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LAUNCH

1. INTRODUCTION

CR VII is a <u>convenient and easy-operated automotive diagnostic tool</u>. Compared to CResetter, CR VII features more powerful OBDII diagnosing functions and covers a wider range of vehicle makes. With built-in help menus and code definitions, diagnosing and repairing is now easier than ever! The CR VII also features the following bi-directional "special tests": EVAP, O2 Sensor, I/M Readiness and On-board monitors testing etc.

2. General Information-About OBDII/EOBD

2.1 On-Board Diagnostics (OBD) II

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

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

1) Whether the Malfunction Indicator Light (MIL) is commanded 'on' or 'off';

2) Which, if any, Diagnostic Trouble Codes (DTCs) are stored;

3) Readiness Monitor status.

2.2 Diagnostic Trouble Codes (DTCs)

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

character, a letter, identifies which control system sets the code. The second character, a number, 0-3; other three characters, a hex character, 0-9 or A-F provide additional information on where the DTC originated and the operating conditions that caused it to set. Here below is an example to illustrate the structure of the digits:
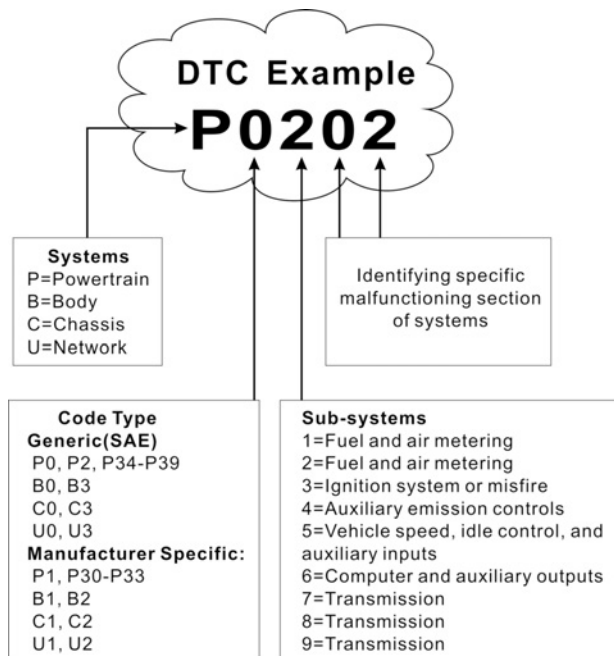
2.3 Location of the Data Link Connector (DLC)

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

manual for the location.
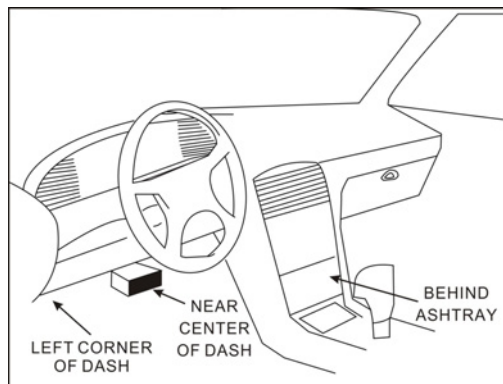
2.4 OBD II Readiness Monitors

