
CKT Series DC Power Supply

Operation Manual

Statement

The contents of this manual are subject to changes without notice.

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Version V2.0 2020

Service Statement

IDEALTEK provides one-year warranty from the date of delivery for the manufactured and sold products. If the power supply fails or damaged under normal use, we will be responsible for free maintenance & repair.

During the warranty period, IDEALTEK will not be liable for free maintenance & repair for any of the following situations, and a cost expense will be charged according to the actual maintenance & repair situations:

1. Products that are not directly sold by us or our officially authorized agents.
2. Caused by force majeure, or due to the user's failure to comply with the operation manual or the user's fault, such as improper operation or other operations causing malfunction or damage.
3. Unauthorized disassembly or modification or installation of accessories without the consent of the company may cause malfunction or damage.

During the warranty period, the user shall be responsible for shipping the faulty or damaged product to IDEALTEK or the place designated by IDEALTEK, and the cost of delivery shall be borne by the user. After the repair is completed, the cost of delivery to the user or the designated location by user shall be borne by IDEALTEK. The insurance during the transportation period shall be insured by the user.

About the manual

This manual applies to all CSP series digital power supplies of IDEALTEK.

Safety signs

To prevent damage to the power supplies, please note that the following signs and marks may appear on the power supplies or on the operation manual:



Warning: A warning sign that identifies conditions that may cause injury or loss of life.



High voltage danger



(Earth-G) Ground terminal



AC input

Storage / Transport / Maintenance / Disposal

Storage

When the device is not in use temporarily, please pack the device appropriately and keep it in a proper storage environment. (If the storage environment is good, packaging can be exempted).

Transport

When transporting this device, please pack the device with the original packaging materials before transporting it. If the packaging materials are lost, please use the equivalent cushioning materials for packaging and paste fragile, waterproof and other marks before transporting to prevent damage to the device during transport.

This device is a precision instrument, please try to use qualified transportation tools for transportation. And try to avoid actions that could damage the device such as heavy drops.

Maintenance

There is no maintenance operation item in this device for general users. (Except those indicated in the manual) When any abnormality occurs in this device, please contact IDEALTEK or officially authorized agents, and do not carry out maintenance by yourself, so as to avoid unnecessary danger and may cause greater damage to the device.

Disposal

When this device no longer needs to be used, please follow your company's scrap processing procedures for disposal, or follow your local legal procedures for disposal of this device. Do not arbitrarily abandon it to avoid environmental damage.

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Chapter 1 Overview of Power Supply

1.1 Introduction

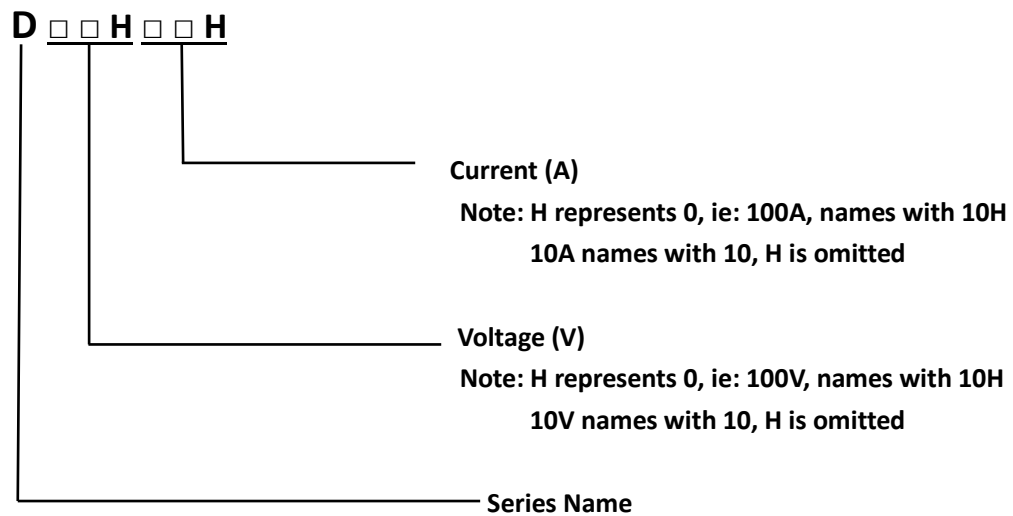
The Series Programmable Digital DC Power Supply is high-frequency switching DC power supply developed by our high-quality development team with years of power products development experience and based on our field experience with extensive user equipment operation. which is suitable for various high-frequency switching DC systems and related supporting equipment.

This series power supplies are widely used for battery charging, power electronics driving, scientific research institutes, production and processing industries, electronic components aging, and other applications need stable DC output.

1.2 Features

- Using PWM pulse width modulation technology based on world-famous brand IGBT or MOSFET power switching component.
- 3C3 coating level for main control board and soft magnetic core adopted.
- Low ripple, fast dynamic response rate, ripple and accuracy up to 0.2%.
- High efficiency, accurate precision, good and reliable performance.
- The output voltage and current can be continuously adjustable from 0 to 100% rated value.
- OVP & OCP values can be arbitrarily settable.
- Relative wide load adaptability.
- Complete protection functions, such as OVP, OCP & OTP.
- Working and protection status indication.
- Equipped with RS232 or RS485 interface. (Optional)
- 5-digit LED display for output voltage and current (measuring range: 1% ~ 100% rated value)
- Forced air cooling, power supply can withstand long-term continuously working with full load.
- Except for the 1KW series power supply, all models adopt 19-inch, standard 2U-3U rack mount chassis.

1.3 Model naming rules and meaning



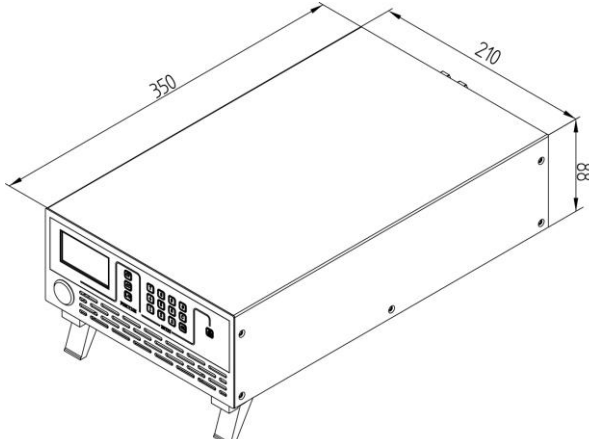
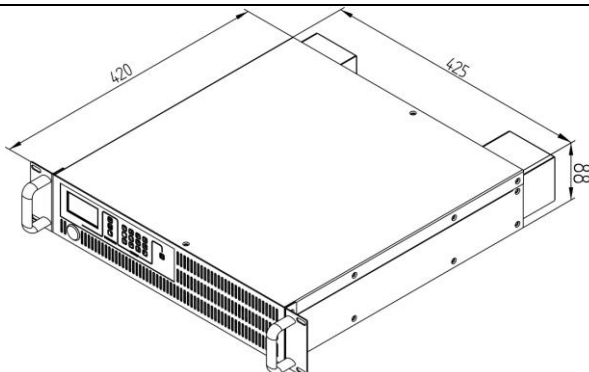
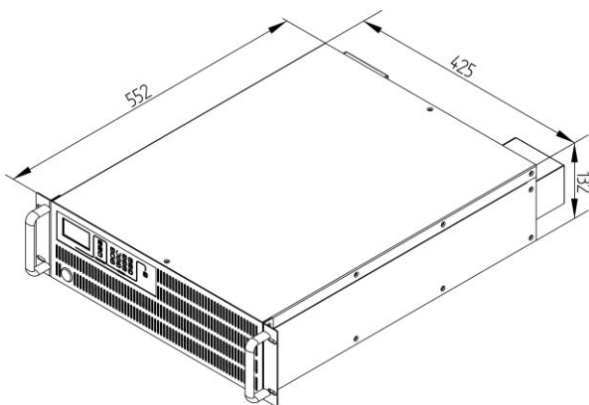
Description:

D Series Power Supplies can be divided into four categories below according to power rating:

- D-1KW series (Rated Power \leq 1KW)
- D-3KW series (1KW < Rated Power \leq 3KW)
- D-6KW series (3KW < Rated Power \leq 6KW)
- D-10KW series (6KW < Rated Power \leq 10KW)

The following installation and operating instructions are classified according to different categories.

1.4 Product Category & Physical Dimension

Product Category	Dimension (W*D*H) (mm)	Physical Drawing
D-1KW	210*350*88	
D-3KW	425*420*88	
D-6/10KW	425*552*132	

1.6 Parameter Description

1.6.1 Environment parameters

- Ambient temperature $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$
- Relative humidity 5% ~ 90% (no condensing)
- Atmospheric pressure: (70 ~ 106) KPA
- No strong corrosive gas, combustible gas, oil mist, conductive and explosive dust
- Indoor use only, good ventilation is required.

1.6.2 Technical parameters

- Input voltage: Single-phase $220\text{Vac} \pm 10\% + \text{PE}$ (Power $\leq 1\text{KW}$)
Three-phase $380\text{Vac} \pm 10\% + \text{PE}$ ($1\text{KW} < \text{Power} \leq 10\text{KW}$)
- Frequency: $50\text{Hz} \pm 5\%$
- Efficiency: $> 85\%$
- Constant voltage working mode: Output voltage continuously adjustable from 0 to 100% rated voltage via key buttons on front panel, (when the limit current is reached, power supply will automatically switch to constant current mode)
- Constant current working mode: Output current continuously adjustable from 0 to 100% rated current via key buttons on front panel, (when the limit voltage is reached, power supply will automatically switch to constant voltage mode)
- Line regulation rate: When the mains changes between 200VAC ~ 240VAC (single-phase) or 340VAC ~ 420VAC (three-phase), the output voltage changes $\leq \pm 0.05\%$.
- Load regulation rate: when the load changes within the range of 15% ~ 100% full load, the output voltage change is $\leq \pm 0.05\%$.
- Dynamic response: $\leq 2\text{ms}$ (When the grid voltage is at the rated value, power supply works in the constant voltage mode, if the load dynamically changes from 25% to 75%, the output voltage changes is $\leq 5\%$.)
- Time drift (when continuous working time is greater than 8 hours): $\leq \pm 1\%$ of rated value.
- Temperature drift (the rate of change caused by temperature changes in the specified temperature range): $\leq \pm 1\%$ of rated value/ $^{\circ}\text{C}$
- Output voltage accuracy: $< 0.2\%$
- Output current accuracy: $< 0.2\%$
- Ripple voltage $\leq 0.5\%$ (typical value of effective value ripple)
- Insulation strength $\geq 20\text{M}$: (no breakdown and arcing) Class-B insulation.

