DC Power Supply

DXKDP Series Programmed DC Power Supply

User Manual

DC POWER
DXKD-300
DC POWER SUPPLY
POWER

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I. Safety instructions:

When using this product, the following safety matters must be observed first: the cautions and warning words in the instruction manual must be understood and observed, if not, you may the safety requirements and rules for the manufacture, design and use of the product. **Please note:** Xiamen Dexing Magnet Tech.Co., Ltd is not responsible for accidents caused by users' non-performance of the safety rules.

⚠ Symbol of high voltage warning.
⚠ Symbol of High pressure hazard.
⏚ Symbol of Body grounding.
⏚ Symbol of Connecting to the earth.

Safety sign!

Warning!

- ▲ Operate the product only at the input voltage indicated on the nameplate, and install and connect the product in strict accordance with the safe electricity usage specifications.
- ▲ The chassis and shell of the product must be well grounded! Removing grounding protection device or poor grounding terminal will lead to the risk of electric shock.
- ▲ The output voltage will reach the dangerous voltage level. Before operating this power supply, ensure that all output terminals have been shielded.
- ▲ Before the DC power supply is disconnected from the power supply input (the power supply switch is turned off), all operations at the output end shall not be carried out, and only the personnel who have been trained in the knowledge of electrical hazards can operate this product.
- ▲ It is strictly prohibited to touch the metal sheet of the power cord plug that has just been unplugged from the electrical socket, otherwise there will be the risk of electric shock.
- ▲ It is strictly prohibited to insert any mechanical parts, especially conductive devices, into the product, otherwise there will be danger of electric shock or damage to the product.
- ▲ Please use fuse with the same rated current, voltage and model. The short-circuit fuse or damaged fuse holder may cause product failure or fire.
- ▲ It is forbidden to use this product under corrosive, explosive gas, conductive dust and steam, strong vibration environments.
- ▲ It is strictly prohibited to use this equipment on life support system or other equipment with similar requirements.

Note!

- ▲ Load equipment must be safely connected to the output of DC power supply and equipped with safety protection to prevent load damage caused by overload or failure of DC power supply during use. Any connection between the load and the DC power supply (at the output) must be protected against rubbing.
- ▲ Please refer to 2A-3A/mm^2 for the selection of wire diameters of power supply input and output wires.

▲ Please make sure that the power supply meets the requirements and the connection is correct before starting up.

▲ Please make sure that the output voltage matches the load before starting up.

▲ Do not install substitute parts on this product or make any unauthorized modifications.

▲ There are no parts inside the product that can be repaired by operators. If you need to repair by yourself, please ask the personnel who had professional training for repair.

▲ Avoid using or appearing liquid substances around the product, they may enter the inside of the product and cause product damage and electric shock to human body.

▲ For DC output, as required, connect (+) or (-) terminal to grounding terminal. If the product is used without grounding, pay attention to the voltage difference between output and ground caused by static electricity.

⚠ **Incorrect operation and use will result in electric shock death or electrical fire!**

☺ **Correct operation and use will bring you ease and DXKDPpiness in your work!**

II. Warranty:

The materials and manufacture of this product within 12 months from the date of delivery is guaranteed by our company. If the warranty period is exceeded, the company will provide service with charges. During the warranty period of the product, if the product fails, the company will only be responsible for the failure of the product and the loss of the product, and the company will not bear the load and all other associated losses.

Warranty service: if this product requires warranty service, the product must be sent back to our company for repair. If the product is returned to our company for repair from other countries, all freight, customs duties and other expenses shall be borne by the customer. (Please refer to the warranty instructions of the warranty card for details!)

Warranty limitation: The above warranty does not apply to product damage caused by the following circumstances:

The customer violates the use regulations of this manual;
Incorrect or inappropriate maintenance products by customers;
Unauthorized modification or misuse;
Operate the product outside the specified environment;
Force majeure factors stipulated by relevant laws.

III. The common sense for use of DC power supply

3.1 Basic definition of constant voltage mode and constant current mode

The constant voltage mode refers to the working mode that the current value of the load changes within the rated range while the output voltage of the DC power supply keeps stable. That is, when the output current changes due to the load change, the output voltage remains at the set voltage value and remains unchanged.

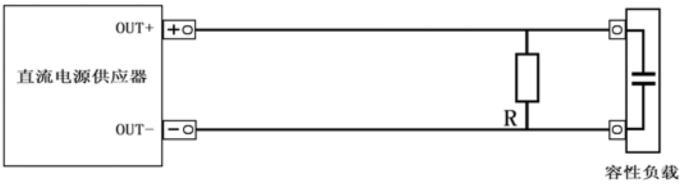
The constant current mode refers to a working mode that the resistance value of the DC load changes within the rated range while the output current of the DC power supply keeps stable. That is, when the resistance value of the load changes causing the output voltage to change, the output current remains at the set current value and remains unchanged.

The work mode state of the DC power supply with constant voltage/constant current mode should be determined according to the nature of the load. Under normal circumstances, the rated voltage is applied. when the actual load current value is less than the set current value, the DC power supply works under the constant voltage mode. When the actual load current value is greater than the set current value, the DC power supply works under the constant current mode.

The states of the constant voltage mode and the constant current mode are complementary, that is, the DC power supply either works under the constant voltage mode or works under the constant current mode. Therefore, before operation, the user should first correctly set the required voltage or current value according to the use nature of the load and the resistance value of the load, and select the use mode meeting the load requirements.

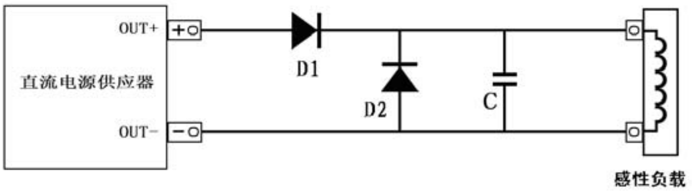
3.2 The capacitive load application:

Because the capacitive load often causes the rising of the output voltage. Especially when the output voltage is adjusted from high to low, it will cause the output voltage to drop slowly. Therefore, when use, a power resistor shall be connected in parallel to the output end of the DC power supply, so that the user can obtain better use effect. (See the following figure)



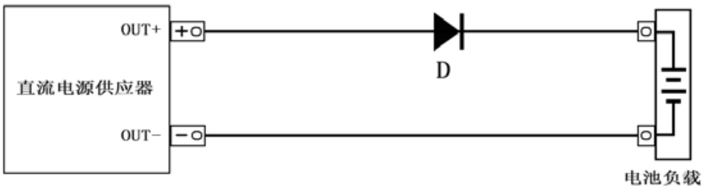
3. 3 Inductive load application

When the DC power supply is switched on or off or the output voltage is changed, the inductive load will generate an induced electromotive force in the opposite direction to affect the operation of the DC power supply and even cause damage to the DC power supply. At this time, a diode shall be connected in series between the output end of the DC power supply and the load, and a capacitor and a freewheel diode shall be connected in parallel at the load end, so as to effectively protect the DC power supply. (See the following figure)



3.4 Battery load application

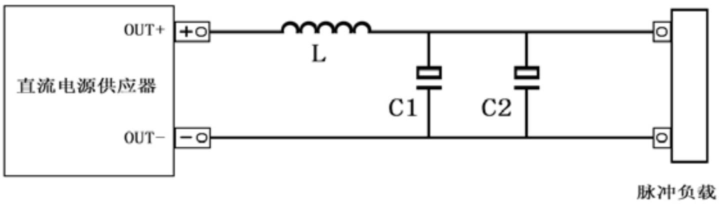
When the DC power supply is used to charge the battery, in order to prevent the power supply from being damaged due to the wrong polarity of the battery, a diode should be connected in series between the power supply and the battery to protect the DC power supply. (See the following figure)



3.5 Pulse load application

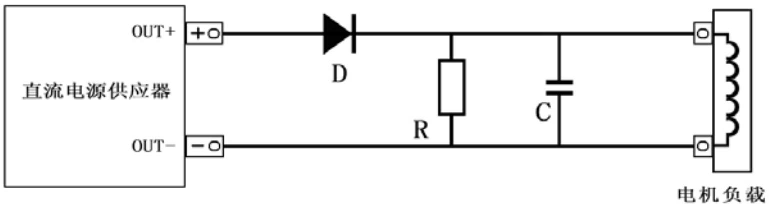
The current peak value of the pulse load is within the nominal value (average value) indicated by the metering device even if it is within the rated current value range output by the DC power supply, or the pulse circuit or the motor drive circuit loads the current waveform. The current will also reach the rated current area of the DC power supply, thus causing the output voltage to drop or be unstable. The solution is to connect the inductors in series between the power supply and the load, or to select a DC power supply with larger output current.

If the pulse width of pulse circuit is narrow or the current peak value is small, a large capacity capacitor can be added at the load end for improvement, and the capacitor can be selected at 1 ampere(about 1000UF). (See the following figure)



3. 6 The load application that generates reverse current

When the motor connected to the output end of the DC power supply suddenly brakes, a large reverse current will be generated. Since the DC power supply cannot absorb the reverse current generated from the load end, the output voltage will rise. The solution is to connect a diode in series between the output end of the DC power supply and the load, and connect a bleeder resistor in parallel at the load end to absorb the reverse current. When the reverse current is a spike surge, connect a large capacity electrolytic capacitor between both ends of the load. (See the following figure)



Our series DC power supply can meet users' normal use requirements in different natures of loads such as resistive, capacitive and inductive. However, due to the differences in the natures of resistive, capacitive, inductive and other loads, the corresponding measures should still be taken according to the natures of different loads so as to obtain the best use effect!

IV. Goods inspection

4.1. Check whether the received products are consistent with the type and quantity of goods signed in the contract. If there are any errors, please do not unpack.

