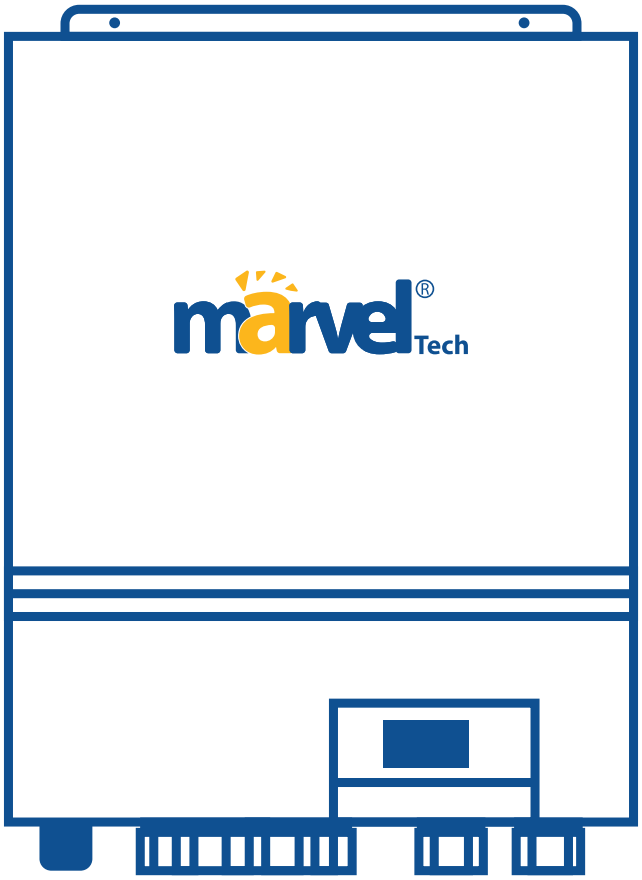


MAX TRI 8.5KW
SOLAR INVERTER / CHARGER

User Manual

Table of Contents

ABOUT THIS MANUAL 1

Purpose 1
Scope 1

SAFETY INSTRUCTIONS 1

INTRODUCTION 2

Features 2
Basic System Architecture 2
Product Overview 3

INSTALLATION 4

Unpacking and Inspection 4
Preparation 4
Mounting the Unit 4
Battery Connection 5
AC Input/Output Connection 6
PV Connection 8
Final Assembly 10
Remote Display Panel Installation 11
Communication Connection 12

OPERATION 14

Power ON/OFF 14
Inverter Turn-on 14
Operation and Display Panel 14
LCD Display Icons 15
LCD Setting 17
LCD Display 35
Operating Mode Description 41
Faults Reference Code 43
Warning Indicator 44

BATTERY EQUALIZATION 45

SPECIFICATIONS 46

Table 1 Line Mode Specifications 46
Table 2 Inverter Mode Specifications 47
Table 3 Charge Mode Specifications 48
Table 4 General Specifications 48

TROUBLE SHOOTING 50

Appendix I: Parallel function 51

Appendix II: BMS Communication Installation 66

Appendix III: The Wi-Fi Operation Guide 72

ABOUT THIS MANUAL

Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

SAFETY INSTRUCTIONS

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

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. **CAUTION** --To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION –** Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10. Fuses are provided as over-current protection for the battery supply.
11. GROUNDING INSTRUCTIONS -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.
14. **WARNING:** Because this inverter is non-isolated, only three types of PV modules are acceptable: single crystalline, poly crystalline with class A-rated and CIGS modules. To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using CIGS modules, please be sure NO grounding.
15. **CAUTION:** It's required to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

INTRODUCTION

This is a multi-function inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support in a single package. The comprehensive LCD display offers user-configurable and easy-accessible button operations such as battery charging current, AC or solar charging priority, and acceptable input voltage based on different applications.

Features

- Pure sine wave inverter
- Configurable color with the built-in RGB LED bar
- Built-in Wi-Fi for mobile monitoring (APP is required)
- Supports USB On-the-Go function
- Built-in anti-dusk kit
- Detachable LCD control module with multiple communication ports for BMS (RS485, CAN-BUS, RS232)
- Configurable input voltage ranges for home appliances and personal computers via LCD control panel
- Configurable AC/PV output usage timer and prioritization
- Configurable AC/Solar charger priority via LCD control panel
- Configurable battery charging current based on applications via LCD control panel
- Compatible to utility mains or generator power
- Auto restart while AC is recovering
- Overload / Over temperature / short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

Basic System Architecture

The following illustration shows basic application for this unit. It also required the following devices to have a complete running system:

- Generator or Utility mains.
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power various appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioners.

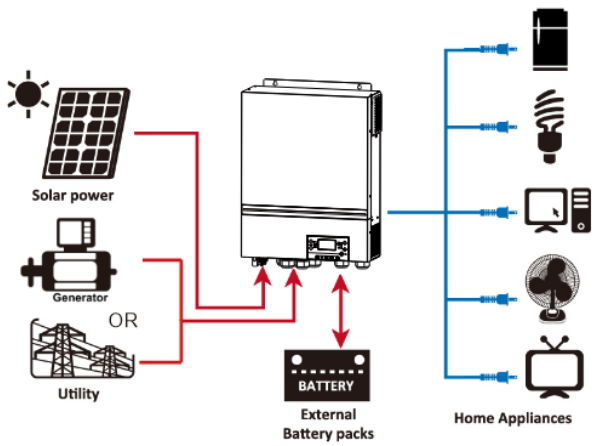
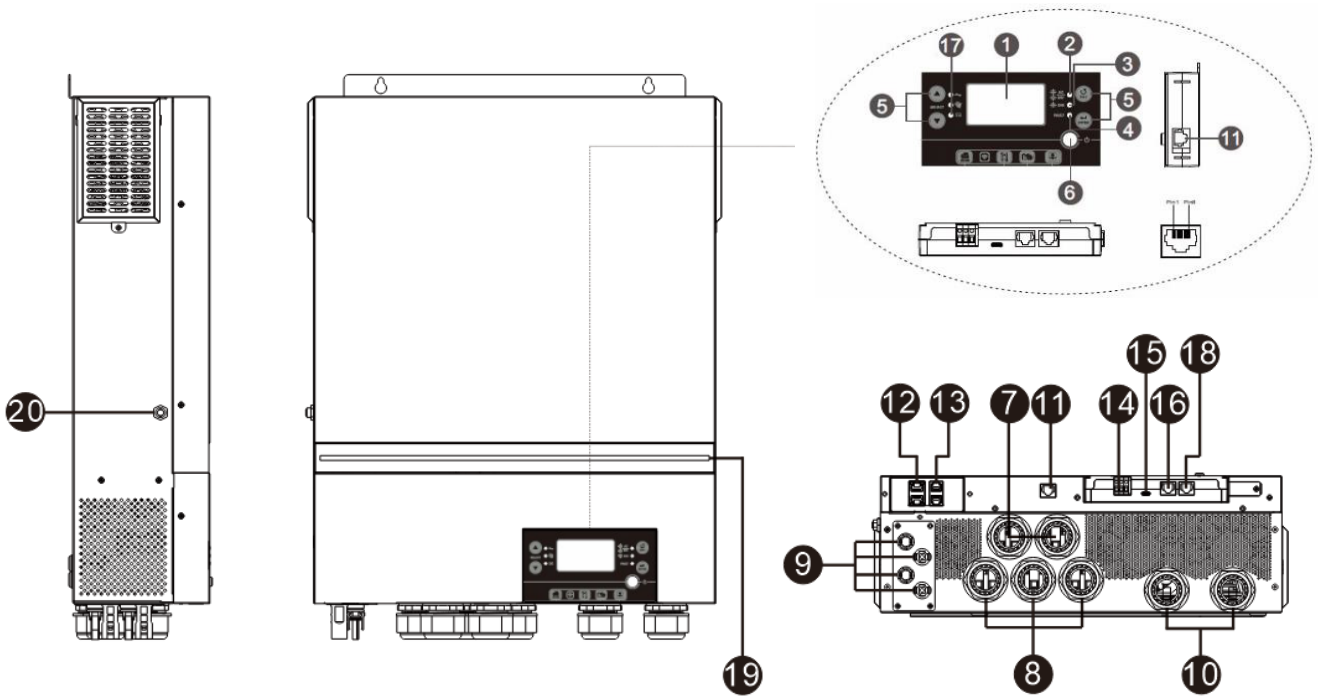


Figure 1 Basic PV System Overview

Product Overview



NOTE: For parallel installation and operation, please check *Appendix I.*

1. LCD display
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons
6. Power on/off switch
7. AC input connectors
8. AC output connectors (Load connection)
9. PV connectors
10. Battery connectors
11. Remote LCD module communication Port
12. Parallel communication port
13. Current sharing port
14. Dry contact
15. USB port as USB communication port and USB function port
16. BMS communication port: CAN, RS-485 or RS-232
17. Output source indicators (refer to OPERATION/Operation and Display Panel section for details) and USB function setting reminder (refer to OPERATION/Function Setting for the details)
18. RS-232 communication port
19. RGB LED bar (refer to LCD Setting section for the details)
20. Breaker

INSTALLATION

Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:


Inverter unit


Manual


software CD

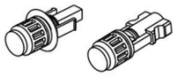

RS-232 cable


Parallel communication cable


Current sharing cable


DC Fuse

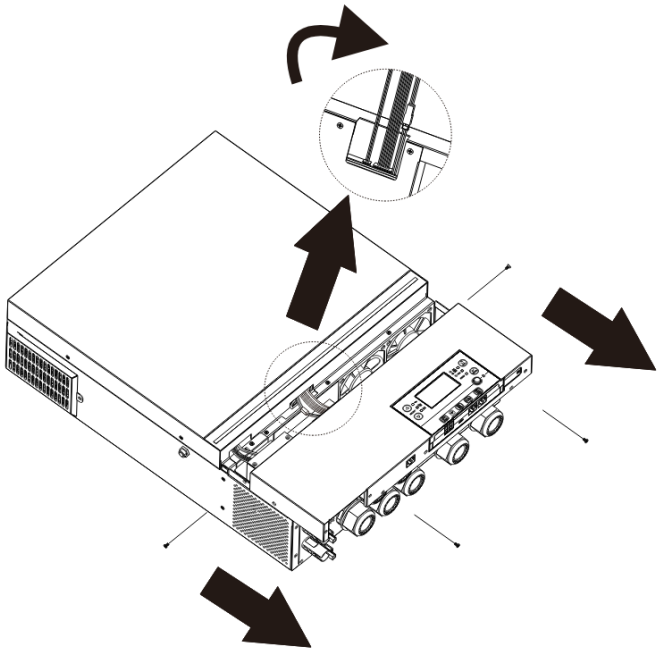

Cable gland x 7 pcs


PV connectors x 2 sets


CT

Preparation

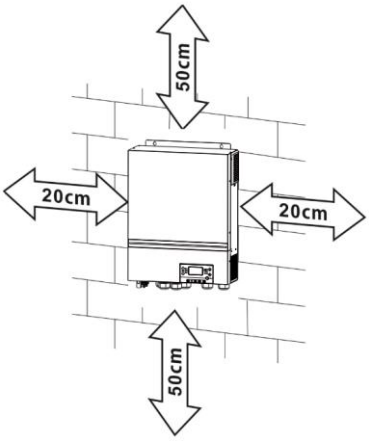
Before connecting all wirings, please take off bottom cover by removing four screws. When removing the bottom cover, be carefully to remove three cables as shown below.



Mounting the Unit

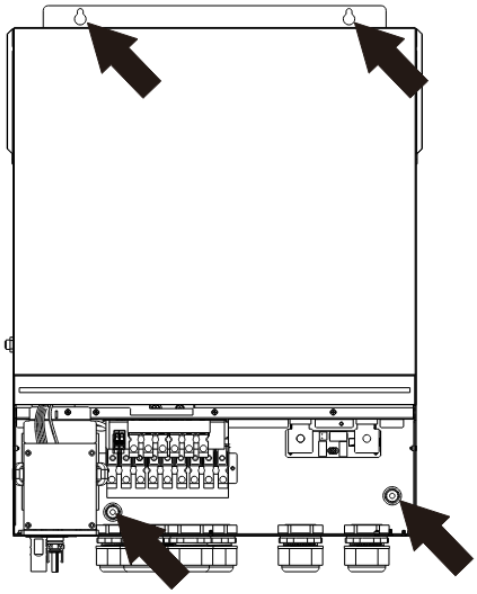
Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



⚠ **SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.**

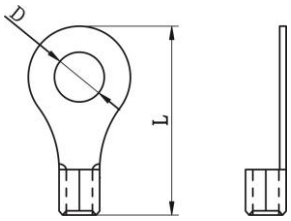
Install the unit by screwing four screws. It's recommended to use M4 or M5 screws.



Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

Ring terminal:



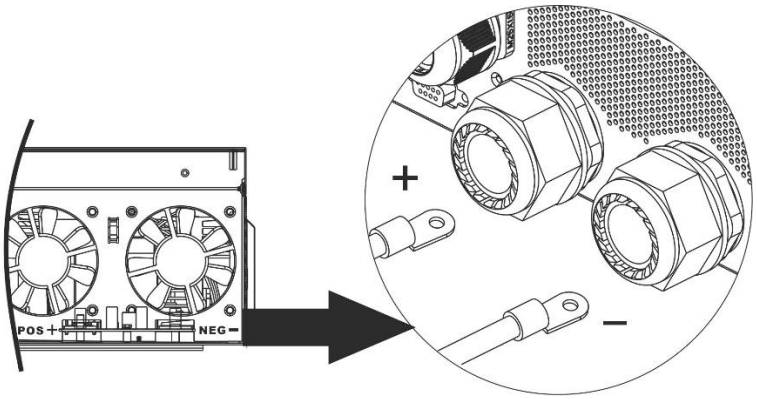
WARNING! All wiring must be performed by a qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Recommended battery cable and terminal size:

Model	Typical Amperage	Battery capacity	Wire Size	Cable mm^2	Ring Terminal Dimensions		Torque value
					D (mm)	L (mm)	
8.5KW	197.6A	250AH	1*3/0AWG	85	8.4	54	5 Nm

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Fix two cable glands into positive and negative terminals.
3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the nuts are tightened with torque of 5 Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



⚠	**WARNING: Shock Hazard** Installation must be performed with care due to high battery voltage in series.

⚠	**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur. **CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly. **CAUTION!!** Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a **separate** AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect input and output connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

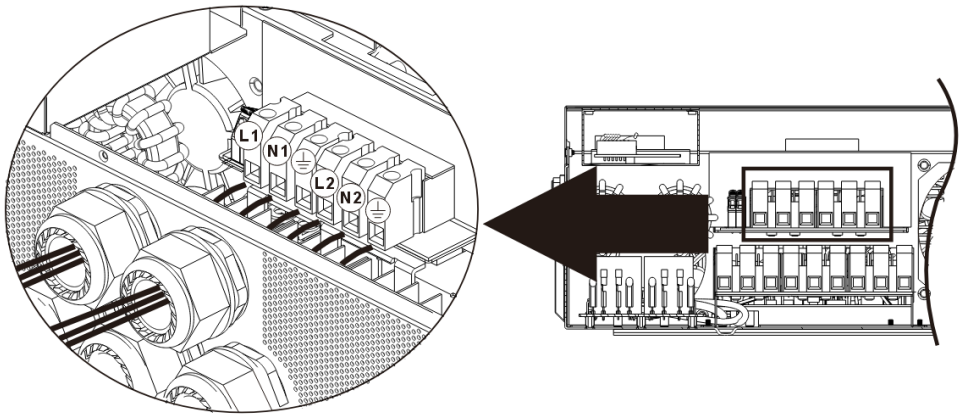
Suggested cable requirement for AC wires

Model	Gauge	Torque Value
8.5KW	6 AWG	1.4~ 1.6Nm

Please follow below steps to implement AC input/output connection:

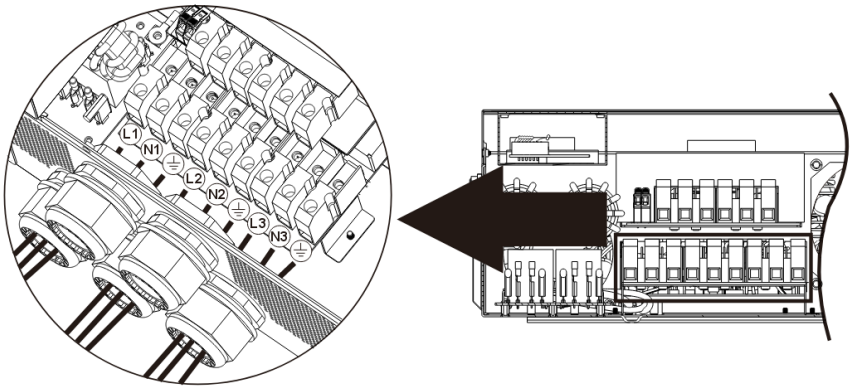
1. Before making AC input/output connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Fix two cable glands into input and output sides.
4. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

   ⏚→**Ground (yellow-green)**
   L1→LINE (brown or black)
   N1→Neutral (blue)
   L2→ Generator (brown or black)
   N2→Neutral (blue)



⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

5. This inverter is equipped with triple -output. There are four terminals (L1/N1, L2/N2,L3/N3) available on output port. It is to set up through LCD program or monitoring software to turn on and off the second/ third output. Refer to "LCD setting" section for the details.
   Before making wiring of second/third output, please remove knockout and install the cable gland first. Insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.
   ⏚**→Ground (yellow-green)**
   L1→LINE (brown or black)
   N1→Neutral (blue)
   L2→LINE (brown or black)
   N2→Neutral (blue)
   L3→LINE (brown or black)
   N3→Neutral (blue)



6. Make sure the wires are securely connected.

CAUTION: Important
Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner requires at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will be trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install **separately** DC circuit breakers between inverter and PV modules.
NOTE1: Please use 600VDC/45A circuit breaker.
NOTE2: The overvoltage category of the PV input is II.
Please follow the steps below to implement PV module connection:

> **WARNING:** Because this inverter is non-isolated, only three types of PV modules are acceptable: single crystalline and poly crystalline with class A-rated and CIGS modules.
> To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using CIGS modules, please be sure NO grounding.
> **CAUTION:** It's required to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

Step 1: Check the input voltage of PV array modules. This system is applied with two strings of PV array. Please make sure that the maximum current load of each PV input connector is 40A.

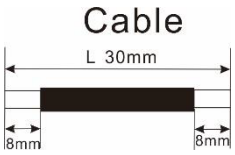
> **CAUTION:** Exceeding the maximum input voltage can destroy the unit!! Check the system before wire connection.

Step 2: Disconnect the circuit breaker and switch off the DC switch.
Step 3: Assemble provided PV connectors with PV modules by the following steps.
Components for PV connectors and Tools:

Female connector housing	
Female terminal	
Male connector housing	
Male terminal	
Crimping tool and spanner	

Prepare the cable and follow the connector assembly process:

Strip one cable 8 mm on both end sides and be careful NOT to nick conductors.

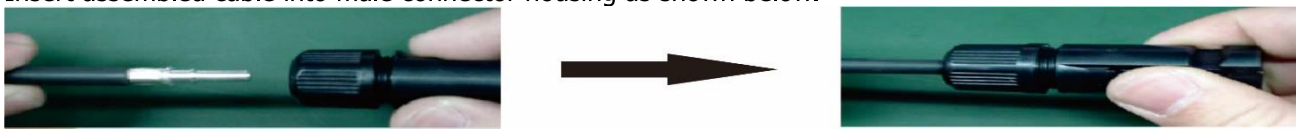


Insert striped cable into female terminal and crimp female terminal as shown below.

Insert assembled cable into female connector housing as shown below.

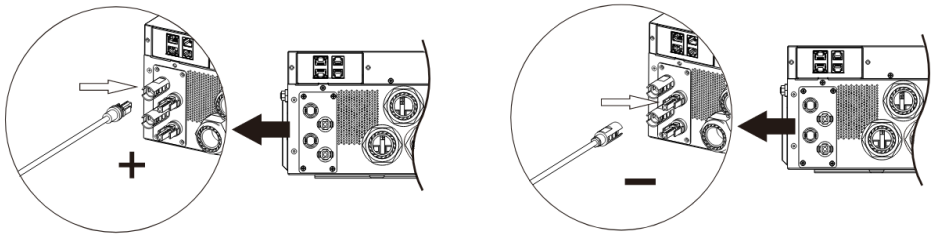
Insert striped cable into male terminal and crimp male terminal as shown below.

Insert assembled cable into male connector housing as shown below.



Then, use spanner to screw pressure dome tightly to female connector and male connector as shown below.

Step 4: Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.



WARNING! For safety and efficiency, it's very important to use appropriate cables for PV module connection. To reduce risk of injury, please use the proper cable size as recommended below.

Conductor cross-section (mm^2)	AWG no.
4~6	10~12

CAUTION: Never directly touch the terminals of inverter. It might cause lethal electric shock.

Recommended Panel Configuration

When selecting proper PV modules, please be sure to consider the following parameters:

1. Open circuit Voltage (Voc) of PV modules not to exceed maximum PV array open circuit voltage of the inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than the start-up voltage.

INVERTER MODEL	8.5KW
Max. PV Array Power	12000W
Max. PV Array Open Circuit Voltage	500Vdc
Max. PV Array Current	27A/27A (Max.40A)
PV Array MPPT Voltage Range	90Vdc~450Vdc
Start-up Voltage (Voc)	80Vdc

Take the 555Wp PV module as an example. After considering above two parameters, the recommended module configurations are listed in the table below.

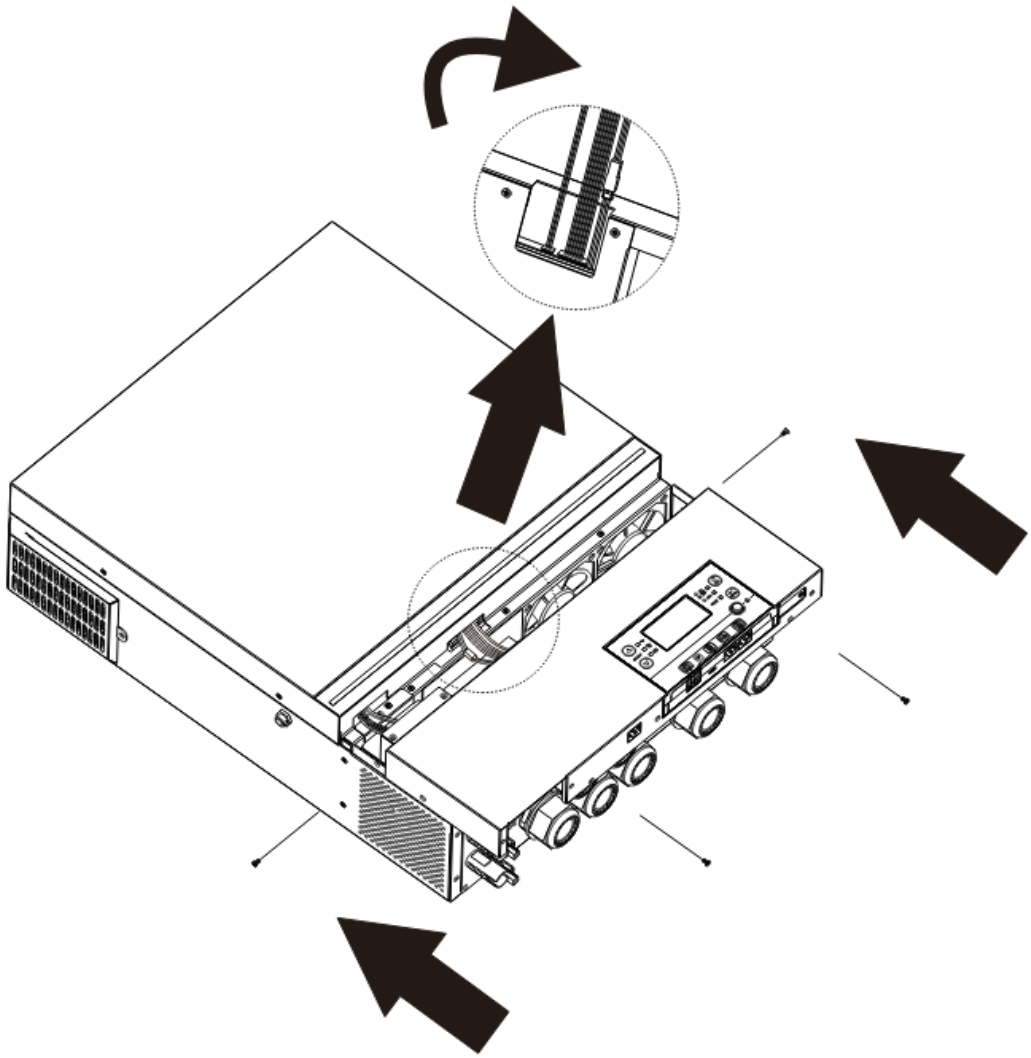
Solar Panel Spec. (reference) - 555Wp - Imp: 17.32A - Voc: 38.46Vdc - Isc: 18.33A - Cells: 110	**SOLAR INPUT 1**	**SOLAR INPUT 2**	**Q'ty of panels**	**Total Input Power**
	Min in series: 3pcs, per input **Max. in series: 12pcs, per input**			
	3pcs in series	x	3pcs	1665W
	x	3pcs in series	3pcs	1665W
	7pcs in series	x	7pcs	3885W
	x	7pcs in series	7pcs	3885W
	7pcs in series	7pcs in series	14pcs	7770W
	8pcs in series	8pcs in series	16pcs	8880W
	10pcs in series	10pcs in series	20pcs	11100W
	11pcs in series	11pcs in series	22pcs	12000W

Take the 640Wp PV module as an example. After considering above two parameters, the recommended module configurations are listed in the table below.

