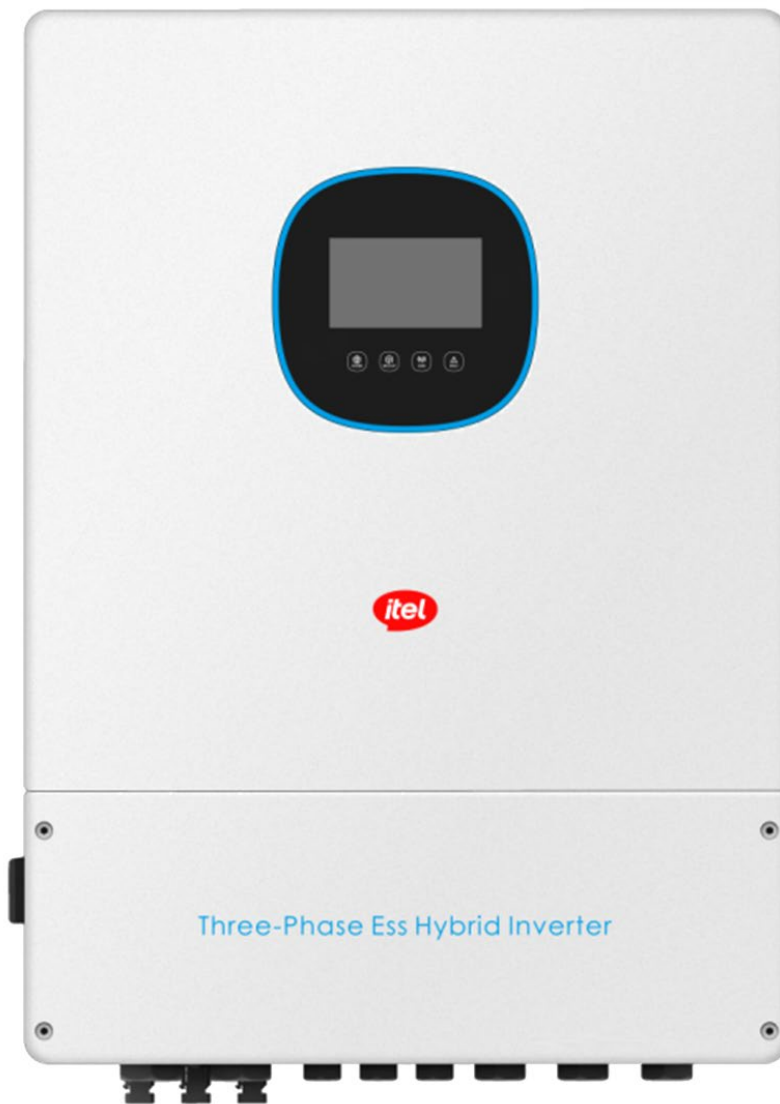


# itel Hybrid Inverter

IHY-5/6/7/8/10/12KL3



## User Manual



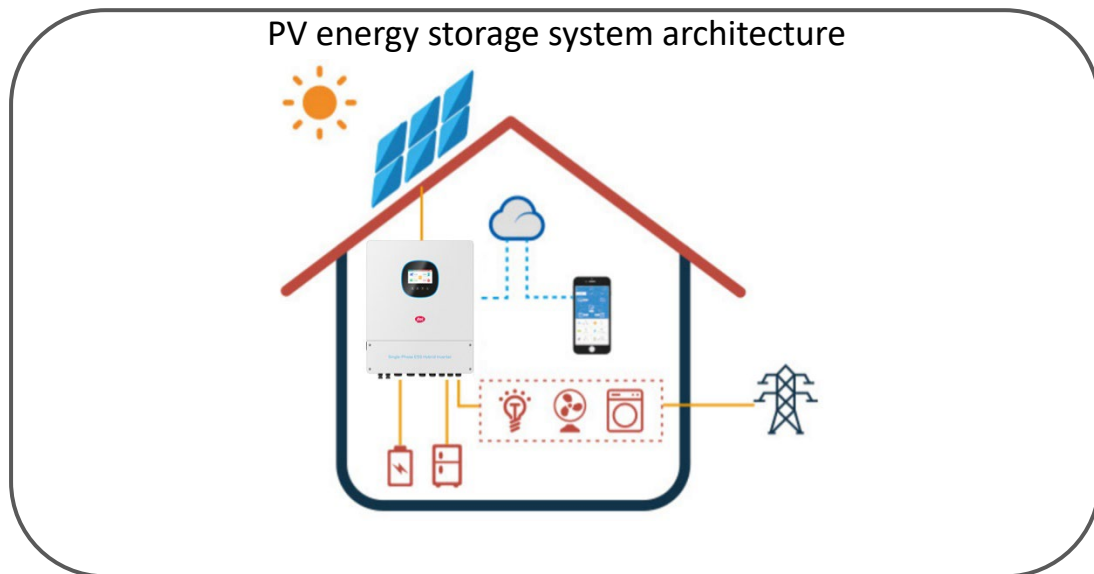
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Hybrid inverter series, also called hybrid or bidirectional solar inverters, apply to solar system with participation of PV, battery, loads and grid system for energy management. The energy produced by PV system shall be used to optimize self-consumption, excess power charge battery and the rest power could be exported to the grid.

Battery shall discharge to support loads when PV power is insufficient to meet self-consumption. If battery power is not sufficient, the system will take power from grid to support loads.



## 1.1 SAFETY & WARNING

This series of bidirectional energy storage inverters strictly abides by relevant product design and testing safety rules. During installation, operation or maintenance, please carefully read all instructions and precautions on the inverter or user manual. Any improper operation may cause personal or property damage.

### • SYMBOLS EXPLANATION

|  |                                                                                                                                |
|--|--------------------------------------------------------------------------------------------------------------------------------|
|  | Caution!<br>Failing to observe a warning indicated in this manual may result in injury.                                        |
|  | DANGER High voltage hazard. Disconnect all incoming power and turn off the product before working on it.                       |
|  | Danger of hot surface!<br>High-temperature hazard. Do not touch the product under operation to avoid being burnt.              |
|  | This side up!<br>The package must always be transported, handled and stored in such away that the arrows always point upwards. |

|                                                                                   |                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Product should not be disposed as household waste.<br>Do not dispose of the inverter as household waste. Discard the product in compliance with local laws and regulations .or send it back to the manufacturer |
|  | Grounding point.                                                                                                                                                                                                |
|  | Read through the user manual before any operations                                                                                                                                                              |
|  | Keep dry!<br>The package/product must be protected from excessive humidity and must be stored under cover.                                                                                                      |
|  | Inverter will be touchable or operable after minimum 5 minutes of being turned off or totally disconnected, in case of any electrical shock or injury.                                                          |

## • SAFETY WARNING

Any installation and operation on inverter must be performed by qualified electricians, in compliance with standards, wiring rules or requirements of local grid authorities or companies.

Before any wiring connection or electrical operation on inverter, all DC and AC power must be disconnected from inverter for at least 5 minutes to make sure inverter is totally isolated to avoid electric shock.

The temperature of inverter surface might exceed 60°C during working, so please make sure it is cooled down before touching it, and make sure the inverter is untouchable for children.

Do not open inverter cover or change any components without authorization, otherwise the warranty commitment for the inverter will be invalid.

Usage and operation of the inverter must follow instructions in this user manual, otherwise the protection design might be useless and warranty for the inverter will be invalid.

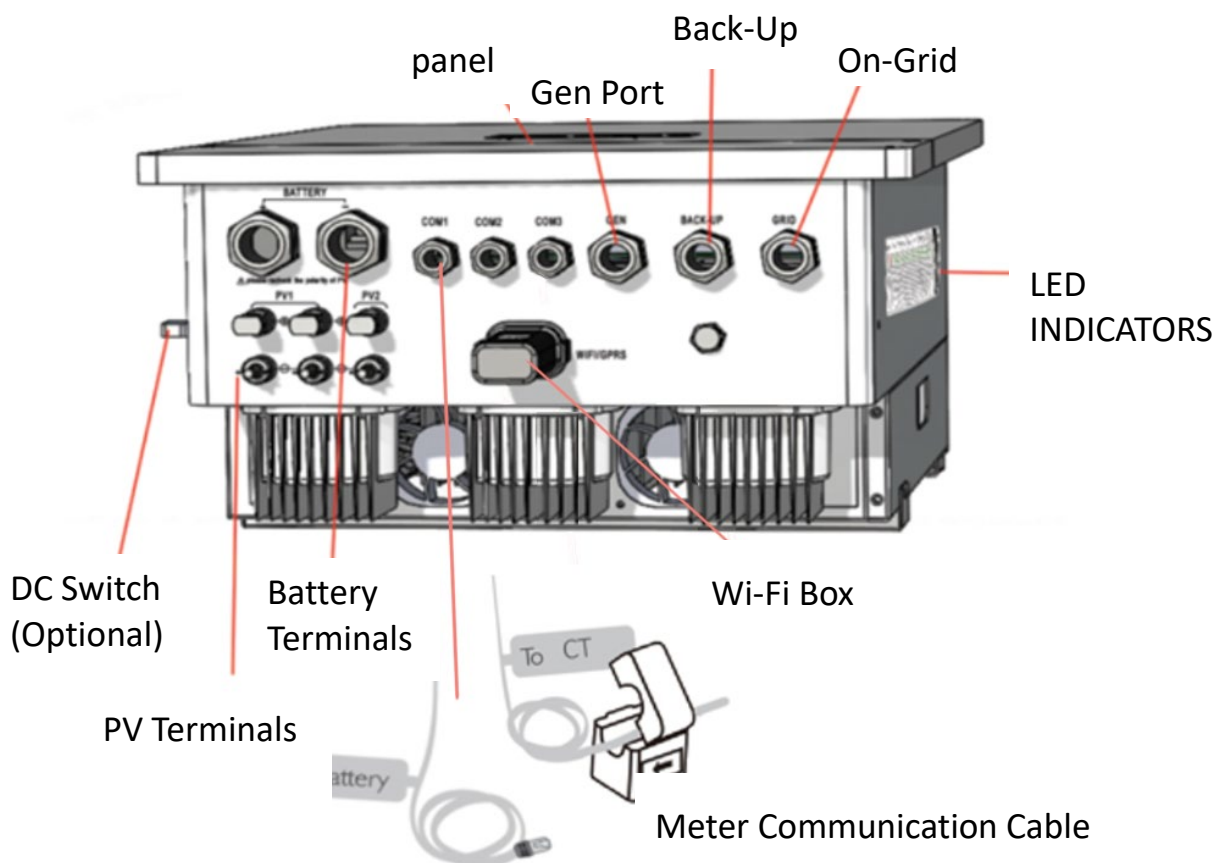
Appropriate methods must be adopted to protect inverter from static damage. Any damage caused by static is not warranted by manufacturer.

PV negative (PV-) on inverter side is not grounded as default design.

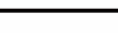
The total open-circuit voltage of PV string/array is lower than the maximum rated DC input voltage of the inverter. Any damage caused by PV over-voltage is beyond warranty.

When the inverter is working, it is prohibited to plug PV, battery, and AC connectors.

## 1.2 PRODUCT OVERVIEW



### • LED INDICATORS

| LED INDICATORS                                                                                        |                                                                                     |                                                           |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <br><b>SYSTEM</b>  |  | ON = SYSTEM IS READY                                      |
|                                                                                                       |  | BLINK = SYSTEM IS STARTING UP                             |
|                                                                                                       |  | OFF = SYSTEM IS NOT OPERATING                             |
| <br><b>BACK-UP</b> |  | ON = BACK-UP IS READY/POWER AVAILABLE                     |
|                                                                                                       |  | OFF = BACK-UP IS LOW                                      |
|                                                                                                       |  | OFF = BACK-UP IS OFF /NO POWER AVAILABLE                  |
| <br><b>COM</b>     |  | ON = BMS AND METER COMMUNICATION OK                       |
|                                                                                                       |  | BLINK1 = METER COMMUNICATION OK<br>BMS COMMUNICATION FAIL |
|                                                                                                       |  | BLINK2 = BMS COMMUNICATION OK<br>METER COMMUNICATION FAIL |
|                                                                                                       |  | OFF = BMS AND METER COMMUNICATION FAIL                    |
| <br><b>FAULT</b>   |  | ON =FAULT HAS OCCURRED                                    |
|                                                                                                       |  | BLINK = OVERLOAD OF BACK-UP OUTPUT/<br>REDUCE LOAD        |
|                                                                                                       |  | OFF = NO FAULT                                            |

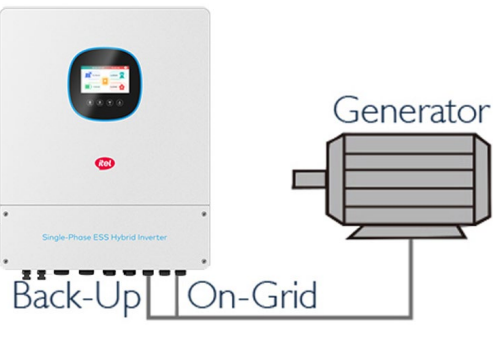
# 2

## INSTALLATION INSTRUCTIONS

### 2.1 UNACCEPTABLE INSTALLATIONS

Please avoid the following installations, which will damage the system or the inverter.

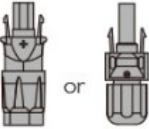
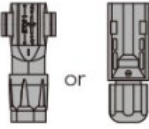
|                                                                                   |                                                                                    |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |
| <p>BACK-UP SIDE CANNOT CONNECT TO GRID.</p>                                       | <p>SINGLE PV STRING CANNOT CONNECT TO TWO OR MORE INVERTERS.</p>                   |

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| <p>ON-GRID OR BACK-UP SIDE CANNOT CONNECT TO ANY AC GENERATOR.</p>                  | <p>CANNOT CONNECT TO INCOMPATIBLE BATTERIES.</p>                                     |

### 2.2 PACKING LIST

On receiving the inverter, please check to make sure all the components as below are not missing or broken.

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| <p>Inverter × 1</p>                                                                 | <p>Wall-mounted Bracket I × 1</p>                                                   | <p>CT × 3</p>                                                                        | <p>Data Collector × 1</p>                                                             |

|                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |
| Positive DC Plug×3                                                                | Negative DC Plug×3                                                                | Net cable×1                                                                        | Battery terminal×2                                                                  |
|  |  |  |  |
| Expansion Bolts×2                                                                 | Hexagon head screw×2                                                              | Cold terminals×15                                                                  | Hexagon head screw×2                                                                |

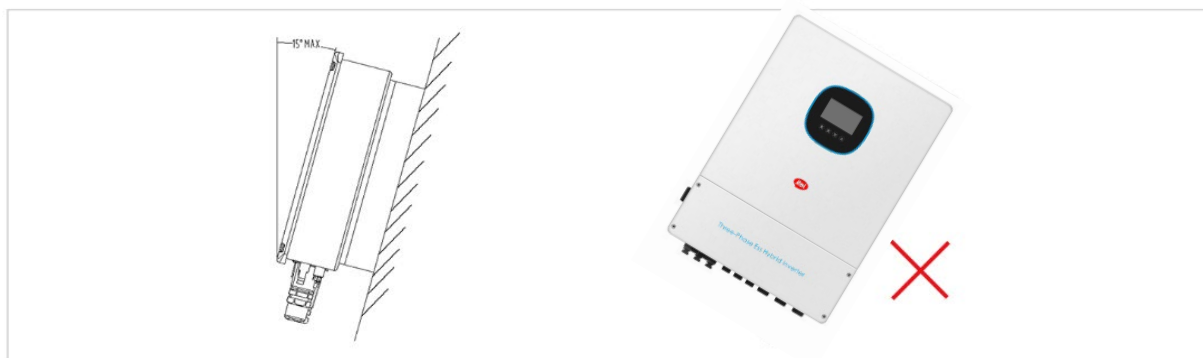
## 2.3 INSTALLATION

### 2.3.1 Installation location selection

For inverter's protection and convenient maintenance, mounting location for inverter should be selected carefully based on the following rules:

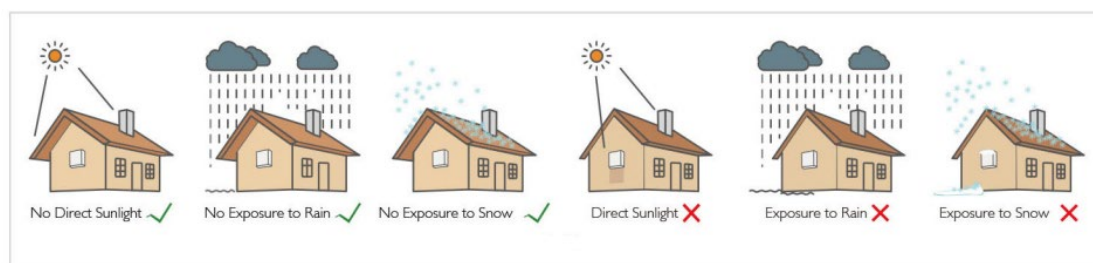
**Rule1.** Inverter should be installed on a solid surface, where is suitable for inverter's dimensions and weight.