4.2. Please check whether there is any damage that may occur during transportation when accepting this product.

4.3. Check whether the accessories of the products are complete compared with the packing list of the products.

4.4. In case of the above-mentioned errors in product inspection, please fill in the product model, contact person's name and contact method and attach a simple explanation of the problem, then contact our company or agent in a timely manner.

V. Product installation, connection

5.1. When working, the DC power supply will generate heat. The power supply should be placed in a well-ventilated environment and avoid places with large heat, high humidity and much dust.

5.2. The front and back of the DC power supply shall have good ventilation devices and avoid overlapping with other products. The distance between the back of the power supply and other objects shall not be less than 300 mm.

5.3. When the DC power supply works, it will produce a magnetic field that will affect the surrounding environment. In order to avoid the influence, please install the equipment that is sensitive to the magnetic field in an unaffected position.

5.4. Confirm that the AC input voltage is consistent with the input voltage of the DC power supply.

5.5. Confirm that the AC input power switch and the power switch of the DC power supply are in OFF state.

5.6. According to the rated power of the product, choose the wire that meets the requirements, and correctly connect the input of the product with the AC input, and carefully check to ensure that the connection is correct.

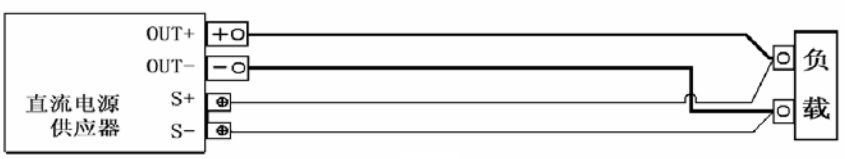
5.7. In order to use product safely, when selecting the conductor that the output is connected to the load, the safe current must be considered to prevent the fire caused by overheating combustion caused by short circuit of the load. At the same time, using the wire with larger wire diameter can obtain better adjustment rate on the load. So when selecting the wire diameter of the wire, please select the wire that meets the requirements according to the rated power of the product, and correctly connect the output of the product with the load.

Please refer to 2A-3A/mm^2 for the cross-sectional area selection for copper conductor. The DC output line should be as short as possible. If the output line is too long, the output performance of the power supply will be reduced due to voltage drop. If the distance between the power supply and the load exceeds 3 meters, the cross-sectional area of the conductor should be increased in multiples.

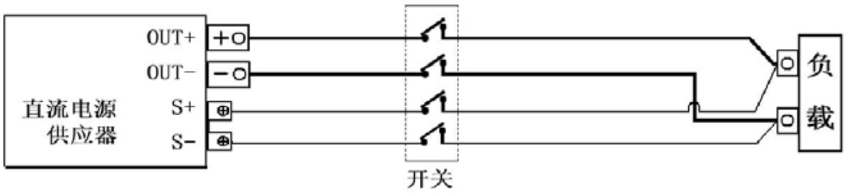
In practical application, the contact resistance of the output terminal of the power supply, the cross-sectional area of the conductor, the material and the length, all are factors that affect the output characteristics of the power supply. Therefore, the voltage measured on the output terminal will be higher than the voltage on the load. Therefore, the cross-sectional area of the selected conductor should meet that the potential difference is not more than 0.5V.

5.8. If multi-stage loads are connected to the same power supply at the same time, each stage load shall use a set of independent connecting wires, and be connected to the output end of the power supply respectively.

5.9. Our series DC power supplies are designed with load terminal voltage detection terminals, so the products have the function of accurately reading the load terminal voltage and conduct accurate control. When connect to the load end to conduct voltage compensation detection, please follow the following diagram.



If users need to switch on /off the load when using, they should carry out connection as shown in the following figure, and ensure that the detection line and the load line are on/off at the same time, otherwise, the DC power supply will be damaged!



5.10. Changes in the resistance value of the load will cause the actual output current to exceed the set current value and the output voltage will decrease. At this time, the operating mode of the power supply will be changed from the constant voltage mode to the constant current mode. Therefore, when setting the current value, an appropriate amount of affluence should be considered to prevent the power supply from working in frequent mode switching states.

5.11. Our series DC power supply is a DC power supply with constant voltage mode and constant current mode. During normal use, the user can choose that the DC power supply works in constant voltage mode or in constant current mode according to the relationship between the set voltage, current value and load value.

5.12. Our series DC power supply can be used normally as long as the power switch is turned on. However, in order to ensure better use performance of the product, **it is recommended to turn on the load for use after preheating for 15 minutes!**

VI. Product introduction

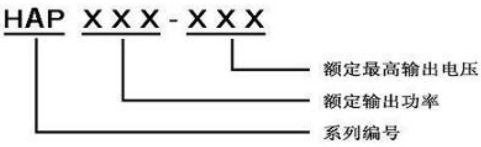
6.1 Product description:

DXKDP series program-controlled DC power supply is a high performance DC power supply specially developed by scientific research and industrial departments for power automatic control applications. The product has excellent electronic characteristics such as high accuracy, high precision and high stability. This series of products are designed with perfect overvoltage and overtemperature protection circuits, and the reliability is higher. This series of products can be programmed automatically by editing the voltage, current and time parameters with the upper computer through the panel keyboard or through the communication interface.

6. 2 Product features:

1. Small volume, light weight, the standard 19-inch installation size, suitable for working table and rack installation; (for low power only)
2. OLED display is adopted to make the display more eye-catching and clear.
3. Keyboard buttons and digital knobs are easy to operate.
4. Chinese and English menu operations can be selected for different users;
5. Built-in 10 sets of programmable controls. In each set, there are the programmable editing voltage current and time output with 99 steps;
6. Standard analog signal output and RS-232(RS-485) control interface;
7. Over-voltage protection and over-current protection functions and O.T.P over-temperature protection circuit can be set, and the protection function is perfect and reliable.
8. Over-voltage protection and over-current protection functions and O.T.P over-temperature protection circuit can be set, and the protection function is perfect and reliable.
9. This product is designed with the load terminal voltage detection terminal, which has the function of accurately reading the load terminal voltage and conduct accurate control.

6.3 Model naming rules:



Description:

The rated output voltage unit is "Volts (V)"

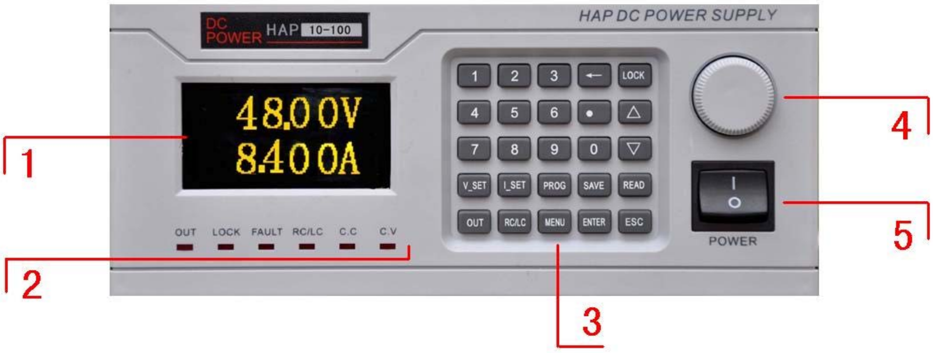
The rated output unit of power is "Watt (W)", and the mark number is ×100.

The serial number is the manufacturer's product serial number.

VII. Product function device description

7.1 Product appearance (note: in this manual, take 3KW as the example, other specifications are for reference only!)

7.2 Functional description of the front panel:


DC POWER
HAP 10-100
HAP DC POWER SUPPLY
48.00V
8.400A
OUT LOCK FAULT RC/LC C.C C.V
1 2 3 ← LOCK
4 5 6 • △
7 8 9 0 ▽
V_SET I_SET PROG SAVE READ
OUT RC/LC MENU ENTER ESC
POWER
1
2
3
4
5

①、OLED display interface: displays Chinese and English menus;

②、The status indicator:

OUT -This indicator light is on when the power supply has output;

LOCK -Press the "LOCK" key, the indicator light will be on, and the keyboard will be locked at this time.

FAULT -The fault indicator, this indicator will be on when the machine fails or the parameters are set incorrectly;

RC/LC -The remote/local control indicator light, which will be on when controlled remotely;

C.C -When it is always on, it means that the DC power supply is working in constant current (or current limiting) mode;

C.V -When it is always on, it means that the DC power supply is working in constant voltage mode.

③、Keyboard operation area (the function keys and numeric keys):

V_SET key: the shortcut key for voltage setting;

I_SET key: the shortcut key for current setting;

PROG key: the shortcut key for program operation;

SAVE key: this key has no function for the time being;

READ key: select the shortcut key of the program and press READ to enter the "Select Program" menu;

OUT key: the output control key. Press "OUT" key, the output indicator -"OUT" will be on and the power supply has output. Press "OUT" key to turn off the output indicator, "OUT" will be off and the power supply output is turned off.

RC/LC key: the remote/local control key;

MENU key: function menu key to enter menu operation;

LOCK key: the key of the locking keyboard. When press the key, the "lock" indicator light is on. All keyboards except

LOCK key are locked.

ENTER key: the "Confirm" key;

ESC key: the "Exit" key;

△ key: the "Up" key;

▽ key: the "Down" key.

④、The digital encoder: It can replace the keyboard for input and has the function of "confirm key".

⑤、The power switch: The power input control switch.

7.3 The Functional description of rear panel:

Due to different voltage and current specifications, the input and output terminals of the rear panel are roughly designed as follows. Please refer to the following diagrams for correct wiring according to the power specifications you actually choose. (For the high-power and special customized products, please refer to the supplementary instructions or connect the wires correctly according to the labels attached on the machine!)

