



NEGAR KHODRO
Plus One, Everyday...



Device Guide
MULTI PROBE



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Introducing and Device Capabilities

Multi Probe is an appropriate device for testing different conditions of sensors and actuators of the vehicle. In this device, the user is able to test different stages such as simulation, logic ,ohm meter, etc. for electrical and electronic parts of the car.

List of device capabilities:

1. Software capabilities

- √ Car Logic Analyzer
- √ Display the actual voltage value
- √ Flash (reset) capability of ECU
- √ Ability to connect to the car battery and perform testing inside the hood
- √ Ability to connect to the car OBD and perform testing inside the car cabin
- √ Ability to test the Instrument Pannel and hands
- √ Car oscilloscope and display signals
- √ Battery tester by voltage drop at startup
- √ Testing the health of the alternator by the voltage when the engine is running
- √ Ohm meter
- √ Buzzer test (Wiring Path Short Connection Test)

Simulation of car sensors

- o Engine speed sensor simulator
- o Valve Sensor Simulator
- o Water temperature sensor simulator
- o Air temperature sensor simulator
- o Throttle sensor simulator
- o Air pressure sensor simulator
- o Fuel rail pressure sensor simulator
- o Tank pressure sensor simulator
- o Gas temperature sensor simulator
- o Speed sensor simulator
- o Oxygen sensor simulator
- o Ambient temperature sensor test

2- Hardware capability

- o Interchangeable probe tip
- o OBDII connector
- o High-quality industrial body



Introducing device appearance and keys

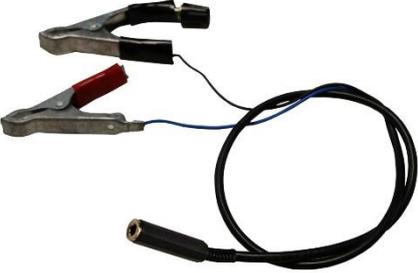
This device has two parts to display information for the user

√ LCD Monitor (see more information on it)

√ LED Monitor (shows logic information in addition to the LCD display with color changes)



Components in device pack

Image	Segment
	Multi Probe device with interface wire
	Clips interface
	OBD interface (optional)
	Interface probe



Introduction and function of the simulator device menu

The emulator is designed so that users can access the device menus and easily test different parts and routes of the car.

The device menus are:

- √ Logic
- √ Ohm meter (resistance test)
- √ volt meter (voltage test)
- √ Buzzer (wiring test)
- √ Parts testing
- √ Back amp test
- √ Flash ECU
- √ Oscilloscope
- √ Sensor simulation

Note: In all stages of testing the device in this catalog, the ECU SSAT and Siemens Sim2k-34 Euro 4 sockets on the Pride car are used as a test sample so that the user can easily get acquainted with the testing steps of the simulator.

Logic Analyzer

With this menu, the device detects the type of information that is sent or received from the wire or the base of the part and identifies it by the LED color:

- √ 12 volts (LED turns red.)
- √ 5 volts (LED turns green.)
- √ 3.3 volts (LED turns purple.)
- √ Earth (LED turns blue.)
- √ Signal (LED turns white)

The steps for testing and troubleshooting components in the Logic menu are as follows:

1- Preparing the simulator device

Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color. (Connect the red lizard clamp to 12 volts and the black lizard clamp to ground)

- 2- Disconnect the socket from the Gas valve sensor.
- 3- Open the car switch.
4. Go to the logic menu and press the OK key.
- 5- The ECU SSAT gas valve sensor has a tripod socket, which according to the manufacturer's instructions has three modes, including the following:

First base: Earth (negative)

Second base: 5 volts

Third base: signal

- 6- By connecting the needle probe of the device to each of the socket bases, the status of that base is displayed on the monitor. (At the same time, the LED on the device displays the color for that status.)



Gas valve sensor bases test

Note 1: Make sure you check the expression with the manufacturer's information and check for the cause if it's contradictory.

Note 2: During the test of the gas valve sensor, in addition to the above test, there should be another test which includes:

- √ Plug the gas valve sensor into the sensor .



