SINGLE-PHASE HYBRID INVERTER

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

User Manual

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Foreword

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• 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.

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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 the 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 the product development. It is probably that there are changes of manual in the subsequent inverter edition. The latest manual can be acquired via visiting the website at https://www.hinen.com.

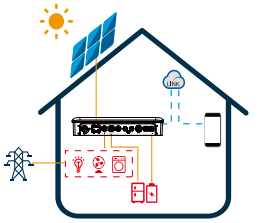
Table of Contents

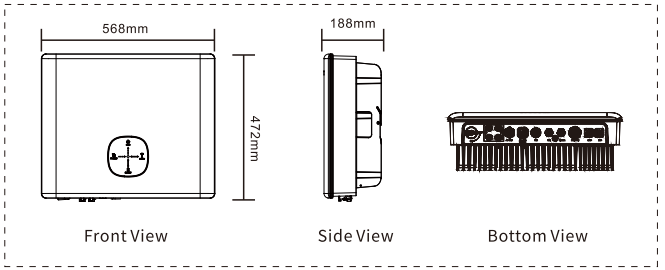
01 Introduction

The inverter is called hybrid or bidirectional solar inverter and is suitable for solar systems with participation of PV, battery, loads and grid system for energy management. Inverter should not be applicable to multiple phase combinations.

The energy produced by PV system shall be used to optimize household, excess power charges battery and the rest power could be exported to the grid. The battery shall discharge to support loads when PV power is insufficient to meet self-consumption needs. If battery power is not sufficient, the system will take power from the utility grid to support loads.

The photovoltaic energy storage inverter diagram:

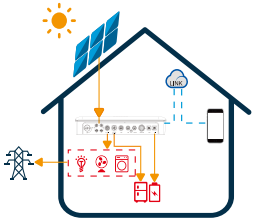




The preceding introduction describes the general operation of the inverter system. The operation mode can be changed with the APP based on the system layout. The possible operation modes for the inverter system are shown below.

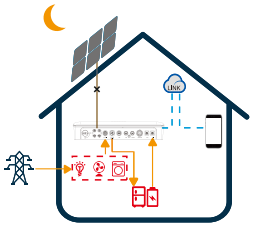
1.1 Operation Modes Introduction

The inverter normally has the following operation modes based on your configuration and layout conditions.



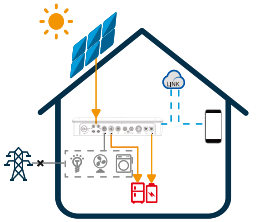
Mode I

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.



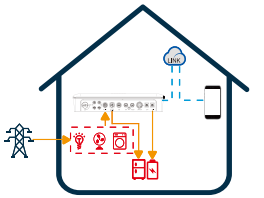
Mode II

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



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.

1.2 Safety and Warning

The inverter from strictly complies with related safety rules for product design and testing. Please read and follow all of the instructions and cautions appearing 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! 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's cover or change any components without manufacturer's authorization, otherwise the warranty commitment for the inverter will be invalid.

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

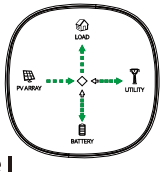
Appropriate methods must be adopted to protect inverter from static damage. Any damage caused by static is not warranted by manufacturer.

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

PV modules used on the inverter must have an IEC61730 class A rating, and the total open circuit voltage of PV string/array is lower than the maximum rated DC input voltage of the inverter. Any damage caused by PV over-voltage is beyond warranty.

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

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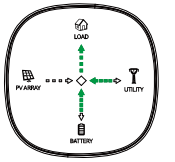
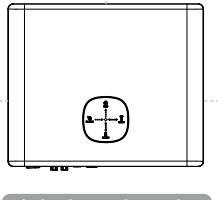
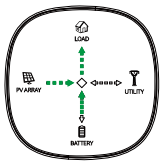


Mode II

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

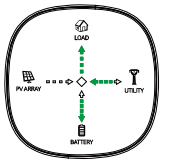


Light board modes



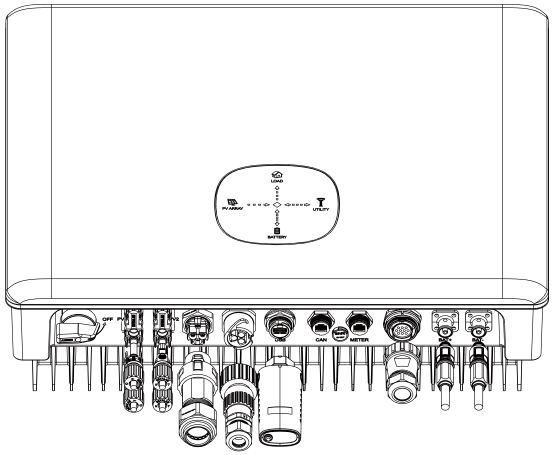
Mode III

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.

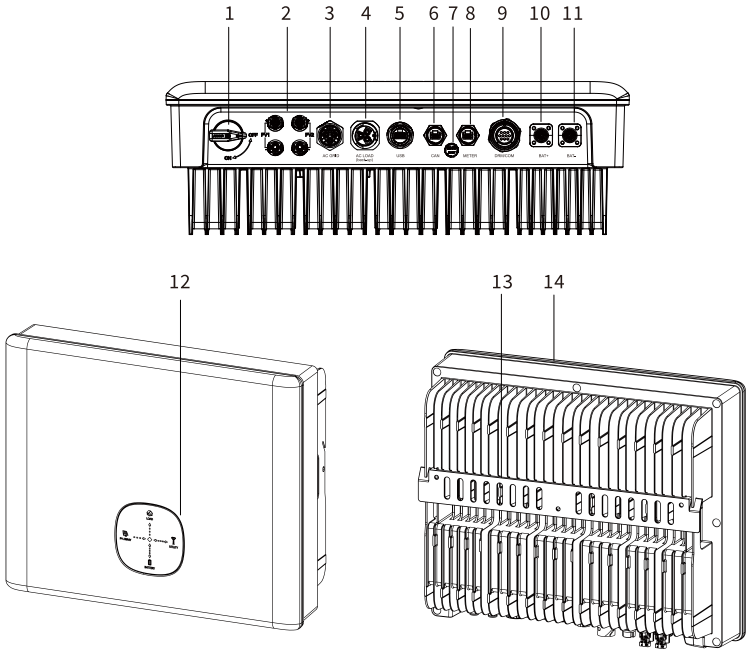


Mode IV

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



Port Diagram:

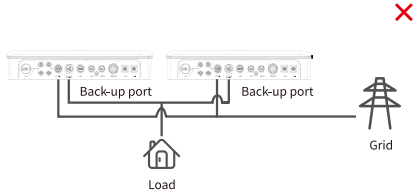


1 PV switch	6 CAN port (BMS Port)	11 Battery negative
2 PV input (PV1/PV2)	7 Waterproof permeable valve	12 LED indicator
3 On-grid terminal	8 Meter Port (CT Port)	13 Mounting plate
4 Back-up port	9 COM Port (RS485 Port/DRMS Port)	14 Heat sink
5 USB terminal	10 Battery positive	

02 Installation Instructions

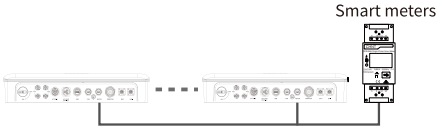
2.1 Unacceptable Installations

Please avoid the following installations which will damage the system or the Inverter. The following installations should be avoided. Any damage caused will not be covered by the warranty policy.

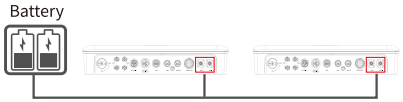


Backup cannot connect in parallel. For advanced applications, please contact our after-sales department.

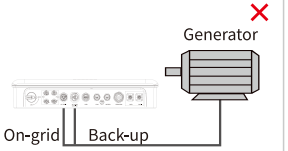
Single PV string cannot connect to multiple inverters.



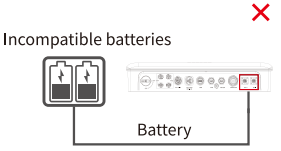
One meter cannot be connected to multiple inverters. Different CTs cannot connect to the same line cable.



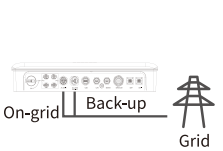
One battery bank cannot be connected to multiple inverters.



The on-Grid or backup side cannot be connected to any AC generator directly.



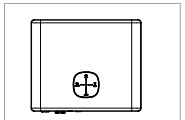
The inverter battery input must not be connected to incompatible batteries.



The backup side 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

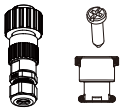

COM connector
x1


Wifi module
x1

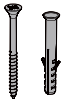

Battery positive plug x1

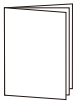

Battery negative plug x1


Grid plug
x1


EPS plug x1
Phillips Screws x4
Protective Cover x1


Screw A x1
Screw B x2

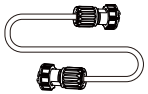

Expansion bolts
x3


User Manual x1
Quick Installation Guide x1

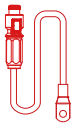

CT x1

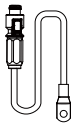

PV Disassembly Tool
x1


RJ45 Waterproof Plug
x1


Battery Communication cable x1


SC25-8 Copper Terminal x2


Red power connector with cable x2


Black power connector with cable x2


Single-phase meter
x1


Cord end terminal
x6


Battery thermal sensor x1


Meter communication cable x1

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

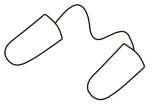
★★ Optional. Types of equipment to be applied vary in different regions. Please consult local customer service for equipment type selection.

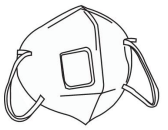
2.3 Mounting

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 Pen

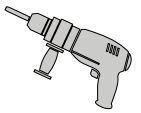

Anti-static Bracelet

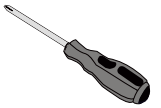

Cord Cutters


Wire Strippers

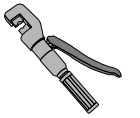

Measuring Stick


Rubber Hammer


Impact Drill


Phillips Screwdriver


Electric Screw Driver

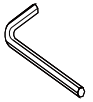

Hydraulic Pliers

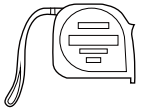

Heat Gun

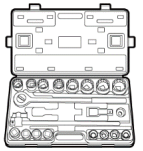

Crimping plier


MC4 PV connection wrench

Multimeter


Allen Wrench

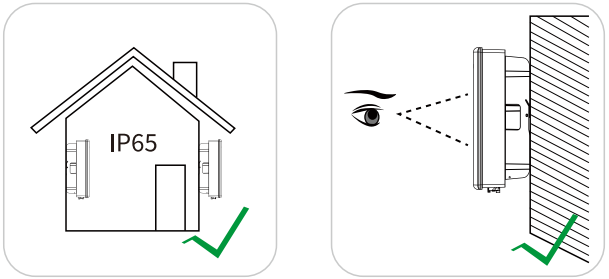

Steel Tape


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.



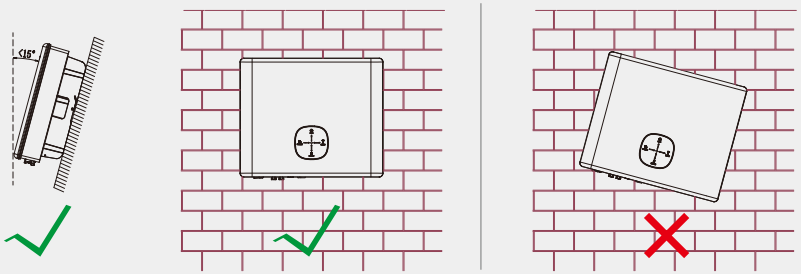
Rule 1. The inverter with IP 65 can be installed both indoors and outdoors.

> **Warning:** It is recommended that the installation of the inverter should be prevented from direct sunlight, snow, rain and other negative influences which may cause function impact or life aging.

Rule 2. Install the inverter in a convenient place for electrical connection, operation, and maintenance. Any part of this system shouldn't block the switch and breaker from disconnecting the inverter from DC and AC power.

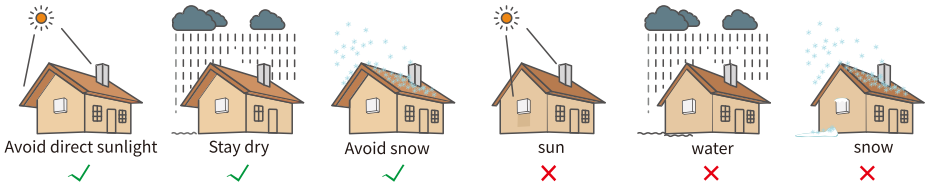
Rule 3. Inverter should be installed at eye level for convenient maintenance.

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

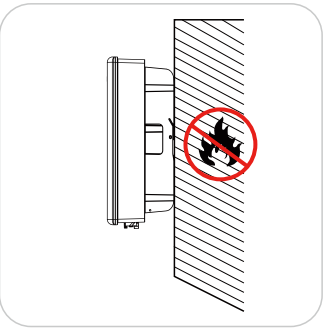


Rule 5. Inverter should be installed vertically with a max rearward tilt of 15°.

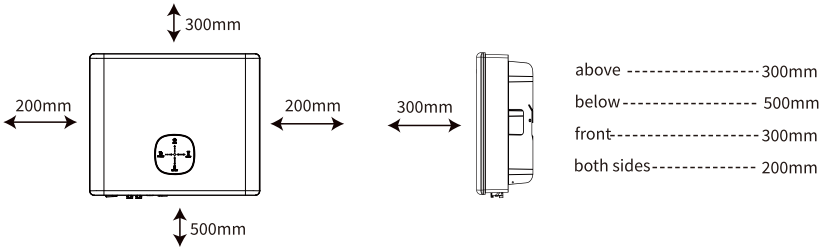
Rule 6. Ambient temperature should be lower than 45°C.(Too high ambient temperature will de-rate the inverter's power efficiency).



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.

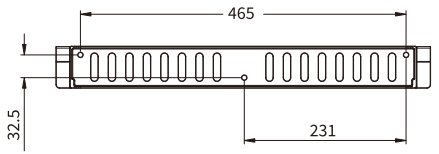
Remember that this inverter is heavy! Please be careful when lifting out from the package. The inverter is suitable for mounting on concrete or other non-combustible surfaces only.

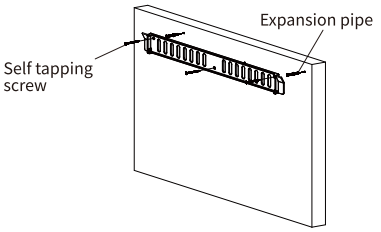
2.3.3 Mounting Inverter

Step 1

Please use the mounting bracket as a template to drill 3 holes in the correct positions (7mm in diameter and 80mm in depth). Use the expansion bolts in the accessory box and tightly attach the mounting bracket to the wall.

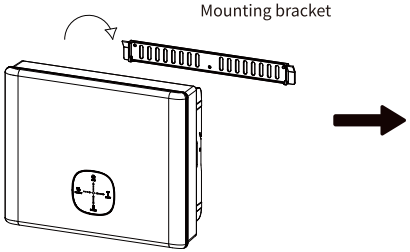
Mounting holes for mounting bracket:



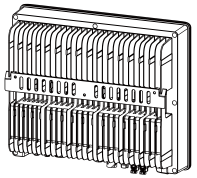


Step 2

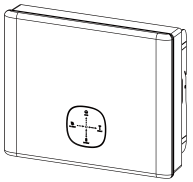
Carry the inverter by holding the heat sink on two sides and place the inverter on the mounting bracket.



Back view:

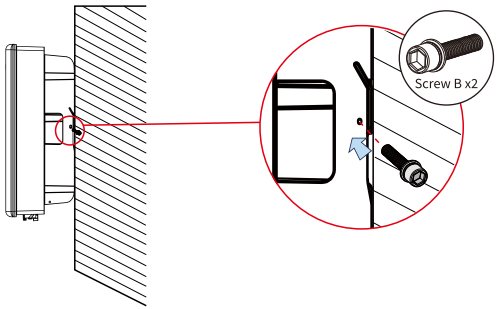


Front view:



Step 3

Use the standard security screws to lock both sides ofthe wall mountings.



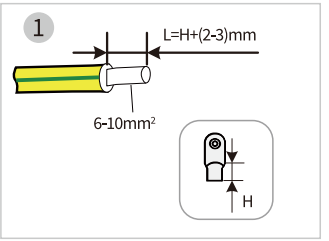
Note: After screwing the left and right screws into the holes, tighten the screws successively!

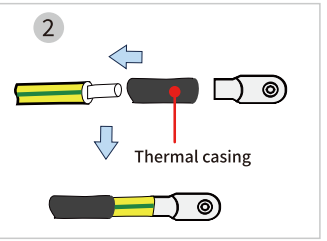
M5
3 N·m

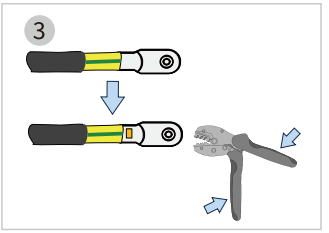
2.4 Electrical Wiring Connection

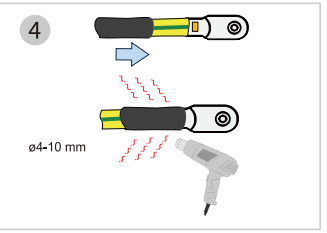
2.4.1 Grounding Connection

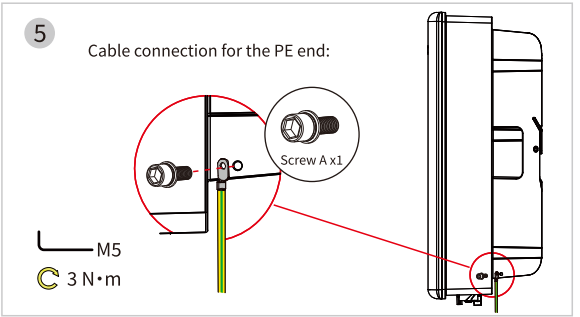
Connect the PE cable to the grounding plate at the grid side.









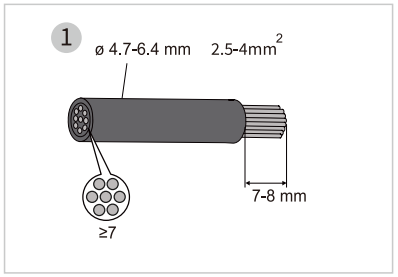


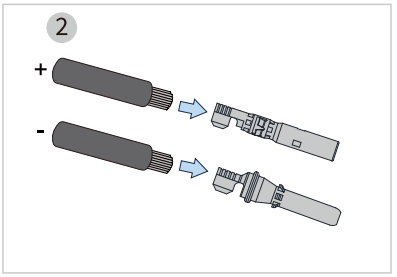
Notice: All non-current carrying metal parts and device enclosures in the PV power system should be grounded.

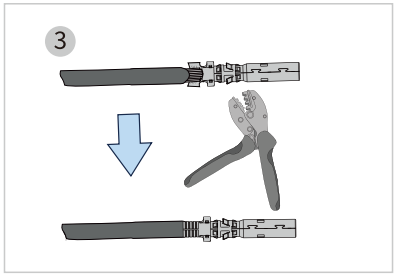
2.4.2 PV Wiring Connection

Before connecting PV panels/strings to the inverter, please make sure all requirements listed below are followed.

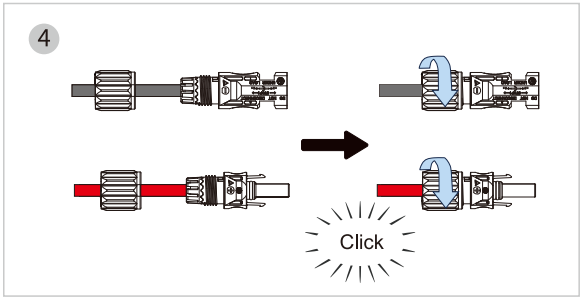
1. The total short-circuit current of a PV string must not exceed the inverter's max DC current.
2. The minimum impedance to earth of the PV module shall be greater than 19.33kΩ.
3. The PV string must not be connected to the earth/grounding conductor.
4. If the inverter is integrated with a PV switch, 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 to the device due to the use of an incompatible terminal shall not be covered by the warranty.
6. BAT plugs are similar to PV plugs. Please make sure the connectors are correct before using them.

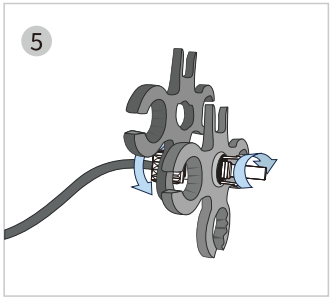




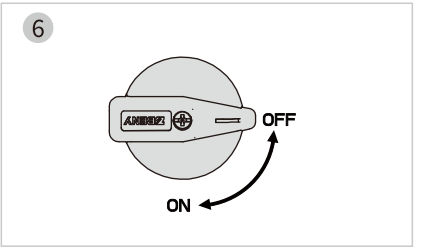


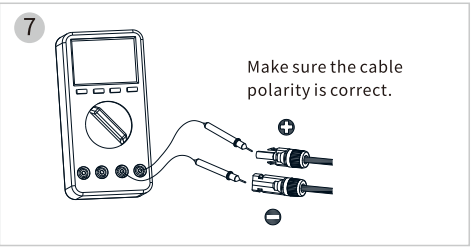
- Strip the insulation from each DC cable by 7-8 mm.
- The conductor cross-sectional area: 2.5-4 mm².
- Assemble cable ends with crimp contacts by PV terminal crimping tool.



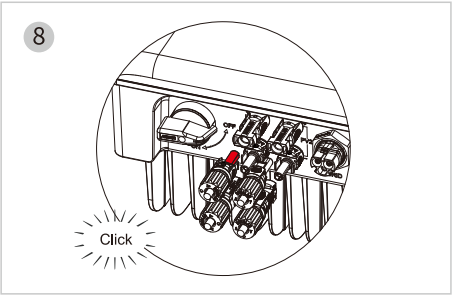


- Lead the cable through the cable gland, and insert the crimp contact into the insulator until it snaps into place.
- Tighten the cable gland and the insulator.
- Gently pull the cable backward to ensure a firm connection.