- Withstand voltage rating: Input → Shell: ≥1500VAC, 1min, leakage current: ≤30mA
Input → Output: ≥1500VAC, 1min, leakage current: ≤30mA
Output → Shell: ≥500VAC, 1min, leakage current: ≤30mA

1.6.3 Optional Function

Item	Basic function	Optional function
Start / Stop	○	
CV / CC control	○	
Voltmeter	○	
Ammeter	○	
Power meter	○	
Timer		○
Fault alarm	○	
Remote control	○	
Soft start	○	
Communication interface RS-485/RS-232	○	

1.6.4 General Specification

Control mode		PWM control
Input	Voltage	Single-phase 220Vac + G / Three-phase 380Vac + G
	Frequency	50/60Hz
	Scope	±10%
Output	Working mode	CV / CC
	Adjustment range	0 ~ 100% voltage / current rated value
	Accuracy	±0.2% of rated value
	Error	RMS 0.2%

Chapter 2 Installation Guide

2.1 Installation Notice

- Please check the product appearance, accessories and model number after unpacking the product, confirm that the product model is correct and if the power supply is damaged due to transportation.
- Please read the manual carefully before installation, wiring and testing; the power supply should be located in a proper environment specified in the manual, and the distance between the ventilation holes and the surroundings should be no less than 50cm.
- Check the power input and output switches should be placed in the OFF position.
- Do not place any objects on the top of the power supply.
- The power installation and working environment must meet the conditions of use.
- The incoming power must meet the rated input requirements of the power supply. The power supply shell or the ground wire of power plug must be strictly grounded (due to the internal switching power supply structure with built-in high-frequency filter, there would be high-frequency filter current flowing through the chassis), positive and negative output must be correctly connected (red is the positive terminal, black is the negative terminal or refer to + and - marks), and the power supply output should adopt copper wires with appropriate cross-sections and be firmly connected.
- CSP series power supplies use three-phase four-wire connection mode. If your input uses three-phase five-wire system, the neutral line can be suspended without connecting to the power supply.
- The user power circuit is the circuit from the power supply wiring terminal to the incoming terminal and fuse on the circuit breaker. Please use the BVR wire and select specified wire diameter as shown in the wiring table, please select the wire strictly according to the specified wire diameter for wiring.

When connecting the power cord, use a suitable tube-shaped pre-insulated end or a spline copper terminal to crimp the wire. The stripped length should be stripped according to the metal part length of the end and the crimping must be firm and complete.
- The output wires are connected to the positive and negative terminals of the power supply output. The diameter of the wiring used are shown in the wiring table; the withstand voltage of the wire must be higher than the output voltage of the power supply to ensure electrical safety.

- The selection of the input and output wires of the power supply needs to consider two aspects:

The withstand voltage value of the wire must be greater than the power supply input / output voltage rating.

The safe current carrying capacity of the wire must be greater than the power supply input / output current rating.

The calculation formula of the input current is:

Single phase input power supplies

$$I = P / (V * \cos\phi)$$

P - active power I - current U - single-phase voltage COSQ - power factor

Three-phase input power supplies

$$I = P / (3^{1/2} * V * \cos\phi)$$

P - active power I - current U - three-phase voltage COSQ - power factor $3^{1/2}$ - approx. 1.732

Wire diameter (mm ²)		2.5	4	6	10	16	25	35	50	70	95	120
Copper core (within 10m)	Safe carrying current (A)	28	35	48	65	95	120	140	175	210	285	360
	Current-carrying coefficient	10	9	8	7	6	5	4	3.5	3	3	3
Aluminum core (within 10m)	Safe carrying current (A)	23	32	42	60	80	100	123	150	175	238	300
	Current-carrying coefficient	9	8	7	6	5	4	3.5	3	2.5	2.5	2.5

The wire diameter is generally calculated according to the following formula:

Copper wire: $S = IL / 54.4$

Aluminum wire: $S = IL / 34$

In the formula: I - the maximum current passing through the wire (A)

L - The length of the wire (M)

S - The cross-sectional area of the wire (mm²)

The current carrying capacity of the wire is also inversely proportional to the length of the wire. The above table is a configuration table listed with a coefficient of 1 for less than 10 meters. If the wiring length is within 10 ~ 50 meters, the above configuration should be multiplied by a coefficient of 0.5; if the wiring length is within 50 ~ 200 meters, a coefficient of 0.3 should be multiplied; if the wiring length is within 200~500 meters, a coefficient of 0.2 should be multiplied.

Estimation formula: multiply by 9 when below 2.5 and go up with minus one. multiply by 5 for 35, and both in groups minus five. The conversion should be calculated when conditions change, and for high temperature 10% discount should be considered and copper needs upgrading.

"Multiply by 9 when below 2.5 and go up with minus one" means that the different kinds of aluminum core insulated wires with no more than 2.5mm^2 cross-section, their current carrying capacity is about 9 times of the number of cross-sections. For example, 2.5mm^2 wire, the current carrying capacity is $2.5 \times 9 = 22.5(\text{A})$.

The multiple relationship between the current-carrying capacity and the number of cross-sections of wires with no less than 4mm^2 cross-section is to line up along the wire number, and the multiples are successively reduced by 1, that is, 4×8 , 6×7 , 10×6 , 16×5 , 25×4 .

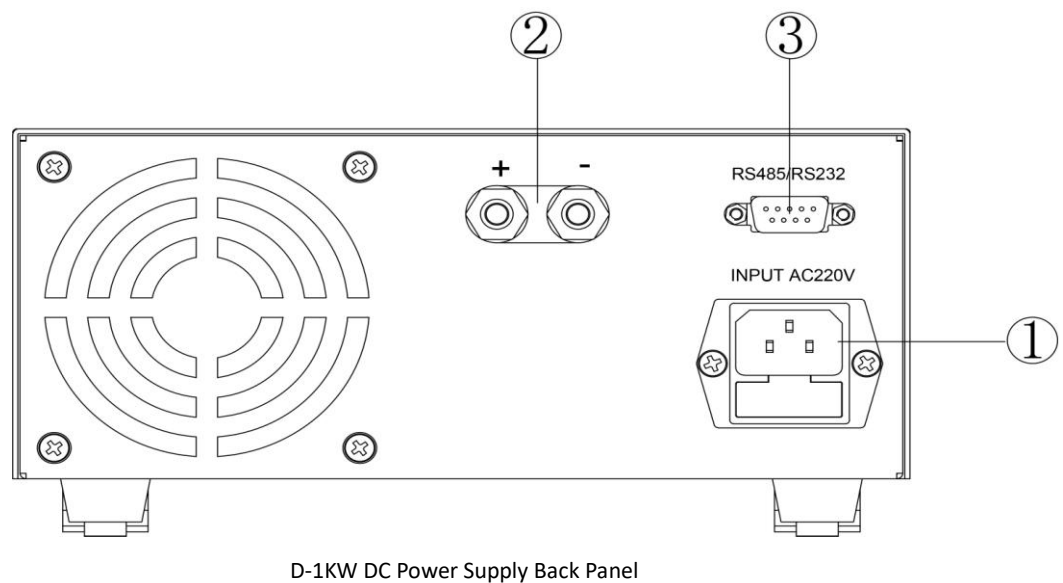
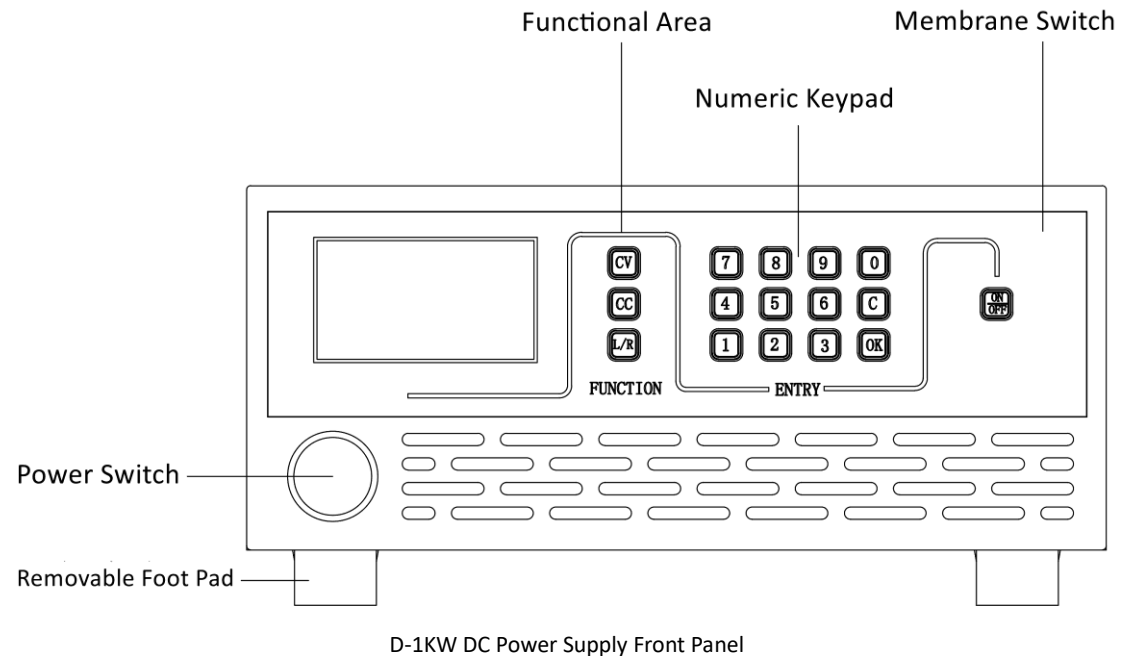
"Multiply by 5 for 35, and both in groups minus five", means that the current carrying capacity of the 35mm^2 wire is 3.5 times of the number of cross-sections, that is, $35 \times 3.5 = 122.5(\text{A})$. For wires of 50mm^2 and above, the multiple relationship between the current-carrying capacity and the number of cross-sections becomes a set of two wire numbers, and the multiples are reduced by 0.5. That is, the current-carrying capacity of 50mm^2 and 70mm^2 wires is 3 times of the number of cross-sections. The current carrying capacity of 95mm^2 and 120mm^2 wires is 2.5 times of the number of cross-sections, and so on.

The above formula is determined by the aluminum core insulated wire and the open coating at an ambient temperature of 25°C . If the aluminum core insulated wire is exposed to the area where the ambient temperature is higher than 25°C for a long time, the current carrying capacity of the wire should be calculated according to the above formula calculation method with a 10% discount; if the copper core insulated wire is used instead of aluminum core wire, then its current-carrying capacity is slightly larger than that of the aluminum wire of the same specification. According to the above formula, the current-carrying capacity of copper wire is one # larger than the aluminum wire. For example, the current carrying capacity of 16mm^2 copper wire can be calculated as 25mm^2 aluminum wire.