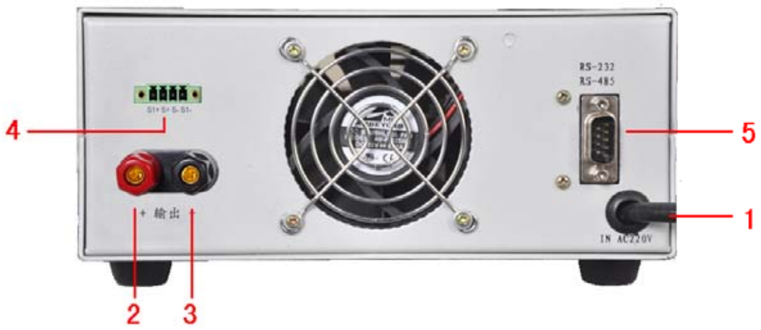


Figure 1

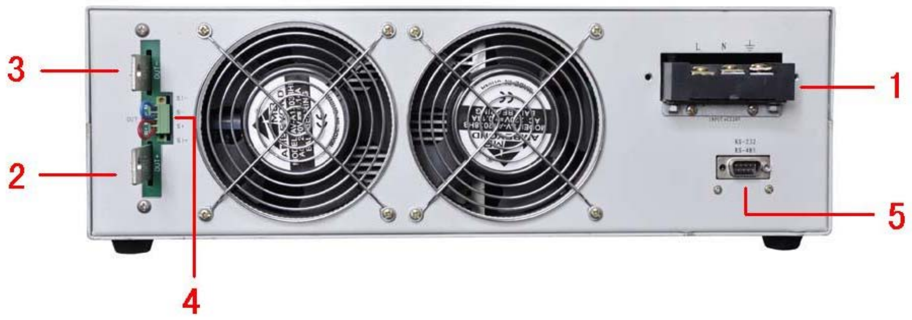


Figure 2

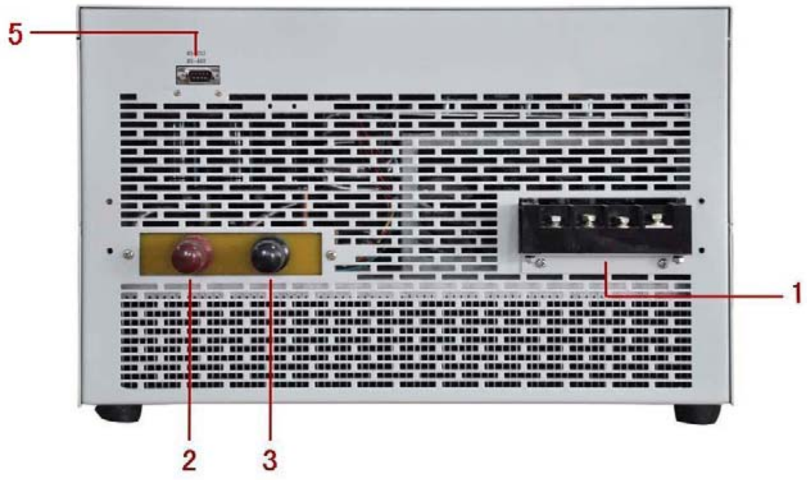


Figure 3

①、AC input terminal: AC input terminal of power supply, input voltage single-phase AC220V/ three-phase AC 380 V+10%;

②、"OUT+"-the positive terminal of the rear panel power output.

③、"OUT-"-the negative terminal of the rear panel power output

④、S compensation port: the detection port for power supply load end. When the user doesn't need load end detection, S1- and S- shall short circuit, and S1+ and S+ shall short circuit. When the user needs load end detection, the short circuit of S1- and S- and that of S1+ and S+ shall be removed, and then S+ is connected to the positive of the load and S- is connected to the negative. (Note: This function is optional! It shall be explained when users ordering!)

Note: When using the load side detection status output, the power supply should not be disconnected from the load, otherwise the power supply will be damaged. If the on-off control is necessary for load, the on-off control of the load end detection signal line must be synchronous!

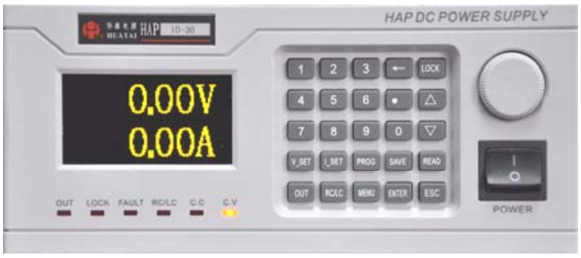
⑤、The communication port RS-232/485. (Note: RS-232 interface is standard. If need RS-485 interface, the user should tell the customer service when ordering!)

7.4 Product operation

7.4.1. Carefully check whether the AC input voltage is consistent with the input voltage of this product and ensure that the connection is correct.

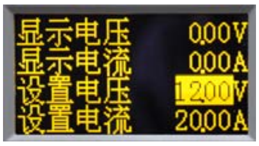
7.4.2. Place the load in the closed state.

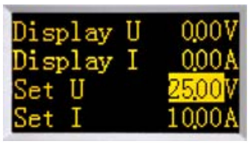
7.4.3. Turn on the "POWER" power switch, and the display will display the following standby interface:



7.4.4. Output voltage setting:

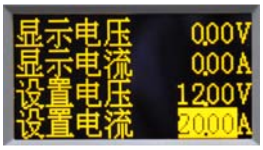
In the standby state, press V_SET the key to enter the voltage setting interface, input the voltage value through the keyboard, and then press the ENTER confirmation key to return to the standby interface.

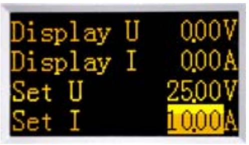

显示电压 0.00V
显示电流 0.00A
设置电压 12.00V
设置电流 20.00A


Display U 0.00V
Display I 0.00A
Set U 25.00V
Set I 10.00A

7.4.5. Output current setting:

In the standby state, press the I_SET key to enter the current setting interface, input the current value through the keyboard, and then press the ENTER confirmation key to return to the standby interface.


显示电压 0.00V
显示电流 0.00A
设置电压 12.00V
设置电流 20.00A

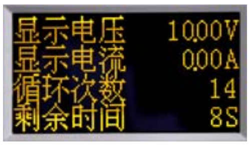

Display U 0.00V
Display I 0.00A
Set U 25.00V
Set I 10.00A

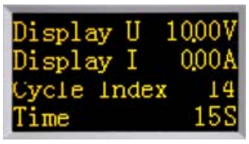
7.4.6. After setting the output voltage and output current, press the OUT key, the "OUT" indicator will be on, and the power supply will have output. Press the OUT key in the power output state, the power output will be turned off and the "OUT" indicator will go out.

7.4.7. When turn on the power supply again after it is turned off, if the voltage and current parameters are not set again, the power supply will default to the last voltage and current output parameters.

7.4.8. Program output:

In the standby state, press the PROG key, and the saved and selected programs begin to output. At this time, the "OUT" indicator is on. In the power program output state, press the PROG key, and the power program output will be turned off and the "OUT" indicator will go out.


显示电压 10.00V
显示电流 0.00A
循环次数 14
剩余时间 8S

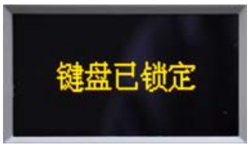

Display U 10.00V
Display I 0.00A
Cycle index 14
Time 15S

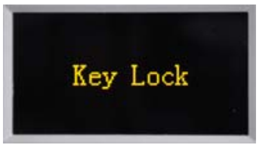
7.4.9. Local/remote control:

Press the RC/LC key and the "RC/LC" indicator will be on. At this time, the power supply is in a remote control state and controlled by the upper computer. All keyboard functions are in an invalid state. Press the RC/LC key again, the "RC/LC" indicator goes out, the power supply returns to the local control state, and all keyboard functions are restored.

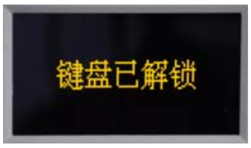
7.4.10. Keyboard locking:

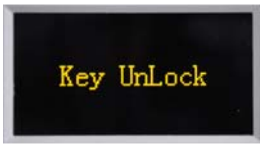
In order to prevent misoperation, after pressing the LOCK key, all keyboards except the LOCK key will be locked, the "lock" indicator will be on, and all keyboards cannot be operated. At this time, the display displays the following interface:





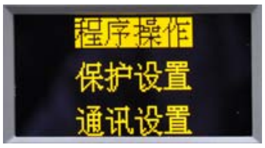
After pressing the LOCK key again, the keyboard LOCK is released, the "lock" indicator goes out, and all keyboard functions are restored.

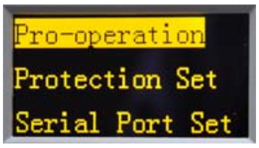


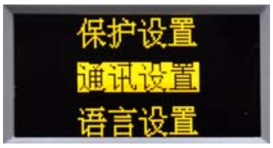


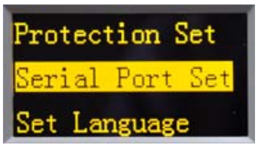
7.5 Main menu

Press the MENU function menu key to enter the menu operation; Press the △ key or ▽ key to select the menu item to be operated.


程序操作
保护设置
通讯设置


Pro-operation
Protection Set
Serial Port Set


保护设置
通讯设置
语言设置

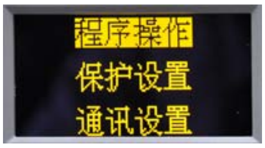

Protection Set
Serial Port Set
Set Language

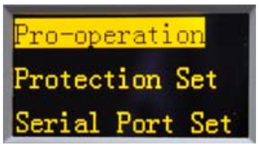
The main menu items are as follows:

Program operation, protection settings, communication settings, language settings.

