

Single Phase Hybrid Solar Inverter

HN3KS-AH2 / HN3K6S-AH2 / HN4KS-AH2 / HN5KS-AH2 / HN6KS-AH2

User Manual

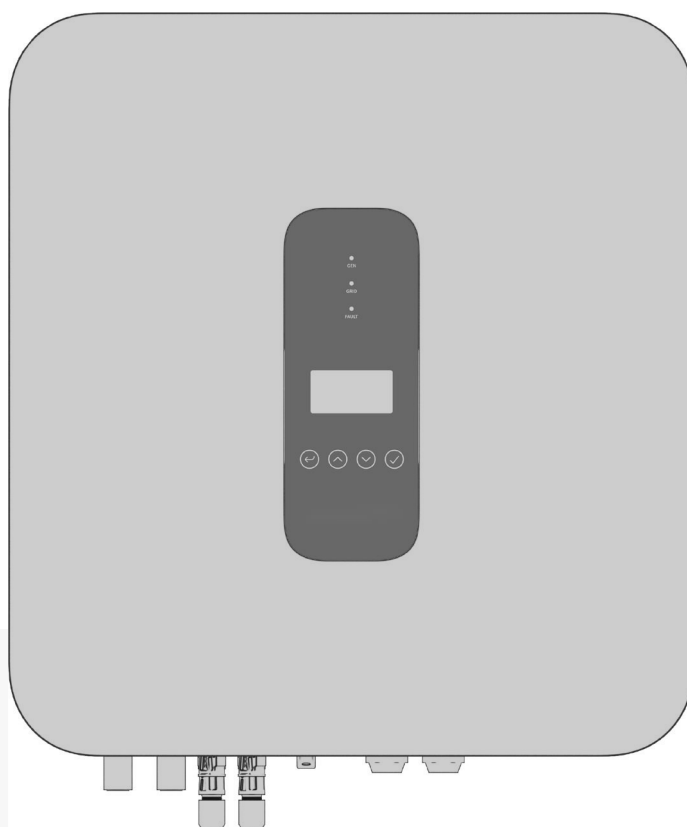


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Foreword







About Manual

Before operating the inverter, be sure to read this manual and other related documents carefully. All documents must be taken care of and made readily available. Due to changes in product development, the contents of this manual may be updated or revised periodically without prior notice.

Labels in Documentation

Label	Description
 DANGER	A high level of potential danger, which, if not avoided, could result in death or serious injury to personnel.
 WARNING	A moderate level of potential danger, which, if not avoided, could result in death or serious injury to personnel.
 CAUTION	A low level of potential danger, which, if not avoided, could result in moderate or minor injuries to personnel.
 NOTICE	Include emphasis and additional information on the content, and may also provide tips or tricks for optimizing product usage.

Labels on Inverter

	CAUTION Do not disconnect under load!
	Danger: High Voltage! Danger: Electrical Hazard!
	Warning: High Temperature! Never touch the enclosure of an operating INVERTER.
	Start maintaining the INVERTER at least 5 minutes after the INVERTER disconnected from all external power supplies.
	Read instructions carefully before performing any operation on the INVERTER.
	Grounding: The system must be firmly grounded for operator safety.

1.Safety Instructions

1.1 General Requirements

During the installation, operation, disassembly, maintenance and scrapping of the product, the relevant local laws and regulations must be strictly observed, as well as the safety instructions in the product manual. The safety precautions in this manual are only supplements to local laws, regulations and regulations.

The manufacturer shall not be liable for any violation of local laws, regulations and manuals during device installation, operation or maintenance.

The safety instructions in this manual are only supplementary and cannot cover all precautions that should be followed. The operation should be based on the actual situation on the site.



DANGER

Do not operate products with electricity, including but not limited to handling, installation, wiring, operation, disassembly and maintenance.



WARNING

- It is strictly prohibited to operate products and cables (including but not limited to handling, installing, operating products and cables, supplying power to products, maintaining and working at altitude, etc.) under severe weather conditions such as flood, lightning, rain, snow and strong winds above level 6.
- In case of fire, evacuate from the building or product area immediately and call the fire alarm number. Re-entry into the burning area is strictly prohibited under any circumstances.
- Do not touch the shell when the device is running at a high temperature, which may cause burns.

1.2 Unpacking Safety

Fully understand this manual and use the appropriate tools to operate the equipment. Learn the correct way to use the tools before using it to avoid injuring others or damaging the equipment.

When fastening products and terminals, use the specified torque to tighten the screws, otherwise the product may be damaged and the damage caused is not covered by the warranty.

Before opening the outer package of the inverter, please check the outer package for visible damage and check the inverter type number, if there is any abnormal packaging or inverter type does not match the situation, do not open and contact your dealer as soon as possible.

Check all safety labels, warning labels and nameplates on the product.

It is strictly prohibited to alter, damage or block the logo and nameplate on the equipment.

1.3 Storage Safety

If the inverter is not put into use immediately, the following storage conditions should be met.

- The inverter must be stored in the original packing box with built-in desiccant.
- The storage temperature ranges from -25°C to $+60^{\circ}\text{C}$ and the storage relative humidity ranges from 0 to 100%.
- If multiple inverters need to be stacked, the number of stacked inverters must not exceed the stacking limit marked on the external container side. At the same time, place it carefully and upright to avoid personal injury or equipment damage.
- Do not store the inverter in direct sunlight, rain and strong electric fields.
- Please store the inverter in a clean, dry place to prevent dust and water vapor erosion.
- The storage period needs to be checked at least every three months. If it is found that moth-eaten rats bite and packaging is damaged, it is necessary to replace the packaging materials in time.
- If the inverter is stored for more than two years, it needs to be inspected and tested by professionals before it can be put into use.

1.4 Carry Safety



CAUTION

- Arrange proper personnel to carry inverters based on the weight of the inverters. The installation personnel must wear protective equipment, such as shoes and gloves.
- When moving inverters, keep them balanced to prevent the inverters from tilting and injuring personnel.
- Placing the inverter directly on hard ground can cause damage to the metal housing, requiring a sponge pad or foam to be laid underneath it.
- Do not use the terminal as a gripper.
- The terminals and interfaces at the bottom of the inverter cannot bear any weight. Do not touch the terminals and interfaces directly with the ground or other supports.

1.5 Installation Safety



CAUTION

- Ensure that the installation environment is well ventilated. Do not place the device in an environment that is flammable, explosive, toxic or smoky.
- Before installation, make sure the product does not have any electrical connections. If drilling holes is required during installation, ensure that water and electricity cables in the wall are avoided.
- Improper installation and operation may cause injury.

1.6 Electrical Connection Safety

- All electrical connections must meet national electrical standards.
- It is necessary to obtain permission from the power department of the country/region in order to connect to the grid.
- Cables prepared by customers must comply with local laws and regulations.
- When connecting wires, you must make sure that the positive and negative poles of the wires correspond to the positive and negative poles of the ports.
- Do not intertwine or cross the wires.
- Install the external protective grounding cable first when performing electrical connection and remove the external protective grounding cable last when removing the inverter.
- The insulation layer may age or be damaged when cables are used at high temperatures. Therefore, keep cables away from heat sources at least 30 mm.



DANGER

- Before electrical connection, ensure that the device is not damaged and that the inverter and all switches connected to are set to OFF. Otherwise, electric shock or fire may occur.
- Do not install or remove cables when the power is on. This prevents instantaneous arc or spark between the core of the power cable and the conductor, which may cause fire or personal injury.
- Do not damage the ground conductor. Do not operate the product if the grounding conductor is not properly installed. Otherwise, personal injury or product damage may occur.



WARNING

- When performing high voltage operations, use special insulation tools.
- When you need to power off the inverter, disconnect all inputs from the product. Do not perform any operation until the device is powered off completely.
- Product damage due to incorrect wiring is not covered by the warranty.

1.7 Operation Safety

When the device is powered on for the first time, professionals must set the parameters correctly. Incorrect parameter Settings may cause the device to be inconsistent with the certification of the country/region, which may affect the normal operation of the device.



DANGER

When the product is working properly, please note the following:

- Do not touch the product enclosure and any heating parts of the inverter (such as the radiator). Otherwise, there may be a risk of burns.
- It is strictly forbidden to plug and unplug any connector on the inverter.
- Do not touch any wiring terminal of the inverter. Otherwise, there may be a risk of electric shock.
- Do not disassemble any parts of the inverter. Otherwise, there may be a risk of electric shock.
- Do not connect or remove any battery, PV string or any PV module in a string and any AC switch. Otherwise, there may be a risk of electric shock.

1.8 Disassembly Safety

Before removing an inverter, disconnect all electrical connections to the inverter, including load, PV, AC, battery, generator and grounding cable.

If the inverter has more than two layers of AC and DC terminals, remove the outer connector and then the inner connector to prevent misoperations that may cause personal injury or device damage.



DANGER

- After the inverter is shut down, there is still a risk of burning. After the inverter cools down, wear protective gloves before operating the inverter.
- After powering off the inverter for 5 minutes, use a monitoring device to measure the inverter and ensure that there is no voltage or current. Then wear protective equipment to remove the inverter.

1.9 Maintenance Safety

- In order to prevent irrelevant personnel from misoperations or accidents near the product, please place eye-catching warning signs or set up safety warning belts around the product.
- To avoid the risk of electric shock, do not perform any maintenance operations other than those described in this manual. If necessary, contact your distributor. Otherwise the loss is not covered by the warranty.
- If the paint on the inverter enclosure falls or rusts, repair it in time. Otherwise, the inverter performance may be affected.
- Do not use cleaning agents to clean the inverter. Otherwise, it may cause damage to the inverter and the resulting loss is not covered by the warranty.
- As the inverter contains no parts that can be maintained, never open the enclosure of the inverter or replace any internal components without authorization. Otherwise, the loss caused is not covered by the warranty.



DANGER

Before performing any maintenance work, power off the device. After powering off the device for 5 minutes, use a testing device to check that there is no voltage or current. Wear protective equipment and strictly follow the safety precautions listed in this manual and other related documents.

1.10 Disposal Safety

When the inverter service life expires, please scrap the inverter according to the relevant local regulations and standards to avoid property damage or casualties.

2.Product Description

2.1 Product Brief Introduction

2.1.1 Function Overview

The inverter is a single-phase hybrid inverter. The inverter is designed to convert the direct current power generated from the PV modules or batteries into grid-compatible AC current and feeds the AC current to the utility grid.

The single-phase hybrid inverter for photovoltaic systems is suitable for both grid-tied and off-grid applications. It can also support the operation of small household loads.

With the integrated Energy Management System (EMS), the inverter can control and optimize the energy flow so as to increase the Self-use of the system.

2.1.2 Model Demonstration

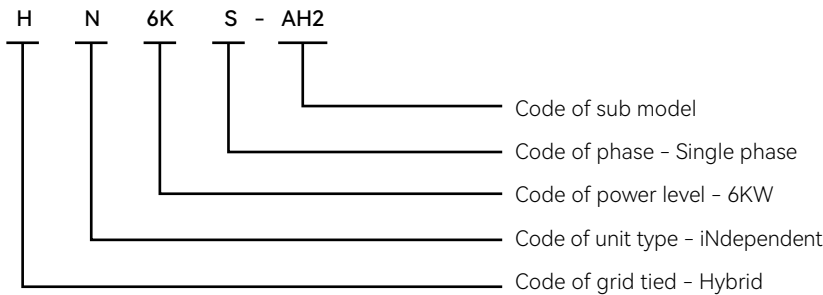


Figure 2.1 Product identification

2.1.3 Appearance

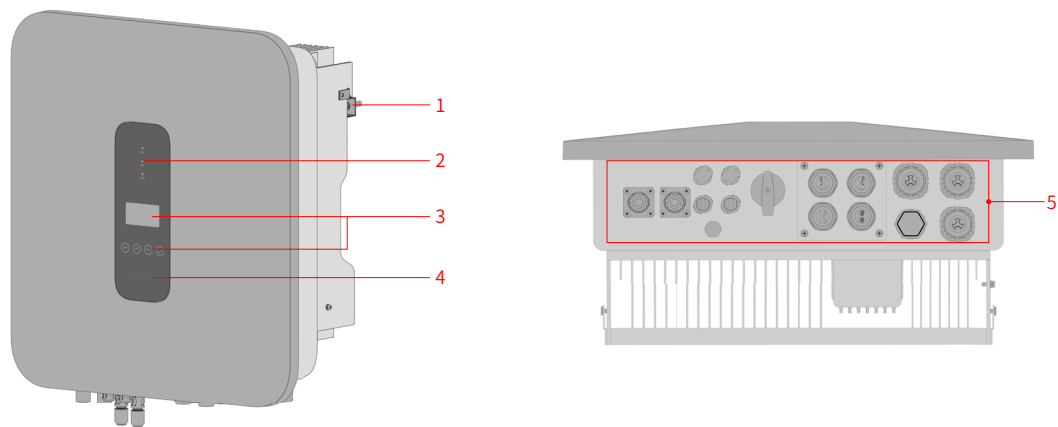


Figure 2.2 Inverter appearance

Table 2.1 Inverter appearance description

No.	Name	Description
1	Mounting-bracket	The inverter can be installed on the wall by mounting-bracket.
2	LED indicator	Indicates the running information.
3	Display and button	Displays the working state and sets the working mode.
4	Connector area	Photovoltaic terminals, battery terminals, AC terminals, generator terminals, load terminals and communication terminals.

2.1.4 Size and Weight

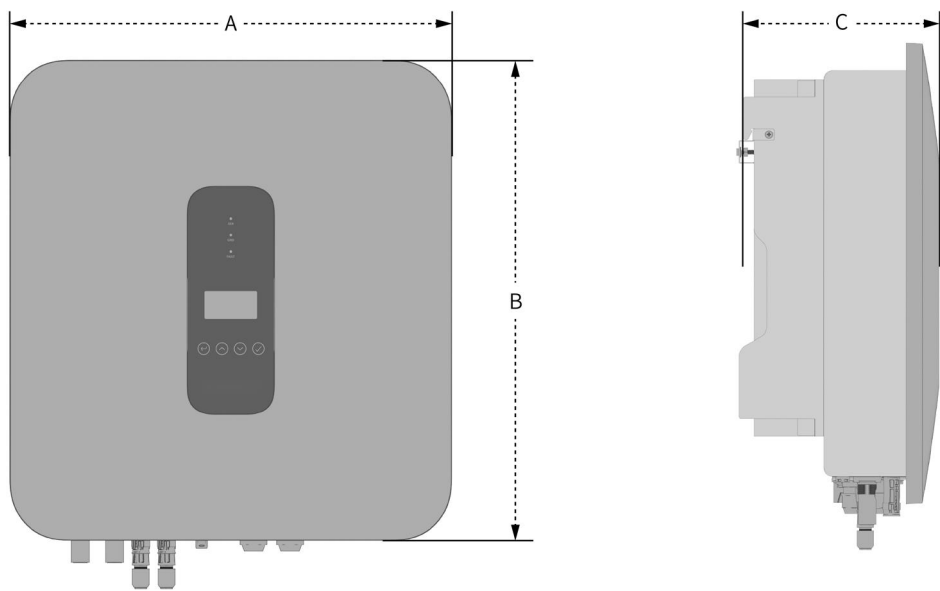


Figure 2.3 Inverter size

The following figure shows the dimensions of the inverter.

Table 2.2 The dimensions of the inverter

Inverter Model	A(mm)	B (mm)	C (mm)	Weight(kg)
HN3KS-AH2	485	527	230	22.5
HN3K6S-AH2				23
HN4KS-AH2				23
HN5KS-AH2				23.5
HN6KS-AH2				23.5

2.1.5 Supported Power Grid Types

This series inverter supports the following power grid types: TN-S and TT. In the TT power grid, the N-to-PE voltage must be less than 30 V.

2.2 LED Indicator

The inverter has three different colors LED indicator to indicate the current running state.

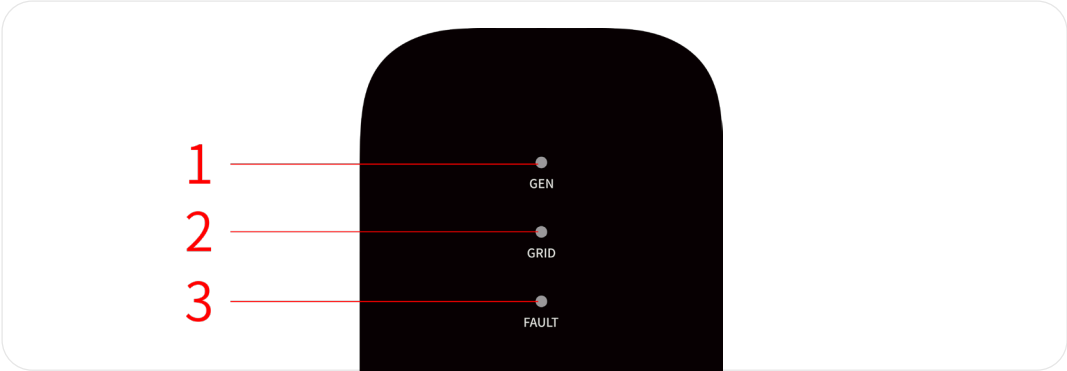


Figure 2.4 LED indicator

Table 2.3 LED indicator explanation

Name	Color	Status	Explanation
Gen	Blue	Constant on	Generator is running
		Alternates flashing. Lights up once every 0.2 second, for 0.2 second	Smart Loads is running
		Alternates flashing. Lights up once every 1 second, for 1 second	Meet the conditions for generator connection, but the generator has a malfunction
		Remains off	The generator connection conditions are not met
Grid	Green	Constant on	Work in grid-connected
		Alternates flashing. Lights up once every 0.2 second, for 0.2 second	Work in off-grid mode
		Alternates flashing. Lights up once every 1 second, for 1 second	Work in grid-connected mode without selling electricity
		Remains off	AC part does not work
Fault	Red	Constant on	Fault occur and the device can not work normal
		Alternates flashing. Lights up once every 1 second, for 1 second	Alarm reported but the device is still working
		Remains off	Work normal

Note: 1. The Grid and the Gen indicator light change to breathing light means Standby.

