

Precautions on Operating Vehicle's ECU

- Do not disconnect the vehicle inner consumer when the ignition switch is on. High voltage transients may encounter at the moment of disconnecting, which may damage the sensors and the ECU.
- Protect the computer from magnetic object (such as wireless speaker).
- Do not cut off the power supply of ECU system before welding on the vehicle.
- Pay more attention to the ECU and the sensors when the operation is next to them.
- Ground yourself when you disassemble PROM, otherwise ECU and sensors will be damaged by static electricity.
- Do not use the pointer ohmmeter instead of DMM to test the ECU and the sensor without special requirement.
- Do not test electric devices in relation with ECU with a test lamp unless otherwise expressly provided.
- Do wear a metal ground strip that one end around your wrist and the other to the vehicle body when you get in and out the vehicle.
- Do not connect ECU harness connector firmly, otherwise electro elements, such as IC inside ECU, will be damaged.

Precaution on Operation

- The appliance is a sophisticated electronic device, never have it clashed when in use.
- Make sure the appliance is properly connected to the DLC to avoid communication interruptions. During operation, keep the screen upward and leveled.
- Don't disconnect the wire network or Wi-Fi network while software updating or sending E-mail, otherwise, it will be interrupted.
- After the operation, the stylus shall be inserted into the hole on the back of the main unit, and put away the cable and connector, etc accessories to the box to avoid the lost.
- Handle with care. Avoid collision. Unplug the power after operation.

Safety Precautions



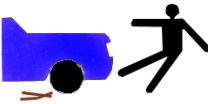
- Automotive batteries contain sulfuric acid that is harmful to skin. In operation, direct contact with the automotive batteries should be avoided. Pay attention not to splash the sulfuric acid into eyes. Keep the ignition sources away from the battery at all times.



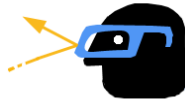
- Engines produce various poisonous compounds (hydrocarbon, carbon monoxide, nitrogen oxides, etc.) which should be avoided. The vehicles shall be tested in a well-ventilated area.



- Avoid contacting high temperature assembly such as water tank and vent-pipe as the temperature of the running engine is very high.



- Before starting engine, put the speed lever in the neutral position or in the P position to avoid injury.



- Wear an ANSI-approved eye shield when testing or repairing vehicles.



- If you use the battery as a power source, connect the RED (+) battery clip to the positive of the vehicle battery and the BLACK (-) battery clip to the negative.

Contents

1. FOREWORD	1
1.1 PRODUCT SUMMARY	1
1.2 PRODUCT FEATURES.....	1
1.3 PRODUCT FUNCTIONS	1
1.4 TECHNICAL SPECIFICATIONS	2
2. ABOUT X-431GDS	3
2.1 X-431 GDS MAIN SET	3
2.1.1 <i>Composition</i>	3
2.1.2 <i>Structure</i>	4
2.2 X-431 GDS COMMON ACCESSORIES	8
2.3 <i>First operation</i>	9
2.3.1 <i>Turn on</i>	9
2.3.2 <i>Icons and function items</i>	9
2.3.3 <i>System Settings</i>	10
3. HOW TO DIAGNOSE	27
3.1 PREPARATION AND CONNECTIONS	27
3.1.1 <i>Preparation</i>	27
3.1.2 <i>X-431 GDS connections</i>	27
3.2 START DIAGNOSING	27
3.2.1 <i>How to start diagnostic program</i>	27
3.3 HOW TO DIAGNOSE	32
3.3.1 <i>Read trouble code</i>	33
3.3.2 <i>Clear trouble code</i>	34
3.3.3 <i>Read data stream</i>	35
3.3.4 <i>Special Function</i>	38
3.3.5 <i>Driving record management</i>	40
3.4 FLOW CHART FOR ENTERING DIAGNOSTIC PROGRAM	43
4. HEAVY-DUTY DIAGNOSIS PLATFORM	44
5. BROWSER	45
6. INFORMATION	47
6.1 NEWS	47

6.2 SOFTWARE DOWNLOAD INFORMATION.....	49
7. MAILBOX	51
7.1 READ MAIL	51
7.2 NEW MAIL	52
8. UPDATE	54
8.1 REGISTER.....	54
8.2 UPDATE.....	56
9. OPTIONAL FUNCTIONS BRIEF FOR X-431 GDS.....	60
9.1 OSCILLOSCOPE.....	60
9.2 IGNITION.....	61
9.3 SENSOR	61
9.4 MULTIMETER	62
9.5 BATTERY TEST	62
10. FOA.....	63

1. Foreword

1.1 Product summary

X-431 GDS is a sophisticated and integrated diagnostic product with powerful functions developed by LAUNCH. It features wired network, meanwhile it also supports Wi-Fi communication, which enables you to access Internet, update online, search information anytime and anywhere, and makes X-431 GDS diagnose vehicle trouble more conveniently. It has functions of diagnose, oscilloscope, ignition, sensor, Multimeter, browser and battery test and service functions such as wireless LAN. VGA extending display function is available. As a result, it has strong practicability and high performance-price ratio, which is a helpful assistant for vehicle diagnosis and maintenance.

X-431 GDS is also applicable to HeavyDuty vehicles, depending on whether HeavyDuty diagnosis software is supplied for your product or not.

1.2 Product features

- High performance industrial control computer runs rapidly and stably.
- Wi-Fi communication makes software update and compliant much convenient.
- Inheriting advanced diagnostic functions from X-431 super scanner, it almost can diagnose all vehicles from China, Asia, Europe and America makes, and testing speed is greatly improved.
- Perfect service information, including service documents, service cases etc.

1.3 Product functions

- ◆ Diagnosing: covers a wide range of electrical control systems for any model from Asia, Europe and America makes; Diagnosing and software upgrading keep pace with other products.
- ◆ Wi-Fi connection: easy to make online update, feedback, search service documents and cases online.
- ◆ Browser: users can visit the service websites saved in Favorites. (Inputting website address manually is disabled temporarily)
- ◆ VGA interface available for external display;

- ◆ Ethernet interface for connecting wired network;
- ◆ Extending functions by connecting it to Scopebox, Sensorbox and Batterybox.

1.4 Technical specifications

Operation system:	Windows Embedded Standard
CPU:	32bits CPU
Display:	7" TFT Hi-brightness color touch screen
Main unit power supply:	DC14V
Working temperature:	-10°C~55°C
Vehicle Type:	12V/24V
Built-in hard disk:	8G

2. About X-431GDS

2.1 X-431 GDS Main set

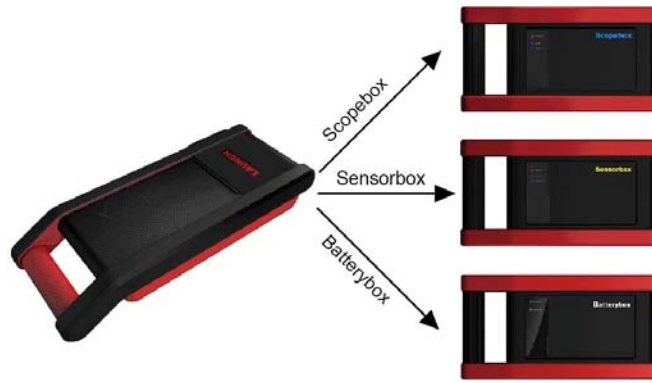


Figure 2-1 X-431 GDS Diagram

2.1.1 Composition

- **Main Unit**
Including display, diagnosing, printing and all standard functions of handheld computer; based on Windows operating system; built-in large capacity hard disk to memorize data; supports Wi-Fi communication.
- **Scopebox (Optional)**
Special Scopebox and ignition analysis functions for vehicles are supplied.
- **Sensorbox (Optional)**
Vehicle sensor analog test and multimeter test are supported.
- **Batterybox (Optional)**
Detects the vehicle battery status and provides inside-the-vehicle and outside-the-vehicle testing modes.

2.1.2 Structure

1. Structure view



Figure 2-2 X-431 GDS Main set structure view

Table 2-1: X-431 GDS terminals and indicators description

No.	Name	Descriptions
1	Handle	Holding or carrying the main unit.
2	SIM slot	Not applied for X-431 GDS.
3	Exhaust vent	For expelling heating to ensure normal temperature of internal parts.
4	VGA terminal	Connect to projector or display.
5	LAN terminal	Connect to wire network with LAN cable.
6	Diagnose terminal	Connect to test cable.
7	USB ports	Connect to USB devices. While connecting function boxes, Scopebox must be connected to the blue USB port.
8	Hard Disk indicator (green)	Indicates diagnosis communication state.
9	Power indicator (red)	Indicates power status.
10	Power connector	Connect to outer power to supply power or charge for main unit.

11	Diagnostic box	Communication module between main unit and vehicle.
12	Printer	Print the displayed results.
13	Power switch	Press to turn on the device and hold pressing to turn off the device.
14	Main display	Color touch screen to display the function interface, touch input or manual input is supported.
15	Air intake vent	Intake air to ensure internal parts temperature normal.

2. Scopebox structure

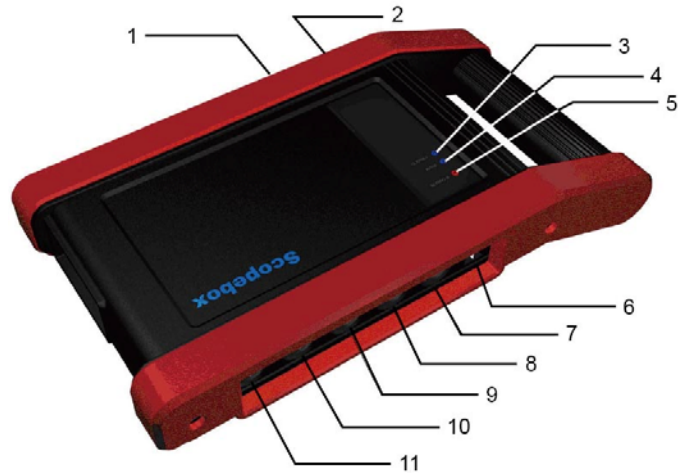


Figure 2-3 Scopebox structure view

Table 2-2: Scopebox terminals and indicators description

No.	Name	Descriptions
1	B type USB port	Connect to main unit with USB cable when it is applied as separated USB device.
2	Power connector	Connect to power supply via the power adaptor.