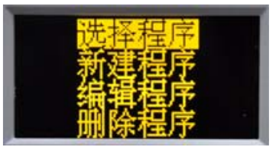
7.5.1. Program operation

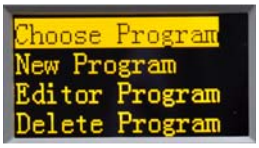
①Press the MENU function key to enter the main menu operation interface; press the △ key or ▽ key to select the menu item "Program operation" and press the ENTER confirmation key to enter the program operation interface.


程序操作
保护设置
通讯设置

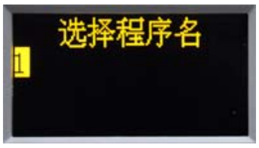

Pro-operation
Protection Set
Serial Port Set

The menu items of program operation include 4 menus: selecting program, creating new program, editing program and deleting program.

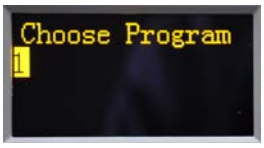

选择程序
新建程序
编辑程序
删除程序


Choose Program
New Program
Editor Program
Delete Program

②Press the ▽ key or ▽ key to select the menu item "Select program" and press the ENTER confirmation key to enter the operation interface of the selection program. Select the saved program, press the ENTER confirmation key, and then press the ESC -“Exit" key to return to the standby interface.



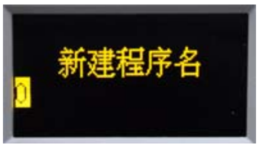
选择程序名
1



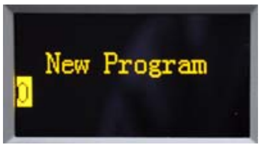
Choose Program
1

If need the output of the selected program, press the PROG key in the standby state interface, the power supply starts to press the selected program output, and press the PROG key again to stop the output.

③Press the ▽ or △ key to select the menu item "New program" and press the ENTER confirmation key to enter the new program operation interface.

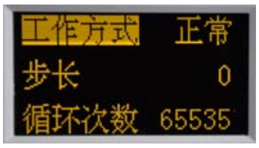


新建程序名
0

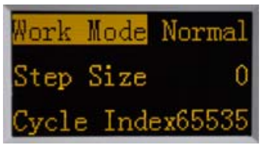


New Program
0

Input the name of the newly created program (the program name is number, such as 0, 1, 2, 3, etc.), and press the ENTER confirmation key to enter the next menu.

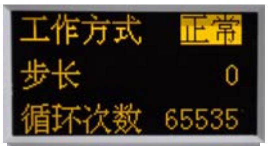


工作方式 正常
步长 0
循环次数 65535

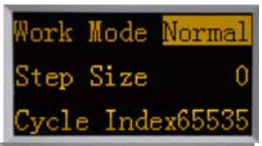


Work Mode Normal
Step Size 0
Cycle Index65535

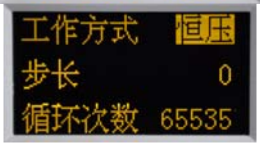
Select the "Working mode" menu, press the ENTER confirmation key to enter the working mode setting, press the △ key or ▽ key to select the "normal", "constant voltage (C.V)" and "constant current (C.C)" working modes respectively. After selection, press the ENTER confirmation key to exit.



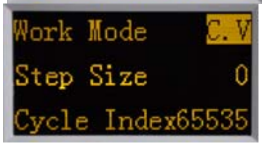
工作方式 正常
步长 0
循环次数 65535



Work Mode Normal
Step Size 0
Cycle Index65535

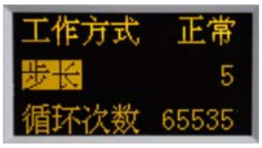


工作方式 恒压
步长 0
循环次数 65535

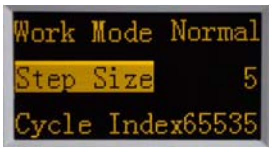


Work Mode C.V
Step Size 0
Cycle Index65535

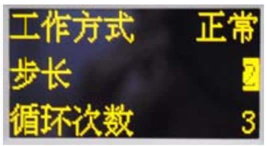
Select the "Step size" menu, press the ENTER confirmation key to enter the step size setting, and set the step size of the program as required. The step size of this product supports 1 to 99 steps. Press the ENTER confirmation key to exit after the setting is completed. When the step size is more than 1, the corresponding voltage, current and time parameter groups correspond to the set step size values. If the step size is set to "2", the voltage, current and time are increased by one group, showing as: voltage 00, current 00; voltage 01, current 01...

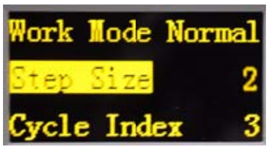


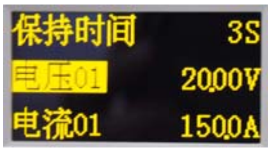
工作方式 正常
步长 5
循环次数 65535

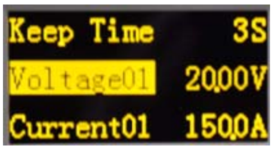


Work Mode Normal
Step Size 5
Cycle Index65535

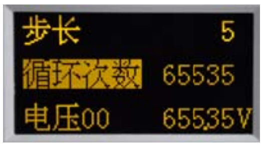

工作方式 正常
步长 2
循环次数 3

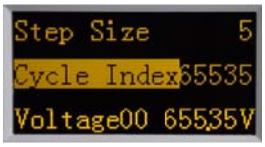

Work Mode Normal
Step Size 2
Cycle Index 3


保持时间 3S
电压01 20.00V
电流01 15.00A


Keep Time 3S
Voltage01 20.00V
Current01 15.00A

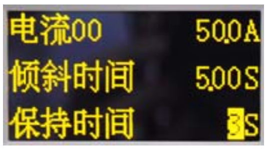
Select the menu “cycle index”, press ENTER to enter the setting of cycle index. Default cycle index of the system is 0. The user can set cycle index as required. The maximum cycle index can be set 65535.

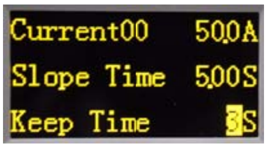

步长 5
循环次数 65535
电压00 655.35V


Step Size 5
Cycle Index65535
Voltage00 655.35V

When the cycle index is set to 1, the program will not run in cycles; when the cycle index is set to 0, the program will run in cycles indefinitely. After setting,press ENTER to quit.

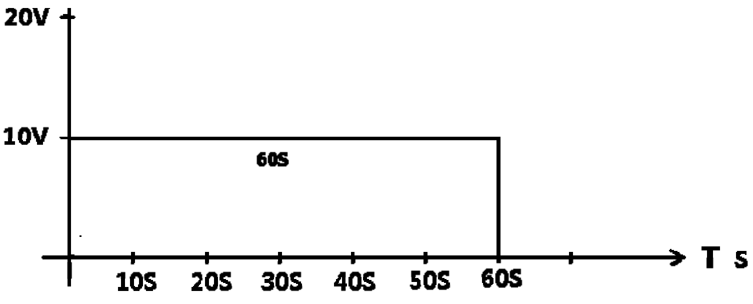
The “Slope Time” rise/fall time of voltage and current, the “Keep Time” is the time of continuous operation after voltage and current rise/fall to a stable value.


电流00 5.00A
倾斜时间 5.00S
保持时间 3S


Current00 5.00A
Slope Time 5.00S
Keep Time 3S

Examples of operations are as follows: (Take 0-30V as an example, the current operation steps are the same as the voltage, and the time is displayed in the form of countdown, in "S").

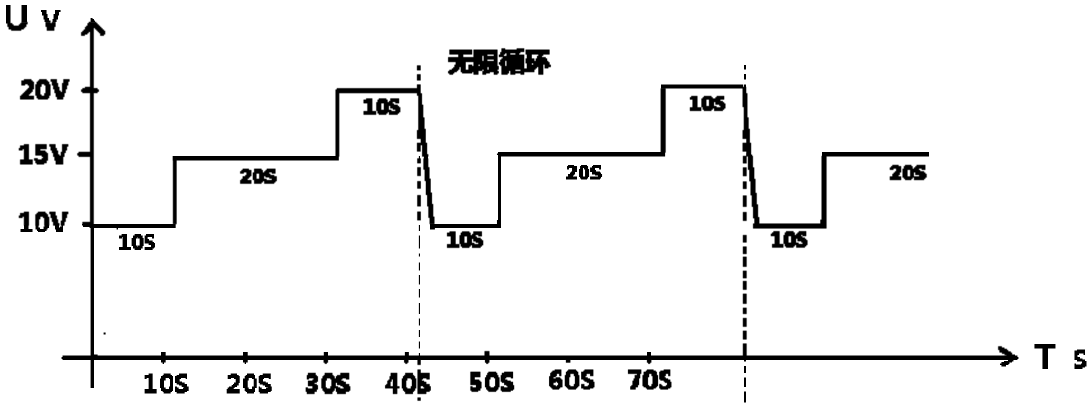
Example 1: start up and run 10V directly, run for 60S, no cycle



Set the step size to “1” and the cycle index to “1”

Set the voltage 00 to “10”V, the slope time to “0”S and the keep time to “60”S;

Sample 2: start up and run 10V directly, run for 10S → directly rise to 15V, run for 20S → directly rise to 20V, run for 10S→ circulate indefinitely

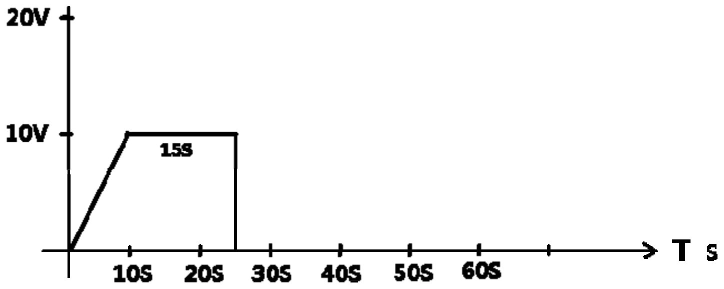


Set the step size to “3” and the cycle index to “0”

Set the voltage 00 to “10”V, the slope time to “0”S and the keep time to “10”S; set the voltage 01 to “15”V, the slope time to “0”S and the keep time to “20”S; set the voltage 02 to “20”V, the slope time to “0”S and the keep time to “10”S

When the voltage drops from high to low, the voltage drop time is affected by the load due to the presence of the power output capacitance! When the load is relatively light, the drop time will be prolonged! The illustration of voltage drop time in this manual is only for users' reference. No special notes will be made for illustrations on other pages!

