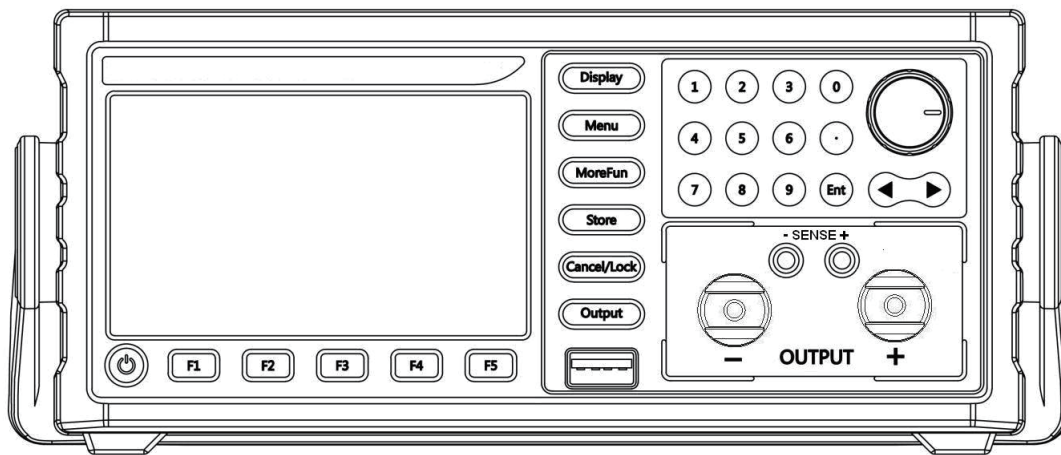


User Manual



High Precision Programmable Switched-Mode DC Power Supply (K-SPL) V4.0

Catalogue

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Performance specifications are subject to change without prior notice.

Document Format Conventions

1. Buttons

In this manual, "Textbox+ Text" typically denotes front panel function buttons. For example: Display

2. Menu

In this manual, menu options are typically indicated by text with a shaded background. For example. Address indicates the "Address" item in the Menu function

3. Operating Steps

In this manual, an arrow "→" indicates the next step. For example: Menu → Address Indicates pressing the Front Panel on the Menu function key, then pressing the Address menu soft key.

Security Summary

This chapter contains the operation of the power supply and important safety instructions that must be followed when storing it, users should read the following instructions in detail before operating to ensure safety and keep the machine in optimal condition.

Safety symbols

The following safety symbols may appear in this operating manual or on the product:

	Warning	Warning The warning statement points out the conditions and behaviors that may endanger the life of the operator
	Attention	Attention The notice states that damage may occur to the product or other devices connected to the product.
	Danger	Danger Be careful with high voltage
		Protect grounding terminals
		Ground terminal
		Shell grounding end

Safety Guide

General Introduction

- | | | |
|---|------------------|---|
|  | Attention | <ul style="list-style-type: none"> ● Do not place heavy objects on the housing. ● Avoid serious impact or improper handling resulting in machine damage. ● Preventive measures against static electricity should be taken when connecting instruments. ● Do not block the ventilation ports of the side and rear panels. ● Do not disassemble the machine unless you are a professional. |
|---|------------------|---|

power supply

- | | | |
|---|----------------|---|
|  | Warning | <p>AC input voltage: 200-240VAC, 50/60Hz.</p> <p>Ensure that the power cable is connected to the grounding end to avoid electric shock.</p> |
|---|----------------|---|

fuse

- | | | |
|---|----------------|---|
|  | Warning | <ul style="list-style-type: none"> ● Make sure you use the correct fuse model before turning on the machine. ● In order to prevent fire, only the fuse of the specified specification of this product is allowed to be used. ● Cut off the power supply before replacing the fuse to eliminate the cause of the fuse damage. |
|---|----------------|---|

Cleaning machines

- Cut off the power before cleaning.
- Use a mild detergent and water to moisten the soft cloth, do not spray cleaner directly
- Do not use chemical or cleaning products containing abrasives such as benzene, toluene, xylene and acetone

operational environment

- Where to use: indoors, away from direct sunlight, dust and strong magnetic fields.
- Relative humidity: <80%
- Altitude: <2000m
- Temperature: 0°C~40°C

Storage environment

- Indoor
- Relative humidity: <70%
- Temperature: 10°C~70°C

Chapter 1. Product Description

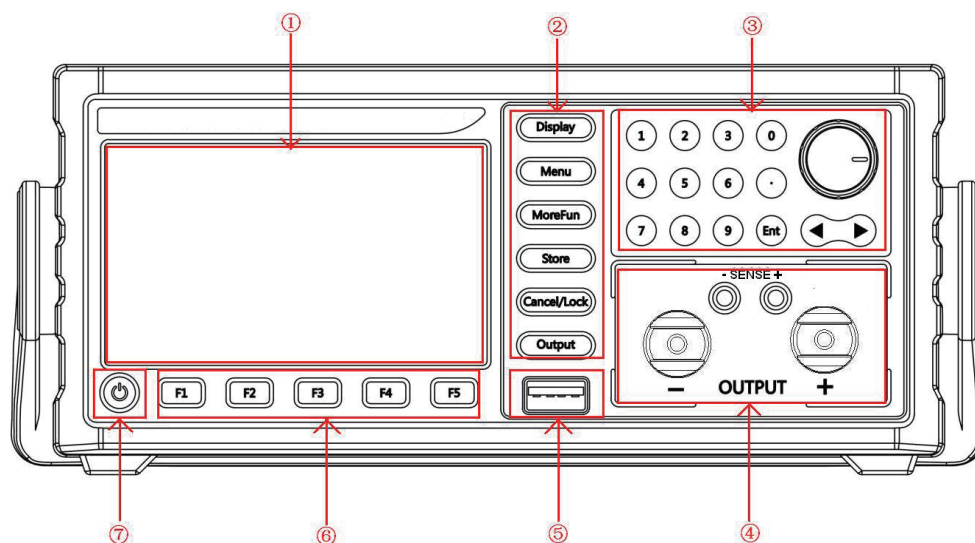
1.1 Introduce

This series of products is a high-precision single-output programmable DC switched-mode power supply, featuring compact design, adjustable parameters, and multiple operational modes. The entire system is fully controlled by a microprocessor (MPU), enabling seamless connectivity with computers (PC) through RS-232 communication interfaces to meet users' needs for automated testing and control systems. Its software commands fully comply with SCPI protocol standards, facilitating user development of custom automation applications. With full digitalization, data input is entirely managed via keyboard and rotary controls, ensuring rapid, precise, and user-friendly operation. The system finds wide application in electronic product development, component testing, telecommunications industries, laboratories, and research institutions.

