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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 Services and Support:**



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For details, please refer to the *Service Procedures* in this manual.

# Safety Information

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For your own safety and the safety of others, and to prevent damage to the device and vehicles upon which it is used, it is important that the safety instructions presented throughout this manual be read and understood by all persons operating or coming into contact with the device.

There are various procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the person doing the work. Because of the vast number of test applications and variations in the products that can be tested with this equipment, we cannot possibly anticipate or provide advice or safety messages to cover every circumstance. It is the automotive technician's responsibility to be knowledgeable of the system being tested. It is crucial to use proper service methods and test procedures. It is essential to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, the device being used, or the vehicle being tested.

Before using the device, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested. Use the device only as described in this manual. Read, understand, and follow all safety messages and instructions in this manual.

## Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level.

---

### DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

---

### WARNING

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

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## Safety Instructions

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The safety messages herein cover situations Autel is aware of. Autel cannot know, evaluate or advise you as to all of the possible hazards. You must be certain that any condition or service procedure encountered does not jeopardize your personal safety.

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### DANGER

When an engine is operating, keep the service area WELL VENTILATED or attach a building exhaust removal system to the engine exhaust system. Engines produce

carbon monoxide, an odorless, poisonous gas that causes slower reaction time and can lead to serious personal injury or loss of life.

---

 **Do Not Turn the Volume Up Too Loud When Using Headphones**

Listening at high volumes that over-stimulate the ear for long periods of time may result in loss of hearing.

## **Safety Warnings**

- 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, for exhaust gases are poisonous.
- Put the transmission in PARK (for automatic transmission) or NEUTRAL (for manual transmission) and make sure the parking brake is engaged.
- Put blocks in front of the drive wheels and never leave the vehicle unattended while testing.
- Be extra cautious when working around the ignition coil, distributor cap, ignition wires and spark plugs. These components create hazardous voltages when the engine is running.
- Keep a fire extinguisher suitable for gasoline, chemical, and electrical fires nearby.
- Do not connect or disconnect any test equipment while the ignition is on or the engine is running.
- Keep the test equipment dry, clean, free from oil, water or grease. Use a mild detergent on a clean cloth to clean the outside of the equipment as necessary.
- Do not drive the vehicle and operate the test equipment at the same time. Any distraction may cause an accident.
- Refer to the service manual for the vehicle being serviced and adhere to all diagnostic procedures and precautions. Failure to do so may result in personal injury or damage to the test equipment.
- To avoid damaging the test equipment or generating false data, make sure the vehicle battery is fully charged and the connection to the vehicle DLC is clean and secure.
- Do not place the test equipment on the distributor of the vehicle. Strong electro-magnetic interference can damage the equipment.

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# 1 Using This Manual

This manual contains device usage instructions.

Some illustrations shown in this manual may contain modules and optional equipment that are not included in your system.

## 1.1 Conventions

---

The following conventions are used.

### 1.1.1 Bold Text

Bold text is used to highlight selectable items such as buttons and menu options.

Example:

- Tap **OK**.

### 1.1.2 Notes and Important Messages

#### *Notes*

A **NOTE** provides helpful information such as additional explanations, tips, and comments.

Example:

---

#### **NOTE**

New batteries reach full capacity after approximately 3 to 5 charging and discharging cycles.

---

#### *Important*

**IMPORTANT** indicates a situation which, if not avoided, may result in damage to the tablet or vehicle.

Example:

---

#### **IMPORTANT**

Keep the cable away from heat, oil, sharp edges and moving parts. Replace damaged cables immediately.

---

### **1.1.3 Hyperlink**

Hyperlinks or links that take you to other related articles, procedures, and illustrations are available in electronic documents. Blue italic text indicates a selectable hyperlink and blue underlined text indicates a website link or an email address link.

### **1.1.4 Illustrations**

Illustrations used in this manual are samples, and the actual testing screen may vary for each vehicle being tested. Observe the menu titles and on-screen instructions to make correct option selection.

### **1.1.5 Procedures**

An arrow icon indicates a procedure.

Example:

➤ **To use the camera:**

1. Tap the **Camera** button. The camera screen opens.
2. Focus the image to be captured in the view finder.
3. Tap the inner blue circle. The view finder now shows the captured picture and auto-saves the taken photo.
4. Tap the thumbnail image on the top right corner of the screen to view the stored image.
5. Tap the **Back** or **Home** button to exit the camera application.

# 2 General Introduction

The MaxiSys Ultra provides full functions and on-line repair information needed when diagnosing vehicles, identifying faults and researching repairs. It features a powerful octa-core processor and 12.9 inch TFT-LCD capacitive touch screen for swift diagnosis and optimum viewing. As an intelligent diagnostic and information system, MaxiSys Ultra not only displays the relevant repairs gathered from experienced industry experts, but provides step-by-step guidance to ensure the repair is done correctly and efficiently.

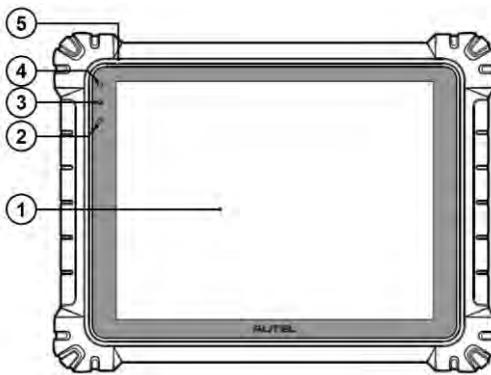
There are three main components to the MaxiSys system:

- MaxiSys Display Tablet – the central processor and monitor for the system.
- MaxiFlash VCMI - Vehicle Communication and Measurement Interface

This manual describes the construction and operation of these devices and how they work together to deliver diagnostic solutions.

## **2.1 MaxiSys Display Tablet**

### **2.1.1 Functional Description**

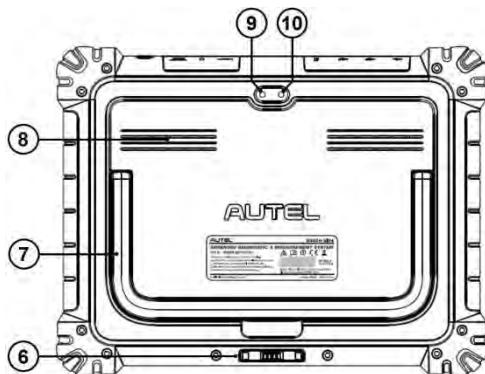


**Figure 2-1 MaxiSys Tablet Front View**

1. 12.9" TFT-LCD Capacitive Touch Screen
2. Ambient Light Sensor – detects ambient brightness.
3. Power LED - refer to Table 2-1 Power LED Description for details.
4. Front Camera
5. Built-in Microphone

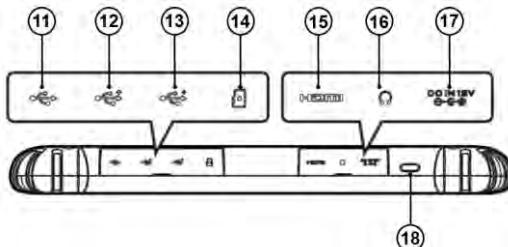
**Table 2-1 Power LED Description**

LED	Color	Description
Power	Green	<ul style="list-style-type: none"> <li>● Lights green when the Display Tablet is charging and the battery level is above 90%.</li> <li>● Lights green when the Display Tablet is powered on and the battery level is above 15%</li> </ul>
	Yellow	Lights yellow when the Display Tablet is charging and the battery level is below 90%.
	Red	Lights red when the Display Tablet is powered on and the battery level is below 15%



**Figure 2-2 MaxiSys Tablet Back View**

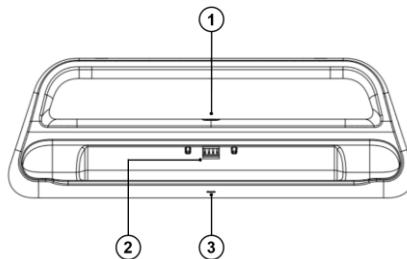
6. Docking Station Port
7. Collapsible Stand – extends from the back to allow hands-free viewing of the tablet
8. Speaker
9. Rear Camera
10. Camera Flash



**Figure 2-3 MaxiSys Tablet Top Side**

11. Mini USB Port - cannot be used with the USB Port simultaneously

12. USB Port
13. USB Port
14. Mini SD Card Slot
15. HDMI (High-Definition Multimedia Interface) Port
16. Head Phone Jack
17. DC Power Supply Input Port
18. Lock/Power Button – long press to turn on and off the Display Tablet, or short press to lock the screen.



**Figure 2-4 Docking Station**

1. DC Power Port – connects to the AC/DC adapter for power supply
2. Charging Dock – holds the MaxiSys tablet while providing optimum visibility and convenient charging
3. Status Indicator Light

The Indicator Light displays differently in response to the tablet status described below:

- A. Green light – battery power of the tablet is sufficient ( $\geq 90\%$ );
- B. Yellow light – battery level is above 14% but below 90%;
- C. Red light – battery level is below 14%;

**NOTE**

Please make sure no small metal or other conductive parts are around the Charging Dock to avoid short circuit damage to the device.

## 2.1.2 Power Sources

The tablet can receive power from any of the following sources:

- Internal Battery Pack
- AC/DC Power Supply

- Vehicle Power

## **! IMPORTANT**

Please charge the battery with the ambient temperature between 0°C and 45°C. If charge the battery when the temperature is out of range, the battery may catch on fire.

### *Internal Battery Pack*

The tablet can be powered with the internal rechargeable battery, which if fully charged can provide sufficient power for about 8 hours of continuous operation.

### *AC/DC Power Supply – using power adapter or docking station*

The tablet can be powered from a wall socket using the AC/DC power adapter or the docking station. The AC/DC power supply also charges the internal battery pack.

### *Vehicle Power*

The tablet can be powered from the cigarette lighter or other suitable power port on the test vehicle through a direct cable connection. The vehicle power cable connects to the DC power supply port on the top side of the display unit.

## **2.1.3 Technical Specifications**

**Table 2-2 Tablet Specifications**

Item	Description
<b>Operating System</b>	Android 7.0
<b>Processor</b>	Samsung Exynos8895V 8-core Processor (2.3GHz Quad-core Mongoose + 1.7GHz Quad-core A53)
<b>Memory</b>	4GB RAM & 256GB On-board Memory
<b>Display</b>	12.9 inch TFT-LCD with 2732 x 2048 resolution & capacitive touch screen
<b>Connectivity</b>	<ul style="list-style-type: none"> <li>● WiFi2 (802.11 a/b/g/n/ac 2x2 MIMO)</li> <li>● BT v.2.1 + EDR</li> <li>● GPS</li> <li>● USB 2.0 (TWO USB HOST Type A, ONE USB mini device)</li> <li>● SD Card (Support up to 64GB)</li> <li>● HDMI 2.0</li> </ul>
<b>Camera</b>	<ul style="list-style-type: none"> <li>● Rear: 16 Megapixel, Autofocus with Flashlight</li> <li>● Front: 5.0 Megapixel</li> </ul>

Item	Description
<b>Sensors</b>	Gravity Accelerometer, Ambient Light Sensor (ALS)
<b>Audio Input / Output</b>	<ul style="list-style-type: none"> <li>● Microphone</li> <li>● Dual Speakers</li> <li>● 3-Band 3.5 mm stereo/standard headset jack</li> </ul>
<b>Power and Battery</b>	<ul style="list-style-type: none"> <li>● 18000mAH 3.8 V lithium-polymer battery</li> <li>● Charging via 12 V AC/DC power supply with the temperature between 0°C and 45°C</li> </ul>
<b>Input Voltage</b>	12V/3A Adapter
<b>Operating Temp.</b>	0 to 50°C (32 to 122°F)
<b>Storage Temp.</b>	-20 to 60°C (-4 to 140°F)
<b>Dimensions (WxHxD)</b>	366.5 mm (14.43") x 280.9 mm (11.06") x 34 mm (1.34")
<b>Weight</b>	2.18kg (4.81 lb.)
<b>Protocols</b>	DoIP, PLC J2497, ISO-15765, SAE-J1939, ISO-14229 UDS, SAE-J2411 Single Wire Can(GMLAN), ISO-11898-2, ISO-11898-3, SAE-J2819 (TP20), TP16, ISO-9141, ISO-14230, SAE-J2610 (Chrysler SCI), UART Echo Byte, SAE-J2809 (Honda Diag-H), SAE-J2740 (GM ALDL), SAE-J1567 (CCD BUS), Ford UBP, Nissan DDL UART with Clock, BMW DS2, BMW DS1, SAE J2819 (VAG KW81), KW82, SAE J1708, SAE-J1850 PWM (Ford SCP), SAE-J1850 VPW (GM Class2)

**Table 2-3 Docking Station Specifications**

Item	Description
<b>Input Voltage</b>	DC/12V/3A
<b>Operating Temperature</b>	-10°C to +55°C (ambient)
<b>Storage Temperature</b>	-40°C to +85°C (ambient)
<b>Dimensions (L x W x H)</b>	396 x 136 x 54 (mm)
<b>Weight</b>	0.98kg (2.1605lb.)

## 2.2 MaxiFlash VCMI – Vehicle Communication and Measurement Interface

### 2.2.1 Functional Description

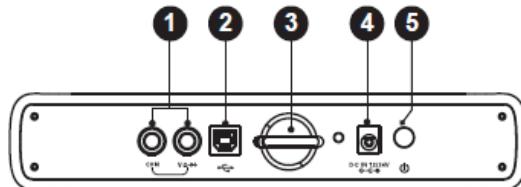


Figure 2-5 VCMI Top View

1. Multimeter Jacks
2. USB Port
3. Hook
4. DC Power Supply Input Port
5. Power Button

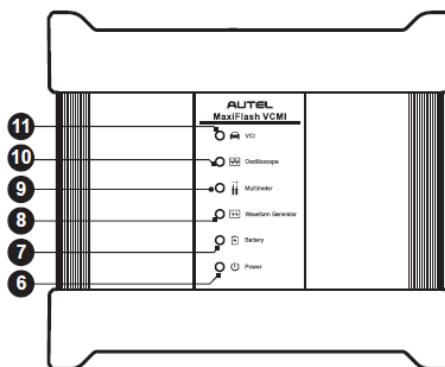
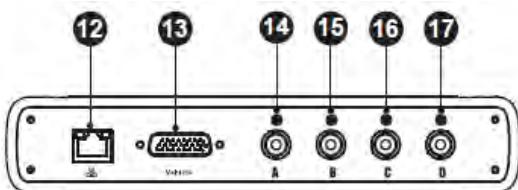


Figure 2-6 VCMI Front View

6. Power LED – refer to Table 2-4 Power LED Description for details
7. Battery LED - refer to Table 2-5 Battery LED Description for details
8. Signal Generator LED - lights green when operating in the signal generator mode
9. Multimeter LED - lights green when operating in the multimeter mode
10. Oscilloscope LED - lights green when operating in the oscilloscope mode and flashes green when communicating
11. Vehicle LED - refer to Table 2-6 Vehicle LED Description for details

## **IMPORTANT**

Do not disconnect the programming device while the vehicle LED status light is on! If the flash programming procedure is interrupted while the vehicle's ECU is blank or only partially programmed, the module may be unrecoverable.



**Figure 2-7 VCMI Bottom View**

12. Ethernet Port
13. Vehicle Data Connector (DB26-Pin)
14. Input Channel A
15. Input Channel B
16. Input Channel C
17. Input Channel D

**Table 2-4 Power LED Description**

LED	Color	Description
Power	Yellow	Lights yellow automatically at power up when VCMI is self-testing.
	Green	Lights solid green when powered on.
	Red	<ul style="list-style-type: none"><li>● Lights solid red when system failure occurs.</li><li>● Flashes red when VCMI is upgrading.</li></ul>

**Table 2-5 Battery LED Description**

LED	Color	Description
Battery	Green	<ul style="list-style-type: none"><li>● Flashes green when VCMI is charging.</li><li>● Lights solid green when fully charged or the battery level is above 75%.</li></ul>
	Yellow	Lights yellow when the battery level is above 25% but below 75%.

<b>LED</b>	<b>Color</b>	<b>Description</b>
	Red	<ul style="list-style-type: none"> <li>● Lights red when the battery level is above 10% but below 25%.</li> <li>● Flashes red when the battery level is below 10%.</li> </ul>

**Table 2-6 Vehicle LED Description**

<b>LED</b>	<b>Color</b>	<b>Description</b>
Vehicle	Green	Lights solid green when connected via USB cable. Flashes green when communicating.
	Blue	Lights solid blue when connected via BT. Flashes blue when communicating.
	Cyan (Blue/Green)	Lights solid cyan when connected via Wi-Fi. Flashes cyan (blue/green) when communicating.
	Magenta (Blue/Red)	Lights solid magenta when connected via Internet cable. Flashes magenta (blue/red) when communicating.

### *Communication Capability*

The Vehicle Communication and Measurement Interface supports BT, Wi-Fi and USB communications. It can transmit vehicle data to the tablet with or without a physical connection. In open areas, the working range of the transmitter through BT communication is up to 328 feet (100 m). The working range of 2.4G Wi-Fi communication is up to 328 feet (100 m) while 5G Wi-Fi is up to 164 feet (50 m). A signal lost due to moving out of range automatically restores itself when the tablet unit is brought closer to the VCMI unit.

### *Measurement Capability*

The VCMI device is designed with the functions of multimeter, oscilloscope, signal generator and OBD communication line inspection. The parameters such as voltage, resistance, current, signal frequency, and voltage-time characteristic of the signal can be measured and the results are displayed on the Display Tablet.

### *Programming Capability*

The VCMI device is a D-PDU, SAE J2534-1 & RP1210 compliant PassThru programming interface device. Using the updated OEM software, it is capable of replacing the existing software/firmware in the Electronic Control Units (ECU), programming new ECUs and fixing software-controlled drivability issues and emission issues.

## 2.2.2 Power Sources

The VCMI device can receive power from the following sources:

- Vehicle Power
- AC/DC Power Supply
- Built-in Battery Pack

### *Vehicle Power*

The VCMI device operates on 12/24 Volt vehicle power, which it receives through the vehicle data connection port. The device powers on whenever it is connected to an OBD II/EOBD compliant data link connector (DLC). For non OBD II/EOBD compliant vehicles, the device can be powered from a cigarette lighter or other suitable power port on the test vehicle using the auxiliary power cable.

### *AC/DC Power Supply*

The VCMI device can be powered from a wall socket using the AC/DC power adapter.

### *Built-in Battery Pack*

The VCMI device can also be powered with its built-in 3750mAh battery pack.

## 2.2.3 Technical Specifications

**Table 2-7 VCMI Specifications**

Item	Description
<b>Communications</b>	<ul style="list-style-type: none"><li>• BT V2.1 + EDR</li><li>• USB 2.0</li><li>• Wi-Fi 2.4G/5G</li><li>• Ethernet</li></ul>
<b>Wireless Frequency</b>	2.4GHz/5GHz
<b>Power and Battery</b>	<ul style="list-style-type: none"><li>• 3750 mAh lithium-polymer battery</li><li>• Charging via 12 V DC power supply</li></ul>
<b>Operating Temp.</b>	0°C to 50°C
<b>Storage Temp.</b>	-20°C to 60°C
<b>Dimensions (L x W x H)</b>	214 mm (8.43") x 192 mm (7.56") x 39 mm (1.54")
<b>Weight</b>	g ( lb.)



**NOTE**

For additional information, please refer to the accompanied user manual for the VCMI device.

---

## 2.3 Accessories Kit

---

### 2.3.1 Main Cable

The VCMI device can be powered through the Main Cable when connected to an OBD II/EOBD compliant vehicle. The Main Cable connects the VCMI device to the vehicle's data link connector (DLC), through which the VCMI device can transmit vehicle data to the tablet.

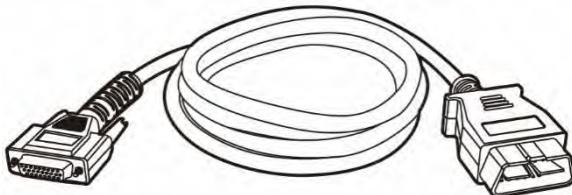


Figure 2-9 Main Cable – 1.5 m in length

### 2.3.2 OBD I Adapters

The OBD I adapters are for Non-OBD II vehicles. The adapter used depends on the type of vehicle being tested. The most common adapters are shown (Some adapters are optional, please contact your distributor for details).



Benz-14



Chrysler-16



BMW-20



Nissan-14



Mitsubishi/Hyun  
dai-12+16



Fiat-3



PSA-2



Mazda-17



VW/Audi-2+2



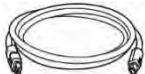
Benz-38

### 2.3.3 Other Accessories



#### Docking Station

Provides power to the tablet.



#### Standard 2.0 USB Cable

Connects the tablet to the VCMI unit.



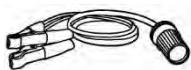
#### AC/DC External Power Adapter

Connects the tablet to the external DC power port for power supply.



#### Cigarette Lighter

Provides power to the tablet or the VCMI device through connection to the vehicle's cigarette lighter receptacle, as some non-OBD II vehicles cannot provide power via the DLC connection.



#### Clipper Cable

Provides power to the tablet or the VCMI device through connection to the vehicle's battery.



#### Lighter Fuse x2

A safety device for the cigarette lighter.

# 3 Getting Started

Make sure the tablet has sufficient power or is connected to the external power supply (see [Power Sources](#) on page 5).

## 3.1 Power Up

Long press the Lock/Power button on the top right side of the tablet to switch the unit on. The system boots up and displays the MaxiSys Job Menu.

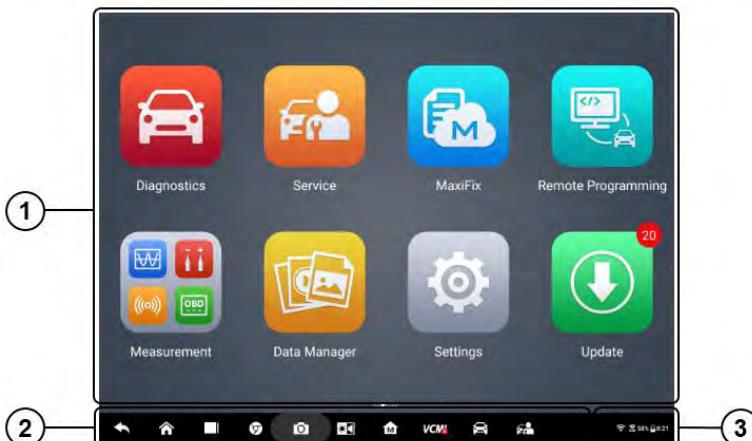


Figure 3-1 Sample MaxiSys Job Menu

1. Application Buttons
2. Locator and Navigation Buttons
3. Status Icons

### NOTE

The screen is locked by default upon startup. It is recommended to lock the screen when not in use to protect information in the system and conserve the power.

Almost all operations on the tablet are controlled through the touch screen. The touch screen navigation is menu driven, which allows you to quickly locate the test procedure, or data that you need, through a series of choices and questions. Detailed descriptions of the menu structures are found in the chapters for each application.

### 3.1.1 Application Buttons

The table below briefly describes each of the applications in the MaxiSys system.

**Table 3-1 Applications**

Name	Button	Description
Diagnostics		Accesses the unit's diagnostics functions. See <a href="#">Diagnostics</a> on page 20.
Service		Accesses special functions menu. See <a href="#">Service</a> on page 74.
Remote Programming		Accesses remote programming request menu. See <a href="#">Remote Programming</a> on page 79.
MaxiFix		Provides the most compatible and abundant repair techniques and diagnostics database. See <a href="#">MaxiFix</a> on page 88.
Measurement		Measures the parameters such as voltage, resistance, current, and monitor signal activities. See <a href="#">Measurement</a> on page 103.
Data Manager		Accesses the organization system for saved data files and to store workshop, consumer information and vehicle test history. See <a href="#">Data Manager</a> on page 246.
Settings		Accesses the system settings menu and general tablet menu. See <a href="#">Settings</a> on page 255.
Update		Accesses system software update menu. See <a href="#">Update</a> on page 260.
VCMI Manager		Accesses VCMI connection menu. See <a href="#">VCMI Manager</a> on page 262.
ADAS		Accesses ADAS introduction menu. See <a href="#">ADAS</a> on page 267.
Support		Synchronizes Autel's online service base station with the MaxiSys tablet. See <a href="#">Support</a> on page 268.
Remote Desk		Configures your unit to receive remote support using the TeamViewer application. See <a href="#">Remote Desk</a> on page 273.

Name	Button	Description
Quick Link		Provides associated website bookmarks to allow quick access to product update, service, support and other information. See <a href="#">Quick Link</a> on page 275.
MaxiViewer		Provides a quick search for supported functions and/or vehicles. See <a href="#">MaxiViewer</a> on page 276.
MaxiVideo		Configures the unit to operate as a video scope device by connecting to an Imager head cable for close vehicle inspections. See <a href="#">MaxiVideo</a> on page 278.
MaxiMall		Repurchases the software that has expired. See <a href="#">MaxiMall</a> on page 285.

### 3.1.2 Locator and Navigation Buttons

Operations of the Navigation buttons at the bottom of the screen are described in the table below:

**Table 3-2 Locator and Navigation Buttons**

Name	Button	Description
Locator		Indicates the location of the screen. Swipe the screen left or right to view the previous or next screen.
Back		Returns to the previous screen.
Android Home		Returns to Android System's Home screen.
Recent Apps		Displays a list of applications that are currently working. Tap an app icon to launch. Remove an app by swiping it to the right.
Browser		Launches the Chrome Internet browser.
Camera		Opens the camera with short press; takes and saves screenshot image with long press. The saved files are auto-stored in the Data Manager application for later reviews. See <a href="#">Data Manager</a> on page 246.

Name	Button	Description
Display & Sound		Adjusts the brightness of the screen and the volume of the audio output.
MaxiSys Home		Returns to MaxiSys Job Menu.
VCMI		Opens the VCMI Manager application. A green icon at the bottom right corner indicates the VCMI device has communicated successfully, a red cross icon will display if connection fails. The battery status icon indicates how much power the VCMI device remains.
MaxiSys Shortcut		Returns to the Diagnostics screen.
Service		Returns to the Service screen.

➤ **To use the camera:**

1. Tap the **Camera** button. The camera screen opens.
2. Focus the image to be captured in the view finder.
3. Tap the inner blue circle. The view finder now shows the captured picture and auto-saves the taken photo.
4. Tap the thumbnail image on the top right corner of the screen to view the stored image.
5. Tap the **Back** or **Home** button to exit the camera application.

Refer to Android documentation for additional information.

### 3.1.3 System Status Icons

These are the standard status icons of the Android operating system. Your MaxiSys display tablet is a fully functional Android Pad. Refer to Android documentation for additional information.

## 3.2 Power Down

All vehicle communications must be terminated before shutting down the tablet. A warning message displays if a shutdown is attempted while the tablet is communicating with the vehicle. Forcing a shut down while the tablet is communicating may lead to ECM problems on some vehicles. Please exit the Diagnostics application before shutting off the tablet.

➤ **To power down the MaxiSys tablet:**

1. Long press the Lock/Power Button.
2. Tap **Power off** option.
3. Tap **OK**.

### 3.2.1 Reboot System

In case of system crash, long press the Lock/Power button and tap **Restart** to reboot the system.

## 3.3 Installing Computer Software

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The MaxiSys Diagnostic Platform allows you to realize some of its functions on a computer to enhance capabilities and improve user experience. To realize these functions on a computer, you need to install certain software.

- **To install the MaxiSys Printer driver program:**
1. Download the **Maxi PC Suite** from [www.autel.com](http://www.autel.com) > *Support & Updates* > *Firmware & Downloads* > *Update Client*, and install to your windows-based computer.
  2. Follow the pop-up instructions to install the Maxi PC Suit to your PC.
  3. After the Maxi PC Suite installation, the printer driver program will be installed into your PC automatically, which is call **PC Link**.
  4. Click on **Finish** to complete the whole installation procedure.

### 3.3.1 Printing Operation

This section describes how to receive files from the MaxiSys Tablet and perform printing through the windows-based computer:

- **To perform printing through the computer**
1. Make sure the Display Tablet is connected to the computer network, either via WiFi or LAN, before printing, See **Printing Setting** on page 256 for more information.
  2. Run the PC Link on the computer to open up the printer interface.
  3. Click **Test Print** to make sure the printer is working successfully.
  4. Tap the **Print** button on the toolbar displayed in various applications of the MaxiSys system. A temporary file will be created and sent to the computer for printing.

5. The MaxiSys Printer will print the received file automatically when the Auto Print option is checked.

If you need to print the document later, click the **Open PDF file** and select the document, and double click the **Print** on the MaxiSys Printer interface to start the printing.

---

 **NOTE**

Make sure the computer installed with the Printing Services program is connected to a printer.

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# 4 Diagnostics

The Diagnostics application can access the electronic control module of various vehicle control systems, such as engine, transmission, antilock brake system (ABS), airbag system (SRS) and more.

## 4.1 Establish Vehicle Communication and Selection

---

### 4.1.1 Establish Vehicle Communication

The Diagnostics operations require connecting the MaxiSys Ultra Diagnostic Platform to the test vehicle through the VCMI device using the Main Cable and test adapters (for non-OBD II vehicles). To establish proper vehicle communication to the tablet, you need to perform the following steps:

1. Connect the VCMI device to the vehicle's DLC for both communication and power source.
2. Connect the VCMI device to the tablet via BT pairing, Wi-Fi or USB connection.
3. When the above steps are completed, check the VCMI navigation button at the bottom bar on the screen, if a green BT, Wi-Fi or USB icon displays at the lower right corner, the MaxiSys Ultra Diagnostic Platform is ready to start vehicle diagnosis.

#### 4.1.1.1 Vehicle Connection

The method used to connect the VCMI device to a vehicle's DLC depends on the vehicle's configuration as follows:

- A vehicle equipped with an On-board Diagnostics Two (OBD II) management system supplies both communication and 12-volt power through a standardized J-1962 DLC.
- A vehicle not equipped with an OBD II management system supplies communication through a DLC connection, and in some cases supplies 12-volt power through the cigarette lighter receptacle or a connection to the vehicle battery.

#### OBD II Vehicle Connection

This type of connection only requires the main cable without any additional adapter.

- **To connect to an OBD II vehicle**

1. Connect the main cable's female adapter to the Vehicle Data Connector on the VCMI device, and tighten the captive screws.
2. Connect the cable's 16-pin male adapter to the vehicle's DLC, which is generally located under the vehicle dash.

---

 **NOTE**

The vehicle's DLC is not always located under the dash; refer to the user manual of the test vehicle for additional connection information.

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### **Non-OBD II Vehicle Connection**

This type of connection requires both the main cable and a required OBD I adapter for the specific vehicle being serviced.

There are three possible conditions for Non-OBD II vehicle connection:

- DLC connection supplies both communication and power.
- DLC connection supplies communication and power is to be supplied via the cigarette lighter connection.
- DLC connection supplies communication and power is to be supplied via connection to the vehicle battery.

➤ **To connect to a Non-OBD II Vehicle**

1. Connect the main cable's female adapter to the Vehicle Data Connector on the VCMI device, and tighten the captive screws.
2. Locate the required OBD I adapter and connect its 9-pin jack to the main cable's male adapter.
3. Connect the attached OBD I adapter to the vehicle's DLC.

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 **NOTE**

Some adapters may have more than one adapter or may have test leads instead of an adapter. Whatever the case, make the proper connection to the vehicle's DLC as required.

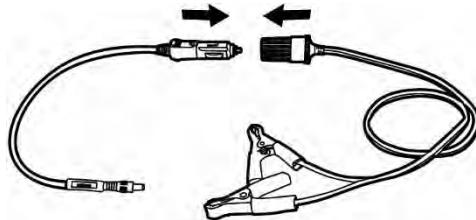
---

➤ **To connect the cigarette lighter**

1. Plug the DC power connector of the cigarette lighter into the DC power supply input port on the device.
2. Connect the male connector of the cigarette lighter into the vehicle's cigarette lighter receptacle.

➤ **To connect the clipper cable**

1. Connect the tubular plug of the clipper cable to the male connector of the cigarette lighter.



**Figure 4-1 Connection between Cigarette Lighter and Clipper Cable**

2. Plug the DC power connector of the cigarette lighter into the DC power supply input port of the VCMI device.
3. Connect the clipper cable to the vehicle's battery.

 **NOTE**

After the VCMI device is successfully connected to the vehicle, the Power LED on the device illuminates, and a brief beep sound will be heard.

#### 4.1.1.2 VCMI Connection

After the VCMI device is properly connected to the vehicle, the Power LED on the VCMI device illuminates solid green, and is ready to establish communication with the tablet.

Coming with the MaxiSys Ultra tool kit, the VCMI device supports 3 communication methods with the tablet: BT, Wi-Fi and USB.

##### **Pairing Up via BT**

In open areas, the working range for BT communication is about 328 feet (100 m); this means you can perform vehicle diagnosis freely around the workshop with greater convenience.

If you use more than one VCMI device to connect to the test vehicles when customers are many, you can perform vehicle diagnosis on various vehicles conveniently, by pairing the tablet separately to each of the VCMI devices connected to the different test vehicles, via BT, without the need to repeat the plugging and unplugging procedure, which is unavoidable through traditional wired connection, thus saves you more time and provides more efficiency.

➤ **To pair up the tablet with the VCMI device via BT**

1. If not already done, power up the tablet.
2. Select the **VCMI Manager** application from the MaxiSys Job Menu.
3. When the **VCMI Manager** application is opened, the device automatically starts scanning for available VCMI devices around for BT pairing. The found devices are listed in the Setting section on the right side of the screen.

---

## NOTE

If no VCMI device is found, this may indicate that the signal strength of the transmitter is too weak to be detected. In this case try to get closer to the device, or reposition the VCMI device, and remove all possible objects that may cause signal interference. When done, tap the **Scan** button at the top right corner to start searching again.

---

4. Depending on the VCMI type you use, the device name may display as Maxi suffixed with a serial number. Select the required device for pairing.
5. When pairing is successfully done, the connection status displayed to the right of the device name is shown as Connected.
6. Wait for a few seconds, and the VCMI button on the system Navigation bar at the bottom of the screen shall display a green circle BT icon, indicating the tablet is connected to the VCMI device, and is ready to perform vehicle diagnosis.

Refer to [BT Pairing](#) on page 264 for additional information.

## Wi-Fi Connection

The VCMI device supports both 2.4GHz and 5GHz Wi-Fi connection. Please choose 2.4GHz or 5GHz Wi-Fi connection according to specific situations. In open areas, the working range of 2.4G Wi-Fi communication is up to 328 feet (100 m) while 5G Wi-Fi is up to 164 feet (50 m).

### ➤ To pair up the tablet with the VCMI device via Wi-Fi

1. If not already done, power up the tablet.
2. Select the **VCMI Manager** application from the MaxiSys Job Menu.
3. When the **VCMI Manager** application is opened, the device automatically starts scanning for available VCMI devices around for Wi-Fi connection. The numbers of found VCMI devices are listed in the Setting section on the right side of the screen.
4. Depending on the VCMI type you use, the device name may display as Maxi suffixed with a serial number. Select the required device for connection.
5. When pairing is successfully done, the connection status is shown as Connected.
6. Wait for a few seconds, and the VCMI button on the system Navigation bar at the bottom of the screen shall display a green circle Wi-Fi icon, indicating the tablet is connected to the VCMI device, and is ready to perform vehicle diagnosis.

Refer to [Wi-Fi Connection](#) on page 263 for additional information.

## USB Cable Connection

The USB cable connection is a simple and quick way to establish communication between the tablet and the VCMI device. After properly connecting the USB cable from the tablet to the VCMI device, the VCMI navigation button at the bottom bar of the screen shows a green tick icon in a few seconds, and the USB LED on the VCMI device illuminates solid green light, indicating the connection between the devices is successful.

The MaxiSys diagnostic platform is now ready to perform vehicle diagnosis.

---

 **NOTE**

Since the USB connection provides the most stable and fastest communication, it is highly recommended to apply this communication method when operating ECU programming or coding. When all the two communication methods are applied at the same time, the MaxiSys system will use the USB communication as the default priority.

#### *4.1.1.3 No Communication Message*

- A. If the tablet is not connected to the VCMI device, an “Error” message displays. An “Error” message indicates the tablet is not communicating with the VCMI device, and so cannot gain access to the vehicle control module. In this case, you need to do the following check-ups:
  - Check if the VCMI device is powered on.
  - In case of wireless connection, check if the network is configured correctly, or if the right device has been paired.
  - If during the diagnosis process, communication is suddenly interrupted due to the loss of signal, check if there are any objects that causes signal interruption.
  - Check if the VCMI device is properly positioned. It is recommended to put the VCMI device with the front side up.
  - Try standing closer to the VCMI device to obtain more stable signals, and faster communication speed. In case of wired connection, check the cable connection between the tablet and the VCMI device.
  - Check if the green LED on the VCMI device is illuminated for BT, Wi-Fi or USB.
- B. If the VCMI device is unable to establish a communication link, a prompt message displays with check instructions. The following conditions are the possible causes for this massage to display:
  - The VCMI device is unable to establish a communication link with the vehicle.
  - You’ve selected a system for testing that the vehicle is not equipped with.
  - There is a loose connection.
  - There is a blown vehicle fuse.
  - There is a wiring fault on the vehicle, or the data cable or adapter.

- There is a circuit fault in the data cable or adapter.
- Incorrect vehicle identification was entered.

## 4.1.2 Getting Started

Prior to first use of the Diagnostics application, the VCMI device must be synchronized with the tablet to establish a communication link. See [VCMI Manager](#) on page 262.

### 4.1.2.1 Vehicle Menu Layout

When the VCMI device is properly connected to the vehicle, and paired to the tablet, the platform is ready to start vehicle diagnosis. Tap on the Diagnostics application button on the MaxiSys Job Menu, the Vehicle Menu appears on the screen.



**Figure 4-2 Sample Vehicle Menu Screen**

1. Top Toolbar Buttons
2. Manufacturer Buttons

#### Top toolbar Buttons

The operations of the Toolbar buttons at the top of the screen are listed and described in the table below:

**Table 4-1 Top Toolbar Buttons**

Name	Button	Description
Home		Returns to the MaxiSys Job Menu.
VID Scan		Tap this button to open a dropdown list; tap <b>Auto Detect</b> for auto VIN detection; tap <b>Manual Input</b> to enter VIN code or license number manually.

Name	Button	Description
		Tap <b>Scan VID</b> to scan the license number / VIN code by camera.
All	All	Displays all the vehicle makes in the vehicle menu.
Favorites	Favorites	Displays user's favorite vehicle makes.
History	History	Displays the stored test vehicle history records. This option provides you direct access to the previously tested vehicle recorded during previous test sessions. See <i>Vehicle History</i> on page 247.
America	America	Displays the American vehicle menu.
Europe	Europe	Displays the European vehicle menu.
Asia	Asia	Displays the Asian vehicle menu.
China	China	Displays the Chinese vehicle menu.
Search	Search	Touching this button opens the virtual keyboard, allowing you to manually enter the specific vehicle make required.
Cancel	Cancel	Touching this button exits the search screen, or cancels an operation.

## Manufacturer Buttons

The Manufacturer buttons display the various vehicle logos and the brand names. Select the required manufacturer button after the VCMI device is properly connected to the test vehicle to start a diagnostic session.

### 4.1.3 Vehicle Identification

The MaxiSys diagnostic system supports five methods for Vehicle Identification.

1. Auto VIN Scan
2. Manual Input
3. Scan License / VIN
4. Manual Vehicle Selection
5. OBD Direct Entry

#### 4.1.3.1 Auto VIN Scan

The MaxiSys diagnostic system features the latest VIN-based Auto VIN Scan function to identify CAN vehicles in just one touch, which allows the technician to quickly detect vehicles, scan all the diagnosable ECUs on every vehicle and run diagnostics on the selected system.

##### ➤ To perform Auto VIN Scan

1. Tap the **Diagnostics** application button from the MaxiSys Job Menu. The Vehicle Menu displays.
2. Tap the **VID Scan** button on the top toolbar.
3. Select **Auto Detect**. The tester starts VIN scanning on the vehicle's ECU. Once the test vehicle is successfully identified, the system will guide you to the Vehicle Diagnostics screen directly.



**Figure 4-3 Sample Auto Detect Screen**

In some cases when users have selected the vehicle brand instead of performing Auto VIN Scan in the first place, the system still provides an option for vehicle VIN scan.



**Figure 4-4 Sample Vehicle Selection Screen**

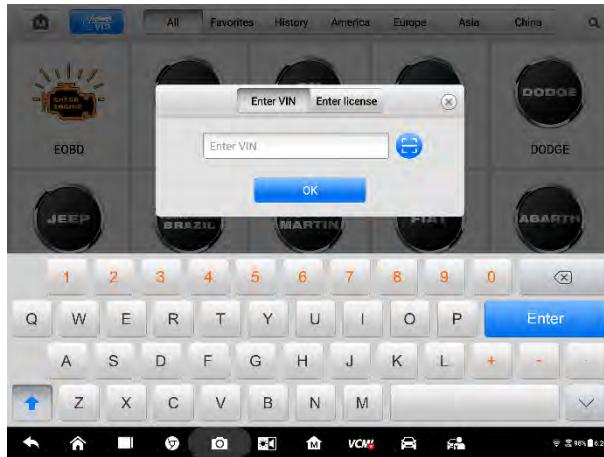
Select **Automatic Selection** and the system will proceed to acquire VIN information automatically or allow users to input the VIN manually.

#### *4.1.3.2 Manual Input*

For some vehicles that do not support the Auto VIN Scan function, the MaxiSys diagnostic system allows you to enter the vehicle VIN manually, or simply take a photo of the VIN sticker for quick vehicle identification.

➤ **To perform Manual Input**

1. Tap the **Diagnostics** application button from the MaxiSys Job Menu. The Vehicle Menu displays.
2. Tap the **VID Scan** button on the top toolbar.
3. Select **Manual Input**.
4. Tap the input box and enter the correct VIN code or license numbers.

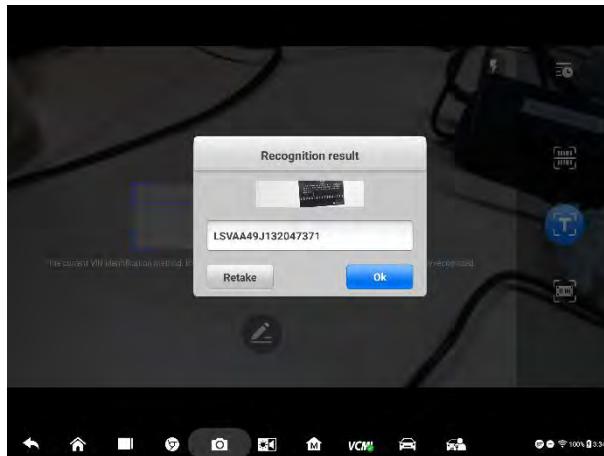


**Figure 4-5 Sample Manual VIN Input**

5. Tap **OK**. The vehicle will be identified in a few seconds, and once the matching is successful, the system will guide you to the Vehicle Diagnostics screen directly.
6. Tap **Cancel** to exit Manual Input.

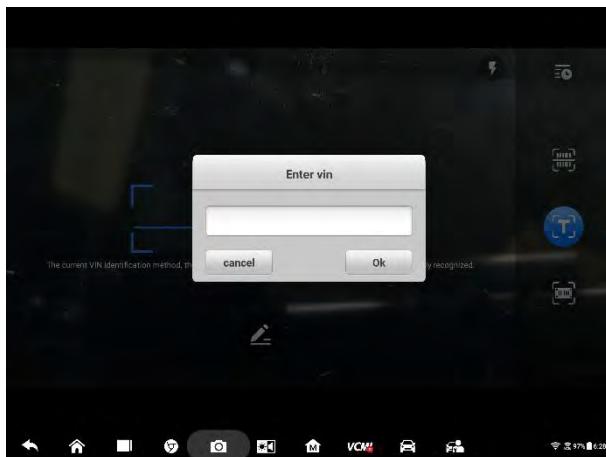
#### 4.1.3.3 Scan License / VIN

Tap **Scan License / VIN** in the dropdown list (Figure 4-3), the camera will be opened. Then adjust the position of the device to align the license number or VIN Code with the scanning window on the screen, the license number or VIN code will be scanned and identified automatically, tap “**OK**”.



**Figure 4-6 Sample Scan License / VIN Code 1**

The vehicle information will be displayed on the tablet. If there are diagnostic records before, the historical record and the vehicle information will be displayed. If there is no related record, the vehicle number and model need to be inputted manually.



**Figure 4-7 Sample Scan License / VIN Code 2**

#### 4.1.3.4 Manual Vehicle Selection

When the vehicle's VIN is not automatically retrievable through the vehicle's ECU, or the specific VIN is unknown, you can choose to select the vehicle manually.

##### Step-by-step Vehicle Selection

This mode of vehicle selection is menu driven; you simply follow the screen prompts and make a series of choices. Each selection you make advances you to the next screen. A **Back** button at the lower right corner of the screen returns you to the previous screen. Exact procedures may vary somewhat by various vehicles being serviced.

##### 4.1.3.5 Alternative Vehicle Identification

Occasionally, you may identify a test vehicle that the tester does not recognize; the database does not support, or has some unique characteristics that prevent it from communicating with the tester through the normal channels. In these instances, you are provided with the OBD direct entry, through which you can perform generic OBD II or EOBD tests. See [Generic OBD II Operations](#) on page 56 for additional information.

## 4.2 Diagnostics Screen Layout

This section describes how to navigate the Diagnostics interface and select test options.

## 4.2.1 Diagnostics Screen Layout

The Diagnostics screens typically includes six sections.



**Figure 4-8 Sample Diagnostics Screen**

1. Diagnostics Toolbar
2. Current Directory Path
3. Status Information Bar
4. Navigation Bar
5. Main Section
6. Functional Buttons

### Diagnostics Toolbar

The Diagnostics Toolbar contains buttons that allow you to print or save the displayed data and perform other operations. The table below provides a brief description for the operations of the Diagnostics toolbar buttons:

**Table 4-2 Diagnostics Toolbar Buttons**

Name	Button	Description
<b>Home</b>		Returns to the MaxiSys Job Menu.
<b>Vehicle Swap</b>		Exits the diagnostic session and returns to the vehicle menu screen to select another vehicle for testing.

Name	Button	Description
Settings		Opens the setting screen. See <a href="#">Settings</a> on page 256.
Print		Saves and prints a copy of the displayed data. See <a href="#">Print</a> on page 256.
Help		Provides instructions or tips for operations of various diagnostic functions.
Save		<p>Taps it to open a submenu, on which there are 3 options available to save the displayed data.</p> <ul style="list-style-type: none"> <li>• Tap <b>Save This Page</b> to take a screenshot image</li> <li>• Tap <b>Save All Data</b> to save a PDF file (mostly used to save data that cover more than 1 page)</li> <li>• Tap <b>Start Saving</b> to record a video clip (only available for recording Live Data or special graph data)</li> </ul> <p>All saved data are stored in the Data Manager application for later reviews. See <a href="#">Data Manager</a> on page 246.</p>
Data Logging		<p>Records the communication data and ECU information of the test vehicle. The saved data can be reported and sent to the technical center via the Internet.</p> <p>Go to the Support application to follow up the processing progress, see <a href="#">Data Logging</a> on page 271.</p>
Send		Taps it to submit the Data Logging report to the technical center via the Internet.

➤ **To print data in Diagnostics**

1. Tap the **Diagnostics** application button from the MaxiSys Job Menu. The **Print** button on the diagnostic toolbar is available throughout the whole Diagnostics operations.
2. Tap **Print** and a drop-down menu appears.
  - a) **Print This Page** – prints a screenshot copy of the current screen.
  - b) **Print All Data** – prints a PDF copy of all displayed data.
3. A temporary file will be created and sent to the computer for printing.
4. When the file is transferred successfully, a confirmation message displays.

---

## **NOTE**

Make sure the tablet is connected to the computer network, either via Wi-Fi or LAN, before printing. For more instructions on printing, see [Print](#) on page 256 for details.

---

### ➤ **To submit Data Logging reports in Diagnostics**

1. Tap the **Diagnostics** application button from the MaxiSys Job Menu. The pen-shaped **Data Logging** button on the diagnostic toolbar is available throughout the whole Diagnostics operations.
2. Tap the **Data Logging** button to open a selection box. Select the abnormal type(s) in the box. A blue tick indicates which option is selected. Tap **OK** to continue.
3. A submission form will display to let you fill in the report information.
4. Tap the **Send** button in the upper right corner of the screen to submit the report form via the Internet, a confirmation message displays when sending is successful.

## *Status Information Bar*

The Status Information Bar at the top of the Main Section displays the following items:

1. VCMI Icon – indicates the communication status between the tablet and the VCMI device.
2. Battery Icon – indicates the battery status of the vehicle.

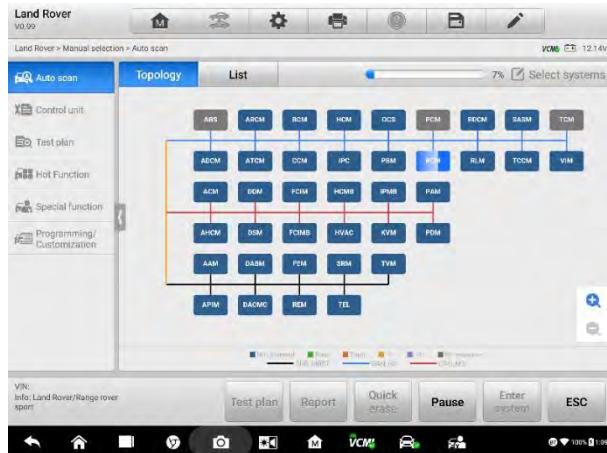
## *Main Section*

The Main Section varies depending on the stage of operations which shows vehicle identification selections, the main menu, test data, messages, instructions and other diagnostic information.

The introductions below are of the two tab pages in the Main Section.

### **A. Topology Tab Page**

The Topology Tab Page displays a system distribution diagram of the vehicle control modules.



**Figure 4-9 Sample Topology Tab Page**

Tap the modules to perform further diagnosis and other test activities. A Function Menu screen (Figure 4-11) shall then display.

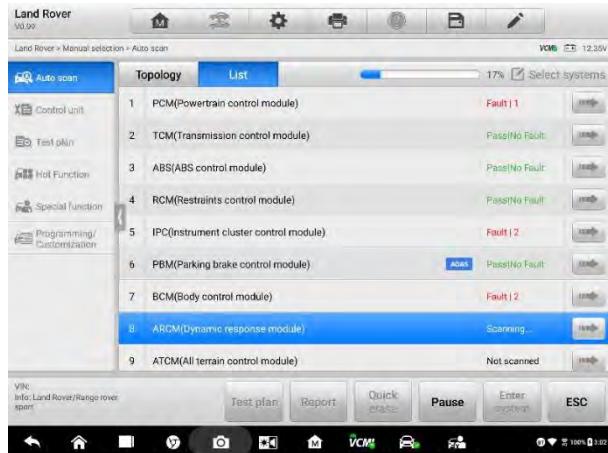
## B. List Tab Page

Column 1 – displays the system numbers.

Column 2 – displays the scanned systems.

Column 3 – displays the diagnostic marks indicating different conditions of the test result.

- ◊ **-!-**: Indicates that the scanned system may not support the code reading function, or there is a communication error between the tester and the control system.
- ◊ **-?-:** Indicates that the vehicle control system has been detected, but the tester cannot accurately locate it.
- ◊ **Fault | #:** Indicates there is/are detected fault code(s) present; “#” indicates the number of the detected faults.
- ◊ **Pass | No Fault:** Indicates the system has passed the scanning process and no fault has been detected.
- ◊ **Not Scanned:** Indicates the system has not been scanned.
- ◊ **No Response:** Indicates the system has not received a response.



**Figure 4-10 Sample List Tab Page**

### *Functional Buttons*

The displayed Functional Buttons at the bottom of the screen vary by the stage of operations. They can be used to navigate, save or clear the diagnostic data, exit scanning as well as make other functional controls. The functions of these buttons will be introduced respectively in the following sections of the corresponding test operations.

The table below provides a brief description of the Functional Buttons' operations in Auto Scan:

**Table 4-3 Functional Buttons in Diagnostics Screen**

Name	Description
<b>Report</b>	Displays the diagnostic data in the report form.
<b>Quick Erase</b>	Erases DTC records and other data from the ECM.
<b>Fault Scan</b>	Scans vehicle system modules.
<b>Pause</b>	Pauses the scanning process.
<b>Enter System</b>	Enters the ECU system.
<b>ESC</b>	Returns to the previous screen or exit Auto Scan.

