ENERGY SOLUTIONS FOR ALL MATTERS

OFF GRID INVERTER

KE Series Split-Phase

User Manual

KAD0004

Model number: KE-8KLSUF KE-10KLSUF KE-12KLSUF

CATALOUGE

1.Safety Notes

1.1How to use this manual

・This manual contains important information, guidelines, operation and maintenance of the product and is suitable for the following models: **KE-8KLSUF, KE-10KLSUF, KE-12KLSUF**.

・Users must follow the contents of this manual in the process of installation, use and maintenance.

1.2The meaning of the symbols in the manual

symbol	description
	**DANGER** indicates a dangerous situation that, if not avoided, will result in death or serious injury
	**WARING** means a dangerous situation that, if not avoided, could result in death or serious injury
	**CAUTION** indicates a dangerous situation that, if not avoided, could result in mild or moderate injury.
	**NOTICE** provides some tips on how to operate the product

1.3Safety instructions

DANGER

- This chapter contains important safety instructions. Please read and save this manual for future reference.
- Be sure to follow local requirements and regulations to install this inverter.
- Beware of high voltages. Turn off the switches on each power supply before and during installation to avoid electric shock.
- In order to achieve the best operation of this inverter, please select the appropriate cable size and necessary protection devices according to the regulations.
- Do not connect or disconnect any connections while the inverter is working.
- Do not open the terminal cover while the inverter is working.
- Make sure the inverter is well grounded.
- Do not short-circuit the AC output and DC input.
- Do not disassemble the machine, all repairs and maintenance, please send to professional repair center.
- Do not charge the frozen battery.

2.Product introduction

2.1Product Description

KE series energy storage hybrid inverter through the connection and overall control of photovoltaic, energy storage battery, grid and load, for home, commercial and industrial users to provide stable, safe and clean electric energy, to meet the energy needs of different scenarios.

2.2Product Features

- Supports multiple types of energy storage batteries such as lead-acid batteries and lithium-ion batteries
- Support single-phase and split-phase pure sine wave output
- Support each phase voltage adjustment in the range of 100~120Vac
- Support two photovoltaic inputs, with the function of tracking the maximum power charging/carrying capacity of two MPPT simultaneously. The MPPT efficiency is up to 99.9%, and the maximum current of a single channel is 22A
- Has two output modes of mains bypass and inverter output, with uninterrupted power supply function
- There are 4 charging modes: PV only, Mains priority, PV priority and mains/PV hybrid charging
- Support for timed battery charging and timed battery discharge
- Energy saving mode function of single machine to reduce no-load energy loss
- With a variety of protection functions, fully protect the safety of photovoltaic panels, batteries, loads and the controller itself.
- Capacitive smart touch large screen, menu operation, intuitive and convenient parameter setting.
- Support 256 event records; Supports 1024 days of historical data storage.
- Built-in Bluetooth and WIFI interface, providing native cloud platform access ability, automatic time after connection.

2.3System connection diagram

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

1. **Photovoltaic modules:** Convert light energy into direct current energy, which can be used to charge the battery through an inverter, or direct inverter to alternating current, which supplies power to the load.

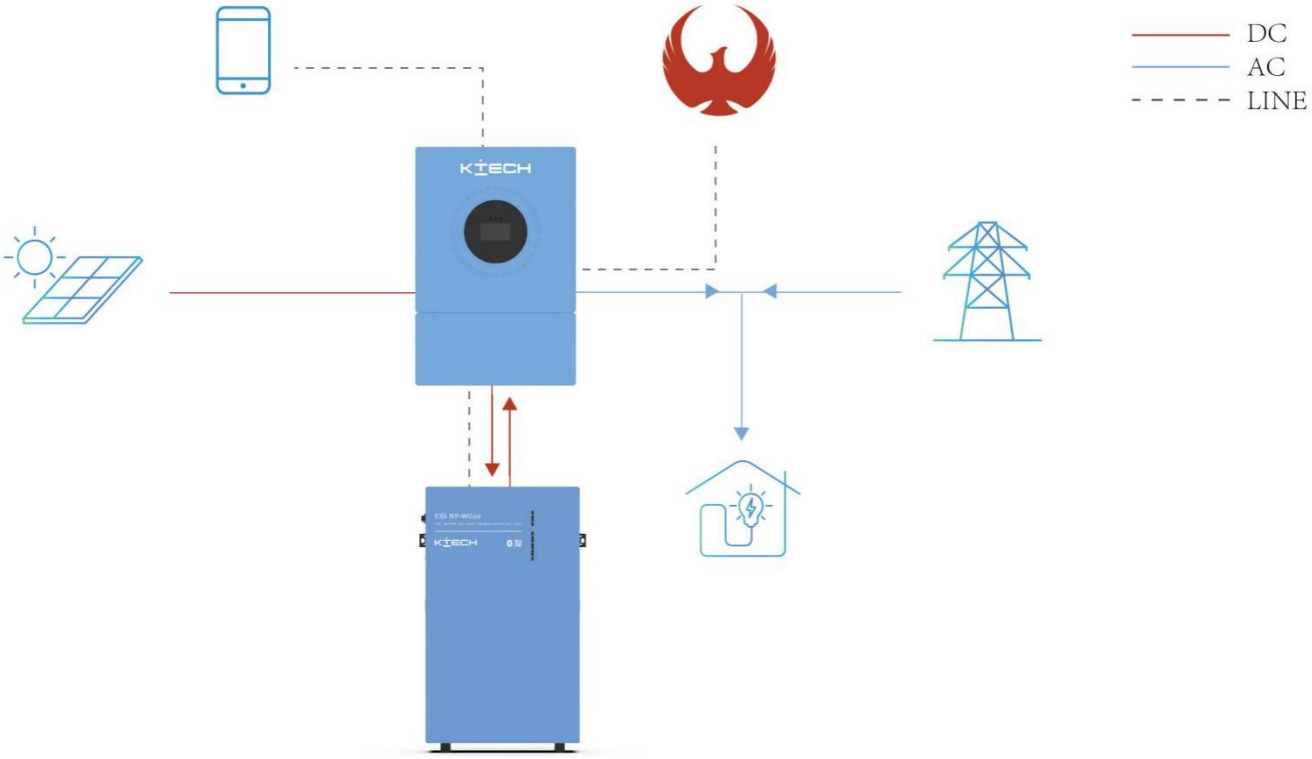
2. **Mains or generator:** Connected to an AC input, which can charge the battery while supplying the load. The system can also generally operate without mains or generator while the battery and photovoltaic modules power the load.

3. **Battery:** The role of the battery is to guarantee the normal power supply of the system load in case of insufficient photovoltaic and no mains power.

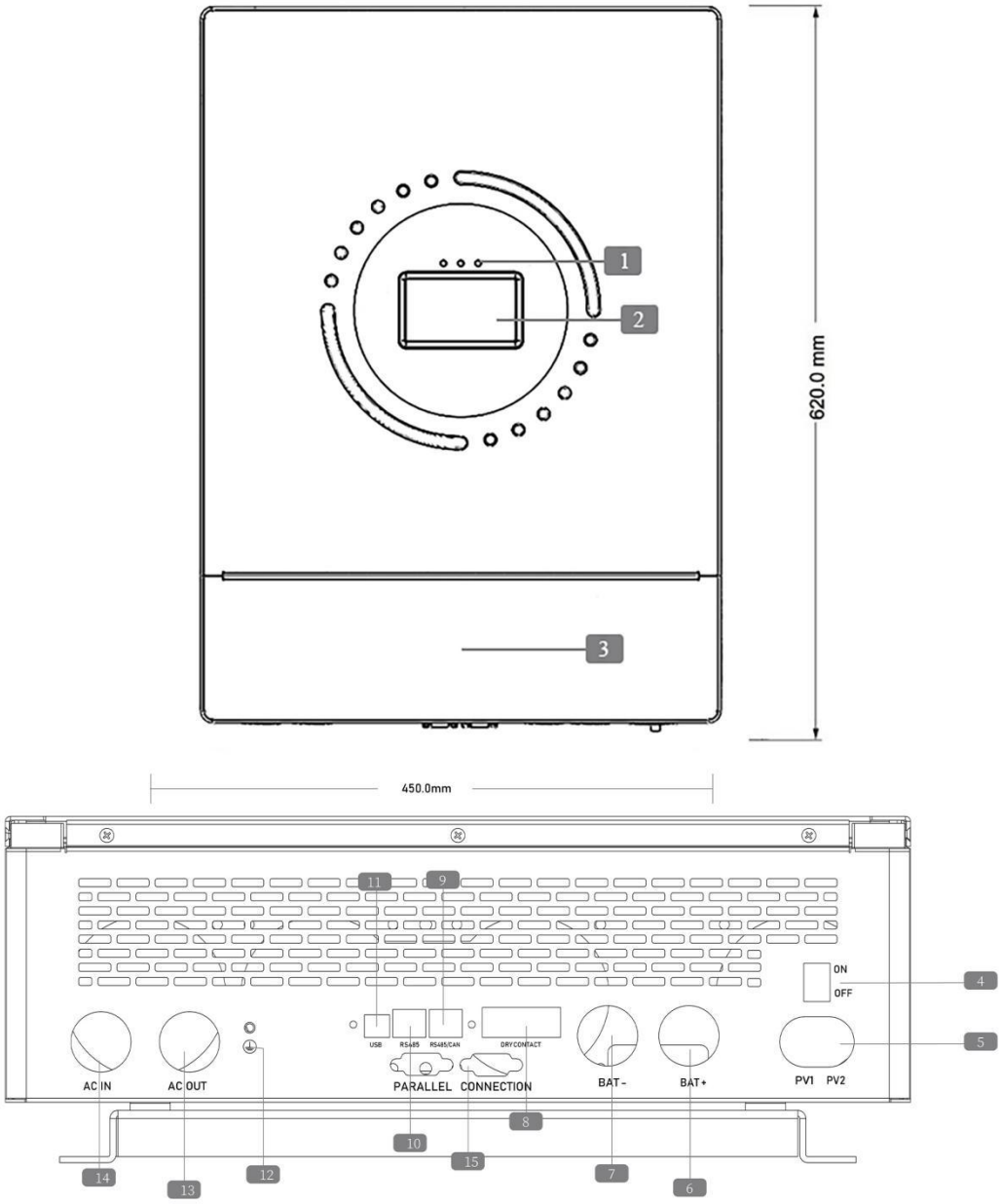
4. **Loads:** A variety of home and office loads can be connected, including refrigerators, lamps, TVs, fans, air conditioners and other AC loads.

5. **Inverters**: Energy conversion devices for the entire system

Actual application scenario diagram:



2.4Product Overview



1	LED indicator	**2**	Capacitive Touchscreen	**3**	Terminal protective cover
4	ON/OFF boat type switch	**5**	Photovoltaic input (1/1)	**6**	Battery (Positive Pole)
7	Battery (Negative Pole)	**8**	Dry contacts	**9**	CAN/RS485-2 port
10	RS485-1 port	**11**	USB-B port	**12**	Ground screws
13	Ac output	**14**	Ac input	**15**	Parallel communication interface

2.5Product parameter sheet

Model number	KE-8KLSUF	KE-10KLSUF	KE-12KLSUF
Inverter output			
Rated output power	8000 W	10000 W	12000 W
Maximum peak power	16000 W	20000 W	24000 W
Rated output voltage	120/240Vac (split/single phase)		
On-load motor capability	5HP	6HP	
Rated frequency	50/60Hz		
Output waveform	Pure sine wave		
Switching time	10ms (typical value)		
Battery			
Battery type	Lithium-ion battery/lead-acid battery/User-defined		
Rated battery voltage	48Vdc		
Voltage range	40~60Vdc		
Maximum PV charging current	180A	200A	
Maximum mains/generator charging current	100A	120A	
Maximum hybrid charging current	180A	200A	
PV input			
MPPT way number	2		
Maximum input power	5500 W+ 5500 W		6600 W + 6600 W
Maximum input current	22A+22A		
Maximum open circuit voltage	500Vdc+500Vdc		
MPPT operating voltage range	125~425Vdc		
Mains/generator input			
Input voltage range	90~140Vac		
Input frequency range	50/60Hz		
Bypass overload current	63A		

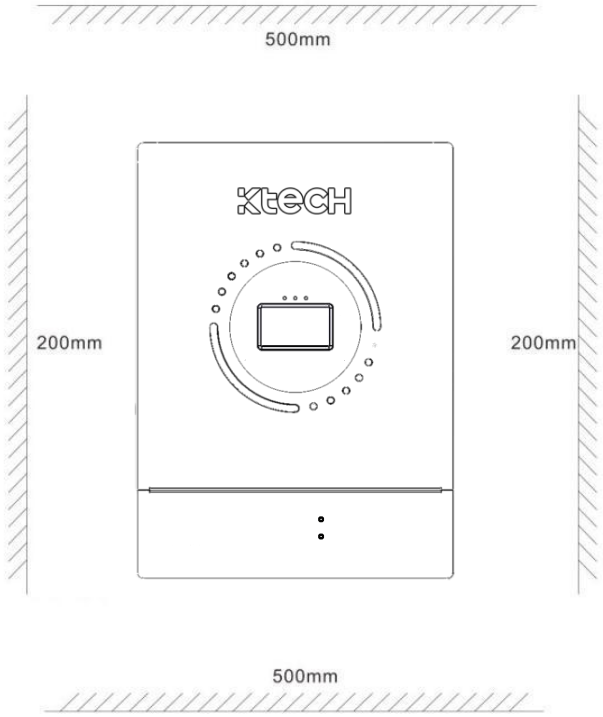
Efficiency			
MPPT tracks efficiency	99.9%		
Maximum efficiency of battery inverter	92%		
Universal			
Size	620*450*172mm		
Weight	23kg		
Level of protection	IP20, for indoor use only		
Ambient temperature	-10 to 55 ° C,>45 ° C derated		
Noise	<60dB		
Cooling method	Smart cooling		
Warranty time	3 years		
communication			
Built-in interface	RS485 / CAN/USB/Dry contact		
Communication module	WIFI/Bluetooth		
Certified			
Safety Rules	UL1741,IEC62109-1,IEC62109-2		
EMC	EN61326-1:2013		
RoHS	Yes		

3.Install

3.1Select the mounting location

This product is for indoor use only (protection level IP20), users are required to consider the following factors before choosing an installation location:

- Choose a solid wall to install the inverter on.
- Install the inverter at eye level.
- Adequate space must be provided for the inverter to dissipate heat.
- The ambient temperature should be between -10 and 55 ° C (14 to 131 ° F) to ensure optimal operation.



DANGER

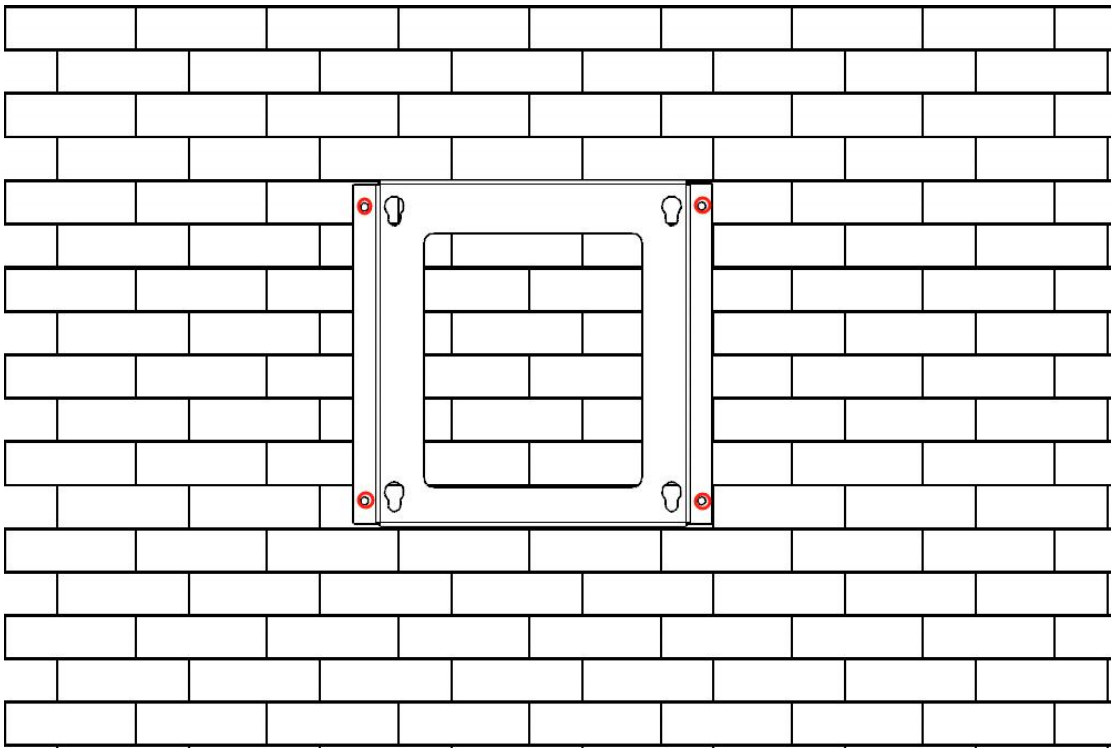
- The inverter should not be installed in proximity to highly flammable substances.
- The inverter should not be installed in potential explosive areas.
- The inverter and lead-acid batteries should not be installed in an enclosed space.

