Version: V1.1

USER MANUAL

Solar Hybrid Inverter

HESP4830SH3

HESP4840SH3

HESP4850SH3

HESP4860SH3

HESP4870SH3

HESP4880SHD3

CONTENTS

1. Safety

1.1 How to use this manual

This manual contains important information、guidelines、operation and maintenance for the following products： HESP series HESP4830SH3～HESP4870SH3、HESP4880SHD3.

This manual must be followed during installation, use and maintenance.

1.2 Symbols in this manual

Symbols	Description
⚠ DANGER	DANGER indicates a hazardous situations which if not avoided will result in death or serious injury.
⚠ WARING	WARING indicates a hazardous situations which if not avoided could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a hazardous situations which if not avoided could result in minor or moderate injury.
ⓘ NOTICE	NOTICE provide some tips on operation of products.

1.3 Safety instruction

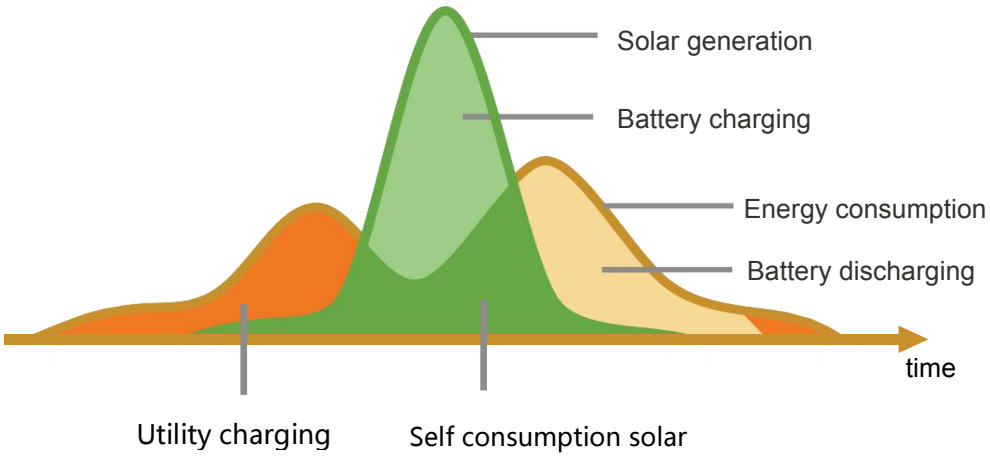
⚠ DANGER

- This chapter contains important safety instructions. Read and keep this manual for future reference.
- Be sure to comply the local requirements and regulation to install this inverter.
- Beware of high voltage. Please turn off the switch of each power sources before and during the installation to avoid electric shock.
- For optimal operation of this inverter, select the appropriate cable size and the necessary protective devices as specified.
- Do not connect or disconnect any connections when the inverter working.
- Do not open the terminal cover when the inverter working.
- Make sure the inverter is well grounding.
- Be careful not to cause short-circuiting of the AC output and DC input.
- Do not disassembly this unit, for all repair and maintenance, please take it to the professional service center.
- Never charge a frozen battery.

2. Production instructions

2.1 Instructions

The HESP series, including HESP4830SH3 - HESP4870SH3 and the HESP4880SHD3 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.
- With a dual activation function when the li-ion battery is dormant; either mains or photovoltaic power supply access can trigger the activation of the li-ion battery.
- Support three-phase pure sine wave output (350~415V).
- Supports phase voltage adjustment in the range of 200Vac, 208Vac, 220Vac, 230Vac, 240Vac.
- Supports two PV inputs, with the function of simultaneously tracking the maximum power charging or carrying capacity of two MPPT.
- Dual MPPT, efficiency up to 99.9%, single maximum current of 26A, perfectly adapted to high-power modules.
- 2 charging modes are available: solar only, grid and PV hybrid charging.
- With time-slot charging and discharging setting function, it helps users to take advantage of peak and valley tariffs and save electricity costs.
- 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.

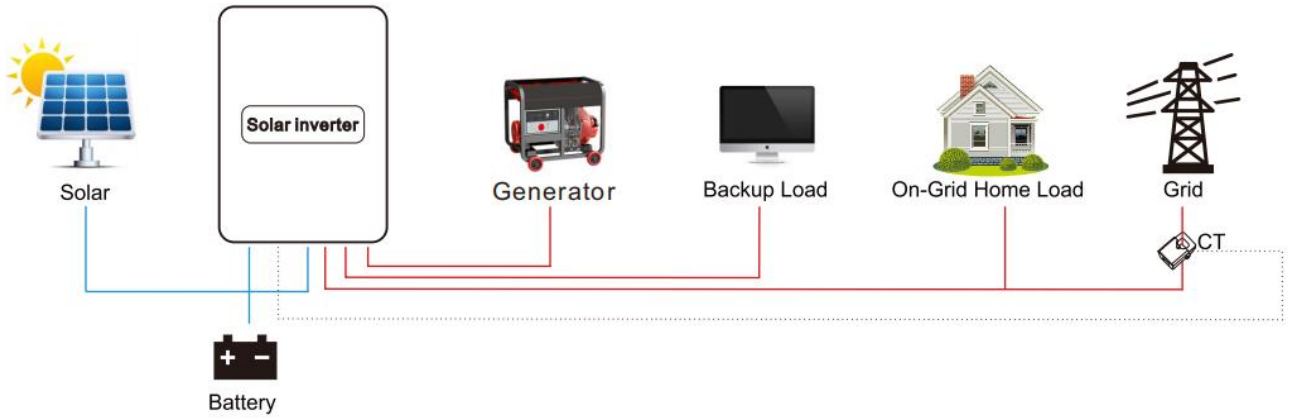
- 360° protection with complete short-circuit protection, over-current protection, over-voltage protection, under-voltage protection, over-load protection, etc.
- Support CAN, USB, and RS485 communication.

2.3 System connection diagram

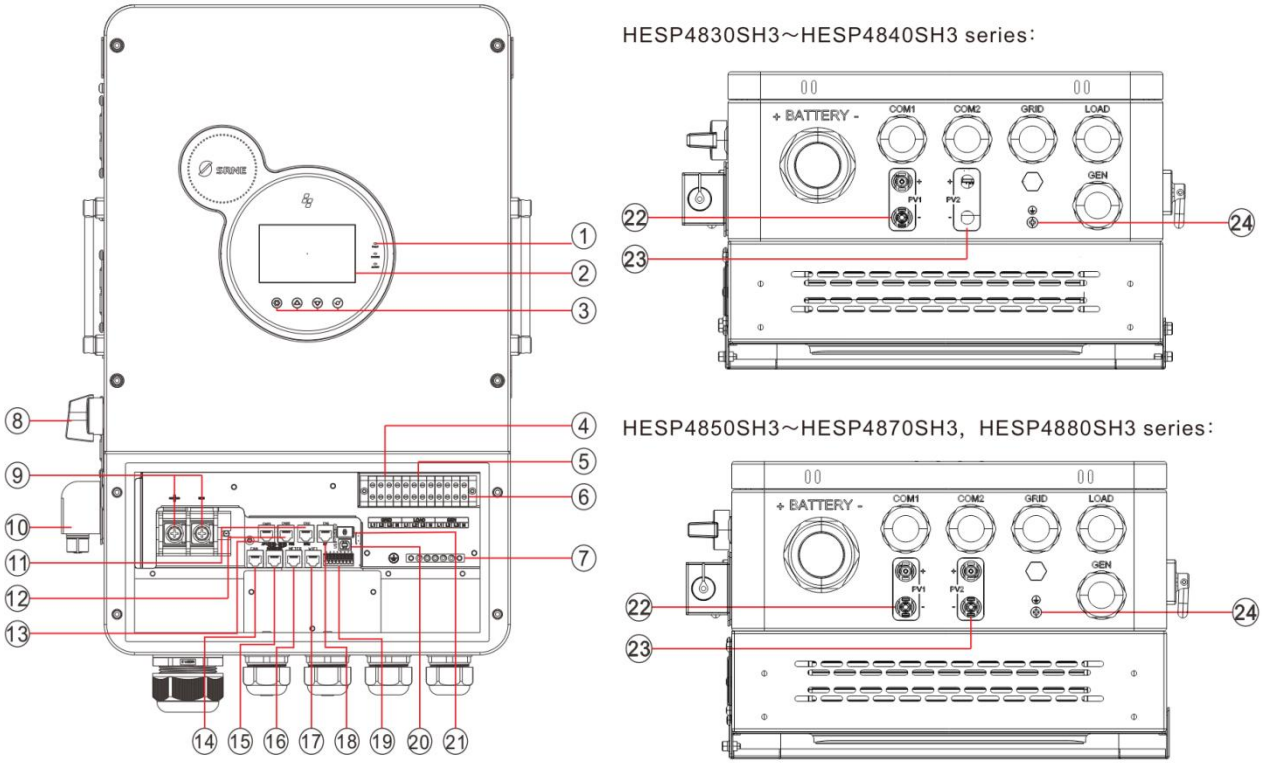
The diagram below shows the system application scenario of this product. A complete system consists of the following components:

- **Solar modules：** converts light energy into DC energy, which can be used to charge the battery via an inverter or directly inverted into AC power to supply the load.
- **Grid or generator：** connected to the AC input, either of the connected grid and generator can charge the battery while supplying the load. When the batteries and photovoltaic modules supply the load, the system can operate without the grid or generator.
- **Battery：** The role of the battery is to ensure the normal power supply of the system loads in case of insufficient photovoltaic and no grid power.
- **Home load：** connects to a variety of home and office loads including refrigerators, lamps, TVs, fans, air conditioners and other AC loads.
- **Inverter：** it is the energy conversion device of the whole system.

The actual application scenario determines the specific system cabling.



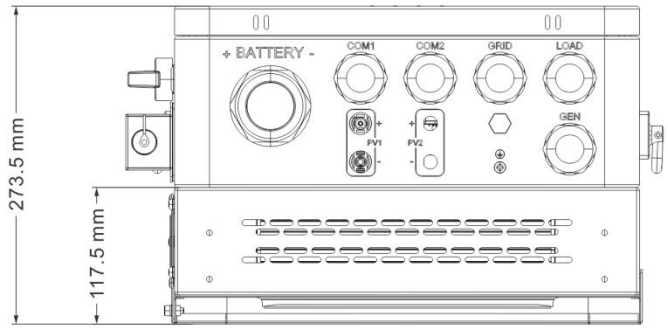
2.4 Production overview



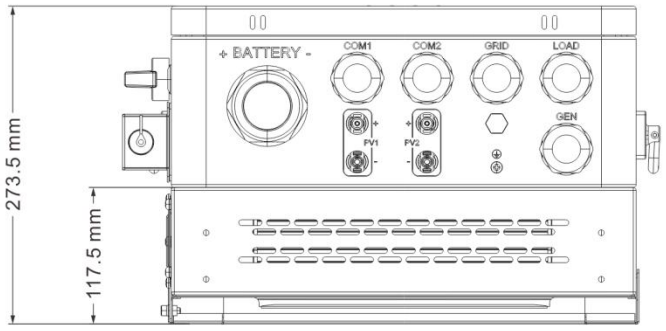
1	LED indicator	2	LCD screen	3	Physical buttons
4	Grid port	5	Load port	6	Generator port
7	Ground bus	8	PV circuit breaker	9	Battery terminal
10	WIFI 2 ports	11	DRMS port	12	Parallel communication port B
13	Parallel communication port A	14	CAN communication port	15	485 communication port
16	Meter port	17	WIFI 1 port	18	CT port
19	Dry contact	20	USB-1 port	21	USB-2 port
22	PV1 port	23	PV2 port (For HESP4850SH3 to HESP4870SH3 and HESP4880SHD3 series only.)	24	Ground terminal

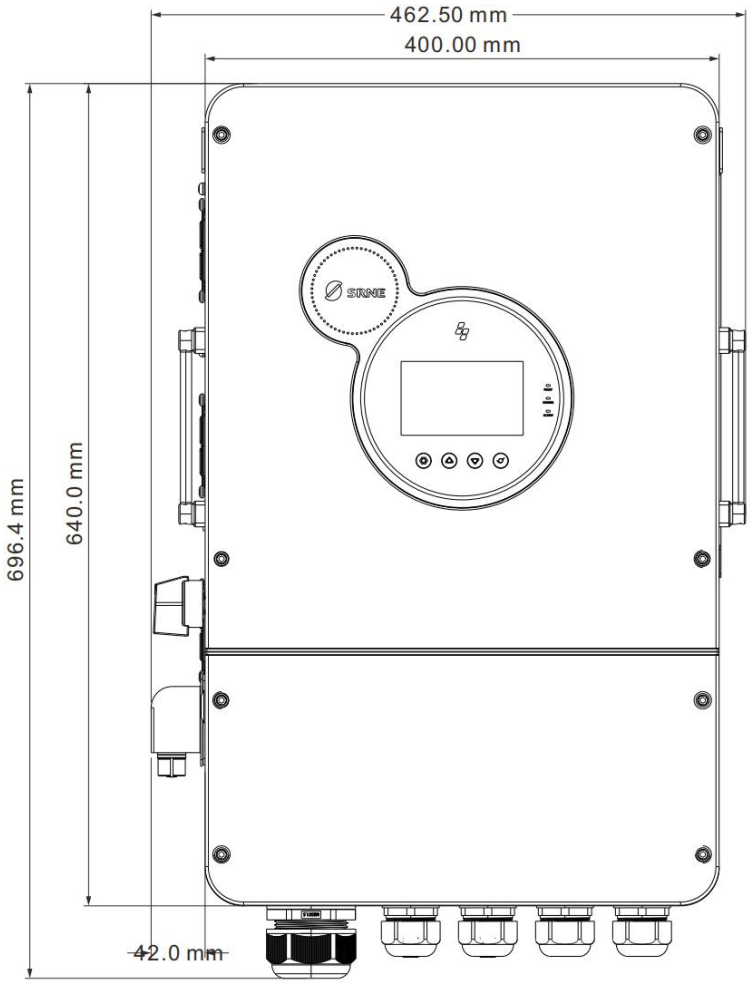
2.5 Dimension drawing

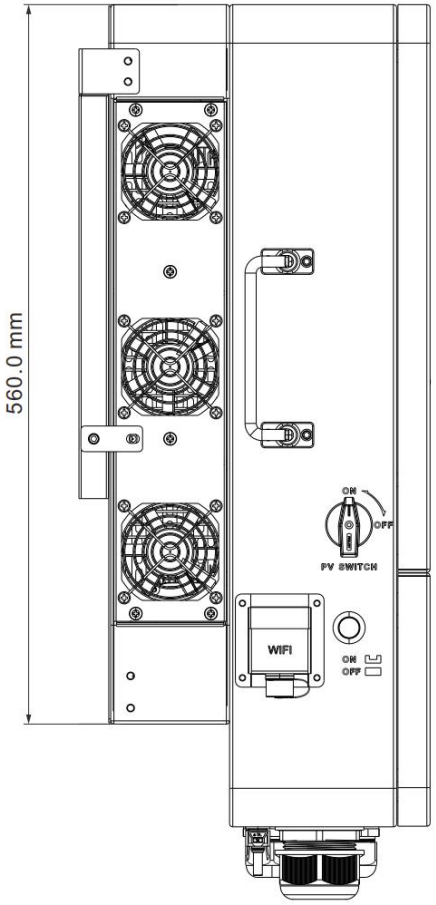
HESP4830SH3~HESP4840SH3 series:



HESP4850SH3~HESP4870SH3, HESP4880SH3 series:





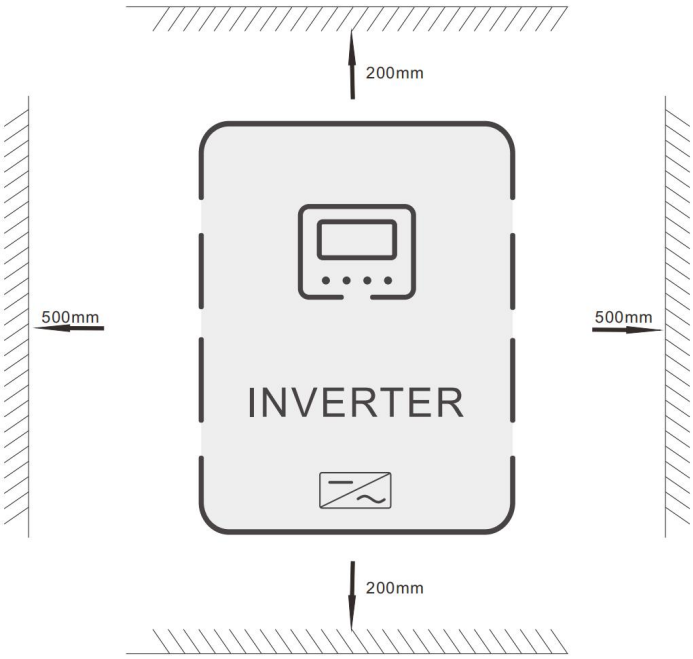


3. Installation

3.1 Select the mount location

The HESP series, including HESP4830SH3 to HESP4870SH3 and HESP4880SHD3, can be used outdoors (with an protection rating of IP65). Before choosing the installation location, users are requested to consider the following factors.

- 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-25~60℃（-13~140℉） to ensure optimal operation.



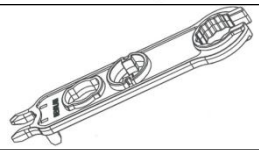
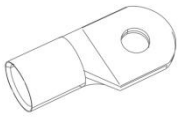
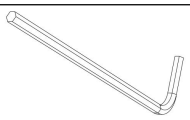
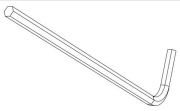
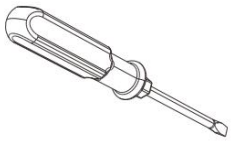
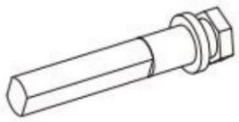
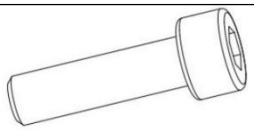
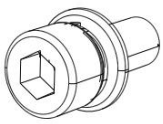
⚠ DANGER

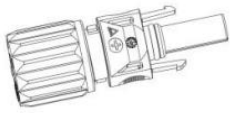
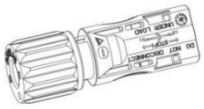
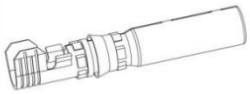
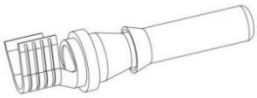
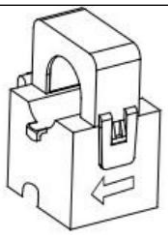
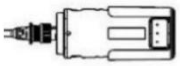
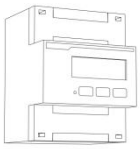
- Do not install the inverter near highly flammable materials.
- Do not install the inverter in a potentially explosive area.
- Do not install the inverter in a confined space with lead-acid batteries.