1.2 Characteristic

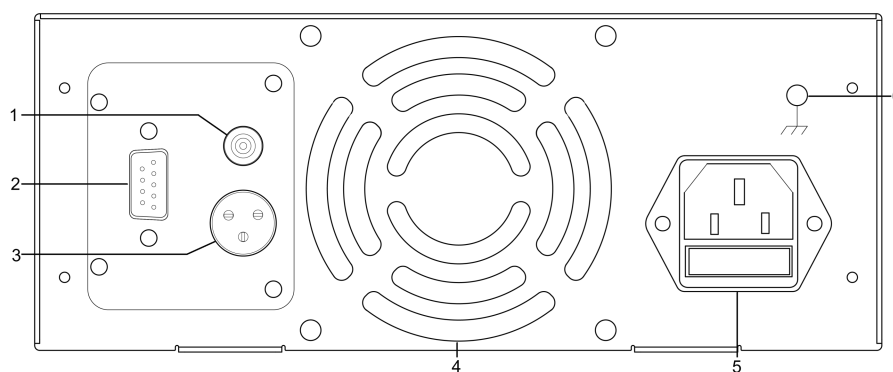
- High accuracy and high resolution: 1mV/1mA (5 digits), 0.1mV/0.1mA (6 digits)
- 4.3 inch TFT color LCD display, displaying comprehensive status indication of the power supply
- Constant Voltage/Constant Current automatic switching
- Equipped with an output control switch for more flexible control
- 100 set storage and recall function, capable of storing / retrieving 100 sets of voltage and current data, with timed execution enabling basic automatic testing
- Timed output function supporting infinite and specified cycle outputs
- Remote sensing to compensate for voltage drop across load lines
- Overload protection, reverse polarity protection, overvoltage protection, overcurrent protection, and overtemperature protection
- Convenient and fast operation and setting interface, featuring a high-speed adjustment knob and numeric keypad input
- One-touch lock function effectively prevents accidental operation
- Built-in buzzer serves as an alert or warning
- Temperature-controlled fan speed ensures low noise and extends the instrument's fan lifespan
- Displays load resistance value and supports low-resistance measurement
- Equipped with RS232 interface; programming command sets support SCPI and MODBUS

1.3 Front and Back Panels



Front Panel

Serial Number	Name	Description
①	TFT LCD Display	User Interface Display
②	Function Key Area	<u>Display</u> : Parameter or Waveform Display Mode Switch <u>Menu</u> : Menu Key <u>MoreFun</u> : Test and List Functions <u>Store</u> : Store and Retrieval Parameter Settings <u>Cancel/Lock</u> : Lock Key (Long press to lock other keys, except <u>Output</u>) <u>Output</u> : Output Key
③	Parameter Input Area	Includes Numeric Keypad, Confirm Key, Directional Keys, Rotary Knob
④	Output Terminals Remote Sense Terminals	Channel Output Connector Preload Voltage Compensation
⑤	USB Host Interface	The instrument functions as a "host device" connected to an external USB device
⑥	Menu Key Area	Corresponding to the various functions of the screen menu above
⑦	Power Key	The instrument enters or exits the power-on state

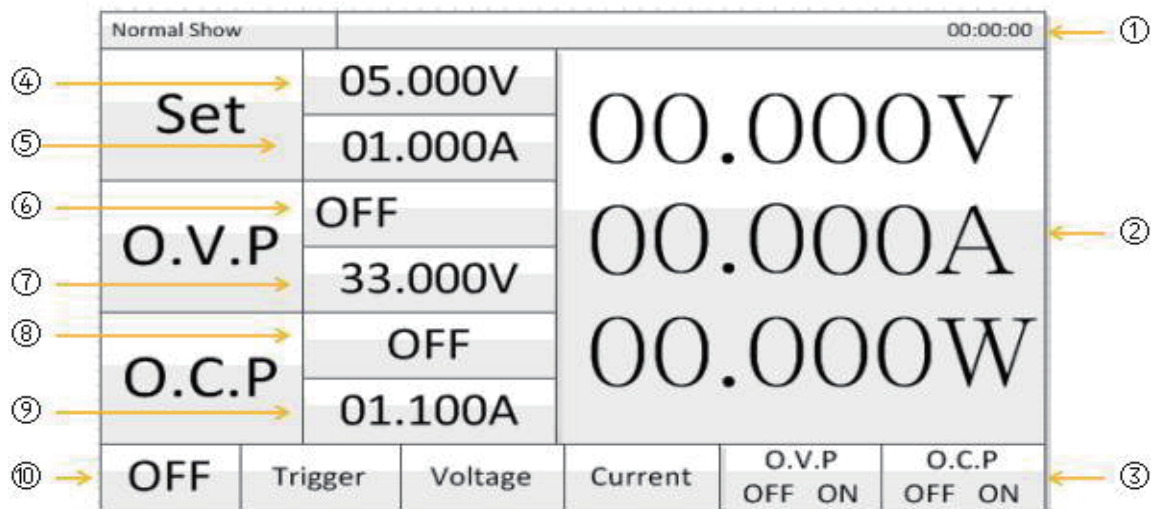


Back Panel

Serial Number	Name	Serial Number	Name
1	Trigger Input	2	RS232 Interface
3	Aviation Connector	4	Fan
5	Power Socket (including fuse holder)	6	Chassis Ground Terminal

1.4 User Interface

The device offers two display modes, each corresponding to a different interface. Refer to the description of “Display Mode” for details.



Serial Number	Description
①	Status Display CV/CC : Constant Voltage /Constant Current status. OVP/OCPP : Overvoltage /Overcurrent status. Output automatically disables upon detection. LOCK: Keyboard Lock status. UDISK : USB drive connected. 00:35:53 :Displays power-on duration.
②	Actual output display.
③	Operation menu display.
④	Voltage setting display.
⑤	Current setting display.
⑥	Overvoltage Protection (O.V.P) status setting display .
⑦	Overvoltage Protection threshold input display.
⑧	Overcurrent Protection (O.C.P) status setting display .
⑨	Overcurrent Protection threshold input display.
⑩	Indicates whether the output switch is enabled.

1.5 First Use

1.5.1 Power Connection

1. Input Power Requirements

Refer to Chapter 5, Performance Specifications, for detailed power input information.