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

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

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

1. Misfire

2. Fuel System

3. Comprehensive Components (CCM)

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

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

1) EGR System

2) O2 Sensors

3) Catalyst

4) Evaporative System

5) O2 Sensor Heater

6) Secondary air Injection

7) Heated Catalyst

8) A/C system

2.5 OBD II Monitor Readiness Status

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

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

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

2.6 OBD II Definitions

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

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

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

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

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

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

Fuel Trim (FT) - Feedback adjustments to the base fuel schedule. Short-term

fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers to much more gradual adjustments to the fuel calibration schedule than short-term trim adjustments. These long-term adjustments compensate for vehicle differences and gradual changes that occur over time.
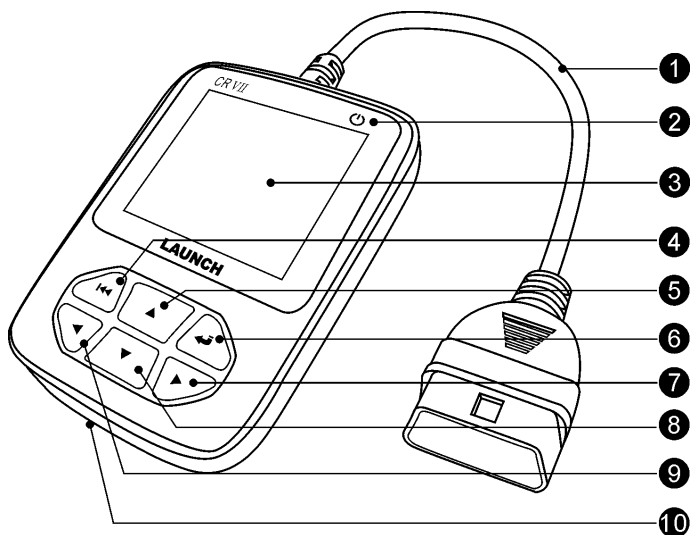
3. Product Descriptions

3.1 Outline of CR VII

Figure 3-1

No.	Name	Descriptions
1	**Cable with OBD II connector**	Connects the CR VII to the vehicle's Data Link Connector (DLC).
2	**Power indicator**	It will light up when CR VII is powered on.
3	**LCD DISPLAY**	Indicates test results.
4	**◄◄ (EXIT) button**	Returns to previous menu.
5/8	**▲ / ▼ buttons**	Move cursor up and down for selection.
6	**↵ (ENTER) button**	Confirms a selection (or action) from a menu list.

7/9	▶ / ◀ **buttons**	Move cursor right or left for selection; Or turn page up and down when more than one page is displayed.
10	**USB port**	Connects on computer to update the CR VII.

3.2 Specifications

- Input voltage range: 9~18V
- Operating current: Typical value <100mA@12V
- Typical consumptions: <1.5W
- Operating temperature: 32°F ~ 122°F/ 0°C ~ 50°C
- Storage temperature: -4°F ~ 70°F/ -20°C ~ 70°C@ RH 60%
- Cabinet protecting level: IP43
- Outline Dimension: 4.7"(L) * 3.2"(W) * 1"(H)
- Product weight: <500g
- Display: 2.8" TFT LCD
- Interface type: Standard 16 pin OBD diagnose interface

3.3 Packing list

- CR VII x 1
- User's manual x 1
- USB cable x 1

4. Operations

4.1 Connection

1. Turn the ignition off.
2. Locate the vehicle's 16-pin Data Link Connector (DLC). (For details on location of DLC, please refer to Chapter 2.3.)
3. Plug the OBDII cable into the vehicle's DLC.
4. Turn the ignition on.
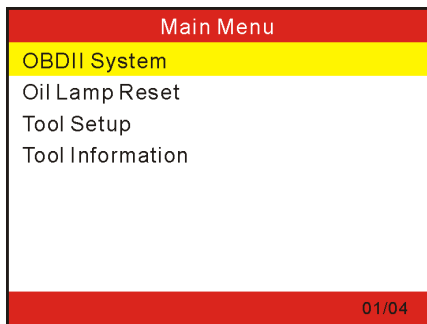5. The screen will display interface as following figure 4-1.

Figure 4-1

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

4.2 Tool Setup

This option enables you to change the interface language.

4.3 Tool Information

This option is used to display Tool Information. Tool information includes: software version, hardware version, serial number and register password.