2.2 Detailed Installation Instruction

2.2.1 D-1KW Installation Instruction

1) D-1KW DC Power Supply Front & Back Panel

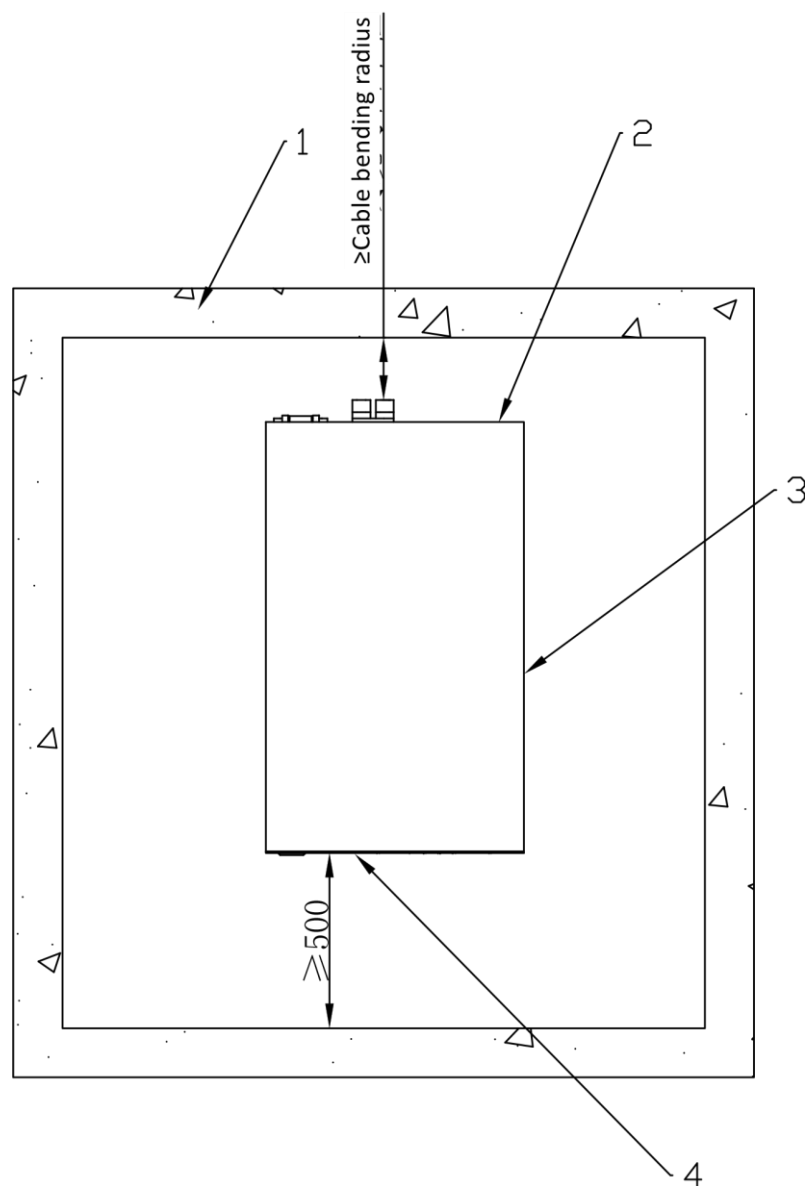


No.	Name
1	Input terminal
2	Output terminal
3	DB9 interface

2) Installation site planning

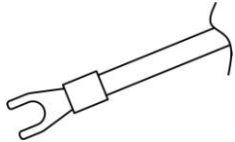
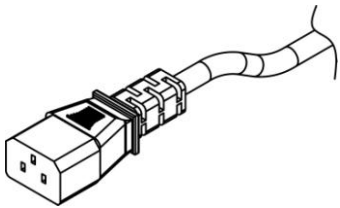
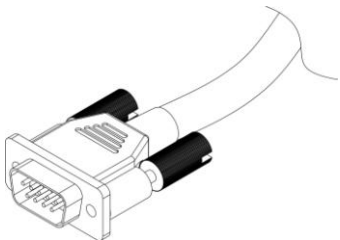
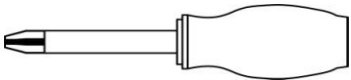

Before installing the D-1KW DC power supply, first, we should plan an available space for installing. In order to facilitate the heat dissipation and maintenance of power supply, it is recommended that the distance between the DC power supply vents and the surroundings should not be no less than 0.5 meters. (If installed into a cabinet, the cabinet needs to have corresponding ventilation holes, and the distance between the ventilation holes and the surrounding should also be at least 0.5 meters), the following figure shows the space required for installation.

To facilitate the installing, the wiring installation job could be done in a spacious place, then move the power supply to the planned area.



1. Internal wall or reference body 2. Wiring terminal on back panel 3. Outline of the device 4. Display on front panel

3) Installation preparation

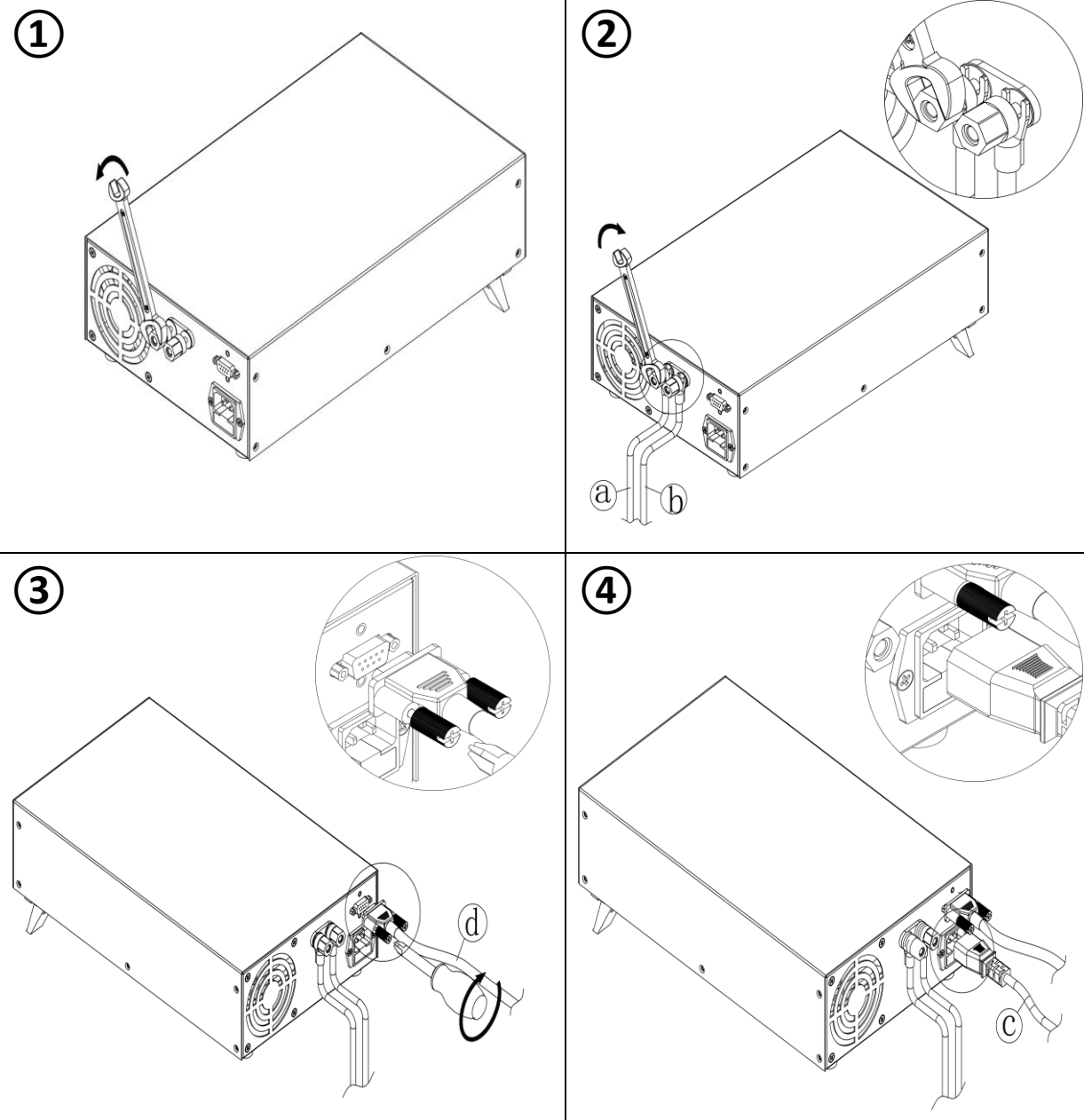
No.	Name	Schematic diagram
a	U-shaped terminal output line + (red)	
b	U-shaped terminal output line - (black)	
c	AC power input line	
d	DB9 male serial cable (standard 325)	
Tools	Phillips screwdriver (2# batch head)	
	Wrench (12)	

Note: Please select the corresponding accessories for assembly according to the diagram in the installation instructions.

And please use appropriate cable according to the calculation of the wire diameter in the installation instructions.

4) Installation steps

CKT-1KW DC power supply installation diagram

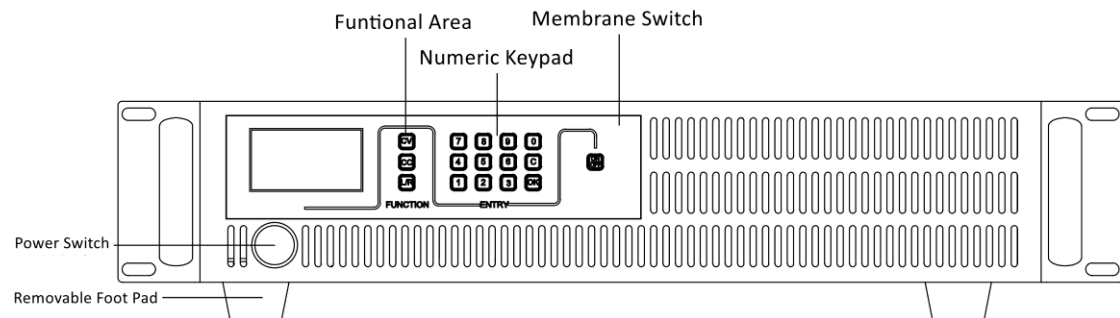


Installation Notes:

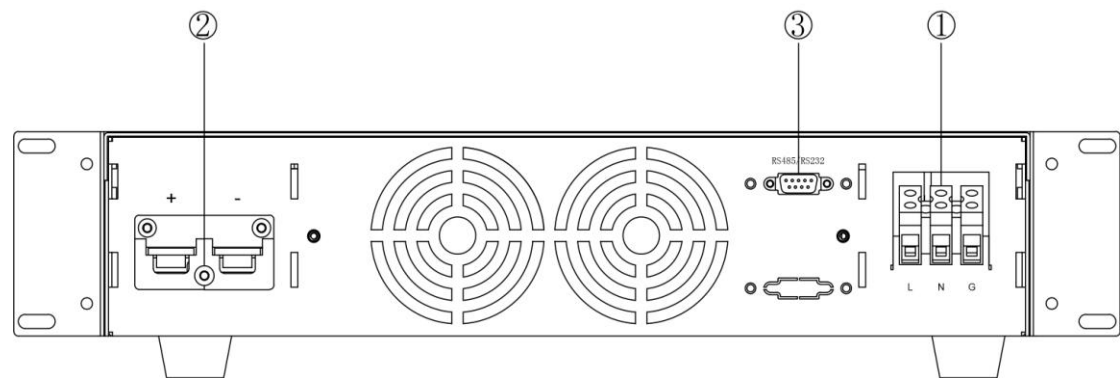
- ① Loosen the output terminal binding post.
- ② Insert the U-shaped terminal output wire into the terminal (output + is red, output- is black)
- ③ Insert the DB9 male end of the serial port cable into the DB9 female end on the rear panel of the power supply, tighten the screws.
- ④ Plug in the input wire tightly, installation is complete.

