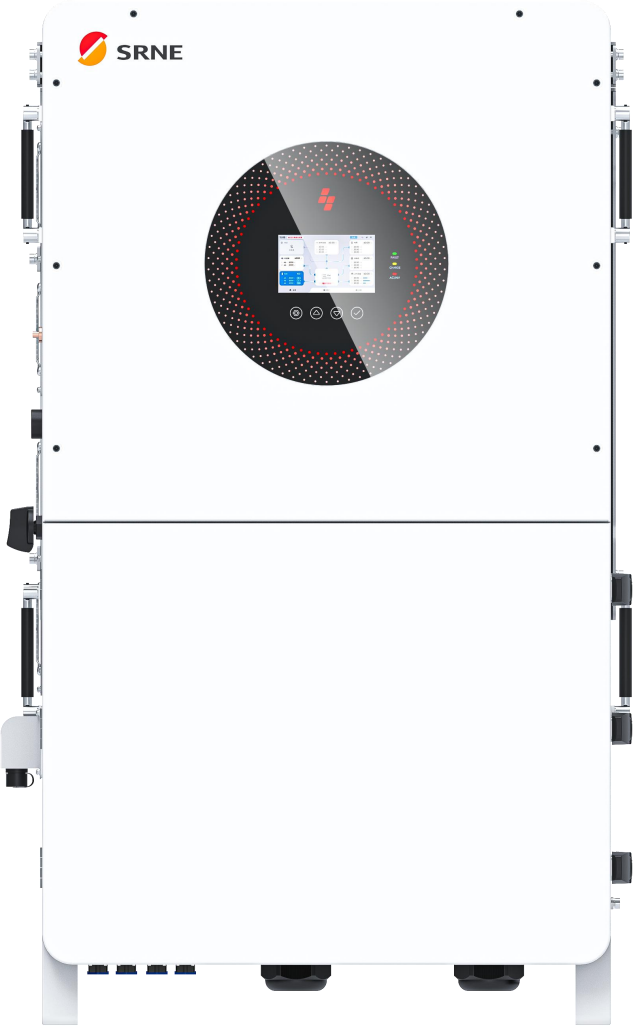
SRNE

User Manual



Solar Hybrid Inverter

IESP500SH3 | IESP550SH3 | IESP600SH3

Ver: V00 2025-08-08

Contents

1.Safety

1.1 How to Use This Manual

This manual contains important information、guidelines、operation and maintenance for the following products：

IESP Series: 500SH3, 550SH3, 600SH3.

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times.

1.2 Symbols in This Manual

⚠ DANGER	DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION: Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
⚠ NOTICE	NOTICE: Provides tips or cues regarding product operation.

1.3 Safety Instruction

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

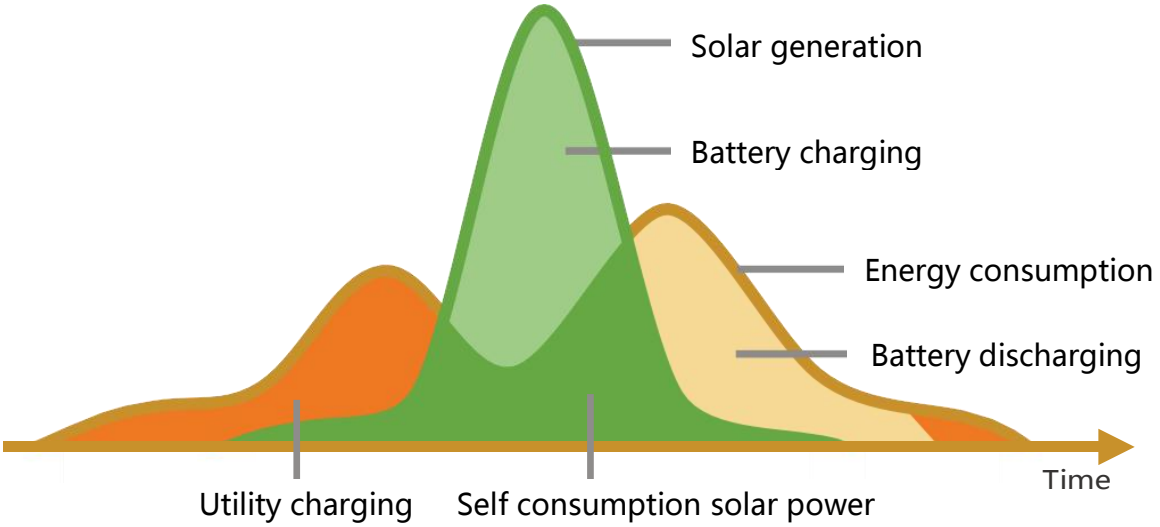
- Be sure to comply the local requirements and regulation to install this inverter.
- Beware of high voltage. Please turn off the switch of each power sources before and during the installation to avoid electric shock.
- For optimum operation of this inverter, please follow required specification to 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.

2.Product Introduction

2.1 Product Description

The IESP SH3 series is a new type of photovoltaic energy storage inverter that integrates solar energy storage, utility charging, energy storage, and supports AC sine wave output. It is highly compatible with various application scenarios, including residential energy storage systems.

It adopts DSP control and achieves high response speed, reliability, and compliance with an industrial standard through an advanced control algorithm. It provides users with a reliable and efficient energy conversion solution.



2.2 Product Features

- Supports connection to lithium-ion batteries.
- 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.
- Supports three-phase pure sine wave output.
- 100% three-phase unbalanced output, with each phase output power reaching over 50% of the rated power.
- Supports phase voltage adjustment within the 200, 208, 220, 230, and 240 volt AC range.
- Supports up to 8 PV input channels, featuring the capability to simultaneously track the maximum charging or load-bearing power of multiple MPPT channels.
- Four MPPT channels with tracking efficiency >99% and a maximum current of 40A per channel, perfectly adapting to high-power modules.
- Supports two charging modes: solar charging only, and grid and photovoltaic hybrid charging.

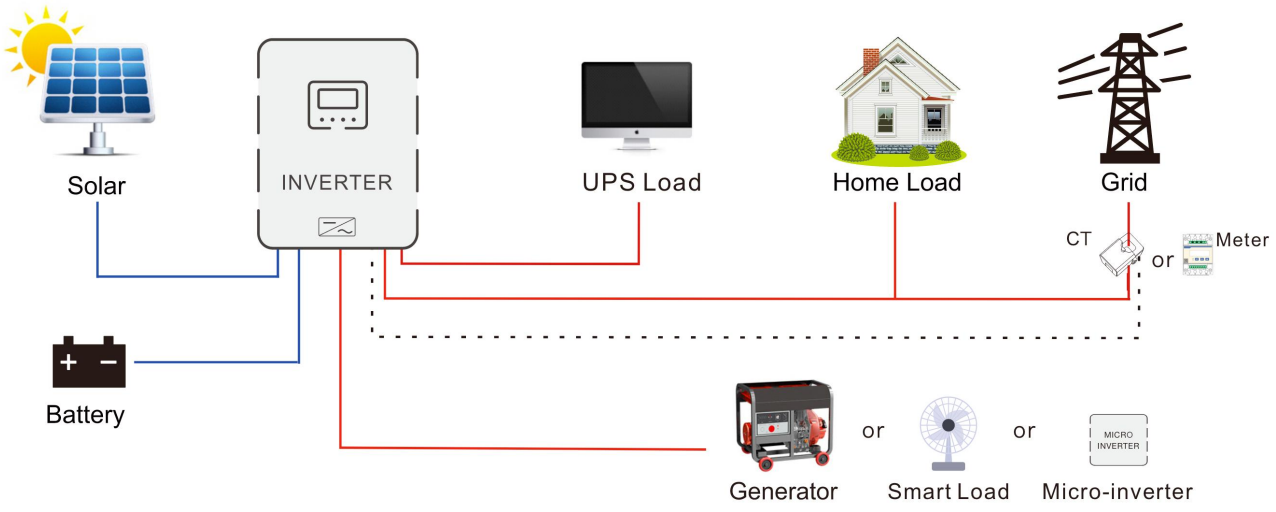
- With the time-slot charging and discharging setting function, you can set the time period for cutting in/out of mains charging and switch the time period between battery discharging and mains bypass power supply mode.
- Energy saving mode function to reduce no-load energy losses.
- With two output modes of utility bypass and inverter output, with uninterrupted power supply function.
- LCD large screen dynamic flow diagram design, easy to understand the system data and operation status.
- Multifunctional protection logic, including short circuit, overcurrent, overvoltage, undervoltage, overload, overtemperature and other protections.
- Support CAN, USB, and RS485 communication.

2.3 System Connection Diagram

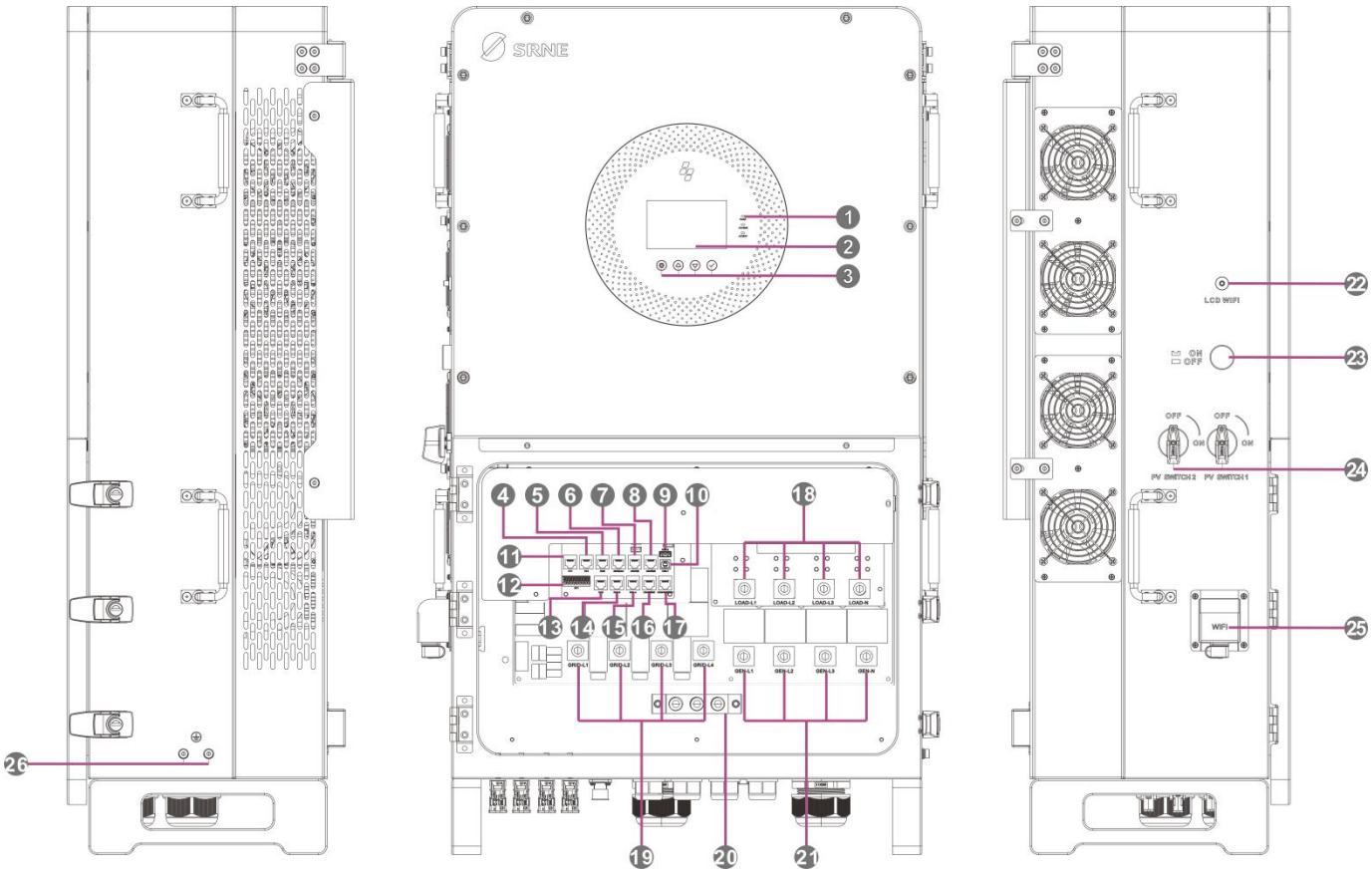
The following figure illustrates the product's system application scenario. A complete system consists of the following components:

- **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:** Connected to the grid AC input, supplying power to loads while charging batteries. The system can operate off-grid when batteries and PV modules power the loads.
- **Battery:** The role of the battery is to ensure the normal power supply of the system loads in case of insufficient photovoltaic and no utility power.
- **Home Load:** Connects to a variety of home and office loads including refrigerators, lamps, TVs, fans, air conditioners and other AC loads.
- **Generator/Secondary Load/Micro-Inverter Input:** When connected to an AC generator, supplies power to loads and charges batteries simultaneously.Without generator connection, this interface can be configured as a secondary load output to power loads. When connected to micro-inverters, it supplies power to loads and charges batteries concurrently.
- **Inverter:** It is the energy conversion device of the whole system.

Note: The actual application scenario determines the specific system cabling.

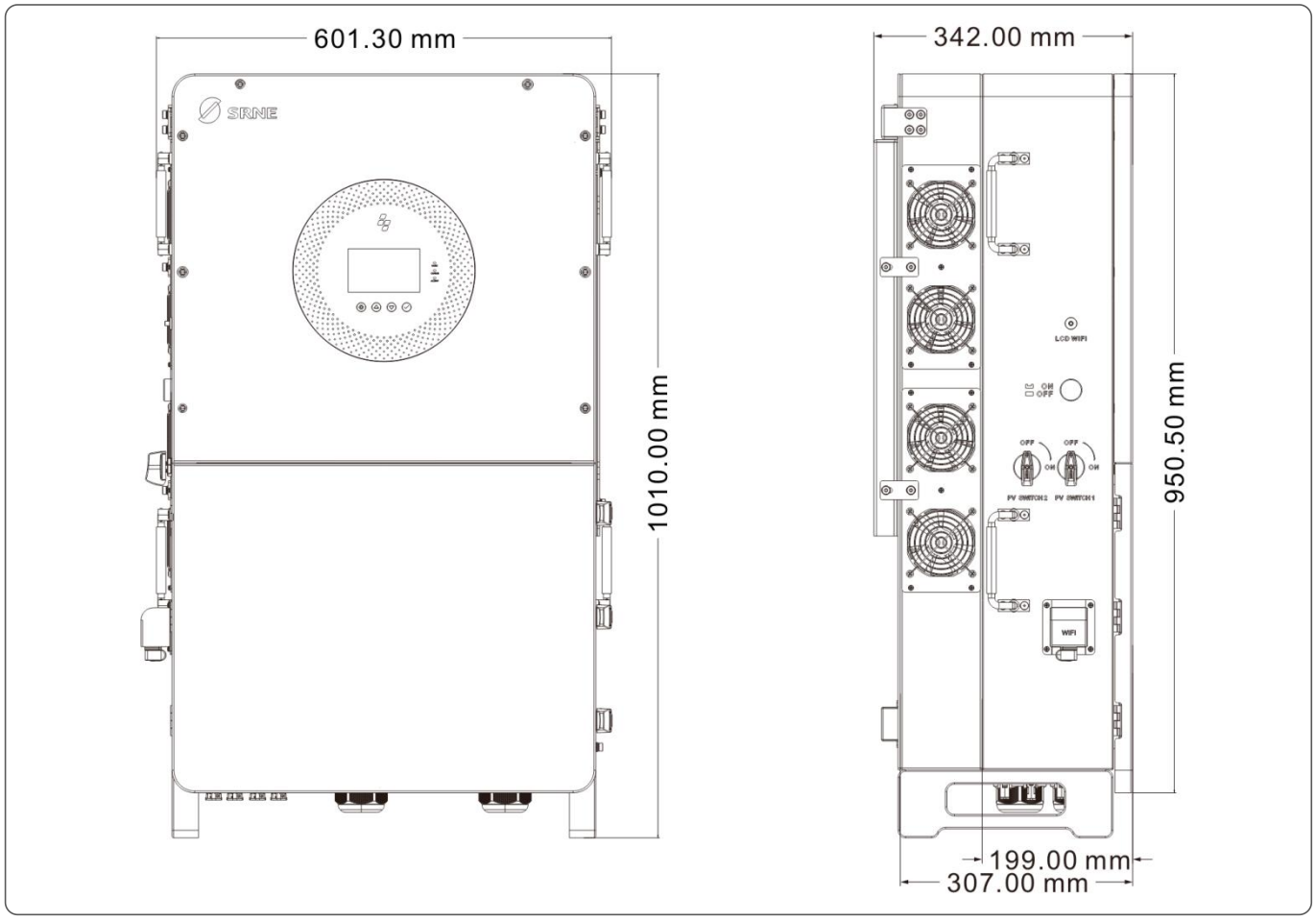


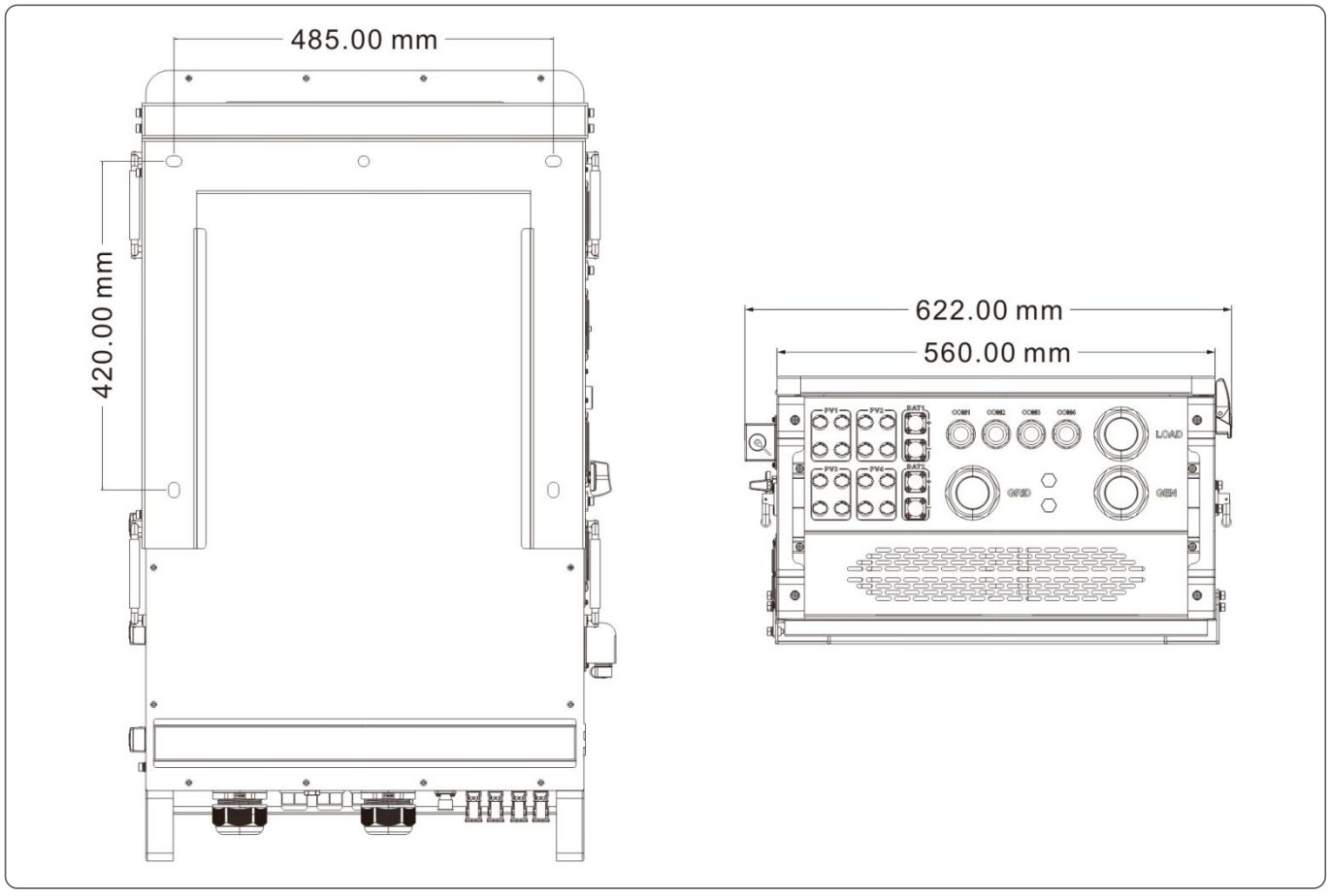
2.4 Product Overview



1	LED Indicators	2	LCD Screen	3	LCD Physical Buttons
4	Micro-inverter CT2	5	DRM	6	485/Meter Port
7	485/WiFi Port	8	485/EMS Port	9	Display Prot USB
10	Communication Prot USB	11	Anti-backflow CT1 Prot	12	Dry Contact Interface
13	CAN2 Communication Port	14	Parallel Operation Port -B	15	Parallel Operation Port -A
16	CAN2/485/BMS2 Communication Port	17	CAN3/485/BMS1 Communication Port	18	Load Ports (L1+L2+L3+N)
19	Grid Ports (L1+L2+L3+N)	20	Grounding Port	21	Generator Ports (L1+L2+L3+N)
22	Display WiFi Interface	23	Operation Switch	24	PV Input Switch
25	WiFi Module	26	Grounding Port		

