd Catalyst** -- Heated Catalyst Monitor
- **A/C Refrig Mon** -- A/C system Monitor

```
┌─────────────────────────────┐
│      Since DTCs Cleared      │
│=============================│
│ MIL Status          OFF     │
│ Misfire Monitor     OK      │
│ Fuel System Mon     OK      │
│ Comp. Component     OK      │
│ Catalyst Mon        INC     │
│ Htd Catalyst        N/A   ⬇ │
└─────────────────────────────┘
```

5) If the vehicle supports readiness test of "**This Drive Cycle**", a screen of the following displays:

```
┌─────────────────────────────┐
│       This Drive Cycle       │
│=============================│
│ MIL Status          OFF     │
│ Misfire Monitor     OK      │
│ Fuel System Mon     N/A     │
│ Comp. Component     OK      │
│ Catalyst Mon        INC     │
│ Htd Catalyst        N/A   ⬇ │
└─────────────────────────────┘
```

6) Press **ESC** button to return to **Diagnostic Menu.**
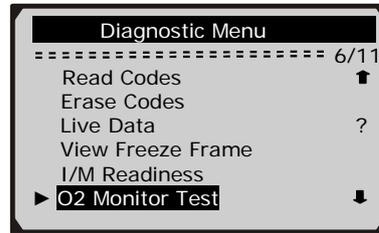
5.6 O2 Monitor Test

OBD2 regulations set by SAE require that relevant vehicles monitor and test the oxygen (O2) sensors to identify problems related to fuel efficiency and vehicle emissions. These tests are not on-demand tests and they are done automatically when engine operating conditions are within specified limits. These test results are saved in the on-board computer's memory.
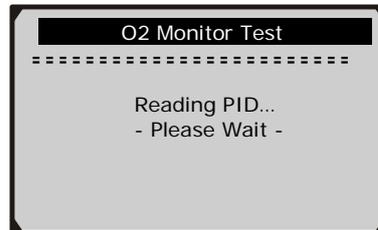
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The O2 Monitor Test function allows retrieval and viewing of O2 sensor monitor test results for the most recently performed tests from the vehicle's on-board computer.

The O2 Monitor Test function is not supported by vehicles which communicate using a controller area network (CAN). For O2 Monitor Test results of CAN-equipped vehicles, see chapter "On-Board Mon. Test".
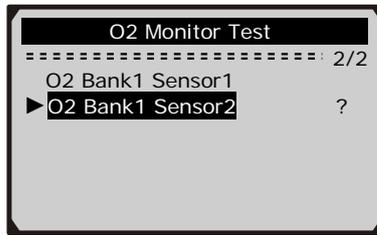
1) Use **UP/DOWN** scroll button to select **O2 Monitor Test** from **Diagnostic Menu** and press **ENTER** button.
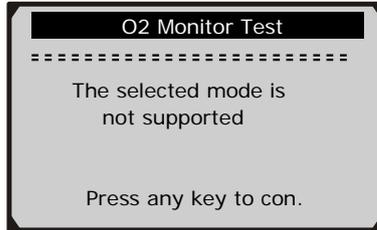
```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ══════════════════════ 6/11 │
│    Read Codes             ⬆ │
│    Erase Codes              │
│    Live Data              ? │
│    View Freeze Frame        │
│    I/M Readiness            │
│  ▶ O2 Monitor Test        ⬇ │
└─────────────────────────────┘
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
┌─────────────────────────────┐
│       O2 Monitor Test       │
│ ══════════════════════════  │
│                             │
│        Reading PID...        │
│        - Please Wait -       │
│                             │
│                             │
└─────────────────────────────┘
```
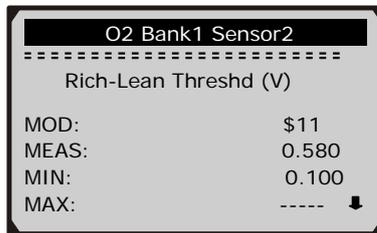
3) Use **UP/DOWN** scroll button to select O2 sensor from **O2 Monitor Test** menu and press **ENTER** button.

```
                  O2 Monitor Test
========================= 2/2
   O2 Bank1 Sensor1
 ►O2 Bank1 Sensor2                ?




```

- If the vehicle does not support the mode, an advisory message will be displayed on the screen.

```
                  O2 Monitor Test
=========================
            The selected mode is
              not supported


            Press any key to con.

