



MAX AIR IP52

Solar Inverter

User Manual

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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
- Built-in Wi-Fi for mobile monitoring (APP is required)
- Supports USB On-the-Go function
- LCD touchscreen with multiple BMS communication ports (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 depicts a standard application for this unit. To ensure a fully operational system, the following external components are required:

- Grid Utility or Generator input
- PV modules

For alternative system architectures or configurations tailored to specific needs, please consult with a qualified system integrator.

This inverter is designed to power a wide range of residential and commercial appliances. It is fully compatible with inductive loads (motor-type appliances), including fluorescent tube lights, fans, refrigerators, and air conditioning units.

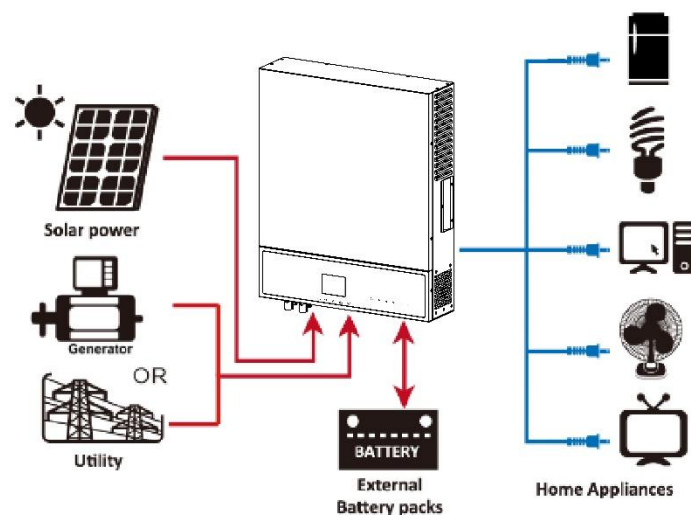
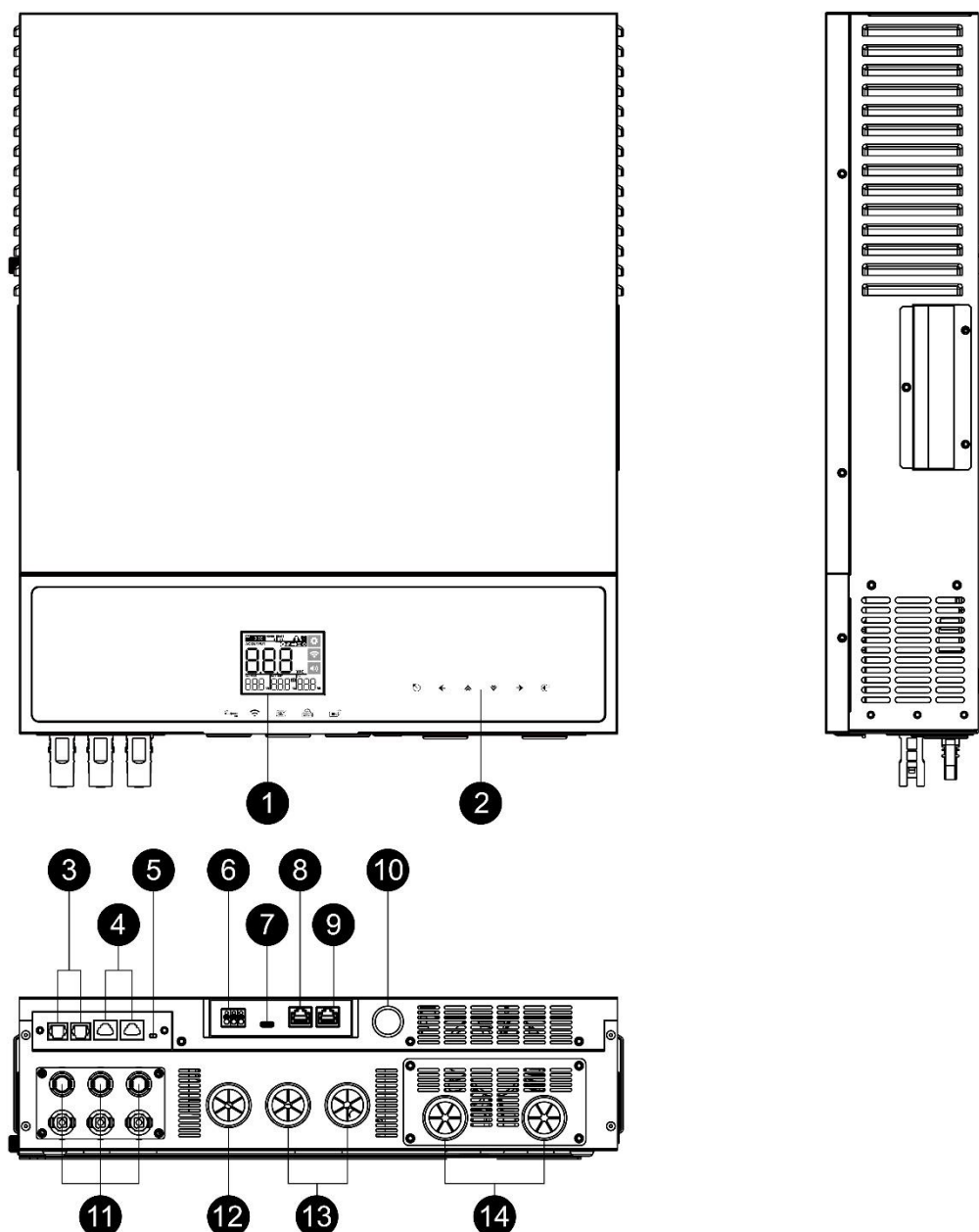


Figure 1 Basic PV System Overview

Product Overview



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

1. LCD display
2. Function buttons
3. Current sharing port
4. Parallel communication port
5. Terminator Selection
6. Dry contact
7. USB port as USB communication port and USB function port
8. BMS communication port: CAN, RS-485 or RS-232
9. RS-232 communication port
10. Power on/off switch
11. PV connectors (8KW, 10KW: 2 inputs; 12KW: 3 inputs)
12. AC input connectors
13. AC output connectors (Load connection)
14. Battery connectors

INSTALLATION

Unpacking and Inspection

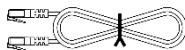
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:



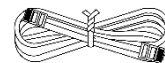
Inverter unit



Manual



Parallel communication cable



Current sharing cable



Mounting bracket



Thumb screw



DC Fuse



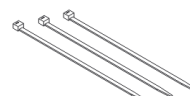
Screws M4x20 3pcs



PV connectors
(12KW x 3 sets; 8-10KW x 2 sets)



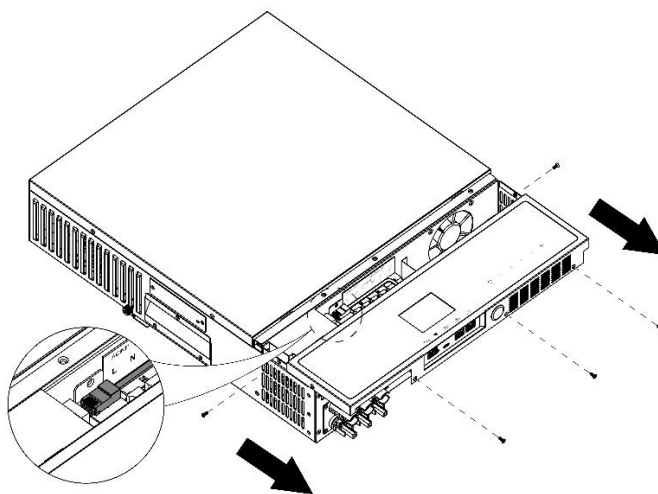
Plastic conical
anchors 3pcs



Cable ties 3pcs

Preparation

Before connecting all wirings, please take off bottom cover by removing five screws. When removing the bottom cover, be carefully to remove one cable as shown below.

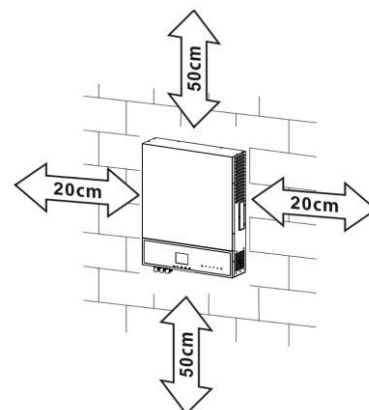


Disconnect RJ45 cable.

Mounting the Unit

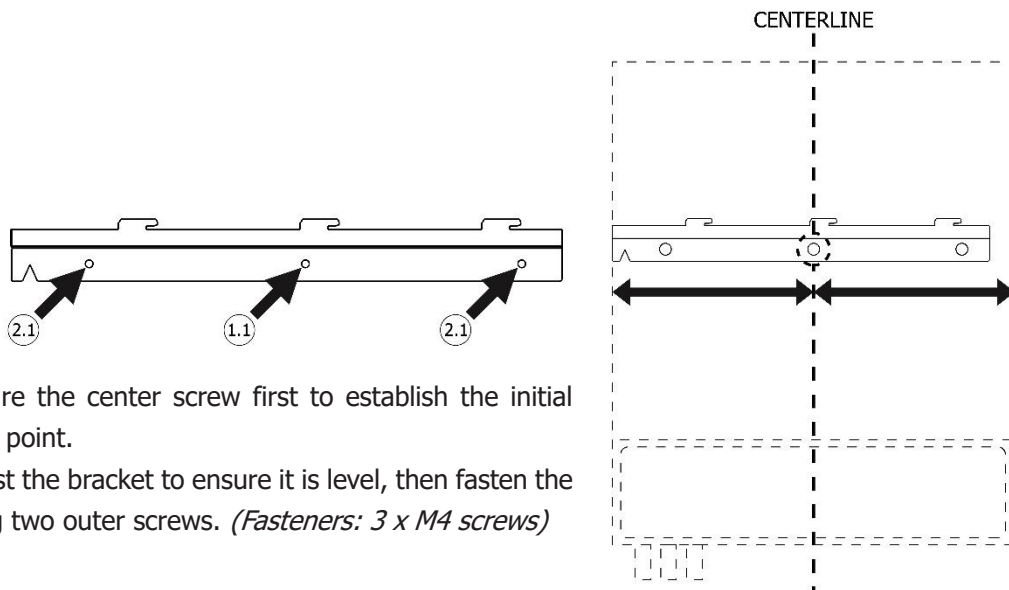
Consider the following points before selecting where to install:

- 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.



Installation steps:

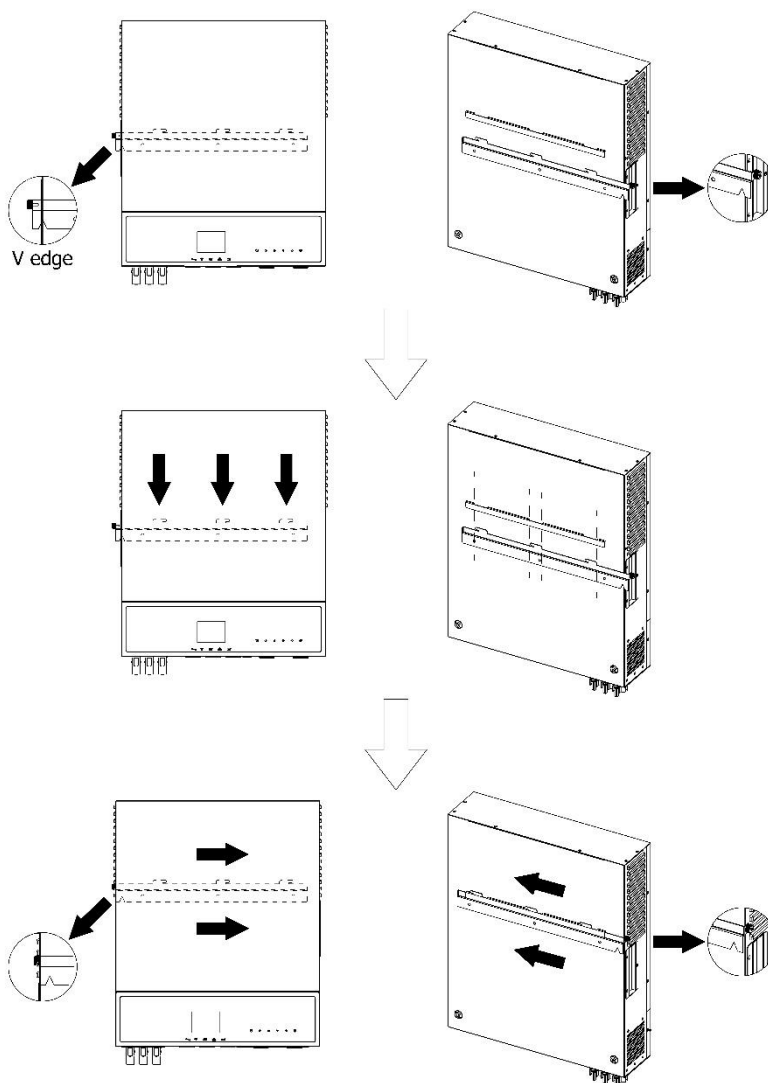
Step 1: Position the mounting bracket against the wall. Align the center screw with the desired mounting location for the inverter, as illustrated. Secure the bracket firmly using three M4 screws.



