User Manual

N6200 Series Wide Range

Medium Power DC Electronic Load

Version: V20231212

Copyright Statement

Contact Us

If you have any questions about this product, please contact us in the following way.

export@ngi-tech.com

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1 Preface

Dear Customers,

First of all, we greatly appreciate your choice of N6200 series DC electronic load (N6200 for short). We are also honored to introduce our company, Hunan Next Generation Instrumental T&C Tech. Co., Ltd. (NGI for short).

About Company

NGI is a professional manufacturer of intelligent equipment and test & control instruments, committed to developing, manufacturing battery simulators, power supplies, electronic loads, and many more instruments. The products can be widely used in the industries of battery, power supply, fuel cell, consumer electronics, new energy vehicle, semiconductor, etc.

NGI maintains close cooperation with many universities and scientific research institutions, and maintains close ties with many industry leaders. We strive to develop high-quality, technology-leading products, provide high-end technologies, and continue to explore new industry measurement and control solutions.

About User Manual

This manual is applied to N6200 series DC electronic load, including installation, operation, specifications and other detailed information. The copyright of the manual is owned by NGI. Due to the upgrade of instrument, this manual may be revised without notice in future versions.

This manual has been reviewed carefully by NGI for the technical accuracy. The manufacturer declines all responsibility for possible errors in this operation manual, if due to misprints or errors in copying. The manufacturer is not liable for malfunctioning if the product has not correctly been operated.

To ensure the safety and correct use of N6200, please read this manual carefully, especially the safety instructions.

Please keep this manual for future use.

Thanks for your trust and support.

2 Safety Instructions

In the operation and maintenance of the instrument, please strictly comply with the following safety instructions. Any performance regardless of attentions or specific warnings in other chapters of the manual may impair the protective functions provided by the instrument.
NGI shall not be liable for the results caused by the neglect of those instructions.

2.1 Safety Notes

- **Confirm the AC input voltage before supplying power**.
- **Reliable grounding**: Before operation, the instrument must be reliably grounded to avoid the electric shock.
- **Confirm the fuse**: Ensure to have installed the fuse correctly.
- **Do not open the chassis**: The operator cannot open the instrument chassis. Non-professional operators are not allowed to maintain or adjust it.
- **Do not operate under hazardous conditions**: Do not operate the instrument under flammable or explosive conditions.
- **Confirm the working range**: Make sure the DUT is within N6200's rated range.

2.2 Safety Symbols

Please refer to the following table for definitions of international symbols used on the instrument or in the user manual.

Table 1

Symbol	Definition	Symbol	Definition
⎓	DC (direct current)	N	Null line or neutral line
~	AC (alternating current)	L	Live line
≂	AC and DC	I	Power-on
3~	Three-phase current	O	Power-off
⏚	Ground	⏻	Back-up power
⏚	Protective ground	⎍	Power-on state
⏚	Chassis ground	⎕	Power-off state
⊥	Signal ground	⚠	Risk of electric shock
WARNING	Hazardous sign	⚠	High temperature warning
Caution	Be careful	⚠	Warning

3 Inspection and Installation

3.1 Open-package Inspection

After receiving the product, please check the device by following these steps:

1. Check whether the packaging is damaged during transportation;

2, please refer to the packing list, check whether the accessories are complete;

3. Check whether the overall appearance of the equipment is abnormal.

Remarks

1. If there is any missing or damaged, please contact NGI authorized dealer or after-sales service department immediately. Do not return the device without a positive response.
2. If the packaging content is consistent and no problem, please take good care of the packaging box and related contents, the instrument needs to meet the packaging requirements when returning to the factory.

3.2 Power Connection

Before connecting the power cord, to prevent electric shock and damage to the instrument, please observe the following precautions:

Warnings

- Please ensure that the power supply voltage matches the rated power supply voltage of the instrument;
- Ensure that the power switch is off;
- Please use the power cord provided by our company and connect one end of the power cord to a three-pronged socket with a protective grounding terminal;

Connect one end of the power cord to the power input socket on the rear panel of the instrument and the other end to the three-pronged socket with a protective earth terminal.

3.3 Wiring

To prevent electric shock and damage to the instrument, please observe the following precautions:

⚠Warnings

- Make sure the device is powered off before connecting to the DUT.
- Before connection, please confirm rated value of test cable and do not measure the current above the rated value.
- Before connecting any wiring, please pay attention to the positive and negative polarity marks, reverse connection may burn the electronic load.

The wiring procedure is as follows:

1. Before connecting the DUT, make sure that the equipment is in the power-off state.

2. Remove the protective cover of the input terminals.

3. Before connecting the electronic load, please pay attention to the positive and negative marking, reverse connection may burn the electronic load. Unscrew the screws on the positive and negative input terminals and connect the red and black test wires to the positive and negative input terminals before tightening the screws.

If the maximum current that the test lead can withstand is not enough to meet the current rated current, please use more than one red and black test lead.

For example, if the maximum current is 500A, users need to purchase two 300A red and black test wires and connect them to the instrument terminals at the same time.

4.Install the protective cover of the input terminal.

5. Connect the other end of the red and black test leads directly to the terminals of DUT.

Notes

The electronic load connection cable must be sufficient to withstand the maximum short-circuit current connected to other devices without overheating. And when the connection inductance between the DUT and the load is less than 5.0uH, it is more in line with the high-slope load specifications and performance.

3.1.1 Local Sense

There are two sensing methods used for the load: remote sense and local sense.

If the load is lightly loaded, the input voltage can be measured by local sense.

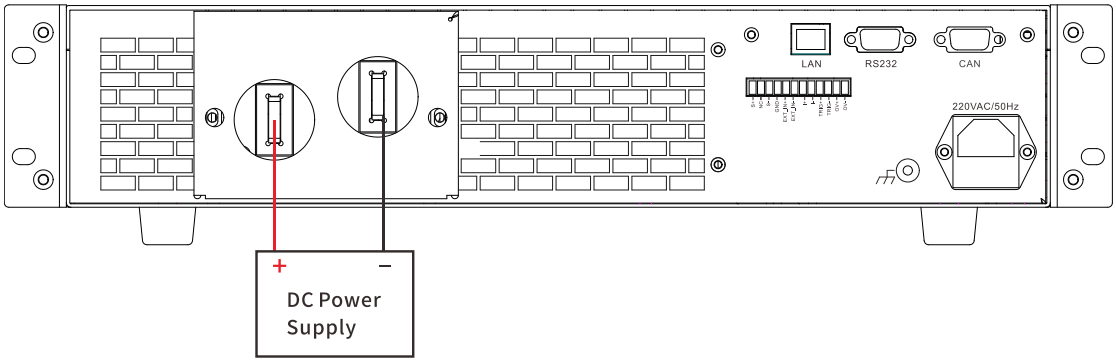

Figure 1 Local sense

3.1.2 Remote Sense

Remote sense is also four-wire sense. When working under CV, CR and CP mode, to ensure accurate measurement, it is recommended to use remote sense. During remote sensing, terminals S+ and S- are directly connected to the output of the DUT.

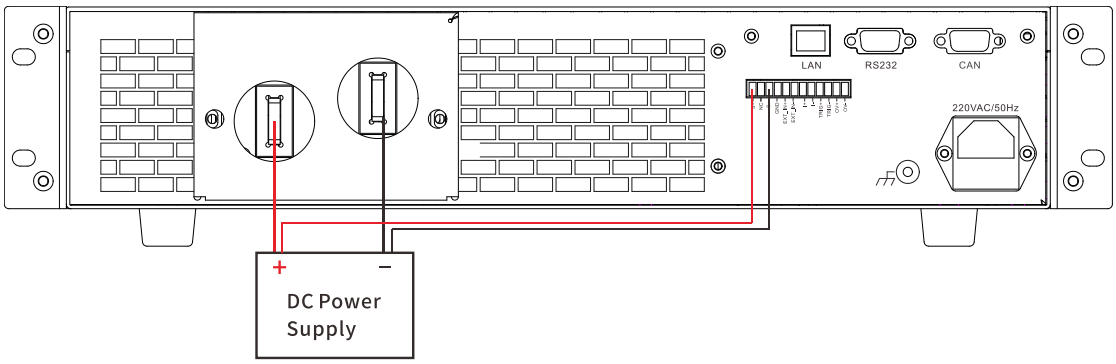

Figure 2 Remote sense

3.4 Power-on Inspection

Warnings

1. Before connecting the power cord, please ensure that the power supply voltage matches the rated power supply voltage of the instrument.
2. Make sure the power switch is off before connecting the power cord.
3. In order to prevent electric shock and fire, please use the power cord provided by the company.
4. In order to prevent electric shock, please be sure to take protective grounding. Please connect the power cord to the three-prong socket with a protected ground terminal.

If the device cannot start normally, try the following methods to resolve the problem:

1. Check whether the power cord is connected properly, whether the device has been normally powered, and whether the device switch is turned on;

2. Check whether the fuse of the instrument is blown. If the fuse is blown, replace it with the same type of fuse to avoid accidents.

Table2 Fuse specifications

Model	N6200 Series
Fuse specifications	250V/10A/20×5/ceramic

To replace a fuse, perform the following steps

1. Turn off the instrument and remove the power cord.
2. Insert a small flathead screwdriver into the slot at the power socket and gently pry out the fuse holder.
3. Remove the fuse and replace it with the specified size.

Warnings

To ensure the safety of operators, disconnect the power supply of the device before replacing the fuse.

4 Product

4.1 Brief Introduction

N6200 series is a programmable DC electronic load with high accuracy, high reliability and high cost performance. With multiple functions, such as CC/C/CP/CR, SEQ test, dynamic test, discharging test, charging test, DCIR test, MPPT, OCP test, short circuit simulation and so on. It supports local control via screen&button and remote control on PC. It is with built-in LAN port, CAN port and RS232 interface. N6200 series is designed in a 19 inch 2U chassis, which is available for benchtop use or installation in 19 inch rack.

Main Features

- Power range: 0-600W/0-1200W/0-1800W
- Voltage range: 0-60V/0-150V/0-600V
- Current range: 0-50A/0-100A/0-150A
- Operation mode: CC, CV, CP, CR
- Stable and reliable CR/CP function supported by hardware
- Supporting LAN/RS232/CAN communication and SCPI commands
- Programmable sequence test function(SEQ), up to 100 groups sequence files, up to 50 steps per file
- CV, CC, CR dual range
- Built-in DCIR test function (Optional)
- Supporting MPPT function
- Analog programming interface(APG), current monitoring interface, remote/local trigger function
- Editable rise and fall slew rate
- Supporting charge & discharge test, OCP test
- Short-circuit simulation, Von/Voff function available

4.2 Appearance & Dimension

N6200 series product dimensions: 88.0mm(H)*482.0mm(W)*610.8mm(D)

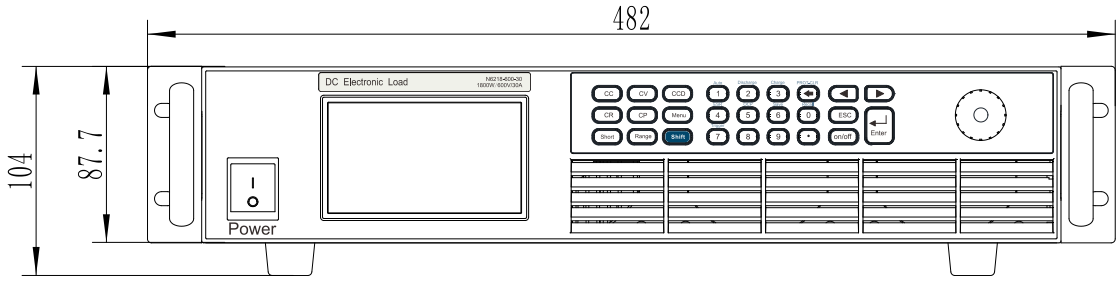

Figure 3 Front Panel Dimension(mm)

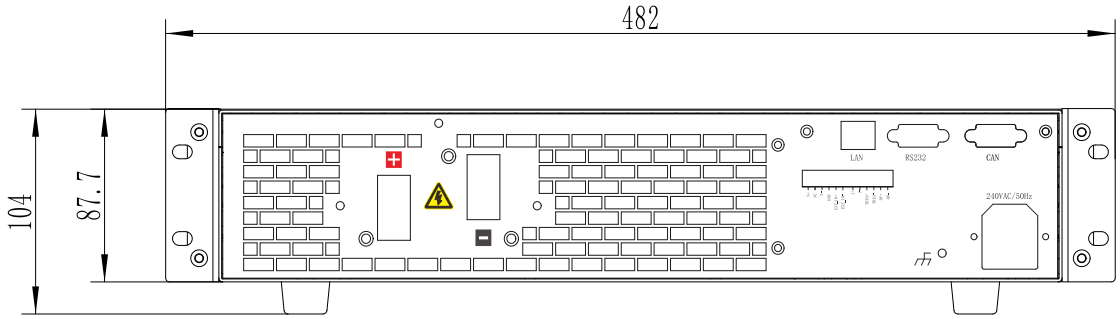

Figure 4 Rear Panel Dimension(mm)

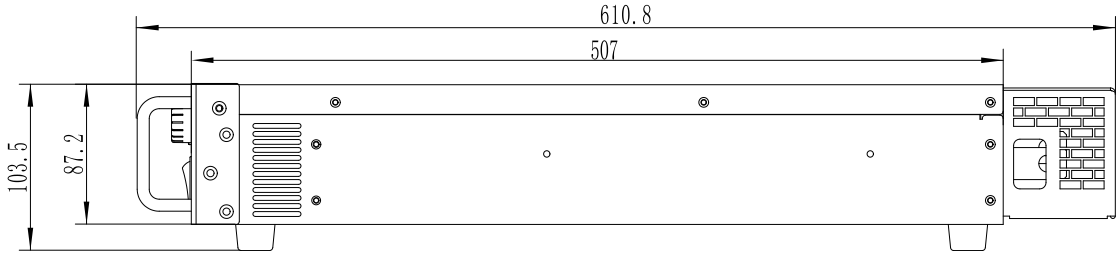

Figure 5 Side Dimension(mm)

4.3 Front Panel Introduction

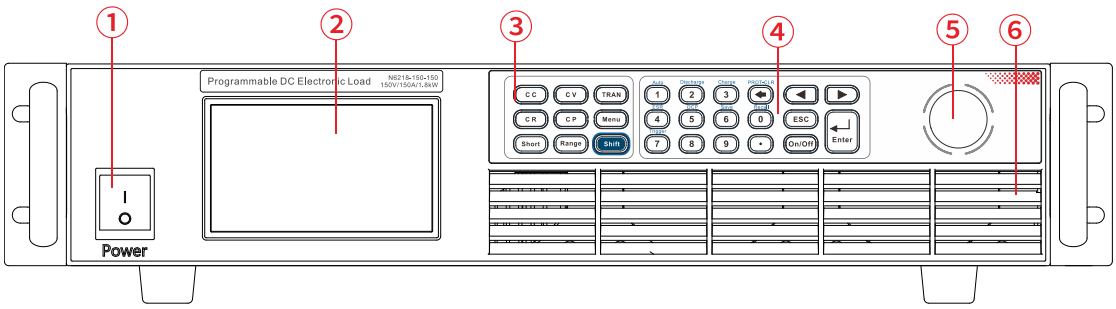

Figure 6 Front Panel

Table 3

Number	Name	Description
1	Power switch	Shut ON/OFF
2	Screen	Display related information
3	Function buttons	Specify corresponding function
4	Numeric buttons	Set parameters+composite key
5	Knob	Rotate to move cursor or change value
6	Air outlet	Air outlet

4.3.1 Keyboard

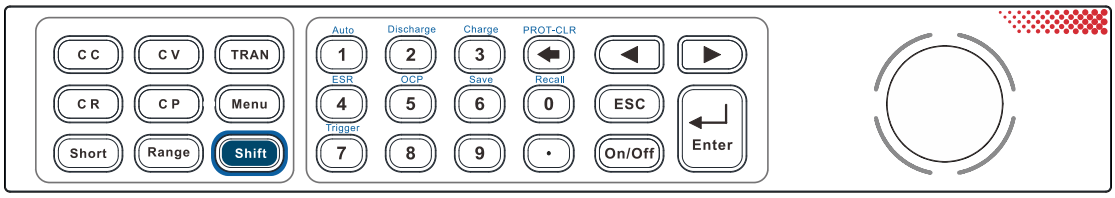

Figure 7 Keyboard

The keyboard of the electronic load is divided into three areas: function keypad, numeric keypad, knob.