2. Fuse Inspection

The instrument is pre-installed with the appropriate fuse at the factory Refer to Section 4.2 to confirm the correct fuse model is used before power-up

3. Connect the Instrument Power Cable

Use the supplied power cable to connect the instrument to the AC power supply.



Warning To avoid electric shock, ensure the instrument is properly grounded.

1.5.2 Power-On Check

Press the power switch on the front panel. The instrument powers on and performs a self-test. , If the self-test passes, the screen will display the startup interface. Otherwise, the system will display the corresponding self-test failure messages (including Analog Board 1, Analog Board 2, Fan, Temperature).

Note: After shutdown, when powering on again, ensure the interval between the two power-on operations exceeds 5s.

1.5.3 Output Check

The output check verifies that the instrument correctly responds to front panel operations and outputs rated values. The output check includes voltage output under no-load conditions and current output under short-circuit conditions for the channel.

1. Output Switch

To enable the power output, press **Output** Press the key; its backlight will illuminate. Pressing the key again will disable the output, and the character backlight will turn off.

2. Voltage Output Check

- (1) When the instrument is unloaded, turn on the power key, ensuring the current setting is not 0;
- (2) Press **Output** the key. After its backlight illuminates, the channel enters constant voltage output mode(CV). Verify that the voltage can be adjusted from 0 to the maximum rated value. Rated value. For parameter input methods, please refer to section 2.1 on data input, the same applies hereafter.

3. Current Output Check

- (1) Turn on the power key;
- (2) Use an insulated test lead to short-circuit the front panel output terminals;
- (3) Set the voltage value to the maximum rated value;
- (4) Press the **Output** key, and after its backlight illuminates, verify that the current can be adjusted from 0 to the maximum rated value.

1.5 Display Mode

The power supply offers two display modes: Standard Display Mode and Waveform Display Mode. Users may select the mode best suited for observation according to their requirements.

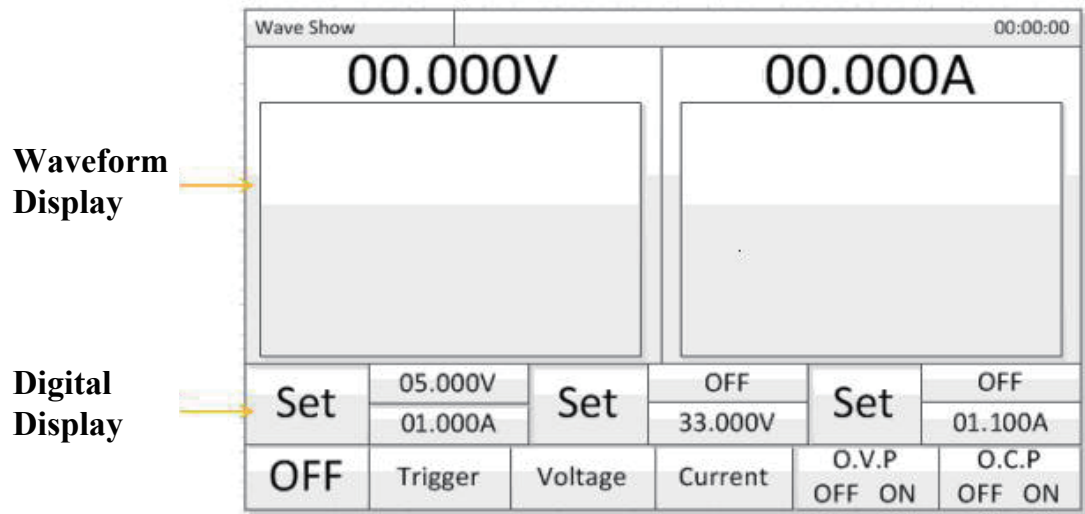
1. Standard Display Mode

Upon power-up, the instrument directly enters Standard Display Mode (alternatively, press the **Display** key while in Waveform Display Mode to switch to Standard Display Mode, at which point the user interface shows **Normal Show**), in the upper left corner, as illustrated below. This mode presents voltage, current, and power settings in digital format. You can also configure overvoltage protection and overcurrent protection.

Normal Show		00:00:00			
Set	05.000V		00.000V		
	01.000A				
O.V.P	OFF		00.000A		
	33.000V				
O.C.P	OFF		00.000W		
	01.100A				
OFF	Trigger	Voltage	Current	O.V.P OFF ON	O.C.P OFF ON

2. Waveform Display Mode

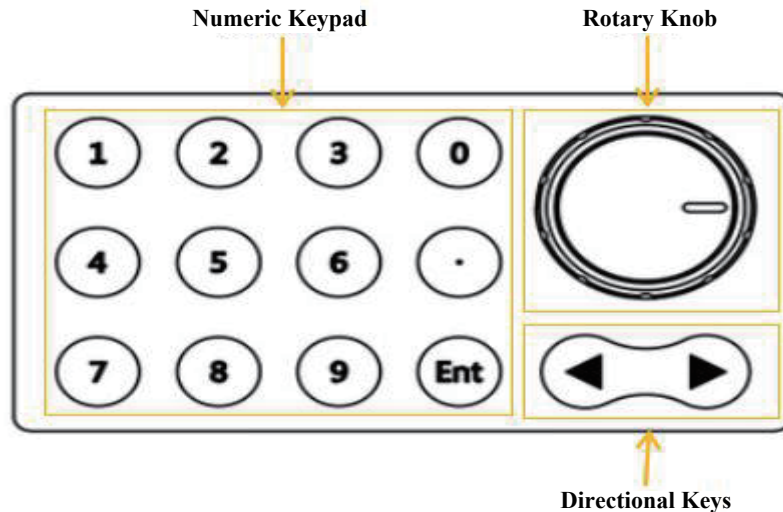
In Standard Display Mode, press **Display** the key to enter Waveform Display Mode (at this time, the upper left corner of the user interface displays **Wave Show**).This mode displays voltage, current, and power values in both numeric and waveform formats, allowing the user to clearly understand the output status of the power supply. You can also set overvoltage protection and overcurrent protection.



Chapter 2 Operation Instructions

2.1 Data Input

The power supply provides two parameter input methods: direct data input and direct parameter input (Modify). Operations can be performed using the numeric keypad, direction keys, and knob on the front panel, as shown in the figure below.



