

# True third-generation upgraded version DC buck power supply · CC/CV/CW

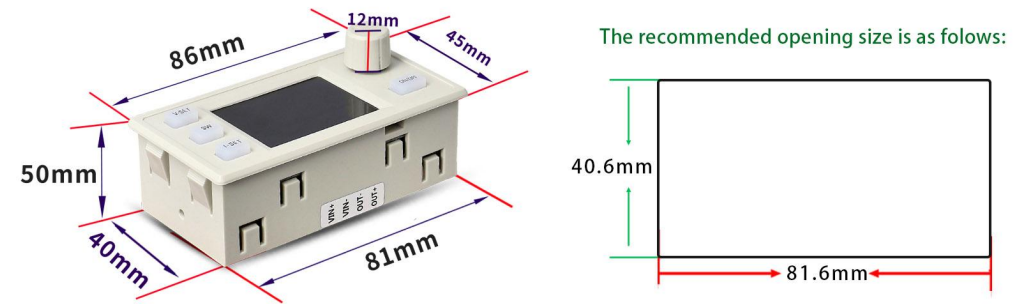
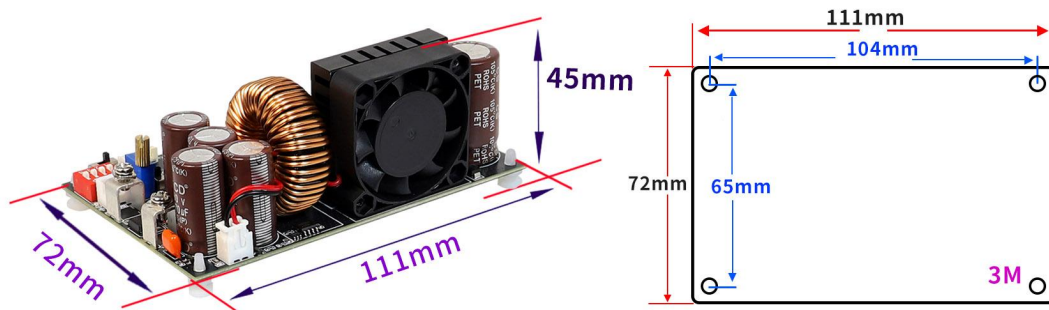
## Product parameters

|                                                                                |                                          |
|--------------------------------------------------------------------------------|------------------------------------------|
| Product name: DC buck power supply                                             | Model: XY7025                            |
| Input voltage: 12-85.00V                                                       | Output voltage: 0.0-70.00V               |
| Output current: 0-25.00A;                                                      | Accuracy of voltage: +0.5%+1 word        |
| Power output: 1750W                                                            | Accuracy of current: $\pm 0.5\%$ +3 word |
| Resolution of voltage: 0.01V                                                   | Resolution of current: 00.01A            |
| Storage data group: 10 groups                                                  | Number of buttons: 5                     |
| Screen size: Over 1.8-inch LCD with a<br>viewable area of 38*29mm              | Buzzer: YES                              |
| Efficiency of conversion: About 95%                                            | Soft start: YES                          |
| MPPT function: Support MPPT solar charging                                     | Output ripple typical value:vpp-150mv    |
| Product size: bare board:111x72x45mm; LCD:86x50x45mm                           |                                          |
| weight: bare board:203g with packaging 230g; A set of:129g with packaging 149g |                                          |

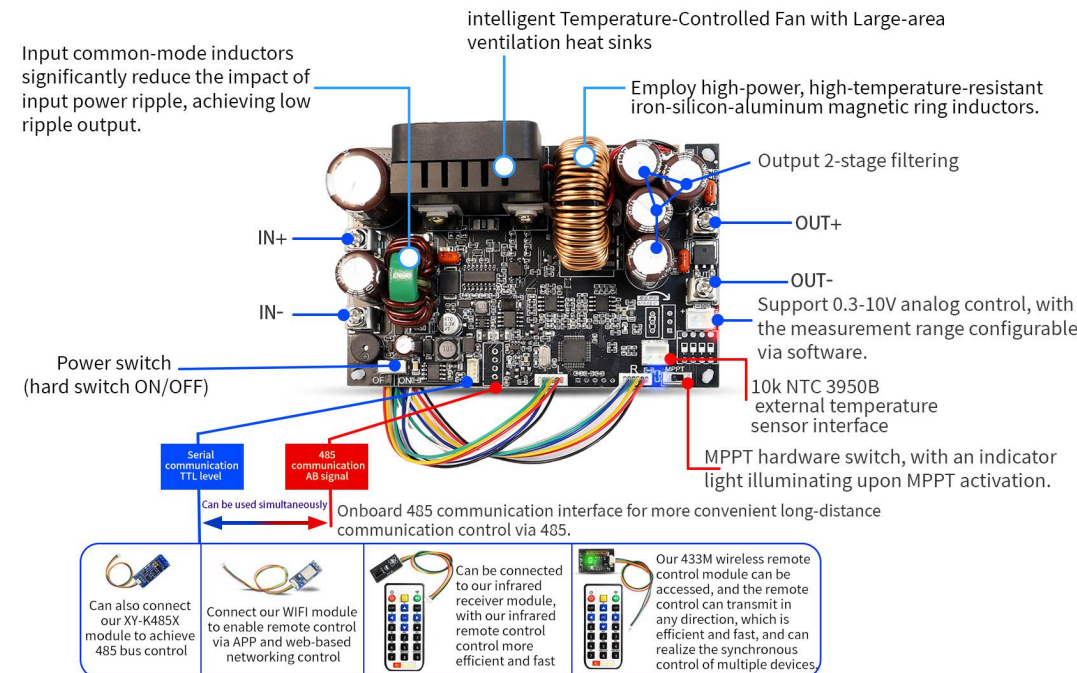
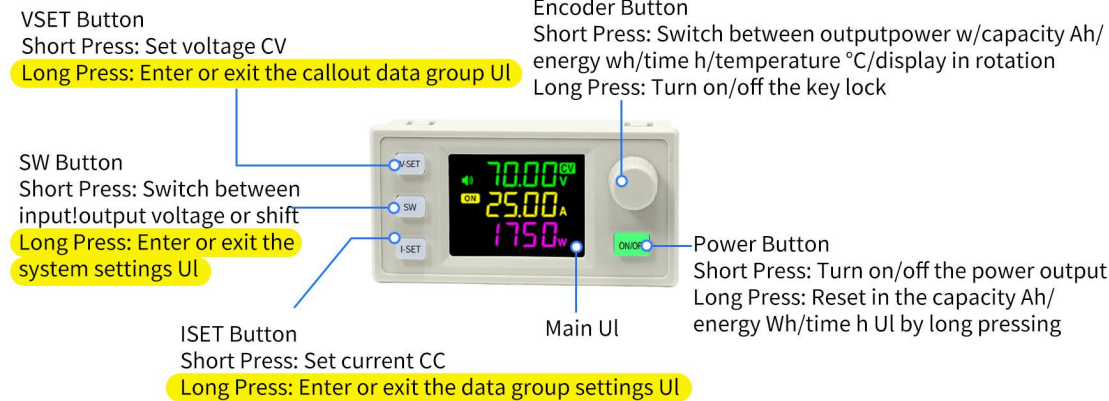
## Protection mechanism

