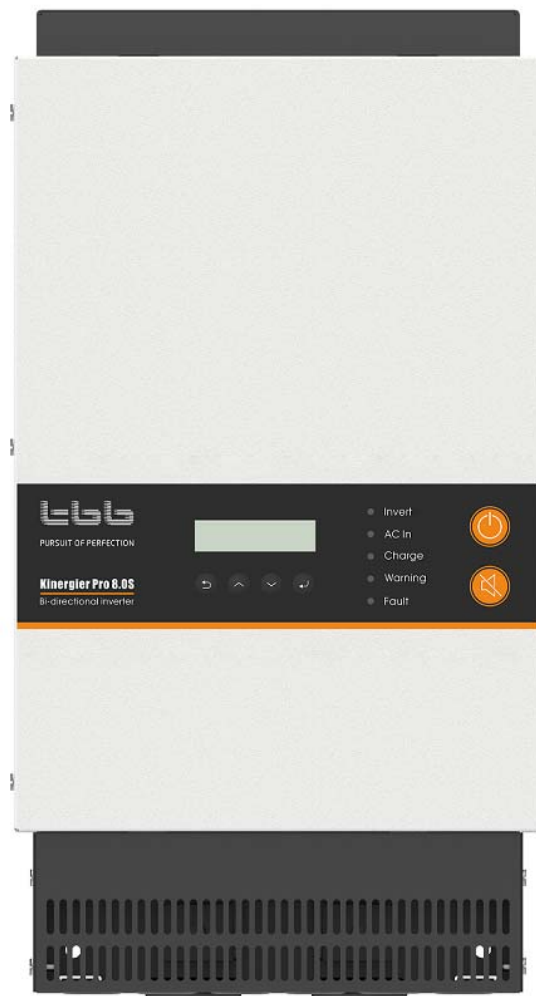


# Kinergier Pro series

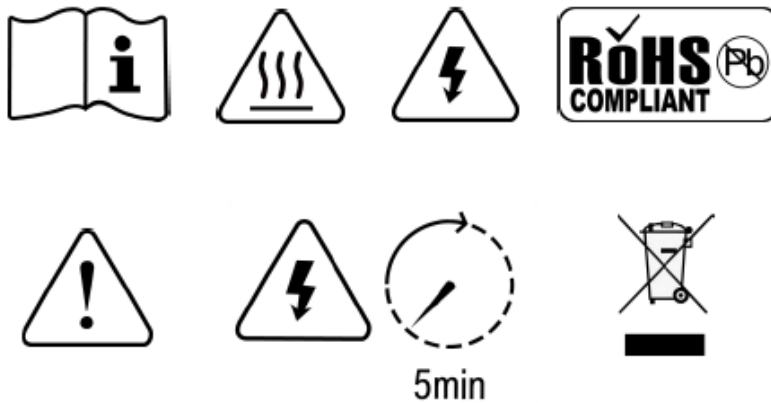
## Bi-directional inverter



**Version: V1.0**

**Date: Mar.2019**





WARNING : FIRE HAZARD

SUITABLE FOR MOUNTING ON CONCRETE OR OTHER

NON- COMBUS TIBLE SURFACE ONLY

CAUTION : THE DC AND AC BREAKER MUST HAVE BEEN

TURNED OFF BEFORE SERVICING

MADE IN CHINA

TBB Power Co., Ltd

## Disclaimer

Unless specially agreed in writing, TBB Power Co., Ltd

- Take no warranty as to the accuracy, sufficiency of suitability of any technical or other information provided in this manual or other documentation.
- Assumes no responsibility or liability for loss or damage, whether direct, indirect, consequential or incidental, which might arise out of the use of such information.
- TBB offer standard warranty with its products, taking no responsibility for direct or indirect loss due to equipment failure.

## About this Manual

This manual describes our product features and provides procedure of installations. This manual is for anyone intending to install our equipment.

## General Instruction

Thanks for choosing our products and this manual were suitable for Kinergier pro bi-directional inverter.

This chapter contains important safety and operation instructions. Read and keep this User Guide well for later reference.

The Kinergier pro bi-directional inverter needs to be installed by professionals and please pay attention to the following points prior to installation:

- 1> Please check the input voltage or voltage of battery is same to the nominal input voltage of this inverter.
- 2> Please connect positive terminal "+" of battery to "+" input of the inverter.
- 3> Please connect negative terminal "-" of battery to "-" input of the inverter.
- 4> Please use the shortest cable to connect and ensure the secure connection.
- 5> While connecting, please secure the connection and avoid short cut between positive terminal and negative terminal of battery, which will cause damage of battery.
- 6> Inverter will have high voltage inside. Only authorized electrician can open the case.
- 7> The inverter WAS NOT designed to use in any life retaining equipment.

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# **1. General Safety Instruction**

## **1.1 Safety instruction**

As dangerous voltages and high temperature exist within the Kinergier pro bi-directional inverter, only qualified and authorized maintenance personnel are permitted to open and repair it. Please make sure Kinergier pro bi-directional inverter is turned off before opening and repairing it.

This manual contains information concerning the installation and operation of the Kinergier pro bi-directional inverter. All relevant parts of the manual should be read prior to commencing the installation. Please follow the local stipulation meantime.

Any operation against safety requirement or against design, manufacture, safety standard are out of the manufacturer warranty.

## **1.2 General precaution**

- DO NOT expose to dust, rain, snow or liquids of any type, it is designed for indoor use. DO NOT block off ventilation, otherwise the Kinergier pro bi-directional inverter would be overheating.
- To avoid fire and electric shock, make sure all cables selected with right gauge and being connected well. Smaller diameter and broken cable are not allowed to use.
- Please do not put any inflammable goods near to inverter.
- NEVER place unit directly above batteries, gases from a battery will corrode and damage Kinergier pro bi-directional inverter.
- DO NOT place battery over Kinergier pro bi-directional inverter.

## **1.3 Precaution regarding battery operation**

- Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.
- The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of battery.
- DO NOT put the metal tool on the battery, spark and short circuit might lead to explosion.
- REMOVE all personal metal items such as rings, bracelets, necklaces, and watches while working with batteries. Batteries can cause short-circuit current high enough to make metal melt, and could cause severe burns.

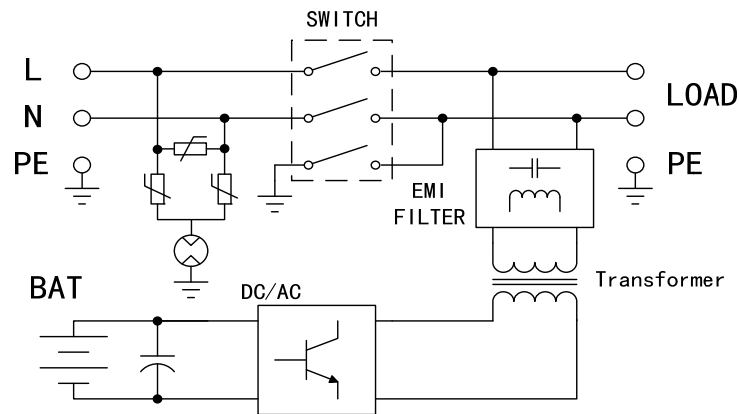
## 2. Description Of Main Function

### 2.1 General description

Thanks for choosing Kinergier pro bi-directional inverter with multiple functions, of which can be used to compose various hybrid power system. The product was delivered with an Kinergier pro bi-directional inverter, a user's manual and a BTS - battery temperature sensor.

Kinergier pro bi-directional inverter is a new generation inverter/charger, of which integrated pure sine wave inverter and a high speed AC transfer switch into a single enclosure. Meantime, multiple power management functions/devices make it convenient to compose different advanced hybrid independent power systems. It has the characteristics of small size, strong carrying capacity and high intelligence, Widely used in solar independent systems, microgrid systems and backup system.

### 2.2 Schematic



### 2.3 Function

#### 2.3.1 Inverter

##### Pure sine wave

Stable frequency and voltage, low ripple, ensure the stability of various precision instruments and IT equipment (THDu<2%).

##### High surge power

Provided with outstanding surge power capability and low frequency transformer, Kinergier pro bi-directional inverter is suitable for heavy inductive load like refrigerator, coffee maker, microwave, power tools, air conditioner etc.

##### Battery low voltage protect

Provide battery low voltage protection depend on Environment with LCD.



### **2.3.2 Feed energy to grid and power assist**

When the AC input is connected to the grid, the inverter can feed energy to grid or PWM rectification charging. Grid adaptability and dynamic response are achieved through digital control technology. At rated power, the charging or inverter grid-connected current THDi<3%.

The inverter can set the maximum threshold of AC input current (Power Assist), In the case of AC (generator/grid) loading, when the load suddenly increases, the inverter will quickly reduce the charging current, and even increase the inverter Power to ensure no large impact on the AC input, so that The AC input power is controlled within the set threshold.

### **2.3.3 Charger**

#### **Multi-stage charging**

The multi-stage battery charging management function can quickly fill the battery and effectively extend the battery life.

#### **Automatic charging temperature compensation**

The bi-directional inverter can collect the ambient temperature through the BTS and automatically adjust the charging voltage to ensure that the battery does not overcharge or undercharge. The charging temperature compensation coefficient is 5mV/°C/cell and can be set through the LCD.

#### **Battery capacity selection**

The user can set the actual battery capacity through the LCD screen. The inverter will automatically charge the battery pack according to the battery capacity (I=0.15C). The minimum battery capacity is set to 100AH.

#### **Lithium battery charging**

The inverter can charge the lithium battery through the LCD setting.

#### **Cycle charging**

When the battery is in the floating state for a long time, the cycle charging program will start every 10 days and can be set through the LCD.

### **2.3.4 Transfer**

In case of voltage/frequency/waveform of AC input match the minimum quality, the voltage will be switched directly to AC output. Kinergier pro bi-directional inverter will switch off, battery charger switching on and load being powered by AC input. You will have at the output the same voltage as AC input.

In case of AC input failure or exceeding the maximum AC input current set by the user, Kinergier pro bi-directional inverter will initiate a quick switching to inverter, of which will guarantee an undisturbed power for majority of the appliance. Upon AC input resume or match the quality, it will switch back again. With this mode, Kinergier pro bi-directional inverter could be used as an UPS.

### **2.3.5 Battery type settings**

The AGM, GEL/OPzV battery types can be selected through the LCD, and the charging voltages of different battery types are different. The battery type is set to GEL by default. Specific electrical parameters can also be adjusted through the LCD.

### **2.3.6 Battery low voltage shutdown threshold set**

Depending on the battery type and application, the user can set different battery low-voltage shutdown points (LVD) through the LCD.

### **2.3.7 Weak grid mode**

In the application environment where the AC input voltage is severely low, it may be in an inverter state for a long time and battery can't be charged. Resulting in a serious undercharge of the battery and failure to supply power to the device. The user can set the weak grid mode and voltage range through the LCD, and it can continue to supply power to the load from the AC input when the grid voltage is low while charging the battery.

### **2.3.8 Generator mode**

If the low power AC generator, the output voltage of the generator is unstable or the waveform is severely distorted. It will always work in inverter mode, user can set the generator mode through the LCD screen, Reduce the requirements of AC input power quality (such as voltage, frequency and waveform), it will continue to work in AC mode.

### **2.3.9 Power search mode**

In the case where the inverter is allowed to work intermittently, the threshold of the power search mode can be set through the LCD. In the power search mode, the no-load power consumption will be reduced by about 70%. The threshold of the power search mode can be adjusted from 0.25% to 1% of rated power.

### **2.3.10 Protect function**

The Kinerwier pro bi-directional inverter is equipped with a series of complete hardware and software protection functions to ensure its stable and reliable operation.

#### **Overload protection**

When overload protection is turned off, it will restart automatically after 60s; after three consecutive overload shutdown protection, the machine will not restart automatically. At this time, the user needs to manually restart.