3	Communication indicator	Blinks green during data communication
4	Operation indicator (green)	Keeps lighting after oscilloscope operated.
5	Power indicator (red)	Keeps lighting after scopebox powered on.
6	1K calibration signal terminals (2 pcs)	One terminal: 1K square wave signal output, 2VP-PVP-P. The other terminal: connect to the ground.
7	CH1	Channel 1
8	CH2	Channel 2
9	CH3	Channel 3
10	CH4	Channel 4
11	External trigger	External trigger signal

3. Sensorbox structure

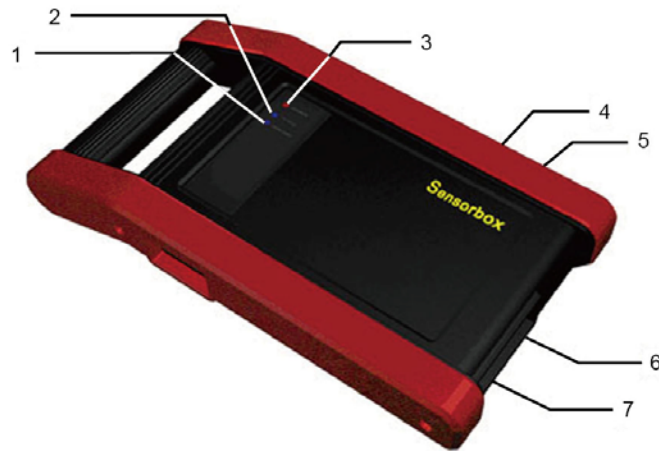


Figure 2-4 Sensorbox structure view

Table 2-3: Sensorbox terminals and indicators description

No.	Name	Description
1	Data receiving indicator	Indicator (green) for receiving data from main unit.
2	Data sending indicator	Indicator (green) for sending data to main unit.
3	Power indicator	It keeps steady on (red) after Sensorbox is powered on.
4	B type USB port	Connect to main unit with USB cable when it is applied as separated USB device.
5	Power connector	Connect to power supply through the power adaptor.
6	COM	Common terminal of multimeter
7	VΩHz	Testing terminal of multimeter

4. Batterybox structure

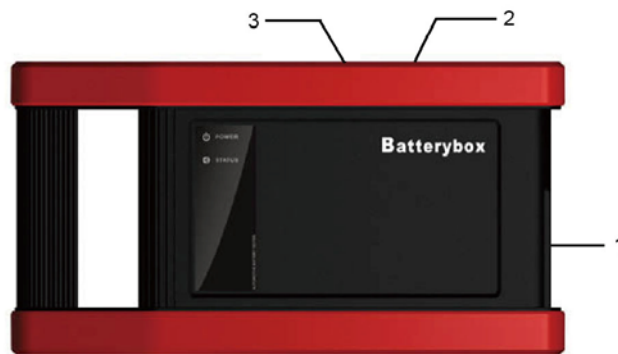


Figure 2-5 Batterybox structure view

Table 2-4: Batterybox terminals and indicators description

No.	Name	Description
1	Battery connector	Connect to battery via cable for testing battery
2	Power connector	Connect to power supply via the power

		adaptor. (unused)
3	B type USB port	Connect to main unit with USB cable when it is applied as separated USB device.

2.2 X-431 GDS Common accessories

Common accessories for each X-431 GDS are same, but for different destinations, the accessories of X-431 GDS (such as diagnostic software, testing connectors) may vary. Please consult from the local agency or check the package list supplied with X-431 GDS together.

Table 2-5: X-431 GDS common accessories and descriptions






No.	Name	Descriptions	View
1	Main test cable	Connect X-431 GDS to vehicle's DLC.	
2	Diagnostic connector	Connect to vehicle's DLC. Several different testing connectors are included for each X-431 GDS.	
3	Cigarette lighter power cable	Obtain power supply from vehicle's cigarette lighter.	
4	Power adaptor	Convert 100~240V AC power supply to 14V DC power supply.	
5	Stylus	For clicking or writing on the screen.	
6	Accessories	Including User's Manual, Service Manual etc.	



Figure 2-6

Note: Hold and press the [Power Switch] button for 6~8 seconds to turn off the main unit, but this is not recommended, please click [Exit system] icon on the main menu to turn off the device.



Figure 2-7

2.3 First operation

2.3.1 Turn on

Press the [Power Switch] button on the main unit, the system will begin to initialize, as shown in Figure 2-6.

After the system completes initializing, the main menu shown as Figure 2-7 will appear on the screen. Here you can select a certain function and operate it.



Figure 2-8

2.3.2 Icons and function items

There are three icons on the top right corner of main menu, as shown in Figure 2-8.

- ① Signal indicator: Indicates current signal and its strength.
- ② Power indicator: Indicates the power capacity / power charging status / connection to outer power supply.
- ③ Time: Display current local time.

Various function items are listed in the main menu of X-431 GDS: Diagnose, Browser, Oscilloscope, Ignition, Sensor, Multimeter, BatteryTest, Information, Mailbox, Update, Settings, Help and Exit system, as shown in Figure 2-8.

Function items and descriptions:

[Diagnose]: Judge vehicle technical state, find out trouble location and cause.

[Browser]: Visit the service documents websites saved in Favorites. (Manually inputting a website address is temporarily unavailable.)

[Oscilloscope]: Rapidly determine vehicle electrical equipment and circuit trouble, making the measurement and setting of vehicle electrical equipment much easier and intuitive.

[Ignition]: Display and analyze ignition waveforms, assist to detect current status and relevant performance of the engine.

[Sensor]: Diagnose/simulate vehicle ECU sensor trouble.

[Multimeter]: Measure the physical parameters such as voltage, resistance, frequency etc.

[BatteryTest]: The most advanced conductance testing technology in the world is applied to make vehicle battery and charging system testing safe, rapid and easy.

[Information]: Obtain the relevant information of news and software updating via X-431 website.

[Mailbox]: Feed back the trouble of the device or vehicle to us by E-mail and we will give you a professional reply in time.

[Update]: Visit X-431 website by Internet, one-key to update vehicle software, it is necessary to complete registering before the first operation.

[Settings]: Set the relevant function operations.

[Help]: Display the relevant help information for users.

[Exit system]: Shut down or restart the main unit.

2.3.3 System Settings

X-431 GDS provides the following setting items: Change Language, Wi-Fi Settings, User Data Import/Export, Date/Time Settings, Power Option, Adjust

Screen Brightness, Screen Calibration, System Clean, System Information, U-Disk Update, Network Test, Multimonitor, Network Configuration, Rotate Screen, and X431 Website Domain Settings and About, as shown in Figure 2-9 and Figure 2-10.

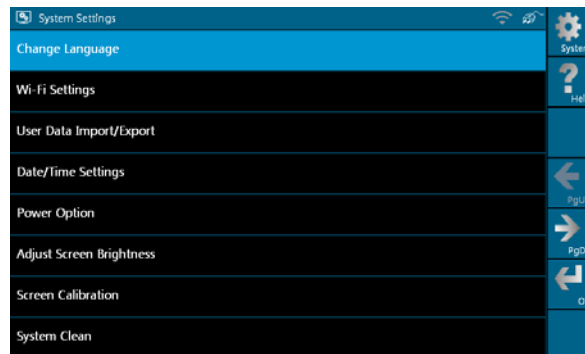


Figure 2-9 (Page 1)

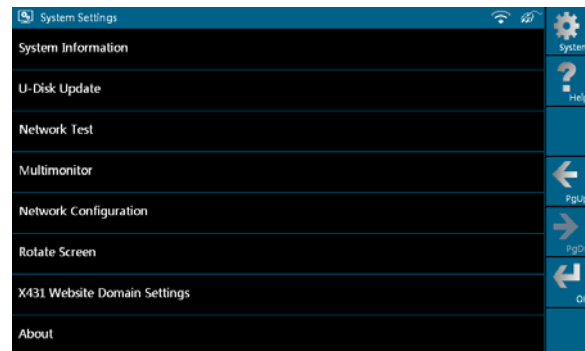


Figure 2-10 (Page 2)

1. Change Language

This option is used to define the system language. Total seven languages are available: Traditional Chinese, English, French, German, Italian, Japanese, Spanish and Portuguese, as shown in Figure 2-11.



Figure 2-11

2. Wi-Fi Settings

This option allows you to configure Wi-Fi network.

Select [Wi-Fi Settings] in [System Settings] and click [OK], the system starts searching network, as shown in Figure 2-12.

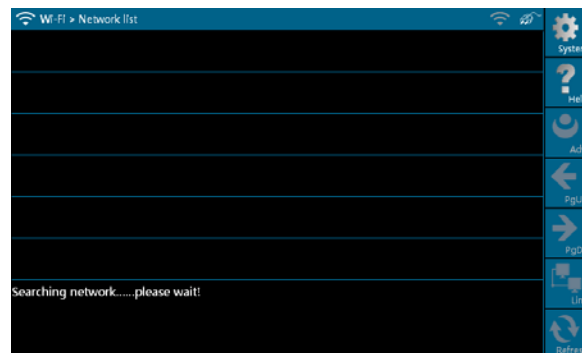


Figure 2-12

It will take some time to search network, after searching, the searched

networks will be listed on the screen, as shown in Figure 2-13.



Figure 2-13

Select one of the network list and click [Link] in Figure 2-13, "Connected" will appear on the screen as shown in Figure 2-14, indicating the device is connected to the network successfully.

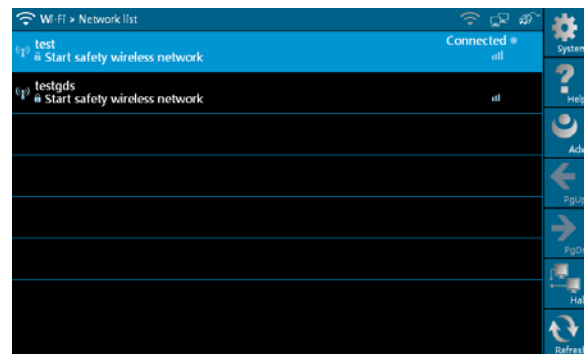


Figure 2-14

Note: When selecting Wi-Fi to access Internet, please set Wi-Fi properly and make sure it is connected successfully, otherwise, the following functions may be abnormal: Browser, Register, U-Disk Update, Network Test, Information, Mailbox and Update.

3. User Data Import/Export

This option enables you to import the saved trouble and diagnostic information from or export it to another X-431 GDS for analysis and comparison. Select [User Data Import/Export] in [System Settings], a screen shown as Figure 2-15 will appear.

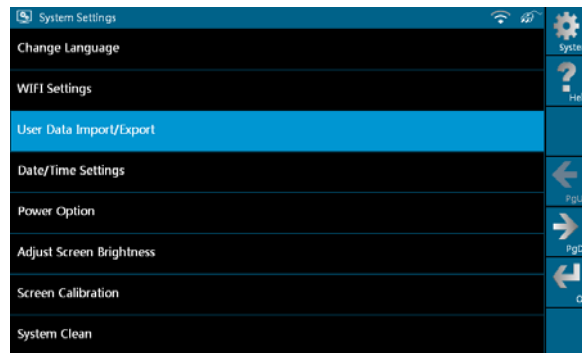


Figure 2-15

Click [OK] in Figure 2-15, modules will appear on screen for your selection, as shown in Figure 2-16.

