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# SINGLE-PHASE HYBRID INVERTER

H3000-EU/H3600-EU/H4000-EU/H4600-EU/H5000-EU/H6000-EU



User Manual

## Foreword

• All information in this document is the property of the inverter system manufacturer. Any parts of this document shall not be copied or reproduced in any commercial forms. Internal use allowed.

• The manufacturer makes no warranties or guarantees, express or implied, with respect to any device and/or software other than this product that may be described in this document, including, but not limited to, any implied warranties of merchantability, fitness for a particular purpose, accuracy or completeness of responses.

• In no event shall the manufacturer or its distributors or resellers be liable for indirect, incidental or consequential damages arising from non-compliance with the guidelines in this document.

• Specifications in this document are subject to change without notice. Every effort has been made to make this document complete, accurate and up to date. However, the manufacturer may require some improvements under certain circumstances without prior notice. The manufacturer shall not be liable for any damage caused by this document, including but not limited to omissions, typographical errors, arithmetic errors or errors listed in the document.

## About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system. The reader can get additional information about other devices at https://www.hinen.com or on the webpage of the respective component manufacturer.

**Validity**

This manual is valid for the following inverter models:

• H3000-EU

• H3600-EU

• H4000-EU

• H4600-EU

• H5000-EU

• H6000-EU

They will be referred to as "**H3000-EU - H6000-EU**" hereinafter unless otherwise specified.

**Target Group**

• Qualified personnel who are responsible for the installation and commissioning of the inverter.

• Inverter owners who will have the ability to interact with the inverter.

**How to Use This Manual**

Read this manual and other related documents before performing any work on the inverter. Documents must be stored carefully and be available at all times. Contents may be periodically updated or revised due to product development. It is possible that there are changes in the manual in subsequent inverter editions. The latest manual can be acquired by visiting the website at https://www.hinen.com

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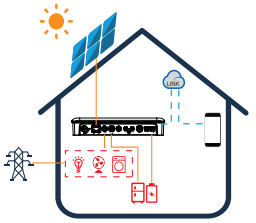
05 Others

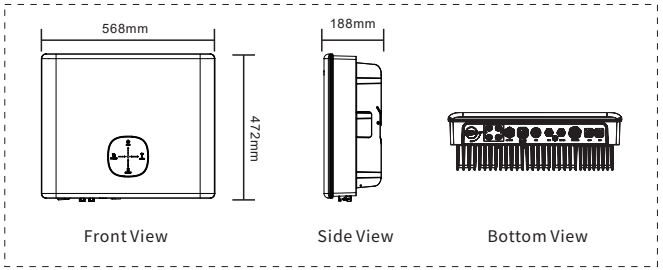
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# 01 Introduction

The product, a hybrid inverter or bidirectional solar inverter, is suitable for solar systems involving PV, batteries, loads, and grid system for energy management. The inverter should not be applicable to multiple phase combinations.
The energy generated by the photovoltaic system can be used to satisfy the household electricity consumption. The surplus energy is used to charge the battery and the remaining energy is exported to the grid. When the photovoltaic energy is not enough to meet the self-consumption, the battery should be discharged to support the load. If the battery is low, the load will be powered by the grid.

The photovoltaic energy storage inverter diagram:

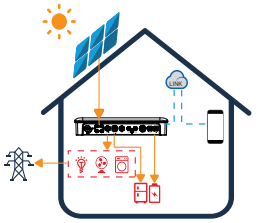





The preceding introduction describes the general operation of the inverter system. The operation mode can be changed with the APP based on the system layout. The possible operation modes for the inverter system are shown below.

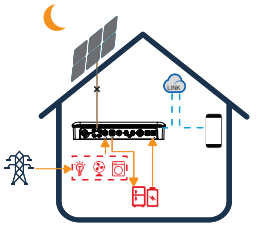
## 1.1 Operation Modes Introduction

According to different system configurations and layouts, the inverter can usually be set to the following operating modes.



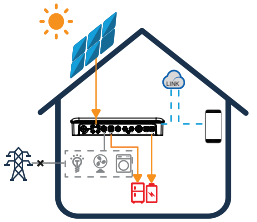
### Mode I

The energy generated by the PV system is mainly used to optimize self-consumption needs. The excess energy is used to charge the batteries,and the rest is exported to the grid.



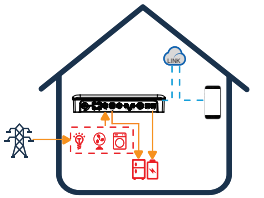
### Mode II

When the PV side does not generate energy and the battery is fully charged, the battery and the grid will supply power to the load at the same time.



### Mode III

When there is a grid outage, the system automatically switch to the back-up mode. The back-up loads can be supplied by both PV and battery energy.



### Mode IV

The grid supplies power to the load and charges the battery. The charging time and power are set by the APP.

## 1.2 Safety and Warning

The inverter strictly complies with relevant safety rules for product design and testing. Please read and follow all instructions and precautions on the inverter or in the User Manual during installation, operation and maintenance, as any improper operation might cause personal injury or property damage.

### Symbol Explanation

| | |
|---|---|
|  | Caution!<br>Failure to observe any warnings contained in this manual may result in injury. |
|  | Danger-high voltage and electric shock! |
|  | Danger-hot surface! |
|  | The components of the product can be recycled. |
|  | This side up! This package must always be transported, handled and stored in such a way that the arrows always point upwards. |
|  | No more than six (6) identical packages being stacked on each other. |
|  | Products shall not be disposed as household waste. |
|  | Fragile - The package/product should be handled with care and never be tipped over or slung. |
|  | Refer to the operation structions. |
|  | Keep dry! The package/product must be protected from excessive humidity and must be stored under cover. |
|  | This symbol indicates that you should wait at least 5mins after disconnecting the inverter from the utility grid and from the PV panel before touching any inner live parts. |
|  | CE mark. |



## Safety Warnings

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

Before any wiring connection or electrical operation on inverter, all battery 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 operation, so please make sure it has cooled down before touching it, and make sure the inverter is out of reach of children.

Do not open the inverter or replace any parts without the authorization of the manufacturer, otherwise, the warranty commitment of the inverter will be invalid.

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

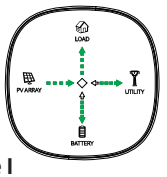
Appropriate methods must be adopted to protect inverter from static damage. Any damage caused by static is not warranted by manufacturer.

PV negative (PV-) and battery negative (BAT-) on inverter side is not grounded as default design. Connecting PV- to EARTH is strictly forbidden.

The photovoltaic modules used on the inverter must meet the IEC61730A level, and the total open-circuit voltage of the photovoltaic string/array must be lower than the maximum rated DC input voltage of the inverter. Any damage caused by photovoltaic overvoltage is not covered by the warranty.

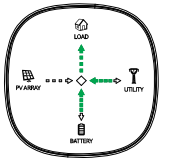
Output of back-up side in switchbox should be labeled "Main Switch EPS Supply". The output of normal load side in switch box should be labeled "Main Switch Inverter Supply".

## 1.3 Product Overview



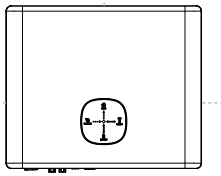

### Mode I

The energy produced by the PV system is used to optimize self-consumption needs. The excess energy is used to recharge the batteries, any remaining excess is then exported to the grid.

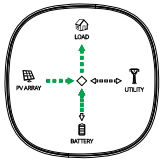



### Mode II

When there is no PV, and the battery is sufficient, it can supply the load together with grid power.

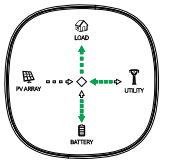


Light board modes



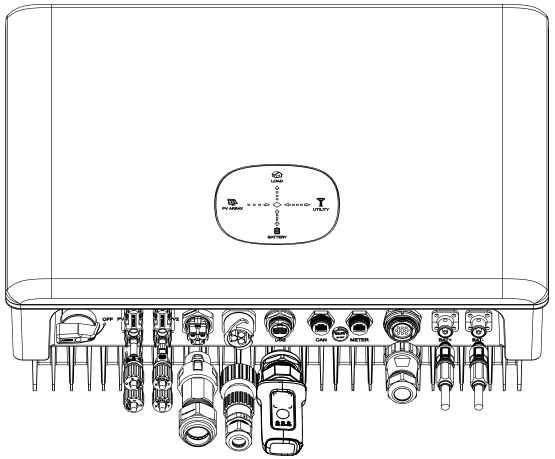

### Mode III

When the grid fails, the system will automatically switch to back-up mode. The back-up loads can be supplied by both PV and battery energy.

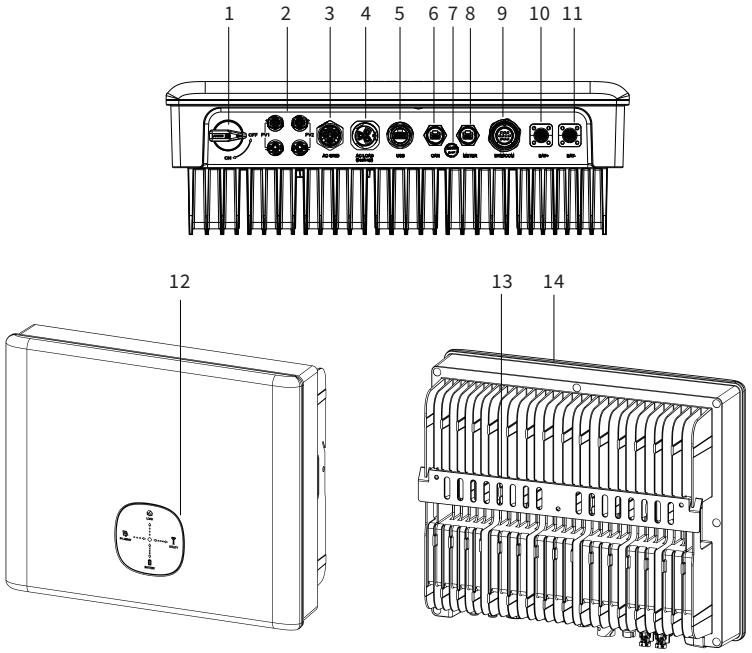



### Mode IV

The grid supplies power to the load and charges the battery. The charging time and power are set by the APP.



**Port Diagram:**



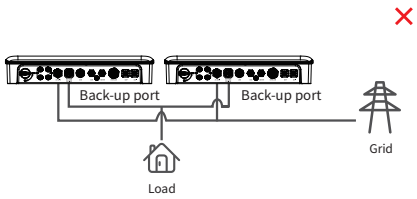

| | | |
|---|---|---|
| 1 PV switch | 6 CAN port (BMS Port) | 11 Battery negative |
| 2 PV input (PV1/PV2) | 7 Waterproof permeable valve | 12 LED indicator |
| 3 On-grid terminal | 8 Meter Port (CT Port) | 13 Mounting plate |
| 4 Back-up port | 9 COM Port (RS485 Port/DRMS Port) | 14 Heat sink |
| 5 USB terminal | 10 Battery positive | |



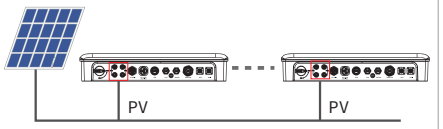
# 02 Installation Descriptions

## 2.1 Unacceptable Installations

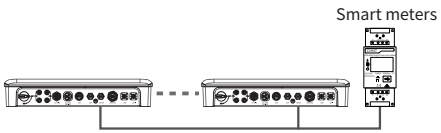
Please avoid the following installations which will damage the system or the inverter.
Damage caused by the following is not covered by the warranty.



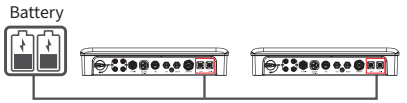

The Back-up port cannot be connected in parallel. If necessary, please contact after-sales support.



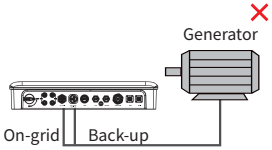

A single PV array cannot be connected to multiple inverters.



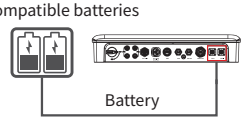

One smart meter cannot be connected to multiple inverters. Different CTs cannot be connected to the same cable.



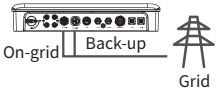

A group of batteries cannot be connected to multiple inverters.




The On-grid or Back-up port cannot be connected to any AC generator directly.



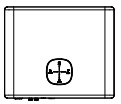

Incompatible batteries cannot be connected to the battery input port of the inverter.




The Back-up port cannot be connected to the grid.

## 2.2 Packing List

Upon receiving the hybrid inverter, please check if any of the components as shown below are missing or broken.


Inverter
x1


Wall-mounted bracket
x1


Positive PV plug
x2


Negative PV plug
x2


COM connector
x1


Wifi module
x1


Battery positive plug x1

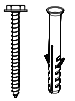

Battery negative plug x1

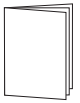

Grid plug
x1


EPS plug x1
Phillips screws x4
Protective cover x1


Short screw A x1

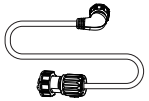

Long screw B x2


Expansion bolts
x3

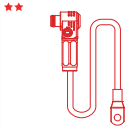

User manual x1
Quick installation guide x1

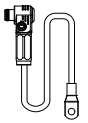

CT
x1

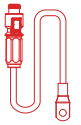

PV disassembly tool
x1

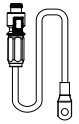

Battery communication cable x1


SC25-8 copper terminal x4


Red DC power cabl
x1

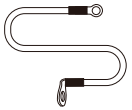

Black DC power cable
x1


Red power connector with cable x 1


Black power connector with cable x 1


Terminal 1
x3


Terminal 2
x3


PE cable
x1


Single-phase meter
x1


Cord end terminal
x6


Meter communication cable x1


Battery thermal sensor x1

★ The images shown here are for reference. The actual product and quantity are based on delivery.

★★ Optional. Types of equipment to be applied vary in different regions. Please consult local customer service for equipment type selection.

★★ Note: Power cables are included in the battery package when the product is paired with the B5000D or B5000D-W.

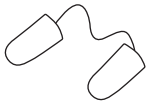


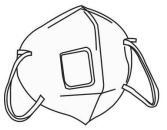
## 2.3 Mounting

### 2.3.1 Installation Tools

Recommended installation tools include but are not limited to the following tools. If necessary, additional auxiliary tools can be used on site.


Protection Goggle


Anti-noise Earplugs


Dust Mask


Safety Gloves


Safety Shoes


Utility Knife


Marker


Anti-static wristband


Cord Cutters


Wire Strippers


Spirit Level


Rubber Hammer


Impact Drill


Phillips Screwdriver


Electric Screw Driver


Hydraulic Pliers


Heat Gun


Crimping plier


MC4 PV connection wrench



Multimeter


Flathead Screwdriver

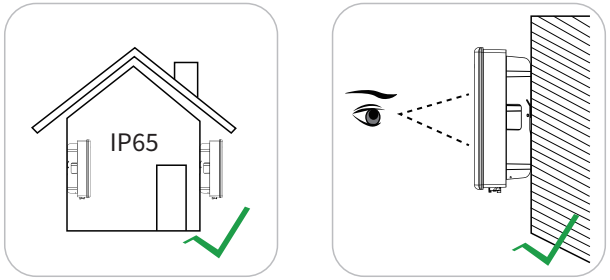

Steel Tape


Socket Wrench Set


Vacuum Cleaner

## 2.3.2 Select Mounting Location

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



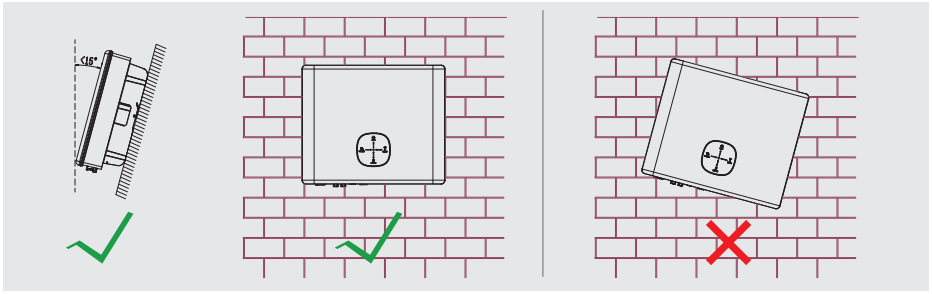

**Rule 1.** The inverter with IP 65 can be installed both indoors and outdoors.

> **Warning:** It is recommended to prevent the inverter from being exposed to direct sunlight, snow, rain, and other negative influences which may affect its functionality or longevity.

**Rule 2.** Install the inverter in a convenient place for electrical connection, operation, and maintenance. Ensure that no part of the system blocks the switch and breaker from disconnecting the inverter from DC and AC power.

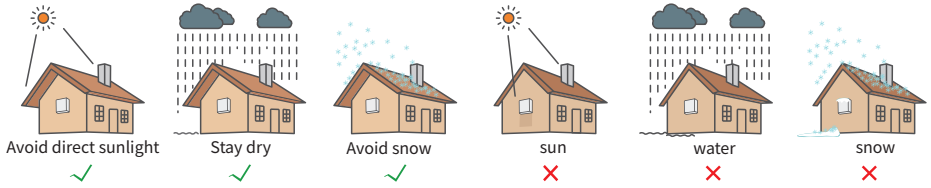
**Rule 3.** Inverter should be installed at eye level for convenient maintenance.

**Rule 4.** The product label on the inverter should be clearly visible after installation. Do not damage the label.



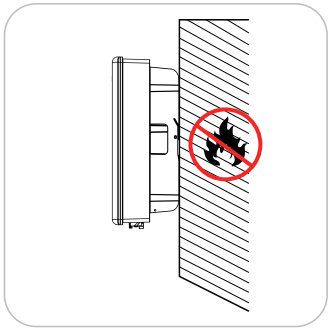
**Rule 5.** Inverter should be installed vertically with a max rearward tilt of 15°.

**Rule 6.** Ambient temperature should be lower than 45°C. High ambient temperatures can decrease the inverter's power efficiency.

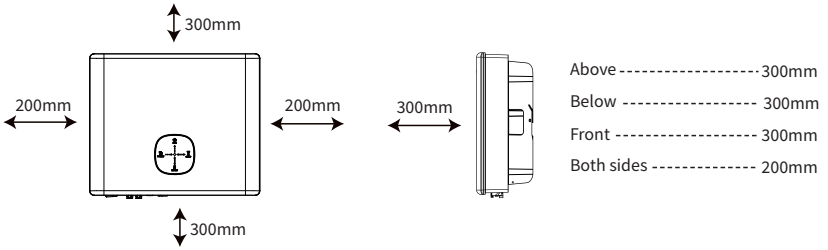





**Rule 7.** The mounting structure where the inverter is installed must comply with local/national standards and guidelines. Ensure that the installation surface is solid enough to bear four times the weight of the inverter and is suitable for the dimensions of the inverter(e.g. cement walls, plasterboard walls, etc.).



**Rule 8.** Leave enough space around the inverter according to the below figure for natural heat dissipation.




The inverter must not be installed near flammable or explosive materials or near equipment with strong electromagnetic fields.

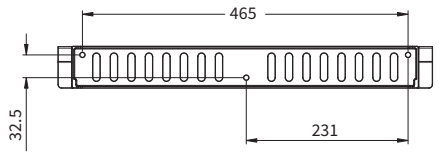
Remember that this inverter is heavy! Please be careful when lifting out from the package. The inverter is suitable for mounting on concrete or other non-combustible surfaces only.

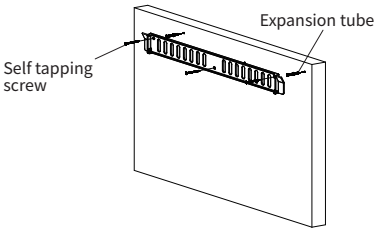
## 2.3.3 Mounting the Inverter

### Step 1

Please place the wall-mounted bracket horizontally on the wall and mark the drilling points with a marker. Remove the bracket and use an impact drill to drill the marked points (8mm in diameter and 80 mm in depth). Use the expansion bolts in the accessory box and fix the wall-mounted bracket tightly on the wall.

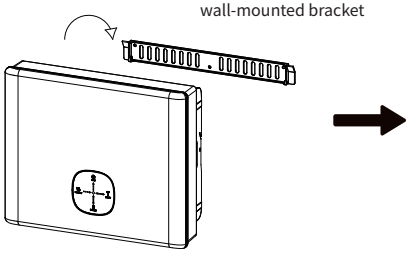
**Mounting holes for wall-mounted bracket:**



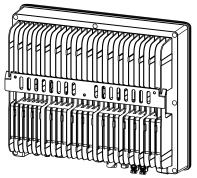




### Step 2

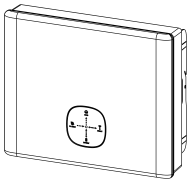
Carry the inverter by holding the heat sink on two sides and place the inverter on the wall-mounted bracket.




Back view:

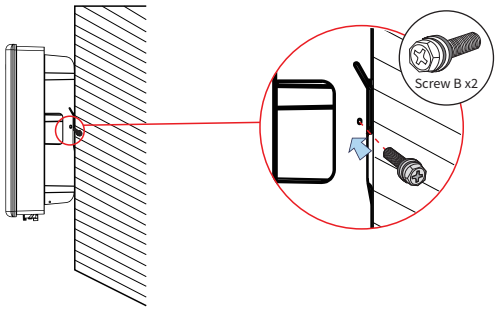


Front view:



### Step 3

Use the standard security screws to lock both sides of the wall-mounted bracket.



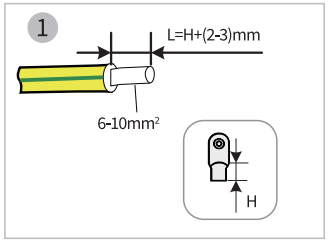

**Note:** After screwing the left and right screws into the holes, tighten the screws successively!

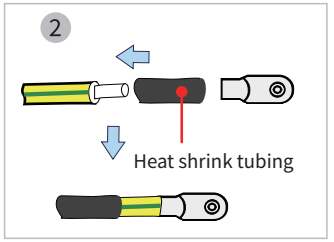
M5
3 N·m

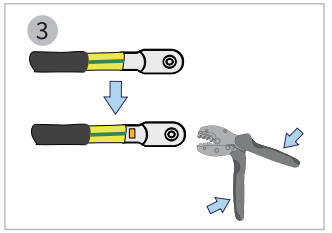
## 2.4 Electrical Wiring Connection

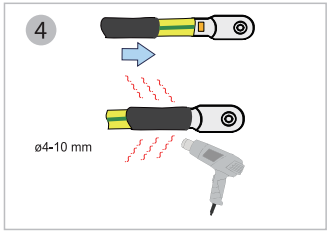
### 2.4.1 Grounding Connection

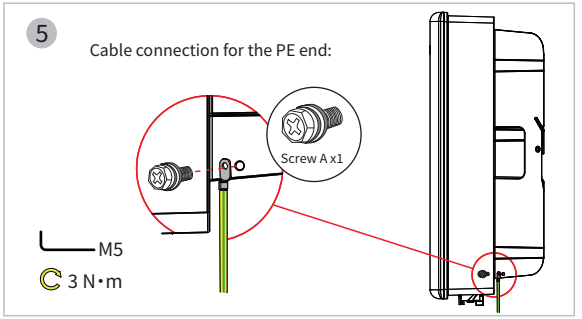
Connect the PE cable to the grounding plate at the grid side.



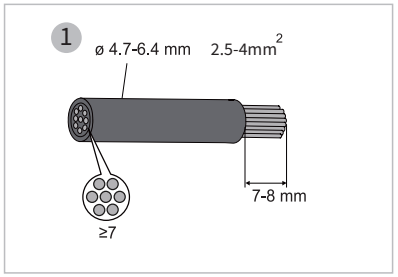



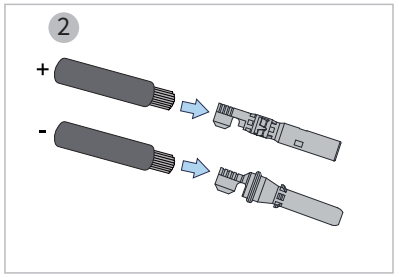

**Notice:** All non-current carrying metal parts and device enclosures in the PV power system should be grounded.

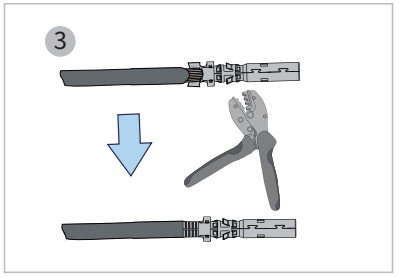
## 2.4.2 PV Wiring Connection

Before connecting PV panels/strings to the inverter, ensure all the following requirements are met:

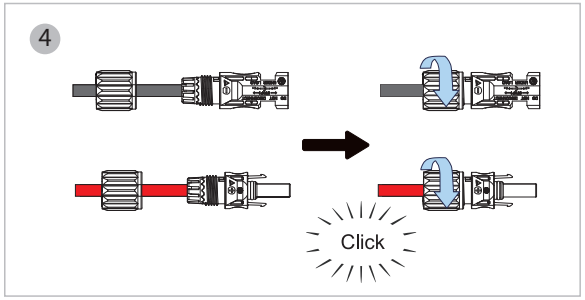
1. The total short-circuit current of a PV string must not exceed the inverter's max DC current.
2. The minimum impedance to earth of the PV module shall be greater than 19.33kΩ.
3. The PV string must not be connected to the earth/grounding conductor.
4. If the inverter is integrated with a PV switch, please make sure it is in the "OFF" position. Otherwise please use an external PV switch to cut off the PV connection during wiring and when necessary.
5. Use the PV plugs in the accessory box for PV connections. Damage caused by using an incompatible terminal will not be covered by the warranty.
6. BAT plugs are similar to PV plugs. Please make sure the connectors are correct before using them.

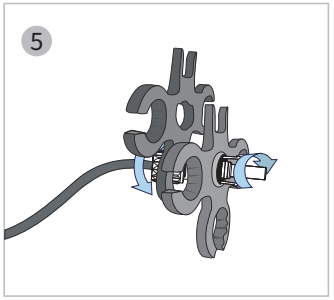


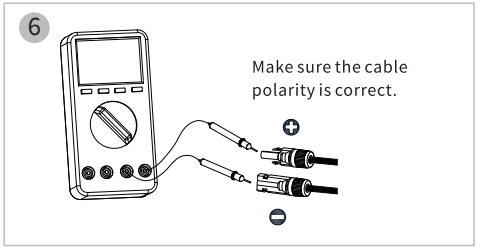

- Strip the insulation from each DC cable by 7-8 mm.
- The conductor cross-sectional area should be 2.5-4 mm².
- Assemble cables and crimp contacts using a PV terminal crimping tool.



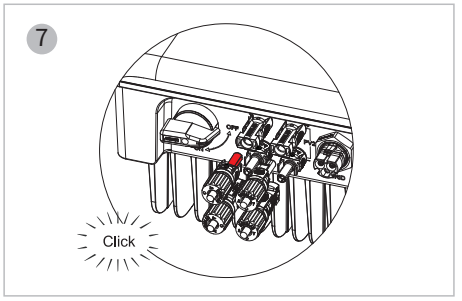






- Lead the cable through the cable gland, and insert the crimp contact into the insulator until it snaps into place.
- Tighten the cable gland and the insulator.
- Gently pull the cable backward to ensure a firm connection.



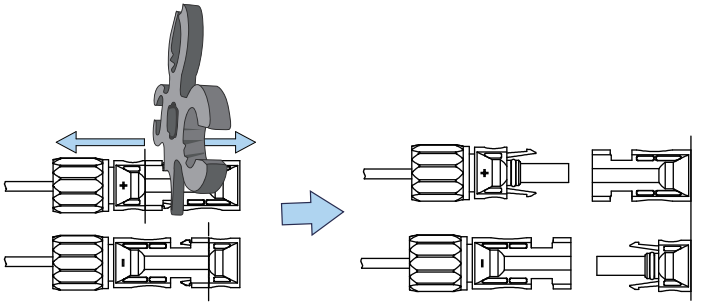

- Check the cable connection of the PV string for polarity correctness and ensure that the opencircuit voltage in any case does not exceed the inverter input limit of 550 V.