#### **Over temperature protection**

When the internal temperature is too high, it will enter the over-temperature protection state; after the internal temperature returns to normal, it can automatically resume normal operation.

#### **Short circuit protection**

The equipment will automatically shut down when the AC output is shorted and needs to be manually activated.

#### **Battery over temperature protection**

During the charging , the equipment will continuously monitor the battery temperature. When the battery temperature is too high, the equipment will automatically reduce the charging current. When the battery is severely heated, the charger will automatically turn off to protect the battery.

#### **Battery low voltage protection**

The equipment will automatically turn off the auxiliary power supply according to the low voltage protection point set by the user, and completely prevent the permanent damage caused by the discharge of the device when the battery voltage drops to the set value.

### **2.3.11 Dry contact**

#### **Input dry contact**

Equipped with two input dry contacts for remote on/off and EPO control.

#### **Output dry contact**

Equipped with two NO/NC relay type dry contacts, the user can set specific functions through the LCD.

Output dry contact default function:

Relay1: The relay is closed when the battery is under voltage.

Relay2: The relay is closed when a fault or overload occurs.

### **2.3.12 RS485**

Equipped with two RS485 interfaces.

### **2.3.13 CAN**

Equipped with a CAN interface.

### **2.3.14 Parallel function**

Two or more units can be connected in parallel to form a single-phase parallel system or a three-phase parallel system, which is convenient for flexible expansion of power capacity and construction of a micro-grid system to meet different application requirements.

### **2.3.15 Power assist function**

Battery energy can be fed through the inverter to the AC output, automatically supplementing the input AC source, such as when the generator or mains power is limited. This function can be used to peak the load and reduce the configuration of the generator, while the Power Assist current threshold can be set through the LCD.

### **2.3.16 Battery priority feed**

Set the battery to give priority to the load when the grid is energized on the AC input. There are two modes of battery feeding, one is to keep the battery full, and the energy that the battery can't accept is fed to the grid side. The other mode is to feed the grid side according to the set current for a specified period of time.

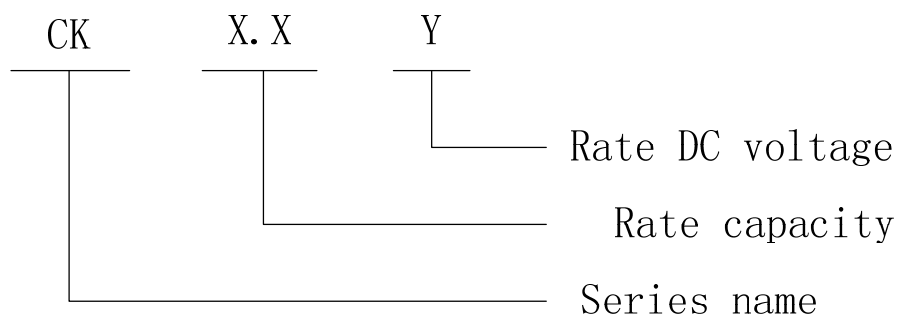
### 2.3.17 AC coupling

Allow current source reference as a grid-connected inverter (reserved).

### 2.3.18 Auxiliary output

The AC OUT1 for dual-output models is used to connect critical loads. The AC OUT2 is used to connect to non-critical loads. AC OUT2 defaults to secondary loads when grid or generators are normal, and when grid or generators are abnormal the AC OUT2 disconnect its load. User can also set the AC OUT2 on/off logic through the LCD.

## 2.4 Naming rules



| figure | explanation               |                      |
|--------|---------------------------|----------------------|
| CK     | series name               |                      |
| 4.0    | Represent rate capacity   | 3000W / 4000W(30min) |
| 6.0    |                           | 4500W / 6000W(30min) |
| 8.0    |                           | 6000W / 8000W(30min) |
| L      | Represent rate DC voltage | 12V                  |
| M      |                           | 24V                  |
| S      |                           | 48V                  |

### Naming example:

#### 1. CK 8.0S:

Kiner gier pro bi-directional inverter

Rate capacity:6000W / 8000W(30min)

Rate dc voltage:48V

## 3. Structure

### 3.1 Product draw

#### 3.1.1 Kinergier pro bi-directional inverter

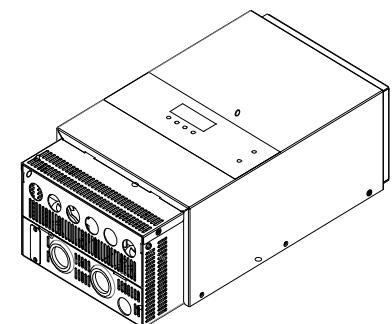
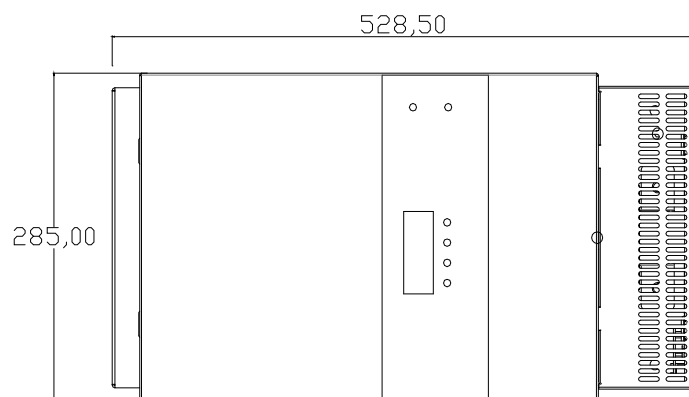
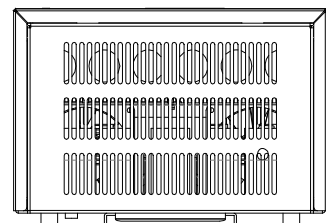
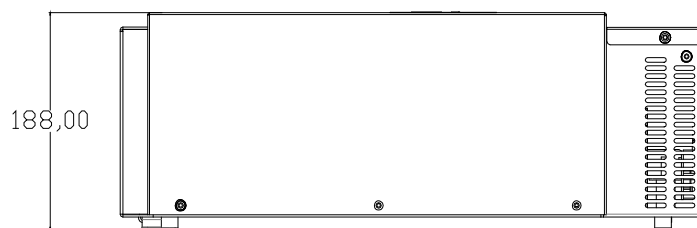
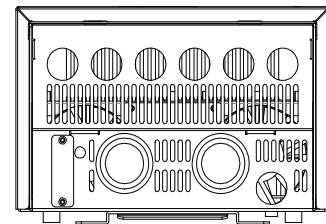
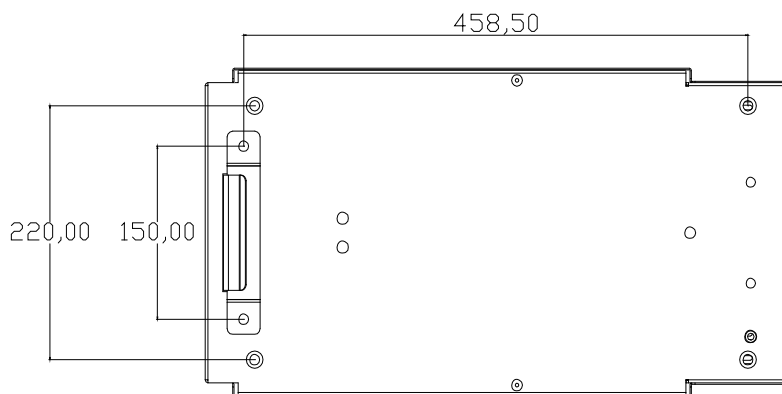
1) CK 4.0S/6.0S/8.0S



## 3.2 Product size

### 3.2.1 Kinergier pro bi-directional inverter

#### 1) CK 4.0S/6.0S/8.0S



## 4. Pre-installation Configuration

### 4.1 Unpacking and inspection

#### 4.1.1 Inspection of appearance

Please confirm whether the equipment is damaged during transportation and whether the accessories are complete after unpacking.

#### 4.1.2 Packing list

| No. | Category                         | Quantity | Remark |
|-----|----------------------------------|----------|--------|
| 1.  | Bi-directional inverter          | 1        |        |
| 2.  | BTS - battery temperature sensor | 1        |        |
| 3.  | Wall mount                       | 1        |        |
| 4.  | Expansion screw                  | 4        |        |
| 5.  | Hex Screw,M6*40mm                | 4        |        |
| 6.  | User ,manual                     | 1        |        |
| 7.  | 8P8C communication cable, 2m     | 1        |        |
| 8.  | 4P4C communication cable, 2m     | 1        |        |

The equipment should be transported to the installation site and then the outer packaging should be removed. Check the various equipments and materials are correct according to the packing list in this manual, and properly keep all kinds of spare parts and accessories for later installation and upgrade equipment or maintenance.

### 4.2 Wiring recommendation

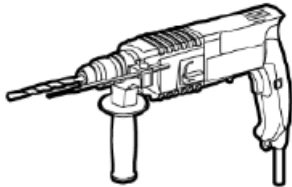
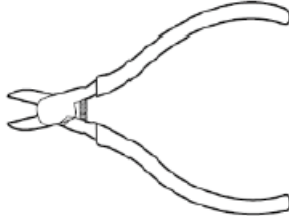
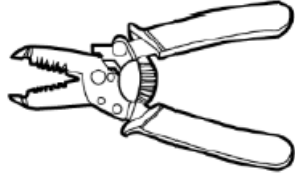

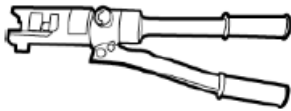


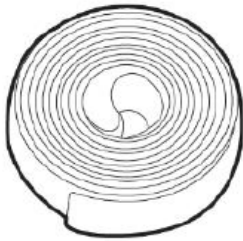
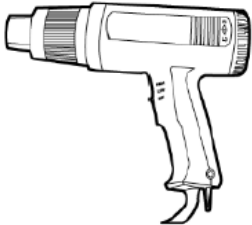


Please find the following minimum wire size. In case of DC cable longer than 1m, please increase the cross section of cable to reduce the loss.

| System capacity | AC wiring                           | PE wiring                           | DC wiring   |
|-----------------|-------------------------------------|-------------------------------------|---|
| CK 4.0S         | 4mm <sup>2</sup> ~10mm <sup>2</sup> | 4mm <sup>2</sup> ~10mm <sup>2</sup> | 35mm <sup>2</sup> ~90mm <sup>2</sup><br>φ8 aperture copper<br>terminal<br>Length<2m |
| CK 6.0S         | 6mm <sup>2</sup> ~10mm <sup>2</sup> | 6mm <sup>2</sup> ~10mm <sup>2</sup> |   |
| CK 8.0S         | 8mm <sup>2</sup> ~10mm <sup>2</sup> | 8mm <sup>2</sup> ~10mm <sup>2</sup> |   |



### 4.3 Tools

Please prepare tools and instruments following the Tab in advance.

| Classify                  | Tools and instruments   |  |   |
|---------------------------|---|--|---|
| Installing                |    |    |    |
|                           | Percussion drill ( $\phi 8\text{mm}$ )  | Diagonal pliers  | Wire stripper   |
|                           |    |   |    |
|                           | Wire cutters<br>( $25\text{mm}^2 \sim 35\text{mm}^2$ )                              | Hydraulic pliers<br>( $25\text{mm}^2 \sim 35\text{mm}^2$ )                           | Cross screwdrivers<br>(M4、M6)   |
|                           |  |  |  |
|                           | Universal meter (600V)  | Heat-shrinkable tubing   | Heat gun  |
| Personal safety equipment |  |  |   |
|                           | Protective gloves   | Protective shoes   |   |

#### 4.4 Location



Keep away from fire, avoid direct sunlight and rain; do not store flammable, explosive or corrosive gases or liquids in the working environment. Don't install in a working environment with metal conductive dust.

Please install the equipment in a location of dry, clean, cool with good ventilation.

