

# PK 7200 System Manual

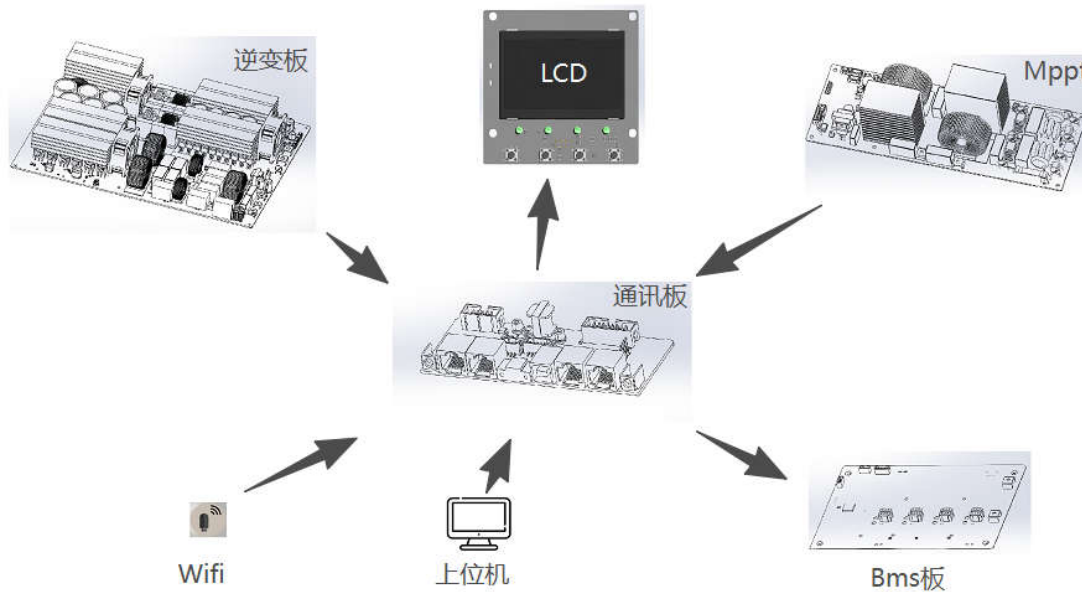
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|---------|----------------------------|-------------|----------|
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## 1、System Framework

The whole system consists of an inverter, a communication board, an MPPT module and a display screen, wherein the communication board is used as an intermediate module and internally communicates with the inverter and the MPPT module to acquire information such as machine state power and the like, simultaneously communicates with the BMS to acquire battery-related information, and can also communicate with an external upper computer or a wifi module and the like to acquire or transmit information, And the machine information can be visually displayed to the user through the display screen.



## 2、System Specifications

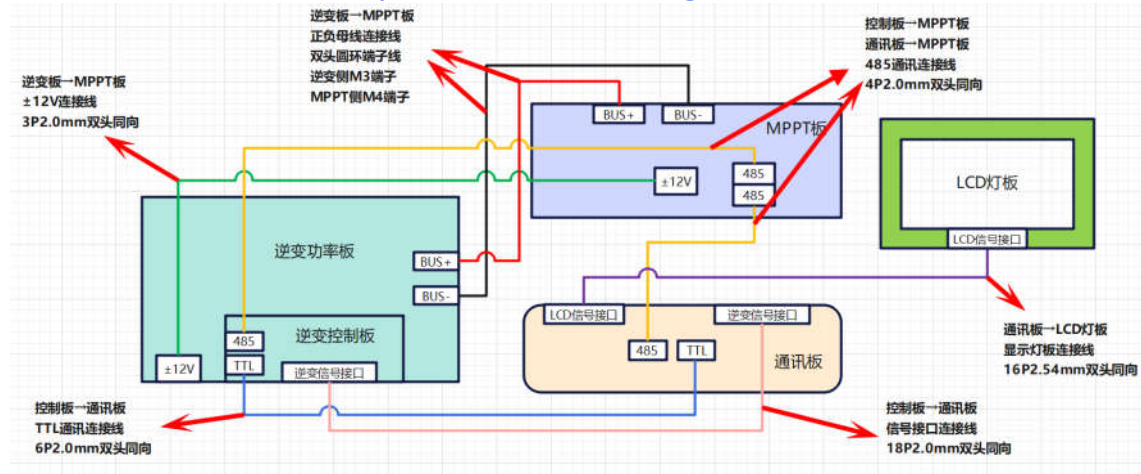
|                        |                                |                                                                                     |
|------------------------|--------------------------------|-------------------------------------------------------------------------------------|
|                        | <b>Model</b>                   | Poplar-PK7200-48V                                                                   |
| <b>Inverter module</b> | <b>Rated power</b>             | 7200W                                                                               |
|                        | <b>Peak power</b>              | 15000W                                                                              |
|                        | <b>Number of output phases</b> | 120/240Vac                                                                          |
|                        | <b>Number of output lines</b>  | Two-phase three-wire (L1, N, L2) + ground                                           |
|                        | <b>Working mode</b>            | Off-grid, grid-connected, grid-connected and off-grid (off-grid, grid-tied, Hybrid) |
|                        | <b>Conversion time</b>         | <10ms                                                                               |
|                        | <b>Rated output voltage</b>    | 120/240Vac                                                                          |
|                        | <b>Output voltage accuracy</b> | ±2%                                                                                 |
|                        | <b>Bypass rated</b>            | 40A                                                                                 |