- Connect the PV connectors to the inverter. If connected correctly, they should make a "click" sound.

The polarity of the PV strings must not be connected in a reverse manner. Otherwise, the inverter could be damaged.

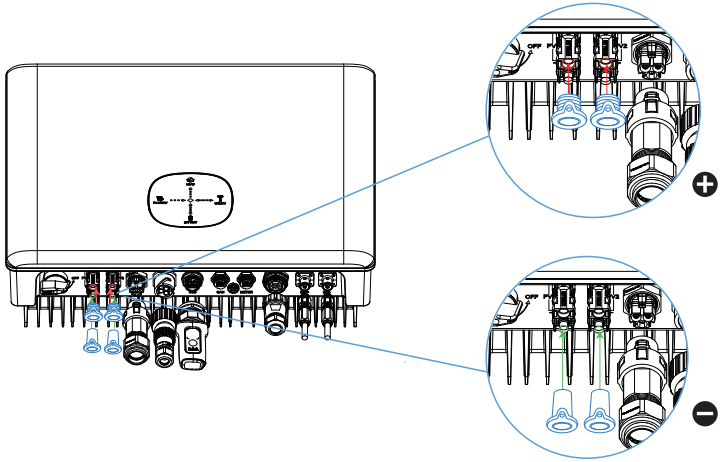
**Remove the PV plugs**



Warning: Please use professional tools to remove the PV plug.

**Notice:**

If the PV port is not used, install a dust cap to prevent rain and dust from entering the inverter.



## 2.4.3 Battery Wiring Connection

Please be careful of any electric shock or chemical hazards.
Make sure there is an external DC breaker (⩾180A) connected to the battery if there is not a built-in DC breaker.

Make sure that the breaker is off and battery nominal voltage meets the specification of the inverter before connecting battery to inverter. Make sure inverter is totally isolated from PV and AC power.

For lithium battery (pack), the capacity should be 50Ah or larger. Battery cable requirements are as follows.




| Part | Description | Value |
|---|---|---|
| A | Insulation outer diameter | 8.1-9.7 mm |
| B | Insulation parts | / |
| C | Cross-sectional area of conductor core | 25 mm² |
| D | Allowable current | 120A |

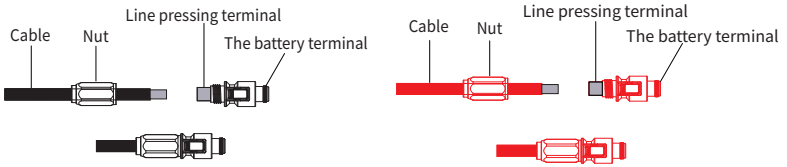
### Battery wiring connection process

Prepare battery cables and accessorie. Thread the battery power cord through the nut.

**Note:**
1. Please use accessories from accessory box.
2. Battery power cable cross-section area should be 25mm².
3. Strip cable coat, revealing 10mm length of metal core.
4. Use special crimping pliers to press the crimping terminal tightly.



**Step 1**

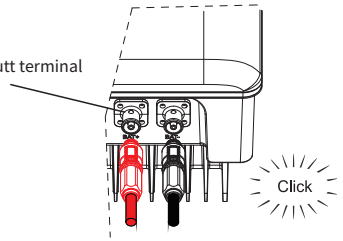



**Step 2**

Connect battery terminal onto inverter.

**Note:**

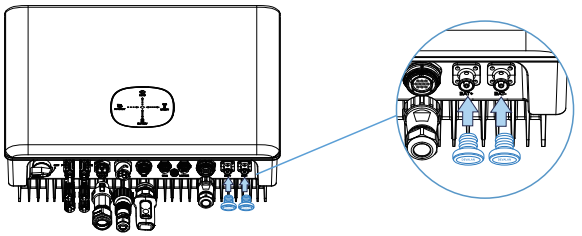
Please make sure polarity (+/-) of battery are not reversed.




* For the compatible lithium batteries (HINEN B5000) connection, please refer to the battery manual and the connection method of 2.6 batteries in this product description.

**Notice:**

If the battery is not used, please install the DC dust cap to prevent rain and dust from entering the inverter.



The battery terminals and the inverter battery port are designed to prevent reverse connection. Battery terminals of other brands do not match this function.




* Remove the terminal connections while holding down the black snap on the terminals.

## Battery Protection

**Battery charging and discharging are limited to protect the battery in the following cases:**

- Battery SOC is lower than 1-DOD (Depth of Discharge).
- The battery voltage is lower than the discharge voltage.
- Battery overheating protection is activated.
- Abnormal communication with the lithium battery.
- Lithium battery BMS limit is reached.

**When the current limit protection occurs:**

- Under on-grid mode, battery charging and discharging operations may be abnormal.
- Under off-grid mode, the inverter will not supply power to the backup terminal.

**Note:**

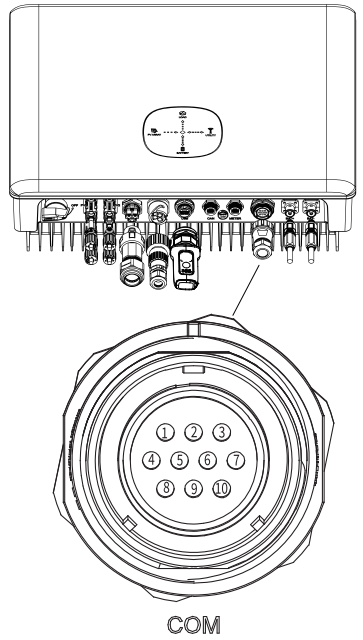
- Off-grid cut-off SOC is 20%. Batteries discharged to 20% under off-grid conditions cannot be further discharged. They must be charged to a level of 23%, at which point only charging is allowed. Once the battery SOC exceeds 25%, the batteries can be discharged again.

- On-grid cut-off SOC is 10%. In grid-connected conditions, when the battery is discharged to 10%, it must be charged back to 13%, at which point only charging is allowed. Once the battery SOC exceeds 15%, the batteries can be discharged again.

- Setting the battery DOD prevents the battery from being fully drained. Once the DOD set point is reached, the load will only be powered by the PV or grid. If the battery has received little or no charge for several days, it may continue to drain to maintain communication with the inverter. Batteries from different manufacturers have different behaviours, but if the SOC of the battery reaches a certain level, the inverter will charge the battery slightly to maintain the SOC. This protection mechanism prevents the battery SOC from dropping to 0%.



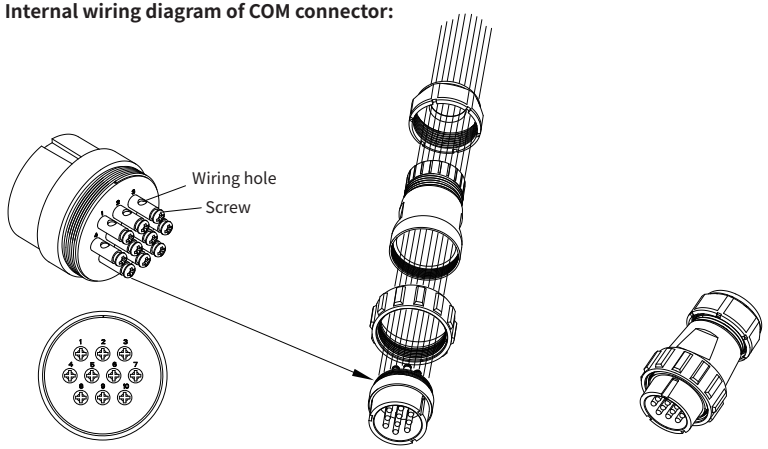
## 2.4.4 COM Connection Mode




① COM/DRM0
② REFGEN
③ DRM4/8
④ DRM3/7
⑤ DRM2/6
⑥ DRM1/5
⑦ EPO+
⑧ EPO-
⑨ RLY_+12V (Wet Contact +)
⑩ RLY(Wet Contact -)

1. Route the signal cable through the terminal protection cover, as shown in the figure.
2. Insert the signal cable into the wiring hole and tighten it with Phillips screwdriver.
3. Install and lock the parts of the connector according to the figure.

**Internal wiring diagram of COM connector:**



## 2.4.5 On-Grid & Back-up Connection

An external AC breaker is needed for on-grid connection to isolate the inverter from the utility grid when necessary.

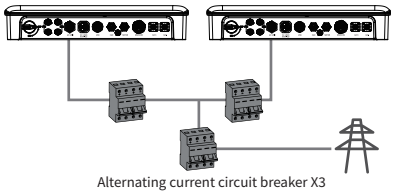
**The requirements for the on-grid AC breaker are shown below.**

| Inverter Type Number (kW) | AC Circuit Breaker Specifications |
|---|---|
| 3.6/5/6 | 25A/40A/40A |

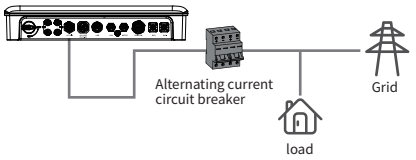
* For details of AC circuit breaker specifications for other inverter types, refer to section 5.4 System Wiring Diagrams.

**Note:** The absence of AC breaker will lead to inverter damage if an electrical short circuit happens on grid side.

1. Single inverters require separate AC circuit breakers.




2. On the AC side, an AC circuit breaker should be installed between the inverter and the grid before connecting the load.




### Requirements for AC Cable Connections to On-grid and Back-up Sides.

Before connecting the AC cables, ensure that the inverter is completely isolated from both DC and AC power.

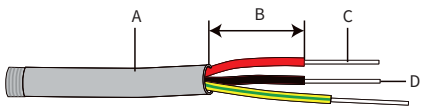
**Note:**

1. The N wire(Neutral wire) is black, the L wire(Live wire) is red, and the PE wire(Protecting Earthing wire) is yellow-green.
2. For AC cables, the PE cable should be longer than the N and L cables so that the protective earth conductor is the last to take the strain if the AC cable slips or is pulled out.

**Notice:** Testing to AS/NNZS 4777.2:2020 Section for multiple phase combinations has not been conducted. Therefore multiple phase combinations should not be used, or external devices should be used in accordance with the requirements of AS/NZS 4777.1.



Common AC cable specifications are as follows.

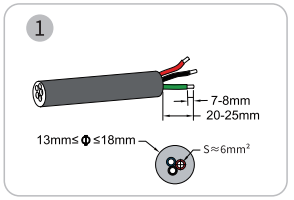



| | Description | Value |
|---|---|---|
| A | Outer diameter | >15mm |
| B | Cable length stripped | 20-25mm |
| C | The length of the conductor | 7-9mm |
| D | Conductor cross-sectional area | 5.26-8.37mm |

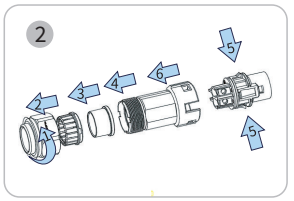
### 2.4.5.1 Grid Connection

**Notice :**

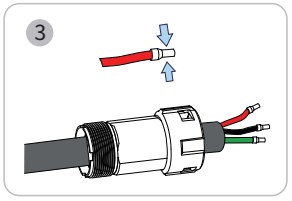
Please use the grid connector from the accessory box. Damage to the device due to the use of incompatible connector shall not be covered by the warranty.



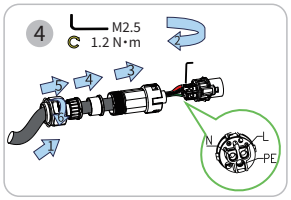

- Strip the cable sheath by 20-25 mm and the wire insulation by 7-8 mm.
- The cross-sectional area of the conductor is approximately 6 mm².




- Unscrew the grid connector counterclockwise, and disassemble the parts in sequence.




- Insert the cable conductor core into the terminal and crimp. Ensure that the cable sheath is not locked into the connector.
- Thread an appropriate length of AC cable through the waterproof terminal.




• Secure all cables to the corresponding terminals with a screwdriver at a torque of 2 N-m according to the markings on the connectors.

• Assemble the parts in order.




• Align the square opening on the grid terminal with the foot buckle on the inverter grid port and insert.

• The foot buckle entering the grid terminal and exposing the upper opening followed by a "click" means the connection is correct.

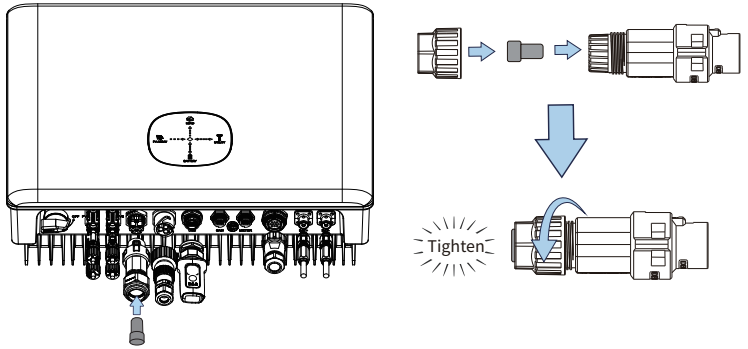
**Notice:**

• All electrical connections must be in accordance with local and national standards.

• Only with the permission of the local utility grid company, the inverter can be connected to the utility grid.

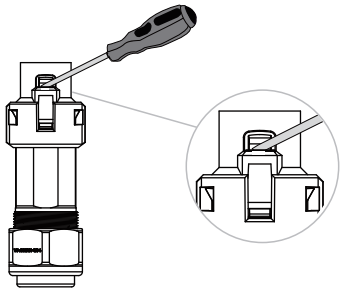
**Notice:**

If the on-grid port is not used, please install a dust plug for the grid plug to prevent rain and dust from entering the inverter.






**Remove the Grid plug**



• To remove the grid terminals use a tool to hold down the foot buckle on the inverter grid port so that the square openings on the grid terminals are free from the inverter.

**Warning:** Disconnect power from grid and equipment, and remove grid terminals by professional installer.

## 2.4.5.2 EPS Connection

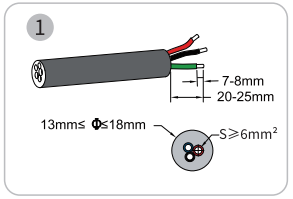
The inverter supports both on-grid and off-grid functions. It will transmit power through the on-grid port when the grid is on and through the back-up port when the grid is off.
A standard PV installation typically consists of connecting the inverter to both panels and batteries. When the system is not connected to the batteries, the manufacturer strongly advises that the backup function shall not be used. Any consequences resulting from non-compliance with the requirement are excluded from the manufacturer's warranty and liability.

**Notice :**

• Use the EPS connector provided in the accessory box. Damage caused by the use of an incompatible connector is not covered under the warranty.

• Ensure the EPS load power rating is within the EPS output power rating of the inverter to prevent an "overload" warning and potential shutdown.

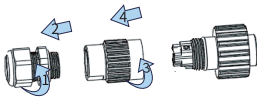
• For non-linear loads, ensure the surge power is within the EPS output power range of the inverter.




• Strip the cable sheath by 20-25 mm and the wire insulation by 7-8 mm.

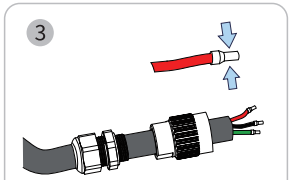
• The cross-sectional area of the conductor： ⩾6 mm².

2



• Unscrew the EPS connector counterclockwise, and disassemble the parts in sequence.

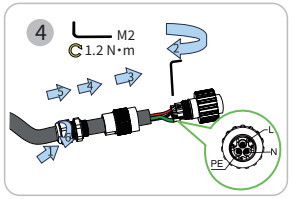
3



• Insert the cable conductor core into the terminal and crimp. Ensure that the cable sheath is not locked into the connector.

• Thread an appropriate length of AC cable through the waterproof terminal.

4




• Secure all cables to the corresponding terminals with a screwdriver at a torque of 2 N-m according to the markings on the connectors.

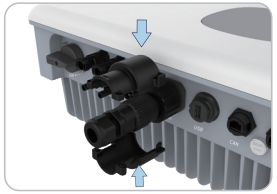
• Assemble the parts in order.

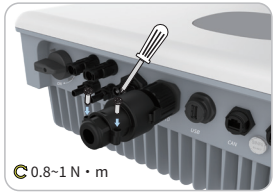
5



• Connect the EPS connector to the inverter and tighten it.

• After the AC Grid is installed, a protective cover must be added.



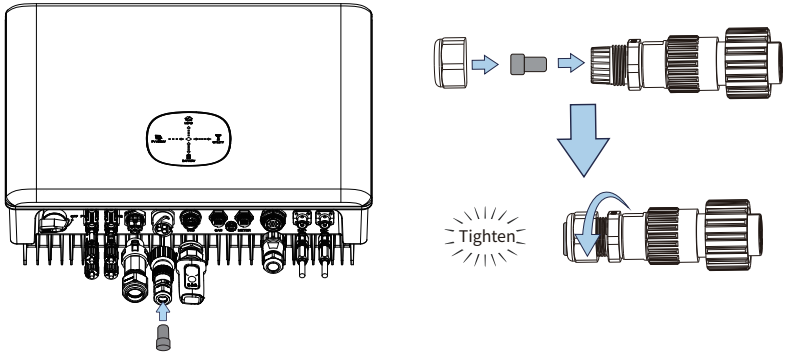




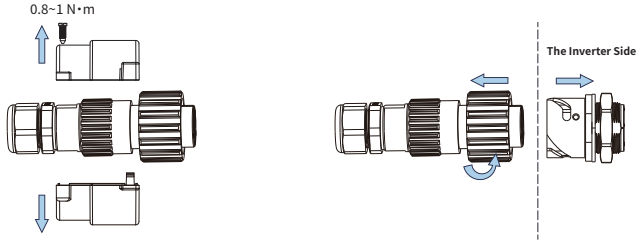



**Notice:**

If the back-up port is not used, please install a dust plug for the EPS plug to prevent rain and dust from entering the inverter.




**Remove the EPS plug**



## Declarations for The Back-up Function

The backup output of the hybrid inverters has overload capability. The inverter also has self-protection derating at high ambient temperatures.

1. For standard photovoltaic installations of the energy storage inverters, it is usually necessary to connect the inverter to photovoltaic panels and batteries. Any consequences resulting from non-compliance with this requirement are excluded from the manufacturer's warranty and liability.

2. In general, the off-grid switching time is less than 20ms (considering the minimum conditions of EPS). However, external factors may prevent the system from starting off-grid mode. Therefore, we recommend users to be fully informed and follow the instructions below:

- Do not use this function if the load requires a stable power supply for reliable operation.
- Do not connect loads that may exceed the maximum off-grid capacity.
- Avoid loads that may generate high starting current surges, such as high-power pumps.
- The battery current may be limited by factors including, but not limited to, temperature and weather conditions.

### Acceptable Loads

The back-up side of the 6K inverter can provide a continuous output of 6000VA for the load. The inverter also includes a self-protection mechanism that derates output at high ambient temperatures.

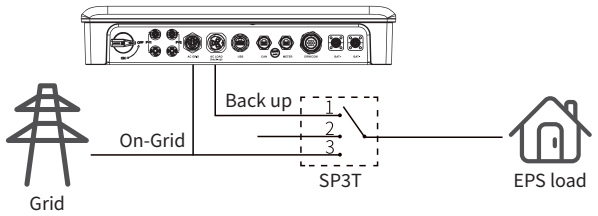
- Inductive Load: Maximum 2KVA for single inductive load, maximum 3.6KVA for total inductive load power.
- Capacitive Load: Maximum 3.6KVA for total power of capacitive loads (e.g. computers, switching power supplies, etc.).

(Do not connect any load with high inrush current at startup)

**Note:**

To facilitate maintenance, use an SP3T switch on both the off-grid and on-grid sides. After installing the SP3T switch, the load power supply mode can be changed by adjusting the circuit breaker switch. The options include maintaining the default state, grid power supply, and off-grid power supply.

1. The EPS load is powered by the back-up end.
2. The EPS load is isolated.
3. The EPS load is powered by the grid end.




**Note**

If the output of the backup end is abnormal, manually turn the dial to the on-grid position to ensure the back-up load operates normally.



## 2.4.6 CT (Current Transformer) & Smart Meter

Make sure the AC cable is totally isolated from AC power before connecting the CT.

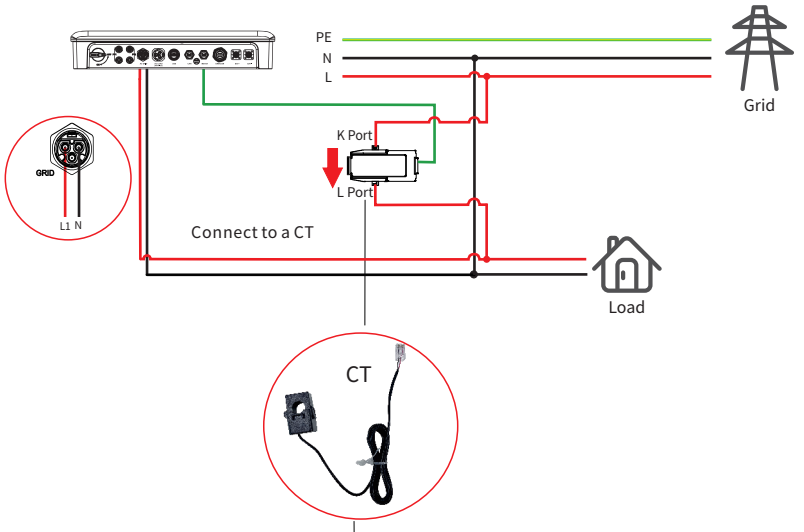
To control the flow of energy between the system and the grid, there are two current sensing schemes: one with only CT and the other with only the smart meter. Please choose which scheme to use according to the actual situation.
The CT (current transformer) in the product package must be installed when the inverter system is installed. It can be used to detect the direction and magnitude of the power grid current. Then through METER communication port indicate the running status of the inverter.

**Note:**

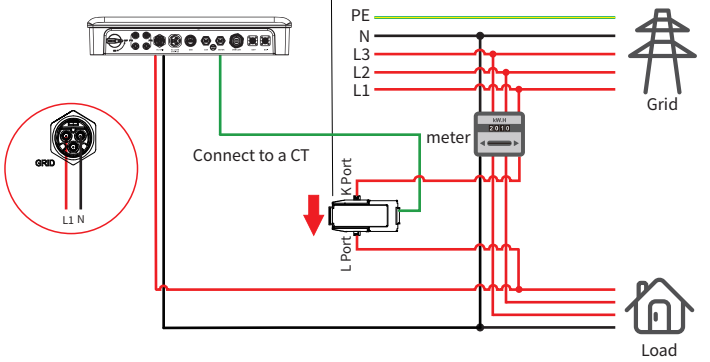
1. Please read the related instructions carefully when using CT.
2. One CT can only be used for one inverter.

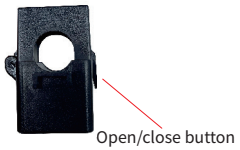
### CT connection diagram(Plan 1)

- For Single Phase Grid




- For Three Phase Grid






CT closed state



CT open state
(Line crossing port)



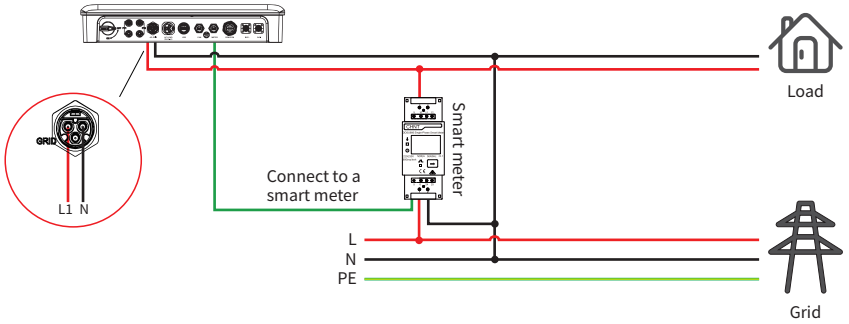
CT current direction
(Direction of arrow)

**Note:**

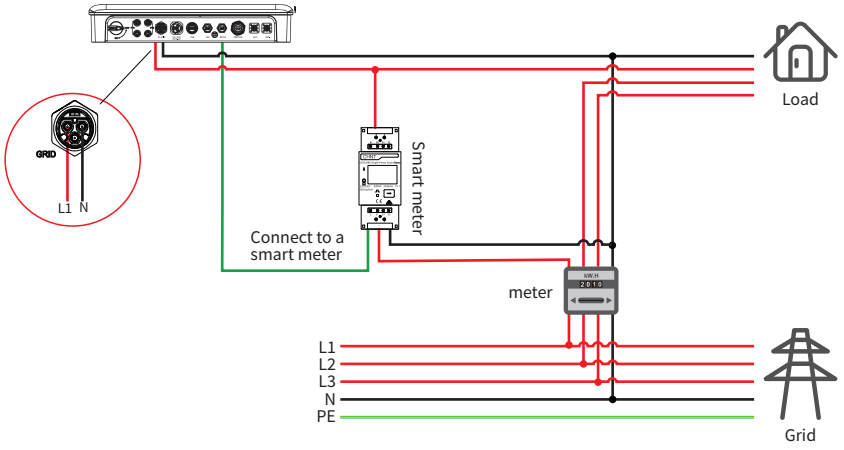
1. Please use the product package with 1 CT and the line length is 5 meters.
2. Read the CT manual carefully when using the CT.
3. The CT products in Plan 1 can be used independently.

## Smart Meter connection diagram(Plan 2)

・For Single Phase Grid




・For Three Phase Grid



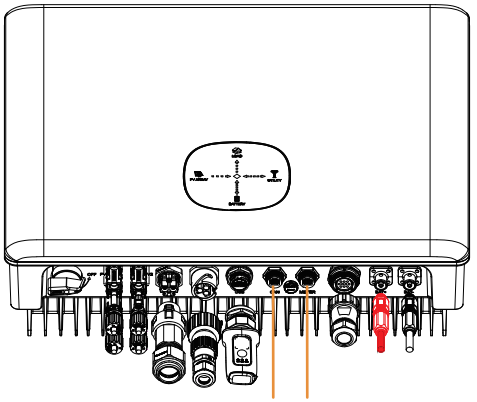

**Note:**

When using this solution, please follow the product usage rules and smart meter usage instructions.



## The inverter BMS Port/Smart Meter/CT Detailed pin function

| Pin | Color | CAN(BMS) | METER (Smart Meter) | CT |
|---|---|---|---|---|
| 1 | Orange and white | WAKE_UP | 485_B | NC |
| 2 | Orange | GND | NC | IGRID_LOADN |
| 3 | Green and white | NC | ATE 485_B | NC |
| 4 | Blue | CANH | NC | NC |
| 5 | Blue and white | CANL | 485_A | NC |
| 6 | Green | NC | ATE 485_A | NC |
| 7 | Brown and white | NC | NC | NC |
| 8 | Brown | NC | NC | IGRID_LOADP |



The CAN port connects to the BMS




The METER port connects to a smart meter or current transformer.

**Please refer to the table above when reading the following:**

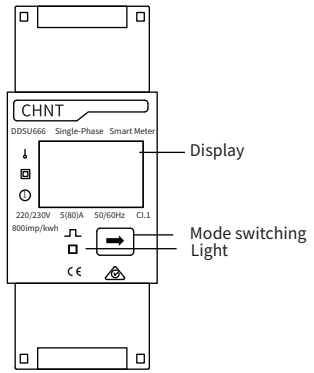
1. Pins with different serial numbers of the crystal head correspond to lines of different colors for connection,for example: Pin 1 = orange -white, Pin 5 = blue-white, Pin 8 = brown.

2. When the crystal head is connected to different devices, the signals connected to each foot are different due to different communication signal formats. Take CT (current transformer) as an example: Pin 1 = orange-white =NC(NC represents Not Connected), Pin 2 = orange =IGRID_LOADN(represents a signal), Pin 3 = green-white =NC, Pin 4 = blue =NC, Pin 5 = blue-white =NC, Pin 8 = brown =IGRID_LOADP (represents a signal).