2. Three LEDS will fast flash during inverter updating.

2.3 Display and Button Description

The inverter has a display screen and four touch buttons used to display running state and set the parameters of the inverter.

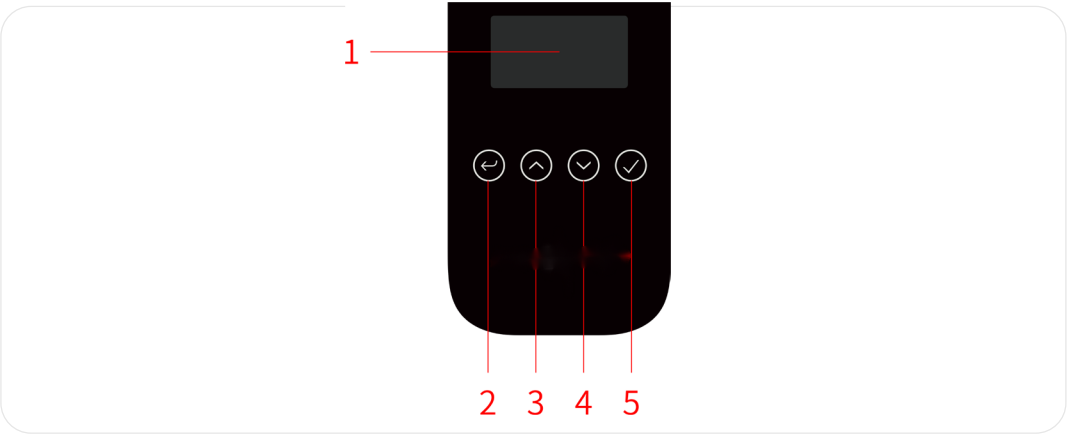


Figure 2.5 Display and button

Table 2.4 Display and button description

NO.	Function key	Describe
1	Screen	Display configured information and running state
2	ESC	Exit/Return to previous menu
3	UP	To go to the previous selection
4	DOWN	To go to the next selection
5	ENTER	OK/Go to next level menu

2.4 Terminal Description

All electrical terminals are located at the bottom of the inverter.

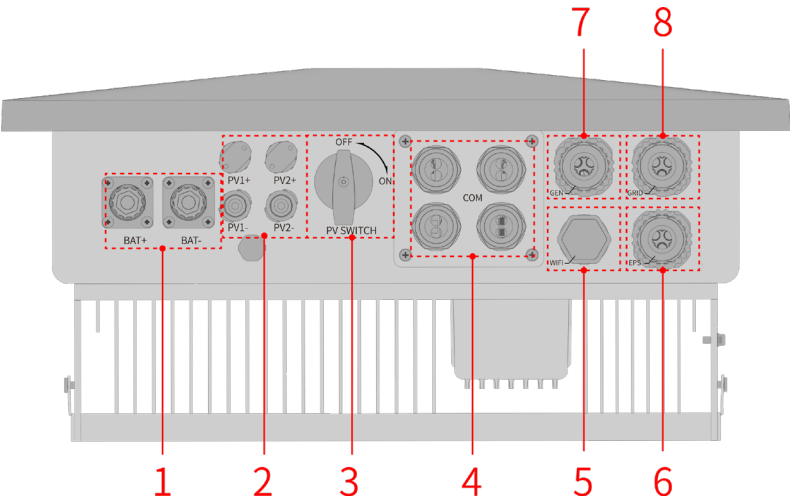


Figure 2.6 Terminal

Table 2.5 Terminal Description

No.	Name	Description	Decisive-Voltage Classification
1	BAT+, BAT-	Connectors for the battery power cables.	DVC-B
2	PV1+,PV1-, PV2+,PV2-	Terminals for PV input.	DVC-C
3	DC SWITCH	Switch on/off the input of the PV.	DVC-C
4	COM	Communication port for BMS, Meter/Grid Current, DRM, AFCI, DRY IO, PARA1, PARA2.	DVC-A
5	WIFI	Communication port to be connected to smart communication stick.	DVC-A
6	EPS	AC terminal for Home loads.	DVC-C
7	GEN	Connect the generator power supply, which can also be used as the output for smart loads.	DVC-C
8	GRID	AC terminal to connect to the grid.	DVC-C

2.5 Multiple Energy-management Strategies

The inverter supports multiple energy management strategies, such as Self-use mode, Peak Shift mode, scheduled charging and discharging mode and backup power mode. Energy management strategies can be set and adjusted through a mobile app and display screen, allowing for the maximization of electricity usage efficiency.

3.Function Description

3.1 Basic Function

The main function of the inverter is to convert the DC power from solar panels or batteries into AC power to meet the requirements of the grid. It achieves this by using a bidirectional converter that allows for charging and discharging of batteries.

Additionally, the inverter is equipped with two maximum power point trackers (MPPT) that track the maximum power point of PV strings from different orientations, tilts or module structures in real-time, maximizing the power output of the solar system.

These functionalities enable the inverter to efficiently utilize the energy from solar panels or batteries and convert it into usable AC power for the grid or for load.

3.2 Protection Function

The inverter is equipped with various protection functions, including AC output short circuit protection, ground insulation resistance monitoring, anti-islanding protection, over-temperature protection, leakage current protection and over-voltage/over-current protection. These protection functions ensure the safe and reliable operation of the inverter and the connected electrical system.

3.2.1 Earth Fault Alarm

If there is a ground fault, the inverter will emit an alarm and indicate a system fault.

3.2.2 Power Derating

Power derating is a method of protecting inverters from device damage due to overheating. Continuous increase in environmental temperature and module temperature can both result in power reduction.

3.2.3 Anti-islanding Protection

Inverters can quickly monitor and disconnect from the grid in the event of grid voltage loss or disconnection. They also emit an alarm signal to avoid safety hazards for the user's equipment and maintenance personnel. The anti-islanding protection response time is less than 1 second, which is lower than the standard requirement of 2 seconds, providing a faster response speed.

3.2.4 Leakage Current Protection

Inverters can detect leakage current in the grid-side circuit. Once the leakage current exceeds the safety range, the inverter will quickly disconnect the circuit and generate an alarm to indicate a system fault, in order to prevent the occurrence of electrical shocks and other hazardous events.

3.3 Battery Management

The inverter is compatible with lithium-ion batteries and lead-acid batteries.

During the communication process between the inverter and the lithium battery, the inverter can accurately assess the State of Charge (SOC) and State of Health (SOH) of the battery by obtaining its status information. This helps improve the performance and reliability of the battery system, resulting in a better user experience and usage efficiency.

For lead-acid batteries, our inverter is designed with a three-stage charging function. Firstly, in the constant current charging stage, the maximum current is used to quickly charge the battery, allowing the voltage to rise rapidly. Once the voltage reaches the constant voltage level, the inverter will maintain a stable voltage state and gradually reduce the current while continuing to charge the battery. Once the battery is fully charged, the inverter will replenish the loss from battery self-discharge with a small current to keep the battery fully charged. Through the three-stage charging function, the inverter can ensure the cycle life of lead-acid batteries and improve their lifespan and performance.

3.3.1 Charge Management

When the working condition of the inverter meets the corresponding requirements, the solar panels, grid or generator can charge the battery.

The maximum allowable charging current is limited to the smaller value among the following values:

- the maximum charge current of the inverter (120A).
- the maximum / recommended charge current from the battery manufacturer.

As a result, the battery charge power may not reach the rated power.

3.3.2 Discharge Management

The maximum permissible discharge current is limited to the smaller of the following values:

- Maximum discharge current of the inverter (120A).
- the maximum/recommended discharge current provided by the battery manufacturer.

As a result, the battery discharge power may not reach the rated power of the inverter.

3.4 Smart Loads Control

Smart load control refers to the ability of an inverter to intelligently manage and control the power consumption of connected loads. The smart loads control helps optimize energy usage, reduce costs and improve the overall efficiency and reliability of the power system.

Both EPS and smart loads ports can supply power to loads. Regardless of whether the smart loads is connected or not, the inverter prioritizes ensuring that the EPS is continuously powered on. After connecting to the smart loads, the inverter also supplies power to the smart loads.

When the grid is available or the battery capacity is high(The real-time SOC of the battery is greater than or equal to the SOC required for smart load access), the inverter can connect smart loads through the generator port and provide power.

However, if the power supply is insufficient (When the grid is disconnected and the SOC of the battery is less than or equal to the SOC required for smart load exit.), the smart load will be disconnected first automatically to ensure continuous loading of the EPS.

3.5 Generator Control

Generator control replaces the ATS device of the generator, realizing the automatic switching of the generator's switch (The generator should support the communication with inverter). When there is a grid outage and low battery capacity (The real-time SOC of the battery is less than or equal to the SOC required for generator access), the control system will automatically switch the power source from the grid or battery to the generator power.

After the generator is started, it continues to monitor the status of the grid and battery. If the grid is restored or the battery capacity is sufficient(The real-time SOC of the battery is greater than or equal to the SOC required for generator exit), it immediately disconnects the generator output and switches to the grid or battery to supply the load.

This control can improve the reliability and stability of the power system, ensuring the normal operation of the load. Also, through optimization algorithms, we achieve optimal efficiency operation control of the generator, effectively improving fuel power generation efficiency and saving fuel consumption.

3.6 Inverter Operating Mode

3.6.1 Energy Storage System Description

The following figure and table show the application of the inverter in the energy storage system.

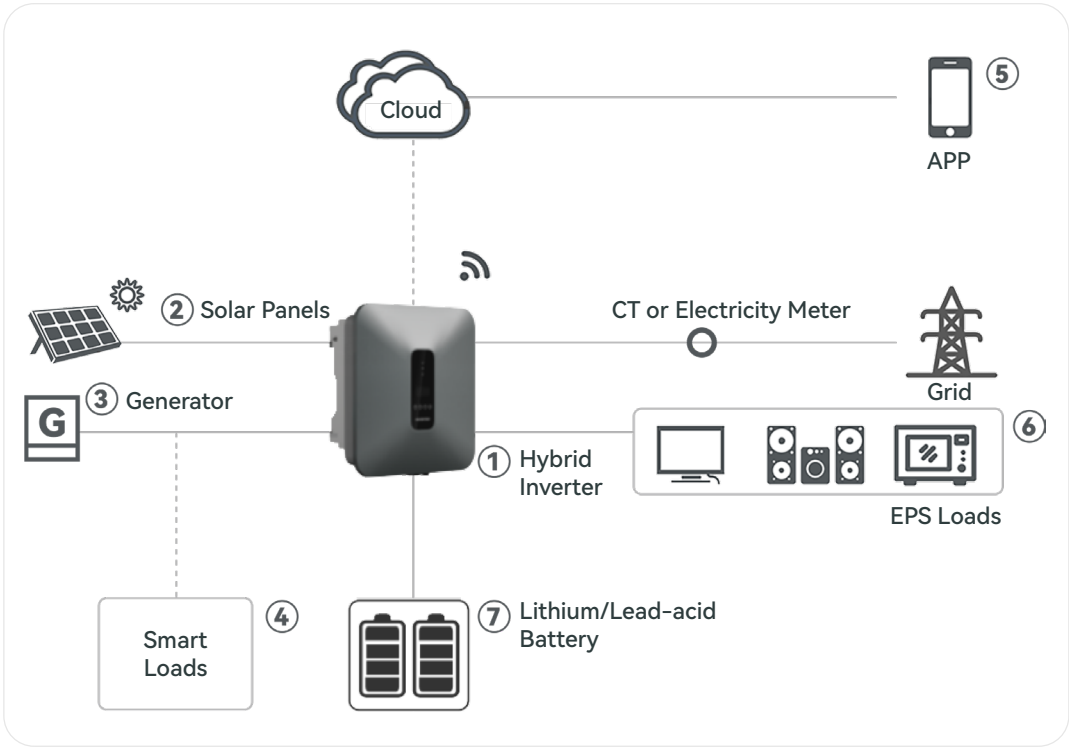


Figure 3.1 Application of inverter

Table 3.1 Components

Item.	Description.	Note.
①	Inverter	Hybrid inverter.
②	Solar panels	Perfectly compatible with most types of solar panels in the market, including the model use 166mm/182mm/210mm solar battery cell.
③	Generator (optional)	Start and shut down the generator automatically based on conditions without external ATS (Automatic Transfer Switch).
④	Smart Loads (optional)	Share the same port with the generator and automatically connects or disconnects the smart loads based on the energy management requirements set by the user.
⑤	APP	Remote real-time monitoring of inverter operating status and data through the APP.
⑥	EPS	Ensure uninterrupted power supply to the main load.
⑦	Battery (optional)	Lithium-ion batteries or lead-acid batteries.

3.6.2 Self-use Mode

It is suitable for areas with high electricity prices, PV on-grid electricity subsidies less or no subsidies.

Table 3.2 Self-use mode description

The grid is available	Daytime	<p>A1 ($P_{PV} \geq P_{Load}$) PV can supply power to both the load, battery and grid. The priority of power supply is as follows: ①Load; ②Battery; ③Grid.</p> <p>B1 ($P_{PV} < P_{Load}$) The priority of load supply depends on the amount of battery energy: ①PV and Battery; ②PV, Battery and Grid.</p>
	Evening	<p>C1 The priority of supplying the load is determined based on the amount of energy in the battery: ①Battery; ②Battery and Grid.</p>
The grid is disconnected	Daytime	<p>D1 ($P_{PV} \geq P_{Load}$) PV can supply power to both the load and the battery. The priority of power supply is as follows: ①Load; ②Battery.</p>
		<p>E1 ($P_{PV} \leq P_{Load}$) When the battery energy is sufficient, the battery and PV combined to power the load.</p>
		<p>F1 When both the energy from PV and battery are insufficient: 1. If there is a generator: The generator and PV work together to supply power to the load and charge the battery. Once the battery charge is sufficient, the generator will stop operating, battery and PV will continue supplying power to the load. 2. If there is no generator: The PV will only charge the battery.</p>
	Evening	<p>G1 When the battery has sufficient charge, it will power the load.</p> <p>H1 When the battery charge is insufficient: 1.If there is a generator: It will power the load and also charge the battery. Once the battery charge is sufficient, the generator will exit and the battery will continue to power the load. 2. If there is no generator: The inverter will be on standby.</p>