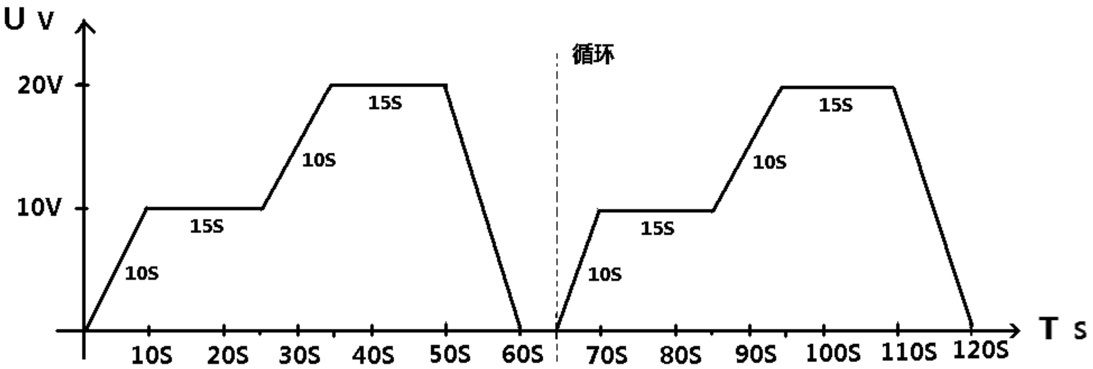
Sample 3: start up and rise from 0V to 10V in a rise time of 10S, run for 15S, no cycle



Set the step size to “1” and the cycle index to “1”

Set the voltage 00 to “10”V, the slope time to “10”S and the keep time to “15”S;

Sample 4: start up and rise from 0V to 10V in a rise time of 10S, run for 15S → rise to 20V in a rise time of 10S, run for 15S → drop to 0V and keep for 5S → run for 2 cycles;



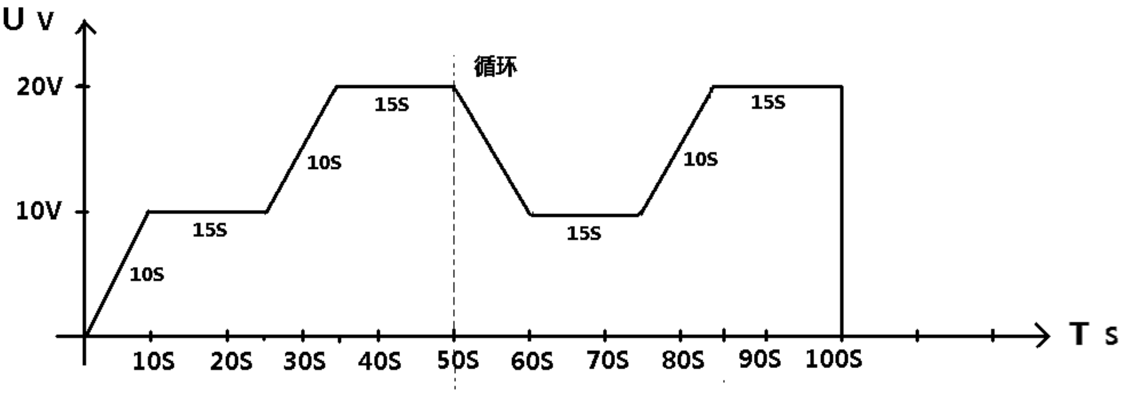
Set the step size to “3” and the cycle index to “2”

Set the voltage 00 to “10”V, the slope time to “10”S and the keep time to “15”S; set the voltage 01 to “20”V, the slope time to “10”S and the keep time to “15”S; set the voltage 02 to “0”V, the slope time to “0”S and the keep time to “5”S

Note: by parity of reasoning, if the cycle index is set to "3", then repeat the step to rise from 0V to 10V, then to 20V and drop to 0V. After the program is completed, the voltage will return to "0" and the power supply will stop outputting.

⚠ If the last step to set voltage 02 to “0” is missed, the power supply will cycle between 20V~10V~20V and cannot start circulating from 0V. See the following sample 5.

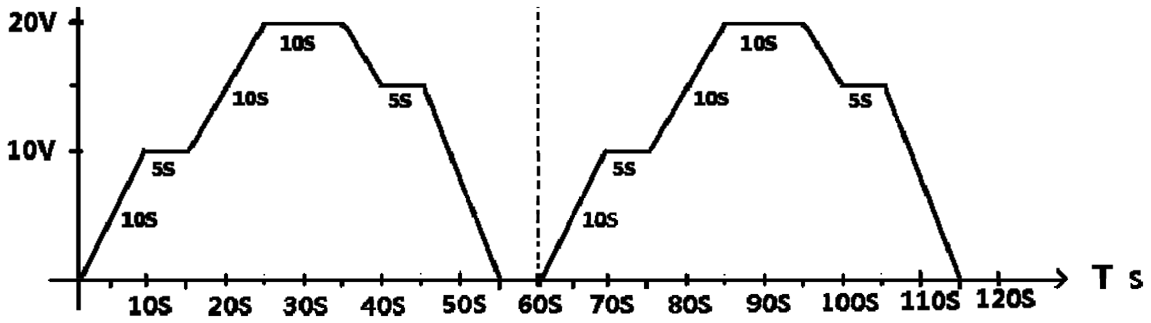
Sample 5: start up and rise from 0V to 10V in a rise time of 10S, run for 15S → rise to 20V in a rise time of 10S, run for 15S → run for 2 cycles;



Set the step size to “2” and the cycle index to “2”

Set the voltage 00 to “10”V, the slope time to “10”S and the keep time to “15”S; set the voltage 01 to “20”V, the slope time to “10”S and the keep time to “15”S;

Sample 6: start up and rise from 0V to 10V in a rise time of 10S, run for 5S → rise to 20V in a rise time of 10S, run for 10S → drop to 15V in a drop time of 5S, run for 5S → drop to 0V and keep for 5S → run for 2 cycles;

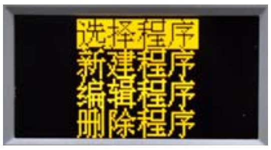


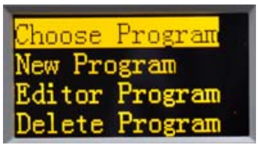
Set the step size to “4” and the cycle index to “2”

Set the voltage 00 to “10”V, the slope time to “10”S and the keep time to “5”S; set the voltage 01 to “20”V, the slope time to “10”S and the keep time to “10”S; set the voltage 02 to “15”V, the slope time to “5”S and the keep time to “5”S

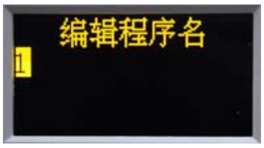
Set the voltage 03 to “0”V, the slope time to “0”S and the keep time to “5”S;

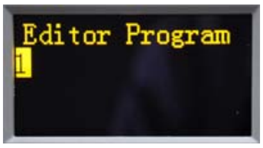
Set the "voltage", "current" and "time" parameters of each step of the program in the above order. This product supports the storage of up to 16 groups of programs. After the setting, press ENTER key, then ESC key to to return to the following menu; Press 7.5.1 ② “Select Program” operation method to select the saved file name and execute the program. Press PROG and the program selected just now starts to output. At this time, the "OUT" indicator light is on. Press the PROG key in the output state of the power program will turn off the output of the power program and the "OUT" indicator light will be off.





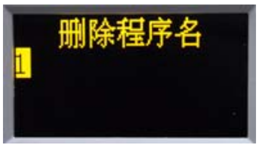
④ Press △ key or ▽ key to select “Edit the Program”; press ENTER key to enter the operation interface to edit the program.

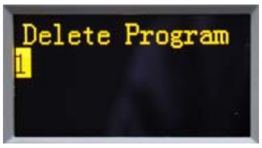



Editor Program
1

Select the saved program to be edited and edit the program according to the steps for “new program”, then press ESC to return to the home screen. The edited program will be saved automatically.

⑤Press the △ key or ▽ key to select the menu item "Delete program" and press the ENTER confirmation key to enter the operation interface of deleting program name.

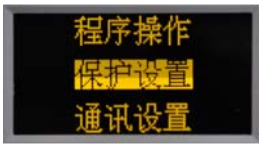
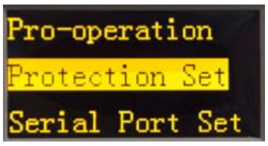



Delete Program
1

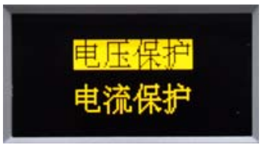
Press the △ key or ▽ key to select the program name to be deleted, press the ENTER confirmation key to delete the program, and after the program is deleted, it will automatically return to the previous operation interface.