Solar Panel Spec. (reference) - 640Wp - Vmp: 36.5Vdc - Imp: 17.54A - Voc: 43.7Vdc - Isc: 18.51A	**SOLAR INPUT 1** **Min in series: 3pcs, per input** **Max. in series: 9pcs, per input**	**SOLAR INPUT 2**	**Q'ty of panels**	**Total Input Power**
	3pcs in series	x	3pcs	1920W
	x	3pcs in series	3pcs	1920W
	9pcs in series	x	9pcs	5760W
	x	9pcs in series	9pcs	5760W
	9pcs in series	9pcs in series	18pcs	11520W

Final Assembly

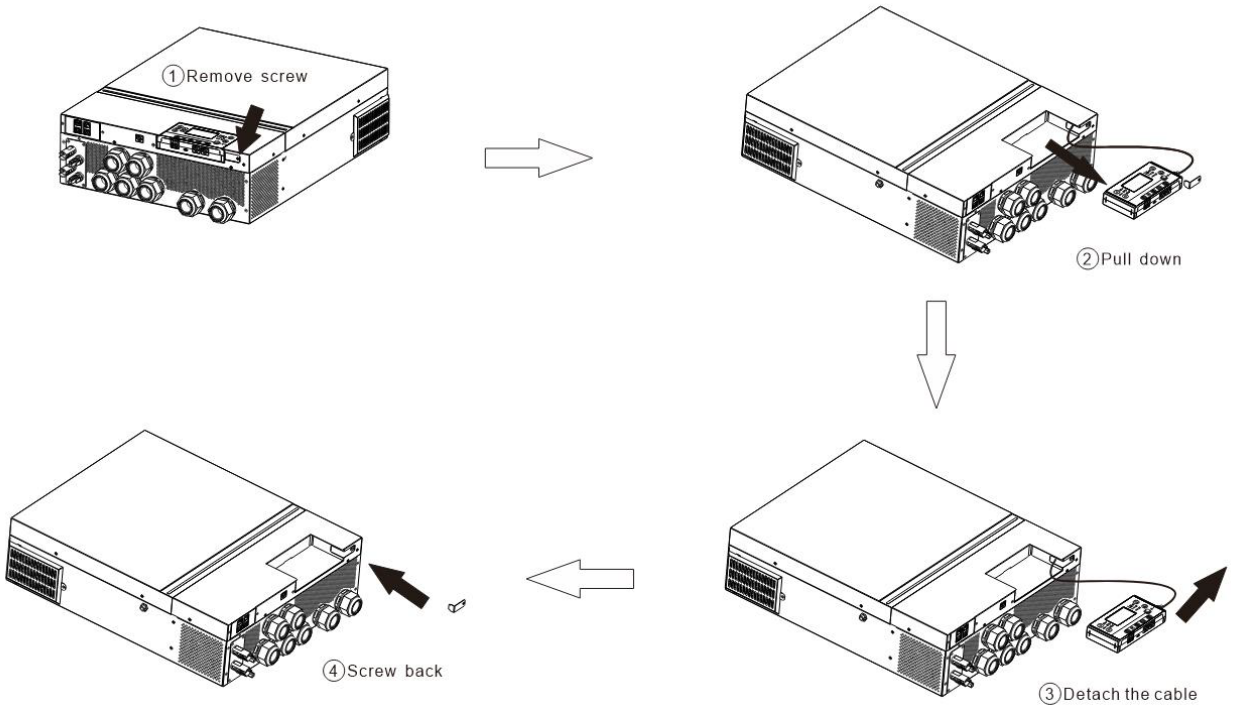
After connecting all wirings, re-connect three cables and then put bottom cover back by screwing four screws as shown below.



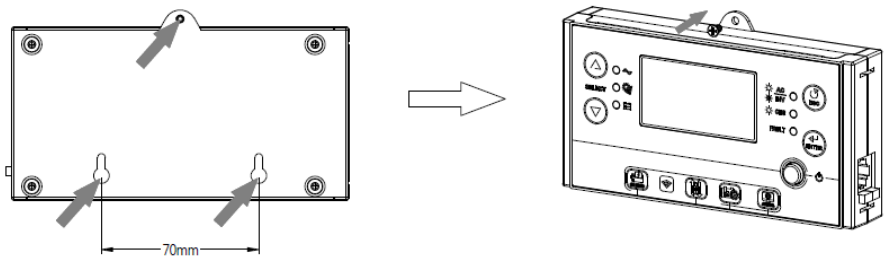
Remote Display Panel Installation

The LCD module can be removable and installed in a remote location with an optional communication cable. Please take the follow steps to implement this remote panel installation.

Step 1. Remove the screw on the bottom of LCD module and pull down the module from the case. Detach the cable from the original communication port. Be sure to replace the retention plate back to the inverter.

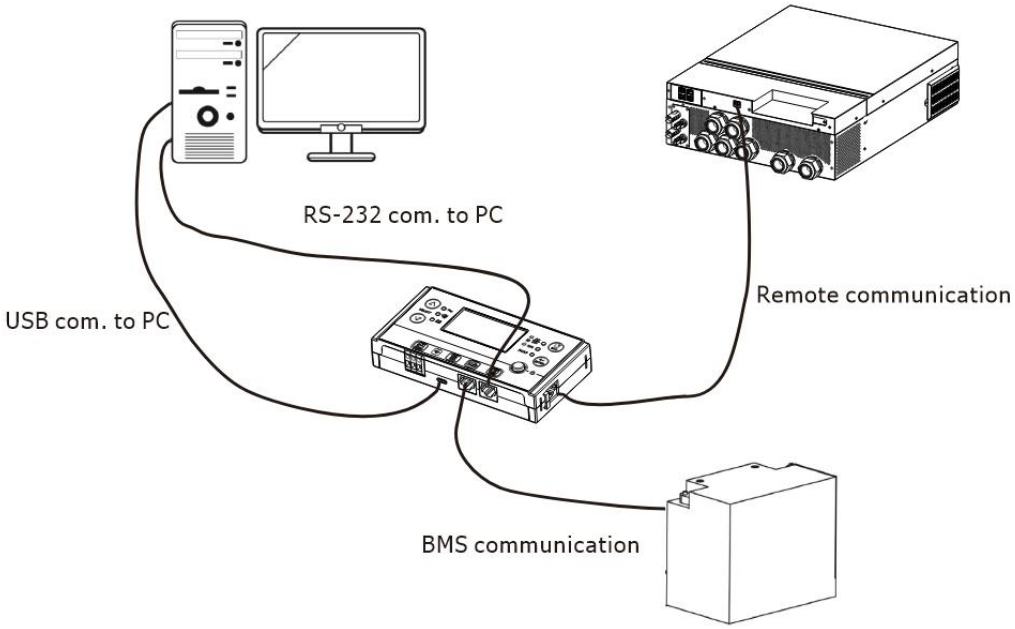


Step 2. Prepare your mounting holes in the marked locations as shown in the illustration below. The LCD module then can be securely mounted to your desired location.



Note: Wall installation should be implemented with the proper screws to the right.

Step 3. After LCD module is installed, connect LCD module to the inverter with an optional RJ45 communication cable as shown below.



Communication Connection

Serial Connection

Please use the supplied serial cable to connect between the inverter and your PC. Install the monitoring software from the bundled CD and follow the on-screen instructions to complete your installation. For detailed software operation, refer to the software user manual on the bundled CD.

Pin assignment

PIN #	Definition	PIN #	Definition
PIN 1	TXD from Inverter	PIN 5	X
PIN 2	RXD to Inverter	PIN 6	X
PIN 3	X	PIN 7	X
PIN 4	X	PIN 8	GND

Serial Connection: BMS port

Pin assignment

PIN #	Definition	PIN #	Definition
PIN 1	X	PIN 5	RS485P
PIN 2	X	PIN 6	CANH
PIN 3	RS485N	PIN 7	CANL
PIN 4	X	PIN 8	GND

USB port (Type C)

Pin assignment

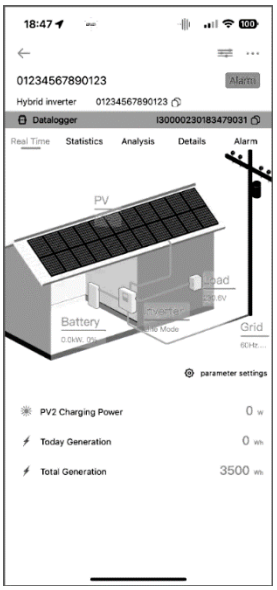
PIN #	Definition	PIN #	Definition
PIN 1, 12	GND	PIN 5, 7	D-
PIN 2, 11	VBUS	PIN 6, 8	D+
PIN 3	X	PIN 9	X
PIN 4	CC1	PIN 10	CC2

DRY-Contact port

Unit Status	Condition				
				NC & C	NO & C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	Output is powered from Battery power or Solar energy.	Program 01 set as USB (utility first)	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open
		Program 01 is set as SBU (SBU priority)	Battery voltage < Setting value in Program 12	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open

Wi-Fi Connection

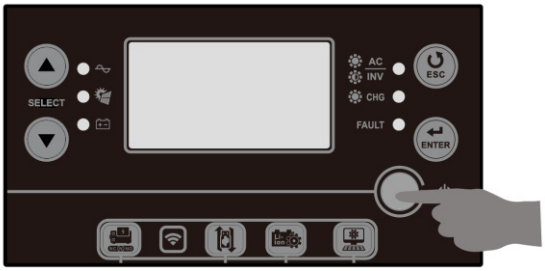
Users can remotely monitor and control their inverters when they combine the Wi-Fi module with Energy-Mate APP. The App uses the Wi-Fi chip to provide remote monitoring data services, which is beneficial for the daily data monitoring of the inverter, querying the real-time data in the device, sending commands from the device, and operating the device remotely. The app is available for both iOS and Android.



OPERATION

Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the display panel) to turn on the unit.



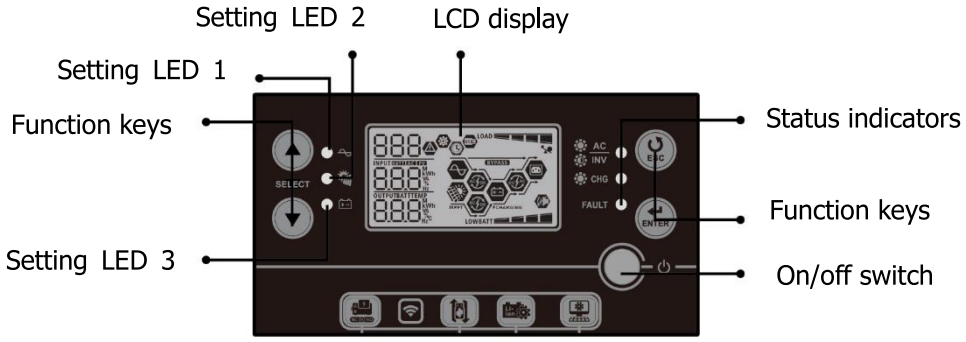
Inverter Turn-on

After this inverter is turned on, WELCOME light show will be started with RGB LED BAR. It will slowly cycle through entire spectrum of nine colors (Green, Sky blue, Royal blue, Violet, Pink, Red, Honey, Yellow, Lime yellow) about 10-15 seconds. After initialization, it will light up with default color.

RGB LED BAR can light up in different color and light effects based on the setting of energy priority to display the operation mode, energy source, battery capacity and load level. These parameters such as color, effects, brightness, speed and so on can be configured through the LCD panel. Please refer to LCD settings for the details.

Operation and Display Panel

The operation and the LCD module, shown in the chart below, includes six indicators, six function keys, on/off switch and a LCD display to indicate the operating status and input/output power information.



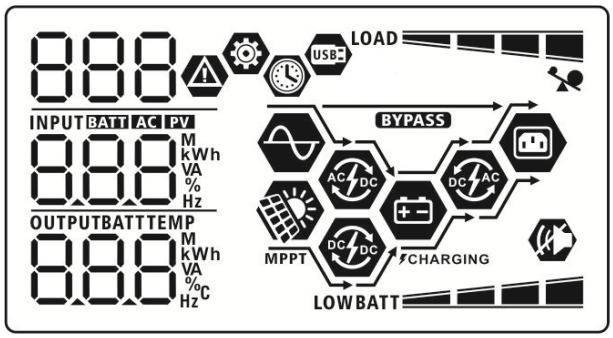
Indicators

LED Indicator		Color	Solid/Flashing	Messages
Setting LED 1		Green	Solid On	Output powered by utility
Setting LED 2		Green	Solid On	Output powered by PV
Setting LED 3		Green	Solid On	Output powered by battery
Status indicators	**AC / INV**	Green	Solid On	Output is available in line mode
			Flashing	Output is powered by battery in battery mode
	CHG	Green	Solid On	Battery is fully charged
			Flashing	Battery is charging.
	FAULT	Red	Solid On	Fault mode
			Flashing	Warning mode

Function Keys

Function Key		Description
ESC	ESC	Exit the setting
▲	Up	To previous selection
▼	Down	To next selection
ENTER	Enter	To confirm/enter the selection in setting mode
▲ and ▼		Press these two keys at the time to switch RGB LED bar for output source priority and battery discharge/charge status.

LCD Display Icons



Icon	Function description
Input Source Information	
AC	Indicates the AC input.
PV	Indicates the PV input
INPUT BATT AC PV 888 M kWh VA % Hz	Indicate input voltage, input frequency, PV voltage, charger current, charger power, battery voltage.
Configuration Program and Fault Information	
888	Indicates the setting programs.
888 ⚠	Indicates the warning and fault codes. Warning: 88 ⚠ flashing with warning code. Fault: F88 lighting with fault code
Output Information	
OUTPUT BATT TEMP 888 M kWh VA % °C Hz	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
OUTPUT	The ICON flashing that indicate the unit with AC output and setting Programs 60, 61 or 62 different to default setting.
Battery Information	
BATT	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

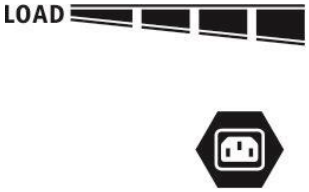
When battery is charging, it will present battery charging status.

Status	Battery voltage	LCD Display

Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	> 2.167 V/cell	Bottom three bars will be on and the top bar will flash.
Floating mode. Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.

Load Percentage	Battery Voltage	LCD Display
Load >50%	< 1.85V/cell	
	1.85V/cell ~ 1.933V/cell	
	1.933V/cell ~ 2.017V/cell	
	> 2.017V/cell	
Load < 50%	< 1.892V/cell	
	1.892V/cell ~ 1.975V/cell	
	1.975V/cell ~ 2.058V/cell	
	> 2.058V/cell	

Load Information		
	Indicates overload.	
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.	
	0%~24%	25%~49%
		
	50%~74%	75%~100%
		

Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the solar charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
	Indicates unit alarm is disabled.
	Indicates USB disk is connected.
	Indicates timer setting or time display

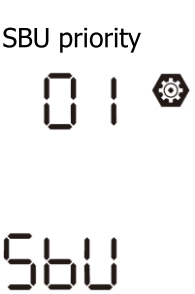
LCD Setting

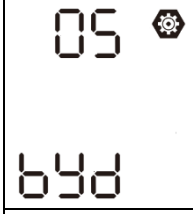
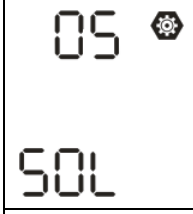
Setting Programs:

After pressing and holding "  " button for 3 seconds, the unit will enter the Setup Mode. Press "  " or "  "button to select setting programs. Press "  " button to confirm you selection or "  " button to exit.

Program List	Functions
01	Output source priority
02	Maximum charging current
03	AC input voltage range
05	Battery type
06, 07	Auto restart when overload or over-temperature
09, 10	Output frequency and voltage
11	Maximum utility and generator charging current
12, 13	Stop/Re-start discharging battery voltage or SOC back to utility source
16	Charger source priority
18	Alarm control
19	Auto return to default display screen
20	Backlight control
22	Beeps while primary source is interrupted
23	Overload bypass
25	Record Fault code
26, 27	Bulk and floating charging voltage
28	AC output mode
29	Battery low cut-off voltage or SOC
30, 31, 33, 34, 35, 36	Battery equalization, voltage, timer, activate
37	Reset all stored data for PV generated power and output load energy
41	Maximum battery discharging current
42, 43	Calibrate meter earth, reverse LED
50, 51, 52	PV power generation, Grid, AC output and Battery power consumption
60, 61, 62, 63, 64	Battery voltage, SOC, discharge time or interval on/off the 2nd output
67	External CT function
70, 71, 72, 73, 74	Battery voltage, SOC, discharge time or interval on/off the 3rd output
83	Erase all data log
84	Data log recorded interval
85, 86, 87, 88, 89	Internal clock setting – Minute, Hour, Day, Month, Year
91, 92, 93, 94, 95	On/Off, brightness, speed, effects and color control for RGB LED
99	Timer Setting for Output Source Priority
100	Tmer Setting for Charger Source Priority

Setting Programs

Program	Description	Selectable option	
00	Exit setting mode	Escape  	
01	Output source priority: To configure load power source priority	Utility first (default)  	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Solar first  	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
		SBU priority  	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	60A (default)  	Setting range is from 10A to 150A Increment of each click is 10A.
03	AC input voltage range	Appliances (default)  	If selected, acceptable AC input voltage range will be within 90-280VAC.

		UPS  	If selected, acceptable AC input voltage range will be within 170-280VAC.
05	Battery type	AGM (default)  	Flooded 
		User-Defined  	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
		Pylontech battery  	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		BYD battery  	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		WECO battery  	If selected, programs of 02, 12, 26, 27 and 29 will be auto-configured per battery supplier recommended. No need for further adjustment.
		Soltaro battery  	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		LIA-protocol compatible battery  	Select "LIA" if using Lithium battery compatible to Lib protocol. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.

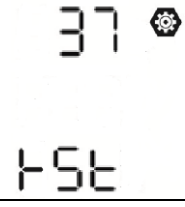
		LIb-protocol compatible battery 	Select "LIb" if using Lithium battery compatible to Lib protocol. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		3rd party Lithium battery 	Select "LIC" if using Lithium battery not listed above. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure.
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
09	Output frequency	50Hz (default) 	60Hz 
10	Output voltage	220V 	230V (default) 
		240V 	
11	Maximum utility and generator charging current Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging	Utility charging current: 2A 	

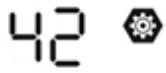
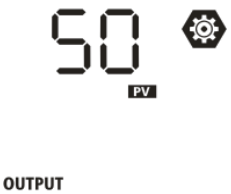
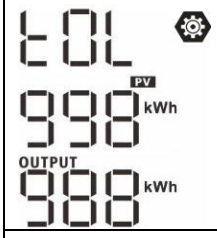
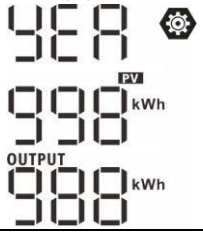
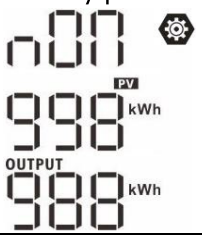
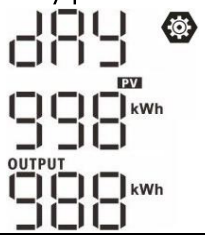
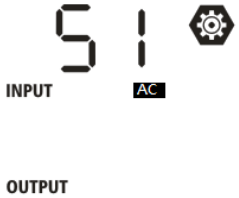
	current from program 02 for utility charger.	Generator charging current: 2A  	
		Setting range is 2A, then from 10A to 150A. Increment of each click is 10A.	
12	Setting voltage point or SOC percentage back to utility source when selecting "SBU" (SBU priority) in program 01.	46V (default)  	Setting range is from 44V to 56V. Increment of each click is 1V.
		SOC 10% (default for Lithium)  	If the battery type (#05) set as Lithium, this setting will change to SOC automatically. Adjustable range is 5% to 95%. Increment of each click is 5%.
13	Setting voltage point or SOC percentage back to battery mode when selecting "SBU" (SBU priority) in program 01.	Battery fully charged  	54V (default) 
		Setting range is from 48V to 62V. Increment of each click is 1V.	
		SOC 80% (default for Lithium)  	If any types of lithium battery is selected in program 05, setting value will change to SOC automatically. Setting range is 10% to 100%.
16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first  	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.

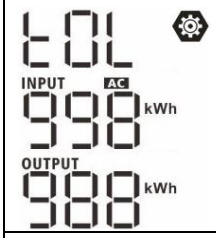
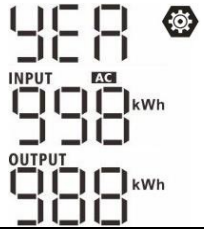
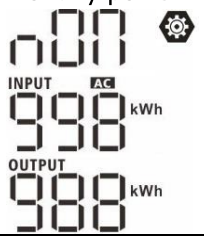
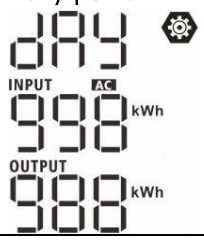
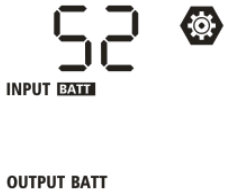
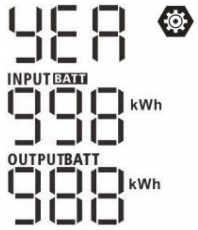
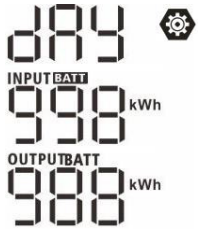
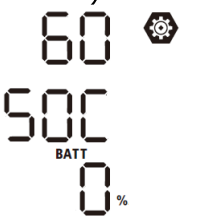
		Solar and Utility (default)  	Solar energy and utility will charge battery at the same time.
		Only Solar  	Solar energy will be the only charger source no matter utility is available or not.
		If this inverter/charger is working in Battery mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
18	Alarm control	Alarm on (default)  	Alarm off 
19	Auto return to default display screen	Return to default display screen (default)  	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen  	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default)  	Backlight off 

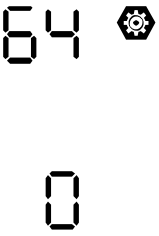
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
25	Record Fault code	Record enable (default) 	Record disable 
26	Bulk charging voltage (C.V voltage)	default: 56.4V 	If self-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 62.0V. Increment of each click is 0.1V.
27	Floating charging voltage	default: 54.0V 	If self-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 62.0V. Increment of each click is 0.1V.
28	AC output mode *This setting is only available when the inverter is in standby mode (Switch off).	Single: This inverter is used in single phase application. 	Parallel: This inverter is operated in parallel system. 
		When the inverter is operated in 3-phase application, set up inverter to be operated in specific phase.	

		L1 phase: 	L2 phase: 
		L3 phase: 	
29	Low DC cut-off voltage or Low SOC: ● If battery power is only power source available, inverter will shut down. ● If PV energy and battery power are available, inverter will charge battery without AC output. ● If PV energy, battery power and utility are all available, inverter will transfer to line mode and provide output power to loads.	default: 44.0V 	If self-defined is selected in program 5, this program can be set up. Setting range is from 42.0V to 48.0V. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.
		SOC 0% (default for Lithium) 	If any types of lithium battery is selected in program 05, setting value will change to SOC automatically. Adjustable range is 0% to 90%. Increment of each click is 5%.
30	Battery equalization	Battery equalization 	Battery equalization disable (default) 
		If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.	
31	Battery equalization voltage	default: 58.4V 	Setting range is from 48.0V to 62.0V. Increment of each click is 0.1V.
33	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.

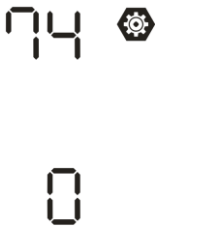
<table>
<tr><td>34</td><td>Battery equalized timeout</td><td>120min (default)
  </td><td>Setting range is from 5min to 900 min. Increment of each click is 5 min.</td></tr>
<tr><td>35</td><td>Equalization interval</td><td>30days (default)
  </td><td>Setting range is from 0 to 90 days. Increment of each click is 1 day</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
  </td><td>Disable (default)
  </td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If “Enable” is selected in this program, it’s to activate battery equalization immediately and LCD main page will show “E9”. If “Disable” is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, “E9” will not be shown in LCD main page.</td></tr>
<tr><td>37</td><td>Reset all stored data for PV generated power and output load energy</td><td>Not reset(Default)
  </td><td>Reset
  </td></tr>
<tr><td rowspan="2">41</td><td rowspan="2">Maximum battery discharging current</td><td>Disable (Default)
  </td><td>If selected, battery discharge protection is disabled.</td></tr>
<tr><td>30A
  </td><td>The setting range is from 30 A to 200 A. Increment of each click is 10A.
If discharging current is higher than setting value, battery will stop discharging. At this time, if the utility is available, the inverter will operate in bypass mode. If no utility is available, the inverter will shut down after 5-minute operation in battery mode.</td></tr>
</table>

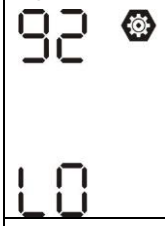
<table>
<tr><td rowspan="2">42</td><td rowspan="2">Adjustment parameter for EARTH LED</td><td>If unit is not in Line mode, it will show nothing.
  </td><td>If unit is in Line mode, it will show following. (default)
  </td></tr>
<tr><td colspan="2">If EARTH LED of meter is on, it can be off by adjusting the parameter. If the unit is in Line mode, this program can be set up. Setting range is from -30 to 30. Increment of each click is 1. The condition of program changed automatically.</td></tr>
<tr><td rowspan="2">43</td><td rowspan="2">Adjustment parameter for REVERSE LED</td><td>If unit is not in Line mode, it will show following.
  </td><td>If unit is in Line mode, it will show following. (default)
  </td></tr>
<tr><td colspan="2">If REVERSE LED of meter is on, it can be off by adjusting the parameter. If the unit is in Line mode, this program can be set up. Setting range is from 0 to 300. Increment of each click is 10.</td></tr>
<tr><td rowspan="3">50</td><td rowspan="3">PV power generation & AC output power consumption</td><td>PV & AC output power
  </td><td>If selected, the display screen will show the power by order with total, yearly, monthly, daily as below. The middle number is the PV power generation and the bottom number is the AC output consumption.</td></tr>
<tr><td>Total amount
  </td><td>Yearly power
  </td></tr>
<tr><td>Monthly power
  </td><td>Daily power
  </td></tr>
<tr><td>51</td><td>Grid power consumption & Feed-in power</td><td>Grid power consumption & Feed-in power
  </td><td>If selected, the display screen will show grid power consumption and feed-in power in order with total, yearly, monthly, daily as below. The middle number is the power consumption taking from grid and the bottom number is the total energy feed-in to the grid.</td></tr>
</table>

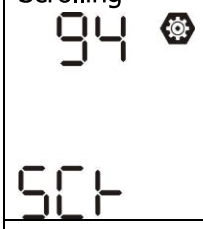
		Total amount 	Yearly power 
		Monthly power 	Daily power 
52	Battery charge power & battery discharge power	Battery charge & battery discharge power 	If selected, the display screen will show the charging and discharging power from battery by order with total, yearly, monthly, daily as below. The middle number is the total charging energy for battery and the bottom number is the discharging power from battery.
		Total amount 	Yearly power 
		Monthly power 	Daily power 
60	Setting cut-off voltage point or SOC percentage on the second output (L2)	default setting: 42.0V 	If "User-defined" is selected in program 05, this setting range is from 42.0V to 60.0V. Increment of each click is 0.1V.
		SOC 0% (default for Lithium) 	If any type of lithium battery is selected in program 05, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 0% to 95%. Increment of each click is 5%.