1 Direct Data Input: This input method uses the numeric keypad and applies to the following parameter settings.

- (1) Voltage and Current Settings
 - Press the **Voltage** or **Current** key on the front panel to select the corresponding menu (with the menu text highlighted);
 - use the numeric keypad to enter the value, then press the **Enter** key to confirm the input. The default unit for voltage is V, and the default unit for current is A (the same applies below).
- (2) Overvoltage Protection and Overcurrent Protection Settings
 - Select **O.V.P** or **O.C.P** the menu for adjustment; the procedure is similar to that for voltage and current settings.

2 Direct Parameter Input (Modification): This input method employs the knob and direction keys and applies to the following parameter settings

- (1) Applicable to all aforementioned settings that support direct data input, such as voltage and current settings.
 - Switch the interface to Standard Display Mode or Waveform Display Mode.
 - Press the **Voltage** or **Current**. Select the corresponding menu. At this point, the cursor is positioned in the **Voltage** or **Current** input field.
 - Rotating the knob on the panel directly increases or decreases the voltage or current value at the cursor position. Pressing the left or right Direction Keys moves the cursor left or right, thereby modifying the voltage or current values at other positions.
- (2) Selection of storage/recall locations
 - Press the **Store** key on the front panel to enter the corresponding interface.
 - Rotate the knob to select the desired storage/recall location for operation.

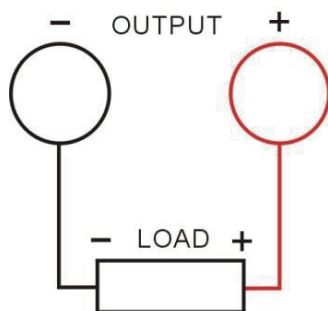
2.2 Constant Voltage Output

The power supply provides two output modes: Constant Voltage Output (CV) and Constant Current Output (CC). The output mode of the channel is determined by the set voltage value, current value, and the connected load. The instrument's output voltage or current will not exceed the set value. In CV mode, the output voltage equals the user-set voltage value; in CC mode, the output current equals the user-set current value.

For example: voltage set to 16V, current set to 3A, load connected is $8\Omega/300W$. Since $8\Omega \times 3A = 24V > 16V$, and $16V / 8\Omega = 2A < 3A$, this channel provides a constant voltage output of 16V and 2A.

Operation Steps:

- 1 Connecting output leads: Connect the instrument output terminals to the load as shown in the figure below.



Refer to the table below to select output leads, and use the shortest possible leads.

AWG*	10	12	14	16	18	20	22	24	26	28
Maximum current (A)	40	25	20	13	10	7	5	3.5	2.5	1.7
Milliohm /meter	3.3	5.2	8.3	13.2	21.0	33.5	52.8	84.3	133.9	212.9

*Note: AWG refers to American Wire Gauge.



Warning Incorrect connections may cause damage to this product or to devices connected to this product.

- 2 Power on: Press the power switch to start the instrument and enter operating mode.
- 3 Voltage setting: Press the **Voltage** menu key and set the voltage value to 16V.
- 4 Current setting: Press the **Current** menu key and set the current to 3A.
- 5 Turn on output: Press the **Output** key (backlight on). The instrument will operate in constant voltage output mode.

Notice:

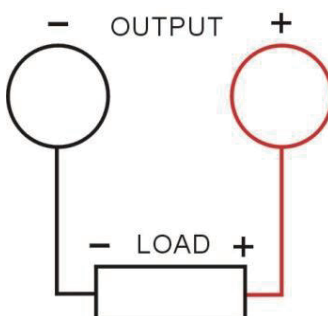
In the CV mode, if the output current exceeds the set value due to load variation, the device will switch to CC mode based on the current setting, and the output voltage will decrease proportionally. At this point, increasing the current set value will restore the CV output.

2.3 Constant Current Output

For example: Voltage is set to 16V , current is set to 5A , and the connected load is $2\Omega/300W$. Since $2\Omega \times 5A = 10V < 16V$ and $16V / 2\Omega = 8A > 5A$, this channel supplies power in constant current mode at 10V and 5A .

Operating Procedures:

- 1 Connecting output leads: Connect the instrument output terminals to the load as shown in the figure below.



Warning Incorrect connections may cause damage to this product or to devices connected to this product.

- 2 Power on: Press the power switch to activate the instrument and enter operating mode.
- 3 Voltage setting: Press the **Voltage** menu key and set the voltage value to 16V.
- 4 Current setting: Press the **Current** menu key and set the current to 5A.
- 5 Turn on output: Press the **Output** key (with corresponding backlight illuminated), the instrument will operate in constant current (CC) output mode.

Notice:

In CC mode, if the output voltage exceeds the set value due to load variations, the instrument will switch to CV(constant voltage) mode based on the preset voltage value, and the output current will decrease proportionally. At this point, the voltage set value may be increased to restore COutput.

2.4 Overvoltage/Overcurrent Protection

To prevent the power supply output from exceeding the rated value of the load, causing damage to the load, the power supply is equipped with overvoltage protection (O.V.P) and overcurrent protection (O.C.P) functions. Users can configure the threshold parameters for overvoltage and overcurrent protection and enable / disable these functions as required. When enabled, if the power supply output exceeds the O.V.P or O.C.P threshold, the device will automatically disconnect the output, thereby effectively protecting the load

2.4.1 O.V.P

O.V.P settings include threshold parameter configuration and enabling/disabling overvoltage protection. The detailed operation steps are as follows:

1 Parameter configuration

- Select the **O.V.P** menu;
- Use the numeric keypad to directly enter the value (the setting range may vary by model), then press the **Enter** key to confirm;
- Parameter setting succeeded; observe the changes in the O.V.P input field.

2 Enable/Disable over-voltage protection

- Press the **Output** key to enable output;
- Select the **O.V.P** menu;
- Press the **O.V.P** menu key repeatedly to toggle the O.V.P status to “ ON ” or “ OFF ” (observe the changes in the O.V.P input field on the interface) to enable / disable the over-voltage protection function. The change thereby enabling/disabling the overvoltage protection function.

Notice:

When the channel output is off, the O.V.P output is also off, but parameters can still be set. If the output voltage exceeds the over-voltage protection threshold, the output will be automatically disabled. The default status of O.V.P is “OFF”. It can be configured as required.

2.4.2 O.C.P

O.C.P settings include threshold parameter configuration and enabling/disabling overvoltage protection. The detailed operation steps are as follows:

1 Parameter configuration

- Select the **O.C.P** menu;
- Use the numeric keypad to directly enter the value (the setting range may vary by model), then press the **Enter** key to confirm;
- Parameter setting succeeded; observe the changes in the O.C.P input field.

