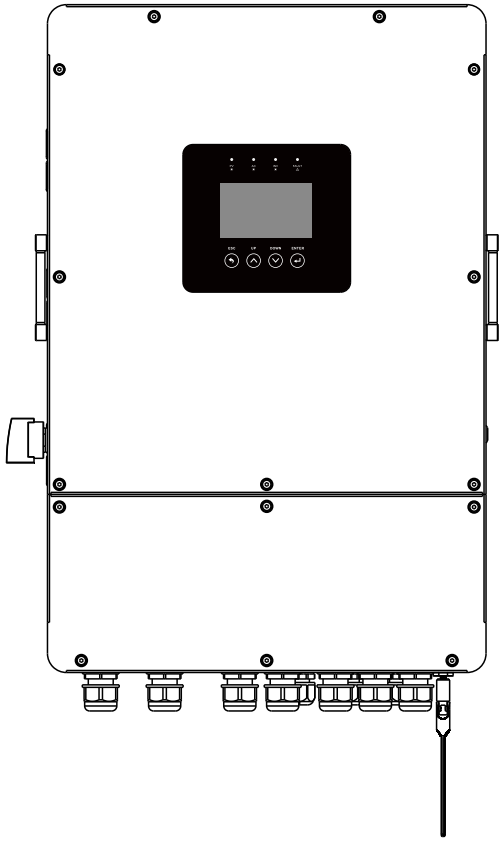
USER MANUAL

HYBRID SOLAR INVERTER



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1. Safety

1.1 How to use this manual

- This manual contains important information, guidelines, operation and maintenance for the following product : TW-10KW/12KW
- The manual must be followed during installation and maintenance.

1.2 Symbols in this manual

DANGER	WARNING	CAUTION	NOTICE
DANGER indicates a hazardous situation which if not avoided will result in death or serious injury.	WARNING indicates a hazardous situation which if not avoided could result in death or serious injury.	CAUTION indicates a hazardous situation which if not avoided could result in minor or moderate injury.	NOTICE provide some tips on operation of products.

1.3 Safety instructions

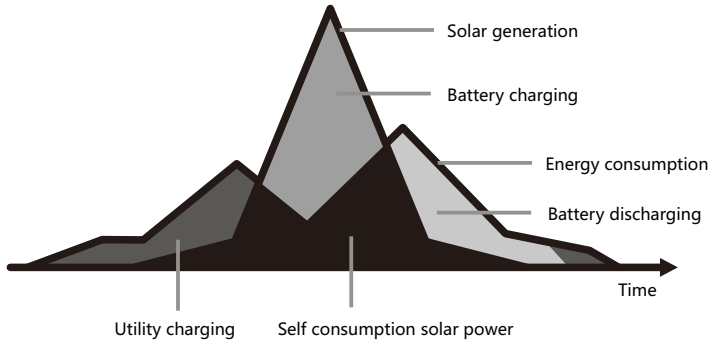
⚠ CAUTION

- This chapter contains important safety instructions. Read and keep this manual for future reference.
- Be sure to comply with the local requirements and regulation to install this inverter.
- Beware of high voltage. Please turn off the switch of each power source before and during the installation to avoid electric shock.
- For optimum operation of this inverter, please follow required specification to select appropriate cable size and necessary protective device.
- Do not connect or disconnect any connections when the inverter is working.
- Make sure the inverter is well grounded.
- Never cause a short circuit between AC output and DC input.
- Do not disassemble this unit, for all repair and maintenance, please take it to the professional service center.
- Never charge a frozen battery.
- Please keep children away from touching or mishandling the inverter.
- Please make sure that this inverter is the only input power source for the load, do not use it in parallel with other input AC power sources to avoid damage.

2. Product Instructions

2.1 Instructions

10KW/12KW series is a new type of solar energy storage inverter control inverter integrating solar energy storage & utility charging and energy storage, AC sine wave output. It adopts DSP control and features high response speed, reliability, and industrial standard through an advanced control algorithm.



2.2 Features

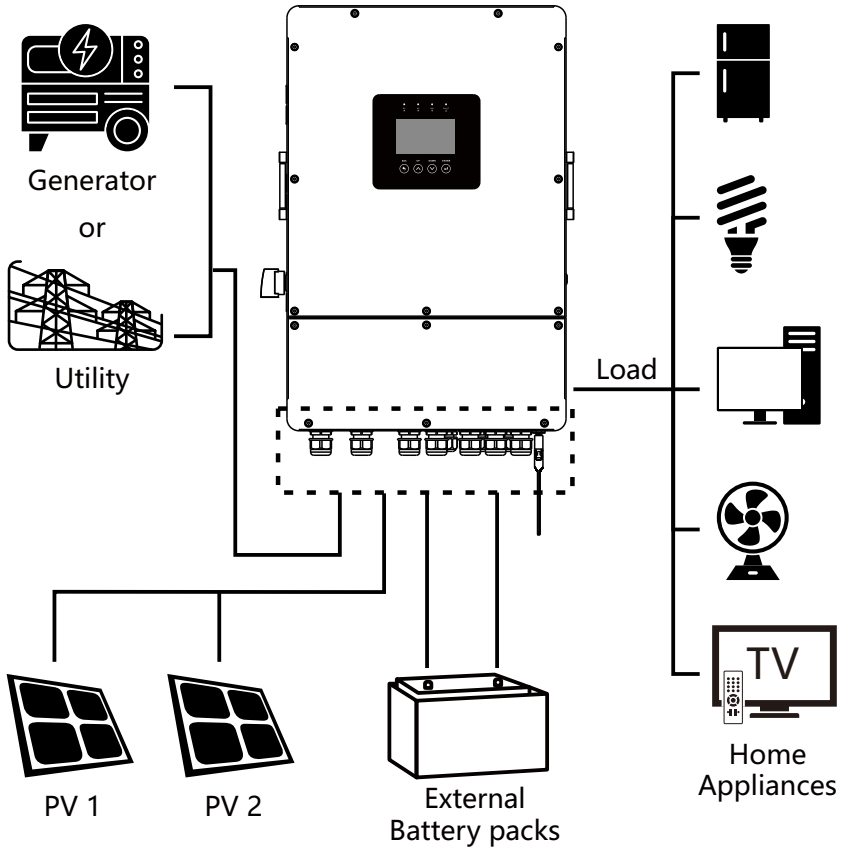
- Supports lead acid battery and li-ion battery connections.
- Dual-activation function for dormant Li-ion batteries: triggered by either mains or PV power supply.
- Support single-phase pure sine wave output.
- Supports five different voltage levels of 200/208/220/230/240Vac per phase.
- Supports dual solar inputs and simultaneous MPPT tracking for both charging and carrying capacity.
- Dual MPPT with 99.9% efficiency and maximum 32A current in a single circuit, perfectly adapted to high power modules.
- 2 charging modes are available: solar only, mixed mains/PV charging.
- With the time-slot charging and discharging setting function, you can set the time period for cutting in/out of mains charging and switch the time period between battery discharging and mains bypass power supply mode.
- Energy saving mode function to reduce no-load energy losses.
- With two output modes of utility bypass and inverter output, with uninterrupted power supply function.
- LCD large screen dynamic flow diagram design, easy to understand the system data and operation status.
- 360° protection with complete short circuit protection, over current protection, over/under voltage protection, overload protection, backfeed protection, etc.
- Support USB, and RS485 communication.

2.3 System connection diagram

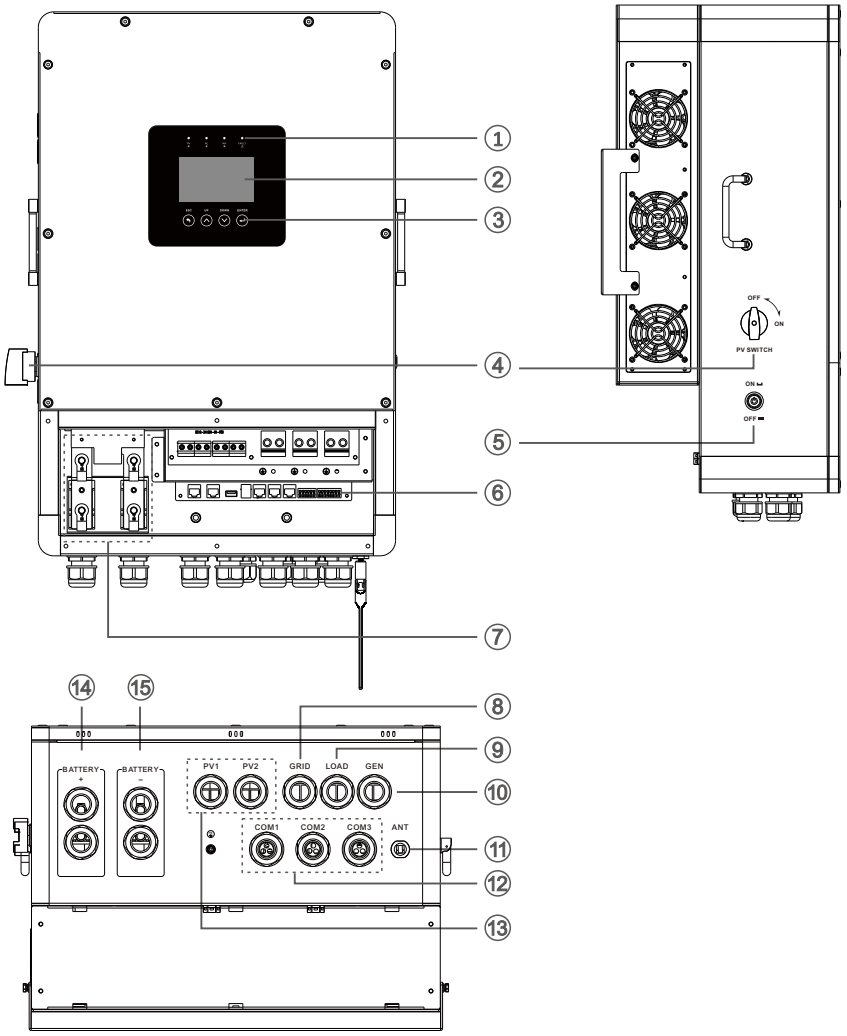
The diagram below shows the system application scenario of this product. A complete system consists of the following components:

1. **PV modules:** Converts light energy into DC energy, which can be used to charge the battery via the inverter or directly converted into AC power to supply the load.
2. **Utility grid or generator:** Connected to the AC input, it can supply the load and charge the battery at the same time. The system can also operate generally without the mains or generator when the battery and the PV module power the load.
3. **Battery:** The role of the battery is to ensure the regular power supply of the system load when the solar energy is insufficient and there is no mains power.
4. **Home load:** Various household and office loads can be connected, including refrigerators, lamps, televisions, fans, air conditioners, and other AC loads.
5. **Inverter:** The energy conversion device of the whole system.

- **The actual application scenario determines the specific system wiring mode**



2.4 Product Overview



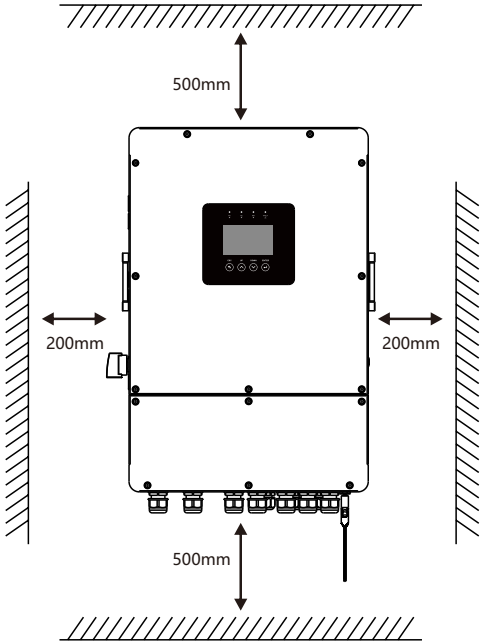
①	LED indicators	⑦	Battery input /output connectors	⑫	COM1/COM2/COM3
②	LCD screen			⑬	PV1/PV2
③	Touchable key	⑧	GRID	⑭	BAT+
④	PV switch	⑨	LOAD	⑮	BAT-
⑤	Machine switch	⑩	GEN		
⑥	Dry contact	⑪	ANT		

3. Installation

3.1 Select the mount location

10KW/12KW series can be used outdoors (protection class IP65). Please consider the followings before selecting the location:

- Choose the solid wall to install the inverter.
- Mount the inverter at eye level.
- Adequate heat dissipation space must be provided for the inverter.
- The ambient temperature should be between -10°C~55°C to ensure optimal operation.



⚠ DANGER

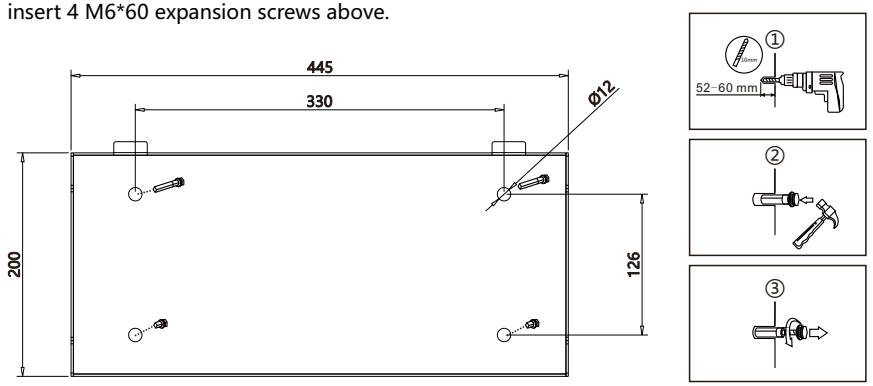
- Do not install the inverter where highly flammable materials are nearby.
- Do not install the inverter in potential explosive areas.
- Do not install the inverter with lead-acid batteries in a confined space.