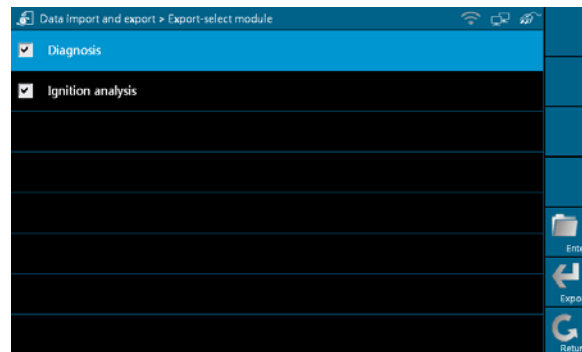


Figure 2-16

In Figure 2-16, select "Diagnosis" and click [Enter], history files similar to Figure 2-17 will be listed on the screen.

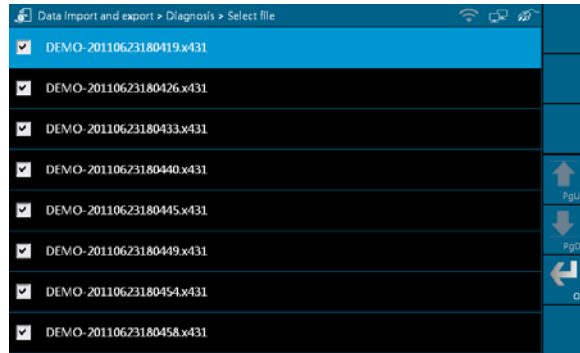


Figure 2-17

Click the checkbox to select the desired files in Figure 2-17 and click [OK] to export the data. A dialog box shown as in Figure 2-18 will pop up on the screen after data is exported successfully. Click [OK], the [Enter] icon will become active, and click it to import the history data.

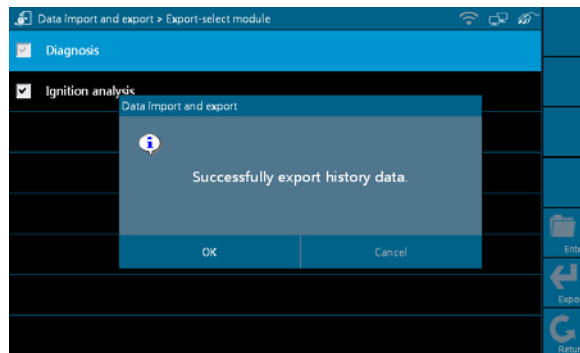


Figure 2-18

Note: If "Export history data failed" appears on screen, please click [Export] to export the data again.

Method for "Import" is same as "Export". Select the history data and click [Import] to import data.

4. Date/Time Settings

This option is used to set the current date and time.

Select [Data/Time Settings] in the [System Settings] and click [OK], the system will enter the following screen, as shown in Figure 2-19.



Figure 2-19

Click the on-screen buttons to set the date and time, and click [OK] to confirm.

5. Power Option

Through it, you can have a general knowledge of current power information.

Select [Power Option] in [System Settings] and click [OK], a screen similar to Figure 2-20 will appear:

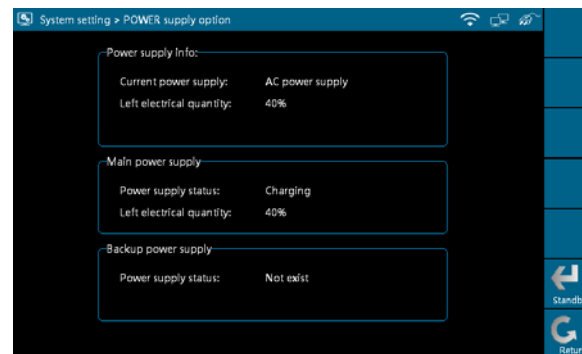


Figure 2-20

6. Adjust Screen Brightness

It is used to adjust the brightness of the screen to your preference. Select [Adjust Screen Brightness] in [System Settings] and click [OK], a screen shown as Figure 2-21 will appear.



Figure 2-21

Drag the slider with the stylus to adjust (0 -100), and click [Return] to exit.

7. Screen Calibration

This option lets you calibrate the touch screen. Select [Screen Calibration] in [System Settings] and click [OK], a screen similar to Figure 2-22 will appear.

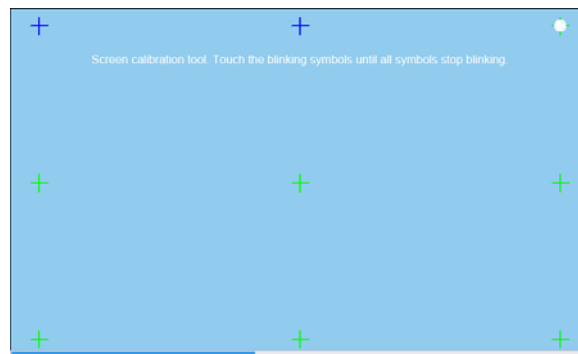


Figure 2-22

In Figure 2-22, properly click the cross symbol on the screen, the cross symbol changes to blue with a hint sound, then one calibration has been finished. After calibrating all crosses, the system will automatically return to [System Settings] interface.

8. System Clean

This option enables you to release disk space, delete unnecessary models, versions, recordings, and also clear snap file and video text which was recorded by oscilloscope and ignition mode, etc.

It includes "Clear history data", "Clear diagnosis software - Car", "Clear diagnosis software - Car(Diesel Engine)" and "Clear diagnosis software - HeavyDuty (Truck/Bus/Engineering Vehicle)".

Select [System Clean] in [System Settings] and click [OK], the interface will be shown as Figure 2-23.

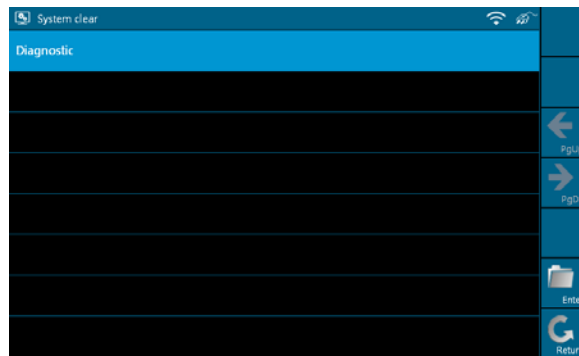


Figure 2-23

Click [Diagnostic] to enter Figure 2-24.

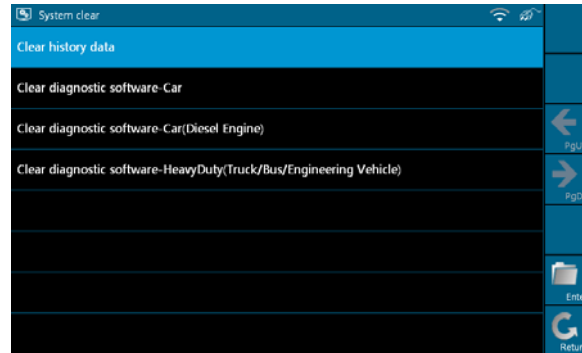


Figure 2-24

1. In Figure 2-24, select [Clear history data] and click [Enter] to enter Figure 2-25. Select one item that you want to clear and click [Clear].

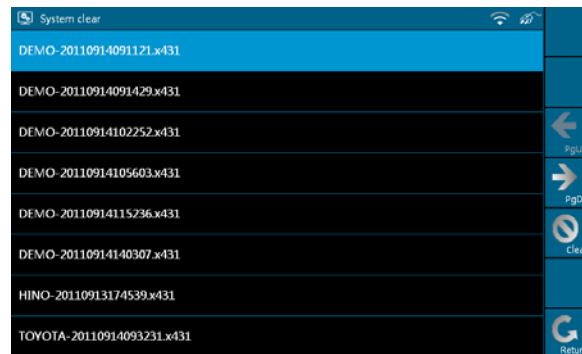


Figure 2-25

Click [OK] in the dialog box shown as Figure 2-25, and the item will be cleared successfully.

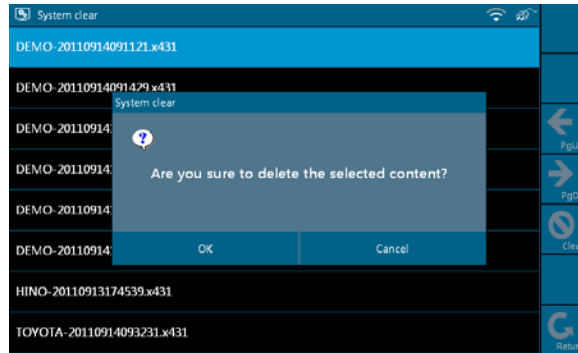


Figure 2-26

- On figure 2-24, select [Clear diagnosis software-Car] and click [Enter]. Select one car model that you want to clear, as shown in Figure 2-27 and click [Fast Clean].



Figure 2-27

Note: For "Clear diagnosis software-Car (Diesel Engine)" and "Clear diagnosis software-HeavyDuty (Truck/Bus/Engineering Vehicle)", the operations are same as [Clear diagnosis software-Car]

9. System Information

This option is used to display the system information.

Select [System Information] in [System Settings] and click [OK], then click

[Update] according to the hints, the latest system information will appear on the screen, as shown in Figure 2-28.

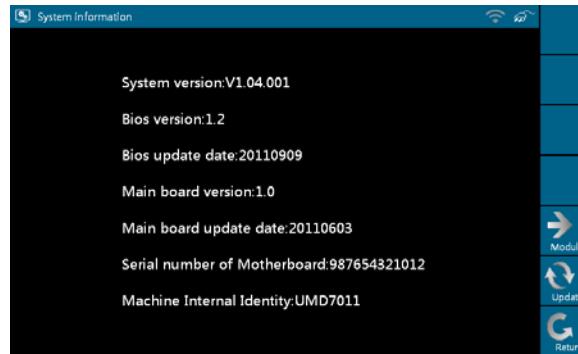


Figure 2-28

10. U-Disk Update

You can download the necessary software from X431 website in the U disk, and then connect it to X-431GDS to update.

Steps to download software with U disk:

1. Connect the U disk to a USB port of PC.
2. Access www.x431.com.
3. Log in the website. (Please register your X-431 GDS before operating it to obtain the User Name and Password)
4. Enter the Download Center.
5. Download the necessary software and save it in the U disk.

Note: Before accessing X-431 website, please check the network configuration or Wi-Fi connection.

Select [U-Disk Update] in [System Settings] and click [OK], a screen shown as Figure 2-29 will appear.

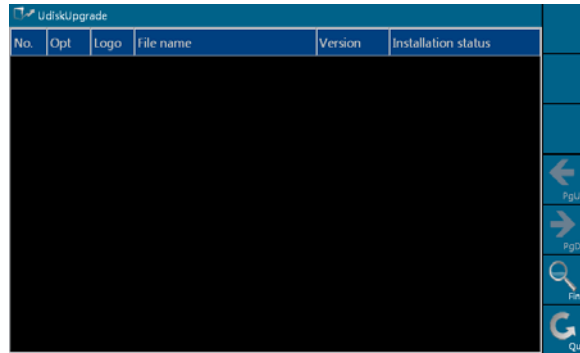


Figure 2-29

Click [Find], the system starts searching the software in the U disk, as shown in Figure 2-30.

