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Introduction

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X-431 is a newly developed automobile diagnostic computer. It is based on the technology of **open diagnostic platform**, the most advanced automobile diagnostic technology brought forward by LAUNCH.

The **open diagnostic platform** represents the highest level of automobile diagnostic technology, and is the developing trend of this field in the future.

Features

Advanced

X-431 is the most advanced automobile diagnostic unit in the world at present. It is designed compactly with modern outline and large LCD touch screen. Demountable printer makes the operation easy. The product is a result of combination of the automobile industry and the communication technology, which starts the new development trend in the automobile diagnosis field. This product not only provides a new way of automotive diagnosis for vehicle service station, but also becomes a favorable choice for "auto fans".

Open

- ✍ Open operation system. That is, X-431 is an open automobile diagnostic platform with multifunction and multi-language based on LINUX operation system.
- ✍ X-431 provides open interface to support the third party's development.

Integrative

X-431 has all functions of PDA.

Handwriting input, personal database, vast vocabulary English-Chinese dictionary. The super capacity database can realize multi-purpose management of user's information.

Flexible

X-431 has a fire-new modern design. Each function can be combined with others at will or used independently.

- ✍ The main unit and the diagnostic box can be used independently.
- ✍ The main unit itself is equal to a PDA, which has the functions of personal database, etc.
- ✍ The SMARTBOX can be connected to PC to perform automobile diagnosis when it is demounted from the main unit. The diagnostic software used by PC can even be downloaded on the LAUNCH website. That is, the SMARTBOX can be sold independently. This is the important feature of X-431.
- ✍ A standard RS232 interface (3 lines) is used to connect the SMARTBOX and its upper unit. So more BOXes can be designed to increase functions, such as SENSORBOX, REMOTEBOX, etc. This feature increases the value of X-431.
- ✍ MINIPRINTER is detachable. User can use it to print out data.

As described above, the independent use of the main unit and the SMARTBOX (or other diagnostic box) is the extraordinary and creative feature of X-431.

Hardware Configuration

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The hardware configuration for Volkswagen diagnostic program is as shown in Figure 01.

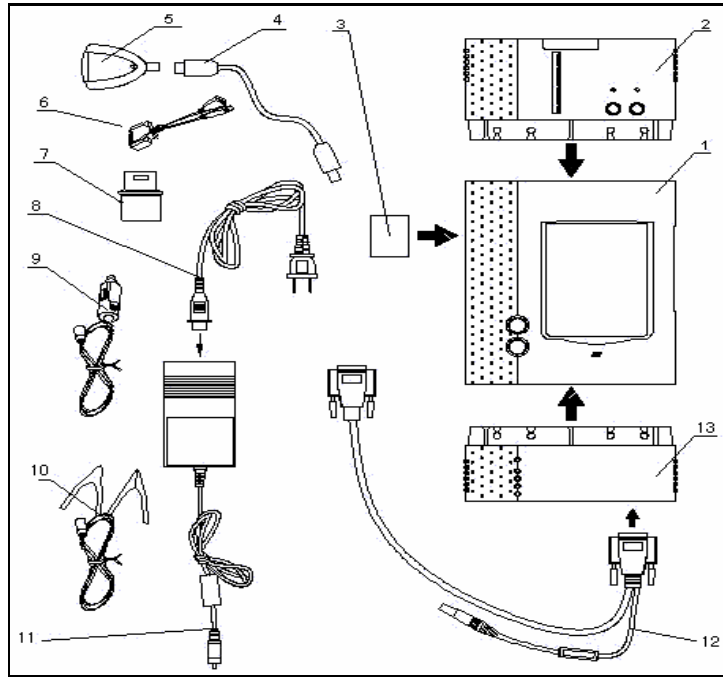


Figure 01

Configuration for Volkswagen diagnosis (Figure 01)

Item	Name	Descriptions	Item	Name	Descriptions
1	X-431 main unit	To display operation buttons, test result, help information, etc.	8	Power cord	To connect the AC 100-240V outlet and the power adapter.
2	MINIPRINTER	To print test result. (optional)	9	Cigarette lighter cable	To get power from the vehicle cigarette lighter
3	CF cartridge	To store diagnostic software and data	10	Battery cable w/two clips	To get power from the vehicle battery
4	USB cable	To connect CF card reader/writer and computer	11	Power adapter	To convert 100-240V AC power into 12V DC power.
5	CF card reader/writer	To read or write data on the CF card	12	Main cable	To connect the diagnostic connector and SMARTBOX
6	[Audi-4] connector	To diagnose Audi vehicles with 4PIN diagnostic socket	13	SMARTBOX	To perform vehicle diagnosis
7	[Smart OBDII] connector	To diagnose Volkswagen/Audi vehicles with 16PIN diagnostic socket			

Ports and Indicators

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See Figure 02 for X-431 connection ports and indicators.

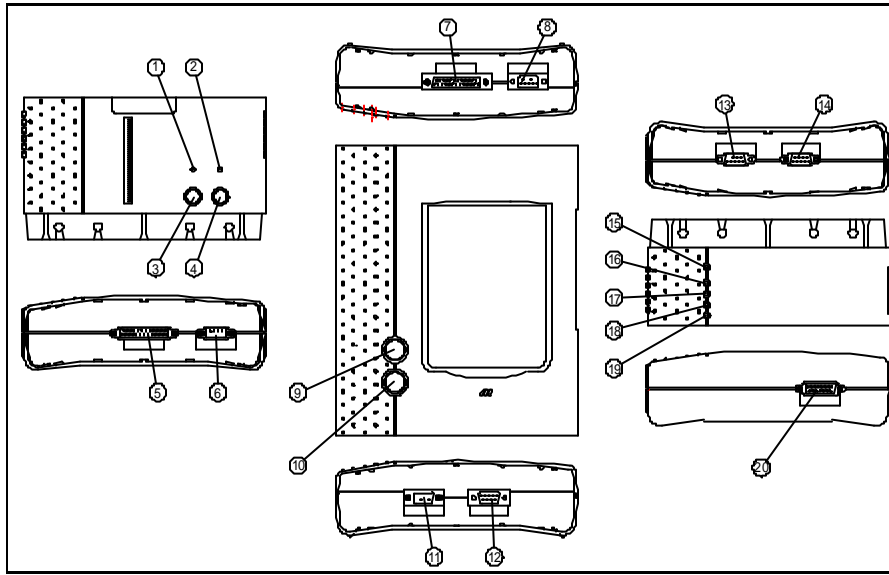


Figure 02

1	Printer SEL indicator (printer readiness)
2	Printer power indicator
3	Printer SEL button (printer readiness)
4	Printer FL button (paper feed)
5	Parallel communication port for connecting printer to main unit
6	Power input for printer
7	Parallel communication port for connecting main unit to printer
8	Power output of main unit.
9	Hotkey of main unit
10	Power switch of the main unit.
11	Power input of main unit
12	Serial communication port of main unit
13	Power output of SMARTBOX
14	Serial communication port of SMARTBOX
15	SMARTBOX power indicator
16	Indicator to show SMARTBOX sending data to the main unit
17	Indicator to show SMARTBOX receiving data from the main unit
18	Indicator to show SMARTBOX sending data to ECU
19	Indicator to show SMARTBOX receiving data from ECU
20	SMARTBOX data port

Printer Operation

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Mounting Paper

MINIPRINTER uses heat sensitive paper with size of 30 × 57mm (internal hole 7mm). Refer to Figure 03a to Figure 03d for mounting the paper.

1. Open the paper lid on the back of the printer. See Figure 03a.

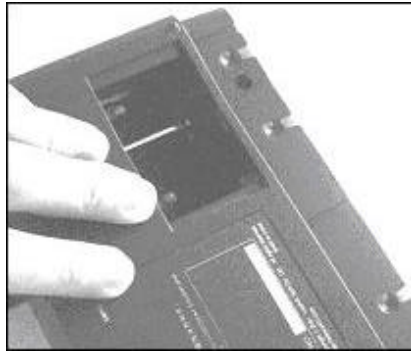


Figure 03a

2. Take out the spindle and mount the paper scroll onto the spindle. See Figure 03b.

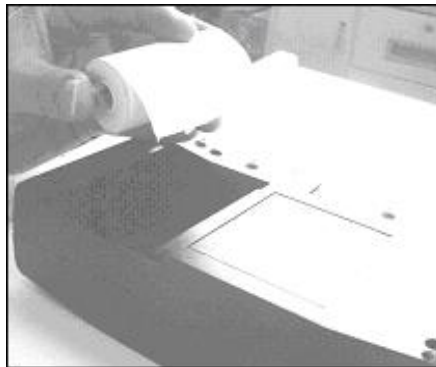


Figure 03b

3. Put the paper spindle into the printer with correct direction. The paper may not be fed if the direction is wrong. See Figure 03b and Figure 03c.



Figure 03c

4. Open the side plate, pull up the pressing rod and lead the paper into slot. Turn the feed knob clockwise until the paper comes out of the outlet. See Figure 03d.