## 2.4.7 Smart Meter Use

| Symbol | Description |
|---|---|
| V | Indicates that the LCD displays voltage |
| A | Indicates that the LCD displays the current current |
| W | Indicates that the LCD displays active power |
| Var | Indicates that LCD display data is reactive power |
| Hz | Indicates that the LCD display data is frequency |

Display (select) :



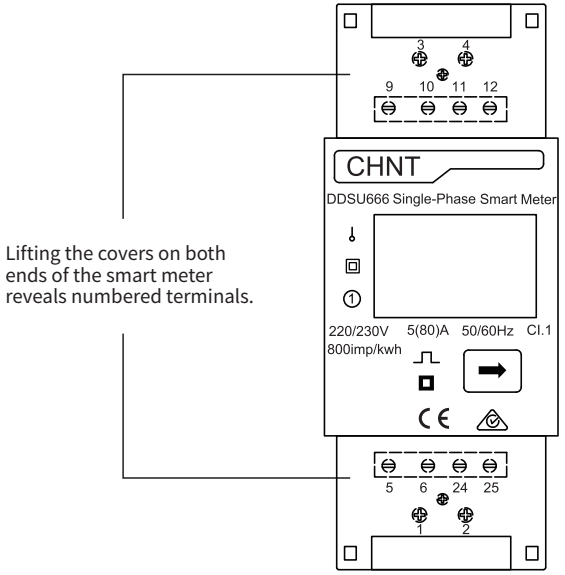

When communication connects, the shielded copper network twisted pair wire should be used, the wire diameter is not lower than the copper network 0.5mm$^2$. In the wiring, the communication line should be far away from strong electric field like strong cable. Maximum transmission distance is 1200m.

When the smart meter is in the normal working state (load state), the positive pulse indicator lights should flicker. If the indicator is not blinking or on for a long time, check whether the smart meter is connected correctly.

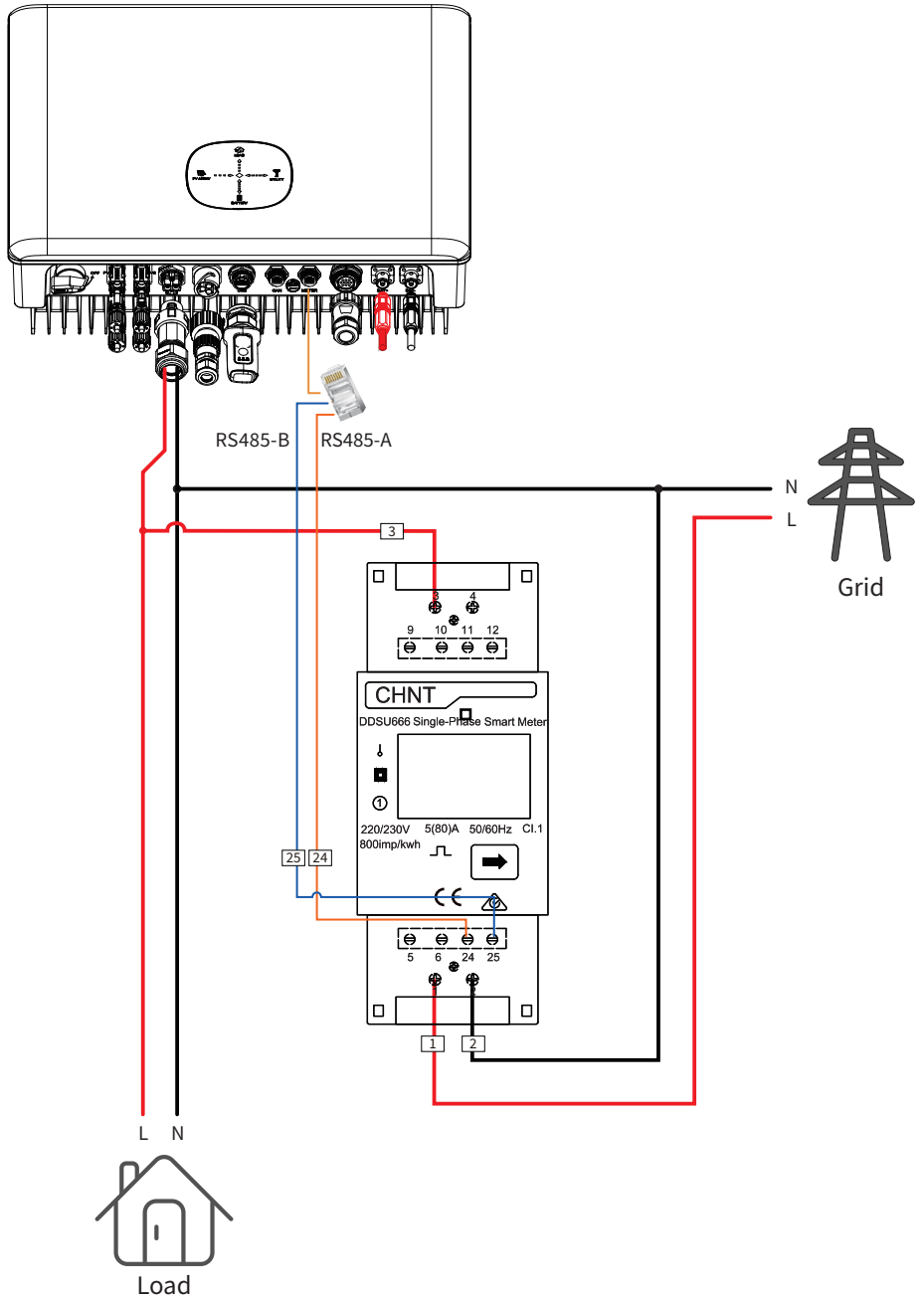
**Note:** The [Chint] DDSU666 smart meter is recommended for use with this product. Carefully read all relevant instructions when using the smart meter.

**Wiring method of smart meter:**

1. Connect port 24 to RS485-A and port 25 to RS485-B.
2. Connect port 1&3 to L of the AC, and port 2 to N of the AC.




**Wiring diagram of smart meter:**



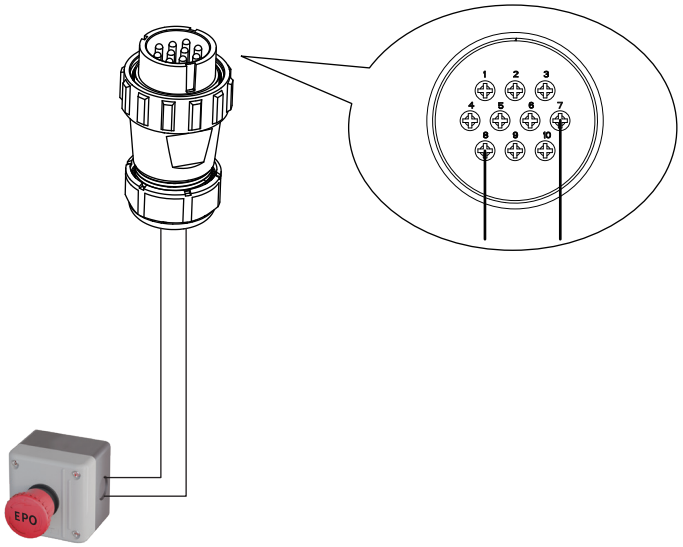

**Note:** Wiring must follow the above wiring rules.Otherwise, the inverter would run abnormally.

## 2.5 Earth Fault Connection Alarm

The inverter complies with ICE 62109-2 13.9. In the event of an inverter ground connection fault, the inverter's fault indicator will light up. For easier maintenance, please install the inverter at eye level.

## 2.6 EPO Connection

Emergency Power Off (EPO) switch is used to maximise safety and minimise damage by quickly disconnecting power to equipment or systems in the event of an emergency or hazardous event.
The hybrid inverter can be connected to the EPO switch. When the EPO switch is activated, the inverter will shut down all power sources, including the grid and battery side, and the EPS function will not work.
The EPO connection procedure is described below.




* Refer to 2.4.4 for the installation method of the wires in the COM terminal.
* EPO switch is an optional accessory for the product. Please contact HINEN if required.

## 2.7 Battery Connection Mode

This inverter supports connecting lithium battery system or connecting lead-acid battery system. Confirm the battery system type clearly before connecting. If you select the wrong system, the inverter system may not work normally.



## 2.7.1 Lithium Battery System Connection

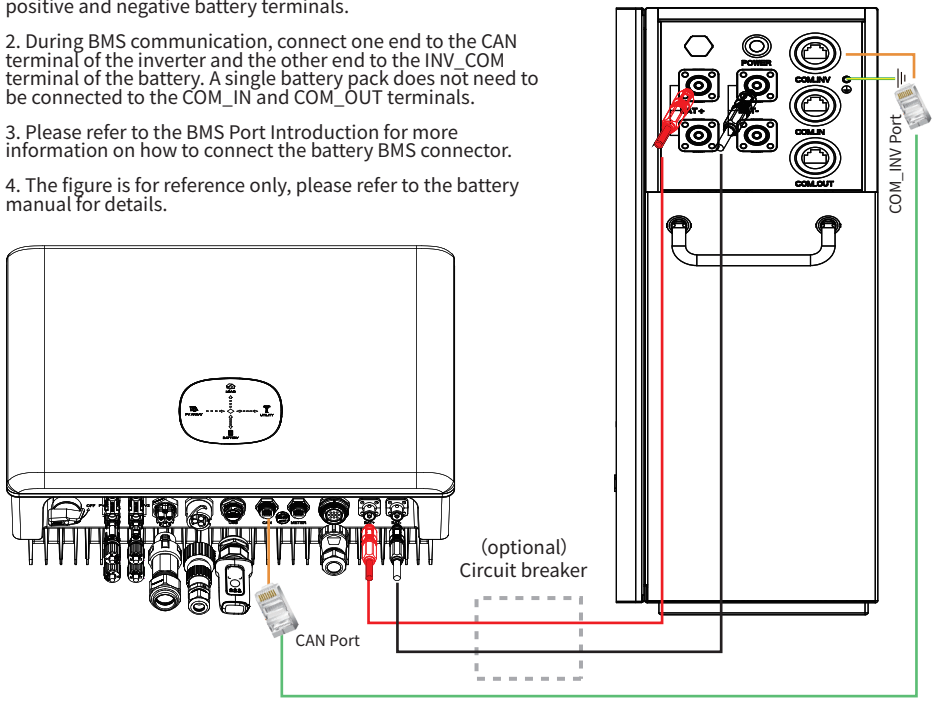
### 2.7.1.1 Single Battery Connection

1. Please refer to Section 2.4.3 for the wiring installation of the positive and negative battery terminals.

2. During BMS communication, connect one end to the CAN terminal of the inverter and the other end to the INV_COM terminal of the battery. A single battery pack does not need to be connected to the COM_IN and COM_OUT terminals.

3. Please refer to the BMS Port Introduction for more information on how to connect the battery BMS connector.

4. The figure is for reference only, please refer to the battery manual for details.



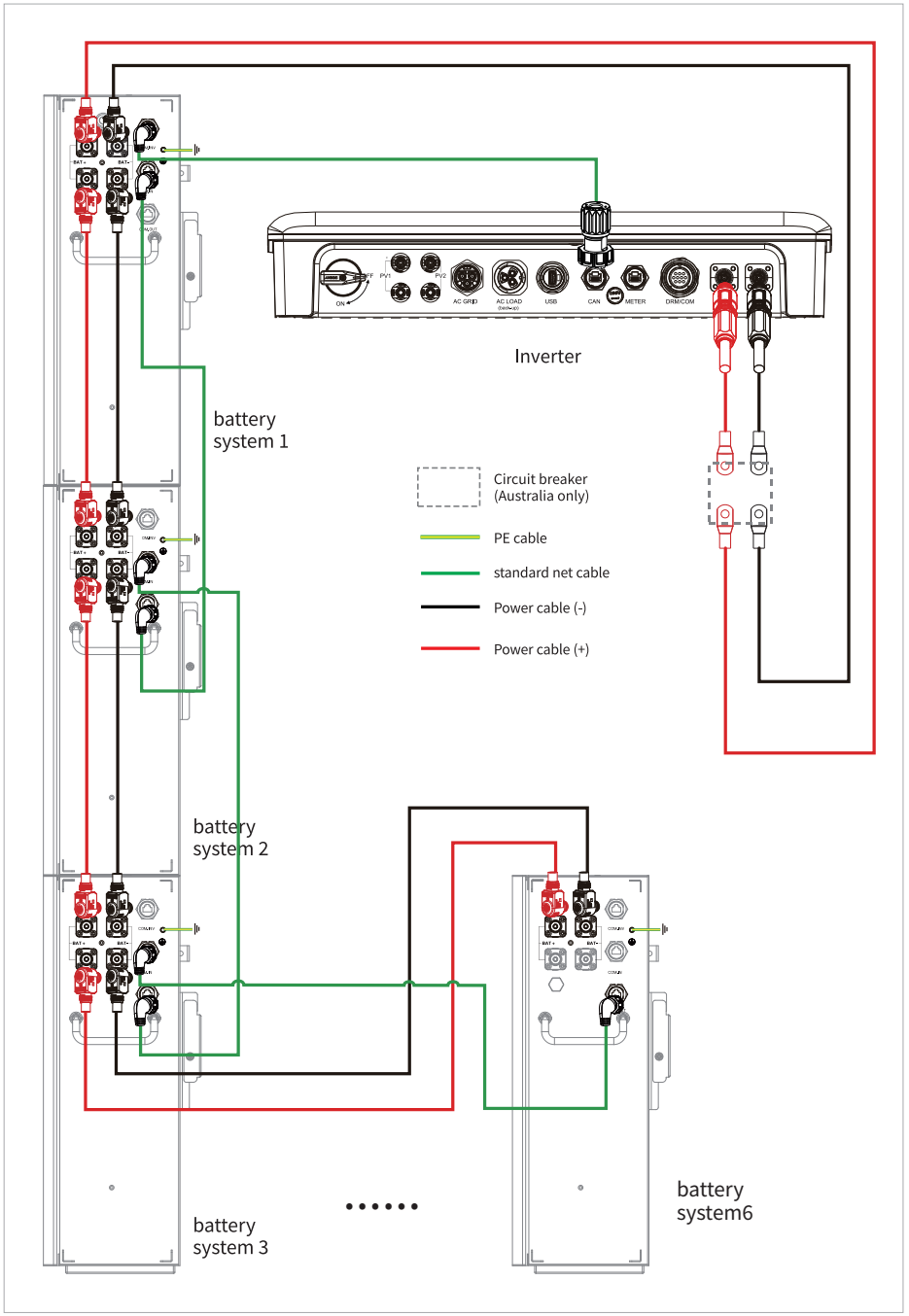

### 2.7.1.2 Multiple Battery Cables Connection

1. When multiple batteries are connected, BMS communication only needs to be connected to the master battery.

2. When the master battery is connected to the multistage slave battery, the COM_OUT of the upper level is connected to the COM_IN of the lower level, and the COM_OUT of the last level is connected to the master COM_IN.

3. The communication cables of the primary and secondary devices are provided by the battery manufacturer.

4. The figure is for reference only, please refer to the battery manual for details.




**Notice:** All non-current carrying metal parts and device enclosures in the energy storage system should be grounded.

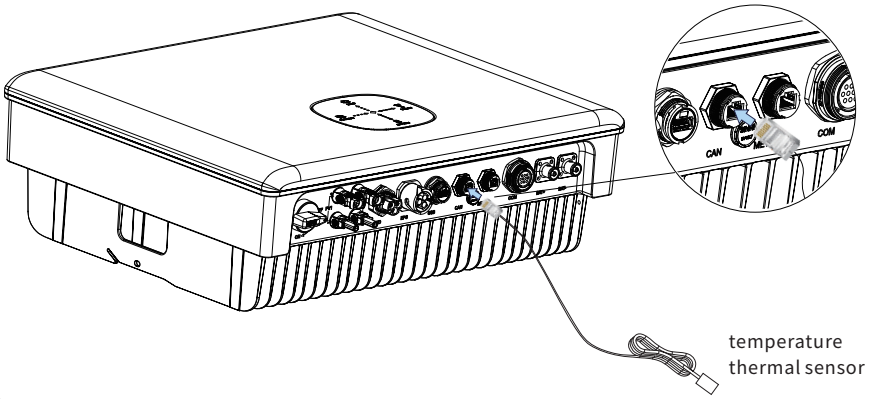


## 2.7.2 Lead-acid Battery System Connection

1. Please refer to Section 2.4.3 for the wiring installation of the positive and negative battery terminals.

2. Use the professional temperature thermal sensor of the lead-acid battery to check the ambienttemperature of the lead-acid battery to ensure safety.

3. Please refer to the BMS Port Introduction for more information on how to connect the battery BMS connector.




**Notice:**

1. If you are using a lithium battery, it is not necessary to install the temperature thermal sensor.

2. The temperature thermal sensor should be connected around the lead-acid battery, preferably affixed to the lead-acid battery.

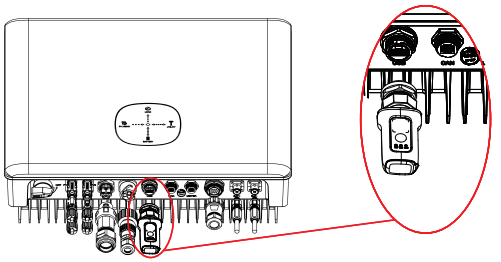
3. The cable is approximately 2 metres long, so be aware of the distance between the battery and the inverter.

**Warning:**

Lead-acid batteries need to be used in a well-ventilated room to prevent the risk of explosion from hydrogen sniping.

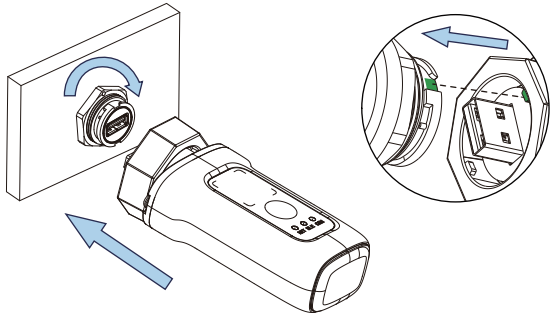
## 2.8 WIFI Module Connection

The WIFI communication function is only applied to WIFI Module.



## 2.8.1 Logger Installation

• Assemble logger to the inverter communication interface as shown in the diagram.



## 2.8.2 Wifi Logger Status

### Check the indicator lights

| Light | Meaning | Status description (All indicator lights are single green lights.) |
|---|---|---|
| ● NET | Network Status | 1. Light off: Failed to connect to the router.<br>2. Light flashing (on 1s/off 1s): Successfully connected tothe router.<br>3. Light always on: Successfully connected to the server. |
| ● BLE | Bluetooth status | 1. Light off: Bluetooth is off.<br>2. Light flashing (on 1s/off 1s): Bluetooth is connecting.<br>3. Light always on: Bluetooth connection is successful. |
| ● COM | Communica-tion status with inverter | 1. Light off: Communication with the inverter failed.<br>2. Light always on: Communication with the inverter is successful. |

### When the router is connected to the network normally, the wifi logger operates normally:

| | |
|---|---|
| Wifi logger powering on | The NET, BLE, and COM indicators will illuminate simultaneously. Subsequently, the three indicators will light up in sequence and will continue to flash repeatedly. |
| Waiting for network configuration | The BLE indicator flashes and the COM indicator is always on. |
| Normal operation | 1. Successfully connected to the server: NET light is always on.<br>2. Successfully connected to the inverter: COM light is always on. |
| Wifi logger/ Inverter upgrade | The NET, BLE, and COM lights flash at the same time (on for 1s/off for 1s). |



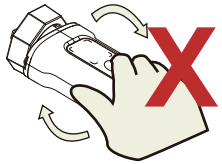
## 2.8.3 Abnormal State Troubleshooting

In the event that the data on the platform appears to be irregular during the operation of the logger, it is advisable to refer to the table provided below and perform basic troubleshooting based on the status of the indicators. Should the issue persist or if the status of the indicators is not listed in the table, please reach out to the aftersales center for further assistance.

(**Note:** Refer to the table below for troubleshooting, which should be conducted at least 2 minutes after the power-on process.)

| ● NET | ● BLE | ● COM | Fault Description | Cause | Solution |
|---|---|---|---|---|---|
| Any state | Any state | OFF | Communicate with inverter is abnormally. | 1. The connection between the logger and the inverter is loose or abnormal.<br>2. The communication rate between the logger and the inverter is inconsistent. | 1. Check whether the connection with the inverter is good. Remove the logger and reinstall it.<br>2. Press the Reset button to restart the logger. |
| OFF | Any state | ON | The connection with the router is abnormal. | 1. The logger has no network.<br>2. The router WiFi signal is weak. | 1. Check if the wireless network is configured.<br>2. Increase the router WiFi signal strength. |
| Flash | Any state | ON | The connection with the router is normal, but the connection with the remote server is abnormal. | 1. The router is not connected to the Internet.<br>2. The wifi logger credentials are abnormal.<br>3. The network is restricted and the server cannot be connected. | 1. Check if the router can access the Internet.<br>2. Check the settings of the router to see if the connection is restricted.<br>3. Contact our customer service. |
| OFF | OFF | OFF | The power supply is abnormal. | 1. The connection between the logger and the inverter is loose or abnormal.<br>2. The inverter power is insufficient.<br>3. The logger is abnormal. | 1. Check whether the connection with the inverter is good. Remove the logger and reinstall it.<br>2. Check the inverter output power.<br>3. Contact our customer service. |

**Warning:**
Please do not hold the logger body to rotate while installing or removinng.



# 03 Commissioning

## 3.1 Inspection Before Commissioning

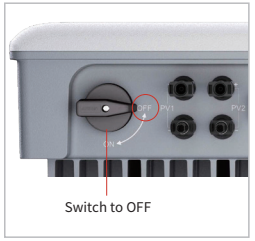
### 3.1.1 Connection Check

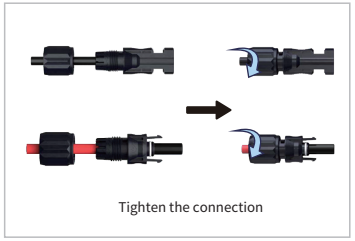
#### PV Side

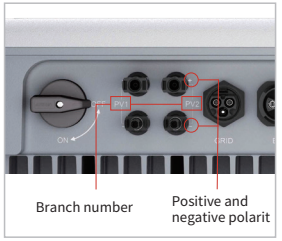
1. Before checking, ensure that the DC switch and the breaker of the combiner box on the AC side are disconnected to prevent electric shock.

2. The DC cables need to be crimped into MC4 terminals in order to connect with the PV+ or PV- terminals of the inverter. The connection should be tightened tightly to ensure good contact of the terminals and prevent water from entering.

3. When wiring the DC side, pay close attention to the positive and negative polarity of the cables and the connection sequence of the components. These correspond to the numbers on the branch terminals at the lower end of the inverter. Avoid cross-wiring or reversing polarity.



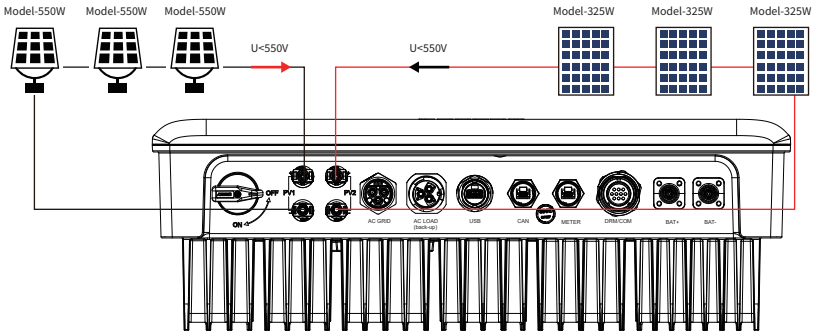




**Risk Of Weak Wiring**










#### Photovoltaic Module Connection Requirements

1. Modules with consistent photovoltaic characteristics should be used for connection under the same MPPT.

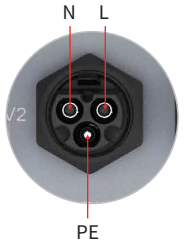
2. Ensure the number of photovoltaic modules connected under the same MPPT is consistent; the number of modules connected to different MPPTs cannot exceed one.

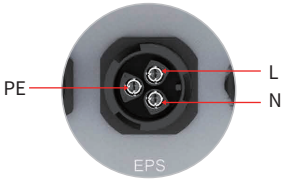
3. The maximum open circuit voltage of each string cannot exceed 950VDC under any circumstances.

#### AC Side

1. Refer to the terminal definition markings on the AC connection terminal. When connecting, ensure the correct positioning of the L, N, and PE cables to avoid incorrect or missing connections. Tighten the terminal screws securely to prevent any looseness.

2. Ensure the AC plug latch is firmly locked when inserted into the inverter.






#### Battery Side

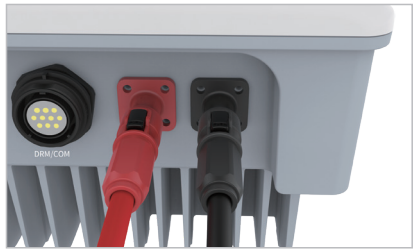
1. Distinguish the positive and negative poles of the battery cable and connect them accordingly.

2. Ensure that the waterproof cover is tightly pressed when the battery terminals are crimped.

3. Ensure that the battery terminals are connected tightly when inserted into the inverter. A click can be heard when properly connected.



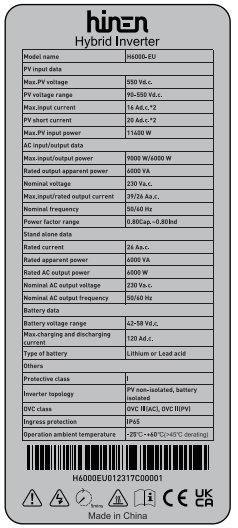




## 3.1.2 Electrical Inspection

Observe the lable of the single-phase inverter. When wiring, electrical inspection should be carried out to ensure that the AC and DC parameters are within the range of the label to avoid damage to the inverter due to external wiring problems.

* The pictures shown here are for reference only. The actual products and labels are subject to delivery.

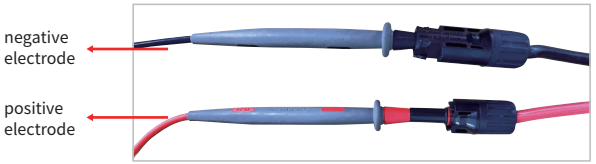



Nameplate

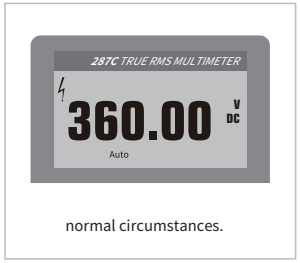
### PV Side

**Open circuit voltage and polarity**

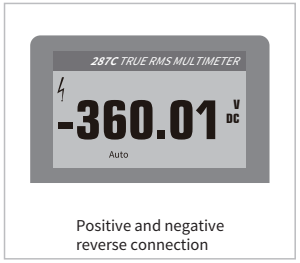
・Turn the multimeter to the DC position, connect the red test lead (positive pole) to the positive pole of the string, and connect the black test lead (negative pole) to the negative pole of the string, and the displayed voltage is the current open circuit voltage.




・In the following figure, the multimeter displays the current open circuit voltage of 360V. The red test lead is connected to the positive pole, and the black test lead is connected to the negative pole, indicating correct polarity. If the positive and negative poles are reversed, the multimeter will display -360V. Do not turn on the inverter in this situation. Contact the installation team to rectify the cables.




normal circumstances.




Positive and negative reverse connection



### Checking Method for String Grounding

・Turn the multimeter to the DC voltage position. Put the red test lead on the measured cable and the black test lead on the ground terminal. Under normal circumstances, the voltage to ground is half of the open circuit voltage, and the voltage gradually decreases during measurement.

・If the voltage to ground is equal to zero or the open circuit voltage, the branch cable is grounded, and the installation team must be ordered to make rectification.

・Grid connection is allowed only after rectification is completed and no grounding condition is detected. It is strictly forbidden to connect to the grid before resolving the grounding issue.



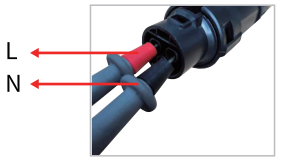

Normal string display

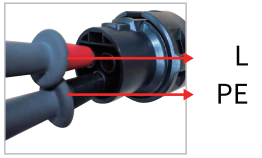



Abnormal string display

### AC Side

・First, adjust the multimeter to the AC voltage range. Connect the red test lead to the L line of the grid terminal and the black test lead to the N line of the grid terminal, the voltage displayed by the multimeter is the grid voltage. If the measured voltage is not within the normal voltage range, please check and correct the wiring and measure again.