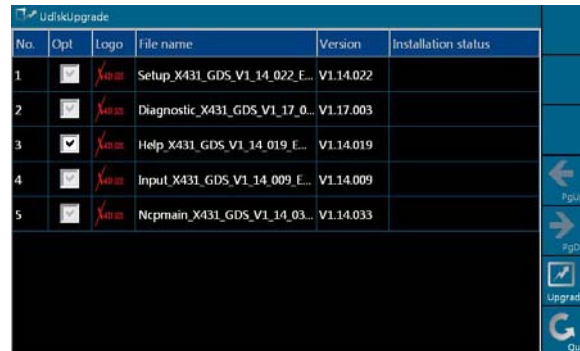


Figure 2-30

Mark a "Check" in the box before the software you want to update in Figure 2-30 and click [Upgrade], the system begins to update. After updating, "Installation successful" appears in column "Installation status", as shown in Figure 2-31.

No.	Opt	Logo	File name	Version	Installation status
1		X431	Setup_X431_GDS_V1_14_022_E...	V1.14.022	Installation successful
2		X431	Diagnostic_X431_GDS_V1_17_0...	V1.17.003	Installation successful
3		X431	Help_X431_GDS_V1_14_019_E...	V1.14.019	Installation successful
4		X431	Input_X431_GDS_V1_14_009_E...	V1.14.009	Installation successful
5		X431	Ncpmain_X431_GDS_V1_14_03...	V1.14.033	52%

Figure 2-31

11. Network Test

This option helps you detect the network configuration and whether it can browse web page normally.

Select [Network Test] in [System Settings] and click [OK], a test result page will appear on the screen. Figure 2-32 indicates that network is detected successfully.

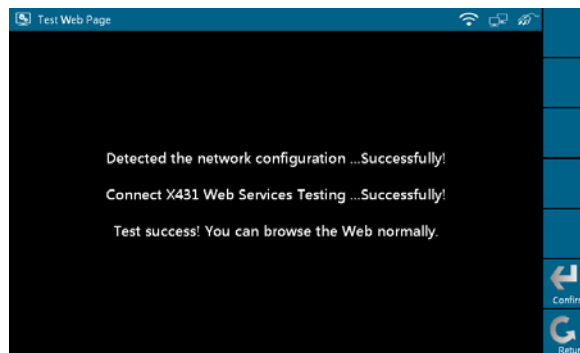


Figure 2-32

Note: If network detecting failed, please check the network configuration or Wi-Fi connection, and detect again.

12. Network Configuration

This option is used to configure wired network options.

Wired Network Configuration interface is shown in Figure 2-33.



Figure 2-33

Operations:

Automatically or manually obtain IP includes:

- A. You can select "Automatic DNS server address" or "Use the following DNS server address" to obtain IP address.
- B. You need to set DNS to manually input IP address.

Suggestion: If there is no network limited, please keep the setting as default, that means, Automatic IP address and Automatic DNS server address should be checked. Thus, if you use DHCP to set IP address, no other settings are needed.

Note: If you use wired network but not Wi-Fi to access Internet, please configure network properly, otherwise, the following functions may be abnormal: Browser, Register, U-Disk Update, Network Test, Information, Mailbox and Update.

13. Multimonitor

Select [Multimonitor] in [System Settings] and click [OK] to enter.

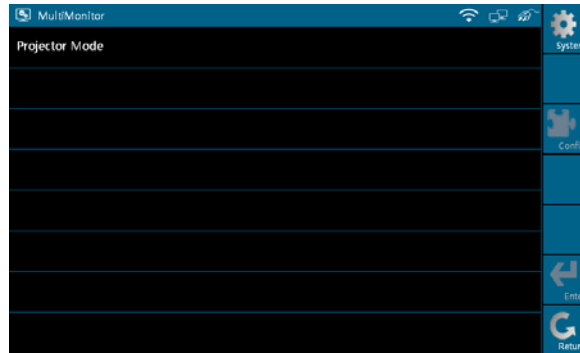


Figure 2-34

Note: Please confirm that VGA cable is connected to VGA connector of X-431 GDS, select [Projector Mode] and click [Enter], projecting effect will appear in a while. You can click [Config] to modify the project resolution.

14. Rotate Screen

Select [Rotate Screen] in [System Settings] and click [OK] to enter the interface, as shown in Figure 2-35. You can choose either "Rotate the screen to the original position" or "Rotate the screen by 180 degree" to view the display screen easily.

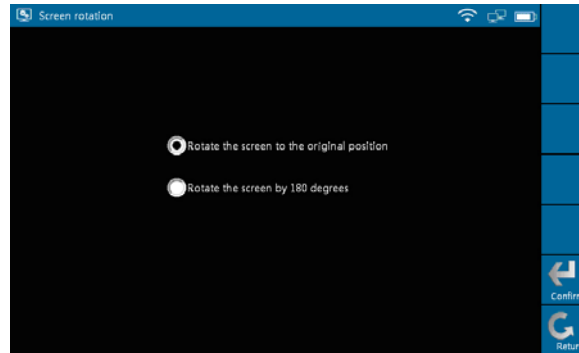


Figure 2-35

Note: Please calibrate the screen every time you rotate the screen (refer to "2.3.3 > 7. Screen Calibration" for details)

15. X431 Website Domain Settings

The system provides two Domain names for users' option. Select [X431 Website Domain Settings] in [System Settings] and click [OK], the interface will be shown as Figure 2-36.

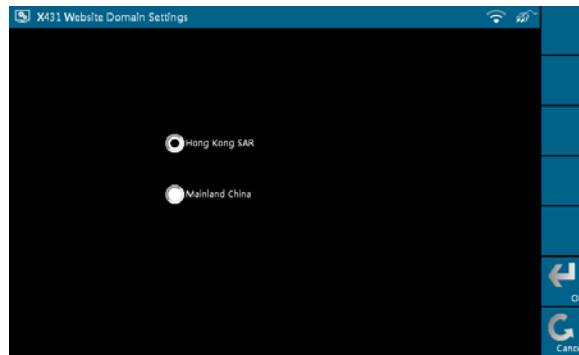


Figure 2-36

Note: The default website is Hong Kong SAR.

3. How to diagnose

3.1 Preparation and Connections

3.1.1 Preparation

1. Normal testing conditions

- Turn on the vehicle power supply.
- Vehicle battery voltage range should be 11-14V and working voltage of X-431 GDS is 12V.
- Throttle should be closed at its close position.
- Ignition timing and idle speed should be within specified range; water and transmission oil temperature are within normal working range (water temperature is 90-110°C and transmission oil temperature is 50-80°C).

2. Select testing connectors

Please select the corresponding connectors while X-431 GDS is testing vehicles which are equipped with universal OBD II 16 PIN diagnostic socket.

3.1.2 X-431 GDS connections

X-431 GDS connection steps are as follows:

- Connect one terminal of main test cable to diagnostic terminal of X-431 GDS.
- Connect the other terminal of main test cable to vehicle's DLC.

3.2 Start diagnosing

X-431 GDS can test a lot of series, models and systems which may continuously increase day by day. Please refer to the "Update" on the main menu interface for more details of X-431 GDS and download the latest diagnostic programs to fully enjoy its powerful diagnostic functions.

3.2.1 How to start diagnostic program

Make sure all connections are properly made (For detailed connection, please refer to 3.1.2), power on to enter the main menu, and then click "Diagnose":

1. If only for Mini-car, the interface will display as following figure 3-1.



Figure 3-1

Buttons description:

[System]: To display the desktop, view current version No. and exit the program.

[Help]: To view help information for current operation.

[File]: To view "Recently used models" and "Historical driving records".

[PgUp.]: To display the previous page.

[PgDn]: To display the next page.

2. If there is Diesel Engine or Heavy-duty vehicles, in addition to Mini-car, the following six possible interfaces shown as figure 3-1a~f will appear.



Figure 3-1a



Figure 3-1b

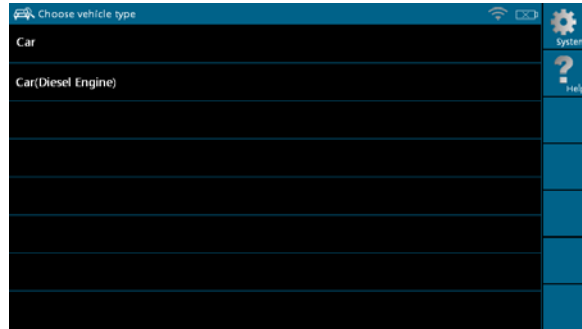


Figure 3-1c



Figure 3-1d



Figure 3-1e

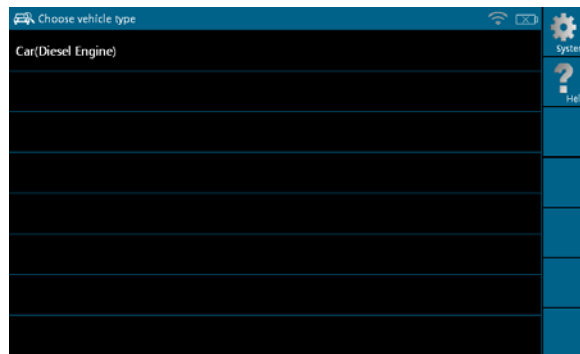


Figure 3-1f

Click corresponding option and the interface will enter Figure 3-1.

In Figure 3-1, select "DEMO" and the screen will display the selection menu for DEMO diagnosis program version, as shown in Figure 3-2.

Note: The operations for other models, series and systems are similar to "DEMO". Please refer to the relevant operation interface for details. Here only take the "DEMO" for an example.

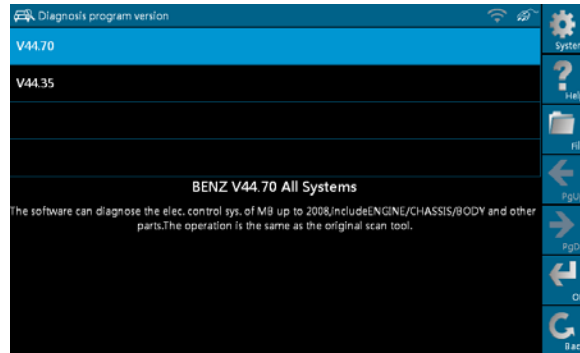


Figure 3-2

Buttons descriptions:

[System]: To display the desktop functions, view current version No. and exit the program.

[Help]: To view help information for current operations.

[File]: To view "Recently used models" and "Historical driving records".

[PgUp.]: To view the previous page.

[PgDn.]: To view the next page.

[OK]: To go to next step.

[Back]: To go back to the previous interface.

