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### **!** IMPORTANT

Before operating or maintaining this unit, please read this manual carefully, paying extra attention to the safety warnings and precautions.

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For details, please refer to the *Service and Support* section in this manual.

# Safety Precautions and Warnings

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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.

# CONTENTS

1	GENERAL INFORMATION.....	1
	ON-BOARD DIAGNOSTICS (OBD) II .....	1
	DIAGNOSTIC TROUBLE CODES (DTCs) .....	1
	LOCATION OF THE DATA LINK CONNECTOR (DLC) .....	2
	OBD II READINESS MONITORS .....	3
	OBD II MONITOR READINESS STATUS .....	4
	OBD II DEFINITIONS .....	5
	OBD II MODES OF OPERATION .....	6
2	USING THE SCAN TOOL.....	8
	TOOL DESCRIPTION .....	8
	SPECIFICATIONS .....	9
	ACCESSORIES INCLUDED .....	9
	NAVIGATION CHARACTERS .....	9
	KEYBOARD.....	10
	POWER.....	10
	SYSTEM SETUP .....	10
	ABOUT.....	17
	VEHICLE COVERAGE .....	17
	PRODUCT TROUBLESHOOTING .....	18
3	OBD II DIAGNOSTICS .....	20
	READ CODES .....	21
	ERASE CODES .....	24
	LIVE DATA .....	25
	VIEW FREEZE FRAME DATA .....	26
	RETRIEVE I/M READINESS STATUS.....	27
	VIEW VEHICLE INFORMATION .....	32
	EXIT THE OBD II TEST .....	33
4	READY TEST .....	34
	GENERAL INFORMATION .....	34
	TEST TOOL APPLICATION.....	34
	LED AND TONE INTERPRETATION.....	36
5	COMPLIANCE INFORMATION.....	38

6	WARRANTY AND SERVICE .....	40
	LIMITED ONE YEAR WARRANTY.....	40
	SERVICE AND SUPPORT.....	41

# 1 General Information

## On-Board Diagnostics (OBD) II

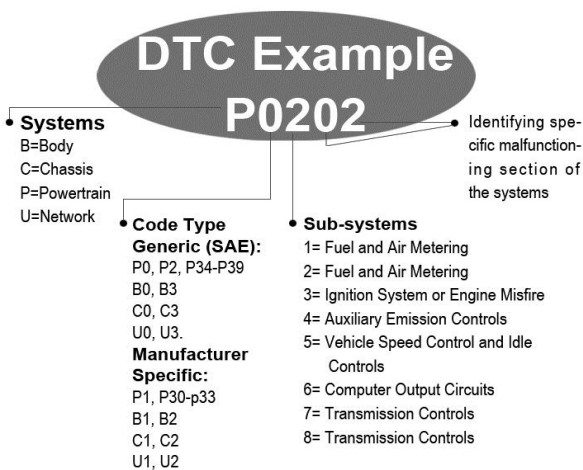
The first generation of On-Board Diagnostics (called OBD I) was developed by the California Air Resources Board (ARB) and implemented in 1988 to monitor some of the emission control components on vehicles. As technology evolved and the desire to improve the On-Board Diagnostic system increased, a new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

## Diagnostic Trouble Codes (DTCs)

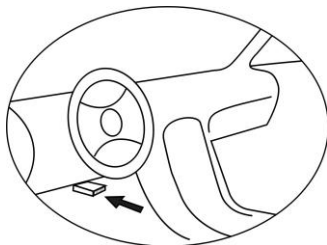
OBD II Diagnostic Trouble Codes are codes that are stored by the on-board computer diagnostic system in response to a problem found in the vehicle. These codes identify a particular problem area and are intended to provide you with a guide as to where a fault might be occurring within a vehicle. OBD II Diagnostic Trouble Codes consists 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:



**Figure 1-1**

## **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.



**Figure 1-2**

# OBD II Readiness Monitors

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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. For different ignition type engines, the available monitors are different too.

The following monitors are to be used for spark ignition engines only:

- 1) EGR System
- 2) O2 Sensors
- 3) Catalyst
- 4) Evaporative System
- 5) O2 Sensor Heater
- 6) Secondary Air
- 7) Heated Catalyst

The following monitors are to be used for compression ignition engines only:

- 1) EGR System
- 2) NMHC Catalyst
- 3) NOx Aftertreatment
- 4) Boost Pressure System
- 5) Exhaust Gas Sensor
- 6) PM Filter

## **OBD II Monitor Readiness Status**

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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 power-train 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.



# OBD II Definitions

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**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 cannot turn the MIL off until necessary repairs are completed or the condition no longer exists.

**DTC** – Diagnostic Trouble Code (DTC) that identifies 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 emission 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.

## OBD II Modes of Operation

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Here is a basic introduction to the OBD II communication protocol.

**Mode byte:** The first byte in the stream is the mode number. There are 9 modes for diagnostic requests, so this first byte is from 1 to 9. The first byte in the response data bytes is this same number plus 64. For example, a mode 1 request would have the first data byte = 1, and the response would have the first data byte = 65. Here is a brief description of the modes:

**Mode \$01 – identifies the Powertrain information and shows current data available to the scan tool.** This data includes: DTCs set, status of on-board tests and vehicle data such as engine RPM, temperatures, ignition advance, speed, air flow rates, and closed loop status for fuel system.

**Mode \$02 – displays Freeze Frame data.** Same data as in mode 1, but it was captured and stored when a malfunction occurred and a DTC was set. Some of the PIDs for mode one are not implemented in this mode.