```

4) View test results of selected O2 sensor.

```
                O2 Bank1 Sensor2
=========================
           Rich-Lean Threshd (V)

  MOD:                    $11
  MEAS:                   0.580
  MIN:                    0.100
  MAX:                    -----   ↓

```

5) Use **UP/DOWN** scroll button to view more screens of data if an ↑ or ↓ icon displays.
6) Press **ESC** button to return to the previous menus.
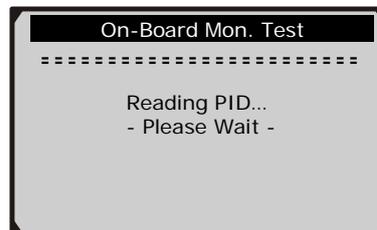
5.7 On-Board Monitor Test

The On-Board Monitor Test is useful after servicing or after erasing a vehicle's control module memory. The On-Board

Monitor Test for non-CAN-equipped vehicles retrieves and displays test results for emission-related powertrain components and systems that are not continuously monitored. The On-Board Monitor Test for CAN-equipped vehicles retrieves and displays test results for emission-related powertrain components and systems that are and are not continuously monitored. Test and components IDs are determined by the vehicle manufacturer.
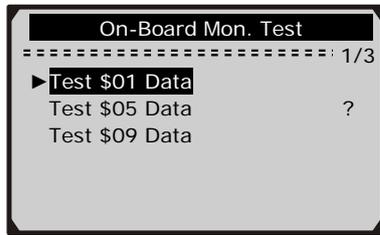
1) Use **UP/DOWN** scroll button to select **On-Board Mon. Test** from **Diagnostic Menu** and press **ENTER** button.
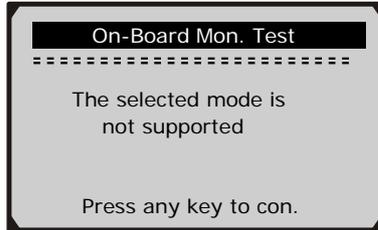
```
┌─────────────────────────────────┐
│       Diagnostic Menu           │
│===================== 7/11       │
│► On-Board Mon. Test        ⬆    │
│  Component Test                 │
│  Vehicle Info.             ?    │
│  Modules Present                │
│  Unit of Measure           ⬇    │
└─────────────────────────────────┘
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
┌─────────────────────────────────┐
│      On-Board Mon. Test         │
│=========================        │
│         Reading PID...          │
│        - Please Wait -          │
│                                 │
│                                 │
└─────────────────────────────────┘
```
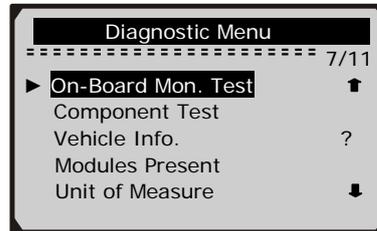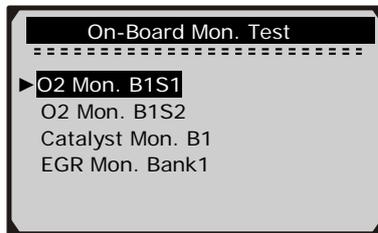
3) From **On-Board Mon. Test** menu, use **UP/DOWN** scroll button to select a test to view and press **ENTER** button.

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```
                On-Board Mon. Test
=======================1/3
   ►Test $01 Data
    Test $05 Data                 ?
    Test $09 Data
```

- If the vehicle under test does not support the mode, an advisory message will be displayed on the screen.

```
                On-Board Mon. Test
=========================

             The selected mode is
               not supported


             Press any key to con.
```

- For CAN-equipped vehicles, test selections can be as below:

```
                On-Board Mon. Test
=========================

   ►O2 Mon. B1S1
    O2 Mon. B1S2
    Catalyst Mon. B1
    EGR Mon. Bank1
```

4) Use **UP/DOWN** scroll button to select the desired monitor from **On-Board Mon. Test** menu and press **ENTER** button.
5) View test data on screen.