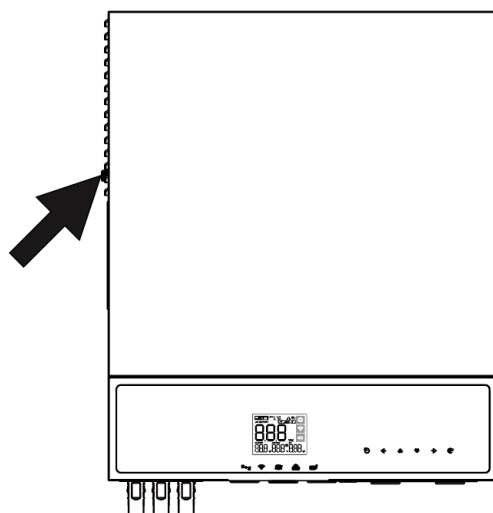
1.1: Secure the center screw first to establish the initial mounting point.

2.1: Adjust the bracket to ensure it is level, then fasten the remaining two outer screws. (*Fasteners: 3 x M4 screws*)

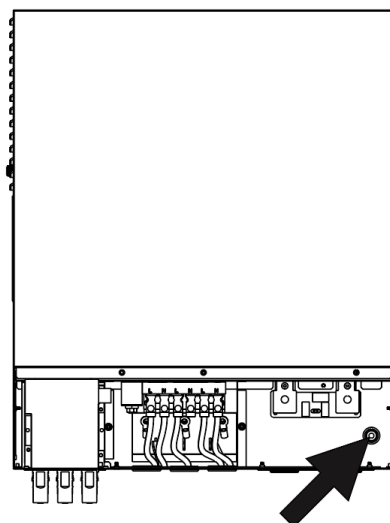
Step 2: Position the inverter above the mounting bracket, aligning the left side of the unit with the bracket's V-edge. Lower the inverter onto the bracket and slide it to the left until it is securely seated in its final position.



Step 3: Tighten the thumb screw on the bracket to lock the inverter in its final horizontal position.



Step 4: Fasten the bottom screw on the terminal side to securely mount the inverter.



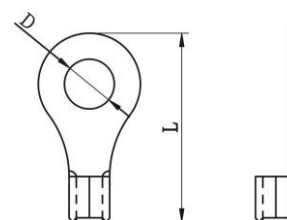
Battery Connection

CAUTION: To ensure operational safety and regulatory compliance, a dedicated DC over-current protector or disconnect device must be installed between the battery and the inverter. While certain applications may not strictly require a manual disconnect, over-current protection remains a mandatory requirement. Please consult the table below to select the appropriate fuse or circuit breaker size based on typical amperage ratings.

WARNING! All electrical wiring must be performed by qualified personnel only.

WARNING! For optimal system safety and efficient operation, it is critical to use the correct cable specifications for battery connections. To minimize the risk of personal injury, please strictly adhere to the recommended cable and terminal sizes provided in the table below.

Ring terminal:



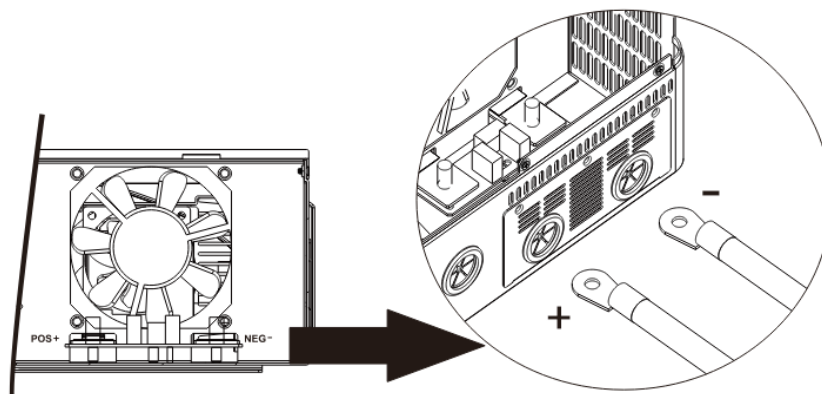
Recommended battery cable and terminal size:

Model	Typical Amperage	Battery capacity	Wire Size	Cable mm ²	Ring Terminal Dimensions		Torque value
					D (mm)	L (mm)	
MAX AIR 8K IP52	162A	250AH	1*1/0AWG	50	8.4	54	5 Nm

MAX AIR 10K IP52	202A	250AH	1*2/0AWG	67	8.4	54	5 Nm
MAX AIR 12K IP52	242A	250AH	1*3/0AWG	85	8.4	54	5 Nm

Battery Connection Procedure:

1. **Prepare Terminals:** Assemble the battery ring terminals according to the recommended cable and terminal specifications.
2. **Secure Connections:** Insert the ring terminals flatly into the inverter's battery connectors. Ensure all nuts are tightened to a torque of 5 Nm.
3. **Verify Polarity:** Confirm that the polarity is correct at both the battery and the inverter/charger. Ensure all ring terminals are securely fastened to the battery terminals.



WARNING: Shock Hazard

Exercise extreme caution during installation. High voltage may be present when batteries are connected 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!! To ensure safe maintenance and full protection against AC input over-current, a dedicated AC circuit breaker must be installed between the inverter and the AC input power source.

CAUTION!! The terminal blocks are divided into two groups marked "IN" and "OUT." To prevent equipment damage, ensure the input and output connectors are not transposed or misconnected.

WARNING! All electrical wiring must be performed exclusively by qualified personnel.

WARNING! To ensure system safety and optimal operational efficiency, the use of appropriately rated cabling for AC input connections is mandatory. To minimize the risk of personal injury, please strictly adhere to the recommended cable specifications provided in the table below.

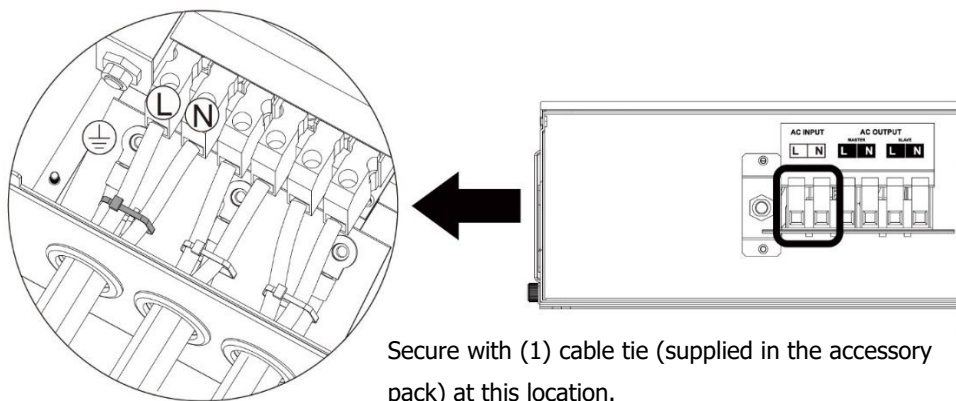
Suggested cable requirement for AC wires

Gauge	Torque Value
8 AWG	1.4~ 1.6Nm

AC Input/Output Connection Procedure:

1. **Safety Preparation:** Ensure the DC protector or disconnect device is in the OPEN position before initiating any AC connections.
2. **Wire Preparation:** Strip 10 mm of insulation from the six conductors. Shorten the Phase (L) and Neutral (N) wires by 3 mm relative to the ground wire.
3. **AC Input Wiring:** Insert the AC input wires according to the polarity markings on the terminal block and tighten the screws securely. Note: The PE (⊕) conductor must be connected first.

⊕ → **Ground (yellow-green)**
L → **LINE (brown or black)**
N → **Neutral (blue)**



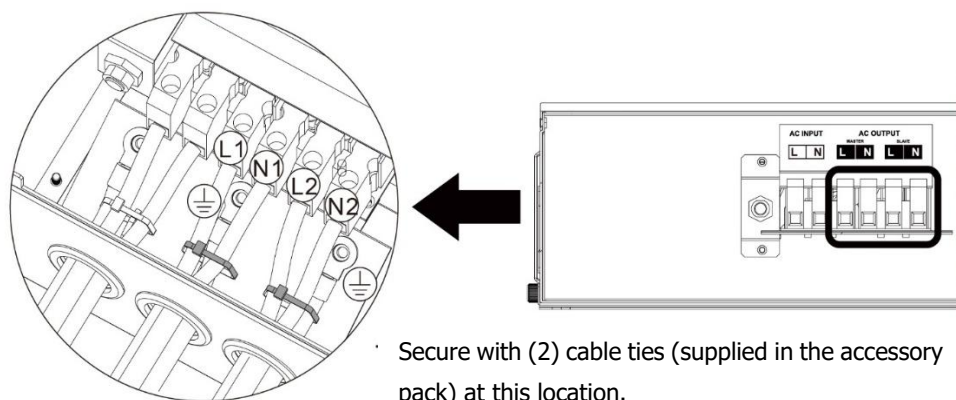
WARNING:

Ensure the AC power source is fully disconnected or isolated before attempting any hardwiring to the unit. Failure to do so may result in severe electric shock or equipment damage.

4. **Dual-Output Configuration:** This inverter features a dual-output design with four terminal positions (L1/N1 and L2/N2) on the output port. The second output can be enabled or disabled via the LCD configuration menu or monitoring software. For detailed instructions, please refer to the "LCD Setting" section.

Insert the AC output wires according to the polarity markings on the terminal block and securely tighten all terminal screws. The PE (⊕) conductor must be connected first to ensure proper grounding.

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



5. 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: For system safety and maintenance, a dedicated DC circuit breaker must be installed between the inverter and the PV modules prior to connection.

NOTE1: Please use 600VDC/30A circuit breaker for 8KW and 10KW Model, 600VDC/50A circuit breaker for 12KW Model.

NOTE2: The overvoltage category of the PV input is II.

Please follow the steps below to implement PV module connection:

WARNING: Due to the non-isolated architecture of this inverter, only the following PV module types are compatible: single crystalline and poly crystalline with class A-rated and CIGS modules.

To prevent system malfunction or equipment damage, do not connect any PV modules with potential current leakage. Grounding of PV modules is strictly prohibited as it will cause leakage current to the inverter. If using CIGS modules, ensure they are NOT grounded.

CAUTION: The use of a PV junction box equipped with surge protection is mandatory. Failure to provide adequate surge protection may result in severe inverter damage in the event of a lightning strike on the PV modules.

Step 1: This inverter supports two independent PV strings. Before connection, verify the input voltage of each PV array. Ensure that the maximum current load for each PV input connector is 30A for 8KW and 10KW Model, 40A for 12KW Model.

CAUTION: Exceeding the maximum input voltage will result in permanent damage to the unit. Thoroughly verify the PV array voltage and system configurations before proceeding with any wiring.

Step 2: Disconnect the circuit breaker and switch off the DC switch.

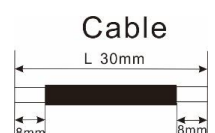
Step 3: Assemble the provided PV connectors with the PV module cables by following the detailed steps below.

Components for PV connectors and Tools:

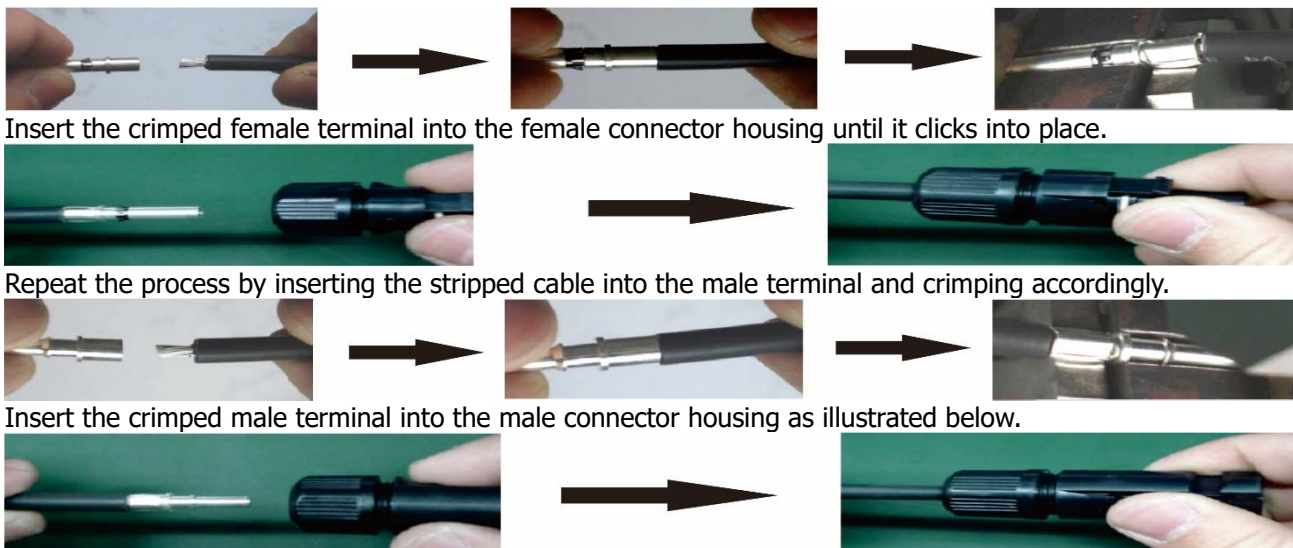
Female connector housing	
Female terminal	
Male connector housing	
Male terminal	
Crimping tool and spanner	

Connector Assembly and Wiring:

Strip 8 mm of insulation from both ends of the cable. Exercise extreme care to avoid nicking or damaging the internal conductors.