|             |                              |                                                                                              |
|-------------|------------------------------|----------------------------------------------------------------------------------------------|
|             | current                      |                                                                                              |
|             | Output frequency             | 50/60Hz $\pm$ 0.1Hz                                                                          |
|             | Output waveform distortion   | <3% @R load<br><7% @Non-Linear load                                                          |
|             | Overload                     | 102% ~ 120% 20s<br>120% ~ 150% 2s<br>>150% 400ms                                             |
|             | Discharge efficiency         | 95%                                                                                          |
|             | No-load loss                 | 9W @ standby mode; 50W @ inverter no-load mode                                               |
|             | Number of AC input phases    | 120/240Vac split phase                                                                       |
|             | Number of AC input lines     | Two-phase three-wire (L1, N, L2) + ground                                                    |
|             | AC input range               | L-N: 80~145Vac                                                                               |
|             | AC Input Frequency Range     | 50Hz: 46~54Hz (default);<br>60Hz: 56~64Hz (default);<br>30~80Hz (allow)                      |
|             | Input power factor           | >0.98                                                                                        |
|             | Charging efficiency          | >96%                                                                                         |
|             | Maximum charge current       | 100A                                                                                         |
|             | Charging voltage range       | 40V~60V                                                                                      |
|             | Precharge current            | 1~3A                                                                                         |
|             | Charging control method      | Pre-charge, constant current, constant voltage, equalizing charge, floating charge, shutdown |
|             | Applicable battery type      | Lead Acid (Flooded)/Gel (GEL)/AGM/Lithium Battery/Custom                                     |
| MPPT module | Maximum input power          | 9kW                                                                                          |
|             | Number of MPPT channels      | 2                                                                                            |
|             | Maximum open circuit voltage | 500V                                                                                         |
|             | Input voltage range          | 80~450Vdc                                                                                    |
|             | Rated input voltage          | 100~400Vdc                                                                                   |
|             | Turn-on voltage              | 100Vdc                                                                                       |

### 3、Description of Internal Modules of the System

#### 3.1 Schematic Diagram of Internal Wiring

The system is composed of inverter board, communication board, MPPT board and display screen. The wiring diagram is as follows:



### 3.2 Description of Inverter Board

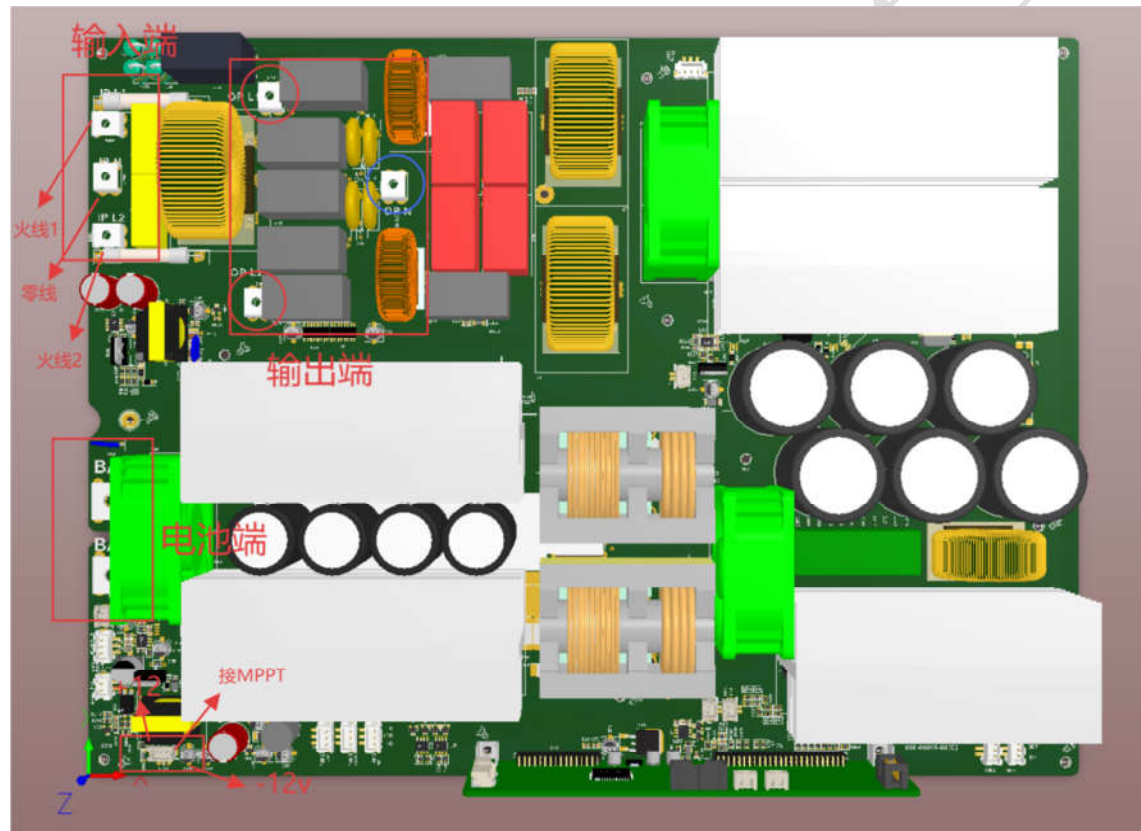


Figure 1

As shown in Figure 1, the AC input terminal includes three M4 screw terminals of IP.L1, IP.L2 and IP. N, and the machine input is a three-wire two-phase split-phase input, that is, the phase difference between L1N and L2N is  $180^\circ$ , the phase voltage is 120 V, and the line voltage is 240 V;

The AC output end includes three M4 screw terminals of OP.L1, OP.L2 and OP. N. The output of the machine is three-wire two-phase split-phase output, that is, the phase difference between L1N and L2N is  $180^\circ$ , the phase voltage is 120 V, and the line voltage is 240 V.

The DC input includes two M5 screw terminals of BAT + and BAT-, and the battery voltage input does not exceed 63 V;

