BENCHTOP INSTRUMENT

High Voltage Programmable DC Power Supply Operation Manual

V1.5

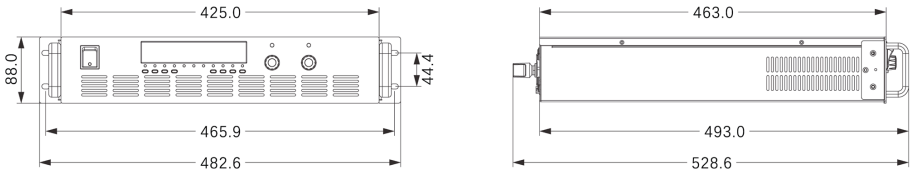
CE

R&D TECH

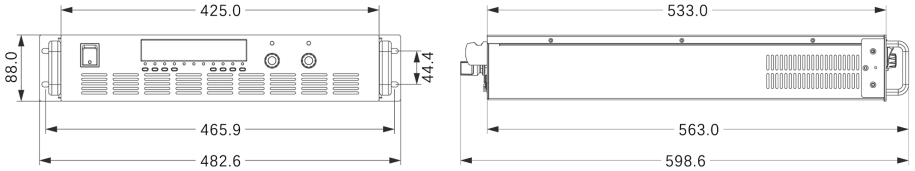
7. DIMENSIONAL DRAWING

7-1. 1/2 2U Cabinet

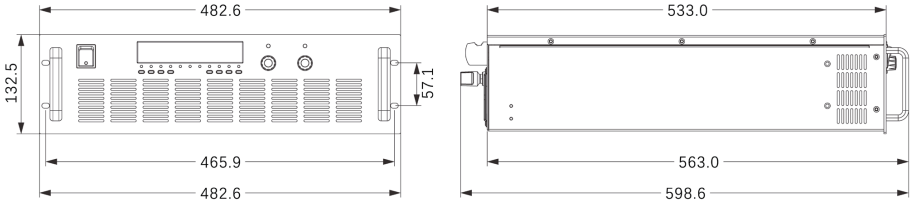
7-2. 2U Cabinet



7-3. 2U-L Cabinet



7-4. 3U Cabinet



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Use of Operation Manual

Please read through and understand this Operation Manual before operating the product. After reading, always keep the manual nearby so that you may refer to it as needed. When moving the product to another location, be sure to bring the manual as well.

Calibration Notification

We notify that the instruments included in this manual are in compliance with the features and specifications as stated in this manual. Before shipment, the instrument has been calibrated in factory. The calibration procedures and standards are compliant to the national regulations and standards for electronic calibration.

Warranty

We guarantee that the instrument has been passed strict quality check. We warrant our instrument's mainframe and accessories in materials within the warranty period of one year. We guarantee the free spare parts for products which are approved defective in this period. To get repair service, please contact with your nearest sales and service office. We do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hinted guarantee items related to tradable characteristics and any particular purpose. We will not take any responsibility in cases regarding to indirect, particular and ensuing damage, such as modifications to the circuit and functions by the users, repairing or component replacement by the users, or damage during transportation.

For product improvement, the specifications are subject to change without prior notice.

SAFETY INSTRUCTION

This chapter contains important safety instructions that you must follow when operating the instrument and when keeping it in storage. Read the following before any operation to insure your safety and to keep the best condition for the instrument.

Safety Symbols

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

	WARNING	Identifies conditions or practices that could result in injury or loss of life.
	CAUTION	Identifies conditions or practices that could result in damage to the instrument or to other properties.
	DANGER	High voltage
	ATTENTION	Refer to the manual
		Protective conductor terminal
		Earth (ground) terminal
		Chassis ground terminal

Model (8000W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
8000-10H	0~1000V	0~8000mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-10HN	-200~-1000V	0~8000mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-15H	0~1500V	0~5330mA	0~1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-15HN	-300~-1500V	0~5330mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-20H	0~2000V	0~4000mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-20HN	-400~-2000V	0~4000mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-30H	400~3000V	0~2660mA	400~3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-30HN	-600~-3000V	0~2660mA	-600~-3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-40H	550~4000V	0~2000mA	550~4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-40HN	-800~-4000V	0~2000mA	-800~-4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-50H	700~5000V	0~1600mA	700~5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-50HN	-1000~-5000V	0~1600mA	-1000~-5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-60H	800~6000V	0~1330mA	800~6300V	≤0.1% FS	1V	1mA	1V	1V	1mA
8000-60HN	-1200~-6000V	0~1330mA	-1200~-6300V	≤0.1% FS	1V	1mA	1V	1V	1mA
Dimensions	482.6Wx132.5Hx533D mm (3U)								
Weight	Approx 22kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

For the purpose of product improvement, specifications are subject to change without prior notice.

Model (6000W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
6000-10H	0~1000V	0~6000mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-10HN	-200~-1000V	0~6000mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-15H	0~1500V	0~4000mA	0~1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-15HN	-300~-1500V	0~4000mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-20H	0~2000V	0~3000mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-20HN	-400~-2000V	0~3000mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-30H	400~3000V	0~2000mA	400~3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-30HN	-600~-3000V	0~2000mA	-600~-3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-40H	550~4000V	0~1500mA	550~4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-40HN	-800~-4000V	0~1500mA	-800~-4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-50H	700~5000V	0~1200mA	700~5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-50HN	-1000~-5000V	0~1200mA	-1000~-5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-60H	800~6000V	0~1000mA	800~6300V	≤0.1% FS	1V	1mA	1V	1V	1mA
6000-60HN	-1200~-6000V	0~1000mA	-1200~-6300V	≤0.1% FS	1V	1mA	1V	1V	1mA
Dimensions	482.6Wx132.5Hx533D mm (3U)								
Weight	Approx 18kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