2.5 Product Size





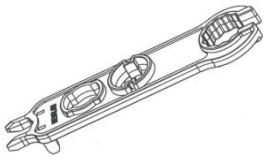
3.Installation

3.1 Installation List

Please check the equipment before installation. Make sure that there is no damage to the packaging.You should have received the following items in the package:

Hybrid inverter
x 1pcs

Wall mount bracket
x 1pcs

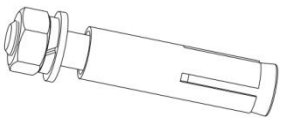


MC4 unlocking tool
x 1pcs

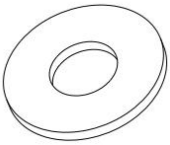
Hex wrench
L-shaped_5mm
x 1pcs

Hex wrench
T-shaped_8mm
x 1pcs

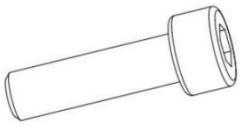
Suspension ring
M8x15mm
x 2pcs



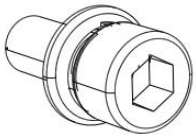
Expansion screws
M8×60mm
x 5pcs



M8 flat washer
x 5pcs

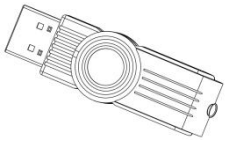


Hex socket head cap
screws M6x18mm
x 2pcs

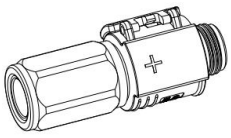


Hex socket head
triple-combination
screws M6x16mm
x 4pcs

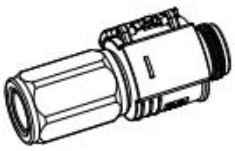
Keys
x 6pcs



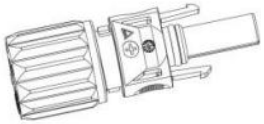
USB Flash Drive
x 1pcs



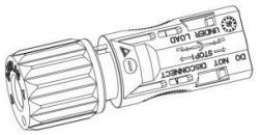
Battery+ terminal
x 2pcs



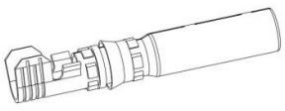
Battery- terminal
x 2pcs



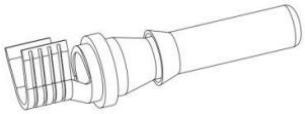
PV+ terminal
x 8pcs



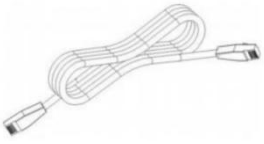
PV- terminal
x 8pcs



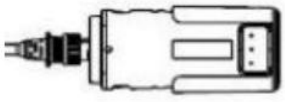
PV+ input metal core
x 8pcs



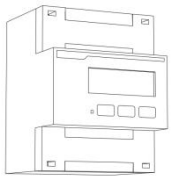
PV- input metal core
x 8pcs



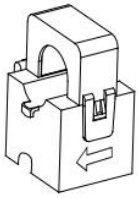
Parallel connection
cable
x 1pcs



WIFI module
(Optional)
x 1pcs



Three-phase meter (Optional)
x 1pcs



CT
x 3pcs

User manual
x 1pcs

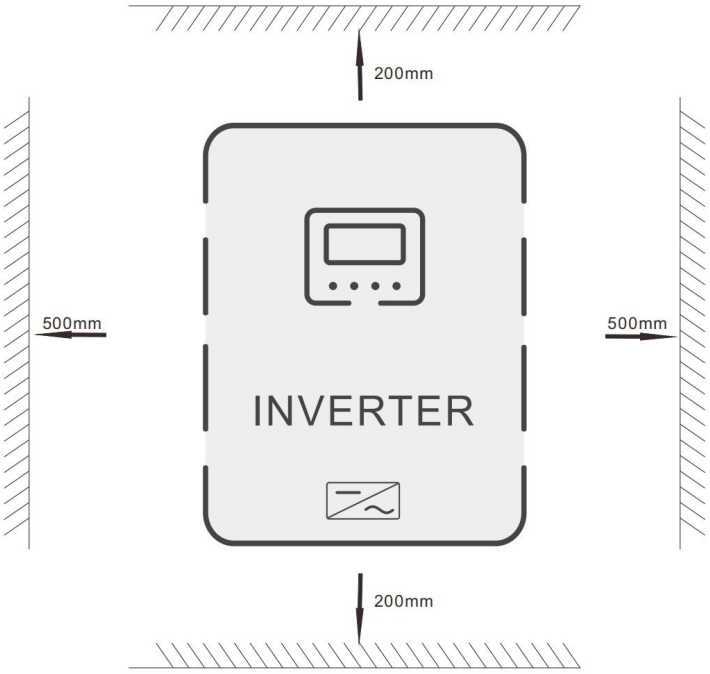
Quality certificate / Outgoing inspection report
x 1pcs

3.2 Mounting Instructions

3.2.1 Installation Location Selection

The IESP SH3 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. (specific requirements: the heat dissipation distance above and below the inverter should be ≥ 200mm, and the distance on both left and right sides should be ≥500mm).
- The ambient temperature should be between-25~60℃ (-13~140℉) to ensure optimal operation.



DANGER

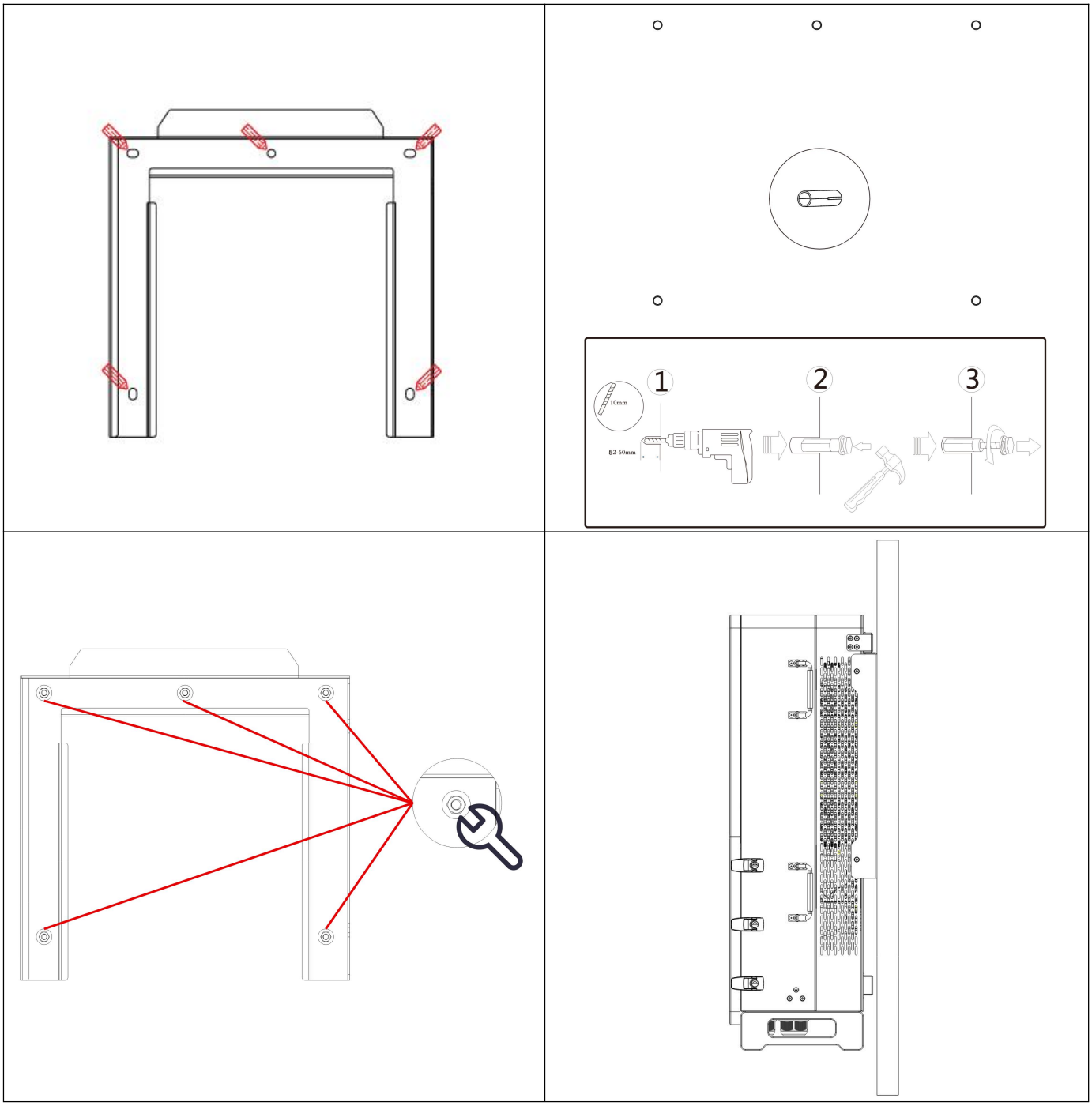
- Do not install the inverter where highly flammable materials are near by.
- Do not install the inverter in potential explosive areas.
- Do not install the inverter with lead-acid batteries in a confined space.

CAUTION

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

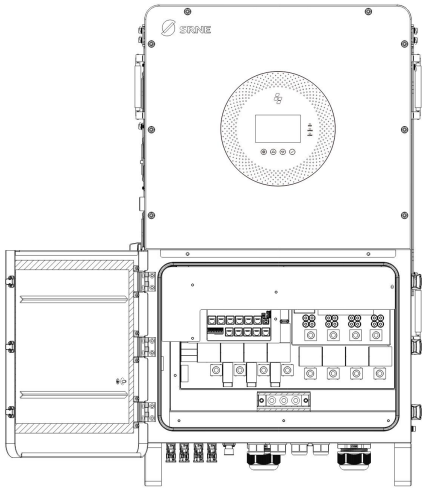
3.2.2 Mounting the Inverter

- **Step 1:** Determine the positions for drilling holes,ensure the position of holes are level,then mark them with a marker pen,use the hammer drill to drill holes on the wall.Keep the hammer drill perpendicular to the wall,do not shake when drilling, so as not to damage the wall.If the error of the hole is too big,you need to reposition.
- **Step2:** Insert M8*60 expansion bolt vertically into the hole an d pay attention to the insertion depth of the expanding bolt(should be deep enough).
- **Step3:** Align the wall hanger with the position of holes,fix the wall hanger on the wall by tightening the expansion bolt with nuts.
- **Step4:** Align the mounting holes and attach the inverter to the wall bracket, securing it in place with safety screws.

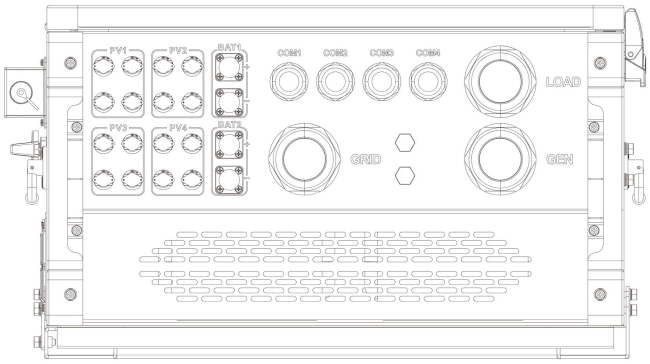


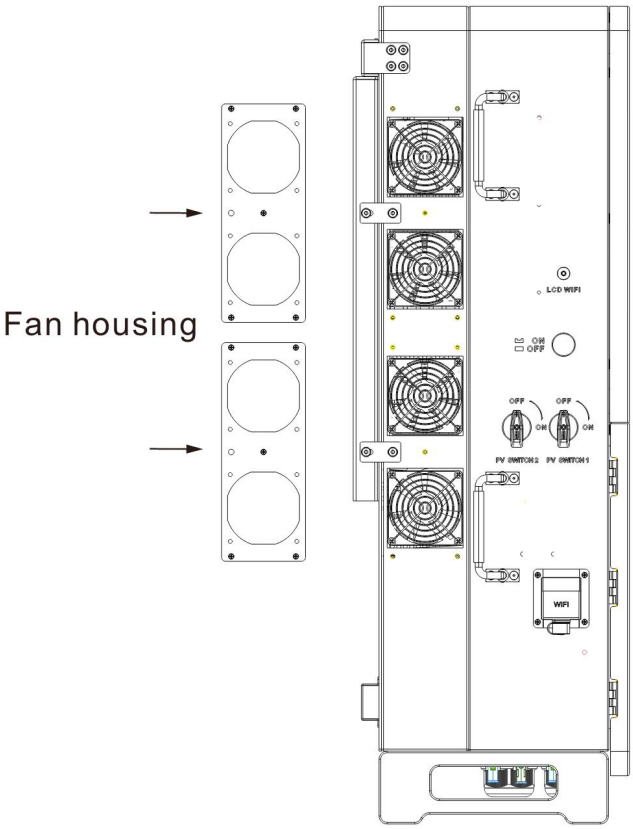
3.2.3 Removing the Terminal Protection Cover

Use the key to unlock the tower buckle lock, and the protective cover can be opened.



Wiring. (Note: The wire must be inserted into the corresponding connector before crimping the terminal.)



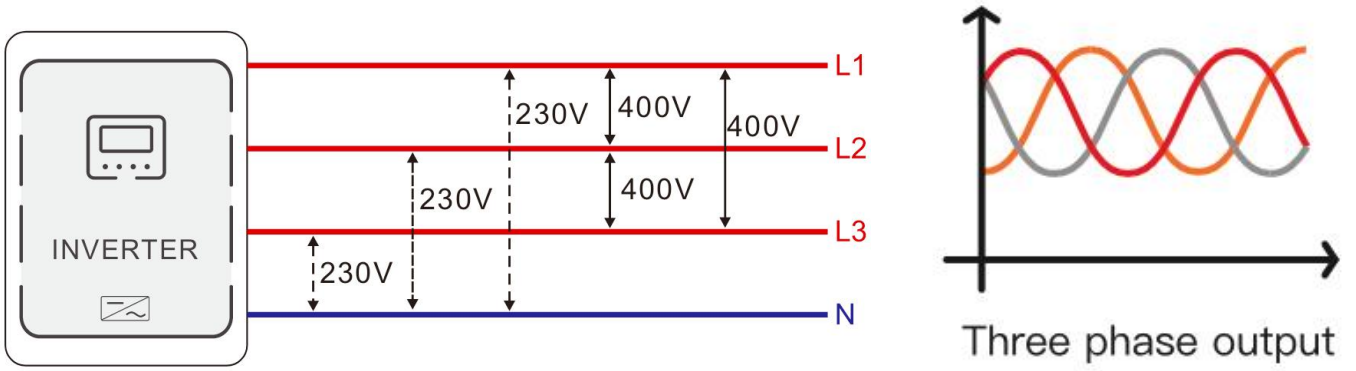


NOTICE

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 Single-Phase or Three-Phase Mode



Items	Description
Applicable models	IESP series SH3 model
AC output phase voltage (L-N)	200~240Vac, 230Vac default

NOTICE

- Users can change the output voltage via the settings menu; for details, refer to Chapter 5.2.
- The output voltage corresponds to the parameter setting item 【Operating Mode】-【Output Phase Voltage】, and the output phase voltage can be set within the range of 200V to 240V.

4.2 Cable & Circuit Breaker Selection

■ PV Input

Models	Cable Diameter	Max. Input Current	Circuit Breaker Spec
IESP500SH3	5mm²/ 10 AWG	40A	2P-50A
IESP550SH3	5mm²/ 10 AWG	40A	2P-50A
IESP600SH3	5mm²/ 10 AWG	40A	2P-50A

■ Battery

Models	Cable Diameter	Max. Input Current	Circuit Breaker Spec
IESP500SH3	21mm²/ 04 AWG	75*2A	2P-150A
IESP550SH3	21mm²/ 04 AWG	75*2A	2P-150A
IESP600SH3	21mm²/ 04 AWG	75*2A	2P-150A

■ Grid

Models	Output Mode	Cable Diameter	Max. Input Current	Circuit Breaker Spec
IESP500SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A
IESP550SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A
IESP600SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A

■ Generator

Models	Output Mode	Cable Diameter	Max. Input Current	Circuit Breaker Spec
IESP500SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A
IESP550SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A
IESP600SH3	Three-phase	42.4mm²/1AWG(L1/L2/L3/N)	200A	4P-250A

■ Load

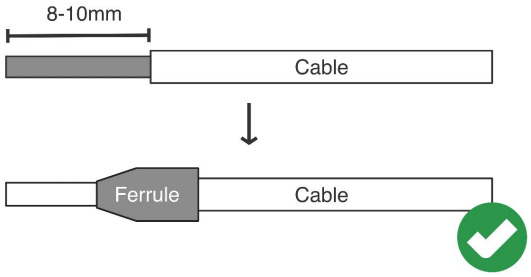
Models	Output Mode	Cable Diameter	Max. Output Current	Circuit Breaker Spec
IESP500SH3	Three-phase	33.6mm²/2AWG(L1/L2/L3/N)	130A	4P-200A
IESP550SH3	Three-phase	33.6mm²/2AWG(L1/L2/L3/N)	130A	4P-200A
IESP600SH3	Three-phase	33.6mm²/2AWG(L1/L2/L3/N)	130A	4P-200A

NOTICE

● **AC input, AC output:**

① Use a stripper to remove the 8-10mm insulation of the cable.

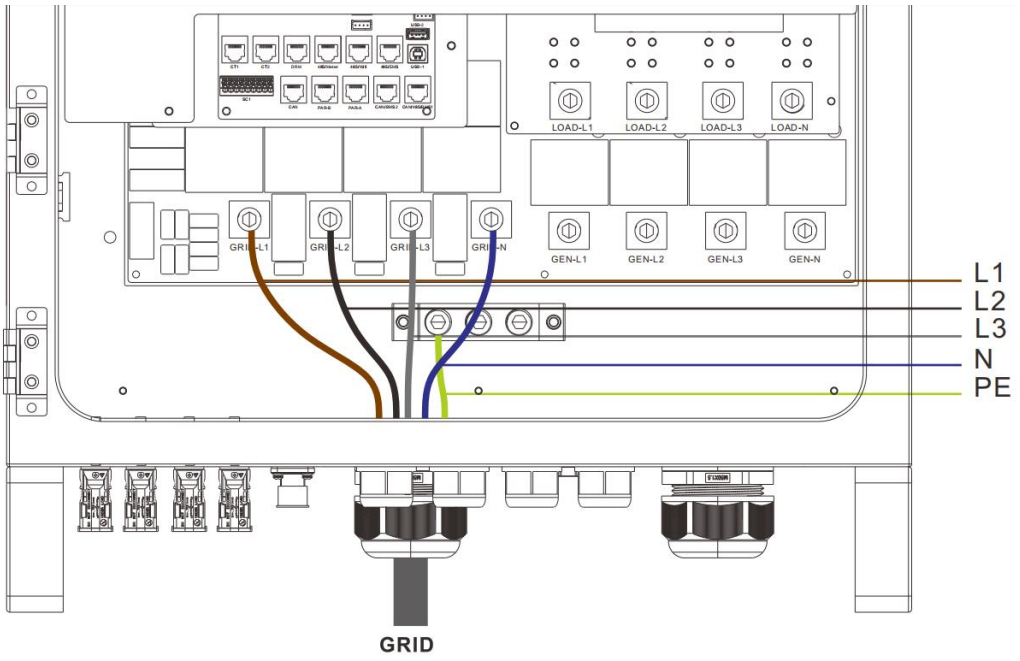
② Fixing a ferrule at the end of the cable (ferrule needs to be prepared by the user).



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

4.3 Grid Input Connection

Connect the live, neutral and ground cables in the position and order of the cables as shown in the diagram below.

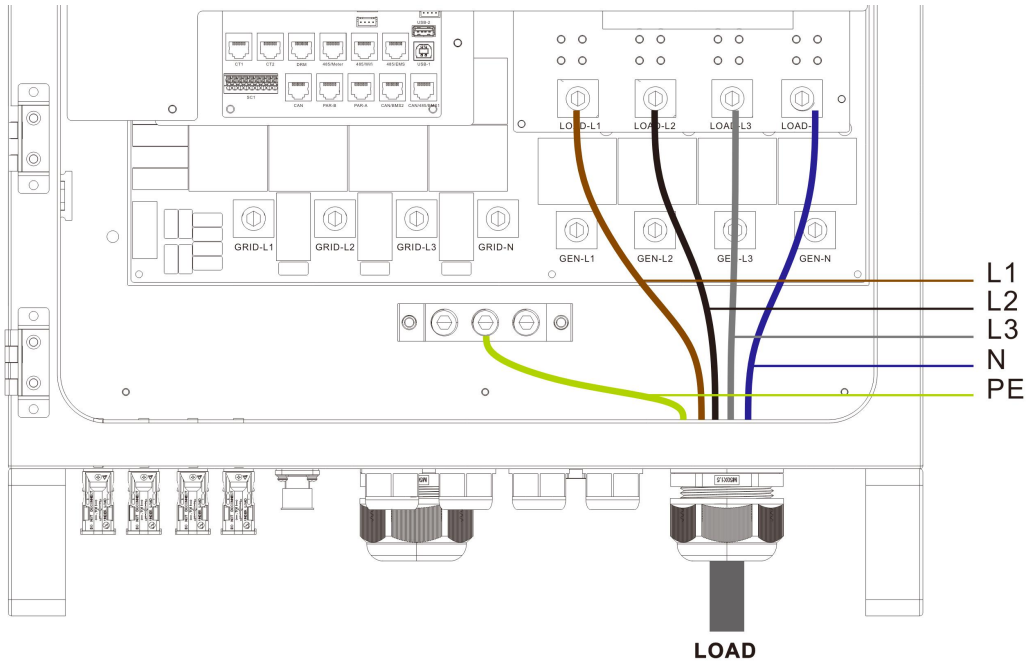


DANGER

- Before connecting the AC input, the circuit breaker must be disconnected to avoid electric shock hazards, and and never operate 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 Load Output Connection

Connect the live, neutral and ground cables in the position and order of the cables as shown in the diagram below.