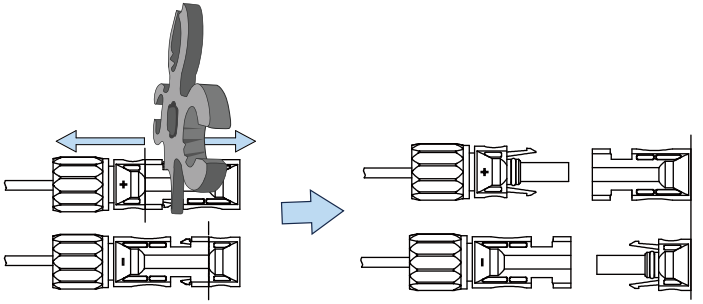
- Check the cable connection of the PV string for polarity correctness and ensure that the opencircuit voltage in any case does not exceed the inverter input limit of 550 V.



- Connect the PV connectors to the inverter. There should be a "click" sound, if they are plugged in correctly.

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

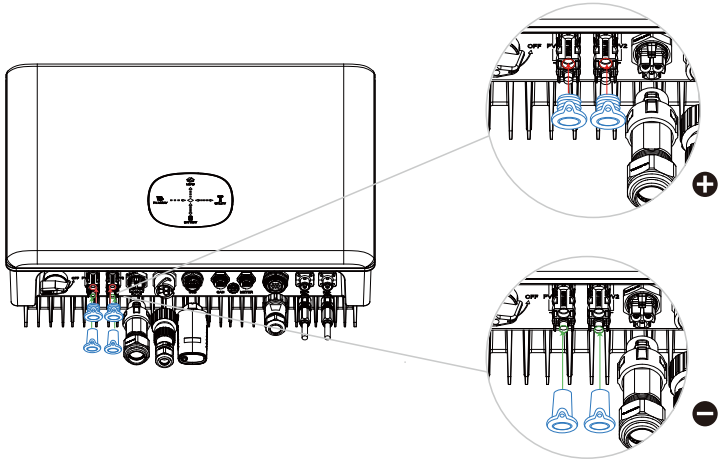
Remove the PV plugs



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.

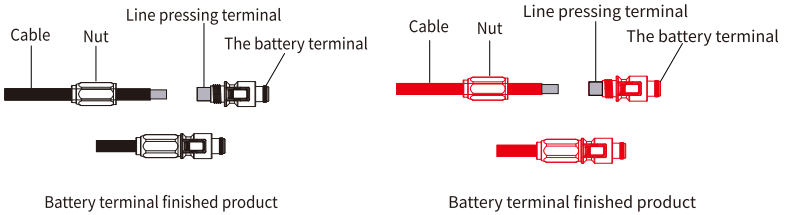
Part	Description	Value
A	Insulation outer diameter	8.1-9.7 mm
B	Insulation parts	/
C	Cross-sectional area of conductor core	25 mm^2
D	Allowable current	120A

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 25mm^2.
3. Strip cable coat, revealing 10mm length of metal core.
4. Use special crimping pliers to press the crimping terminal tightly.

Step 1

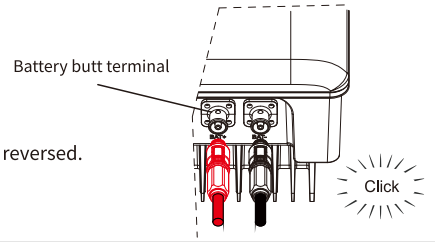


Step 2

Connect battery terminal onto inverter.

Note:

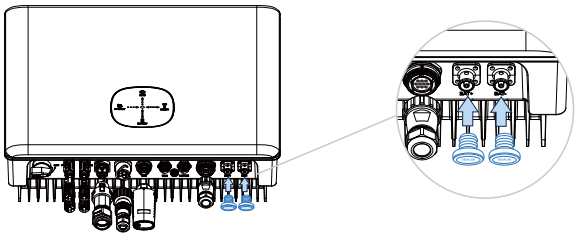
Please make sure polarity (+/-) of battery are not reversed.



* 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 escription.

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

In the following cases, the battery charging and discharging is limited to protect the battery.

- Battery SOC is lower than 1-DOD (Depth of Discharge).
- Battery voltage is lower than discharge voltage.
- Battery over heating protection.
- Battery communication is abnormal for lithium battery.
- BMS limitation for lithium battery.

When charge/discharge current limitation protection happens:

- Under on-grid mode, battery charge/discharge operation could be abnormal.
- Under off-grid mode, back-up supply will shut down.

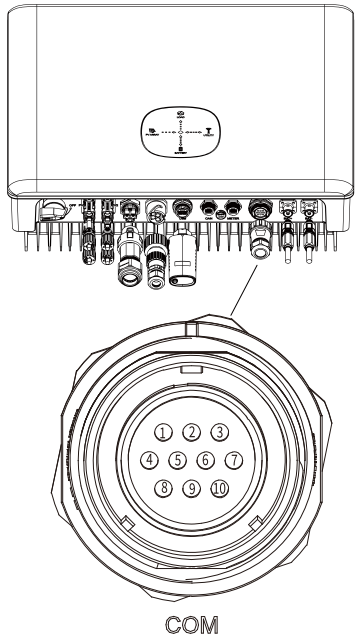
Note:

- Off-grid cut-off SOC is 20%. Batteries discharged to 20% under off-grid conditions are not allowed to be re-discharged, and will be asked to be charged by 3% to a charge of 23%, at which point only charging will still be allowed; after charging to >=25%, the batteries are allowed to be discharged.

- On-grid cut-off SOC is 10%. Grid-connected conditions when the battery is discharged to the cut-off SOC10%, at which time the battery is charged back to 13%, at which time it is not allowed to be discharged; after charging to >=15%, the battery is allowed to be discharged.

- The DOD setting of a battery prevents the inverter from discharging battery reserve power. As soon as the DOD is reached the load of building will only be supported by either PV power or the grid. If there are continuous days when little or no battery charging occurs, the battery may continue to self-consume energy to support communications with the inverter. This behavior is different between battery manufactures products, however, if the SOC of the battery reaches a certain level, the inverter will boost the SOC back-up. This protection mechanism safeguards the battery from falling to 0% SOC.

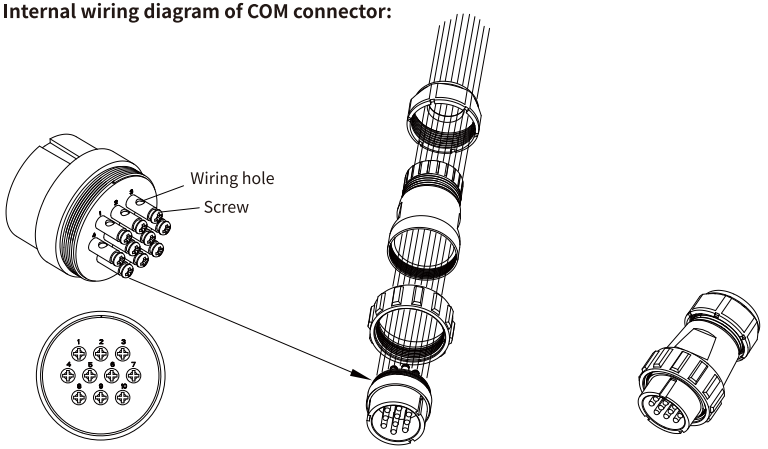
2.4.4 COM Connection Mode



① COM/DRM0
② REFGEN
③ DRM4/8
④ DRM3/7
⑤ DRM2/6
⑥ DRM1/5
⑦ EPO+
⑧ EPO-
⑨ RLY_+12V
(Dry contact positive)
⑩ RLY(Negative dry 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:



Connecting port panel | Wiring and parts installation | COM finished product

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.

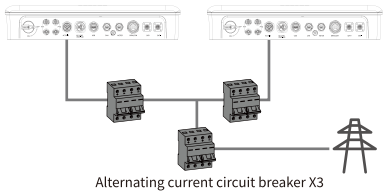
The requirements for the on-grid AC breaker are shown below.

Inverter Type Number	AC Circuit Breaker Specifications
The 6K inverter	50A / 230V (eg. DZ47-60 C32)

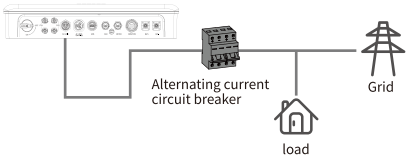
* For details of AC circuit breaker specifications for other inverter types, refer to section 5.4 System Wiring Diagrams.

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

1. Use separate AC breakers for individual inverters.



2. On the AC side, an individual breaker should be connected between the inverter and grid but before any loads.



Requirement of AC Cable Connected to On-Grid and Back-Up Side.

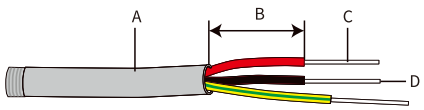
Make sure the inverter is totally isolated from any DC or AC power before connecting the AC cable.

Note:

1. Neutral cable shall be blue, line cable shall be black or brown (preferred) and protective earth cable shall be yellow-green.
2. For AC cables, PE cable shall be longer than N & L cables, so in case that the AC cable slips or is taken out, the protecting earth conductor will be the last to take the strain.

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.



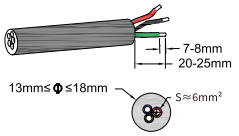
	Description	Value
A	Outer diameter	＞15mm
B	Cable length stripped	20-25mm
C	The length of the conductor	7-9mm
D	Conductor cross-sectional area	5.26-8.37mm

2.4.5.1 Grid Connection

Notice :

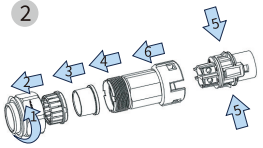
Please use the grid connector from the accessory box. Damage to the device due to the use of incompatible connector shall not be covered by the warranty.

1



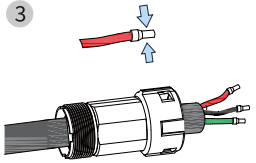
- Strip the cable sheath by 20-25 mm and the wire insulation by 7-8 mm.
- The cross-sectional area of the conductor is approximately 6 mm².

2

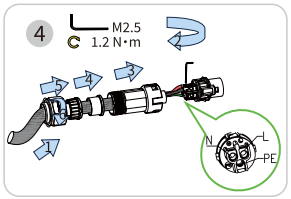


- Unscrew the grid connector counterclockwise, and disassemble the parts in sequence.

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.



• 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.

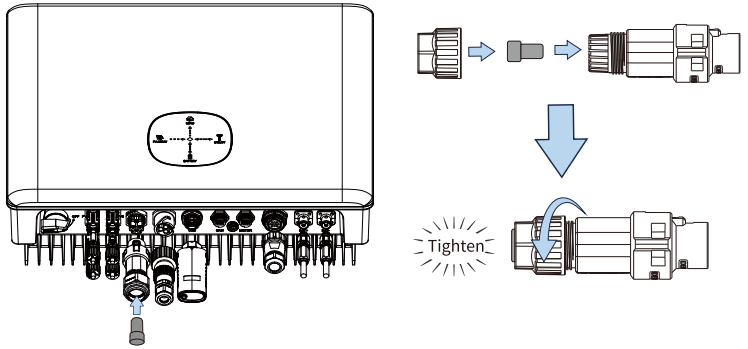
Notice:

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

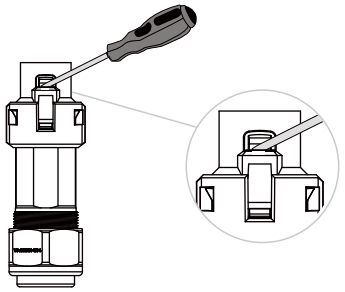
• Only with the permission of the local utility grid company, the inverter can be connected to the utility grid.

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

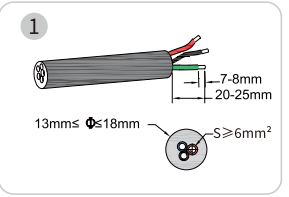
The inverter has on-grid and off-grid function. The inverter will transmit power through the GRID port when the grid is on, and it will transmit power through the back-up port when the grid is off.
A standard PV installation typically consists of connecting the inverter to both panels and batteries. When the system is not connected to the batteries, the manufacturer strongly advises that the backup function shall not be used. The manufacturer will not honor the standard warranty and will not be liable for any consequences arising from users not following this instruction.

Notice :

• Use the EPS connector from the accessory box. Damage to the device due to the use of an incompatible connector shall not be covered by the warranty.

• Make sure the EPS load power rating is within the EPS output rating, otherwise the inverter will shut down with an "overload" warning.

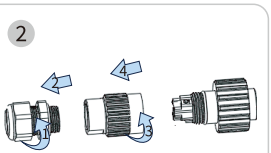
• For the nonlinear load, please make sure the inrush power should be within the EPS output power range.



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

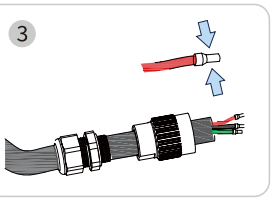
• The cross-sectional area of the conductor： ⩾6 mm².

2



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

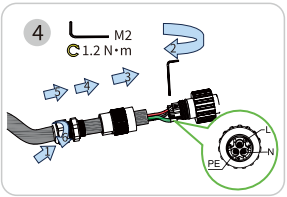
3



• 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



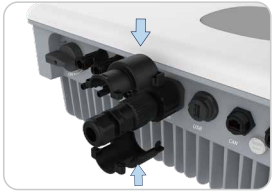
• Secure all cables to the corresponding terminals with a screwdriver at a torque of 2 N-m according to the markings on the connectors.

• Assemble the parts in order.

5

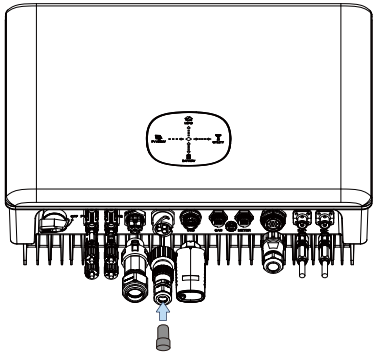
• Connect the EPS connector to the inverter and tighten it.

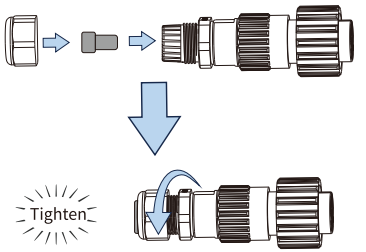
• After the AC Grid is installed, a protective cover must be added.



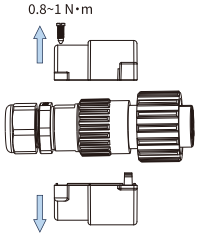
Notice:

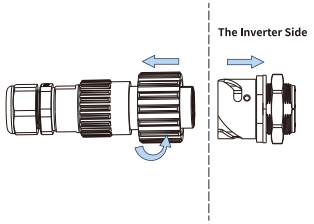
If the back-up port is not used, please install a dust plug for the EPS plug to prevent rain and dust from entering the inverter.





Remove the EPS plug





Declarations for The Back-up Function

The back-up output of the hybrid inverters has over load ability. And the inverter has self-protection derating at high ambient temperature.

1. For Hybrid inverters , the standard PV installation typically consists of the connection of the inverter with both panels and batteries. In the case where the system is not connected to the batteries, the back-up function is strongly not recommended to use. Any consequences resulting from non-compliance with this statement are excluded from the manufacturer's warranty and liability.

2. Under normal circumstances, the back-up switching time is less than 20 ms (the minimal condition to be considered as the EPS level). However, some external factors may cause the system to fail on back-up mode. As such, we recommend the users to be aware of conditions and follow the instructions as below.

- Do not connect loads when they are dependent on a stable energy supply for a reliable operation.
- Do not connect the loads which may in total exceed the maximum back-up capacity.
- Try to avoid those loads which may create very high start-up current surges such as inverter air-conditioner, high-power pump etc.
- Due to the condition of the battery itself, battery current might be limited by some factors including but not limited to the temperature, weather etc.

Acceptable Loads Are as Below

The 6K inverter is able to supply a continuous 6000VA output. The inverter also has self-protection against derating at high ambient temperature.

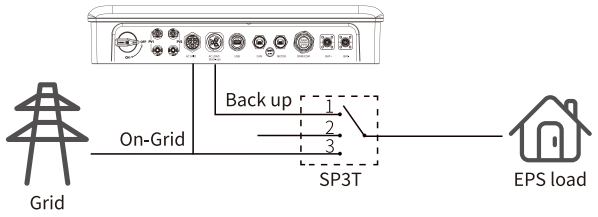
- Inductive Load: Maximum 2KVA for single inductive load, maximum 3.6KVA for total inductive load power.
- Capacitive Load: Total capacitive load (like computer, switch power etc.) power ⩽ 3.6KVA.

(Any load with high inrush current at start-up is not accepted)

Note:

To facilitate maintenance, install one SP3T switch at the off-network end and one at the grid-connected end. After the SP3T switch is installed, you can adjust the circuit breaker switch to change the load power supply mode, for example, keep the default mode, power supply from the grid, or power supply from the off-grid.

1. The EPS load is powered/supply from backup output/port.
2. The EPS Load is isolated.
3. The EPS load is powered/supply from the grid.



Note

When the output of the off-network end is to gear 3 (grid-connected end), so that the EPS load can work normally.

2.4.6 CT (Current Transformer) & Smart Meter

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

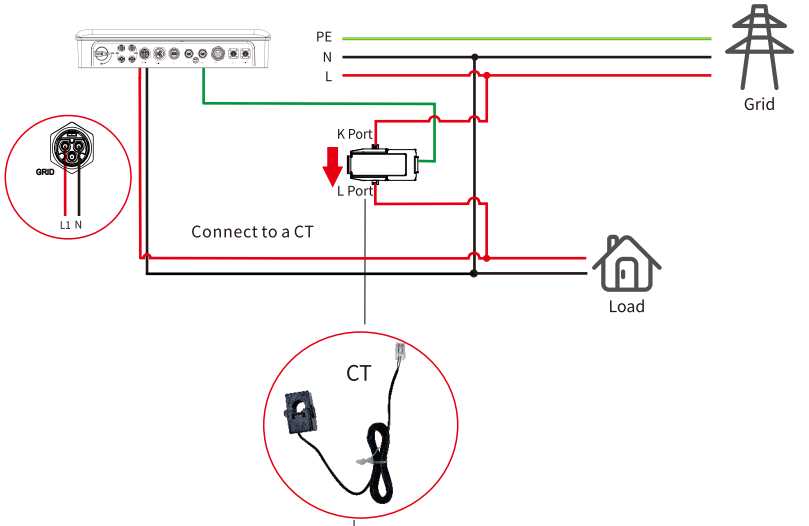
To control the flow of energy between the system and the grid, there are two current sensing schemes: one with only CT and the other with only the smart meter. Please choose which scheme to use according to the actual situation.
The CT (current transformer) in the product package must be installed when 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:

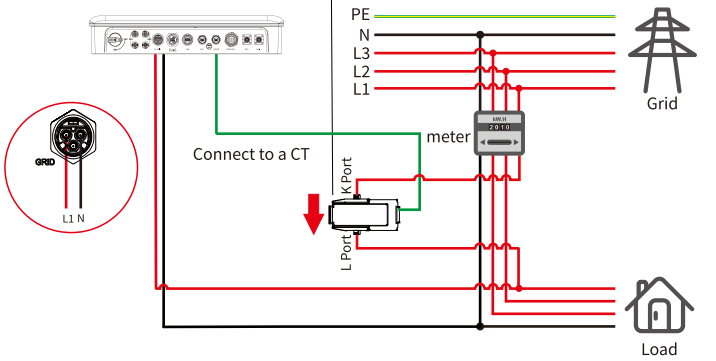
1. Please read the related instructions carefully when using CT.
2. One CT can only be used for one inverter.

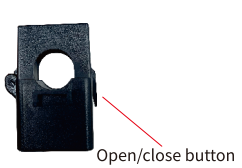
CT connection diagram(Plan 1)

- For Single Phase Grid



- For Three Phase Grid





CT closed state

CT open state
(Line crossing port)

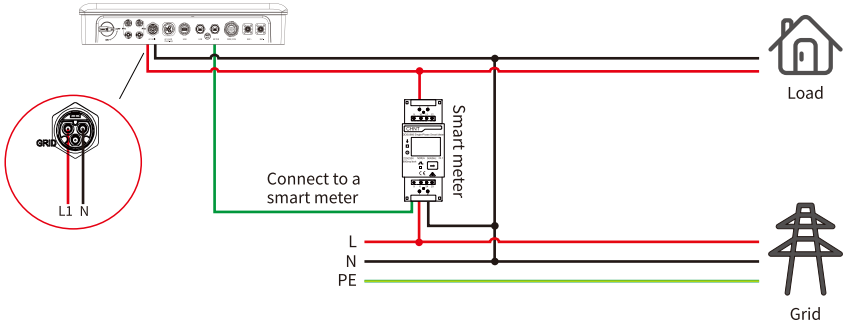
CT current direction
(Direction of arrow)

Note:

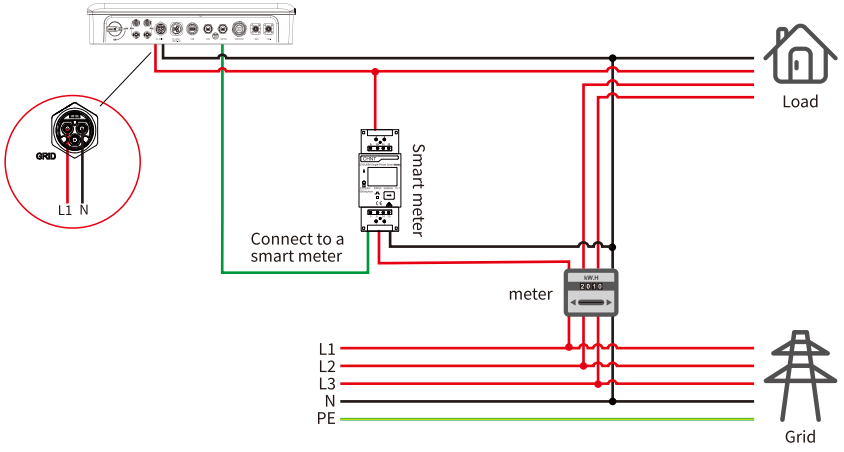
1. Please use the product package with 1 CT and the line length is 5 meters.
2. Read the CT manual carefully when using the CT.
3. The CT products in Plan 1 can be used independently.