61	Setting discharge time on the second output (L2).	Disable (Default) 	Setting range is disable and then from 0 min to 990 min. Increment of each click is 5 min. *If the battery discharge time achieves the setting time in program 61 and the program 60 function is not triggered, the output will be turned off.
62	Setting time interval to turn on the second output (L2)	00~23 (Default) 	Setting range is from 00 to 23. Increment of each click is 1 hour. If setting range is from 00 to 08, the second output will be turned on until 09:00. During this period, it will be turned off if any setting value in program 60 or 61 is reached.
63	Setting voltage point or SOC to restart on the second output (L2)	Default setting: 46.0V 	If "User-defined" is selected in program 05, this setting range is from 43.0V to 61.0V. Increment of each click is 0.1V. *If second output is cut off due to setting in program 60, second output (L2) will restart according to setting in program 63.
63	Setting voltage point or SOC to restart on the second output (L2)	SOC: 20% (default for lithium battery) 	If any type of lithium battery is selected in program 05, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 5% to 100%. Increment of each click is 5%. *If second output is cut off due to setting in program 60, second output (L2) will restart according to setting in program 63.
64	Setting waiting time to turn on the second output (L2) when the inverter is back to Line Mode or battery is in charging status	0 min (Default) 	Setting range is from 0 min to 990 min. Increment of each click is 5 min. *If second output is cut off due to setting in program 61, second output (L2) will restart according to setting in program 64.
67	External CT function	CT disable(Default) 	50A 

		200A 	
70	Setting cut-off voltage point or SOC percentage on the third output (L3)	default setting: 42.0V 	If "User-defined" is selected in program 05, this setting range is from 42.0V to 60.0V. Increment of each click is 0.1V.
		SOC 0% (default for Lithium) 	If any type of lithium battery is selected in program 05, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 0% to 95%. Increment of each click is 5%.
71	Setting discharge time on the third output (L3).	Disable (Default) 	Setting range is disable and then from 0 min to 990 min. Increment of each click is 5 min. *If the battery discharge time achieves the setting time in program 71 and the program 70 function is not triggered, the output will be turned off.
72	Setting time interval to turn on the third output (L3)	00~23 (Default) 	Setting range is from 00 to 23. Increment of each click is 1 hour. If setting range is from 00 to 08, the third output will be turned on until 09:00. During this period, it will be turned off if any setting value in program 70 or 71 is reached.
73	Setting voltage point or SOC to restart on the third output (L3)	Default setting: 46.0V 	If "User-defined" is selected in program 05, this setting range is from 43.0V to 61.0V. Increment of each click is 0.1V. *If the third output is cut off due to setting in program 70, the third output (L3) will restart according to setting in program 73.

		SOC: 20% (default for lithium battery) 	If any type of lithium battery is selected in program 05, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 5% to 100%. Increment of each click is 5%. *If the third output is cut off due to setting in program 70, the third output (L3) will restart according to setting in program 73.
74	Setting waiting time to turn on the third output (L3) when the inverter is back to Line Mode or battery is in charging status	0 min (Default) 	Setting range is from disable, 0 min to 990 min. Increment of each click is 5 min. *If the third output is cut off due to setting in program 71, the third output (L3) will restart according to setting in program 74.
83	Erase all data log	Not reset(Default) 	Reset 
84	Data log recorded interval *The maximum data log number is 6550. If it's over 6550, it will re-write the first log.	1 minute (default) 	1, 2, 3~6 minutes, default 1 minute
85	Time setting – Minute	For minute setting, the range is from 0 to 59. 	
86	Time setting – Hour	For hour setting, the range is from 0 to 23. 	

87	Time setting– Day	For day setting, the range is from 1 to 31. 	
88	Time setting– Month	For month setting, the range is from 1 to 12. 	
89	Time setting – Year	For year setting, the range is from 17 to 99. 	
91	On/Off control for RGB LED *It's necessary to enable this setting to activate RGB LED lighting function.	Enabled (default) 	Disable 
92	Brightness of RGB LED	Low 	Normal (default) 
		High 	
93	Lighting speed of RGB LED	Low 	Normal (default) 

		High  	
94	RGB LED effects	Scrolling  	Breathing 
		Solid on (Default)  	
95	Color combination of RGB LED to show energy source and battery charge/discharge status: ● Grid-PV-Battery ● Battery charge/discharge status	C01: (Default) ● Violet-White-Sky blue ● Pink-Honey  	C02: ● White-Yellow-Green ● Royal blue-Lime yellow 
99	Timer Setting for Output Source Priority  	Once access this program, it will show "OPP" in LCD. Press " ENTER " button to select timer setting for output source priority. There are three timers to set up. Press " ▲ " or " ▼ " button to select specific timer option. Then, press " ENTER " to confirm timer option. Press " ▲ " or " ▼ " button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press " ENTER " to confirm starting time setting. Next, the cursor will jump to next column to set up end time. Once ending time is set completely, press " ENTER " to confirm all setting.	
		Utility first timer  	Solar first timer 

<table>
<tr><td></td><td></td><td>SBU priority timer
  </td><td></td></tr>
<tr><td rowspan="3">100</td><td rowspan="3">Timer Setting for Charger Source Priority
 
  </td><td colspan="2">Once access this program, it will show “CGP” in LCD. Press “ ENTER ” button to select timer setting for charger source priority. There are three timers to set up. Press “ ▲ ” or “ ▼ ” button to select specific timer option. Then, press “ ENTER ” to confirm timer option. Press “ ▲ ” or “ ▼ ” button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press “ ENTER ” to confirm starting time setting.Next, the cursor will jump to next column to set up end time. Once ending time is set completely, press “ ENTER ” to confirm all setting.</td></tr>
<tr><td>Solar first
  </td><td>Solar and utility
  </td></tr>
<tr><td>Only solar
  </td><td></td></tr>
</table>

USB Function Setting

There are three USB function setting such as firmware upgrade, data log export and internal parameter re-write from the USB disk. Please follow below procedure to execute selected USB function setting.

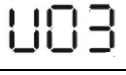
Procedure	LCD Screen
Step 1: Insert an OTG USB disk into the USB port.	
Step 2: Press and hold " ESC " button for 3 seconds to enter USB function setting.	
Step 3: Press " ▲ " or " ▼ " button to enter the selectable setting programs	

Step 3: Please select setting program by following the procedure.

Program#	Operation Procedure	LCD Screen
Upgrade firmware	After entering USB function setting, press " ENTER " button to enter "upgrade firmware" function. This function is to upgrade inverter firmware. If firmware upgrade is needed, please check with your dealer or installer for detail instructions.	
Re-write internal parameters	After entering USB function setting, press " ▼ " button to switch to "Re-write internal parameters" function. This function is to over-write all parameter settings (TEXT file) with settings in the USB disk from a previous setup or to duplicate inverter settings. Please check with your dealer or installer for detail instructions.	
Export data log	After entering USB function setting, press " ▼ " button twice to switch to "export data log" function and it will show "LOG" in the LCD. Press " ENTER " button to confirm the selection for export data log. If the selected function is ready, LCD will display "rdy". Press " ENTER " button to confirm the selection again.	
	● Press " ▲ " button to select "Yes" to export data log. "YES" will disappear after this action is complete. Then, press " ESC " button to return to main screen. ● Or press " ▼ " button to select "No" to return to main screen.	

If no button is pressed for 1 minute, it will automatically return to main screen.

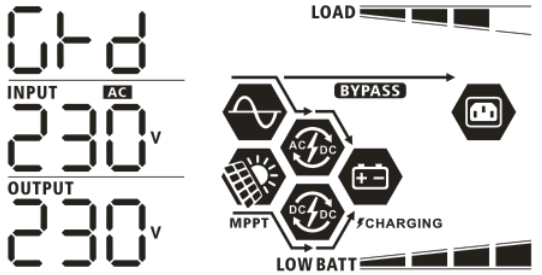
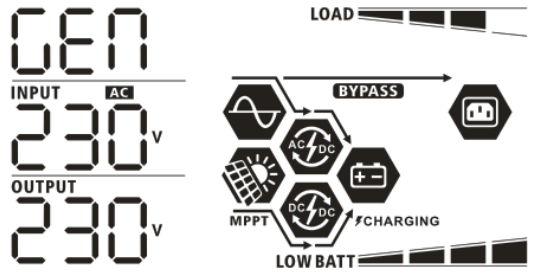
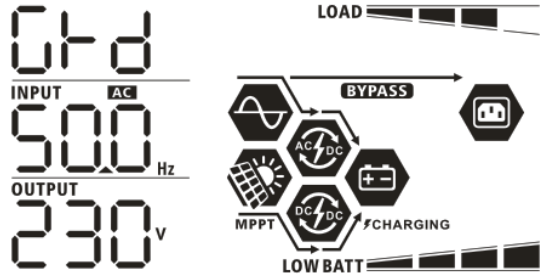
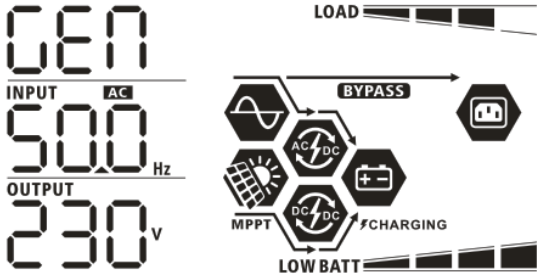
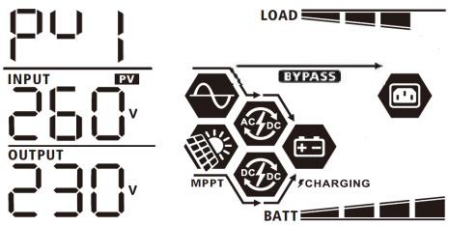
Error message for USB On-The-Go functions:

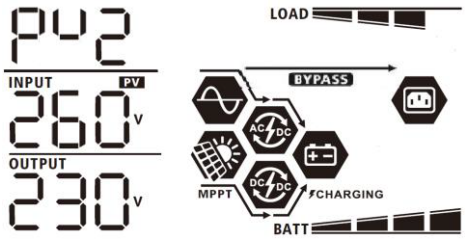
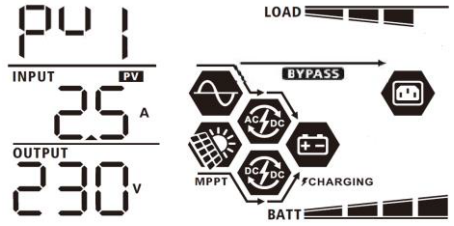
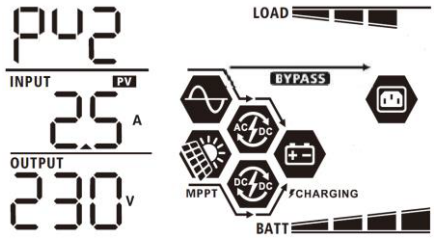
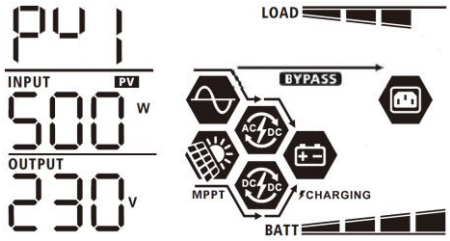
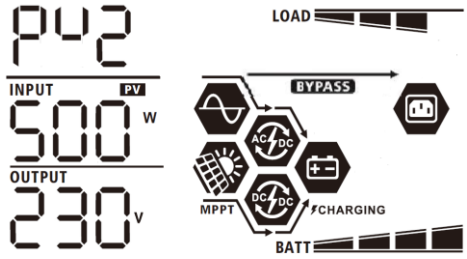
Error Code	Messages
	No USB disk is detected.
	USB disk is protected from copying.
	Document inside the USB disk contains the wrong format.

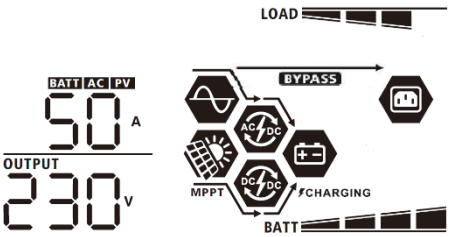
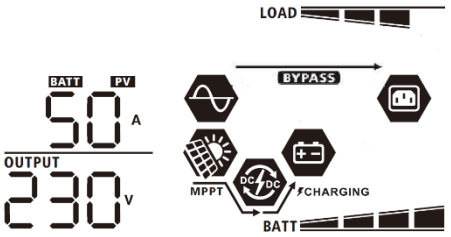
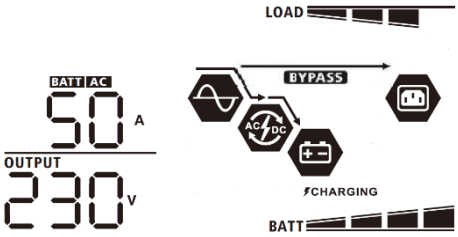
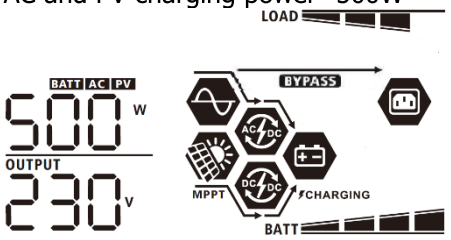
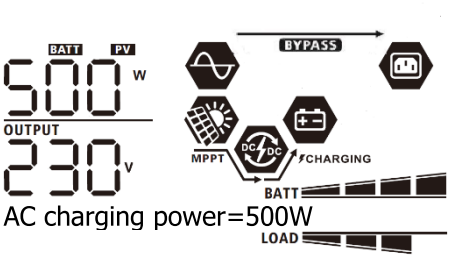
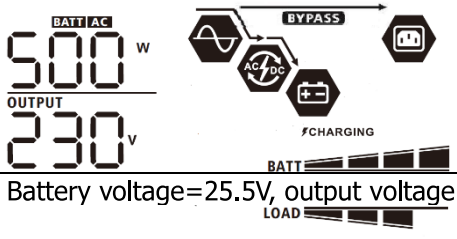
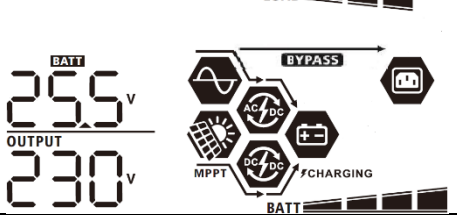
If any error occurs, error code will only show for 3 seconds. After 3 seconds, it will automatically return to the main screen.

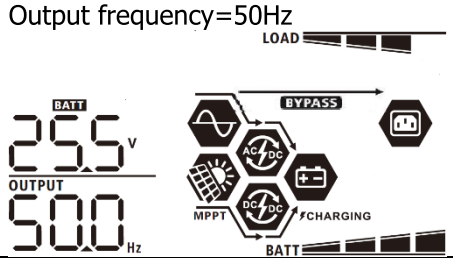
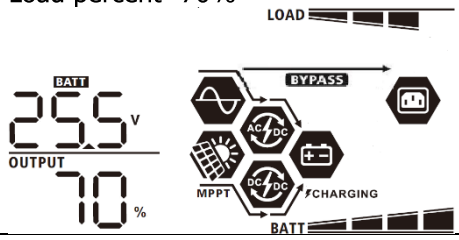
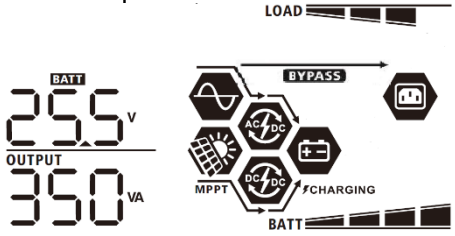
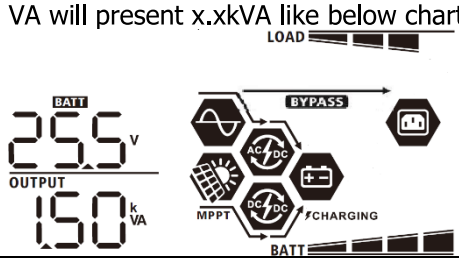
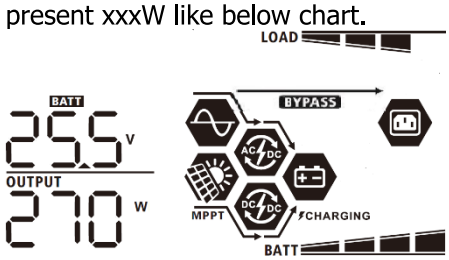
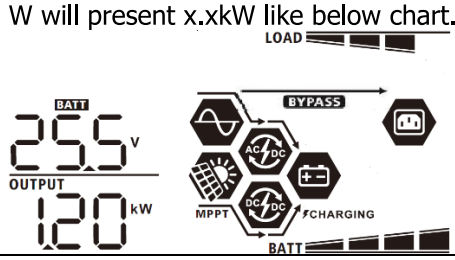
LCD Display

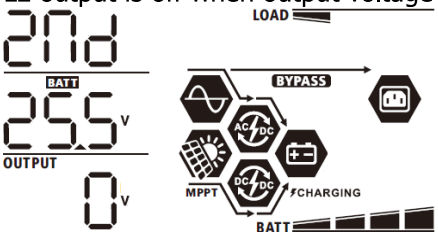
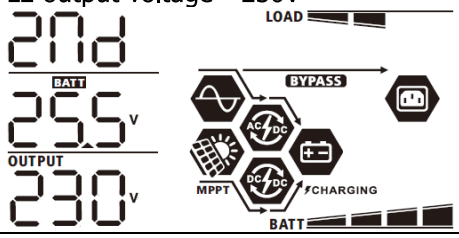
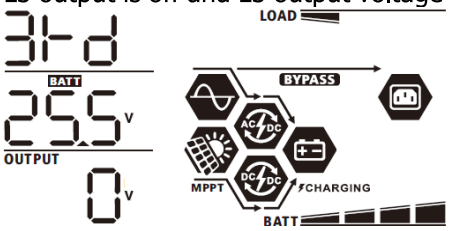
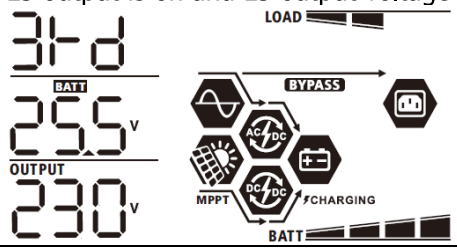
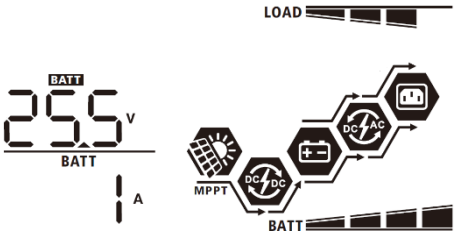
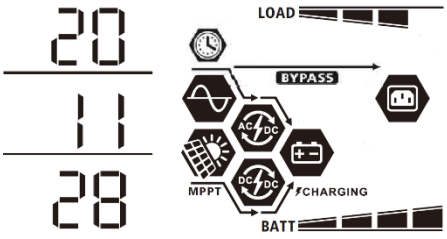
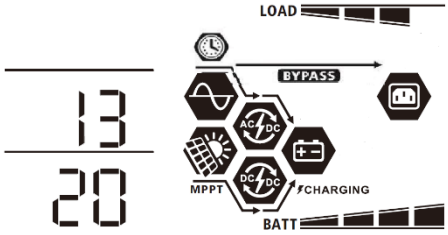
The LCD display information will be switched in turn by pressing the "▲" or "▼" button. The selectable information is switched as the following table in order.

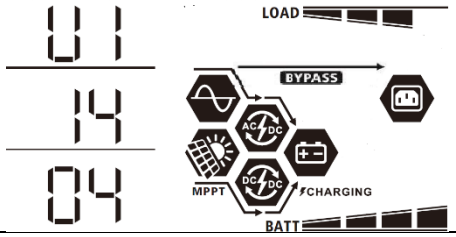
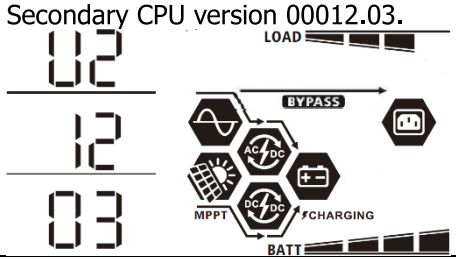
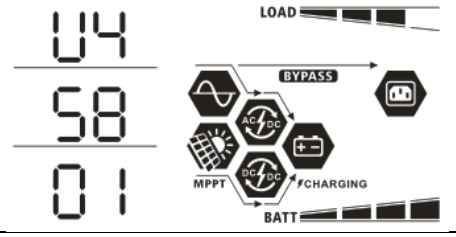
Selectable information	LCD display
Input voltage/Output voltage (Default Display Screen)	Grid input voltage=230V, output voltage=230V  Generator input voltage=230V, output voltage=230V 
Input frequency	Grid input frequency=50Hz  Generator input frequency=50Hz 
PV voltage	PV1 voltage=260V 

<table>
<tr><td rowspan="2"></td><td>PV2 voltage=260V
 
</td></tr>
<tr><td rowspan="2">PV current</td><td>PV1 current = 2.5A
 
</td></tr>
<tr><td>PV2 current = 2.5A
 
</td></tr>
<tr><td rowspan="2">PV power</td><td>PV1 power = 500W
 
</td></tr>
<tr><td>PV2 power = 500W
 
</td></tr>
</table>

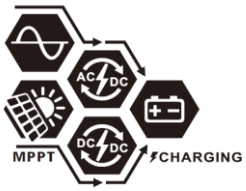
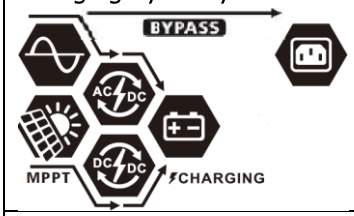
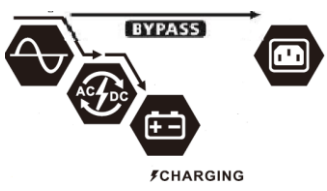
Charging current	AC and PV charging current=50A  PV charging current=50A  AC charging current=50A 
Charging power	AC and PV charging power=500W  PV charging power=500W  AC charging power=500W 
Battery voltage and output voltage	Battery voltage=25.5V, output voltage=230V 

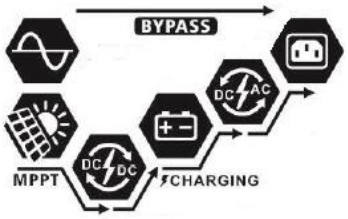
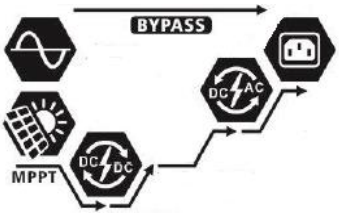
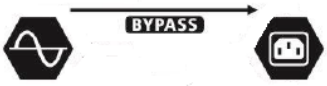
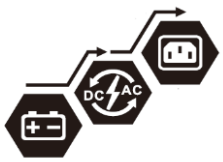
Output frequency	Output frequency=50Hz 
Load percentage	Load percent=70% 
Load in VA	When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.  When load is larger than 1kVA (≧1KVA), load in VA will present x.xkVA like below chart. 
Load in Watt	When load is lower than 1kW, load in W will present xxxW like below chart.  When load is larger than 1kW (≧1KW), load in W will present x.xkW like below chart. 

L2 Output voltage	L2 output is off when output voltage shows 0V.  L2 output in on when output voltage show value. L2 output voltage =230V 
L3 output voltage	L3 output is off and L3 output voltage shows 0V.  L3 output is on and L3 output voltage is 230V. 
Battery voltage/DC discharging current	Battery voltage=25.5V, discharging current=1A 
Real date.	Real date Nov 28, 2020. 
Real time.	Real time 13:20. 

Main CPU version checking.	Main CPU version 00014.04. 
Secondary CPU version checking.	Secondary CPU version 00012.03. 
The third CPU version checking	The third CPU version 00058.01. 

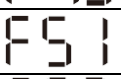
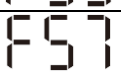
Operating Mode Description

<table>
<tr><th>Operation mode</th><th>Description</th><th>LCD display</th></tr>
<tr><td rowspan="4">Standby mode
Note:
*Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.</td><td rowspan="4">No output is supplied by the unit but it still can charge batteries.</td><td>Charging by utility and PV energy.
 
</td></tr>
<tr><td>Charging by utility.
 
</td></tr>
<tr><td>Charging by PV energy.
 
</td></tr>
<tr><td>No charging.
  </td></tr>
<tr><td>Fault mode
Note:
*Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.</td><td>No charging at all no matter if grid or PV power is available.</td><td>No charging.
  </td></tr>
<tr><td rowspan="2">Line Mode</td><td rowspan="2">The unit will provide output power from the mains. It will also charge the battery at line mode.</td><td>Charging by utility and PV energy.
 
</td></tr>
<tr><td>Charging by utility.
 
</td></tr>
</table>

Operation mode	Description	LCD display
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	If "SUB" (solar first) is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time. 
		If either "SUB" (solar first) or "SBU" is selected as output source priority and battery is not connected, solar energy and the utility will provide the loads. 
		Power from utility. 
Battery Mode	The unit will provide output power from battery and/or PV power.	Power from battery and PV energy. 
		PV energy will supply power to the loads and charge battery at the same time. No utility is available. 
		Power from battery only. 

Operation mode	Description	LCD display
Battery Mode	The unit will provide output power from battery and/or PV power.	Power from PV energy only. 

Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited.	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
10	PV over current	
11	PV over voltage	
12	DCDC over current	
13	Battery discharge over current	
51	Over current	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
57	Current sensor failed	
58	Output voltage is too low	

Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	
02	Over temperature	None	
03	Battery is over-charged	Beep once every second	
04	Low battery	Beep once every second	
07	Overload	Beep once every 0.5 second	
10	Output power derating	Beep twice every 3 seconds	
15	PV energy is low.	Beep twice every 3 seconds	
16	High AC input (>280VAC) during BUS soft start	None	
30	Communication lost between DSP and INPUT MCU	None	
32	Communication failure between inverter and remote display panel	None	
E9	Battery equalization	None	
bP	Battery is not connected	None	

BATTERY EQUALIZATION

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

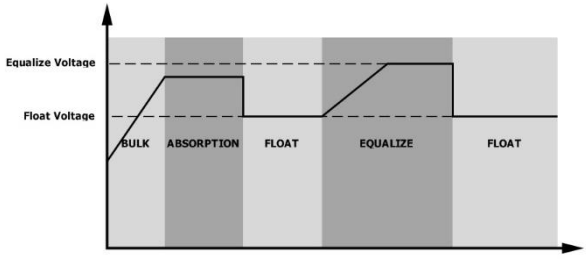
- **How to Apply Equalization Function**

You must enable battery equalization function in monitoring LCD setting program 33 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 37.
2. Active equalization immediately in program 39.

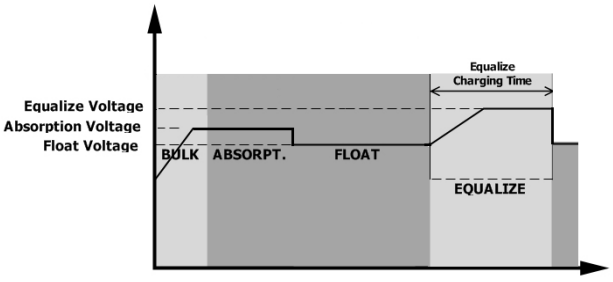
- **When to Equalize**

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

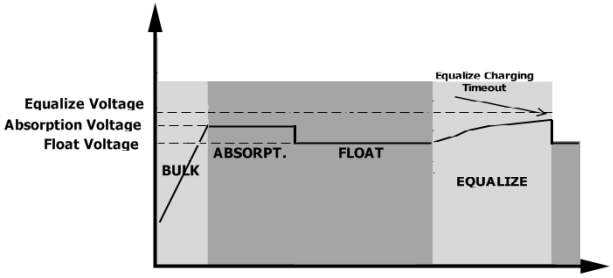


- **Equalize charging time and timeout**

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



SPECIFICATIONS

Table 1 Line Mode Specifications

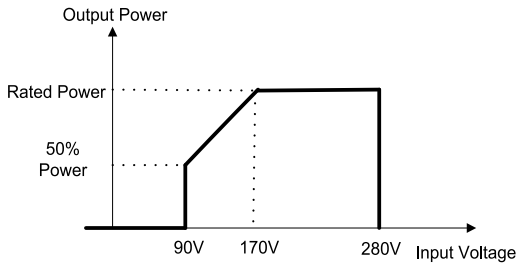
MODEL	8.5KW
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	170Vac±7V (UPS) 90Vac±7V (Appliances)
Low Loss Return Voltage	180Vac±7V (UPS); 100Vac±7V (Appliances)
High Loss Voltage	280Vac±7V
High Loss Return Voltage	270Vac±7V
Max AC Input Voltage	300Vac
Max AC Input Current	60A
Max Output Current for 2nd output	60A
Max Output Current for 3rd output	60A
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
Low Loss Frequency	40±1Hz
Low Loss Return Frequency	42±1Hz
High Loss Frequency	65±1Hz
High Loss Return Frequency	63±1Hz
Output Short Circuit Protection	Line mode: Circuit Breaker (70A) Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)
Transfer Time	10ms typical, 12ms maximum @50Hz (UPS); 20ms typical, 25ms maximum @50Hz (Appliances)
Output power de-rating: When AC input voltage under 170V the output power will be de-rated.	