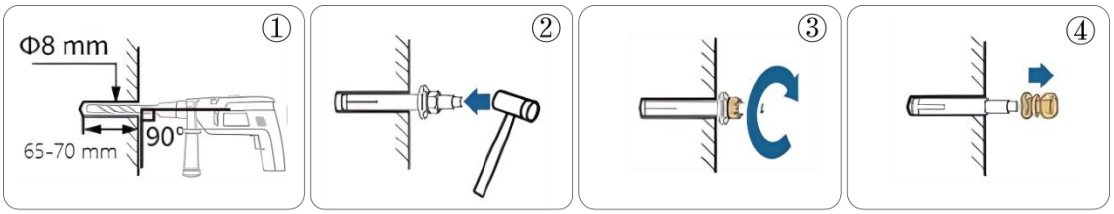
WARING

- The inverter must not be installed in an area exposed to direct sunlight.
- Do not install or utilize the inverter in a humid environment.

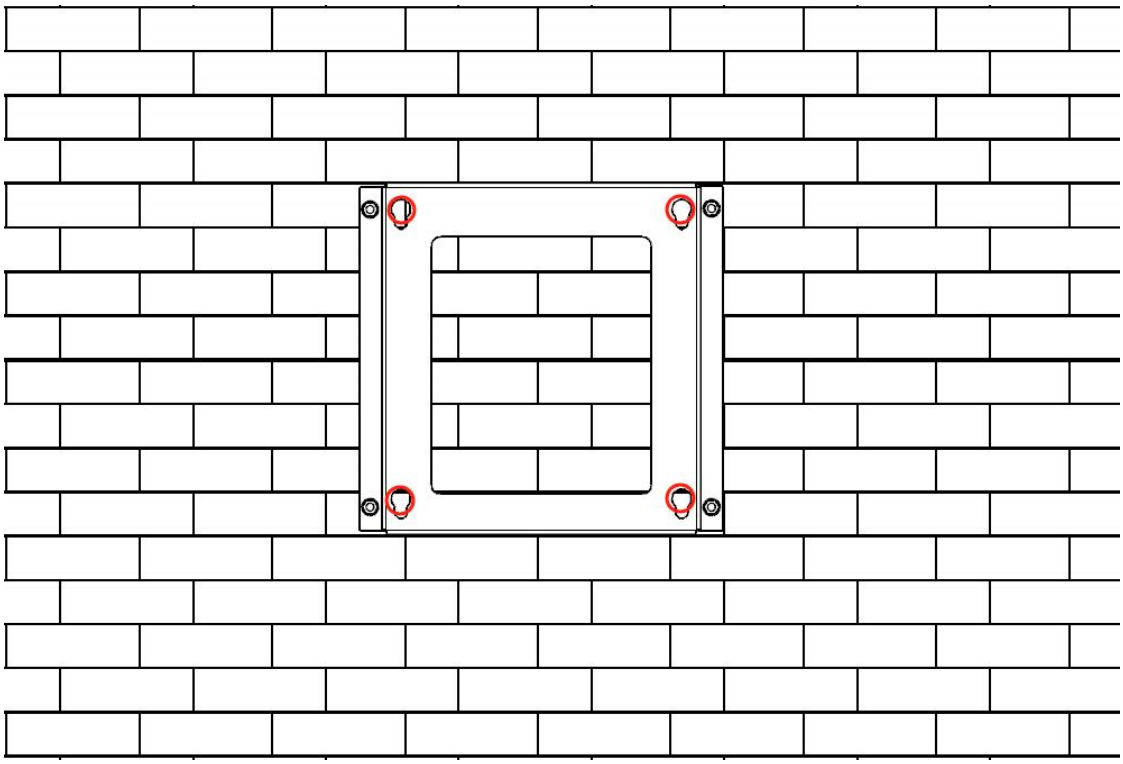
3.2Install the pylon

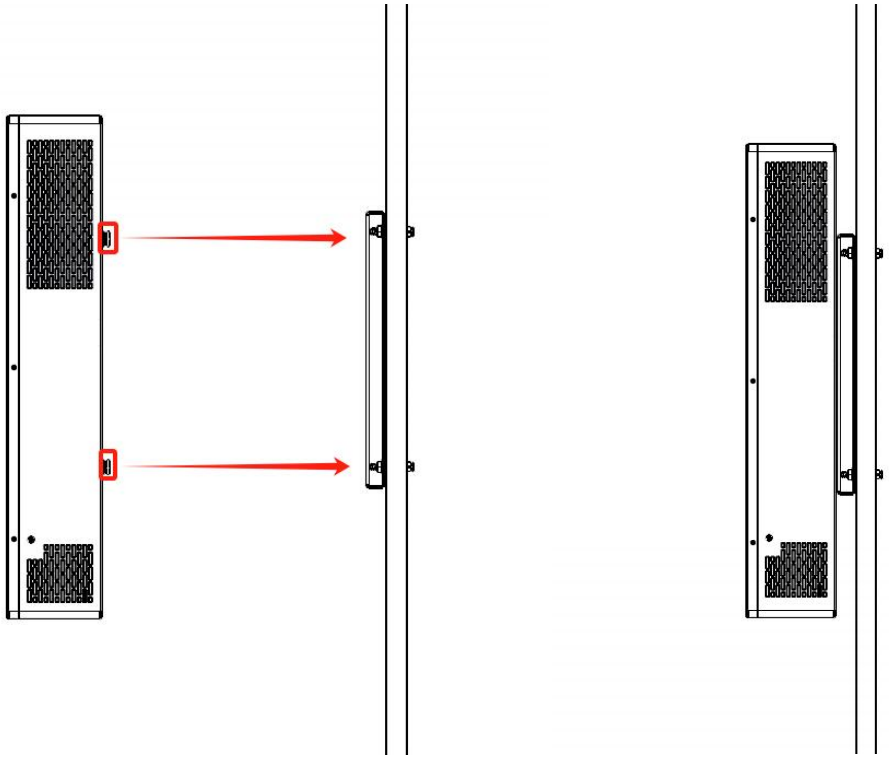
Use an electric drill to drill 4 mounting holes in the wall according to the hole positions of the pylon according to the specified dimensions and insert four expansion screws.





3.3Install the inverter





NOTICE

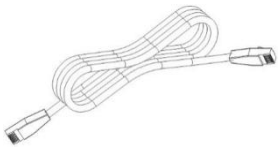
• When using the equipment in areas with poor air quality, the dust filter will be blocked by air particles. Please disassemble and clean the air filter regularly to avoid affecting the internal air flow rate of the inverter, thus triggering the device overtemperature protection failure, affecting the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

3.4Parallel wiring connection

3.4.1 Introduction

- Inverters can be up to six parallel.
- When using the parallel function, it is necessary to correctly, firmly and reliably connect the parallel communication line (packaging accessories). The following is the connection line diagram:

Parallel line *1



3.4.2 Note on connection of parallel connecting wire

1.PV wiring:

When it comes to parallel connection, distinct machines are required to be connected to different PV arrays or PV sources. The identical PV should not be connected to different machines, and the PV1 and PV2 of a machine must not be connected to the same PV source.

2. Battery cable connection:

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

3. AC OUT connection:

3.1Single phase parallel line

For single-phase parallel connection, all inverters must be connected L to L, N to N, and PE to PE. Ensure that the connection is correct and the cable length and diameter are the same before power-on and startup to avoid abnormal operation of the parallel system output due to incorrect connection.

3.2Three-phase parallel line

When three-phase parallel is connected, all inverters must be N to N wire and PE to PE. The L lines of all machines in the same phase need to be connected together, but the L lines of AC output in different phases can not be connected together. Other precautions are the same as for connecting single-phase parallel machines.

3.3AC IN connection:

When single-phase parallel connection, all inverters must be connected to L, N and N wire, PE and PE, and ensure that the connection is correct and the wiring length and wire diameter are the same before power-on

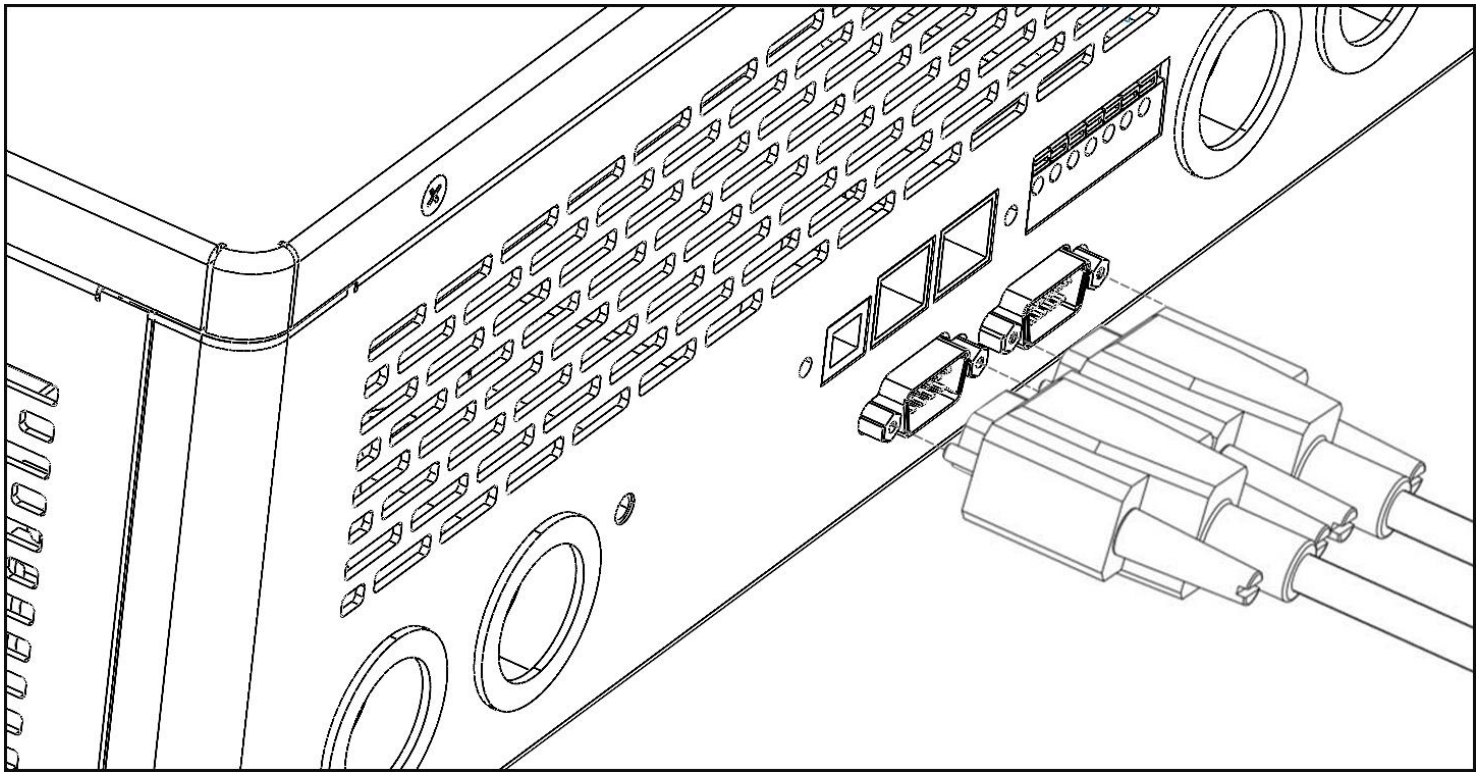
and startup, to avoid the wrong connection caused by the parallel system output abnormal work. At the same time, do not use multiple different AC source input to avoid damage to the inverter or external electrical equipment. Ensure that the AC source input is consistent and unique. When the three-phase parallel connection, all inverters must be connected to the N wire and PE to PE. The L lines of all machines with the same phase need to be connected together, while the L lines of different phases of AC input can not be connected together.

3.4Parallel communication line connection:

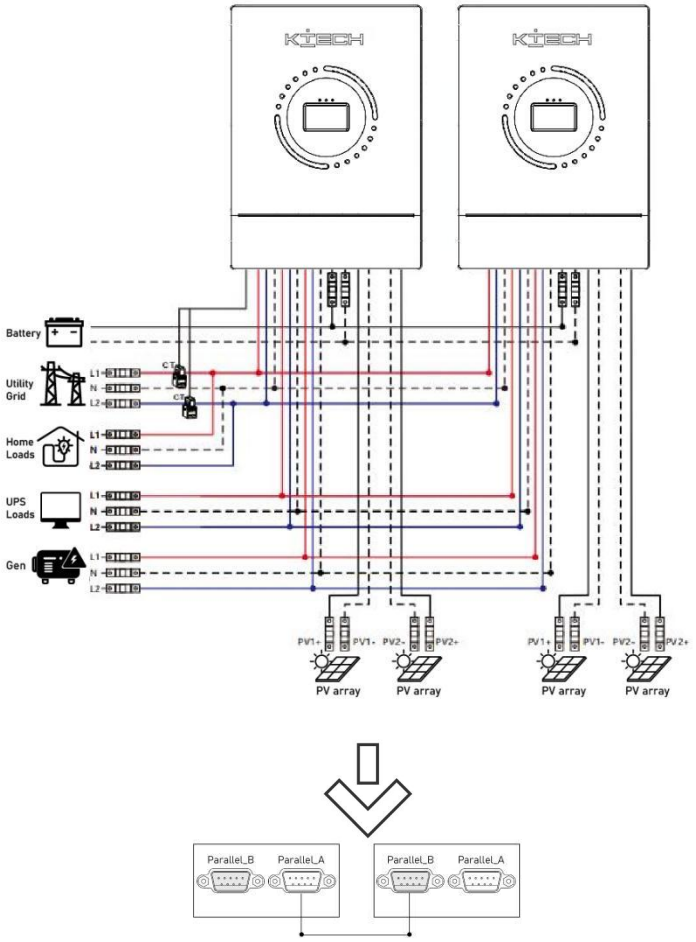
The communication line is used for single-phase or three-phase parallel connection. Each machine needs to be connected with one out and one in, that is, the male head of the machine (out) and the female head of the machine (in) need to be connected. The male head of the machine cannot be connected with the female head of the machine. At the same time, the parallel communication line of each machine must be tightened by screws to avoid the parallel communication line falling off or poor contact resulting in abnormal work or damage to the system output.

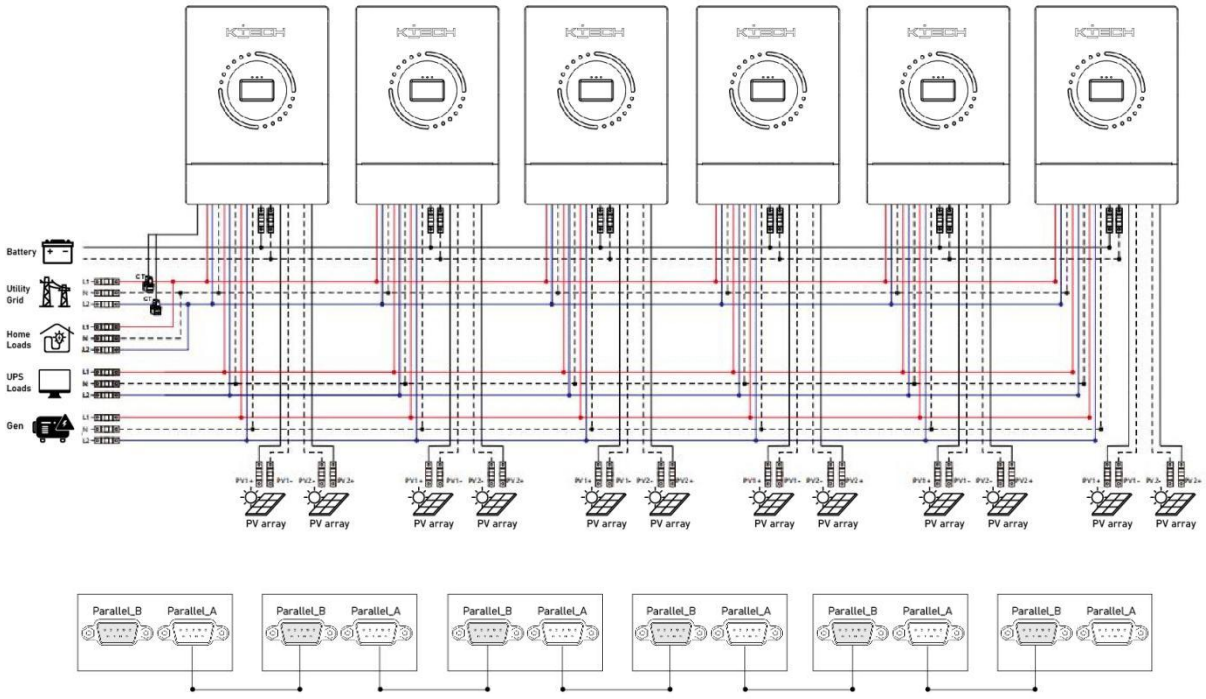
3.4.3 Single phase parallel machine connection guide diagram