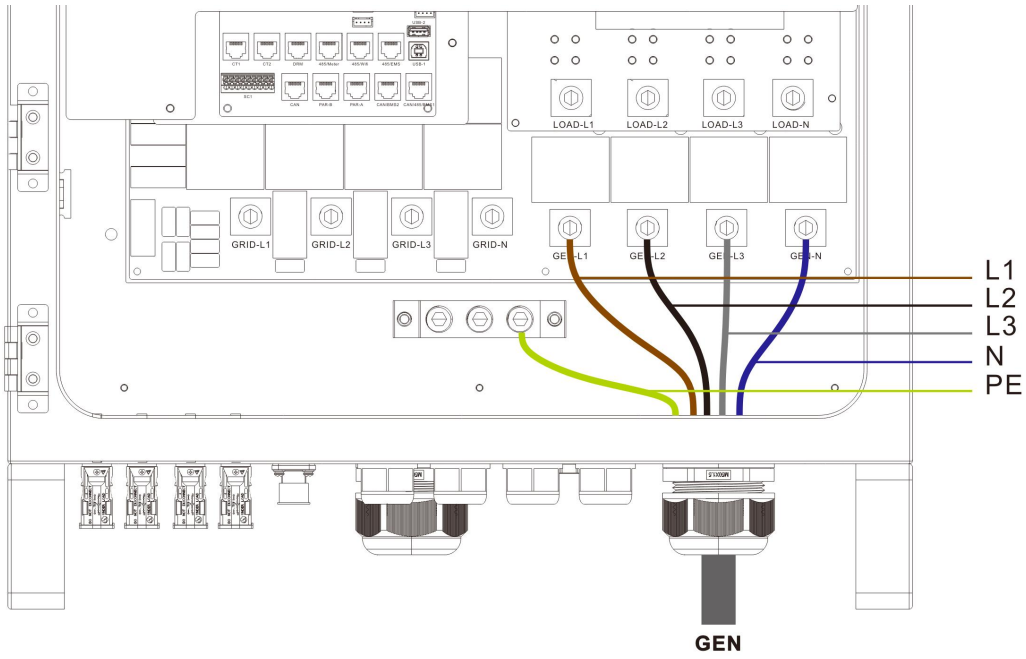


DANGER

- Before connecting the AC input, the circuit breaker must be disconnected to avoid electric shock hazards, and and never operate with electricity.
- Please check that the cable used is sufficient for the requirements, too thin, poor quality cables are a serious safety hazard.

4.5 Generator Input Connection

Connect the live, neutral and ground cables in the position and order of the cables as shown in the diagram below.



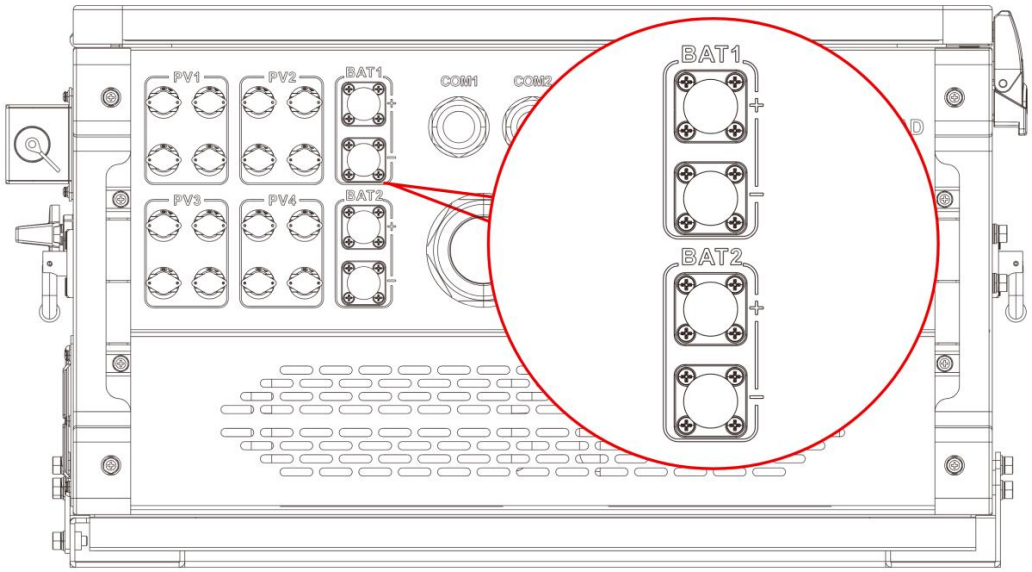
DANGER

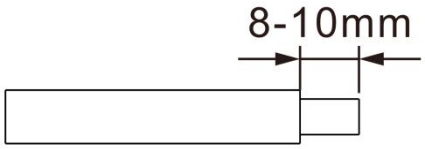
- Before connecting the AC input, the circuit breaker must be disconnected to avoid electric shock hazards, and and never operate with electricity.
- Please check that the cable used is sufficient for the requirements, too thin, poor quality cables are a serious safety hazard.

4.6 Battery Connection

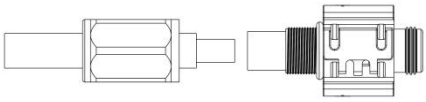
Connect the positive and negative cable of the battery according to the diagram below.

- **Step1:** Select the appropriate cable type and specification.The cable shall be stripped, and the specific stripping length is shown below Fig(1).
- **Step2:** Insert the tripped positive and negative power cables into the positive and negative terminal and crimp them using a clamping tool.
- **Step3:** Before connect the terminal please open the safety catch shown below fig(5).

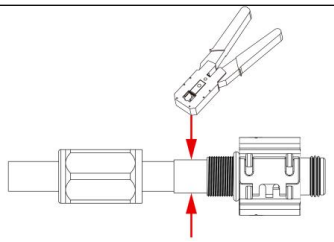




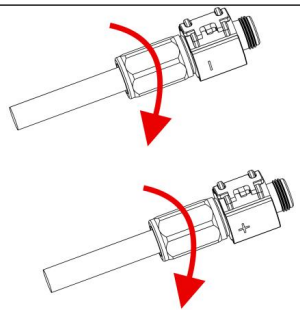
(1) wire cutting



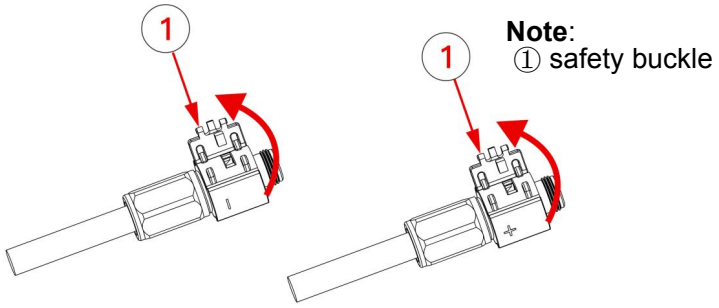
(2) thread the wire



(3) pressing the line



(4) tighten the nut cap



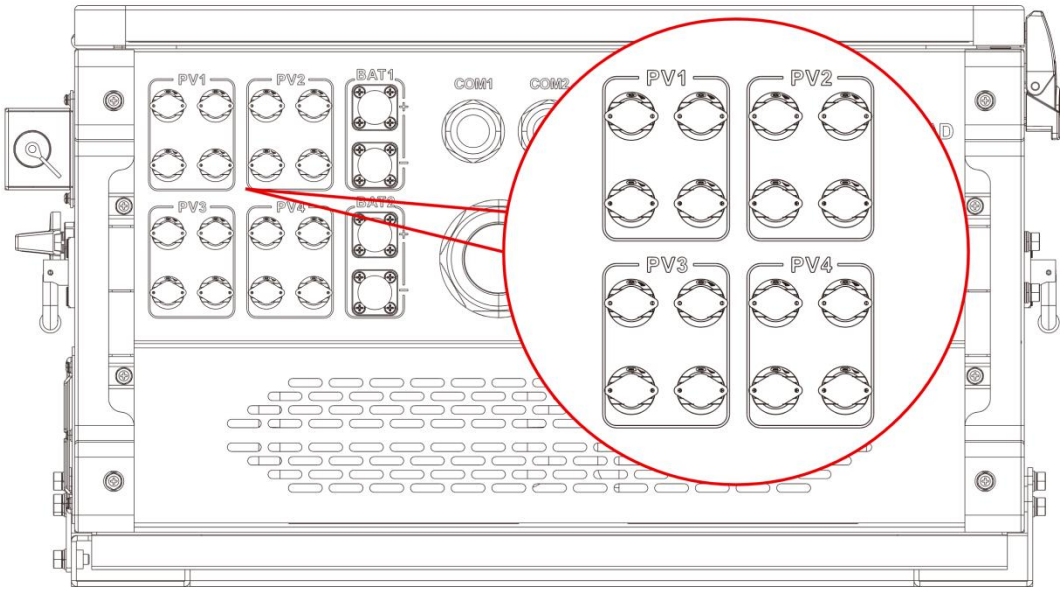
(5) Open the safety buckle before wiring.

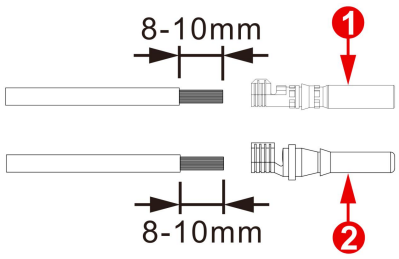
⚠ DANGER

- Before connecting the battery, the circuit breaker must be disconnected to avoid electric shock hazards, and live operation is strictly prohibited.
- Please ensure that the positive and negative poles of the battery are connected correctly. Do not reverse the connection, 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.
- The lengths of the two sets of battery cables connected to the inverter should be as consistent as possible; otherwise, current imbalance may occur.

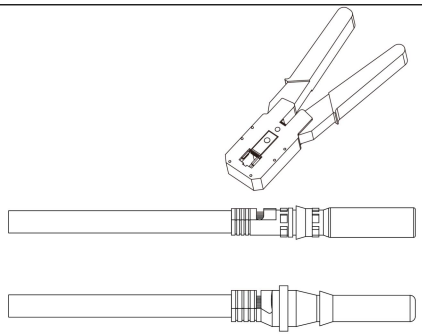
4.7 PV Connection

1. Before connecting PV, first close the external circuit breaker and make sure that the cable used is sufficiently thick. Please refer to section "4.2 Cable & Circuit Breaker Selection".
2. Correctly connect the PV input wires according to the cable sequence and terminal positions shown in the figure below. When using in parallel, different machines need to be connected to different PV arrays or PV sources.

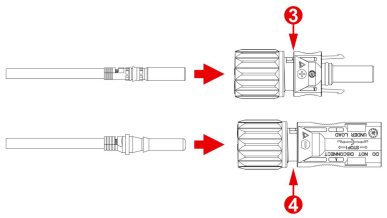




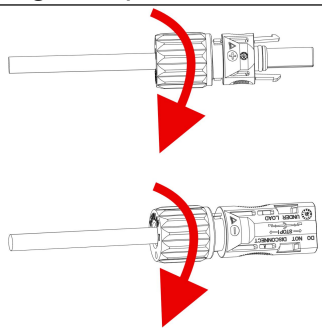
① Positive pole metal
② Negative pole metal



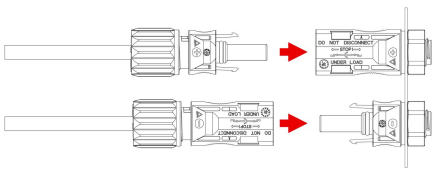
Press the wire by crimping tool



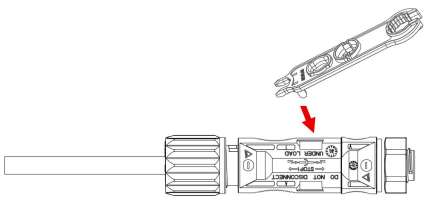
③ Positive connector
④ Negative connector
Insert until a "click" sound is heard.



Tighten terminal



Connect to the inverter prot



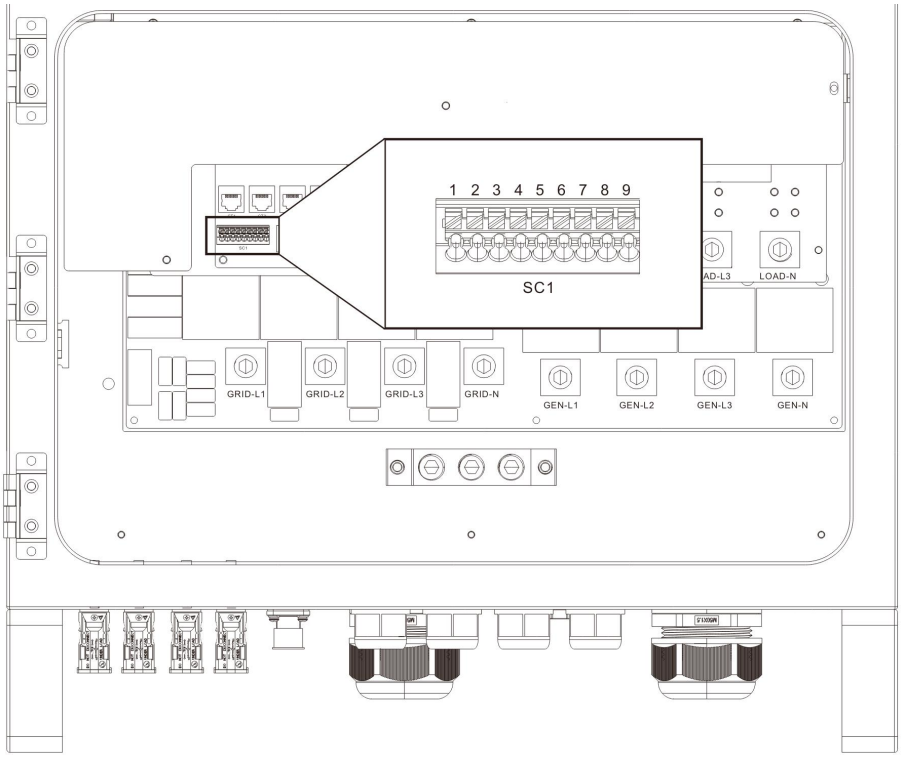
Disconnect PV terminal

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 doesnot exceed the max. open-circuit voltage of the inverter (the value is 1000V), otherwise the inverter may be damaged.

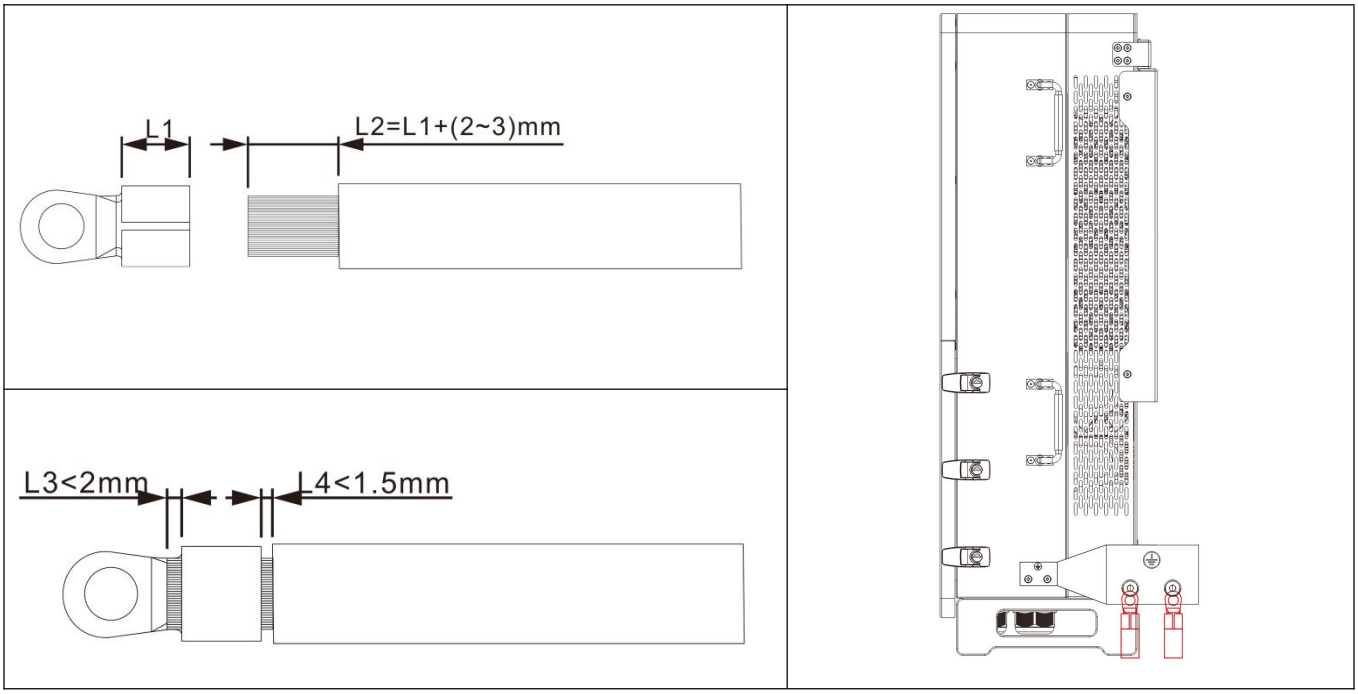
4.8 Dry Contact Connection

Use a small screwdriver to push backward in the direction of the arrow, and insert the communication cable into the dry contact port.
Communication cable diameter: 0.2~1.5mm²



4.9 Grounding Connection

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



NOTICE

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

4.10 Final Installation

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

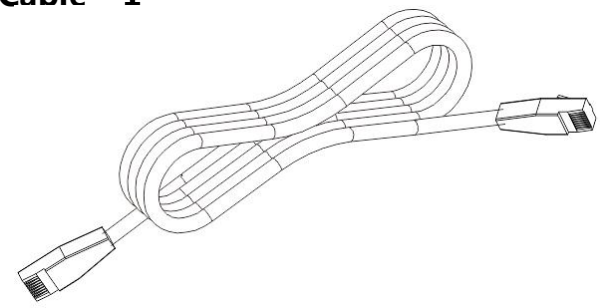
- **Step 1:** Close the circuit breaker of the battery.
- **Step 2:** Press the ON/OFF switch on the side of the inverter. The screen and indicator lights turning on indicates that the inverter has been activated.
- **Step 3:** Sequential close of the circuit breakers for PV, AC input and AC output.
- **Step 4:** Start the loads one by one in order of power from small to large.

4.11 Parallel Connection

4.11.1 Parallel Operation

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

Parallel Communication Cable * 1



4.11.2 Precautions for Connecting Parallel Connection Cables

1.Photovoltaic connection:

When connecting in parallel, the PV array of each inverter must be independent.

2.Battery connection:

When connecting in parallel, the battery of each inverter must be independent.

3.Load connection:

In three-phase parallel connections, all solar energy storage inverters must be connected with N to N and PE to PE. The AC output L lines of the same phase should be connected together.The wiring method is the same when using a generator as a secondary load.

4.Grid connection:

In three-phase parallel connections, all solar energy storage inverters must be connected with N to N and PE to PE. The grid L lines of the same phase should be connected

together.The wiring method is identical when using a generator as an input source or for micro-inverters.