**Rule 2.** Inverter installation should stand vertically or lie on a slope by max 15°.



**Rule 3.** Ambient temperature should be lower than 60°C

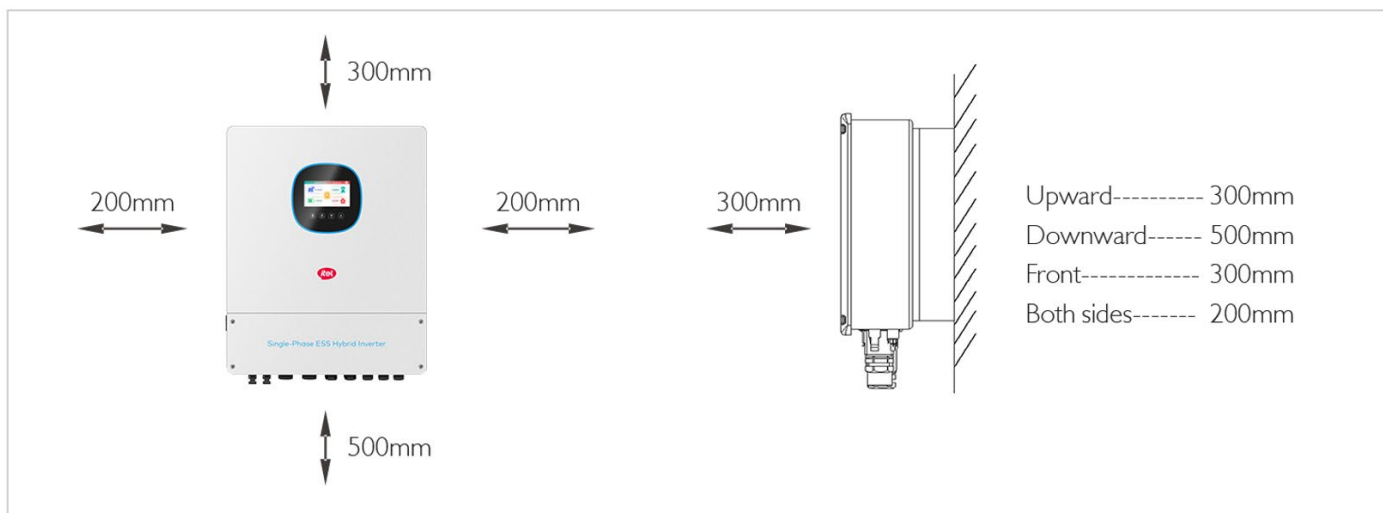
**Rule 4.** The installation of inverter should be protected under shelter from direct sunlight or bad weather like snow, rain, lightning etc.



**Rule 5.** Inverter should be installed at eye level for convenient maintenance.

**Rule 6.** Product label on inverter should be clearly visible after installation.

**Rule 7.** Leave enough space around inverter following the values on pic 3.



Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment.

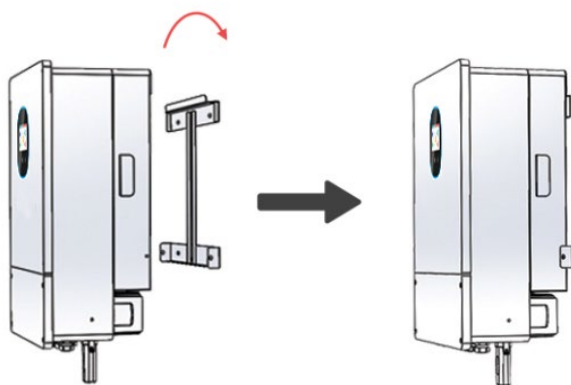
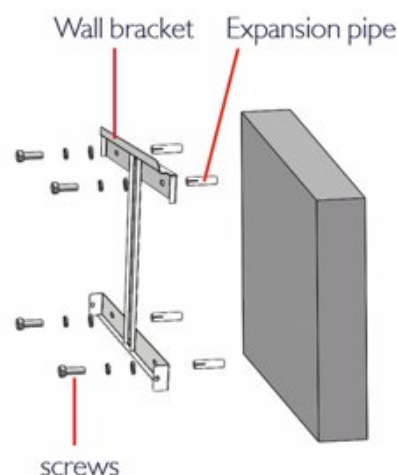
## 2.3.2 Installation

This inverter can only be installed on a flat surface.

### Step1:

Please use the mounting bracket as a template to drill 2 holes on right positions (10mm in diameter, and 35mm in depth)  
Use expansion bolts in accessory box and fix the mounting bracket onto the wall tightly

**NOTE:** Bearing capacity of the wall must be higher than 38KG, otherwise may not be able to keep inverter from dropping



### Step2:

Carry the inverter by grabbing the radiator on both sides and secure the inverter to the mounting bracket.

**NOTE:** Make sure the heat sink on inverter is rightly joint with mounting bracket.

**Step3:**

Finally, screw fixation, both screws need to be fixed. Add anti-theft locks as needed

**NOTE:** Make sure the screws between the inverter and the fixing plate are tightened to prevent them from falling off.

**Step4:**

The ground cable should be connected to the ground location on the side.

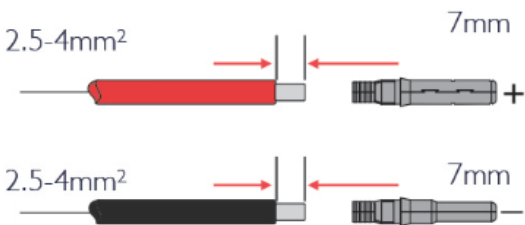
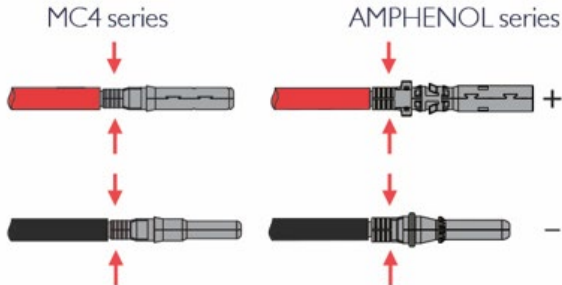
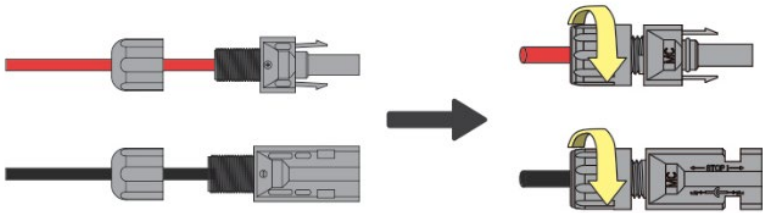
## 2.4 ELECTRICAL WIRING CONNECTION

### 2.4.1 PV CONNECTION

Before connecting PV panels/strings to inverter, please make sure requirements are followed as below :

- The total short-circuit current of PV string must not exceed inverter's max DC current
- The minimum isolation resistance to ground of the PV string must exceed 18.33k $\Omega$  in case of any shock hazard
- PV strings could not connect to earth/grounding conductor
- Use the DC plugs in the accessory box

**NOTE:** There will be MC4 or Amphenol DC plugs in accessory box, the detailed connection as below:

|                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step1:</b> Prepare PV cables and DC plugs.                                                                                                                                                                                                                                    | <b>Step2:</b> Connect PV cable to DC connectors.                                                                                                                                                                                                                                      |
|  <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>● Please use DC plugs and connectors in accessory box</li><li>● PV cable should be standard, 2.5-4mm<sup>2</sup> PV cable</li></ul> |  <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>● PV cable must be tightly crimped into the Connectors.</li><li>● For Amphenol connector, the limit buckle cannot be pressed.</li></ul> |
| <b>Step3:</b> Screw the cap on and plug onto inverter side.                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                       |
|  <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>● There will be a click sound if connectors are inset correctly into DC plugs</li></ul>                                            |                                                                                                                                                                                                                                                                                       |



The polarity of the PV string and the inverter cannot be reversed, otherwise the inverter may be damaged.

## 2.4.2 BATTERY CONNECTION

For lithium battery (pack) the capacity should be 100Ah or larger. Battery cable requirement as below.

|  | Grade | Description       | Value                |
|-----------------------------------------------------------------------------------|-------|-------------------|----------------------|
|                                                                                   | A     | OD                | 10-12mm              |
|                                                                                   | B     | Isolation section | NA                   |
|                                                                                   | C     | Conductor Core    | 50-75mm <sup>2</sup> |

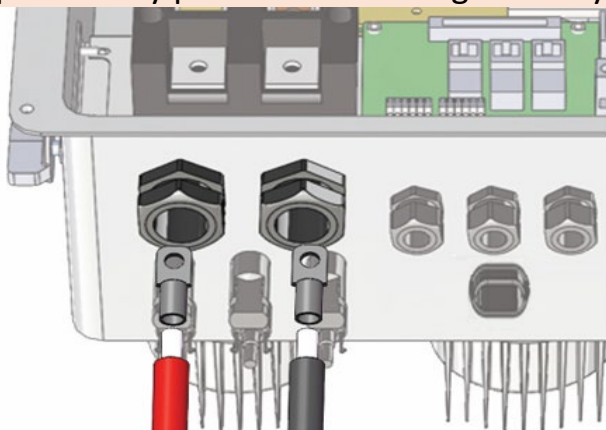
• Please be careful against any electric shock or chemical hazard

### • Battery wiring connection steps as below:



Before connecting the battery to the inverter, ensure that the battery switch is turned off and the battery's nominal voltage reaches the product technical parameters, and ensure that the inverter is completely isolated from PV and AC power sources.

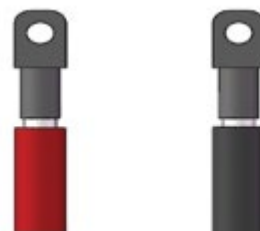
**Step1:** Prepare battery cables and accessories and put battery power cable through battery cover.



#### NOTE:

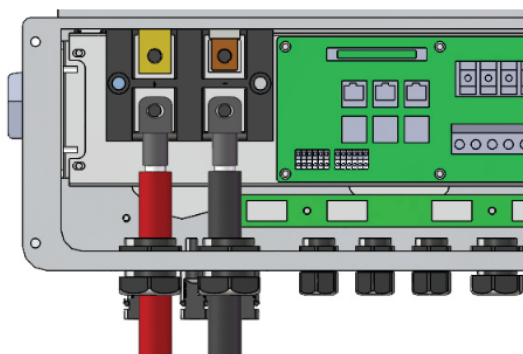
1. Please use accessories from box
2. Battery power cable should be 50~70mm<sup>2</sup>

**Step2:** Make battery terminals.



- Ribbon cable jacket, exposing 10mm long metal core. Use a special crimper to compress the battery terminals.

**Step3:** Connect battery terminals onto inverter.



#### NOTE:

Please make sure polarity (+/-) of battery are not reversed

## •FOR LEAD-ACID BATTERIES

Lead-Acid and other similar older-technology battery types require experienced and precise design, installation and maintenance to work effectively.

For lead-acid battery bank, the inconformity between battery cells might lead to battery cell over-charge or discharge, and further might damage battery cells and shorten battery bank life.

For this series inverters there is no temperature compensation, thus customers need do battery settings based on the real working temperature of battery.

For lead-acid battery settings on App, please honestly refer to battery specifications and the actually battery work condition like work temperature and battery age. Unsuitable settings will lead to higher SOC deviation, weaker battery lifespan and further battery damage.

For lead-acid batteries, battery SOC calculation might not be so accurate result from like battery inconformity between cells, battery aging or other specifications of lead-acid battery etc.

We will keep the right for explanation on all the settings suggested and all the problems happened on lead-acid batteries or the whole system. And we are not responsible for any damage caused by unsuitable settings, battery beyond warranty or battery quality etc.

## •BATTERY PROTECTION DESCRIPTION

Battery will act a protective charge/discharge current limitation under any condition as below:

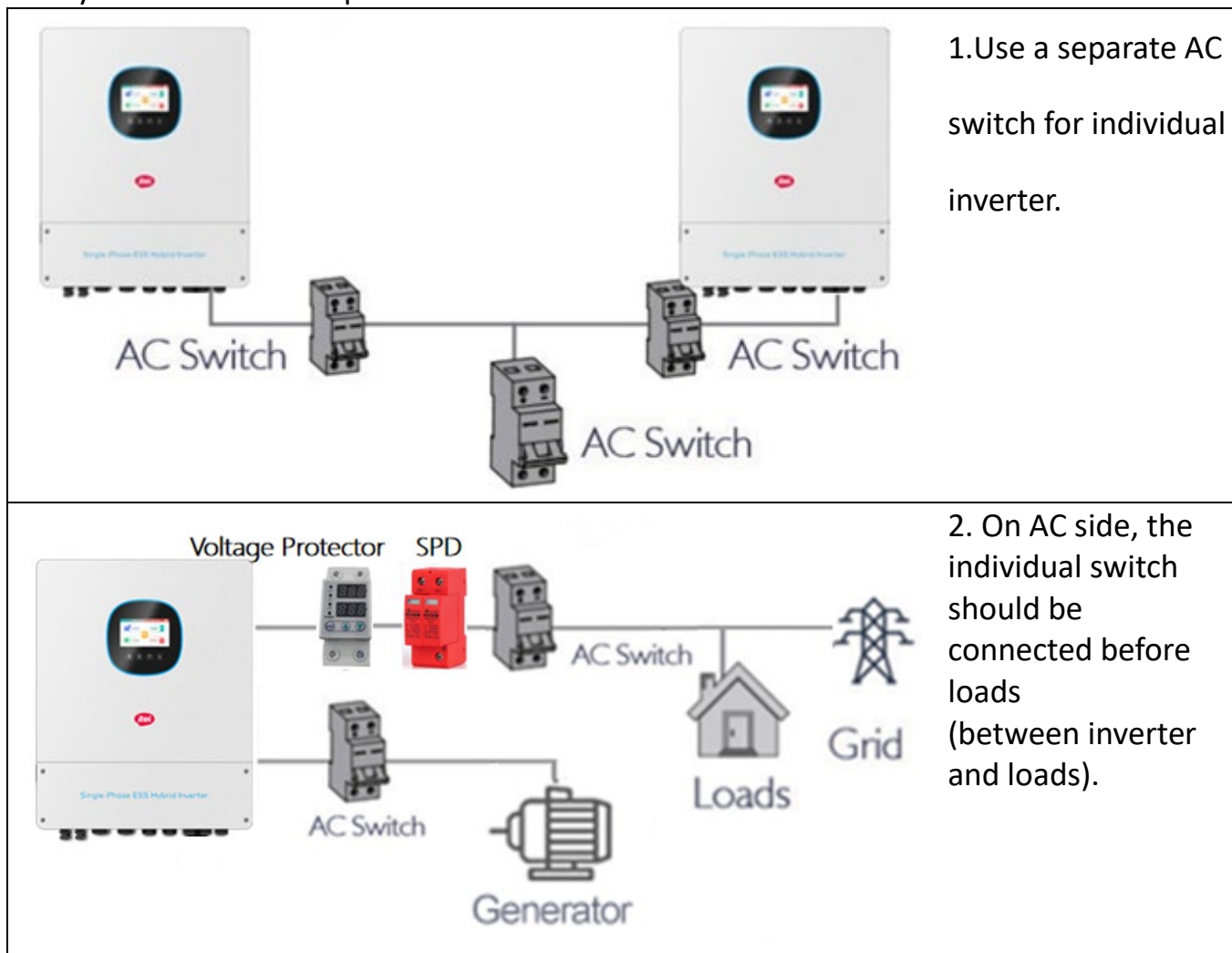
- Battery SOC is lower than SOC Protection
- Battery voltage lower than discharge Cut-off Voltage
- Battery over temperature protection
- BMS limitation for lithium battery

When charge/discharge current limitation protection happens:

- Under on-grid mode, battery charge/discharge operation could be abnormal
- Under off-grid mode, Back-Up supply will shut down

## 2.4.3 ON-GRID & BACK-UP & GEN CONNECTION

An external AC switch (>32A) is needed for On-Grid connection to isolate from grid when necessary. Below are the requirements on AC switch use:



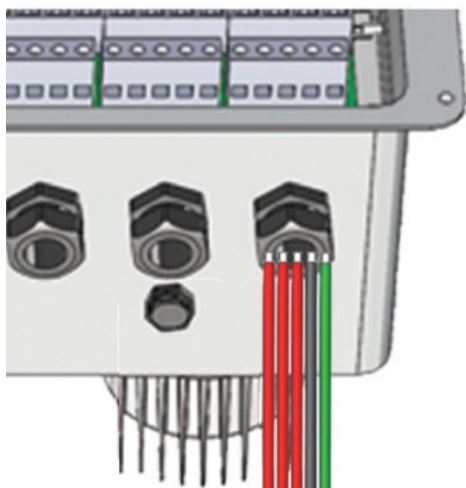
•On-Grid wiring connection process is as below:



Make sure inverter is totally isolated from any DC or AC power before connection AC Cable.

**Step1:**

1. Prepare the terminals and AC cables.
2. Put AC cable through terminal cover and screw the five cables tightly on the connectors.



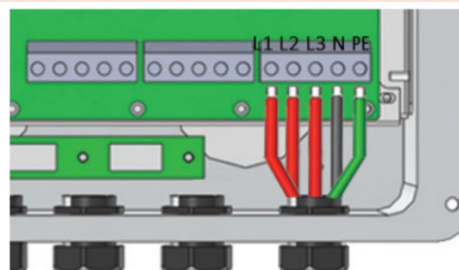
4mm<sup>2</sup> Copper Conductor Material

**NOTE:**

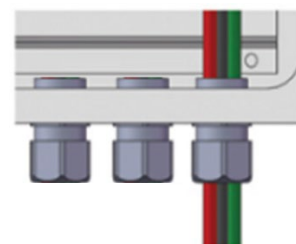
- Please use the terminals in components box;
- Make sure cable jacket is not locked with conductor

**Step2:** Lock terminal cover and screw up the terminal cap

**Note:** Make sure the terminal cover is rightly locked onto the terminal



**Step3 :** Connect the assembled AC terminals onto inverter.



**Note:** Make sure it is connected to 'On-Grid' side

•**Back-Up wiring connection process is as below:**

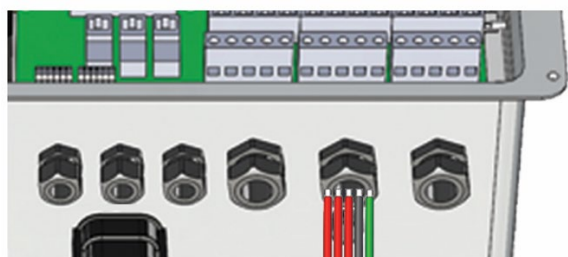
An external AC switch (>32A) is needed for Back-Up connection to be isolated when necessary.



