Photovoltaic Energy Storage Inverter

User's Manual

Models:KE-8KC5LSUF/KE-10KC5LSUF/KE-12KC5LSUF

Catalogue

1.Safety Instruction

1.1 How to Use This Manual

· This manual contains important information about the product, guidelines, operation and maintenance. It applies to the following models: **KE-8KC5LSUF, KE-10KC5LSUF, KE-12KC5LSUF**.

· Users must follow the contents of this manual during installation, use and maintenance.

1.2 Meaning of Symbols in the Specification

symbol	description
	Danger indicates a dangerous situation which, if not avoided, will result in death or serious injury
	WARING indicates that dangerous conditions, if not avoided, may lead to death or serious injury
	Caution indicates a dangerous situation that, if not avoided, may result in minor or moderate injury
	NOTICE Provides some tips about how to operate the product

1.3 Safety Instructions

 **DANGER**

- This chapter contains important safety instructions. Please read and keep this manual for future reference.
- Please be sure to install this inverter in accordance with local requirements and regulations.
- Handle high voltage with care. Before and during installation, turn off the switches of each power supply to avoid electric shock.
- In order to make the inverter reach the best operating state, please select the appropriate cable size and necessary protection devices according to the regulations.
- Do not connect or disconnect any connections when the inverter is working.
- Do not open the terminal cover when the inverter is working.
- Ensure that the inverter is properly grounded.
- Do not cause a short circuit between the AC output and DC input.
- Do not disassemble this machine. All maintenance and maintenance should be sent to a professional maintenance center.
- Do not charge a frozen battery.

2.Product Presentation

2.1 Product Description

Energy storage hybrid inverter connects and coordinates the control of photovoltaic, energy storage battery, power grid and load, so as to provide stable, safe and clean electric energy for household, commercial and industrial users to meet the energy needs under different scenarios.

2.2 Product Features

• Supports various types of energy storage batteries such as lead-acid batteries and lithium-ion batteries

• Supports single-phase and split-phase pure sine wave output

• Supports the adjustment of voltage per phase within the range of 100~ 130V

• Supports two photovoltaic inputs and has the function of tracking two MPPT maximum power charging/carrying capacity at the same time. The MPPT efficiency is up to 99.9%, and the maximum current of a single path is 22A

• It has two output modes of mains bypass and inverter output, and has the function of uninterrupted power supply

• There are four charging modes: only PV, mains power priority, PV priority and hybrid charging

• Supports periodic battery charging and discharging

• The energy saving mode function of a single machine reduces the energy loss of no load

• It has many protection functions to protect the safety of photovoltaic panels, storage batteries, loads and controllers themselves

• Capacitive intelligent touch screen, menu operation, parameter setting intuitive and convenient

• Supports 256 event records; supports 1024 days of historical data storage

• Built-in Bluetooth and WIFI interface, providing native cloud platform access capability, connection can be automatically synchronized

2.3 System Block Diagram

The following figure shows the system application scenario of this product. A complete system consists of the following parts:

1. Photovoltaic modules: convert light energy into direct current, which can be used to charge the battery through inverter, or directly converted into alternating current to supply power to the load

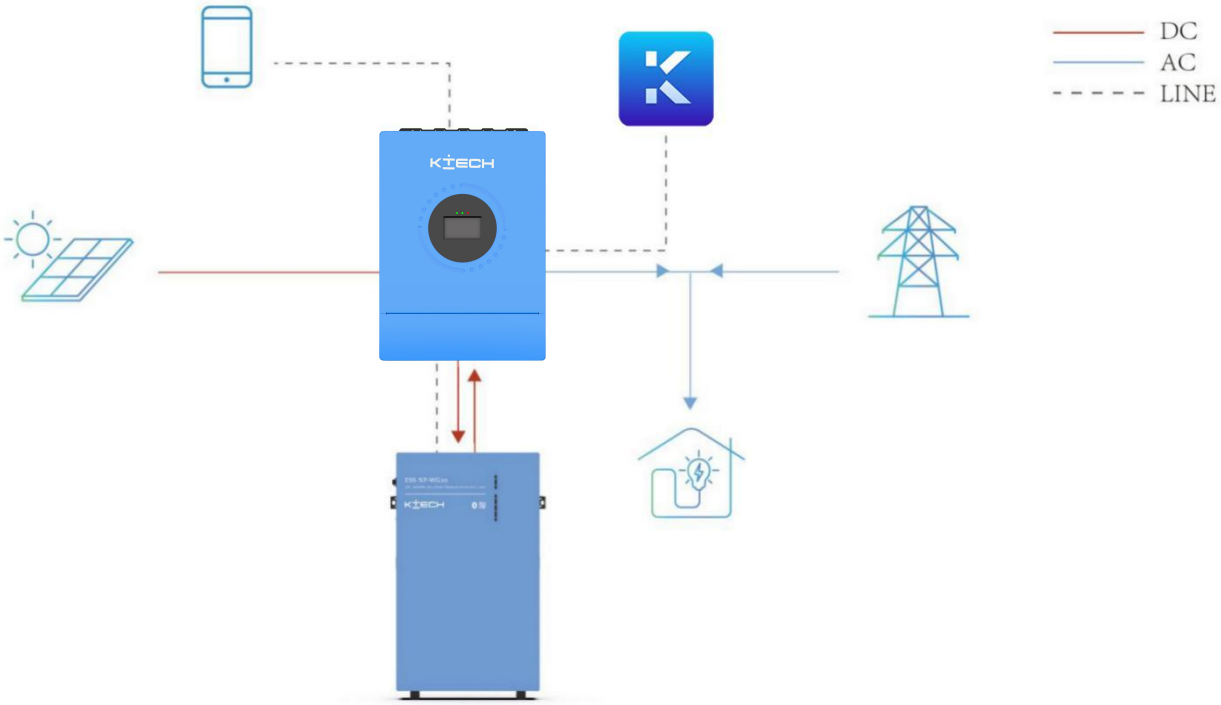
2. Utility power or generator: Connected to an AC input and can charge the battery while supplying the load. The system can generally also operate without utility power or a generator when the battery and photovoltaic modules are powering the load

3.Battery: The role of the battery is to ensure the normal supply of the system load in the case of 2insufficient photovoltaic and no mains electricity

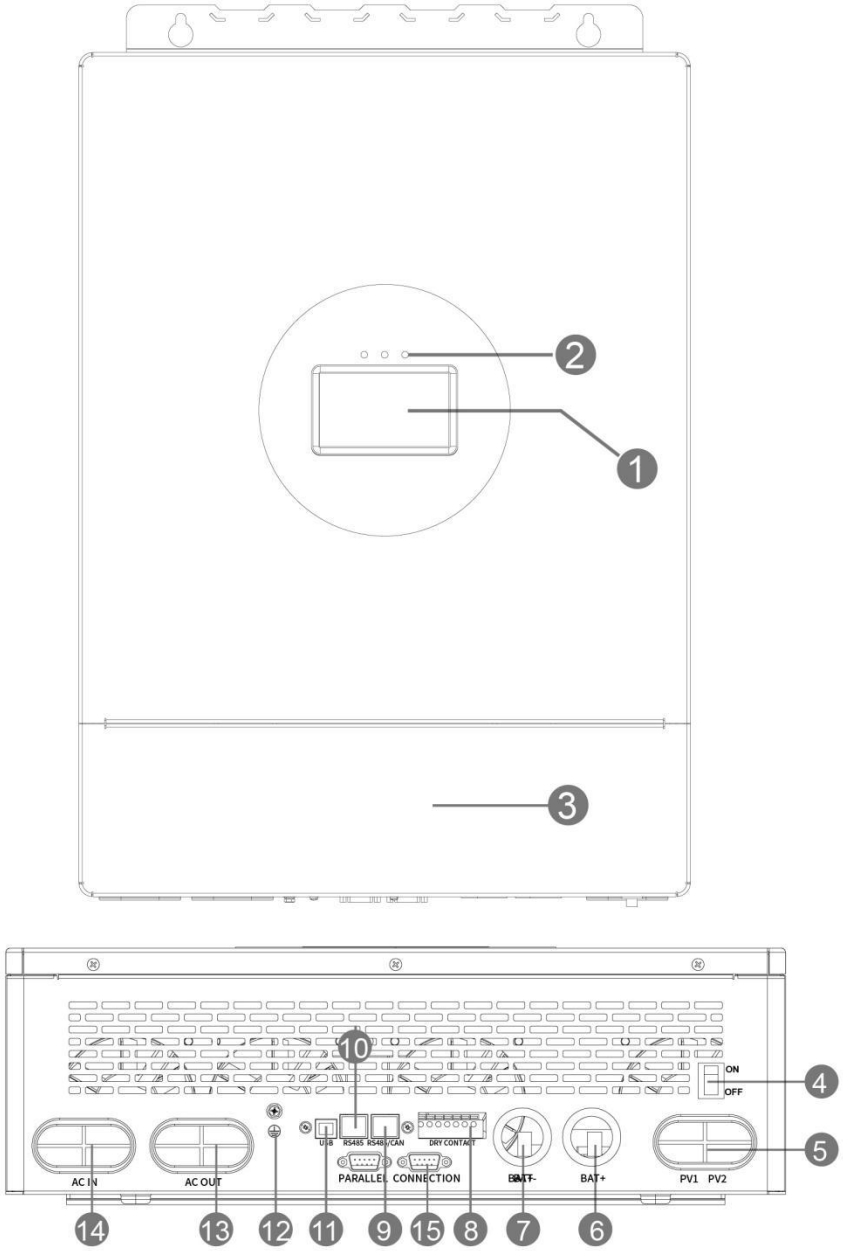
4. Load: Can connect to a variety of home and office loads, including refrigerators, lighting fixtures, televisions, fans, air conditioners and other AC loads

5. **Inverter：** The energy conversion device for the whole system

Actual application scenario diagram:



2.4 Product Summary



1	Capacitive touch screen	2	LED pilot lamp	3	Terminal protection cover
4	ON/OFF ship type switch	5	PV input (1/1)	6	Battery (positive terminal)
7	Battery (negative electrode)	8	Dry contact points	9	CAN/RS485-2 port
10	RS485-1 port	11	USB-B port	12	Grounding screws
13	AC output	14	AC input	15	Parallel communication port

2.5 Product Parameter Table

Model	KE-8KC5LSUF	KE-10KC5LSUF	KE-12KC5LSUF
Inverter output			
Output rating	8000W	10000W	12000W
Maximum peak power	16000W	20000W	24000W
Rated output voltage	120/240V (single-phase/split-phase)		
Belted motor capacity	5HP	6HP	
Rated frequency	50/60Hz		
Discharge waveform	pure sine wave		
Switching period	10ms (typical value)		
Cell			
Battery type	Lithium ion battery / lead acid battery / user customization		
Rated battery voltage	48V		
Voltage range	40~60V		
Maximum photovoltaic charging cu- rrent	180A	200A	200A
Maximum mains/generator charging current	100A	100A	100A
Maximum mixed charging current	180A	200A	200A
Photovoltaic input			
MPPT way	2		
Maximum input power	7500W+7500W		9000W+9000W
Maximum input current	22A+22A		
Maximum open circuit voltage	500V+500V		
MPPT Operating voltage range	125~425V		
City power/generator input			
Input voltage range	90~140V(Per Phase)		
Input frequency range	50/60Hz		
Passing current on the side	63A		
Productivenes			
MPPT, tracking efficiency	99.9%		
Maximum efficiency of battery inverter	92%		
Be in common			
Size(W*H*D)	450*620*142mm		
Weight	23.5kg（Net weight）		
Levels of protection	IP20/IP54		
Ambient temperature	-10~55℃,>45℃ derating		
Noise	<60dB		
Cooling-down method	Intelligent air cooling		
Warranty period	Three years		
Communication			
Communication interface	Wi-Fi/Bluetooth/RS485/CAN/USB/dry contact		
External module (optional)	4G		
Attestation			
Pandect	UL1741/ FCC		

3.Installation

3.1 Select the Installation Location

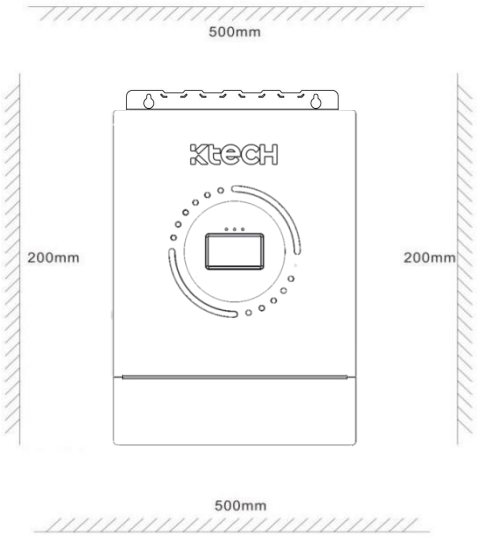
This product is for indoor use only (protective class IP20). Before choosing the installation location, users should consider the following factors:

· Choose a sturdy wall to install the inverter

· Install the inverter at eye level

· Provide sufficient heat dissipation space for the inverter

· Ambient temperature should be between-10 and 55℃ (14 to 131℉) to ensure optimal operation



DANGER

- Do not install the inverter near highly flammable materials
- Do not install the inverter in a potentially explosive area
- Do not install the inverter and lead-acid battery in a confined space

WARING

- Do not install the inverter in direct sunlight
- Do not install or use the inverter in a humid environment