```
           Test   $01   Data
==========================
ID   :              00
MOD :              $11
MEAS:               0
MAX :               0
MIN :           --------
STS :              OK        ⬇
```

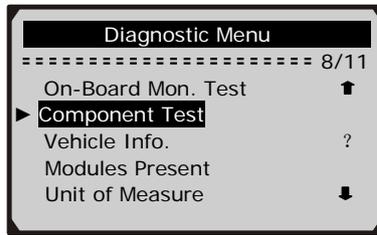● For CAN-equipped vehicles, test results displayed can be as below:

```
           O2 Mon.  B1S1
==========================
   Rich-Lean Threshd    (MV)

MEAS:              0.450
MIN:               0.312
MAX:               0.630
STS:               OK       ⬇
```

6)   Press **ESC** button to return to the previous menus.

5.8 Component Test

The Component Test function allows initiating a leak test for the vehicle's EVAP system. The scan tool itself does not perform the leak test, but commands the vehicle's on-board computer to start the test. Different vehicle manufacturers might have different criteria and methods for stopping the test once it has been started. Before starting the Component Test, refer to the vehicle service manual for instructions to stop the test.
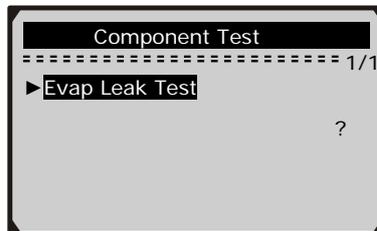
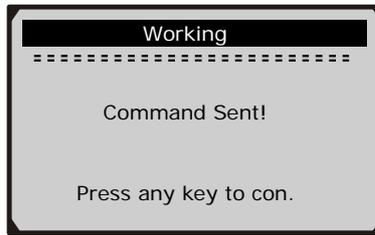1)   Use **UP/DOWN** scroll button to select **Component Test** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│      Diagnostic Menu         │
│ ═══════════════════ 8/11     │
│    On-Board Mon. Test    ⬆   │
│  ► Component Test            │
│    Vehicle Info.         ?   │
│    Modules Present          │
│    Unit of Measure       ⬇   │
└─────────────────────────────┘
```

2) Wait a few seconds while the scan tool validates the PID MAP.

```
┌─────────────────────────────┐
│      Component Test          │
│ ═══════════════════════      │
│                              │
│        Reading PID...        │
│        - Please Wait -       │
│                              │
│                              │
└─────────────────────────────┘
```
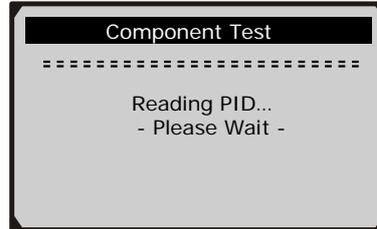
3) From **Component Test** menu, use **UP/DOWN** scroll button to select the test to be initiated.

```
┌─────────────────────────────┐
│      Component Test          │
│ ══════════════════════ 1/1   │
│  ►Evap Leak Test            │
│                              │
│                      ?       │
│                              │
│                              │
└─────────────────────────────┘
```

4) If the test has been initiated by the vehicle, a confirmation message will be displayed on the screen.

```
┌─────────────────────────────────┐
│        Working                  │
│ = = = = = = = = = = = = = = = = │
│                                 │
│        Command Sent!            │
│                                 │
│                                 │
│      Press any key to con.      │
└─────────────────────────────────┘
```

- Some vehicles do not allow scan tools to control vehicle systems or components. If the vehicle under test does not support the EVAP Leak Test, an advisory message is displayed on the screen.

```
┌─────────────────────────────────┐
│      Component Test             │
│ = = = = = = = = = = = = = = = = │
│       The selected mode is      │
│          not supported          │
│                                 │
│      Press any key to con.      │
└─────────────────────────────────┘
```
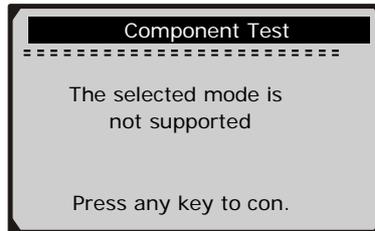
5) Wait a few seconds or press any key to return to **Diagnostic Menu**.