2.2.2 D-3KW Installation Instruction

1) CKT-3KW DC Power Supply Front & Back Panel



D-3KW DC Power Supply Front Panel



D-3KW DC Power Supply Back Panel

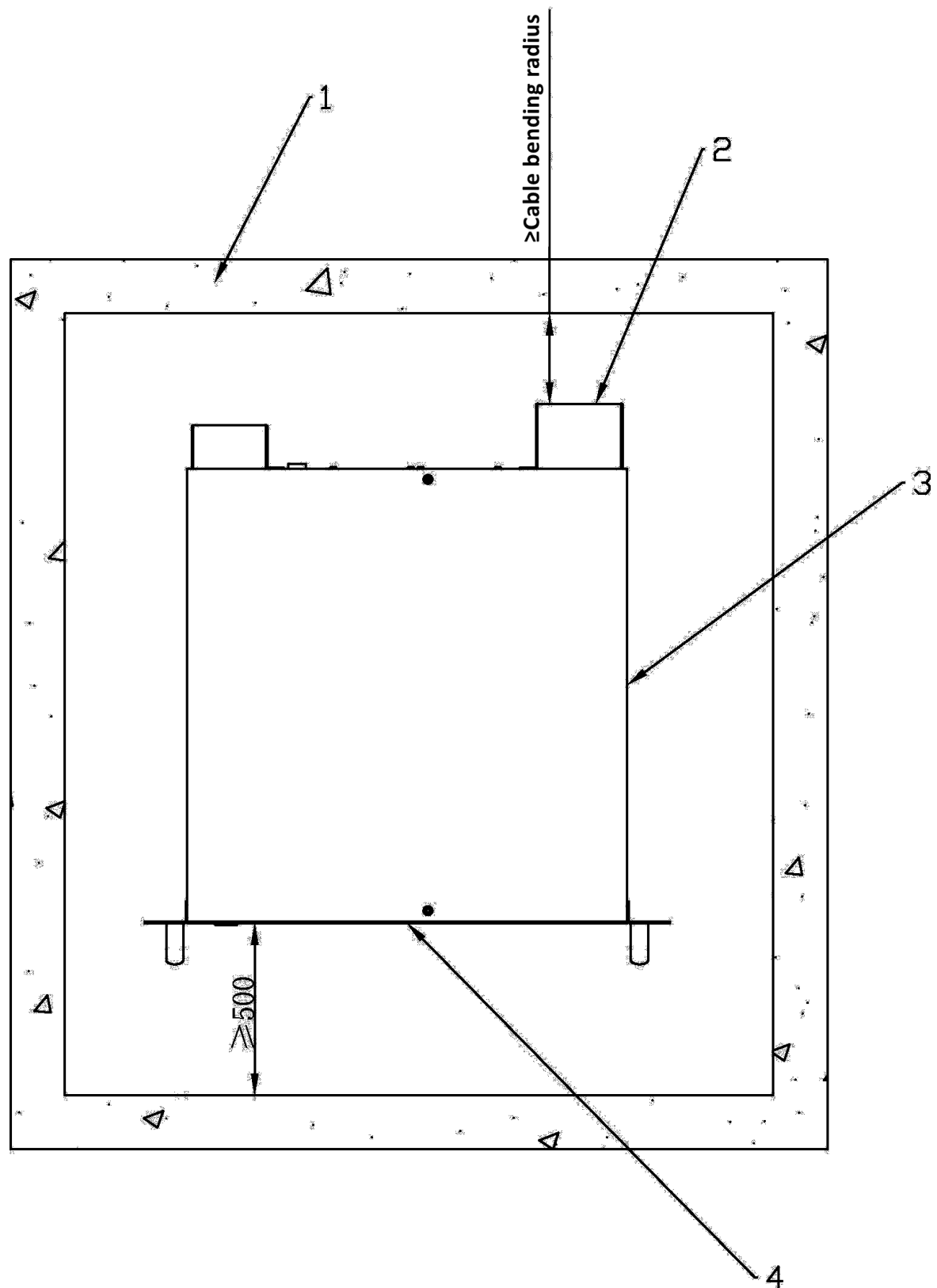
No.	Name
1	Input terminal
2	Output terminal
3	DB9 interface

2) Installation site planning

Before installing the D-3KW DC power supply, first, we should plan an available space for installing. In order to facilitate the heat dissipation and maintenance of power supply, it is recommended that the distance between the DC power supply vents and the surroundings should not be no less than 0.5 meters. (If installed into a cabinet, the cabinet needs to have corresponding ventilation holes, and the distance between the ventilation holes and the surrounding should also be at least 0.5 meters), the following figure shows the space required for installation.

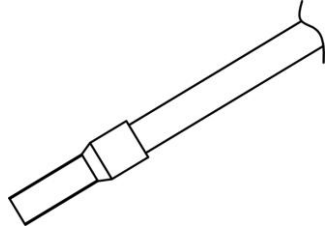
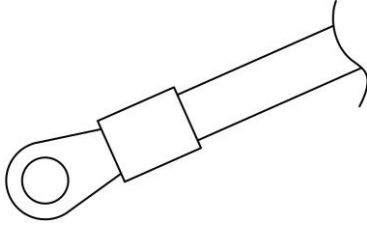
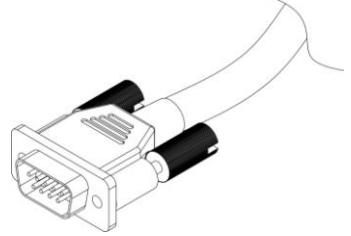
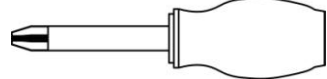
To facilitate the installing. the wiring installation job could be done in a spacious

place, then move the power supply to the planned area.



1. Internal wall or reference body 2. Wiring terminal on back panel 3. Outline of the device 4. Display on front panel

3) Installation preparation

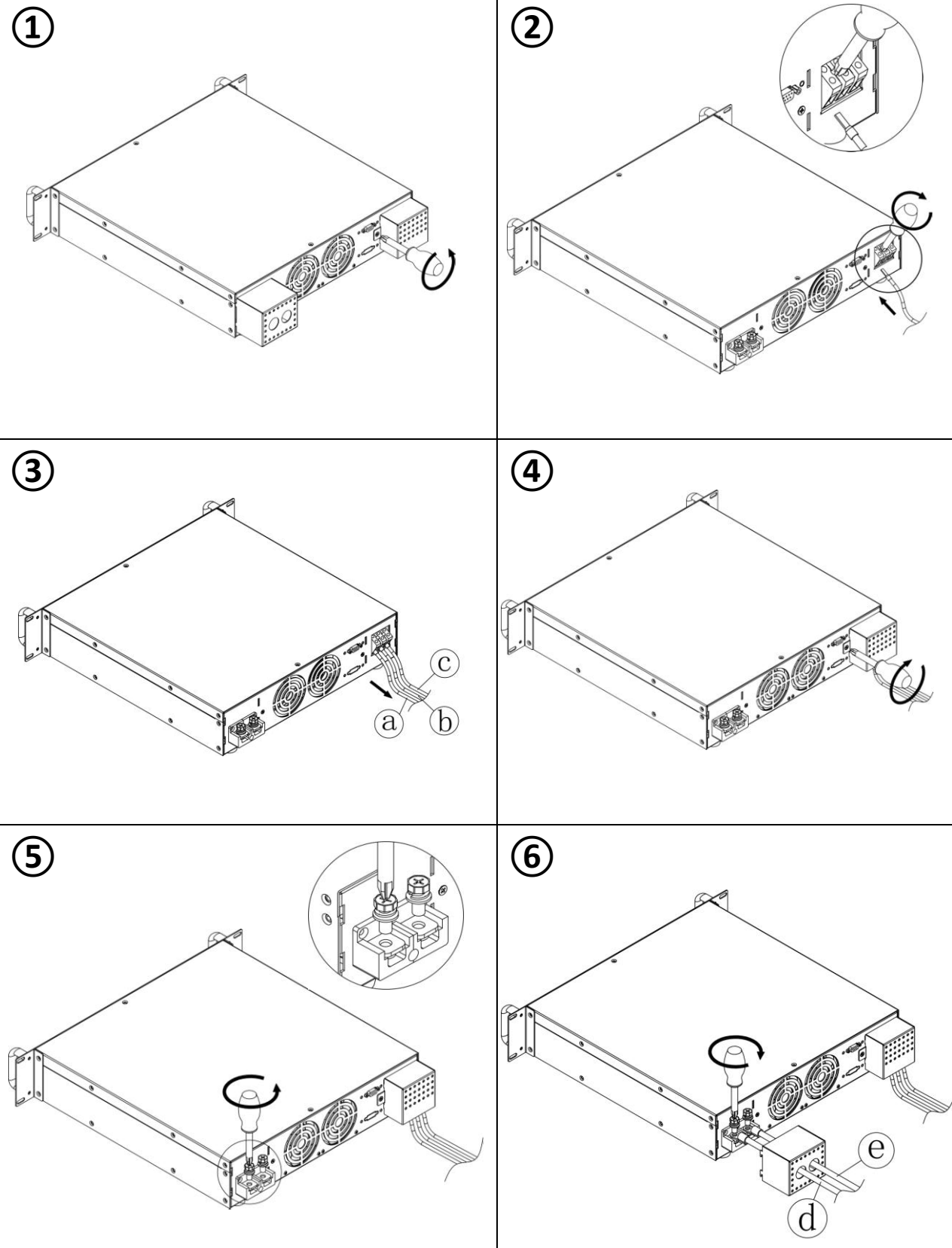
No.	Name	Schematic Diagram
a	Pin type input line L (red)	
b	Pin type input line N (black)	
c	Pin type input line G (yellow-green)	
d	OT terminal output line + (red)	
e	OT terminal output line - (black)	
f	DB9 male serial cable (standard 325)	
Tools	Phillips screwdriver (2# batch head)	

Note: Please select the corresponding accessories for assembly according to the diagram in the installation instructions.

And please use appropriate cable according to the calculation of the wire diameter in the installation instructions.

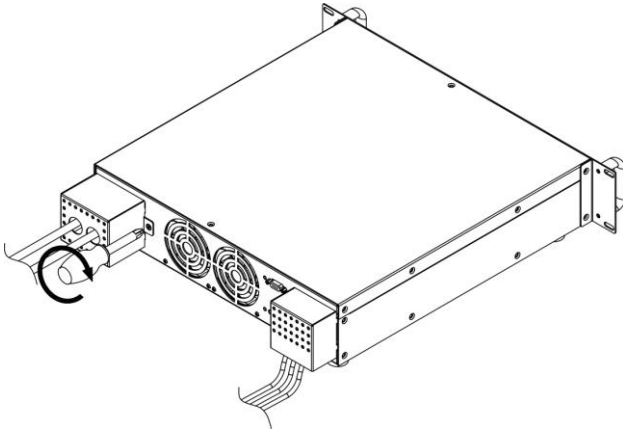
4) Installation steps

CKT-3KW DC power supply installation diagram

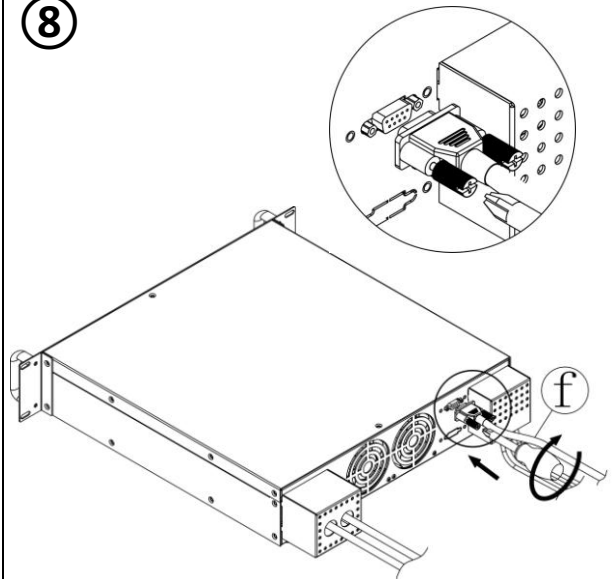


CKT-3KW DC power supply installation diagram

⑦



⑧



Installation Notes:

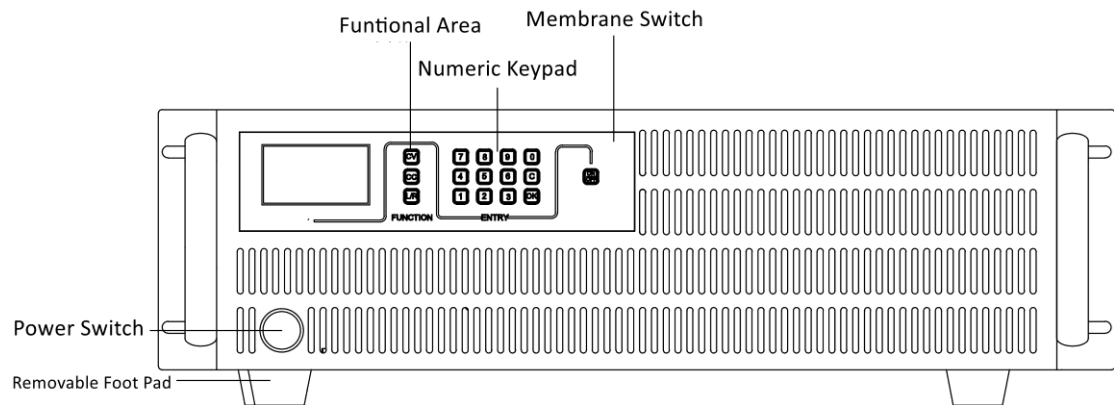
- ① Remove the input and output terminals covers.
- ② Connect the input line: (1). Loosen the screw in the wiring hole of the input terminal.

