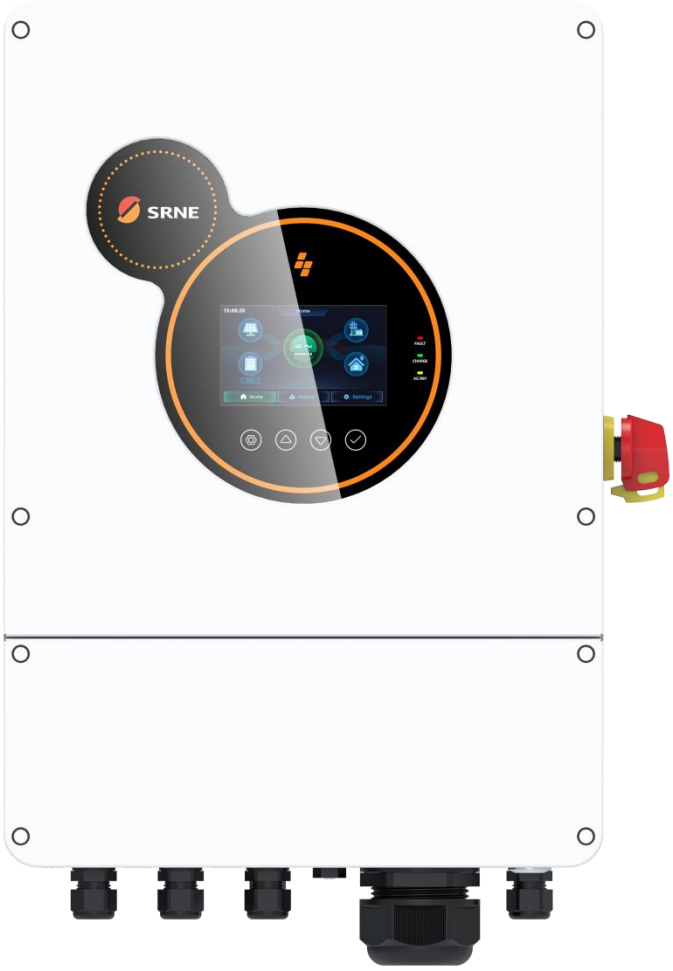
USER MANUAL



Solar Hybrid Inverter

HESP4836S100-H | HESP4840S100-H | HESP4846S100-H
HESP4850S100-H | HESP4855S100-H | HESP4860S100-H

SRNE

Contents

1. Safety

1.1 How to use this manual

This manual contains important information、guidelines、operation and maintenance for the following products：HESP 3.6～6KW series.
The manual must be followed during installation and maintenance.

1.2 Symbols in this manual

Symbol	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 instructions

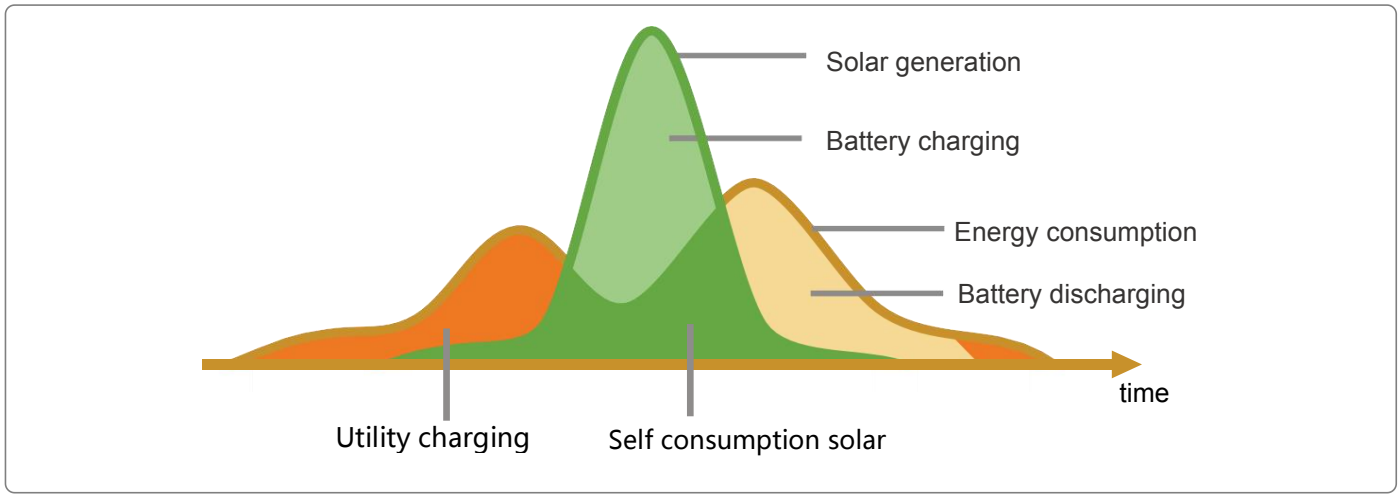
⚠ DANGER

- 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 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.
- Do not open the terminal cover when the inverter working.
- Make sure the inverter is well grounding.
- Never cause AC output and DC input short circuited.
- Do not disassembly 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. Production Instructions

2.1 Instructions

HESP 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.
- Smart load function.
- AC coupling function.
- With a dual activation function when the li-ion battery is dormant; either mains/photovoltaic power supply access can trigger the activation of the li-ion battery.
- Support single-phase pure sine wave output.
- Supports four different voltage levels of 200\208\220\230\240Vac.
- Supports two solar inputs and simultaneous tracking of two solar maximum power charging/supplying power capacity functions.
- Dual MPPT with 99.9% efficiency and maximum 16A 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 grid 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.

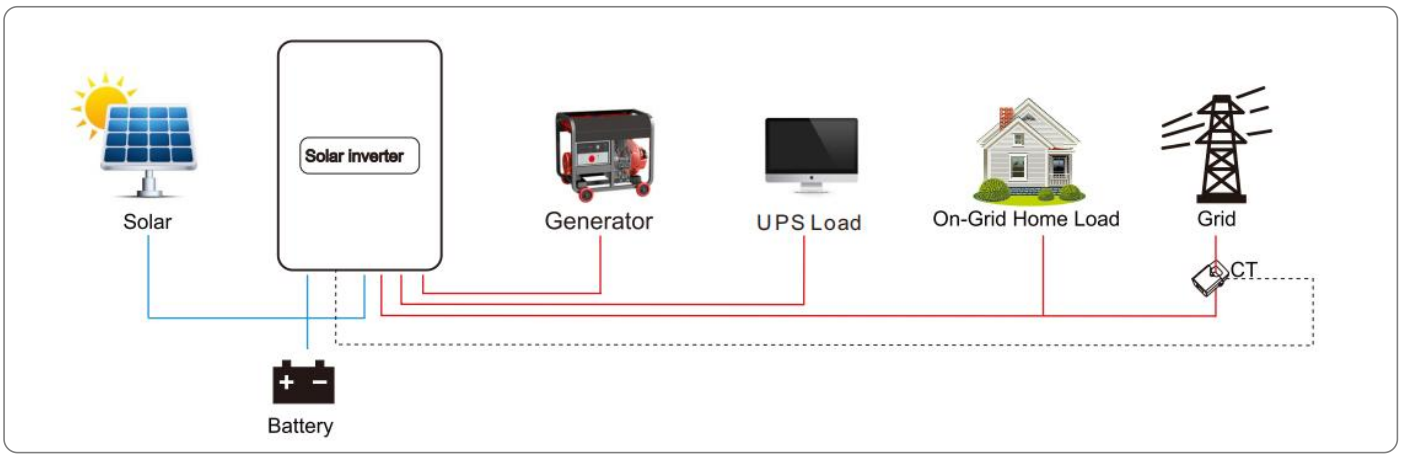
- LCD large screen dynamic flow diagram design, easy to understand the system data and operation status.
- 360° protection with complete short circuit protection, over current protection, over under voltage protection, overload protection, backfill protection, etc.
- Support CAN, USB, and RS485 communication.

2.3 System connection diagram

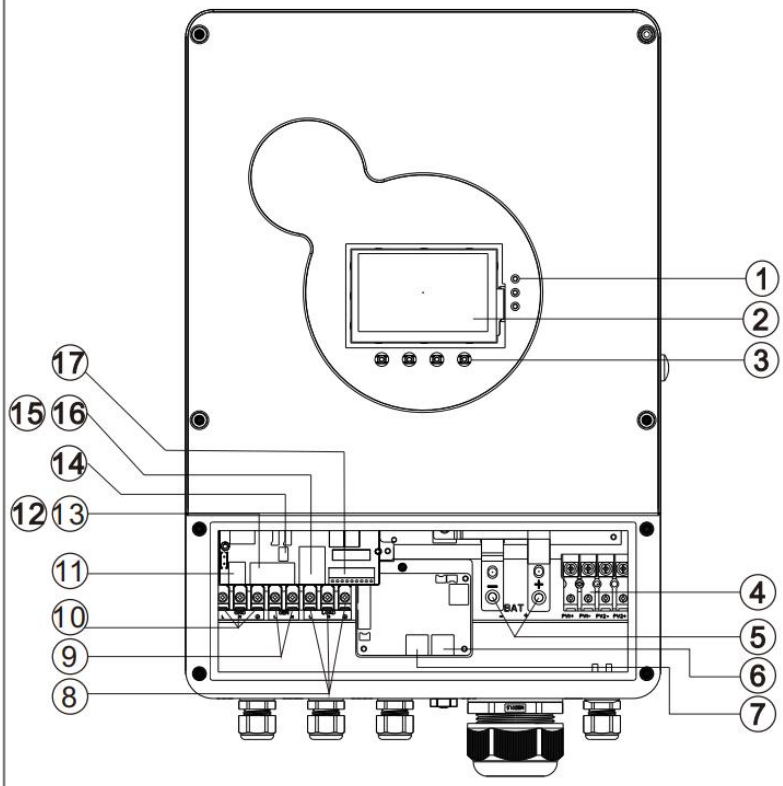
The diagram below shows the system application scenario of this product. A complete system consists of the following components:

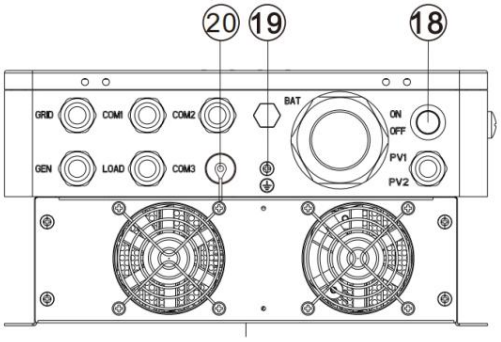
- **PV modules:** converts light energy into DC energy, which can be used to charge the battery via an inverter or directly inverted into AC power to supply the load.
- **Grid or generator:** connected to the AC input, it can supply the load and charge the battery at the same time. The system can also operate generally without the mains or generator when the battery and the PV module power the load.
- **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.
- **Home load:** Various household and office loads can be connected, including refrigerators, lamps, televisions, fans, air conditioners, and other AC loads.
- **Inverter:** The energy conversion device of the whole system.

The actual application scenario determines the specific system wiring method.



2.4 Production Overview





1	LED Indicators	11	USB-B port
2	LCD screen	12	RS485/CAN port
3	button	13	DRMS port
4	PV1/PV2 ports	14	DIP switch
5	Battery port	15	WIFI port
6	Parallel communication A port	16	USB-A port
7	Parallel communication B port	17	Dry contact
8	LOAD ports	18	ON/OFF switch
9	Generator ports	19	Grounding screw
10	Grid ports	20	WIFI port 2

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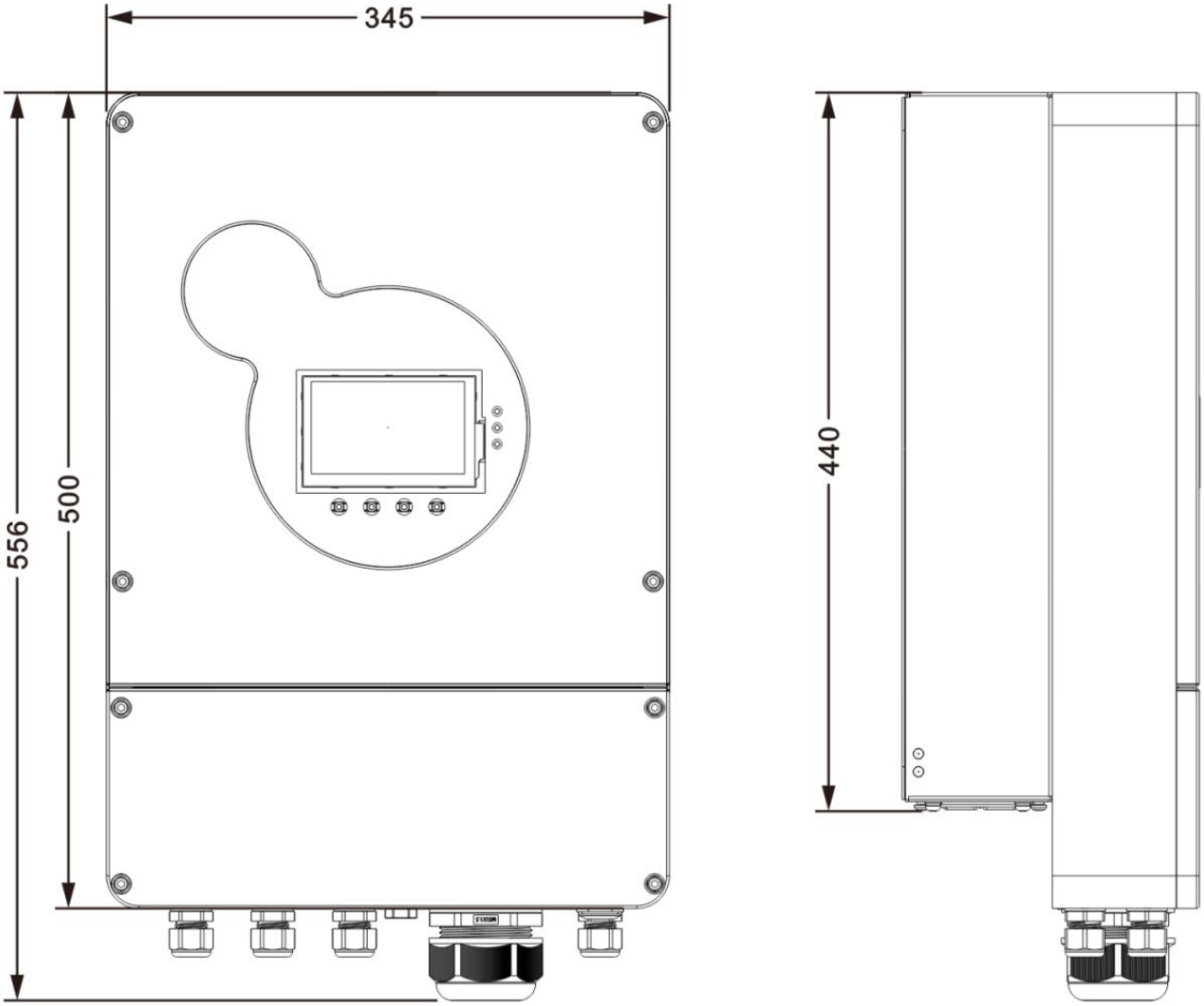
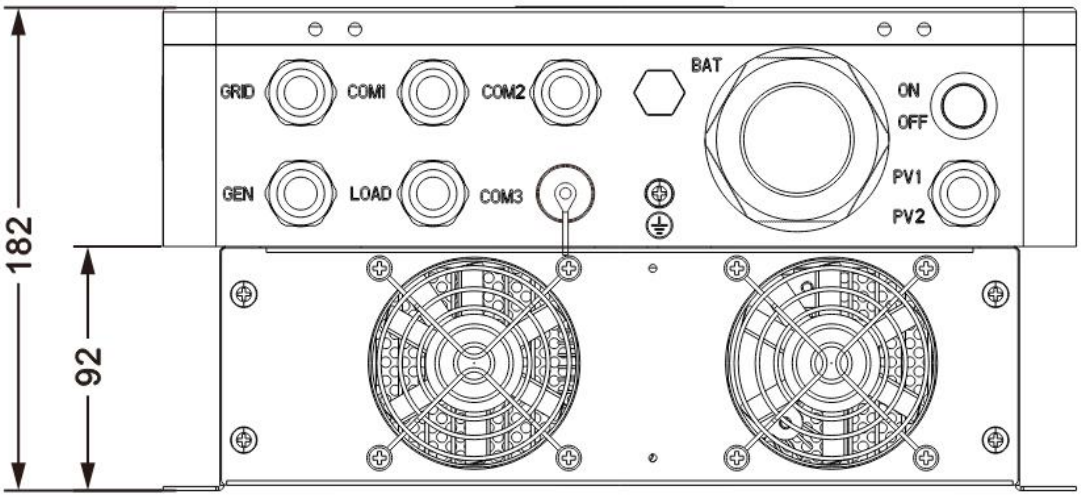
2.5 Dimension drawing





3. Installation

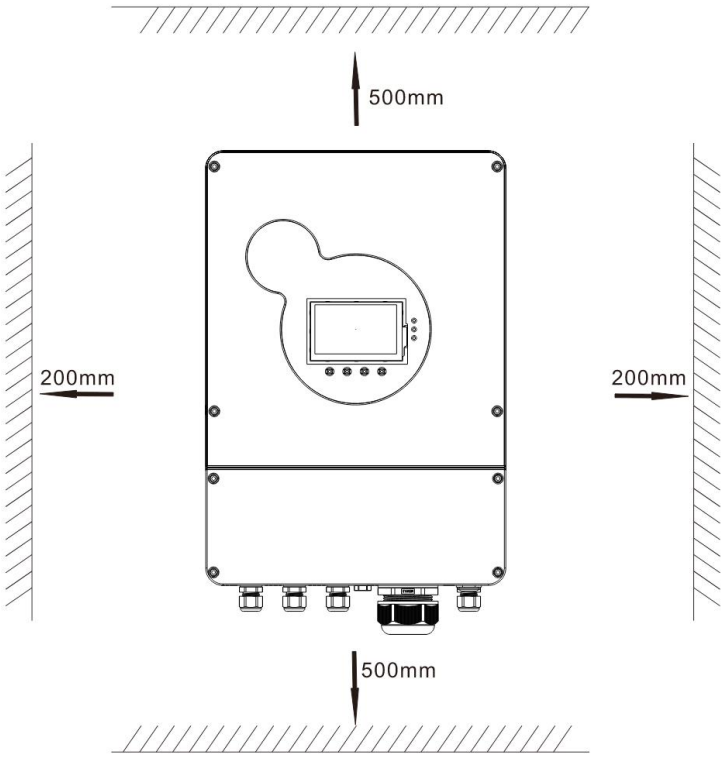
3.1 How to operate inverters safely

- Installation, maintenance, and connection of the inverter must be performed by qualified personnel with relevant certifications, complying with local electrical standards, wiring regulations, and utility requirements.
- Opening the inverter top cover is strictly prohibited. Follow this manual’ s installation instructions. Unauthorized contact or component replacement may cause personal injury and equipment damage.
- Electrostatic discharge (ESD) may damage electronic components; ESD precautions must be implemented.
- Ensure the PV array’ s output voltage does not exceed the inverter’ s maximum rated input voltage.
- Equipment protection features may be impaired if operated outside manufacturer specifications.
- After disconnection, residual electrical energy and heat may cause electric shock or burns.
- Live plugging/unplugging of AC/DC terminals during operation is prohibited.
- Output ports must not be connected to public grids.
- Individual PV strings must not be connected to multiple inverters.
- Use insulated tools during installation; live electrical work is forbidden. The inverter must be reliably grounded.

3.2 Select the mount location

HESP 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 (Allow 500mm for top and bottom and 200mm for left and right).
- The ambient temperature should be between-25~60℃ (-13~140℉) to ensure optimal operation.