⚠ CAUTION

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

3.2 Packing list

No.	Picture	Description	Quantity
1		Inverter	1pcs
2		Wall bracket	1pcs
3		MC4 unlocking tool	1pcs
4		Cold pressed terminals SC70-10	2pcs
5		Hex key 3.17 mm	1pcs
6		Hex key 4 mm	1pcs
7		Flat - head screwdriver	1pcs
8		Expansion bolt M8*60mm	4pcs
9		Spare screws M5*18mm	1pcs
10		Socket head cap three - in - one screw M5*12mm	2pcs

11		PV+ terminal	2pcs
12		PV- terminal	2pcs
13		PV+ input metal core	2pcs
14		PV- input metal core	2pcs
15		Parallel connection wire	1pcs
16		Current Transformer	3pcs
17		WIFI module (optional)	1pcs
18		Three - phase electric meter (optional)	1pcs
19		User manual	1pcs
20		Warranty card	1pcs
21		Certificate of Conformity	1pcs
22		Shipping inspection report	1pcs

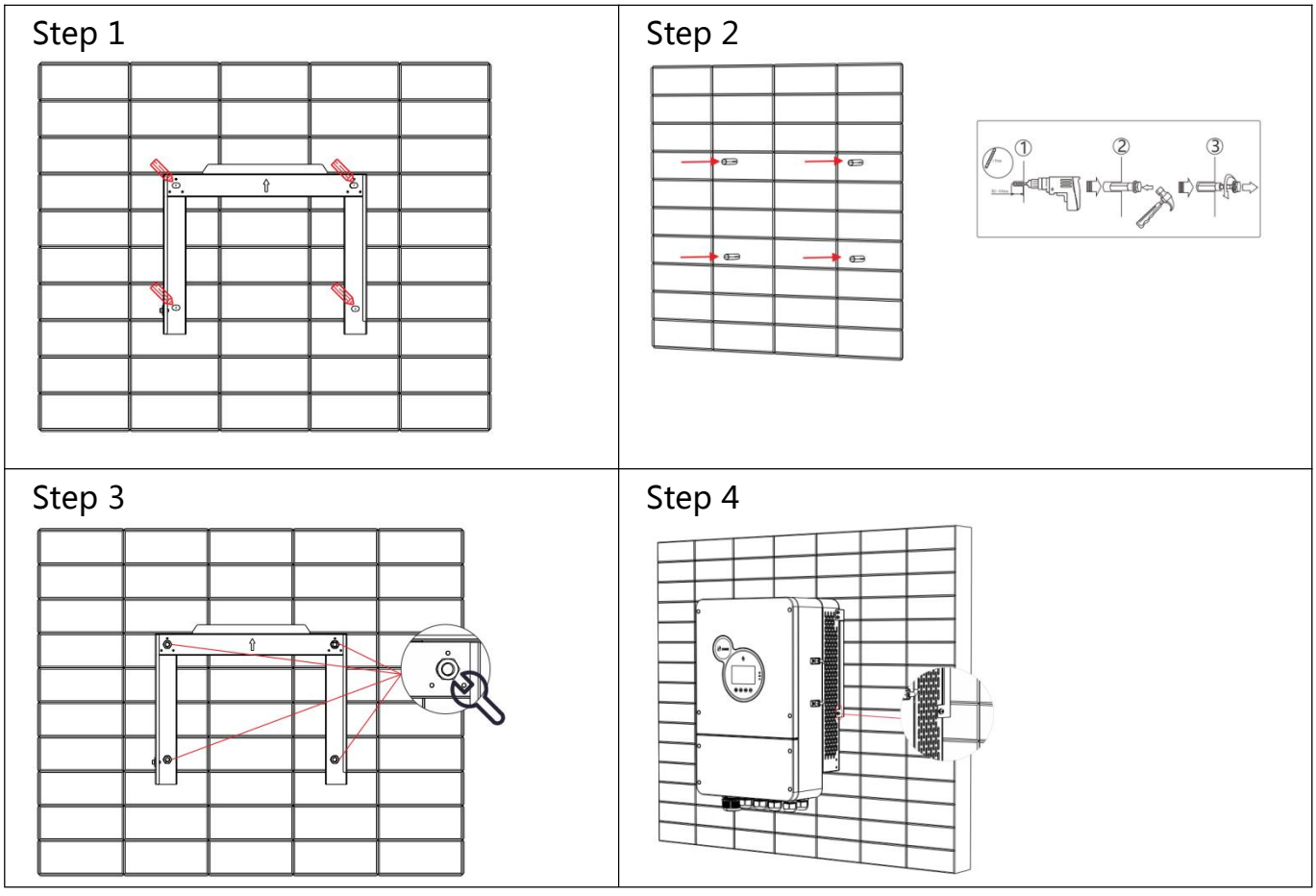
3.3 Mount the inverter

Step 1: Select the wall with sufficient bearing capacity, the wall bracket will be horizontally affixed to the wall with the installation of the wall, with a marker pen on the wall to mark the fixed wall bracket needs to be drilled position, and then use the impact drill to drill holes in the wall, drilling to keep the impact drill perpendicular to the wall, do not shake, so as not to damage the wall, if the hole drilling error is large need to reposition.

Step 2: Vertically insert the M8×60 expansion bolts into the holes. Pay attention to the insertion depth of the expansion bolts (it should not be too shallow).

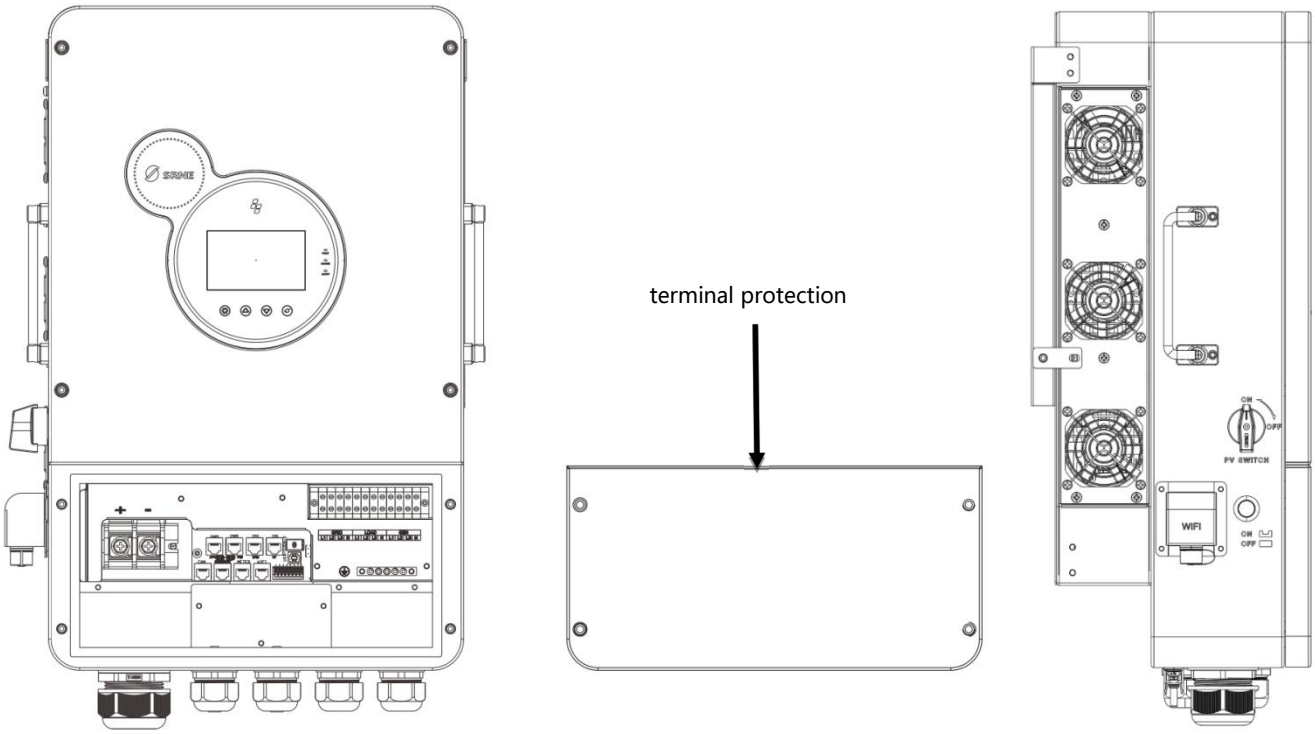
Step 3: Align the wall - mounted bracket with the hole positions and fix the wall - mounted bracket to the wall with nuts.

Step 4: First, hang the inverter on the wall - mounted bracket, and then fix the inverter to the wall - mounted bracket with M6 socket - head cap screws.



3.4 Removal of terminal protection cover and wiring connection

Use a hexagon screwdriver to remove the terminal protection cover.

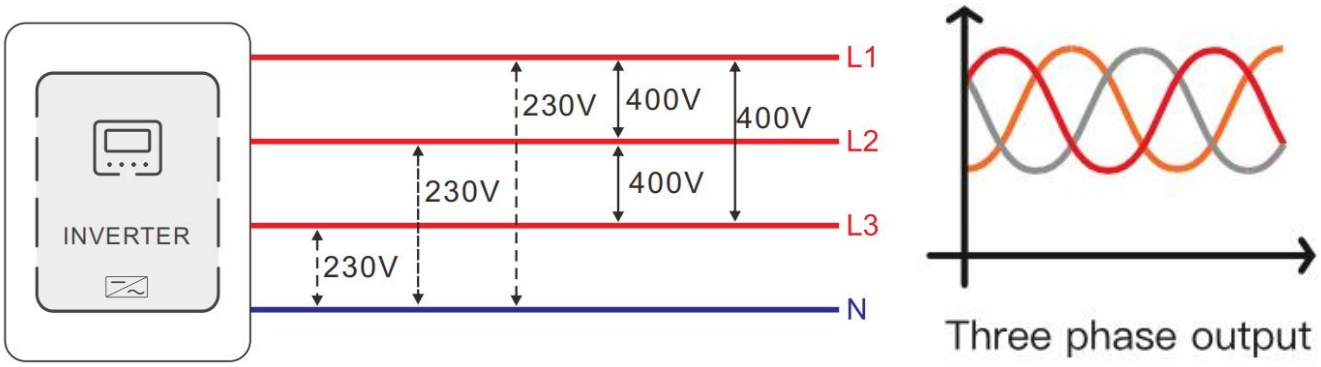


NOTICE

When using the device in areas with poor air quality, the dust screen is easily blocked by air particles. Please disassemble and clean the dust screen periodically to avoid affecting the internal air flow rate of the inverter, which may trigger an over-temperature protection fault (19/20 fault) affecting the use of the power supply and the service life of the inverter.

4. Connection

4.1 Three-phase mode



Items	Description
Applicable models	The HESP series, including HESP4830SH3 to HESP4870SH3 and HESP4880SHD3
AC output phase voltage (L-N)	200~240Vac, 230Vac default

NOTICE

- Users can change the output phase mode and output voltage through the setting menu. For details, please refer to Chapter 5.2.
- The output voltage corresponds to the parameter setting of [output phase voltage]. The output phase voltage can be set within the range of 200V ~ 240V.

4.2 Cable & circuit breaker selection

- PV input

Models	Recommended Wire Diameter	Maximum Input Current
HESP4830SH3	4mm^2/12 AWG	26A
HESP4840SH3	4mm^2/12 AWG	26A
HESP4850SH3	4mm^2/12 AWG	26A
HESP4860SH3	4mm^2/12 AWG	26A
HESP4870SH3	4mm^2/12 AWG	26A
HESP4880SHD3	4mm^2/12 AWG	26A

- AC input

Models	Mode	Recommended Wire Diameter	Maximum Input Current
HESP4830SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4840SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4850SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4860SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4870SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4880SHD3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A

- Generator input

Models	Mode	Recommended Wire Diameter	Maximum Input Current
HESP4830SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4840SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4850SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4860SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4870SH3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A
HESP4880SHD3	Three - phase	10mm^2/8AWG(L1/L2/L3/N)	45A

- Battery

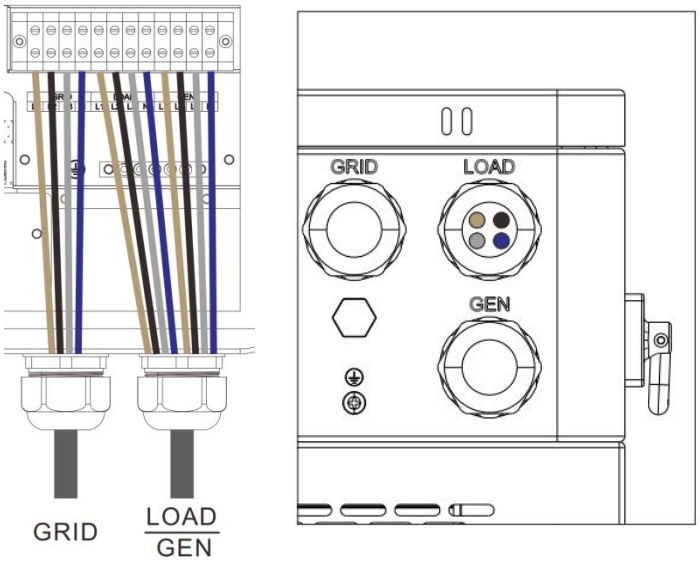
Models	Recommended Wire Diameter	Maximum Discharge Current
HESP4830SH3	25mm²/ 4 AWG (M8)	80A
HESP4840SH3	25mm²/ 4 AWG (M8)	100A
HESP4850SH3	50mm²/ 0 AWG (M8)	120A
HESP4860SH3	50mm²/ 0 AWG (M8)	150A
HESP4870SH3	70mm²/ 00 AWG (M8)	180A
HESP4880SHD3	70mm²/ 00 AWG (M8)	200A

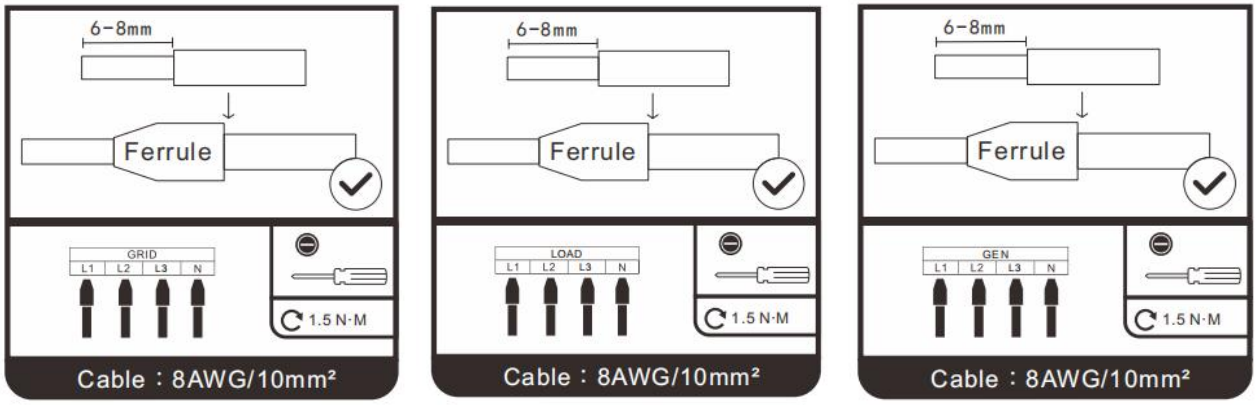
- AC Output

Models	Mode	Maximum Phase Current	Bypass Current	Recommended Wire Diameter
HESP4830SH3	Three - phase	6.9A	45A	$10mm^2$/8AWG(L1/L2/L3/N)
HESP4840SH3	Three - phase	9.1A	45A	$10mm^2$/8AWG(L1/L2/L3/N)
HESP4850SH3	Three - phase	11.4A	45A	$10mm^2$/8AWG(L1/L2/L3/N)
HESP4860SH3	Three - phase	13.6A	45A	$10mm^2$/8AWG(L1/L2/L3/N)
HESP4870SH3	Three - phase	15.9A	45A	$10mm^2$/8AWG(L1/L2/L3/N)
HESP4880SHD3	Three - phase	18.2A	45A	$10mm^2$/8AWG(L1/L2/L3/N)

4.3 AC Input, output and generator wiring

Connect the live wire, neutral wire, and ground wire according to the cable positions and sequence shown in the figure below.



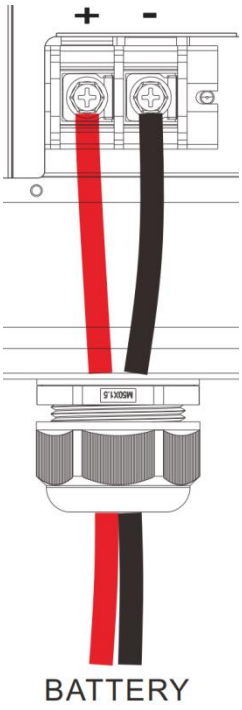


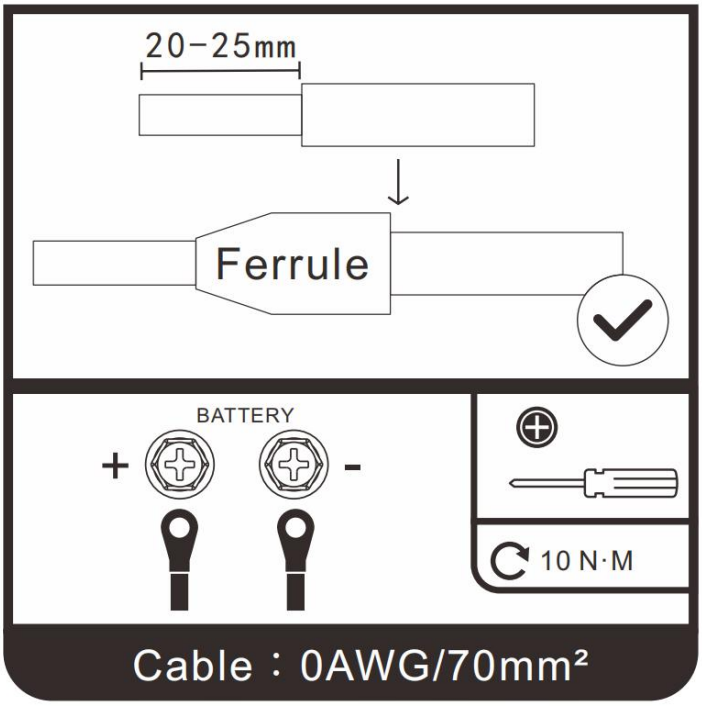
⚠ DANGER

- Before connecting the AC input and output, the circuit breaker must be disconnected to avoid the risk of electric shock and must not be operated with electricity.
- 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 cables of the battery according to the cable positions and sequence shown in the figure below.