Table 2 Inverter Mode Specifications

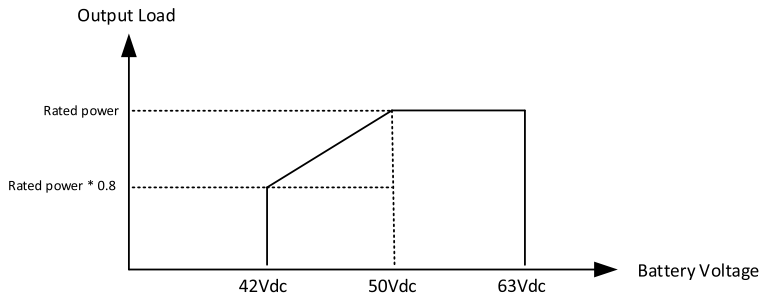
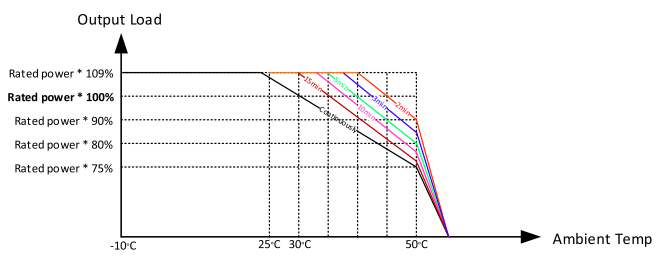
MODEL	8.5KW
Rated Output Power	8500W
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	230Vac±5%
Output Frequency	60Hz or 50Hz
Peak Efficiency	93%
Overload Protection	10s@110%~150%load; 5s@≥150% load; 100ms @ ≥205% load
Surge Capacity	2* rated power for 5 seconds
Low DC Warning Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 46.0Vdc 42.8Vdc 40.4Vdc
Low DC Warning Return Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 48.0Vdc 44.8Vdc 42.4Vdc
Low DC Cut-off Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 44.0Vdc 40.8Vdc 38.4Vdc
High DC Recovery Voltage	61Vdc
High DC Cut-off Voltage	63Vdc
DC Voltage Accuracy	+/-0.3V@ no load
THDV	<5% for linear load,<10% for non-linear load @ nominal voltage
DC Offset	≦100mV
Power Limitation When battery voltage is lower than 50Vdc, output power will be derated. If connected load is higher than this derated power, the AC output voltage will decrease until the output power reduces to this derated power. The minimum AC output voltage is output voltage setting – 10V.	 

Table 3 Charge Mode Specifications

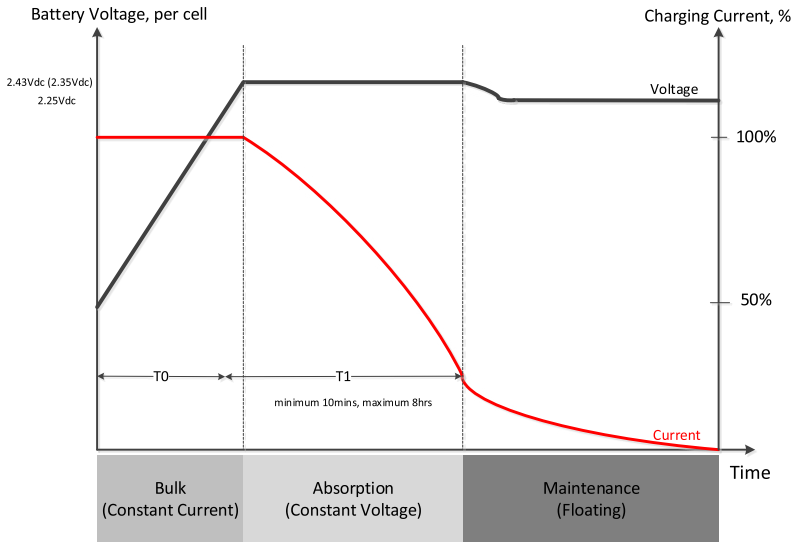
Utility Charging Mode		
MODEL		**8.5KW**
Charging Current (UPS) @ Nominal Input Voltage		150A
Bulk Charging Voltage	**Flooded Battery**	58.4V
	AGM / Gel Battery	56.4Vdc
Floating Charging Voltage		54Vdc
Overcharge Protection		63Vdc
Charging Algorithm		3-Step
Charging Curve		
Solar Input		
MODEL		**8.5KW**
Rated Power		12000W
Max. PV Array Open Circuit Voltage		500Vdc
PV Array MPPT Voltage Range		90Vdc~450Vdc
Max. Input Current		27A x 2 (MAX 40A)
Max. Charging Current		150A
Start-up Voltage		80V +/- 5Vdc

Table 4 General Specifications

MODEL	**8.5KW**
Safety Certification	CE
Operating Temperature Range	-10°C to 50°C
Storage temperature	-15°C~ 60°C
Humidity	5% to 95% Relative Humidity (Non-condensing)
Dimension (D*W*H), mm	147.4x 432.5 x 553.6
Net Weight, kg	18.4

Table 5 Parallel Specifications

Max parallel numbers	6
Circulation Current under No Load Condition	Max 2A
Power Unbalance Ratio	<5% @ 100% Load
Parallel communication	CAN
Transfer time in parallel mode	Max 50ms
Parallel Kit	YES

Note: Parallel feature will be disabled when only PV power is available.

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS→Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature of internal converter component is over 120°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	

Appendix I: Parallel function

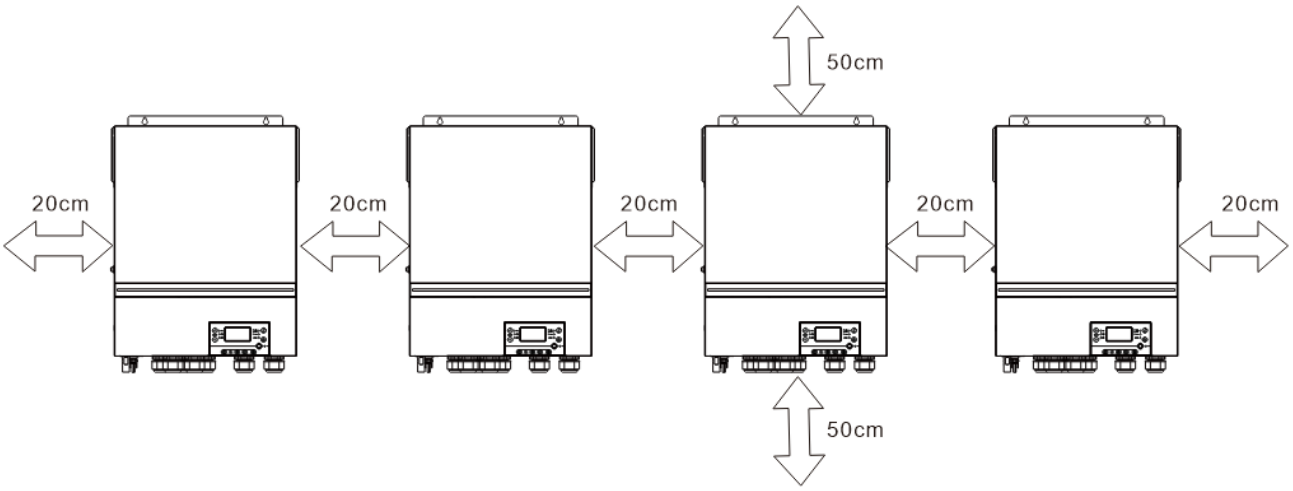
1. Introduction

This inverter can be used in parallel with two different operation modes.

1. Parallel operation in single phase is with up to 6 units. The supported maximum output power is 51KW/51KVA.
2. Maximum six units work together to support three-phase equipment. Maximum four units support one phase.

2. Mounting the Unit

When installing multiple units, please follow below chart.



NOTE: For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit. Be sure to install each unit in the same level.

3. Wiring Connection

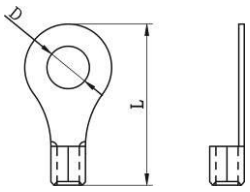
WARNING: It's REQUIRED to connect battery for parallel operation.

The cable size of each inverter is shown as below:

Recommended battery cable and terminal size for each inverter:

Model	Wire Size	Cable mm^2	Ring Terminal Dimensions		Torque value
			D (mm)	L (mm)	
8.5KW	1*3/0AWG	85	8.4	54	5 Nm

Ring terminal:



WARNING: Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working.

Recommended AC input and output cable size for each inverter:

Model	AWG no.	Torque
8.5KW	6 AWG	1.4~ 1.6 Nm

You need to connect the cables of each inverter together. Take the battery cables for example: You need to use a connector or bus-bar as a joint to connect the battery cables together, and then connect to the battery terminal. The cable size used from joint to battery should be X times cable size in the tables above. "X" indicates the number of inverters connected in parallel.

Regarding AC input and output, please also follow the same principle.

CAUTION!! Please install the breaker at the battery and AC input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or AC input.

Recommended breaker specification of battery for each inverter:

Model	1 unit*
8.5KW	300A/70VDC

*If you want to use only one breaker at the battery side for the whole system, the rating of the breaker should be X times current of 1 unit. "X" indicates the number of inverters connected in parallel.

Recommended breaker specification of AC input with single phase:

Model	2 units	3 units	4 units	5 units	6 units
8.5KW	120A/230VAC	180A/230VAC	240A/230VAC	300A/230VAC	360A/230VAC

Note 1: Also, you can use 60A breaker with only 1 unit and install one breaker at its AC input in each inverter.

Note 2: Regarding three-phase system, you can use 4-pole breaker directly and the rating of the breaker should be compatible with the phase current limitation from the phase with maximum units

Recommended battery capacity

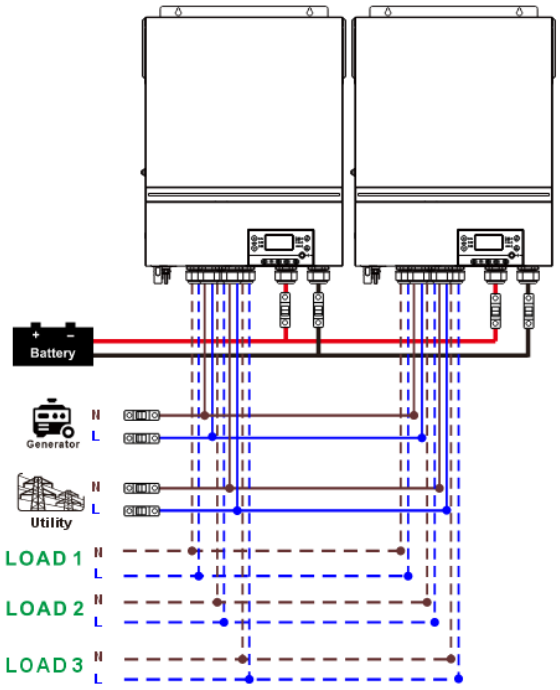
Inverter parallel numbers	2	3	4	5	6
Battery Capacity	200AH	400AH	400AH	600AH	600AH

WARNING! Be sure that all inverters will share the same battery bank. Otherwise, the inverters will transfer to fault mode.

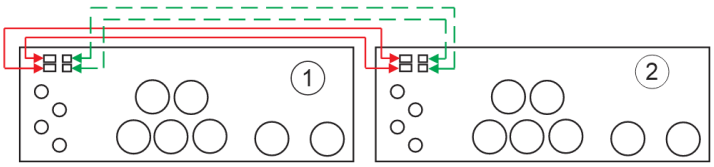
4-1. Parallel Operation in Single phase

Two inverters in parallel:

Power Connection

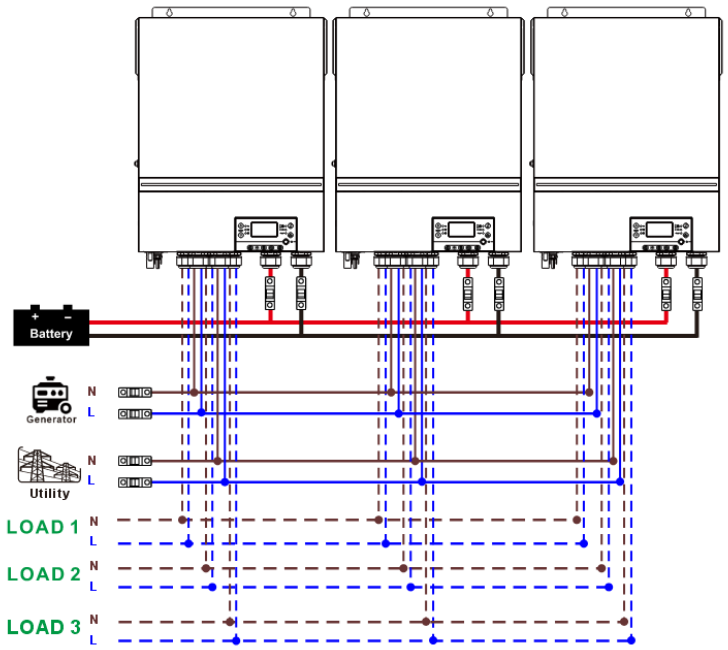


Communication Connection

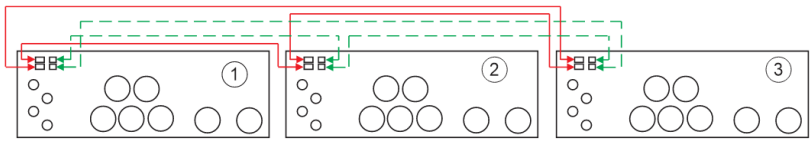


Three inverters in parallel:

Power Connection

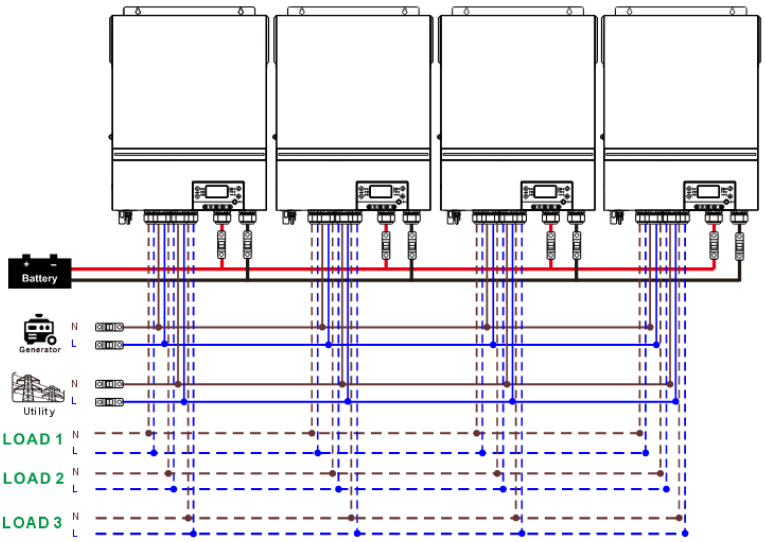


Communication Connection

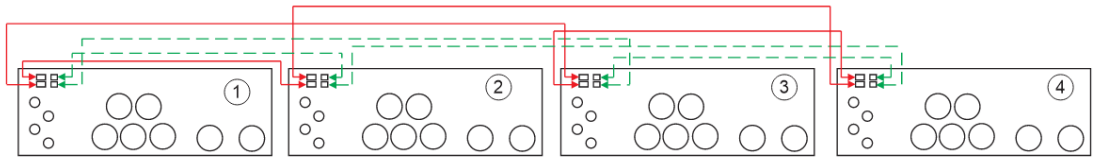


Four inverters in parallel:

Power Connection

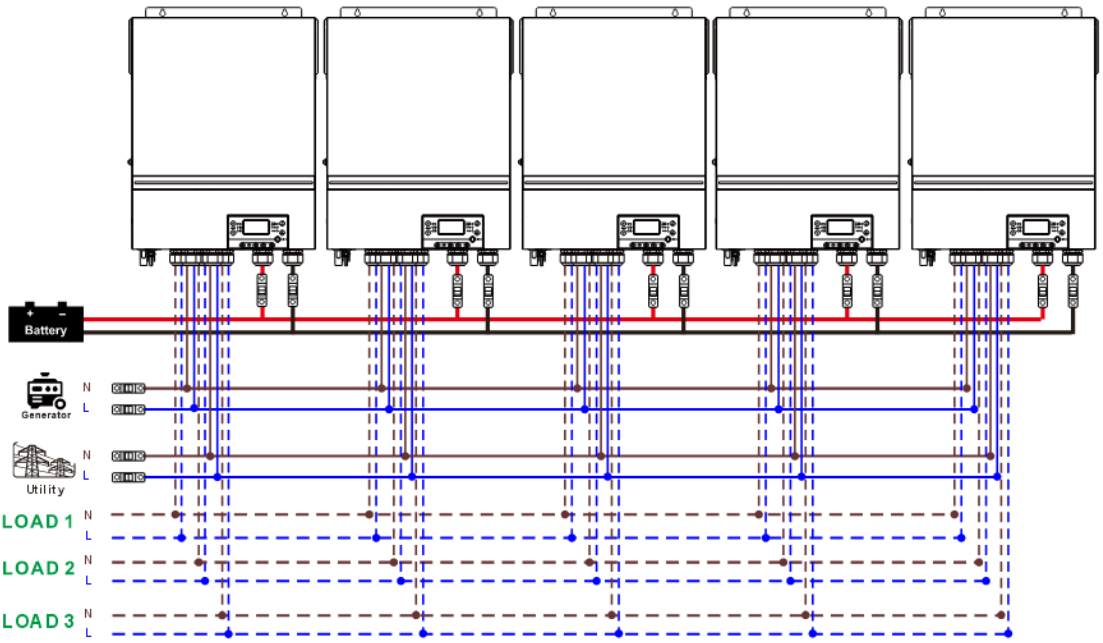


Communication Connection

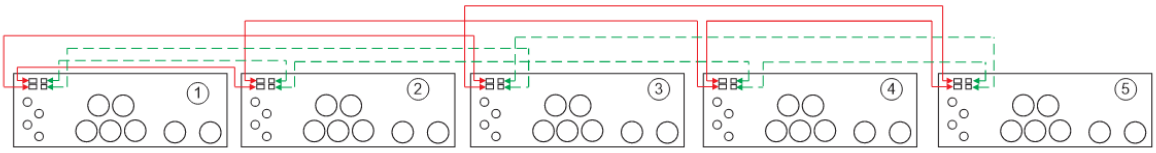


Five inverters in parallel:

Power Connection

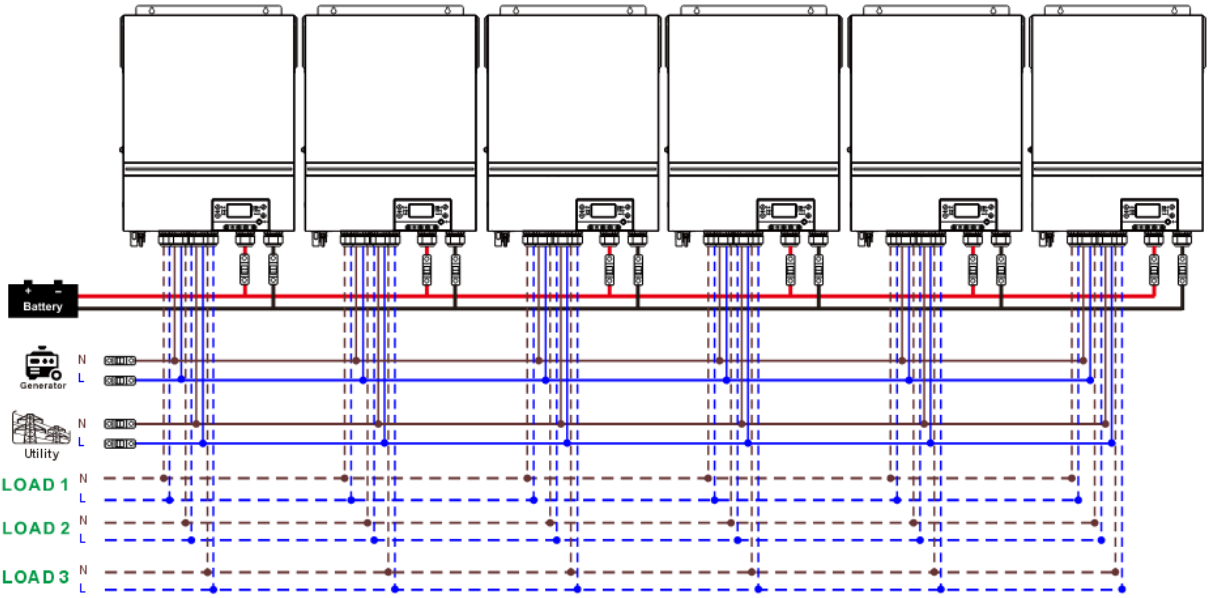


Communication Connection

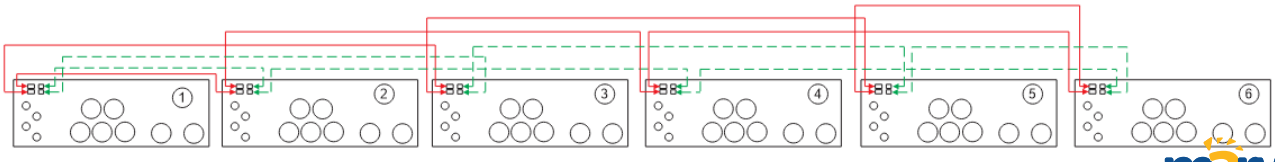


Six inverters in parallel:

Power Connection



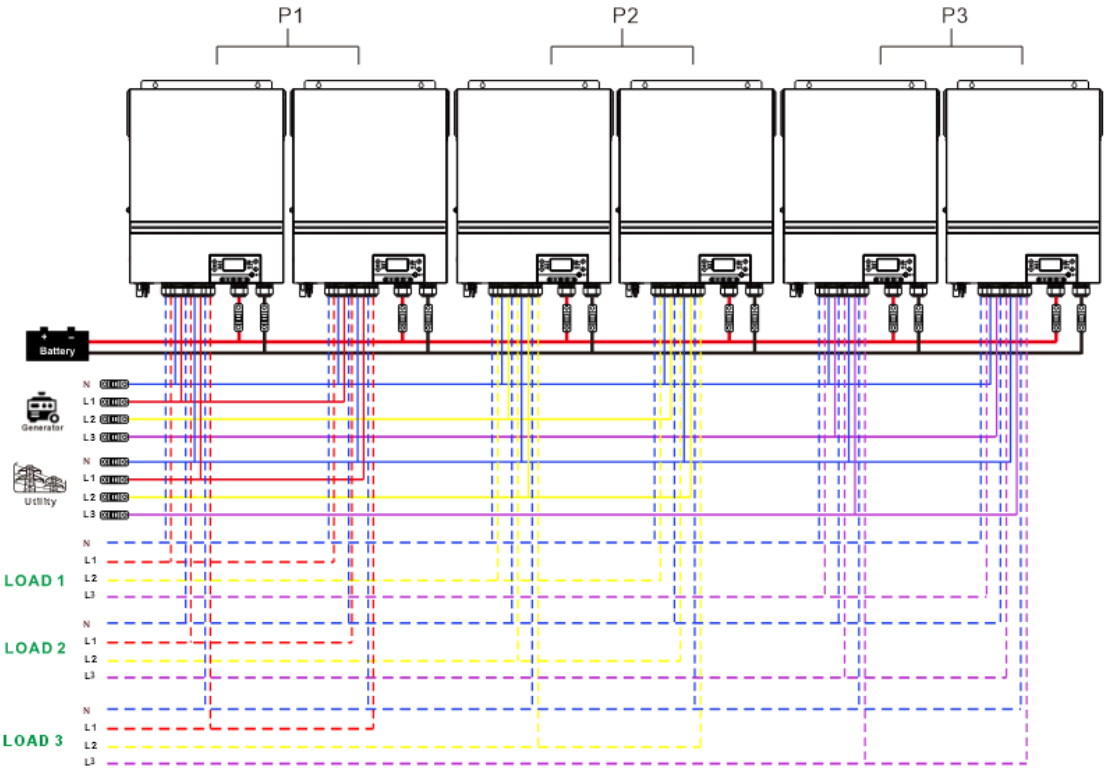
Communication Connection



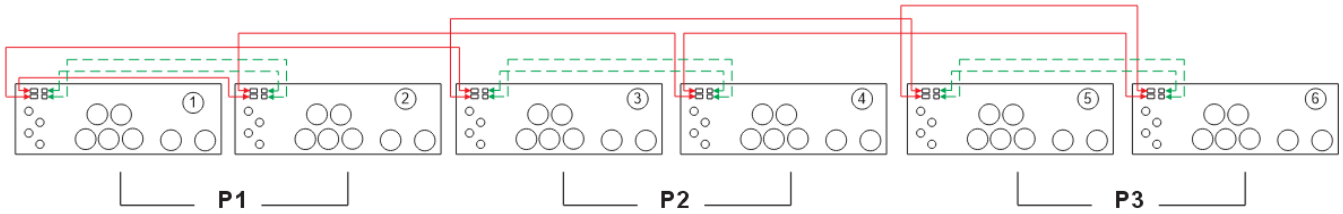
4-2. Support 3-phase equipment

Two inverters in each phase:

Power Connection

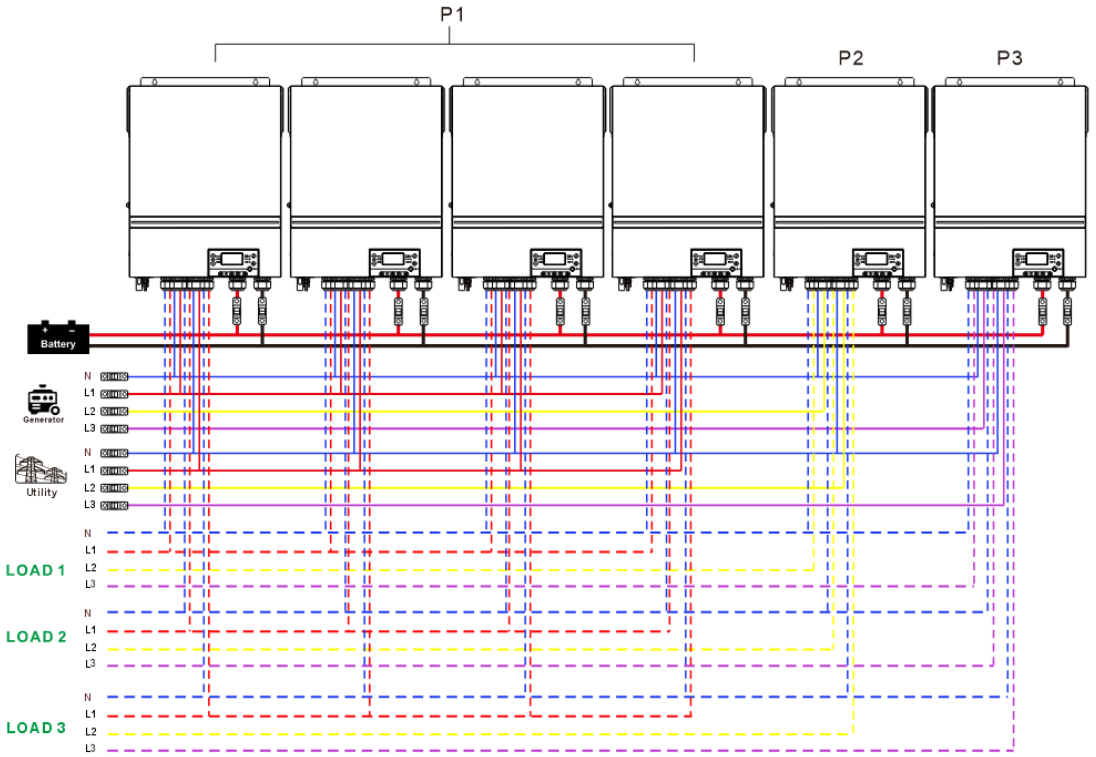


Communication Connection

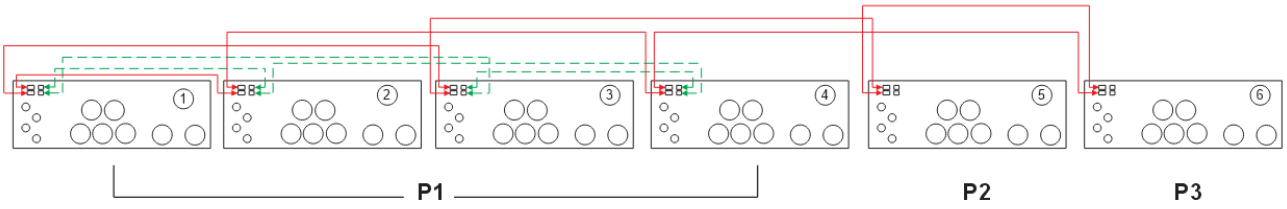


Four inverters in one phase and one inverter for the other two phases:

Power Connection

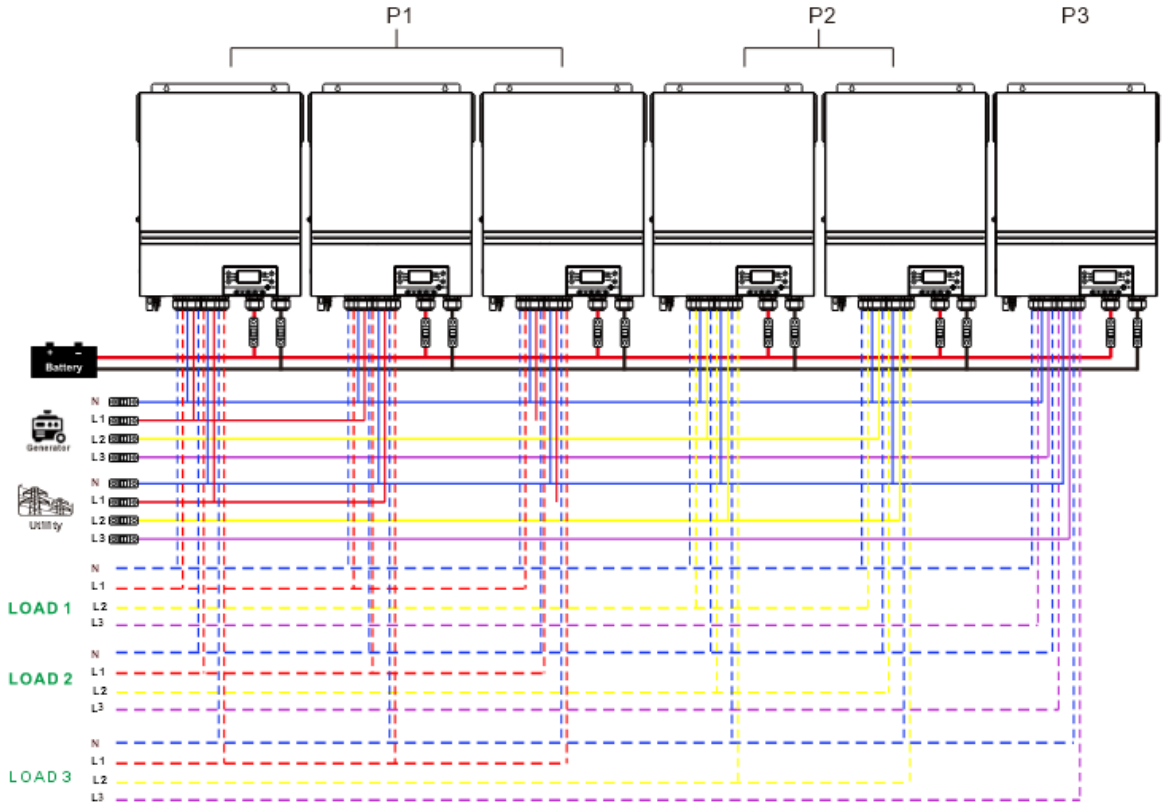


Communication Connection

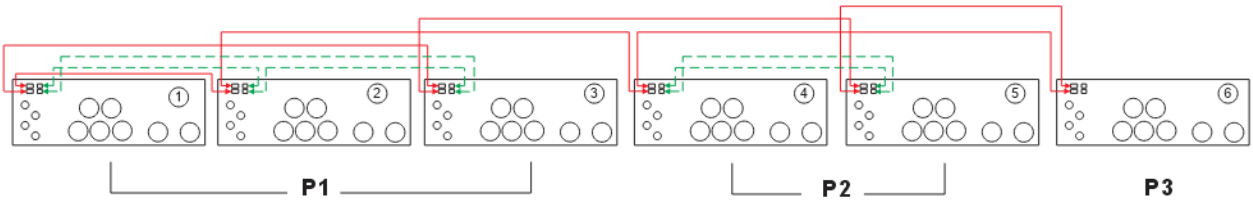


Three inverters in one phase, two inverters in second phase and one inverter for the third phase:

Power Connection

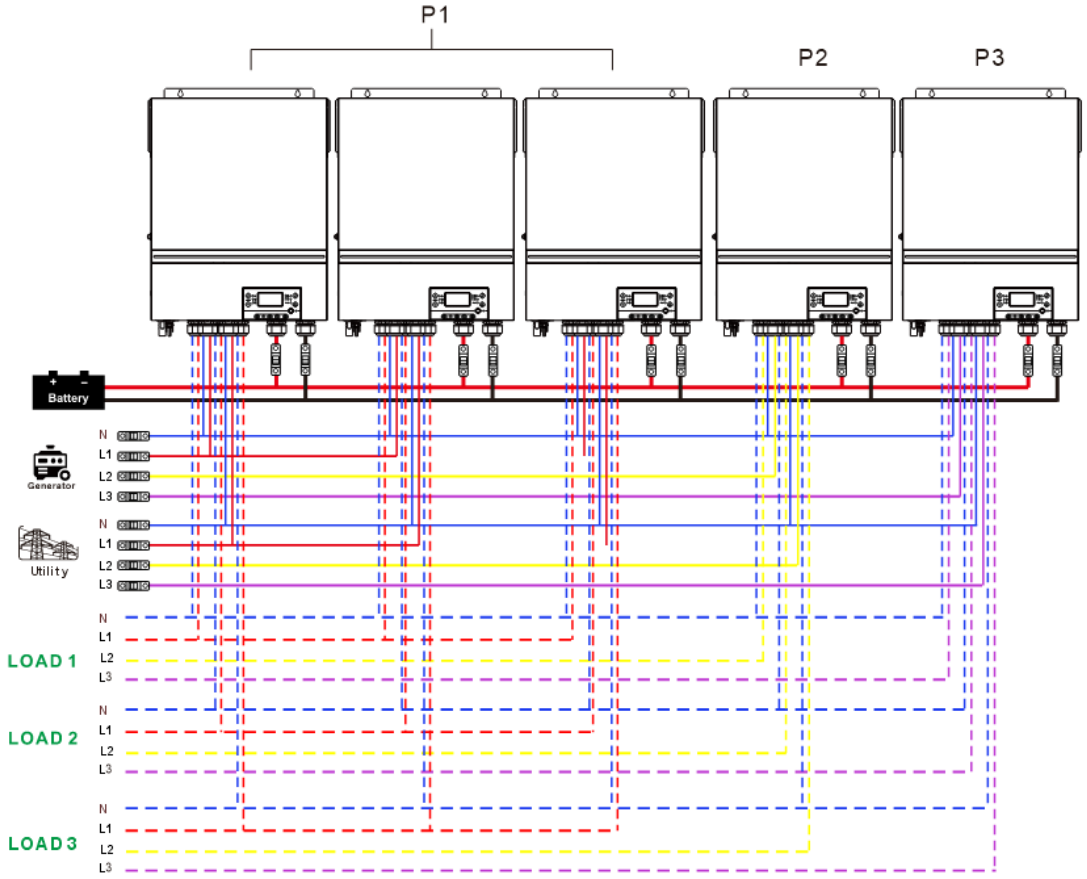


Communication Connection

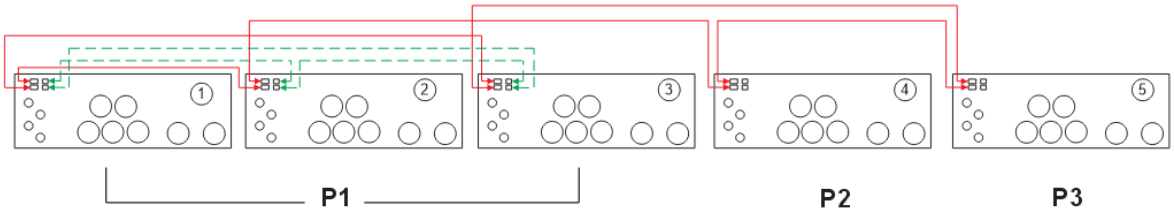


Three inverters in one phase and only one inverter for the remaining two phases:

Power Connection

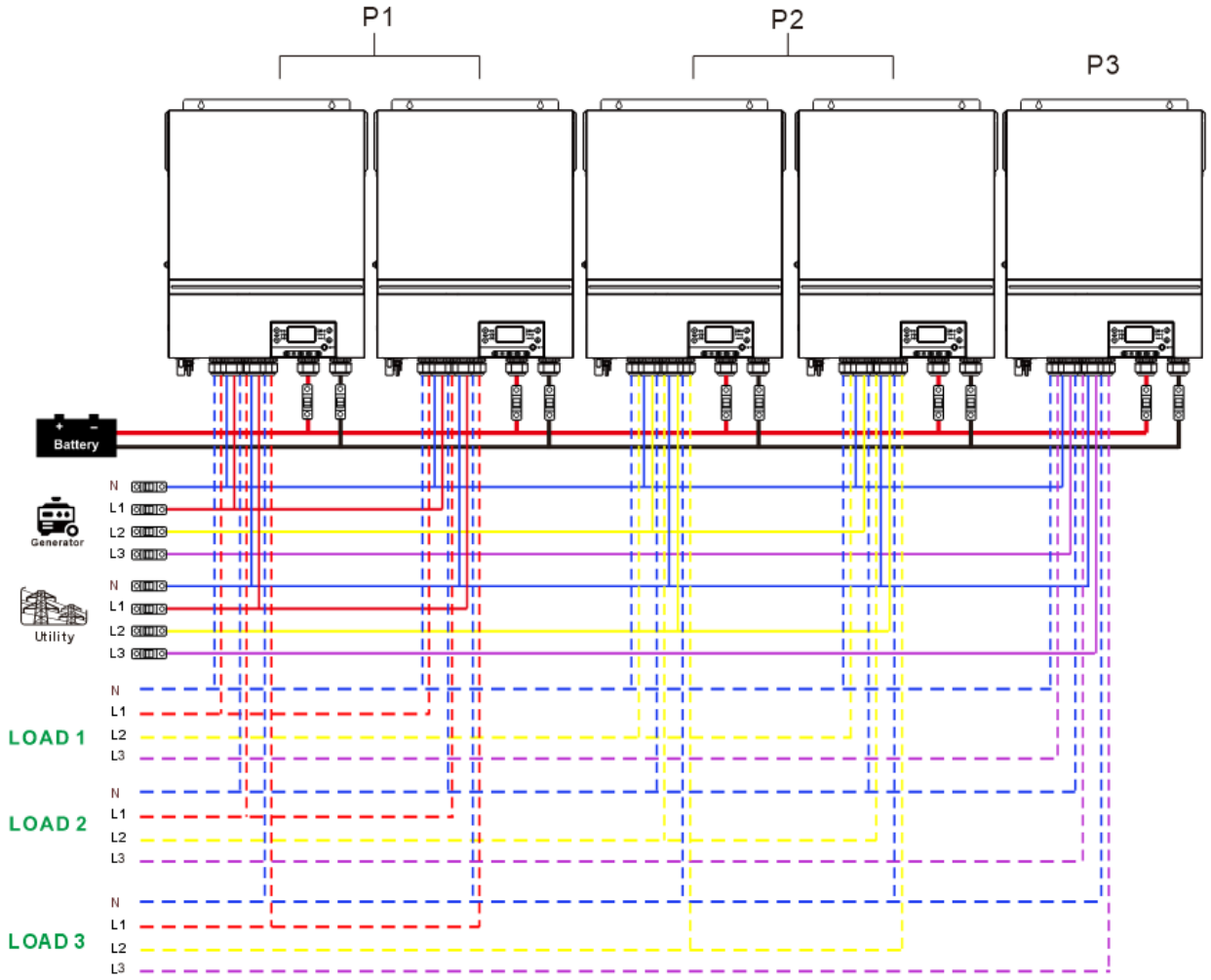


Communication Connection

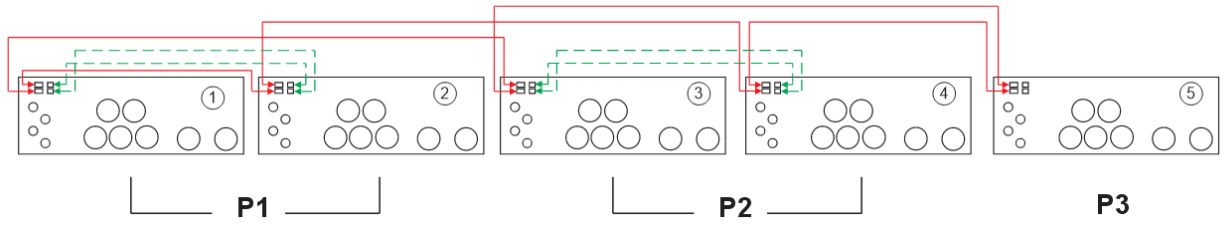


Two inverters in two phases and only one inverter for the remaining phase:

Power Connection

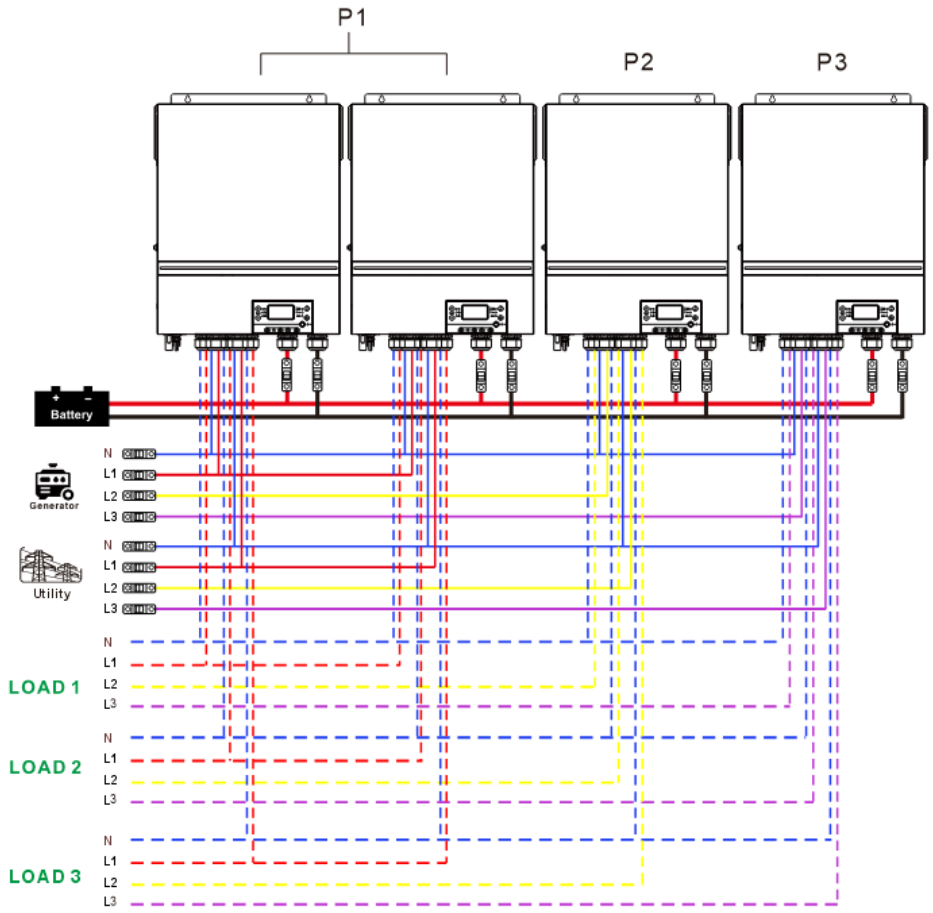


Communication Connection

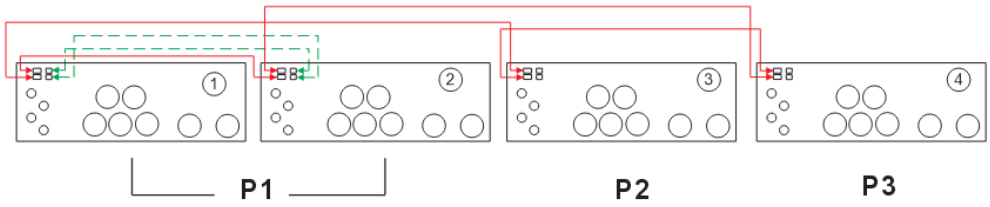


Two inverters in one phase and only one inverter for the remaining phases:

Power Connection

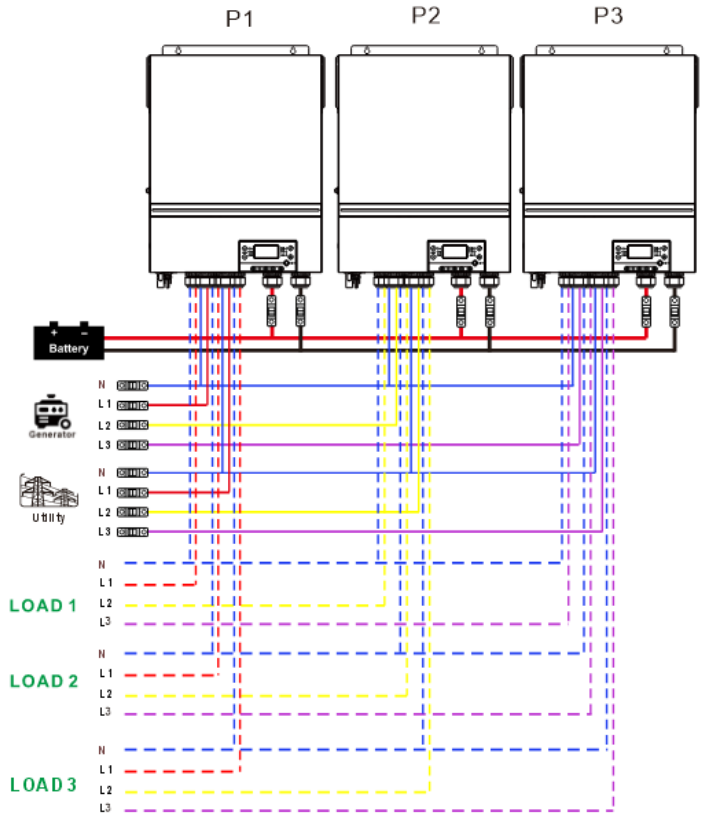


Communication Connection

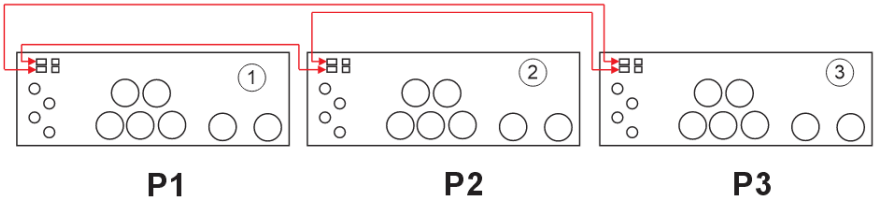


One inverter in each phase:

Power Connection



Communication Connection



WARNING: Do not connect the current sharing cable between the inverters which are in different phases. Otherwise, it may damage the inverters.

5. PV Connection

Please refer to user manual of single unit for PV Connection.

CAUTION: Each inverter should connect to PV modules separately.

6. LCD Setting and Display

Setting Program:

<table>
<tr><th>Program</th><th>Description</th><th colspan="2">Selectable option</th></tr>
<tr><td rowspan="5">28</td><td rowspan="5">AC output mode
*This setting is able to set up only when the inverter is in standby mode. Be sure that on/off switch is in “OFF” status.</td><td>Single
 
</td><td>When the unit is operated alone, please select “SIG” in program 28.</td></tr>
<tr><td>Parallel
 
</td><td>When the units are used in parallel for single phase application, please select “PAL” in program 28. Please refer to 5-1 for detailed information.</td></tr>
<tr><td>L1 phase:
 
</td><td rowspan="3">When the units are operated in 3-phase application, please choose “3PX” to define each inverter.
It is required to have at least 3 inverters or maximum 6 inverters to support three-phase equipment. It’s required to have at least one inverter in each phase or it’s up to four inverters in one phase. Please refers to 4-2 for detailed information.
Please select “3P1” in program 28 for the inverters connected to L1 phase, “3P2” in program 28 for the inverters connected to L2 phase and “3P3” in program 28 for the inverters connected to L3 phase.

Be sure to connect share current cable to units which are on the same phase.
Do NOT connect share current cable between units on different phases.</td></tr>
<tr><td>L2 phase:
 
</td></tr>
<tr><td>L3 phase:
 
</td></tr>
</table>

Fault code display:

Fault Code	Fault Event	Icon on
60	Power feedback protection	F60
71	Firmware version inconsistent	F71
72	Current sharing fault	F72
80	CAN fault	F80
81	Host loss	F81
82	Synchronization loss	F82
83	Battery voltage detected different	F83
84	AC input voltage and frequency detected different	F84
85	AC output current unbalance	F85
86	AC output mode setting is different	F86

Code Reference:

Code	Description	Icon on
NE	Unidentified unit master or slave	NE
HS	Master unit	HS
SL	Slave unit	SL

7. Commissioning

Parallel in single phase

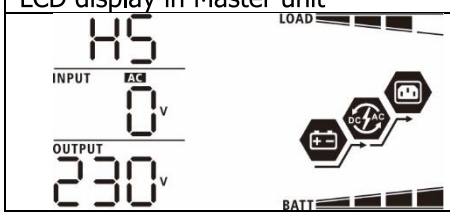
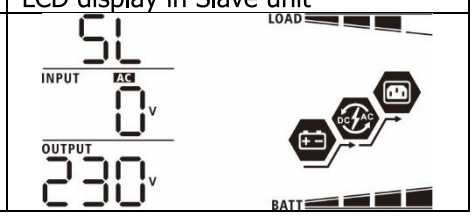
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 28 of each unit. And then shut down all units.

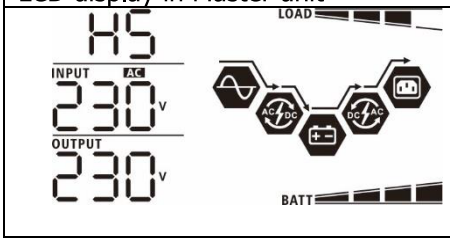
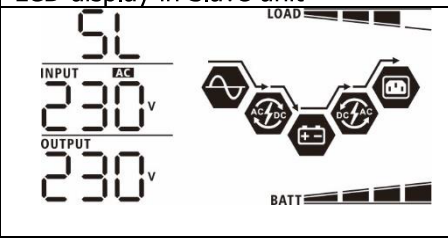
NOET: It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

NOTE: Master and slave units are randomly defined.

Step 4: Switch on all AC breakers of Line wires in AC input. It's better to have all inverters connect to utility at the same time. If not, it will display fault 82 in following-order inverters. However, these inverters will automatically restart. If detecting AC connection, they will work normally.

LCD display in Master unit	LCD display in Slave unit
	

Step 5: If there is no more fault alarm, the parallel system is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Support three-phase equipment

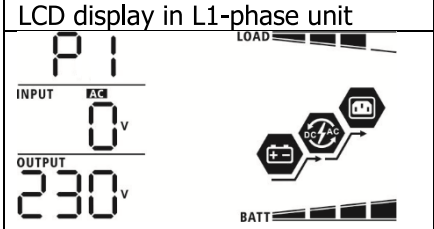
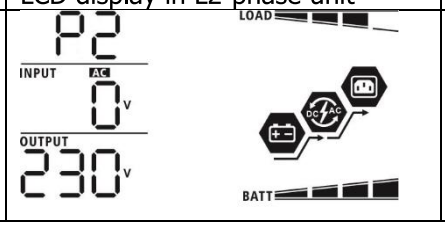
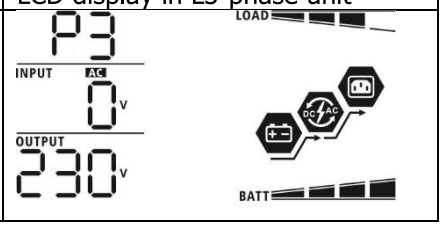
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

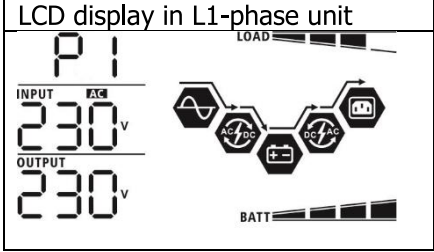
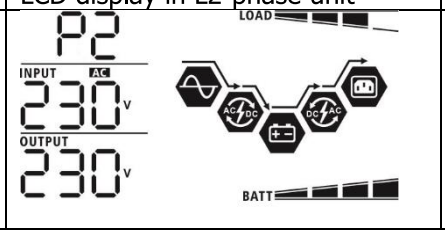
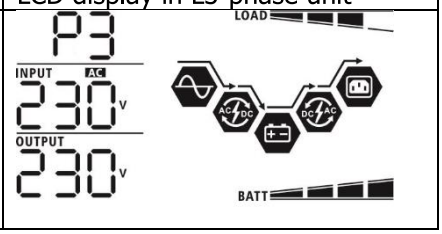
Step 2: Turn on all units and configure LCD program 28 as P1, P2 and P3 sequentially. And then shut down all units.