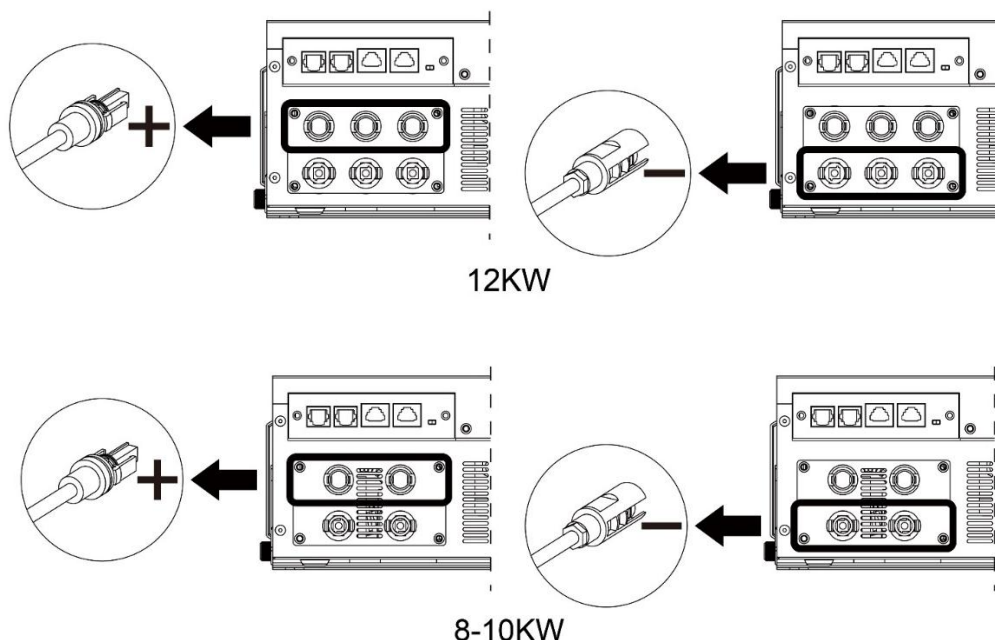
Insert the stripped cable into the female terminal and crimp it securely using a professional crimping tool.



Using a PV spanner, firmly tighten the pressure dome onto both the female and male connectors to ensure a weatherproof seal.



Step 4: Prior to connection, use a multimeter to verify the correct polarity of the cables from the PV modules and the inverter's PV input connectors. Securely connect the positive pole (+) of the PV cable to the positive (+) input terminal. Securely connect the negative pole (-) of the PV cable to the negative (-) input terminal. Ensure both connectors are fully seated and locked with an audible "click."



WARNING! For optimal system safety and operational efficiency, it is critical to use appropriately rated cabling for all PV module connections. To minimize the risk of personal injury or equipment damage, please strictly adhere to the recommended cable specifications provided in the table below.

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

CAUTION: Never touch the inverter terminals directly. These components carry high-voltage electrical current, and contact may result in lethal electric shock or severe injury.

Recommended PV Module Configuration

When selecting the appropriate PV modules, please ensure the following critical parameters are met:

1. The cumulative Open Circuit Voltage (Voc) of the PV array string must not exceed the inverter's rated Maximum PV Array Open Circuit Voltage.
2. The Open Circuit Voltage (Voc) of the PV array must be higher than the system's start-up voltage.

INVERTER MODEL	MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
Max. PV Array Power	11000W (8000W per tracker)	13000W (10000W per tracker)	18000W (12000W per tracker)
Max. PV Array Open Circuit Voltage	500Vdc		
PV Array MPPT Voltage Range	90Vdc~450Vdc		
Start-up Voltage (Voc)	80Vdc		

Using a 555Wp PV module as a reference, the following configurations are recommended to ensure compliance with the specified electrical parameters. Please refer to the table below for optimized string layouts.

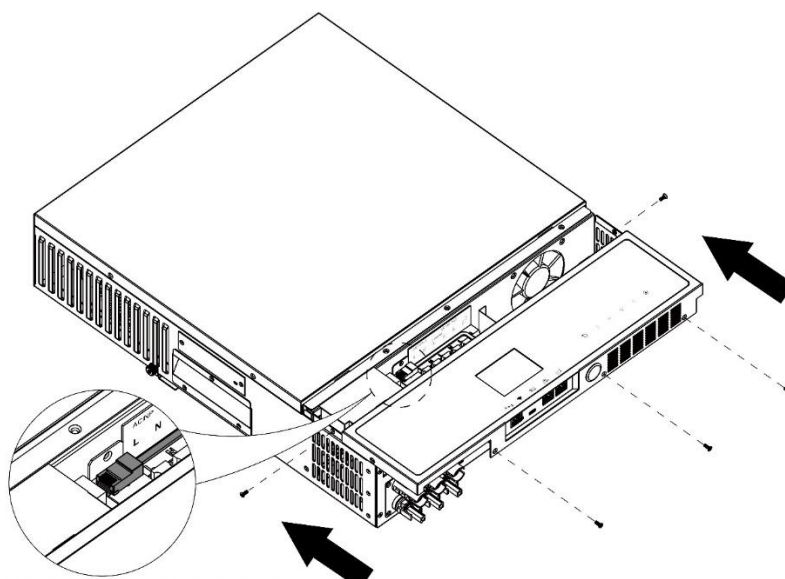
Solar Panel Spec. (reference) - 555Wp - Imp: 17.32A - Voc: 38.46Vdc - Isc: 18.33A - Cells: 110	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of panels	Total Input Power
	Min in series: 3pcs, per input Max. in series: 12pcs, per input			
	3pcs in series	x	3pcs	1665W
	x	3pcs in series	3pcs	1665W
	7pcs in series	x	7pcs	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	12210W
	12pcs in series	12pcs in series	24pcs	13320W
	10pcs in series	10pcs in series, 2 strings	30pcs	16650W
	11pcs in series	11pcs in series, 2 strings	33pcs	18315W

Using a 720Wp PV module as a reference, the following configurations are recommended to ensure compliance with the specified electrical parameters. Please refer to the table below for optimized string layouts.

Solar Panel Spec. (reference) - 720Wp - Vmp: 40.5Vdc - Imp: 17.44A - Voc: 49.4Vdc - Isc: 18.49A	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of panels	Total Input Power
	Min in series: 3pcs, per input Max. in series: 10pcs, per input			
	3pcs in series	x	3pcs	2160W
	x	3pcs in series	3pcs	2160W
	10pcs in series	x	10pcs	7200W
	x	10pcs in series	10pcs	7200W
	8pcs in series	8pcs in series	16pcs	11520W
	9pcs in series	9pcs in series	18pcs	12960W
	10pcs in series	10pcs in series	20pcs	14400W
	7pcs in series, 2 strings	7pcs in series	21pcs	15120W
	8pcs in series, 2 strings	8pcs in series	24pcs	17280W

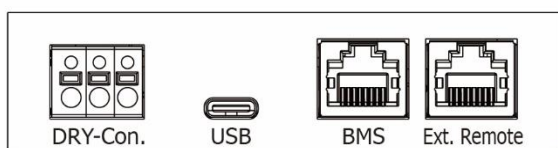
Final Assembly

After completing all wiring connections, reinstall the bottom cover by securing the five screws as illustrated below.



Ensure the RJ45 cable is securely connected.

Communication Connection



Ext. Remote Box Connection:

Pin assignment

PIN #	Definition	PIN #	Definition
PIN 1	GND	PIN 5	RXD to Inverter
PIN 2	+12V	PIN 6	TXD from Inverter
PIN 3	-12V	PIN 7	BAT
PIN 4	GND	PIN 8	SW
RS232 Baud rate = 38400			

* An optional HMI Remote Panel is available for the monitoring and control of the inverter system. For detailed installation and operational procedures, please consult the dedicated HMI Remote Panel User Manual.

Serial Connection: BMS port + COM port

Pin assignment

PIN #	Definition	PIN #	Definition
PIN 1	TXD from Inverter	PIN 5	RS485P
PIN 2	RXD to Inverter	PIN 6	CANH
PIN 3	RS485N	PIN 7	CANL
PIN 4	X	PIN 8	GND
RS232 Baud rate = 2400			
RS485 Baud rate = 9600			
CAN Baud rate = 100k(WECO), 500k(BYD, SOL, LIA), the remaining are 100k.			

USB port (Type C)

This port could be used either connection with PC to communicate with monitoring software or USB disk to export inverter data log and OTA firmware. Detail information please refer to the LCD setting section.

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

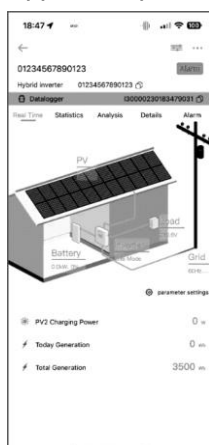
Dry Contact port

There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

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.	Output Source Priority set as USB (utility first)	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Setting value in Stop Re-Discharging Volt or battery charging reaches floating stage	Close	Open
		Output Source Priority is set as SBU (SBU priority)	Battery voltage < Setting value in Stop Dischg Volt@AC O.K.	Open	Close
			Battery voltage > Setting value in Stop Re-Discharging Volt or battery charging reaches floating stage	Close	Open

Wi-Fi Connection

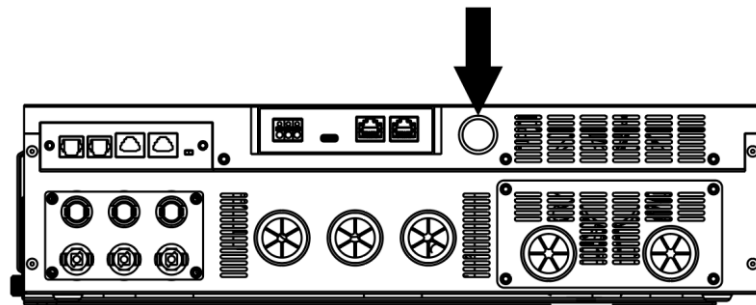
By integrating the Wi-Fi module with the Energy-Mate App, users can achieve comprehensive remote monitoring and control of their inverter systems. The App leverages dedicated Wi-Fi connectivity to provide cloud-based data services, enabling users to monitor daily performance, query real-time device parameters, and execute remote commands. This interface simplifies device management and ensures optimal system oversight from any location. The Energy-Mate App is compatible with both iOS and Android platforms.



OPERATION

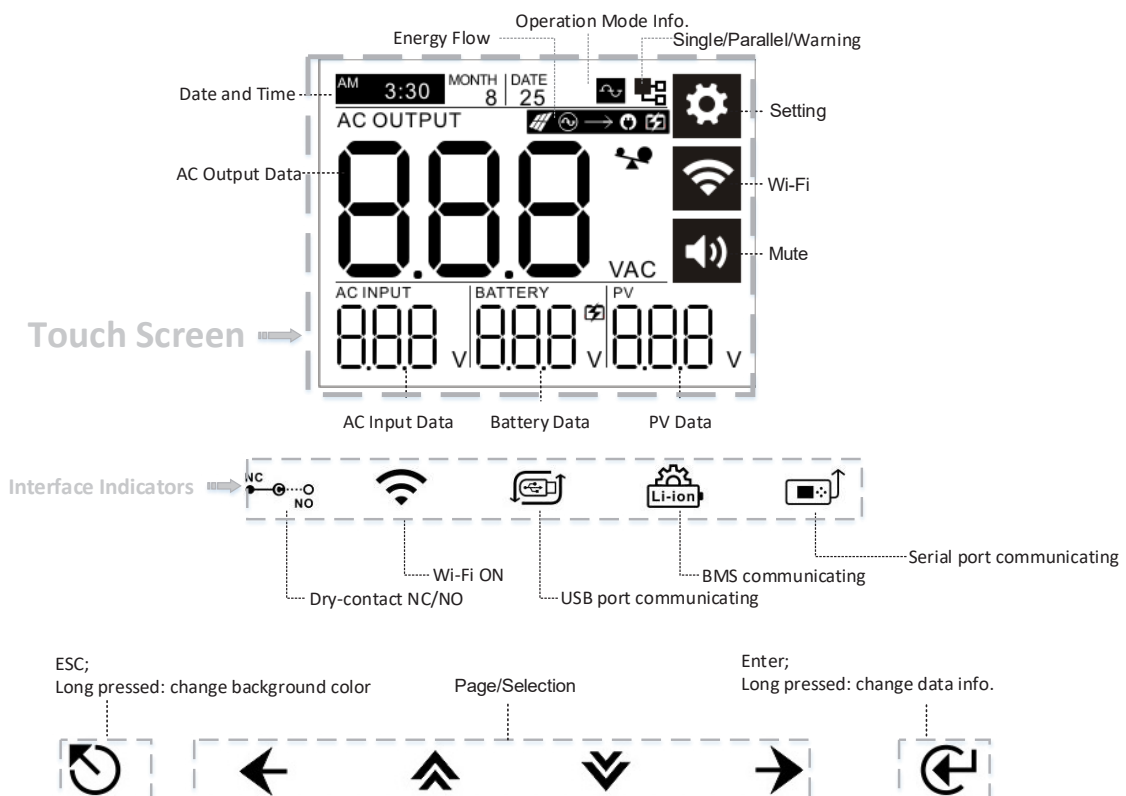
Power ON/OFF

Once the unit has been properly installed and the battery connections are verified, press and hold the On/Off switch (located on bottom of the inverter) for 3 to 5 seconds to initialize the system.



Operation and Display Panel

The Human Machine Interface (HMI) panel, illustrated in the diagram below, serves as the primary control center. It features six touch-sensitive function keys and a high-definition LCD, providing real-time data on system operating status and input/output power metrics.