⚠ DANGER

- Before connecting the battery, the circuit breaker must be disconnected to avoid the risk of electric shock and must not be operated with electricity.
- Please ensure that the positive and negative terminals of the batteries are correctly connected 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 groups of photovoltaic (PV) systems according to the following chart, and connect the positive and negative wires of the two PV circuits in the specified cable positions and sequence.

<table>
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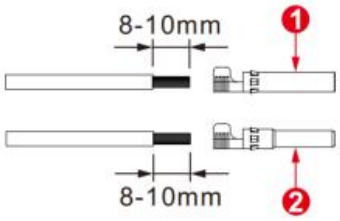
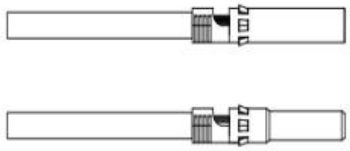
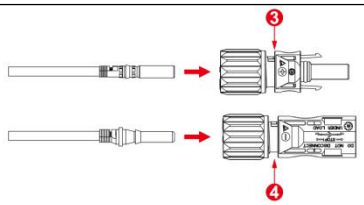
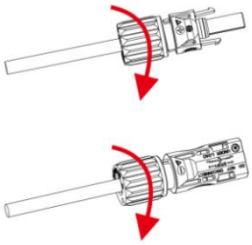
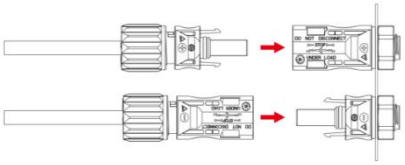
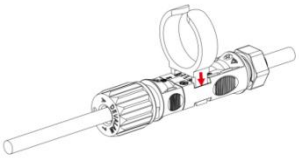
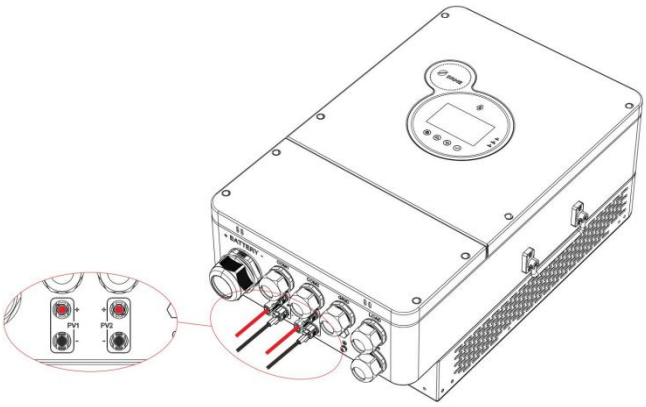
<td> 

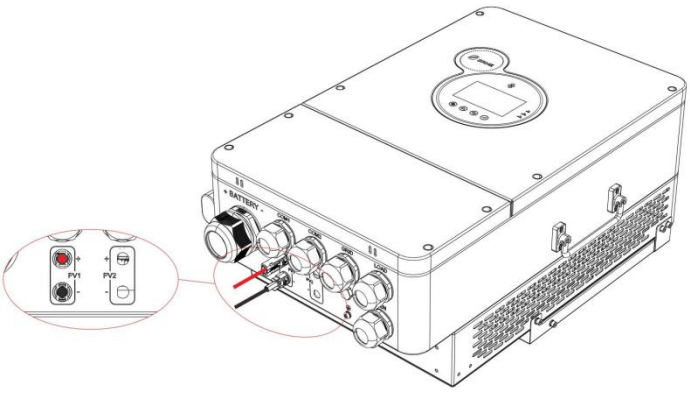
1. PV+ Photovoltaic Wiring.
2. PV- Photovoltaic Wiring.</td>
<td> 
3. Use a wire crimping pliers to crimp the wires tightly.</td>
<td> 

4. For the positive and negative connectors, listen for a "click" sound.</td>
</tr>
<tr>
<td> 
5. Tighten the terminals.</td>
<td> 
6. Connect to the inverter port.</td>
<td> 
7. Disconnect the PV terminals</td>
</tr>
</table>

HESP4850SH3～HESP4870SH3，HESP4880SHD3 series：



HESP4830SH3～HESP4840SH3 series：

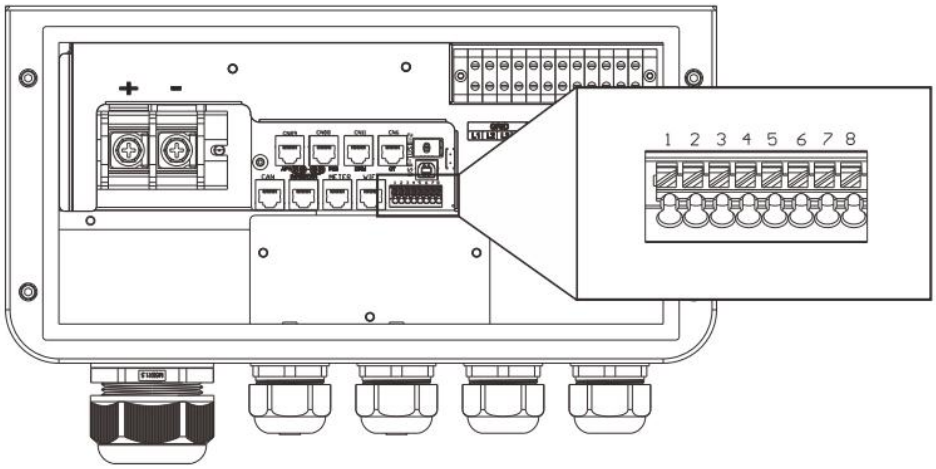


⚠ DANGER

- Before connecting the PV, the circuit breaker must be disconnected to avoid the risk of electric shock and must not be operated with electricity.
- Make sure that the open-circuit voltage of the PV modules connected in series does not exceed the maximum open-circuit voltage of the inverter (the value is 800V), otherwise the inverter may be damaged.

4.6 Dry contact connection

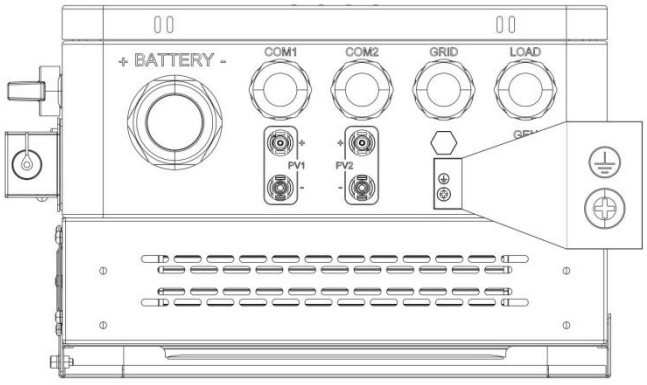
Use a small screwdriver to push back the direction indicated by the arrow, and then insert the communication cable into the dry junction port. (Communication cable cross section 0.2~1.5mm^2).



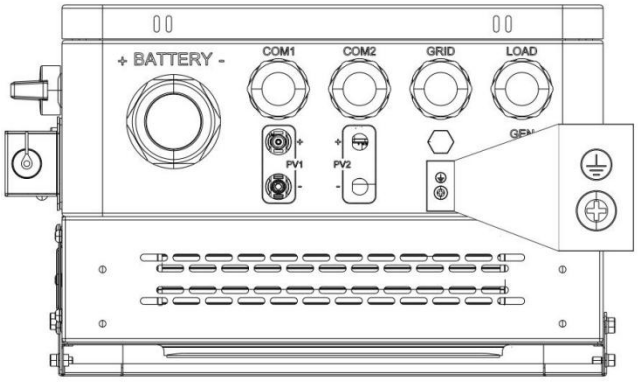
4.7 Grounding connection

Make sure that the earth terminal is securely connected to the grounding busbar.

HESP4850SH3～HESP4870SH3，HESP4880SHD3 series：



HESP4830SH3～HESP4840SH3 series：



NOTICE

- Grounding wire shall be not less than 4 mm² in diameter and as close as possible to the earthing point.

4.8 Final assembly

After ensuring reliable wiring and correct wire sequence, reinstall the terminal protection cover to its original position.

Step 1: Close the battery circuit breaker.

Step 2: Press the ON/OFF switch at the bottom of the inverter. Once the screen and indicator lights turn on, it indicates that the inverter has been activated.

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

Step 4: Start the devices one by one in ascending order of power.

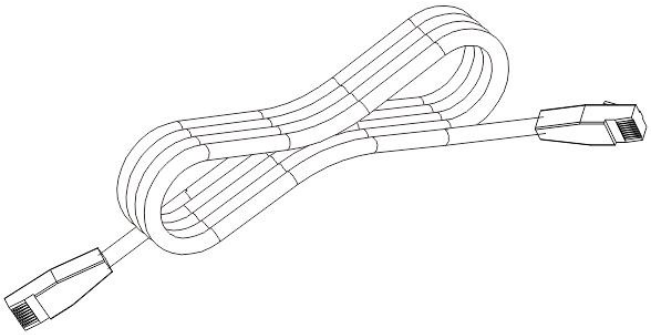
4.9 Parallel connection wiring

4.9.1 Introduction to parallel connection

A. A maximum of six inverter-control integrated machines can be connected in parallel.

B. When using the parallel connection function, it is necessary to correctly, stably and reliably connect the parallel communication cables. The following is the wiring diagram (packaging accessories):

Parallel communication cable*1



4.9.2 Cautions for parallel connection

Warning:

A. PV wiring:

In parallel connection, the PV array of each inverter must be independent, and the PV array of PV1 and PV2 for one inverter must also be independent.

B. Battery wiring:

When connecting multiple parallel machines, all the inverse control integrated machines must be connected to the same battery, BAT+ connected to BAT+, BAT- connected to BAT-, and ensure that the

connection is correct and the wiring length and wire diameter are the same before powering up and starting, to avoid the wrong connection caused by the output of the parallel system does not work properly.

C. LOAD wiring:

When connecting multiple parallel machines, all inverse control integrated machines must be connected 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 outputs of different phases cannot be connected together, refer to the wiring diagram.
L wires of all machines of the same phase need to be connected together, but L wires of AC outputs of different phases cannot be connected together, refer to the wiring diagram.

D. GRID wiring:

When connecting multiple parallel machines, all inverse control integrated machines must be connected 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 AC input L lines between different phases cannot be connected together. Refer to the wiring diagram.

E. Communication wiring:

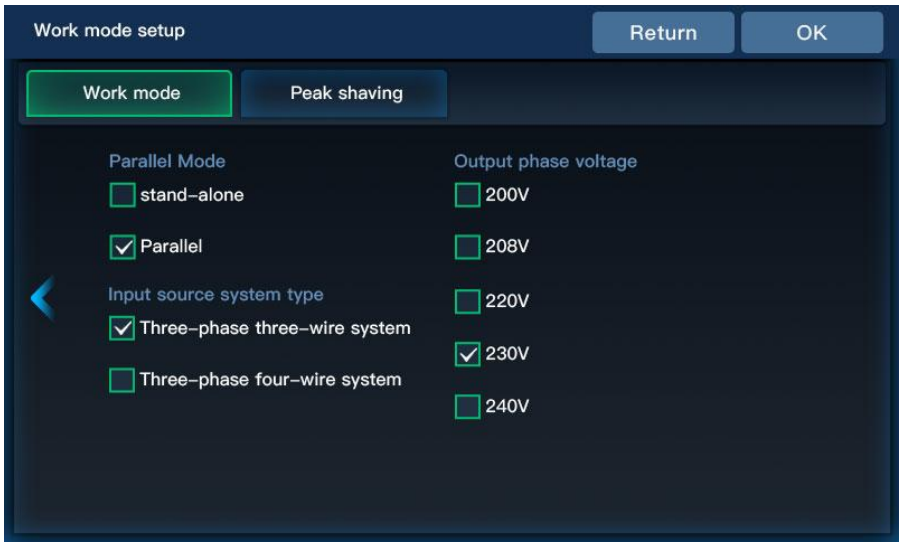
Our parallel communication cable is a 10 Pin network cable with shielding function, used for parallel connection, each machine needs to be connected with one out and one in, i.e., this machine "Parallel_A" is connected to "Parallel_B" of the machine that needs to be parallelized, and it is not possible to connect "Parallel_A" to this machine "Parallel_B" or this machine "Parallel_A" to the machine that needs to be parallelized. The "Parallel_A" connects to the "Parallel_B" of this machine or the "Parallel_A" connects to the "Parallel_A" of the machine to be paralleled. ". At the same time, the parallel communication cable of each machine should be ensured that the 10 Pin network connection cable is fastened tightly, so as to prevent the parallel communication cable from falling off or having poor contact, which may cause the system output to work abnormally or be damaged.

F. Before connecting the system and after connecting the system, please refer to the following system wiring diagram in detail to ensure that all wiring is correct and reliable before powering up.

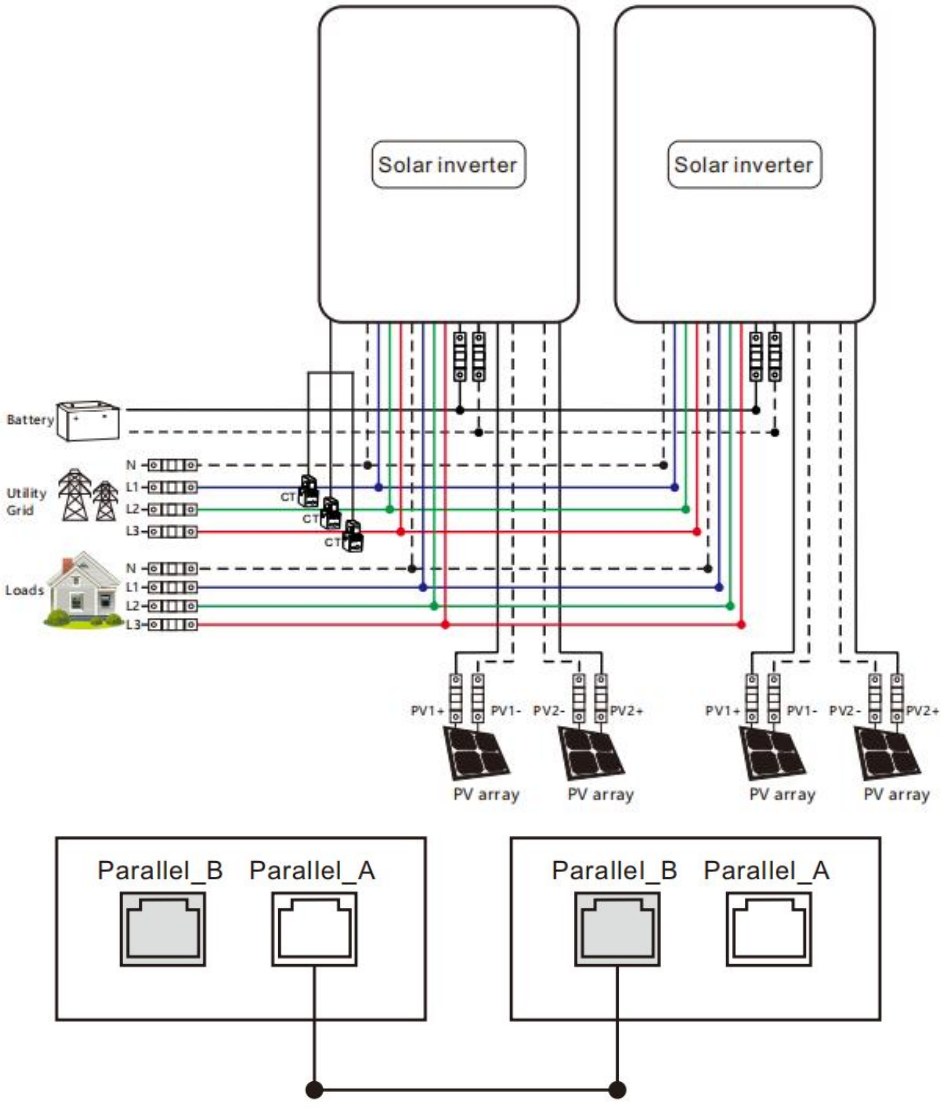
G. After the system is wired correctly and powered up for normal operation, if you need to add a new machine, you need to disconnect the battery input, PV input, AC input and AC output, and make sure that all the inverters are powered down before you rewire and connect to the system.

4.9.3 Schematic diagram of parallel connection

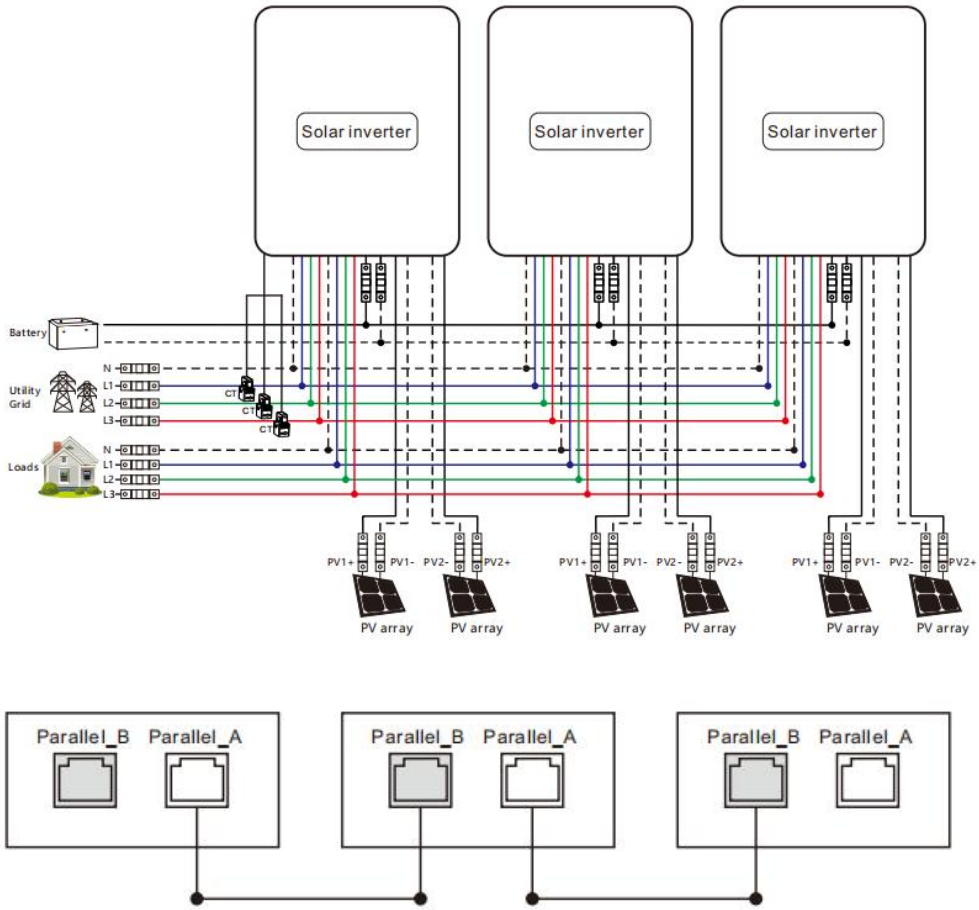
In the parallel connection mode, each inverter needs to be set to "Parallel".