⚠ CAUTION

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

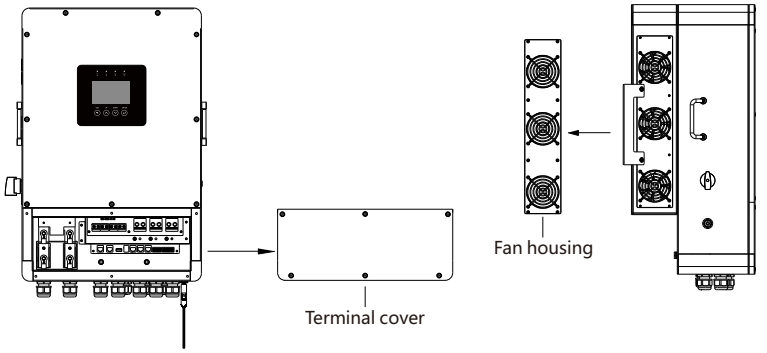
3.2 Mount the inverter

Punch 4 mounting holes in the wall with an electric drill according to the specified size, and insert 4 M6*60 expansion screws above.



3.3 Remove the terminal cover

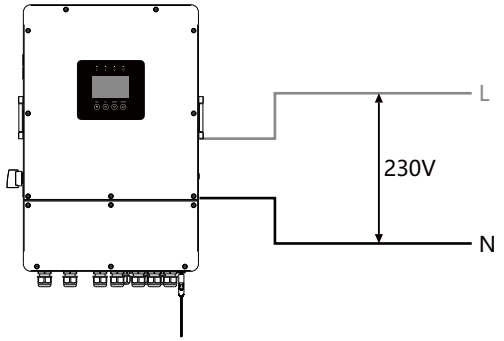
Using a screwdriver, remove the terminal protection cover.

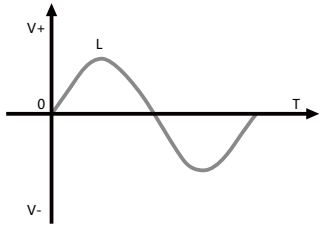


4. Connection

4.1 Single-phase output

AC output





Item	Description
Applicable model	10KW/12KW series model
Output Voltage Range (L-N)	200-240Vac, 230Vac default

4.2 Cable & circuit breaker requirement

- **PV input**

Model	Cable Diameter	Max. PV Input Current	Circuit Breaker Spec
TW-10KW/12KW	6mm²/10AWG	32A/32A	2P-40A

- **AC input**

Model	Cable Diameter	Max Input Current	Circuit Breaker Spec
TW-10KW/12KW	13mm²/6AWG	63A	2P-63A

- **Generator**

Model	Cable Diameter	Max Input Current	Circuit Breaker Spec
TW-10KW/12KW	13mm²/6AWG	63A	2P-63A

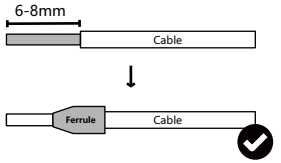
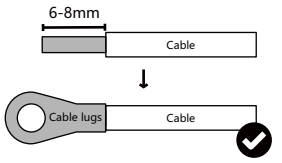
- **Battery**

Model	Cable Diameter	Max. Battery Current	Circuit Breaker Spec
TW-10KW	42mm²/1AWG	230A	2P-250A
TW-12KW	55mm²/0AWG	270A	2P-300A

- **AC output**

Model	Cable Diameter	Max. Output Current	Circuit Breaker Spec
TW-10KW/12KW	13mm²/6AWG	63A	2P-63A

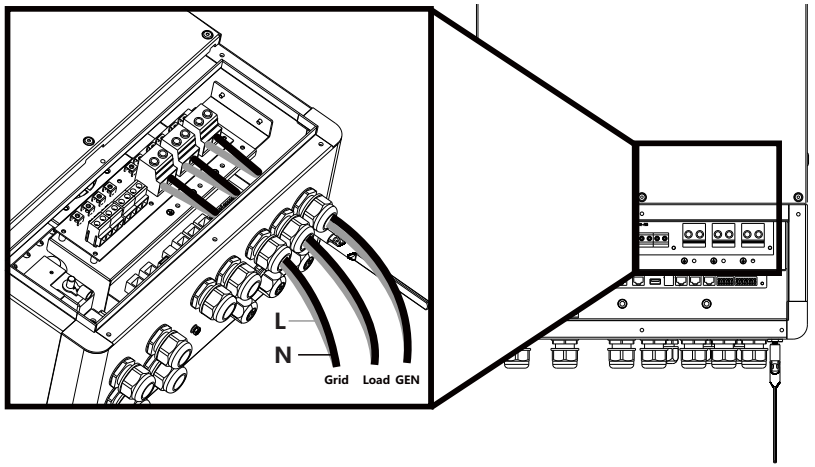
NOTICE

• **PV INPUT、AC INPUT、AC OUTPUT** 1. Use a stripper to remove the 6~8mm insulation of the cable. 2. Fixing a ferrule at the end of the cable. (ferrule needs to be prepared by the user)	• **BATTERY** 1. Use a stripper to remove the 6~8mm insulation of the cable. 2. Fixing cable lugs that supply with the box at the end of the cable.
	

The wire diameter is for reference only. If the distance between the PV array and the inverter or between the inverter and the battery is long, using a thicker wire will reduce the voltage drop and improve the performance of the system.

4.3 GRID & LOAD &GEN connection

Connect the live, neutral and ground wires according to the cables' position and order shown in the diagram below.

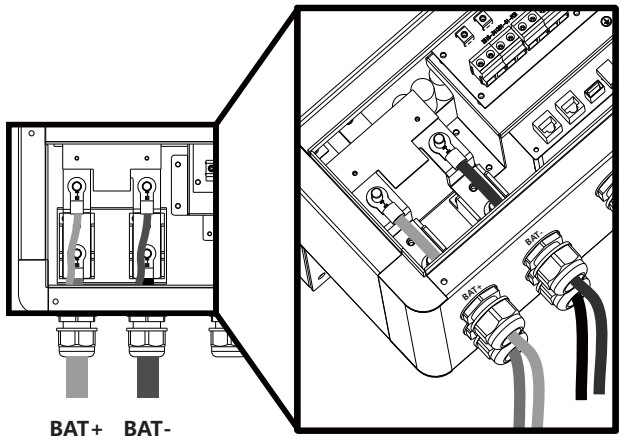


DANGER

- Before connecting AC inputs and outputs, switch off and isolate all relevant circuit breakers. Never perform wiring on energized circuits.
- Please check that the cable used is sufficient for the requirements, too thin, poor quality cables are a serious safety hazard.

4.4 Battery connection

Connect the positive and negative cable of the battery according to the diagram below.

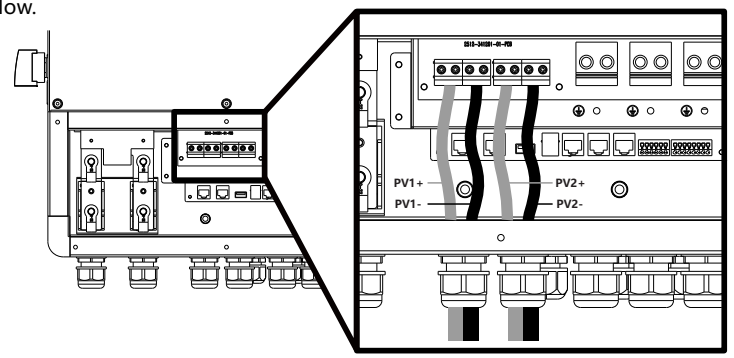


DANGER

- Before connecting battery, switch off and isolate all relevant circuit breakers. Never perform wiring on energized circuits.
- Make sure that the positive and negative terminals of the battery are connected correctly and not reversed, otherwise the inverter may be damaged.
- Please check that the cable used is sufficient for the requirements, too thin, poor quality cables are a serious safety hazard.

4.5 PV connection

Connect the positive and negative wires of the two strings of PV according to the diagram below.

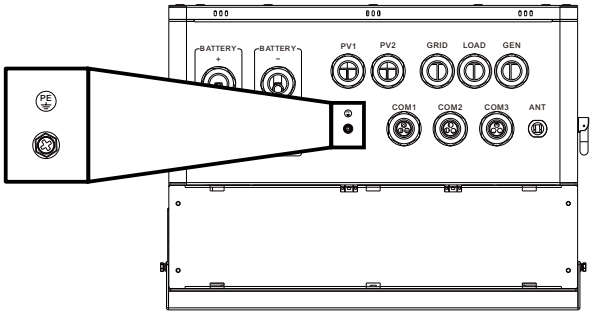


! *DANGER*

- Before connecting PV, switch off and isolate all relevant circuit breakers. Never perform wiring on energized circuits.
- Please make sure that the open circuit voltage of the PV modules in series does not exceed the **Max. Open Circuit Voltage** of the inverter (this value is 500V), otherwise the inverter may be damaged.

4.6 Grounding connection

Please make sure the grounding terminal connect to the Grounding Bar.



! *NOTICE*

- The grounding cable size shall not be less than 4 mm² and shall be as close as possible to the grounding point.

4.7 Final assembly

After confirming reliable wiring and correct wiring sequence, restore the terminal cover to its original position.

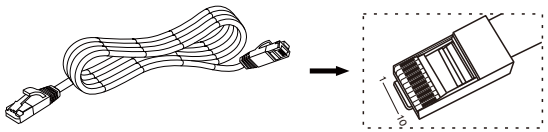
- Step 1: Close the circuit breaker of the battery.
- Step 2: Press the rocker switch at the bottom of the inverter, and the screen and indicator will light up, indicating that the inverter is enabled.
- Step 3: Close the circuit breakers for PV input, AC input, and AC output in sequence.
- Step 4: Start loads one by one in order of power from small to large.

4.8 Inverter Parallel

4.8.1 Introduction

1. Up to six units connected in parallel.
2. When using the parallel operation function, the following connecting lines (package accessories) shall be firmly and reliably connected:

Parallel communication cable*1



4.8.2 Cautions for parallel connection

Warning:

1. PV wiring:

When connected in parallel, the PV arrays of each machine must be independent and the PV arrays of PV1 and PV2 of each machine must also be independent.

2. Battery wiring

Parallel connection in single or three-phase: ensure that all solar storage inverters are connected to the same battery, with BAT + connected to BAT + , BAT- connected to BAT-, and that the connection is correct with the same wiring length and line diameter before power on, so as to avoid the abnormal operation of parallel system output caused by wrong connection.

3. LOAD wiring:

Parallel connection in single phase: ensure L-to-L, N-to-N and PE-to-PE connection for all solar storage inverters, and that the connection is correct with the same wiring length and line diameter before power on,so as to avoid the abnormal operation of parallel system output caused by wrong connection. For specific wiring, please refer to Wiring Diagram.
Parallel connection in three-phase: ensure N-to-N and PE-to-PE connection for all solar storage inverters. The L lines of all inverters connected to the same phase need to be connected together. But L lines of different phases cannot be joined together. Other connection precautions are the same as parallel connection in single phase. For specific wiring, please refer to Wiring Diagram.

4. GRID wiring:

Parallel connection in single phase: ensure L-to-L, N-to-N and PE-to-PE connection for all solar storage inverters, and that the connection is correct with the same wiring length and line diameter before power on,so as to avoid the abnormal operation of parallel system output caused by wrong connection. Meanwhile, it is not allowed to have multiple different AC source inputs to avoid damage to the external equipment of the inverter. The consistency and uniqueness of AC source input shall be ensured. For specific wiring, please refer to Wiring Diagram.

Parallel connection in three-phase: ensure N-to-N and PE-to-PE connection for all solar storage inverters. The L lines of all inverters connected to the same phase need to be connected together. But L lines of different phases cannot be joined together. Other connection precautions are the same as parallel connection in single phase. For specific wiring, please refer to Wiring Diagram.

5. Wiring of parallel communication line:

Our parallel communication cable is a shielded 10Pin network connection cable, which can be used for single phase or three-phase parallel connection. Each machine must be connected with one out and one in. This means that the machine "Parallel_A" is connected to the machine to be parallelized "Parallel_B", and that the machine "Parallel_A" is not allowed to connect to the "Parallel_B". "Parallel_B" or "Parallel_A" is connected to the machine to be parallelized "Parallel_A". At the same time, the parallel communication cable of each machine should be fastened with 10Pin network connection cable to avoid disconnection or poor contact of the parallel communication cable, which may cause abnormal operation or damage to the system output.