・As shown in the figure below, when the wiring is correct, the measured voltages are 230.25V and 230.38V; when the L and N wires are reversed, the measured voltages are 230.13V and 1.26V.




Normal circumstances



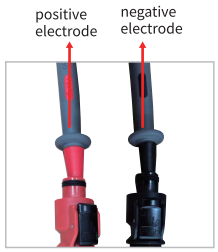

L, N reversed

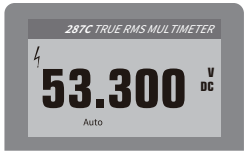
## Battery Side

**Open circuit voltage and polarity**

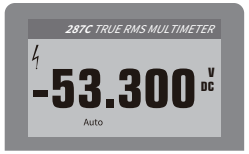
・Turn the multimeter to the DC position, connect the red test lead (positive pole) to the red terminal of the battery, and connect the black test lead (negative pole) to the black terminal of the battery, and the displayed voltage is the battery voltage.

・In the picture on the right, the multimeter shows that the current battery voltage is 53.3V. The red test lead is connected to the positive pole, and the black test lead is connected to the negative pole, indicating correct polarity. If the positive and negative poles are reversed, the multimeter will display -53.3V. Do not connect the battery in this case. Contact the installation team to rectify the cable.




normal circumstances




Positive and negative reverse connection



# 3.2 Powering on the System

## 3.2.1 Boot Steps

**Caution:**

・ Before turning on the AC switch between the inverter and the power grid, use a multimeter set to the AC position to check whetehr the AC voltage is within the specified range.

・ The battery DC breaker must be turned on before turning on the Solar DC switch and the Grid AC switch.

・ When installing the power cable, please note that the red cable is positive (+) and the black cable is negative (-).

**Ensure that the electrical connections are normal before performing the power-on operation.**

1. Turn on the DC breaker between the battery and the inverter.
2. Turn on the DC switch between the PV string and the inverter (if present).
3. Set the "PV SWITCH" of the inverter to "ON".
4. Turn on the external AC circuit breaker. The inverter lamp board will perform a self-check.
5. After the self-inspection is completed, the PV and GRID flowing LED lights will be always on, and the intermediate status lights will be on and waiting for grid connection.
6. When the battery is connected and turned on, the BAT flowing LED light of the inverter is always on and stationary. (If multiple batteries are in parallel, only the master battery switch needs to be turned on, and the remaining slave batteries will wake up automatically.)
7. Send a power-on command through the APP. (The first installation will start by default.)
8. After passing the 2-3 minute self-inspection, the system will connect to the grid. The LOAD flow lights will light up, and all the flow lights will change according to the actual power.

・Execute the above steps, if there is no fault in the system, the inverter starts up successfully.

① 

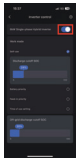
"PV SWITCH" set to "ON"

② 


Connect to the grid

③ 

Battery on

④ 

APP input boot command

⑤ 

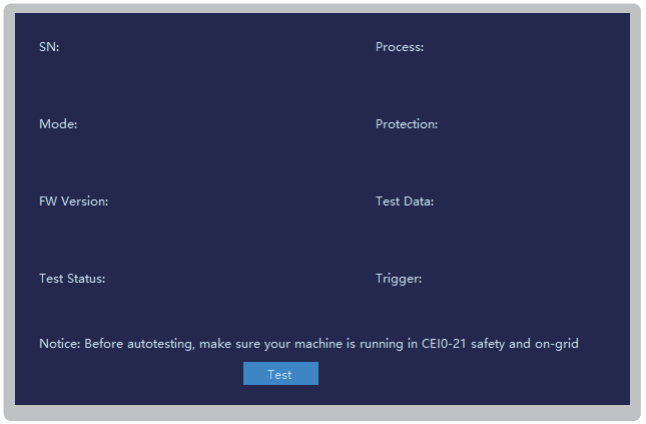
Operating status

## 3.2.2 Auto Test

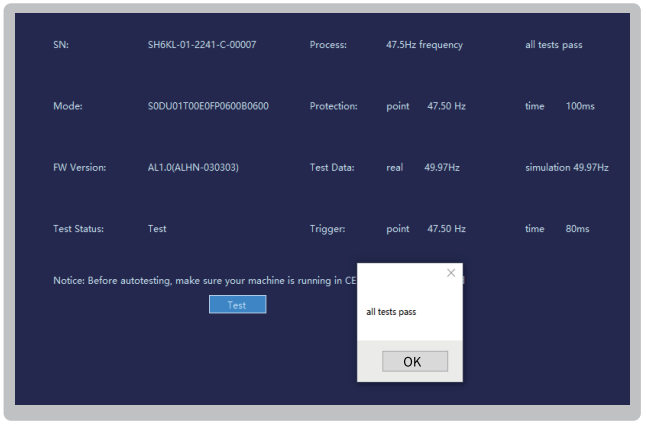
• Any user can activate the self-test function, but if the inverter needs to be checked, follow the operator's instructions to perform an automatic test.

**Auto Test Procedures**

1. Click "Auto Test", enter the auto test page, click "Test", and it will start testing.




2. The auto test takes about 6-7 minutes. After the auto test is completed, a prompt of "all tests pass" will pop up. Click "OK" to automatically generate an AutoTest Report.




| Auto-test | | | | |
|---|---|---|---|---|
| Software designation / version: Refer to 4.7 version information of the App chapter. | | | | |
| Accuracy | | Threshold (V or Hz) | Disconnec-tion time(ms) | Tolerance |
| Overvoltage | Reading | 264.5V | 200 | The voltage thresholds deviation is within 1%. |
| | Default | 264.5V | 180 | |
| Undervoltage | Reading | 34.5V | 200 | The time deviation is within 3%±20 ms. |
| | Default | 34.2V | 180 | |
| Overfrequency | Reading | 51.5HZ | 100 | The frequency thresholds deviation is within±20 mHz. |
| | Default | 51.49HZ | 80 | |
| Underfrequency | Reading | 47.5HZ | 100 | The time deviation is within 3%±20 ms. |
| | Default | 47.5HZ | 80 | |
| Supplement: The slew rate of the threshold values, either increase or decrease, are ⩽0.05 Hz/s for frequency and ⩽0.05 Vn/s for voltage starting from the nominal threshold value. | | | | |

## 3.3 Shutting Down the System

**Caution:** Do not turn off the DC breaker under load.

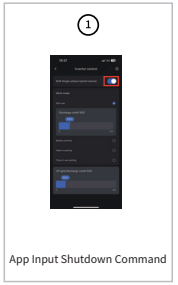
**If maintenance or inspection is required, please follow these steps to shut down the system.**

Shutdown steps:

1. Send a shutdown command through the logger or near-end APP software to shut down the inverter.
2. Disconnect the PV circuit breaker and set the "PV SWITCH" to the "OFF" position.
3. Turn off the circuit breaker between the inverter and the grid.
4. Press and hold the POWER BUTTON on the battery that is connected to the inverter for 3 seconds to turn off the battery.
5. Switch off the battery circuit breaker.
6. Check the inverter's operating status.
7. Wait until all LEDs and OLEDs are off to ensure the inverter has shut down completely.

### Precautions

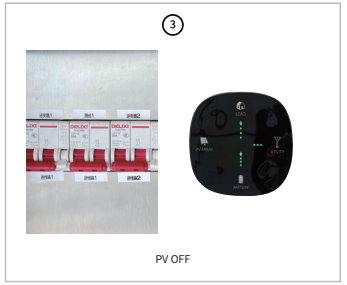
- When powering off the system, follow the operating instructions and safety regulations.
- After the inverter is shut down, residual power and heat may remain in the chassis, which can cause electric shock or burns. Ensure the inverter is fully discharged or wait at least 5 minutes before operating the inverter again.



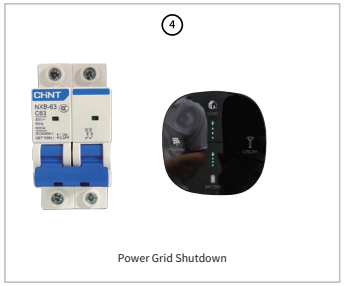
App Input Shutdown Command



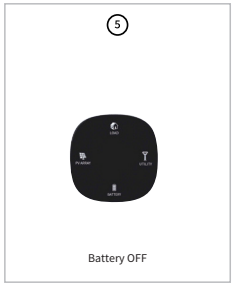
Switch OFF



PV OFF



Power Grid Shutdown



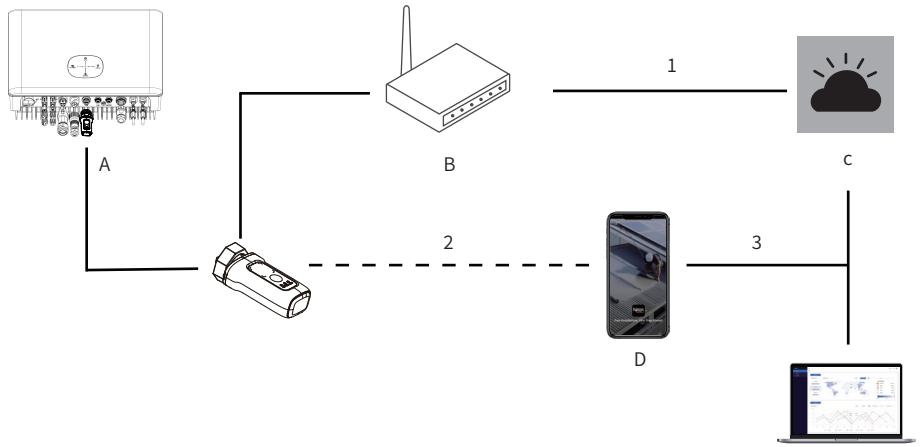
Battery OFF



# 04 APP

## 4.1 Internet Connection

With the WIFI module installed, view corresponding information through Hinen app or Solarman app.




A: Inverter

B: Router/Switch

C: Hinen server

D: Hinen APP

E: Hinen WEB

1: Internet

2: Local access

3: Remote

## 4.2 Downloading and Login

### Step 1: Downloading the App

Make sure that the mobile phone meets the following requirements:
- Mobile phone operating system: Android 8.0 or later, iOS 14.0 or later.
- The mobile phone can access the Internet.
- The mobile phone supports WLAN or Bluetooth.

**Method 1:** Search Hinen Solar in Google Play (Android) or App Store (iOS) to download and install the app.

**Method 2:** Scan the QR code below to download and install the app.

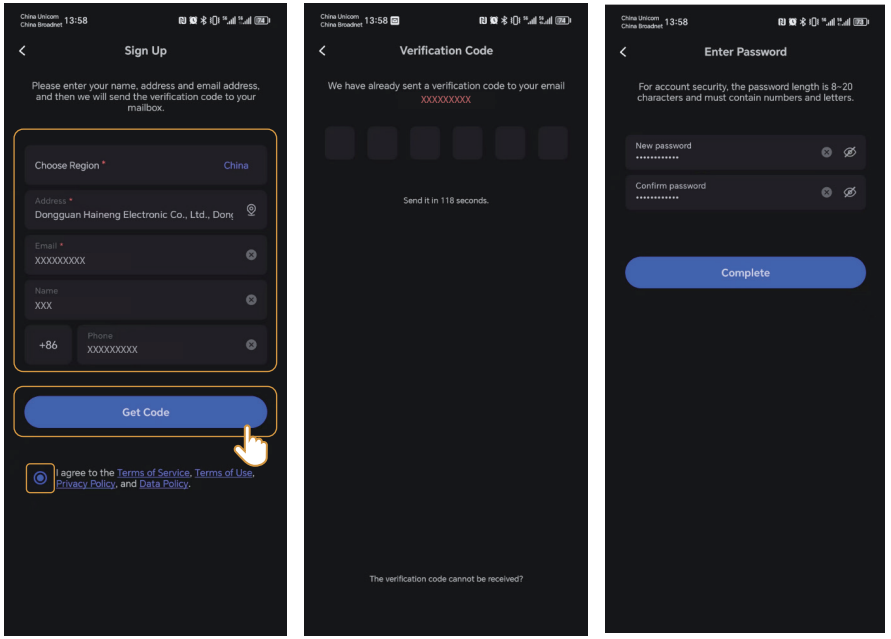
Hinen Install APP Download QR code

Hinen Solar APP Download QR code

**Tips:**
This document takes version 1.0.5 as an example to introduce relevant operations. The screenshots given in this document are for illustration purposes only. Interfaces in different periods may differ. The actual interface display shall prevail.

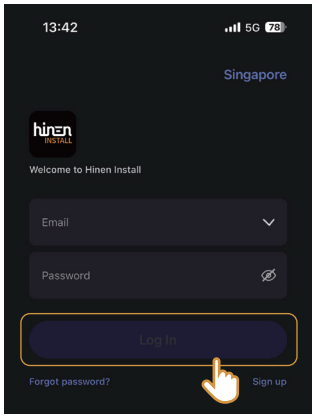
### Step 2: Sign up

Please select your region, enter your address, email address, name and phone number, click "I agree to the Terms of Service, Terms of Use, Privacy Policy and Data Policy" and then click "Get Code". Enter the verification code you have received. After the code is verified successfully, please enter your password to complete the registration.

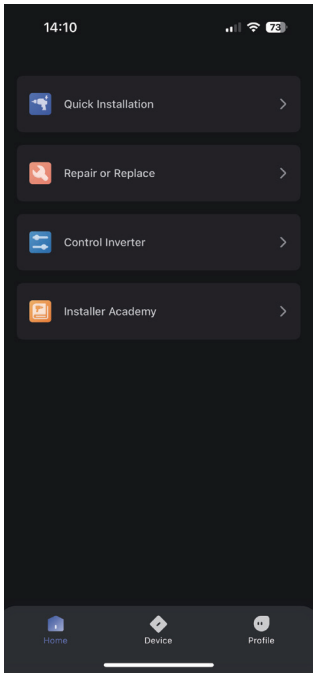



### Step 3: Log in

After registration, enter your account and password, and tap login.



After login, you can go to the home page, which mainly includes "Quick Installation", "Repair and Replace", " Control Inverter", and "Installer Academy".




Scan the following QR code to download and install the Solarman App according to the prompt information.

SOLARMAN Smart

SOLARMAN Business

SOLARMAN Manual

https://www.hinen.com/pages/smart-energy-management-system

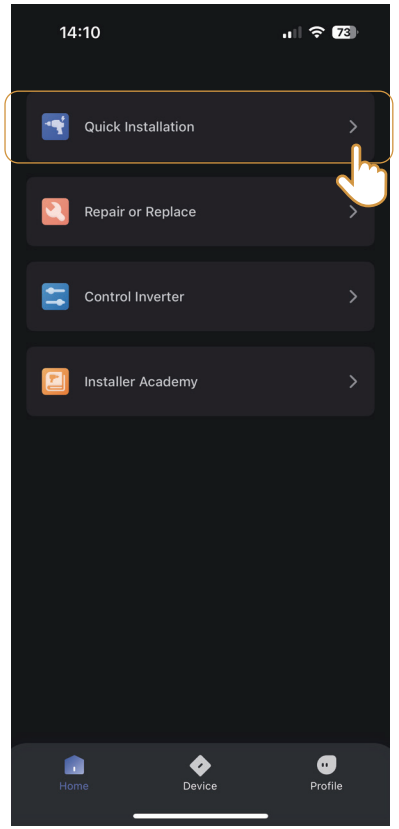


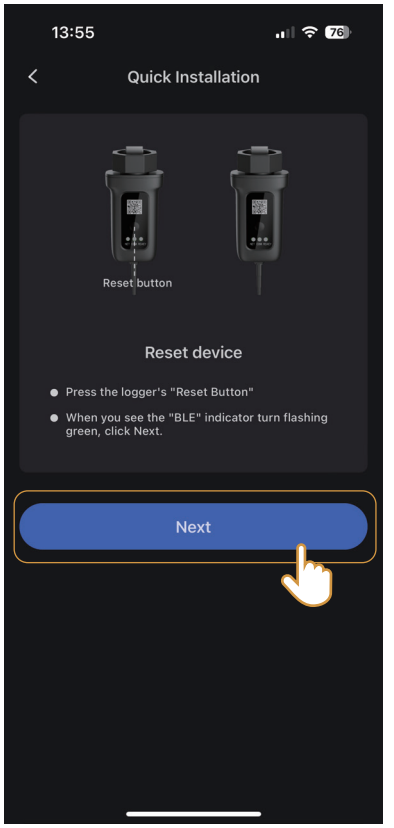
## 4.3 Quick Installation

**Tips:**
During the quick installation process, please ensure that both Bluetooth and location services are enabled and the application is granted with Bluetooth and permission access.

### 4.3.1 Connecting to the Logger

After login, click "Quick Installation" on the home page. Follow the instructions to reset the logger and tap "Next " to connect the logger.



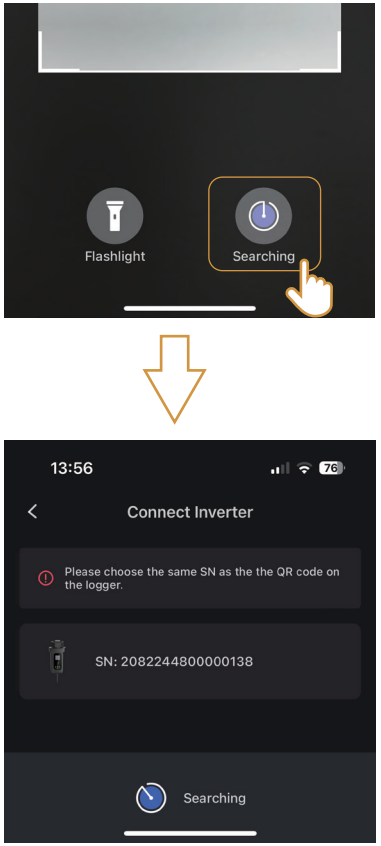
Methods of connecting the logger are as follows.

**Method 1:** Scan the QR code of the logger.




You can find the QR code on the logger.

**Method 2:** Tap " Searching" to connect the logger.

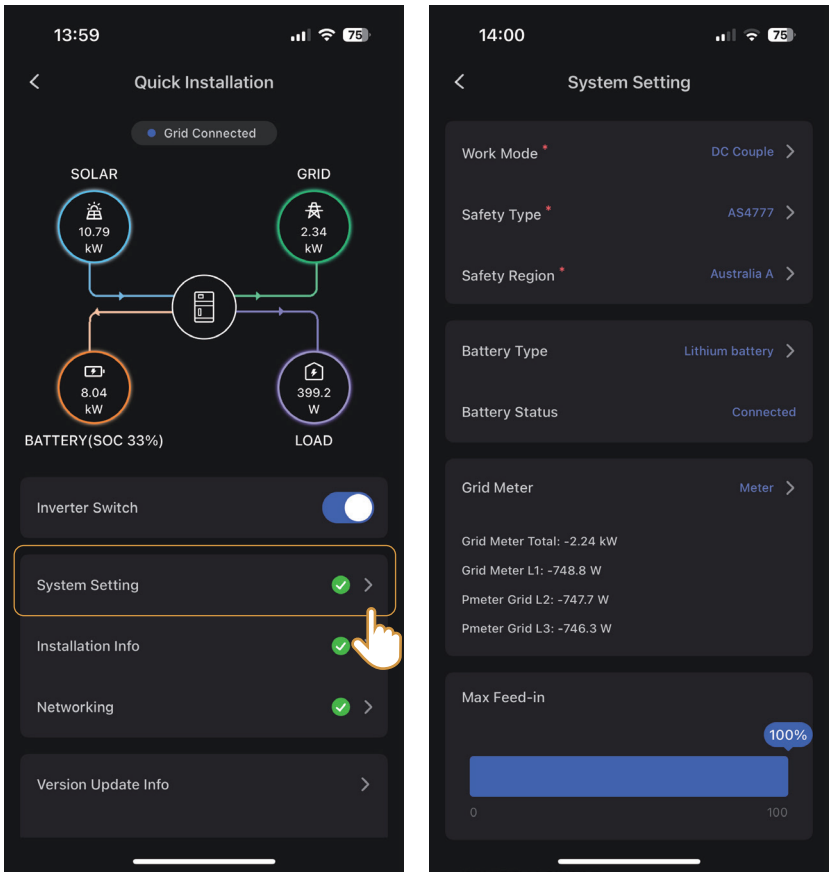



**Warning:** Before setting any parameters, read through user manual of the app and the inverter to fully learn the functions and features of the product. If the inverter parameters are set improperly, the inverter may malfunction and damage the battery, which will affect the inverter's power generation.



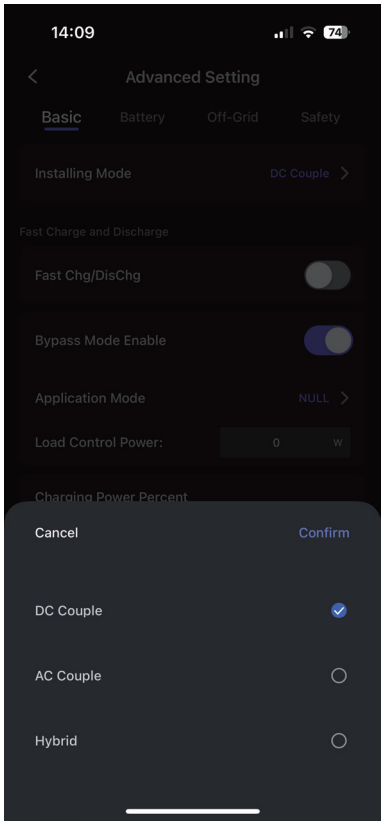
## 4.3.2 System Setup

On completion of connecting the logger, you can enter home page of "Quick Installation". Tap "System Setting" and fill in the relevant information to complete the system setup.




You can set the installing mode, safety type, battery type, grid meter, maximum feed-in power percentage, etc., according to the actual situation.

There are three installing modes: DC Couple, AC Couple and Hybrid.




When to Choose AC Couple:
・The system already has a third-party PV inverter installed, and you need to connect it to Hinen's inverter.

When to Choose DC Couple:
・This is a new installation with both PV panels and batteries.
・The system does not include a third-party PV inverter.

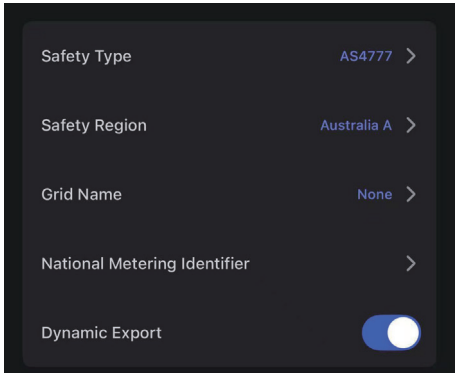
When to Choose Hybrid Mode:
・The system needs to support both AC Couple and DC Couple functionalities.
・The installation includes both new PV panels and an existing PV system, which are connected to Hinen's inverter.



Safety Type: Please select the safety type according to the actual situation. The following table outlines the safety regulations applicable to each country.

| Safety regulation | Area | Safety regulation | Area |
|---|---|---|---|
| Null | N/A | NI_G99 | United Kingdom |
| CQC | China | NI_G98 | |
| EN50549 | Europe | IRELAND | |
| BELGIUM | Belgium | CEI_021 | Italy |
| VDE0126 | France | NRS097 | South Africa |
| AS4777 | Australia | TOR | Austria |
| NewZealand | New Zealand | POLAN | Poland |
| N4105 | Germany | SPAIN | Spain |
| G99 | United Kingdom | JAPAN | Japan |
| G98 | | / | / |

If AS4777 is selected as safety type, the following information need to be configured:




Regional Standards: There are four main regions including A, B, C and NZ, which stands for New Zealand region. For compliance with AS/NZS4777.2:2020, please select from Australia A/B/C. It is advisible to consult your local grid operator to select the appropriate regional standard.

| Regional Standards | Electrical Company |
|---|---|
| Australia A | N/A |
| Australia B | N/A |
| Australia C | N/A |
| New Zealand | N/A |

Grid Name: Select the correct grid operator. You can choose None, South Australia Power Network, Jemena, City Power, Powercor Australia, or United Energy Services.

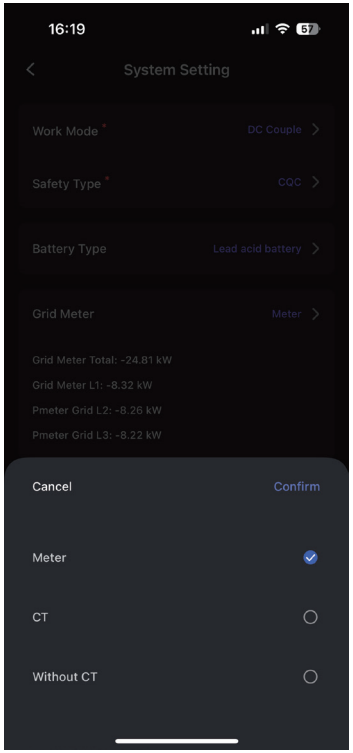
National Meter Identifier: Please fill in the national meter identifier.

Dynamic Export: You can enable or disable this function.

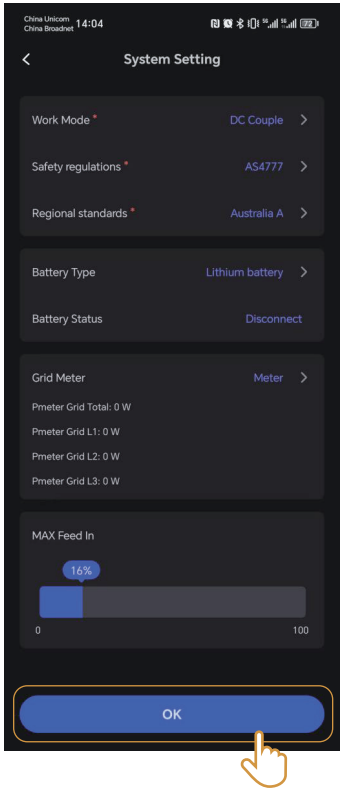
Tap "Battery type" to select lithium battery, lead acid battery, or none. Please select according to the real situation.

MAX Feed In: You can limit the feed-in power to the grid. The actual feed-in power to the grid is calculated by multiplying the inverter's rated power by the percentage you have configured in Max Feed-in setting. Take a 6kW inverter as an example. If you configure the parameter to 80%, the inverter will feed power to the grid at a maximum of 4.8kW.

Tap "Grid Meter" to select "Meter", "CT", or "Without CT", and check the related information of the grid.




On completion of configuration, tap "OK".

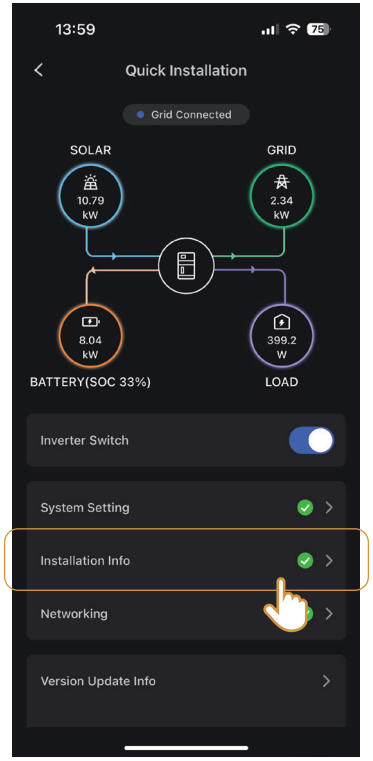




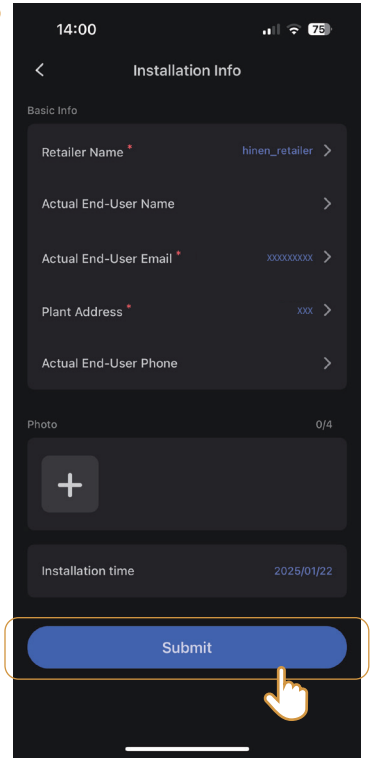

## 4.3.3 Adding Installation Information

Tap "Installation Info" to enter the "Installation Info" page. Please enter correct retailer name, actual end-user name and email address, plant address, actual end-user phone number, and photos. On completion of filling in the information, click "Submit".