Select one of the system modules from the Topology or List, and tap **Enter System** to enter the specific system functions

## NOTE

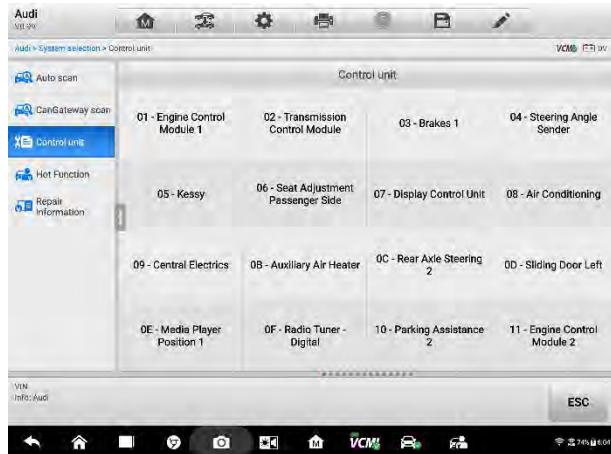
With the diagnostic toolbar hovering at the top of the screen throughout the whole diagnostic procedures, you can perform various operations on the diagnostic information at any time, such as printing and saving the displayed data, obtaining help information, or performing data logging.



Figure 4-11 Sample Function Menu Screen

The options vary slightly for different vehicles. The function menu may include:

- **ECU Information** – provides the retrieved ECU information in detail. Selecting opens an information screen.
- **Read Codes** – displays detailed information of DTC records retrieved from the vehicle control module.
- **Erase Codes** – erases DTC records and other data from the ECM.
- **Live Data** – retrieves and displays live data and parameters from the vehicle's ECU.
- **Active Test** – provides specific subsystem and component tests. This selection may appear as *Actuators*, *Actuator Test*, or *Function Tests* and the tests options vary depending on the manufacturer and model.
- **Control Unit** - This option allows you to manually locate a required control system for testing through a series of choices. Simply follow the menu driven procedure, and make proper selection each time; the program will guide you to the diagnostic function menu after you complete the choices.



**Figure 4-12 Sample Control Unit Screen**

- **Special Functions** – provides component adaptation or variant coding functions for custom configurations, and allows you to reprogram adaptive values for certain components after making repairs. Depending on the test vehicle, this section may appear as *Idle Learn*, *CKP Variation Learn*, Engine Oil Life Reset, *Fuel Trim Reset* or something similar.

### Screen Messages

Screen messages appear when additional input is needed before proceeding. There are mainly three types of on-screen messages as to their purposes: Confirmation, Warning, and Error.

#### ● Confirmation Messages

This type of messages usually displays as an “Information” screen, which appears when you are about to perform an action that cannot be reversed or when an action has been initiated and your confirmation is needed to continue.

When a user-response is not required to continue, the message displays briefly before automatically disappearing.

#### ● Warning Messages

This type of messages appears when completing the selected action may result in an irreversible change or loss of data. A typical example is the “Erase Codes” message.

#### ● Error Messages

Error messages appear when a systemic or procedural error has occurred. Possible errors include cable disconnection and communication interruption due to certain reasons.

## 4.2.2 Making Selections

The Diagnostics application is a menu-driven program that presents a series of choices one at a time. As you select from a menu, the next menu in the series displays. Each selection narrows the focus and leads to the desired test. Use your fingertip or the stylus pen to make menu selections.

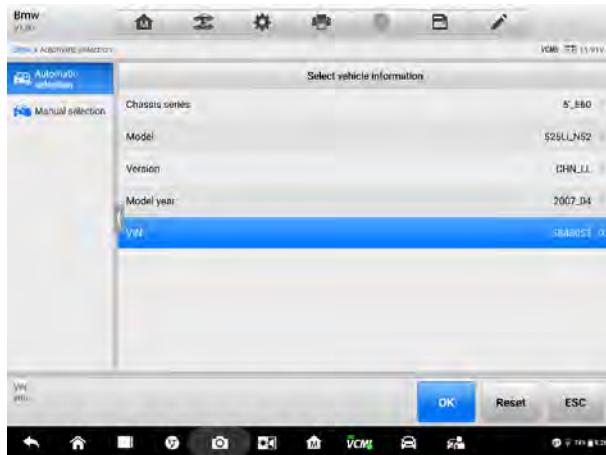
## 4.3 Auto Scan

---

The Auto Scan function performs a comprehensive scanning over all the systems on the vehicle's ECU in order to locate fault systems and retrieve DTCs. Tap Fault Scan to start. A system which has passed scanning with no fault is shown in green font; whereas a system that proves to be faulty in the scan is shown in orange.

➤ **To perform Auto Scan function**

1. Tap the **Diagnostics** application button in the MaxiSys Job Menu. Choose the corresponding vehicle information and enter the vehicle diagnostic page.



**Figure 4-13 Sample Vehicle Selection Screen**

2. The Topology tab page appears in the main section. Tap **Fault Scan** from the bottom functional buttons to scan the vehicle system modules.



**Figure 4-14 Sample Auto Scan Screen 1**

3. A system which has passed scanning with no fault is shown in green; whereas a system that proves to be faulty in the scan is shown in orange.



**Figure 4-15 Sample Auto Scan Screen 2**

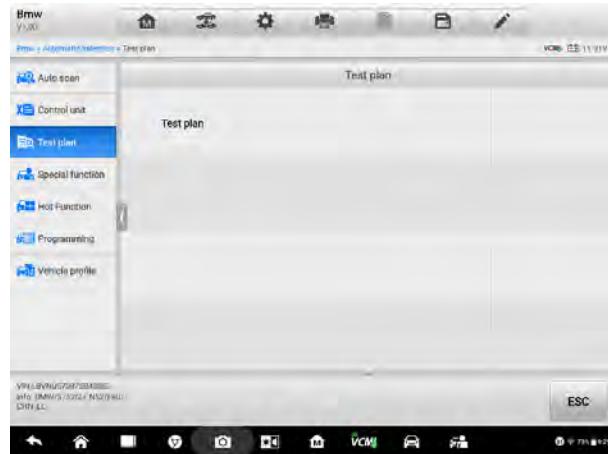
### 4.3.1 Test Plan

The Test Plan function intelligently calculates the priority of vehicle DTCs and guides users to solve the problems step by step. This function is currently available for some vehicles and more vehicles will be supported after subsequent updates.

#### ➤ To perform Test Plan function

1. Tap **Test Plan** from the bottom functional buttons, or tap **Test Plan** in the

navigation bar to the left of the screen, then select **Test Plan** in the main section.



**Figure 4-16 Sample Test Plan Screen 1**

2. A test plan appears showing recommended priority for each item. Items with higher priority should be tested first.

Type	Description	Custom	Priority	Details
Service function	UHS pre delivery check	Not performed	1	
Service function	Ignition circuit, safety system (airbag)	Not performed	2	
Service function	Voltage supply for Central Information Display (C10)	Not performed	4	
Service function	Supply, Instrument panel (KOMBI)	Not performed	5	
Service function	Electric steering lock	Not performed	5	
Service function	Supply to Car Access System (CAS)	Not performed	6	
Service function	Seat belt buckle contact	Not performed	6	
Service function	Power supply, steering column switch cluster	Not performed	6	

**Figure 4-17 Sample Test Plan Screen 2**

4. Tap the button to test relative functions. Tap the button to see the system information in detail and tap again to fold it.



**Figure 4 18 Sample Test Plan Screen 3**

5. Press **OK** to continue.



**Figure 4 19 Sample Test Plan Screen 4**

6. Follow the instructions on the tablet to continue until the function is executed.

## 4.4 Read and Erase Codes

### 4.4.1 Read Codes

This function retrieves and displays the DTCs from the vehicle's control system. The Read Codes screen varies for each vehicle being tested. For some vehicles, freeze frame data can also be retrieved for viewing. The sample Read Codes screen displays as below:



Figure 4-20 Sample Read Codes Screen

1. Diagnostics Toolbar – see [Table 4-2 Diagnostics Toolbar Buttons](#) on page 31 for details.
2. Current Directory Path
3. Status Information Bar
4. Navigation Bar
5. Main Section
  - Column 1 – displays the retrieved codes from the vehicle.
  - Column 2 – indicates the status of the retrieved codes.
  - Column 3 – detailed descriptions for the retrieved codes.
6. Functional Buttons
  - **DTC guide** – tap to check related repair cases and help information.
  - **Freeze Frame** – only available when freeze frame data is available for viewing; Selecting displays a data screen, which looks very similar to the Read Codes interface, therefore same operation method may be applied.

- **Search** – tap it to search the selected DTC related information on the Internet.
- **Erase codes** - after reading the retrieved codes from the vehicle and certain repairs have been carried out, you can erase the codes from the vehicle using this function.
- **Read codes** - retrieves and displays the DTCs from the vehicle's control system. The Read Codes screen varies for each vehicle being tested.
- **ESC** – tap it to return to the previous screen or exit the function.

#### 4.1.2 Erase Codes

After reading the retrieved codes from the vehicle and certain repairs have been carried out, you can erase the codes from the vehicle using this function. Before performing this function, make sure the vehicle's ignition key is in the ON (RUN) position with the engine off.

➤ **To erase codes**

1. Tap **Erase Codes** in the Function Menu.
2. A warning message displays to inform you of data loss when this function is applied.
  - a) Tap **Yes** to continue. A confirming screen displays when the operation is successfully done.
  - b) Tap **No** to exit.
3. Tap **ESC** on the confirming screen to exit Erase Codes.
4. Check the Read Codes function again to ensure the operation is successful.

### 4.5 Live Data

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When this function is selected, the screen displays the data list for the selected module. The data available for any control module varies from one vehicle to another. The parameters display in the order that they are transmitted by the ECM, so expect variation among vehicles.

Gesture scrolling allows you to quickly move through the data list. Touch the screen and drag your finger up or down to reposition the parameters being displayed if the data occupies more than one screen. The figure below displays a typical Live Data screen:



**Figure 4-21 Sample Live Data Screen**

1. Diagnostics Toolbar Buttons – see [Table 4-2 Diagnostics Toolbar Buttons](#) on page 31 for detailed descriptions of the operations for each button.
2. Current Directory Path
3. Status Information Bar
4. Navigation Bar
5. Main Section
  - Name Column – this column displays the parameter names.
    - a) Check Box – tap the check box to the left of a parameter name to select the item. Tap the check box again to deselect it.
    - b) Drop-down Button – tap the drop-down button on the right side of the parameter name to open a submenu, which provides optional modes in which to display the data.
  - Value Column – displays the values of the parameter items.
  - Unit Column – displays the unit for the parameter values.
    - To change the Unit mode, tap the **Setting** button in the top toolbar and select a required mode. See [Unit](#) on page 255.

## Display Mode

There are four types of display modes available for data viewing, allowing you to view various types of parameters in the most suitable way for better data check-ups.

Tap the drop-down button on the right side of the parameter name to open a submenu. There are 4 buttons to configure the data display mode, plus one **Help** button on the right, active when additional information is available for your reference.

Each parameter item displays the selected mode independently.

- ❖ **Analog Gauge Mode** – displays the parameters in gauge charts.
- ❖ **Text Mode** – the default mode that displays the parameters in texts lists.

---

## NOTE

Status parameters, such as a switch reading like ON, OFF, ACTIVE, and ABORT can only be displayed in Text Mode. Whereas value parameters, such as a sensor reading, can be displayed in both text mode and graph modes.

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- ❖ **Waveform Graph Mode** – displays the parameters in waveform graphs.  
In this mode, three control buttons will appear on the right side of the parameter item, allowing you to manipulate the display status.
    - Text Button – resumes Text Display Mode.
    - Scale Button – changes the scale values, which are displayed below the waveform graph. There are four scales available: x1, x2, x4 and x8.
    - Zoom-in Button – taps once to display the selected data graph in full screen.
  - ❖ **Digital Gauge Mode** – displays the parameters in form of a digital gauge graph.
  - ❖ **Full Screen Display** – this option is only available in the waveform graph mode, and mostly used in Graph Merge status for data comparison. There are three control buttons available on the top right side of the screen under this mode.
    - Edit Button – tap to open an edit window, in which you can set the waveform color and the line thickness displayed for the selected parameter item.
    - Scale Button – tap to change the scale values below the waveform graph. There are four scales available: x1, x2, x4 and x8.
    - Zoom-out Button – tap to exit full screen display.
- **To edit the waveform color and line thickness in a data graph**
1. Select 1 to 3 parameter items to display in Waveform Graph mode.
  2. Tap the **Zoom-in Button** on the right side to display the data graph in full screen.
  3. Tap the **Edit Button**, and an edit window appears.
  4. Select a parameter item from the left column.

5. Select a desired sample color from the second column.
  6. Select a desired sample line thickness from the right column.
  7. Repeat step 4 to 6 to edit the waveform for each parameter item.
  8. Tap **Done** to save the setting and exit, or tap **Cancel** to exit without saving.
6. Functional Buttons

The operations of all the available functional buttons on the Live Data screen are described below:

- ◊ **Back** – redirects you to the previous screen or exit the function.
- ◊ **Record** – starts recording the retrieved live data; the recorded data is then stored as a video clip in the Data Manager application for future reviews. This function can be triggered automatically at preset threshold value or manually as you choose, and the triggering mode and record duration can be configured in the Setting mode of Live Data.
- ◊ **Freeze** – displays the retrieved data in freeze mode.
  - Previous Frame – moves to the previous frame of frozen data.
  - Next Frame – moves to the next frame of frozen data.
- ◊ **Resume** – this button displays when the Record or Freeze function is applied. Tapping this button stops data recording, or exit freeze data mode, and resumes normal data display mode.
- ◊ **Flag** – this button displays when the Record function is applied. Tapping this button sets flags for the recorded data at points wherever you choose, when playing back the recorded video clip later in *Data Manager*, the preset flag will enable a popup to allow notes to be input.
- ◊ **Clear Data** – tap this button to clear all previously retrieved parameter values at a cutting point whenever you choose.
- ◊ **To Top** – moves a selected data item to the top of the list.
- ◊ **Graph Merge** – tap this button to merge selected data graphs (for Waveform Graph Mode only). This function is very useful when comparing different parameters.

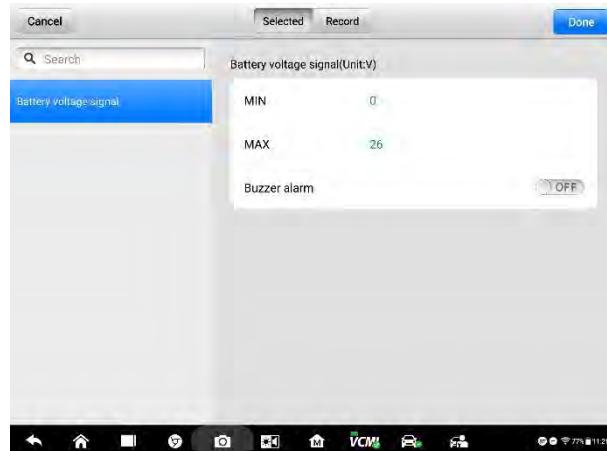
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#### **NOTE**

This mode supports Graph Merge for 2 to 3 parameter items only, select 2 or 3 items each time when making graph merge.

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- To cancel Graph Merge mode, tap the drop-down button on the right side of the parameter name, and select a data display mode.
- ❖ **Show Selected/Show All** – tap this button to exchange between the two options; one displays the selected parameter items, the other displays all the available items.
- ❖ **Setting** – tap this button to open a setting screen, which allows you to set the trigger mode, recording duration, and various threshold values for data recording, and make other controls.



**Figure 4-22 Sample Setting Mode in Live Data**

There are four navigation buttons at the top of the **Setting** mode screen.

- **Selected Button** – displays the configuration screen where you can set the threshold values, an upper limit and a lower limit, for triggering the buzzer alarm. This function is only applied to the Waveform Graph display mode.
  - a) MIN – tap this button to open a virtual keyboard to enter the required lower limit value.
  - b) MAX – tap this button to open a virtual keyboard to enter the required upper limit value.
  - c) Buzzer Alarm – switches the alarm on and off. The alarm function makes a beep sound as a reminder whenever the data reading reaches the preset minimum or maximum point.

➤ **To set threshold limits for the parameter values**

1. Tap the **Setting** button at the bottom of the Live Data screen.
2. Tap the **Selected** navigation button.
3. Select a parameter item from the left column, or enter the item name in the Search bar.
4. Tap the **MIN** button on the right side, and enter the required minimum value.
5. Tap the **MAX** button on the right side, and enter the required maximum value.
6. Tap the **ON/OFF** button on the right side of the Buzzer Alarm button to turn it on or off.
7. Tap **Done** to save the setting and return to the Live Data screen; or tap **Cancel** to exit without saving.

When the limits are successfully set, two horizontal lines appear on each of the data graphs (when Waveform Graph Mode is applied) to indicate the alarming point. The limit lines are shown in different colors for distinction from the parameter waveforms.

- **Record** – displays the configuration screen for Record Setting, where you can set the trigger type, duration and trigger point for the data recording function.
  - a) Trigger Type – sets the trigger mode for data recording, mainly of two kinds: Manual and Auto. There are four options available:
    - 1) Manual – allows you to manually start and stop data recording.
    - 2) DTC – auto triggers data recording when any DTC is detected.
    - 3) DTC Check Mode – auto triggers data recording when certain pre-selected DTC types are detected.
    - 4) Parameter – auto triggers data recording when any parameter value reaches the preset threshold.
  - b) Duration – sets the recording time (for Auto trigger mode only).
  - c) Trigger Point – reserves a relative percentage of a record length before the data recording start point for reference (for Auto trigger mode only).

➤ **To perform setting for live data record**

1. Tap the **Setting** functional button at the bottom of the Live Data screen.

2. Tap the **Record** navigation button.
  3. Tap the **>** button to the right of the **Trigger Type** bar and select the required trigger mode.
  4. Tap the **>** button to the right of the **Duration** bar and select a length of time.
  5. Tap the **>** button to the right of the **Trigger Point** bar and select a relative percentage of a record length to be reserved before the data recording start point.
  6. Tap **Done** to save the setting and return to the Live Data screen; or tap **Cancel** to exit without saving.
- **Done** – confirms and saves the setting, and redirects you to the Live Data screen.
  - **Cancel** – cancels the setting operation, and redirects you to the Live Data screen.

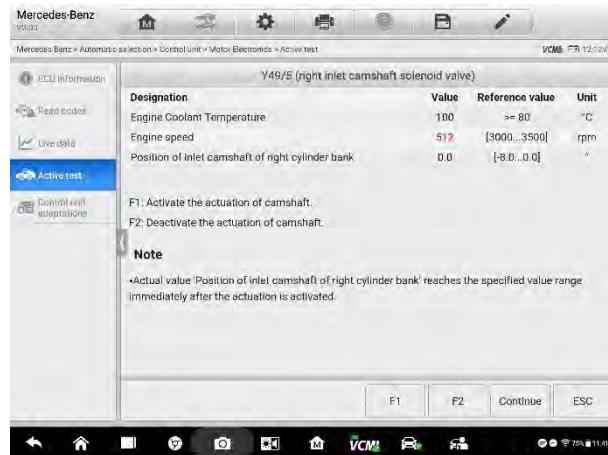
## 4.6 Active Test

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The Active Test function is used to access vehicle-specific subsystem and component tests. Only available test vehicles, which vary by manufacturer, year, and model, are displayed in the menu.

During an active test, the tester outputs commands to the ECU in order to drive the actuators. This test determines the integrity of the system or parts by reading ECU data, or by monitoring the operation of the actuators, such as switching a solenoid, relay, or switch, between two operating states.

Selecting Active Test opens a menu of test options that varies by make and model. Selecting a menu option activates the test. Follow all screen instructions while performing tests. How and what information is presented on the screen vary according to the type of test being performed. Some toggle and variable control tests display Active Test Controls at the top of the screen with data stream information below, or vice versa.



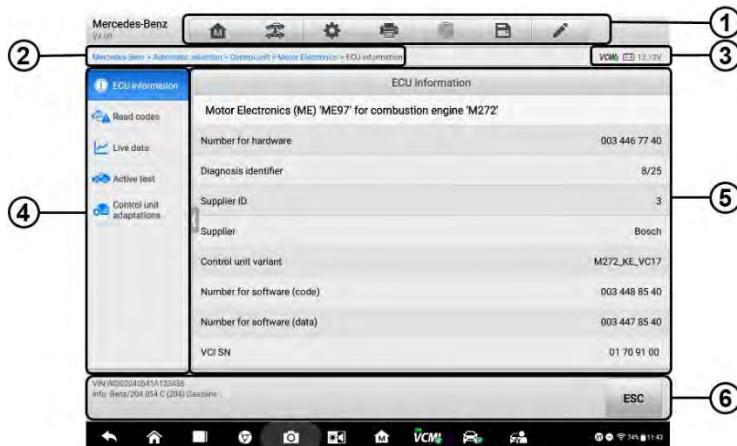
**Figure 4-23 Sample Active Test Screen**

The functional buttons in the lower right corner of the Active Test screen manipulate the test signals. The operational instructions are displayed in the main section of the test screen. Simply follow the on-screen instructions and make appropriate selections to complete the tests. Each time an operation is successfully executed, message such as "Command Finished", or "Activation Successful" displays.

Tap the **ESC** functional button to exit the test when finished.

## 4.7 ECU Information

This function retrieves and displays the specific information for the tested control unit, including unit type, version numbers and other specifications. The sample ECU Information screen displays as below:



**Figure 4-24 Sample ECU Information Screen**

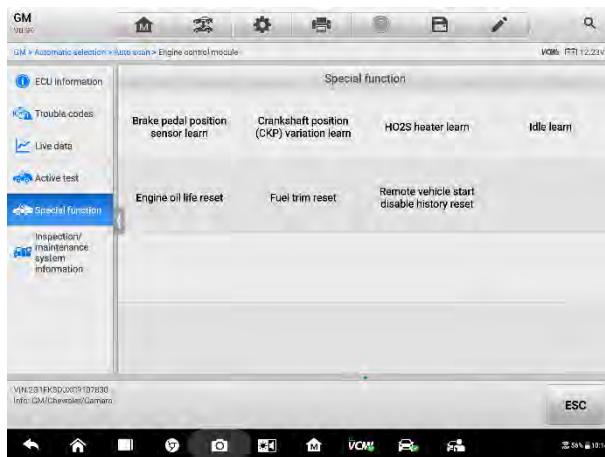
1. Diagnostics Toolbar Buttons – see [Table 4-2 Diagnostics Toolbar Buttons](#) on page 31 for detailed descriptions of the operations for each button.
2. Current Directory Path
3. Status Information Bar
4. Navigation Bar
5. Main Section – the left column displays the item names; the right column displays the specifications or descriptions.
6. Functional Button – in this case, only a **Back** (or **ESC**) button is available; tap it to exit after viewing.

## 4.8 Special Functions

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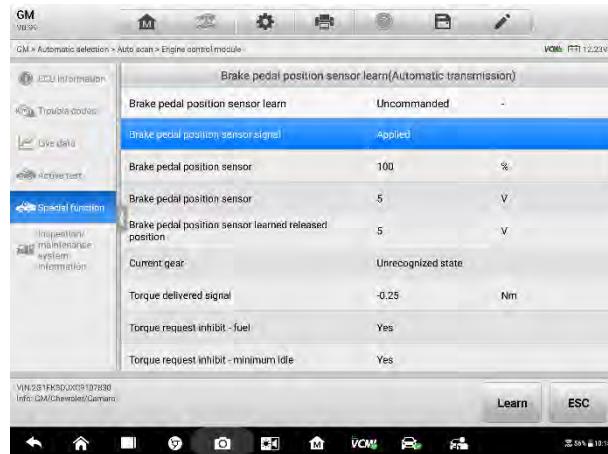
These functions perform various component adaptations, allowing you to recalibrate or configure certain components after making repairs or replacement.

The sample of the Special Function screen displays as below:



**Figure 4-25 Sample Special Function Screen 1**

Select one specific function, the screen displays as below:



**Figure 4-26 Sample Special Function Screen 2**

List Tab Page:

- Column 1 – displays the description of the function being performed or live data corresponding to the special function
- Column 2 – displays the execution status or value of the live data corresponding to the special function, such as Completed, or Activated, etc.
- Column 3 – displays the measurement units of the live data.

Tap the **Learn** button to perform the selected function and tap the **ESC** button to exit the function.

## 4.9 Programming and Coding

Since the introduction of OBD II and leading up to modern Hybrids and EVs, hardware and software technologies in cars have been advancing at an exponential rate. In-car software is becoming one of the leading needs for service, and updating software may be the only way to fix the following issues:

- Drivability
- Fuel Efficiency
- Power Loss
- Fault Codes
- Durability of Mechanical Parts

The Programming and Coding function is used to re-flash the vehicle control modules, which allows you to update the computer software of the vehicle to the latest version,

as well as to reprogram adaptive data for certain components after making repairs or replacements.

---

 **NOTE**

The programming function applies only when the vehicle is connected with a VCMI or J2534 programming device, which serves as a PassThru interface to establish communication with and transfer data to the vehicle's ECU.

Available programming or coding operations vary by test vehicle. Only the available operations display in the tablet menu.

There are two general types of programming operations:

- A. Coding – also known as *Teach-in Program*, or *Component Adaptation*, is used to reprogram adaptive data for vehicle control modules after repairs or replacements of vehicle parts.
- B. Reprogramming Operations – downloads the latest version of software from the online server database through Internet access (this procedure is done automatically when the tablet is connected to the Internet, so there is no need to check for software updates yourself), and reprograms the newest version into the vehicle's ECU.

---

 **NOTE**

Ensure that the tablet is connected to a stable internet access before applying the ECU programming function, so that the tablet is able to obtain access to the manufacturer's server for update service.

Selecting the Programming or Coding function opens a menu of operation options that varies by make and model. Selecting a menu option either shows a programming interface or opens another menu of additional choices. Follow all screen instructions while performing the programming or coding operations. How and what information is presented on the screen vary according to the type of operation being performed.

## 4.9.1 Coding

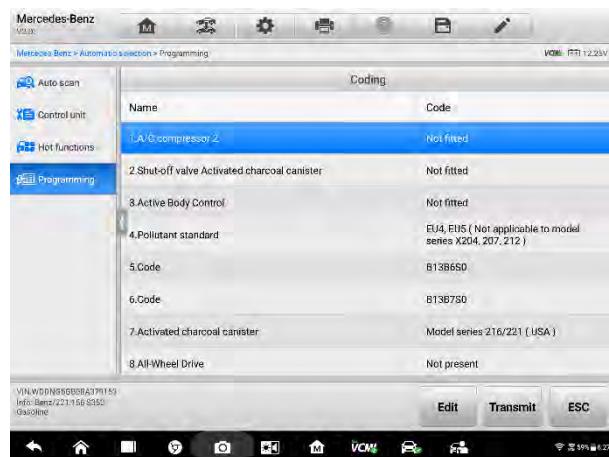


Figure 4-27 Sample Coding Screen

The main section of the Coding screen displays a list of vehicle components and the coding information that mainly consists of two parts:

1. All available systems for coding are displayed on the left side, and the coding data or value on the right side.
2. The bottom line of the main section displays the functional buttons, which allows you to manipulate the operation.

Check the vehicle condition and the coding information carefully, use the functional button to edit Codes for the corresponding components, tap **Send** when you finish editing all the items. When the operation is done, an execution status message such as Completed, Finished or Successful, may display.

Tap the **ESC** button to exit the function.

## 4.9.2 Reprogramming Operation

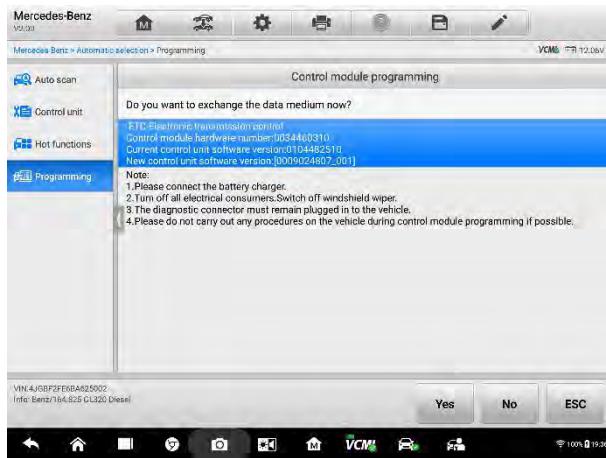
Before reprogramming begins:

- It is mandatory that Ultra tablet is connected to stable WiFi network.
- Tablet must be connected to VCMI by USB.
- Tablet battery must be fully charged during module programming. Connect tablet to charger if needed.
- Attach battery maintainer to vehicle battery to ensure steady 13-15 voltage is

maintained.

- If reprogramming a used module, it needs to be unlocked.
- Do not quit the application during a module reprogramming process or will fail.

Typical reprogramming operations require you to input and validate VIN number first. Tap the input box and enter the correct number, and the programming interface then displays.



**Figure 4-28 Sample Reprogramming Operation Screen**

The main section of the reprogramming interface offers information of the hardware, the current software version and the newest software versions to be programmed into the control units.

A series of on-screen operational instructions will display to guide you through the programming procedure.

Carefully read the on-screen information and follow the instruction to execute the programming procedure.

### 4.9.3 Re-flash Errors

#### ! IMPORATANT

When reprogramming onboard, always make sure the vehicle battery is fully charged and in good working condition. During reprogramming, the operation may fail if voltage falls below the proper operation voltage. Sometimes a failed operation can be recovered, but the failed reprogramming can also ruin the control module. We recommend connecting an external battery maintainer to the vehicle to ensure steady 12-15 voltage is maintained and a successful operation.

Occasionally a flash update procedure may not complete properly. Common causes of flash errors include poor cable connections between the tablet, VCMI, and vehicle, the vehicle ignition being switched off before the flash procedure is complete, or low vehicle battery voltage.

If the process crashes, recheck all the cable connections to assure good communications and initialize the flash procedure. The programming procedure will automatically repeat if the previous operation does not succeed.

## 4.10 Generic OBD II Operations

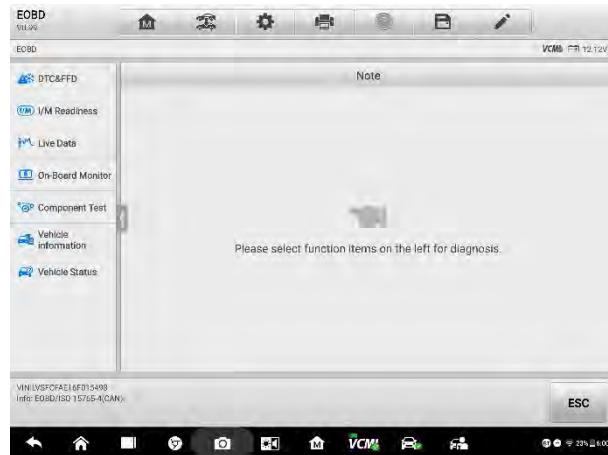
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A fast-access option for OBD II/EOBD vehicle diagnosis is available on the Vehicle Menu screen. This option presents a quick way to check for DTCs, isolate the cause of an illuminated malfunction indicator lamp (MIL), check monitor status prior to emissions certification testing, verify repairs, and perform other emissions-related services. The OBD direct access option is also used for testing OBD II/EOBD compliant vehicles that are not included in the Diagnostics database. Functions of the diagnostics toolbar buttons at the top of the screen are the same as those available for specific vehicle diagnostics. See [Table 4-2 Diagnostics Toolbar Buttons](#) on page 31 for details.

### General Procedure

➤ **To access the OBD II/EOBD diagnostics functions**

1. Tap the **Diagnostics** application button in the MaxiSys Job Menu. The Vehicle Menu displays.
2. Tap the **EOBD** button. There are two options to establish communication with the vehicle.
  - Auto Scan – select it to establish communication using each protocol in order to determine which one the vehicle is broadcasting on.
  - Protocol – select it to open a submenu of various protocols. A communication protocol is a standardized way of data communication between an ECM and a diagnostic tool. Global OBD may use several different communication protocols.
3. Select a specific protocol if the **Protocol** option is selected. Wait for the OBD II Diagnostic Menu to appear.



**Figure 4-29 Sample OBD II Diagnostic Menu**

4. Select a function option to continue.

- DTC & FFD
- I/M Readiness
- Live Data
- O2 Sensor Monitor
- On-Board Monitor
- Component Test
- Vehicle Information
- Vehicle Status

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**NOTE**

Some functions are supported only on certain vehicles.

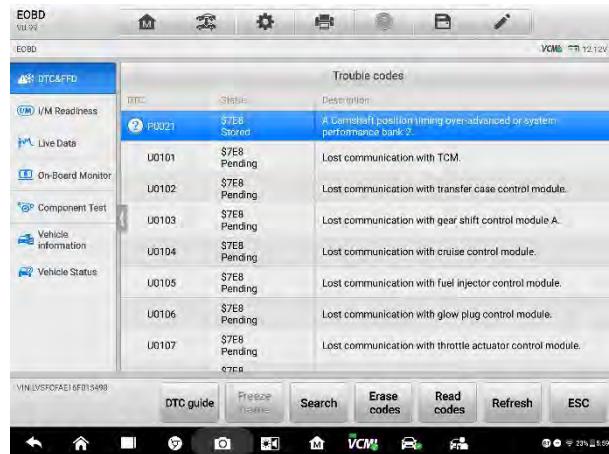
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## Function Descriptions

This section describes the various functions of each diagnostic option:

### DTC & FFD

When this function is selected, the screen displays a list of Stored Codes and Pending Codes. When the Freeze Frame data of certain DTCs are available for viewing, a snowflake button will display on the right side of the DTC item. The Erase Codes function can be applied by tapping the functional button at the bottom of the screen.



**Figure 4-30 Sample DTC & FFD Screen**

- **Stored Codes**

Stored codes are emission-related DTCs from the ECM of the vehicle. OBD II/EOBD Codes have a priority according to their emission severity, with higher-priority codes overwriting lower-priority ones. The priority of the code determines the illumination of the Malfunction Indicator Light (MIL) and the codes erase procedure. Manufacturers rank codes differently, so expect to see differences between vehicles.

- **Pending Codes**

These are codes whose storing conditions have been met during the last drive cycle, but need to be met on two or more consecutive drive cycles before the DTC stored. The purpose of this service is to assist the service technician after a vehicle repair when diagnostic information is cleared, by reporting test results after a single driving cycle.

- If a test fails during the driving cycle, the DTC associated is reported. If the pending fault does not occur again within 40 to 80 warm-up cycles, the fault is automatically cleared from memory.
- Test results reported by this service do not necessarily indicate a faulty component or system. If test results indicate another failure after additional driving, a DTC is stored to indicate a faulty component or system, and the MIL is illuminated.

- **Freeze Frame**

In most cases the stored frame is the last DTC reported. Certain DTCs, those that have a greater impact on vehicle emission, have a higher priority. In these cases,

DTC of the highest priority is the one for which the freeze frame records are retained. Freeze frame data includes a “snapshot” of critical parameter values at the time the DTC is stored.

- **Erase Codes**

This option is used to clear all emission-related diagnostic data such as, DTCs, freeze frame data and specific manufacturer-enhanced data from the vehicle’s ECM, and resets the I/M Readiness Monitor Status for all vehicle monitors to Not Ready or Not Complete status.

A confirmation screen displays when the clear codes option is selected to prevent accidental loss of data. Select **Yes** on the confirmation screen to continue, or **No** to exit.

### *I/M Readiness*

This function is used to check the readiness of the monitoring system. It is an excellent function to use prior to having a vehicle inspected for compliance to a state emissions program. Selecting I/M Readiness opens a submenu with two choices:

- Since DTCs Cleared – displays the status of monitors since the last time the DTCs are erased.
- This Driving Cycle – displays the status of monitors since the beginning of the current drive cycle.

### *Live Data*

This function enables the display of real-time PID data from the ECU. Displayed data includes analog and digital input and output, and system status information broadcast in the vehicle data stream.

Live data can be displayed in various modes, see [4.5 Live Data](#) on page 43 for detailed information.

### *O2 Sensor Monitor*

This function allows retrieval and review of recent O2 sensor monitor test results stored on the vehicle’s on-board computer.

The O2 Sensor Monitor test function is not supported by vehicles that communicate using a controller area network (CAN). For O2 Sensor Monitor tests results of CAN-equipped vehicles, refer to [On-Board Monitor](#).

### *On-Board Monitor*

This function allows you to view the results of On-Board Monitor tests. The tests are useful after the service when a vehicle’s control module memory is already erased.

### **Component Test**

This function enables dual-direction control of the ECM so that the diagnostic tool can transmit control commands to operate the vehicle systems. This function is useful in determining how well the ECM responds to a command.

### **Vehicle Information**

This function enables the display of the vehicle identification number (VIN), calibration identification number, calibration verification number (CVN), and other information of the test vehicle.

### **Vehicle Status**

This function service to check the current condition of the vehicle, such as the communication protocols of OBD II modules, retrieved codes amount, and status of the Malfunction Indicator Light (MIL).

## **4.11 Diagnostic Report**

---

### **Pre-Scan and Post-Scan**

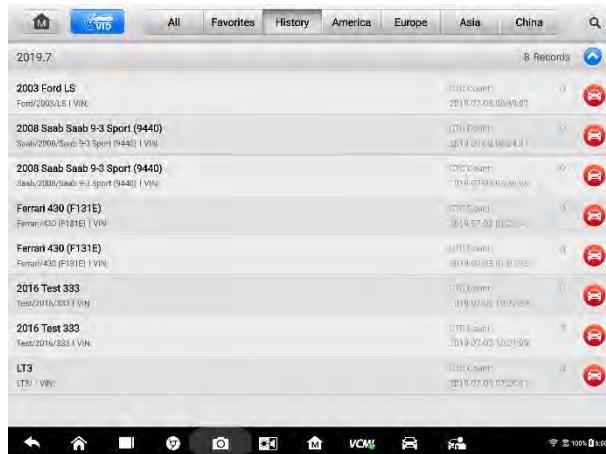
- To perform the pre-scan and post-scan functions:
  1. Auto SCAN the Vehicle - the Auto VID function can instantly identify all vehicle information. All available modules in all systems will be scanned automatically. Then DTCs and code details will be listed.
  2. Print Pre-SCAN Report - vehicle pictures can be attached to SCAN report. The report file can be generated and submitted. The report is customized with shop and vehicle information.
  3. Repair Vehicle - creates efficient repair plan from the start.
  4. Auto SCAN Repaired Vehicle - ensures no new faults were created during repair and no DTCs are present at completion.
  5. Print Post-SCAN Report - proves all DTCs on Pre-SCAN report are fixed.

### **Diagnostic Report PDF**

The diagnostic report can be reviewed, saved, and printed in the following interfaces.

- a) Via the **History** function:

- Enter the Diagnosis main page, and tap **History** in the Top Toolbar.



**Figure 4-31 Sample History Screen**

- Select a history record, and tap the button in the upper right corner to view, print, email or delete the PDF document.



**Figure 4-32 Sample Historical Test Screen**

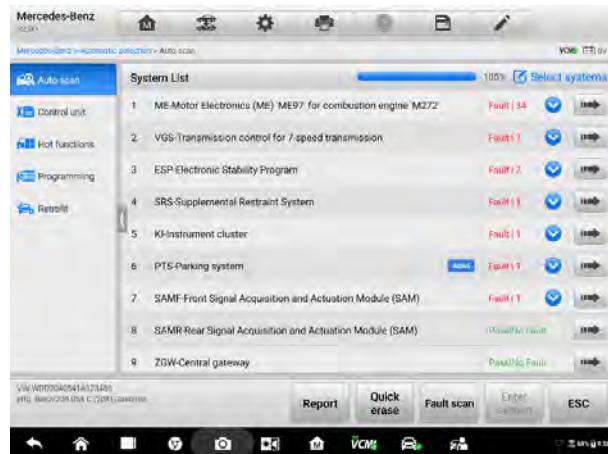
b) Via the Auto Scan function:

- Enter the Auto Scan page and tap **Fault Scan** in the Functional Button Bar at the bottom of the screen.



**Figure 4-33 Sample Auto Scan Screen 1**

- When the system scan is completed, tap **Report** in the Functional Button Bar at the bottom of the screen.

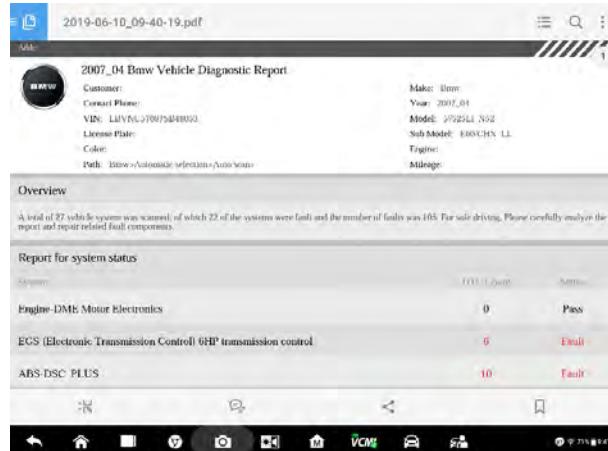


**Figure 4-34 Sample Auto Scan Screen 2**

- Tap the button in the Diagnostics Toolbar, and select **Save all data** to save the PDF document or select **Save this page** to save the screen shot of the current page.



**Figure 4-35 Sample Auto Scan Screen 3**



**Figure 4-36 Sample PDF Document Screen**

c) Via the functions on the Navigation Bar:

- The diagnostic report can also be reviewed through Auto scan, Read codes, Live data, and Active test, etc. functions page. Tap the button in the Diagnostics Toolbar, and select **Save all data** to save the PDF document or select **Save this page** to save the screen shot of the current page.



Figure 4-37 Sample Read Codes Screen

## 4.12 Exit Diagnostics

The Diagnostics application operates as long as communication with the vehicle is still active. You must exit the diagnostics operation interface to stop all communications with the vehicle before closing the Diagnostics application.

### NOTE

Damage to the vehicle electronic control module (ECM) may occur if communication is disrupted. Make sure that all forms of connection, such as data cable, USB cable, and wireless or wired network, are properly connected throughout the test. Exit all interfaces before disconnecting the test cable and power supply.

#### ➤ To exit the Diagnostics application

1. On an active diagnostic screen, tap the **Back** or **ESC** functional button to exit a diagnostic session step-by-step; Or
2. Tap the **Vehicle Swap** button in the diagnostics toolbar to return to the Vehicle Menu screen.
3. On the vehicle menu screen, tap the **Home** button in the top toolbar; or tap the **Back** button in the navigation bar at the bottom of the screen. Or
4. Tap the **Home** button in the diagnostics toolbar to exit the application directly and return to the MaxiSys Job Menu.

Now, the Diagnostics application is no longer communicating with the vehicle and it is safe to open other MaxiSys applications, or exit the MaxiSys Diagnostic System and return to the Android System's Home screen.

# 5 Repair Assist

Repair Assist is a specific fault code analysis function, with which you can access the most comprehensive and the latest code-specific data, tests information, real repairing cases and relevant fixes. It is finely assembled based on real shop repair orders and industry professionals.

Apart from that, in order to ensure the accuracy and reliability of the Repair Assist, a huge database has been built. Repair Assist adopts the scientific data cloud computing technology to match the specific fault code with the exact model of various vehicle brands. And the data has been verified strictly by maintenance experts.

The following are main parts of the code data contained in Repair Assist:

1. Technical Service Bulletin (OEM Information)
2. Frequency of Occurrence
3. Troubleshooting
4. Real Fixes
5. Relevant Repair Information
6. Recommended Cases

## 5.1 Access the System

---

Before starting Repair Assist, please ensure that the vehicle communication has been established properly. Namely, connect the MaxiSys Ultra Diagnostic tablet to the test vehicle through the VCMI device. For detailed steps for vehicle communication with the MaxiSys display tablet, see [Establish Vehicle Communication](#).

After all the above has been done, start with Auto scan, you will see the scanned modules listed on the main screen.

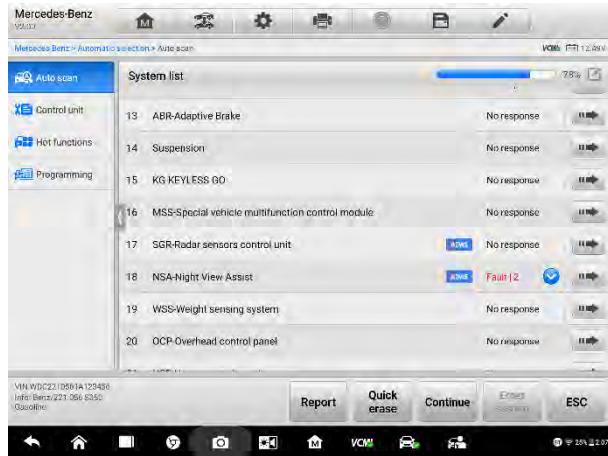


Figure 5-1 Sample System List Screen

For some vehicles, like Volkswagen, Audi, BMW, Ford, Land Rover, Jaguar, Chrysler, Fiat, Volvo, a topology is added for presenting the relations and differences of vehicle systems.

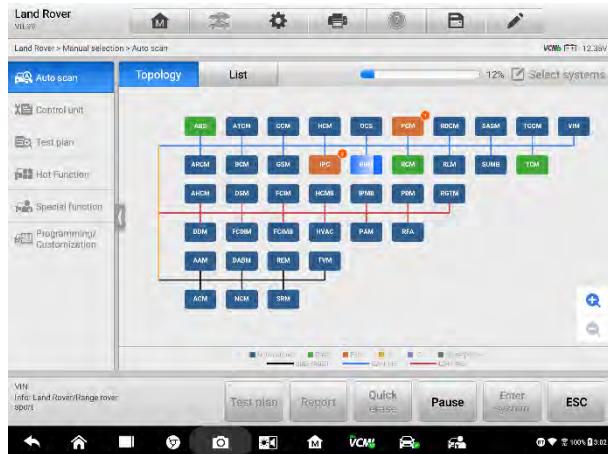


Figure 5-2 Sample Topology Display Screen

To review the Auto scan procedures, see Chapter 4 Basic Diagnostic Operation (Getting Started)

- To access the system
  1. Tap the **List** button, a list of modules is scanned or in the process of scanning.

2. Choose one entry from the module list.
3. Tap the grey arrow icon (**Figure 5-1 System list**) on the right of the entry to enter a screen with code results dropdown.

## 5.2 Code Results Dropdown Menu

---

The first step is to read the DTCs through **Read codes**. For detailed procedure, see [Read Code](#) in Basic Diagnostic Operation.

After DTCs have been read, the code results dropdown menu is displayed together with status and description. There are some diagnostic icons in grey color (**Figure 5-3 DTC code dropdown menu**) on the right and under the **DTC guide**. Select one of these icons and enter the core of Repair Assist - repair case

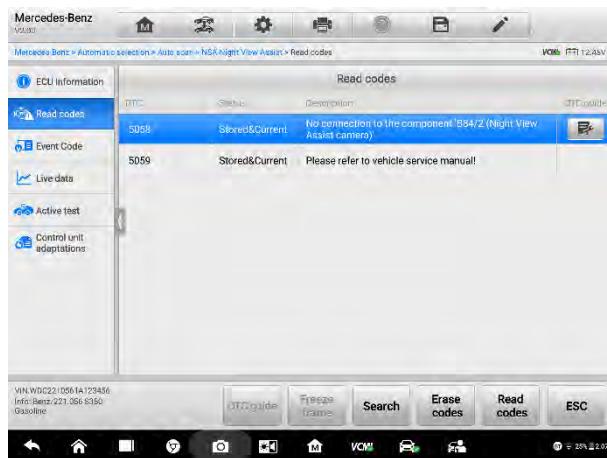
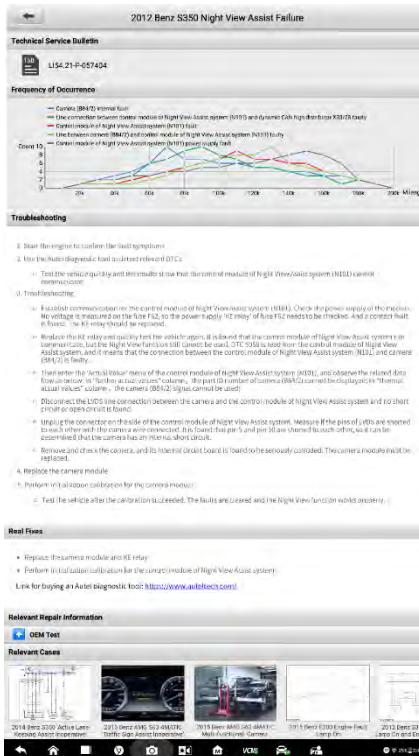


Figure 5-3 Sample DTC Code Dropdown Menu

## 5.3 Repair Case Screen Layout

---

Repair Assist is divided into 6 main sections and sub-sections with multiple diagnostic procedures and repair cases. Each section contains detailed description and introduction.

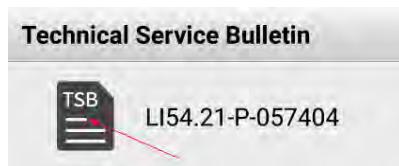


**Figure 5-4 Sample Repair Case Layout**

1. Title - displays the year, brand, and model of the vehicle, together with its fault.
2. **Technical Service Bulletin** - contains code-specific Recalls, TSB, and OEM campaigns.
3. **Frequency of Occurrence** - graphically displays the frequency tendency of different types of faults as mileage increases.
4. **Troubleshooting** - displays the detailed steps of detecting and clearing DTCs.
5. **Real Fixes** - sums up fix steps for real repair in a simpler way.
6. Autel tool link - offers links for buying Autel diagnostic tools.
7. **Relevant Repair Information** - describes repair procedures in detail.
8. Subdivision steps - shows specific operations on components during maintenance.
9. **Relevant Cases** - recommends other relevant fault-clearing cases for the same type of vehicle.

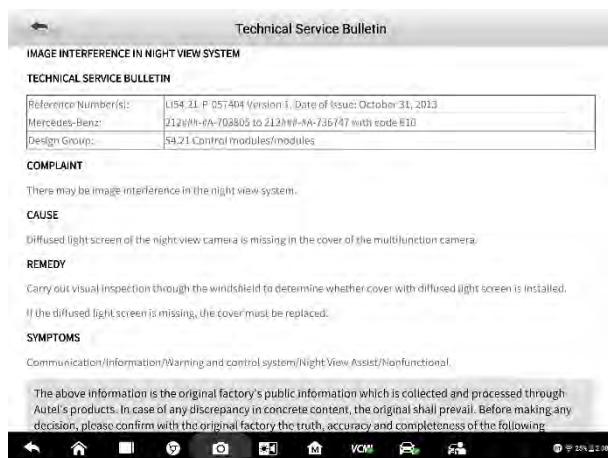
## 5.4 Technical Service Bulletin (OEM Information)

The Technical Service Bulletin provides a precise tool for matching the selected fault code with relevant TSB or OEM. It shortens searching time, simplifies operational procedures, and directly displays the data as required.



**Figure 5-5 Sample TSB Screen**

For details, please tap the TSB icon, and you will see a file unfolded with OEM Information. The following graph is an example of cause analysis of image interference in night view system with exact TSB information, complaint, causes, remedy and relevant symptoms for the vehicle.



**Figure 5-6 Sample Detailed TSB Screen**

## 5.5 Frequency of Occurrence

The Frequency of Occurrence graph shows the frequencies of different faults as mileage increases.



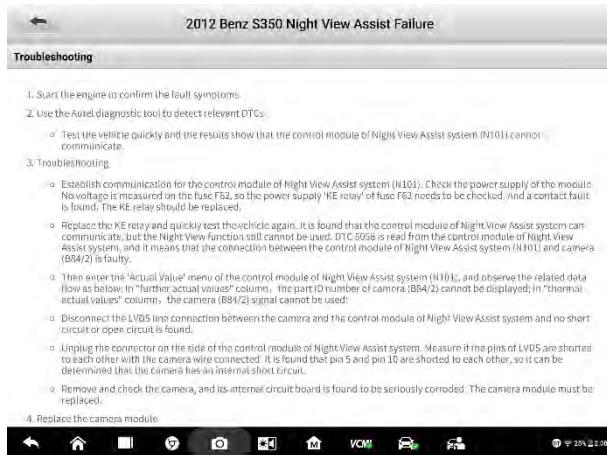
**Figure 5-7 Sample Frequency of Occurrence Graph**

Graph example: As is shown in the graph below, each fault has its changing frequency that peaks at a certain mileage. Before the mileage reaches 100k miles, the camera internal fault occurs more frequently than other fault types, with its highest frequency of 10 coming at 70k miles, while line connection fault between control module of Night View Assist system (N101) and dynamic CAN high distributor X30/28 occurs as frequently as 10 at 90k miles. As the mileage approaches 110k miles, the occurrence of the two faults drops, giving way to Night View Assist system control module fault which, after reaching 9 at 110k miles, starts to decline at the same point. Another line fault between camera (B84/2) and control module of Night View Assist (N101), poses not much threat in the previous 110k miles, but it boasts a maximum occurrence of 8 when the vehicle travels 130k miles. Similarly, the power supply fault of control module of Night View Assist (N101) becomes most worrisome at 150k miles.