(2). Insert the input wires into the wiring hole of the input terminal and tighten the screws firmly.
- ③ Gently pull the input wires to check whether the input wires are locked.
- ④ Install the input terminal cover.
- ⑤ Remove the output terminal wiring screws.
- ⑥ Connect the output line: (1). Pass the output wires through holes on the output terminal cover.

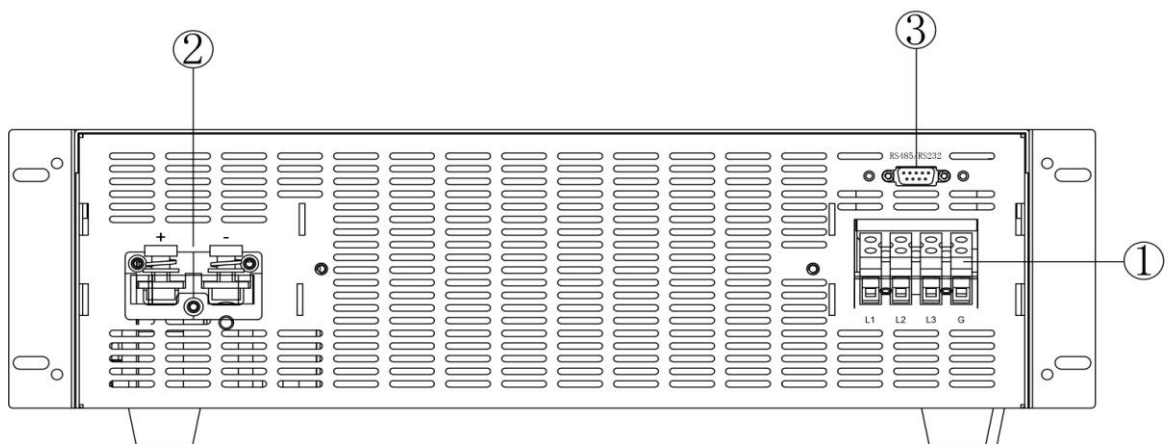
(2). Put the output wire terminal on the copper bar of the power supply output terminal and tighten the screws firmly.
- ⑦ Install the output terminal cover.
- ⑧ Insert the DB9 male end of the serial port cable into the DB9 female end on the rear panel of the power supply and tighten the screws firmly.

2.2.3 D-6KW / 10KW Installation Instruction

1) CKT-6KW / 10KW DC Power Supply Front & Back Panel



D-6KW / 10KW DC Power Supply Front Panel



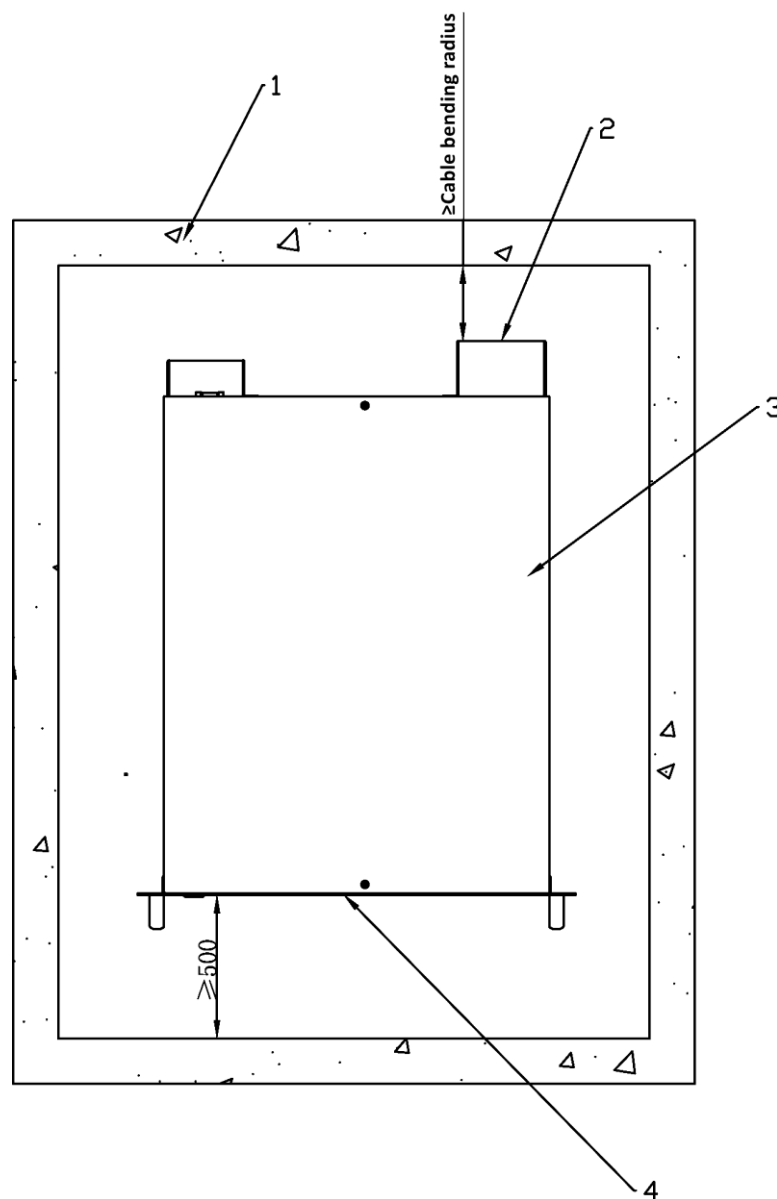
CSP-6KW / 10KW DC Power Supply Front Panel

No.	Name
1	Input terminal
2	Output terminal
3	DB9 interface

2) Installation site planning

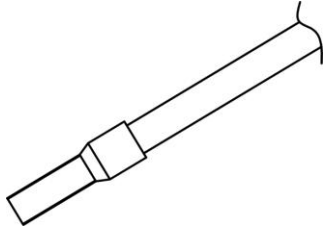
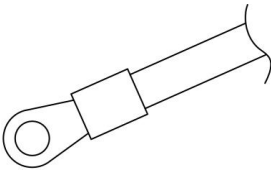
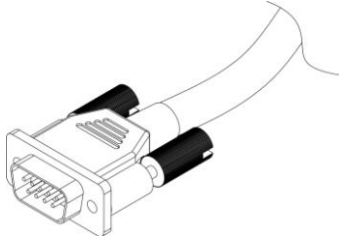
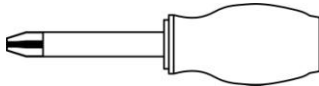
Before installing the D-6KW / 10KW DC power supply, first, we should plan an available space for installing. In order to facilitate the heat dissipation and maintenance of power supply, it is recommended that the distance between the DC power supply vents and the surroundings should not be no less than 0.5 meters. (If installed into a cabinet, the cabinet needs to have corresponding ventilation holes, and the distance between the ventilation holes and the surrounding should also be at least 0.5 meters), the following figure shows the space required for installation.

To facilitate the installing. the wiring installation job could be done in a spacious place, then move the power supply to the planned area.



1. Internal wall or reference body 2. Wiring terminal on back panel 3. Outline of the device 4. Display on front panel

3) Installation preparation

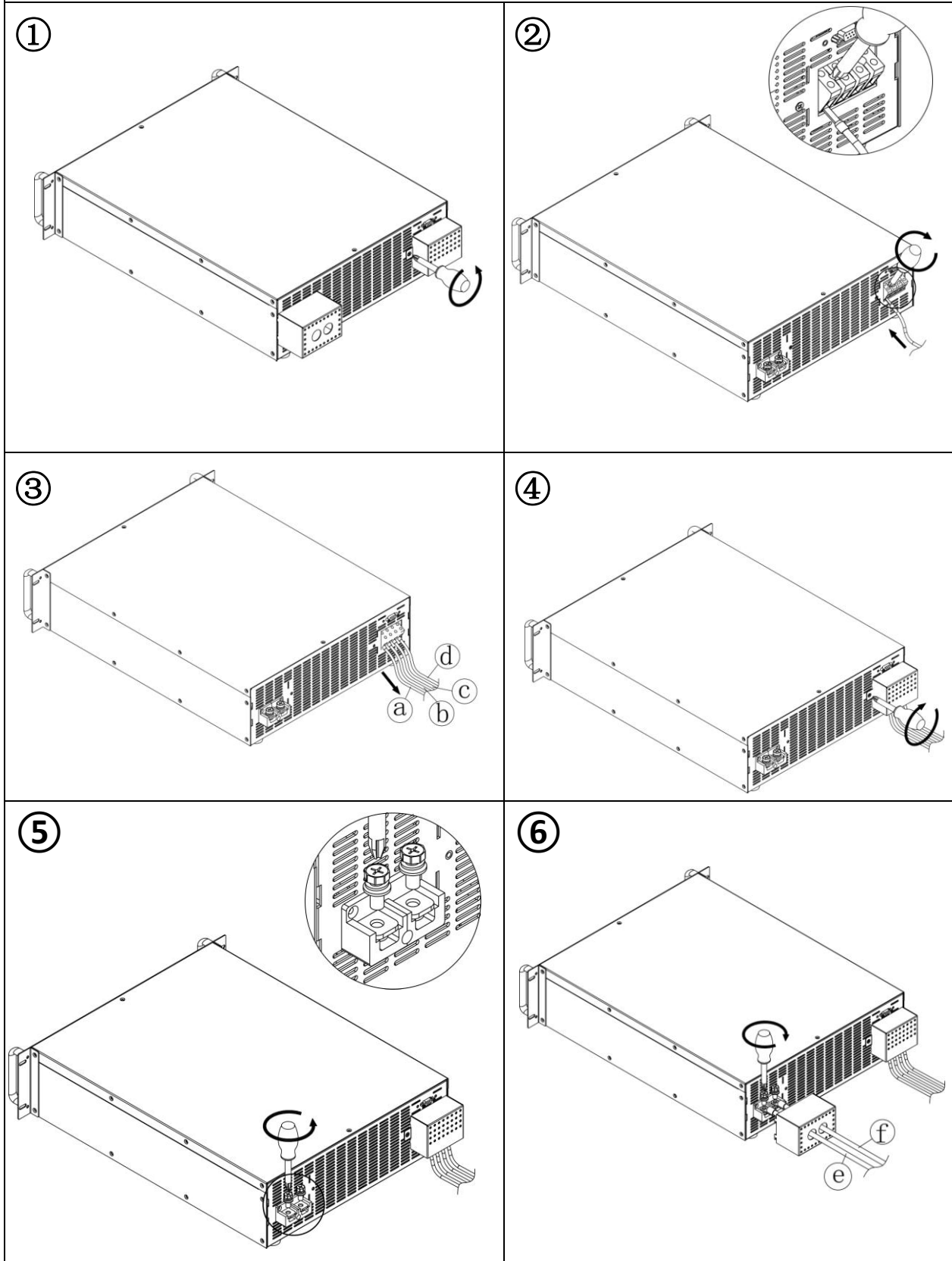
No.	Name	Schematic diagram
a	Pin type input line L1 (yellow)	
b	Pin type input line L2 (green)	
c	Pin type input line L3 (red)	
d	Pin type input line G (yellow-green)	
e	OT terminal output line + (red)	
f	OT terminal output line - (black)	
g	DB9 male serial cable (standard 325)	
Tools	Phillips screwdriver (2# batch head)	