1、Inverter parallel communication line and current equalizing detection line need to be connected after the screw lock, the diagram is as follows:



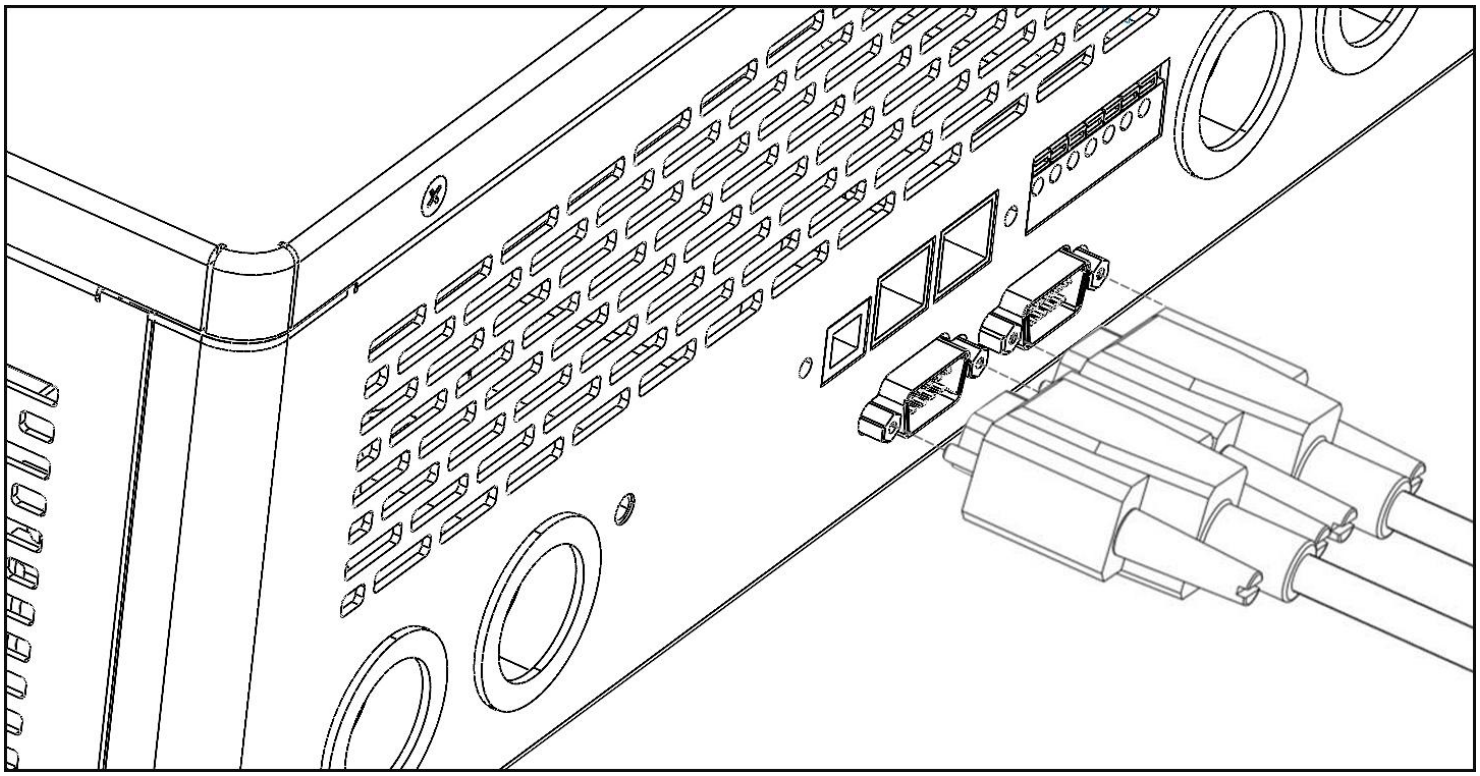
2, multiple parallel machine, parallel machine connection guidance diagram is as follows:





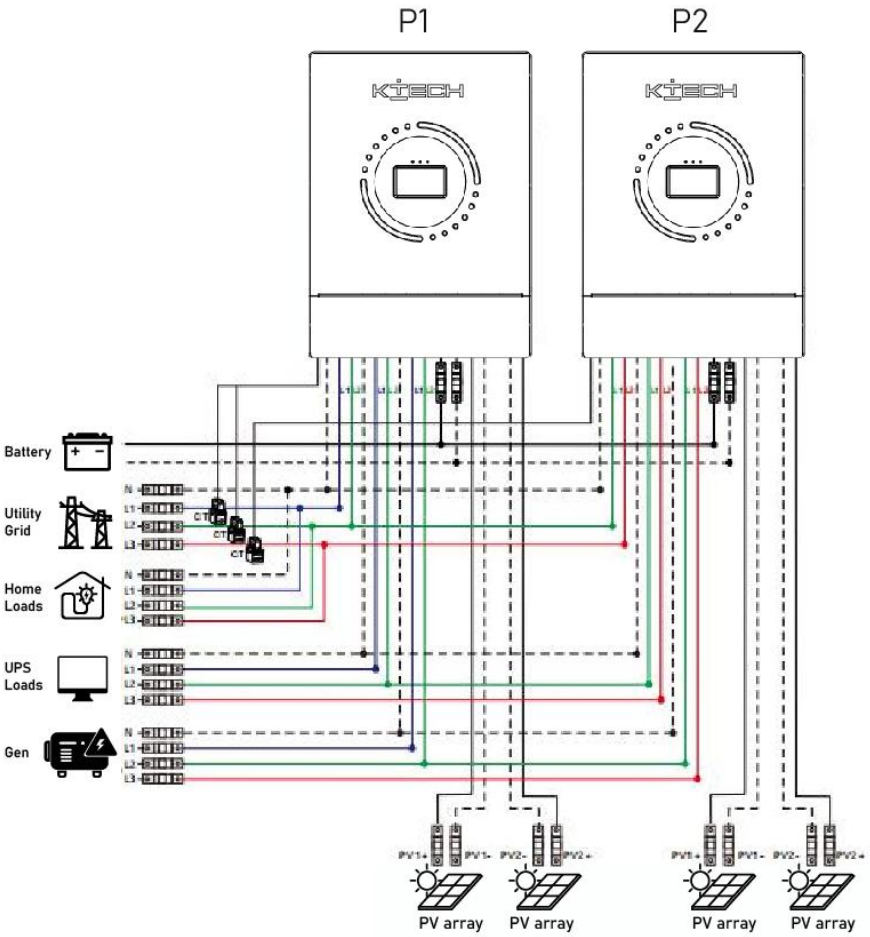
3.4.4 Three-phase parallel machine connection guidance diagram

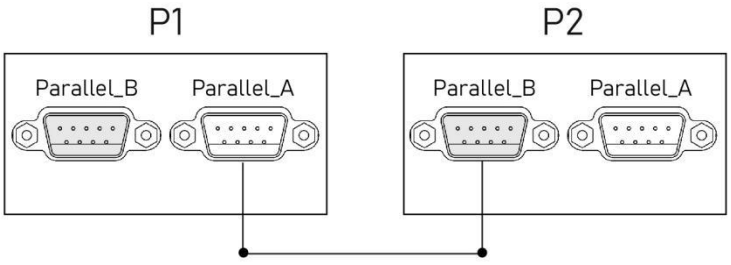
1.The inverter parallel communication line needs to be connected after the screw lock, the diagram is as follows:



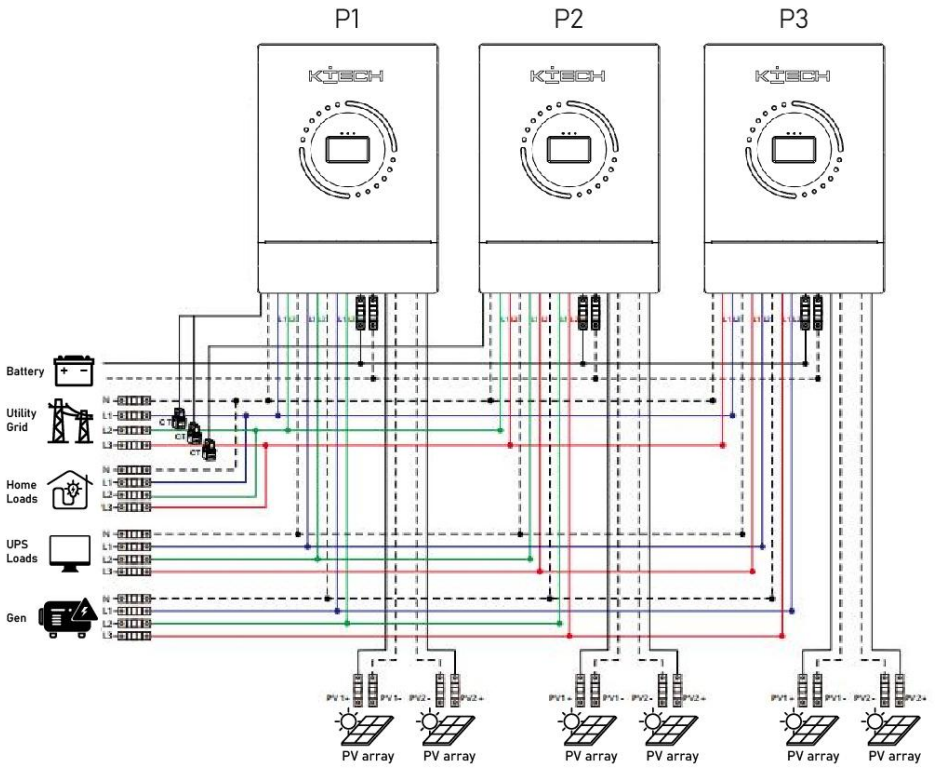
Three-phase parallel

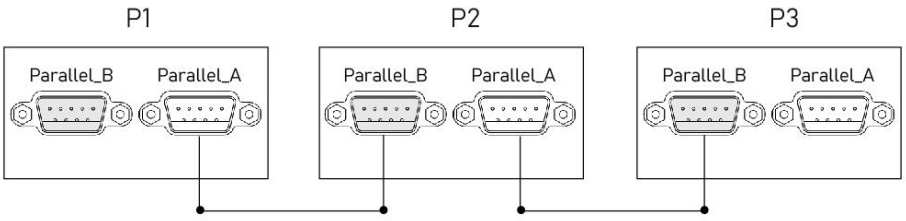
a）



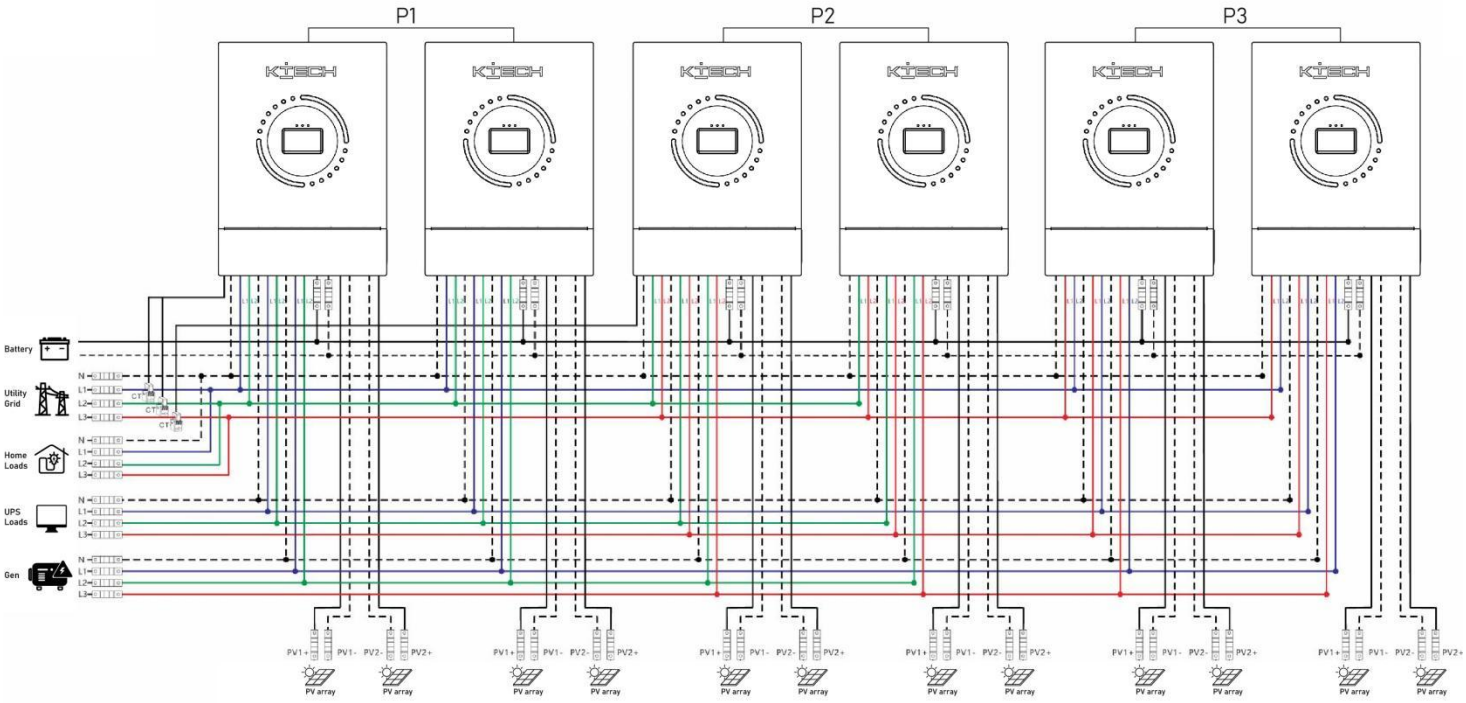


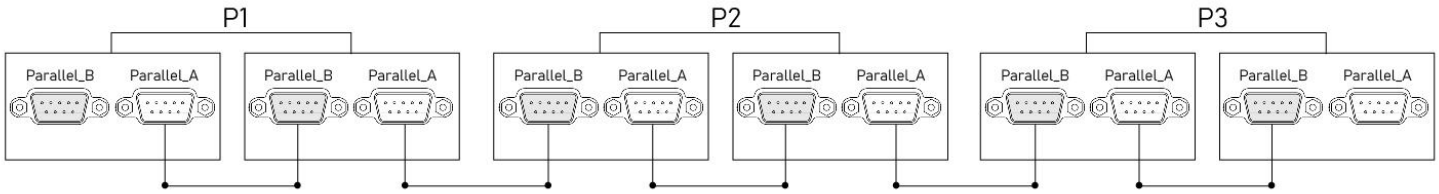
b）


P1
P2
P3
Battery
Utility Grid
Home Loads
UPS Loads
Gen
CT
PV array
PV array
PV array
PV array
PV array
PV array


P1
P2
P3
Parallel_B
Parallel_A
Parallel_B
Parallel_A
Parallel_B
Parallel_A

c）


P1
P2
P3
Battery
Utility Grid
Home Loads
UPS Loads
Gen
N
L1
L2
L3
CT
PV1+
PV1-
PV2-
PV2+
PV array


P1
P2
P3
Parallel_B
Parallel_A

Attention:

1) Before powering on and lighting the screen, check whether the wiring is correct according to the wiring diagram above to avoid system problems.

2) All connections must be securely secured to avoid system anomalies caused by cable shedding.

3) When connecting AC output cables to the load, connect the cables correctly according to the requirements of the electrical load equipment to avoid damage to the load equipment.

4)The AC output voltage needs to be set uniformly, or set only for the host. When running in parallel, the voltage set on the host prevails. The master forcibly overwrites other slaves to be consistent. In standby mode only, you can set this option.

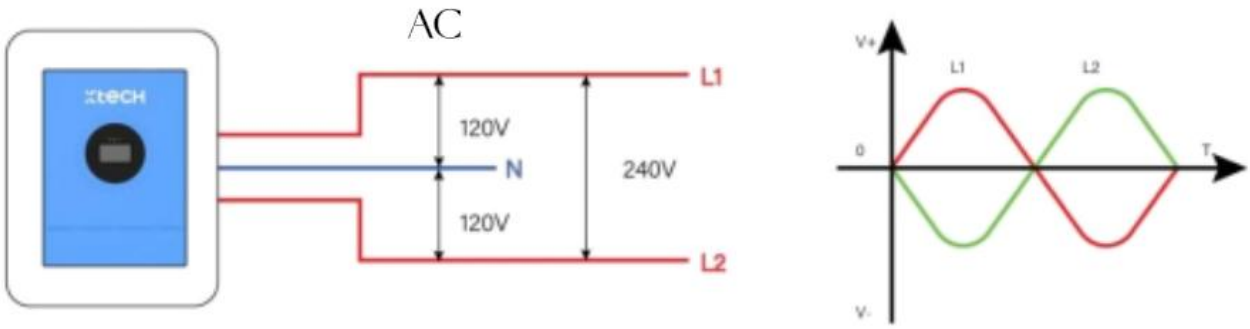
5) The machine defaults to standalone mode from the factory, and if you use parallel or three-phase functions, you need to set the AC output mode through the screen. The setting method is:

Power on one machine each time, turn off the other machines, and then set the AC output mode according to the field system operation mode. After the machine is successfully set up, turn off the machine switch, wait for the machine to be powered off, and then set other machines in turn until all machines are set up, all machines are powered on again at the same time, and enter the working state.