1

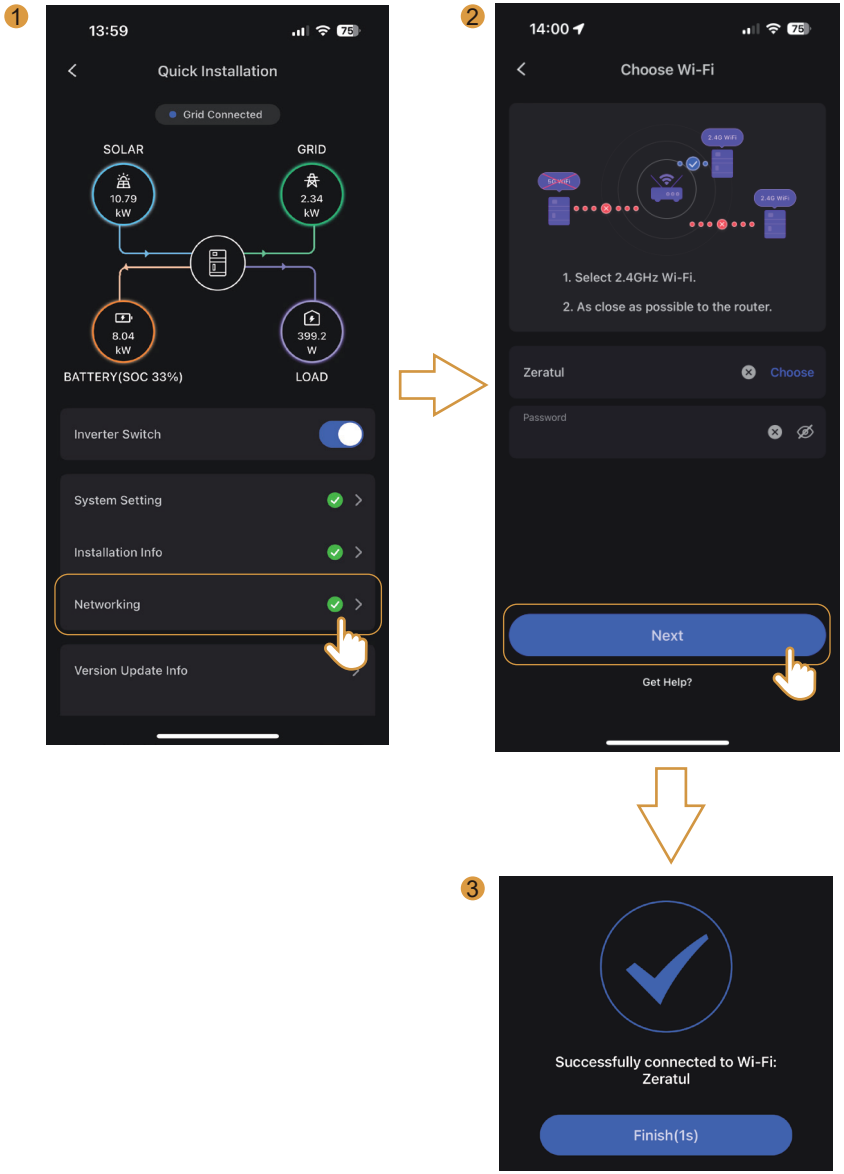



2



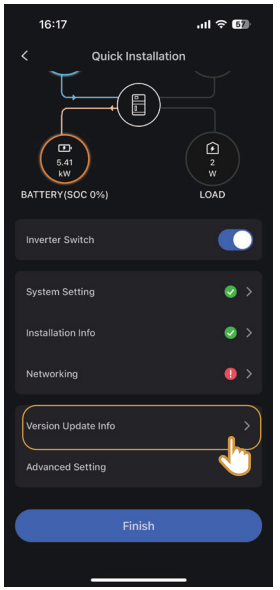
## 4.3.4 Configuring Network

Tap "Networking" and fill in the WiFi name and password. Once successfully networked, tap "Finish".




## 4.3.5 Version Update

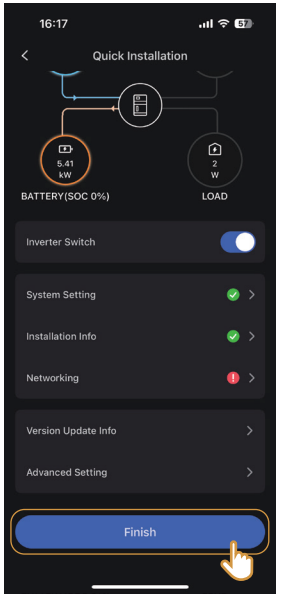
Tap "Version update Info" to check if the current version is the latest. If not, tap "Update".




## 4.3.6 Advanced Settings

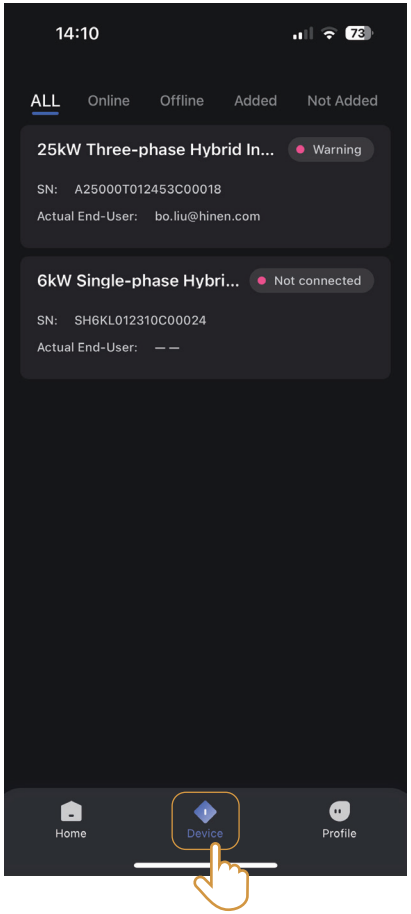
Tap "Advanced Setting" to configure the parameter and function in compliance with the local law and regulation. Refer to Chapter 5 for the specific settings.

After finishing all the setups, tap "Finish" at the bottom to complete quick installation.



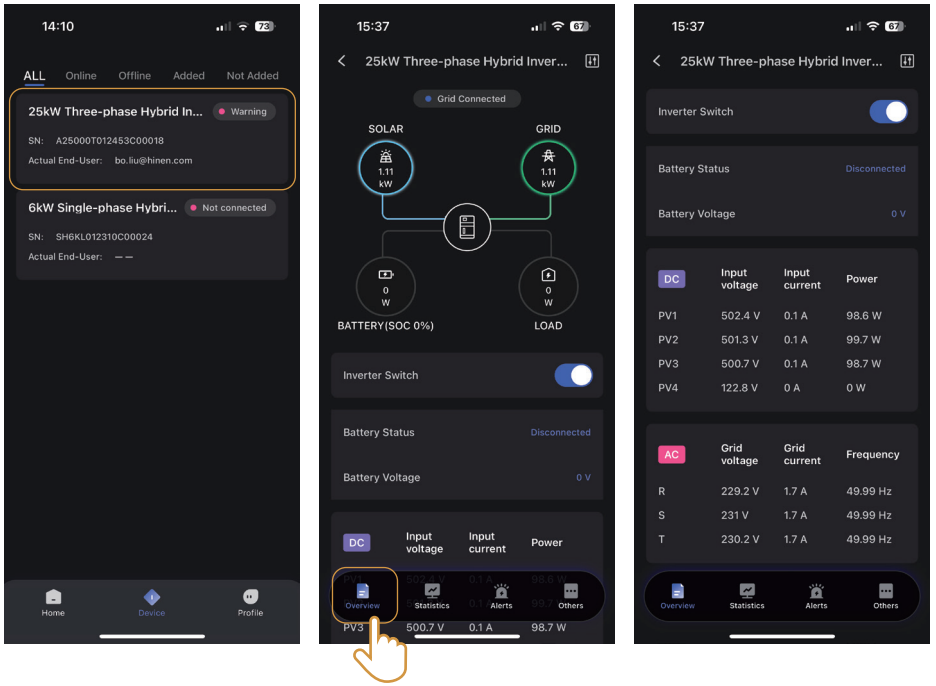
## 4.4 Controlling the Inverter Remotely

Tap "Device" to check all the devices you have installed, including online devices, off-line devices, added devices, and not added devices. Tap the corresponding device to check the real-time running information of the system and control the inverter remotely.



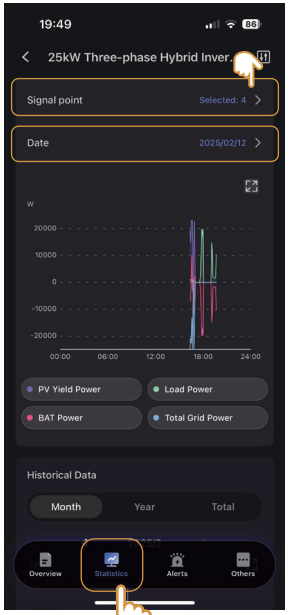

### 4.4.1 Overview of Device

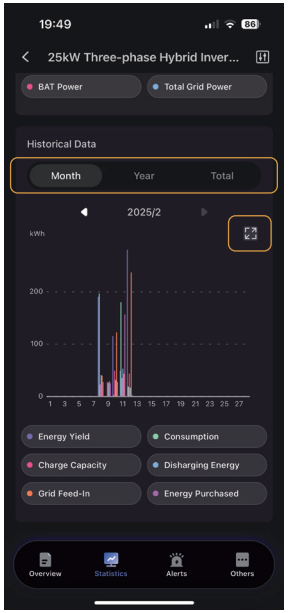
Tap "Overview" to control the operation of the inverter and check the real-time running status of the inverter, including the data of battery, PV, grid, and load.




### 4.4.2 Viewing Graph Data

Tap "Statistics" to check the graph data of the device. Tap "Signal point" to select up to six signal points you want to view, and tap "Confirm" to check the graph data.




Tap "Date" to check the graph of the day. You can check the graph data by filteringmonth, year, and total.
Tap the icon to check the graph data on landscape.

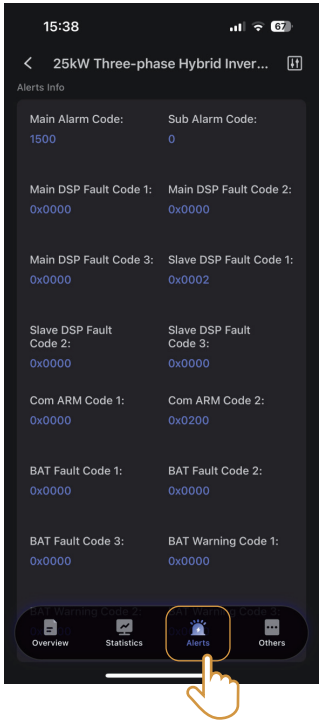






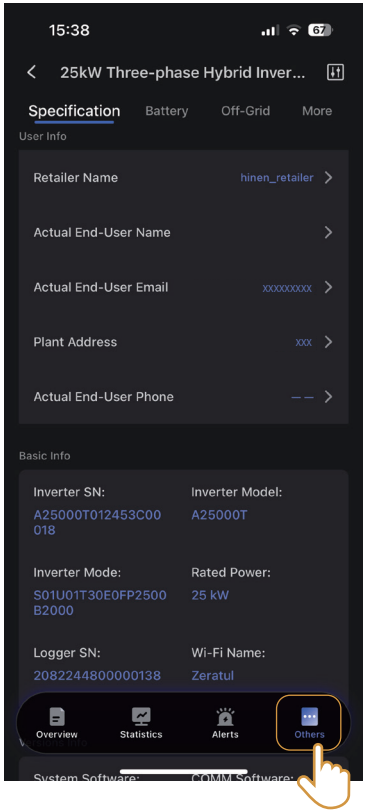
## 4.4.3 Viewing Alarm Information

Tap "Alerts" to check the alarm code and error code.



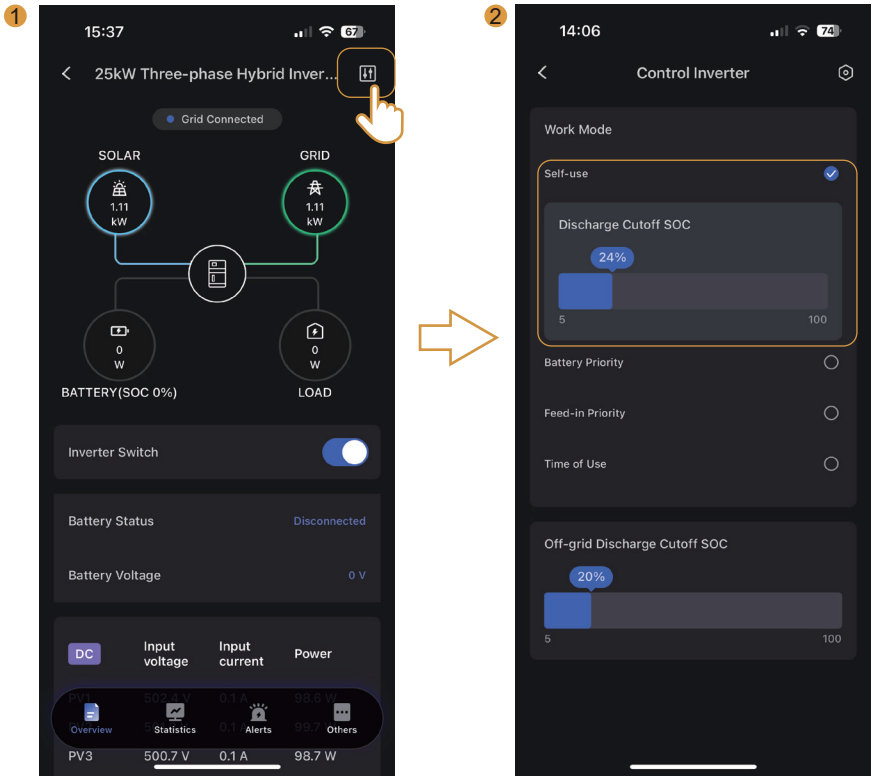
## 4.4.4 Viewing other information

Tap "Others" to check the user information, basic information, battery information, off-grid information, and more.

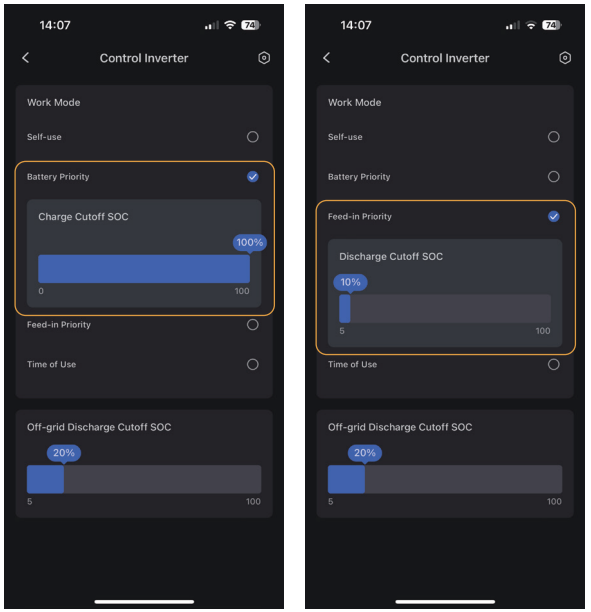



## 4.4.5 Work Mode Setup

Tap the icon to enter "Control Inverter" page to configure the work mode and cut-off SOC. Please refer to the following table for details.



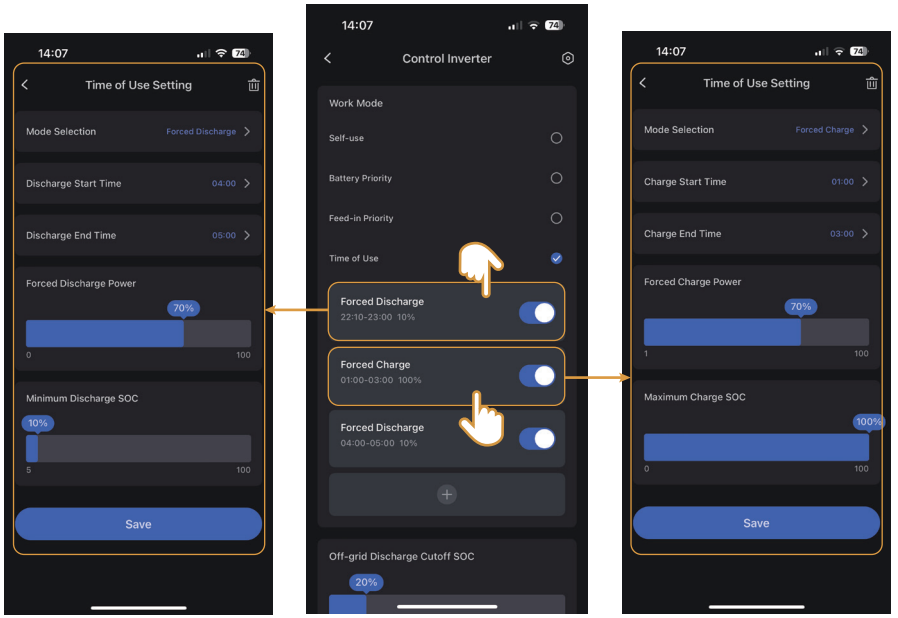

self-use mode




Battery Priority mode




Feed-in Priority mode




Time-of-use mode

The definition of work modes and parameter settings are described in the following table.

| Work Mode | Definition | Parameter Settings |
|---|---|---|
| Self-use | • PV power is preferentially supplied to satisfy the load.<br>• Excess power is charged to the battery, and any surplus is then fed to the grid.<br>• If PV power is insufficient to meet the load, the load is first supplemented by the battery, followed by the grid.<br>• This mode minimizes reliance on the grid, with electricity generated by PV being used first. | • You can set discharge cut-off SOC as needed according to your needs. If you set discharge cut-off SOC at 20%, the battery will stop discharging in on-grid state when the battery SOC hits 20%. |
| Battery Priority | • PV power prioritizes charging the battery.<br>• Excess power supplies the load, and any surplus is fed to the grid.<br>• If PV power cannot fully charge the battery, the battery is charged by the mains.<br>• The load is prioritized to use solar energy; any uncovered load is supplemented by mains power.<br>• In this mode, PV power is used first, followed by grid power. | • You can set charge cut-off SOC as needed. If you set the charge cut-off SOC at 90%, the battery will stop charging when the SOC hits 90%.<br>• You can set the charging power percent on “Advanced Setting” page. |
| Feed-in Priority | • PV power prioritizes satisfying the load, and excess power is fed to the grid.<br>• If the PV power fed to the grid cannot be met, the battery supplements.<br>• If PV generation cannot meet the load, the battery is prioritized to discharge to supplement the load. If still insufficient, the uncovered load is met by mains.<br>• In this mode, PV prioritizes satisfying the load and exporting power to the grid. Excess energy charges the battery only when PV power exceeds the feed-in power plus load power. | • You can set discharge cut-off SOC as needed. If you set discharge cut-off SOC at 20%, the battery will stop discharging in on-grid state when the SOC hits 20%.<br>• You can restrict the maximum power sent to the grid by adjusting the MAX Feed-in parameter on system setting page.<br>• You can configure the discharging power percent on “Advanced Setting” page. |
| Time of use | • This mode is designed to maximize energy cost savings based on a user-defined schedule.<br>• Users can set 3 time periods via the Hinen App to enable forced charging or discharging. | • You can select force charge/discharge, set charge/discharge start time, charge/discharge end time, force charging/discharging power, and cut-off SOC as needed. Tap the icon 🗑 on the upper right corner to delete the current time slot.<br>• Take the 6KW inverter as an example. If you set the charging power at 50%, it means the inverter will charge the battery with the power of 3 KW at most. |

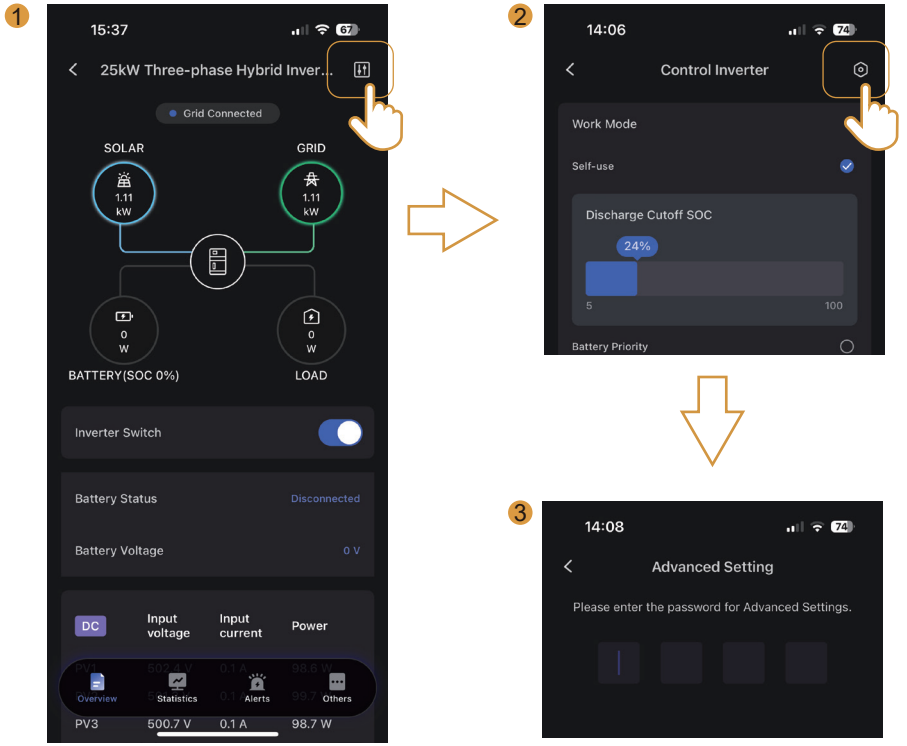
## 4.5 Advanced Settings

**Warning:**
The following Settings with '⚠' can not be modified randomly. Otherwise the system error will be caused. Please read through the function of the relevant Settings first. If you need to change, please contact our after-sales staff!

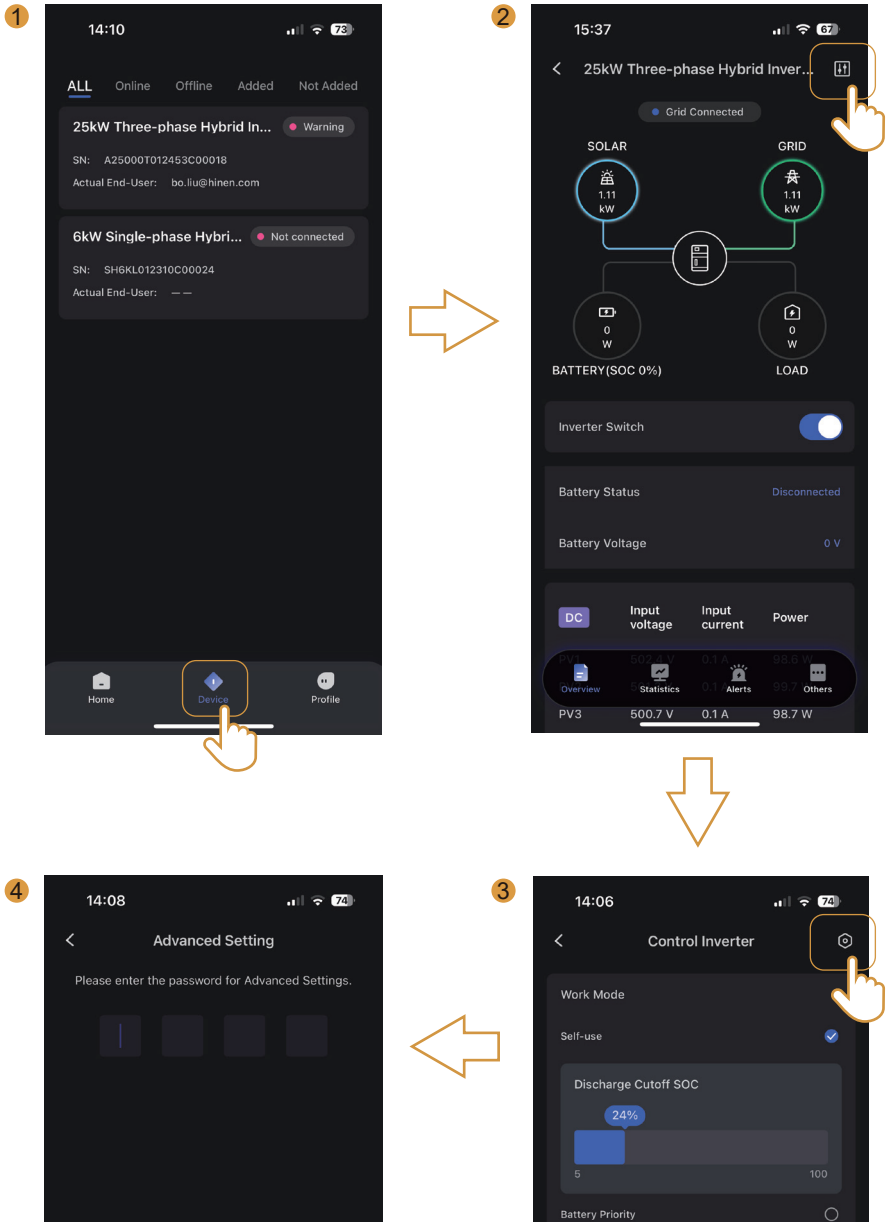
There are two methods to enter "Advanced Setting" page.

Local mode: Tap "Control Inverter" on the home page. After the device is connected successfully, tap the icon > on the upper right corner of "Control Inverter" page, and enter the password to enter " Advanced Setting" page.

**Tips:**
Please make sure your Bluetooth is always on. Otherwise the device will fail to be connected.

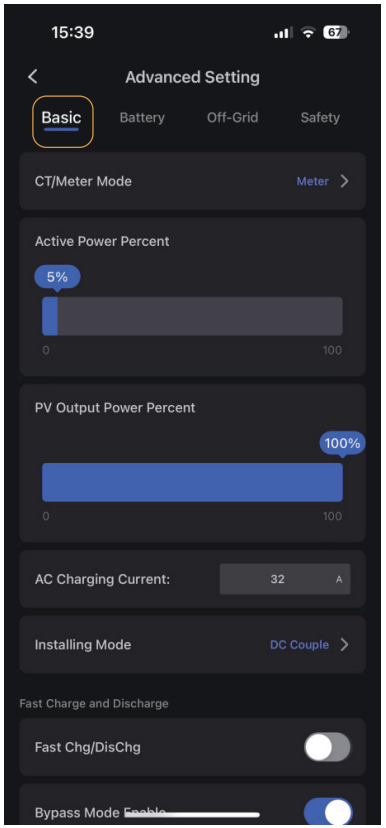


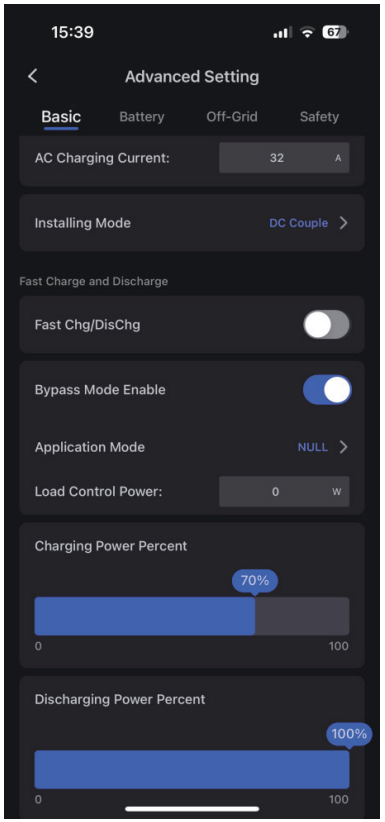

Remote control: Tap "Device" and select the device you want to check to enter device details page. Then tap the icon to enter "Control Inverter" page, and tap the icon to enter the password to enter " Advanced Setting" page.



