PROGRAMMABLE POWER SUPPLY

USER MANUAL

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Foreword

Please read the following safety precautions before using this product to avoid personal injury and prevent damage to this product or products connected to this product. To avoid possible danger, be sure to use this product as specified.

- ☐ **Use a suitable power cord.** Avoid fire or personal injury.
- ☐ **Ground the product.** This product is grounded through the ground wire of the power cord. The ground wire must be connected to the ground.
- ☐ **Do not block and isolate the machine's air inlets and fan vents.**
- ☐ **Never open the cover.** Do not allow the product when the cover or panel is open.
- ☐**Do not operate the product if you suspect it is malfunctioning.**
- ☐ **Use a suitable fuse.**
- ☐ **Do not operate in a humid environment.**
- ☐ **Do not operate in a flammable, explosive or humid environment.**

The main function

1. Single output, use MCU to precisely control the output voltage and current.

2. Can set output over-voltage, over-current protection, the machine has overload and over-temperature protection.

3.Four groups of panels save the recall settings.

4.Full digital panel operation, step adjustment using shuttle switch.

5.Constant voltage / constant current automatic switching.

6.485 communication interface, support Modbus protocol

7.Key lock to prevent misoperation.

Thank you for your trust in our products. After purchasing DC power series products, for better use, please read the instructions carefully before use and keep them in a safe place.

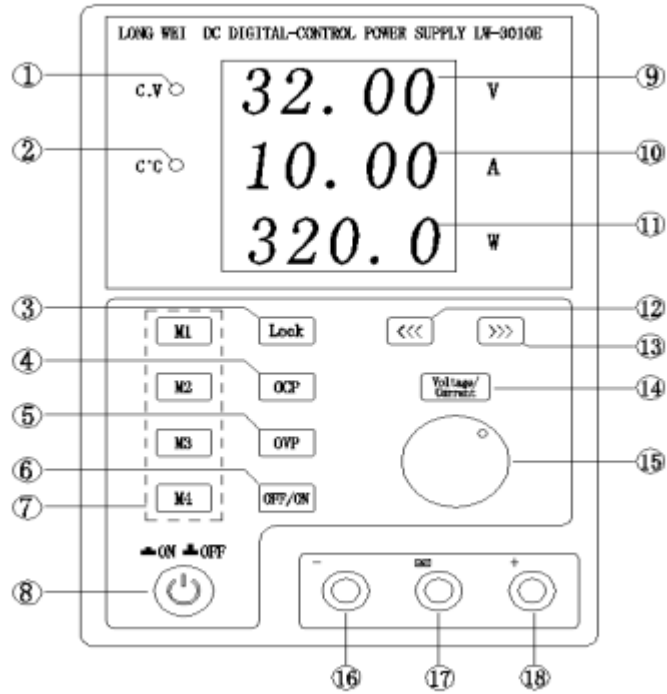
1. Overview

Note: The following indicators are measured after warming up for 20 minutes and the ambient temperature is 25 ℃ ± 5 ℃.

Model	305	3010	603	605	1003
Output voltage	0-32V	0-32V	0-62V	0-62V	0-102V
Output current	0-5A	0-10A	0-3A	0-5A	0-3A
Power effect					
Voltage	≤0.2%	≤0.2%	≤0.2%	≤0.3%	≤0.3%
Current	≤0.2%	≤0.2%	≤0.2%	≤0.3%	≤0.3%
Load effect					
Voltage	≤0.25%	≤0.25%	≤0.25%	≤0.25%	≤0.25%
Current	≤0.25%	≤0.25%	≤0.25%	≤0.25%	≤0.25%
Ripple					
Voltage	≤30mVrms	≤30mVrms	≤30mVrms	≤50mVrms	≤60mVrms
Current	≤15mArms	≤20mArms	≤20mArms	≤20mArms	≤20mArms
Output resolution					
Voltage	0.01V	0.01V	0.01V	0.01V	0.1V
Current	0.001A	0.01A	0.001A	0.001A	0.001A
Operating environment					

Altitude	≤2000m
Ambient temperature	-10℃~+40℃
Relative humidity	≤80%
Storage environment	
Ambient temperature	-40～+85℃
Relative humidity	≤80%
Input power	50/60HZ，AC220V/110V± 10% （Switch ）
Interface (optional)	
Remote control interface	RS485
Annex	
Standard accessories	Power host 1set、Input power cord 1pcs、Manual 1pcs
Size and weight	
Size	237(L)*111(W)*162(H)mm(No highlights)
Weight	2.3kg