4.3.2 Function Button

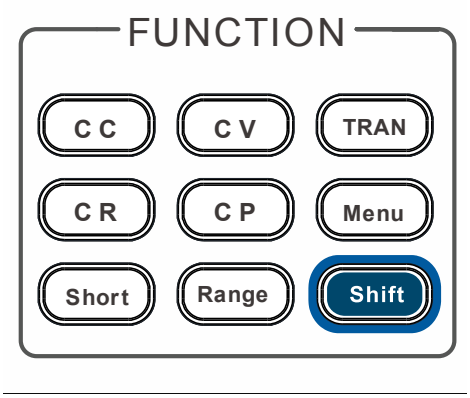

Figure 8 Function Button

Table4

Button	Function
C C	Select the constant current test function (CC) to set the current input value
C V	Select the constant voltage test function (CV) to set the voltage input value.
TRAN	Enable Dynamic Test Function Button (TRAN)
C R	Select the constant resistance test function (CR) to set the resistance input value.
C P	Select the constant power test function (CP) and set the power input value.
Menu	Menu key, press this key to enter the main menu.
Short	Short-circuit function button to start or end the short-circuit test.
Range	Range switch key.
Shift	Compound Buttons.

Table 5

Button	Function
Shift + Auto 1	Enter the auto test function interface.
Shift + Discharge 2	Enter the discharge test function interface.
Shift + Charge 3	Enter the charge test function interface.
Shift + PROT-CLR ◄	Clear the protection status key.
Shift + ESR 4	Enter the ESR Test function interface.
Shift + OCP 5	Enter the OCP Test function interface.
Shift + Save 6	Store load parameter values such as voltage, current and power setpoints.
Shift + Trigger 7	Trigger key to enable triggering.
Shift + Recall 0	Recall stored load parameter values such as voltage, current and power set points.

4.3.3 Numeric Button

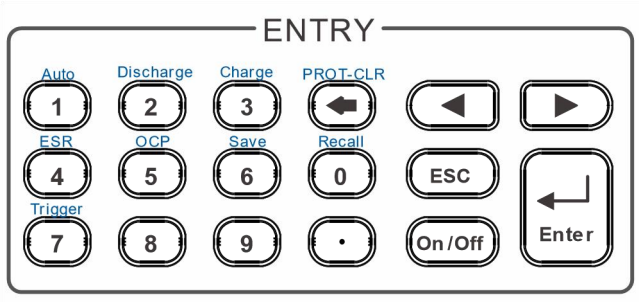

Figure 9 Numeric Buttons

Table 6

Button	Function
0 ~ 9	Value input key.
.	Decimal point.
PROT-CLR	Clear the input key.
◄ ►	Move the keys left and right to adjust the cursor to the specified position when setting the value.
Enter	Confirm key.
ESC	Exit key, which can exit in any working state.
On/Off	Control the input state of the load: on/off.

4.3.4 Knob

N6200 knob is shown in Figure 10:

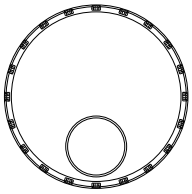

Figure 10 Knob

The functions are described as follows:

1. Adjust the value setting;
2. Select menu items/parameter items;
3. Confirm the set value or selected menu item/parameter item.

Adjust the value setting

In the value setting interface, turn the knob clockwise to increment the value, and turn the knob counterclockwise to decrement the value.

Select menu items/parameter items

The knob can be used to select a menu item/parameter item. In the display interface, turning the knob clockwise selects the next menu/parameter item, and turning the knob counterclockwise selects the previous menu/parameter item.

Confirm the set

After finishing setting values or selecting a menu item, press the knob to confirm it.

4.4 Rear Panel Introduction

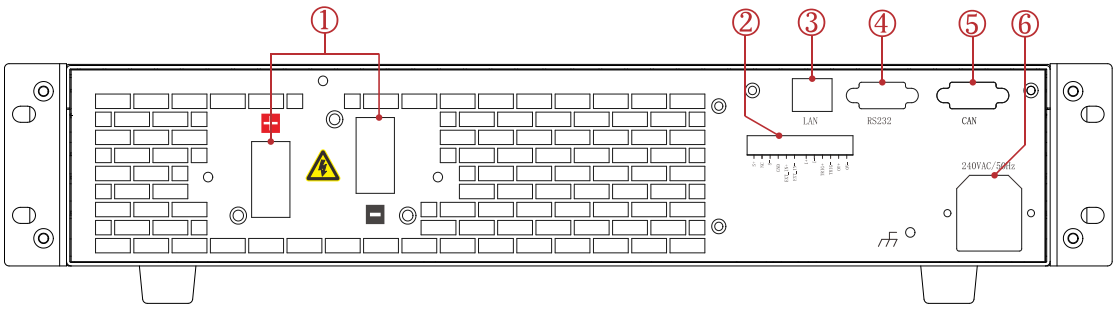

Figure 11 Rear Panel

Table 7

Number	Name	Description
1	Positive and negative input wiring copper bars	Connect input source output.
2	Control signal terminal	For connecting external programming inputs, extended inputs and outputs, and CAN control.
3	LAN port	Can be controlled via LAN communication.
4	RS232 interface	Can control the instrument through RS232 communication.
5	S+/S- Terminals	Used for remote sense
6	Power input socket	AC220V power input with built-in fuse.

4.4.1 Control Signal Terminal

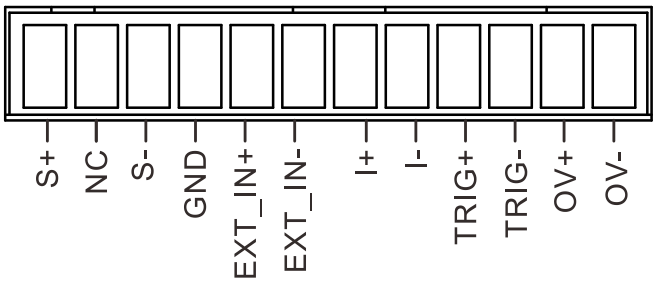

Figure 12 Control Signal Terminal

This terminal block (Figure 12) is used to connect external programming inputs, current monitoring inputs, and expand the input and output, the pin definitions of which are shown in Table8.

Table 8

Number	Description
S+	Remote sense positive terminal.
NC	Dangling.
S-	Remote sense negative terminal.
GND	Ground.
EXT-IN+	Externally programmed input voltage signal positive.
EXT-IN-	Externally programmed input voltage signal negative.
I+	Current output monitoring+
I-	Current output monitoring-
OV+	Obligate.
OV-	Obligate.
TRIG IN+	External trigger signal input to positive.
TRIG IN-	External trigger signal input to negative.

Sampling Terminals

S+ and S- are remote sense terminals that provide remote voltage signals to the electronic load measurement system.

It is recommended to set the load to remote sense when the load is operating in CV, CR and CP modes or when precise measurement is required. The remote sense terminals S+ and S- are connected directly to the output port of the DUT, which eliminates the voltage drop across the connecting wires, resulting in high measurement accuracy.

If the remote mode is used and the remote sense terminals S+ and S- are not connected to the output of the DUT, the electronic load will not detect the port voltage correctly in any function and the constant voltage, constant resistance and constant power functions will not work properly.

Current Monitor Output

The current monitoring terminal provides 0-10V output signal, corresponding to the input current from 0 to full scale under current range, and the input current value is proportional to the output voltage value on the terminal. For example: the full scale current of a load is 30A, in CCH range, if the loading current is 30A, the output voltage of terminal "I" is 10V; if the loading current is 3A, the output voltage of terminal "I" is 1V.

External Programming Input

The CC function can be continuously controlled by inputting an external voltage signal (DC) at the "EXT_IN+" terminal. The external programming input voltage range is 0 to 10V, which corresponds to 0 to full-scale input current in the current range. "EXT_IN-" is the ground terminal.

Note:

1. The external programming function is only in CC mode.
2. It is prohibited to connect an external voltage exceeding 10V to the external programming terminals. If the external programming voltage exceeds 10V, the input current of the load may exceed the rated value, which may cause the load to enter the protection state.
3. If this function is used, the **External Programming** must be set to **On** in the application setting menu.

External Trigger Input

Set the external control to Toggle mode, short-circuit TRIG_IN+ and TRIG_IN-. Short circuit once, load ON, short circuit again, load OFF.

Set the external control to Hold mode, short-circuit TRIG_IN+ and TRIG_IN-, load ON; disconnect TRIN_IG+ and TRIG_IN-, load OFF.

4.4.2 Serial Port (RS232)

The port pins are shown in Table 9.

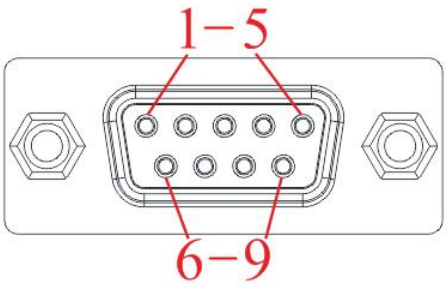

Figure 13 Pin Identification

Table9 RS232 Pin description

Pin	Signal name and function
1	NC
2	RXD，receive data
3	TXD，transmit data
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

4.4.3 LAN Port

The N6200 series comes with a LAN port that connects the computer to the device's LAN port via a network cable, as shown in Figure 14.

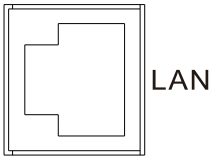

Figure 14 LAN port

Remarks

N6200 is equipped with three communication ports: RS232, CAN and LAN. Users can choose any one to realize the communication with the computer.

5 Operation

5.1 Interface Introduction

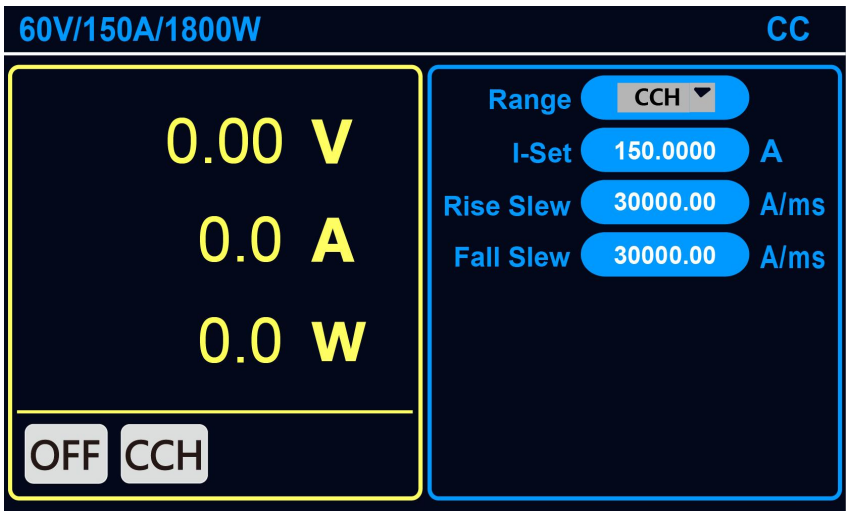

Figure 15 Interface introduction

Table 10 Marking instruction

Parameter	Description
Range	To select the operation range
I-Set	To set the current
Rise Slew	To set the rise slew rate
Fall Slew	To set the fall slew rate

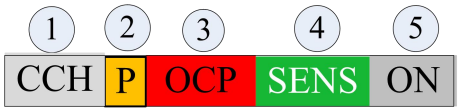

Figure 16 The status bar displays information

Table11

Number	Description
①	Mode and range, including CCH, CCL, CVH, CVL, CVBH, CVBL, CRH, CRL and CP
②	External Programming ON
③	Alarms, including OVP, OCP, OPP, OTP, TSF, MISS, MOT
④	Remote Sensing ON
⑤	Load status（ON/OFF)

Alarms	Description
OPP	Over-power protection
OCP	Over-current protection
OVP	Over-voltage protection
OTP	Over-temperature protection
TSF	Temperature sensor failure
MISS	Power Module Loss
MOT	Power Module over heat

- **Over-current protection (OVP)**

If the input current is higher than the current protection setting value, the over-current protection will be triggered, and the interface alarm will be "OCP".

- **Over-voltage protection (OVP)**

If the input voltage is higher than the set value of voltage protection, over-voltage protection will be triggered, and the interface alarm will be "OVR".

- **Over-power protection (OPP)**

The over-power protection function is mainly used to protect the hardware, preventing the components from being in the over-power state for a long time, which may lead to rapid aging or damage. If the input power is higher than the power protection setting value, the over power protection will be triggered, and then the interface alarm prompts "OPP".

- **Over-temperature protection (OTP)**

The load has an internal temperature detection sensor, if the internal temperature is detected to exceed the protection value, the load will stop pulling the load and the interface alarm will indicate "OTP".

- **Module overheat protection (MOT)**

Each power module of the load is equipped with a temperature control switch. When the temperature protection value, the switch closes, N6200 stops loading, the interface alarm prompts "MOT", and an alarm sounds.

- **Temperature Sensor Failure (TSF)**

If the temperature sensor is damaged, N6200 stops loading and the interface alarm prompts "TSF".

- **Power Module Drop Protection (MISS)**

Each power module of the load communicates with the main board through the communication cable and reports its own status at regular intervals. If the communication between the power module and the main board is interrupted due

to line failure or other abnormalities, the load will stop pulling load and the alarm in the interface will indicate "MISS", and an alarm will be issued at the same time.

5.2 Load Operation Mode

Electronic load can work in the following 8 operation modes:

Constant Current (CC)

Constant Voltage (CV)

Constant Resistance (CR)

Constant Power (CP)

5.2.1 Constant Current (CC)

5.2.1.1 Constant Current

Under CC mode, the load will sink a constant current regardless of the input voltage. Figure 17 shows the working curve:

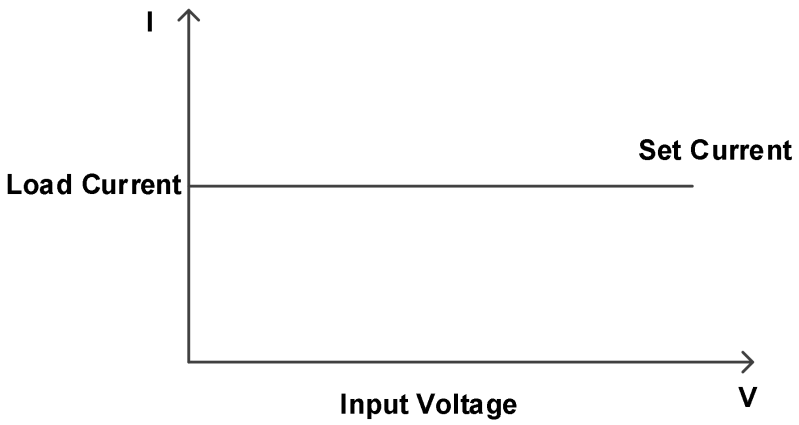

Figure 17 Constant Current Mode

5.2.1.2 Operation Steps

Please refer to the specification table for constant current value, rising and falling slew rate, and measuring range.

1. Press the "CC" key on the main page to Enter the CC interface (for other interfaces, press the ESC key to return to the main page), move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
2. "Range": there are two options for range CCH (constant current high range), CCL (constant current low range), rotate the "knob" to select the range, press the "Enter" key to confirm;
3. "I-Set": Input through the numeric keys, and press "Enter" to confirm;
4. "Rise slew": Enter by numeric keys and press "Enter" to confirm;
5. "Fall slew": Enter by numeric keys and press "Enter" to confirm;
6. Press the "On/Off" key to turn on, and the display state is "ON", as shown in Figure 18.

Figure 18 CC mode

7. Press the "On/Off" key to turn on, and the display state is "ON", test finished.

5.2.2 Constant Voltage (CV)

5.2.2.1 Function Description

In this mode, N6200 will consume current to maintain the input voltage at the set value.