## 4.5.1 Basic Settings

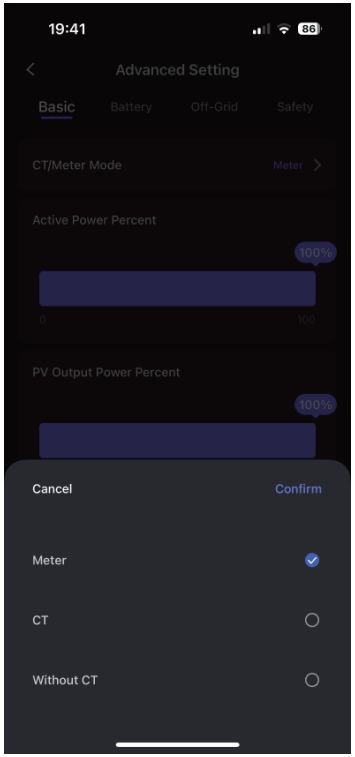
On "Basic" page, you can configure the active power percent, PV output power percent, AC charging current, installing mode, charging power percent, discharging power percent, and enable or disable fast charge and discharge or bypass mode according to the actual situation.






• **CT/Meter Mode:** You can select "CT", "Meter", or "without CT" based on the site installation.

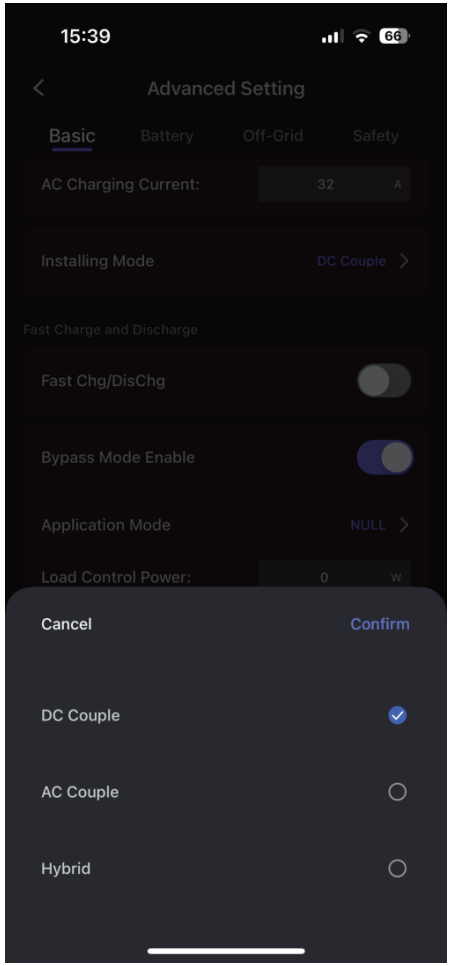



• **Active power percent:** This is the inverted power percent in grid-connected state. Take the 6kW inverter as an example. If the active power percent is configured at 60%, the maximum AC output power of the inverter is 3.6kW in grid-connected state. The default setting is 100%.

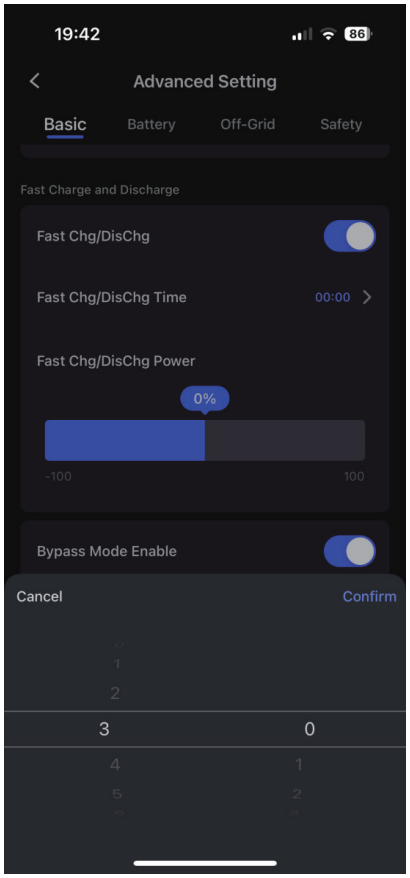
• **PV output power percent:** The PV output power can be limited by configuring the PV output percent. Take the 6kW inverter whose maximum PV output power is 11.4kW as an example. If the PV output power percent is set to 50%, the maximum PV output power is 5.7kW.

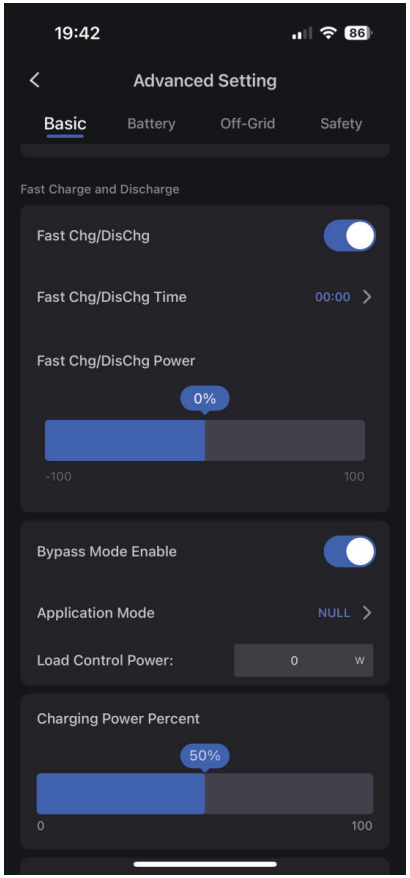
• **AC charging current:** Indicates the maximum valid value of current drawn from some phase of the grid. The default value varies with power levels of different inverters.

• **Installing Mode:** You can select AC Couple, DC Couple, or hybrid mode depending on the actual situation. For specific configuration, please refer to step 2 in Chapter 2.



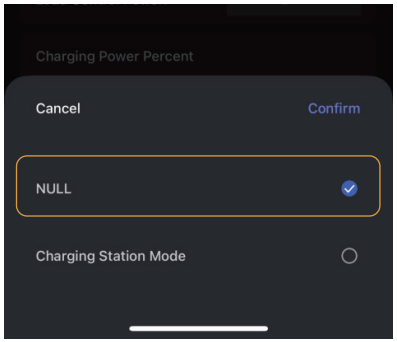

• **Fast Charge and Discharge:** If fast charge and discharge is enabled, the fast charge/discharge time and power can be configured. The setting value -100% ~0 indicates the maximum percentage of fast discharging power, while 0-100% indicates the maximum percentage of fast charging power. 0% indicates no charging or discharging. Take the 6kW inverter as an example. Configure the Fast Chg/DisChg Power to -60%, and the system will discharge the battery at a maximum of 3.6kW. Configure the Fast Chg/DisChg Power to 80%, and the system will fast charge the battery at a maximum of 4.8kW. If you set the Fast Chg/DisChg Time at 3, the whole fast charge or discharge process with the power configured will last 3 hours from the moment the Fast Chg/DisChg is enabled.



• **Bypass mode Enable:** If bypass mode is enabled in grid-connected state, when the battery and PV can not supply power, the energy required by the back-up port will be supplied by the power grid through inverter's bypass.

• **Application Mode:** This mode is set to "null" by default. If it is an inverter grid -connected system, " Charging Station Mode" can be configured, which is mainly used in underground garages. In this case, a three-phase 6CT electricity meter must be used, where CT1, CT2, and CT3 measure the power of each phase of the grid, and CT4, CT5, CT6 measure the grid-connected load power of each phase. When the total power of the grid-connected load (L1+L2+L3) is less than the set Load Control Power, the inverter grid-connected system will draw power from the grid to charge the battery, and the power drawn will be the set Load Control Power. When the total power of the grid-connected load (L1+L2+L3) exceeds the set Load Control Power, the battery will discharge to supply energy to the load, and the discharge power will be equal to the total grid-connected load as measured by CT4, CT5, and CT6.




• **Load Control Power:** If the "Charging Station Mode" is selected in application mode, load control power can be set, the setting range of which is 0 to 65535W. The default setting value is 0W.

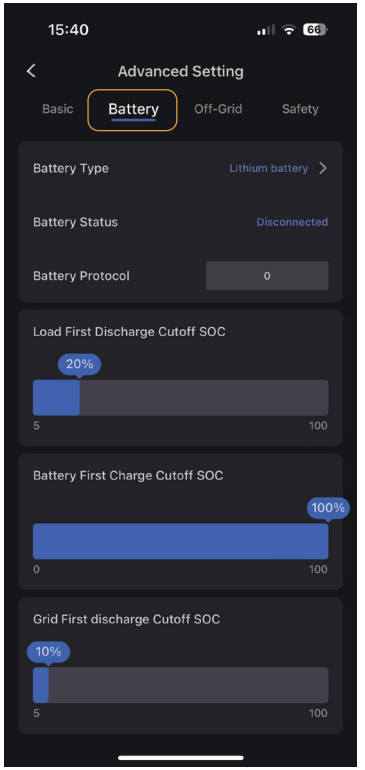
• **Charging power percent:** Take the 6kW inverter as an example. If charging power percent is set to 60%, the inverter will charge the battery at a maximum of 3.6kW.

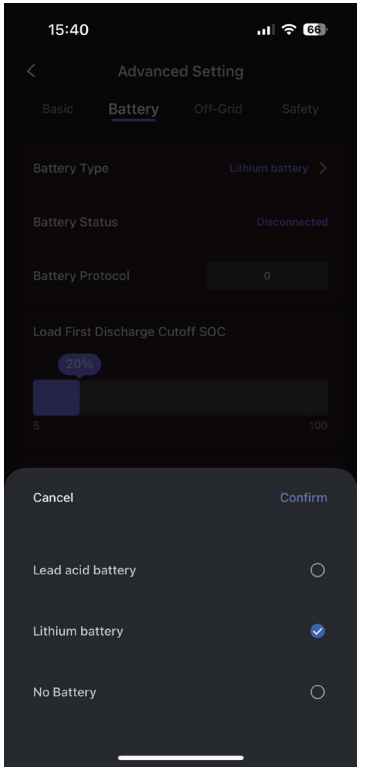
• **Discharging power percent:** Take the 6kW inverter as an example. If charging power percent is set to 60%, the inverter will discharge the battery at a maximum of 3.6kW.



## 4.5.2 Battery Setup

On "Battery" page, if your battery type is lithium battery, you can configure battery protocol, and cut-off SOC in different work modes. The battery status indicates whether the battery is connected successfully.



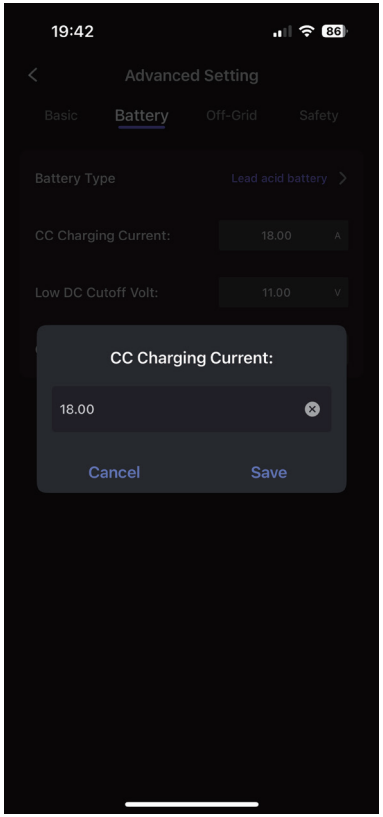




Please refer to the battery protocol code in the following table and select the correct one.

| Battery Protocol Code | | | |
|---|---|---|---|
| Three-phase Inverter | | Single-phase Inverter | |
| 0 | GOODWE high pressure | 0 | PYLON low pressure |
| 1 | SHOTO_HV | 1 | HINEN low pressure |
| 2 | PYLON high pressure | 2 | GROWATT low pressure |
| 3 | HINEN high pressure | 3 | Growcol_LV |
| 4-20 | Battery 4~20 | 4 | SHOTO_LV |
| - | - | 5-20 | Battery 5~20 |

**If you select lead acid battery, the following parameters can be configured.**

CC Charging Current: refers to the maximum charging current.
Low DC Cutoff Volt: refers to the minimum discharging voltage.
CV Charging Volt: refers to the maximum charging voltage.



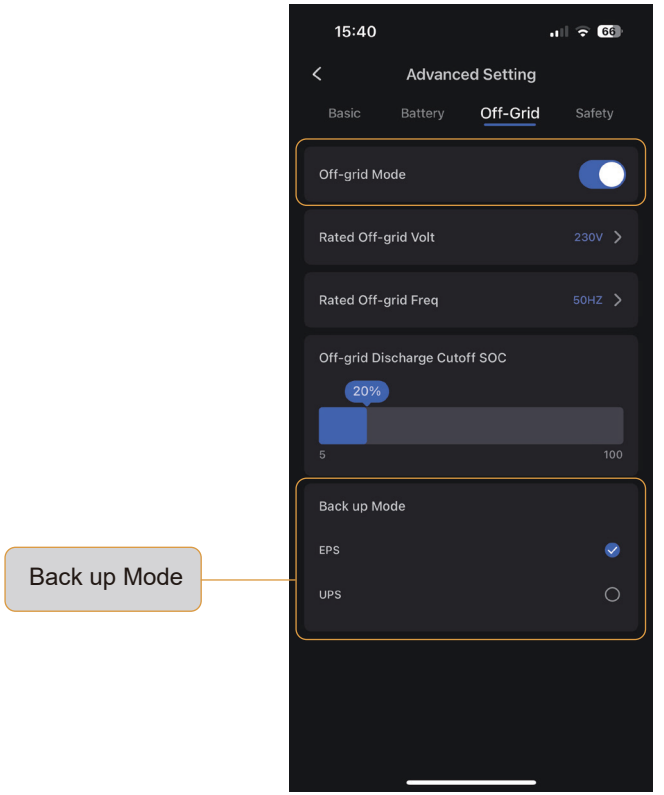

## 4.5.3 Off-grid Setup ⚠

Safety regulations vary in different countries, so please set the rated off-grid voltage, rated off-grid frequency and back-up mode in compliance with the local laws and regulations.

**Off-grid mode:** The off-grid mode is enabled by default. When blackout occurs or the inverter cannot be connected to the grid, the EPS port will power the load immediately.

**Off-grid Discharge Cutoff SOC:** The setting logic is the same as introduced in work mode section.

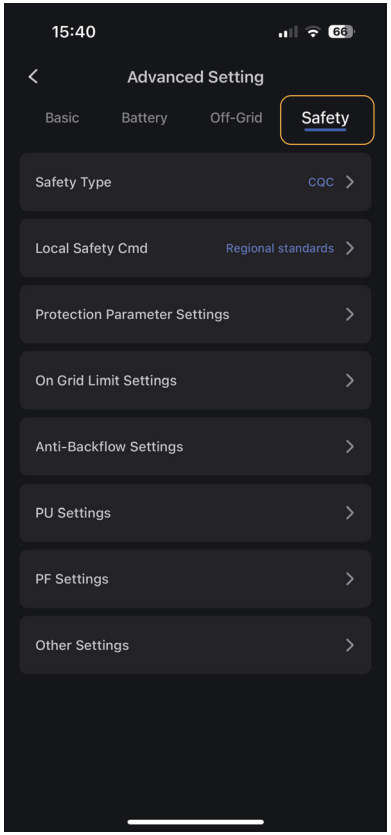
**Back-up Mode:** The UPS function is featured with a rapid grid disconnection detection, with the switching time from grid-connected to off-grid operation typically occurring within 10ms. However, certain countries and regions mandate strict disconnection time requirements, often exceeding 100ms. In such cases, the UPS fast disconnection function must be disabled. For scenarios requiring rapid grid-to-off-grid switching, the UPS function can be activated.
The EPS function is designed for standard grid connection and disconnection after the UPS function is disabled. It detects grid anomalies in accordance with safety regulations and performs the switch between grid-connected and off-grid operation once the specified delay time is met. The grid anomaly detection and disconnection time for EPS function are generally configurable, with typical settings greater than 20ms. Therefore, it is suitable for regions with strict regulatory requirements.
To meet safety standards, the inverter is configured by default to enable the EPS function. For any required modifications to this setting, please contact and consult the qualified professional installer.

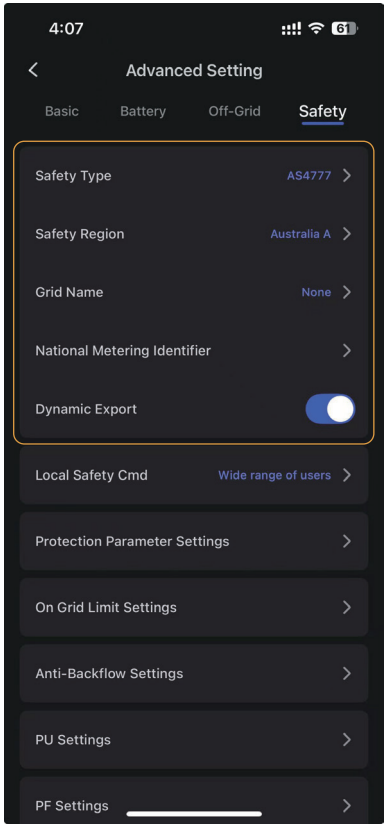


## 4.5.4 Safety Setup ⚠

On "Safety" page, safety type can be configured. The safety type varies in different countries. Please refer to the settings in "Quick Installation" for detailed instruction.

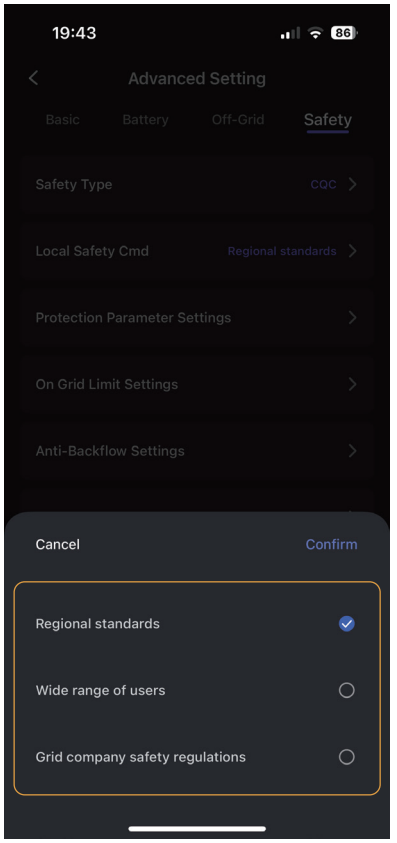
**Notice:**
If AS4777 is selected, please select "Safety Region", "Grid Name", fill in the " National Metering Identifier", and enable or disable "Dynamic Export".





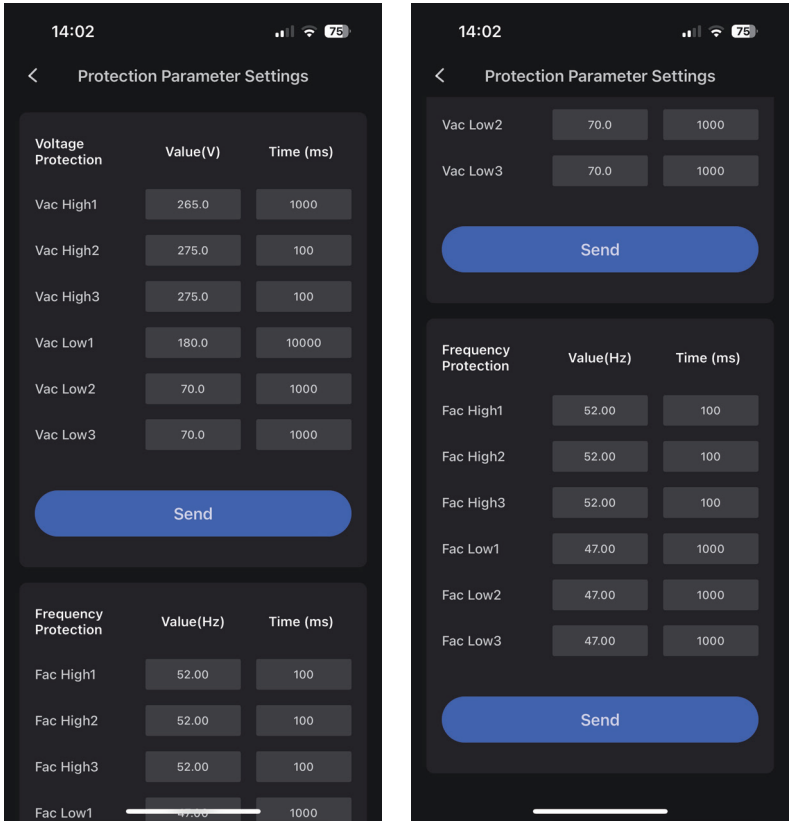

The local safety command includes "Regional standards", "Wide range of users", and "Grid company safety regulations". The default setting is "Regional standards". "Wide range of users" applies to African areas. Please configure in compliance with local laws and regulations.



### 4.5.4.1 Protection Parameter Setup ⚠

Tap "Protection Parameter Settings" on "Safety" page to enter parameter setting. The safety regulations vary in different countries, so please set the voltage and frequency protection parameters in compliance with local laws and regulations. The voltage parameter should be configured in the following logic: Vac Low 1 > Vac Low 2 > Vac Low 3, Vac High 1 < Vac High 2 < Vac High 3. The same logic can be applied to the frequency protection parameters.

**Notice:**
Make sure the system can be connected to the grid before configuring the protection parameters.




### 4.5.4.2 On-grid Limits Setup ⚠

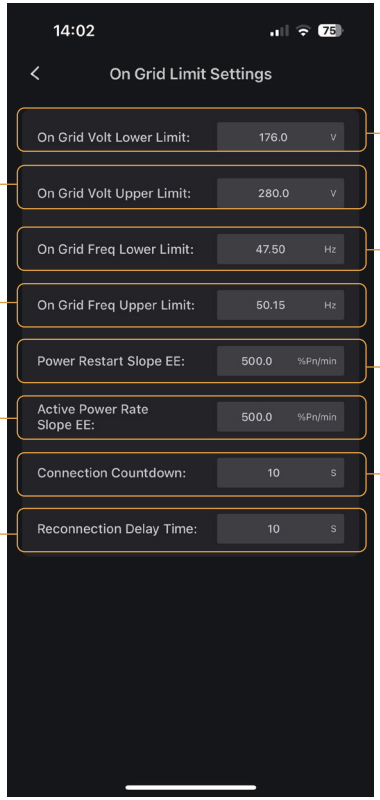
The inverter will detect the voltage and frequency of the grid before connecting to the grid. When the grid voltage and frequency are within the normal range, the inverter can be connected to the grid. Otherwise, the inverter cannot be connected to the grid.

On Grid Volt Upper Limit: The grid voltage can not be higher than this value when the inverter is connected to grid.

On Grid Freq Upper Limit: The grid frequency can not be higher than the value when the inverter is connected to grid.

Active Power Rate Slope EE: The rate at which the inverter increases its output power when it first connects to the grid. The value range is 1.0-1000.0 Pn/min.

Reconnection Countdown: The countdown for the inverter to reconnect to the grid.




On Grid Volt Lower Limit: The grid voltage can not be lower than this value when the inverter is connected to grid.

On Grid Freq Lower Limit: The grid frequency can not be lower than this value when the inverter is connected to grid.

Power Restart Slope EE: The load rate at which the inverter increases power when reconnecting to the grid after grid disconnection. The value range is 1.0-3000.0 Pn/min.

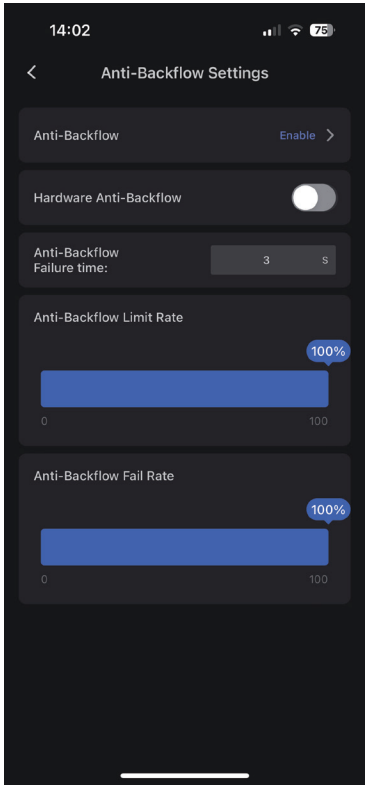
Connection Countdown: The countdown for the inverter to connect to the grid.

### 4.5.4.3 Anti-Backflow Setting ⚠

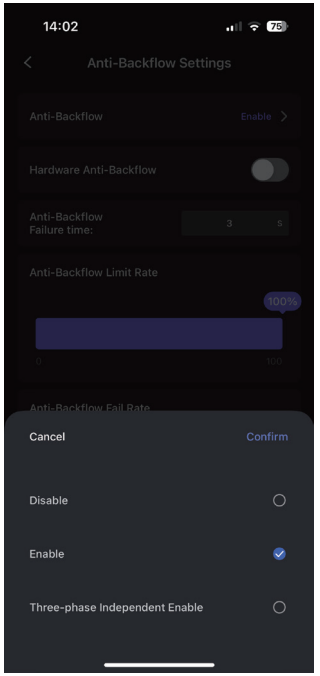
The anti-backflow function mainly limits the current output from the inverter to the grid, thus preventing power from feeding into the grid. In some cases, it is also referred to as export limitation or zero export. The anti-backflow function is a software-based limit. When the output power exceeds the software limit, the inverter will reduce the output power so that it reaches the specified limit within 15 seconds.

Hinen inverters are equipped with a hardware anti-backflow function. If enabled, the inverter will disconnect from the grid within 5 seconds if the output power exceeds the hardware limit.

**Notice:**
This function requires CTs or meter to be properly installed prior to use.




**Anti-backflow function:** It is disabled by default. Enabling the anti-backflow function prevents the inverter from feeding power into the grid. If a three-phase system is used, you can select "Three-phase independent Enable" for each phase.




**Hardware Anti-backflow:** Click the icon to enable or disable this function. The icon indicates that the function is enabled, while the icon indicates it is disabled. If you enable the hardware anti-backflow, the inverter will be disconnected from the grid when the output power exceeds the hardware limit.

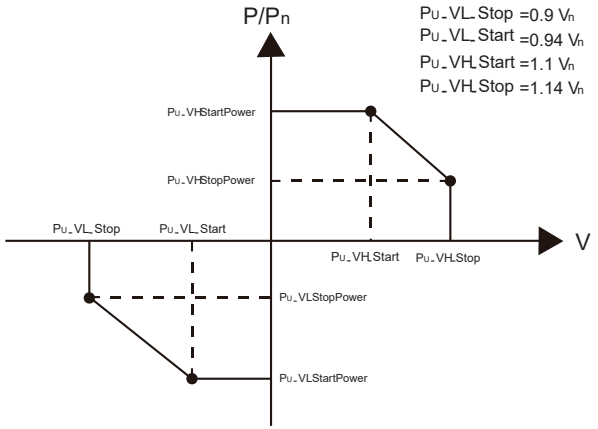
**Anti-Backflow Failure time:** In the event of a malfunction or damage to the meter, the anti-backflow function will fail. Setting an anti-backflow failure time in advance ensures that the device will automatically activate the anti-backflow function after a meter failure. For example, if the anti-backflow failure time is set to 120 seconds, the device will automatically enable the anti-backflow function 120 seconds after the meter fails.

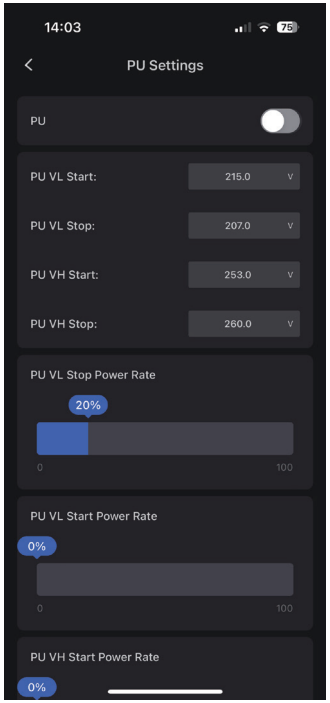
**Anti-backflow Limit Rate:** Once you enable the anti-backflow function, you can set this parameter to limit the power fed to the grid, the value range of which is between 0 and 100%. Take a 6kW inverter as an example. If the anti-backflow limit rate is set to 60%, the inverter will feed power to the grid at a maximum of 6kW*60%=3.6kW.