√ Connect the needle probe of the simulator to the corresponding basis associated with sending signals base from behind the gas valve sensor socket.

Note 3: In some parts, you have to strip some of the connection wire to the socket base of the part or make a connection by inserting a needle into the back of the socket base to read the values.

√ Move the gas valve.

√ During the work with the simulator, you should observe a voltage between 0.5 to 4.75 v as a variable, otherwise the part is defective.

Note 4: In some cases, you need to turn on the car to test the parts.

Ohm Meter

Some car parts such as oxygen sensor heaters, engine speed sensors, relays, etc. have resistors and the amount of this resistance is important in tests. To test the resistance value, the ohm meter capability of the Multi Probe device can be used.

The steps of testing and troubleshooting the components in the ohm meter menu are as follows:

1- Preparing the simulator

Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the ground) and disconnect the socket from the oxygen sensor.

2- Connect the interface probe to the device



Interface probe to the lizard clamp connection





3- Go to the ohm meter menu and press the OK key.

4- Oxygen sensor has a 4-pin socket, which according to the manufacturer's instructions is as follows:

First base: Signal

Second base: signal

Third base: heater resistance

Fourth base: heater resistance

5- Connect the needle probe of the device to one of the bases of the oxygen sensor heater according to the manufacturer's instructions and connect the interface probe of the device to the other base of the oxygen sensor heater (according to the instructions).

Check the resistance declared in the simulator with the manufacturer's values.



Oxygen sensor ohmic test

Note: Make sure you check the expression with the manufacturer's information and check for the cause if it's contradictory.

How to calibrate the ohm meter of a Multi Probe device

In the device menu list, enter the ohm meter section, then first connect the tip of the Multi Probe device directly to earth of your power supply. Then, hold down the up key and the down key at the same time until the word "Calibration" appears at the top of the screen. In this case, the number written on the screen should show the number zero.

Finally, press the return key and re-enter the ohm meter menu. In this case, you should see the number zero on the screen again, and from now on you can work with the device.

**Important note :**

If the earth's place of the power supply changes, you should calibrate the ohm meter again. Unless you see the same number on the screen, with a direct connection of the probe tip to the power supply earth.

Voltmeter (voltage test)

By this menu, the user will be able to check the amount of voltage that is sent or received from the wire or the base of the part.

The steps of testing and troubleshooting the components in the voltmeter menu are as follows:

1- Preparing the simulator

Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the ground) and disconnect the socket from the oxygen sensor.

2- Open the car switch.**3- In the simulator, go to the voltmeter menu and press the OK key.**

4- Oxygen sensor socket has 4 bases, which according to the manufacturer's instructions have 4 modes, including the following:

First base: 0.5 to 5 volts

Second base: 0.5 to 5 volts

Third grade: negative

Fourth base: 12 volts

5 -You must view the voltage on the wire by connecting the device probe to each socket base. Make sure you check the expression with the manufacturer's information and check for the cause if it's contradictory.



Note 1: In some parts to read the values, you must strip some of the wire overlay connected to the socket base or connect by entering a needle to the back of the socket.

Note 2: In some cases, you need to turn on the car to test the parts.



oxygen sensor test

Buzzer (Wire Test)

In order to test the safe path of the wires inside the car and check if the wire is connected or disconnected, the user needs to inspect the path of the wire.

For user convenience, the buzzer test is designed in the simulator device to conduct the wiring test properly and easily.

The steps of testing and troubleshooting the buzzer test are as follows:

Note: To test the buzzer, be sure to remove the positive end of the battery and remove it from the car battery.

For example, we act as following to test the path of socket injector to ECU socket and double relay:

- 1- Preparing the simulator: Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color. (Connect the red lizard clamp to 12 volts and the black lizard clamp to earth)
- 2- Connect the interface probe to the simulator. (According to the ohm meter test method)
- 3- From the menu, select Buzzer Test.
- 4- Specify the path of the injector socket bases to the ECU socket and the double relay according to the wiring map provided by the manufacturer.