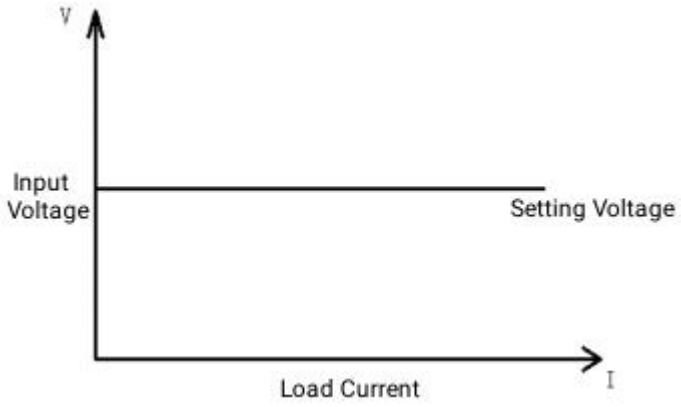

Figure 19 Constant Voltage Mode

5.2.2.2 Operation Steps

1. User press "CV" button to enter the interface, and move to the target menu item through the "◄" and "►" button on the front panel or turn the "knob", then press "Enter" button to enter the menu item;

2."Range": divided into CVH (constant voltage large range), CVL (constant voltage small range), turn the "knob" to select the range, press "Enter" button to confirm;

3."V-Set": enter the value by numeric button, press "Enter" to confirm;

4."Rise Slew": enter the value by numeric button, press "Enter" to confirm;

5."Fall Slew": enter the value by numeric button, press "Enter" to confirm;

6.Press the "On/Off" button, and the load is ON, the channel status is displayed as "ON" on the screen;

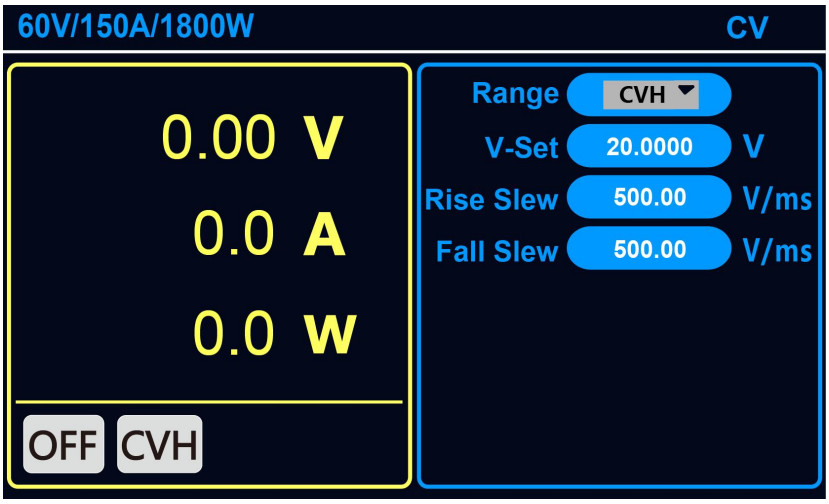

Figure 20 Constant Voltage

7. Press the "On/Off" button, and the load is OFF, the channel status is displayed as "OFF" on the screen, the test is completed.

5.2.3 Constant Resistance (CR)

5.2.3.1 Function Description

Under CR mode, the load is equivalent to a constant resistance, and the loading current changes with the input voltage. The working curve is shown in figure 21.

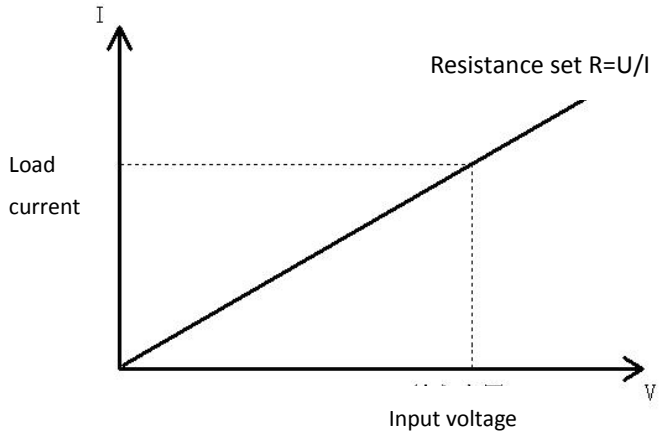

Figure 21 CR mode

5.2.3.2 Operation Steps

Please refer to the specification table for constant resistance value, rise/fall slew rate and measuring range.

1. Press the "CR" key on the main page to Enter the CR interface (for other interfaces, press the ESC key to return to the main page), move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
2. "Range": there are two options for range, CRH (constant resistance high), CRL (constant resistance low), rotate the "knob" to select the range, press the "Enter" key to confirm;
3. "R-Set": Input through the numeric keys, and press "Enter" to confirm;
4. "Rise slew": Input through the numeric keys, and press "Enter" to confirm;
5. "Fall slew": Input through the numeric keys, and press "Enter" to confirm;

6. Press the "On/Off" key to turn on, and the display state is "ON", as shown in Figure 22.

Figure 22 CR mode

7. Press the "On/Off" key to turn off, and the display state is "OFF", test finished.

5.2.4 Constant Power (CP)

5.2.4.1 Operation Steps

Under CP mode, the electronic load operates at the set power, and if the input voltage increases, the input current will decrease and the power P (=U*I) will remain at the set power. Figure 23 shows the working curve.

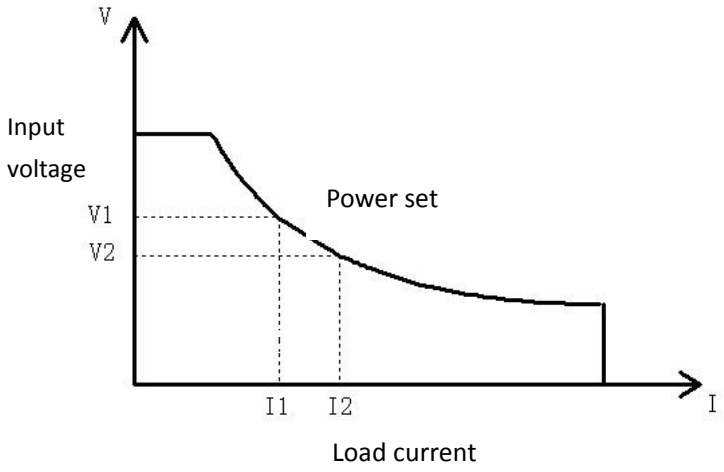

Figure 23 CP mode

5.2.4.2 Operation Steps

Please refer to the specification table for CP value, rise/fall slew rate and measuring range.

1. Press the "CP" key to Enter the CP interface, move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.

2."P-Set": Input through the numeric keys, and press "Enter" to confirm;

3."Rise slew": Input through the numeric keys, and press "Enter" to confirm;

4."Fall slew": Input through the numeric keys, and press "Enter" to confirm;

5.Press the "On/Off" key to turn on, and the display state is "ON", as shown in Figure 24.

Figure 24 CP mode

6.Press the "On/Off" key to turn off, and the display state is "OFF", test finished.

5.3 Dynamic Test (TRAN)

5.3.1 Function Description

The Dynamic function simulates dynamic load behavior in order to test the dynamic characteristics of a power supply. Dynamic testing has three operating modes: Conti, Pulse and Toggle. The Pulse and Toggle modes require a trigger signal, which is either the key combination "Shift+7" (Trigger) or the trigger terminal on the rear panel.

If the Conti is selected, N6200 switches continuously between the main value and the transient value according to the set pulse width, and will be executed according to the set parameters all the time.

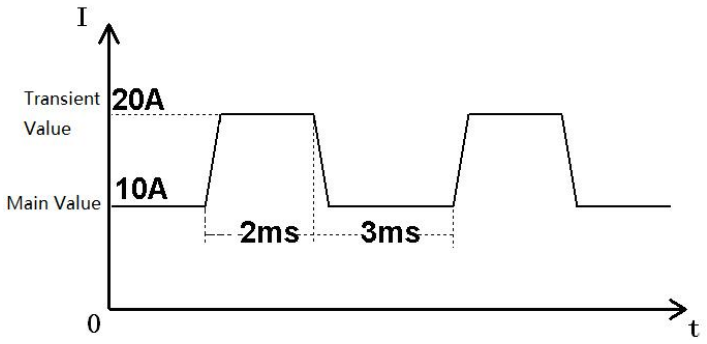

Figure 25 Conti

If Pulse is selected, N6200 receives a trigger signal, it switches from the main value to the transient value, and returns to the main value after maintaining the transient pulse width time. As shown in Figure 26, in pulse mode, when the transient test is enabled, N6200 will immediately switch to the transient value every time it receives a trigger signal, and after maintaining the pulse width time, it will automatically switch back to the main value.

Remarks

N6200 does not respond to the received trigger signal within the pulse width time of switching to the transient value.

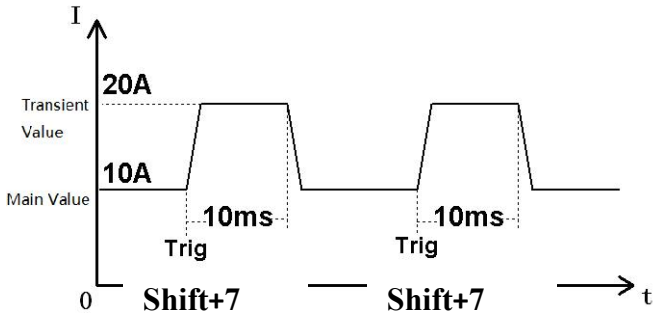

Figure 26 Pulse

If Toggle is selected, the trigger signal is received and N6200 will switch between the main value and the transient value, with the switching time determined by the slew. As shown in Figure 30.

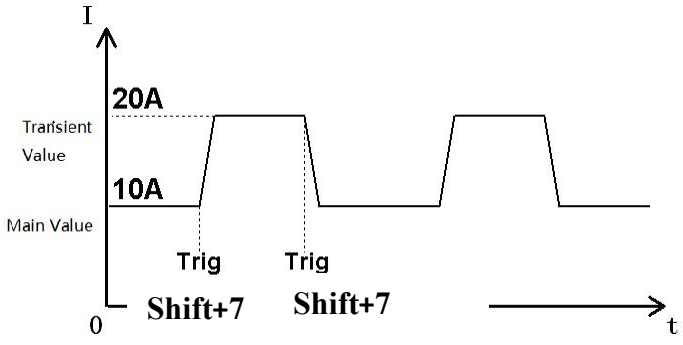

Figure 27 Toggle

In the dynamic operation mode, four dynamic functions can be set: dynamic current (CCD), dynamic voltage (CVD), dynamic resistance (CRD) and dynamic power (CPD).

5.3.2 Operation Steps

1. Turn the knob to CCD mode, press enter to parameter setting page;
2. Through the front panel "◄" "►" key or turn the "knob" to move the cursor to the target menu items, press "Enter" to enter the menu item setting;
3. "Range": turn the knob to select range, press the "Enter" key to confirm;
4. "Mode": turn the "knob" to select the operation mode, press "Enter" key to confirm, you can choose Conti (continuous) / Pulse (pulse) / Toggle (toggle). Different operation mode, corresponding setting parameters are also different, take Conti (continuous) mode as an example;
5. "Current1"： Input by numeric keys, press "Enter" to confirm, current1 is the main value;
6. "Current2" ： Input by numeric key, press "Enter" to confirm, current2 is the transient value;
7. "Pulse Wid.1": input by numeric key, press "Enter" to confirm, pulse width 1 is the load time of current 1, the value range is 0.015ms～60000s, press "Shift" to switch the time unit. Press "Shift" key to switch the time unit;
8. "Pulse Wid.2": input by numeric key, press "Enter" to confirm, pulse width 2 is the carrying time of current 2, the value range is 0.015ms～60000s, press "Shift" key to switch the time unit. Press "Shift" key to switch the time unit;
9. "Rise Slew": input by numeric key, press "Enter" to confirm;
10. "Fall Slew": input by numeric key, press "Enter" to confirm;
11. Press the "ON/OFF" key, the display channel status is identified as "ON", as shown in Figure 28;

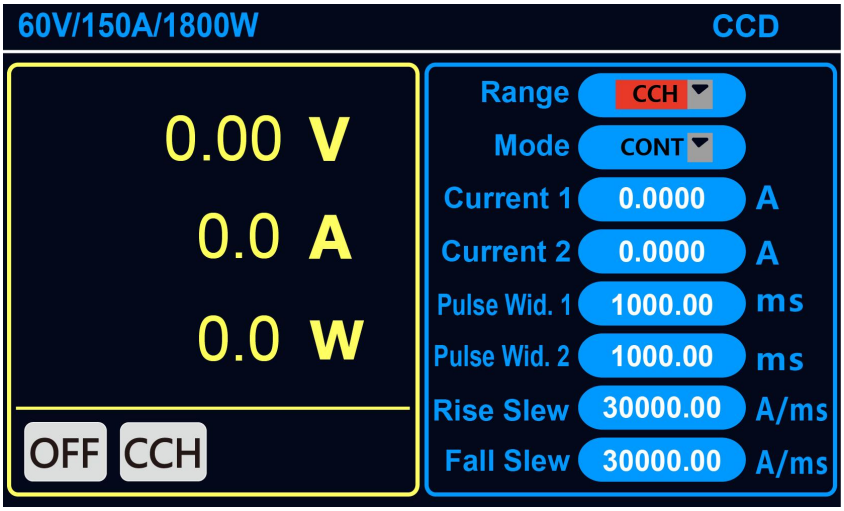

Figure 28 CCD

12. Press the "On/Off" key to turn off, and the display state is "OFF", test finished.

5.4 SEQ Edit

5.4.1 Function Description

SEQ Edit allows users to edit a complex sequence of changes to achieve continuous loading in different modes.

5.4.2 Operation Steps

1. Press "Menu" to Enter the main menu page, rotate "knob" to select "SEQ Edit", and press "Enter" to enter;
2. Move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
3. "File No.": used to select the current sequence test file to be edited, input through the numeric key, press "Enter" key to confirm, sequence file value range 1-100;
4. "Total Steps": used to specify the total number of steps of the current sequence file, sequence length value range 1-50, input through the numeric key, press

"Enter" to confirm;

5. "Link to SEQ": it is used to specify the file to continue to execute after the current sequence file is run, the value range is 0-100, input through the numeric key, and press "Enter" to confirm;
6. "Cycle": the number of runs of the sequence file, ranging from 1-60000, input through numeric key and confirmed by "Enter";
7. "Step No.": it is used to select the current test step to be edited, and then set the corresponding parameters. After the parameter setting of the current step is completed, the value range of the edit step is 1-50, input through numeric key and confirmed by "Enter";
8. "Mode" : By rotating the "knob" to switch the current step load mode, Including CCH, CCL, CVH, CVL , CRH, CRL, CPH, and CPL. Different load modes have different load main values and load slew rate. If the user chooses a certain load mode, its subsequent setting items will be different.
9. "I-Set": Set the current load master value. The load master value setting item corresponds to the load mode. For example, if the load mode is set to CCH, the current parameter is Current. If the value is CVH, the present step is voltage. Input the value using numeric keys and press Enter to confirm.
10. "Rise/ fall slew " : if the load mode is selected as other modes, then you can set the current rise and fall slew rate, input through the numeric key, press "Enter" to confirm;
11. “Dwell”: Enter the time range from 0.0ms to 100000s by numeric keys, and press Enter to confirm. If the delay time is set to 0, it means the load is running all the time, users can press "shift" to switch the time unit, and press "Enter" to confirm;
12. "Inspection": the check content is divided into VOL (check voltage), CUR (check current), POW (check power), the default is OFF (shut off “check content”) state, you can rotate the "knob" to select “check content”, press "Enter" to confirm. If the user is more concerned about the time accuracy of the waveform, the “check

content” can be turned off.

13. “Check Upper Limit and Lower limit”: If the check content is not OFF, set the check upper limit and check lower limit and press Enter to confirm.

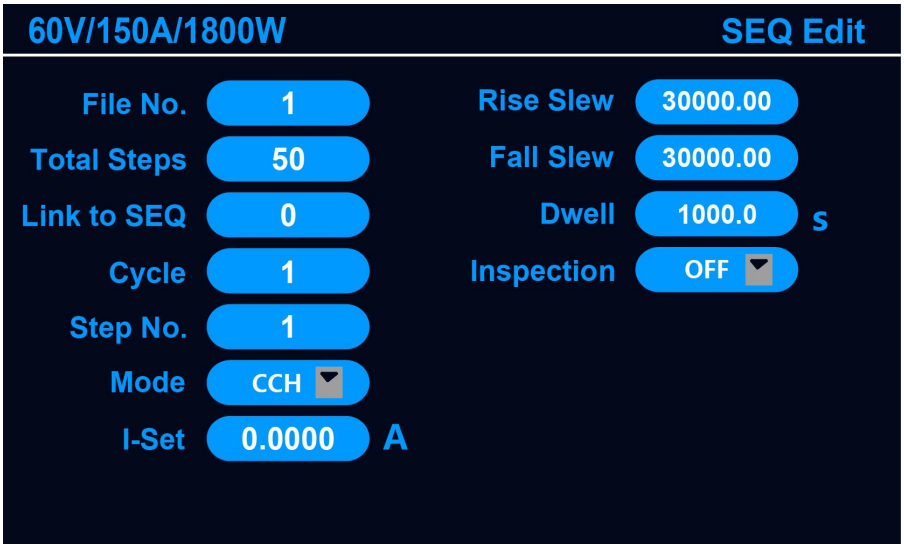

Figure 29 SEQ Edit

14. After this sequence is edited press the key combination "Shift+6 (Save)" to save it.

5.5 Auto Test

5.5.1 Function Description

The auto test function is used to simulate the real waveform with load and provides an efficient specification check process, which significantly improves test efficiency. This function requires calling sequence files for testing (sequence files are edited under the "Automatic Test editing" interface), and users can edit up to 100 automatic test files, each of which can support 50 test steps. In each test step, the user can set the mode, value, rise slew, fall slew, time unit, dwell and inspection.

When the sequence file is running, starting from step 1, the load performs the on-load action according to the parameters in the test step. When the delay reaches, the specification check (whether the sampling voltage/sampling current/sampling power is within the range) is performed, and then switches to the next step. After all the test steps are run, the load is automatically turned OFF and the test is stopped.