2 Enable/Disable over-current protection

- Press the **Output** key to enable output;
- Select the **O.C.P** menu;
- Press the **O.C.P** menu key repeatedly to toggle the O.C.P status to “ ON ” or “ OFF ” (observe the changes in the O.C.P input field on the interface) to enable / disable the over-current protection function. The change thereby enabling/disabling the overcurrent protection function.

Notice:

When the channel output is off, the O.C.P output is also off; however, parameter settings can still be configured. If the output current exceeds the overcurrent protection threshold, the output will automatically turn off. The default state of O.C.P is “OFF.” You may configure it according to your requirements.

2.5 Menu Functions

Press **Menu** key to enter the menu function settings interface, as shown in the figure below.

SYS Config		16:59:58	
Baud Rate	:9600	Power On	:OFF & Def Set
Address	:001	UsetLimit	:300.50U
Beeper	:ON	IsetLimit	:1.0500A
BackLight	:100	CCFrist	:OFF
Display	:Power	USB Mode	:Device Udisk
Sense	:OFF	HotKey	:OFF
VSelf	:OFF	COM Protocol	:SCPI
TrigSource	:IMM		
TrigFunction	:Output	Ver	:Jul 31 2023
OFF		Next ↓	Last ↑

Press F2 and F3 , Select Next and Last accordingly , Move the cursor to the parameter to be modified. , Then rotate the knob , to change the parameter value.

2.5.1 Baud Rate

Press **Menu** key. Then , move the cursor to Baud Rate .Then rotate the knob to change the baud rate. Available baud rates include 1200, 2400, 4800, 9600 , 19200 , 38400 , 57600 and 115200.

2.5.2 Address

Press **Menu** key. Then , move the cursor to Address and .Rotate the knob or use the numeric keypad to enter the address to change the power supply address. Available addresses range from 001 to 250,for a total of 250 addresses

2.5.3 Beeper

Press **Menu** key. Then , Move the cursor to Beeper., Then rotate the knob , Select “ON” or “OFF” . , If ON is selected, each time a key is pressed, a ‘beep’ sound will occur; if OFF is selected, no sound prompt will occur.

2.5.4 BackLight

Press **Menu** key. Then , move the cursor to BackLight to adjust the screen brightness, which can be continuously set from 001 to 255.The screen brightness value can be entered via the numeric keypad or adjusted using the arrow keys and the knob.

2.5.5 Display

Press **Menu** key. Move the cursor to Display and rotate the knob to select either “ Power ” or “ Resistor ” to change the display interface parameter. If Power is selected, the power will be displayed; if Resistor is selected, the equivalent resistance value will be displayed.

2.5.6 Sense

Press **Menu** key. Move the cursor to Sense and rotate the knob , Select “ON” or “OFF” . If ON is selected, to enable the voltage compensation function; selecting OFF will disable the voltage compensation function.

2.5.7 VSelf

Press **Menu** key. Move the cursor to VSelf and then rotate the knob to select either ON or OFF to enable or disable voltage fine adjustment.

2.5.8 TrigSource

Press **Menu** key. Move the cursor to TrigSource, then rotate the knob and select IMM, EXT, Pulse, Level to change the triggering mode. IMM represents communication command triggering, EXT represents external triggering, Pulse represents pulse triggering, and Level represents low-level triggering.

2.5.9 TrigFunction

Press **Menu** key. Next, move the cursor to TrigFunction and then rotate the knob to select Output or List . Output means that each trigger event toggles the output .If originally ON, it will turn OFF after one trigger; conversely, if OFF, it will turn ON. The List indicates that each pulse advances to the next group in the Test Function list. Further details regarding the Test Function will be provided later.

2.5.10 Power On

Press **Menu** key. Then, Move the cursor toPower On, then rotate the knob to select OFF & Def Set,OFF & User Set or ON &User Set . If OFF & Def Set is selected, after power cycling, the output terminal will not output voltage or current, and the initial voltage and current values will be the default 5V/1A ; If OFF & User Set is selected, after power cycling, the output terminal will also not output voltage or current, but the voltage and current values will be those last used by the user; If ON & User Setis selected, after power cycling, the output terminal will output voltage and current, and the voltage and current values. These are the voltage and current values last used by the user. The user may set the desired startup mode according to actual requirements.

2.5.11 UsetLimit and IsetLimit

Press **Menu** key. Then, move the cursor to UsetLimiter IsetLimitand input the voltage or current usage value via the knob or keyboard. Upper limits: preset voltage, current, and communication command voltage values will be restricted within this range.

2.5.12 CCFrst

Press **Menu** key. Then, move the cursor to CCFrst and rotate the knob to select ON or OFF to enable or disable the current priority mode.

2.5.13 USB Mode

Press **Menu** key. Then, move the cursor to USB Mode and rotate the knob to select Disable!!!,Device UART or Device Udisk to change the power supply' s USB mode. If Disable !!! (Unavailable) is selected, the user will be unable to use USB Mode. If Device UART (Emulated Serial Port Mode) is selected, the USB interface can emulate a serial port, functioning identically to the RS232 serial port located at the rear of the Power Supply, thereby allowing users to communicate directly with the Power Supply from the front panel. If Device Udisk (Slave Mode) is selected, the Power Supply functions as a U disk, enabling the user to access internal data (embedded Flash 4M) through a computer, and also allowing the configuration input data file to be uploaded to the Power Supply via the computer.

Note: The setting will only be completed after powering off and restarting the instrument each time the mode is changed.

2.5.14 HotKey

Press **Menu** key. Then,Move the cursor to HotKey, then rotate the knob to select OFF, ON (Keep on), or ON (Turn off).If you select OFF, the HotKey function is disabled; if you select ON,then pressing the numeric keys 0~9 will recall the corresponding ten sets of settings (HK0 to HK9) from memory;Select ON (Keep on): When switching settings while in the output state, the output state will remain active. Select ON (Turn off): When switching settings while in the output state, the output will be turned off.

2.5.15 COM Protocol

Press **Menu** key. Then, Then,Move the cursor to COMProtocol and turn the rotary knob to select either the ModBus protocol or the SCPI protocol.

2.6 Test function and list function.

The power supply has a timed output function. Once enabled, the instrument will output pre-set voltage and current values (up to 100 sets), realistically simulating the operating conditions of various power sources in real-world scenarios.