Figure 03d

5. Push down the pressing rod, mount the side plate, attach the paper lid, and then connect the printer to the X-431 main unit.

Printing Test Result

There are two indicators on the printer:

1. [SEL] : to show the readiness of the printer.
2. [POWER] : the power indicator of the printer.

If the [SEL] indicator is not lit, you can press the [SEL] button to turn it on and make the printer ready.

When the [SEL] indicator is lit, it shows that the printer is ready. Click the [PRINT] button (if it appears) on the screen of X-431 main unit to print the test result.

Explanation of Buttons

[POWER]	Power button
[HOTKEY]	Hot key. Press it to calibrate the screen after the machine is turned on. Or press it to enter the vehicle diagnosis interface after X-431 is started.
[SEL]	To select the printer. When [SEL] indicator is lit, the printer is ready to print. If [SEL] indicator is not lit, the printer is not able to print.
[FL]	Paper-feed button.

Button Descriptions

The main buttons on the operation interface and their functions are as follows:

[BACK]: to return to the previous interface.

[START]: to do the next operation.

[EXIT]: to exit the diagnostic program.

[OK]: to confirm and execute.

[CANCEL]: to cancel present operation and return to the previous interface.

[PAGE UP]: to display the previous page. It is inactive if the current page is the first page.

[PAGE DOWN]: to display the next page. It is inactive if the current page is the last page.

[HOME]: return to the main interface.

[PRINT]: to print the test result.

[BOX INFO]: to show the version information of SMARTBOX.

[HELP]: to display the help information.

[RETRY]: to do the unfinished operation once again.

Conditions for Test

- ✂ The voltage of vehicle battery should be 11-14V. The rated voltage of the X-431 is 12V.
- ✂ Turn off all electric devices such as A/C, headlight, stereos etc.
- ✂ The throttle should be in the closed position.
- ✂ The ignition timer and idle speed should be in the standard range; the water temperature should be 90-110 and the transmission oil temperature should be 50-80 .

Select Diagnostic connector

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- ✂ If the diagnostic socket is 4PIN, please select the [Audi-4] diagnostic connector.
- ✂ If the diagnostic socket is 16PIN, please select the [Smart OBDII] diagnostic connector.

Diagnostic Socket Location

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The diagnostic socket of Volkswagen vehicle is located in the cab under the instrument at the driver side.

Pin Definitions

16PIN Diagnostic Socket

The 16PIN diagnostic socket is as shown in Figure 04.

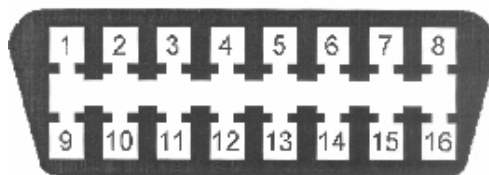


Figure 04

PIN definition of 16PIN diagnostic socket

PIN	Definition
2	BUS+
4	Grounding
5	Grounding
7	K line
10	BUS-
15	L line
16	Power +12V

4PIN Diagnostic Socket

The 4PIN diagnostic socket is as shown in Figure 05.

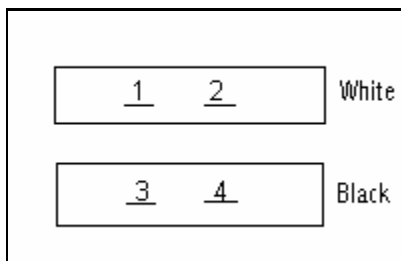


Figure 05

PIN definition of 4PIN diagnostic socket

PIN	Definition
1	L line
2	K line
3	Grounding
4	Power

Connection

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Refer to Figure 06 and Figure 07 for 4PIN and 16PIN diagnostic sockets connection.

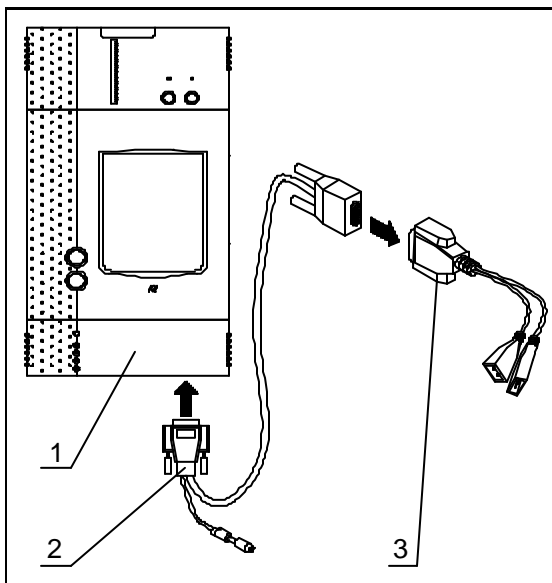


Figure 06

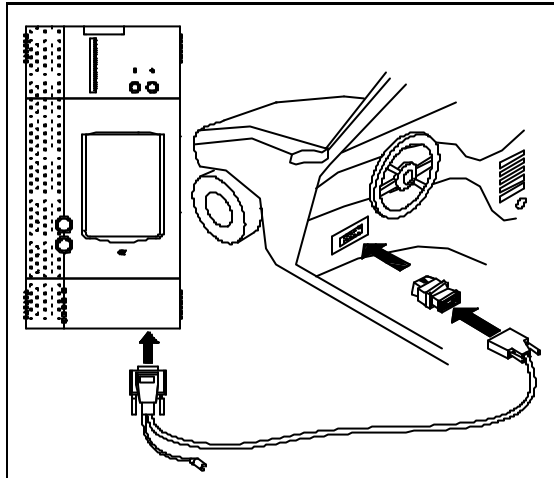


Figure 07

- ✘ Insert the CF cartridge into the CF cartridge slot, let the side printed with "X-431" be downward, and make sure the cartridge is fully seated.
- ✘ Insert one end of the main cable into the diagnostic socket on SMARTBOX.
- ✘ Connect the other end of the main cable to the selected diagnostic connector.
- ✘ Connect the diagnostic connector to the vehicle diagnostic socket.

Caution:

For 4PIN diagnostic socket, make sure that the black connector is plugged into black socket, the white connector is plugged into white socket, and the direction is correct. (If you feel hard to plug, try another direction. Do not overexert!) The diagnostic socket of Volkswagen vehicle is self-powered, so external power source is not necessary.

Note:

If the power supply on vehicle diagnostic socket is insufficient or the power pin is damaged, you can get power in the following ways:

- ? *From cigarette lighter: insert one end of the cigarette lighter cable into the lighter socket in vehicle and connect the other end to the power connector of X-431 main cable.*
- ? *From battery: clamp the two clips of battery cable on the positive and negative poles of battery and insert another end of the cable into the power connector of X-431 main cable.*
- ? *From power adapter: connect the power adapter to the 100-240V AC outlet with power cord. Insert the 12V DC plug of power adapter into the power connector of X-431 main cable*

Operation

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Entering Function Menu

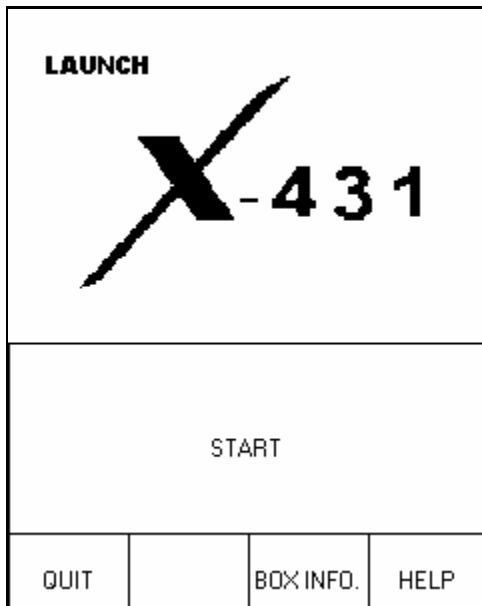


Figure 08

After connection, press [POWER] key to start X-431.

After starting the main unit, press [HOTKEY] (or click [Start] button on the main menu, and select [GAG] [GD Scan] on the pop-up menu), the screen will display the home page of vehicle diagnosis as shown in Figure 08.

Button descriptions:

- ? [QUIT]: to exit the diagnostic program.
- ? [BOX INFO.]: to display hardware and software version of SMARTBOX.
- ? [HELP]: to display help information.
- ? [START]: to start the diagnosis.

