TBEA

TH(3.6~8)K-SLA01

USER MANUAL

TBEA

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CONTENT

PREFACE

Summary

This document mainly introduces the installation, electrical connection, adjustment, maintenance and troubleshooting methods of TH series single-phase hybrid inverter. Before installing and using the inverter, please read this manual carefully to understand the safety information and get familiar with the functions and characteristics of the inverter. The document may be updated from time to time. Please obtain the latest version of the information and other product information from the official website.

Applicable products

This document is applicable to the following TH series single-phase hybrid inverter:
TH(3.6~8)K-SLA01

Applicable staff

It is only applicable to professionals who are familiar with local regulations and standards and electrical system, have received professional training and are familiar with the relevant knowledge of the product.

Symbol definition

To better use this manual, the following symbols are used to highlight important information. Please read the symbols and instructions carefully.

	**Danger:** Indicates a highly potential danger that, if not avoided, could result in death or serious injury to personnel.
	**Warning:** Indicates a moderate potential hazard, which could lead to death or serious injury if not avoided.
	**Watch out:** Indicates a low level of potential danger that, if not avoided, may result in moderate or mild injury to personnel.
	**Watch out:** Emphasizing and supplementing the content may also provide tips or tricks for optimizing product usage, which can help you solve a problem or save you time.

1 OPEN-PACKAGE INSPECTION

1.1 Inspection before acceptance

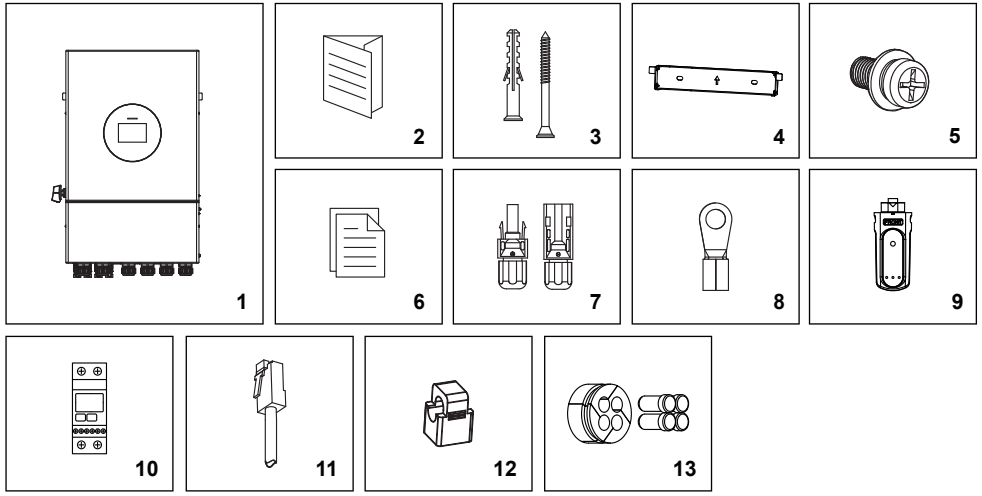
Before signing for the product, please carefully check the following contents:

- Check the outer packaging for any damage, such as deformation, holes, cracks, or other signs that may cause damage to the equipment inside the packaging. If there is any damage, do not open the packaging and contact your dealer.
- Check if the inverter model is correct. If there is any discrepancy, do not open the packaging and contact your dealer.
- Check whether the type and quantity of delivered items are correct, and whether there is any damage to the appearance. If there is any damage, please contact your dealer.

1.2 Packing list

Watch out:

- The number of PV DC input terminals matches the number of inverter DC input terminals.
- The datalogger and electricity meter kit are provided as optional, please refer to the actual situation.



No.	Description	Model	Unit	QTY	Remark
1	Inverter		pcs	1	
2	Quick installation manual		pcs	1	
3	Self tapping screws+expansion bolts	ST8×40+M12×60	set	2	
4	Wall-mounting bracket		pcs	1	
5	Combination screws	M5×12	pcs	1	
6	Inspection report		pcs	1	
7	PV terminals (+, -)		pair	*1	black
8	Ground wire OT terminal		pcs	*2	
9	Datalogger		pcs	1	optional
10	Meter kit		set	1	optional
11	Parallel cable	CAT5e	pcs	1	
12	Current transformer		pcs	1	
13	Communication waterproof plug with plug rod		pcs	1	

*1 The number of PV terminals allocated corresponds to the number of specific inverter terminals.

*2 The number of Ground wire OT terminal dispatched is subject to the actual BOM.

Note: The pictures in the manual are only schematic drawings. The product and optional parts are subject to the actual product.

1.3 Storage

If the inverter is not put into use immediately, please store it according to the following requirements:

- Make sure that the outer packing box is not removed.
- Make sure that the storage temperature is always - 40°C~+70°C and the storage relative humidity is always 0~100% without condensation.
- Make sure the inverter stacking height and direction are placed according to the label on the packing box.
- Make sure there is no risk of toppling the inverter after stacking.
- Regular inspection is required during storage. If the package is damaged due to insect and rat bite, the packaging materials shall be replaced in time.
- The inverter shall be put into use after being stored for a long time and inspected and confirmed by professionals.

2 SAFETY PRECAUTIONS

The safety precautions contained in this document must always be observed when operating the equipment.

Watch out:
The inverter has been designed and tested in strict accordance with safety regulations, but as electrical equipment, the relevant safety instructions must be observed before any operation on the equipment. Improper operation may lead to serious injury or property damage.

2.1 General safety

Watch out:

- Due to product version upgrading or other reasons, the document content will be updated from time to time. If there is no special agreement, the document content cannot replace the safety precautions in the product label. All descriptions in this document are for guidance only.
- Please read this document carefully for products and precautions before installing the equipment.
- Professional and qualified electrical technicians who shall be familiar with the relevant standards and safety specifications of the project site must carry out all equipment operations.
- Insulation tools and personal protective equipment shall be used to ensure personal safety during inverter operation. Electrostatic gloves, wrist strap and antistatic clothing shall be worn when contacting with electronic devices to protect the inverter from electrostatic damage.
- Equipment damage or personal injury caused by inverter not installed, used or configured in accordance with the requirements of this document or corresponding user manual is not within the responsibility scope of equipment manufacturer.

2.2 PV string safety

Danger:

- Please use the DC wiring terminals provided with the box to connect the inverter DC cable. If other types of DC wiring terminals are used, serious consequences may be caused, and the equipment damage caused thereby is not within the scope of the equipment manufacturer.
- The solar array (solar panel) will have DC high voltage.

Warning:

- PV modules used with inverters must have IEC 61730 class A rating or other equivalent standard class.
- Make sure good grounding of component frame and support system.
- Do not ground the PV array positive (+) or negative (-) as this may cause serious damage to the inverter.
- Make sure that the DC cables are firmly connected without looseness after connection.
- Use a multimeter to measure the positive and negative electrodes of the DC cable. Make sure that the positive and negative electrodes are correct, no reverse connection occurs and the voltage is within the allowable range.
- Do not connect the same PV string to multiple inverters, or the inverter may be damaged.
- In order to reduce the risk of fire, the inverter connected circuit requires an overcurrent protection device (OCPD). DC OCPD shall be installed according to local requirements. All PV power supplies and circuit conductors shall have disconnect connections in accordance with NEC Article 690, Part II.

2.3 Inverter safety

Danger:

- Please connect the inverter AC cable with the AC wiring terminals provided with the box. If other types of AC wiring terminals are used, serious consequences may be caused, and the equipment damage caused thereby is not within the scope of the equipment manufacturer.
- Danger of electric shock. There are no serviceable parts inside the machine. Please do not disassemble it. Please obtain service from qualified and recognized service technicians.

Warning:

- Make sure that the voltage and frequency of the grid connection access point meet the inverter grid connection specifications.
- It is recommended to add circuit breaker or fuse and other protective devices at the AC side of the inverter, and the specification of the protective device shall be 1.25 times greater than the maximum AC output current of the inverter.
- The protective ground wire of inverter must be firmly connected to make sure that the impedance between neutral wire and ground wire is less than 10 Ω.
- Copper core cable is recommended for AC output cable, and aluminum wire is prohibited.
- If the PV system is not equipped with batteries, do not use the off-grid load function. The system power consumption risk caused by this will exceed the warranty scope of the equipment manufacturer.
- It is forbidden to connect the power grid to the off-grid output terminal.

Identifications on inverter box are as follows:	
There is high voltage after the inverter is powered on. Trained professional electrical technicians must perform all inverter operations. There is large contact current after the inverter is powered on. Before the inverter is powered on, it must be ensured that the inverter has been well grounded.	Residual voltage still exists after the inverter is powered off, and it takes 5 minutes to discharge to the safe voltage.
Please read the product manual carefully before operating the equipment.	Potential hazards after equipment operation. Please take protective measures during operation.
When the inverter is working, the enclosure temperature is high and there is a danger of scalding. Do not touch it.	Connection point of protective earthing wire.
CE symbol	The equipment shall not be treated as domestic garbage. Please treat the equipment according to local laws and regulations or send it back to the equipment manufacturer.

2.4 Battery safety

Warning:

- The inverter manufacturer must approve the battery used in conjunction with the inverter, and the approved battery list can be obtained through the official website or consulted with local distributors.
- Before installing the device, please carefully read the user manual corresponding to the battery to understand the product and precautions. Please strictly follow the requirements of the battery user manual.
- If the battery has been fully discharged, please strictly follow the corresponding battery user manual to charge the battery.
- The battery current may be affected by some factors, such as temperature, humidity, weather conditions, etc., which may lead to battery current limiting and affect charging and discharging performance.
- If the battery cannot start, please contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Use a multimeter to measure the positive and negative poles of the DC cable, ensuring that the positive and negative poles are correct, and the voltage is within the allowable range.
- Do not connect the same battery pack to multiple inverters, as this may cause damage to the inverters.
- The inverter must be used with a matching lithium battery.Lithium batteries with relays do not require additional breaker.If breaker needs to be added, the breaker must be turned on first and then powered on. Otherwise damage will occur.

2.5 Personnel requirements

Watch out:

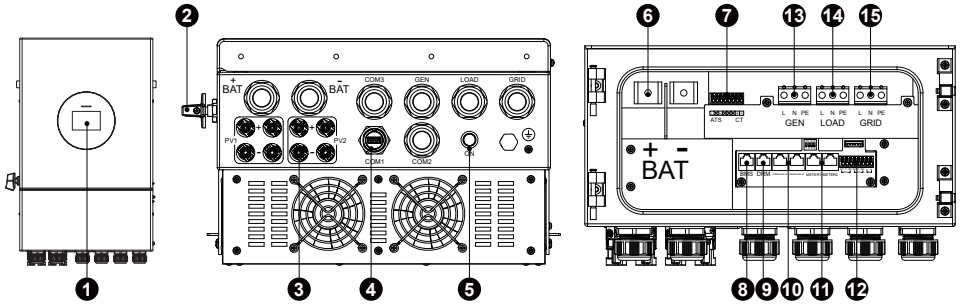
- Personnel responsible for installing and maintaining equipment must first undergo strict training, understand various safety precautions, and master the correct operating methods.
- Only qualified professionals or trained personnel are allowed to install, operate, maintain, or replace equipment or components.

3 INTRODUCTION

3.1 Products introduction

The TH series single-phase hybrid inverter integrates an energy management system in the PV system, controls and optimizes energy flow, and can adapt to the requirements of the smart grid. The load, stored in the battery, and output to the grid, uses the electricity generated in the PV system.

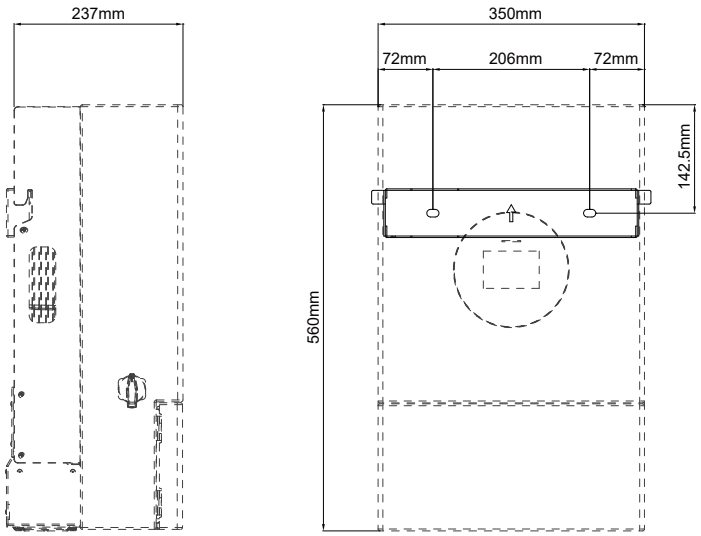
3.2 Outlook introduction



This picture is for reference only. Please refer to the actual situation.

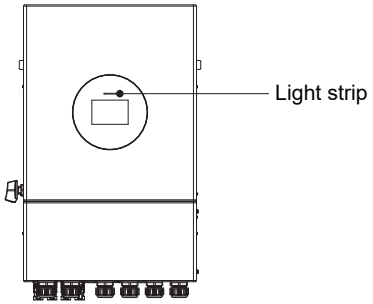
No.	Items	Description
1	LCD Screen	Indicates the working status of the inverter
2	DC switch	Control DC input on or off (warning: this switch does not have breaking capacity and is prohibited to operate when the machine is running)
3	PV DC port	Connect PV module with PV wiring connector
4	Communication module port 1	The communication module can be connected via RS485, supporting optional communication modules such as bluetooth, Wi-Fi
5	Cold start switch	When the off-grid mode is powered by battery alone, activate the machine. First, turn on the battery breaker and activate the battery. Then press this button for 5 seconds. The panel lamp will be on after waiting for a moment. At this time, the machine can be started and set.
6	Battery DC port	Connect the battery with the battery connector
7	Function Port 1	ATS230V contact signals Port and CT sensor Port
8	BMS Port	The battery BMS communication cable can be connected via CAN or RS485
9	DRM Port	DRM communication Port
10	PARALLEL Ports	Connect and communicate units to units
11	METER Ports	Smart meters can be connected via RS485
12	Function Port 2	DRY contact signals Port
13	Generator interface	Connect Generator
14	Load interface	Connect AC Load
15	Utility/National grid power interface	Connect AC Utility/national grid supply

3.3 Dimension



3.4 Display description

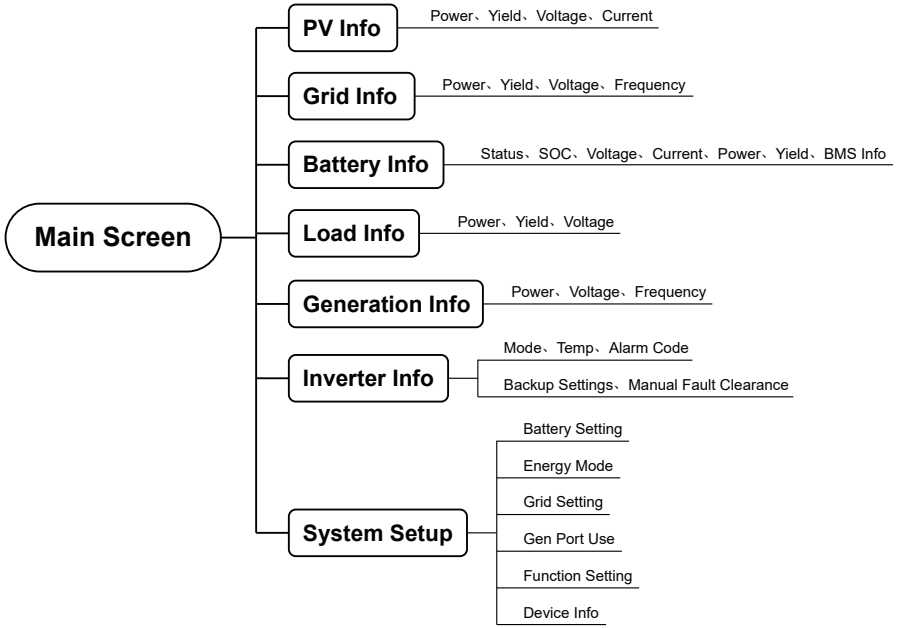
3.4.1 LED display light



Equipment status	LED	Priority
Upgrade	Red, green and yellow LED indicators flash alternately	1
Error	Red LED indicator always on	2
Alarm	Yellow LED indicator flashes	3
Running	Green LED indicator always on	4
Standby	Green LED indicators flashes	5

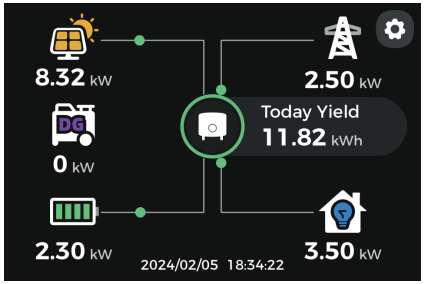
3.4.2 LCD menu

3.4.2.1 LCD operation flow chart

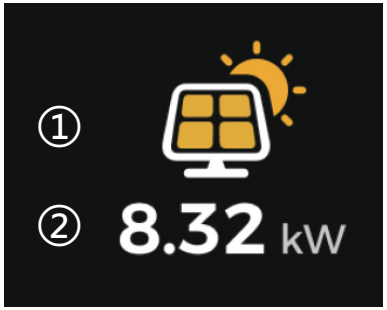
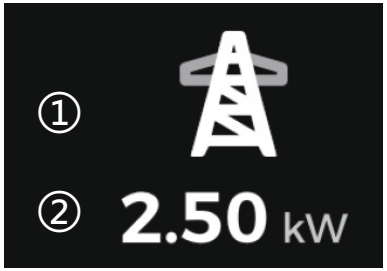
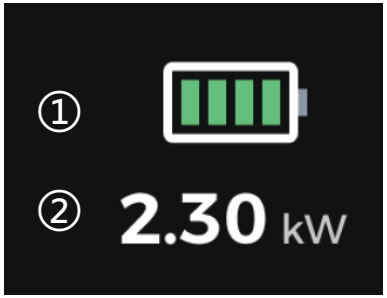


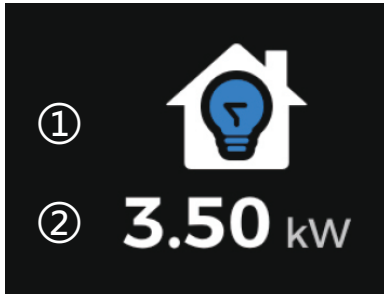
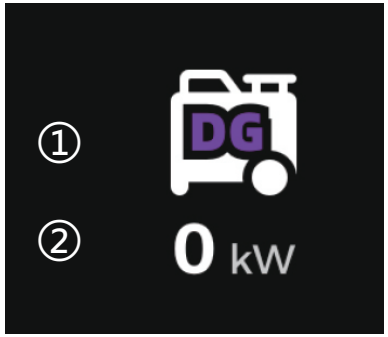
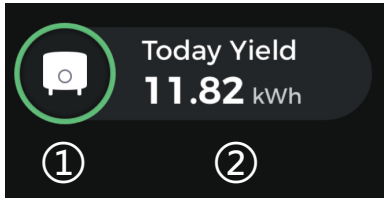
3.4.2.2 Main screen

The LCD is a touchscreen. The screen below displays the overall information of the inverter.