3.3 How to diagnose

In Figure 3-2, click [OK] to proceed to Figure 3-3.



Figure 3-3

Note: Diagnosing different vehicles has the same operation steps (including the test model, system, model year and the DLC selection options), please refer to the page prompts during operation.

Buttons description:

[System]: To display the desktop functions, view current version No. and exit the program.

[Help]: To view help information for current operations.

[File]: To view "Recently used models" and "Historical driving records".

[PgUp.]: To view the previous page.

[PgDn.]: To view the next page.

[Reset]: To verifies the SMARTBOX again.

[Back]: To go back to the previous interface.

Click [Engine] in Figure 3-3 (If there is more than one page of system menu, click [Next Pg.] to view.), the system message "Communication is initialized..." will appear on the screen, as shown in Figure 3-4.

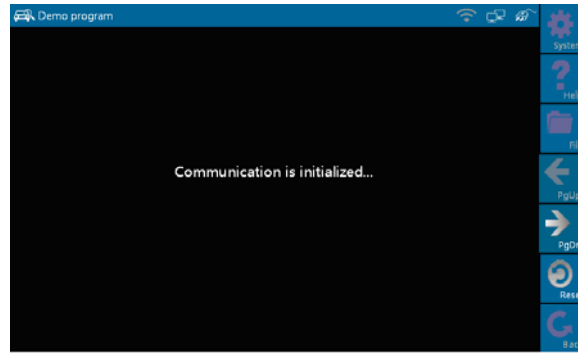


Figure 3-4

Note: The test method is similar for different systems, here take [Engine] for an example.

After communicating, the interface will skip to the function menu of [Diagnose], as shown in Figure 3-5:

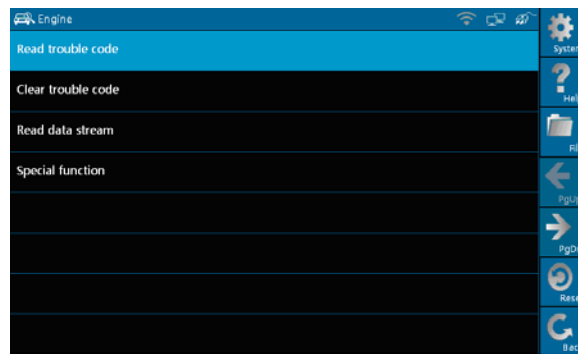


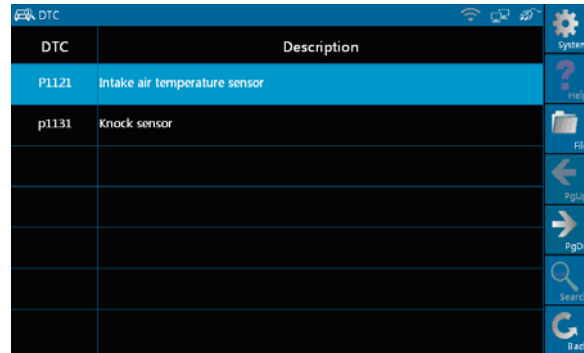
Figure 3-5

In Figure 3-5, there are four functions of [Engine]: "Read trouble code", "Clear trouble code", "Read data stream" and "Special function".

3.3.1 Read trouble code

Click [Read trouble code] in Figure 3-5, X-431 GDS starts executing this

function. After testing, results will appear on screen, as shown in Figure 3-6.



DTC	Description
P1121	Intake air temperature sensor
p1131	Knock sensor

The screenshot shows a mobile application interface for viewing Diagnostic Trouble Codes (DTCs). The main area is a table with two columns: 'DTC' and 'Description'. The first row is highlighted in blue and contains 'P1121' and 'Intake air temperature sensor'. The second row contains 'p1131' and 'Knock sensor'. Below these are four empty rows. On the right side, there is a vertical sidebar with several icons: a gear for 'System', a question mark for 'Help', a folder for 'File', a left arrow for 'PgUp', a right arrow for 'PgDn', a magnifying glass for 'Search', and a circular arrow for 'Back'.

Figure 3-6

Buttons description:

[System]: To display the desktop, view current version and exit the program.

[File]: To view "Historical driving records" and "Print" current DTCs.

[Search]: To search the corresponding details of fault code by Google through Internet.

[Back]: To go back to the previous interface.

If the tested system has no DTCs, a message will appear on the screen, indicating that there are no DTCs in the system.

3.3.2 Clear trouble code

Click [Clear trouble code] as shown in Figure 3-7, all existing trouble code will be cleared.

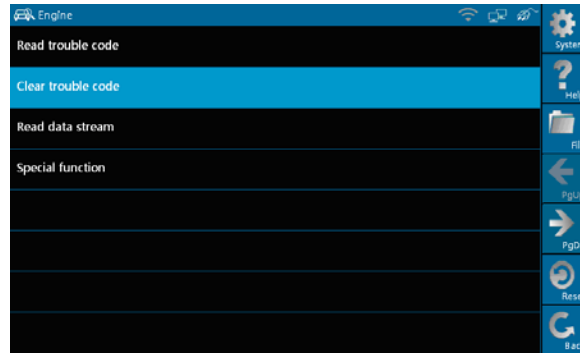


Figure 3-7

If trouble codes are cleared successfully, a prompt message will appear on the screen, as shown in Figure 3-8. If all trouble codes have been cleared, or there are no trouble codes, "No DTCs" will appear on the screen.

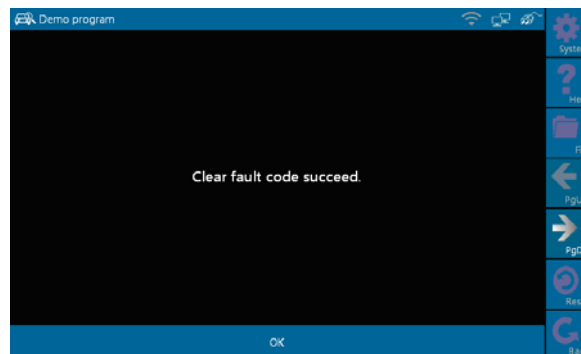


Figure 3-8

3.3.3 Read data stream

Click [Read data stream] as shown in Figure 3-9, you can read the running parameters.



Figure 3-9

As Figure 3-10 shows, the selected datastream are displayed in blue.

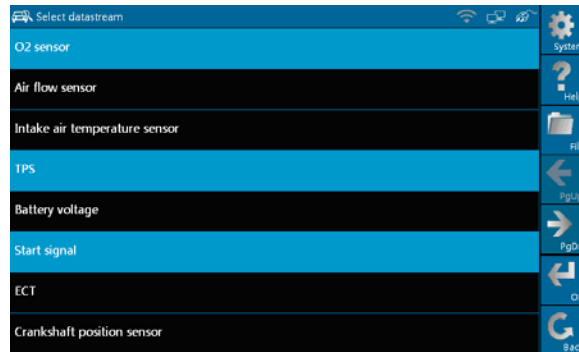


Figure 3-10

Click [OK] in Figure 3-10, dynamic data of the selected datastream will appear on screen, as shown in Figure 3-11.

Datastream name	Value	Unit
O2 sensor	2929	mV
TPS	2929	mV
Start signal	Off	

Figure 3-11

To view the dynamic waveform of the selected data stream, click [Advanced] -> [Plot] in Figure 3-11, as shown in Figure 3-12.

Datastream name	Value	Unit
O2 sensor	1757	mV
TPS	1757	mV
Start signal	On	

Figure 3-12

Buttons description:

[Plot]: To display single data stream waveform.

[Record]: To record the dynamic data stream during a certain time. (After clicking, [Record] becomes [Stop])

[Help]: To view the help information of current operation.

Click [Plot] in Figure 3-12, the waveform of "O2 sensor" will be displayed on the screen, as shown in Figure 3-13.

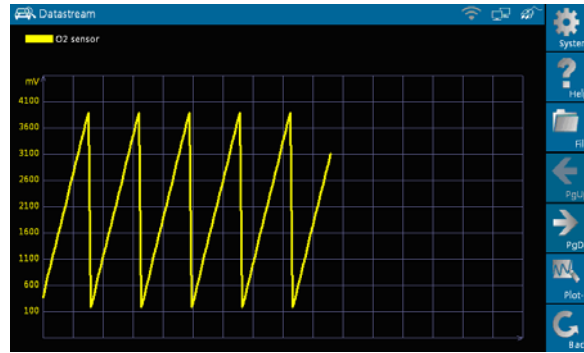


Figure 3-13

In Figure 3-13, click [Plot-2], [Plot-3], [Plot-4]...etc., four waveforms of selected data stream displayed in different colors will appear on the screen, which helps you view easily, as shown in Figure 3-14.

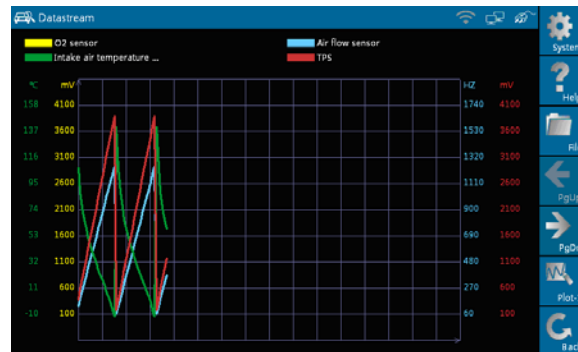


Figure 3-14

3.3.4 Special Function

This function is applied to detect whether the system parameters are normal or not.

Click [Special function] in function menu, the screen will be shown as Figure 3-15.



Figure 3-15

Note: We just take [1# injector] as an example to show how to set the special function.

To detect whether [1# injector] works normally or not, click [1# injector].

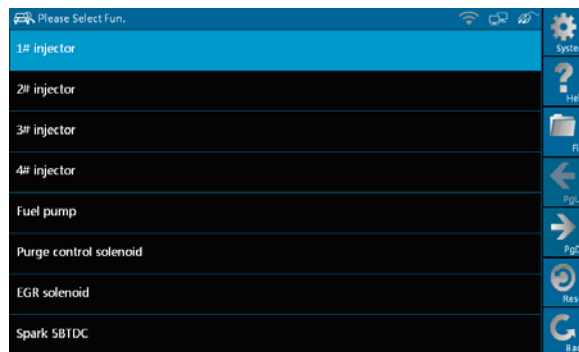


Figure 3-16

After detecting, the result will appear on the screen, as shown in Figure 3-17.

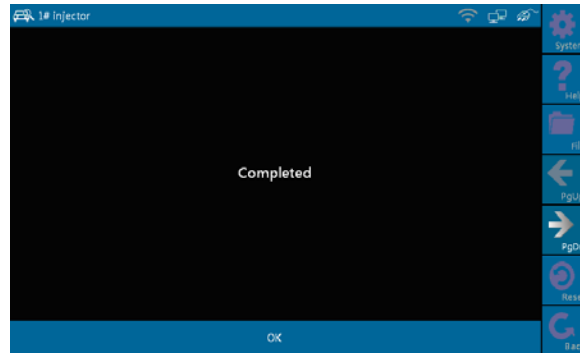


Figure 3-17

Note: If [1# injector] works abnormally, the system will fail to indicate that the part has some trouble.