⚠ DANGER

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

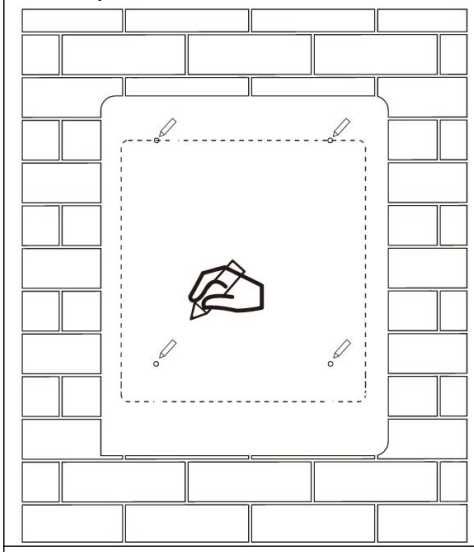
⚠ CAUTION

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

3.3 Mount the inverter

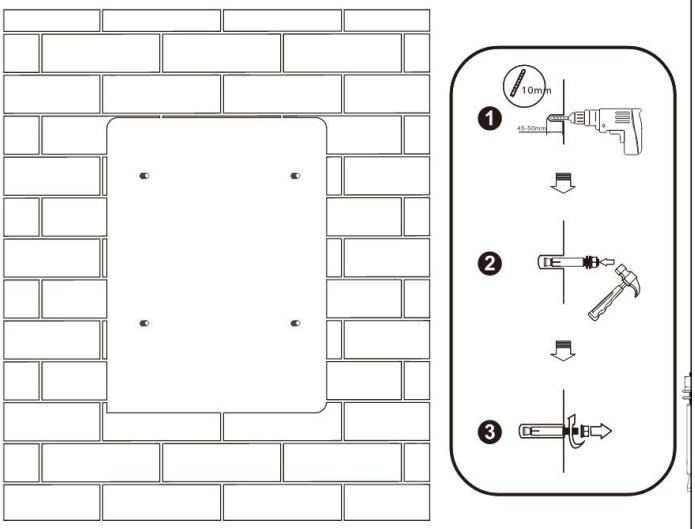
Installation Location Selection

Put the installation auxiliary board in the proper position, and mark the place where the holes need to be punched.



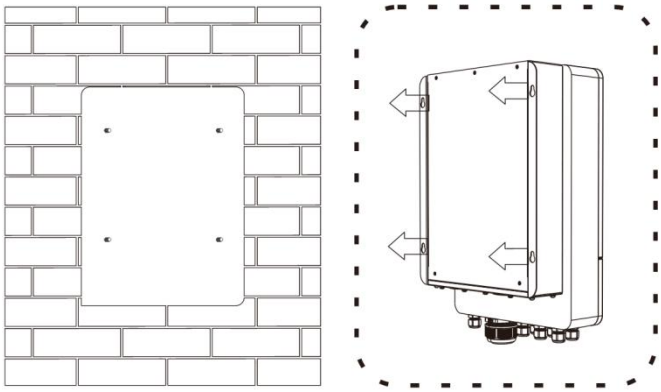
Install Expansion Bolts

Drill 4 holes, φ10-12, depth 45~50mm according to the hole location.Drive the expansion screw into the above holes and tighten the nut.



Align the hole bits

Align the four holes of the inverter to the corresponding screw positions, and then place them.

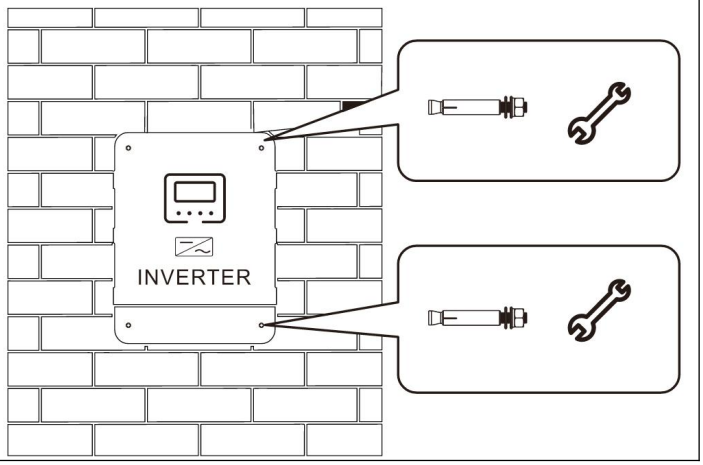


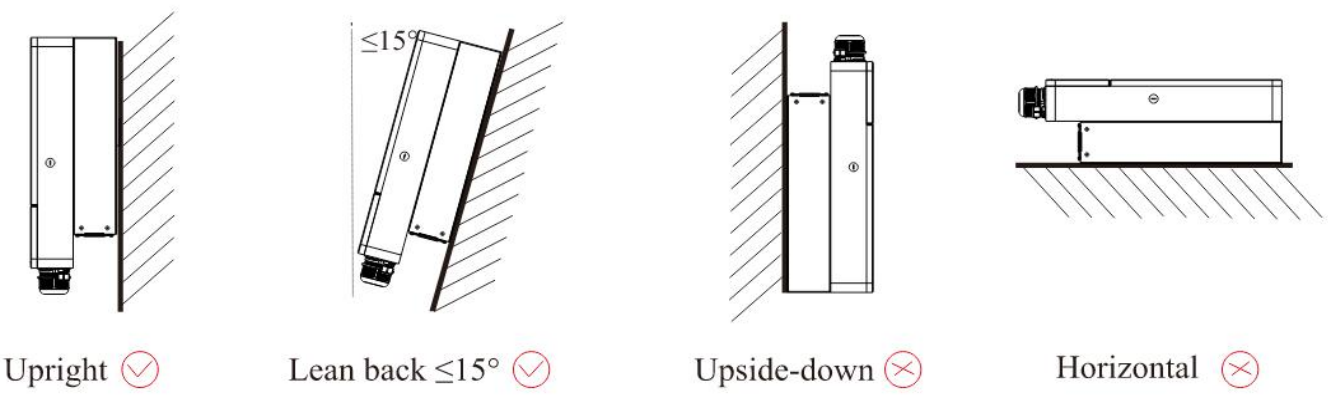
Install Inverter

Tighten the corresponding screws to ensure a firm and secure fit.

Screw size: M6*60

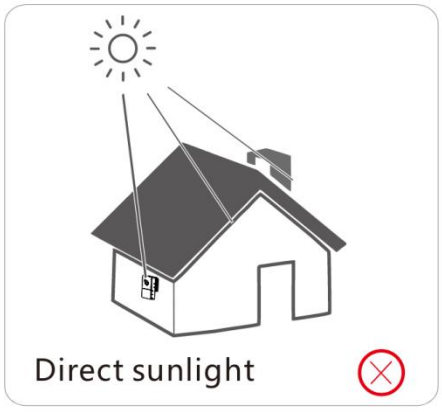
Recommended torque: 4Nm





NOTICE

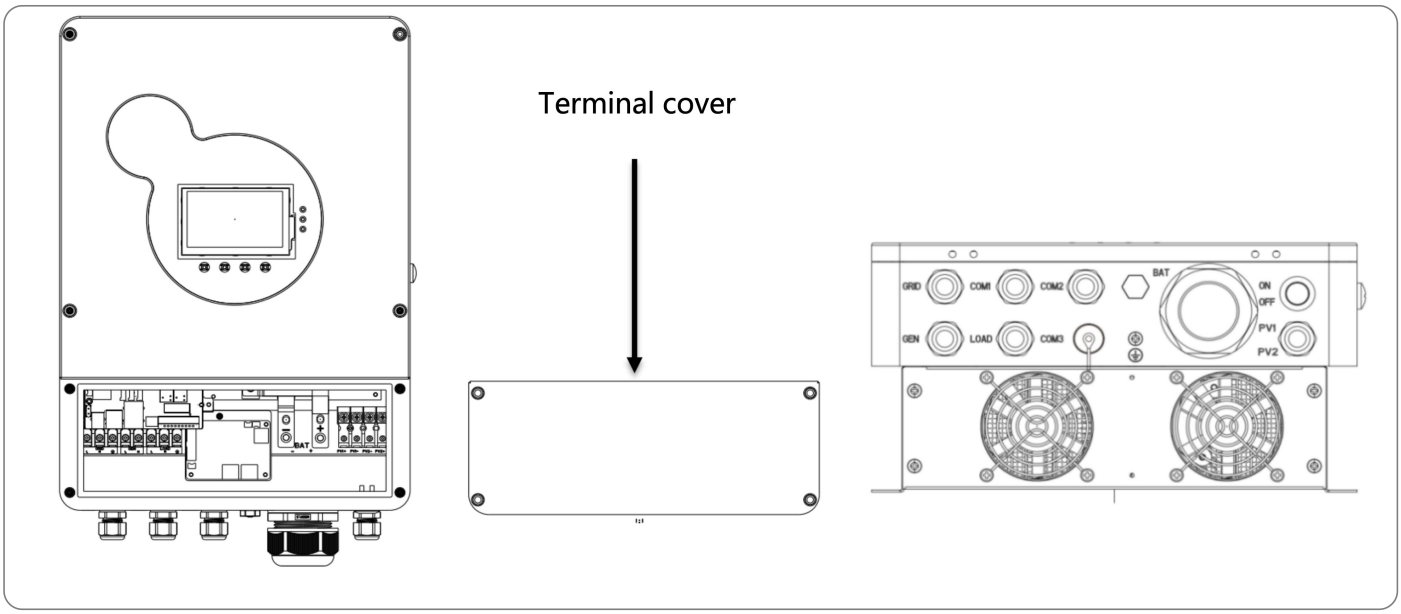
- The device can be installed indoors or outdoors.
- Please install the inverter on a flat surface.
- Avoid installation on inclined or rough surfaces.
- To ensure optimal operation and a long service life, the ambient temperature must be below 50 °C.
- The inverter must be installed in a well-ventilated environment to ensure good heat dissipation.
- The inverter must be installed in a well-ventilated environment to ensure good heat dissipation. To ensure a long service life, the inverter must not be exposed to direct sunlight, rain or snow,or snow.
- It is recommended that the inverter be installed in a sheltered area.



3.4 Remove the terminal cover & wiring

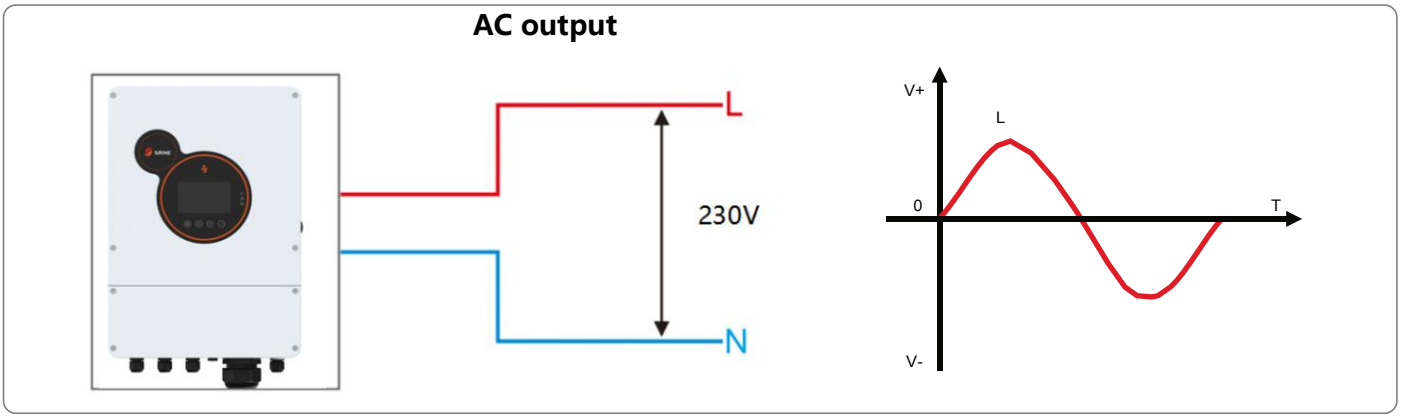
Using a screwdriver, remove the terminal protection cover and anti-insect net.

After completing the wiring, reinstall the terminal cover on the inverter. Screw size: Diameter 5 mm, length 16 mm ; Torque: 1.8 N·m.



4. Connection

4.1 Single-phase output



Items	Description
Applicable Model	HESP series S model
Output Voltage Range (L-N)	200～240Vac, 230Vac default

NOTICE

- Users can change the output phase mode and output voltage by setup menu. Please read the chapter 5.2 Setting.
- The output voltage can be set from 200V to 240V.

4.2 Cable & circuit breaker requirement

■ PV Input

Models	Cable Diameter	Max. PV Input Current	Circuit Breaker Spec
HESP4836S100-H	4mm^2/12AWG	16A/16A	2P—25A
HESP4840S100-H	4mm^2/12AWG	16A/16A	2P—25A
HESP4846S100-H	4mm^2/12AWG	16A/16A	2P—25A
HESP4850S100-H	4mm^2/12AWG	16A/16A	2P—25A
HESP4855S100-H	4mm^2/12AWG	16A/16A	2P—25A
HESP4860S100-H	4mm^2/12AWG	16A/16A	2P—25A

■ Grid

Models	Cable Diameter	Max. Input Current	Circuit Breaker Spec
HESP4836S100-H	8mm^2/8AWG	40A	2P—40A
HESP4840S100-H	8mm^2/8AWG	40A	2P—40A
HESP4846S100-H	8mm^2/8AWG	40A	2P—40A
HESP4850S100-H	8mm^2/8AWG	40A	2P—40A
HESP4855S100-H	8mm^2/8AWG	40A	2P—40A
HESP4860S100-H	8mm^2/8AWG	40A	2P—40A

■ Generator

Models	Cable Diameter	Max. Input Current	Circuit Breaker Spec
HESP4836S100-H	8mm^2/8AWG	40A	2P—40A
HESP4840S100-H	8mm^2/8AWG	40A	2P—40A
HESP4846S100-H	8mm^2/8AWG	40A	2P—40A
HESP4850S100-H	8mm^2/8AWG	40A	2P—40A
HESP4855S100-H	8mm^2/8AWG	40A	2P—40A
HESP4860S100-H	8mm^2/8AWG	40A	2P—40A

■ Battery

Models	Cable Diameter	Max. Battery Discharge Current	Max. Battery Charge Current	Circuit Breaker Spec
HESP4836S100-H	35mm^2/2AWG	100A	100A	2P-160A
HESP4840S100-H	35mm^2/2AWG	100A	100A	2P-160A
HESP4846S100-H	35mm^2/2AWG	118A	100A	2P-160A

HESP4850S100-H	35mm²/2AWG	125A	100A	2P-200A
HESP4855S100-H	35mm²/2AWG	130A	100A	2P-200A
HESP4860S100-H	35mm²/2AWG	135A	100A	2P-200A

■ Load

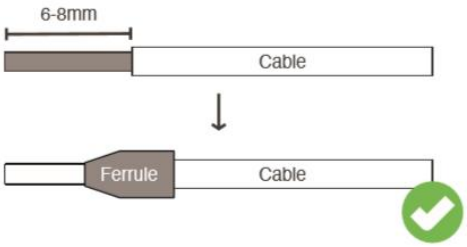
Models	Cable Diameter	Output Current	Circuit Breaker Spec
HESP4836S100-H	8mm²/8AWG	17.4A	2P-40A
HESP4840S100-H	8mm²/8AWG	17.4A	2P-40A
HESP4846S100-H	8mm²/8AWG	20A	2P-40A
HESP4850S100-H	8mm²/8AWG	24A	2P-40A
HESP4855S100-H	8mm²/8AWG	24A	2P-40A
HESP4860S100-H	8mm²/8AWG	26A	2P-40A

ⓘ *NOTICE*

■ **PV INPUT、AC INPUT、AC OUTPUT**

① Use a stripper to remove the 6~8mm insulation of the cable.

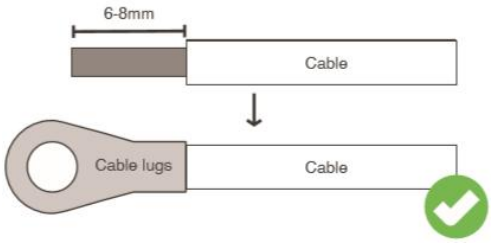
② Fixing a ferrule at the end of the cable.



■ **BATTERY**

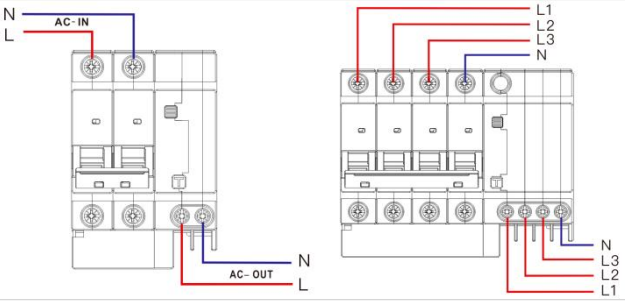
① Use a stripper to remove the 6~8mm insulation of the cable

② Fixing cable lugs that supply with the box at the end of the cable.



■ **Leakage Circuit Breaker**

GRID, LOAD, and GEN pass through this protector first before connecting to the inverter. When a leakage current fault (> 30mA) occurs, the protector will disconnect the circuit to provide protection.

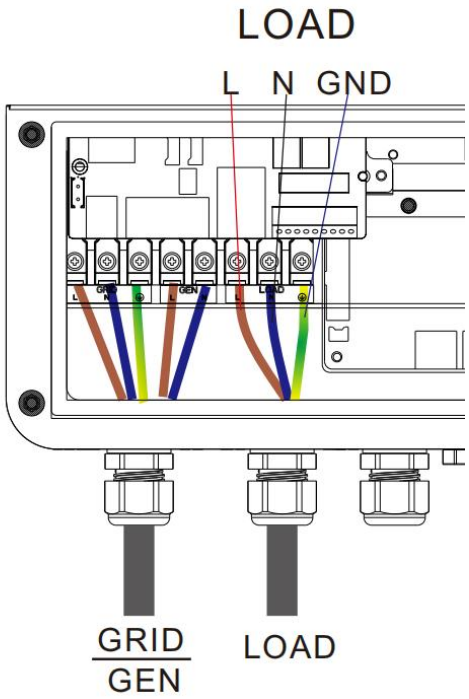


The wire diameter is for reference only. If the distance between the PV array and the inverter or between the inverter and the battery is long, using a thicker wire will reduce the voltage drop and improve the performance of the system.

Cable preparation and installation must be prepared by a registered or licensed electrician.

4.3 GRID & LOAD & GEN connection

Connect the energized conductor, neutral and grounding wires in the cable location and sequence shown in the diagram below.

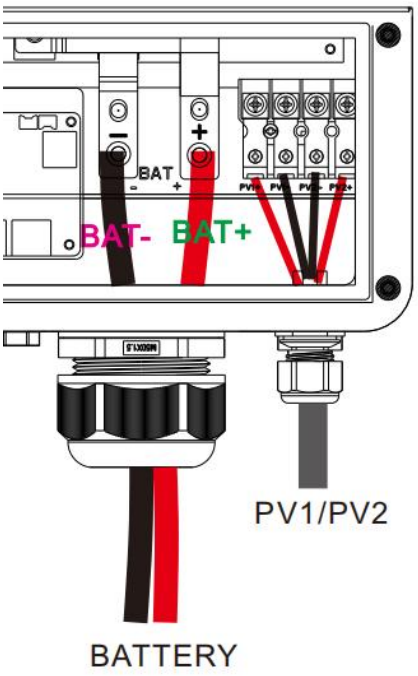


⚠ DANGER

- Before connecting AC inputs and outputs, the circuit breaker must be opened 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 cable of the battery according to the diagram below.

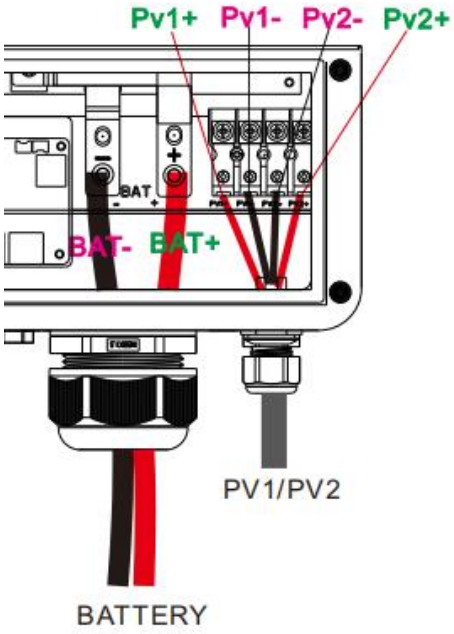


⚠ DANGER

- Before connecting battery, the circuit breaker must be opened to avoid the risk of electric shock and must not be operated with electricity.
- 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.