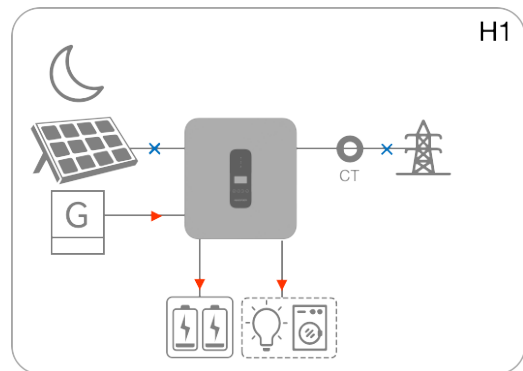
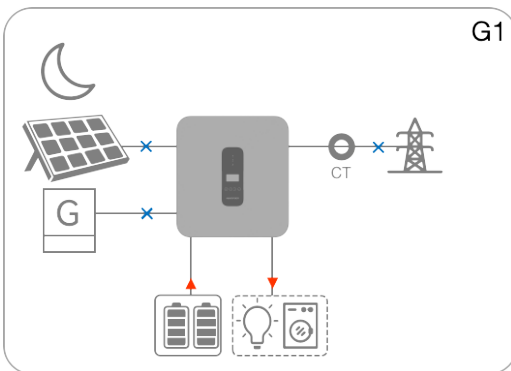
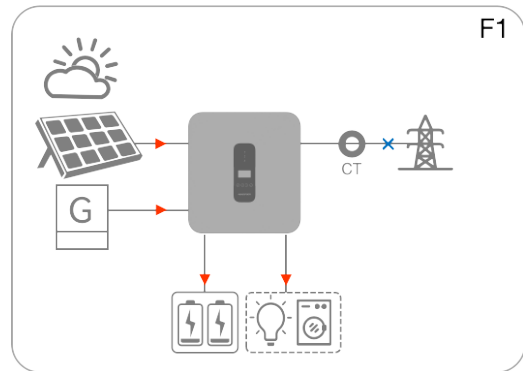
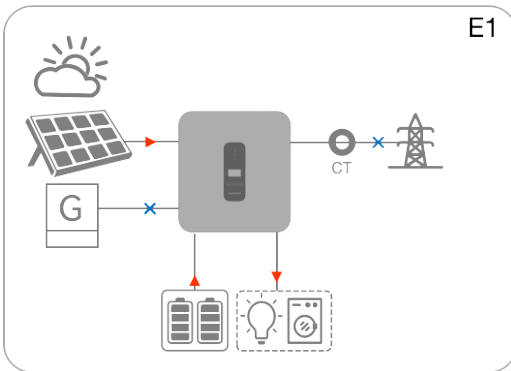
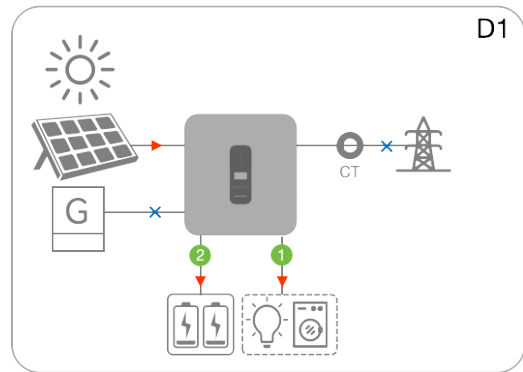
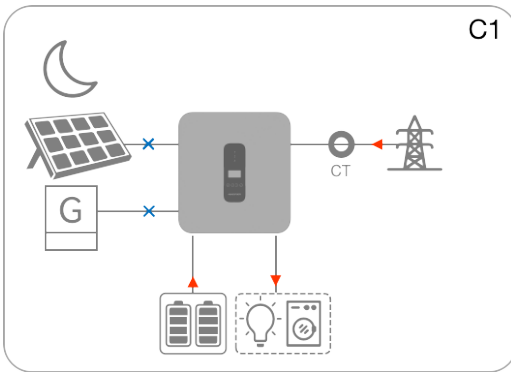
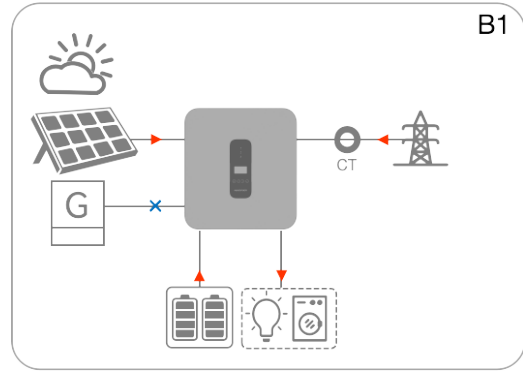
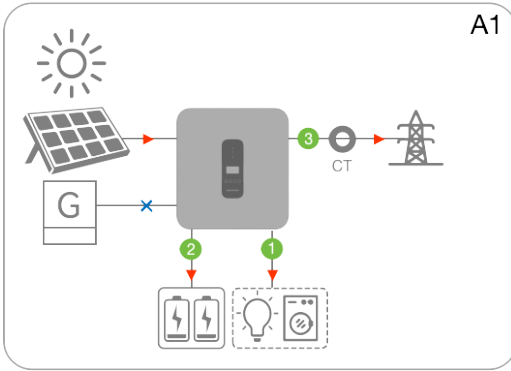


Figure 3.2 Self-use energy flow diagram

3.6.3 Peak Shift Mode

The Peak Shift mode can only be selected if it complies with local laws and regulations, such as allowing the battery to sell electricity to the grid. It is recommended to use the Peak Shift mode in scenarios where there is a significant difference in electricity prices between peak and off-peak periods.

Table 3.3 Peak Shift mode description

The grid is available	Peak	<p>A2 ($P_{PV} \geq P_{Load}$)</p> <p>PV can supply power to both the load, battery and grid. The priority of power supply is as follows: ①Load; ②Grid; ③Battery.</p>
		<p>B2 ($PPV < P_{Load}$)</p> <p>1.PV and battery working together to power the load. 2.The extra energy from the battery can be sold to the power grid.</p>
	Valley	<p>C2 ($P_{PV} \geq P_{Load}$)</p> <p>PV can supply power to both the load, battery and grid.The priority of power supply is as follows: ①Load; ②Battery; ③Grid. If the PV energy is not enough to charge the battery, electricity can be drawn from the grid to charge the battery.</p>
		<p>D2 ($P_{PV} < P_{Load}$)</p> <p>The PV can be combined with the grid to power the load. If the battery is not fully charged at this time, electricity can be drawn from the grid to charge.</p>
	Normal	<p>E2 ($P_{PV} \geq P_{Load}$)</p> <p>PV can supply power to both the load, battery and grid. The priority of power supply is as follows: ①Load; ②Battery; ③Grid. If the photovoltaic energy is insufficient to charge the battery, the power grid will not charge the battery.</p>
		<p>F2 ($P_{PV} < P_{Load}$)</p> <p>The PV system will work together with the grid to supply the load. The battery cannot charge or discharge.</p>
The grid is disconnected	Daytime	The logic is the same as the Self-use mode: D1,E1,F1.
	Evening	The logic is the same as the Self-use mode: G1,H1.

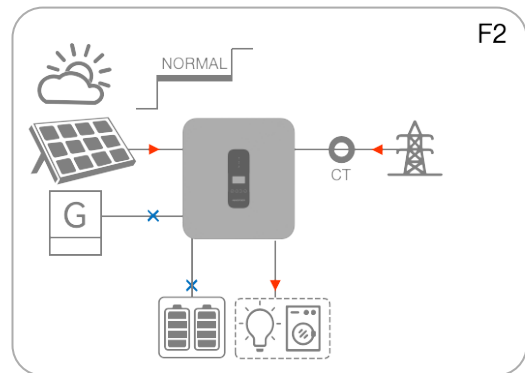
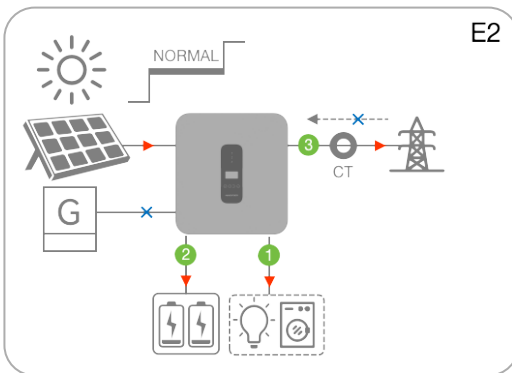
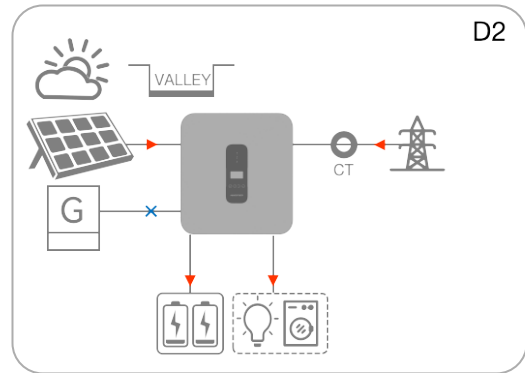
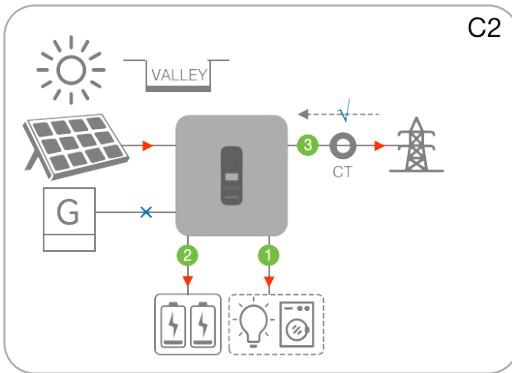
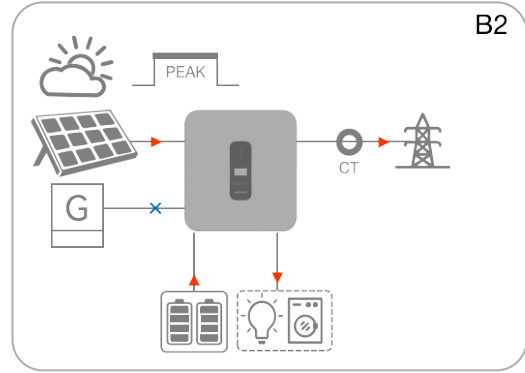
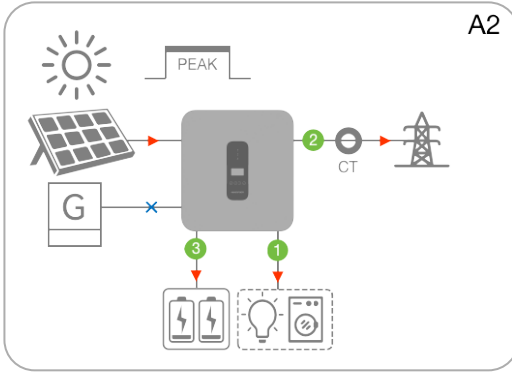


Figure 3.3 Peak Shift mode energy flow diagram

3.6.4 Battery Priority Mode

The battery priority mode is primarily suitable for scenarios where the grid is unstable and there are critical loads. When the grid is available, the system ensures that the battery is fully charged to ensure that the loads can be powered by the battery when the grid is disconnected.

Table 3.4 Battery priority mode description

The grid is available	Daytime	A3 ($P_{pv} \geq P_{Load}$) PV can supply power to both the load, battery and grid. The priority of power supply is as follows: ①Load; ②Battery; ③Grid. If the PV energy is not enough to charge the battery, electricity can be drawn from the grid to charge the battery.
		B3 ($P_{pv} < P_{Load}$) The PV can be combined with the grid to power the load. If the battery is not fully charged at this time, electricity can be drawn from the grid to charge.
	Evening	C3 The grid supply the load. If the battery is not full, charge the battery. The battery cannot supply the load.
The grid is disconnected	Daytime	The logic is the same as the Self-use mode: D1,E1,F1.
	Evening	The logic is the same as the Self-use mode: G1,H1.

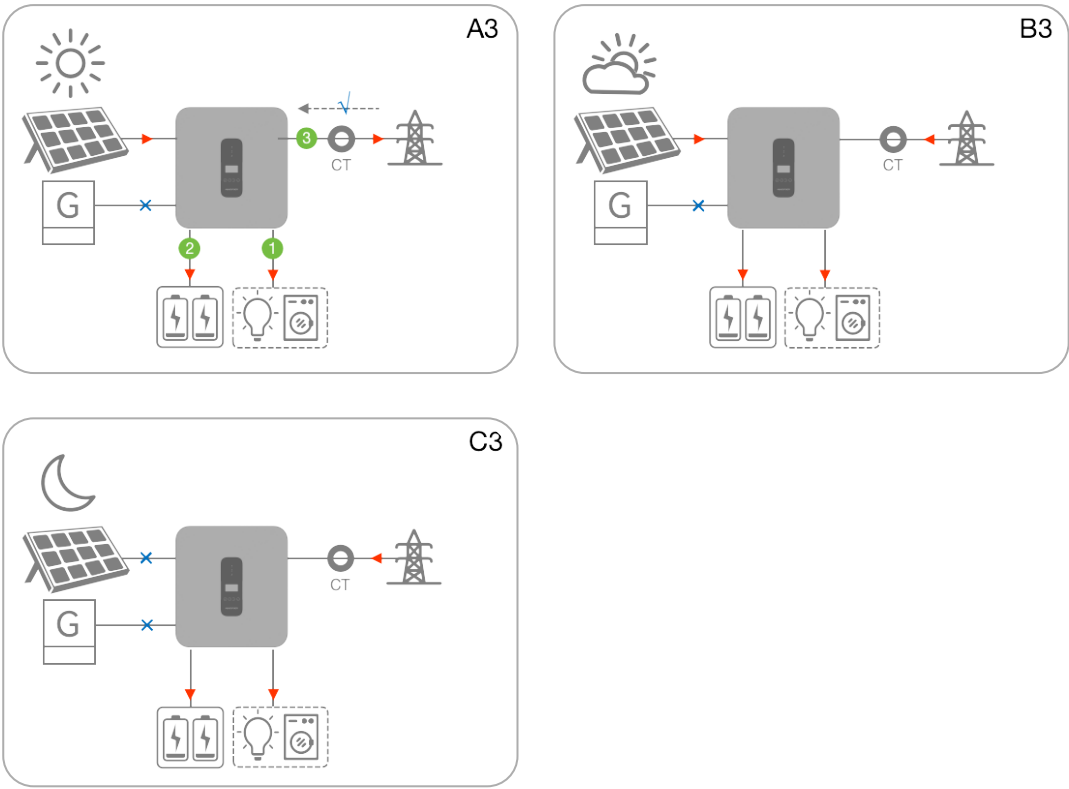


Figure 3.4 Backup mode energy flow diagram

3.6.5 Scheduled Charge and Discharge Mode

Inverter controls the charging and discharging process of the battery based on the user-set schedule. This mode ensures that the battery has sufficient power when the user needs electricity, while avoiding overcharging and over discharging issues that may occur when the battery is in charging or discharging state for a long time. It optimizes the battery usage and extends the battery lifespan.

3.7 Reactive Power Regulation

The inverter can output the corresponding reactive power according to demand, and there are two methods of reactive power control: reactive power control and power factor control.

When selecting reactive power control, the inverter will output the corresponding reactive power according to the reactive power set by the user to meet the power system's requirements for reactive power. With power factor control, the inverter automatically adjusts the reactive power based on the set active power and power factor, in order to meet the desired power factor value of the power system.

The maximum active power that can be set is the rated power corresponding to the inverter model. The maximum reactive power that can be set is $\pm 60\%$ of the rated power. The power factor that can be set ranges from -0.8 to 1 for capacitive loads or from 0.8 to 1 for inductive loads.

Therefore, depending on the actual requirements, choose the appropriate reactive power control method so that the inverter can output the required reactive power for the grid during grid connection and meet the requirements of the power system.

3.8 Communication and Configuration

The inverter possesses various ports for device and system monitoring, including RS485 and WLAN which can configure various parameters for optimal operation. Real-time operational data of the inverter can be obtained through APP.

Inverters can also communicate with batteries to obtain battery status information, enabling monitoring, management and protection of the battery.

Inverters can also replace the Automatic Transfer Switch (ATS) function of a generator by communicating with the generator to achieve automatic start-up and shutdown of the generator.

Inverters also have ports for arc fault detection.

At the same time, our product can also achieve parallel operation of multiple inverters.

3.9 PV Control

The PV control section includes PV control modes and PV emergency enablement.

The PV control modes can be divided into independent control and parallel control based on how the PV panels are connected. PV independent control refers to connecting two PV panels separately to two independent PV1 and PV2 input channels. Under PV independent control, each PV panel has its own Maximum Power Point Tracking (MPPT) controller. PV parallel control refers to connecting one PV panel in parallel to both PV1 and PV2 input channels, both PV1 and PV2 channels are connected to the same PV panel, and there is only one MPPT controller for both channels.

PV emergency enable determines whether the inverter can operate off-grid and supply power to the load with only PV input. When PV emergency enable is turned on, even if the grid, battery, and generator are disconnected, the inverter can still utilize the energy from the PV panels to provide power to the load. When PV emergency enable is turned off, even if there is PV input, the inverter cannot operate off-grid and will be in standby mode.



NOTICE

- After enabling PV emergency mode, due to the stability issues of PV energy caused by weather and sunlight, it is recommended to connect low-power loads, such as lighting and TV. It is not recommended to use high-power devices with high requirements for the stability of PV energy, such as desktop computers and air conditioners, to prevent the inverter from shutting down due to PV energy fluctuations, which may result in data loss.
- When using one PV parallel in two PV input ports, you need to set the PV mode to parallel in the PV Set (default is independent).

4.Unpacking

4.1 Check Before Signing

Before unpacking the inverter, check the outer packing for damage, such as holes and cracks and check the inverter model.

If any damage is found or the inverter model is not what you requested, do not unpack the package and contact your dealer as soon as possible.