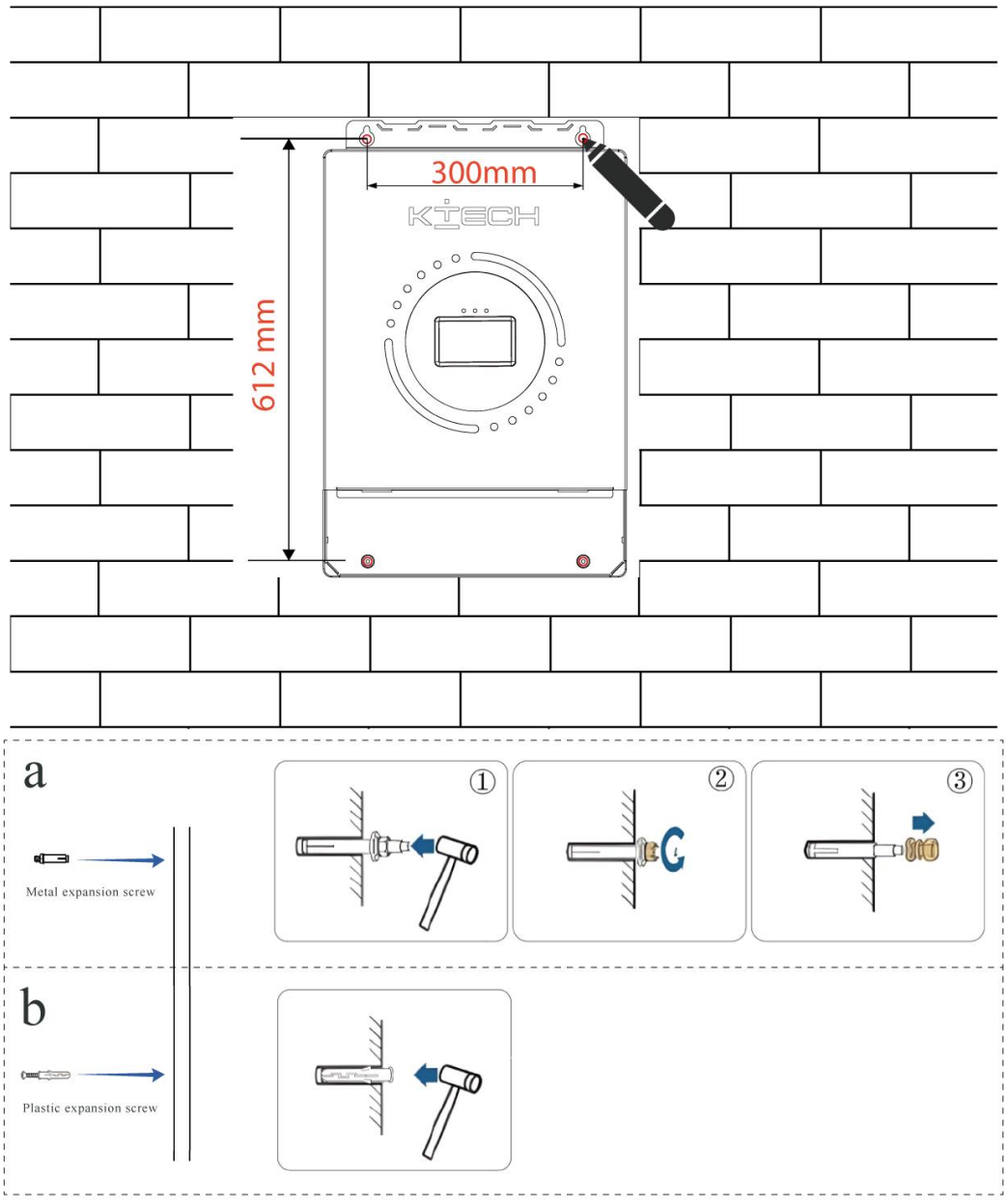
3.2 Install the Machine

3.2.1 Installing the Wall-Mount Bracket

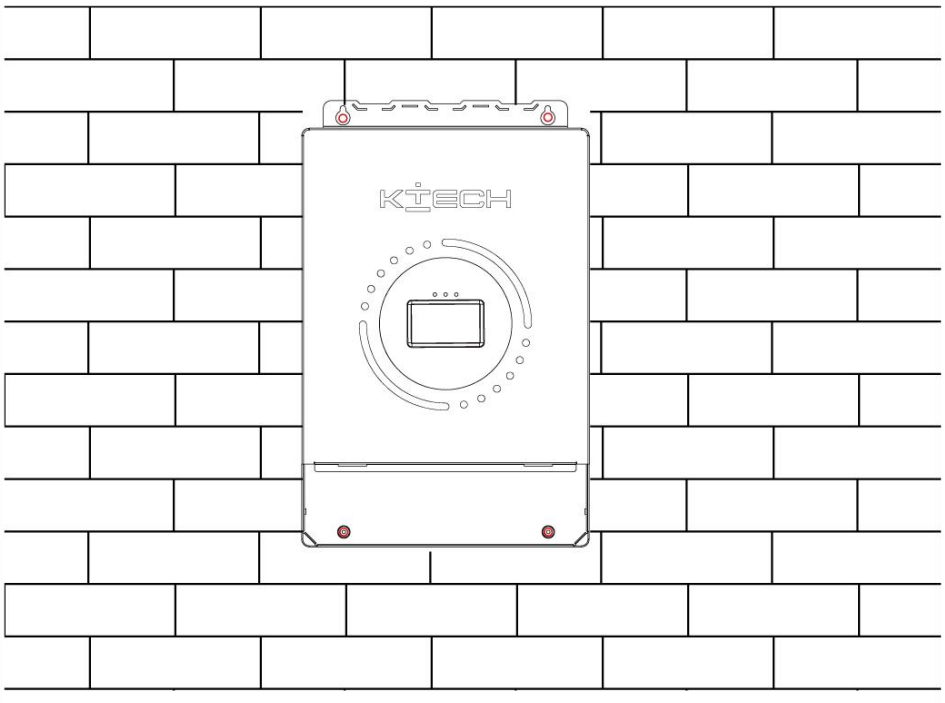
At least one meter above the ground, attach the backboard to the wall and make a mark on the wall by passing a marker through the four holes around the backboard.

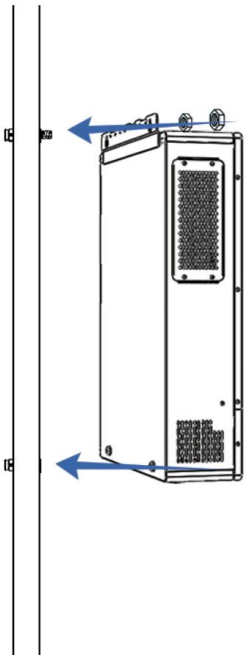
a.Drive the metal expansion bolt into the wall, tighten the nut to make the expansion bolt open its expanding feet; then remove the washer and nut.

b.Drive the plastic expansion tube into the wall.



3.2.2 Installing the Inverter

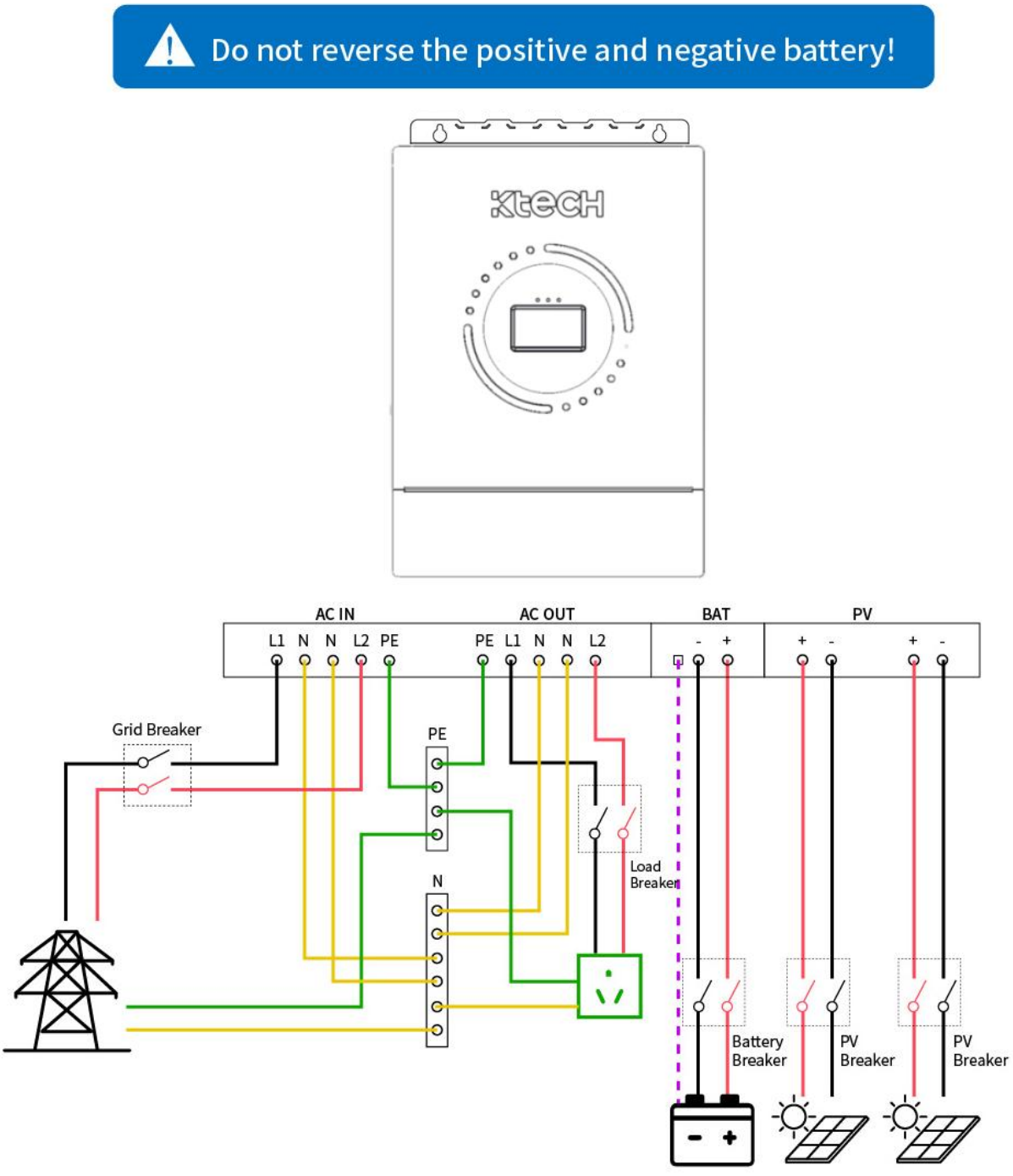




NOTICE

• When using the equipment in areas with poor air quality, the dust filter will be blocked by air particles. Please disassemble and clean the air filter regularly to avoid affecting the internal air flow rate of the inverter, thus triggering the device overtemperature protection failure, affecting the use of power supply and the service life of the inverter.

3.3 Schematic Diagram for Single - phase Connection



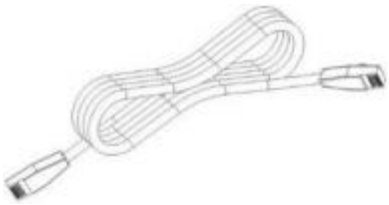
3.4 Connect the AC and DC wiring

3.4.1 Introduction

· A maximum of six inverters can be connected in parallel

· When using the parallel function, it is necessary to correctly, securely and reliably

Parallel line *1



3.4.2 Precautions for Connecting the Standby Cable

1、 PV Wiring：

When connected in parallel, different machines need to access different PV arrays or PV sources. The same PV cannot be accessed by different machines, and PV1 and PV2 of a machine cannot access the same PV source.

2、 Battery Wiring:

When a single-phase or three-phase parallel connection is connected, all inverters must be connected to the same battery, BAT+ and BAT+ are connected, BAT-and BAT-are connected, and ensure that the connection is correct before power on and startup, and the wiring length and wire diameter are the same, so as to avoid abnormal operation of the output of the parallel system caused by wrong connection.

3、 AC OUT Wiring:

3.1 Single-Phase Parallel Line

When a single-phase parallel connection is connected, all inverters must be connected with L and L, N and N lines, PE and PE, and ensure that the connection is correct before power on and startup, and the wiring length and wire diameter are the same, so as to avoid abnormal operation of the output of the parallel system caused by wrong connection.

3.2 Three-Phase Parallel Line

When connecting three-phase parallel machines, all inverters must be connected with N lines to N lines and PE to PE. The L lines of machines in the same phase must be connected together, but AC output L lines between different phases should not be connected. Other preventive measures are the same as those for single-phase parallel machine connections.

4、 AC IN Wiring:

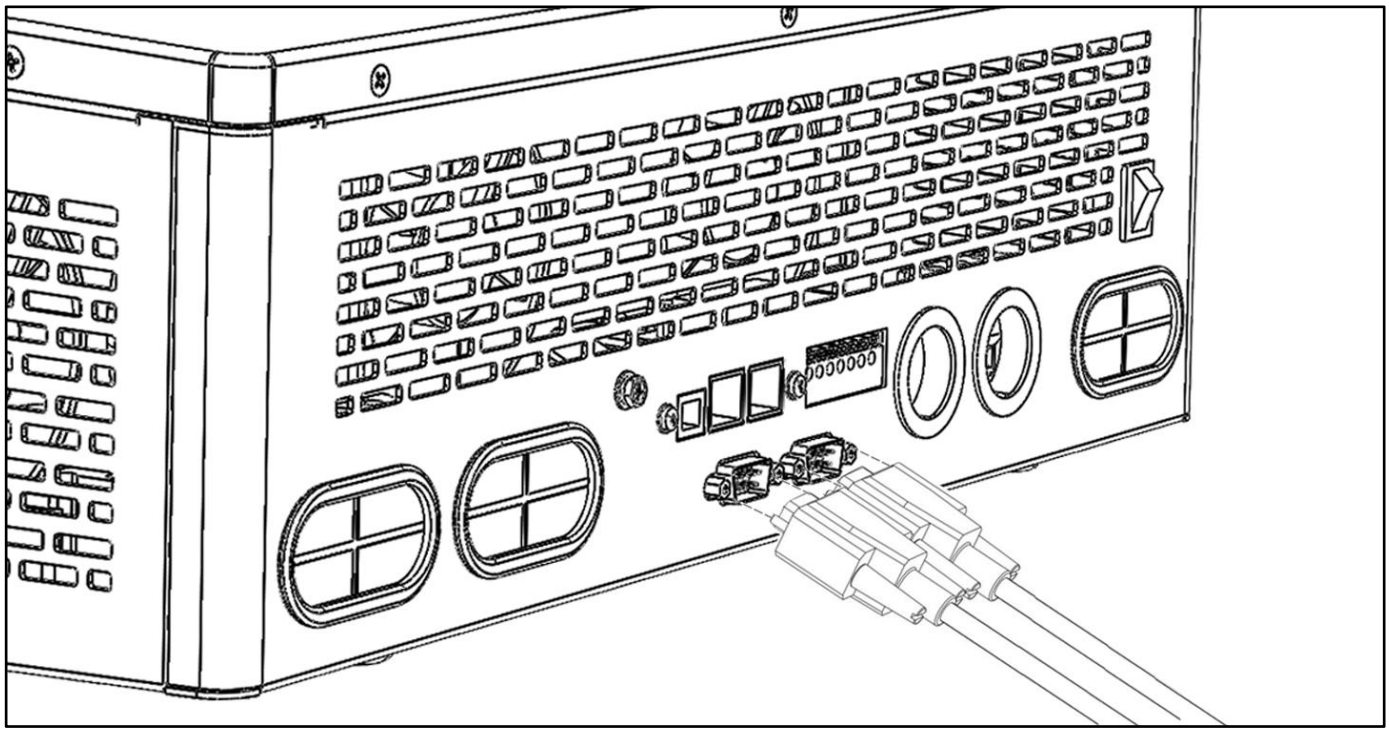
When connecting single-phase parallel systems, all inverters must be connected as follows: L- phase to L-phase, N-phase to N-phase, and PE-phase to PE-phase. Ensure proper connections before power-on startup with identical wire lengths and gauge specifications to prevent operational failures caused by incorrect wiring. Multiple AC input sources should not be connected simultaneously to avoid damaging inverters or external electrical equipment. The AC input sources must maintain consistent and unique configurations. For three-phase parallel connections, all inverters must be connected as follows: N-phase to N-phase and PE-phase to PE- phase. L-lines of machines in the same phase must be interconnected, but L-lines from different phases should not be connected together.