5.Communication lines:

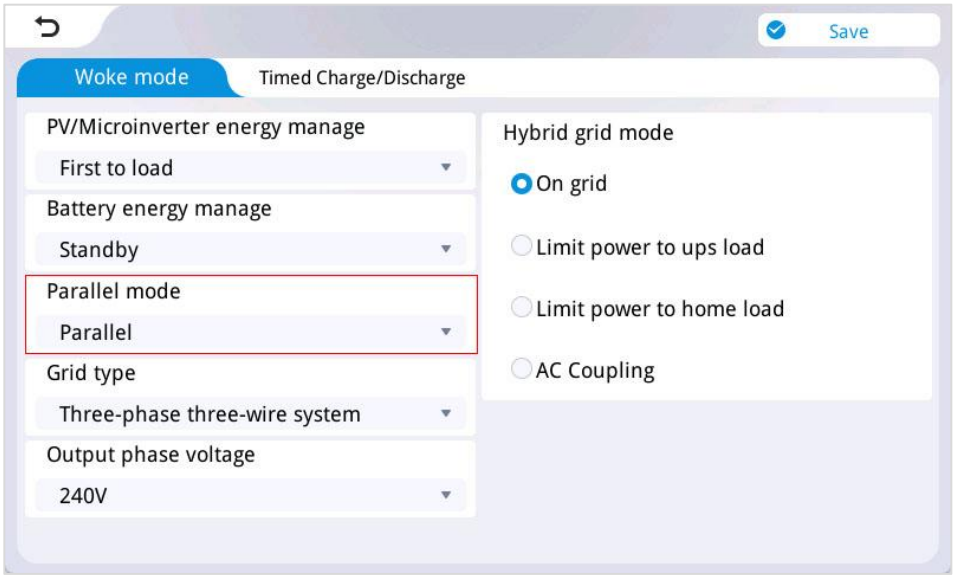
Our parallel communication cable is a shielded 8-pin network cable suitable for three-phase parallel connections. Each unit must have one input and one output connection. Specifically, Unit "Parallel_A" should be connected to Unit "Parallel_B" for parallel operation. Direct connections from "Parallel_A" back to itself or another "Parallel_A" unit, or improper loops between "Parallel_A" and "Parallel_B," are strictly prohibited. Additionally, secure each unit's parallel communication cable firmly to the 8-pin network connector to prevent disconnections or poor contacts, which may lead to abnormal system operation or damage to the output.

6.Before and after connecting the system, carefully refer to the system wiring diagram below. Ensure all connections are correct and secure before powering on.

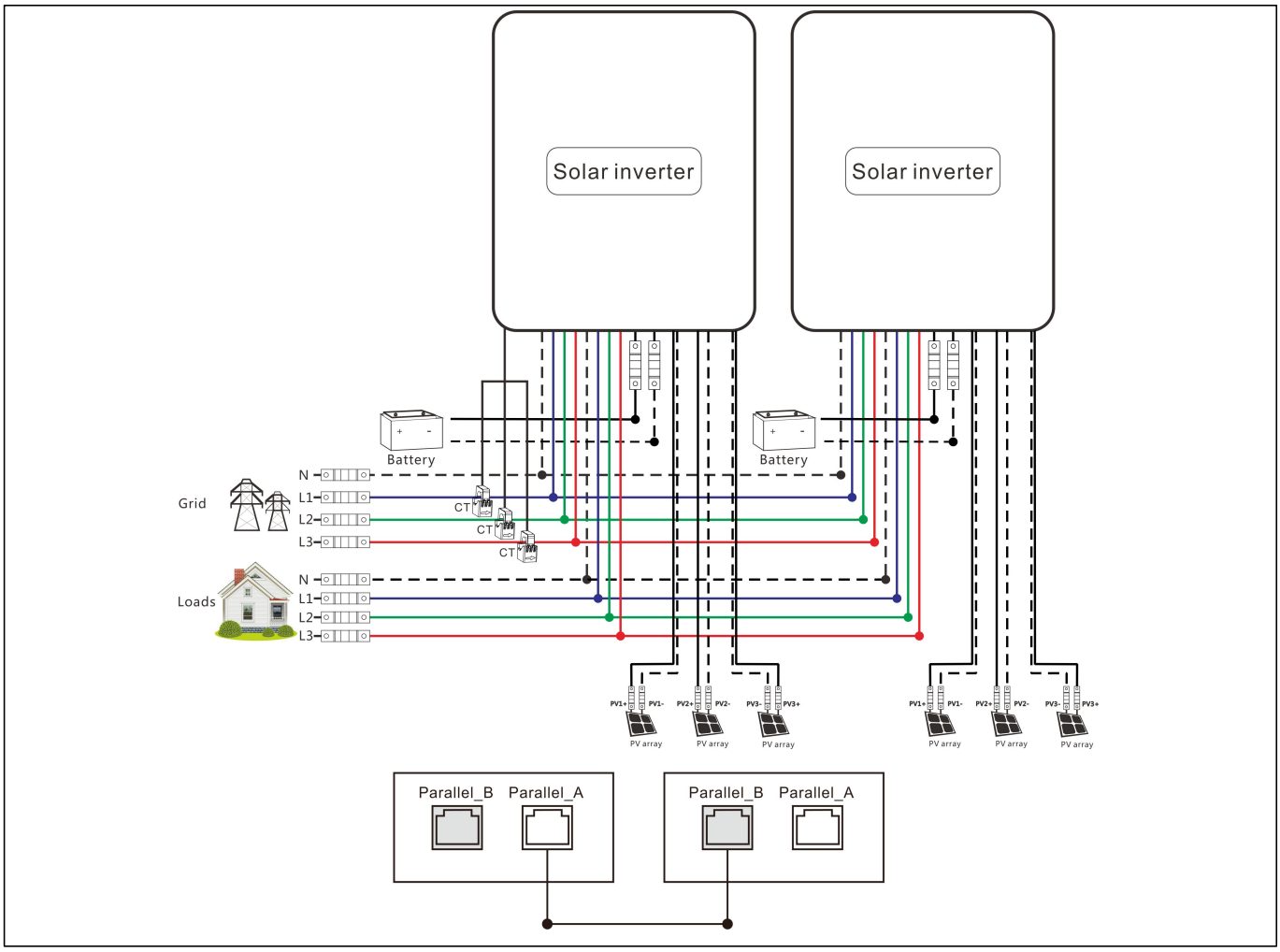
7.After the system is correctly wired, powered on, and operating normally, if a new inverter needs to be connected, ensure that the battery input, PV input, AC input, and AC output are disconnected, and all solar energy storage inverters are powered off before reconnecting to the system.

4.11.3 Schematic Diagram for Three-Phase Parallel Connection Guidance

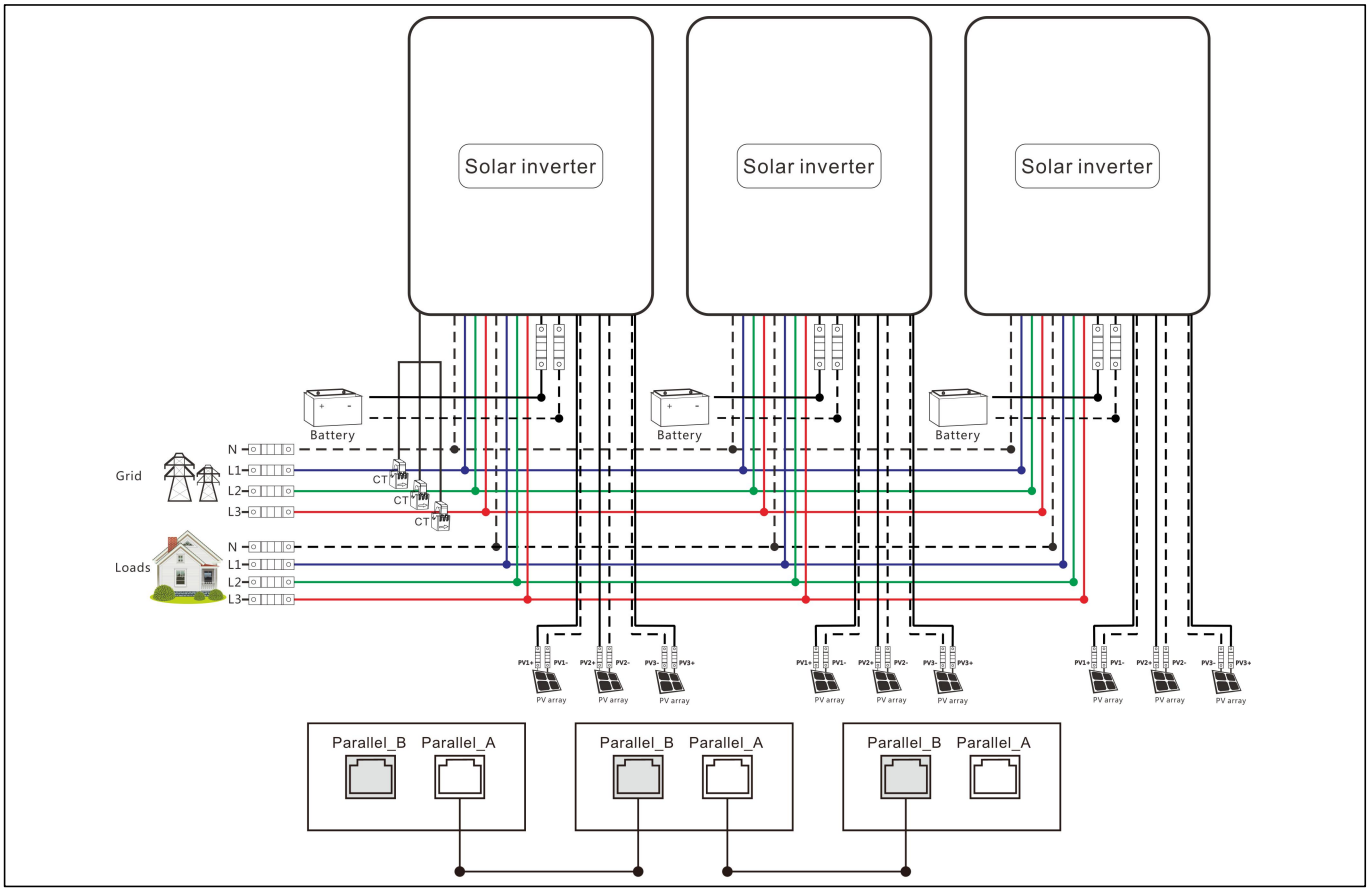
Set the parallel mode of each inverter to "Parallel".



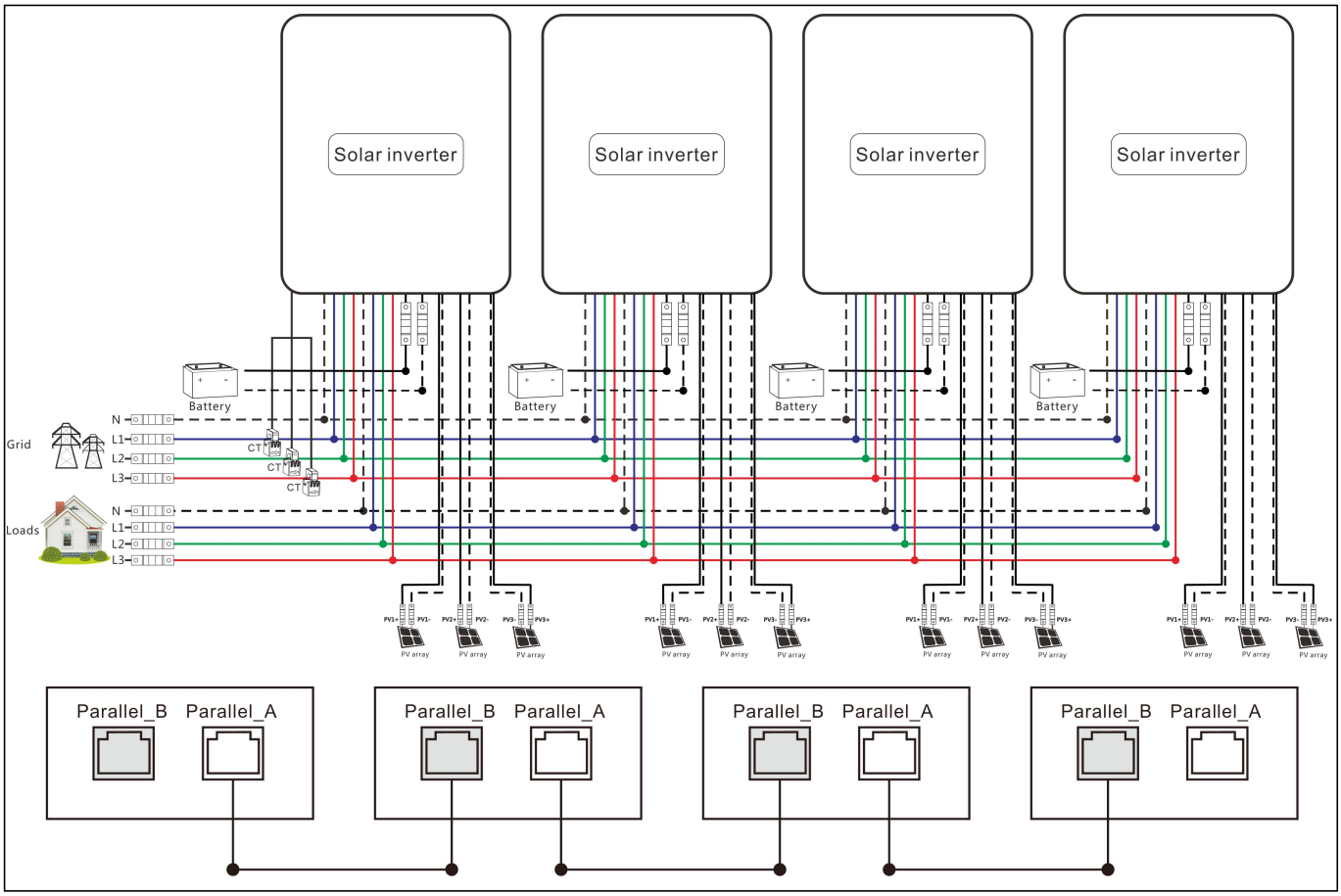
a) Two units connected in parallel:



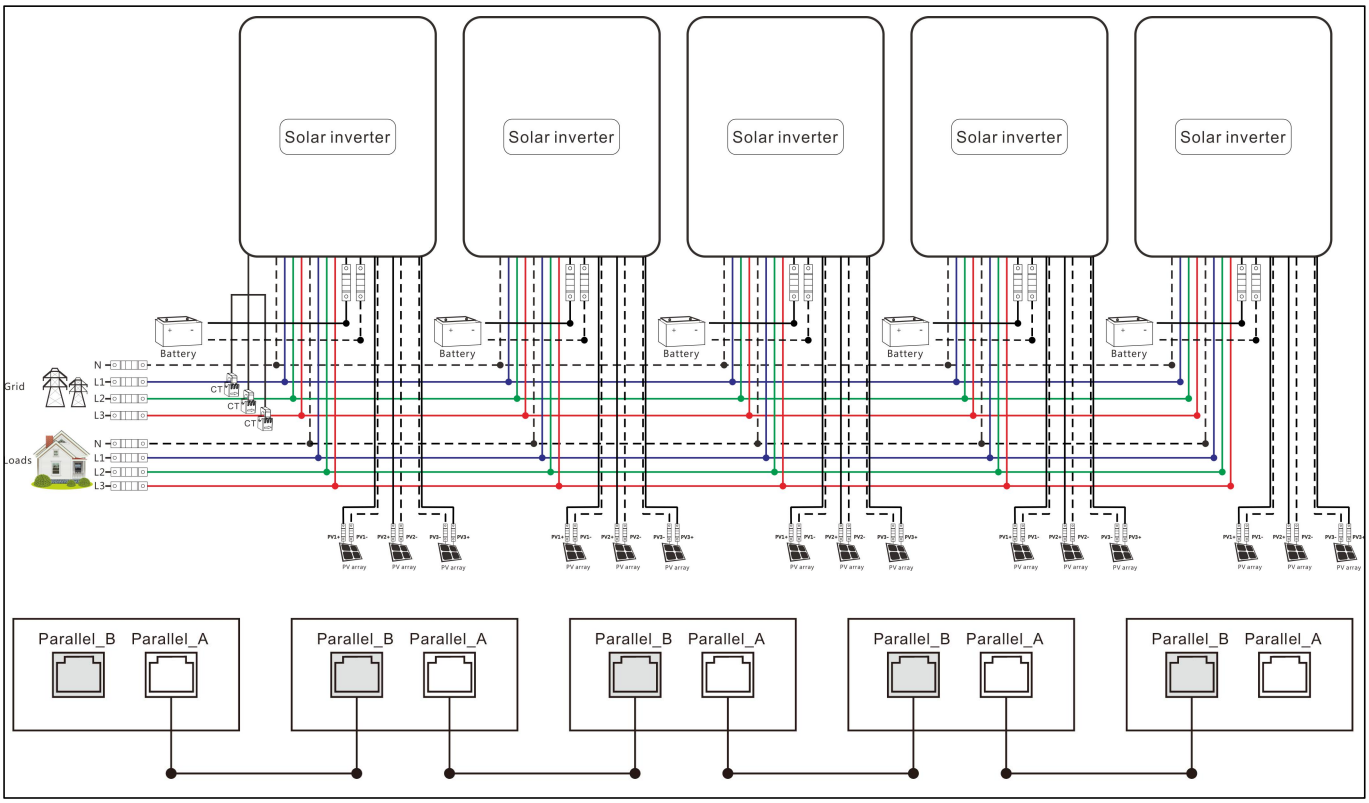
b) Three units connected in parallel:



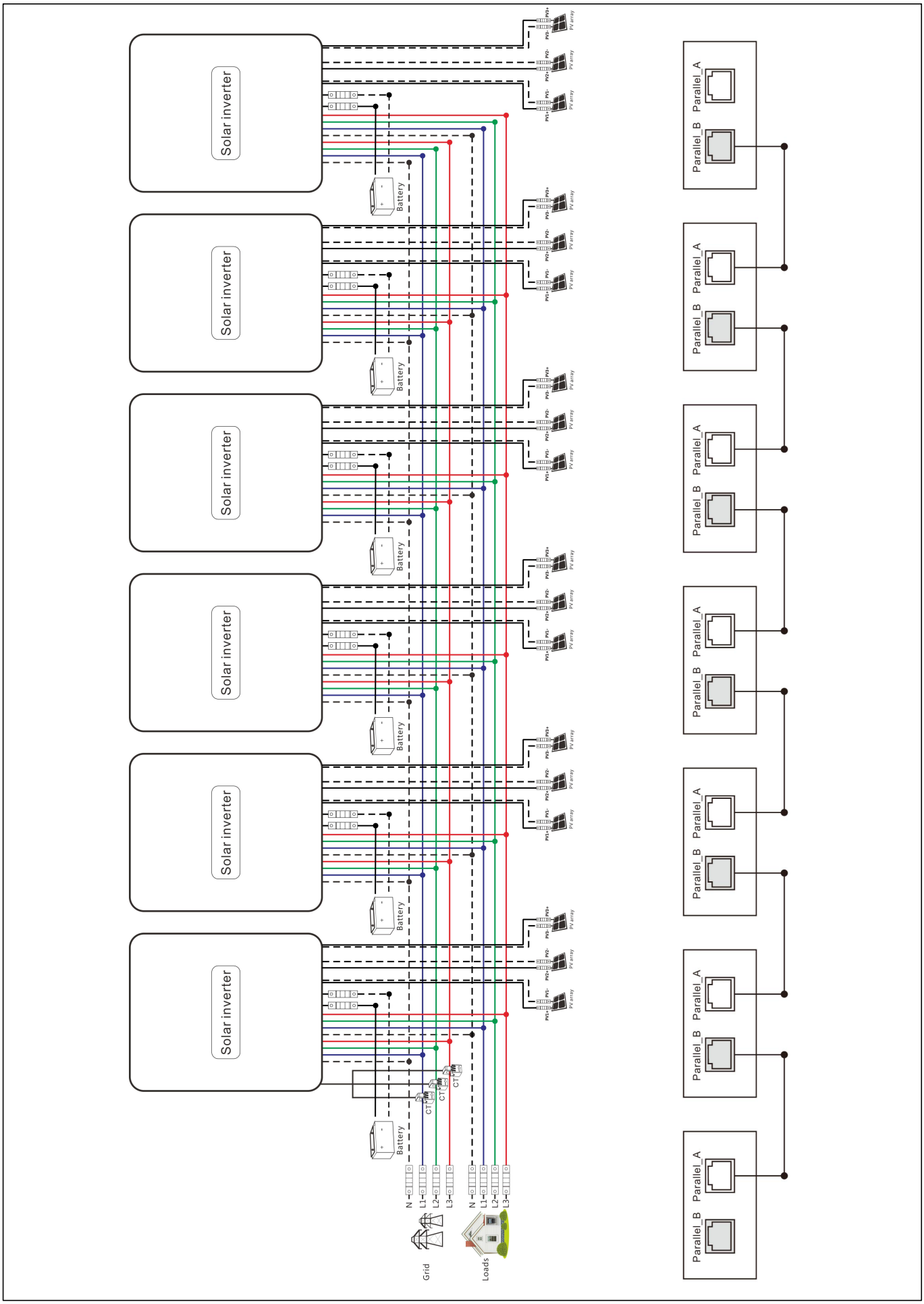
c) Four units connected in parallel:



d) Five units connected in parallel:



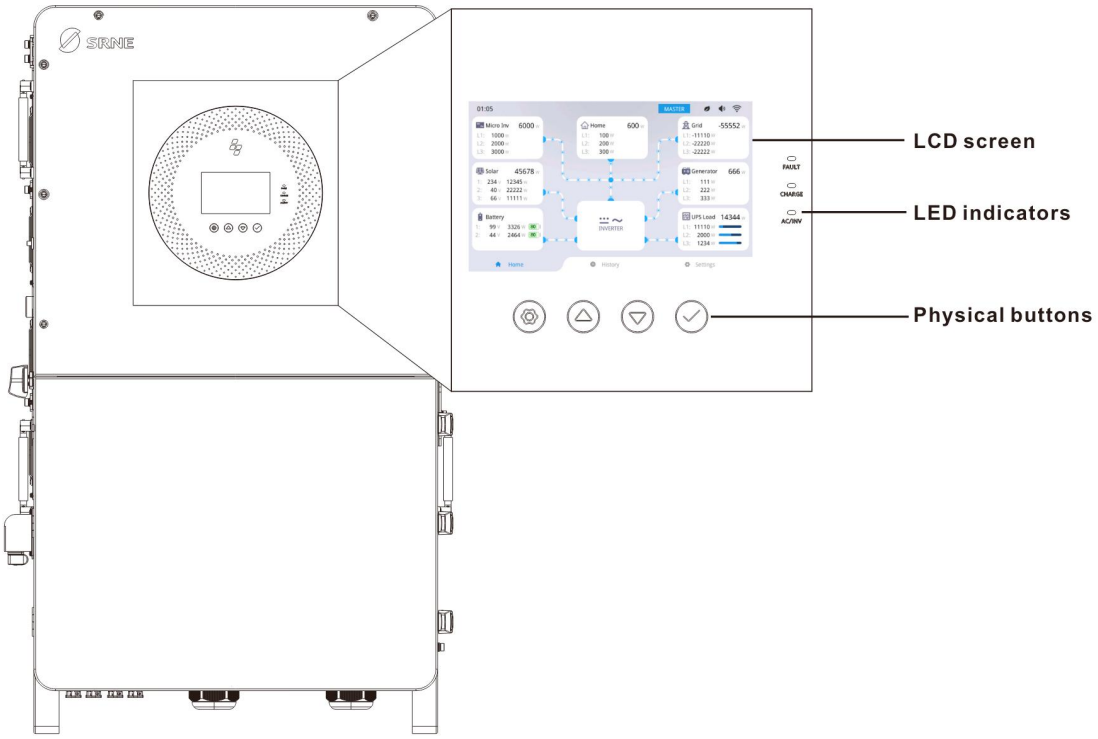
e) Six units connected in parallel:



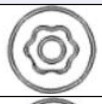
5.Operation

5.1 Operation and Display Panel

The inverter's operation and display panel includes 1 LCD screen, 3 LED indicators, and 4 physical buttons.