Operating temperature: -20~60°C

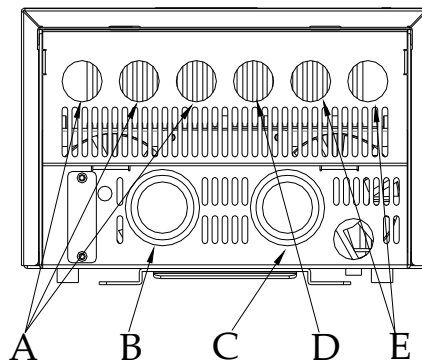
Storage temperature: -40~70°C

Cooling: Force fan

Relative humidity in operation: 95% without condensation.

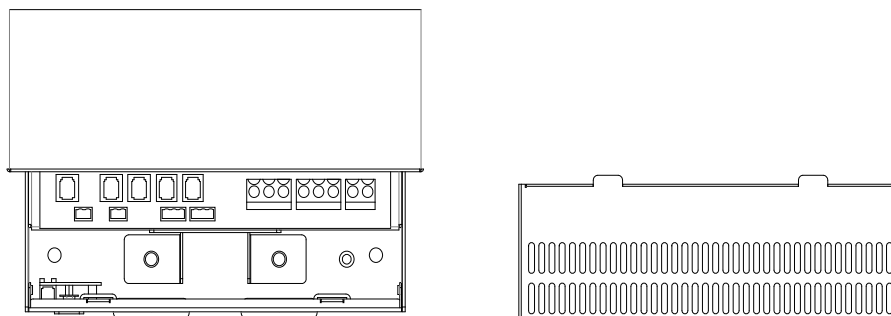
#### 4.5 Installation interface

##### Front panel



|   |   |
|---|---|
| A | Communication cable, dry contact cable threading hole |
| B | Battery negative cable threading hole                 |
| C | Battery positive cable threading hole                 |
| D | AC input cable threading hole                         |
| E | AC output cable threading hole                        |

##### Remove the top panel



## 5. Installation And Connection



**For the user operation safety, cut off the power before installation.**

### 5.1 General advice

Ensure that the Kinergier pro bi-directional inverter has the correct DC voltage with the existing battery system.

Install Kinergier pro bi-directional inverter as close to the batteries as possible reducing the voltage drop on cable for the better performance of the equipment.

We recommend connecting a DC fuse corresponding to the conductor between battery and Kinergier pro bi-directional inverter, which will offer protection to the battery cable. Please refer to following chart of our recommendations.

| Type    | 48Vdc    |
|---------|----------|
| CK 4.0S | 125A/80V |
| CK 6.0S | 200A/80V |
| CK 8.0S | 250A/80V |

On the AC output side, we recommend connecting the output from Kinergier pro bi-directional inverter to a suitable Residual Current Circuit Breaker and Circuit Breaker.



**Please make sure Kinergier pro bi-directional inverter is turned off before connection. Otherwise, high voltage could be present.**

## 5.2 Fix the bi-directional inverter

Basically, Kinergier pro bi-directional inverter could be installed either vertically on wall or horizontally on floor.

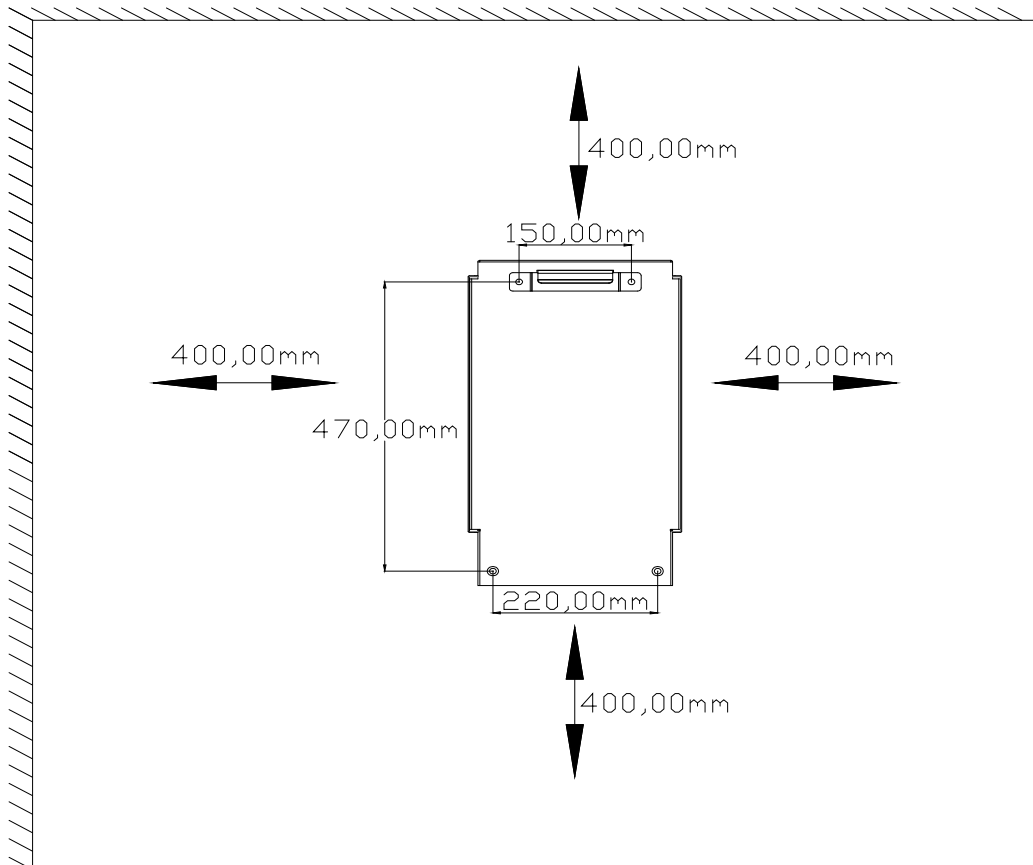
Take the case of installing on the wall as an example, please choose a flat surface to fix the unit securely.

Step1: Punch the wall according to the mounting hole cardboard.

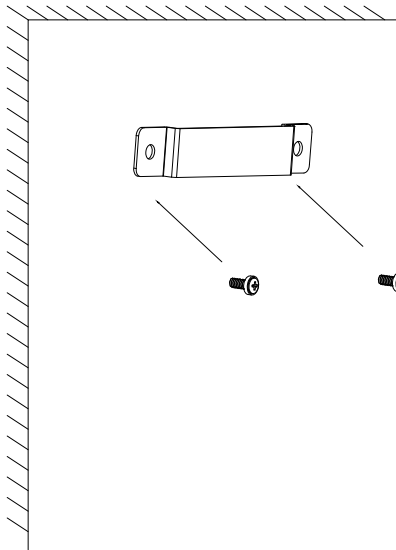
step2: Fix the mount to the wall with 2\*M6 screws.

step3: Snap the bottom hook into the wall mount.

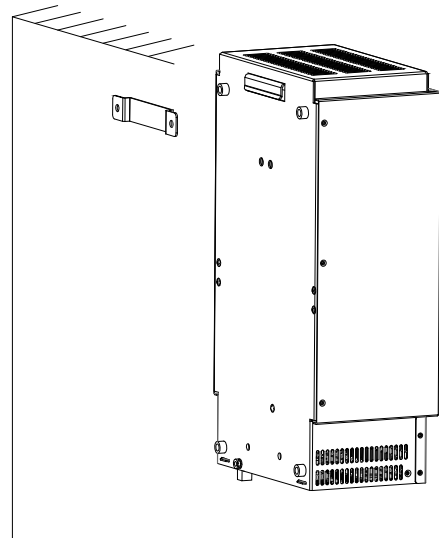
step4: Fix the bottom plate to the wall with 2\*M6 screws.



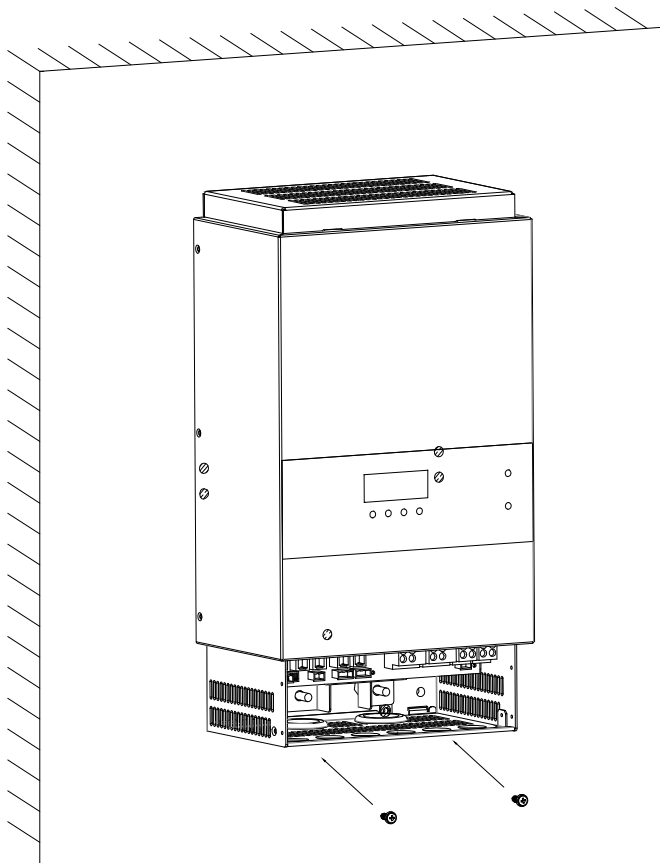
Step 1



Step 2



Step3



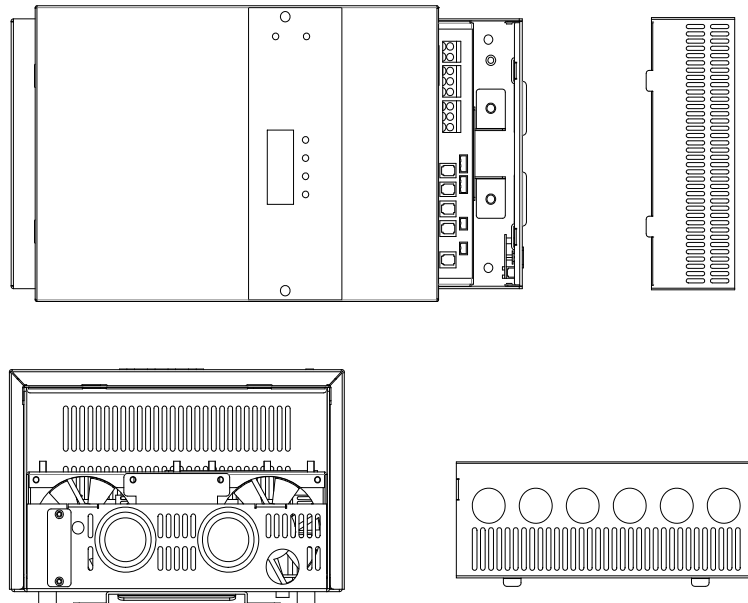
Step 4

### 5.3 Connect the power cable



Please make sure Kinergie pro bi-directional inverter is turned off before connection. Otherwise, high voltage could be present.

Remove the front and top panels before connecting the host cable.



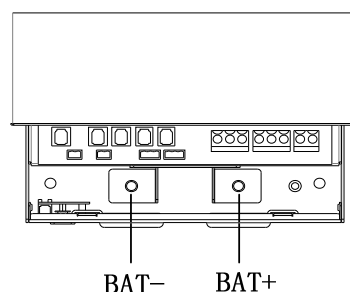
#### 1) Connect DC cable



Please double check battery voltage matches the model you are going to install, the wrong battery could destroy equipment and is out of warranty.