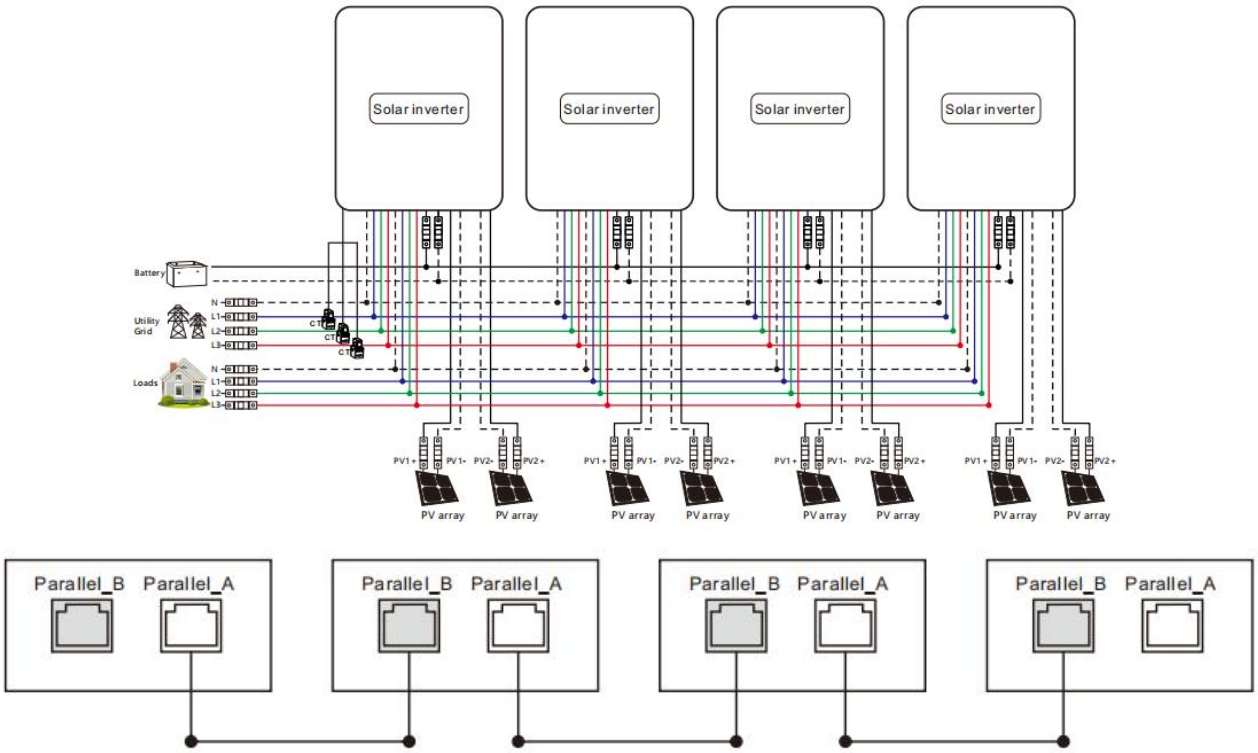
A. Two units connected in parallel:



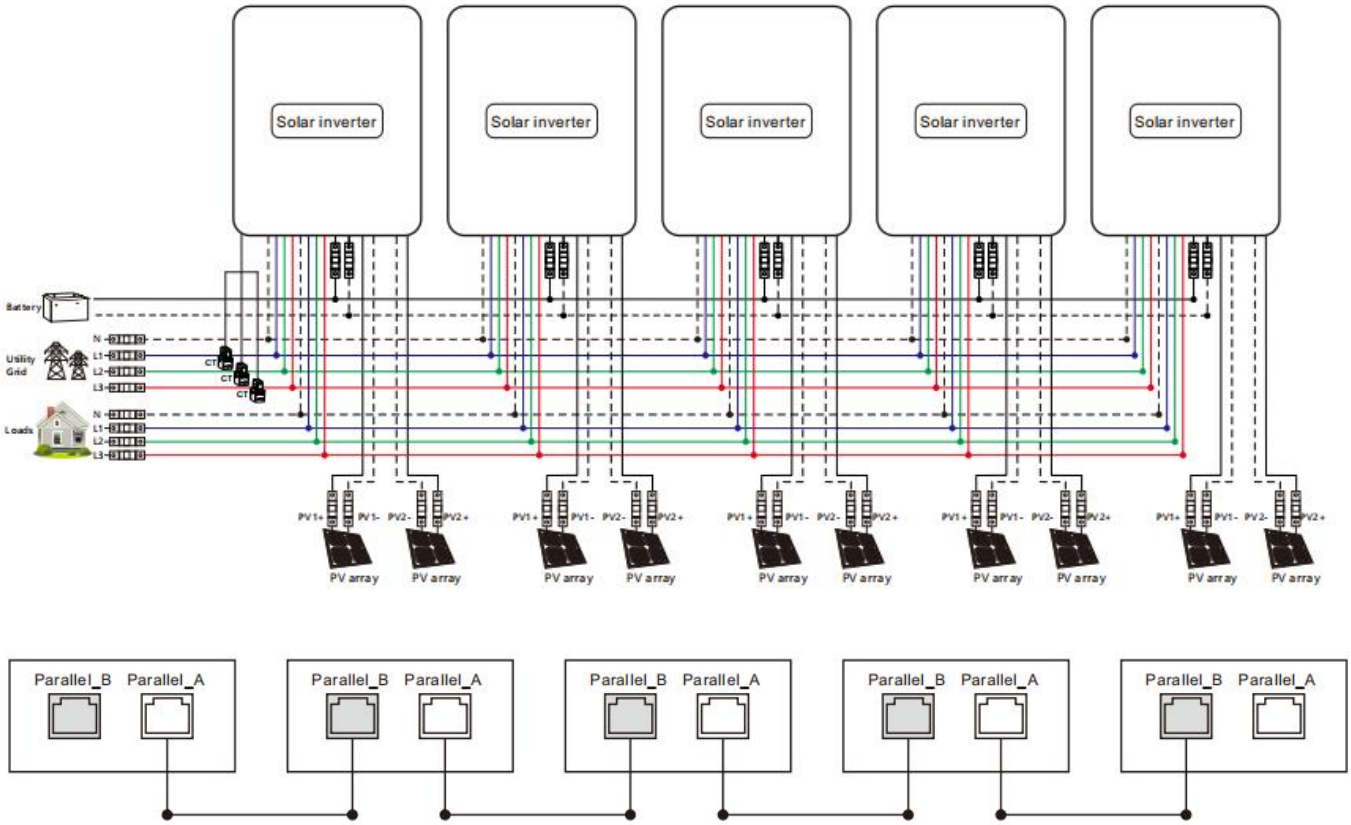
B. Three units connected in parallel:



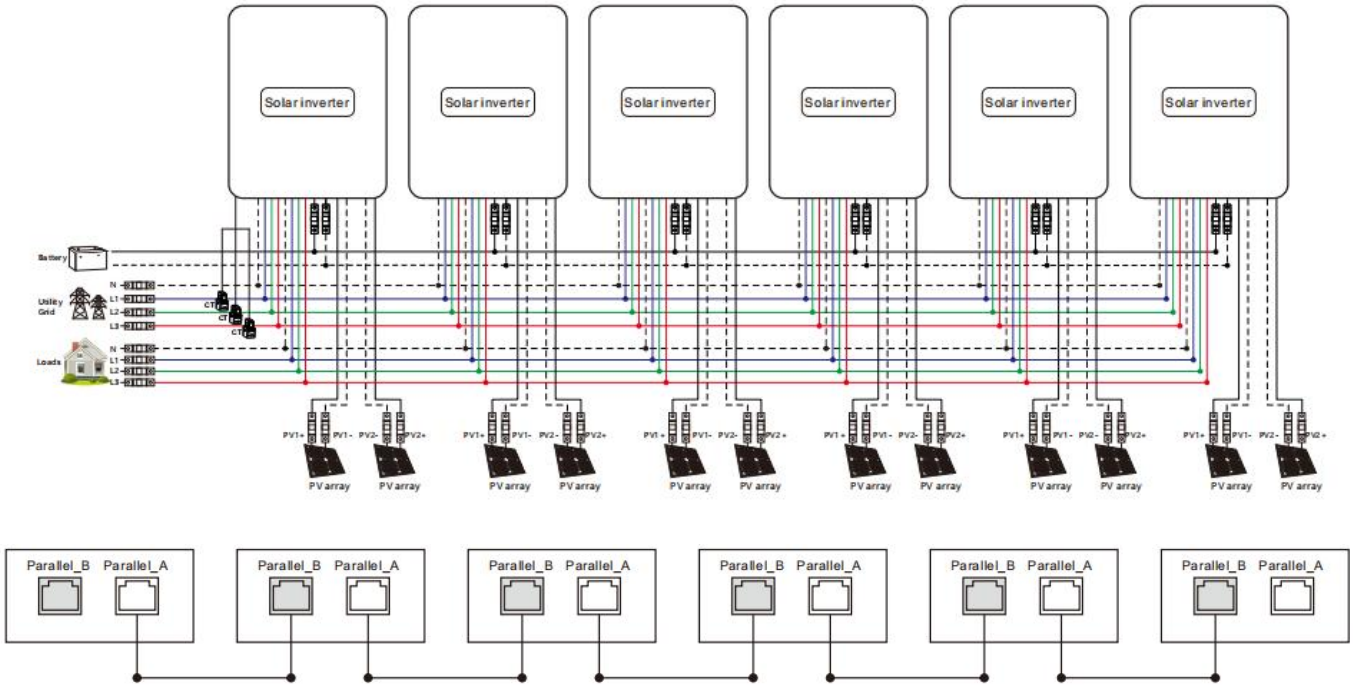
C. Four units connected in parallel:



D. Five units connected in parallel:



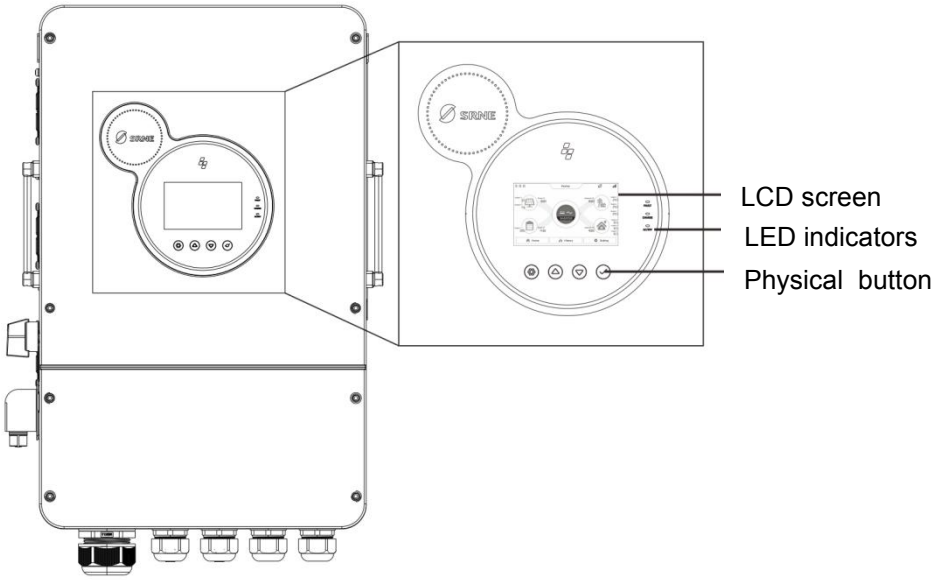
E. Six units connected in parallel:



5. Operation

5.1 Operation and display panel

The operation and display panel below includes 1 LCD screen, 3 indicators, 4 Physical button.



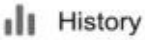
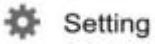
- **Physical button**

Physical button	Description
	To enter/exit the setting menu
	Go to the next option
	Go to the previous option
	Confirm/Enter the selection in the settings menu

- **LED indicators**

Indicators	Color	Description
FAULT	Red	Continued: Level 1 fault
		Flash: Level 2 fault
CHARGE	Green	Continued: charging complete
		Flash: charging
AC/INV	Yellow	Continued: utility grid by-pass output
		Flash: inverter output

- Display screen

Icon	Description	Icon	Description
	Solar panel		Load
	Battery		Grid or generator
	Homepage		Inverter operating status
	Historical data		Settings
0 :0 :0	Local time		Buzzer Off
	Energy saving mode		Power flow direction
Monday	Weekday	**UPS**	UPS load (Connected to the load terminal of the inverter)
HOME	HOME Load (Connected to GRID Side)		Generator port

- **View real-time data**

On the LCD home screen, click the inverter icon, battery icon, mains icon, load icon and photovoltaic icon to view the real-time data of the machine.

System data			
No.	**Real - time data items**	**No.**	**Real - time data items**
1	Device Information	2	Serial number
3	Software Version	4	Minor version
5	LCD Version	6	Power Rating
7	MCU2 Version	8	RS485 Address
9	Customer ID	10	External Temperature
11	Inverter Temperature	12	PV Temperature
13	Transformer Temperature	14	L1 Voltage
15	L1 Current	16	L2 Voltage
17	L2 Current	28	L3 Voltage
19	L3 Current	20	Positive Bus Voltage
21	Negative bus voltage	22	Total Bus Voltage
Battery data			
1	Battery SOH%	2	Battery SOC%
3	Battery Voltage	4	Charge Current
5	Battery power	6	Discharge Current
7	BMS Communication Protocol	8	Battery Type
9	Battery state of charge		
Grid data			
1	L1 Voltage	2	L1 Current
3	L1 Active power	4	L1 Apparent power
5	L3 Voltage	6	L3 Current
7	Frequency	8	L2 Voltage

9	L2 Current	10	L2 Active power
11	L2 Apparent power	12	L3 Active power
13	L3 Apparent power	14	Grid charging Current
Load data			
1	L1 Voltage	2	L1 Current
3	L1 Active power	4	L1 Apparent power
5	L1 Frequency	6	L1 Load factor
7	L1 Domestic load power	8	L1 Secondary load apparent power
9	Load ratio of the whole machine	10	L2 Voltage
11	L2 Current	12	L2 Active power
13	L2 Apparent power	14	L2 Frequency
15	L2 Load factor	16	L2 Domestic load power
17	L2 Total secondary load power	18	Overall load factor
19	L3 Voltage	20	L3 Current
21	L3 Active power	22	L3 Apparent power
23	L3 Frequency	24	L3 Load factor
25	L3 Domestic load power	26	L3 Total secondary load power
27	Load ratio of the whole machine	28	L1 Secondary load current
29	L1 Secondary load active power	30	L1 Secondary load apparent power
31	L2 Secondary load current	32	L2 Secondary load active power
33	L2 Secondary load apparent power	34	L3 Secondary load current
35	L3 Secondary load active power	36	L3 secondary load apparent power

PV data			
1	PV1 Voltage	2	PV1 Current
3	PV1 Power	4	PV2 Voltage
5	PV2 Current	6	PV2 Power
7	PV Total Power		

Click on 'History' to see the history of the machine.

Today's data			
1	Battery Charging Amount	6	Load consumption
2	Battery Discharging Amount	7	Grid charging amount
3	Battery Discharging Amount	8	Load consumption from the utility power supply
4	Today's Grid-connected Power Amount	9	Load capacity of the generator
5	Generator charging amount		
Historical data			
1	Last seven days PV power generation	4	Grid Charge for the last seven days
2	Battery charging in the last seven days	5	Load consumption in the last seven days
3	Battery discharge in the last seven days	6	Consumption from the grid in the last seven days
Energy statistics			
1	Total battery charge	6	Total charging from the grid
2	Total Solar Power Generation	7	Total load consumption from the grid
3	Total Battery Discharge	8	Total grid connection
4	Total load consumption	9	Total generator carrying capacity
5	Total generator charge		
Historical Failures			

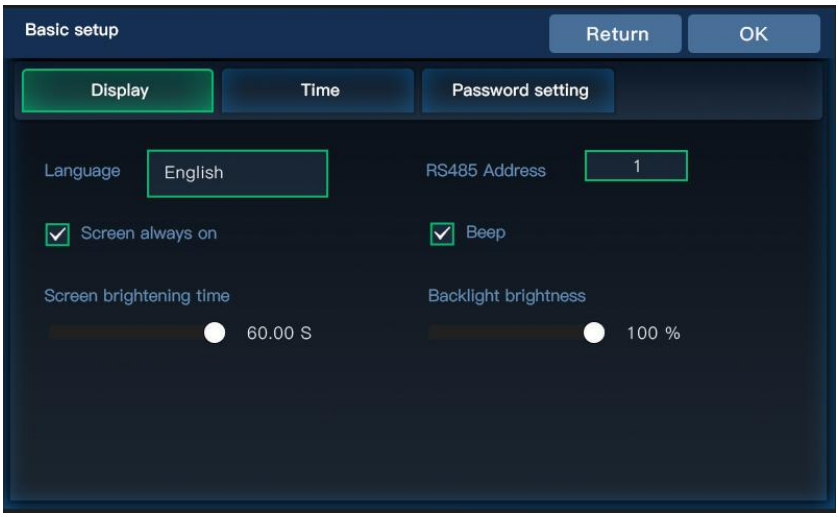
5.2 Setting

Operation Instructions:

Click "Settings" in the menu bar at the bottom of the screen to enter the settings interface. It includes five categories of settings: Basic Settings, Working Mode Settings, Battery Settings, Grid - connection Settings, and Advanced Settings.