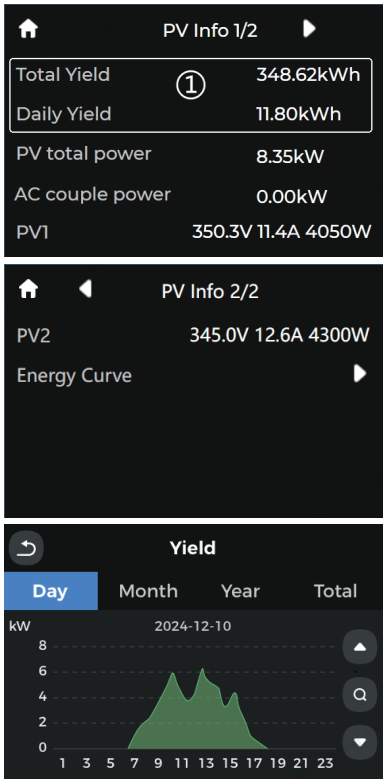


1. The main screen shows the connection status, energy levels, and dynamic flow of the PV, battery, power grid, and load.
2. The status ring in the center of the screen represents the operating status of the inverter. When the status ring is green, it indicates that the inverter is operating normally. When the status ring is red, it means the inverter has a fault. You can click on the inverter icon to view the fault information.
3. The system setup icon allows you to enter the parameter settings interface. This interface includes the following options:
   - Battery Setting
   - Energy Mode
   - Grid Setting
   - Gen Port Use
   - Function Setting
   - Device Info
4. The time is displayed at the bottom of the screen.

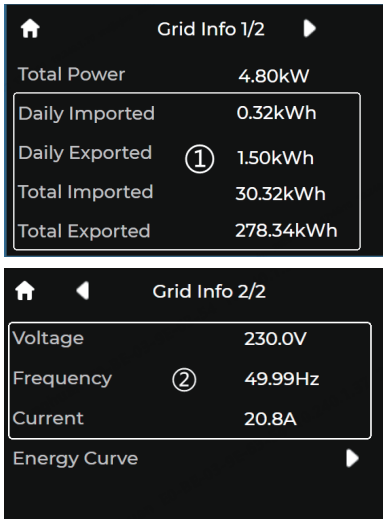
	① PV status icon.Click to view the detailed information of PV. **ON:** PV is connected and the voltage is within the operating range. **Flashing:** PV is connected, but the voltage exceeds the operating range. **OFF:** PV is not connected. ② PV input power. This area will display the sum of the PV power of the hybrid inverter. This power will include the power generation of the AC-coupled on-grid inverter when the AC coupling is enabled and the meter communication is normal.
	① Grid status icon.Click to view the detailed information of grid. **ON:** Grid is connected and the voltage and frequency is within the operating range. **Flashing:** Grid is connected, but the voltage or frequency exceeds the operating range. **OFF:** Grid is not connected. ② Grid power.
	① Battery status icon.Click to view the detailed information of battery. **ON:** Battery is connected and the voltage is within the operating range. **Flashing:** Battery is connected, but the voltage exceeds the operating range. **OFF:** Battery is not connected. The green squares inside the battery icon represent the battery's SOC. ② Battery power.

	① Backup switch status icon.Click to view the detailed information of load. **ON:** Backup switch is turn on and the power is within the operating range. **Flashing:** Backup overload. **OFF:** Backup switch is turn off. ② Load power. When the meter or CT is connected, this power includes the power of both home loads and backup loads.
	① Generator status icon. Click to view the detailed information of Generator . **ON:** Generator is connected and the voltage and frequency is within the operating range. **Flashing:** Generator is connected, but the voltage or frequency exceeds the operating range. **OFF:** Generator is not connected. ② Generator power.
	① Inverter status icon. Click to view the detailed information of Inverter.Click to view the basic information of the inverter and perform quick settings. ② The power generation of PV today,click to view the power generation statistics.

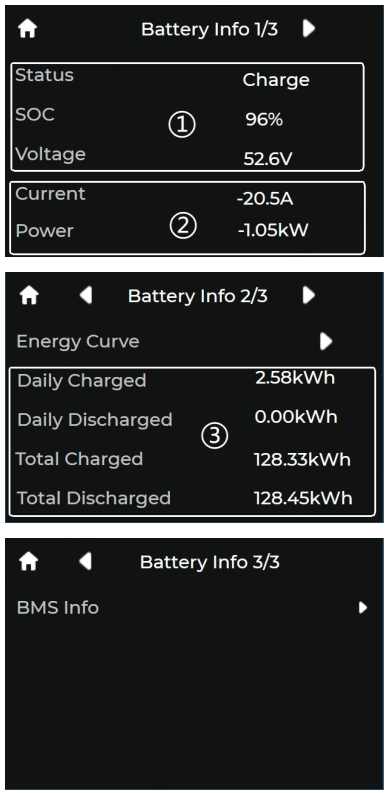
3.4.2.3 Real-time data interface



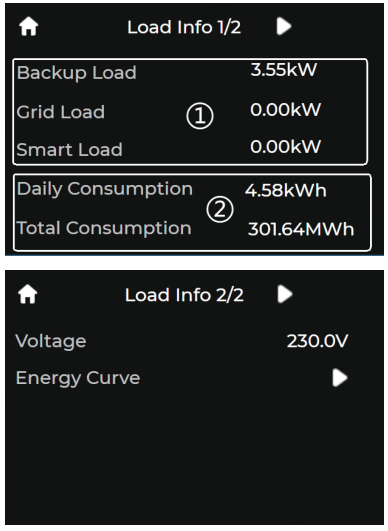
PV information.
① PV panel energy for Day and Total.
PV total power: PV panel total generation.
AC couple Power: If a string inverter is AC-coupled to the grid or load side of a hybrid inverter and a meter is installed, this section will display the AC couple power, which is the power recorded by the meter. Ensure successful communication between the meter and the hybrid inverter.
PV1: Voltage,Current,Power for MPPT1.
PV2: Voltage,Current,Power for MPPT2.
Energy Curve: Power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, please check on the monitoring system. Click the up and down arrow to check power curve of different period.



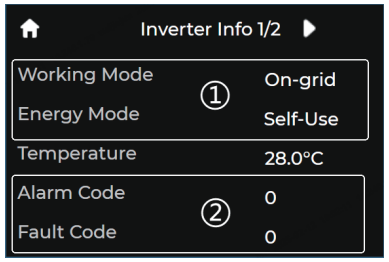
Grid information.
Total Power: Grid power, negative means sell to grid, positive means buy from grid.
① The imported and exported energy for grid.
② Voltage,Frequency and Current of grid.
Energy Curve: Power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, please check on the monitoring system. Click the up and down arrow to check power curve of different period.



Battery information.
① Status,SOC,Voltage of the battery.
② Battery charge/discharge current and power. Positive values indicate discharging, while negative values indicate charging.
Energy Curve: Power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, please check on the monitoring system. Click the up and down arrow to check power curve of different period.
③ The charged and discharged energy for the battery.
BMS Info: Access this interface to view detailed BMS information if you are using a lithium battery that communicates with the inverter.



Load information.
① Load power on the backup power side and grid side. Data for "Grid Load" will only be displayed when either "Anti-backflow Function" is enabled and a CT / meter is connected.
Smart load will show "OFF" when it is turned off.
② The consumption of loads on the backup side and grid side.
Voltage: Voltage of the backup port.
Energy Curve: Power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, please check on the monitoring system. Click the up and down arrow to check power curve of different period.

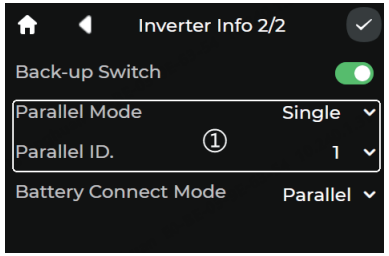


Inverter information1/2.

① Inverter working mode,energy mode setting.

Temperature: The internal temperature of the inverter.

② Alarm and fault code.Refer to the Fault Alarm Table.



Inverter information2/2.

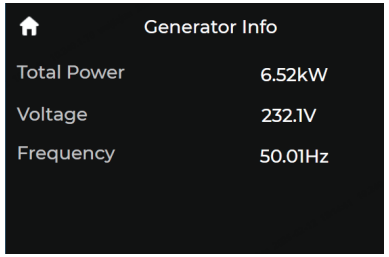
Back-up Switch: Enable/disable back-up output.

① Parallel settings,If multiple inverters are to be used in parallel, you need to set "Parallel Mode" to "Parallel" and set the "Parallel ID" to non - repeating numbers from 1 to 16.

Battery Connect Mode:

Paralle: The parallel system shares the battery.

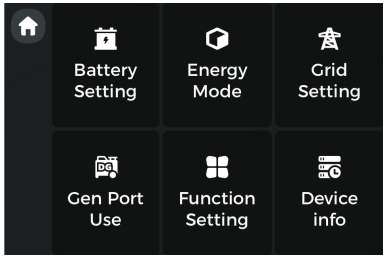
Single: Each inverter is independently connected to the battery.

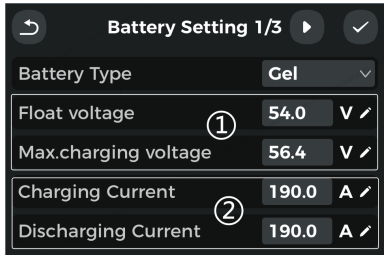


Generator information.

The input power, voltage and frequency of the generator.

3.4.2.4 Settings interface





Battery Setting1/3.

Battery Type: These battery types AGM,Gel(Default), Wet,USER and PYLON can be set.

① The maximum voltage and Float voltage in the three - stage charging.

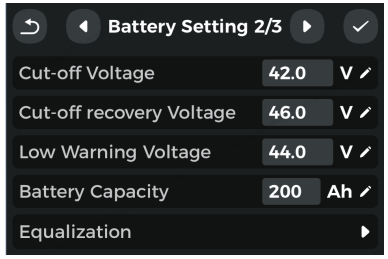
When the battery type is set to AGM,Gel , Wet and Lithium battery(Pylon), the charging voltage will be fixed according to the following table.

Type	Max.charging voltage	Float voltage	Equalization Voltage
AGM	57.6V	53.6V	57.6V
Gel	56.4V	54.0V	/
Wet	59.0V	55.0V	59.0V
Lithium	Follow BMS		

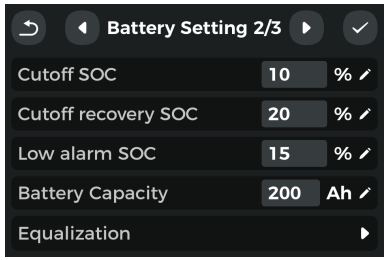
When the battery type is set to USE,you can manually configure the battery charging voltage according to your needs.

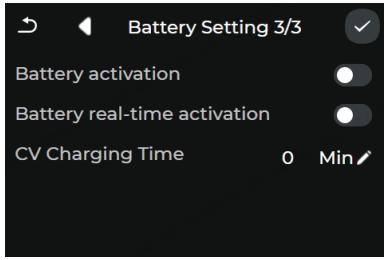
② Settings for charge and discharge current. When lithium battery is used and the BMS communication is connection, these two parameters will follow the BMS.

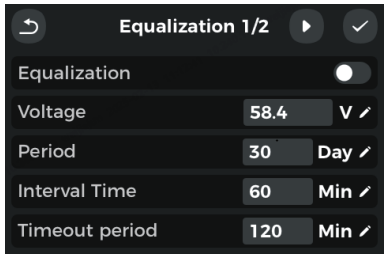
No BMS communication (Show Voltage):

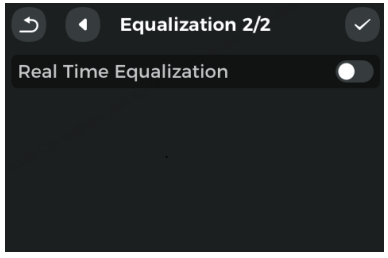


BMS communication normal (Show SOC):









Battery Setting2/3&3/3.

Cut-off Voltage/SOC: When the battery Voltage/SOC is lower than this value, the battery stops discharging.

Cut-off recovery Voltage/SOC: When the battery Voltage/SOC exceeds this value, the battery resumes discharging.

Low Warning Voltage/SOC: Battery low warning will be triggered when the battery's voltage drops below this value. The alarm will be cleared when the voltage exceeds this value + 2V.

When the battery type is set to lithium - ion battery and the BMS communication is connected, the above parameters are presented according to the SOC.

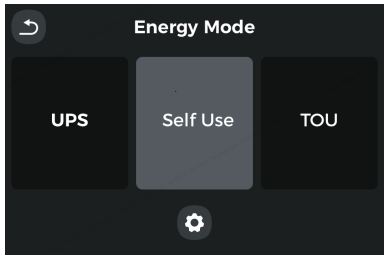
Battery Capacity: Set according to the actual battery configuration. This parameter will affect the SOC calculation.

Equalization: After clicking to enter, you can turn on or off the equalizing charge function and configure the equalizing charge parameters.

Battery activation: When this function is enabled, the inverter will automatically activate the lithium - ion battery after startup.

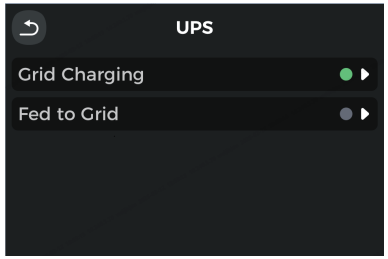
Battery real-time activation: Initiate the lithium - battery activation procedure immediately.

CV Charging Time: Set the constant - voltage charging time.The inverter will automatically switch the charging state according to the battery status when the CV time set to 0.

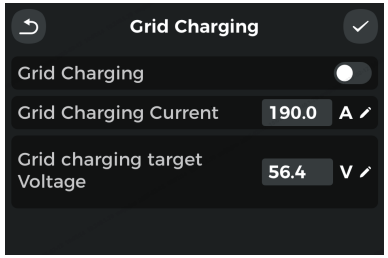


Energy Mode:

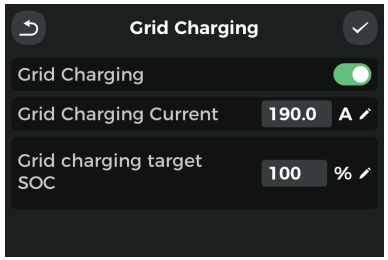
Three energy modes are available: UPS, Self Use, and Time-of-Use (TOU). Specific configurations can be made after entering the corresponding interface.