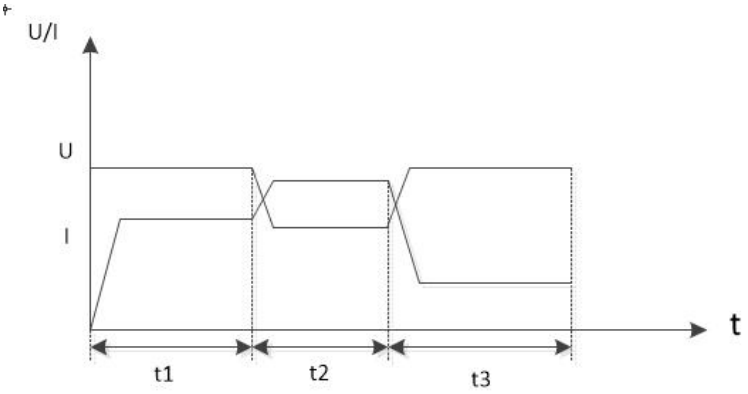

Figure 30 Auto test

5.5.2 Operation Steps

1.After editing the auto test file, press "Menu" to enter the main menu page, rotate "knob" to select "auto test", and press "Enter" to enter;

2. Move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.

3. "File No." : Rotate the "knob" to select the auto test file and press "Enter" to confirm;

4. Press the "On/Off" key to turn on, and the display state is "ON", observe the display reading, as shown in Figure 31.

5. After the test is completed, the load will automatically turn OFF and stop running, and the display status is marked as "OFF". The screen will also display the test result "PASS" or "FAIL" if the current sequence file is turned on.

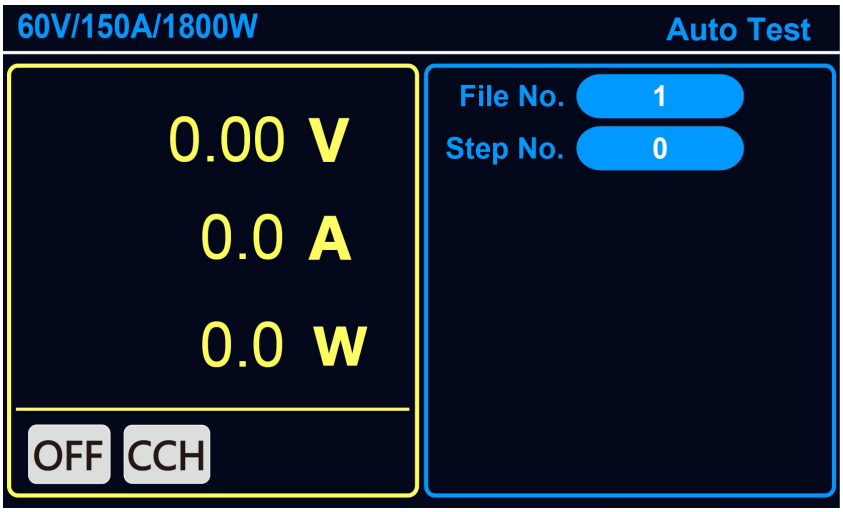

Figure 31 Auto test

5.6 Discharge Test

5.6.1 Function Description

The discharge function is used to test the discharge of batteries or super capacitors. During the test, the voltage of the battery (or capacitor) continues to decrease. When the voltage at both ends of the battery is detected to be lower than the end voltage, the load is OFF and the discharge of the battery (or capacitor) is stopped.

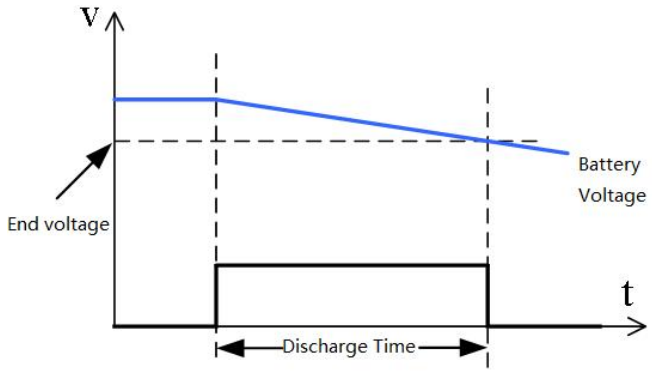

Figure 32 Discharge test curve

5.6.2 Operation Steps

1. Press "Menu" to Enter the main menu page, rotate "knob" to select "Discharge", and press "Enter" to enter;
2. Move the cursor to the target menu through the "◀" "▶" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
3. "I-Discharge": Input through the numeric keys, the setting range is 0 to rated current and press "Enter" to confirm;
4. "V-End": Input through the numeric keys, and press "Enter" to confirm. When the voltage of the DUT drops to the end voltage, the load stops, and the setting range is 0- rated voltage;

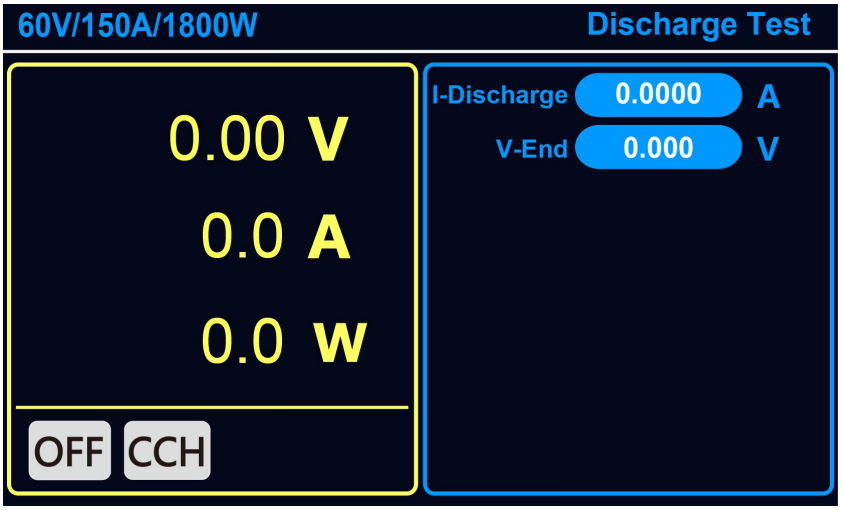

Figure 33 Discharge test

5.Press the "On/Off" key to turn off, and the display state is "OFF", test finished.

5.7 Charge Test

5.7.1 Function Description

The charge test function is used to perform a charge test on a battery or super capacitor. In addition to providing constant current charging mode, N6200 series loads also add intelligent constant current to constant voltage charging mode.

If the charge test function is used, the load needs to be connected in series with the power supply and the battery (or super capacitor), and the remote sense of the load is turned on, and the Sense Mode line is used to connect to the positive and negative terminals of the battery. The wiring method is shown in Figure 34.

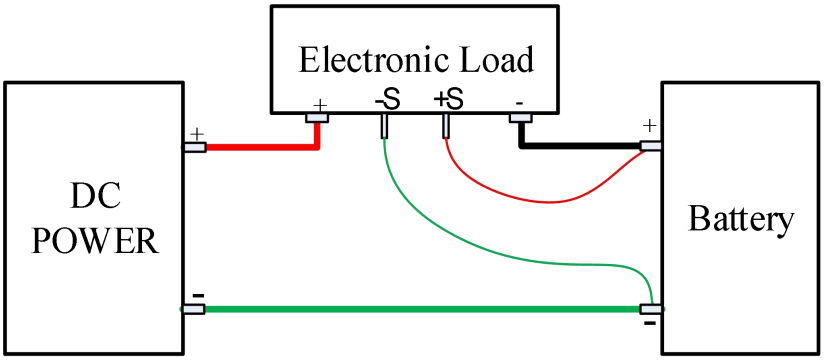

Figure 34 Charge Test Wiring Diagram

5.7.2 Operation Steps

Loading time and discharge is recorded after N6200 is turned on. Before testing, these data can be cleared by pressing "←(PROT-CLR)".

1. Users press "Shift+3 (Charge)" to enter the "Charge" interface, or select "Charge " under the "Menu" menu and press "Enter" key to enter;
2. Move the cursor to the target menu through the "◀" "▶" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
3. "I-Charge": Input through the numeric keys, the setting range is 0 to rated current and press "Enter" to confirm;
4. "V-Charge ": input the end voltage by numeric key, press "Enter" to confirm, when the voltage of the DUT drops to the end voltage, stop loading, the setting range is 0-rated voltage;
5. "CV Time": input CV time by numeric key, press "Enter" to confirm, the charging duration is equal to the constant voltage time, stop loading, the setting range is 0-86400s;
6. Press the "On/Off", the display channel status is identified as "ON", as shown in Figure 35;

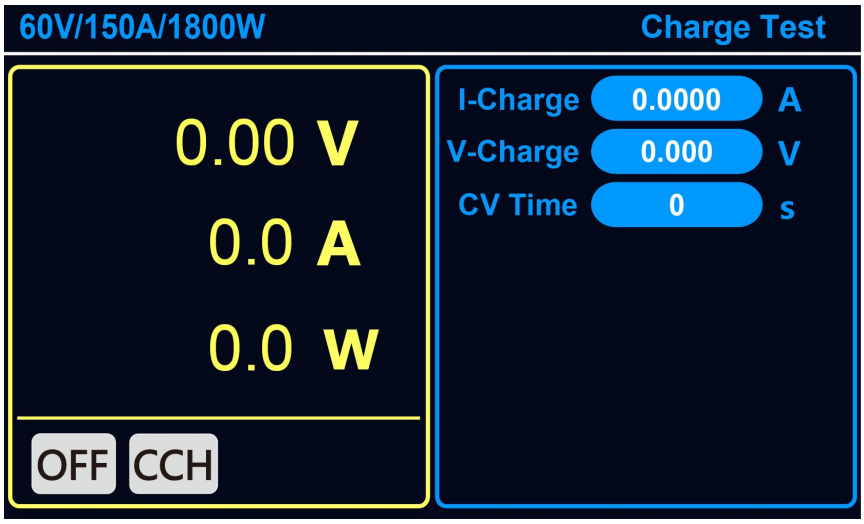

Figure 35 Charge Mode

7. N6200 will charge the battery with constant current first, when the voltage reaches the set charging voltage, it will turn to constant voltage charging at this moment, when the constant voltage charging time reaches the set constant voltage time, it will stop charging, and at the end of the test, the screen will display the amount of battery charging (unit Wh).
8. Press the "ON/OFF" key to turn off, and the display state is "OFF", test finished.

5.8 ESR Test (DCIR Optional)

5.8.1 Function Description

Equivalent DC Internal Resistance (DCIR) is an important technical indicator for measuring the performance of batteries and super capacitors. The N6200 series loads provide professional DCIR measurement functions that support a wide range of measurement standards, and have the advantages of accurate and repeatable measurement results.

The DCIR measurement function pulls the load on the DUT in constant current mode. At the moment of current pulling, the voltage change of the DUT can be accurately captured by the precise internal resistance sampling circuit of N6200, and the equivalent DC internal resistance of the DUT can be calculated according to Ohm's law.

5.8.2 Operation Steps

1. Users press "Shift+4 (ESR)" to enter the "ESR Test" interface, or select "ESR Test" under the "Menu" menu, and press "Enter" to enter the interface.
2. Move the cursor to the target menu through the "◄" "►" key or rotate the "knob" on the front panel, and press the "Enter" key to enter the menu settings.
3. "Range": divided into CCH (constant current large range), CCM (constant current medium range), CCL (constant current low range), turn the "knob" to select the range, press "Enter" key to confirm;
4. "I-Set": input via numeric keys, press "Enter" to confirm, the setting range is 0 - rated current;
5."Test Range"：It refers to the range of pressure difference generated by the internal resistance of the DUT through the current (it is recommended to use 80% of the current range for testing), for example: the internal resistance of the DUT is about 10mΩ, the current setting is not more than 1A in the 10mV range; the current setting

is not more than 10A in the 100mV range; the current setting is not more than 100A in the 1000mV range. Turn the "knob" to select the range, press "Enter" to confirm;

6. “Method”: including Square and N-ms. Turn the "knob" to select the range, press "Enter" to confirm;

7. Connect a super capacitor or battery to the input and observe the display reading, as shown in Figure 36.

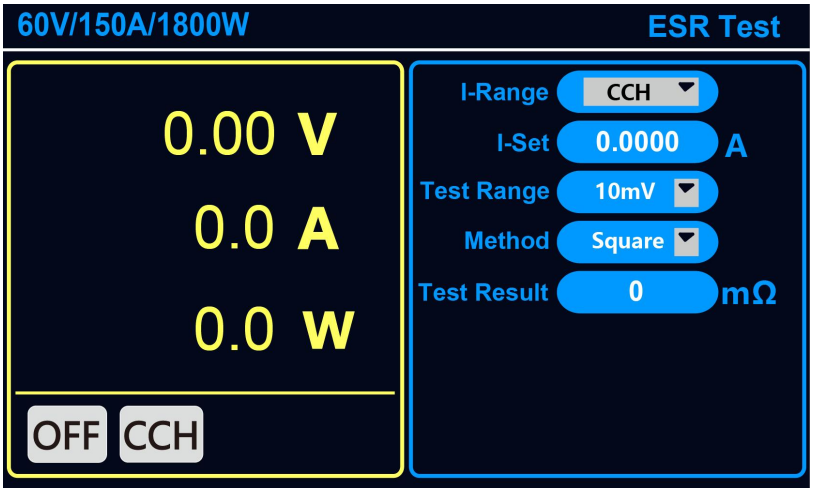

Figure 36 ESR Test

8. Press the "ON/OFF" key to turn off, and the display state is "OFF", test finished.

Note

When testing, please make sure that the wiring is correct, and it is recommended to use high current to test.

5.9 OCP Test

5.9.1 Function Description

Under the OCP mode, when the input voltage reaches the Von, N6200 will load, and the current is incremented by the step every certain period of time. At the same time, N6200 input voltage is detected to judge whether it is higher than end voltage. If it is higher, it indicates that OCP has not occurred, then repeat the current stepping operation until it runs to the end current; if it is lower, it indicates that OCP has occurred.

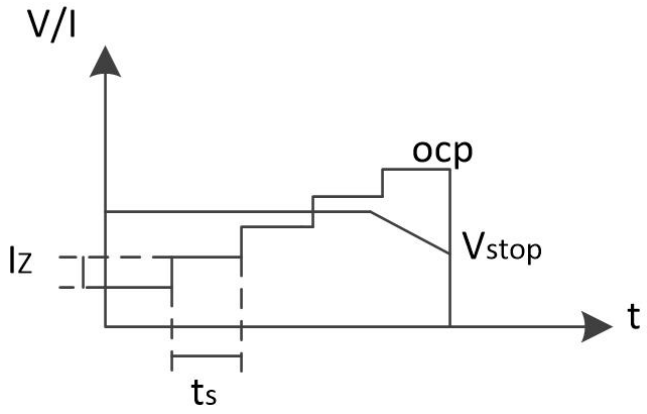

Figure 37 OCP Test

Iz：increment current ts：dwell Vstop：end voltage

5.9.2 Operation Steps

1. Users press “Shift+5” to enter“OCP ”or to select OCP under Menu interface and press “Enter”；

2. Press “◄”“►”or rotate “knob”to move cursor to desired item, and press“Enter”to set value；

3. “I-Start”：Input via numeric keys，press “Enter”to confirm ；

4. “I-Incr”：Input via numeric keys，press “Enter”to confirm ；

5. “V-End”：Input via numeric keys，press “Enter”to confirm ，When the voltage

of the terminals is less than the end voltage, N6200 stops loading;;

6. “Dwell” ： Input via numeric keys, press “Enter”to confirm. Range 0.02s~60000s; The current will increment to the protection current in dwell;

7. press “On/Off”, the screen will display “ON”， as the following figure shown;

Figure 38 OCP Test

8. After completing the test, press "ON/OFF", the display channel status is marked as "OFF" and the test result is displayed.

5.10 Application

Users press “Menu” and select “Application” to enter interface, as the following figure is shown.