In conclusion, the graph provides a convenient reference to locating possible faults of the Night View Assist function in accordance with the driving mileage.

## 5.6 Troubleshooting

Troubleshooting presents a series of diagnostic and repair steps from confirming fault symptoms to clearing the faults. Troubleshooting is not only introduced by the way of words description, but also presented by video explanation for some specific vehicles' repairing process.



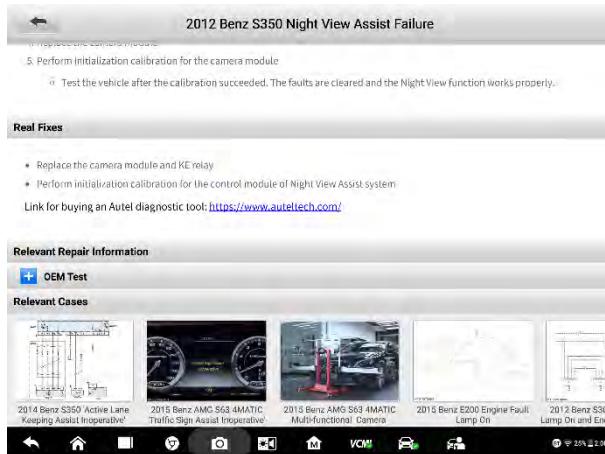
**Figure 5-8 Sample Troubleshooting Description 1 (Words)**



**Figure 5-9 Sample Troubleshooting Description 2 (Video)**

## 5.7 Real Fixes

Real fixes gives a brief introduction of real repair operations. Follow these steps and start your repair tests.



**Figure 5-10 Sample Repair Fixes Steps Screen**

When a diagnostic tool is required during the repair process, tap the following link of Autel official website and buy the tools you need. <https://www.auteltech.com/>

## 5.8 Relevant Repair Information

This part is described with OEM test or other operating guidance for specific repair steps. In order to present clear and professional repair information, multiple forms of description are used, including relevant circuit or wiring diagrams, tablets, vehicle structures analysis, and components separation, together with a lot of key notes.



**Figure 5-11 Sample Relevant Repair Info Screen 1**



Multifunction camera A40/13

Wiring diagram for multifunction camera	PE54.21-P-2129-57RKBA
Abbreviations of signal and circuit designations for wiring diagrams	OV00.01-P-1001-28RKA
Use of wiring diagrams	OV00.01-P-1901-03RKA
Search aid for all electrical components	OV00.01-P-1909RKA
Location and assignment of fine and plug connectors	GF00.19-P-1000RKA
Location and assignment of ground points	GF00.19_P_2000RKA
Location and assignment of Z connector sleeves (wiring and plug connectors in wiring harness)	GF00.19_P_3000RKA
Fuse and relay box, as built configuration	GF54.15-P_0800RKA



Figure 5-12 Sample Relevant Repair Info Screen 2

## 5.9 Relevant Cases

This part offers relevant repair cases of different vehicle models with similar faults or the same vehicle model with different faults. To make the best of the repair cases, tap the related items recommended, and you will get more knowledge of the same fault.

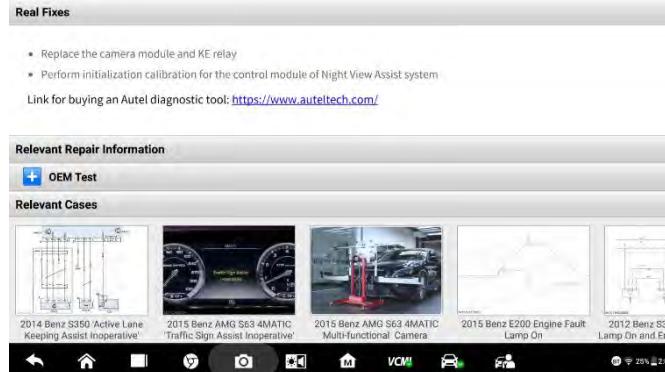


Figure 5-13 Sample Relevant Repair Info Screen 2

- How to move with the procedure?
  1. Tap the repair case icon and enter its main page.
  2. Scroll through the page and find the information you want.
  3. After finishing the browsing, you can tap the arrow icon at the left top and return to the previous repair case page.

# 6 Service

The **Service** section is specially designed to provide quick access to the vehicle systems for various scheduled service and maintenance tasks. The typical service operation screen is a series of menu driven executive commands. Follow on-screen instructions to select appropriate execution options, enter correct values or data, and perform necessary actions. The application will display detailed instructions to complete selected service operations.

After entering each special function, the screen will display two application choices: **Diagnosis** and **Hot Functions**. The **Diagnosis** enables the reading and clearing of codes which is sometimes necessary after completing certain special functions. **Hot Functions** consists of sub functions of the selected special function.



Figure 6-1 Sample Service Menu

Several most commonly used services are described in this chapter.

## 6.1 Oil Reset Service

Perform reset for the Engine Oil Life system, which calculates an optimal oil life change interval depending on the vehicle driving conditions and climate. The Oil Life Reminder must be reset each time the oil is changed, so the system can calculate when the next oil change is required.

### NOTE

1. Always reset the engine oil life to 100% after every oil change.

2. All required work must be carried out before the service indicators are reset. Failure to do so may result in incorrect service values and cause DTCs to be stored by the relevant control module.
  3. For some vehicles, the scan tool can reset additional service lights such as maintenance cycle and service interval. On BMW vehicles for example, service resets include engine oil, spark plugs, front/rear brakes, coolant, particle filter, brake fluid, micro filter, vehicle inspection, exhaust emission inspection and vehicle checks.
- 

## 6.2 Electric Parking Brake (EPB) Service

---

This function has a multitude of usages to maintain the electronic braking system safely and effectively. The applications include deactivating and activating the brake control system, assisting with brake fluid control, opening and closing brake pads, and setting brakes after disc or pad replacement.

### 6.2.1 EPB Safety

It can be dangerous to perform Electric Parking Brake (EPB) system maintenance, so before you begin the service work, please keep these rules in mind.

- ✓ Ensure that you are fully familiar with the braking system and its operation before commencing any work.
- ✓ The EPB control system may be required to be deactivated before carrying out any maintenance/diagnostic work on the brake system. This can be done from the tool menu.
- ✓ Only perform maintenance work when the vehicle is stationary and on level ground.
- ✓ Ensure that the EPB control system is reactivated after the maintenance work has been completed.

---

#### NOTE

Autel accepts no responsibility for any accident or injury arising from the maintenance of the Electric Parking Brake system.

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## 6.3 Tire Pressure Monitoring System (TPMS) Service

---

This function allows you to quickly look up the tire sensor IDs from the vehicle's ECU, as well as to perform TPMS replacement and reset procedures after tire sensors are replaced.

## **6.4 Battery Management System (BMS) Service**

---

The Battery Management System (BMS) allows the tool to evaluate the battery charge state, monitor the close-circuit current, register the battery replacement, activate the rest state of the vehicle, and charge the battery via the diagnostic socket.

---

### **NOTE**

1. This function is not supported by all vehicles.
  2. The sub functions and actual test screens of the BMS may vary by vehicle, please follow the on-screen instructions to make correct option selection.
- 

The vehicle may use either a sealed lead-acid battery or an AGM (Absorbed Glass Mat) battery. Lead acid battery contains liquid sulphuric acid and can spill when overturned. AGM battery (known as VRLA battery, valve regulated lead acid) also contains sulphuric acid, but the acid is contained in glass mats between terminal plates.

It is recommended that the replacement aftermarket battery has the same specifications, such as capacity and type, as the exiting battery. If the original battery is replaced with a different type of battery (e.g. a lead-acid battery is replaced with an AGM battery) or a battery with a different capacity (mAh), the vehicle may require reprogramming of the new battery type, in addition to, performing the battery reset. Consult the vehicle manual for additional vehicle-specific information.

## **6.5 Diesel Particle Filter (DPF) Service**

---

The Diesel Particle Filter (DPF) function manages DPF regeneration, DPF component replacement teach-in and DPF teach-in after replacing the engine control unit.

The ECM monitors driving style and selects a suitable time to employ regeneration. Cars driven a lot at idling speed and low load will attempt to regenerate earlier than cars driven more with higher load and speed. In order for regeneration to take place, a prolonged high exhaust temperature must be obtained.

In the event of the car being driven in such a way that regeneration is not possible, i.e., frequent short journeys, a diagnostic trouble code will eventually be registered in addition to the DPF light and "Check Engine" indicators displaying. A service regeneration can be requested in the workshop using the diagnostic tool.

Before performing a forced DPF regeneration using the tool, check the following items:

- The fuel light is not on.
- No DPF-relevant faults are stored in system.
- The vehicle has the specified engine oil.
- The oil for diesel is not contaminated.

---

**! IMPORTANT**

Before diagnosing a problem vehicle and attempting to perform an emergency regeneration, it is important to obtain a full diagnostic log and read out relevant measured value blocks.

---

**✎ NOTE**

1. The DPF will not regenerate if the engine management light is on, or there is a faulty EGR valve.
  2. The ECU must be re-adapted when replacing the DPF and when topping up the fuel additive Eolys.
  3. If the vehicle needs to be driven in order to perform a DPF service, a second person is needed for the function. One person should drive the vehicle while the other person observes the screen on the Tool. Do not attempt to drive and observe the scan tool at the same time. This is dangerous and puts your life and the lives of other motors and pedestrians at risk.
- 

## 6.6 Immobilizer (IMMO) Service

---

An immobilizer is an anti-theft mechanism that prevents an automobile's engine from starting unless the correct ignition key or other device is present. This device prevents thieves from starting the car by a method known as hot wiring. Most new vehicles have an immobilizer as standard equipment. An important advantage of this system is that it doesn't require the car owner to activate it; it operates automatically. An immobilizer is considered as providing much more effective anti-theft protection than an audible alarm alone; many auto insurance companies offer lower rates for vehicles that are equipped with an immobilizer.

As an anti-theft device, an immobilizer disables one of the systems needed to start a car's engine, usually the fuel supply or the ignition. This is accomplished by radio frequency identification between a transponder in the ignition key and a device called a radio frequency reader in the steering column. When the key is placed in the ignition, the transponder sends a signal with a unique identification code to the reader, which relays it to a receiver in the vehicle's computer control module. If the code is correct, the computer allows the fuel supply and ignition systems to operate and start the car. If the code is incorrect or absent, the computer disables the system, and the car will be unable to start until the correct key is placed in the ignition.

The IMMO service can disable a lost vehicle key and program the replacement key fob. One or more replacement key fobs can be programmed.

## **6.7 Steering Angle Sensor (SAS) Service**

---

Steering Angle Sensor Calibration permanently stores the current steering wheel position as the straight-ahead position in the steering angle sensor EEPROM. Therefore, the front wheels and the steering wheel must be set exactly to the straight-ahead position before calibration. In addition, the vehicle identification number (VIN) is also read from the instrument cluster and stored permanently in the steering angle sensor EEPROM. On successful completion of calibration, the steering angle sensor fault memory is automatically cleared.

Calibration must always be carried out after the following operations:

- Steering wheel replacement
- Steering angle sensor replacement
- Any maintenance that involves opening the connector hub from the steering angle sensor to the column
- Any maintenance or repair work on the steering linkage, steering gear or other related mechanism
- Wheel alignment or wheel track adjustment
- Accident repairs where damage to the steering angle sensor or assembly, or any part of the steering system may have occurred



### **NOTE**

1. Autel accepts no responsibility for any accident or injury arising from servicing the SAS system. When interpreting DTCs retrieved from the vehicle, always follow the manufacturer's recommendation for repair.
  2. All software screens shown in this manual are examples, actual test screens may vary by test vehicle. Pay attention to the menu titles and onscreen instructions to make correct option selections.
  3. Before starting procedure, make sure vehicle has an ESC button. Look for button on dash.
-

# 7 Remote Programming

Remote Programming Operation is a support function based on data transmission through Cloud platform, providing remote programming for solving tricky diagnostic troubles.

## 7.1 General Introduction

Remote programming operation uses the Cloud platform to build an invisible bridge that connects the client diagnostic tablet with experts that have OEM software information. The following figure gives you a more intuitive presentation of the principles of the Remote Programming function.

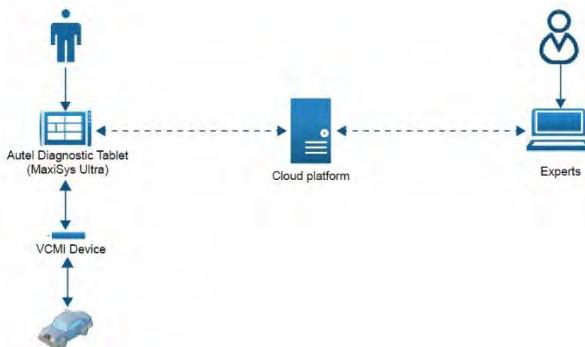


Figure 7-1 Principles of Remote Programming

Table 7-1 Description of Remote Programming principle

Name	Description
VCMI device	Build a link between the vehicle and the Autel diagnostic tablet.
MaxiSys Ultra	Tap the Remote Programming module on its screen for uploading diagnostic data and other questions.
Cloud platform	Transmit diagnostic data from the vehicle side to the experts, making it possible for the experts doing OEM remote programming for vehicle diagnosis.
Experts	Provide technical support for diagnostic troubles based on OEM software.

The Remote Programming is a newly developed module which supplements the MaxiSys Ultra in vehicle diagnosis. It overcomes the distance problem and expands the functions of the MaxiSys Ultra diagnostic tablet. Apart from that, Remote Programming provides instant support for dealing with new faults in diagnosing the latest vehicle models.

---

 **NOTE**

Except for the above professional functions, Remote Programming cannot be ignored also because the expert support is free of charge.

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## 7.2 Getting Started

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Before getting started, a proper connection between the vehicle and VCMI is required. When faults have been detected, there is no way to solve it because of OEM restriction. It is time for you to log in to the Remote Programming module on the MaxiSys Ultra tablet. Remote Programming has a quite easy access channel, just follow the steps below:

➤ **To open the Remote Programming application:**

1. Tap the **Remote Programming** icon to enter the Homepage. (VIN is auto-matched during the procedure.)
2. Select relevant vehicle information (brand, model, and year).
3. Tap the **Finish** icon in the upper right corner of the screen.

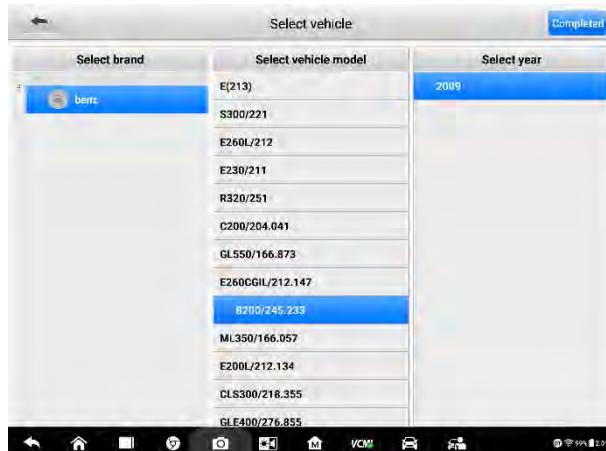


Figure 7-2 Sample Vehicle Selection Page

## 7.3 Operation

The Remote Programming Operation process consists of 3 main steps, namely, order submission, order confirmation, and the most critical, remote programming. Besides, historical order serves as a reminder of your previous data information.

### 7.3.1 Submit Order

When you see the **Service** and **Orders** tabs at the top, you have entered the Submit Order page.

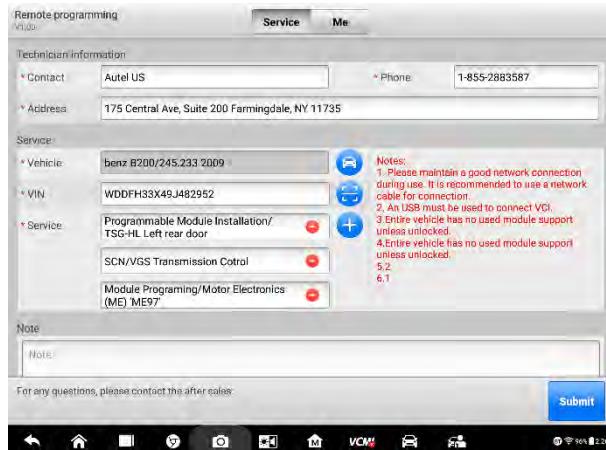


Figure 7-3 Sample Submit Order Page

Input the **Technician information** and **Service information** according to the notes prompted. Please make sure that your phone number is correct and real existed, for our experts will contact you through phone calls for further communication on vehicle problems.

In the Service information section, there are 3 blue buttons to the right of the boxes. These buttons are available for quick filling. For detailed operation, see the table below.

Table 7-2 Functions of Buttons

Icon	Description
	For selecting vehicle brands and models.
	For scanning the VIN code of the vehicle.
	For adding exact Service types.

The **Note contents** in red color on the middle right side are tips for doing the remote programming connection. While the **Notes** at the bottom are designed for writing vehicle troubles for experts' reference.

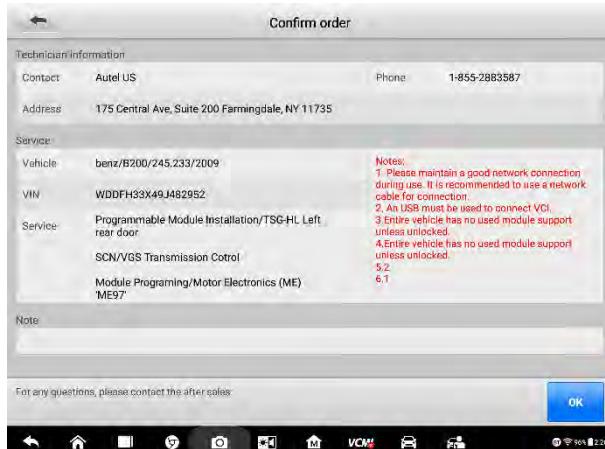
After all information have been input, tap the **Submit** button to proceed.

#### **NOTE**

Each box that starts with a red asterisk must be filled. The information input must be valid and genuine.

### 7.3.2 Confirm Order

As the order has been submitted, you are directed to the **Confirm Order** page. Make a quick check about the contents that you have input before and then tap the blue button **OK** to continue.



**Figure 7-4 Sample Confirm Order Page 1**

If you do not want to continue with this order, or if you find any errors in your order, you can tap the **Cancel** button in the lower right corner to terminate the procedure.

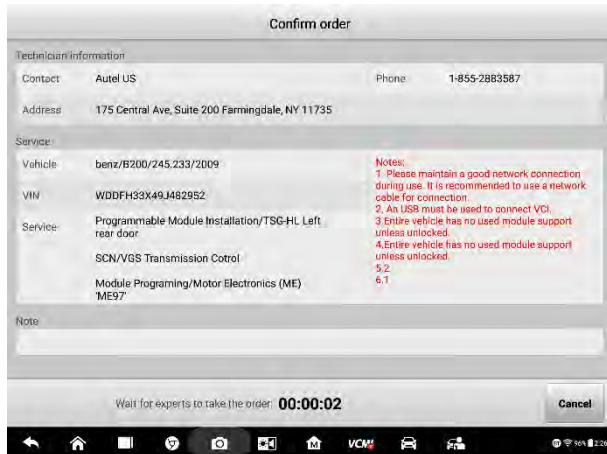


Figure 7-5 Sample Confirm Order Page 2



### NOTE

This **Cancel** button can be pressed only before the expert takes your order.

After the expert takes your order, a message will appear asking for your confirmation. You need to confirm this order within 5 minutes. Otherwise, this order will be canceled automatically.

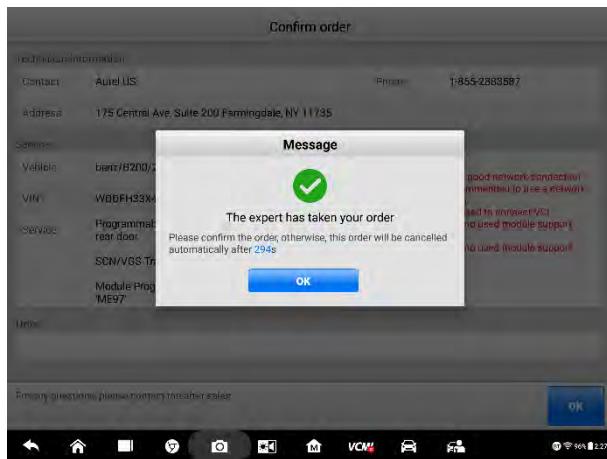


Figure 7-6 Sample Confirm Order Page 3

### 7.3.3 Remote Programming

Once the expert has received your order, the **Remote Programming** page appears. At this point, the expert starts to perform remote programming. If you want to see how the

expert programs, tap the **Remote desktop** in the upper right corner. Once the expert accepts your request, you will have access to the expert's computer desktop. But it is also possible that the expert rejects your request. To accept or not to accept, it is totally up to the expert.

#### 7.3.3.1 Request Accepted

When the expert accepts your request, you will see a shared desktop showing a series of programming operations as in the figure below.

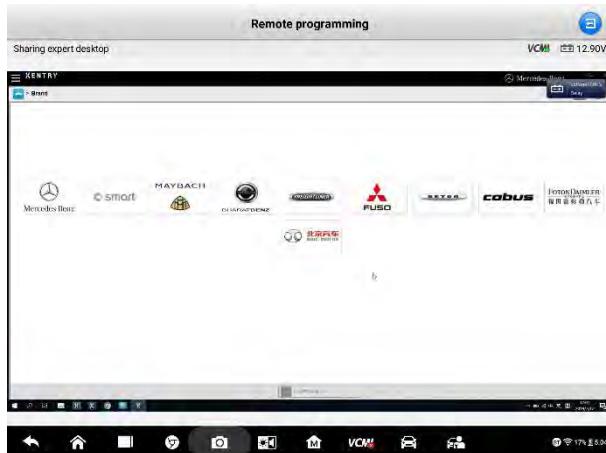


Figure 7-7 Sample Remote Programming Page 1

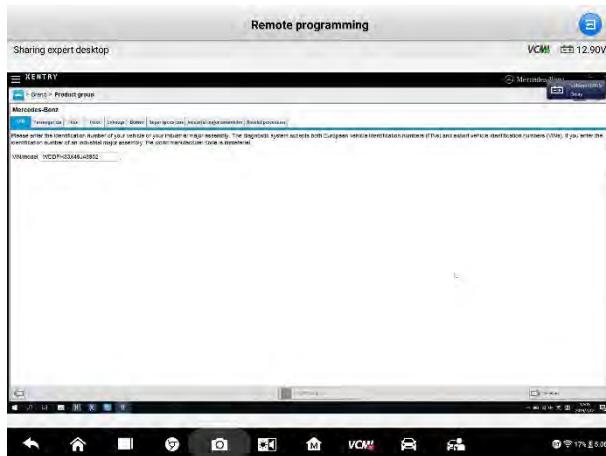
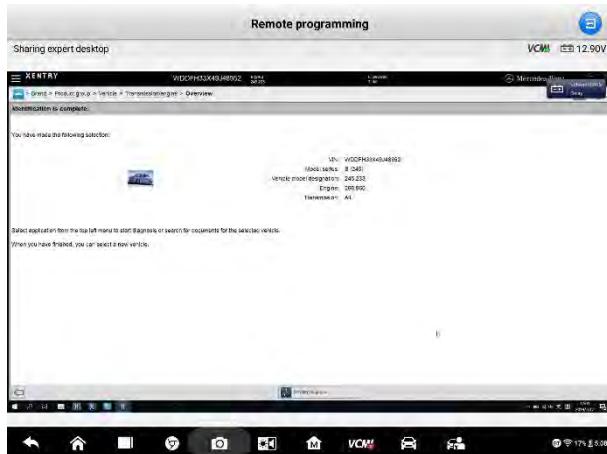
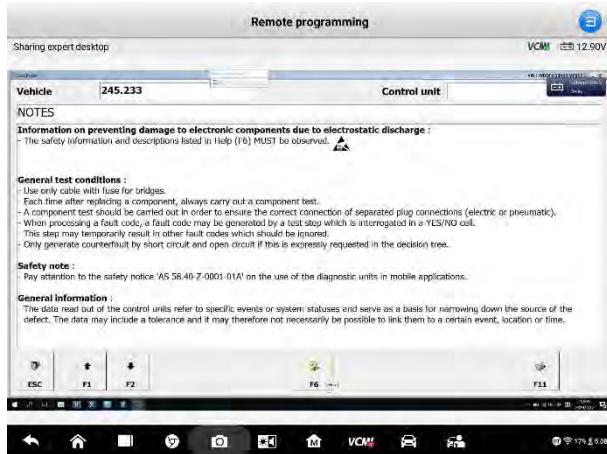


Figure 7-8 Sample Remote Programming Page 2



**Figure 7-9 Sample Remote Programming Page 3**

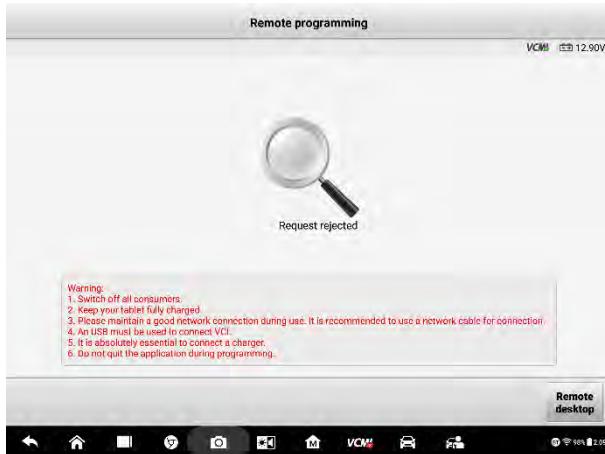


**Figure 7-10 Sample Remote Programming Page 4**

These operations are based on the OEM software which authorizes the expert to do programming and help you diagnose the vehicle.

### 7.3.3.2 Request Rejected

If the expert rejects your request, you will receive a rejection message.

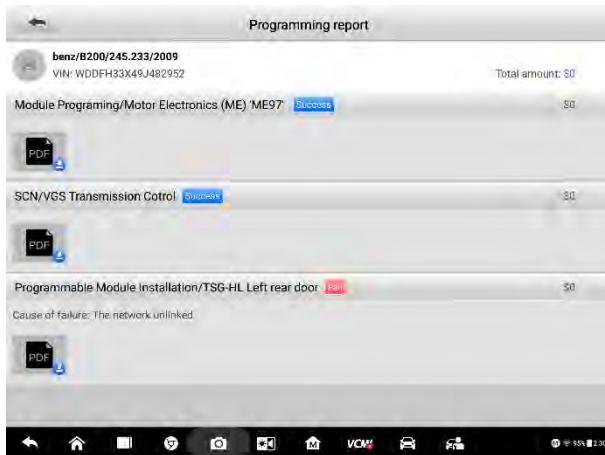


**Figure 7-11 Sample Request Rejected Page**

### 7.3.3.3 Programming Finished

When Remote Programming is finished, a message will be returned saying **Programming is over, please wait for expert to upload the report....**

After that, you will be redirected to the **Program Report** page that shows the status, **Success** or **Failure**, of each programming procedure.



**Figure 7-12 Sample Program Report Page**

#### **NOTE**

A PDF report file is attached to each record. Tap it to see the detailed output information.

## 7.3.4 Historical Orders

Historical orders are orders completed or not completed out of subjective or objective reasons, such as proactive cancellation, unexpected networking disconnection, or unexpected power-off.

Tap the **Orders** button, and you will see the historical orders.

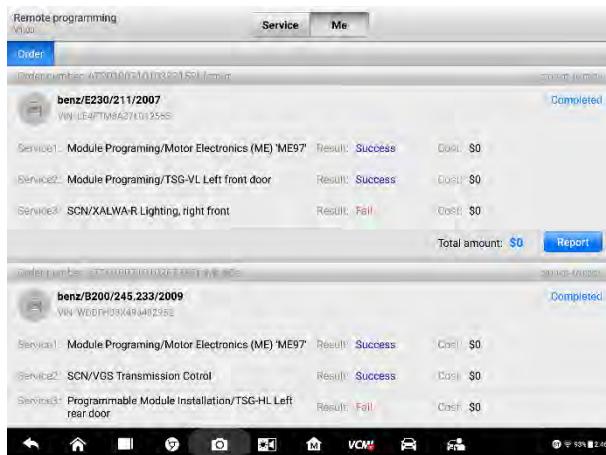


Figure 7-13 Sample Historical Orders Page

Both Completed and Incomplete orders are recorded in this part. For Completed orders, the programming report is available if you tap the blue button **Report**. For Incomplete orders, you can resubmit them.

- To resubmit the incomplete orders.
  1. Tap the **Submit** button, and the **Incomplete orders** page appears.
  2. Check and confirm the information on the **Incomplete orders** page.
  3. Tap **OK** to continue.
  4. After the waiting page appears, wait for the expert to take orders.
  5. A **Message** saying **Expert has received the order** appears Tap **OK** after you confirm the message.



### NOTE

You need to confirm the order before it is canceled automatically after 5 minutes.

# 8 MaxiFix

MaxiFix is an online community, based on the ever-expanding cloud database that provides abundant information and resources to help find efficient solutions for all kinds of vehicle troubles. It serves as a forum allowing the users to network with other MaxiSys users and Autel Technicians, including posting questions, answering questions, sharing tips and searching for repair cases with proven documented fixes.

Apart from the truth that the MaxiFix provides the abundant troubleshooting information available, the database keeps growing with daily feed of reported solution cases and advisory reports from MaxiSys users worldwide.

Information in the MaxiFix database is organized into a series of diagnostic tips that are designed to help you locate the cause of particular problems of the test vehicle and quickly find solutions to them.

## 8.1 Getting Started

The MaxiFix application is accessible by tapping the **MaxiFix** icon in blue. This application supports automatic login because it can recognize the serial number and password of the Autel MaxiSys Ultra tablet intelligently.

## 8.2 Navigation

When entering the MaxiFix, you will see a full screen layout as shown in **Figure 8-1** below.



Figure 8-1 Sample MaxiFix Home Page

The MaxiFix screen layout contains 3 main areas:

1. **The Navigation Bar** – the top Navigation Bar allows you to switch between different sections of MaxiFix. Besides, a bell-shaped icon and a bust icon are located in the upper right corner of the screen, which lead to messages and personal information respectively.
2. **The Function Menu** – on the upper left side under the Navigation Bar, the Function Menu displays the submenus of each main menu.
3. **The Main Screen** – occupying the rest of the screen, the Main Screen displays vehicle-related content including problems and corresponding solutions, interactive activities, tips and information posted by Autel MaxiSys Ultra users.

## Message Icon & Personal Center Icon

### Message Icon

The bell-shaped icon in the upper right corner reminds you of messages about your activities on MaxiFix.

Tap the icon to enter the **My Messages** page where you can see a list of messages read or unread. If a piece of message is not read, the entry is in dark black; otherwise, the entry turns to gray.

These unread messages can be set as read once you tap the **All set as read** button. If there are too many messages, you can tap the **Clear** button to clear the message history.

### Personal Center Icon

Next to the message icon, the bust icon leads to **Personal Center**.

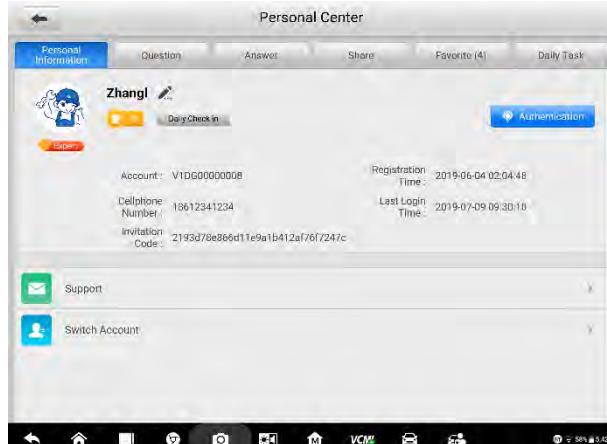


Figure 8-2 Sample Personal Center Page

Personal Center consists of six tab pages, with **Personal Information**, **Question**, **Answer**, **Share**, **Favorite**, and **Daily Task** being their respective tab tile. Each tab page shows a different aspect of the user's activities on MaxiFix.

**Personal Information** –contains the account registration, Support and Switch account functions. In the upper right corner opposite to the account name, there is a blue button, where you can apply for technician authentication

- **To apply for the authentication**

1. Tap the **Authentication** button and enter the Technician Accreditation page.
2. Fill in the information required in each empty box.
3. Do not forget to upload HD pictures of certificate.
4. Tap **Submit** to send your application.
5. After all has been done, please wait for verification. As long as your information meets the required standards, you will get a successful authentication soon.

Back to the main screen of Personal Information, **Support** offers a feedback channel for sharing user experience on MaxiFix and viewing FAQs. MaxiFix allows other accounts to log in. You can tap **Switch Account** to switch to another account.

**Question** – records the posted questions in the MaxiFix community.

**Answer** – records your answers to others' questions.

**Share** –presents analysis of troubleshooting vehicles and tips for diagnosis shared by yourself.

**Favorite** – collects questions, shares, and repair cases you saved before.

**Daily task** – provides various tasks with reward coins. You can do daily tasks to earn coins and community experience values. The daily tasks include sharing tips, posting questions, and answering pending questions. The detailed operation is explained in [Community](#).

## **8.3 Operations**

---

The top navigation bar consists of Home, Real Fixes, Academy and Integral Mall, the functions of which are shown below:

**Community** – shows questions and answers about vehicle problems and fault code solutions. Moreover, this section offers a good chance to join the MaxiFix community.

**Real Fixes** – presents real cases collected from actual shop repair orders and described in an easy-to-understand and professional manner.

**Academy** – offers an online learning and help platform for vehicle diagnosis technicians, with videos concerning various specific topics and query tools for searching vehicle information.

**Integral Mall** – displays a series of Autel diagnostic products, including diagnostic tablets, endoscope, and oscilloscope, and other diagnostic components, etc. These products can be exchanged with reward coins that you won from daily tasks and other tasks. For detailed exchange steps, see [Integral Mall](#).

### 8.3.1 Community

The Community menu showcases the MaxiFix community with three tab pages.



Figure 8-3 Sample Community Page

#### Three tab pages:

- **Newest** – contains questions and tips about exact vehicle faults posted by the MaxiSys Ultra users in chronological order. The icon with a question mark leads to a question posted by MaxiSys Ultra users; while the bookmark icon represents that the following is a service tip shared by MaxiSys Ultra users.

Table 8-1: Table of Small Icons in MaxiFix

Icon	Description
	Signifying that what follows is a question.
	Signifying that what follows is a service tip.

Icon	Description
	Signifying the number of views.
	Signifying the number of adoptions for the service tip.
	Signifying the number of answers to the question.
	Signifying the number of reward coins.

Each **question** is accompanied with two icons indicating the number of views and answers respectively. Similarly, each **repair tip** is accompanied with two icons indicating the number of views and adoptions.

Some of the questions are attached with a coin icon, indicating the number of reward coins provided for the best answer. The questioner can raise the number of reward coins to stimulate better solutions.

To the right of the questions, the orange phrase **Underway** indicates that the question has been answered by experts or technicians but not confirmed by the questioner; while a green word **Resolved** indicating that the questioner has been confirmed with the best answer.

- **Hottest** – displays hot questions with the most replies from experts or other professional MaxiSys Ultra users, along with the most views.

For viewing convenience, entries under the **Hottest** menu are divided to be shown in two modes. Tap the question mark icon, and the screen only displays questions posted by users. Tap the bookmark icon, and the screen only shows service tips shared by users. (For icon meanings, see *Table 8-1: Table of Small Icons in MaxiFix*)

- **Follow** – displays the questions and tips that you are following. The **Select Vehicle** button to the left allows you to make a quick selection of specific vehicles.

➤ **To select a vehicle**

1. Tap the blue **Select Vehicle** button to the left.
2. Select **Brand** of the vehicle from the list.
3. Select **Model** of the vehicle from the list.

After finishing the vehicle selection procedure, the identified vehicle is shown in the **Follow** tab page, with related user-posted questions and tips, matched and displayed together with user IDs. Tap one of the matched entries to see the details.

### Three Function Buttons:

The three function buttons in the upper right corner are designed to enable online communication between MaxiSys Ultra users and Autel experts.

- **Post Question/Tip** – This button provides a channel to ask questions about vehicle faults and share good solutions to diagnostic troubles.

#### ➤ To post a question/tip

1. Tap the **Post Question/Tip** button to enter the **Post Question** and **Sharing Tip** page.
2. Tap the **Select Vehicle** button, select **Year**, **Brand**, **Model**, and **Engine** from the list.
3. Fill in the **Subject** in short phrases or a short question with keyword.
4. Fill in **Credit Reward** as a reward for the best answer.
5. Write your question or expression about vehicle faults in the **Content** box. (Three different posting ways are available, including picture, video and voice.)
6. After all have done above, tap **Submit** in the upper right corner. And your question will be uploaded soon on the list of the Newest.

---

#### NOTE

The steps of posting a sharing tip are similar to posting a question, except that step 4 is not included in **Sharing Tip**.

---

Once a question has been posted, the entry is presented with the **Question icon**. While a tip has been posted, the entry is presented with the **Service Tip icon**.

- **Post Answer** – This button is for answering questions posted by other MaxiSys Ultra users.

#### ➤ To post an answer

1. Tap the Post Answer button to enter the Pending Questions page.
2. Select **To be answered**, and you will see a list of unanswered questions. Select **Underway**, and you will see a list of questions with some but no best answers.
3. Tap one question entry, and enter a page with a blue **Post Answer** button to the right.
4. Tap the **Post Answer** button to enter the **Reply** page.

5. Post your analysis and insights in the **Content** box.

 **NOTE**

Three different posting ways are available, including with a maximum of 5 pictures, a video within 15 seconds or a voice within 3 minutes.

As long as your answer is adopted by the questioner, the system will automatically award you reward coins. If your answer is confirmed as the Best Answer, you will receive reward coins from both the system and the questioner.

 **NOTE**

You can complement your answer via the **Continue Answer** button.

- **Search** – This button enables you to search for answers and solutions to questions and troubles, as convenient and efficient as to search in Google.

 **NOTE**

The most-searched keywords will be memorized in **Hot Search**, and the **Search History** records the keywords you input.

### 8.3.2 Real Fixes

In **Real Fixes**, a list of repair cases and troubleshooting tips are collected by way of content instructions and graph analysis. Additionally, some repair cases are attached with videos showing the whole process of troubleshooting. This kind of visual presentation is much more intuitive and instructive, compared with words introduction.



**Figure 8-4 Sample Real Fixes Page 1**

There are six function parts in Real Fixes, as explained below:

1. Signifies the navigation bar
2. Signifies the vehicle selection button
3. Signifies the keywords search for repair fixes
4. Signifies the total search results of keywords searching
5. Signifies the repair fixes title and vehicle specification
6. Signifies the views and satisfaction for the repair case in MaxiFix community

In the list of real cases, three icons are attached to each fixes entry, making it possible for viewers to evaluate each case entry. For icon meanings, see Table 8-2 Icons on Real Fixes.

**Table 8-2 Icons on Real Fixes**

Icon	Description
	Signifying that the repair case is fitted with both words and pictures.
	Signifying that the repair case is accompanied with a video for explaining vehicle principles and diagnostic troubles.
	Stating the vehicle specifications, including brand and model.
78	Signifying the number of views for each repair case.
1	Tap this icon if you find the repair case helpful.
0	Tap this icon if you find the repair case not helpful.

The **Select Vehicle** button in the upper left half allows you to choose the vehicle model and search for relevant fixing information.

➤ **To Search for a real fix**

1. Tap the **Select Vehicle** button in blue to the left.
2. Select **Year** of the vehicle from the list.
3. Select **Brand** of the vehicle from the list.
4. Select **Model** of the vehicle from the list.
5. Select **Engine** of the vehicle from the list.

6. After all selections have been done, the system will match the identified vehicle with a list of repair case entries.
7. Press one entry of them and enter the real fix page with diagnostic description in detail (Figure 8-5).

### *Real Fixes in Detail*

**2014 BMW 740i MS**  
K5101143499999  
Fault description: 2014 BMW 740i MS, Seat Belt No Pretensioning Function, Parking Function Inoperative  
Applicable Vehicles:  
2011 BMW 740i  
2012 BMW 710i  
2013 BMW 740i  
2014 BMW 740i  
2015 BMW 740i

**Symptoms:**  
1. The seat belt has no pretensioning function.  
2. The airbag deployed, but the parking function is incomplete.

**DTCs:**  
• ABS013 - Vehicle speed sensor (front left right)  
• ABS020 - Deceleration by DSC/ESP/ASR/DSR/Parking Brake/EMV/Seat belt warning

**Trouble Area:**  
• TPS (TPS)  
• TPS signal (TPS)  
• ABS/Brake  
• ECU (ECU)  
• ABS fault  
• Vehicle speed (VSP/VS)

**Repair Notes:**  
The customer complains that the instrument indicates that the DSC function is limited, and the left front seat belt active pre-tightening function is not working. The repair advisor suggests that the driver's side airbag is not deployed when the parking function is activated. During the test drive, the parking function and warning lamp is always on. In order to confirm whether the safety belts are working normally or not, the technician tested it and it is found that the left front and right front seats have no pretensioning function. (In normal cases, the seat belts tighten automatically when the driver's side airbag is triggered.) The customer says that this fault has occurred since the last repair due to heating, and the function is normal before the repair.

**Real Fixes:**  
• Repair note: BMW - Left Front Side Airbag / Airbag seat belt limitation  
Link: <http://www.adblue.com>

**Author:**  
Team of Avant Automobile Service Experts

**Manual:**  
BMW Test  
Parking Brake

**Activating unit and EMF control unit**

**IBAMA**

**Recommended Cases:**

Name	Description	Date	IBAMA ID
2011 BMW X5 xDrive35i Traction Control	2011 BMW X5 xDrive35i Traction Control	2011-09-01	00101000000000000000000000000000
2012 BMW X5 xDrive35i The Precise Launch	2012 BMW X5 xDrive35i The Precise Launch	2012-09-01	00101000000000000000000000000000
2014 BMW X5 xDrive35i Traction Control Fault	2014 BMW X5 xDrive35i Traction Control Fault	2014-09-01	00101000000000000000000000000000
2013 BMW X5 xDrive35i Side View Camera System	2013 BMW X5 xDrive35i Side View Camera System	2013-09-01	00101000000000000000000000000000

**Figure 8-5 Sample Real Fixes Page**

This page comprises a series of diagnostic operations, from finding vehicle faults, locating errors, to providing suggested solutions. It is based on a great deal of real repair cases with relevant graphs and videos, to present a complete maintenance database for the reference of MaxiSys Ultra users.

Each repair case includes nine main parts:

1. **Applicable Vehicles** – matches different types of vehicles that this repair case analysis can be applicable to.

- Symptoms** – points out the fault symptoms of the vehicle, which provides a reference to confirm the vehicle problems.
- DTC** – matches relevant fault codes for further resolving. This is based on a large DTC database commonly used worldwide.
- Trouble Area** – indicates the exact position of the vehicle problems. This part helps to locate the vehicle problems accurately.

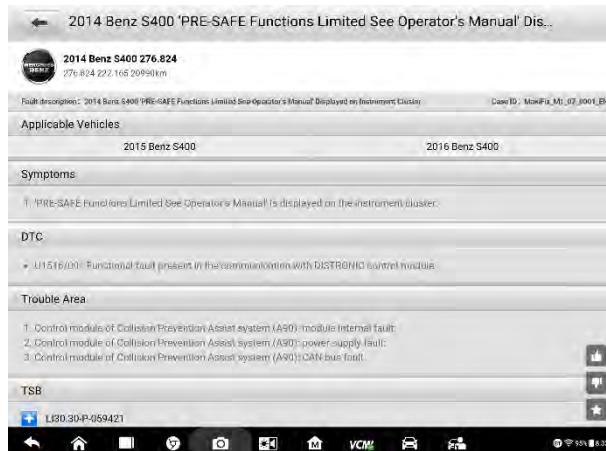


Figure 8-6 Sample Trouble Area Page

- Troubleshooting** – illustrates the detailed diagnostic operations in a vivid format.

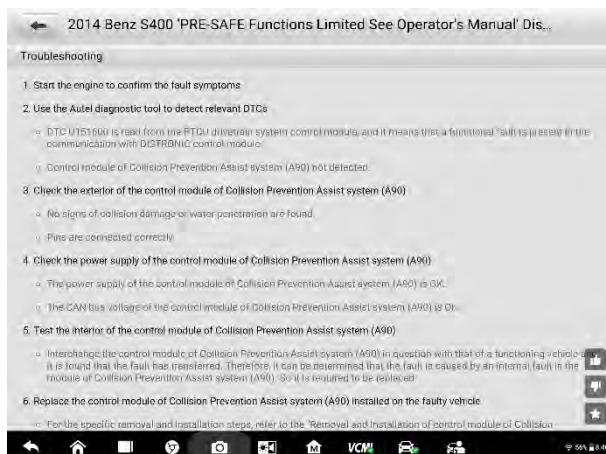
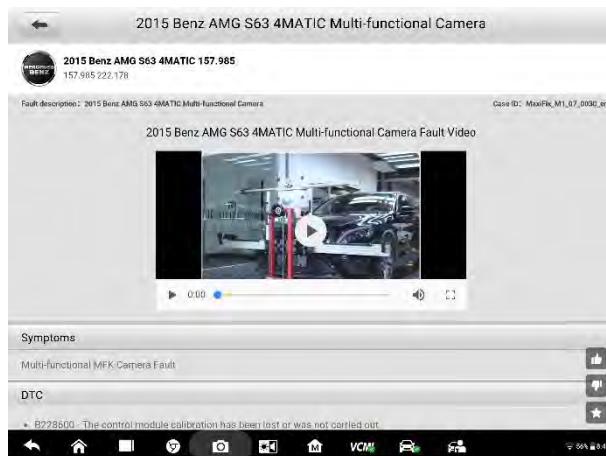


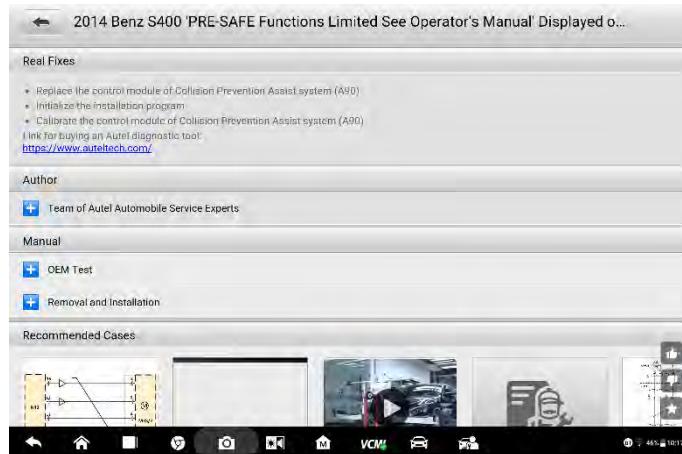
Figure 8-7 Sample Troubleshooting Page 1

In most circumstances, troubleshooting is introduced by the way of words description. Some specific vehicles are attached with video presentation for troubleshooting process.



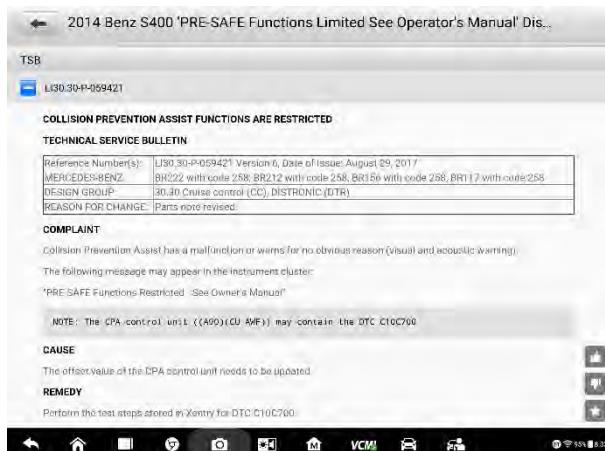
**Figure 8-8 Sample Troubleshooting Page 2**

6. **Real Fixes** – gives suggestions on dealing with the vehicle faults. To buy diagnostic devices, you can tap the link and go to the Autel official website.
7. **Author** – identifies the author of the professional repair case. Some of them are authenticated technicians, while most are from the team of Autel Automobile Service Experts with long-term diagnostic experience and technical skills.
8. **Manual** – presents relevant operations on components during the diagnosis.
9. **Recommended cases** – associates other repair cases which share similar faults or keywords with this case



**Figure 8-9 Sample Recommended Cases Page**

For some vehicles repair case, a TSB file is added for further analysis, shown as below.



**Figure 8-10 Sample TSB Page**

**Quick search:** Except for the above searching by pressing the **Select Vehicle** button, there is a **Search** box for quickly accessing repair cases in the upper right corner of the **Real Fixes** section. Input keywords and tap the Search button, and the system will match all relevant entries for reference. The more keywords, the more precise the matching results.

### 8.3.3 Academy

The third menu of MaxiFix is Academy, a platform for technicians to enrich their knowledge and improve operating skills in vehicle diagnosis. Academy contains two main parts, Featured Videos and Query Tools.



**Figure 8-11 Sample Academy Page**

**Featured Videos** – aims to help the technicians, namely the MaxiSys Ultra users, to enrich their maintenance skills. This part contains three types of videos with different functions.

1. **Tool Tips:** Videos on Tool Tips are meant to introduce the knowledge of diagnostic tools as well as operations in diagnostic process.
2. **Skill Enhancement:** Videos on Skill Enhancement are shot to show diagnostic procedures in real maintenance scenes and share expertise of senior technicians.
3. **Vehicle Theory:** Videos on Vehicle Theory are recorded to impart vehicle theories or principles by experts in vehicle structure and maintenance.

**Query Tools** – provides large volumes of vehicle data for quick query. The Accumulator Query is for vehicle battery searching, while the Tire Query is for tire information searching.

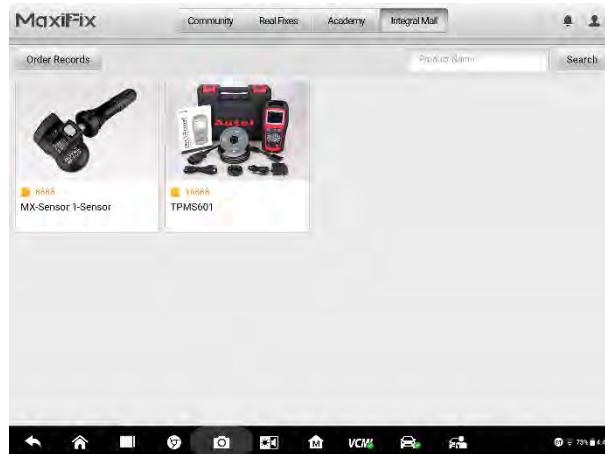
➤ **To run a query (take Tire Query for example)**

1. Tap the **Tire Query** icon to enter the Select Vehicle page.
2. Tap the **Select Vehicle** to select from the four rows of menus that appear.
3. Select **Year, Brand, Model, and Engine**.

- After all selections have been done, the corresponding tire specifications will be displayed.

### 8.3.4 Integral Mall

The Integral Mall is built as a coins reward system for awarding the useful answers and perfect repairing tips. It is a new menu of MaxiFix, which, in other hand, enhances the interaction and communication between technicians and Autel support.

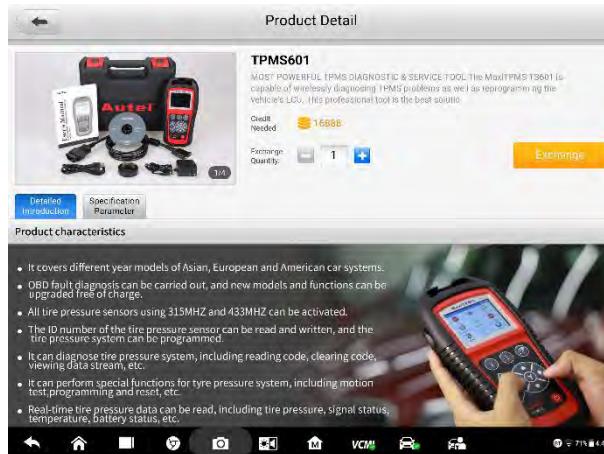


**Figure 8-12 Sample Integral Mall Page**

In the Integral mall, the reward coins can be used as coupons for exchanging specific products or devices. If you are keen on some of them, just make an order for the exchange with the required number of coins. You will get a reduction of payment with the coins.