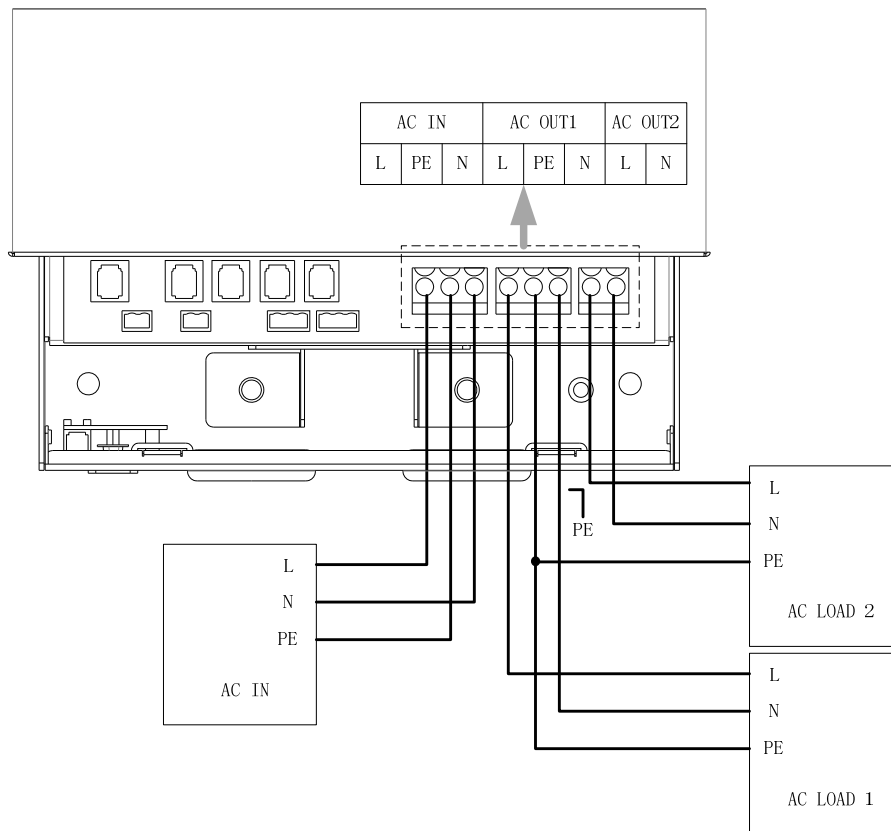
Please double confirm the polarity of battery input. Reverse polarity could cause permanent damage on equipment and is out of warranty.



Refer to section 4.2 to select the appropriate wire and connect the cable according to the base sheet metal mark.

After determining the positive and negative polarity, pass the DC input cable of the battery pack through the threading hole of the front panel and lock the nut with the wrench or sleeve.

## 2) Connect AC cable



AC input cable: Refer to section 4.2 to select the appropriate wire. Pass the AC input cable through the front panel, confirm “L”, “N” and “PE”, and tighten the screws with a screwdriver.

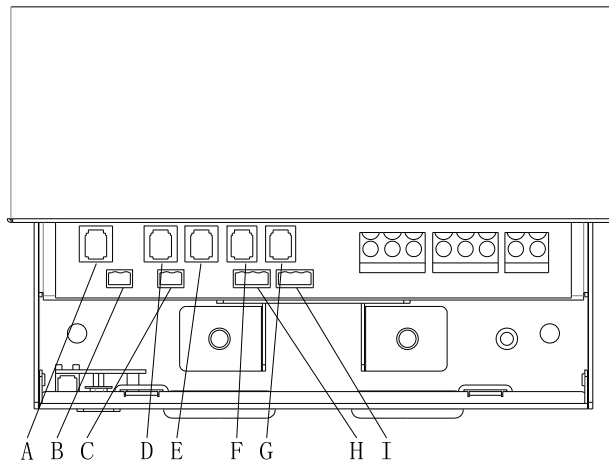
AC output cable: Refer to section 4.2 to select the appropriate wire. Pass the AC output cable through the front panel, confirm “L”, “N” and “PE”, and tighten the screws with a screwdriver.

PE cable: Refer to section 4.2 to select the appropriate wire. Connect the PE terminal on the lower right.



**Please double check the AC input and AC output were right after connection. Wrong connection will cause permanent damage of equipment and it is out of warranty.**

## 5.4 Connect the signal cable



| No. | Name          | Definition                                      |
|-----|---------------|---|
| A   | Bat Tem       | BTS - battery temperature sensor                |
| B   | Remote ON/OFF | Remote ON/OFF control                           |
| C   | DryInput      | Input Dry control                               |
| D   | ComSyncIn     | Parallel synchronous communication input (CAN)  |
| E   | ComSyncOut    | Parallel synchronous communication output (CAN) |
| F   | ComSYS        | System communication (RS485)                    |
| G   | ComMON        | Monitor communication (RS485)                   |
| H   | Relay1        | Output Dry control 1                            |
| I   | Relay2        | Output Dry control 2                            |



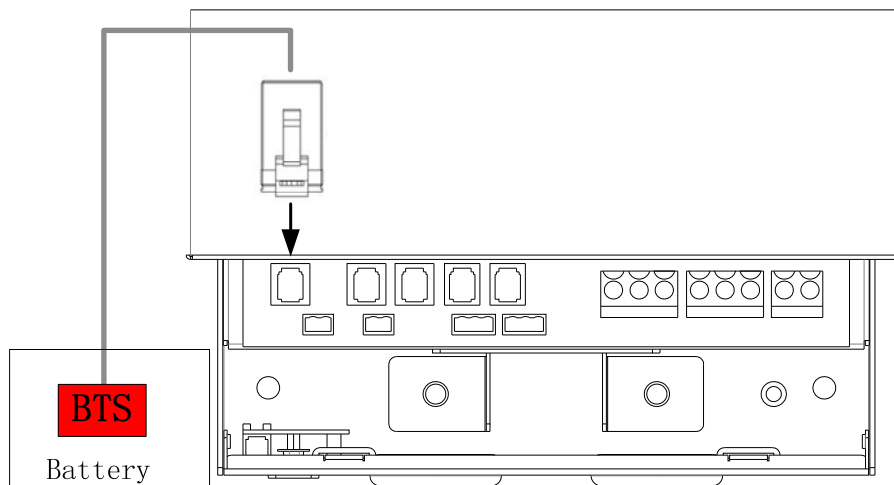
### 5.4.1 Connect BTS - battery temperature sensor

Connect the battery temperature sensor cable through the corresponding wiring hole on the front panel to the corresponding Bat Tem interface.

Remove the red sticker from the battery temperature sensor and attach the sensor to the center of the side of the battery to ensure a firm bond.



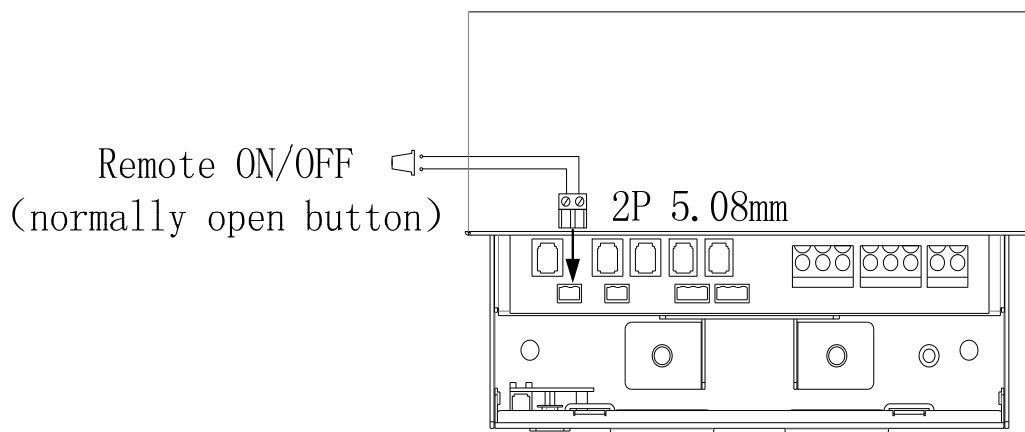
**Please notice the cable supplied is around 3000mm. Do not pull cable too hard avoid loose contact.**



### 5.4.2 Connect remote ON/OFF button

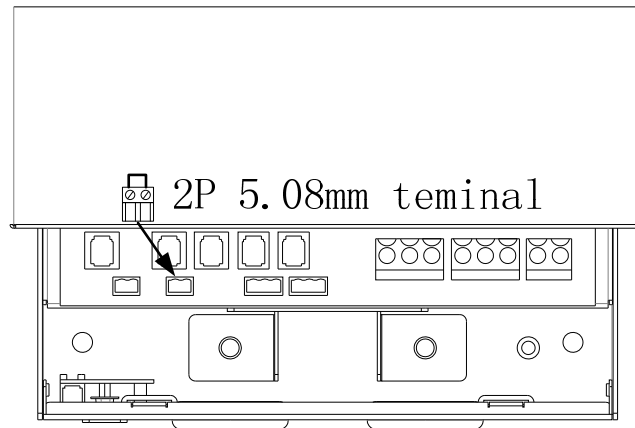
Connect the remote ON/OFF interface to the external switch button (normally open button) through the extension cable, and the line length can be adjusted according to the actual distance.

For details on how to operate the remote ON/OFF switch, see Chapter 6.



### 5.4.3 Connect input dry contact

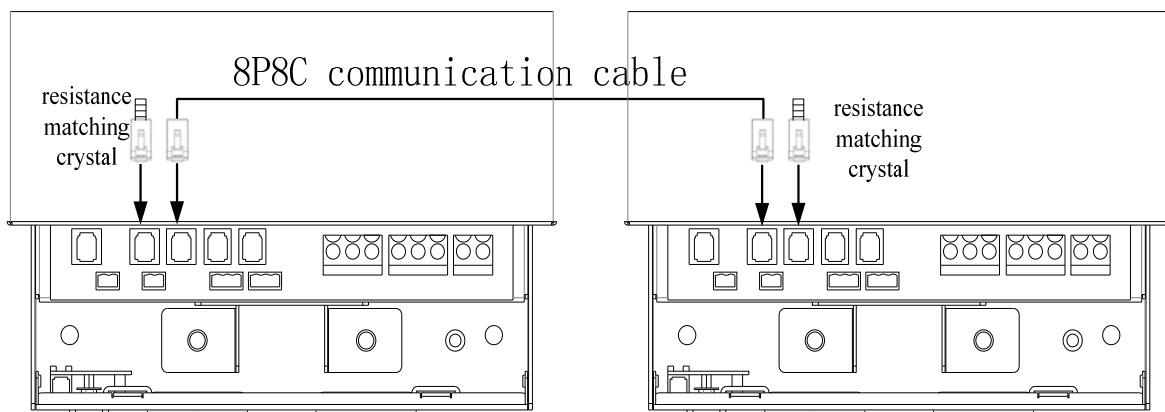
The input dry contact is connected by default with a short-circuit terminal for EPO control. After the terminal is removed, the inverter stops working. If there is no special case, do not remove the terminal.



### 5.4.4 Connecting parallel synchronous communication cable

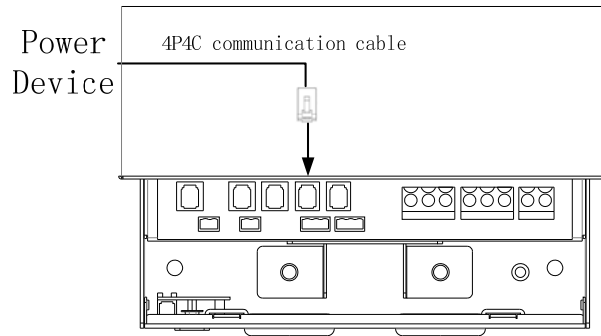
In single mode, please keep the resistance matching crystal that is inserted to the "ComSyncIn" interface.

In the parallel mode, please keep the resistance matching crystal that is inserted to the "ComSyncIn" interface of the first unit and "ComSyncOut" interface of the last unit, and remove the resistor matching crystal of other units, connect the adjacent units by a standard 8P8C network cable, the "ComSyncOut" interface of the previous units is connected to the "ComSyncIn" interface of the next machine.