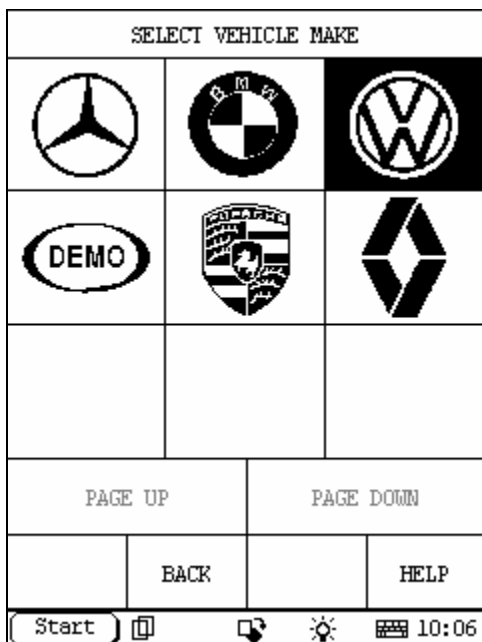


Figure 09

Click [START] button, the screen will display the vehicle make menu as shown in Figure 09.

Button descriptions:

- ? [BACK]: to return to the previous interface.
- ? [PAGE UP]: to display the previous page, it is inactive if the current page is the first page.
- ? [PAGE DOWN]: to display the next page, it is inactive if the current page is the last page.
- ? [HELP]: to display the help information.

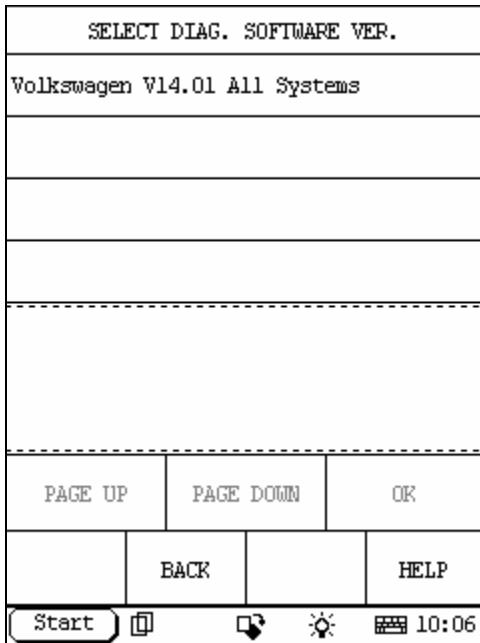


Figure 10

Click the icon of Volkswagen on the vehicle make menu. The screen will be displayed as shown in Figure 10.

Button descriptions:

- ? [BACK]: to return to the previous interface.
- ? [HELP]: to display the help information.

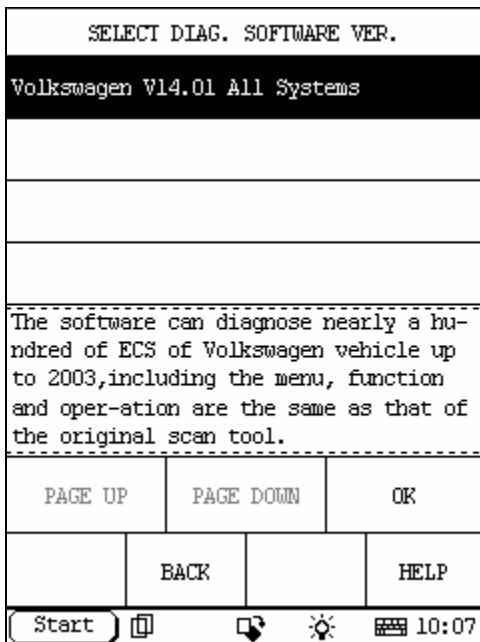


Figure 11

Click [Volkswagen V14.01 All Systems]. The display will be as shown in Figure 11. The software can diagnose the electronic control systems of Volkswagen up to 2003. The operation is the same as that of the original scan tool.

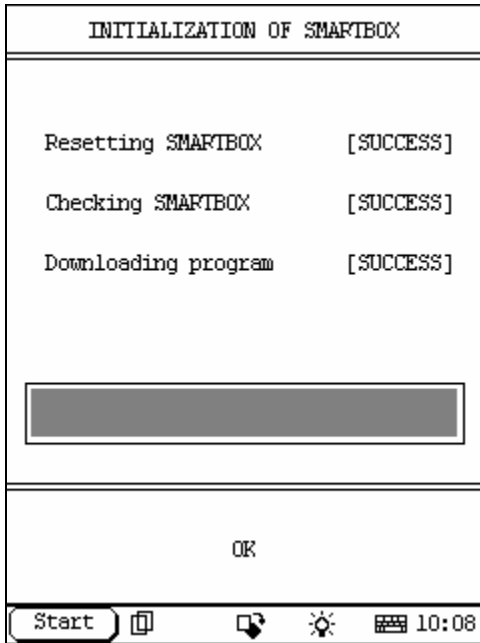


Figure 12

Click [OK] button, X-431 begins reset and check the SMARTBOX, and download the diagnostic program from the CF cartridge. After download, the screen will be displayed as shown in Figure 12.

Button descriptions:
[OK]: to go on the test.

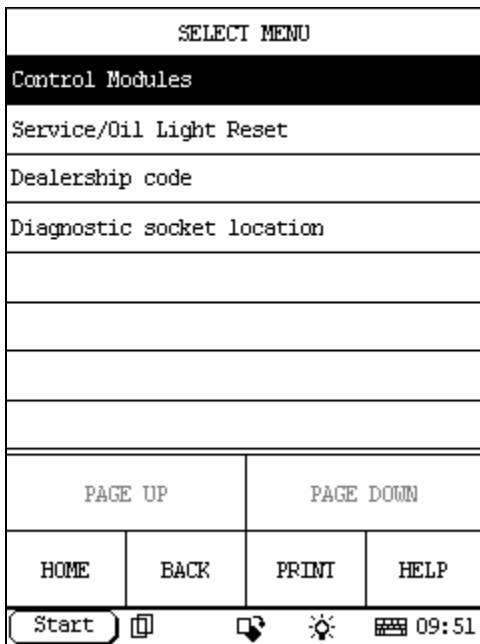


Figure 13

Control Modules [Home](#)

Click [OK] button, the screen will display the information as shown in Figure 13.

Button descriptions:

- ? [HOME]: to return to the homepage of vehicle diagnosis.
- ? [BACK]: to return to the previous interface.
- ? [HELP]: to display the help information.

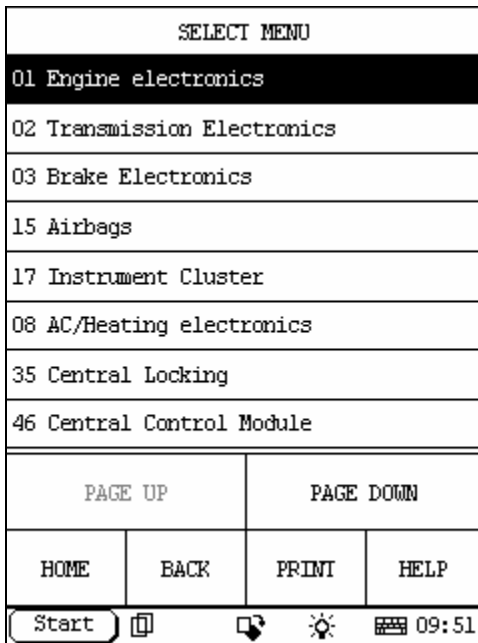


Figure 14

Click [Control Modules]. The screen displays the menu of test systems as shown in Figure 14. Because all systems are in the same diagnostic procedure, we just introduce the engine electronics.

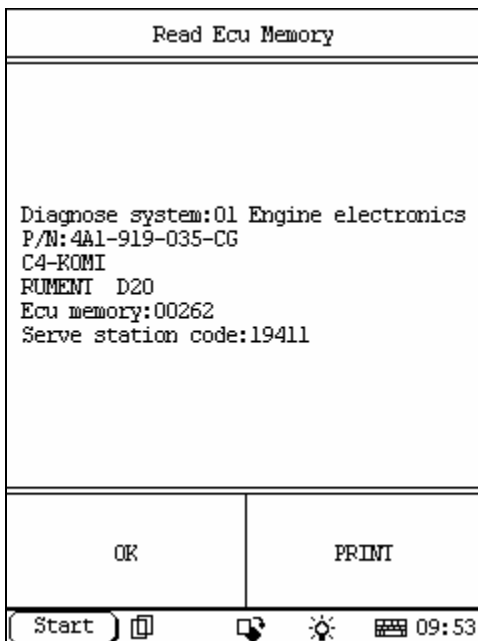


Figure 15

Click [Engine electronics]. If the communication is successful, the screen will display the information on vehicle ECU, as shown in Figure 15.

Note:

The information is from the vehicle ECU. If you have any question during test, don't hesitate to contact LAUNCH to get answer as soon as possible.

Button descriptions:

- ? [OK]: to go on the test.
- ? [PRINT]: to print the displayed information.

DIAGNOSE ITEM			
Control Unit Info			
Read Fault Codes			
Measuring Blocks			
Clear Fault Codes			
Basic Settings			
Adaptation			
Single Reading			
Output Tests			
PAGE UP		PAGE DOWN	
HOME	BACK	PRINT	HELP
Start			09:53

Figure 16

Click [OK] button. The screen will display the function menu as shown in Figure 16.