5. OBDII System Diagnose

5.1 OBDII Diagnose

In Figure 4-1, highlight [OBDII System] and press [◀▤] to enter, the screen will display as following figure 5-1:
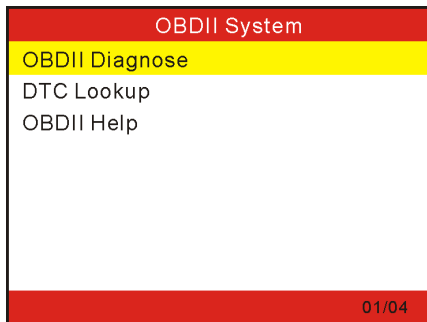
OBDII System
OBDII Diagnose
DTC Lookup
OBDII Help
01/04

Figure 5-1

Press [▼]/[▲] to select [OBDII Diagnose] and press [◀▤], the screen will enter the screen as shown in figure 5-2:

Monitor Status	
MIL Status	OFF
DTCs in this ECU	108
Readiness Completed	5
Readiness Not Completed	2
Readiness Not Supported	3
Datastream Supported	119
Ignition	Spark
Protocol Type	CAN

Figure 5-2

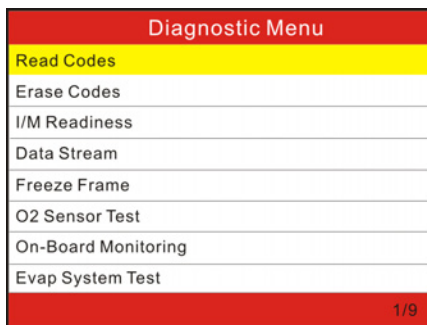Press [◀▤], a screen similar to Figure 5-3 will appear:

Figure 5-3

If it fails to enter the system, a prompt message box will appear. Follow the on-screen instructions to check the possible cause and retry it.

5.1.1 Read Codes

Select [Read Codes] and press [◀◀]. A screen similar to Figure 5-4 will pop up:
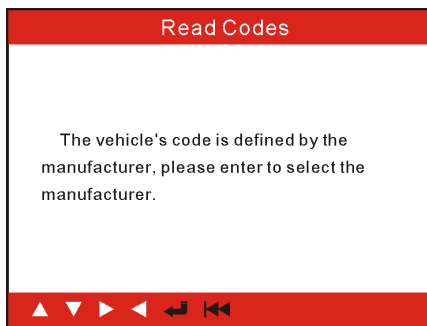

Figure 5-4

Press [◀◀] to enter to select the manufacturer. Figure 5-5 will be shown on the screen. Press [▼]/[▲] to select different items; press [▶]/[◀] to turn to next or previous page. After selecting the desired one, press [◀◀] to confirm.

Figure 5-5

If some DTCs are found, the system will enter a screen similar to figure 5-6 will appear:
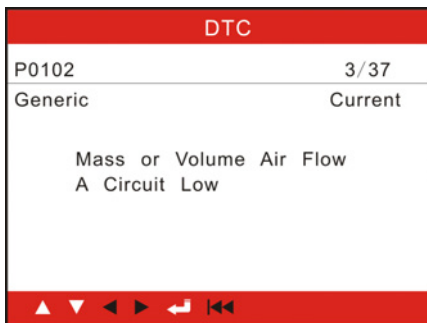
Figure 5-6

3/37 indicates there are 37 codes total and now P0102 is the third code to display. The screen will also show the detailed description of the current DTC.

You can use [▶] key to view the next code.

If the DTC can not be found, the message "The fault code is not found in the database" will appear.

Press [◄◄] to exit diagnostic function.

5.1.2 Erase Codes

Select [Erase Codes], the screen will display the interface as shown below:
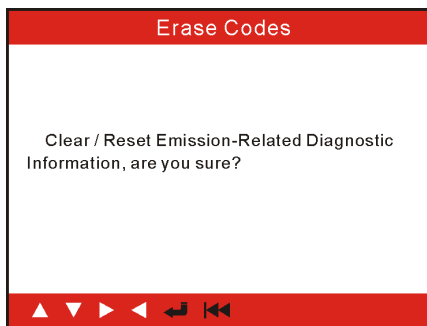
```
┌──────────────────────────────────────┐
│            Erase Codes               │
├──────────────────────────────────────┤
│                                      │
│                                      │
│   Clear / Reset Emission-Related Diagnostic │
│   Information, are you sure?          │
│                                      │
│                                      │
│                                      │
│  ▲  ▼  ▶  ◀   ↵   |◀◀                │
└──────────────────────────────────────┘
```