5.9 Viewing Vehicle Information

The Vehicle Info. function enables retrieval of Vehicle Identification No. (VIN), Calibration ID Nos. (CINs), Calibration Verification Nos. (CVNs) and In-use Performance Tracking on 2000 and newer vehicles that support Mode 9.
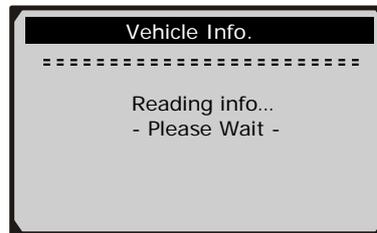
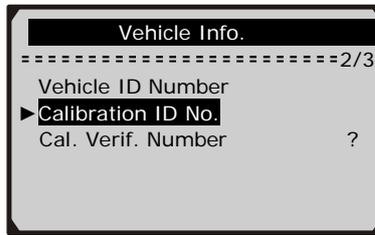1) Use **UP/DOWN** scroll button to select **Vehicle Info.** from the **Diagnostic Menu** and press **ENTER** button.

```
       Diagnostic Menu
===================== 9/11
  On-Board Mon. Test        ↑
  Component Test
► Vehicle Info.             ?
  Modules Present
  Unit of Measure           ↓
```
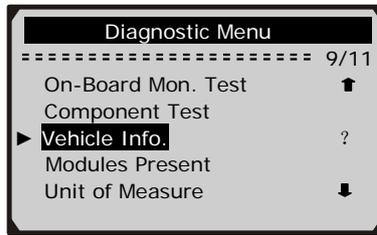
2) An advisory message comes up to remind you. Wait a few seconds or press any key to continue.

```
        Vehicle Info.
=========================

         Turn key on
       with engine off !


      Press any key to con.
```

3) Wait a few seconds while the scan tool reads vehicle information.

```
        Vehicle Info.
======================

         Reading info...
         - Please Wait -
```

● If the vehicle does not support this mode, a message shows on the display warning that the mode is not supported.

4) From **Vehicle Info.** menu, use **UP/DOWN** scroll button to select an available item to view and press **ENTER** button.

```
          Vehicle Info.
=====================2/3
  Vehicle ID Number
► Calibration ID No.
  Cal. Verif. Number         ?
```

5) View retrieved vehicle information on screen.

```
        Calibration ID No.
=========================
Cal ID1:
          30668343
Cal ID2:
          08644359
```
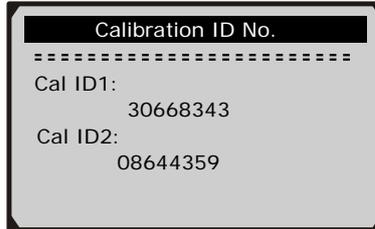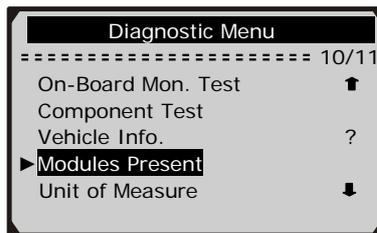
6) Press **ESC** button to return previous menu

5.10 Modules Present

The Modules Present function allows viewing of the module IDs and communication protocols for OBD2 modules in the vehicle.

1) Use **UP/DOWN** scroll button to select **Modules Present** from **Diagnostic Menu** and press ENTER button.

```
         Diagnostic Menu
==================== 10/11
  On-Board Mon. Test        ⬆
  Component Test
  Vehicle Info.             ?
► Modules Present
  Unit of Measure           ⬇
```

2) View modules present with their IDs and communication protocols.

```
          Modules Present
=========================
 ID                 Protocol
_____
 $11              ISO 9141-2
```

6. Print Data

The Print Data function allows printing out diagnostic data recorded by the scan tool or customized test reports.

- *To print out retrieved data, you need the following tools:*
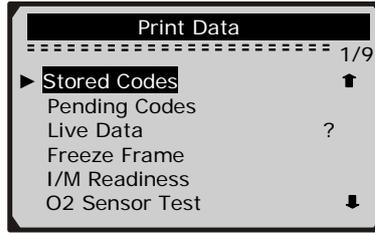
  MS509 scan tool

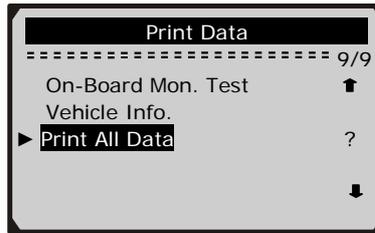 A PC or laptop with USB ports

  A USB cable

1) Place included CD into CD-Drive, or download applications from our website: www.auteltech.com or our distributors' websites.

2) Follow onscreen instructions on your computer to install applications.

3) Launch Maxi-Link Tool Kit, and start printing application by selecting *Scan Tools➞MS509➞Print*.

4) Connect the scanner to computer with the USB cable supplied.