2.Panel description



Front panel

①Constant voltage indicator ②Constant current indicator ③ Lock key ④Overcurrent protection key

⑤Overvoltage protection key ⑥Output start / stop key

⑦Store / Recall key ⑧power switch ⑨Voltage display

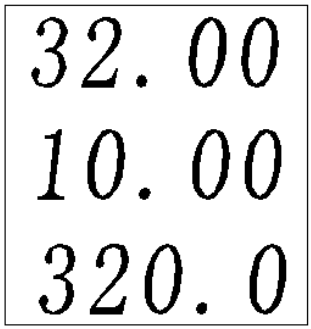
⑩Current display ⑪Power display ⑫Left key ⑬Right key

⑭Voltage and current switch key ⑮Adjustment knob

⑯Output terminal negative ⑰Output terminal ground

⑱Output terminal positive

Digital tube display



V

V:Display output voltage and voltage setting value.

A

A:Display output current and current setting value

W

W:The output power value isdisplayed, and "OFF" is displayed when the output is stopped.

Status Display

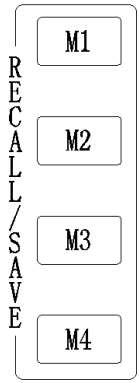
C.V ○

C.V is the output constant voltage indicator. This indicator is on when the power supply works in constant voltage mode.

C.C ○

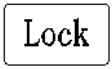
C.C is the output constant current indicator. When the power supply works in constant current mode, the indicator is on.

Panel operation introduction

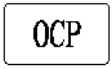


When pressed the stored content will be stored or recalled, which can be directly recalled.

The keys also serve as indicators. When a certain group is on, it indicates that the current power setting output is a parameter of this group.



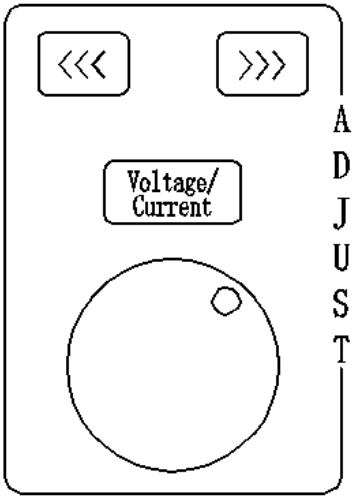
LOCK: Locks / unlocks the front panel settings. When the button is illuminated, other keys will be locked and disabled.



OCP: Enable or disable over-current setting; when over-current protection is enabled, this button will light up.

OVP: Turn on or off over-voltage protection; when over-voltage protection is on, this button lights up.

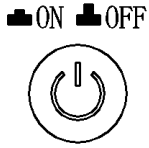
OFF/ON: Turn the output on or off; when the output is turned on, this button lights up.



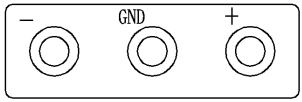
Voltage and current coarse and fine adjustment buttons, press >>> to decrease the adjustment rate of the shuttle knob, and press <<<to increase the adjustment rate of the shuttle knob.

Voltage and current adjustment switch.

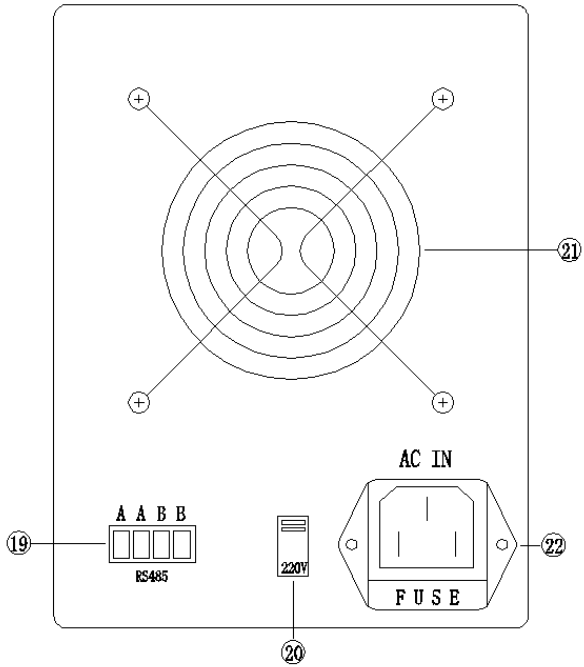
Quickly adjust the knob of the voltage and current; also is the buzzer on / off button.