Figure 5-7

Press [|◀◀] to cancel; press [↵] to erase DTC's, and the screen will display the interface as shown in Figure 5-8:

```
┌──────────────────────────────────────┐
│            Erase Codes               │
├──────────────────────────────────────┤
│                                      │
│                                      │
│   Please Turn Ignition ON with Engine Off, press │
│   OK key to continue!                │
│                                      │
│                                      │
│                                      │
│  ▲  ▼  ▶  ◀   ↵   |◀◀                │
└──────────────────────────────────────┘
```
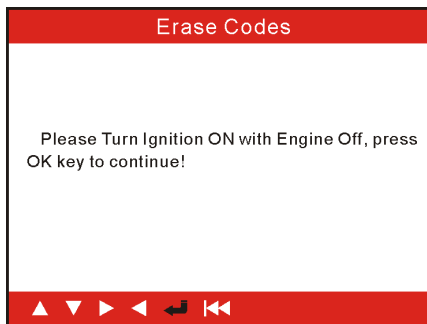
Figure 5-8

According to the above figure, press [↵] to clear the DTC. If successful, figure 5-9 will appear on the screen.
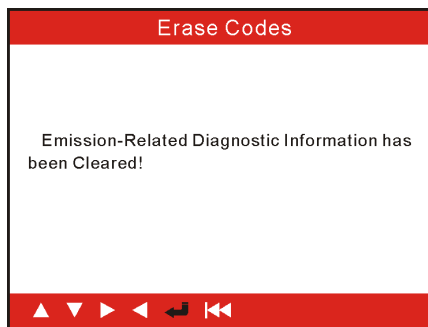
Figure 5-9

Notes:

• Before performing this function, make sure to retrieve and record the trouble codes.

• After clearing, you should retrieve trouble codes once more or turn ignition on and retrieve codes again. If there are still some trouble codes in the system, please troubleshoot the code using a factory diagnosis guide, then clear the code and recheck.

5.1.3 I/M Readiness

I/M refers to Inspection and Maintenance that is legislated by the Government to meet federal clean-air standards. I/M Readiness indicates whether or not the various emissions-related systems on the vehicle are operating properly and are ready for Inspection and Maintenance testing.

The purpose of the I/M Readiness Monitor Status is to indicate which of the vehicle's Monitors have run and completed their diagnosis and testing (as described in Chapter 2.5), and which ones have not yet run and completed testing and diagnosis of their designated sections of the vehicle's emissions system.

The I/M Readiness Monitor Status function also can be used (after repair of a fault has been performed) to confirm that the repair has been performed correctly, and/or to check for Monitor Run Status.

Select [I/M Readiness] and press [◄▊], the screen will display the interface as shown below:
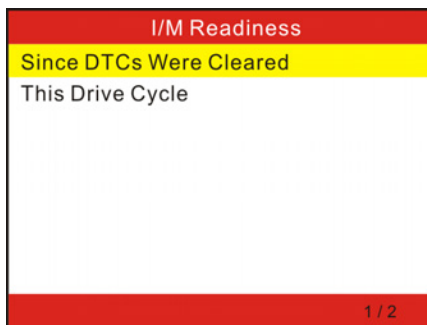
Figure 5-10

Press [▼]/[▲] to select and press [◄┘], the screen will display the interface as shown below:

Figure 5-11

Press [▶]/[◄] button to view other data of vehicle.

Press [|◄◄] to return to Diagnostic Menu.

N/A means Not Available on this vehicle; INC means Incomplete or Not Ready and OK means Completed or Monitor Ok.