NOET: It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

Step 3: Turn on all units sequentially.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step 4: Switch on all AC breakers of Line wires in AC input. If AC connection is detected and three phases are matched with unit setting, they will work normally. Otherwise, the AC icon will flash and they will not work in line mode.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step 5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Note 1: To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.

Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

8. Trouble shooting

Situation		Solution
Fault Code	Fault Event Description	
60	Current feedback into the inverter is detected.	1. Restart the inverter. 2. Check if L/N cables are not connected reversely in all inverters. 3. For parallel system in single phase, make sure the sharing are connected in all inverters. For supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase, and disconnected in the inverters in different phases. 4. If the problem remains, please contact your installer.
71	The firmware version of each inverter is not the same.	1. Update all inverter firmware to the same version. 2. Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update. 3. After updating, if the problem still remains, please contact your installer.
72	The output current of each inverter is different.	1. Check if sharing cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
80	CAN data loss	1. Check if communication cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
81	Host data loss	
82	Synchronization data loss	
83	The battery voltage of each inverter is not the same.	1. Make sure all inverters share same groups of batteries together. 2. Remove all loads and disconnect AC input and PV input. Then, check battery voltage of all inverters. If the values from all inverters are close, please check if all battery cables are the same length and same material type. Otherwise, please contact your installer to provide SOP to calibrate battery voltage of each inverter. 3. If the problem still remains, please contact your installer.
84	AC input voltage and frequency are detected different.	1. Check the utility wiring conncetion and restart the inverter. 2. Make sure utility starts up at same time. If there are breakers installed between utility and inverters, please be sure all breakers can be turned on AC input at same time. 3. If the problem remains, please contact your installer.
85	AC output current unbalance	1. Restart the inverter. 2. Remove some excessive loads and re-check load information from LCD of inverters. If the values are different, please check if AC input and output cables are in the same length and material type. 3. If the problem remains, please contact your installer.
86	AC output mode setting is different.	1. Switch off the inverter and check LCD setting #28. 2. For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set on #28. For upporting three-phase system, make sure no "PAL" is set on #28. 3. If the problem remains, please contact your installer.

Appendix II: BMS Communication Installation

1. Introduction

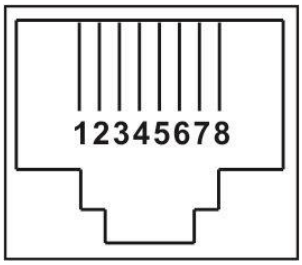
If connecting to lithium battery, it is recommended to purchase a custom-made RJ45 communication cable. Please check with your dealer or integrator for details.

This custom-made RJ45 communication cable delivers information and signal between lithium battery and the inverter. These information are listed below:

- Re-configure charging voltage, charging current and battery discharge cut-off voltage according to the lithium battery parameters.
- Have the inverter start or stop charging according to the status of lithium battery.

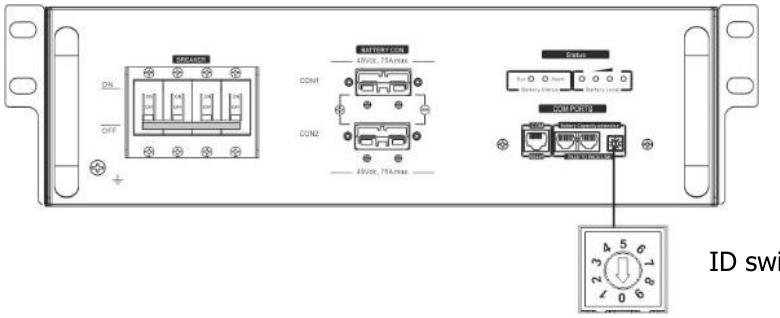
2. Pin Assignment for BMS Communication Port

	Definition
PIN 1	RS232TX
PIN 2	RS232RX
PIN 3	RS485B
PIN 4	NC
PIN 5	RS485A
PIN 6	CANH
PIN 7	CANL
PIN 8	GND

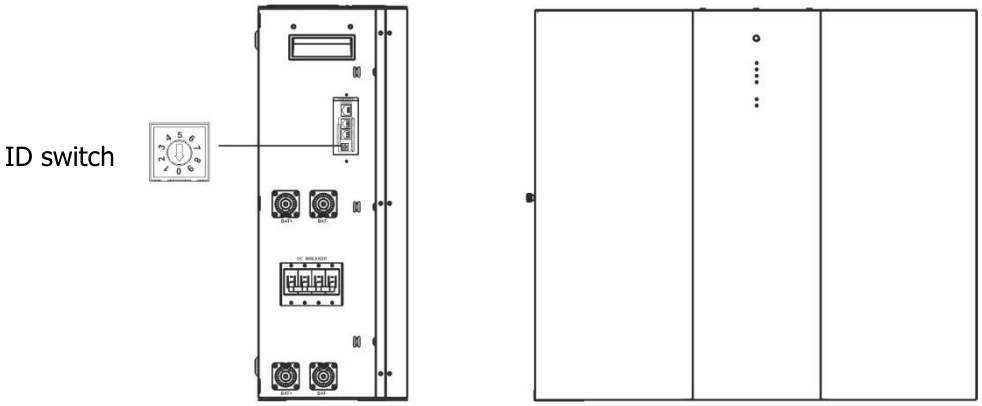


3. Lithium Battery Communication Configuration

LIO-4810-150A

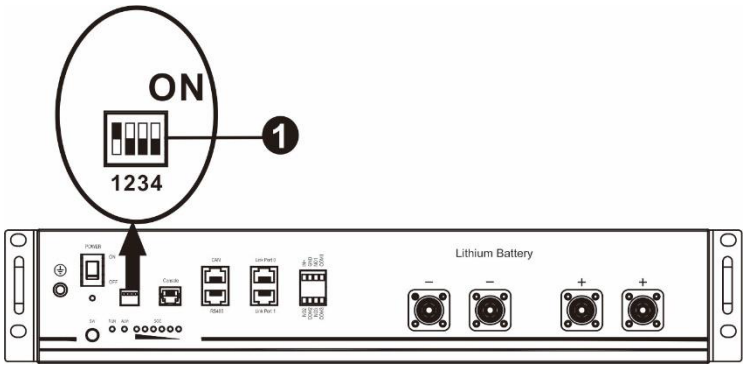


ESS LIO-I 4810



ID Switch indicates the unique ID code for each battery module. It's required to assign a unique ID to each battery module for normal operation. We can set up the ID code for each battery module by rotating the PIN number on the ID switch. From number 0 to 9, the number can be random; no particular order. Maximum 10 battery modules can be operated in parallel.

PYLONTECH



①Dip Switch: There are 4 Dip Switches that sets different baud rate and battery group address. If switch position is turned to the "OFF" position, it means "0". If switch position is turned to the "ON" position, it means "1".

Dip 1 is "ON" to represent the baud rate 9600.
Dip 2, 3 and 4 are reserved for battery group address.
Dip switch 2, 3 and 4 on master battery (first battery) are to set up or change the group address.

NOTE: "1" is upper position and "0" is bottom position.

Dip 1	Dip 2	Dip 3	Dip 4	Group address
1: RS485 baud rate=9600 **Restart to take effect**	0	0	0	Single group only. It's required to set up master battery with this setting and slave batteries are unrestricted.
	1	0	0	Multiple group condition. It's required to set up master battery on the first group with this setting and slave batteries are unrestricted.
	0	1	0	Multiple group condition. It's required to set up master battery on the second group with this setting and slave batteries are unrestricted.
	1	1	0	Multiple group condition. It's required to set up master battery on the third group with this setting and slave batteries are unrestricted.
	0	0	1	Multiple group condition. It's required to set up master battery on the fourth group with this setting and slave batteries are unrestricted.
	1	0	1	Multiple group condition. It's required to set up master battery on the fifth group with this setting and slave batteries are unrestricted.

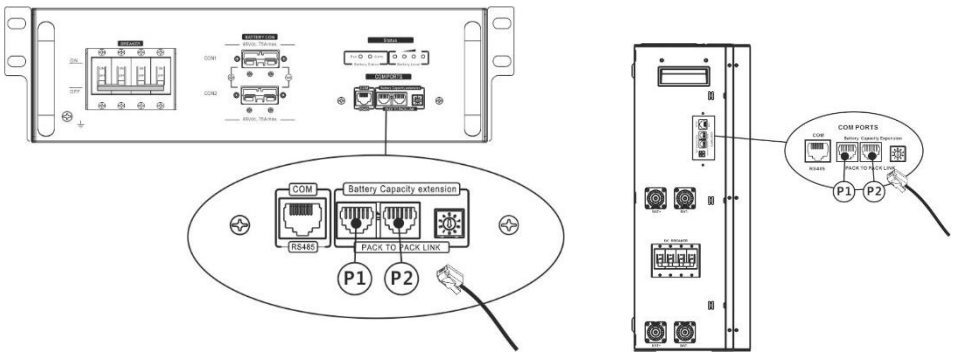
NOTE: The maximum groups of lithium battery is 5 and for maximum number for each group, please check with battery manufacturer.

4. Installation and Operation

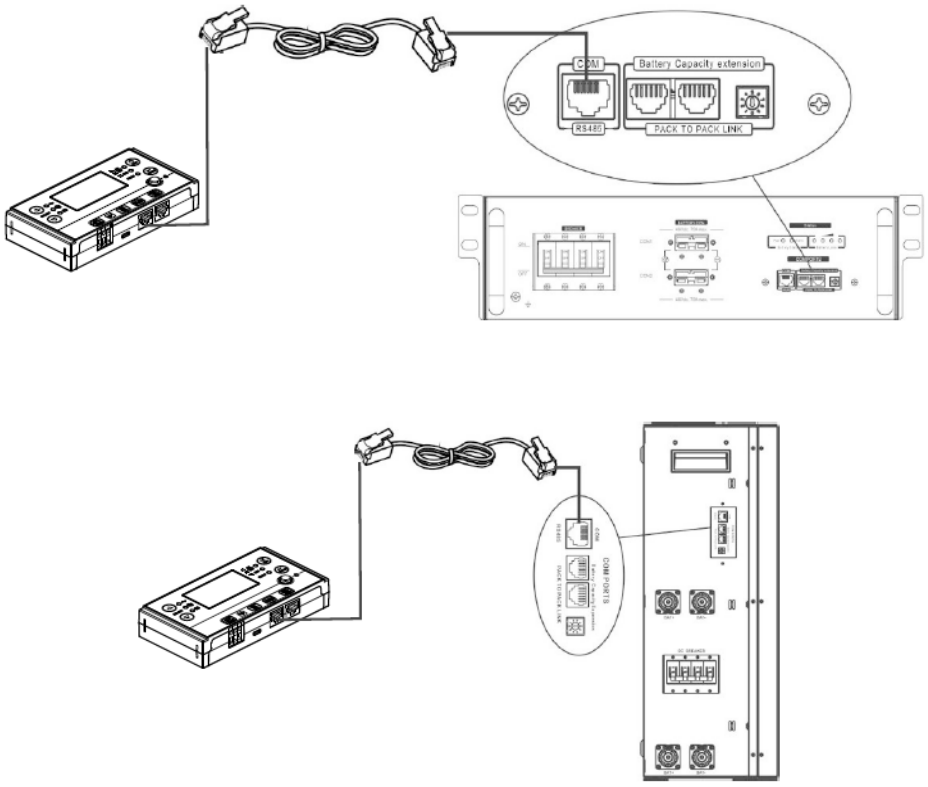
LIO-4810-150A/ESS LIO-I 4810

After ID no. is assigned for each battery module, please set up LCD panel in inverter and install the wiring connection as following steps.

Step 1: Use supplied RJ11 signal cable to connect into the extension port (P1 or P2).



Step 2: Use supplied RJ45 cable (from battery module package) to connect inverter and Lithium battery.

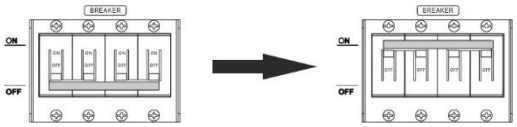


*** For multiple battery connection, please check battery manual for the details.**

Note for parallel system:

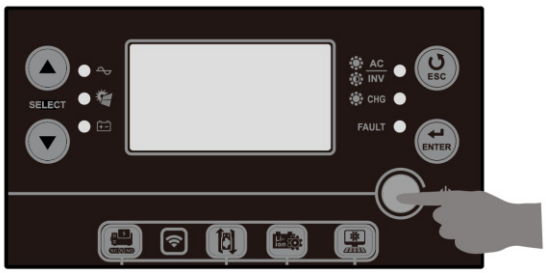
1. Only support common battery installation.
2. Use custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set this inverter battery type to "LIB" in LCD program 5. Others should be "USE".

Step 3: Turn the breaker switch "ON". Now, the battery module is ready for DC output.



Step 4: Press Power on/off button on battery module for 5 secs, the battery module will start up.
*If the manual button cannot be approached, just simply turn on the inverter module. The battery module will be automatically turned on.

Step 5: Turn on the inverter.



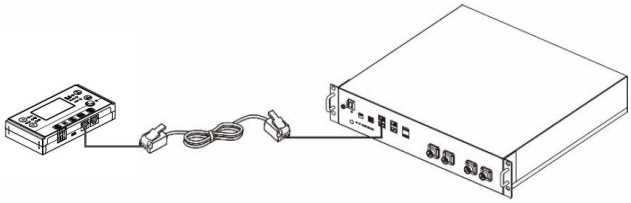
Step 6. Be sure to select battery type as "LIB" in LCD program 5.

If communication between the inverter and battery is successful, the battery icon on LCD display will flash. Generally speaking, it will take longer than 1 minute to establish communication.

PYLONTECH

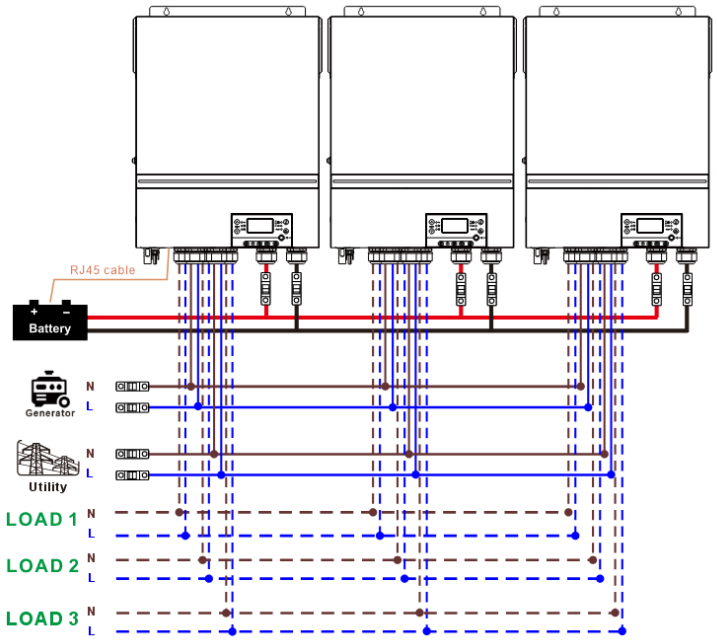
After configuration, please install LCD panel with inverter and Lithium battery with the following steps.

Step 1. Use custom-made RJ45 cable to connect inverter and Lithium battery.

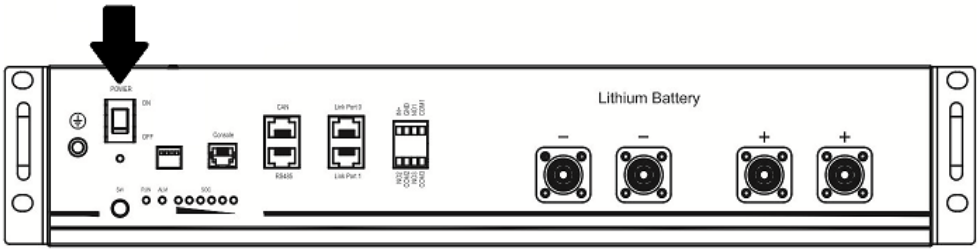


Note for parallel system:

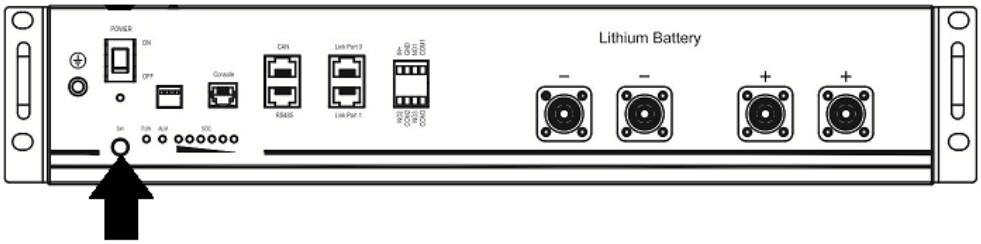
1. Only support common battery installation.
2. Use custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set this inverter battery type to "PYL" in LCD program 5. Others should be "USE".



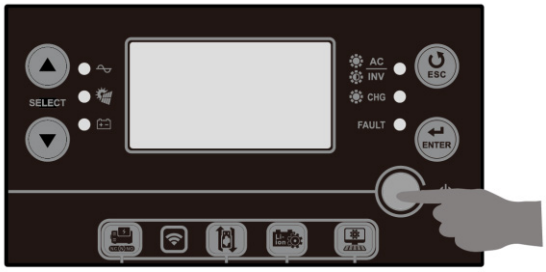
Step 2. Switch on Lithium battery.



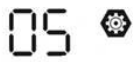
Step 3. Press more than three seconds to start Lithium battery, power output ready.



Step 4. Turn on the inverter.



Step 5. Be sure to select battery type as "PYL" in LCD program 5.



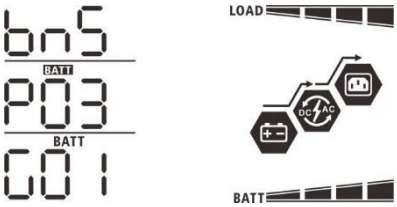
If communication between the inverter and battery is successful, the battery icon  on LCD display will flash. Generally speaking, it will take longer than 1 minute to establish communication.

Active Function

This function is to activate lithium battery automatically while commissioning. After battery wiring and commissioning is successfully, if battery is not detected, the inverter will automatically activate battery if the inverter is powered on.

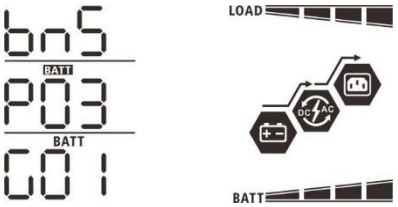
5. LCD Display Information

Press "▲" or "▼" button to switch LCD display information. It will show battery pack and battery group number before "Main CPU version checking" as shown below.

Selectable information	LCD display
Battery pack numbers & Battery group numbers	Battery pack numbers = 3, battery group numbers = 1 

6. Code Reference

Related information code will be displayed on LCD screen. Please check inverter LCD screen for the operation.

Code	Description	Action
	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 60 to stop charging and discharging battery.	
	Communication lost (only available when the battery type is setting as any type of lithium-ion battery.) ● After battery is connected, communication signal is not detected for 3 minutes, buzzer will beep. After 10 minutes, inverter will stop charging and discharging to lithium battery. ● Communication lost occurs after the inverter and battery is connected successfully, buzzer beeps immediately.	
	Battery number is changed. It probably is because of communication lost between battery packs.	Press "UP" or "DOWN" key to switch LCD display until below screen shows. It will have battery number re-checked and 62 warning code will be clear. 
	If battery status is not allowed to charge after the communication between the inverter and battery is successful, it will show code 69 to stop charging battery.	
	If battery status must to be charged after the communication between the inverter and battery is successful, it will show code 70 to charge battery.	
	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 71 to stop discharging battery.	

Appendix III: The Wi-Fi Operation Guide

1. Introduction

Wi-Fi module can enable wireless communication between solar inverters and the monitoring platform. Users can remotely monitor and control their inverters when they combine the Wi-Fi module with Energy-Mate APP. The App uses the Wi-Fi chip to provide remote monitoring data services, which is beneficial for the daily data monitoring of the inverter, querying the real-time data in the device, sending commands from the device, and operating the device remotely. The app is available for both iOS and Android.

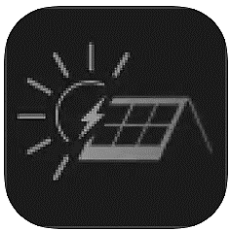
The major functions of this APP:

- Delivers device status during normal operation.
- Allows to configure device setting after installation.
- Notifies users when a warning or alarm occurs.
- Allows users to query inverter history data.

2. Energy-Mate App

2-1. Download and install APP

Please find "Energy-Mate" app from Apple® store or Google® Play Store. Install this app in your mobile phone.



Or scan the following QR code with your smart phone and download Energy-Mate App.

(Android system) (iOS system)

2-2. Initial Setup

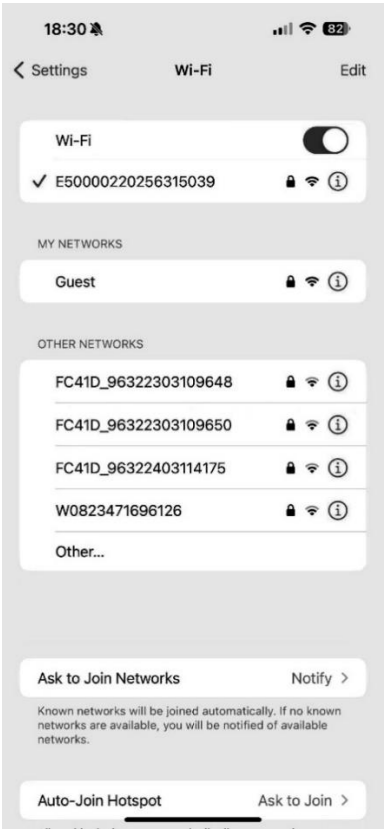
You can choose local Wi-Fi or Bluetooth to configure the Wi-Fi module network through Energy-mate APP.

Local Wi-Fi Configuration

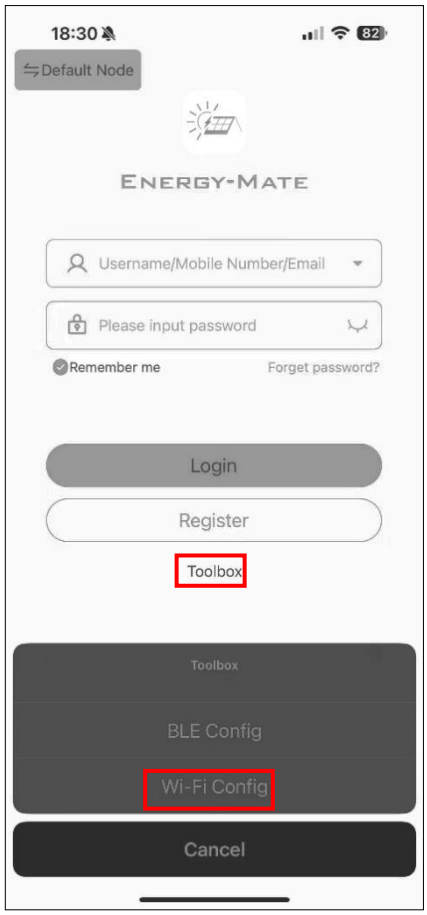
If you have configured the network through Bluetooth, please skip this section.

- Turn on the unit.
- Open the Wi-Fi settings from your smart phone.

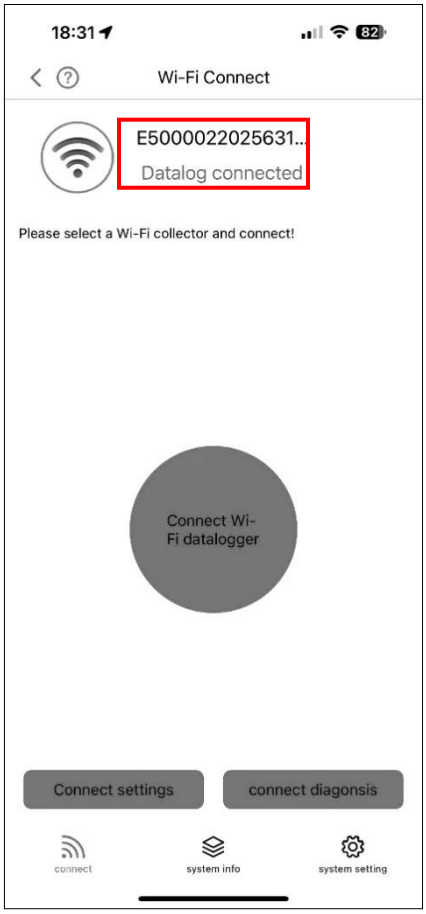
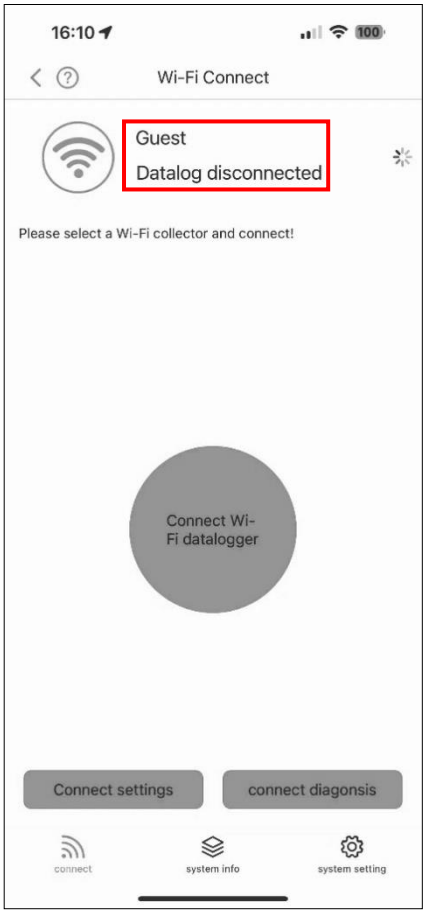
- Connect your smart phone to the Wi-Fi module. The Wi-Fi module PN number is 18 digits.
- Default password for the Wi-Fi module is: 12345678.



- Once the Wi-Fi connection is successful, click the Energy-Mate APP installed in the phone to enter the login page. Then, click the "Toolbox" and choose "Wi-Fi Config" to enter the Wi-Fi configuration page.