Smart Meter connection diagram(Plan 2)

・For Single Phase Grid



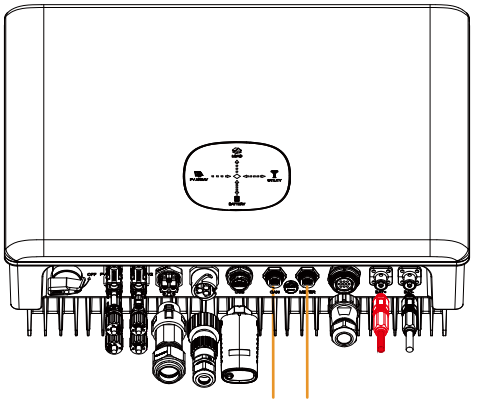
・For Three Phase Grid

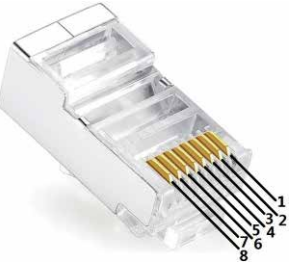


Note:
When using this solution, please follow the product usage rules and smart meter usage instructions.

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 electricity meter or current transformer

Please refer to the table above when reading the following:

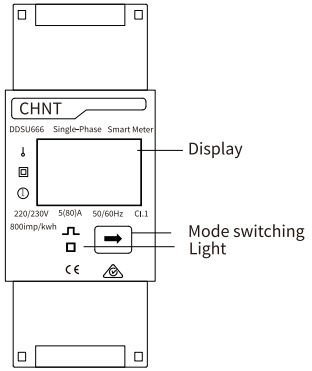
1. Pins with different serial numbers of the crystal head correspond to lines of different colors for connection,for example: Pin 1 = orange -white, Pin 5 = blue-white, Pin 8 = brown.

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) :



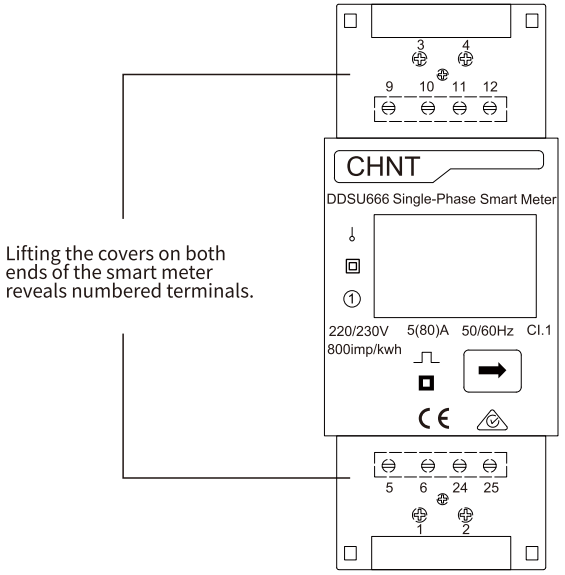
When communication connects, the shielded copper network twisted pair wire should be used, the wire diameter is not lower than the copper network 0.5mm^2. In the wiring, the communication line should be far away from strong electric field like strong cable. Maximum transmission distance is 1200m.

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 electricity meter is connected correctly.

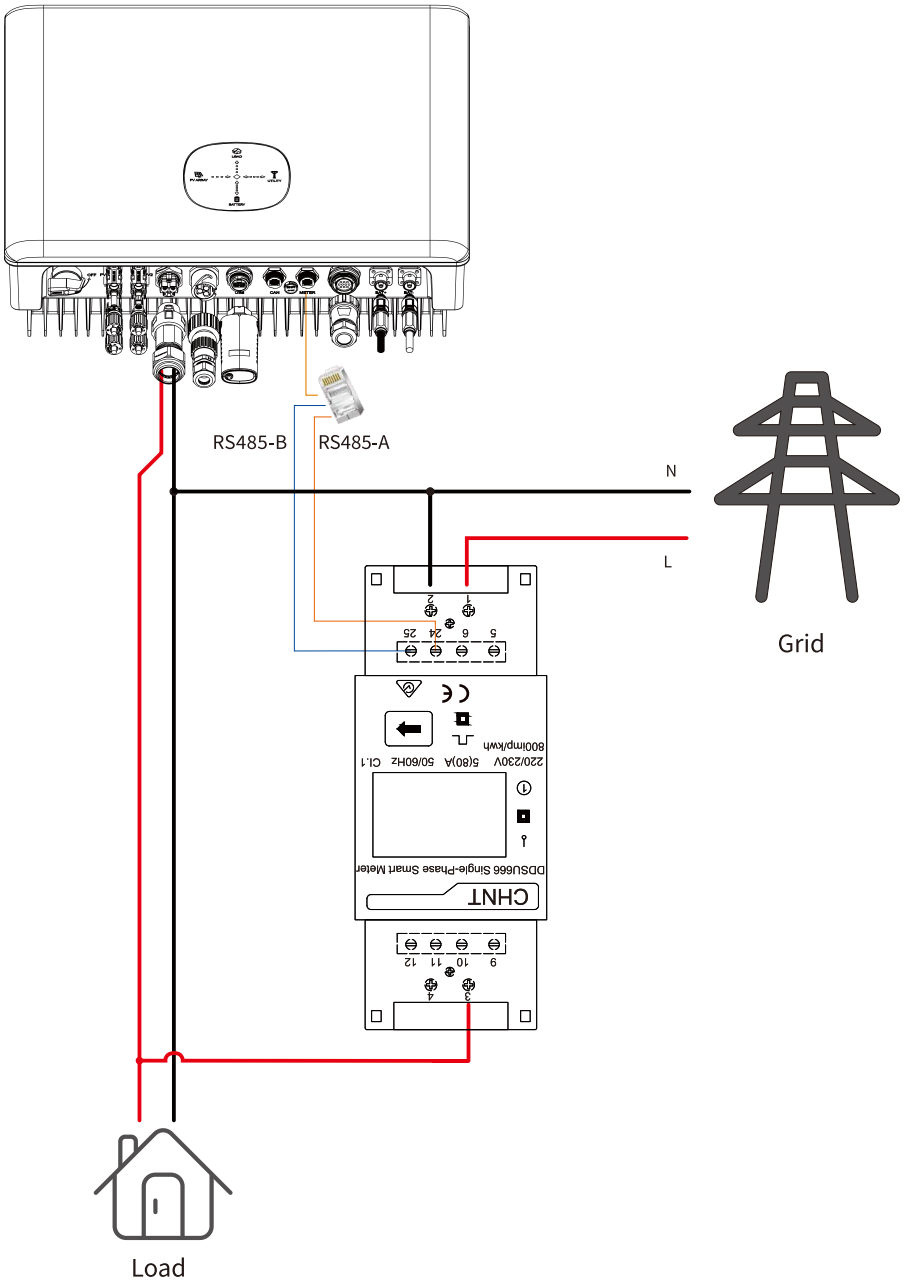
Note: Please refer to DDSU666 Single-Phase Instruction Manual - Photovoltaic for detailed usage of smart meters.

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:



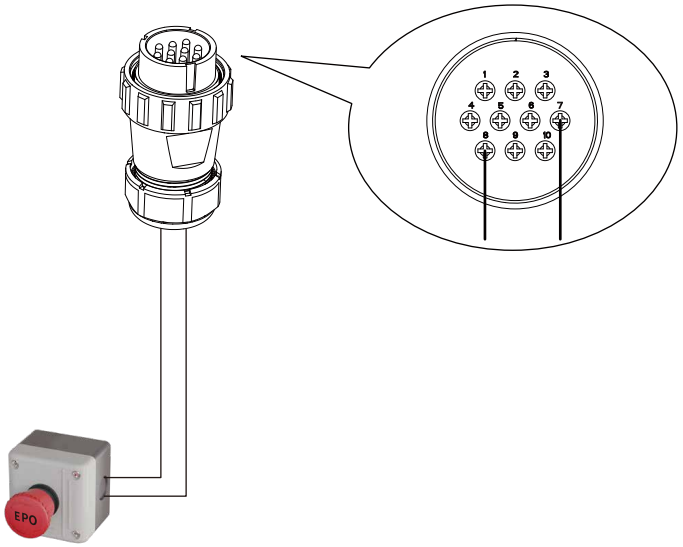
Note: Wiring must follow the above wiring rules.Otherwise, the inverter would run abnormally.

2.5 Earth Fault Alarm Connection

The inverter complies with IEC 62109-2 13.9. In the event of a ground fault in the inverter, Fault indicator LED on inverter cover will light up.Inverter should be installed at eye level for convenient maintenance.

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 a product optional accessory, please contact HINEN if required.

2.7 Battery Connection Mode

Please be clear which kind of battery system you want, lithium battery system or lead-acid battery system, if you choose the wrong system, the inverter system can't work normally.

2.7.1 Lithium Battery System Connection

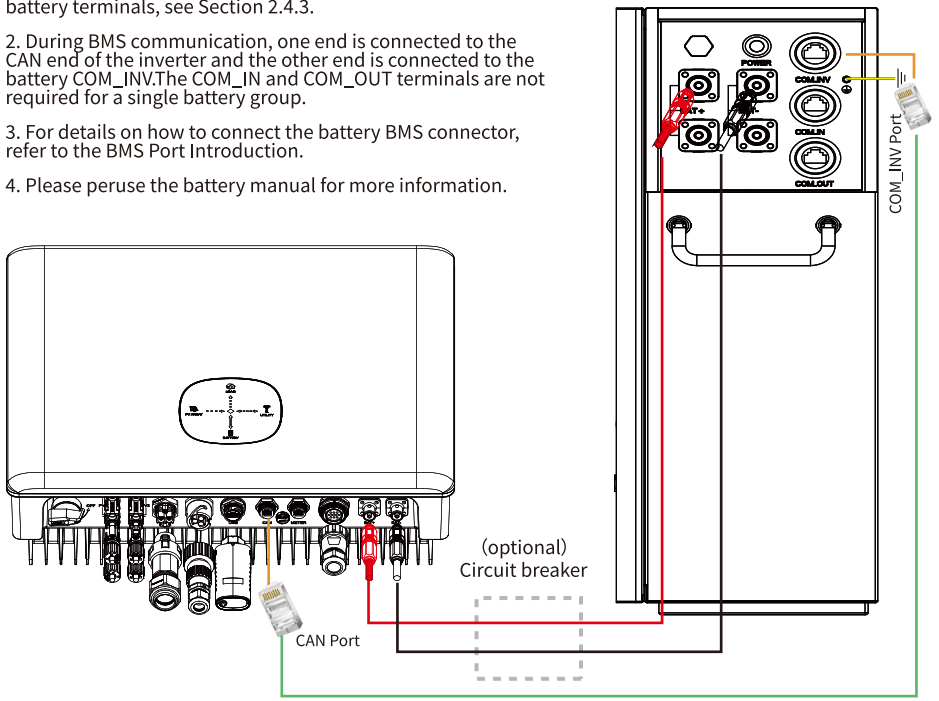
2.7.1.1 Single Battery Connection

1. For details about how to connect the positive and negative battery terminals, see Section 2.4.3.

2. During BMS communication, one end is connected to the CAN end of the inverter and the other end is connected to the battery COM_INV.The COM_IN and COM_OUT terminals are not required for a single battery group.

3. For details on how to connect the battery BMS connector, refer to the BMS Port Introduction.

4. Please peruse the battery manual for more information.



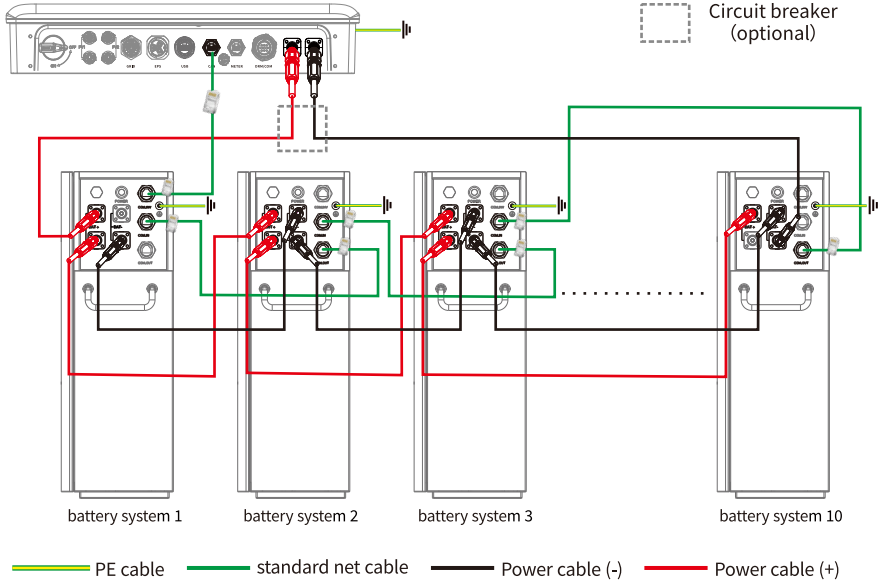
2.7.1.2 Multiple Battery Cables Connection

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

2. When the host 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 host COM_IN.

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

4. Please peruse the battery manual for more information.



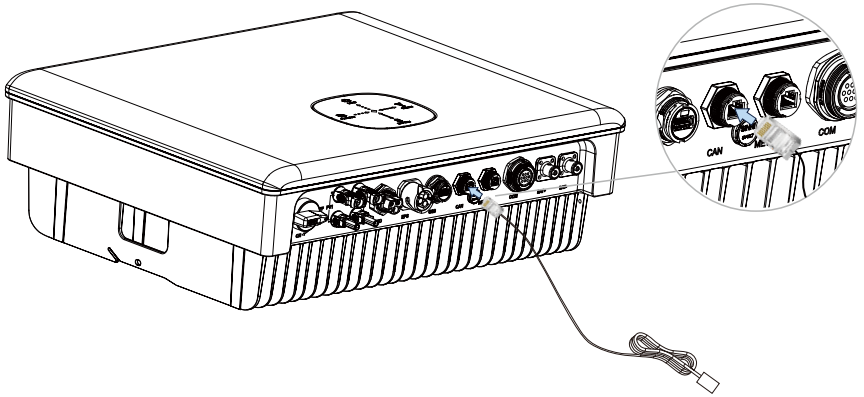
Notice: All non-current carrying metal parts and device enclosures in the energy storage system should be grounded.

2.7.2 Lead-acid Battery System Connection

1. For details about how to connect the positive and negative battery terminals, see Section 2.4.3.

2. Please use the temperature thermal sensor of the lead-acid battery to check the ambient temperature of the lead-acid battery to ensure safety.

3. For details on how to connect the battery BMS connector, refer to the BMS Port Introduction.



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.

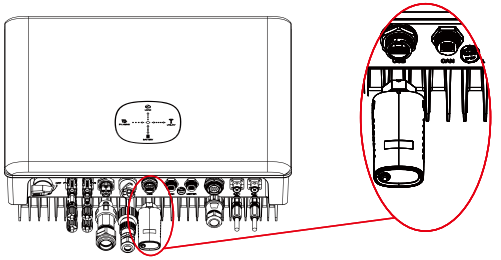
3. The cable is approximately 2 metres long, so be aware of the distance between the battery and the inverter.

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

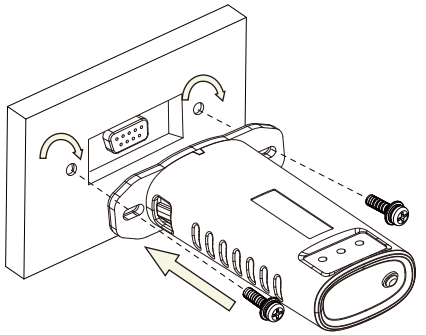
The WIFI communication function is only applied to WIFI Module.



2.8.1 Stick Logger Installation

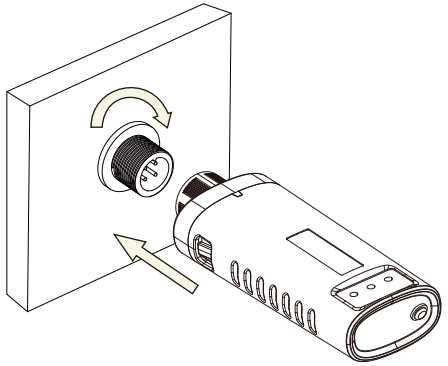
Type 1

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



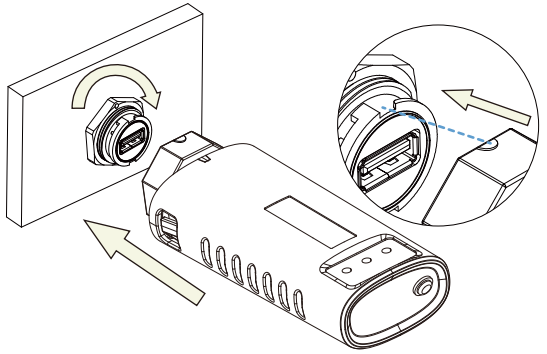
Type 2

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



Type 3

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



2.8.2 Logger Status

Check Indicator light

Lights	Implication	Status Description(All lights are single green lights.)
● NET	Communication with router	1.Light off: Connection to the router failed. 2.On 1s/Off 1s(Slow flash): Connection to the router succeeded. 3.Light keeps on: Connection to the server succeeded. 4.On 100ms/Off 100ms(Fast flash): Distributing network fast.
● COM	Communication with inverter	1.Light keeps on: Logger connected to the inverter. 2.Light off: Connection to the inverter failed. 3.On 1s/Off 1s(Slow flash): Communicating with inverter.
● READY	Logger running status	1.Light off: Running abnormally. 2.On 1s/Off 1s (Slow flash): Running normally. 3.On 100ms/Off 100ms(Fast flash): Restore factory settings.

The normal operation status of the stick logger, when router connected to the network normally:
1.Connection to the server succeeded: NET light keeps on after the logger powered on.
2.Logger running normally: READY light flashes.
3.Connection to the inverter succeeded: COM light keeps on.

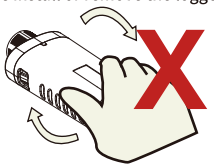
2.8.3 Abnormal State Processing

If the data on platform is abnormal when the stick logger is running, please check the table below and according to the status of indicator lights to complete a simple troubleshooting. If it still can not be resol-ved or indicator lights status do not show in the table below, please contact Customer Support.

(**Note:** Please using the following table query after power-on for 2mins at least.)

NET ● NET	COM ● COM	READY ● READY	Fault Description	Fault Cause	Solution
Any state	OFF	Slow flash	Communicate with inverter abnormally	1.Connection between stick logger and inverter loosen. 2.Inverter does not match with stick logger's communication rate.	1.Check the connection between stick logger and inverter. Remove the stick logger and install again. 2.Check inverter's communication rate to see if it matches with stick logger's. 3.Long press Reset button for 5s, reboot stick logger.
OFF	ON	Slow flash	Connection between logger and router abnormal	1.Stick logger does not have a network. 2.Router WIFI signal strength weak.	1.Check if the wireless network configured. 2.Enhance router WIFI signal strength.
Slow flash	ON	Slow flash	Connection betwe-en logger and router normal, connection between logger and remote server abnormal.	1.Router networking abnormal. 2.The server point of logger is modified. 3.Network limitation, server cannot be connected.	1.Check if the router has access to the network. 2.Check the router's setting, if the connection is limited. 3.Contact our customer service.
OFF	OFF	OFF	Power supply abnormal	1.Connection between stick logger and inverter loosen or abnormal. 2.Inverter power insufficient. 3.Stick Logger abnormal.	1.Check the connection, remove the stick logger and install again. 2.Check inverter output power. 3.Contact our customer service.
Fast flash	Any state	Any state	Networking status	Normal	1.Exit automatically after 2mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.
Any state	Any state	Fast flash	Restore factory settings	Normal	1.Exit automatically after 1mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.

⚠ **Warning:**
Please do not hold the logger body to rotate while install or remove the logger.



⚠ **Notice:**
Do not remove waterproof plug.

03 Commissioning

3.1 Inspection Before Commissioning

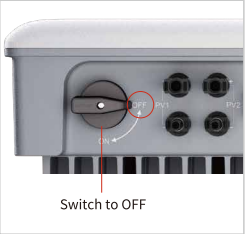
3.1.1 Connection Check

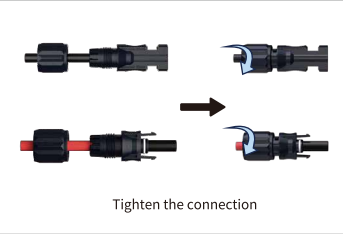
PV Side

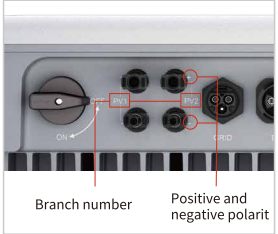
1. Before checking, make sure that the DC switch and the breaker of the combiner box on the AC side are disconnected. Prevent electric shock.

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

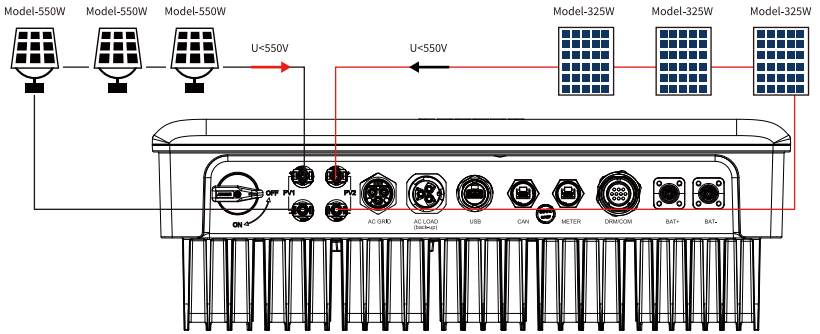
3. When wiring the DC side, pay attention to the positive and negative polarity of the cables and the connection sequence of the components, which correspond to the numbers of the branch terminals at the lower end of the inverter. Avoid cross wiring or reverse polarity.







Risk Of Weak Wiring



Photovoltaic Module Access Requirements

1. Under the same MPPT, modules with consistent photovoltaic characteristics should be used for connection.

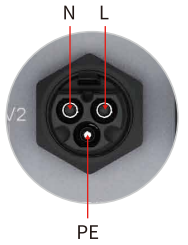
2. Under the same MPPT, ensure that the number of photovoltaic modules connected is consistent; the number of photovoltaic modules connected to different MPPTs cannot exceed one.

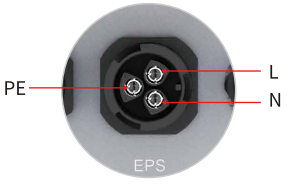
3. The maximum open circuit voltage of each branch cannot be greater than 550VDC under any circumstances.

AC Side

1. The definition marks of each terminal can be observed on the AC connection terminal. When connecting, pay special attention to the position of the L, N, and PE cables to ensure that the cables are connected correctly without wrong connection or missing connection. The screws on the terminals are tight and there is no looseness.