6)After the system runs, the output voltage is measured correctly, and then the load is set.

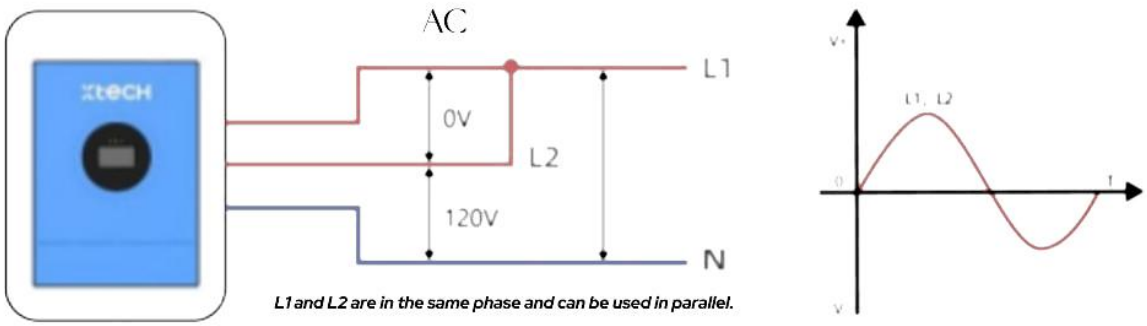
4 .Wiring

4.1 Split-phase mode (default)



Items	Description
Applicable model	KE-12KLSUF/KE-10KLSUF/KE-8KLSUF
Ac output phase voltage (L-N)	100~120Vac, 120Vac default
Ac output line voltage (L-L)	200 to 240Vac, 240Vac default

4.2 Single-phase mode

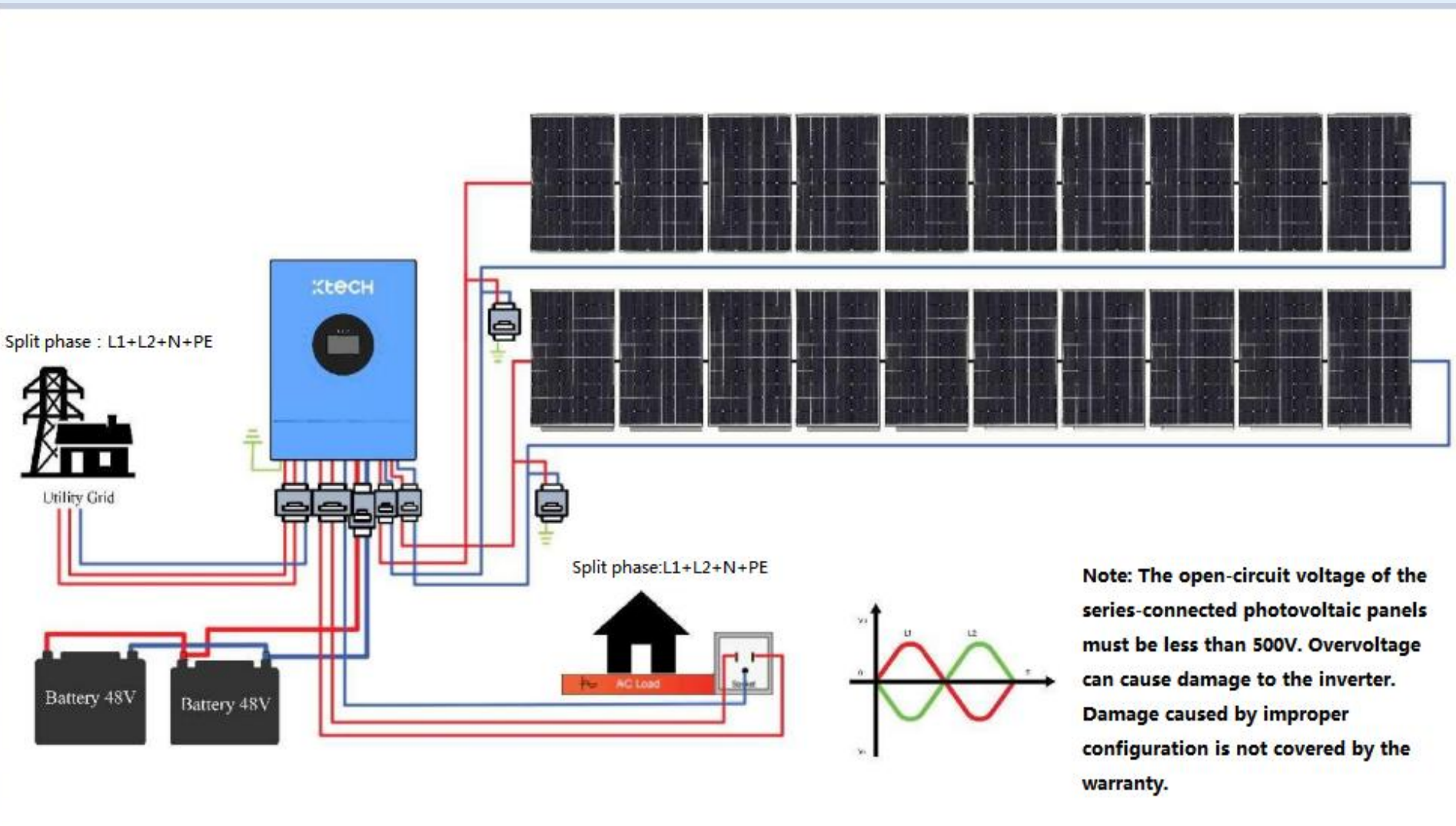


Items	Description
Applicable model	KE-12KLSUF/KE-10KLSUF/KE-8KLSUF
Ac output phase voltage (L-N)	100~120Vac, 120Vac default

NOTICE

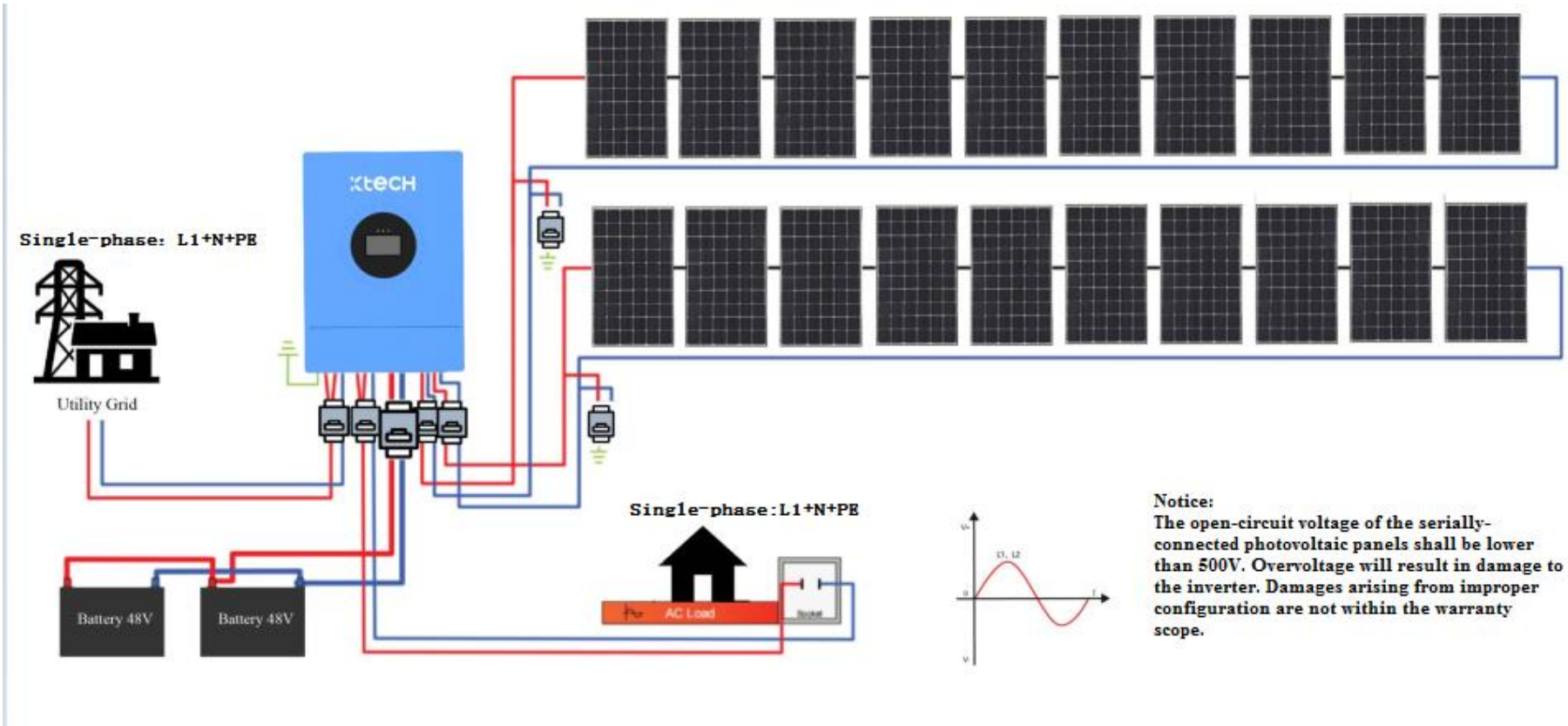
- Users can change the output voltage through the settings menu.
- The output voltage can be set within the range of 100V to 120V.

Split phase mode



Note: The open-circuit voltage of the series-connected photovoltaic panels must be less than 500V. Overvoltage can cause damage to the inverter. Damage caused by improper configuration is not covered by the warranty.

Single-phase mode



Notice:
The open-circuit voltage of the serially-connected photovoltaic panels shall be lower than 500V. Overvoltage will result in damage to the inverter. Damages arising from improper configuration are not within the warranty scope.

4.3 Cable and circuit breaker selection

•Photovoltaic input

Model number	Wire diameter	Maximum input current	Circuit breaker specifications
KE-8KLSUF	5mm²/10AWG	22A	2P-25A
KE-10KLSUF	5mm²/10AWG	22A	2P-25A
KE-12KLSUF	5mm²/ 10 AWG	22A	2P-25A

•Ac input

Model number	Output model	Maximum current	Wire diameter	Circuit breaker specifications
KE-8KLSUF	Split phase	63A(L1/L2/N)	13mm²/6AWG (L1/L2/N)	3P-63A
	Single -phase	63A(L1/L2) 126A(N)	13mm²/6AWG (L1/L2) 26mm²/3AWG (N)	2P-125A
KE-10KLSUF	Split phase	63A(L1/L2/N)	13mm²/6AWG (L1/L2/N)	3P-63A
	Single -phase	63A(L1/L2) 126A(N)	13mm²/6AWG (L1/L2) 26mm²/3AWG (N)	2P-125A
KE-12KLSUF	Split phase	100A(L1/L2/N)	27mm²/3AWG (L1/L2/N)	3P-100A
	Single -phase	100A(L1/L2) 160A(N)	68mm²/6AWG (L1/L2) 26mm²/ 2/0AWG (N)	2P-175A

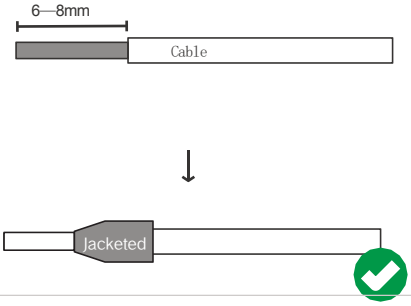
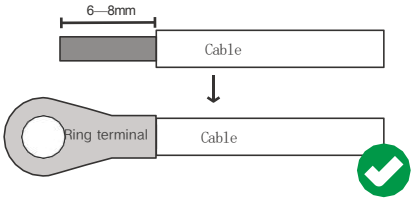
•Battery

Model number	Wire diameter	Maximum current	Circuit breaker specifications
KE-8KLSUF	34mm²/2AWG	180A	2P-200A
KE-10KLSUF	42mm²/1AWG	220A	2P-250A
KE-12KLSUF	42mm²/1AWG	220A	2P-250A

•Ac output

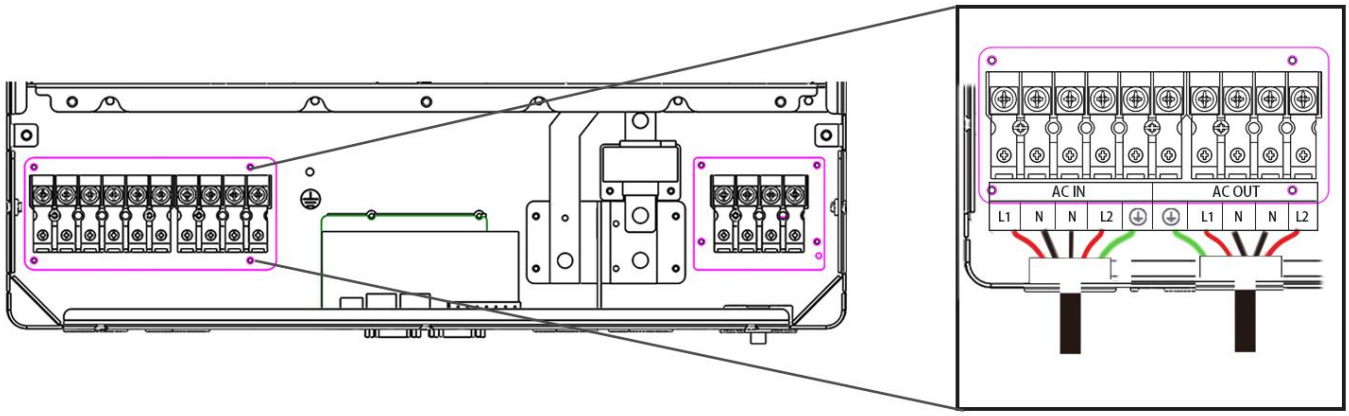
Model number	Output model	Maximum current	Wire diameter	Circuit breaker specification
KE-8KLSUF	Split phase	42A(L1/L2/N)	13mm²/6AWG (L1/L2/N)	3P-63A
	Single-phase	42A(L1/L2) 84A(N)	13mm²/6AWG (L1/L2) 26mm²/3AWG (N)	2P-125A
KE-12KLSUF	Split phase	63A(L1/L2/N)	13mm²/6AWG (L1/L2/N)	3P-63A
	Single-phase	63A(L1/L2) 126A(N)	13mm²/6AWG (L1/L2) 26mm²/3AWG (N)	2P-125A
KE-12KLSUF	Split phase	100A(L1/L2/N)	27mm²/3AWG (L1/L2/N)	3P-100A
	Single-phase	100A(L1/L2) 160A(N)	68mm²/6AWG (L1/L2) 26mm²/ 2/0AWG (N)	2P-175A

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.



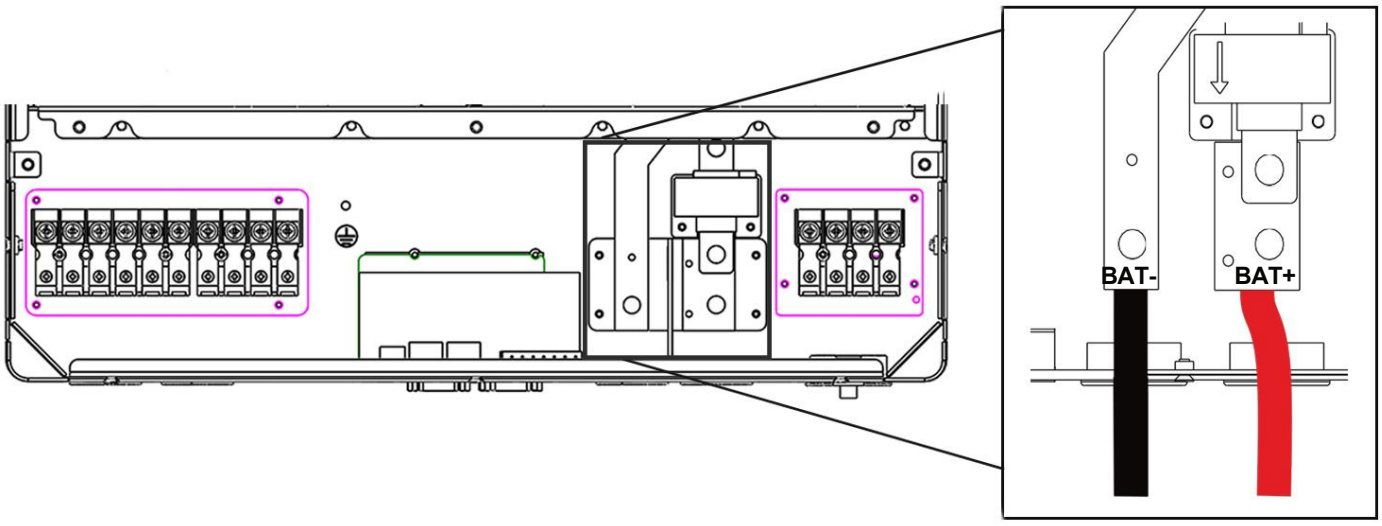
Ac input AC output

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.