➤ **To make an order (take MaixiTPMS TS601 for example)**

- Enter the Integral Mall, and you will see the products priced in reward coins.
- In the product list, tap MaixiTPMS TS601 and enter the **Product Detail** page.
- Read the information about the main functions of the product, pay attention to the number of coins needed for exchange, and then choose the quantity of exchange. Product pictures are showcased in the carousel, below which there are two buttons. **Detailed Introduction** describes the product characteristics, while **Specification Parameter** explains data for product configuration.



**Figure 8-13 Sample Product Detail Page**

4. Tap the **Exchange** button in orange to enter the Exchange Confirmation page
5. Check the order details carefully and tap the **Confirm** button in the upper right corner. The exchange is completed when the Exchange Success notice appears.
6. Tap **Done** to complete the process.

---

 **NOTE**

For more information about the orders you have made, please switch to the Integral Mall page, and tap **Order Records**, you will see all the orders you have made in Integral Mall.

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# 9 Measurement

The Measurement application can provide all the features needed for performing electrical and electronic circuit tests as well as monitoring signal activities on any modern vehicles, which shows you what is really going on within a vehicle's electrical system.

After properly connecting with a test vehicle and communicating with MaxiSys Ultra, the VCMI (Vehicle Communication and Measurement Interface) is used as an integrated device that functions as an oscilloscope, a signal generator, a multimeter and OBD communication line inspection.

## 9.1 Oscilloscope Operation

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An oscilloscope is a measuring instrument that shows how a signal varies with time in a graphical way. Various signal activities can be displayed and monitored on a two-dimensional grid. The graphical form created by a signal is called a waveform. The voltage-time characteristic of the signal or waveform is drawn as a visual line called the trace.

### 9.1.1 Safety Information

Follow these instructions below to reduce the risk of injury from electric shock and prevent equipment damage.

#### A. Maximum input ranges

Observe all terminal ratings and warnings marked on the product.



#### DANGER:

- To prevent electric shock, take all necessary safety precautions when working on equipment where voltages beyond the specified input range may be exist. Contact with voltages outside of the specified measuring range presents a risk of electric shock.
- To prevent injury or death, the oscilloscope must not be directly connected to the mains (line power). To measure mains voltages, use a differential

isolating probe specifically rated for mains use.

 **WARNING:**

- Operation outside of the safe input range is likely to cause permanent damage to the oscilloscope and other connected equipment.

**B. Grounding**

 **DANGER:**

- The scope's ground connection through the USB cable is for measurement purposes only. The oscilloscope does not have a protective safety ground.
- Do not connect the ground input (chassis) to any electrical power source. To prevent personal injury or death, use a voltmeter to check that there is no significant AC or DC voltage between the oscilloscope ground and the point to which you intend to connect the ground input.

 **WARNING:**

- Applying a voltage to the ground input is likely to cause permanent damage to the oscilloscope, the attached computer, and other equipment.
- To prevent measurement errors caused by poor grounding, always use the high-quality USB cable supplied with the oscilloscope.

**C. External connections**

 **DANGER:**

- To prevent injury or death, use only the power cord and adaptor supplied with the product.

**D. Environment**

 **DANGER:**

- To prevent injury or death, do not use the product in wet or damp conditions, or around explosive gas or vapor.

 **WARNING:**

- To prevent damage, always use and store your oscilloscope in appropriate environments.

**E. Product Maintenance**

The product contains no user-serviceable parts. Repair, servicing and calibration require specialized test equipment and must be performed by Autel Tech Support or an approved service provider.

**DANGER:**

- To prevent injury or death, do not use the product if it appears to be damaged in any way, and stop using the product when any abnormal operations occur.

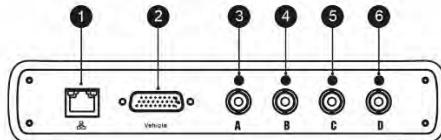
**WARNING:**

- Do not tamper with or disassemble the oscilloscope, connectors or accessories. Internal damage will affect performance.
- Do not block any of the instrument's air vents to avoid damage caused by overheating.
- When cleaning the oscilloscope, use wet soft cloth with mild detergent in water. Do not allow water to enter the oscilloscope casing, as this will cause damage to the electronics inside.

## 9.1.2 General Introduction

### 9.1.2.1 Component Locations

The input channels are located on the bottom of the VCMI device and are compatible with many test leads and probes.

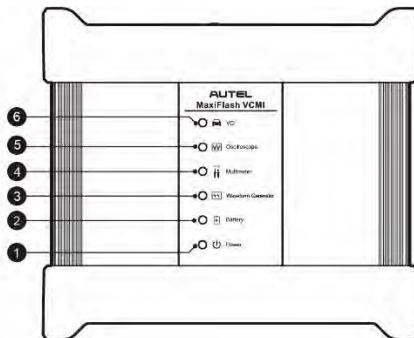


**VCMI Bottom View**

- Ethernet Connector – Connects to RJ45 Network Cable
- Vehicle Data Connector – Connects to the vehicle DLC using the provided Main Cable.
- Input Channel A
- Input Channel B

5. Input Channel C
6. Input Channel D

The oscilloscope LED is located on the front panel of the VCMI device. When the VCMI is properly connected and powered on, the oscilloscope LED illuminates green when operating in the oscilloscope mode, and blinks green when the VCMI is communicating.



**VCMI Front View**

1. Power LED
2. Battery LED
3. Signal Generator LED
4. Multimeter LED
5. Oscilloscope LED
6. Vehicle LED

#### *9.1.2.2 Technical Specifications*

**Table 9-1 Technical Specifications**

Item	Description
<b>Channels</b>	4
<b>Bandwidth</b>	10MHz

Item	Description
<b>Maximum Sample Rate</b>	<ul style="list-style-type: none"> <li>● 1 or 2 channels: 50MS/s*</li> <li>● 3 or 4 channels: 25MS/s</li> </ul> <p>* MS/s = mega samples per second</p> <p>To reach the speed with two channels, please select one channel in channel A or B, the other channel in channel C or D.</p>
<b>Input Ranges (Full Scale)</b>	±50 mV to ±200V
<b>Sensitivity</b>	10 mV/div to 40V/div
<b>Input Coupling</b>	AC/DC
<b>Input Impedance</b>	1MΩ in parallel with 25pF
<b>Vertical Resolution</b>	12 bits
<b>Buffer Memory</b>	32M samples shared among active channels
<b>Time Base Ranges</b>	100ns/div to 1000s/div
<b>Connection</b>	<ul style="list-style-type: none"> <li>● USB 2.0</li> <li>● Wi-Fi</li> </ul>
<b>Max. Wi-Fi Transmission Distance</b>	Up to 98ft
<b>DC Accuracy</b>	±1% of full scale
<b>Storage Humidity Range</b>	5 to 95%RH, non-condensing

#### 9.1.2.3 Accessories



**USB 2.0 Cable (SA001)**

Connects the oscilloscope to the Display Tablet to ensure reliable signal transmission.



**Secondary Ignition Pickup (SA273)**

The BNC connector is connected to the oscilloscope to measure the secondary ignition voltage of conventional ignition systems and most HEI (High Energy Ignition) and DIS

(Distributorless Ignition) systems.



### Scope Test Lead

**(Red: SA005, Green: SA006, Blue: SA007, Yellow: SA008)**

The BNC connector is connected to the oscilloscope, and the 4mm banana plug is connected to various probes.



### Breakout Lead (SA151)

Easily accessible to existing automotive wiring harness connectors for obtaining signals of various sensors. Four sizes are available: 0.6 mm, 1.5 mm, 2.3 mm and 2.8 mm.



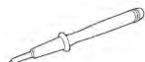
### Flexible Back-pinning Probe (Red: SA053, Black: SA054)

Designed for back-probing under the insulation of multi-plug terminals to pick up the signal of the test component. The flexible part can be bent and access to difficult areas. The probe tip is not replaceable.



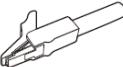
### Back-pinning Probe Set (SA051)

Designed for back-probing under the insulation of plugs to pick up the signal of the test component. The probe tip is replaceable.



### Multimeter Probe (Red: SA055, Black: SA056)

Designed for connecting exposed wires or terminals.



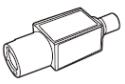
### Small Crocodile Clips (Red: SA057, Black: SA058)

Used to connect exposed wires or terminals. SA059 (red) and SA060 (black) for larger terminals.



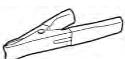
### **Large Dolphin Clips (Red: SA059, Black: SA060)**

Used to connect exposed wires or terminals, including battery terminals. SA057 (red) and SA058 (black) for smaller terminals.



### **Attenuators 20:1 (SA020)**

Passive 20:1 attenuator, can output 1V when inputting a 20V signal.



### **Battery Clip (Optional) (Red: SA061, Black: SA062)**

Dedicated to connecting car battery terminals.



### **65A AC/DC Current Clamp (Optional) (SA253)**

Used to measure AC or DC currents up to 65A. Two scales are available: 1mV/10mA for 10mA to 2A, 1mV/100mA for 10mA to 65A.



### **650A AC/DC Current Clamp (Optional) (SA256)**

Used to measure AC or DC currents up to 650A. Two scales are available: 1mV/100mA for 100mA to 20A, 1mV/1A for 100mA to 650A.



### **Coil On Plug (COP) Probe (Optional) (SA271)**

Used to the oscilloscope to measure the secondary ignition voltage of COP.



### **HT Extension Lead (Optional) (SA275)**

Fit the HT extension leads between the coil pack and the plugs of the independent ignition system (COP), and then place the (SA273) secondary ignition pickup on each lead to obtain the secondary ignition voltage.

### 9.1.3 Getting Started

Before opening the Oscilloscope application, the VCMI device must be connected to the Display Tablet via the provided USB cable or Wi-Fi network. For more information, see [Establish Vehicle Communication](#) on page 20.

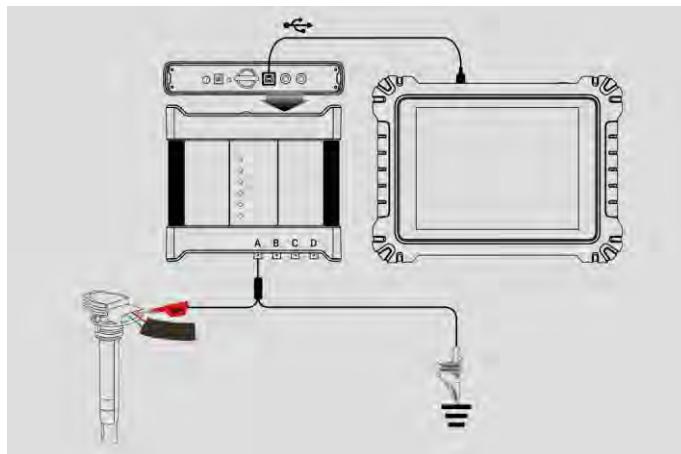


Figure 9-1 Sample Connection Diagram

➤ **To open the oscilloscope application:**

1. Insert the applicable test lead or probe terminal ends into the input channel(s) to complete the connection.
2. Tap the **Measurement** icon on the Home screen of the MaxiSys Ultra Display Tablet. The Measurement screen opens.
3. Tap the **Scope** icon to open the oscilloscope Menu.
4. Select a desired testing opinion to continue.

**NOTE**

Please check the oscilloscope LED status indicator on the front panel of VCMI device. The oscilloscope LED illuminates green when operating in the oscilloscope mode and blinks green when communicating.

### 9.1.4 Oscilloscope Update

The operating software of the oscilloscope is continually optimized. Tap the **Help** button in the upper half of the screen to update.

Before update the oscilloscope software, please make sure the tablet network connection is stable.

#### 9.1.4.1 APK Update

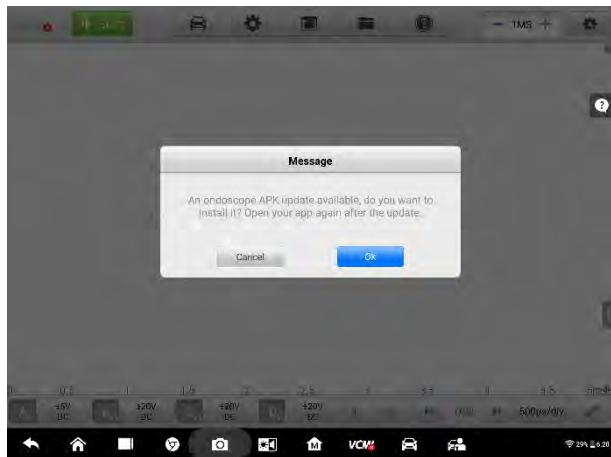
➤ **To update the APK:**

1. Tap the **Help** button on the upper half of the screen. A dropdown list appears.



**Figure 9-2 Sample Help Screen**

2. Tap the **Check Update the APK** in the dropdown list. A confirmation message appears.



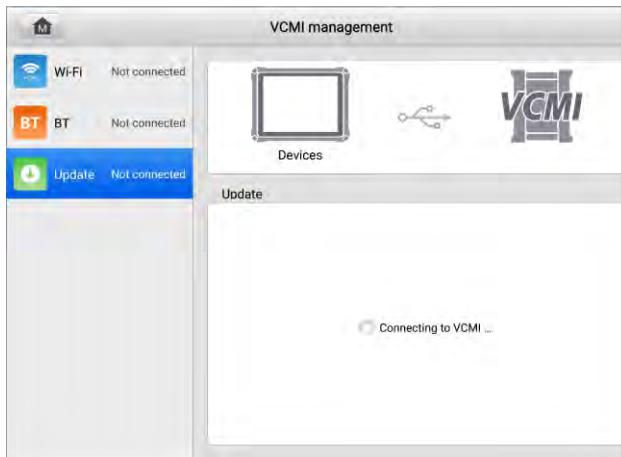
**Figure 9-3 Sample Update Confirmation Screen**

3. Tap **OK** to update the software or tap **Cancel** to exit.

#### **9.1.4.2 Firmware Update**

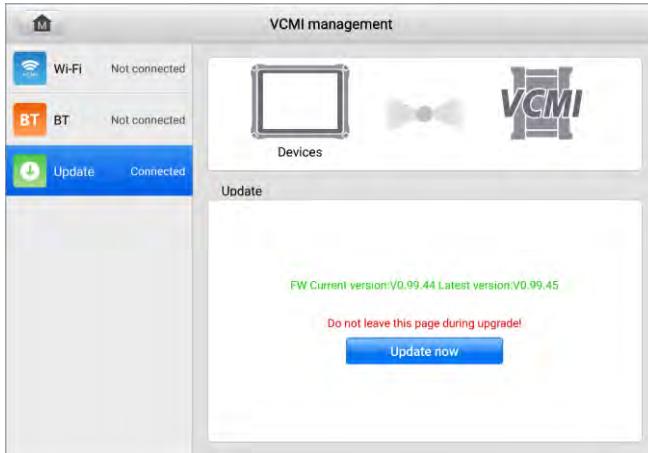
➤ **To update the firmware:**

1. Tap the **Help** button on the upper half of the screen. A dropdown list appears. (Figure 9-2)
2. Tap the **Check Update Firmware** in the dropdown list. The screen will switch to the **Update** section in the **VCMI Management** application.



**Figure 9-4 Sample Firmware Update Screen 1**

3. The current version and the latest version of the software will be displayed after a few seconds, tap **Update Now** to update the software if available.



**Figure 9-5 Sample Firmware Update Screen 2**

## 9.1.5 Screen Layout and Operations

The Oscilloscope application works as a signal processing program that displays the shape of electrical signals onscreen with a live graph showing voltage against time. The grid on the screen shows divisions of voltage and time to enable measurements to be made.

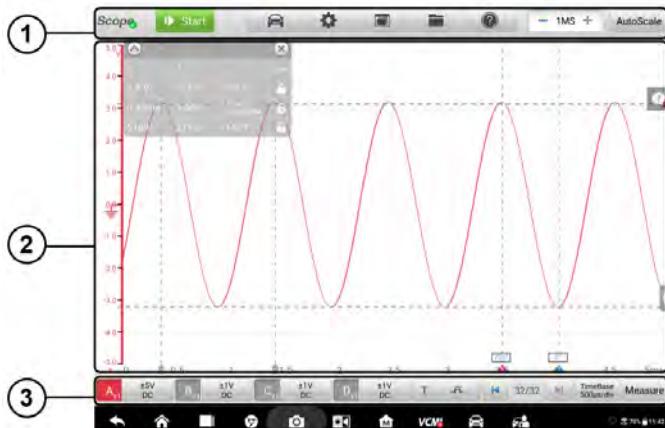
Tap the **Measurement** icon on the home screen then select **Scope** in the menu, the oscilloscope page appears. The screen typically includes the following sections.

---

### NOTE

The **MaxiScope** icon can also be selected to open the application from the Android screen after tapping on the Android Home button at the bottom of the screen.

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**Figure 9-6 Sample Oscilloscope Menu Screen**

1. Upper Section Buttons - see [9.1.5.1 Upper Section Buttons](#) on page 114 for details.
2. Main View Section – see [9.1.5.2 Main View Section](#) on page 132 for details.
3. Lower Section Buttons - see [9.1.5.3 Lower Section Buttons](#) on page 139 for details.

### **9.1.5.1 Upper Section Buttons**

The upper section buttons are used for configurations of various settings and operations. The following table provides brief descriptions of each button.

**Table 9-2 Upper Section Buttons**

Name	Button	Description
Scope Icon		Indicates the oscilloscope connection status. See <a href="#">Scope Button</a> on page 115 for more information.
Start/Stop		Start or stop the oscilloscope device. See <a href="#">Start/Stop Button</a> on page 116 for more information.
Presets		A wide variety of preset guided information for you to view. Selecting one allows automatic set-up of the oscilloscope to capture a waveform of the specified waveform type. See <a href="#">Presets Menu</a> on page 116 for more information.
Settings		Configurations of math channel, mode setting and signal generator. See <a href="#">Settings Menu</a> on page 119 for more information.
Window Display		Set the layout and channel position. See <a href="#">Window Display Menu</a> on page 124 for more information.
File		Print, open, save, and delete the waveform data. See <a href="#">File Menu</a> on page 128 for more information.
Help		View the user manual, update the APK and firmware. See <a href="#">Help Menu</a> on page 130 for more information.
Number of Samples		Set the maximum number of samples that will be captured at each channel. See <a href="#">Number of Samples</a> on page 131 for more information.
Auto Scale		Set up the appropriate time base and amplitude range to display the signal correctly. See <a href="#">Auto Scale</a> on page 131 for more information.

## Scope Button

This **Scope button** indicates the oscilloscope connection status. A **green tick** means a successful connection with the Display Tablet, whereas a **red cross** means connection failure.

## Start/Stop Button

You can tap the **Start/Stop Button** icon to start and stop the oscilloscope device.

Name	Button	Description
Start		Tap to start the oscilloscope and the sampling begins.
Stop		Tap to stop the oscilloscope and the sampling ends.

## Presets Menu

Tap the car-shaped icon in the top navigation bar to enter the **Presets Menu**. This menu offers a wide variety of preset guided information for you to view.

The frequently used test components and options are listed in the presets menu:

- **Charging and Starting** - Test the functions related to car charging and starting, such as current and voltage idle test, starting current and voltage test, relative compression test, etc.
- **Sensors** - Test the common car sensors such as oxygen sensors, camshaft sensors, crankshaft sensors, etc.
- **Actuators** - Test the common car actuators such as injectors, fuel pumps, canister purge solenoids, etc.
- **Comprehensive Test** - Combined test of the car's sensors or actuators, such as the crankshaft position sensor and camshaft position sensor test; the primary ignition and crankshaft position test; the throttle position sensor and front oxygen sensor test, etc.
- **Ignition** - Test the ignition process of the car, including the voltage and current test of the primary and secondary ignition
- **Communication** – Test the car's communication buses including CAN-bus, LIN-bus, K-Line, etc.

➤ **To use the Presets menu:**

Take Injector for example to demonstrate how to find and view information in the Presets menu:

1. Tap the **Presets** button in the top navigation bar. A submenu opens.
2. Tap the desired test component or option in the left column.

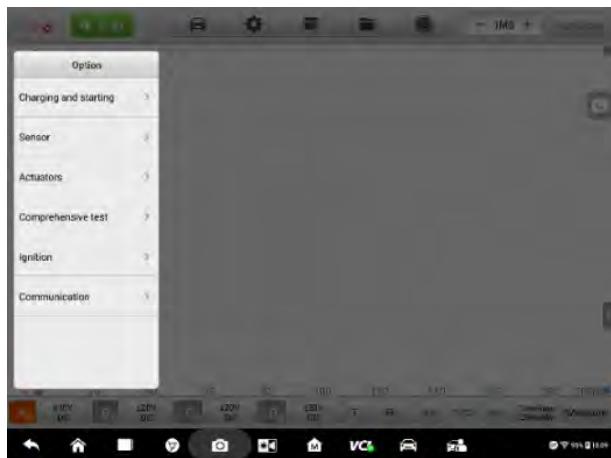


Figure 9-7 Sample Presets Menu Screen 1

3. Tap the desired sub-options in columns that appear.

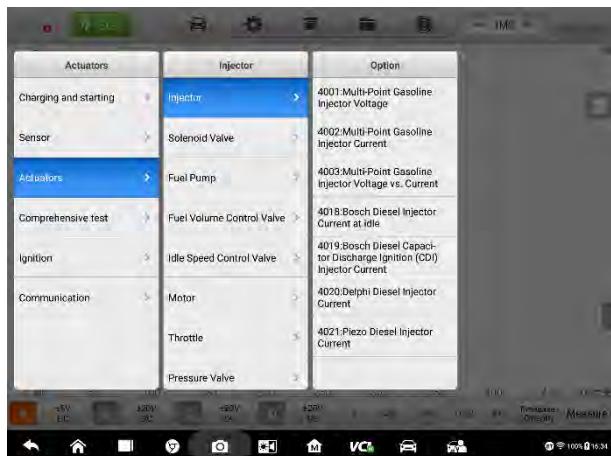
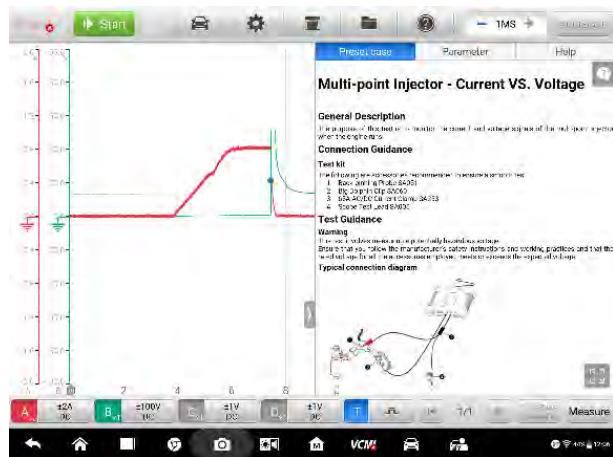


Figure 9-8 Sample Presets Menu Screen 2

4. View the preset guided information. A reference signal waveform is displayed on the Main Screen and the preset guided information on the right side of the screen.



**Figure 9-9 Sample Presets Display Screen**

5. The preset guided information can be hidden and the reference signal waveform is viewed in full screen by tapping the arrow button.



**Figure 9-10 Sample Reference Signal Waveform Display**

#### **NOTE**

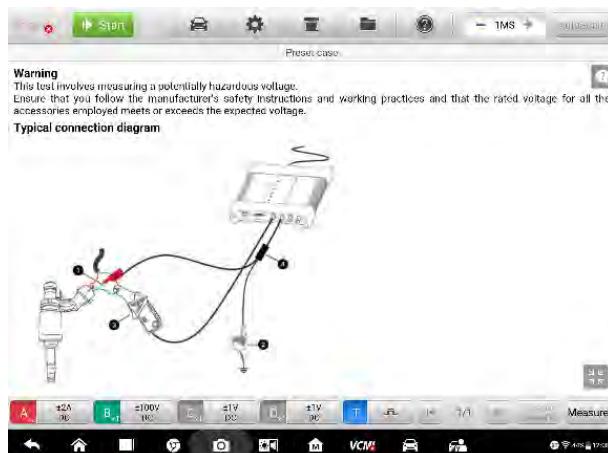
The parameter values such as the ranges of voltage and time divisions are automatically set when performing the presets menu without any manual adjustment.

6. The preset guided information such as the general description, test guidance, waveform analysis can be viewed in full screen by tapping the four-direction button in the lower right corner. Tap again to exit full screen.



### NOTE

The pictures in the preset guided information can be displayed in a full screen for viewing in details.



**Figure 9-11 Sample Preset Guided Information Display (Full Screen)**

7. Tap the **Start/Stop** button. The oscilloscope will perform waveform acquisition according to the preset parameters.

## Settings Menu

Tap the gear-shaped icon in the top navigation bar to enter the **Setting Menu**. The **Math Channel**, **Mode Setting** and **Signal Generator** can be manually configured in the menu.

### Math Channels

A math channel is a virtual channel generated by a mathematical function of the input channel. It can be displayed in an oscilloscope in the same way as an input signal, and like an input signal it has its own measure axis, scaling and color.

The oscilloscope has a set of built-in math channels for the most important functions:

- **Turnover:** reverses the signal polarity to turn the waveform upside down on the screen
- **A+B:** channel A plus channel B
- **A-B:** channel A minus channel B
- **A\*B:** multiply channel A by channel B
- **A/B:** channel A divided by channel B
- **Frequency:** the frequency of the signal
- **Pulse Width (+):** the positive pulse width
- **Pulse Width (-):** the negative pulse width
- **Duty Cycle (+):** the positive duty cycle
- **Duty Cycle (-):** the negative duty cycle

➤ **To set the math channel:**

Take **Invert A** for example.

1. Tap **Settings** button in the top navigation bar. A dialog box opens.
2. Select the **Math Channels** option in the dialog box.
3. Tap the **Invert A** check box. The selected check box will show with a blue tick.

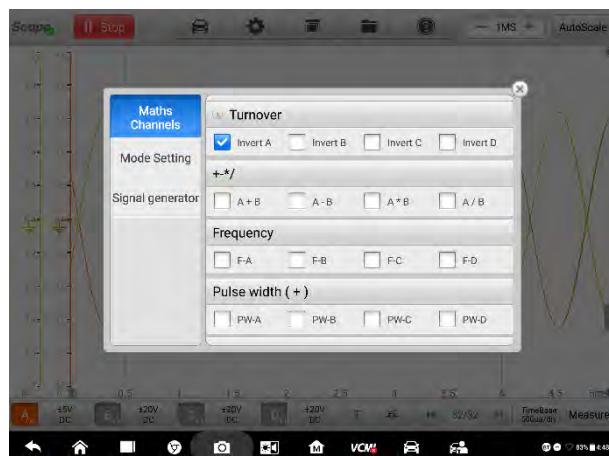


Figure 9-12 Sample Math Channel Setting Screen

4. Close the dialog box, the waveforms are displayed on the screen.

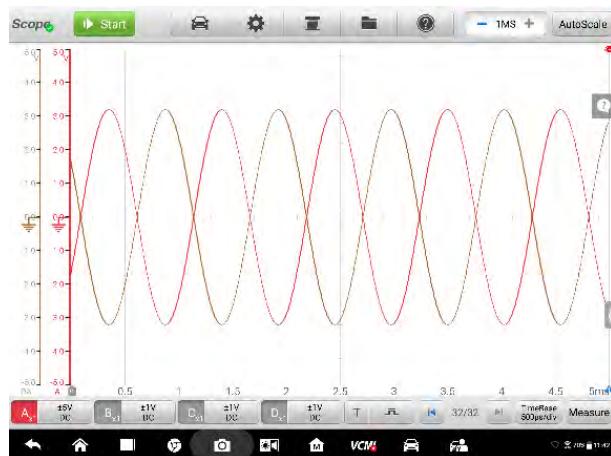


Figure 9-13 Sample Math Channel Setting Screen

### Mode Settings

Two mode settings are available: normal mode and demo mode.

---

 **NOTE**

The oscilloscope is required to be connected in any mode.

---

In normal mode, the actual waveform is displayed on the screen when a test component is connected to the oscilloscope. In demo mode, a demo waveform is displayed on the screen, which can help you to become familiar with the functions of the oscilloscope.



Figure 9-14 Sample Mode Setting Screen

### Signal Generator Settings

The signal generator function can be activated when running the oscilloscope function simultaneously. It can simulate the DC voltage, impulse, positive duty cycle, negative duty cycle, sine wave, and triangle wave. The values of voltage, frequency and duty cycle can be adjusted manually.

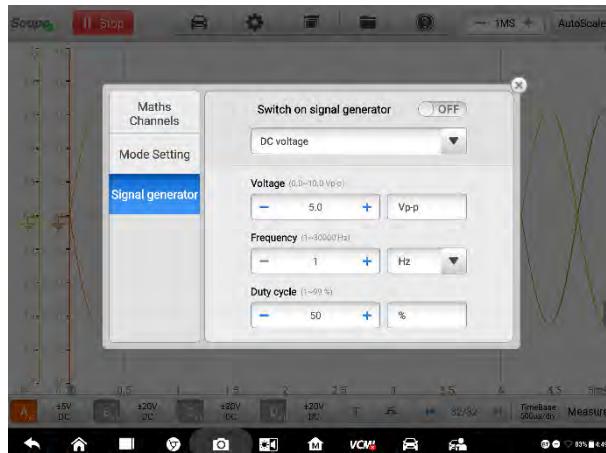


Figure 9-15 Sample Signal Generator Setting Screen

➤ **To set the signal generator:**

1. Tap the **Settings** button in the top navigation bar. A dialog box opens.
2. Select the **Signal Generator** option in the dialog box.
3. Toggle the **OFF** button to **ON** to enable the signal generator. Select a desired option from the dropdown menu list. Then tap the “+” or “-” buttons to adjust the voltage, frequency and duty cycle values manually.



**Figure 9-16 Sample Signal Generator Settings Screen**

4. Close the dialog box. The signal generator settings are displayed on the screen.

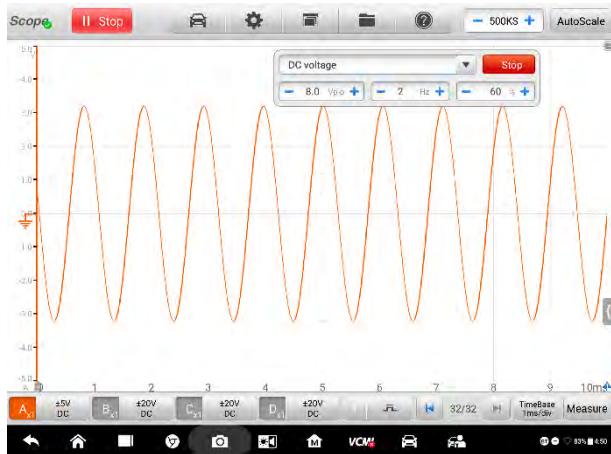


Figure 9-17 Sample Signal Generator Display Screen

## Window Display Menu

A Window displays the data captured by the oscilloscope in a grid. By default, a window displays a single trace. You can set the number of traces in the Window Display menu.

### Display Mode

The Window Display menu allows you to configure up to four traces.

**Single Window** – displays a single trace

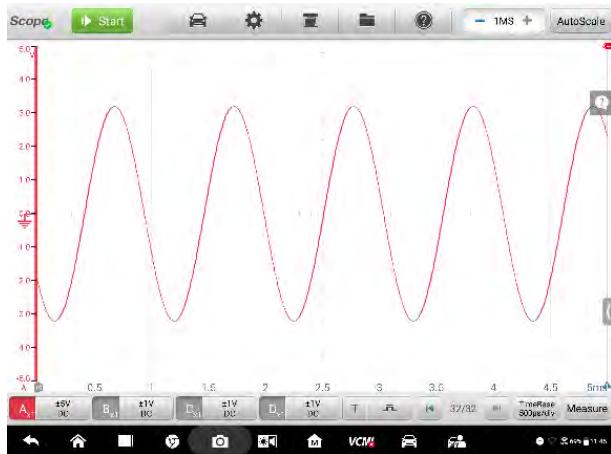


Figure 9-18 Sample Single Window Screen

**Double Window** – displays two separate traces one below another horizontally

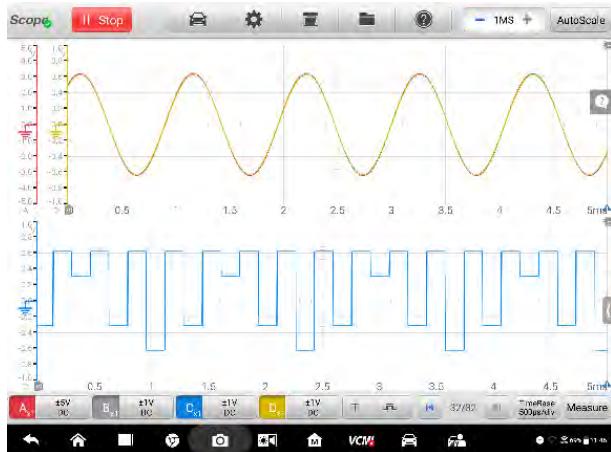
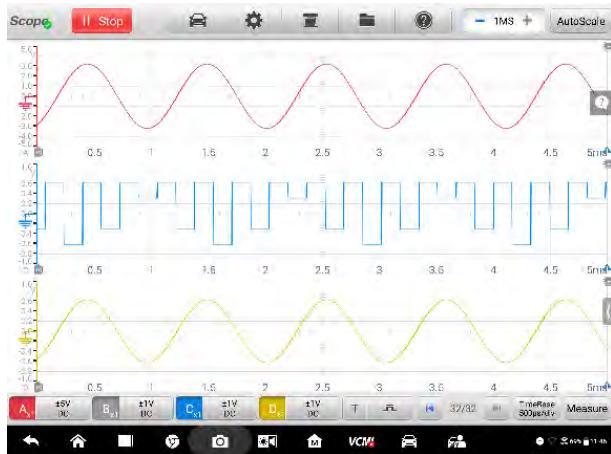


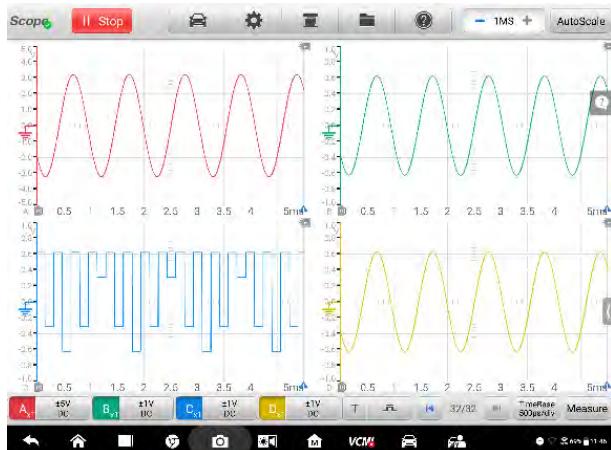
Figure 9-19 Sample Double Window Screen

**Triple Window** – displays three traces one below another horizontally



**Figure 9-20 Sample Triple Window Screen**

**Quadruple Window** – displays four traces one below another horizontally and side by side vertically



**Figure 9-21 Sample Quadruple Windows Screen**

➤ **To set the display mode:**

1. Tap the **Window Display** button in the top navigation bar. A dialog box opens.
2. Select the **Display Mode** in the dialog box.

3. Select the desired window quantity by tapping the corresponding icon.

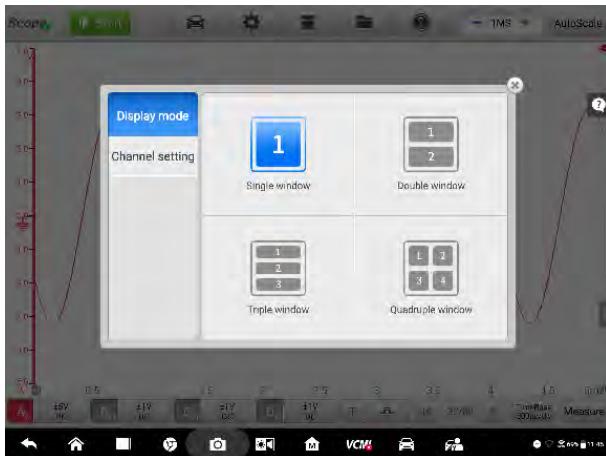


Figure 9-22 Sample Display Mode Selection Screen

4. Close the dialog box. The window is displayed as arranged.

## Channel Settings

The channel settings allow you to switch the position in which the activated channel is displayed. Select which channels are visible in the display window. The display status is set to **ON**, the input channels are enabled, otherwise, the input channels (set to OFF status) are not available for viewing.

➤ **To set the channel setting:**

1. Tap the **Window Display** button in the top navigation bar. A dialog box opens.
2. Select the **Channel Settings** in the dialog box.
3. Toggle the display status icon to **ON**. Select the proper position in the dropdown list.

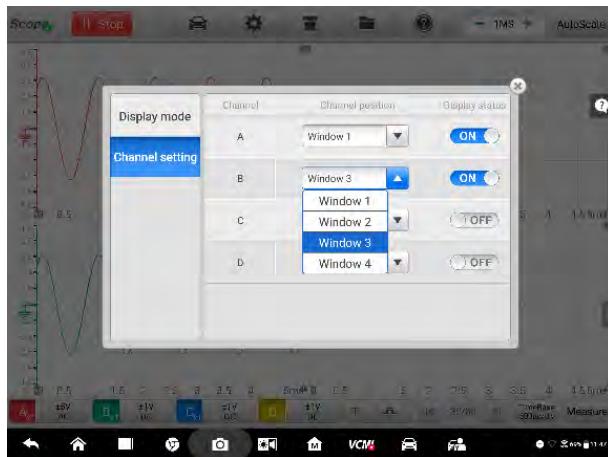


Figure 9-23 Sample Channel Setting Screen

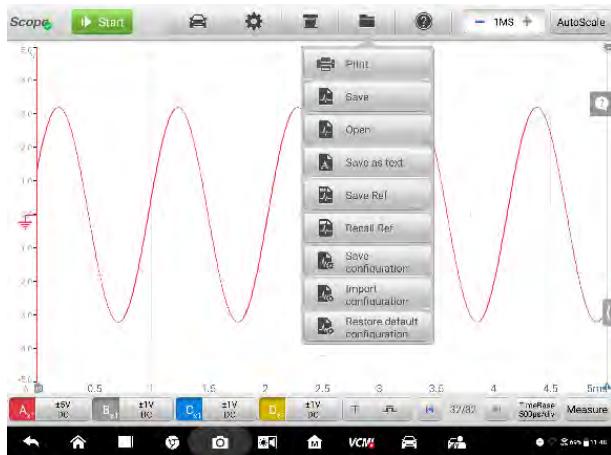
4. Close the dialog box and the activated channel is displayed in the selected window.



Figure 9-24 Sample Channel Display Screen

## File Menu

The **File** button allows you to print, open, save, and delete the waveform data. The **File Menu** supports the following functions.



**Figure 9-25 Sample File Menu Screen**

- **Print** – Tap to generate a temporary JPG picture and print the current waveforms.

---

**NOTE**

1. Make sure the Display Tablet is connected to a printer successfully.
  2. Make sure the network is available.
- 

● **Waveform Operation**

This section allows you to save and open the waveforms.

**Save** – Tap to capture and save the current waveforms or the latest 5 frame waveforms. On the Save Waveform screen, tap each item to input the corresponding information and then tap Save or Save as default to finish.

---

**NOTE**

The file name is required to input when saving waveforms.

---

**Open** – Tap to retrieve the saved waveforms. You can select and delete the saved waveforms by tapping the Edit button in the upper right corner of the screen.

**Save as text** – Tap to save the current waveform data to a text file. You can use the ES file browser to find the saved text file. View the saved text file at **Home > ES file browser > Main content > Scan file > Data file > Scope file > txt file**.

● **Reference Waveform Operation**

This section allows you to save, open and clear the reference waveforms.

**Save Ref** – Tap to save a copy of an existing signal waveform for future reference. With this function, you can freely create a waveform library according to your needs, with normal and abnormal waveforms of various sensors, actuators, etc. to facilitate subsequent comparison and analysis of waveforms.

On the Save Ref screen, tap on each item to input the corresponding information and then tap Save or Save as default to finish.



### NOTE

The file name is required to input when saving reference waveforms.

**Recall Ref** – Tap to retrieve the saved reference waveform as a comparative reference to examine a live signal. Select the desired reference waveform by ticking the check box alongside and then the two kinds of waveforms (reference waveform and current waveform) are displayed on the screen, making you compare and analyze the signals better.

**Clear Ref** – Tap to clear the saved reference waveform from the Main Screen.

## ● Configuration Operation

The configurations can be saved and imported, or set to default.

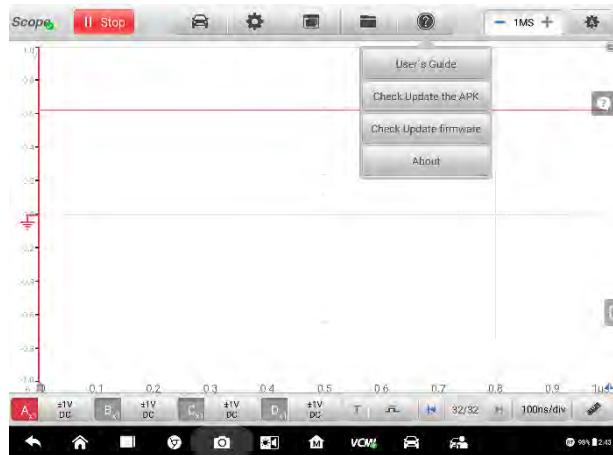
**Save the Config** – Tap to save the configuration values of waveforms on the current screen, for example, the amplitude, the time base, the number of samples, etc.

**Import the Config** – Tap to import the saved configuration values of waveforms.

**Default Config** – Tap to cancel the current setting values and quickly refresh the screen to retrieve the default setting values.

## Help Menu

The Help Menu allows you to view the user manual, update the APK and firmware, and view versions of the APK and firmware.



**Figure 9-26 Sample Help Menu Screen**

**User Manual** – the document with complete information and operations of the oscilloscope.

**Check Update the APK** – check online to find the latest version of the APK.

**Check Update Firmware** – check online and update to the latest firmware version of the oscilloscope.

**About** – displays the model number of the oscilloscope, the firmware version numbers and the software version numbers.

## Number of Samples

This button allows you to set the maximum number of samples that will be captured at each channel. The sampling rate of current time base can be adjusted by changing the number of samples. You can check the sampling interval, sampling rate, and sample size in the **Parameter and Help** sheet.

The number of samples can be lowered or raised by tapping the left-right buttons.

## Auto Scale

You can use this **Auto Scale** button to optimize settings as it can search for a signal on one of the enabled input channels and set up the appropriate time base and amplitude range to display the signal correctly.

### 9.1.5.2 Main View Section

After configuring the window display settings in the upper section, the main view section screen varies. Up to four traces, along with digital readouts of current signal values, signal status and triggering conditions, can be displayed simultaneously on the main view section screen.

Each trace has two control features as **X-axis** and **Y-axis**, which enable you to adjust the oscilloscope settings to suit the particular test measurement. If multiple traces are displayed at the same time, the **Y-axis** for each trace is adjusted separately while the **X-axis** is the same for all traces.

- **Y-axis** – the voltage level is recorded on the vertical. It is shown down the left side of the screen.
- **X-axis** – time is presented on the horizontal. It is shown along the bottom of the screen.

### Measurement Overrange Indicator

When the signal voltage exceeds the measurement input range, a **red overrange indicator** with the message “**Channel overrange**” is displayed in the top left corner of the screen displays. Exceeding the common-mode input range may cause inaccurate measurements and can lead to severe signal distortion.



Figure 9-27 Sample Over-range Indicator Screen

Select an appropriate scale setting for the signal being sampled to avoid an overrange condition.

---

### IMPORTANT

To prevent electric shock, do not exceed voltage limits between inputs.

---

## Channel Selection

In the main view section, a channel has two conditions: selected and unselected. Some operations depend on the selected condition of the channel, such as voltage rulers, waveform movements, and waveform zooming.

Tap the zero baseline marker or the Y-axis, which thickens to indicate the channel is selected.

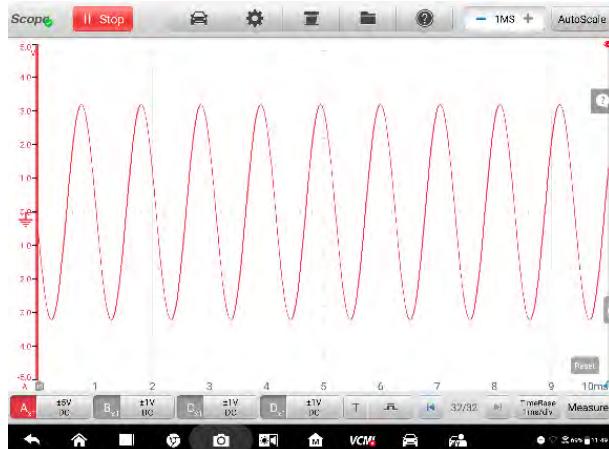


Figure 9-28 Sample Channel Selection 1 (Selected)

Tap the zero baseline marker or the Y-axis again to exit the channel selection.

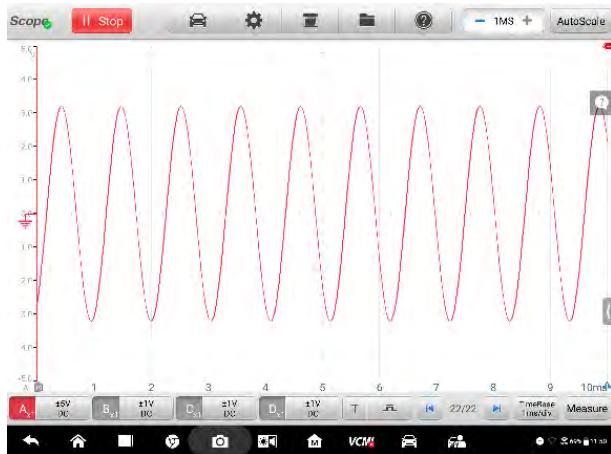


Figure 9-29 Sample Channel Selection 1 (Unselected)

## Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, but the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

## Measurement Rulers

The coordinate Rulers allow the voltage and time duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, the cycle time (duration) and frequency.

There are three kinds of measurement rulers: the vertical **Time Ruler**, the horizontal **Voltage Ruler**, and the vertical **Angle Ruler**.

Tap the **Ruler Activator** in the lower left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

Tap the **Angle Activator** in the lower right corner of the grid and drag it across the screen to the desired position. An **Angle Ruler** is generated.

The two angle rulers are positioned to mark the start and end of a cycle. By default, the start and end angle values are  $0^\circ$  and  $720^\circ$ , which can be configured in the Ruler Setting box.

The **Voltage Ruler** can be generated in the similar way by tapping the **Ruler Activator** in the upper right corner and dragging it downwards.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values for the corresponding channels will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.

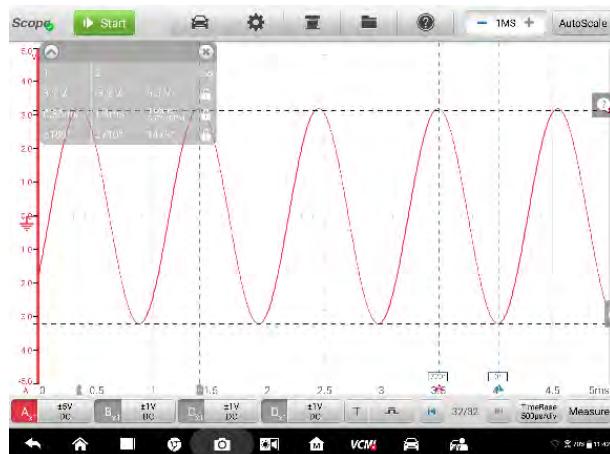


Figure 9-30 Sample Rulers Display Screen

➤ **To configure angle settings:**

1. Drag **Angle Activator** to generate the angle rulers.
2. Tap the start or end angle value to open the Ruler Setting box.
3. Input the desired angle value and the angle partition in the field.



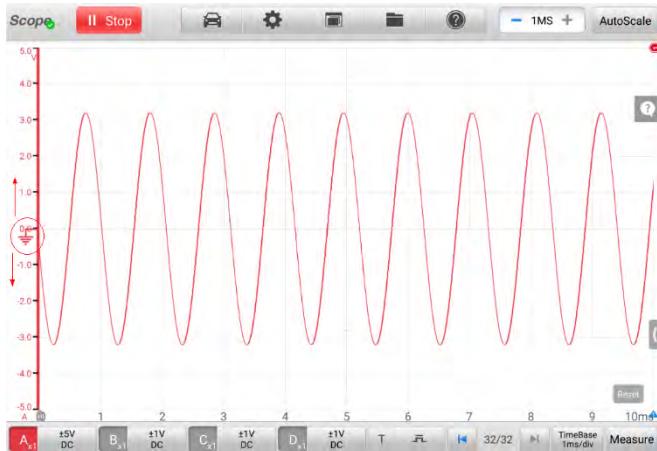
Figure 9-31 Sample Angle Setting Screen

4. Tap **Confirm** in the upper right corner to save the settings, or tap **Cancel** to exit without saving.

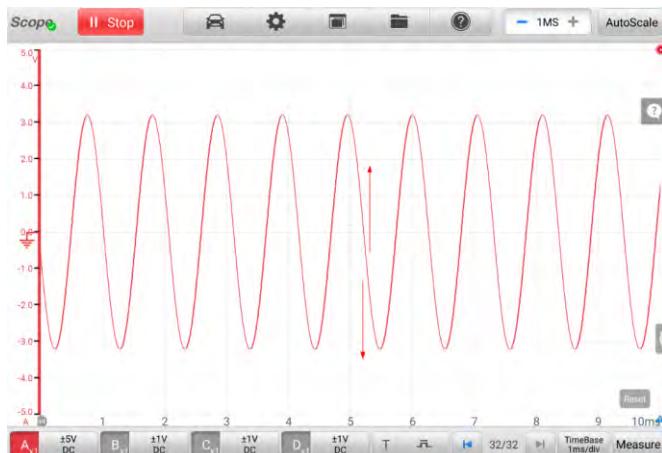
## Zero Baseline

The zero baseline is marked the 0 value in the Y-axis, showing the ground level of each channel waveform.

After the channel is selected, the Zero Baseline can be adjusted by dragging the zero baseline marker up/down along the Y-axis (Figure 9-32), or dragging the waveform up/down, or moving the screen up/down in the grid (Figure 9-33).



**Figure 9-32 Sample Dragging Zero Baseline Marker Screen**



**Figure 9-33 Sample Dragging Waveform or Moving Screen**

### NOTE

Tapping the zero baseline marker makes the vertical scale line thinner. In this case, the waveform is unselected and cannot be dragged. Tap the zero baseline marker again to select.

## Parameter and Help

Tap the arrow button in the lower right corner of the screen to open the parameter and sheet.

The **Parameter** function allows you to view the values of parameters like sampling interval, sampling rate, sample size, channel, range and coupling mode.

The **Help** function provides the relevant introduction, information and test procedures when you are viewing a specific section or tapping to a specific button.

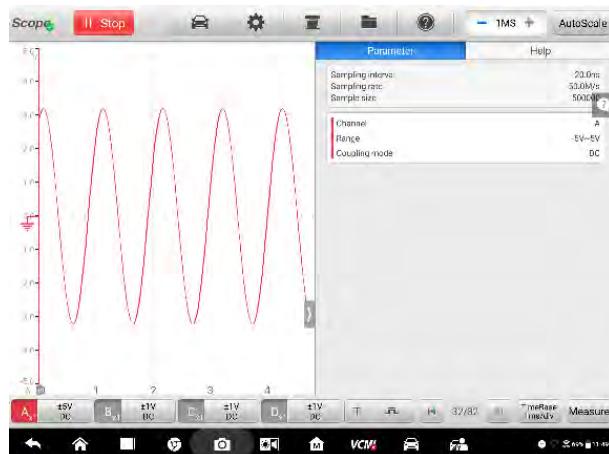
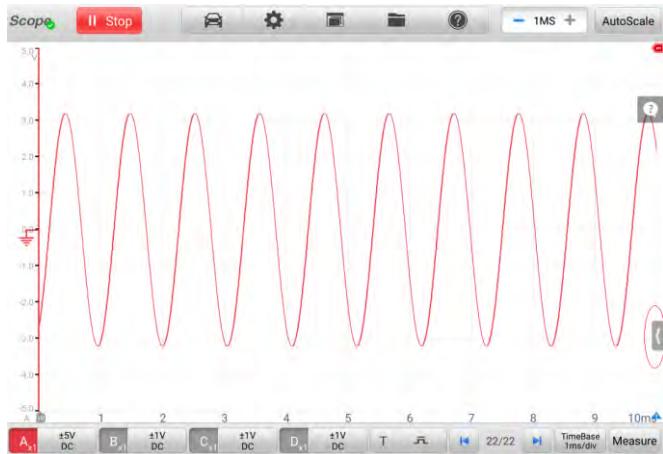


Figure 9-34 Sample Parameter Screen

➤ **To open and close the parameter and help sheet:**

1. Tap the arrow button on the right-hand side of the screen.



**Figure 9-35 Arrow Button Position Screen**

2. The parameter and help sheet displays.
3. Tap the arrow button again or click any space outside of the sheet to close the parameter and help sheet.