5、 Parallel Communication Line Wiring:

Communication cables should be connected using single-phase or three-phase parallel configurations. Each device must maintain a one-out-one-in connection pattern: the device's male connector (out) must connect to the parallel machine's female connector (in), and never vice versa. Additionally, all parallel communication cables must be securely fastened with screws to prevent dislodging or poor contact, which could lead to abnormal system operation or equipment damage.

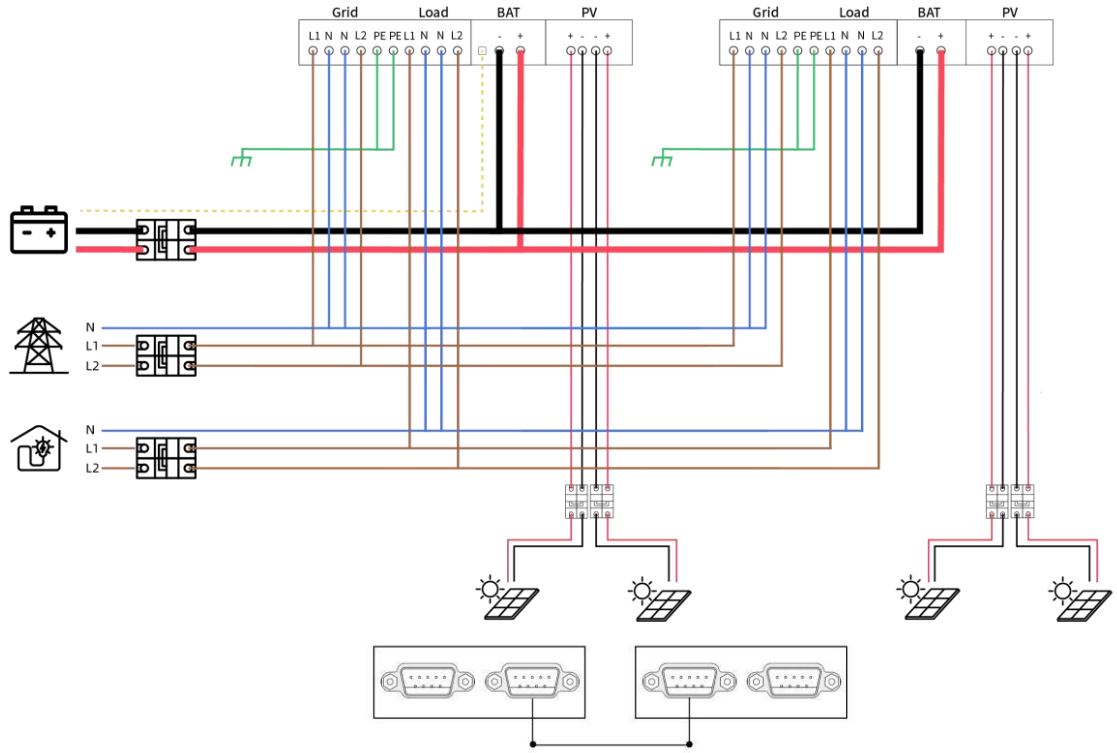
3.4.3 Single-phase parallel connection guide diagram

1、 The Inverter Parallel Communication Line and Equal Current Detection Line Need to Be Connected and Locked With Screws, as Shown in the Schematic Diagram:

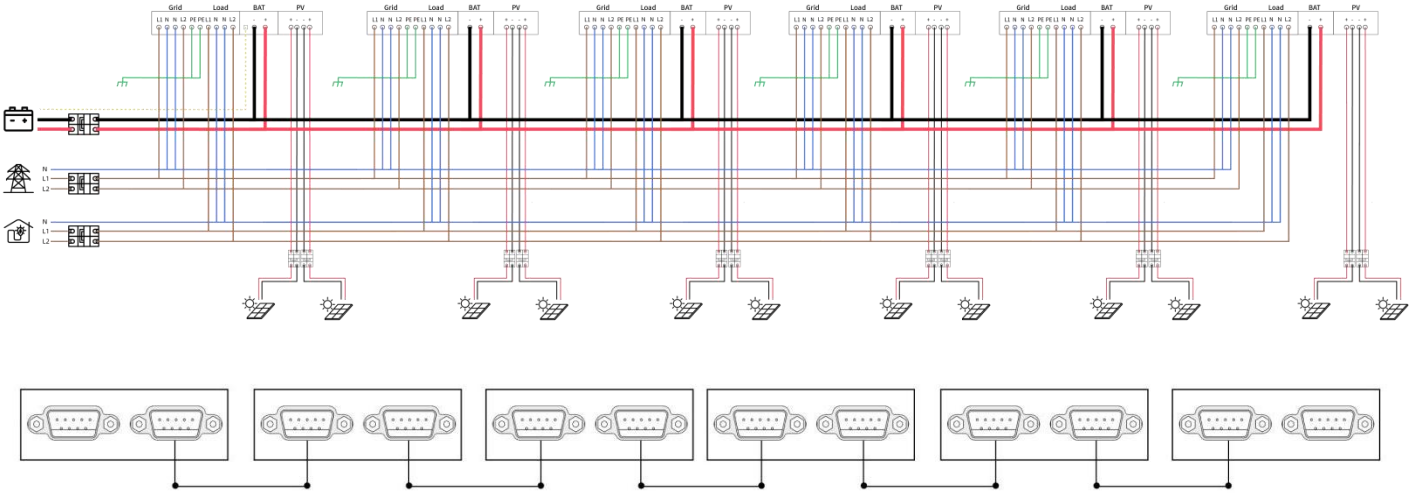


2、 When Multiple Units Are Connected in Parallel, the Connection Diagram Is as Follows:

1) The System Connects Two Inverters in Parallel:

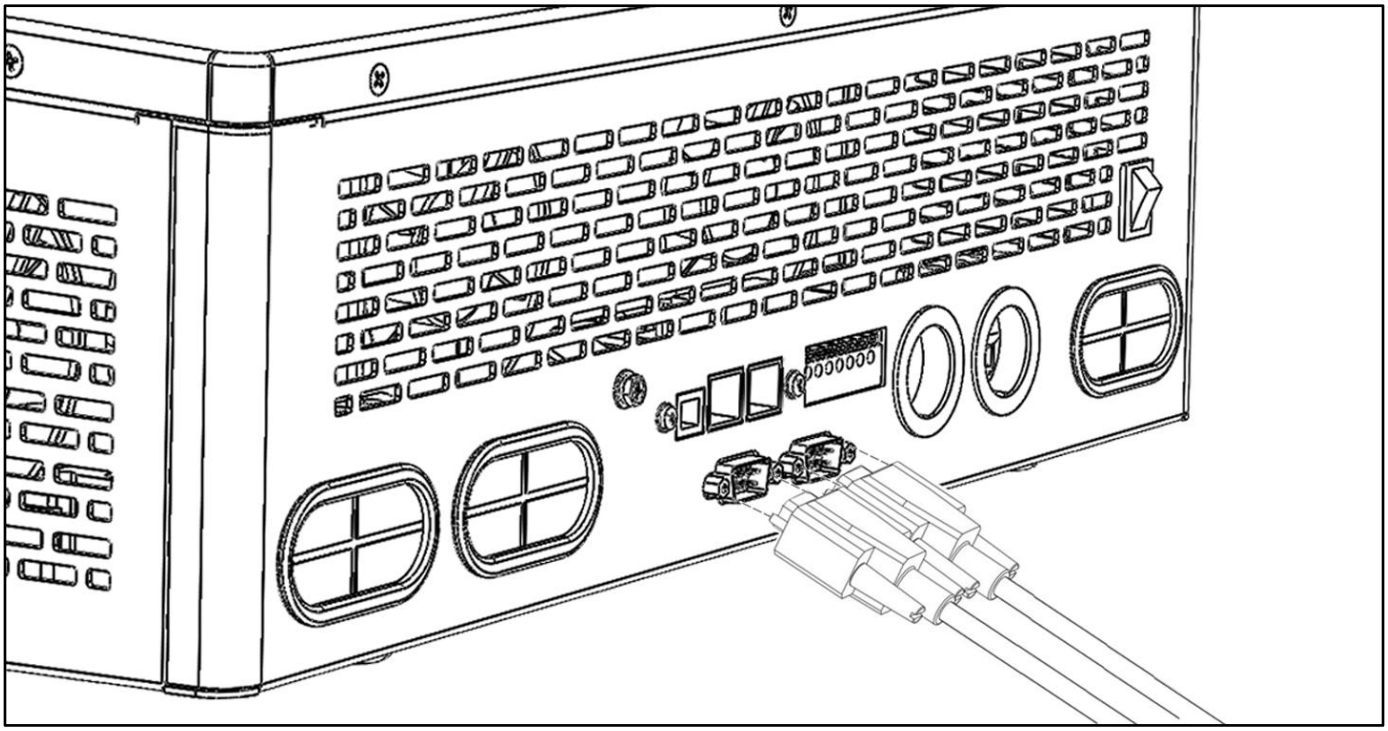


2) Six Inverters Are Connected in Parallel:

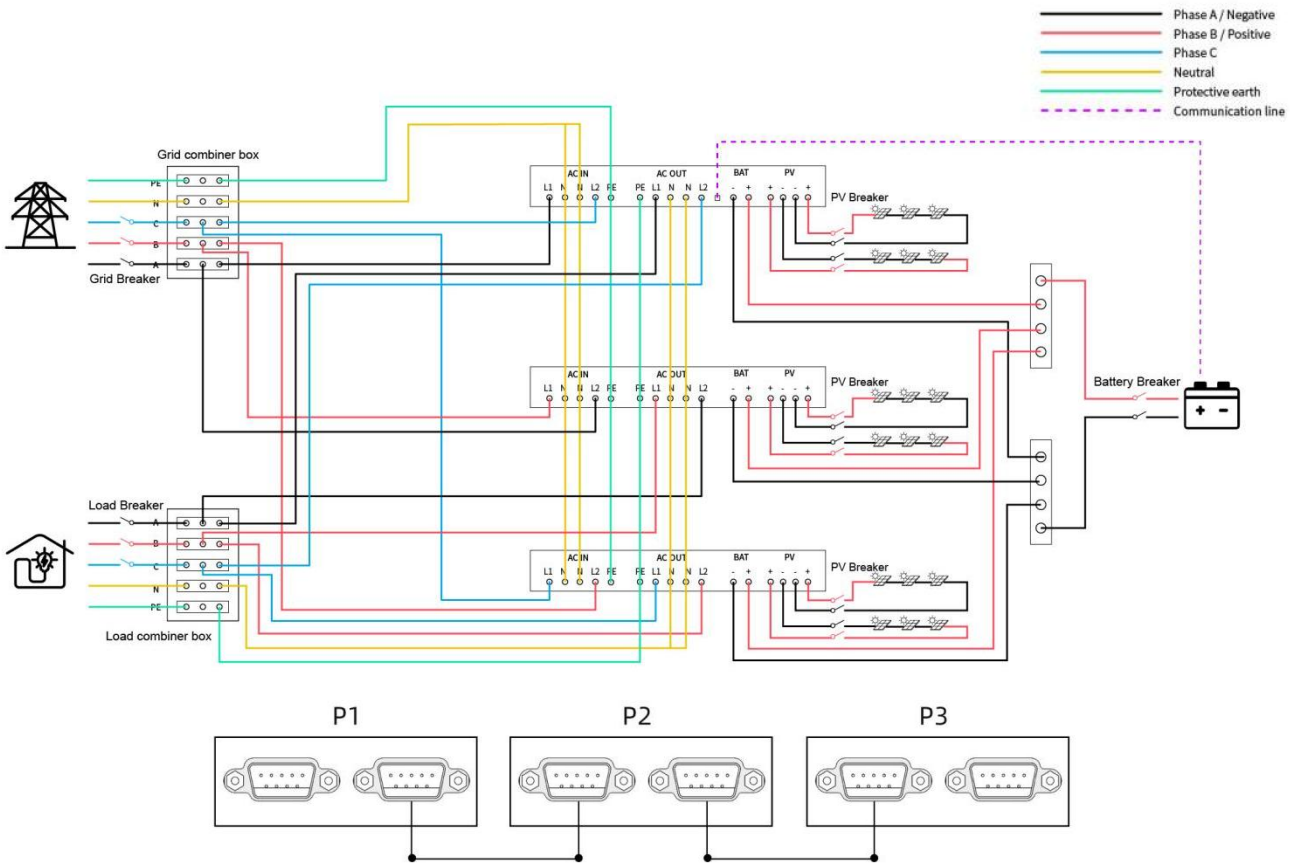


3.4.4 Three-phase parallel connection diagram

1、 The communication line of the inverter should be connected and locked with screws, as shown in the schematic diagram:



Three-Phase Parallel Operation



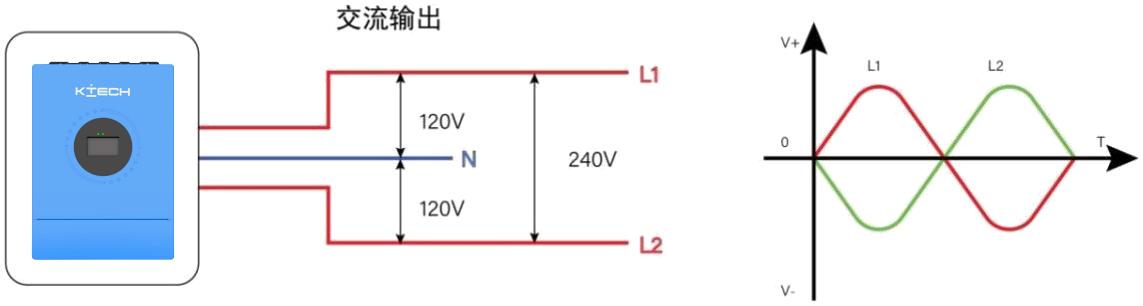
Note:

1) Before powering on and lighting up the screen, check whether the wiring is correct according to the above wiring diagram to avoid system problems.
2) All connections should be fixed and strong to avoid system failure caused by wire loss.
3) When the AC output is connected to the load, the wiring should be correct according to the requirements of the electrical load equipment to avoid damage to the load equipment.
4) The communication output voltage must be set to a consistent value, or only the host can be configured. When operating in parallel mode, the voltage set by the host shall prevail, and the host shall forcibly rewrite the remaining slaves to keep them consistent. This option can only be set in standby mode.
5) Machine factory defaults to stand-alone mode, if you use a weaver or three-phase function, need to set the weaver mode through the screen. The setting method is:

   Each time the power is turned on, one machine is turned on and the rest are turned off. Then, the parallel mode and phase are set according to the on-site system operation mode. For single-phase parallel units, set up the single-phase parallel unit main unit, slave unit, and slave unit in sequence. Three-phase parallel units are set in sequence as three-phase parallel main unit, slave unit, and slave unit, and the phases are set in sequence as A phase, B phase, and C phase. After the machine is successfully set up, turn off the machine switch, wait for the machine to be powered on, and then set the other machines in sequence until all machines are set up. At the same time, all machines should be powered on again and enter the working state.
6) After the system is running, the measurement output voltage is correct, and then the load is connected to set.