**Mode \$03 – displays the type of powertrain or emission related DTCs stored by a 5 digit code identifying the faults.** There may be more than one response message if there are more trouble codes than will fit in the data bytes of the response message, or if there are more than one ECU computer responding.

**Mode \$04 – used to clear DTCs and Freeze Frame data.** This clears all diagnostic trouble codes that may be set including freeze frame data and readiness monitors.

**Mode \$05 – displays oxygen sensor test results.** This mode displays the oxygen sensor monitor screen and the test results gathered about the oxygen sensor.

There are ten numbers available for diagnostics:

1. \$01 Rich-to-Lean O2 sensor threshold voltage
2. \$02 Lean-to-Rich O2 sensor threshold voltage
3. \$03 Low sensor voltage threshold for switch time measurement

4. \$04 High sensor voltage threshold for switch time measurement
5. \$05 Rich-to-Lean switch time in ms
6. \$06 Lean-to Rich switch time in ms
7. \$07 Minimum voltage for test
8. \$08 Maximum voltage for test
9. \$09 Time between voltage transitions in ms

**Mode \$06 – Non-Continuously Monitored Systems test results.** There are typically a minimum value, a maximum value, and a current value for each non-continuous monitor. This data is optional, and it is defined by a given vehicle make if it's used.

Mode \$07 – a request for DTCs (pending) from Continuously Monitored Systems after a single driving cycle has been performed to determine if repair has fixed a problem. This is used by service technicians to verify repair was performed properly and after clearing diagnostic trouble codes.

Mode \$08 – this Special Control Mode requests control of the on-board system, test, or component bi-directionally (where applicable). This mode is manufacturer specific.

**Mode \$09 – reports vehicle information.** This information includes vehicle VIN number and calibration information stored in the vehicle ECUs.

**Mode \$0A – requests emission-related Diagnostic Trouble Codes with Permanent status.** This mode is required for all emissions-related DTCs. The presence of permanent DTCs at an inspection without the MIL illuminated is an indication that a proper repair was not verified by the on-board monitoring system.


# 2 Using the Scan Tool






## Tool Description

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Figure 2-1

1. **OBD II CONNECTOR** – connects the scan tool to the vehicle's Data Link Connector (DLC).
2. **LCD DISPLAY** – displays test results.
3.  **GREEN LED** – indicates that engine systems are running normally (The monitors on the vehicle are active and performing their diagnostic testing is in the allowed limit, and no DTCs are present).

4.  **YELLOW LED** – indicates there is a possible problem. A “Pending” DTC is present and/or some of the vehicle’s emission monitors have not run their diagnostic testing.
5.  **RED LED** – indicates there is a problem in one or more of the vehicle’s systems. The red LED also indicates DTCs are present. DTCs display the scan tool’s display. In this case, the MIL on the vehicle’s instrument panel will light steady.
6.  **ONE-CLICK I/M READINESS KEY** – quick-checks State Emissions readiness and drive cycle verification.
7.  **ENTER/EXIT BUTTON** – confirms a selection (or an action) from a menu. Or returns to previous menu.
8.  **SCROLL BUTTON** – scrolls through menu items.
9. **USB PORT** – connects the scan tool to the Windows PC for upgrading.

## Specifications

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- 1) Display: TFT color display (220 x 176 dpi)
- 2) Operating Temperature: 0°C to 60°C (32°F to 140 °F)
- 3) Storage Temperature: -20°C to 70°C (-4°F to 158 °F)
- 4) External Power: 8.0 V to 18.0 V power provided via vehicle battery
- 5) Dimensions:
 

Length	Width	Height
117 mm (4.61")	72 mm (2.83")	18 mm (0.71")
- 6) NW: 0.18 kg (0.39 lb.), GW: 0.21 kg (0.46 lb.)

## Accessories Included

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- 1) **USB Cable** – used to connect to Windows PC to update the tool’s software.
- 2) **Quick Guide** – instructions on registering tool and updating software.

## Navigation Characters

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Characters used to help navigate the scan tool are:

- 1) **#** – identifies the control module number from which data is retrieved.
- 2) **Pd** – identifies a pending DTC when viewing DTCs.

## Keyboard

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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.

## Power

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The scan tool is powered via the vehicle Data Link Connector (DLC). Just follow the steps below to turn on the scan tool:

- 1) Locate DLC on vehicle.
  - *A plastic DLC cover may be found for some vehicles and you need to remove it before attaching the OBD II cable.*
- 2) Plug the tool's OBD II cable to the vehicle's DLC.

## System Setup

---

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

- 1) **Language:** Selects the desired language.
- 2) **Configure Monitors:** Sets the monitors you want to test.
- 3) **Unit of Measure:** Sets the unit of measure to English or Metric.
- 4) **Key Beep Set:** Turns on/off key-press beep.
- 5) **Status Beep Set:** Turns on/off the I/M Readiness Status beep.
- 6) **Tool Self-test:** Checks if the LCD display, LED lamps and keyboard are working normally.
- 7) **Update Mode:** Accesses the Update Mode.
  - *Tool operates with default settings until changed.*

## To Enter the Setup Menu

When the scan tool is powered on, it displays a **Main Screen**.



**Figure 2-2**

From the **Main Screen**: Use the **SCROLL** button to select **Setup**, and press the **ENTER/Exit** button. Follow the instructions to make adjustments and settings as described in the above setup options.