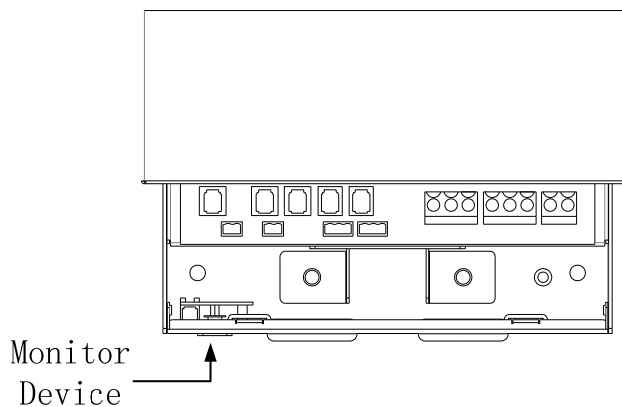
### 5.4.5 Connect the system communication cable

Connect the external power device to the "ComSYS" interface through the 4P4C communication cable.



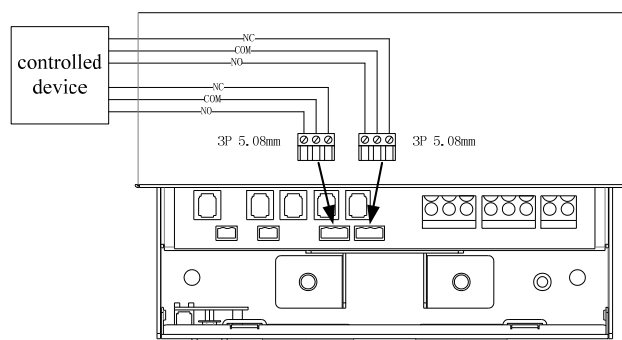
### 5.4.6 Connect the monitor communication cable

Connect the external monitor device to the "ComMON" interface through the 4P4C communication cable.



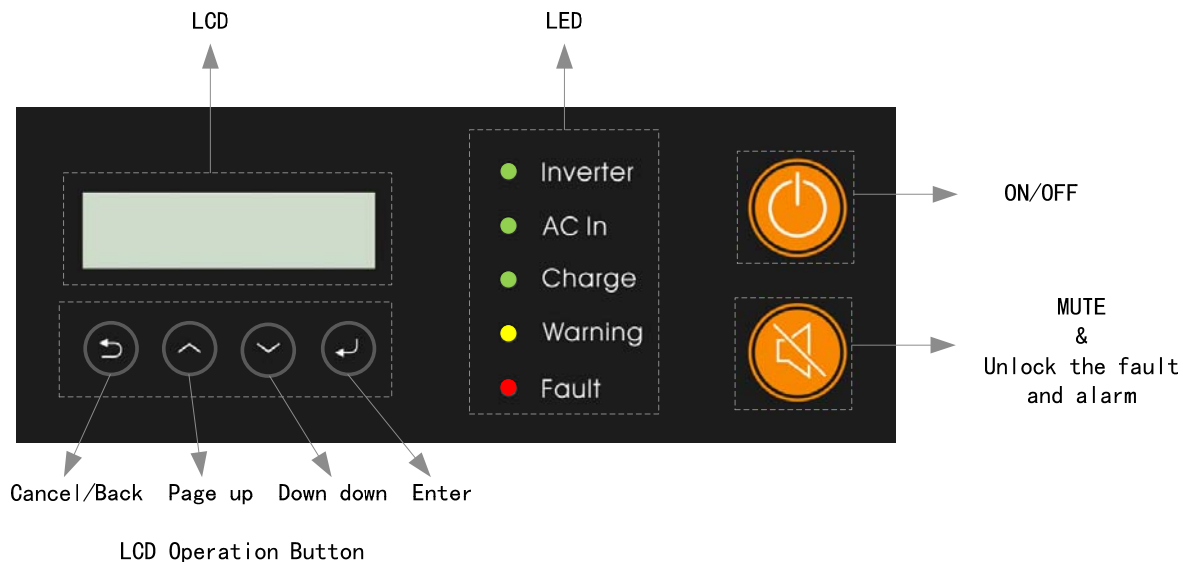
### 5.4.7 Connect input dry contact

Connect the externally controlled device and the output dry contact pair terminal by the suitable cable, and the inserted plugged terminal into the corresponding output dry contact interface "relay1" or "relay2".



## 6. Operation of Kinergier Pro





### 6.1 Button description



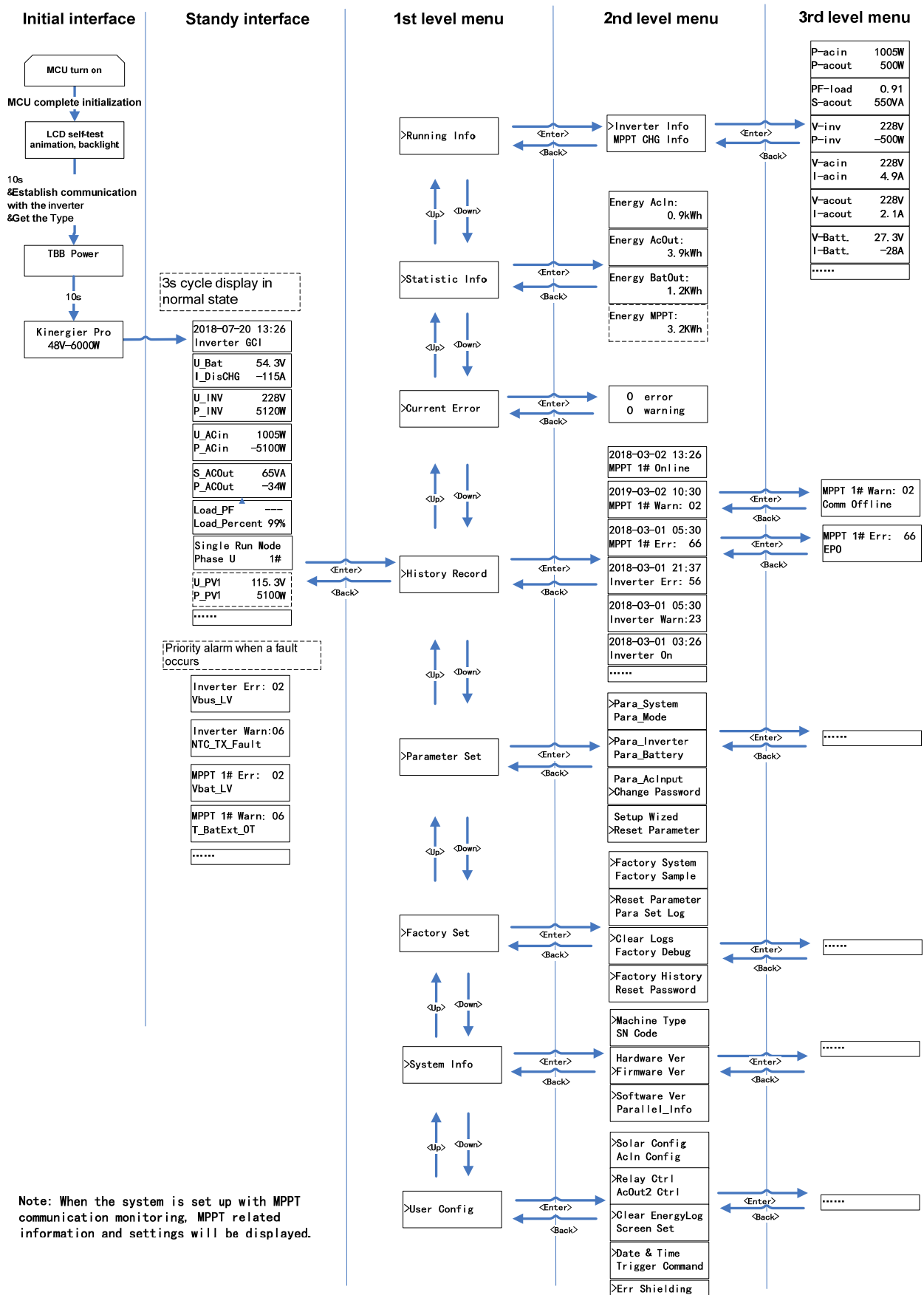
Press the ON/OFF button for more than 1s to start the machine. After the power-on self-test is completed, the machine is in the standby state. Press the ON/OFF button for more than 2s to turn on the inverter.

Press the switch button for more than 2s to turn off the inverter, the whole machine enters the standby state, and then press the switch button for more than 5s, the auxiliary power supply is powered off.

Remote ON/OFF button operation principle is the same as above.

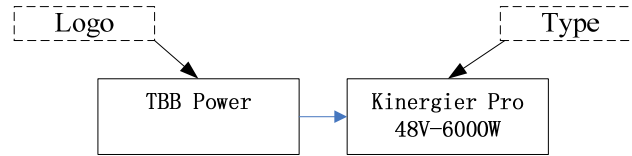
| No. | Symbol  | Function    |
|-----|---|-------------|
| 1   |  | Page up     |
| 2   |  | Page down   |
| 3   |  | Enter       |
| 4   |  | Cancel/Back |

## 6.2 Menu introduction

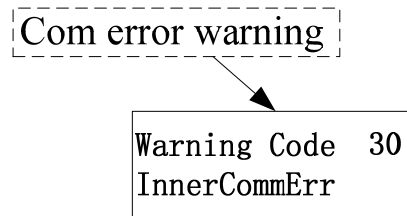


### 6.3 Initial interface

After turn-on, the LCD will have a boot animation of the screen and light the backlight, and then display the following information in sequence.





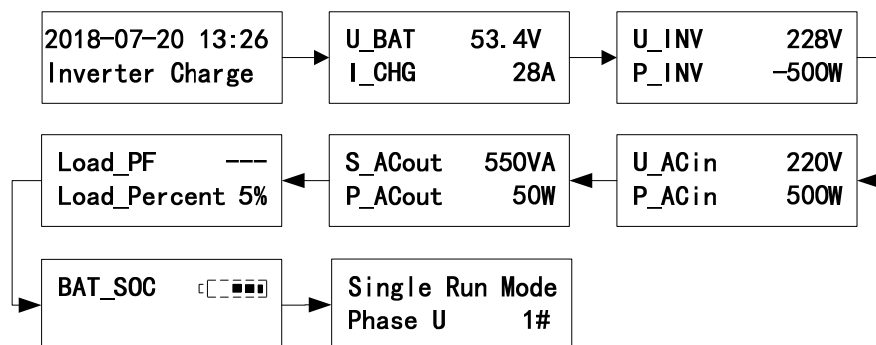
Note: In the boot interface, the LCD will establish contact with the Inverter. If there is a communication failure, the communication fault will be displayed.