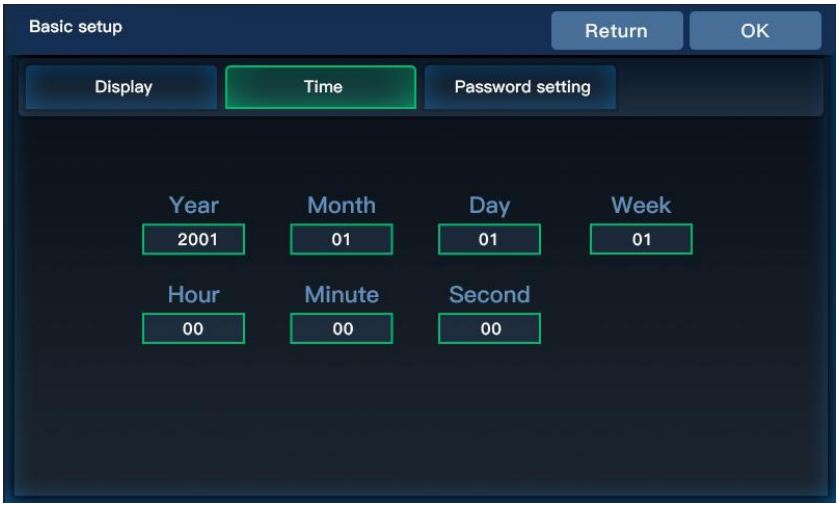
5.2.1 Basic setup

5.2.1.1 Display setup

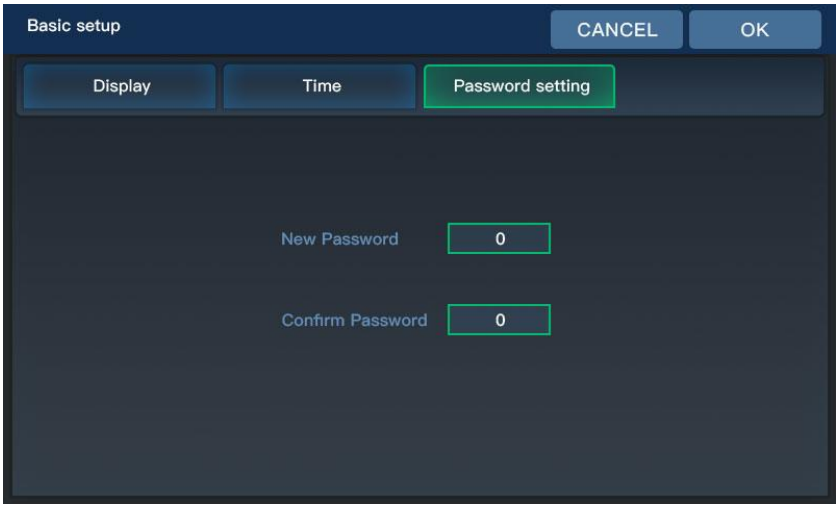


Parameter meaning	Instructions
Language	Available languages include English, Italian, German, Spanish, and Chinese.
RS485 address	This refers to the RS485 address of the inverter. For a single unit, the adjustable range is 1 - 254, and for parallel units, it is 1 - 6.
Screen always on	You can choose whether the screen is always on.
Beep	You can choose whether to enable the buzzer alarm.
Screen brightening time	Adjustable range: 0 ~ 60 seconds.
Backlight brightness	0 ~ 100%.

5.2.1.2 Time setup



5.2.1.3 Password setting (Password is required to access the Grid Settings and Advanced Settings)

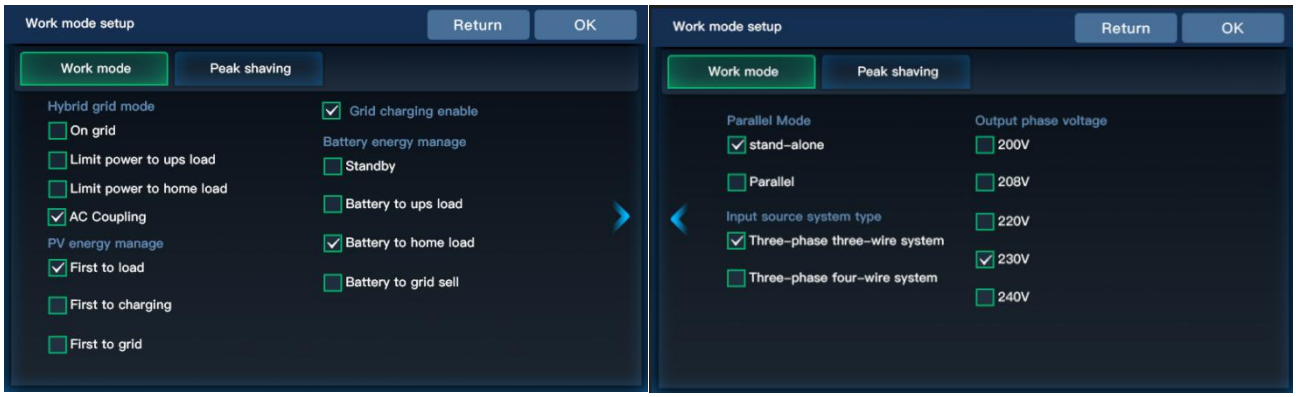


Default password is "4321".

Password setting value range: “0～9999”

5.2.2 Work mode setup

5.2.2.1 Work mode



Home Load: connected to the GRID port of the machine, requires external CT for monitoring.

UPS Load: connected to the LOAD port of the machine.

Parameter Meaning	Option	Description
Hybrid grid mode	On grid	PV and battery energy can be grid-connected
	Limit power to ups load	UPS Load Backflow Prevention, PV or Battery Energy for UPS Load Only, Excess Energy Charging.
	Limit power to home load	Home Load backflow prevention, PV or battery energy is for Home loads only, excess energy is not connected to the grid.
	AC Coupling	Enable AC coupling function.
PV energy manage	When the hybrid grid mode is set to “Limit Power to ups” or CT is not connected, the following loads are UPS loads. When the hybrid grid mode is set to “Limit Power to home/On grid” and CT is connected, the following loads are UPS loads plus home loads.	
	First to Load	PV Energy Supply Priority: Load-Charge-Grid Connection.
	First to charging	PV Energy Supply Priority: Charge - Load - Grid Connection.
	First to grid	PV Energy Supply Priority: Load - Grid Connection - Charging.
Grid charging enable	Selectable grid participation in battery charging.	
Battery energy manage	Standby	Batteries are not discharged in the presence of utility power, and are inverted and discharged only in the off-grid operating condition.
	Battery to UPS loads	When the PV power is less than the UPS load power, the battery discharges to replenish it.

	Battery to home load	The battery can supply power to household loads and UPS loads.
	Battery to grid sell	Battery can supply power to the grid.
Parallel Mode	Stand-alone	
	Parallel	
Input source system type	Three-phase three-wire system	Without N-wire mode
	Three-phase four-wire system	With N-wire mode
Output Phase Voltage	Settable: 200V , 208V , 220V , 230V , 240V	

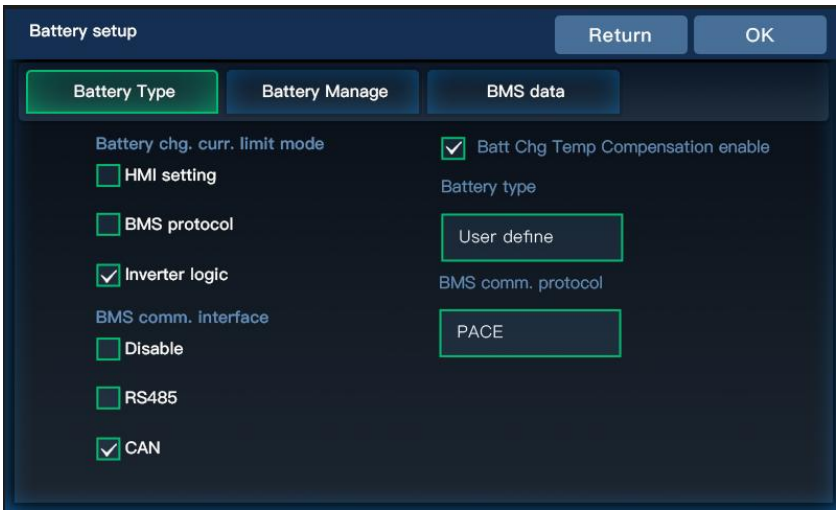
5.2.2.2 Peak shaving

Parameter Meaning	Description
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 timed charging and discharging time period.
Week enable	Sets the day of the week for timed charging/discharging (effective only for time-sharing charging/discharging).

5.2.3 Battery setup

To enter this setting, you need to enter the password set by the user, the default password is “4321”.

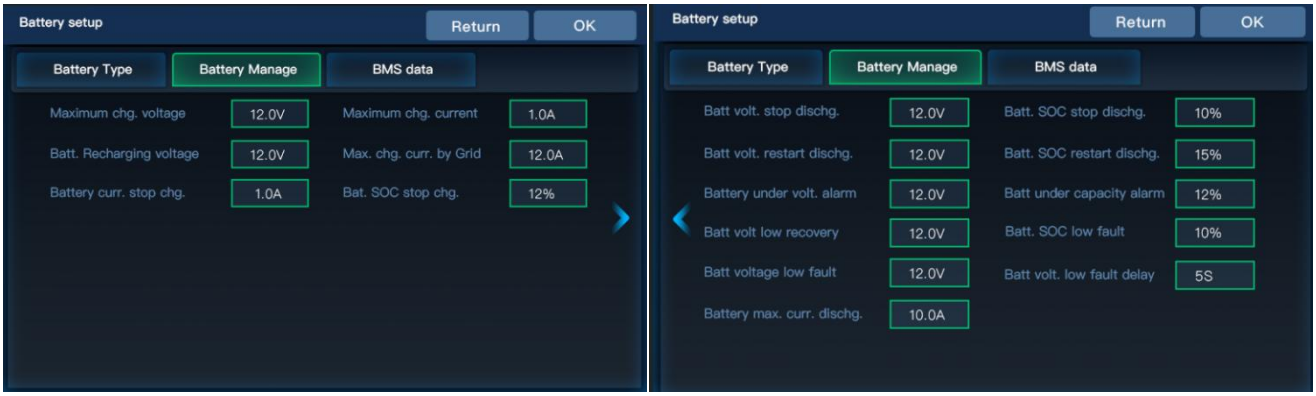
5.2.3.1 Battery type



Parameter Meaning	Option	Description
Battery chg. curr. limit mode	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.
BMS comm. interface	Disable	BMS does not communicat.
	RS485	BMS RS485 communication function.
	CAN	BMS CAN communication function.
Batt Chg Temp Compensation enable	Select whether to turn on temperature compensation.	
BMS comm. protocol	When the BMS port selection setting item = 485 or CAN, it is necessary to select the corresponding lithium battery manufacturer brand for communication: 485 protocol: 1: PACE 2: RUDA 3: AOGUAN 4: OULITE 5: CEF 6: XINWANGDA 7: DAQIN 8: WOW 9: PYL Ⅰ 10: MIT 11: XIX 12: POL 13: GUOX 14: SMK 15: VOL 16: WES 17: SGP 18: GSL 19: PYT Ⅱ CAN protocol: 20: UZE 21: PYL 22: SGP 23: GSL	
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.
	LFP/14/ 15/ LFP 16	Li-FePO4/14/15/16, corresponding to Li-FePO4 14 string, 15 string, 16 string.

	N13/ N14	Ternary lithium batteries, N13/N14, corresponding to ternary lithium batteries 13 string, 14 string.
	No battery	Without battery.

5.2.3.2 Battery manage



Parameter Meaning	Description
Maximum charging voltage	When the battery is charging, the voltage reaches the value to enter the float state or stop charging.
Maximum charging current	Set the amount of current when charging the battery
Battery Recharge Voltage	When the battery is fully charged, the inverter stops charging and resumes charging when the battery voltage is lower than this voltage value.
Max. chg. curr. by Grid	Sets the amount of mains charging current for the battery when using mains power (the value is the battery current, DC)
Battery stop charging current	Charging stops when the charging current is less than the set value.
Battery stop charging SOC	SOC will stop charging when the value reaches this setting (valid when BMS communicates normally)
Battery cut-off discharge voltage	When the battery is discharged, it stops discharging when the voltage reaches this value and switches to mains load.
Battery cut-off discharge SOC	When the SOC value reaches this setting, the battery stops discharging and switches to mains load (valid when BMS communication is normal)
Battery re-discharge voltage	When the battery voltage is too low to be discharged, the battery voltage needs to reach this setting before it can be discharged again.
Battery re-discharge SOC	When the battery reports a low SOC fault, the battery SOC reaches this setting and can be re-discharged (valid when BMS communication is normal).

Battery under-voltage alarm value	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 shut down.
Battery Low SOC Alarm Value	The SOC value will alarm if it reaches this setting. If the SOC value exceeds 5% of the set value, the inverter output will not turn off and the fault fault disappears (valid when BMS communication is normal).
Battery recovery voltage	When the battery reports a low voltage fault, the battery voltage reaches this setting and the fault will be cleared.
Battery low SOC fault	When the battery voltage reaches this setting, the inverter will alarm the battery SOC low fault and stop discharging (valid when BMS communication is normal).
Battery Low Voltage Fault	When the battery voltage reaches this setting, the inverter will report a low battery voltage fault.
Over-discharge delay	When the battery voltage reaches the "stop discharge voltage" setting, the inverter output will be shut down with a delay.
Maximum Battery Discharge Current	Setting the maximum battery discharge current

5.2.3.3 BMS date(When the battery communicate with inverter)

Check the data that battery BMS uploade to inverter.

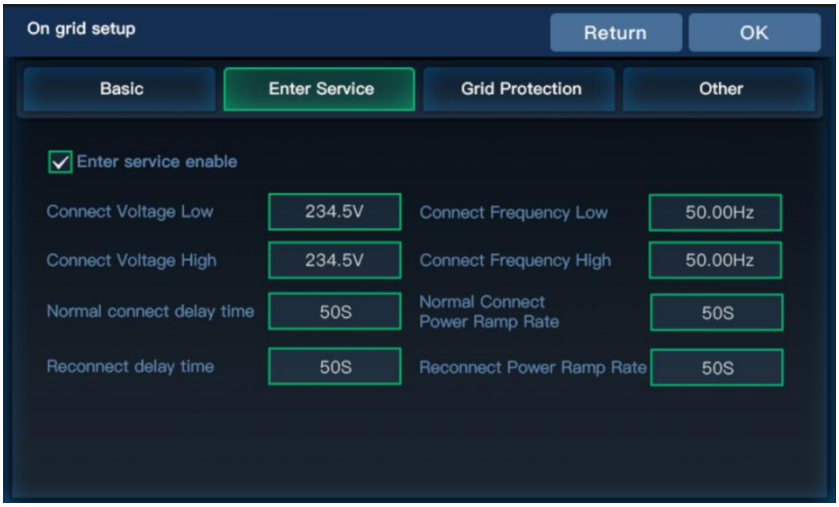
5.2.4 On grid setup

To enter this setting, you need to enter the password set by the user, the default password is “4321”.

5.2.4.1 Basic

Parameter Meaning	Description
Grid Standard	Eu general: EN50549-1
	German: VDE-ARN-4105
	Other regions: GNL
Grid frequency	Selection of local grid frequency, 50Hz/60Hz
External CT ratio	When connecting an external CT, enter the ratio on the CT specification.
Sell Power Max	Setting the maximum grid-connected 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 20~500W
On Grid Reactive Power	Setting range 0~100%, % of reactive power
Reactive power over excited Reactive power under excited	Over indicates 0-100% / Under indicates -100%~0%
On Grid PF	Setting range 0.8~1
Reactive power over excited Reactive power under excited	Over indicates 0.8~1 / Under indicates -0.8 ~ -1

5.2.4.2 Parameters for the parallel connection (it is not recommended that the user change this recommendation)



Parameter Meaning	Description
Enter service enable	Grid connection startup setting (default is on), turn off the value of the inverter does not connect to the grid.
Connect Voltage Low	Voltage less than this value will not be connected to the grid.
Connect Frequency Low	Frequency less than this value will not connect to the grid.
Connect Voltage High	Voltage higher than this value does not connect to the grid.
Connect Frequency High	Frequency higher than this value will not be connected to the grid.
Normal connect delay time	Normal grid connection, grid connection delay time.
Normal Connect Power Ramp Rate	Normal grid connection, grid power rise rate.
Reconnect delay time	Grid disconnection and reconnection, grid connection delay time.
Reconnect Power Ramp Rate	Grid disconnection reconnection, rate of rise of grid-connected power.

5.2.4.3 Grid protection parameters (it is not recommended that the user change this setting)

Parameter Meaning	Description
LV1	Class 1 undervoltage protection point
LF1	Class 1 underfrequency protection point
LV2	Class 2 undervoltage protection point
LF2	Class 2 underfrequency protection point
HV1	Class 1 overvoltage protection point
HF1	Class 1 overfrequency protection point
HV2	Class 2 overvoltage protection point
HF2	Class 2 overfrequency protection point
Time	Protection Response Time

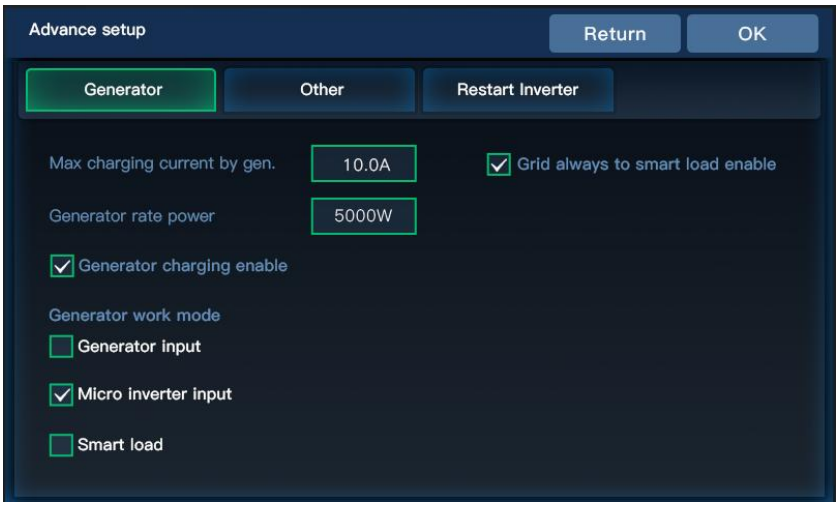
5.2.4.4 Other (it is not recommended that users change this setting)

Parameter Meanin	Description
Frequency Droop (F-P) enable	Adjustment of inverter output power according to grid frequency.
Volt-Watt (V-P) curve enable	Regulates the active power of the inverter according to the set grid voltage.
Volt-Var (V-Q) curve enable	Adjustment of the inverter reactive power according to the set grid voltage.
Watt-Var (P-Q) curve enable	Adjustment of the inverter reactive power according to the set active power.
Watt-PF (P-PF) curve enable	Adjustment of the inverter power factor according to the set active power.
LVRT/HVRT enable	Adjustment of the grid HV ride-through / LV ride-through values.
Reactive power percentage enable	
Discharge PF enable	
Charge PF enable	
DRMS Enable	Australia only

5.2.5 Advance setup

To enter this setting, you need to enter the password set by the user, the default password is “4321”.