**Figure 2-3**

### *Language Setup*

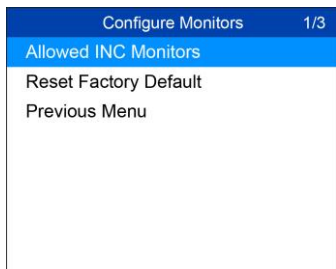
- *English is the default language.*
- 1) From **System Setup** screen, use the **SCROLL** button to select **Language**, and press the **ENTER/Exit** button.
  - 2) Use the **SCROLL** button to select the desired language and press **ENTER/Exit** to save your selection and return to previous screen.



**Figure 2-4**

## Configure Monitors

From **System Setup** screen, use the **SCROLL** button to select **Configure Monitors**, and press the **ENTER/Exit** button.



**Figure 2-5**

On this menu, configure the number of monitors to pass diagnosis, and restore the default settings.

### 1) Allowed INC Monitors

From **Configure Monitors** screen, use the **SCROLL** button to select **Allowed INC Monitors**, and press the **ENTER/Exit** button.

Emissions tests vary depending on the geographic or regional area in which the vehicle is registered. To this, the scan tool provides a more flexible way to meet different standards by allowing the user to select 0, 1, 2, or 3 “not complete” monitors in test.

### 2) Reset Factory Default

From **Configure Monitors** screen, use the **SCROLL** button to select **Reset Factory Default**, and press the **ENTER/Exit** button.

It will restore the default configuration settings in the **Configure Monitors** menu, and delete any customized settings. In this case, the **Allowed INC Monitors** will be set to 1.

The tool will display a message to ask for your confirmation. Use **SCROLL** button to select **Yes** to proceed or **No** to exit without change.

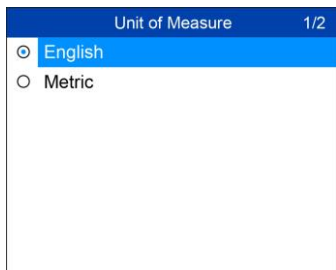
## Unit of Measure

- *Metric is the default measurement unit.*

### 1) From **System Setup** screen, use the **SCROLL** button to select **Unit of Measure** and press the **ENTER/Exit** button.



- 2) From **Unit of Measure** screen, use the **SCROLL** button to select the desired unit of measurement.



**Figure 2-6**

- 3) Press the **ENTER/Exit** button to save your selection and return to previous menu.

### *Key Beep Set*

This function allows you to turn on/off the build-in speaker for key pressing.

- *The default setting is Beep On.*
- 1) From **System Setup** screen, use the **SCROLL** button to select **Key Beep Set** and press the **ENTER/Exit** button.
  - 2) From **Key Beep Set** menu, use the **SCROLL** button to select **Beep ON** or **Beep OFF** to turn on/off the beep.



**Figure 2-7**

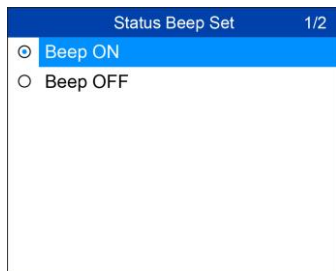
- 3) Press the **ENTER/Exit** button to save your selection and return to previous menu.

### *Status Beep Set*

- *The default setting is Beep On.*

This function allows you to turn on/off the built-in speaker as an indicator during diagnostic testing. Different audio tones correspond to different LED lights. This function is invaluable when performing diagnostics alone, or while working in bright areas where LED illumination alone is not sufficient.

- 1) From **System Setup** screen, use the **SCROLL** button to select **Status Beep Set** and press the **ENTER/Exit** button.
- 2) From **Status Beep Set** menu, use the **SCROLL** button to select **Beep ON** or **Beep OFF** to turn on/off the beep.



**Figure 2-8**

- 3) Press the **ENTER/Exit** button to save your selection and return to previous menu.

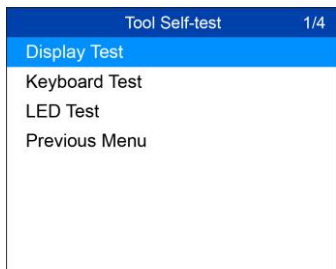
### *Tool Self-test*

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

#### **A. Display Test**

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

- 1) From **System Setup** screen, use the **SCROLL** button to select **Tool Self-test**, and press the **ENTER/Exit** button.
- 2) Select **Display Test** from **Tool Self-test** menu and press the **ENTER/Exit** button to start test.



**Figure 2-9**

- 3) When completed, press the **ENTER/Exit** button to exit.

## **B. Keyboard Test**

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

- 1) Use the **SCROLL** button to select **Keyboard Test** from the **Tool Self-test** menu, and then press the **ENTER/Exit** button.
- 2) Press any key to start test. When you press a key, the key name should display on screen. If the key name does not display, the key is not functioning.



**Figure 2-10**

- *The [OK] button refers to ENTER/Exit button.*
- 3) Double press **ENTER/Exit** to return to previous menu.

## **C. LED Test**

The **LED Test** function verifies if the I/M Readiness LED indicator lamps are functioning properly.

- 1) Use the **SCROLL** button to select **LED Test** from the **Tool Self-test** menu, and then press the **ENTER/Exit** button.

- 2) In the **LED Self-test** menu, use the **SCROLL** button to select one or more LED lamps to test. The LED should turn on or off according to the selected commands.



**Figure 2-11**

- 3) When completed, select **Previous Menu** and press the **ENTER/Exit** button to exit.

### *Update Mode*

To update your scan tool, you need the following items.