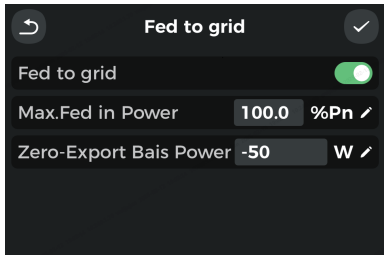


No BMS communication(Show Voltage):



BMS communication normal(Show SOC):





UPS Mode.

UPS: Uninterruptible power supply mode.

Power source priority for the load is as follows:

1.PV 2.Grid 3.Battery

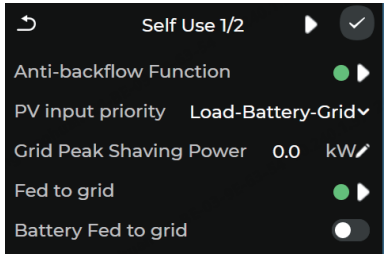
The PV input priority is "Battery-Load-Grid": PV energy is preferentially used for the battery charging, then for load, and the excess power is fed into the grid.

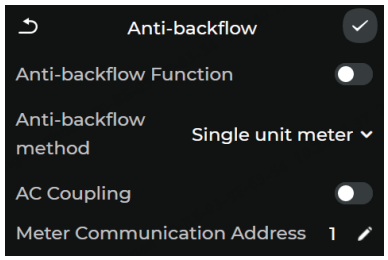
Grid Charging: This option allows you to enable or disable grid charging, set the maximum grid charging current, and define the target voltage or SOC. Grid charging will stop when the battery voltage or SOC reaches the target value.

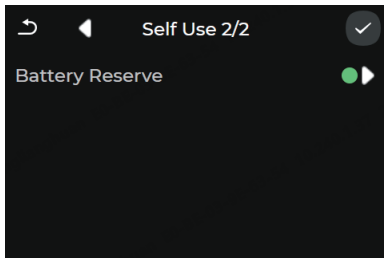
Fed to Grid: When it is active,The excess power of PV after powering the load and charging can be fed into the grid.

Max.Fed in Power: Allowed the maximum output power to fed to grid.

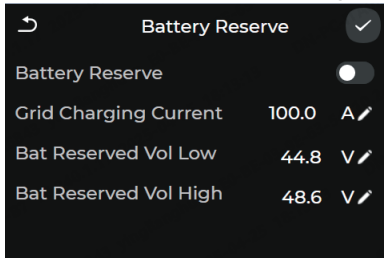
Zero-Export Bias Power: In Anti-backflow mode, to prevent the inverter from feeding any power to the grid, it is recommended to set this value between -20W and -120W.



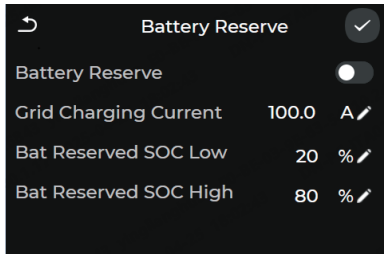




No BMS communication (Show Voltage):



BMS communication normal (Show SOC):



Self Use Mode.

Power source priority for the load is as follows:

1.PV 2.Battery 3.Grid

The priority of PV energy utilization is as follows (Default):

1.Load 2.Battery Charge 3.Grid

Anti-backflow Function: This function must be used in conjunction with a CT or energy METER. When it is activated, the energy from the battery and PV will power the backup loads and home loads.

Anti-backflow Method: Select "CT" or "METER" according to the actual configuration.

AC Coupling: Control the ON/OFF for AC coupling function. For specific introduction,refer to Chapter 5.3.13.

Meter Communication Address: Set the meter's Modbus address (1-128).

PV input priority:

"Load-Battery-Grid"(Default): PV energy is preferentially used for the load, then for battery charging, and the excess energy is fed into the grid.

"Load-Grid-Battery": PV energy is preferentially used for the load, then fed into the grid, and the excess energy is used to charge the battery.

Grid Peak Shaving Power:

This function is not effective when the power is set to 0. When it is active, grid output power will be limited within the set value. If the load power exceeds the allowed value, it will take PV energy and battery as supplement. If still can't meet the load requirement, grid power will increase to meet the load needs.

Fed to Grid: Same as "UPS" Mode.

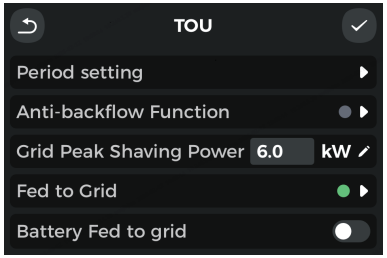
Battery Fed to Grid: When it is active,The energy remaining after the PV and the battery power the load can be fed into the grid.

Battery Reserve: Battery Reserve function switch.

Grid charging Current: Set the maximum grid charging current for the battery.

Bat Reserved Voltage/SOC Low: Set the minimum Voltage/SOC threshold, When the Voltage/SOC is lower than the set value, the battery will stop discharging and the inverter will prioritize charging.

Bat Reserved Voltage/SOC High: Set the maximum Voltage/SOC threshold. When the Voltage/SOC exceeds the set value, the battery resumes discharging.



TOU Mode.

Period Setting: It is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load.

Anti-backflow Function: Same as "Self Use" Mode.

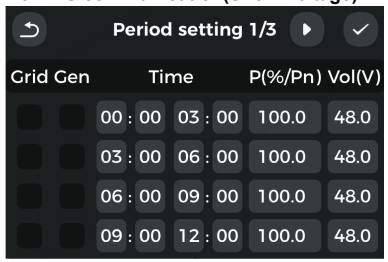
AC Coupling: Same as "Self Use" Mode.

Grid Peak Shaving Power: Same as "Self Use" Mode.

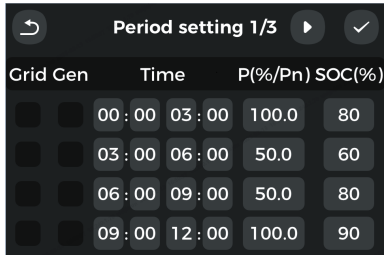
Fed to Grid: Same as "UPS" Mode.

Battery Fed to Grid: When it is active and within the battery discharging time period,The energy remaining after the PV and the battery power the load can be fed into the grid.

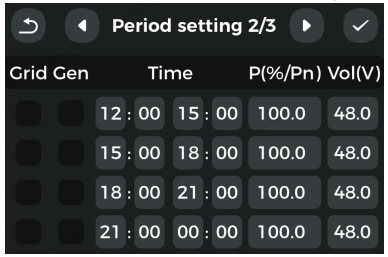
No BMS communication(Show Voltage):



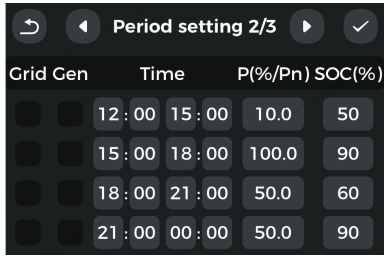
BMS communication normal(Show SOC):

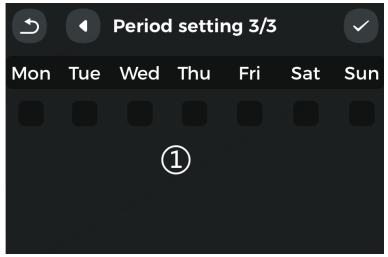


No BMS communication(Show Voltage):



BMS communication normal(Show SOC):





Period Setting.

Grid: utilize grid to charge the battery in a time period.

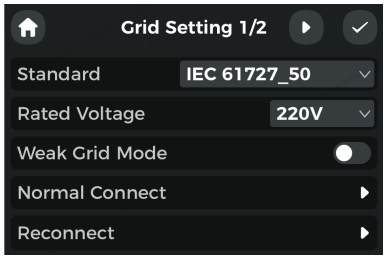
Gen: utilize generator to charge the battery in a time period.

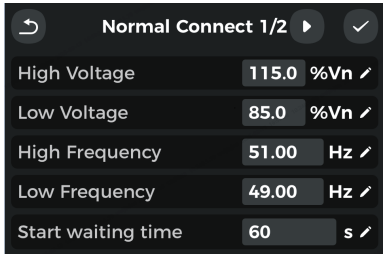
Time: Real time, range of 01:00-24:00. 00:00~00:00 means it takes effect 24 hours a day.

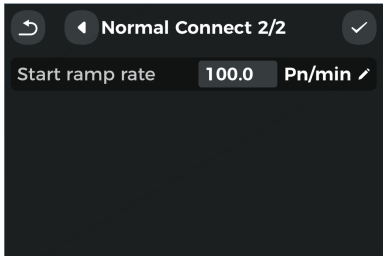
P(%/Pn): Maximum charge(in charge time) or discharge(in discharge time) power of battery allowed. Pn Means rate power of the inverter.

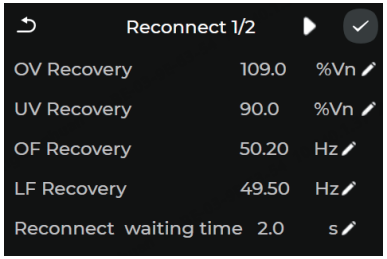
Vol(V)/SOC(%): The target Voltage/SOC for battery charging(in charge time) or discharging(in discharge time).

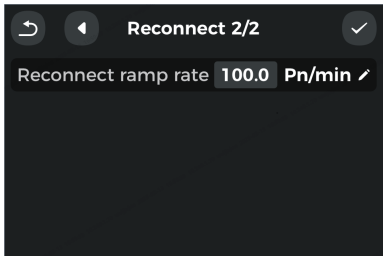
① TOU Week Setting, It allows users to choose which day to execute the setting of "Time of Use".If none of the dates are selected, it means it takes effect at all times.











Grid Setting.

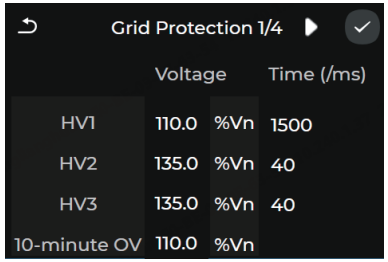
Standard: Set grid standards.

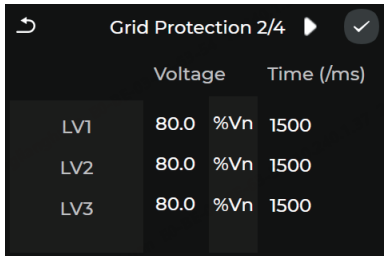
Rated Voltage: AC rated voltage setting. Only some standards support modification.

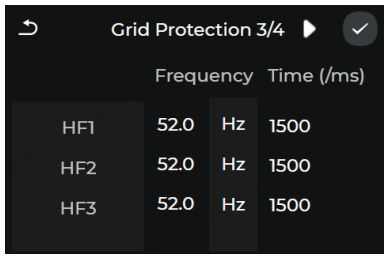
Weak Grid Mode: After enabling this function, inverter can be compatible with grid of poor quality.

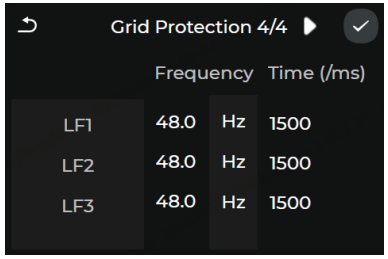
Normal Connect: This interface can configure the voltage range,frequency range, waiting time and the power rising rate for the inverter's first connection to the grid.

Reconnect: This interface can configure the voltage range,frequency range, waiting time and the power rising rate for the inverter's connection to the grid after the inverter trip from the grid.









Grid Protection.

HV1: Level1 over voltage protection value and trip time for grid ."Vn" means rate voltage.

HV2: Level2 over voltage protection value and trip time for grid.

HV3: Level3 over voltage protection value and trip time for grid.

10-minute OV: The over voltage protection value of the average voltage of the grid within 10 minutes.

LV1: Level1 under voltage protection value and trip time for grid.

LV2: Level2 under voltage protection value and trip time for grid.

LV3: Level3 under voltage protection value and trip time for grid.

HF1: Level1 over frequency protection value and trip time for grid.

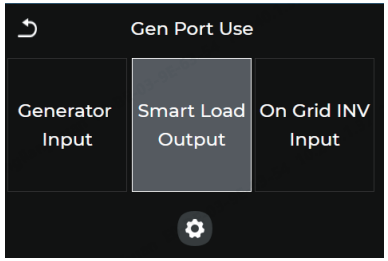
HF2: Level2 over frequency protection value and trip time for grid.

HF3: Level3 over frequency protection value and trip time for grid.

LF1: Level1 under frequency protection value and trip time for grid.

LF2: Level2 under frequency protection value and trip time for grid.

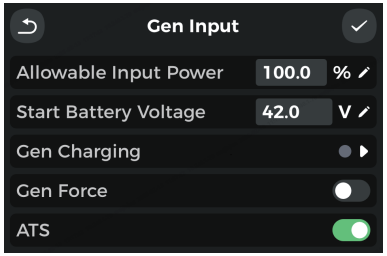
LF3: Level3 under frequency protection value and trip time for grid.



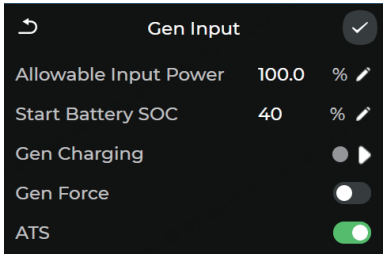
Gen Port Use.

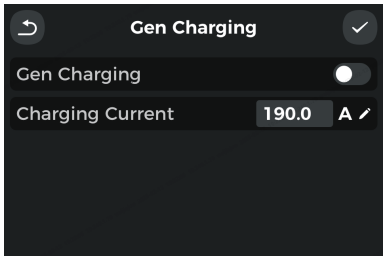
Generator Input(Default): Configure the generator input parameters.

No BMS communication(Show Voltage):

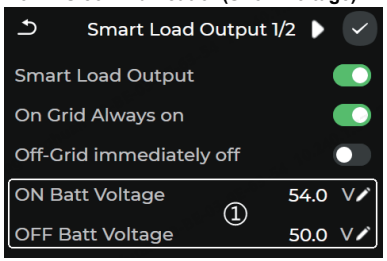


BMS communication normal(Show SOC):

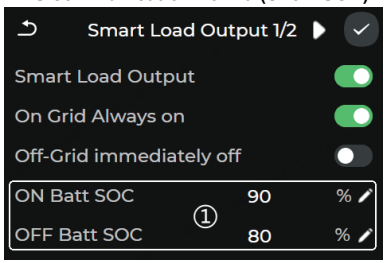




No BMS communication(Show Voltage):



BMS communication normal(Show SOC):



Allowable Input Power: Allowed Max.power from generator.

Start Battery Voltage/SOC: Generator starting point, when the battery Voltage/SOC is lower than this parameter, the inverter starts the generator through the dry contact.

Gen Charging: Control the enabling of the generator to charge the battery and the charging current. This option is disabled when TOU is enabled.

Gen Force: When the generator is connected, it is forced to start the generator without meeting other conditions.

ATS: It is related with ATS port voltage, The ATS port outputs 230V to drive an external switch when the inverter is operating in the off - grid mode.

Smart Load Output: This mode utilizes the Gen input connection as an backup output.

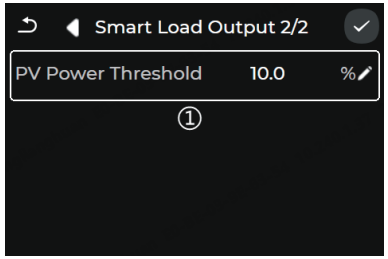
On Grid Always on: When this function is enabled, the smart load output remains on all the time when the inverter is operating in the on - grid mode.

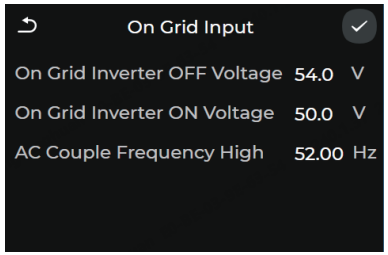
Off-Grid immediately off: When this function is turned on, the smart load output will be immediately shut down when the grid is disconnected.

① The smart load output only receives power when both the battery Voltage/SOC and the PV power are above the user - programmable thresholds.

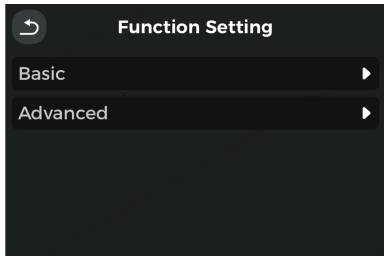
For example:	
PV Power Threshold	**10%**
ON Batt Voltage	**54V**
OFF Batt Voltage	**50V**

When the PV power exceeds 10%Pn and the battery voltage exceeds 54V, the smart load output will turn on. When the PV power is less than 500W or the battery voltage is lower than 50V, the smart load output will automatically turn off.