The absence of AC breaker on Back-Up side will lead to inverter damage if only electrical short-circuit happened on Back-Up side. And Back-Up function cannot turn off under on-grid condition.

**Step1:**

1. Prepare the terminals and AC cables.
2. Put AC cable through terminal cover and screw the five cables tightly on the connectors.



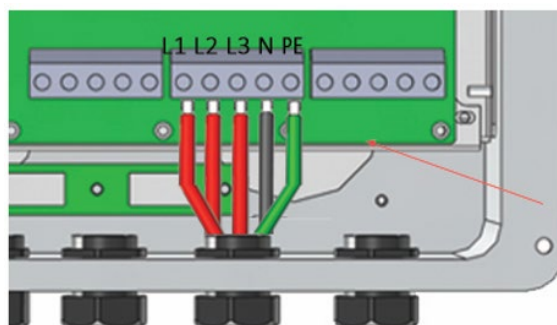
4mm<sup>2</sup> Copper Conductor Material

**NOTE:**

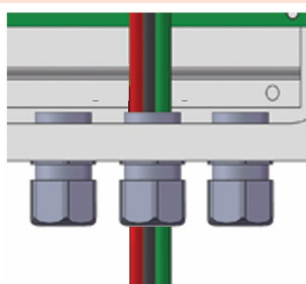
- Please use the terminals in components box;
- Make sure cable jacket is not locked with conductor

**Step2:** Lock terminal cover and screw up the terminal cap

**Note:** Make sure the terminal cover is rightly locked onto the terminal



**Step3 :** Connect the assembled AC terminals onto inverter.

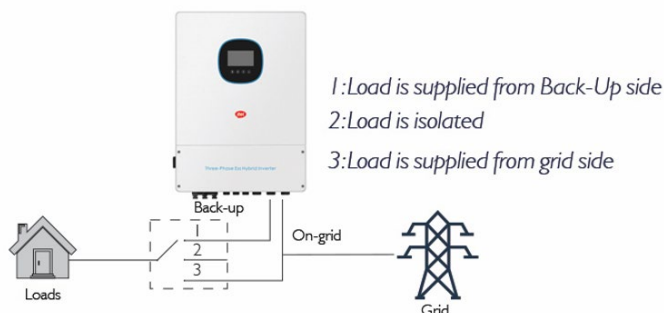


**Note:** Make sure it is connected to 'back-up' side

**Declaration For Back-Up Loads**

Inverter is able to supply a continuous rated power output or max twice the rated power in less than 15 seconds on Back-Up side to support Back-Up loads. And the inverter has self-protection derating at high ambient temperature.

**For a convenient maintenance, a switch could be installed on Back-Up and On-Grid side. Then it is adjustable to support load by Back-Up or by grid or just leave it there**



**Declaration For Back-Up Overload Protection**

Inverter will stop. you need to reduce the load and then operate the APP to “Overload Reset” to clear the overload fault; or restart after a complete power outage.

•**GEN wiring connection process is as below:**

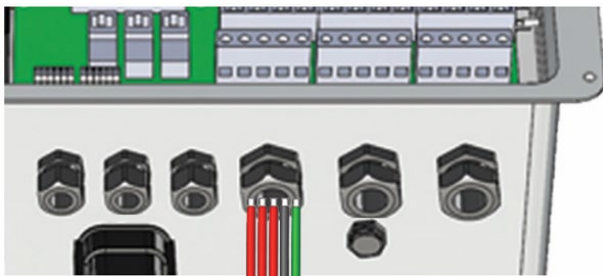
An external AC switch (>32A) is needed for Back-Up connection to be isolated when necessary.



The absence of AC breaker on GEN side will lead to inverter damage if only electrical short-circuit happened on Back-Up side.

**Step1:**

1. Prepare the terminals and AC cables.
2. Put AC cable through terminal cover and screw the five cables tightly on the connectors.



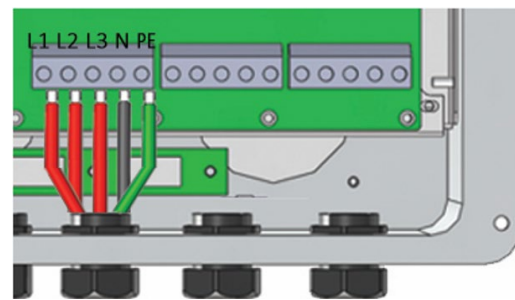
4mm<sup>2</sup> Copper Conductor Material

**NOTE:**

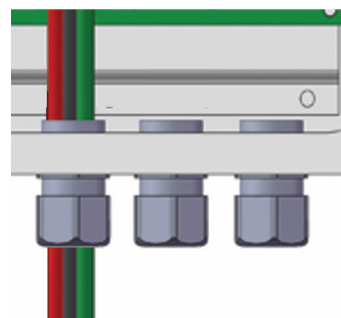
- Please use the terminals in components box;
- Make sure cable jacket is not locked with conductor

**Step2:** Lock terminal cover and screw up the terminal cap

**Note:** Make sure the terminal cover is rightly locked onto the terminal



**Step3 :** Connect the assembled AC terminals onto inverter.

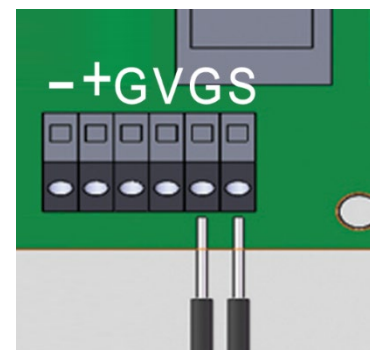
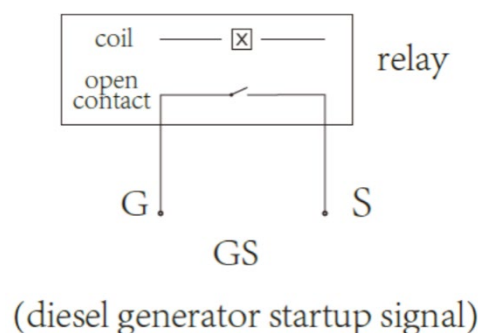


**Note:** Make sure it is connected to 'GEN' side

•**GS Indications**

GS: dry contact signal for startup the diesel generator.

When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).



**Note:** When the Smart Load Output function is turned on, the GEN port can be used as an output port to connect to the load. Smart load output or generator input functions cannot be set simultaneously.

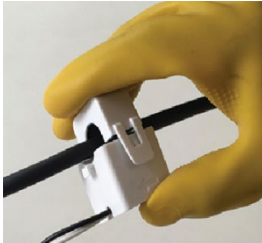
## •CT Indications



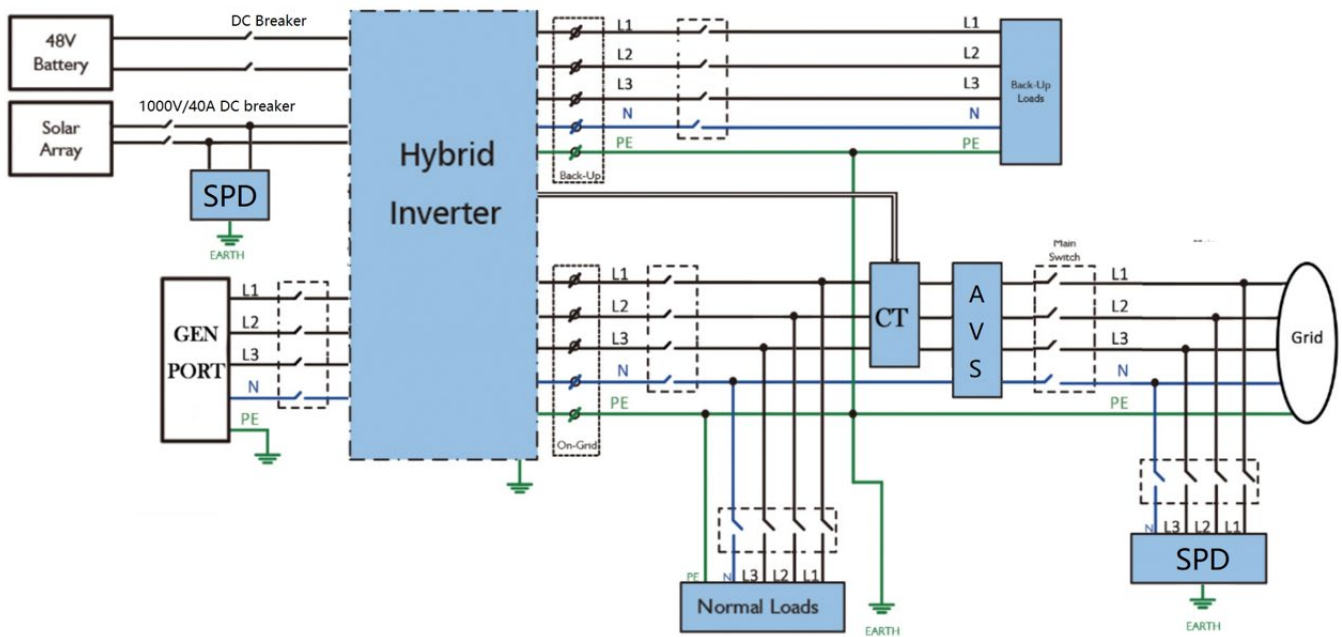
All work should be performed by trained and qualified operators using safe and suitable tools.

Since this product is a split type transformer, please pay attention to the cleanliness of the magnetic core surface during installation. If there is dirt on the core surface, the accuracy of the product will be deteriorated.

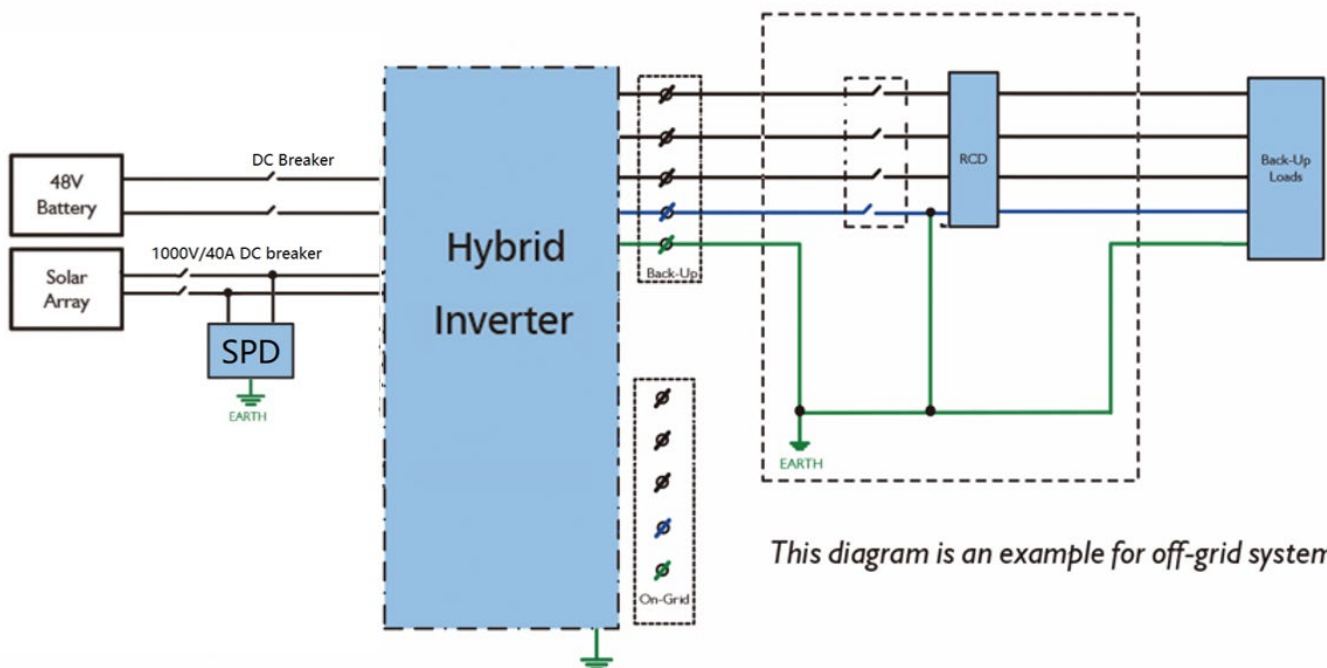
1. Before the transformer is connected to any equipment, please ensure that the circuit is powered off to prevent clicks.
2. Open CT, see figure 1.
3. Clip the CT on the cable under test. Make sure that the maximum current in the wiring does not exceed the maximum input current of the CT; The current flows in the direction of the arrow on the CT housing.
4. Fasten the CT again, the cable under test should be inside the CT window now (see figure 2)
5. Fix the CT on the cable under test with nylon cable ties to prevent the CT from sliding see figure 3)
6. Connect the CT output white wire to the positive terminal of the measuring device, and the CT output black wire to the negative terminal of the measuring device (see figure 4).
7. After checking that the circuit is correct, turn on the power and the CT starts to measure the current in the circuit.

| figure 1                                                                            | figure 2                                                                            | figure 3                                                                             | figure 4                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |

## •SYSTEM CONNECTION DIAGRAMS



*This diagram is an example for grid systems without special requirement on electrical wiring connection.*



*This diagram is an example for off-grid system*

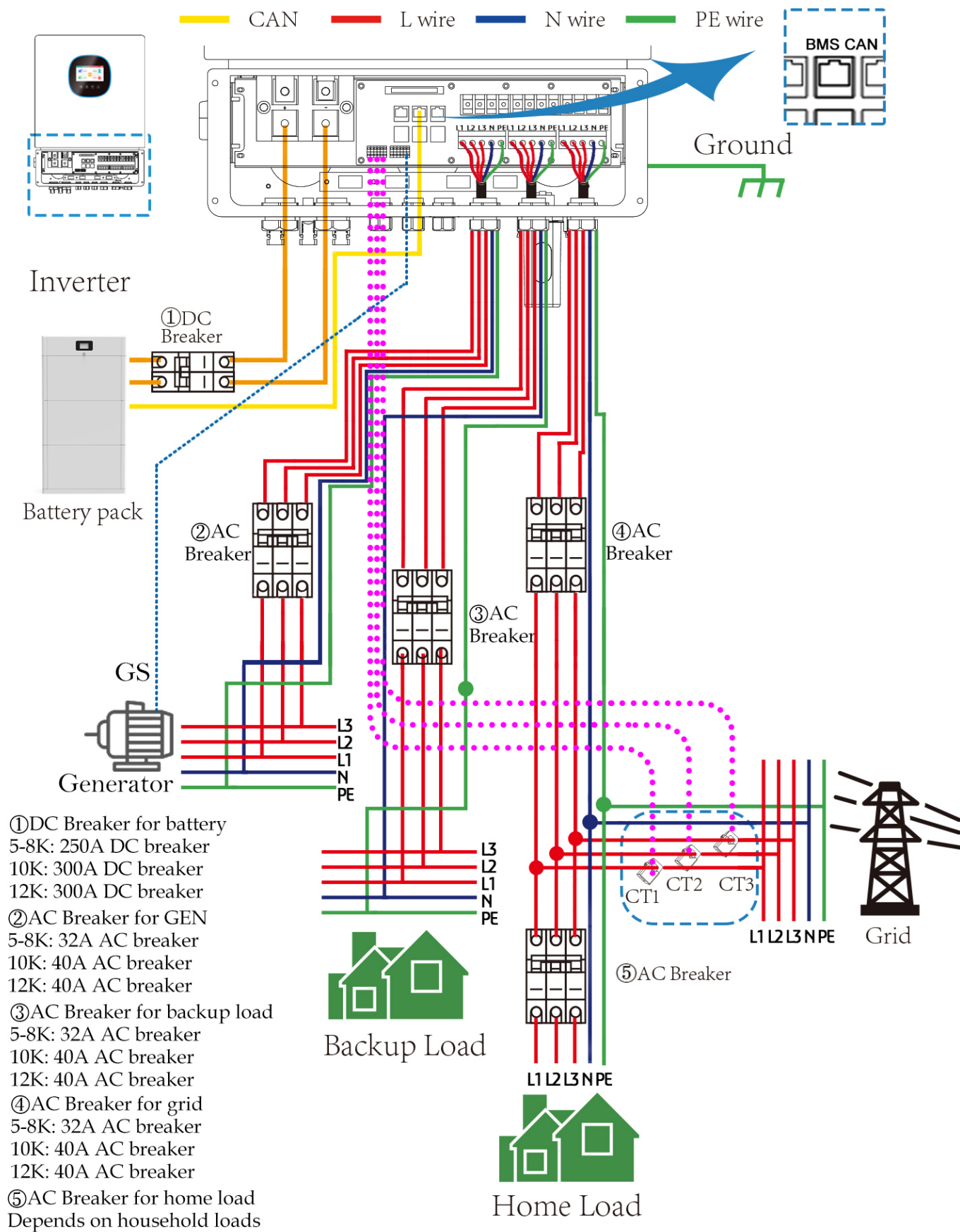
## NOTE

Meter communication cable (RJ45) is attached on the inverter "To Meter" cable, could be extended to max 100m, and must use standard RJ45 cable and plug as below:

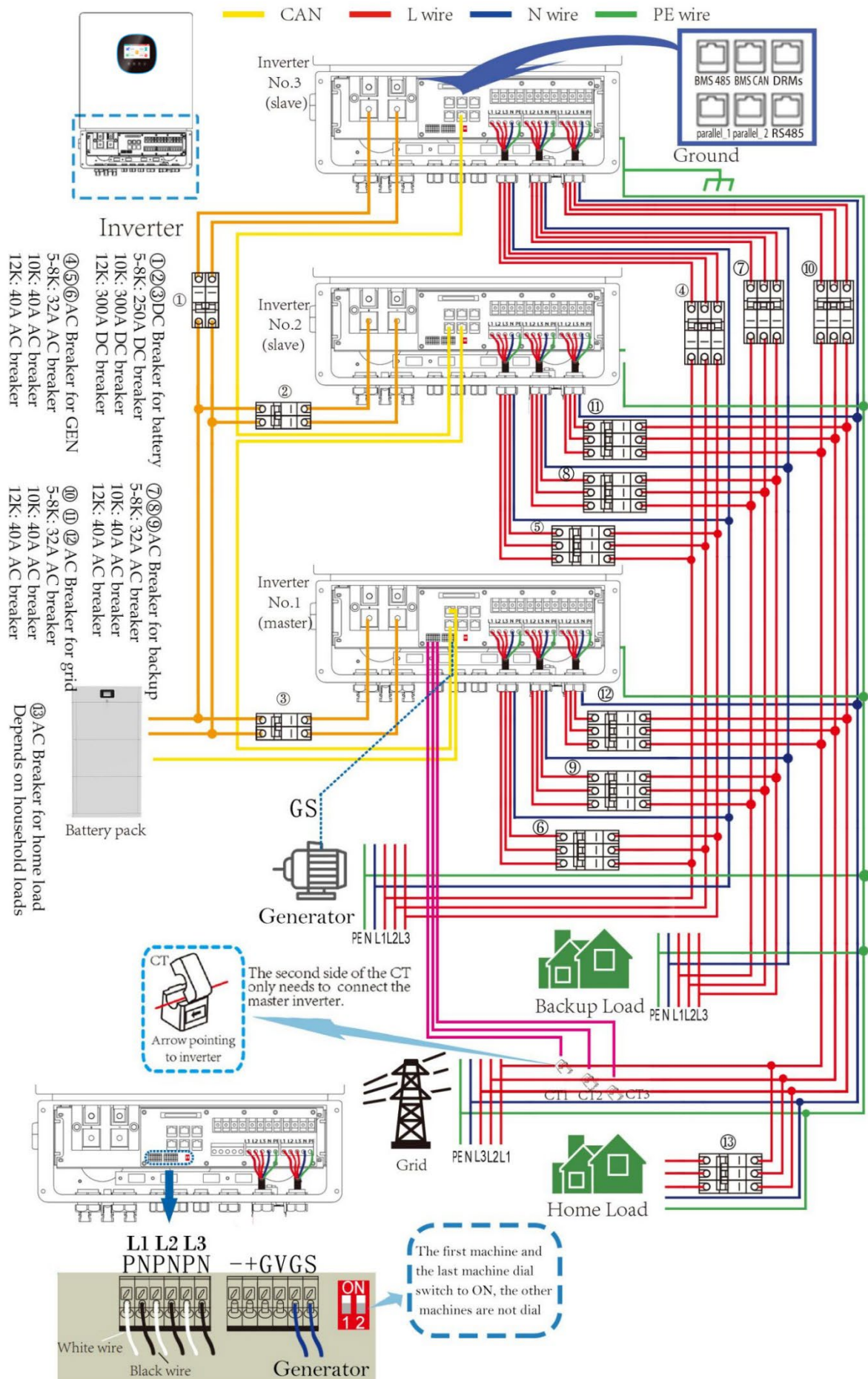


| Position | Color        | BMS(CAN) Function | BMS(485) Function | Meter Function |
|----------|--------------|-------------------|-------------------|----------------|
| 1        | Orange&white | NC                | 485_B             | NC             |
| 2        | Orange       | NC                | 485_A             | NC             |
| 3        | Green&white  | NC                | NC                | 485_BI         |
| 4        | Blue         | CAN_H             | NC                | NC             |
| 5        | Blue&white   | CAN_L             | NC                | NC             |
| 6        | Green        | NC                | NC                | 485_AI         |
| 7        | Brown&white  | NC                | 485_A             | 485_BI         |
| 8        | Brown        | NC                | 485_B             | 485_AI         |

## •Three phase connection diagram



## 2.5 THREE PHASE PARALLEL CONNECTION DIAGRAM



# 3

## APP OPERATION

### 3.1 SOLARMAN Smart APP OPERATION

SOLARMAN Smart is an external monitoring/ configuration application for hybrid inverters, used on smart phones or pad for both Android and iOS system, main functions as below:

1. Edit system configuration to make the system work as customer needs
2. Monitor and check performance of the hybrid system
3. W-Fi configuration

**Please download SOLARMAN Smart APP**

Iphone : Search "SOLARMAN Smart APP "in Apple Store

Android: Search"SOLARMAN Smart APP" in Google Play



### 3.2 WIFI CONFIGURATION



Please use 2.4G network for configuration. 5G network is not supported.

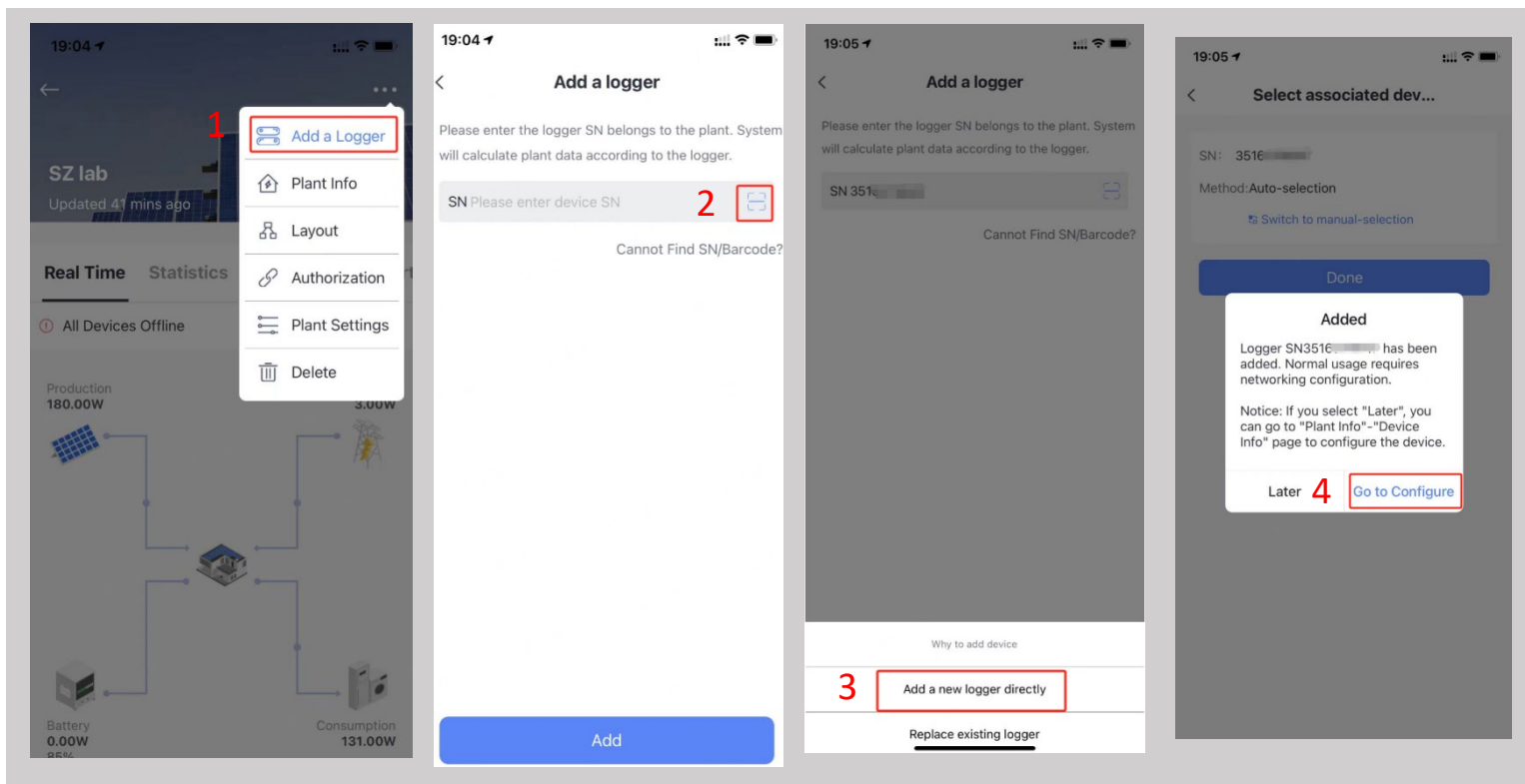


Before configuring the network, please make sure:

Successfully connected to home Wi-Fi network

Bluetooth function of mobile phone is turned on

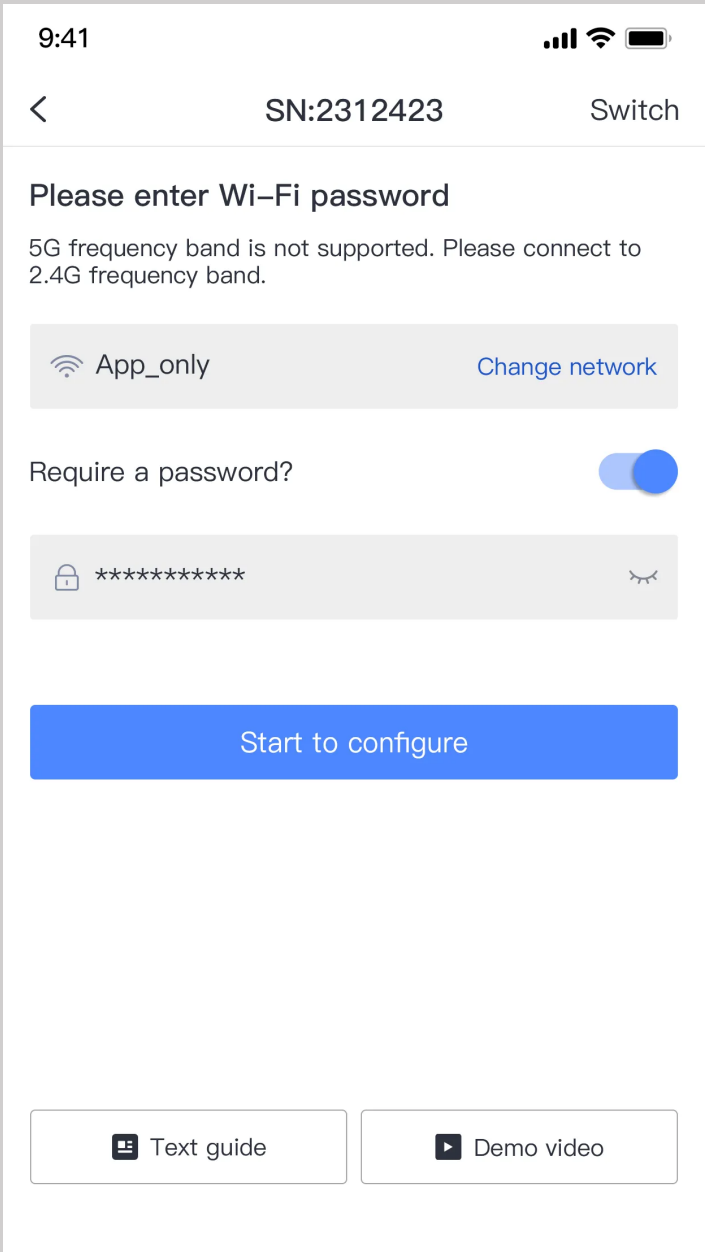
Open SOLARMAN Smart APP and create new plant and then add a logger:



## Step 1: Confirm Wi-Fi Info

Please make sure that your mobile phone is connected to the Wi-Fi network at home, which is consistent with the network displayed on the page, and enter the connection password of the network.

After completing the input and confirming that the password is correct, click the "**Start to configure**" button.

A screenshot of a mobile application interface for Wi-Fi configuration. The status bar at the top shows the time 9:41, signal strength, Wi-Fi, and battery icons. The app header includes a back arrow, the serial number 'SN:2312423', and a 'Switch' button. The main content area has the title 'Please enter Wi-Fi password' and a message: '5G frequency band is not supported. Please connect to 2.4G frequency band.' Below this is a network selection card showing 'App\_only' with a Wi-Fi icon and a 'Change network' link. A toggle switch for 'Require a password?' is turned on. A password input field contains ten asterisks and has a visibility toggle icon. A large blue 'Start to configure' button is centered below the password field. At the bottom, there are two buttons: 'Text guide' with a document icon and 'Demo video' with a play button icon.

9:41

< SN:2312423 Switch

Please enter Wi-Fi password

5G frequency band is not supported. Please connect to 2.4G frequency band.

App\_only Change network

Require a password? ☒

\*\*\*\*\*

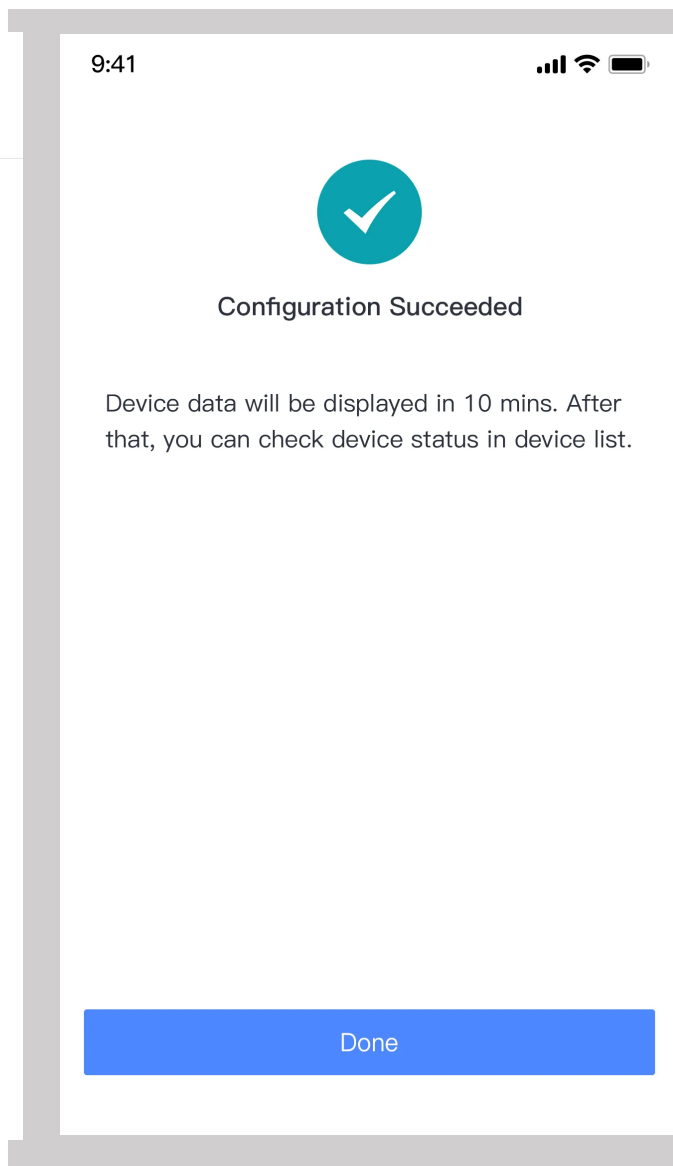
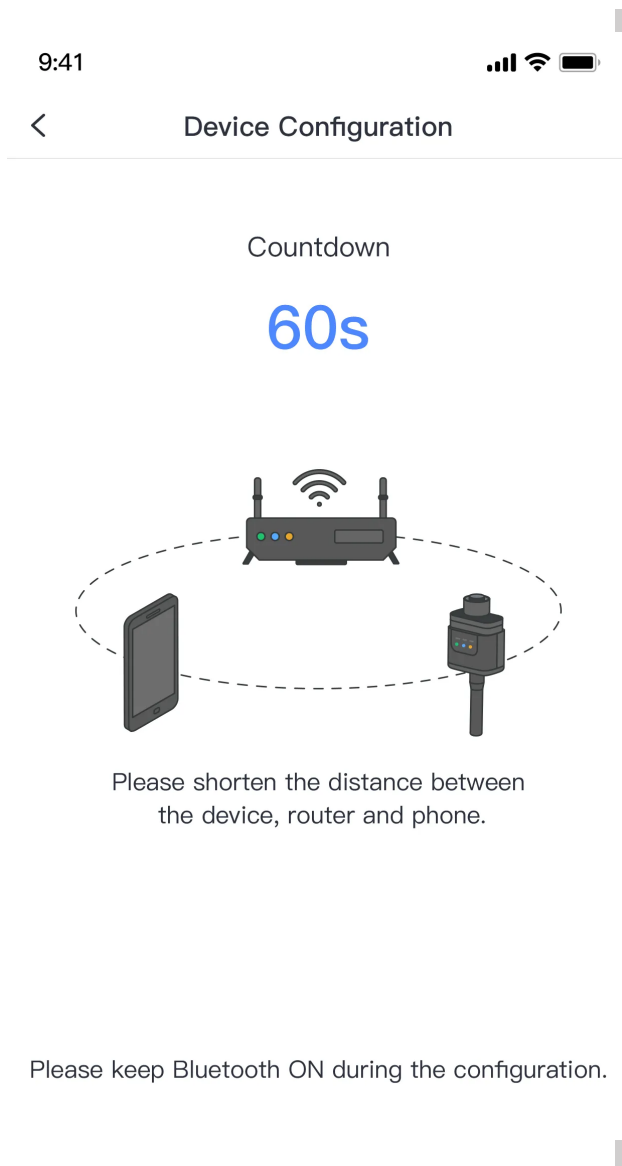
Start to configure

Text guide Demo video

## Step 2: Auto Configuration

Please wait for a while to complete the configuration. System will switch to the Configured Page automatically. Please keep the Wi-Fi and Bluetooth functions of your phone turned on during the configuration process.