- MaxiLink ML319
- A Windows-based computer or laptop with USB ports
- The provided USB cable

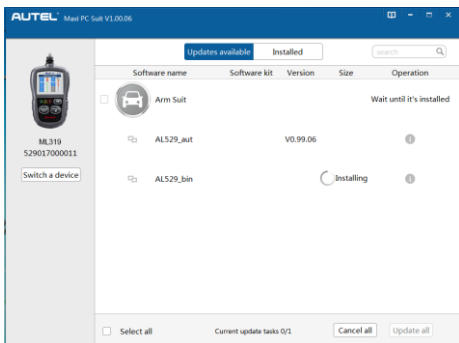
### **Update Procedure**

Autel frequently releases software updates to download.

Connect the tool to a Windows-based computer using the included USB cable.

Follow the update procedure to finish updating.

1. Download the **Maxi PC Suite** from [www.autel.com](http://www.autel.com) > *Support* > *Downloads* > *Autel Update Tools*, and install to your Windows-based computer.
2. Run the **Maxi PC Suite**.
3. From **System Setup** screen in the tool, select **Update Mode**, and press **ENTER/Exit**.
4. In the **Update** window, select the appropriate files to install.



**Figure 2-12 Sample Update Window**

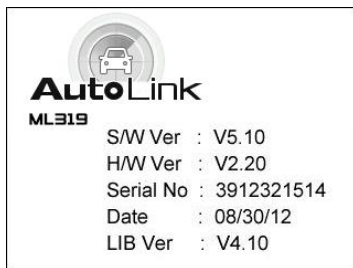
## To Exit the Setup Menu

Use the **SCROLL** button to select **Previous Menu** from the **System Setup** screen, and press the **ENTER/Exit** button to return to **Main Screen**.

## About

The **About** function displays important tool information including serial number and software version number.

- 1) From **Main Screen**, use the **SCROLL** button to select **About** and press the **ENTER/Exit** button; wait for the **About** screen to display.
- 2) View tool information on screen.



**Figure 2-13**

## Vehicle Coverage

The MaxiLink ML319 OBDII/EODB Scanner is specially designed to work with all OBD II compliant vehicles, including those equipped with the Control Area Network (CAN) protocol. The EPA requires all domestic, Asian

and European vehicles, 1996 and newer (including light trucks), sold in the United States must be OBD II compliant.

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.

## **Product Troubleshooting**

---

This section describes problems that may be encountered while using the scan tool.

### **Vehicle Linking Error**

A communication error occurs if the scan tool fails to communicate with the vehicle’s ECU (Engine Control Unit). Perform the following steps to resolve error:

- ✓ Verify that the ignition is ON.
- ✓ Ensure the scan tool’s OBD II connector is securely connected to the vehicle’s DLC.
- ✓ Verify that the vehicle is OBD II 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:

- ✓ 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, do the following:

- ✓ 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.

## **LED Lamps Not Working**

If the LED lamps don't light during I/M Readiness testing, do the following:

- ✓ Make sure the OBD II cable is connected to the DLC securely.
- ✓ Verify the ignition key is in the KOER position.
- ✓ Run the LED Test in the System Setup menu. If the scan tool does not pass this test, there is a problem with the LED lamp. Please contact Autel Tech Support or your local selling agent.

# 3 OBD II Diagnostics

When more than one vehicle control module is detected by the scan tool, you will be prompted to select the module with retrievable data. The Power train Control Module [PCM] and Transmission Control Module [TCM] are the most commonly scanned modules.

**CAUTION:** *Don't connect or disconnect the scan tool while the ignition is on or the engine running.*

- 1) Turn the ignition off.
- 2) Locate the vehicle's 16-pin Data Link Connector (DLC).
- 3) Plug the tool into the vehicle's DLC.
- 4) Turn the ignition on. Engine can be off or running.
- 5) Use the **SCROLL** button to select **OBD II/EODB** from the **Main Screen** in the scan tool.
- 6) Press the **ENTER/Exit** button to wait for the Menu to display. The tool will display OBDII protocols until it has detected the vehicle's communication protocol.
  - *If the scan tool fails to communicate with the vehicle's ECU (Engine Control Unit) more than three times, a "LINKING ERROR!" message displays on the tool.*
  - ✓ Verify the ignition is ON;
  - ✓ Check if the scan tool's OBD II cable is securely connected to the vehicle's DLC;
  - ✓ Verify that the vehicle is OBD II compliant;
  - ✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back on and repeat step 5.
  - *If the "LINKING ERROR" message continues to display, contact your local distributor or customer service for assistance.*
- 7) View a summary of system status (MIL status, DTC counts, Monitor status) on screen. Wait a moment or press any key for Diagnostic Menu to display.



System Status	
Codes Found	6
Ignition Type	Spark
Monitors N/A	3
Monitors OK	3
Monitors INC	5

**Figure 3-1**

- If more than one module is detected, you will be prompted to select a module to test.

Control Module	1/2
Engine	
Module \$AT	

**Figure 3-2**

- Use the **SCROLL** button to select a module and press the **ENTER/Exit** button to confirm.