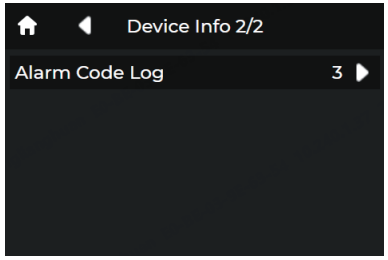




On Grid Input: Set the generator port as the input port of the On-Grid inverter to implement the AC coupling function.
On Grid Inverter OFF Voltage/SOC: The inverter will cut off the On-gird inverter input when the Voltage/SOC exceeds the set value.
On Grid Inverter ON Voltage/SOC: The inverter will recovery the On-gird inverter input when the Voltage/SOC lower than the set value.
AC Couple Frequency High: As the battery charging current exceeds the set value. During the process, the hybrid inverter will increase the output frequency to reduce the power of the on-grid inverter, and the upper limit of the frequency is the set value.



Function Setting.
Basic: Set the system time.
Advanced: Administrator function. Access requires an administrator password.



Device Info.
This interface displays the inverter's serial number and software version information, and alarm Logs.

4 APPLICATION

4.1 Application scenario

Warning:

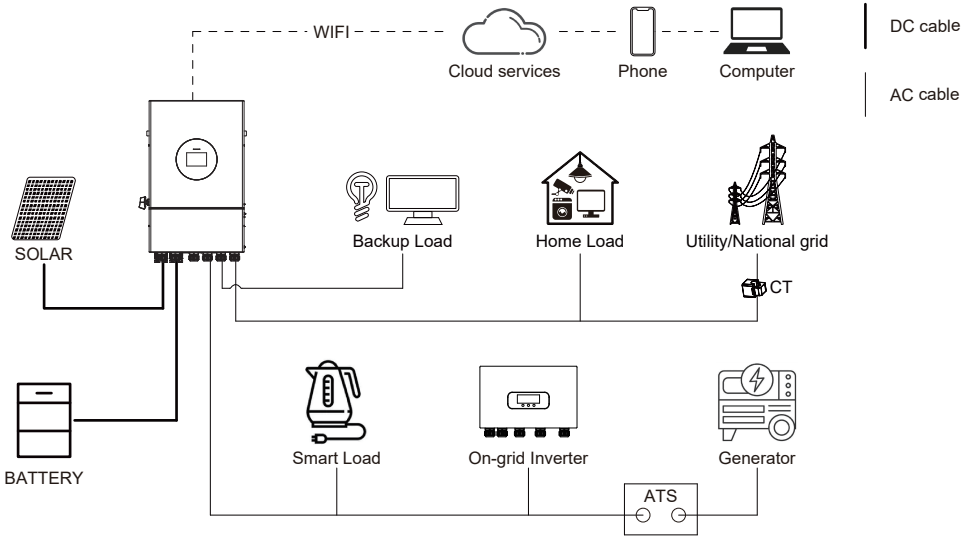
- PV systems are not suitable for connecting devices that rely on stable power supply, such as life-sustaining medical equipment. Please ensure that the power outage of the system does not cause personal injury.
- Please try to avoid using loads with high starting currents in PV systems, such as high-power water pumps, as this may result in off grid output failure due to excessive instantaneous power.
- If the photovoltaic system is not equipped with batteries, do not use the off grid load function, as the resulting system power consumption risk will exceed the warranty range of the equipment manufacturer.
- The battery current may be affected by some factors, such as temperature, humidity, weather conditions, etc., which may lead to battery current limiting and affect the carrying capacity.
- The inverter has UPS function, and the switching time is less than 10ms. Please ensure that the off grid load capacity is less than the rated power of the inverter, otherwise it may cause the UPS function to fail to start when the power grid is powered off.
- When the inverter is protected for a single time, it can automatically restart. If it occurs multiple times, the inverter will stop and wait, and the inverter can be immediately restarted through the APP.
- When the inverter is in off grid mode, it can be used normally by ordinary household loads, such as

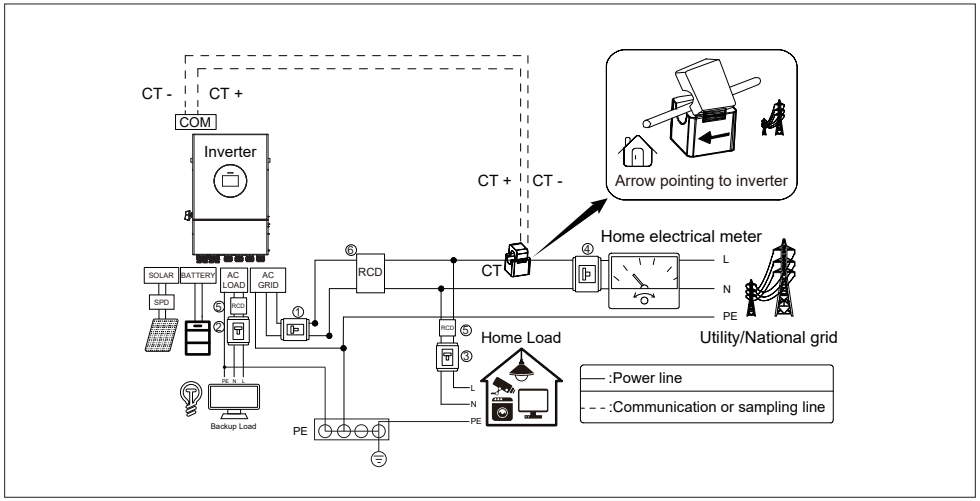
  Inductive load: 1-pit non-variable frequency air conditioner.

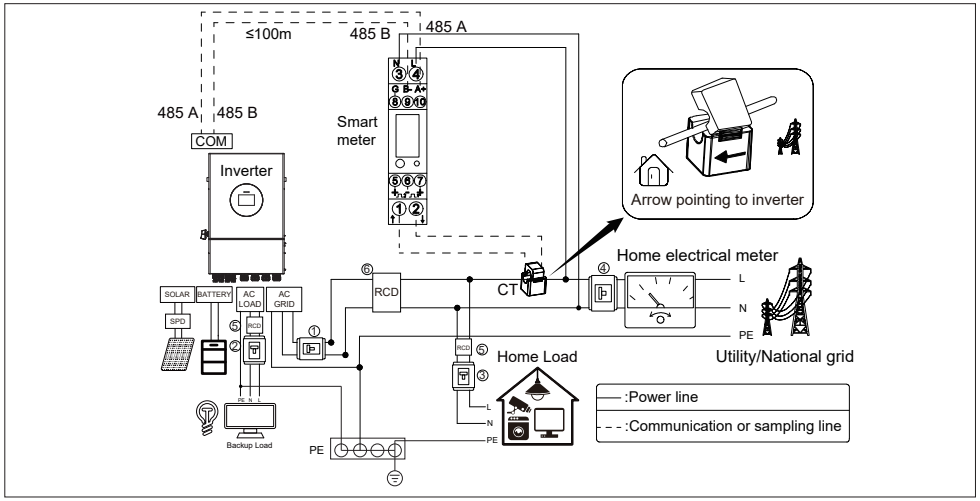
  Capacitive load: total power ≤ 0.6 x inverter rated output power.

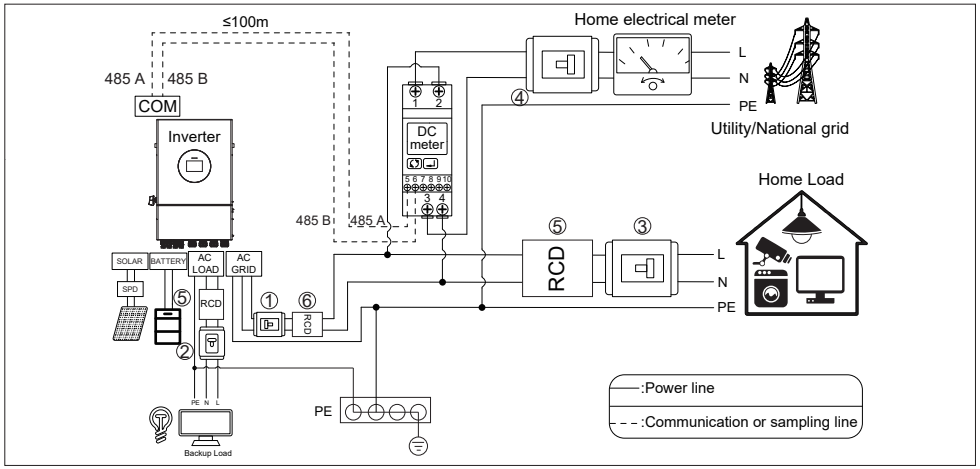
4.1.1 Basic system architecture

The following illustration shows basic application of this inverter.
It also includes following devices to have a complete running system.
-Generator or Utility
-PV modules
Consult with your system integrator for other possible system architecture depending on your requirements.
This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.









No.	TH(3.6~8)K-SLA01
①	50A/230V AC breaker
②	Maximum 50A/230V AC breaker
③	Depends on loads
④	Depends on family loads and inverter capacity
⑤	30mA RCD Type A Suitable,Type B Recommended
⑥	30mA RCD Type A Suitable,Type B Recommended

Note1: *If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required for Battery.

Note2: The values in the table are recommended values and could be set to other values according to actual conditions.

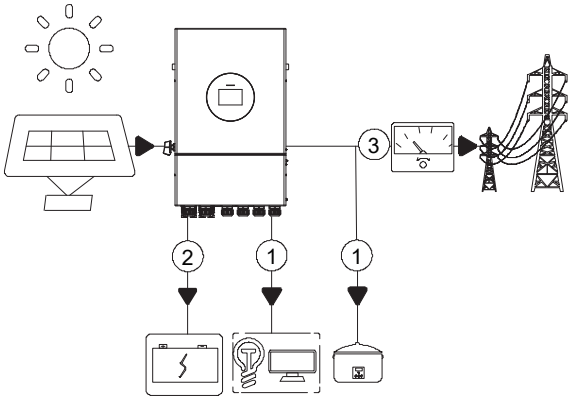
4.2 Application mode

4.2.1 Self-use

Watch out:
It is applicable to regions with high electricity cost, low electricity sales revenue and stable power grid.

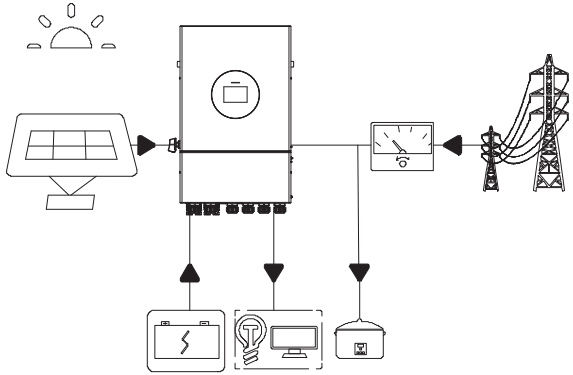
PV energy suffient:

PV energy shall be used to supply power to the load in priority, excess energy shall be used to charge the battery, and the remaining energy shall be sold. As shown in the figure below, 1. 2. 3 represents energy priority.



Insufficient PV energy or night conditions:

The load energy is preferentially supplied by the PV energy, supplemented by the battery discharge. If the battery energy is insufficient, the power is purchased from the grid.

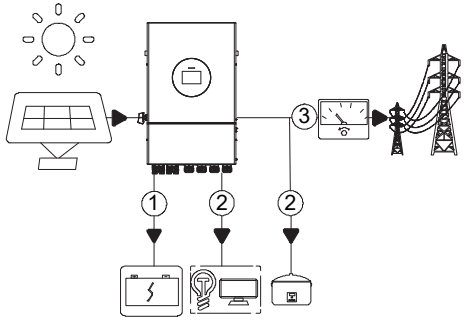


4.2.2 UPS mode

Watch out:
- It is applicable to areas with important load and unstable power grid.
- All energy priorities are to ensure that the battery reserves energy as much as possible to ensure that off-grid output loads can be powered in case of grid abnormality.

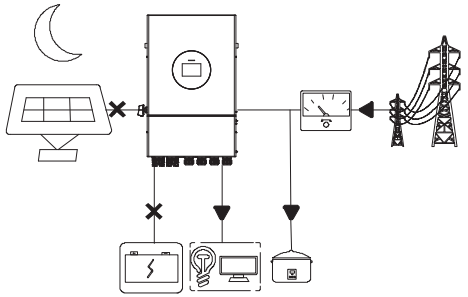
Day time:

The PV energy shall be used to charge the battery in priority, the excess energy shall be used by the load, and the remaining energy shall be sold. As shown in the figure below, 1. 2. 3 represents energy priority.



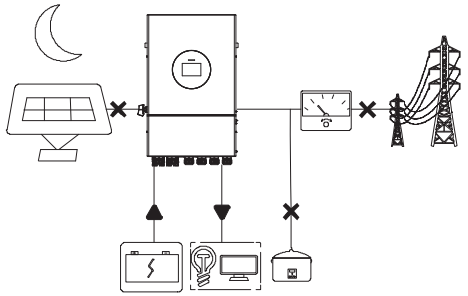
Night time:

The power grid is normal, the power is purchased from the power grid to supply power for the load, and the battery is used for power backup.



Night time:

The grid is abnormal, the inverter enters the off-grid mode, and the battery discharges to supply power to the off-grid port load.



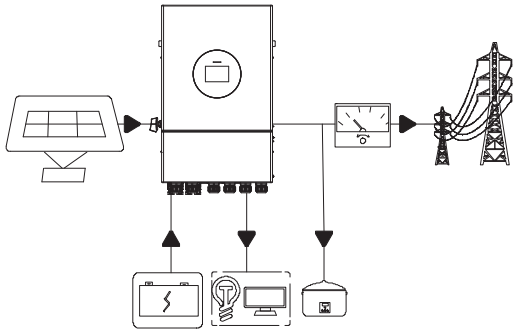
4.2.3 TOU

Watch out:

- The economic mode can only be selected if the local laws and regulations are met. For example, if the power grid is prohibited to charge the battery, do not use this mode.
- It is recommended to use peak shaving and valley filling in the scenario with large difference between peak and valley electricity prices.

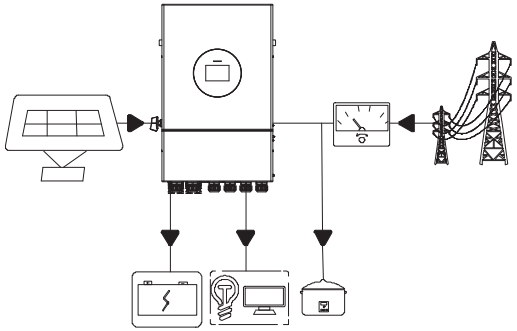
Discharge Period:

Power source priority for the load is as PV-Battery-grid.
The priority of PV energy utilization is as Load-Battery Charge-Grid when "Battery Fed to grid" is disable.
The priority of PV energy utilization is as Load-Grid-Battery Charge when "Battery Fed to grid" is enable.



Charge period:

Power source priority for the load is as PV-Grid-Battery.
The priority of PV energy utilization is as Load-Grid-Battery Charge.



4.3 Function characteristics

4.3.1 Power derating

In order to make the inverter operate safely, the inverter will automatically reduce the output power when the operating environment is not ideal.

The following factors may cause power derating, so please try to avoid them during use.

- Unfavorable environmental conditions such as direct sunlight, high temperatures, etc
- The inverter's output power percentage has been limited by the app or web-end settings
- Variation with grid voltage frequency
- High input voltage
- High input current value
- Insufficient battery pack power configuration

4.3.2 Battery standby to shutdown automatically

In order to protect the battery SOC, when only the battery is powered and in the standby mode, after waiting 5 minutes, the inverter will automatically turn off the power supply and enter the power saving mode.

At this time, the battery discharge power is 0W, and the remote communication and other functions are synchronously stopped. After the mains supply is recovered or the PV is recovered, the inverter will be automatically activated again.

If the battery is required to supply power separately and start the inverter power supply due to application or commissioning, please turn on the battery switch and activate the battery,(if invterver have cold start, then press the cold start button under the machine for 5 seconds) wait for a moment, the panel lamp will be on, at this time, the machine can be started in the off grid mode and set.