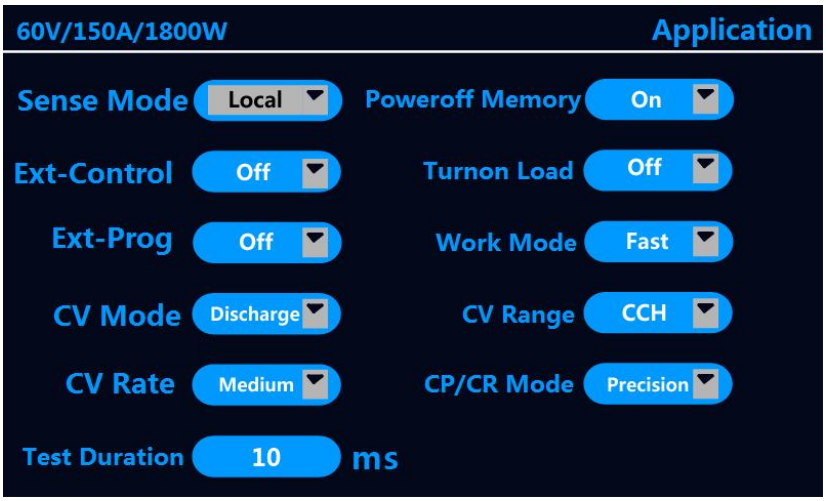

Figure 39 Application

Table13

Parameter	Function
Sense Mode	To set local or remote
Ext-Control	External trigger source, options: Toggle, Hold and Off
Ext-Prog	To turn on/off external programming
CV Mode	To set charge or discharge, for battery or capacitor charge & discharge test
CV Rate	This parameter is for setting CV rate. The options are slow, medium and fast. The rate is related to the response speed of external power supply. If the response speed of external power supply is high, CV rate should be set to High.
Test Duration	ESR single pulse test time is 10ms-200ms. Default is 10ms.
Poweroff Memory	This function is to save the data when turning off N6200 or in power failure.
Turnon Load	When this function is set to ON, N6200 will automatically load after power-on, according to the previous setting before power-off.
Work Mode	The options are fast and slow. Fast option provides high response speed. Slow option internally compensates for accuracy errors caused by fast response.
CV Range	To set current range under CV mode, options: CCH and CCL
CP/CR Mode	The options are fast and precision.

5.11 System

Users press “Menu” to enter **System** interface, as the following figure is shown：

Figure 40 System

- **IP Address**

The default IP address is 192.168.0.123, which can be changed by the numeric button, and the change will take effect after reboot.

- **Subnet Mask**

The mask defaults to 255.255.255.0 and cannot be changed.

- **Com Baud**

N6200 supports multiple baud rate, which can selected by user’s needs. The change will take effect after reboot.

- **Parity**

It can be set to None, Odd or Even.

- **CAN Baud**

Baud rate setting can be changeable and take effect after reboot.

- **Beeper**

User can set the instrument’s sound On or Off.

- **Language**

The N6200 supports both Chinese and English.

- **Fast Recall**

ON/OFF

- **Device ID**

Set the instrument ID, and it will take effect after reboot.

- **Protocol**

Include Modbus/SCPI

5.12 Protection

Users press “Menu” and select“Protection”to enter interface， and set values, which is shown in the following figure.

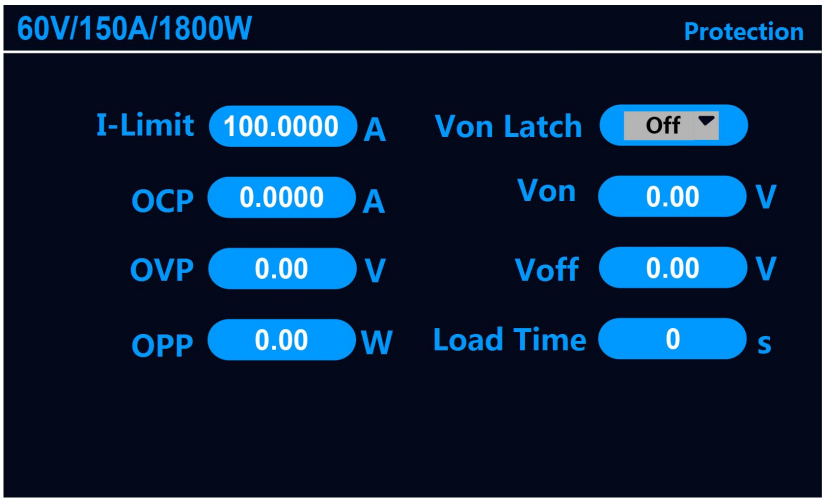

Figure 41 Protection

- **I-Limit**

Set programmable current limit

- **OCP**

If the OCP is triggered, N6200 will be unloaded immediately and the OCP symbol will appear on the screen. To disable this function, set the value to 0A.

- **OVP**

If the OVP is triggered, N6200 will be unloaded immediately and the OVP symbol will appear on the screen. To disable this function, set the value to 0V.

- **OPP**

If the OPP is triggered, N6200 will be unloaded immediately and the OPP symbol will appear on the screen. To disable this function, set the value to 0W.

- **Von**

If the input voltage is higher than the setting, N6200 will be loaded immediately.

- **Voff**

If the input voltage is lower than the unloading voltage, N6200 will stop

loading immediately. To disable this function, set the value to 0V.

- **Load Time**

  The range is 0-90000s. To disable this function, set the value to 0s.

- **Von Latch**

  When Von latch is on，it indicates Von reaches, and N6200 sink current; When Von latch is off, it indicates setting value is lower than Von, N6200 stops loading.

5.12.1 Von/Voff

Von's mode is divided into two ways: latch and unlatch:

Latch: N6200 starts loading when the input voltage is higher than Von and unloading when the input voltage is lower than Voff. After unloading, when the input voltage is higher than Von again, N6200 will not load automatically.

Unlatch: When the input voltage is higher than Von, N6200 will load. When the input voltage is lower than Von, N6200 stops loading.

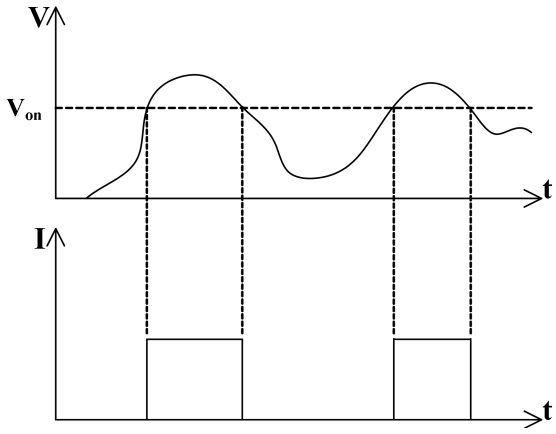

Figure 42 Unlatch

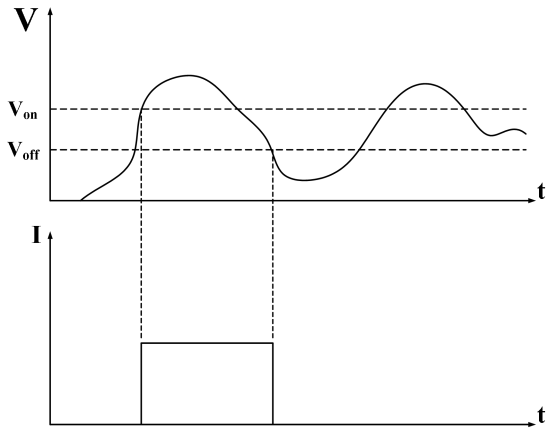

Figure 43 Latch

Note:
1. Von is only effective in CC mode.
2. Von must be higher than Voff, or N6200 will work abnormal.

5.12.2 Timed Unload

When the loading time reaches the setting value, N6200 will unload, which can realize precise time control. For example, setting the loading time to 20s, N6200 will unload after loading 20s.

Operation steps：

1. Press “Menu” to enter main interface.
2. Select“Protection” and press “Enter”t o confirm
3. Modify the loading time

5.13 MPPT

5.13.1 Function Description

There is the I-V curves, where PMAX is at the intersection of IMAX and VMAX.

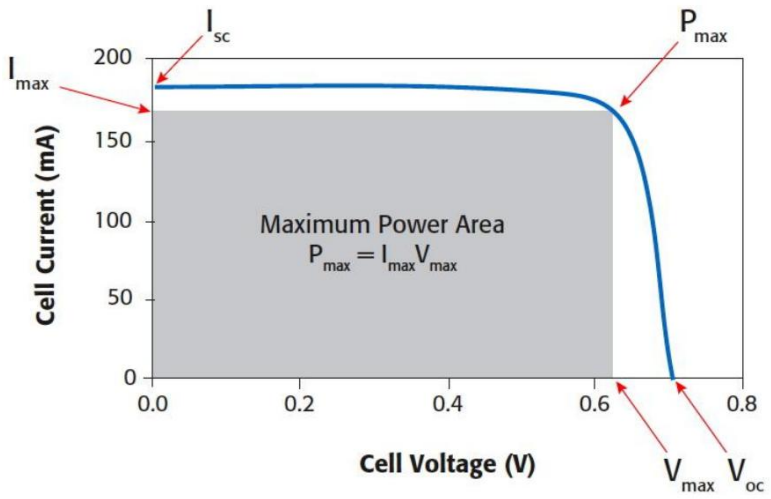

Figure 44 I-V Curve

MPPT is commonly used to test the maximum output power of solar panels. In this function, N6200 works in CV mode. At the beginning of the test, the constant voltage is close to 0V, and then slowly increase the voltage until the current drops to 0 (the power is 0), during this process the N6200 will record the electrical parameters in real time. The final test results include the maximum power point, voltage at the maximum power point, current at the maximum power point, open circuit voltage, and short circuit current.

5.13.2 Operation Steps

1. Users press “Menu”to enter the main interface, and rotate “knob”to select“MPPT”，then press“Enter”;

2. Select“◄”“►”or rotate “knob”to move cursor to desired item, press “Enter”to menu;

3. “Model”： including **Scan** and **Trace**， rotate “knob”to select desired mode，

and press “Enter”to confirm;

4. “Step V”： Input via numeric keys, press “Enter”to confirm;

5. “Step T”： Input via numeric keys, press “Enter”to confirm;

6. “MPP”： maximum power. Input via numeric keys, range 0.1~3600s, press “Enter”to confirm;

7. Press “On/Off”， the screen will display“ON”“CCH”， as the following picture shown. N6200 loads 0V in CV mode and increases the loading voltage in step time until the maximum power point id reached.

Figure 45 MPPT

8. After the test is completed, "Vmp", "Imp ", "Voc ", "Isc" will be calculated automatically.

5.14 Factory Reset

Users press “Menu” and select“Factory Reset”， then press “Enter” to reset factory setting. As is shown in the following figure.

Figure 46 Factory Reset

6 Application Software Installation & Configuration

6.1 PC Software Configuration

To make better use of the system performance, the following computer configuration is recommended:

- CPU: 2.0G, dual-core and above
- Memory: 4G and above
- Hard disk: 80G and above
- Port: Ethernet port
- Operating system: Microsoft Windows 7 and above

6.2 Application Software Installation and Uninstallation

6.2.1 Installation

1) Find the installation program "setup.exe" from the USB flash drive in accessory bag.

2) Make double-click on the file and begin installation.

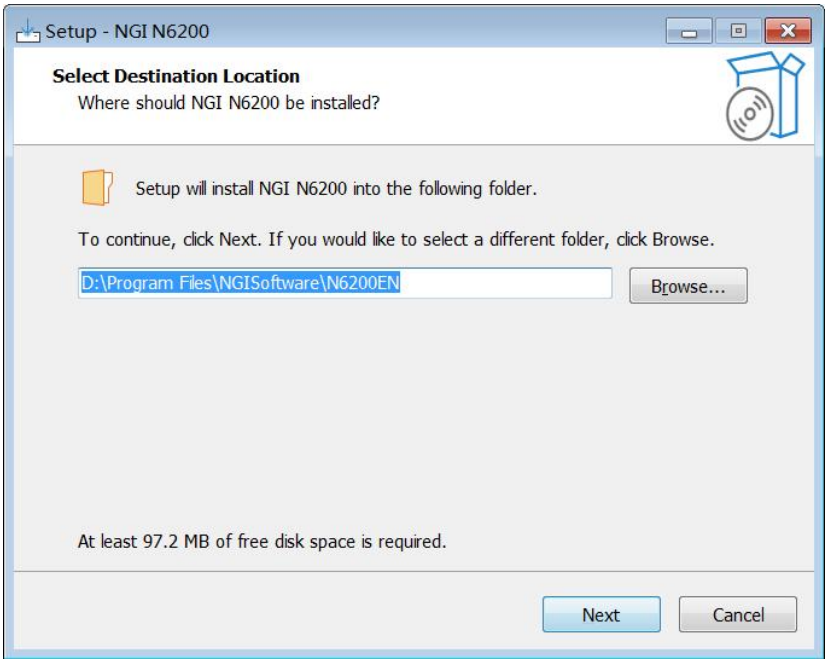

Figure 47 Program Installation

3) Click Next as prompted until the installation is completed. The software will automatically create a shortcut on the desktop.

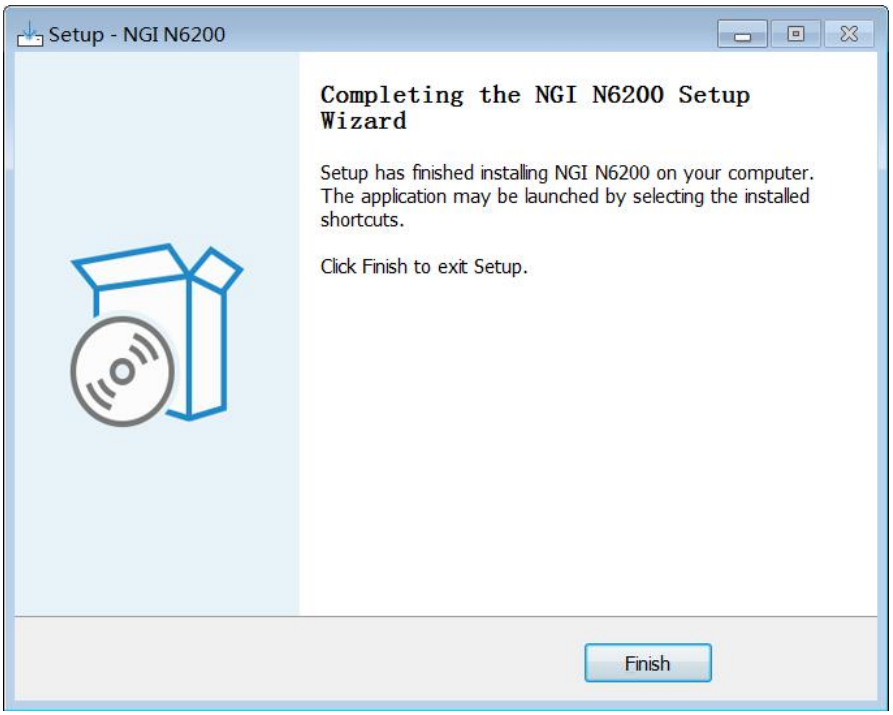

Figure 48 Installation Completed

6.2.2 Uninstallation

Methods for uninstallation:
Method 1: Program uninstallation can be completed through **Uninstall Program** in **Control Panel** of the operating system, or by right-clicking the shortcut and selecting uninstall.

Method 2: Find the setup program in your computer disk and delete.

6.3 PC Connection

6.3.1 Port Connection

Please plug the Ethernet cable to PC Ethernet port and the other side to N6200 LAN port. After N6200 series is turn on, enter the system configuration interface to check the network IP. PC needs to keep the same network segment with N6200 in order to

search the device.

Figure 49 System interface

6.3.2 Disabling operating system standby mode

■ Windows 7 settings

Click **Start**→Click **Control Panel**→Click **Power Options**→Click **Change Computer Sleep Time**.