When you go back to 「**Device List**」, the logger will still at **Offline** status. Usually, the data will be updated in 10 mins. Please wait patiently.



**If configuration failure occurs, please check the following reasons and try it again.**

1. Make sure WLAN is ON;
2. Make sure Bluetooth is ON;
3. Make sure WiFi is normal;
4. Make sure wireless router does not implement the white-black list;
5. Shorten the distance between the phone and device;
6. Try to connect to other Wi-Fi;
7. Remove the special characters ( , ; " ' " ` ) in Wi-Fi network.

### 3.3 THREE PHASE PARALLEL PARAMETER SETTINGS

**1.**

Download and enter SOLARMAN Smart

**2.**

Click "Local Mode"

**3.**

Method 1: scan to enter logger SN

Method 2: Enter logger SN manually.

**4.**

① Click "Params"

② Swipe and click "System"

**5.**

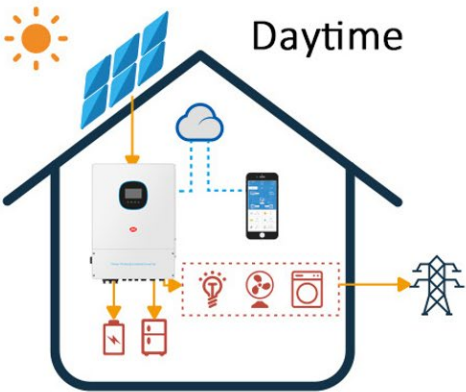
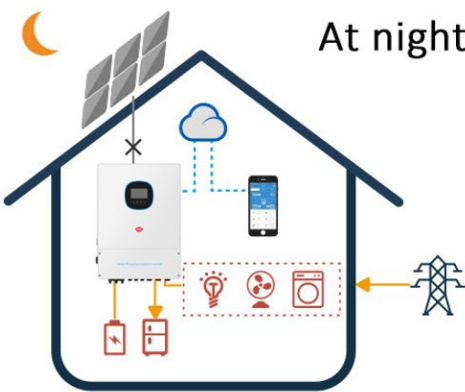
Click on the Parallel address Setting to set, starting with 1 and then adding one to each subsequent machine. (All parallel machines must be set up, and the address must be: starting from 1, continuous, less than or equal to the total number of parallel machines)

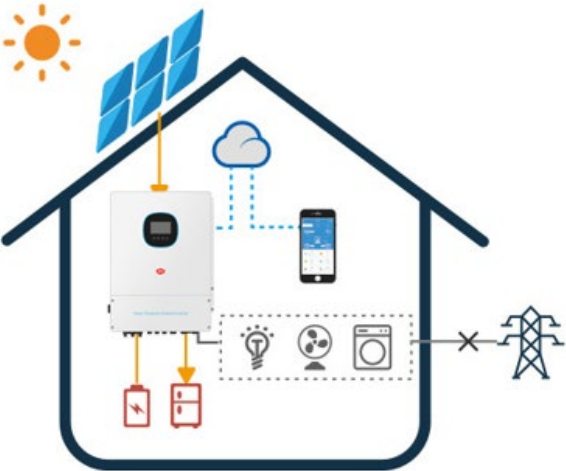
**6.**

After all machines are set up, Power down and restart all machines .  
(click Switch-Switch ON and OFF enable, select ON and click Confirm, and the machine starts.)

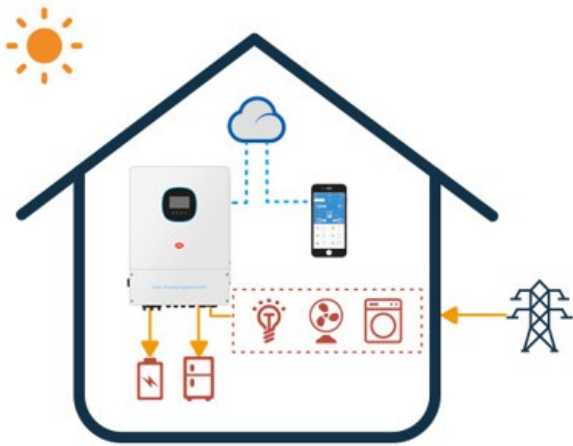
### 3.4 OPERATION STATES INTRODUCTION

Hybrid inverter system normally has the following work states based on your configuration and layout conditions

| Battery standby state                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  <p>Daytime</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |  <p>At night</p> |
| <p>In this state, the load supply priority is PV &gt; Grid &gt; Battery.</p> <ol style="list-style-type: none"> <li>1. When PV power is available, PV power will provide power to the load first. If it's sufficient, PV power will charge the battery, if it's more sufficient, PV power will feed-in to the grid.</li> <li>2. When PV power is not available or not sufficient, the Grid will provide power to the load.</li> <li>3. When PV power and the Grid is not available, the battery will provide power to the load.</li> </ol> |                                                                                                    |
| NOTE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| <p>In this state, only the PV power can charge the battery, and the battery can only provide power to the load and can't provide power to feed-in the grid.</p>                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                    |

| Off-grid state                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      | <p>In this state, the load supply priority is PV &gt; Battery.</p> <p>In this state, the inverter will provide 230V pure sine waveform to ensure the load can use pure electricity.</p> <ol style="list-style-type: none"> <li>1. When PV power is available, provide 230V pure sine waveform to ensure the load.</li> <li>2. When PV power is not available or not sufficient, the battery will provide power to the load.</li> </ol> |
| NOTE                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>In this state, only the PV power can charge the battery. to ensure the load can use pure electricity, the Grid is not available.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Economical state



In this state, you can set a set of battery charging and discharging time.

### (1) During the battery charging period:

1. When PV power is available, PV power will provide power to the load first. If it's sufficient, PV power will charge the battery, if it's more sufficient, PV power will feed-in to the grid.
2. When PV power is not available or not sufficient, the Grid will provide power to the load and charge the battery at the meanwhile.

**NOTE:** In this state, the Grid can charge the battery. So we suggest that the charging period is setting in the electricity valley time.

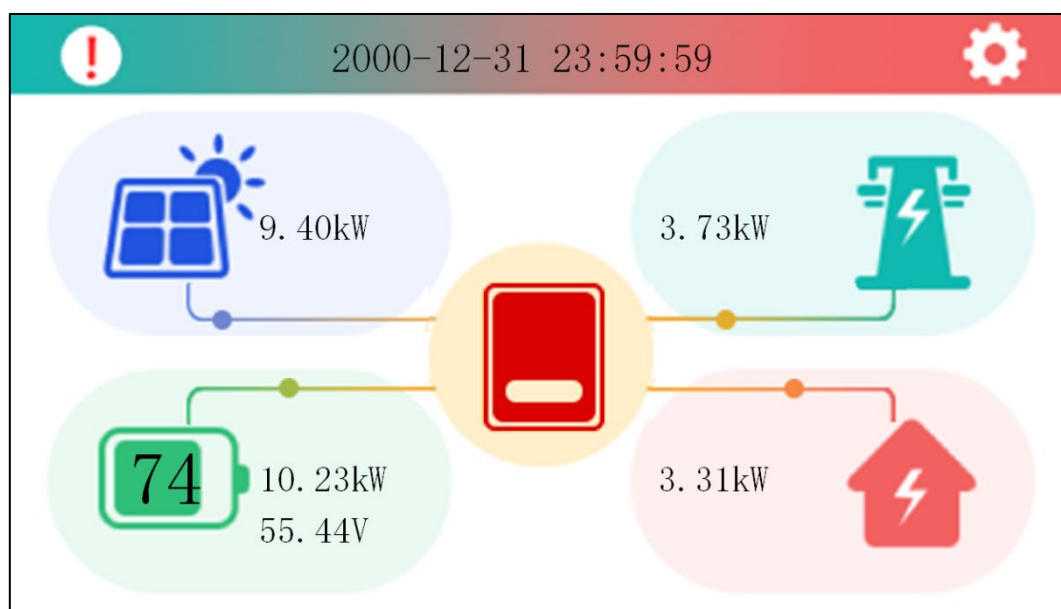
### (2) During the battery discharging period:

1. When PV power is available, PV power will provide power to the load first. If it's sufficient, PV power will feed-in to the grid directly.
2. When PV power is not available or not sufficient, the battery will provide power to the load.
3. When the battery voltage is under the cut-off voltage, the Grid will provide power to the load.

**NOTE:** In this state, if the battery discharge power set value is more the load power , the excess power will be connected to the grid, and opening the anti-reverse flow can prevent the battery energy from flowing to the grid.

## 4.1 MAIN PAGE

The LCD is a touchscreen, please touch the screen to operate.



This is the main page. Power on the LCD to show the flow chart on the main page. When powering on, data refreshing exists a little delay, so please wait for a few seconds before operation until the real time appears directly above on the screen.

The main page displays PV, grid, battery, load power, battery voltage and SOC. At the same time, the color of the inverter icon indicates the real time operation status. Based on the real-time power changes, the battery icon changes, and through the signal dots flow direction to show the dynamic flow of power relationship.

### • Description of Touch Functions

| Icons | Functions                                                                         |
|-------|-----------------------------------------------------------------------------------|
|       | Click to enter the PV page, and view real-time data for the PV section.           |
|       | Click to enter the Grid page, and view real-time data for the Grid section.       |
|       | Click to enter the GEN page, and view real-time data for the GEN section.         |
|       | Click to enter the Battery page, and view real-time data for the Battery section. |
|       | This icon means that the Battery SOC ranges from 0 to 10 percent.                 |
|       | This icon means that the Battery SOC ranges from 10 to 20 percent.                |
|       | This icon means that the Battery SOC ranges from 20 to 30 percent.                |

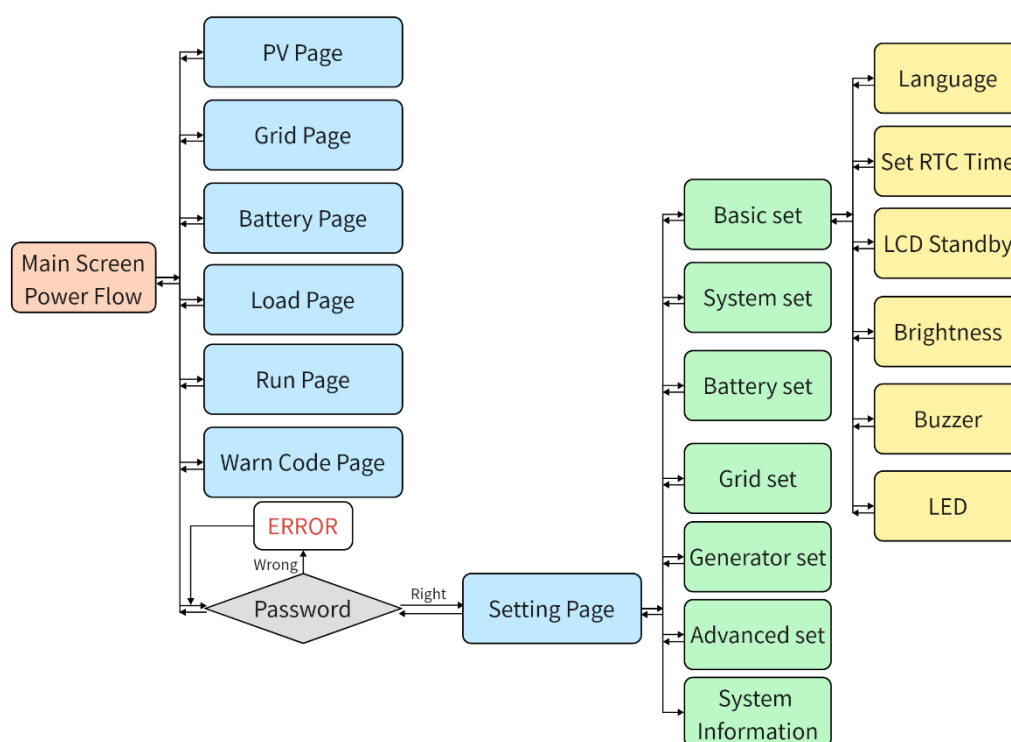
|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                            | This icon means that the Battery SOC ranges from 30 to 50 percent.                                                                                                                                                     |
|                                                                                                                                                                            | This icon means that the Battery SOC ranges from 50 to 75 percent.                                                                                                                                                     |
|                                                                                                                                                                            | This icon means that the Battery SOC ranges from 75 to 100 percent.                                                                                                                                                    |
|                                                                                                                                                                            | Click to enter the Load page, and view real-time data for the Load section.                                                                                                                                            |
| <br><br> | <p>Click to enter the Run page, and overview the basic information of each section.</p> <p>If the icon is orange, it indicates current normal operation.</p> <p>If the icon is red, it means current alarm faults.</p> |
|                                                                                                                                                                            | <p>Click to enter the Error Code page, and view the latest alarm records (up to 99).</p> <p>The content includes the number of messages, alarm time, and error code.</p>                                               |
|                                                                                                                                                                            | Click to enter the Setting page, but you need to enter the password correctly at first.                                                                                                                                |
|                                                                                                                                                                            | Home-return button.                                                                                                                                                                                                    |
|                                                                                                                                                                          | Back button.                                                                                                                                                                                                           |
| <br>                                                                                  | <p>Page-up button.</p> <p>When the button turns transparent, it means untouchable.</p>                                                                                                                                 |
| <br>                                                                                  | <p>Page-down button.</p> <p>When the button turns transparent, it means untouchable.</p>                                                                                                                               |
| <br>                                                                                  | <p>Save button.</p> <p>When the button turns transparent, it means untouchable.</p>                                                                                                                                    |
| <br>                                                                                  | <p>It indicates that the password is correct, click to enter the Setting page.</p> <p>It indicates the password is wrong and you need to re-enter, or it shows ERROR.</p>                                              |
| <br>                                                                                  | <p>It means unselected.</p> <p>It means selected.</p>                                                                                                                                                                  |
| <br>                                                                                  | <p>It means off.</p> <p>It means on.</p>                                                                                                                                                                               |

Click on the icons of each section to view real-time data, as shown in the table above.

Click on the gear icon in the upper right corner of the Main screen to enter the Setting interface. In order to protect the information security and prevent misuse, each time you enter the Setting interface, you need to enter the password once. The default password is 1234. There is a delay of a few seconds in the judgment of the password, please be patient and wait for the entry icon to turn on and change to green, click and enter Setting menu interface, select the system set, battery set, grid set, generator set, basic set, advanced set and others. Enter the sub-setting interface for parameter modification (If the password is wrong, the entry icon closes and turns red, you need to re-enter the correct password. If you click on the icon at this time, it will display "Error", you can only click on the home return button or back button to re-enter the password interface and enter the correct password).

In each sub-setting interface, the selection way is to click on the hollow circle to make it become a solid circle or click on the box to make the check mark appear, and the input way is to click on the rectangular input box to use the keyboard to input the numbers (there is no need to input the unit), and then click on save button to take effect. After successful setting, it will return back to the previous interface automatically. Any parameter modification needs to click save to take effect, otherwise the modification will not work. LCD brightness and standby time are adjusted by clicking the plus/minus icon or dragging the slider, and system time is adjusted by clicking the plus/minus icon. Similarly, you need to save after modification. The parameter settings have limited the range of input values to protect against accidental touch, so you can operate with peace of mind.

## • Operation Flow Chart



## 4.2 REAL-TIME INFORMATION PAGE

### • PV PAGE

| PV           |        |  |
|--------------|--------|-----------------------------------------------------------------------------------|
| DC Voltage 1 | 0.0V   |  |
| DC Current 1 | 0.00A  |  |
| DC Voltage 2 | 0.0V   |  |
| DC Current 2 | 0.00A  |  |
| DC Power 1   | 0W     |  |
| DC Power 2   | 0W     |  |
| E-PV-Day     | 0.0kWh |  |
| E-PV-Month   | 0.0kWh |  |
| E-PV-Year    | 0.0kWh |  |
| E-PV-All     | 0.0kWh |  |

This is **PV** Page, one page in total.

① Real-time data: It can display the two-channel DC voltage, current, and power in real time, and simultaneously display the current day, current month, current year, and cumulative power generation.

② Button: The right area of the screen is the button area, the top one to return to the home page, next to return to the previous page button, page-up button, page-down button, save button. When the button turns transparent, it means untouchable.