5 INSTALLATION

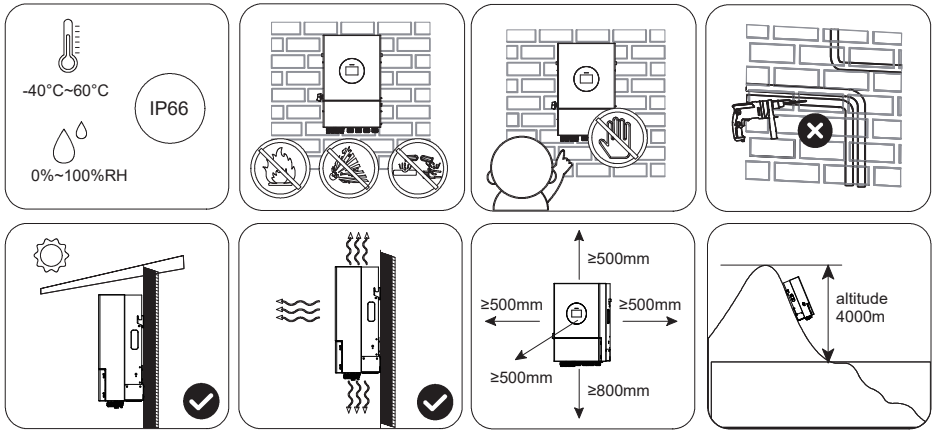
5.1 Installation requirements

5.1.1 Environmental requirements

- The protection class of inverter is IP66, which can be installed indoor and outdoor.
- Equipment shall not be installed in flammable, explosive and corrosive environment.
- The installation position shall be kept away from the accessible range of children and the position easy to be touched. High temperatures may be present on the surface when the equipment is in operation to prevent burns.
- The installation position shall avoid the water pipe and cable in the wall to avoid danger during punching.
- The inverter shall avoid salt fog areas and installation environments such as sunshine, rain and snow. It is recommended to install the inverter in a sheltered installation position. If necessary, a sunshade can be erected.
- When installing the inverter, certain space shall be reserved around the inverter to ensure sufficient installation and heat dissipation space.
- Under the installation scenario of multiple inverters, when the space is sufficient, the installation mode of "straight line" is recommended, When the space is insufficient, it is recommended to install the product in a zig-zag manner. It is not recommended to install multiple inverters by overlapping.
- The installation height of the equipment shall be convenient for operation and maintenance, ensure that the equipment indicator lights, all labels are easy to see, and the terminal blocks are easy to operate.
- The inverter is installed at an altitude lower than the maximum working altitude of 4000m.
- Keep away from strong magnetic field environment to avoid electromagnetic interference. If there is a radio station near the installation location or wireless communication equipment below 30MHz, please install the equipment according to the following requirements:

  Ferrite core with multi-circle winding or low-pass EMI filter at inverter DC input or AC output.

  The distance between inverter and wireless electromagnetic interference equipment exceeds 30m.

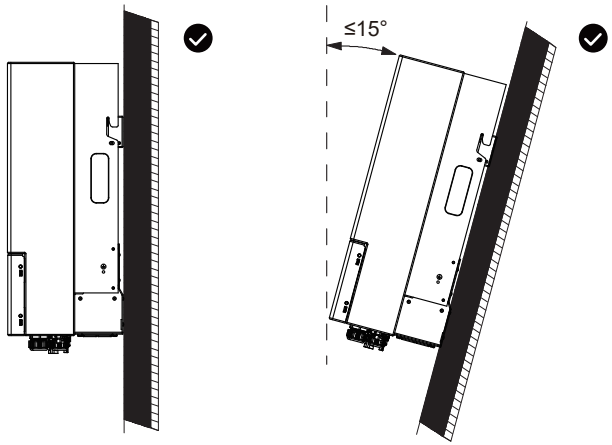


5.1.2 Carrier requirements

- Installation carriers must not be flammable and must be fire resistant.
- Please make sure that the mounting carrier is solid and reliable and can bear the weight of inverter.
- The equipment will vibrate during operation, so do not install it on the carrier with poor sound insulation, so as to avoid disturbance to residents in the living area caused by the noise generated by the equipment during operation.

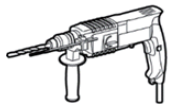
5.1.3 Installation angle requirements

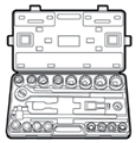
- Recommended inverter installation angle: vertical or pitching ≤ 15°.
- Do not invert, tilt forward, tilt backward beyond the angle and install the inverter horizontally.

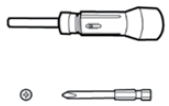


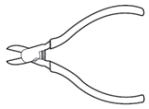
5.1.4 Installation tool requirements

The following installation tools are recommended for installation. Other auxiliary tools can be used on site if necessary.

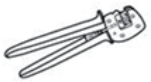

Percussion drill


Sockets tool box


Torque screw driver


Diagonal pliers


Wire stripper


Crimping pliers


Pressing terminal crimping plier

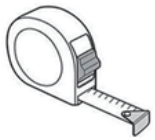

Hydraulic tongs


Wire cutter

Multimeter (Vdc range>1000V)


Rubber hammer


Vacuum cleaner


Tape measure


Levelling instrument


Electrician's knife


Heat shrinkable sleeve


Air heater

Cable ties

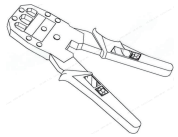

Goggles


Insulating gloves


Protective gloves


Respirator


Protective shoes


Cable clamp

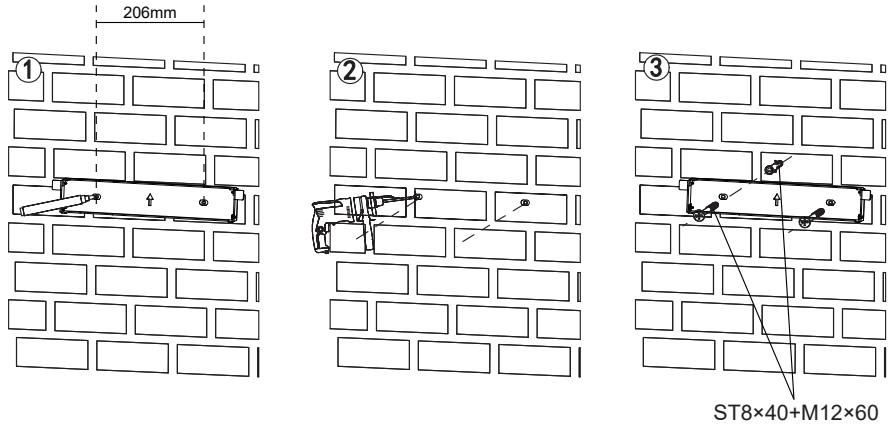
5.2 Installation of inverter

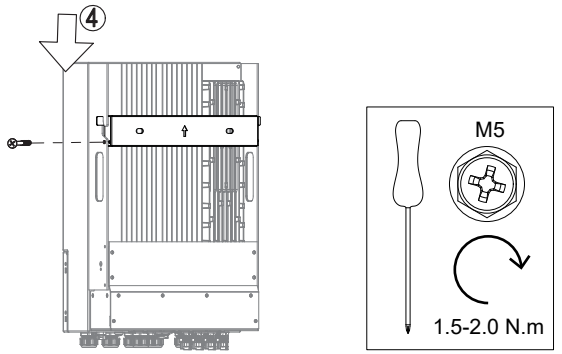
Watch out:

- Transportation, turnover, installation and other operations must meet the requirements of national and regional laws and regulations and relevant standards.
- Please equip corresponding personnel according to the weight of the equipment to prevent the equipment from exceeding the weight range that can be handled by human body and damaging personnel.
- Wear safety gloves to avoid injury.
- Please make sure that the equipment is balanced during handling to avoid dropping.

Watch out:

- When drilling holes, make sure that the drilling position is kept away from water pipes, cables, etc. in the wall to avoid danger.
- Wear goggles and dust mask when punching to avoid dust inhalation into respiratory tract or into eyes.
- Make sure that the inverter is securely installed to prevent injuries from falling.





5.3 Electrical connection

5.3.1 Safety precautions

Danger:

- Specifications of all operation, cables and components used in electrical connection shall comply with local laws and regulations.
- Before electrical connection, please disconnect the DC switch and AC output switch of inverter to make sure that the equipment is powered off. It is strictly forbidden to operate with electricity, otherwise, electric shock and other hazards may occur.
- Cables of the same type shall be bound together and arranged separately from cables of different types. It is forbidden to wind or cross cables.
- If the cable bears too much tension, it may lead to poor wiring. When wiring, please reserve a certain length of the cable before connecting to the inverter wiring port.
- When crimping the connecting terminal, please make sure that the conductor part of the cable is fully contacted with the connecting terminal, and do not crimp the cable insulation skin together with the connecting terminal, otherwise, the equipment may be unable to operate, or the inverter terminal block may be damaged due to heating due to unreliable connection after operation.

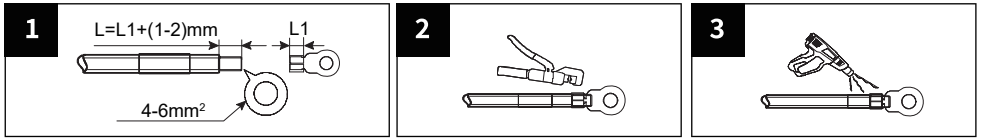
Watch out:

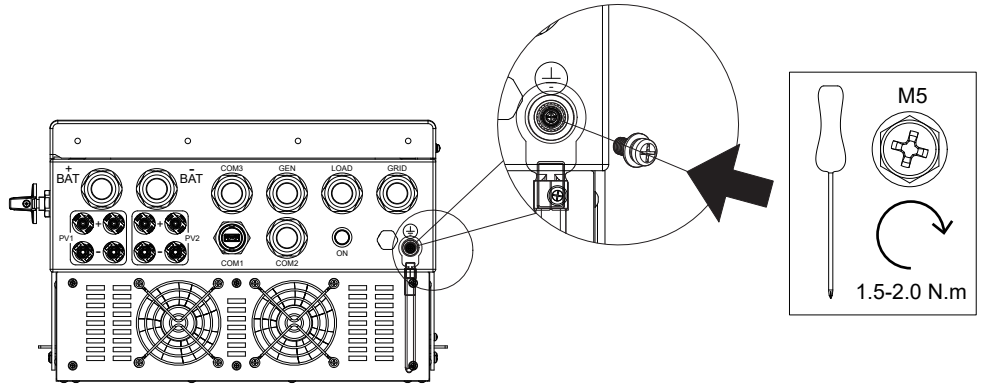
- When making electrical connection, please wear safety shoes, protective gloves, insulating gloves and other personal protective equipment as required.
- Only professionals are allowed to carry out operations related to electrical connection.

5.3.2 Connecting protective earth wire

Warning:

- The protective grounding of the crate shell cannot replace the protective grounding wire of the AC output port. When wiring, ensure that the protective grounding wires at the two places are reliably connected.
- In case of multiple inverters, make sure that the protective earthing point of all inverter crate enclosures is equipotentially connected.
- To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint on the external of the grounding terminal for protection after the connection and installation of the protective ground wire.
- Please prepare the protective ground wire, and the recommended specification:
  Type: Outdoor single-core copper wire
  Conductor cross-section: 4-6mm² (12 - 10AWG)





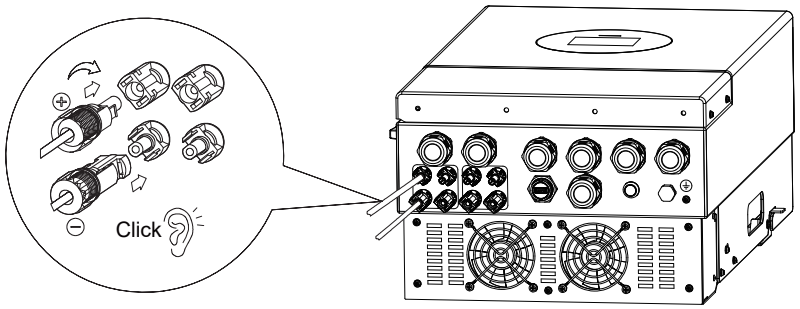
5.3.3 Connect PV input cable

Danger:

- Do not connect the same PV string to multiple inverters, otherwise the inverter may be damaged.
- Please make sure that the maximum short circuit current and maximum input voltage of each MPPT are within the allowable range of the inverter.
- Please make sure that the positive electrode of the PV string is connected to the PV port + of the inverter, and the negative electrode of the PV string is connected to the PV port - of the inverter.
- Please prepare your own PV input cable. Recommended specification:
  Type: Outdoor PV multi-core copper wire
  Conductor cross-section: 4-6mm² (12 - 10AWG)
  Outer diameter of conductor insulation layer: φ3~7mm

Warning:

- PV string output does not support grounding. Before connecting PV string to inverter, please make sure that the minimum insulation resistance to ground of PV string meets the minimum insulation impedance requirements (R=maximum input voltage/30mA).
- Make sure that the DC cables are firmly connected without looseness after connection.
- Use a multimeter to measure the positive and negative electrodes of the DC cable and ensure that the positive and negative electrodes are correct without reverse connection, and the voltage is within the allowable range.



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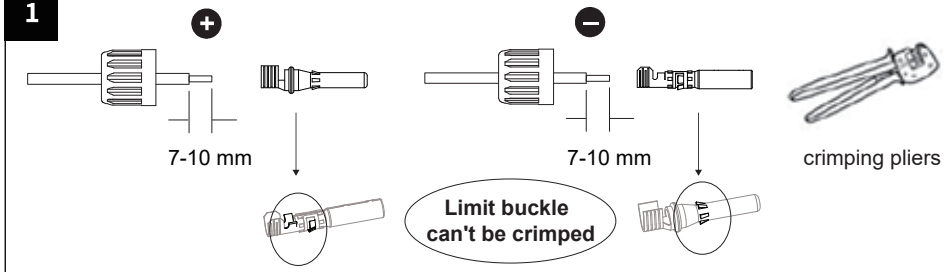

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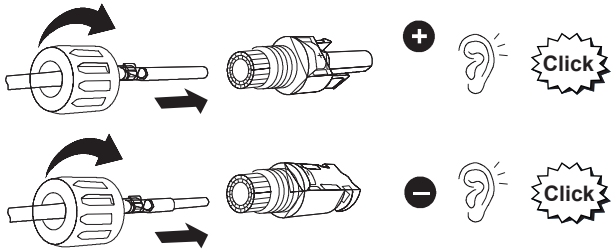

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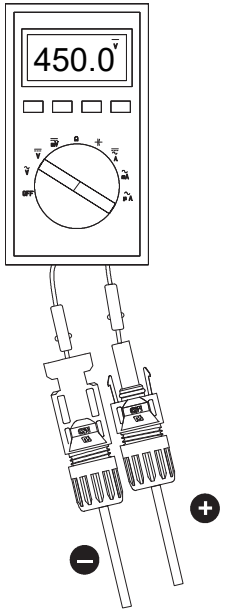
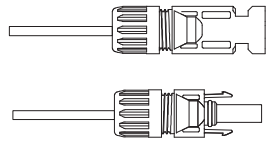




Make sure PV polarity is right,
PV voltage≤550V

5.3.4 Connect the battery input cable

Danger:

- The inverter manufacturer shall approve the battery used with inverter, and the approved battery list can be obtained through the official website.
- Short-circuit of battery may cause personal injury. Instantaneous large current caused by short circuit can release a lot of energy and may cause fire.
- Before connecting the battery cable, please confirm that the inverter and battery are powered off and the front and rear switches of the equipment are disconnected.
- When the inverter is operating, do not connect or disconnect the battery cable. Violation operation may cause electric shock.
- When connecting the battery cable, please use insulated tools to prevent accidental electric shock or battery short circuit.
- Make sure that the battery open circuit voltage is within the allowable range of the inverter.
- One DC switch is required between inverter and battery.
- Please prepare your own DC input cable. Recommended specification:

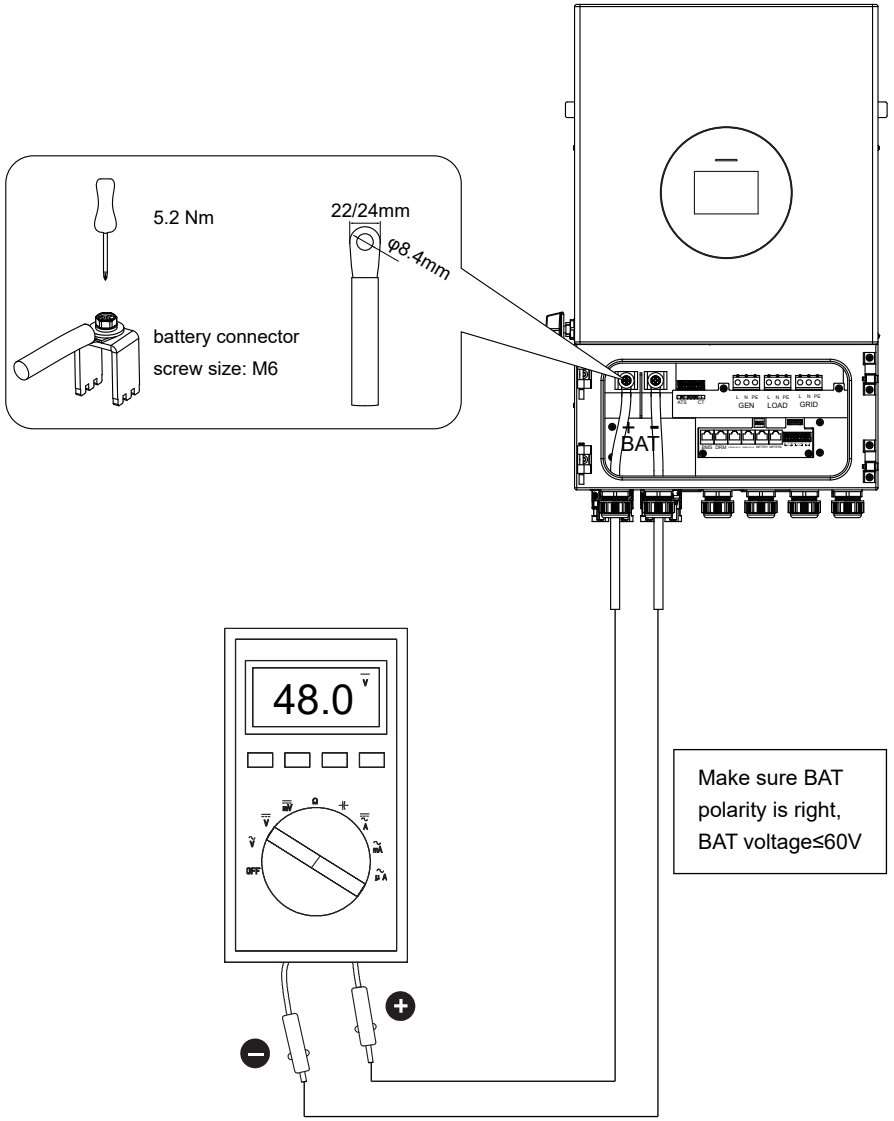
  Type: Outdoor DC multi-core copper wire

  Conductor sectional area: 54.5mm² (0AWG or 2*3AWG)

  Outer diameter of conductor insulation layer: φ8~11mm

Warning:

- During wiring, the battery cable is completely matched with the "BAT +", "BAT -" and grounding port of the battery terminal. If the cable connection is wrong, the equipment will be damaged.
- Do not connect load between inverter and battery.
- Make sure that the DC cables are firmly connected without looseness after connection.
- Use a multimeter to measure the positive and negative electrodes of the DC cable and ensure that the positive and negative electrodes are correct without reverse connection, and the voltage is within the allowable range.