2.6.1 Test Function

Press the front panel **MoreFun** key to enter the test function interface, as shown in the figure below (note that the upper left corner of the test function displays “TestRun”, and the List function displays “List Run”. Repeatedly pressing the **MoreFun** key allows switching between the test function and the list function),

Test Run		00:00:00			
V.U.L:	06.000V	00.000V 00.000A 00.000W			
V.L.L:	03.000V				
A.U.L:	02.000A				
A.L.L:	00.500A				
Set	03.000V 01.000A				
OFF	Trigger		Voltage	Current	Config

The test function is primarily used for voltage and current limit testing. If voltage or current exceeds the set value, the power supply will trigger an alarm.

In the figure above, V.U.L indicates the upper voltage limit for testing, and V.L.L indicates the lower voltage limit; A.U.L and A.L.L represent the upper and lower current limits respectively, and Trigger denotes the trigger key.

The user can press the **Config** menu soft key, corresponding to F5, to configure parameters for the test function. Upon entering, the interface appears as shown below,

Test Config	05:45:00				
V Test Status: OFF		A Test Status: OFF			
V Upper Limit: 06.000V		A Upper Limit: 02.000A			
V Lower Limit: 03.000V		A Lower Limit: 00.500A			
Test Delay: 00500mS					
Delay Mode: Alarm & Release					
A Bypass: 0.0010A					
OutputMode: Keep ON					
Test Show: OFF					
OFF		Next	Last		Reture

U Test Status Used to configure whether the voltage test is enabled. Position the cursor here, then rotate the knob to adjust.

U Upper Limit Used to set the upper voltage limit,U Lower LimitUsed to set the lower voltage limit.

Similarly,A Test Status, A Upper Limit, and A Lower Limit are used to configure whether the current test is enabled and to set the current upper and lower limits, respectively.

Test Delay Used to set the delay time.

DelayMode Used to configure the delay mode, with two options: OnlyAlarm and Alarm&Release. OnlyAlarm indicates that an alarm will trigger immediately when the output exceeds the set value. Alarm&Release indicates that the alarm will trigger with a delay after exceeding the set value, functioning similarly to debounce. The delay duration is determined by TestDelay.

A Bypass is the initial detection current; detection starts when this current is exceeded

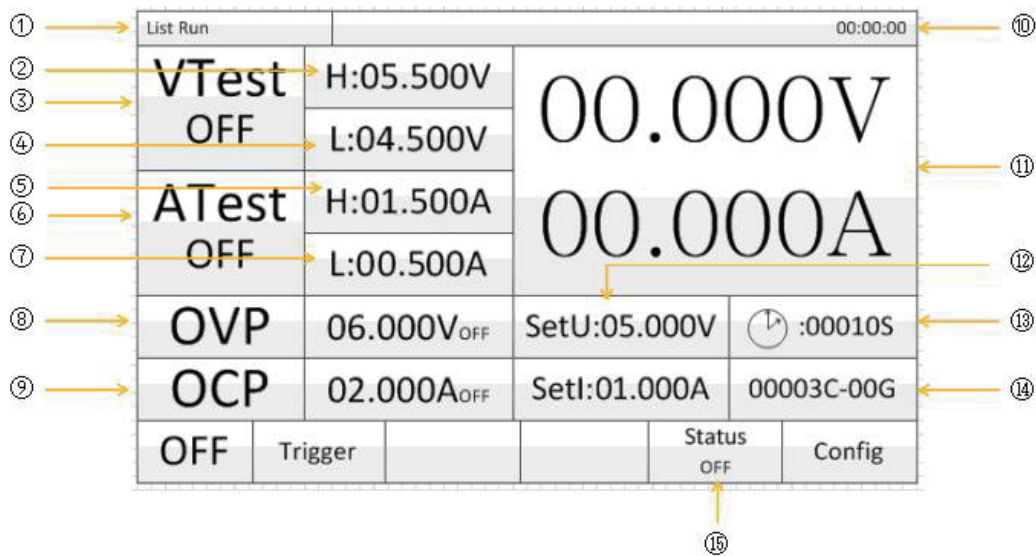
OutputMode is used to set the output state after an alarm, with two modes: KeepON and TurnOFF. KeepON means to maintain output after an alarm, while TurnOFF means to turn off output after an alarm;

Test Show is used to display whether the tested product is qualified, with OK indicating qualified and NG indicating unqualified;

After setting up, press the menu soft key corresponding to "Return", which is F5, and then press the Output key to perform voltage and current testing.

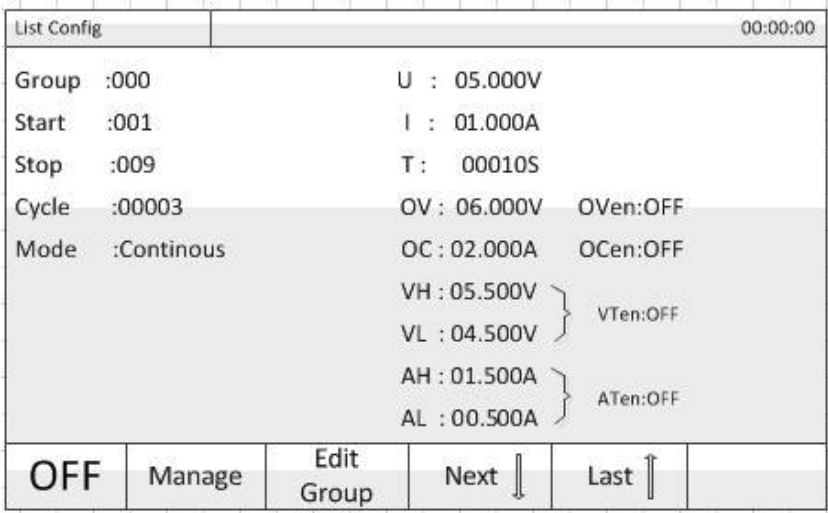
2.6.2 List Function

Press the MoreFun key on the front panel again to enter the List function interface, as shown below.



1	Indicates entry into the List test interface.	2	Voltage Test Upper Limit
3	Enable Voltage Test	4	Voltage Test Lower Limit
5	Current Test Upper Limit	6	Enable Current Test
7	Current Test Lower Limit	8	Overvoltage Protection Value and Enable Status
9	Overcurrent Protection Value and Enable Status	10	Power-On Time
11	Real-Time Output Voltage and Current	12	Set Voltage and Current Values
13	Remaining Time for Current Execution Group	14	Number of Cycles and Groups
15	Enable List Test		

Pressing F5 again allows configuration of list parameters, as shown in the figure below (Note: Before entering parameter settings, the list test function must be disabled, i.e., the Status above must be set to OFF).