Button descriptions:

- ? [HOME]: to return to the homepage of vehicle diagnosis.
- ? [BACK]: to return to the previous interface.
- ? [HELP]: to display the help information.
- ? [PAGE DOWN]: to display the next page.

DIAGNOSE ITEM			
Code Module			
Login			
Chassis Number adjustment			
Readiness			
PAGE UP		PAGE DOWN	
HOME	BACK	PRINT	HELP
Start			15:11

Figure 17

Click [PAGE DOWN] button to display the second page of the function menu as shown in Figure 17.

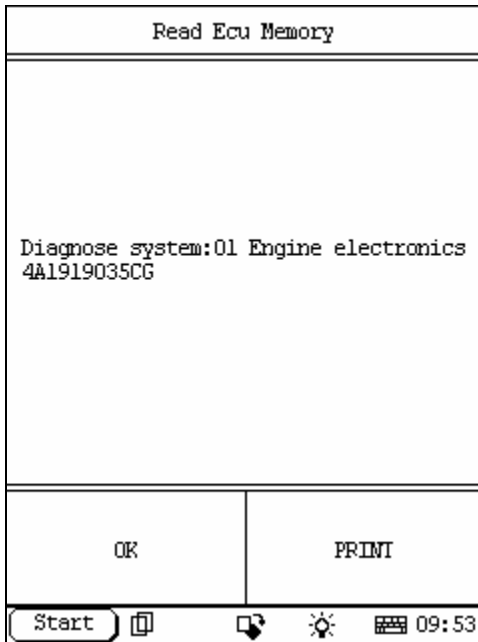


Figure 18

Read ECU Memory [Home](#)

Click [Read ECU Memory] in the function menu. The screen will display the information on ECU of the tested system. See Figure 18.

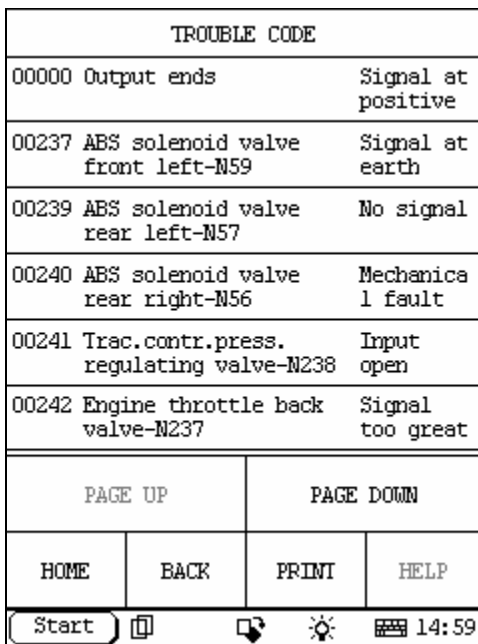


Figure 19

Read Fault Memory [Home](#)

Click [Read Fault Memory] in the function menu. X-431 starts to test the fault code. The screen will display the test result when the test is finished. Figure19 is an example of a test.

Button descriptions:

- ? [HOME]: to return to the homepage of vehicle diagnosis.
- ? [BACK]: to return to the previous interface.
- ? [PRINT]: to print the test result.

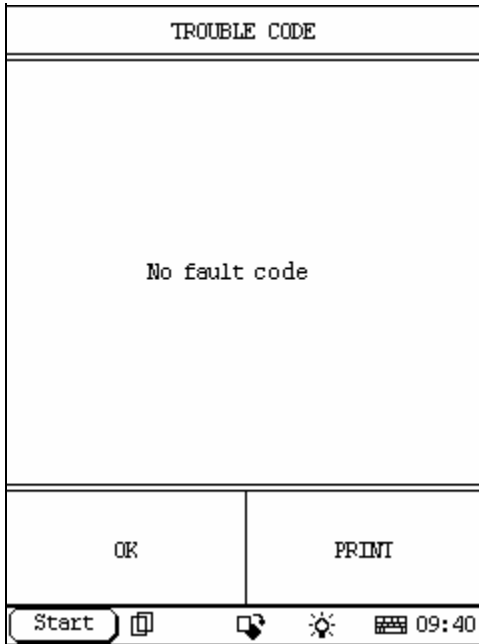


Figure 20

If there is no fault code in the tested system, the display will be as shown in Figure 20.

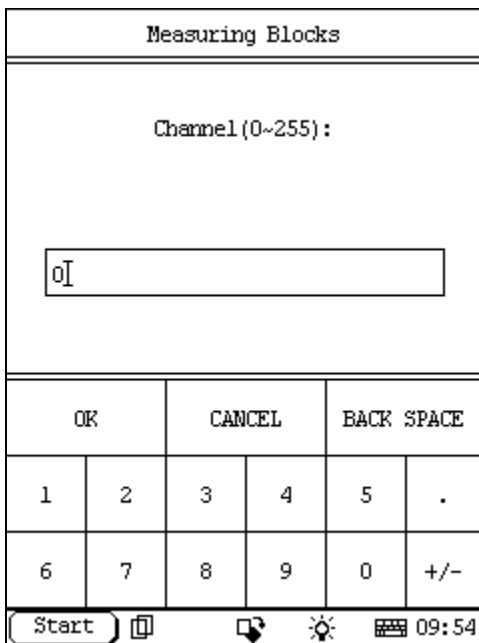


Figure 21

Read Measuring Value [Home](#)

The function gives the technician access to data-stream or live data from the ECM. Because there are so many data-stream parameters they are grouped. Each group can be selected by the display group number and shown sequentially. Click [Read Measuring Value] in the function menu. The screen will be displayed as shown in Figure 21.

X-431 prompts user to input the channel No. of data stream. Click the number button to input the group No. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one. After the correct channel No. is inputted, click [OK] button to perform the function of "read measuring value".

DATA STREAM				
GROUP:	1			
At Idle				
Idle speed,700-820 rpm	224.4 r/min			
Coolant Temp,80-110	0.29 %			
Oxygen Sensor,-10%-10%	33.80 <°			
Adj for Basic,1x1111111	33.93 ° v.OT			
PAGE UP	PAGE DOWN	GRAPHIC-1		
HOME	BACK	PRINT	HELP	
Start				15:00

Figure 22

For example, when "1" is inputted for the channel No., the screen will display the live value of data stream of the channel. See Figure 22.

Note:

Not all vehicle support the function.

DATA STREAM				
Idle speed,700-820 rpm r/min				
224.5				
224.4				
224.3				
PAGE UP	PAGE DOWN	GRAPHIC-2		
HOME	BACK	PRINT	HELP	
Start				15:00

Figure 23

For seeing the waveform of an item, click the item and then click [GRAPHIC-1]. Figure 23 shows an example of the waveform.

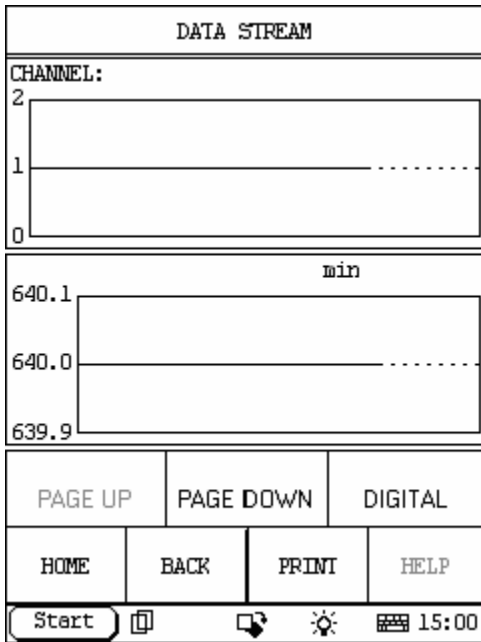


Figure 24

Click [GRAPHIC-2] to display the waveforms of 2 data stream items. See Figure 24. It is convenient for the user to make live comparison between two correlative data stream items.

Note:

- ? The screen will display the live value of data stream again if the [DIGITAL] button is clicked in the interface.
- ? The three display modes -- [DIGITAL], [GRAPHIC-1] and [GRAPHIC-2] can be switched in turn.

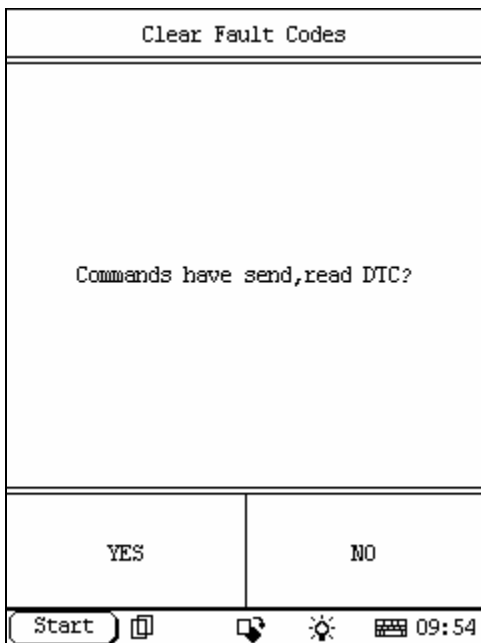


Figure 25

Clear Fault Codes

[Home](#)

After you know what the fault codes are, then you can erase the error memory and road test the car to see if they come back. Click [Clear Fault Codes] in the function menu. X-431 starts to erase the fault code. The screen will display as show in Figure 25.