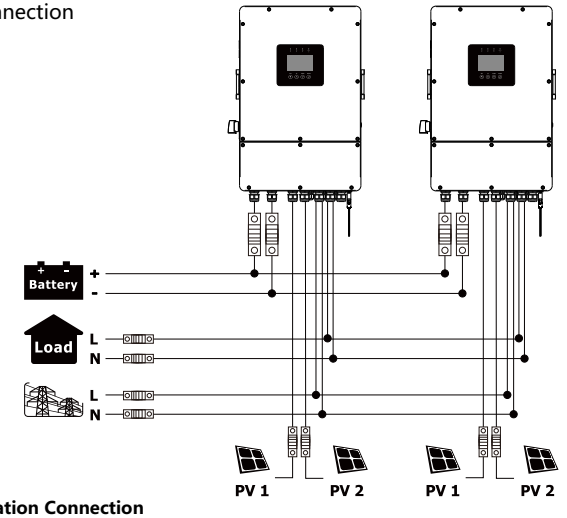
6. Before and after connecting the system, please carefully refer to the following system wiring diagrams to ensure that all wiring is correct and reliable before power on.

7. After the system is correctly wired, powered on, and in normal operation, if a new inverter needs to be connected, make sure to disconnect the battery input, PV input, AC input and AC output, and that all solar storage inverters are powered off before reconnecting into the system.

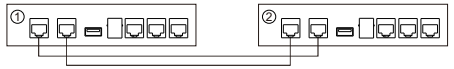
4.8.3 Parallel Operation in Single phase

Two inverters in parallel:

Power Connection

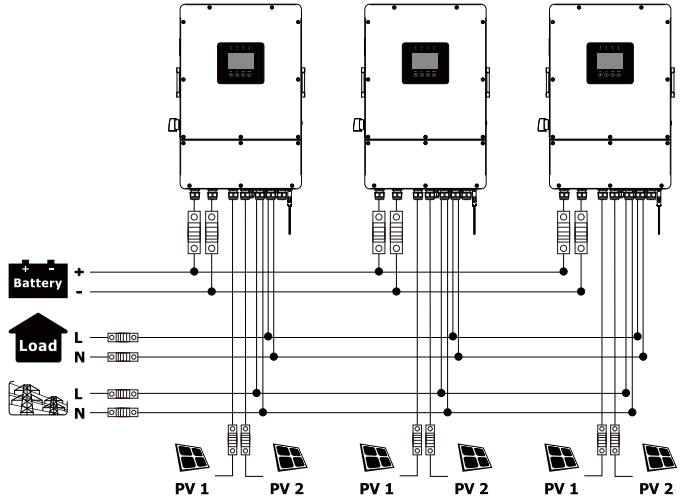


Communication Connection

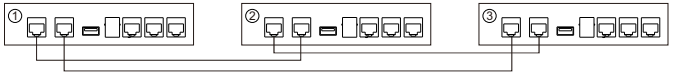


Three inverters in parallel:

Power Connection

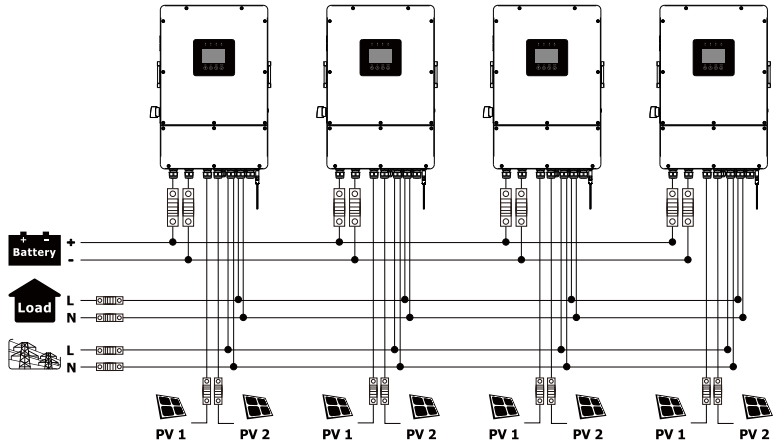


Communication Connection



Four inverters in parallel:

Power Connection

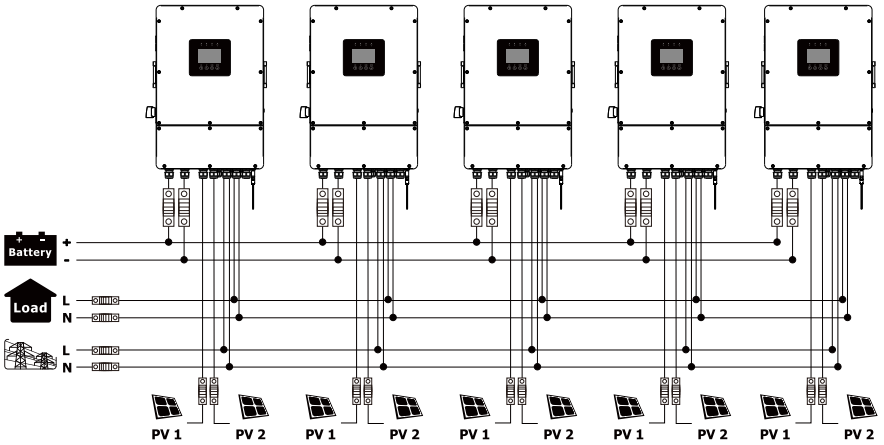


Communication Connection

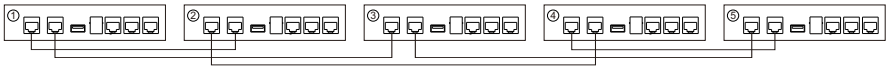


Five inverters in parallel:

Power Connection

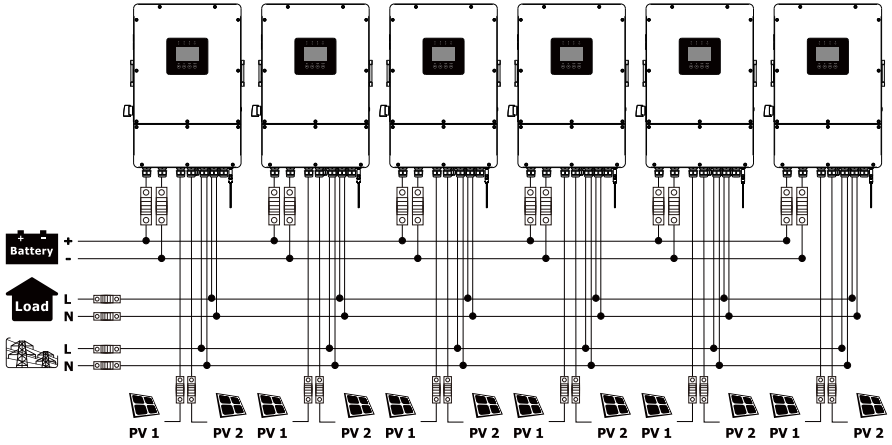


Communication Connection

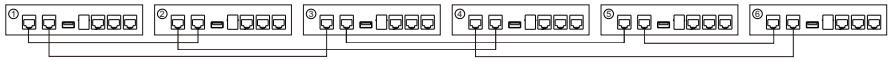


Six inverters in parallel:

Power Connection



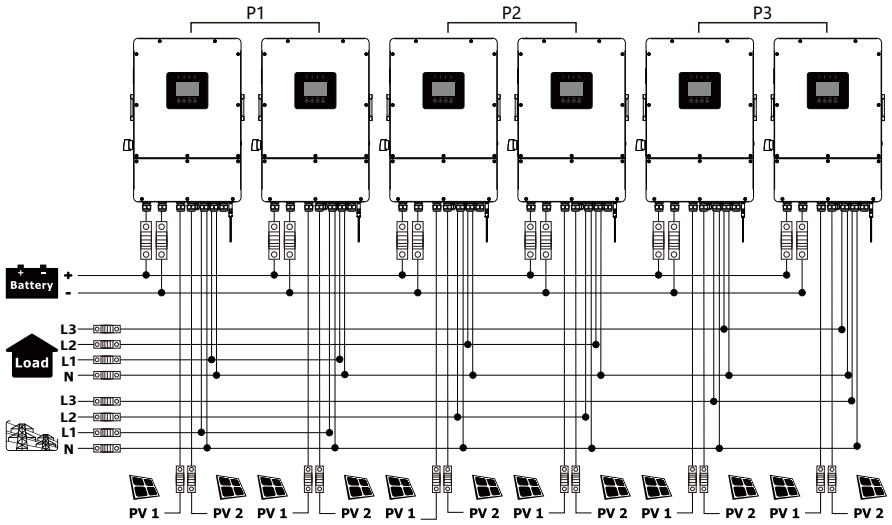
Communication Connection



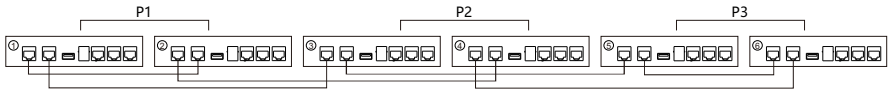
4.8.4 Support 3-phase equipment

Two inverters in each parallel:

Power Connection

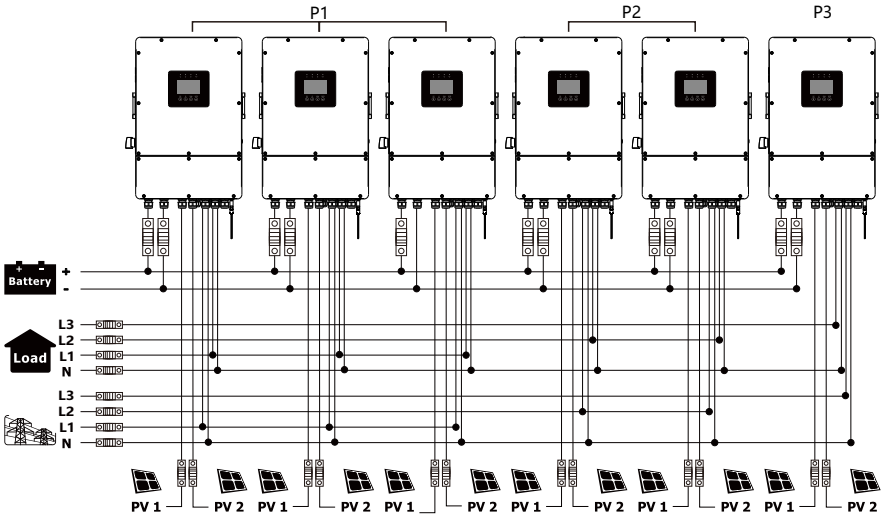


Communication Connection

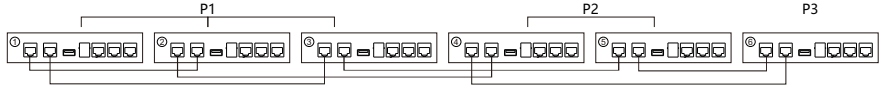


Three inverters in one phase, two inverters in second phase and one inverter for the third phase:

Power Connection

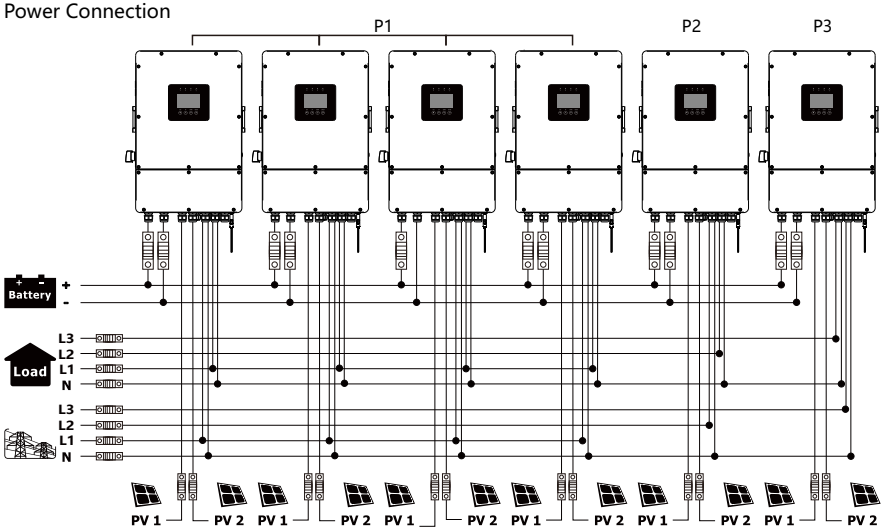


Communication Connection

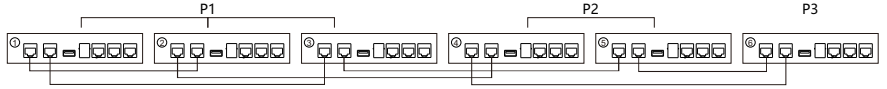


Four inverters in one phase and one inverter for the other two phases:

Power Connection

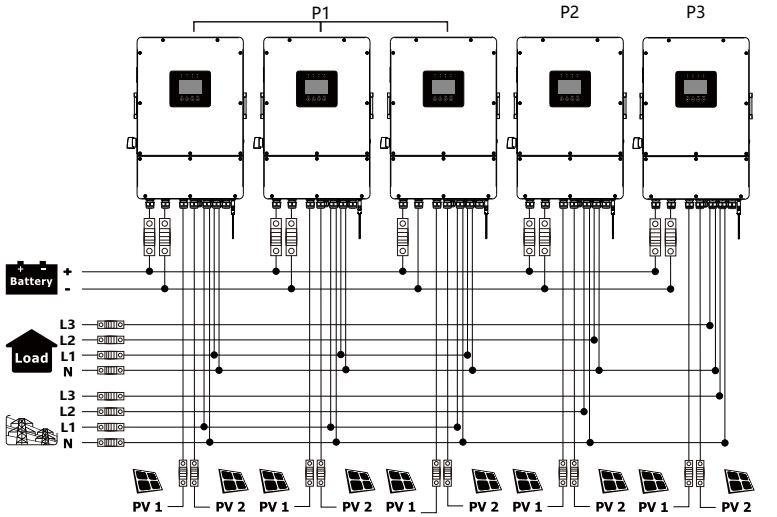


Communication Connection

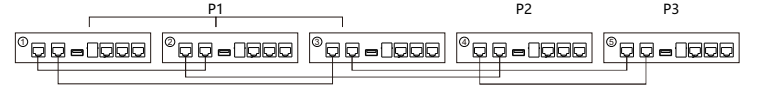


Three inverters in one phase and only one inverter for the remaining two phases:

Power Connection

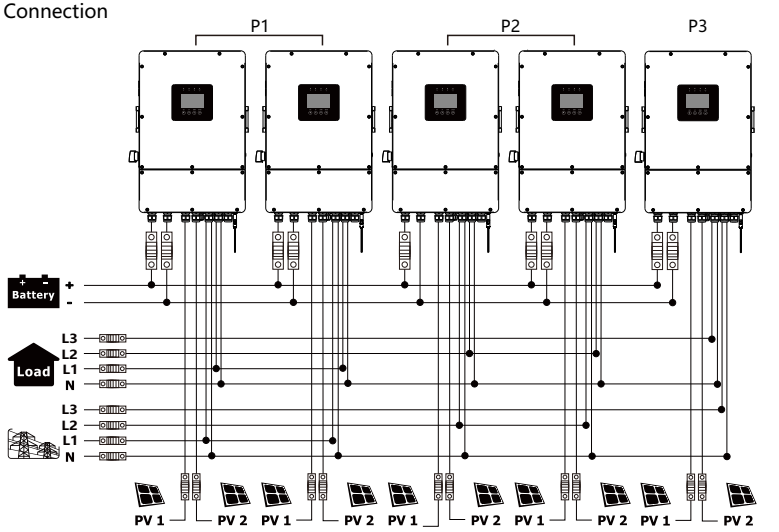


Communication Connection

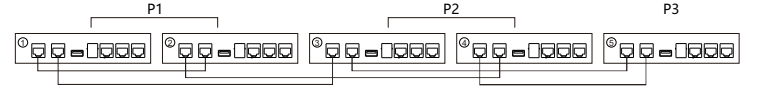


Two inverters in two phases and only one inverter for the remaining phase:

Power Connection

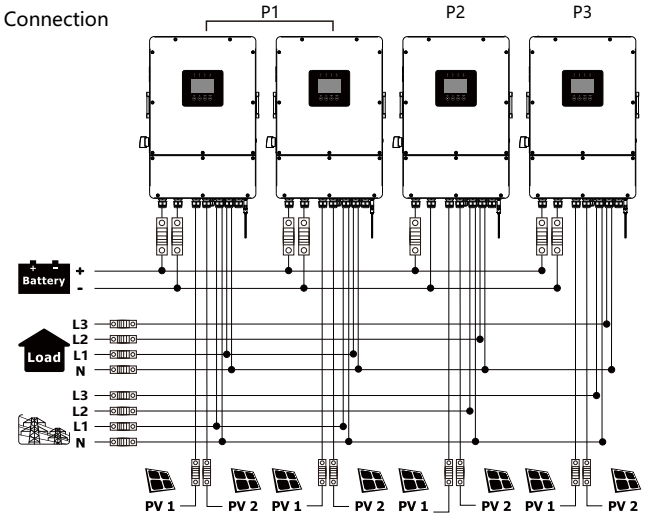


Communication Connection

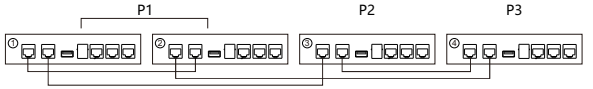


Two inverters on one phase and one inverter on each remaining phase、One inverter on each phase:

Power Connection

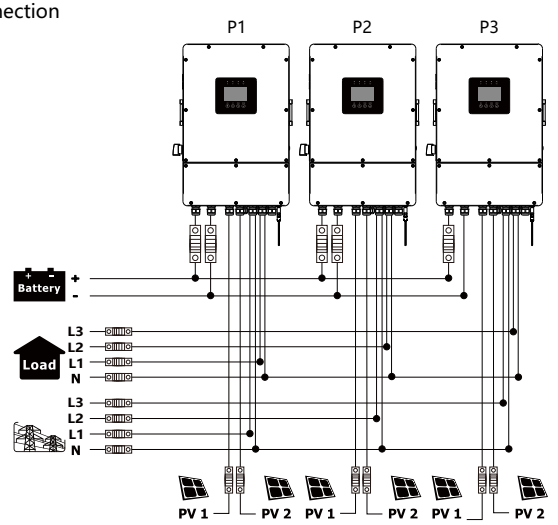


Communication Connection

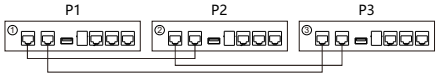


One inverter on each phase:

Power Connection



Communication Connection



Note:

1) Before powering on and lighting up the screen, check for correct wiring according to the above wiring diagrams to avoid system problems.

2) All wiring must be fixed and reliable to avoid wire drop during use.

3) When the AC output is wired to the load, it shall be properly wired according to the requirements of the electrical load equipment to avoid damage to the load equipment.

4) Setting item "output voltage setting" needs to be set consistently or only for the master. When paralleling, the voltage set by the master will prevail, and the master will be forced to rewrite the rest of the slaves to be consistent. This option can be set in standby mode only.

5) Machine factory default for single machine mode, if you use parallel or three-phase function, you need to set the" Parallel mode " item parameters through the screen. The setting method is: power on one machine at a time, the rest of the machine off, and then set the " Parallel mode " item parameters according to the site system operation mode. After this machine is set successfully, turn off the machine switch and wait for the machine to be powered down, then set the rest of the machines in turn until all machines are set, and then all machines are powered up again at the same time and enter the working state.

The" Parallel mode " setting item: When in single-phase parallel connection : setting " Parallel mode "should be set as "Single-phase parallel". When in three-phase parallel connection, setting " Parallel mode " should be set as follows: all machines in phase 1 must be set as "Parallel-three phase A", all machines in phase 2 must be set as "Parallel-three phase B", all machines in phase 3 must be set as "Parallel-three phase C". At present, the voltage phase difference between P1-P2, P1-P3 and P2-P3 is 120 degrees.

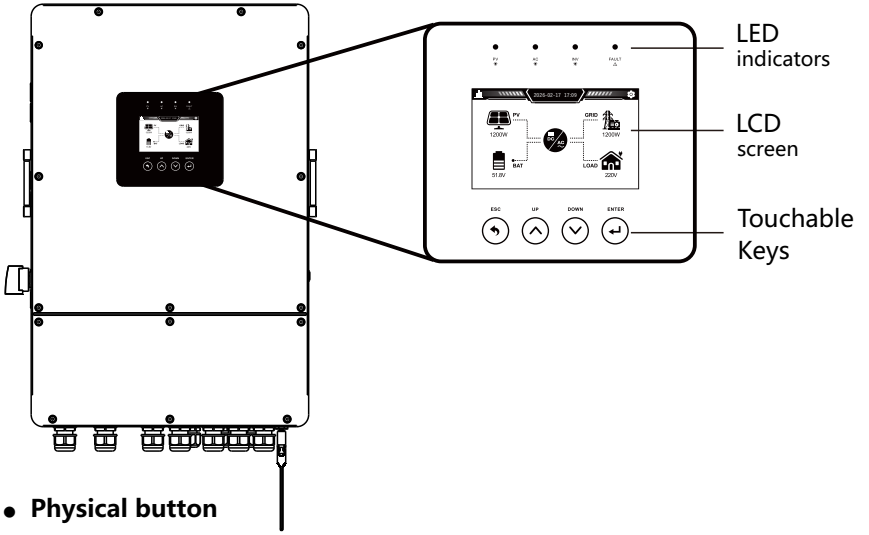
a. When the output voltage set in the setting output voltage is 230Vac (S model), the line voltage between the live wire L1 in phase 1 and the live wire L2 in phase 2 is 230*1.732 = 398Vac, and similarly the line voltage between L1-L3, L2-L3 is 398Vac; the single phase voltage between L1-N, L2-N, L3-N is 230Vac.

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

5. Operation

5.1 Operation and display panel

The operation and display panel below includes 1 LCD screen, 4 indicator lights, 4 touchable keys.



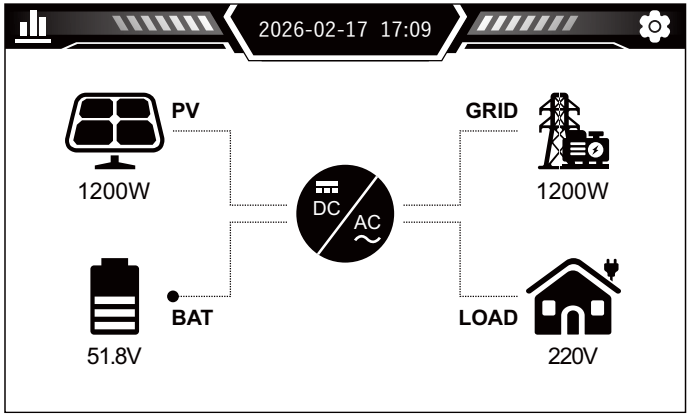
- **Physical button**

Touchable Keys	↩	∧	∨	↵
Description	Return	Previous page	Next page	Confirm

- **LED indicators**

Indicators	Color	Description
PV	Green	Light on: PV access valid
		Light off: PV access invalid
AC	Green	Light on: Grid access valid
		Light off: Grid access invalid
OUTPUT	Green	Light on: UPS load Bypass mode
		Light flash: UPS load invert mode
		Light off: The machine is starting up
FAULT	Red	Light on: Alarm occurred.information displayed on the home page.
		Light off: Working normally, false alarm

- **Display panel**

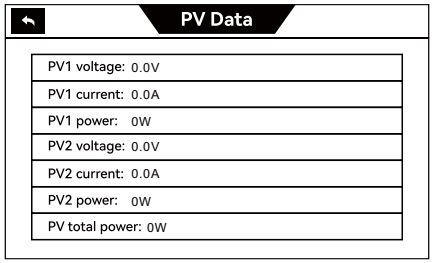


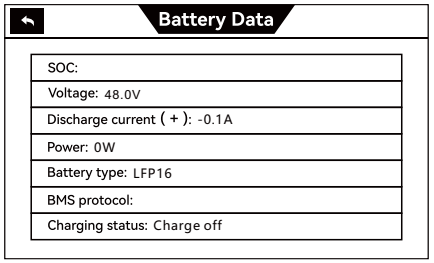
Icon	Function Description
2026-02-17 17:03	Local time
	Historical data page
	Settings page
1200W	PV panel, indicates PV voltage,Power
1200W	The utility grid, indicates the AC information
DC AC	The inverter is working

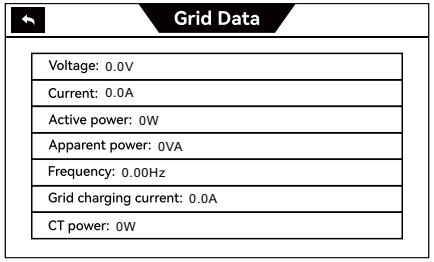
Icon	Function Description
BYPASS	When the PV panels and batteries are disconnected, the system automatically switches to bypass mode.
220V	The home load, indicates output voltage
51.8V	Battery , Voltage
	The energy direction

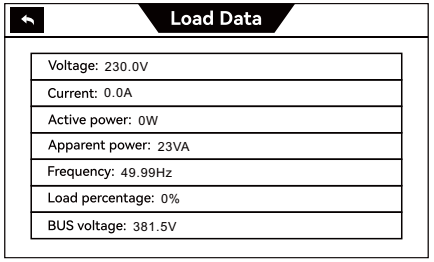
• View real-time data

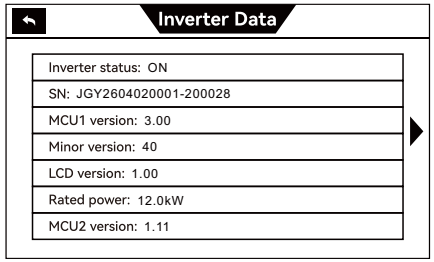
On the LCD home screen, press the **Up/Down** buttons or tap the inverter icon, battery icon, mains icon, load icon and photovoltaic icon to view the real-time operating data of the device.