- under-voltage (LUP): (Adjustable 10-95V, default 10V)
- over-voltage (OUP): (Adjustable from 0 to 72V, default is 72V)
- over-current (OCP): (Adjustable from 0 to 27A, default 27A)
- over-power (OPP): (Adjustable from 0 to 2000W, default is 1800W)
- over-temp (OTP): Adjustable from 0 to 110°C, default is 95 °C
- over-time out (OHP): 1 minute -99 hours 59 minutes, off by default
- over-capacity (OAH): 0-9999Ah, off by default
- over-energy (OPH): 0-4200KWh, off by default

## Product size



## Button Function

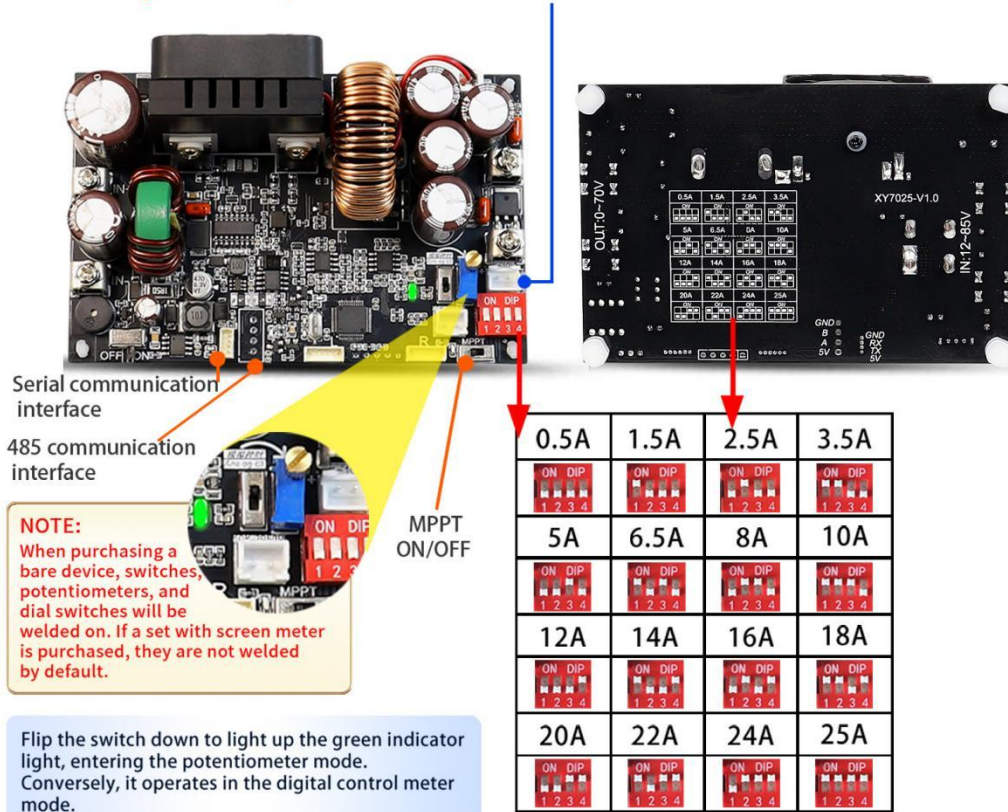


## Analog Control

- The bare board can be used independently, supporting MPPT and analog 0.3-10V control, with serial communication + on-board 485 communication (both can be used simultaneously).
- The output voltage is adjustable from 0-70V, and the output current is adjustable from 0-25A.

Support 0.3-10V analog control, with the measurement range configurable via software.

**Note:** Analog control is only available in the numerical control screen mode



Flip the switch down to light up the green indicator light, entering the potentiometer mode. Conversely, it operates in the digital control meter mode.

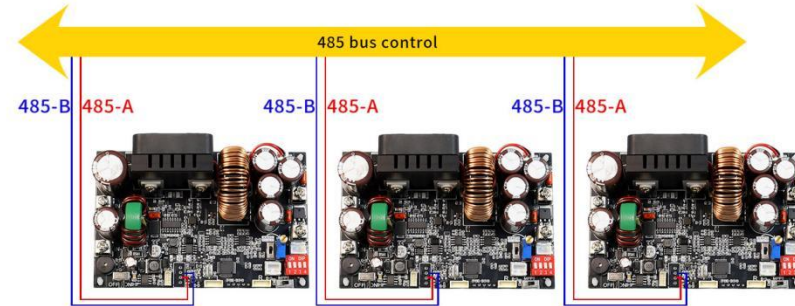
In potentiometer mode, the output voltage (constant voltage) can only be controlled through the potentiometer; the constant current value can be set via a dip switch, with a total of 16 gears to meet most scenarios (can also be set via Modbus).

The advantage of setting the constant current value through the dip switch is that it eliminates the need to use a multimeter's current range for measurement, thereby avoiding the potential burnout of the multimeter due to insufficient range of most multimeters' 10A gear.

## Low-cost communication power supply

Onboard 485 communication enables remote multi-machine control, and with our multi-serial port PC software, the functions are more powerful.

Communication control can be achieved with a separate bare board, providing a low-cost solution.



Independent dual serial ports (usable simultaneously) featuring serial TTL level communication and onboard 485 communication.

## Product UI function details

When the power supply is on, it is displayed ON

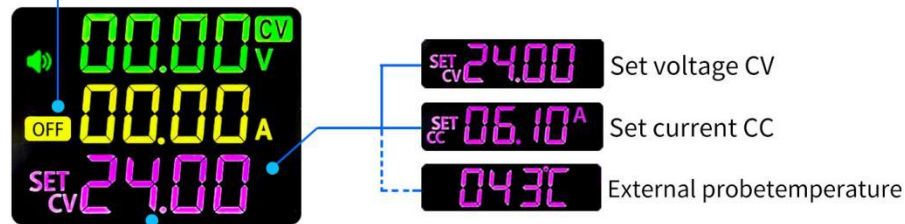


On the Main UI, short pressing the Encoder button toggles between displaying output power (W), capacity (Ah), energy (Wh), time (h), temperature (c), showing them in rotation.