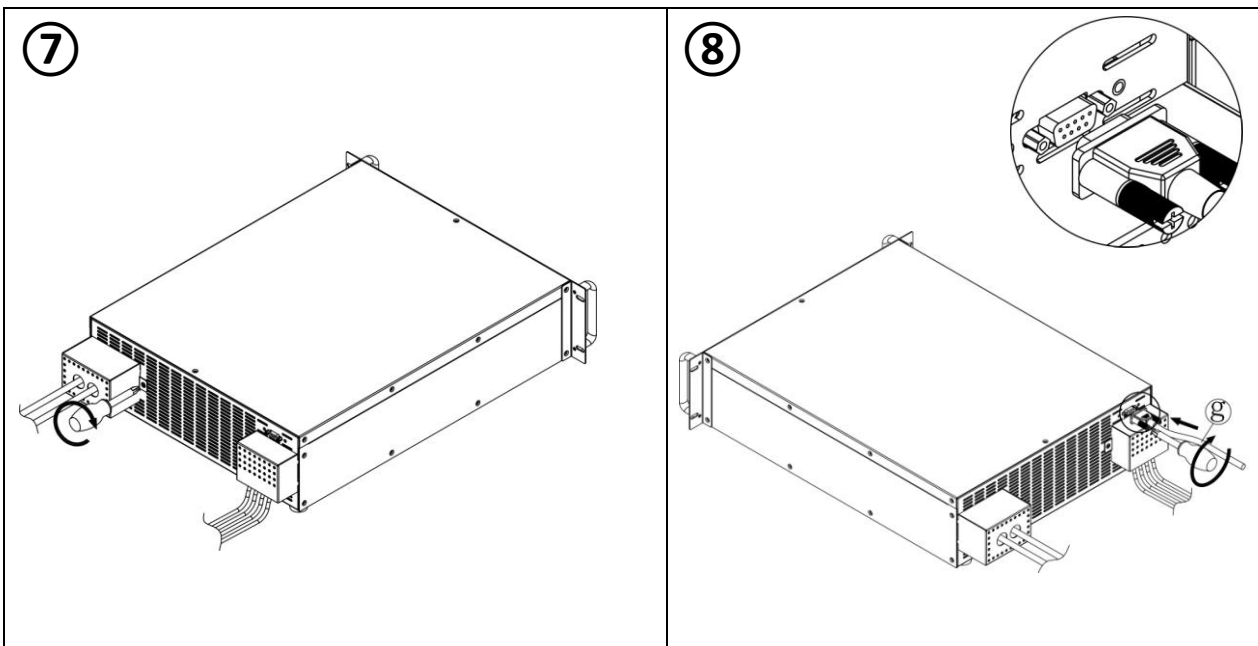
Note: Please select the corresponding accessories for assembly according to the diagram in the installation instructions.

And please use appropriate cable according to the calculation of the wire diameter in the installation instructions.

4) Installation steps

CKT-6KW / 10KW DC power supply installation diagram





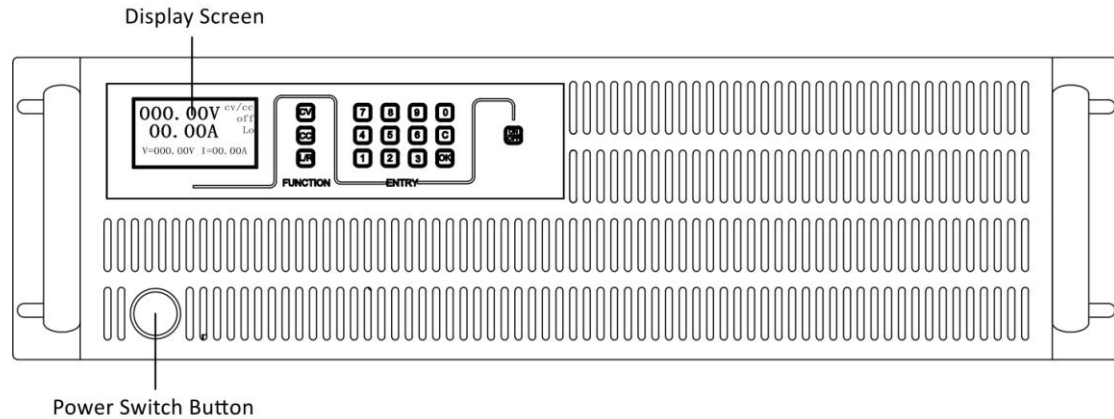
Installation Notes:

- ① Remove the input and output terminals covers.
- ② Connect the input line: (1). Loosen the screw in the wiring hole of the input terminal.
(2). Insert the input wires into the wiring hole of the input terminal and tighten the screw firmly.
- ③ Gently pull the input wires to check whether the input wires are locked.
- ④ Install the input terminal cover.
- ⑤ Remove the output terminal wiring screws.
- ⑥ Connect the output line: (1). Pass the output wires through holes on the output terminal cover.
(2). Put the output wire terminal on the copper bar of the power supply output terminal and tighten the screws firmly.
- ⑦ Install the output terminal cover.
- ⑧ Insert the DB9 male end of the serial port cable into the DB9 female end on the rear panel of the power supply and tighten the screws firmly.

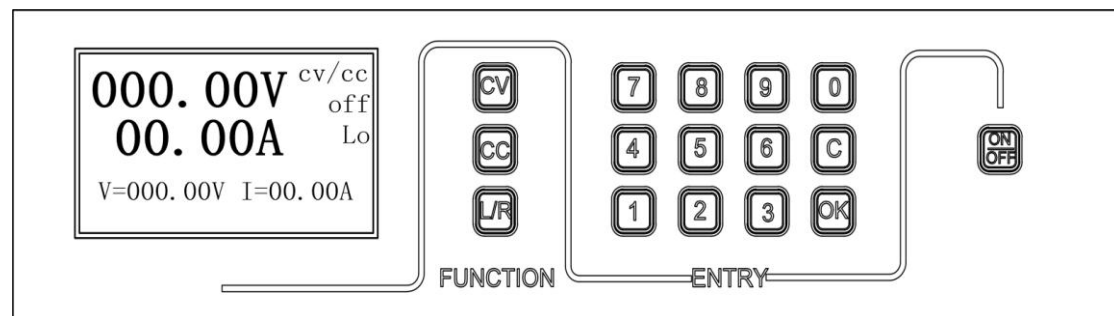
Chapter 3 Operations & Setting

3.1 Operation Interface & Indication

- 1) After the power supply is correctly wired, press the "Power Switch" button, then the fan will rotate and the screen display will light up.

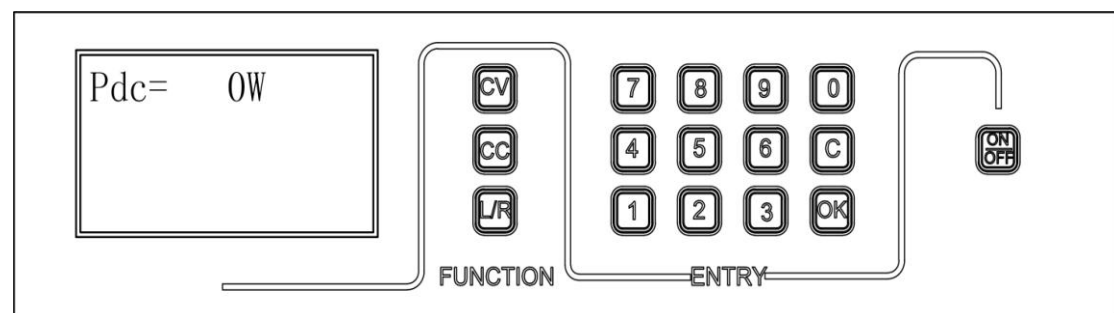


Power Supply Front Panel

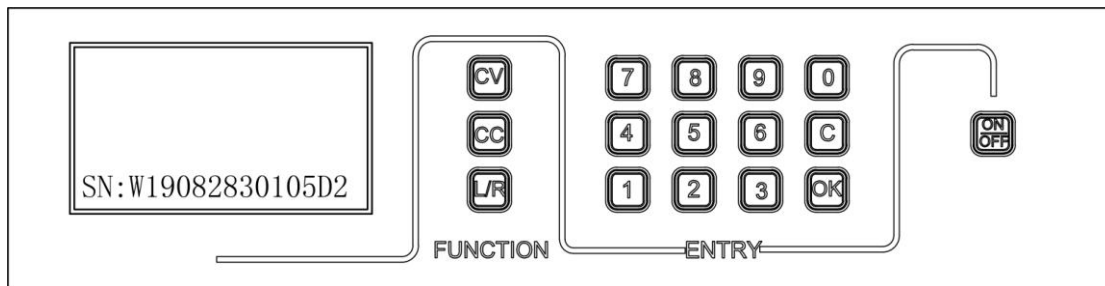


Display interface (3 interfaces in total, press "OK" key to switch among three interfaces)

Main display interface



Secondary display interface



Third display interface

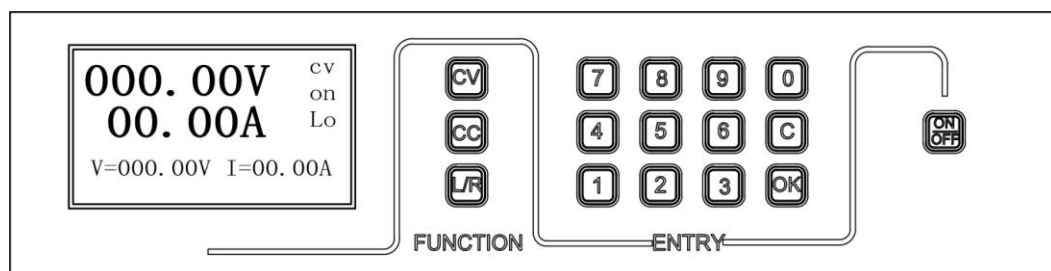
Remarks:

1. When the output status area of "Main Display Interface" displays "cv/cc", indicating that the power supply is in DC pre-output state. Press the "ON/OFF" key to start the output after the voltage and current setting are finished (refer to the "General Setting" chapter). Then, the output state of the power supply (CV or CC) is determined by the output setting and specific load connected.
2. If the "Steps Mode" is successfully set (refer to the "Steps Mode Setting" chapter), the output status area will display "StpMD", indicating that the power supply is in pre-output state of Step mode.
3. If the "Charge Mode" is successfully set (refer to the "Charge Mode Setting" chapter), the output status area will display "ShgMD", indicating that the power supply is in pre-output state of Charge mode.
4. SN is the identity of the power supply; each power supply has a unique serial number.