5) Use **UP/DOWN** scroll button to select **Print Data** from **Main Menu**, and press **ENTER** button.

```
            Main Menu
=====================4/6
 Diagnostics
 DTC Lookup
 Review Data              ?
▶Print Data
 System Setup
 Tool Information
```

6) Use **UP/DOWN** scroll button to select the desired item to print from **Print Data** menu.

```
┌─────────────────────────┐
│      Print Data          │
│========================= 1/9
│ ► Stored Codes        ↑  │
│   Pending Codes          │
│   Live Data        ?     │
│   Freeze Frame           │
│   I/M Readiness          │
│   O2 Sensor Test      ↓  │
└─────────────────────────┘
```

● To print all retrieved data, **UP/DOWN** scroll button to select **Print All Data** from **Print Data** menu.

```
┌─────────────────────────┐
│      Print Data          │
│========================= 9/9
│   On-Board Mon. Test  ↑  │
│   Vehicle Info.          │
│ ► Print All Data     ?   │
│                          │
│                       ↓  │
└─────────────────────────┘
```

7) Press **ENTER** button to upload data to the computer.

7. Appendix

7.1 Appendix 1-- PID List

PID Abbreviation	Full Name
DTC_CNT	DTC Stored Number
DTCFRZF	DTC
FUELSYS1	Fuel System 1 Status
FUELSYS2	Fuel System 2 Status
LOAD_PCT (%)	Calculated Load Value
ETC(°F)	Engine Coolant Temperature
ETC(°C)	Engine Coolant Temperature
SHRTFT1 (%)	Short Term Fuel Trim-Bank1
SHRTFT3 (%)	Short Term Fuel Trim-Bank3
LONGFT1 (%)	Long Term Fuel Trim-Bank1
LONGFT3 (%)	Long Term Fuel Trim-Bank3
SHRTFT2 (%)	Short Term Fuel Trim-Bank2
SHRTFT4 (%)	Short Term Fuel Trim-Bank4
LONGFT2 (%)	Long Term Fuel Trim-Bank2
LONGFT4 (%)	Long Term Fuel Trim-Bank4
FRP(kPa)	Fuel Rail Pressure(gauge)
FRP(psi)	Fuel Rail Pressure(gauge)
MAP(kPa)	Intake Manifold Absolute Pressure
MAP(inHg)	Intake Manifold Absolute Pressure
RPM(/min)	Engine RPM
VSS(km/h)	Vehicle Speed Sensor
VSS(mph)	Vehicle Speed Sensor
SPARKADV(\x82)	Ignition Timing Advance for #1
IAT(°F)	Intake Air Temperature
IAT(°C)	Intake Air Temperature
MAF(g/s)	Mass Air Flow Sensor
MAF(lb/min)	Mass Air Flow Sensor
TP (%)	Absolute Throttle Position

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PID Abbreviation	Full Name
AIR_STAT	Commanded Secondary Air Status
O2SLOC	Location of O2 Sensors
O2B1S1(V)	O2 Sensor Output Voltage(B1S1)
SHRTFTB1S1 (%)	Short Term Fuel Trim(B1S1)
O2B1S2(V)	O2 Sensor Output Voltage(B1S2)
SHRTFTB1S2 (%)	Short Term Fuel Trim(B1S2)
O2B1S3(V)	O2 Sensor Output Voltage(B1S3)
SHRTFTB1S3 (%)	Short Term Fuel Trim(B1S3)
O2B1S4(V)	O2 Sensor Output Voltage(B1S4)
SHRTFTB1S4 (%)	Short Term Fuel Trim(B1S4)
O2B2S1(V)	O2 Sensor Output Voltage(B2S1)
SHRTFTB2S1 (%)	Short Term Fuel Trim(B2S1)
O2B2S2(V)	O2 Sensor Output Voltage(B2S2)
SHRTFTB2S2 (%)	Short Term Fuel Trim(B2S2)
O2B2S3(V)	O2 Sensor Output Voltage(B2S3)
SHRTFTB2S3 (%)	Short Term Fuel Trim(B2S3)
O2B2S4(V)	O2 Sensor Output Voltage(B2S4)
SHRTFTB2S4 (%)	Short Term Fuel Trim(B2S4)
O2B1S1(V)	O2 Sensor Output Voltage(B2S1)
SHRTFTB1S1 (%)	Short Term Fuel Trim(B2S1)
O2B1S2(V)	O2 Sensor Output Voltage(B1S2)
SHRTFTB1S2 (%)	Short Term Fuel Trim(B1S2)
O2B2S1(V)	O2 Sensor Output Voltage(B2S1)
SHRTFTB2S1 (%)	Short Term Fuel Trim(B2S1)
O2B2S2(V)	O2 Sensor Output Voltage(B2S2)
SHRTFTB2S2 (%)	Short Term Fuel Trim(B2S2)
O2B3S1(V)	O2 Sensor Output Voltage(B3S1)
SHRTFTB3S1 (%)	Short Term Fuel Trim(B3S1)
O2B3S2(V)	O2 Sensor Output Voltage(B3S2)
SHRTFTB3S2 (%)	Short Term Fuel Trim(B3S2)
O2B4S1(V)	O2 Sensor Output Voltage(B4S1)