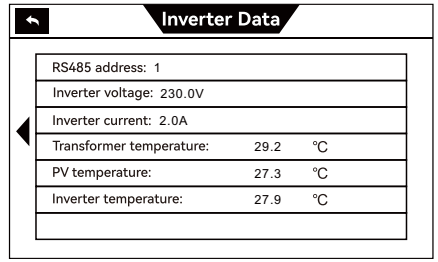






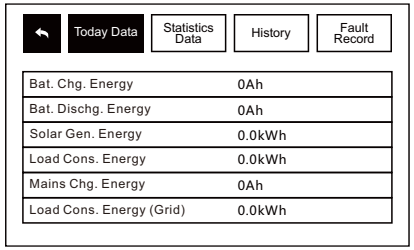


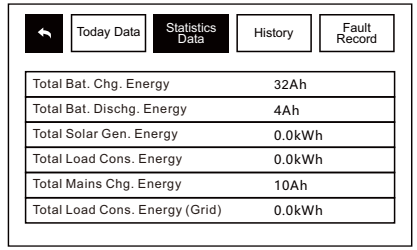


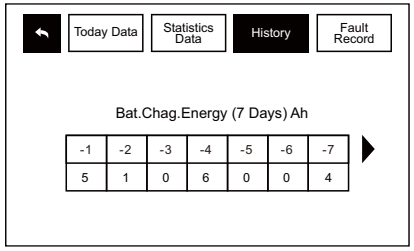


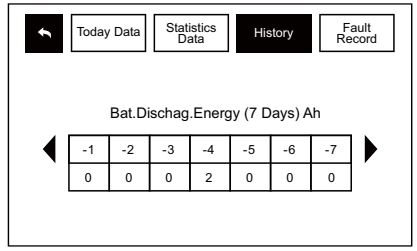
• View historical data

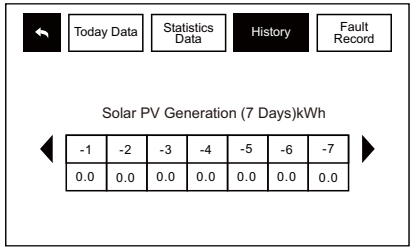
On the LCD home screen, press the history icon, view historical data of the device.

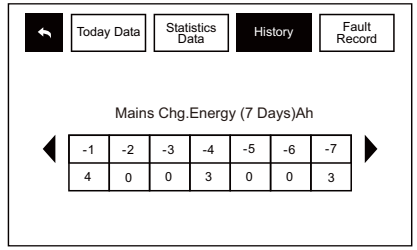


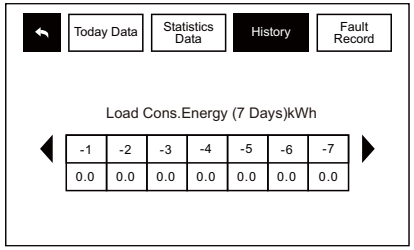


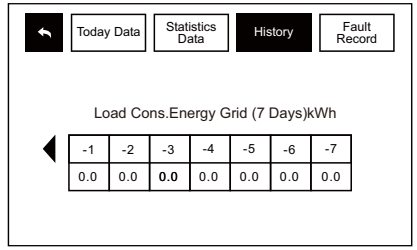


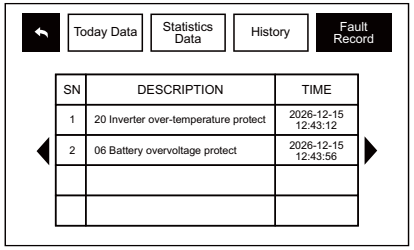






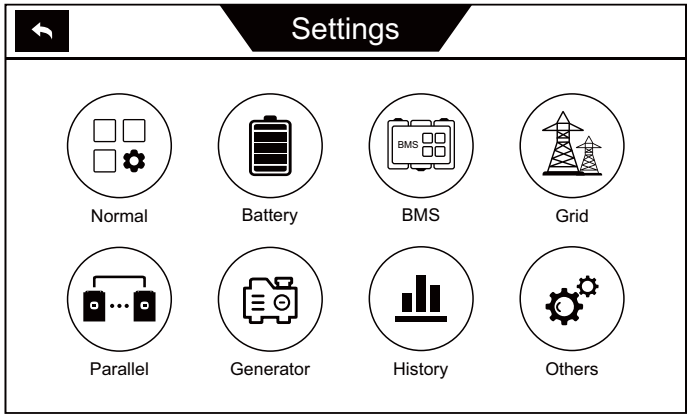






- The data of x days ago

- **Settings interface**



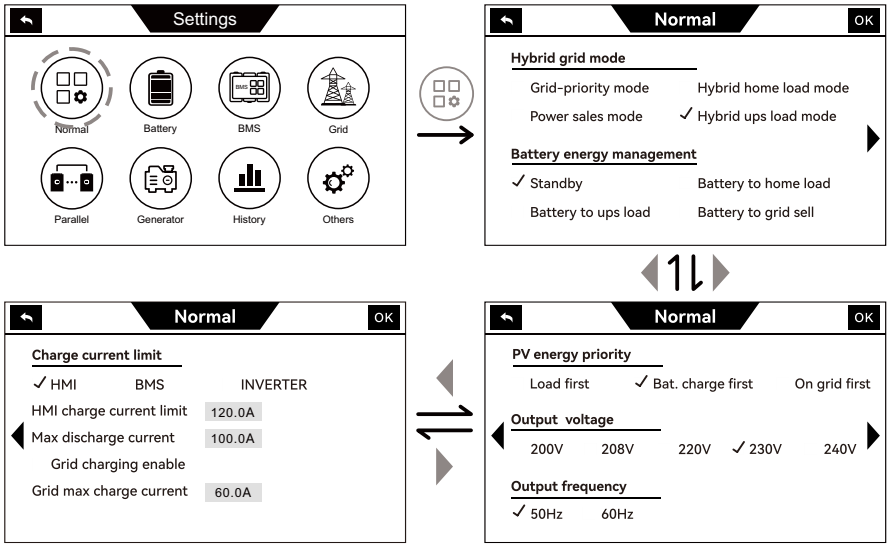
Icon	Function Description	Icon	Function Description
	Normal mode settings		Parallel mode and ID settings
	Battery settings		Generator mode settings
	BMS mode settings		History, view historical data
	Grid settings		Settings for Other Items

5.2 Setting

You can quickly access the setting mode by pressing the "**UP**" button. To switch between different setting interfaces, press the "**UP**" and "**DOWN**" buttons respectively. Once all settings are completed, press the "**Enter**" or "**OK**" to save and confirm the changes.

- **Normal**

Access the Normal Settings Mode. Press the "**UP**" and "**DOWN**" buttons respectively to switch between different setting pages. After completing all configurations, press the "**Enter**" or "**OK**" to save and confirm the changes.

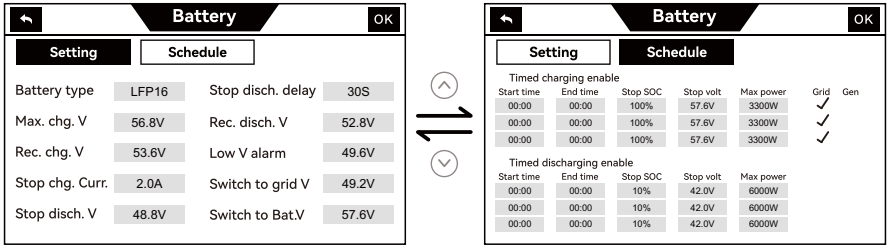


Parameter	Option	Description
Hybrid Grid Mode	Grid-priority mode	Off-grid mode
	Power sales mode	On-grid mode. Direct grid connection of excess PV energy
	Hybrid ups load mode	UPS load backflow prevention, photovoltaic or battery energy is only for the ups load, excess energy will not be connected to the grid
	Hybrid home load mode	Home load anti-backflow,solar or battery energy is only supplied to the home load, excess energy will not be connected to the grid
Battery Energy Manage	Standby	The battery is discharged only when the working state is off the grid
	Battery to ups load	When the PV power is less than the UPS load power, the battery discharge is added
	Battery to home load	The battery can supply the power to Home load
	Battery to grid sell	The battery can supply the power to grid

Parameter	Option	Description
PV energy manage	● When Hybrid Grid Mode is set to "Limit Power to ups load" or when CT is not connected, the following load refers to the ups load. ● When Hybrid Grid Mode is set to "Limit Power to home load/On grid" and CT is connected, the following load refers to the ups load plus the home load.	
	First to Load	PV power supply logic: load-charge-grid connection
	First to charging	PV power supply logic: charge-load-grid connection
	First to grid	PV power supply logic: load-grid connection-charge
Output Voltage	200V,208V,220V,230V,240V	Select AC output voltage
Output Frequency	50Hz,60Hz	Select AC output frequency
Chg. Curr. Limit	HMI	Maximum battery charging current is limited according to the inverter battery charging current setting value
	BMS	Maximum battery charging current is limited by the current limit value of the BMS
	INVERTER	Maximum battery charging current is limited by the machine's derating logic
Max. Chg. Curr.	Setting the amount of current when charging the battery	
Max. Discharge Current	the maximum current allowed when the battery discharges. Users set this value for grid-tied or hybrid load-supplying discharge; in off-grid mode the setting has no effect.	
Grid charging enable	Enable,Disable	Selectable grid participation in battery charging
Grid Max. Chg. Curr.	When using mains charging, set the size of the battery mains charging current (the value is the battery current, DC)	

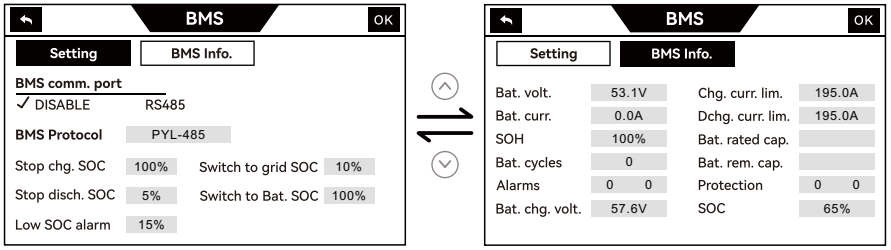
• Battery

Enter battery mode. Press the "**UP**" and "**DOWN**" buttons to switch between the "**Settings**"and "**Schedule**" interfaces. After completing all configurations, press "**Enter**" or "**OK**" to save and confirm the changes.



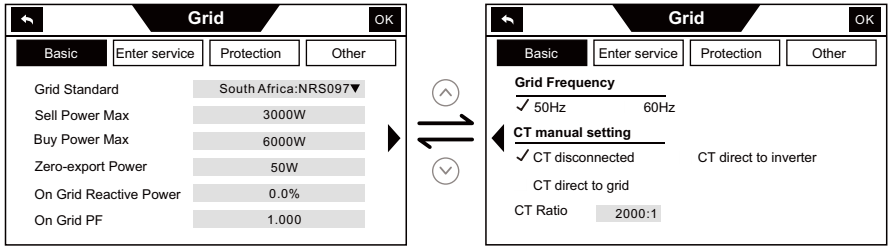
Column	Parameter	Option	Description
Setting	Battery Type	USER	User customizable to set all battery parameters
		SLd	Sealed Lead Acid Battery
		FLd	Open-ended lead-acid batteries
		GEL	gel lead-acid battery
		LFP14 LFP15 LFP16	Li-FePO4/14/15/16, corresponding to Li-FePO4 14string, 15 string, 16 string
		N13 N14	Ternary lithium batteries, N13/N14, corresponding to ternary lithium batteries 13 string, 14 string
		No battery	Without battery
	Max. Chg. V	When the battery is charging, the voltage reaches the value to stop charging	
	Rec. Chg. V	When the battery is fully charged, the inverter stops charging and resumes charging when the battery voltage falls below this voltage value.	
	Stop Chg. Curr.	Charging stops when the charging current falls below this setting.	
	Stop Disch. V	When the battery is discharged, the voltage reaches the value and stops discharging.	
	Stop Disch. Delay	When the battery voltage reaches the "Stop Discharge Voltage" setting, the inverter output is shut down with a delay.	
	Rec. Disch. V	When the battery low voltage disconnects the inverter output, the battery voltage needs to be greater than this setting to restore the battery inverter AC output.	
	Low V Warn	Battery under-voltage alarm point, when the battery voltage is lower than the judgment point, the under-voltage alarm will be reported and the output will not be turned off.	
	Switch to Grid V	Switch to utility (grid) power when the battery voltage falls below this value.	
	Switch to Bat. V	Switch to battery power when the battery voltage exceeds this value	
Schedule	Time charging/ discharging enable	Select whether to turn on timed charging and discharging	
	Start/End Time	Setting the time period for timed charging and discharging	
	Stop SOC	Setting the battery charging cut-off SOC value and the cut-off SOC value for discharging during the timed charging and discharging time period (during BMS communication)	
	Stop Volt	Setting the battery charging cut-off voltage value and discharging cut-off voltage value during the timed charging and discharging time period (when the BMS is not communicating)	
	Max Power	Setting the battery charging power and discharging power during the timedcharging and discharging time period	
	Grid charge	When setting the timed charge, select the grid to charge the battery	
	Generator	When setting the timed charge, select the generator to charge the battery	