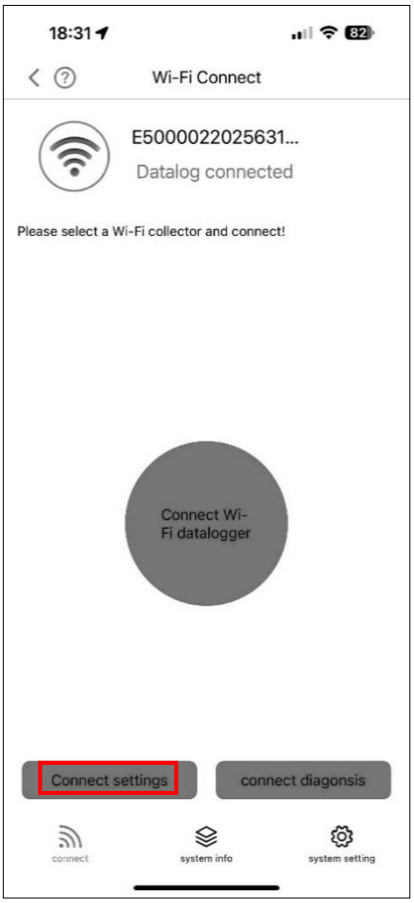


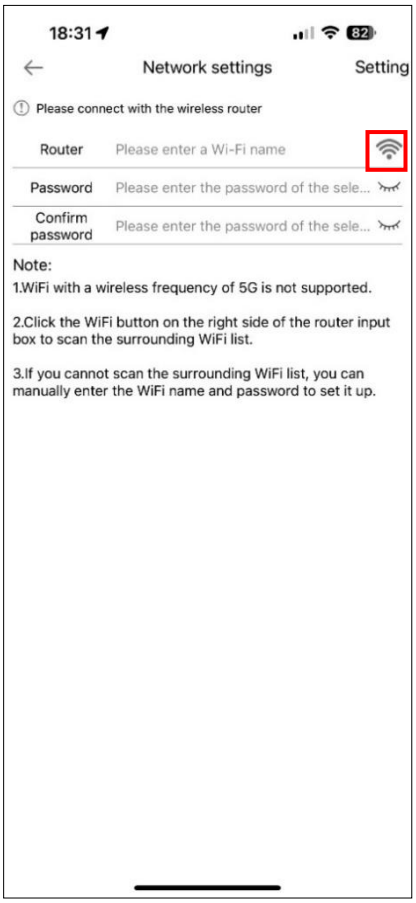
- After entering the Wi-Fi configuration page, please note that the connected Wi-Fi name **must** be the **same as your Wi-Fi module PN number**, and the status **must** be **connected**. If not, please return to the login page, connect your smart phone to the Wi-Fi module, and re-enter the Wi-Fi configuration page.

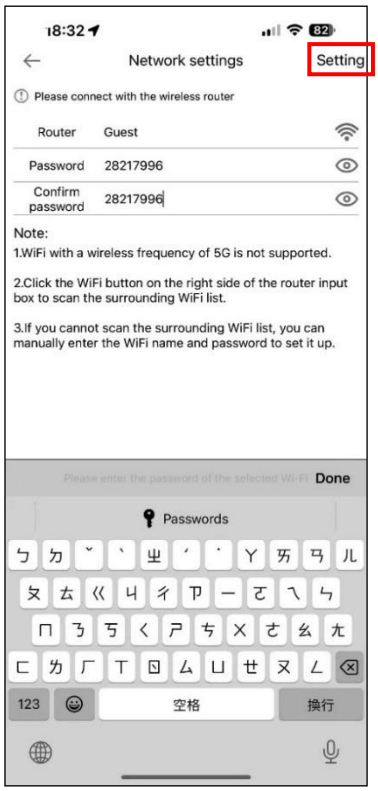
The Wi-Fi module connection is **successfully**	The Wi-Fi module connection **failed**
You can proceed to the next step to configure the network. 	Please return to the login page, connect your smart phone to the Wi-Fi module, and re-enter the Wi-Fi configuration page. 

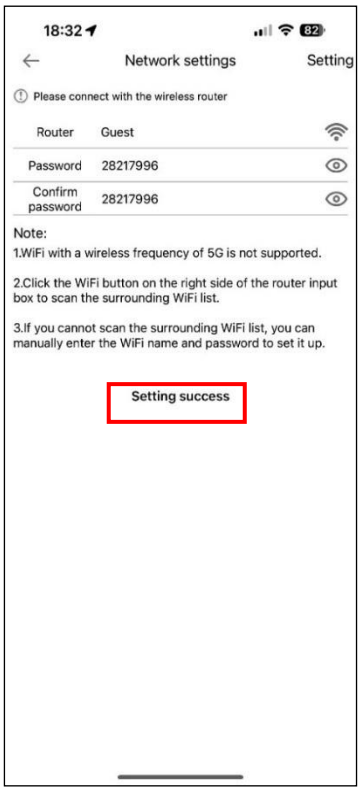
- Click "Connect settings" to manually enter the router name or click  to choose the router name. Then, enter the router password and click the "Setting" to complete the setting.

  The Wi-Fi module only could connect the router at **2.4GHz**.

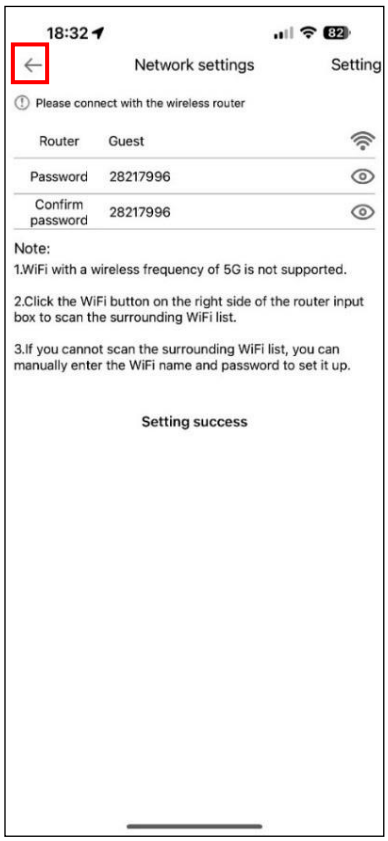


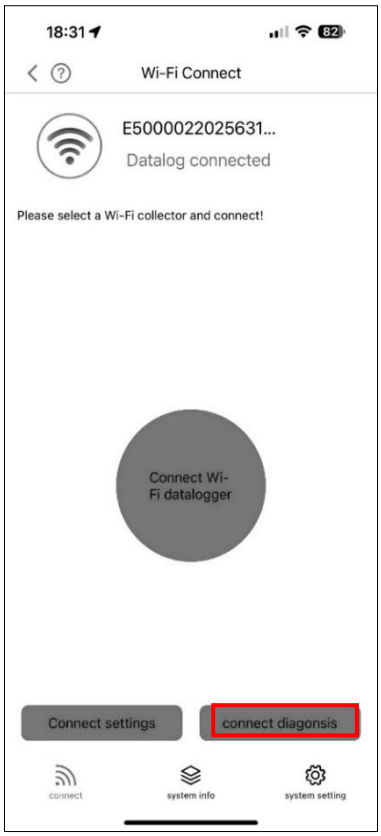


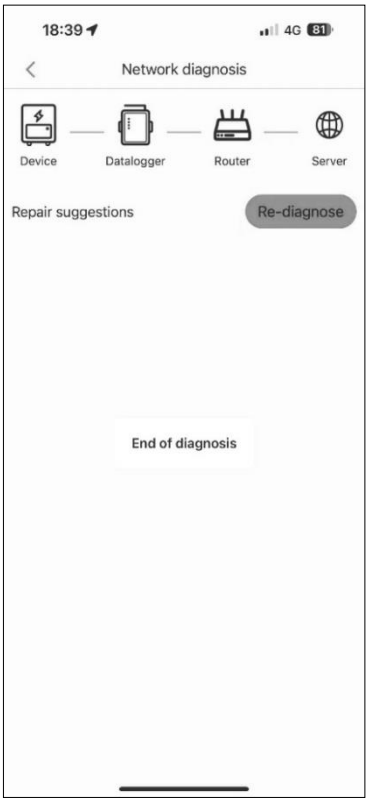
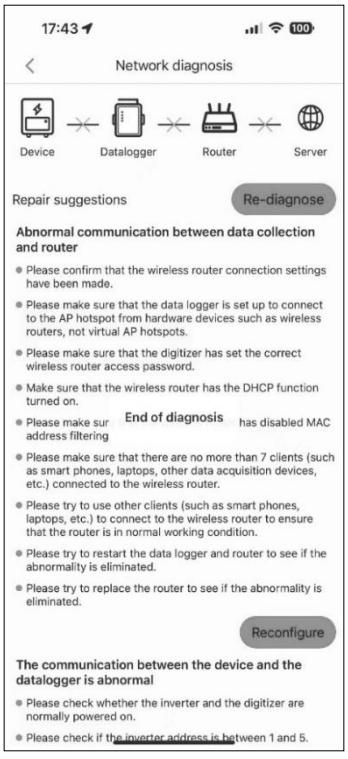




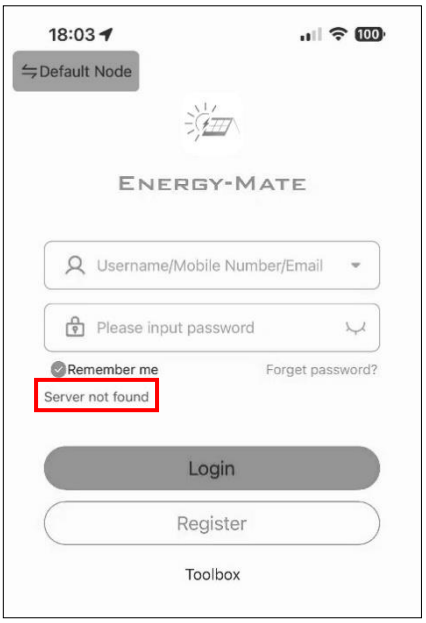
- Click  to return to the Wi-Fi configuration page. Click "Connect diagnosis" to check the connection status.





The configuration is **successfully**	The configuration **failed**
Green lines between device, datalogger, router, and server. 	Red crosses between device, datalogger, router, and server. Please refer to APP instructions to re-configure. 

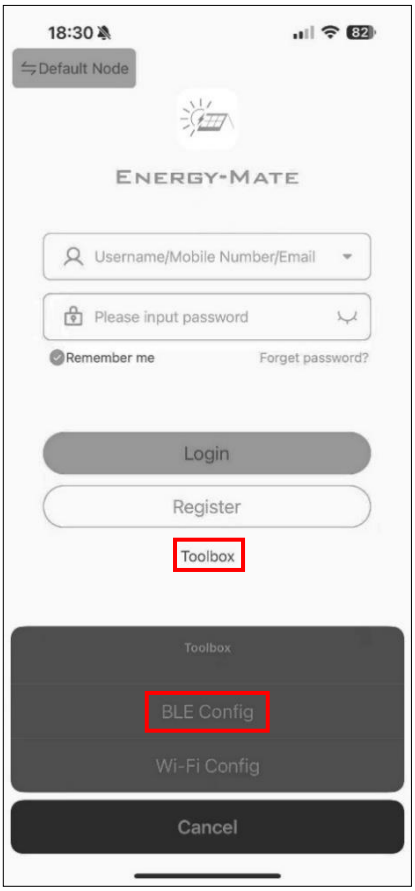
- After Wi-Fi configuration, please **forget** the Wi-Fi module of the Wi-Fi connection on the smartphone to avoid automatic connection and unable to access the network. The login page will prompt "Server not found".



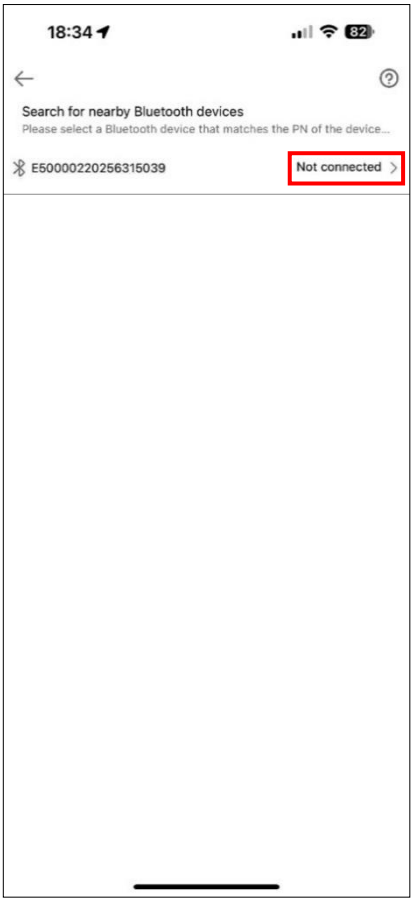
Bluetooth Configuration

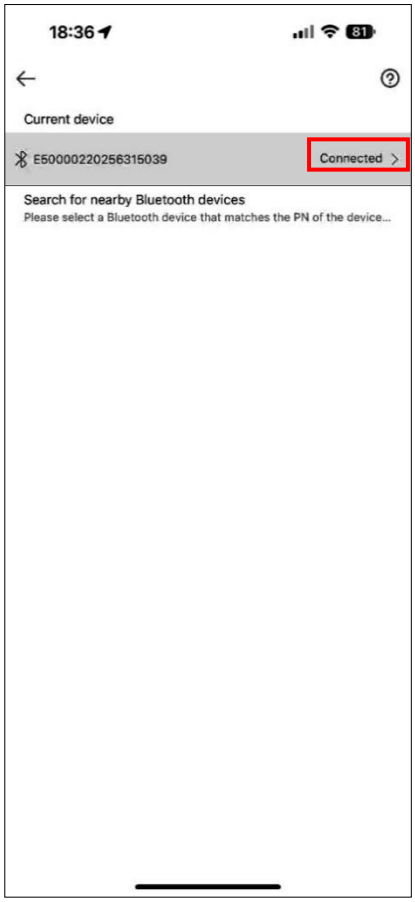
If you have configured the network through Wi-Fi, please skip this section.

- Turn on the unit.
- Open the Bluetooth from your smart phone.
- Click the Energy-Mate APP installed in the phone to enter the login page. Then, click the "Toolbox" and choose "BLE Config" to enter the Bluetooth configuration page.



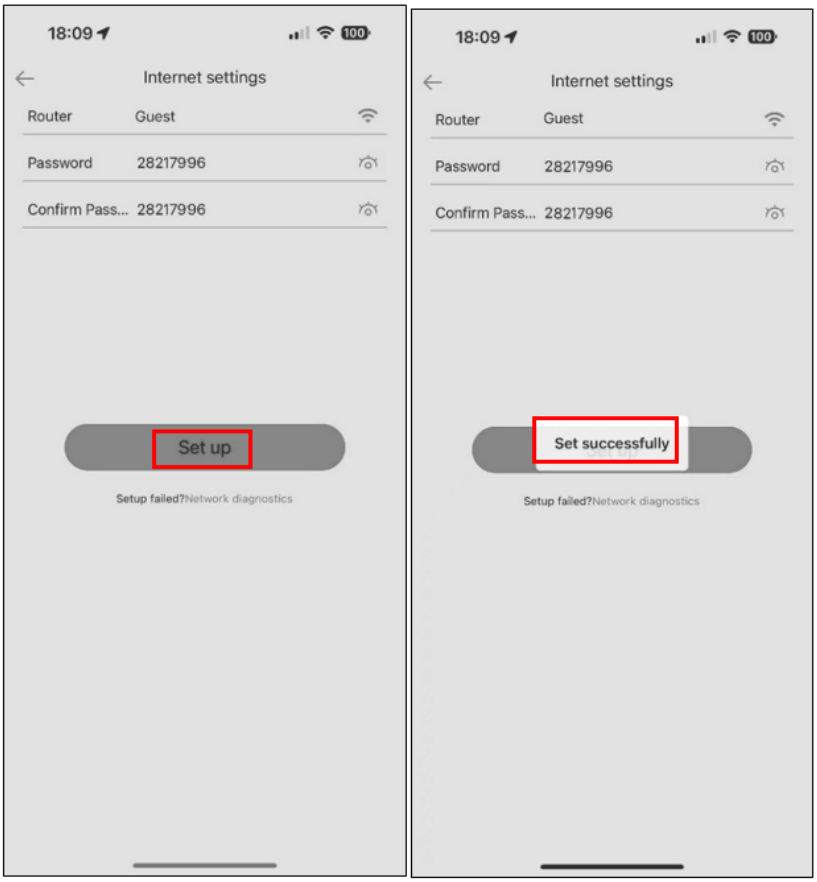
- Connect your smart phone to the Wi-Fi module through Bluetooth.



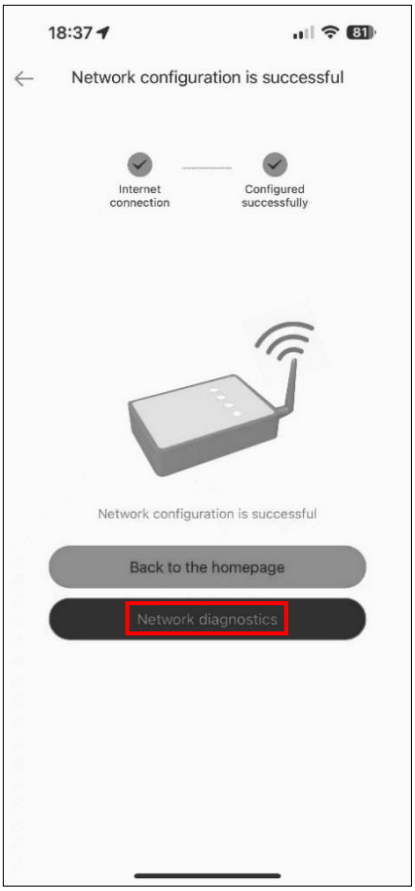


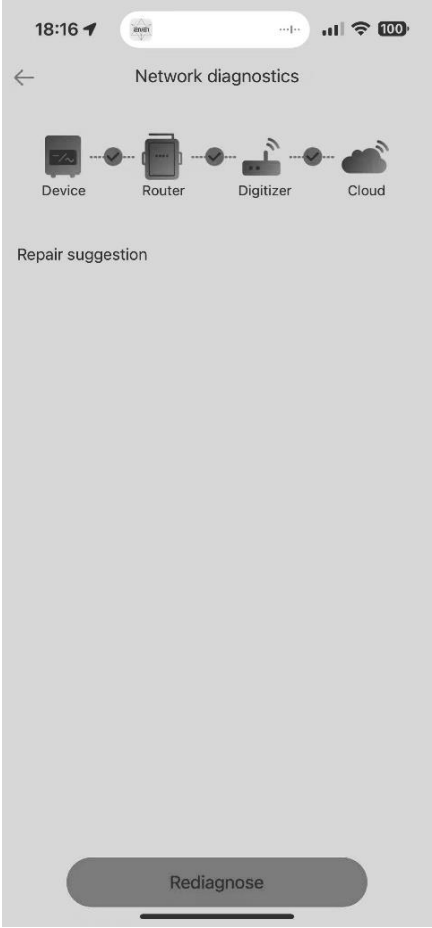
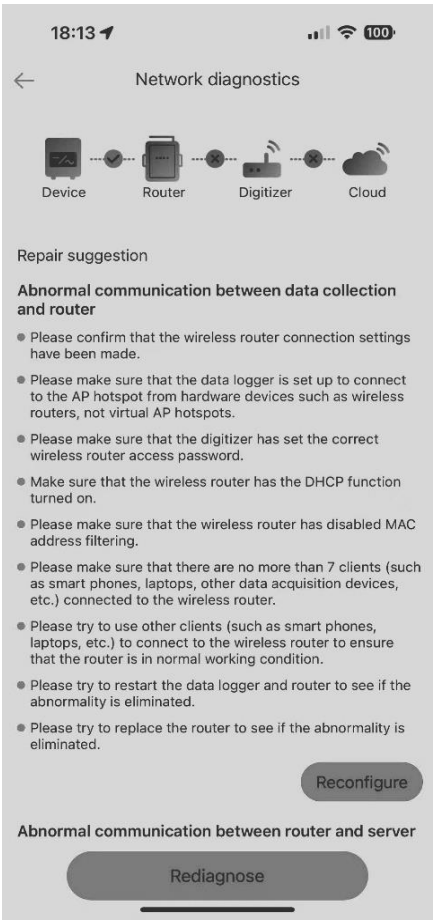
- Manually enter the router name or click  to choose the router name, enter the router password, and then click the "Setting" to complete the setting.

  The Wi-Fi module only could connect the router at **2.4GHz**.

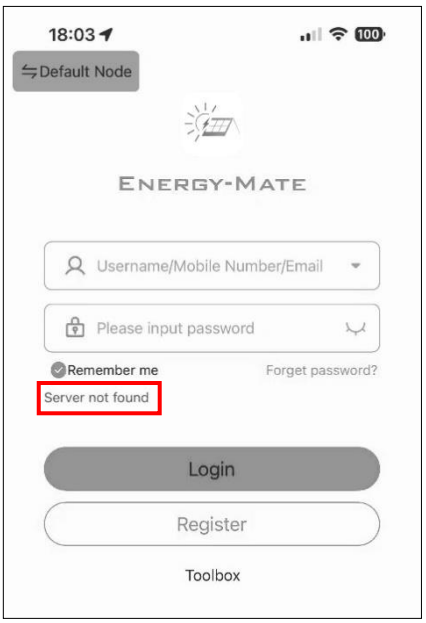


- Click "Network diagnosis" to check the connection status.



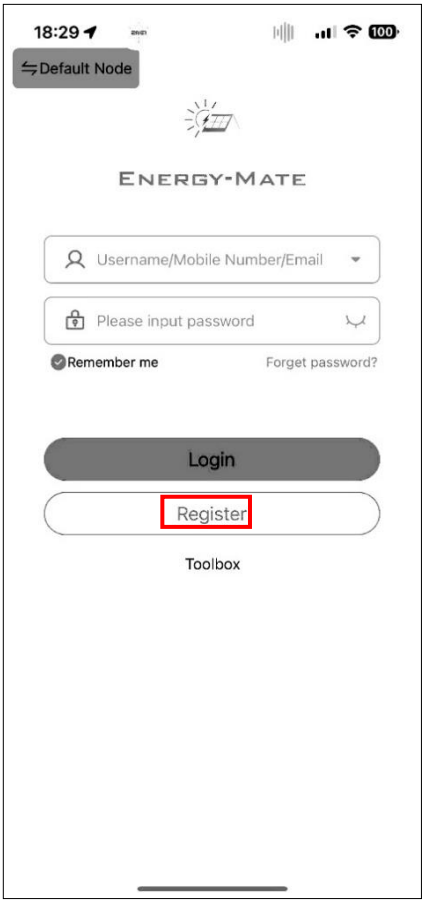
The configuration is **successfully**	The configuration **failed**
Green lines between device, data logger, router, and server. 	Red crosses between device, data logger, router, and server. Please refer to APP instructions to reconfigure. 

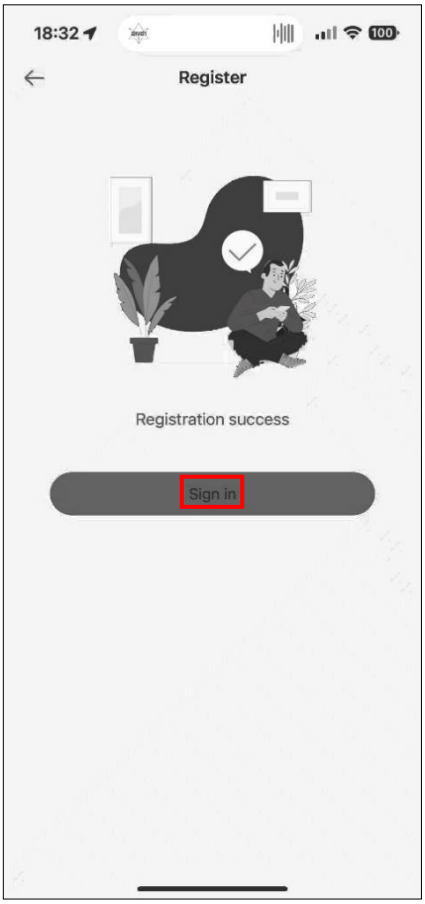
- After Bluetooth configuration, please **disconnect** the Wi-Fi module of the Bluetooth connection on the smartphone to avoid automatic connection and unable to access the network. The login page will prompt "Server not found".



2-3 Registration and login

- Connect your smart phone to the router.
- Registration at first time.
- Click the "Register" to enter registration page and fill in the information. Once registration is complete, click "Sign in" or click  to return to the home page. Then, enter the registered username and password to log in.

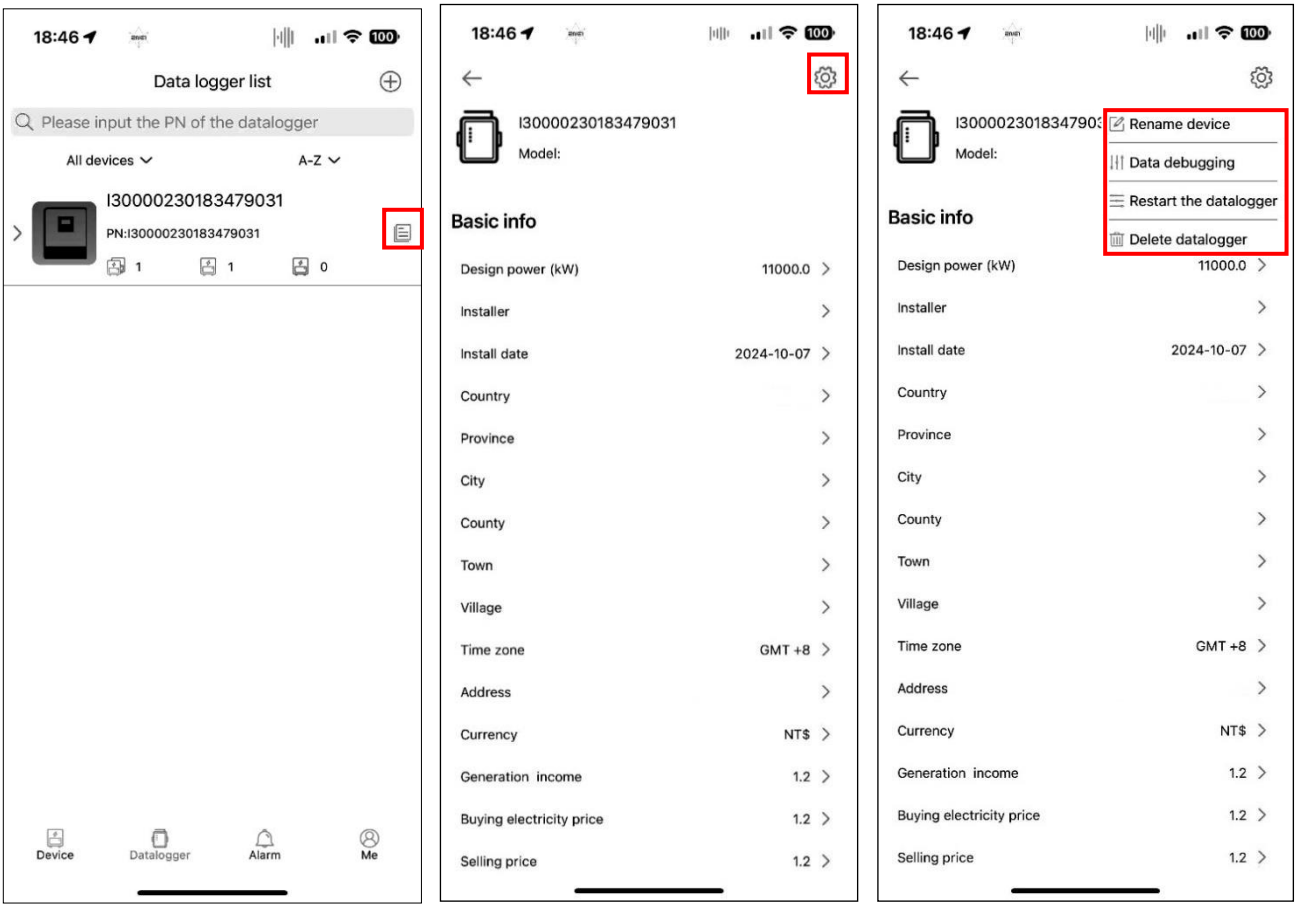




2-4 Datalogger

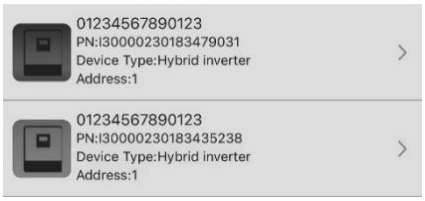
- After login, the default Home page will appear.
- Choose Datalogger page to see the Wi-Fi module list.
  - Gray icon means Wi-Fi module is offline. Please refer to 2-2 Initial Setup to choose local Wi-Fi or Bluetooth configure Wi-Fi module network.
  - Green icon means Wi-Fi module is online.