Group	Indicates the number of groups (MAX: 100 data groups)	U	SET VOLTAGE VALUE
Start	Starting group number	I	Set current value
Stop	Ending group number	T	Output time of this group
Cycle	Number of cycles, 000 means infinite loop	OV	Overvoltage protection value
Mode	Select continuous test or trigger test	OVen	Whether overvoltage protection is enabled
Manage	Can switch to FLASH to read data	OC	Overcurrent protection value
Edit/Select Group	Edit parameters within a group / Select group parameters for setting	OCen	Whether overcurrent protection is enabled
VH	Upper limit of test voltage	AH	Upper limit of test current
VL	Lower limit of test voltage	AL	Lower limit of test current
VTen	Whether test voltage is enabled	ATen	Whether test current is enabled

2.7 Storage and Retrieval

The power supply supports file operations on USB drives and local storage, allowing storage, recall, or deletion of system settings or timing parameters for voltage, current, overvoltage protection, and overcurrent protection. Users can utilize the device's internal memory to "Store / Retrieval" 100 state files (STATE000-099), 100 timer parameter files (TIMER000-099), or 100 battery parameter files (BATTERY000-099). Additionally, more files can be "Stored / Retrieval" using a USB drive.

Press the front panel **Store** button to open the "Store/ Retrieval" interface (as shown below).

List Manage		00:00:00			
FLASH		Select File:			
0 1 2 3 4 5 6 7		1:	9:		
8 9 A B C D E F		2:	10:		
G H I J K L M N		3:	11:		
O P Q R S T U V		4:	12:		
W X Y Z ! # \$ %		5:	13:		
& () _ @ - { }		6:	14:		
		7:	15:		
		8:	16:		
OFF	Flash USB	Save	Read	Delete	Return

When a USB drive is inserted, the status bar will display "UDISK," indicating the USB drive has been detected. For USB drive operations (storing, recalling, and deleting), users can create new folders to save 100 sets of list data or read 100 sets of data from existing folders. The read data is displayed directly in the list, and any overwritten data corresponds to existing data in the list. Operations for USB and internal Flash memory are identical. The toggle key is located at the lower left Flash USB.

Steps to create a new file: Press the Save button, then press New, followed by rotating the knob. When the green circle highlights the desired character, press the knob once to confirm that character for the filename (a total of 48 characters are available, including digits 0 to 9 (10 characters), uppercase letters (26 characters), as well as symbols such as exclamation mark, parentheses, etc.). Finally, press the Yes button to create a new file. The file will contain the 100 sets of data from the list.

Steps to overwrite files: First, use the knob to select the file to overwrite, then press the Save key, and then press WriteOver to overwrite the data in the list to the current file.

File Reading Procedure: First, use the knob to select the desired file, press the Read key, then press the Yes key. This will load 100 sets of list data from the file into the list, which can be viewed in **More/Fun** the List Run mode.

File Deletion Procedure: First, use the knob to select the file to be deleted, press the Delete key, then press the Yes key to confirm and delete the file.

Return Operation: Press the Return key on the **Store** display to return to the main interface.

Storage and Retrieval Menu Description

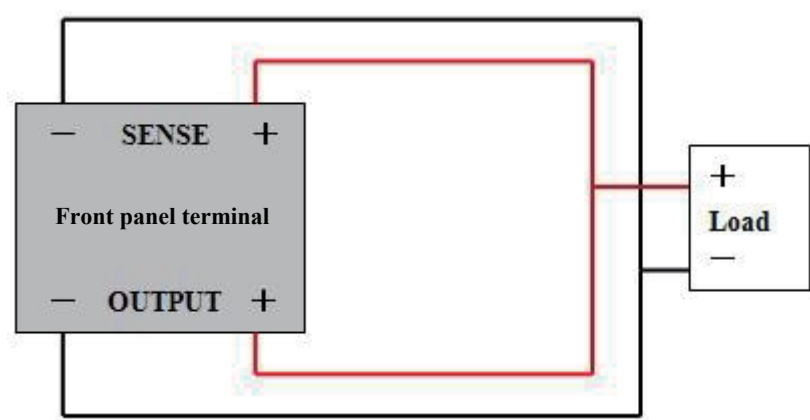
Menu	Description
Flash USB	When a USB drive is connected, pressing this key switches between the internal hard drive and the USB drive, enabling file creation, Overwrite, read, or delete operation.
Save	Save data to the selected storage location (hidden if selection is invalid).
Read	Read data from the selected storage location (hidden if selection is invalid).
Delete	Delete data from the selected storage location (hidden if selection is invalid).
Return	Return to main interface.

2.8 Remote Sensing Function

This series of power supplies can deliver high current output; therefore, the voltage drop on the load connection leads becomes non-negligible. Under high current output conditions, to ensure the load receives an accurate voltage, the instrument is designed with a Sense (Remote Sensing) operating mode. In this mode, the system automatically compensates for the voltage drop in the load leads, thereby ensuring the output value set by the user is consistent with the voltage actually delivered to the load.

Before using the Remote Sensing Function, you must first set the power supply to remote sensing mode, and the Remote Sensing Function can only be enabled when the output is turned off. Sense The sensing leads should preferably not be twisted together with the load lines.

Wiring Diagram for Power Supply Remote Sensing Measurement:



Operating Procedure:

1. Connect the output terminals on the instrument front panel and the Sense terminals on the rear panel respectively to both ends of the load as shown in the above figure. Pay attention to polarity during connection.
2. Press **Menu** → **Sense** , then rotate the knob to enable or disable the Remote Sensing Function.

Chapter 3 Remote Control

This series of power supplies supports remote control mode, providing an RS232 interface for communication with a computer, and all front panel functions can be operated via host software.

3.1 Interface Setup

3.1.1 Interface

An RS232 interface is installed on the back panel of the instrument, as shown below.



RS232 Interface

3.1.2 Communication Settings

Configure the PC's COM port according to the following settings:

- (1) Baud rate:9600
- (2) Parity:None
- (3) Data bits:8
- (4) Stop bits:1
- (5) Flow control:None

Note 1: If the power supply does not respond during remote control, please check:

- Whether the interface cable is disconnected.
- Whether the connections between the interface cable, power supply, and corresponding PC pins are correct.
- Whether the interface cable connection is secure.
- Whether the communication parameter settings of the remote control program match those in Section 3.1.2.
- Whether the command terminator of the remote control program is a newline (hexadecimal 0X0A).