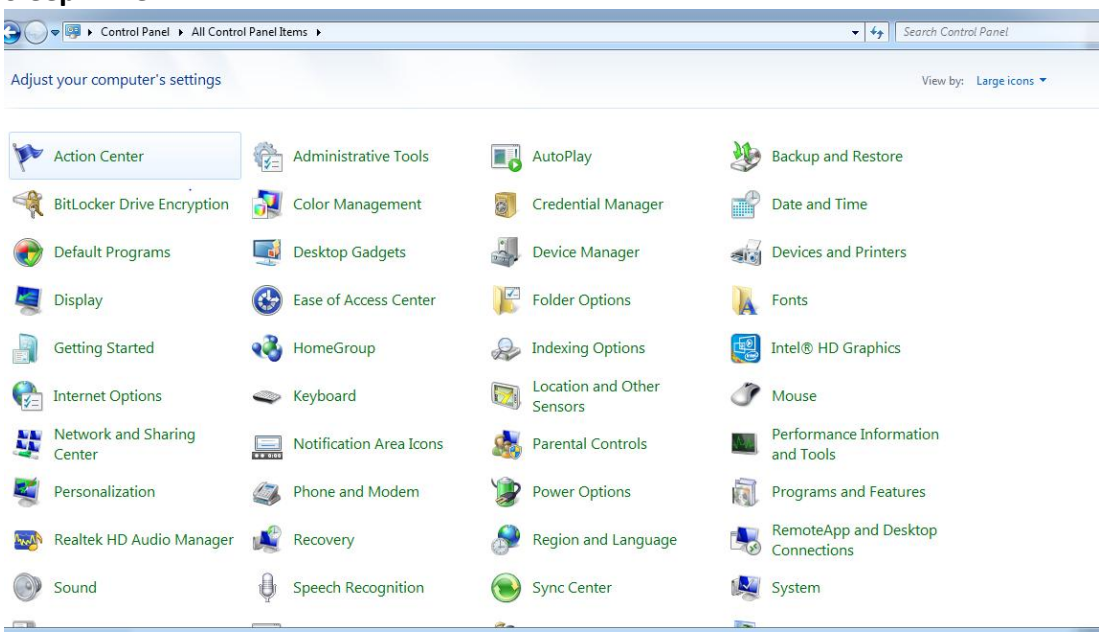

Figure 50 Windows 7 settings

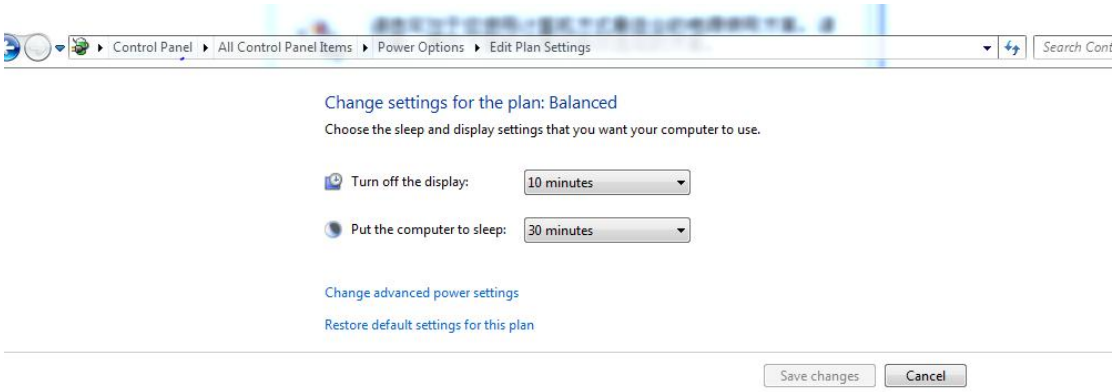

Figure 51 Windows 7 settings

Set **Turn off the display** and **Put the computer to sleep** to Never.

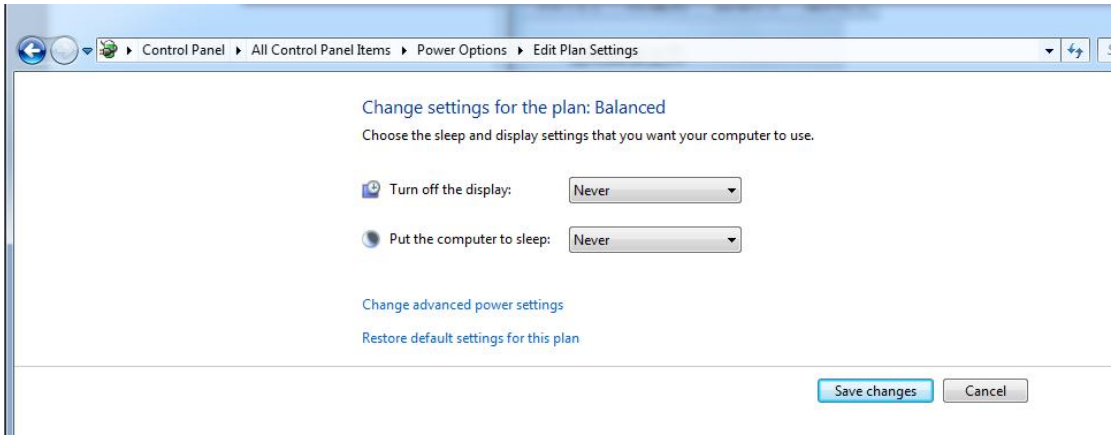

Figure 52 Windows 7 settings

■ Windows 10 settings

Click **Start**→Click **Settings**.

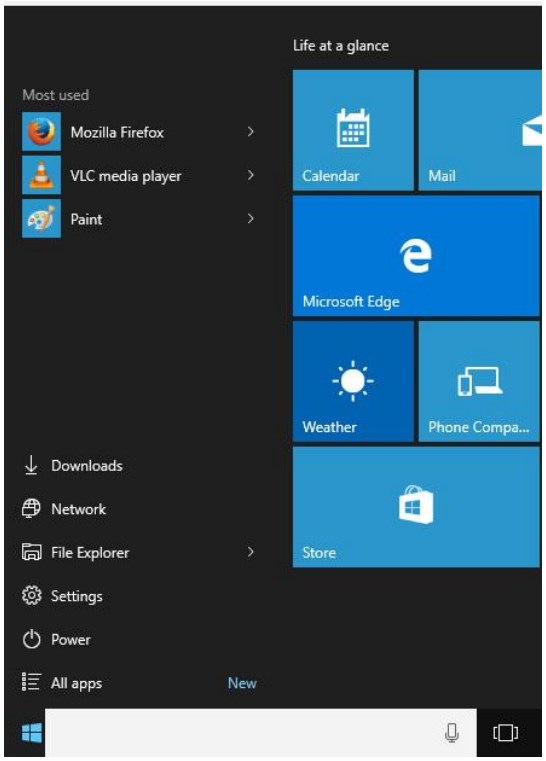

Figure 53 Windows 10 settings

Click **System**.

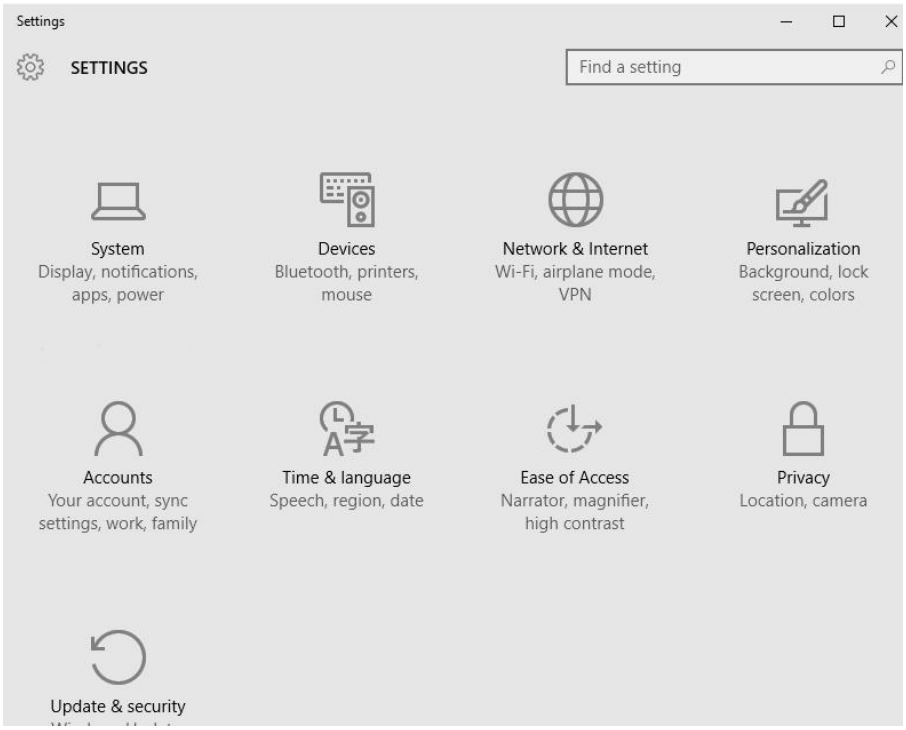

Figure 54 Windows 10 settings

Click **Power & sleep**.

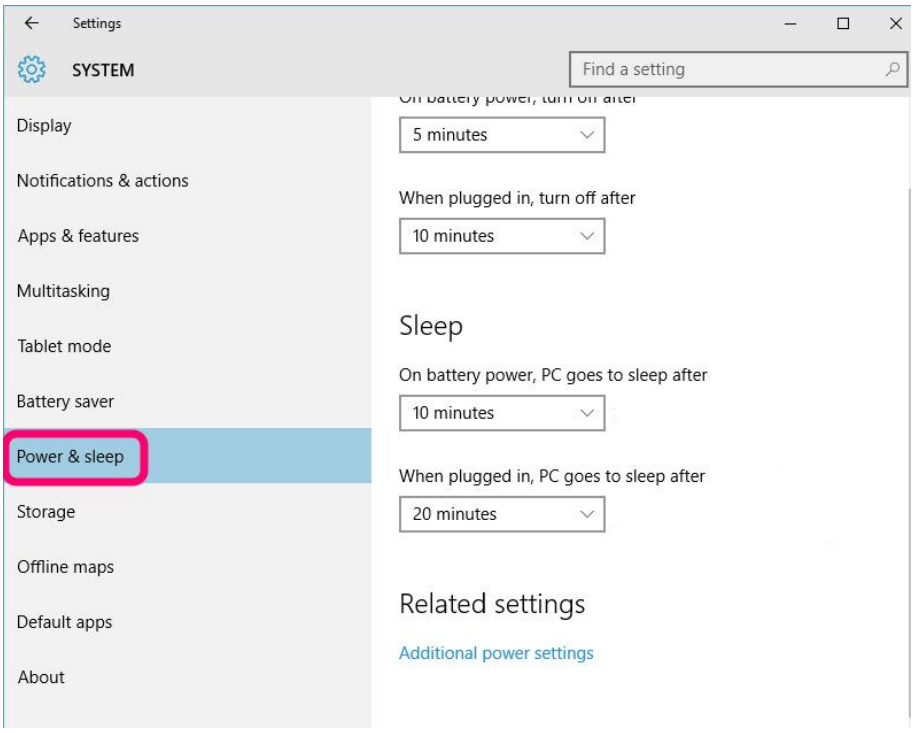

Figure 55 Windows 10 settings

Select **Never** for both options under **Sleep**.

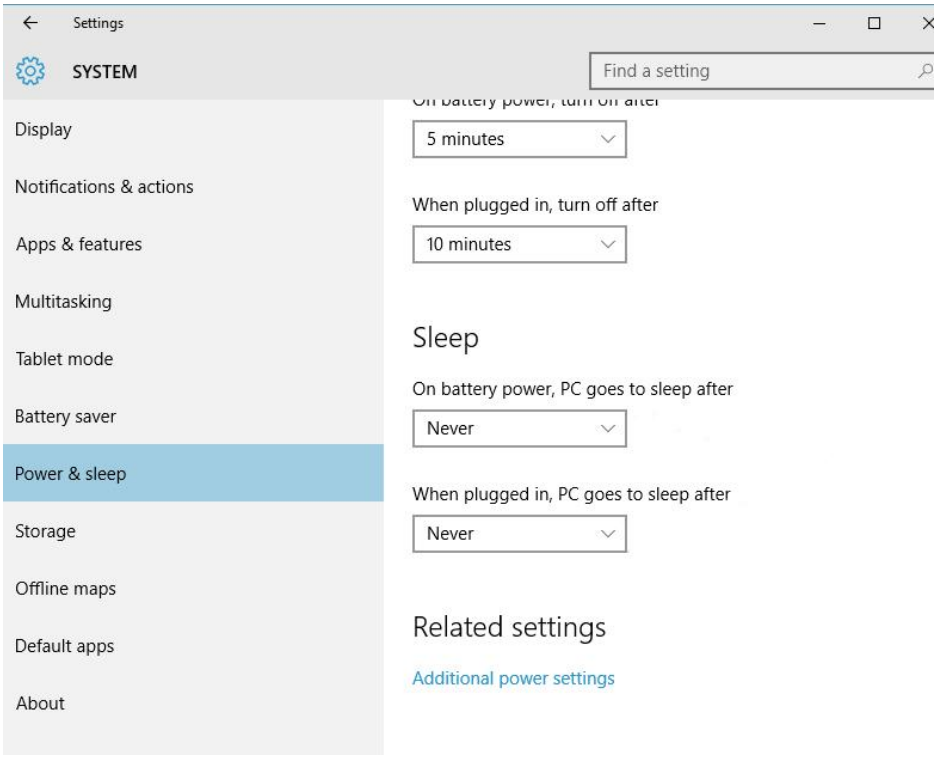

Figure 56 Windows 10 settings

6.3.3 Network IP Address Setting

The default IP of LAN port is 192.168.0.XXX (range from 0 to 255). Before operation, the computer IP should be assigned to the same network segment of N6200. But IP addresses should be different.

■ Windows 7 Setting

Click **Start**→Click **Control Panel**→Click **Network and Sharing Center**.

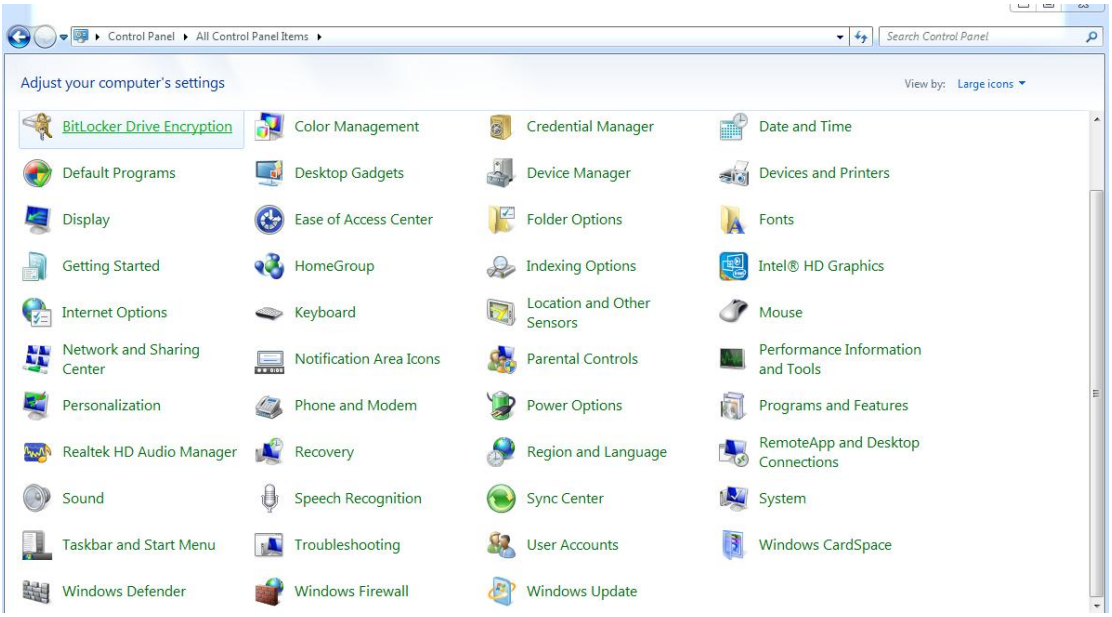

Figure 57 Network IP Address Setting

Click **Change adapter settings**.

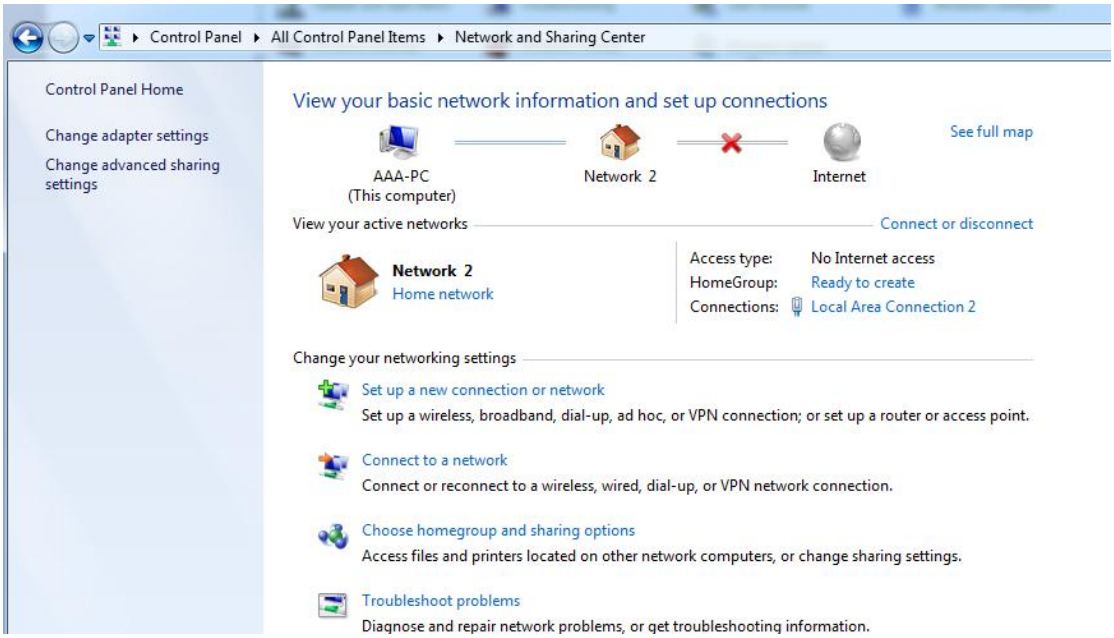

Figure 58 Network IP Address Setting

Select the network→Right click and choose **Properties**.