- Click  to see the Wi-Fi module information.
- Click  to rename device, data debugging, restart the datalogger, and delete datalogger.
  - Rename device: rename the Wi-Fi module name.
  - Data debugging: send RS232 commands to the inverter in hexadecimal format.
  - Restart the datalogger: restart the Wi-Fi module.
  - Delete datalogger: delete the Wi-Fi module. The inverter information in the device page will **also be deleted**. Once deleted, you **can** add datalogger under another account.

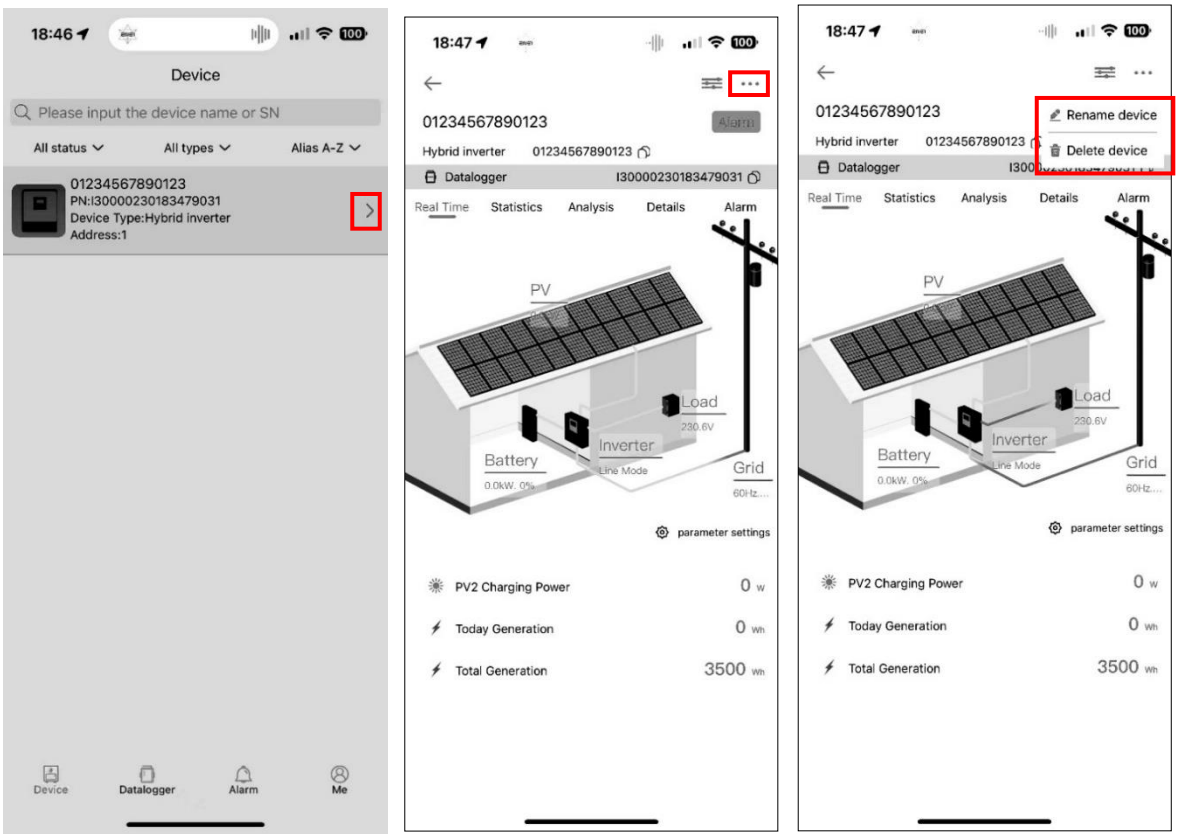


2-5 Device

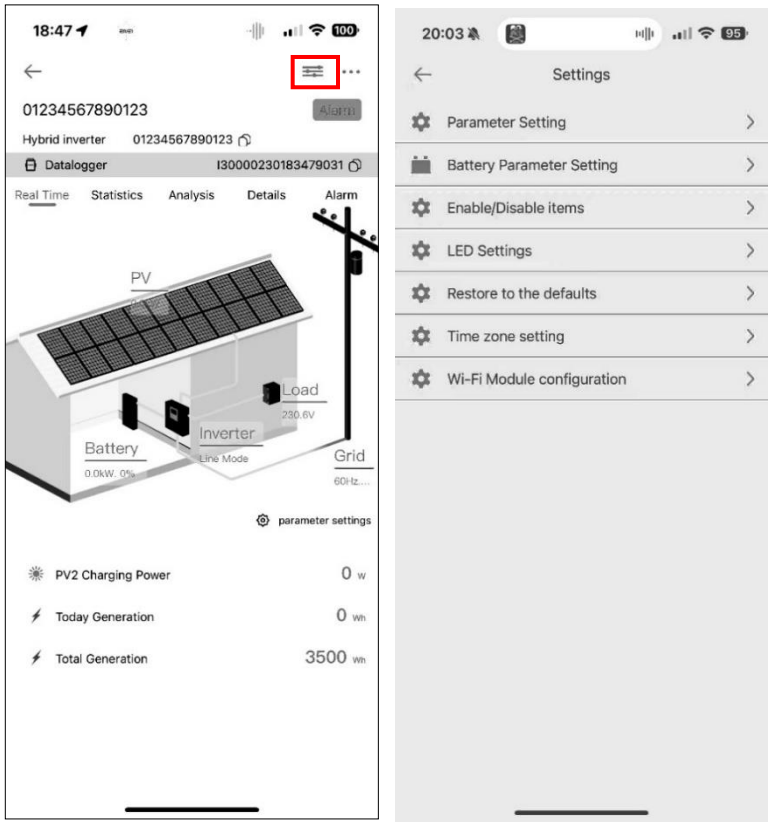
- Choose Device page to see the inverter list.
  - Gray icon means inverter is offline.
  - Green icon means inverter is online and no warnings and faults.
  - Yellow icon means inverter is online and has a warning.
  - Red icon means inverter is online and has a fault.



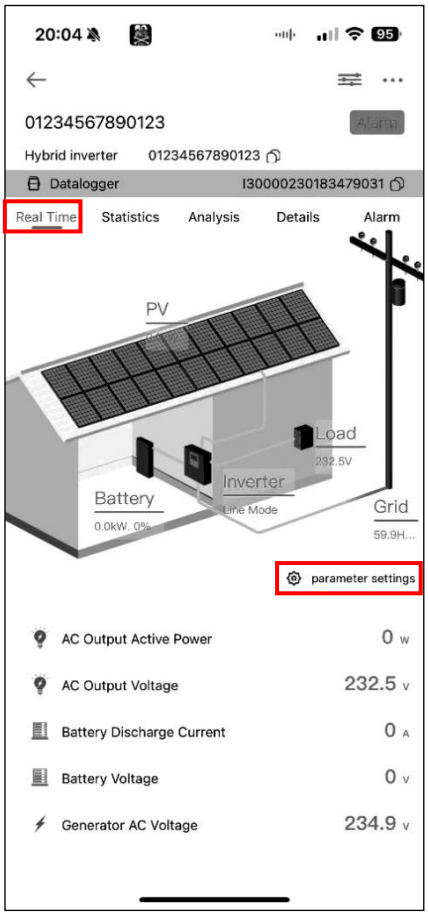
- Click  to see the inverter information.
- Click  to rename device and delete device.
  - Rename device: rename the inverter name.
  - Delete device: delete the inverter. The Wi-Fi module information in the datalogger page will **not be deleted**. Even if deleted, you **cannot** add Wi-Fi module under another account.

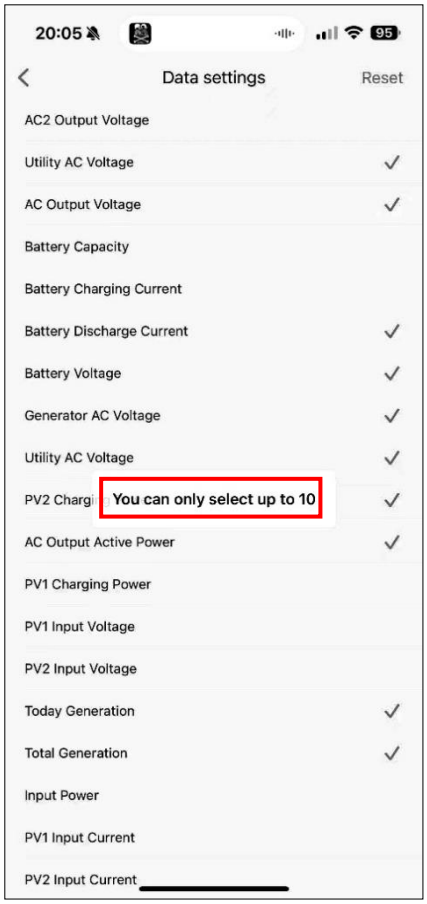


- Click  to enter setting parameters page. The setting items on the parameter page will be different based on different models.



- Click "Real Time" to see the inverter real-time data. Click "parameter settings" to choose data you want to see on the real time page. You can choose up to **10 data**.





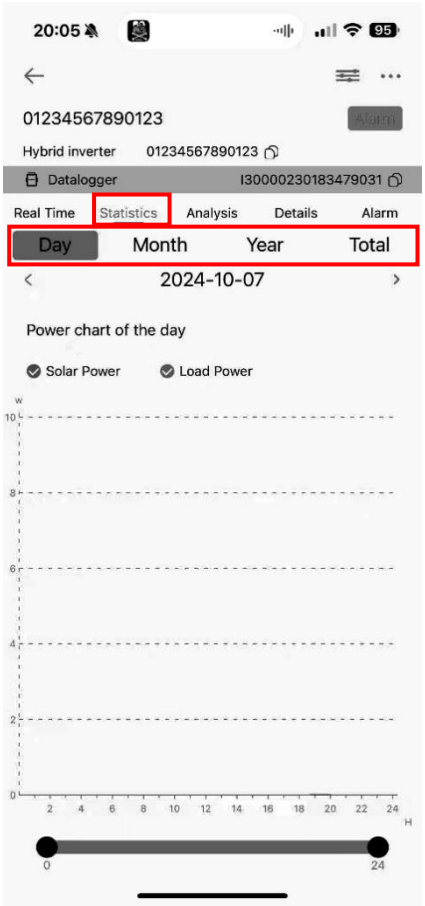
- Click "Statistics" to see the inverter solar power per hour, day, month and year.

  Day: Click the button to query the hourly power generation data of the current day.

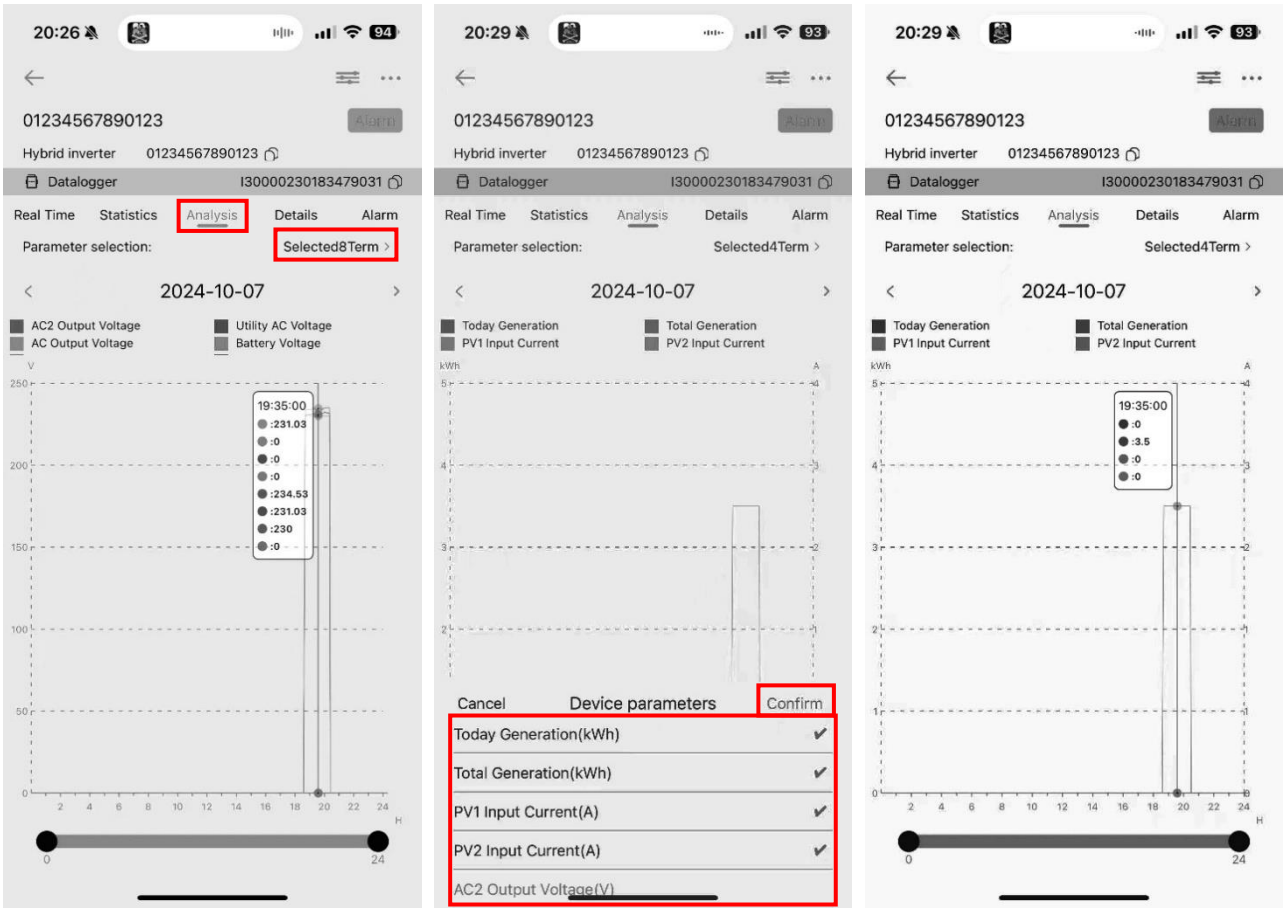
  Month: Click the button to query the daily power generation data of the current month.

  Year: Click the button to query the monthly power generation data of the current year.

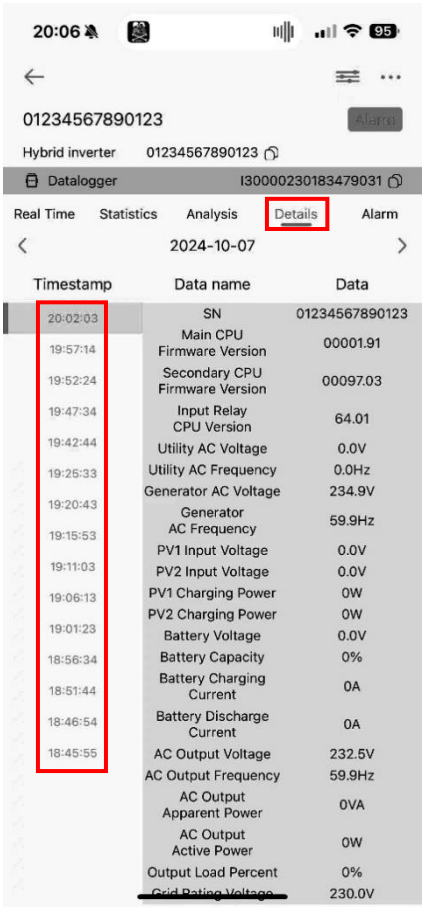
  Total: Click the button to query the annual power generation data.



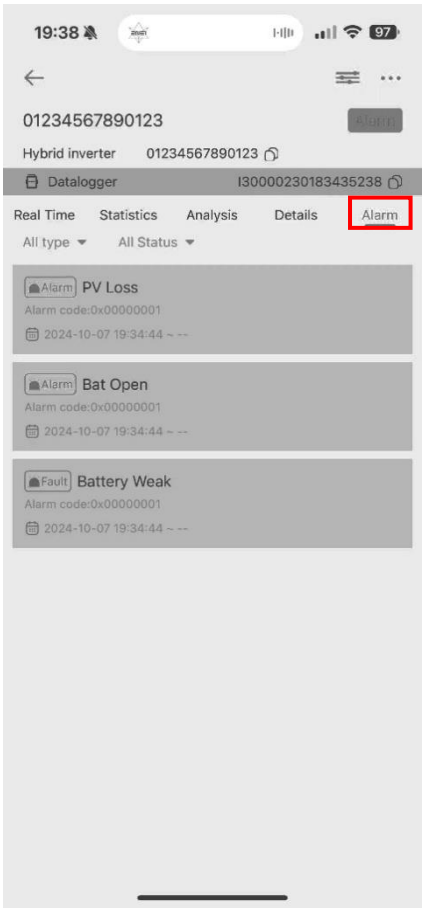
- Click "Analysis" to see the inverter data per hour. Click "SelectedXTerm" to choose the data you want to compare. You can choose up to **2 different units** such as energy (kWh) and current (A).



- Click "Details" to see the inverter history.



- Click "Alarm" to see the inverter warning and fault.



2-6 Alarm

- Choose Alarm page to see the warning and fault list of all inverters.

2-7 Me

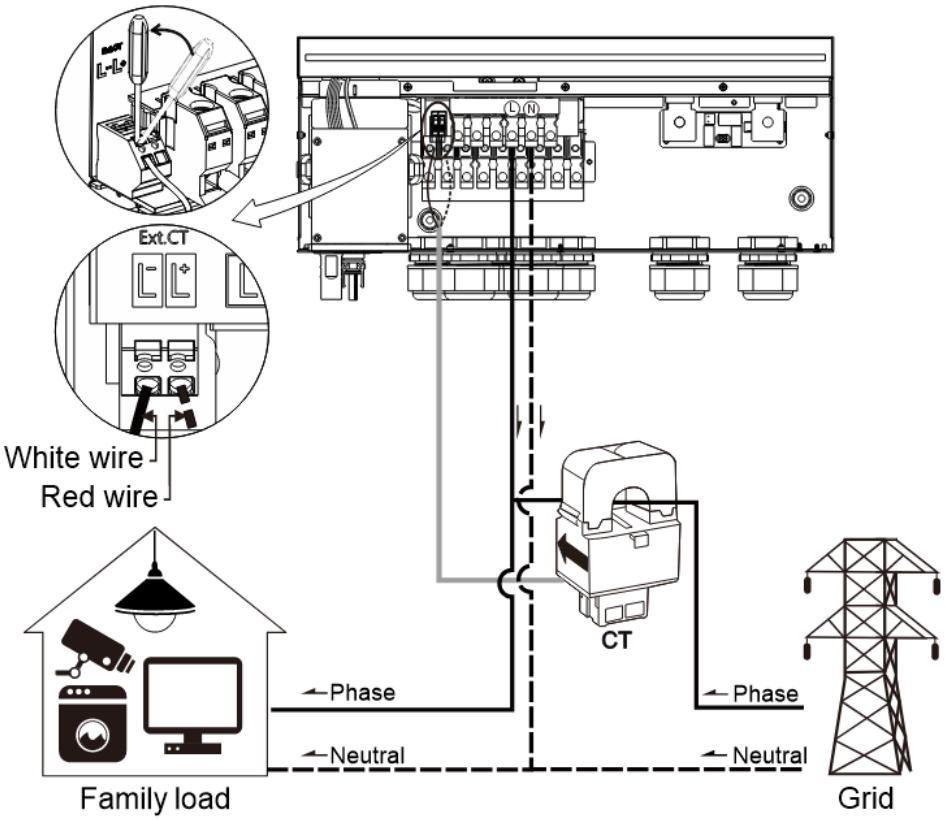
- Choose Me page to see account information and app version.
- Click "Username" to modify nick name and password, and check if the mail has been bound. If the mail is bound, you can retrieve password through mail.

Appendix IV: The CT Operation Guide

With the CT connected, the hybrid inverter can be easily integrated into the existing household system. The CT can be used to control power generation and the battery charging of the inverter.

Single commissioning

Step 1. Power off the inverter and connect the CT circuit according to the wiring diagram below.



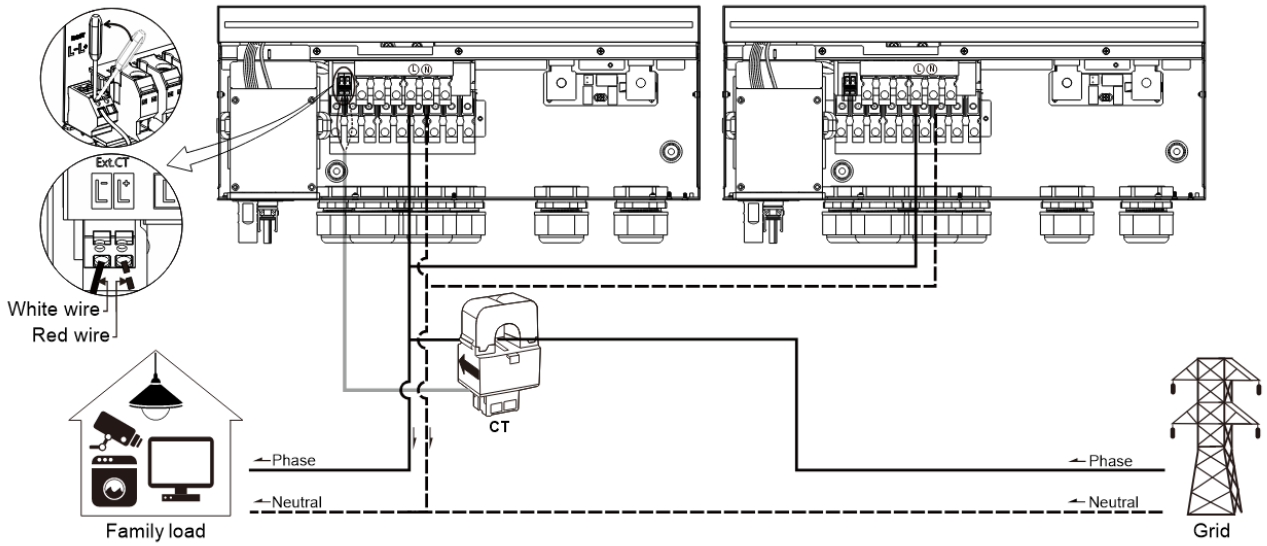
Step 2: Power on all inverters, wake up the LCD and modify the Settings.

Step 3: Enter LCD setting on the inverter with CT sensor connected and change External CT function to "50A" or "200A".

External CT function	CT disable(Default) 67 CdS	50A 67 50 A	200A 67 200 A

Parallel commissioning

Step 1. Power off the inverter and connect the CT sensor according to the wiring diagram below. For other parallel circuits, please follow Appendix I.



Step 2: Power on all inverters, wake up the LCD and modify the Settings.

Step 3: Enter LCD setting on the inverter with CT sensor connected and change External CT function to "50A" or "200A".

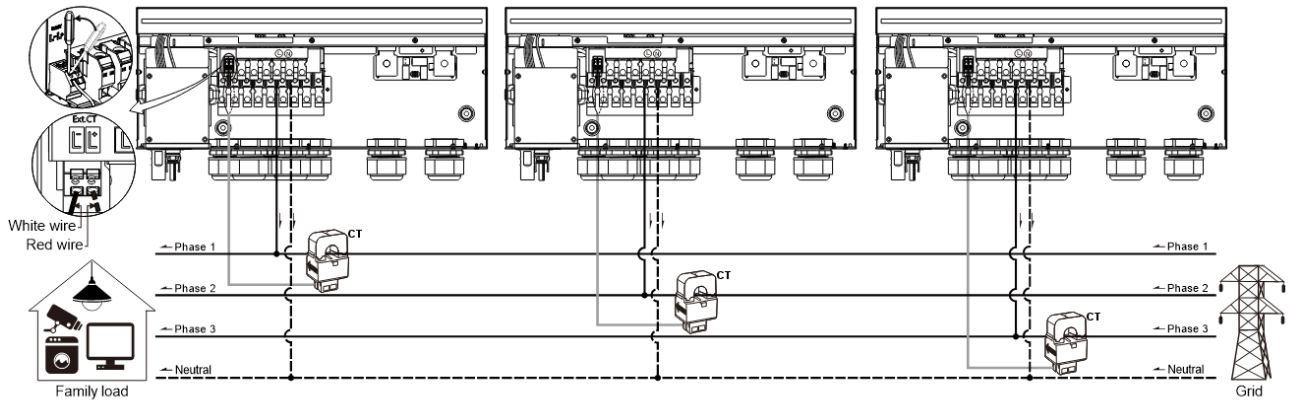
	CT disable(Default)	50A	200A
External CT function	67 CdS	67 50 A	67 200 A

IMPORTANT ATTENTION:

If applying CT function during parallel operation, it only needs one inverter from the parallel system connected to CT sensor. Be sure to enable external CT function on the one inverter with CT connected and set up "Disable" on the remaining inverters. Otherwise, it will cause CT function not working during parallel operation.

Three-phase commissioning

Step 1. Power off the inverters and connect the CT sensor according to the wiring diagram below. For other parallel circuits, please follow Appendix I.



Step 2: Power on all inverters, wake up the LCD and modify the Settings.

Step 3: Enter LCD setting on the inverter with CT sensor connected and change External CT function to "50A" or "200A".

	CT disable(Default)	50A	200A
External CT function	67 CdS	67 50 A	67 200 A

IMPORTANT ATTENTION:

If applying CT function during parallel operation, it only needs one inverter from the parallel system connected to CT sensor. Be sure to enable LCD external CT function on the one inverter with CT connected and set up 'Disable' on the remaining inverters. Otherwise, it will cause CT function not working during parallel operation.