Safety Guidelines

General Instruction CAUTION	● Do not place heavy objects on the casing. ● Avoid serious impact or improper handling to prevent damage to the instrument. ● Preventive measures for releasing static electricity should be taken when connecting the instrument. ● Do not block the air ventilation holes on the two sides and on the back of the chassis. ● Do not disassemble the instrument unless you are professionals.
Power supply WARNING	AC Input voltage: 220V/380V±10%, 50/60Hz Connect the protective grounding conductor of the AC power cord to an earth ground to avoid electrical shock.
Fuse WARNING	● Make sure the correct type of fuse is installed before power up. ● Replace the AC fuse with the same type and rating as the original fuse. ● Disconnect the power cord before fuse replacement. Make sure the cause of fuse blowout is fixed before fuse replacement.
Cleaning	● Disconnect the power cord before cleaning. ● Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid. ● Do not use chemicals or cleaner containing harsh material such as benzene, toluene, xylene, and acetone.
Operation environment	● Location: indoor, no direct sunlight, dust free, almost non-conductive pollution (note below). ● Relative humidity: 10%~80% ● Altitude: <2000m ● Temperature: 0°C ~ 40°C
Storage environment	● Location: indoor ● Relative humidity: 10%~90% ● Temperature: -20°C ~ 70°C

1. QUICK START

1-1. Product Description

The PCH series are high power output Switching DC power supply with rated power of 600W to 8KW. The PCH series adopts ZVZCS PWM technology, which greatly reduces switching consumption and therefore facilitates switching function with high efficiency and high stability.

The PCH series are built into a 2U 19-inch standard chassis. The maximum rated voltage is from +1000V to +12KV. There is option for negative output from -1000V to -12KV. RS232 and RS485 communication interfaces are made as standard part for PCH series, providing multiple communication choices for digital control.

1-2. Features

- Adopting ZVZCS PWM technology, high efficiency and high stability
- 4 digits LED display for voltage and current
- Constant voltage and constant current operations
- Auto CV/CC switch
- Low ripple, high stability
- No overshoot during output ON
- List mode function, Auto Run function
- Panel lock and output ON/OFF function
- Preset function, setting of voltage and current with output open circuit
- Thermostatic control fan, low noise
- Over voltage, over temperature, under voltage and current limit protections
- Built into 19-inch standard chassis, easy use in cabinet installation and auto test system integration
- Thermostatic control fan, low noise
- Multiple programming interfaces: RS232, RS485
- Support ModBus-RTU commands

1-3. Protections

Over Voltage Protection (O.V.P.): Adjustable OVP protection with limit of 105% rated output voltage. The output will be shut down when OVP is activated.

Over Current Protection (O.C.P.): Current limit.

Over Temperature Protection (O.T.P.): Built-in OTP protection with heat sink temperature limit of 50°C±5%.The output will be shut down when OTP is activated.

Under Voltage Protection (U.V.P.): Built-in UVP protection with limit of 165Vac.The output will be shut down the UVP is activated.

Model (5000W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
5000-10H	0~1000V	0~5000mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-10HN	-200~-1000V	0~5000mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-15H	0~1500V	0~3300mA	0~1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-15HN	-300~-1500V	0~3300mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-20H	0~2000V	0~2500mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-20HN	-400~-2000V	0~2500mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-30H	400~3000V	0~1600mA	400~3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-30HN	-600~-3000V	0~1600mA	-600~-3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-40H	550~4000V	0~1250mA	550~4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-40HN	-800~-4000V	0~1250mA	-800~-4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-50H	700~5000V	0~1000mA	700~5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-50HN	-1000~-5000V	0~1000mA	-1000~-5250V	≤0.1% FS	1V	1mA	1V	1V	1mA
5000-60H	800~6000V	0~830mA	800~6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
5000-60HN	-1200~-6000V	0~830mA	-1200~-6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	482.6Wx88Hx533D mm (2U-L)								
Weight	Approx 14kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

Model (4000W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
4000-10H	0~1000V	0~4000mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-10HN	-200~-1000V	0~4000mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-12H	0~1200V	0~3300mA	0~1260V	≤0.1%FS	1V	1mA	1V	1V	1mA
4000-12HN	-240~-1200V	0~3300mA	-240~-1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-15H	0~1500V	0~2600mA	0~1575V	≤0.1%FS	1V	1mA	1V	1V	1mA
4000-15HN	-300~-1500V	0~2600mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-20H	0~2000V	0~2000mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-20HN	-400~-2000V	0~2000mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-30H	400~3000V	0~1300mA	400~3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-30HN	-600~-3000V	0~1300mA	-600~-3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-40H	550~4000V	0~1000mA	550~4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-40HN	-800~-4000V	0~1000mA	-800~-4200V	≤0.1% FS	1V	1mA	1V	1V	1mA
4000-50H	700~5000V	0~800mA	700~5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-50HN	-1000~-5000V	0~800mA	-1000~-5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-60H	800~6000V	0~660mA	800~6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-60HN	-1200~-6000V	0~660mA	-1200~-6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-80H	1000~8000V	0~500mA	1000~8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-80HN	-1600~-8000V	0~500mA	-1600~-8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-100H	1200~10000V	0~400mA	1200~10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
4000-100HN	-2000~-10000V	0~400mA	-2000~-10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	482.6Wx88Hx533D mm (2U-L)								
Weight	Approx 14kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

1-4. Knowledge about CC and CV Mode

The DC power supply is to supply voltage and current in constant voltage (CV) or constant current (CC) mode within the rated output range. The working characteristics of these series Power Supplies is called a constant voltage/constant current automatic cross-over type. This permits continuous transition from constant current to constant voltage modes in response to the load change. The intersection of constant voltage and constant current modes is called the crossover point. Fig. 1-1 shows the relationship between this crossover point and the load.