#### Note

The preset guided information is also displayed on the right side of the screen after selecting the specific options and test components from Presets menu.

#### 9.1.5.3 Lower Section Buttons

The buttons at the bottom include the channel control buttons, trigger setting buttons, buffer button, time base button and measurement button. The following table provides brief description of each button.

**Table 9-3 Lower Section Buttons**

Name	Button	Description
Channel Control		Tap to configure the settings of each channel. The channel color lights indicating which channel is activated, and the grey color indicates that the channel is not activated. See <a href="#">Channel Control</a> on page 140 for more information.
Trigger		Tap to open the trigger setting menu. See <a href="#">Trigger</a> on page 152 for more information.

Name	Button	Description
Buffer		Tap the Previous or Next button to scroll to the previous or the next frame waveform. See <a href="#">Buffer</a> on page 158 for more information.
Time Base		Tap to select an appropriate time per division. See <a href="#">Time Base</a> on page 159 for more information.
Measurement		Tap to select an appropriate measurement. See <a href="#">Measurement</a> on page 160 for more information.

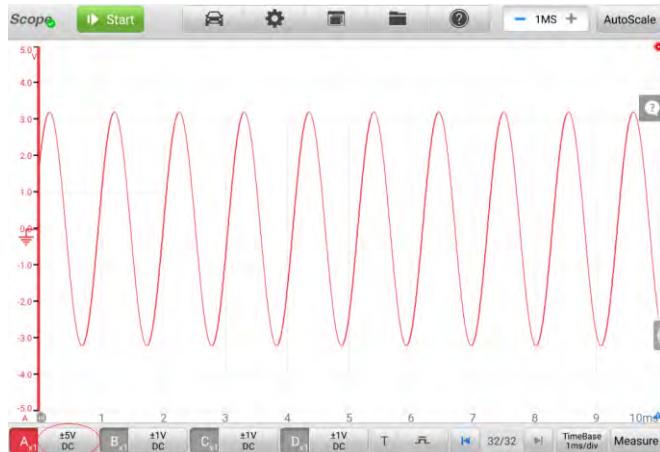
## Channel Control

There are four input channels in all: **input channel A**, **input channel B**, **input channel C**, and **input channel D**. The four channel buttons are displayed on the lower left side of the screen. You can set the input channel(s) through the corresponding channel control button(s).

Each **Channel Control** button includes the input channel number, the amplitude value and probe value. The probe value is displayed in the lower right corner of the left column of the channel control button while the amplitude value displayed in the right column.

➤ **To activate and close the channel:**

1. Tap the left column of the channel control button to activate the channel. The color changes from grey to the corresponding color of the channel. Or,
2. Tap the right column of the channel control button to open the settings dialog box.



**Figure 9-36 Sample Activate Channel Screen**

3. Tap the left column of channel control button again to close the channel. The channel color changes to grey again.

### Channel Color

The specific color of each input channel makes you identify the trace and read the corresponding waveform better.

**Table 9-3 Channel Color Table**

Input Channel	Color
A	Red
B	Green
C	Blue
D	Yellow

The amplitude, probe, low pass filtering and DLC channel settings can be configured in the Channel control dialog box.

### Amplitude Settings

The amplitude settings allow you to set up the oscilloscope to capture signals with the specified range. If the input signal exceeds the selected range, an over-range indicator will be displayed. To solve this problem, you can select **Auto** to adjust the vertical scale automatically.

It only changes the vertical scale, while the horizontal scale is not changed. AC and DC voltage can be toggled to set up the input circuitry.

### Note

Remember that the vertical scale is ALWAYS divided into 10 major divisions, and all scale settings reflect in these 10 divisions. The division set of 10 cannot be changed, so the 10 divisions cannot be added, or removed.

There are two modes available to set the amplitude value.

**Mode 1:** For example, selecting DC 5V sets the channel amplitude to **±5 DC** (seen at the right side of the channel control button), reflecting the entire vertical scale range is from -5V to +5V. As the vertical scale is divided into 10 segments, each segment is incremented by 1V.



Figure 9-37 Channel Setting Dialog Box Screen

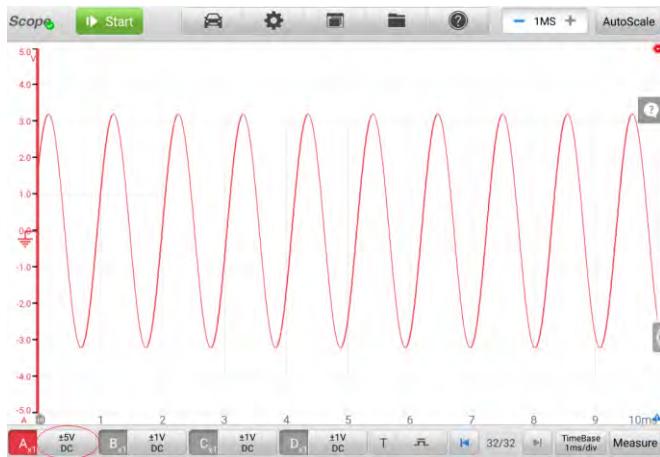


Figure 9-38 Sample Amplitude Setting Screen (DC 5V)

**Mode 2:** Selecting the **## /div** button can adjust value incremented by each division. For example, selecting AC 2.0V/div, sets the channel amplitude to **2.0V/div AC** (seen at the right side of the channel control button), reflecting each segment is incremented by 2V. As the vertical scale is divided into 10 segments, the entire vertical scale range is from -10V to +10V.

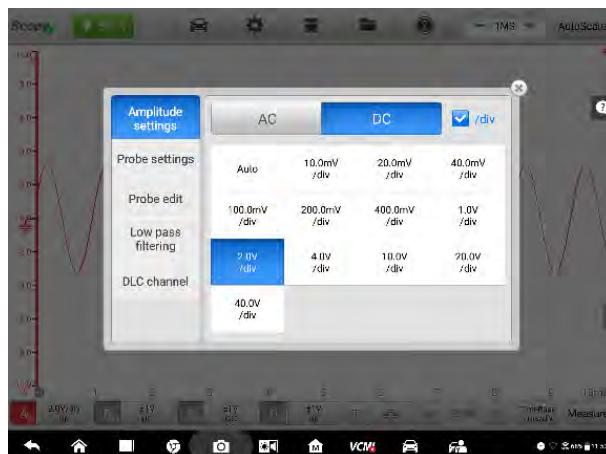


Figure 9-39 Sample Amplitude Setting Screen (AC 2.0V/div)

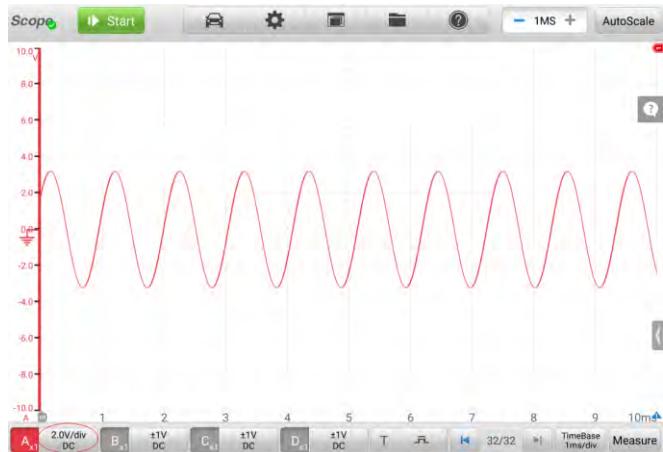


Figure 9-40 Sample Amplitude Setting Screen (AC 2.0V/div)

## Probe Settings

A probe is an accessory that connects to your oscilloscope and picks up signals to be measured. It can pick up different forms of signal, but generally delivers a voltage signal.

This oscilloscope has built-in definitions of standard probes. By default, the probe is set to be x1, which means 1V signal at the input to the probe will display as 1V.

The inner probes (built-in probes) include:

- **X1:** no attenuation
- **10 : 1 Attenuator:** select when using a 10-fold attenuation probe
- **20 : 1 Attenuator:** select when using a 20-fold attenuation probe (SA020)
- **X1000:** select when using a 1,000-fold attenuation probe
- **65A Current Clamp (1mV/10mA mode, Max: 2A):** 1mV/10mA mode on 65A current clamp, the max. current is 2A
- **65A Current Clamp (1mV/100mA mode, Max: 65A):** 1mV/100mA mode on 65A current clamp, the max. current is 65A
- **650A Current Clamp (1mV/100mA mode, Max: 20A):** 1mV/100mA mode on 650A current clamp, the max. current is 20A
- **650A Current Clamp (1mV/1A mode, Max: 650A):** 1mV/1A mode on 650A current clamp, the max. current is 650A

- **Coil-On-Plug Ignition Probe [COP]:** select when using the COP ignition probe (SA271)
- **Secondary Ignition Probe[Ign]:** select when using the secondary ignition probe (SA273)
- **Secondary Ignition Probe (Inverted) [I\_Ign]:** select when using the secondary ignition probe (SA273) and inverting the secondary ignition signal

You can select the inner standard probes in the probe settings. After selecting a correct probe, the settings can be seen in the lower right corner of the left column of the channel control button, indicating the probe is in use.

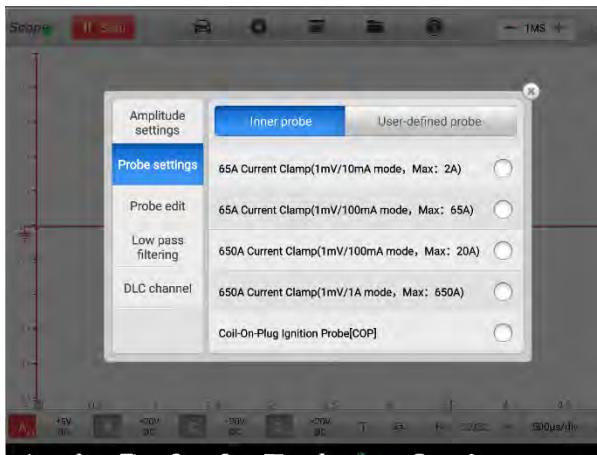


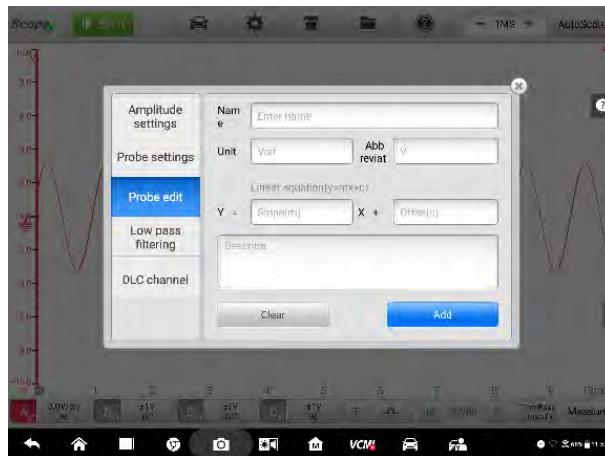
Figure 9-41 Sample Inner Probe Setting Screen

### Probe Edit

If you have purchased a probe that is different from the built-in standard probe, you can also add the custom probe.

#### NOTE

Please refer to the probe's instruction manual or consult the corresponding manufacturer for the linear equation ( $y=mx+c$ ).

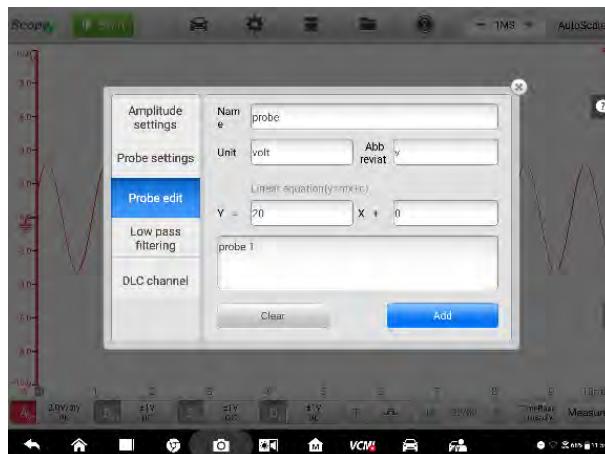


**Figure 9-42 Sample Probe Edit Screen 1**

➤ **To add custom probes:**

Add a 20 : 1 Attenuator as an example:

1. Tap the right column of the channel control button at the bottom of the screen to open the setting dialog box.
2. Select the **Probe Edit** option in the left column of the dialog box.
3. Tap each field to open the virtual keyboard and input the required information.



**Figure 9-43 Sample Probe Edit Screen 2**

4. Tap **Add** to save the settings, or tap **Clean** to exit without saving.
5. The added probe will be listed in the Probe Settings page.

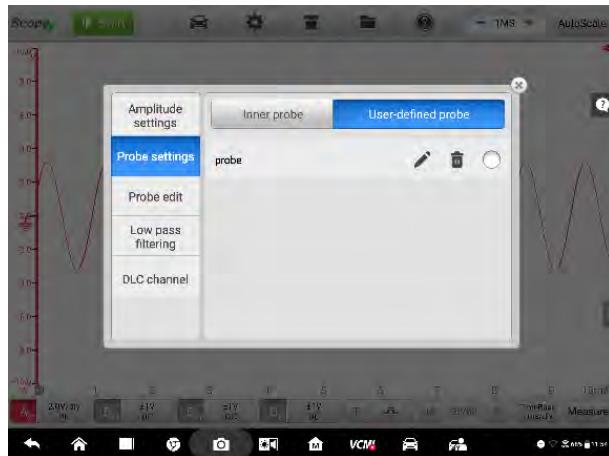


Figure 9-44 Sample Probe Edit Screen 3

### LPF (Lowpass Filtering)

The lowerpass filtering (LPF) is an independent digital lowpass filter for each input channel to remove noise from the signal.

It is helpful to find and reject low frequencies from the selected input channel for getting more accurate measurements. Take the two screenshots below as an example to show the comparison with or without setting the lowpass filtering.



Figure 9-45 Before Setting Lowpass Filtering Screen

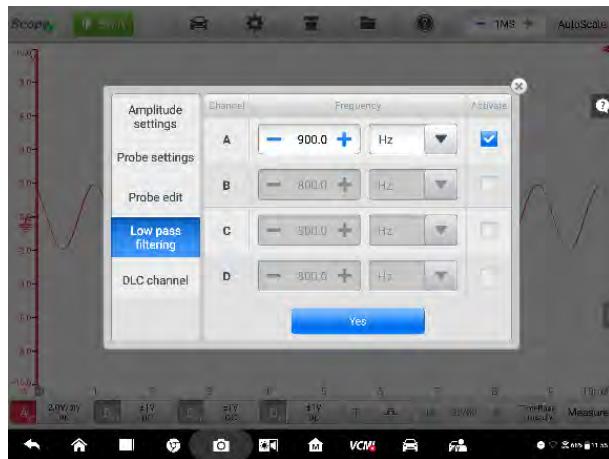


Figure 9-46 After Setting Lowpass Filtering Screen

➤ **To configure the lowpass filtering settings:**

1. Tap the right column of the channel control button at the bottom of the screen to open the setting dialog box.
2. Select the **LPF (Lowpass Filtering)** option in the left column of the dialog box.
3. Select one channel to activate and then set the appropriate frequency by

tapping the “-” or “+” button. The unit can be switched to **Hz**, **KHz** or **MHz** from the dropdown list.

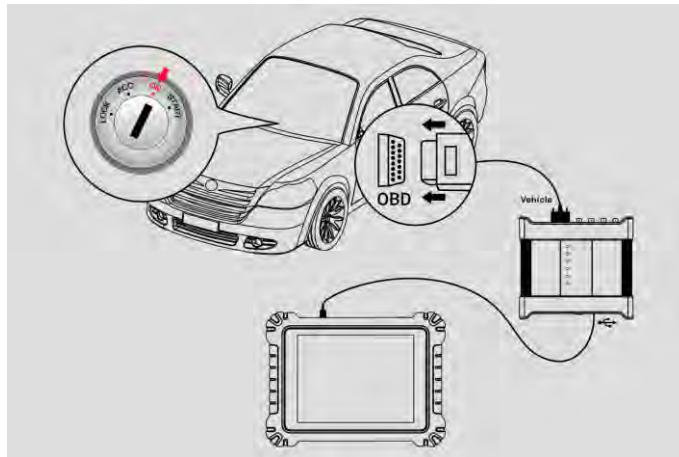


**Figure 9-47 Sample Lowpass Filtering Screen**

4. Tap **Yes** to save the settings or close the dialog box directly to exit without saving.

### DLC Channel

The DLC (Data Link Connector) channel enables data to be collected from the vehicle's OBD pins for easy analysis of vehicle communications.



**Figure 9-48 Sample DLC Connection Diagram**

➤ **To open and set the DLC channel:**

1. Tap the right column of the channel control button at the bottom of the screen to open the setting dialog box.
2. Select the **DLC Channel** in the left column of the dialog box.
3. Selecting the **Enable DLC channel** shows a blue tick, indicating the channel is activated. Then select the pin according to your needs.



**Figure 9-49 Sample DLC Channel Setting Screen 1**

4. Close the dialog box, the selected result is displayed on the screen. Tap the amplitude setting button on the bottom of the screen can adjust the value for the DLC channel.

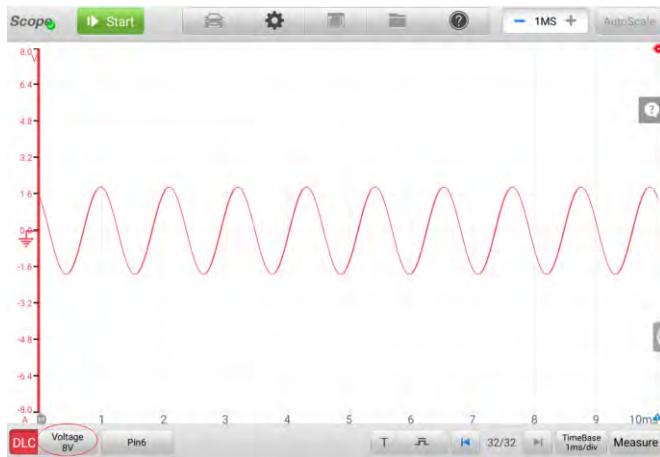


Figure 9-50 Sample DLC Channel Setting Screen 2

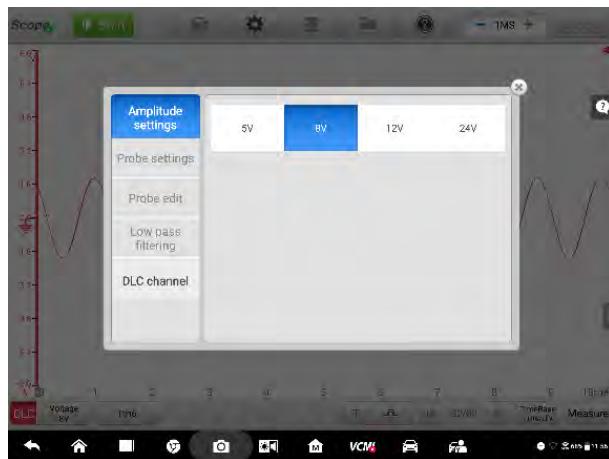


Figure 9-51 Sample DLC Channel Setting Screen 3

5. Tap the DLC icon in the lower left corner of the screen to close the DLC channel.



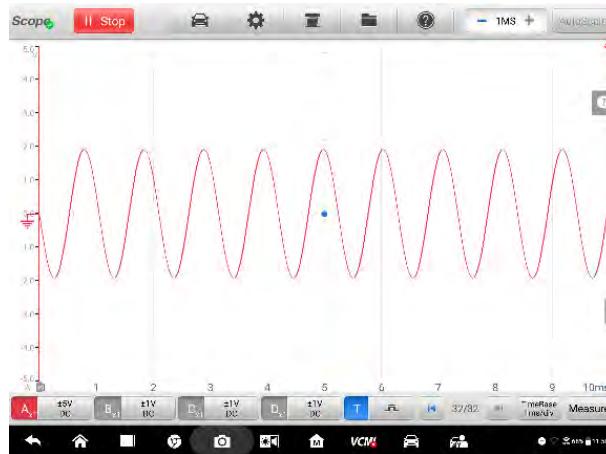
Figure 9-52 Sample DLC Channel Setting Screen 4

## Trigger

The trigger is mainly used to display a stable and enabled waveform so that you can view only the part of the waveform you are interested in. Generally, the continuous waveform display in non-trigger mode may have jitter or offset.

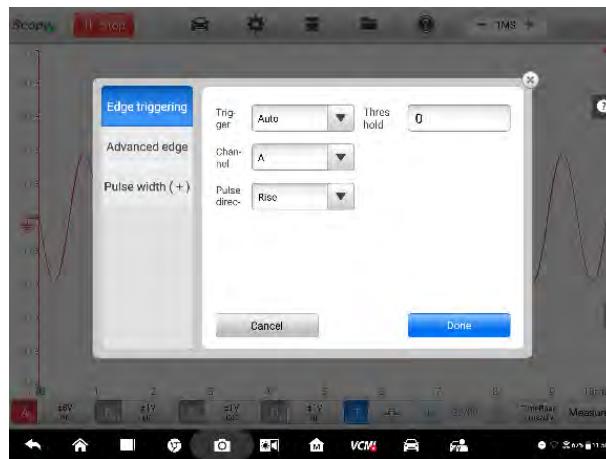
According to the trigger settings, the oscilloscope is triggered when the signal crosses a threshold, or wait until the signal meet the setting conditions.

When the oscilloscope is capturing the signal, tap the left column of the **Trigger** button to active the trigger function, and a **trigger point** is shown as a blue point.



**Figure 9-53 Sample Trigger Point Screen**

When the oscilloscope is capturing the signal, tap the right column of the **Trigger** button to open the trigger settings dialog box.



**Figure 9-54 Sample Trigger Settings Screen**

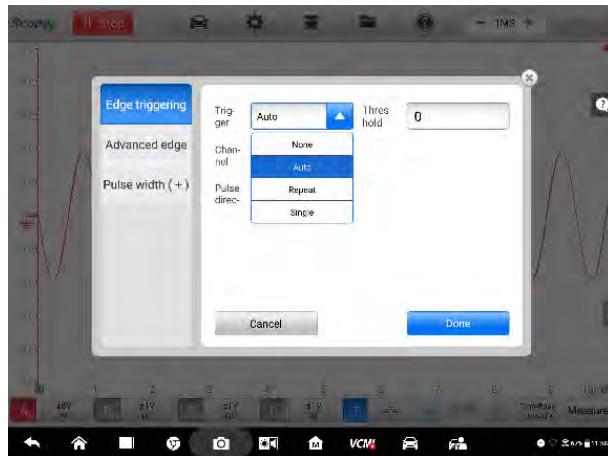
### Edge Triggering

The edge trigger is one of the most common trigger modes that occurs when a voltage crosses a threshold. This trigger type allows you to configure the trigger

mode, threshold, trigger channel and pulse direction settings. Tap **Done** to save the settings or tap **Cancel** to exit without saving.

- **Trigger Mode**

Four trigger modes are available: **None**, **Auto**, **Repeat** and **Single**. You can select one mode according to your specific needs.



**Figure 9-55 Sample Trigger Mode Screen**

The table below offers brief description for each trigger mode.

**Table 9-4 Trigger Mode Table**

Trigger Mode	Description
<b>None</b>	In this trigger mode, the oscilloscope can continuously capture data, without waiting for a trigger event.
<b>Auto</b>	In this trigger mode, the oscilloscope will wait for a trigger before capturing data. It can automatically update after a short period, even if the signal does not cross the trigger point.
<b>Repeat</b>	In this trigger mode, the oscilloscope waits until a trigger event occurs. If there is no trigger event, nothing will be displayed on the screen.
<b>Single</b>	In this trigger mode, the oscilloscope stop capturing data once a trigger event occurs.

- **Channel**

You can select the applicable trigger channel in the dropdown list. The selected channel is the one that the oscilloscope monitors for the trigger condition.

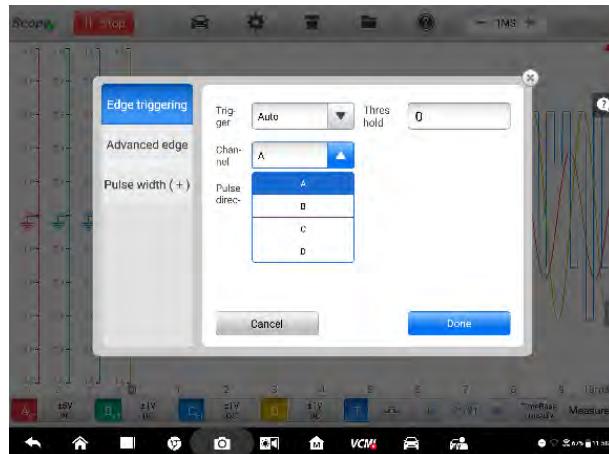


Figure 9-56 Sample Trigger Channel Screen

### ● Pulse Direction

Two pulse direction settings are available: **Rise** and **Fall**.

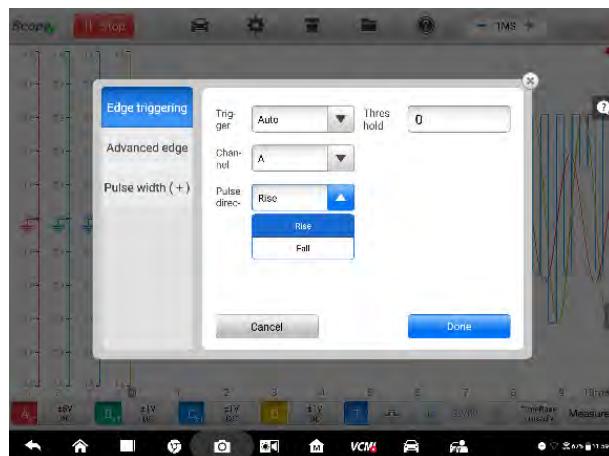


Figure 9-57 Sample Pulse Direction Screen

- ❖ **Rising Edge Trigger** - Indicates trigger is turned on to start the trace on the rising edge of the waveform.

- ❖ **Falling Edge Trigger** – Indicates trigger is turned on to start the trace on the falling edge of the waveform

- **Threshold**

The **Threshold** allows you to set the voltage threshold for the trigger.

- ❖ To precisely position the trigger point, input the value in the Threshold field in the trigger settings dialog box.
- ❖ To roughly position the trigger point, drag the trigger point to a desired position.

➤ **To configure the trigger settings:**

1. Tap the right column of the **Trigger** button to open the trigger settings dialog box.
2. Select the trigger mode, trigger channel and pulse direction in the dropdown list.
3. Input the value in the Threshold field in the trigger settings dialog box.
4. Tap **Done** to save settings or tap **Cancel** to exit without saving.

## Advanced Edge

This trigger type includes all the functions of the edge trigger type, but with two additional options: **the Rising or Falling option** and **the hysteresis option**.

**Rising or Falling** option in the dropdown menu of the pulse direction: Dual edges of a waveform can be triggered, especially for monitoring pulses of both polarities at once.

**Hysteresis** option: It is used to reduce false triggering on noisy signals. When hysteresis is enabled, a second trigger threshold voltage is used in addition to the main trigger threshold. The trigger fires only when the signal crosses the two thresholds in the correct order. The first threshold arms the trigger, and the second causes it to fire.

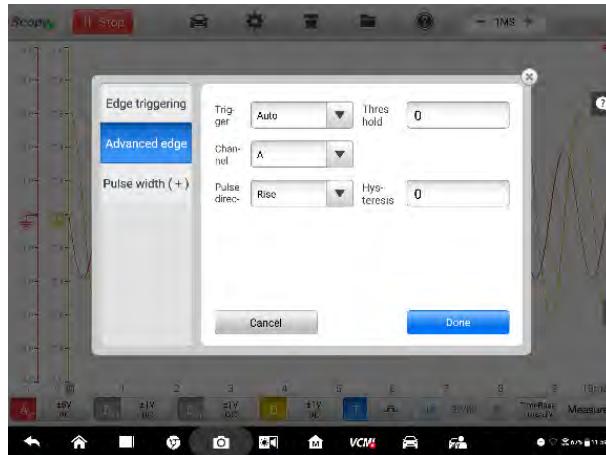


Figure 9-58 Sample Advanced Edge Screen

## Pulse Width

This trigger type allows you to monitor pulses of a specified width.

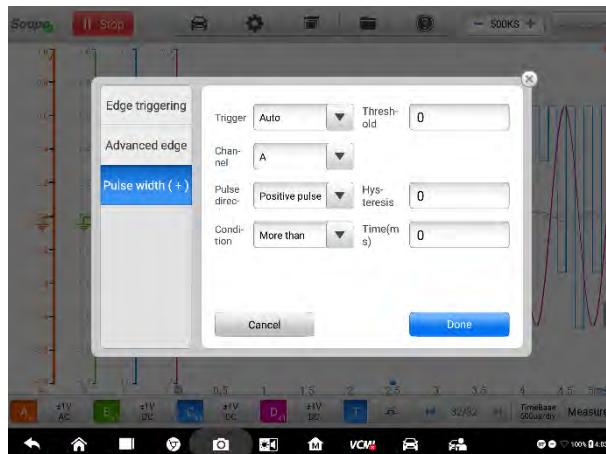


Figure 9-59 Sample Pulse Width Settings Screen

➤ **To set the pulse width:**

1. Tap the **Trigger** button at the bottom of the screen to open the Trigger Settings dialog box.

2. Select the **Pulse Width** in the left column of the dialog box.
3. Select the desired trigger mode and channel mode.
4. Set the pulse direction to either Positive pulse or Negative pulse according to the polarity of the pulse.
5. Select one of the four Conditions:
  - **More than:** triggers on pulses wider than the specified time.
  - **Less than:** triggers on pulses narrower than the specified time.
  - **In the time range:** triggers on pulses wider than Time 1 but narrower than Time 2.
  - **Out of the time range:** triggers on pulses narrower than Time 1 but wider than Time 2.
6. Set the trigger **Threshold** and **Hysteresis**.
7. Set the **Time 1** or **Time 2** in minutes (if available) to define the pulse width.
8. Tap **Done** to save settings or tap **Cancel** to exit without saving.

## Buffer

The waveform buffer shows which signal waveform is displayed on the current screen and how many signal waveforms are captured and stored in the buffer memory.

The oscilloscope can capture and store up to 32 waveforms. You can select a waveform from the waveform buffer by tapping the **Previous** or **Next** button to switch to the previous or the next waveform.

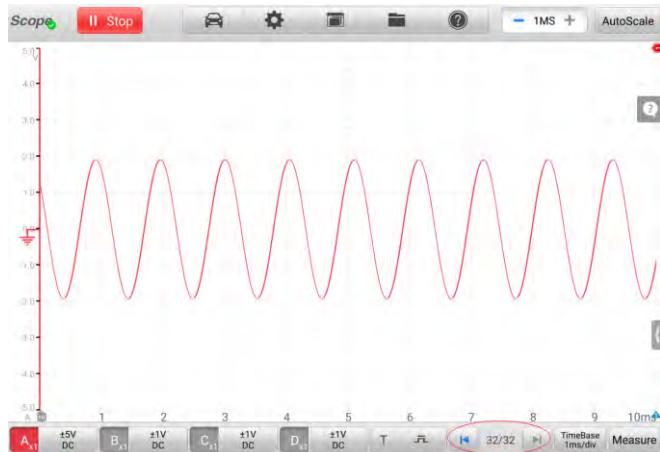


Figure 9-60 Sample Buffer Screen

Name	Button	Description
Previous		Tapping to display the previous waveform in the buffer.
Buffer Index		Shows which waveform is currently being displayed and how many waveforms are in the buffer.
Next		Tapping to display the next waveform in the buffer.

## Time Base

The time base controls the time interval across the oscilloscope display. Tap the Time Base button at the bottom to open the setting dialog box, and then select the desired options.

**Continuous Mode:** if the time base is set to more than or equal to 200ms/div, the oscilloscope switches to the continuous mode. In this mode, the oscilloscope updates the trace continuously as each capture progresses, rather than waiting for a complete capture before updating the trace.

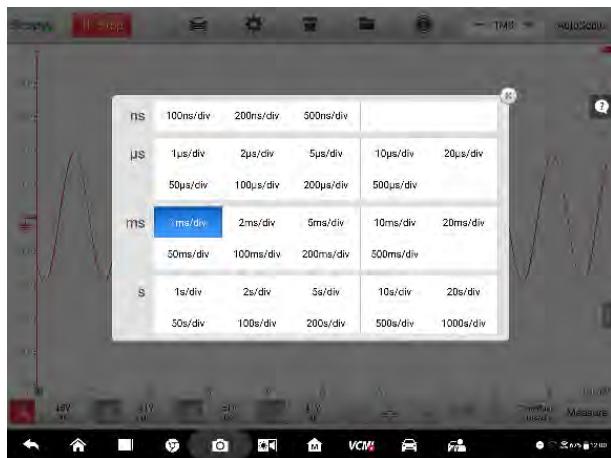


Figure 9-61 Sample Time Base Screen

## Measurement

The available measurements for each channel are (from left to right):

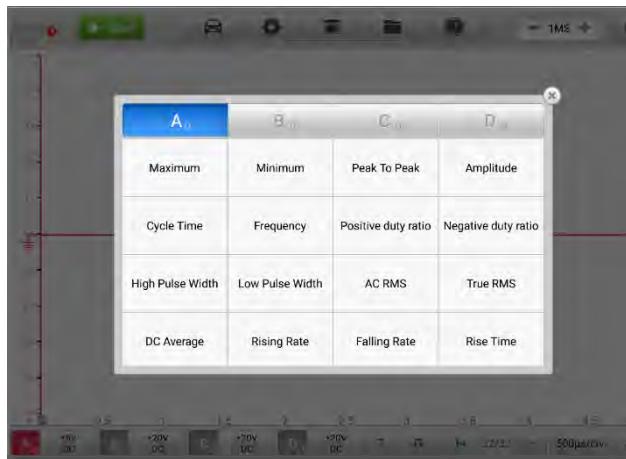


Figure 9-62 Sample Measurement Screen

- **Maximum** – the highest level that the signal reaches
- **Minimum** – the lowest level that the signal reaches
- **Peak To Peak** – the difference between maximum and minimum

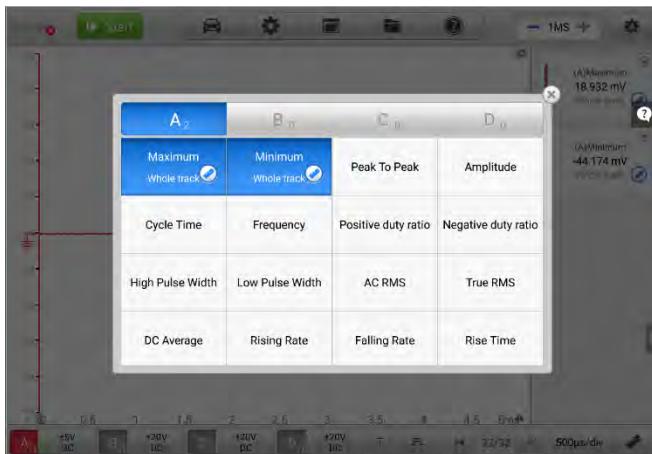
- **Amplitude** – the top value minus the bottom value
- **Cycle Time** – the duration of one cycle in a repeated pattern in the waveform
- **Frequency** – the number of signal occurrences per second
- **Positive Duty Ratio** – the ratio of positive pulse width to period width
- **Negative Duty Ratio** – the ratio of negative pulse width to period width
- **High Pulse Width** – the amount of time that the signal spends above its average value
- **Low Pulse Width** – the amount of time that the signal spends below its average value
- **AC RMS** – the root mean square (RMS) value of the waveform minus the DC Average
- **True RMS** – the root mean square (RMS) value of the waveform, including the DC component
- **DC Average** – the average value of the waveform
- **Rising Rate** – the rate at which the signal level rises
- **Falling Rate** – the rate at which the signal level falls
- **Rise Time** – the time the signal takes to rise from the lower threshold to the upper threshold
- **Fall Time** – the time the signal takes to fall from the upper threshold to the lower threshold
- **X@Max** – the corresponding value of X axis when the amplitude is the maximum
- **X@Min** – the corresponding value of X axis when the amplitude is the minimum
- **Positive Acreage** – the waveform acreage measured above the zero baseline
- **Negative Acreage** – the waveform acreage measured below the zero baseline
- **Full Acreage** – the positive acreage plus negative acreage
- **Top Value** – 90% of the waveform maximum value
- **Bottom Value** – 10% of the waveform minimum value
- **Positive Overshoot** – the ratio of the difference between the maximum value and the top value and the amplitude
- **Negative Overshoot** – the ratio of the difference between the bottom value

and the minimum value and the amplitude

- **Positive Pre-shoot** – the ratio of the difference between the bottom value and the minimum value and the amplitude
- **Negative Pre-shoot** – the ratio of the difference between the maximum value and the top value and the amplitude

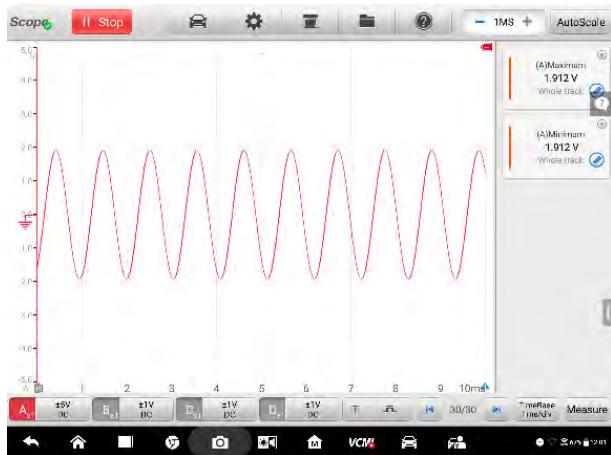
➤ **To set the measurements:**

1. Tap the **Measure** button at the bottom of the screen to open the measurement dialog box.
2. Select the desired channel to be measured.
3. Select the appropriate measurement options. The **Whole Track** and **Ruler Track** can be toggled through the **Edit** icon in the upper corner of the option.



**Figure 9-63 Sample Measurement Setting Screen**

4. Close the dialog box, and the corresponding measurement readings are displayed on the right-hand side of the screen. You can directly adjust the whole track or ruler track on the displayed screen, or delete the measurement directly by tapping the **X** button.



**Figure 9-64 Sample Measurement Display Screen**

### 9.1.6 Troubleshooting

A. If the oscilloscope cannot communicate with the MaxiSys Display Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Display Tablet via the supplied USB cable or Wi-Fi network.
- If the communication between the VCMI device and the MaxiSys Display Tablet still fails, restart the MaxiSys Display Tablet and reconnect the VCMI device.

B. If unwanted signals are displayed or some signals are displayed unclearly:

- Please use the supplied test leads or probes to connect with the input channels.
- Check the test leads or probes for damage.
- Make sure the polarity of the test leads connections are correct.
- Make sure the signal and ground connections are clean and secure.
- Make sure the ground lead is providing a direct ground from the circuit to the input channel.
- Isolate the test leads from other components, leads, or systems that may induce unwanted noise into the signal being tested, for example, the electric motors, secondary ignition components, relays, alternators, etc.

## **9.1.7 Glossary**

### *AC/DC Control*

Each channel can be set to either AC coupling or DC coupling. With DC coupling, the voltage displayed onscreen is equal to the true voltage of the signal with respect to ground. With AC coupling, any DC component of the signal is filtered out, leaving only the variations in the signal for the AC component.

### *Aliasing*

When the signal frequency gets higher than half the scope's maximum sampling rate and exceeds the limit, a distorted waveform appears. This distortion is called aliasing.

### *Amplitude*

This term indicates the maximum voltage generated from the zero volts line of the oscilloscope.

### *Analog Bandwidth*

All oscilloscopes have an upper limit to the range of frequencies at which they can measure accurately. The analog bandwidth of an oscilloscope is defined as the frequency at which a displayed sine wave has half the power of the input sine wave (about 71% of the amplitude).

### *Block Mode*

A sampling mode in which the computer prompts the oscilloscope to collect a block of data into its internal memory before stopping the oscilloscope and transferring the whole block into computer memory. This mode of operation is effective when the input signal being sampled is high frequency.

### *Buffer Size/Cache Size*

This term indicates the size of the oscilloscope's buffer memory. The buffer memory is used by the oscilloscope to temporarily store data. This helps to compensate for the differences in data transfer rate from one device to another.

### *Frequency*

This term describes the number of signal occurrences per second. Frequency is measured in Hz (hertz).

### *Peak to peak voltage*

This term indicates the difference in voltage between the minimum and maximum voltages occurring in the waveform.

### *Time Base*

The time base controls the time interval across the scope display.

### *Voltage Range*

The voltage range is the range between the maximum and minimum voltages that can be accurately captured by the oscilloscope.

### *Sampling Rate*

This term is used to define the number of samples per second captured by the oscilloscope. The faster the sampling rate of the scope, the more frequently it measures the signal voltage, and so the more detailed will be the trace that appears on the scope screen.

## **9.2 Multimeter Operation**

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A multimeter is a measuring instrument that is used to measure voltage, resistance, frequency, diode, duty cycle and pulse width as well as continuity test. The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra can function as a multimeter to provide precise measurements.

### **9.2.1 Safety Information**

Follow the instructions below to reduce the risk of injury from electric shock and prevent equipment damage.

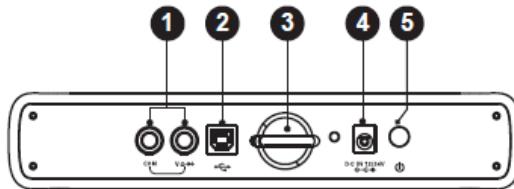
- Use the multimeter only as specified in this manual.
- Do not apply more than the rated voltage between terminals or between any terminal and earth ground.
- Do not input a value beyond the range when measuring. Remember that the limit value range of this multimeter is  $\pm 200V$ .
- To prevent injury or death, do not use the multimeter if it appears to be damaged in any way, and stop use immediately if you are concerned with any abnormal operations.
- To prevent injury or death, never ground yourself when taking electrical measurements. Isolate yourself from ground by using dry rubber insulating mats to cover all exposed/grounded metal. Stand on rubber mats and wear dry clothing.
- Use the test leads or probes supplied with the product, or proper and applicable terminals. Inspect the test leads or probes for damage before use.
- When using probes, keep fingers behind the finger guards on the probes.
- Use the supplied replacement fuses or specified replacement parts.
- Always consider electrical and electronic equipment to be energized (live). Never assume any equipment is de-energized.
- When making electrical connections, connect the common test lead before connecting the live test lead; when disconnecting, disconnect the live test lead before disconnecting the common test lead.
- When measuring current, turn off circuit power before connecting the multimeter to the circuit. Remember to place the multimeter in series with the circuit.
- After current measurement is finished, turn off the power to the circuit before removing the test leads and before reconnecting any disconnected wires or devices.
- Do not add voltage to the input terminal when measuring resistance.

- To avoid electric shock, turn off the power to the test component before testing it for connection.
- To prevent damage, always use and store your multimeter in appropriate environments.
- Do not use in wet or damp conditions, or around explosive gas or vapor.
- Do not tamper with or disassemble the multimeter, connectors or accessories. Internal damage will affect performance.
- Before carrying out maintenance and cleaning of the multimeter, make sure the unit is NOT connected to a power source, vehicle or computer.
- When cleaning the multimeter, use wet soft cloth with mild detergent in water. Do not allow water to enter the multimeter casing, as this will cause damage to the electronics inside.

## 9.2.2 General Introduction

### 9.2.2.1 Component Locations

The multimeter jacks are located on the top of the VCMI device while the input channels are located on the bottom.



**VCMI Top View**

1. Multimeter Jacks – for ground and signal cables
2. USB Port
3. Hook
4. DC Power Supply Input Port
5. Power Button

### **IMPORTANT**

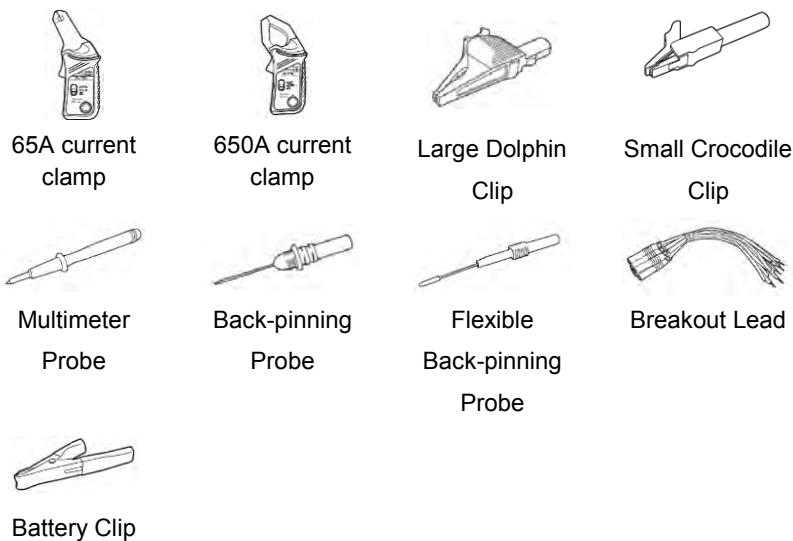
When using the multimeter function, please insert the supplied multimeter probes to the multimeter probe jacks. But when measuring current, the input channel A is assigned.

### 9.2.2.2 Technical Specifications

Item	Description
<b>Voltage Range</b>	$\pm 200V$
<b>Resistance Range</b>	$1\Omega$ to $10M\Omega$
<b>Diode</b>	2V
<b>Frequency Range</b>	1Hz to 1MHz
<b>Duty Cycle Range</b>	%1 to 99%
<b>Pulse Width Range</b>	10us to 1000ms
<b>Current Range</b>	<ul style="list-style-type: none"><li>● 0 to 65A (65A current clamp)</li><li>● 0 to 650A (650A current clamp)</li></ul>

### 9.2.2.3 Accessories

Some provided accessories are general for the multimeter and oscilloscope. Please refer to [Accessories](#) on page 107 for details.



The two multimeter test leads (Red: SA015 / Black: SA016) are general for the multimeter and signal generator.



#### Multimeter Test Lead

Used to connect the multimeter and multimeter probe.

### 9.2.3 Getting Started

Before opening the Multimeter application, the VCMI device must be connected to the Display Tablet via the provided USB cable or Wi-Fi network. For more information, see [Establish Vehicle Communication](#) on page 20.

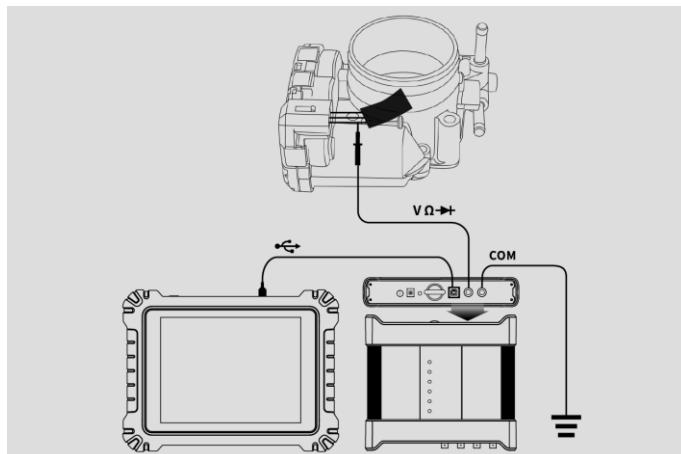


Figure 9-1 Sample Connection Diagram

➤ **To open the multimeter application:**

1. Insert the applicable test leads or probe terminal ends into the multimeter jacks to complete the connection.
2. Tap the **Measurement** icon on the Home screen of the MaxiSys Ultra Display Tablet. The Measurement screen opens.
3. Tap the **Multimeter** icon to open the Multimeter Menu.
4. Select a desired test option to continue.

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## NOTE

Please check the multimeter LED status indicator on the front panel of VCMI device. The multimeter LED illuminates green when operating in the multimeter mode.

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### 9.2.4 Multimeter Update

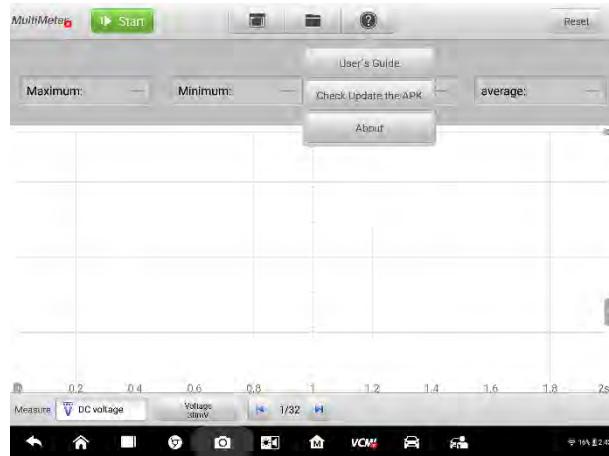
The operating software of the multimeter is continually optimized. Tap the Help button in the upper half of the screen to update.

Before update the multimeter software, please make sure the tablet network connection is stable

#### 9.2.3.1 APK Update

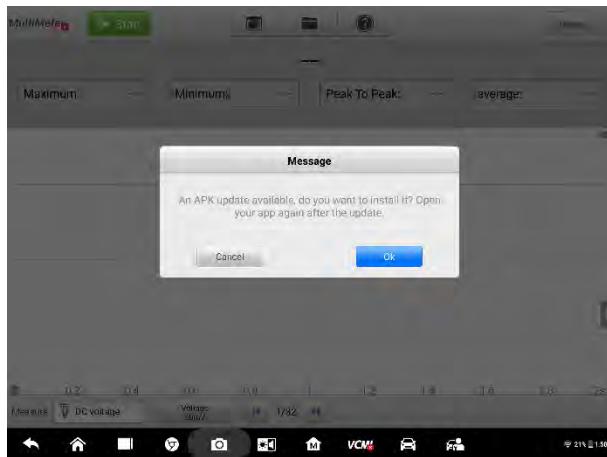
➤ **To update the APK:**

1. Tap the **Help** button on the upper half of the screen. A dropdown list appears.



**Figure 9-2 Sample Help Screen**

2. Tap the **Check Update the APK** in the dropdown list. A confirmation message appears.



**Figure 9-3 Sample Update Confirmation Screen**

3. Tap **OK** to update the software or tap **Cancel** to exit.

### **9.2.5 Screen Layout and Operations**

Tap the **Measurement** icon on the home screen then tap the **Multimeter** icon in the menu, the multimeter page appears. The screen typically includes the following button sections.

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 **NOTE**

The **Measure** icon can also be selected to open the **Multimeter** application from the Android screen after tapping on the Android Home button at the bottom of the screen.

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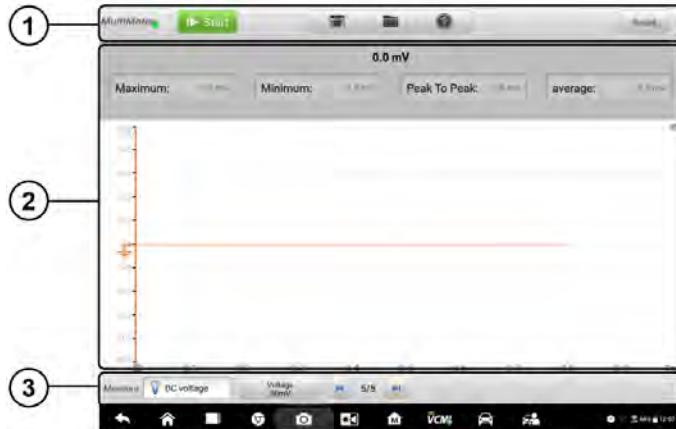


Figure 9-4 Sample Multimeter Menu Screen

1. Upper Section Buttons - see [9.2.5.1 Upper Section Buttons](#) on page 172 for details.
2. Main View Section – see [9.2.5.2 Main View Section](#) on page 177 for details.
3. Lower Section Buttons - see [9.2.5.3 Lower Section Buttons](#) on page 181 for details.