Display interface English abbreviation table		
Display area	Parameter	
State area	CV/CC	constant voltage or constant current pre-output mode (OFF state)
	CV	constant voltage output mode (ON state)
	CC	constant current output mode (ON state)
	StpMD	Steps (Steps) pre-output mode (OFF state)
	cvStep	Constant voltage step output mode (ON state)
	ccStep	Constant current step output

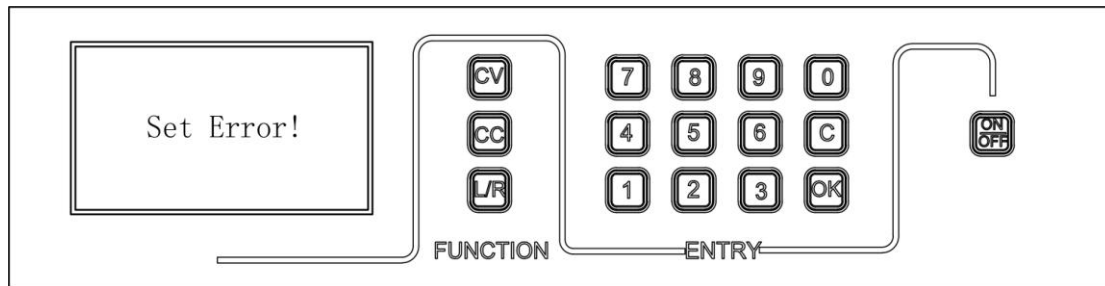
		mode (ON state)
	ChgMD	Charge pre-output mode (OFF state)
	cvChg	constant voltage charge mode (ON state)
	ccChg	constant current charge mode (ON state)
Switch area	ON	Turns on the output (ON state)
	OFF	Turns off the output (OFF state)
	Step0 ~ Step9	The x step / segment (0~9) step / charge output (step / charge mode ON state)
L / R	Lo / Re	Local / Remote control mode
Secondary display interface	Pdc	Real-time output power
Third display interface	SN	Product serial number

- 2) Set the voltage and current values as described in "General setting" of "3.2 Parameter Setting Parameters"
- 3) Press the ON/OFF button to start DC output.
 - a. If the setting parameters are valid, the power supply will output normally according to the setting values
 "Main Display Interface" displays <on> state of DC output mode
 1. "State area" displays "cv or cc" output mode.
 2. "Switch area" displays "on"



Main Display Interface (Running <on> state of DC mode)

- b. If the setting parameters are invalid, the "Set Alarm Interface" would be displayed, and would automatically return to "Main Display Interface" after 3 seconds, (can press the "C" key button to immediately return to the "Main Display Interface")

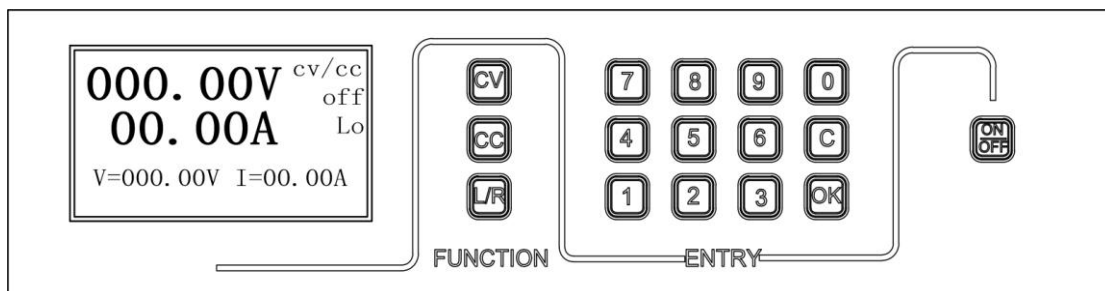


Set Alarm Interface

- 4) Press "ON/OFF" button to stop power supply DC output.

"Main Display Interface" displays <on> state of DC output mode

1. "State area" displays "cv or cc" output mode.
2. "Switch area" displays "off"



Main Display Interface (Stop <off> state of DC mode)

- 5) Press "Power Switch" button again to turn off the power supply.

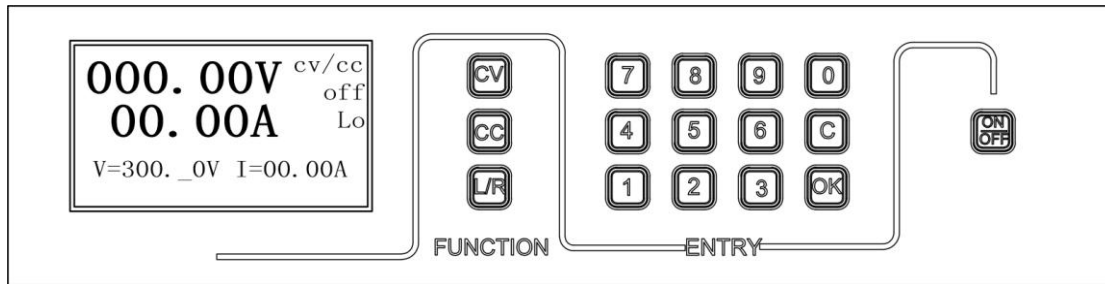
3.2 Parameter Setting

3.2.1 General settings

Example: DC power supply 300V/5A

- 1) Voltage setting (5 effective digits)

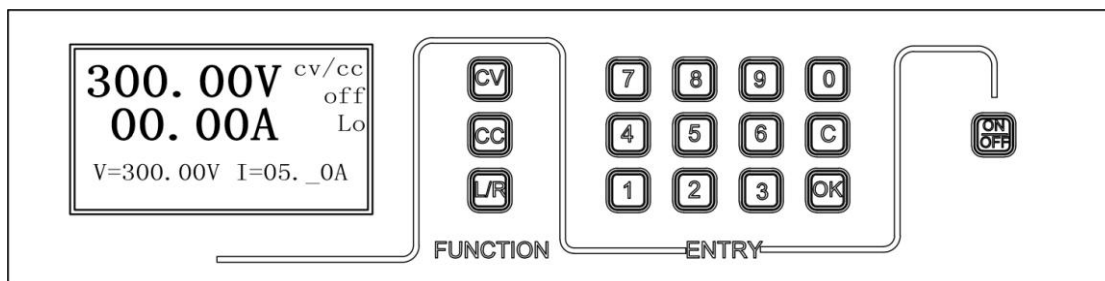
Under "Main Display Interface", press CV key → enter 300 → press OK key to confirm the set voltage value (the cursor position of the space bar is where the set parameters can be entered).



Voltage setting display

2) Current setting (4 effective digits)

Under "Main Display Interface", press CC key → enter 05 → press OK key to confirm the set current value (the cursor position of the space bar is where the set parameters can be entered)



Current setting display

3.2.2 Function setting

1. Function parameter setting

- 1) When the "Main Display Interface" shows that the power supply is in the output off state, press "C" key and then enter the password "123456" and press "OK" to confirm, then the LCD enters the function selection menu.
- 2) Select the "Setting" menu and press the "OK" key to enter the function parameter setting interface.
- 3) Press "CV" or "CC" key up and down to select "Communication Settings", "Function Settings" or "Protection Settings" option, and press "OK" key to enter the corresponding submenu.
- 4) Refer to the table below stating the description of "Function Setting Parameters", and press the "CV" or "CC" key up and down to select the corresponding setting parameters.
- 5) Press the "OK" key to enter the parameter setting, enter the appropriate value for setting (the cursor position of the space bar is where the set parameters can be entered,

during the parameters entering process, you can press the "C" key to cancel), and press the "OK" key to confirm.

6) After finishing the setting, press the "C" key to exit the "Function Setting Interface"

Submenu	User parameter	Function description	Default value
Communication Settings	Baud	Baud rate (0:9600, 1:115200, 2:19200, 3:57600)	0:9600bps
	Addr	Modbus address (0 ~ 255)	1
	CRCLitEnd	CRC is sent in little-endian alignment (YES: little-endian alignment, NO: big-endian alignment)	YES: little-endian alignment
	V Addr	Voltage (DA) register address (≥ 64)	64
	I Addr	Current (DA) register address (≥ 65)	65
	SW Addr	ON / OFF register address (≥ 66)	66
Function Settings	Bootup	Power-on Startup mode (0: local mode, 1: remote mode)	0: local mode
	VTsoft	Voltage soft start time (unit mS, 10mS ~ 10S)	1000 mS
	ITSoft	Current soft start time (unit mS, 10mS ~ 10S)	500 mS
	Reset Fac	Factory setting RESET	---

Protection Settings	VLimit	Voltage protection value (unit: 10mV, 0.05Vn ~ 1.1Vn)	1.1Vn
	VTime	Voltage protection delay time (unit: mS, 0 ~ 60000mS)	100mS
	ILimit	Current protection value (unit: 10mA, 0.05In ~ 1.1In)	1.1In
	ITime	Current protection delay time (unit: mS, 0 ~ 60000mS)	10mS
	PLimit	Overload protection value (unit: 100W, 0.05Pn ~ 1.5Pn)	1.1Pn
	PTime	Overload protection delay time (unit: mS, 0 ~ 60000mS)	1000mS
	TPLimit	Instantaneous overload protection value (unit: 100W, 0.05Pn ~ 1.5Pn)	1.2Pn
	TPTime	Instantaneous protection delay time (unit: mS, 0 ~ 60000mS)	10mS
	Err Res	Fault automatic recovery enable (0: disable, 1: enable)	NO: disable

	Res T	Fault automatic recovery time (unit: S, 0 ~ 65535S)	1S
	VErrLat	Hardware overvoltage protection latch (YES: latch fault, NO: No latch fault)	YES: Latch fault
	CErrLat	Hardware overcurrent protection latch (YES: latch fault, NO: No latch fault)	YES: Latch fault

Function Setting Parameter

Note: Vn, In and Pn respectively represent the rated voltage, rated current and rated power of different of power supply.

2. Steps mode setting

- 1) When "Main Display Interface" shows that the power supply is in the output off state, press "C" key and then enter the password "123456" and press "OK" to confirm, then the LCD enters the function selection menu.
- 2) Select the "Steps Setting" menu and press the "OK" key to enter the Steps mode setting interface.
- 3) Select the "Step Mode" menu, press the "OK" key to set the Step mode (Press "CV", "CC" Or "C" key to select constant voltage, constant current step mode or turn off step mode), and press the "OK" key again to confirm the settings (for parameters, refer to the table below stating the description of "Step Mode Setting Parameters")
- 4) Select the "Step Num" menu, press the "OK" key to set the Step number, and press "OK" key again to confirm the settings and enter the "Step menu table", press "CV" or "CC" keys to select up and down and enter the required value and duration parameters. After completing the parameter settings of the "step menu table", press "C" to exit.
- 5) Select the "Cycle Num" and press "OK" to enter the cycle number parameter setting, and press the "OK" key again to confirm the settings.
- 6) Press the "C" key to exit the Steps mode setting, press the "C" key again to exit the "Function Parameter Setting" menu and enter the Main Display Interface, and then

press "ON/OFF" to start/stop the Step mode output.

Parameter	Description	Default value
Step Mode	Step output according to CV/CC mode; CV: Constant voltage mode; CC: Constant current mode.	NO: Step mode prohibited
Step Num	Step number of a complete cycle, 1~10 steps can be set.	0
Volt/Curr[x]	The target value of each step.	0
Time[x]	The holding time of each step target value. (Unit: s, 0 ~ 10000s)	0
CycleNum	Cycle number of Step mode (0 ~ 65535)	65535: maximum cycle number

Step Mode Setting Parameter

3. Charge mode settings

- 1) When "Main display interface" shows that the power supply is in the output off state, press the "C" key and then enter password "123456" press "OK" to confirm, the LCD display will enter the function selection menu.
- 2) Select "Charge Setting" option, press "OK" key to enter "Charge Mode Setting Interface"
- 3) Select the "Chg Mode" menu, press the "OK" key to set the charge mode (press "1" or "0" key to turn on or off the charge mode), and then press the "OK" key to confirm the settings (refer to the following table "Charge Mode" setting parameters")
- 4) Select the "Step Num" menu, press the "OK" key to set the number of charging segments, and then press "OK" key to confirm.
- 5) Select the "StpDely" menu, press the "OK" key to set the inter-segment delay (delay between segments), press "OK" again to confirm.
- 6) Select the "Dry Level" parameter, press the "OK" key to set the effective electric level of the control dry node, and then press "OK" again to confirm.
- 7) After turning on the charge mode as described in step "3", press the "CV" or "CC" keys up and down to select and set each segment parameter of charging, and input the corresponding target value and judgment value of voltage and current, duration and discharge time.
- 8) Press the "C" key to exit the charge mode setting, and press the "C" key again to exit the "Function parameter setting" menu and enter "Main display interface", press

"ON/OFF" to control Step mode output.