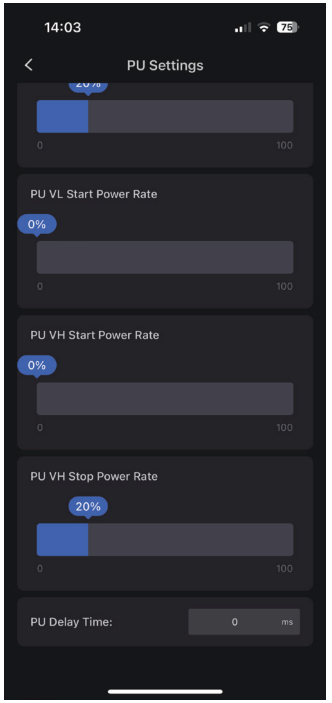
**Anti-backflow Fail Rate:** In cases where the meter or CT fails, this setting determines the percentage of power the inverter can feed into the grid. Take the 6kW inverter as an example. If the Anti-backflow Fail Rate is set to 60%, the inverter will feed power to the grid at a maximum of 3.6kW when the Meter or CT fails.

## 4.5.4.4 PU Settings ⚠

The PU settings have been pre-configured according to the safety standards of different countries. Please do not modify them without proper authorization. Active power control with an active power standard curve P=F(v) is shown in the figure below.



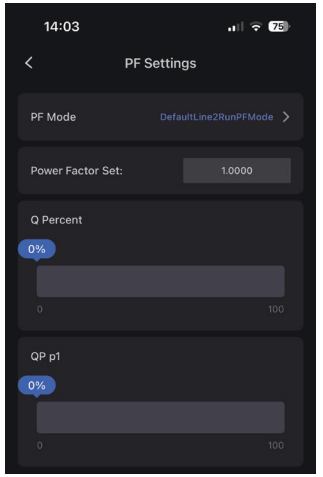



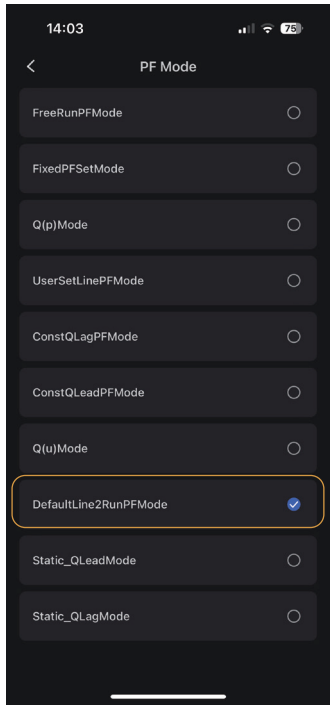



## 4.5.4.5 PF Settings ⚠

The power factor is applicable in certain countries. Please follow the local grid requirements.



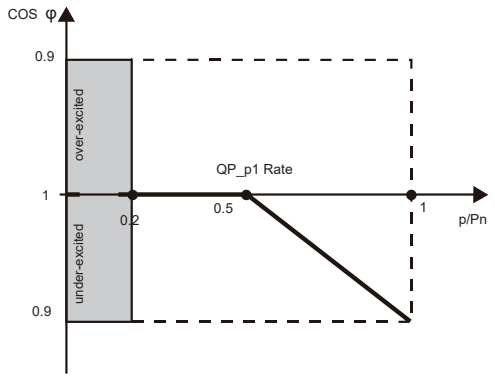

PF mode settings are shown as follows:



| Mode | Comment |
|---|---|
| Free Run PF Mode | The PF is fixed at +1.000. |
| Fixed PF Set Mode | Power factor |
| Q(P) Mode | QP_p1 Rate |
| User Set Line PF Mode | / |
| ConstQ Lead PF Mode | Q_Percentage |
| ConstQ Lag PF Mode | Q_Percentage |
| Q(u) Mode | QU_Percent Max |
| | QU_Q2 Percent |
| | QU_Q3 Percent |
| | QU_Percent Min |
| | QU_UV_Stop |
| | QU_UV_Start |
| | QU_OV_Start |
| | QU_OV_Stop |
| | Qu Delay Time |
| | Qu Lock in Power |
| | Qu Lock Out Power |
| Default Line2 Run PF Mode | / |
| Static_Q Lead PF Mode | / |
| Static_Q Lag PF Mode | / |

**Q(p) Mode:** The power factor of the inverter varies with the change in the inverter's output power.

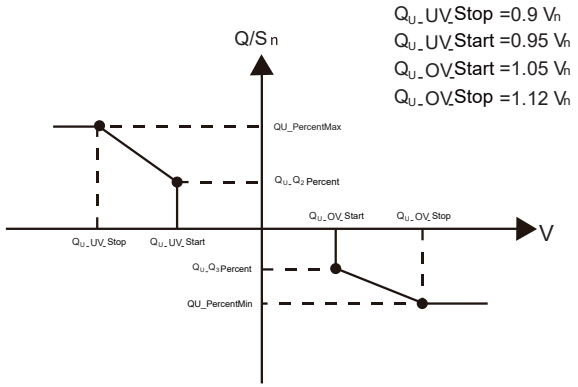
Reactive power control, reactive power standard curve cos φ = f(P)




**ConstQ Lag/Lead Mode:** Reactive power can be adjusted by changing the current phase angle.

**Q(u) Mode:** The reactive power output of the inverter varies with changes in the grid voltage.

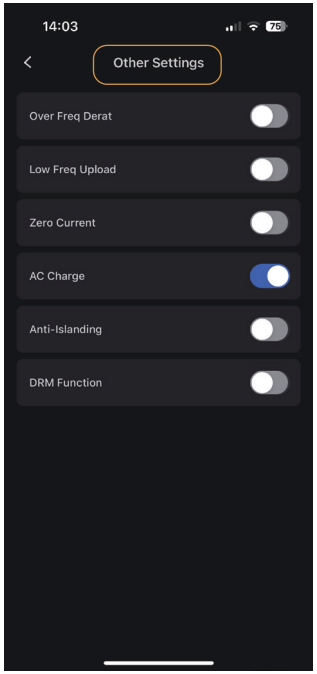
Reactive power control, reactive power standard curve Q= f(V)




Reactive power can be adjusted via the power factor. With a fixed power factor, the reactive power setting value can be calculated based on the current power. The range of PF is from -0.8 to 0.8.
Leading: The inverter is drawing reactive power from the grid.
Lagging: The inverter is supplying reactive power to the grid.

### 4.5.4.6 Other Settings ⚠

Enter the "Other Settings" page to enable or disable the following functions based on actual conditions.




**Over Freq Derat Curve:** In some countries and regions, when the grid frequency exceeds the over-frequency derating trigger frequency, the inverter should reduce active power at a certain slope to lower the grid frequency. Please enable or disable this function based on actual conditions.

**Low Freq Upload:** In some countries and regions, when the grid frequency drops below the frequency threshold for power increase, the device should increase active power output to raise the grid frequency. Please enable or disable this function based on actual conditions.

**Zero Current:** When the zero current function is enabled, if the voltage is too high or too low before the first and second-stage grid protection time, the current will drop to zero.
During the first and second-stage grid protection time, voltage and current will return to normal. If the protection time exceeds the first and second-stage grid protection time, the grid will disconnect.
If the voltage is too high or too low for a short period, the current will immediately drop to zero. Once the voltage returns to normal, the current will also return to normal.

**AC Charge:** After enabling AC charging, the grid will be allowed to charge the battery.

**Anti-Islanding:** The inverter uses Active Frequency Drift (AFD) method (also known as frequency offset) to prevent islanding effects. The anti-islanding function is enabled by default to protect equipment and personnel from harm.

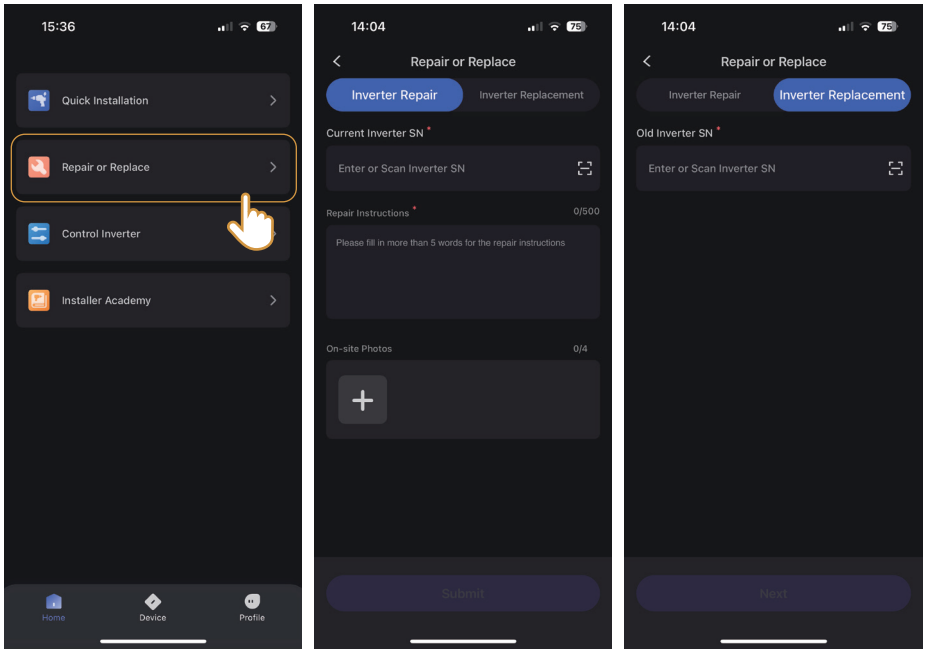
**DRM Function:** The DRM function is a demand response method required by the NZS4777.2 standard and is only applicable to NZS4777.2. It is disabled by default.



## 4.6 Repair and Replacement

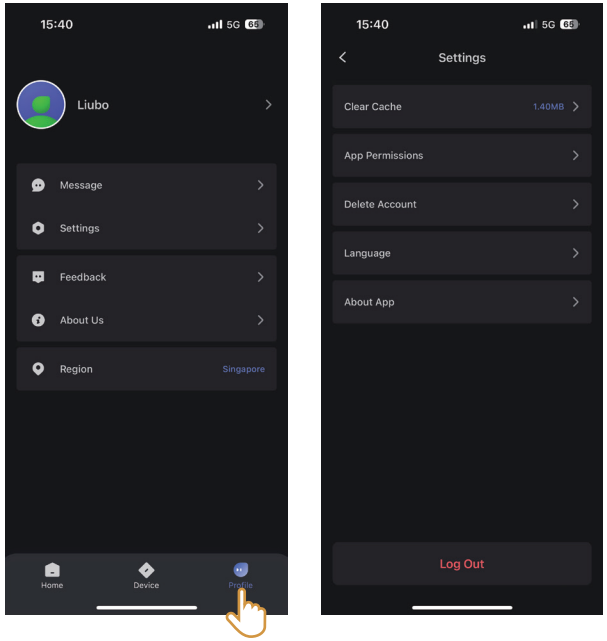
Tap "Repair or Replace" to enter the corresponding page. Please select "Inverter Repair" or "Inverter Replacement" and submit the relevant information based on the real situation.

**Caution:**
Repair or replacement of the products should be conducted by professional personnel!

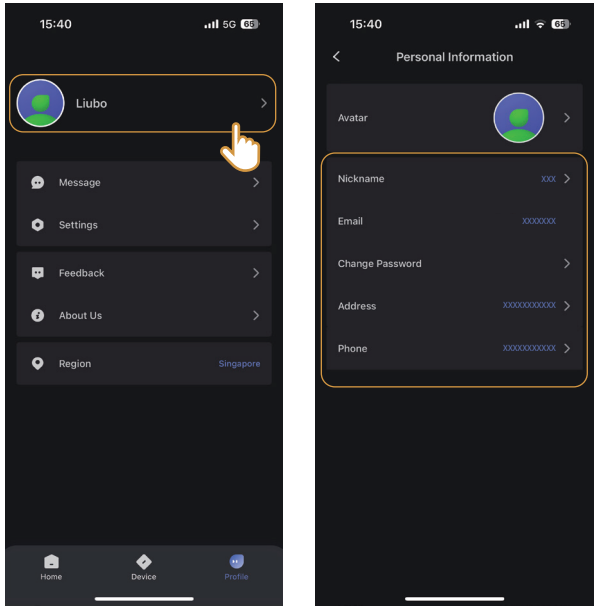


## 4.7 Personal Information

Tap "Profile" to check personal information and submit feedback. Tap "Settings" to delete account, select language, view the App version and log out.




Tap the avatar to configure your personal information or change the password.




## 4.8 Error Codes

### 4.8.1 Fault Code

| Main Fault Code | Inverter State | Fault Description | Suggestion |
|---|---|---|---|
| 108 | Error/Off | NTC Temperature too high | 1. After shutdown, check the temperature, restart the inverter normally.<br>2. If the error message still exists, contact manufacturer. |
| 109 | Error/Off | Bus voltage abnormal | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 110 | Error/Off | Communication fault | 1. After shutdown, Check communication board wiring.<br>2. If the error message still exists, contact manufacturer. |
| 200 | Error/Off | No AC Connection | 1. After shutdown, Check AC wiring.<br>2. If error message still exists, contact manufacturer. |
| 201 | Error/Off | AC V Outrange | 1. Check grid voltage.<br>2. If the error message still exists despite the grid voltage being within the tolerable range, contact manufacturer. |
| 202 | Error/Off | AC F Outrange | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 205 | Error/Off | CT LN Reversed | 1. After shutdown, Check the SP-CT connection.<br>2. If error message still exists, contact manufacturer. |
| 300 | Error/Off | EPS OP Short Fault | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 302 | Error/Off | Off-grid output voltage is too low | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 303 | Error/Off | Off-grid output voltage is too High | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 401 | Error/Off | The DC input voltage is exceeding the maximum tolerable value | 1. Immediately disconnect the DC switch and check the voltage.<br>2. If the fault code still exists after the normal voltage is restored, contact manufacturer. |

| Main Fault Code | Inverter State | Fault Description | Suggestion |
|---|---|---|---|
| 500 | Error/Off | BMS Communication fault | 1. Check 485 cable between SP and battery.<br>2. Check if battery is sleeping.<br>3. If error message still exists, contact manufacturer. |
| 502 | Error/Off | Battery voltage low | 1. Check battery voltage.<br>2. If error message still exists, contact m anufacturer. |
| 503 | Error/Off | Battery Voltage High | 1. Check whether the battery volttage too high; if battery OK, please restart the inverter; if not, please replace battery.<br>2. If error message still exists, contact manufacturer. |
| 504 | Error/Off | Battery temperature out of specified range for charge or discharge | 1. Check battery temperature.<br>2. If error message still exists, contact manufacturer. |
| 505 | Error/Off | Battery terminals reversed | 1. Check battery terminals.<br>2. If error message still exists, contact manufacturer. |
| 506 | Error/Off | Battery terminal open (only for lithium battery) | 1. Check battery terminal.<br>2. If error message still exists, contact manufacturer. |



## 4.8.2 Warning Code

| Main Warning Code | Inverter State | Warning Description | Suggestion |
|---|---|---|---|
| 1100 | Warning/On | Fan function abnormal | 1. After shutdown, check the fan connection.<br>2. Replace the fan.<br>3. If the error message still exists, contact manufacturer. |
| 1101 | Warning/On | Meter abnormal | 1. Check if the meter is on.<br>2. Check whether the machine and the meter connection is normal . |
| 1102 | Warning/On | Optimizer and inverter communication is abnormal | 1. Check if the meter is reversed or not.<br>2. Check whether the machine and the meter connection is normal. |
| 1103 | Warning/On | Optimizer and inverter communication is abnormal | 1. Check if the optimizer is on.<br>2. Check whether the connection between the optimizer and the inverter is normal. |
| 1104 | Warning/Off | Bus voltage Low | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 1200 | Warning/On | No Utility | 1. Please confirm whether grid is lost or not.<br>2. If error message still exists, contact manufacturer. |
| 1201 | Warning/On | Grid voltage outrange | 1. Check whether the AC voltage is in the range of standard voltage in specification.<br>2. If error message still exists, contact manufacturer. |
| 1202 | Warning/On | Grid frequency outrange | 1. Check whether the frequency is in the range of specification or not.<br>2. If error message still exists, contact manufacturer. |
| 1204 | Warning/On | CT Open | 1. Check if AC current sensor is connected well.<br>2. If error message still exists, contact manufacturer. |
| 1205 | Warning/On | SP-CT L N line reversed or Ground fail | 1. Check whether the L line and N line of SO-CT is reversed or not.<br>2. If error message still exists, contact manufacturer. |
| 1206 | Warning/On | Communication fault，M3 didn't receive SP-CT data | 1. Check communication wire.<br>2. If error message still exists, contact manufacturer. |
| 1302 | Warning/On | Off-grid output voltage is too High | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |

| Main Warning Code | Inverter State | Warning Description | Suggestion |
|---|---|---|---|
| 1303 | Warning/On | Off-grid output voltage is too low | 1. Restart inverter.<br>2. If error message still exists, contact m anufacturer. |
| 1304 | Warning/Off | EPS OP OverLord Warning | 1. Restart inverter.<br>2. If error message still exists, contact manufacturer. |
| 1404 | Warning/On | Dryconnect function abnormal | 1. After shutdown, check the dryconnect wiring.<br>2. If the error message still exists, contact manufacturer. |
| 1406 | Warning/On | PV Reversed | 1. Check PV input terminals.<br>2. If error message still exists, contact manufacturer. |
| 1501 | Warning/On | Battery terminal open (only for lithium battery) | 1. Check whether the battery is connected.<br>2. If error message still exists, contact manufacturer. |
| 1502 | Warning/On | Lead-acid battery temperature sensor was open | 1. Check whether the temperature sensor of lead-acid battery is installed or not.<br>2. Check whether the temperature sensor of lead-acid battery is connected well or not.<br>3. If error message still exists, contact manufacturer. |
| 1503 | Warning/On | Battery temperature outrange | 1. Check whether the environment temperature of battery is in the range of specification or not.<br>2. If error message still exists, contact manufacturer. |
| 1504 | Warning/On | Lithium battery Over Load warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1505 | Warning/On | Lithium battery only charge warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1506 | Warning/On | Lithium battery need charge warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1507 | Warning/On | Lithium battery charge full warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1508 | Warning/On | Lithium battery disable charge for bus High warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1509 | Warning/On | Lithium battery disable discharge for bus High warning | 1. Check whether output load over Lithium battery rate power; If load too large, please reduce load.<br>2. If error message still exists, contact manufacturer. |
| 1510 | Warning/On | Temperature sensor connection is abnormal | 1. After shutdown, check whether the temperature sampling module is connected properly.<br>2. If the error message still exists, contact manufacturer. |

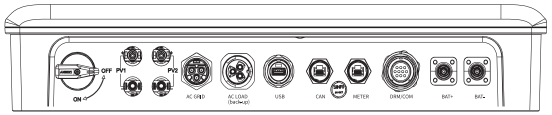


# 05 Others

## 5.1 Troubleshooting

### Checks Before Turning on AC Power

- Battery connection: Ensure that the polarity (+/-) is connected correctly when connecting the inverter to the battery, refer to Figure 1.
- PV input connection: Ensure that the polarity (+/-) is connected correctly when connecting the inverter to the PV panels, refer to Figure 2.
- On-grid & backup connections: Ensure that the polarity is correct when connecting the on-grid side to the grid and the backup side to the load, and the polarities (e.g. L/N are in sequence) are not reversed, refer to Figure 3.
- CT (Current Transformer) connections: Ensure that the CT is connected between the load and the grid. The direction of the CT (Current Transformer) cannot be reversed, and the current flow direction must point to the inverter. Refer to Figure 4.



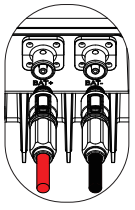


Figure 1

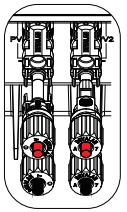


Figure 2

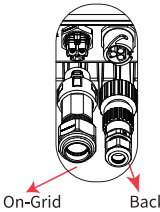



Figure 3

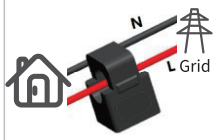



Figure 4

### Checks At Startup and Turning On AC Power

**Battery Settings, BMS Communication and On Line Limit, Off Grid Settings.**

After connecting the data logger, check the "Battery Type" on the APP to make sure that the battery type the same as was installed. Check whether the "On Line Limit" setting and "Off Grid Settings" are correct. If it is not correct, please set it correctly in "Setup".

**Note:** For compatible lithium batteries, the BMS status will display "Normal" after selecting the correct battery company.

## Problems During Operation

**1. The inverter did not start up with PV only.**

(1) Make sure the PV voltage is greater than 120V.

(2) Make sure that, for the connection between the inverter and PV panels, the polarities (+/-) are not reversed.

---

**2. Hybrid inverter does not discharge or output when off-grid or no PV or PV power is less than the load power.**

(1) Check whether the communications between the inverter and Smart Meter are OK.

(2) Make sure the load power is greater than 150W.

a. The battery will not discharge continuously unless the load power is greater than 150W.

b. If the battery does not discharge when the Meter power is greater than 150W, please check the Smart Meter & CT connections and directions.

(3) Ensure that SOC (discharge status) is greater than 1-DOD (discharge depth). Alternatively, if the battery discharges below 1-DOD, the battery will only discharge again when the SOC is charged to a level greater than (20%+1-DOD/2).

(4) Check on the APP whether the charge time has already been set because during the charge time, the battery will not discharge (battery will charge in priority during times of concurrent charge/discharge).

---

**3. The battery does not charge when the PV power is greater than the load power.**

(1) Check if charge voltage on APP (in "Battery Type") is properly set (for lead-acid battery), as battery cannot charge if battery voltage reaches charge voltage.

(2) Check the discharge time setting on APP.

(3) Check if battery is fully charged or not, or if battery voltage reaches "charge voltage" or not.

---

**4. High power fluctuations during battery charge or discharge.**

(1) Check if there are fluctuations in load power.

(2) Check if there are fluctuations in PV power.

---

**5. Battery does not charge.**

(1) Make sure that BMS communications are OK on the APP.

(2) Check if the CT is connected at the right position and is connected in the right direction per the User Manual.

(3) Check if the total load power is significantly higher than the PV power.



## Questions & Answers (Q & A)

### About the WIFI Configuration

**1. Why can't I find the WIFI signal on mobile devices?**

Normally the WIFI signal can be seen immediately after inverter has powered up. However, the WIFI signal will disappear when the inverter connects to the internet. If settings need to be changed, please connect the router. If you cannot find the WIFI signal or connect to the router, please try to reload the WIFI.

**2. Why can't I connect to the WIFI signal on my phone?**

The WIFI module can only connect to one device at a time. If the signal is already connected to another device, you will not be able to connect to the signal.

**3. Why does the WIFI module fail to connect to network after I choose the right router hotspot and enter the right passwords?**

It's possible that there are special characters not supported by module in the hotspot passwords. Please modify the password to consist of only Arabic numerals or uppercase / lowercase letters.

### About Battery Operation

**1. Why does the battery not discharge when the grid is not available but it discharges normally when the grid is available?**

On the APP, the off-grid output and backup function should be turned on to force the battery to discharge under off-grid mode.

**2. Why is there no output on the backup side?**

For backup supply, "Backup Supply" on the APP must be turned on. In off-grid mode or when the grid power is disconnected, the "Off-Grid Output Switch" function must be turned on as well.

**Note:** When turning the "Off-Grid Output Switch" on, do not restart the inverter or battery. Otherwise, the function will be switched off automatically.

**3. Why does the battery SOC suddenly jump to 95%?**

This normally happens when BMS communications fail when using lithium batteries. If the batteries enter float charge mode, the SOC is automatically reset to 95%.

**4. The battery cannot be fully charged to 100%?**

The battery will stop charging when the battery voltage reaches the charge voltage set in the APP.

### About APP Operation And Monitoring

**1. Why can't I save settings on the APP?**

This could be caused by losing the connection to WIFI.

- Make sure you have already connected to WIFI (make sure that no other devices are connected) or to the router (if WIFI is connected to the router). The APP homepage shows the connections.
- Make sure you restart the inverter 10 mins after you have changed any settings because the inverter will save the settings every 10 mins while operating in normal mode. We recommend that parameter settings be changed when the inverter is in wait mode.

**2. Why are the data displayed on the homepage different from the parameter page, like charge/discharge, PV value, load value, or grid value?**

The data refresh frequency is different, so there will be data discrepancies between different pages on the APP as well as between these shown on the portal and APP.

**3. Some columns show NA, like battery SOH, etc. Why does that happen?**

NA means that the APP has not received data from the inverter or server because of communication problems, such as battery communications and the communications between inverter and the APP.

## About the CT and Power Limit Function

**1. How to activate the output power limit function?**

This function can be activated by following these steps:

- Make sure the Smart Meter/CT connections and communications are functioning correctly.
- Enable the anti-reverse current function on the APP, and set the maximum allowable reverse current power to the grid on the APP.

**Note:** Even if the output power limit is set to 0W, there might still be a deviation of a maximum of 100 W when exporting to the grid.

**2. Why is there still power exporting to the grid after I have set the power limit to 0 W?**

The export limit could theoretically be 0W but there will be a deviation of around 50–100 W.

**3. Can I use other meter brands to take over from the Smart Meter in the system or to change settings in Smart Meter?**

No, because the communication protocol is integrated into the inverter and Smart Meter, other meter brands cannot communicate. Also, any change to the manual settings could cause a meter communication failure.

**4. What is the maximum current allowed to pass through the CT ?**

The maximum current for the CT is 88A.

## Other Questions

**1. Is there a quick way to make the system work?**

Please refer to this user manual.

**2. What kind of load can I use to connect to the backup side?**

It can be connected to critical loads in the home, such as refrigerators, computers, lights, etc. Please note that the load power cannot exceed the specification.

**3. Will the warranty of the inverter still be valid if, for some special conditions, we cannot follow 100% of the User Manual instructions for installation or operation?**

Normally we still provide technical support for problems caused by not following the instructions in the User Manual. However we cannot guarantee any replacements or returns. So, if there are any special conditions for which you cannot follow the instructions 100%, please contact the after-sales department for suggestions.