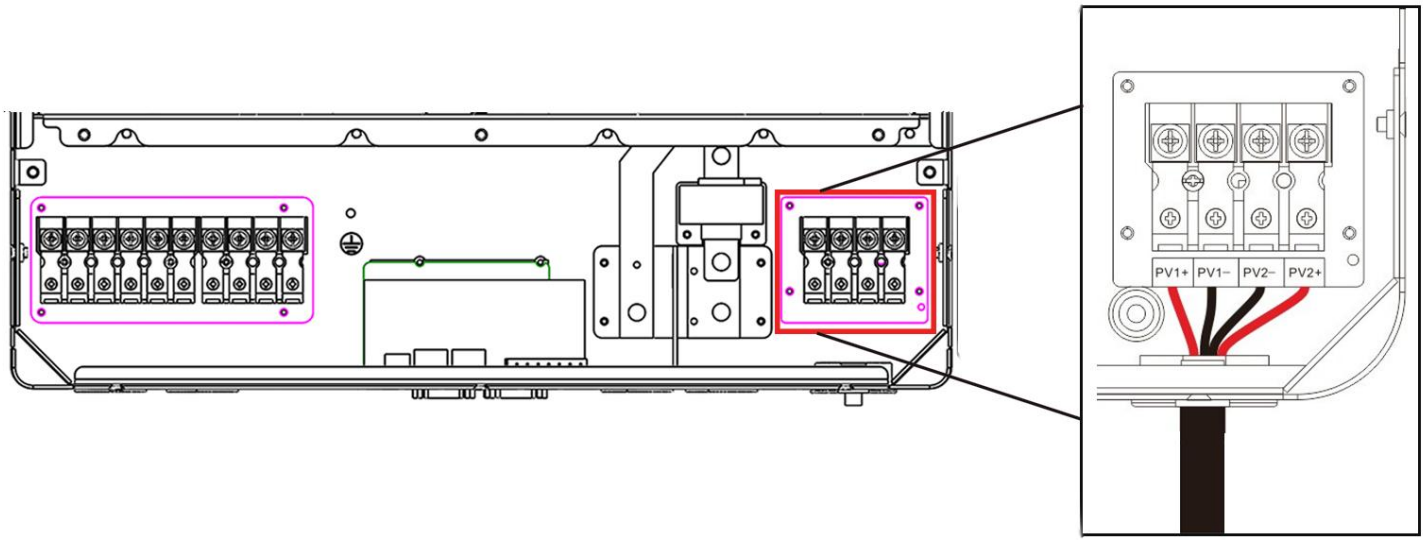


DANGER

- Before connecting the battery, the circuit breaker must be disconnected to avoid the danger of electric shock and must not be operated with electricity.
- Make sure that the positive and negative terminals of the battery are properly connected, and do not connect them in reverse, otherwise it may damage the inverter.
- Please check that the cable used is sufficient to meet the requirements, too thin, poor quality cables will have serious safety hazards.

4.6 Photovoltaic wiring

Connect the positive and negative wires of the two photovoltaics according to the cable position and sequence shown in the following figure.

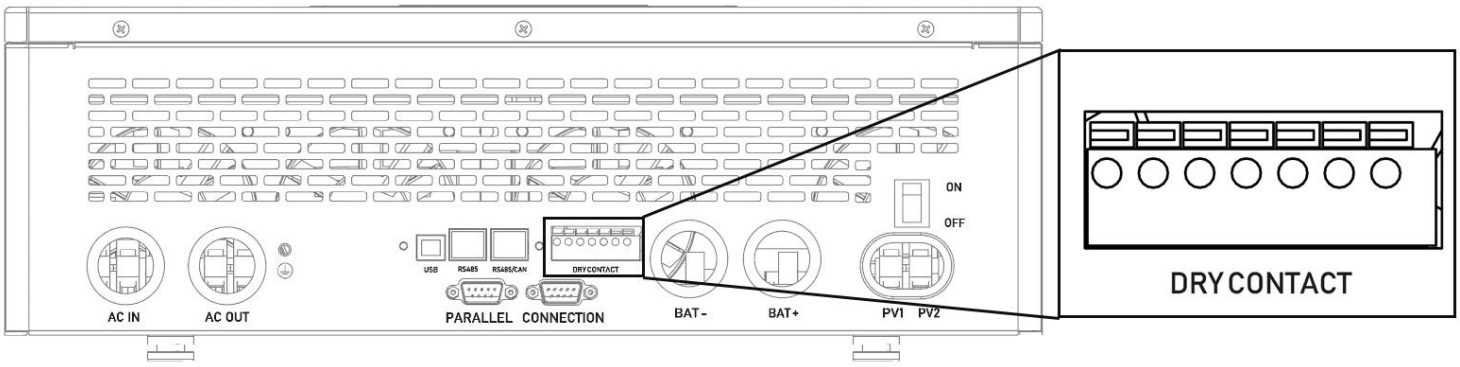


DANGER

- 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 (in the KE series, this value is 500V), otherwise the inverter may be damaged.

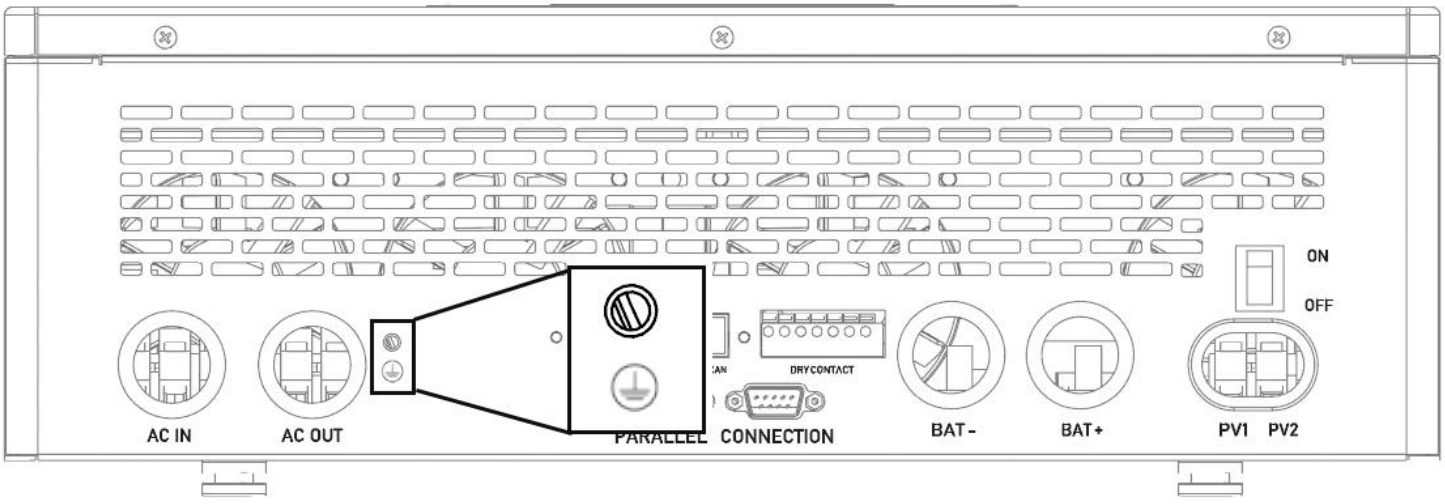
4.7 Dry contact cable

Use a small screwdriver to push the arrow back in the direction it is pointing, then insert the communication cable into the dry junction port. (The section of the communication wire is 0.2 to 1.5mm²).



4.8 Ground

Ensure that the ground terminal is securely connected to the ground bus.



NOTICE

- The ground cable should be no less than 4mm² in diameter and as close to the ground point as possible.

4.9 Final installation

After ensuring that the wiring is reliable and the wire sequence is correct, restore the terminal protective cover to its original position.

4.10 Start the inverter

•Step 1: Close the battery's circuit breaker.

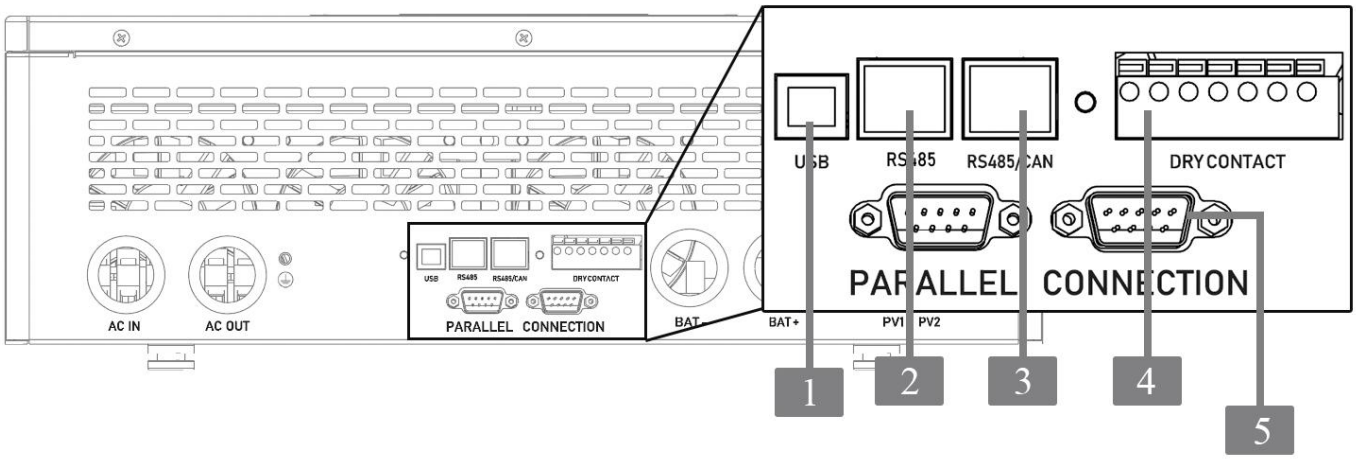
•Step 2: Press the boat switch at the bottom of the inverter, and the screen and indicator light up, indicating that the inverter has been activated.

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

•Step 4: Start the load one by one according to the order of power from small to larg

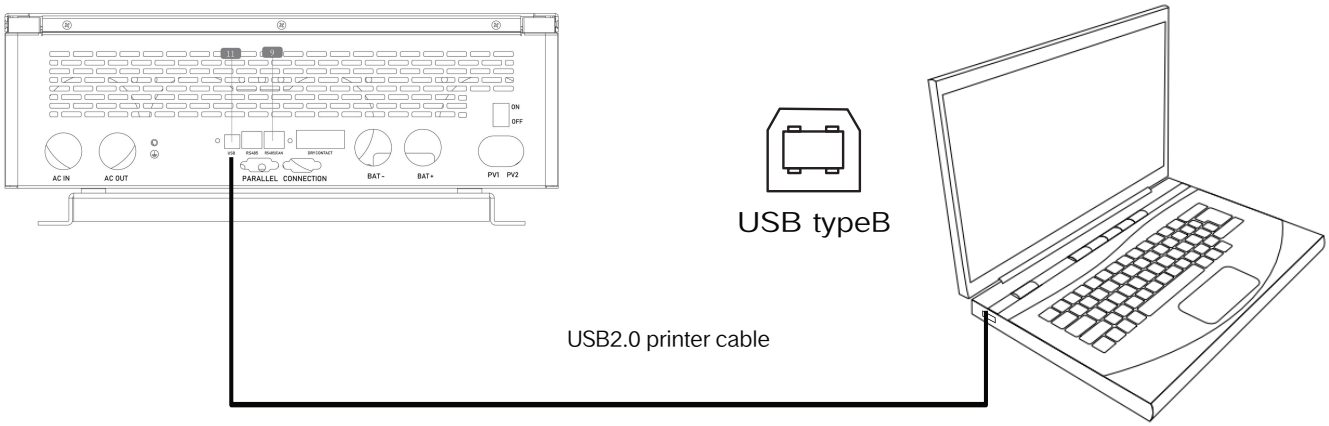
5.Communication

5.1Overview



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

5.2 USB-B port

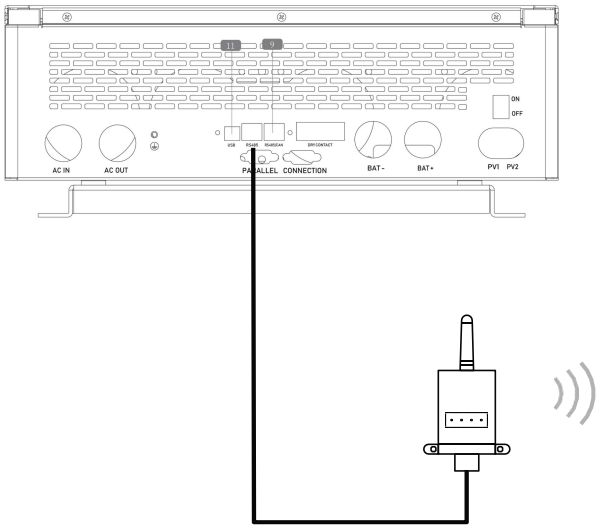


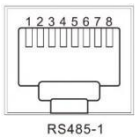
The user can use the upper computer software through this port to read and modify the device parameters. If you need the upper computer software installation package, you can download it from the official website or contact us to obtain the installation package.

NOTICE

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

5.3 RS485-1 port

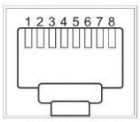




RJ45	Definition
Pin1	5V
Pin2	GND
Pin3	/
Pin4	/
Pin5	/
Pin6	/
Pin7	RS485-A
Pin8	RS485-B

5.4CAN/RS485-2 port

The RS485-2 port is used to connect BMS to Lithium-ion batteries.



CAN/RS485-2

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

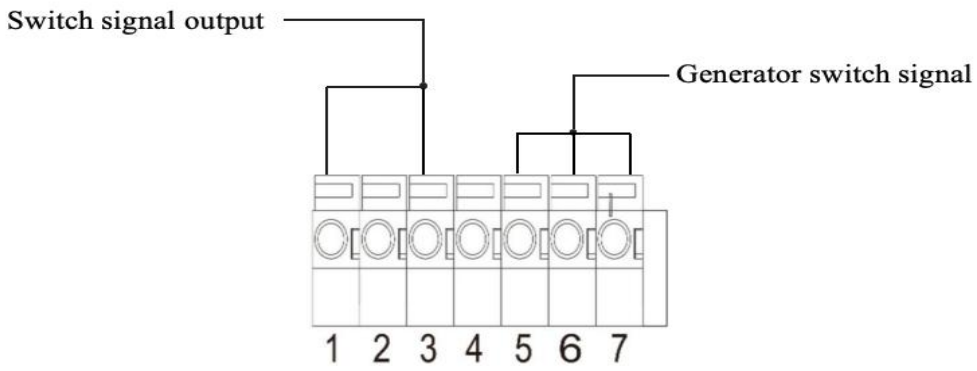
If it is necessary for the inverter to communicate with the lithium-ion battery BMS for you, please contact us to obtain information about the communication protocol or upgrade the inverter to the corresponding software program.

If you employ a common RJ45 network cable, please inspect the pin definitions. Generally, pin 1 and pin 2 need to be disconnected for normal usage.

5.5 Dry contact port

Dry contact ports have two functions:

1. Switch signal output 2. Generator remote start/stop



Features	Description
Switching signal output	When the battery voltage reaches the discharge limit voltage, the voltage from pin 3 to pin 1 is 0V, and when the battery is normally charged and discharged, the voltage from pin 3 to pin 1 is 5V.
The generator is started and stopped remotely	When the battery voltage reaches the under-voltage alarm voltage or the voltage point at which the battery switches to mains power, pins 6 through 5 are normally on and pins 7 through 5 are normally off. When the battery voltage reaches the voltage point at which the mains is switched to the battery or the battery is fully charged, pins 6 through 5 are normally closed and pins 7 through 5 are normally on. (5/6/7 pin outputs 125Vac/1A,230Vac/ 1A,30Vdc/1A)

NOTICE

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

5.6 Bluetooth

The inverter has a built-in Bluetooth module, which can be connected to the EnerWise APP (EnerWise APP can be downloaded from the website or contact us to obtain the installation package.)

5.7 WIFI

Connect to EnerWise Cloud platform after setting up an Internet access AP.