2. When the AC plug is inserted into the inverter, make sure that the latch is locked firmly.





Battery Side

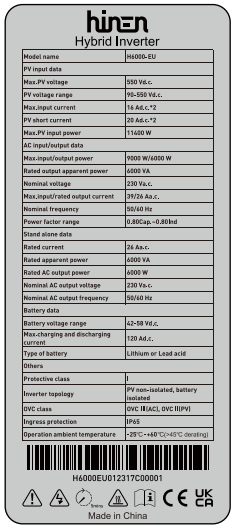
1. The battery cable must distinguish the positive and negative poles and connect them accordingly.

2. When pressing the terminal, it is necessary to press and hold the waterproof cover firmly. When connecting, the terminal needs to be pushed to the top until the sound of fastening is heard.

3.1.2 Electrical Inspection

Observe the lable of the single-phase inverter. When wiring, electrical inspection should be cartied 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.

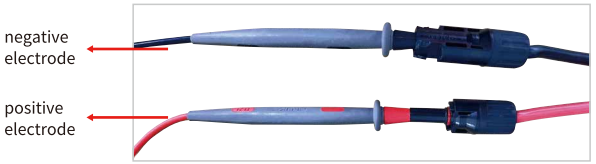


Nameplate

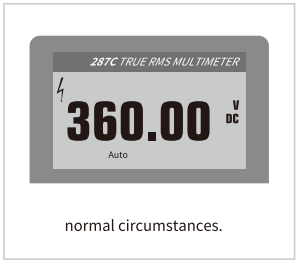
PV Side

Open circuit voltage and polarity

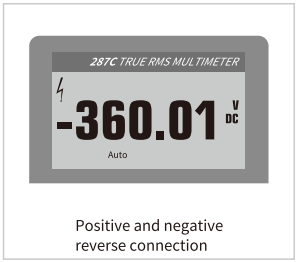
・Turn the multimeter to the DC position, connect the red test lead (positive pole) to the positive pole of the string, and connect the black test lead (negative pole) to the negative pole of the string, and the displayed voltage is the current open circuit voltage.



・In the following figure, the multimeter displays the current open circuit voltage of 360V, the red test lead is connected to the positive pole, the black test lead is connected to the negative pole, and the positive and negative polarities are correct; if the positive and negative poles are reversed, the multimeter will display -360V. It is forbidden to turn on the inverter at this time, and you need to contact the construction unit to rectify the cables.



normal circumstances.



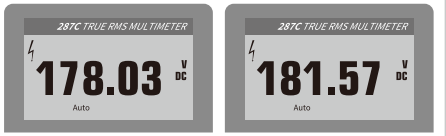
Positive and negative reverse connection

Checking Method for String Grounding

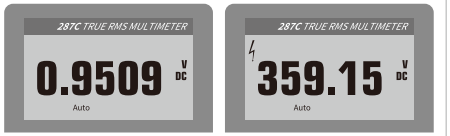
・Turn the multimeter to the DC voltage position, put the red test lead on the measured cable, and the black test lead on the ground terminal. Under normal circumstances, the voltage to ground is half of the open circuit voltage, and the voltage gradually decreases during measurement.

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

・Grid connection is allowed after the rectification is completed and no grounding condition is checked. It is strictly forbidden to connect to the grid before the grounding condition is not resolved.



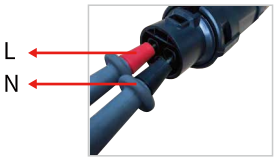
Normal string display

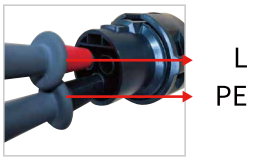


Abnormal string display

AC Side

・Turn the multimeter to the AC voltage range, put the red test lead on the L line of the grid terminal, and the black test lead on the N line, and the displayed voltage is the grid voltage. Then, the red test lead does not move, and the black test lead is placed on the PE line, and the displayed voltage should be similar to the grid voltage. f the measured voltage is not within the normal voltage range, please check and correct the wiring and then measure again.





・As shown in the figure below, when the line sequence wiring is correct, the measured voltage values are 230.2V and 230.38V; when the Land N lines are reversed, the measured voltages are 230.13V and 1.26V.

Normal circumstances

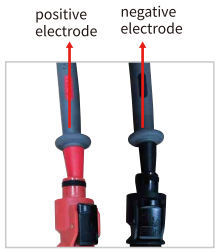
L, N reversed

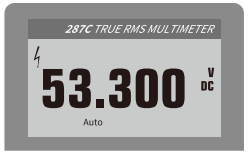
Battery Side

Open circuit voltage and polarity

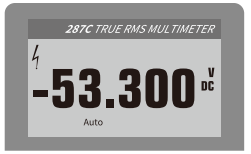
・Turn the multimeter to the DC position, connect the red test lead (positive pole) to the red terminal of the battery, and connect the black test lead (negative pole) to the black terminal of the battery, and the displayed voltage is the battery voltage.

・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, the black test lead is connected to the negative pole, and the positive and negative polarities are correct; if the positive and negative poles are reversed, the multimeter will display -53.3V, It is forbidden to connect the battery at this time, and you need to contact the construction unit 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 that the AC voltage is within the specified range.

・ Must turn on the Battery DC breaker before turning on the Solar DC switch and the Grid AC switch.

・ When installing the power cable, pleasenote that the red connection level ispositive(+); Black wire with negativeelectrode (-).

After ensuring that the electrical connection is completed normally, perform the power-on operation to turn on the inverter.

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 there is).
3. Set the "PV SWITCH" of the inverter to "ON".
4. Turn on the external AC circuit breaker, and the inverter lamp board will self-check.
5. After the self-Inspection is completed, the PV and GRID flowing led light are always on, and the intermediate status lights are always on and wait for grid connection.
6. When 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. The APP sends a power-on command. (The first installation will start by default)
8. After passing the 2-3min self-inspection, it will be connected to the grid, the LOAD flow lights will tight 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 

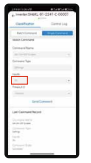
"PV SWITCH" set to "ON"

② 

Connect to the grid

③ 

Battery on

④ 

APP input boot command

⑤ 

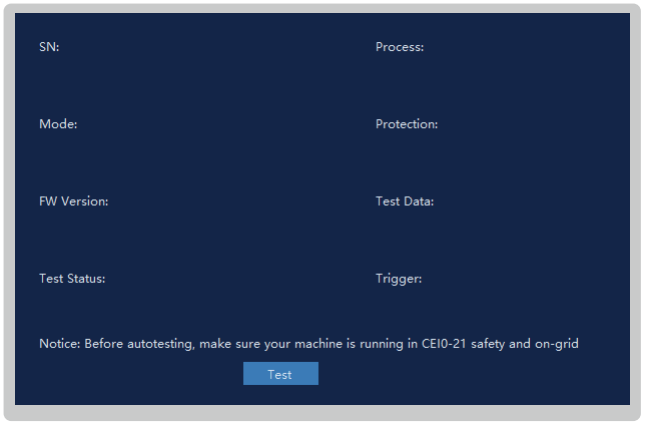
Operating status

3.2.2 Auto Test

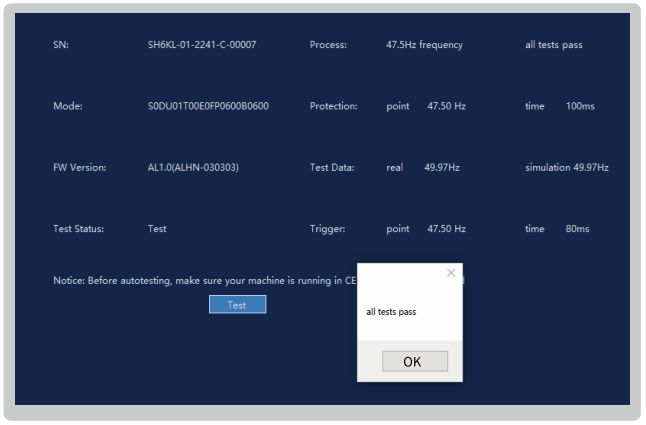
• Any user can activate the self-test function, but if the inverter needs to be checked, follow the operator's instructions to perform an automatic test.

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.

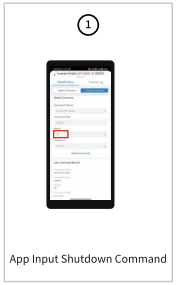
If maintenance or inspection is required, please follow the steps below to shut down the machine.

Shutdown Steps:

1. Send a shutdown command through the data collector or near-end APP software to shut down the inverter.
2. Disconnect the PV circuit breaker and put the "PV SWITCH" in the "OFF" state.
3. Turn off the circuit breaker between the inverter and the grid.
4. Press and hold the battery POWER BUTTON connected to the inverter for 3 seconds to turn off the battery.
5. Switch off the battery circuit breaker.
6. Check the inverter operating status.
7. Wait until all LEDs and OLEDs go out to ensure the inverter has shut down completely.

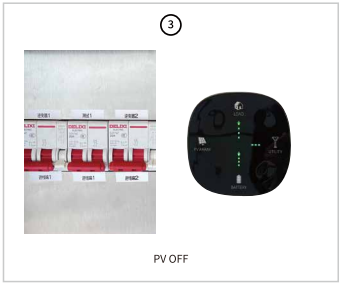
Precautions

- When powering off the system, be sure to follow the operating instructions and safety regulations.
- After the inverter is shut down, there will be residual power and residual heat in the chassis, which may cause electric shock or burns. Please make sure the inverter is fully discharged, or operate the inverter after 5 minutes.

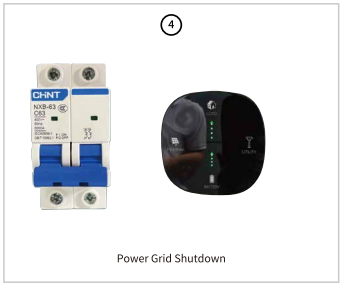


App Input Shutdown Command

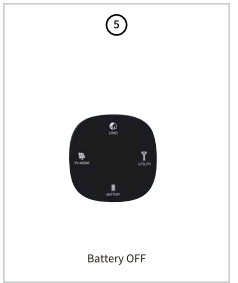
Switch OFF



PV OFF



Power Grid Shutdown

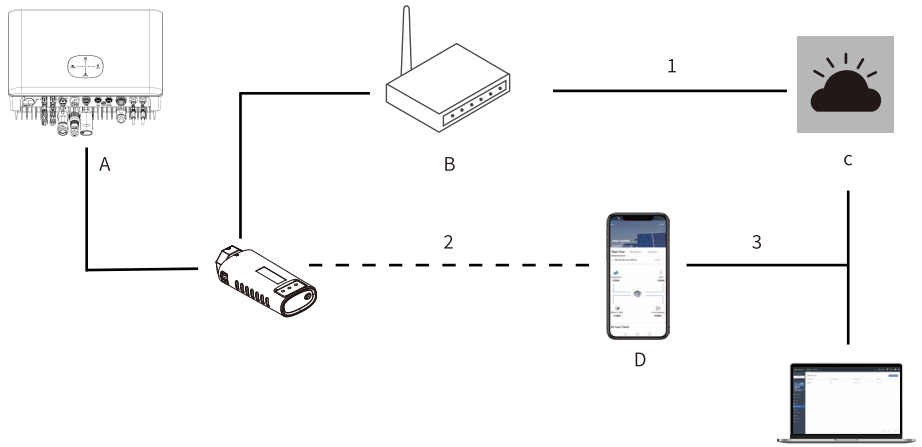


Battery OFF

04 APP

4.1 Internet Connection

With the WIFI module installed, view corresponding information through SOLARMAN APP or SOLARMAN WEB.



A: Inverter
B: Router/Switch
C: SOLARMAN server
D: SOLARMAN APP
E: SOLARMAN WEB

1: Internet
2: Local access
3: Remote

4.2 APP Preparation

4.2.1 Download & Use The APP

Method 1

Download and install the App through the following application stores:

- MyApp (Android, mainland China users).
- Google Play (Android, users other than mainland China ones)
- App Store (iOS)

Method 2

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

SOLARMAN Smart

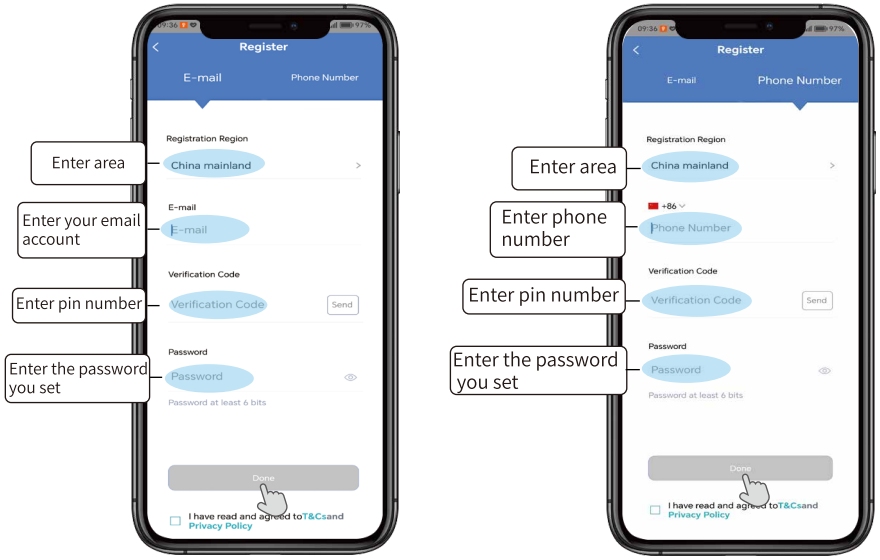
SOLARMAN Business

- The App icon appears on the home screen after installation.

Notice:
1. The screenshots in this manual are based on the V1.10.29 application for Android, and the actual interface may differ.
2. The setup instructions in this manual may not be the latest version, if you need any help, please contact HINEN for the latest version.

4.2.2 User Registration

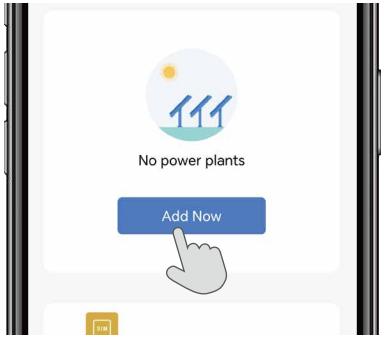
There are two ways to register: email registration and mobile phone number registration. Enter your mobile phone number or email account number, get the corresponding SMS verification code, set a password yourself, and click "I have read and agreed to accept T&Cs and Privacy Policy" and "Done" to complete the registration.

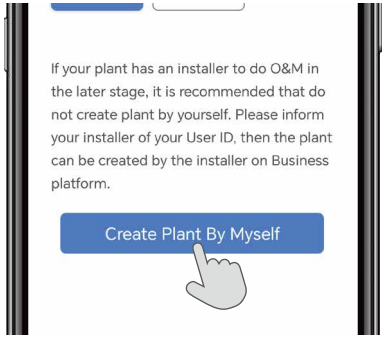


4.3 Plant Creation

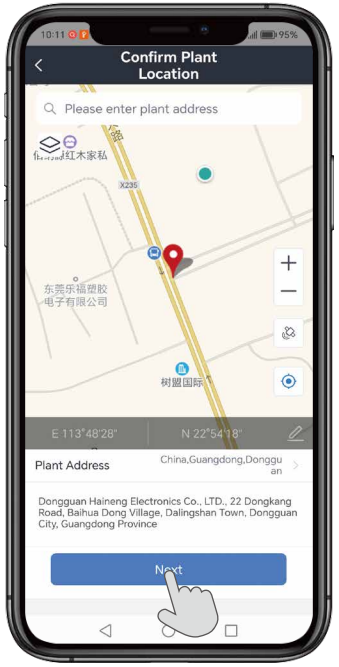
1

After successful login, enter the main interface, please click the "Add Now" button to enter the add power plant interface. Please choose whether the installer is responsible for the post operation and maintenance of the power plant according to the actual situation.

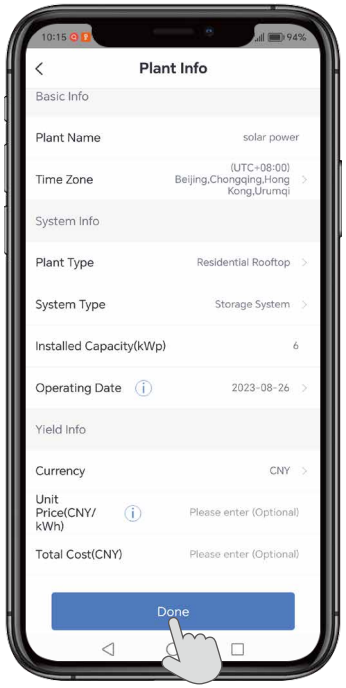




2



The system will automatically start positioning to confirm the location of the power plant. If the address positioning is not accurate, you can choose to select manual positioning.

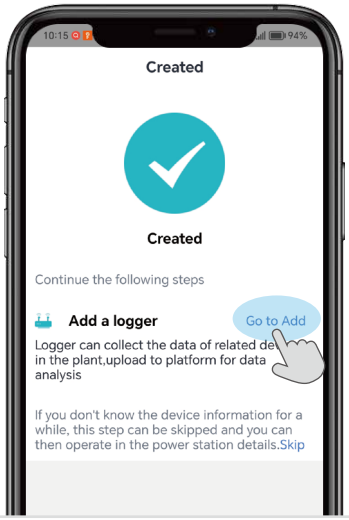


3

After determining the location of the power plant, enter the power plant information. Please fill in according to your equipment information, and consult the installer if you have any questions.

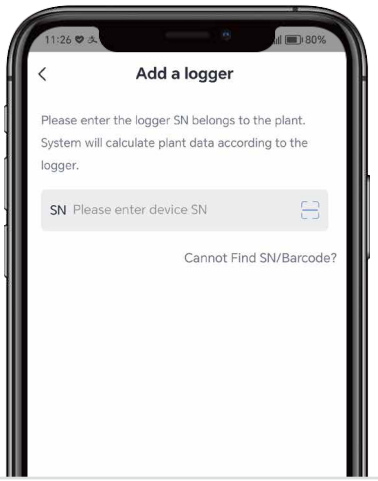
Take the 6KW Single-Phase Hybrid Solar Inverter as an example. First, give the power plant a name, and then select "Storage System" as the grid-connected type, fill in "6" for the installed capacity according to the model. Fill in the income information according to the local electricity fee, and click "Done" to create the information.

4.4 Add a Logger



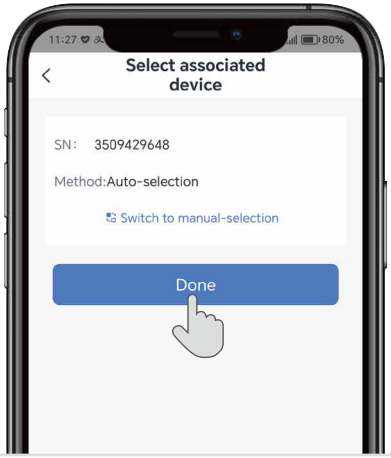
1

After completing the creation, a successful creation interface will appear, we can click "Go to Add" to add a logger.



As shown in the figure, you can enter the serial number of your logger in the serial number input box, or click on the scan code on the right side of the input box to add your logger by scanning the code. The serial number and QR code of your logger are printed on the front of your logger device.

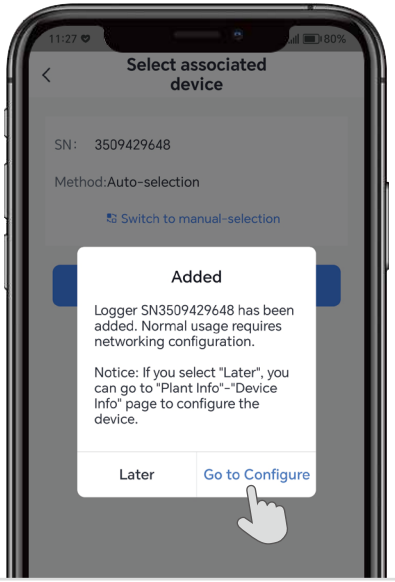
2



3

Click the Add button when you have finished entering the scan code or serial number to enter the page of selecting related equipment. Please choose to automatically associate devices, and click "Done".

4.5 Device Networking



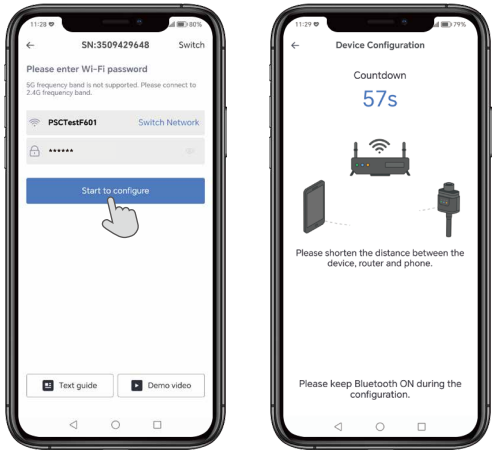
1

After adding the logger successfully, the prompt box of adding the logger successfully will pop up, where you can choose"Go to Configure" to configure the network for the logger.

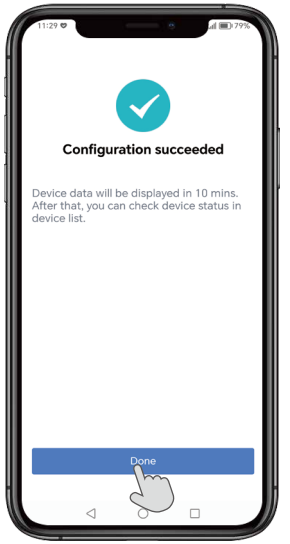
2

Before networking configuration, you need to connect WIFI and turn on the Bluetooth function according to the prompts. If there is no shared WIFI in your area, you can also use your mobile phone to turn on the hotspot to connect the logger to WIFI.

After Bluetooth is turned on and WIFI connection is successful, we will enter the following interface and enter the password to confirm that there are no errors in succession. Click "Start to configure" to enter the interface of configuring equipment detection. Please wait patiently.