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PID Abbreviation	Full Name
SHRTFTB4S1 (%)	Short Term Fuel Trim(B4S1)
O2B4S2(V)	O2 Sensor Output Voltage(B4S2)
SHRTFTB4S2 (%)	Short Term Fuel Trim(B4S2)
OBDSUP	OBD Require To Which Vehicle Designed
O2SLOC	Location of O2 Sensors
RUNTM(sec)	Time Since Engine Start
MIL_DIST(km)	Distance Travelled While MIL Activated
MIL_DIST(mile)	Distance Travelled While MIL Activated
FRP(kPa)	FuelRail Pres. Relative To Manifold Vacuum
FRP(PSI)	FuelRail Pres. Relative To Manifold Vacuum
FRP(kPa)	Fuel Rail Pressure
FRP(PSI)	Fuel Rail Pressure
EQ_RATB1S1	Equivalence Ratio(wide range O2S)(B1S1)
O2B1S1(V)	O2 Sensor Voltage(wide range O2S)(B1S1)
EQ_RATB1S2	Equivalence Ratio(wide range O2S)(B1S2)
O2B1S2(V)	O2 Sensor Voltage(wide range O2S)(B1S2)
EQ_RATB1S3	Equivalence Ratio(wide range O2S)(B1S3)
O2B1S3(V)	O2 Sensor Voltage(wide range O2S)(B1S3)
EQ_RATB1S4	Equivalence Ratio(wide range O2S)(B1S4)
O2B1S4(V)	O2 Sensor Voltage(wide range O2S)(B1S4)
EQ_RATB2S1	Equivalence Ratio(wide range O2S)(B2S1)
O2B2S1(V)	O2 Sensor Voltage(wide range O2S)(B2S1)
EQ_RATB2S2	Equivalence Ratio(wide range O2S)(B2S2)
O2B2S2(V)	O2 Sensor Voltage(wide range O2S)(B2S2)
EQ_RATB2S3	Equivalence Ratio(wide range O2S)(B2S3)
O2B2S3(V)	O2 Sensor Voltage(wide range O2S)(B2S3)
EQ_RATB2S4	Equivalence Ratio(wide range O2S)(B2S4)
O2B2S4(V)	O2 Sensor Voltage(wide range O2S)(B2S4)
EQ_RATB1S1	Equivalence Ratio(wide range O2S)(B2S1)
O2B1S1(V)	O2 Sensor Voltage(wide range O2S)(B2S1)
EQ_RATB1S2	Equivalence Ratio(wide range O2S)(B1S2)
O2B1S2(V)	O2 Sensor Voltage(wide range O2S)(B1S2)

PID Abbreviation	Full Name
EQ_RATB2S1	Equivalence Ratio(wide range O2S)(B2S1)
O2B2S1(V)	O2 Sensor Voltage(wide range O2S)(B2S1)
EQ_RATB2S2	Equivalence Ratio(wide range O2S)(B2S2)
O2B2S2(V)	O2 Sensor Voltage(wide range O2S)(B2S2)
EQ_RATB3S1	Equivalence Ratio(wide range O2S)(B3S1)
O2B3S1(V)	O2 Sensor Voltage(wide range O2S)(B3S1)
EQ_RATB3S2	Equivalence Ratio(wide range O2S)(B3S2)
O2B3S2(V)	O2 Sensor Voltage(wide range O2S)(B3S2)
EQ_RATB4S1	Equivalence Ratio(wide range O2S)(B4S1)
O2B4S1(V)	O2 Sensor Voltage(wide range O2S)(B4S1)
EQ_RATB4S2	Equivalence Ratio(wide range O2S)(B4S2)
O2B4S2(V)	O2 Sensor Voltage(wide range O2S)(B4S2)
EGR_PTC (%)	Commanded EGR
EGR_ERR (%)	EGR Error
EVAP_PCT (%)	Commanded Evaporative Purge
FLI (%)	Fuel Level Input
WARM_UPS	Number of Warm-ups Since DTC Cleared
CLR_DIST(km)	Distance Since DTC Cleared
CLR_DIST(mile)	Distance Since DTC Cleared
EVAP_VP(Pa)	Evap System Vapor Pressure
EVAP_VP(inH2O)	Evap System Vapor Pressure
BARO(kPa)	Barometric Pressure
BARO(inHg)	Barometric Pressure
EQ_RAT11	Equivalence Ratio(wide range O2S)(B1S1)
O2S11(mA)	O2 Sensor Current(wide range O2S)(B1S1)
EQ_RAT12	Equivalence Ratio(wide range O2S)(B1S2)
O2S12(mA)	O2 Sensor Current(wide range O2S)(B1S2)
EQ_RAT13	Equivalence Ratio(wide range O2S)(B1S3)
O2S13(mA)	O2 Sensor Current(wide range O2S)(B1S3)
EQ_RAT14	Equivalence Ratio(wide range O2S)(B1S4)
O2S14(mA)	O2 Sensor Current(wide range O2S)(B1S4)
EQ_RAT21	Equivalence Ratio(wide range O2S)(B2S1)