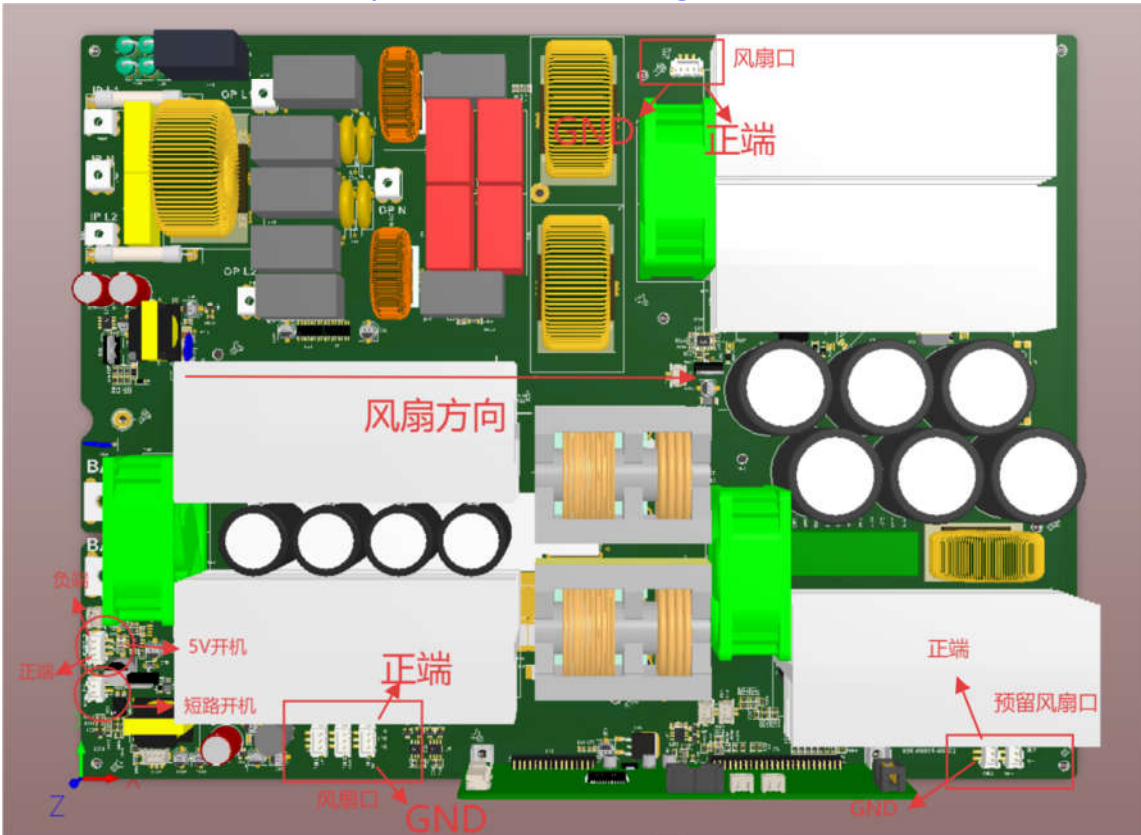


Figure 2

As shown in Figure 2, the machine has six XH2.54 fan interface sockets. Pin 1 of the socket is the positive terminal, the highest voltage is 12 V, and pin 3 is GND. The voltage is used to regulate the fan speed, and the program controls the fan speed by adjusting the port voltage.

Two startup modes are provided: 2PinXH2.54 physical short circuit switch and 3PinXH2.54 electrical signal (5V) switch. The machine can be started by continuous physical short circuit or 5V power supply, and can be shut down by removing the short circuit signal or 5V signal.

### 3.3 MPPT Board Description



Figure 3

As shown in Figure 3, the MPPT board has two PV inputs, including PV1 +, PV1-, PV2 + and PV2-, with a total of four 6.3 male plug spring terminals, and the maximum power of a single circuit is 4500W.

### 3.4 Description of Communication Board

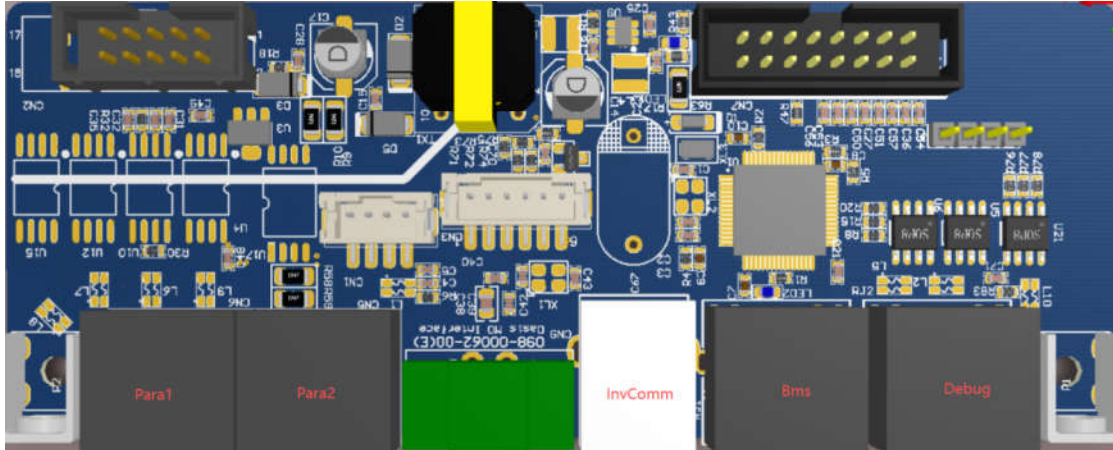


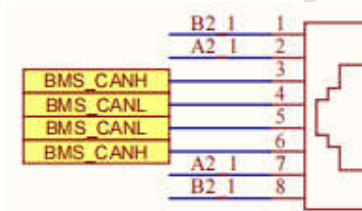
Figure 4

As shown in Figure 4, the communication board has five external interfaces, of which:

Para1 and Para2: 2 parallel network ports, which can be connected with standard network cable during parallel operation;

InvComm: 1 USB-B port, using the standard B port USB cable, the external serial port communication can be used to obtain the inverter debugging information;

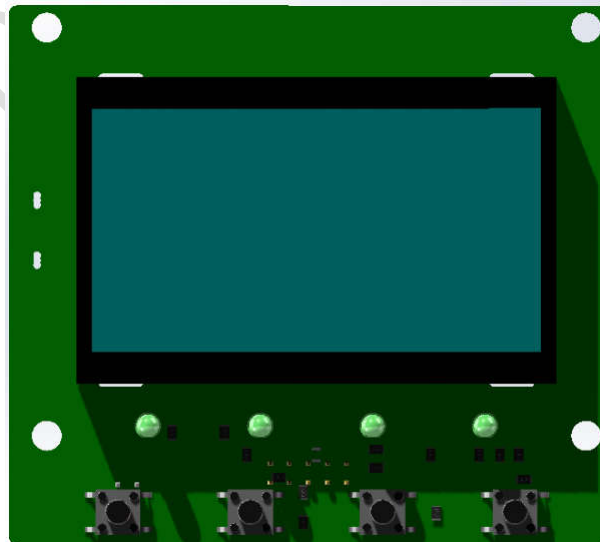
Bms: 1 BMS communication network port, including CAN and RS485 communication modes, and the line sequence is as follows:



Debug: 1 external 485 communication network port, used to connect external upper computer or serial port tool, used to set machine information, communication line sequence is 5 pin 485A, 6 pin 485B;

### 3.5 Description of LCD Lamp Panel

Use the common LCD display screen in the industry, including 4 function keys, 4 LED indicators and one LCD display screen;



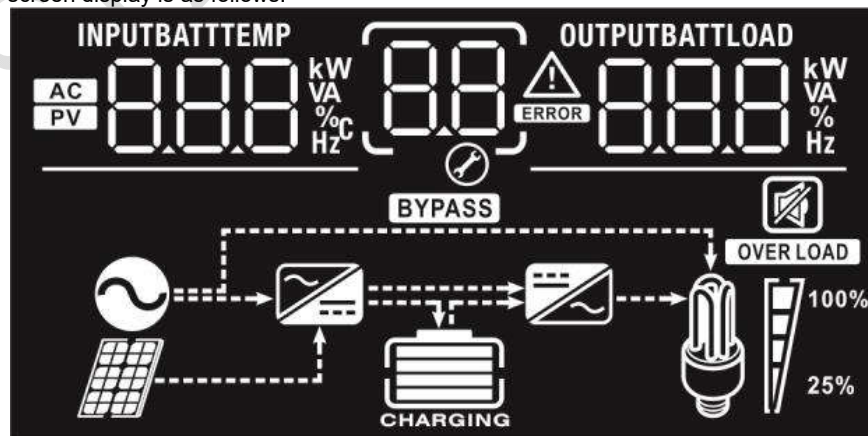
LED indicator description

| LED indicator |        |             | Explain                                                             |
|---------------|--------|-------------|---------------------------------------------------------------------|
| BYP           | Yellow | Chang Liang | Bypass output on                                                    |
|               |        | Flicker     | Bypass abnormality, such as abnormal frequency and abnormal voltage |
| BAT           | Green  | Chang Liang | Battery discharge output                                            |
|               |        | Flicker     | The battery is low                                                  |
| CHG           | Green  | Chang Liang | Battery is fully charged                                            |
|               |        | Flicker     | The battery is charging                                             |
| FAULT         | Red    | Chang Liang | Inverter failure (Appendix)                                         |
|               |        | Flicker     | Inverter alarm (Appendix)                                           |

**Description of function keys**

| Function keys | Explain                                                                          |
|---------------|----------------------------------------------------------------------------------|
| ESC           | Set the exit key                                                                 |
| UP            | The interface display flips up                                                   |
| DOWN          | The interface display turns down                                                 |
| FUNC          | Press and hold the function setting button for 3s to enter the setting interface |