3



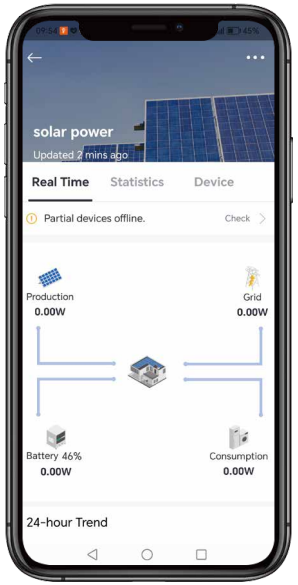
4

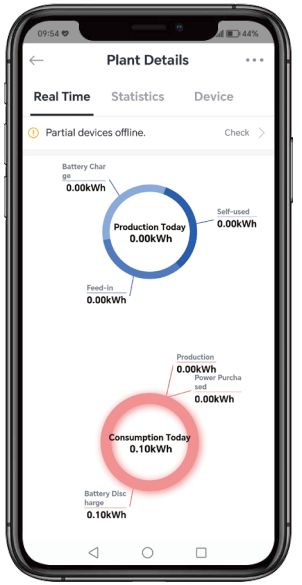
Configuration succeeded.

Click "Done" and we will go to the home page.

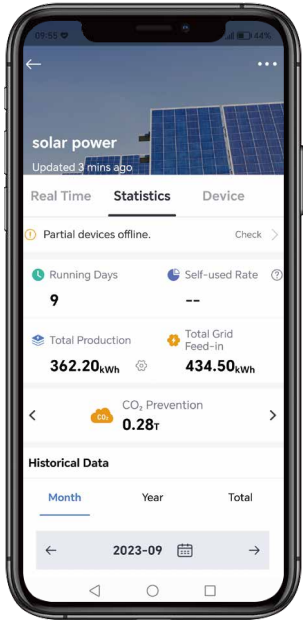
4.6 Observe the Running Status of the Device

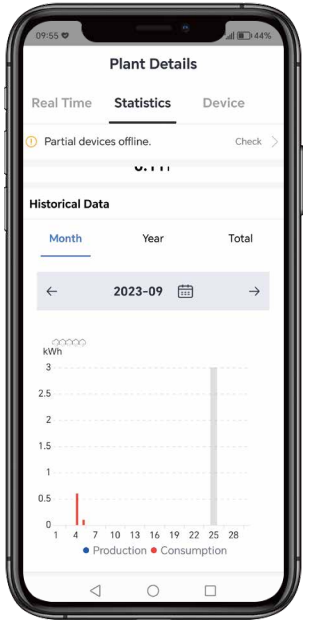
After the power plant is built and the logger is successfully added, we can see the working status of the entire energy storage system in real time. In "Real Time", we can see the working situation of the energy storage system, the situation of 24 hours of generation power and discharge power, and the statistics of how much discharge and power generation today.





In the "Statistics" interface, we can also see the data information of system operation.

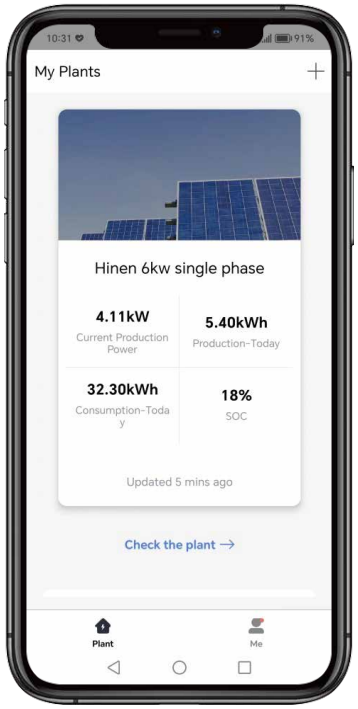




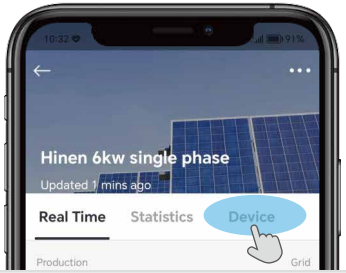
4.7 View the System Information and Parameters

• Enter to view the system information and parameters

1 Click anywhere on this page to enter the power station.



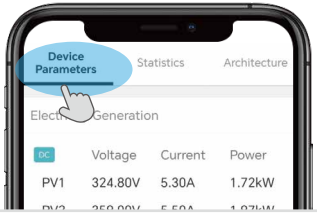
2 Click on "Devices".



3 Click "Inverter" and "Inverter name/SN number".

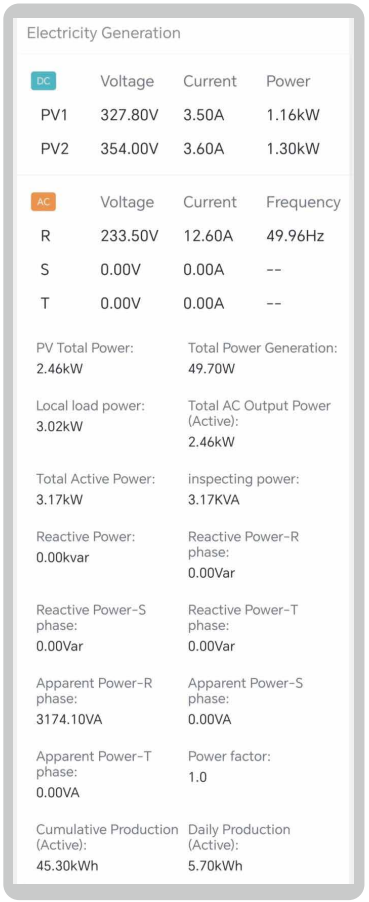
4 Enter the following interface, the first one is "Device Parameters".

Click on "System Parameters".



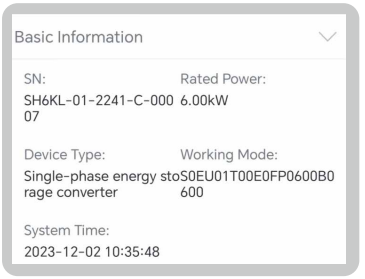
• System information and parameter introduction

No	Name	Description
1	Electricity Generation	Shows the information on DC power generation, AC power generation, total power generation, etc.
2	Basic information	Shows the main inverter model, rated power, system type, operating mode and other basic information.
3	Version Information	Shows the software version of the inverter, the software version of the matched battery and the hardware version of the battery.
4	Power Grid	Shows the total power of the grid, the cumulative amount of grid connection, the cumulative amount of purchased power, etc.
5	Electricity Consumption	Shows the power consumption, total power consumption, cumulative power consumption, today's power consumption, etc.
6	Battery	Shows the status of the battery, battery type, battery voltage, battery power, etc.
7	BMS	Indicates the basic information of the battery management system BMS: including the maximum discharge current of the BMS, the battery CV voltage, the number of parallel batteries and other basic information.
8	Temperature	Shows the main system operating ambient temperature, inverter radiator temperature, radiator temperature information.
9	State	Shows the current working state of the inverter: there are several states such as on-grid state, off-grid state, fault state and so on.
10	Alert	Shows mainly the alarm information of the system, when the system malfunctions, the corresponding fault code will be displayed, which mainly includes the fault code of the inverter and the fault code of the BMS battery.
11	Control	Indicates the current priority of the system: generally there are three priority modes: load priority, battery priority, and grid priority.
12	Off-grid	The main information here is the frequency, voltage and current of the off-grid side.



Electricity Generation

The main information here is the generation information of the system, including DC generation, AC generation, total PV power, total generation power, local load power, total AC output power (active), and total active power. Here there are mainly three phases R\S\T and the corresponding active power, reactive power and apparent power. As well as the power factor, the cumulative power generation (active) at the last time, and the power generation (active) of the day.

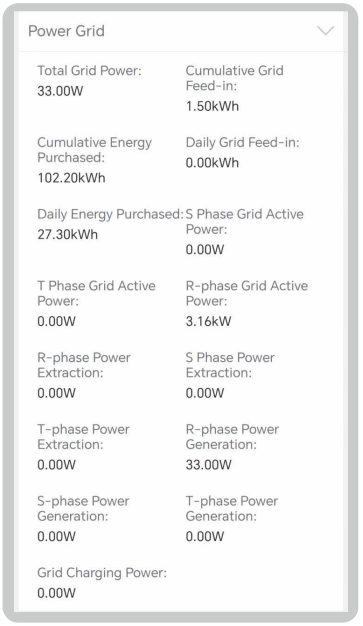


Basic information

Here is the basic information of the system, including the SN number of the inverter, power rating, device type, system operating mode, and current time of the system.

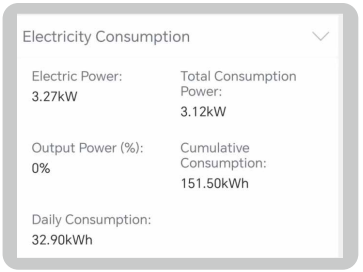
Version Information

Here is the system version information, including the system's software version, battery software version, and battery hardware version. The system software version includes the monitoring software version, the software version identification and the safety regulation version.



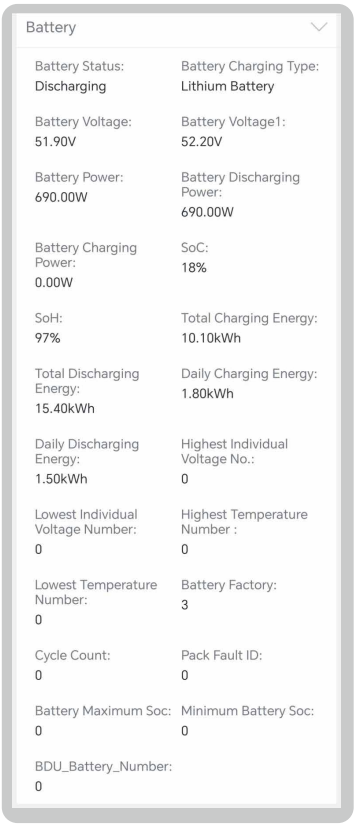
Power Grid

The main information here is about the grid, including the total power of the grid, the cumulative amount of grid connection, the cumulative amount of power purchased, the amount of grid connection on the day, and the amount of power purchased on the day. There are a total of three phases of the grid, R/S/T, including active power, withdrawal power, generation power, and grid charging power for each phase.



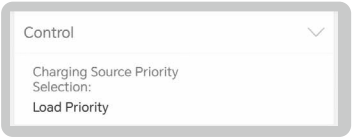
Electricity Consumption

This refers to the system's power consumption, total power consumption, percentage of power output, cumulative power consumption and power consumption for the day.



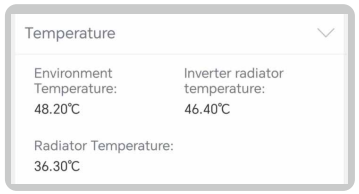
Battery

Here is the information about the batteries assigned to the system: current battery status, battery type, battery host voltage, battery slave voltage, battery power, battery charging power, battery discharging power, remaining battery capacity (SOC), battery health index (SOH), cumulative battery charging, cumulative battery discharging, battery charging on the day, battery discharging on the day, and so on.



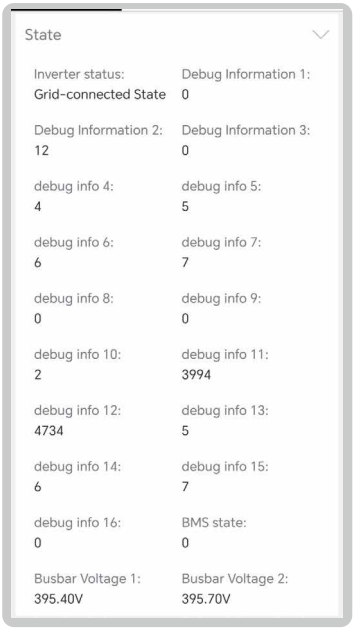
Control

Here is the main system priority information, the system mainly has load priority, battery priority, grid priority these three priority. Load priority that is not set to charge the battery fast charging and discharging, the default is load priority, priority power supply to the load to use; battery charging that is set to charge the battery, it is the battery priority; set the battery to the grid when the battery is discharged, that is, the grid priority. But no matter which kind of priority, it is the priority to supply power to the load, and more power then to the battery or the grid.



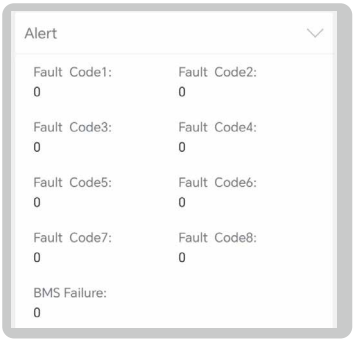
Temperature

The main information here is the ambient temperature at which the system operates, the temperature of the inverter's heat sink, the temperature of the heat sink.



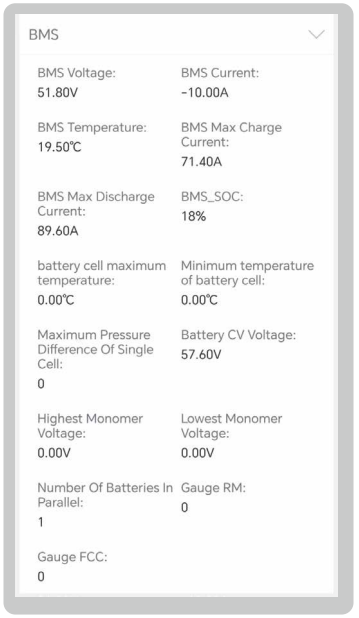
State

Here is the working status of the inverter, which mainly includes grid-connected status, off-grid status, fault status, etc., system debugging information, BMS status, system bus voltage 1, system bus voltage 2, etc.



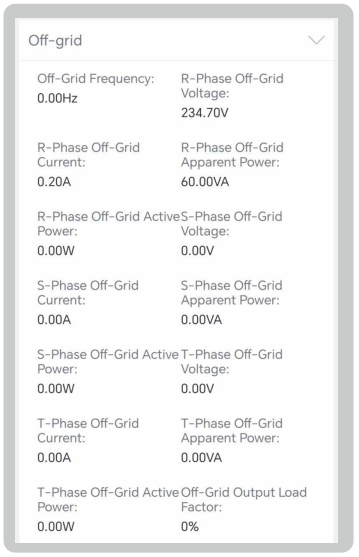
Alert

Here is mainly the system's alarm information, when the information is faulty, the alarm code will be displayed, generally fault code 1 is the main fault code, fault code 2-8 is the sub-fault code as well as the BMS battery failure information.



BMS

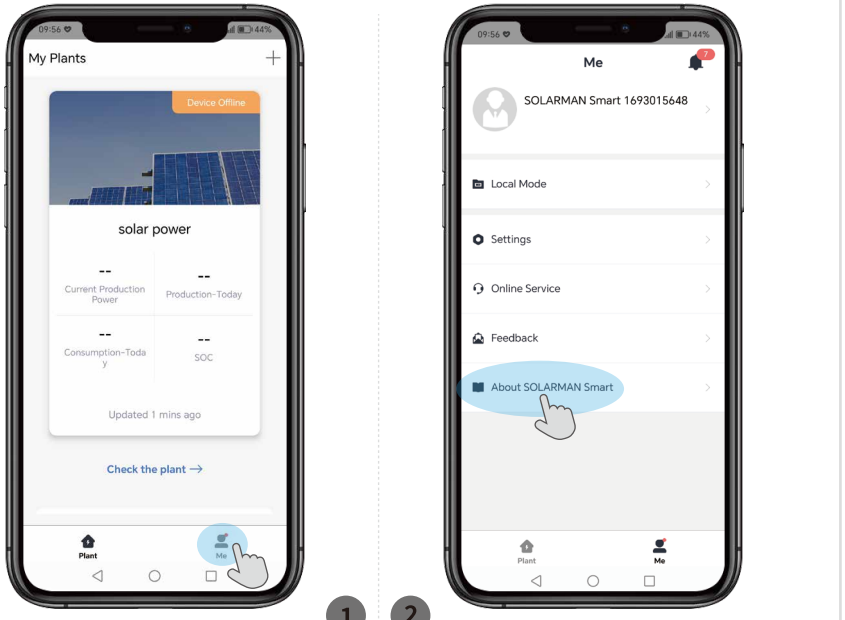
Here is the main battery management system BMS related information, including BMS battery voltage, BMS battery current, BMS temperature, BMS maximum charging current, BMS maximum discharging current, BMS SOC and so on.



Off-Grid

The main information here is the off-grid information of the system, which mainly includes off-grid frequency, R/S/T phase off-grid voltage, off-grid current, off-grid apparent power, off-grid active power, and off-grid output load factor.

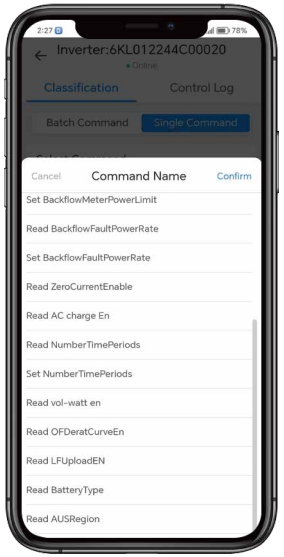
If you want to know more detailed information, please refer to the user manual on the APP, as shown below:



4.8 Settings

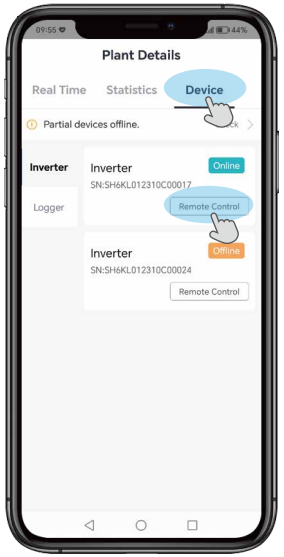
The following settings with " ⚠ " can only be viewed but not changed. If you need to change them, please contact your installer or HINEN.

* The following is an example of a user version that can only read view fields/commands. The user will not be able to click on any of the locked fields / commands after the system has been commissioned.



4.8.1 Common Settings

Click **"Device"** to enter the following interface, click **"Remote Control".**



⚠ Remote Power Control

You can find the **"Remote Power Control"** function in the **"Batch Commands"**, which is a setting to control fast charging and discharging.

• **Setting fast charging and discharging enable:** Enable/Disable for Enable Setting, Disable Setting.

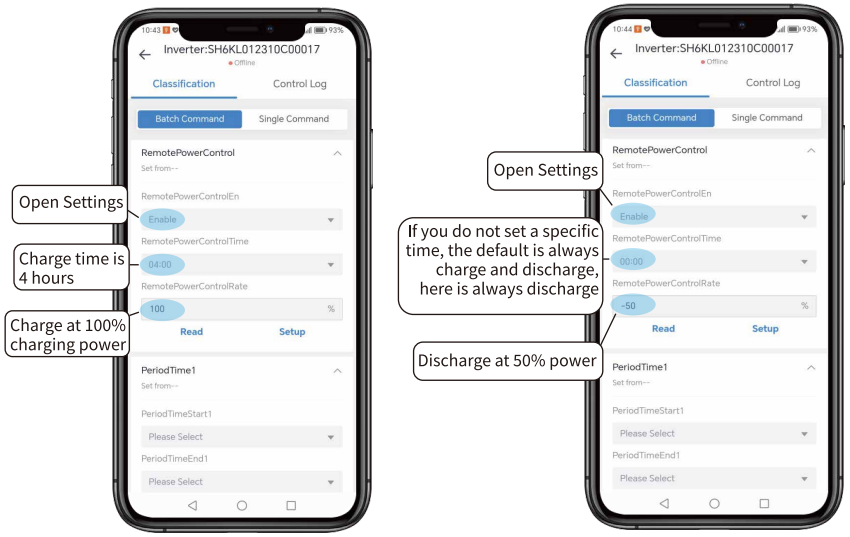
• **Setting fast charging and discharging time:** from "0:00" to "23:00", which means that it can only be charged and discharged in the set time.

Note: under normal circumstances, the battery stops charging when it is charged to 100%, and stops discharging when it is discharged to 10%. The start and stop SOC of the battery when it is charging or discharging can be set using "Load First Settings".

• **Setting fast charging and discharging power:** the range is from "-100 to 100" %, from "-100 to 0" % fordischarge power, from "0 to 100" % for charging power.

• **In the charge and discharge setting,** if the set time is "0:00", that is, charge and discharge all the time, without limiting the time, stop charging when the power reaches 100%, and stop discharging when the power reaches 10%. The start and stop SOC of the battery when it is charging or discharging can be set using "Load First Settings". If the inverter is suddenly disconnected, that is, the grid and the battery are all disconnected, the set charge/discharge settings will become invalid.

• **After the Settings are completed,** you need to click the "Setup" button to send instructions.



Note: If you set fast charge and discharge, the priority period will be invalid. The priority of the fast charge and discharge setting is higher than that of the later priority period setting.When the preset period of fast charge and discharge coincides with a preset priority period, the preset period of fast charge and discharge is activated preferentially.

Period Time

There are 20 priority periods in the APP, and each period has three setting options

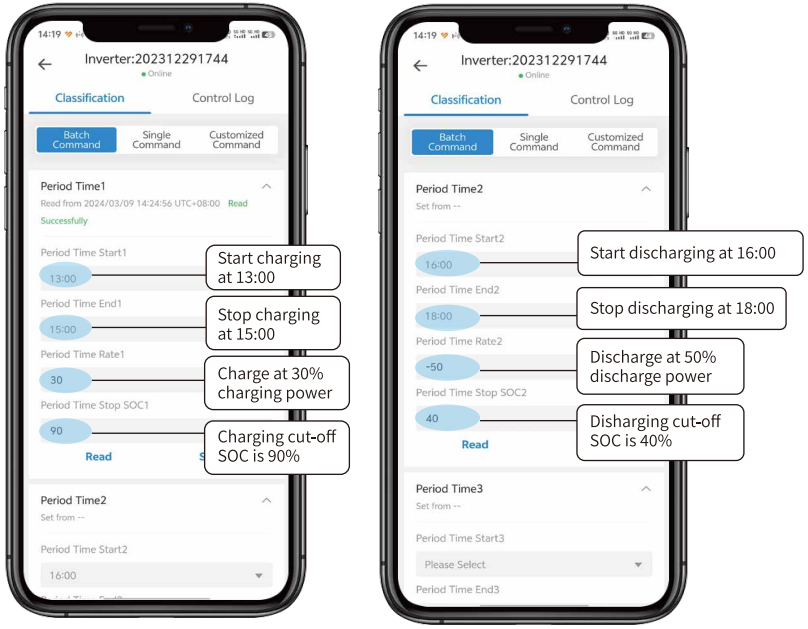
• **Period N Start time:** The value ranges from 0:00 to 23:59.

• **Period N End time:** The value ranges from 0:00 to 23:59.

• **Period N charge and discharge power rate:** The range from "-100 to 100" %. When a negative value between -100 and 0 is set, it indicates that the system is discharging at that power; when a positive value between 0 and 100 is set, it indicates that the system is charging at that power.

• **Period N stop SOC :** The cut-off SOC for charging and discharging.