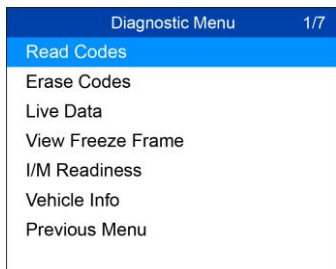
## Read Codes

---

- ◆ *The Read Codes function can be performed with the key on, engine off (KOEO) or with the key on, engine running (KOER).*
- ◆ *Stored Codes are also known as “hard codes”, which are fault codes, or trouble codes that have been stored in the vehicle computer memory because the faults have reoccurred for more than a specified amount of key-cycles. These codes will cause the control module to illuminate the malfunction indicator light (MIL) when emission-related faults occur.*
- ◆ *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 as yet considered serious. Pending Codes will not cause a malfunction*

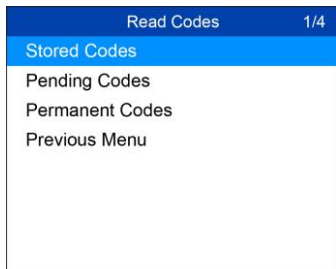
indicator light (MIL). If the fault does not occur within a certain number of warm-up cycles, the code clears from memory.

- ◆ *Permanent Codes are DTCs that are "confirmed" and are retained in the non-volatile memory of the vehicle's computer until the appropriate monitor for each DTC has determined that the malfunction is no longer present and is not causing the MIL. Permanent DTCs are stored in non-volatile memory and can not be erased by any diagnostics service or by disconnecting power to ECU.*
- 1) Use **SCROLL** button to select **Read Codes** from **Diagnostic Menu** and press **ENTER/Exit** button.



**Figure 3-3**

- 2) Use the **SCROLL** button to select **Stored Codes** or **Pending Codes** from the **Read Codes** menu and press the **ENTER/Exit** button.



**Figure 3-4**

- If no codes are found, a message will display **"No (pending) codes are stored in the module!"** Wait a moment or press any key to return to previous screen.

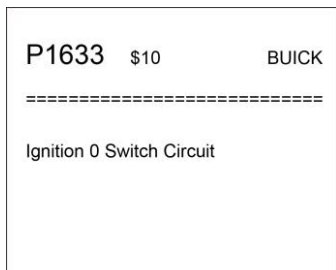
---

**NOTE**

Permanent Codes function is available only for vehicles supporting the CAN protocols.

---

- 3) View DTCs and their definitions on screen. Press **ENTER/Exit** button to return to previous screen.



**Figure 3-5**

- The control module number, sequence of the DTCs, total number of codes detected and type of codes (Generic or Manufacturer specific, Stored or Pending codes) will be observed on the upper right hand corner of the display.
- 4) If more than one DTC is found, use the SCROLL button to review each code.
- 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 SCROLL button to select manufacturer and then press ENTER/Exit button to confirm.



**Figure 3-6**

- If the manufacturer of your vehicle is not listed, use the **SCROLL** button to select **Other** and press the **ENTER/Exit** button.

- 5) Select **Previous Menu** from the **Read Codes** screen, and press **ENTER/Exit** button to return to previous menu.

## Erase Codes

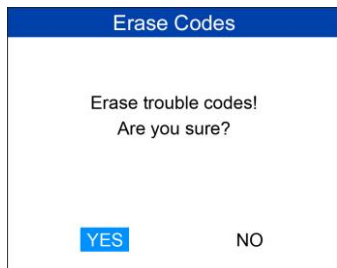
---

### NOTE

1. 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 repairs or services have been performed.
2. Even if deleted, codes will again display if the underlining fault causing the code is not addressed.

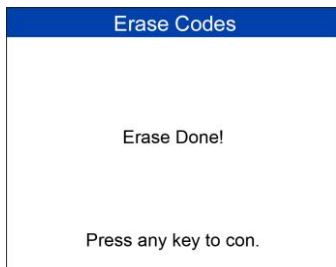
This function is performed with key on, engine off (KOEO). Do not start the engine.

- 1) Use the **SCROLL** button to select **Erase Codes** from **Diagnostics Menu** and press the **ENTER/Exit** button.
- 2) A warning message displays for your confirmation.



**Figure 3-7**

- If you do not want to proceed with erasing codes, use **SCROLL** button to select **NO** to exit. A message of "Command Cancelled!" displays. Wait a moment or press any key to return to **Diagnostic Menu**.
- 3) Press the **ENTER/Exit** button to confirm.
    - If the codes are cleared successfully, an "**Erase Done!**" confirmation message displays.



**Figure 3-8**

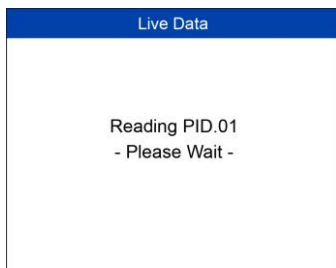
- If the codes are not cleared, then an “**Erase Failure. Turn Key on with Engine off!**” message displays.

## Live Data

---

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

- 1) To view live data, use the **SCROLL** button to select **Live Data** from **Diagnostic Menu** and press the **ENTER/Exit** button.
- 2) Wait a few seconds while the scan tool validates the PID MAP.



**Figure 3-9**

- 3) To view complete set of data, use **SCROLL** button to select **Complete Data Set** from **View Data** menu and press the **ENTER/Exit** button.

View Data	1/3
Complete Data Set	
Unit of Measure	
Previous Menu	

**Figure 3-10**

- View live PIDs on the screen. Use the **SCROLL** button for more PIDs if additional information is available on more than one page.

Live Data	6
DTC_CNT	0
FUELSYS1	0L
FUELSYS2	--
LOAD_PCT (%)	0.0
ETC (°C)	39
SHRTFT1 (%)	99.2

**Figure 3-11**

- The number “x” to the right of the screen indicates the sequence of the highlighted item.
- Press the **ENTER/Exit** button to return to previous menu.
  - Select **Previous Menu** from the **Read Codes** screen, and press **ENTER/Exit** button to return to previous menu.