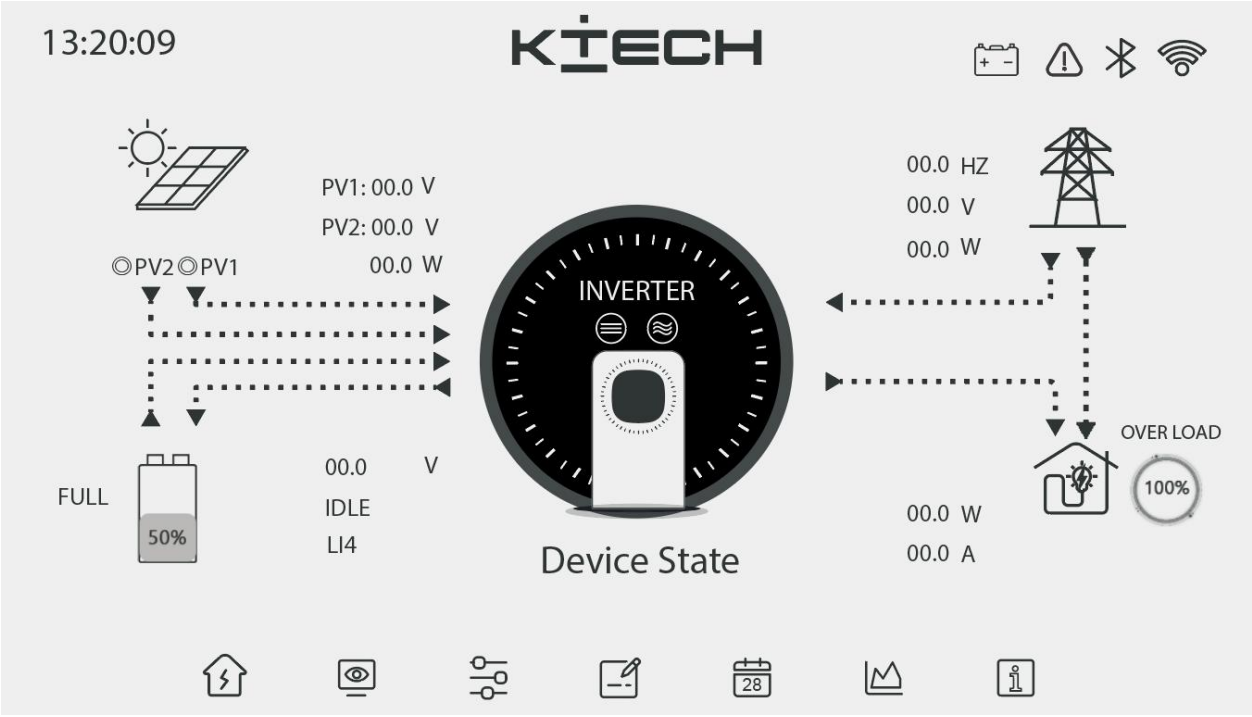
6.Interface operation

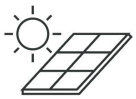
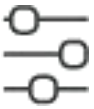
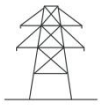
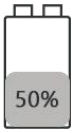
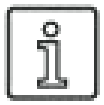
6.1LED indication

Indicator light	Colors	Description
AC/INV	green	Steady on: Mains bypass output
		Blinking: Inverter output
CHARGE	green	Steady on: Charging is complete
		Blinking: Charging is underway
FAULT	red	Blinking: A fault occurs

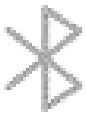
6.2LCD and operation

6.2.1 Main Page



Icon Data	Description	ICONS	Description
	Indicate battery		Home interface
	Represents PV photovoltaic panel		Parameter setting interface
	Indicates load		Real-time data interface
	Representation grid		Statistics interface
	Indicates electrical energy flow		Event recording interface
	Battery SOC capacity		Historical data interface
	Load rate		Device information interface

The status information of all sectors is displayed as follows:

Icon data	Description
	Gray: Bluetooth not connected Green: Bluetooth is connected
	Gray: The device is working properly Yellow: The device is faulty
	Gray: WIFI is not connected Green: WIFI is connected
	Gray: The BMS is not communicating Green: BMS communication is ongoing

Description of device running status displayed on the main interface:

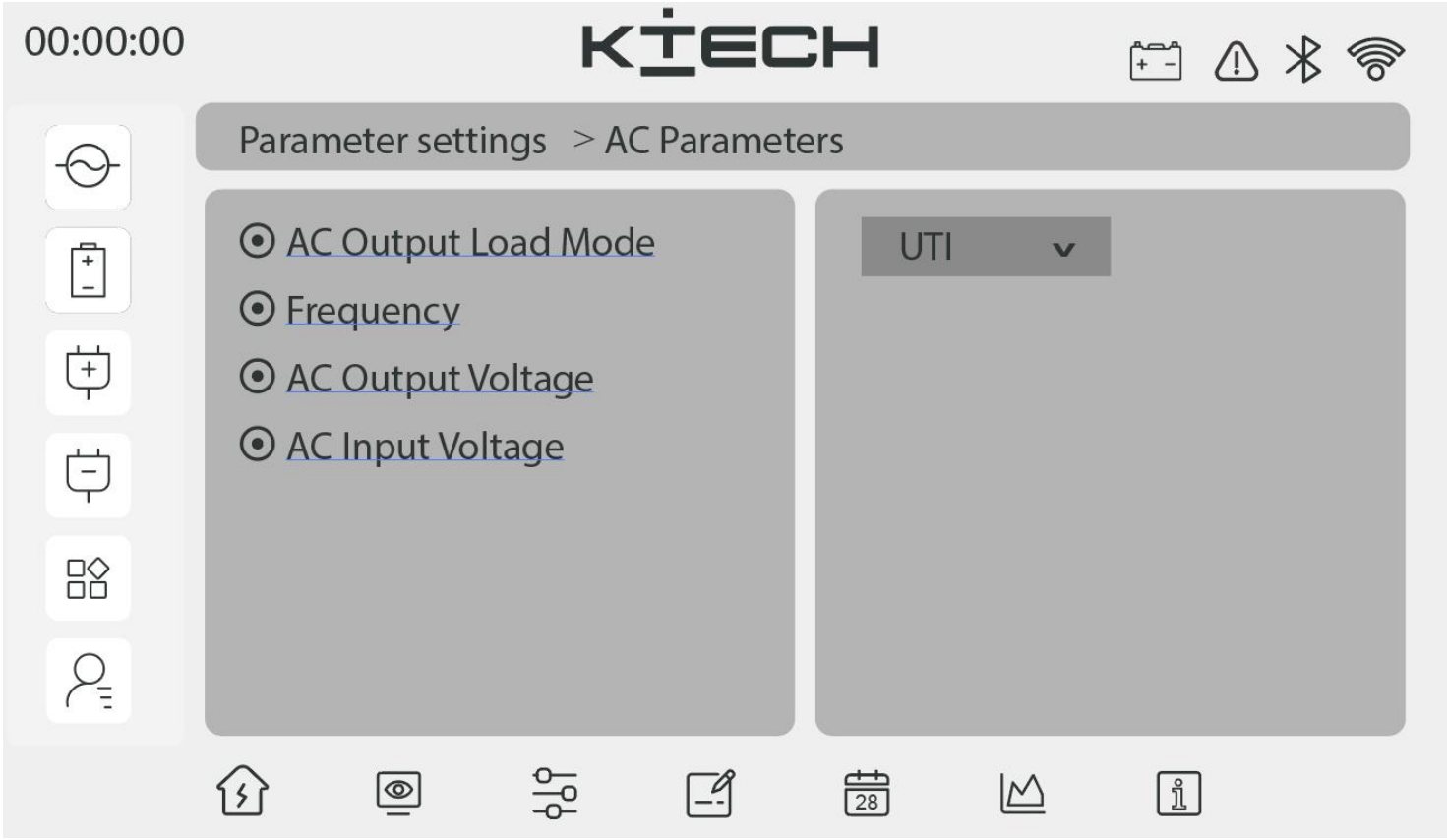
Device status	Description
INIT	Initialize
READY	Standby
MAINS	Mains running
INVERTER	Inverter Run
INV2MAINS	Inverter to mains
MAINS2INV	Mains2inv
BATACTIVE	Battery active
MANUALOFF	Manual shutdown
FAULT	Malfunctions

All circles menu options are as follows:

The above is the bottom view of any interface. You can touch and press the interface icon on any interface to jump to the corresponding interface.

Menu level	Items	Liquid Crystal Display Projects
Main Menu	Main menu Steps 1 Main page	Main interface
	2 Parameter Settings	Parameter settings
	3 Have real-time monitoring	Real time monitoring
	4 Statistics	Statistical data
	5 Record of events	Event recording
	6 Historical data	Historical data of the day
	7. Device information	Device information

6.2.2 Parameter Settings



In the parameter design interface, you can enter the effective value through the virtual keyboard or select the option through the drop-down list. When entering through the virtual keyboard, you must press the "√" of the virtual keyboard to complete effective modification. After the drop-down list is expanded, click one of the items to be selected to complete the parameter setting modification. If you do not modify the parameter setting after expansion, click any area outside the drop-down list of the interface to cancel the drop-down option.

(Note: When the device fails, the parameter cannot be modified)

Items	Item icon	Project name	LCD project	Project parameters and their scope	Step Size
1. Set AC parameters		Ac output mode	AC Output load mode	0: UTI mains priority 1: The SBU inverter is preferred 2: SOL PV preferred	
		Output frequency	Frequency	×1Hz(45~ 65Hz)	1
		Output voltage	AC Output voltage	X 1V(100 to 264V)	1
		AC input range	AC Input range	×1(0:APL 1:UPS)	

2. Set battery parameters		Battery type	Battery type	"USE" user-defined "SLD" seals the lead-acid battery "FLD" opens the lead-acid battery "GEL" colloidal battery "L14"Lithium-ion battery *14 "L15" Lithium-ion battery *15 "L16" Lithium-ion battery *16 "N13" ternary Lithium-ion battery *13 "N14" ternary Lithium-ion Battery *14	
		Inverter switching voltage	Inverter switching voltage	X 0.1V(9.0 ~ 17.0V) x n	0.1
		Battery system voltage	Battery system voltage	“12V” “24V” “36V” “48V”	
		Nominal capacity of battery	Nominal battery capacity	×1(1~9999AH)	1
		Lithium battery activation current	Activation current of lithium battery	X 0.1 (0 ~ 20 A) a.	0.1
		Discharge up to SOC	Discharge cut-off SOC	X 1% (0 ~ 100%)	1
		Stop charging SOC	Stop charging SOC	X 1% (0 ~ 100%)	1
		Temperature compensation coefficient	Temperature compensation	X -0.1mV (0, no compensation; -(3~5)mV/℃/2V)	0.1
		Low SOC alarm	SOC low alarm	X 1% (0 ~ 100%, Low SOC capacity alarm)	1
		Switch the mains SOC capacity	Switching the SOC capacity of the mains	X 1% (0 to 100%. In SBU mode, the SOC capacity is less than or equal to the mains	1

			power supply	power supply.)	
		Switch battery SOC capacity	Switching battery SOC capacity	X 1% (1 to 100% : In SBU mode, the SOC capacity is greater than or equal to the value switched to inverter.)	1
		Mains switching voltage	Switch voltage of mains power	X 0.1V(9.0 ~ 17.0V) x n,	0.1
3. Battery charging Settings		Battery charging mode	Battery charging mode	SNU Hybrid mode CUB mains is preferred CSO PV is preferred OSO PV only	
		Mains charging current	Utility charging current	×1A(0~100A)	1
		Maximum charging current	Maximum allowed charging current	×1(0~200A: 0: Disable system charging and discharging)	1
		Over-voltage	Over-voltage threshold	X 0.1V(9.0 ~ 17.0V) x n	0.1
		Raise the charging voltage	Boost charging voltage	X 0.1V(9.0 ~ 17.0V) x n	0.1
		Boost charging time	Boost charging time	×1MIN(0~300 MIN)	1
		Raise the charge return voltage	Boost charging recovery voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Equalizing charge voltage	Equalization charging voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Equalizing charge time	Equalization charging time	×1MIN(0~300 MIN)	1
		Equalize charging timeout	Equalize the charge timeout	×1MIN(5~900 MIN)	1
		Balanced charging interval	Equalization charging	0: Disable. 1~300D(days)	1

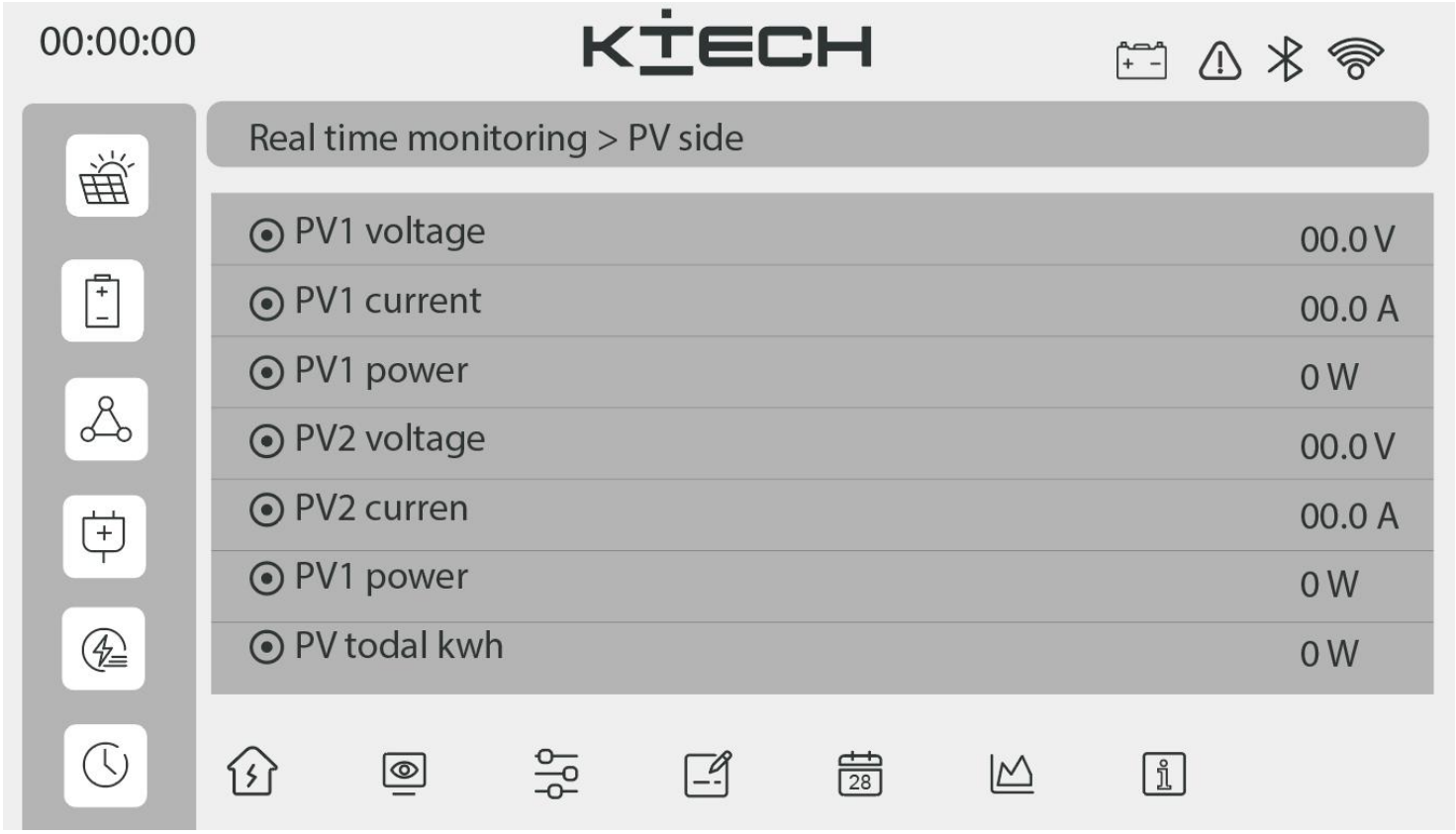
			interval		
		Charge activation method	Charging activation method	X 1 (0, OFF: Disable activation (lead-acid battery only); 1, PULSE: (default) with intermittent control, (except lead-acid battery);	
		Floating charge voltage	Float charge voltage	X 0.1V(9.0 ~ 17.0V) x n	0.1
		Stop charging current	Stop charging current	×1A(0~10A)	1
4 Set the battery discharge		Under-voltage warning voltage	Battery under-voltage alarm voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Overplay the return voltage	Battery under-voltage recovery voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Over-discharge voltage	Battery over-discharge voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Discharge limiting voltage	Battery discharge limiting voltage	X 0.1V(9.0 to 17.0V) x n	0.1
		Overplay delay	Battery over-discharge delay	×1s(0~60s)	1
5. Set system parameters		Parallel mode	Parallel mode	0: Stand-alone 1: single phase parallel 2: Two phase parallel 3: Two parallel machine 120 4: Two parallel machine 180 5: Three-phase A 6: Phase B 7: Phase C	
		Machine derating	Machine	X 1W (0: no derating, 1000 ~	1

		power	derating power	30000W)	
		NPE ground wire shorting function	NPE ground shorting function	0: Prohibited 1: Enable	
		Energy Saving mode	Energy saving mode	0: disable 1: Enable	
		Over-temperature automatically restarts	Automatic restart after over-temperature	0: Off limits 1: Enable	
		Automatic restart for overload	Automatic restart after overload	0: Forbidden 1: Enable	
		Buzzer alarm	Buzzer alarm	0: Forbidden 1: Enable	
		Mode Change Alerts	Mode shift alerted	0: Forbidden 1: Enable	
		Overload bypass function	Overload bypass function	0: Forbidden 1: Enable	
		1: Separate phase phase difference	The phase difference between the phases of the single machine	Only applicable to the phase difference between the phases of the single machine 0: Phase difference 180 degrees 1: Phase difference 120 degrees 2: Phase difference 0 degrees	
		Grid-connected and mixed with load function	Grid connection and mixed-load function	0: Disable (default) 1: on grid 2:mix load	
		Leakage current detection	Leakage current detection	0: Prohibited 1: Enable	
		PV output priority	PV output priority	0: Charge priority 1: Load first	
		Charging current limit (When starting BMS)	Charge current limit	0:SET; 1: BMS (default)	