1. If you set multiple priority periods, the number of effective depends on the set "number of priority periods".
2. At the same time, in the effective priority period, not in accordance with the set priority period serial number < such as from 1-20 to run in sequence >, but in accordance with the set time period to charge and discharge.



Note:

1 After setting the priority period, you need to set the number of charge and discharge periods immediately to activate the preset priority period.

2 At the same time, you cannot set two overlapping periods. For example,if you set the time ranges from 0:00 to 01:00 and from 01:00 to 02:00, and the time ranges from 01:00 to 01:00 coincide with each other, you need to set the priority time ranges from 0:00 to 01:00 and from 01:01 to 02:00.

3 When the inverter suddenly loses power, that is,when the grid and battery are all disconnected, the set prioritry periods are automatically saved.

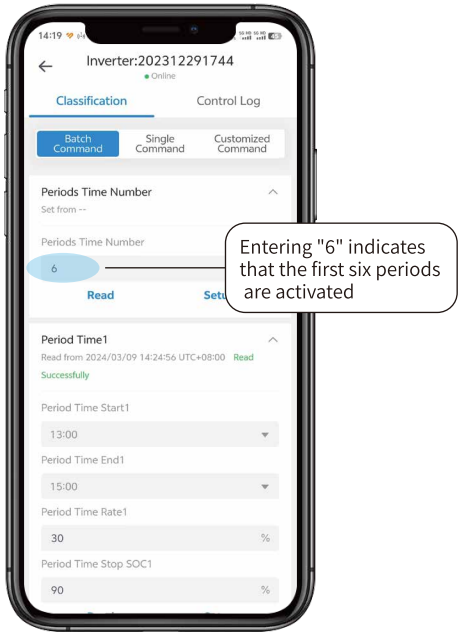
Number Time Periods

After setting all the charging and discharging periods, we can set the “Number Time periods” to activate the set charging and discharging periods.

For example, a total of 5 charge and discharge periods are set, but the number "2" is entered in "Number Time Periods", then the first two of the priority periods are activated.

Generally, priority periods are set from period 1 in numerical order (For example, period 1, period 2, period 3...). The charging and discharging periods is also activated in sequence (For example, time period 1, time period 2, time period 3, time period 4, time period 5 is set, but the charging and discharging period is set to 2, then the time period 1 and 2 are activated)

After the setup is complete, you need to click the "Send Command" button to activate the instruction.



NOTE: When the “Number Time Periods” is entered as “0” and activated, the preset priority periods will be cleared and need to be reset.

Prioritization Mode

In the actual use of the inverter, it usually involves the setting of the priority level, and there are generally three priority setting methods: "Load Priority", "Battery Priority" and "Grid Priority".

Types Of Prioritization Models

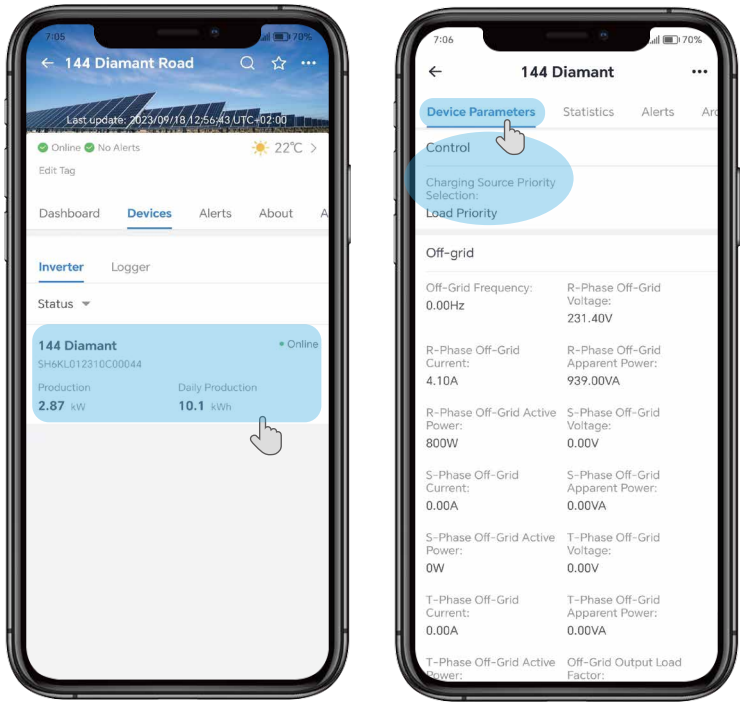
• **Load Priority Mode:** The inverter system is turned on to prioritize power to the loads, which can draw power from the grid, PV, or batteries. If the “Period Time” setting is not enabled, the system defaults to Load Priority Mode.

• **Battery Priority Mode:** Excess power exists after the inverter system is turned on to satisfy the load, charging the battery is prioritized. In the "Period Time" setting, if the charging power is between 0% and 100%, the system is set to Battery Priority Mode.

• **Grid Priority Mode:** Excess electricity that exists after the inverter system is turned on to satisfy the load is prioritized to be discharged to the grid. In the "Period Time" setting, if the discharged power is between -100% and 0%, the system is set to Grid Priority Mode.

View Priority Mode Status

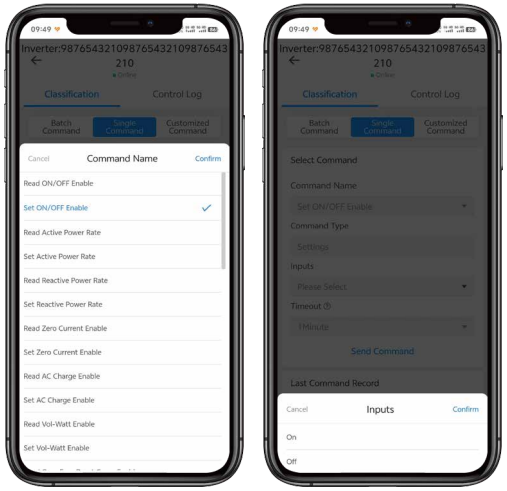
Click on the inverter you want to view, then click on the "Device Parameters" button and locate "Control" in this screen to display the relevant priority information.



Set ON/OFF Enable

This is the device start switch. After plugging in the device, the device will enter standby mode and the device will run when the switch is turned on.

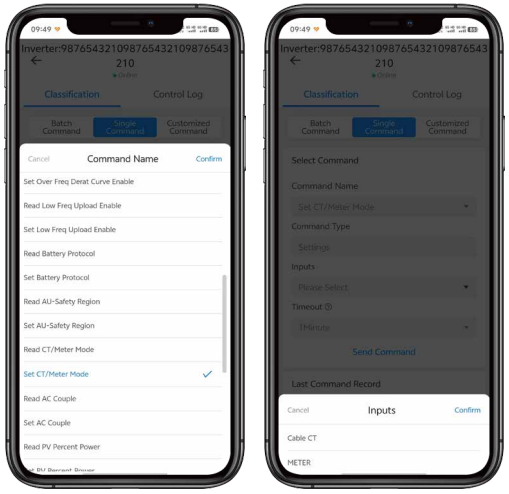
Click **"Single Command" → "Select Command" → "Command Name"**, select **"Set ON/OFF Enable"** function , click **"Confirm"**, and click **"On/Off"** to open or close the inverter. After the setup is complete, you need to click the **"Send Command"** button to activate the instruction.



CT Mode

Please select METER/CT Mode according to the actual condition of your equipment.

NOTE: While installing CT, paying special attention to the direction. After opening the ring buckle of CT, there will be an arrow, and the CT will be connected to the live line of the power grid interface of the inverter, and the arrow points in the direction that should follow the current, and then the CT will be connected to the end of the CT to the "METER" of the inverter.



Anti-Backflow

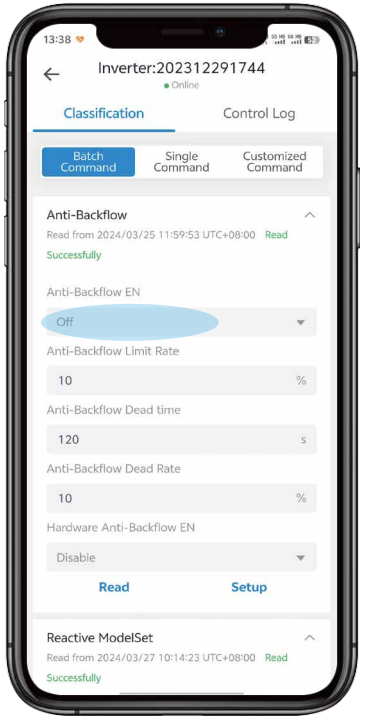
The main function of the anti-reverse current is to limit the current output from the inverter to the grid and thus limit the power output from the inverter to the grid. In some situations , this function is also referred to as Export limitation or Zero export. The anti-reverse current function is a soft limit. When the output power exceeds the soft limit value, the inverter output power is reduced such that the export limit is reached within 15 seconds.

* The inverter has generation control function , which monitors the response of the inverter combination to soft limit and hard limit. But this feature is monitored internally by Hinen's software team.

Note: To use this function, please connect a smart meter or CT.

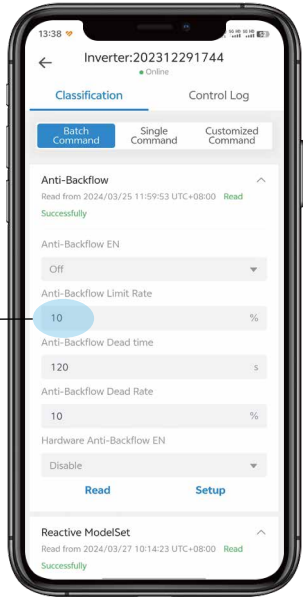
In the Batch Command, Anti-Reverse Current function is divided intosuch as "Read/Set Local Anti-Backflow Enable", "Read/Set Backflow Meter Power Limit", and "Read/Set backflow Fault Power Rate".

- **Anti-Backflow Enabl:**
  select “Anti Backflow Enable” to limiting the power supplied by the whole system to the power grid. If your equipment is a three-phase inverter, you can select “Three-phase Independent Back Prevention Enable”.



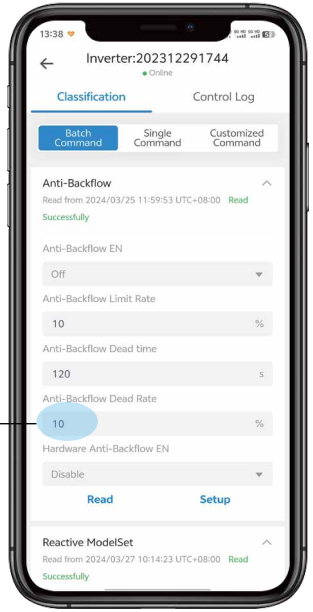
• **Anti-Backflow Limit Rate:**
It is mainly to control the grid-connected power of the whole system. "0%" means that the whole system does not supply power to the grid, and "100%" means that the whole system supplies power to the grid with the maximum power.

After turning on the anti-backflow enable switch, we need to input 0%-100% to limit the grid-connected power. Taking the 6kw single-phase inverter as an example, inputting 50% means that the grid-connected power of the whole system is 3000W.



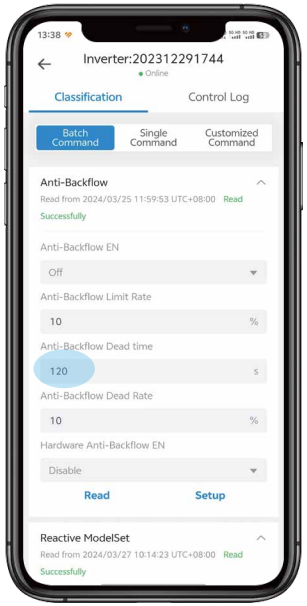
• **Anti-Backflow Fail Rate:**
In the event of a meter failure or damage that causes the anti-backflow function fail, this setting can control the output power of the entire system (including the on-grid and off-grid ends).

The range can be set from 0-100%. Take a 6KW single-phase inverter as an example, setting 60% means that the output power of the entire inverter is 3.6KW, which can be used when the meter fails.



• **Anti-Backflow Fail time:**
If the meter is faulty or damaged, the anti-backflow function will fail. However, the anti-backflow failure time can be set in advance to make the device automatically start the anti-backflow function after the meter failure. For example, set the 120S failure time, that is, from the moment the meter fails, after 120S, the device will automatically turn on the anti-backflow function.

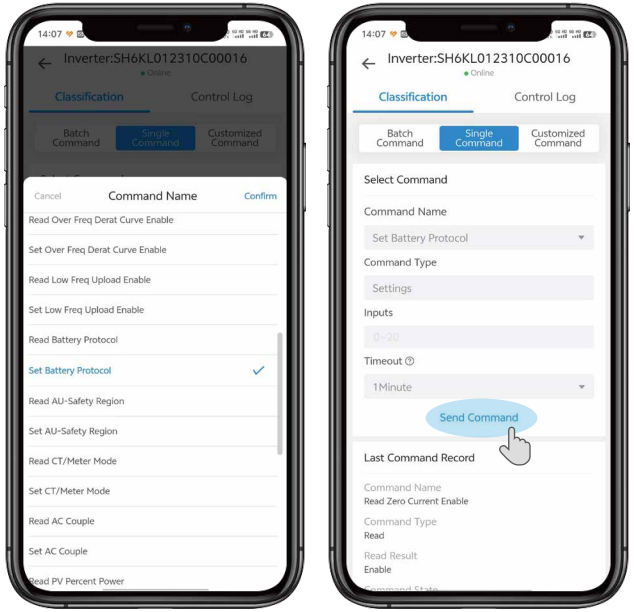
NOTE: set "Anti-Backflow Fail time" and "Anti-Backflow Fail Rate" only after the anti-backflow current function is enabled.



No.	Name	Description
1	Read Anti-Backflow Enabl	Read the current state of the anti-backflow function.
2	Set Anti-Backflow Enabl	Set "off", "Enable" (for single-phase inverters), "Three-phase Independent enable" (for three-phase inverters).
3	Read Anti-Backflow Limit Rate	Read the current anti-backflow current power rate (access to smart meter or CT).
4	Set Anti-Backflow Limit Rate	Set the current anti-backflow current power rate (access to smart meter or CT).
5	Read Anti-Backflow Fail Rate	Read the current anti-backflow current power rate (when the smart meter fails or is damaged).
6	Set Anti-Backflow Fail Rate	Set the current anti-backflow current power rate (when the smart meter fails or is damaged).
7	Read Anti-Backflow Fail time	Read the current start time of the anti-backflow current function (when the smart meter is faulty or damaged).
8	Set Anti-Backflow Fail time	Set the current start time of the anti-backflow current function (when the smart meter is faulty or damaged).

⚠ Battery Protocol Type

In the “Single Command”, we pull down the scroll bar, find the second derivative setting "Set Battery Protocol", and click "Confirm "after selecting it. You can enter the corresponding battery protocol code (0-20) and send the command.



Please refer to the battery protocol code appendix

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

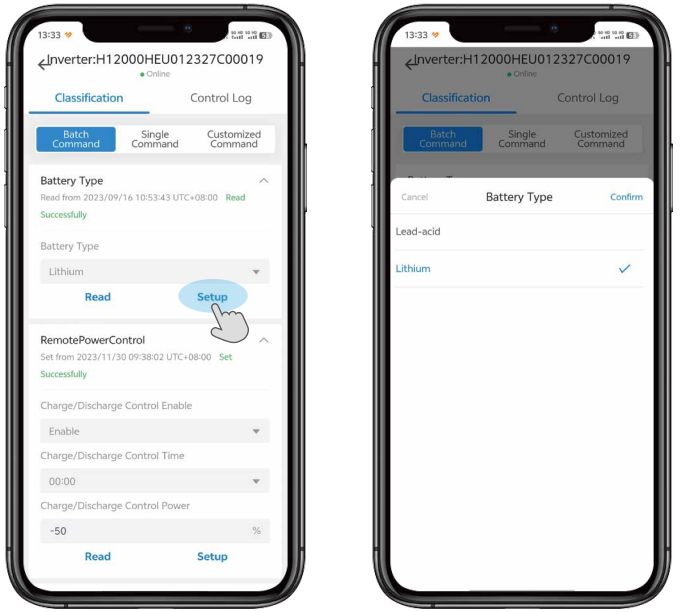
4.8.2 Other Settings

The following settings with "⚠" are only for users to view and cannot be changed. If you need to change the settings that require professional operation, please contact your installer or HINEN.

Batch Command

⚠ Battery Type

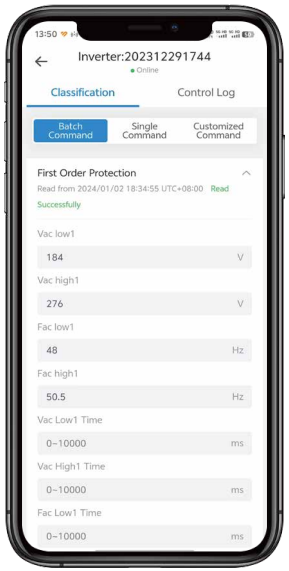
There are two options: lead-acid battery and lithium battery. Please select the corresponding battery type according to your device.



First Order Protection

In the grid first order protection parameters, the main setting is to disconnect the grid when the grid voltage or grid frequency is higher or lower than the set, and protect the circuit.

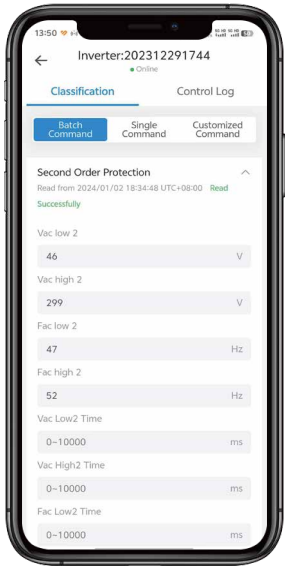
This setting does not affect the use of off-grid load.



Second Order Protection

According to the different safety regulations of each country, the setting and function of the second order protection parameters are the same as that of the first order protection parameters.

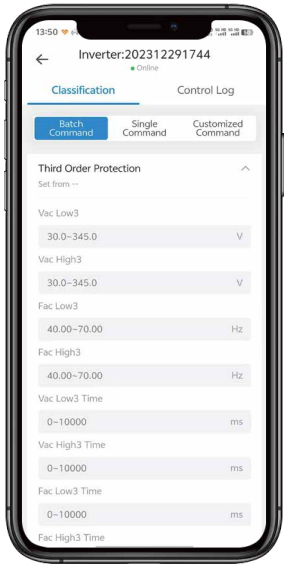
In practical application and detection, the second order protection parameters will be detected first. If the second order parameters trigger protection, the first order parameters will not be detected again. If second order protection is not triggered, first order parameters are detected. In short, the higher the order, the higher the priority, both are protection Settings.



Third Order Protection

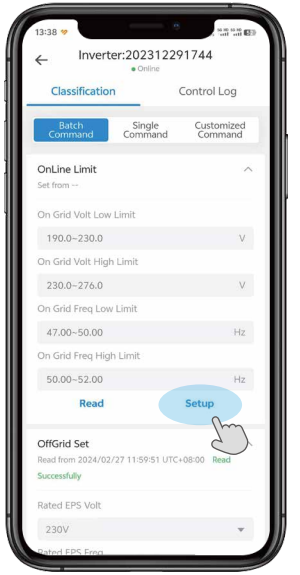
Refer to the grid second order protection description.

Note: The grid first, second and third order protection parameters are set after the grid connection.



On Line Limit

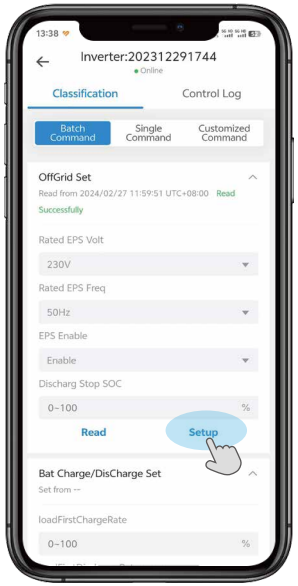
This setting is before the grid connection, when the grid-connected voltage is within the range of low voltage and high voltage, and at the same time within the low grid frequency and high grid frequency, it can be connected to the grid. Beyond or below this range, the inverter can not be connected to the grid.



⚠ Off Grid Setting

According to the safety regulations of each country are different, you can set the corresponding off-grid voltage and off-grid frequency according to the safety requirements of the user.

Off-grid voltage has 230V/240V/208V three voltage range options, off-grid frequency has 60Hz/50Hz two frequency range options.



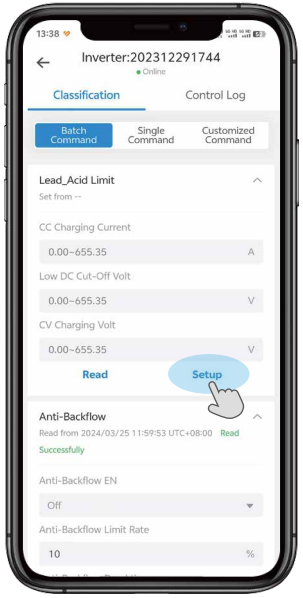
⚠ Lead Acid Limit

This setting is set for the battery used by the user. If the user uses a lead-acid battery, it is set according to the relevant parameters of the battery.

·**CC Charging Current** refers to the maximum charge current.

·**Low DC Cut-Off Volt** refers to the minimum discharge voltage.

·**CV Charging Volt** refers to the maximum charge voltage.



⚠ Battery Change/Discharge Setting

This is a setting for the battery, which is performed in the load priority mode. (For details on priority settings, refer to "Prioritization Mode" in "Common Settings".)

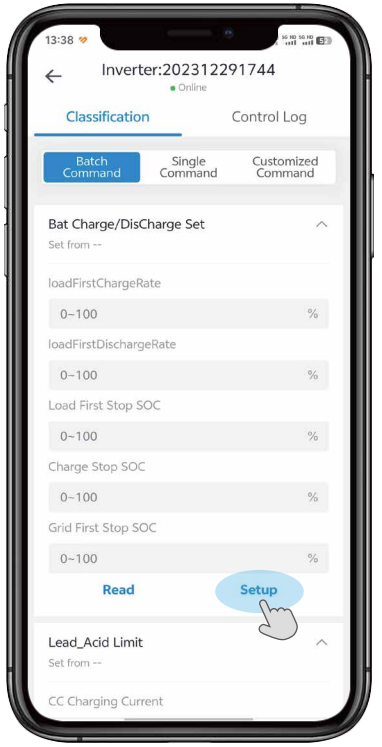
• **Load Frist Charge Rate &Load Frist Discharge Rate** refers to the charging/discharging power of the battery with load priority mode.