#### 9.2.5.1 Upper Section Buttons

The upper section buttons are used for configurations of various settings and operations. The following table provides brief descriptions of each button:

Table 9-1 Upper Section Buttons

Name	Button	Description
Multimeter Icon		Indicates the multimeter connection status. See <a href="#">Multimeter Button</a> on page 173 for more information.
Start/Stop		Start or stop the multimeter device. See <a href="#">Start/Stop Button</a> on page 173 for more information.

Name	Button	Description
Display Mode		Set the display mode. See <a href="#">Display Mode Menu</a> on page 173 for more information.
File		Print, open and save the waveform data. See <a href="#">File Menu</a> on page 174 for more information.
Help		View the user manual, update the APK and firmware. See <a href="#">Help Menu</a> on page 176 for more information.
Reset		Recalculates the digital readouts displayed in the figure mode.

## Multimeter Button

This **Multimeter button** indicates the multimeter connection status. A **green tick** means a successful connection with the Display Tablet, whereas a **red cross** means connection failure.

## Start/Stop Button

Press this **Start/Stop Button** icon to start and stop the multimeter device.

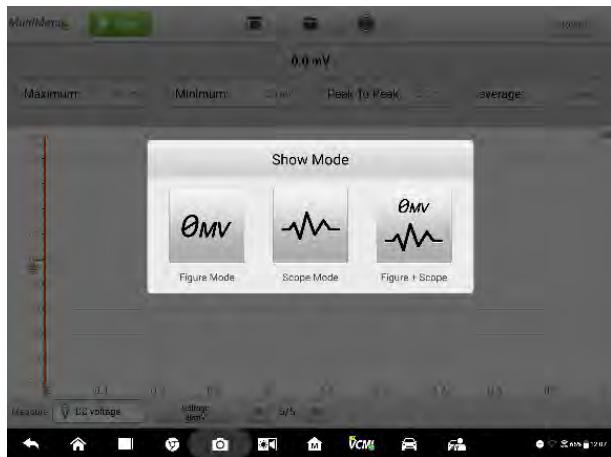
Name	Button	Description
Start		Tap to start the multimeter and the measurement begins.
Stop		Tap to stop the multimeter and the measurement ends.

## Display Mode Menu

The position of the digital readouts and waveform in the main view section can be selected in the Display Mode Menu.

➤ **To set the display mode:**

1. Tap the **Display Mode** button in the top navigation bar. A submenu opens.



**Figure 9-5 Sample Display Mode Menu Screen**

2. Select one of the three display modes according to your preference.
3. The corresponding display mode will be shown on the screen.

**Table 9-2 Display Mode Table**

Icon	Mode	Description
	Figure Mode	Displays the digital readouts only.
	Scope Mode	Displays the waveform only.
	Figure + Scope Mode	Displays both the digital readouts and waveform on the screen.

## File Menu

The file menu supports the following functions.



**Figure 9-6 Sample File Menu Screen**

- **Print** – Tap to generate a temporary JPG picture and print the current waveforms.

**NOTE**

Make sure the Display Tablet is connected to a printer successfully.

Make sure the network is available.

- **Waveform File Operation**

Save and open the waveform files in this section. This operation is only suitable for waveform-related modes such as the **Scope** mode and **Figure + Scope** mode, but the **Figure** mode is not applicable.

**Save** – Tap to capture and save the current waveforms. On the Save File screen, tap each item to input the corresponding information and then tap **Save** or **Save Default** to finish.

**NOTE**

The file name is required to input when saving waveforms.

**Open** – Tap to retrieve the saved waveforms. You can select and delete the saved waveforms by tapping the **Edit** button in the upper right corner of the screen.

**Save as text** – Tap to save the current waveform data to a text file. You can use the ES file browser to find the saved text file. View the saved text file at **Home > ES file browser > Main content > Scan file > Data file > Scope file > txt file**.

- **Configuration Operation**

The configurations can be saved and imported.

**Save the Config** – Tap to save the configuration values of waveforms on the current screen, for example, the amplitude, the time base, the number of samples.

**Import the Config** – Tap to import the saved configuration values of waveforms.

## Help Menu

The Help Menu allows you to view the user manual, update the software, and view versions of the device.



**Figure 9-7 Sample Help Menu Screen**

**User Manual** – the document with the complete information and operations of the multimeter.

**Check Update the APK** – check online to find the latest version of the APK.

**About** – displays the model numbers of the multimeter, the firmware version numbers and the software version numbers.

### 9.2.5.2 Main View Section

The main view section varies depends on the display mode configuration in the upper half.

#### Figure Mode

The main view section in the figure mode displays only the digital readouts, like the values of current measurement, maximum measurement, minimum measurement, peak to peak measurement and average measurement.



Figure 9-8 Sample Main View Section Screen (Figure Mode)

- **Current Value:** the current value can be the AC voltage, DC voltage, resistance, frequency, or duty cycle according to your specific setting
- **Maximum:** the maximum value of the measurement since the measuring begins
- **Minimum:** the minimum value of the measurement since the measuring begins
- **Peak to Peak:** the difference between the maximum and minimum value
- **Average:** the average value of the measurements

#### Scope Mode

The main view section in the scope mode only displays the waveform.



Figure 9-9 Sample Main View Section Screen (Scope Mode)

The main view section features a coordinate grid with **X-axis** and **Y-axis**, representing the time duration and voltage level respectively.

The voltage level on the Y-axis can be configured in the Amplitude Settings while the time duration on the X-axis can be set in the Time Base Settings.

## Channel Selection

In the main view section, a channel has two conditions: selected and unselected. Some operations depend on the selected condition of the channel, such as voltage rulers, waveform movements, and waveform zooming.

### ➤ To select and unselect the channel:

1. Tap the zero baseline marker or the Y-axis, which thickens to indicate the channel is selected.
2. Tap the zero baseline marker or the Y-axis again to exit the channel selection.

## Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, but the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

## Measurement Rulers

In the coordinate grid, there are two kinds of **measurement rulers**, which allow the voltage and time duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, the cycle time (duration) and frequency.

The vertical **Time Ruler** - Tap the **Ruler Activator** in the bottom left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

The horizontal **Voltage Ruler** - The **Voltage Ruler** can be generated in the similar way by tapping the **Ruler Activator** in the upper right corner and dragging it downwards.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values for the corresponding channels will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.



Figure 9-10 Sample Measurement Rulers Screen

## Zero Baseline

The zero baseline is marked the 0 value in the Y-axis, showing the ground level of each channel waveform. After the channel is selected, the zero baseline can be adjusted by dragging the baseline marker up/down along the Y-axis, or dragging the waveform up/down or moving the screen up/down in the grid.

### NOTE

Tapping the baseline marker makes the vertical scale line thinner. In this case, the waveform is unselected and cannot be dragged. Tap the baseline marker again to select.



Figure 9-11 Sample Zero Baseline Screen

## Figure + Scope Mode

In this mode, the main view section displays the digital readouts on the top and the waveform in the grid.



**Figure 9-12 Sample Main View Section Screen (Figure + Scope Mode)**

#### 9.2.5.3 Lower Section Buttons

The measurement, buffer and time base can be configured in the lower section.

**Table 9-3 Lower Section Buttons**

Name	Button	Description
<b>Measure</b>	Measure <input checked="" type="button"/> AC voltage	Tap to select an appropriate measurement. See <a href="#">Measure Setting</a> on page 181 for more information.
<b>Amplitude</b>	Voltage 600v	Tap to select an appropriate amplitude value. See <a href="#">Amplitude Setting</a> on page 183 for more information.
<b>Buffer</b>	<input type="button"/> 32/32 <input type="button"/>	Tap the Previous or Next button to switch to the previous or the next waveform. See <a href="#">Buffer</a> on page 187 for more information.

### Measure Setting

This multimeter can be used to measure or test AC voltage, DC voltage, resistance, AC electricity, DC electricity, diode, frequency, duty cycle, pulse width, continuity and period.

The measurement types include:

- **AC/DC voltage:** measures the voltage in the electrical circuit
- **Resistance:** measures the resistance of the electrical circuit or the component
- **AC/DC electricity:** measures current amperage through the input channel A by using the optional current clamp

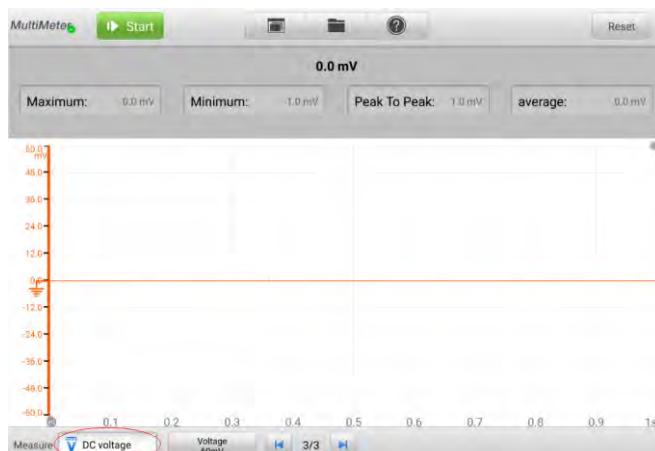
 **Note**

The type of current clamp can be selected in the dropdown list.

- **Diode:** conducts the diode test of the electrical circuit
- **Frequency:** measures the frequency of the input signal
- **Duty Cycle (+)/(-):** measures the (+) and (-) duty of the input signal
- **Continuity:** determines whether a low impedance exists between two points in the electrical circuit. If the impedance is less than 10 ohms, the circuit is “closed”, otherwise, the circuit is “open”.
- **Period:** measures the amount of time that one complete cycle of the input signal endures
- **Pulse Width (+)/(-):** measures the pulse width of the input signal

➤ **To set the measure setting:**

1. Tap the **Measure Setting** button in the lower left corner of the screen. A dialog box appears.



**Figure 9-13 Sample Measure Setting Position Screen**

2. Select the **measure type** you want to measure or test in the right column of

the dialog box. The blue color indicates the option is selected.

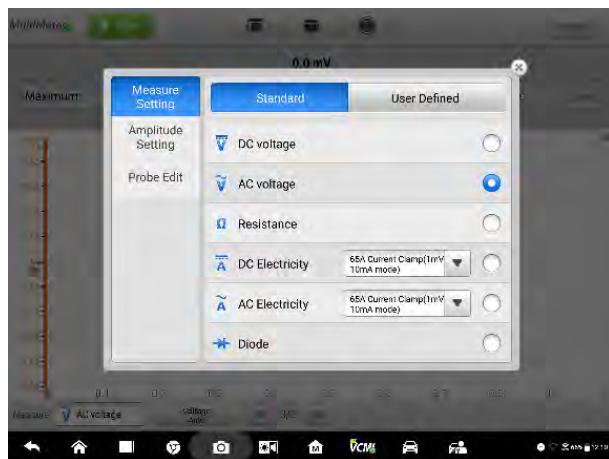


Figure 9-14 Sample Measure Setting Screen

3. Close the dialog box, the measure type you set displays on the screen.

## Amplitude Setting

After you select the measurement type, you can also set the amplitude value for that type. However, amplitude value setting disables for the resistance measurement.

The amplitude settings allow you to set up the multimeter to capture signals with the specified range. If the input signal exceeds the selected range, an over-range indicator will be displayed. To solve this problem, you can select **Auto** to adjust the vertical scale automatically.

There are two modes available to set the amplitude value.

**Mode 1:** For example, selecting AC 1V sets the amplitude to **Voltage 1V** (seen at the amplitude button), reflecting the vertical scale range is from -1V to +1V. As the vertical scale is divided into 10 segments, each segment is incremented by 0.2V.

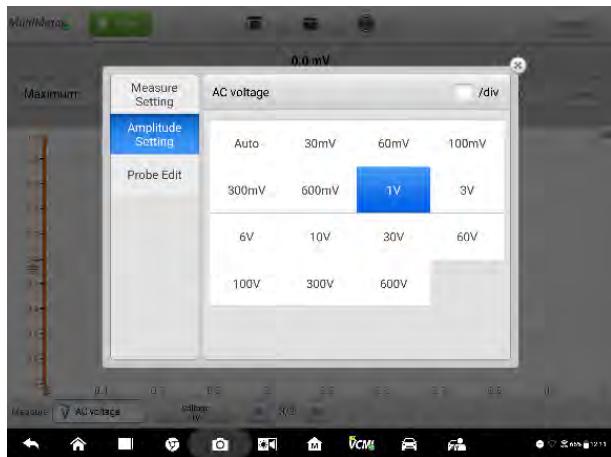


Figure 9-15 Channel Setting Dialog Box Screen (AC 1V)

**Mode 2:** Selecting the **## /div** button can adjust the value incremented by each division. For example, selecting AC 2.0V/div, sets the amplitude to **Voltage 2.0V/div** (seen at the amplitude button), reflecting each segment is incremented by 2V. As the vertical scale is divided into 10 segments, the entire vertical scale range is from -10V to +10V.



Figure 9-16 Sample Amplitude Setting Screen (AC 2.0V/div)

## Testing Procedures

The following section describes how to take measurements with the multimeter. The testing procedures are the same for various measurement types.

Measuring AC voltage for example.

➤ **To measure AC voltage:**

1. Tap the **Measure Setting** button in the lower left corner of the screen to open the setting dialog box. Select **AC voltage** in the dialog box.
2. Set the proper amplitude value in the **Amplitude Setting** menu in the same dialog box.
3. Insert the supplied multimeter probes into the multimeter jacks of the VCMI device.
4. Measure the AC voltage by touching the probes to the correct points of the circuit.
5. Read the measured voltage on the Display Tablet.



**Note**

Please use the optional current clamp to connect with the input channel A when measuring currents. In other cases, please use the supplied multimeter probes to connect with the multimeter jacks.

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## Probe Edit

If you have purchased a probe, you can add the custom probe in the probe edit menu.

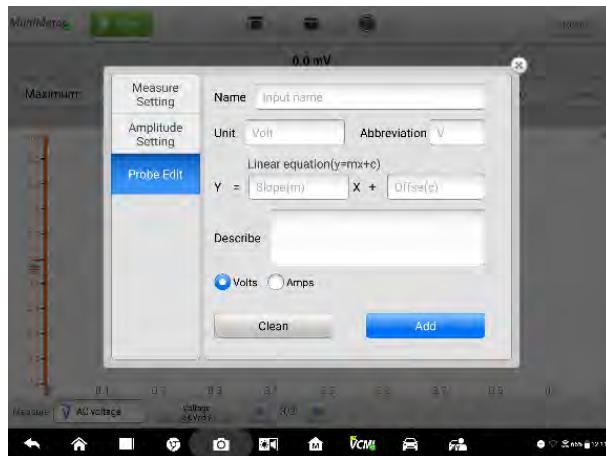


Figure 9-17 Sample Probe Edit Screen 1

➤ To add custom probes:

1. Tap the **Measure Setting** button in the lower left corner of the screen to open the setting dialog box.
2. Select the **Probe Edit** option in the left column of the dialog box.
3. Tap each field to open the virtual keyboard and input the required information.

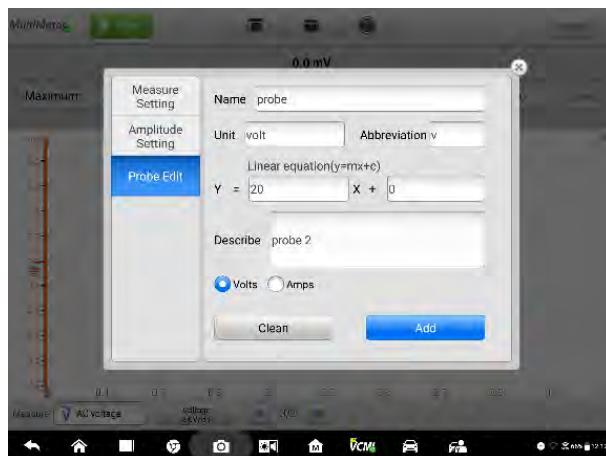


Figure 9-18 Sample Probe Edit Screen 2

4. Tap **Add** to save the settings, or tap **Clean** to exit without saving.

5. The added probe will be listed in the Measure Settings page.

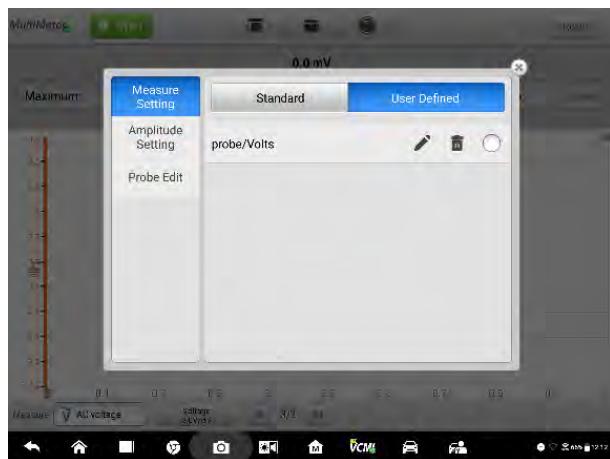


Figure 9-19 Sample Probe Edit Screen 3

## Buffer

The waveform buffer shows which signal waveform is displayed on the current screen and how many signal waveforms are captured and stored in the buffer memory.

The multimeter can capture and store up to 32 waveforms. You can select a waveform from the waveform buffer by tapping the **Previous** or **Next** button to switch to the previous or the next waveform.



**Figure 9-20 Sample Buffer Screen**

Name	Button	Description
Previous		Tap to display the previous waveform in the buffer.
Buffer Index		Shows which waveform is currently being displayed and how many waveforms are in the buffer.
Next		Tap to display the next waveform in the buffer.

## **9.2.6 Troubleshooting**

If the multimeter cannot communicate with the MaxiSys Display Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Display Tablet via the supplied USB cable or Wi-Fi network.
- If the communication between the VCMI device and the MaxiSys Display Tablet still fails, restart the MaxiSys Display Tablet and reconnect the VCMI device.

## **9.2.6 Glossary**

**AC**

Alternating Current - electrical current that switches polarity at regular intervals.

**DC**

Direct Current - electrical current that flows in one direction only.

**Amperage**

This term describes the strength of an electric current, expressed in amperes.

**Amplitude**

This term indicates the maximum voltage generated from the zero volts line of the multimeter.

### *Frequency*

This term describes the number of signal occurrences per second. Frequency is measured in Hz (hertz).

### *Duty Cycle*

Measurement of the length of a signals on time. Specified as a percentage (ratio), of the total cycle time.

### *Peak to Peak*

The difference between maximum and minimum value.

### *Cursor*

The onscreen markers used to measure time and amplitude.

### *Diode*

A semiconductor device that allows current flow only in one direction.

### *Grid*

A network of horizontal and vertical scales displayed on the scope screen that aids in the measuring of signal characteristics.

## **9.3 Signal Generator Operation**

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The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra can function as a signal generator to send out electric signals to the vehicle's sensor or actuator for testing or measuring.

### **9.3.1 Safety Information**

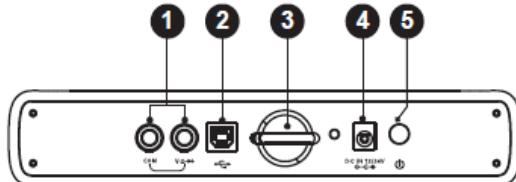
Follow the instructions below to reduce the risk of injury from electric shock and prevent equipment damage.

- Use the signal generator only as specified in this manual.
- Do not apply more than the rated voltage between terminals or between any terminal and earth ground.
- To minimize shock hazard, please connect the device ground input (chassis) to an electrical ground.
- Do not alter the ground connection. Without the protective ground connection, all accessible conductive parts can render an electric shock.
- To avoid electric shock hazard, disconnect power cable before removing covers.
- To prevent injury or death, do not use the signal generator if it appears to be damaged in any way, and stop use immediately if you are concerned any abnormal operations.
- Inspect the test leads or probes for damage before use.
- Use the accessories supplied with the product.
- Use the supplied replacement fuses or specified replacement parts.
- To prevent damage, always use and store your signal generator in appropriate environments.
- Do not place the signal generator in an area that is directly exposed to sunlight or under high humidity.
- Do not tamper with or disassemble the signal generator, connectors or accessories. Internal damage will affect performance.
- Before carrying out maintenance and cleaning of the signal generator, make sure the unit is NOT connected to a power source, vehicle or computer.
- When cleaning the signal generator, use wet soft cloth with mild detergent in water. Do not let water to enter the signal generator casing, as this will cause damage to the electronics inside.

## 9.3.2 General Introduction

### 9.3.2.1 Component Locations

The multimeter jacks are used when operating the signal generator. The two multimeter jacks are located on the top of the VCMI device.



**VCMI Top View**

1. Multimeter Jacks – for ground and signal cables
2. USB Port
3. Hook
4. DC Power Supply Input Port
5. Power Button

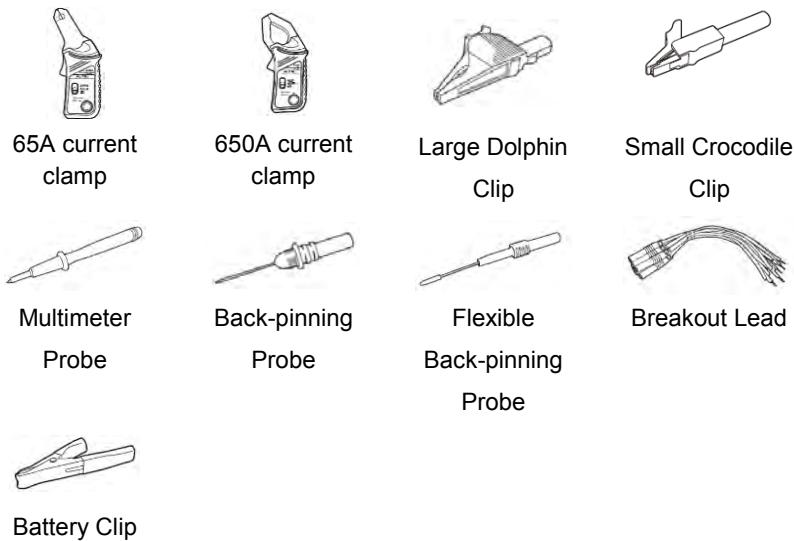
### 9.3.2.2 Technical Specifications

Item	Description
<b>Voltage Range</b>	0 to 10V
<b>Frequency Output</b>	1Hz to 30KHz
<b>Duty Cycle Range</b>	1% to 99% (1Hz to 30KHz)
<b>Accuracy</b>	3%
<b>DC Voltage Waveform</b>	Voltage: 0 to 10V
<b>Pulse Waveform</b>	<ul style="list-style-type: none"><li>• Voltage: 0 to 10V</li><li>• Frequency: 1Hz to 30KHz</li></ul>
<b>Sinusoid Waveform</b>	<ul style="list-style-type: none"><li>• Voltage: 0 to 10V</li><li>• Frequency: 1Hz to 30KHz</li></ul>

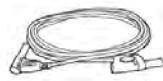
Item	Description
<b>Triangle Waveform</b>	<ul style="list-style-type: none"> <li>● Voltage: 0 to 10V</li> <li>● Frequency: 1Hz to 30KHz</li> </ul>
<b>Positive Duty Cycle Waveform</b>	<ul style="list-style-type: none"> <li>● Voltage: 0 to 10V</li> <li>● Frequency: 1Hz to 30KHz</li> <li>● Duty Cycle: 1% to 99%</li> </ul>
<b>Negative Duty Cycle Waveform</b>	<ul style="list-style-type: none"> <li>● Voltage: 0 to 10V</li> <li>● Frequency: 1Hz to 30KHz</li> <li>● Duty Cycle: 1% to 99%</li> </ul>

### 9.3.2.3 Accessories

The following accessories are general for the signal generator and oscilloscope. Please refer to [Accessories](#) on page 107 for details.



The multimeter test leads (Red: SA015 / Black: SA016) are general for the signal generator and multimeter.



### Multimeter Test Lead

Used to connect the signal generator and the probe.

### 9.3.3 Getting Started

Before opening the Signal Generator application, the VCMI device must be connected to the Display Tablet via the provided USB cable or Wi-Fi network. For more information, see [Establish Vehicle Communication](#) on page 20.

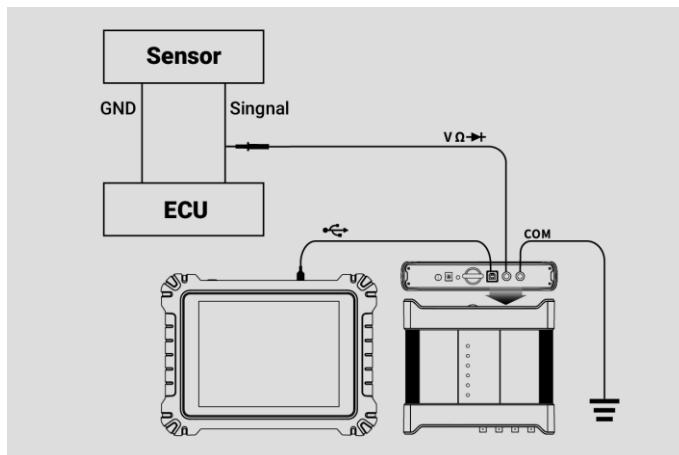


Figure 9-1 Sample Connection Diagram

➤ **To open the signal generator application:**

1. Insert the multimeter test lead ends into the multimeter jacks on the top of the VCMI device to complete the connection.
2. Tap the **Measurement** icon on the Home screen of the MaxiSys Ultra Display Tablet. The Measurement screen opens.
3. Tap the **Signal Generator** icon to open the signal generator Menu.
4. Select a desired test option to continue.

---

**NOTE**

Please check the signal generator LED status indicator on the front panel of VCMI device. The signal generator LED illuminates green when operating in the signal generator mode.

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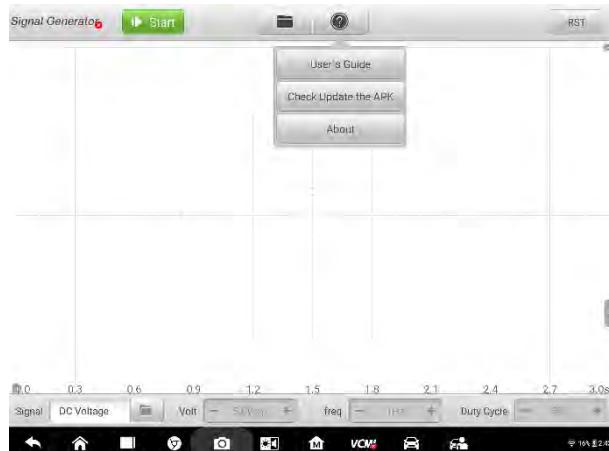
### 9.3.4 Signal Generator Update

The operating software of the signal generator is continually optimized. Tap the Help button in the upper half of the screen to update.

#### 9.3.4.1 APK Update

➤ **To update the APK:**

1. Tap the **Help** button on the upper half of the screen. A dropdown list appears.



**Figure 9-2 Sample Help Screen**

2. Tap the **Check Update the APK** in the dropdown list. A confirmation message appears.

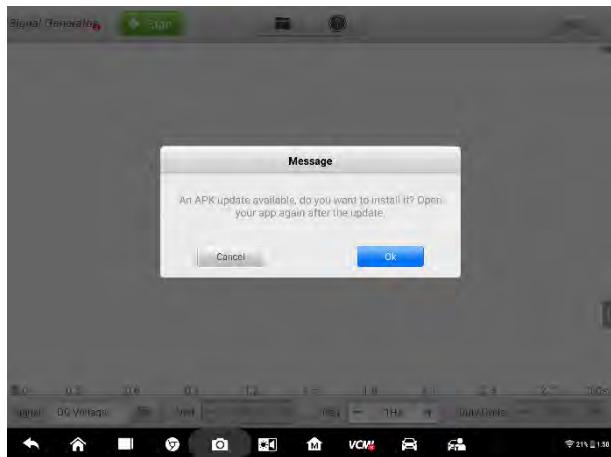


Figure 9-3 Sample Update Confirmation Screen

3. Tap **OK** to update the software or tap **Cancel** to exit.

### 9.3.5 Screen Layout and Operations

Tap the **Measurement** icon on the home screen and select **Signal Generator** from the menu, the signal generator page appears. The screen typically includes the following button sections.

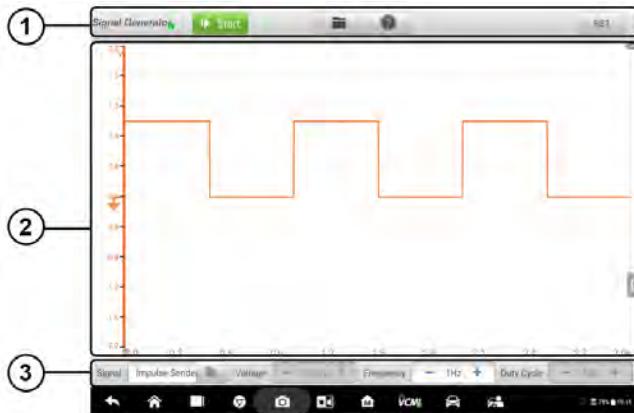
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 **NOTE**

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The **Measure** icon can be also selected from the Android screen after clicking on the Android Home button at the bottom of the screen.

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**Figure 9-4 Sample Signal Generator Menu Screen**

1. Upper Section Buttons - see [9.3.5.1 Upper Section Buttons](#) on page 196 for details.
2. Main View Section – see [9.3.5.2 Main View Section](#) on page 199 for details.
3. Lower Section Buttons - see [9.3.5.3 Lower Section Buttons](#) on page 202 for details.

### 9.3.5.1 Upper Section Buttons

The upper section buttons are used for configuring various settings and operations. The following table provides brief descriptions of each button.

**Table 9-1 Upper Section Buttons**

Name	Button	Description
Signal Generator Icon		Indicates the signal generator connection status. See <a href="#">Signal Generator Button</a> on page 197 for more information.
Start/Stop		Start and stop the signal generator device. See <a href="#">Start/Stop Button</a> on page 197 for more information.
File		Print, open and save the waveform data. See <a href="#">File</a> on page 197 for more information.

Name	Button	Description
Help		View the user manual, update the software and view version numbers. See <a href="#">Help</a> on page 198 for more information.
Reset		Reset the configurations and refresh the screen.

## Signal Generator Button

The **Signal Generator Icon** indicates the signal generator connection status. A **green tick** means a successful connection with the Display Tablet, whereas a **red cross** means connection failure.

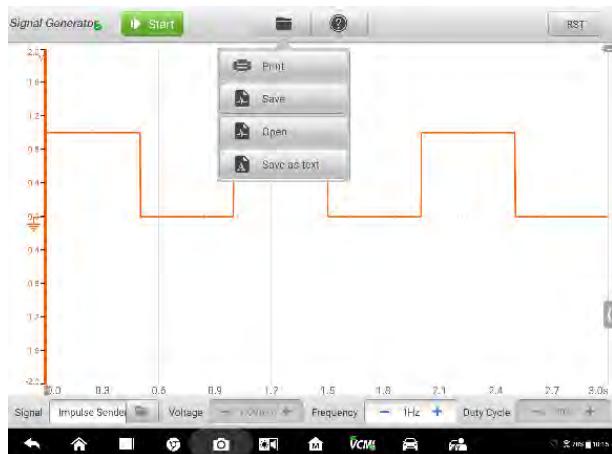
## Start/Stop Button

You can tap the **Start/Stop Button** icon to start or stop the signal generator device.

Name	Button	Description
Start		Tap to start the signal generator and the sampling begins.
Stop		Tap to stop the signal generator and the sampling ends.

## File Menu

The file menu supports the following functions.



**Figure 9-5 Sample File Menu Screen**

- **Print** – Tap to generate a temporary JPG picture and print the current waveforms.

---

**NOTE**

Make sure the Display Tablet is connected to a printer successfully.

Make sure the network is available.

---

- **Save** – Tap to capture and save the current waveform. On the Save File screen, tap each item to input the corresponding information and then tap **Save** or **Save Default** to finish.

---

**NOTE**

The file name is required to input when saving waveforms.

---

- **Open** – Tap to retrieve the saved waveforms. You can select and delete the saved waveforms by tapping the **Edit** button in the upper right corner of the screen.
- **Save as text** – Tap to save the current waveform data to a text file. You can use the ES file browser to find the saved text file. View the saved text file at **Home > ES file browser > Main content > Scan file > Data file > Scope file > txt file**.

## Help Menu

The Help Menu allows you to view the user manual, update the software, and view versions of the device.



**Figure 9-6 Sample Help Menu Screen**

**User Manual** – provides complete information and operations of the signal generator.

**Check Update the APK** – check online for the latest version of the APK.

**About** – displays the model numbers of the signal generator, and the software version numbers.

#### 9.3.5.2 Main View Section

The main view section screen displays as a coordinate grid with **X-axis** and **Y-axis**, representing the duration and voltage level respectively.

#### Channel Selection

In the main view section, a channel has two conditions: selected and unselected. Some operations depend on the selected condition of the channel, such as voltage rulers, waveform movements, and waveform zooming.

➤ **To select and unselect the channel:**

1. Tap the zero baseline marker or the Y-axis, which thickens to indicate the channel is selected.
2. Tap the zero baseline marker or the Y-axis again to exit the channel selection.

## Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, only the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

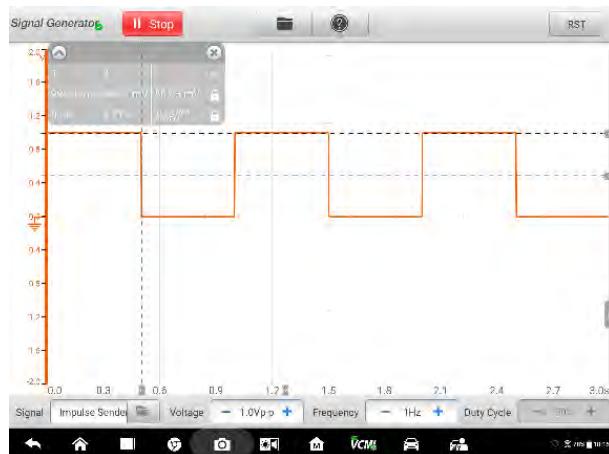
## Measurement Ruler

In the coordinate grid, there are two kinds of **measurement rulers**, which allow the voltage and duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, and the cycle time (duration).

The vertical **Time Ruler** - Tap the **Ruler Activator** in the lower left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

The horizontal **Voltage Ruler** - The **Voltage Ruler** can be generated in the similar way by clicking the **Ruler Activator** in the upper right corner and dragging it downwards.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.



**Figure 9-7 Sample Measurement Rulers Screen**

## Zero Baseline

The zero baseline is marked the 0 value in the Y-axis, showing the ground level of each channel waveform. After the channel is selected, the Zero Baseline can be adjusted by dragging the zero baseline marker up/down along the Y-axis.

## Help Assistant

Tapping the arrow button in the lower right corner of the screen opens the Help Assistant sheet.

The **Help Assistant** function provides the relevant introduction, information and test procedures when you are viewing a specific section or tapping a specific button.



**Figure 9-8 Sample Help Assistant Screen**

- **To open and close the Help Assistant sheet:**
  1. Tap the arrow button on the right-hand side of the screen.



**Figure 9-9 Arrow Button Position Screen**

2. The Help Assistant sheet displays.
3. Tap the arrow button again or click any space outside of the sheet to close the sheet.

**Note**

The preset guided information is also displayed on the right-hand side of the screen after selecting the specific options and test components from Presets menu in the upper section.

#### 9.3.5.3 Lower Section Buttons

The waveform mode, voltage, frequency and duty cycle can be configured in the lower section.

**Table 9-2 Lower Section Buttons**

Name	Button	Description
<b>Waveform Mode Setting</b>	Mode DC Voltage	Tap to select an appropriate waveform mode. See <a href="#">Waveform Mode Setting</a> on page 203 for more information.
<b>Voltage Setting</b>	Voltage	Tap to select an appropriate voltage value. See <a href="#">Voltage Setting</a> on page 208 for more information.

Name	Button	Description
<b>Frequency Setting</b>	Frequency	Tap to select an appropriate frequency value. See <i>Frequency Setting</i> on page 211 for more information.
<b>Duty Cycle Setting</b>	Duty Cycle	Tap to select an appropriate duty cycle value. See <i>Duty Cycle Setting</i> on page 214 for more information.

## Waveform Mode Setting

The signal generator supports the waveform modes such as the DC voltage, pulse, positive duty cycle, negative duty cycle, sinusoid, triangle waveform, and arbitrary waveform.

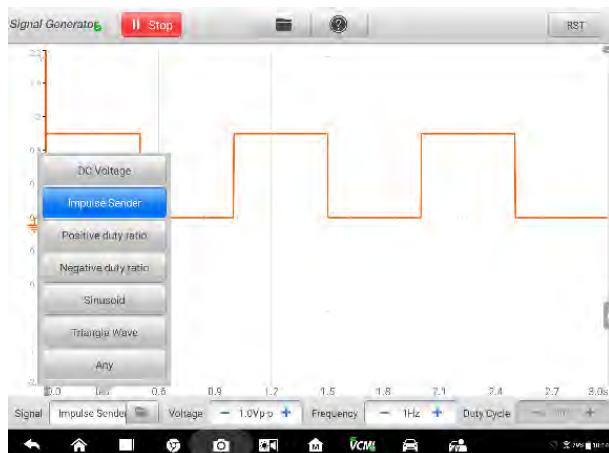


Figure 9-10 Waveform Mode Setting Screen

## DC Voltage

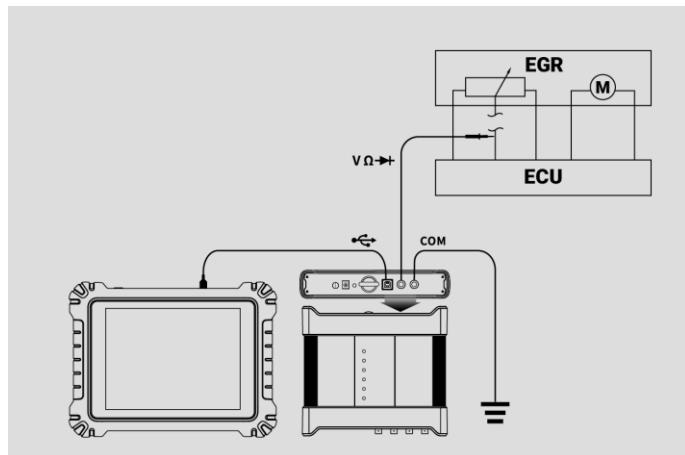


Figure 9-11 Sample DC Voltage Connection Diagram

After you set the DC voltage in the signal generator interface, the signal generator can simulate the signals of sensors such as the water temperature sensor, oil pressure sensor, position sensor, switch, etc. and then feed back to the engine ECU.

## Duty Cycle

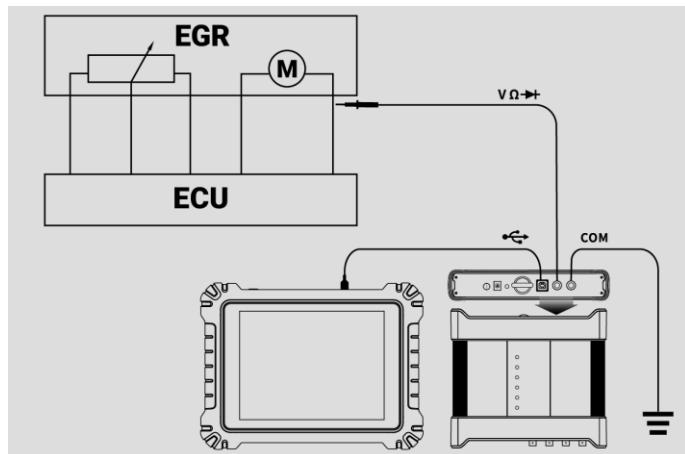
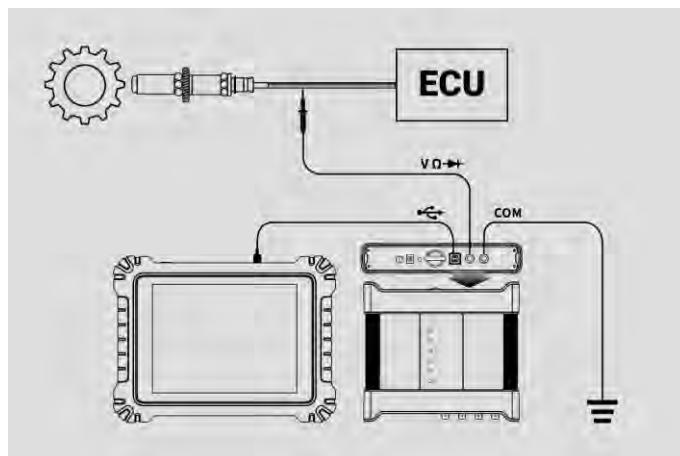


Figure 9-12 Sample Duty Cycle Connection Diagram

After you set the voltage, duty cycle and frequency in the signal generator interface, the duty cycle signal sent by the signal generator can directly drive the motor or solenoid valve to inspect whether the actuator is working properly or not.

### Pulse Waveform



**Figure 9-13 Sample Pulse Waveform Connection Diagram**

After you set the voltage and frequency in the signal generator interface, the pulse signals sent by the signal generator simulate the signals of various Hall sensors, and feed back to the ECU to inspect it by checking various lines and control modules.

## Sinusoid

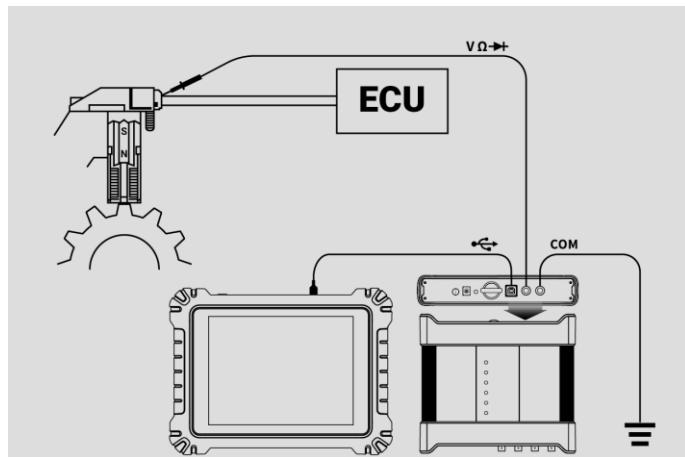


Figure 9-14 Sample Sinusoid Connection Diagram

After you set the amplitude and frequency in the signal generator interface, the sinusoid signals sent by the signal generator simulate the signals of various Hall sensors, and feed back to the ECU to inspect it by checking various lines and control modules.

## X+Y Waveform

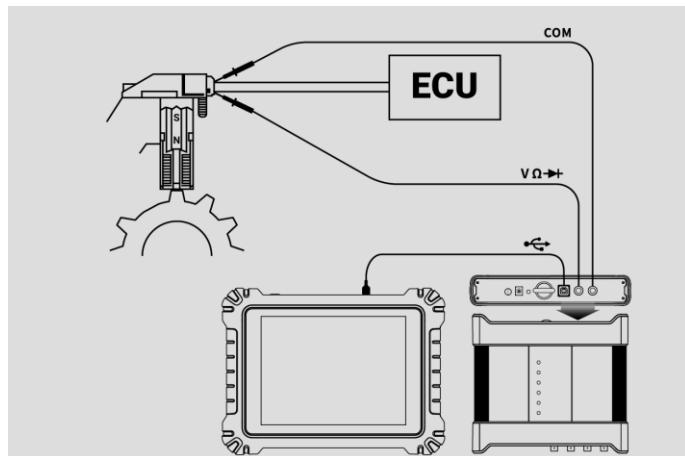
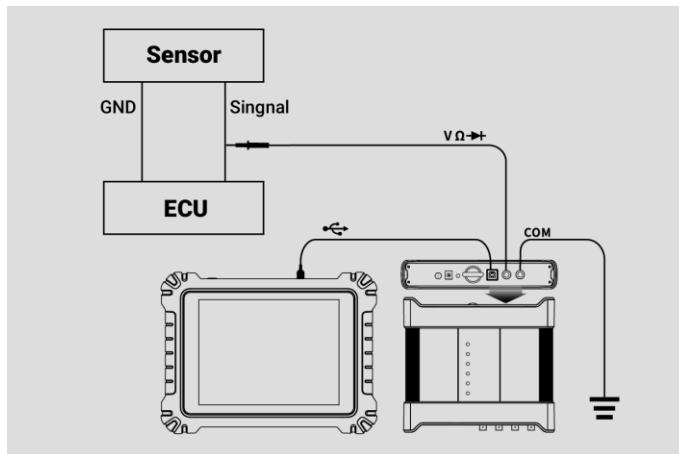


Figure 9-15 Sample X+Y Waveform Connection Diagram

This type of waveform is mainly used to simulate the missing teeth signals of magnetolectric, photoelectric or Hall-type crankshafts and camshafts. The amplitude, frequency and XY values can be configured in this waveform.

### Triangle Waveform



**Figure 9-16 Sample Triangle Waveform Connection Diagram**

This is a symmetrical triangle waveform, which is mainly used to simulate the triangle wave signals. The amplitude and frequency can be configured in this waveform.

## Arbitrary Waveform

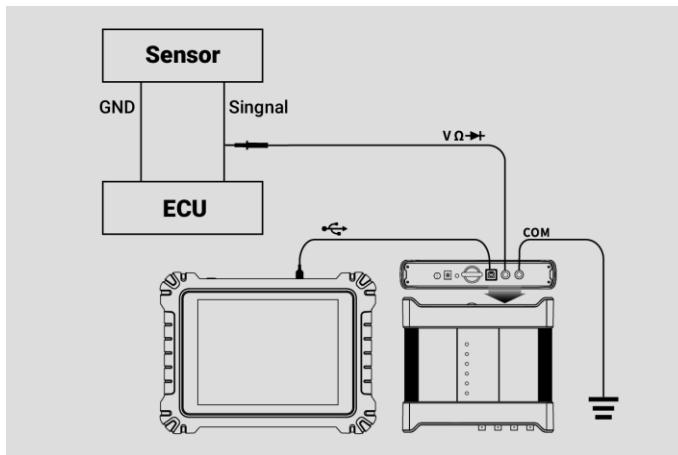


Figure 9-17 Sample Arbitrary Waveform Connection Diagram

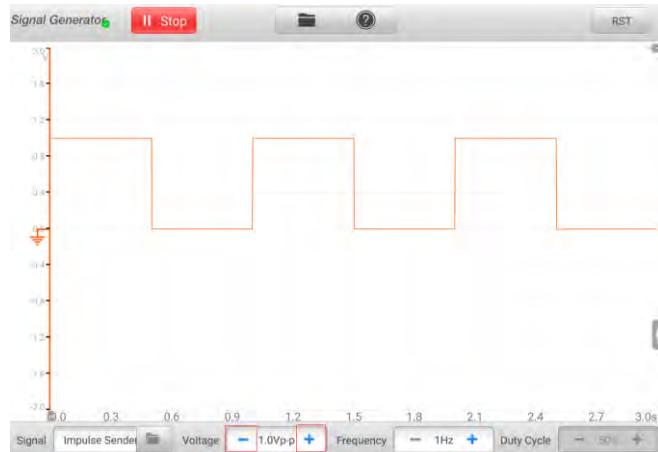
Any type of the mentioned waveforms can be loaded again after the waveform and parameter settings are saved.

## Voltage Setting

After you select the waveform mode, you can also set the amplitude value for that mode.

There are **three methods** to adjust the voltage value:

**Method 1:** Tap the “+” and “-” buttons at the bottom Voltage Setting area.



**Figure 9-18 Sample Voltage Setting Screen 1**

Range	Button	Description
0.1V to 0.9V		Raises the voltage by 0.1V
		Lowers the voltage by 0.1V
1V to 10V		Raises the voltage by 1V
		Lowers the voltage by 1V

**Method 2:** Tap the **Voltage Setting** button at the bottom of the screen to open a dialog box. Adjust the voltage value by tapping the **positive or negative value** at the bottom of the dialog box. Then tap **OK** to confirm or **Cancel** to exit without saving.

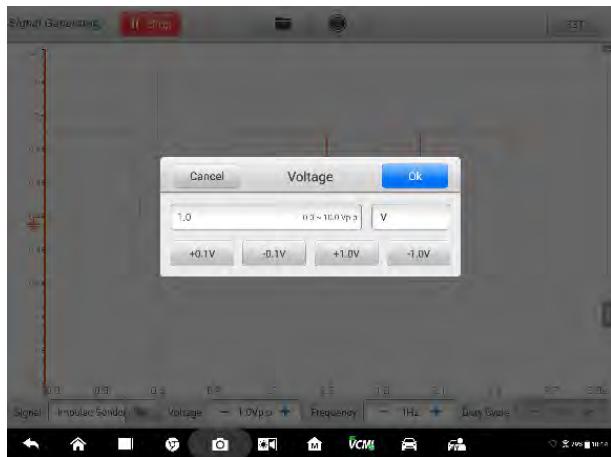


Figure 9-19 Sample Voltage Setting Screen 2

Value	Description
+0.1V	Raises the voltage by 0.1V
-0.1V	Lowers the voltage by 0.1V
+1.0V	Raises the voltage by 1V
-1.0V	Lowers the voltage by 1V

**Method 3:** Input the voltage value using the virtual keyboard. Tap the voltage field to clear the current value and input the new value using the virtual keyboard. Then tap **OK** to confirm or **Cancel** to exit without saving.



Figure 9-20 Sample Voltage Setting Screen 3

## Frequency Setting

When the waveform mode is selected and the signal generator is operating, you can also set the frequency value for that mode.

The same as setting the voltage value, there are also three methods to adjust the frequency value:

**Method 1:** Tap the “+” and “-” buttons at the bottom Frequency Setting area.

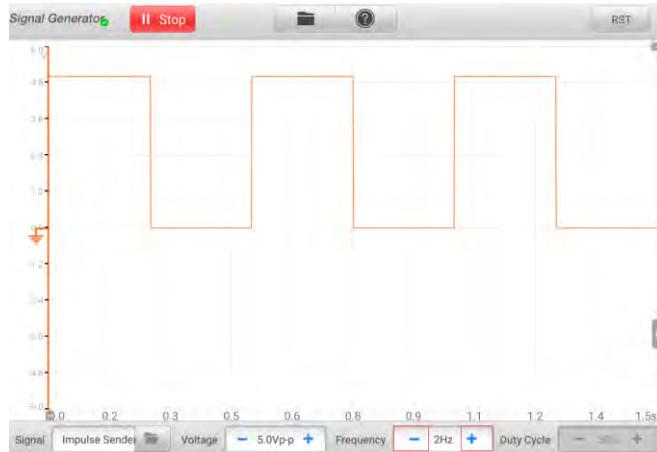


Figure 9-21 Sample Frequency Setting Screen 1

Range	Button	Description
1Hz to 10Hz	+	Raises the frequency by 1Hz
	-	Lowers the frequency by 1Hz
10Hz to 100Hz	+	Raises the frequency by 10Hz
	-	Lowers the frequency by 10Hz
100Hz to 1000Hz	+	Raises the frequency by 100Hz
	-	Lowers the frequency by 100Hz
1.0KHz to 30.0KHz	+	Raises the frequency by 1KHz
	-	Lowers the frequency by 1KHz

**Method 2:** Tap the **Frequency Setting** button at the bottom of the screen to open a dialog box. Adjust the voltage value by tapping the **positive or negative value** at the bottom of the dialog box. The unit of the frequency can be switched Hz to KHz. Then tap **OK** to confirm or **Cancel** to exit without saving.

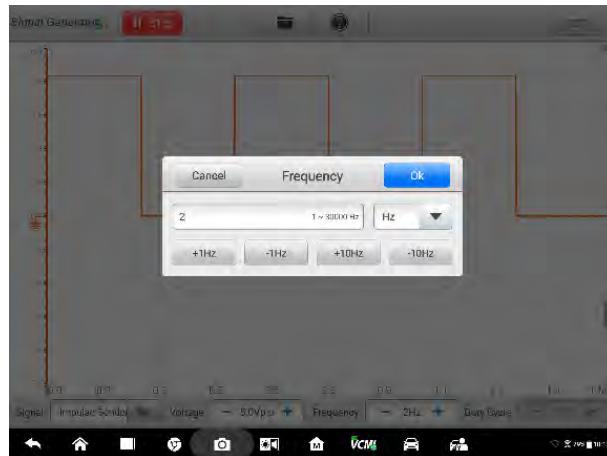


Figure 9-22 Sample Frequency Setting Screen 2

Value	Description
+1.0Hz	Raises the frequency by 1Hz
-1.0Hz	Lowers the frequency by 1Hz
+10.0Hz	Raises the frequency by 10Hz
-10.0Hz	Lowers the frequency by 10Hz
+1.0KHz	Raises the frequency by 1KHz
-1.0KHz	Lowers the frequency by 1KHz
+10.0KHz	Raises the frequency by 10KHz
-10.0KHz	Lowers the frequency by 10KHz

**Method 3:** Input the frequency value using the virtual keyboard. Tap the frequency field to clear the current value and input the new value using the virtual keyboard. Then tap **OK** to confirm or **Cancel** to exit without saving.