• BMS

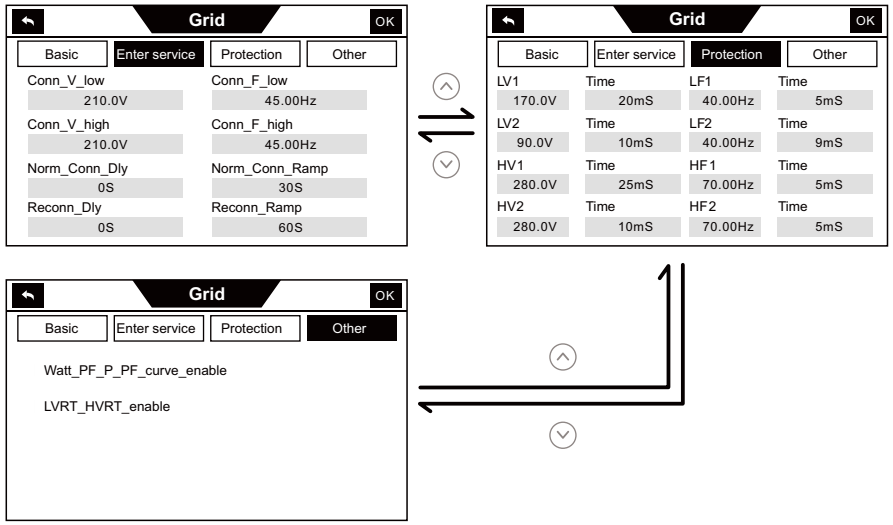


Column	Parameter	Option	Description
Setting	BMS Comm. Port	DISABLE	BMS does not communicate
		RS485	BMS RS485 communication function
	BMS Protocol	When the BMS port selection setting item = 485,you need to select the corresponding lithium battery manufacturer brand for communication:PACE-PACEEX; PYL-PYLONTECH	
	Stop Chg. SOC	Charging will stop when the SOC value reaches this set point (effective when BMS communication is normal).	
	Stop Disch. SOC	When the SOC value reaches this setting, an error 32 is reported and the inverter output is shut down (valid when BMS communication is normal).	
	Low SOC Alarm	SOC value up to this setting will report 30 faults. The inverter output will not shut down and the fault disappears if the SOC value exceeds 5% of the set value. (Valid when BMS communication is normal)	
	Switch to Grid SOC	When the battery reaches the SOC value, it is converted to mains power supply (effective for BMS communication).	
	Switch to BT SOC	When the battery reaches the SOC value, it is converted to battery power supply (effective for BMS communication).	
BMS Info	Bat. Volt.	Battery voltage	
	Bat. Curr.	Battery current	
	Bat. Temp.	Battery temperature	
	SOH	Battery state of health (SOH)	
	Bat. Cycles	Battery charge/discharge cycles	
	Alarms	Fault code	
	Bat. Chg. Volt.	Charging voltage	
	Chg. Curr. Lim.	Charging current limit	
	Dchg. Curr. Lim.	Discharging current limit	
	Bat. Rated Cap.	Rated capacity	
	Bat. Rem. Cap.	Remaining capacity	
	Protection	Protection code	
	SOC	State of charge (SOC)	

• Grid

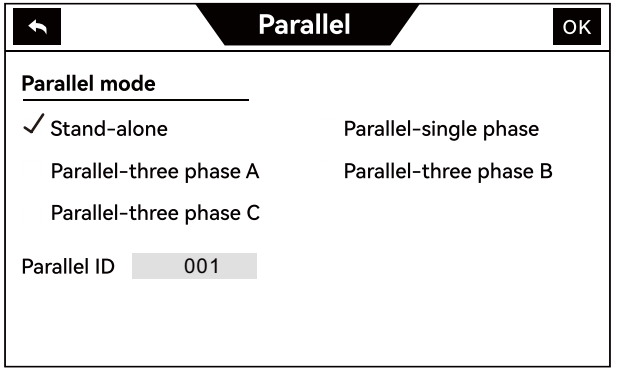


Column	Parameter	Option	Description
Basic	Grid Standard	Italy: CEI 021 Germany: VDE-ARN-4105 Europel: EN50549-1 Spain: UNE217002 England: G99 South Africa: NRS-097 Other regions: GNL Australia: AS4777.2 Australia A Australia: AS4777.2 Australia Newzealand Poland: EN 50549-1 MYANMAR Not Initialized	
	Sell Power Max	On grid power	
	Buy Power Max	Maximum power drawn from the grid. If the grid charging power + load power exceeds this setting, the machine reduces the charging power. (Setting range: 0 to rated power)	
	Zero-export Power	Error calibration power in the case of backflow prevention, recommended setting 20-100W	
	On Grid Reactive Power	Setting range 0-100%, % of reactive power	
	On Grid PF	Setting range 0.8-1	
	Grid Frequency	Selection of local grid frequency，50Hz/60Hz	
	CT Ratio	When connecting an external CT, enter the ratio on the CT specification.	
	CT manual setting	CT disconnected	CT (Current Transformer) not used
		CT direct to inverter	CT arrow pointing toward the inverter
		CT direct to grid	CT arrow pointing toward the grid



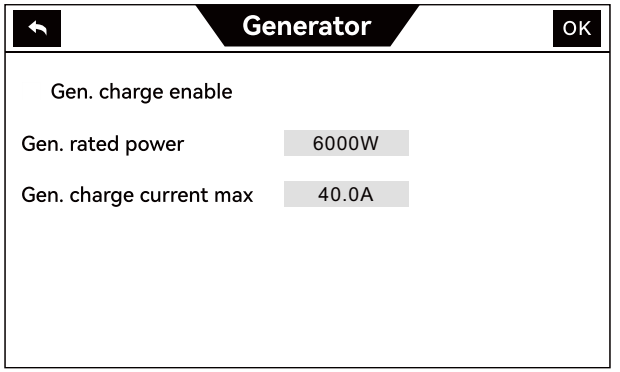
Column	Parameter	Option	Description
Enter service	Conn_V_low	Grid-connected low voltage protection voltage	
	Conn_V_high	Grid-connected high-voltage protection voltage	
	Norm_Conn_Dly	Grid normal connection, grid connection delay time	
	Reconn_Dly	Grid down reconnection, grid connection delay time	
	Conn_F_low	Grid-connected low-frequency protection points	
	Conn_F_high	Grid-connected high-frequency protection points	
	Norm_Conn_Ramp	Normal grid connection, rate of rise of grid-connected power	
	Reconn_Ramp	Grid disconnection and reconnection, rate of rise of grid-connected power	
Protection	Lv1	Class 1 undervoltage protection point	
	Lv2	Class 2 undervoltage protection point	
	Hv1	Class 1 overvoltage protection point	
	Hv2	Class 2 overvoltage protection point	
	LF1	Class 1 underfrequency protection point	
	LF2	Class 2 underfrequency protection point	
	HF1	Class 1 overfrequency protection point	
	HF2	Class 2 overfrequency protection point	
	Time	Protection Response Time	
Other	Watt_PF_P_PF_curve_enable	Adjustment of the power factor of the inverter according to the set active power	
	LVRT_HVRT_enable	Adjustment of grid HV ride-through / LV ride-through values	

• Parallel



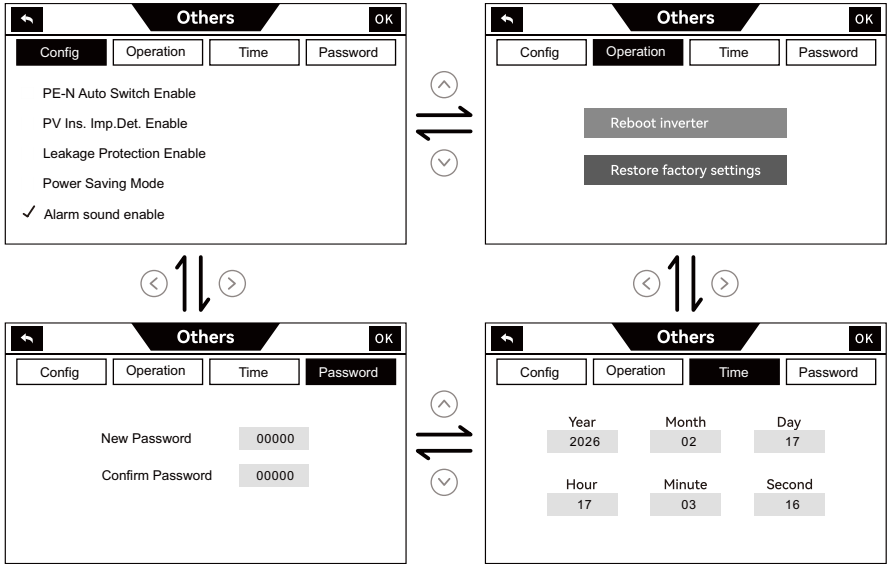
Parameter	Option	Description
Parallel mode	Stand-alone Parallel-single phase Parallel-three phase A Parallel-three phase B Parallel-three phase C	Three-phase parallel connection setting All machines in phase 1 must be set as 【three phase A】 All machines in phase 2 must be set as 【three phase B】 All machines in phase 3 must be set as 【three phase C】 When the output voltage is 230Vac, At present the line voltage between the live wire L1 in phase 1, and the live wire L2 in phase 2 is 230*1.732 = 398Vac, and similarly the line voltage.
Parallel ID	inverter RS485 address, range 1-254	

• Generator



Parameter	Description
Max. Gen. Chg. Curr.	Maximum battery charging current during generator charging
Generator Rate Power	Setting the power of the generator up to the rated power of the inverter
Gen. Chg. Enable	Setting whether the generator is charged or not

• Others

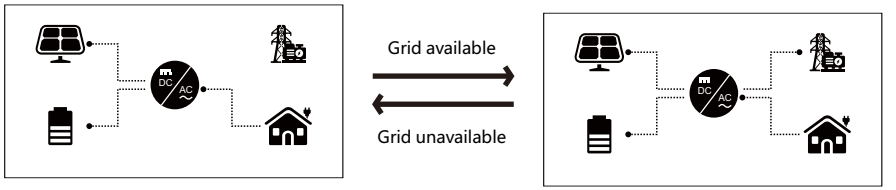


Column	Parameter	Description
Config	PE-N Auto Switch Enable	Enable automatic switching of PE-N connections
	PV Ins. Imp. Det. Enable	Enable PV insulation impedance detection
	Leakage Protection Enable	Enable leakage current protection
	Power Saving Mode	After turning on the energy-saving mode, if the load is empty or less than 25W, the inverter output will be shut down after a delay of 5min; when the load is more than 40W, the inverter will start automatically.
	Alarm Sound Enable	When enabled, the buzzer activates on alarm.
Time	Time Setting	
Password	New machine default password: 0 (no password). Users may set a new password. If the user-set password is forgotten, use the super password "15432" to access.	
Operation	Restore Factory Settings	Reset all inverter settings
	Reboot Inverter	Restart the inverter
	Alarm Sound Enable	Enable inverter audible alarm on fault

5.3 Output priority

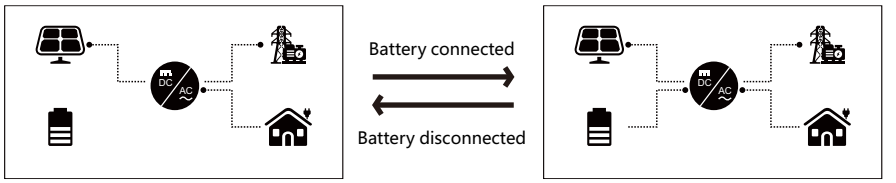
• AC First Output

Utility at first priority, utility and solar provide power to load at the same time when solar is available, battery will provide power to load only when utility power is not available.(Priority: utility>solar>battery)



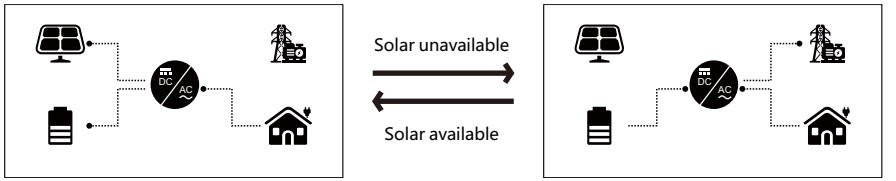
• Solar and Grid Hybrid Output

In UTI mode, when not connected to the battery or when the battery is full, the solar and the utility supply power to the load at the same time.(Priority: solar>utility>battery)



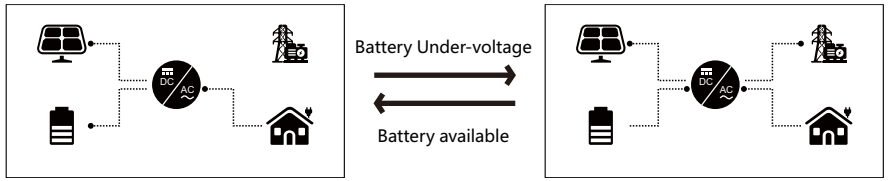
• Solar First Output

Solar provides power to the loads as first priority.If solar is not sufficient or not available, the utility will be used as a supplement to provide power to the loads. This mode maximises solar energy while maintaining battery power and is suitable for areas with relatively stable power grids.(Priority: solar>utility>battery)



- **Battery first**

Solar provides power to the loads as first priority. If solar is not sufficient or not available, the battery will be used as a supplement to provide power to the loads. When the battery voltage reaches the value of parameter (Voltage point of battery switch to utility) will switch to utility to provide power to the load, This mode makes maximum use of DC energy and is used in areas where the grid is stable. (Priority: solar>battery>utility)

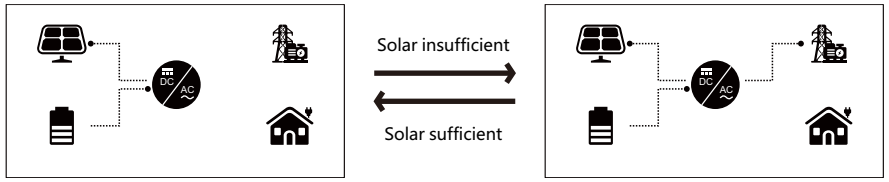


5.4 Battery charging mode

The charging mode corresponds to the parameter Battery Charging Mode, allowing the user to set the charging mode manually.