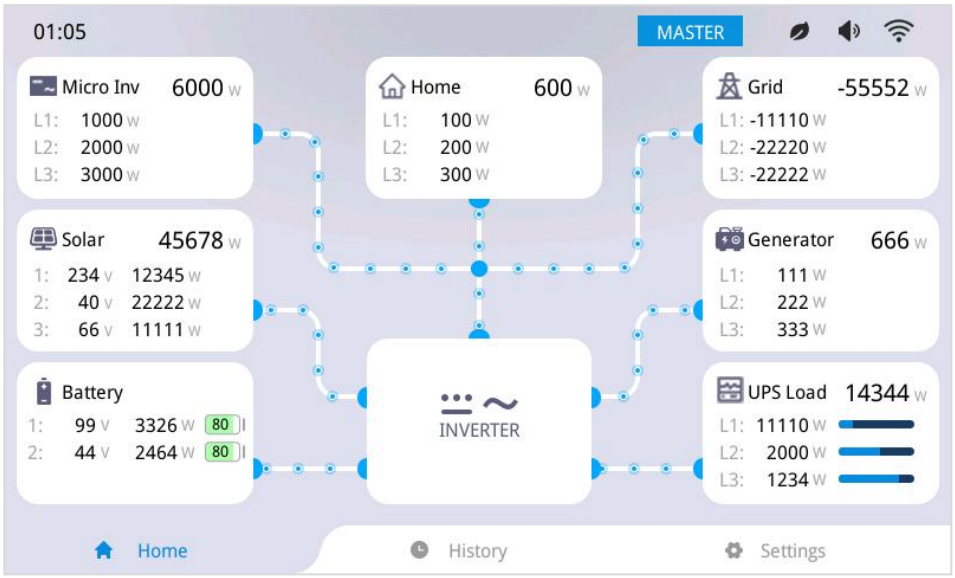
■ Physical buttons

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

■ LED indicators

Indicator	Color	Description
FAULT	Red	Flashing: Error occurred
CHARGE	Green	Continued: Charging completed
		Flashing: Charging in progress
AC/INV	Yellow	Continued: Utility grid bypass output
		Flashing: Inverter output

■ Display Panel



Icon	Description	Icon	Description
	Microinverter		Grid
	Solar Panel		Generator
	Battery		UPS Load
	Household Load		Inverter
	Home Page		Energy Saving Mode
	Historical Data		Settings
01 : 05	Local Time		Buzzer
	WiFi Status		Energy Flow
MASTER	Main Unit Logo		

■ View real-time data

On the LCD home screen, click the inverter icon, battery icon, grid icon, generator icon, UPS load icon, or PV icon allows viewing of real-time data for each component. The microinverter and household load icons are non-clickable, as their data is fully displayed on the home page.

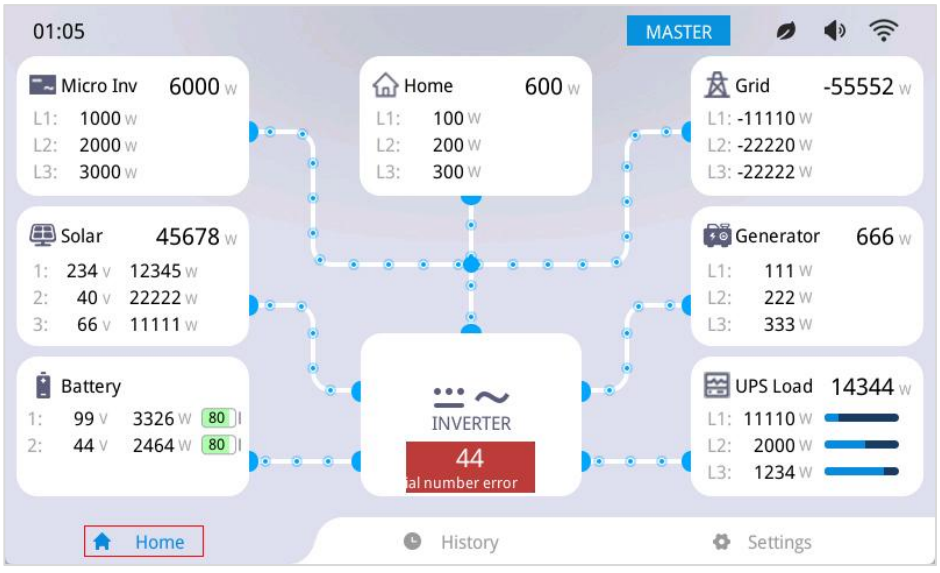
System Data			
NO.	**Real-Time Data Item**	**NO.**	**Real-Time Data Item**
1	MCU1 Version	11	SN Code (Inverter Serial Number)
2	MCU2 Version	12	Machine Status
3	Minor Version Number	13	DC/DC Temperature

4	LCD Version	14	DC/AC Temperature
5	Rated Power	15	Transformer Temperature
6	Customer ID	16	External Battery Temperature
7	RS485 Address	17	Parallel Total Local Load Power
8	Bus Positive Voltage	18	Parallel Total Household Load Power
9	Bus Negative Voltage	19	Parallel Total Grid Power
10	Bus Total Voltage	20	Parallel Total Generator Power
Battery Data			
1	Battery 1 Voltage	7	Battery 2 Voltage
2	Battery 1 Charging/Discharging Power	8	Battery 2 Charging/DischargingPower
3	Battery 1 Charging/Discharging Current	9	Battery 2 Charging/Discharging Current
4	Battery 1 SOC (%)	10	Battery 2 SOC (%)
5	Battery Type	11	BMS Communication Protocol
6	Charging Status	12	BMS Data
Grid Data			
1	L1 Voltage	8	L2 Voltage
2	L1 Current	9	L2 Current
3	L1 Active Power	10	L2 Active Power
4	L1 Apparent Power	11	L2 Apparent Power
5	L3 Voltage	12	L3 Active Power
6	L3 Current	13	L3 Apparent Power
7	Frequency	14	Grid Charging Current
UPS Load Data			
1	L1 Voltage	10	L2 Voltage
2	L1 Current	11	L2 Current
3	L1 Active Power	12	L2 Active Power
4	L1 Apparent Power	13	L2 Apparent Power
5	L3 Voltage	14	L3 Apparent Power
6	L3 Current	15	L3 Active Power
7	L1 Load Rate	16	L2 Load Rate
8	L3 Load Rate	17	Frequency
9	Overall Load Rate		
PV Panel Data			
1	Solar1 Voltage V	8	Solar3 Current A
2	Solar1 Current A	9	Solar3 Power W

3	Solar1 Power W	10	Solar4 Voltage V
4	Solar2 Voltage V	11	Solar4 Current A
5	Solar2 Current A	12	Solar4 Power W
6	Solar2 Power W	13	PV Total Power
7	Solar3 Voltage V		
Generator Data			
1	L1 Voltage	8	L2 Voltage
2	L1 Current	9	L2 Current
3	L1 Active Power	10	L2 Active Power
4	L1 Apparent Power	11	L2 Apparent Power
5	L3 Voltage	12	L3 Active Power
6	L3 Current	13	L3 Apparent Power
7	Frequency	14	Charging Current
Second Load Data			
1	L1 Current	6	L2 Current
2	L1 Active Power	7	L2 Active Power
3	L1 Apparent Power	8	L2 Apparent Power
4	L3 Current	9	L3 Apparent Power
5	L3 Active Power	10	Total Load Power

■ Browsing Detailed Data with Buttons

1. Press the up/down buttons, and when "**HOME**" is highlighted in blue, press the **confirm** button to select the home page icon.



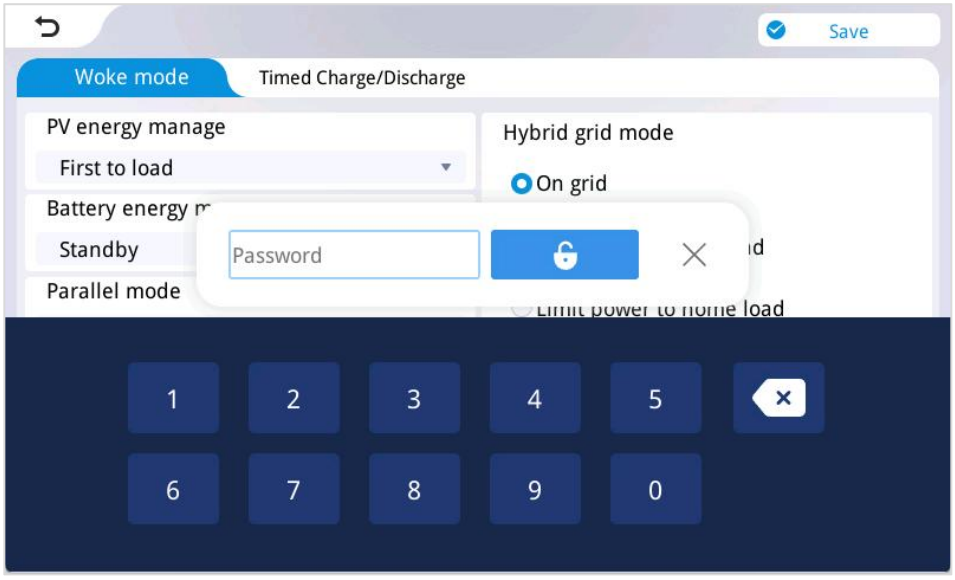
2. After selecting the home page icon, press the confirm button again to enter the data details page.

5.2 Setting Parameters

Operation Instructions:

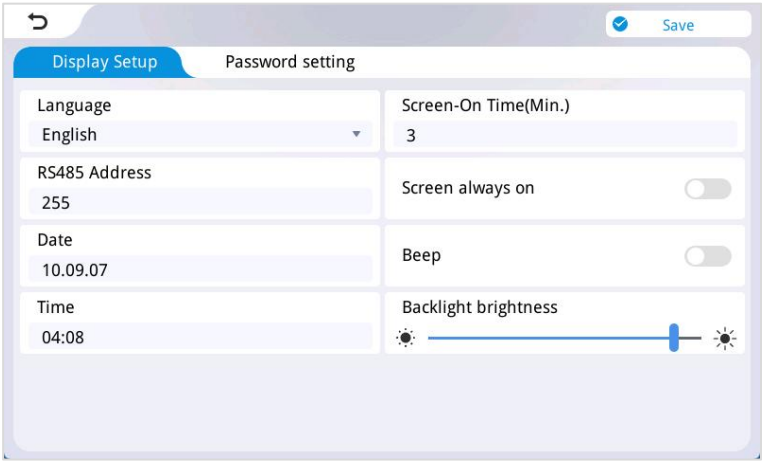
1.Click the "**Settings**" button in the bottom menu bar of the screen to enter the settings interface. It includes seven categories: "**Basic Settings**", "**Operation Mode Settings**", "**Battery Settings**", "**Grid Settings**", "**Advanced Settings**", "**WIFI Firmware Settings**", and "**Firmware Upgrade**".

2.When modifying settings, if password permission is enabled, a password must be entered to modify the parameters.



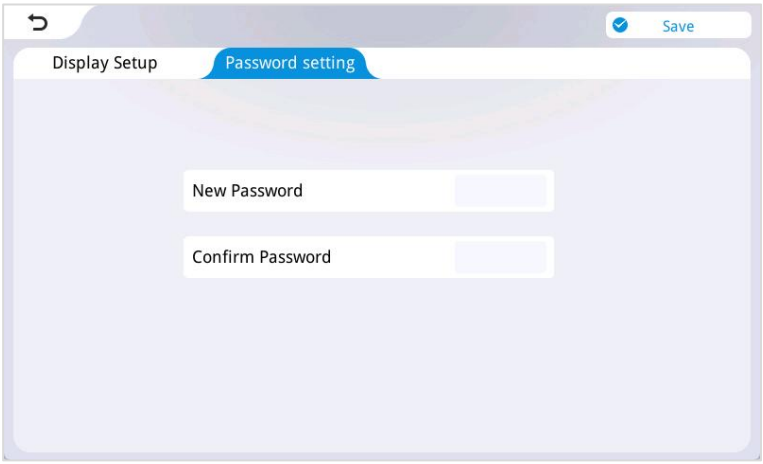
5.2.1 Basic Settings

5.2.1.1 Display Setting



- **Language:** English, Italian, German, Spanish, Chinese.
- **RS485 Address:** RS485 address of the inverter.
  ① Single device: Adjustable range 1~254.
  ② Parallel devices: Adjustable range 1~6.
- **Date:** Set year, month, day.
- **Time:** Set hour and minute.
- **Screen-On Time(Min.):** Adjustable range 1~30 minutes.
- **Screen always On:** Select whether the screen stays on continuously.
- **Beep:** Select whether to enable buzzer alarm.
- **Backlight brightness:** Adjustable from 0~100%.

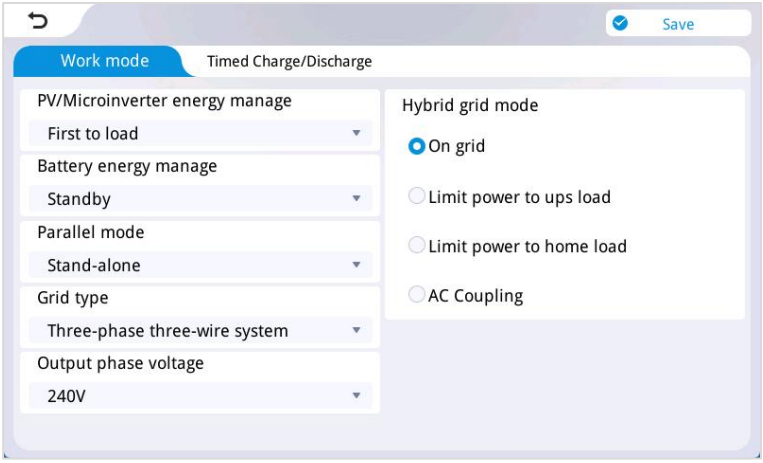
5.2.1.2 Password Setting(Change Password)



- **New Password:** Enter your custom new password.
- **Confirm Password:** Please re-enter the new password exactly as above to verify the accuracy of the password setting.

5.2.2 Operation Mode Settings

5.2.2.1 Working Mode

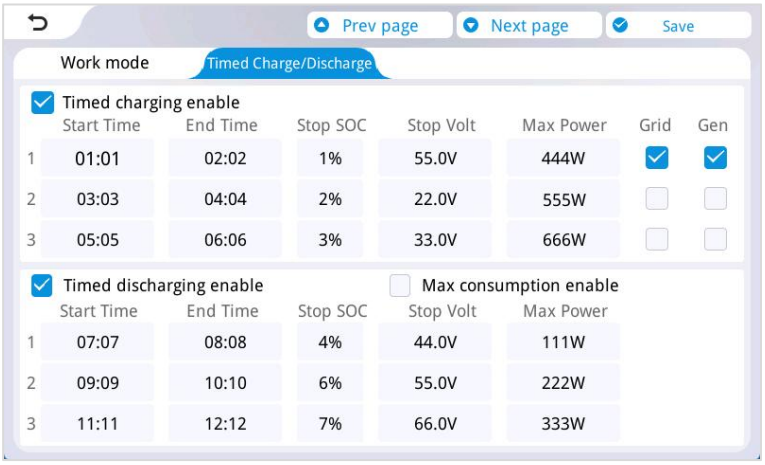


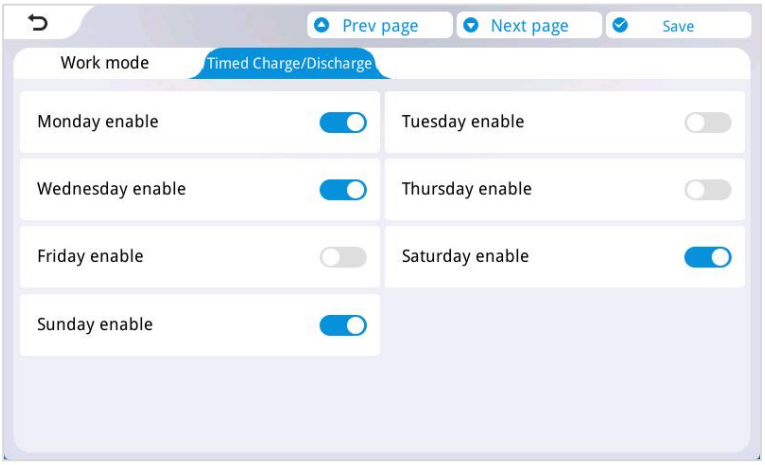
1. UPS Load: Connected to the LOAD port of the machine.
2. Smart Load: Refers to the load connected to the machine's GEN port.(Only valid when the GEN port is set to the smart load function.)
3. Home Load: Refers to the load connected to the machine's GRID port, which requires external CT or energy meter for use.(Otherwise, the power of the Home load cannot be detected.)

This is the detailed page of "Working Mode"		
Parameter Meaning	**Options**	**Description**
Hybrid grid mode	On grid	Direct grid connection of excess PV energy.
	Limit power to UPS load	In this mode, solar or battery energy is only used for UPS load and smart load,Excess energy will not be fed into the grid (UPS load is reverse-flow protected).
	Limit power to home load	In this mode, solar or battery energy is used only for the UPS load, smart load, and home load. Excess energy will not be fed into the grid (HOME load is reverse-flow protected).
	AC Coupling	This mode is used to add AC coupling functionality to on-grid inverters. The on-grid inverter needs to be connected to the grid side of the hybrid inverter (effective only when the GEN port is not set to micro-inverter mode); or connected to the generator side of the hybrid inverter (effective only when the GEN port is set to micro-inverter mode). In this mode, the hybrid inverter will use the grid energy from the on-grid inverter to power loads or charge batteries.
PV/Microinverter energy manage	When the hybrid grid mode is set to "Limit power supply to UPS load" or when CT1 is not connected, the meter is not communicating, or communication fails (effective only when the meter detection location is set to the grid side), the subsequent loads refer to the UPS load and smart load. When the hybrid grid mode is set to "Limit Home Load/Grid Power Supply" and CT1 is successfully connected or the meter communication is successful (effective only when the meter detection location is set to the grid side), the subsequent loads refer to the UPS load, smart load, and home load.	
	First to Load	Photovoltaic energy is prioritized for load, followed by charging, and lastly, feeding into the grid. Micro-inverter energy is prioritized for load, followed by charging, and lastly, feeding into the grid.
	First to charging	Photovoltaic energy is prioritized for charging, followed by load, and lastly, feeding into the grid. Micro-inverter energy is prioritized for charging, followed by load, and lastly, feeding into the grid.
	First to grid	Photovoltaic energy is prioritized for load, followed by feeding into the grid, and lastly, charging. Micro-inverter energy is prioritized for load, followed by feeding into the grid, and lastly, 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	The battery can supply power to the UPS load, smart load, and home load, but does not participate in selling power to the grid.
	Battery to home load	The battery powers UPS loads, smart loads, and household loads, but does not participate in grid selling.