4.2 Packing List

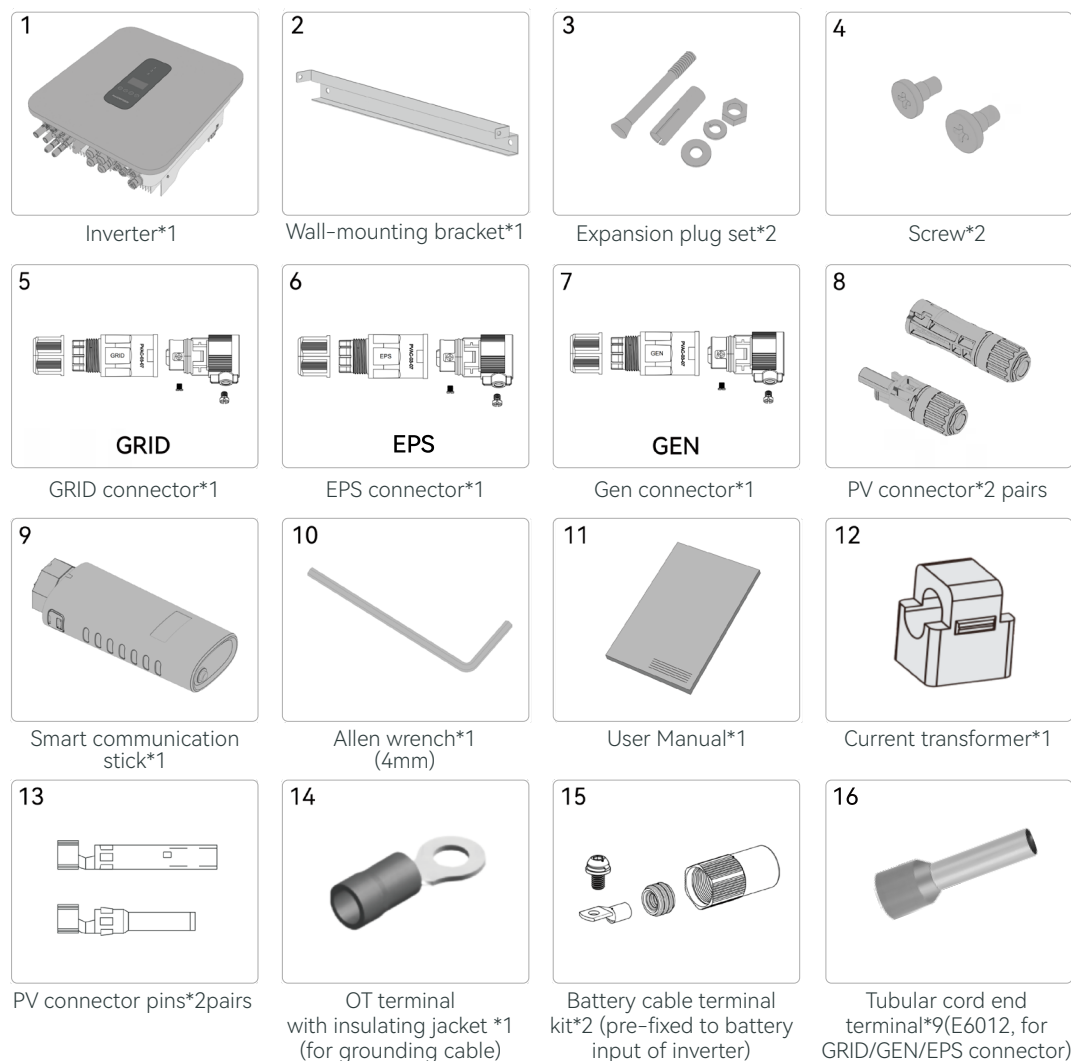


Figure 4.1 Scope of delivery

5. Mechanical Mounting

5.1 Safety During Mounting



DANGER

- Make sure there is no electrical connection before installation.
- Before drilling, avoid the water and electricity wiring in the wall.



WARNING

Respect all local standards and requirements during mechanical installation.



NOTICE

If drilling is required during installation:

- Wear safety goggles and protective gloves when drilling holes.
- Make sure to avoid the water and electricity wiring in the wall before drilling to avoid danger during drilling.
- Avoid the product of debris and dust.

5.2 Location Requirements

The proper installation position ensures the safe operation, service life and performance of the inverter to a large extent. The inverter protection level of this product is IP66, which allows it to be installed both indoors and outdoors. The inverter should be installed at a height that makes it easy to view the LED indicator panel and to facilitate electrical connection, operation and maintenance. Do not install in places accessible to children.

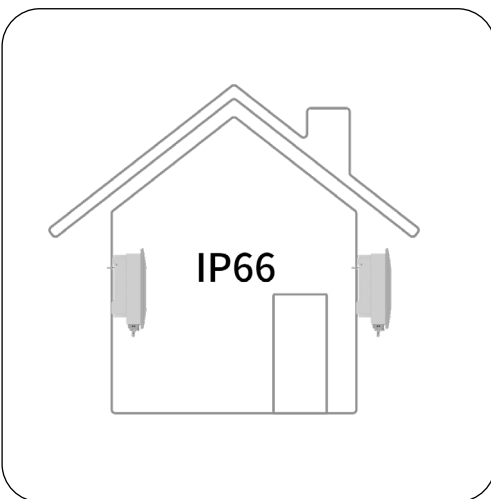


Figure 5.1 Installation location

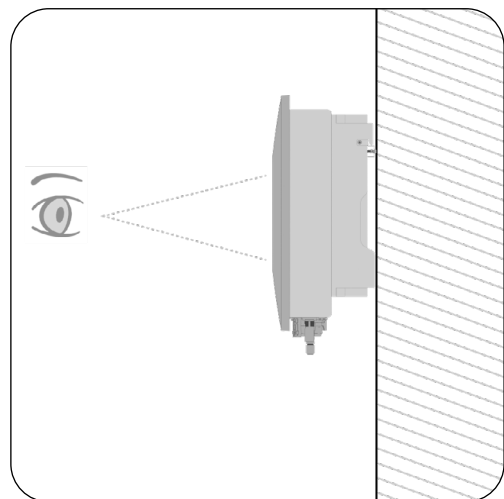


Figure 5.2 Installation height requirements

5.2.1 Environment Requirements

WARNING

Poor installation environment will affect system performance!

- Ensure that the inverter is installed in a well-ventilated place and the heat dissipation system or vent is not blocked.
- Do not install the inverter in an environment with flammable and explosive objects or smoke and strong electric fields.
- The ambient temperature and relative humidity must meet the following requirements. Inverter power reduction protection occurs in high-temperature environments. If the inverter is installed in an environment with direct sunlight or temperatures exceeding 40 degrees Celsius, it can lead to a decrease in power output.
- Install the inverter in a sheltered area to avoid direct sunlight and bad weather (e.g. snow, rain, lightning, etc.).

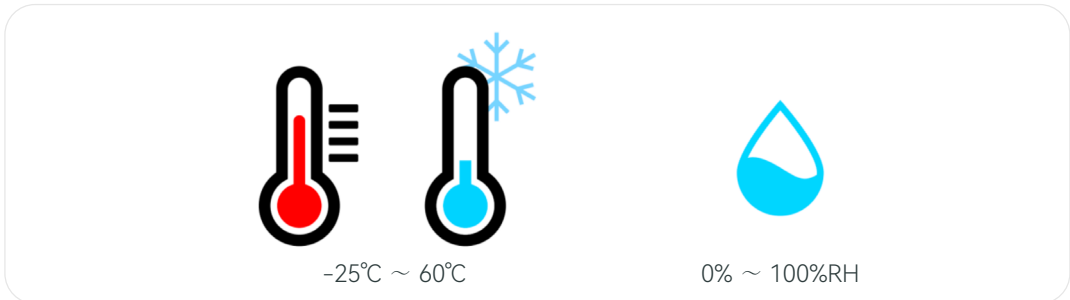


Figure 5.3 Temperature and humidity requirements

5.2.2 Carrier Requirements

The installation structure of the inverter must comply with local/national standards and guidelines. The installation carrier must not be made of flammable materials and must have fire-resistant properties. Please ensure that the installation carrier is sturdy and reliable enough to bear 3 times the weight of the inverter and is suitable for the size of the inverter.

When the inverter is in operation, it may generate vibrations. Therefore, do not install it on carriers with poor sound insulation to avoid causing disturbance to residents in living areas due to the noise generated by the equipment during operation.

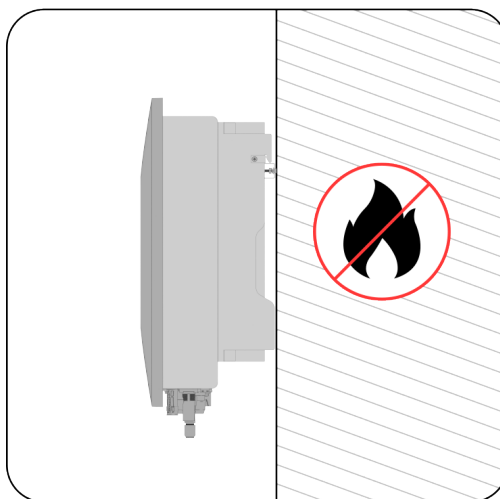


Figure 5.4 Installation carrier requirements

5.2.3 Angle Requirements

The recommended installation angle for inverter is vertical or backward tilt not exceed 15 degrees.
The inverter must not be installed horizontally, rotated, inverted, tilted forward or exceed the backward tilt angle.

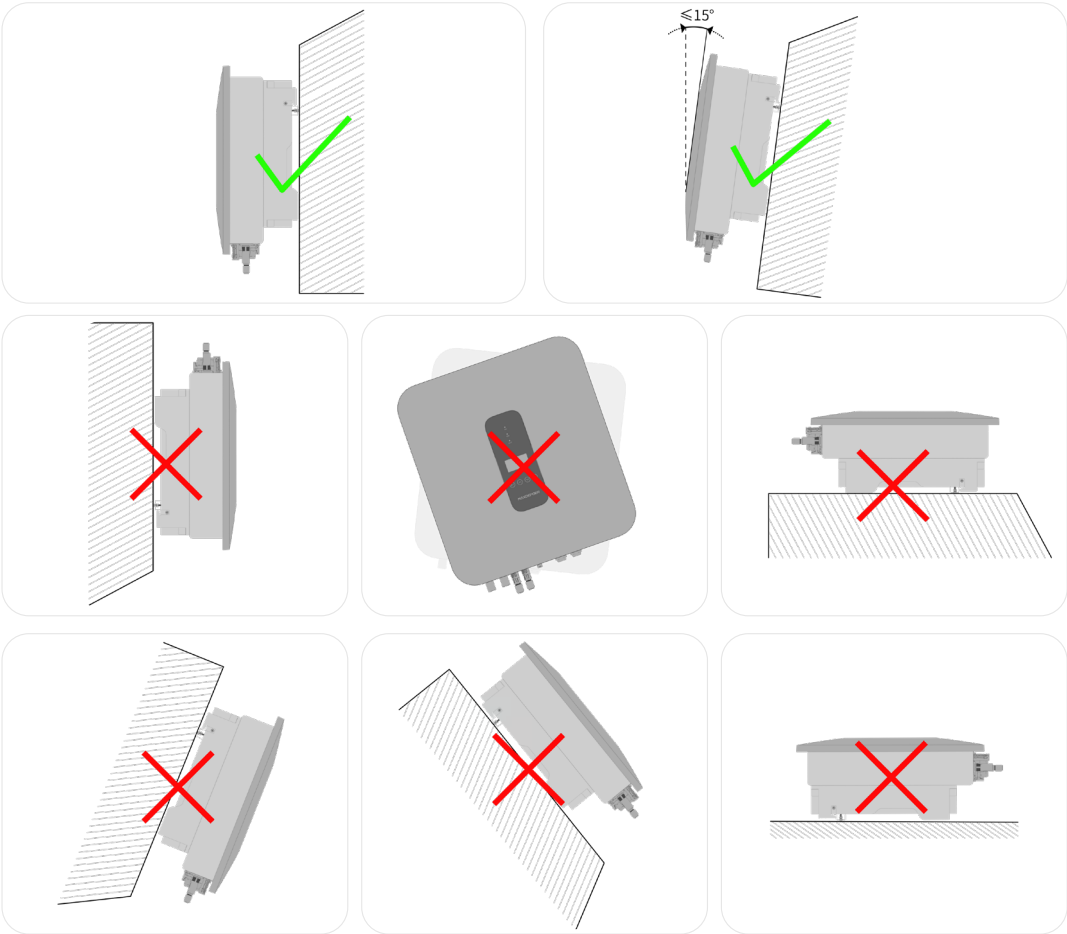


Figure 5.5 Installation angle requirements

5.2.4 Clearance Requirements

Reserve enough clearance around the inverter to ensure sufficient space for heat dissipation.

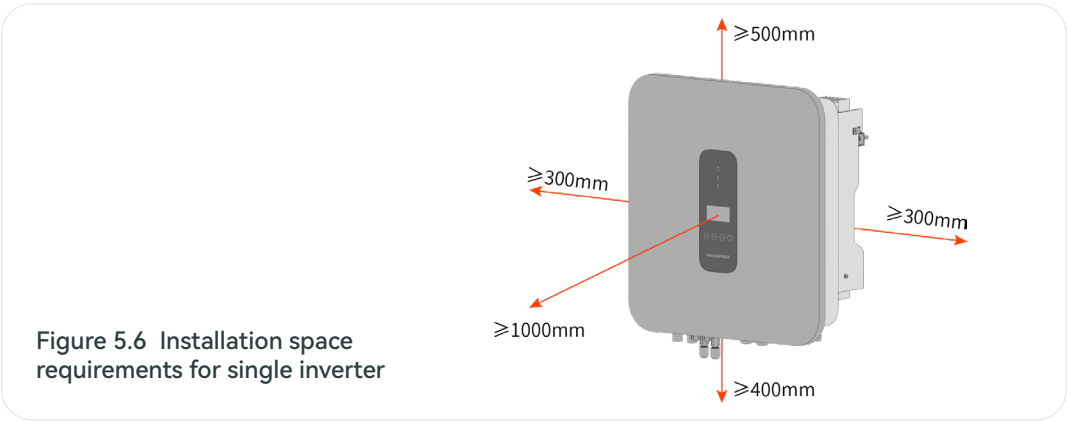


Figure 5.6 Installation space requirements for single inverter

For multiple inverters, recommended as following:

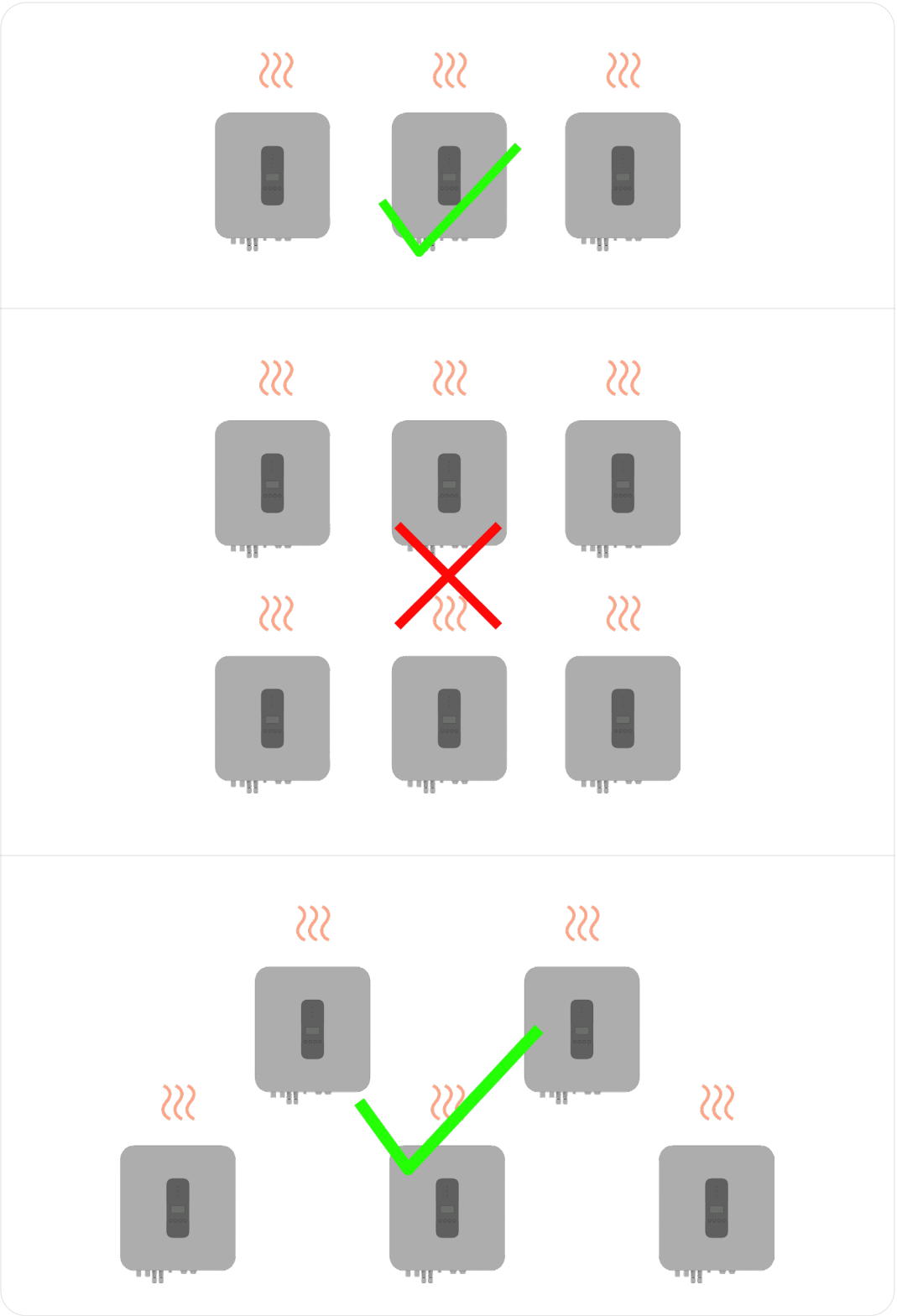


Figure 5.7 Installation space requirements for multiple inverters

5.2.5 Installation Tools

Installation tools include but are not limited to the following recommended ones. Other auxiliary tools can be used if necessary.



Figure 5.8 Installation tools requirements

5.3 Installation

5.3.1 Moving Inverter



CAUTION

- When carrying out transportation, turnover, installation and other operations, it is necessary to comply with the laws, regulations and relevant standards of the country or region.
- Before installation, the inverter should be taken out of the packaging box and transported to the installation site.

5.3.2 Mounting-bracket

The inverter can be installed on a rack or wall by means of mounting-bracket.

Dimensions of the mounting-bracket are as follows.