Icons on the LCD

Operation Mode Info.						
Line Mode 	PV Mode 	Battery Mode 	Charge Mode 	Standby Mode 	Fault Mode 	
Single/Parallel/Warning						
Identify 	Master 	Slave 	3-Phase R 	3-Phase S 	3-Phase T 	Warning
Energy Flow						
Grid 	PV 	Discharging 		Charging 	Load 	
	Grid supply Load				Grid charging Battery	
	PV supply Load				PV charging Battery	
	Battery supply Load				PV feed into Grid	
	Grid charging Battery and supply Load					
	PV supply Load and feed into Grid					
	PV supply Load and charging Battery					
	PV supply Load, charging Battery and feed into Grid					
	PV and Grid supply Load					
	PV and Grid charging Battery					
	PV and Battery supply Load					
	PV and Grid supply Load and charging Battery					

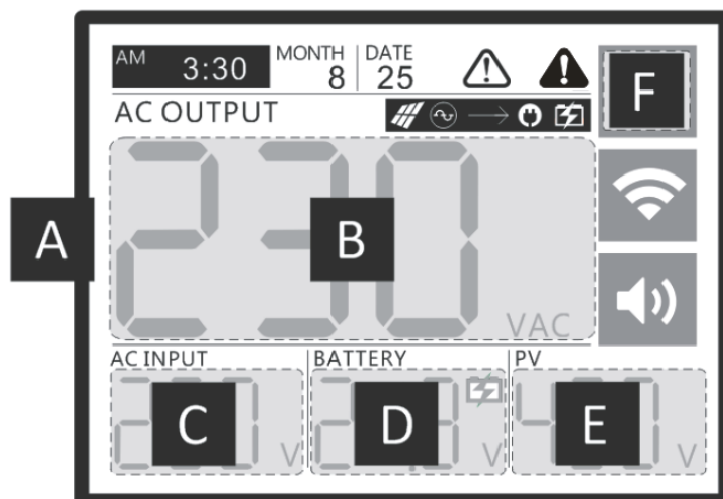
Audible Alarm

Buzzer	Messages
Beep 1time/1s	Heavy load, Temp issue, Fan issue, BMS lost
Beep continuously	All Fault modes

Status Indicator

Status	Color	Description	Remark
Normal	White	Inverter operating	Flashing indicates that data transmission is in progress with the central display.
Warning	Blue	Warning event detected	
Fault	Red	Fault event detected	

LCD Touchable Main Page



LCD Touchable Main Pages

A Starting / HOME

B AC Output Information

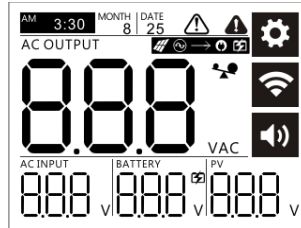
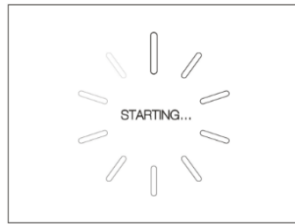
C AC Input Information

D Battery Information, BMS Information

E PV Information

F Setting, Machine Information

A Starting / HOME



B AC Output Information

AC Output	
Output Frequency	50.0 Hz
Output1 Volt	230.0 V
Output2 Volt	230.0 V
Output Current	10.2 A
Output Power	900 W
Output Power Percent	70 %

AC Output	
Today	7800 WH
This Month	8900 WH
This Year	32 KWH
Total	32 KWH

C AC Input Information(AC Feed only applicable to hybrid models.)

AC Input	
Grid Volt	230.0 V
Grid Frequency	50.0 Hz
Grid Current	5.5 A
Today	1500 WH
This Month	4500 WH
This Year	3145 KWH
Total	3145 KWH

AC Feed	
Grid Volt	230.0 V
Grid Frequency	50.0 Hz
Grid Current	5.5 A
Today	1500 WH
This Month	4500 WH
This Year	3145 KWH
Total	3145 KWH

D Battery Information

Battery	
Type	Lead-Acid
Voltage	48.0 V
Current	50.0 A
Power	1250 W
SOC	100.0 %
Status	Connected

Battery	
Charged Energy	
Today	7800 WH
This Month	8900 WH
This Year	32 KWH
Total	32 KWH

Battery	
Discharged Energy	
Today	7800 WH
This Month	8900 WH
This Year	32 KWH
Total	32 KWH

BMS Info.	
Communication State	Disconnect

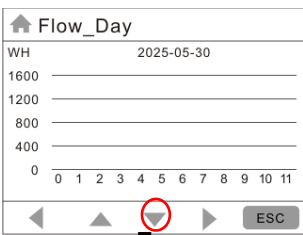
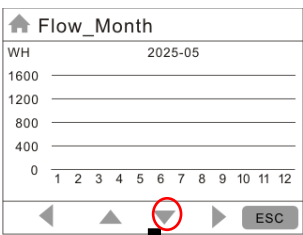
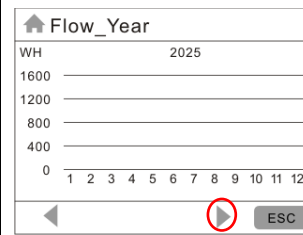
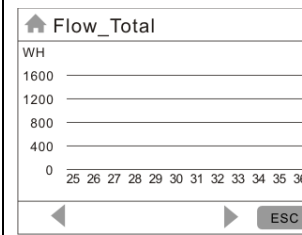
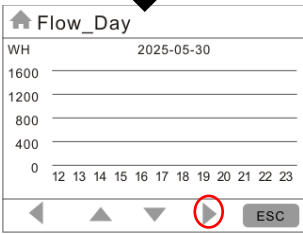
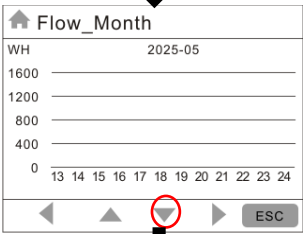
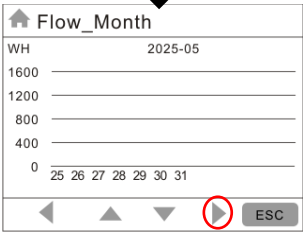
BMS Info.	
Communication State	Connect
Max. Charging Voltage	48.0 V
Max. Charging Current	100 A
Cut-Off Voltage	44.0 V

E PV Input Information

PV Input	
PV1 Input Power	3000 W
PV1 Input Voltage	300.0 V
PV1 Input Current	10 A
PV2 Input Power	3600 W
PV2 Input Voltage	300.0 V
PV2 Input Current	12 A
Total Solar Power	6600 W

PV Input	
Today	7800 WH
This Month	8900 WH
This Year	32 KWH
Total	32 KWH

Energy Chart (available in the AC output, AC input, Battery and PV input pages)

			
		Press "▶" to jump to "Total" page. Press "◀" back to "Monthly" page.	
Press "▼" to see next 12 hours in one day. Press "▶" to jump to "Monthly" page.		 Press "▼" to see next 12 days in one month. Press "▶" to jump to "Yearly" page.	

F

Setting

- Machine Information

System Setting

Information

General

AC Output

AC Input

Battery

Advance

Information

S/N

9612344567890

Parallel Status

Single

Operation Mode

Standby

DSP Version

63.01

MCU Version

57.00

LCD Version

05.00

ESC

Event

Event

Page 1

Time

Code

Event

0305 12:00

F01

Fan Lock

0406 15:40

F08

Bus Over

1111 11:11

F53

Soft Start Time Out

1231 08:30

F10

PV Over Curr

0101 00:00

F07

Over Load

ESC

Click icon to access information page. It will also show "Event" details while clicking "Event" icon.

- General

System Setting

Information

General

AC Output

AC Input

Battery

Advance

General

Time Setting

25/08/05, 14:40

LCD Sleeping

Disable

Alarm Control

Disable

Data Log Storage Period

6 Weeks

Fault Auto-Restart

Disable

Overload Bypass

Disable

ESC

General

Ext. Remote Box Control

Disable

ESC

Page 1

General – Time setting

Time Setting

25 / 8 / 5

20 : 26

ESC

Year Setting

+ 25 -

Set

ESC

Month Setting

+ 8 -

Set

ESC

Day Setting

+ 5 -

Set

ESC

Hour Setting

+ 20 -

Set

ESC

Minute Setting

+ 26 -

Set

ESC

Simply click "+" to increase number and "-" to decrease number.

General – LCD Sleep

LCD Sleep

3 min

5 min

Disable

ESC

General – Alarm Control

Alarm Control

Enable

Disable

ESC

General – Data Log Storage period

Data Log Storage period

+ 6 -

Set

ESC

General – Fault Auto Restart

Fault Auto-Restart

Enable

Disable

ESC

General – Overload Bypass

Overload Bypass

Enable

Disable

ESC

General – Ext. Remote Box Control

Ext. Remote Box Control

Enable

Disable

ESC

Page 2			If any lithium battery type is selected in battery type setting, it will show SOC percentage in ReDischarge item.
AC Output – Discharge Voltage / SOC OP2		AC Output – Discharge Time OP2	AC Output – ReDischarge Time OP2
AC Output – Discharge Interval OP2		AC Output – ReDischarge Voltage / SOC OP2	

- AC Input		
AC Input – Input Voltage Range	AC Input – Earth LED Calibration	AC Input – Reverse LED Calibration

Battery

System Setting

Information General

AC Output AC Input

Battery Advance

Battery

Battery Type AGM

Bulk Charging Voltage(CV) 56.4 V

Chg Source Priority CSO

Floating Charging Voltage 54.0 V

Max.Charging Current 100 A

Stop Dischg Volt@AC N.G. 42.0 V

Max.Grid Chg Current 50 A

Stop Dischg Volt@AC O.K. 46.0 V

Max.Discharging Curr Disable

Re-Dischg Voltage 54.0 V

Equalization Function Enable

Equalization Voltage 58.4V

Equalization Internal 10 day

Equalization Time 100 min

Equalization Timeout 100 min

Equalization Immediately Enable

 Battery Type

AGM	FLD
USE	PYL
BYD	WECO

 ESC

 Battery Type

SOL	LIA
LIB	LIC

Max. Grid Chg Current(A)

+ 50 -

Set

ESC

 Charging Source Priority

Regular

Schedule

ESC

 Regular

CSO

SNU

OSO

ESC

When "Regular" is selected, the charging source priority will be followed as setting always. When "Schedule" is selected, the charging source priority will change based on setting schedule.

 Charging Source Priority

Regular

Schedule

ESC

 Schedule

CSO	0	:	0
SNU	0	:	0
OSO	0	:	0

ESC

 Schedule

CSO	0	:	0
SNU	0	:	0
OSO	0	:	0

ESC

Charging Schedule SNU Start

+

0

-

Set

ESC

The screen displays the title "Charging Schedule SNU End" at the top. Below the title, there are three buttons: a "+" button, a "0" button, and a "-" button. Below these three buttons is a "Set" button. At the bottom right corner, there is an "ESC" button.

	Schedule CSO 0 : 0 SNU 0 : 0 OSO 0 : 0 ESC	Charging Schedule OSO Start + 0 - Set ESC	Charging Schedule OSO End + 0 - Set ESC
Page 2	Battery Bulk Charging Voltage(CV) 56.4 V Floating Charging Voltage 54.0 V Stop Dischg Volt@AC N.G. 42.0 V Stop Dischg Volt@AC O.K. 46.0 V Re-Dischg Voltage 54.0 V ESC	Battery Bulk Charging Voltage(CV) 56.4 V Floating Charging Voltage 54.0 V Stop Dischg SOC @AC N.G. 010 % Stop Dischg SOC @AC O.K. 020 % Re-Dischg SOC 080 % ESC	If any lithium battery type is selected in battery type setting, it will show SOC percentage in Stop Dischg items.
Battery – Charging Voltage	Battery – Floating Voltage	Battery – Stop Discharge Voltage / SOC @ AC N.G.	
Bulk Charging Voltage(CV) + 56.4 - Set ESC	Floating Charging Voltage + 54.0 - Set ESC	Stop Dischg Volt @ AC N.G.(V) + 44.0 - Set ESC	Stop Dischg SOC @ AC N.G.(%) + 30 - Set ESC
Battery – Stop Discharge Voltage / SOC @ AC O.K.		Battery – Re-Discharging Voltage / SOC	
Stop Dischg Volt @ AC O.K.(V) + 46.0 - Set ESC	Stop Dischg SOC @ AC O.K.(%) + 40 - Set ESC	Re-Discharging Voltage(V) + 54.0 - Set ESC	Re-Discharging SOC(%) + 80 - Set ESC
Page 3	Battery Equalization Function Enable Equalization Voltage 58.4V Equalization Interval 10 day Equalization Time 100 min Equalization Timeout 100 min Equalization Immediately Enable ESC		
Battery – Equalization Function	Battery – Equalization Voltage	Battery – Equalization Interval	Battery – Equalization Time
Equalization Function Enable Disable ESC	Equalization Voltage(V) + 58.4 - Set ESC	Equalization Interval(day) + 10 - Set ESC	Equalization Time(min) + 100 - Set ESC
Battery – Equalization Timeout		Battery – Equalization Immediately	
Equalization Timeout(min) + 100 - Set ESC		Equalization Immediately Enable Disable ESC	

- Advance It's requested to enter Password to access advance setting. The default password is "123". Feed to Grid Control / Max. Feed-in to Grid Power only applicable to hybrid models.			
Advance – Erase Data Log	Advance – Reset to default	Advance – Feed to Grid Control	Advance – Max. Feed-in to Grid Power

Advance – Firmware Update The new firmware classified as five levels.		
Level 1, 2 – Minor. These updates include minor detection adjustments with no impact on core functionality. Installation is optional.	Level 3, 4 - Recommended. These updates provide enhancements to specific applications and features. Installation is highly recommended to improve performance.	Level 5 – Critical. This level includes essential corrections to system behaviors and critical functions. This update is mandatory for continued system stability and security.