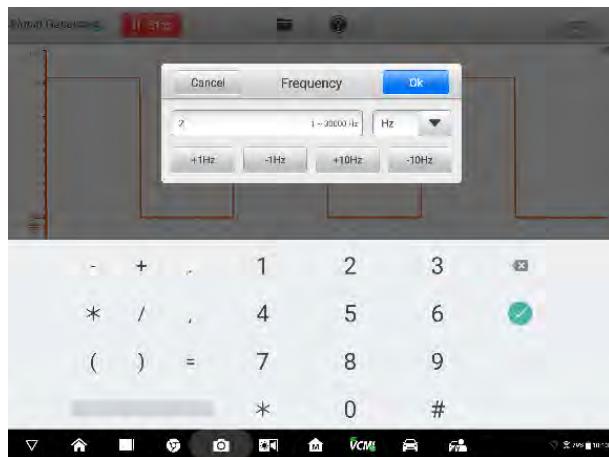


Figure 9-23 Sample Frequency Setting Screen 3

## Duty Cycle Setting

When the waveform mode is set, you can also set the duty cycle ratio for that mode.

The same as the previous settings, there are also three methods to adjust the duty cycle ratio:

**Method 1:** Tap the “+” and “-” buttons at the bottom Duty Cycle Setting area.



Figure 9-24 Sample Duty Cycle Setting Screen 1

Range	Button	Description
1% to 99%		Raises the duty cycle ratio by 1%
		Lowers the duty cycle ratio by 1%

**Method 2:** Tap the **Duty Cycle Setting** button at the bottom of the screen to open a dialog box. Adjust the duty cycle by tapping the **positive or negative ratio** at the bottom of the dialog box. Then tap **OK** to confirm or **Cancel** to exit without saving.

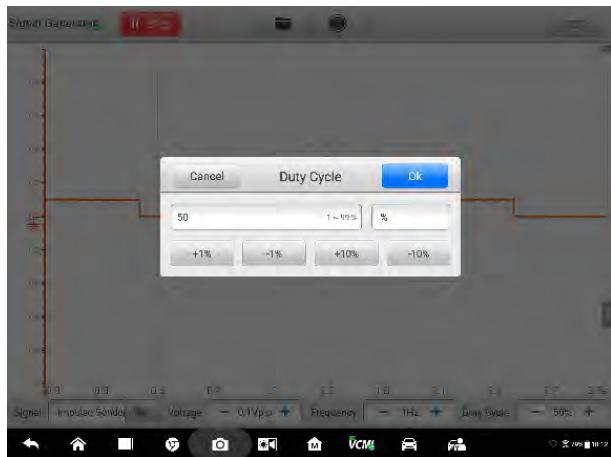


Figure 9-25 Sample Duty Cycle Setting Screen 2

Value	Description
+1.0%	Raises the duty cycle ratio by 1.0%
-1.0%	Lowers the duty cycle ratio by 1.0%
+10.0%	Raises the duty cycle ratio by 10%
-10.0%	Lowers the duty cycle ratio by 10%

**Method 3:** Input the duty cycle ratio using the virtual keyboard. Tap the duty cycle field to clear the current value and input the new value using the virtual keyboard. Then tap **OK** to confirm or **Cancel** to exit without saving.

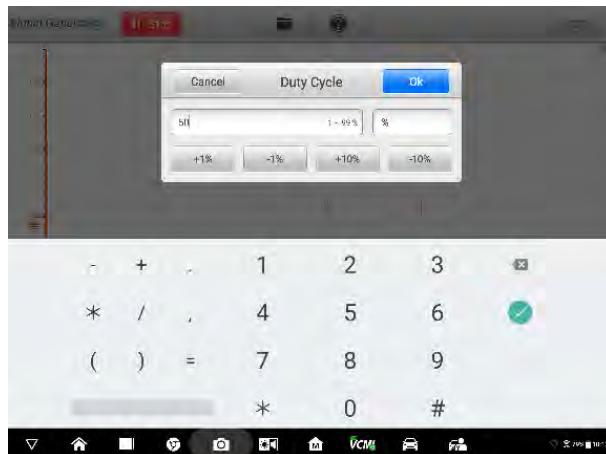


Figure 9-26 Sample Duty Cycle Setting Screen 3

### 9.3.6 Troubleshooting

If the signal generator cannot communicate with the MaxiSys Display Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Display Tablet through the supplied USB cable.

---

#### IMPORTANT

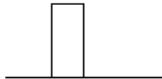
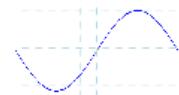
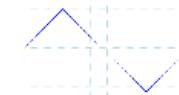
All vehicle communications must be terminated before resetting the connection to avoid damage to the devices and the vehicle. The Internet connection may be aborted during resetting.

---

- If the communication between the VCMI device and the MaxiSys Display Tablet still fails after reset, restart the MaxiSys Display Tablet and reconnect the VCMI device.

### 9.3.7 Glossary

Waveform Type	Description	Sample Waveform
<b>DC Voltage</b>	A wave with constant voltage	

Waveform Type	Description	Sample Waveform
Pulse	A pulse wave with variable pulse width	
Sinusoid	A sine wave	
Triangle	A symmetrical triangle wave	
Duty Cycle	Includes positive duty cycle and negative duty cycle	

## **9.4 OBD Communication Line Inspection Operation**

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The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra is designed with the OBD communication line inspection function by checking the ON-OFF lamps on the tablet screen.

Generally, the vehicle's electronic control systems are designed to comply with the specific communication protocols. The control units in the electronic control systems communicate with the Display Tablet through the diagnostic adapter, mostly through the OBDII adapter.

With the OBD communication line inspection function, you can check whether the control units in vehicle's electronic control systems work properly or not by illuminating ON-OFF lamps according to the condition of sending out the communication signals.

### **9.4.1 Safety Information**

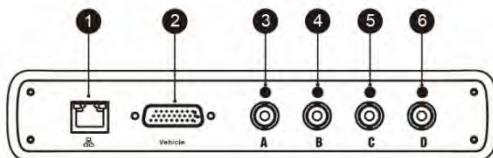
Follow the instructions below to ensure proper communication line inspection performance.

- Different preconditions for different functions. Before inspection, please read the inspection guides carefully.
- The pin number for OBDII may be different for different vehicle modes. Please check and confirm for correct pin number and then proceed inspection.
- Select OBDII connector's signal pins manually if the test vehicle's actual communication signal pins are assigned differently.
- Make sure the DLC main cable has connected to the vehicle before inspection.
- Make sure the ignition key is in ON position when test the vehicle's communication line.
- Please check the correct communication lines refer to the circuit diagram of the test vehicle if the inspection fails due to no signal input.
- Do not use in wet or damp conditions, or around explosive gas or vapor.
- Do not tamper with or disassemble the product, connectors or accessories. Internal damage will affect performance.
- Before carrying out maintenance and cleaning of the product, make sure the unit is NOT connected to a power source, vehicle or computer.
- When cleaning the product, use wet soft cloth with mild detergent in water. Do not let water to enter the product casing, as this will cause damage to the electronics inside.

## 9.4.2 General Introduction

### Component Locations

The main connectors are located on the bottom of the VCMI device.

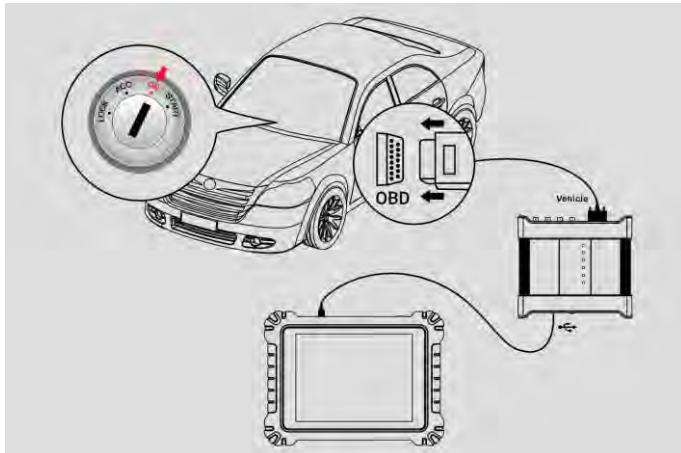


1. Ethernet Connector
2. Vehicle Data Connector
3. Input Channel A
4. Input Channel B
5. Input Channel C
6. Input Channel D

## 9.4.3 Getting Started

Before opening the OBD Communication Line Inspection application, you have to complete three steps below:

- 1) Connect the VCMI device to the Display Tablet via the provided USB cable or Wi-Fi network, see [Establish Vehicle Communication](#) on page 20.
- 2) Connect the VCMI device to the vehicle's OBDII connector.
- 3) Turn the IG key to **ON** position.



**Figure 9-1 Sample Connection Diagram**

➤ **To open the OBD Communication Line Inspection application:**

1. Please refer to *Figure 9-1 Sample Connection Diagram* to complete the connection and turn the IG key to ON position.
2. Tap the **Measurement** icon on the Home screen of the MaxiSys Ultra Display Tablet. The Measurement screen opens.
3. Tap the **OBD** icon to open the OBD Communication Line Inspection Menu.
4. Select a desired communication protocol to test.

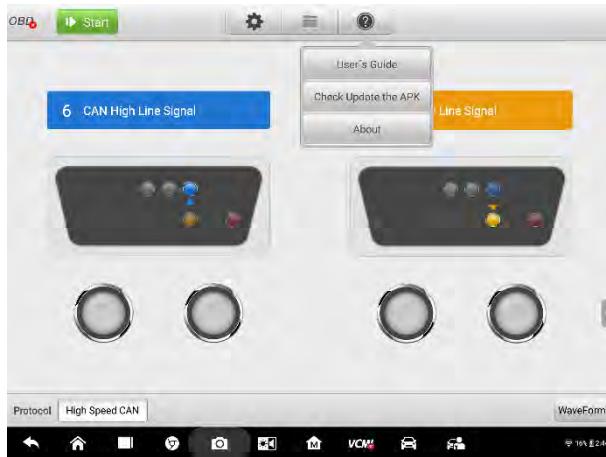
#### **9.4.4 Update**

The operating software of the device is continually optimized. Tap the **Help** button in the upper half of the screen.

##### *APK Update*

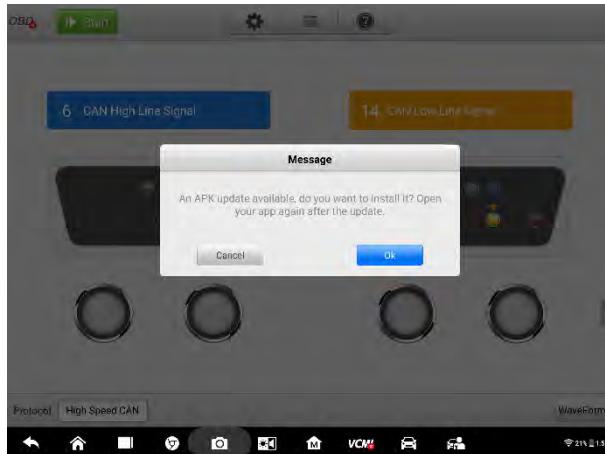
➤ **To update the APK:**

1. Tap the **Help** button on the upper half of the screen. A dropdown list appears.



**Figure 9-2 Sample Help Screen**

2. Tap **Check Update the APK** in the dropdown list. A confirmation message appears.



**Figure 9-3 Sample Update Confirmation Screen**

3. Tap **OK** to update the software or tap **Cancel** to exit.

## 9.4.5 Screen Layout and Operations

The OBD Communication Line Inspection application allows you to select the communication protocols, the signal pins and voltage value for testing.

Tap the **Measurement** icon on the home screen and select **OBD** in the menu, the OBD Communication Line Inspection page appears. The screen typically includes the following button sections.



### NOTE

The **Measure** icon can also be selected to open the OBD application from the Android screen after tapping on the Android Home button at the bottom of the screen.



**Figure 9-4 Sample OBD Communication Line Inspection Menu Screen**

1. Upper Section Buttons - see [9.4.5.1 Upper Section Buttons](#) on page 222 for details.
2. Main View Section – see [9.4.5.2 Main View Section and Lower Section Buttons](#) on page 227 for details.
3. Lower Section Buttons – see [9.4.5.2 Main View Section and Lower Section Buttons](#) on page 227 for details.

### 9.4.5.1 Upper Section Buttons

The upper section buttons are used for configurations of various settings and operations. The following table provides brief descriptions of each button.

**Table 9-1 Upper Section Buttons**

Name	Button	Description
OBD Icon		Indicates the device connection status. See <a href="#">OBD Button</a> on page 223 for more information.
Start/Stop		Start or stop the device. See <a href="#">Start/Stop Button</a> on page 223 for more information.
Settings		Set the communication protocol manually. See <a href="#">Settings Menu</a> on page 223 for more information.
File		Print, open and save the waveform data. See <a href="#">File Menu</a> on page 226 for more information.
Help		View the user manual and update the software. See <a href="#">Help Menu</a> on page 227 for more information.

## OBD Button

This **OBD button** indicates the OBD device connection status. A **green tick** means a successful connection with the Display Tablet, whereas a **red cross** means connection failure.

## Start/Stop Button

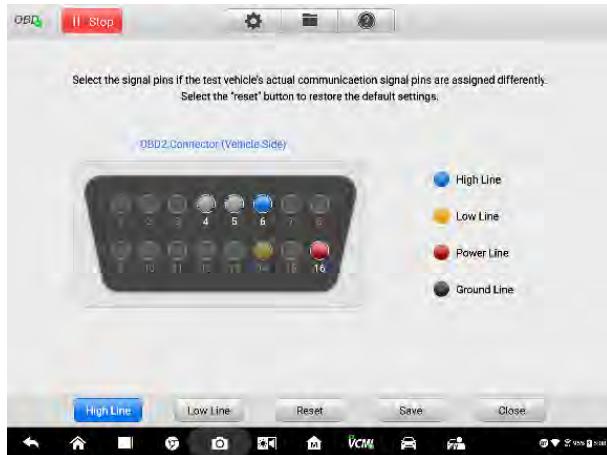
You can tap the **Start/Stop Button** icon to start or stop the device.

Name	Button	Description
Start		Tap to start the device and the testing begins.
Stop		Tap to stop the device and the testing ends.

## Settings Menu

Tap the gear-shaped icon in the top navigation bar to enter the **Settings Menu**.

The pin number for OBDII may be different for different vehicle modes. In Settings Menu, you can select OBDII connector's signal pins manually if the test vehicle's actual communication signal pins are assigned differently.



**Figure 9-5 Sample Settings Menu Screen 1**

At the bottom of the settings menu screen, the **Protocol**, **Reset**, **Save** and **Close** buttons are displayed. The protocol varies according to the protocol you set.

Take CAN protocol as an example.

**CAN-H:** select the pin assigned for high speed CAN-bus communication line

**CAN-L:** select the pin assigned for low speed CAN-bus communication line

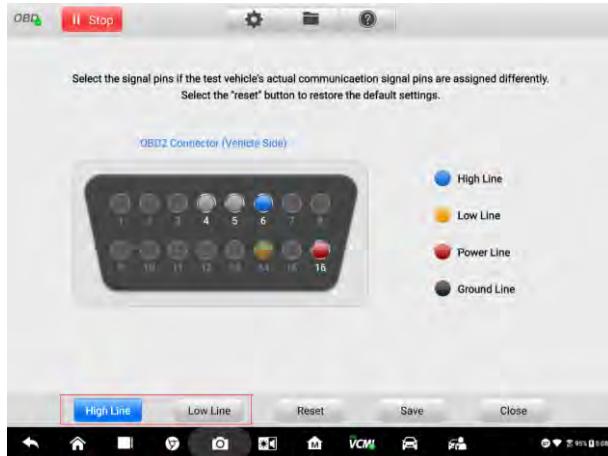
**Reset:** restore the default settings

**Save:** save the changes when custom pin assignment is set

**Close:** exit the settings menu screen

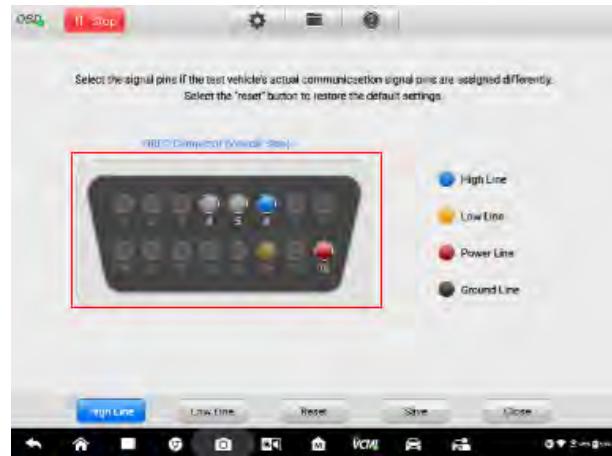
➤ **To select the signal pins manually:**

1. Tap the gear-shaped icon in the top navigation bar to enter the **Settings Menu**.
2. Tap **CAN-H** or **CAN-L** to select the communication protocol.



**Figure 9-6 Sample Settings Menu Screen 2**

3. Tap the correct pin number in the OBDII Connector Assignment picture according to the test vehicle's actual communication signal pins.



**Figure 9-7 Sample Settings Menu Screen 3**

4. Tap **Save** to save settings or tap **Close** to exit without saving.

## File Menu

The **File** button allows you to print, open and save the waveform data. The **File Menu** is enabled in the **Waveform Mode** and supports the following functions.



Figure 9-8 Sample File Menu Screen

- **Print** – Tap to generate a temporary JPG picture and print the current waveforms.

---

**NOTE**

Make sure the Display Tablet is connected to a printer successfully.  
Make sure the network is available.

---

- **Save** – Tap to capture and save the current waveforms. On the Save File screen, tap each item to input the corresponding information and then tap **Save** or **Save Default** to finish.

---

**NOTE**

The file name is required when saving waveforms.

---

- **Open** – Tap to retrieve the saved waveforms. You can select and delete the saved waveforms by tapping the Edit button in the upper right corner of the screen.
- **Save as text** – Tap to save the current waveform data to a text file. You can use the ES file browser to find the saved text file. View the saved text file at **Home > ES file browser > Main content > Scan file > Data file > Scope file > txt file**.

## Help Menu

The Help Menu allows you to view the user manual, update the software, and view versions of the device.

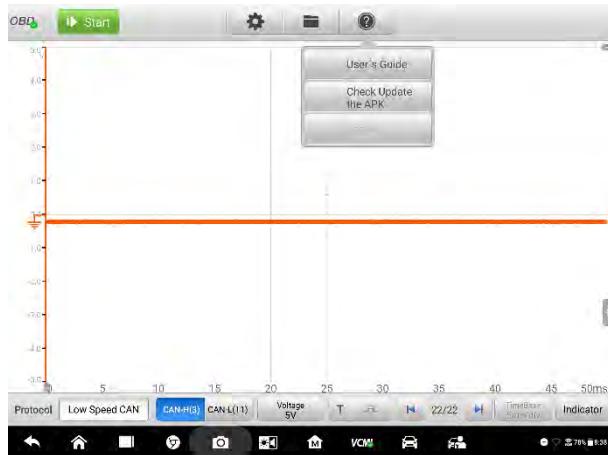


Figure 9-9 Sample Help Menu Screen

**User Manual** – the document with complete information and operations of the device.

**Check Update the APK** – check online to find the latest version of the APK.

**About** – displays the model number of the device, the firmware version numbers and the software version numbers.

### 9.4.5.2 Main View Section and Lower Section Buttons

Two modes are available in the OBD communication line inspection function: Indicator Mode and Waveform Mode.

#### Indicator Mode

This mode is designed to show the condition of voltage fluctuation in vehicle's communication line. In this mode, the right and left indicator lamps will be flashing consecutively when the electronic control units send out signals properly.

By default, the screen displays in the Indicator mode when the application is opened.

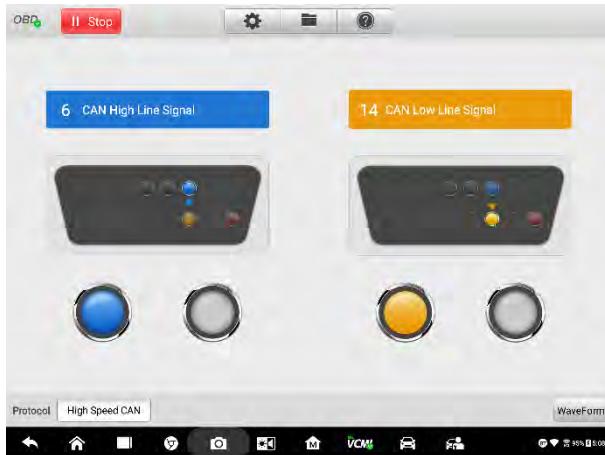


Figure 9-10 Sample Indicator Mode Screen

## Main View Section

The **CAN-High** line is assigned to **Pin 6** and the **CAN-Low** line to **Pin 14** of the OBDII adapter by default according to the **CAN-Bus** standard protocol.

If the test vehicle's actual communication signal pins are assigned differently, you can select OBDII connector's signal pins manually in the [Settings Menu](#).

When the electronic control units send out signals properly, the left and right indicator lamps icons will flash consecutively on the screen.

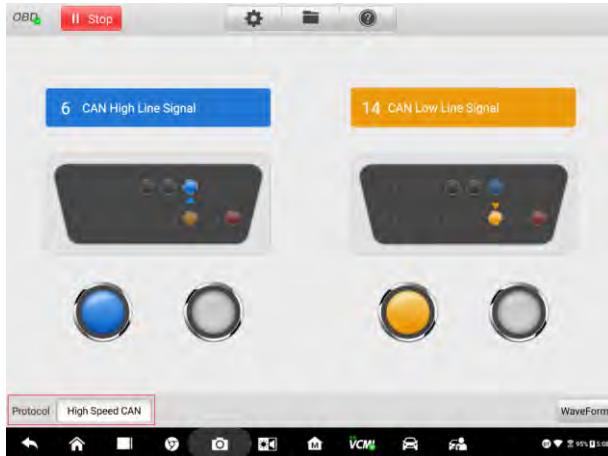
### NOTE

The flashing lamps simply indicate that the communication signals are detected, rather than the correctness of the signals.

## Lower Buttons

### ● Protocol Button

In the left lower corner of the screen, you can select the protocol you want to test.



**Figure 9-11 Sample Protocol Button Screen**

The following protocols are included:

- ❖ **High Speed CAN** - offers baud rates from 40 Kbit/s to 1 Mbit/sec, depending on cable length. This is the most popular standard for the physical layer, since it allows for simple cable connection between devices. High speed CAN networks are terminated with 120 ohm resistors on each end of the network.
- ❖ **Low Speed CAN** - offers baud rates from 40 Kbit/s to 125 Kbit/sec. This standard allows CAN bus communication to continue in case of a wiring failure on the CAN bus lines. In low speed CAN networks, each device has its own termination.
- ❖ **Single CAN** - offers baud rates up to 33.3 Kbit/s (up to 88.3 Kbit/s for high-speed mode)
- ❖ **J1939 CAN** - is used in the commercial vehicle area for communication throughout the vehicle, with the physical layer defined in ISO 11898. Under J1939/11 and J1939/15, the data rate is specified as 250 Kbit/s, with J1939/14 specifying 500 Kbit/s.
- ❖ **J1850 (PWM)** - SAE J1850 pulse-width modulation offers baud rates up to 41.6 Kbit/s, standard of the Ford Motor Company
- ❖ **J1850 (VPW)** - SAE J1850 variable pulse width offers baud rates up to 10.4 Kbit/s, standard of the General Motors
- ❖ **J1708 (SAE)** - the standard defines a double-wire 18-gauge cable that can run up to 130 feet (40 m) and operates at 9600 bit/s
- **Waveform button**

In the right lower corner of the screen, you can enter to the Waveform Mode by tapping the **Waveform** button.



Figure 9-12 Sample Indicator Button Screen

## Test Procedure

The test procedure is the same for all the protocols.

➤ **To test the communication line:**

Take High speed CAN-bus line as an example.

1. Make sure the VCMI is connected to the vehicle's OBDII connector. The VCMI is connected with Display Tablet successfully. Please refer to the [Connection Diagram](#).
2. Turn the IG key to ON position.
3. Select the **High Speed CAN** protocol in the lower corner of the screen.
4. The OBDII connector pin numbers that the signals are being transmitted are indicated, and the indicator lamps flash consecutively.

---

 **NOTE**

If the indicator lamps are not flashing, check the IG key ON status and the OBDII connector' signal pin assignment, then make closer inspection on the circuit.

## Waveform Mode

This mode allows you to view the test result in a waveform form with more details and set more configuration for specific needs.

The screen is displayed in the Indicator mode by default. Tap the **Waveform** button in the lower corner of the Indicator mode screen to switch to the Waveform Mode. The screen is shown as below.



Figure 9-13 Sample Indicator Mode Screen

## Main View Section

The main view section features as a coordinate grid with **X-axis** and **Y-axis**, representing the time duration and voltage level respectively. The voltage level can be configured in the Amplitude Settings while the time duration can be set in the Time Base Settings.

## Channel Selection

In the main view section, a channel has two conditions: selected and unselected. Some operations depend on the selected condition of the channel, such as voltage rulers, waveform movements, and waveform zooming.

### ➤ To select and unselect the channel:

1. Tap the zero baseline marker or the Y-axis, which thickens to indicate the channel is selected.
2. Tap the zero baseline marker or the Y-axis again to exit the channel selection.

## Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, only the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

### Measurement Rulers

In the coordinate grid, there are two kinds of **measurement rulers**, which allow the voltage and time duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, the cycle time (duration) and frequency.

The vertical **Time Ruler** - Tap the **Ruler Activator** in the bottom left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

The horizontal **Voltage Ruler** - The **Voltage Ruler** can be generated in the similar way by clicking the **Ruler Activator** in the top right corner and dragging it downwards.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values for the corresponding channels will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.



Figure 9-14 Sample Measurement Rulers Screen

### Zero Baseline

The zero baseline is marked the 0 value in the Y-axis, showing the ground level of each channel waveform. After the channel is selected, the zero baseline can be adjusted by dragging the baseline marker up/down along the Y-axis, or dragging the waveform up/down or moving the screen up/down in the grid.

#### NOTE

Tapping the baseline marker makes the vertical scale line thinner. In this case, the waveform is unselected and cannot be dragged. Tap the baseline marker again to select.



Figure 9-15 Sample Zero Baseline Screen

#### Help Assistant

Tapping the arrow button in the lower right corner of the screen opens the Help Assistant sheet.



**Figure 9-16 Sample Help Assistant Screen**

The **Help Assistant** function provides the relevant introduction, information and test procedures when you view a specific section or tap a specific button.

➤ **To open and close the Help Assistant sheet:**

1. Tap the arrow button on the right-hand side of the screen.
2. The Help Assistant sheet displays.
3. Tap the arrow button again or click any space outside of the sheet to close the sheet.

## Lower Buttons

The measurement, buffer and time base can be configured at the lower section.

**Table 9-2 Lower Section Buttons**

Name	Button	Description
<b>Protocol</b>	Protocol High Speed CAN	Tap to select an appropriate protocol. See <a href="#">Protocol Setting</a> on page 235 for more information.
<b>Communication Line</b>	Line6 Line14	Tap to select the appropriate communication line. See <a href="#">Communication Line</a> on page 236 for more information.

Name	Button	Description
Amplitude	Voltage 5v	Tap to select an appropriate amplitude value. See <a href="#">Amplitude Setting</a> on page 237 for more information.
Trigger	T	Tap to open the trigger setting menu. See <a href="#">Trigger</a> on page 238 for more information.
Buffer	32/32	Tap the Previous or Next button to switch to the previous or the next frame waveform. See <a href="#">Buffer</a> on page 241 for more information.
Time Base	TimeBase 500μs/div	Tap to select an appropriate time per division. See <a href="#">Time Base</a> on page 242 for more information.
Indicator	Indicator	Tap to switch to the Indicator mode.

## ● Protocol Setting

Seven types of communication protocols are available: High Speed CAN, Low Speed CAN, Single CAN, J1939 CAN, J1850 (PWM), J1850 (VPW) and J1708 (SAE).

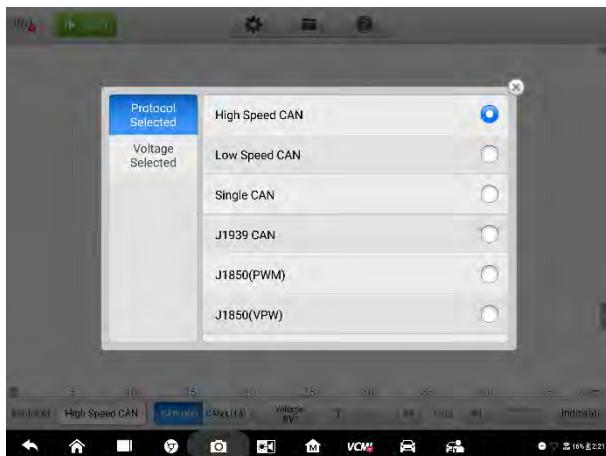
### ➤ To select the protocol:

1. Tap the **Protocol** button in the lower left corner of the screen. A dialog box opens.



**Figure 9-17 Sample Protocol Type Button Screen**

2. Select the desired **Protocol type** in the dialog box.



**Figure 9-18 Sample Protocol Setting Screen**

3. Close the dialog box by tapping the X icon.

#### ● **Communication Line**

The communication line selection varies according to the protocol you have set.

Tap the appropriate communication line at the bottom of the screen.



**Figure 9-19 Sample Communication Line Button Screen**

- **Amplitude Setting**

After selecting the protocol type, you can also set the amplitude value for that type.

- **To set the amplitude:**

1. Tap the **Amplitude** button at the bottom of the screen. A dialog box appears.



Figure 9-20 Sample Amplitude Button Screen

2. Select the appropriate amplitude for the protocol.

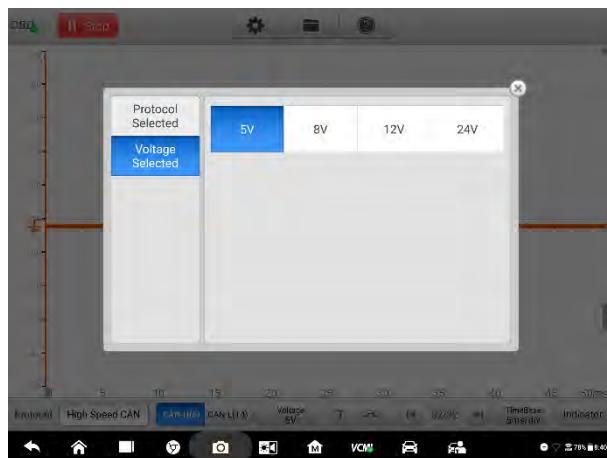


Figure 9-21 Sample Amplitude Setting Screen

3. Close the dialog box by tapping the **X** icon.

- **Trigger**

The trigger is mainly used to display a stable and enabled waveform so that you can view only the part of the waveform you are interested in. Generally, the continuous waveform display in non-trigger mode may have jitter or offset.

According to the trigger settings, the device is triggered when the signal crosses a threshold, or wait until the signal meet the setting conditions.

When the device is capturing the signal, tap the left column of the **Trigger** button to active the trigger function, and a **trigger point** is shown as a blue point.

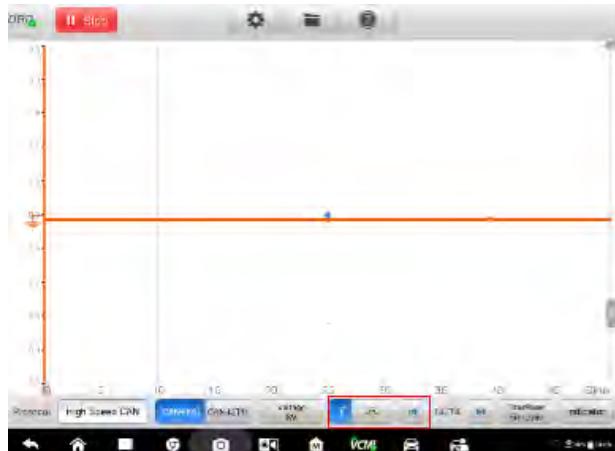


Figure 9-22 Sample Trigger Point Screen

The **Edge Trigger** is one of the most common trigger modes and occurs when a voltage crosses a threshold. This trigger type allows you to configure the trigger mode, threshold, trigger channel and pulse direction settings. Tap **Done** to save the settings or tap **Cancel** to exit without saving.

When the device is capturing the signal, tap the right column of the **Trigger** button to open the trigger settings dialog box.

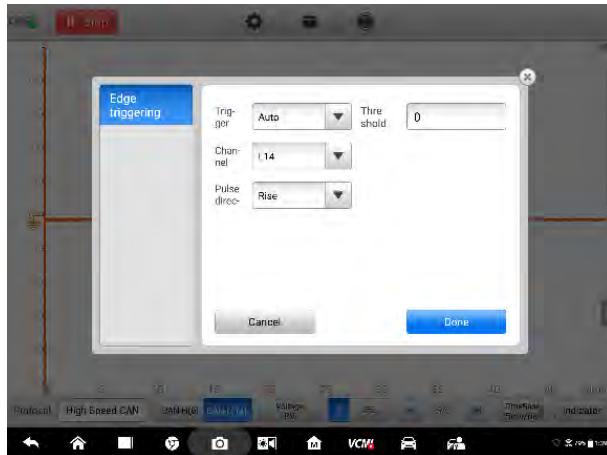


Figure 9-23 Sample Trigger Settings Screen

### Trigger Mode

Three trigger modes are available: **None**, **Auto** and **Repeat**. You can select one mode according to your specific needs.

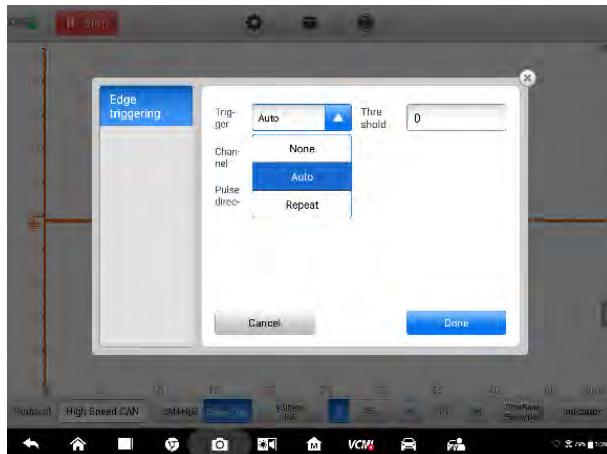


Figure 9-24 Sample Trigger Mode Screen

The table below offers brief description for each trigger mode.

**Table 9-3 Trigger Mode Table**

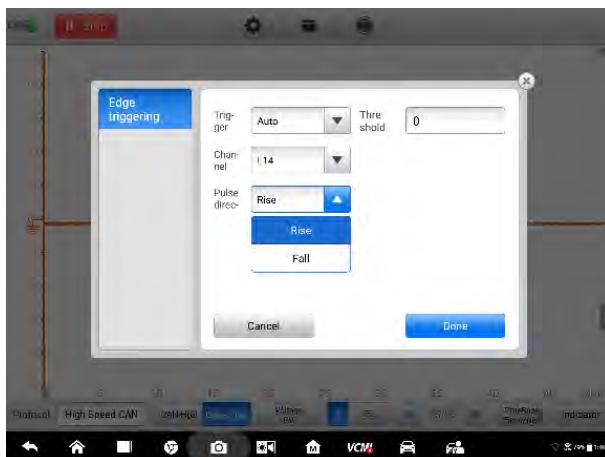
Trigger Mode	Description
<b>None</b>	In this trigger mode, the device can continuously capture data, without waiting for a trigger event.
<b>Auto</b>	In this trigger mode, the device will wait for a trigger before capturing data. It can automatically update after a short period, even if the signal does not cross the trigger point.
<b>Repeat</b>	In this trigger mode, the device waits until a trigger event occurs. If there is no trigger event, nothing will be displayed on the screen.

## Channel

You can select the applicable trigger channel in the dropdown list. The selected channel is the communication line that the device monitors for the trigger condition.

## Pulse Direction

Two pulse direction settings are available: **Rise** and **Fall**.



**Figure 9-25 Sample Pulse Direction Screen**

- ❖ **Rising Edge Trigger** - Indicates trigger is turned on to start the trace on the rising edge of the waveform.
- ❖ **Falling Edge Trigger** – Indicates trigger is turned on to start the trace on the falling edge of the waveform.

## Threshold

The **Threshold** allows you to set the voltage threshold for the trigger.

❖ To precisely position the trigger point, input the value in the Threshold field in the trigger settings dialog box.

❖ To roughly position the trigger point, drag the trigger point to a desired position.

### ➤ To configure the trigger settings:

1. Tap the right column of the **Trigger** button to open the trigger settings dialog box.
2. Select the trigger mode, trigger channel and pulse direction in the dropdown list.
3. Input the value in the Threshold field in the trigger settings dialog box.
4. Tap **Done** to save settings or tap **Cancel** to exit without saving.

## ● Buffer

The waveform buffer shows which signal waveform is displayed on the current screen and how many signal waveforms are captured and stored in the buffer memory.



Figure 9-26 Sample Buffer Screen

The device can capture and store up to 32 waveforms. You can select a waveform from the waveform buffer by tapping the **Previous** or **Next** button to switch to the previous or the next waveform.

Name	Button	Description
Previous		Tap to display the previous waveform in the buffer.
Buffer Index		Shows which waveform is currently being displayed and how many waveforms are in the buffer.
Next		Tap to display the next waveform in the buffer.

- **Time Base**

The time base controls the time interval across the device display. Tap the **Time Base** button at the bottom to open the setting dialog box, and then select the desired options.



Figure 9-27 Sample Time Base Screen 1



**Figure 9-28 Sample Time Base Screen 2**

**Continuous Mode:** if the time base is set to more than or equal to 200ms/div, the device switches to the continuous mode. In this mode, the device updates the trace continuously as each capture progresses, rather than waiting for a complete capture before updating the trace.

- **Indicator Button**

In the lower corner of the screen, you can enter the Indicator Mode by tapping the **Indicator** button.



**Figure 9-29 Sample Indicator Button Screen**

## **9.4.6 Troubleshooting**

If the VCMI device cannot communicate with the MaxiSys Display Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Display Tablet via the supplied USB cable or Wi-Fi network.
- Check if the pin number is set properly.
- Check if the IG key is turned to **ON** position.
- If the communication between the VCMI device and the MaxiSys Display Tablet still fails, restart the MaxiSys Display Tablet and reconnect the VCMI device.

## **9.4.7 Glossary**

### ***Vehicle Bus***

A vehicle bus is a specialized internal communications network that interconnects components inside a vehicle (e.g., automobile, bus, train, industrial or agricultural vehicle, ship, or aircraft). Protocols include Controller Area Network (CAN), Local Interconnect Network (LIN) and others.

### ***CAN Bus***

A Controller Area Network (CAN bus) is a robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer.

### ***SAE International***

Initially established as the Society of Automotive Engineers, is a U.S.-based, globally active professional association and standards developing organization for engineering professionals in various industries. Principal emphasis is placed on transport industries such as automotive, aerospace, and commercial vehicles.

### ***SAE J1708***

SAE J1708 is a standard used for serial communications between ECUs on a heavy duty vehicle and also between a computer and the vehicle. With respect to Open System Interconnection model (OSI), J1708 defines the physical layer. Common higher layer protocols that operate on top of J1708 are SAE J1587 and SAE J1922. The protocol is maintained by SAE International.

## **SAE J1939**

Society of Automotive Engineers standard SAE J1939 is the vehicle bus recommended practice used for communication and diagnostics among vehicle components. It is used in the commercial vehicle area for communication throughout the vehicle, with the physical layer defined in ISO 11898.

## **J1850**

Defines a serial data protocol. There are two variants- 10.4 Kbit/s (single wire, VPW) and 41.6 Kbit/s (two wire, PWM). Mainly used by US manufacturers, also known as PCI (Chrysler, 10.4 Kbit/s), Class 2 (GM, 10.4 Kbit/s), and SCP (Ford, 41.6 Kbit/s).

## **OBD**

On-board diagnostics (OBD) is an automotive term referring to a vehicle's self-diagnostic and reporting capability. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle subsystems.

### *OBD-II diagnostic connector*

The OBD-II DLC (post-1996 vehicles) is usually located under the instrument panel on the driver side, though there are several exceptions. The SAE J1962 specification provides for two standardized hardware interfaces, called type A and type B. Both are female, 9-pin (2x8), D-shaped connectors, and both have a groove between the two rows of pins.

### *DLC*

The data link connector (DLC) is the multi-pin diagnostic connection port for automobiles, trucks, and motorcycles used to interface a scan tool with the control modules of a given vehicle and access on-board diagnostics and live data streams.

# 10 Data Manager

The Data Manager application allows you to store, print, and review the saved files, manage the workshop information, customer information records, and keep test vehicle history records.

Selecting the Data Manager application opens the file system menu. There are six main functions available.



**Figure 10-1 Sample Data Manager Main Screen**

The table below briefly describes each of the function buttons in the Data Manager application.

**Table 10-1 Buttons in Data Manager**

Name	Button	Description
<b>Vehicle History</b>		Tap to review the diagnostic history record.
<b>Workshop Information</b>		Tap to edit the information of workshops.
<b>Customer</b>		Tap to create a new customer account file.

Name	Button	Description
Image		Tap to review the screenshots
PDF		Tap to review the diagnostic reports.
Review Data		Tap to review the recorded data.
Uninstall Apps		Tap to uninstall applications.
Data Logging		Tap to review the communication data and ECU information of the test vehicle. The saved data can be reported and sent to the technical center via the internet.

## 10.1 Vehicle History

This function stores records of test vehicle history, including vehicle information and the retrieved DTCs from previous diagnostic sessions. Test information is summarized and displayed in an easy-to-view table listing. The Vehicle History also provides direct access to the previously tested vehicle and allows you to restart a diagnostic session without the need to do vehicle identification again.

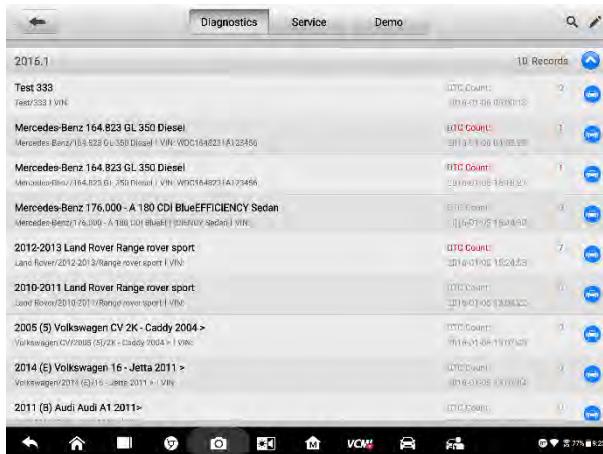


Figure 10-2 Sample Vehicle History Screen

1. Top Toolbar Buttons – navigation and application controls.
2. Main Section – displays all the vehicle history records.

- **To activate a test session for the recorded vehicle**
  1. Tap **Data Manager** on the MaxiSys Job Menu.
  2. Select **Vehicle History** to open the screen. Tap **Diagnostics** or **Service** to select diagnostic test records or service test records.
  3. Tap **Diagnostics** at the bottom of the thumbnail of a vehicle record item. Or,
  4. Select a vehicle record item by tapping the thumbnail.
  5. A Historical Test record sheet displays, check the recorded information of the recorded test vehicle, and tap the Diagnostics button on the upper right corner.
  6. The Diagnostics screen of the vehicle displays and a new diagnostic session is activated, see [Diagnostic Operation](#) for detailed instructions on vehicle diagnostic operations.

## Historical Test Record

The Historical Test record of the tested vehicle is a detailed data form, which includes general information of the vehicle such as vehicle year, make and model and the diagnostic trouble codes retrieved from the previous test sessions, as well as other service details that can be manually added by the technician.

Vehicle Information			
Title:	2019 GM Cadillac	<input type="button" value="View PDF"/>	
Year:	2019	VIN:	<input type="button" value="Print"/>
Make:	GM	License:	<input type="button" value="Email"/>
Model:	Cadillac	Odometer:	<input type="button" value="Delete"/>
Sub model:	ATS	Mileage:	
Color:			
Engine:		Status:	Not started
<hr/>			
Technician			
Technician Notes:			

**Figure 10-3 Sample Historical Test Record Sheet**

- **To edit the Historical Test record**
  1. Tap **Shop Manager** on the MaxiSys Job Menu.
  2. Select **Vehicle History**.
  3. Select the specific vehicle history record thumbnail from the main section. The

Historical Test record will display.

4. Tap **Edit** to start editing.
5. Tap each item to input information or attach files or images.

#### NOTE

The vehicle VIN, license number and customer account information are correlated by default. Any one of them, when added, IDs will be automatically associated with the others already in the test record.

6. Tap **Add to Customer** to correlate the Historical Test record sheet to an existing customer account, or add a new associated account to be correlated with the test vehicle record. See *Customer* on page 250 for more information.
7. Tap **Done** to save the updated record, or tap **Cancel** to exit without saving.

## 10.2 Workshop Information

The Workshop Information form allows you to input, edit, and save the detailed workshop information, such as shop name, address, phone number and other remarks, which, when printing vehicle diagnostic reports and other associated test file, will display as the header of the printed documents.

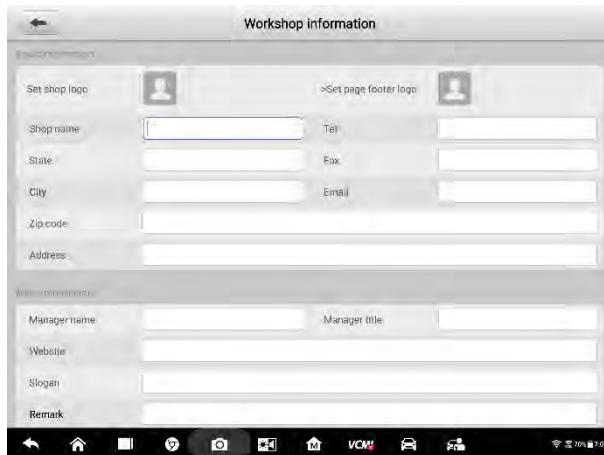


Figure 10-4 Sample Workshop Information Sheet

➤ **To edit the Workshop Information sheet**

1. Tap the **Shop Manager** application on the MaxiSys Job Menu.
2. Select **Workshop Information**.

3. Tap on each field to input the appropriate information.
4. Tap **Done** to save the updated workshop information record, or tap **Cancel** to exit without saving.

## 10.3 Customer Manager

---

The Customer Manager function allows you to create and edit customer accounts. It helps you to save and organize all customer information accounts that are correlated with the associated test vehicle history records.

➤ **To create a customer account**

1. Tap the **Shop Manager** application on the MaxiSys Job Menu.
2. Select **Customer Manager**.
3. Tap the **Add Account** button. An empty information form displays, tap each field to input the appropriate information.



### NOTE

The items that must be filled are indicated as required fields.

---

4. Some customers may have more than one vehicle for service; you can always add new vehicle information to the account. Tap **Add New Vehicle Information**, and then fill in the vehicle information. Tap the button to cancel.
5. Tap **OK** to save the account, or tap **Cancel** to exit without saving.

➤ **To edit a customer account**

1. Tap **Shop Manager** on the MaxiSys Job Menu.
2. Select **Customer Manager**.
3. Select a customer account by tapping the corresponding name card. A Customer Information record displays.
4. Tap **Edit** on the top toolbar to start editing.
5. Tap on the input field to edit or amend information, and enter updated information.
6. Tap **OK** to save the updated information, or tap **Cancel** to exit without saving.

➤ **To delete a customer account**

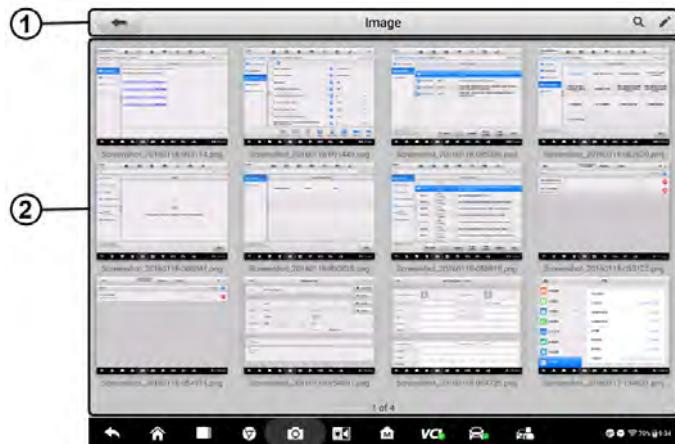
1. Tap **Shop Manager** on the MaxiSys Job Menu.
2. Select **Customer Manager**.
3. Select a customer account by tapping the corresponding name card. A Customer Information record displays.

4. Tap **Edit** on the top toolbar to start editing.
5. Tap **Delete Customer Information**. A confirmation message displays.
6. Tap **OK** to confirm the command, and the account is deleted. Tap **Cancel** to cancel the request.

## 10.4 Image

---

The Image section is a JPG database containing all captured screenshots.



**Figure 10-5 Sample Image Database Screen**

1. Toolbar Buttons – used to edit, print and delete the image files. See [Table 10-2 Toolbar Buttons in JPG Database](#) on page 251 for detailed information.
2. Main Section – displays the stored images.

**Table 10-2 Toolbar Buttons in JPG Database**

Name	Button	Description
Back		Return to the previous screen.
Enter Edit		Tap to display the editing toolbar to print, delete or view image information.
Cancel		Tap to close the editing toolbar or cancels file search.
Search		Quickly locates the image file by entering the vehicle name, test path, file name or file info.

<b>Info</b>		Tap to open a window displaying the detail information of the image.
<b>Print</b>		Tap to print the selected image.
<b>Delete</b>		Tap to delete the selected image.

➤ **To edit image information**

1. Select **Data Manager** from the MaxiSys Job Menu.
2. Select **Image** to access the JPG database.
3. Select an image to display it in full screen.
4. Tap the screen once to display the editing toolbar.
5. Tap **Info** to open a window displaying the image information.
6. Tap **Edit** on the top right corner of the window. The editing screen displays.
7. Edit the image information by entering the new file name, and file information.
8. Tap **Done** to save the information and exit, or tap **Cancel** to exit without saving.

➤ **To delete selected images**

1. Select **Data Manager** from the MaxiSys Job Menu.
2. Select **Image** to access the JPG database.
3. Tap the **Enter Edit** button to display the editing toolbar.
4. Select the images to be deleted by tapping the thumbnail images, the selected thumbnail displays a check mark at the bottom right corner.
5. Tap the **Delete** button, and then **Delete Selected**, now the selected images are deleted.

## 10.5 PDF Files

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The PDF section stores and displays all PDF files of saved data. After entering the PDF database, select a PDF file to view the stored information.

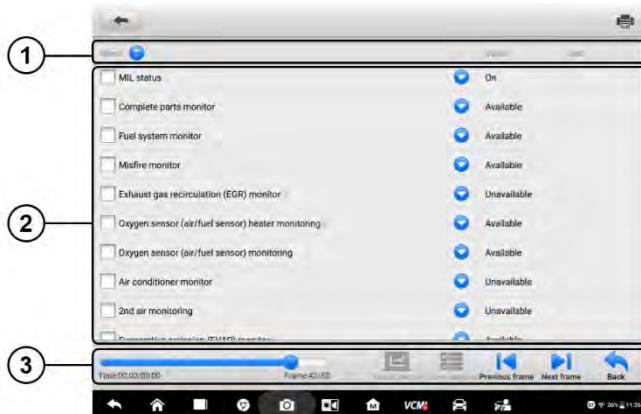
This section uses the standard Adobe Reader application for file viewing and editing. Please refer to the associated Adobe Reader manual for more detailed instructions.

## 10.6 Review Data

---

The Review Data section allows you to playback the recorded data frames of live data streams.

On the Review Data main screen, select a record file to playback.