## View Freeze Frame Data

---

**Freeze Frame Data** allows the technician to view the vehicle’s operating parameters at the moment a DTC (Diagnostic Trouble Code) is detected. For example, the parameters may include engine speed (RPM), engine coolant temperature (ECT), or vehicle speed sensor (VSS). This information will aid the technician by allowing the parameters to be duplicated for diagnostic and repair purposes.

- To view freeze frame data, use the **SCROLL** button to select **View Freeze Frame** from **Diagnostic Menu** and press the **ENTER/Exit** button.

- 2) Wait while the scan tool validates the PID MAP.
- 3) If retrieved information displays on more than one screen, use the **SCROLL** button, as necessary, until all the data have shown up.

View Freeze Frame		6
DTCFRZF		P1633
FUELSYS1		0L
FUELSYS2		--
LOAD_PCT (%)		0.0
ETC (°C)		39
SHRTFT1 (%)		99.2

**Figure 3-12**

- If no freeze frame data is available, the message “**No freeze frame data stored**” displays.
- 4) Press **ENTER/Exit** button to return to previous screen.

## Retrieve I/M Readiness Status

---

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

*CAUTION: By clearing trouble codes you also clear the readiness status for the individual emission system readiness tests. In order to reset these monitors, the vehicle must be driven through a complete drive cycle with no trouble codes in memory. Amount of time needed for reset vary by vehicle.*

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

- A. **Since DTCs Cleared** - indicates status of 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 emission 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.

There are two ways to retrieve I/M readiness status.

## Retrieve I/M Readiness Status with One-Click I/M Readiness Key

Press the **One-Click I/M Readiness Key**, to retrieve I/M readiness status. The screen will display as below. The LEDs colors and the audio tones indicate readiness status.

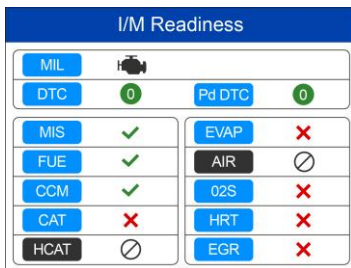


Figure 3-13

✓ **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.

The green, yellow and red LEDs provide a quick way to help you determine if a vehicle is ready for an Emission Test.

The LED and audio tone are interpreted as below:

### LED Interpretation

**GREEN LED** – indicates that engine systems are “OK” and operating normally (the number of Monitors supported by the vehicle that have run and performed their self-diagnostic testing is in the allowed limit. MIL is off. ). There are neither stored nor pending DTCs. The vehicle is ready for an Emission Test, and there is a good possibility that it can be certified.



**YELLOW LED** – with MIL off, there may be three possible conditions to cause the yellow LED to light.

- ✧ If a “Stored” Diagnostic Trouble Code is causing the yellow LED to light, it is still possible that the vehicle will be allowed to be tested for emissions and certified.
- ✧ If a “Pending” Diagnostic Trouble Code is causing the yellow LED to light, it is still possible that the vehicle will be allowed to be tested for emissions and certified.
- ✧ The Yellow LED will also light if the monitors do not complete their tests. Each state’s emissions standards differ on the number of tested monitors needed to meet vehicle emissions compliance.

---

**NOTE**

Confer with your automotive technician about the status results of each monitor to determine if the vehicle is ready for your state’s emissions test.

---

**RED LED** – indicates there is a problem with one or more of the vehicle’s system. The test of a vehicle resulting in a lit red LED lighting is not ready for an Emissions Test. The red LED is also an indication that there are DTCs present. The MIL lamp on the vehicle’s instrument panel will light steady. The problem that is causing the red LED to light must be repaired before an Emissions Test can be performed. It is also suggested that the vehicle be inspected/repared before driving the vehicle further.

If the red LED lights, there is a definite problem present in the system(s). In this case, you have the following options:

- ✧ Repair the vehicle yourself. If you are going to perform the repairs yourself, proceed by reading the vehicle service manual and following all its procedures and recommendations.
- ✧ Take the vehicle to a professional to have it serviced. The problem(s) causing the red LED to light must be repaired before the vehicle undergoes Emissions Testing.

### *Audio Tone Interpretation*

The audio tone is configured according to the I/M Readiness Status.

**Table 3-1**

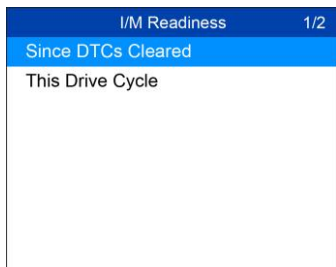
LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	5 seconds

Yellow LED	short, long, short beep	5 seconds
Red LED	Four short beeps	5 seconds

After you have read the information, press **ENTER/Exit** to exit. The other buttons are disabled to prevent misoperation.

## Retrieve I/M Readiness Status in Typical Way

- 1) Use the **SCROLL** button to select **I/M Readiness** from **Diagnostic Menu** and press **ENTER/Exit** button.
- 2) Wait while the scan tool validates the PID MAP.
- 3) If the vehicle supports both types of tests, then both types will be displayed on the screen for selection.



**Figure 3-14**

- 4) Use the **SCROLL** button to view the status of the MIL light (**ON** or **OFF**) and the following monitors.