LCD full screen display is as follows:



| Icon                  | Explain |
|-----------------------|---------|
| Enter the information |         |

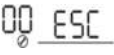
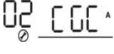
|                                                                                    |                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | AC input is displayed                                                                                                                                                                                                                                                                                                                               |
|   | Displays the PV input                                                                                                                                                                                                                                                                                                                               |
|   | Displays AC and PV input power, input voltage, input current, maximum machine temperature, and input frequency                                                                                                                                                                                                                                      |
| <b>Configuration procedures and fault information</b>                              |                                                                                                                                                                                                                                                                                                                                                     |
|   | Display access to setup program                                                                                                                                                                                                                                                                                                                     |
|   | <p>Alarm code and fault code are displayed</p> <p>Alarm:  alarm code and triangle exclamation mark flashing display</p> <p>Fault:  Fault code and error flag constant display</p> |
| <b>Output information</b>                                                          |                                                                                                                                                                                                                                                                                                                                                     |
|   | Displays output power, output voltage, output current, percent load, and output frequency                                                                                                                                                                                                                                                           |
| <b>Battery information</b>                                                         |                                                                                                                                                                                                                                                                                                                                                     |
|  | Press 0-24%, 25-49%, 50-74% and 75-100% to display the battery level, and the CHARGING icon will be displayed additionally when charging                                                                                                                                                                                                            |

| Load information                                                                    |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    | Overload flag                                                                     |                                                                                   |                                                                                     |                                                                                     |
|    | Displays the load at 0-24%, 25-49%, 50-74%, and 75-100 percent                    |                                                                                   |                                                                                     |                                                                                     |
|                                                                                     | 0%~24%                                                                            | 25%~49%                                                                           | 50%~74%                                                                             | 75%~100%                                                                            |
|                                                                                     |  |  |  |  |
| Operation mode information                                                          |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|    | Equipment connected to AC source                                                  |                                                                                   |                                                                                     |                                                                                     |
|    | Equipment access to PV panel                                                      |                                                                                   |                                                                                     |                                                                                     |
|    | Open bypass output                                                                |                                                                                   |                                                                                     |                                                                                     |
|    | AC-DC mode of operation                                                           |                                                                                   |                                                                                     |                                                                                     |
|    | DC-AC mode of operation                                                           |                                                                                   |                                                                                     |                                                                                     |
| Silent operation                                                                    |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|  | Silent mode is on                                                                 |                                                                                   |                                                                                     |                                                                                     |

### LCD settings

Press and hold the FUNC key 3S to enter the setup mode, press UP or DOWN to select the setup program, and then press the FUNC key to confirm the selection or press the ESC key to exit the setup program.

### Set up the program

| Program | Description           | Operation selection                                                                 |                                                                                                     |
|---------|-----------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 00      | Exit the setup mode   |  | Press UP or DOWN to select other function settings, and press ESC or FUNC to exit the setting mode. |
| 01      | Set the parallel mode |  | 0: Not enabled<br>1: Enable                                                                         |
| 02      | Set the charging      |  | Default is 80 A                                                                                     |

|    |                                             |               |                                         |
|----|---------------------------------------------|---------------|-----------------------------------------|
|    | current                                     |               |                                         |
| 03 | Set the charge cutoff voltage               | 03 <u>CGU</u> | Default 56.8 V                          |
| 04 | Sets the maximum mains input current        | 04 <u>IPC</u> | Default 40A                             |
| 05 | Set the parallel address                    | 05 <u>Add</u> | 1: Host<br>2 ~ 10: Slave                |
| 06 | Set the overload auto-recovery enable       | 06 <u>Lfd</u> | 0: Not enabled<br>1: Enable             |
| 07 | Set over temperature auto recovery enable   | 07 <u>tfp</u> | 0: Not enabled<br>1: Enable             |
| 09 | Set the output frequency                    | 09 <u>FtE</u> | 50HZ or 60HZ can be set                 |
| 10 | Sets the output voltage                     | 10 <u>UOL</u> | 200V, 208V, 220V, 230V, 240V can be set |
| 11 | Set low voltage protection point of battery | 11 <u>bU</u>  | Default 37V                             |
| 12 | Set the battery undervoltage                | 12 <u>bUb</u> | Default 38V                             |

|  |                |  |  |
|--|----------------|--|--|
|  | recovery point |  |  |
|--|----------------|--|--|

## 4. Test Description

### 4.1 Open Output

After the battery and the BMS communication line are connected, use the physical short circuit switch to continuously short circuit or continuously provide 5V power supply, the display screen lights up to indicate that the machine has been awakened, and then wait for the machine to turn on the AC output.