Note2: When controlling the instrument via software, the **Lock** key lights up, the power supply enters remote control mode, and the control keys on the front panel are locked and can no longer be used for control. To return to local control mode, simply press **Lock** key to turn off the key light, the power supply will then revert to local control mode.

3.2 SCPI Programming Command Set

This device supports two programming protocols: SCPI and MODBUS RTU . The power supply is shipped from the factory with the SCPI protocol selected by default. Refer to section “2.5.15 ” to select the desired protocol for communication control. For detailed MODBUS and SCPI programming command sets, please refer to the programming manual.

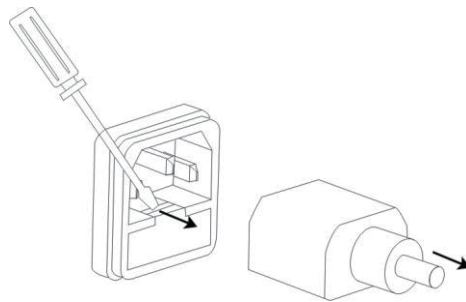
Chapter 4 Maintenance

4.1 Periodic Inspection

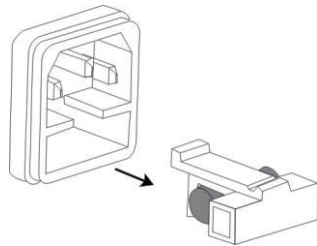
- In the process of using the product, in order to ensure that the product can achieve its best working state, please do regular inspection.
- Check whether the power supply input socket is burned out. Check whether the power output terminal is loose.

4.2 Replacement of Fuse

step : (1) Unplug the power cord and remove the fuse box with a small screwdriver.



(2) Replace fuse.



Fuse specification: T10AL/250V

Chapter 5 Product specification

When using this specification, ensure that the machine is turned on for more than 30 minutes.

Epi :

Model	30V20A	60V10A	15V60A
Rated output (0°C~40°C)			
Voltage	0~30V	0~60V	0~15V
Current	0~20A	0~10A	0~10A
Maximum Output			
Voltage	32V	64V	15.5V
Current	20.5A	10.5A	60.5A
Protection Settings			
Overvoltage protection	0~33V	0~65V	0~16V
Overcurrent protection	0~21A	0~11A	0~61A
Voltage output			
Line regulation	≤0.01%+4mV		
Load regulation	≤0.1%+5mV		
Recovery time	≤1.5ms(50% load change)		
Ripples and noise	≤5mVrms,30mVpp		
Temp coefficient	≤300ppm/°C		
Set precision	±(0.03% of reading+10mV)(25±5°C)		
Set resolution	1mV(5bits)/0.1mV(6bits)		
Current output			
Line regulation	≤0.2%+3mA		
Load regulation	≤0.2%+5mA		
Ripples and noise	≤10mArms		
Set precision	±(0.3% of reading+10mA)(25±5°C)		
Set resolution	1mA(5 bits)/0.1mA(6 bits)		
Display			
Voltage	5 digits display/6 digits display		
Current	5 digits display/6 digits display		
Voltage resolution	1mV (5 bits)/0.1mV (6 bits)		
Current resolution	1mA(5 bits)/0.1mA(6 bits)		
Accuracy of reading	±(0.02% of reading+5mV)(25±5°C); ±(0.05% of reading+10mA)(25±5°C)		
Protection	Overload protection, polarity reversal protection, overvoltage protection, overcurrent protection, overtemperature protection		
Lock function	have		
Interface	Standard RS232 interface, support SCPI and MODBUS instruction set, analog control interface (optional)		
Storage and retrieval	100 group		
Insulativity	Between output terminals and enclosure or other terminals; ≤60 VDC		
Operational environment	Indoor usage Altitude: ≤2000m Environmental temperature: 0~40°C Relative humidity: ≤80% Installation level: II Level of contamination: 2		
Storage environment	Environment temperature: -10~70°C relative humidity: ≤70%		
Input	AC220V±10%, 50Hz(or AC 110 V ± 10%, 60Hzmanual switching)		
Appendix	Power cable 1, PC software CD 1, RS232 interface cable 1		
Size	400(D)×215(W)×88(H)mm		
Weight	Approx.5.5 kg		

Table 2:

Model	30V30A	60V15A	80V11A
Rated output (0℃~40℃)			
Voltage	0~30V	0~60V	0~80V
Current	0~30A	0~15A	0~11A
Maximum Output			
Voltage	32V	64V	82V
Current	30.5A	15.5A	11.5A
Protection Settings			
Overvoltage protection	0~33V	0~65V	0~83 V
Overcurrent protection	0~31A	0~16A	0~12A
Voltage output			
Line regulation	≤0.01%+4mV		
Load regulation	≤0.1%+5mV		
Recovery time	≤1.5ms(50% load change)		
Ripples and noise	≤5mVrms,30mVpp		
Temp coefficient	≤300ppm/℃		
Set precision	±(0.03% of reading+10mV)(25±5℃)		
Set resolution	1mV(5bits)/0.1mV(6bits)		
Current output			
Line regulation	≤0.2%+3mA		
Load regulation	≤0.2%+5mA		
Ripples and noise	≤10mArms		
Set precision	±(0.3% of reading+10mA)(25±5℃)		
Set resolution	1mA(5 bits)/0.1mA(6 bits)		
Display			
Voltage	5 digits display/6 digits display		
Current	5 digits display/6 digits display		
Voltage resolution	1mV (5 bits)/0.1mV (6 bits)		
Current resolution	1mA(5 bits)/0.1mA(6 bits)		
Accuracy of reading	±(0.02% of reading+5mV)(25±5℃); ±(0.05% of reading+10mA)(25±5℃)		
Protection	Overload protection, polarity reversal protection, overvoltage protection, overcurrent protection, overtemperature protection		
Lock function	have		
Interface	Standard RS232 interface, support SCPI and MODBUS instruction set, analog control interface (optional)		
Storage and retrieval	100 group		
Insulativity	Between output terminals and enclosure or other terminals; ≤60 VDC		
Operational environment	Indoor usage Altitude: ≤2000m Environmental temperature: 0~40℃ Relative humidity: ≤80% Installation level: II Level of contamination: 2		
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