				2:INV	
		BMS Protocol	BMS	X 1 (0 ~ 30)	1
6. Communication parameter Settings		Device communication address	Device communication address	X 1 (1 ~ 247)	1
		RS4851 working mode	RS485-1 working mode	0, Modbus slave station 1, BMS main station	
		RS4851 communication baud rate	RS485-1 communication baud rate	0960; 1192 00; 2384 00; 3576 00; 4115, 200,	
		RS4851 communication data bits	RS485-1 communication data bits	0, 5; 1, 6; 2, 7; 3, 8	
		RS4851 Communication stop bit	RS485-1 communication stop bit	1, 1; 2,1.5; 3, 2	
		RS4851 Communication Check	RS485-1 communication verification	0, none; 2, even; 3, odd	
		RS4852 work mode	RS485-2 working mode	0, Modbus slave station; 1, BMS master station	
		RS4852 communication baud rate	RS485-2 communication baud rate	0960; 1192 00; 2384 00; 3576 00; 4115, 200,	
		RS4852 communication data bits	RS485-2 communication data bits	0, 5; 1, 6; 2, 7; 3, 8	

		RS4852 Communication stop bit	RS485-2 communication stop bit	1, 1; 2,1.5; 3, 2	
		RS4852 Communication Check	RS485-2 communication verification	0, none; 2, even; 3, odd	
		LCD backlight time Settings	LCD backlight time	X 1 (0, steady on; 1 to 600s)	1
		Bluetooth enabled	BLE enabled	0: Disable. 1: Enable	
		WiFi Enable	WIFI enabled	0: disables; 1: Enable	
7. Set the charging time in stages		The segmented charging is enabled	Time-based utility charge /load function switch	0: disable 1: enable	
		1 Segment start and end charging time	1 stage start and end charge time	Hour: 0-23 Points: 0-59	
		2 Segment start and end charging times	2 stage start and end charge time	Hour: 0-23 Score: 0-59	
		3 Segment start and end charging times	3 stage start and end charge time	Hour: 0-23 Points: 0-59	
8 Set the discharge time in stages		The segmented discharge is enabled	Scheduled utility discharge function switch	0: Forbidden 1: Enable	
		1 Start and end charging time	1 stage start and end discharge time	Hour: 0-23 Points: 0-59	
		2 Section start and end discharge times	2 stage start and end discharge time	Hour: 0-23 Points: 0-59	
		3 Segment start and end discharge times	3 stage start and end discharge time	Hour: 0-23 Points: 0-59	

6.2.3 Real-time monitoring



Under any screen, click the "Real-time monitoring" icon to jump to this screen.

Items	Item icon	Project name	LCD project	Description
1.PV (photovoltaic panel) data		Solar panel 1 Voltage	PV1 voltage	
		Solar panel 1 Current	PV1 current	
		Solar panels 1 Power	PV1 power	
		Solar panel 2 Voltage	PV2 voltage	
		Solar panel 2 Current	PV2 current	
		Solar panels 2 Power	PV2 power	
		Total solar panel power	PV total kWh	
2 Battery data		Battery voltage	BAT voltage	
		Battery current	BAT current	
		Battery SOC	BAT SOC	

		Battery charging status	BAT charging state	"IDLE" does not charge; "MPPT"MPPT charged; "BST" lift charging; "FLT" float charging; "EQU" balanced charging; "LIMIT" current-limiting charge
		Full battery state	BAT charging full state	“NOT FULL - Unfilled ” “FULL - Filled ”
		On-load condition	Load selection	0 No load 1 Invert with load, INV 2 Bypass with load, Bypass 3 Carry load at the same time Bypass and INV
3 Mains and other data		Grid apparent power	Grid apparent power	
		Grid apparent power	Grid voltage	
		Grid current	Grid current	
		Inverter voltage	Inverter voltage	
		Inverting current	Inverter current	
		Load current	Load current	
		Load active power	Load active power	
		Load apparent power	Load apparent power	
		Load apparent	Load rate	
		Grid frequency	Grid frequency	
		Inverter frequency	Inverter frequency	

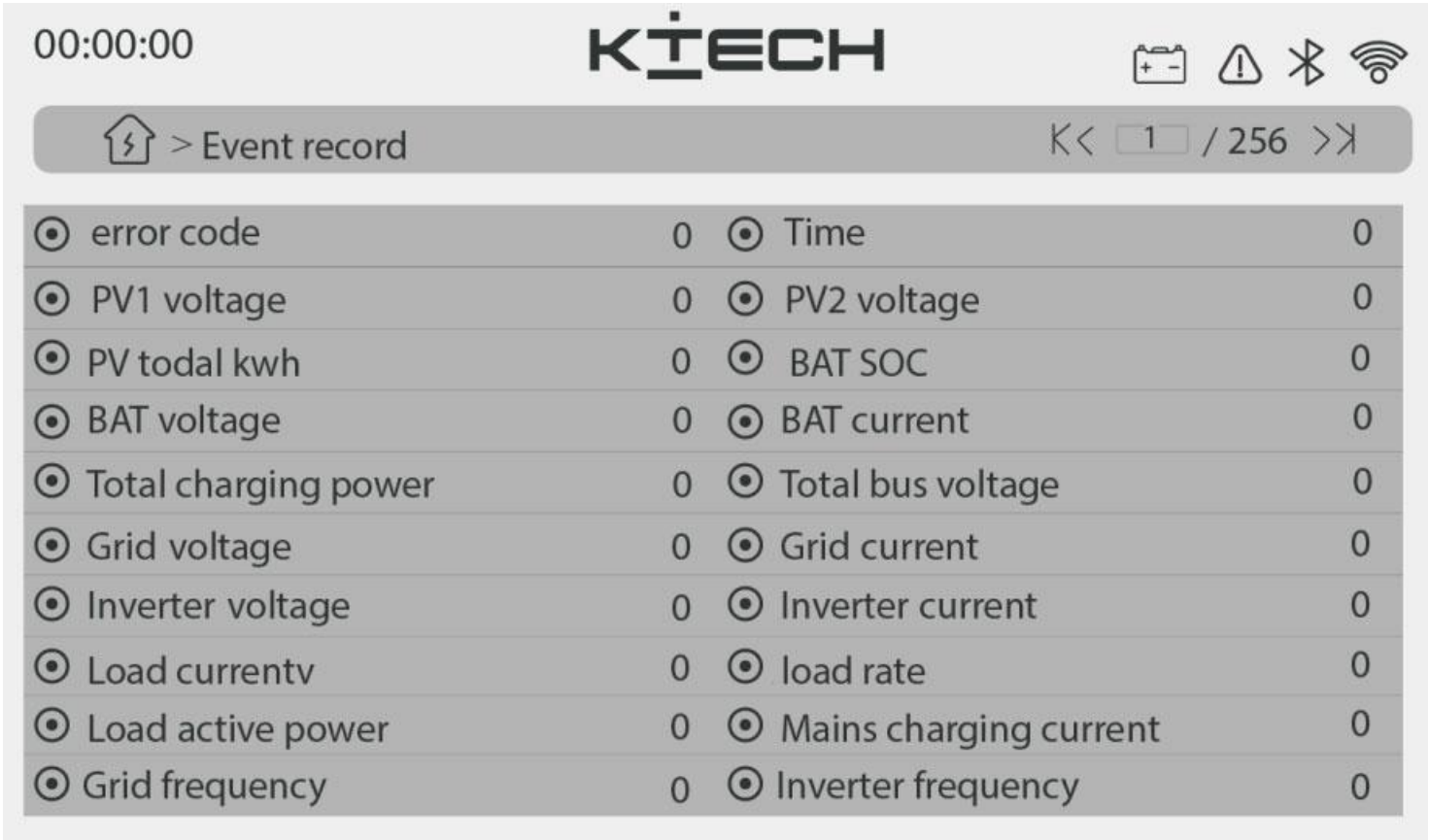
		Grid L1 voltage	Grid L1 voltage	
		L2 voltage of grid	Grid L2 voltage	
		Inverter L1 Voltage	Inverter L1 voltage	
		Inverter L1 Current	Inverter L1 current	
		Inverter L2 voltage	Inverter L2 voltage	
		Inverter L2 Current	Inverter L2 current	
		Load L1 Current	Load L1 current	
		Load L2 current	Load L2 current	
		L2 apparent power of the grid	Grid L2 apparent power	
		L1 apparent power of the grid	Grid L1 apparent power	
		Load L1 active power	Load L1 active power	
		Load L1 active power	Load L2 active power	
		Load L1 apparent power	Load L1 apparent power	
		Load L2 apparent power	Load L2 apparent power	
		L1 apparent power	L1 Load rate	
		L2 Load rate	L2 Load rate	
		Grid L1 current	Grid L1 current	
		L2 current of network	Grid L2 current	
		Grid active power	Grid active power	
		L1 active power of the grid	Grid L1 active power	
		L2 active power of the grid	Grid L2 active power	

4 Charge data		Total charge power	Total charging power	
		Mains charging current	Mains charging current	
		PV Charging current	PV charge current	
5 Discharge data		Total bus voltage	Total bus voltage	
		Positive bus voltage	Positive bus voltage	
		Negative bus voltage	Negative bus voltage	
		Average current of parallel load	Average current of parallel load	
6. Equipment and temperature data		PV radiator temperature	PV radiator temperature	
		Inverter radiator temperature	Inverter radiator temperature	
		Battery radiator Temperature	Battery radiator temperature	
		Device status	Device status	0: Initialize INIT 1: Standby READT 2: MAINS running 3: INVERTER run inverter 4: Inverter to mains INV2MAINS 5: Mains to inverter MAINS2INV 6: battery activation BATACTIVE 7: Manual shutdown MANUALOFF 10: FAULT
		Fault information	Error information	Refer to the Fault Code information sheet for details
7. Communication status		Bluetooth status	Ble status	0: Closed; 1, connected; 2, waiting to connect

		WIFI status	WIFI status	0, closed; 1, connected; 2, waiting to connect
		Cloud platform connection status	Cloud platform connectivity status	0, closed; 1, connected;
		RS485-1 communication status	RS485-1 communication status	0, no communication; 1, communicating;
		RS485-2 communication status	RS485-2 communication status	0, no communication; 1, communicating;
		BMS communication status	BMS communication status	0, the communication is abnormal. 1: The communication is normal.

6.2.4 Event record

In any interface, click the "Event Record" icon to jump to this interface, which can record up to 256 events.



Serial Number	Description	Serial number	Description
1	Equipment status	14	Inverting current
2	Battery charging status	15	Load current
3	Solar panel 1 Voltage	16	Load active power
4	Solar panel 2 voltage	17	Load apparent power
5	Total solar panel power	18	Mains charging current
6	Battery SOC	19	Load rate
7	Battery voltage	20	Grid frequency
8	Battery current	21	Inverter frequency
9	Total power of charge	22	PV heat sink temperature
10	Total bus voltage	23	Inverter heat sink temperature
11	Grid voltage	24	Battery transformer heat sink temperature
12	Grid current	25	PV charging current
13	Inverter voltage	26	Average current of parallel load

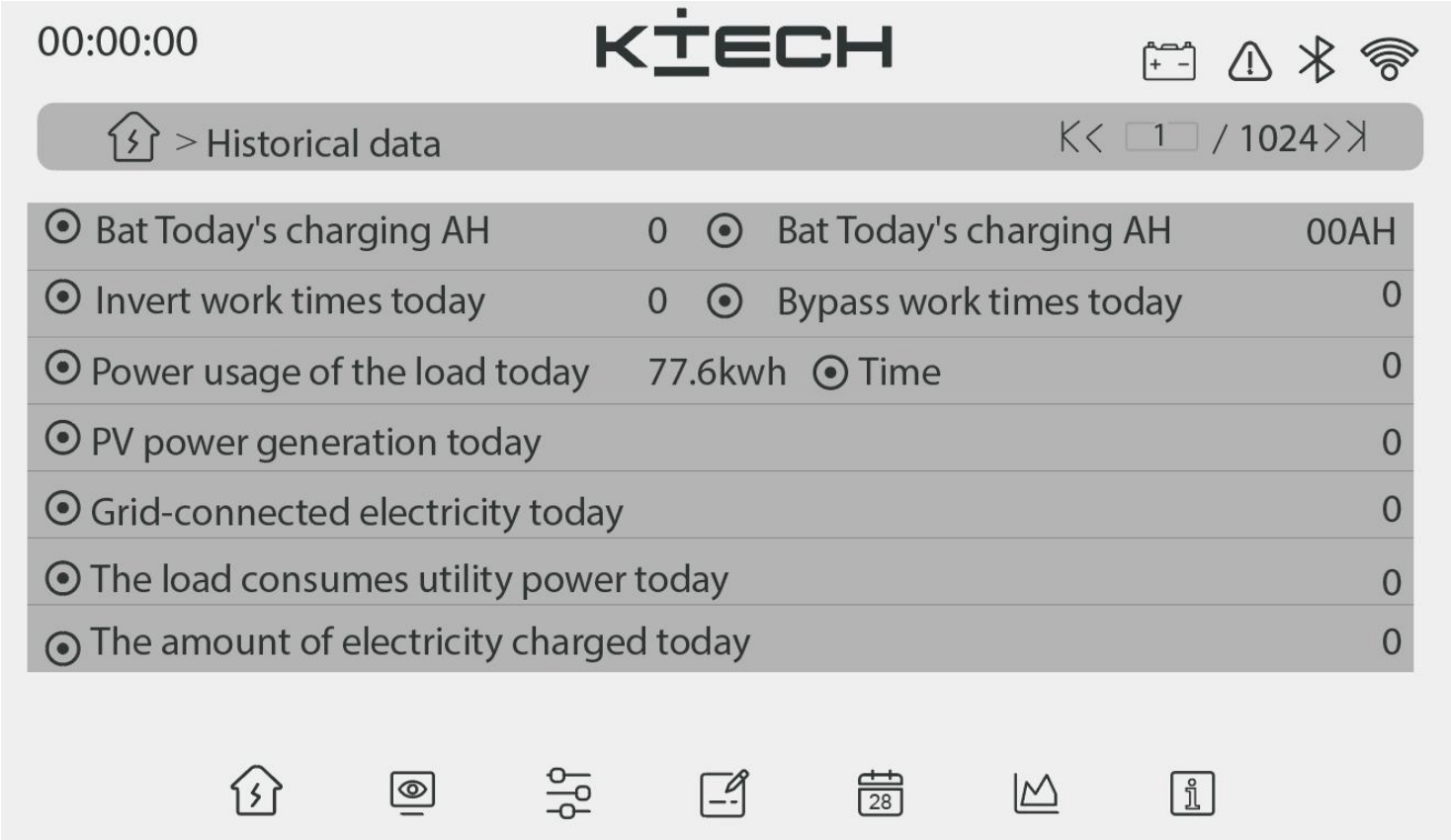
The fault information table is as follows:

Trouble codes	Description	Trouble codes	Description
1	Battery under-voltage alarm	27	The mains input phase is incorrect
2	The average battery discharge current over-current protection software	28	Bus-bar low voltage protection
3	Battery not connected alarm	29	Battery capacity less than 10% alarm (take effect after BMS communication is successful)
4	This alarm is generated when the battery under-voltage stops discharging	30	The battery capacity rate is less than 5% (the alarm takes effect after the BMS communication is successful)
5	Protect the battery from over-current	31	Low capacity battery shutdown (effective after successful BMS communication)
6	Charge over-voltage protection	32	Parallel control can communication failure
7	Bus over-voltage hardware protection	33	Parallel can communication failure

8	Bus over-voltage software protection	34	The parallel ID (communication address) is set incorrectly
9	PV over-voltage protection	35	Parallel current sharing fault
10	Boost over-stream software protection	36	Parallel mode, battery voltage difference is large
11	Boost over-current hardware protection	37	In parallel mode, the mains input source is inconsistent
12	The communication between the primary and secondary chips is faulty	38	In parallel mode, the hardware synchronization signal is faulty
13	Bypass overload protection	39	The DC component of inverter voltage is abnormal
14	Inverter overload protection	40	Parallel program versions are inconsistent
15	Inverter over-current hardware protection	41	The parallel cable is faulty
16	Request shutdown fault from chip	42	Serial number not set from factory
17	Inverter short circuit protection	43	AC output mode - incorrect setting of the setting item
18	The soft start of the bus is faulty	44	Battery voltage below discharge limit voltage affects output
19	PV radiator over-temperature protection	45	Battery transformer and radiator over-temperature protection
20	Inverter radiator over-temperature protection	58	BMS communication failure
21	Fan failure	59	BMS reports an error
22	Memory failure	60	BMS Low temperature alarm (effective after successful BMS communication)
23	Model setting error	61	BMS over-temperature alarm (effective after successful BMS communication)
24	Positive and negative bus voltage imbalance	62	BMS over-current alarm (effective after successful BMS communication)
25	Bus short circuit	63	BMS Under-voltage alarm (effective after successful BMS communication)
26	Inverter AC output is pumped back to bypass AC output	64	BMS over-voltage alarm (effective after successful BMS communication)