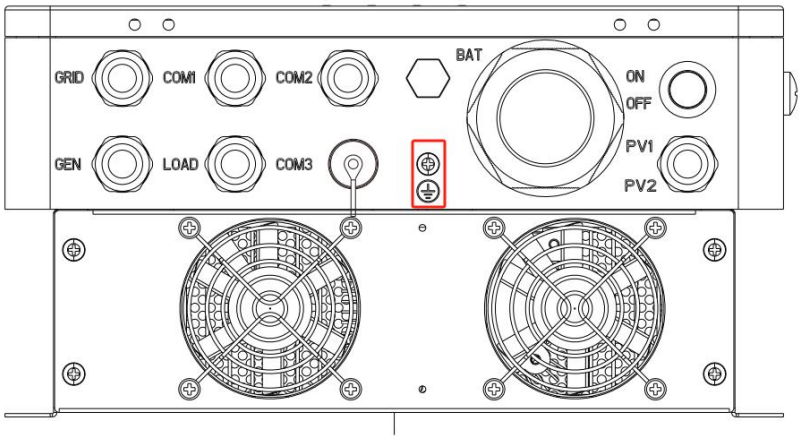


DANGER

- Before connecting PV, the circuit breaker must be opened to avoid the risk of electric shock and must not be operated with electricity.
- 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. (Torque: 1.8 N·m)



NOTICE

The grounding cable should have a diameter of no less than 4 mm² and be as close as possible to the grounding point.

4.7 Final assembly

After ensuring that the wiring is reliable and the wire sequence is correct, install the terminal protection cover in place.

- **Step 1 :** Close the circuit breaker of the battery.
- **Step 2 :** Press the rocker switch on the bottom of inverter, the screen and indicators light up to indicate that the inverter has been activated.
- **Step 3 :** Sequential close of the circuit breakers for PV, AC input and AC output.
- **Step 4 :** Start the loads one by one in order of power from small to large.

4.8 Starting and Shutting Down the Inverter

Before initiating the startup or shutdown procedures of the inverter, it is imperative to strictly follow the prescribed inspection protocol to ensure both the safety of the equipment and personnel, as well as the stability of subsequent operations.

The foremost task is to conduct a thorough inspection of the machine's wiring. Carefully verify that the types of connectors for the AC input cables, DC input cables, communication cables, and all other connections align with the specifications of the equipment. Ensure that the wiring sequence adheres strictly to the electrical schematic diagram to prevent issues such as incorrect or reverse connections. Simultaneously, inspect the tightness of each terminal to confirm that the external AC circuit breaker and the integrated DC isolator switch remain in the OFF position.

Once all of the aforementioned checks have been confirmed as correct, the inverter can be powered on. The operator must wear insulated gloves and press the "ON/OFF" control button located on the bottom panel of the unit.

It is important to note that the button features a dual-function design. The first press closes the internal contacts, initiating the inverter’ s self-check process, which, upon passing, automatically transitions into standby mode, supplying stable AC power. To turn off the inverter, simply press the "ON/OFF" button again, triggering the shutdown procedure. At this point, the contacts open, and the device enters the off state.

Throughout the entire process, the operator should continuously monitor the status indicators and the display screen. If any abnormal alarm signals arise, operations should be halted immediately to diagnose the issue. It is strictly prohibited to force the startup or repeatedly press the control button without a clear understanding of the fault cause.

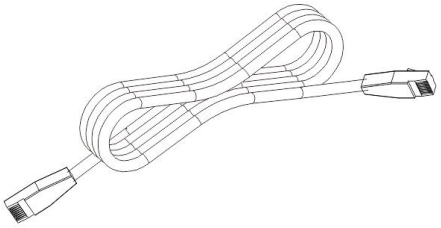
4.9 Inverter Parallel

4.9.1 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:

③ Dip switches 1 and 2 of the first and last inverters must be put down when inverters are in parallel

Dip switches	Parallel communication line*1:
	

4.9.2 Precautions for connecting the parallel connecting lines

Warning:

1. **PV connection:**
   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 8Pin 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 8Pin 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 check the following system wiring diagrams in detail to ensure that all wiring is correct and reliable before powering on.

7. After the system is 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.

4.9.3 Schematic diagram of parallel connection in three phase

① The parallel communication line and current sharing detection line of the solar storage inverter need to be locked with screws after connecting.

② In case of parallel operation with multiple inverters, the schematic diagram of parallel connection is as follows:

Parallel Operation in three phase :

All inverters in P1 must be set as 【three phase A】

All inverters in P2 must be set as 【three phase B】

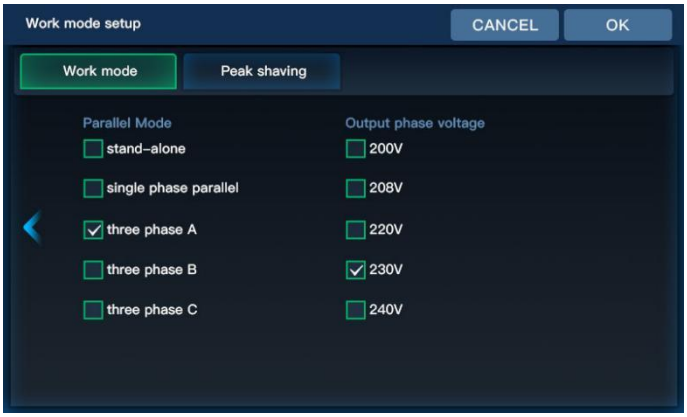
All inverters in P3 must be set as 【three phase C】

When the output phase voltage is 230Vac

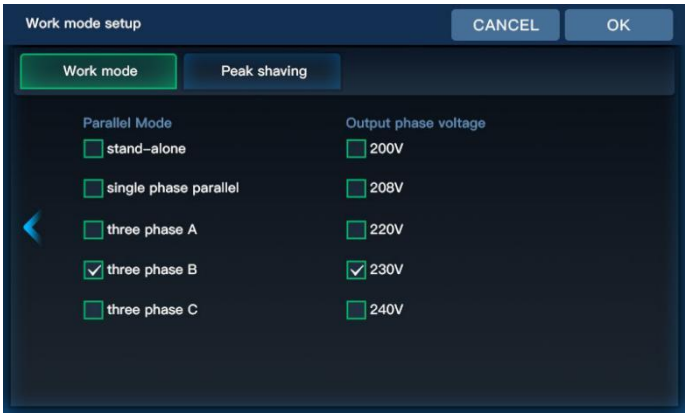
At present the line voltage between the live wire L1 in phase 1 and the live wire L2 in phase 2 is

230*1.732 = 398Vac, and similarly the line voltage.

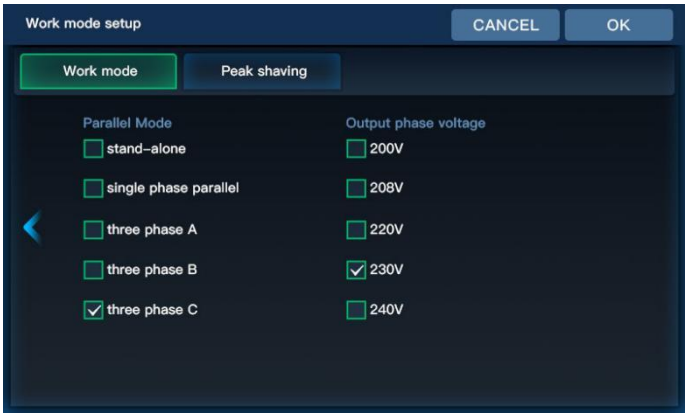
P1 inverters setting



P2 inverters setting

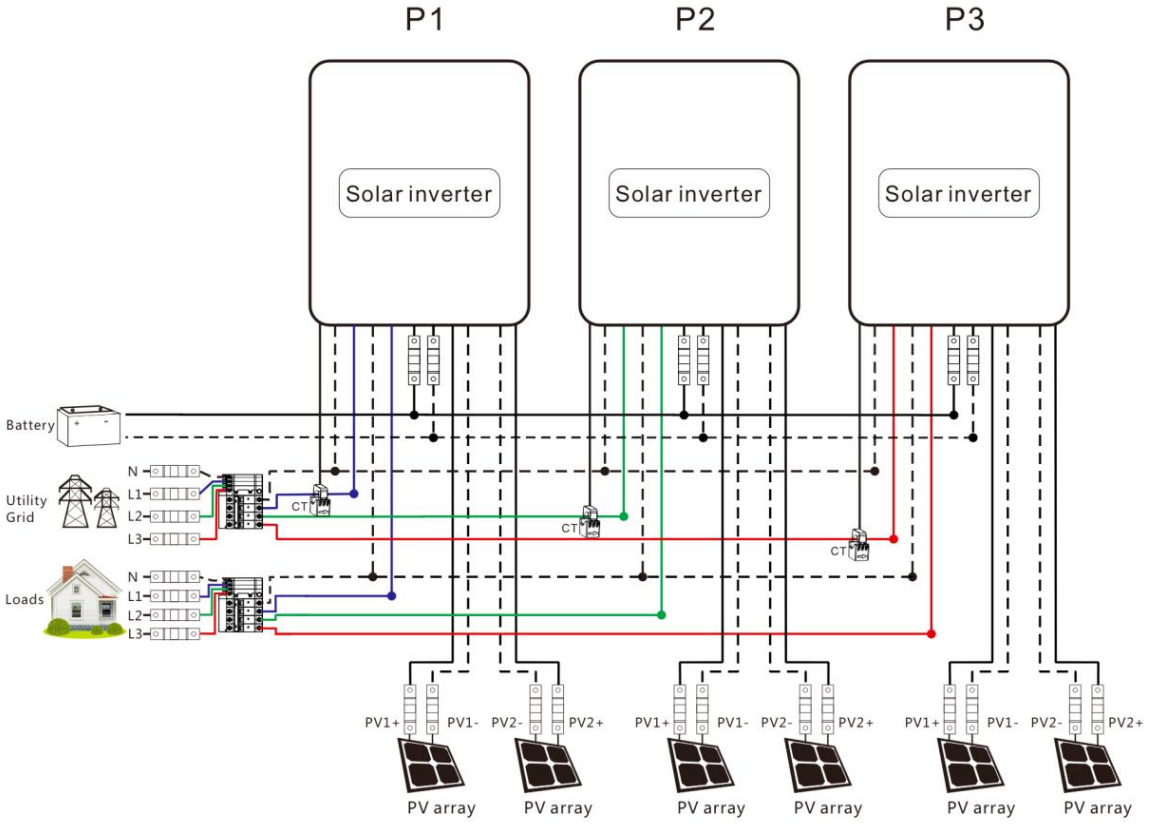


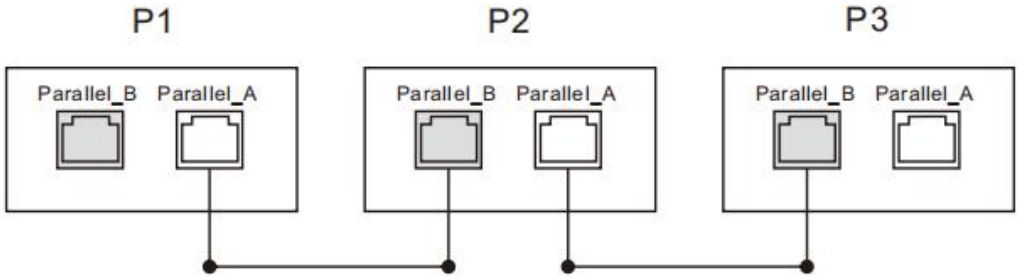
P3 inverters setting



a) Three units connected in three phase:

1+1+1 system:





Note:

① Before starting up and running, please check whether the connection was correct to avoid any abnormalities in the system.

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 phase 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.

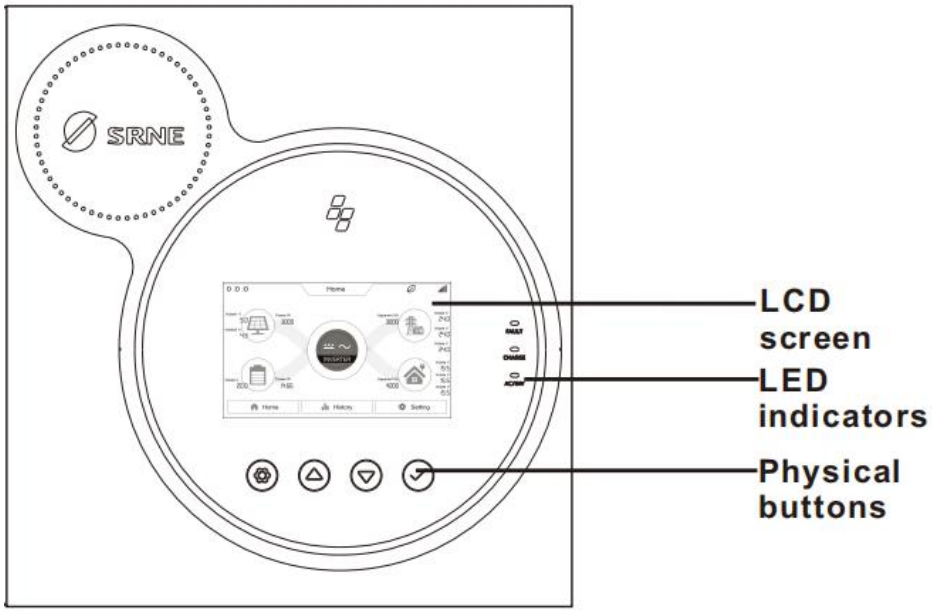
⑤ The machine is factory-set to single-machine mode by default. If you want to use the three-phase function, you need to set the "Working Mode" parameter on the screen. The setup method is as follows: Turn on the power of each machine one by one, keeping the others turned off. Then, set the "Three-Phase Phase" according to the on-site system operating mode. After successfully setting up this machine, turn off the machine switch and wait for the machine to completely power down. Then, set up the remaining machines one by one until all machines are set up. Finally, restart all machines simultaneously and enter working mode.

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, 3 indicators, 4 physical buttons.



■ Buttons

Buttons	Description
	To enter/exit the setting menu
	To last selection
	To next selection
	To confirm/enter the selection in setting menu

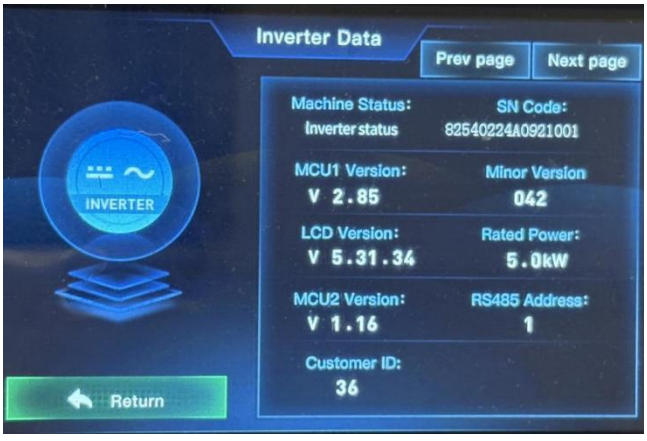
■ LED Indicators

Indicators	Color	Description
FAULT	Red	Flash: error occur
CHARGE	Yellow	Continued: charging complete
		Flash: charging
AC/INV	Green	Continued: utility grid by-pass output
		Flash: inverter output

■ Display screen

Icon	Description	Icon	Description
	Solar panel		Load
	Battery		Grid
Home	Home page		Inverter is Working
History	History data	Setting	Setting
0 :0 :0	Local time		The buzzer is slient
	Indicates that the machine is currently in energy-saving mode.		The enery direction
UPS	UPS load (connected to inverter load port)	**HOME**	HOME load (connected to grid port)
	Smart Load		Generator port

■ Inverter Data



Simply tap the inverter status icon on the home screen to access the "Inverter Firmware Version" interface.

Parameter Meaning	Description
Machine Status	Inverter status
MCU1 Version	V 2.85
LCD Version	V 5.31.34
MCU2 Version	V 1.16
Minor Version	042
Rated Power	5.0kW

■ 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.	**Item**	**No.**	**Item**
1	Machine state	9	SN code
2	MCU1 version	10	Min. version number
3	LCD version	11	Rated power
4	MCU2 version	12	RS485 address
5	Outside temperature	13	Transformer temperature
6	PV temperature	14	Inverter temperature
7	Inverter voltage	15	Inverter current
8	Customer ID	16	Total busbar voltage
Battery data			
1	SOH	6	Discharge current
2	SOC (Percentage of remaining battery capacity)	7	BMS protocol
3	Battery voltage	8	Battery type
4	Charge current	9	Battery charge status
5	Battery power (Battery charging and discharging power)		
Grid data			
1	Voltage	5	Current
2	Active power	6	Apparent power
3	Frequency	7	Mains charging current

4	CT power	8	
Load data			
1	Voltage	5	Current
2	UPS load active power	6	UPS load apparent power
3	Frequency	7	Load rate
PV data			
1	PV1 voltage	5	PV2 current
2	PV1 current	6	PV2 power
3	PV1 power	7	PV total power
4	PV2 voltage		

Click on the history button in the menu bar below to access the historical data and view various types of historical data.

Today data			
1	Battery charging energy	6	Load consumption energy from grid
2	Battery discharging energy	7	On grid energy
3	Solar generated energy	8	Gen discharging capacity
4	Load consumption energy	9	Gen charging capacity
5	Grid charging energy	10	Home load consumption energy
History			
1	PV generation last seven days history	4	Mains charge eneryfor last 7 days
2	Battery charging enery for last 7 days	5	Load consumption eneryfor last 7 days
3	Battery discharge for last 7 days	6	Load consumption from the grid for last 7 days
Energy Statistics			
1	Total battery charging energy	6	Total on grid energy
2	Total solar generated energy	7	Total load consumption energy from grid
3	Total battery disharging energy	8	Total gen discharging capacity
4	Total load consumption energy	9	Total gen charging capacity
5	Total mains charging energy	10	Total home load consumption energy

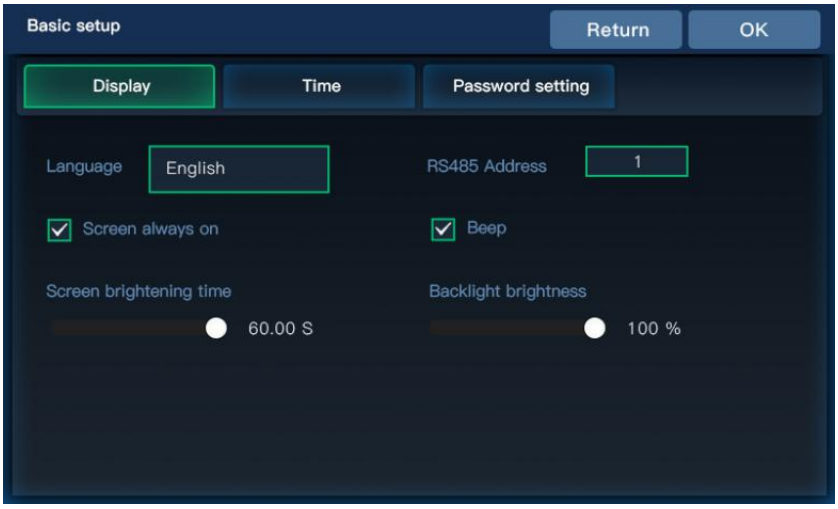
5.2 Setting

Operating 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.