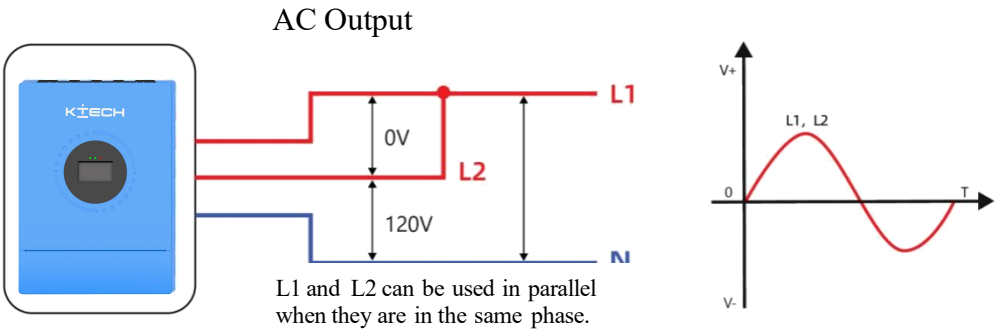
4.Wiring

4.1 Split - phase Mode (default)



roject	description
Applicable model	KE-12KC5LSUF/ KE-10KC5LSUF/KE-8KC5LSUF
AC output phase voltage (L-N)	100~ 130V,120V default
AC output line voltage (L1-L2)	200~260V,240V default

4.2 Single-Phase Mode

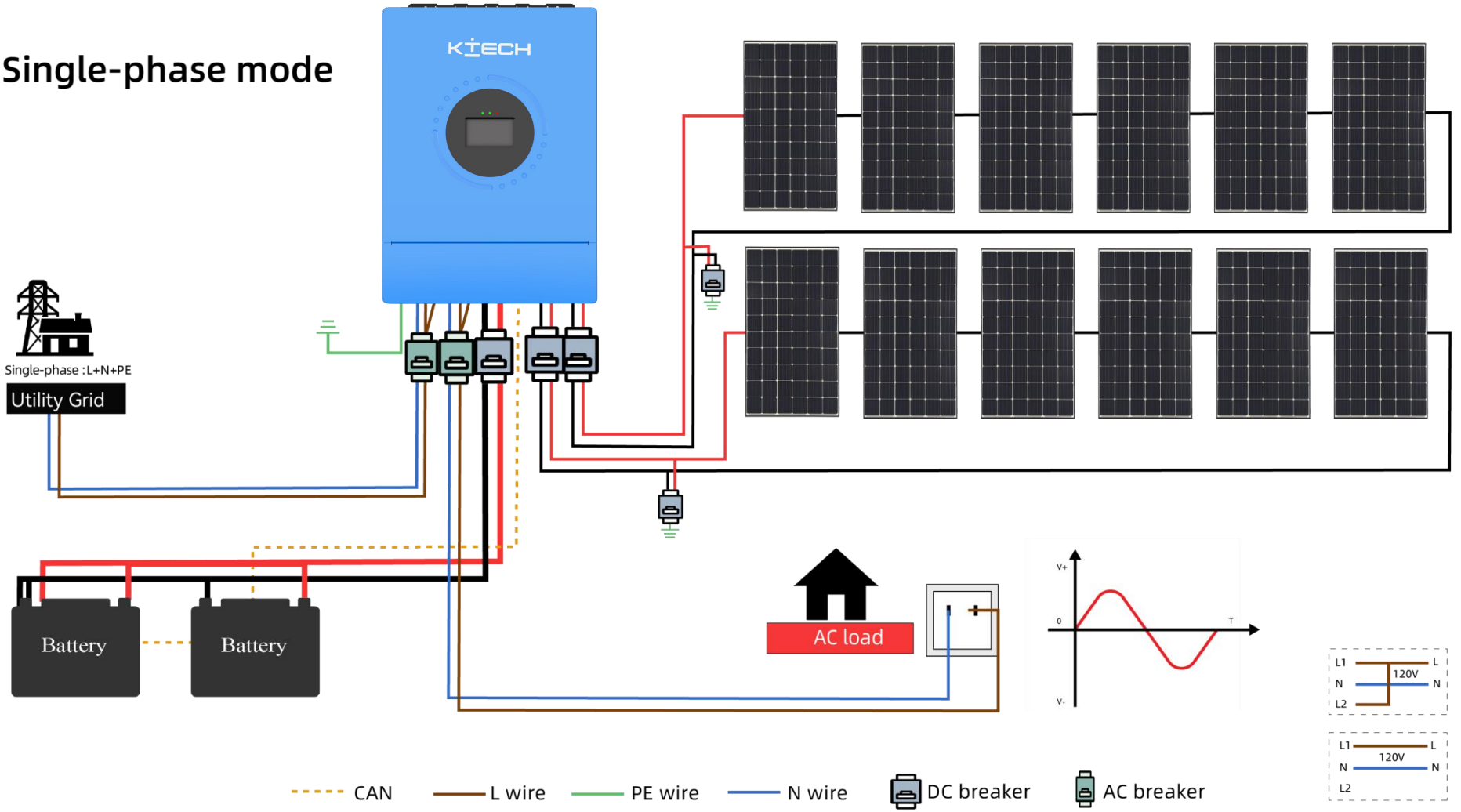


project	description
Applicable model	KE-12KC5LSUF/ KE-10KC5LSUF/KE-8KC5LSUF
AC output phase voltage (L-N)	100~ 130V,120V default

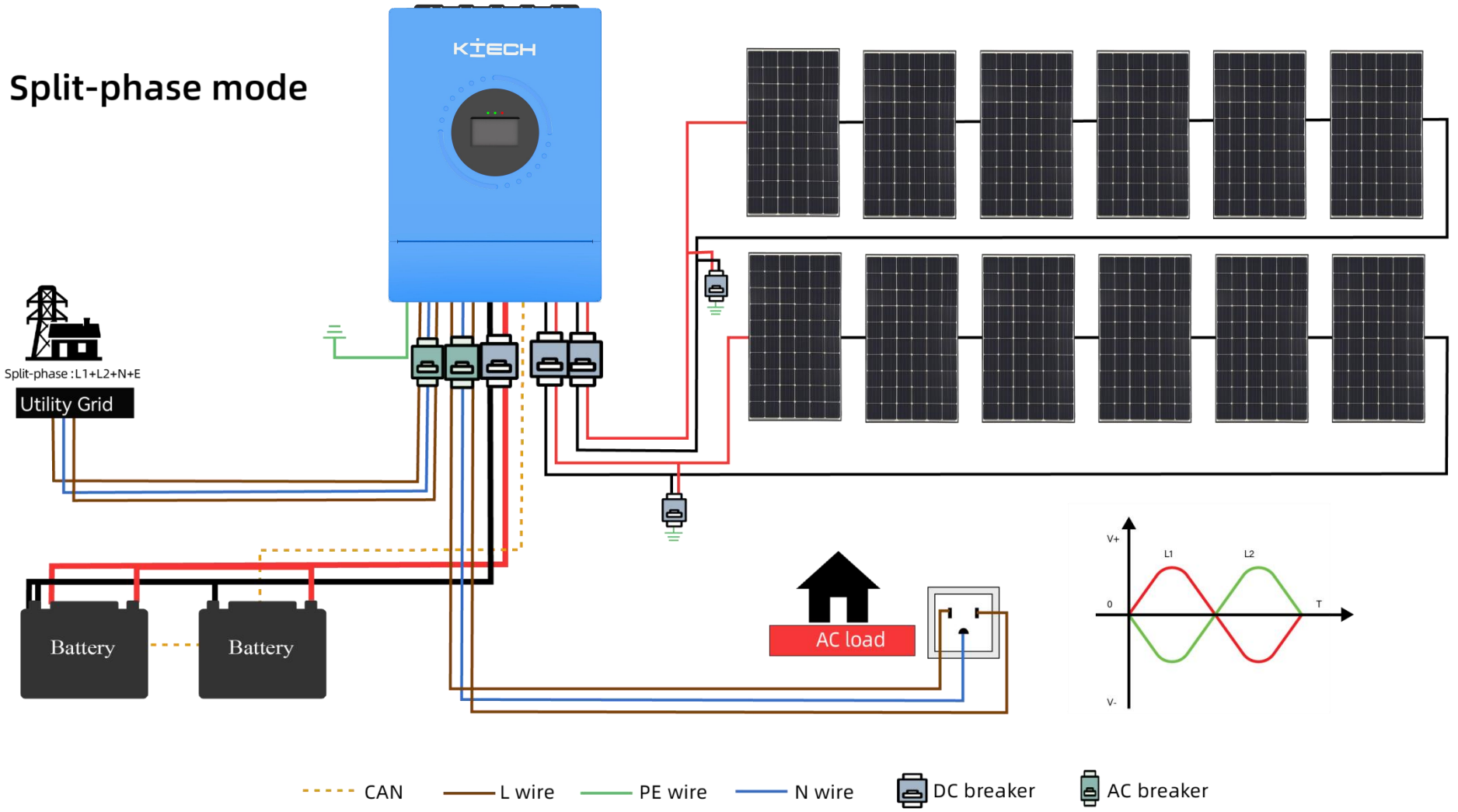
NOTICE

- The output voltage can be changed by setting the menu.
- The output voltage can be set in the range of 100V~130V.

Single-phase mode



Split-phase mode



4.3 Cable and Circuit Breaker Selection

· PV input

model	Wire diameter	Maximum input current	Circuit breaker specifications
KE-8KC5LSUF	4mm²/ 10 AWG	22A	2P-32A
KE-10KC5LSUF	4mm²/ 10 AWG	22A	2P-32A
KE-12KC5LSUF	4mm²/ 10 AWG	22A	2P-32A

· AC input

model	Output mode	maximum current	Wire diameter	Circuit breaker specifications
KE-8KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A
KE-10KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A
KE-12KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A

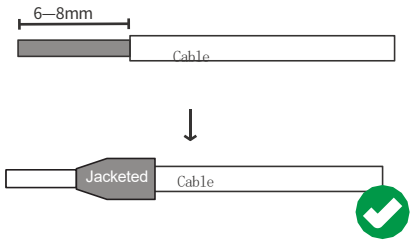
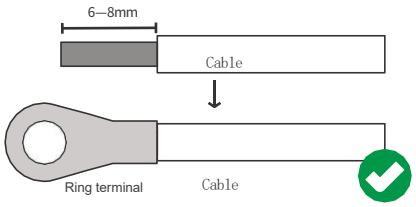
· Battery

model	Wire diameter	maximum current	Circuit breaker specifications
KE-8KC5LSUF	95mm²/ 4/0 AWG	180A	2P-200A
KE-10KC5LSUF	120mm²/ 250 kcmil	200A	2P-250A
KE-12KC5LSUF	120mm²/ 250 kcmil	200A	2P-250A

·AC output

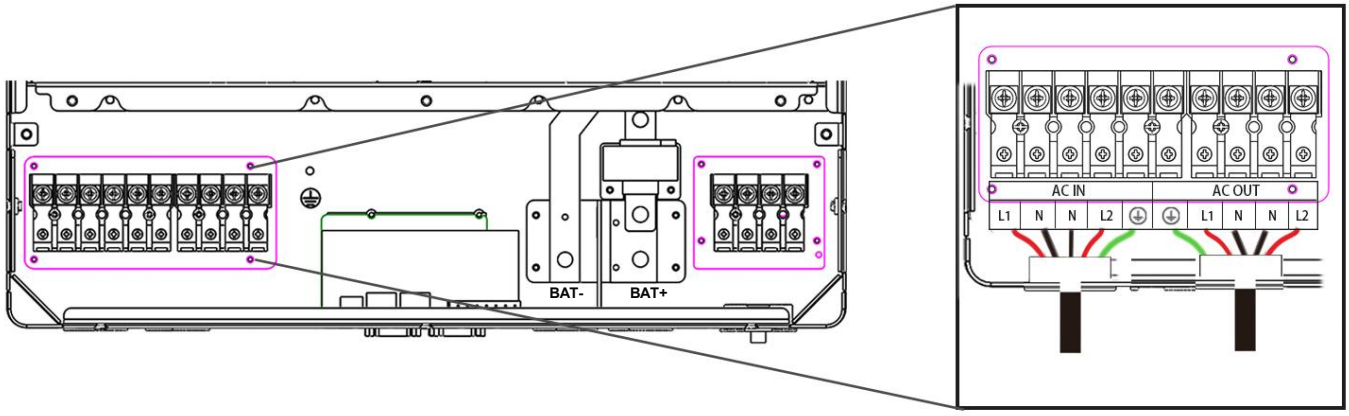
model	Output mode	maximum current	Wire diameter	Circuit breaker specifications
KE-8KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A
KE-10KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A
KE-12KC5LSUF	Split-phase/ Single-phase	63A(L1/L2/N/N)	25mm²/4AWG (L1/L2/N/N)	3P-63A

NOTICE

• Pv input, AC input, AC output 1. Strip the 6 to 8mm insulation of the cable with a wire stripper. 2. Attach a bushing to the end of the cable (bushing to be prepared by the user)	
• Battery end 1. Use a wire stripper to strip the 6 to 8mm insulation from the cable. 2. Secure (supplied with box) ring terminals at the end of the cable	

4.4 Ac input and output cables

Connect the live wire, neutral wire, and ground wire according to the position and sequence of the cables shown in the following figure.