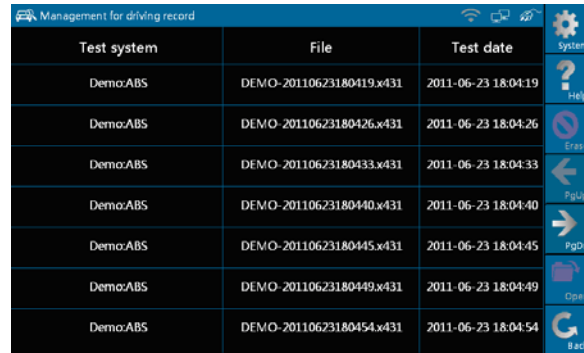
3.3.5 Driving record management

View the recorded and saved data streams and waveforms (To "Record", click [Advanced] -> [Record] button on the running interface of data streams). Click [File] -> [History] button on the "Select maker" menu, as shown on Figure 3-18.



Figure 3-18

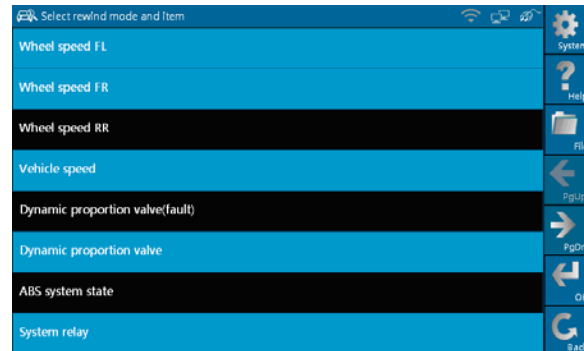
The system switches to Figure 3-19, listing datastream information for different vehicles and records in different time.



Test system	File	Test date
Demo:ABS	DEMO-20110623180419.x431	2011-06-23 18:04:19
Demo:ABS	DEMO-20110623180426.x431	2011-06-23 18:04:26
Demo:ABS	DEMO-20110623180433.x431	2011-06-23 18:04:33
Demo:ABS	DEMO-20110623180440.x431	2011-06-23 18:04:40
Demo:ABS	DEMO-20110623180445.x431	2011-06-23 18:04:45
Demo:ABS	DEMO-20110623180449.x431	2011-06-23 18:04:49
Demo:ABS	DEMO-20110623180454.x431	2011-06-23 18:04:54

Figure 3-19

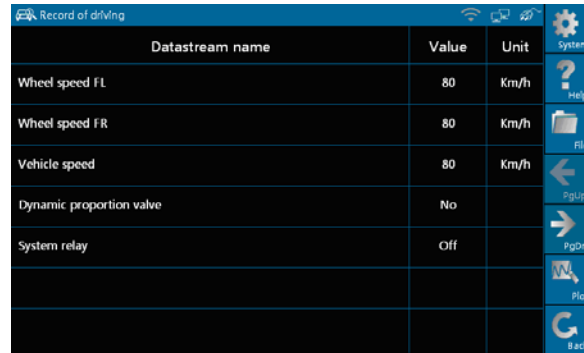
Select the one you want to view and click [Open] in Figure 3-19, recorded datastream will be shown on the screen, similar to Figure 3-20.



Select rewind mode and Item
Wheel speed FL
Wheel speed FR
Wheel speed RR
Vehicle speed
Dynamic proportion valve(fault)
Dynamic proportion valve
ABS system state
System relay

Figure 3-20

Select the desired datastream and click [OK], then the recorded dynamic datastream information will appear, as shown in Figure 3-21.

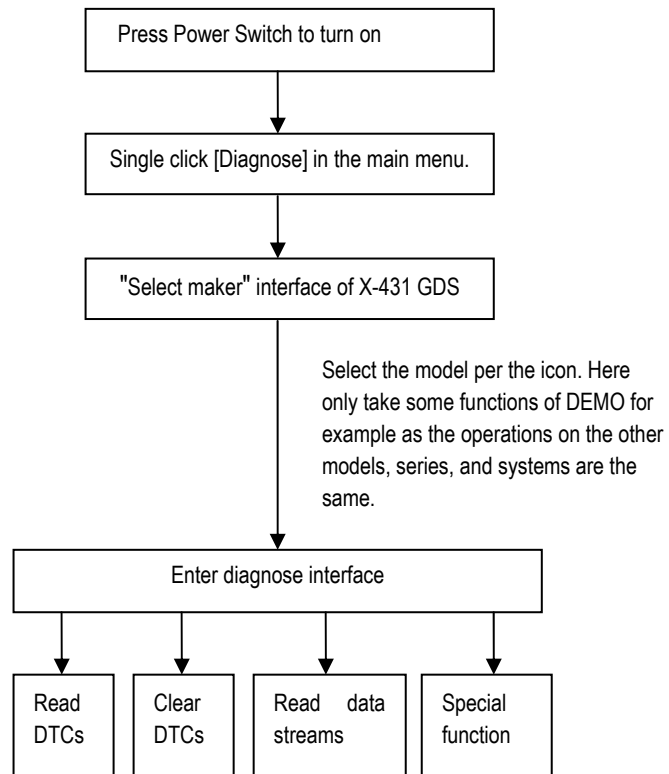


The screenshot shows a software interface titled "Record of driving". It features a table with three columns: "Datastream name", "Value", and "Unit". The table lists several datastreams with their corresponding values and units. To the right of the table is a vertical toolbar with icons for "System", "Help", "File", "PageUp", "PageDown", "Plot", and "Back".

Datastream name	Value	Unit
Wheel speed FL	80	Km/h
Wheel speed FR	80	Km/h
Vehicle speed	80	Km/h
Dynamic proportion valve	No	
System relay	Off	

Figure 3-21

3.4 Flow chart for entering diagnostic program



4. Heavy-Duty diagnosis platform

Heavy-Duty platform included in X-431 GDS is designed for Heavy-Duty vehicles including diesel and gasoline automotive diagnosis. Users can select Heavy-Duty function depending on product configuration.

It has the following features:

- No need to switch voltage level when testing 24V trucks.
- Support all the current X-431 test software.
- Fast upgrading via the internet to keep updated with the latest vehicle models.
- International standard design, applicable to all diagnostic sockets.
- Including all the electronic control system.
- Unique data transmission to ensure update in time.

For more detailed Heavy-Duty diagnosing and operations, please refer to "Heavy-Duty Automobile Diagnostic Platform User's Manual".

Note: The Heavy-Duty function can be activated if Heavy-Duty product configuration was purchased.

5. Browser

Browser is available on X-431 GDS, which helps you view and obtain relevant service documents from the third-party website saved in Favorites.

Click [Browser] on the main menu to enter browser, as shown in Figure 4-1.

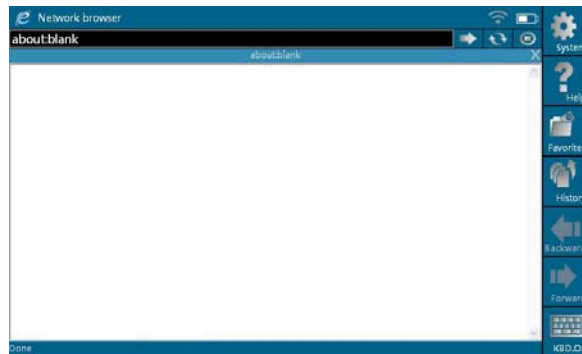


Figure 4-1

Click [Favorites] and select [View], the website list will appear on the screen, as shown in Figure 4-2 and Figure 4-3.



Figure 4-2



Figure 4-3

Select a desired website shown as Figure 4-4, and click [Open link] to browse the contents of the website quickly.

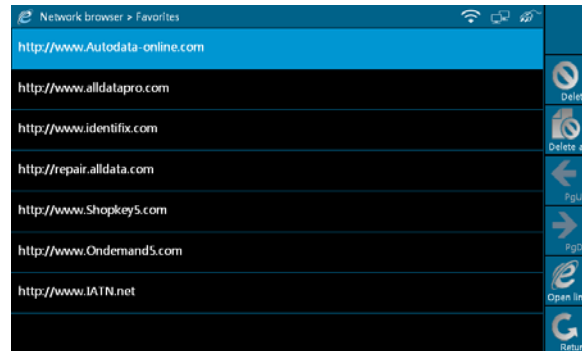


Figure 4-4

Notes:

- 1. Before operating Browser, please make sure that Network Configuration or Wi-Fi has been connected successfully.*
- 2. Only the website listed in Favorites can be viewed presently, manually inputting website address is unavailable now.*

6. Information

This option enables you to obtain the latest news and software download information about the device.

6.1 News

Click [Information] on the main menu, the system starts checking network, as shown in Figure 6-1.

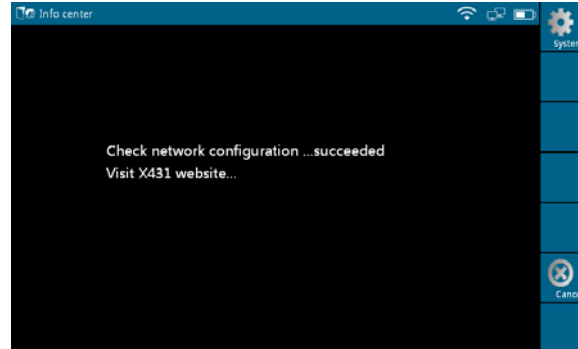


Figure 6-1

After network accesses successfully, [News] interface will appear on the screen, as shown in Figure 6-2.



Figure 6-2

Buttons description:

[System]: To display the desktop, view current version or exit the program.

[Help]: To view the help information of current operation.

[Info]: To switch to "Software downloads Information" interface.

[PgUp]: To view the previous page.

[PgDn]: To view the next page.

[View]: To view the details.

[Retry]: To re-try the current operation.

Select one certain news in Figure 6-2 and click [View], detailed information will appear on the screen, as shown in Figure 6-3.



Figure 6-3

Buttons description:

[PgUp]: To view the previous page.

[PgDn]: To view the next page.

[Return]: To return to the previous interface.

[NextItem]: To view the next item.

If read timeout, a prompt message will appear on the screen, as shown in Figure 6-4. In this case, please check your network configuration and click "Retry".