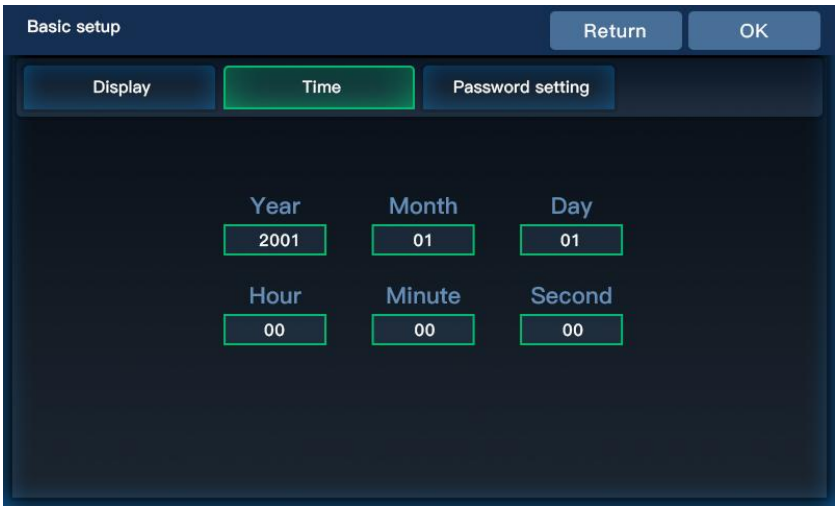
5.2.1 Basic Setup

5.2.1.1 Display Setup



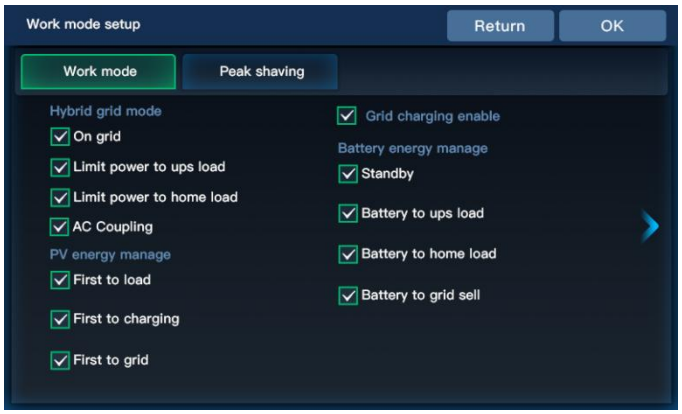
Parameter Meaning	Description
Language	English, Italia, Deutschland, Espana, Chinese,Polski
RS485 Address	This refers to the RS485 address of the inverter. For a single unit, the adjustable range is 1~254, and for parallel units, it is 1~ 6
Screen always on	Selectable whether the screen is always on or not
Beep	You can choice whether enable the Beep alarm
Screen brightening time	Setting range 0～60 seconds.
Backlight brightness	0~100%

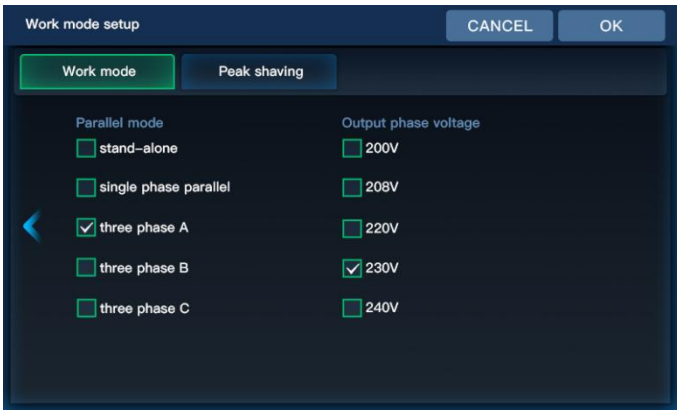
5.2.1.2 Time Setup



5.2.2 Work Mode Setup

5.2.2.1 Work Mode





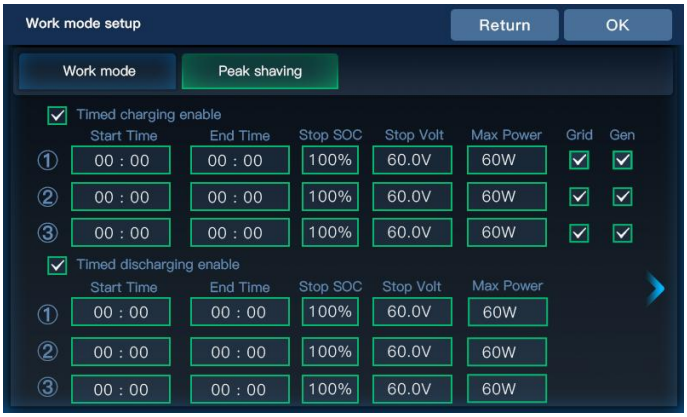
Home Load: connected to the GRID port of the machine, requires external CT for monitoring.

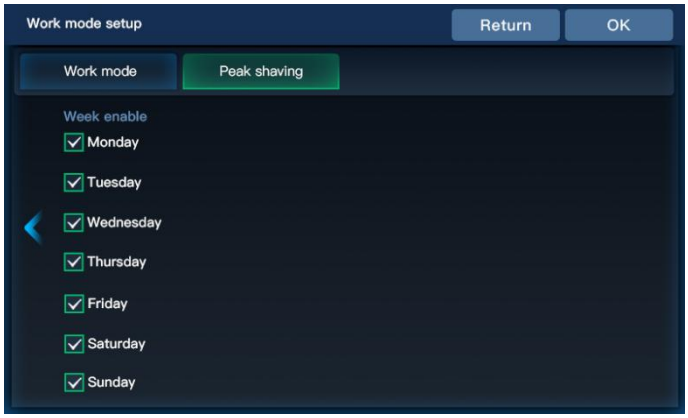
UPS Load: connected to the LOAD port of the machine.

Parameter Meaning	Option	Description
Hybrid grid mode	On grid	Direct grid connection of excess PV energy
	Limit Power to UPS load	UPS load backflow prevention, photovoltaic or battery energy is only for the UPS load, excess energy will not be connected to the grid
	Limit Power to home load	Backflow prevention for household loads, with solar or battery energy supplied to UPS loads, smart loads and household loads, with no excess energy connected to the grid.
	AC Coupling	Connect the grid-connected inverter to the grid side of the hybrid inverter, which uses the grid-connected energy from the grid-connected inverter for supplying power or charging.
PV energy manage	When mixed 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 mixed 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
Grid charging enable	Selectable grid participation in battery charging	
Battery energy manage	Standby	The battery does not discharge, and 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 UPS load, Smart load and Home load.
	Battery to grid sell	The battery can supply the power to grid.
Parallel mode	Stand-alone	
	Three Phase A	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
	Three Phase B	
	Three Phase C	
Output phase voltage	Settable： 200V,208V,220V,230V,240V	

5.2.2.2 Peak Shaving



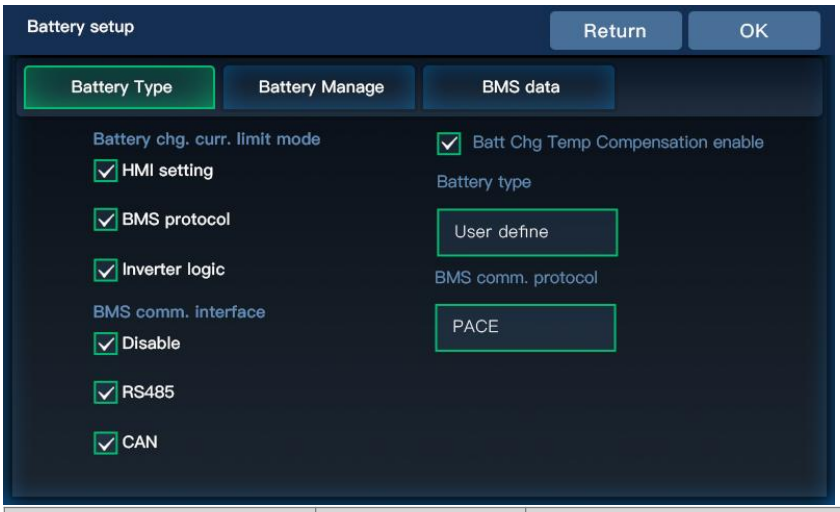


Parameter Meaning	Description
Time charging/ discharging enable	Select whether to turn on timed charging and discharging.
Start/End Time	Setting the time period for timed charging and discharging.
Stop SOC	Setting the battery charging cut-off SOC value and the cut-off SOC value for discharging during 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.
Grid	When setting the timed charge, select the grid to charge the battery.
Gen	When setting the timed charge, select the generator to charge the battery.
Week enable	Sets the day of the week for timed charging/discharging (effective only for time-sharing charging/discharging).

5.2.3 Battery Setup

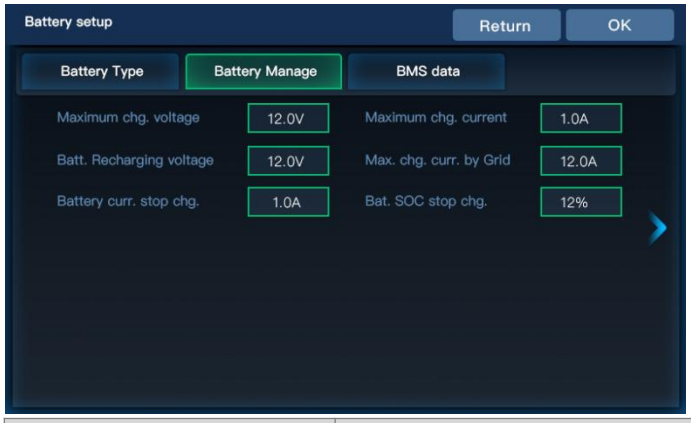
5.2.3.1 Battery Type



Parameter Meaning	Option	Description
Battery chg. curr. limit mode	HMI setting	Maximum battery charging current is limited according to the inverter battery charging current setting value.
	BMS protocol	Maximum battery charging current is limited by the current limit value of the BMS.
	Inverter logic	Maximum battery charging current is limited by the machine's derating logic.
BMS comm. interface	Disable	BMS does not communicate
	RS485	BMS RS485 communication function
	CAN	BMS CAN communication function
Batt Chg Temp Compensation enable	Select whether to turn on temperature compensation	
Battery Type	USER define	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	$LiFePO_4$ /14/15/16, corresponding to $LiFePO_4$ 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
BMS comm. protocol	When the BMS port selection setting item = 485 or CAN, you need to select the corresponding lithium battery manufacturer brand for communication: 485 protocol: 1: PACE-PACEEX 2: RUDA-Ritar 3: AOGUAN-=ALLGRAND BATTERY	

	4 : OULITE-OLITER 5 : CEF-CHANGFENG TECNOLOGY 6 : XINWANGDA -SUNWODA 7: DAQIN -DAKING 8 : WOW-SRNE 9: PYL-PYLONTECH 10 : MIT-FOXESS 11: XIX-XYE 12: POL-POWERMR 13: GUOX-Gotion 14: SMK-SMK 15: VOL-WEILAN CAN protocol: 16: UZE-YUZE

5.2.3.2 Battery Manage



Parameter Meaning	Description
Maximum chg. voltage	When the battery is charging, the voltage reaches the value to enter the float state or stop charging.
Batt. Recharging voltage	When the battery is fully charged, the inverter stops charging and resumes charging when the battery voltage falls below this voltage value.
Battery curr. stop chg.	When the charging current falls below this setting, the battery will stop charge.
Maximum chg. current	Setting the amount of current when charging the battery
Max. chg. curr. by Grid	When using mains charging, set the size of the battery mains charging current (the value is the battery current)
Bat.SOC stop chg.	Charging will stop when the SOC value reaches this set point (effective when BMS communication is normal).
Batt volt. stop dischg.	The battery will stop discharging when it reaches this setting value in the mixed grid state (when there is grid access).
Batt volt. restart dischg.	When the battery voltage is too low to discharge, the battery voltage needs to reach this setting to discharge again.
Battery under volt. alarm	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.
Batt volt low recovery	When the battery report voltage low fault, the battery voltage reach this setting, the fault will be cleard.
Batt voltage low fault	When in the off-grid state, the inverter will shut down due to the low voltage of the battery; when in the hybrid grid state, the battery will stop outputting due to low voltage.
Battery max. curr. dischg.	Set the max battery discharger current
Batt. SOC stop dischg.	In the hybrid grid state, the battery will stop discharging when the State of Charge (SOC) is lower than this set value. In the off-grid state, the battery will continue to discharge when the SOC is lower than this set value.
Batt. SOC restart dischg.	When the battery report SOC low fault, the battery SOC reach this setting, it can restart discharge(valid when BMS communication is normal).
Batt under capacity alarm	SOC value up to this setting will alarm. 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)
Batt. SOC low fault	When the State of Charge (SOC) of the battery reaches this set value, the inverter will report a low battery SOC fault and stop discharging (this is valid when the Battery Management System (BMS) communication is normal).

Batt. Volt. low fault delay	When the battery voltage reaches the "Batt voltage low fault" setting, the battery will stop diacharging with a delay.

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

5.2.4.1 Basic

Parameter Meaning	Description
Grid Standard	Italy: CEI 021
	Germany: VDE-ARN-4105

	Europel: EN50549-1
	Spain: UNE217002
	Great Britain: G99
	South Africa: NRS-097
	Other regions: GNL
	Australia: AS4777.2 Australia A
	Australia: AS4777.2 Australia B
	Australia: AS4777.2 Australia C
	Australia: AS4777.2 Australia Newzealand
	Poland: EN 50549-1
	Northern Ireland: G98/NI
	Great Britain: G98
	Northern Ireland: G99/NI
	Ireland: EN50549-IE
	MYANMAR
	Thailand: PEA-MEA
Grid Frequency	Selection of local grid frequency , 50Hz/60Hz
Sell Power Max	Setting the maximum grid-connected power
External CT ratio	When connecting an external CT, enter the ratio on the CT specification.
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 of reactive power percentage: 0% to 100%
Reactive power over excited	Over indicates 0%~100%
Reactive powerunder excited	Under indicates -100%~0%
On Grid PF	Setting range 0.8~1
Power factor over excited	Over indicates 0.8~1
Power factor under excited	Under indicates -0.8 ~- 1

Note: Regional settings and power quality adjustments cannot be made through the SOLARMAN application; these settings can only be configured via the inverter's LCD screen.

5.2.4.2 Enter Service (This setting cannot be changed by customers)

Note:

Australia: AS4777.2 Australia A/B

Newzealand

Note:

Australia: AS4777.2 Australia C

Newzealand

Parameter Meaning	Description
Connect Voltage Low	Grid-connected low voltage protection voltage
Connect Voltage High	Grid-connected high-voltage protection voltage
Normal connect delay time	Grid normal connection, grid connection delay time
Reconnect delay time	Grid down reconnection, grid connection delay time
Connect Frequency Low	Grid-connected low-frequency protection points
Connect Frequency High	Grid-connected high-frequency protection points
Normal connect Power Ramp Rate	Normal grid connection, rate of rise of grid-connected power
Reconnect Power Ramp Rate	Grid disconnection and reconnection, rate of rise of grid-connected power

5.2.4.3 Grid Protection (This setting cannot be changed by customers)

Note:

Australia: AS4777.2 Australia A/B

Note:

Australia: AS4777.2 Australia C

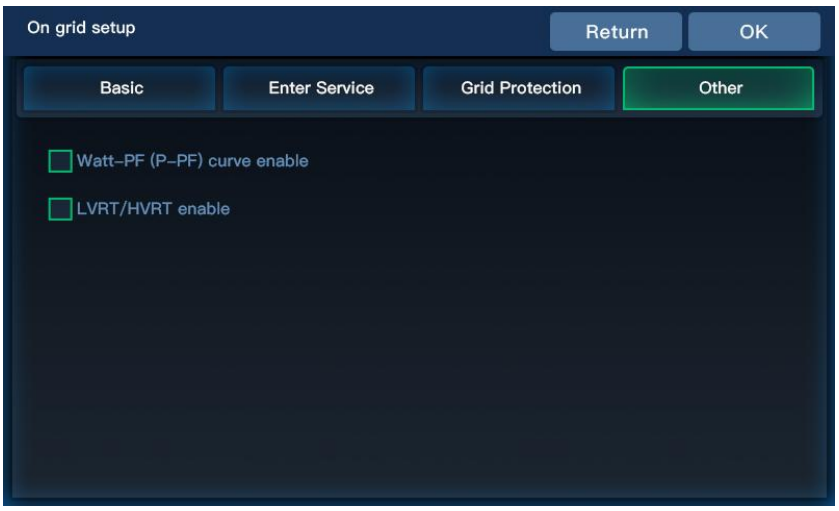
Note:

Australia: AS4777.2 Australia Newzealand

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

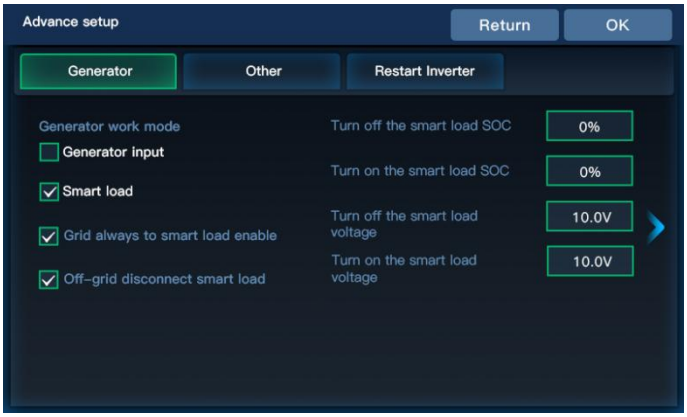
5.2.4.4 Other

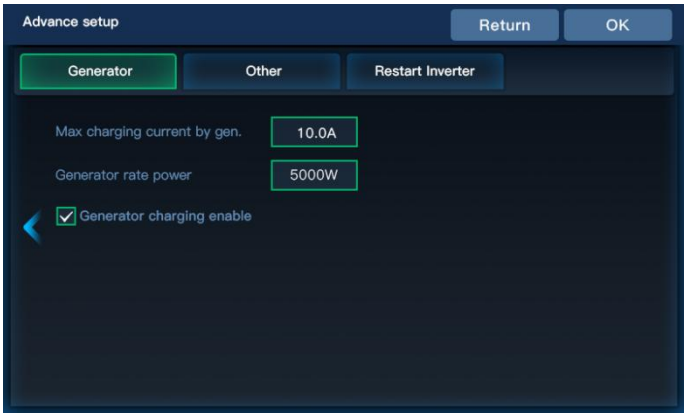


Parameter Meaning	Description
Watt-PF (P-PF) curve enable	Adjustment of the power factor of the inverter according to the set active power
LVRT/HVRT enable	Adjustment of grid HV ride-through / LV ride-through values

5.2.5 Advance Setup

5.2.5.1 Generator





Parameter Meaning	Description	
Generator work mode	Generator Input	When the generator is connected to the “Gen port”, select the generator input.
	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.
	Off-grid disconnect smart load	Whether or not to enable the Off-grid Disconnect Smart Load function.

Turn off the smart load SOC Turn on the smart load SOC	Set the State of Charge (SOC) of the battery to turn the intelligent load on or off.
Turn off the smart load voltage Turn on the smart load voltage	Set the battery voltage to turn the intelligent load on or off.
Max charging current by gen.	Maximum battery charging current during generator charging
Generator rate power	Setting the power of the generator up to the rated power of the inverter
Generator charging enable	Setting whether the generator is charged or not

5.2.5.2 Other

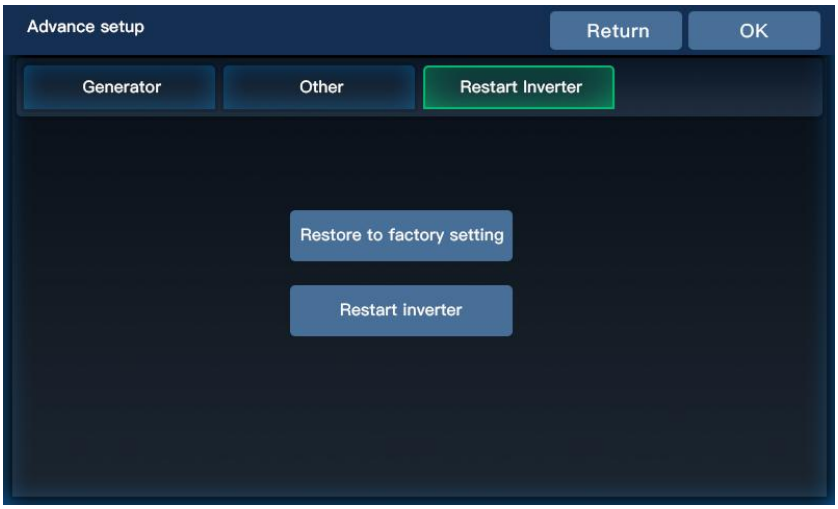
Ground Fault Interface Display Diagram

Parameter Meaning	Description
PE-N connect enable	Enable automatic switching of Neutral connections
PV Riso check enable	Enable PV insulation impedance detection When the PV is connected, the system will detect a ground fault. If the grounding impedance does not meet the required standard, the device will flash a red light and emit a buzzer alarm. After the device is powered on, it performs a ground impedance check every 10 minutes. If the impedance fails to meet the standard three consecutive times, the alarm will persist continuously. At this point, the fault must be manually resolved and the machine restarted. If necessary, please contact the manufacturer or authorized distributor for assistance.
Leakage curr. protection enable	Enable leakage current protection
Power saveing 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.
BMS comm. error stop	Inverter stops output when BMS communication error occurs.
CT manual setting	Select the direction of the CT according to the installation of the CT.
Electric meter options	Whether to enable single-phase meter.