5.1.4 Data Stream

Press [▼]/[▲] button to select Data Stream in Main Menu interface and then press [◄┘] button to confirm, the screen will display the interface as shown in figure 5-12:
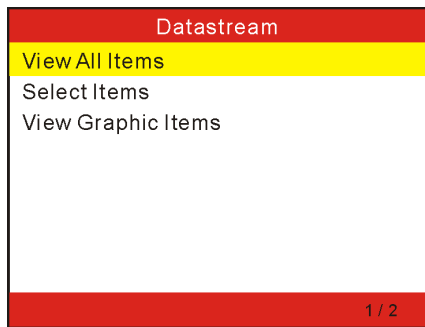
Datastream
View All Items
Select Items
View Graphic Items
1 / 2

Figure 5-12

Select [View All Items] and press [◀◢]button, the screen will display the interface as shown below:

Datastream	
Fuel system 1 status	- - -
Fuel system 2 status	- - -
Comprehensive component monitor	52.9%
Catalyst monitor	54°C
	1~ 4/87

Figure 5-13

Press [▶]/[◀] button to view other data streams.

Press [◀◀] to return to Diagnostic Menu.

Select [Select Items] in Datastream menu and press [◀◢], the screen will display the interface as shown below:

Select Datastream	
[ ]	All Datastream of Page
[ ]	Fuel system 1 status
[ ]	Fuel system 2 status
[ ]	Calculted LOAD Value
	1~ 4/87

Figure 5-14

Press [▼]/[▲] button to select datastream items, and press [▶]/[◀] button to turn page. After selecting items, press [◀◀], the screen will display the selected datastream items.

To select all datastream of the current page, highlight the first line and then press [◀◀], √ will appear before all items. To deselect all, just press [◀◀] again.

If [View Graphic Items] is selected in Datastream menu and press [◀◀] to enter the graphic items selection screen.

Press [▼]/[▲] button to select single data stream items, and press [◀◀] button, the screen will display the selected items of live graphic data.

Press [◀◀]to return to Diagnostic Menu.

5.1.5 View Freeze Frame

When an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. This information is referred to as freeze frame data.

Freeze Data is a snapshot of the operating conditions at the time of an emission-related fault.

Note: If DTCs were erased, Freeze Data may not be stored in vehicle memory depending on vehicle.

5.1.6 O2 sensor test

The results of O2 sensor test are not live values but instead the results of the ECU's last O2 sensor test. For live O2 sensor readings, refer to any of the live sensor screens such as Graph Screen.

Not all test values are applicable to all vehicles. Therefore, the list generated will vary depending on vehicle. In addition, not all vehicles support the Oxygen Sensors screen.

5.1.7 On-board monitor test

This function can be utilized to read the results of on-board diagnostic monitoring tests for specific components/systems.

5.1.8 EVAP System Test

The EVAP test function lets you initiate a leak test for the vehicle's EVAP system. The CR VII does not perform the leak test, but signals to vehicle's on-board computer to initiate the test. Before using the system test function, refer to the vehicle's service repair manual to determine the procedures necessary to stop the test.

5.1.9 Vehicle Info

Select [Vehicle Info] and press [⬛] , the screen will display the information, such as VIN (Vehicle Identification Number), CID (Calibration ID) and CVN (Calibration Verification Number).

5.2 DTC Lookup

This function enables you to retrieve the DTC easily and view its detailed definitions.