	Battery to grid sell	The battery can supply power to the UPS load, smart load, and home load, and participate in selling power to the grid.
Parallel mode	Stand-alone.	
	Parallel operation.	
Grid type	Three-Phase Three-Wire System.	
	Three-Phase Four-Wire System.	
Output phase voltage	Settable: 200V,208V,220V,230V,240V	

5.2.2.2 Peak Shaving

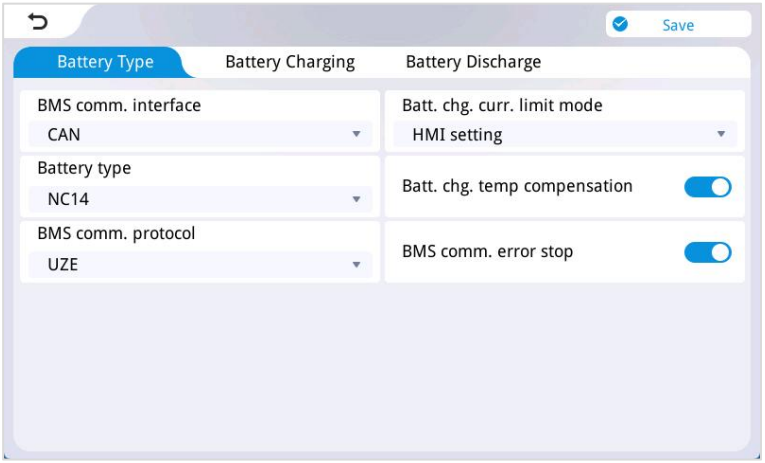




- **Timed charging enable:** Select whether to enable scheduled charging.
- **Timed discharging enable:** Select whether to enable scheduled discharging.
- **Start/End Time:** Set the time period for scheduled charging/discharging.
- **Stop SOC:** Set the battery's cutoff SOC values for charging/discharging during the scheduled charging/discharging time periods. (effective when BMS communication is successful).
- **Stop Volt:** Set the battery's cutoff voltage values for charging /discharging during the scheduled charging/ discharging time periods. (effective when BMS communication is not established or fails).
- **Max. Power:** Setting the battery charging power and discharging power during the scheduled charging and discharging time period.
- **Grid:** Allow the grid to charge the battery during the scheduled charging period.
- **Gen:** Allow the generator to charge the battery during the scheduled charging period.
- **Max. consumption enable:** Allow the battery to discharge outside the scheduled discharging period.
- **Weekly Enable:** Set the days of the week for scheduled charging/discharging (only valid for scheduled charging/discharging).

5.2.3 Battery Settings

5.2.3.1 Battery Type



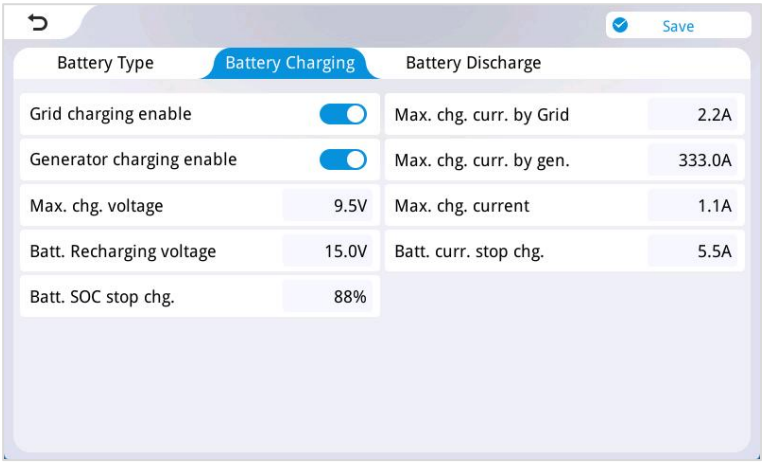
- **BMS comm. interface:**
  ① **Disable:** BMS communication disabled.
  ② **RS485:** BMS RS485 communication.
  ③ **CAN:** BMS CAN communication.
- **Battery Type:**
  ① **USER define:** All battery parameters can be customized by the user.
  ② **Lithium:** Lithium Battery.
  ③ **No battery:** No battery connected.

- **BMS comm. protocol:** When the BMS port selection is set to CAN, the corresponding lithium battery manufacturer's brand must be selected for communication.
  CAN protocol: UZE=UZENERGY; WOW_CAN=SRNE

Note: Please refer to the actual display on the screen.

- **Battery chg. curr. limit mode(valid for BMS communication):**
  ① **HMI setting:** The max. battery charging current is limited by the charging current setting value of the inverter.
  ② **BMS setting:** The max. battery charging current is restricted by the current limit value of the BMS.
  ③ **Inverter setting:** The max. battery charging current is limited by the derating logic of the device.
- **Batt. Chg Temp Compensation:** Used to select whether to enable temperature compensation.

5.2.3.2 Battery Charging



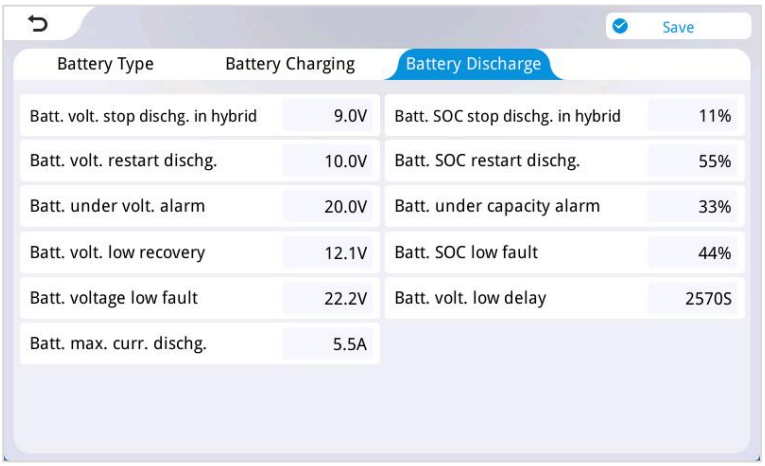
- **Grid charging enable:** Select whether to allow the grid to charge the battery (not applicable to scheduled charging).
- **Generator charging enable:** Select whether to allow the generator to charge the battery (not applicable to scheduled charging).
- **Max. chg. voltage:** Set the maximum charging voltage during constant voltage charging of the battery.

- **Batt. Recharging voltage:** After the battery is fully charged, the inverter stops charging. Charging resumes when the battery voltage drops below this value. (This setting is effective when BMS communication is not established or has failed.)
- **Batt. SOC stop chg.:** When the SOC reaches the specified value, battery stops charging. (Valid when BMS communication is normal).
- **Max. chg. curr. by Grid:** Set the maximum charging current from the grid to the battery.
  (**Note**: This value refers to the battery-side current, not the grid-side current, and does not apply to scheduled charging.)

- **Max. chg. curr. by gen.:** Set the maximum charging current from the generator to the battery. (**Note**: This value refers to the battery-side current, not the generator-side current, and does not apply to scheduled charging.).
- **Max. chg. current:** Set the maximum charging current during the constant current phase of battery charging.
- **Batt. curr. stop chg.:** During the constant voltage charging phase, charging will cease when the charging current falls below this value. (Effective when BMS communication is not performed or BMS communication fails).

Note: After the battery is fully charged, the inverter stops charging. Charging will resume when the battery SOC drops below this value. (Fixed at Battery Charging Stop SOC - 5%, non-modifiable, effective when BMS communication is normal)

5.2.3.3 Battery Discharging



- **Batt. under volt. alarm:** When the battery voltage is lower than this value, the inverter will report an under-voltage alarm (Notify the user that the battery is about to stop discharging), but the battery will not stop discharging. (Effective when BMS communication is not established or fails.)
- **Batt. volt. low recovery:** When the battery report voltage low fault, the battery voltage reach this setting, the fault will be cleard.
- **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 battery SOC is lower than this value, the inverter will report a low battery SOC fault and stop discharging. (Effective when BMS communication is normal.)
- **Batt. voltage low fault:** When the battery voltage is lower than this value and after the "Discharge Stop Delay Time" elapses, the inverter will report a low battery voltage fault and stop discharging.
- **Batt. volt. low delay:** Battery stop discharge delay time.
- **Batt. max. curr. dischg.:** Set the max. battery discharger current.

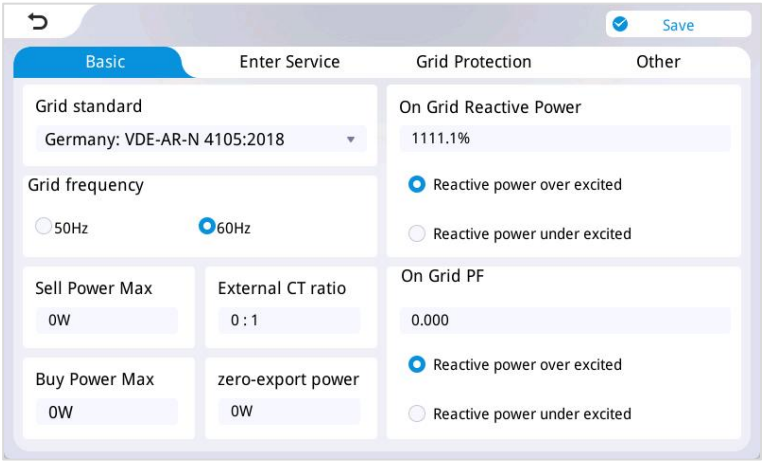
The following settings are only effective in hybrid grid operation mode:

- **Batt. volt. stop dischg. in hybrid:** Discharging stops when the battery voltage is lower than this value. (Effective when BMS communication is not established or fails.)
- **Batt. SOC stop dischg. in hybrid:** Discharging stops when the battery SOC is lower than this value. (Effective when BMS communication is normal.)
- **Batt. volt. restart dischg. :**The inverter stops discharging after low battery voltage, and resumes discharging when the battery voltage rises above this value. (Effective when BMS communication is not established or fails.)
- **Batt. SOC restart dischg.:** The inverter stops discharging after low battery capacity, and resumes discharging when the battery SOC rises above this value. (Effective when BMS communication is normal.)

Note: When the [Advanced Settings] - [Generator] - [Dry Contact Function] is set to Generator Control, the dry contact signal will activate when the discharge level falls below the hybrid network discharge limit, and the signal will be deactivated when the recharge threshold is exceeded.

5.2.4 Grid Connection Settings

5.2.4.1 Basic Page



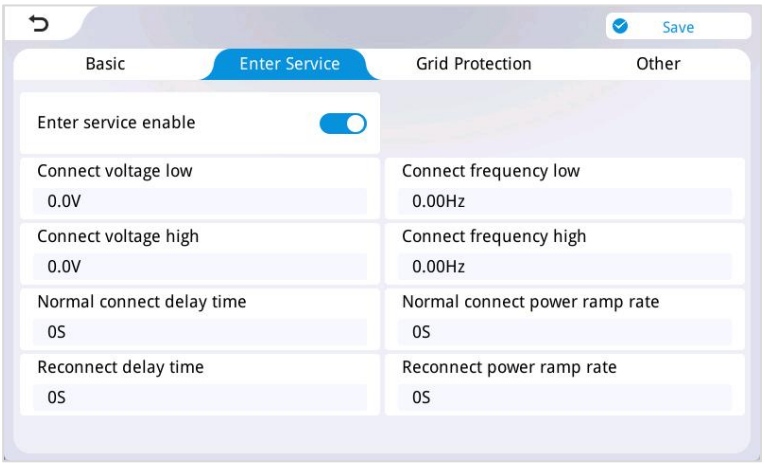
- **Grid frequency:** Select the local grid frequency (50Hz/60Hz).
- **Sell Power Max.:** Set the maximum power for feeding into the grid.
- **Buy Power Max.:** Maximum power drawn from the grid. If the grid charging power + load power by the grid exceeds this setting, the inverter will prioritize reducing the grid charging power to avoid exceeding the buying power threshold.

- **External CT ratio:** When connecting an external CT1, enter the ratio on the CT1 specification. (CT1 is fixed for grid-side power collection.)
- **zero-export power:** Error calibration power for anti-backflow, recommended to be set between 20-100W. Due to sampling accuracy issues, in order to bring the anti-backflow side power close to 0W:
  ① When buying power P > 0, set this value to P;
  ② When selling power P > 0, set this value to -P.
- **On Grid Reactive Power:** Setting range 0~100%, % of reactive power.
- **Reactive power over/under excited:** "over" indicates 0%-100% / "under" indicates -100%~0%.
- **On Grid PF:** Setting range 0.8 ~ 1.
- **Reactive power over / under excited:** "over" indicates 0.8 ~ 1 / "under" indicates -0.8 ~ -1

- **Grid standard (The actual display on the screen shall prevail):**

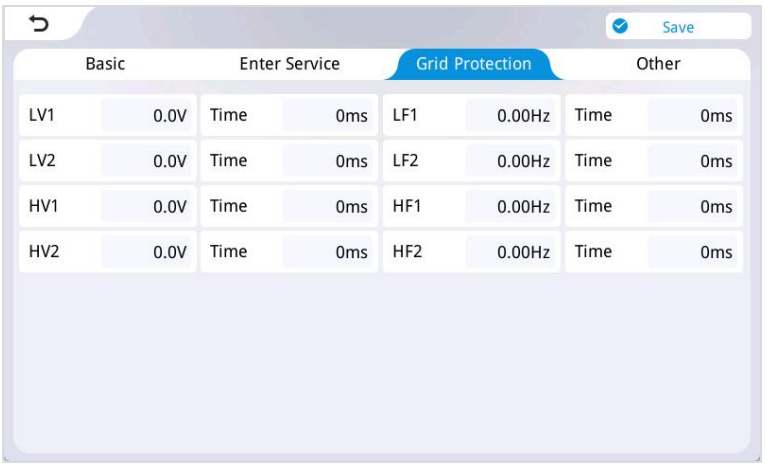
Austria: TE-OVE	Thailand: PEA-MEA PEA-MEA	Italy: CEI 0-21:2022/V1:2022
Germany: VDE-AR-N 4105:2018	Europe: EN 50549-1	Spain: UNE 217002: 2020-10
United States: IEEE Std 1547 2018/IEEE1547	Great Britain: G99	South Africa: NRS097
Australia: AS4777.2 Australia A	Myanmar	Poland: EN 50549-1
Australia: AS4777.2 New Zealand	Puerto Rico	Thailand: PEA-MEA
Ireland: EN50549-IE	United States: UL1741	Northern Ireland: G99/NI
Great Britain: G98	Northern Ireland: G98/NI	Uninitialized

5.2.4.2 Enter Service (This setting is not recommended to be changed by the customer)



- **Enter service enable:** Grid connection startup setting (enabled by default).
- **Connect voltage low:** Min. voltage requirement for grid connection.
- **Connect frequency low:** Min. frequency requirement for grid connection.
- **Connect voltage high:** Max. voltage requirement for grid connection.
- **Connect frequency high:** Max. frequency requirement for grid connection.
- **Normal connect delay time:** The delay time for the inverter to connect to the grid when the grid first meets the connection requirements.
- **Normal connect power ramp rate:** The ramp rate of grid-connected power for the first grid connection.
- **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.

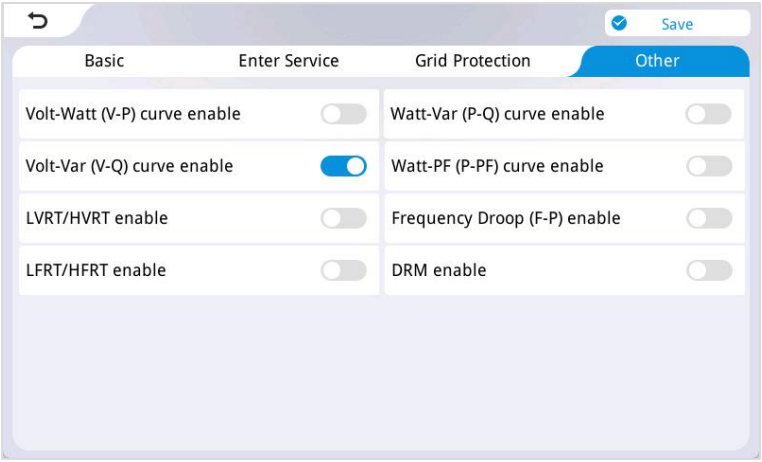
5.2.4.3 Grid Protection (This setting is not recommended to be changed by the customer)



- **Time:** Time Protection Response Time.
- **LV1:**
  Class 1 undervoltage protection point.
  When the grid voltage drops below this threshold and remains so for the corresponding protection response time, the inverter shall disconnect from the grid.
- **LF1:** Class 1 underfrequency protection point.
  When the grid frequency drops below this threshold and remains below it for the corresponding protection response time, the inverter shall disconnect from the grid.
- **LV2:** Class 2 undervoltage protection point.
  When the grid voltage drops below this threshold and remains below it for the corresponding protection response time, the inverter shall initiate grid disconnection.
- **LF2:** Class 2 underfrequency protection point.
  When the grid frequency drops below this threshold and remains below it for the corresponding protection response time, the inverter shall disconnect from the grid.
- **HV1:** Class 1 overvoltage protection point.
  When the grid voltage rises above this threshold and remains above it for the corresponding protection response time, the inverter shall disconnect from the grid.

- **HF1:** Class 1 overfrequency protection point.
  When the grid frequency exceeds this threshold and remains above it for the corresponding protection response time, the inverter shall disconnect from the grid.
- **HV2:** Class 2 overvoltage protection point.
  When the grid voltage exceeds this threshold and persists above it for the preconfigured protection response time, the inverter shall initiate grid disconnection.
- **HF2:** Class 2 overfrequency protection point.
  When the grid frequency exceeds this threshold and remains above it for the specified protection response time, the inverter shall disconnect from the grid.

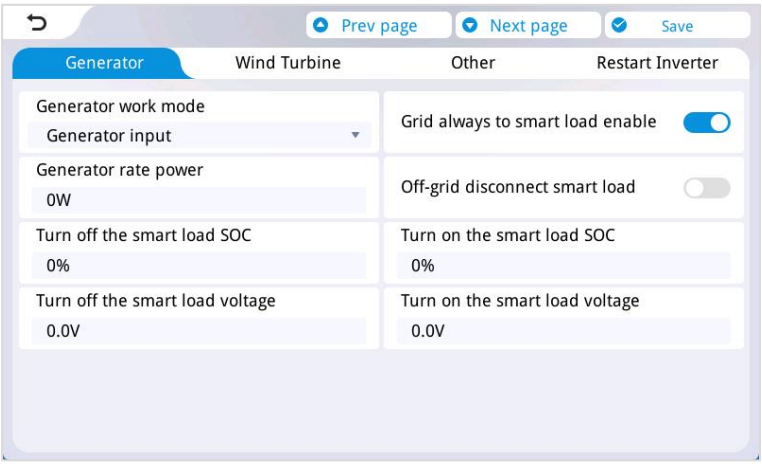
5.2.4.4 Others (It is not recommended for users to change this suggested item)



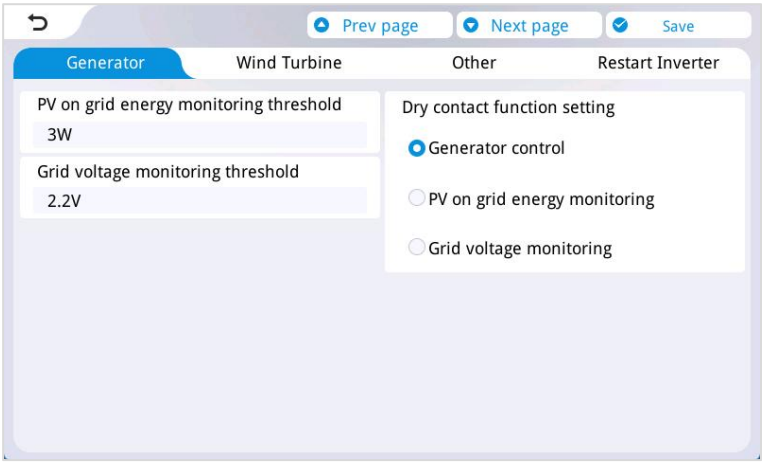
- **Volt-Watt (V-P) curve enable:**
  Regulates the active power of the inverter according to the set grid voltage.
- **Volt-Var (V-Q) curve enable:**
  Adjustment of the inverter reactive power according to the set grid voltage.
- **LVRT/HVRT enable:**
  Adjustment of the grid HV ride-through / LV ride-through values.
- **LFRT/HFRT enable:** According to the preset grid high-frequency/low-frequency ride-through thresholds.
- **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.
- **Frequency Droop (F-P) enable:** Adjustment of inverter output power according to grid frequency.
- **DRM Enable:** Australia only.