Power switch button, press to turn on the power, and pop up will turn off the power.



Positive and negative output terminal, GND terminal is ground terminal.



BACK PANEL

⑲ RS485 interface ⑳ 110V / 220V input switching (default 220V)

㉑ Fan cooling air outlet ㉒ Power socket (including fuse holder)

3.Instructions

1.Output voltage and current settings

（1）Connect the load to the positive and negative output terminals on the front panel.

（2）Set the output voltage and current.

Press the “Voltage / Current” button to switch between the voltage adjustment and current adjustment keys. Use the jog dial to adjust the voltage and current. Press the "<<<" or ">>>" button, you can choose to operate in different positions of the digital tube to

adjust.

（3）Press "ON / OFF", the button will light up, and the output will be turned on. Depending on the load status, the CV lamp or CC lamp is on.

2.Output on / off

Press the output key "OFF / ON" to turn on the output and the key will light up. Press the output button again to turn off the output of the power supply and the button will be dimmed.

Note: In any of the following cases, the output will automatically stop.

（1）When the overcurrent protection is activated and the output current reaches the maximum current setting.

（2）When the overvoltage protection is activated and the output voltage exceeds the set overvoltage protection value.

3.Front panel lock

Press the LOCK key, the key lights up, and the front panel key operation is locked.

If the lock is released, press the LOCK key, the key will be dimmed, and the panel operation will resume.

4.Buzzer on / off

The buzzer is turned on by default. The buzzer can be turned off by pressing the jog dial; the buzzer will be turned on by pressing it again.

Note: The buzzer will sound an alarm when the overcurrent

protection is activated and overcurrent protection occurs, or when the overvoltage protection is activated and overvoltage protection occurs.

5.Store / Recall Settings

1.Storage settings (the machine provides 4 sets of storage)

Press the corresponding storage keys M1-M4, such as "M2", the M2 key will light up, and the digital tube will display the current stored voltage and current values. At this time, you can set the voltage and current. After the digital tube stops flashing, the power supply automatically saves the newly set voltage and current value in the M2 group.

2.Recall settings

Press any set of M1-M4 storage keys, such as the "M2" key, and the M2 key will light up. The nixie tube displays the stored voltage and current values and calls the stored voltage and current values. At this time, you can press the "ON / OFF" button to start the output.

6.Overcurrent and overvoltage protection

1.Overcurrent protection OCP

Over-current protection, that is, the output stops when the actual current exceeds the over-current value. It protects the load current from sudden changes and stops the output. Press the "OCP" button, the button lights up, the output current setting value is converted to the overcurrent protection value, and the power supply

enters the overcurrent protection mode. When the actual current reaches or exceeds the overcurrent value, the output is stopped, the buzzer beeps, and "OCP" is displayed. Press "OCP" again, the button will be dimmed and the over-current protection will be exited.

2.Overvoltage protection OVP

Over-voltage protection, that is, the output stops when the actual voltage exceeds the over-voltage value. It protects the load voltage from sudden changes and stops the output. Press the "OVP" button, the button lights up. The overvoltage setting value is (output voltage setting value + 0.5V). When the output voltage is greater than the overvoltage setting value, the power supply stops outputting, the buzzer beeps, the digital tube displays "OFF", press the OVP key again to stop the alarm and cancel the overvoltage protection.

4. Constant current / Constant voltage

The DC power supply can automatically switch between constant voltage mode (C.V) and constant current mode (C.C) according to the conditions of the load.

When the output current is less than the current output setting value, the DC power supply works in constant voltage mode, the front panel indicator (C.V) is on, the output voltage is constant, and the output current varies with the load.

When the output current reaches the set value, the power

supply enters the constant current mode (C.C), the indicator (C.C) on the front panel lights up, the current output will be constant at the preset value, and the output voltage will change with the load. When the output current is less than the preset value, the DC power supply will automatically return to the constant voltage mode (C.V).

5.Remote control

The rear panel has a power supply with a 485 communication interface, which can be connected to a PC through the interface and controlled remotely. If the PC does not provide a 485 interface, you can use a USB to 485 converter and connect it to a power source.

COM port setting Set the COM port on the PC as follows

Baud rate: 9600

Start bit: 1

Data bits: 8

Check digit: None

Stop bits: 1

Data overflow control: None

Note: For communication protocol and syntax, please refer to “RS485 and Modbus Communication Protocol Programming Guide”

6.Common problem

Question 1：Panel keys do not work

Answer 1: See if the LOCK key on the panel is on. If the light is on, the panel is locked. Press again to release the lock.