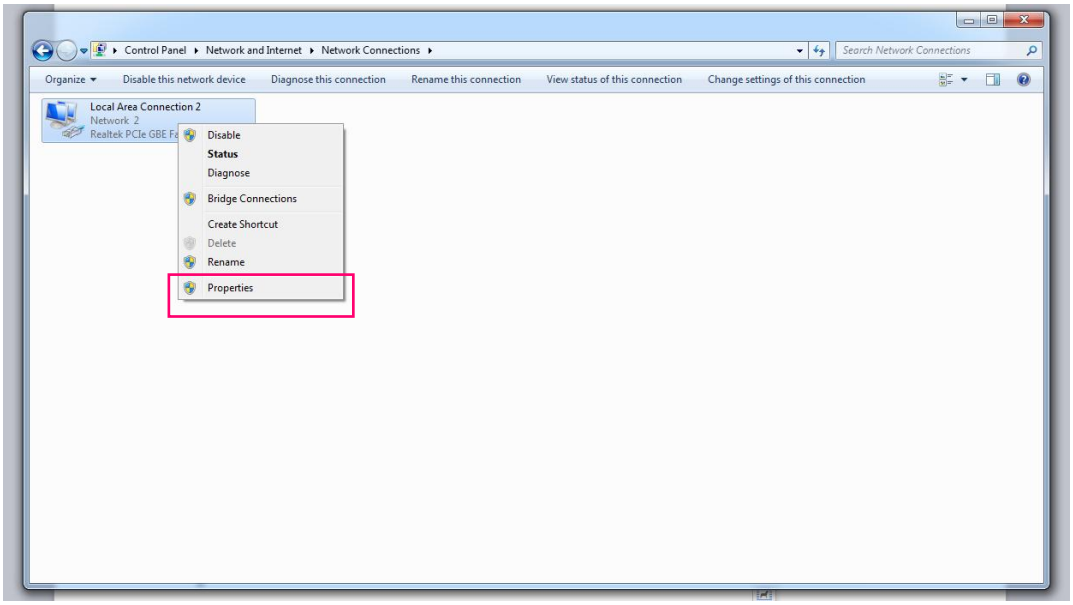

Figure 59 Network IP Address Setting

Click Internet Protocol Version 4(TCP/IPv4) and fill the below information and press **OK**.

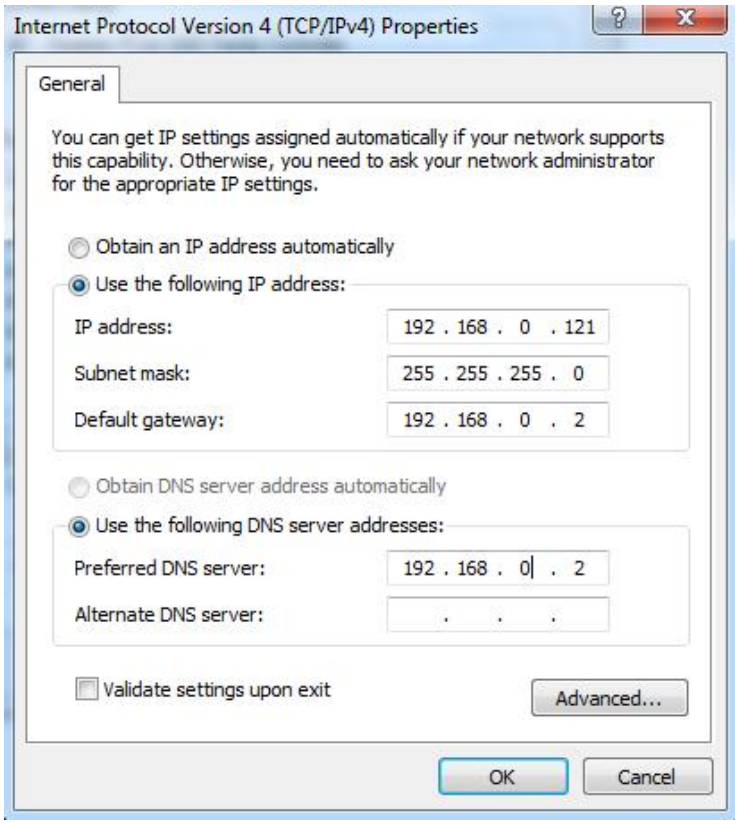

Figure 60 Network IP Address Setting

Click **Start**→Input **cmd**.
Input ping 192.168.0.123(default IP of N6200) and check if N6200 can communicate properly.

Figure 61 Run Command

If communicating properly, the below information will be reverted.

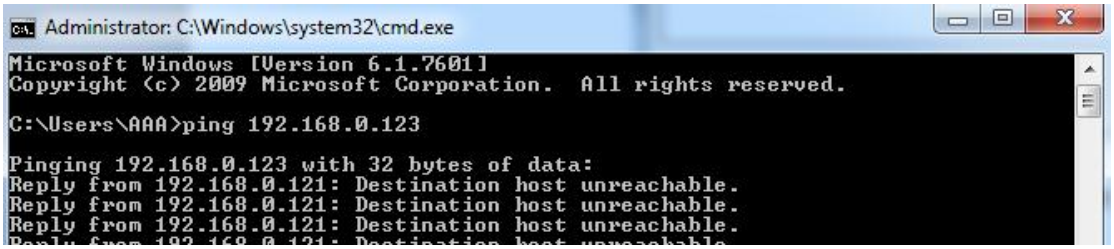

Figure 62 Communication Test

■ Windows 10 Setting

Click **Start**→Click **Set**→Click **Network & Internet**.

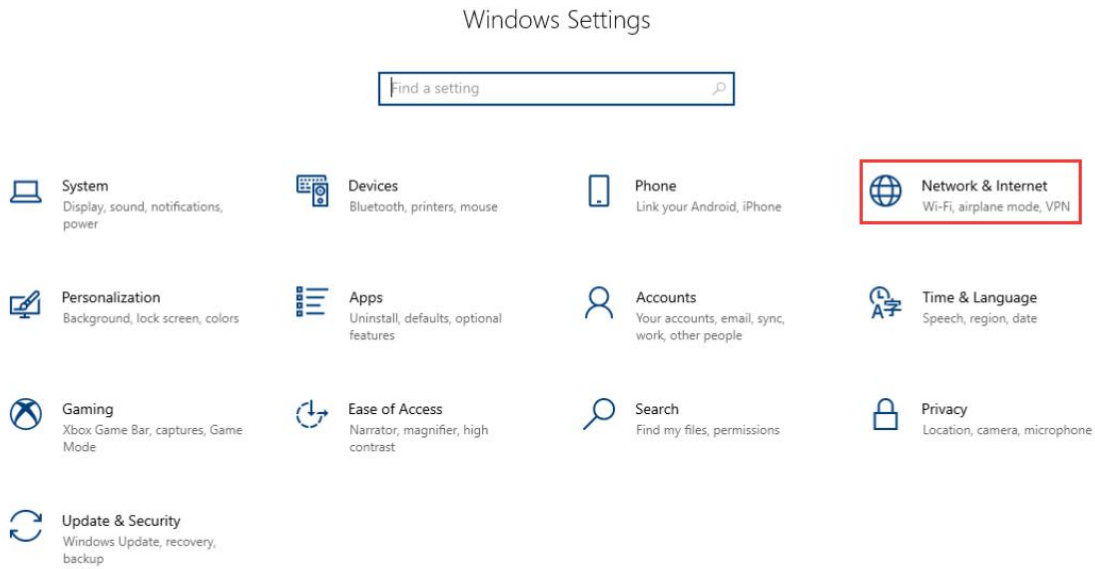

Figure 63 Network IP Address Setting

Click **Change adapter options**.

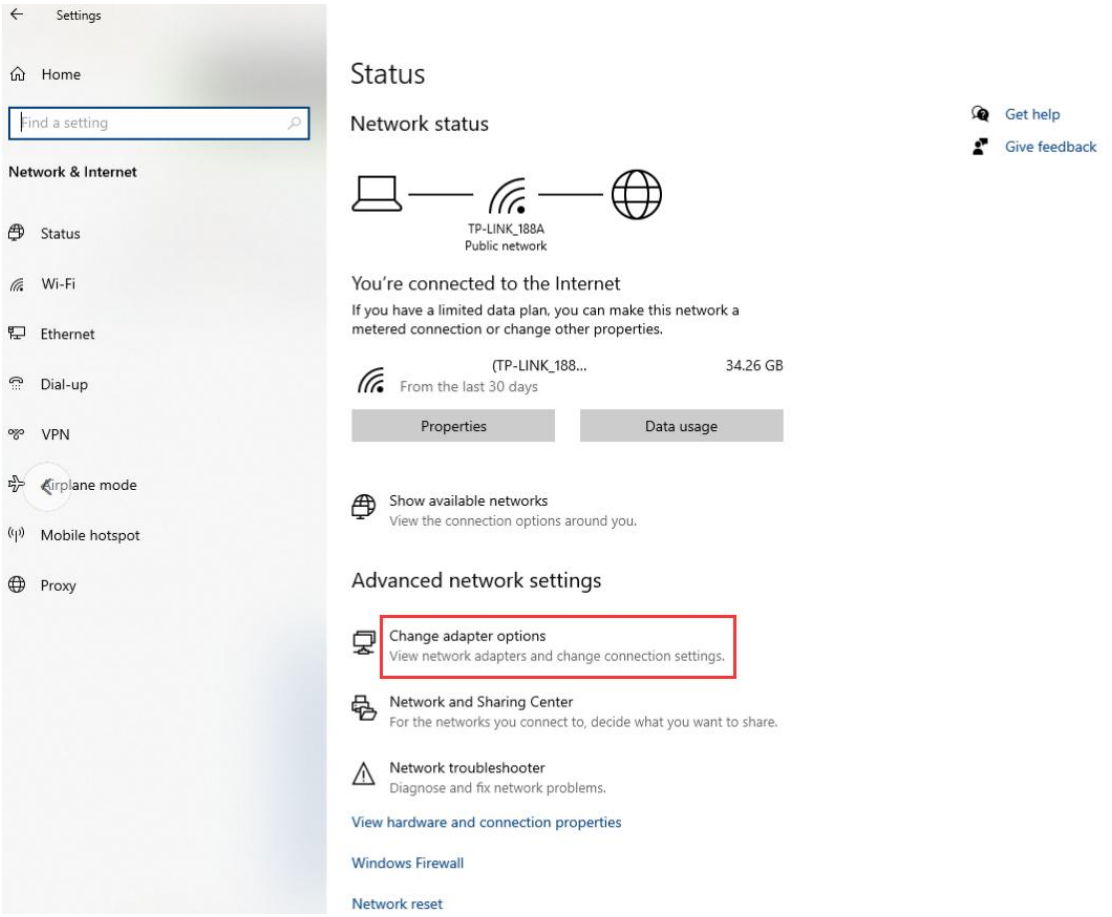

Figure 64 Network IP Address Setting

Select the network→Right click and choose **Properties**.

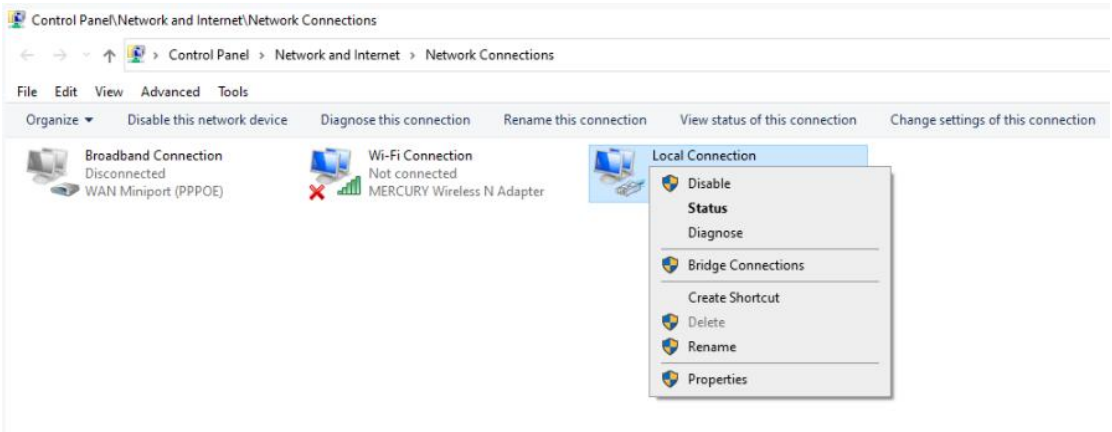

Figure 65 Network IP Address Setting

Click Internet Protocol Version 4(TCP/IPv4) and fill the below information and press **OK**.

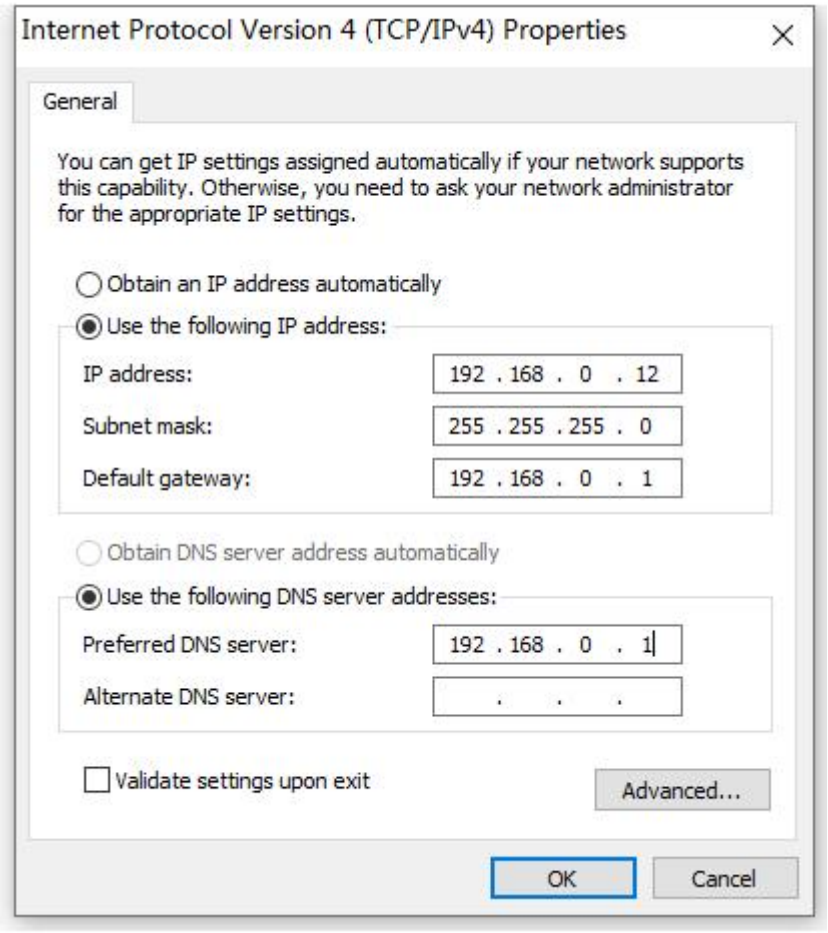

Figure 66 Network IP Address Setting

Click **Start**→Input **cmd**.

Input ping 192.168.0.123(default IP of N6200) and check if N6200 can communicate properly.

Figure 67 Run Command

If communicating properly, the below information will be reverted.

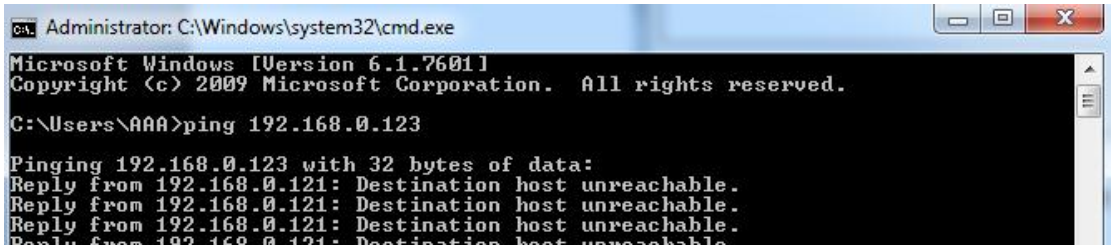

Figure 68 Communication Test

6.4Operation

After the application software is successfully installed, a shortcut icon will be generated on the desktop. Please click the shortcut to enter the menu.