First base: Signal (59th ECU socket pin)

Second base: 12 volts (bases for power relay and double relay output)



5- Connect the needle probe of the device to the base of the injector socket for receiving the signal from ECU and then connect the interface probe of the device to the corresponding base in the ECU socket.

Note: To ensure the power supply to the injector, also check the 12 volt path from the power supply socket of the injector socket to the output of the power supply relay, the double relay.

6- At this time, if the route is correct, the buzzer will sound, otherwise the route is interrupted and the user must troubleshoot the route.

Note: In order to find the wire breakage if the wiring is cut, you must perform the buzzer test steps along the wire to determine the wiring cut-off limits. (The wire may be cut or the wiring path may have a problem such as sulfation)



Testing the injector supply to double relay

Part test

This menu allows the user to check for parts that do not function as signals or enter the path when a base is stimulated.

These tests include :

√Battery Test

√Battery and Generator Test

√ Relay Test



Battery test

With this menu, the user can check the battery and generator under normal conditions and under load.

In this menu, two test capabilities are considered for the battery, in these two steps, the user ensures the status of the battery.

The steps for testing and troubleshooting parts in the battery test menu are as follows:

1- Preparing the simulator: Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the earth)

2. Select the parts test menu and the battery test section.

Note: Note the instructions that appear on the device monitor when entering the battery test section.

3- Before activating a consumer of the car, connect the needle probe of the device to the positive battery head.

4- By connecting the needle probe to the battery head, the battery voltage is displayed in the monitor of the device, which is usually between 11.5 and 12.5 volts for a healthy battery, otherwise the battery is defective.

5- After ensuring that the battery is safe in the no-load phase, the car battery should be tested at the moment of starting, keep the device in battery test mode.

6- Start the car engine.

7- At the moment of start, the battery voltage will be displayed on the monitor of the device, which is usually between 10.5 and 11 volts for a healthy battery, otherwise the battery should be troubleshooted.

Battery and alternator test

After testing the battery, you must make sure that the battery charging system works by the alternator, which is available to the user through the battery and alternator test menu.

The steps for testing and troubleshooting parts in the battery and alternator test menu are as follows:

1- Preparing the simulator: Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the ground)

2- Connect the needle probe of the device to the positive battery head.

3- put the car in high light mode.



4- Turn on the car engine.

5- Select the parts test menu and the battery and alternator test section.

6- At this time, the monitor of the device informs you that the system is healthy or defective. If the battery charging system is not in the specified range, the user should check the route and parts related to the battery charge.

Note: In order to verify battery and alternator, it is better that the user once test the simulator probe on the positive head of battery, and then again place needle probe on the generator outbound wire and verify the healthy contact test.



battery health test

Instrument Pannel

Sometimes the hands or the screens on the back of the amp do not give accurate information about the condition of the car or they get into trouble. As a result, the user needs a proper testing and simulation device to ensure that the path or back of the amp is safe. The test menu of the back of the amp allows the user to do this.

In the menu instrument panel, the following items are available for the user to test:

Odometer hand

Engine speed hand

Water temperature indicator hand

Fuel level indicator hand

Illumination of warning signs

Testing the odometer hand, engine speed hand, water temperature indicator hand and fuel level indicator hand on the back of the amp to display the kilometer, engine speed, water temperature and fuel level is done digitally by the hand and in new cars.

By moving a hand by a motor, vehicle information is displayed to the user. The user tests and checks the required items to ensure the safe path and front of the amp through this menu.

Note: The method of simulation in the menus is odometer in terms of kilometers per hour, engine speed in terms of revolutions per minute, but in the indicators section, water temperature and fuel level are done in terms of percentage.

The steps for testing and troubleshooting the hands instrument panel are as follows:

1- Preparing a Multi Probe device

Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the ground)

2- Select the test menu of instrument panel and the section related to the desired hand test.

3- Open the car switch.

4- Connect the needle probe of the device to the stimulation base related to the desired hand (according to the manufacturer's instructions).

Note: In some cases, to connect the needle to the excitation base, you have to bare some of the relevant wire or connect the needle to the base from behind the socket.