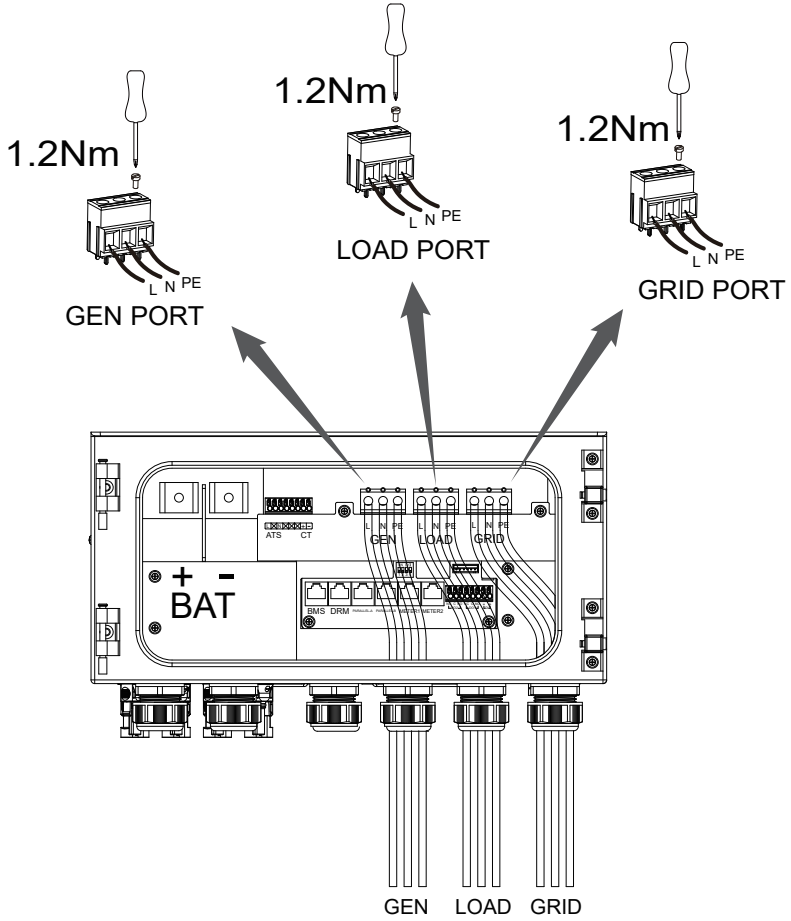
5.3.5 Connecting AC cable

Danger:

- In order to ensure that the inverter and the grid can be safely disconnected from the grid in case of abnormal conditions, please connect the AC switch on the AC side of the inverter. Multiple inverters cannot be connected to one AC switch at the same time. Please select proper AC switch according to local regulations.
- When the inverter is powered on, the AC off-grid port will be powered. If the off-grid port load needs to be maintained, make sure to disconnect the off-grid port circuit breaker or power down the inverter, otherwise it may cause electric shock.
- Please prepare your own AC input cable. Recommended specification:
  Type: Outdoor AC single-core copper wire
  Conductor sectional area: 6-10mm² (8AWG-6AWG)
  Outer diameter of conductor insulation layer: φ13~18mm
- If multi-core copper wire is selected, supporting crimping terminal shall be used for assembly. It is forbidden to directly press multi-core copper wire into the connector.

Warning:

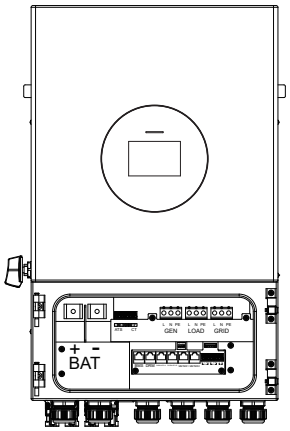
- The residual current monitoring unit (RCMU) is integrated inside the inverter, and when the inverter detects a leakage current greater than the allowable value, it will quickly disconnect from the power grid.
- When wiring, the AC cable matches the "L", "N", and grounding port of the AC terminal completely. If the cable is connected incorrectly, it will cause equipment damage.
- Please make sure that the wire core is fully inserted into the terminal-wiring hole and not exposed.
- Make sure that the cable connections are tight, otherwise equipment operation may cause overheating of the wiring terminals and damage to the equipment.
- When connecting AC cables, it is recommended to first connect the off grid output cable and then connect the mains cable. It is strictly prohibited to connect the mains cable to the off grid output port.

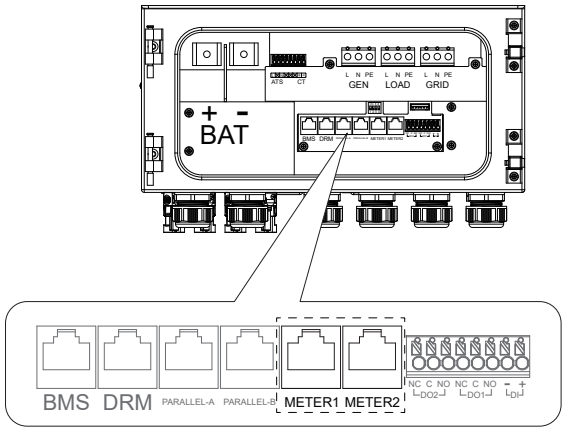


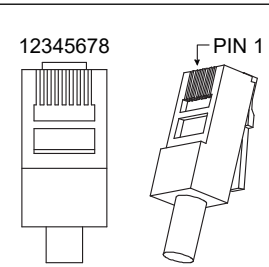
5.3.6 Smart meter (optional)

Watch out:

- When connecting communication cables, please ensure that the definition of the wiring port matches the device perfectly, and the cable routing should avoid interference sources, power cables, etc. to avoid affecting signal reception.
- The electrical meter and CT are shipped with the inverter, and the relevant parameters have been preset at the factory. Please do not modify the relevant parameters of the electricity meter and CT.
- Each inverter needs to be connected to a separate meter. Do not connect multiple inverters to the same electrical meter.
- To ensure the normal use of the electricity meter and CT, please ensure the following: Please ensure that the CT is matched and connected to the phase cable, and the CT is connected to the L-cable.
- Please connect the CT according to the direction of the electrical meter. If it is reversed, a CT reverse fault will be reported.
- The length of the CT cable provided with the inverter is 3m or 5m. Please install the electricity meter and CT according to the actual situation.
- Please provide your own communication cable for the electrical meter, and it is recommended to use T568B standard network cables of Class 5 or higher standards.
- The communication cable connecting the electrical meter to the inverter supports a maximum of 100m and can be connected to a standard RJ45 crystal head. The port definition is as follows:

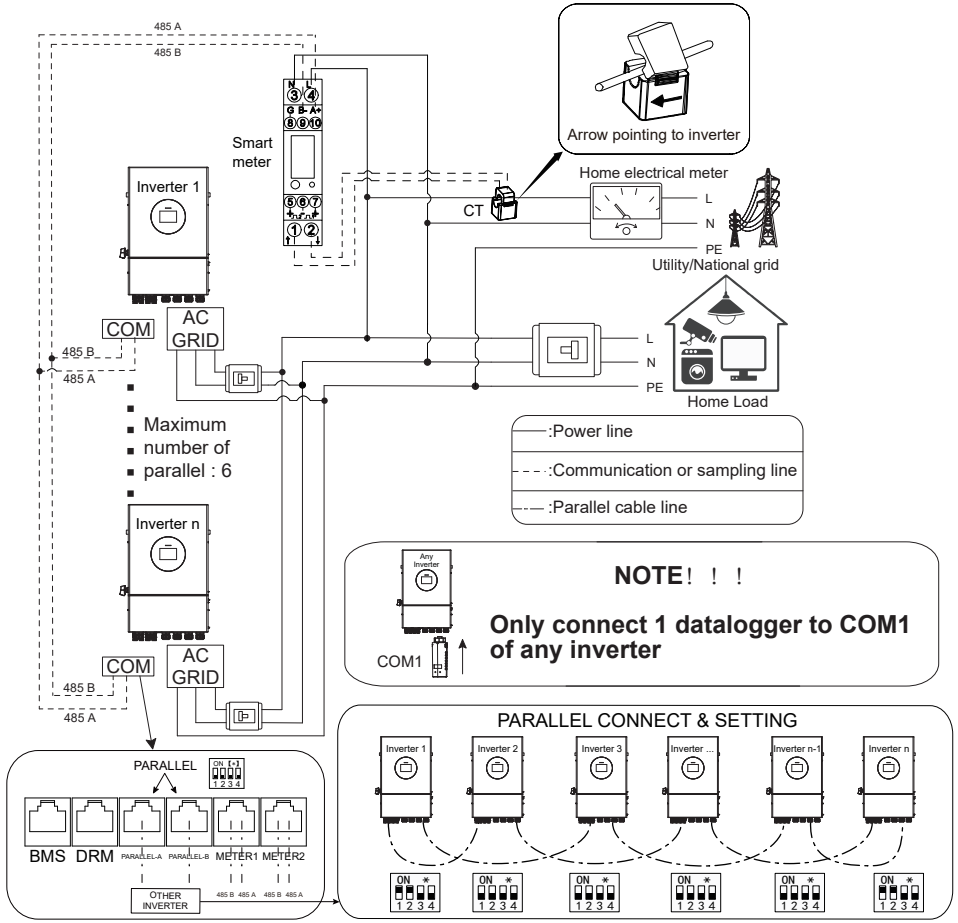






Pin	Function	Pin	Function
1	**485B**	5	485A
2	**485A**	6	GND
3	GND	7	485A
4	485B	8	485B

The single-phase inverter can meet the requirements of the zero export function through one electrical meter and CT.

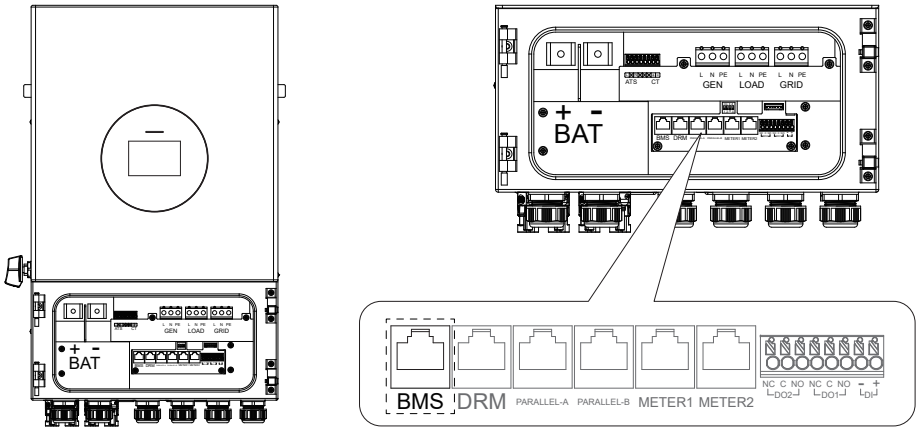


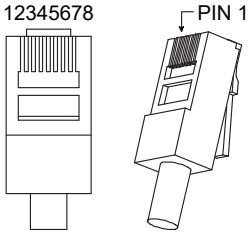
Note: This picture shows the CT meter connection, see the page 27 of the user manual for the DC meter connection.

5.3.7 BMS communication

Watch out:

- When connecting the communication cable, please ensure that the wiring port definition is completely matched with the equipment, and the cable route shall avoid the interference source, power cable, etc. to avoid affecting the signal receiving.
- CAN communication or RS485 communication shall be selected between inverter and battery according to actual demand.
- Please prepare the BMS communication cable by yourself. It is recommended to use the Cat5e and above standard network cable of T568B standard.
- It is suggested that the communication cable between BMS and inverter should be ≤ 5m, and standard RJ45 crystal head can be connected. The port definition is as follows:



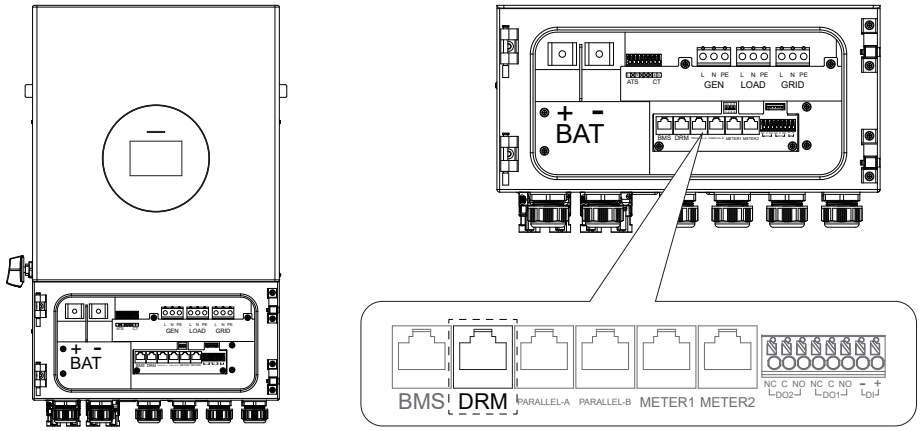


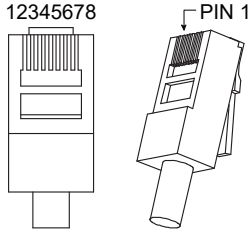
Pin	Function	Pin	Function
1	485B	5	**CANL**
2	485A	6	GND
3	GND	7	485A
4	**CANH**	8	485B

5.3.8 DRM control (for Australia)

Watch out:

- When connecting the communication cable, please ensure that the wiring port definition is completely matched with the equipment, and the cable route shall avoid the interference source, power cable, etc. to avoid affecting the signal receiving.
- Please prepare the DRM communication cable by yourself. It is recommended to use the Cat-5 and above standard network cable of T568B standard.