For spark ignition engines:

- **MIS** – Misfire Monitor
- **FUEL** – Fuel System Monitor
- **CCM** – Comprehensive Component Monitor
- **EGR** – EGR System Monitor
- **O2S** – O2 Sensors Monitor
- **CAT** – Catalyst Monitor
- **EVAP** – Evaporative System Monitor
- **HTR** – O2 Sensor Heater Monitor
- **AIR** – Secondary Air Monitor
- **HCAT** – Heated Catalyst Monitor

For compression ignition engines:

- **MIS** – Misfire Monitor
- **FUEL** – Fuel System Monitor
- **CCM** – Comprehensive Component Monitor
- **EGR** – EGR System Monitor
- **HCCAT** – NMHC Catalyst Monitor
- **NCAT** – NOx Aftertreatment Monitor
- **BP** – Boost Pressure System Monitor
- **EGS** – Exhaust Gas Sensor Monitor
- **PM** – PM Filter Monitor

Since DTCs Cleared	1/6
<b>MIL Status</b>	<b>OFF</b>
Misfire Monitor	OK
Fuel System Mon	OK
Comp. Component	OK
Catalyst Mon	INC
Htd Catalyst	N/A

**Figure 3-15**

- 1) If the vehicle supports readiness test of “**This Drive Cycle**”, a screen of the following displays:

This Drive Cycle	1/6
<b>MIL Status</b>	<b>OFF</b>
Misfire Monitor	OK
Fuel System Mon	OK
Comp. Component	OK
Catalyst Mon	INC
Htd Catalyst	N/A

**Figure 3-16**

- 2) The LEDs and audio tones corresponding to different monitor status will be activated as below.

**Table 3-2**

LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	2 minutes

Yellow LED	short, long, short beep	2 minutes
Red LED	Four short beeps	2 minutes

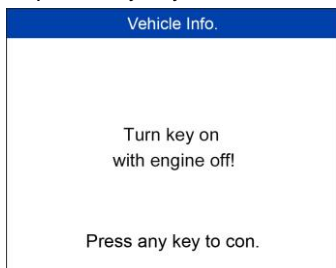
- 3) Use the **SCROLL** button for more PIDs if additional information is available on more than one page.
- 4) Press the **ENTER/Exit** button to return to **Diagnostic Menu**.

## View 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 **SCROLL** button to select **Vehicle Info.** from the **Diagnostic Menu** and press **ENTER/Exit** button.
- 2) A message displays to remind you to “Turn key on with engine off!” Wait a moment or press any key to continue.



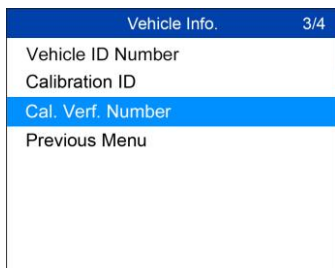
**Figure 3-17**

- 3) Wait while the scan tool reads vehicle information.



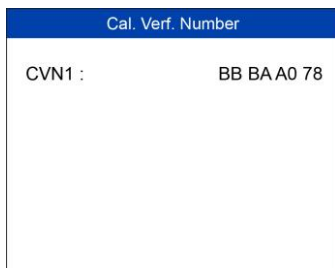
**Figure 3-18**

- If the vehicle does not support this mode, a message displays that the mode is not supported.
- 4) From Vehicle Info. menu, use the **SCROLL** button to select an available item to view and press the ENTER/Exit button.



**Figure 3-19**

- 5) View retrieved vehicle information on screen.



**Figure 3-20**

- 6) Select **Previous Menu** from the **Vehicle Info** screen, and press **ENTER/Exit** button to return to the previous menu.

## **Exit the OBD II Test**

---

- 1) To exit OBD II test, use **SCROLL** button to select **Previous Menu** from **Diagnostic Menu** and press **ENTER/Exit** button.
- 2) A warning message comes up asking your confirmation. Press **ENTER/Exit** button to exit.

# 4 Ready Test

This function can be used as a convenient readiness test tool by automotive technicians to determine if the tested vehicle is ready for an emission test. By visual and audible indication, you will learn a vehicle's emissions readiness.

## General Information

---

Repairs to the emissions-control systems of a 1996 or newer vehicle cause the vehicle's computer (ECU) memory to be cleared. The vehicle must go through a drive cycle to allow the ECU to perform a series of tests to ensure that the repair was successful, and before a state mandated emission test can be conducted. But how will you know when it is ready?

With this scan tool, you don't have to drive around endlessly and continuously coming back to the repair shop for retest to check if all required tests by the ECU are completed. And you could also do a quick check of the vehicle to determine if it is ready to receive an emission test without the hassle of connecting your vehicle to the analyzer or having to use a complicated scan tool.

In the following cases, this function is especially useful.

- You bought a used car and the check engine light had been cleared to mask potential problems.
- You disconnected the battery for tune-ups and other engine repairs, dead battery replacement, car radio installation and car alarm installation.
- You used a scan tool to clear the DTCs.
- Your car has been sent for repairs.

## Test Tool Application

---

This function displays which vehicle monitors have run, if they have been completed and the results of the testing. Results display on one screen providing an at-a-glance profile of the vehicle.

Use the **SCROLL** button to select **Ready Test** from **Main Screen**, and press the **ENTER/Exit** button.



Figure 4-1

## As Post-Repair Diagnostic Tool

This function can be used (after the vehicle has done any emission-related repairs) to confirm that the repair has been performed successfully.

After repairs, some drive cycles are required to reset the monitoring systems. Drive cycles vary by vehicle and by monitor.