When connected to an external temperature probe (10K 3950B NTC), it will automatically display the probe's temperature.



"OFF" is displayed when the power is off



When the power is off, the set voltage and current are displayed downward in turn.

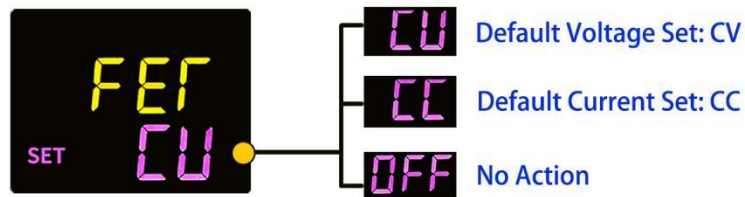
## Set the voltage/current

### 1. Set the voltage/current



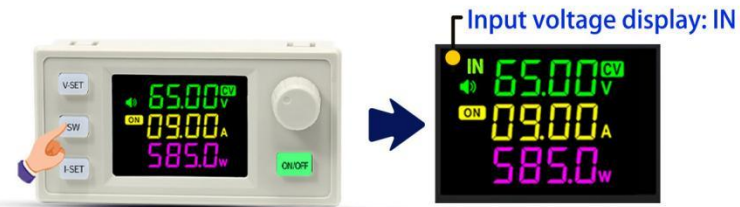
On the main UI, short press the **VSET** button to set the voltage. The LCD will display **VSET** in the lower row, and "CV" will flash to indicate that the voltage setting position is selected and blinking. Then, short press the **SW** button or the encoder button to switch the voltage setting position. Adjust the value by rotating the encoder. After setting is complete, short press the **VSET** button to exit and save. To set the current, short press the **ISET** button, and the setting steps are the same as for voltage.

### 2. Quick Setting of Voltage or Current



In the system parameter settings UI, set the parameter FET to CV or CC. Rotate the encoder on the main UI to enter the voltage or current setting UI. Rotate the encoder to quickly set the voltage or current.

### 3. Input/output voltage display



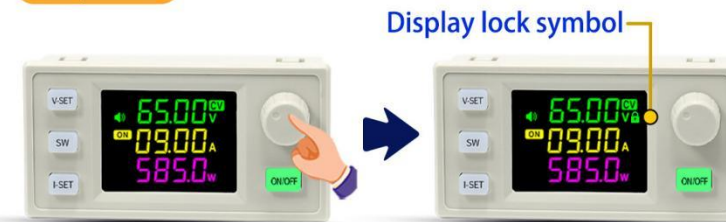
On the main UI, press the **SW** button briefly to switch between input and output voltage displays.

### 4. Checking power (W)/capacity (Ah)/energy (Wh)/time (h)



On the main UI, press the encoder button briefly to switch between displaying power (W)/capacity (Ah)/energy (Wh)/time (h)/temperature (°C) in rotation.

### 5. Key lock



On the main UI, press and hold the encoder button for 2 seconds to lock the set voltage and current to prevent misoperation; press and hold the encoder button for 2 seconds after locking to unlock.

### 6. Data Group Function

This product has a total of 10 data groups from Cd0 to Cd9.

Press and hold the VSET button on the main UI to access the data group UI.



You can press VSET/ISET briefly to switch between constant voltage (CV) and constant current (CC) settings. It supports quick viewing and modification of voltage and current in the data group, as well as SW shift operation.

After confirming the data group, press and hold the VSET/SW button or press the encoder button briefly to select the desired data group.

Introduction to CV/CC/CW



1 When the constant power function is not turned on, the power supply only has the functions of constant voltage (CV) and constant current (CC), which automatically switch based on the load;

1.1 When the load current is less than the set constant current value, the power supply is in the constant voltage mode, where the output voltage is the set voltage value CV, and the current is adaptive;

1.2 When the load current exceeds the set constant current value, the power supply automatically enters the constant current mode. At this time, the output current is the set constant current value CC, and the voltage is adaptive;

2 After the constant power function is turned on, the constant current value defaults to the maximum value , and the constant voltage value CV serves as the initial voltage (set to a reasonable value based on actual conditions). After the power supply is turned on, the equivalent resistance R of the load is calculated using Ohm’ s law  $R=U/I$ . Then, the corresponding voltage can be calculated based on the set constant power value using the power formula  $P=U/R$ . At this point, the constant power point algorithm automatically follows, and the constant power is achieved.

Constant Power Switch and Constant Power Value Setting

- 1. Press and hold SW on the main UI to enter system set.
- 2. Press ISET/VSET briefly to switch to the "-CP-" constant power switch option. Press ON to enable constant power and OFF to disable it.
- 3. After enabling constant power, press ISET briefly on the main interface to modify the value of constant power.

Data Group Parameter Set

Press and hold the ISET button on the main interface to enter the settings menu. The first parameter is to select the data group Cd0-9.

Press VSET briefly to select the next parameter, and press ISET briefly to select the previous parameter. After completing the settings, press and hold the ISET/SW/encoder button to exit the settings UI.

|                                     |                                                                                                                                                                                                                                                                                                                                                                                    |
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| <p>Data Group Selection Cd0-Cd9</p> | <p>Rotate the encoder to select the desired data group Cd0-Cd9.</p> <p>For example, if Cd2 is selected, subsequent parameter settings will be for the Cd2 data group.</p>                                                                                                                                                                                                          |
| <p>Setting Voltage CV</p>           | <p>Briefly press SW or the encoder button to select the position, and rotate the encoder to adjust the value.</p> <p>For instance, setting 12.00 will result in a CV voltage of 12.00V when this data group is accessed.</p>                                                                                                                                                       |
| <p>Setting Current CC</p>           | <p>Briefly press SW or the encoder button to select the position, and rotate the encoder to adjust the value.</p> <p>For example, setting 6.000 will result in a CC current of 6.000A when this data group is accessed.</p> <p>Note: The CV and CC modes switch automatically based on the load. When the load reaches the set CC value, it automatically switches to CC mode.</p> |