On the main menu screen, select [DTC Lookup] and press [⬛] to enter DTC lookup screen.
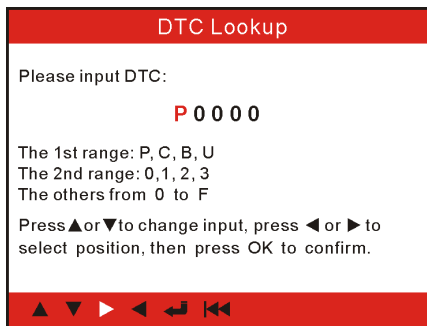
```
┌─────────────────────────────────────┐
│            DTC Lookup                │
├─────────────────────────────────────┤
│ Please input DTC:                    │
│                                      │
│           P 0 0 0 0                  │
│                                      │
│ The 1st range: P, C, B, U            │
│ The 2nd range: 0,1, 2, 3             │
│ The others from  0  to  F            │
│                                      │
│ Press▲or▼to change input, press ◄ or ► to │
│ select position, then  press  OK  to  confirm. │
│                                      │
├─────────────────────────────────────┤
│  ▲  ▼  ►  ◄  ↵  |◄◄                 │
└─────────────────────────────────────┘
```

Figure 5-15

Press [▶]/[◀] button to move the highlight bar to different position. Press [▼] /[▲] button to alter the value, then press [◀▮] button, the screen will display the definition of the DTC.

Press [◀◀] to return to the previous screen.

5.3 OBD II Help

This option allows you to have a general knowledge of OBDII.

6. How to reset oil lamp

There are two methods available to reset service lamp: reset manually or reset automatically. Auto reset follows the principle of sending command from CR VII to vehicle's ECU to do resetting. While using manual reset, users just proceed following the on-screen instructions.

Take BMW as an example to demonstrate the manual resetting process.

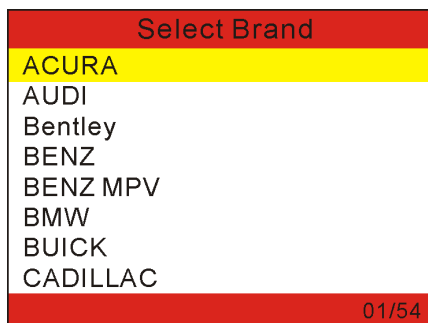Select "Oil Lamp Reset" in function interface as shown in Figure 4-1 and press [⏎], figure 6-1 appears:

Select Brand
ACURA
AUDI
Bentley
BENZ
BENZ MPV
BMW
BUICK
CADILLAC
01/54

Figure 6-1

Press [▼]/[▲] to select "BMW", press [⏎] to confirm, Figure 6-2 appears:

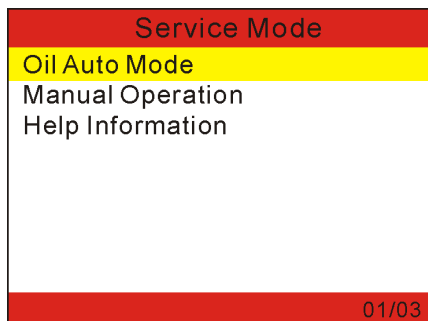| Service Mode |
| --- |
| Oil Auto Mode |
| Manual Operation |
| Help Information |
| |
| |
| |
| |
| 01/03 |

Figure 6-2

Note: Different vehicles may vary with different menus and operation steps, please proceed according to the instructions on the screen.

Press [▼]/[▲] to select "Oil Auto Mode", and then press [◄⏎] to confirm, Figure 6-3 appears:
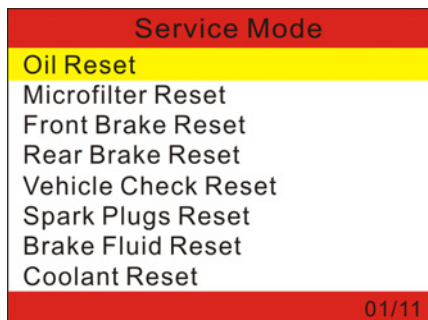

Figure 6-3

Press [▼]/[▲] to select the desired reset, and then press [◄⏎] to confirm.