In CV mode, a regulated output voltage is provided. The output voltage remains constant as the load increases while the output current changes in response to the load changes, up till the present current limit point is reached. At that point, the output current becomes constant and the output voltage drops in proportion to the further increases in load. The pint is indicated by the front panel LED indicators. The crossover point is reached when the CV indicator goes off and the CC indicator comes on.

Similarly, in CC mode, crossover from the CC to CV mode automatically occurs from a decrease in the load. A regulated output current is provided. The output current remains constant as the load decreases while the output voltage changes in response to the load changes.

A power supply with CV and CC operation mode can be operated in only one mode according to load situation. The output characteristics are shown as Fig. 1-1. According to Fig.1-1, the power supply is in CV mode when the actual load is over the preset load capacity; and the power supply is in CC mode when the actual load is below the preset load capacity.

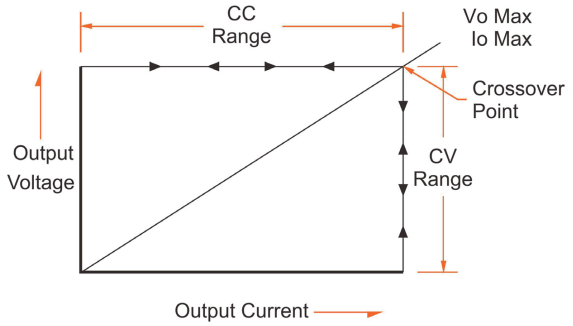
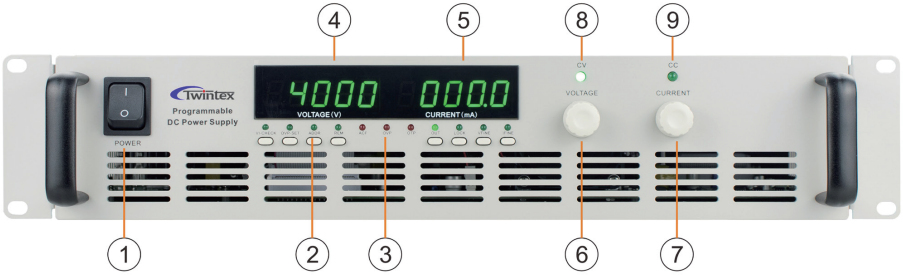


Fig.2-1

Set Vs = preset voltage, Is = preset current value, hence preset load capacity Rs – Vs/Is
If we have an actual load capacity RL=Vo/Io, when RL>Rs, the power supply is in CV operation mode. When RL<Rs, the power supply is in CC operation mode.

2. PANEL CONTROLS AND INDICATORS

2-1. Front Panel Illustration

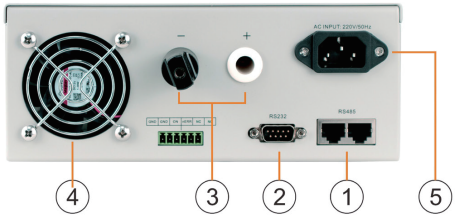


No.	Name	Description
1	Power switch	ON/OFF the power input.
2	Function buttons: There are 8 function buttons. The words above each button represent their functions.	
	VI-CHECK	Press it to display the preset voltage and current limits. Use voltage and current knobs to set voltage and current limits.
	OVP-SET	Press it to enter OVP setting mode. Use voltage knob to set OVP value.
	ADDR	Press it to enter remote address setting mode.
	REM	Press it to switch between remote control mode and local control mode.
	OUT	Press it to turn on/off the output.
	VFINE	Press it to switch between voltage fine adjustment and coarse adjustment.
	IFINE	Press it to switch between current fine adjustment and coarse adjustment.
3	Indicators: There are 11 LED indicators. Each indicates one operation mode. The words beneath each indicator represent their operation modes. When an indicator lights on, the power supply is operated in this mode.	
	VI-CHECK	Indicates preset mode.
	OVP-SET	Indicates OVP setting mode.
	ADDR	Indicates remote address setting mode.
	REM	Indicates remote control mode.
	ACF	Indicates AC input fault protection mode when the input voltage is too low or too high.
	OVP	Indicates over voltage protection mode.
	OTP	Indicates over temperature protection mode.
	OUT	Indicates output ON.
	LOCK	Indicates buttons and knobs are disabled or locked.
	VFINE	Indicates voltage fine adjustment mode.
	IFINE	Indicates current fine adjustment mode.
4	Voltage display	Displays voltage value.
5	Current display	Displays current value.
6	Voltage knob	For voltage adjustment.
7	Current knob	For current adjustment.
8	CV indicator	Indicates constant voltage mode.
9	CC indicator	Indicates constant current mode.

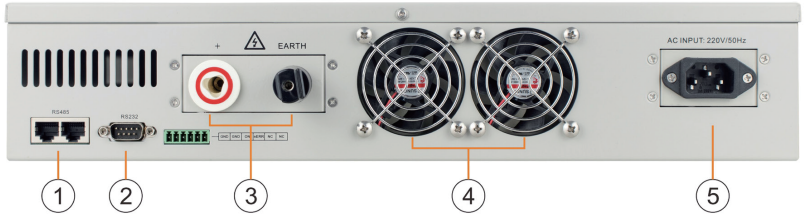
Model (3000W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
3000-10H	0~1000V	0~3000mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-10HN	-200~-1000V	0~3000mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-12H	0~1200V	0~2500mA	0~1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-12HN	-240~-1200V	0~2500mA	-240~-1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-15H	0~1500V	0~2000mA	0~1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-15HN	-300~-1500V	0~2000mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-20H	0~2000V	0~1500mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-20HN	-400~-2000V	0~1500mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-30H	200~3000V	0~1000mA	200~3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-30HN	-600~-3000V	0~1000mA	-600~-3150V	≤0.1% FS	1V	1mA	1V	1V	1mA
3000-40H	200~4000V	0~750mA	200~4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-40HN	-800~-4000V	0~750mA	-800~-4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-50H	300~5000V	0~600mA	300~5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-50HN	-1000~-5000V	0~600mA	-1000~-5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-60H	400~6000V	0~500mA	400~6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-60HN	-1200~-6000V	0~500mA	-1200~-6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-80H	500~8000V	0~375mA	500~8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-80HN	-1600~-8000V	0~375mA	-1600~-8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-100H	800~10000V	0~300mA	800~10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-100HN	-2000~-10000V	0~300mA	-2000~-10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-120H	1000~12000V	0~250mA	1000~12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
3000-120HN	-2400~-12000V	0~250mA	-2400~-12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	482.6Wx88Hx533D mm (2U-L)								
Weight	Approx 13kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