Problem 2: No power is output when the OFF / ON button is pressed

Answer 2: Check whether the current is set to 0A. Set a larger current to turn on the output.

Question 3: Press the OFF / ON key, the output voltage rises slowly

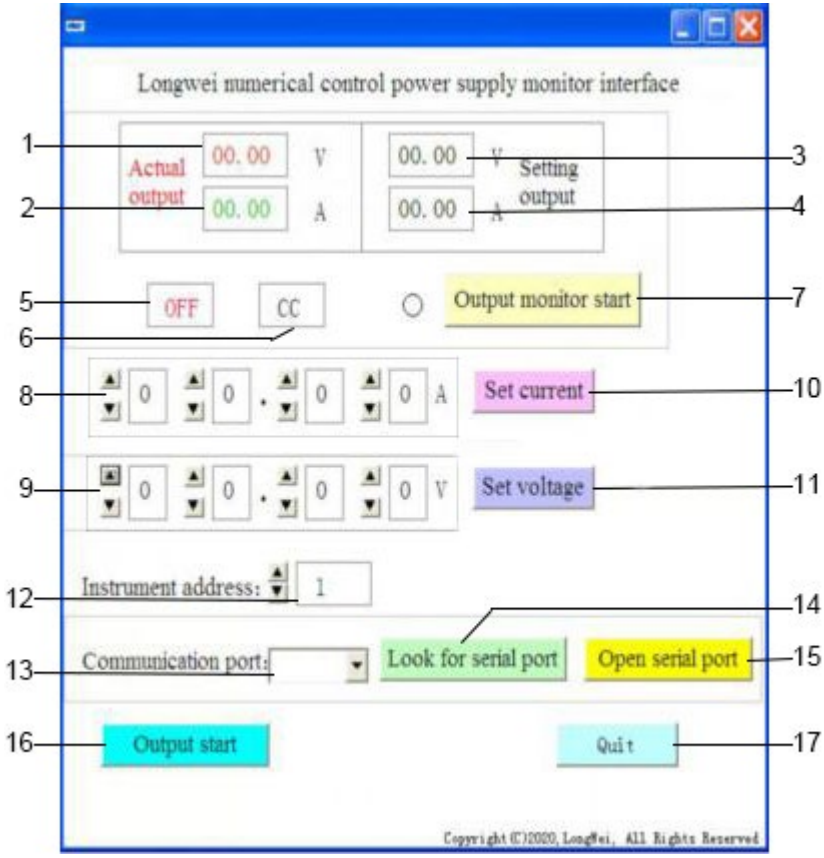
Answer 3: The current is set too small, and a larger current is sufficient.

Question 4: The voltage and current data are not saved

Answer 4: The digital tube is turned off while it is still flashing. The digital tube will automatically save data after it stops flashing.

7.Computer software interface description

The software is installed on the computer to monitor the status and value of the power supply in real time and control the parameters of the power supply.



1. The actual output voltage of the power supply.
2. The actual output current of the power supply.
3. Set voltage value of power supply.
4. Set current value of power supply.

5. Output status indication: “ON” means the output is started, and “OFF” means the output is stopped.

6. Display power status: "CV" indicates constant voltage status, "CC" indicates constant current status, and "OC" indicates overcurrent status.

7. Output monitoring start button: press to start monitoring, press again to close monitoring.

8. Operate on the output current value.

9. Operate on the output voltage value.

10. Communication control of set current to power supply.

11. Communication control of set voltage to power supply.

12. Select the instrument address for RS485 communication.

13. Displays the port number. The port number is generally between COM1-COM16. Select the corresponding port number from the drop-down list.

14. Look for serial port button. Press to find available port numbers.

15. Open the serial port button and press to open the communication port.

16. The output start button turns on and off the power output.

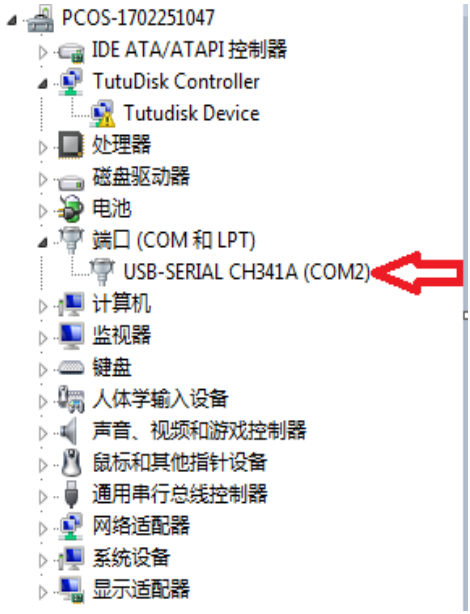
17. Exit software button, press exit software.