### 4.2 Output with Load

It can be separately connected to L1 + N or L2 + N with 120V low-voltage load, with a maximum load of 3600 W for each circuit, or connected to L1 + L2 with 240V high-voltage load, with a maximum load of 7200W. Overload protection will be triggered if the maximum load is exceeded.

### 4.3 Mains Charging

IP.L1, IP.L2 and IP. N need to be connected at the same time. The phase difference between IP.L1 and IP.L2 is 180°. Note that it is not allowed to connect IP.L1 and IP.L2 only. The N line also needs to be connected. If the use scenario is that the input is connected to IP.L1 + LP. N or IP.L2 + LP. N separately, the inverter board program needs to be updated. After the mains supply is connected, wait for the machine to automatically enter the charging mode. The charging current of the battery can be set through item 02 of the LCD panel setting interface.

### 4.4 PV Charging

One PV can be connected separately or two PVs can be connected at the same time, but one PV output can not be connected to two inputs at the same time. The open circuit voltage of PV is 450 V. After the PV is connected, the machine will charge itself.

### 4.5 Charging Priority Test

The charging priority can be set through the screen setting interface.

- ① PV charging priority: PV gives priority to battery charging, and only when the PV system fails, it will be charged by the grid.
- ② Priority of mains supply charging: The mains supply shall be used to charge the battery. Only when the mains supply is interrupted, the photovoltaic charging can be started.
- ③ Hybrid charging: photovoltaic and mains hybrid charging mode. PV charging is a priority mode, when the PV power supply is insufficient, the electric quantity is supplemented by the mains supply; When the photovoltaic power supply is sufficient, the mains supply stops charging.
- ④ Only PV charging: only the photovoltaic panel is used for charging, and the commercial power is not used for charging;

## 4.6 Discharge Priority Test

Discharge priority can be set through the screen setting interface.

① PV power supply priority: give priority to PV discharge, insufficient PV is supplemented by the battery, when there is no PV or the battery reaches the set protection SOC or voltage, it is switched to mains discharge.

Power priority: PV → Battery → Grid

② Priority of mains supply: give priority to mains discharge, and switch to inverter discharge only when the mains supply is interrupted.

Power Priority: Grid → PV → Battery

③ Priority of battery power supply: give priority to inverter discharge, and use mains discharge only when DC reaches the set protection SOC or voltage.

Power priority: PV → Battery → Grid

④ Hybrid power supply: PV discharge is preferred. When PV is insufficient, the mains supply and inverter supply the load together. When the mains supply is interrupted or the mains supply is insufficient, it will be supplemented by the battery.

Power priority: PV → grid → battery

## 4.7 Parallel Test

Not yet open.

## 5 Appendix

### 5.1 Fault List

| Fault code | Fault description                   | Fault code | Fault description                    |
|------------|-------------------------------------|------------|--------------------------------------|
| 01         | BUS soft start timeout              | 02         | BUS overvoltage                      |
| 03         | BUS undervoltage                    | 04         | BUS is unbalanced                    |
| 05         | BUS short circuit                   | 06         | Inverter soft start timeout          |
| 07         | Inverter high voltage               | 08         | Inverter low voltage                 |
| 10         | Inverter short circuit              | 22         | Output overload                      |
| 23         | Inverter overtemperature            | 32         | Inverter board communication is lost |
| 34         | BMS communication is lost           | 38         | Charging overcurrent                 |
| 55         | Low temperature or NTC open circuit | 57         | The battery is open                  |
| 59         | Battery overvoltage                 |            |                                      |

## 5.2 Alarm List

| Alarm code | Alarm description     | Alarm code | Alarm description         |
|------------|-----------------------|------------|---------------------------|
| 22         | Overload alarm        | 23         | Over temperature alarm    |
| 55         | Low temperature alarm | 57         | Low battery voltage alarm |