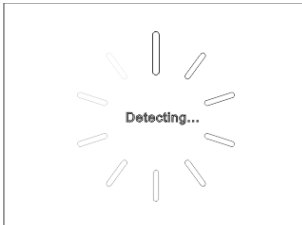
Step 1. Controller Selection The unit contains two internal controllers. Select one controller to verify if it is running the latest firmware version.		
Step 2. Firmware Update Procedure		
- If the firmware is available and compatible: Choose to Update Immediately or Schedule a specific time for the process to begin		
- If the firmware is missing or incompatible: USB Method: Connect a USB drive containing the correct firmware. Select Update Immediately or Schedule a specific time; the unit will automatically pull the update from the USB drive. Cloud Method: If a USB drive is unavailable, press ESC to exit. Download the required firmware from the Cloud		

(Web Portal) first, then return to Step 1.

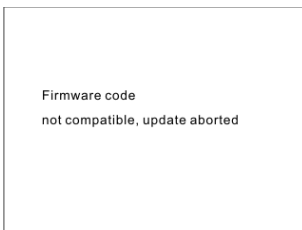
DSP Update No new firmware available inside the unit, please download it from USB disk or Cloud Yes, immediately No, specified time ESC	DSP Update Update level Update firmware now?  Yes, immediately No, specified time ESC	Firmware UpdateTime ^ 0 V ^ 0 V ^ 0 V ^ 0 V Set ESC
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Step 3: USB Detection and Verification

The system will attempt to detect the USB drive. This process typically takes approximately 5 seconds.



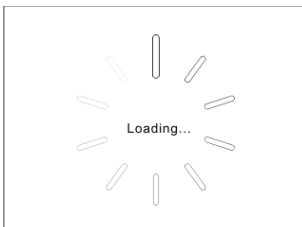
If detection exceeds 5 seconds, the process has timed out. Please contact your vendor to verify you have the correct firmware version and a compatible USB drive.



Step 4. Firmware Loading

Firmware will be uploaded from the USB drive (est. 20 seconds).

NOTE: This step is bypassed if the firmware was previously downloaded via the Cloud/Web interface.



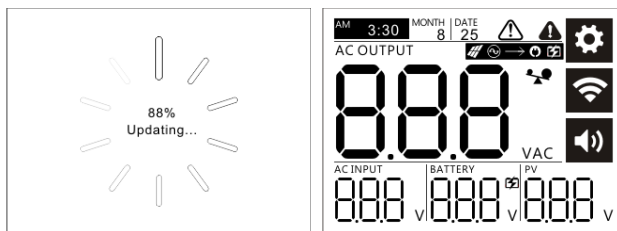
Potential Update Interruptions: The update process may be halted under the following conditions:

- Incompatibility: The firmware version does not match the hardware. Contact your vendor for the correct update file.
- Current Version Detected: The unit is already running the latest firmware. No further action is required.
- Reboot Confirmation: A notification will appear stating the unit must reboot to complete the update. Confirm this prompt to proceed or cancel to stay on the current version.

Firmware code not compatible, update aborted	Latest firmware already	DSP Update Firmware update will result a system reboot (output turned off for 10 seconds) Yes, proceed No, abort ESC
---	-------------------------	--

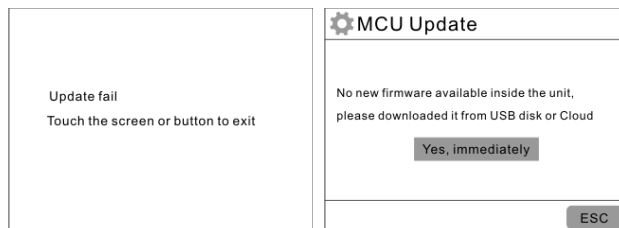
Step 5. Firmware Update Progress and Completion

A progress bar will display the update percentage (XX% Updating) until the process is complete. Upon a successful update, the system will automatically return to the Main Page.



If the update fails, one of the following alerts will appear:

- DSP Update Failure: The DSP update was unsuccessful. Please manually abort the process and restart the update.
- MCU Update Failure: The MCU update failed. You must retry this update immediately to prevent HMI malfunction.



Advance – Export Logs

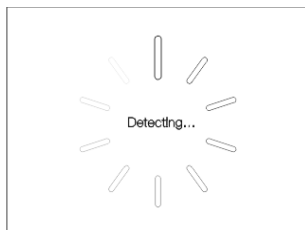
Step 1. Initiation

Select OK to begin the log export process. Select ESC or Cancel to exit the screen and return to the previous menu.

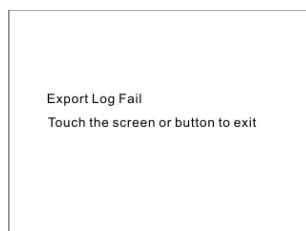


Step 2. USB Detection

The system will initialize the USB drive (approximately 5 seconds).



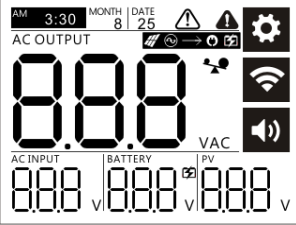
If detection exceeds 5 seconds, the process has failed. Please verify that the USB drive is using the correct file system format as specified by the vendor.



Step 3. Export Progress

The screen will indicate that the log export is in progress. Upon successful completion, the system will automatically return to the Main Page.





AM 3:30 MONTH 8 DATE 25

AC OUTPUT 000 VAC

AC INPUT 000 V BATTERY 000 V PV 000 V

If the export process is interrupted, refer to the following solutions:

- Write Protection Error: The USB drive is write-protected. Disable the protection switch or security settings on the drive and try again.
- Access Denied / File Error: The system cannot open the file or access the directory. Reformat the USB drive to a compatible format and restart the process.

Export Log Fail

Touch the screen or button to exit

Battery Equalization Description

Battery equalization function is built into the charge controller. It reverses the buildup of negative chemical effects such as 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 may have built up on the plates. If left unchecked, this condition, called sulfating, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize the battery periodically.

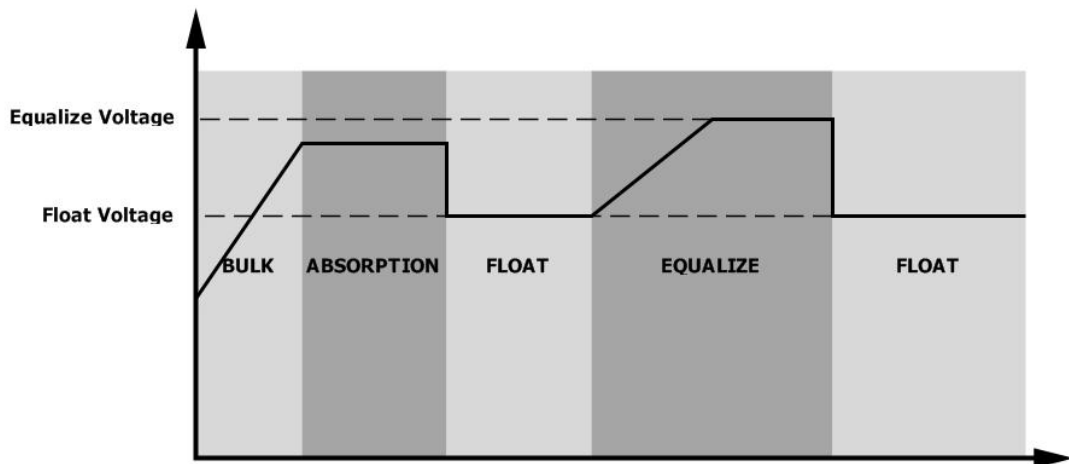
● How to Activate Equalization Function

You must enable battery equalization function in Battery Setting Page. You can then apply this function by either one of the following methods:

1. Setting equalization interval in Battery Setting Page.
2. Activate equalization immediately in Battery Setting Page.

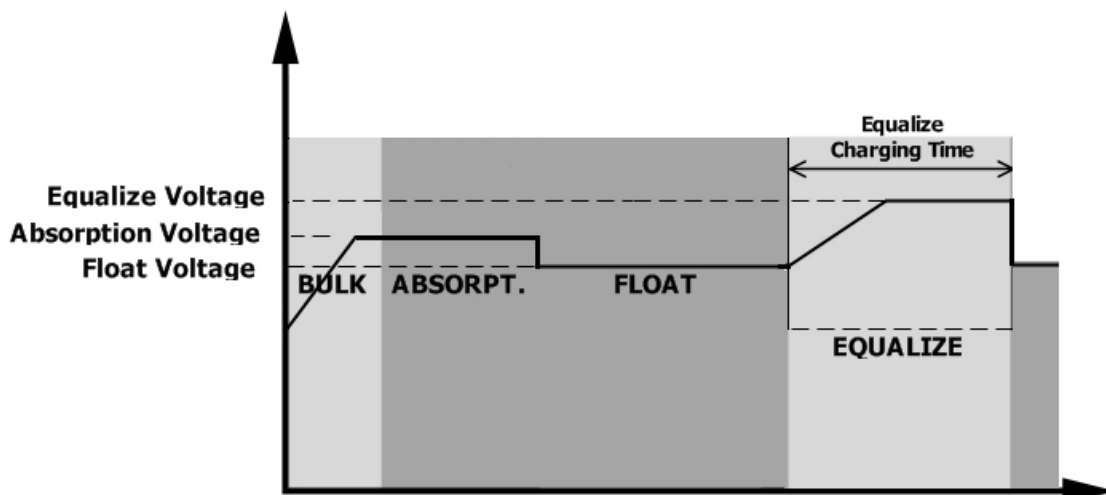
● When to Equalize

In floating charge stage, when setting the equalization interval (battery equalization cycle) is reached, or equalization is activated immediately, the controller will start to enter Equalize Mode.

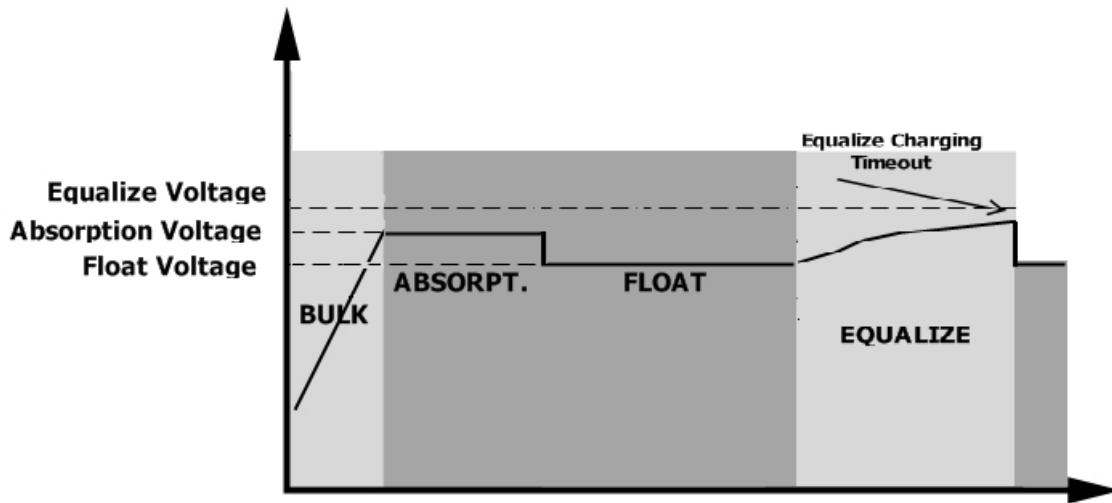


● Equalize Charging and Timeout

In Equalize Mode, the controller will supply power to charge battery as much as possible until battery voltage reach the equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the equalization level. The battery will remain in the Equalize Mode until the equalization timer runs out.



However, in Equalize Mode, if the battery equalization timer runs out and the battery voltage doesn't recover to the battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves equalization voltage. If the battery voltage is still lower than equalization voltage when the extension runs out, the charge controller will stop equalization and return to the floating charging stage.