Model (2400W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
2400-60H	400~6000V	0~400mA	400~6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-60HN	-1200~-6000V	0~400mA	-1200~-6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-80H	500~8000V	0~300mA	500~8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-80HN	-1600~-8000V	0~300mA	-1600~-8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-100H	800~10000V	0~240mA	800~10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-100HN	-2000~-10000V	0~240mA	-2000~-10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-120H	1000~12000V	0~200mA	1000~12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-120HN	-2400~-12000V	0~200mA	-2400~-12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	482.6Wx88Hx533D mm (2U-L)								
Weight	Approx 13kg								
AC Input	3φ4W, 380V±10% 47~63Hz								

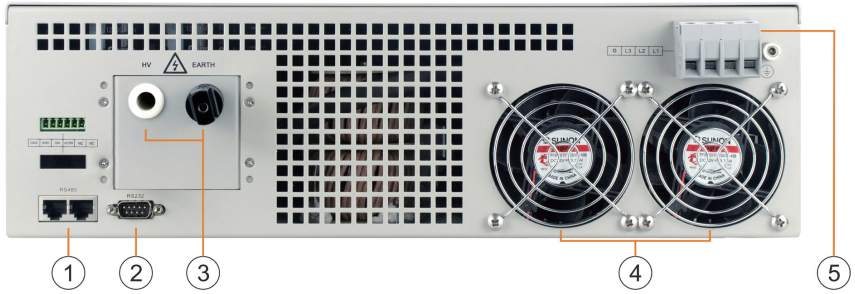
2-2. Rear Panel Illustration



Rear Panel (1/2 2U)



Rear Panel (2U)



Rear Panel (3U)

1. RS485 interface
2.RS232 interface
3. Output terminal
4. Cooling fan
5. Power socket

3. PREPARATION BEFORE USE

3-1. Check Packing List

On receiving the power supply, please check if anything is missing from the packing list. If any, please contact your supplier immediately.

a) Power supply unit x1
b) Power cord x1
c) Operation manual x1
d) RS232 cable x1
e) High voltage output cable x1

3-2. Installation

1. When the power supply is working, heat will be generated. The power supply should be placed in a well-ventilated environment, and avoid places with high heat dissipation, high humidity and dust. Please arrange appropriate installation space according to the size of the power supply.
2. The front and back of the power supply should have good ventilation conditions, and avoid overlapping with other products. The distance between the back of the power supply and other objects should not be less than 500mm.
3. When the power supply is working, it will generate a magnetic field to affect the surrounding environment. To avoid the impact, please install those equipments which are sensitive to the influence of the magnetic field in an unaffected location.

3-3. Connection

1. Make sure that the AC input voltage matches the input voltage of the power supply.
2. Make sure that the AC input power switch and the power switch of the power supply are in the OFF state.
3. According to the rated power of the power supply, select appropriate input cable to correctly connect the input of this power supply to the AC input, and carefully check to ensure that the connection is correct.
4. To ensure safety, when selecting the output cable connected to the load, the safe current must be considered to prevent fire caused by overheating caused by the short circuit of the load. At the same time, using an output cable with a larger wire diameter can obtain a better adjustment rate on the load. So when selecting the wire diameter of the output cable, please select appropriate wire diameter that meets the requirements between the output of the power supply and the load according to the rated power of the power supply.
5. Make the correct connection.

3-4. Check Power Supply Status

Turn on the **POWER** switch, the power supply will enter operating mode. The cooling fan starts to run, the LED display lights on, the buttons and rotary knobs on front panel react to their operation. The power supply unit shall remain intact.

Model (2400W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
2400-10H	0~1000V	0~2400mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-10HN	-200~-1000V	0~2400mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-12H	0~1200V	0~2000mA	0~1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-12HN	-240~-1200V	0~2000mA	-240~-1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-15H	0~1500V	0~1600mA	0~1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-15HN	-300~-1500V	0~1600mA	-300~-1575V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-20H	0~2000V	0~1200mA	0~2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-20HN	-400~-2000V	0~1200mA	-400~-2100V	≤0.1% FS	1V	1mA	1V	1V	1mA
2400-30H	200~3000V	0~800mA	200~3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-30HN	-600~-3000V	0~800mA	-600~-3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-40H	200~4000V	0~600mA	200~4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-40HN	-800~-4000V	0~600mA	-800~-4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-50H	300~5000V	0~480mA	300~5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
2400-50HN	-1000~-5000V	0~480mA	-1000~-5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	425Wx88Hx463D mm (2U)								
Weight	Approx 12kg								
AC Input	1φ3W, 220V±10% 47~63Hz								