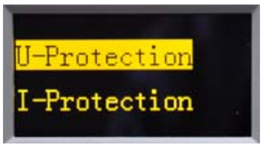
7.5.2. Protection settings

Press the MENU function key to enter the main menu operation interface.


程序操作
保护设置
通讯设置

Pro-operation
Protection Set
Serial Port Set

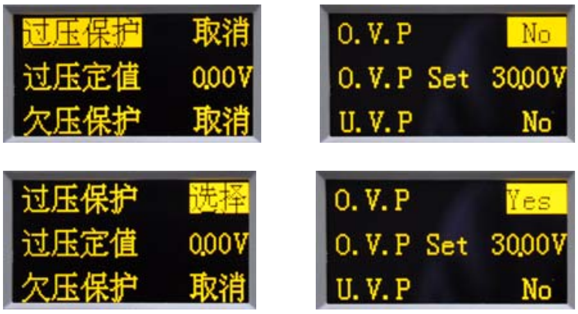
Press the △ key or the ▽ key to select the menu item "Protection settings" and press the ENTER confirmation key to enter the protection settings.




U-Protection
I-Protection

Select the menu item "Voltage protection" and press the ENTER confirmation key to enter the voltage protection setting interface.

Select the menu item "Overvoltage protection", press the ENTER confirmation key to set the overvoltage protection function. Press the △ key or ▽ key to select the function, select "Select", it indicates that the protection function is valid, and select "Cancel", it indicates that the protection function will be invalid.



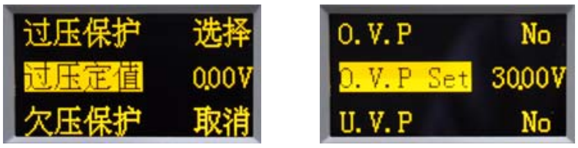
过压保护 取消
过压定值 0.00V
欠压保护 取消

O.V.P No
O.V.P Set 30.00V
U.V.P No

过压保护 选择
过压定值 0.00V
欠压保护 取消

O.V.P Yes
O.V.P Set 30.00V
U.V.P No

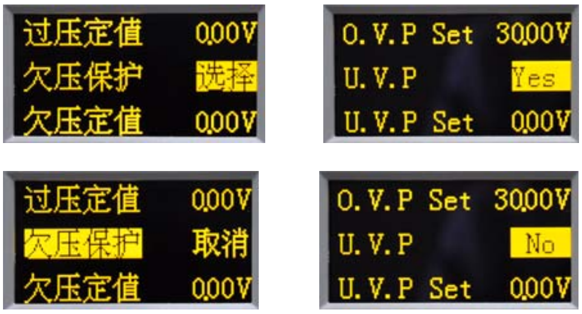
Select the menu item -"Overvoltage setting value", press the ENTER confirmation key to set the overvoltage protection value, type into the protection voltage value and press the ENTER confirmation key to exit.



过压保护 选择
过压定值 0.00V
欠压保护 取消

O.V.P No
O.V.P Set 30.00V
U.V.P No

Select the menu item "Undervoltage protection", press the ENTER confirmation key to set the undervoltage protection function. Press the △ key or ▽ key to select the function, select "Select", it indicates that the protection function will be valid, and select "Cancel", it indicates that the protection function will be invalid.



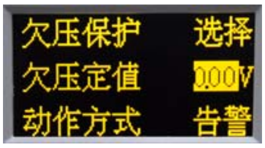
过压定值 0.00V
欠压保护 选择
欠压定值 0.00V

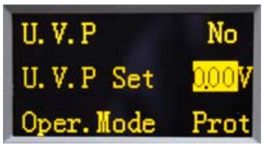
O.V.P Set 30.00V
U.V.P Yes
U.V.P Set 0.00V

过压定值 0.00V
欠压保护 取消
欠压定值 0.00V

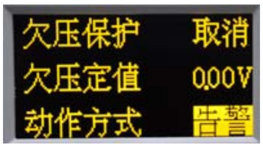
O.V.P Set 30.00V
U.V.P No
U.V.P Set 0.00V

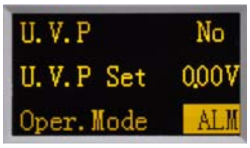
Select the menu item "undervoltage setting value", press the ENTER confirmation key to set the undervoltage protection value, type into the protection voltage value and press the ENTER confirmation key to exit.

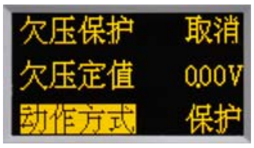

欠压保护 选择
欠压定值 0.00V
动作方式 告警

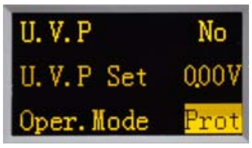

U.V.P No
U.V.P Set 0.00V
Oper.Mode Prot

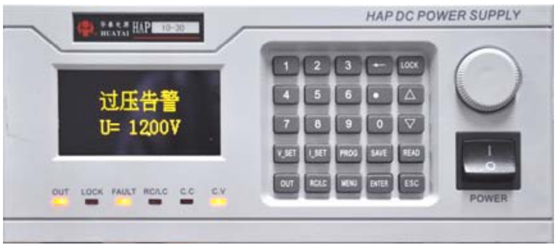
Select the menu item "Action mode", press the ENTER confirmation key to set the voltage protection mode, and select the "Alarm" mode. When voltage protection occurs on the power supply, an alarm prompt will be displayed without stopping the power supply output. Select the "Protection" mode, when the power supply has voltage protection, an alarm prompt will be displayed, the fault indicator "Fault" will be on, and the power supply output will be stopped at the same time.


欠压保护 取消
欠压定值 0.00V
动作方式 告警

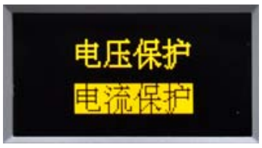

U.V.P No
U.V.P Set 0.00V
Oper.Mode ALM

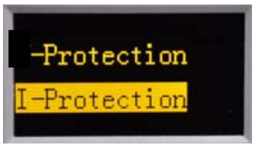

欠压保护 取消
欠压定值 0.00V
动作方式 保护


U.V.P No
U.V.P Set 0.00V
Oper.Mode Prot

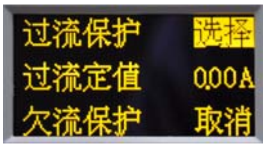


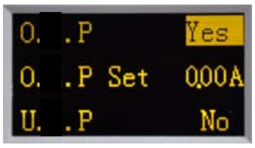
Select the menu item "Current protection" and press the ENTER confirmation key to enter the voltage protection setting interface.

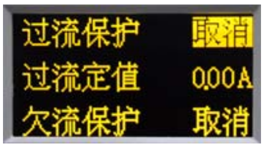

电压保护
电流保护

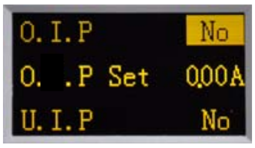

-Protection
I-Protection

Select the menu item "Overcurrent protection", press the ENTER confirmation key to set the overcurrent protection function, press the △ key or ▽ key to select the function. Select the "Select", it indicates that the protection function will be valid, and select the "cancel", it indicates that the protection function is invalid.

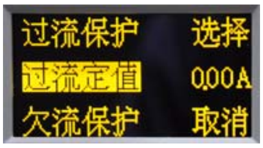

过流保护 选择
过流定值 0.00A
欠流保护 取消

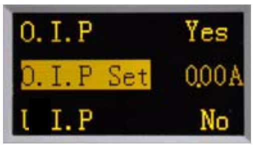

O. .P Yes
O. .P Set 0.00A
U. .P No


过流保护 取消
过流定值 0.00A
欠流保护 取消

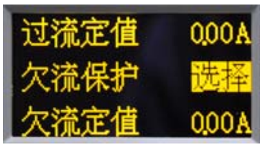

O.I.P No
O. .P Set 0.00A
U.I.P No

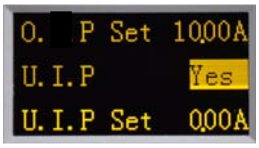
Select the menu item "Overcurrent setting value", press the ENTER confirmation key to set the overcurrent protection value, type into the protection current value and press the ENTER confirmation key to exit.

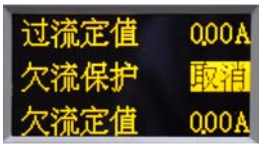

过流保护 选择
过流定值 0.00A
欠流保护 取消

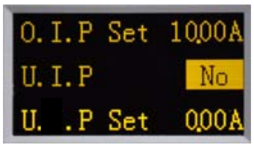

O.I.P Yes
O.I.P Set 0.00A
l I.P No

Select the menu item "Under current protection", press the ENTER confirmation key to set the under current protection function, press the △ key or ▽ key to select the function. Select the "select", it indicates that the protection function will be valid, and select the "Cancel", it indicates that the protection function will be invalid.

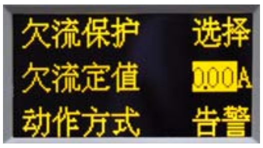

过流定值 0.00A
欠流保护 选择
欠流定值 0.00A

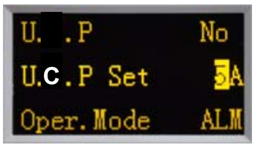

O. P Set 10.00A
U.I.P Yes
U.I.P Set 0.00A


过流定值 0.00A
欠流保护 取消
欠流定值 0.00A

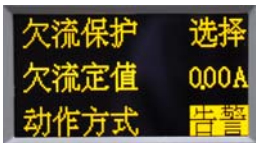

O.I.P Set 10.00A
U.I.P No
U. .P Set 0.00A

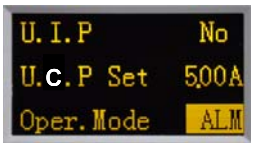
Select the menu item "Undercurrent setting value", press the ENTER confirmation key to set the undercurrent protection value, type into the protection current value and press the ENTER confirmation key to exit.