If it fails to enter, another prompt window will appear. In this case, please check the possible causes step by step following the instructions on the screen. After entering the system, the screen appears as shown in Figure 6-4:
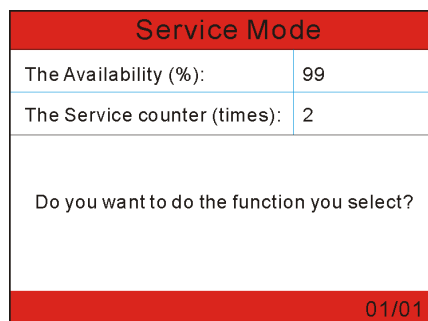

Figure 6-4

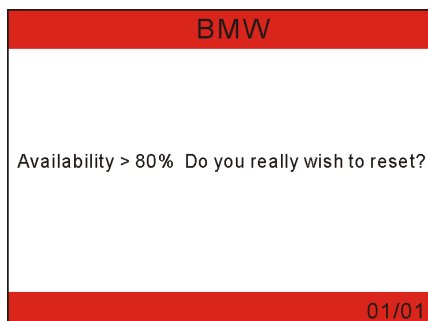Press [◄⏎], a screen similar to Figure 6-5 will appear.

BMW

Availability > 80% Do you really wish to reset?

01/01

Figure 6-5

Press [◀⏎] to confirm. If reset successful, Figure 6-6 appears and press [◀⏎] to exit.

BMW
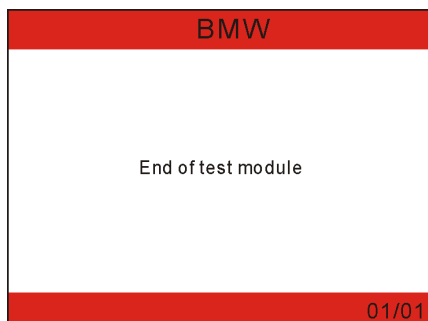
End of test module

01/01

Figure 6-6

Turn off the ignition switch.

Note: While starting, message of replacing engine oil appears again to indicate that engine oil system should be reset.

7. Updating

7.1 Download and install update tool

Log on x431, then click the link shown at the bottom of the page to enter, then choose "CR VII" from "Products" to go into a screen similar to Fig. 7-1:

Figure 7-1

Click "Updating" icon to download the update tool to your PC. Decompress it and double click it to start installing, and then follow the on-screen instructions to proceed until it is complete.

7.2 How to update

After the update tool has been successfully installed, the corresponding icon will appear on the desktop.

1. Connect CR VII to PC via the included USB cable, then launch CR VII update tool to enter Fig. 7-2.

    Note: To do a successful online update, make sure your PC is properly connected to the internet.

Figure 7-2

2. The system automatically identifies and shows the product serial number. Choose the desired language and click "Update" to enter the update page directly.

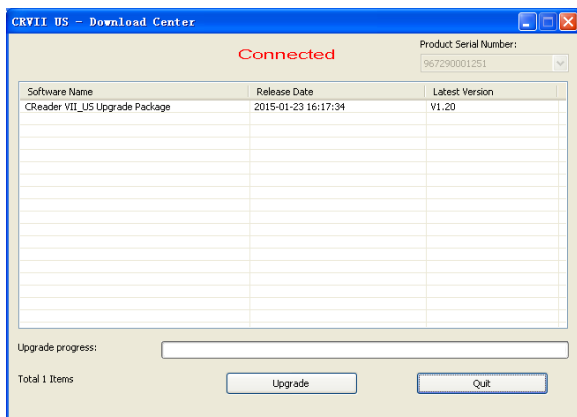3. Click "Upgrade" to start updating.

Figure 7-3

4. Once update is finished, a prompt message will pop up on the screen. In this case, unplug the USB cable from the PC.

Note: In process of upgrade, do NOT disconnect the USB cable.

8. FAQ

Question: Screen of main unit flashes at engine start.

Answer: Caused by electromagnetic disturbance and it is normal phenomenon.

Question: There is no response when communicating with on-board computer.

Answer: Please confirm the proper voltage of power supply and check if the throttle has been closed, the transmission is in the neutral position, and the water is in proper temperature.