Model (1200W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
1200-10H	0~1000V	0~1200mA	0~1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
1200-10HN	-200~-1000V	0~1200mA	-200~-1050V	≤0.1% FS	1V	1mA	1V	1V	1mA
1200-12H	0~1200V	0~1000mA	0~1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
1200-12HN	-240~-1200V	0~1000mA	-240~-1260V	≤0.1% FS	1V	1mA	1V	1V	1mA
1200-15H	0~1500V	0~800mA	0~1575V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-15HN	-300~-1500V	0~800mA	-300~-1575V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-20H	0~2000V	0~600mA	0~2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-20HN	-400~-2000V	0~600mA	-400~-2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-30H	200~3000V	0~400mA	200~3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-30HN	-600~-3000V	0~400mA	-600~-3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-40H	200~4000V	0~300mA	200~4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-40HN	-800~-4000V	0~300mA	-800~-4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-50H	300~5000V	0~240mA	300~5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-50HN	-1000~-5000V	0~240mA	-1000~-5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-60H	400~6000V	0~200mA	400~6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-60HN	-1200~-6000V	0~200mA	-1200~-6300V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-80H	500~8000V	0~150mA	500~8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-80HN	-1600~-8000V	0~150mA	-1600~-8400V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-100H	800~10000V	0~120mA	800~10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-100HN	-2000~-10000V	0~120mA	-2000~-10500V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-120H	1000~12000V	0~100mA	1000~12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
1200-120HN	-2400~-12000V	0~100mA	-2400~-12600V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	425Wx88Hx463D mm (2U)								
Weight	Approx 12kg								
AC Input	1φ3W, 220V±10% 47~63Hz								

3-5. Check Output

The following steps are to check and ensure that the power supply can make maximum rated output and response to front panel operations correctly.

➔ **Check Output Voltage**

The following steps are to verify basic voltage functions under empty load.

a) Turn on the **POWER** switch, CV and OUT indicators light on. Other indicators do not light.
b) Press **OVP-SET** button to display preset OVP value. Adjust **VOLTAGE** knob to set OVP value to the maximum. Press **OVP-SET** button again to return to output voltage and current display.
c) Adjust **VOLTAGE** knob to set output voltage to the maximum. Current display shall be 0A at this moment.

➔ **Check Output Power**

The following steps are to verify basic current functions under load.

a) Turn on the **POWER** switch, CV and OUT indicators light on. Other indicators do not light.
b) Press **VI-CHECK** button to display the preset current limit. Adjust **CURRENT** knob to set the current limit to the rated value. Press **VI-CHECK** button again to return to output voltage and current display.
c) Press **VOLTAGE** knob to set output voltage to the rated value.
d) Adjust load to set output current to the rated value. Check if the output power is in compliance with output voltage and current.

➔ **Check Short Circuit**

a) Use a suitable short circuit connecting cable to connect the positive and negative output terminals. Make sure of good contact.
b) Press **POWER** switch to turn on the power. Adjust **VOLTAGE** know to set the power supply to CC mode. The CC indicator lights on. The power supply enters short circuit protection mode.
c) Press **OUT** button to turn off the output. Adjust **VOLTAGE** knob to set output voltage at any value.
d) Press **OUT** button to turn on the output. Check if the power supply enters short circuit protection mode.
e) Press **POWER** switch to turn off the power. Take off the short circuit connecting cable.
f) Press **POWER** switch again to turn on the power again. Check if the power supply works properly.

3-6. How to Check if the Power Supply cannot Start up Properly

If the power supply cannot start up properly, please follow below instructions.

a) Check if the power cord is in good connection. Check if the AC input is proper. Check if the power switch is ON.
b) Check if the OUT indicator is ON.
c) Check if the ACF, OTP or OVP indicator lights on.
d) Press **VI-CHECK** button to check the preset voltage and current limits. If the preset voltage or current limit is set to zero, adjust the **VOLTAGE** or **CURRENT** knob to set voltage or current limit to the desired value. Press **VI-CHECK** button again to return to output voltage and current display.
e) Press **OVP-SET** button to check OVP value. If the OVP value is set to zero, adjust VOLTAGE knob to set OVP value to the desired value. Press **OVP-SET** button again to return to output voltage and current display.

4. OPERATION INSTRUCTIONS

Section 1 QUICK START has made simple description on installation and operation of the power supply. This section will give detailed operation instructions.

4-1. Front Panel Function

Before operation, you need to know functions of front panel and meanings of indicators.
After turning on the **POWER** switch, the power supply enters standby mode. In local operation, all buttons and knobs are enabled.

The power supply can be switched between local operation and remote operation via PC control or front panel control. In remote control mode, the REM indicator lights on, and only **REM** button is enabled while all other buttons and knobs are disabled.

The **OUT** button can turn on or off the output. When output is on, the OUT indicator lights on. When output is off, the OUT indicator lights off.

Descriptions on operations of front panel buttons and knobs:

No.	Button/Knob	Status	Description
1	VI-CHECK	Press in	Set voltage and current preset value.
2	OVP-SET	Press in	Set OVP value.
3	ADDR	Press in	Set communication address.
4	REM	Press in	Switch between remote control mode and local control mode.
5	OUT	Press in	Turn the output on or off.
6	LOCK	Press in	Lock or unlock front panel.
7	VFINE	Press in	Switch between voltage fine adjustment and coarse adjustment.
8	IFINE	Press in	Switch between current fine adjustment and coarse adjustment.
9	VOLTAGE	Turn	Turn to increase or decrease output voltage value, OVP value, or address.
10	CURRENT	Turn	Turn to increase or decrease current value.

Indicators on front panel indicates operation mode or error signal of the power supply.

No.	Indicator	Status	Description
1	VI-CHECK	On	Voltage and current limits setting mode.
2	OVP-SET	On	OVP setting mode.
3	ADDR	On	Communication setting mode.
4	REM	On	Remote control mode.
5	ACF	On	AC power input fault protection mode.
6	OVP	On	Over voltage protection mode.
7	OTP	On	Over temperature protection mode.
8	OUT	On	Output is on.
9	LOCK	On	Front panel is locked. All buttons and knobs are disabled except LOCK button.
10	VFINE	On	Fine adjustment mode for output voltage and OVP values.
11	IFINE	On	Fine adjustment mode for output current value.
12	CV	On	Constant voltage operation mode.
13	CC	On	Constant current operation mode.