### • GRID PAGE

| Grid           |        |    |
|----------------|--------|-------------------------------------------------------------------------------------|
| Grid VoltageA  | 0.0V   |    |
| Grid VoltageB  | 0.0V   |   |
| Grid VoltageC  | 0.0V   |  |
| Grid CurrentA  | 0.00A  |  |
| Grid CurrentB  | 0.00A  |  |
| Grid CurrentC  | 0.00A  |  |
| Grid Frequency | 0.00Hz |  |

1/4

| Grid                 |    |    |
|----------------------|----|---------------------------------------------------------------------------------------|
| Output PowerA        | 0W |    |
| Output PowerB        | 0W |   |
| Output PowerC        | 0W |  |
| Total Output Power   | 0W |  |
| Reactive PowerA      | 0W |  |
| Reactive PowerB      | 0W |  |
| Reactive PowerC      | 0W |  |
| Total Reactive Power | 0W |  |

2/4

| Grid              |         |  |
|-------------------|---------|-------------------------------------------------------------------------------------|
| Power FactorA     | 0.000   |  |
| Power FactorB     | 0.000   |  |
| Power FactorC     | 0.000   |  |
| Grid Power Status | Sell    |  |
| Meter PowerA      | 0W      |  |
| Meter PowerB      | 0W      |  |
| Meter PowerC      | 0W      |  |
| Meter Total Power | 0W      |  |
| Meter COM Status  | Failure |  |

3/4

| Grid         |        |  |
|--------------|--------|---------------------------------------------------------------------------------------|
| E-Buy-Day    | 0.0kWh |  |
| E-Buy-Month  | 0.0kWh |  |
| E-Buy-Year   | 0.0kWh |  |
| E-Buy-All    | 0.0kWh |  |
| E-Sell-Day   | 0.0kWh |  |
| E-Sell-Month | 0.0kWh |  |
| E-Sell-Year  | 0.0kWh |  |
| E-Sell-All   | 0.0kWh |  |

4/4

This is **Grid** Page, four pages in total. The number of pages is displayed in the lower left corner.

① Real-time data: Real-time display of three-phase grid voltage, current, AC output power and reactive power, power factor, meter power, display of grid frequency, status and meter COM status, statistics of total AC output and reactive power, total power of the meter, and the day, month, year, and the cumulative amount of bought/sold energy.

② Grid Power Status: Balance; Sell; Buy.

③ Meter COM Status: Failure; OK.

## • BATTERY PAGE

| Battery                   |              |  |
|---------------------------|--------------|-----------------------------------------------------------------------------------|
| Battery Voltage           | 0.00V        |  |
| Battery Current           | 0.00A        |  |
| Battery Power             | 0W           |  |
| Battery Capacity          | 0.0%         |  |
| Battery working Status    | Discharge    |  |
| Battery Test Status       | Both allowed |  |
| BMS COM Status            | OK           |  |
| BMS Temperature           | 0.0°C        |  |
| BMS Max Charge Current    | 0.00A        |  |
| BMS Max Discharge Current | 0.00A        |  |

1/2

| Battery             |        |  |
|---------------------|--------|-------------------------------------------------------------------------------------|
| LLC Voltage         | 0.0V   |  |
| LLC Current         | 0.00A  |  |
| E-Charging-Day      | 0.0kWh |  |
| E-Charging-Month    | 0.0kWh |  |
| E-Charging-Year     | 0.0kWh |  |
| E-Charging-All      | 0.0kWh |  |
| E-Discharging-Day   | 0.0kWh |  |
| E-Discharging-Month | 0.0kWh |  |
| E-Discharging-Year  | 0.0kWh |  |
| E-Discharging-All   | 0.0kWh |  |

2/2

This is **Battery** Page, two pages in total. The number of pages is displayed in the lower left corner.

① Real-time data: Real-time display of battery voltage, current, power, power, working status, detection status, BMS COM status, temperature, Max. charging and discharging current, LLC voltage and current, and statistic of the day, month, year, and the cumulative amount of charged/discharged energy.

② Battery working Status: Standby; Charge; Discharge.

③ Battery Test Status: Disconnect; Charging allowed; Both allowed; Discharging allowed.

④ BMS COM Status: Failure; OK.

## • LOAD PAGE

| Load             |       |  |
|------------------|-------|-------------------------------------------------------------------------------------|
| Back-Up VoltageA | 0.0V  |  |
| Back-Up VoltageB | 0.0V  |  |
| Back-Up VoltageC | 0.0V  |  |
| Back-Up CurrentA | 0.00A |  |
| Back-Up CurrentB | 0.00A |  |
| Back-Up CurrentC | 0.00A |  |

1/2

| Load            |        |  |
|-----------------|--------|---------------------------------------------------------------------------------------|
| Back-Up Power A | 0W     |  |
| Back-Up Power B | 0W     |  |
| Back-Up Power C | 0W     |  |
| P-Load          | 0W     |  |
| E-Load-Day      | 0.0kWh |  |
| E-Load-Month    | 0.0kWh |  |
| E-Load-Year     | 0.0kWh |  |
| E-Load-All      | 0.0kWh |  |

2/2

This is **Load** Page, two pages in total. The number of pages is displayed in the lower left corner.

① Real-time data: Real-time display of three-phase load voltage, current, AC output power, statistics of total power consumption, and the day, month, year, and the cumulative amount of consumed energy.

## • GEN PAGE

| Gen             |        |  |
|-----------------|--------|-------------------------------------------------------------------------------------|
| Gen Voltage A   | 0.0V   |  |
| Gen Voltage B   | 0.0V   |  |
| Gen Voltage C   | 0.0V   |  |
| Gen Current A   | 0.00A  |  |
| Gen Current B   | 0.00A  |  |
| Gen Current C   | 0.00A  |  |
| Gen Power A     | 0W     |  |
| Gen Power B     | 0W     |  |
| Gen Power C     | 0W     |  |
| Gen Total Power | 0W     |  |
| Gen Frequency   | 0.00Hz |  |

This is **GEN** Page, one page in total.

① Real-time data: Real-time display of the voltage, current, power, frequency and total power of the GEN.

## • RUN PAGE

| Load    | Grid    | Inverter |  |
|---------|---------|----------|--|
| OW      | OW      | OW       |  |
| 0.0V OW | 0.0V OW | 0.0V OW  |  |
| 0.0V OW | 0.0V OW | 0.0V OW  |  |
| 0.0V OW | 0.0V OW | 0.0V OW  |  |
| Battery | PV 1    | PV 2     |  |
| OW      | OW      | OW       |  |
| 0.00V   | 0.0V    | 0.0V     |  |
| 0.00A   | 0.00A   | 0.00A    |  |

This is **Run** Page, one page in total.

① Real-time data: Real-time display of the voltage, power and total power of the load, the grid, the inverter output, the battery, and the two PVs.

## • ERROR CODE PAGE

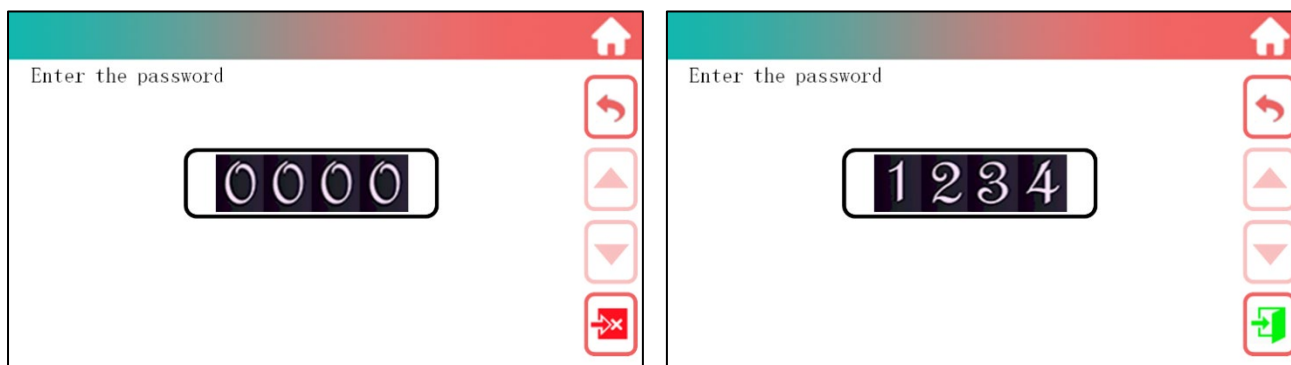
| Error Code |                   |                        |  |
|------------|-------------------|------------------------|--|
| No         | Time              | Error Code             |  |
| 01         | 20-00-00 00:00:00 | W_1:1:Under Ugrid      |  |
| 02         | 20-00-00 00:00:00 | W_1:3:Under Fr         |  |
| 03         | 20-00-00 00:00:00 | F_1_15:Remote shutdown |  |
| 04         | 20-00-00 00:00:00 | W_1:5:Under Upv        |  |
| 05         | 20-00-00 00:00:00 | W_1:1:Under Ugrid      |  |
| 05         | 20-00-00 00:00:00 | W_1:3:Under Fr         |  |
| 07         | 20-00-00 00:00:00 | W_1:5:Under Upv        |  |
| 08         | 20-00-00 00:00:00 | F_1_15:Remote shutdown |  |
| 09         | 20-00-00 00:00:00 | W_1:1:Under Ugrid      |  |
| 10         | 20-00-00 00:00:00 | W_1:3:Under Fr         |  |
| 11         | 20-00-00 00:00:00 | W_1:5:Under Upv        |  |

1/9

This is **Error Code** Page, nine pages in total. The number of pages is displayed in the lower left corner.

① Real-time data: Real-time display of latest alarms (up to 99, 1 page stores 11), the latest is displayed at top, and it doesn't show if there is none. Specific contents include serial number, alarm time, corresponding fault codes.

## 4.3 PASSWORD ENTER PAGE



This is **Password Enter** Page, you need to enter the password correctly before entering the Setting Page.

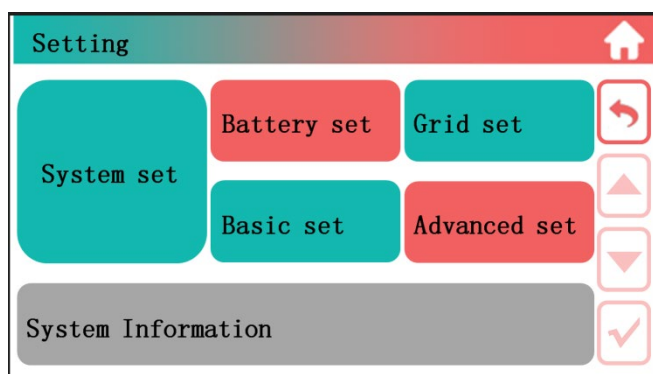
- ① The default password is 1234.
- ② If the password is wrong, the entry icon in the lower right corner turns red, the door closes and an "X" appears; if the password is correct, the entry icon in the lower right corner turns green and the door opens.
- ③ If the password is correct, you can enter the setting page by clicking on the "door icon". If you click on the wrong password, "ERROR" will pop up, and you can only go back to the home page or the previous page by clicking on the button, and then go back to the password page to re-enter.
- ④ When the settings are changed and you back out to the main page, the password will be cleared automatically.



This is **Keyboard Input** Page.

- ① "0-9" is used to input numbers, "." is used to input decimal, "+/-" is used to switch between positive and negative values, "←" is used to delete, "Esc" is used to quit or cancel input, "OK" is used to confirm.

## 4.4 SETTING PAGE



This is **Setting** Page, seven buttons in total.

- ① System set: switch on/off; anti-reflux source; max. power selling; PV energy mode; charging and discharging periods, power, battery SOC, voltage settings.
- ② Battery set: Protocol Selection; Discharge Protection; BAT Activation Mode; Equal Charge Configuration; Float Charge Configuration.

- ③ Grid set: frequency selection; upper and lower limits of grid voltage; reconnection time.
- ④ Basic set: language; time; standby; brightness; buzzer; LED.
- ⑤ Advanced set: battery paralleling; forced off-grid mode; PCS paralleling address; PCS paralleling quantity; active/reactive power adjustment; power factor adjustment; PV shadow scanning; islanding protection; low-voltage ride-through; clearing overload faults.
- ⑥ System information: rated output power; FM version of LCD; program version of STM32, DSP\_slave/master, CPLD; startup countdown time.

## 4.5 SYSTEM INFORMATION PAGE

**System Information**
⬆

|                          |          |   |
|--------------------------|----------|---|
| FM Version of LCD        | Xa102_P3 | ↶ |
| Rated Output Power       | 0W       | ⬆ |
| FM Version of STM32      | 0        | ⬆ |
| FM Version of DSP_master | 0        | ⬇ |
| FM Version of DSP_slave  | 0        | ⬇ |
| FM Version of CPLD       | 0        | ⬇ |
| Countdown Time           | 0s       | ✓ |

This is **System Information** Page, one page in total.

① Real-time data: Real-time display of rated output power; FM version of LCD; program version of STM32, DSP slave/master, CPLD; startup countdown time.

## 4.6 SYSTEM SET PAGE

**System set**
⬆

Switch      ☐ OFF   ☐ ON

☐ Selling First

☐ Anti-reflux to grid   ☐ Solar Sell

☐ Anti-reflux to CT   ☐ Solar Sell

Max Sell Power      Zero-export Power

Energy Mode   ☐ Batt First   ☐ Load First

↶  
⬆  
⬇  
✓

This is **System Set** Page, two pages in total. The number of pages is displayed in the lower left corner.

① **Switch**: Controls the power on and off of the inverter. ☐ means unselected, ☒ means selected.

② **Work Mode**:

i) Selling First: PV is used to power loads and battery, allowing the inverter to sell excess energy generated by the solar panels back to the grid. If it is during a discharging period, energy of battery can also be sold back to the grid. Prioritization of power supply sources for loads: PV>Grid>Battery.

**System set**
⬆

| Gen                   | Grid                  | Grid                  | Time        | Power | Battery |      |
|-----------------------|-----------------------|-----------------------|-------------|-------|---------|------|
| CHG                   | CHG                   | EDC                   |             |       |         |      |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 0: 0 ~ 0: 0 | 0W    | 0.0%    | 0.0V |

↶  
⬆  
⬇  
✓

ii) Anti-reflux to grid: The inverter only supplies power to the connected backup load. It neither supplies power to household loads nor sells power to the grid. The built-in CT will detect the power flowing back to the grid and will reduce the power of the inverter, only to supply local loads and charge for battery.

iii) Anti-reflux to CT: The inverter supplies power to connected backup loads and household loads. If PV power and battery power are insufficient, they will be supplied with grid power. The inverter won't sell power to the grid. In this mode, a CT is required and an external CT will detect the power flowing back to the grid and will reduce the power of the inverter, only to supply local and household loads, charge for battery.

③ **Solar Sell:** It is a special pattern in the Anti-reflux to grid or Anti-reflux to CT mode. If this pattern is on, excess energy can be sold back to the grid. At this time PV is prioritized for use as follows: loads, charging battery, grid. ☐ means off, ☒ means on.

④ **Max Sell Power:** The maximum output power allowed to flow into the grid.

⑤ **Zero-export Power:** The maximum amount of power flowing into the grid with the "Solar Sell" off.

⑥ **Energy Mode:** Prioritization of PV energy supply.

i) Batt First: PV energy supply is first used to charge the battery and then used to power the load. If the PV energy is insufficient, the grid will supply both the battery and the load.

ii) Load First: PV energy supply is first used to power the load and then used to charge the battery. If the PV energy is insufficient, the grid will supply both the battery and the load.

Note: If operating on off-grid status, the PV energy mode is always load first.

⑦ **Charging and Discharging Periods:** Up to six charging and discharging time periods can be set, click the circle to select charging(CHG) and discharging(EDC) mode, solid circle means selected. For convenience, hours and minutes are set separately, click on the input box and enter with the keyboard, set the start time first and then set the end time. Moreover, charge and discharge power can be set, as well as battery cut-off SOC and voltage. In order to avoid generating program conflicts, the two time periods front and rear are configured with a continuous relationship, where the end time of the previous period is the start time of the subsequent period.

In addition, if the battery protocol is a Pb Acid, the battery cut-off SOC item can only be set to 0% or 100% when setting the period parameter. Charging needs to be set to 100% and discharging needs to be set to 0%.

⑧ **GEN Charge:** utilize diesel generator to charge the battery in a time period.

## 4.7 BATTERY SET PAGE

### Battery set

Protocol Setting -- Pb Acid

Discharging Protection

|                        | On-grid                            | Off-grid                        | Voltage                            |
|------------------------|------------------------------------|---------------------------------|------------------------------------|
| Cut-off                | <input type="text" value="0%"/>    | <input type="text" value="0%"/> | <input type="text" value="0.00V"/> |
| Restored               | <input type="text" value="0%"/>    | <input type="text" value="0%"/> | <input type="text" value="0.00V"/> |
| Discharge Max. Current | <input type="text" value="0.00A"/> |                                 |                                    |

☐ Active BAT Mode enable

### Protocol Setting

☐ Pb Acid    ☐ CAN-Bus-proto-PYLON-v1.3

Battery set

|                |                                                        |  |
|----------------|--------------------------------------------------------|--|
| U-Equal Charge | <input style="width: 90%;" type="text" value="0.00V"/> |  |
| I-Equal Charge | <input style="width: 90%;" type="text" value="0.00A"/> |  |
| U-Float Charge | <input style="width: 90%;" type="text" value="0.00V"/> |  |
| I-Float Charge | <input style="width: 90%;" type="text" value="0.00A"/> |  |
| T-Float Charge | <input style="width: 90%;" type="text" value="0m"/>    |  |

2/2

③ **Active BAT Mode enable:** Restore the battery from its over-discharged state by slowly charging it from the PV array or the grid. This feature needs to be set up when the inverter is down.

④ **Equal Charge:** Battery equal charge voltage and current can be set.

⑤ **Float Charge:** Battery float charge voltage, current and time (in minutes) can be set.

This is **Battery Set** Page, two pages in total. The number of pages is displayed in the lower left corner.

① **Protocol Setting:** Select battery BMS protocol, currently supports Pb Acid and CAN-Bus-PROTO-PYLON-v1.3. Click to sub-page to select, and click save, back to Battery set page.