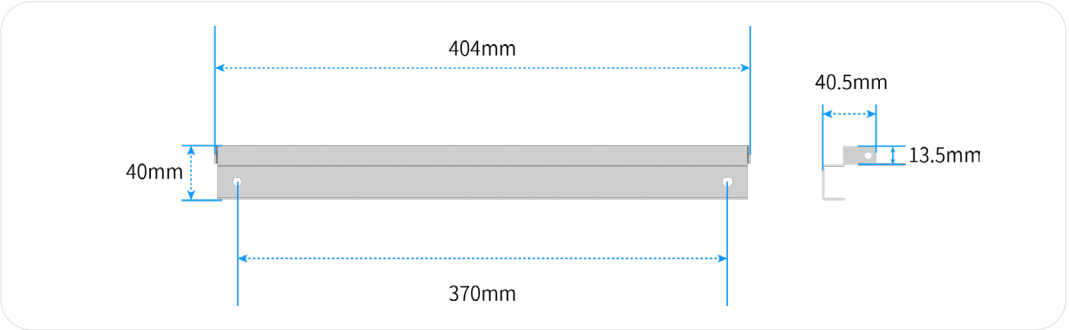


Figure 5.9 Dimensions of the mounting-bracket

Reserve enough space when installing the mounting-bracket to meet the installation space requirements of the inverter.

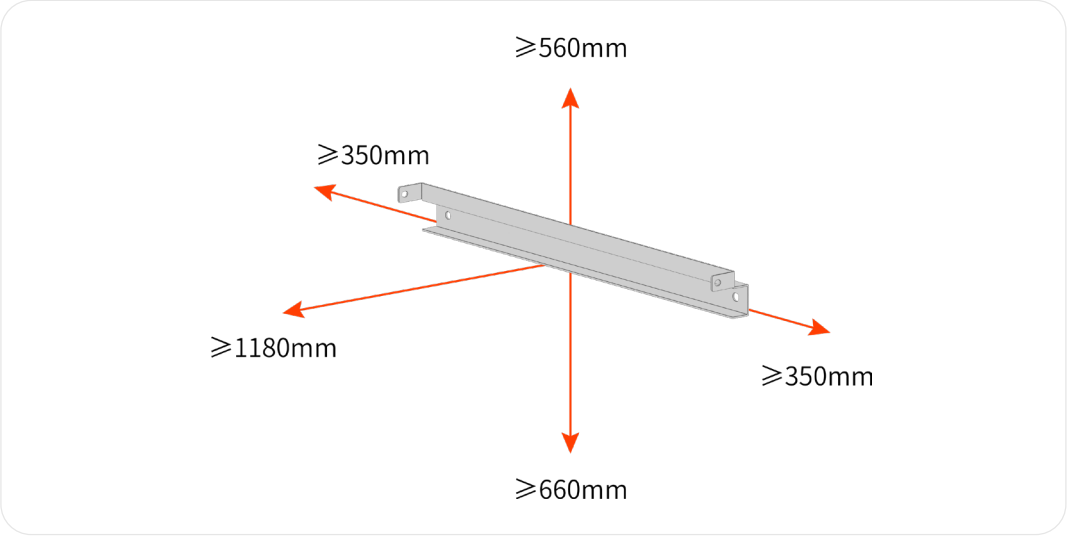


Figure 5.10 Installation space requirements of the mounting-bracket

Inverter is installed on the wall by means of wall-mounting bracket and the expansion plug sets.
The following expansion plug set is recommended for the installation.

- (1) Self-tapping screw(M6)
- (2) Expansion tube
- (3) Nut
- (4) Flat gasket
- (5) Spring shim

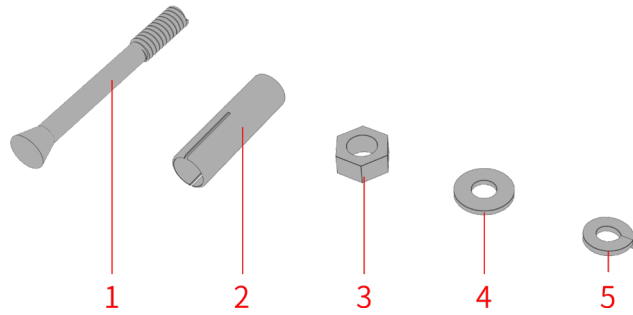


Figure 5.11 Expansion plug set

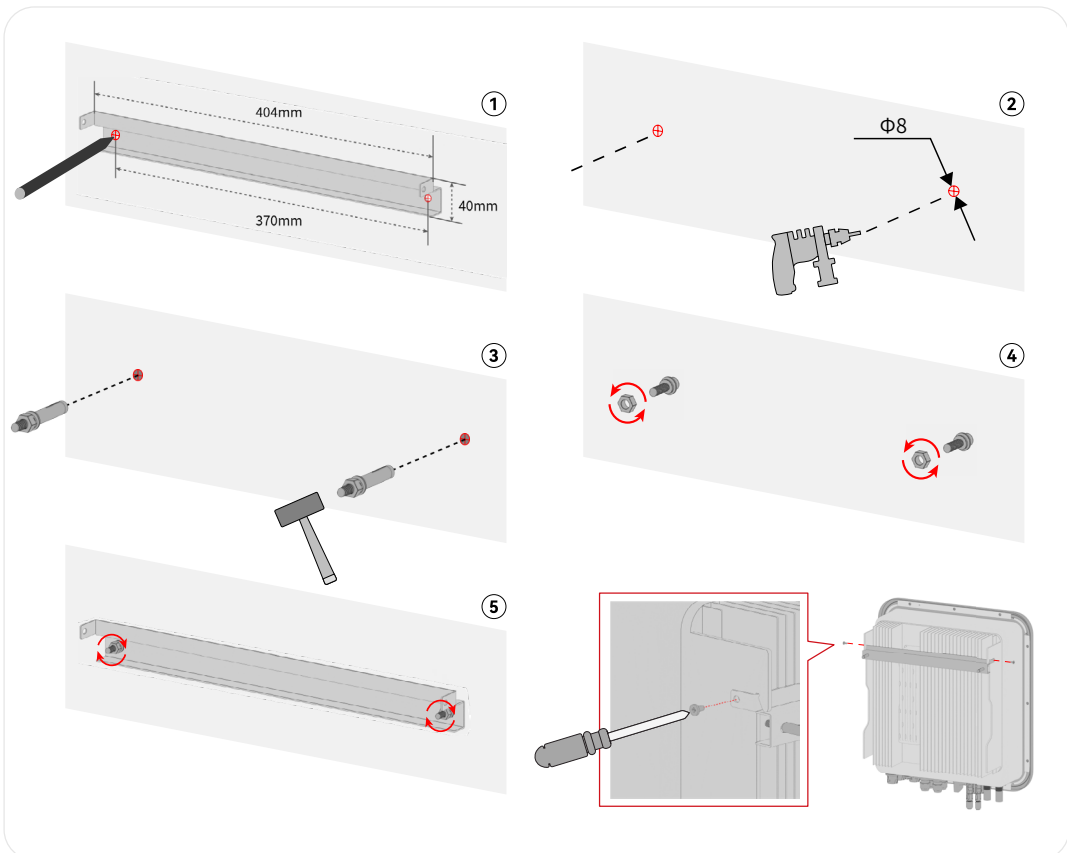
5.3.3 Installing Inverter

Inverter is installed on the wall by means of wall-mounting bracket and



NOTICE

- Ensure that the installation hole positions on the wall are consistent with the mounting bracket and make sure the mounting bracket is placed horizontally.
- The depth of the holes should be about 70 mm.



6 Electrical Connection

6.1 Safety Instructions



DANGER

- All operations during the electrical connection process, as well as the specifications of cables and components used, must comply with local laws and regulations.
- Before performing electrical connections, disconnect the inverter and all switches connected to it to ensure that all equipment is powered off. It is strictly prohibited to perform operations while the power is on.
- Before manipulating any cables, be sure to use a measuring device to ensure that the cables are not live or carrying any electrical current.
- Before completing the electrical connection work, do not close any circuit breakers or switches.



WARNING

- The grounding conductor must not be damaged and no operation should be performed on the product before installing the grounding conductor. Otherwise, it may cause personal injury or product damage.
- When crimping wire terminals, ensure that the cable conductor is in full contact with the terminal. Do not crimp the cable insulation along with the terminal. Otherwise, it may result in the equipment not functioning properly or the inverter terminal block being damaged due to unreliable connections and subsequent heat generation.
- Incorrect wiring may cause product damage and any damage caused as a result will not be covered by the warranty.
- During electrical connection operations, personnel must wear safety shoes, protective gloves, insulated gloves and other personal protective equipment as required.
- After completing any wiring connection, lightly tug on the cables to ensure a secure connection without any loose or detached wires.



NOTICE

- Only professionals are allowed to perform electrical connection operations.
- The cable colors depicted in this manual are for reference only. Please select cables according to local cable standards.
- All unused terminals must be covered with waterproof caps to prevent them from affecting the product's protection level.
- After completing the wiring, be sure to use fireproofing materials such as fireproof mud to seal the gaps around the inverter's input and output holes. This will prevent foreign objects or moisture from entering and affecting the long-term normal operation of the inverter.

6.2 Electrical Connection Overview



WARNING

- It is important to install circuit breakers on all input cables to prevent electrical short circuits and potential damage to the inverter.
- Ensure that all output cables are securely connected to the circuit breakers to avoid any malfunction of the inverter.



NOTICE

- If local standard have other requirements for cables, set the cable specification according to the local standard.
- The factors that affect cable selection include rated current, cable type, routing mode, environmental temperature and maximum expected line loss.
- The length of the external cable between the battery and the inverter should be less than 3 meters.

The electrical connection should be realized as follows:

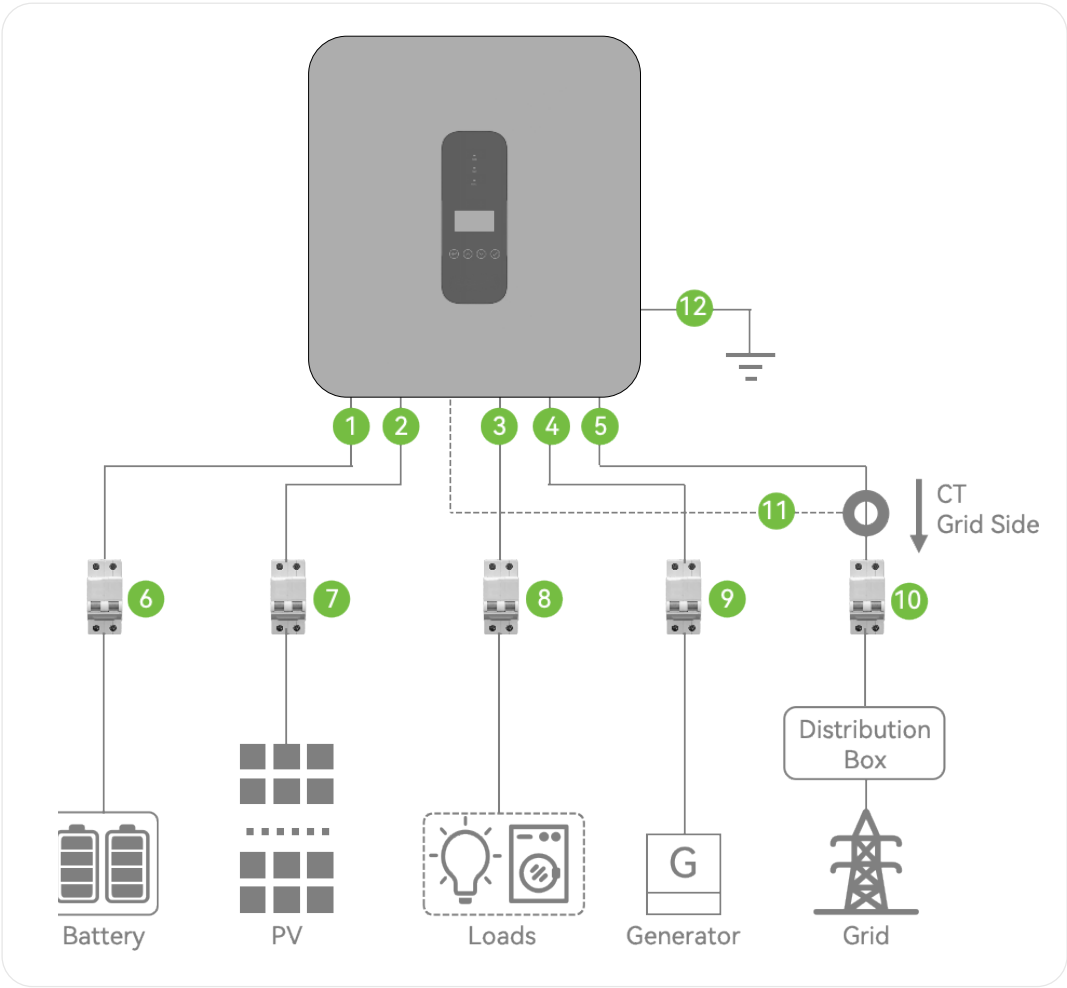


Figure 6.1 Electrical connection

Table 6.1 Cable / Breaker Recommend

No.	Cable/Breaker	Type	Recommended models
1	Battery cable	Complying with 150A standard	25mm ² and above
2	PV cable	Common outdoor PV cable in the industry	4mm ² and above
3	EPS cable	Outdoor 3-core(L, N and PE) copper wire cable	6mm ² and above
4	GEN cable / Smart loads cable	Outdoor 3-core(L, N and PE) copper wire cable	6mm ² and above
5	AC cable	Outdoor 3-core(L, N and PE) copper wire cable	6mm ² and above
6	Battery breaker		150A
7	PV breaker		30A
8	EPS breaker		40A
9	Generator breaker		40A
10	On grid breaker		40A
11	CT with cable		
12	Ground cable	Outdoor single-core yellow-green cable	4mm ² and above

6.3 External Protective Grounding Connection



DANGER

Ensure a reliable connection of the grounding wire to prevent electrical shock hazards.



WARNING

- The external grounding protection point provides a reliable grounding. Do not use inappropriate grounding conductors as it may result in product damage or personal injury.
- If unsure about the grounding connection, please consult a professional for proper guidance.

The external grounding cable is to be prepared by the customer themselves. The grounding cable must be yellow-green color. OT terminals with insulating jacket is in the packing.

1.Remove insulation sleeve a proper length from the head of cables.



2.Use OT terminal crimping tool make cable and terminal crimped tightly.



3.Connect the ground cable with M4 screw.

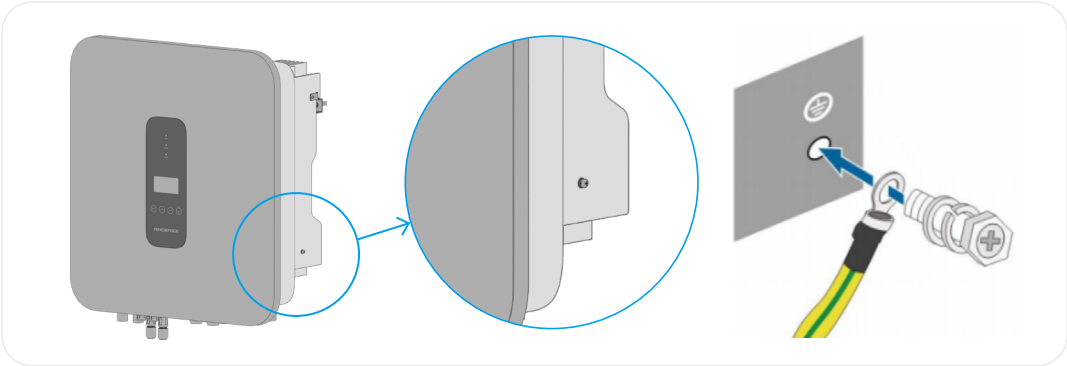


Figure 6.2 Steps for connecting the protective ground wire

6.4 Grid Connection

6.4.1 AC Side Requirements

Only with the permission of the local power grid department can the inverter be connected to the grid. Before connecting the inverter to the grid, make sure that the grid voltage and frequency meet the requirements, as specified in the ‘Technical Data Sheet’. Otherwise, please contact the power company for assistance. An independent double-pole circuit breaker must be installed on the grid side of the inverter to ensure a safe disconnection between the inverter and the grid (recommended specification is 40A).



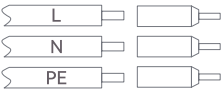
WARNING

- Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.
- Do not connect any load between the inverter and the AC circuit breaker.
- Multiple inverters cannot share one AC circuit breaker.

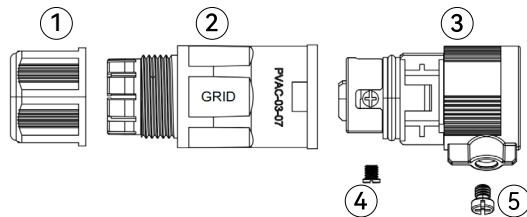
6.4.2 Connecting AC Cable

Disconnect the AC circuit breaker and secure it against reconnection.

1.Prepare the power cable as required, the L/N/PE cable color should meet the local regulations. Remove insulation sleeve 8-12mm from the head of cables. Insert the cable into tubular cord end terminal. Use terminal crimping tool make the cable conductor and terminal conductor clamped.

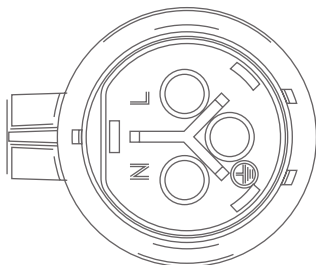


2.Choose the GRID connector(silk printing with ‘GRID’ on surface). Separate the connectors into 5 parts as shown below.