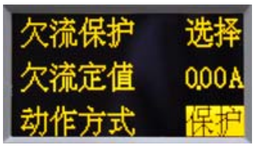

欠流保护 选择
欠流定值 0.00A
动作方式 告警

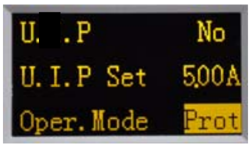

U. .P No
U.C.P Set 5A
Oper.Mode ALM

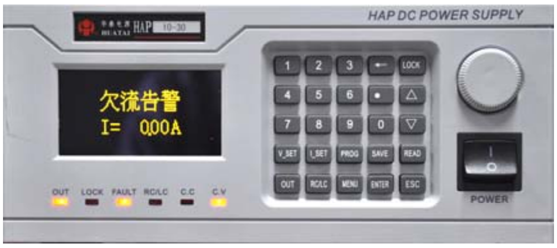
Select the menu item "Action mode", press the ENTER confirmation key to set the current protection mode, and select the "Alarm" mode. When the power supply has current protection, an alarm prompt will be displayed without stopping the power supply output. Select the "protection" mode, when the power supply has current protection, an alarm prompt will be displayed, the fault indicator "Fault" will be on, and the power supply output will be stopped at the same time.


欠流保护 选择
欠流定值 0.00A
动作方式 告警


U.I.P No
U.C.P Set 5.00A
Oper.Mode ALM

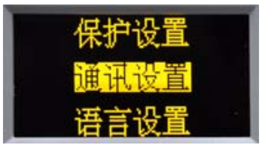

欠流保护 选择
欠流定值 0.00A
动作方式 保护

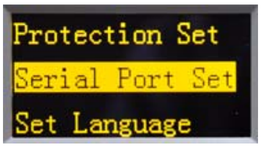

U.[redacted].P No
U.I.P Set 5.00A
Oper.Mode Prot



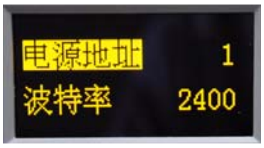
7.5.3. Communication settings

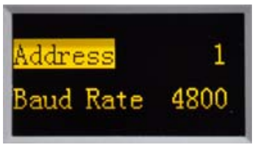
Press the MENU function key to enter the main menu operation interface.


保护设置
通讯设置
语言设置


Protection Set
Serial Port Set
Set Language

Press the △ key or ▽ key to select the menu item "Communication settings" and press the ENTER confirmation key to enter the communication settings interface.


电源地址 1
波特率 2400

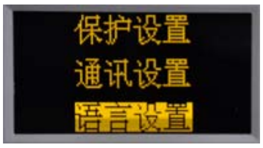

Address 1
Baud Rate 4800

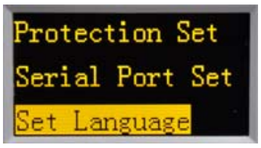
Select the "Power address" menu and press the ENTER key to confirm the power address setting. The power address can be set in the range of 0-254. The default public address of the power supply is 1.

Select the "Baud rate" menu and press the ENTER key to confirm baud rate selection. The baud rate selection parameters are 2400, 4800, 9600 and 14400 respectively. It is recommended to select 4800.

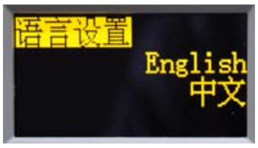
7.5.4. Language settings

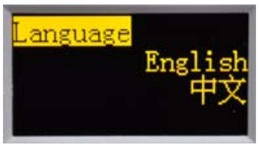
The display language of this product is available in Chinese and English. Press the MENU function key to enter the main menu operation interface.


保护设置
通讯设置
语言设置

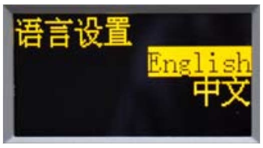

Protection Set
Serial Port Set
Set Language

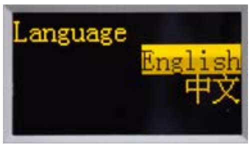
Press the △ key or the ▽ key to select the menu item of "Language setting" and press the confirmation key to enter the language setting interface.


语言设置
English
中文


Language
English
中文

Press the ENTER confirmation key to set the language, press the △ key or ▽ key to select "Chinese" or "English". After complete the language setting, press the ENTER confirmation key to exit.


语言设置
English
中文


Language
English
中文

VIII. The main technical parameters of the program-controlled DC power supply

Projects	Parameter
Model	DXKDP-(see machine factory nameplate or front panel model label)
AC input	Single phase 220V±10%/three phase 380V±10%
Frequency	50Hz/60Hz
Output voltage	0- rating value (see the factory nameplate)
Output current	0- rating value (see the factory nameplate)
Output power	(see the factory nameplate)
Power supply stability rate	≦0.3%+10mV
Load stability rate	≦0.5%+30mV
Ripple	≤0.5%+10mV(rms), low voltage and high current products ≤1%+10mV(rms)
Voltage value display	Precision of 4-digit meter: ±1% +1 word (10%-100% rating value)
Display format	0.000V-9.999V；0.00V-99.99V；0.0V-999.9V
Current value display	Precision of 4-digit meter: ±1% +1 word (10%-100% rating value)
Display format	0.000A-9.999A；0.00A-99.99A；0.0A-999.9A
Menu display	64×128 dot matrix OLED display
Output overvoltage protection	The menu is set with O.V.P protection, the protection value can be set arbitrarily, and the output is turned off after protection.
Output overcurrent protection	The menu is set with O.C.P protection, the protection value can be set arbitrarily, and the output is turned off after protection.
Over temperature protection	Built-in O.T.P protection, the protection value is 85℃±5% (radiator temperature). After protection, the output is turned off.
Voltage setting	Menu settings, keyboard or encoder knob input
Current setting	Menu settings, keyboard or encoder knob input
State memory capacity	10 sets of programmable control. In each set, there are the programmable editing voltage current and time output with 99 steps;
Control interface	Standard analog signal output RS-232(RS-485) control interface
Output polarity	The positive (+) and negative (-) of output can be grounded arbitrarily.
Heat dissipation method	Forced cooling
Operating environment	Indoor design, temperature: 0℃ ~ 40℃; humidity: 10% ~ 85% RH

Storage environment	Temperature:-20℃ ~ 70℃; humidity: 10% ~ 90% RH
Note: all values are typical values and may exceed this value under different loads or other conditions. The accuracy is measured in the terminal voltage detection state of the load. Under the conditions of temperature error and that components become old, there may be deviation between the actual value and the rated value.	

IX. Communication between power supply and PC

Press the LOCAL/REMOTE key on the front panel to select the control mode of power supply so as to accept remote PC control.

At this time, the "REMOTE" light is on, indicating that the power supply is controlled by the remote PC.

The PC can control the power supply through the RS232 serial port of the back panel.

Power Frame Format Communication Protocol

1. Communication interface:

1.1 Interface standard: RS-232 /RS-485

1.2 Communication format:

Asynchronous, the start bit is one, the data bits are eight , and the stop bit is one.

1.3 Communication rate: 2400-19200

1.4 Communication mode: the master-slave mode.

2. Message format:

0AAH	Synchronization character
ADDR	Address code
CODE	Feature code
Length	Message length
⋮	Message content
Sum L	Code and

Note:

① The message length refers to the sum of message content lengths.

② The maximum length of message content is 250 bytes.

③ The code sum is the low 8-bit value (single byte sum) of the sum of address code, feature code, message length and message content.

④ The address code range is 0-0FEH, of which 0FEH is the broadcast address.

⑤ Message content can be empty

3. Message type:

3.1 Special messages:

ACK(06H) reception correctly

NAK(015H) reception incorrectly

These two bytes appear in the uplink message and the downlink message as feature codes, and there is no message content.

NAK refers to that the receiving side informs the sending side that this reception is wrong. ACK refers to that the receiving side informs the sending side that this reception is correct.

3.2 Downlink message

CODE = 20h-set the output state of the power supply.

CODE = 21h-set the output voltage of the power supply.

CODE = 22h-set the output current of the power supply.

CODE = 23h-set the output voltage and current of the power

CODE= 24h-set the baud rate of the power supply.

CODE = 25h-read protection parameters.

CODE = 26h-read the actual current value and actual voltage value of the power supply.

CODE = 27h-set protection parameters.

CODE= 28h-read the set voltage value, set current value and status of the power supply.

Code = 29h-set the new communication address of the power supply.

Code = 2AH-read the status of power supply working .

Code = 2BH-read system information of power supply.

Code = 30H-set the local/remote working status of the power supply.