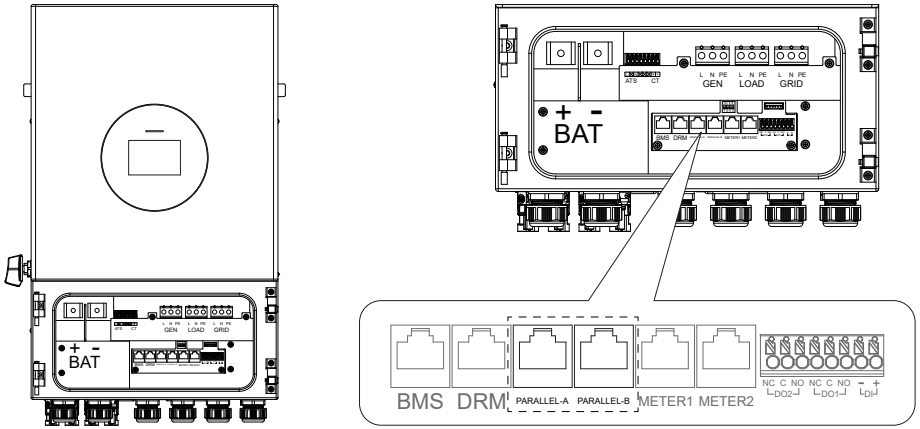


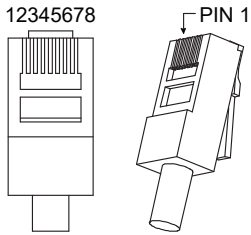
Pin	Function	Pin	Function
1	**DRM1/5**	5	**DRM_REF**
2	**DRM2/6**	6	**DRM_GND**
3	**DRM3/7**	7	**NC**
4	**DRM4/8**	8	**NC**

5.3.9 Parallel communication

Watch out:

- When connecting the communication cable, please ensure that the wiring port definition is completely matched with the equipment, and the cable route shall avoid the interference source, power cable, etc. to avoid affecting the signal receiving.
- Please prepare the meter communication cable by yourself. It is recommended to use the Cat-5 and above standard network cable of T568B standard.
- Parallel related wiring and setting detailed operations are shown in **Appendix 1** Parallel operation.
- The communication cable between inverter and inverter can be connected with standard RJ45 crystal head, and the port definition is as follows:



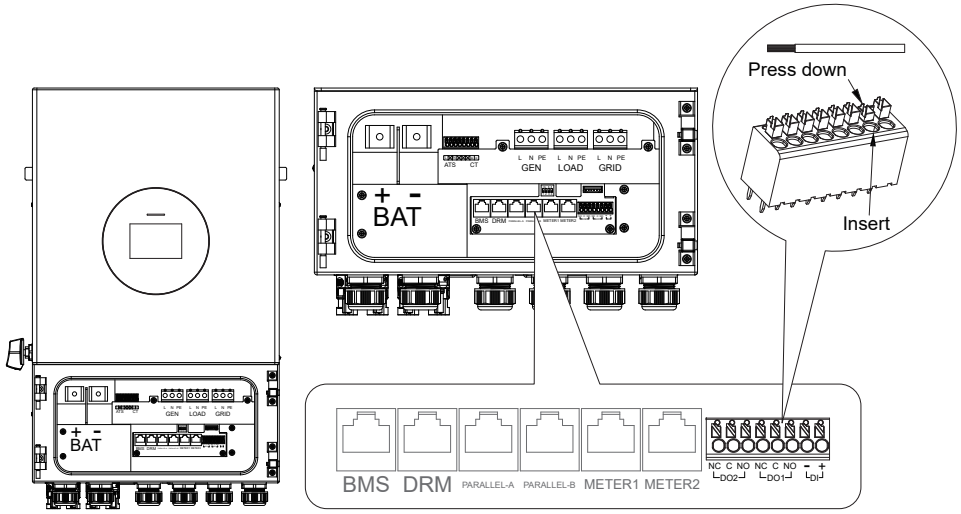


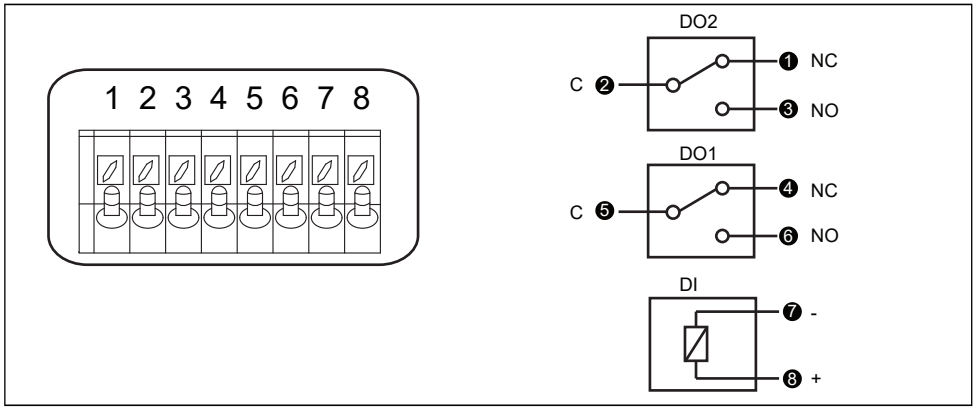
Pin	Function	Pin	Function
1	**CANB_H**	5	**PAR-HOST**
2	**CANB_L**	6	**PAR-MODE**
3	**GNDCOM**	7	**PAR.CAN_H**
4	**PAR-SYN**	8	**PAR.CAN_L**

5.3.10 DRY communication

Watch out:

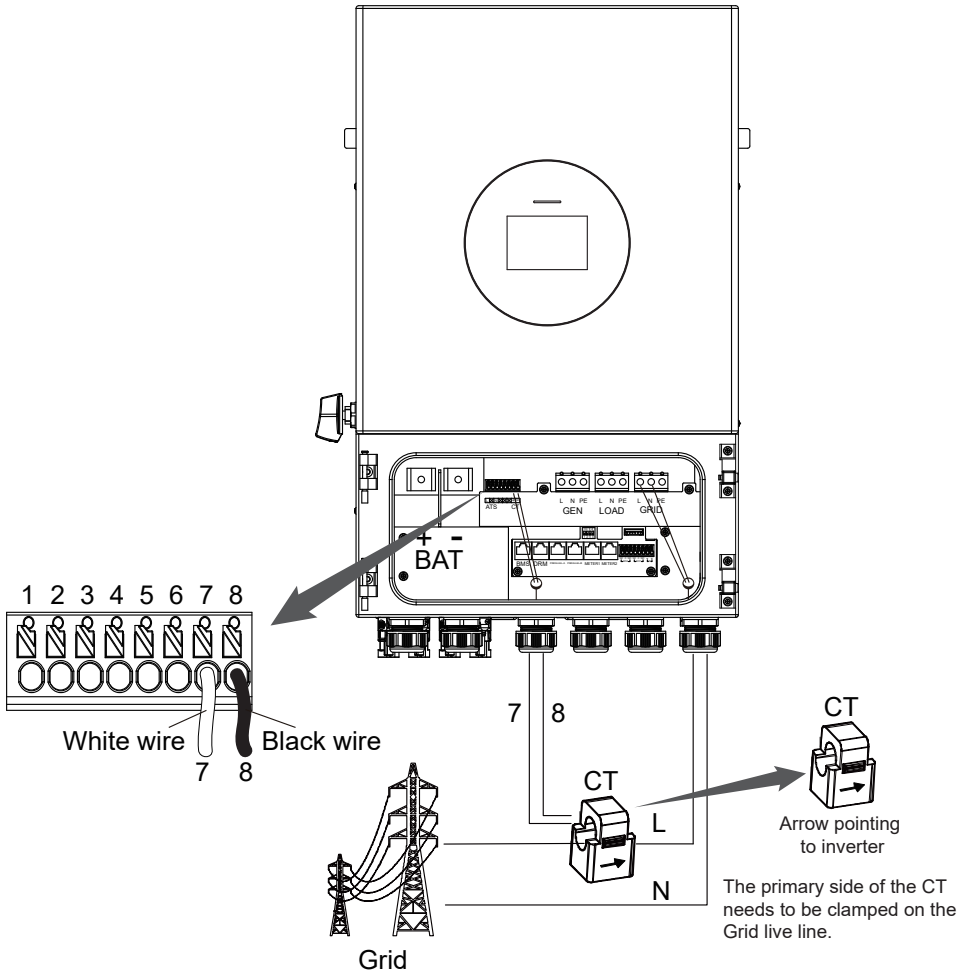
- When connecting the communication cable, please ensure that the wiring port definition is completely matched with the equipment, and the cable route shall avoid the interference source, power cable, etc. to avoid affecting the signal receiving.
- The port definition is as follows:





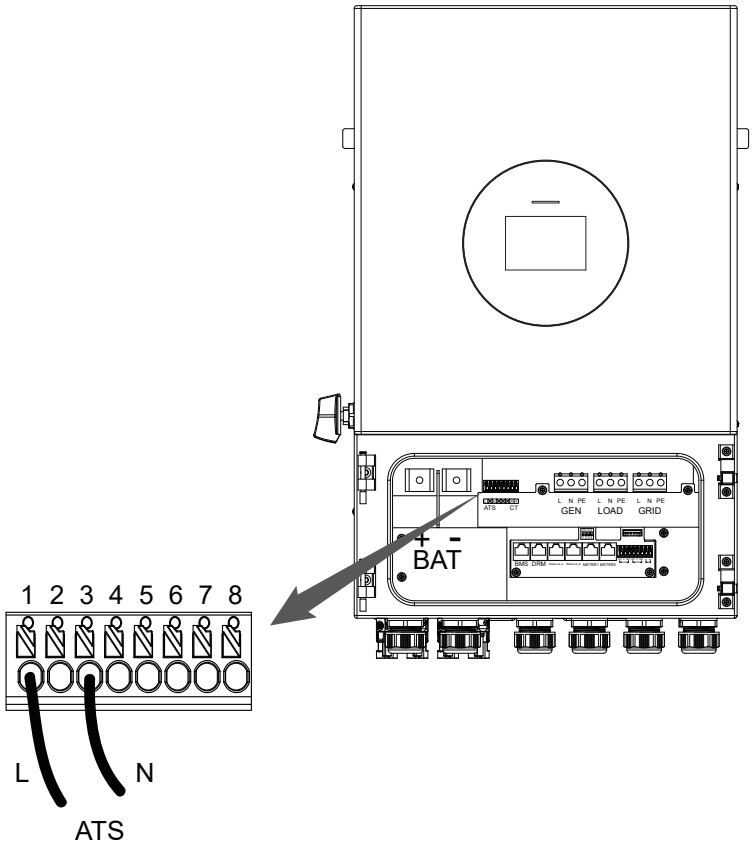
5.3.11 CT connection

Note: when the reading of the load power on the LCD is not correct,please reverse the CT arrow.



5.3.12 ATS function

ATS: if the conditions are met, it will output 230Vac.



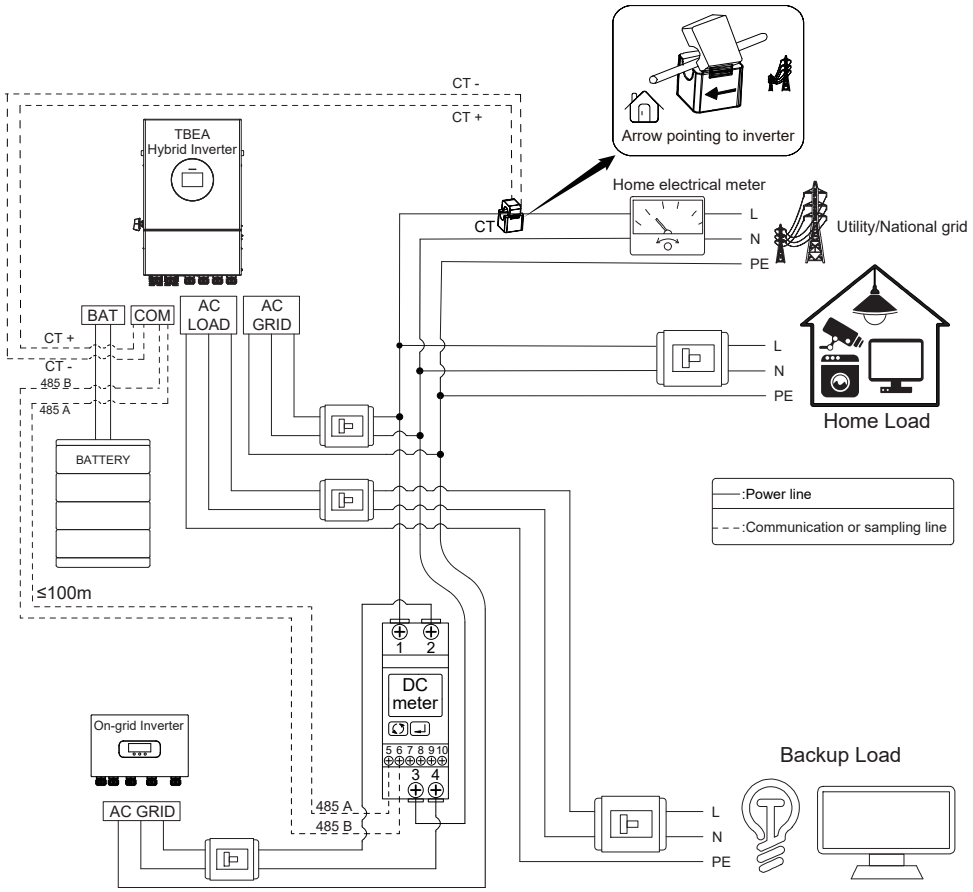
5.3.13 AC coupling (optional)

Watch out:

- When connecting the communication cable, please ensure that the wiring port definition is completely matched with the equipment, and the cable route shall avoid the interference source, power cable, etc. to avoid affecting the signal receiving.

AC coupling function

1. Enable the AC coupling function;
2. Set the communication address of meter 2 to 30 through the meter button;
3. Enable the anti backflow function code and set the anti backflow percentage to 100%.



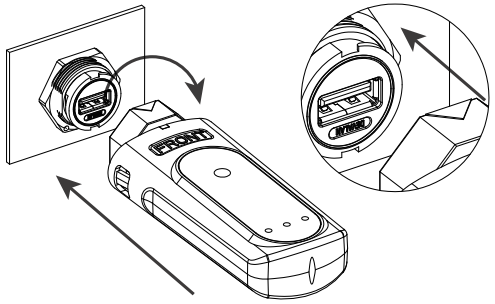
Note: This picture shows the CT connection, see the page 27 of the user manual for the CT meter connection and the DC meter connection.

5.3.14 Datalogger connection (optional)

Watch out:

- Detailed introduction of communication module can be obtained from the official website.

1. Open the COM1 port cover plate, assemble the datalogger and USB port together as shown in the figure, and tighten the datalogger.
2. The datalogger can support Wifi communication. Refer to the datalogger installation guide for detailed operation.



6 EQUIPMENT COMMISSIONING AND MAINTENANCE

6.1 Check before power-on

Items	Checking items	Standard
1	Installation of inverter	The inverter shall be installed correctly, firmly and reliably
2	Cable arrangement	Cables shall be reasonably arranged and well protected, without damage
3	Datalogger	The datalogger shall be installed correctly, firmly and reliably
4	Identifying	The safety signs and warning labels on the inverter are not blocked or damaged
5	Switch	"DC SWITCH" and all switches connected to the inverter are "OFF"
6	Cable connection	The AC output cable, DC input cable and grounding wire are connected correctly, firmly and reliably
7	Unused terminals and interfaces	Unused terminals and interfaces are protected with waterproof covers
8	Circuit breaker	Reasonable selection of AC circuit breaker
9	Environmental requirements	Reasonable installation space, clean and tidy environment, no construction remains

6.2 Power on the equipment

Step 1: At the AC switch between the inverter and the power grid, measure the voltage at the power grid side with a multimeter to confirm that the voltage of the power grid is within the allowable range of the inverter operating voltage.

Step 2: Close the AC switch.

Step 3: Battery system startup:
a:Press the POWER button and the indicator lights up.
b:Long press the ON/OFF button for more than 3s.

Step 4: Turn on the "DC SWITCH" on the inverter.

Step 5: Observe the inverter LCD/LED indicator and check the inverter operation status.

6.3 Set inverter parameters via APP

Watch out:
To ensure that the inverter works properly, please use the TB·eSolar application program to complete the inverter parameter setting.

Scan the QR code below to download the TB·eSolar application or log in following website to download this application: https://eu.esolar.tbecloud.com/login

Watch out:
Please also obtain the operating instructions of the communication rod from the official website, to set the contents more consistent with the application scenario.

6.4 Power off the equipment

Danger:
- When operating and maintaining the inverter, please turn off the inverter for treatment. Live operation of the equipment may cause damage to the inverter or electric shock.
- After the inverter is powered off, it will take a certain amount of time for internal components to discharge. Please wait until the equipment is fully discharged according to the required label time requirements.

Step 1: Disconnect the AC switch between the inverter and the utility/national grid.

Step 2: At the AC switch between the inverter and the utility/national grid, measure the voltage on the power grid side with a multi-meter to confirm that the power has been cut off.

Step 3: Battery system shutdown:
a: Long press the ON/OFF button for more than 3s.
b: Press the POWER button and the indicator light will go out.

Step 4: Observe the inverter LCD/LED indicator, check the inverter operation status, and confirm to enter standby.

Step 5: Turn off "DC SWITCH" on the inverter.

6.5 Equipment removal

Danger:
- Make sure inverter is power off.
- Wear personal protective equipment when operating the inverter.

Step 1: Successively remove all electrical connections of inverter, including DC cable, AC cable, communication cable, communication module and protective earth wire.

Step 2: Remove the inverter from the back cladding.

Step 3: Remove the back cladding.