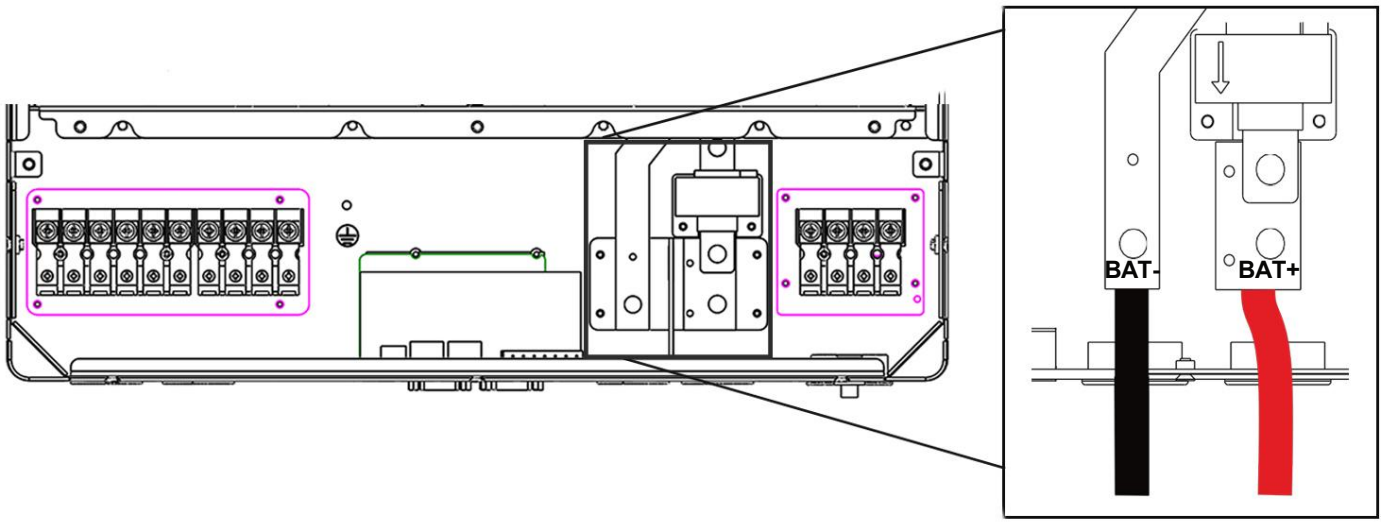
Ac input AC output

DANGER

- Before connecting AC inputs and outputs, the circuit breaker must be disconnected to avoid the danger of electric shock and no live operation.
- Check that the cable used is sufficient to meet the requirements, too thin, poor quality cables can be a serious safety hazard.

4.5 Battery Wiring

Connect the battery's positive and negative cables in the cable position and order shown in the image below.

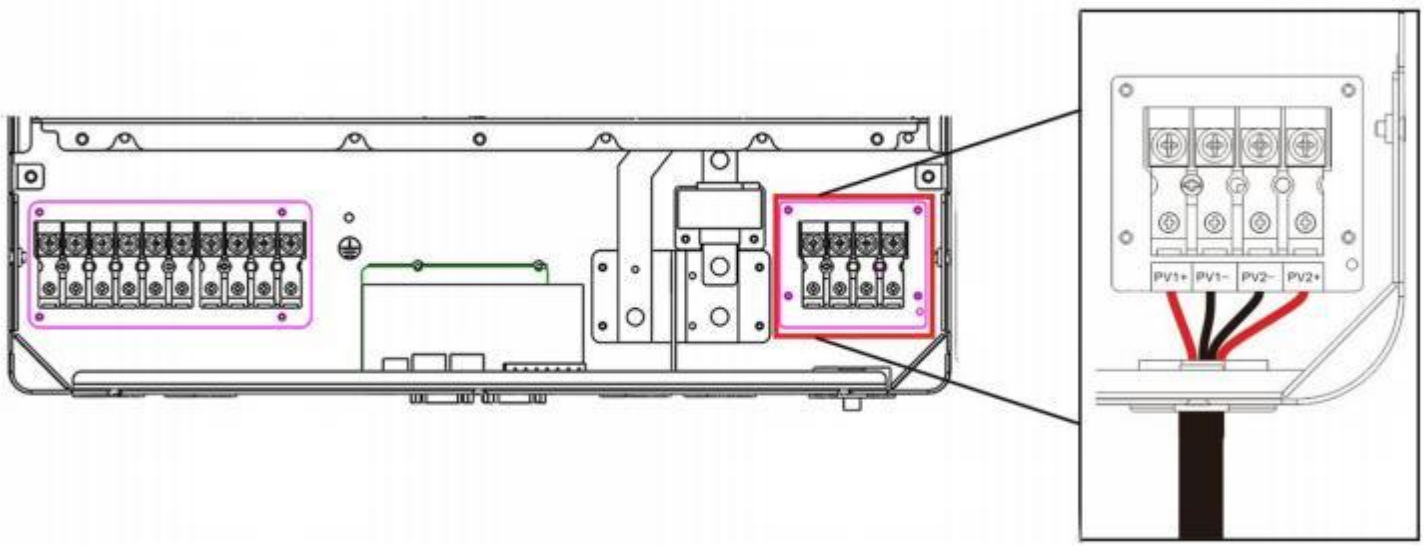


DANGER

- Before connecting the battery, the circuit breaker must be disconnected to avoid the risk of electric shock. Do not operate with power on.
- Make sure that the positive and negative terminals of the battery are connected correctly. Do not reverse them, otherwise the inverter may be damaged.
- Check whether the cable used is sufficient to meet the requirements, too thin, poor quality cable will have serious safety risks.

4.6 Photovoltaic Wiring

Connect the positive and negative poles of both photovoltaic cells in the position and order shown in the figure below.

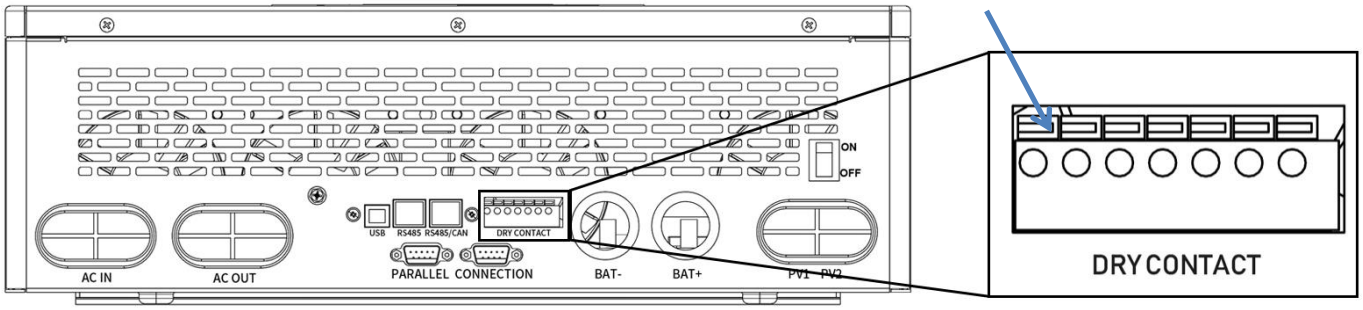


DANGER

- Before connecting the PV, the circuit breaker must be disconnected to avoid the danger of electric shock, and live operation is not allowed.
- Make sure that the open circuit voltage of the PV module in series does not exceed the maximum open circuit voltage of the inverter (this value is 500V), otherwise the inverter may be damaged.

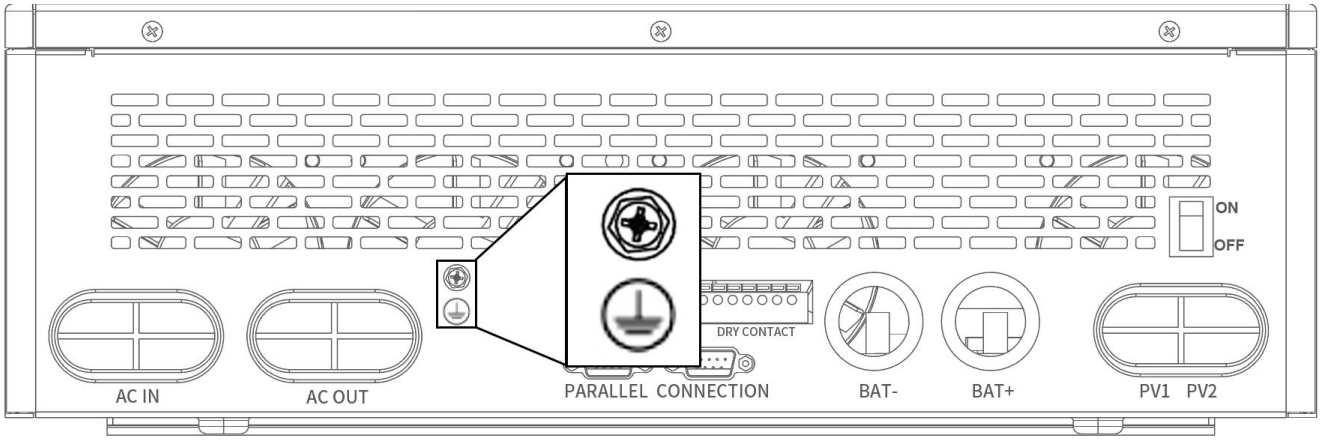
4.7 Dry contact wiring

Use a small screwdriver to push the arrow in the direction indicated, and then insert the communication cable into the dry junction port. (The cross-section of the communication cable is 0.2-1.5mm²).



4.8 Landing

Ensure that the grounding terminal is reliably connected to the grounding busbar.



4.9 Final Installation

After ensuring the reliability of wiring and correct wire sequence, restore the terminal cover to its original position.

4.10 Start the Inverter

· Step 1: Close the circuit breaker of the battery.

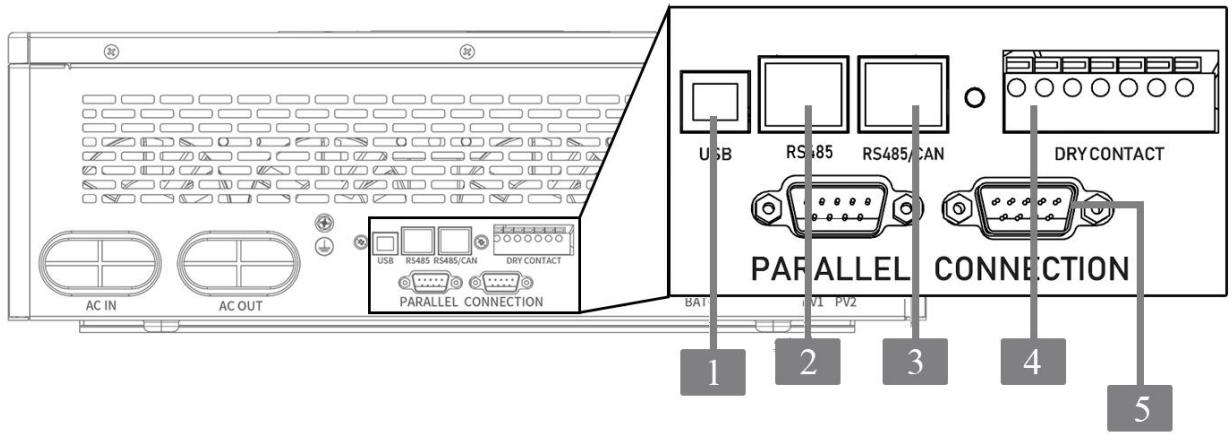
· Step 2: Press the boat-shaped switch at the bottom of the inverter. The screen and indicator lights will light up, indicating that the inverter has been activated.

· Step 3: Close the circuit breakers of photovoltaic, AC input and AC output in turn.

· Step 4: Start the load one by one in order of increasing power.

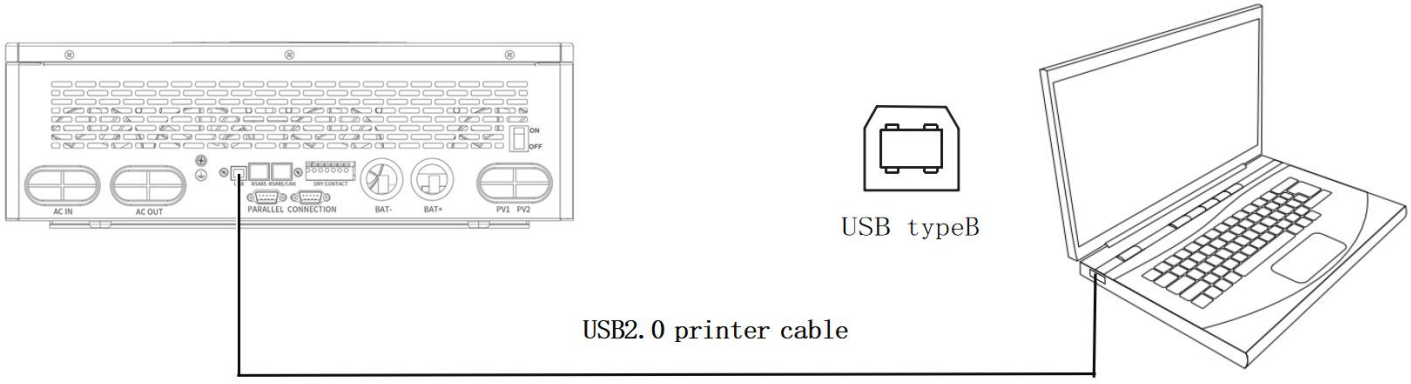
5. Communication

5. 1 Overview



1	USB-B port	2	RS485-1 port	3	CAN/RS485-2 port
4	Dry contact port	5	Parellel port		

5.2 USB-B Port

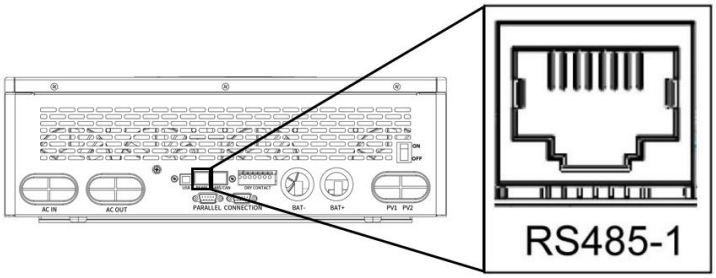


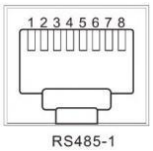
NOTICE

The USB-B and RS485 ports cannot be used at the same time.