4. Command word communication protocol:

4.0: Control power output state (20H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (20H)

The fourth byte	message length (01H)
The fifth byte	power output state (0 is output OFF, 1 is output ON)
The sixth byte	check code

4.0.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.1: Set the output voltage of the power supply (21H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (21H)
The fourth byte	message length (02H)
The fifth byte	set the low byte of the voltage value
The sixth byte	set the high byte of the voltage value
The seventh byte	check code

4.1.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.2: Set the output current of the power supply (22H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (22H)
The fourth byte	message length (02H)
The fifth byte	set the low byte of the current value
The sixth byte	set the current value high byte
The seventh byte	check code

4.2.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.3: Set the output voltage and current of the power supply (23H)

The first byte	sync header (AAH)

The second byte	power supply address (0 ~ FEH)
The third byte	command word (23H)
The fourth byte	message length (04H)
The fifth byte	set the low byte of the voltage value
The sixth byte	set the high byte of the voltage value
The seventh byte	set the low byte of the current value
The eighth byte	set high byte of current value
The ninth byte	check code

4.3.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.4: Set baud rate of power supply (24H)

The first byte	sync header (AAH)					
The second byte	power supply address (0 ~ FEH)					
The third byte	command word (24H)					
The fourth byte	message length (02H)					
The fifth byte	baud rate	value :	0	1	2	3
The sixth byte	baud rate	baud rate:	2400	4800	9600	14400
The seventh byte	check code					

4.4.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.5: Read Protection Parameters (25H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (25H)
The fourth byte	message length (00H)
The fifth byte	check code

4.5.1: Return

NAK(015H) reception incorrectly

Correct

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (25H)
The fourth byte	message length (0EH)
The fifth byte	overvoltage protection selection/cancellation (0 cancels 1 selection)
The sixth byte	the low bit of overvoltage protection value
The seventh byte	the high bit of overvoltage protection value
The eighth byte	under voltage protection selection/cancellation (0 cancel 1 select)
The ninth byte	the low bit of under voltage protection value
The tenth byte	the high bit of under voltage protection value
The 11th byte	voltage protection operation mode(0 alarm 1 protection)
The 12th byte	overcurrent protection selection/cancellation (0 cancel 1 select)
The 13th byte	the low bit of overcurrent protection value
The 14th byte	the high bit of overcurrent protection value
The 15th byte	the underflow protection selection/cancellation (0 cancel 1 select)
The 16th byte	the low bit of under-current protection value
The 17th byte	the high bit of under-current protection value
The 18th byte	current protection working mode (0 alarm 1 protection)
The 19th byte	check code

4.6: Read actual current value and actual voltage value of the power supply. (26H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (26H)
The fourth byte	message length (00H)
The fifth byte	check code

4.6.1: Return

NAK(015H) reception incorrectly

Correct

The first byte	sync header (AAH)

The second byte	power supply address (0 ~ 0xFe)
The third byte	command word (26H)
The Fourth byte	message length (5)Fourth byte message length (5)
The Fifth byte	the low byte of actual voltage value
The Sixth byte	the high byte of actual voltage value
The Seventh byte	the low byte of actual current value
The eighth byte	the high byte of Actual Current Value
The ninth byte	CC CV state (0 constant current state 1 constant voltage state)
The tenth byte	check code

4.7: Read setting protection parameters. （27H）

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (27H)
The fourth byte	message length (08H protection parameter type is 1 or 2)(0FH protection parameter type is 3)
The fifth byte	protection parameter type (1 voltage protection parameter 2 current protection parameter 3 voltage and current protection parameter)
The sixth byte	overvoltage protection selection/cancellation (0 cancel 1 select)
The seventh byte	the low bit of overvoltage protection value
The eighth byte	high overvoltage protection value
The ninth byte	undervoltage protection selection/cancellation (0 cancel 1 select)
The tenth byte	the low bit of undervoltage protection value
The 11th byte	the high bit of undervoltage protection value
The 12th byte	voltage protection operation mode (0 alarm 1 protection)
The 13th byte	overcurrent protection selection/cancellation (0 cancel 1 select)
The 14th byte	the low bit of overcurrent protection value
The 15th byte	the high bit of overcurrent protection value
The 16th byte	underflow protection selection/cancellation (0 cancel 1 select)
The 17th byte	the low bit of under-current protection value

The 18th byte	the high bit of under-current protection value
The 19th byte	current protection operation mode (0 alarm 1 protection)
The 20th byte	check code

47.1:. Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.8: read the set voltage value, set current value and state of the power supply. （28H）

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (28H)
The fourth byte	message length (00H)
The fifth byte	check code

4.8.1: Return

NAK(015H) reception incorrectly

Correct

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (28H)
The fourth byte	message length (05H)
The fifth byte	power output state (0 is output OFF, 1 is output ON)
The sixth byte	set the low byte of the voltage value
The seventh byte	set the high byte of the voltage value
The eighth byte	set current value low byte
The ninth byte	set the current value high byte
The tenth byte	check code

4.9: Set the new address of the power supply (29H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (29H)
The fourth byte	message length (02H)

The fifth byte the new address of power supply

The sixth byte the new address of power supply

The seventh byte check code

4.9.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

4.10: read power supply operating state (2AH)

The first byte sync header (AAH)

The second byte power supply address (0 ~ FEH)

The third byte command word (2AH)

The fourth byte message length (00H)

The fifth byte check code

4.10.1: Return

ACK(06H) power supply works normally

NAK(015H) reception incorrectly

There is a power failure.

The first byte sync header (AAH)

The second byte power supply address (0 ~ FEH)

The third byte command word (2AH)

The fourth byte message length (03H)

The fifth byte fault type (0= overvoltage protection 1= overvoltage alarm 2= undervoltage protection 3= undervoltage alarm 4= overcurrent protection)

(5= over current alarm 6= under current protection 7= under current alarm 8= over temperature protection)

The sixth byte the low byte of byte voltage/current value

The seventh byte the high byte of voltage/current value

The eighth byte check codes

4.11: Read operation state of power supply (2BH)

The first byte sync header (AAH)

The second byte power supply address (0 ~ FEH)

The third byte	command word (2BH)
The fourth byte	message length (00H)
The fifth byte	check code

4.11.1: Return

NAK(015H) reception incorrectly

Correct

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)
The third byte	command word (2BH)
The fourth byte	message length (0EH)
The fifth byte	the normalized voltage value (actual value = read value *the power of negative normalized value of 10)
The sixth byte	the normalized current value (actual value = read value * the power of negative normalized value of 10)
The seventh byte	for debugging
The eighth byte	for debugging
The nineth byte	for debugging
The tenth byte	for debugging
The 11th byte	the high bit of the maximum of voltage set
The 12th byte	voltage the low bit of the maximum of voltage set
The 13th byte	the high bit of the maximum of current set
The 14th byte	the low bit of the maximum of current set.
The 15th byte	for debugging
The 16th byte	for debugging
The 17th byte	for debugging
The 18th byte	for debugging
The 19th byte	check code

4.1.2: Set local/remote working state of power supply (30H)

The first byte	sync header (AAH)
The second byte	power supply address (0 ~ FEH)

The third byte	command word (30H)
The fourth byte	message length (01H)
The fifth byte	local/remote operation status (0= local 1= remote)
The sixth byte	check code

412.1: Return

ACK(06H) reception correctly

NAK(015H) reception incorrectly

Note:

1. If you do not know the power supply address, you can use 0FFH(255) as the address to send the read command. The returned command contains the power address.

2. If the power supply fails, the high bit of the returned command word is one (i.e. 26H is changed to A6H)

3. If the power supply fails, read the power supply status and return to the power supply.

For example:

Read the 2B command first, then confirm the maximum output voltage, current, voltage step size and current step size of the power supply.

If the power supply address is 1, the maximum voltage is 50.00V; the minimum voltage step is 0.01V and the maximum current is 1.000A; the minimum current step size is 0.001A.

1. Read the system information of power supply

Send: AA 01 2B 00 2C

Receive: AA 01 2B 0E 02 03 00 00 00 13 88 03 E8 00 00 00 00 00 C5

The minimum step size of 02 voltage is 10^{-2}

The minimum step size of 03 current is 10-3

The decimal value of 13 88 is 5000, 5000 *10-2= 50.00 V.

The decimal value of 03 E8 is 1000, $1000*10^{-3}$=1.000A.

2. Turn on the power supply

Send: AA 01 20 01 01 23

Receive: 06

3. Close the power supply

Send: AA 01 20 01 00 22

Receive: 06

4. Set the output voltage as 10V

Send: AA 01 21 02 E8 03 0F

Receive: 06

5. Set the output current as 0.5A

Send: AA 01 22 02 F4 01 1A

Receive: 06

6. Set the output voltage as 10V and the output current as 0.5A

Send: AA 01 23 04 E8 03 F4 01 08

Receive: 06

7. Read the actual current value and actual voltage value of the power supply (voltage 10V, current 0.5A)

Send: AA 01 26 00 27

Receive: AA 01 26 04 E8 03 F4 01 0B

Power Supply MODBUS Communication Protocol

1. Baud rate: 9600bps, invalid check.

2. Serial communication frame: the start bit is one, the data bits are eight, and the stop bit is one.

Table 1: Data items of power parameters

Serial number	Parameter item	Data Type	Unit	Access rules	Address	Explanation
1	Power supply address	UINT		R/W	0x0000	
2	Power output status	UINT		R/W	0x0001	
3	Set current	UINT	A	R/W	0x0002	
4	Set voltage	UINT	V	R/W	0x0003	
5	Actual current	UINT	A	R	0x0004	
6	Actual voltage	UINT	V	R	0x0005	
7	CC/CV status	UINT		R	0x0006	
8	Working state of power supply	UINT		R	0x0007	
9	Fault voltage/current	UINT	A/V	R	0x0008	
10	Normalized current value	UINT		R	0x0009	
11	Normalized voltage value	UINT		R	0x000A	
12						

General instruction: 1. All parameters are words composed of unsigned double bytes.

In the scope rule: R: means the readable only R/W: means the readable and writable.

The power output status is equal to 1 output, and other values turn off the output.

Power setting value = setting value * (the power of "normalized current/voltage value" of 10)

Actual power supply value = read value * (the power of "normalized current/voltage value" of 10),

The working state of the power supply is equal to 0, and the power supply is normal. After the fault, the read fault sign of the address will be removed automatically.

(8= overvoltage protection; 1= undervoltage protection; 2= overvoltage alarm; 3= undervoltage alarm; 4= overcurrent protection; 5= under-current protection; 6= overcurrent alarm; 7= under-current alarm)

2. See the following table for functional codes and description

Function code	Meaning
03H	Read data (single or group)
06H	Modify single data
10H	Modify data (single or group)

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