### 6.4 Real-time information interface

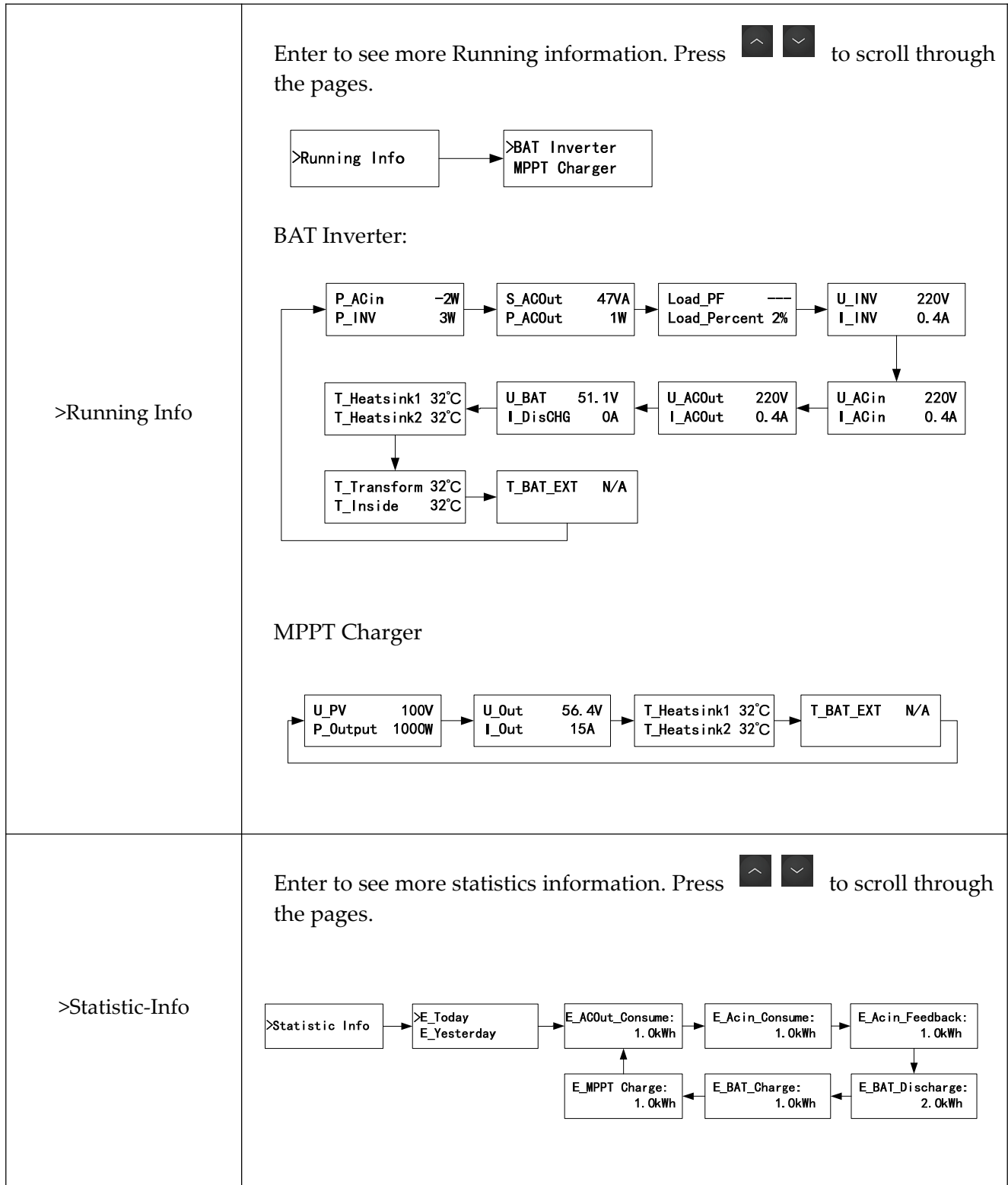
The LCD standby interface is a real-time information display interface, which displays detailed device working status. The default polling display time is 5S, and the time can be set manually.



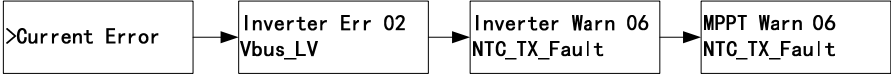


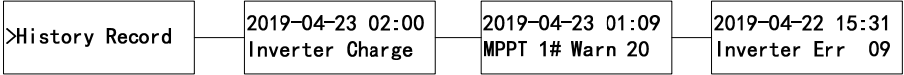

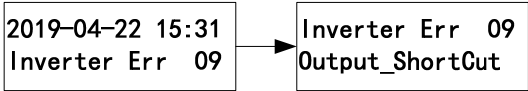
When press   to turn pages, the default will stop 30S on the current page, and the time can be set manually.



## 6.5 Information query interface

Press the  in the standby interface to enter the 1st level menu. Press the  button on the first level menu to enter the corresponding 2nd level menu. Some 2nd level menus can enter the 3rd level menu. Press the  to return the upper level menu.

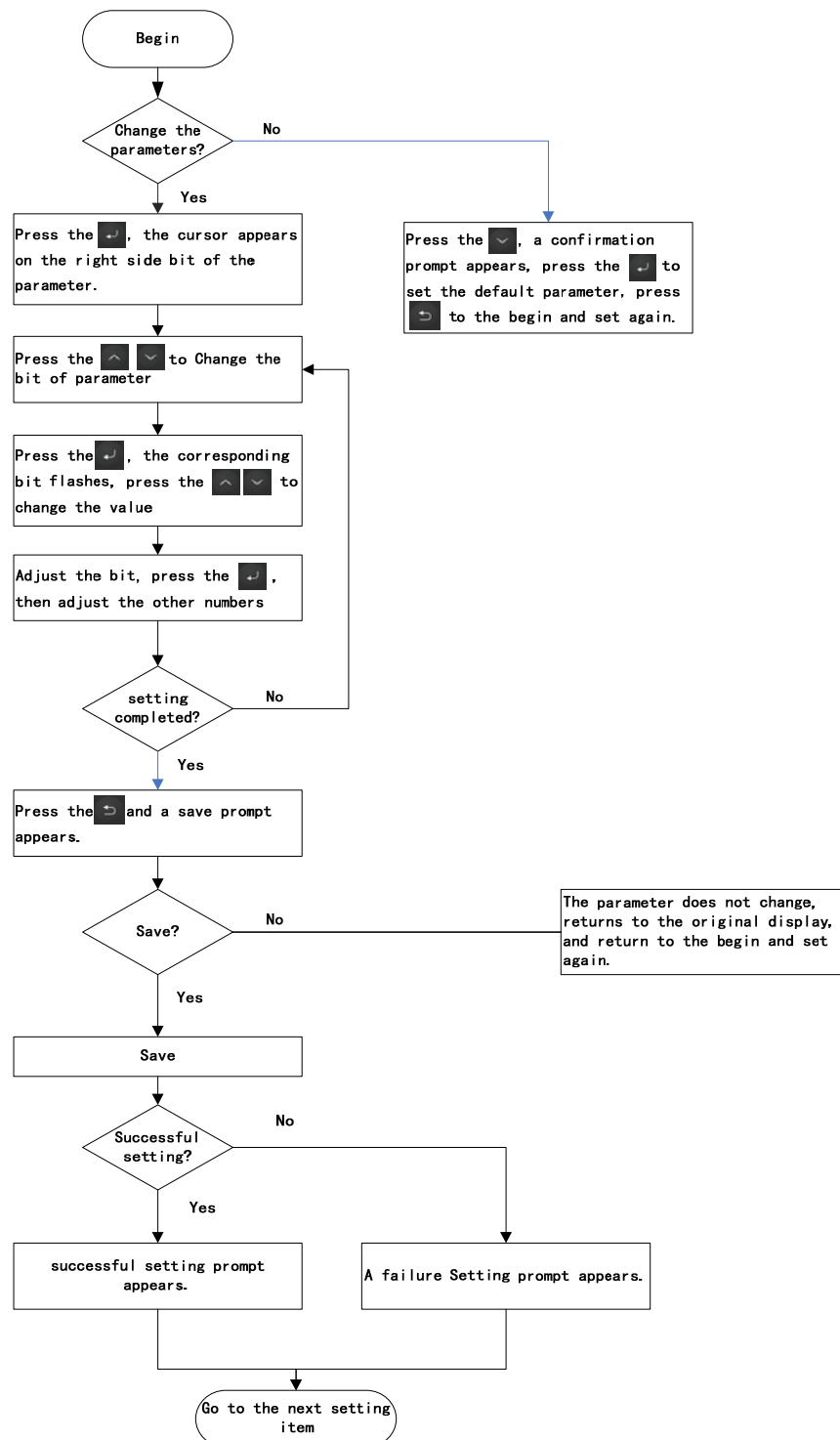


|                            |  |
|----------------------------|--|
| <p>&gt;Current Error</p>   | <p>Enter to see current error information. Press   to scroll through the pages.</p> <p>The first line is the corresponding code for the fault or warning flag.</p> <p>The second line is specific information.</p> <div data-bbox="509 488 1404 562">  <pre> graph LR     A[&gt;Current Error] --&gt; B[Inverter Err 02<br/>Vbus_LV]     B --&gt; C[Inverter Warn 06<br/>NTC_TX_Fault]     C --&gt; D[MPPT Warn 06<br/>NTC_TX_Fault] </pre> </div> <p>Displayed when there is no fault:</p> <div data-bbox="513 667 746 754"> <div>0 errors</div> <div>0 warnings</div> </div>   |
| <p>&gt;History Records</p> | <p>Enter to see history record information. Press   to scroll through the pages. the secondary menu when the event occur.</p> <div data-bbox="509 925 1417 999">  <pre> graph LR     A[&gt;History Record] --&gt; B[2019-04-23 02:00<br/>Inverter Charge]     B --&gt; C[2019-04-23 01:09<br/>MPPT 1# Warn 20]     C --&gt; D[2019-04-22 15:31<br/>Inverter Err 09] </pre> </div> <p>Press the  to enter the third level menu to display detailed information.</p> <div data-bbox="513 1137 1043 1227">  <pre> graph LR     A[2019-04-22 15:31<br/>Inverter Err 09] --&gt; B[Inverter Err 09<br/>Output_ShortCut] </pre> </div> |



## 6.6 Parameter setting interface

### 6.6.1 Operating instructions



Note: Some parameter settings are only allowed to be set when the Equipment is not in the running state, including the following setting information:

|            |            |                |               |               |                 |
|------------|------------|----------------|---------------|---------------|-----------------|
| >Para_Addr | >Para_Mode | >Para_Inverter | >Para_Battery | >Para_AcInput | >Factory System |
|------------|------------|----------------|---------------|---------------|-----------------|

### 6.6.2 Parameter set

|                |  |   |  |
|----------------|--|---|--|
| >Parameter Set | <p>A password is required to enter the parameter setting interface. The default is 1234, and the password can be set. This menu contains the following settings submenus:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">&gt;Para_System<br/>Para_Mode</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">&gt;Para_Invert<br/>Para_Battery</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">&gt;Para_ACin<br/>Change Password</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">&gt; Setup Wizard<br/>Reset Parameter</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">&gt;Clear EnergyLog<br/>Para_MPPT</div> </div> |   |  |
| >Para_System   | Display  | Setting range   | Description  |
|                | Parallel_Sytem   | 1-Parallel; 0-Single  | Set the unit's in single or parallel system                                  |
|                | Parallel_UVW   | 1-U/2-V/3-W   | Set the unit's phase   |
|                | Parallel_Address   | 1~8   | Set the unit's parallel address  |
|                | Common_BAT_SYS   | 1- Common battery pack system;<br>0- Distributed Battery Pack System  | Set the system's battery pack mode   |
| >Para_Mode     | Display  | Setting range   | Description  |
|                | Common_N_Line  | 1- Input and output neutral lines are connected together<br>0- The input and output neutral lines are not connected | Input and output Neutral line setting  |
|                | GND_Connect_EN   | 1- Neutral grounding is enable<br>0- Neutral grounding is disable   | Set the neutral line grounding mode when battery invert and AC in disconnect |
|                | OutCtrl_CHG  | 1- Charge is controlled by LCD<br>0- Charge is controlled by MCU  | Charge control mode (read only)  |