3.Wire the cable through ①→②.

4.Make sure L/N/PE cable go into the socket ③ with the right hole(as shown below). Tighten the bolts ④ on socket ③ on each cable.

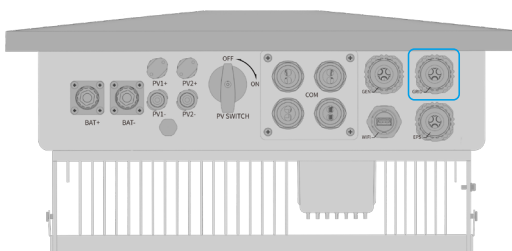


5.Put ② and ③ together. If you hear a 'click', two pieces connected well.

6.Screw on the cover ① to complete the assembly of the connector.

7.Insert the GRID connector to GRID port on the inverter. After you hear a 'click', two pieces connected well.

8.Tighten the bolts ⑤ on socket ③.



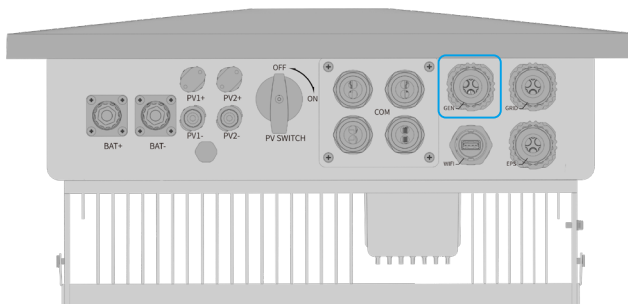
NOTICE

Observe the terminal assignment. Do not connect any phase line to the 'PE' terminal or PE wire to 'N' terminal. Otherwise, unrecoverable damage to the inverter may follow.

6.5 Generator Connection

The wiring and connection steps for the generator ports are the same as the grid ports. Please refer to section 6.4.2 for the wiring steps for the grid ports and follow the same procedure for the generator ports. The only attention is choosing the GEN connector for generator connection(silk printing with 'GEN' on surface).

Make sure to plug the generator terminals into the corresponding GEN ports on the inverter.



After reaching certain conditions (such as grid disconnection and low battery capacity), the inverter can automatically control the generator to start and stop. To use this feature, communication with the generator is required, and the generator must be capable of communication and have ATS functionality. For detailed communication wiring methods, please refer to section 6.9 and follow the steps provided.



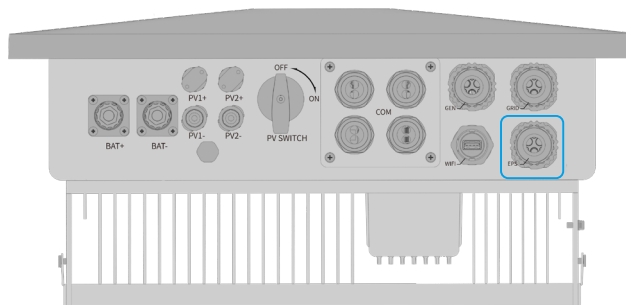
NOTICE

- Regardless of whether the generator port or the smart loads port is selected, it is necessary to set the currently used function on the display screen.
- Once the function is changed, it is also necessary to update the settings on the screen; otherwise, it may result in inverter malfunctions.

6.6 EPS Connection

The wiring and connection steps for the EPS ports are the same as the grid ports. Please refer to section 6.4.2 for the wiring steps for the grid ports and follow the same procedure for the load ports. The only attention is choosing the EPS connector for EPS connection(silk printing with 'EPS' on surface).

Make sure to plug the EPS terminals into the corresponding EPS ports on the inverter.



6.7 PV Connection

6.7.1 PV Side Requirements



DANGER

- Exposure to sunlight can generate lethal high voltages in photovoltaic strings, so strictly adhere to the safety precautions listed in the photovoltaic string and related documents.
- Ensure all cables are voltage-free before performing electrical operations.
- If the DC input line is accidentally reversed, first, turn off the circuit breaker. Then, set the 'DC switch' to the 'OFF' position and remove the positive and negative terminals after ensuring there is no voltage. This will correct the polarity of the PV input line on the inverter.
- Please do not connect any DC switches or AC/DC circuit breakers before completing the electrical connections.



WARNING

- Do not ground the positive or negative terminals of the solar modules, as this can severely damage the inverter.
- Choose high-quality and reliable solar modules. Ensure that the maximum open-circuit voltage and maximum short-circuit current of each photovoltaic string are within the allowable range of the inverter, as specified in the 'Technical Data Sheet' Additionally, the operating voltage should fall within the MPPT voltage range.
- Before connecting the PV terminals to the corresponding ports on the inverter, please first check the polarity of the photovoltaic string to ensure it is correct.
- Do not connect the same PV string to multiple inverters, as this may cause damage to the inverters.
- After connecting the DC cables, use a multimeter to measure the polarity of the DC cables to ensure that the positive and negative terminals are correct and there is no reverse connection. Also, ensure that the voltage is within the allowable range.



NOTICE

- During the installation of PV strings and inverters, if improper installation or routing of distribution cables leads to a short circuit between the positive or negative terminals of the PV strings and the ground, reverse connection or connection to the wrong ports of the inverter, it may result in equipment damage.
- Any equipment damage caused by such improper installation is not covered by the warranty. It is important to carefully follow the installation guidelines and ensure proper wiring and connection to avoid any potential damage.

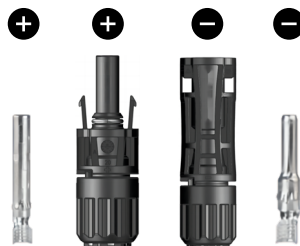
6.7.2 Installing PV Cables



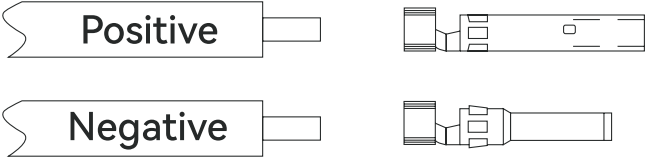
NOTICE

To ensure IP66 protection, please only use the connectors provided with the inverter. Any equipment damage caused by using other incompatible models of positive and negative metal terminals and DC connectors is not covered by the equipment warranty.

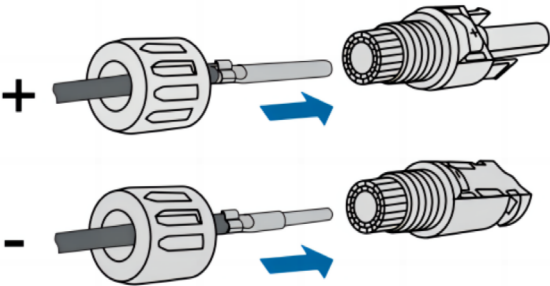
MC4 Cable Coupler and Pin shown as following (The appearance may be slightly different depending on the product batch):



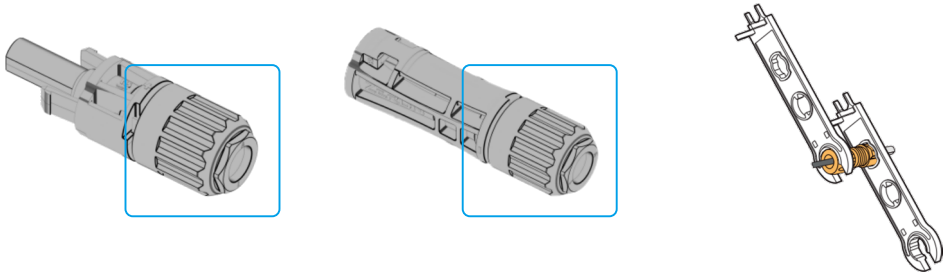
1.Prepare the PV cable as required. The positive cable should be red color or as local regulation. The negative cable should be black color or as local regulation. Remove insulation sleeve 6–8mm from the head of cables. Use terminal crimping tool make the cable and terminal connected tightly.



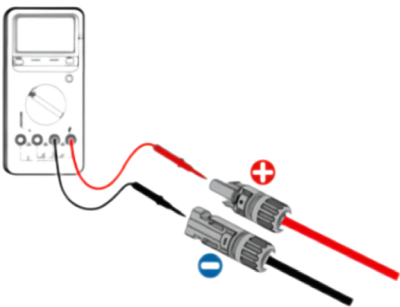
2.Insert the cable into MC4 cable coupler. After hearing a ‘click’, the cable is in the right position.



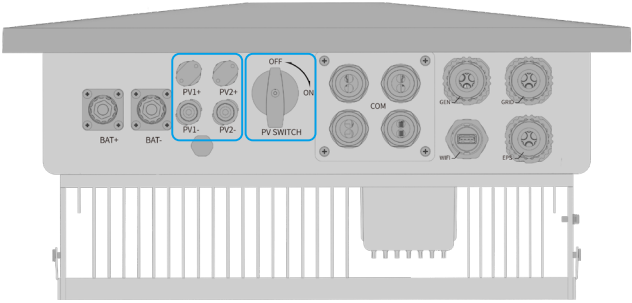
3.Screw on the locking nut. Then use wrench to fasten the nut.



4.Ensure the polarities are correct.



5.Ensure the PV switch is OFF. Then connect MC4 securely to PV port on the inverter. After hearing a 'click', the PV connectors are connected well.



6.8 Battery Connection

This section mainly describes the cable connections on the inverter side. Refer to the instructions supplied by the battery manufacturer for the connections on the battery side and configuration.

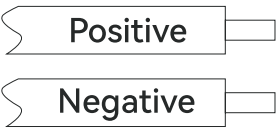


WARNING

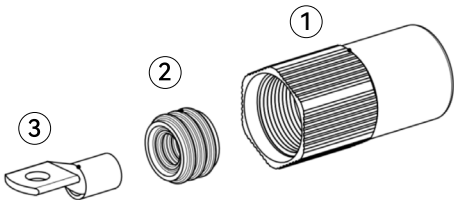
- Only use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, use electrical tape to cover the entire exposed metal surfaces of the available tools except their tips.
- Do not disconnect under load!
- During the installation and operation of the inverter, please ensure that the positive or negative polarities of batteries do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.
- When the battery is not in use for a long period of time, please turn off the battery pack switch button to prevent damage to the battery.

Follow the steps:

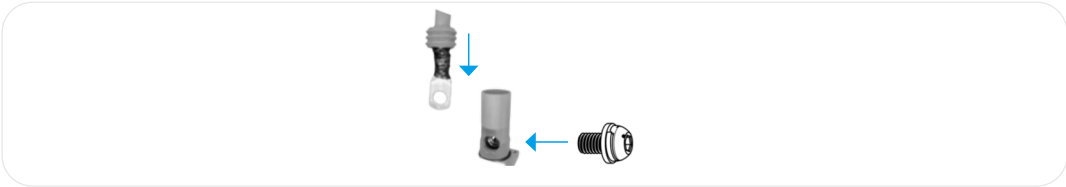
1.Prepare the battery cable as required. The positive cable should be red color or as local regulation. The negative cable should be black color or as local regulation. Remove insulation sleeve 8-12mm from the head of cables. Battery cable terminal kit(2 pairs) is pre-fixed to battery input of inverter. Remove kit before connecting.



2.Wire the cable through Battery terminal cap① and waterproof ring②, then use terminal crimping tool make the cable and DT terminal③ connected tightly.



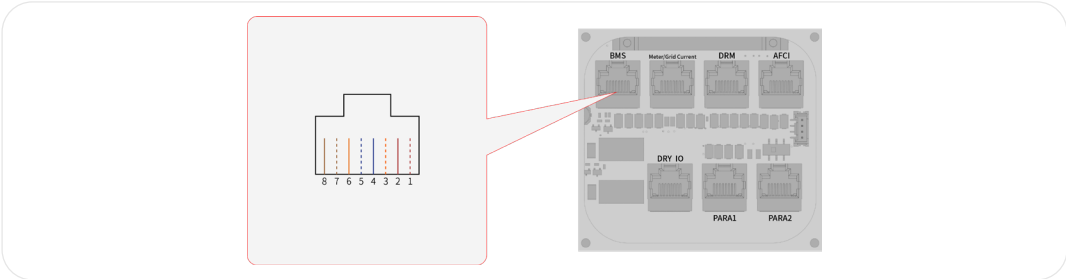
3.Before connecting checking the positive and negative port carefully. Insert the cable into mounting plug of battery port on inverter. Use hexagonal socket screws to secure DT terminal③(use Allen wrench to tight the screws).



4.Tighten Battery terminal cap① in clockwise direction.

6.9 Connecting Communication Cable

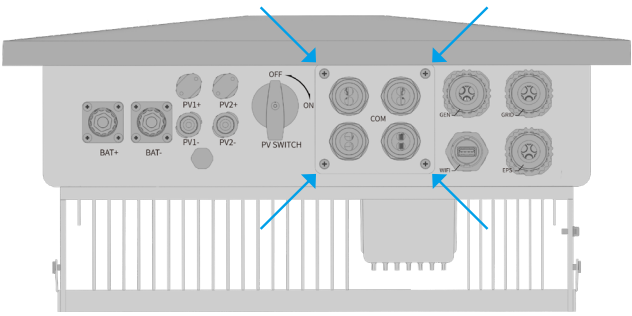
The CAN cable or RS485 cables enables the communication between the inverter and the Li-ion battery. You can choose one of the pass protocols.
The communication port has six slots, each corresponding to a different function. Be careful not to insert it into the wrong slot to avoid communication failure and inverter malfunction.The specific functions corresponding to each slot are as shown in the table below.



Name	Description	Pin definition			
BMS	BMS Communication for Batteries	1.RS485B 5.CANL	2.RS485A 6.GND	3.GND 7.NC	4.CANH 8.NC
Meter/Grid Current	CT/Meter Communication	1.RS485A 5.CTS-	2.RS485B 6.CTR-	3.CTR+ 7.CTT+	4.CTS+ 8.CTT-
DRM	Grid communication in Australia	1.DRM1 5.+5V	2.DRM2 6.DRM0	3.DRM3 7.GND	4.DRM4 8.GND
AFCI	Arc Fault Detection Communication	1.AFCIRS485A 5.NC	2.AFCIRS485B 6.GND	3.+5V 7.HPRS485A	4.NC 8.HPRS485B
DRY IO	Communication with Generator	1.NO1 5.NC	2.NC1 6.COM2	3.COM1 7.NO2	4.NC 8.NC2
PARA1& PARA2	Parallel communication	1.PARACANH 5.EMSCANL	2.PARACANL 6.NC	3.NC 7.SYN_PARA+	4.EMSCANH 8.SYN_PARA-

Note: For DRY IO port, COM1 and COM2 are connected to the 12V power supply of the generator. NO1 is connected to the start output signal line of the generator. NO2 is connected to the fuel output signal line of the generator.

1.Remove the screws from the COM port cover.



2.When we connect BMS cable, take one waterproof plug① out first. Wire the cable from Cap④→sealing ring③→sealing ring②, then connect the RJ45 terminal to the BMS port. The same connection method is used for other communication cables.



3.Assemble all the parts. Tighten Cap④.

6.10 CT or Electric Meter Connection

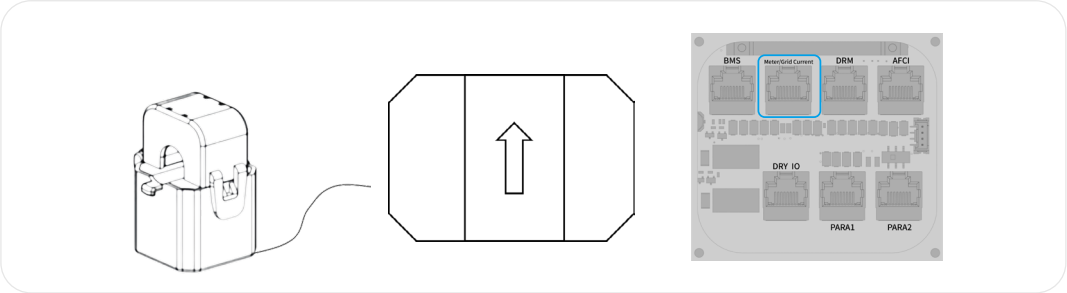


NOTICE

- CT is shipped with the box. If users need to use an electric meter, they will need to purchase it separately. The wiring of the electric meter must strictly follow the instructions provided with the meter.
- When connecting CT, it is essential to pay attention to the correct direction. Incorrect direction can lead to abnormal operation of the inverter.

The specific steps for removing and installing the COM port and RJ45 connector are detailed in section 6.9. Please refer to the steps and follow them accordingly.