Model (600W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
600-10H	0~1000V	0~600mA	0~1050V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-10HN	-200~-1000V	0~600mA	-200~-1050V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-12H	0~1200V	0~500mA	0~1260V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-12HN	-240~-1200V	0~500mA	-240~-1260V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-15H	0~1500V	0~400mA	0~1575V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-15HN	-300~-1500V	0~400mA	-300~-1575V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-20H	0~2000V	0~300mA	0~2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-20HN	-400~-2000V	0~300mA	-400~-2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-30H	200~3000V	0~200mA	200~3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-30HN	-600~-3000V	0~200mA	-600~-3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-40H	200~4000V	0~150mA	200~4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-40HN	-800~-4000V	0~150mA	-800~-4200V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-50H	300~5000V	0~120mA	300~5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-50HN	-1000~-5000V	0~120mA	-1000~-5250V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-60H	400~6000V	0~100mA	400~6300V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-60HN	-1200~-6000V	0~100mA	-1200~-6300V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-80H	500~8000V	0~75mA	500~8400V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-80HN	-1600~-8000V	0~75mA	-1600~-8400V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-100H	800~10000V	0~60mA	800~10500V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-100HN	-2000~-10000V	0~60mA	-2000~-10500V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-120H	1000~12000V	0~50mA	1000~12600V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
600-120HN	-2400~-12000V	0~50mA	-2400~-12600V	≤0.1% FS	1V	0.01mA	1V	1V	0.01mA
Dimensions	425Wx88Hx463D mm (2U)								
Weight	Approx 12kg								
AC Input	1φ3W, 220V±10% 47~63Hz								

6-2. Model List

Model (600W)	Rated Output			Voltage Ripple	Programming Resolution			Display Resolution	
	V	A	OVP		V	A	OVP	V	A
600-10HS	0~1000V	0~600mA	0~1050V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-10HSN	-200~-1000V	0~600mA	-200~-1050V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-12HS	0~1200V	0~500mA	0~1260V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-12HSN	-240~-1200V	0~500mA	-240~-1260V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-15HS	0~1500V	0~400mA	0~1575V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-15HSN	-300~-1500V	0~400mA	-300~-1575V	≤0.05% FS	1V	0.1mA	1V	1V	0.1mA
600-20HS	0~2000V	0~300mA	0~2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-20HSN	-400~-2000V	0~300mA	-400~-2100V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-30HS	200~3000V	0~200mA	200~3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
600-30HSN	-600~-3000V	0~200mA	-600~-3150V	≤0.1% FS	1V	0.1mA	1V	1V	0.1mA
Dimensions	212.5Wx88Hx340D mm (1/2 2U)								
Weight	Approx 5kg								
AC Input	1φ3W, 220V±10% 47~63Hz								

4-2. Front Panel Operation

4-2.1. How to Use Buttons

VI-CHECK

Press the **POWER** switch to turn on the power supply. The power supply enters standby mode. Press **VI-CHECK** button to display the preset voltage and current limits. Use **CURRENT** knob to adjust the set current limit to the desired value. Press **VI-CHECK** button again to return to output voltage and current display. During operation, if the actual output current exceeds preset current limit, the power supply enters CC mode. Setting an appropriate current limit value can protect connecting equipments from damages by over current.

OVP-SET

Press the **POWER** switch to turn on the power supply. The power supply enters standby mode. Press OVP-SET to display the present OVP value. Use **VOLTAGE** knob to adjust the set current limit to the desired value. Press **OVP-SET** button again to return to output voltage and current display. When the actual output voltage exceeds OVP value, the OVP circuit will be activated and the output will be shut down immediately.

ADDR

Press the **POWER** switch to turn on the power supply. The power supply enters standby mode. Press **ADDR** button to display the present address. Use **VOLTAGE** knob to set the communication address to the desired value. Press **ADDR** button again to return to output voltage and current display.

REM

Use **REM** button to switch between remote control and local control. In remote control mode, only REM button is enabled, which can switch the power supply to local control (front panel control). All other buttons and knobs are disabled. In local control mode, all buttons and knobs are enabled.

OUT

During operation of the power supply, use **OUT** button to turn off the output. The OUT indicator lights off. Press **OUT** button again to recover the output. The OUT indicator lights on again.

When using the **VOLTAGE** knob to adjust output voltage, the **VOLTAGE** knob inadvertently generates an overshoot that causes the actual output voltage to exceed the preset voltage limit. Then OVP is activated and OVP indicator lights on. Turn the **VOLTAGE** knob anti-clockwise to half a circle, and then press **OUT** button. The output will recover. If the output still dose not recovers, turn the **VOLTAGE** knob anti-clockwise a little more.

LOCK

Use **LOCK** button to lock or unlock front panel. In front panel operation (local control), the LOCK indicator is always off. All buttons and knobs on front panel are enabled. Press **LOCK** button to lock the front panel. The LOCK indicator lights on. Except **LOCK** button, all other buttons and knobs are disabled. Press **LOCK** button again and the LOCK indicator lights off. The front panel is unlocked.

VFINE

Use **VFINE** button to switch between coarse and fine adjustment during setting voltage limit or maximum voltage. The VFINE indicator is always off, meaning that the **VOLTAGE** knob is in coarse adjustment. Press **VFINE** button and the VFINE indicator lights on. The **VOLTAGE** knob is in fine adjustment.

IFINE

Use **IFINE** button to switch between coarse and fine adjustment during setting current limit. The IFINE indicator is always off, meaning that the **CURRENT** knob is in coarse adjustment. Press **IFINE** button and the IFINE indicator lights on. The **CURRENT** knob is in fine adjustment.

4-2.2. How to Use Knobs

Voltage knob

In display of output voltage and current, use **VOLTAGE** knob to set output voltage. Turn the knob clockwise to increase voltage, or anti-clockwise to decrease it. Output voltage can be set at any value between 0V to rated output voltage.