• **Load Frist Stop SOC** refers to the battery is discharged to the load up to the set SOC value to stops discharging.

• **Change Stop SOC** refers to charging the battery to the set SOC value to stop charging. If the PV is turned on, the battery is charged for the PV and the grid together.

• **Grid First Stop SOC** refers to the battery is discharged to the grid up to the set SOC value to stop discharging.

The battery is charged/discharged at a set power in load priority mode.

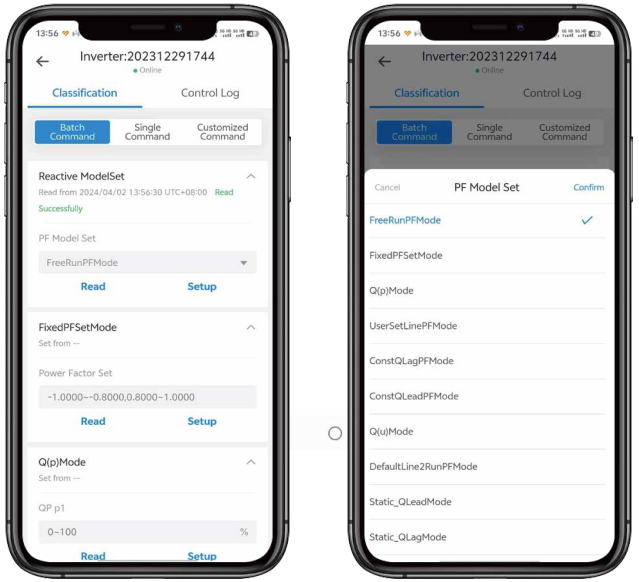


***SOC:** State of Charge, refers to the available state of charge remaining in the battery.

PF Model Set

Power Factor (applicable to specific countries, please refer to local grid requirements).

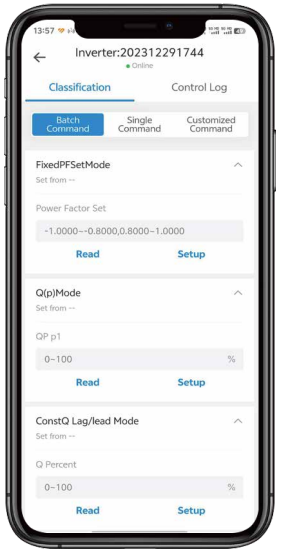
Mode	Comment
Free Run PF Mode	The PF is fixed at +1.000.
Fixed PF Set Mode	Power factor
Q(P) Mode	QP_p1 Rate
User Set Line PF Mode	/
ConstQ Lead PF Mode	Q_Percentage
ConstQ Lag PF Mode	Q_Percentage
Q(u) Mode	QU_Percent Max
	QU_Q2 Percent
	QU_Q3 Percent
	QU_Percent Min
	QU_UV_Stop
	QU_UV_Start
	QU_OV_Start
	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	/



Fixed PF Set Mode

The reactive power can be regulated by the parameter PF (Power Factor).

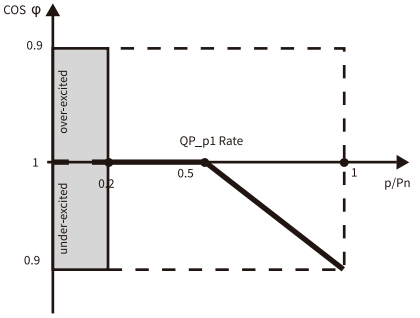
The power factor is fixed and reactive power setpoint is calculated according to the current power. The PF ranges from 0.8 leading to 0.8 lagging.
Leading: the inverter is sourcing reactive power to the grid.
Lagging: the inverter is injecting reactive power into the grid.

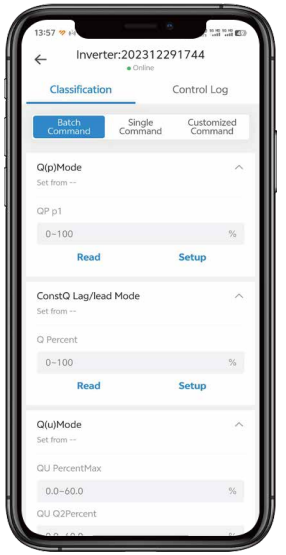


Q(p)Mode

The PF of the inverter output varies in response to the output power of the inverter.

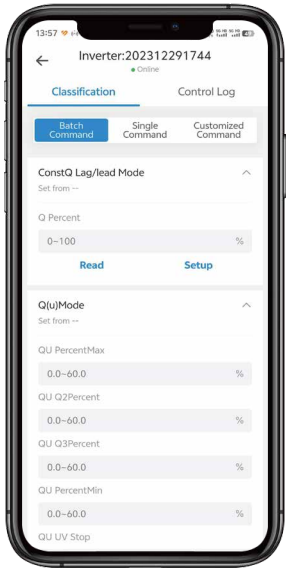
- Reactive power control, reactive power standard curve cos φ = f(P)





ConstQ Lag/Lead Mode

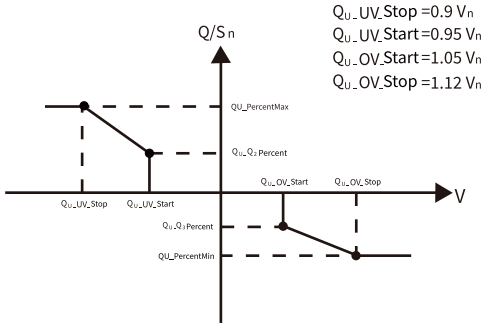
The reactive power can be adjusted by the current phase angle.



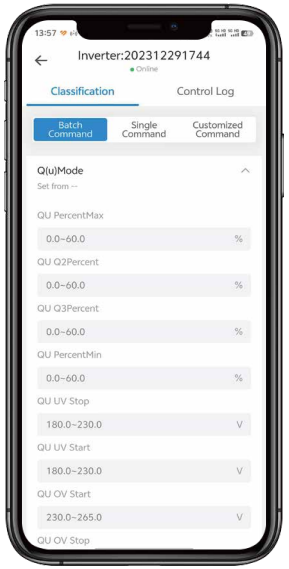
Q(u)Mode

The reactive power output of the inverter will vary in response to the grid voltage.

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



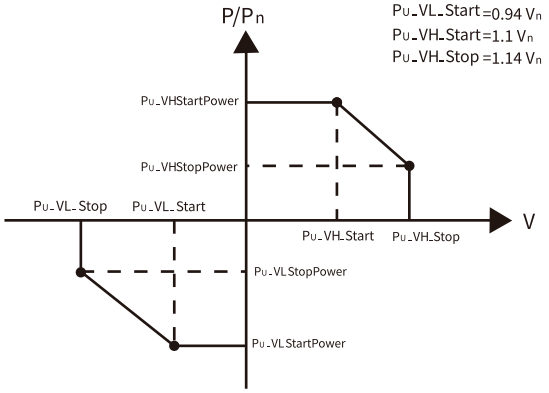
$Q_{U\_UV\_Stop}$ =0.9 V_n
$Q_{U\_UV\_Start}$ =0.95 V_n
$Q_{U\_OV\_Start}$ =1.05 V_n
$Q_{U\_OV\_Stop}$ =1.12 V_n



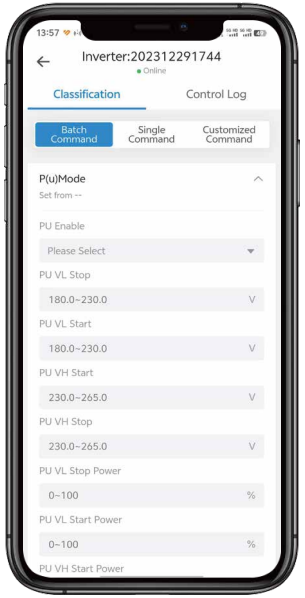
Volt-watt

Mode	Comment
Volt-watt	PU Enable
	PU VL Stop
	PU VL Start
	PU VH Start
	PU VH Stop
	PU VL Stop Power
	PU VL Start Power
	PU VH Start Power
	PU VH Stop Power
	PU Delay Time

- Active power control, active power standard curve P=f(V)



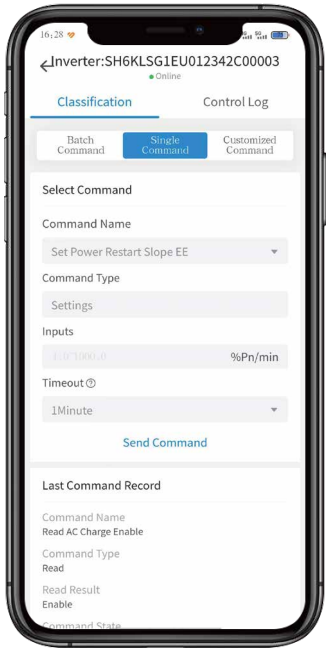
$P_{U\_VL\_Stop}$ =0.9 V_n
$P_{U\_VL\_Start}$ =0.94 V_n
$P_{U\_VH\_Start}$ =1.1 V_n
$P_{U\_VH\_Stop}$ =1.14 V_n

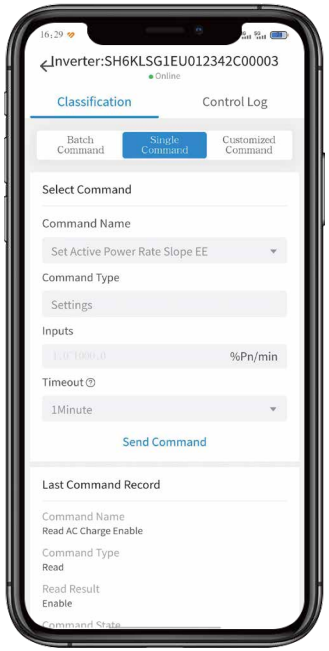


Mode	Comment
Power Restart Slope EE	Power Restart Slope EE (1-1000%/min)
Active Power Rate Slope EE	Active Power Rate Slope EE (1-1000%/min)
Active Power Percent	Active Power Percent (0-100%)

Power Restart Slope EE: The active power loading rate after the system is shut down for abnormal reasons and then started again. The range can be set from 1-1000%Pn/min.

Active Power Rate Slope EE: The rate at which the active power is loaded on the first power-up of the system. The range can be set from 1-1000%Pn/min.



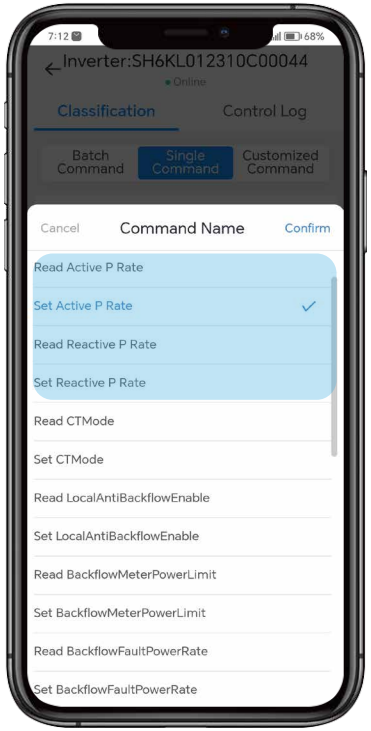


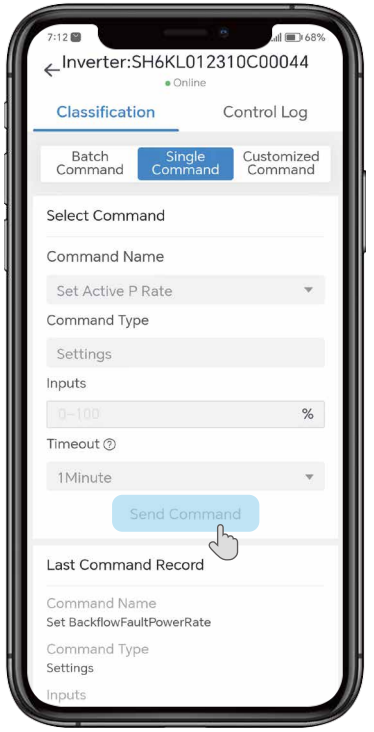
⚠ PowerControl

Power control Power control, divided into Active P Rate and Reactive P Rate, selectable range is 0%-100%.

Active P Rate refers to the output active power, which is the electric power needed to maintain the normal operation of electrical equipment.

Reactive P Rate refers to the output reactive power, which does not consume electric energy in the grid, and is an essential power in the grid.





Zero Current Enable

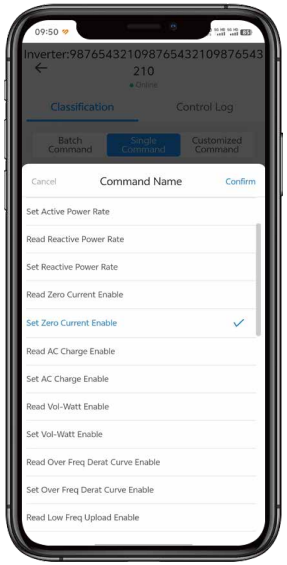
• If before the first and second protection times of the grid, if the voltage is too high or too low, the current will drop to zero.

• If within the first and second protection times of the grid, the voltage will return to normal, and the current will also return to normal.

• If the first and second protection times of the grid are exceeded, the grid will be disconnected.

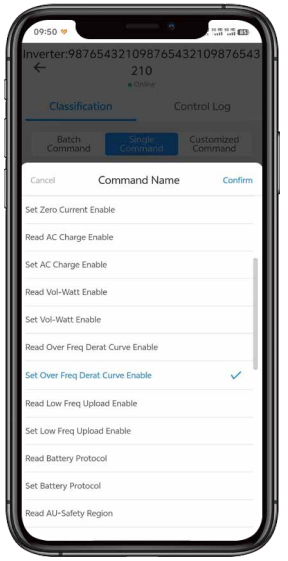
• If the voltage is too high or too low for a short period of time, the current will drop to zero instantly.

• After the voltage returns to normal, the current will also return to normal.



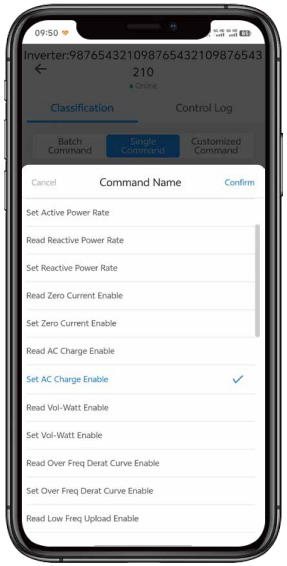
Over Freq Derat Curve Enable

The standards of certain countries and regions require that when the grid frequency exceeds the over-frequency derating trigger frequency， the inverter will derate the active power according to a certain slope to help reduce the grid frequency. In this case, set this parameter to Enable.



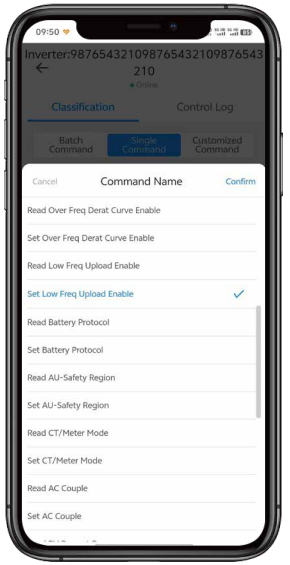
AC Charge Enable

When AC Charging is enabled, it will allow the grid to charge the batteries.



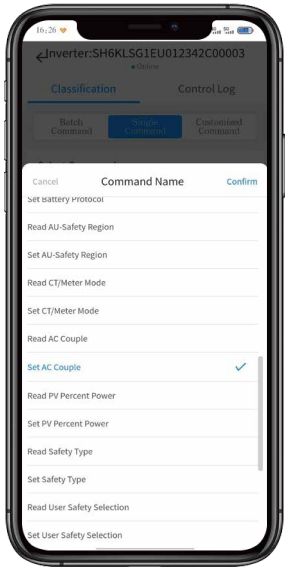
Low Freq Upload Enable

This is "Under frequency rise power Enable" setting. The standards of certain countries and regions require that when the power grid frequency is lower than the frequency threshold for power raising, the device needs to increase the active power output to help increase the power grid frequency. In this case, set this parameter to Enable



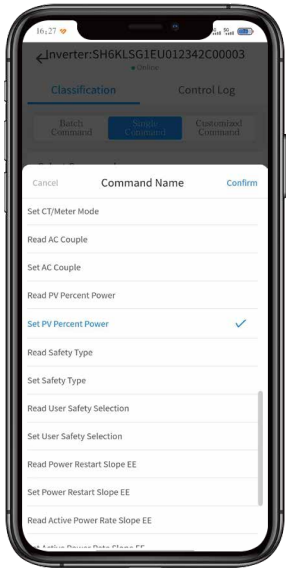
AC Coupled Inverter Enable

The inverter supports hybrid mode and AC Coupled mode, please choose according to the actual usage, otherwise there will be a system error.



PV Percent Power

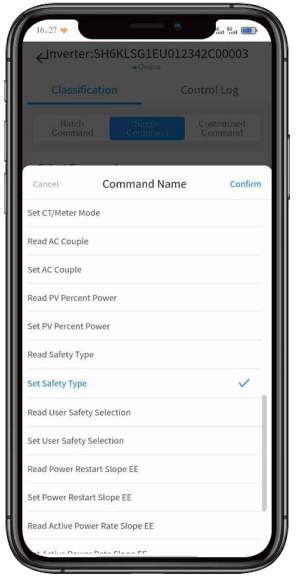
This function allows users to adjust the percentage of PV output to adjust the structure of their home electricity consumption to obtain the best results.

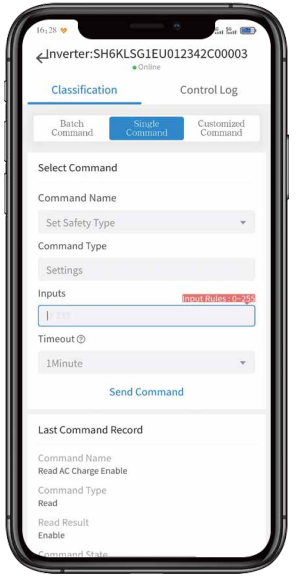


Safety Type

The safety settings of the equipment are generally preset according to the factory.

Note: It must be set according to the actual situation, otherwise there will be a system error during the run.





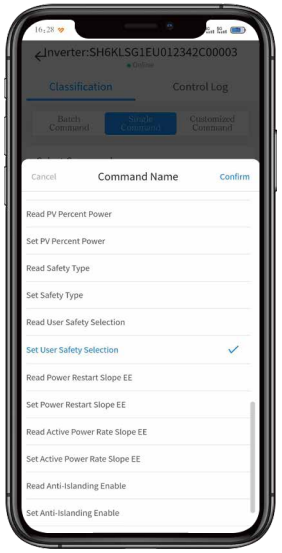
Please refer to the safety type appendix

Safety Type	Area	Safety Name	Safety Type	Area	Safety Name
0	N/A	SF_Null	10	United Kingdom	SF_NI_G99
1	China	SF_CQC_1	11	United Kingdom	SF_NI_G98
2	Europe	SF_EN50549	12	United Kingdom	SF_IRELAND
3	Belgium	SF_BELGIUM	13	Italy	SF_CEI_021
4	France	SF_VDE0126	14	South Africa	SF_NRS097
5	Australia	SF_AS4777-A、SF_AS4777-B、SF_AS4777-C、SF_AS4777-NZ		South Africa (Wide Range)	SF_NRS097
6	New Zealand	cS_NewZealand	15	Austria	SF_TOR
7	Germany	SF_N4105	16	Poland	SF_POLAN
8	United Kingdom	SF_G99	17	Spain	SF_SPAIN
9	United Kingdom	SF_G98	18	Japan	SF_JAPAN

User Safety Selection

This setting is associated with the safety type, and when you select the safety type corresponding to the country, you can select the specific type

- **Regional standards.** Please select according to your location.
- **User standards.** It is available for a wide range of voltage users in South Africa.
- **Grid company Standarrds.** Select this standard if the dispatch of electricity in your area is regulated by the grid company.

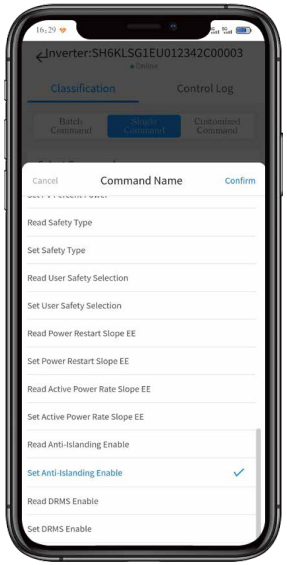


Anti-Islanding Enable

The inverter uses the active frequency drift (AFD) method, also known as frequency biasing, to prevent the islanding effect.

The anti-islanding enable is on by default, so please select it carefully in order to protect equipment and personnel from harm!

* The islanding effect means that when the power grid is cut off, the grid-connected power generation system fails to detect the power outage and still supplies power to the power grid. This is very dangerous for the maintenance personnel and the power grid on the transmission line.



4.9 Trouble Codes

4.9.1 Fault Reference Code

Main Fault Code	Inverter State	Fault Discription	Suggestion
108	Error/Off	NTC Temperature too high	1. After shutdown,Check the temperature, normal restart the inverter. 2. If the error message still exists, contact manufacturer.
109	Error/Off	Bus voltage abnormal	1. Restart inverter. 2. If error message still exists,contact manufacturer.
110	Error/Off	Communication fault	1. After shutdown,Check communication board wiring. 2. If the error message still exists, contact manufacturer.
200	Error/Off	No AC Connection	1. After shutdown,Check AC wiring. 2. If error message still exists,contact manufacturer.
201	Error/Off	AC V Outrange	1. Check grid voltage. 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. 2. If error message still exists,contact manufacturer.
205	Error/Off	CT LN Reversed	1. After shutdown，Check the SP-CT connection. 2. If error message still exists,contact manufacturer.
300	Error/Off	EPS OP Short Fault	1. Restart inverter. 2. If error message still exists,contact manufacturer.
302	Error/Off	Off-grid output voltage is too low	1. Restart inverter. 2. If error message still exists, contact manufacturer.
303	Error/Off	Off-grid output voltage is too High	1. Restart inverter. 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. 2. If the fault code still exists after the normal voltage is restored, contact manufacturer.