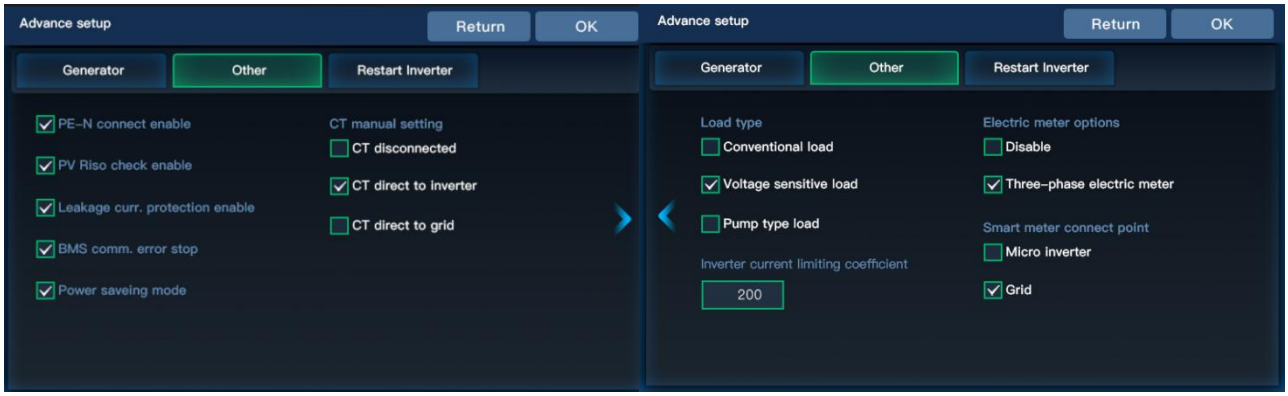
5.2.5.1 Generator



Parameter Meaning	Description	
Max charging current by gen.	Maximum battery charging current of the generator.	
Generator rate power	Setting the rated power of the generator.	
Generator charging enable	Set whether the generator is charged or not.	
Generator work mode	Generator Input	When the generator is connected to the “Gen port”, select the generator input.
	Micro inverter input	Grid-tie inverter is connected to the “Gen port” of the hybrid inverter.
	Smart load	When a load is connected to the “Gen port”, select the load output.
Grid always to smart load enable	Whether to enable continuous power supply to the smart load.	

5.2.5.2 Other

To enter this setting, you need to enter the password set by the user, the default password is “4321”.



Parameter Meaning	Description
PE-N Connect enable	Enable automatic switching of PE-N connections.
PV Riso check enable	Enable PV insulation impedance detection.
Leakage curr. protection enable	Enable leakage current protection.
BMS comm. error stop	Inverter stops output when BMS communication error occurs.
Power saveing mode	After turning on the energy-saving mode, if the load is no load or less than 35W, the inverter output will be turned off after a delay of 5min; when the load is more than 50W, the inverter will start automatically.
CT manual setting	Select the direction of the CT according to the installation of the CT.
Load Type	Select the load type according to the connected load.
Inverter Current Limiting coefficient	Adjust the current coefficient when the inverter is soft-started (this setting is not recommended to be modified by the customer).
Electric meter options	Whether to enable three-phase meter.
Smart meter connect point	Select on-grid inverter side or grid side according to meter installation location.

5.2.5.3 Restart

To enter this setting, you need to enter the password set by the user, the default password is “4321”.

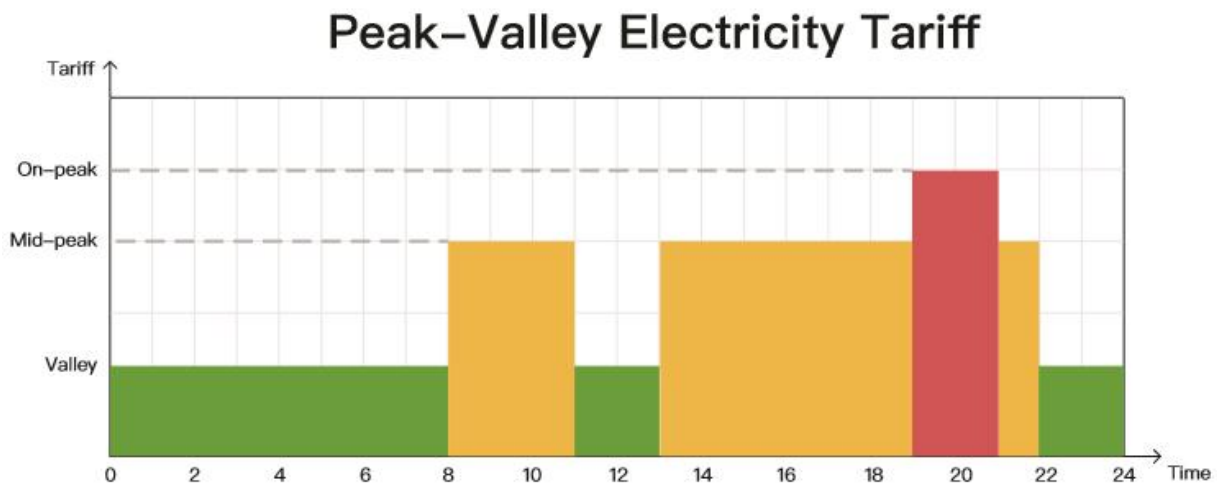
Parameter Meaning	Description
Restore to factory settings	Reset all inverter settings
Restart inverter	Restart the inverter

5.3 Charging/discharging function by days of the week and time of the day

The HESP series, including HESP4830SH3 to HESP4870SH3 and the HESP4880SHD3 series, have the function of charging and discharging by different time periods within a week, distinguishing between Monday and Sunday. Users can set different charging and discharging time periods according to the local peak and valley electricity prices, so as to make rational use of the utility power and photovoltaic energy. When the utility power price is expensive, the battery inverter can be used to supply electricity to the load. When the utility power price is low, the utility power can be used to supply power to the load and charge the battery, which can help users save electricity bills to the greatest extent.

Users can turn on/off the time-period-based charging/discharging function in the parameters of "Segmented Charging Enable" and "Segmented Discharging Enable" in the setting menu. And set the charging and discharging time periods in the parameters of "Timed Utility Power Charging Start/Time

Setting" and "Timed Utility Power Discharging Start/Time Setting".



Weekly and hourly mains charging, with load function

There are 7 weekdays and 3 time slots that can be set by the user. The user can set the grid charging/loading time slots within the range of 00:00 to 23:59 from Monday to Sunday, and if there is PV energy output during the time slots set by the user, PV energy will be utilized in priority, and if there is no PV energy output or insufficient PV energy, the grid will be activated as a supplementary power.

Battery discharging function by days of the week and time periods

There are seven self-defined days of the week and three definable time slots. Users can set the battery discharge time within the range of 00:00 to 23:59 from Monday to Sunday, and the inverter will prioritize the battery inverter to carry the load during the time slots set by the user, and if the battery is insufficient, the inverter will automatically switch to the mains to ensure the loads are running stably.

5.4 Battery parameter

- **Lead-acid battery**

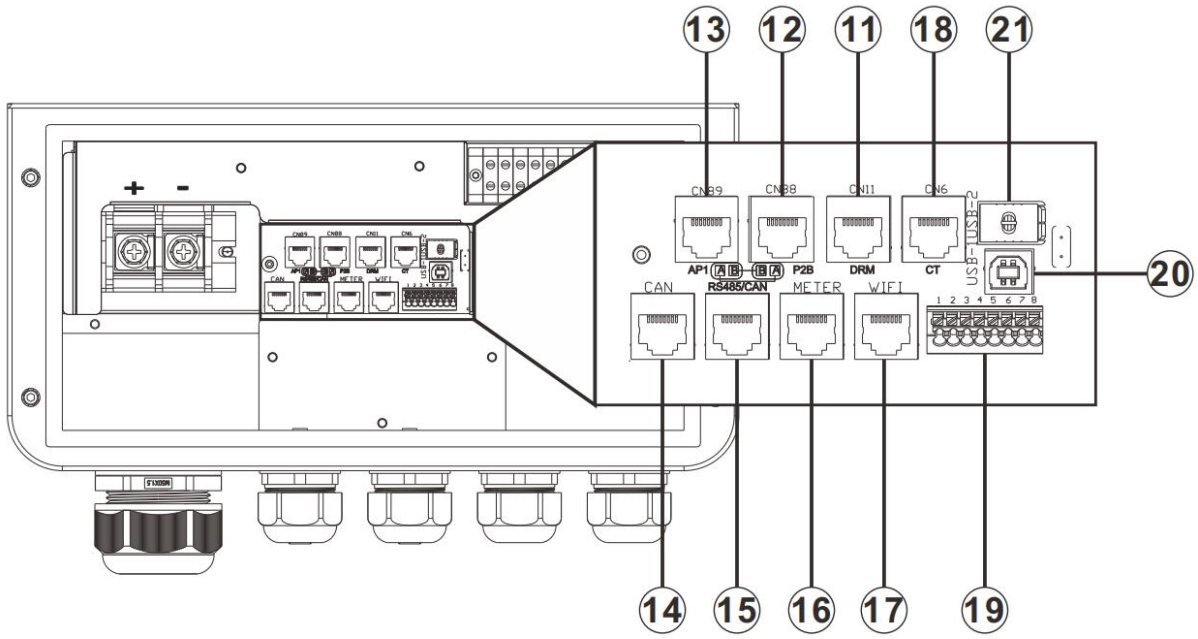
Parameters \ Battery type	Sealed lead acid battery (SLD)	Gel lead acid battery (GEL)	Flooded lead acid battery (FLD)	User-defined (USE)	Adjustable
Overvoltage disconnection voltage	60V	60V	60V	60V	
Battery fully charged recovery point	52V	52V	52V	52V	√
Boost charge voltage	-	-	-	40 ~ 58.4V	√
Undervoltage alarm voltage	44V	44V	44V	40 ~ 52.2V	√
Undervoltage alarm voltage recovery point	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage	42V	42V	42V	40 ~ 60V	√
Low voltage disconnection voltage recovery point	52V	52V	52V	52V	√
Discharge limit voltage	-	-	-	40 ~ 60V	√
Over-discharge delay time	5s	5s	5s	1 ~ 30s	√
Boost charge duration	-	-	-	10 ~ 900 minutes	√

- **Li-ion battery**

Battery type / Parameters	Ternary (N13)	Ternary (N14)	LFP (L16)	LFP (L15)	LFP (L14)	Adjustable
Overvoltage disconnection voltage	60V	60V	60V	60V	60V	
Battery fully charged recovery point	50.4V	54.8V	53.6V	50.4V	47.6V	√
Equalizing charge voltage	-	-	-	-	-	√
Boost charge voltage	53.2V	57.6V	56.8V	53.2V	49.2V	√
Undervoltage alarm voltage([01] fault)	43.6V	46.8V	49.6V	46.4V	43.2V	√
Undervoltage alarm voltage recovery point([01] fault)	Undervoltage alarm voltage+0.8V					
Low voltage disconnection voltage([04] fault)	38.8V	42V	48.8V	45.6V	42V	√
Low voltage disconnection voltage recovery point ([04] fault)(setup item [batt.volt.low fault recovery])	46V	49.6V	52.8V	49.6V	46V	√
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V	√
Over-discharge delay time	30s	30s	30s	30s	30s	√
Boost charge duration	120 minutes	120 minutes	120 minutes	120 minutes	120 minutes	√

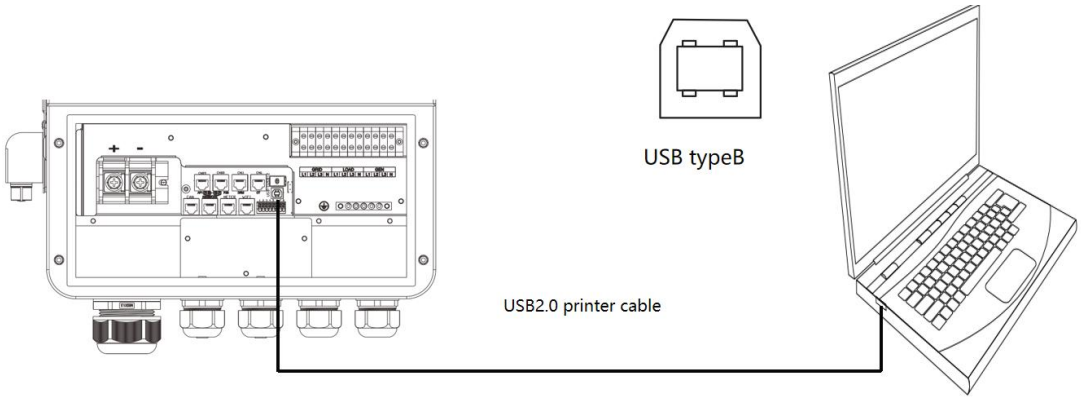
6. Communication

6.1 Overview



11	DRMS port	12	Parallel communication port B
13	Parallel communication port A	14	CAN communication port
15	485 communication port	16	Meter port
17	WIFI port	18	CT port
19	Dry contact	20	USB-1 port
21	USB-2 port		

6.2 USB-1 port

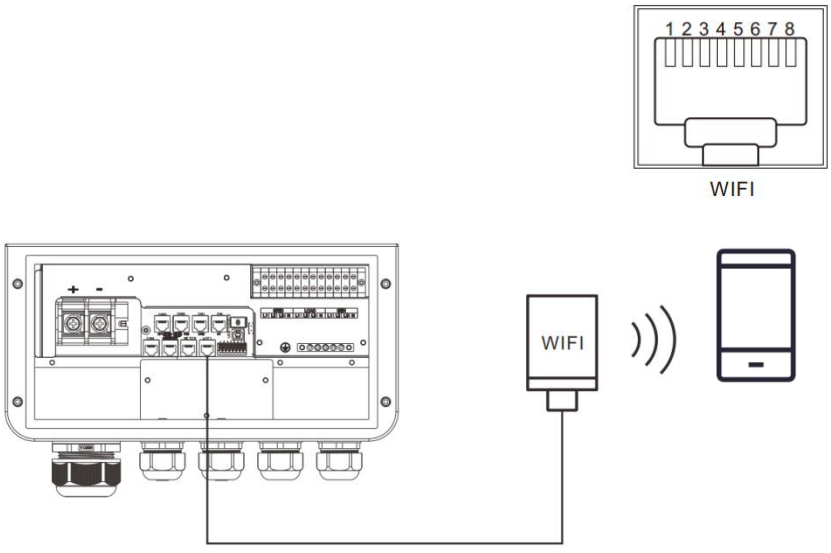


The user can read and modify device parameters through this port by using the host software. Please contact us for the host software installation package if you require one.

6.3 WIFI port

WIFI communication port can be connected with our self-developed RS485 to WIFI/GPRS communication module, which can be connected to our inverter to check the operation parameters and status of the inverter through mobile APP.

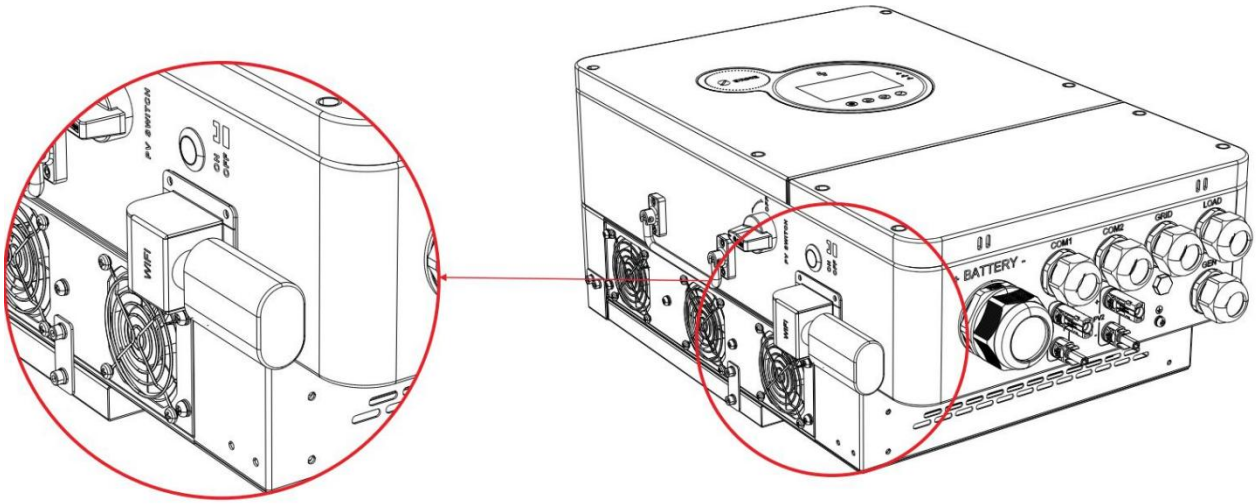
WIFI 1 port (either one):



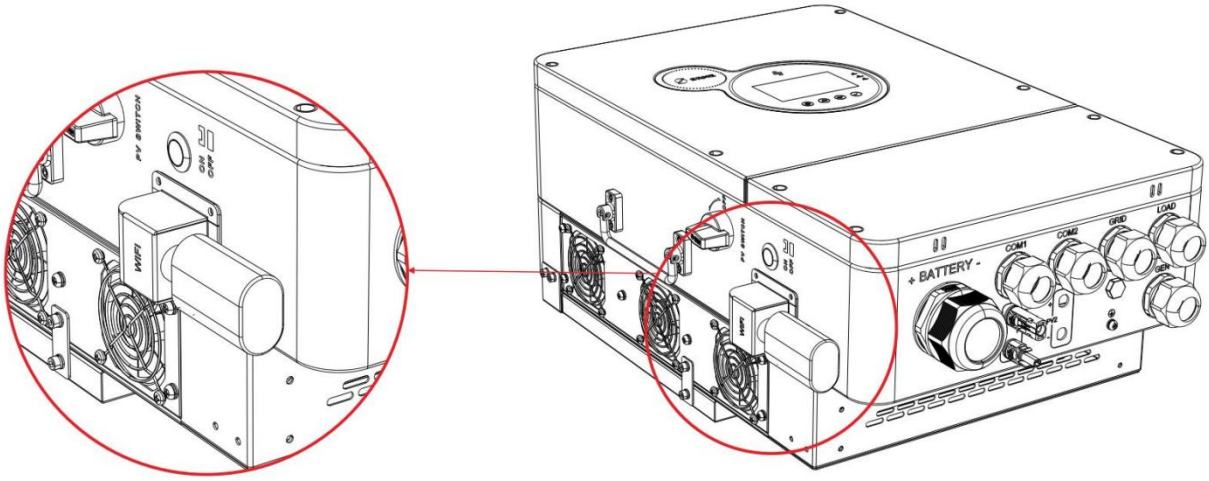
RJ45	Definition
Pin 1	5V
Pin 2	GND
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

WIFI 2 ports (choose one of the two):

HESP4850SH3～HESP4870SH3，HESP4880SHD3 series：

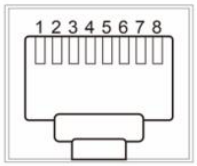


HESP4830SH3～HESP4840SH3 series：



6.4 RS485 port

The RS485/CAN interface is used to connect to the BMS lithium battery



RS485

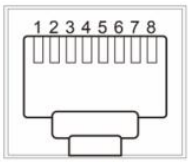
RJ45	Definition
Pin 1	RS485-B
Pin 2	RS485-A
Pin 3	/
Pin 4	CANH
Pin 5	CANL
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B

NOTICE

If you need to use the inverter to communicate with the lithium battery BMS, please contact us for the communication protocol or upgrade the inverter to the appropriate software programme.