Parameters	Description	Default value
Chg Mode	Giving output and judging according to charging parameters of each segment (YES: open, CC: constant current mode)	NO: Turn off charging mode
Step Num	Number of complete charging segment (1 ~ 10 segments)	1
StpDely	Delay time between charging segments (Unit: S, 0 ~ 65535S)	10S
Dry Level	Active electric level of dry node control	High: Active high electric level.
VSet[x]	Target value of each segment voltage	Vn
CSet[x]	Target value of each segment current	In
Vjud[x]	Judgment voltage value of each segment	0.9Vn
Cjud[x]	Judgment current value of each segment	0.3In
Tflt[x]	Charging time of each segment (Unit: S, 0 ~ 65535S)	300S
Tdis[x]	Discharging time of each segment (Unit: S, 0 ~ 65535S)	180S

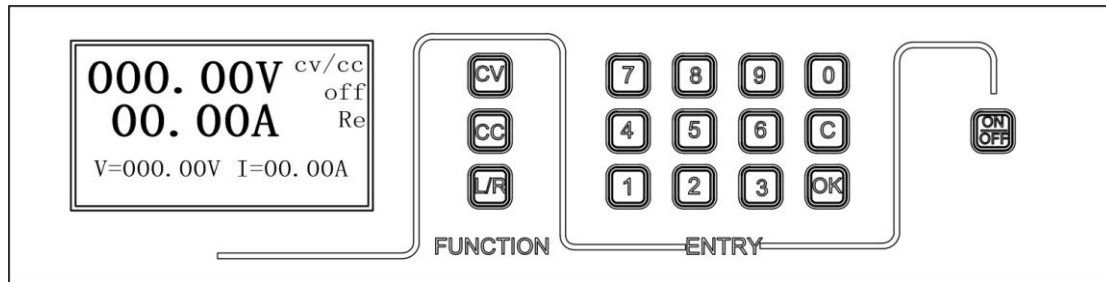
Charge mode setting parameters

Note: "Dry Level" and the discharge time of each segment can only be used in the power supply with dry node interface, please ignores these settings for the power supplies without dry node interface.

3.3 Remote control instructions

The default setting of the power supply is local control. If remote control function is required, connect the power supply remote control terminal (DB9 terminal) to the controller (ie: Host computer) of user and press the L/R key to set the power supply control mode to remote control mode.

For specific remote-control content, please refer to our "ModbusRTU Communication Protocol".



Remote Control Display

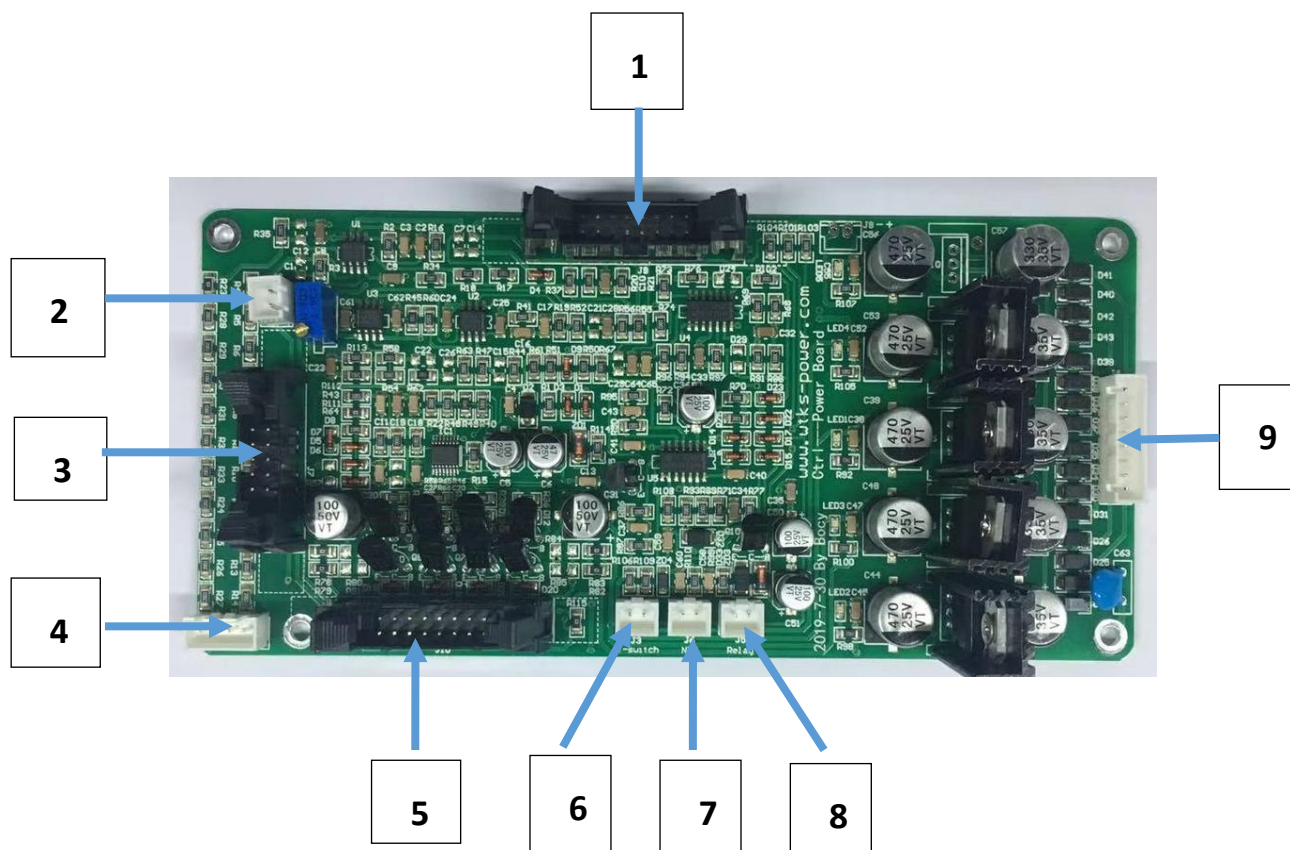
Chapter 4 Calibration

4.1 Calibration & Maintenance

During the use of the DC power supply, the user should regularly clean and inspect the power supply according to its working environment, and the relative steps are as below:

- A. Before opening the chassis, disconnect the external supply and wait for 30 minutes in case the internal capacitors still have electric stored.
- B. After opening the chassis, clean the dust on all internal parts with dry cloth or brush, or compressed air to blow the dust away, but be attention that the air pressure should not to be too high so as not to damage the inside components.
- C. Check the air switch open / closed actions are fine and reliable.
- D. Check whether the fans can work normally without abnormal noise.
- E. Check whether the copper part for output connection has oxidization and clean it up regularly.
- F. Check whether the screws and nuts are loose.

4.2 Description of main control board terminals for calibration



Schematic diagram of main control board

Number	Name	Number	Name
1	LCD signal interface	2	Current sampling interface
3	Feedback signal interface	4	Voltage sampling interface
5	Main control board signal output interface	6	Temperature switch interface
7	Temperature sampling	8	Relay control interface
9	Main control board power connection		

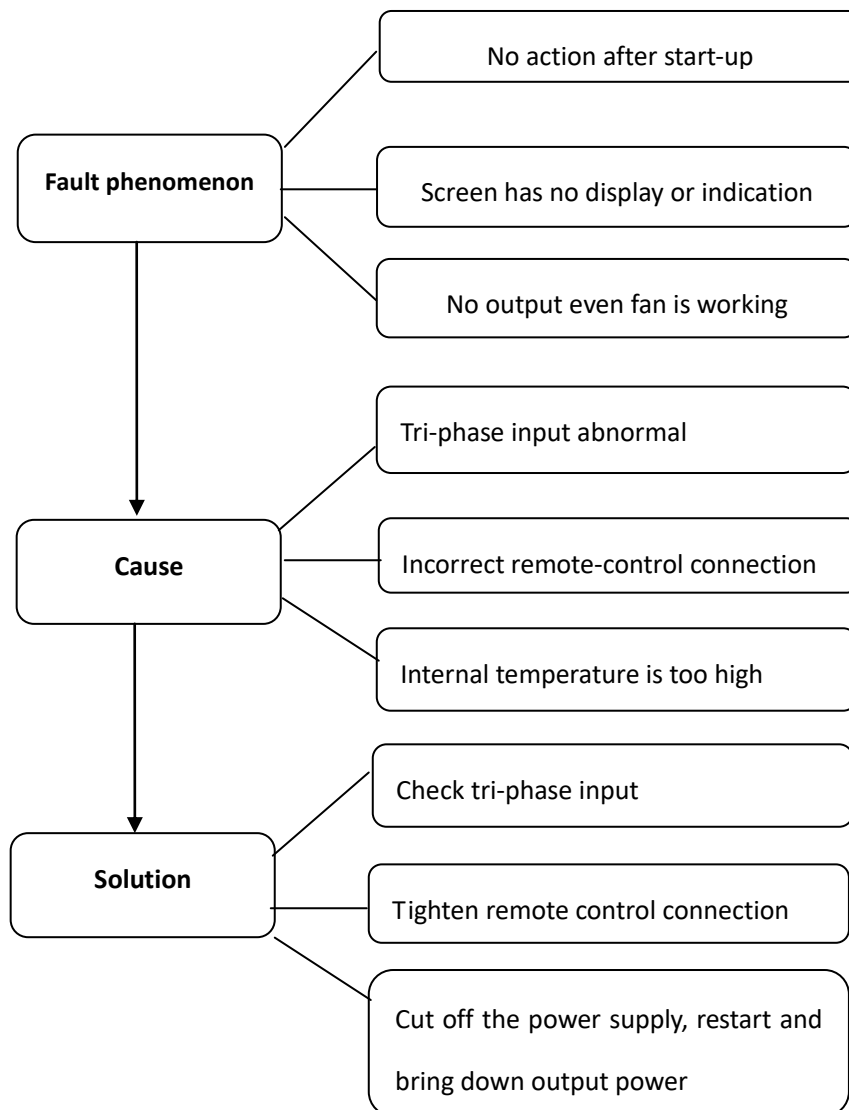
Chapter 5 Troubleshooting

5.1 Repair & Maintenance

1. Because this power supply has excellent materials and complete protection functions, it is generally not easy to malfunction.
2. If the mains power trips, please stop power supply and check immediately to avoid greater faults. The fault under this condition is generally the input rectifier bridge breakdown, or the inverter bridge module damage. Please check and replace with same model if fault found.
3. If there is an alarm signal or indication, please turn off the mains power and stop for a while, then reclose the mains, usually, it will recover. If the fault still exists, shut down power supply immediately for maintenance.
4. If the Ammeter and Voltmeter do not light up, it may be that the plug kitting of the meters is off, or the 5V power supply is damaged. Please check and replace if fault found.
5. If the current and voltage are both displayed as 000 after Power-on, it may be that the given potentiometer is in poor contact, or the drive circuit is faulty, or the inverter power module is damaged. Please check and confirm, replace and then, try to restart the power supply.
6. In general, if the output voltage can be adjusted from zero to the rated value but the output current is abnormal, it is mostly the external load problem. Please check the external connection points first to check whether the contact is good.
7. The repair & maintenance of power supply should be operated by professionals to avoid personal injury.
8. If the fault cannot be eliminated for a while, please contact us for further actions.

5.2 FAQ

If failure occurs during the use of DC power supply, please contact us directly, commonly, we do not encourage user to repair the power supply by themselves. However, some simple faults can be removed by the user, which are not caused by the power supply itself, but by improper installation or operation.



Chapter 6 Ordering Guide

6.1 Ordering instructions

1. Please select the product model, specification, quantity you need according to your application.
2. If the user is not uncertain with the requirements, please provide us with some application information as below so that we can give you some advice on model selection.
 - A. Actual working voltage and current.
 - B. If soft start feature required.
 - C. The load characteristics or usage.

6.2 Packing accessories

1. DC power supply * 1pc
2. Input cable *1pc
3. Operation Manual * 1pc