1.Serial driver installation and control software

Install the driver "CH340.exe". Click to open CH340.exe driver installation.

Install the software "NC Power Monitoring Assistant.exe".

2.Look for serial port button Look for serial port



Open the monitoring assistant software and click "Look for serial port", the communication port will display COM1 ~ COM16. If there are multiple display options, you can open the computer device manager, find the port bar, select the port number corresponding to CH341, and select COM2 as shown in the figure below.

3.Open serial button Open serial port

After looking for the serial port and selecting the port, opening the serial port will connect the computer to the power supply. "Port COMA is already open" will be displayed in the lower left corner after successful opening.

4.Output start button Output start

After the serial port is turned on and the power supply is successfully connected to the computer, you can start the power supply output. Click this button when “Output Start” is displayed, the power supply will start output, and the display will change to “Output Stop”. Click the button when "Output Stop" is displayed, the power supply will stop output, and the display will change to "Output Start".

5.Set current button Set voltage

In different positions on the left, scroll up and down to set the value, and then click the Set Current button. The control software will send the set value to the power supply, and the power supply will respond to change the set current value.

6.Set voltage button Set current

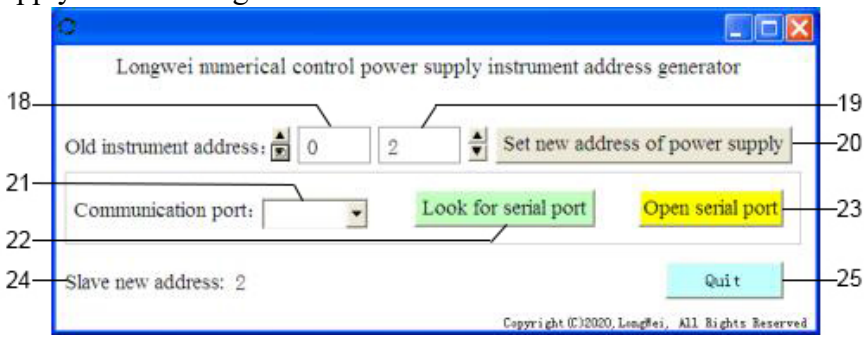
In different positions on the left, scroll up and down to set the value, and then click the set voltage button. The control software will send the set value to the power supply, and the power supply will respond to change the set voltage value.

7.Output monitor start Output monitor start

Click "Output monitoring start", the output window displays the actual output voltage and current value, and the status (constant voltage, constant current or over current) is displayed. At the same time, the key display changes to "output monitoring stop".

8.Instrument address setting Instrument address:

The default communication address of the machine is 1. When multi-machine slave control is needed, a new communication address needs to be set for each machine. Using the "Address Generator" software, the communication address of the power supply can be changed.



18. The current communication address of the power supply, just use 0.
19. New communication address to be set by the power supply.
20. Set new address of programmable power.
21. Displays the port number. The port number is generally between COM1-COM16. Select the corresponding port number in the drop-down list.
22. Look for the port, Press to find available port numbers.
23. Open the serial port button and press to open the communication port.
24. Show new the communication address.
25. Exit software button, press exit software.

8. Notes and statements

(1) Please use the software according to the operating instructions to reduce the chance of software bugs.

(2) If there is a bug, please restart the software.

(3)Before opening the software, please open the serial port, and then perform other operations. Click the "Output Monitor Start" button to start monitoring.

(4)Frequently receiving data between the computer and the power supply will occupy a certain amount of memory and cause a certain stall. Please do not open too much software and leave enough memory to prevent the software from becoming unresponsive and stuck.

(5)RS485 communication can connect up to 128 power supplies.

9. Communication FAQ

(1) If the driver is still not installed successfully, please download the driver and install it yourself.

(2) Can't find or open the serial port, please refer to Open Serial Port in the operating instructions. If the USB-SERIAL CH341 (COMA) suddenly disappears or is not found, please restart your computer.

(3) None of the above methods can work. Please check whether the RS485 data cable and the power supply are properly connected.

Standard accessories

Power host	1set
Input power cord	1pcs
Manual	1pcs
485 communication plug	1pcs（Optional）