6.5 CAN port

The CAN port is used to connect to the BMS of Liion battery .

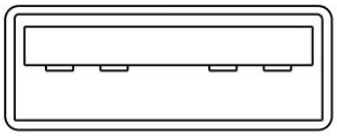


CAN

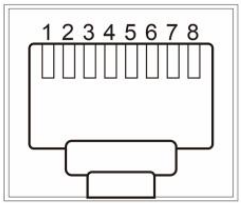
RJ45	Definition
Pin 1	/
Pin 2	/
Pin 3	/
Pin 4	CANH
Pin 5	CANL
Pin 6	/
Pin 7	/
Pin 8	/

6.6 USB-2 port

It is used to updated the screen firmware.



6.7 DRMS(Only Australia)

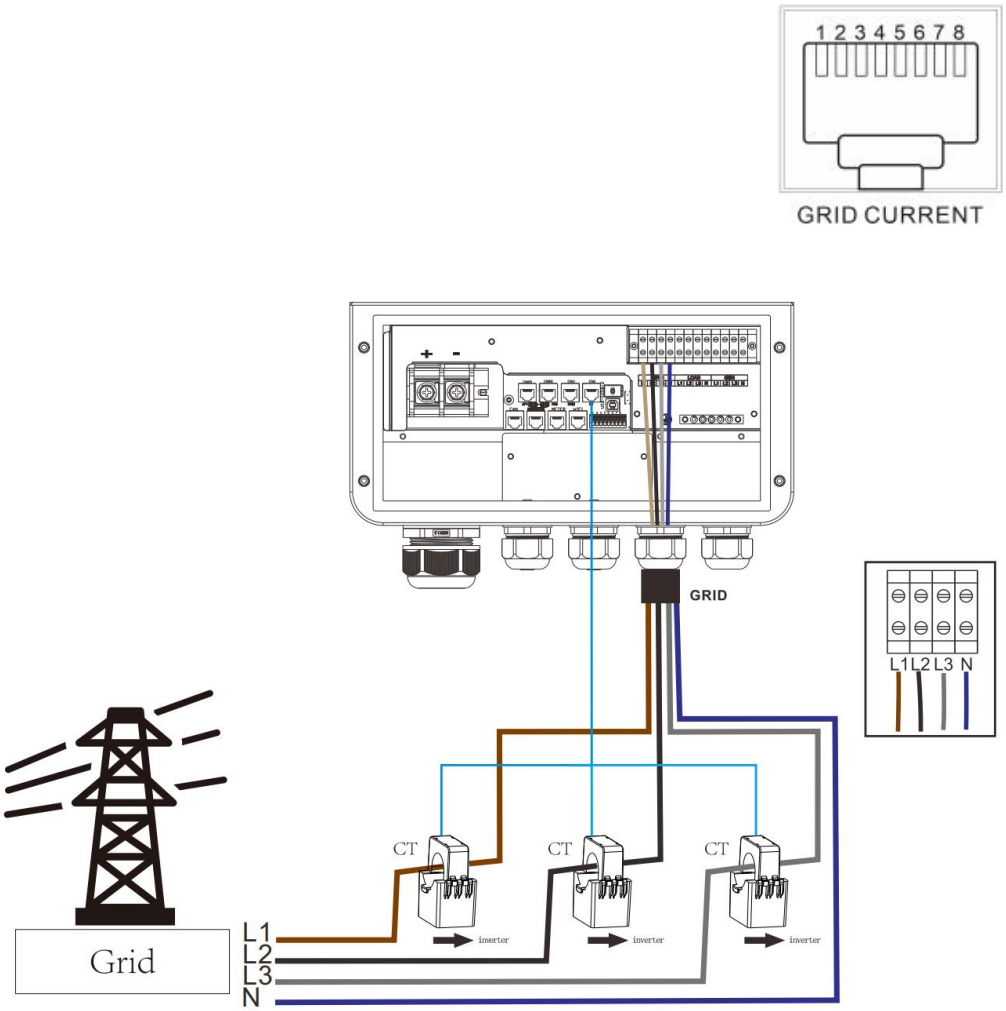


DRMS

MODEL	RJ45 socket asserted by shorting pins		Requirement
DRM0	5	6	Operate the disconnection device.
DRM5	1	5	Do not generate power to grid.
DRM6	2	5	Do not generate at more than 50% of rated power.
DRM7	3	5	Do not generate at more than 75% of rated power AND Sink reactive power if capable.
DRM8	4	5	Increase power generation (subject to constraints from other active DRMs) .

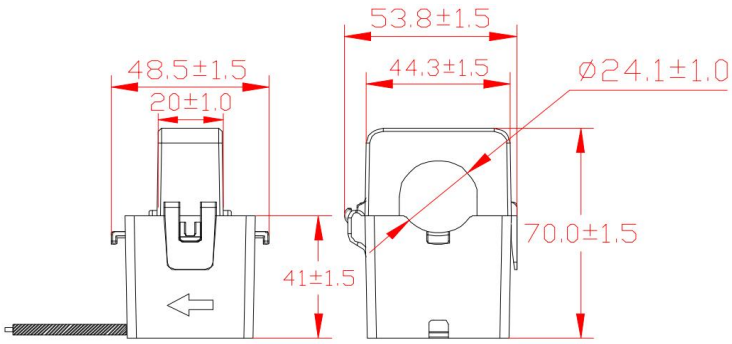
RJ45	Definition	RJ45	Definition	RJ45	Definition
Pin 1	DRM5	Pin 2	DRM6	Pin 3	DRM7
Pin 4	DRM8	Pin 5	RefGen	Pin 6	COM/DRM0
Pin 7	V+	Pin 8	V-		

6.8 External CT wiring (CT direction pointing toward the inverter)

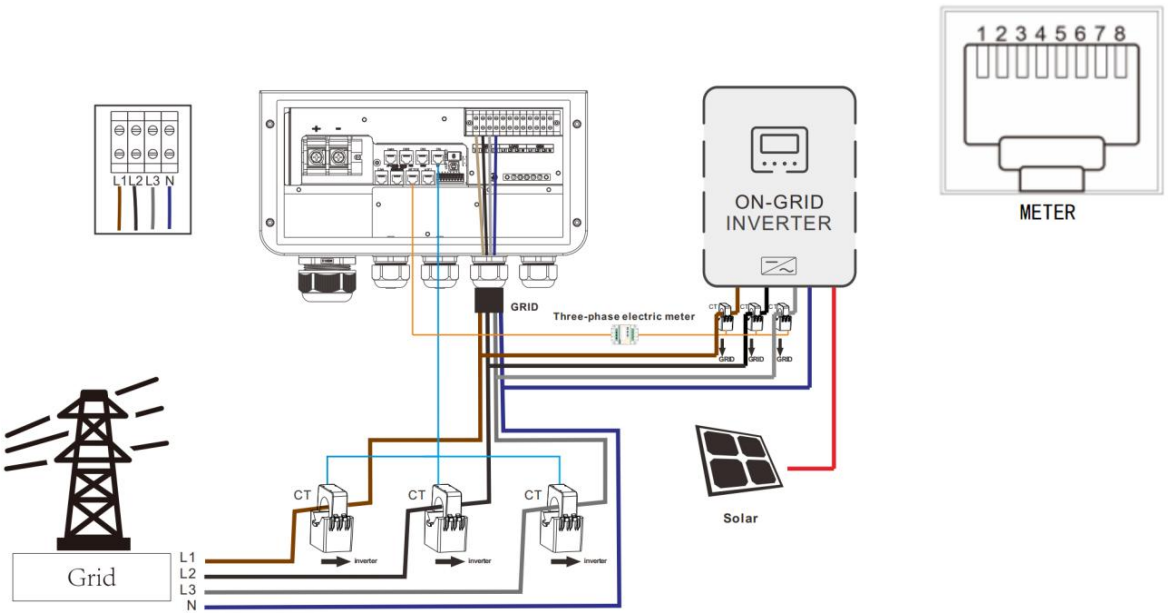


RJ45	Definition	RJ45	Definition	RJ45	Definition
Pin 1	CT1+	Pin 2	CT1-	Pin 3	/
Pin 4	CT2+	Pin 5	CT2-	Pin 6	/
Pin 7	CT3+	Pin 8	CT3-		

Split Core Current Transformer (CT) dimension: (mm)
Secondary output cable length is 4m.

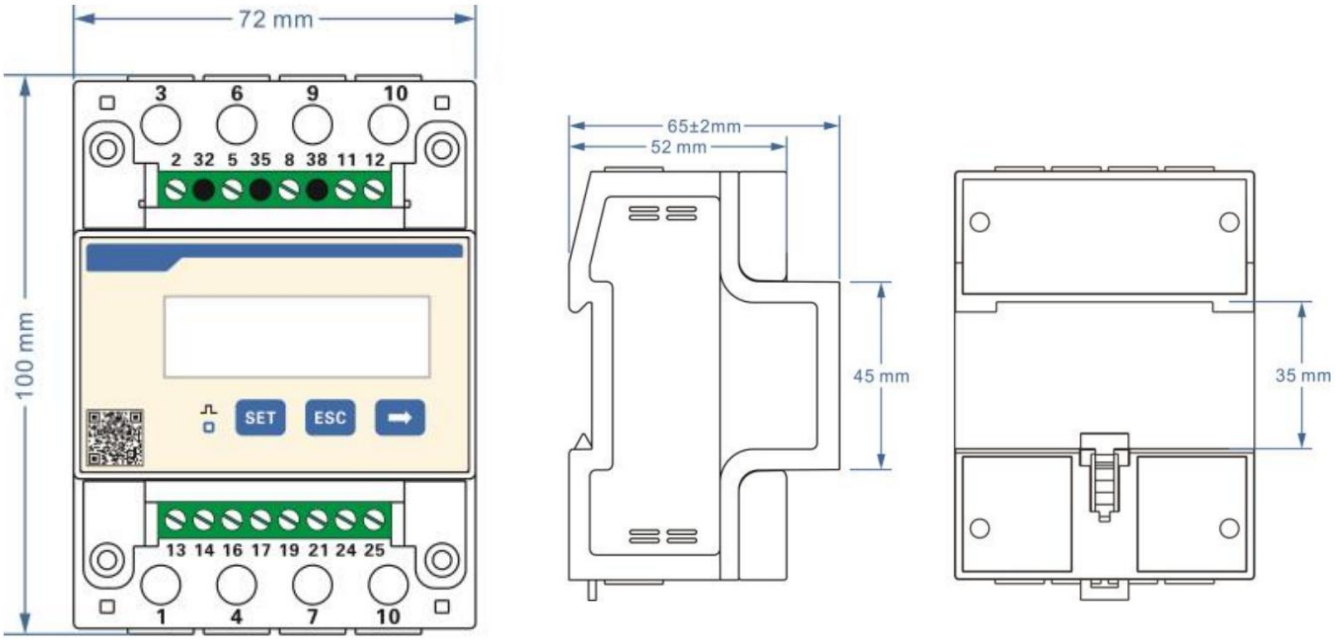


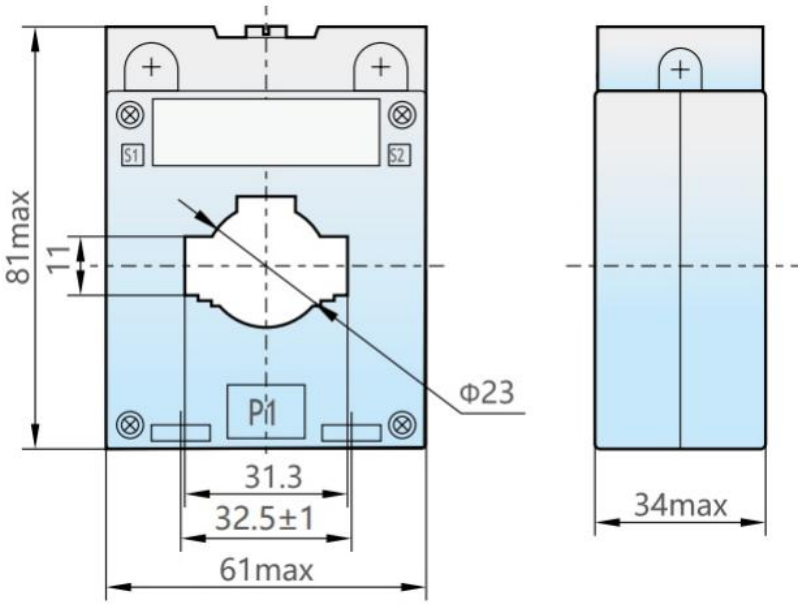
6.9 Three-phase meter wiring (CT direction pointing towards the grid)(Optional)



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

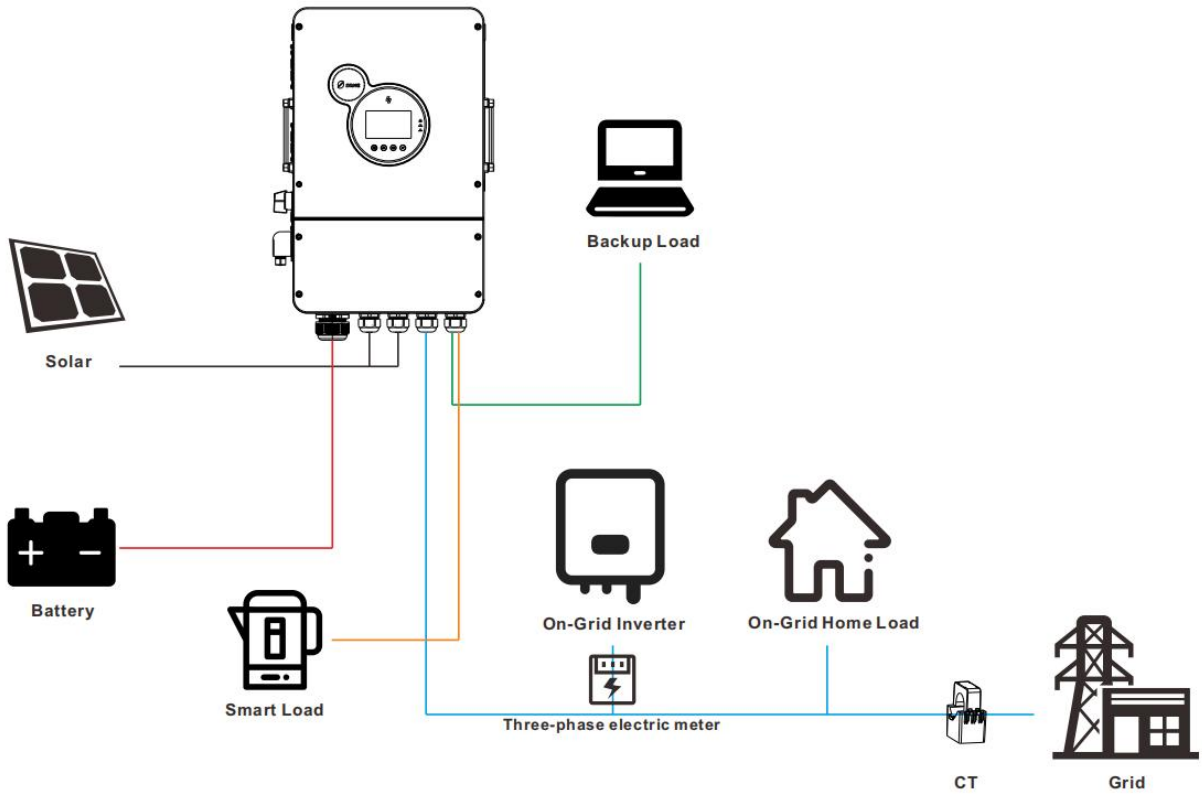
1. Meter size: (mm)
2. CT size 1: (mm)