Fault Reference Code

Code Type	Code #	Event	Code Type	Code #	Event
Fault	F01	Fan fault	Fault	F16	Inv start fault
Fault	F02	High PV-volt	Fault	F17	High dc offset
Fault	F03	High bat-volt	Fault	F18	Over-load
Fault	F04	Low bat-volt	Fault	F19	Amp sense fault
Fault	F05	Output S.C.	Fault	F20	Backfeed fault
Fault	F06	High op-volt	Fault	F21	Firmware fault
Fault	F07	Low op-volt	Fault	F22	Par-CAN fault
Fault	F08	High bus-volt	Fault	F23	Par-host fault
Fault	F09	Low bus-volt	Fault	F24	Par-sync fault
Fault	F10	High PV-amp	Fault	F25	Par-bat fault
Fault	F11	High inv-amp	Fault	F26	Par-grid fault
Fault	F12	High bus-amp	Fault	F27	Par-opa fault
Fault	F13	High disc-amp	Fault	F28	Par-set fault
Fault	F14	Over temp.	Fault	F29	OP Circuit Fault
Fault	F15	Bus start fault	Fault	F34	PFC over current
Warning	W01	Grid not exist	Warning	W11	Comm. Lost
Warning	W02	PV not exist	Warning	W12	Par limited
Warning	W03	Pack not exist	Warning	W13	Ip CB trip
Warning	W04	Weak SoC	Warning	W14	EQ warning
Warning	W05	Weak PV-volt	Warning	W15	MCU comm. lost
Warning	W06	Power de-rate	Warning	W16	Disable CHG& DISCHG
Warning	W07	Heavy load	Warning	W17	Disable CHG
Warning	W08	Temp issue	Warning	W18	Disable DISCHG
Warning	W09	Fan issue	Warning	W19	Force CHG
Warning	W10	BMS lost			

SPECIFICATIONS

Table 1 Line Mode Specifications

Model	MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
Rated Output Power	8KW	10KW	12KW
Input Voltage Waveform	Sinusoidal (utility or generator)		
Nominal Input Voltage	230Vac		
Low Loss Voltage	170Vac $\pm$ 7V (UPS) 90Vac $\pm$ 7V (Appliances)		
Low Loss Return Voltage	180Vac $\pm$ 7V (UPS); 100Vac $\pm$ 7V (Appliances)		
High Loss Voltage	280Vac $\pm$ 7V		
High Loss Return Voltage	270Vac $\pm$ 7V		
Max AC Input Voltage	300Vac		
Max AC Input Current	60A		
Max Output Current for 2nd output	60A		
Nominal Input Frequency	50Hz / 60Hz (Auto detection)		
Low Loss Frequency	40 $\pm$ 1Hz		
Low Loss Return Frequency	42 $\pm$ 1Hz		
High Loss Frequency	65 $\pm$ 1Hz		
High Loss Return Frequency	63 $\pm$ 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 (UPS); 20ms typical (Appliances)		
Output power de-rating: When AC input voltage under 170V the output power will be de-rated.			

Table 2 Inverter Mode Specifications

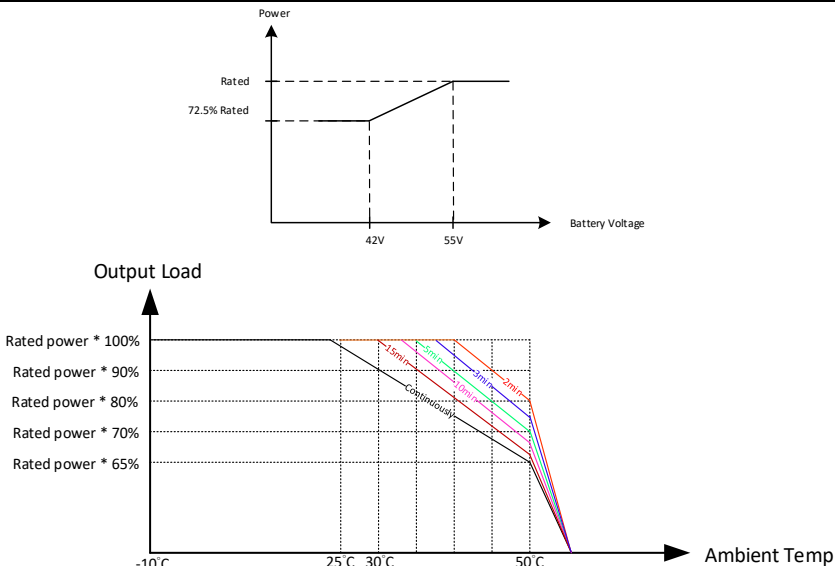
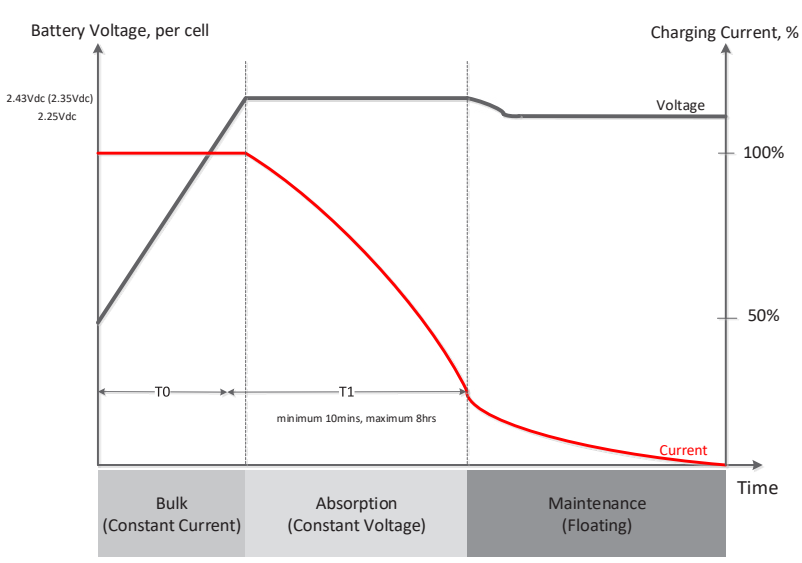
Model	MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
Rated Output Power	8KW	10KW	12KW
Output Voltage Waveform	Pure Sine Wave		
Output Voltage Regulation	230Vac $\pm$ 5%		
Output Frequency	60Hz or 50Hz		
Peak Efficiency	90%		
Overload Protection	10s@105%~110%; 5s@ $\geq$ 120%; 100ms @ $\geq$ 160%		
Surge Capacity	2* rated power for 5 seconds		
Low DC Warning Voltage @ load < 20% @ 20% $\leq$ load < 50% @ load $\geq$ 50%	46.0Vdc 42.8Vdc 40.4Vdc		
Low DC Warning Return Voltage @ load < 20% @ 20% $\leq$ load < 50% @ load $\geq$ 50%	48.0Vdc 44.8Vdc 42.4Vdc		
Low DC Cut-off Voltage @ load < 20% @ 20% $\leq$ load < 50% @ load $\geq$ 50%	44.0Vdc 40.8Vdc 38.4Vdc		
High DC Recovery Voltage	61Vdc		
High DC Cut-off Voltage	63Vdc		
DC Voltage Accuracy	$\pm$ 0.3V@ no load		
THDV	<5% for linear load, <10% for non-linear load @ nominal voltage		
DC Offset	$\leq$ 100mV		
Power Limitation When battery voltage is lower than 55Vdc, 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		MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
Charging Current (UPS) @ Nominal Input Voltage		120Amp	150Amp	200Amp
Bulk Charging Voltage	Flooded Battery	58.4Vdc		
	AGM / Gel Battery	56.4Vdc		
Floating Charging Voltage		54Vdc		
Overcharge Protection		63Vdc		
Charging Algorithm		3-Step		
Charging Curve				

Solar Input			
MODEL	MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
Rated Power	11000W (8000W per tracker)	13000W (10000W per tracker)	18000W (12000W per tracker)
Max. PV Array Open Circuit Voltage	500Vdc		
PV Array MPPT Voltage Range	90Vdc~450Vdc		
Max. Input Current	2*30Amp (MAX 45Amp)		30A/40A (MAX 60Amp)
Max. Charging Current	150A	150A	200A
Start-up Voltage	80V +/- 5Vdc		

Table 4 General Specifications

MODEL	MAX AIR 8K	MAX AIR 10K	MAX AIR 12K
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	429.6*506.1*107.4		
Net Weight, kg	18.4		

Table 5 Parallel Specifications

Max parallel numbers	12
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

Phenomenon and/or Possible cause	What to do
No response while press the main switch.	
No Utility power and PV is applied.	Check whether the DC breaker tripped or has not yet turned on? If problem still exists, please contact the service center to repair it.
No response while pressing the main switch.	
Utility power or PV power exists.	Check whether the AC breaker tripped? Or PV voltage reaches to the operation level? If problem still exists, please contact the service center to repair it.
Output turned off, Buzzer beeps continuously.	
F01 shows. Fans abnormal stopped during startup sequence	Please contact service center to replace them.
F02 shows.	Configure the PV panels lower than 500V.
F03 shows.	Disconnect the Utility and PV power. Then, re-apply again. If over-voltage alarm still sounds, the internal charger might has some problem. Please contact with service center to repair it.
F05 shows.	Check and verify if there is any load with short circuit condition? Remove the load and restart the unit again. If problem still exists, please contact the service center to repair it.
F14 shows.	Keep the unit installed in a well ventilated environment.
F18 shows.	Reduce the applied load and restart the unit again.
F06, F07, F08, F09, F10, F11, F12, F13, F15, F16, F17, F19 or F20 shows.	Please restart the unit again. If problem still exists, please contact the service center to repair it.
F20 shows.	- Restart the inverter. - Check if L/N cables are not connected reversely in all inverters. - 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. If the problem remains, please contact your installer.
F22, F23, or F24 shows.	- Check if communication cables are connected well and restart the inverter. - If the problem remains, please contact your installer.
F25 shows.	- Make sure all inverters share same groups of batteries together. - 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.

	If the problem still remains, please contact your installer.
F26 shows.	1. Check the utility wiring connection 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. If the problem remains, please contact your installer.
F27 shows.	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. If the problem remains, please contact your installer.
F28 shows.	1. Switch off the inverter and check LCD setting AC output mode 2. For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set. For supporting three-phase system, make sure no "PAL" is set on AC output mode setting 3. If the problem remains, please contact your installer.
F29 shows.	1. Check if sharing cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
Output powered but buzzer beeps per second.	
W07 shows.	Reduce load will release the warning.
W08 shows.	Keep the unit installed in a well ventilated environment.
W09 shows.	Fans abnormal stopped during operation. Please contact service center to replace them.
W10 shows.	BMS communication disconnected. Please contact service center to repair it.
Output powered but no buzzer. Only record on log	
W04 shows.	Charge the battery.
W05 shows.	Reduce the load.
W06 shows.	Utility voltage lower to a certain level, the output rating will be limited.
W11 shows.	Internal communication disconnected. Please contact service center to repair it.
W16, W17, W18 or W19 shows.	Check Battery status
WiFi mark is not displayed.	
Unit can't connect to the APP.	Check the Wi-Fi function enabled and icon available on the LCD then follow the Wi-Fi installation procedure to pair the Wi-Fi module with router and APP.

Appendix I: Parallel function

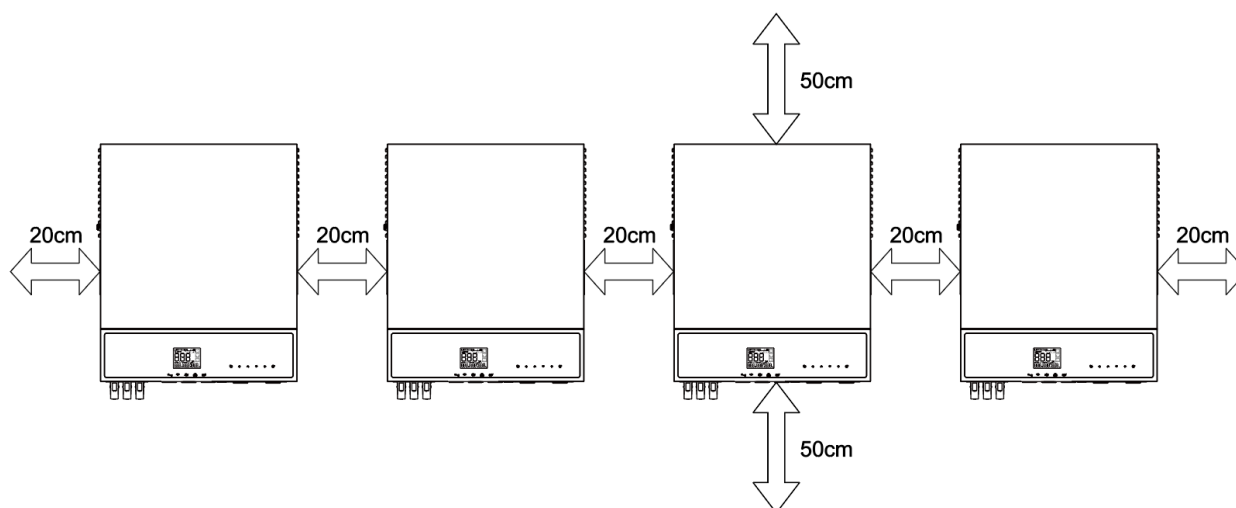
1. Introduction

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

1. Parallel operation in single phase is with up to 12 units. The supported maximum output power for 8KW model is 96KW/96KVA, 120KW/120KVA for 10KW model and 144KW/144KVA for 12KW model.
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: To ensure adequate air circulation and effective heat dissipation, maintain a minimum clearance of approximately 20 cm from the sides and 50 cm above and below each unit. Furthermore, ensure all units are installed at the same horizontal level to maintain system uniformity.

3. Wiring Connection

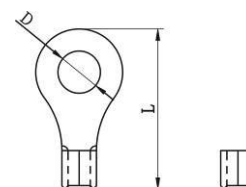
WARNING: For parallel operation, it is **mandatory** to have the battery system connected. The system will not function in parallel mode without a stable battery source.

Please refer to the table below for the required cable specifications for **each individual inverter**.