Smart meter connection point	Select on-grid inverter side or grid side according to meter installation location.

NOTE: The SOLARMAN application supports displaying alert messages and push notifications. Settings are as follows: :
(1) Push Notification: If you select to click【Push Notification】, you can jump to the corresponding page to turn on or off the mobile phone reminder message, so as to facilitate the acquisition of relevant plant reminder information or shielding.
(2) Alert Message: If you select【Alert Message】, you can jump to the corresponding page to set the alert message of the current account, including accepting the Alert Message, Alert Range Settings and Alert Frequency Settings.

5.2.5.3 Restart

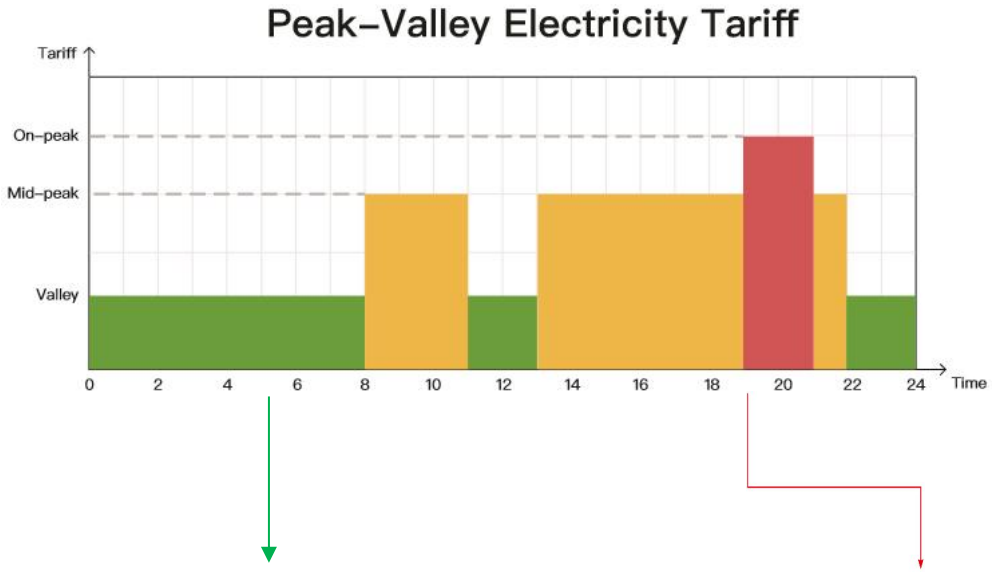


Parameter Meaning	Description
Restore to factory setting	Reset all inverter settings
Restart inverter	Restart the inverter

5.3 Time-slot charging/discharging function

The HESP 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. Below are examples for users to understand the function.



Time-slot Utility Charging/Supplying Power Function	Time-slot Battery Disacharging Function
	
With 3 definable periods, the user can freely set the mains charging/supplying power time within the range of 00:00 to 23:59. During the time period set by the user, if PV energy is available, PV energy will be used first, and if PV energy is not available or insufficient, utility energy will be used as a supplement.	With 3 definable time periods, users can freely set the battery discharge time within the range of 00:00 to 23:59. During the time set by the user, the inverter will give priority to the battery inverter to carry the load, and if the battery power is insufficient, the inverter will automatically switch to mains power

	to ensure stable operation of the load.

5.4 Battery Parameter

● Lead-acid battery

Battery type / Parameters	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	57.6V	56.8V	57.6V	40～60V	√
Undervoltage alarm voltage([01] fault)	44V	44V	44V	40～60V	√
Undervoltage alarm voltage recovery point([01] fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage([04] fault)	42V	42V	42V	40～60V	√
Low voltage disconnection voltage recovery point ([04] fault)(setup item [35])	52V	52V	52V	52V	√
Discharge limit voltage	-	-	-	40～60V	√
Over-discharge delay time	5s	5s	5s	1～30s	√
Boost charge duration	-	-	-	10～600 minutes	√

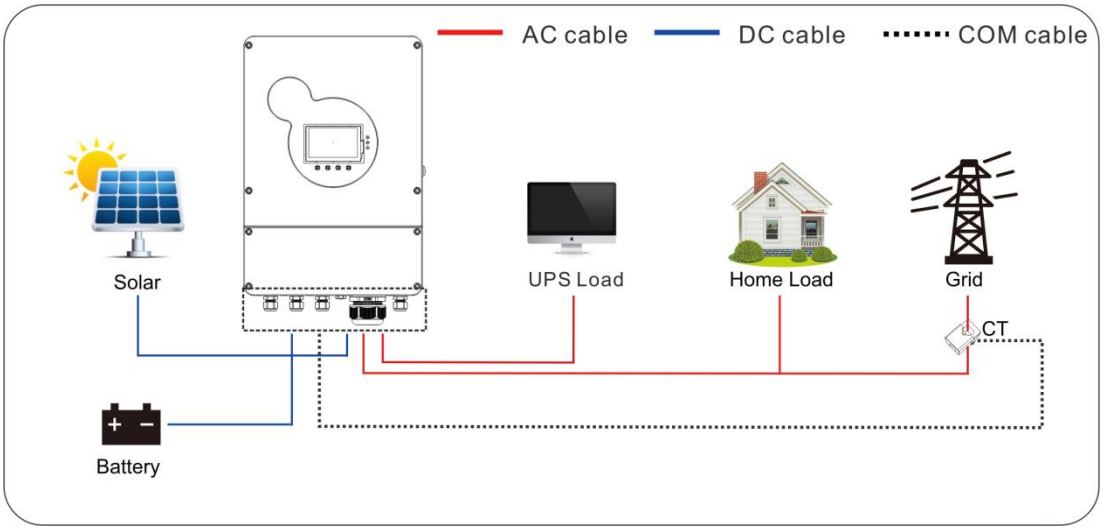
● Li-ion battery

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	43.6V	46.8V	49.6V	46.4V	43.2V	√

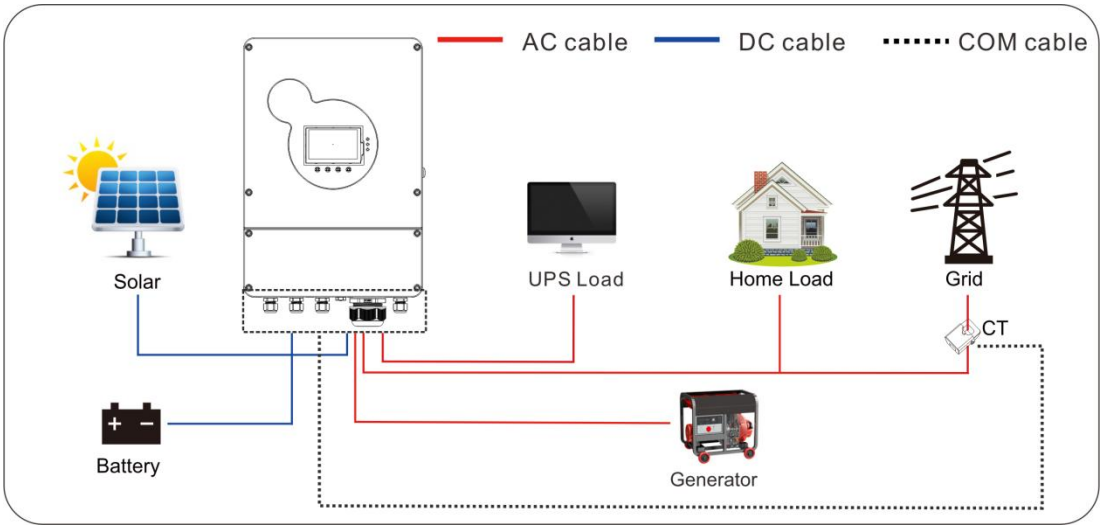
voltage([01] fault)						
Undervoltage alarm voltage recovery point ([01] fault)	Undervoltage alarm voltage+0.8V					
Low voltage disconnection voltage ([04] fault)	38.8V	42V	48.8V	45.6V	42V	√
Low voltage disconnection voltage recovery point ([04] fault) (setup item [35])	46V	49.6V	52.8V	49.6V	46V	√
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	√

5.5 Connection Mode

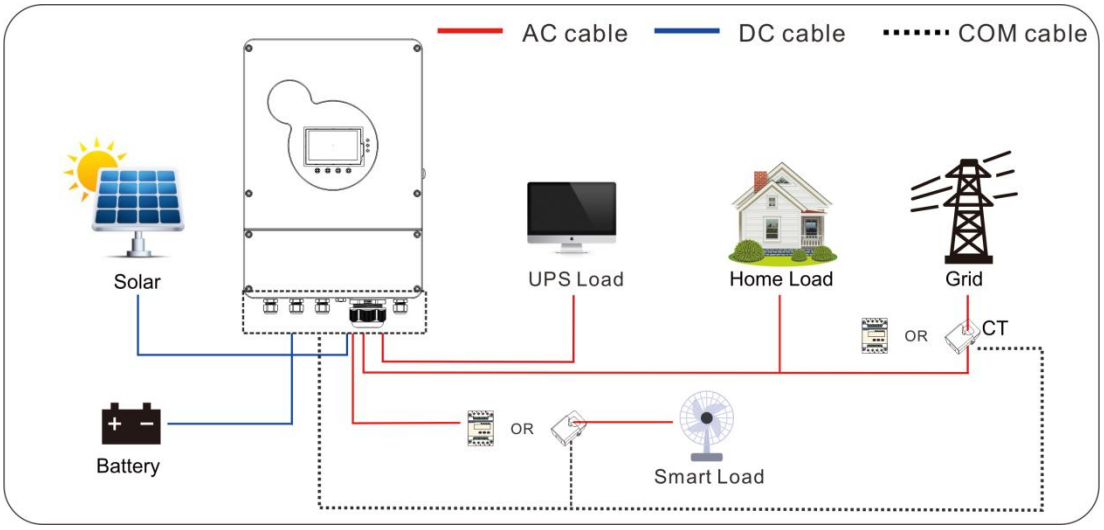
1. Basic



2. With generator

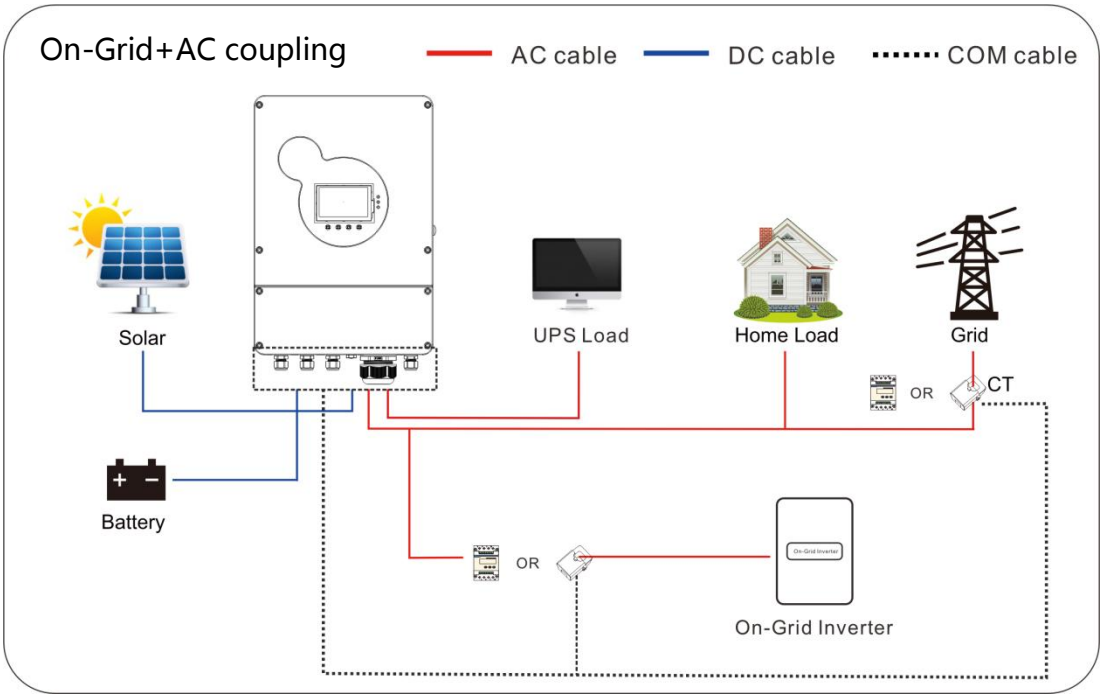


3. With smart load



4. AC Coupling

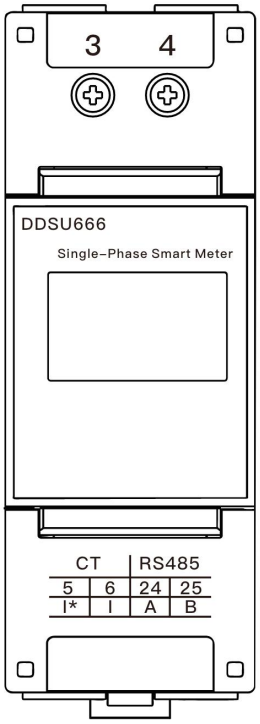
Smart Load Mode and AC Coupling Mode cannot be used at the same time.



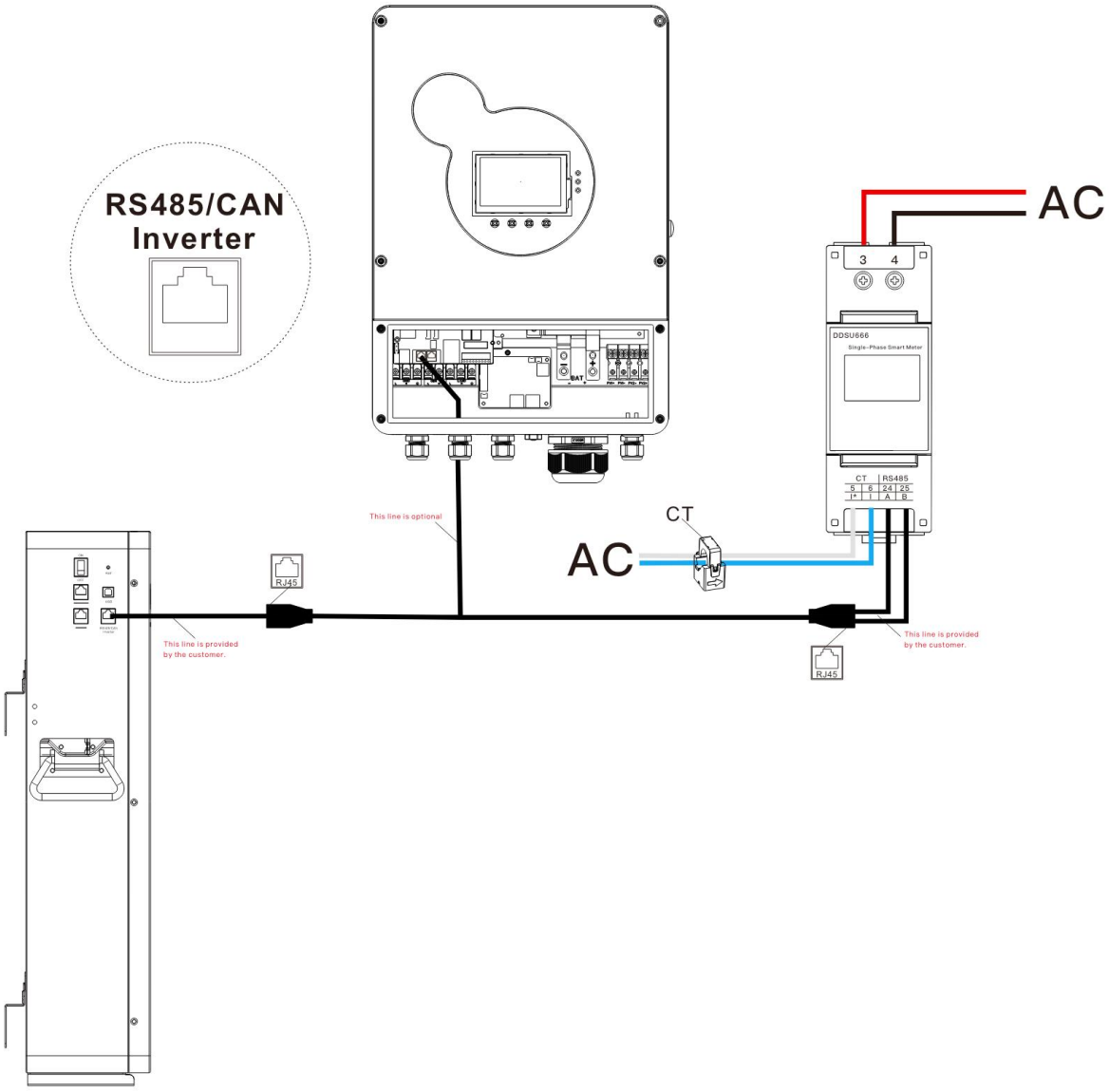
Note: ① When connecting to the utility in off-grid or grid-tied mode for battery charging and bypassing loads, it must be ensured that the utility neutral remains connected to the load neutral at the output at all times. In addition to completely disconnecting the utility.

② When operating in backup mode, neutral continuity is maintained internal to the inverter.

5.6 Smart Meter Wiring Diagram



PIN	Definition
3	AC-L
4	AC-N
5	CT-White
6	CT-Blue
24	RS485-A
25	RS485-B



5.7 Remote Monitoring

The inverter supports APP application to provide more comprehensive and intuitive monitoring of power plant data, creating the ultimate user experience with extremely simplified product design thinking to meet the convenient operation of offline applications.

5.7.1 Download App

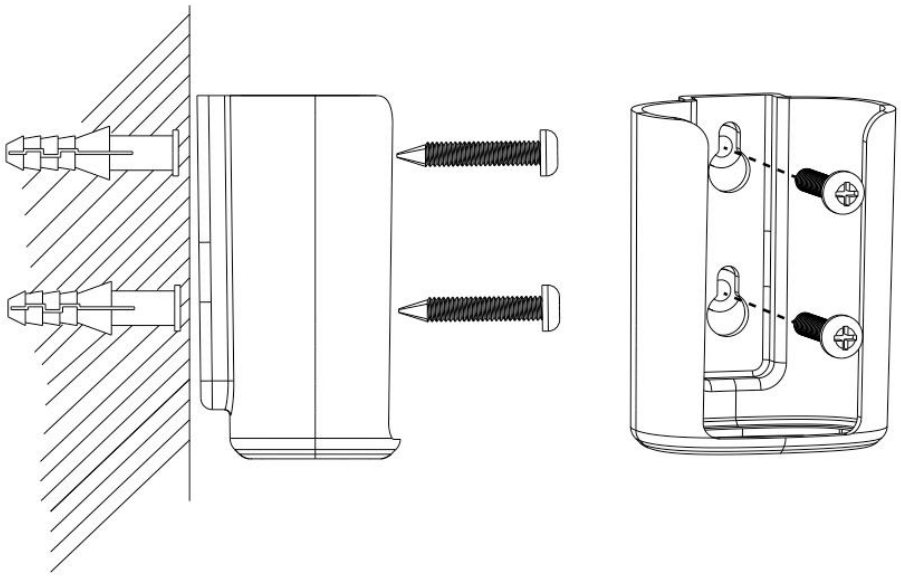
- **App Download：** Android system can search "SOLARMAN Smart " through application market/store for downloading, while IOS system can choose to download SOLARMAN Smart APP in Apple Store.