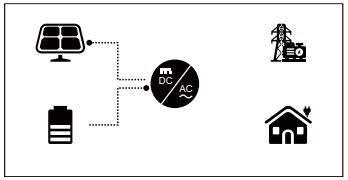
- **Hybrid Charging**

PV and mains charge the battery at the same time, with PV taking priority and mains acting as a supplement when PV is insufficient. This is the fastest charging method and is suitable for areas with insufficient power supply, providing sufficient backup power for users. (Priority: PV > utility)



- **Only Solar Charging**

Only photovoltaic electricity is used to charge the battery, without starting the mains charging. This is the most energy-efficient method, with all battery power coming from solar energy, and is usually used in areas with good radiation conditions.



5.5 Time-slot charging/discharging function

The 10KW/12KW series is equipped with a time-slot charging and discharging function, which allows users to set different charging and discharging periods according to the local peak and valley tariffs, so that the utility power and PV energy can be used rationally.

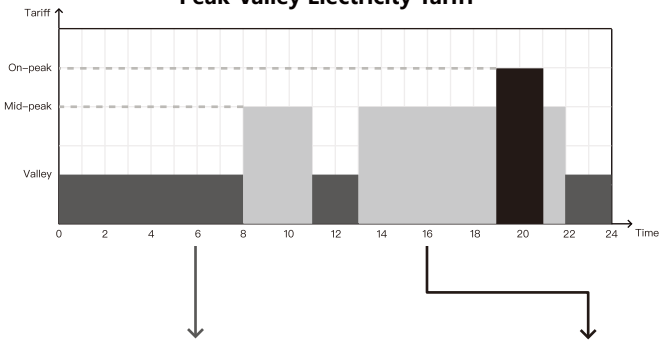
When mains electricity is expensive, the battery inverter is used to carry the load; when the mains electricity is cheap, the mains electricity is used to carry the load and charge, which can help customers to save electricity costs to the greatest extent.

The user can turn on/off the time-slot charging/discharging function in setup menu parameter Battery. and set charging and discharging slot in parameter. Below are examples for users to understand the function.

NOTICE

Before using the function for the first time, please set the local time and date, and then you can set corresponding periods based on the local time-of-use price.

Peak-Valley Electricity Tariff



Time-slot Utility Charging/ Carrying Function



With 3 definable periods, users can freely set the mains charge/loading period in the range of 00:00–23:59. During the period set by the user, in case of PV energy output, it will be used first; in case of no PV energy output or lack of PV energy, mains will be used as a supplement.

Timed battery discharge function

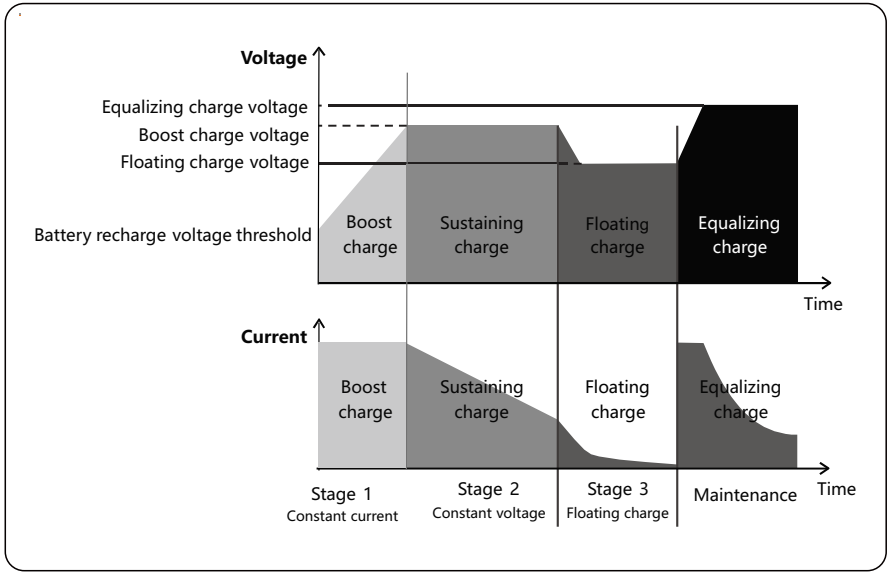


With 3 definable periods, users can freely set the battery discharge period in the range of 00:00–23:59. During the period set by the user, the inverter will first use the battery inverter to load; if the battery power is insufficient, the inverter will automatically switch to mains to ensure stable operation of the load.

5.6 Battery parameter

• Lead-acid battery

Parameter/Battery Type	Sealed Lead-acid Battery	Gel lead-acid battery	Flooded Lead-acid Battery	User-defined Battery
	SLD	GEL	FLD	USE
Overvoltage disconnect voltage	60 V	60 V	60 V	60 V
Equalizing charge voltage	58 V	56.8 V	58 V	40 V–60 V (settable)
Boost charge voltage	57.6 V	56.8 V	57.6 V	40 V–60 V (settable)
Floating charge voltage	55.2 V	55.2 V	55.2 V	40 V–60 V (settable)
Under-voltage alarm voltage	44 V	44 V	44 V	40 V–60 V (settable)
Under-voltage disconnect voltage	42 V	42 V	42 V	40 V–60 V (settable)
Discharge limit voltage	40 V	40 V	40 V	40 V–60 V (settable)
Over-discharge delay time	5s	5s	5s	1s–30s (settable)
Equalizing charge duration	120 min	-	120 min	0 min–600 min (settable)
Equalizing charge cycle	30 d	-	30 d	0 d–250 d (settable)
Boost charge cycle	120 min	120 min	120 min	10 min–600 min (settable)

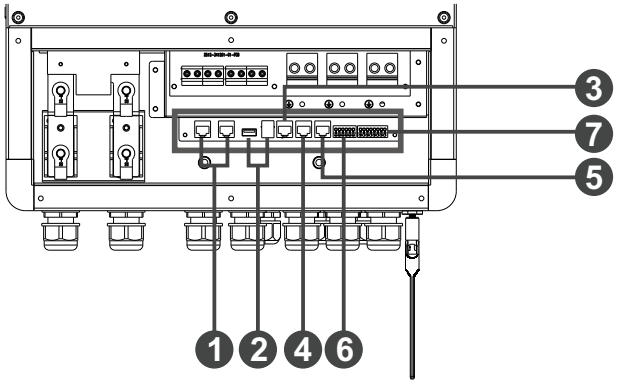


• Li-ion battery

Parameter/Battery Type	Ternary Li-ion Battery		LFP Battery			User-defined Battery
	N13	N14	L16	L15	L14	USE
Overvoltage disconnect voltage	60 V	60 V	60 V	60 V	60 V	60 V
Equalizing charge voltage	-	-	-	-	-	40 V–60 V (settable)
Boost charge voltage	53.2 V	57.6 V	56.8 V	53.2 V	49.2 V	40 V–60 V (settable)
Floating charge voltage	53.2 V	57.6 V	56.8 V	53.2 V	49.2 V	40 V–60 V (settable)
Under-voltage alarm voltage	43.6 V	46.8 V	49.6 V	46.4 V	43.2 V	40 V–60 V (settable)
Under-voltage disconnect voltage	38.8 V	42 V	48.8 V	45.6 V	42 V	40 V–60 V (settable)
Discharge limit voltage	36.4 V	39.2 V	46.4 V	43.6 V	40.8 V	40 V–60 V (settable)
Over-discharge delay time	30s	30s	30s	30s	30s	1s–30s (settable)
Equalizing charge duration	-	-	-	-	-	0 min–600 min (settable)
Equalizing charge cycle	-	-	-	-	-	0 d–250 d (settable)
Boost charge cycle	120 min (settable)	120 min (settable)	120 min (settable)	120 min (settable)	120 min (settable)	10 min–600 min (settable)

6. Communication

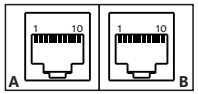
6.1 Overview



1	2	3	4	5	6	7
Parallel port	USB port	COMM port	BMS port	DRM port	CT port	Dry contact port

6.2 Parallel port

a)This port is used for parallel communication, through which the parallel modules can communicate with each other.



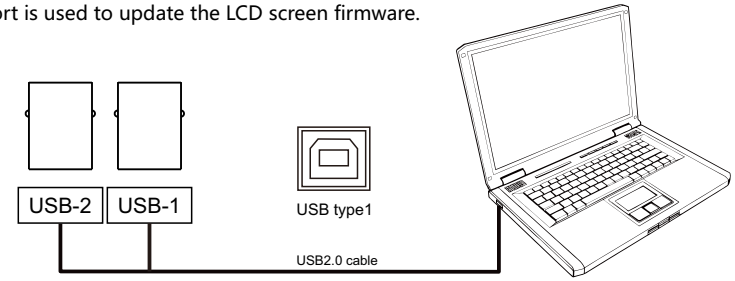
b) Each machine has two 10Pin ports, one for the Parallel_A and one for the Parallel_B.

c) When connecting, make sure to connect the local Parallel_A to the parallelized machine Parallel_B, or the local Parallel_B should be connected to the parallelized machine Parallel_A.

d) Do not connect local Parallel_A to local Parallel_B.

6.3 USB port

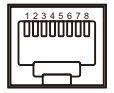
The USB-2 port is used to update the LCD screen firmware.



The USB-1 port is used to update the main program firmware.

6.4 COMM port (Optional Accessories)

Users can use host computer software through the port to read and modify device parameters. If needing the installation package for host computer software, contact us to get it.

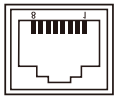


COMM

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

6.5 BMS port

BMS port is used to connect to the BMS of Li-ion battery.



BMS

RJ45	Definition
Pin 1	RS485-B
Pin 2	RS485-A
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	/
Pin 8	/

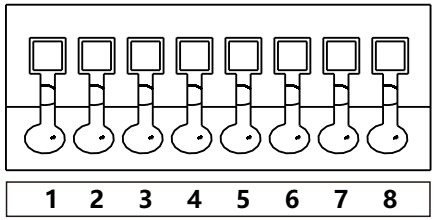
NOTICE

If you need the communication between the inverter and the BMS of the Li-ion battery, please contact us to understand the communication protocol, or upgrade the inverter to the corresponding software program.

6.6 Dry contact port

The dry contact port has 3 functions:

1. RSD power supply
2. Temperature sampling (reserved)
3. Generator remote start/stop



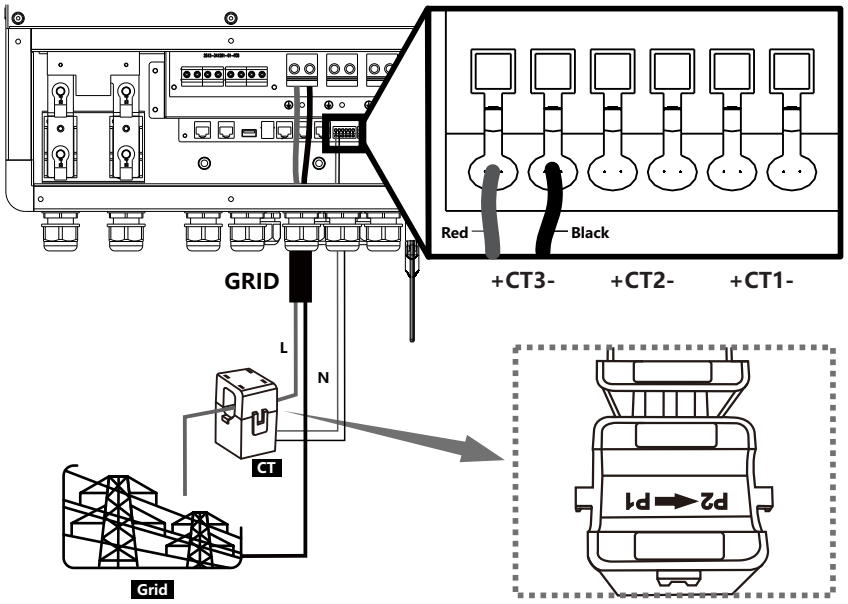
Function	Description
RSD power supply	PIN1 is GND, PIN2 is RSD 12V
Temperature sampling (reserved)	PIN1& PIN5 can be used for battery temperature sampling compensation.
Generator remote Start/stop	6-7:NC 6-8:NO Remote generator shutdown: PINS 6 to 7 are normally closed, and PINS 6 to 8 are normally open. (PIN6/7/8 output 125Vac/1A, 230Vac/1A, 30Vdc/1A)

NOTICE

If you need to use the remote start/stop function of the generator with dry contact, please ensure that the generator has an ATS and supports remote start/stop.