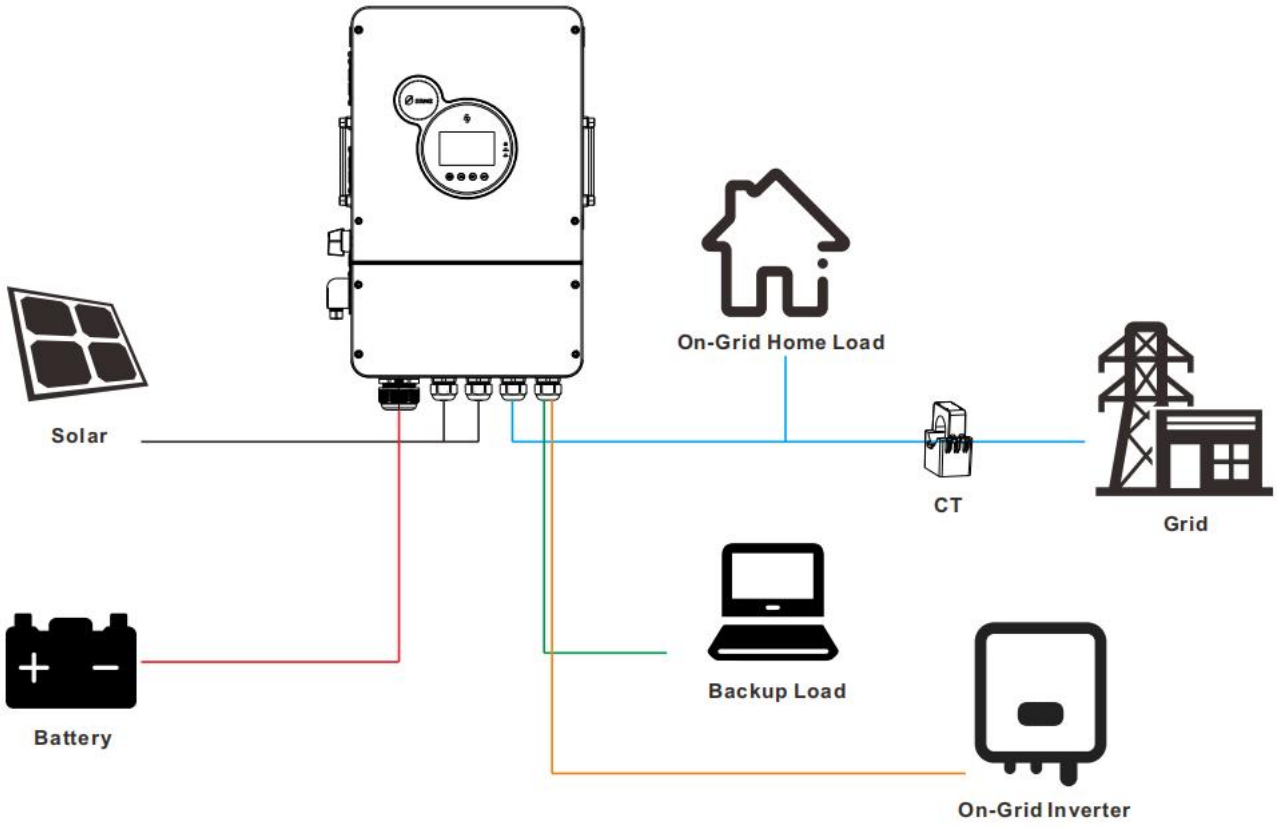


6.10 AC coupling function wiring

1. AC coupling - Grid side



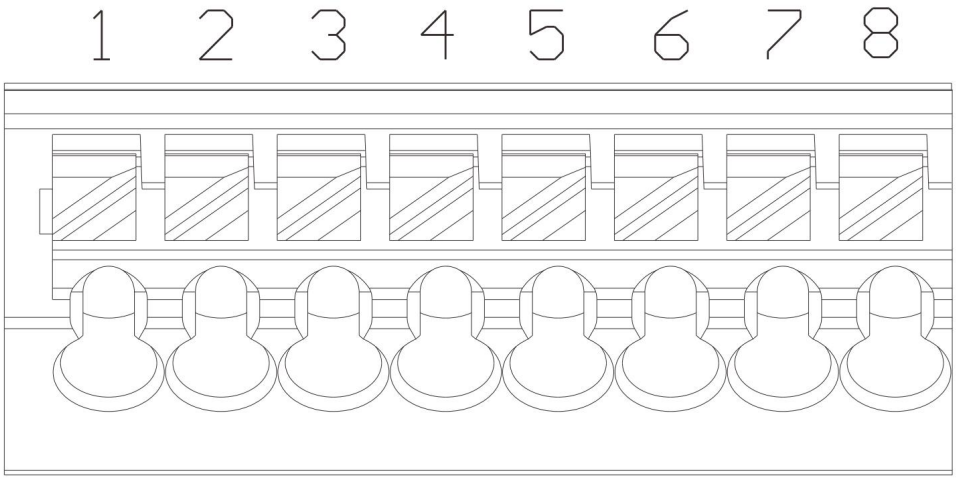
2. AC Coupling - Generator side



6.11 AC coupling function

The dry contact port has 3 functions.

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



Function	Definition
RSD power supply	Pin 1 is GND and Pin 2 is RSD 12V+.
Temperature Sampling (Reserved)	Pin 1 and Pin 5 can be used for battery temperature sampling compensation
Generator remote start/stop	6 - 7: NC 6 - 8: NO Remote generator shutdown: pins 6 - 7 normally closed, pins 6 - 8 normally open(Pin 6/7/8 output 125Vac/1A, 230Vac/1A, 30Vdc/1A)

NOTICE

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

7. Fault and Remedy

7.1 Fault code

Fault Code	Meaning	Does it affect the output	Description	Fault Level
01	BatVoltLow	Not	Battery undervoltage alarm	Grade 3
02	BatOverCurrSw	Yes	Battery discharge average current overcurrent software protection	Grade 2
03	BatOpen	Yes	Battery not connected alarm	Grade 3
04	BatLowEod	Yes	Battery undervoltage stop discharging alarm	Grade 2
05	BatOverCurrHw	Yes	Battery overcurrent hardware protection	Grade 1
06	BatOverVolt	Yes	Charge overvoltage protection	Grade 1
07	BusOverVoltHw	Yes	Busbar overvoltage hardware protection	Grade 1
08	BusOverVoltSw	Yes	Bus overvoltage software protection	Grade 1
09	PvVoltHigh	Not	PV overvoltage protection	Grade 1
10	PvAFCIErr	Yes	PV Arcing Alarm	Grade 1
11	PvBoostOCHw	Not	Boost overcurrent hardware protection	Grade 1
12	SpiCommErr	Yes	Master-slave SPI communication failure	Grade 2
13	OverloadBypass	Yes	Bypass overload protection	Grade 2
14	OverloadInverter	Yes	Inverter overload protection	Grade 2
15	AcOverCurrHw	Yes	Inverter overcurrent hardware protection	Grade 1
16	AuxDSpReqOffPWM	Yes	Slave Chip Shutdown Request Fault	Grade 3
17	InvShort	Yes	Inverter short circuit protection	Grade 1
18	Bussoftfailed	Yes	Bus soft-start fault	Grade 1
19	OverTemperMppt	Not	PV Heatsink Over Temperature Protection	Grade 2

20	OverTemperInv	Yes	Inverter radiator over-temperature protection	Grade 2
21	FanFail	Yes	Fan Failure	Grade 1
22	EEPROM	Yes	Memory failure	Grade 1
23	ModelNumErr	Yes	Model setting error	Grade 1
24	Busdiff	Yes	Positive and negative bus voltage imbalance	Grade 2
25	BusShort	Yes	Bus short circuit	Grade 1
26	Rlyshort	Yes	Inverter AC output backfeed to bypass AC output	Grade 1
27	LinePhaselose	Yes	Grid input phase loss	Grade 3
28	LinePhaseErr	Yes	Grid input phase error	Grade 3
29	BusVoltLow	Yes	Low bus voltage protection	Grade 2
30	BatCapacityLow1	Not	Battery capacity rate below 10% alarm (effective after successful BMS communication)	Grade 3
31	BatCapacityLow2	Not	Battery capacity rate below 5% alarm (Effective after successful BMS communication)	Grade 3
32	BatCapacityLowStop	Yes	Battery low capacity shutdown (set BMS enable active)	Grade 2
33	ControlCanFault	Yes	Control of CAN parallel operation faults	Grade 2
34	CanCommFault	Yes	Parallel can communication failure	Grade 3
35	ParaAddrErr	Yes	Incorrect parallel ID (communication address) setting	Grade 3
36	Balance currentOC	Yes	Balanced bridge arm overcurrent fault	Grade 1
37	ParaShareCurrErr	Yes	parallel flow equalization fault	Grade 2
38	ParaBattVoltDiff	Yes	Parallel mode with large differences in battery voltage	Grade 2
39	ParaAcSrcDiff	Yes	Parallel mode, inconsistent utility input source	Grade 3
40	ParaHwSynErr	Yes	Parallel mode, hardware synchronization signal failure	Grade 2

41	InvDcVoltErr	Yes	Inverter voltage DC component	Grade 2
42	SysFwVersionDiff	Yes	Abnormal parallel program version inconsistency	Grade 2
43	ParaLineContErr	Yes	Faulty parallel wiring	Grade 2
44	Serial number error	Yes	Serial number not set at factory	Grade 2
45	Error setting of split-phase mode	Yes	Parallel mode setting item set incorrectly	Grade 2
46	MeterComErr	Yes	Meter communication error	Grade 2
48	AFCIComErr	Yes	AFCI communication error	Grade 1
49	Grid over voltage	Yes	Set the local grid standard in the setup menu.	Grade 4
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	Low insulation resistance fault	Not	PV1+, PV2+, PV- impedance to ground abnormally low	Grade 4
57	Leakage current overload fault	Yes	System leakage current exceeds the standard	Grade 1
58	BMSComErr	Not	BMS communication error	Grade 4
60	BMSUnderTem	Not	BMS low temperature alarm (effective after successful BMS communication)	Grade 2
61	BMSOverTem	Yes	BMS over-temperature alarm (effective after successful BMS communication)	Grade 2
62	BMSOverCur	Yes	BMS overcurrent alarm (effective after successful BMS communication)	Grade 2
63	BMSUnderVolt	Not	BMS undervoltage alarm (effective after successful BMS communication)	Grade 2

Fault sound and light level indication			
Failure Level	**Level Description**	**Fault Lamp Status**	**Buzzer Status**
Class 1	Failure level alarm, the machine may be damaged and other serious faults.	Fault Lamp Constant	Buzzer sounds for 0.5 seconds and stops for 0.5 seconds (more rapid audible alert).
Grade 2	Output shuts down, stops charging, audible and visual alerts.	Fault light on for 1 second, off for 1 second	Buzzer sounds for 1 second, stops for 1 second (softer audible alert).
Grade 3	Setting error, external error, etc., the output may shut down, buzzer alerts.	Fault lamp does not light up	Buzzer sounds for 0.5 seconds and stops for 1.5 seconds (gentle audible alert).
Grade 4	Other alarms, does not affect the output and charging.	Fault lamp does not light up	Buzzer doesn't sound.

7.2 Partial Troubleshooting

Fault Code	Meaning	Causes	Remedy
/	No screen display	No power input, or the switch on the bottom of the unit is not switched on.	Check whether the battery air circuit-breaker or PV air circuit-breaker is turned on. Check if the switch is "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 [battery under volt.alarm].	Charge the battery and wait for the battery voltage to be higher than the value set by 'Battery setup'.
03	Battery not connected	The battery is not connected, or the BMS is in discharge protection state.	Check that the battery is reliably connected. Check that the battery circuit-breaker is off. Ensure that the BMS is able to communicate properly.
04	Battery over-discharge	The battery voltage is lower than the value set in parameter [batt voltage low fault].	Manual reset:Shut down and restart. Auto reset:Charge the battery so that the battery voltage is higher than the voltage set by 'Battery setup'.
06	Battery over-voltage when charging	Battery overvoltage.	Manually power down and restart. Check if the battery voltage exceeds the limit. If exceeded, the battery will need to be discharged until the voltage is below the battery overvoltage recovery point.
13	Bypass over-load (software detection)	Bypass output power or output current over-load for a period of time.	Reduce the load power and restart the device. Please refer to item 11 of the protection function for more details.
14	Inverter over-load(software detection)	Inverter output power or output current over-load for a period of time.	
19	Heat sink of PV input over-temperature (software detection)	Heat sink of PV input temperature exceeds 90℃ for 3s.	Normal charging and discharging is resumed when the temperature of the heat sink cools below the over-temperature recovery temperature.
20	Heat sink of inverter output over-temperature (software detection)	Heat sink of inverter output temperature exceeds 90℃ for 3s.	

21	Fan failure	Hardware detects fan failure.	Manually toggle the fan after powering off the machine to check for foreign matter blockage.
26	AC input relay short-circuit	Relay for AC input sticking.	Manually turn off and restart the machine, if the fault reappears after restarting, you need to contact the after-sales service to repair the machine.
28	Utility input phase fault	AC input phase does not match AC output phase.	Make sure that the phase of the AC input is the same as the phase of the AC output.

NOTICE

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

8. Protection and maintenance

8.1 Protection function

No.	Protection functions	Description
1	PV Input Current Limit Protection	When the charging current or power of the PV array configured exceeds the PV input rated value, the inverter will limit the input power and charge at the rated.
2	PV over-voltage protection	If the PV voltage exceeds the maximum value allowed by the hardware, the machine reports a fault and stops PV boosting to output a sinusoidal AC waveform.
3	Night-time anti-reverse charge protection	At night, the battery will be prevented from discharging to the PV module because the battery voltage is greater than the PV module voltage.
4	Grid input overvoltage protection	When the mains voltage of per phase exceeds 280Vac, the mains charging will be stopped and will switch to inverter output.
5	Grid input undervoltage protection	When the mains voltage of per phase falls below 170Vac, the mains charging will be stopped and will switch to inverter output.
6	Battery overvoltage protection	When the battery voltage reaches the over-voltage disconnection voltage point, it will automatically stop the PV and mains charging of the battery to prevent over-charging and damage to the battery.
7	Battery undervoltage protection	When the battery voltage reaches the low-voltage disconnection voltage point, it will automatically stop discharging the battery to prevent the battery from being over-discharged and damaged.
8	Battery overcurrent protection	When the battery current exceeds the range allowed by hardware, the machine will turn off output and stop discharging the battery.
9	AC output short circuit protection	When a short-circuit fault occurs at the load output for more than 200ms, it will immediately turn off the output AC voltage, and then manually re-power up and turn on the power in order to restore the normal output.
10	Radiator 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	Three phase overload logic: After triggering the overload protection, the inverter will resume output after 3 minutes, 5 consecutive overloads will shut down the output until the inverter is restarted. (102%<load<110%):alarm,output shut down after 5 minutes. (110%<load<125%):alarm, output shut down after 20s. (125%<load<200%):alarm, output shut down after 10s. Single phase overload logic: 1.5*(102%<load<110%) :alarm, output shut down after 5 minutes. 1.5*(load>110%): alarm, output shut down after 10s.
12	AC reverse charge protection	Prevents back-feeding of battery inverter AC power to bypass AC inputs.
13	Bypass overcurrent protection	Built-in AC input overcurrent protection circuit breaker.
14	Bypass wiring error protection	When the phase of the two bypass inputs is different from the phase of the inverter phase split, the machine will prohibit cutting into the bypass to prevent the load from dropping out or shorting out when cutting into the bypass.

8.2 Maintenance

To maintain optimum long-lasting working performance, it is recommended that the following items be checked twice a year.

1. Ensure that the airflow around the inverter is not blocked and remove any dirt or debris from the radiator.

2. Check that all exposed conductors are not damaged by sunlight, friction with other surrounding objects, dry rot, insect or rodent damage, etc. The conductors need to be repaired or replaced if necessary.

3. Verify that the indications and displays are consistent with the operation of the equipment, note any faults or incorrect displays and take corrective action if necessary.

4. Check all terminals for signs of corrosion, insulation damage, high temperatures or burning/discolouration and tighten terminal screws.

5. Check for dirt, nesting insects and corrosion, clean as required, clean insect screens regularly.

6. If the lightning arrester has failed, replace the failed arrester in time to prevent lightning damage to the inverter or other equipment of the user.

⚠ DANGER

- Make sure that the inverter is disconnected from all power sources and that the capacitors are fully discharged before carrying out any checks or operations to avoid the risk of electric shock.

The Company shall not be liable for damage caused by：

1. Damage caused by improper use or use in a wrong location.
2. PV modules with an open-circuit voltage exceeding the maximum permissible voltage.
3. Damage caused by the operating temperature exceeding the restricted operating temperature range.
4. Dismantling and repair of the inverter by unauthorised persons.
5. Damage caused by force majeure: damage during transport or handling of the inverter.

9. Datasheet

Models	HESP Series					
	4830SH3	4840SH3	4850SH3	4860SH3	4870SH3	4880SHD3
Inverter Output						
Rated Output Power	3000W	4000W	5000W	6000W	7000W	8000W
Max. Peak Power	6000VA	8000VA	10000VA	12000VA	14000VA	16000VA
Rated Output Voltage	230/400Vac (Three-phase)					
Output Voltage Tolerance	±5%					
Three-phase Motor Capacity	3HP	3HP	4.5HP	6HP	6HP	6HP
Rated Frequency	50/60Hz ± 0.3Hz					
Output Waveform	Pure sine wave					
Switching Time	10ms (typical)					
Overload Protection	Three-phase overload logic. After triggering the overload protection, the inverter restores the output after 3 minutes, 5 consecutive overloads turn off the output until the inverter restarts. (102%<load<110%):Alarm, output off after 5 minutes. (110%<load<125%):Alarm, output off after 20s. (125%<load<200%):alarm, output off after 10s. Single-phase overload logic. 1.5*(102%<load<110%):Alarm, output off after 5 minutes. 1.5*(load>110%):alarm, output off after 10s.					
AC Output (grid-connected)						
Rated Power	3000W	4000W	5000W	6000W	7000W	8000W
Max. Apparent Power	3300VA	4400VA	5500VA	6600VA	7700VA	8800VA
Power Factor	0.8 ahead, 0.8 behind					
Rated Output Voltage	3L/N/PE 230/400Vac					
Rated Grid Frequency	50/60Hz					
AC Output Rated Current	4.4Aac	5.8Aac	7.2Aac	8.7Aac	10.1Aac	11.6Aac
Total Current Harmonic Distortion Rate (THD)	<3%					

Battery						
Battery Type	Li-ion / Lead-Acid / User Defined					
Rated Battery Voltage	48Vdc (Minimum Startup Voltage 44V)					
Voltage Range	40 ~ 60Vdc					
Max. Generator Charging Current	50Adc	60Adc	80Adc	100Adc	120Adc	140Adc
Max. Grid Charging Current	50Adc	60Adc	80Adc	100Adc	120Adc	140Adc
Max. Hybrid Charging Current	80Adc	100Adc	120Adc	150Adc	180Adc	200Adc
PV Input						
No. Of MPPT	1		2			
Max. Input Power	6000W	8000W	10000W	12000W	14000W	16000W
Max. Input Current	26Adc		26Adc / 26Adc			
Max. Short-circuit Current	35Adc		35A / 35Adc			
Max. Open Circuit Voltage	800Vdc/800Vdc					
MPPT Voltage Range	200 ~ 650Vdc		200 ~ 650Vdc / 200 ~ 650Vdc			
Grid / Generator Input						
Input Voltage Range	Phase voltage 170 to 280V, Line voltage 305 to 485V					
Input Frequency Range	50Hz / 60Hz					
Bypass Overload Current	45A					
Efficiency						
MPPT Tracking Efficiency	99.9%					
Max. Efficiency	≧92%					
European Efficiency	97.0%					
Protection						
PV Lightning Protection	√					
Anti-islanding Protection	√					

PV Input Reverse Connection Protection	√
Insulation Impedance Detection	√
Leakage Current Detection	√
Output Overcurrent Protection	√
Output Short Circuit Protection	√
Surge Protection	DC type II/AC type II
Overvoltage Protection Level	DC type II/AC type III
Accreditation	
Grid Connection Certification	EN50549,VDE4105
Safety Regulations	IEC62109-1, IEC62109-2
EMC	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2
RoHS	Yes
General Data	
Parallel Capacity	6
Operating Temperature	-25～60℃, >45℃ Derate
Humidity Range	0～100%
Noise	<55dB
Protection Class	IP65
Cooling Method	Heat sink + intelligent fan cooling
Self-consumption Power	<100W
Dimension	640*400*250mm (excluding hangers and connectors)
Weight	37.5kg
Communication Port	RS485/CAN
External Module	4G/WIFI