In OVP preset mode, use **VOLTAGE** knob to set the OVP value. Turn the knob clockwise to increase OVP value, or anti-clockwise to decrease it. The OVP value can be set at any value between 0V to rated output voltage.

Current knob

In display of output voltage and current, use **CURRENT** knob to set the current limit. Turn the knob clockwise to increase current limit or anti-clockwise to decrease it. The current limit can be set at any value between 0A to rated output current.

4-2.3. Example of Operation

Example: model number PCL1200-60

This model has rated power 1200W, rated voltage 60V and rated current 20A.

Operation steps:

1) Connect the power supply to local power grid.
2) Press POWER switch to turn on the power. The LED display shows 00.00V and 00.00A. The CV indicator light on. Other indicators remain off. It means that the power supply starts up properly.
3) Set OVP value
4) Press V-I CHECK to set output voltage to the desired value and current limit according to actual needs.
5) Press OUT to enable the output.

WARNING DO NOT forcefully press any button or knob on the front panel.

6. SPECIFICATIONS

6-1. Technical Specifications

Output		
Rated Voltage		Full range adjustable
Rated Current		Full range adjustable
OVP Range		Up to 105% of rated voltage adjustable
Line Regulation		CV≤0.5%+2LSB, CC≤0.5%+2LSB
Load Regulation		CV≤0.1%+2LSB, CC≤0.1%+2LSB
Ripple & Noise		≤0.05% FS, ≤0.1% FS
Programming		
Programming Resolution	Voltage	1V
	Current	0.1mA/ 1mA
	OVP	1V
Interface		RS232 and RS485
Commands		ModBus-RTU
Display		
Meter		4 1/2 digits LED display for voltage and current
Display Resolution	Voltage	1V
	Current	0.1mA/ 1mA
Display Accuracy	Voltage	≤0.2%FS+2LSB
	Current	≤0.5%FS+2LSB
Protection		
Over Voltage Protection (O.V.P.)		Built-in OVP protection with limit of 105% rated output voltage. The output will be shut down when OVP is activated.
Over Temperature Protection (O.T.P.)		Built-in OTP protection with heat sink temperature limit of 50°C±5%. The output will be shut down when OTP is activated.
Under Voltage Protection (U.V.P.)		Built-in UVP protection with limit of 165Vac. The output will be shut down when UVP is activated.
General		
Cooling method		Cooling fan
Operating environment		0°C~40°C, 10%~80%RH
Storage environment		-20°C~70°C, 10%~90%RH

5-9. Frequently Used Functions

Setting remote control:

Operation	Coil Name	Value	Description
Write Single Coil	PC	1	Required

Cancelling remote control:

Operation	Coil Name	Value	Description
Write Single Coil	PC	0	Required

Voltage setup:

Operation	Register Name	Value	Description
Write Register	VSET	double	Optional
Write Register	CMD	1	Required

Current setup:

Operation	Register Name	Value	Description
Write Register	ISET	double	Optional
Write Register	CMD	2	Required

Voltage soft start setup:

Operation	Register Name	Value	Description
Write Register	VSET	double	Optional
Write Register	TMCVS	double	Optional
Write Register	CMD	3	Required

Baudrate setup:

Operation	Register Name	Value	Description
Write Register	BAUDRATE	u16	Optional
Write Register	CMD	5	Required

Enable output:

Operation	Register Name	Value	Description
Write Register	CMD	6	Required

Disable output:

Operation	Register Name	Value	Description
Write Register	CMD	7	Required

5. REMOTE CONTROL

The power supply is equipped with RS232 and RS485 interfaces, supporting Modbus-RTU protocol. There is PC software to facilitate remote control by PC.

5-1. Introduction to Communication Interface

The following table lists out connection method and performance of each communication interface.

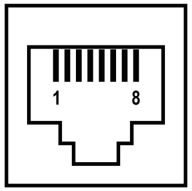
Interface	Connection Method	Communication Mode	Communication Distance	Multi-unit Communication
RS232	RS232 cable	Full duplex	Short	NO
	USB-to-RS232 cable + RS232 cable	Full duplex	Short	NO
RS485	RS485 cable (RJ45 connector)	Half duplex	Long	YES
	USB-to-RS485 cable + RS485 cable (RJ45 connector)	Half duplex	Long	YES

5-2. Interface Definition

5-2.1. Interface Definition of RS485

Pin out of the RS485 interface is given as below.

Connector illustration:



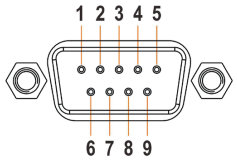
Pin out definition:

Pin	RS485 Pin out definition
1	GND
2	GND
3	A(D+)
4	B(D-)
5	NC
6	NC
7	NC
8	NC

5-2.2. Interface Definition of RS232

Pin out of the RS232 interface is given as below.

Connector illustration:



Pin out definition:

Pin	Pin out definition	Pin out function
1	NC	Blank
2	TXD	Send power supply data
3	RXD	Receive PC command
4	NC	Blank
5	GND	Ground
6	NC	Blank
7	NC	Blank
8	NC	Blank
9	NC	Blank

5-3. Data

The command frame consists of four parts: address, function code, data, and error check.
To ensure reliability during communication, time interval between each frame shall be more than 3.5 times of single byte character transmission time. For example, baud rate as 9600, time interval between each frame shall be more than 11*3.5/9600=0.004s.

The power supply uses Bidirectional asynchronous communication, fixed with 1 start bit, 8 data bits and 1 stop bit. It supports four baud rates: 9600, 19200, 38400 and 57600.

Data length is fixed in some frames, but also not in some other frames. According to Modbus protocols, data of hexadecimal number and floating point value shall be low byte follows high byte, and data of output value must be 0x0000 or 0xFF00 when writing coil. 0x0000 means position 0. 0xFF00 means position 1.

5-4. Function Code

A function code is single byte hexadecimal number. Following four functions are available.