|                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>LVP Settings (Input Under-Voltage Protection)</p>  | <p><b>Briefly press SW or the encoder button to select the position, and rotate the encoder to adjust the value.</b></p> <p>For instance, if LVP is set to 12.00V, the output will be shut off for protection when the input voltage drops below 12.00V.</p> <p>After protection, "LUP" will be displayed on the bottom line. Press any button to cancel the alarm. When the input voltage rises above LUP, protection is automatically canceled.</p>                                                                                                                                                                                                                                                                                        |
| <p>OVP Settings (Over-Voltage Protection)</p>         | <p><b>Short press SW or encoder button to select the position, rotate the encoder to adjust the value.</b></p> <p>For instance, if OVP is set to 24.00, when the output voltage exceeds 24.00V, the output will be shut off for protection, thus protecting the load from burnout due to overvoltage.</p> <p>After protection, "OVP" will be displayed on the bottom line. Press any button to cancel the alarm.</p>                                                                                                                                                                                                                                                                                                                         |
| <p>OCP Setting (Over-Current Protection)</p>          | <p><b>Short press SW or encoder button to select the position, rotate the encoder to adjust the value.</b></p> <p>Short press SW or encoder button to select the position, rotate the encoder to adjust the value.</p> <p>For example, if OCP is set to 2.000, when the output current exceeds 2.000A, the output will be shut off for protection, protecting the load from burnout due to overcurrent.</p>                                                                                                                                                                                                                                                                                                                                  |
| <p>OPP Setting (Over-Power Protection)</p>            | <p><b>Short press SW or encoder button to select the position, rotate the encoder to adjust the value.</b></p> <p>For instance, if OPP is set to 100.0W, when the output power exceeds 100.0W, the output will be shut off for protection, preventing the load from burnout due to overpower.</p> <p>After protection, "OPP" will be displayed on the bottom line. Press any button to cancel the alarm.</p>                                                                                                                                                                                                                                                                                                                                 |
| <p>OAH Setting (Over-Capacity Protection)</p>       | <p><b>Short press the power button to turn on/off the over-capacity protection function. ---- This function is off by default.</b></p> <p>Short press the power button to activate this function, then short press SW or encoder button to select the position, rotate the encoder to adjust the value. Long press the power button to switch the decimal point position (0.000Ah, 00.00Ah, 000.0Ah, 0000Ah). The maximum setting is 9999Ah.</p> <p>For example, if OAH is set to 2.000Ah, when the cumulative output capacity exceeds 2.000Ah, the output will be shut off for protection.</p> <p>After protection, "OPP" will be displayed on the bottom line. Press any button to cancel the alarm and reset the cumulative capacity.</p> |

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| <p>OPH Setting (Over-Energy Protection)</p>         | <p><b>Short press the power button to turn on/off the over-energy protection function. ---- This function is off by default.</b></p> <p>Short press the power button to activate this function, then short press SW or encoder button to select the position, rotate the encoder to adjust the value. Long press the power button to switch the decimal point position (0.000Wh, 00.00Wh, 000.0Wh, 0000Wh, 0.0.0.0Wh (representing 0000KWh)). The maximum setting is 4200KWh.</p> <p>For instance, if OPH is set to 500.0Wh, when the cumulative output energy exceeds 500.0Wh, the output will be shut off for protection.</p> <p>After protection, "OPH" will be displayed on the bottom line. Press any button to cancel the alarm and reset the cumulative energy.</p> |
| <p>OHP Setting (Over-Time Protection)</p>           | <p><b>Short press the power button to turn on/off the over-time protection function. ---- This function is off by default.</b></p> <p>Short press the power button to activate this function, then short press SW or encoder button to select the position, rotate the encoder to adjust the value. The minimum unit is 1 minute, and the maximum setting is 99:59 (99 hours 59 minutes).</p> <p>For example, if OHP is set to 02:30, when the output is on for more than 2 hours and 30 minutes, the output will be shut off for protection.</p> <p>After protection, "OHP" will be displayed on the bottom line. Press any button to cancel the alarm and reset the cumulative time.</p>                                                                                 |
| <p>OTP Setting (Over-Temperature Protection)</p>  | <p><b>Short press SW or encoder button to select the position, rotate the encoder to adjust the value in units of °C or °F (Switch between °C or °F in the system settings interface).</b></p> <p>For instance, if OTP is set to 90°C, when the PCB temperature near the power transistor reaches 90°C, the output will be shut off for protection.</p> <p>After protection, "OTP" will be displayed on the bottom line. Press any button to cancel the alarm. When the temperature drops below OTP, the protection will be automatically canceled.</p>                                                                                                                                                                                                                    |

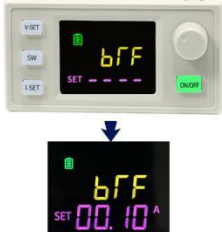
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| <p>ETP Settings (External Over-Temperature Protection)</p>  | <p>Press the power button briefly to enable/disable the external over-temperature protection function, which is defaulted to "off" when disabled.</p> <p>To enable this function, briefly press the power button, then press the SW or encoder button to select the position, and rotate the encoder to adjust the value.</p> <p>For example, if the ETP is set to 60°C, upon connecting an external temperature probe (10K, NTC probe), the output will automatically shut off for protection when the temperature exceeds 60°C.</p> <p>After protection is activated, "ETP" will be displayed on the bottom row. Press any button to cancel the alarm, and the protection will be automatically lifted when the temperature falls below the ETP setting.</p> <p>Application Scenario: Attach the external temperature probe to the load (such as a rechargeable battery). When the load temperature exceeds the set temperature, the output will be shut off for protection, effectively preventing the load from overheating and damaging.</p> |
| <p>PON Settings (Power-On Output)</p>                       | <p>Rotate the encoder to select between OFF (output off upon power-on) and ON (output on upon power-on).</p> <p>For example, if PON is set to OFF, then the output is off when the power is just powered on, you need to press the power button to open the output; Otherwise, the output is directly turned on after the power-on.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## System Parameter Set

Press and hold the SW button on the main interface to enter the settings menu. The first parameter is the buzzer setting (bEP). Press VSET briefly to select the next parameter and press ISET briefly to select the previous parameter. After completing the settings, press and hold the SW/encoder button to exit the settings.