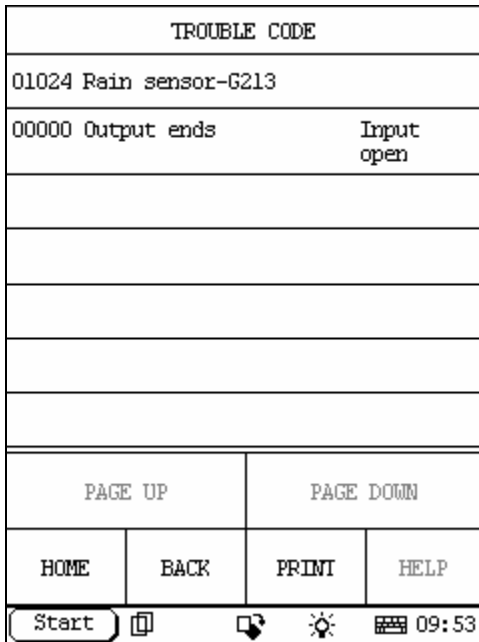


Figure 26

Click [yes], the screen will display the residual fault code after erasing. Figure 26 shows an example of the result after erasing.

Click [NO] to return to the function menu.

Button descriptions:

- ? [HOME]: to return to the homepage of vehicle diagnosis.
- ? [BACK]: to return to the previous interface.
- ? [PRINT]: to print the test result.

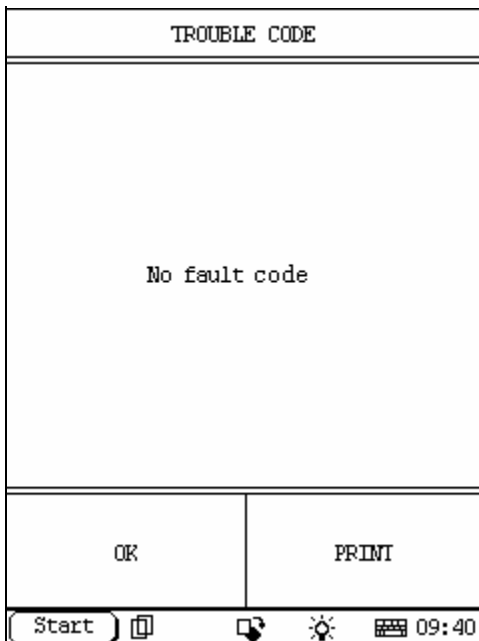


Figure 27

If all fault codes are erased or there is no fault code in the tested system, the screen will be displayed as shown in Figure 27.

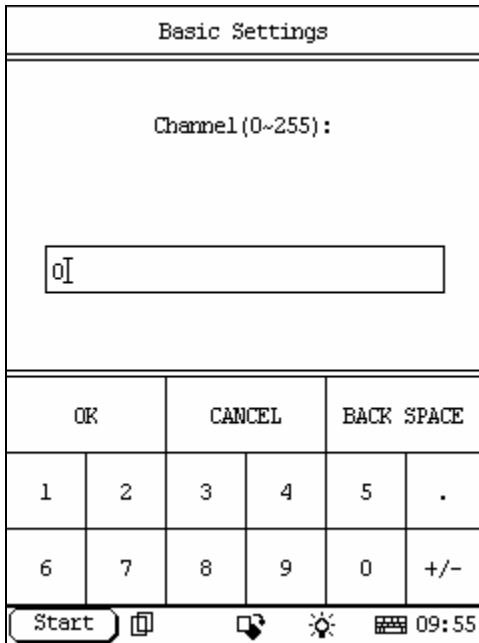


Figure 28

Basic Setting

[Home](#)

This function allows the user to perform basic settings on some systems after a part has been replaced or repaired.

Click [Basic Setting] in the function menu. The display will be as shown in Figure 28.

X-431 prompts user to input the channel No. Click the number button to input the group No. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one. After the correct channel No. is inputted, click [OK] button to perform the basic setting for the system.

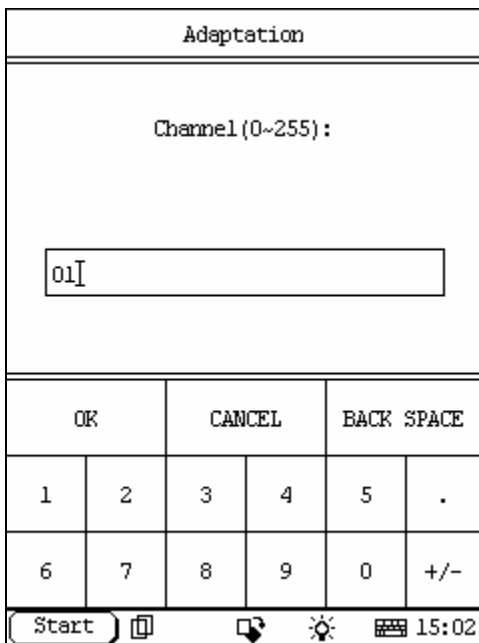


Figure 29

Adaptation

[Home](#)

The function should only be used by technicians who understand the results of changing baseline settings to engine controls. For example, the base idle speed can be changed using the function. Changes in adaptive or baseline settings will affect vehicle emissions, performance, and service life. The vehicle warranty may be voided by changing these settings. Learned values can be deleted or erased. Click [Adaptation] in the function menu. The screen will be displayed as shown in Figure 29

X-431 prompts user to input the channel No. of data stream. Click the number button to input the group No. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one.

Adaptation				
GROUP:	1			
Adaptated number:	2			
	0.2 r/min			
PAGE UP		PAGE DOWN		PRINT
<	OK	CANCEL	+	->
Start	☐	☑	☀	15:03

Figure 30.

After the correct channel No. is inputted, click [OK] button. See Figure 30.

X-431 prompts user to select the adapted number by [+] or [-].

Click [ok], adaptation complete.

Adaptation				
GROUP:	1			
Adaptated number:	1			
PAGE UP		PAGE DOWN		PRINT
<	CANCEL	+	-	->
Start	☐	☑	☀	15:06

Figure 31.

If you want to change adapted number matched data, click [>], the screen display as show in figure31.

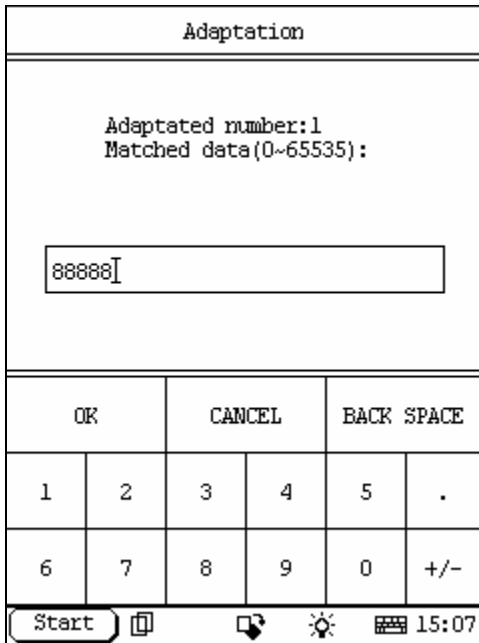


Figure 32.

Click [->], the screen display as show in figure32. Click the number button to input the group No. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one. After the correct channel No. is inputted, dick [OK] button to match data.

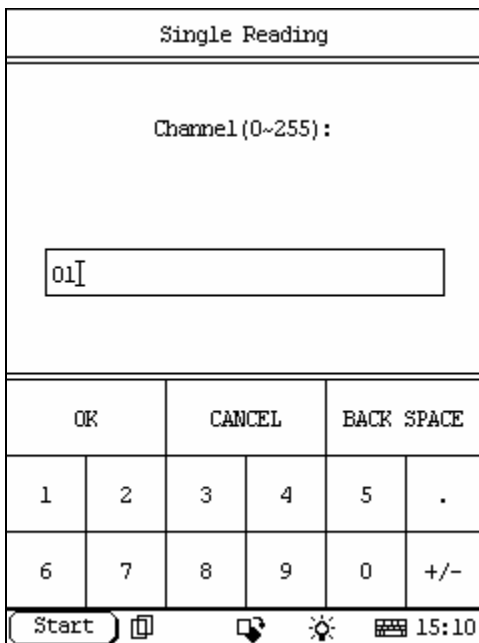


Figure 33.