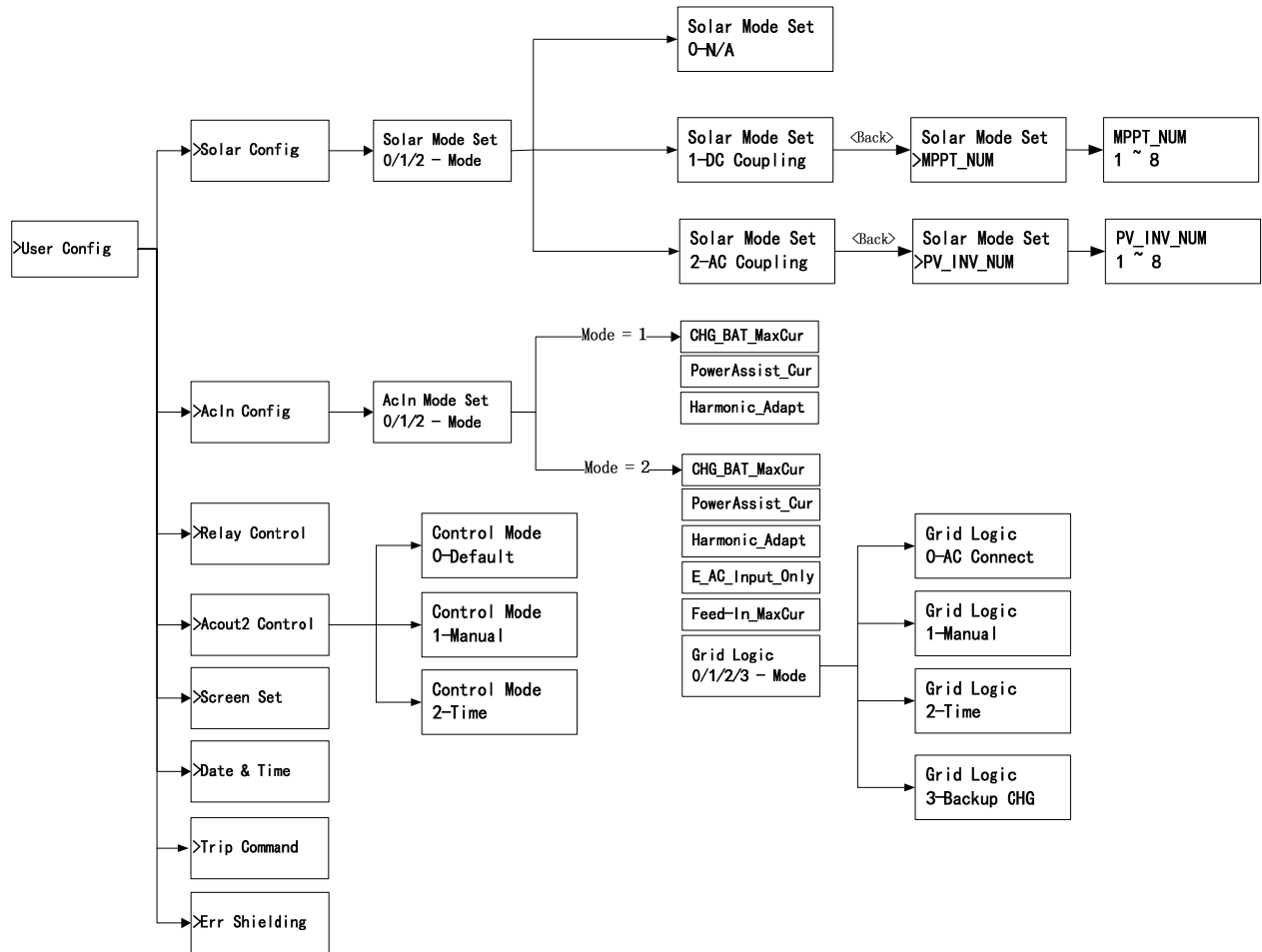
|                |  |  |   |
|----------------|--|--|---|
| >Para_Mode     | OutCtrl_ACont2                                   | 1- AC out2 is controlled by<br>LCD<br>0- AC out2 is controlled by<br>MCU                       | AC out2 external control<br>mode  |
|                | OutCtrl_Relay                                    | 1- Output dry contact is<br>controlled by LCD<br>0- Output dry contact is<br>controlled by MCU | Output dry contact<br>external control mode<br>(read only)  |
|                | Bypass_Supply_EN                                 | 0- Bypass output is enable<br>0- Bypass output is disable                                      | Whether bypass output<br>is allowed in case of<br>inverter failure or<br>battery undervoltage   |
|                | Silent_Mode_EN                                   | 0- Buzzer silent mode is<br>enable<br>1- Buzzer silent mode is<br>disable                      | Whether the inverter's<br>buzzer sounds when the<br>MPPT alarms   |
| >Para_Inverter | Display  | Setting range  | Description   |
|                | INV_Output_Volt                                  | 200~240V   | Inverter output voltage<br>RMS  |
|                | Rate_AC_Freq                                     | 50/60HZ  | Rated AC frequency  |
| >Para_Battery  | > Basic Setting Detail Setting<br>Basic Setting: |  |   |
|                | Display  | Setting range  | Description   |
|                | Battery_AH                                       | 100~2000AH   | Set the battery capacity  |
|                | Battery_Type                                     | 0: GEL<br>1: AGM<br>2: LFP<br>3: OpZV  | Set the battery type  |
|                | Detail Setting:                                  |  |   |
|                | Display  | Setting range  | Description   |
|                | U_AVE_CHG  | U_Float_CHG ~ 14.5V<br>(12V min)   | The average charging<br>voltage of a single<br>battery (battery size is<br>12V/section)<br>Note: This value is<br>affected when changing<br>the battery type and can<br>be reconfigured as<br>needed. |

|               |                  |  |   |
|---------------|------------------|--|---|
| >Para_Battery | U_Float_CHG      | 11.5V ~ U_AVE_CHG<br>(14.5V max)   | Floating voltage of single battery (battery size is 12V/section)<br>Note: This value is affected when changing the battery type and can be reconfigured as needed.                  |
|               | U_DisCHG_End     | 9V ~ (BAT_LV_Protect - 0.3)<br>(11V max)   | Secondary undervoltage protection for single-cell battery (battery size is 12V/section)   |
|               | BAT_LV_Protect   | (U_DisCHG_END + 0.3) ~<br>(min(LV_PRO_Recover,<br>BAT_LV_Warn) - 0.3)<br>(Range:9.5~12V) | Undervoltage protection for single battery (battery size is 12V/section)  |
|               | BAT_LV_Warn      | (BAT_LV_Protect + 0.3)~13V<br>(10V min)  | Undervoltage warning for single battery (battery size is 12V/section)   |
|               | BAT_OV_Warn      | (BAT_LV_Warn + 0.3)~15V<br>(12V min)   | Overvoltage alarm for single battery (battery size is 12V/section)  |
|               | SYS_CHG_MaxCur   | 5~100A   | System maximum charging current<br>Note: This value is affected when changing the battery capacity and battery type, and the user can reconfigure it according to the requirements. |
|               | E2F_Delay        | 1~600min   | Minimum Bulk time   |
|               | Max_ABSORP_Time  | 1~240h   | Maximum Absorption time   |
|               | Auto_CHG_Cycle   | 24~2400h   | Equalization cycle time   |
|               | CHG_TEMP-Coef    | 0~20mv/°C/cell   | Charging temperature compensation coefficient   |
|               | CHG_TEMP_OMPE_EN | 1-on; 0-off  | enable the charging temperature compensation  |
|               | LV_PRO0_Recover  | (BAT_LV_Protect + 0.3) ~<br>14.5V  | Undervoltage protection recovery value  |

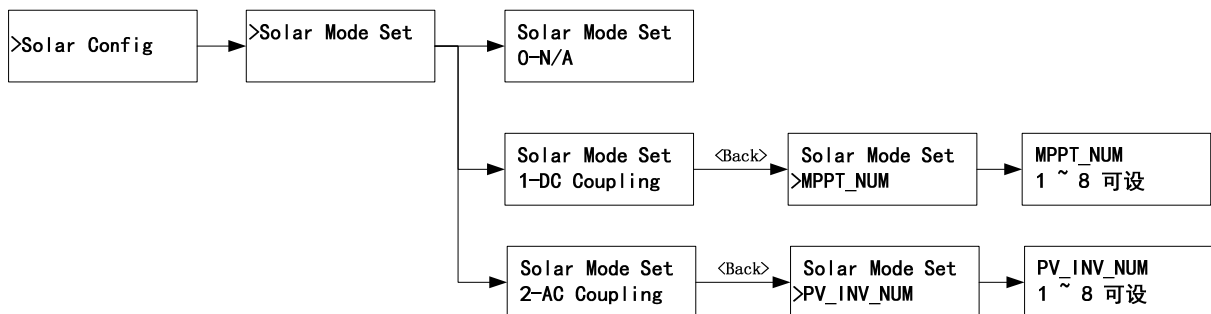
| >Para_AcIn | Display          | Setting range                             | Description  |
|------------|------------------|---|--|
|            | E_AcIn_Priority  | 0-DC First<br>1-AC First<br>2-User Config | Read only<br><br>Change according to the configuration of ACin Config in user config   |
|            | AC_U_Max         | 220~260V                                  | Maximum AC in input voltage  |
|            | AC_U_Min         | 165~220V                                  | Minimum AC in input voltage  |
|            | AC_F_Max         | Rate_AC_Freq + (0 ~ 5)Hz                  | Maximum AC in input frequency  |
|            | AC_F_Min         | Rate_AC_Freq - (0 ~ 5)Hz                  | Minimum AC in input frequency  |
|            | Harmomic_Adapt   | 0- Normal Grid<br>1- Weak Grid            | AC in harmonic adaptation mode.<br>Note: When the AC in input harmonic is too large and the inverter cannot track its phase, select 1 to give the inverter a greater chance to track the phase of the AC in. |
|            | PowerAssist_Cur  | 3~50A                                     | The maximum current allowed for AC in input, that is, when the input current of ACin reaches this set value, the excess energy required by the load will be taken from the battery.                          |
|            | Feedback_EN      | 0- Forbid<br>1- Allow                     | Whether to allow energy to be fed back to ACin (read only)   |
|            | Feedback_MaxCur  | 0~50A                                     | Maximum current allowed to feed back to grid   |
|            | AC-Connect Delay | 20~300s                                   | Delay time into the grid after AC in is detected to be normal  |

|                  |   |   |   |
|------------------|---|---|---|
| >Para_AcIn       | Feedback Delay                                | 0~300s  | After AC in is connected to grid, the delay of allowing energy to be feedback into Grid |
|                  | ACin_CHG_Maxcur                               | 2A ~ SYS_CHG_MaxCur   | The maximum charging current that allows AC in to charge the battery.                   |
| >Change password | Change the Parameter Set's enter password     |   |   |
| >Setup Wizard    | See 6.8                                       |   |   |
| >Reset Parameter | Display                                       | Description   |   |
|                  | Reset User_Para                               | Restore the user's default parameters                               |   |
| >Clear EnergyLog | Display                                       | Description   |   |
|                  | Clear Ener gyLog                              | Clear the electricity statistics for the day in Statistic Info      |   |
| >Para_MPPT       | Parameters cannot be set when MPPT is offline |   |   |
|                  | Display                                       | Setting range   | Description   |
|                  | Silent_Mode_EN                                | 0- Buzzer silent mode is enable<br>1- Buzzer silent mode is disable | Whether the MPPT's buzzer sounds when the MPPT alarms                                   |
|                  | DC_Input_Mode                                 | 0- Mode is disable<br>1- Mode is enable                             | MPPT input connected to DC source mode  |