- **QR code download：** SOLARMAN Smart APP can also support scanning QR code with mobile phone for downloading. Please scan the code with mobile phone.

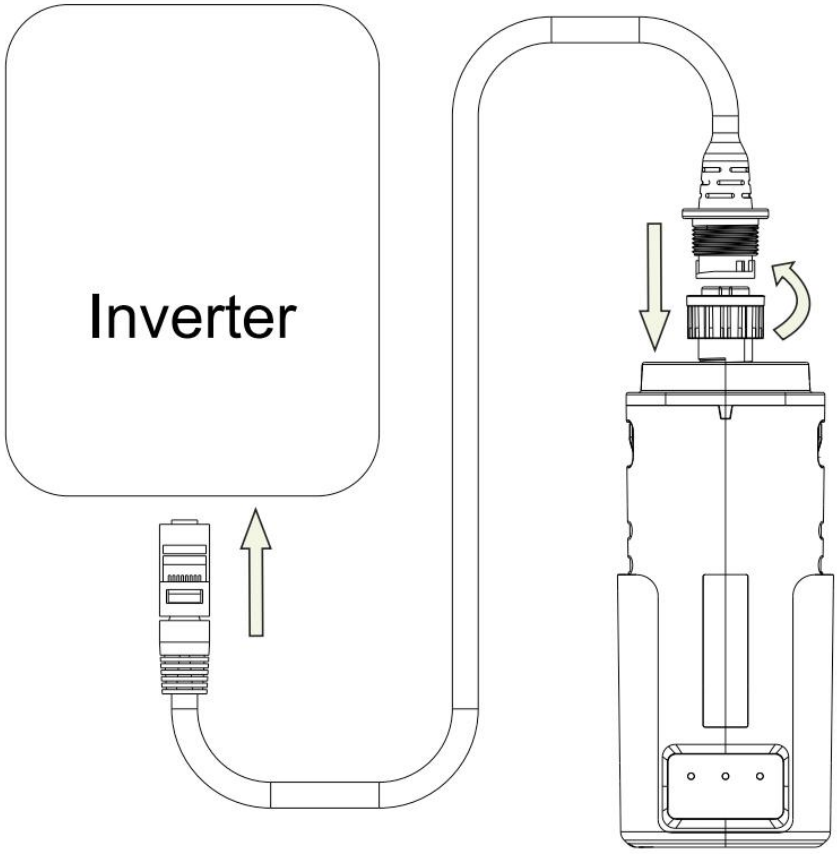
SOLARMAN Smart

5.7.2 Stick Logger Installation

Step1: Install the fixed bracket on the wall next to the inverter.



Step2:Connect inverter with data logger, and tighten it.



The normal operation status of the stick logger, when router connected to the network normally:

1.Connection to the server succeeded: NET light keeps on after the logger powered on.

2.Logger running normally: READY light flashes.

3.Connection to the inverter succeeded: COM light keeps on.

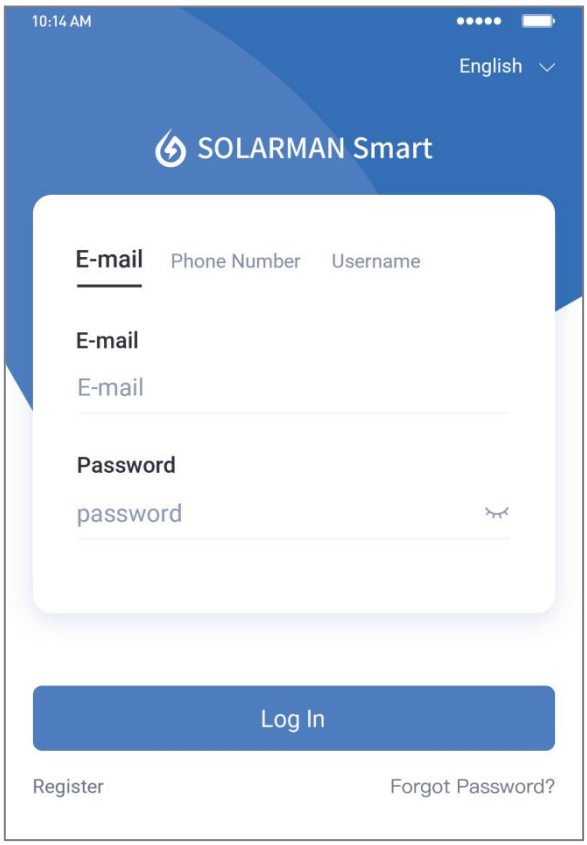
5.7.3 SOLARMAN Smart APP Operation

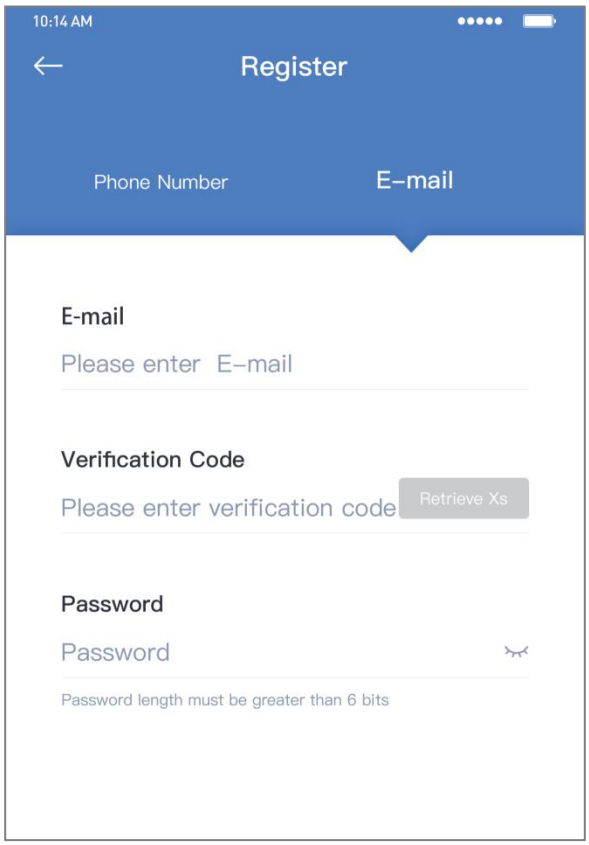
Please make sure Bluetooth and WiFi are ON and the router can connect to the network normally.

- **Registration**

Go to SOLARMAN Smart and register.

Click “Register” and create an account here.

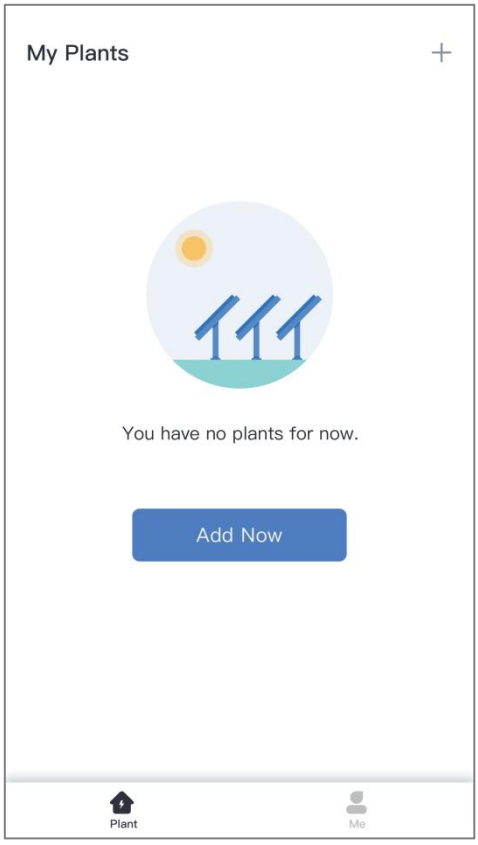


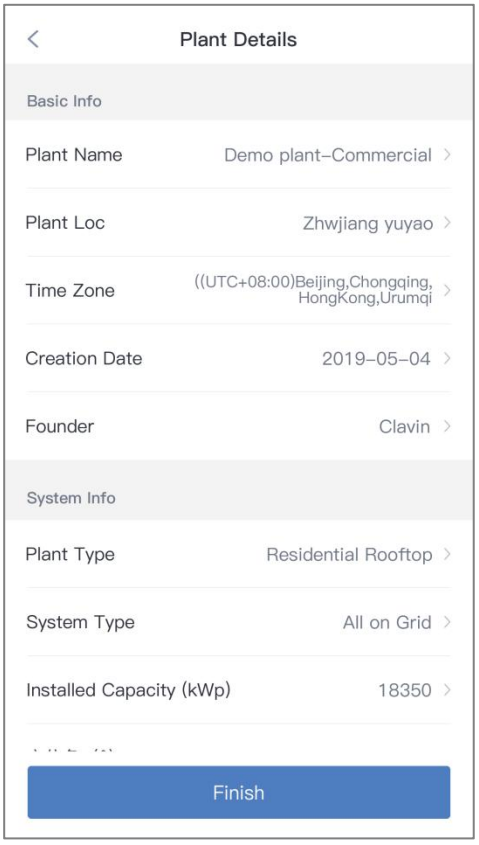


- **Create a Plant**

Click "Add Now" to create your plant.

Please fill in plant basic info and other info here.



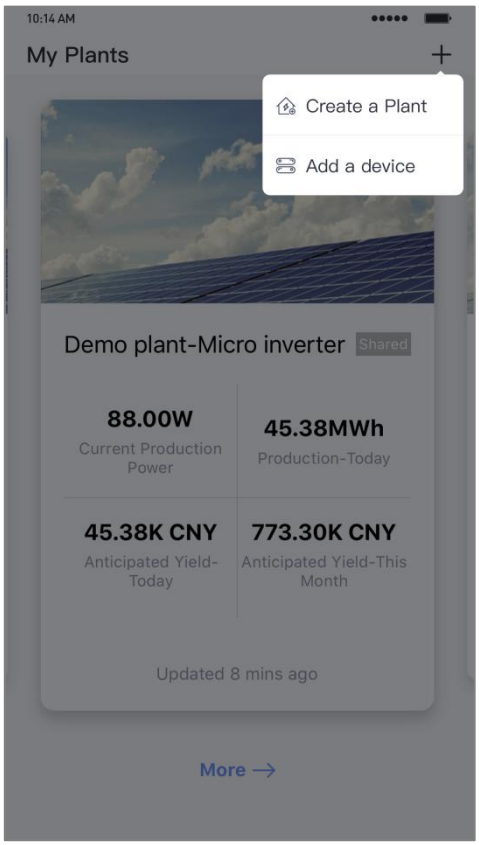


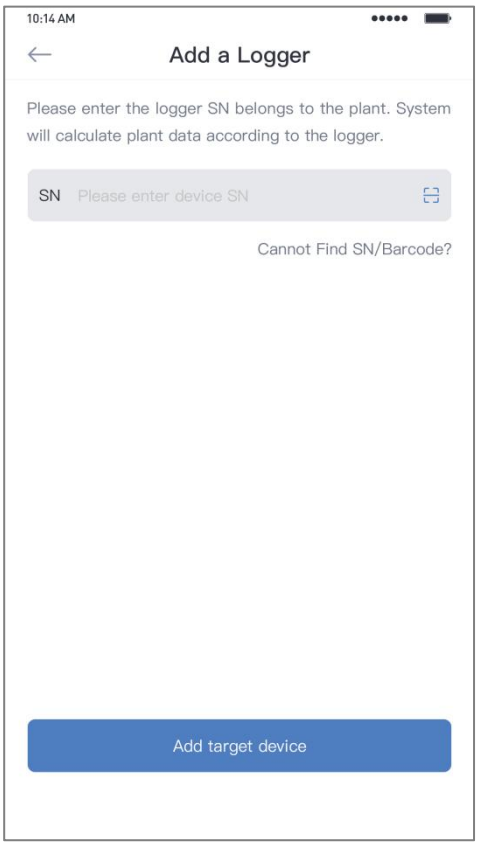
- **Add a Logger**

Method 1: Enter logger SN manually.

Method 2: Click the icon in the right and scan to enter logger SN

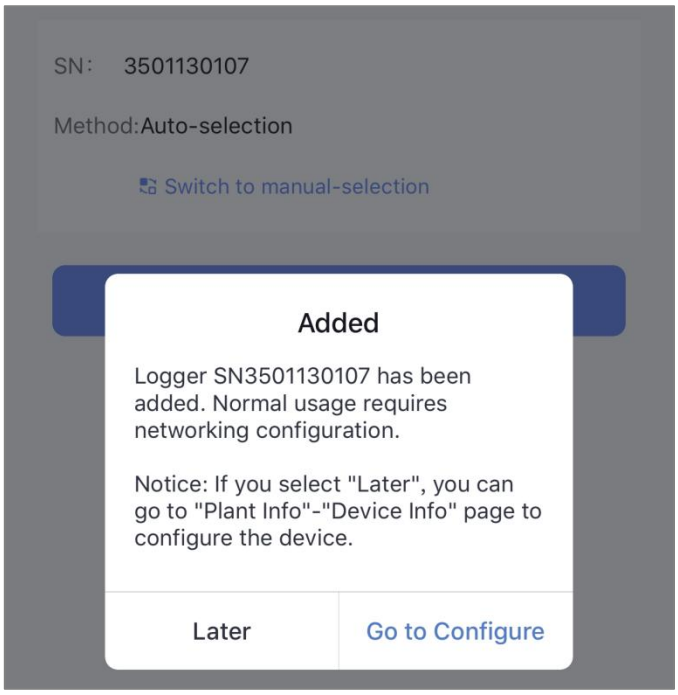
You can find logger SN in the external packaging or on the logger body

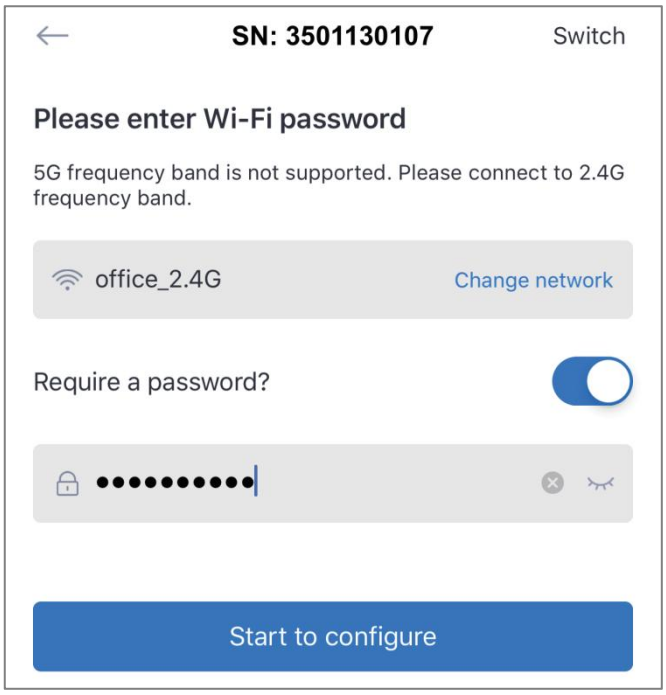




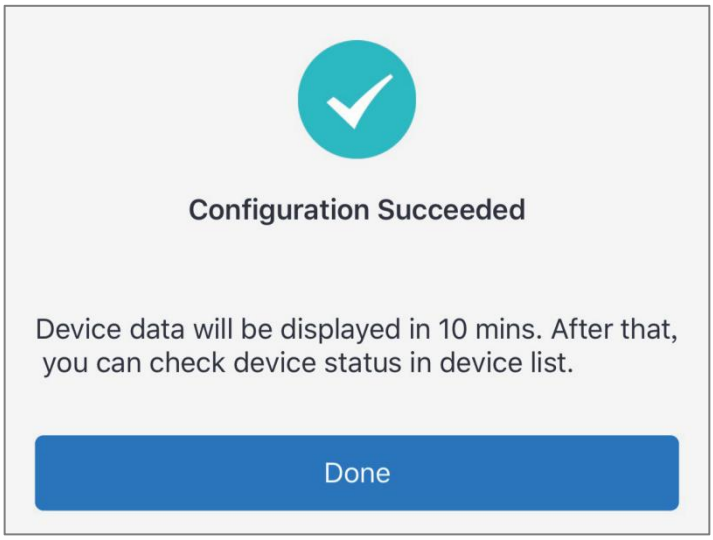
- **Network Configuration**

Step 1: Click “Go to Configure” to set the network. (Please make sure Bluetooth and WiFi are ON.)





Step 2: Please wait for a few minute. Then click "Done" and view plant data.

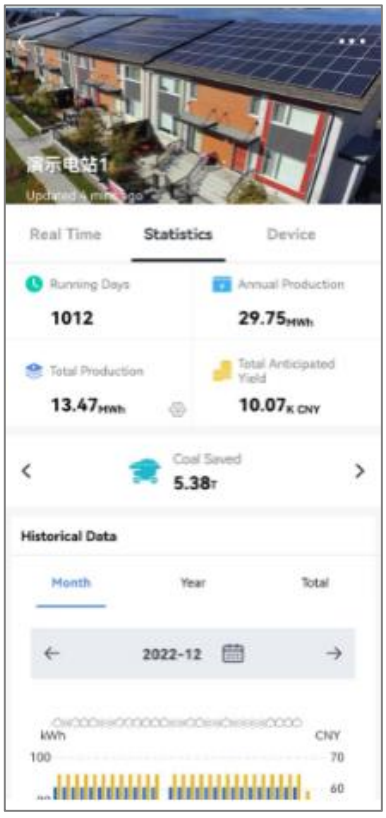


NOTICE

If configuration failure occurs, please check the following reason and try it again.

(1) Make sure WLAN is ON.
(2) Make sure WiFi is normal.
(3) Make sure wireless router does not implement the white-black list.
(4) Remove the special characters in Wi-Fi network.
(5) Shorten the distance between the phone and device.
(6) Try to connect to other Wi-Fi.

5.7.4 Plant Detail



After the photovoltaic plant is created and connected to the Logger, you can select the plant to view the corresponding plant data and related settings, including Real time, Statistical, Device, Alerts, Plant Info and Layout, so as to meet the end user's maintenance of plant information and data browsing.

Note: In general, the Plant data can be viewed normally only after 5-10 minutes after the Logger networking configuration is completed.

➢ Real-time Data

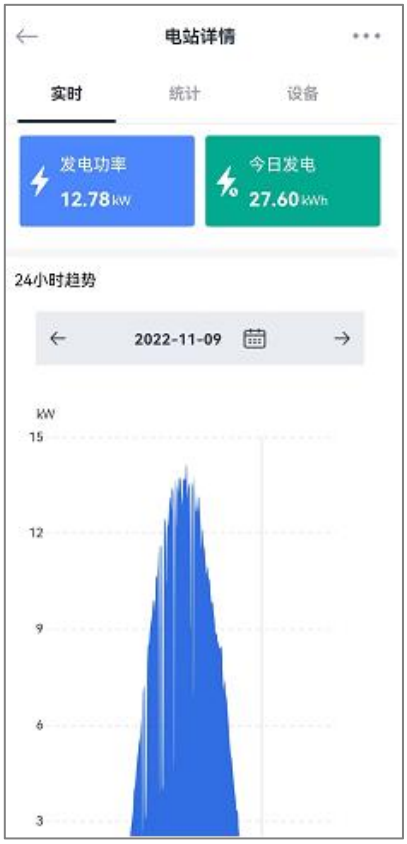
In the "Real time" interface, you can see the real-time data of the Plant, such as real-time generation power and output, energy flow chart, 24-hour power curve, generation and consumption data, etc. The system will display different page layouts according to your plant grid connection type. Please set your plant according to the actual situation.