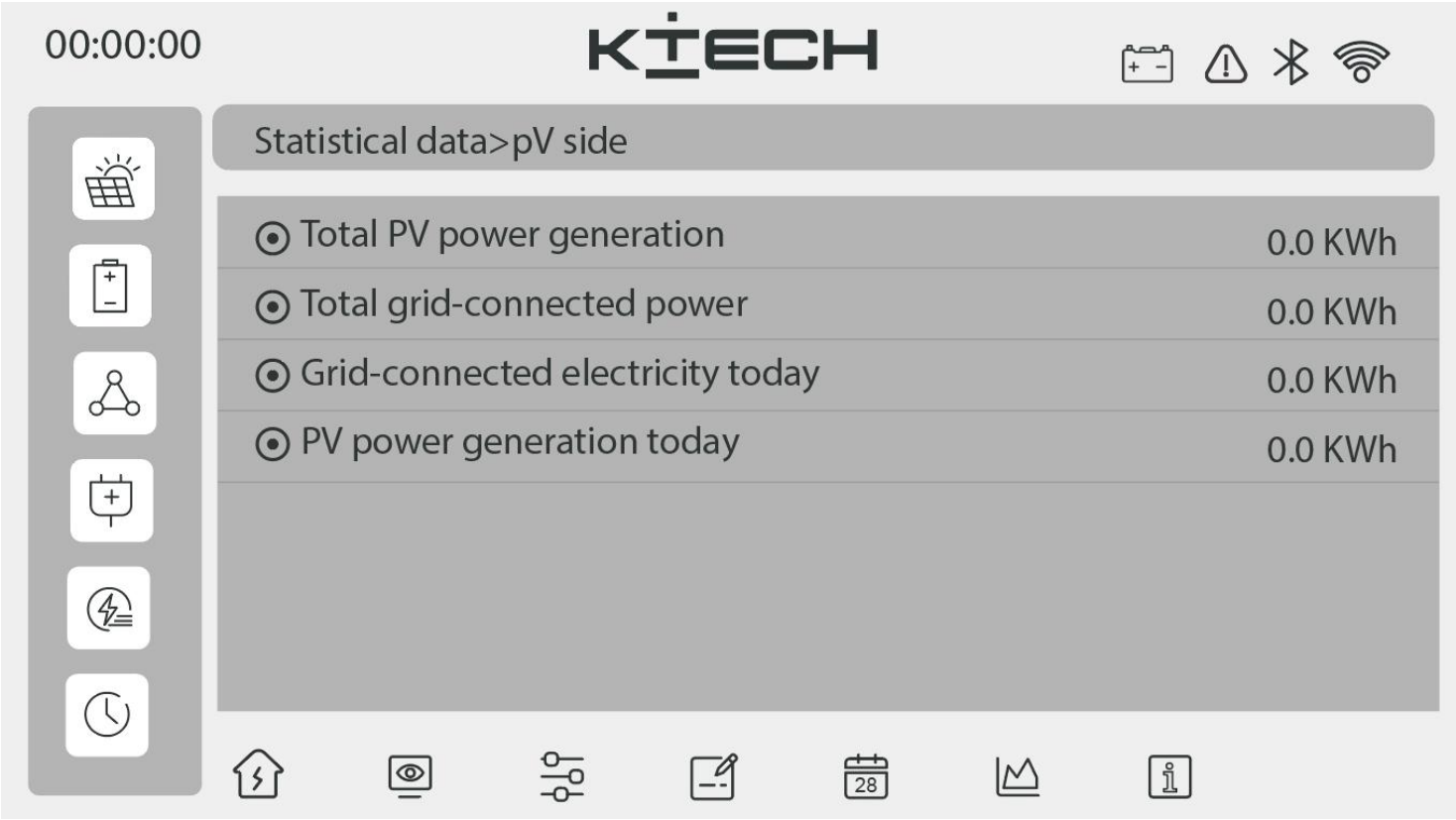
6.2.5 Historical data

Under any interface, click the "Historical Data" icon to jump to this interface, which can record up to 1024 historical data records.



Serial Number	Item name
1	Electricity connected to the grid on the same day
2	The number of ampere-hours that the battery is charged on the same day
3	Number of ampere-hours of battery discharge for the day
4	PV power generation of the day
5	Electricity consumption of the load for the day
6	Charge electricity on the day of the mains
7	The load consumes electricity from the mains on the same day
8	Invert the working hours of the day
9	Bypass day working hours

6.2.6 Statistics



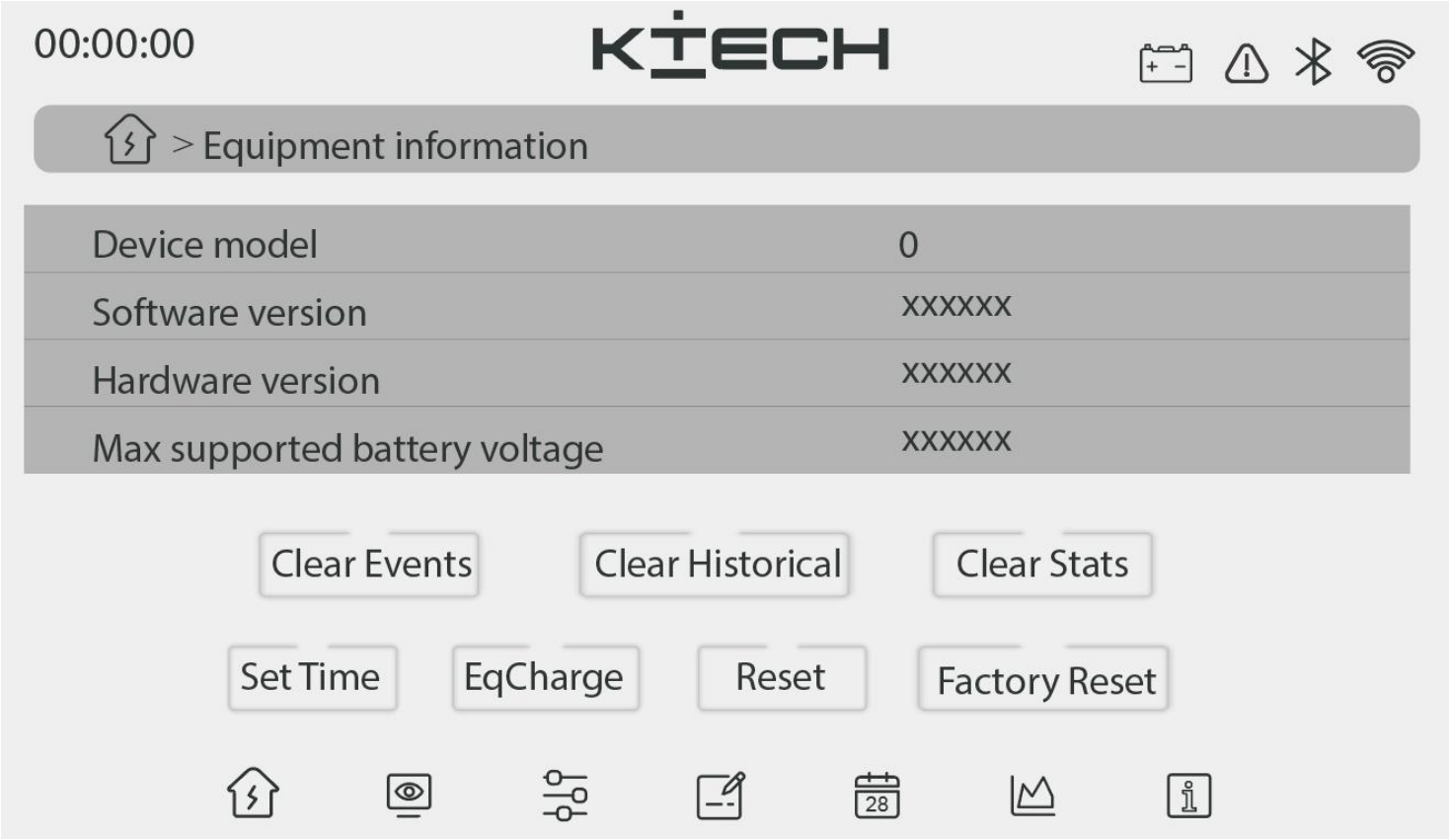
In any interface, click the "Statistics" icon to jump to this interface.

Items	Item icon	Project name	LCD project
1.PV and grid-connected data		PV cumulative power generation	Total PV power generation
		Total PV power generation	Total grid-connected power
		Electricity connected to the grid on the same day	Grid-connected electricity today
		Grid-Connected Electricity today	PV power generation today
2 Battery data		The number of ampere-hours that the battery charges on the day	Today's charging AH
		The number of ampere-hours that the battery charges for the day	Today's discharge AH
		Cumulative ampere-hours of	Cumulative discharge AH

		battery charging	
		Cumulative discharge AH of the battery	Cumulative charge AH
3 Load the data		The load consumes cumulative power from the mains	Total electricity consumption from mains
		Total electricity consumption from load	Total load power consumption
		The load consumes electricity from the mains for the day	The load consumes utility power today
		The load consumes utility power today	Electricity consumption on the day of load
4. Charging data		Total amount of mains charge	Total charging of mains
		Charge the mains on the same day	The amount of electricity charged today
5 Time data		Boot time	Boot time
		Total number of days run	Total running days
		Total running days of the inverter	Invert working hours today
		Invert working hours today	Bypass is working for today's hours
		Last balanced charge completion time	Time of last equalization charge completion
		Inverter total working hours	Cumulative working hours of the inverter
		Cumulative working hours of the bypass	Cumulative working hours for bypasses
		Number of fault records	Event records

		Number of historical data bars	Historical data records

6.2.7 Device Information



LCD Items	Project name
Model	Model number of equipment
Hardware version	Hardware version
Software version	Software version
Max supported battery voltage	Max supported battery voltage

Immediate balanced charging

After clicking "EqCharge" on the device information interface, the device can enter the balanced charging state.

Modify the device time

After clicking "Set time" on the device information screen, you can enter the screen for setting the time.

Modify the device time by touching the virtual keyboard. You must click "OK" after the modification, otherwise it is not modified.

Clear event record

Click "Clear Events" on the device Info screen and confirm in the pop-up info box to clear event records.

Clear historical data records

Click "Clear Historical" in the device information screen and confirm in the pop-up information box to clear the historical data record.

Clear Statistics

Click "Clear stats" under the device info screen and confirm under the pop-up info box to clear statistics.

Factory data reset

Click "Factory Reset" under the device information interface and confirm under the pop-up information box to restore factory Settings.

Resetting

When the device makes an error, click "Reset" in the device information interface and confirm in the pop-up information box to reset the device.

7.Protection function

7.1Protective features

No	Protective features	Instructions
1	Photovoltaic current limiting protection	When the charging current or power of the configured PV array exceeds the rated current or power of the inverter, it will be charged at the rated current or power.
2	Photovoltaic over-voltage protection	If the PV voltage exceeds the maximum allowed by the hardware, the machine will report a fault and stop the PV boost to output a sinusoidal AC wave.
3	Night anti-back-charge protection	At night, because the battery voltage is higher than the voltage of the photovoltaic module, it will prevent the battery from discharging to the photovoltaic module.
4	Mains input over-voltage protection	When the mains voltage per phase voltage exceeds 280Vac, the mains charging will be stopped and the inverter output will be changed.
5	Mains input under-voltage protection	When the mains voltage per phase voltage is lower than 170Vac, the mains charging will be stopped and the inverter output will be changed.
6	Battery over-voltage protection	When the battery voltage reaches the over-voltage disconnect voltage point, the PV and the mains will automatically stop charging the battery to prevent the battery from being damaged by overcharging.
7	Battery under-voltage protection	When the battery voltage reaches the low voltage disconnect voltage point, the battery will automatically stop discharging to prevent the battery from being damaged by excessive discharge.
8	Battery over-current protection	After the battery current exceeds the range allowed by the hardware, 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 output end of the load, the output AC voltage will be turned off immediately, and the output will be output again after 1 minute. If the output load is still in a short circuit state after 3 attempts, the short circuit fault of the load must be eliminated first and then manually powered on again to restore the normal output.
10	Heat sink over-temperature 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 the overload protection, the inverter will resume output after 3 minutes, and 5 consecutive overloads will shut down the output until the inverter restarts. (102% < load <110%) ±10%: error, output turns off after 5 minutes. (110% < load <125%) ±10%: An error is reported after 10s and the output is turned off. Load >125%±10% : An error is reported and the output is turned off after 5s.
12	Ac back-filling protection	Prevent the battery inverter AC from pouring back into the bypass AC input.
13	Bypass over-current protection	Built-in AC input over-current protection circuit breaker.
14	Bypass wire error protection	When the phase of the input and the phase of the inverter are different, the machine will prohibit the bypass to prevent load power failure or short circuit when the bypass is cut.

8.Product maintenance

8.1Troubleshooting

Trouble Codes	Meaning	Reas ons	Solutions
/	Screen no display	No power input, or device switch is not turned on	Check whether the battery circuit breaker or PV circuit breaker is closed. The switch is in the "ON" state
01	Battery under-voltage	The battery voltage is lower than the value set in "Battery Undervoltage Warning Voltage" in the parameter	Charge the battery until the battery voltage is higher than the value set in the parameter.
03	Battery not connected	The battery is not connected, or the lithium battery BMS is in the discharge protection state	Check that the battery is reliably connected; Check that the battery's circuit breaker is off; Make sure the BMS of the lithium-ion battery can communicate properly.
04	Over-discharge of the battery	The battery voltage is lower than the value set in Overdischarge Voltage	Reset manually. Power off and restart Automatic reset: Charge the battery so that the battery voltage is higher than the value set in the parameter item "Over-discharge Return Voltage"

06	Charge battery over-voltage protection	The battery is in an over-voltage state	Manually turn off the power and restart it. Check that the battery voltage is over the limit. If it does, the battery needs to be discharged until the voltage falls below the over-voltage voltage of the battery
13	Bypass overload (software detection)	The bypass output power or output current is overloaded for a certain period of time	Reduce the load power and restart the device. Refer to item 11 in Protection Features for more details
14	Inverter overload (Software detection)	The output power or output current of the inverter is overloaded within a certain period	
19	The temperature of the photovoltaic radiator is too high	The temperature of the photovoltaic radiator exceeds 90 ° C for 3s	When the temperature of the radiator cools below the over-temperature recovery temperature, normal charging and discharging are resumed
20	The inverter heat sink is overheated	The temperature of the inverter heat sink exceeds 90 ° C for 3s	
21	Fan failure	The hardware has detected a faulty fan	Manually flip the fan after shutting it off to check for any blocked foreign objects
26	Ac input relay shorted	Ac output relay sticks	Restart manually, if the fault occurs again after restarting, you will need to contact after-sales service to repair the machine
27	The mains input phase is faulty	The AC input phase is inconsistent with the AC output phase	Make sure that the phase of the AC input is the same as the phase of the AC output, for example, if the output is in split phase mode, the input must be in split-phase mode also

8.2Maintenance

In order to maintain the best long-term performance, it is recommended to check the following items twice a year. 1. Make sure that the airflow around the inverter will not be blocked and remove any dirt or debris from the radiator.

2, check all the exposed wire is not due to the sun, friction with other objects around, dry rot, insects or rodents damage caused by insulation damage, if necessary, need to repair or replace the wire.

3, verify that the instructions and display are consistent with the operation of the equipment, please pay attention to any failure or wrong display and take corrective measures if necessary.

4, check all terminals for signs of corrosion, insulation damage, high temperature, or burning/discoloration, and tighten the terminal screws.

5, check for dirt, nesting insects, and corrosion, and clean the insect netting regularly as required.

6, if the lightning arrester has failed, timely replace the failed lightning arrester to prevent lightning damage to the inverter or even other equipment of the user.

DANGER

• Prior to undertaking any inspection or operation, it is imperative to ensure that the inverter is disconnected from all power supplies and that the capacitors are completely discharged in order to evade the hazard of electric shock.

Machine problems caused by the following conditions are not covered by KTECH's standard warranty:

1. The product has exceeded the warranty period (except for the extended warranty period service signed by both parties);
2. failure or damage caused by failure to operate according to product instructions or related installation and maintenance requirements, and failure or damage caused by non-product specified working environment, storage or use. Such as installation distance, ventilation, waterproof cap not properly used, etc.;
3. disassemble, repair or modify the machine without authorization of KTECH;
4. Products obtained through channels not authorized by KTECH;
5. failure and damage caused by unforeseeable or human factors or force majeure, such as stormy weather, flood, lightning, over-pressure, insect infestation and fire;
6. unauthorized modification, design change or replacement of parts;
7. Vandalizing or defiling, making indelible marks, stealing, etc.;
8. Normal wear;
9. Not in accordance with the correct safety requirements (such as VDE standards, etc.);
10. Failure or damage caused by quality problems of other non-KTECH products;

11. Damage caused by the transportation process (including scratches on the casing caused by the movement of the packaged products during transportation);

12. Rust and corrosion on the shell of the machine due to harsh environment.