PID Abbreviation	Full Name
O2S21(mA)	O2 Sensor Current(wide range O2S)(B2S1)
EQ_RAT22	Equivalence Ratio(wide range O2S)(B2S2)
O2S22(mA)	O2 Sensor Current(wide range O2S)(B2S2)
EQ_RAT23	Equivalence Ratio(wide range O2S)(B2S3)
O2S23(mA)	O2 Sensor Current(wide range O2S)(B2S3)
EQ_RAT24	Equivalence Ratio(wide range O2S)(B2S4)
O2S24(mA)	O2 Sensor Current(wide range O2S)(B2S4)
EQ_RAT11	Equivalence Ratio(wide range O2S)(B2S1)
O2S11(mA)	O2 Sensor Current(wide range O2S)(B2S1)
EQ_RAT12	Equivalence Ratio(wide range O2S)(B1S2)
O2S12(mA)	O2 Sensor Current(wide range O2S)(B1S2)
EQ_RAT21	Equivalence Ratio(wide range O2S)(B2S1)
O2S21(mA)	O2 Sensor Current(wide range O2S)(B2S1)
EQ_RAT22	Equivalence Ratio(wide range O2S)(B2S2)
O2S22(mA)	O2 Sensor Current(wide range O2S)(B2S2)
EQ_RAT31	Equivalence Ratio(wide range O2S)(B3S1)
O2S31(mA)	O2 Sensor Current(wide range O2S)(B3S1)
EQ_RAT32	Equivalence Ratio(wide range O2S)(B3S2)
O2S32(mA)	O2 Sensor Current(wide range O2S)(B3S2)
EQ_RAT41	Equivalence Ratio(wide range O2S)(B4S1)
O2S41(mA)	O2 Sensor Current(wide range O2S)(B4S1)
EQ_RAT42	Equivalence Ratio(wide range O2S)(B4S2)
O2S42(mA)	O2 Sensor Current(wide range O2S)(B4S2)
CATEMP11(°F)	Catalyst Temperature Bank1Sensor1
CATEMP11(°C)	Catalyst Temperature Bank1Sensor1
CATEMP21(°F)	Catalyst Temperature Bank2Sensor1
CATEMP21(°C)	Catalyst Temperature Bank2Sensor1
CATEMP12(°F)	Catalyst Temperature Bank1Sensor2
CATEMP12(°C)	Catalyst Temperature Bank1Sensor2
CATEMP22(°F)	Catalyst Temperature Bank2Sensor2
CATEMP22(°C)	Catalyst Temperature Bank2Sensor2
VPWR(V)	Control Module Voltage

PID Abbreviation	Full Name
LOAD_ABS (%)	Absolute Load Value
EQ_RAT	Commanded Equivalence Ratio
TP_R (%)	Relative Throttle Position
AAT(°F)	Ambient Air Temperature
AAT(°C)	Ambient Air Temperature
TP_B (%)	Absolute Throttle Position B
TP_C (%)	Absolute Throttle Position C
APP_D (%)	Accelerator Pedal Position D
APP_E (%)	Accelerator Pedal Position E
APP_F (%)	Accelerator Pedal Position F
TAC_PCT (%)	Commanded Throttle Actuator Control
MIL_TIME	Minute run by Engine While MIL activated
CLR_TIME	Time since Diagnostic Trouble Code Clear