Step 4: Properly save the inverter and ensure that the storage conditions meet the requirements if the subsequent inverter is still put into use.

6.6 Equipment scrapping

If the inverter cannot be used anymore and needs to be scrapped, please dispose according to the electrical waste disposal requirements of the inverter country/region.

The inverter shall not be treated as household garbage.

6.7 Trouble shooting

Please trouble shoot according to the following methods. If the trouble shooting methods cannot help you, please contact the after-sales service center.

When contacting the after-sales service center, please collect the following information for quick solution.

1. Inverter information, such as serial number, software version, equipment installation time, fault occurrence time, fault occurrence frequency, etc.
2. Equipment installation environment, such as weather conditions, whether components are sheltered and whether there is shadow, etc. It is recommended to provide photos, videos and other documents to assist in analyzing problems.
3. Utility/National grid condition.

Defect codes	Defect name	Cause	Solutions
101	BUS software overvoltage	1. Abnormal grid or load fluctuation. 2. Weak light or abnormal light changes. 3. The configuration of the photovoltaic array is wrong, and the number of photovoltaic panels connected in series is too large. 4. Poor insulation of photovoltaic to ground.	1. If it happens by chance, it may be caused by abnormal power grid, load or light for a short time. After the self-check is normal, the inverter will return to normal operation without manual intervention. 2. Check the series configuration of the corresponding photovoltaic array string to ensure that the open circuit voltage of the string is not higher than the maximum working voltage of the inverter. 3. Check the impedance of the PV strings to the protective ground. If a short circuit occurs, please find the short circuit point and rectify it. 4. Restart the inverter after disconnecting the off-grid load. If The restart is normal, you need to increase the battery or reduce the off-grid load (hybrid inverter).
102	BUS undervoltage		
103	BUS imbalance		
104	BUS hardware overvoltage		
201	Battery soft start BUS timeout	1. Abnormal fluctuation of power grid. 2. Inverter sampling fault. 3. Wiring failure.	1. If it happens by accident, it may be caused by the abnormal power grid or load for a short time. After the self-check is normal, the inverter will return to normal operation without manual intervention. 2. Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn. After 10 minutes, close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn to check whether the fault is still the same. 3. Please check whether the photovoltaic, AC and battery cables are correctly connected according to the wiring requirements of the manual.
202	Grid soft start BUS timeout		
203	DCDC boost soft start BUS timeout		
301	Phase A soft start timeout		
401	DCDC software overcurrent	1. Abnormal fluctuation of power grid or load. 2. Inverter sampling fault. 3. Battery wiring failure.	1. If it happens by accident, it may be caused by abnormal power grid or load for a short time. After the self-check is normal, the inverter will return to normal operation without manual intervention. 2. Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn, and close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn after 10 minutes to check whether the fault is still there. 3. Please check whether the battery cable is correctly connected according to the wiring requirements of the manual.
501	DCDC hardware overcurrent		

Defect codes	Defect name	Cause	Solutions
601	Phase A software overcurrent	1. Abnormal grid or load fluctuation. 2. Inverter sampling fault.	1. If it happens by accident, it may be caused by abnormal power grid or load for a short time. After the self-check is normal, the inverter will return to normal operation without manual intervention. 2. If it occurs frequently, check whether the voltage frequency of the power grid is stable. If the power grid fluctuates greatly, enable the weak power grid mode and restart the inverter. 3. If it appears during the first installation, please check whether the power grid is connected to the off-grid output interface (hybrid inverter) by mistake according to the wiring requirements of the manual. 4. Restart the inverter after disconnecting the off-grid load. If The restart is normal, you need to increase the battery or reduce the off-grid load (hybrid inverter).
701	Phase A hardware overcurrent		
801	Phase A overvoltage		
901	Phase A undervoltage		
1001	Battery overvoltage	The battery voltage is higher than the allowable range.	1. Please check whether the battery configuration voltage meets the Inverter Specifications according to the wiring requirements of the manual. 2. Confirm whether the inverter charging voltage setting matches the battery specification.
1101	Battery reverse connection	Wrong positive and negative battery wiring.	Turn off the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn. After the inverter is turned off, adjust the positive and negative wiring of the battery, turn on the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn to check whether the fault is still there.
1201	Back-up overload	Off-grid load power exceeds inverter rated power.	Reduce the off-grid output load of the inverter.
1301	Back-up phase A short circuit	Short circuit in off-grid output.	Disconnect the AC circuit breaker, battery circuit breaker, and PV input switch in sequence. After the inverter is turned off, check whether the corresponding off-grid output side wiring and load are short-circuited.

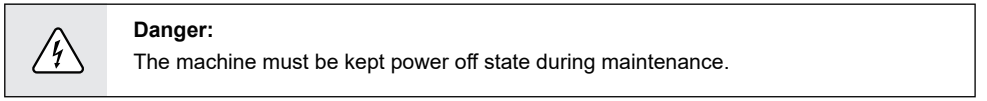
Defect codes	Defect name	Cause	Solutions
1501	Control board overtemperature	1. The installation position of the inverter is not ventilated. 2. The ambient temperature is too high. 3. The fan works abnormally.	1. Check whether the ventilation of the inverter installation position is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or the ambient temperature is too high, please improve its ventilation and heat dissipation conditions. 3. Check whether the fan is working normally, whether the air duct is blocked or blocked by dust.
1502	Battery module overtemperature		
1503	PV module overtemperature		
1504	Invert module overtemperature		
1505	Control board NTC not connected	Temperature detection circuit abnormality.	Disconnect the AC circuit breaker, battery circuit breaker, and PV input switch in sequence. After 10 minutes, close the battery circuit breaker, AC circuit breaker, and PV input switch in sequence to check whether the fault persists.
1506	Battery module NTC not connected		
1507	PV module NTC not connected		
1508	Inverter module NTC not connected		
1701	Phase A current DC component protection	The DC component of the inverter output current is higher than the safety regulations or the default allowable range of the machine.	If it happens occasionally, it may be caused by a short-term abnormality in the power grid or load. After the inverter self-checks normally, it will resume normal operation without manual intervention.
1801	PV1 overvoltage	There are too many PV panels in the PV string.	Check the series configuration of the corresponding photovoltaic array string to ensure that the open circuit voltage of the string is not higher than the maximum operating voltage of the inverter.
1802	PV2 overvoltage		
1901	PV software overcurrent	1. Improper PV panel configuration. 2. Abnormal lighting changes.	1. Ensures that the current of the strings are within the specifications of the inverter. 2. If it occurs occasionally, it may be caused by abnormal short-term light. After the inverter self-checks normally, it will resume normal operation without manual intervention.
2001	PV hardware overcurrent		
2101	PV arcing	1. The DC connection terminals are not firmly connected. 2. The DC cable is damaged.	Please check whether wires of PV side are connected correctly according to the wiring requirements in the manual.

Defect codes	Defect name	Cause	Solutions
2201	PV1 reverse connection	The positive and negative poles of the DC series connection are reversed.	Disconnect the AC circuit breaker, battery circuit breaker, and photovoltaic input switch in sequence. After the inverter is turned off, adjust the DC positive and negative poles, and then close the battery circuit breaker, AC circuit breaker, and photovoltaic input switch in sequence to check whether the fault persists.
2202	PV2 reverse connection		
2301	PV1 short circuit	Short circuit in DC string.	Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn, and then close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn after 10 minutes to check whether the fault persists.
2302	PV2 short circuit		
2401	Internal fan abnormal	1. Abnormal power supply of fan. 2. Mechanical failure (locked rotor). 3. The fan is aged and damaged.	Check whether the fan is working properly, whether the air duct is blocked or blocked by dust.
2801	Grid wrongly connected to the Backup port	The off-grid output port is incorrectly connected to the grid.	Please check whether the grid is connected to the off-grid output interface by mistake according to the wiring requirements in the manual.
2802	Grid wrongly connected to the Smart Load port		
2901	ISO protection	1. The photovoltaic string is short-circuited to the protection ground. 2. The installation environment of photovoltaic string is relatively humid for a long time and the line insulation to ground is poor.	1. Check the impedance of the photovoltaic string to the protection ground. It is normal that the resistance value is greater than 50k Ω. If the resistance value is less than 50kΩ, please check the short circuit point and rectify it. 2. Check whether the protective earth wire of the inverter is connected correctly.

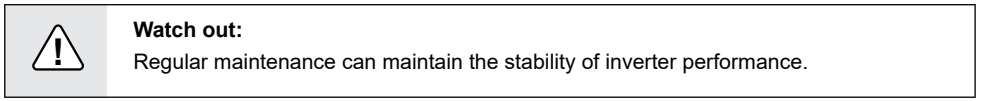
Defect codes	Defect name	Cause	Solutions
3001	GFCI sensor abnormal	The leakage current sensor has abnormal sampling.	Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn, and then close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn after 10 minutes to check whether the fault persists.
3002	GFCI protection	1. The photovoltaic string or AC line is short-circuited to the protection ground. 2. Electric equipment has Leakage Current. 3. The installation environment of the machine is relatively humid for a long time and the insulation of the line to the ground is poor.	1. Confirm whether the insulation of photovoltaic string and AC line is normal. 2. Check whether there is leakage current in the electrical equipment.
3101	Auxiliary power protection	Power circuit failure.	Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn. and then removing the external communication cable, data acquisition rod and other equipment, close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn, check if the fault persists.
3301	Relay abnormal	1. Abnormal relay (relay short circuit). 2. Control circuit is abnormal. 3. Abnormal AC side wiring (virtual connection or short circuit may exist).	1. Please check whether the AC Cable is correctly connected according to the wiring requirements of the manual. 2. Disconnect the AC circuit breaker, battery circuit breaker and photovoltaic input switch in turn. After 10 minutes, close the battery circuit breaker, AC circuit breaker and photovoltaic input switch in turn to check whether the fault is still the same.
3401	Phase A current excessive sampling bias	Abnormal control circuit.	Disconnect the AC circuit breaker, battery circuit breaker, and PV input switch in sequence. After 10 minutes, close the battery circuit breaker, AC circuit breaker, and PV input switch in sequence to check whether the fault persists.
3501	Phase A output current excessive sampling bias		
3601	Phase A DC current excessive sampling bias		
3701	PV1 current excessive sampling bias		
3702	PV2 current excessive sampling bias		
3801	GFCI excessive sampling bias		
3901	DCDC1 current excessive sampling bias		

Defect codes	Defect name	Cause	Solutions
4201	DRM off	Respond to scheduled shutdown.	No need to deal with, if you have any questions, please contact the installer.
4202	Command off		
4203	Remote locking		
4301	DSP/ARM protocol version mismatch	Wrong firmware version matching.	Please upgrade the inverter's firmware to the latest version.
4302	Hardware version error		
4401	Parallel CAN communication protection	Parallel communication failure.	Please check whether the parallel communication cable is correctly connected according to the wiring requirements in the manual.
4402	Parallel synchronization signal protection		
4403	Parallel host signal protection		
4404	Parallel current sharing protection	In the parallel system, the inverter current sharing is inconsistent.	1. Please check whether the parallel communication cable is correctly connected according to the wiring requirements in the manual. 2. Please confirm whether the off-grid outputs of all inverters in the parallel system are connected together.
4405	Inconsistent parallel version	Wrong firmware version matching.	Please upgrade the firmware of the inverter in the parallel system to the latest version.
4406	Parallel machine parameter conflict	The rated voltage and frequency settings of the machine in the parallel system are inconsistent.	Set the regulations and rated voltage of all machines in the system to be consistent.
4407	Parallel number conflict	Parallel machine number is repeated.	Check whether the parallel machine number of two or more inverters in the parallel machine system is duplicate, and change the duplicate machine number to non-duplicate machine number within 1~15.
4408	System overload	The off-grid load power exceeds the parallel system rated power.	1. Confirm whether all inverters' off-grid outputs are connected in parallel. If so, follow suggestion 2. Reduce the inverter's off-grid output load or add another inverter to the parallel system.

6.8 Regular maintenance



Danger:
The machine must be kept power off state during maintenance.



Watch out:
Regular maintenance can maintain the stability of inverter performance.

Content	Method	Cycle
System Cleaning	Check the cooling fin and air inlet/outlet for foreign matter and dust. Especially the fan needs regular maintenance to prevent debris from blocking the fan and affecting the operation of the inverter.	half year
DC switch	Turn on and off the DC switch for 10 times continuously to ensure the normal function of DC switch.	one year
Electrical connection	Check whether the electrical connection is loose, whether the cable appearance is damaged and whether there is copper leakage.	half year
Tightness	Check whether the tightness of the equipment inlet hole meets the requirements. If the gap is too large or not sealed, it shall be re-closed.	one year

7 TECHNICAL PARAMETER

Model	TH3.6K-SLA01	TH4K-SLA01	TH5K-SLA01	TH6K-SLA01	TH8K-SLA01
Input DC					
Max.input power	7.2kW	8kW	10kW	12kW	16kW
Max.input voltage			550V		
Rated voltage			360V		
Start-up voltage			60V		
MPPT voltage range			90-450V		
Max.input current	16A/16A	16A/16A	16A/16A	16A/16A	32A/32A
Max.short circuit current	20A/20A	20A/20A	20A/20A	20A/20A	40A/40A
MPPT number	2	2	2	2	2
Max.input strings number	2	2	2	2	4
Input Battery					
Battery type			Lead-acid or Li-ion		
Battery voltage range			40-60V		
Number of battery input channels			1		
Max.charge/discharge current			190A/190A		
Communication			CAN/RS485		
Charging Strategy for Li-Ion Battery			Self-adaption to BMS		

Model	TH3.6K-SLA01	TH4K-SLA01	TH5K-SLA01	TH6K-SLA01	TH8K-SLA01
Output AC (Grid side)					
Rated output power	3.6kW	4kW	5kW	6kW	8kW
Max.apparent output power	3.96kVA	4.4kVA	5.5kVA	6.6kVA	8.8kVA
Max.rated current	15.7A	17.4A	21.7A	26.1A	34.8A
Max.output current	17.2A	19.1A	23.9A	28.7A	38.3A
Grid voltage range			160-300V		
Rated grid voltage			1/N/PE,220V/230V		
Rated grid frequency			50/60Hz		
Power Factor			>0.99 (0.8 leading...0.8 lagging)		
THDi			<3%		
Input AC (Grid side)					
Rated input power	3.6kW	4kW	5kW	6kW	8kW
Max.input power	6.9kW	6.9kW	6.9kW	9.2kW	11.5kW
Max.apparent output power	6.9kVA	6.9kVA	6.9kVA	9.2kVA	11.5kVA
Max.input current	30A	30A	30A	40A	50A
Rated input voltage			1/N/PE,220V/230V		
Rated input frequency			50/60Hz		
Output AC (Back-up)					
Rated output power	3.6kW	4kW	5kW	6kW	8kW
Max.output current	17.2A	19.1A	23.9A	28.7A	38.3A
Max.output power			2 times of rated power,10 s		
Back-up switch time			<4 ms		
Rated output voltage			220V/230V		
Rated frequency			50/60Hz		
THDv			<3%		

Model	TH(3.6~8)K-SLA01
Efficiency	
Max.efficiency	97.70%
EU efficiency	96.70%
MPPT Efficiency	99.80%
Protection	
Integrated DC switch	Yes
DC rever-polarity protection	Yes
Anti-islanding protection	Yes
Short circuit protection	Yes
Output over current protection	Yes
DC Surge protection	Type II
AC Surge protection	Type II
Insulation impedance detection	Yes
Ground Fault Monitoring	Yes
Residual leakage current detection	Yes
Temperature protection	Yes
AC Over voltage Protection	Yes
DC Over current Protection	Yes
Antibackflow	Yes
24-hour load monitoring	Yes
Parallel	Yes

Model	TH(3.6~8)K-SLA01
General Data	
Dimensions (W x H x D)	350 x 560 x 237 mm
Weight *[1]	25kg
Self consumption(night) (Rated voltage)	≤20W
Operating temperature range	-40...+60°C
Cooling concept	Smart Fan Cooling
Max.operation altitude	4000m(Derating above 3000m)
Relative humidity	0-100%
Protective class	I
Ingress protection	IP66
Topology Structure	Transformerless
Grid connection stadard	IEC 61727, IEC 62116, IEC 61683
Safety/EMC standard	IEC/EN 61000-6-1/3, IEC/EN 62109-1, IEC/EN 62109-2
Type of DC terminal	MC4 connector
Battery connection type	Terminal
Type of AC terminal (Back-up)	Terminal
Type of AC terminal (Grid side)	Terminal
Display&Communication	
Display	LCD+Bluetooth+APP
Communication interface	RS485/CAN, WIFI+Bluetooth

The product may be update in the future. The above parameters are for reference only. Please refer to the real thing.
*[1]:The weight parameters here are for reference only, and the actual weight shall prevail outside the box or official website.

PARALLEL SYSTEM CONNECTION

Note: This picture shows the CT connection, see the page 27 of the user manual for the CT meter connection and the DC meter connection.