|                                                                                                                        |                                                                                                                                                                      |
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| <p>bEP Settings (Beeper Enable)</p>  | <p>Rotary encoder to turn on/off the beeper.</p> <p>For example, selecting OFF will disable the beeper, and there will be no keystroke prompt tone or alarm one.</p> |
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|                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>b-L Settings (LCD Brightness Adjustment)</p>                       | <p>Rotary encoder to adjust the brightness level.</p> <p>1-5 levels, factory default is level 5 (brightest).</p>                                                                                                                                                                                                                                                                                 |
| <p>C-F Settings (Choice between Celsius °C and Fahrenheit °F)</p>     | <p>Rotary encoder to select 'C' or '°F'</p> <p>Meeting the needs of different countries and regions worldwide.</p>                                                                                                                                                                                                                                                                               |
| <p>FET Settings (Quick Adjustment of Voltage, Current, or Power)</p>  | <p>Rotary encoder to select CV/CC/OFF/CP.</p> <p>CV: Quickly adjust voltage using the rotary encoder on the main interface.<br/>CC: Quickly adjust current using the rotary encoder on the main interface.<br/>OFF: No action when rotating the encoder on the main interface.<br/>CP: Quickly adjust power using the rotary encoder on the main interface (when constant power is enabled).</p> |
| <p>Add Settings (Power Supply Address)</p>                            | <p>Pressing the SW/encoder button briefly to select the bit, and rotate the encoder to adjust the numerical value.</p> <p>Value range: 1~247, factory default is 001.</p> <p>The product with serial communication is a low-cost communication power supply that supports the standard ModBus protocol and can be networked through 485 modules or WIFI modules.</p>                             |
| <p>bRE Settings (Communication Baud Rate Settings)</p>              | <p>Rotary encoder to set different values from 0-8.</p> <p>0:9600 1: 14400 2: 19200<br/>3:38400 4: 56000 5: 576000<br/>6:115200 7: 2400 8: 4800<br/>默认6波特率115200</p>                                                                                                                                                                                                                             |
| <p>PPT Settings (MPPT Solar Charging Settings)</p>                  | <p>Rotary encoder to turn on/off the MPPT function. OFF: Disable. ON: Enable.</p> <p>After enabling, press the SW or encoder button briefly to switch to setting the maximum power point coefficient. Rotate the encoder to adjust the coefficient value between 0.75-0.85, with a default of 0.8.</p>                                                                                           |

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| <p><b>CW Settings</b><br/>(Constant Power CW ON/OFF)</p>                        | <p>To enable or disable the constant power CW function using a rotary encoder</p> <p>After enabling constant power, press ISET briefly on the main interface to modify the value of constant power.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>bCH Settings</b><br/>(Battery automatic charging threshold setting.)</p>  | <p>Press the power button briefly to turn this function on or off .<br/>----This function is off by default.</p> <p>When the battery voltage falls below the threshold, the power output is automatically activated to commence charging.</p> <p>For instance, if the threshold is set at 12.00V, when the battery voltage drops below 12.00V, the power output is automatically activated to start charging the battery.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>bTF Setting</b><br/>(Charge Cutoff Current)</p>                           | <p>Press the power button briefly to turn this function on or off<br/>----This function is off by default.</p> <p>After enabling this function, press the SW or encoder button briefly to select the digit, and rotate the encoder to adjust the value in mA.</p> <p>For example, if set to 10mA, when charging the battery, if the charging current is less than 10mA, it will be considered as fully charged, and the output will be disconnected to prevent overcharging and damaging the battery.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>CLU Setting</b><br/>(Calibrate Output Voltage)</p>                      | <p>If the output voltage is inaccurate, you can calibrate it<br/>(do not connect any load during calibration).</p> <ol style="list-style-type: none"> <li>1.Press and hold the power button to start calibration, and "01" will be displayed on the first line.</li> <li>2.Measure the output voltage using a high-precision multi-meter and input the actual voltage into the third line (SW shift operation is supported).</li> <li>3.Press the power button briefly to enter the second step of calibration, and "02" will be displayed on the first line.</li> <li>4.Repeat step 2 and input the actual voltage into the third line.</li> <li>5.Press the power button again briefly, and "03" will be displayed on the first line. Wait for calibration to complete without any other operation. If successful, "SUC" will be displayed; if failed, "ERR" will be displayed.</li> </ol> <p>Note: If calibration fails, you can try again. If you accidentally enter the calibration state, you can exit by pressing and holding the power button, and the parameters will not be saved after exiting.</p> |

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| <p><b>CLA Setting</b><br/>(Calibrate Output Current)</p>                           | <p>If the output current is inaccurate, you can calibrate it.</p> <ol style="list-style-type: none"> <li>1.Connect a multimeter in current mode or an electronic load (the electronic load needs to be set to the maximum range of the product) directly to the output terminal.</li> <li>2.Press and hold the power button to start calibration, and "01" will be displayed on the first line. Input the actual current value from the multimeter or electronic load into the third line (SW shift operation is supported).</li> <li>3.Press the power button briefly to enter the second step of calibration, and "02" will be displayed on the first line.</li> <li>4.Repeat step 2 and input the actual current into the third line.</li> <li>5.Press the power button again briefly and wait-for calibration to complete without any other operation. If successful, "SUC" will be displayed; if failed, "ERR" will be displayed.</li> </ol> <p>Note: If calibration fails, you can try again. If you accidentally enter the calibration state, you can exit by pressing and hold-ing the power button, and the parameters will not be saved after exiting.</p> |
| <p><b>ZERO Setting</b><br/>(Current Zero Calibration)</p>                          | <p>If there is a small current with n 100mA when the output is not connected to a load, you can press and hold the power button to calibrate the zero point. Do not connect any load to the output terminal during zero calibration</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>CLOF Setting</b><br/>(Force Power Output Off When Switching Data Sets)</p>  | <p>Rotate the encoder to select ON or OFF for this function.</p> <p>ON: Enable this function. After enabling, when switching data sets, the power will be forcibly turned off to prevent high voltage from damaging the load.</p> <p>OFF: Disable this function. After disabling, the power switch state will be maintained when switching data sets.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>POFF</b><br/>(ShutDown Function)</p>                                       | <p>ON: Enable the ShutDown function. Press and hold the Power Key for 5 seconds to shut down;In the shutdown state, click the Power Key to start up;</p> <p>OFF: Disable the shutdown function;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>RET Setting</b><br/>(Restore Factory Settings)</p>                         | <p>Press and hold the power button<br/>---- it stops blinking to restore factory settings.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <p><b>WIFI Config</b><br/>(Need WF-POW module)</p>    | <p><b>Modify pairing mode with encoder</b></p> <p>-----: Invalid Wifi<br/>TOH: Touch Pair<br/>AP: AP Pair<br/>ROU: Connect Router<br/>nET: NetWorking</p>                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>AnA Setting</b><br/>(Analog Control)</p>        | <p><b>Analog Control Voltage Range, which can be self-configured.</b></p> <p>Adjustable analog voltage range from 2 to 10V;<br/>For example, with an analog voltage range of 0~5V and a power output range of 36V, when the signal voltage is 2V, the output voltage = <math>2V / (5V - 0.3V) * 36V = 15.32V</math>.</p> <p>When the signal voltage is below 0.3V, the output voltage is 0V. When the signal voltage exceeds the set maximum value, the output voltage is the set maximum range voltage.</p> |
| <p><b>UER View</b><br/>(Firmware Version Number)</p>  | <p>The firmware version number of the program.<br/>The product will support firmware upgrades to access new features.</p>                                                                                                                                                                                                                                                                                                                                                                                    |