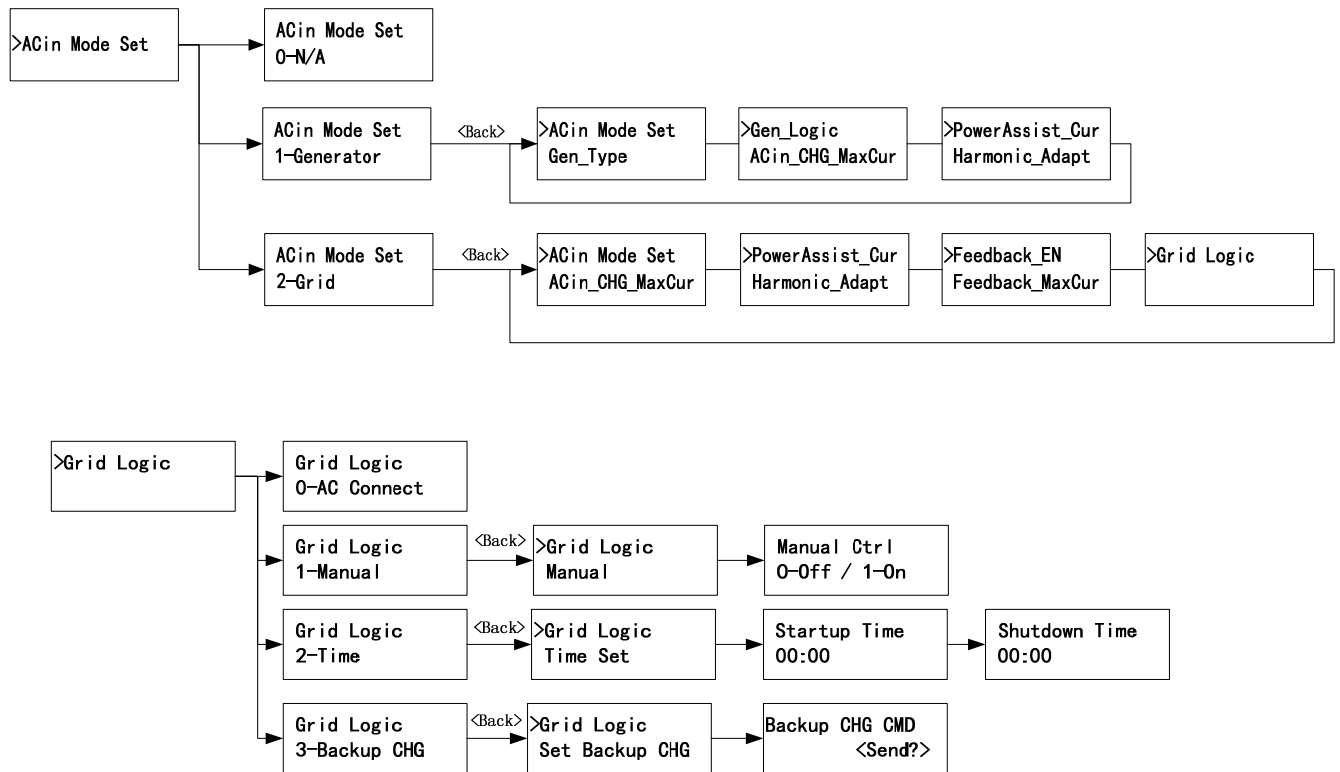
## 6.7 User config



### 6.7.1 Solar Config



## 6.7.2 ACin Config



## 6.7.3 Relay Control

|               |  |
|---------------|--|
| 0-Default     | Relay 1 switch from the normally open state to the normally closed state when battery undervoltage occurs.<br>Relay 2 switch from the normally open state to the normally closed state when machine overload alarm or failure. |
| 1-Gen Driver  | Generator start and stop control(reserved)   |
| 2-Other Logic | Reserved   |

## 6.7.4 ACout2 Control

|            |   |
|------------|---|
| 0-Default  | ACout2 relay is turned on and output when AC in powered or grid connection. |
| 1-Manual   | Control the ACout2 relay manually.  |
| 2-Time     | Timing control ACout2 relay.  |
| 3-INV Load | Control ACout2 relay according to inverter load rate.                       |
| 4-BAT Volt | Control ACout2 relay according to battery voltage.                          |

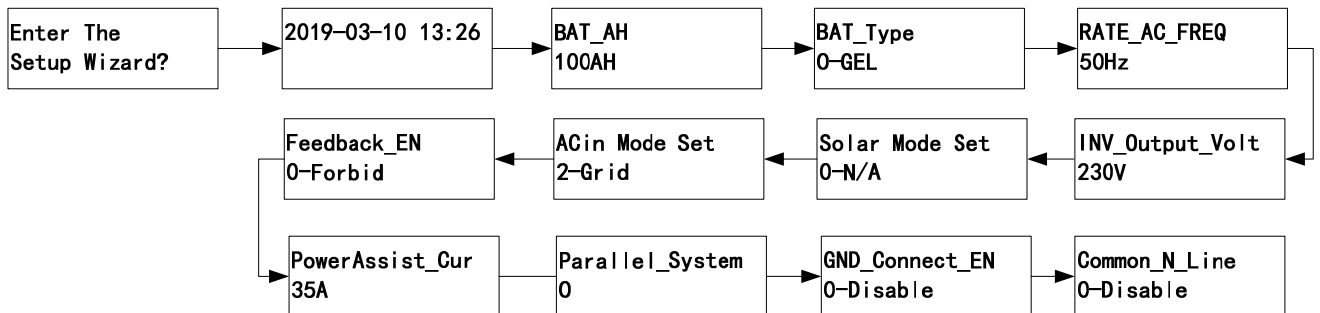


### 6.7.5 Screen Set

|                   |  |
|-------------------|--|
| Backlight _Close  | Backlight time setting,0~180s  |
| Backlight _KeepOn | Backlight fixed lighting function enabled, 1-on(Enable) ; 0-off(Disable).                                      |
| Page_Turn_Auto    | Automatically page turning time of the real-time information display interface, 3~30s.                         |
| Page_Turn_Pause   | Dwell time of the real-time information display interface, 3~180s.   |
| Menu_Exit_Auto    | If there is no operation for a long time, return time of the real-time information display interface, 30~180s. |

### 6.8 Setup wizard

The first time turn on or after restoring the factory settings, need to enter the setup wizard.



## 6.9 Error code

| No. | Error Code      | Description                           | Solution |
|-----|-----------------|---------------------------------------|----------|
| 1   | Vbus_OV         | DC bus is over voltage                |          |
| 2   | Vbus_LV         | DC bus is under voltage               |          |
| 3   | Vbus_Hw_Pro     | DC bus is hardware over voltage       |          |
| 4   | PSU_Fault       | Auxiliary power supply is abnormal    |          |
| 5   | T_HS_OT         | Heat sink's temperature is too high   |          |
| 6   | T_TX_OT         | Transformer's temperature is too high |          |
| 7   | Sam_HD_Fault    | Sampling is abnormal                  |          |
| 8   | EEPROM_Fail     | EEPROM is abnormal                    |          |
| 9   | Output_SC       | Output short circuit                  |          |
| 10  | Output_OL       | Output over load                      |          |
| 11  | CoolSys_Err     | Cooling system is abnormal            |          |
| 12  | VbatLow_Deep    | Battery is severe under voltage       |          |
| 13  | Vinv_LV         | Inverter is under voltage             |          |
| 14  | Instant_OC_Soft | Instantaneous over current            |          |
| 15  | EPO             | Emergency stop                        |          |
| 16  | Rly_Err         | Relay is abnormal                     |          |

## 6.10 Warning code

| No. | Warning Code     | Description                               | Solution |
|-----|------------------|---|----------|
| 1   | Vbat_OV          | Battery is over voltage                   |          |
| 2   | Vbat_LV          | Battery is under voltage                  |          |
| 3   | Cur_Limit        | Inverter is over current                  |          |
| 4   | Over Load        | Overload                                  |          |
| 5   | NTC_HS_Fault     | Heat sink temperature sample is failure   |          |
| 6   | NTC_TX_Fault     | Transformer temperature sample is failure |          |
| 7   | BatExt_OT        | Battery temperature is too high           |          |
| 8   | Fan_Fault        | Fan is abnormal                           |          |
| 9   | Par_Connect      | Parallel running is abnormal              |          |
| 10  | CommParCan_Err   | CAN communication error is abnormal       |          |
| 11  | Par_ID_Conflict  | Parallel address conflict                 |          |
| 12  | ParaSet_Conflict | Parameter do not match                    |          |
| 13  | Vbat_LV_Fault    | Battery is under voltage protection       |          |
| 14  | TypeSet_Mismatch | Type does not match                       |          |
| 15  | Par_Output_Err   | Parallel output is abnormal               |          |
| 16  | InnerCommErr     | Internal communication is abnormal        |          |
| 17  | Reserved         |   |          |
| 18  | Reserved         |   |          |
| 19  | Reserved         |   |          |
| 20  | V_AcIn_OV        | AC input is over voltage                  |          |
| 21  | V_AcIn_LV        | AC input is under voltage                 |          |
| 22  | F_AcIn_OF        | AC input is over frequency                |          |
| 23  | F_AcIn_LF        | AC input is under frequency               |          |
| 24  | Phase_Err        | Phase sequence is abnormal                |          |

## 6.11 Event code

| Event Code      | Description                              |
|-----------------|--|
| Turned on       | The equipment is Turned on to standby    |
| Turned off      | The equipment is Turned off from standby |
| Inverter off    | The Inverter is off                      |
| Inverter on     | The Inverter is on                       |
| Inverter charge | The Inverter is in charging mode         |
| Inverter GCI    | The Inverter is in GCI mode              |
| Inverter bypass | The Inverter is in bypass mode           |
| Inverter fault  | The Inverter is in fault mode            |
| MPPT Off        | The MPPT charger is off                  |
| MPPT Charge     | The MPPT charger is in charging mode     |
| MPPT Fault      | The MPPT charger is in fault mode        |

## 7. Specification

| Series                          | CK 4.0S   | CK 6.0S | CK 8.0S |
|---------------------------------|---|---------|---------|
| Power Assist                    | Yes   |         |         |
| Grid Connect Invert             | Yes   |         |         |
| AC inputs                       | Input voltage range:170~265 VAC<br>Input frequency:45~65Hz      |         |         |
| Inverter                        |   |         |         |
| Nominal battery voltage         | 48Vdc   |         |         |
| Input voltage range             | 42~60Vdc  |         |         |
| Output                          | Output voltage: 220~240 VAC ± 2%<br>Frequency: 45~60 Hz ± 0.05% |         |         |
| Harmonic distortion             | THDV<2%            THDI<5%                                      |         |         |
| Cont. output power at 25°C      | 3000W   | 4500W   | 6000W   |
| Power factor                    | 1.0   |         |         |
| Peak power (30min)              | 4000W   | 6000W   | 8000W   |
| Peak power (5 sec)              | 6000W   | 9000W   | 12000W  |
| Cont. output power at 40°C      | 2400W   | 3600W   | 4800W   |
| Maximum efficiency              | 95%   | 95%     | 96%     |
| Zero load power                 | 17W   | 20W     | 26W     |
| Charger                         |   |         |         |
| Charge voltage 'absorption'     | 57.6Vdc   |         |         |
| Charge voltage 'float'          | 55.2Vdc   |         |         |
| Battery types                   | AGM / GEL / OPZV / Li-ion                                       |         |         |
| Charge current<br>house battery | 50A   | 75A     | 100A    |
| Temperature compensation        | Yes   |         |         |

| General data                   |   |                           |                           |
|--------------------------------|---|---------------------------|---------------------------|
| Transfer time                  | <2ms(<15ms when WeakGrid Mode)  |                           |                           |
| Remote on-off                  | Yes   |                           |                           |
| Programmable relay             | 2x  |                           |                           |
| Protection                     | a) output short circuit<br>b) overload<br>c) battery voltage too high<br>d) battery voltage too low<br>e) temperature too high<br>f) input voltage out of range<br>g) input voltage ripple too high |                           |                           |
| CAN Bus communication port     | For parallel and three phase operation,<br>remote monitoring and system integration   |                           |                           |
| General purpose com. Port      | RS485,Bluetooth,GPRS,WLAN   |                           |                           |
| Operating temperature range    | -20 to +60°C  |                           |                           |
| Storage temperature range      | -40 to +70°C  |                           |                           |
| Relative humidity in operation | 95% without condensation  |                           |                           |
| Mechanical Data                |   |                           |                           |
| Dimension                      | 530mm<br>*285mm<br>*185mm   | 530mm<br>*285mm<br>*185mm | 530mm<br>*285mm<br>*185mm |
| Net Weight                     |   |                           | 40KG                      |
| Cooling                        | Forced fan  |                           |                           |
| Protection index               | IP20  |                           |                           |



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