## 5.2 Technical Parameters

| Model / Item | H3000-EU | H3600-EU | H4000-EU | H4600-EU | H5000-EU | H6000-EU |
|---|---|---|---|---|---|---|
| **PV Input Specification** | | | | | | |
| Max. PV input power(W) | 6000 | 7200 | 8000 | 9200 | 10000 | 11400 |
| Max. PV voltage (VDC) | 550 | 550 | 550 | 550 | 550 | 550 |
| Nominal voltage (VDC) | 360 | 360 | 360 | 360 | 360 | 360 |
| Startup voltage (VDC) | 90 | 90 | 90 | 90 | 90 | 90 |
| Minimum operating voltage(VDC) | 90 | 90 | 90 | 90 | 90 | 90 |
| MPPT work voltage range(VDC) | 90~550 | 90~550 | 90~550 | 90~550 | 90~550 | 90~550 |
| MPPT voltage range (full load, VDC) | 130~480 | 130~480 | 140~480 | 155~480 | 165~480 | 200~480 |
| Number of MPPT | 2 | 2 | 2 | 2 | 2 | 2 |
| Number of strings per MPPT | 1 | 1 | 1 | 1 | 1 | 1 |
| Max. short-circuit current per MPPT(A) | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| Max. input current per MPPT(A) | 16/16 | 16/16 | 16/16 | 16/16 | 16/16 | 16/16 |
| Backfeed current to the array(A) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Battery Specification(Compatible with $LiFePO_4$ battery or Lead acid)** | | | | | | |
| Battery voltage range(VDC) | 42~58 | 42~58 | 42~58 | 42~58 | 42~58 | 42~58 |
| Nominal voltage (VDC) | 50 | 50 | 50 | 50 | 50 | 50 |
| Min. full load voltage(VDC) | 45 | 45 | 45 | 45 | 45 | 45 |
| Max. charge/ discharge current(A) | 66.7/66.7 | 80/80 | 87/87 | 100/100 | 100/100 | 120/120 |
| Max. continuous charge/discharge power(W) | 3000 | 3600 | 4000 | 4600 | 5000 | 6000 |

| Grid Port Specification | | | | | | |
|---|---|---|---|---|---|---|
| Nominal voltage (VAC) | 230 | | | | | |
| Nominal frequency(Hz) | 50/60 | | | | | |
| Rated output power(W) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Rated output apparent power(VA) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Max. output apparent power(VA) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Rated output current(A) | 13 | 16 | 17.4 | 20 | 21.7 | 26 |
| Max. output current (A) | 20 | 20 | 24 | 24 | 27 | 27 |
| Max. input power(W) | 4500 | 5520 | 6000 | 6900 | 7500 | 9000 |
| Max. input apparent power(VA) | 4500 | 5520 | 6000 | 6900 | 7500 | 9000 |
| Max. input current(A) | 24 | 24 | 33 | 33 | 39 | 39 |
| Maximum output fault peak current (A) | 75 (50uS) | 75 (50uS) | 75 (50uS) | 75 (50uS) | 75 (50uS) | 75 (50uS) |
| Maximum output over current protection(A) | 65 | 65 | 65 | 65 | 65 | 65 |
| Power factor range | 0.8 cap~0.8 ind | 0.8 cap~0.8 ind | 0.8 cap~0.8 ind | 0.8 cap~0.8 ind | 0.8 cap~0.8 ind | 0.8 cap~0.8 ind |
| **Backup Port Specification** | | | | | | |
| Nominal voltage (VAC) | 230 | | | | | |
| Nominal frequency(Hz) | 50/60 | | | | | |
| Rated output power(W) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Rated output apparent power (VA) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Max. output apparent power (VA) | 3000 | 3680 | 4000 | 4600 | 5000 | 6000 |
| Rated output current(A) | 13 | 16 | 17.4 | 20 | 21.7 | 26 |
| Max. output current (A) | 20 | 20 | 24 | 24 | 27 | 27 |
| **Efficiency** | | | | | | |
| MAX. efficiency | 97.00% | 97.00% | 97.10% | 97.10% | 97.20% | 97.20% |
| European efficiency | 96.60% | 96.60% | 96.70% | 96.70% | 96.80% | 96.80% |
| MPPT efficiency | ⩾99.5% | | | | | |
| **Protection&Function** | | | | | | |
| DC switch | Yes | | | | | |
| DC reverse polarity protection | Yes | | | | | |
| AC/DC surge protection | Yes | | | | | |
| Battery reverse protection | Yes | | | | | |
| AC short-circuit protection | Yes | | | | | |
| Ground fault monitoring | Yes | | | | | |
| Grid monitoring | Yes | | | | | |
| Anti-islanding protection | Yes (refer to IEC-62116) | | | | | |
| Residual-current monitoring unit | Yes | | | | | |
| Insulation resistance monitoring | Yes | | | | | |

| | |
|---|---|
| **Overvoltage class** | OVC III[AC], OVC II[PV] |
| **General information** | |
| **Ingress protection** | IP65 |
| **Operation ambient temperature range** | -25~60℃, derating above 45℃ |
| **Altitude** | <4000m |
| **Relative humidity** | 0~100% |
| **Dimensions [W*H*D]** | 568*472*188mm |
| **Weight** | ≈29.6KG |
| **Noise** | ⩽25dB |
| **Protective Class** | Class I |
| **Monitor** | WIFI |
| **Isolated topology** | PV to AC non-isolated, battery to PV/AC high frequency isolated |
| **Warranty*** | 10 Years |
| **Country of manufacture** | Made in China |
| **Certification** | |
| **Grid code** | VDE-AR-N 4105, VDE V 0124-100, AS/NZS 4777.2, NC RfG:2016, PSE:2018, PTPiREE:2021, VDE 0126-1-1, EN 50549-1 and grid codeof DK, NL, FI, CEI 0-21,G98, G99,UNE 217001-2020, UNE 217002-2020, NTS SEPE:2021 (Type A), RD 1699:2011, NRS 097-2-1, IEC 61727, IEC 62116, TOR Type A/B:2022, OVE R25:2020, C10/C11:2021 |
| **Safety** | IEC/EN IEC/BS EN62109-1:2010, IEC/EN/BS EN62109-2:2011, AS 60947-3:2018, IP65 |
| **EMC** | IEC/EN IEC/BS EN IEC 61000-6-1, IEC/EN/BS EN IEC 61000-6-3, IEC61000-2-2 & CISPR11 |

Warranty*：Refer to the product warranty terms for details.

## 5.3 Error Messages

The following error messages can be viewed through APP when a failure occurs.

| Error Message | Explanation | Reason | Solution |
|---|---|---|---|
| Grid Loss | Public grid power is not available (power lost or on-grid connection fails) | Inverter does not detect the connection of grid | 1. Check (use multi-meter) if AC side has voltage. Make sure grid power is available.<br>2. Make sure AC cables are connected tightly and well.<br>3. If all is well, please try to turn off AC breaker and turn on again in 5 mins. |
| VAC Failure | Grid voltage is not within permissible range | Inverter detects that AC voltage is beyond the normal range requiredby the safety country | 1. Make sure safety country of the inverter is set right.<br>2. Check (use multi-meter) if the AC voltage (Between L & N) is within a normal range (also on AC breaker side)<br>a. If the AC voltage is high, then make sure the AC cable complies with that required on user manual and the AC cable is not too long.<br>b. If the voltage is low, make sure the AC cable is connected well and the jacket of the AC cable is not compressed into the AC terminal.<br>3. Make sure the grid voltage of your area is stable and within normal range. |
| FAC Failure | Grid frequency is not within permissible range | Inverter detects that the grid frequency is beyond the normal range required by the safety requirement | 1. Make sure the safety country of the inverter is set right.<br>2. If safety country is right, then please check on the inverter display if AC frequency (Fac) is within a normal range.<br>3. If FAC failure only appears a few times and is resolved soon, it should be caused by occasional grid frequency unstability. |
| Over Temperature | Temperature inside of the inverter is too high | The inverter's working temperature is too high. | 1. Try to decrease surrounding temperature.<br>2. Make sure the installation complies with the instruction on inverter user manual.<br>3. Try to close the inverter for 15 mins, then start up again. |

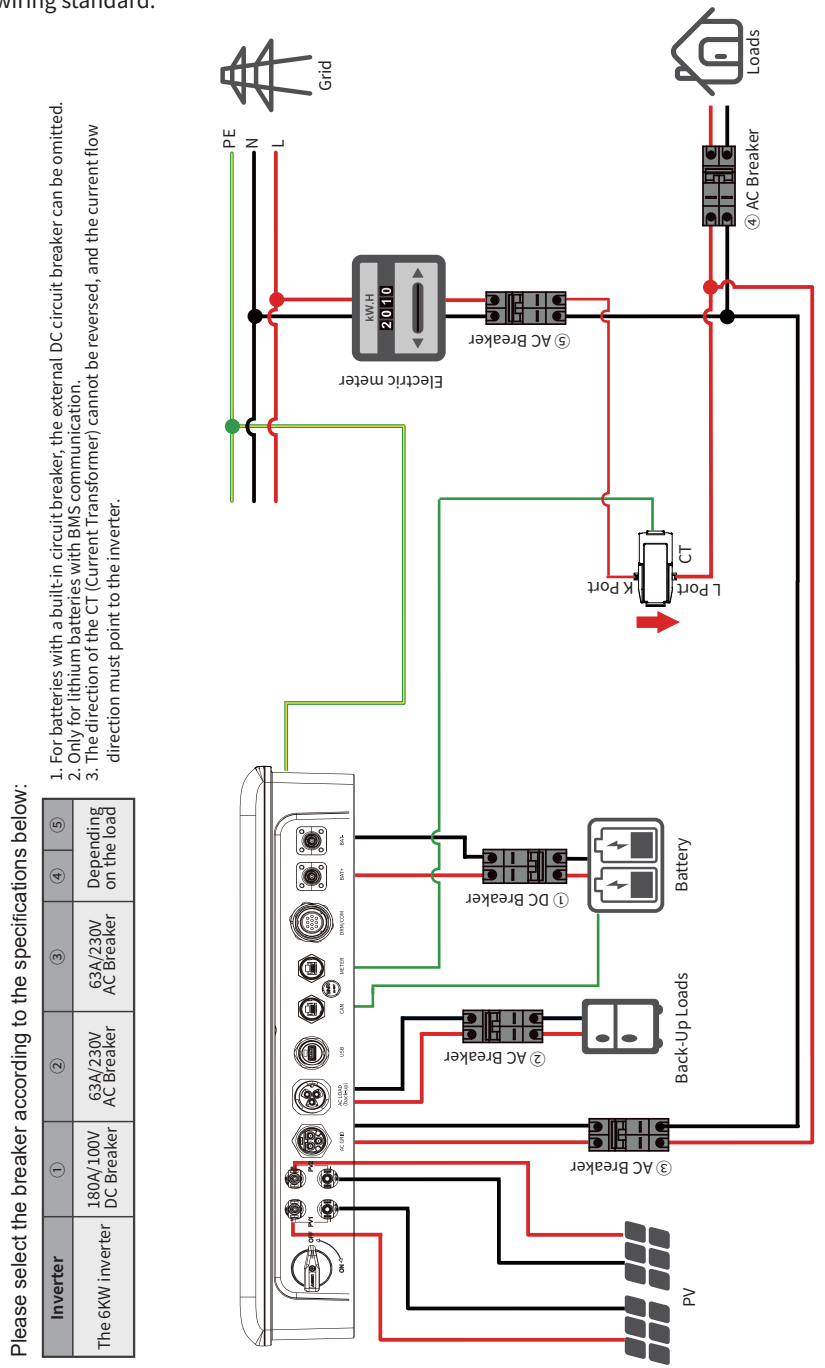
| Error Message | Explanation | Reason | Solution |
|---|---|---|---|
| Isolation Failure | Isolation failure could be caused by multiple reasons like that the PV panels are not grounded well, DC cable is broken, PV panels are aged or surrounding humidity is comparatively heavy, etc. | Isolation failure could be caused by multiple reasons like that the PV panels are not grounded well, DC cable is broken, PV panels are aged or surrounding humidity is comparatively heavy, etc. | 1. Use multi-meter to check if the resistance between earth & inverter frame is close to zero. If it's not, please ensure that the connection is well.<br>2. If the humidity is too high, isolation failure may occur.<br>3. Check the resistance between PV1+/PV2+/V3+/PV4/+BAT+/PV- to earth. If theresistance is lower than the minimum isolation resistance shown in the table( chapter 2.4.2 ) , check the system wiring connection.<br>4. Try to restart the inverter. Check if the fault still occurs. If not, it means it is caused by an occasional situation, or contact after-sales. |
| Ground Failure | Ground leakage current is too high | Ground failure could be caused by multiple reasons like that the neutral cable on the AC side is not connected well or the surrounding humidity is comparatively heavy, etc. | Check (use multi-meter) if there is voltage (normally should be close to 0V) between earth & inverter frame. If there is a voltage, it means the neutral & ground cables are not connected well on the AC side. If it happens only in the early morning/ dawn /rainy days with higher air humidity and is recovered soon, it should be normal. |
| DC Bus High | BUS voltage is over-high | \ | Try to restart the inverter. Check if the fault still occurs. If not, it means it is caused by an occasional situation, or contact after-sales. |
| Back-Up Over Load | Back-up side is over loaded | The total back-up load power is higher than the back-up rated output power. | Decrease back-up loads to make sure the total load power is lower than back-up nominal output power. |



## 5.4 System Wiring Diagram

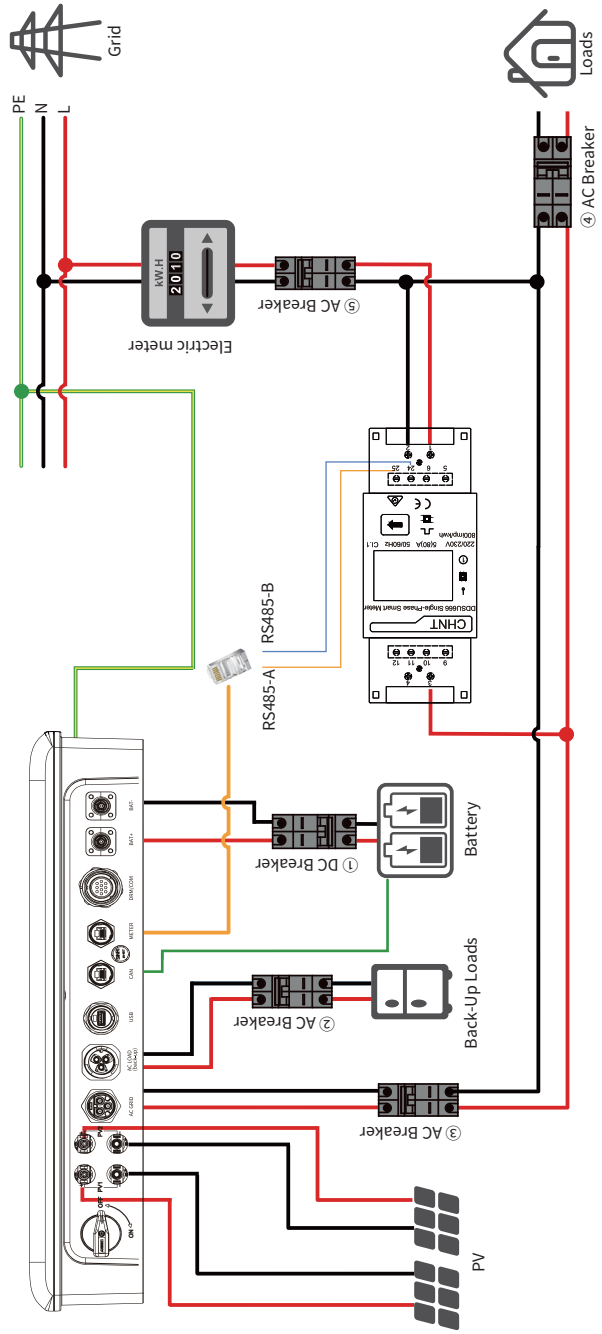
Wiring System for the Hybrid Inverter (With CT)

**Note:** This diagram indicates the wiring structure of the hybrid inverter instead of the electric wiring standard.



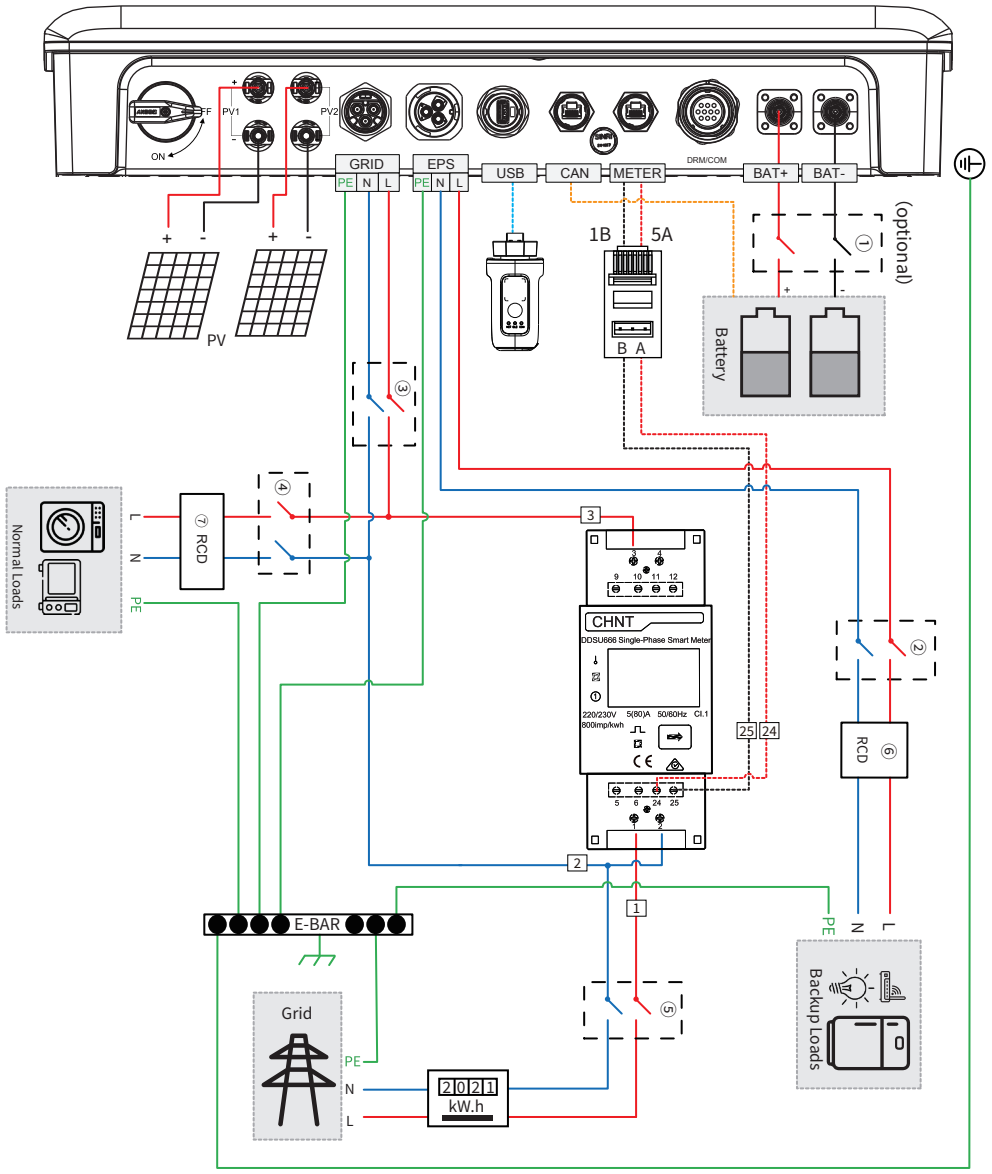
Wiring System for the Hybrid Inverter (With smart meter)

**Note:** This diagram indicates the wiring structure of the hybrid inverter instead of the electric wiring standard.



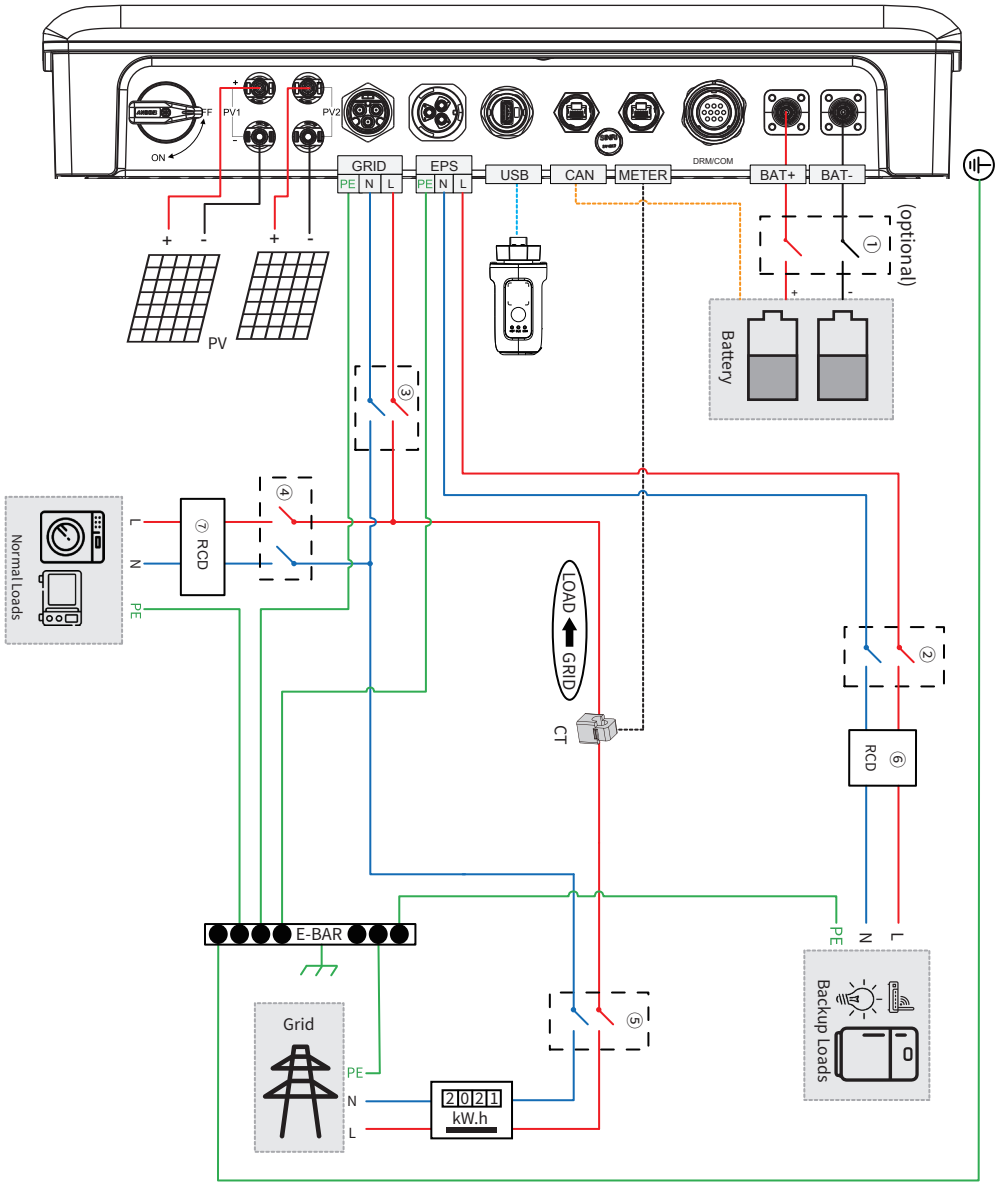

This diagram is an example for grid systems without special requirements on electrical wiring connection (with smart meter) .

**Note:** The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise the back-up function may be abnormal when the grid fails.



This diagram is an example for grid systems without special requirements on electrical wiring connection (with CT).

**Note:** The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise the back-up function may be abnormal when the grid fails.




| Model | ① (optional) | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
|---|---|---|---|---|---|---|---|
| H3000-EU | 180A/100V DC Breaker | 20A/230V AC Breaker | 40A/230V AC Breaker | Depends on Loads | Main Breaker | 40A/230V 30mA RCD (Type A) | 63A/230V 30mA RCD (Type A) |
| H3600-EU | 180A/100V DC Breaker | 20A/230V AC Breaker | 40A/230V AC Breaker | | | | |
| H4000-EU | 180A/100V DC Breaker | 25A/230V AC Breaker | 40A/230V AC Breaker | | | | |
| H4600-EU | 180A/100V DC Breaker | 32A/230V AC Breaker | 40A/230V AC Breaker | | | | |
| H5000-EU | 180A/100V DC Breaker | 40A/230V AC Breaker | 63A/230V AC Breaker | | | | |
| H6000-EU | 180A/100V DC Breaker | 40A/230V AC Breaker | 63A/230V AC Breaker | | | | |

Note

- If the battery has integrated a readily accessible internal DC breaker, then no additional ① DC breaker is required.
- The use of ⑥ ⑦ 30mA RCD is recommended but not mandatory, please comply with local regulations for the system installation.

## 5.5 Quick Checklist To Avoid Dangerous Conditions

1. The inverter must not be installed near flammable or explosive materials or near equipment with strong electromagnetic fields.

2. Remember that this inverter is heavy! Please be careful when lifting from the package.

3. Make sure that the battery breaker is off and that the nominal battery voltage meets safety requirement before connecting the battery to the inverter; make sure that the inverter is totally isolated from both PV and AC power.

4. Make sure that the inverter is totally isolated from all DC or AC power before connecting the AC cable.

5. Before connecting the CT, ensure that the AC cable is completely isolated from the AC power supply.

# Appendix

## Overvoltage category definition

| | |
|---|---|
| **Category I** | Applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level. |
| **Category II** | Applies to equipment not permanently connected to the installation. Examples are appliances, portables tools and other plug-connected equipment. |
| **Category III** | Applies to a fixed equipment downstream, including the main distribution board. Examples are switchgear and other equipment in an industrial installation. |
| **Category IV** | Applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). Examples are electricity meters, primary over-current protection equipment and other equipment connected directly to outdoor open lines. |

## Moisture location category definition

| **Moisture Parameters** | **Level** | | |
|---|---|---|---|
| | 3K3 | 4K3 | 4K4H |
| **Temperature Range** | 0~+40°C | -33~+40°C | -20~+55°C |
| **Moisture Parameters** | 5%~85°C | 15%~100% | 4%~100% |

## Environment category definition

| **Environment Condition** | **Ambient Temperature** | **Relative Humidity** | **Applied To** |
|---|---|---|---|
| **Outdoor** | -20~50°C | 4%~100% | PD3 |
| **Indoor Unconditioned** | -20~50°C | 5%~95% | Pd3 |
| **Indoor Conditioned** | -0~40°C | 5%~85% | Pd2 |

## Pollution degree definition

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

## 5.6 Disclaimer

Inverters must be transported, used, and operated under suitable environmental and electrical conditions. The manufacturer reserves the right to withhold after-sales service or assistance under the following conditions:

1. The inverter was damaged during transportation.

2. The inverter is out of warranty, or an extended warranty was not purchased.

3. The inverter is installed, modified or operated in an improper manner without authorization from the manufacturer.

4. The inverter is installed or used under improper environmental or technical conditions without authorization from the manufacturer.

5. The inverter is installed or configured in violation of the requirements mentioned in the user manual.

6. The inverter is installed and operated in violation of the requirements or warnings mentioned in this user manual.

7. The inverter is damaged by any force majeure such as lightning, earthquake, fire, storm, or volcanic eruption.

8. The inverter's software or hardware is disassembled, changed, or updated without the manufacturer's authorization.

9. The inverter is installed, used, or operated in violation of any international or local policies and regulations.

10. Incompatible batteries, loads, or other devices are connected to the inverter system.

**Note:** The manufacturer reserves the right to interpret all content in this user manual. To maintain the IP protection level, the inverter must be well-sealed, and unused terminals/holes should not be opened. Ensure no water or dust enters the terminals/holes.

## 5.7 Maintenance

### 5.7.1 Maintenance Details

To ensure optimal performance and longevity, the inverter should be maintained regularly. Follow the detailed steps below:

**Safety Note:** Before performing any maintenance, ensure the inverter is completely isolated from both PV and AC power for at least 5 minutes.

**Heat Sink:** Use a clean, dry towel to clean the heat sink annually.

**Torque:** Use a torque wrench to tighten AC and DC connections annually.

**DC Breaker:**
- Regularly check the DC breaker. Turn the DC switch on and off ten times consecutively every year to ensure proper functionality.
- Clean the contacts to extend the DC breaker lifetime.

**Waterproof plate:** Inspect and replace the waterproof plate for devices like RS485 annually.



### 5.7.2 Daily Maintenance

1. Before performing maintenance, use a multimeter and other instruments to measure the voltage between the metal parts that need to be touched or may be touched and the grounding copper bar to avoid electric shock.

2. During maintenance, pay attention to the warning labels on the inverter to prevent personal injury caused by high voltage.

3. Ensure that the DC input switch and PV switches are all disconnected during maintenance.

4. After completing maintenance, follow the normal operation steps to start the machine.

**String Inverter Maintenance Items and Cycle**

| Check parts | Check item | Check items | Treatment question | Inspection cycle |
|---|---|---|---|---|
| overall inspection | exterior | Observe whether the appearance of the inverter is damaged or deformed? | In severe cases, please replace it in time | Every six months to one year |
| | system cleaning | Is there any foreign matter or dust on the surface of the inverter box? | Clean up foreign objects and dust | |
| | | Whether the heat sink is blocked or dusty ? | Remove occlusion, clean up dust | |
| system running | operating status | Does the inveiter make abnormal noises during operation? | In severe cases, please replace it in time | Every six months to one year |
| | operating parameters | When the inverter is running, check whether the parameters are set correctly? | Exclude abnormal settings | |
| connecting part | fall off,loose | Check whether the cable connection is disconnected or loose? | Tighten the connection according to the regulations | Half a year after the first commissioning, then once every six months to one year |
| | damage | Check whether the cable is damaged, and focus on checking whether the skin of the cable in contact with the metal surface has cut marks? | In severe cases, please replace it in time | |
| | terminal | Check whether the waterproof covers of unused ports such as RS485 and RJ45 are locked? | Guaranteed to be sealed | |