## About Sinilink



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1、Protocol introduction

The communication protocol is MODBUS-RTU protocol, the product only supports function codes 0x03,0x06,0x10; the communication interface is TTL serial port;

2、Introduction of the communication protocol

Information transmission is asynchronous, and the Modbus-RTU mode is in 11-bit bytes

|                              |                   |
|------------------------------|-------------------|
| Word format<br>(serial data) | The 10-bit binary |
| start bit                    | One               |
| data bit                     | Eight             |
| parity check bit             | not have          |
| stop bit                     | One               |

Data frame structure:

|                        |              |         |            |                  |
|------------------------|--------------|---------|------------|------------------|
| Data frame interval    | address code | FC      | data field | CRC verification |
| Of 3.5 bytes and above | 1 Bytes      | 1 Bytes | N byte     | 2 Bytes          |

Before sending data, the rest time of data bus, i. e., no data transmission time is greater than 3.5 (e. g., baud rate is 9600 When 5ms) message sending to start with at least 3.5 bytes of time pause interval, the entire message frame must be as a series The continued data stream is refreshed if there is more than 3.5 bytes of pause before the frame is completed  
Incomplete message and assume that the next byte is the address domain for a new message. Similarly, if a new message is less than Within 3.5 characters, then before the previous message begins, the receiving device will regard it as a continuation of the previous message.

1.1 Address code:

The address code is the first byte (8 bits) of each communication message frame, ranging from 1 to 255. This byte indicates the set by the user

The slave of the address will receive the information sent by the host machine. Each slave must have a unique address code and only the ground The slave of the address code can respond to the return information. When the information is returned, the data starts with the respective address code.host

The address code sent by the machine indicates the slave machine address that will be sent to, and the address code returned by the slave machine indicates the returned slave machine address.each other The address code required indicates where the information comes from.

1.2 Function code:

The function code is the second byte of each communication information frame transmission, and the function code defined by the ModBus communication regulation is 1 to 127. Send as a host request, tell the slave what action to perform through a function code. As a slave response, return return  
The function code is the same as the function code sent from the host, and indicates that the slave has responded to the host and has performed related operations.  
This machine only supports 0x03,0x06,0x10 functional codes.

| FC   | definition               | Operation (binary)                                       |
|------|--------------------------|----------------------------------------------------------|
| 0x03 | Read register data       | Reads the data for one or more registers                 |
| 0x06 | Write a single register  | Write a set of binary data to a single register          |
| 0x10 | Write multiple registers | Write multiple sets of binary data to multiple registers |

1.3, and the data area

The data area includes what kind of information to be returned by the machine or what action to perform, which can be data (e. g., on Off volume input / output, analog volume input / output, register, etc.), reference address, etc. For example, the host passes by the function code  
03 tells the value of the return register (including the starting address of the register to read and the length of the read register)  
The data returned includes the data length of the register and the data content.

0x03 Read the functional host format

| address code | FC      | Register start address | Number of register addresses n (1~32) | CRC check code |
|--------------|---------|------------------------|---------------------------------------|----------------|
| 1 Bytes      | 1 Bytes | 2 Bytes                | 2 Bytes                               | 2 Bytes        |

### 0x03 Read function returns the format from the machine

| address code | FC      | Number of returned registers n * 2 | Register data   | CRC check code |
|--------------|---------|------------------------------------|-----------------|----------------|
| 1 Bytes      | 1 Bytes | 1 Bytes                            | And 2 * n bytes | 2 Bytes        |

### 0x06 Write a single register function host format

| address code | FC      | Register start address | Register data | CRC check code |
|--------------|---------|------------------------|---------------|----------------|
| 1 Bytes      | 1 Bytes | 2 Bytes                | 2 Bytes       | 2 Bytes        |

### 0x06 Write a single register function from the machine return format

| address code | FC      | Register start address | Register data | CRC check code |
|--------------|---------|------------------------|---------------|----------------|
| 1 Bytes      | 1 Bytes | 2 Bytes                | Two bytes     | 2 Bytes        |

### 0x10 Write in a multiple-register function host format

| address code | FC      | Register start address | Number of register addresses n (1~32) | Write the number of bytes 2*n | Register data | CRC check code |
|--------------|---------|------------------------|---------------------------------------|-------------------------------|---------------|----------------|
| 1 Bytes      | 1 Bytes | 2 Bytes                | 2 Bytes                               | 1 Bytes                       | 2 * n Bytes   | 2 Bytes        |

### 0x10 Write multiple registers from the host format

| address code | FC      | Register start address | Number of register addresses n | CRC check code |
|--------------|---------|------------------------|--------------------------------|----------------|
| 1 Bytes      | 1 Bytes | 2 Bytes                | 2 Bytes                        | 2 Bytes        |

**Factory default port rate 115200 device address 1**

**Protocol register introduction (the data in a single register address is double-byte data)**

| name    | explain                      | Byte number | radius point | unit | read - write | Register address (decimal system) | Register address (hexadecimal) |
|---------|------------------------------|-------------|--------------|------|--------------|-----------------------------------|--------------------------------|
| V-SET   | Voltage setting              | 2           | 2            | V    | R/W          | 0                                 | 0x0000                         |
| I-SET   | Current setting              | 2           | 3            | A    | R/W          | 1                                 | 0x0001                         |
| VOUT    | Output voltage display value | 2           | 2            | V    | R            | 2                                 | 0x0002                         |
| IOUT    | Output current display value | 2           | 3            | A    | R            | 3                                 | 0x0003                         |
| POWER   | Output power display value   | 2           | 2            | W    | R            | 4                                 | 0x0004                         |
| UIN     | Input voltage display value  | 2           | 2            | V    | R            | 5                                 | 0x0005                         |
| AH-LOW  | Output AH is low by 16 bits  | 2           | 0            | maH  | R            | 6                                 | 0x0006                         |
| AH-HIGH | Output AH is high by 16 bits | 2           | 0            | maH  | R            | 7                                 | 0x0007                         |
| WH-LOW  | Output WH is low by 16 bits  | 2           | 0            | mwH  | R            | 8                                 | 0x0008                         |
| WH-HIGH | Output WH high by 16 bits    | 2           | 0            | mwH  | R            | 9                                 | 0x0009                         |
| OUT_H   | Open time-length-hours       | 2           | 0            | H    | R            | 10                                | 0x000A                         |
| OUT_M   | Start length-                | 2           | 0            | M    | R            | 11                                | 0x000B                         |