Depending on your equipment, we recommend:

（1）If your equipment (such as inverter) only collects power generation data and transmits it to the grid company, it is recommended that you select "All on Grid" as the System Type of the Plant

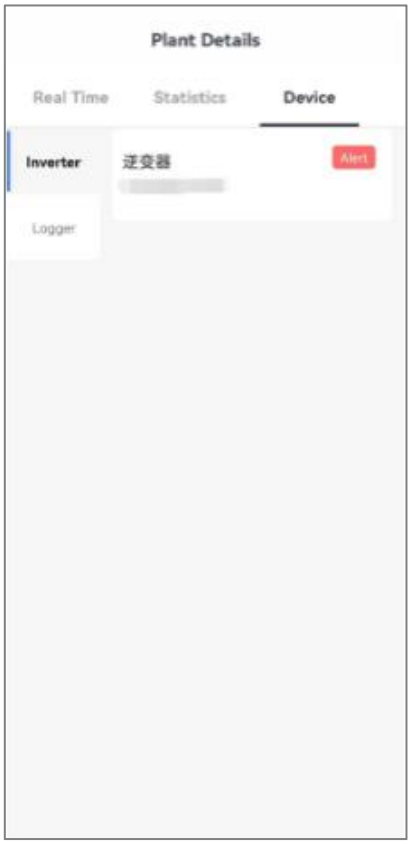
（2）If your equipment (such as inverter) collects power generation data and power consumption data at the same time, it is recommended that you select "Self consumption" as the System Type of the Plant

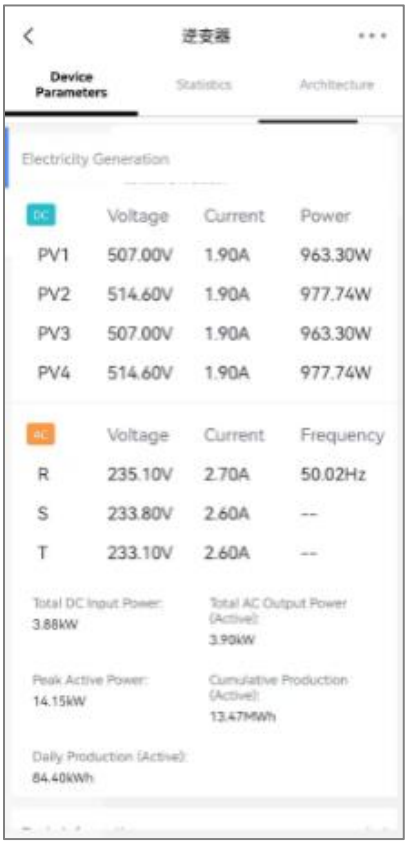
（3）If your equipment (such as inverter) collects power generation data, power consumption data, battery data and grid data at the same time, it is recommended that you select "Storage System" as the System Type of the Plant.



➢ Device info

In the "Device" interface, you can view the device information under plant. Select and click a specific device to view the specific information of the device, including the device parameters, data statistics and connection information. Through these data, you can determine whether the device is in normal working state. It can support networking configuration, meter configuration and other functional operations for the corresponding equipment. If the equipment is a logger, networking configuration can be carried out. If the equipment is an electricity meter,meter configuration can be carried out.



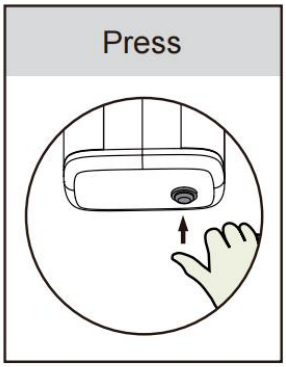


5.7.5 Abnormal State Processing

If the data on platform is abnormal when the stick logger is running, please check the table below and according to the status of indicator lights to complete a simple troubleshooting. If it still can not be resolved or indicator lights status do not show in the table below, please contact Customer Support.

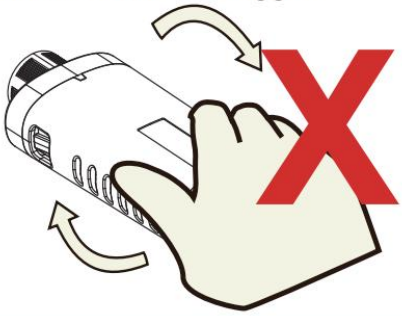
(Note: Please using the following table query after power-on for 2mins at least.)

NET ● NET	COM ● COM	READY ● READY	Fault Description	Fault Cause	Solution
Any state	OFF	Slow flash	Communicate with inverter abnormally	1.Connection between stick logger and inverter loosen. 2.Inverter does not match with stick logger's communication rate.	1.Check the connection between stick logger and inverter. Remove the stick logger and install again. 2.Check inverter's communication rate to see if it matches with stick logger's. 3.Long press Reset button for 5s, reboot stick logger.
OFF	ON	Slow flash	Connection between logger and router abnormal	1.Stick logger does not have a network. 2.Router WiFi signal strength weak.	1.Check if the wireless network configured. 2.Enhance router WiFi signal strength.
Slow flash	ON	Slow flash	Connection between logger and router normal, connection between logger and remote server abnormal.	1.Router networking abnormal. 2.The server point of logger is modified. 3.Network limitation, server cannot be connected.	1.Check if the router has access to the network. 2.Check the router's setting, if the connection is limited. 3.Contact our customer service.
OFF	OFF	OFF	Power supply abnormal	1.Connection between stick logger and inverter loosen or abnormal. 2.Inverter power insufficient. 3.Stick Logger abnormal.	1.Check the connection, remove the stick logger and install again. 2.Check inverter output power. 3.Contact our customer service.
Fast flash	Any state	Any state	Networking status	Normal	1.Exit automatically after 2mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.
Any state	Any state	Fast flash	Restore factory settings	Normal	1.Exit automatically after 1mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.



Key-press	Status Description	Light Status
Long press 5s then release	Rebooting the stick logger.	All lights are extinguished immediately.
Long press 10s then release	Resetting the stick logger.	1.All lights are extinguished after 4s. 2.READY light flashes fast for 100ms.

Warning:
Please do not hold the logger body to rotate while install or remove the logger.

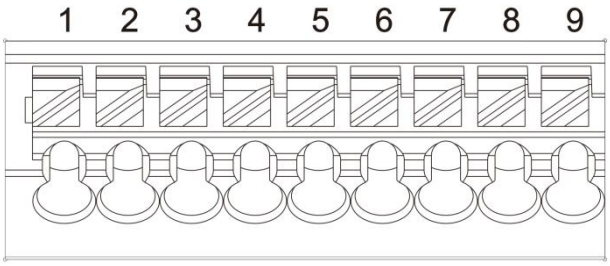


Notice:
Do not remove waterproof plug.

6. Communication

6.1 Dry contact

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



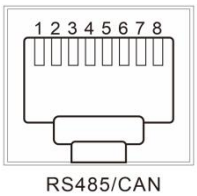
Function	Description
RSD power supply	PIN 1 is GND，PIN 3 is RSD 12V+
Temperature sampling （reserved）	Pin 1 & Pin 2 can be used for battery temperature sampling compensation.
Generator remote start/stop	4-5：NC； 4-6：NO Remote generator shutdown: Pins 4 to 5 are normally closed, and pins 4 to 6 are normally open. (Pin 4/5/6 output 125Vac/1A,230Vac/1A,30Vdc/1A)
CT connection	PIN 8：CT-； PIN9：CT+

NOTICE

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

6.2 RS485/CAN communication port

RS485/CAN communication port for RS485 and CAN communication with lithium battery BMS



RS485/CAN

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

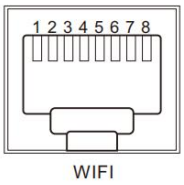
6.3 DIP switch

The single inverter need to press down DIP 1,2.

When the inverters are in parallel, press down DIP 1,2 of the first and last inverters.

6.4 WIFI port

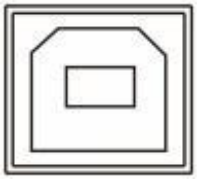
The WIFI port is used to connect to the Wi-Fi/GPRS data acquisition module, which allows the user to view the operating status and parameters of the inverter via the mobile.



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

6.5 USB-A port

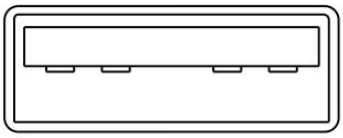
It is used to updated the screen firmware



6.6 USB-B port

This port is a USB communication port, which can be used for USB communication with the selected upper computer software of our company (Need to apply for).

To use this port, the corresponding “USB to serial port chip CH340T driver” should be installed in the computer.



6.7 Parallel port

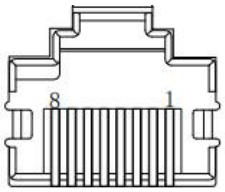
a) This port is used for parallel communication, through which the parallel modules can communicate with each other.

b) Each machine has two 8Pin 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.

6.8 DRMS port(only Australia)



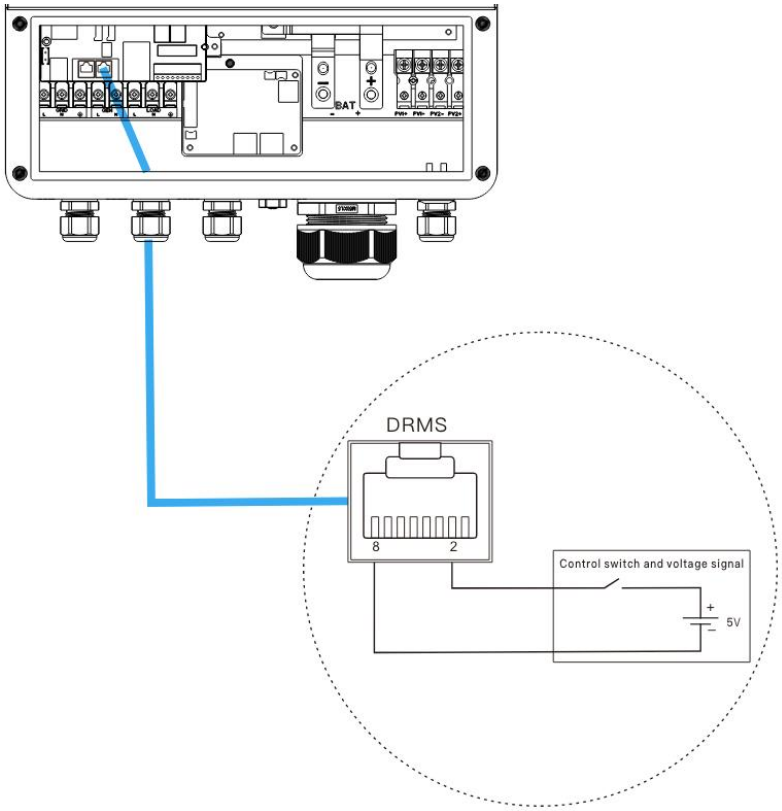
DRMS

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

MODE	RJ45 socket asserted by shorting pins		Requirement
DRM0	5	6	Operate the disconnection device
DRM5	1	5	Do not generate power to grid
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)

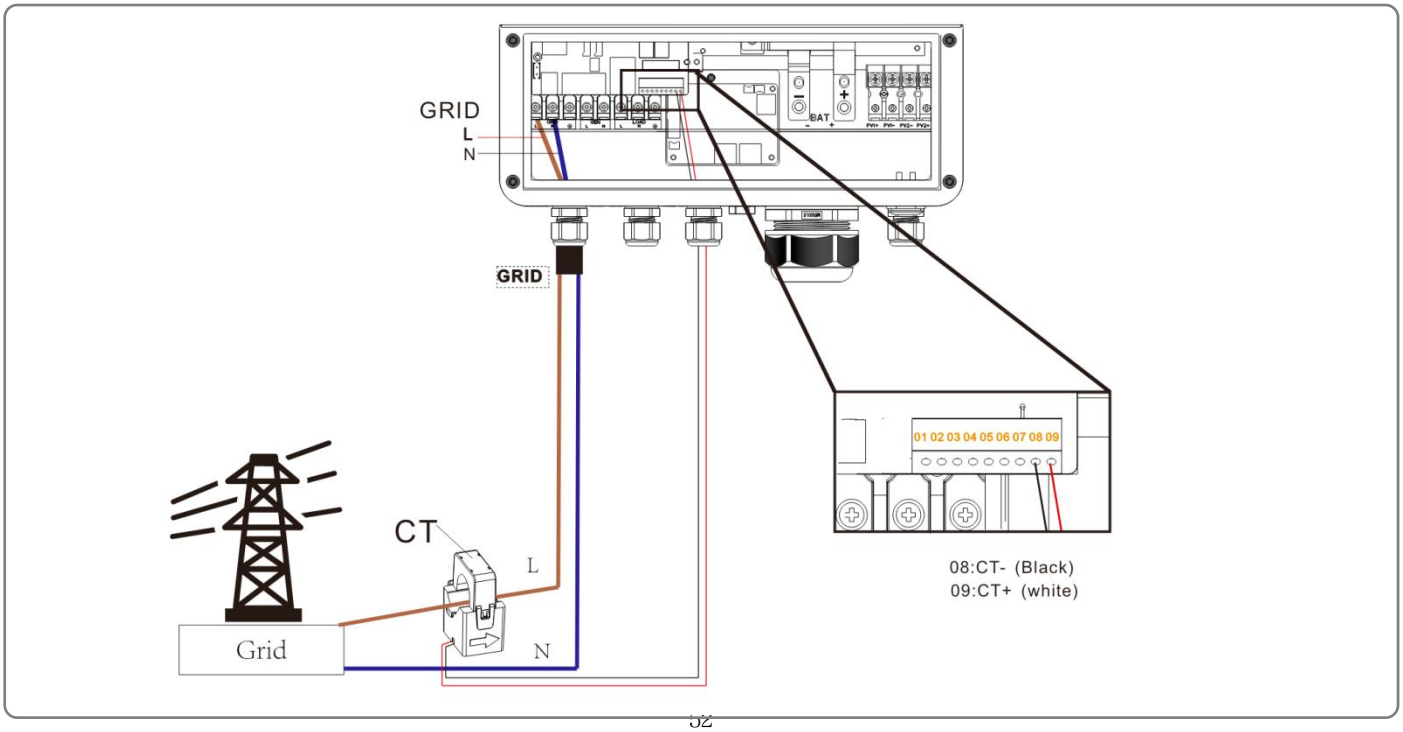
MODE	The RJ45 socket is activated by an external power signal		Requirement
DRM6	2	8	When an external voltage of 5V is applied, the machine will stop outputting and shut down within 5 seconds.

Use a digital power supply to generate a 5V voltage (the voltage must not exceed 5V). Connect the GND of the digital power supply to the DRMS-Pin8 of the inverter. Use a switch to control the on/off state of DRMS-Pin2 and the power supply VCC. When the control switch is closed, the digital power supply will apply a 5V voltage to Pin2 and Pin8, and the inverter will shut down its output and power off within 5 seconds.

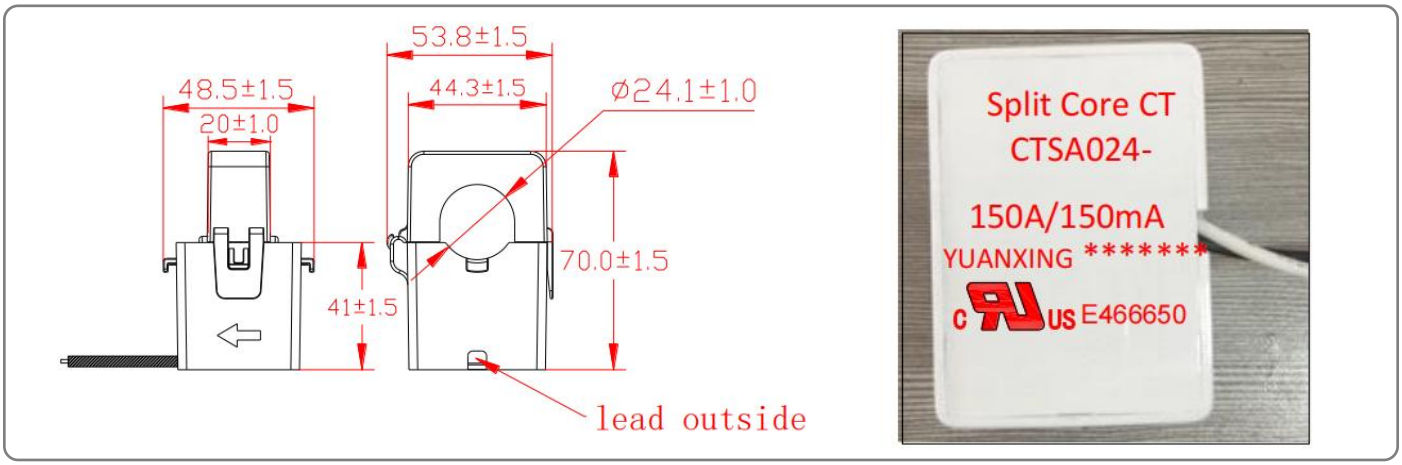


6.9 External CT port

6.9.1 External CT connection method

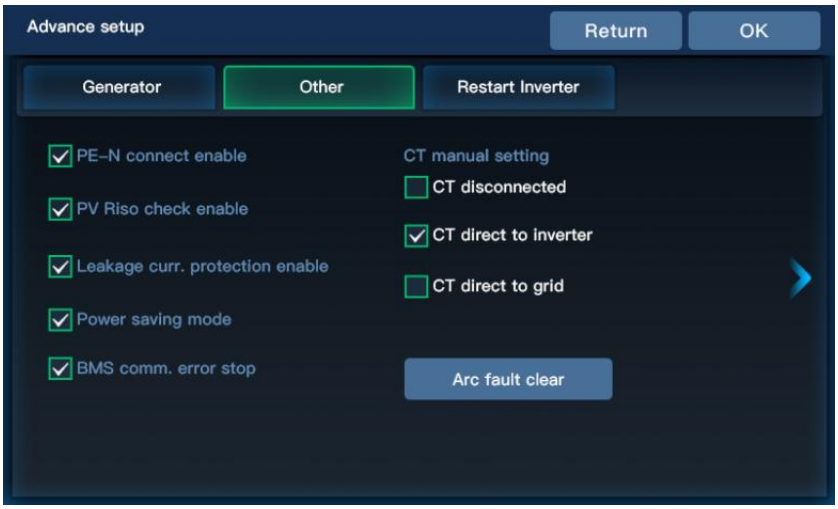


1. Split Core Current Transformer (CT) dimension: (mm)
2. Secondary output cable length is 4m.
3. The CT direction is "to inverter"



6.9.2 External CT function settings

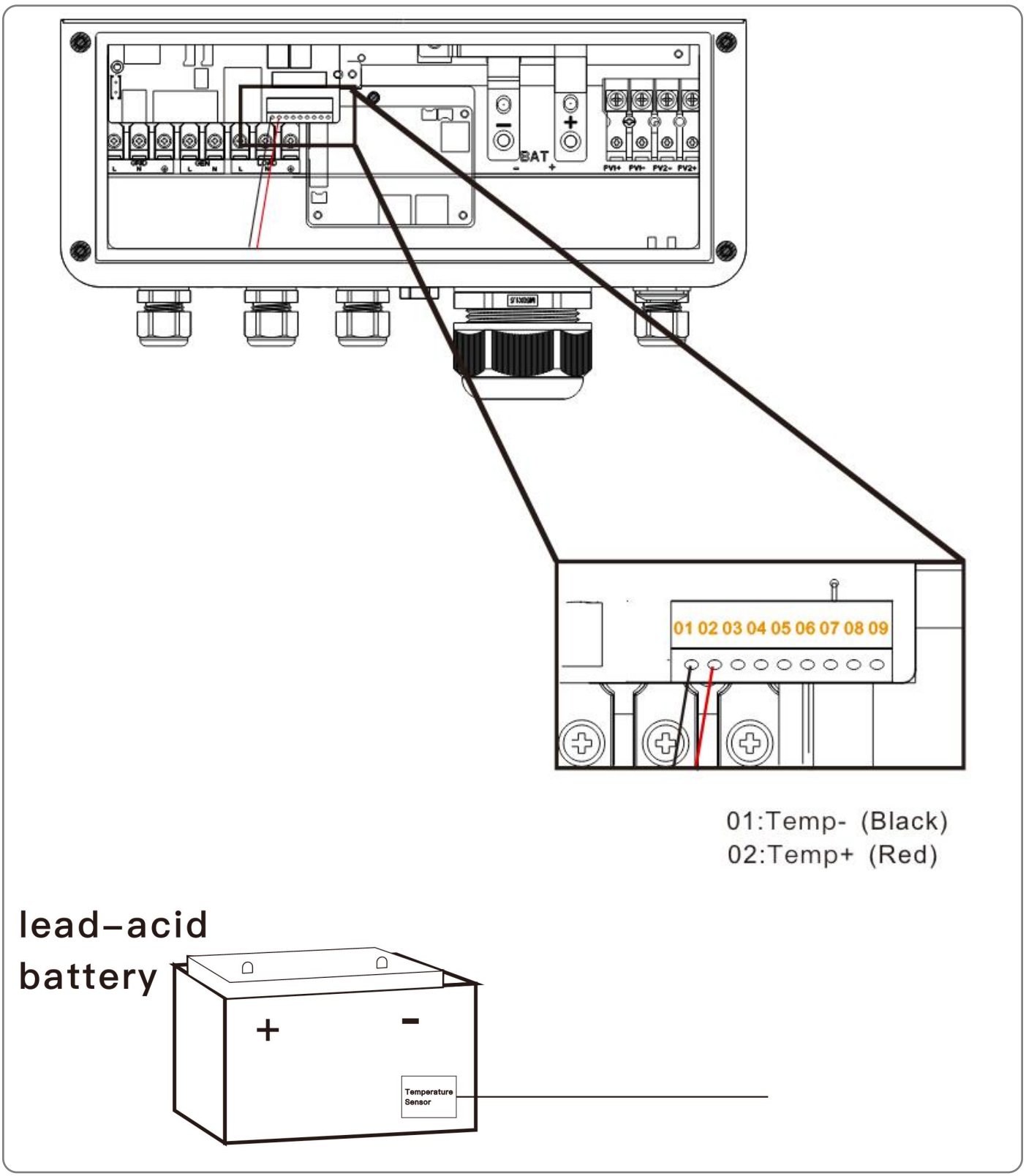
CT manual setting：Select the direction of the CT according to the installation of the CT.