5.3 RS485-1 Port

Port RS485-1 is a data expansion port.

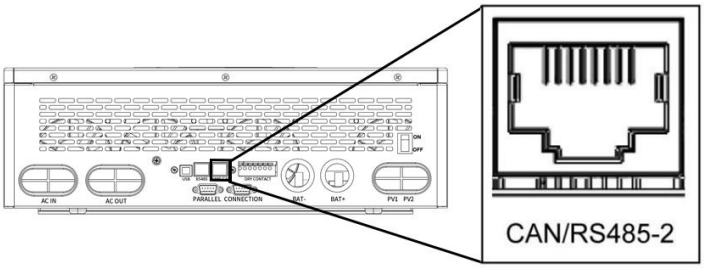


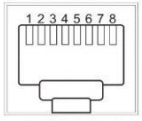


RJ45	definition
Pin 1	5V
Pin 2	GND
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

5.4 CAN/RS485-2 Port

The CAN/RS485-2 port is used to connect to the BMS of the lithium ion battery.





RJ45	definition
Pin 1	5V
Pin 2	GND
Pin 3	/
Pin 4	CANH
Pin 5	CANL
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

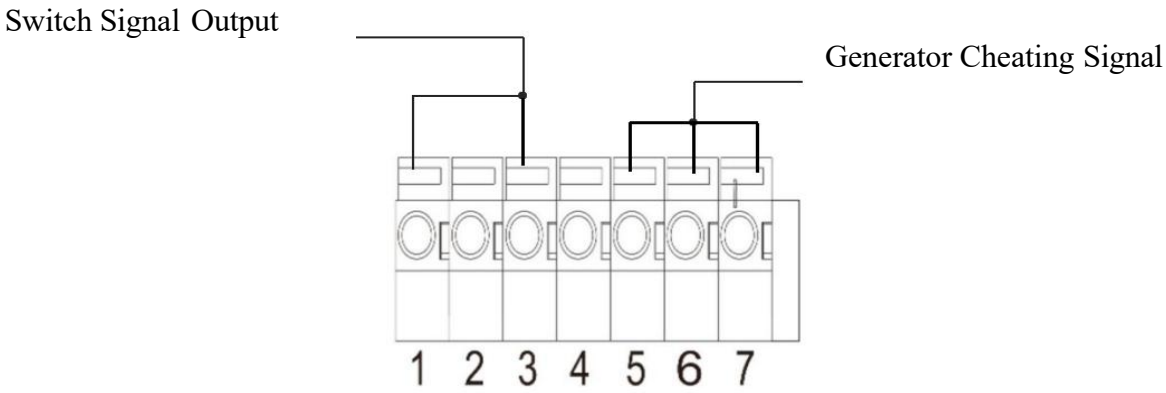
NOTICE

If you need the inverter to communicate with the lithium - battery BMS, please contact us to le arn about the communication protocol or upgrade the inverter to the corresponding software program.If you use a common RJ45 network cable, please check the pin definition. Pins 1 and 2 usually need to be cut off for normal use.

5.5 Dry Contact Port

The dry contact port has two functions:

1. Switch signal output 2. Remote start/stop of generator



function	description
Switch signal output	When the battery voltage reaches the discharge limit voltage, pin 3 to pin 1 voltage is 0V, when the battery is normal charge and discharge, pin 3 to pin 1 voltage is 5V.
Remote start/stop of generator	When the battery voltage reaches the under-voltage alarm voltage or the battery is switched to the mains voltage point, pins 6 to 5 are in the normally open state and pins 7 to 5 are in the normally closed state. When the battery voltage reaches the point where mains power switches to battery or when the battery is fully charged, pins 6 to 5 remain in a normally closed state while pins 7 to 5 stay in a normally open state. (Pins 5/6/7 output 125V/1A,230V/1A,30V/1A)

NOTICE

If you need to use the remote start/stop function of a generator with dry contacts, make sure that the generator has an ATS and supports remote start/stop.

5.6 Bluetooth

The inverter is equipped with a built-in Bluetooth module, which can be connected and used through the Xiaoai Manager /Wisehome APP (the Wisehome APP can be downloaded by scanning the QR code below, or from the official website or by contacting us to obtain the installation package).

IOS/Android

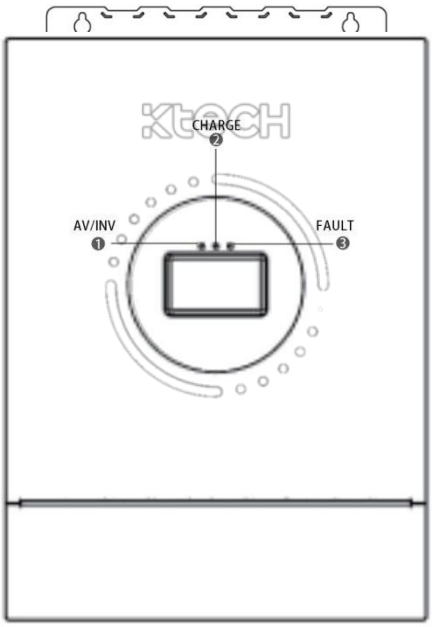
5.7 WIFI

After setting up the internet access AP, it can be connected to the Xiaoai Manager /Wisehome cloud platform.

Note: When setting the Wi-Fi name within the app, the Wi-Fi name must consist of English letters and numbers (name length < 32 characters) and cannot contain Chinese characters or special symbols. The password must consist of English letters and numbers (password length ≥ 8, < 16 characters) and cannot contain Chinese characters or special symbols.

6. Interface Operation(Based on UI version 1.3.0.9)

6.1 LED Indicator



Pilot lamp	Pigment	Description
1.AC/INV	hispid arthraxon	Chang Liang: mains bypass output
		Flicker: Inverter output
2.CHARGE	hispid arthraxon	Chang Liang: Charging is complete
		Flash: Charging
3.FAULT	red	Flashing: A fault has occurred

6.2 Liquid Crystal Display and Operation

(1)Home Page

Correspond to the Sequence in the Diagram

① Display the current time on the device.

② This icon is not displayed when the device is a single machine; when the device is in parallel mode.The "M" icon is displayed when the host is offline, and the "S" icon is displayed when the host is offline.

③ Equipment failure: gray when the equipment is not faulty, red when the equipment is faulty.

④ Battery BMS communication connection status,when connected to the battery and BMS communication is normal, the icon is green, not connected is gray.

⑤ WIFI, connection status, when the device is connected to 2.4G-WIFI, it is green, and gray when not connected.

⑥ Bluetooth connection status. When the APP connects to the device through Bluetooth, the icon is green and gray when not connected.

⑦ Equipment communication status: green when the equipment is normal, otherwise gray (Note: When the equipment is gray, contact the staff for processing).

Long press the large icon in the middle of the inverter to set whether to manually shut down the machine. After the machine stops, if you need to continue running, long press this icon in the prompt box to confirm.

Correspond to the Sequence in the Diagram

① Long press this icon for about 1s to enter the detailed PV data interface.

② Real-time PV total power.

③ Real-time voltage of PV1.

④ If the device supports two PV channels, this data shows the real-time voltage of PV2. If the device only supports one PV channels, this data is not available.

① Long press for about 1s to enter the detailed data interface of the power grid.

② If the equipment is single-phase, this data is not available,If the device is a split phase, the data shows the real-time current of the grid L1.

③ If the device is single-phase, this data shows the grid current.
If the device is a split-phase , the data will show the real-time Current of the grid L2.

④ If the device is single-phase, this data shows the grid frequency
If the device is a split -phase, the data shows the real-time voltage of the grid L1.

⑤ If the device is single-phase, this data shows the grid voltage.
If the device is a split -phase, the data shows the real-time voltage of the grid L2.

① Long press this icon for about 1s to enter the detailed battery data interface.

② Real-time voltage.

③ Percentage of battery capacity.

④ When this text is displayed, it means that the battery is full.

① Long press for about 1s to enter the load detailed data interface.

② If the device is a single camera, this data shows the real-time load current. If the device is a split -phase, this data shows the real-time load L1 current.

③ If the device is a single -phase, this data is not displayed.
If the device is a split -phase, this data shows the real-time current of load L2.

④ If the device is a single -phase, this data shows the real time power of load .
If the device is a split -phase, this data shows the real-time voltage of load L1.

⑤ If the device is a single phase, this data is real-time voltage of load.
If the device is a split -phase, this data shows the real-time voltage of load L2.

⑥ When the device is a split -phase, this icon will be displayed.

Correspond to the Sequence in the Diagram

① The running status of the device

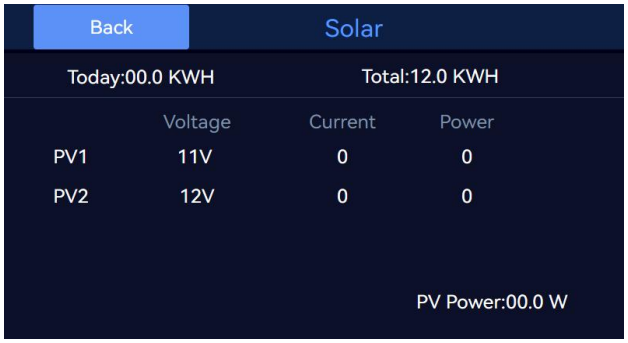
② Click this icon to enter the viewable data menu interface

③ Click this icon to enter the device information interface

④ Click this icon to enter the device Settings data menu interface

(2) PV Data Interface

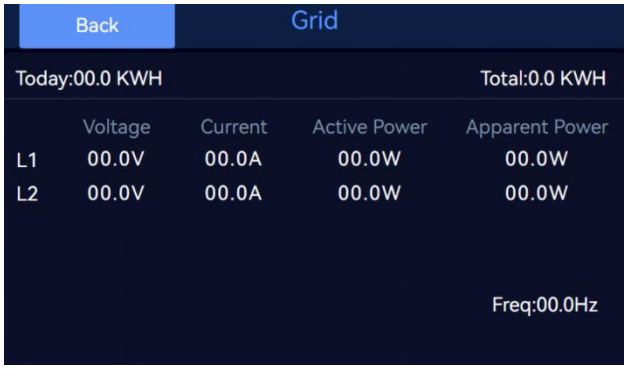
In this interface, the upper part shows the daily PV solar panel's PV power generation and total power generation, while the lower part shows the PV voltage, current and power respectively.



(3) Grid Data Interface

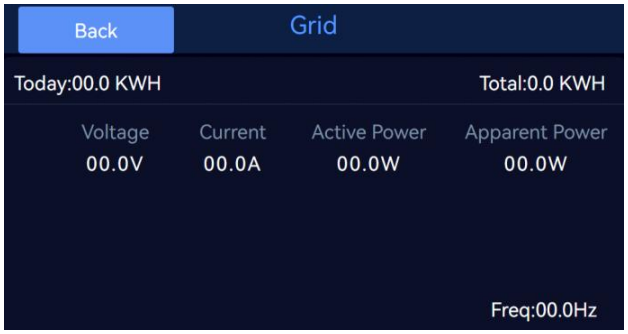
The data of the power grid will vary according to the equipment model. If it is a split-phase inverter,the right interface will be displayed:

The data shown are the voltage, current, active power and apparent power of L1 a and L2 respectively.



If it is a single phase, the right interface will be displayed:

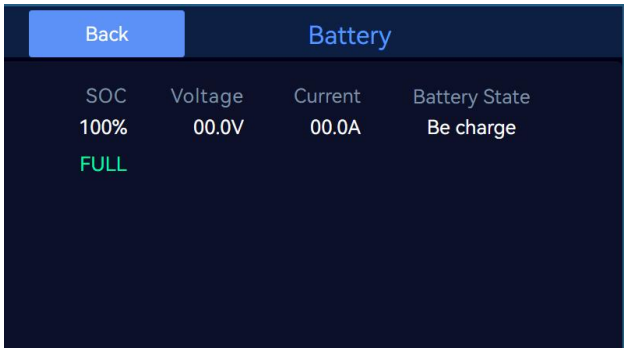
Above the interface are the daily and total grid-connected electricity of the power grid.



(4) Battery Data Interface

The data displayed on the battery interface are:

Battery capacity, voltage, current and battery charging status. When "FULL" is di is splayed, it means the battery is full.



(5) Load Data Interface

The data on the load side, like the grid, varies by model

If it is a split-phase inverter, the right side of the interface will be displayed:

The data shown are the current, active power, apparent power and load of the loads L1 and L2.

If it is a single-phase inverter, the interface on the right is displayed:

The data shown here are the current, active power,apparent power and load rate of the load. The data above are the daily electricity consumption and total electricity consumption of the load.

(6) Equipment Information Interface

Display text	Description
Hardware-version	Current machine hardware version number
Software release	Current machine software version number (check the update on the side. After the device is connected to wifi, you can check whether the current device is the latest version. If not, the user can choose to update the current version)
Display the screen UI version	Current machine display UI version number (check and update on the side. After the device is connected to Wifi, you can check whether the current device is the latest version. If not, the user can choose to update the current version)
Equipment SN	The current machine's SN number
Maximum support voltage of battery	The maximum supported battery voltage of the current machine
Language	After clicking, users can choose the language setting of UI on the interface.

(7) Read Only Category Menu and Control Interface

icon	description
	Click to enter the real-time data interface
	Click to enter the statistics interface
	Click to enter the historical data interface

	Click to enter the event log data interface
	Click to enter the control function options interface

(8) Real-Time Data Interface

Click "<" and " >" to flip pages. The circle below the interface represents which page you are currently on,

When the user enters the interface, the last page is displayed.