|             |                                          |   |   |     |     |    |        |
|-------------|------------------------------------------|---|---|-----|-----|----|--------|
|             | minutes                                  |   |   |     |     |    |        |
| OUT_S       | Open time-seconds                        | 2 | 0 | S   | R   | 12 | 0x000C |
| T_IN        | Internal temperature value               | 2 | 1 | F/C | R   | 13 | 0x000D |
| T_EX        | External temperature value               | 2 | 1 | F/C | R   | 14 | 0x000E |
| LOCK        | Key lock                                 | 2 | 0 | –   | R/W | 15 | 0x000F |
| PROTECT     | protect status                           | 2 | 0 | –   | R/W | 16 | 0x0010 |
| CVCC        | Constant pressure constant current state | 2 | 0 | –   | R   | 17 | 0x0011 |
| ONOFF       | switched output                          | 2 | 0 | –   | R/W | 18 | 0x0012 |
| F-C         | The temperature symbol                   | 2 | 0 | –   | R/W | 19 | 0x0013 |
| B-LED       | Back brightness level                    | 2 | 0 | –   | R/W | 20 | 0x0014 |
| SLEEP       | Rest screen time                         | 2 | 0 | M   | R/W | 21 | 0x0015 |
| MODEL       | product model                            | 2 | 0 | –   | R   | 22 | 0x0016 |
| VERSION     | Firmware version number                  | 2 | 0 | –   | R   | 23 | 0x0017 |
| SLAVE-ADD   | From the machine address                 | 2 | 0 | –   | R/W | 24 | 0x0018 |
| BAUDRATE_L  | Baud rate                                | 2 | 0 | –   | R/W | 25 | 0x0019 |
| T-IN-OFFSET | Internal temperature correction          | 2 | 1 | F/C | R/W | 26 | 0x001A |
| T-EX-OFFSET | External temperature                     | 2 | 1 | F/C | R/W | 27 | 0x001B |

|           |                                      |   |   |   |     |    |        |
|-----------|--------------------------------------|---|---|---|-----|----|--------|
|           | correction                           |   |   |   |     |    |        |
| BUZZER    | The buzzer switch                    | 2 | 0 | – | R/W | 28 | 0x001C |
| EXTRACT-M | Quickly call up the data group       | 2 | 0 | – | R/W | 29 | 0x001D |
| DEVICE    | device status                        | 2 | 0 | – | R/W | 30 | 0x001E |
| MPPT-SW   | MPPT switch                          | 2 | 0 | – | R/W | 31 | 0x001F |
| MPPT-K    | MPPT Maximum power point coefficient | 2 | 0 | – | R/W | 32 | 0x0020 |
| BatFul    | Full current current                 | 2 | 0 | – | R/W | 33 | 0x0021 |
| CW-SW     | Constant power switch                | 2 | 0 | – | R/W | 34 | 0x0022 |
| CW        | Constant power value                 | 2 | 0 | – | R/W | 35 | 0x0023 |
|           |                                      |   |   |   |     |    |        |
|           |                                      |   |   |   |     |    |        |
|           |                                      |   |   |   |     |    |        |
|           |                                      |   |   |   |     |    |        |
| V-SET     | Voltage setting                      | 2 | 2 | V | R/W | 80 | 0x0050 |
| I-SET     | Current setting                      | 2 | 3 | A | R/W | 81 | 0x0051 |
| S-LVP     | Low pressure protection value        | 2 | 2 | V | R/W | 82 | 0x0052 |
| S-OVP     | Overpressure protection value        | 2 | 2 | V | R/W | 83 | 0x0053 |
| S-OCF     | Overflow protection value            | 2 | 3 | A | R/W | 84 | 0x0054 |
| S-OPP     | Overpower protection value           | 2 | 1 | W | R/W | 85 | 0x0055 |
| S-OHP_H   | Maximum output time-                 | 2 | 0 | H | R/W | 86 | 0x0056 |

|         |                                                |   |   |           |     |    |        |
|---------|------------------------------------------------|---|---|-----------|-----|----|--------|
|         | -hours                                         |   |   |           |     |    |        |
| S-OHP_M | Maximum output time-<br>-minutes               | 2 | 0 | M         | R/W | 87 | 0x0057 |
| S-OAH_L | Maximum output AH is<br>16 bits lower          | 2 | 0 | maH       | R/W | 88 | 0x0058 |
| S-OAH_H | Maximum output AH is<br>16 bits higher         | 2 | 0 | maH       | R/W | 89 | 0x0059 |
| S-OWH_L | Maximum output WH is<br>16 bits lower          | 2 | 0 | 10mw<br>H | R/W | 90 | 0x005A |
| S-OWH_H | Maximum output WH is<br>16 bits high           | 2 | 0 | 10mw<br>H | R/W | 91 | 0x005B |
| S-OTP   | Overtemperatu<br>re protection<br>value        | 2 | 0 | F/C       | R/W | 92 | 0x005C |
| S-INI   | Power output<br>switch                         | 2 | 0 | -         | R/W | 93 | 0x005D |
| S-ETP   | External<br>pass,<br>temperature<br>protection | 2 | 0 | -         | R/W | 94 | 0x005E |

**Note 1: (0019H) Port rate register meaning 0:9600 1:14400 2:19200 3:38400 4:56000 5:576000 6:115200 (7:2400 8:4800, some equipment support)**

Note 2: The product has M0-M9, each group has 14 data numbers 20-2D. M0 data group is the default, M1 and M2 data groups are the product panel, and M3-M9 is the ordinary storage array. The starting address of the data group is 0050H + data group number \* 0010H. For example, the starting address of M3 data group is 0050H + 3 \* 0010H=0080H.

Note 3: The read and write value of the key lock function is 0 and 1.0 is non-locked, and 1 is locked.

Note 4: Protection status register:

0: Normal operation, 1: OVP, 2: OCP, 3: OPP, 4: LVP, 5: OAH, 6: OHP, 7: OTP, 8: OEP, 9: OWH, 10: ICP 11: ETP

|                                            |                                     |                                                |                                                |
|--------------------------------------------|-------------------------------------|------------------------------------------------|------------------------------------------------|
| 0: Alarm code                              | 1: OVP<br>overvoltage<br>protection | 2: OCP<br>overcurrent<br>protection            | 3: OPP, over-<br>power protection              |
| 4: LVP input<br>undervoltage<br>protection | 5: OAH maximum<br>output capacity   | 6: OHP maximum<br>output time                  | 7: OTP over-<br>temperature<br>protection      |
| 8: OEP, with no<br>output protection       | 9: OWH maximum<br>energy output     | 10: ICP maximum<br>input current<br>protection | 11: ETP, external<br>temperature<br>protection |

Note 5: constant voltage constant current state read value is 0 and 1,0 is CV state and 1 is CC state.