Main Fault Code	Inverter State	Fault Discription	Suggestion
500	Error/Off	BMS Communication fault	1. Check 485 cable between SP and battery. 2. Check if battery is sleeping. 3. If error message still exists,contact manufacturer.
502	Error/Off	Battery voltage low	1. Check battery voltage. 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. 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. 2. If error message still exists,contact manufacturer.
505	Error/Off	Battery terminals reversed	1. Check battery terminals. 2. If error message still exists,contact manufacturer.
506	Error/Off	Battery terminal open (only for lithium battery)	1. Check battery terminal. 2. If error message still exists,contact manufacturer.

4.9.2 Warning Reference Code

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

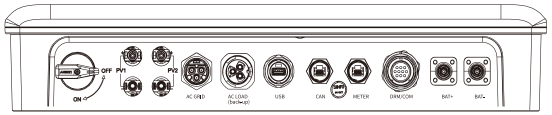
Main Warning Code	Inverter State	Warning Discription	Suggestion
1303	Warning/On	Off-grid output voltage is too low	1. Restart inverter. 2. If error message still exists, contact m anufacturer.
1304	Warning/Off	EPS OP OverLord Warning	1.Restart inverter. 2. If error message still exists,contact manufacturer.
1404	Warning/On	Dryconnect function abnormal	1. After shutdown,Check the dry Dryconnect wiring. 2. If the error message still exists, contact manufacturer.
1406	Warning/On	PV Reversed	1. Check PV input terminals. 2. If error message still exists,contact manufacturer.
1501	Warning/On	Battery terminal open (only for lithium battery)	1. Check the battery is connected. 2. If error message still exists,contact manufacturer.
1502	Warning/On	Lead-acid battery temperature sensor was open	1. Check the temperature of lead-acid battery is installed or not. 2. Check the temperature of lead-acid battery is connected well or not. 3. If error message still exists,contact manufacturer.
1503	Warning/On	Battery temperature outrange	1. Check the environment temperature of battery is in the range of specification or not. 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. 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. 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. 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. 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. 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. 2. If error message still exists, contact manufacturer.
1510	Warning/On	Temperature sensor connection is abnormal	1. After shutdown,Check the temperature sampling module is connected properly. 2. If the error message still exists, contact manufacturer.

05 Others

5.1 Troubleshooting

Checks Before Turning on AC Power

- Battery connections: Confirm that the connections between the inverter and battery: the polarities (+/-) are not reversed. Refer to figure 1.
- PV input connection: Confirm the connections between the inverter and PV panels: the polarities (+/-) are not reversed. Refer to figure 2.
- On-grid & backup connections: Confirm that the on-grid is connected to the power grid and that the backup is connected to the loads: the polarities (e.g. L/N are in sequence) are not reversed. Refer to figure 3.
- CT connections: Ensure that the CT is connected between the load and the grid and is oriented towards the inverter. And follow the directional signs on the CT Refer to figure 4.



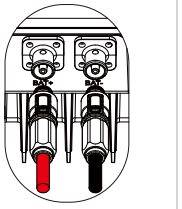


Figure 1

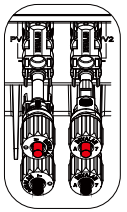


Figure 2

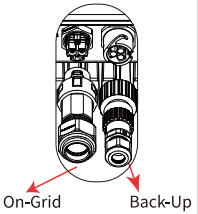


Figure 3

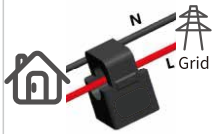


Figure 4

Checks At Startup and Turning On AC Power

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

After connecting the data collector, check the APP"Battery Type" to make sure that the battery type is the same as was installed. Also check that the "On Line Limit" setting and "Off Grid Settings" setting 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.

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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 param 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

Item \ Model	H3000-EU	H3600-EU	H4000-EU	H4600-EU	H5000-EU	H6000-EU
PV terminal parameter						
Max. PV input power(W)	6000	7200	8000	9200	10000	11400
Max. PV voltage (Vd.c.)	550	550	550	550	550	550
Nominal voltage (Vd.c.)	360	360	360	360	360	360
Startup voltage (Vd.c.)	90	90	90	90	90	90
Minimum operating voltage(Vd.c.)	90	90	90	90	90	90
MPP work voltage range(Vd.c.)	90~550	90~550	90~550	90~550	90~550	90~550
MPP voltage range(full load, Vd.c.)	130~480	130~480	140~480	155~480	165~480	200~480
Number of MPP tracker	2	2	2	2	2	2
Number of strings per MPP tracker	1	1	1	1	1	1
Max. short-circuit current per MPP trackers	20/20	20/20	20/20	20/20	20/20	20/20
Max. input current per MPP tracker(A)	16/16	16/16	16/16	16/16	16/16	16/16
Backfeed current to the array	0A	0A	0A	0A	0A	0A
Battery terminal parameter(compatible with LiFeP04 battery or Lead acid)						
Battery voltage range(Vd.c.)	42~58	42~58	42~58	42~58	42~58	42~58
Nominal voltage (Vd.c.)	50	50	50	50	50	50
Min. full load voltage(Vd.c.)	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 terminal parameter						
Nominal voltage (Va.c.)	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 curren	75A (50uS)	75A (50uS)	75A (50uS)	75A (50uS)	75A (50uS)	75A (50uS)
Maximum output over current protection	65A	65A	65A	65A	65A	65A
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
Stand-alone terminal parameter						
Nominal voltage (Va.c.)	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 devices						
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 monitori	Yes					

Overvoltage class	OVC III[AC], OVC II[PV]
General information	
Ingress protection	Ip65
Operation ambient temperature range	-25~60°C, derating above 45°C
Altitude	<4000m
Relative humidity	0~100%
Dimensions [W*H*D]	568*472*188mm
Weight	≈29.6KG
Noise	⩽25dB
Protective Class	Class I
Monitor	WIFI/GPRS
Isolated topology	PV to AC non-isolated, battery to PV/AC high frequency isolated
Warranty	5 Years, optional 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

5.3 Error Messages

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

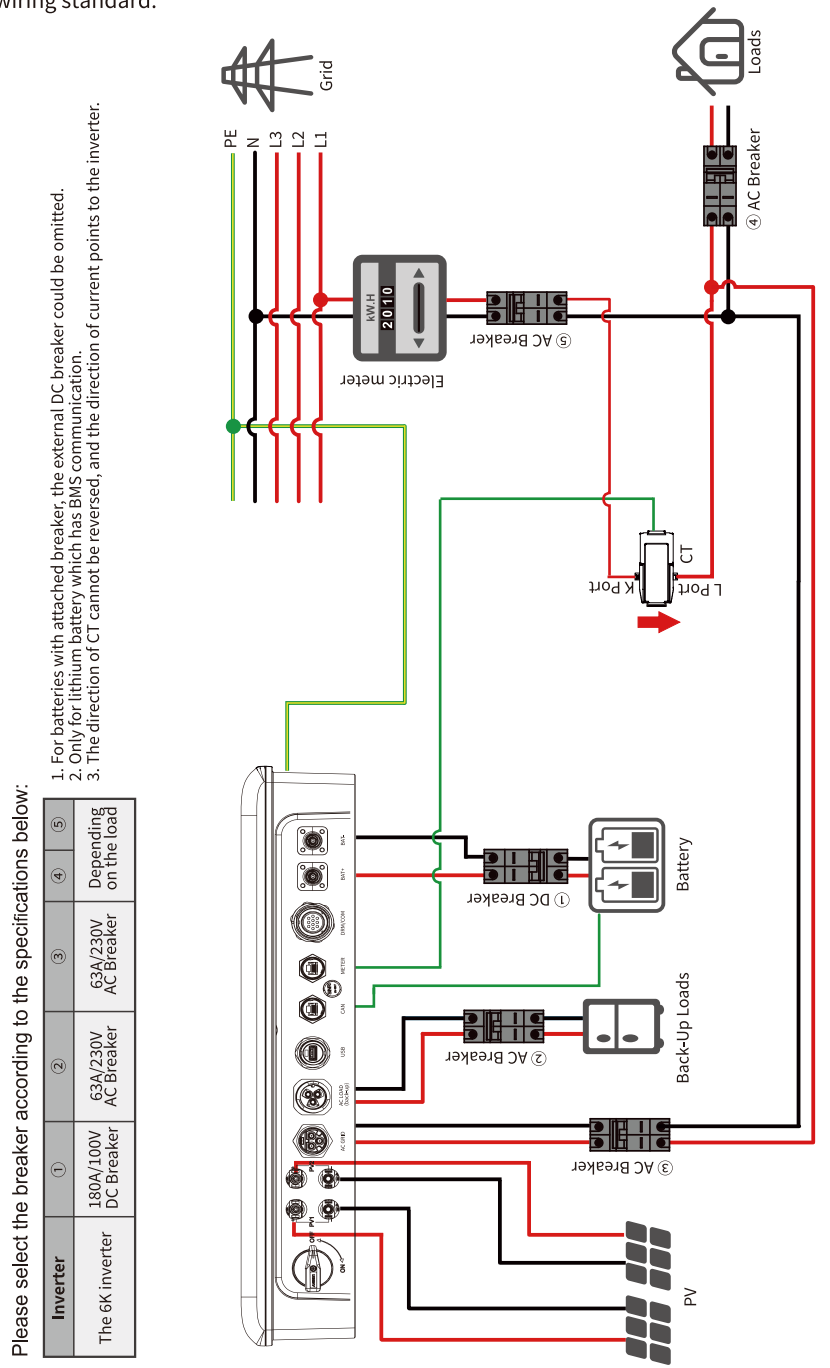
Error Message	Explanation	Reason	Solution
Grid Loss	Public grid power is not available (power lost or on-grid connection fails)	Inverter does not detect the connection of grid	1. Check (use multi-meter) if AC side has voltage. Make sure grid power is available. 2. Make sure AC cables are connected tightly and well. 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. 2. Check (use multi-meter) if the AC voltage (Between L & N) is within a normal range (also on AC breaker side) 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. 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. 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. 2. If safety country is right, then please check on the inverter display if AC frequency (Fac) is within a normal range. 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. 2. Make sure the installation complies with the instruction on inverter user manual. 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. 2. If the humidity is too high, isolation failure may occur. 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. 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, not the electric wiring standard.



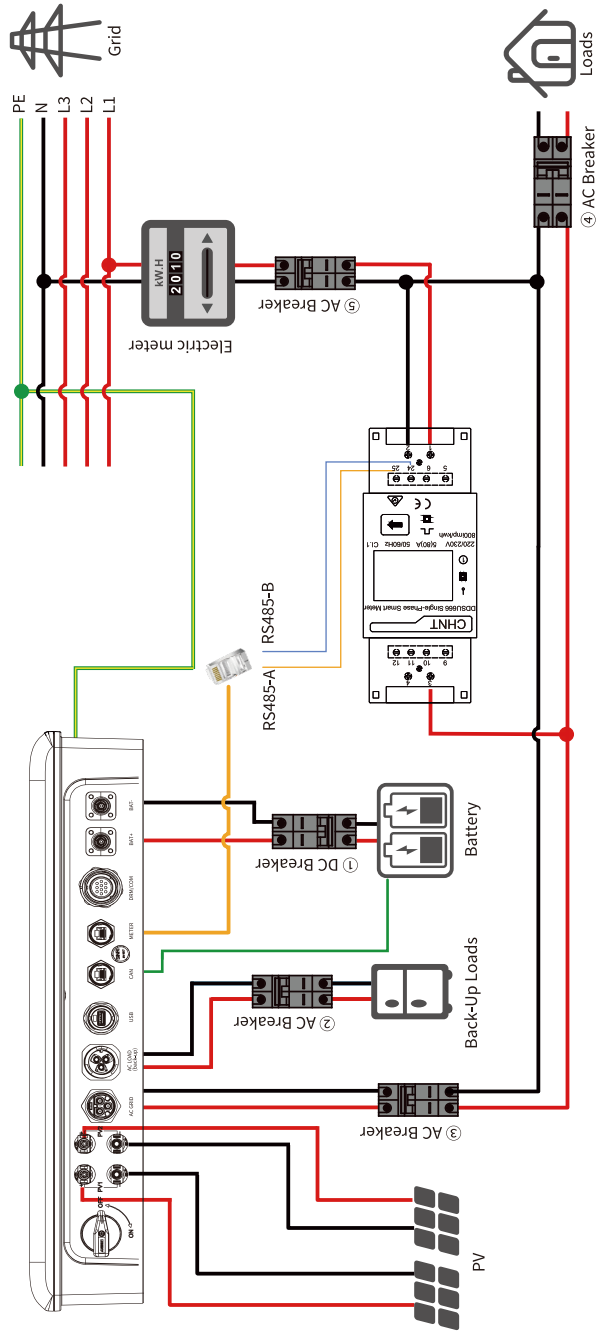
1. For batteries with attached breaker, the external DC breaker could be omitted.
2. Only for lithium battery which has BMS communication.
3. The direction of CT cannot be reversed, and the direction of current points to the inverter.

Please select the breaker according to the specifications below:

Inverter	①	②	③	④	⑤
The 6K inverter	180A/100V DC Breaker	63A/230V AC Breaker	63A/230V AC Breaker		Depending on the load

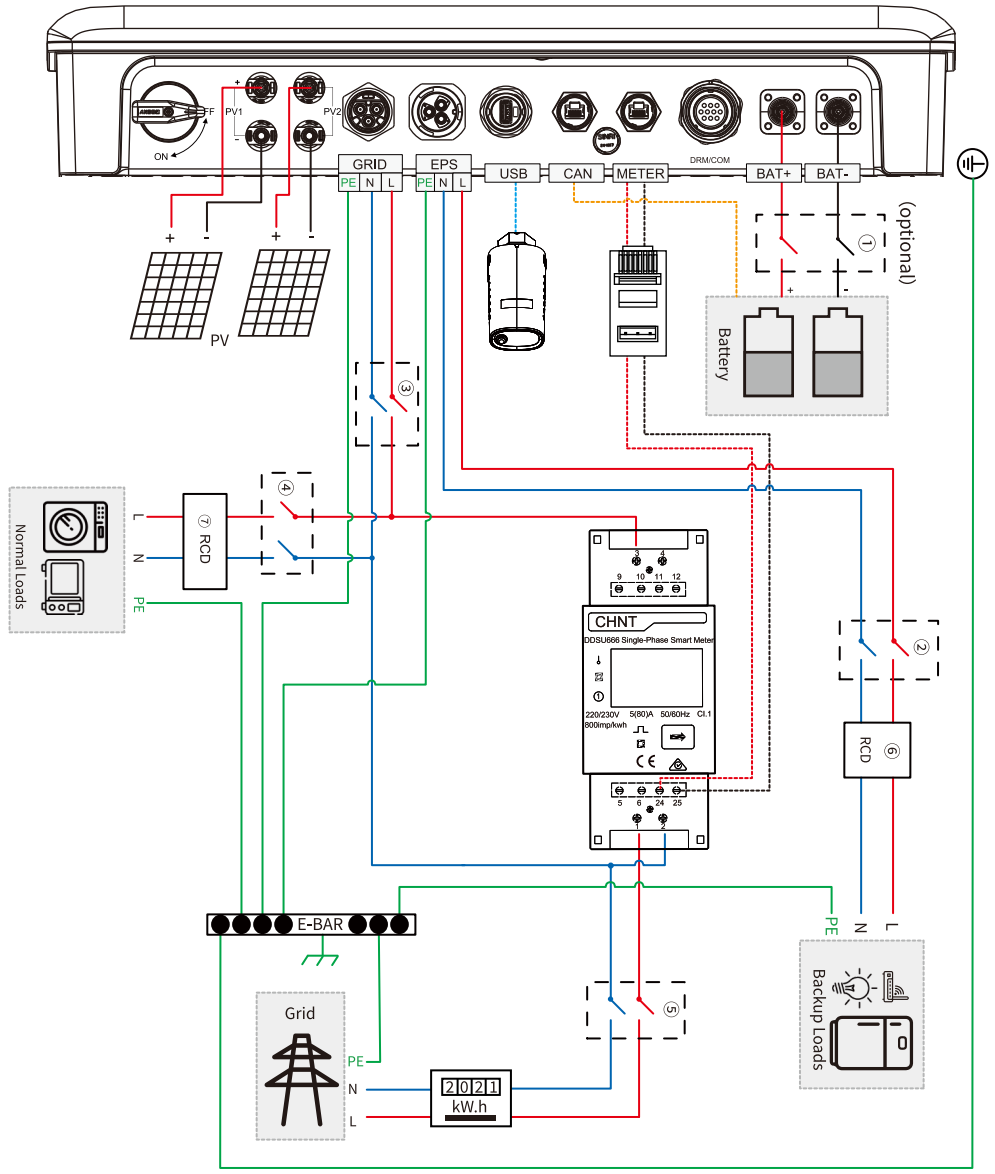
Wiring System for the Hybrid Inverter (With smart meter)

Note: This diagram indicates the wiring structure of the hybrid inverter, not the electric wiring standard.



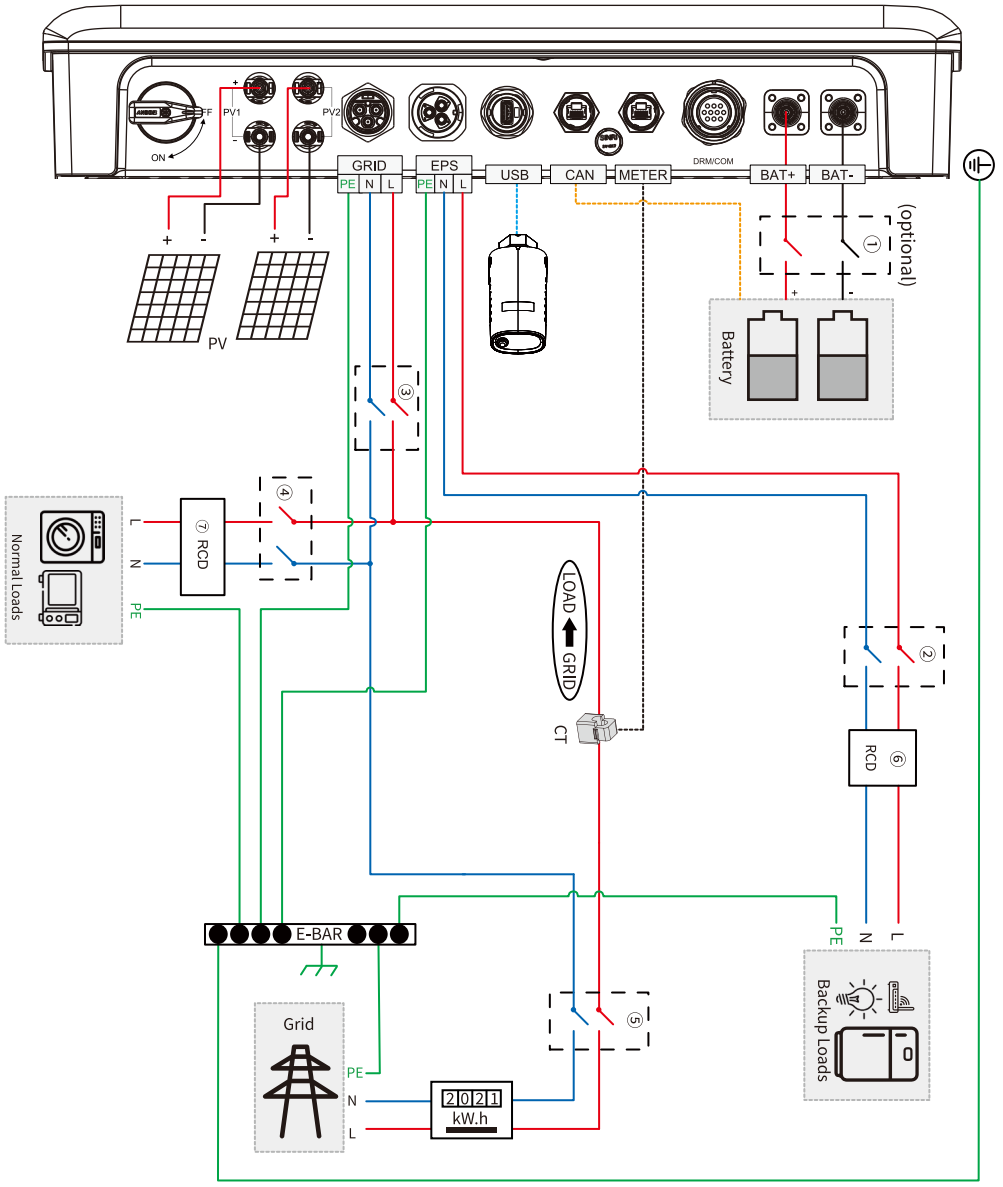
This diagram is an example for grid systems without special requirements on electrical wiring connection (with smart meter) .

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

The inverters are transported, used and operated under appropriate environmental and electrical conditions. The manufacturer has the right to not provide after-sales services or assistance under the following conditions.

1. The inverter is damaged during transferring.

2. The inverter is out of the warranty year and an extended warranty is not purchased.

3. The inverter is installed, refitted, or operated in improper ways without authorization from the manufacturer.

4. The inverter is installed or used under improper environmental or technical conditions (as mentioned in this User Manual) and without authorization from manufacturer.

5. The installation or configuration of the inverter does not follow the requirements mentioned in this User Manual.

6. The inverter is installed or operated contrary to the requirements or warnings mentioned in this User Manual.

7. The inverter is broken or damaged by any force majeure, such as lightening, earthquake, fire hazard, storm and volcanic eruption etc.

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

9. The Inverter is installed, used, or operated against any related provisions contained in international or local policies or regulations.

10. Any incompatible batteries, loads or other devices are connected to the system.

Note: The manufacturer retains the right to explain all of the contents in this User Manual. To insure IP65, the inverter must be sealed well; please install the inverters within one day of unpacking; otherwise, please seal all unused terminals /holes; unused terminals/holes are not allowed to remain open; and confirm that there is no risk of water or dust entering any terminals/holes.

5.7 Maintenance

5.7.1 Maintenance Details

Inverter should be maintained regularly, details as below.

Before maintenance, make sure that the inverter is totally isolated from both PV and AC power for at least 5 minutes.

Heat sink: please use a clean towel to clean the heat sink every year.

Torque: use a torque wrench to tighten the AC and DC connections every year.

DC breaker: check the DC breaker regularly and turn the DC switch on and off for ten consecutive times every year to make sure that it is working properly.

DC breaker: clean the contacts and it will extend the DC breaker lifetime.

Waterproof plate: check if the waterproof plate of device like RS485 is changed every year.

5.7.2 Daily Maintenance

1. Before maintenance, please use a multimeter and other instruments to detect 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, please pay attention to the warning labels of the inverter to prevent personal injury caused by high voltage.

3. During maintenance, please ensure that the DC input switch PV Switches are all disconnected.

4. After the maintenance is completed, 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	