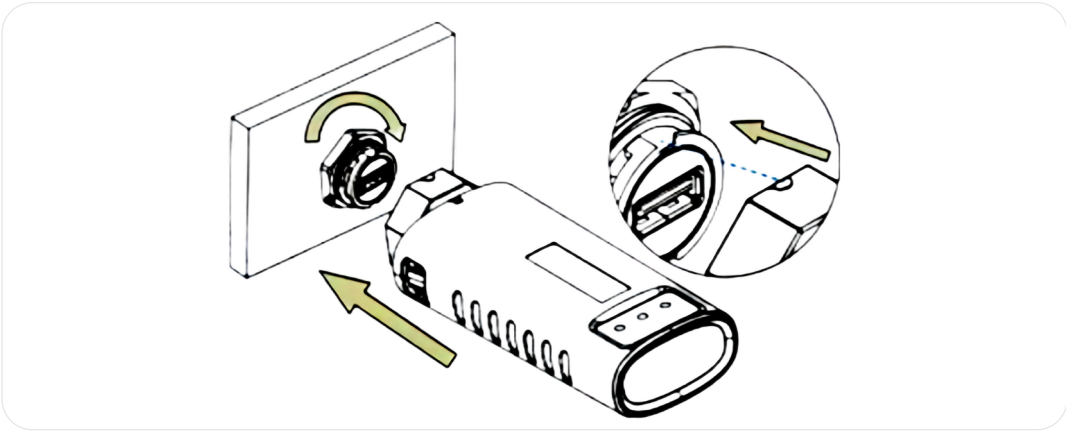
Disassemble the CT and insert the L line (live wire) of the inverter and grid connection into it. It is important to pay attention to the direction of the CT and ensure that the arrow points from the inverter towards the grid. Plug RJ45 connector of CT into Meter/Grid Current port.



6.11 Smart Communication Stick Connection

The smart communication stick will be included in the package and is used to connect to the cloud platform.

- 1.Remove the waterproof cap from the WiFi interface.
- 2.Install the stick according to guide slot.
- 3.Tighten the cap in the clockwise direction.



7.System Commissioning

7.1 Inspection before Commissioning

Check the following items before starting the inverter:

Table 7.1 Inspection items

No.	Inspection items
1	All equipment has been reliably installed.
2	All DC switches and AC circuit breakers are in the 'OFF' position.
3	The ground cable is properly and reliably connected.
4	The AC cable is properly and reliably connected.
5	The DC cable is properly and reliably connected.
6	The communication cable is properly and reliably connected.
7	Unused ports are sealed.
8	The installation space is proper, and the installation environment is clean and tidy.

7.2 System Power-on

If all of the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

Before turn on the AC switch between the inverter and the grid, you need to use a multimeter AC voltage gear to measure whether the AC voltage is within the allowable range.

Power-on steps:

- Step 1:** (Optional) If equipped with a battery, please open the external DC circuit breaker between the inverter and the battery pack.
- Step 2:** Turn on the AC circuit breaker between the inverter and the grid.
- Step 3:** Open the external DC circuit breaker between the inverter and the photovoltaic array.
- Step 4:** (Optional) Power on the battery pack manually if a battery is equipped.
- Step 5:** Rotate the DC switch of the inverter to 'ON' position.
- Step 6:** Observe the LED to check the inverter operating status.

If the sun irradiation and grid conditions meet requirements, the inverter will operate normally.

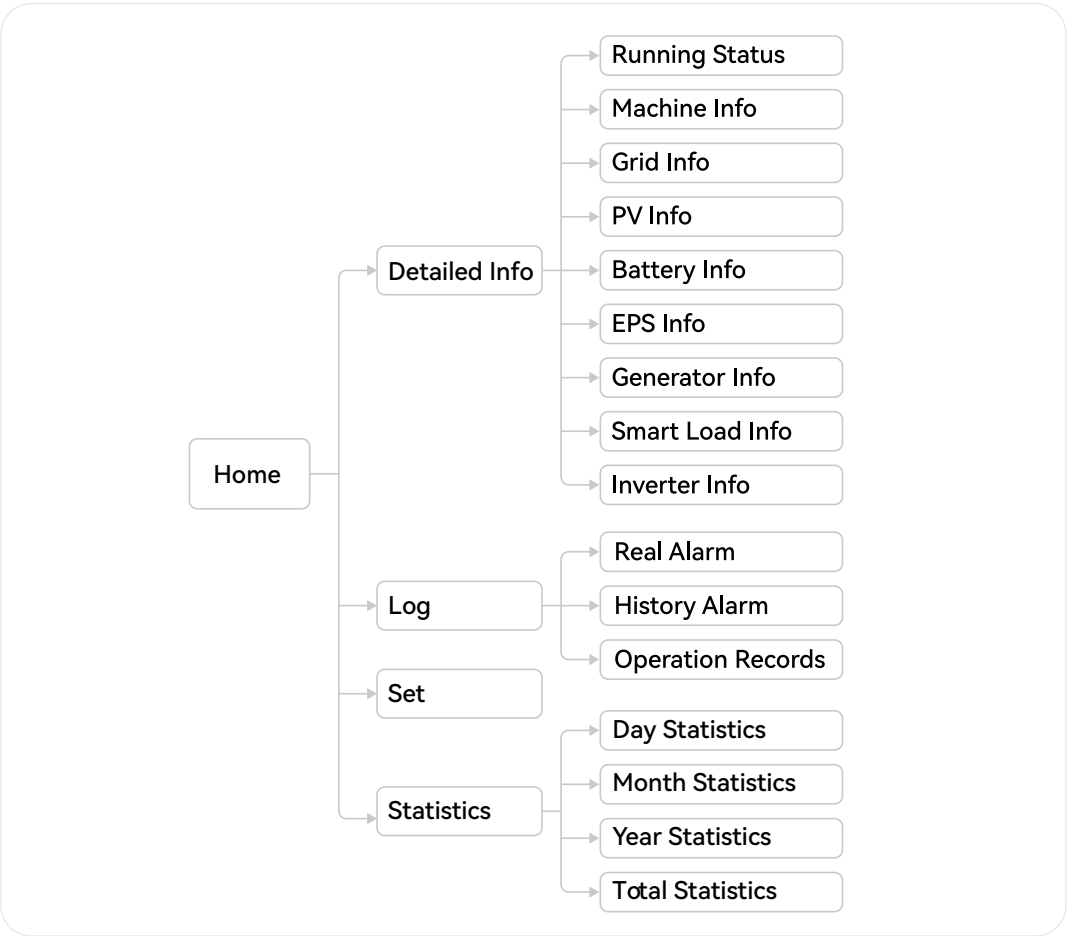
Observe the LED indicator to ensure that the inverter operates normally.

If the indicator light is abnormal, please disconnect all power supplies and reconfirm whether the wiring is normal or not.

7.3 System Commissioning

To ensure the proper functioning of the inverter, it is important to perform the parameter settings on the display screen immediately after powering it on. This includes configuring the parameters related to the grid, battery, photovoltaic information and communication settings, among others.

The relationship diagram of the page settings is as follows:





NOTICE

- By using the UP and DOWN buttons, you can move the cursor up and down or flip through pages. Pressing the ENTER key will allow you to enter sub-pages or confirm settings information. Pressing the ESC key will take you back to the previous page.
- When setting parameters, UP represents plus one, and DOWN represents minus one.
- When setting several rows of data, you can follow the steps below to proceed:
 1. Use the UP and DOWN key to navigate to the desired row. Then, press the ENTER key to enter the selected row for setting.
 2. Use the UP and DOWN keys to increase or decrease the value of the data. And the ENTER key is used to move the cursor.
 3. Once the setting is complete, press the ESC key to bring up the Sure and cancel page. Pressing ENTER indicates confirmation, while pressing ESC indicates cancellation.

7.3.1 Home page

After powering on, if there is a fault, the content of the real-time fault page will be automatically displayed. If there is no fault, it will enter the home page. Pressing the ENTER key on the home page will allow access to four sub-pages, including:

- 1.Detailed Info
- 2.Log
- 3.Set
- 4.Statistics

After pressing the UP key on the home page or after 30 seconds of no key operation, 'Summary Information' will be displayed. After 3 minutes of no button operation, the screen will turn off to save power. Pressing any button will bring back to the home page.

Interface	Description
<div><div>HOME</div><div>Status: Mode: D-Sell: D-Buy:</div></div>	The HOME page displays the current operating mode, daily selling power(KWh), and daily buying power(KWh) of the inverter.
<div><div>Menu</div><div>→Detailed Info Log Set Statistics</div></div>	To enter the Menu, simply press ENTER from the HOME page. Then, you can navigate through the four sub-pages by using the UP and DOWN buttons to move the cursor.

7.3.2 Detailed Info

After moving the cursor and entering 'Detailed Info', you can continue to select and enter 8 sub-pages to view data related to the machine and its operational status.

1)Menu

Interface	Description
<div><div>Detailed Info</div><div>→Running Status Machine Info Grid Info PV Info Battery Info EPS Info Generator Info Smart Load Info Inverter Info</div></div>	In the detailed information section, you can view the current operating status of the system, machine information, grid information, PV information, battery information, EPS information, generator information, smart load information, and inverter information.

2)Page

You can view the current operating status of the inverter.

Interface	
<div>Running Status</div> <div>PV Status: Bat Status: Grid Status: Gen Status:</div>	<div>Machine Info</div> <div>Language: Grid Standard: PV Mode: Work Mode: Anti-reflux: BMS: System Temperature:</div>
<div>Grid: Voltage: 0.0V Current: 0.0A Frequency: 0.00Hz Act-Power: 0W React-Power: 0Var</div>	<div>PV1: Voltage: 0.0V Current: 0.0A Power: 0W PV2: Voltage: 0.0V Current: 0.0A Power: 0W</div>
<div>Bat: Voltage: 0.0V Current: 0.0A SOC: 0%</div>	<div>EPS: Voltage: 0.0V Current: 0.0A Power: 0VA Load Rate: 0.0%</div>
<div>Gen: Voltage: 0.0V Current: 0.0A Frequency: 0.00Hz</div>	<div>Smart Load: Voltage: 0.0V Current: 0.0A Power: 0VA Load Rate: 0.0%</div>
<div>Inverter</div> <div>DSP Version: EMS Version: SN: Model:</div>	

7.3.3 Log

Interface	Description
<div> Log →Real Alarm Historical Alarm Operation Records </div>	When a malfunction occurs or you want to view the operation records, you can enter the 3 sub-pages of 'Log' to view the fault information and operation records.
<div> Real Alarm Fault code: Fault content </div>	Display a total of 20 real-time alarm, including fault code and fault content.
<div> Historical Alarm Fault code: Fault content Occur: Clear: </div>	Display a total of 80 historical alarm, including fault code, fault content, occurrence time and clear time.
<div> Operation Records Type: Occur: Obj: </div>	Display a total of 50 operation records, including the operation type, operation time and operation object.

7.3.4 Set

1) Set

Interface	Description
<div> Set →Work Mode Grid set Battery set PV set Gen set System set </div>	You can make various settings in the 'Set' section, which includes energy management strategy, grid settings, battery settings, photovoltaic settings, generator settings and system settings.

2) Work Mode

Interface	Description
<div> Work Mode →Self-use Peak Shift Battery Priority Scheduled </div>	The operating modes of the inverter include self-use, peak shift, battery priority, and scheduled charge and discharge.

2.1) Peak Shift

Interface	Description
<div><div>Peak Shift</div><div>→Peak Time 1 Peak Time 2 Peak Time 3 Valley Time 1 Valley Time 2 Valley Time 3</div></div>	<p>In the Peak Shift mode, there are a total of six time period that can be set. You can refer to the time slots provided by the local power grid for setting.</p>
<div><div>Peak Time1</div><div>→Start T: 00:00:00 End T: 00:00:00</div></div>	<p>The pages for the remaining time period have the same content and settings as the 'Peak Time 1' subpage.</p> <p>The time periods for peak time and valley time should not overlap with each other and should not cross midnight.</p>

2.2) Scheduled

Interface	Description
<div><div>Scheduled</div><div>→Charge Time 1 Charge Time 2 Charge Time 3 Discharge Time 1 Discharge Time 2 Discharge Time 3</div></div>	<p>In the scheduled charge and discharge mode, there are also a total of 3 charging time periods and 3 discharging time periods. You can set them according to needs.</p>
<div><div>Charge Time 1</div><div>Start T: 00:00:00 End T: 00:00:00</div></div>	<p>The remaining time period's settings page and content are the same as 'Charge Time 1'.</p> <p>The time periods for charge time and discharge time should not overlap with each other and should not cross midnight.</p>

3)Grid Set

Interface	Description
<div><div>Grid Set</div><div>→Anti-reflux</div><div>Grid Standard</div><div>React-Power Mode</div><div>Power Set</div><div>Power Factor</div><div>Detector Select</div></div>	<p>The grid settings include six items: anti-reflux control, grid-connection standards, reactive power control, power set, power factor setting and detector selection.</p>
<div><div>Anti-reflux</div><div>→Enable</div><div>Disable</div></div>	<p>Once the anti-reflux setting is enabled, the inverter will be unable to feed electricity back into the grid and can only continue to supply power to the load. When anti-reflux setting is disabled, the inverter can operate normally and sell electricity to the grid.</p>
<div><div>Grid Standard</div><div>→EU</div><div>GER</div><div>ZA</div><div>BE</div></div>	<p>The inverter support the grid requirements and standards of the European Union, Germany, South Africa and Belgium.</p>
<div><div>React-Power Mode</div><div>→React-Power</div><div>Power Factor</div></div>	<p>The inverter supports both reactive power control, power factor control.</p>
<div><div>Power Set</div><div>→Active power:0000W</div><div>Reactive Power:0000Var</div></div>	<p>Set grid-connected power and reactive power.The maximum value for active power setting is the rated power of the device, and the maximum setting value for reactive power is ±60% of the rated power.</p>
<div><div>Power Factor</div><div>Power Factor: +1.00</div></div>	<p>Set power factor.The power factor can be set within the range of +0.8 to 1 or -0.8 to 1.</p>
<div><div>Detector Select</div><div>→CT</div><div>Meter</div></div>	<p>Select the corresponding CT or Meter mode based on the actual connected current sampling terminal.</p>

4) Battery Set

Interface	Description
<div> <div>Battery Set</div> <div>→Enable Type</div> </div>	The battery settings include battery enablement and battery type settings. Only when the battery enablement is turned on, the battery can function properly, and all other settings related to the battery will take effect.
<div> <div>Type</div> <div>→None Li-ion Lead-acid</div> </div>	Inverter supports lithium-ion batteries and lead-acid batteries, and the settings should be based on the actual connected battery type.

4.1) Lithium Battery

Interface	Description
<div> <div>Li-ion</div> <div>→Manufacturer Communication SOC Threshold Max Current</div> </div>	Parameter setting for lithium battery: manufacturer, communication method, SOC Threshold and maximum current.
<div> <div>Communication</div> <div>→CAN RS485</div> </div>	Choose the corresponding option based on the actual communication method used by the battery.
<div> <div>Manufacturer</div> <div>→CVTE Pylon</div> </div>	The battery manufacturers that support Pylon and CVTE.
<div> <div>SOC Threshold</div> <div>Chg Threshold:000% Dischg Threshold:000%</div> </div>	The SOC threshold includes the charge threshold of SOC and the discharge threshold of SOC.
<div> <div>Max Current</div> <div>MaxChgCur: 0.0A MaxDischgCur: 0.0A</div> </div>	The maximum charging and discharging current should be set based on the actual battery's maximum current limit and the corresponding battery current limit value of the inverter model.

4.2) Lead-acid Battery

Interface	Description
<p>Lead-acid →Capacity And Current SOC Threshold Voltage</p>	Parameter setting for lead.acid battery: capacity and current, SOC threshold and voltage.
<p>Capacity And Current Capacity: 000Ah MaxChgCur: 000A MaxDischgCur: 000A</p>	Based on the relevant parameters of the actual battery, set the battery capacity, maximum charging current, and discharge current.
<p>SOC Threshold Chg Threshold:000% Dischg Threshold:000%</p>	The SOC threshold includes the charge threshold of SOC and the discharge threshold of SOC.
<p>Voltage Shutdown: 00.0V Absorption: 00.0V Float: 00.0V</p>	Set shutdown voltage, absorption voltage and float voltage.

5) PV Set

Interface	Description
<p>PV Set →PV Mode PV Emergency Enable</p>	Set PV mode and emergency enable.
<p>PV Mode →Independent Parallel</p>	The input types of a photovoltaic system can be divided into two modes: independent and parallel.
<p>PV Emergency Enable →Enable Disable</p>	Enable and disable of PV emergency enable.

6) Gen Set

Interface	Description
<div><div>Gen Set</div><div>→Mode Select</div><div>Gen Power</div><div>Clear Gen Fault</div><div>Gen Trip SOC</div><div>Smart Load Trip SOC</div></div>	<p>Set the generator mode selection , power output, generator trigger SOC, and smart load trigger SOC. After the generator failure, it is necessary to repair the generator fault and manually clear the fault before reconnecting it to the inverter.</p>
<div><div>Mode Select</div><div>→None</div><div>Gen</div><div>Smart Load</div></div>	<p>The generator port can be selected as empty, generator or smart load.</p>
<div><div>Gen Power</div><div>Rated Power: 0000W</div><div>Max Power: 0000W</div></div>	<p>Set the battery SOC when generator is connected or disconnected.</p>
<div><div>Gen Trip SOC</div><div>Exit SOC: 000%</div><div>Access SOC: 000%</div></div>	<p>Set the battery SOC when generator is connected or disconnected.</p>
<div><div>Smart Load Trip SOC</div><div>Exit SOC: 000%</div><div>Access SOC: 000%</div></div>	<p>Set the battery SOC when the smart load is connected or disconnected.</p>

7) System Set

Interface	Description
<div>System Set</div> <div>→Language Time Password Clear Alarm Clear Record Factory Remote Control Protect Low Power</div>	System settings include language, time and password settings. You can also clear faults, view and clear logs, restore factory settings, set up remote control, protection mode and low power mode.
<div>Language</div> <div>→English</div>	The language can be chosen as English. The option for other languages is currently under development.
<div>Time</div> <div>Date: 2000-00-00 Time: 00:00:00 Week: Sunday</div>	Time settings can be adjusted according to the local time.
<div>Password</div> <div>→New: 000000 Confirm: 000000</div>	The initial password is 000000, and the new password cannot be the same as the old password. After setting all the parameters for the first time, you can set a new password. In the future, only with the correct password can the settings be modified.
<div>Remote Control</div> <div>→Local Control Remote Control</div>	Select local control or remote control through settings.
<div>Protect Set</div> <div>→Island Ground Leakage</div>	Protection function includes island protection, grounding protection and insulation impedance protection. Each protection function can be enabled or disabled.
<div>Low Power</div> <div>→Enable Disable</div>	Low power mode can be enabled or disabled.