Use the following procedures to check if the repair has been done correctly:

- 1) Connect the scan tool to the vehicle's DLC and erase the DTC(s) from the vehicle's computer memory.
- 2) After the erase procedure is performed, status of most monitors will be changed. Leave the scan tool connected to the vehicle, and select **Ready Test** from **Main Screen**.
- 3) Continue to drive the vehicle until the scan tool notifies you that the drive cycle has been completed.
- 4) If the GREEN LED lights and the tool emits two long beeps, your vehicle is ready and the repair work is confirmed.
- 5) If the RED LED lights, your vehicle is not ready and if you have performed repairs, they have failed to correct the emissions issue.

## As Pre-Check Diagnostic Tool

Prior to having a vehicle inspected for state emissions compliance, use this function to check the readiness status.

- 1) While the scan tool connected to the vehicle, select **Ready Test** from **Main Screen**. Drive the car till the scan tool notifies you safely with

color LEDs and audible tone if your vehicle is ready to conduct state emission test.

- 2) If the GREEN LED lights and two long beeps are heard, your vehicle is ready and it should pass emissions testing.
- 3) If the RED LED lights, your vehicle is not ready and must be repaired before an emission test can be performed.

#### NOTE

1. If you are driving the vehicle to perform a drive cycle ALONE, set the Status Beep On. The beep signifies that the monitors have run and the diagnostics testing completed. NEVER drive and operate the scan tool at the same time!
2. This function displays the real time data of emission-related monitoring systems readiness status. Once the scan tool has finished other operations, for example, clearing trouble codes, the I/M Readiness Monitor Status program resets status of all the monitors to “INC” condition. The vehicle must be driven through a complete drive cycle to set the monitors to Ready status. Times for reset vary by vehicle. Please refer to your vehicle’s service manual for drive cycle information.
3. In this function, only the **ENTER/Exit** button is available. The other buttons are disabled to prevent misoperation.

## LED and Tone Interpretation

Select **Ready Test** from the **Main Screen** and the screen displays as depicted below, including applicable monitors status, MIL state, Ignition type, DTCs (stored and pending).


I/M Readiness			
MIL			
DTC	0	Pd DTC	0
MIS	✓	EVAP	✗
FUE	✓	AIR	⊘
CCM	✓	O2S	✗
CAT	✗	HRT	✗
HCAI	⊘	EGR	✗

Figure 4-2



If the scan tool is idle, the result will immediately display. If it is busy, it will wait till the current procedure finished. After viewing the status, press **ENTER/Exit** button to exit.

- ✓ **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.

The LED and audio tone indications are interpreted as below:

## LED Interpretation

The green and red LEDs provide an easy way to check if emission-related monitoring systems have completed their self-diagnostic testing.

**GREEN LED** – your vehicle is **Ready**. Indicates that engine systems are “OK” and operating normally (the number of Monitors supported by the vehicle that have run and performed their self-diagnostic testing is in the allowed limit).

**RED LED** – your vehicle is **Not Ready**. Indicates that the number of Monitors supported by the vehicle that have run and performed their self-diagnostic testing is out of the allowed limit.

## Audio Tone Interpretation

The audio tone can be configured according to the I/M Readiness Status.

**Table 4-1**

LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	2 minutes
Red LED	No beep	

# 5 Compliance Information

## FCC COMPLIANCE

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme aux CNR exempts de licence d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes:

1. Ce dispositif ne peut causer des interférences; et
2. Ce dispositif doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

---

### **WARNING**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

---

### **NOTE**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

---

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **RF WARNING STATEMENT**

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

The term "IC" before the radio certification number only signifies that IC technical specifications were met.

#### **RoHS COMPLIANCE**

This device is declared to be in compliance with the European RoHS Directive 2011/65/EU.

#### **CE COMPLIANCE**

This product is declared to conform to the essential requirements of the following Directives and carries the CE mark accordingly:

EMC Directive 2014/30/EU

R&TTE Directive 1999/5/EC

Low Voltage Directive 2014/35/EU

# 6 Warranty and Service

## Limited One Year Warranty

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Autel Intelligent Technology Corp., Ltd. (the Company) warrants to the original retail purchaser of this Autel device that should this product or any part thereof during normal usage and under normal conditions be proven defective in material or workmanship that results in product failure within 1 year period from the date of purchase, such defect(s) will be repaired, or replaced (with new or rebuilt parts) with Proof of Purchase, at the Company's option, without charge for parts or labor directly related to the defect(s).

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

### **This warranty does not apply to:**

- 1) Products subjected to abnormal use or conditions, accident, mishandling, neglect, unauthorized alteration, misuse, improper installation or repair or improper storage;
- 2) Products whose mechanical serial number or electronic serial number has been removed, altered or defaced;
- 3) Damage from exposure to excessive temperatures or extreme environmental conditions;
- 4) Damage resulting from connection to, or use of any accessory or other product not approved or authorized by the Company;
- 5) Defects in appearance, cosmetic, decorative or structural items such as framing and non-operative parts.
- 6) Products damaged from external causes such as fire, dirt, sand, battery leakage, blown fuse, theft or improper usage of any electrical source.

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### **! IMPORTANT**

All contents of the product may be deleted during the process of repair. Please backup any contents of your product before delivering the product for warranty service.

---

# Service and Support

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If you have any questions regarding the product, please contact one of our offices or your local distributor.

## AUTEL NORTH AMERICA

- **Phone:** 855-AUTEL-US (855-288-3587) Mon.-Fri. 9am-6pm EST
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