② **Discharging Protection:**

i) Cut-off: Set the battery discharge to stop only when it reaches the given conditions (battery SOC and voltage in on-grid/off-grid state).

ii) Restored: Set the power supply to load to restore only when it reaches the given conditions (battery SOC and voltage in on-grid/off-grid state).

iii) Discharge Max. Current: The maximum value of current allowed to be reached in the discharging state of the battery.

## 4.8 GRID SET PAGE

Grid set

|                          |                                                         |  |
|--------------------------|---------------------------------------------------------|--|
| Grid Frequency           | <input type="radio"/> 50Hz <input type="radio"/> 60Hz   |  |
| Grid Voltage Upper limit | <input style="width: 90%;" type="text" value="0.0V"/>   |  |
| Grid Voltage Lower limit | <input style="width: 90%;" type="text" value="0.0V"/>   |  |
| Grid Frequency Up limit  | <input style="width: 90%;" type="text" value="0.00Hz"/> |  |
| Grid Frequency Low limit | <input style="width: 90%;" type="text" value="0.00Hz"/> |  |
| Grid Reconnect delay     | <input style="width: 90%;" type="text" value="0"/>      |  |

Grid set

|            |                                                                                        |  |
|------------|----------------------------------------------------------------------------------------|--|
| Grid level | <input type="radio"/> LN:230VAC LL:400VAC<br><input type="radio"/> LN:133VAC LL:230VAC |  |
|            |                                                                                        |  |
|            |                                                                                        |  |
|            |                                                                                        |  |

This is **Grid Set** Page, two pages in total.

① Frequency select: please select your local grid frequency, you can choose 50Hz, 60Hz.

② Grid Voltage: Upper and lower grid voltage limits can be set.

③ Grid Frequency: Upper and lower grid frequency limits can be set.

④ Grid Reconnect delay: The reconnection time can be set in the on-grid state.

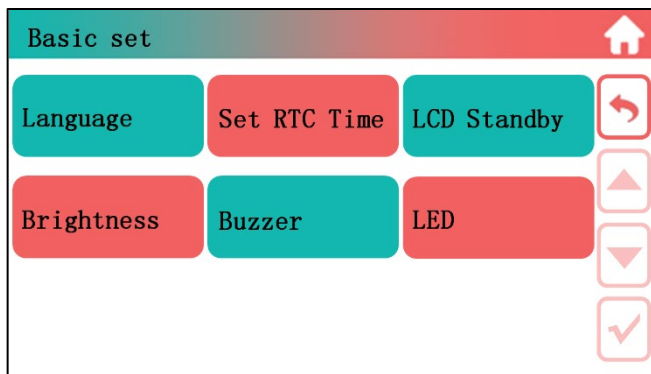
⑤ Grid Level: There're several voltage levels for the inverter output voltage.

LN:230VAC LL:400VAC

LN:133VAC LL:230VAC

Note: The grid frequency and grid level need to be selected when the inverter is down, and the inverter needs to be powered back on after the selection is completed.

## 4.9 BASIC SET PAGE



This is **Basic Set** Page, six buttons in total.

①Language: LCD language can be set, switching between 中文 and English.

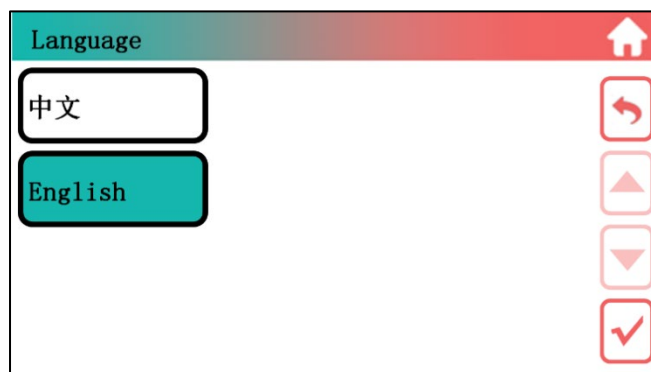
②Set RTC Time: The RTC time can be changed.

③LCD Standby: Screen standby time can be set, that is to say, how long there is no touch to apply to the screen, its brightness is automatically reduced to lowest. The settable range is 1~240s.

④Brightness: The current brightness of the screen can be set. The settable range is 1~100%.

⑤Buzzer: Buzzer can be set to sound or not when touching.

⑥LED: Support LED night mode function, you can set whether to enable or not and time period.



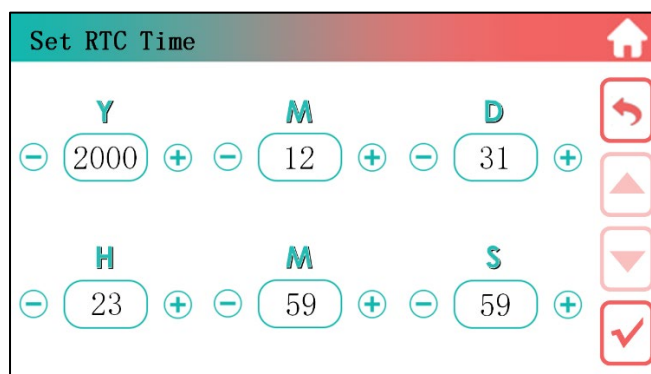
This is **Language** Page.

① 中文 and English languages are supported.

②The current language is displayed in real time by the color of the option block, blue is selected, white is not.

③When you change the language, you can judge whether the click is effective or not by whether the color of the option block changes to blue, and then click Save.

④After changing the language, it will take a few seconds for all the text to be changed to the new language, so please don't click it too often.

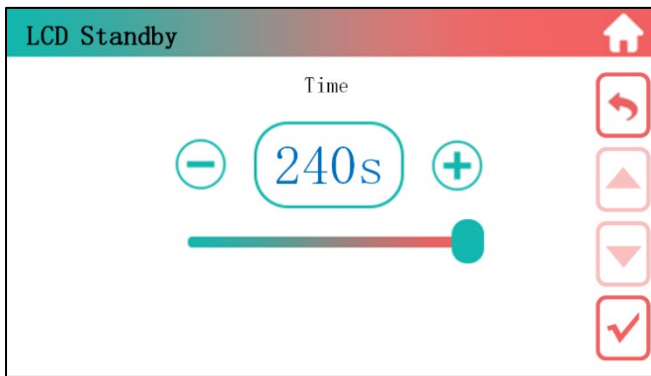


This is **Set RTC Time** Page.

①RTC time can be set to meet the needs of different areas of use.

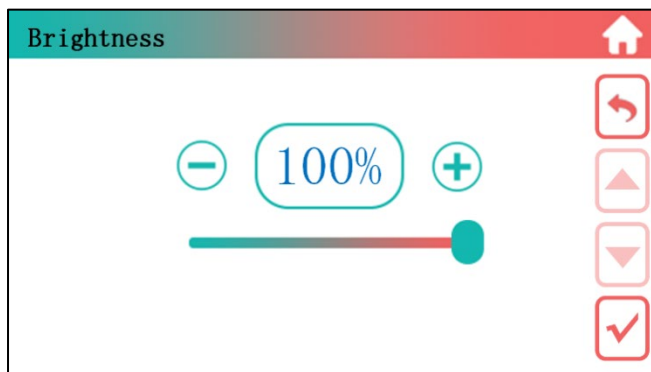
②For ease of operation, the year, month, day, hour, minute, and second are added and subtracted respectively. Y-M-D H:M:S means Year-Month-Day Hour: Minute: Second.

③After changing the time, you can return to the main page to see that the system time has been changed to the newly set time.



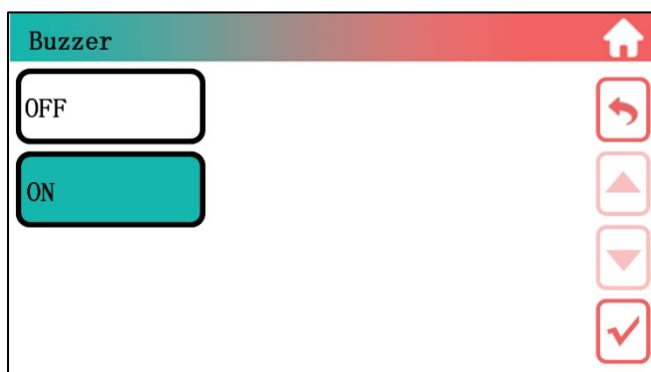
This is **LCD Standby** Page.

- ① Screen standby time can be set, that is to say, how long there is no touch to apply to the screen, its brightness is automatically reduced to lowest.
- ② There are two ways to adjust, clicking on the plus or minus icon or dragging the slider to adjust.
- ③ The settable range is 1~240s. The default value is 240s.



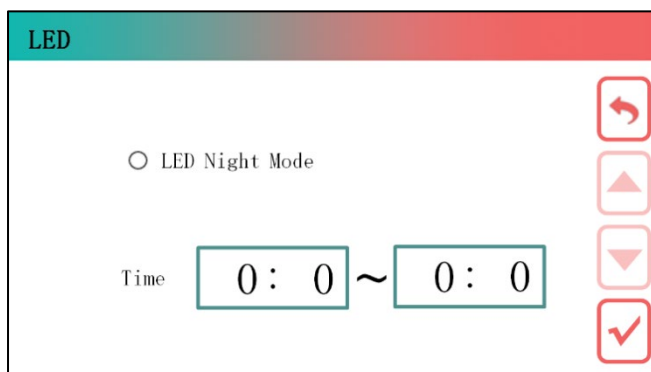
This is **Brightness** Page.

- ① The current brightness of the screen can be set to be displayed as a percentage of the maximum brightness.
- ② There are two ways to adjust, clicking on the plus or minus icon or dragging the slider to adjust.
- ③ The settable range is 1~100%. To protect the screen, upper and lower limits are set for the actual display brightness. The default value is 64%.



This is **Buzzer** Page.

- ① Buzzer can be set to sound or not when touching.
- ② The current buzzer setting is displayed in real time by the option block color, blue is the current buzzer selected state.
- ③ When changing the buzzer switch, you can judge whether the click is valid by whether the option box color changes to blue, and then click save setting.



This is **LED** Page.

- ① For settings related to controlling the LED light off at night.
- ② You can set whether to enable the LED night mode or not.
- ③ You can set the time period to use the night mode and enable the control function, to realize automatic control of LED light off.

## 4.10 ADVANCED SET PAGE

The image shows two screenshots of the 'Advanced set' page. The first screenshot (page 1/2) displays the following settings: 'Force Off-grid Mode' (radio button), 'Only PV Off-grid enable' (radio button), 'Gen Signal' (radio button), 'PCS Parallel address' (input field with value 0), and 'PCS Parallel quantity' (input field with value 0). The second screenshot (page 2/2) displays the following settings: 'Overload Reset' (radio button), 'Smart Load Output' (radio button), 'SOC' (input field with value 0%), 'Voltage' (input field with value 0.0V), 'Protection' (input field with value 0%), 'Restored' (input field with value 0%), and 'Active Power' (input field with value 0.0). Both pages have a red header bar with a home icon and a red sidebar with navigation icons.

This is **Advanced Set** Page, two pages in total. The number of pages is displayed in the lower left corner.

① Force Off-grid Mode: Use this function to force a switch to the off-grid state, which prioritizes power to the load in this mode.

② Only PV off-grid enable: Inverter In the off-grid state with only PV input, if this function is enabled, the machine can start to supply power to the load. This feature needs to be set up when the inverter is down.

③ GEN Signal: If this function is turned on, then when the power grid suddenly disappears, the inverter will send a dry contact signal to control the generator to start running; When the power grid returned to normal, the dry contact signal was disconnected and the generator stopped working.

④ PCS Parallel: Support PCS parallel function, you can set the address and quantity of parallel machine. (Multiple machines in parallel: the address of each machine must start from 1, consecutive and less than or equal to parallel quantity). This function needs to be set when the inverter is down, and the inverter needs to be powered back on after the setup is completed.

⑤ Overload Reset: After an alarm occurs, while other kinds of fault can be cleared automatically, only overload faults need to be cleared manually with this function. The operation way is to click on the hollow circle to change it to a solid circle, click on the Save button, and return to the Setting page automatically, then the overload fault is cleared successfully once. The next time you need to clear it, just repeat the operation above.

⑥ Smart Load Output: This mode utilizes the Gen input connection as an output witch only receives power when the battery SOC and Voltage is above a user programmable threshold. This feature needs to be set up when the inverter is down.

## 5.1 Warning List

| System Warning Code 1 | Warning Event | Description                                                                      | Solutions                                                                                                                                                                                                                    |
|-----------------------|---------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                     | Over Ugrid    | The Grid Voltage is Higher than the setting value when the inverter is running   | 1. Check the AC voltage is in the range of standard voltage inspecification;<br>2. Check whether grid AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer. |
| 1                     | Under Ugrid   | The Grid Voltage is Lower than the setting value when the inverter is running    | 1. Check the AC voltage is in the range of standard voltage inspecification;<br>2. Check whether grid AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer. |
| 2                     | Over Fr       | The Grid Frequency is Higher than the setting value when the inverter is running | 1. Check the frequency is in the range of specification or not;<br>2. Check whether AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                   |
| 3                     | Under Fr      | The Grid frequency is Lower than the setting value when the inverter is running  | 1. Check the frequency is in the range of specification or not;<br>2. Check whether AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                   |
| 4                     | Line Check    | The Grid is Loss when the inverter is running                                    | 1. Check whether grid AC cables are firmly and correctly connected;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                     |
| 5                     | Under Upv     | The PV voltage is lower than 300V when turn on the PV switch                     | 1. Check the PV is in the range of specification or not;<br>2. Check whether PV cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                          |
| 6                     | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 7                     | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 8                     | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 9                     | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 10                    | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 11                    | Reserved      |                                                                                  |                                                                                                                                                                                                                              |
| 12                    | Reserved      |                                                                                  |                                                                                                                                                                                                                              |

|    |          |  |  |
|----|----------|--|--|
| 13 | Reserved |  |  |
| 14 | Reserved |  |  |
| 15 | Reserved |  |  |

| System<br>Warning Code 2 | Warning<br>Event                         | Description                                                                              | Solutions                                                                                                                                                                                                                                     |
|--------------------------|------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                        | UBATTERY<br>_LOW                         | The battery<br>voltage is lower<br>than 44V or lower<br>than the SOC<br>that you setting | 1. Check the battery voltage;<br>2. Check whether Battery cables are firmly<br>and correctly connected;<br>3. Restart the inverter 2-3 times;<br>4. If the fault still existing, Please contact<br>your installer.                            |
| 1                        | UBATTERY<br>_LOSS                        | The battery is<br>lower than 25V                                                         | 1. Check the battery voltage;<br>2. Check whether Battery cables are firmly<br>and correctly connected;<br>3. Restart the inverter 2-3 times;<br>4. If the fault still existing, Please contact<br>your installer.                            |
| 2                        | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 3                        | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 4                        | Fault FAN                                | The FAN isn't<br>working                                                                 | 1. Restart the inverter 2-3 times;<br>2. If the fault still existing, Please contact<br>your installer.                                                                                                                                       |
| 5                        | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 6                        | Battery<br>Transient<br>under<br>voltage | The battery<br>voltage<br>is lower than 40V<br>at one moment                             | 1. Check the battery voltage;<br>2. Check whether Battery cables are firmly<br>and correctly connected;<br>3. Restart the inverter 2-3 times;<br>4.If the fault still existing, Please contact<br>your installer.                             |
| 7                        | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 8                        | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 9                        | DC Stop                                  | The DC side isn't<br>working                                                             | 1, The BUS voltage can't be built from PV or<br>battery.<br>2. Check whether Battery cables are firmly<br>and correctly connected;<br>3. Restart the inverter 2-3 times;<br>4. If the fault still existing, Please contact<br>your installer. |
| 10                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 11                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 12                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 13                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 14                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |
| 15                       | Reserved                                 |                                                                                          |                                                                                                                                                                                                                                               |