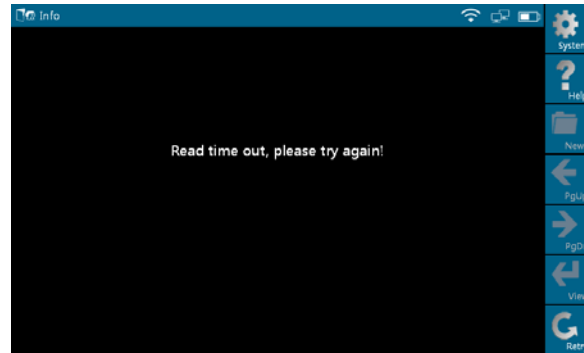


Figure 6-4

6.2 Software download information

Click [Info] in Figure 6-2, the system will switch to software download info interface, as shown in Figure 6-5.



Figure 6-5

Button description:

[System]: To display the desktop, view the version or exit the program.

[Help]: To view the help information of current operation.

[News]: To switch to "News" interface.

[PgUp]: To view the previous page.

[PgDn]: To view the next page.

[View]: To view the details.

[Retry]: To retry the same operation.

In Figure 6-5, select one of the software programs and click [View], the system will enter the content page, as shown in Figure 6-6.



Figure 6-6

7. Mailbox

X-431 GDS has a Mailbox function, by which you can send E-mail to us once you come across any question or problem unresolved, and we will give you professional answer in time.

7.1 Read mail

Click [Mailbox] on the main menu, system starts checking network, as shown in Figure 7-1.

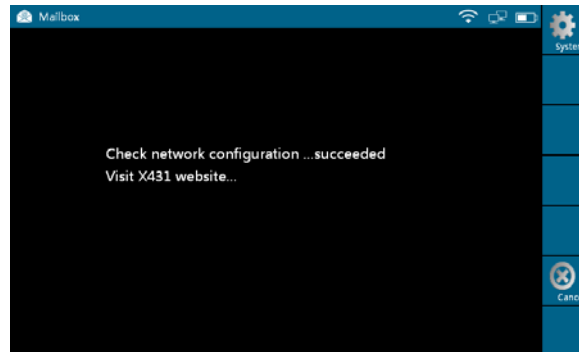


Figure 7-1

After accessing network, the system will display as Figure 7-2.

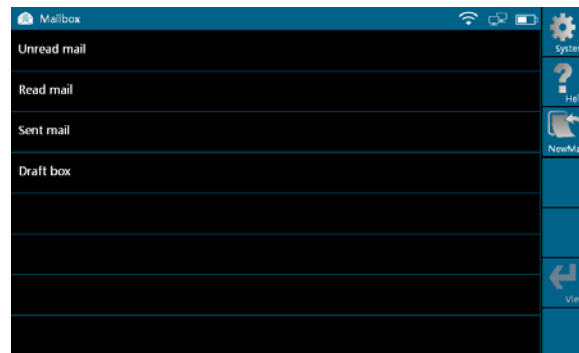


Figure 7-2

In Mailbox interface, there are four items: Unread mail, Read mail, Sent mail and Draft box. Select one (e.g. Read mail), and click [View] to read the details.

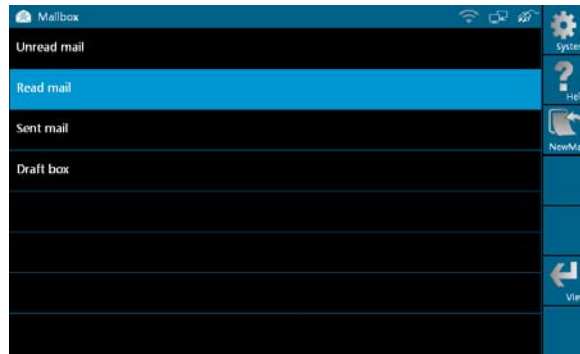


Figure 7-3

7.2 New mail

Click [NewMail] in Figure 7-3, mail writing interface appears on the screen, as shown in Figure 7-4.

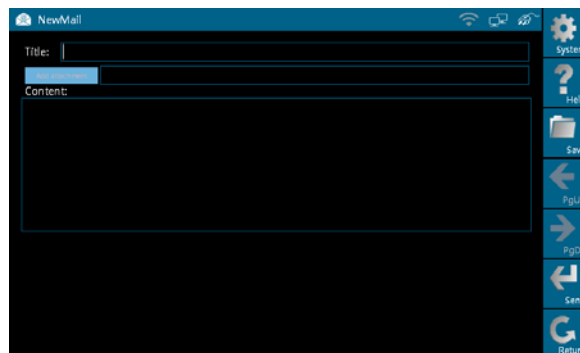


Figure 7-4

Write down the title and contents by stylus manually, as shown in Figure 7-5.

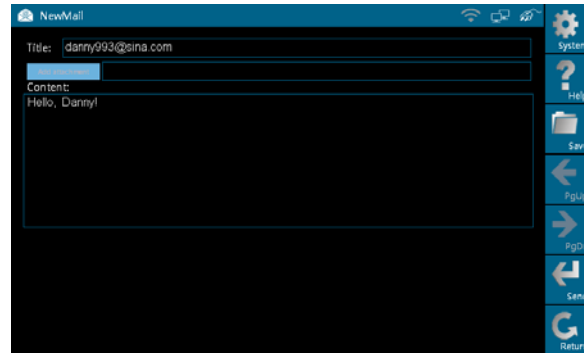


Figure 7-5

Buttons description:

[Save]: To save a mail that is not finished or will be sent later.

[Send]: To send the mail.

[Return]: To return to the previous interface.

When a new mail is finished, click [Send]. If the mail is sent out successfully, a dialog box will appear as shown in Figure 7-6.

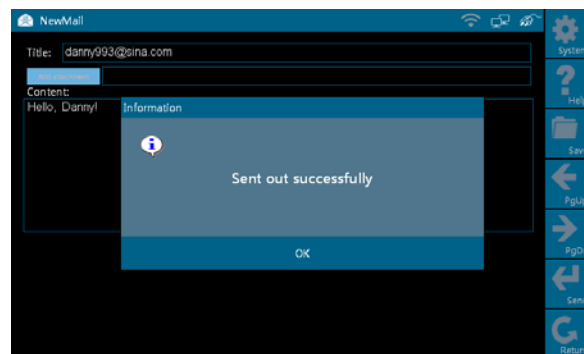


Figure 7-6

If the mail fails to send out, a prompt message will appear on the screen, as shown in Figure 7-7.

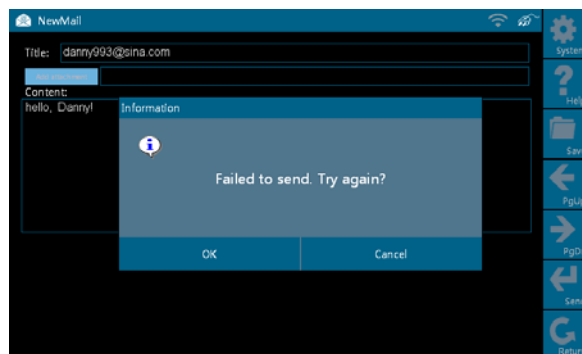


Figure 7-7

Click [OK] in Figure 7-7 to send the mail again, or click [Cancel] to cancel sending.

Note: Please check the network configuration or Wi-Fi connection before operating Mailbox function.

8. Update

X-431 GDS provides quick and easy software update service, by which you can enjoy all update services including download and update the software.

Note: Enter the update center, vehicle software which can be updated are default to check, you can click [Update] to perform one-key update. You can also click [Select] to select all or cancel all.

8.1 Register

To operate this device, you have to experience a product registration. After entering the function modules, a registration page will appear automatically and once registering is complete, this page will never appear again.

Note: Before registering, please check you network configuration or Wi-Fi connection.

Click [Update] on the main menu, terms of update service will be shown on

the screen, as shown in Figure 8-1.

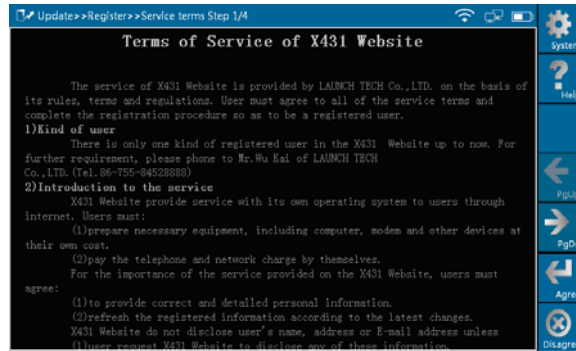


Figure 8-1

Read the "Terms of Service of X431 Website" and click [Agree] to proceed to the next step, as shown in Figure 8-2. Some registration information are required to fill (by stylus or manually input).

Fill the product information

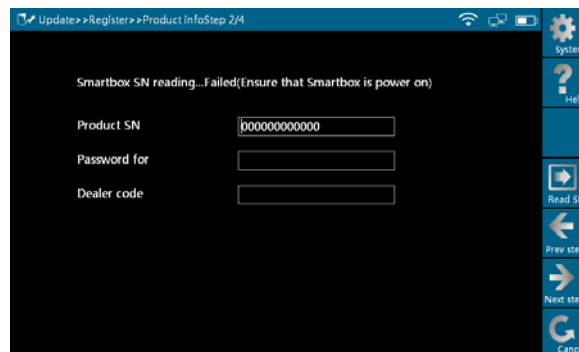


Figure 8-2

By default, Product SN is created by system. While purchasing this product, you will be offered one envelop, in which there is the register password (secret). You can obtain the dealer code from the dealer. Complete filling the information in Figure 8-2 and click [Next step], a new dialogue box pops up,

then fill the detailed user information (items with "*" must be filled, confirm password must be same as login password, Email must be effective and same as confirm Email, we will send you the secret information to this Email after registering successfully.). Click [Register], a prompt message indicating that you have registered successfully will appear on the screen, and you can enter purchasing or download center.

Note: Please contact the local dealers if you can not register.

8.2 Update

While updating, the system will check network configuration, perform ID verification and access latest version information, as shown in Figure 8-3.

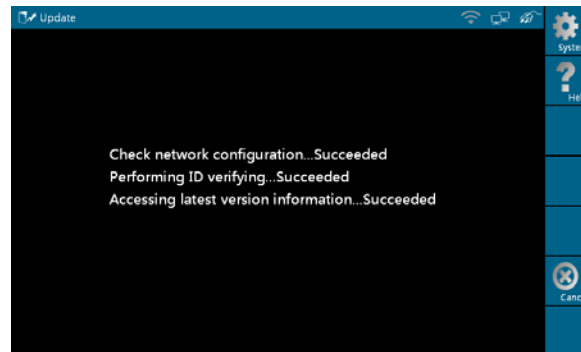


Figure 8-3

Software update list appears on the screen, as shown in Figure 8-4.

Logo	SW name	Current ver.	Update ver.	Top version
Diagnostic SW				
<input checked="" type="checkbox"/>	KIA	40.30	40.30	40.30
<input checked="" type="checkbox"/>	BJD	20.03	20.03	20.03
<input checked="" type="checkbox"/>	VW	25.80	25.80	25.80
<input checked="" type="checkbox"/>	HONDA	43.20	43.20	43.20
<input checked="" type="checkbox"/>	DAEWOO	25.20	25.20	25.20
<input checked="" type="checkbox"/>	ROMEO	18.01	18.01	18.01
<input checked="" type="checkbox"/>	USAFORD	38.80	38.80	38.80

Figure 8-4

In Figure 8-4,

Current Ver.: current version No.