Single reading

[Home](#)

Click [Single Reading] in the function menu. The screen will be displayed as shown in Figure 33. X-431 prompts user to input the channel No. of data stream. Click the number button to input the group No. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one. After the correct channel No. is inputted, click [OK] button to perform the function of "read individual measuring value".

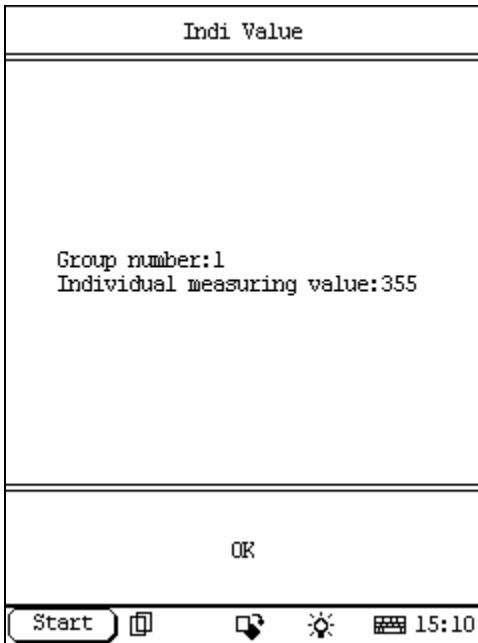


Figure 34.

After the correct channel No. is inputted, click [OK] button to perform the function of "read individual measuring value"

For example, when "1" is inputted for the channel No., the screen will display the live value of the channel. See Figure 34.

Click [ok] then return.

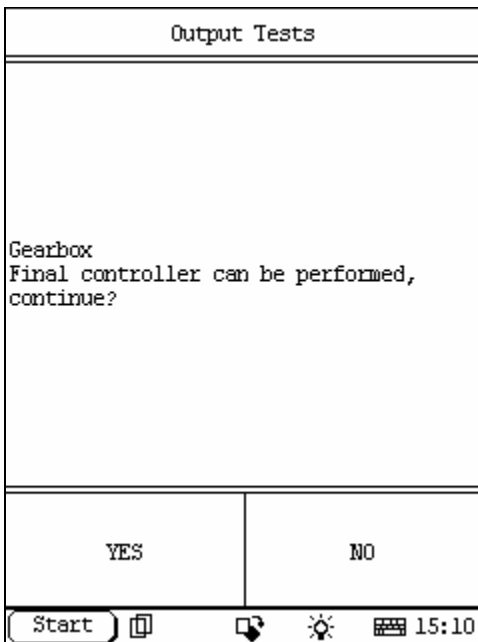


Figure 35.

Output Tests

[Home](#)

This function allows the user to check output devices such as fuel injectors, solenoids, valves, and motors for functionality. Click [Output Tests] in the function menu. The screen will display the information as shown in Figure 35.

Button descriptions:

- ? **[YES]:** to perform the test for next component.
- ? **[NO]:** to quit the test and return to the function menu.

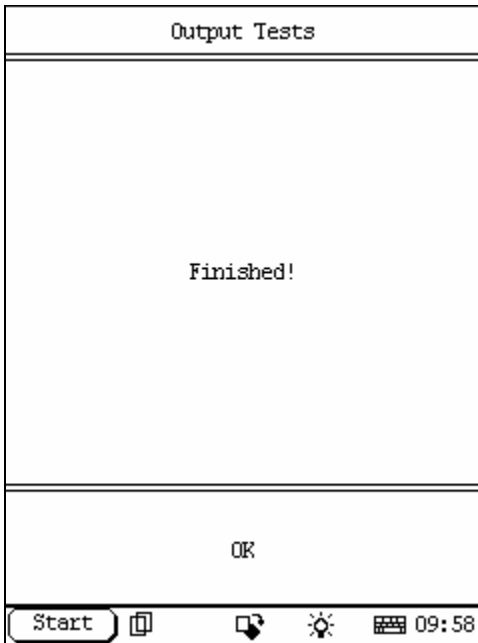


Figure 36.

When the test for all actuators is finished, the screen will display the information as shown in Figure 36.

Click [OK] button to return to the function menu.

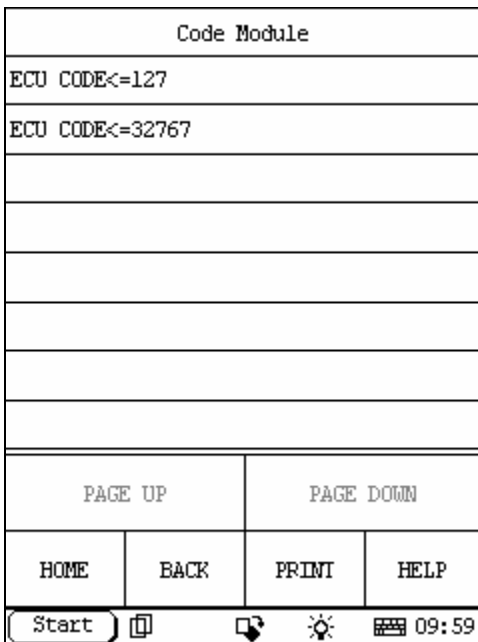


Figure 37.

Code Module

[Home](#)

The function gives the technician the ability to 'flash' a control unit with new program data. Always consult the repair manual. Coding is used to 'customize' the control unit for a particular market or car version. Click [Code Module] in the function menu. The screen will be displayed as shown in Figure 37

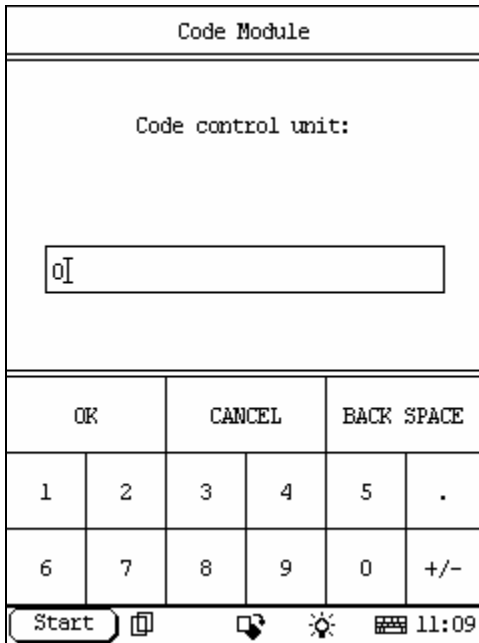


Figure 38.

Click [ECU CODE<=127] or [ECU CODE<=32767]. The screen will be displayed as shown in Figure 38. Click the number button to input the control unit code. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one.

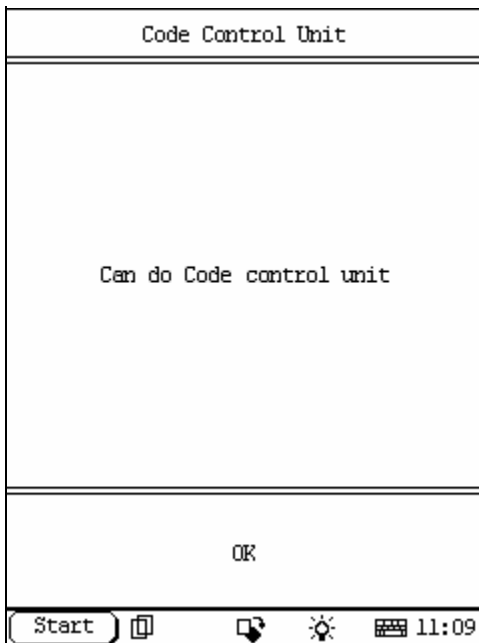


Figure 39.

After the correct control unit is inputted, click [OK] button to perform the function of "code control unit".

If the control unit can be coded, the screen will be displayed as shown in Figure 39.

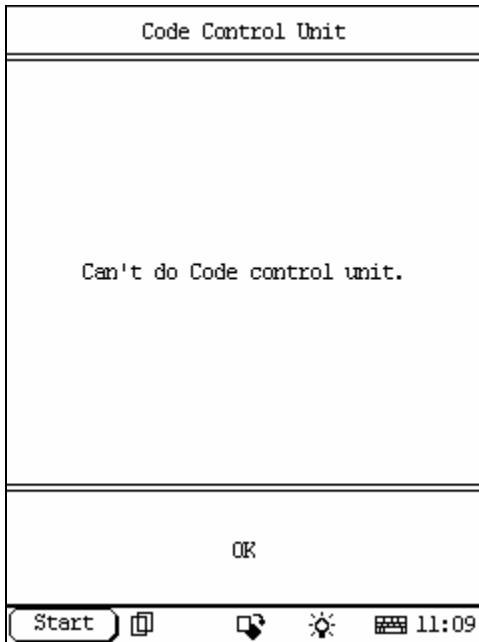


Figure 40.