## 5.2 Fault Reference Codes

| System Fault Code 1 | Fault Event | Description                                                                      | Solutions                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------|-------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                   | Under Upv1  | The PV voltage is lower than 20V ,and the current is higher than 2A              | 1. Check the PV is in the range of specification or not;<br>2. Check whether PV cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                                                                                                                                                                                         |
| 1                   | Over Ipv1   | The PV current is higher than 30A                                                | DC side over current fault<br>1. Check PV module connect and battery connect;<br>2. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again;<br>3. If the error message still remains, please contact your installer.                                                                                                                            |
| 2                   | Over Upv1   | The PV voltage is higher than 900V                                               | 1. Check the PV is in the range of specification or not;<br>2. Check whether PV cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                                                                                                                                                                                         |
| 3                   | Over Ipv2   | The PV current is higher than 30A                                                | DC side over current fault<br>1. Check PV module connect and battery connect;<br>2. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again;<br>3. If the error message still remains, please contact your installer.                                                                                                                            |
| 4                   | Over temp   | The temperature is higher than 100°C                                             | 1. Check whether the work environment temperature is too high;<br>2. Turn off the inverter for 10mins and restart;<br>3. If the fault still existing, please contact us for help.                                                                                                                                                                                                           |
| 5                   | Over Iac    | AC over current fault                                                            | AC side over current fault<br>1. Please check whether the backup load power and common load power are within the range;<br>2. Restart and check whether it is in normal;<br>3. Check the backup load connected, make sure it is in allowed power range<br>4. If the fault still exists, please contact us for help<br>5. If the error message still remains, please contact your installer. |
| 6                   | Over Ugrid  | The Grid Voltage is Higer than the setting value when the inverter isn't running | Grid voltage fault<br>1. Check the AC voltage is in the range of standard voltage inspecification;<br>2.Check whether grid AC cables are firmly and correctly connected;                                                                                                                                                                                                                    |

|    |                     |                                                                                    |                                                                                                                                                                                                                                                                |
|----|---------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                     |                                                                                    | 3. If the error message still remains, please contact your installer.                                                                                                                                                                                          |
| 7  | Over Fr             | The Grid Frequency is Higer than the setting value when the inverter isn't running | Grid frequency out of range<br>1. Check the frequency is in the range of specification or not;<br>2. Check whether AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                      |
| 8  | Under Backup        | The backup is connected with the Grid                                              | 1. Check the backup terminal;<br>2. Detect the backup voltage with the multimeter;<br>3. Restart the inverter 2-3 times;<br>4. If the fault still existing, please contact us for help.                                                                        |
| 9  | Over Ubus           | The BUS Voltage is Higer than 980V                                                 | 1. check the total power of the inverter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                                                                 |
| 10 | Over ILeak          | AC leakage current fault                                                           | Leakage current fault<br>1. Check the PV side cable ground connection;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                                    |
| 11 | Fault Relay         | The Relay isn't working                                                            | 1. Restart the inverter 2-3 times;<br>2. If the fault still existing, please contact us for help.                                                                                                                                                              |
| 12 | Fault GFD           | DC insulation failure                                                              | PV isolation resistance is too low<br>1. Check the connection of PV panels and inverter is firmly and correctly;<br>2. Check whether the PE cable of inverter is connected to ground;<br>3. If the error message still remains, please contact your installer. |
| 13 | Over Backup Voltage | The Backup Voltage is high                                                         | 1. Check the backup terminal;<br>Detect the backup voltage with the multimeter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                           |
| 14 | XINT Iac            | The inverter current is high and touch the protection.                             | 1. check the power of the backup load;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                                                                    |
| 15 | Remote Shutdown     | Turn off the inverter                                                              | 1. Check the other fault code of the inverter and according to the solution to solve the problem.<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                         |

| System Fault Code 2 | Fault Event        | Description                                                                        | Solutions                                                                                                                                                                                                                                          |
|---------------------|--------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                   | Fault SPI          | The upper computer communicates with the lower computer fault                      | 1. Restart the inverter 2-3 times;<br>2. If the fault still existing, please contact us for help.                                                                                                                                                  |
| 1                   | Under Ugrid        | The Grid Voltage is Lower than the setting value when the inverter isn't running   | Grid voltage fault<br>1. Check the AC voltage is in the range of standard voltage inspecification;<br>2. Check whether grid AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer. |
| 2                   | Under Fr           | The Grid Frequency is Lower than the setting value when the inverter isn't running | Grid frequency out of range<br>1. Check the frequency is in the range of specification or not;<br>2. Check whether AC cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.          |
| 3                   | Under Upv2         | The PV voltage is lower than 20V ,and the current is higher than 2A                | 1. Check the PV is in the range of specification or not;<br>2. Check whether PV cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                                                |
| 4                   | Over Upv2          | The PV voltage is higher than 900V                                                 | 1. Check the PV is in the range of specification or not;<br>2. Check whether PV cables are firmly and correctly connected;<br>3. If the error message still remains, please contact your installer.                                                |
| 5                   | Reserved           |                                                                                    |                                                                                                                                                                                                                                                    |
| 6                   | Under Ubus         | The BUS Voltage is Lower than 600V                                                 | 1. check the total power of the inverter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                                                     |
| 7                   | Reserved           |                                                                                    |                                                                                                                                                                                                                                                    |
| 8                   | Fault Temper       | The Temper is fault                                                                | 1. Check whether the work environment temperature is too high or too low;<br>2. Turn off the inverter for 10mins and restart;<br>3. If the fault still existing, please contact us for help.                                                       |
| 9                   | Over Load          |                                                                                    | 1. check the total power of the inverter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                                                     |
| 10                  | Reserved           |                                                                                    |                                                                                                                                                                                                                                                    |
| 11                  | Parallel Data Loss | Parallel Data Loss                                                                 | 1. When in parallel mode, check the parallel communication cable connection and hybrid                                                                                                                                                             |

|    |                     |                                                        |                                                                                                                                                                                                                                   |
|----|---------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                     |                                                        | inverter communication address setting;<br>2, Restart the inverter 2-3 times;<br>3. If the fault still exists, please contact us for help.                                                                                        |
| 12 | Parallel Phase Loss | Parallel Phase Loss                                    | 1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still exists, please contact us for help. |
| 13 | Parallel Stop       | Parallel system stop                                   | 1. Check the hybrid inverter work status. According to the fault code to solve the problem.<br>2. If the fault still existing, please contact us for help.                                                                        |
| 14 | XINT Ipv            | The PV boost current is high and touch the protection. | 1. check the PV voltage and the power of the backup load;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                                    |
| 15 | Reserved            |                                                        |                                                                                                                                                                                                                                   |

| System Fault Code 3 | Fault Event     | Description                                             | Solutions                                                                                                                                                                                       |
|---------------------|-----------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                   | UBUS_OVER       | The BUS Voltage is Higer than 980V                      | 1. check the total power of the inverter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                  |
| 1                   | UBUS_LOW        | The BUS Voltage is Lower than 600V                      | 1. check the total power of the inverter;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                  |
| 2                   | UBATTERY_OVER   | The Battery Voltage is Higer than 60V                   | 1. Check the battery voltage;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help.                                                              |
| 3                   | Reserved        |                                                         |                                                                                                                                                                                                 |
| 4                   | ILLC_OVER       | The LLC current is high                                 | 1. check the total power of the inverter include the charging and the discharging current;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help. |
| 5                   | IBuckBoost_OVER | The Buck-boost voltage is high and touch the protection | 1. check the total power of the inverter include the charging and the discharging current;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help. |
| 6                   | ULLC_OVER       | The LLC voltage is high and touch                       | 1. check the total power of the inverter include the charging and the discharging                                                                                                               |

|    |                 |                                                                       |                                                                                                                                                                                                 |
|----|-----------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                 | the protection                                                        | current;<br>2. Check the battery voltage;<br>3. Restart the inverter 2-3 times;<br>4. If the fault still existing, please contact us for help.                                                  |
| 7  | Fault data SPI  | The upper computer communicates with the lower computer fault         | 1. Restart the inverter 2-3 times;<br>2. If the fault still existing, please contact us for help.                                                                                               |
| 8  | Over time SPI   | The upper computer communicates with the lower computer fault         | 1. Restart the inverter 2-3 times;<br>2. If the fault still existing, please contact us for help.                                                                                               |
| 9  | Over Ibat       | The battery current is higher than 1.5 multiples of the setting value | 1. check the discharging current that you setting;<br>2. check the total power of the inverter;<br>3. If the fault still existing, please contact us for help.                                  |
| 10 | Reserved        |                                                                       |                                                                                                                                                                                                 |
| 11 | Reserved        |                                                                       |                                                                                                                                                                                                 |
| 12 | Reserved        |                                                                       |                                                                                                                                                                                                 |
| 13 | Reserved        |                                                                       |                                                                                                                                                                                                 |
| 14 | ILLC_XINT       | The LLC current is high and touch the protection                      | 1. check the total power of the inverter include the charging and the discharging current;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help. |
| 15 | IBuckBoost_XINT | The Buck-boost current is high and touch the protection               | 1. check the total power of the inverter include the charging and the discharging current;<br>2. Restart the inverter 2-3 times;<br>3. If the fault still existing, please contact us for help. |

## 5.3 TROUBLESHOOTINGS

### •TROUBLESHOOTINGS

#### Checking Before Starting Up

**PV Input Connection:** Confirm the connection between inverter and PV panels : polarity ( +/-)not reversed

**Battery Connection:** Confirm the connection between inverter and battery : polarities ( +/-) not reversed

**On-Grid & Back-Up Connection:** Confirm On-Grid connected to public grid and Back-Up to loads : polarity ( L/N) not reversed

## Problems During Operation

### Hybrid inverter not Start Up With ONLY Battery

|                 |                                                                                                         |
|-----------------|---------------------------------------------------------------------------------------------------------|
| <b>Solution</b> | Make sure the voltage of battery is higher than 48V, otherwise battery cannot start Hybrid inverter up. |
|-----------------|---------------------------------------------------------------------------------------------------------|

### Hybrid inverter not Start Up With ONLY PV

|                 |                                                                             |
|-----------------|-----------------------------------------------------------------------------|
| <b>Solution</b> | Only PV cannot start, so ensure that one of the grid and battery is normal. |
|-----------------|-----------------------------------------------------------------------------|

### No Discharge or Output from Hybrid inverter at Night Without PV or PV Power Lower Than Load Power:

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| <b>Solution</b> | Refer to "Battery Protection Instructions" in 2.4.2 |
|-----------------|-----------------------------------------------------|

### Battery Not Charge When PV Power Higher Than Load Power:

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Solution</b> | <ol style="list-style-type: none"><li>1. Check if charge voltage on App (Set Basic Setting) is properly set (for lead-acid battery) as battery cannot charge if battery voltage reaches charge voltage.</li><li>2. Check if it is during discharge time set on App.</li><li>3. Check if battery is fully charged or not, or battery voltage reach "charge voltage" or not.</li><li>4. Check if the SOC is higher than 98%.</li></ol> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### High Power Fluctuation Battery Charge or Discharge:

|                 |                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Solution</b> | <ol style="list-style-type: none"><li>1. Check if there is a fluctuation on load power;</li><li>2. Check if there is a fluctuation on PV power.</li></ol> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|

### Battery Does Not Charge

|                 |                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Solution</b> | <ol style="list-style-type: none"><li>1. Make sure BMS communication is OK on App (for lithium batteries);</li><li>2. Check if the total load power is much higher than PV power.</li></ol> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Questions & Answers (Q & A)

### About Battery Operation

**Q:** Why battery switch always trip when starts it up (Lithium battery)?

**A:** For lithium battery like BYD , normally the switch trips for flowing reason:

1. BMS communication fails, or battery SOC is so low to protect itself.
2. Battery SOC is too low, battery trips to protect itself.
3. An electrical short-cut happened on battery connection side.

Q: How to set the battery charging and discharging current?

A: Inverter factory default battery charging current 10A and discharging current 20A. You can adjust it according to the specifications of the battery used.

### About SOLARMAN Smart APP Operation and Monitoring

Q: Why Cannot save settings on App

A: This could be caused by losing connection to Solar-WiFi.

1. Make sure you connected Solar-WiFi (make sure no other devices connected) or router (if connected Solar-WiFi to router) and on APP home page shows connection well.

2. Make sure Hybrid inverter under waiting mode (on APP) before you change any settings on SOLARMAN Smart disconnect grid/load/battery, only leave PV connected and then restart till see work mode as "wait" on APP.

Q: On App, some columns show NA, like battery SOH, etc. why is that?

A: NA means App does not receive data from inverter or server, normally it is because communication problem, such as battery communication, and communication between inverter and the APP.

### About Meter and Power Limit Function

Q: How to Act Output Power Limit function?

A: For Hybrid Inverter system, the function could be realized by:

1. Make sure Meter connection and communication well;
2. Turn on Export Power Limit function and Set the max output power to grid on APP

**Note:** *If Out-put Power Limit set as 0W, then there might still have deviation max 100W exporting to grid.*

Q: Why there is still power exporting to grid after I set power limit as 0W?

A: Export limit could theoretically to minimum 0W, but there will have a deviation of around 50-100W for Hybrid Inverter system.

## 6.1 DISCLAIMER

The hybrid inverters are transported, used and operated under environmental and electrical conditions. We have the right not providing after-sales services or assistance under following conditions:

- Inverter is damaged during transferring
- The inverter has expired the warranty year and no extended warranty has been purchased.
- Inverter is installed, refitted or operated in improper ways without authority from us
- Inverter is installed or used under improper environment or technical condition mentioned in this user manual, without authority from us
- Installation or configuration of the inverter does not follow requirements mentioned in this user manual
  - The inverter is installed or operated against the requirements or warnings that are mentioned in this user manual
- Inverter is broken or damaged by any force majeure like lightning, earthquake, fire hazard, storm and volcanic eruption etc.
- Inverter is disassembled, changed or updated on software or hardware without authority from us
- Inverter is installed, used or operated against any related items in international or local policies or regulations.
- Any non-compatible batteries, solar panels, loads or other devices connected to Hybrid inverter system



We will keep right to explain all the contents in this user manual.

### \*Maintenance

The inverter requires periodically maintenance, details as below:



Make sure inverter is totally isolated from all DC and AC power for at least 5 mins before maintenance

Heat sink: please use clean towel to clean up heat sink once a year

Torque: please use torque wrench to tighten AC and battery wiring connection once a year

DC switch: check DC switch regularly, active the DC switch 10 times in a row once a year.

Operating DC switch will clean contacts and extend lifespan of DC switch

## Appendix: Protection Category Definition

### Environment Category Definition

| Environment Condition       | Ambient Temperature | Relative Humidity | Applied to |
|-----------------------------|---------------------|-------------------|------------|
| <b>Outdoor</b>              | -20~+50℃            | 4%~100%           | PD3        |
| <b>Indoor Unconditioned</b> | -20~+50℃            | 5%~95%            | PD3        |
| <b>Indoor Conditioned</b>   | 0~+40℃              | 5%~85%            | PD2        |

### Pollution Degree Definition

|                            |                                                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pollution Degree I</b>  | No pollution or only dry, non-conductive pollution occurs. The pollution has no influence                                               |
| <b>Pollution Degree I</b>  | Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected. |
| <b>Pollution Degree II</b> | Conductive pollution occurs, or dry, non-conductive pollution occurs, which becomes conductive due to condensation which is expected.   |
| <b>Pollution Degree IV</b> | Persistent conductive pollution occurs, for example, the pollution caused by conductive dust, rain and snow.                            |

## 6.2 TECHNICAL PARAMETERS

| MODEL                                         | IHY 5KL3                                      | IHY 6KL3 | IHY 7KL3 | IHY 8KL3      | IHY 10KL3  | IHY 12KL3  |
|-----------------------------------------------|-----------------------------------------------|----------|----------|---------------|------------|------------|
| PV input                                      |                                               |          |          |               |            |            |
| Vmax PV (Vdc) (absolute Max.)                 | 1000 V                                        |          |          |               |            |            |
| Isc PV (absolute Max.) (A)                    | 22.5A                                         | 22.5A    | 22.5A    | 22.5 A/ 22.5A | 45A/ 22.5A | 45A/ 22.5A |
| Max. PV input current / strings (A)           | 18A                                           | 18A      | 18A      | 18A/18A       | 36A/18A    | 36A/18A    |
| Number MPP trackers                           | 1                                             |          |          | 2             |            |            |
| Start-up Voltage(Vdc)                         | 150                                           |          |          |               |            |            |
| MPPT Range (Vdc)                              | 200~800                                       |          |          |               |            |            |
| Vdc range @ full power (Vdc)                  | 350~800                                       |          |          |               |            |            |
| P pv Max(kW)                                  | 10                                            | 12       | 14       | 16            | 20         | 24         |
| Battery ( charge/discharge)                   |                                               |          |          |               |            |            |
| Battery type                                  | Li-ion/Lead-acid                              |          |          |               |            |            |
| Battery Norma Voltage (Range) (Vdc)           | 48V(40-60V)                                   |          |          |               |            |            |
| Max charge/discharge Current(A)               | 120                                           | 125      | 150      | 190           | 210        | 250        |
| Max charge/discharge Power(W)                 | 5000                                          | 6000     | 7000     | 8000          | 10000      | 12000      |
| AC Grid (input and output)                    |                                               |          |          |               |            |            |
| Normal AC Voltage (VAC)                       | 380/400(3W+N+PE)                              |          |          |               |            |            |
| Frequency (Hz)                                | 50/60                                         |          |          |               |            |            |
| Max. cont output current (A)                  | 8.3                                           | 10       | 11.6     | 13.3          | 16.7       | 20         |
| Max. cont output Power (W)                    | 5000                                          | 6000     | 7000     | 8000          | 10000      | 12000      |
| Max. cont. Apparent Power (VA)                | 5500                                          | 6600     | 7700     | 8800          | 11000      | 13200      |
| Power factor(adjustable)                      | 0.8 leading to 0.8 lagging                    |          |          |               |            |            |
| AC Load output (stand alone)                  |                                               |          |          |               |            |            |
| Normal Voltage (VAC)                          | 380/400(3W+N+PE)                              |          |          |               |            |            |
| Frequency (Hz)                                | 50/60                                         |          |          |               |            |            |
| Nominal Current(A)                            | 8.3                                           | 10       | 11.6     | 13.3          | 16.7       | 20         |
| Max. cont. Power (W)                          | 5000                                          | 6000     | 7000     | 8000          | 10000      | 12000      |
| Max. Three-phase Unbalanced Output Current(A) | 11.4                                          | 13.6     | 15.9     | 18.2          | 22.7       | 27.3       |
| Overload Capability (off grid)                | >200% for 15 sec                              |          |          |               |            |            |
| Output Power Factor(off grid)                 | 0.8 leading to 0.8 lagging                    |          |          |               |            |            |
| Output Current Harmonic Distortion            | THD<3%(Nonlinear load); THD<1.5%(Linear load) |          |          |               |            |            |

| Others                  |                                       |
|-------------------------|---------------------------------------|
| Ingress protection (IP) | IP66                                  |
| Protective class        | Class I                               |
| Temperature (°C)        | -25°C~+60°C                           |
| Inverter Isolation      | Non-isolated PV- AC                   |
|                         | High frequency isolated(Battery Side) |
| Overvoltage category    | OVC III (AC Main), OVC II (PV)        |
| Dimensions,D*W*H(mm)    | 475*683*256                           |
| Weight (kg)             | 38                                    |
| Altitude                | 2000m                                 |