The interface is divided into six pages, displaying the following:

Page 1 (Equipment)

Parameter name: Equipment status, total charging power, load state, grid frequency, inverter frequency

Page 2 (fault)

Parameter name: Fault information 1, Fault information 2, Fault information 3, Fault information 4

Page 3 (current)

Parameter name: parallel load average current, PV charging current, mains charging current

Page 4 (temperature)

Parameter name: PV radiator temperature, inverter radiator temperature, battery radiator temperature

Page 5 (Voltage)

Parameter name: total bus voltage, positive bus voltage, parent bus voltage（It depends on the machine. Some models have high and low busbars, while others have high and low busbars plus main, positive and negative terminals）

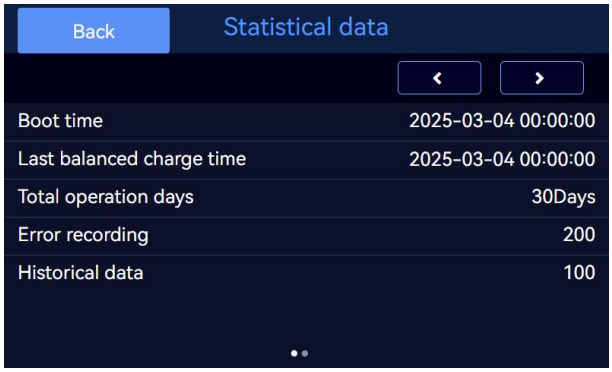
Page 6 (Communication status)

Parameter name: Bluetooth status, WIFI status, cloud platform link status, RS4851 communication status, RS4852 communication status, BMS communication status

(9) Statistical Data Interface

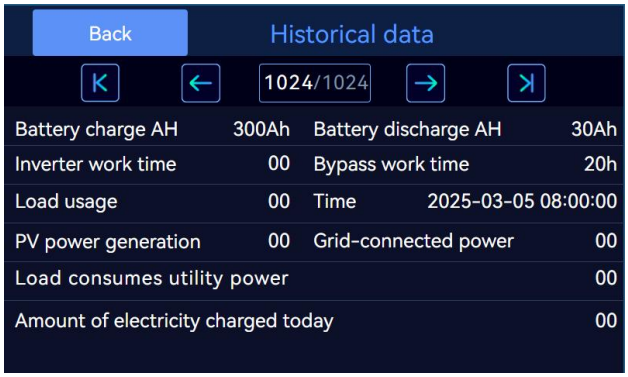
The interface is divided into two pages, and the content displayed is as follows:

	Order number	Parameter name
Page 1	1	Battery charging ampere-hours of the day
	2	The ampere-hours of battery discharge on the same day
	3	Inverter working time
	4	Bypass working time
	5	Charging capacity
	6	Electricity consumption
Page 2	7	Available machine time
	8	Last equalization charge completion time
	9	Total days in operation
	10	Number of fault records
	11	Number of historical data entries



(10) Historical Data Interface

Order number	Parameter name
1	Battery ampere-hour charging capacity for the day
2	Battery discharge ampere-hour count for the day
3	Inverter operating hours on the day
4	Bypass working hours on the day
5	Load day electricity consumption
6	Time
7	Daily PV power generation
8	Daily grid-connected electricity generation
9	Electricity charged from the municipal power grid on the same day
10	Power consumption from the utility grid on the day of load

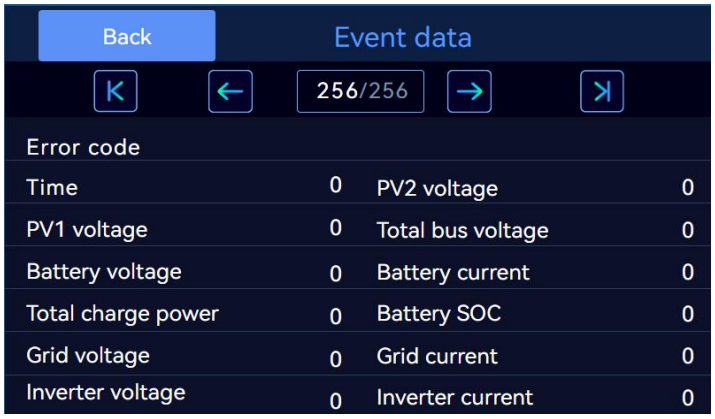


If there is a large amount of historical data, you can click the current page number and use the interface keyboard to input the number of items you want to view, and then jump to that item.

(11) Event Log Interface

The above is the event recording interface, which can be viewed by swiping up and down the screen. Like historical data, users can select and input a specific one to jump.（The following pictures only show some parameters）

Order number	Parameter name
1	Fault code
2	Time of failure
3	Device status
4	Battery charing status
5	Solar panel voltage 1
6	Solar panel voltage 2
7	Total solar panel power
8	Storage battery SOC
9	Battery voltage
10	Battery current
11	Total charging power
12	Total bus voltage
13	City power charging currentt
14	Grid frequency
15	Inverter frequency
16	PV heat dissipation plate temperature
17	Temperature of the heat sink of inverters
18	Temperature of battery transformer heat sink
19	PV charging current
20	And the average load current of the machine



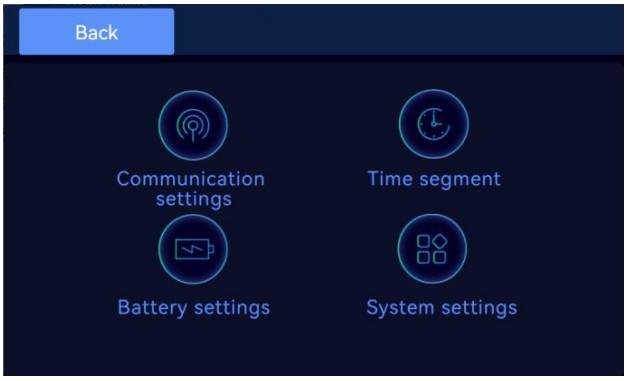
(12) Control Function

The control functions are as shown in the table above. After clicking the arrow,except for clicking "Set Time" which will jump to the external interface for setting, other functions can be executed after clicking confirm.

	Order number	Parameter name
Page 1	1	Charge immediately and evenly
	2	Set-up time （When setting the time, pay attention to the time zone setting, as it will affect the synchronization time and time-sharing function of the next startup）
	3	Clear event records
	4	Clear statistics
Page 2	5	Clear historical data
	6	Factory data reset
	7	Reset

(13) Setting Class Parameters

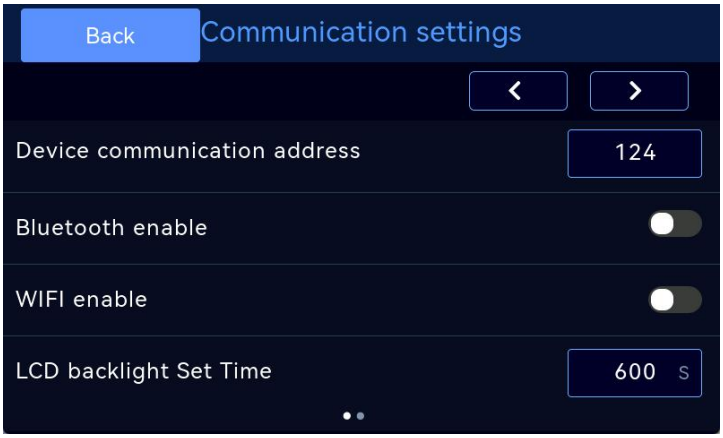
Icon	Description
	After clicking, enter the communication data setting interface
	After clicking, enter the interface of time setting for charging and discharging
	After clicking, enter the battery parameter setting interface
	After clicking, enter the system parameter setting interface



(14) Communication Data Setting Interface

In the setting parameters, clicking the input box can display the keyboard to input data, and clicking the switch icon can open or close.

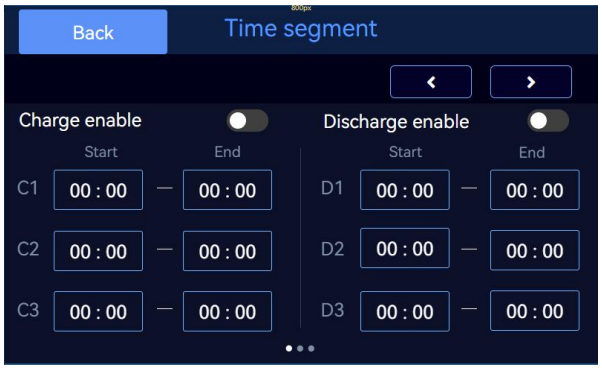
	Order number	Parameter name
Page 1	1	device address
	2	Bluetooth enabled
	3	WIFI enabled
	4	LCD backlight time
Page 2	1	RS485-1 parameter Settings
	2	RS485-2 parameter Settings



(15) Periodic Charge and Discharge Settings

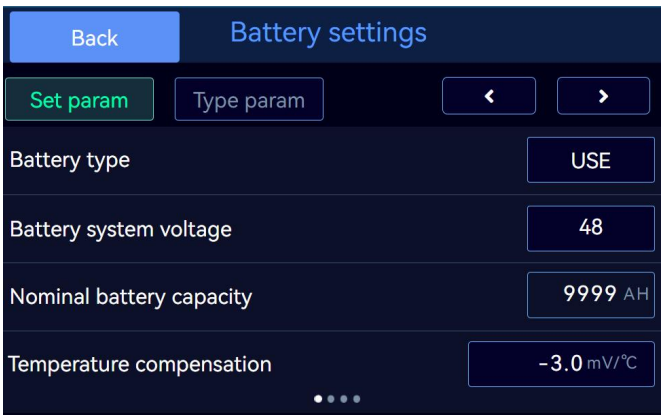
The time-based charging/discharging configuration interface displays a green color when the "Charge set" or "Discharge set" option is selected. This indicates the parameter adjustment interface is active. Users can configure start and end times for each period by clicking the ">" button to enter the settings. If the time interval function for charging or discharging is not enabled, the corresponding time settings will be invalid.

		Order number	Parame-ter name
Charge	Page 1	1	Time - segmented charging enable
		2	Setting of start and end time f or charging stage 2
		3	Setting of start and end time for charging stage 2
		4	Setting of start and end time for charging stage 3
	Page 2	5	Setting of start and end time for charging stage 4
		6	Setting of start and end time for charging stage 5
		7	Setting of start and end time for charging stage 6
		8	Setting of start and end time for charging stage 7
	Page 3	9	Setting of start and end time for charging stage 8
		10	Setting of start and end time for charging stage 9
Discharge	Page 1	1	Periodic discharge enable
		2	Setting of start and end time for discharging stage 1
		3	Setting of start and end time for discharging stage 2
		4	Setting of start and end time for discharging stage 3
	Page 2	5	Setting of start and end time for discharging stage 4
		6	Setting of start and end time for discharging stage 5
		7	Setting of start and end time for discharging stage 6
		8	Setting of start and end time for discharging stage 7
	Page 3	9	Setting of start and end time for discharging stage 8
		10	Setting of start and end time for discharging stage 9



(16) Battery Parameter Settings

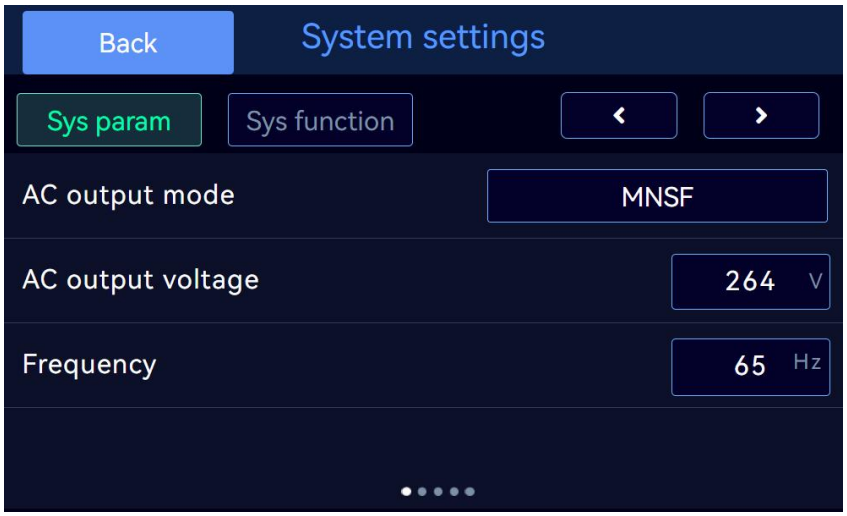
When "Setting Parameters" or "Type Parameters" is displayed in green, it indicates that the interface is in place, and each parameter can be set through drop-down options and input boxes.



	Page	Main options	Option 2	Description
Set param	Page 1	Battery type	USE	User customization, battery parameters can be set ccording to requirements
			SLD	sealed lead acid battery
			FLD	Open lead-acid batteries
			GEL	Colloidal batteries
			L14	Lithium iron phosphate battery 14 series
			L15	Lithium iron phosphate battery 15 series
			L16	Lithium iron phosphate battery 16 series
			N13	Three-element lithium battery 13 series
			N14	Three-element lithium battery 14 series
		Battery system voltage	48V	The voltage of the battery system is fixed at 48V and cannot be changed
		Nominal battery capacity	1~9999AH	It can be input in the range of 1~9999AH, and step by 1 AH
		Temperature compensation	-(3~5)MV/℃/2V	Setting range- (3-5) MV, step 0.1mV, users can set according to the battery parameters，0: No compensation
	Page 2	Switch mains SOC capacity	0~100%	It can be input in the range of 0~100%, and the step is 1%. Under the inverter priority mode, when the SOC capacity is less than or equal to this value, it switches to mains power.
		Switch battery SOC capacity	1~100%	It can be input in the range of 1 to 100%, with a step of 1%. In the inverter priority mode, the SOC capacity is greater than or equal to this value and switches to inverter.
		Inverter switching mains voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V.
		Mains switching inverter voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V.
	Page 3	Maximum allowed charge current	0~240A	It can be input in the range of 0~240A, step by 1A, and set to 0 to prohibit the system from charging and discharging
		Stop charge current	0~10A	It can be input in the range of 0~10A and step 1A
		Stop charge SOC	0~100%	It can be input in the range of 0~100%, and the step is 1%
		Equalize the charge timeout	5~900 MIN	Can be input in the range of 5~900 MIN, step 1MIN, only when the battery type is open lead-acid battery and sealed lead-acid battery and custom