5.2.5 Advanced Settings

5.2.5.1 Generator

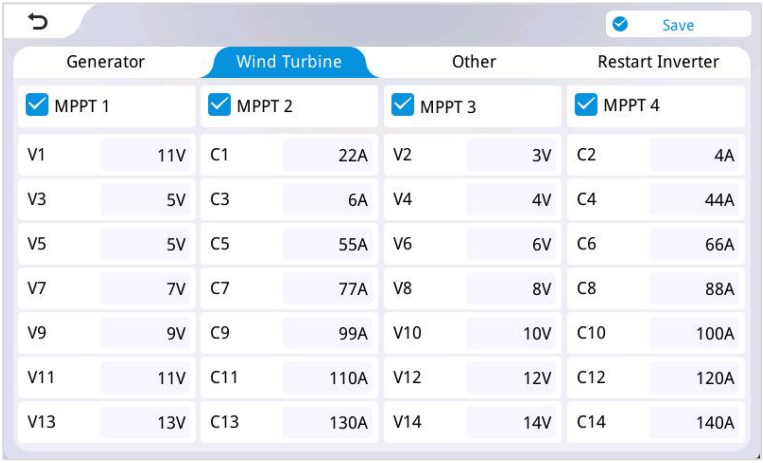


- **Generator work mode:**
  ① **Generator input:** When the generator is connected to the "Gen port", select the "Generator input".
  ② **Micro inverter input:** When the on-gridinverter is connected to the "Gen Port" of the hybrid inverter, select the "Microinverter Input" .
  ③ **Smart load:** When the load is connected to the "Gen port", select "Smart load output" .



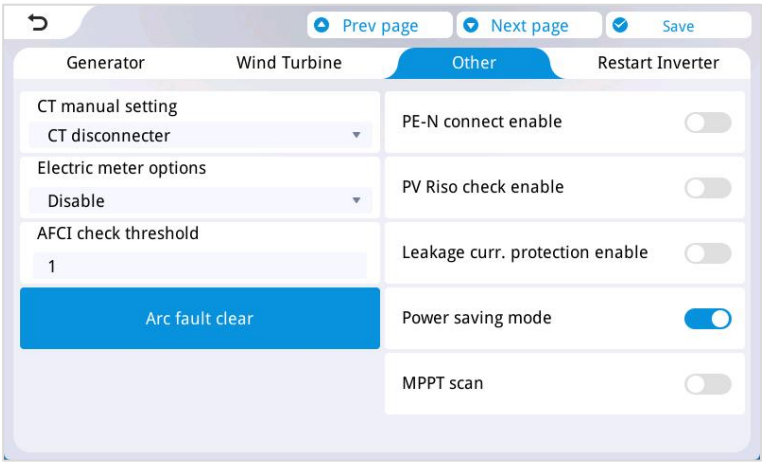
- **Grid always to smart load enable:** When the inverter operates in hybrid grid mode, the smart load shall always be enabled.
- **Generator rate power:** Setting the rated power of the generator.
- **Off-grid disconnect smart load:** When the inverter operates in off-grid mode, the smart load shall be immediately disabled.
- **Turn on the smart load SOC:** When battery SOC > this value, enable smart load. (Effective when BMS communication is normal)
- **Turn off the smart load SOC:** When battery SOC < this value, disable smart load. (Effective when BMS communication is normal).
- **Turn on the smart load voltage:** When battery voltage > this value, enable smart load. (Effective when BMS communication is not established or fails)
- **Turn off the smart load voltage:** When battery voltage < this value, disable smart load . (Effective when BMS communication is not established or fails).
- **Dry contact function setting:**
  ① Generator control.
  ② PV on grid energy monitoring.
  ③ Grid voltage monitoring.
- **Grid voltage monitoring threshold:** When the grid voltage exceeds the threshold, the dry contact operates.
- **PV on grid energy monitoring threshold:** When the PV grid-connected energy exceeds the threshold, the dry contact operates.

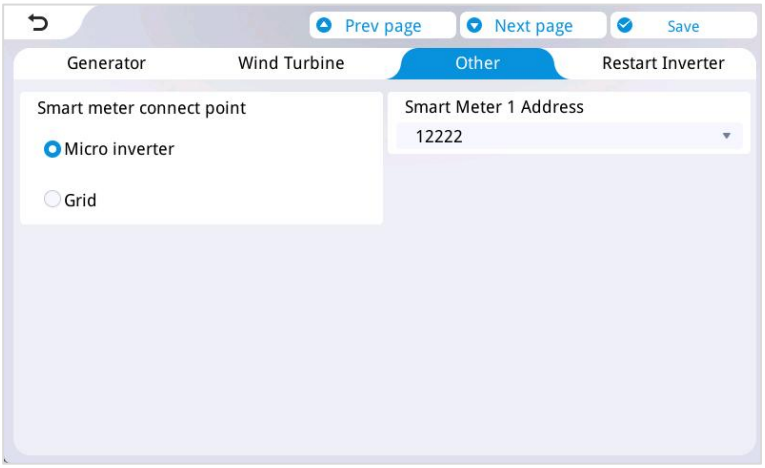
5.2.5.2 Wind Turbine Settings



- **MPPT1/2/3/4:** Enable for wind turbine input.
- **V1/2/3/4.../14:** Voltage parameters for the wind turbine.
- **C1/2/3/4.../14:** Current parameters for the wind turbine.

5.2.5.3 Other





- **CT manual setting:**

Select the CT direction according to the CT installation (ensure that the direction of each phase CT is consistent).

① When the arrow on the CT points to the inverter, set it to "Point to Inverter".

② When the arrow on the CT points to the grid, set it to "Point to Grid".

- **Electric meter options:** Whether to enable three-phase meter.
- **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.
- **Power saveing mode:** When the energy-saving mode is activated:

① If the load power is less than 25W, the inverter output will turn off after 5 min;

② If the load power is greater than 40W, the inverter output will restart immediately.

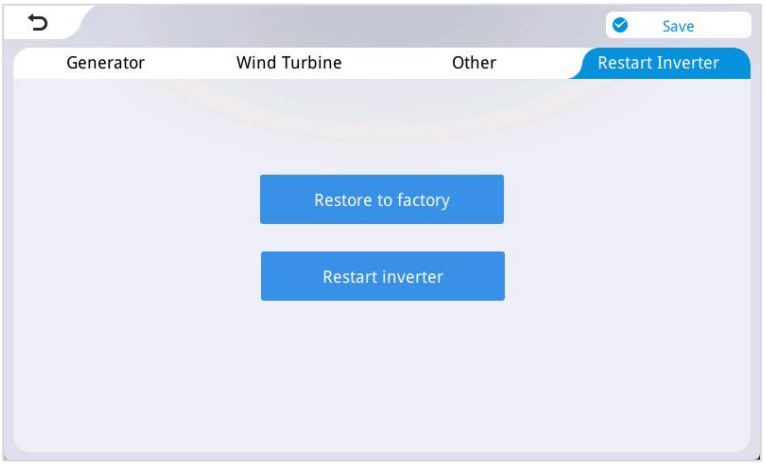
- **MPPT scan:** When this function is enabled: The inverter will perform an MPPT global scan every 30 min. During the scan, the photovoltaic power will drop to 0W and then reach the maximum power point.

  Note: Applicable to scenarios where the photovoltaic panels cannot output maximum power due to shading or other reasons.
- **Smart meter connect point:** Select the corresponding object based on the power to be collected by the meter.

  ① When the meter is required to collect micro-inverter power, select "Micro inverter" (valid only when the micro-inverter is connected to the grid side);

  ② When the meter is required to collect grid power, select "Grid".
- **Smart Meter 1 Address**
- **AFCI check threshold**
- **Arc fault clear**

5.2.5.4 Restart



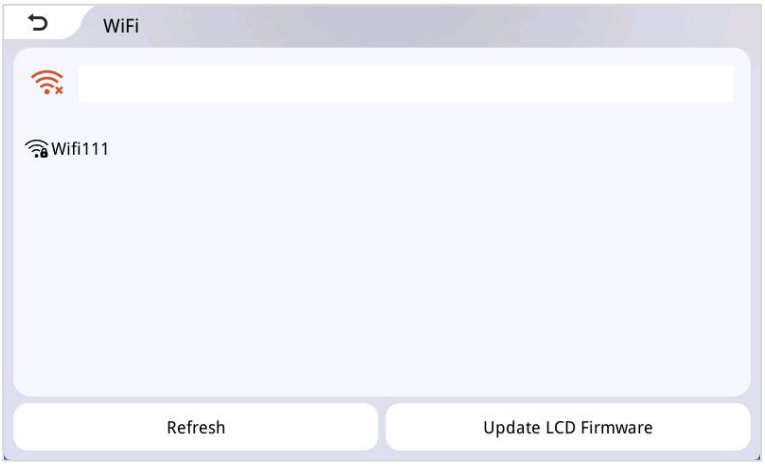
- **Restore to factory:** Reset all inverter settings.
- **Restart inverter:** Restart the inverter.

5.2.6 WIFI Setting

Important Note: In the current version, the WIFI function is only used for screen program upgrade.

5.2.6.1 Search and Select Network

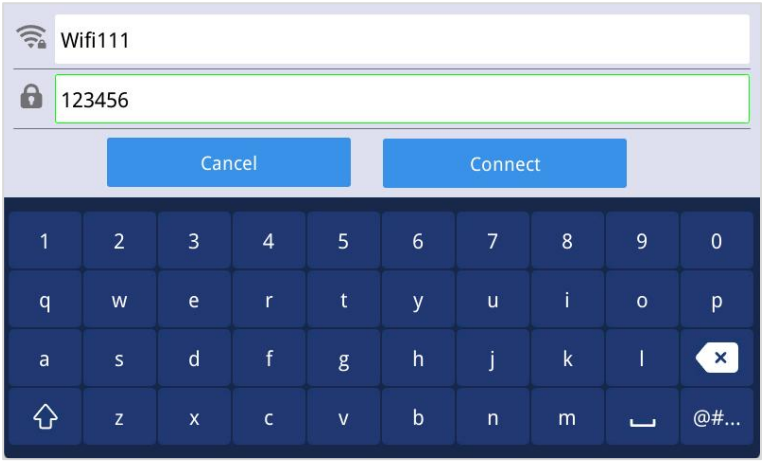
Click the [**Refresh**] button, select the target network name from the hotspot list, and click to enter the password input interface.



- **Refresh:** Refresh the WIFI network to obtain WIFI hotspots.
- **Update LCD Firmware:** Update the LCD display firmware.

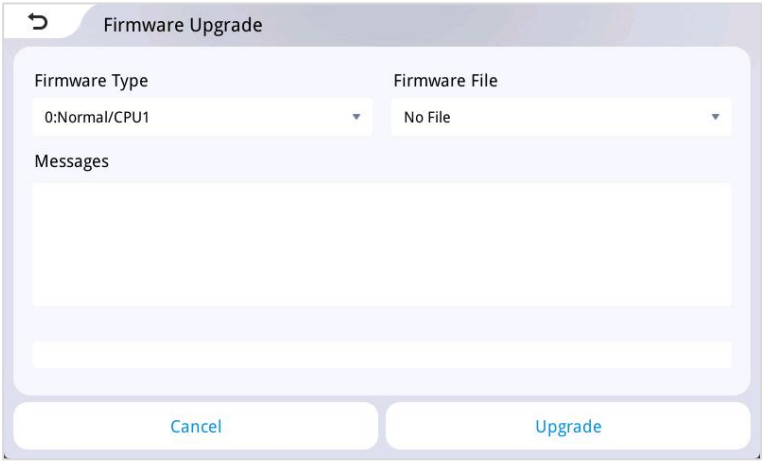
5.2.6.2 Enter and Verify Password

Enter the WIFI network password (supporting numbers and letters) in the password input field; click [**Connect**] to confirm and establish the connection.



- **Cancel:** Exit the password data interface.
- **Connect:** Connect to the WIFI network.

5.2.7 Firmware Upgrade via USB Drive

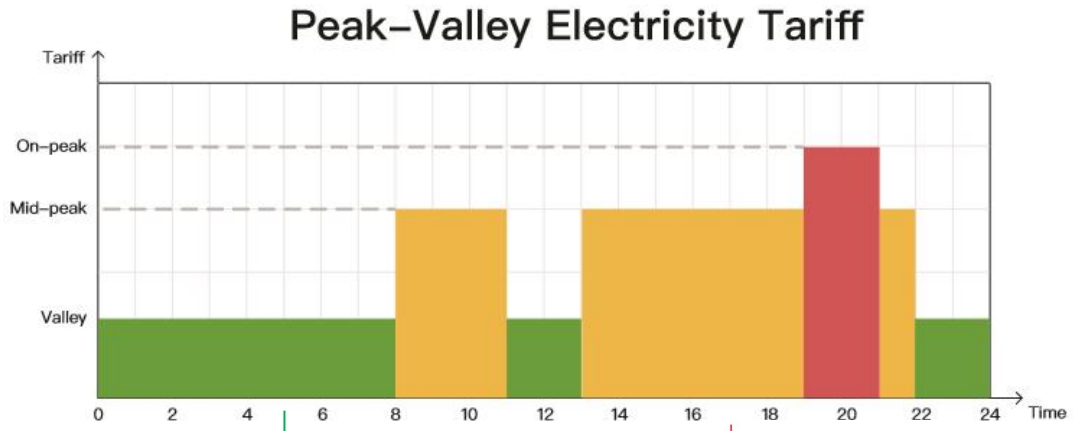


- **Firmware Type:**
  ① Firmware type.
  ② 0: Normal/CPU1
  ③ 1: CPU2
  ④ 2: AUX DSP
  ⑤ 3: AFCI MCU
  ⑥ 4: BMS MCU
- **Firmware File:** Firmware file in the USB drive.
- **Cancel:** Cancel the upgrade.
- **Upgrade:** Update the firmware.

5.3 Time-slot Charging/Discharging Function

The IESP SH3 series have the function of charging and discharging by different time periods. 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. The function of charging and discharging by different time periods, refer to Section 5.2.2.2.

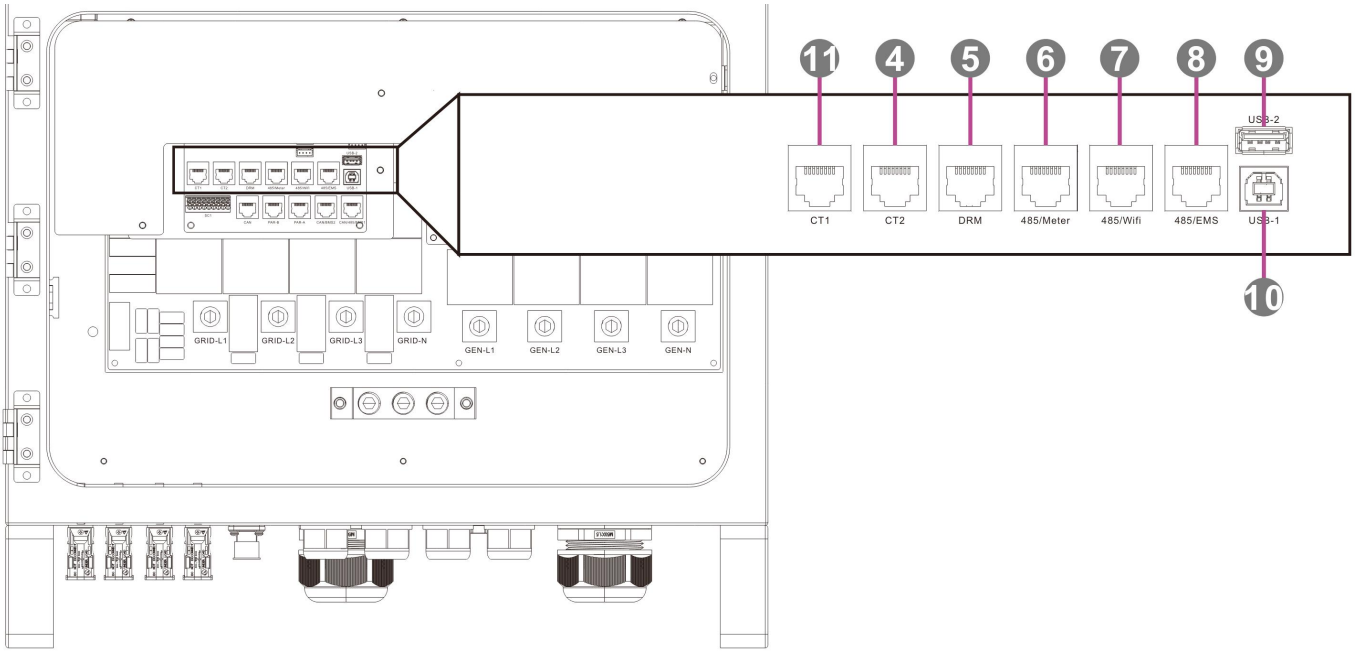
Before using this function for the first time, please refer to Section 5.2.1.1 to set the local time. Users can set corresponding time periods according to the electricity prices during peak and off-peak hours in the local area.

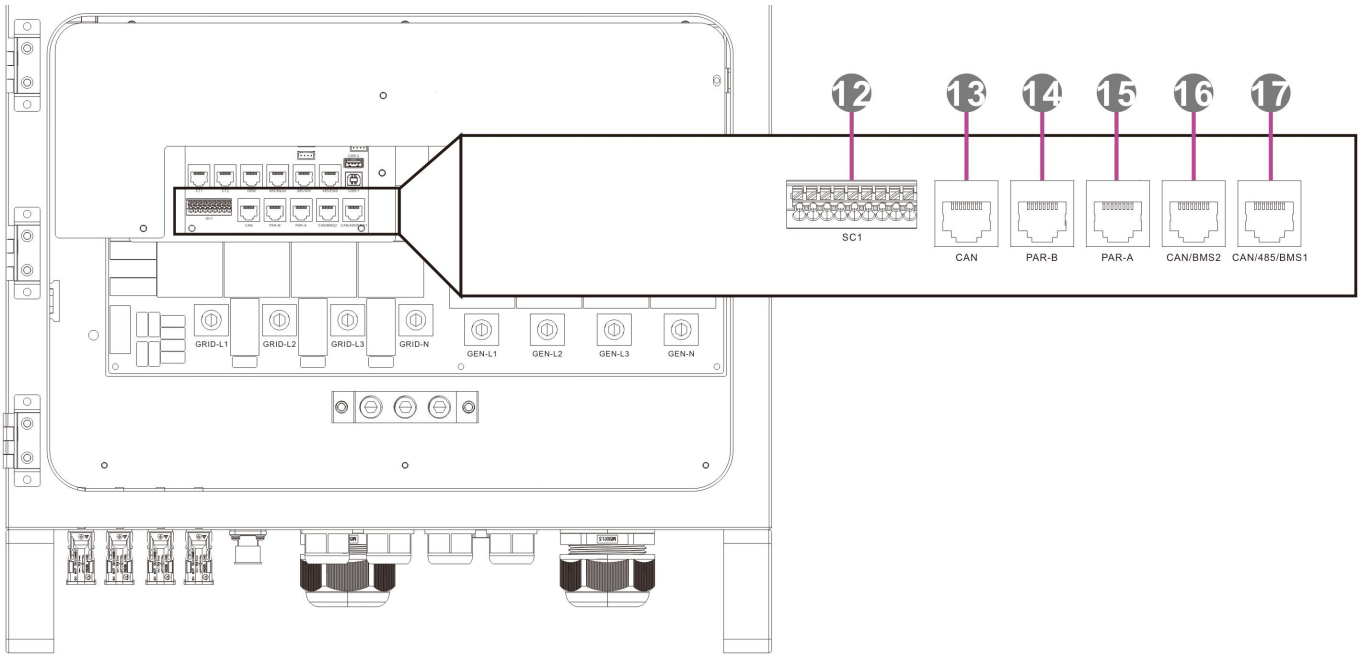


Time-slot Utility Charging & Loading Function	Time-slot Battery Discharging Function
	
With 3 definable periods, the user can freely set the mains charging/supplying power time within the range of 00:00 to 23:59. During the time period set by the user, if PV energy is available, PV energy will be used 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.