5. During the test, change the simulation values (increase or decrease the values) and compare the amount of change with the movement of the desired hand. If the values are inconsistent, the components instrument panel should be troubleshooted.

Note: To test the hands, it is better to send the simulation signal once through the bases of the ECU socket to make sure that the signal is sent to the back of the amp.



Kilometer hand test



Water temperature hand test



Simulation of warning signs

On the back of the car amp, there are lights and warning signs of the car's condition, such as check lights, immobilizer, etc. To test for these symptoms, the target bases must be properly stimulated.

The steps for testing and troubleshooting the warning signs on the back of the amp are as follows:

- 1- Preparing the Multi Probe device: Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the ground)
2. Select the test menu on the back of the amp and the section related to the test of warning signs.
- 3- Open the car switch.
- 4- Connect the needle probe of the device to the excitation base related to the desired warning signs (according to the manufacturer's instructions).

Note: In some cases, to connect the needle to the excitation base, you have to bare some of the relevant wire or connect the needle to the base from behind the socket.

5. During the test, the warning signs on the back of the amp will turn on or off for a short time, so when testing, pay attention to the function of the relevant signs on the back of the amp. If any part does not work properly, troubleshooting should be done.

Note: It is better to send the simulation signal through the sockets of the ECU once to test the warning signs to make sure that the ECU signal is sent to the back of the amp.



LED test of light check



Immobilizer LED test

Flash ECU

Flashing the engine ECU means clearing the errors recorded in the ECU and restoring the ECU to factory settings.

Due to the fact that during the test, the socket may be disconnected or an error may occur in the engine ECU, the user can clear the temporary errors created in the ECU through this menu.

Important Note: Before flashing, pay attention to the type of ECU, if the ECU is of the non-flash type, do not flash the ECU and prevent the ECU from being damaged.

The steps for flashing ECU are as follows:

- 1- Connect the OBD socket probe to the device.
- 2- Open the car switch.
- 3- Select the ECU flash menu.
- 4- Press the confirmation key to perform the automatic identification steps.
- 5- After identifying the ECU, the device automatically performs the flashing steps.



Connection to the car OBD socket and flashing ECU



Oscilloscope

All components (sensors and actuators) have a signal sent to the ECU or a signal received from the ECU, and the signal needs to be measured by an oscilloscope to determine the correctness of the signal.

Note: In this section, we use the engine speed sensor as a benchmark test to explain the operation of the oscilloscope.

The steps of testing and troubleshooting by oscilloscope are as follows:

1- Preparing a Multi Probe device

Connect the power cables of the device to the head of the car batteries or the positive and negative connections of the car according to the color. (Connect the red lizard clamp to 12 volts and the black lizard clamp to ground)

2. Select the Oscilloscope menu.

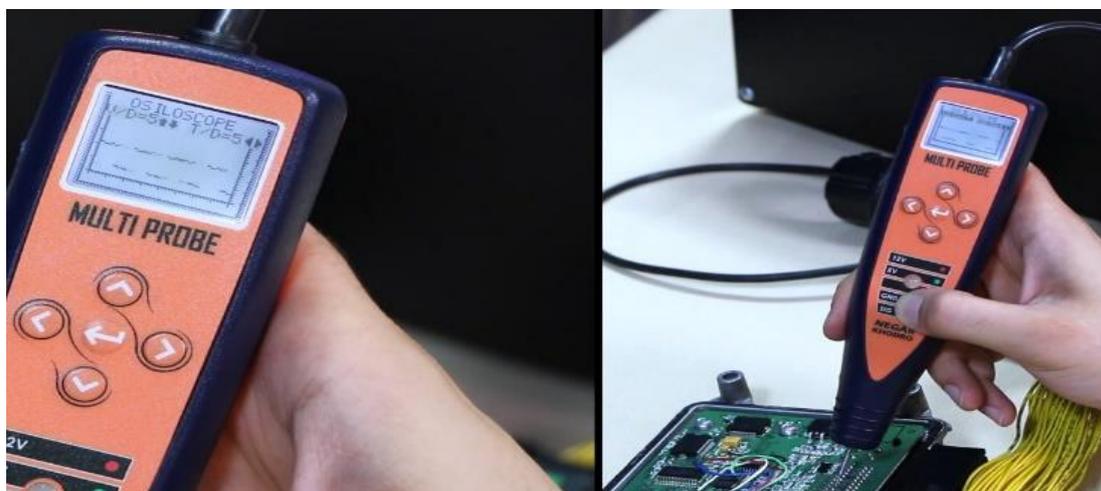
3- Turn on the car engine.