	Page 4	Activattion current of lithium batttery	0~20A	It can be input in the range of 0~20A with a step of 0.1 A.
		Charging activation method	OFF	Do not activate (lead-acid batteries only)
			PULSE(Default)	Adopt intermittent control (except for lead-acid batteries)
		Discharge cut-off SOC	0~100%	It can be input in the range of 0~100%, and the step is 1%
		SOC low alarm	0~100%	It can be input in the range of 0~100%, and the step is 1%. An alarm will be given when the set SOC capacity is reached
Type param	Page 1	Over-voltage threshold	36~68V	It can be input in the range of 36~68V with a step of 0.1 V
		Equalizing charge voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V and is only valid when the battery type is open lead- acid battery, sealed lead-acid battery and custom
		Boost charge voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V and is valid for custom and lithium battery types
		Float charge voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V. This parameter cannot be set after successful BMS communication
	Page 2	Boost charge recovery voltage	36~68V	It can be input in the range of 36~68V with a step of 0.1 V
		Battery over-discharge recovery voltage	36~68V	When the battery pack voltage drops below the "over-discharge protection voltage" during discharge trigger- ing, the inverter re-sets the allowable supply voltage to the preset value when the battery voltage recovers to this level during charging. The input range is 36-68V with a 0.1V step adjustment, and the parameter must exceed the preset "over-discharge voltage"
		Battery under-voltage war ning level	36~68V	When the batter voltage is lower than this voltage, the device will give an undervoltage alarm and output without shutdown. It can be input within the range of 36~68V with a step of 0.1V.It is valid for custom battery and lithium battery types
		Battery over-discharge voltage	36~68V	When the battery voltage is lower than this judgment point, and the inverter output is turned off after triggering the value of "over discharge delay", it can be input within the range of 36~68V, step by 0.1V, and it is valid for custom battery type and lithium battery type
	Page 3	Discharge limit voltage	36~68V	When the battery voltage is lower than the value of this parameter, the output is immediately turned off. The input can be in the range of 36~68V, with a step of 0.1V
		Over-discharge time delay	0~60s	When the battery voltage is lower than the parameter " overcharge voltage", and the inverter output is turned off after triggering the delay time set by this parameter, the input range can be 0~60s, and the step is 1s. It is valid for custom battery type and lithium battery
		Equalizing charge time	0~300 MIN	Can be input in the range of 0~ 300 MIN, step 1MIN, only when the battery type is open lead-acid battery and sealed lead -acid battery and custom
		Boost charge time	0~300 MIN	Refers to the continuous charging time when the voltage reaches the parameter "Increase charging volt- age" and the set voltage. It can be input in the range of 0~300 MIN, step by 1 minute, and it is valid for battery types of custom and lithium battery
	Page 4	Equalizing charging interval	0	Set to 0 to be off
			1~300D(days)	It can be input in the range of 1 to 300 days, step by 1 day, and is only valid when the battery type is open lead-acid battery, sealed lead-acid battery and custom

(17) System Settings



	Page	Main options	Option 2	Description
Sys param	Page 1	AC output mode	Mains priority	In the case of mains power priority, the mains power prioritizes supplying power to the load and battery, while the battery only supplies power to the load when mains power is unavailable. (For example, when the time discharge function is used, the battery can discharge.) **Priority: Mains power > Photovoltaic > battery**
			Inverter priority	Inverter priority: Switch to mains power with load only when the battery voltage falls below the set value of parameter [Battery-to-utility voltage point]. When the battery voltage exceeds the set value of parameter [Utility-to-Battery voltage point] or is fully charged, switch back to inverter with load from mains power Inverter first .**Priority: Photovoltaic > Battery > mains power**
			PV priority	PV priority: When the photovoltaic is not available, or the battery voltage is lower than the set value of [battery to mains voltage point], it switches to mains power. **Priority: Photovoltaic > mains power > battery**
		AC output voltage	100~130V	It can be input in the range of 100~130V with a step of 1V
		Frequency	45~ 65Hz	It can be input in the range of 45~65Hz and step 1Hz
	Page 2	Parallel mode	Single	Users can select the corresponding parameter Settings according to different parallel operation requirements, and the default single machine mode is selected.
			Single-phase master	
			Slave	
			Three-phase master	
			Two-phase 2*208Host (only displayed on the split-phase)	
		Parallel phase	Phase A	
			Phase B	
			Phase C	

	Page 3	Battery charge mode	Hybrid	Give priority to photovoltaic charging. When the photovoltaic power is insufficient, switch to the municipal power supply. When performing inversion, only photovoltaic charging can be initiated.
			Mains priority	Mains power priority charging, only light activated when city power is invalid
			PV priority	Photovoltaic priority charging is only activated when photovoltaic is invalid
			PV Only	Only photovoltaic charging is allowed, and mains charging is not started
		Charge current limit	SET	The maximum battery charging current is not greater than the set value "battery charging current"
			BMS (default)	The maximum battery charging current is not greater than the BMS, the highest value
			INV	The maximum battery charging current is not greater than the logical judgment value of the inverter
		Mains charge current limit	0~100A	It can be input in the range of 0~100A and step 1A
	Page 4	BMS	PYLON	This item is set to Pylon by default
		PV output priority	Charge priority	In this mode, the PV output charges the battery first
			Load priority	In this mode, the PV output gives power to the load first
	Page 5	AC input mode	APL	The input voltage range is 90~140V
			UPS	The input voltage range is 90~140V
		Grid type (only displayed on the split-phase inverter)	240/120	
			208/120	
			0/120	
Sys function	Page 1	NPE ground shorting function	open	
			close	
		Energy saving mode	open	
			close	
		Automatic restart after overload	open	
			close	
		Automatic restart after over-temperature	open	
			close	
	Page 2	Buzzer alarm	open	
			close	
		Mode shift alerted	open	
			close	
		Overload bypass function	open	
			close	

(18) The Fault Information Is as Follows:

Fault code	Description	Fault code	Description
1	Battery voltage low	29	Battery SOC is below the alarm value
2	Battery over current software	30	Battery SOC is below the discharge cutoff set value
3	Battery no connect	31	Low battery shutdown
4	Battery undervoltage stops discharging	32	Parallel control CAN communication failure
5	Battery overcurrent hardware protection	33	Parallel CAN communication failure
6	Battery charge overvoltage protection	34	Parallel communication address setting error
7	Bus overvoltage hardware protection	35	Parallel current sharing fault
8	Bus overvoltage software protection	36	Parallel mode, battery voltage difference is large
9	PV overvoltage protection	37	the mains input source is inconsistent
10	PV Boost overcurrent software protection	38	Parallel mode, hardware sync signal failure
11	PV Boost overcurrent hardware protection	39	Abnormal DC component of inverter voltage
12	SPI communication error	40	Parallel program versions are inconsistent
13	Bypass overload protection	41	Parallel wiring fault
14	Inverter overload protection	42	Serial number is not set at the factory
15	Inverter overcurrent hardware protection	43	Parallel mode setting error
16	Slave chip request shutdown fault	44	Battery voltage is lower than discharge limit voltage
17	Inverter short circuit protection	45	Battery radiator over-temperature protection
18	Bus soft start fault	46	Overload warning
19	PV radiator over-temperature protection	47	Battery discharge current overcurrent
20	Inverter radiator over-temperature protection	48	Leakage current protection
21	Fan fault	49	PV insulation protection
22	Memory fault	58	BMS communication failure
23	Model setting error	59	BMS Error
24	Positive and negative bus voltages are unbalanced	60	BMS low temperature alarm
25	Bus short circuit	61	BMS over temperature alarm
26	Inverter AC output is fed back to bypass AC output	62	BMS overcurrent alarm
27	Mains input phase error	63	BMS undervoltage alarm
28	Bus voltage low protection	64	BMS overvoltage alarm

Notes：

1）OTA Update: The device cannot perform OTA update when it is in the following states: Mains Operation, Inverter Operation, Inverter-to-Mains Switching, Mains-to-Inverter Switching, PV Charging Only, or Fault.

Solution: For UI version 1.3.0.7 and above, long-press the large icon on the main interface to manually shut down the device before proceeding with the update.

2）When Setting Charging Current: The set value of mains charging current must always be less than the set value of maximum charging current.

3）In Fault State: When modifying parameters in general settings, a secondary confirmation is required.

4）US Standard Split-Phase Inverter Parallel Operation Timing: If the parallel operation mode is Three-Phase Master Unit / 2*208 Master Unit, the grid type must be set to 2*208.

5）In Parallel Operation State (Device as Master Unit): The device does not allow parameter modification when it is in the following states: Mains Operation, Inverter Operation, Inverter-to-Mains Switching, Mains-to-Inverter Switching, or PV Charging Only.

6）In Parallel Operation State (Device as Slave Unit): The device does not allow parameter modification when it is in the following states: Mains Operation, Inverter Operation, Inverter-to-Mains Switching, Mains-to-Inverter Switching, or PV Charging Only. In other states, only the following three parameters can be modified: [Parallel Operation Mode], [Grid Type], and [Parallel Operation Phase].

7.Protection Functions

7.1 Protection Functions

No	Protection Function	Instructions
1	PV Current Limiting Protection	When the charging current or power of the configured photovoltaic array exceeds the rated current or power of the inverter, charging will be carried out at the rated current and power.
2	PV Overvoltage Protection	If the photovoltaic voltage exceeds the maximum value allowed by the hardware, the machine will report a fault and stop the photovoltaic boost to output a sinusoidal AC wave.
3	Night Anti-Backflow Protection	At night, because the battery voltage is greater than the voltage of the PV module, it will prevent the battery from discharging to the PV module.
4	AC Input Overvoltage Protection	When the mains voltage exceeds 140V per phase, the mains charging will be stopped and the inverter output will be switched
5	AC Input Undervoltage Protection	When the mains voltage per phase is lower than 90V, the mains charging will be stopped and the inverter output will be switched.
6	Battery Overvoltage Protection	When the battery voltage reaches the overvoltage break point, PV and mains power will be automatically stopped to prevent overcharging of the battery.
7	Battery Undervoltage Protection	When the battery voltage reaches the low voltage break point, the discharge of the battery will be automatically stopped to prevent excessive discharge of the battery.
8	Battery Overcurrent Protection	When the battery current exceeds the hardware's allowable range, the machine will turn off the output and stop discharging the battery.
9	AC Output Short-Circuit Protection	When a short circuit fault occurs at the load output end, the output AC voltage will be immediately turned off and output again after one minute. If the output is still short circuit after three attempts, the power must be manually recharged and turned on before normal output can be restored.
10	Heat Sink Overtemperature Protection	When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will resume charging and discharging.
11	Overload Protection	After triggering overload protection, the inverter will resume output after 3 minutes. If overloaded for 5 consecutive times, the output will be shut down until the inverter restarts.(102% <110%)± 10%: Error, output will be shut down after 5 minutes.
12	AC Backfeed Protection	Prevent the battery inverter AC from backflowing to the bypass AC input.
13	Bypass Overcurrent Protection	Software detection.
14	Bypass Wiring Error Protection	When the phase of the two bypass inputs is different from the phase of the inverter phase, the machine will prohibit the bypass from being switched on to prevent the load from being powered off or short-circuited when the bypass is switched on.

8.Product Maintenance

8.1 Troubleshooting

Fault Code	Meaning	Cause	Solution
/	The screen is not displaying	There is no power input, or the device switch is not turned on.	Check whether the battery circuit breaker or PV circuit breaker is closed; ensure the switch is in the "ON" state.
01	Battery voltage low	The battery voltage is lower than the value set in the "battery under-voltage warning voltage" parameter	Charge the battery until the battery voltage is higher than the value set in the parameter.
03	Battery no connect	The battery is not connected, or the lithium battery BMS is in discharge protection mode	Check whether the battery is reliably connected; check whether the circuit breaker of the battery is closed; ensure that the BMS of the lithium-ion battery can communicate normally.
04	Battery undervoltage stops discharging	The battery voltage is lower than the value set by the parameter "overcharge voltage"	Perform a manual reset. Turn off the power and restart. Automatic reset: Charge the battery until its voltage is higher than the value set in the parameter item "Over - discharge Recovery Voltage".
06	Battery charge overvoltage protection	The battery is overvoltage	Turn off the power manually and restart. Check whether the battery voltage exceeds the limit. If so, discharge the battery until the voltage is below the overvoltage of the battery
13	Bypass overload protection	The output power or output current of the side road is overloaded for a certain period of time	Reduce the load power and restart the device. For more details, refer to item 11 in the protection function
14	Inverter overload protection	The output power or output current of the inverter is overloaded for a certain period of time	
19	PV radiator over-temperature protection	The temperature of the photovoltaic radiator exceeds 80°C for 3s	When the radiator temperature cools below the overtemperature recovery temperature, normal charging and discharging are resumed
20	Inverter radiator over-temperature protection	The temperature of the inverter radiator exceeds 80°C for 3s	
21	Fan fault	The hardware detects a fan failure	After powering off, manually turn the fan to check if there is any foreign object blocking it.
26	Inverter AC output is fed back to bypass AC output	The AC output relay is stuck	Manual restart, if the fault occurs again after restart, you need to contact the after-sales service to repair the machine
27	Mains input phase error	The AC input phase is not consistent with the AC output phase	Ensure that the phase of the AC input is the same as that of the AC output. For example, if the output is in split mode, the input must also be in split mode

8.2 Maintenance

To maintain optimal long-term performance, it is recommended to perform the following checks twice a year:

1. Confirm that the air flow around the inverter is not blocked, and remove any dirt or debris on the radiator.
2. Check all exposed wires to see if their insulation is damaged due to sun exposure, friction with surrounding objects, dry rot, damage by insects or rodents, etc. Repair or replace the wires if necessary.
3. Verify that the indicators and displays are consistent with the equipment operation. Pay attention to any fault or error displays and take corrective measures if necessary.
4. Examine all the wiring terminals for signs of corrosion, insulation damage, high temperature, burning/discoloration, and tighten the terminal screws.
5. Check for dirt, nesting insects, and corrosion, and clean the insect - proof net regularly as required.
6. If the lightning arrester has failed, replace the failed one in a timely manner to prevent lightning-strike damage to the inverter and even other equipment of the users.

DANGER

•Before performing any inspection or operation, make sure that the inverter is disconnected from all power sources and that the capacitors are fully discharged to avoid the risk of electric shock.

The following causes of machine problems are not covered by the standard warranty:

1. The product has exceeded the warranty period (except for the service of extending the warranty period signed by both parties).
2. Failure to operate according to the product manual or relevant installation and maintenance requirements, failure or damage caused by non-product specified working environment, storage or use. Such as incorrect use of installation distance, ventilation, waterproof cap, etc..
3. Unauthorized disassembly, maintenance or modification of the machine.
4. Products obtained through unauthorized channels.
5. Faults and damages caused by unforeseen or human factors or force majeure, such as storm weather, flood, lightning, overvoltage, insect damage and fire.
6. Unauthorized modification, design change or replacement of parts.
7. Intentional damage or defacement, making indelible marks, theft, etc..
8. Normal wear and tear.
9. Not used in accordance with correct safety requirements (e.g. VDE standards).
10. Other failures or damages caused by non-product quality problems.
11. Damage caused by transportation (including scratches on the shell caused by moving the packaged product during transportation).
12. Due to the harsh environment, the machine shell is rusted and corroded.