If the control unit can't be coded, the screen will be displayed as shown in Figure 40

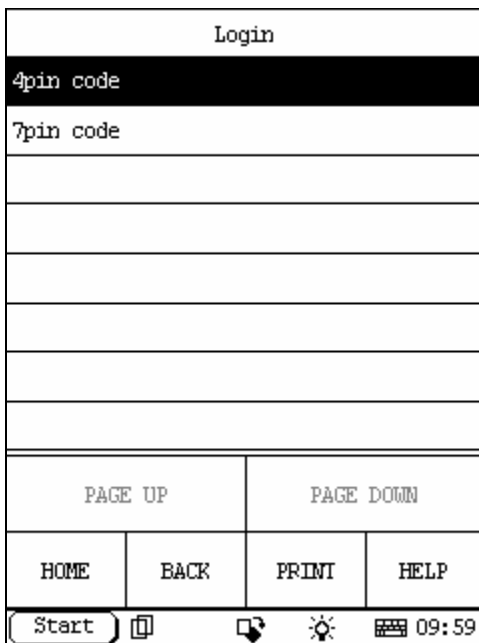


Figure 41.

Login

[Home](#)

Note:

Perform this function first before performing the functions like "code control unit", "adaptation", etc.

Click [Login] in the function menu. The screen will be displayed as shown in Figure 41.

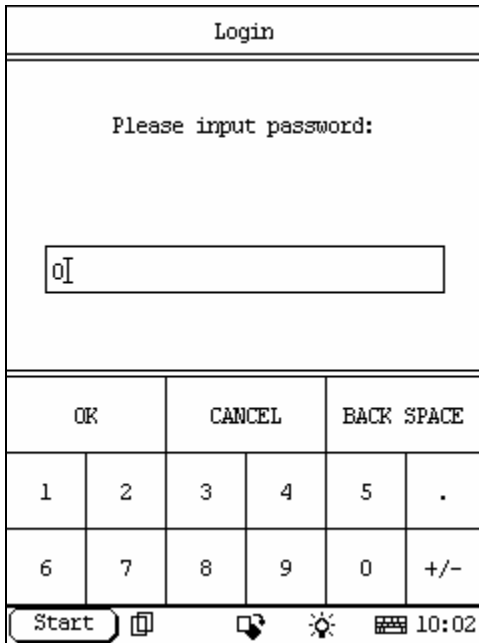


Figure 42.

Select the socket accord to the car that is being scanned. The screen will be displayed as shown in Figure 42.

Click the number button to input the login password. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one.

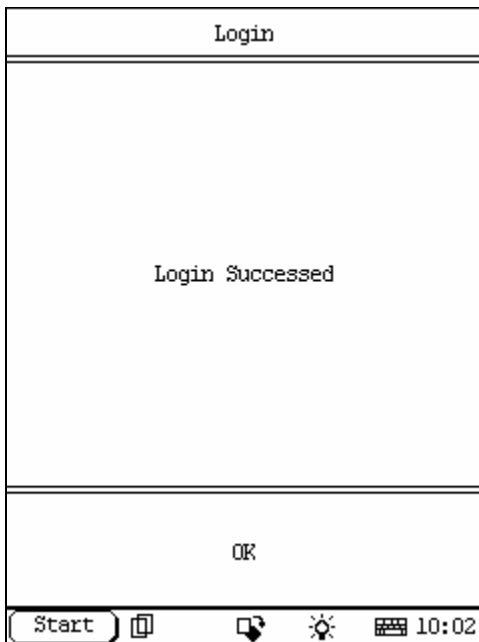


Figure 43.

After the login password is inputted, click [OK] button. X-431 starts to log in. When the login is successful, the screen will display the information as shown in Figure 43

Chassis Number Adjustment

[Home](#)

Click [Chassis Number Adjustment] in the function menu. The screen will be displayed as shown in Figure 44.

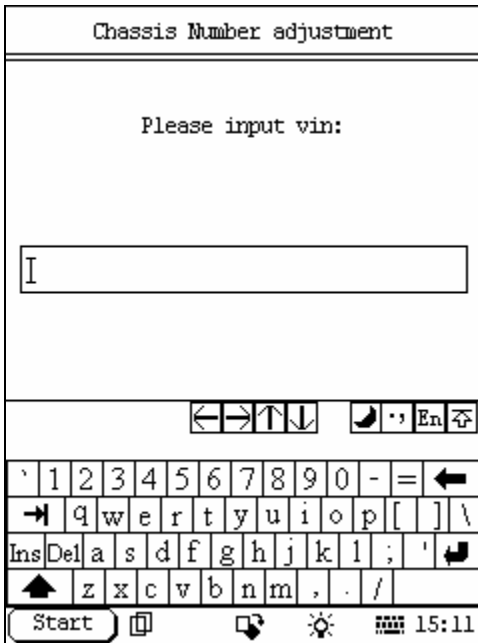


Figure 44.

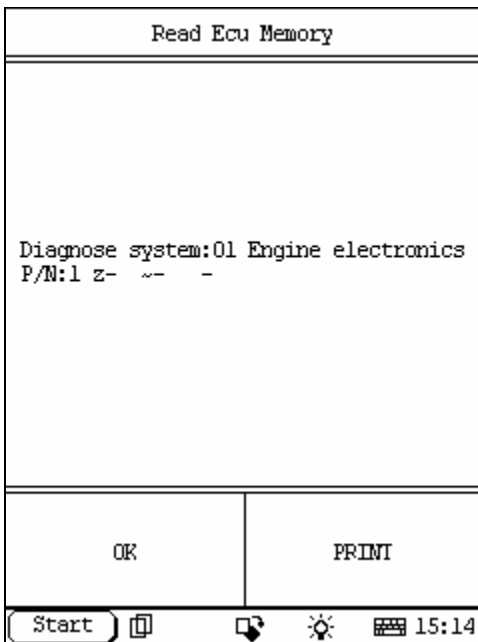


Figure 45.

Input the right number and close the keyboard then click [ok]. The screen will be displayed as shown in Figure 45.

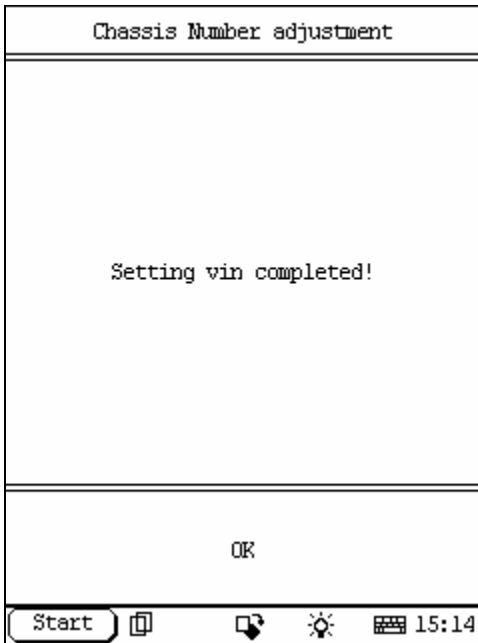


Figure 46.

Click [ok] Then the screen will be displayed as shown in Figure 46.

Click [ok] in here then return.

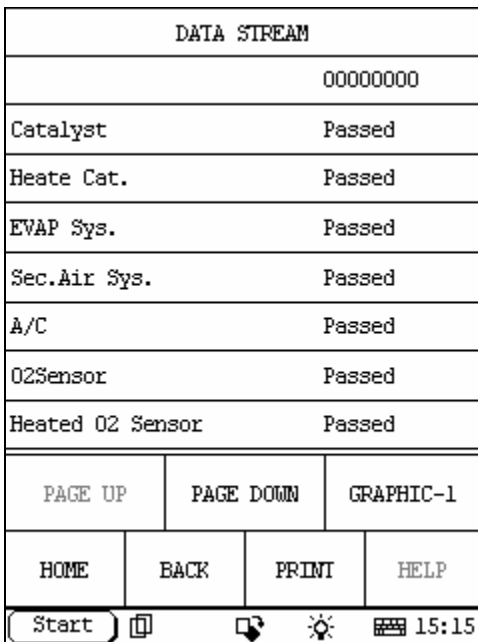


Figure 47.

Readiness

[Home](#)

Note:

Readiness function is that checking the systems on vehicle such as catalyst, heat cat, EVAP sys etc.

Click [Readiness] in the function menu. The screen will be displayed as shown in Figure 47.

Service/Oil light reset [Home](#)

Note:

When the service/oil light lights, this function can reset the light after service was finished.

Click [Service/Oil light reset] in the figure13. The screen will be displayed as shown in Figure 48.