Note 6: The read and write value of switch output function are 0 and 1,0 is closed state and 1 is open state.

Note 7: The backlight brightness level is 0-5,0 is the darkest and 5 is the brightest.

Note 8: The write value of the quick call-up data group function is 0-9, and the corresponding data group data will be automatically called up after writing.

#### 1.4 Error check code (CRC check):

The host machine or slave can use the verification code to distinguish whether the received information is correct. Due to the electronic noise or some other interference,

Error sometimes occur during the transmission of information. The error check code (CRC) can check the host or slave communication data

Whether the information in the sending process is wrong, the wrong data can be abandoned (whether sent or received), thus increasing the system Safety and efficiency of the system. MODBUS The CRC of the communication protocol (redundant cycle code) consists of 2 bytes, namely, the 16-bit binary number.

The CRC code is calculated by the sending device (host) and placed at the tail of the sending message frame. The device receiving the message (slave) is heavier

New calculation of the CRC received information, compare whether the calculated CRC is consistent with the received, if the two do not match, then

Indicates an error. When CRC check code is sent, the low is before and the high is behind.

**Calculation method of the CRC code:**

(1) The preset 116-bit register is hex FFFF (all 1); call this register is CRC register;

(2) Put the first 8-bit binary data (both the first byte of the communication information frame) and the low 8 of the 16-bit CRC register

Different positions or positions, put the results in the CRC register;

(3) Move the content of the CRC register to one right (toward the low) to fill the highest position with 0, and check the displacement after the right shift;

(4) If displacement is 0: repeat step 3 (move one bit right again); if displacement is 1: CRC register and multiple items

Formula A001 (10100000000000001);

(5) Repeat steps 3 and 4 until the right moves 8 times, so that the entire 8-bit data is processed;

(6) Repeat steps 2 to step 5 to process the next byte of the communication information frame;

(7) The high and low levels of the 16-bit CRC register obtained after calculating all the bytes of the communication information frame according to the above steps

Bytes for exchange;

(8) The final CRC register content is the CRC code.

3、Communication instances

Example 1: The host machine reads the output voltage and the output current display value

Message format sent by the host:

| Host sent                              | Byte number | Send the message | remarks                                  |
|----------------------------------------|-------------|------------------|------------------------------------------|
| From the machine address               | 1           | 01               | Send to the with address 01              |
| FC                                     | 1           | 03               | Read the register                        |
| Register start address                 | 2           | 0002H            | Register start address                   |
| Number of register addresses           | 2           | 0002H            | There are 2 bytes in total               |
| CRC a sign or object indicating number | 2           | 65CBH            | The CRC codes are calculated by the host |

For example, if the current display value is 05.00V,1.500A, the message format returned by the slave response:

| From the machine response                     | Byte number | The information returned | remarks                                         |
|-----------------------------------------------|-------------|--------------------------|-------------------------------------------------|
| From the machine address                      | 1           | 01                       | From the machine 01                             |
| FC                                            | 1           | 03                       | Read the register                               |
| Number of read bytes                          | 1           | 04                       | A total of 1 byte                               |
| Address is the contents of the 0002H register | 2           | 01F4H                    | Output voltage display value                    |
| Address is the contents of the 0003H register | 2           | 05DCH                    | Output current display value                    |
| CRC a sign or object indicating number        | 2           | B8F4H                    | The CRC code is calculated by the slave machine |

Example 2: The host machine should set the voltage to 24.00V

Message format sent by the host:

| Host sent                                     | Byte number | Send the message | remarks                                  |
|-----------------------------------------------|-------------|------------------|------------------------------------------|
| From the machine address                      | 1           | 01H              | From the machine 01                      |
| FC                                            | 1           | 06H              | Write a single register                  |
| Register address                              | 2           | 0000H            | Register address                         |
| Address is the contents of the 0000H register | 2           | 0960H            | Set the output voltage value             |
| CRC a sign or object indicating number        | 2           | 8FB2H            | The CRC codes are calculated by the host |

Message format of the response returned after receiving from the machine:

| From the machine response | Byte number | The information returned | remarks                     |
|---------------------------|-------------|--------------------------|-----------------------------|
| From the machine address  | 1           | 01H                      | Send to the with address 01 |
| FC                        | 1           | 06H                      | Write a single              |

|                                               |   |       |                                                 |
|-----------------------------------------------|---|-------|-------------------------------------------------|
|                                               |   |       | register                                        |
| Register address                              | 2 | 0000H | Register start address                          |
| Address is the contents of the 0000H register | 2 | 0960H | Set the output voltage value                    |
| CRC a sign or object indicating number        | 2 | 8FB2H | The CRC code is calculated by the slave machine |

|                                        |   |       |                                                 |
|----------------------------------------|---|-------|-------------------------------------------------|
| address                                |   |       | address 01                                      |
| FC                                     | 1 | 10H   | Write register                                  |
| Register start address                 | 2 | 0000H | Register start address                          |
| Number of register addresses           | 2 | 0002H | There are 2 bytes in total                      |
| CRC a sign or object indicating number | 2 | 41C8H | The CRC code is calculated by the slave machine |

**Example 3:** The host should set the voltage of 24.00V and the current of 15.00A.

Message format sent by the host:

|                                               |             |                  |                                          |
|-----------------------------------------------|-------------|------------------|------------------------------------------|
| Host sent                                     | Byte number | Send the message | remarks                                  |
| From the machine address                      | 1           | 01H              | From the machine 01                      |
| FC                                            | 1           | 10H              | Write register                           |
| Register start address                        | 2           | 0000H            | Register start address                   |
| Number of register addresses                  | 2           | 0002H            | There are 2 bytes in total               |
| Write the number of bytes                     | 1           | 04H              | A total of 1 byte                        |
| Address is the contents of the 0000H register | 2           | 0960H            | Set the output voltage value             |
| Address is the contents of the 0001H register | 2           | 05DCH            | Set the output current value             |
| CRC a sign or object indicating number        | 2           | F2E4H            | The CRC codes are calculated by the host |

Message format of the response returned after receiving from the machine:

|                           |             |                          |                  |
|---------------------------|-------------|--------------------------|------------------|
| From the machine response | Byte number | The information returned | remarks          |
| From the machine          | 1           | 01H                      | Send to the with |