6.Communication

6.1 Product Overview

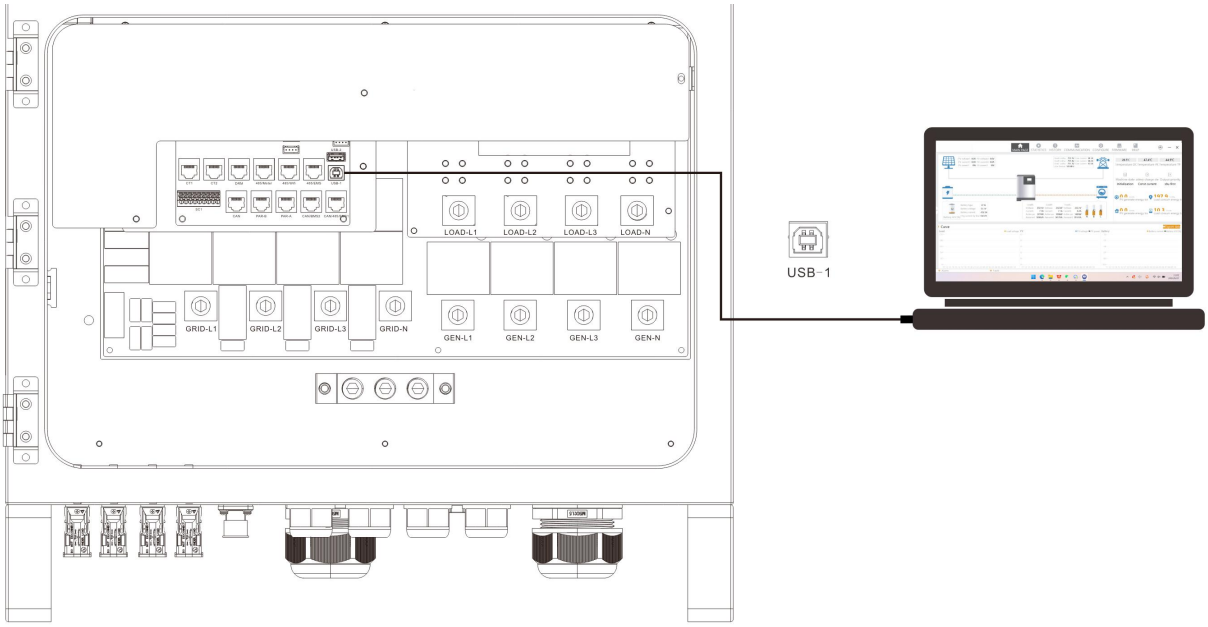




4	Micro-inverter CT2	5	DRM	6	485/Meter Port
7	485/WiFi Port	8	485/EMS Port	9	Display USB
10	Communication USB	11	Anti-backflow CT1 Prot	12	Dry Contact Interface
13	CAN2 Communication Port	14	Parallel Operation Port -B	15	Parallel Operation Port -A
16	CAN2/485/BMS2 Communication Port	17	CAN3/485/BMS1 Communication Port		

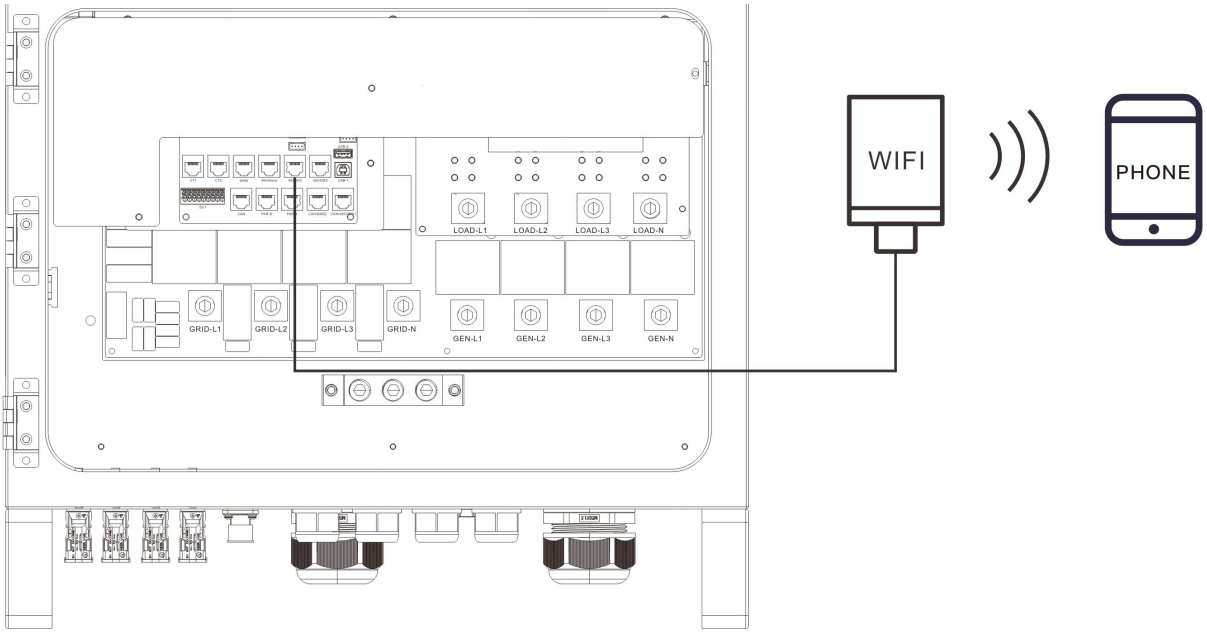
6.2 USB-1 Port

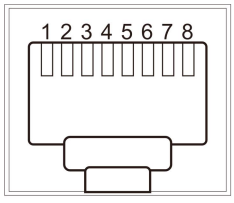
The user can read and modify device parameters through this port by using the host software. Please contact us for the host software installation package if you require one.



6.3 WIFI Communication Function

The WIFI port is used to connect to the Wi-Fi/GPRS logger module, which allows users to view the operating status and parameters of the inverter via mobile phone APP.



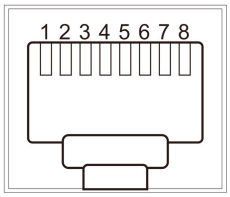


WIFI

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

6.4 RS485 Port

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



RS485

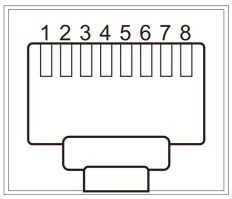
RJ45	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
Definition	RS485-B	RS485-A	/	CANH	CANL	/	RS485-A	RS485-B

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.

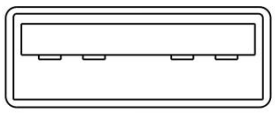


CAN

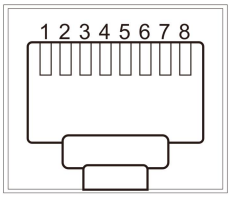
RJ45	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
Definition	/	/	/	CANH	CANL	/	/	/

6.6 Display Port USB-2

It is used to updated the screen firmware.



6.7 DRM(Only Australia)

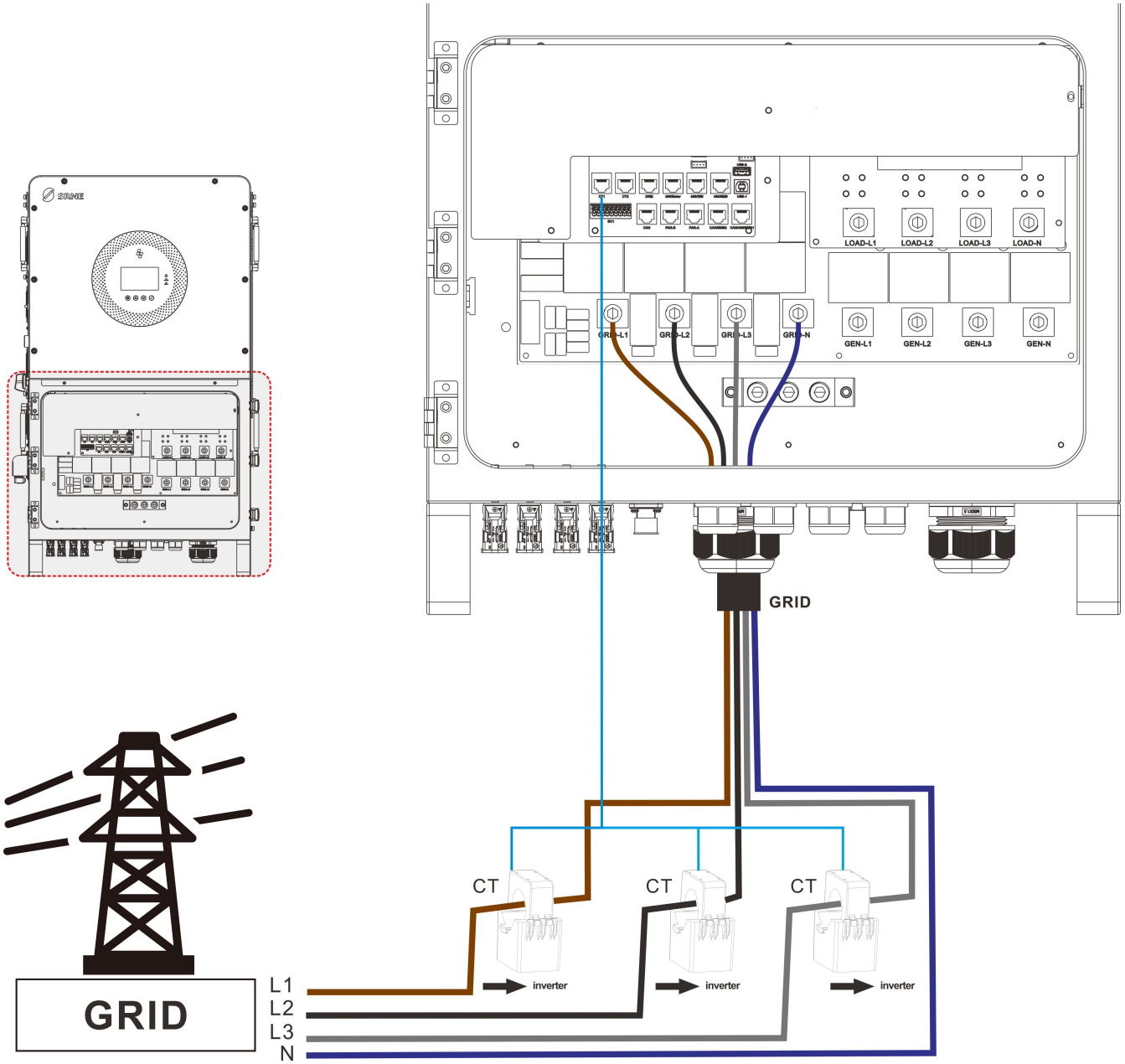


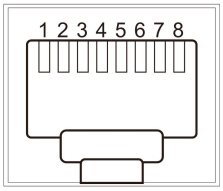
DRM

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

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 DRM) .

6.8 External CT Prot

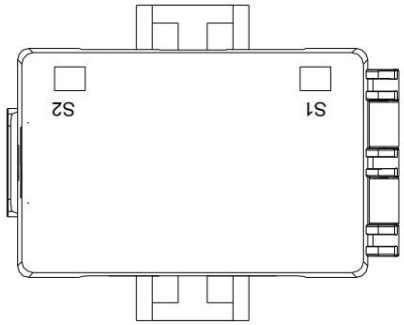


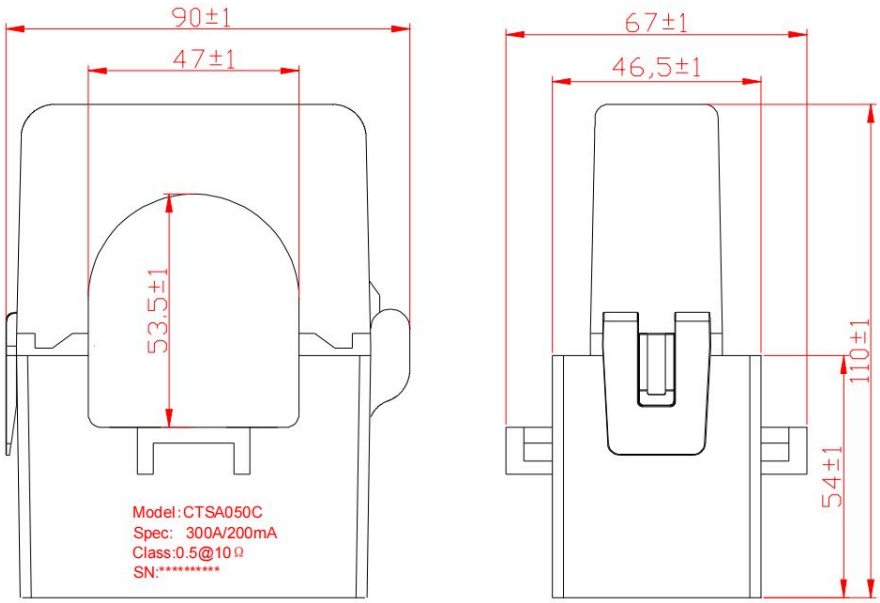


485/Meter

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

1. Split-core current transformer (CT) dimensions (mm)
2. Secondary output cable length is 3 meters.





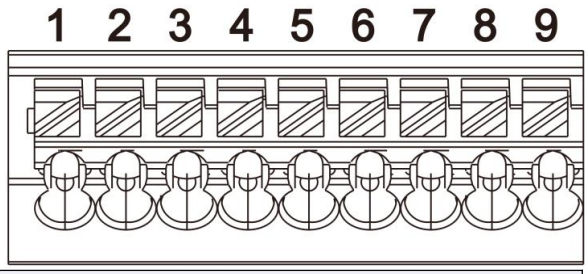
6.9 Dry Contact Function

The dry contact port has 3 functions:

1.Generator remote start/stop

2.Temperature sampling (reserved)

3.RSD power supply



Function	Definition
Generator remote start/stop	1-2: NO; 1-3: NC Remote generator shutdown: Pins 1 to 2 are normally opened; pins 1 to 3 are normally closed. (Pins 1/2/3 output 125Vac/1A, 230Vac/1A, 30Vdc/1A).
Temperature sampling (reserved)	Pins 9 and 5 can be used for battery temperature sampling compensation.
RSD power supply	Pin 9 is GND, pin 4 is RSD 12V+.

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.

7.Fault and Remedy

7.1 Fault Codes

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	PvBoostOCSw	YES	Boost overcurrent (software protection).
11	PvBoostOCHw	NO	Boost overcurrent (hardware protection).
12	SpiCommErr	YES	SPI communication fault of master and slave chips.
13	OverloadBypass	YES	Bypass overload protection.
14	Overload Inverter	YES	Inverter overload protection.
15	AcOverCurrHw	YES	Inverter overcurrent hardware protection.
16	AuxDSpReqOffPWM	YES	Slave chip OFF request fault.
17	InvShort	YES	Inverter short-circuit protection.
18	Bussoftfailed	YES	Bus soft-start failure.
19	OverTemperTrans	YES	Overtemperature Protection for PV Heatsink.
20	OverTemperInv	YES	Overtemperature Protection for Inverter Heatsink
21	FanFail	YES	Fan failure.
22	EEPROM	YES	Memory failure.
23	Model NumErr	YES	Model setting error.
24	Busdiff	YES	Positive and negative bus voltage imbalance.
25	BusShort	YES	Bus short circuit.
26	Rlyshort	YES	Inverter AC output backfeed to bypass AC output.
27	LinePhaselose	YES	Grid input phase lose.

28	LinePhaseErr	YES	Grid input phase error.
29	BusVoltLow	YES	Low bus voltage protection.
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).
33	ControlCanFault	YES	Control CAN fault in parallel operation.
34	CanCommFault	YES	CAN communication fault in parallel operation.
35	ParaAddrErr	YES	Parallel ID （communication address）setting error.
36	Balance currentOC	YES	Balanced bridge arm overcurrent fault.
37	ParaShareCurrErr	YES	Parallel operation current sharing failure.
38	ParaBattVoltDiff	YES	Battery parallel connection anomaly.
39	ParaAcSrcDiff	YES	Parallel mode, inconsistent mains input source.
40	ParaHwSynErr	YES	Parallel mode, hardware synchronization signal failure.
41	InvDcVoltErr	YES	Abnormal DC component of inverter voltage
42	SysFwVersionDiff	YES	Inconsistent parallel operation program versions
43	ParaLineContErr	YES	Parallel operation wiring fault
44	Serial number error	YES	Serial number not set at factory
45	Error setting of split- phase mode	YES	Incorrect parallel operation mode settings
49	Grid over voltage	YES	Set the local grid standard in the setup menu.
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+, PV3+, PV4+, PV- impedance to ground abnormally low.
57	Leakage current overload fault	YES	System leakage current exceeds the standard.
58	BMSComErr	NO	BMS communication error.
60	BMSUnderTem	NO	BMS low temperature alarm (effective after successful BMS communication).

61	BMSOverTem	YES	BMS over-temperature alarm (effective after successful BMS communication).
62	BMSOverCur	YES	BMS overcurrent alarm (effective after successful BMS communication).
63	BMSUnderVolt	NO	BMS undervoltage alarm (effective after successful BMS communication).

7.2 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 undervoltage protection	The battery voltage is lower than the value set in 【Battery Settings】- 【Battery Discharge】- 【Batt. Under volt. alarm】.	Charge the battery and wait until the battery voltage is 2V higher than the value set in 【Battery Settings】- 【Battery Discharge】- 【Battery Under volt. alarm】.
03	Battery not connected	Battery not connected or BMS in discharge protection mode	Check that the battery connection is secure. Check that the battery circuit breaker is not tripped.Ensure that the BMS is communicating properly.
04	Battery over-discharge protection voltage	The battery voltage is lower than the value set in 【Battery Settings】- 【Battery Discharge】- 【Batt. voltage low fault】.	Manual reset: Turn off and restart. Automatic reset: Charge the battery so that the battery voltage is higher than the voltage set in the parameter item 【Battery Settings】 - 【Battery Discharge】- 【Battery Recovery Voltage】.
06	Battery overvoltage during charging	Battery is in over-voltage condition.	Manually power off and restart. Check to see if the battery voltage exceeds the limit. If it exceeds, the battery needs to be discharged until the voltage is below the battery over-voltage recovery point.
13	Bypass overload (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 overload (Software detection)	Inverter output power or output current over-load for a period of time.	

19	PV input heat sink 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	Inverter input heat sink over-temperature (Software detection)	Heat sink of inverter output temperature exceeds 90℃ for 3s.	
21	Fan fault	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	Grid 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.

8.Protection and Product Maintenance

8.1 Protection Functions

No.	Protection Functions	Description
1	PV input current 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 reports a fault and stops PV boosting to output a sinusoidal AC waveform.
3	Anti-reverse charge protection at night	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	AC input over-voltage protection	When the mains voltage of per phase exceeds 280Vac, the mains charging will be stopped and will switch to inverter output.
5	AC input under-voltage 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 over-voltage 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 under-voltage 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 over-current 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, the AC output voltage will be switched off immediately and output again after 1 min. If the output load is still short-circuited after 3 attempts, short-circuit fault of the load must be eliminated first and then manually re-powered in order to restore the normal output.
10	Heat sink over-temperature protection	When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will resume charging and discharging.
11	Inverter over-load protection	**Three-Phase Overload Logic:** After overload protection is triggered, the inverter resumes output after 3 minutes. If overload occurs five consecutive times, output is disabled until the inverter is restarted. (101% < Load ≤ 110%): Operates normally. (110% < Load < 120%): Alarm triggered; output shuts down after 400–600 seconds. (120% ≤ Load < 130%): Alarm triggered; output shuts down after 200–400 seconds. (130% ≤ Load < 140%): Alarm triggered; output shuts down after 10–200 seconds. (140% ≤ Load < 150%): Alarm triggered; output shuts down after 1–10 seconds. **Single-Phase Overload Logic:** (140% ≤ Load < 150%): Alarm triggered; output shuts down after 1–10 seconds.
12	AC output reverse	Prevents backfeeding of battery inverter AC to bypass AC inputs.
13	Bypass over-current protection	Built-in AC input overcurrent protection circuit breaker.
14	Bypass phase inconsistency 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 short-circuiting 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	IESP500SH3	IESP550SH3	IESP600SH3	Adjustable
Inverter Output (Load)				
Rated Output Power	50000W	55000W	60000W	
Max. Peak Power	75000VA	82500VA	90000VA	
Rated Output Voltage	220/380Vac,230/400Vac （3L+N+PE）			Y
Output Voltage Error	± 5%			
Load Motor Capacity	21HP	23HP	25HP	
Rated Frequency	50/60Hz ± 0.3Hz			Y
Waveform	Pure sine wave			
Switch Time	10ms (Typical)			
AC Output (On-grid)				
Rated Output Power	50000W	55000W	60000W	
Max. Apparent Power	55000VA	60500VA	66000VA	
Power Factor	0.8 leading to 0.8 lagging			
Rated AC Voltage	220/380Vac，230/400Vac，3L/N/PE			
Rated AC Frequency	50/60Hz			
Rated AC Current	75.9Aac	83.6Aac	91.2Aac	
THD	<3% (Rated Power)			
Battery Data				
Battery Type	Lithium-ion Battery			Y
Number of Battery Input	2			
Battery Voltage Range	150-820Vdc			
Max. Charging/ Discharging Current	150A (75A+75A)	150A (75A+75A)	150A (75A+75A)	Y
PV Input				
No. Of MPPT Trackers	4			
Max. PV Input Power	75000W	82500W	90000W	
Max. PV Input Current	40A*4			
Max. Short-circuit Current	60A*4			
Max. Open-circuit Voltage	1000V			
MPPT Operating Voltage Range	150V～850V			
Grid/Generator Input				
Input Voltage Range	0.85Un-1.1Un			

Input Frequency Range	50/60Hz	
Bypass Overload Current	200A	
Efficiency		
MPPT Tracking Efficiency	> 99%	
Max. Efficiency	97.8%	
European Efficiency	97.2%	
Protections		
PV Input Lightning Protection	Yes	
Anti-islanding Protection	Yes	
PV String Input Reverse Polarity Protection	Yes	
Insulation Resistor Detection	Yes	
Residual Current Monitoring Unit	Yes	
Output Over Current Protection	Yes	
Output Shorted Protection	Yes	
Surge Protection	DC type II/AC type II	
Overvoltage Category	DC type II/AC type III	
Certification		
On-grid Standard	EN50549,VDE4105	
Safety	IEC62109-1, IEC62109-2	
EMC	EN61000-6-1, EN61000-6-3, FCC 15 class B	
RoHS	Yes	
Basic Data		
Parallel Capacity	6	
Operating Temperature	-25~60℃, >45℃ derated	
Humidity Range	0～100%	
Noise	<65dB	
Protection Degree	IP65	
Cooling Method	Heat sink + intelligent air cooling	
Standby Power Consumption	<30W	
Dimensions	622x342x1010mm	
Weight	95kg	
Communication Interface	RS485 / CAN / USB /Dry contact	Y
External Modules (Optional)	Wi-Fi / 4G Stick	Y

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