Update Ver.: the lowest version that can be installed currently.

Top version: the current top version.

Click [History] to select one or several desired software, as shown in Figure 8-5.

Logo	SW name	Current ver.	Update ver.	Top version
<input type="checkbox"/>	VOLVO	41.30	41.30	41.30
<input type="checkbox"/>	RENAULT	39.61	39.61	39.61
<input checked="" type="checkbox"/>	BENZ	44.30	44.30	44.30
<input type="checkbox"/>	DAIHATSU	19.35	19.35	19.35
<input type="checkbox"/>	SKODA	24.80	24.80	24.80
<input type="checkbox"/>	BMW	43.21	43.21	43.21
<input type="checkbox"/>	GZHONDA	20.10	20.10	20.10
<input type="checkbox"/>	OPEL	37.20	37.20	37.20

Figure 8-5

Button description:

[System]: To display the desktop, view the current version or exit the program.

[Help]: To view the help information of current page operation.

[Update]: To execute software update operation.

[History]: To select version that can be downloaded or corresponding vehicle.

In Figure 8-5, you can select several pieces of software and update them together for corresponding vehicles, then click [Update].

Here, we take "BENZ" as an example to explain one-key update.

Select "BENZ" and click [Update] in Figure 8-5, the software will be downloaded and installed automatically, as shown in Figure 8-6 and Figure 8-7.

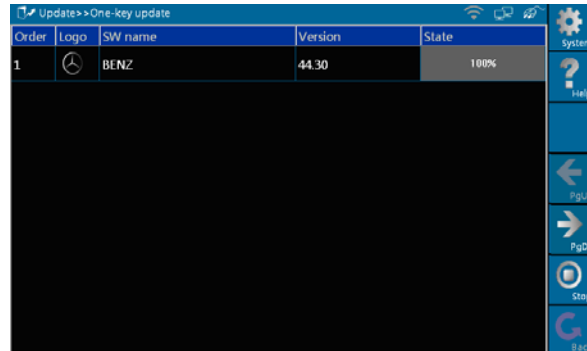


Figure 8-6

Figure 8-6 shows the downloading progress. When "100%" appears, it indicates that the software has been downloaded completely.

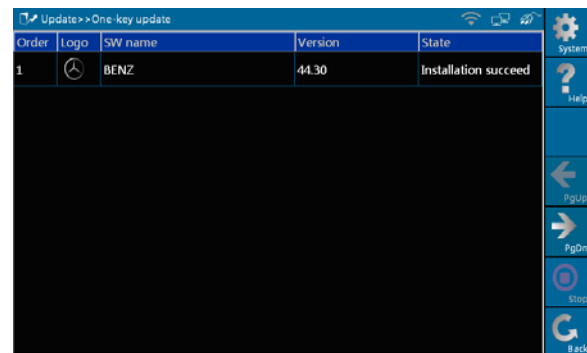


Figure 8-7

Figure 8-7 shows the installation state. If "Installation succeed" appears, it indicates that installation has completed.

If the network configuration is not correct, software download will fail and [Retry] turns active. In this case, please check the network and download it again, as shown in Figure 8-8.

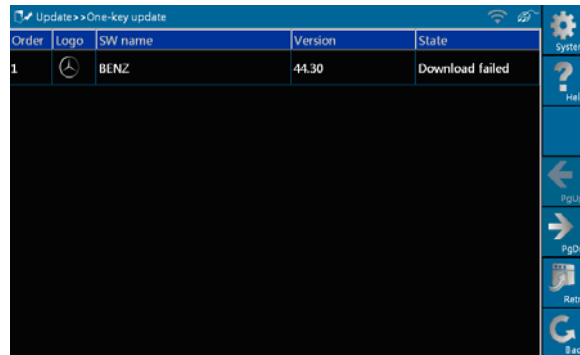


Figure 8-8

Button description:

[System]: To display the desktop, view current version or exit the program.

[Help]: To view the help information of current page operation.

[Stop]: To stop downloading or installing.

[Retry]: To execute the same operation again.

[Return]: To return to the previous interface.

9. Optional functions brief for X-431 GDS

9.1 Oscilloscope

X-431 GDS has an optional function of oscilloscope, which can make the auto repair technician quickly judged the faults on automotive electronic equipment and wiring. If using an ordinary oscilloscope to test the electronic equipment, the biggest problem is how to set the oscilloscope (adjust the display parameters of oscilloscope to make the waveform become clear), while using the automotive oscilloscope can make the setting on testing automotive electronic equipment become simple and intuitive (via automatic setting function), just via clicking "Automatic settings", the waveform can be directly observed without any setting and adjustment. For some automotive electronic equipment, the signal change rate is very fast, whose cycle reached a thousandth, besides, many fault signals are intermittent, and unsteady, which makes the ordinary equipments, such as decoder, Multimeter etc., hard to capture such fault signal and affects the fault diagnosis and trouble; and the oscilloscope sweep speed is far greater than the signal frequency of such vehicles, usually 5-10 times of the measured signal. The automotive oscilloscope not only can quickly capture the circuit signal, but also can slowly display the waveform to observe and analyze. It can also record and store the tested signal waveform which can be playback to observe for the fast signal, having great convenience to failure analysis. Either high-speed signal (e.g.: injection nozzle, intermittent fault signal) or the slow-speed signal (e.g. the throttle position change and the oxygen sensor signal) can be observed through automotive oscilloscope in an appropriate waveform.

We know that the electronic signal can be compared and judged via testing five parameters indexes. The five parameters indexes are the amplitude (the maximum voltage of signal), the frequency (the cycle time of signal), the shape (the appearance of signal), the pulse width (the duty cycle or the time range of signal), and the array (the repetition characteristic of signal), which can be tested, displayed, saved by the automotive oscilloscope. Via the waveform analysis can further detect the circuit fault on sensors, actuators, circuits, and electronic control units, etc.

For detailed operations and specifications, please refer to X431 GDS Scopebox user's manual.

9.2 Ignition

The ignition system is the system which has greatest impact on the performances of gasoline engine, as the statistical data shows that nearly half of the failures are caused by poor work of electrical system. And the performance tests of engine often start from the ignition system. Nowadays ignition system includes distributor and distributorless. Distributorless includes independent ignition and simultaneous ignition.

1. Distributor ignition system: conventionally includes contact breaker (commonly known as the platinum) contact-controlled ignition system and magnet, infrared or hall components breakless ignition system.
2. Direct ignition system: crankshaft sensor send out the ignition timing signal and cylinder identification signal for the specified cylinder send out the specified signal in specified time, each cylinder has its independent ignition coil.
3. Simultaneous ignition system: two cylinders share one ignition coil, when two cylinder pistons reach top dead center at the same time (one is compression, the other is the exhaust), two spark plugs will be ignited at the same time, at this time, the ignition for the former cylinder with high-pressure low temperature gas mixture, the ignition is valid, while for the latter one with low-pressure high temperature exhaust gas, the ignition is invalid.

X-431 GDS can test and analyze the primary/secondary signal coming from various engine ignition systems.

For detailed operations and specifications, refer to X431 GDS Scopebox user's manual.

9.3 Sensor

Vehicle sensors are the signal input devices for electrical control systems, which can transform all kinds of running parameters, such as vehicle speed, coolant temperature, engine RPM, air flow, throttle opening, etc., into the electronic signal for the vehicle computer who can optimize the engine running status per the above-mentioned parameters to keep the engine working in a prime status. As the sensors can be separated into many types, when you troubleshoot a related-sensor fault, you shall focus not only on the sensor itself,

but also the whole trouble circuit and variety of sensor's parameters while running. "Sensor simulation test" function is specially developed to diagnose and simulate vehicle sensor faults, including "DC voltage simulation", "Fixed frequency simulation", "Predefined waveform simulation", and "Hand-drawing waveform simulation", which can help customer to diagnose and simulate the vehicle sensors quickly and conveniently.

For detailed operations and specifications, refer to X431 GDS Sensorbox user's manual.

9.4 Multimeter

X-431 GDS provides an optional function of "Multimeter", by which, you can perform voltage, resistance or frequency test.

For detailed operations and specifications, refer to X431 GDS Sensorbox user's manual.

9.5 BatteryTest

X-431 GDS provides an optional function of "BatteryTest", which adopts the most advanced conductance testing technology in the world, detects the vehicle battery status and provides in-vehicle and out-vehicle testing modes. In-vehicle testing can complete charging system and ignition system testing. Several battery standards and regulars are supported, including CCA, DIN, IEC, EN, JIS, SAE and GB etc.

For detailed operations and specification, refer to X431 GDS Batterybox user's manual.

10. FQA

X431 GDS is a hi-tech product. With the development of modern automotive industry, more and more new technologies will be adopted and there may be questions during operation, including the software, hardware, operation and something related to the vehicles. Read the user's manual to get the answer whenever you have any question, or contact our Customer Service Center for help. Here, we list some frequently asked questions and answers relating to the using of X431 GDS.

About Hardware

Q: Why does the LCD touch screen respond so slowly in cold weather?

A: It is because the ambient temperature is close to the lower limit of operating temperature range (-10-55°C). Under this situation, it is necessary to warm up the machine for 30 minutes before test.

Q: There is only backlight and no character on the screen. What should I do?

A: Check if the power is well connected. Turn off the machine, unplug the power connector and re-plug it. Turn on the machine after it has been connected to the power for 1 second.

Q: Why there is no response or response incorrectly while clicking the screen with touch pen?

A: Please calibrate the screen again. Refer to "2.3.3 7. Screen Calibration" for details.

About Operations

Q: System halts while reading data stream.

A: Connector is loosen, shutdown the device and connect well to test again.

Q: E-mail sending failed.

A: Check network configuration.

Q: Fail in Mail operation while feedback problems.

A: Product is not registered, please register and operate again.

Q: Software download failed.

A: Check network configuration.

Q: Blank screen after operating for a period.

A: When there is no external power supply connected, power of battery exhausts, Please connect external power supply.

About Vehicles

Q: Main screen blinks at the moment when engine ignition.

A: It results from electromagnetic interference and this is normal phenomena.

Q: Detecting interrupted while testing.

A: It results from electromagnetic interference or loose connection.

Q: No response while communicating with vehicle ECU.

A: Make sure that the voltage of vehicle battery is in specified range, the throttle is in the closed position, and all electrical consumers are turned off, and water temperature is in specified range.

Q: Some systems can not be diagnosed

A: The diagnostic socket for the system on some early vehicle may be separated. Refer to the vehicle instruction manual.

Q: No corresponding trouble codes description.

A: It is generally normal circuit "sequel", search the most approaching trouble code and analyze it.