Figure 69 Shortcut

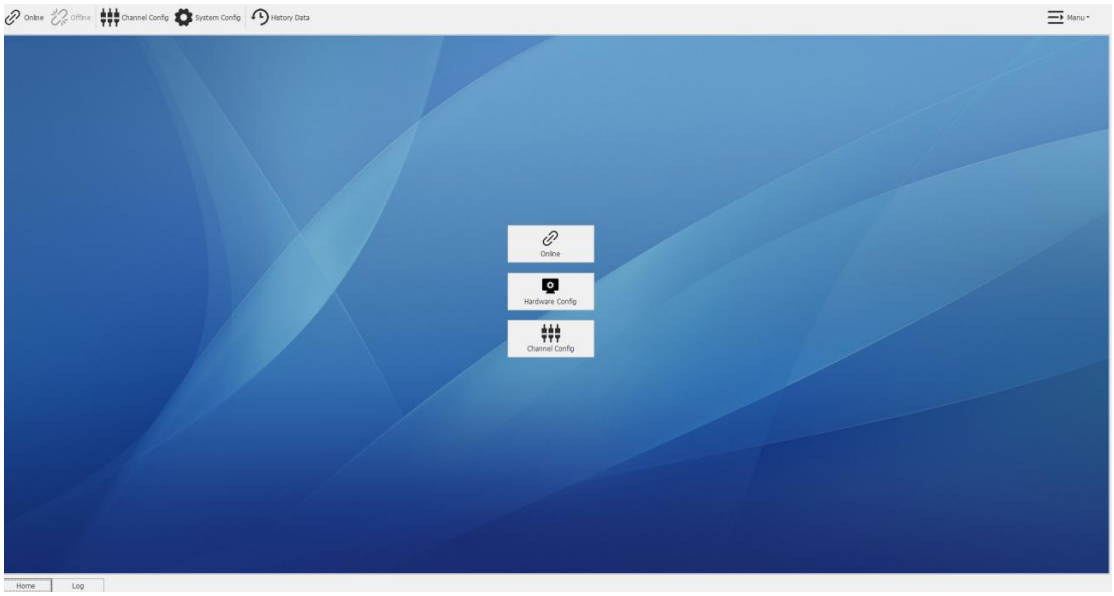

Figure 70 Application Software Interface

Application software interface introduction:

1. Toolbar

It includes Online and Offline, System, History Data.

2. Menu
3. Shortcut menu
4. Log

To display device exception information.

6.5 Configuration

6.5.1 Hardware Configuration

Operation Steps:

1. Click **Hardware Config**.

2. Click **Scan**→Select 192.168.0.XXX network→Click **OK**→Click **Save** after the device is searched.

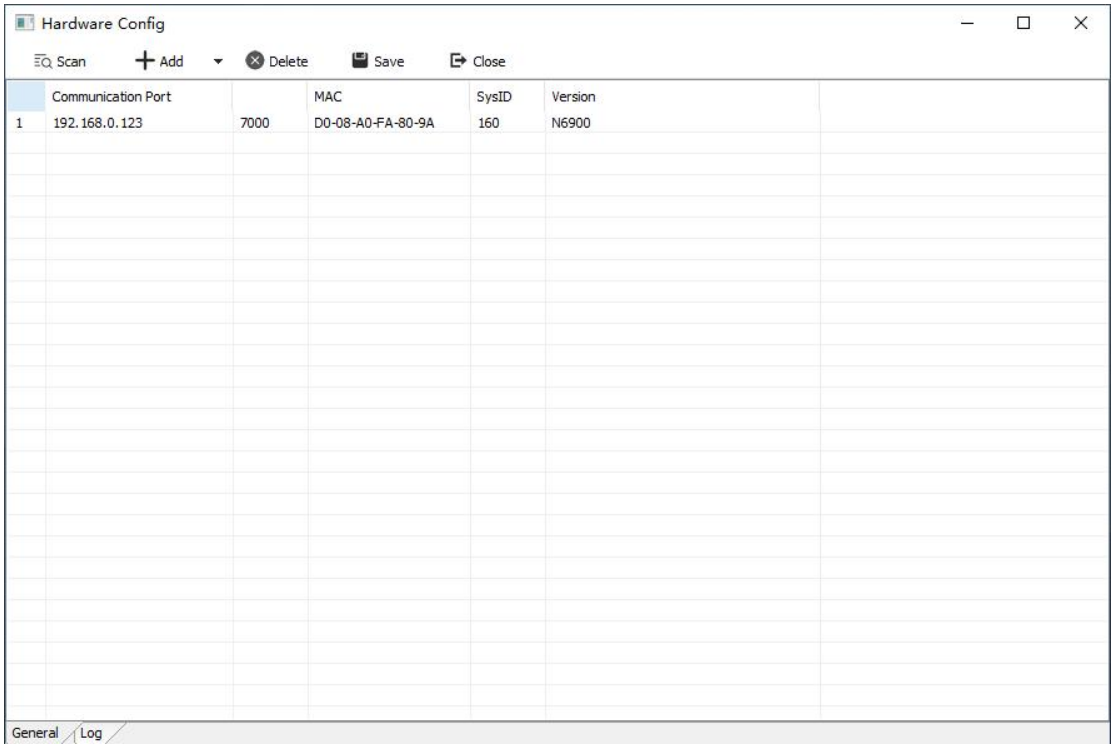

Figure 71 Hardware configuration

6.5.2 Online/Offline

Online means that the software establishes a connection with the device, and the device can be controlled only in the online state. **Offline** means that the the communication is interrupted.

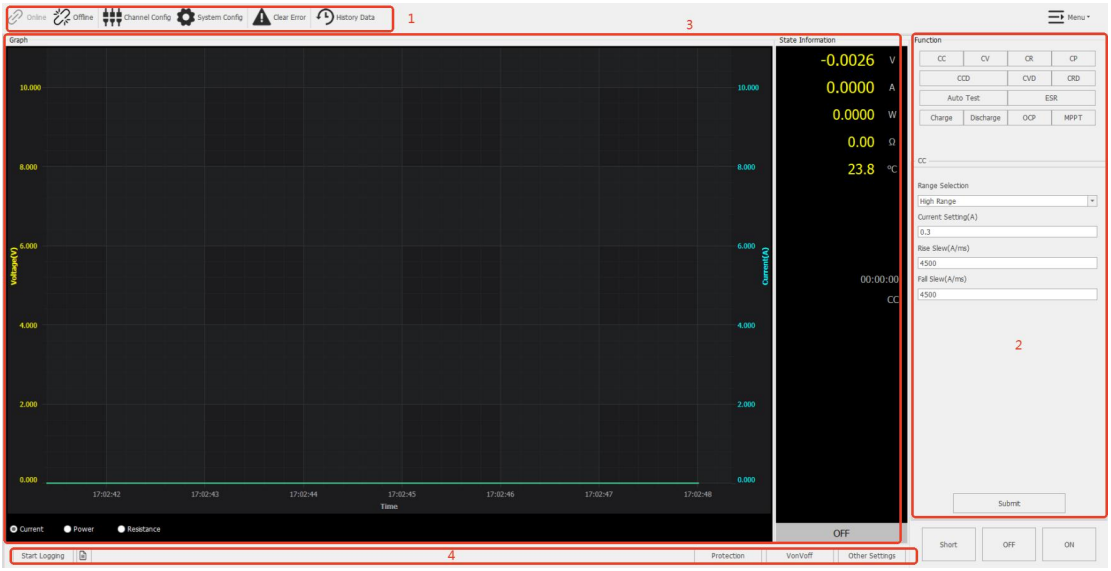

Figure 72 Online

1. Toolbar: including online, offline, channel configuration, system configuration, clear error and history data;

2. Functional mode: Includes CC, CV, CR, CP, CCD, CVD, CRD and etc. Parameter setting, ON/OFF, and fault clearing are available under each mode;

3. Graph: Contains voltage, current etc.;

4. Start Data Logging: Click to start data logging, the file data (.ndat format) will be automatically saved to the historical data;

VonVoff: When the setting is on, it means that the load starts to load when the voltage reaches the loading voltage; When the setting is off, it means that the load will be turned off when it is lower than the loading voltage;

Other Settings: Same function as Application Settings.
Protection: including OCP.

7 Maintenance and Self-inspection

7.1 Regular Maintenance

Clean the Device

Please wipe lightly the device with a dry or slightly wet cloth, and do not wipe the inside of it. Make sure the power is disconnected before cleaning.

⚠**Warning: Disconnect power before cleaning.**

7.2 Fault Self-inspection

Device Fault Self-inspection

Due to system upgrade or hardware problem, the device may break down. Please do the following necessary inspection to eliminate the troubles, which can save your maintenance and time cost. If the troubles cannot be recovered, please contact NGI.

The inspection steps are as below.

- Check whether the device is powered.
- Check whether the device can be turned on normally.
- Check whether the fuse has no damage.
- Check whether other connectors are correct, including wire cables, plug, etc.
- Check whether the system configuration is correct.
- Check whether all the specifications and performances are within the device working range.
- Check whether the device displays error information.
- Operate on a replacement device.

Calibration Intervals

It is suggested that N6200 series should be calibrated once a year.

8 Main Technical Data

Warning

The measurement accuracy is identified by the following three conditions: within one year after calibration, operation temperature between -18℃ and 28℃, and the relative humidity up to 80%. Please to be ready for half hour to ensure the measurement accuracy.

Table 14

Model	N6206-60-50		N6206-150-50		N6206-600-10	
Voltage	60V		150V		600V	
Current	50A		50A		10A	
Power	600W					
Min. Operating Voltage	2V@50A		2V@50A		4.5V@10A	
	CC Mode					
Range	0-5A	0-50A	0-5A	0-50A	0-1A	0-10A
Resolution	0.08mA	0.8mA	0.08mA	0.8mA	0.01mA	0.1mA
Accuracy (23±5℃)	Low range: 0.1%+0.1%F.S.; High range: 0.1%+0.15%F.S.					
	CV Mode					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Resolution (V)	0.1mV	1mV	0.25mV	2.5mV	1mV	10mV
Accuracy (23±5℃)	0.05%+0.1%F.S.					
	CP Mode					
Range	0-600W					
Resolution (W)	10mW					
Accuracy (23±5℃)	0.5%+1%F.S.					
	CR Mode					
Range	0.03~120Ω	0.5~1200Ω	0.06~300Ω	1.2~3000Ω	1.12~6000Ω	22.4~60000Ω
Resolution	16bits					
Accuracy (23±5℃)	0.35%+26.0 mS	0.35%+2.6mS	0.35%+10.4 mS	0.35%+1.04 mS	0.35%+0.5m S	0.35%+0.05 mS
	Slew Rate					
Current	0.8-50A/ms	50-2500A/ms	0.8-50A/ms	50-2500A/ms	0.1-10A/ms	10-500A/ms

Voltage	0.5-25V/ms	25-250V/ms	10-60V/ms	60-600V/ms	5.0-250V/ms	250-2500V/ms
Power	0.8-50A/ms	50-2500A/ms	0.8-50A/ms	50-2500A/ms	0.1-10A/ms	10-500A/ms
Resistance	0.8-50A/ms	50-2500A/ms	0.8-50A/ms	50-2500A/ms	0.1-10A/ms	10-500A/ms
Accuracy (23±5℃)	(1+35%)*Setting value					
	Voltage Measurement					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Accuracy (23±5℃)	0.05%+0.05%F.S.					
	Current Measurement					
Range	0-5A	0-50A	0-5A	0-50A	0-1A	0-10A
Accuracy (23±5℃)	0.1%+0.1%F.S.					
	Power Measurement					
Range	0-600W					
Accuracy (23±5℃)	0.5%+1%F.S.					
	Dynamic Mode					
T1&T2	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy (23±5℃)	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
	Others					
Interface	LAN/RS232					
AC Input	Single phase, please refer to the voltage mark at the rear panel.					
Net Weight	Approx. 12.7KG					
Dimension	88.0mm(H)*482.0mm(W)*507.0mm(D)					

Table 15

Model	N6212-60-100		N6212-150-100		N6212-600-20	
Voltage	60V		150V		600V	
Current	100A		100A		20A	
Power	1,200W					
Min. Operating Voltage	2V@100A		2V@100A		4.5V@20A	
	CC Mode					
Range	0-10A	0-100A	0-10A	0-100A	0-2A	0-20A
Resolution	0.16mA	1.6mA	0.16mA	1.6mA	0.03mA	0.3mA

Accuracy (23±5℃)	Low range: 0.1%+0.1%F.S.; High range: 0.1%+0.15%F.S.					
	CV Mode					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Resolution (V)	0.1mV	1mV	0.25mV	2.5mV	1mV	10mV
Accuracy (23±5℃)	0.05%+0.1%F.S.					
	CP Mode					
Range	0-1200W					
Resolution (W)	20mW					
Accuracy (23±5℃)	0.5%+1%FS					
	CR Mode					
Range	0.02~60Ω	0.3~600Ω	0.03~150Ω	0.6~1500Ω	0.56~3000Ω	11.2~30000Ω
Resolution	16bits					
Accuracy (23±5℃)	0.35%+52mS	0.35%+5.2mS	0.35%+20.8mS	0.35%+2.08mS	0.35%+1mS	0.35%+0.1mS
	Slew Rate					
Current	1.6-100A/ms	100-5000A/ms	1.6-100A/ms	100-5000A/ms	0.3-20A/ms	20-1000A/ms
Voltage	0.5-25V/ms	25-250V/ms	10-60V/ms	60-600V/ms	5.0-250V/ms	250-2500V/ms
Power	1.6-100A/ms	100-5000A/ms	1.6-100A/ms	100-5000A/ms	0.3-20A/ms	20-1000A/ms
Resistance	1.6-100A/ms	100-5000A/ms	1.6-100A/ms	100-5000A/ms	0.3-20A/ms	20-1000A/ms
Accuracy (23±5℃)	(1+35%)*Setting value					
	Voltage Measurement					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Accuracy (23±5℃)	0.05%+0.05%F.S.					
	Current Measurement					
Range	0-10A	0-100A	0-10A	0-100A	0-2A	0-20A
Accuracy (23±5℃)	0.1%+0.1%F.S.					
	Power Measurement					
Range	0-1200W					
Accuracy	0.5%+1%F.S.					

(23±5℃)						
	Dynamic Mode					
T1&T2	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy (23±5℃)	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
	Others					
Interface	LAN/RS232					
AC Input	Single phase, please refer to the voltage mark at the rear panel.					
Net Weight	Approx. 14.4KG					
Dimension	88.0mm(H)*482.0mm(W)*507.0mm(D)					

Table 16

Model	**N6218-60-150**		**N6218-150-150**		**N6218-600-30**	
Voltage	60V		150V		600V	
Current	150A		150A		30A	
Power	1800W					
Min. Operating Voltage	2V@150A		2V@150A		4.5V@30A	
	CC Mode					
Range	0-15A	0-150A	0-15A	0-150A	0-3A	0-30A
Resolution	0.25mA	2.5mA	0.25mA	2.5mA	0.05mA	0.5mA
Accuracy (23±5℃)	Low range: 0.1%+0.1%F.S.; High range: 0.1%+0.15%F.S.					
	CV Mode					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Resolution	0.1mV	1mV	0.25mV	2.5mV	1mV	10mV
Accuracy (23±5℃)	0.05%+0.1%F.S.					
	CP Mode					
Range	0-1800W					
Resolution	30mW					
Accuracy (23±5℃)	0.5%+1%F.S.					
	CR Mode					
Range	0.01Ω~40Ω	0.2Ω~400Ω	0.02Ω~100Ω	0.4Ω~1000Ω	0.38Ω~2000Ω	7.5Ω~20000Ω
Resolution	16bits					
Accuracy	0.35%+78.1	0.35%+7.81	0.35%+31.25	0.35%+3.125	0.35%+1.5	0.35%+0.15

(23±5℃)	mS	mS	mS	mS	mS	mS
	Slew Rate					
Current	2.5-150A/ms	150-7500A/ms	2.5-150A/ms	150-7500A/ms	0.5-30A/ms	30-1500A/ms
Voltage	0.5-25V/ms	25-250V/ms	10-60V/ms	60-600V/ms	5.0-250V/ms	250-2500V/ms
Power	2.5-150A/ms	150-7500A/ms	2.5-150V/ms	150-7500A/ms	0.5-30A/ms	30-1500A/ms
Resistance	2.5-150A/ms	150-7500A/ms	2.5-150A/ms	150-7500A/ms	0.5-30A/ms	30-1500A/ms
Accuracy (23±5℃)	(1+35%)*Setting value					
	Voltage Measurement					
Range	0-6V	0-60V	0-15V	0-150V	0-60V	0-600V
Accuracy(23±5℃)	0.05%+0.05%F.S.					
	Current Measurement					
Range	0-15A	0-150A	0-15A	0-150A	0-3A	0-30A
Accuracy (23±5℃)	0.1%+0.1%F.S.					
	Power Measurement					
Range	0-1800W					
Accuracy (23±5℃)	0.5%+1%F.S.					
	Dynamic Mode					
T1&T2	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms	0.025-60ms	1-60000ms
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy (23±5℃)	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
	Others					
Interface	LAN/RS232					
AC Input	Single phase, please refer to the voltage mark at the rear panel.					
Net Weight	Approx. 16.1KG					
Dimension	88.0mm(H)*482.0mm(W)*507.0(D)mm					

NOTE 1: For other specifications, please contact NGI.
NOTE 2: All specifications are subject to change without notice.