4- Connect the needle probe of the device to the base of sending the signal from the engine speed sensor to the ECU (according to the manufacturer's instructions).

Note 1: In some cases, to connect the needle to the excitation base, you have to bare some of the relevant wire or connect the needle to the base from behind the socket.

Note 2: To test the signal, it is better to do it on the ECU base and also on the base of the desired part so that the two sides of the wire are checked correctly.

5- The information is displayed as a wavelength (values should be checked with the information of the manufacturer), if the wavelength of the part is not displayed correctly, it is defective and should be replaced.



Basic test related to SSAT engine speed



Simulation of sensors

After the user has made sure of the correct connection of the wiring path, the resistance of the sensor and the sending of the signal from the sensors, but still does not see the desired values in the relevant parameter section in the diagnostic, or the operating conditions of the car engine are inappropriate, the corresponding signal should be simulated for ECU.

- 1- Engine speed
- 2- Valve shaft
- 3- Speed
- 4- Water temperature
- 5- Ambient temperature
- 6- Air temperature
- 7- Temperature of gas rail
- 8- Ambient air pressure
- 9- Manifold air pressure
- 10- Gas tank pressure
- 11- Gas rail pressure
- 12- Electric gas pedal
- 13- Electric gas valve
- 14- Oxygen sensor

Note: The simulation method in the menus of the engine speed and valve stem is in terms of kilometers and revolutions per minute, but in other sections it is done in terms of percentage.

In the simulation section, three methods are used to ensure the correct operation of the sensors, which include the following:

- √ volt meter
- √ Ohm meter
- √ Simulation

The test steps of voltmeter and ohm meter in this part of the Multi Probe device are the same as the method described in the previous sections of this guide.



simulation

The simulation steps are as follows:

1- Preparing a Multi Probe device

Connect the power cables of the device to the car batteries or the positive and negative connections of the car according to the color (connect the red lizard clamp to 12 volts and the black lizard clamp to the earth)

2. Select the simulation menu and the water temperature simulation section.

3- Disconnect the water temperature sensor socket from the sensor.

4- Open the car switch.

5- Connect Diag Device(OBD tools) to the car.

6- Connect the needle of the Multi Probe device to the base of sending the signal from the water temperature socket to the ECU (according to the manufacturer's instructions).

7- At this time, the simulated signal is sent to the ECU by the device and the data can be seen by the user in the relevant parameter by Diag Device(OBD Tools).

8- During the simulation, change the values sent by the simulation (increase or decrease the values) and compare the amount of changes with the values inside the diagram (the value displayed in the diagram for the water temperature sensor with changes between 0 and 100 degrees C) and if the values are inconsistent, the user should try to find the defect in the ECU.

Simulation of water temperature sensor on the car and observing the change of instrument panel parameters are the steps that are fully described above to troubleshoot the wiring route and parts. The ECU is the same as the above method, which requires the basic information of the ECU and the connection path of the ECU and the data sheet of the ECU.



Water temperature sensor simulation

Device safety and maintenance tips

- √ To test the health of the device, connect the probe to the positive end of the battery. At this time, the display should show 12 volts and the 12 volt LED should light up.
- √ Before connecting the interface cables, make sure that the cable socket is intact and that the connector on the back of the device is not tilted.
- √ Protect the device from impact and fluid penetration.
- √ If there is a problem with the needle probe of the device, you can get the needle probe from the company and screw it out, remove the defective needle probe and replace the healthy probe.
- √ Multi Probe device is designed for vehicle electronics testing and voltage measurement up to 20 volts. Avoid connecting the device to high voltages, such as car coil pins while the car is on, and the like.





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