**Figure 10-7 Sample Data Playback Screen**

1. Drop-down Toolbar – tap the button at the top center of the screen to open the Drop-down Toolbar.
2. Main Section – displays the recorded data frames.
3. Navigation Toolbar – allows you to manipulate data playback.

Use the Navigation Toolbar buttons to playback the record data from frame to frame.

Tap **Back** to exit data playback.

## 10.7 Apps Uninstall

This section allows you to manage the firmware applications installed on the MaxiSys Diagnostics System. Selecting this section opens a managing screen, on which you can check all the available vehicle diagnostic applications.

Select the vehicle firmware you want to delete by tapping on the car brand icon, the selected item will display a blue check mark at the upper right corner. Tap the **Delete** button on the top bar to delete the firmware from the system database.

## **10.8 Data Logging**

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The Data Logging section allows you to launch Support platform directly to view all records of all sent or unsent (saved) data loggings on the diagnostic system. For more details, please refer to [\*Data Logging\*](#) on Page 271.

# 11 Settings

Selecting Settings application opens a setup interface, on which you can adjust default setting and view information about the MaxiSys system. The following options are available for the MaxiSys system settings:

- Unit
- Language
- Printing Setting
- Scan Report
- Notification Center
- Auto Update
- ADAS Registration
- Vehicle List
- System Settings
- About

## 11.1 Operations

---

This section describes the operation procedures for the settings.

### 11.1.1 Unit

This option allows you to adjust the measurement unit for the diagnostic system.

- **To adjust the unit setting**
1. Tap the **Settings** application on the MaxiSys Job Menu.
  2. Tap the **Unit** option on the left column.
  3. Select the required measurement unit, Metric or English. A check mark will display to the right of the selected unit.
  4. Tap the **Home** button on the top left corner to return to the MaxiSys Job Menu.  
Or select another setting option for the system setup.

## 11.1.2 Language

This option allows you to adjust the display language for the MaxiSys system.

➤ **To adjust the language setting**

1. Tap the **Settings** application on the MaxiSys Job Menu.
2. Tap the **Language** option on the left column.
3. Select the required language. A check mark will display to the right of the selected language.
4. Tap the **Home** button on the top left corner to return to the MaxiSys Job Menu. Or select another setting option for the system setup.

## 11.1.3 Print

### *Printing Setting*

This option allows you to print any data or information anywhere and anytime either via PC network or WiFi.

➤ **To setup the printer connection**

1. Tap **Settings** on the MaxiSys Job Menu.
2. Tap **Printing Setting** on the left column.
3. Tap the **Print via Network** item to activate the printing function, which enables the device to send files to the printer through the PC via WiFi or Ethernet connection.
4. Tap **Home** on the top left corner to return to the MaxiSys Job Menu. Or select another setting option for the system setup.

### *Printing Operations*

➤ **To install the MaxiSys Printer driver program**

1. Download **Maxi PC Suite** from [www.autel.com](http://www.autel.com) > Supports & Updates > Firmware & Downloads > Update Client, and install to a Windows-based PC.
2. Double click on **Setup.exe** item.
3. Select the installation language and the wizard will load.
4. Follow the instructions on the screen and Click **Next** to continue.
5. Click **Install** and the printer driver program will be installed onto the computer.
6. Click **Finish** to complete the installation.



**NOTE**

The MaxiSys Printer runs automatically after the installation.

---

This section describes how to receive file from the MaxiSys tablet and perform printing through the computer:

➤ **To perform printing through the computer**

1. Make sure the tablet is connected to the computer network, either via WiFi or LAN, before printing.
2. Run the **MaxiSys Printer** program on the computer.
3. Click **Test Print** to make sure the printer is working successfully.
4. Tap the **Print** button on the toolbar of the tablet. A test document will be sent to the computer.
  - If the **Auto Print** option in the MaxiSys Printer is selected, the MaxiSys Printer will print the received document automatically.
  - If the **Auto Print** option is not selected, click **Open PDF File** button to view all the temporary files. Select the file(s) to print and click **Print**.

 **NOTE**

Make sure the computer installed with the Printing Services program is connected to a printer.

---

#### **11.1.4 Scan Report**

The Scan Report option allows you to turn the pre-scan report and post-scan report on or off.

➤ **To enable the Scan Report function**

1. Tap **Settings** on the MaxiSys Job Menu.
2. Tap **Scan Report** on the left column.
3. Tap **ON/OFF** to enable or disable the function. If the function is enabled the button displays blue, or if disabled the button displays gray.
4. Tap **Home** on the top left corner to return to the MaxiSys Job Menu. Or select another setting option for the system setup.

#### **11.1.5 Notification Center**

This option allows you to turn the Notification Center function on or off. The Notification Center function configures the MaxiSys tablet to receive regular online messages from the server for system update notifications or other service information via the Internet. It

is highly recommended to keep this function on all the time, so you won't miss out any new update for MaxiSys or event from Autel. Internet access is required for receiving online messages.

➤ **To enable the Notification Center function**

5. Tap **Settings** on the MaxiSys Job Menu.
6. Tap **Notification Center** on the left column.
7. Tap **ON/OFF** to enable or disable the Notifications function. If the function is enabled the button displays blue, or if disabled the button displays gray.
8. Tap **Home** on the top left corner to return to the MaxiSys Job Menu. Or select another setting option for the system setup.

When the Notification Center function is turned on, and new messages are received by the MaxiSys device, a notification message displays on the MaxiSys Job Menu. Press on the message bar and drag it down to display a list of received messages. Slide the list up or down to view additional messages if present.

Tap a specific message to launch the corresponding application. For example, if you tap on an Update notification message, the Update application will be launched.

### **11.1.6 Auto Update**

This option allows you to set the specific time for updating software automatically. There are three update options: OS Update, MaxiSys Update and Vehicle Update.

Tap **ON/OFF** to enable Auto Update. If the connectivity is enabled the button turns blue, or if disabled the button turns gray. Then set the time of the day for updating. If a specific time is set, the selected software will be automatically updated at this specific time.

### **11.1.7 ADAS Registration**

➤ **To active the MaxiSys ADAS Calibration:**

1. Confirm the registered MaxiSys has active updates.
2. Select **Settings** on the MaxiSys Job Menu.
3. Click on **ADAS Registration**.
4. Scan the QR code on the ADAS frame to bind, or manually input frame serial number when QR code is not available.
5. Enter the validation code from the ADAS Calibration Card.
6. The system will be reset and back to the desktop.

## 11.1.8 Vehicle List

This option allows you to sort the vehicles either by order of frequency or by alphabetic order.

➤ **To adjust the vehicle list setting**

1. Tap the **Settings** application on the MaxiSys Job Menu.
2. Tap **Vehicle List** on the left column.
3. Select the required sort type. A check mark will display to the right of the selected language.
4. Tap the **Home** button in the top left corner to return to the MaxiSys Job Menu. Or select another setting option for system setup.

## 11.1.9 System Settings

This function provides you with direct access to the Android system setting interface, where you can adjust various system settings for the Android system platform, regarding wireless and networks settings, various device settings such as sound and display, as well as system security settings, and check related information about the Android system. Refer to Android documentation for additional information.

## 11.1.10 About

The About function provides information of the MaxiSys diagnostic device including the product name, version, hardware, and serial number.

➤ **To check the MaxiSys product information in About**

1. Tap the **Settings** application on the MaxiSys Job Menu.
2. Tap the **About** option on the left column. The product information screen displays on the right.
3. Tap the **Home** button on the top left corner to return to the MaxiSys Job Menu, or select another setting option for the system setup, after viewing.

# 12 Update

The internal programming of the MaxiSys Diagnostic System, known as the firmware, can be updated using the Update application. Firmware updates increase the MaxiSys applications' capabilities, typically by adding new tests, new models, or enhanced applications to the database.

The display device automatically searches for available updates for all of the MaxiSys components when it is connected to the Internet. Any updates that are found can be downloaded and installed on the device. This section describes installing an update to the MaxiSys Diagnostic System firmware. A notification message displays if an update is available when the Notifications function is enabled in the Settings application (See [Notification Center](#) on page 257).



**Figure 12-1 Sample Update Screen**

## 1. Navigation and Controls

- Home Button – returns to the MaxiSys Job Menu.
- Update All – available updates for all tablet systems
- Show Recent – shows the recent updates
- Search Bar – searches specific update item by inputting the file name, for example: a specific vehicle manufacturer.

2. Status Bar
  - Left Side – displays the MaxiSys device model information and serial number
  - Right Side – displays an update progress bar indicating the completion status
3. Main Section
  - Left Column – displays vehicle logos and update firmware version information.
  - Middle Column – displays a brief introduction about the new changes to the firmware operation or capabilities. Tap  button to display an information screen to view more details, and tap the dim area around to close the window.
  - Right Column – according to the operation status of each firmware item, the button displays differently.
    - a) Tap **Update** to update the selected item.
    - b) Tap **Pause** to suspend the updating procedure.
    - c) Tap **Continue** to go on updating the suspended update.

➤ **To update the firmware**

1. Power up the tablet, and ensure that it is connected to a power source and has a steady Internet connection.
2. Tap the **Update** application button from the MaxiSys Job Menu; or tap the update notification message when received. The Update application screen displays.
3. Check all available updates:
  - If you decide to update all the items, tap the **Update All** button.
  - If you only want to update some individual items, tap the **Update** button on the right column of the specific item.
4. Tap the **Pause** button to suspend the updating process. Tap **Continue** to resume the update and the process will continue from the pause point.
5. When the updating process is completed, the firmware will be installed automatically. The new version will replace the older version.

# 13 VCMI Manager

The VCMI Manager is an application for connecting the MaxiSys Ultra tablet with VCMI device. This application allows you to pair the tablet with the VCMI device and to check the communication status. **There is an option to choose Bluetooth connection to your VCMI or Wi-Fi connection which is more stable and faster in speed for module operation.** No matter whether the network signal is accessible or not, the VCMI Manager provides double guarantee for steady connection.

Except connecting with VCMI devices, the MaxiSys Ultra tablet also supports **VCI connecting**, which means other VCI devices can be connected with the MaxiSys Ultra tablet. If the VCI device is connected successfully, the VCMI icon and relevant contents on the screen will change to those of VCI correspondingly.

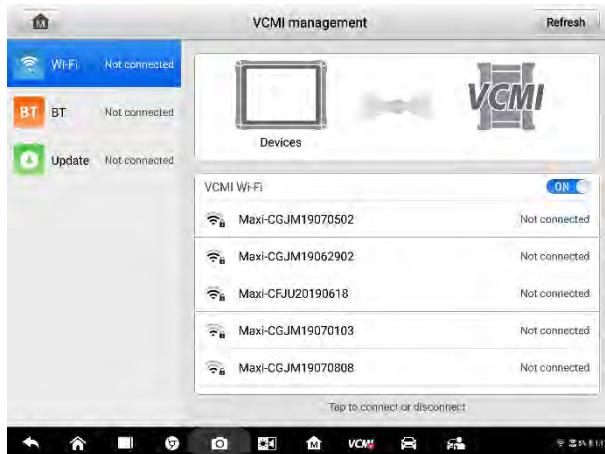


Figure 13-1 Sample VCMI Manager Screen

1. **Connection Mode** – there are three connection modes available for selection. The connection state is displayed alongside.
  - Wi-Fi Connection – when connected to a wireless device, the connection state displays as Connected, otherwise it displays as Not Connected.
  - BT Pairing – when paired to a wireless device, the connection state displays as Connected; otherwise it displays as Not Connected.
  - Update (for VCMI software only) – updates VCMI software via Internet through

the MaxiSys tablet networking using USB connection.

- Select a connection mode to manage and set up connection.

2. **Settings** – this section allows you to manage wireless pairing or set up network connection.

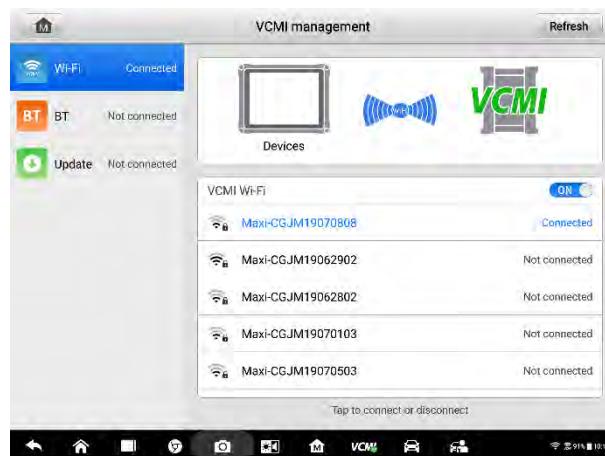
- Wi-Fi Setting - searches and displays the type and partial serial number for all of the devices available for Wi-Fi connection.
- BT Setting – searches and displays the type and partial serial number for all of the devices available for pairing. Tap a required device to start pairing. The BT status icon displayed to the left of the device name indicates the received signal strength.
- Ethernet Setting – allows you to perform network configuration.

## 13.1 Wi-Fi Connection

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Wi-Fi Connection is an advanced function for quick linkage with VCMI. Since Wi-Fi connection supports 2.5G/5G, it connects the MaxiSys Ultra tablet with VCMI box in a much steady and fast speed. Because of Wi-Fi connection, MaxiSys Ultra tablet sets you free to sit in the comfortable office away from the heated vehicle, but operate diagnostic procedures smoothly and quickly as perfect as doing beside the vehicle. For good running, the distance between Ultra tablet and the VCMI device connected with vehicle should be within 100 meters in an open space for good running.

Furthermore, Wi-Fi connection builds good environment for oscilloscope measurement function, which is mentioned in Chapter 9.1 Oscilloscope Operation.



### Figure 13-3 Sample Wi-Fi Connection Screen

➤ **To connect the VCMI device with the tablet via Wi-Fi connection**

1. Power on the tablet.
2. Connect the 26-pin end of the data cable to the VCMI's vehicle data connector.
3. Connect the 9-pin end of the data cable to the vehicle data link connector (DLC).
4. Tap **VCMI Manager** on the MaxiSys Job Menu of the tablet.
5. Select **Wi-Fi**, from the connection mode list.
6. Tap the Wi-Fi toggle to turn it **ON**. Tap **Refresh** at the top right corner. Now the device starts searching for available units.
7. Depending on the VCMI type you use, the device name may display as Maxi suffixed with a serial number. Select the required device for connection.
8. When connection is successfully done, the connection status displayed to the right of the device name is shown as **Connected**.
9. Wait a few seconds, and the VCMI button on the system Navigation bar at the bottom of the screen shall display a green Wi-Fi icon, indicating the tablet is connected to the VCMI device.
10. Tap the connected device listing again to disconnect it.
11. Tap **Back** on the top left to return to the MaxiSys Job Menu.

---

 **NOTE**

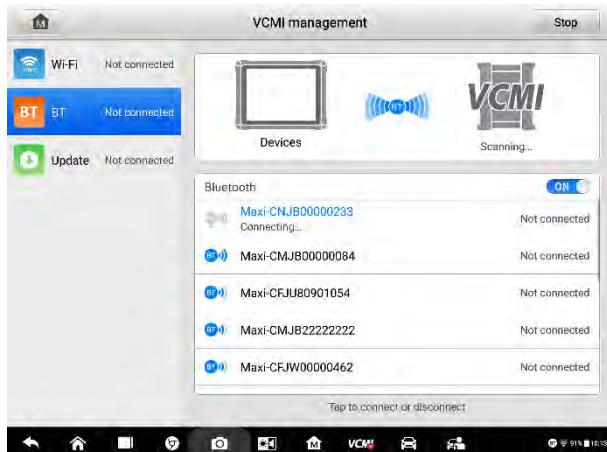
To ensure quick connection, please perform this operation in a steady network environment.

---

## 13.2 BT Pairing

---

BT Paring is the basic way for wireless connection. The VCMI device needs to be either connected to a vehicle or to an available power source, so that it is powered up during the synchronization procedure. Make sure the tablet has a charged battery or is connected to an AC/DC power supply.



**Figure 13-2 Sample BT Pairing Screen**

➤ **To pair the VCMI device with the tablet**

1. Power on the tablet.
2. Connect the 26-pin end of the data cable to the VCMI's vehicle data connector.
3. Connect the 9-pin end of the data cable to the vehicle data link connector (DLC).
4. Tap **VCMI Manager** on the MaxiSys Job Menu of the tablet.
5. Select **BT**, short for Bluetooth, from the connection mode list.
6. Tap the Bluetooth toggle to turn it **ON**. Tap **Scan** at the top right corner. Now the device starts searching for available pairing units.
7. Depending on the VCMI type you use, the device name may display as Maxi suffixed with a serial number. Select the required device for pairing.
8. When pairing is successfully done, the connection status displayed to the right of the device name is shown as **Connected**.
9. Wait a few seconds, and the VCMI button on the system Navigation bar at the bottom of the screen shall display a green tick icon, indicating the tablet is connected to the VCMI device.
10. Tap the connected device listing again to disconnect it.
11. Tap **Back** on the top left to return to the MaxiSys Job Menu.

---

**NOTE**

A VCMI device can be paired to only one tablet each time, and once it's been paired, the device will not be discoverable for any other unit.

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## 13.3 Update

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The Update module provides the latest update for the MaxiSys Ultra tablet. Before update the VCMI software, please make sure the tablet network connection is stable.



Figure 13-4 Sample VCMI Update Screen

➤ **To update the VCMI device software**

1. Power on the tablet.
2. Connect the VCMI device to the tablet via USB.
3. Tap **VCMI Manager** on the MaxiSys Job Menu of the tablet.
4. Select **Update** from the connection mode list.
5. The current version and the latest version of the VCMI software will be displayed after a few seconds, click **Update Now** to update the VCMI software if available.

# 14 ADAS

Advanced Driver Assistance Systems (ADAS) is an array of vehicle systems that aid the driver either through passive alerts or by active control of the vehicle to drive safer and with greater awareness and precision.

Cameras, sensors, ultrasound, radar and LIDAR are some of the systems used to capture the driving environment data, including travelling or static vehicles position, pedestrian location, road sign, driving lane and intersection detection, road (curves) and driving conditions (poor visibility or evening driving), use that information to instruct the vehicle to take its predetermined action. Cameras, sensors and sensing systems are typically located in front and rear bumpers, windshield, front grill and side and rear view mirrors.

Autel ADAS Calibration Tool provides comprehensive and precise ADAS calibration.

1. Covers many vehicle makes, including Benz, BMW, Audi, VW, Porsche, Infiniti, Lexus, GM, Ford, Volvo, Toyota, Nissan, Honda, Hyundai, and Kia.
2. Supports the calibration of multiple driver assistant systems, including Adaptive Cruise Control (ACC), Night Vision System (NVS), Lane Departure Warning (LDW), Blind Spot Detection (BSD), Around View Monitoring (AVM), Rear Collision Warning (RCW) and Heads-up Displays (HUD).
3. Supplies graphic illustrations and step-by-step instructions.
4. Provides demos to guide the technician through the calibration.



Figure 14-1 Sample ADAS Introduction Page

# 15 Support

This application launches the Support platform which synchronizes Autel's online service base station with the MaxiSys display tablet. In order to synchronize the device to your online account, you need to register the product through the Internet when you use it for the first time. The Support application is connected to Autel's service channel and online communities that provides the quickest way for problem solutions, allowing you to submit complaints or send help requests to obtain direct service and support.

## 15.1 Product Registration

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In order to get access to the Support platform and obtain update and other services from Autel, you are required to register the MaxiSys Diagnostic Device the first time you use it.

➤ **To register the diagnostic device**

1. Visit the website: <http://pro.autel.com>.
2. If you have an Autel account, Sign In with your account ID and password.
3. If you are a new member to Autel, click on the **Create Autel ID** button on the left side to create an ID.
4. Enter the required information in the input fields, and click **Get Verification Code** button to get the verification code for email validation.
5. The online system will automatically send a verification code to the registered email address. Input the code in the Verification Code field and fill in the other input fields, read through Autel's Terms and Conditions and click on **Agree**, and then click **Create Autel ID** at the bottom. A product registration screen will display.
6. The device's serial number and password is located in the **About** section of the Settings application on the tablet.
7. Select your product model, enter the product serial number and password on the Product Registration screen, and click **Submit** to complete the registration procedure.

## 15.2 Support Screen Layout

The Support application interface is navigated by the Home Button on the top navigation bar.

- Home Button – returns to the MaxiSys Job Menu.

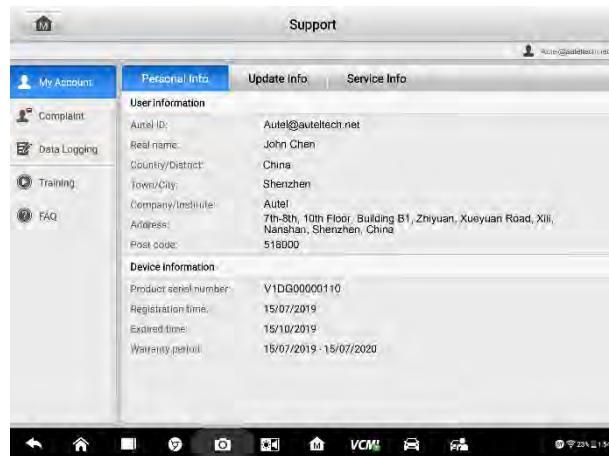


Figure 15-1 Sample Support Application Screen

The main section of the Support screen is divided into two sections. The narrow column on the left is the main menu; selecting one subject from the main menu displays the corresponding functional interface on the right.

## 15.3 My Account

The My Account screen displays the comprehensive information of the user and the product, which is synchronized with the online registered account, including User Info, Device Info, Update Info and Service Info.

### 15.3.2 Personal Info

The User Info and Device Info are both included under the Personal Info section.

- User Info – displays detailed information of your registered online Autel account, such as your Autel ID, Name, Address and other contact information.
- Device Info – displays the registered product information, including the Serial Number, Registration Date, Expire Date, and Warranty Period.

## 15.3.2 Update Info

The Update Info section displays a detailed record list of the product's software update history, including the product serial number, software version or name, and the update time.

## 15.3.3 Service Info

The Service Info section displays a detailed record list of the device's service history information. Every time the device has been sent back to Autel for repair, the device's serial number and the detailed repair information, such as the fault type, changed components, or system reinstallation will be recorded and updated to the associated online product account that will be synchronized to the Service Info section.

# 15.4 User Complaint

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The User Complaint screen allows you to establish a new complaint case, as well as to view historical complaint records.

## 15.4.1 Screen Layout

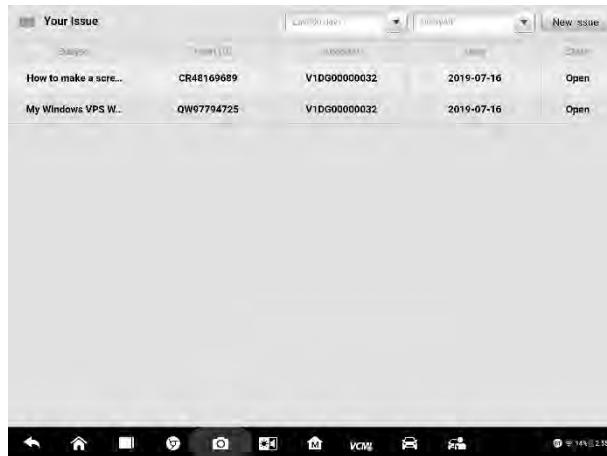


Figure 15-2 Sample Complaint Screen

### Complaint List

The complaint list normally displays all the complaint records of all time and all status by default. The summary information for each complaint item includes the

Subject Name, Ticket ID, User's Account ID, Date, and the Case Status.

There are two kinds of the case status:

- Open – indicates the complaint case has been started but not processed yet
- Closed – indicates the complaint case has been processed, solved, and ended

➤ **To establish a new complaint session**

1. Register the product online.
2. Tap **Support** on the MaxiSys Job Menu. The device information is automatically synchronized with the online account.
3. Tap **Complaint** on the Main Menu.
4. Tap **New Issue** at the upper right corner. A selection menu with a category of service channels displays.
5. Select your target service channel and click **Next** to continue. A standard complaint form displays, on which you are allowed to enter detailed information, such as personal information, vehicle information, and device information, you can also attach image or PDF files with the form.
6. Enter in each input field the appropriate information. To settle the complaint more efficiently, it is recommended to complete the form with as much as detail as possible.
7. Select the required processing time on the last section according to the urgency of the case.
8. Tap **Submit** to send the completed form to Autel's online service center. The submitted complaints will be carefully read and handled by the service personnel.

## **15.5 Data Logging**

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The Data Logging section keeps records of all **Feedback** (submitted), **Not Feedback** (but saved) or **History** (up to the latest 20 test records) data loggings on the diagnostic system. The support personnel will receive and process the submitted reports through the Support platform. The solution will be sent back within 48 hours. You may continue to correspond with Support until the issue is resolved.



**Figure 15-3 Sample Data Logging Screen**

➤ **To make a reply in a Data Logging session**

1. Tap on the **Feedback** tag to view the list of submitted data loggings.
2. Select the latest message from Support.
3. Tap on the input field on the bottom of the screen, and enter your reply. Or tap the Audio button to record a voice message, or tap the camera button to take a screenshot.
4. Tap **Send** to deliver your message to Support.

## 15.6 Training Channels

The Training section provides quick links to Autel's online video accounts. Select a video channel by language to see all available Autel online tutorial videos on such topics as product usage techniques and vehicle diagnostics practices.

## 15.7 FAQ Database

The FAQ section provides you comprehensive and abundant references for all kinds of questions frequently asked and answered about the use of Autel's online member account, and shopping and payment procedures.

- Account – displays questions and answers about the use of Autel's online user account.
- Shopping & Payment – displays questions and answers about online product purchase and payment methods or procedures.

# 16 Remote Desk

The Remote Desk application launches the TeamViewer Quick Support program, which is a simple, fast and secure remote control interface. You can use the application to receive ad-hoc remote support from Autel's support center, colleagues, or friends, by allowing them to control your MaxiSys tablet on their PC via the TeamViewer software.

## 16.1 Operations

If you think of a TeamViewer connection as a phone call, the TeamViewer ID would be the phone number under which all TeamViewer Clients can be reached separately. Computers and mobile devices that run TeamViewer are identified by a globally unique ID. The first time the Remote Desk application is started, this ID is generated automatically based on the hardware characteristics and will not change.

Make sure the tablet is connected to the Internet before launching the Remote Desk application, so that the tablet is able to receive remote support from the third party.

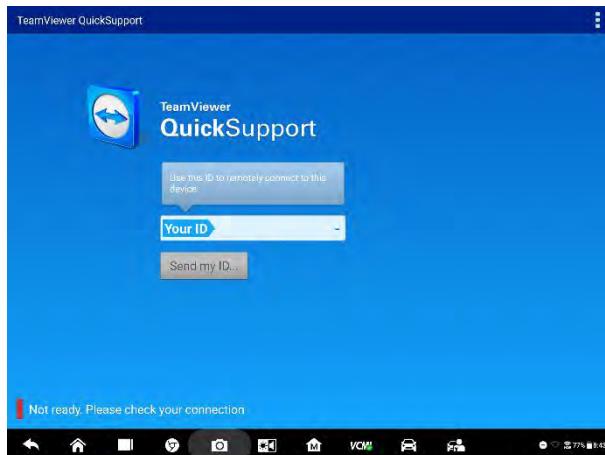


Figure 16-1 Sample Remote Desk Screen

- **To receive remote support from a partner**
  1. Power on the tablet.
  2. Tap the **Remote Desk** application on the MaxiSys Job Menu. The

TeamViewer interface displays and the device ID is generated and shown.

3. Your partner must install the Remote Control software to his/her computer by downloading the TeamViewer full version program online (<http://www.teamviewer.com>). Start the software on his/her computer at the same time, in order to provide support and take control of the tablet remotely.
4. Provide your ID to the partner, and wait for him/her to send you a remote control request.
5. A message displays to ask for your confirmation to allow remote control on your device.
6. Tap **Allow** to accept, or tap **Deny** to reject.

Refer to the associated TeamViewer documents for additional information.

# 17 Quick Link

The Quick Link application provides you with convenient access to Autel's official website and many other well-known sites in automotive service, which offers you abundant information and resources, such as technical help, knowledge base, forums, training, and expertise consultations.

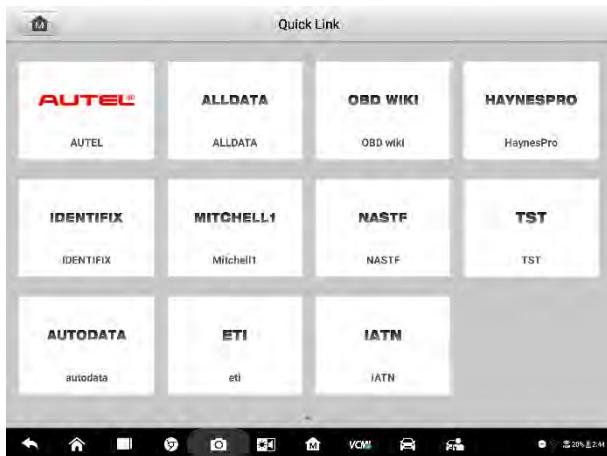


Figure 17-1 Sample Quick Link Screen

➤ **To open a quick link**

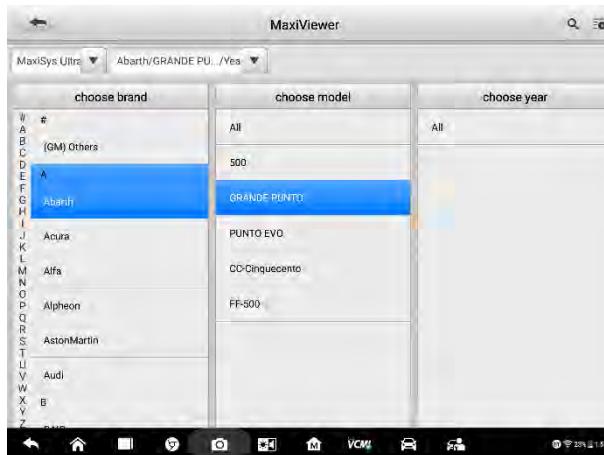
1. Tap **Quick Link** on the MaxiSys Job Menu. The Quick Link application screen displays.
2. Select a website thumbnail from the main section. The Chrome browser is launched and the selected website is opened.
3. Now you can start exploring the website!

# 18 MaxiViewer

The MaxiViewer allows you to search the functions supported by our tools and the version information. There are two ways of searching, either by searching the tool and the vehicle or searching the functions.

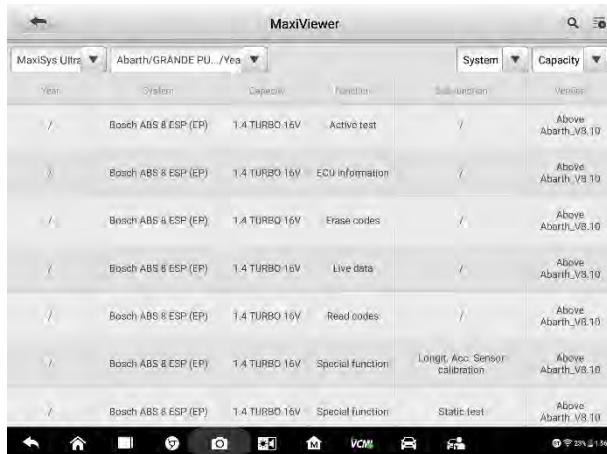
## ➤ To search by the vehicle

1. Tap the MaxiViewer application on the MaxiSys Job Menu. The MaxiViewer application screen displays.
2. Tap the tool name on the top left to drop down the tool list, tap the one you want to search.
3. Tap the vehicle brand, model, and year you want to search.



**Figure 18-1 Sample Function Viewer Screen 1**

4. All the functions support by the selected tool for the selected vehicle displays within three columns, function, sub function, and version.



**Figure 18-2 Sample Function Viewer Screen 2**

➤ **To search by the functions**

1. Tap the MaxiViewer application on the MaxiSys Job Menu. The MaxiViewer application screen displays.
2. Tap the tool name on the top left to drop down the tool list, tap the one you want to search.
3. Type in the function you want to search to the top right search column. All the vehicles with this function will be listed with 8 columns, the Brand, Model, Year, System, Sub system, Function, Sub function, and Version.



**NOTE**

Fuzzy search is supported, type in part of the function you want to search can also find you all the related.

# 19 MaxiVideo

The MaxiVideo application configures the MaxiSys Diagnostic Device to operate as a digital video scope by simply connecting the tablet to a Digital Inspection Camera. This function allows you to examine difficult-to-reach areas normally hidden from sight, with the ability to record digital still images and videos, which offers you an economical solution to inspect machinery, facilities, and infrastructure in a safe and quick way.

## **WARNINGS & IMPORTANTS:**

Follow these instructions to reduce the risk of injury from electric shock, entanglement and other causes and prevent tool damage.

- Do not place the image head and cable into anything or anywhere that may contain a live electric charge or moving parts, which increases the risk of electric shock or entanglement injuries.
- Do not use the image head cable to modify surroundings, clear pathways or clogged areas.
- When inspection is completed, carefully withdraw the imager head cable from the inspection area.
- The image head cable are waterproof to a depth of 3m (10'), greater depths may cause leakage into the imager head cable and cause electric shock or damage the tool.
- The working temperature of the imager head is between 32 °F (0 °C) and 113 °F (45 °C).

### **Check-Ups:**

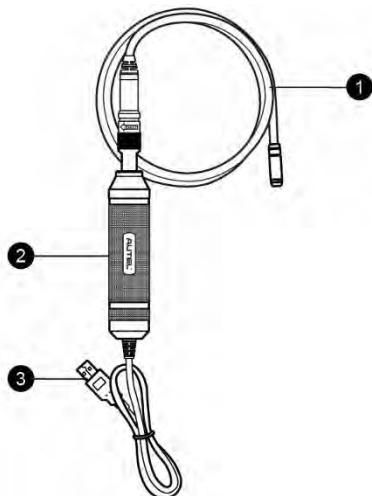
- ✓ **FOR AUTOMOBILES:** Ensure the automobile is not running during inspection. Metal and liquid under the hood may be hot. Don't get oil or gas on the imager head.
- ✓ **FOR PIPES:** If you suspect a metal pipe could contain an electric charge, have a qualified electrician to check the pipe before using.
- ✓ **FOR WALLS:** For inspecting the inside walls, be sure to shut off the circuit breaker to the whole house before using the tool.
- ✓ **WORK AREA:** Ensure the work area has sufficient light.

## 19.1 Additional Accessories

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The Digital Inspection Camera and its fittings are the additional accessories. Both sizes (8.5 mm and 5.5 mm) of the imager head are optional and available for purchase along with the standard MaxiSys tool kit.

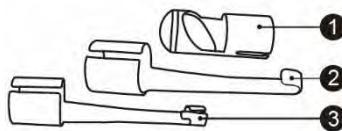
### 19.1.1 Digital Inspection Camera



**Figure 19-1 Digital Inspection Camera**

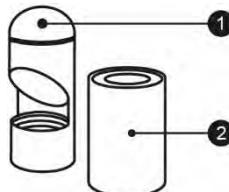
1. Removable Imager Head Cable – connects to the tool when performing digital inspections for image and video viewing.
2. Handgrip – ergonomically designed handle for comfortable grips and agile operation.
3. USB Cable – connects the Digital Inspection Camera to MaxiSys tablet.

## 19.1.2 Imager Head Accessories



**Figure 19-2 8.5mm Imager Head Accessories**

1. Magnet – picks up small metal objects, such as dropped rings or screws.
2. Hook – unclogs obstacles and picks up wires in the pipes or confined areas.
3. Mirror – helps to look around corners and see the unreachable areas.



**Figure 19-3 5.5mm Imager Head Accessories**

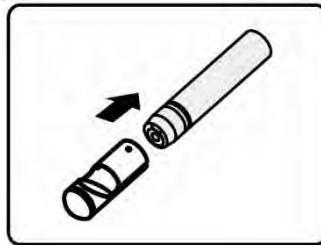
1. Mirror – helps to look around corners and see the unreachable areas.
2. Magnet – picks up small metal objects, such as dropped rings or screws.

## 19.1.3 Accessory Assembly

### 19.1.3.1 For 8.5mm Imager Head

The three accessories, including the Magnet, Hook, and Mirror, can be attached to the Imager Head with the same manner described below:

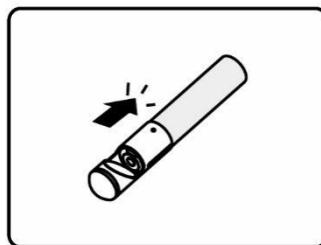
1. Hold the accessory and the imager head.



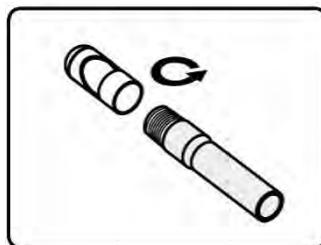
2. Slip the end of the accessory over the imager head and then fix the accessory.

#### 19.1.3.2 For 5.5mm Imager Head

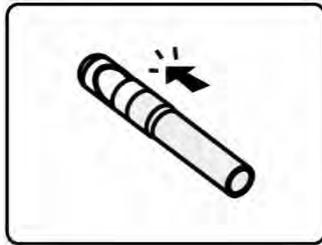
The two accessories, including the Magnet and Mirror, can be attached to the Imager Head with the same manner described below:



1. Hold the accessory and the imager head.



2. Screw the thread part of the accessory over the imager head to fix the accessory.



### 19.1.4 Technical Specifications

Table 19-1 *Specifications*

Item	Description
<b>Optimal Viewing Distance</b>	1" to 14" (2.54cm to 35.56cm) with 8.5mm diameter imager head 3/8" to 12" (0.95cm to 30cm) with 5.5mm diameter imager head
<b>Image Capture</b>	JPG images (640x480) AVI videos (320 x 240)
<b>Operating Temperature</b>	Main Unit: 0°C to 55°C (ambient) Cable: -10°C to 70°C
<b>Storage Temperature</b>	-20°C to 75°C (ambient)
<b>Waterproof</b>	Imager head and cable to 1m
<b>Weigh</b>	0.3 kg with 8.5 mm diameter imager head 0.2 kg with 5.5 mm diameter imager head

## 19.2 Operations

Before performing the Digital Inspection application, the Imager Head Cable must be connected to the tablet through the USB port. Install the correct imager head accessories for use in the appropriate application.

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 **NOTE**

When in operation, the imager head cable can be bent into a certain shape. This may help you operate the cable into confined areas.

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➤ **To take pictures using the Digital Inspection application**

1. Connect the Imager Head Cable to the USB port on the top side of the tablet.
2. If not already done, power up the tablet.
3. Tap the **Digital Inspection** application on the MaxiSys Job Menu. The Digital Inspection application interface displays, showing a camera operating screen. The default camera is now the Imager head.
4. Select the **camera** icon at the lower right corner to take photos.
5. Focus the image to be captured in the view finder by adjusting and properly locating the imager head cable.
6. Tap the blue ring on the operating screen. The view finder now displays the captured picture and auto-saves the taken photo.
7. Tap the thumbnail image on the top right corner of the screen to view the stored image, slide the screen left and right to view the images one by one.
8. Tap on the selected image and the edit toolbar instantly displays.
9. Tap the appropriate button to **share**, **delete**, or **edit** the image.
10. Tap the **Back** or **Home** button on the Navigation bar at the bottom of the screen to exit the Digital Inspection application.

➤ **To record a video using the Digital Inspection application**

1. Connect the Imager Head Cable to the USB port on the top side of the tablet.
2. If not already done, power up the tablet.
3. Tap the **Digital Inspection** application on the MaxiSys Job Menu. The Digital Inspection application interface displays, showing a camera operating screen. The default camera is now the Imager head.
4. Select the **video** icon at the lower right corner to record a video.
5. Properly locate the imager head cable to focus the inspection scene for recording.
6. Tap the red ring on the operating screen to start recording.
7. Tap the red circle again to stop recording. The recorded video is automatically saved to the system Gallery.
8. Tap the thumbnail image on the top right corner to review the recorded video.
9. Tap the **Play** button to play the video.
10. Tap on the selected video and the edit toolbar instantly displays.
11. Tap the appropriate button to **share**, **delete**, or **edit** the video.
12. Tap the **Back** or **Home** button on the Navigation bar at the bottom of the screen to exit the Digital Inspection application.

➤ **To configure various settings for the work mode of the imager head**

1. Tap  button at the bottom edge of the circle.
2. Select each item to make appropriate adjustments.

For more tips and detailed information about the camera application, please refer to associated Android documentations.

# 20 MaxiMall

MaxiMall is an online mall that accesses to purchase MaxiSys software subscription updates, together with other value-added services.

## 20.1 Operations

MaxiMall opens a channel through which users can access subsequent software support and function additions for specific devices. This application, to some extent, lengthens the effective lifespan of Autel MaxiSys Ultra.

### 20.1.1 MaxiMall Layout

The MaxiMall application is easy to access. Tap the **MaxiMall** icon, then enter the homepage of MaxiMall.

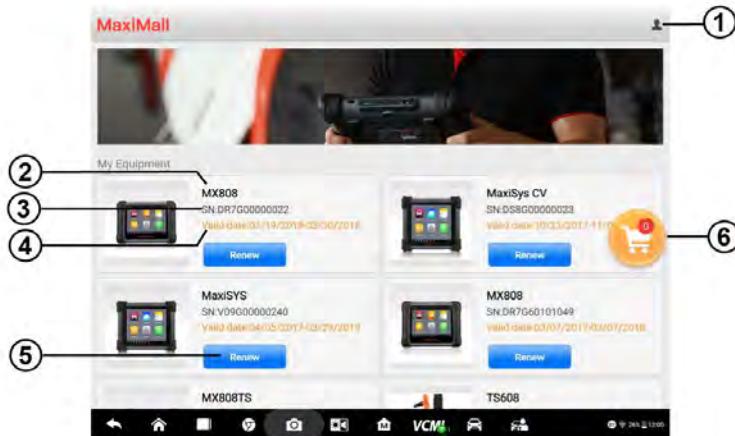


Figure 20-1 Sample MaxiMall Layout Screen

Pay attention to the important buttons and information that should not be missed before further operation.

1. **Personal center** - shows your account information and previous orders on the

- MaxiMall application.
2. **Product name** - displays the name and model of the Autel device you own
  3. **SN number** - shows the serial number of each device for identification.
  4. **Valid date** - reminds you of the effective period of the MaxiSys Ultra software before a new version is launched.
  5. **Blue box** - provides conditional access to new software services or valid-added services for specific devices. (For example, tap the **Renew**, you will see a list of options, as Figure 20-2 shows.)



Figure 20-2 Sample Software Buy Screen

6. **Shop Cart** - provides a storing basket for adding products that you want to buy.

## 20.1.2 Operation Procedure

Follow the procedure below to make an order.

1. Tap the **Renew** button as shown in the *Figure 20-1*.
2. Select the software type you need from the list (*Figure 20-2*). Add them to your shop cart.
3. Tap the **Shop Cart** icon on the right side to enter the **Shop Cart** page.
4. Tap the check box before the item you want to purchase, tap **Select all** if you want to buy all the items. After that, tap the blue **Settlement** button to proceed.
5. In the **Order Details** page, check your personal information, such as Nick Name,

Phone Number, Address, and the most important, the total cost. Then tap **Submit Order** after you confirm them (**Figure 20-3**).



Figure 20-3 Sample Order Details Screen

### 20.1.3 Personal Center

**Personal Center** is a crucial module for dealing with your orders. On the top of **Personal Center**, the personal information is matched with your Autel ID. Please check and ensure that the information is valid and true.



Figure 20-4 Sample Personal Center Screen

The following three entries are **My Equipment**, **My Order**, and **Software update** respectively. Among them, **My Equipment** shows the devices you already possess; **Software update** shows MaxiMall application updates available; **My Order** leads to a list of your orders in different states.

If you want to exit the login, please tap the red button **Exit Login** in the lower right corner.

## 20.1.4 My Order

Tap the right pointing arrow in the **My Order** entry to enter the **My Order** page with four tabs at the top.

### 20.1.4.1 All Orders

Choose the **All** tab, and you will see all the orders in **Completed** or **Incompleteness** status.

Each order starts with the Order Number and Product name and on the right side of each order, there are order status, price, total number of items, and total cost. The blue button in the lower right corner corresponds with the order status.

For completed orders, the button shows Details; for uncompleted orders, there are two buttons - **Cancel** in grey and **Settlement** in blue.



Figure 20-5 Sample My Order Screen 1

### 20.1.4.2 Incompleteness

Choose the **Incompleteness** tab, and you will see orders that are not completed. You can tap either **Cancel** or **Settlement** to perform further operations.



Figure 20-6 Sample My Order Screen 2

#### 20.1.4.3 Completed

Choose the **Completed** tab, and you will see your finished orders. For detailed information, press the **Details** button.



Figure 20-7 Sample My Order Screen 3

#### 20.1.4.4 Lapse

The **Lapse** tab page contains orders that are aborted or canceled in the process.



Figure 20-8 Sample My Order Screen 4

# **21 Maintenance and Service**

To ensure that the tablet and the combined VCMI unit perform at their optimum level, we advise that the product maintenance instructions covered in this section is read and followed.

## **21.1 Maintenance Instructions**

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The following shows how to maintain your devices, together with precautions to take.

- Use a soft cloth and alcohol or a mild window cleaner to clean the touch screen of the tablet.
- Do not use any abrasive cleansers, detergent, or automotive chemicals to the tablet.
- Maintain the devices in dry conditions and keep them within normal operating temperatures.
- Dry your hands before using the tablet. The touch screen of the tablet may not work if the touch screen is moist, or if you tap the touch screen with wet hands.
- Do not store the devices in humid, dusty or dirty areas.
- Check the housing, wiring, and connectors for dirt and damage before and after each use.
- At the end of each work day, wipe the device housing, wiring, and connectors clean with a damp cloth.
- Do not attempt to disassemble your tablet or the VCMI unit.
- Do not drop or cause severe impact to the devices.
- Use only authorized battery chargers and accessories. Any malfunction or damage caused by the use of unauthorized battery charger and accessories will void the limited product warranty.
- Ensure that the battery charger does not come in contact with conductive objects.
- Do not use the tablet beside microwave ovens, cordless phones and some medical or scientific instruments to prevent signal interference.

## **21.2 Troubleshooting Checklist**

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- A. When the tablet does not work properly:

- Make sure the tablet has been registered online.
  - Make sure the system software and diagnostic application software are properly updated.
  - Make sure the tablet is connected to the Internet.
  - Check all cables, connections, and indicators to see if the signal is being received.
- B. When battery life is shorter than usual:
- This may happen when you are in an area with low signal strength. Turn off your device if it is not in use.
- C. When you cannot turn on the tablet:
- Make sure the tablet is connected to a power source or the battery is charged.
- D. When you are unable to charge the tablet:
- Your charger maybe out of order. Contact your nearest dealer.
  - You may be attempting to use the device in an overly hot/cold temperature. Charge the device in a cooler or warmer area.
  - Your device may have not been connected to the charger properly. Check the connector.

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 **NOTE**

If the problems persist, please contact Autel's technical support personnel or your local selling agent.

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## **21.3 About Battery Usage**

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Your tablet is powered by a built-in Lithium-ion Polymer battery. This means that, unlike other forms of battery technology, you can recharge your battery while some charge remains without reducing your tablet's autonomy due to the "battery memory effect" inherent in those technologies.

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 **DANGER**

The built-in Lithium-ion Polymer battery is factory replaceable only; incorrect replacement or tampering with the battery pack may cause an explosion.

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- Do not use a damaged battery charger.
- Do not disassemble or open, crush, bend or deform, puncture or shred.
- Do not modify or remanufacture, attempt to insert foreign objects into the battery, expose to fire, explosion or another hazard.

- Use only the included charger and USB cables. Failure to use Autel-authorized charger and/or USB cables, may result in device malfunction or failure.
- Use of an unqualified battery or charger may present a risk of fire, explosion, leakage, or another hazard.
- Avoid dropping the tablet. If the tablet is dropped, especially on a hard surface, and the user suspects damage, take it to a service center for inspection.
- The closer you are to your network's wireless router, the longer your tablet usage time because less battery power is consumed for the connection.
- The battery recharging time varies depending on the remaining battery capacity.
- Battery life inevitably shortens over time.
- Since overcharging may shorten battery life, remove the tablet from its charger once it is fully charged. Unplug the charger, once charging is complete.
- Leaving the tablet in hot or cold places, especially inside a car in summer or winter, may reduce the capacity and life of the battery. Always keep the battery within normal temperatures.

## 21.4 Service Procedures

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This section introduces information for technical support, repair service, and application for replacement or optional parts.

### 21.4.1 Technical Support

If you have any question or problem on the operation of the product, please contact us.

#### AUTEL NORTH AMERICA

- **Phone:** 855-AUTEL-US (855-288-3587) Monday-Friday 9am-6pm EST
- **Website:** [www.autel.com](http://www.autel.com)
- **Email:** [ussupport@autel.com](mailto:ussupport@autel.com)
- **Address:** 175 Central Avenue, Suite 200, Farmingdale, New York, USA 11735

#### AUTEL EUROPE

- **Phone:** 0049 (0) 61032000522
- **Website:** [www.autel.eu](http://www.autel.eu)
- **Email:** [sales.eu@autel.com](mailto:sales.eu@autel.com), [support.eu@autel.com](mailto:support.eu@autel.com)
- **Address:** Robert-Bosch-Strasse 25, 63225, Langen, Germany

## AUTEL CHINA HQ

- **Phone:** 0086-755-86147779
- **Website:** [www.autel.com](http://www.autel.com)
- **Email:** [support@autel.com](mailto:support@autel.com)
- **Address:** 7th, 8th, 10th floor, Building B1, Zhiyuan, Xueyuan Road, Xili, Nanshan, Shenzhen, 518055, China.

## AUTEL SOUTH AMERICA

- **Phone:** (+507) 308-7566
- **Website:** [www.autel.com/es](http://www.autel.com/es)
- **Email:** [sales.latin@autel.com](mailto:sales.latin@autel.com), [latsupport@autel.com](mailto:latsupport@autel.com)
- **Address:** Office 103, Building 3845, International Business Park, Veracruz, Panamá Pacífico, Panamá

## AUTEL AUSTRALIA

- **Phone:** 03 9480 2978 / +61 476293327
- **Website:** [www.autel.com.au](http://www.autel.com.au)
- **Email:** [sales@autel.com.au](mailto:sales@autel.com.au)
- **Address:** 155 Islington Street, Melbourne, Collingwood, VIC 3066

For technical assistance in other markets, please contact your local selling agent.

### 21.4.2 Repair Service

If it becomes necessary to return your device for repair, please download the repair service form from [www.autel.com](http://www.autel.com), and fill in the form. The following information must be included:

- Contact name
- Return address
- Telephone number
- Product name
- Complete description of the problem
- Proof-of-purchase for warranty repairs
- Preferred method of payment for non-warranty repairs

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**NOTE**

For non-warranty repairs, payment can be made with Visa, Master Card, or with approved credit terms.

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**Send the device to your local agent, or to the below address:**

7th, 8th, 10th Floor, Building B1, Zhiyuan,

Xueyuan Road, Xili, Nanshan,

Shenzhen, 518055, China

### **21.4.3 Other Services**

You can purchase the optional accessories directly from Autel's authorized tool suppliers, and/or your local distributor or agent.

Your purchase order should include the following information:

- Contact information
- Product or part name
- Item description
- Purchase quantity

# 22 Compliance Information

## FCC Compliance

**FCC ID: WQ8MAXISYSULTRA**

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.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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

## SAR

The radiated output power of this device is below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact is minimized during normal operation.

The exposure standard for wireless devices employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/Kg. Tests for SAR are conducted using standard operating positions accepted by the FCC with

the device transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the device while operating can be well below the maximum value. This is because the device is designed to operate at multiple power levels so as to use only the power required to reach the network. To avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to antenna should be minimized.

# 23 Warranty

## 23.1 12-Month Limited Warranty

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Autel Intelligent Technology Corp., Ltd. (the Company) warrants to the original retail purchaser of this MaxiSys Diagnostic 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 twelve (12) months 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:*

- a) Products subjected to abnormal use or conditions, accident, mishandling, neglect, unauthorized alteration, misuse, improper installation or repair or improper storage;
- b) Products whose mechanical serial number or electronic serial number has been removed, altered or defaced;
- c) Damage from exposure to excessive temperatures or extreme environmental conditions;
- d) Damage resulting from connection to, or use of any accessory or other product not approved or authorized by the Company;
- e) Defects in appearance, cosmetic, decorative or structural items such as framing and non-operative parts.
- f) 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. You should create a back-up copy of any contents of your product before delivering the product for warranty service.

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