7.3.5 Statistics

Interface	Description
<div>Statistics →Day Statistics Month Statistics Year Statistics Total Statistics</div>	Inverters can collect and summarize data for the current day, month, year and overall.
<div>Day Statistics PV: 0.0KWh Sell: 0.0KWh Buy: 0.0KWh Charge: 0.0KWh Discharge: 0.0KWh Load: 0.0KWh</div>	No matter which statistical information it is, you can view the information about PV, selling electricity, purchase electricity, charging, discharging and load. Load information includes EPS and smart load.

7.3.6 Summary Information

The 'summary information' is automatically displayed after pressing the UP key on the home page or 30 seconds of no key operation. It will automatically scroll and cycle, and you can also use the UP and DOWN keys to manually navigate through pages. If you need to return to the home page, simply press the ESC key.

Interface	
<div>PV Status: Bat Status: Grid Status: Gen Status:</div>	<div>Grid Info Voltage: 0.0V Current: 0.0A Frequency: 0Hz Act-Power: 0W React-Power: 0Var</div>
<div>PV1 Info Voltage: 0.0V Current: 0.0A Power: 0W</div>	<div>PV2 Info Voltage: 0.0V Current: 0.0A Power: 0W</div>
<div>EPS Info Voltage: 0.0V Current: 0.0A Power: 0VA</div>	<div>Battery Info Voltage: 0.0V Current: 0.0A SOC: 0%</div>
<div>Gen Info Voltage: 0.0V Current: 0.0A Power: 0VA</div>	<div>Smart Load Info Voltage: 0.0V Current: 0.0A Power: 0VA</div>

8 System Decommissioning

8.1 Decommissioning Inverter



WARNING

Danger of burns!

Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before operating the inverter after it cools down.

Step 1: Disconnect the AC circuit breaker between the inverter and the power grid.

Step 2: Turn the 'DC SWITCH' on the bottom of the inverter to 'OFF'.

Step 3: Disconnect the breaker between the inverter and the PV string.

Step 4: Disconnect the breaker between the inverter and the battery.

Step 5: (Optional) Disconnect the AC circuit breaker between the inverter and the generator.

Step 6: Wait for at least 5 minutes until the internal capacitors are completely discharged.

Step 7: Use a current clamp meter to check the PV DC cables and confirm that there is no current.

8.2 Dismantling Inverter



WARNING

- Before removing the inverter, check that all inputs are disconnected (including AC source, PV, batteries and generator).
- Please do not touch any potentially energized components for at least 5 minutes after disconnecting all inputs to the inverter.
- After the inverter has been disconnected from power for 5 minutes, use a testing device to ensure that all terminals have no voltage or current. Then wear protective equipment before operating the inverter.

Step 1: Decommissioning the Inverter.

Step 2: Disconnect all electrical connections to the inverter, including signal wires, DC input wires, energy storage wires, AC output wires and protective ground. To disconnect all electrical connections of the inverter, follow the reverse steps of '6 Electrical Connections'.

Step 3: Dismantle the inverter referring to '5 Mechanical Mounting' in reverse steps.

Step 4: If necessary, remove the wall-mounting bracket from the wall.

Step 5: If the inverter will be reinstalled in the future, please refer to '1.3 Inverter Storage' for a proper conservation.

9 Warning Code and Maintenance

9.1 Fault Diagnosis and Solutions

9.1.1 Troubleshooting

Once the inverter fails, you can view the fault information on the App interface and LCD screen.



NOTICE

- Before troubleshooting, it is important to strictly follow the detailed steps in section 8.1 to disconnect the electrical connections and shut down the inverter to avoid any personal injury.
- After troubleshooting and resolving the issue based on the recommended solutions, follow the detailed steps in section 7 to power on and restart the inverter.

Table 9.1 Troubleshooting information

Fault Codes	Fault Explanation	Trigger conditions	Corrective Measures
E005	Output Short	Short circuit on the load side L and N wires.	Please check if there are any issues with the output connection of the inverter, such as a short circuit between positive and negative terminals or reverse connection.
E010	System Overtemperature Protection	Continuous high-power operation or inadequate heat dissipation cause the inverter temperature to rise excessively.	Please check whether the inverter installation position meets installation requirements, the ventilation is good, and the ambient temperature exceeds the upper limit.
E011	System Overload End	The household load power is too high.	Please check if the load power exceeds the rated power of the inverter. If it does, you must turn off some household appliances.
E400	Gen Start Failure	Failure on the generator side causing the generator to fail to start.	1. Check if the generator-related settings on the screen are correct. 2. Check if the communication wiring of the generator is correct. 3. Check if there are any abnormalities with the generator itself.
E602	BMS Communication Error	BMS communication connection failed.	Check if the battery communication cable is connected correctly.
E115	CT Disconnection Error	The CT or Meter is either forgotten to be connected or not properly connected.	Please check if the CT or Meter is connected. If the CT or Meter is already connected, check if the RJ45 connector is inserted into the correct socket position or firmly inserted.
E116	Meter Disconnection Error		

9.1.2 Fault and Alarm Code

The fault and alarm codes of all inverters are detailed in the following table. The device you have purchased may only include partial fault information. If you encounter a fault that cannot be identified or resolved, please contact your dealer.

When contacting for service, please gather the following inverter information to help quickly resolve your problem:

1. Inverter Information: serial number, software version, fault codes, operating conditions and status before and after the fault, fault occurrence time and frequency.
2. Grid and Battery Conditions: whether the grid can connect to the home load normally, whether the battery operation is normal.
3. Equipment Installation Environment: whether the wiring is correct, whether the inverter is obstructed, etc.

Table 9.2 Fault and alarm code information

Category	Fault Codes and Abbreviations	Fault Explanation
Fault	E000: Bus OVP Fast	Bus Overvoltage Fast Check
	E001: Bus OVP Slow	Bus Overvoltage Slow Check
	E002: Bus UVP	Bus Undervoltage Protection
	E003: Bus Soft Fail	Bus Soft Start Failure
	E005: Output Short	Output Short Circuit
	E006: GFCI leakage 3	GFCI Leakage Fault Level 3
	E007: GFCI leakage 2	GFCI Leakage Fault Level 2
	E008: GFCI leakage 1	GFCI Leakage Fault Level 1
	E010: Sys OTP	System Overtemperature Protection
	E011: Overload End	System Overload End
	E013: Slave MCU Err	Slave MCU Error
	E014: ISO Err	ISO Error
	E015: Board Conn Err	Bus-Board Connection Error
	E016: Ground Protect	Ground Protection
	E020: INV OTP	Inverter Overtemperature Protection
	E021: DC OTP	DC Overtemperature Protection
	E022: Grid Rly Err	Grid Relay Error
	E024: GFCI Check Err	GFCI Check Error
Alarm	E100: Grid OVP 3	Grid Overvoltage Protection Level 3
	E101: Grid OVP 2	Grid Overvoltage Protection Level 2
	E102: Grid OVP 1	Grid Overvoltage Protection Level 1
	E103: Grid UVP 3	Grid Undervoltage Protection Level 3
	E104: Grid UVP 2	Grid Undervoltage Protection Level 2
	E106: Grid OFP Fast	Grid Overfrequency Protection Fast Check
	E107: Grid OFP Slow	Grid Overfrequency Protection Slow Check
	E108: Grid UFP Fast	Grid Underfrequency Protection Fast Check
	E109: Grid UFP Slow	Grid Underfrequency Protection Slow Check
	E110: Island Err	Island Error
	E111:Grid Off Fast	Grid Off Fast Check
	E112:PLL Err	Phase-locked Loop Error
	E114:Grid OVP-10Min	Grid Overvoltage Protection For 10 Minutes
	E115:CT Disconnect	CT Disconnection Error
	E116:Meter Disconnect	Meter Disconnect Error
	E117:CT Reverse	CT Reverse Error
	E118:Meter Reverse	Meter Reverse Error
	E136: INV OVP	INV Overvoltage Protection

Category	Fault Codes and Abbreviations	Fault Explanation
Alarm	E140: Current DC Over	DC Over Current Error
	E200: Mid-Bus OVP	Middle-Bus Overvoltage Error
	E203: DC OCP	DC Overcurrent Protection
	E207: Bat OVP	Battery Overvoltage Protection
	E208: Bat UVP	Battery Undervoltage Protection
	E209: Bat High SOC	Battery High SOC Error
	E20A: Bat Low SOC	Battery Low SOC Error
	E301: PV1 OVP	PV1 Overvoltage Protection
	E302: Differ PV OVP	PV Over Voltage Difference
	E303: PV1 OCP	PV1 Overcurrent Protection
	E305: PV1 Weak Power	PV1 Weak Power Error
	E321: PV2 OVP	PV2 Overvoltage Protection
	E323: PV2 OCP	PV2 Overcurrent Protection
	E325: PV2 Weak Power	PV2 Weak Power Error
	E400: Gen Start Fail	Generator Start Failure
	E401: Gen OVP	Generator Overvoltage Protection
	E402: Gen UVP	Generator Undervoltage Protection
	E403: Gen OFP	Generator Overfrequency Protection
	E404: Gen UFP	Generator Underfrequency Protection
	E405: Gen Loss	Generator Loss
	E500: Fan Err	System Fan Error
	E501: Overload	System Overload
	E502: Gen Overload	Generator Overload
	E600: PCS Comm Err	PCS Communication Error
	E602: BMS Comm Err	BMS Communication Error
	E604: Bat Weak	Battery Weak Error
	E605: Model Err	Model Mismatch Error
	E701: Cell Differ Volt	Cell Different Voltage Alarm
	E702: MOSFET H-Temp	MOSFET High Temperature Alarm
	E703: Cell L-Temp	Cell Low Temperature Alarm
	E704: Cell H-Temp	Cell High Temperature Alarm
	E705: Cell L-Volt	Cell Low Voltage Alarm
	E706: Cell H-Volt	Cell High Voltage Alarm
	E707: Pack L-Volt	Module Low Voltage Alarm
	E708: Pack H-Volt	Pack High Voltage Alarm
	E709: BMS Inner Comm	BMS Inner Communication Alarm
	E710: BMS H-DischgCurr	BMS High Discharge Current Alarm
	E711: BMS H-ChgCurr	BMS High Charge Current Alarm
	E712: Cell H-Differ-T	Cell High Different Temperature Alarm
	E713: Cell Differ-T	Cell Different Temperature Error
	E714: Cell UTP Err	Cell Undertemperature Protection Error
	E715: Cell OTP Err	Cell Overtemperature Protection Error
	E716: Cell UVP Err	Cell Undervoltage Protection Error
	E717: Cell OVP Err	Cell Overvoltage Protection Error

Category	Fault Codes and Abbreviations	Fault Explanation
Alarm	E718: Pack UVP Err	Pack Undervoltage Protection Error
	E719: Pack OVP Err	Pack Overvoltage Protection Error
	E720: BMS Err	BMS Error
	E721: BMS Dischg OCP	BMS Discharge Overcurrent Protection Error
	E722: BMS Chg OCP	BMS Charge Overcurrent Protection Error
	E730: BMS OVP Err	BMS Overvoltage Protection Error
	E731: BMS UVP Err	BMS Undervoltage Protection Error
	E732: BMS OTP Err	BMS Overtemperature Protection Error
	E733: BMS UTP Err	BMS Undertemperature Protection Error
	E734: BMS Dischg OCP	BMS Discharge Overcurrent Protection Error
	E735: BMS Chg OCP	BMS Charge Overcurrent Protection Error
	E736: BMS Err	BMS Error
	E737: BMS H-Volt	BMS High Voltage Alarm
	E738: BMS L-Volt	BMS Low Voltage Alarm
	E739: BMS H-Temp	BMS High Temperature Alarm
	E740: BMS L-Temp	BMS Low Temperature Alarm
	E741: BMS H-DischgCurr	BMS High Discharge Current Alarm
	E742: BMS H-ChgCurr	BMS High Charge Current Alarm
	E743: BMS Slave Loss	BMS Slave Loss

9.2 Maintenance

9.2.1 Maintenance Notice



DANGER

- Be sure to use special insulation tools when perform high-voltage operations.
- Before performing any maintenance operations, follow section 8.1 to disconnect the inverter from the power supply.
- Even though the inverter is turned off, it can still be hot and may cause burns. Wait for the inverter to cool down before wearing protective gloves and proceeding with any operations.
- During product maintenance, if there is any unusual odor, smoke or abnormal appearance, it is strictly prohibited to open the product to prevent any harm to personnel. If none of these issues are present, follow the alarm correction measures to repair or restart the inverter.



NOTICE

- To avoid the risk of electric shock, do not perform any other maintenance operations beyond those described in this manual. If necessary, contact your distributor. Otherwise, the losses caused is not covered by the warranty.
- Avoid touching the PCB board or other static-sensitive components to prevent damage to the devices.

9.2.2 Routine Maintenance

Table 9.3 Routine maintenance requirements


Check Item	Check Method	Maintenance cycle
System running status	Check if the inverter is damaged or deformed. Check if there are any abnormal sounds during the operation of the inverter. When the inverter is running, check if the parameters are correctly set for proper operation.	At least once every six months.
System clean	Check if there is any obstruction or dirt above the heat sink.	Once every six months to a year.
Electrical connection	Check if the cable connections are loose and if there are any significant gaps in the cable entry holes. Inspect the cables for any damage, especially if the copper core of the cables is exposed.	At least once every six months.
Grounding reliability	Check whether the ground cable is properly grounded.	Once every six months to a year.


10. Technical Data Sheet

	Specification	HN3KS	HN3K6S	HN4KS	HN5KS	HN6KS
PV input	Max. PV input power	4500Wp	5500Wp	6000Wp	7500Wp	9000Wp
	Max. PV input voltage	d.c.550V	d.c.550V	d.c.550V	d.c.550V	d.c.550V
	MPPT voltage range	d.c.80~520V	d.c.80~520V	d.c.80~520V	d.c.80~520V	d.c.80~520V
	Max. PV input current	d.c.2×19A	d.c.2×19A	d.c.2×19A	d.c.2×19A	d.c.2×19A
	Isc PV(absolute maximum)	d.c.2×25A	d.c.2×25A	d.c.2×25A	d.c.2×25A	d.c.2×25A
Battery input	Rated battery voltage	d.c.48V	d.c.48V	d.c.48V	d.c.48V	d.c.48V
	Battery voltage range	d.c.40~60V	d.c.40~60V	d.c.40~60V	d.c.40~60V	d.c.40~60V
	Max. battery charge/discharge current	d.c.80A/80A	d.c.80A/80A	d.c.80A/80A	d.c.120A/120A	d.c.120A/120A
	Battery type	Li-ion/lead-acid	Li-ion/lead-acid	Li-ion/lead-acid	Li-ion/lead-acid	Li-ion/lead-acid

	Specification	HN3KS	HN3K6S	HN4KS	HN5KS	HN6KS
Grid output	Rated grid voltage	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V
	Rated grid frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
	Rated grid output active power	3000W	3680W	4000W	5000W	6000W
	Rated grid output apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. grid output apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. grid output current	a.c. 13.1A	a.c. 16.0A	a.c. 17.4A	a.c. 21.8A	a.c. 26.1A
Generator input	Rated voltage	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V
	Rated frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
	Generator input voltage range	a.c. 176–280Vac	a.c. 176–280Vac	a.c. 176–280Vac	a.c. 176–280Vac	a.c. 176–280Vac
	Rated input apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. input apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. input current	a.c. 13.1A	a.c. 16.0A	a.c. 17.4A	a.c. 21.8A	a.c. 26.1A
EPS output	Rated output voltage	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V	a.c. 230V
	Rated output frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
	Rated output apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. output apparent power	3000VA	3680VA	4000VA	5000VA	6000VA
	Max. output current	a.c. 13.1A	a.c. 16.0A	a.c. 17.4A	a.c. 21.8A	a.c. 26.1A
General info	Adjustable cos(φ)	0.8ind...0.8cap	0.8ind...0.8cap	0.8ind...0.8cap	0.8ind...0.8cap	0.8ind...0.8cap
	Operating temperature range	–25°C...60°C	–25°C...60°C	–25°C...60°C	–25°C...60°C	–25°C...60°C
	Inverter topology	Non-Isolated	Non-Isolated	Non-Isolated	Non-Isolated	Non-Isolated
	Enclosure	IP66	IP66	IP66	IP66	IP66
	Protection class	I	I	I	I	I
	Overvoltage category	II(PV), III(MAINS)	II(PV), III(MAINS)	II(PV), III(MAINS)	II(PV), III(MAINS)	II(PV), III(MAINS)

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