Function code	Description
0x01	Read coil status, read data addressing by bit.
0x05	Write single coil, write data addressing by bit.
0x03	Read holding register(s), read data addressing by byte.
0x10	Write register(s), write data addressing by byte.

5-5. Error Check

The power supply uses Cyclic Redundancy Check (CRC). The CRC result is in single byte, high byte following low byte. The CRC result is generated in below way.

a) Set a 16-bit CRC register, with initial value as 0xFFFF.
b) Set the 1st bit (address) in the data frame in bitwise XOR with 8 low bytes of CRC, and then save into CRC register.
c) Move the CRC register to the right by 1 bit. Check if the moved out lowest order is 1 or not. If it is 1, set the CRC register in XOR with fixed number 0xA001.
d) Repeat step c for 8 times.
e) Repeat steps b, c and d from the next byte of the data frame, until the last data frame in the data field.
f) The rest contents in the CRC register are the final checking value. Add the checking value to the last data in the data frame, 8 high bytes following 8 low bytes.

If data checking error happens during receiving data, the power supply returns ID + error code + checking code.

5-7. Coil and Register Address Assignments

Coil Definition:

Name	Address	Bit	Attribute	Description
PC	0x0500	1	W/R	Remote control status. Bit 1: front panel control is disabled.
ACF	0x0510	1	R	AC input fault. Byte 1: ACF fault protection mode is on.
OTP	0x0511	1	R	Bit 1: OTP mode is activated.
OVP	0x0512	1	R	Bit 1: OVP mode is activated.
OFF	0x0513	1	R	Bit 1: Output is OFF
CC	0x0514	1	R	Bit 1: CC mode Bit 0: CV mode

Register Definition:

Name	Address	Byte	Attribute	Description
CMD	0x0A00	1	W/R	Command register: 8 low bytes valid, 8 high bytes invalid.
VMAX	0x0A01	2	W/R	Max. voltage register, double type
IMAX	0x0A03	2	W/R	Max. current register, double type
VSET	0x0A05	2	W/R	Setting voltage register, double type
ISET	0x0A07	2	W/R	Setting current register, double type
TMCVS	0x0A09	2	W/R	Voltage initiated timer setting register , double type
BAUDRATE	0x0A1b	1	W/R	Baud rate setting register, u16 type 1=9600, 2=19200, 3=38400, 4=57600 The new baud rate is valid after rebooting the power supply.
VS	0x0B00	2	R	Voltage register, double type
IS	0x0B02	2	R	Current register, double type
MODEL	0x0B04	1	R	Model number register, u16 type
EDITION	0x0B05	1	R	Firmware version register, u16 type

5-8. CMD Register Definition

Definition	CMD value	Description
Voltage setting	1	To make the setting voltage effective
Current setting	2	To make the setting current effective
Voltage soft start setting	3	To make the setting voltage rises up slowly.
Baudrate setting	5	To make the setting baudrate effective
Turn output ON	6	To enable the output.
Turn output OFF	7	To disable the output.

Write Register

Request frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x10
Start address	2	0~0xFFFF
Register number	2	n=1-32
Byte number	1	2*n
Register value	2*n	
Check code	2	
Reply frame	**Data length**	**Value**
Address	1	1-64
Function code	1	0x010
Start address	2	0~0xFFFF
Register number	2	n
Check code	2	
Exception frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x90
Exception code	1	1~8
Check code	2	

Example:

The power supply's communication address: 1

To set output voltage at 10V, register address of VSET is 0x0A05, and byte of VSET is 2 (double type register)

Send request: 01 10 0A 05 00 02 04 41 20 00 00 58 C6

Normal reply: 01 10 0A 05 00 02 52 11

HEX 41200000=Floating point value 10, hence the voltage is set 10V

5-6. Complete Command Frame

Read Coil Status

Request frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x01
Start address	2	0~0xFFFF
Coil number	2	1-16
Check code	2	
Reply frame	**Data length**	**Value**
Address	1	1-64
Function code	1	0x01
Byte number	1	1-2
Coil status	n	
Check code	2	
Exception frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x81
Exception code	1	1~8
Check code	2	

Example:

The power supply's communication address: 1

To read the power supply's remote control status, coil address of PC is 0x0500

Send request: 01 01 05 00 00 01 FD 06

Sample reply: 01 01 01 FF 11 C8

FF is read back data. The lowest bit is 1, hence the remote control status is ON

Write Single Coil

Request frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x05
Start address	2	0~0xFFFF
Output value	2	0x0000 or 0xFF00
Check code	2	
Reply frame	**Data length**	**Value**
Address	1	1-64
Function code	1	0x01
Start address	2	0~0xFFFF
Output value	2	0x0000 or 0xFF00
Check code	2	
Exception frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x85
Exception code	1	1~8
Check code	2	

Example:

The power supply's communication address: 1

To set the power supply at remote control, coil address of PC is 0x0500

Send request: 01 05 05 00 FF 00 8C F6

Normal reply: 01 05 05 00 FF 00 8C F6

Read Holding Register

Request frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x03
Start address	2	0~0xFFFF
Register number	2	n=1-32
Check code	2	
Reply frame	**Data length**	**Value**
Address	1	1-64
Function code	1	0x03
Byte number	1	2*n
Register value	2*n	
Check code	2	
Exception frame	**Data length**	**Value**
Address	1	1~64
Function code	1	0x83
Exception code	1	1~8
Check code	2	

Example:

The power supply's communication address: 1

To read the power supply's output voltage VS, register address of VS is 0x0B00, and byte of VS is 2 (double type register)

Send request: 01 03 0B 00 00 02 C6 2F

Sample reply: 01 03 04 40 AB 28 46 01 E1

40AB2846 is the read back voltage value

HEX 40AB2846=Floating point value 5.34867, hence the output voltage is 5.35V