6.7 External CT port

1. Split Core Current Transformer (CT) dimension:(mm)
2. Secondary output cable length is 5m.
3. The CT direction is "to inverter"



6.8 Built-in WiFi (Optional)

Built-in WiFi is used to connect to the Wi-Fi data acquisition module, which allows theused to view the operating status and parameters of the inverter via the mobile phone APP.

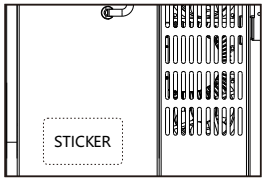
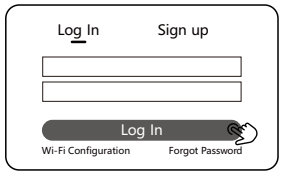


Figure 1



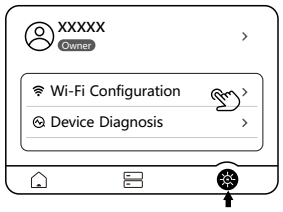
1. APP Download

Android system can search for "Solar of Things" through various domestic mainstream application markets, and iOS systems can download the app from the Apple App Store.



2. Register Login

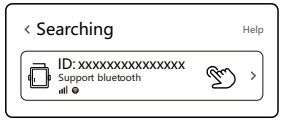
When using the APP for the first time, you need to register an account on the login page before logging in. If you already have an account, you can log in directly by entering your account username and password on the login page.



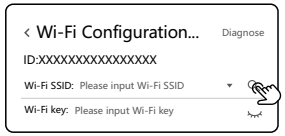
3. Wi-Fi Configuration

After logging in, on the "Me" page, click [Wi-Fi Configuration] to enter the matching web page.

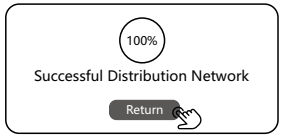
Allow the app to access Bluetooth, Wi-Fi, and location permissions according to the prompt.



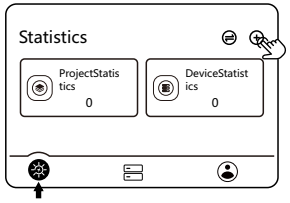
On the search device page, click the ID that matches the sticker on the right side. For details, please refer to Figure 1.



Click [Wi-Fi SSID] to search the surrounding router information on the right side of the input box. Select the router you need to connect and enter the password to connect accordingto the prompts.



After network configuration succeeds.



4. Add Device

Return to the Home page, click the [+] number, add the device, automatically scan the peripheral equipment, select the device you need to add, click [Add], enter the device information editing page, enter the information according to the prompt, and after entering the required information, tap complete.

7. Fault Codes and Remedies

7.1 Fault codes

Fault Code	Meaning	Affect Output (Yes/No)	Description
01	BatVoltLow	Yes	Battery under-voltage alarm
02	BatOverCurrSw	Yes	Overcurrent software protection for average battery discharge current
03	BatOpen	Yes	Disconnected battery alarm
04	BatLowEod	Yes	Under-voltage battery discharge stop alarm
05	BatOverCurrHw	Yes	Battery overcurrent hardware protection
06	BatOverVolt	Yes	Charge overvoltage protection
07	BusOverVoltHw	Yes	Bus overvoltage hardware protection
08	BusOverVoltSw	Yes	Bus overvoltage software protection
09	PvVoltHigh	Yes	PV overvoltage protection
10	PvBoostOCSw	No	Boost overcurrent software protection
11	PvBoostOCHw	No	Boost overcurrent hardware protection
13	OverloadBypass	Yes	Bypass overload protection
14	OverloadInverter	Yes	Inverter overload protection
15	AcOverCurrHw	Yes	Inverter overcurrent hardware protection
17	InvShort	Yes	Inverter short-circuit protection
19	OverTemperMppt	No	PV heat sink over-temperature protection
20	OverTemperInv	Yes	Inverter heat sink over-temperature protection
21	FanFail	Yes	Fan fault
22	EEPROM	Yes	Memory fault
23	ModelNumErr	Yes	Model setting error
26	Rlyshort	Yes	Inverter AC output backward to bypass AC output
29	BusVoltLow	Yes	Bus low-voltage protection
30	BatCapacityLow1	No	Alarm of battery capacity rate below 10% (taking effect after BMS communication is successful)
31	BatCapacityLow2	No	Alarm of battery capacity rate below 5% (taking effect after BMS communication is successful)
32	BatCapacityLowStop	Yes	Battery low-capacity OFF (taking effect after BMS communication is successful)
34	CanCommFault	Yes	Parallel can communication fault
35	ParaAddrErr	Yes	Parallel ID (communication address) setting error
37	ParaShareCurrErr	Yes	Parallel current sharing fault
38	ParaBattVoltDiff	Yes	Large battery voltage difference in parallel mode
39	ParaAcSrcDiff	Yes	Inconsistent mains input source in parallel mode
40	ParaHwSynErr	Yes	Hardware synchronization signal error in parallel mode
41	InvDcVoltErr	Yes	Inverter DC voltage error
42	SysFwVersionDiff	Yes	Inconsistent system firmware version in parallel mode
43	ParaLineContErr	Yes	Parallel connection fault
44	Serial number error	Yes	Failure to set the serial number before leaving factory
45	Error setting of split-phase mode	Yes	Setting error of setting items in parallel mode
49	Grid over voltage	Yes	Selects the local corresponding grid standard
50	Grid under voltage	Yes	
51	Grid over frequency	Yes	
52	Grid under frequency	Yes	
53	Grid loss	Yes	
54	Grid DC current over	Yes	
55	Grid standard un init	Yes	
56	Lowinsulation resistance fault	No	Abnormally low earth impedance of PV1+, PV2+, and PV-
57	Leakagecurrent overload fault	Yes	System current leakage out of the standard
58	BMSComErr	No	BMS communication fault

60	BMSUnderTem	No	BMS under-temperature alarm (taking effect after BMS communication is successful)
61	BMSOverTem	No	BMS over-temperature alarm (taking effect after BMS communication is successful)
62	BMSOverCur	No	BMS overcurrent alarm (taking effect after BMS communication is successful)
63	BMSUnderVolt	No	BMS under-voltage alarm (taking effect after BMS communication is successful)
64	BMSOverVolt	No	BMS overvoltage alarm (taking effect after BMS communication is successful)

7.2 Troubleshooting

Fault Code	Meaning	Cause	Solution
/	No screen display	There is no power input, or the device switch at its bottom is not turned on	Check if the battery air-switch or PV air-switch has been closed; check if the switch is in "ON"; press any button on the screen to exit the screen sleep mode.
01	Battery under-voltage	The battery voltage is lower than the value set in parameter [Setting]	Charge the battery until the battery voltage exceeds the value set in parameter [Setting].
03	Disconnected battery	The battery is not connected, or the BMS of the lithium-ion battery is in the discharge protection state	Check if the battery is reliably connected; check if the circuit breaker of the battery is off; ensure that the BMS of the lithium-ion battery can communicate normally.
04	Battery over-discharge	The battery voltage is lower than the value set in parameter Setting	Manual reset: Turn off the power, and restart Automatic reset: Charge the battery until the battery voltage is higher than the value set in parameter [Setting]
06	Rechargeable battery overvoltage protection	The battery is in the overvoltage state	Manually turn off the power, and restart Check if the battery voltage exceeds the limit. If the limit is exceeded, discharge the battery until the voltage is below the overvoltage recovery threshold of the battery

13	Bypass overload (software detection)	The output power or current of the bypass is overloaded within a certain period	Reduce the load power, and restart the device. For more details, please refer to item 11 in *Protection Function*
14	Inverter overload (software detection)	The output power or current of the inverter is overloaded within a certain period	
19	Over-high temperature of the heat sink for PV input (software detection)	The temperature of the heat sink for PV input exceeds 90°C for 3s	Wait until the temperature of the heat sink is below the over-temperature recovery temperature, when charge and discharge return to normal
20	Over-high temperature of the heat sink for inverter output (software detection)	The temperature of the heat sink for inverter output exceeds 90°C for 3s	
21	Fan fault	Software detection finds the fan has a fault	Shut down, manually flick the fan, and check if any foreign objects are blocking it
26	AC input relay short-circuit	Stuck relay for AC output	Manually shut down, and restart. If the fault occurs again after restarting, contact the after-sales service personnel to repair the machine
28	Mains input phase fault	The phase of AC input is inconsistent with that of AC output	Ensure that the phase of AC input is the same as that of AC output. For example.

NOTICE

If you encounter product faults that cannot be solved by the methods listed in the above table, please contact our after-sales service department for technical support, and do not disassemble the device by yourself.

8. Protection Function and Product Maintenance

8.1 Protection function

No	Protection Function	Description
1	PV current-limiting protection	When the charge current or power of the configured PV array exceeds the rated current and power of the inverter, it will charge at the rated current and power
2	PV overvoltage protection	If the PV voltage exceeds the maximum allowable value of hardware, the machine will report the fault, and stop the step-up of PV to output sine AC waves
3	Reverse charge protection at night	At night, as the battery voltage is greater than that of the PV module, it will prevent the battery from discharging to the PV module
4	Mains input overvoltage protection	When the mains voltage of each phase exceeds 280 VAC, it will stop mains from charging, and switch it to inverter output
5	Mains input under-voltage protection	When the mains voltage of each phase is lower than 90 VAC, it will stop mains from charge, and switch it to inverter output
6	Battery overvoltage protection	When the battery voltage reaches the overvoltage disconnect voltage threshold, it will automatically stop PV and mains from charging the battery, thus preventing damage to the battery due to overcharge
7	Battery under-voltage protection	When the battery voltage reaches the low-voltage disconnect voltage threshold, it will automatically stop discharging the battery, thus preventing damage to the battery due to overdischarge
8	Battery overcurrent protection	When the battery current exceeds the allowable range of 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 load output terminal, it will immediately turn off the output of AC voltage. Only after manually powering on the device, normal output restores
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 charge and discharge again
11	Overload protection	5min@102%~110% load 10s@110%~125% load 5s@>125% load
12	AC backward protection	Prevent the mains of battery inverter backward to bypass AC input
14	Bypass wiring error protection	When the phase of the two bypass inputs is different from that of the inverter split-phase, the machine will prohibit connecting to the bypass, thus preventing the power failure or short circuit of load when connecting to the bypass

8.2 Maintenance

In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.

1. Make sure that the airflow around the inverter is smooth, and remove any dirt or debris from the heat sink.
2. Check whether the insulation of all exposed wires is damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc. Repair or replace wires if necessary.
3. Verify the consistency of the indication and display with the device operation. Please pay attention to any faults or errors, and take corrective actions if necessary.
4. Check all wiring terminals for corrosion, insulation damage, and signs of high temperature or burning/discoloration, and tighten the terminal screws.
5. Check for dirt, nesting insects, and corrosion, clean up as required, and clean the insectproof net regularly.
6. If the arrester fails, replace it in time against lightning damage to the inverter or even other devices of the user.

⚠ *DANGER*

Before conducting any inspection or operation, please ensure that the inverter is disconnected from all power sources and that the capacitor is fully discharged to avoid the risk of electric shock.

Our company will not be held responsible for damage due to the following reasons:

1. Damage caused by improper use or use in the wrong location.
2. The open circuit voltage of the PV module exceeds the maximum allowable voltage.
3. The operating temperature exceeds the limited operating temperature range.
4. Unauthorized personnel dismantle, and repair the inverter.
5. Force majeure: damage during transportation or handling of the inverter

9. Parameter Table

Inverter Model	TW-10KW	TW-12KW	Settable
Inverter output			
Rated output power	10KW	12KW	
Maximum peak power	20KVA	24KVA	
Rated output voltage	230Vac (Default) (200/208/220/240Vac selectable) ±5%		Y
Loading motor capacity	5HP	6HP	
Rated frequency	50/60Hz		Y
Output wave	Pure sine wave		
Switching time	10 ms (typical value)		
Parallel number	1~6 units		
Overload protection	5min@102%~110% load; 10s@110%~125% load; 5s@>125% load.		
Battery			
Battery type	Lithium-ion battery/lead-acid battery/user-defined battery		Y
Rated battery voltage	48Vdc		
Voltage range	40Vdc~60Vdc		Y
Maximum mains/generator charge current	120A /120A		Y
Maximum mix charge current	220A		Y
PV input			
MPPT channel number	2		
Maximum input power	8000W+8000W	9000W+9000W	
Maximum Input current	32A+32A		
Maximum open circuit voltage	500Vdc		
MPPT operating voltage range	125Vdc~425Vdc		
Mains/generator input			
Input voltage range	90Vac~280Vac		
Rated input frequency	50/60Hz		
Bypass overload current	63A		
Efficiency			
MPPT tracking efficiency	99.9%		
Maximum efficiency of battery inverter	97.5%		
General			
Product size(D*W*H)	670x440x326.7mm		
Packing size(D*W*H)	825x578x405mm		
N.W.(KG)	38.5KG		
G.W.(KG)	44KG		
Protection level	IP65		
Ambient temperature	-10°C~55°C, >45°C derating		
Noise	<60dB		
Cooling mode	Intelligent		
Communication			
Module interface	RS485/USB/Dry contact		Y
	WiFi/GPRS (optional)		Y