7.2 Appendix 2 -- In-use Performance Tracking Data List

Abbreviation	Full Name	Definitions
OBDCOND	**OBD Monitoring Conditions Encountered Counts**	OBD Monitoring Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified OBD monitoring conditions (general denominator).
IGNCNTR	**Ignition Counter**	Ignition Counter displays the count of number of times that the engine has been started.
CATCOMP1	**Catalyst Monitor Completion Counts Bank 1**	Catalyst Monitor Completion Counts Bank 1 displays number of times that all conditions necessary to detect a catalyst system bank 1 malfunction have been encountered (numerator).
CATCOND1	**Catalyst Monitor Conditions Encountered Counts Bank 1**	Catalyst Monitor Conditions Encountered Counts Bank 1 displays number of times that the vehicle has been operated in the specified catalyst monitoring conditions (denominator).
CATCOMP2	**Catalyst Monitor Completion Counts Bank 2**	Catalyst Monitor Completion Counts Bank 2 displays number of time that all conditions necessary to detect a catalyst system bank 2 malfunction have been encountered (numerator).
CATCOND2	**Catalyst Monitor Conditions Encountered Counts Bank 2**	Catalyst Monitor Conditions Encountered Counts Bank 2 displays number of times that the vehicle has been operated in the specified catalyst monitoring conditions (denominator).

O2SCOMP1	**O2 Sensor Monitor Completion Counts Bank 1**	O2 Sensor Monitor Completion Counts Bank 1 displays number of time that all conditions necessary to detect an oxygen sensor bank 1 malfunction have been encountered (numerator).
O2SCOND1	**O2 Sensor Monitor Conditions Encountered Counts Bank 1**	O2 Sensor Monitor Conditions Encountered Counts Bank 1 displays number of times that the vehicle has been operated in the specified oxygen sensor monitoring conditions (denominator).
O2SCOMP2	**O2 Sensor Monitor Completion Counts Bank 2**	O2 Sensor Monitor Completion Counts Bank 2 displays number of time that all conditions necessary to detect an oxygen sensor bank 2 malfunction have been encountered (numerator).
O2SCOND2	**O2 Sensor Monitor Conditions Encountered Counts Bank 2**	O2 Sensor Monitor Conditions Encountered Counts Bank 2 displays number of times that the vehicle has been operated in the specified oxygen sensor monitoring conditions (denominator).
EGRCOMP	**EGR Monitor Completion Condition Counts**	EGR Monitor Completion Condition Counts displays number of time that all conditions necessary to detect an EGR system malfunction have been encountered (numerator).
EGRCOND	**EGR Monitor Conditions Encountered Counts**	EGR Monitor Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified EGR system monitoring conditions (denominator).

AIRCOMP	**AIR Monitor Completion Condition Counts (Secondary Air)**	AIR Monitor Completion Condition Counts (Secondary Air) displays number of time that all conditions necessary to detect an AIR system malfunction have been encountered (numerator).
AIRCOND	**AIR Monitor Conditions Encountered Counts (Secondary Air)**	AIR Monitor Conditions Encountered Counts (Secondary Air) displays number of times that the vehicle has been operated in the specified AIR system monitoring conditions (denominator).
EVAPCOMP	**EVAP Monitor Completion Condition Counts**	EVAP Monitor Completion Condition Counts displays number of time that all conditions necessary to detect a 0.020" EVAP system leak malfunction have been encountered (numerator).
EVAPCOND	**EVAP Monitor Conditions Encountered Counts**	EVAP Monitor Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified EVAP system leak malfunction monitoring conditions (denominator).

8. Warranty and Service

8.1 Limited One Year Warranty

Autel warrants to its customers that this product will be free from all defects in materials and workmanship for a period of one (1) year from the date of the original purchase, subject to the following terms and conditions:

1) The sole responsibility of Autel under the Warranty is limited to either the repair or, at the option of Autel, replacement of the scan tool at no charge with Proof of Purchase. The sales receipt may be used for this purpose.

2) This warranty does not apply to damages caused by improper use, accident, flood, lightning, or if the product was altered or repaired by anyone other than the Manufacturer's Service Center.

3) Autel shall not be liable for any incidental or consequential damages arising from the use, misuse, or mounting of the scan tool. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

4) All information in this manual is based on the latest information available at the time of publication and no warranty can be made for its accuracy or completeness. Autel reserves the right to make changes at any time without notice.

8.2 Service Procedures

If you have any questions, please contact your local store, distributor or visit our website at www.auteltech.com.

If it becomes necessary to return the scan tool for repair, contact your local distributor for more information.