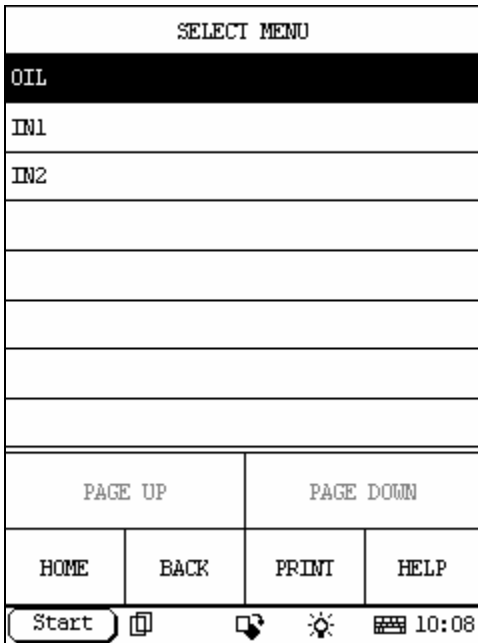


Figure 48

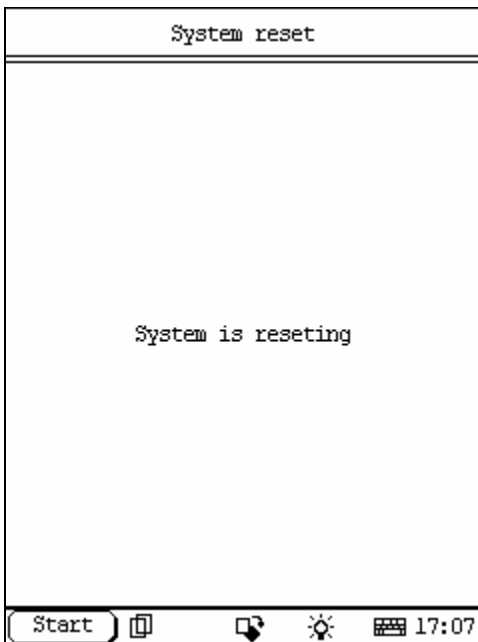


Figure49

Because resetting oil, in1 and in2 are in the same procedure, we just introduce the oil.

Click [Oil] then the screen will display as shown in Figure 49.

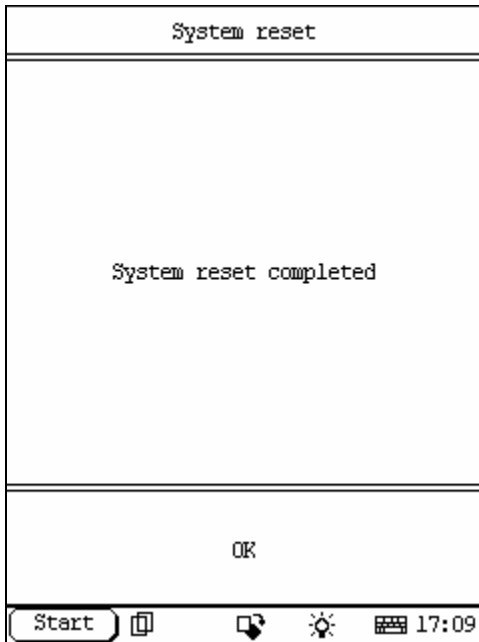


Figure 50

A few seconds later, the screen display as show in figure50.

Click [ok], resetting finish.

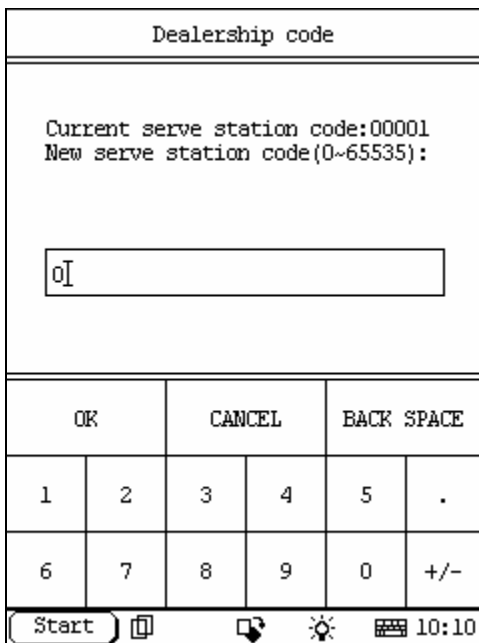


Figure51

Dealership code

[Home](#)

Note:

When we have our vehicle maintained or repaired in a new serve station, we can input the new serve station code, that we can remember where are we have our vehicle maintained or repaired and what's the trouble last time when we do it again.

Click [dealership code] in the figure13. The screen will be displayed as shown in Figure 51.

Click the number button to input the dealership code. If wrong number is inputted, click [BACK SPACE] to delete the wrong number and input the correct one.

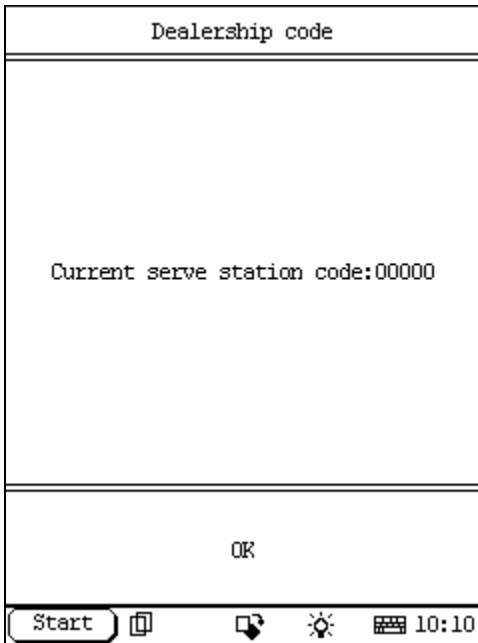


Figure 52

Click [ok] then the screen will display as shown in Figure 52. we can see the serve station code input in above.

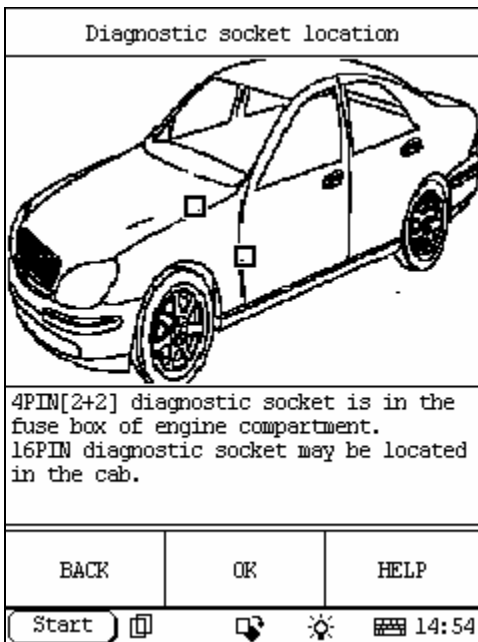


Figure 53

Diagnostic socket location

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Click [Diagnostic socket location] in the figure13. The screen will be displayed as shown in Figure 53.

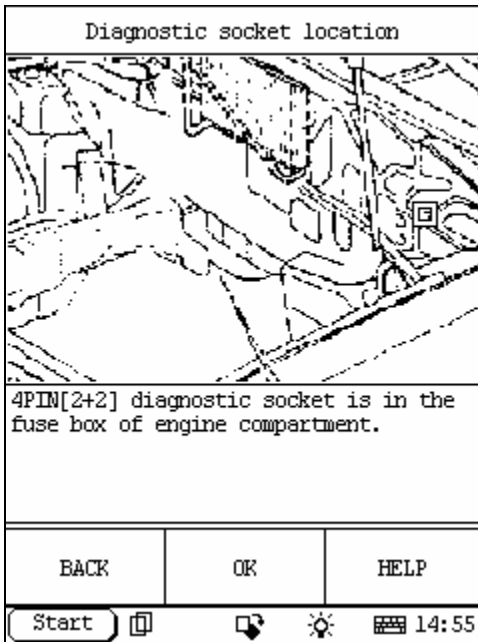


Figure 54

Click the flash square, the screen will be displayed as shown in Figure 54. The flash square location is where the diagnostic socket it is.

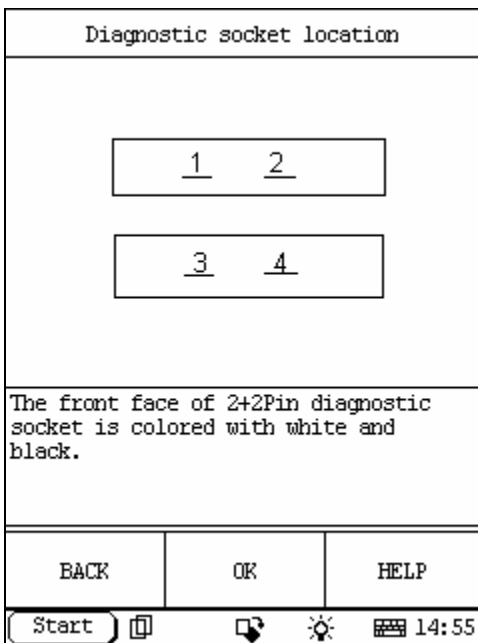


Figure 55

Click the flash square, the screen will display the diagnostic socket in detail as shown in Figure 55.