After the external device is connected, set it up in the "On grid setup" screen (as shown below).
External CT ratio set to 1000:1 ;
Error calibration power in the case of backflow prevention, recommended setting 20~100W.

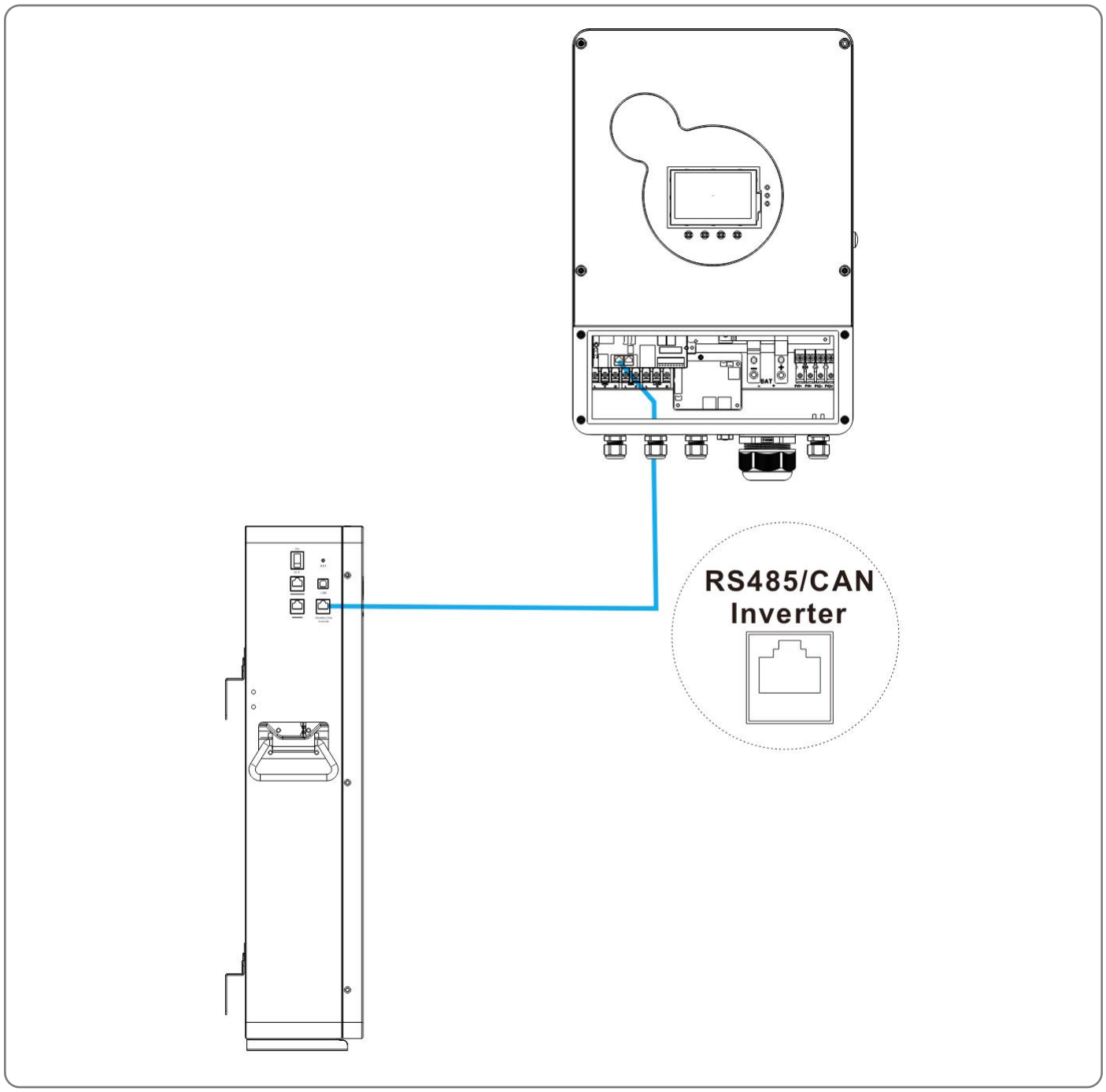
6.10 Lead-acid battery installation method

To prevent lead-acid batteries from being damaged by overcharging during high-temperature weather, as well as to avoid safety hazards caused by hydrogen release and battery rupture:
- Attach the temperature sensor to the side of the lead-acid battery and connect the other end to the inverter (as shown in the diagram below).



6.11 Lithium battery with BMS connected to inverter operation

Operation: Connect the battery to the inverter with a standard CAT.5 cable (as shown below). Please refer to section “5.2.3 Battery Setup” for detailed settings.



7. Fault and Remedy

7.1 Fault code

Fault code	Fault name	Whether it affects the output or not	Description
【01】	BatVoltLow	No	Battery undervoltage alarm.
【02】	BatOverCurrSw	Yes	Battery discharge average current overcurrent (software protection).
【03】	BatOpen	Yes	Battery not-connected alarm.
【04】	BatLowEod	Yes	Battery undervoltage stop discharge alarm.
【05】	BatOverCurrHw	Yes	Battery overcurrent (hardware protection).
【06】	BatOverVolt	Yes	Charging overvoltage protection.
【07】	BusOverVoltHw	Yes	Bus overvoltage (hardware protection).
【08】	BusOverVoltSw	Yes	Bus overvoltage (software protection).
【09】	PvVoltHigh	No	PV overvoltage protection.
【10】	PvOCSw	No	Boost overcurrent (software protection).
【11】	PvOCHw	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	Buck heat sink over temperature protection.
【20】	OverTemperInv	Yes	Inverter AC output with load or AC charging radiator over-temperature protection.
【21】	FanFail	Yes	Fan blockage or failure fault.
【22】	EEPROM	Yes	Memory failure.
【23】	ModelNumErr	Yes	Model setting error.
【26】	RlyShort	Yes	Inverted AC Output Backfills to Bypass AC Input.
【29】	BusVoltLow	Yes	Internal battery boost circuit failure.
【30】	BatCapacityLow1	No	Alarm given when battery capacity rate is lower than 10% (setting BMS to enable validity).
【31】	BatCapacityLow2	No	Alarm given when battery capacity rate is lower than 5% (setting BMS to enable validity).
【32】	BatCapacityLowStop	Yes	Inverter stops when battery capacity is low (setting BMS to enable validity).

【34】	CanCommFault	Yes	CAN communication fault in parallel operation.
【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 AC 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 line connection error in parallel mode.
【44】	Serial number error	Yes	No serial number set at factory.
【45】	Error setting of split-phase mode	Yes	Item “Parallel” setting error.
【46】	Meter communication error	Yes	Abnormal wiring, check whether the meter communication line is connected correctly, and check whether the meter communication address is set correctly.
【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】	Low insulation resistance fault	No	PV1+, PV2+ and PV- abnormally low impedance to ground.
【57】	Leakage current overload fault	Yes	System leakage current exceeds limit.
【58】	BMS communication error	No	Check whether the communication line is connected correctly and whether BMS is set to the corresponding lithium battery communication protocol.
【60】	BMS battery low temperature alarm	No	BMS alarm battery low temperature.
【61】	BMS battery over temperature alarm	No	BMS alarm battery over temperature.
【62】	BMS battery over current alarm	No	BMS alarm battery over current.
【63】	BMS battery undervoltage alarm	No	BMS alarm low battery.

7.2 Troubleshooting

Fault code	Faults	Remedy
Display	No display on the screen	Check if the battery switch or PV switch is closed; whether the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
【06】	Battery overvoltage protection	Check that the battery voltage does not exceed the protection value. If it does, discharge the battery until the voltage falls below the battery over-voltage recovery point.
【01】 【04】	Battery undervoltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
【21】	Fan failure	Check if the fan is not turning or blocked by foreign object.
【19】 【20】	Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
【13】 【14】	Bypass overload protection, inverter overload protection	① Reduce the use of power equipment; ② Restart the unit to resume load output.
【17】	Inverter short-circuit protection	① Check the load connection carefully and clear the short-circuit fault points; ② Re-power up to resume load output.
【09】	PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
【03】	Battery disconnected alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.
【40】 【43】	Parallel connection fault	Check if the parallel line is not connected well, such as loose or wrong connection.
【35】	Parallel ID setting error	Check whether the setting of parallel ID number is repeated.
【37】	Parallel current sharing fault	Check if the parallel current sharing line is not connected well, such as loose or wrong connection.
【39】	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface.
【42】	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent.
【44】	Serial number error	Incorrect device serial number setting.
【45】	Parallel mode error	There is a device in the parallel system with the wrong parallel mode setting.
【49】	High grid voltage	Check that the grid voltage is within the normal range, if the grid voltage is abnormal, wait until the grid voltage is restored.
【50】	Low grid voltage	Check that the grid voltage is within the normal range, if the grid voltage is abnormal, wait until the grid voltage is restored.
【51】	High grid frequency	Check that the grid frequency is within the normal range, if the grid frequency is abnormal, wait until the grid frequency is restored.
【52】	Low grid frequency	Check that the grid frequency is within the normal range, if the grid frequency is abnormal, wait until the grid frequency is restored.

【53】	Grid unconnected	Check if the grid is correctly connected, e.g. if the switch is closed and if the grid is disconnected.
【54】	Grid-connected current with DC component over	Power down and restart the device, if it continues to report faults, contact the manufacturer after sales.
【56】	Low insulation resistance fault	Check that the system is well grounded and that the PV modules and cables are not worn.
【57】	Leakage current overload fault	Check that the system is well grounded and that the loads are not operating abnormally.

NOTICE

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

8. Protection and Maintenance

8.1 Protection features

No.	Protection Feature	Instruction
1	PV input current/power limiting 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 input over-voltage	If the PV voltage exceeds the maximum value allowed by the hardware, the machine will report a fault and stop the PV boost to output a sinusoidal AC wave.
3	PV night reverse current protection	At night, the battery is prevented from discharging through the PV module because the battery voltage is greater than the voltage of PV module.
4	AC input over-voltage protection	When the AC input voltage of each phase exceeds 280V, the mains charging will be stopped and switched to the inverter mode.
5	AC input under-voltage protection	When the AC input voltage of each phase below 170V, the utility charging will be stopped and switched to the inverter mode.
6	Battery over-voltage protection	When the battery voltage reaches the over-voltage cut-off point, the PV and the utility will automatically stop charging to prevent the battery from being overcharged and damaged.
7	Battery under-voltage protection	When the battery voltage reaches the under-voltage cut-off point, the inverter will automatically stop the battery discharge to prevent damage from over-discharging the battery.
8	Battery over-current protection	After a period when the battery current exceeds that allowed by the hardware, the machine will switch 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, the AC output is immediately turned off and turned on after 1 second.If the output load terminal is still short-circuited after 3 attempts, the inverter must be manually restarted after first removing the short- circuit fault from the load before the normal output can be restored.
10	Heat sink over-temperature protection	When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will resume charging and discharging.
11	Inverter over-load protection	After triggering the overload protection the inverter will resume output after 3 minutes, 5 consecutive overloads will switch off the output until the inverter is restarted. (102%<load<125%) : alarm and output shutdown after 5min; (125% < load < 150%) : alarm and output shutdown after 10s. Load > 150% : alarm reported and output switched off after 5s.
12	AC output reverse	Prevents AC back flow from the battery inverter to the bypass AC input.
13	Bypass over-current protection	Built-in AC input over-current protection circuit breaker.
14	Bypass phase inconsistency protection	When the phase of the bypass input and the phase of the inverter split do not match, the inverter disables switching to the bypass output to prevent the load from dropping out or short-circuiting when switching to the bypass.
15	Charging short-circuit protection	When the external battery port is short-circuited in the PV or AC charging state, the inverter will protect and stop the output current.
16	Parallel connection error protection	In parallel operation, the equipment will be protected when the parallel line is lost.
17	Parallel battery voltage difference protection	In parallel operation, the equipment will be protected when the battery connection is inconsistent and the battery voltage is greatly different from that detected by the host.
18	Parallel AC voltage difference protection	In parallel operation, the equipment will be protected when the AC IN input connection is inconsistent.
19	Synchronization signal fault protection	The equipment will be protected when there is a fault in the guidance signal between parallel buses, causing inconsistent behavior of each inverter.

8.2 Maintenance

To maintain optimum and long-lasting working performance, we recommend that the following items are 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 the insect screen 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

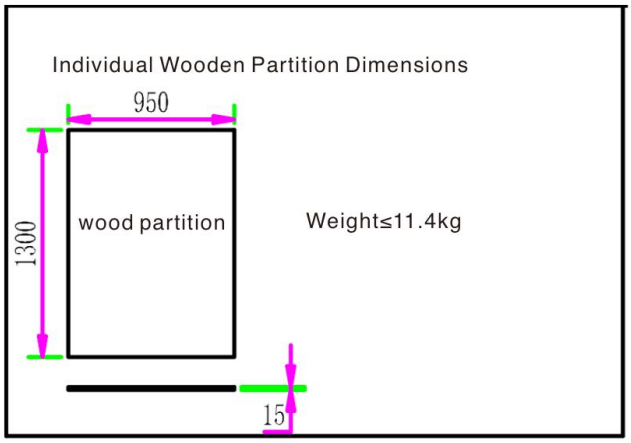
Make sure that the inverter is disconnected from all power sources and that the capacitors are fully discharged before supplying power out any checks or operations to avoid the risk of electric shock.

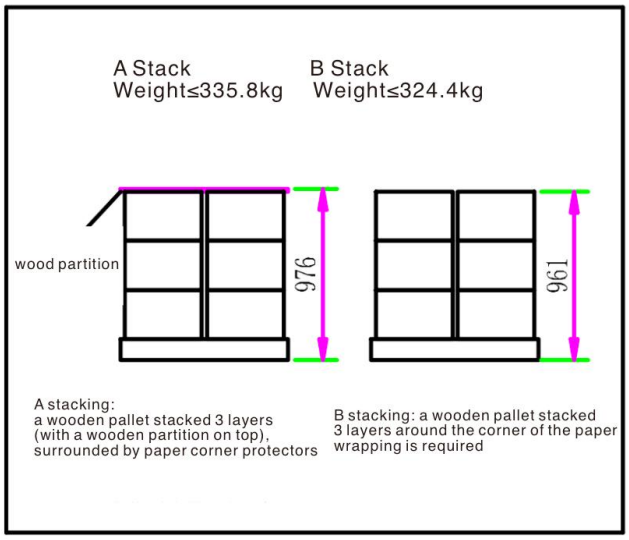
The Company shall not be liable for damage caused by :

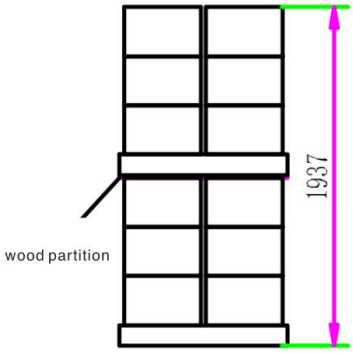
1. Damage caused by improper use or use in a wrong location.
2. Photovoltaic modules with an open circuit voltage exceeding the maximum permissible voltage.
3. Damage caused by the operating temperature exceeding the restricted operating temperature range.
4. Dismantling and repair of the inverter by unauthorised persons.

8.3 How to safely transport inverters

Refer to the chart below for specific crating and transportation methods:







A and B for stacking, after stacking a pile of 24 boxes single stack size 1300X950X1937 (H)
Weight: 660.2kg

9. Parameter Sheet

MODEL	HESP4836S100-H	HESP4840S100-H	HESP4846S100-H	HESP4850S100-H HESP4855S100-H	HESP4860S100-H
AC Output (load)					
Rated Output Power	3,600W	4,000W	4,600W	5,500W	6,000W
Max. Peak Power	3,600VA	4,000VA	4,600VA	5,500VA	6,000VA
Rated Output Voltage	230Vac (Single phase) (200/208/220/240Vac settable)				
Output voltage Error	±5%				
Power Factor	0.8 leading to 0.8 lagging				
Load Motor Capacity	3HP		4HP		
Rated AC Frequency	50/60Hz ± 0.3Hz				

Waveform	Pure Sine Wave				
Switch Time	10ms (typical)				
Overload	After triggering the overload protection the inverter will resume output after 3 minutes, 5 consecutive overloads will switch off the output until the inverter is restarted. (102%<load<125%): alarm and output shutdown after 5min; (125% < load < 150%) : alarm and output shutdown after 10s. Load > 150% : alarm reported and output switched off after 5s.				
AC Output (on-grid)					
Rated Output Power	3,600W	4,000W	4,600W	5,500W	6,000W
Max. Apparent Power	3,600VA	4,000VA	4,600VA	5,500VA	6,000VA
Power Factor	0.8 leading to 0.8 lagging				
Rated Voltage	220/230Vac				
Rated Frequency	50/60Hz				
Rated Output Current	15.7Aac	17.4Aac	20Aac	24Aac	26Aac
THD	<3%				
Battery					
Battery Type	Li-ion / Lead-Acid				
Rated Battery Voltage	48Vdc (minimum start-up voltage 44V)				
Voltage Range	40~60Vdc				
Max. Generator Charging Current	60Adc				
Max. Grid Charging Current	60Adc				
Max. Hybrid Charging Current	100Adc				
Max. Discharging Current	90A	100A	118A	130A	135A
PV Input					
No. of MPPT Trackers	2				
Max. PV array power	2700W+2700W	3000W+3000W	3500W+3500W	4000W+4000W	4500W+4500W
Max. Input Current	16/16Adc				
Max.PV Isc	27A/27Adc				
Max. Voltage of Open Circuit	500Vdc				
MPPT Voltage Range	120~450Vdc				
Grid / Generator Input					
Input Voltage Range	90~280Vac				
Frequency Range	50/60Hz				
Max. Bypass Overload Current	40Aac				
Efficiency					
MPPT Tracking	99.9%				

Efficiency	
Max Efficiency	97.5%
European Efficiency	97%
Protection	
PV Input Lightning Protection；Anti-islanding Protection；PV String Input Reverse Polarity Protection； Insulation Resistor Detection；Residual Current Monitoring Unit； Output Over Current ProtectionOutput Shorted Protection	
Surge Protection	DC type II/AC type II
Over-Voltage Category	DC type II/AC type III
Certified specifications	
On-grid standard	EN50549-1,G99,NRS-097,CEI 021,VDE-ARN-4105,UNE217002
Safety	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3, FCC 15 class B
RoHS	Yes
Basic data	
Operating Temperature Range	-25~60℃,>45℃ derated
Humidity range	0-100%
Warranty	5 years
Noise	<60dB
Protection Degree	IP65
Cooling Method	Heat sink + intelligent fan cooling
Self-consumption	<100W
Dimensions	556*345*182mm
Weight	20kg
Communication port	RS485 / CAN / USB / Dry contact
External Modules （Optional）	Wi-Fi / GPRS