Recommended battery cable and terminal size:

Model	Wire Size	Cable mm ²	Ring Terminal Dimensions		Torque value
			D (mm)	L (mm)	
8KW	1*1/0AWG	50	8.4	54	5 Nm
10KW	1*2/0AWG	67	8.4	54	5 Nm
12KW	1*3/0AWG	85	8.4	54	5 Nm

Ring terminal:



WARNING: or parallel configurations, it is **imperative** that all battery cables are of equal length. Any discrepancy in cable length will result in a voltage imbalance between the inverters and the battery pack, leading to synchronization failures or improper operation of the parallel system.

Recommended AC input and output cable size for each inverter:

AWG no.	Torque
8 AWG	1.4~ 1.6 Nm

Use a common bus-bar or high-current connector as a junction point to unify the battery cables before connecting to the battery pack. To ensure safety and performance, the cable gauge from the junction point to the battery must be X times the cross-sectional area specified in the individual inverter tables (where "X" represents the total number of inverters in parallel).

Apply the same scaling principle for all AC input and output wiring to accommodate the combined current of the parallel system.

CAUTION!! Dedicated circuit breakers must be installed at both the battery bank and the AC input source. This configuration is mandatory to ensure the system can be safely isolated during maintenance and remains fully protected against over-current conditions from either the battery or the AC grid.

Recommended breaker specification of battery for each inverter:

Model	1 unit*
8KW	200A/70VDC
10KW	250A/70VDC
12KW	300A/70VDC

* If a single circuit breaker is used to protect the entire battery system, its rated current (amperage) must be X times the recommended rating for a single unit. In this context, "X" represents the total number of inverters connected in parallel

Recommended breaker specification of AC input with single phase:

Model	2	3	4	5	6	7	8	9	10	11	12
8KW~12KW	120A 230VAC	180A 230VAC	240A 230VAC	300A 230VAC	360A 230VAC	420A 230VAC	480A 230VAC	540A 230VAC	600A 230VAC	660A 230VAC	720A 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	7	8	9	10	11	12
Battery Capacity	400 AH	600 AH	800 AH	1000 AH	1200 AH	1400 AH	1600 AH	1800 AH	2000 AH	2200 AH	2400 AH

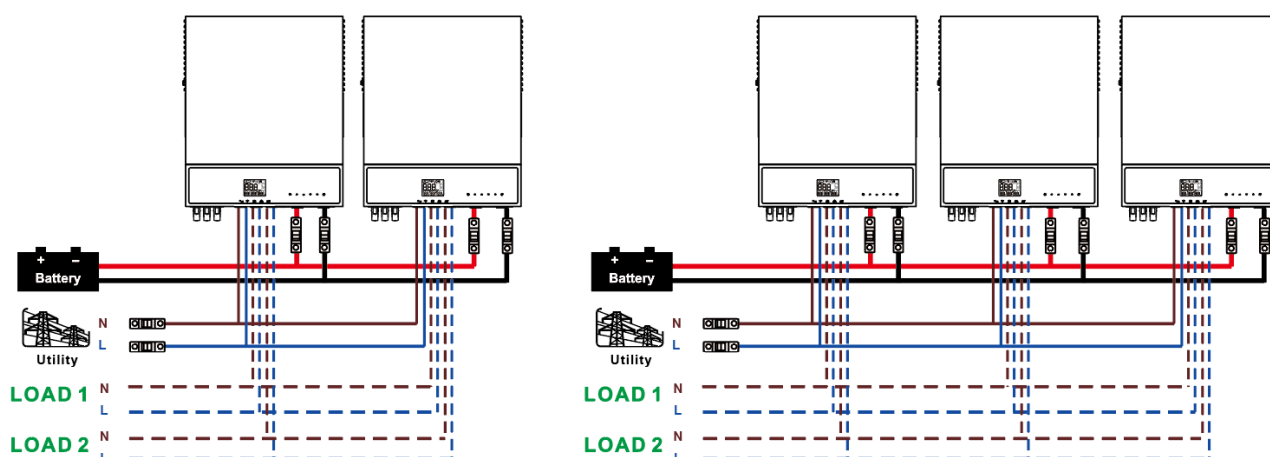
WARNING! In a parallel system, all inverters must share the same battery bank. Failure to maintain a common battery source will cause the inverters to trigger a fault mode and cease operation.

4. Parallel

4-1. Parallel Operation in Single phase

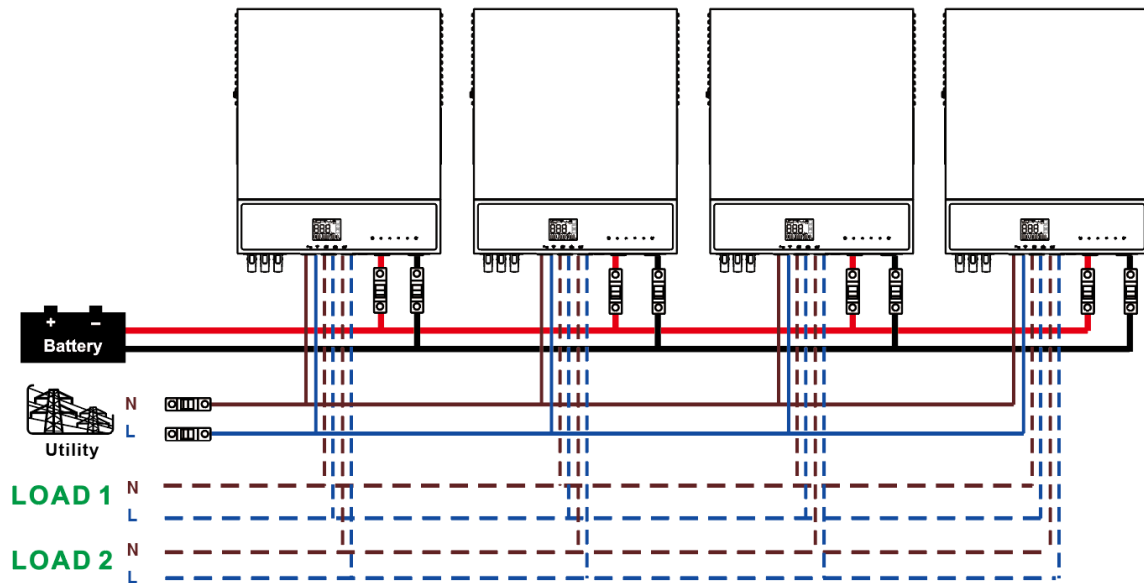
Two and three inverters in parallel:

Power Connection



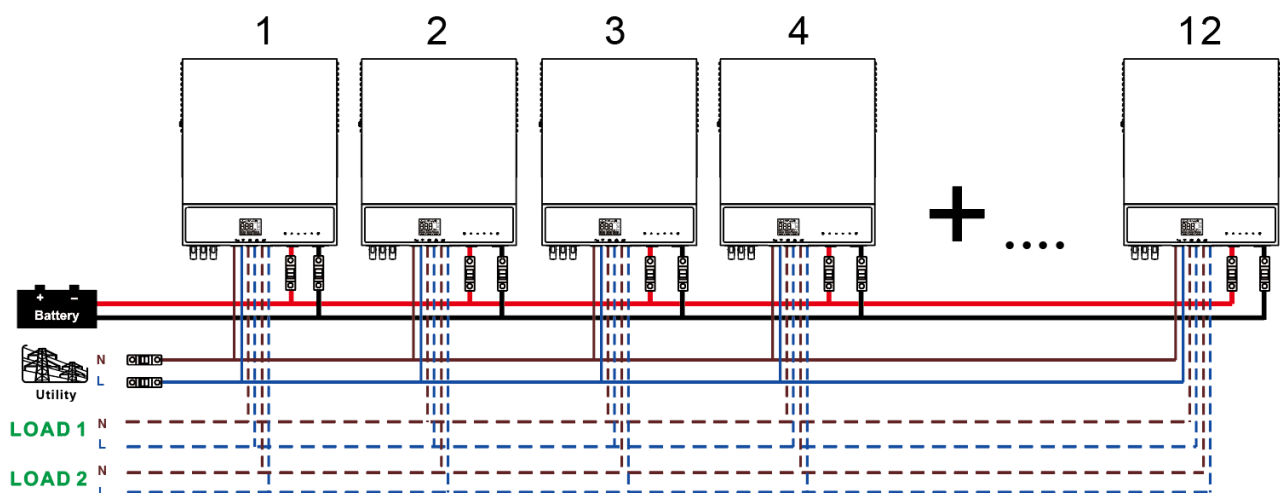
Four inverters in parallel:

Power Connection



Up to twelve inverters in parallel:

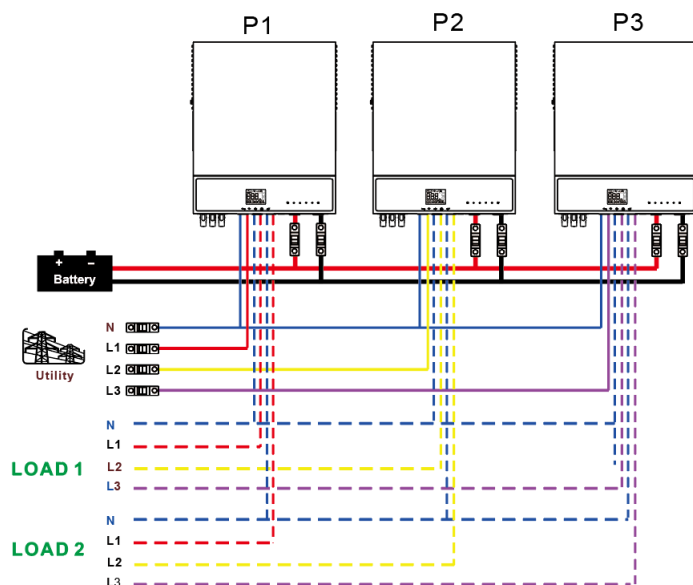
Power Connection



4-2. Support 3-phase equipment

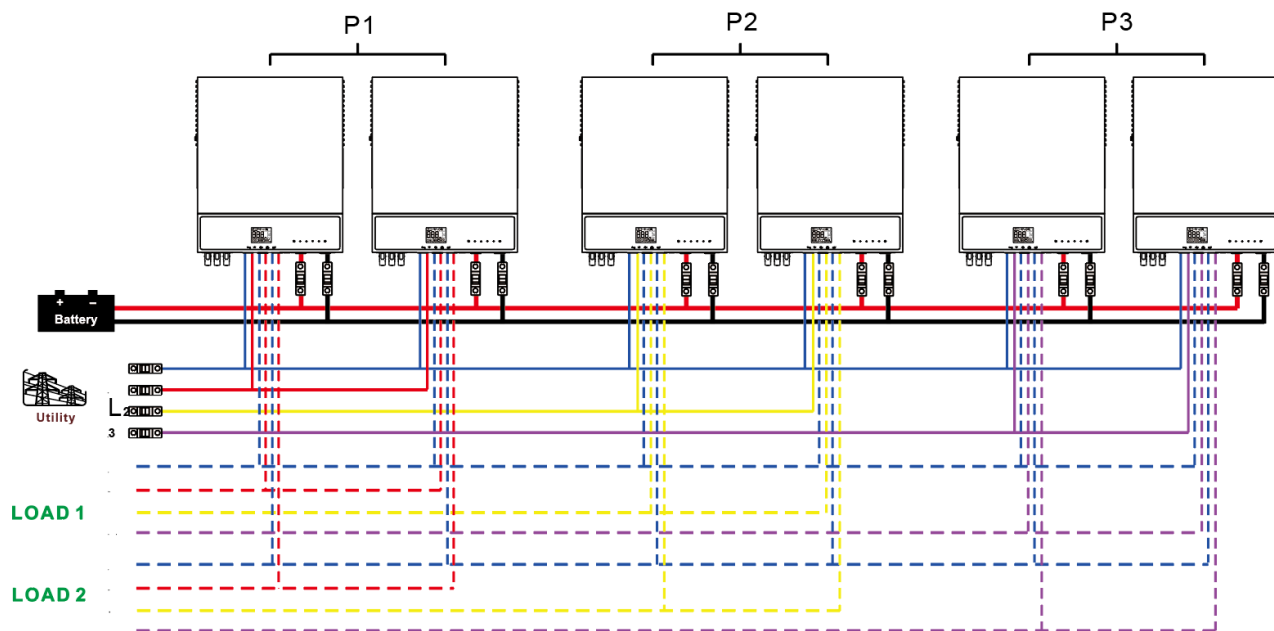
One inverter in each phase:

Power Connection



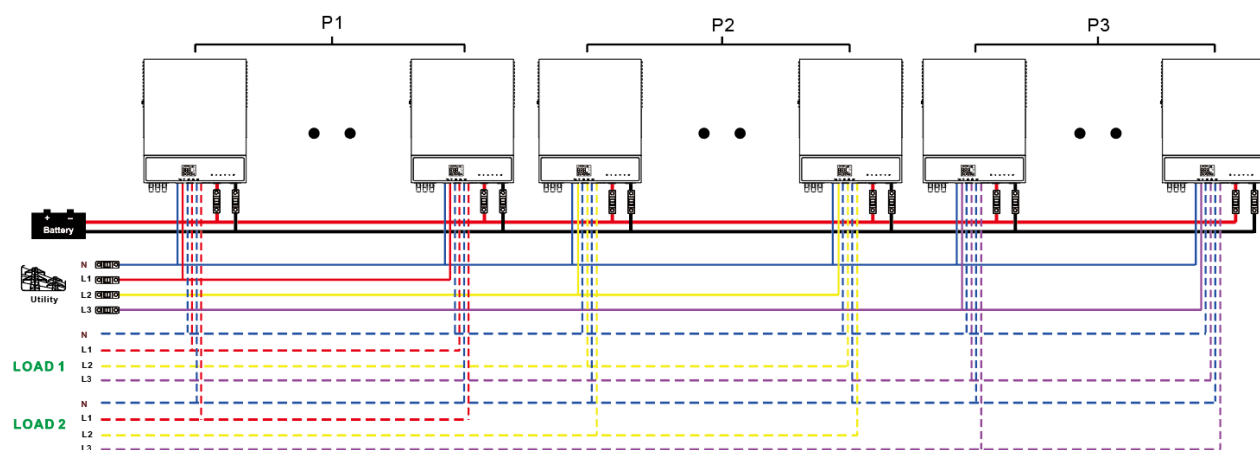
Two inverters in each parallel:

Power Connection



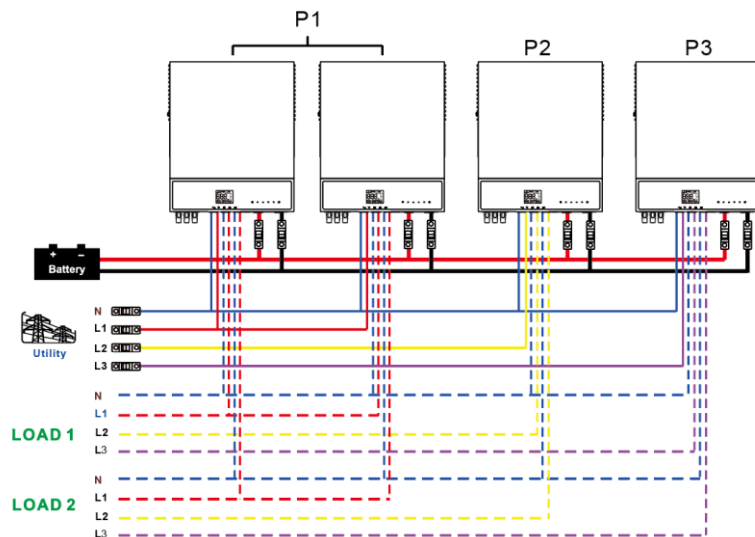
Three to four inverters in each phase:

Power Connection



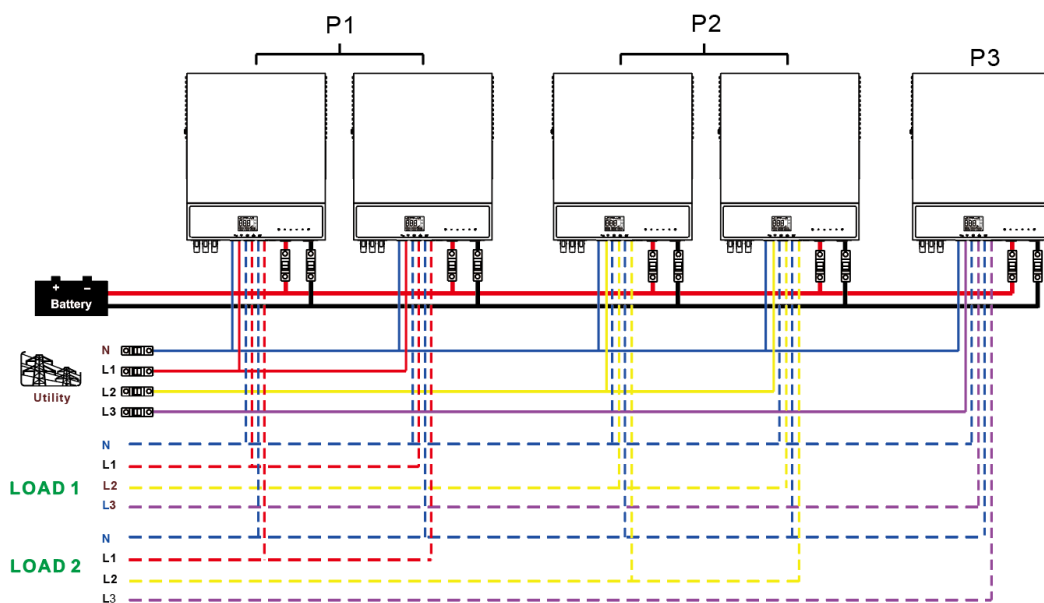
Two inverters in one phase and only one inverter for the remaining phases:

Power Connection



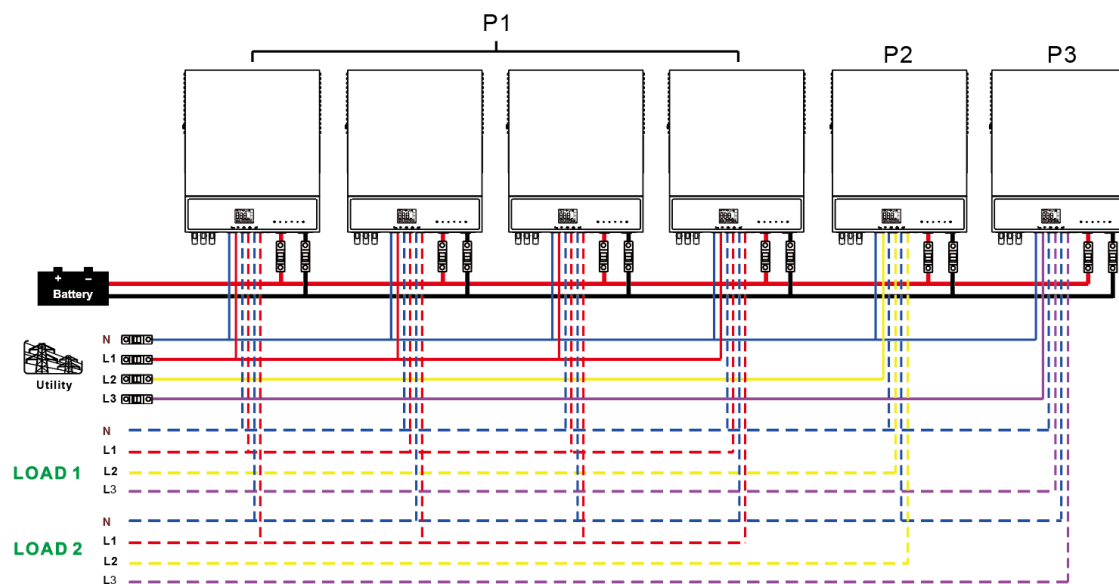
Two inverters in two phase and only one inverter for the remaining phase:

Power Connection



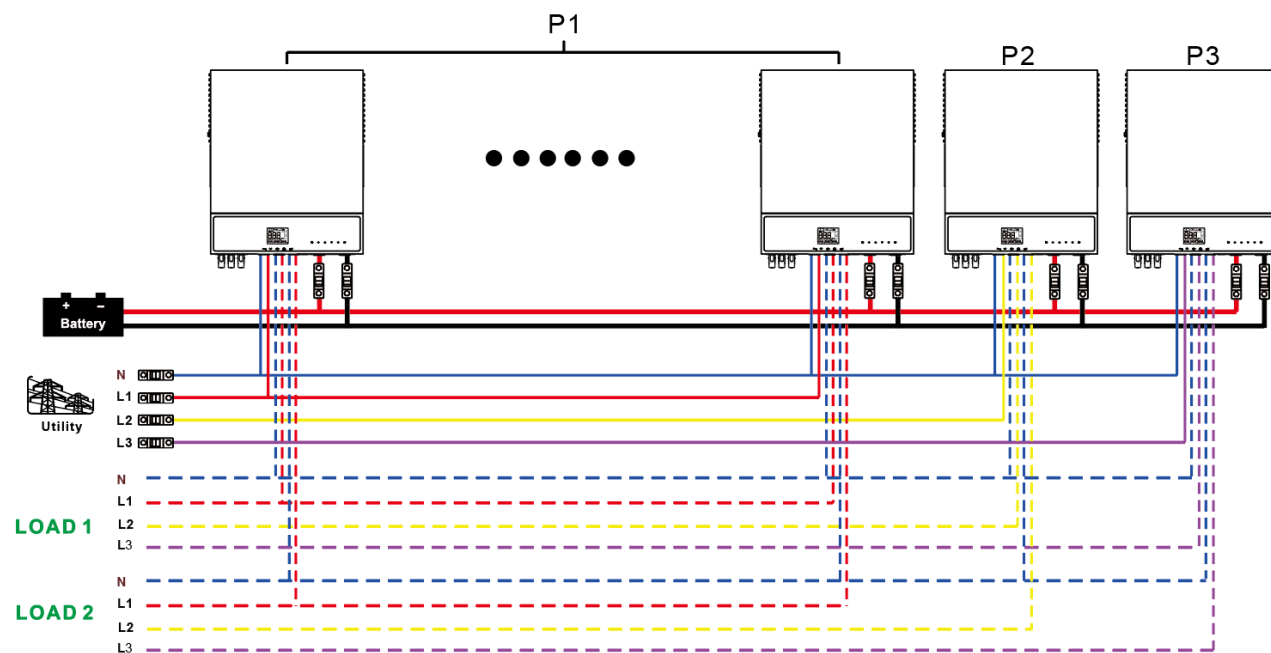
Four inverters in one phase and one inverter for the other two phases:

Power Connection



Five to ten inverters in one phase and one inverter for the other two phases:

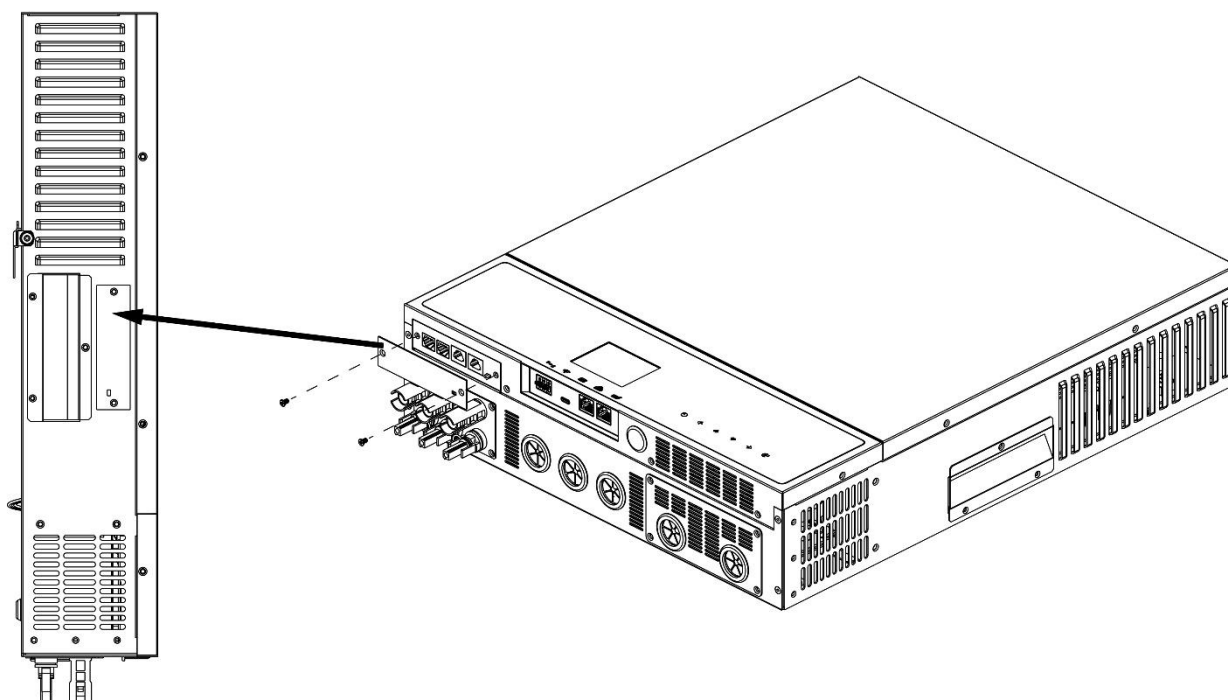
Power Connection



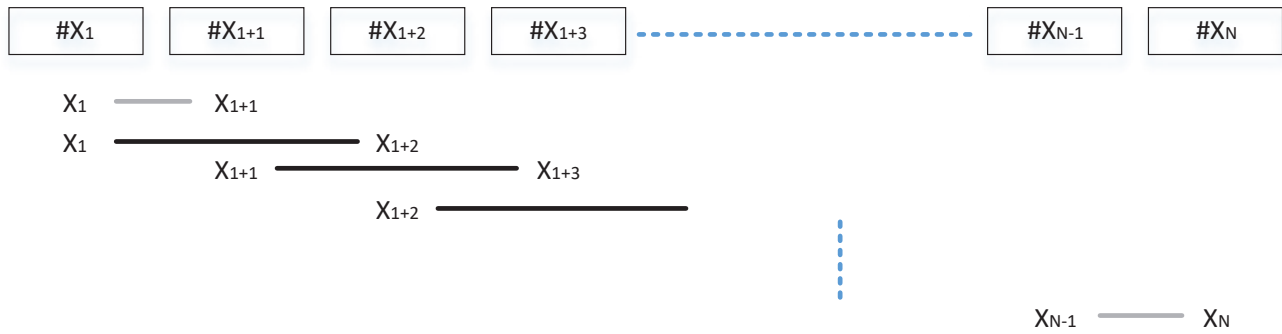
Guide for Parallel and Current Sharing Cable Connection

- When inverters are installed on the same phase, the connection method for the parallel cable and the current sharing cable is identical.
- **NEVER connect the current sharing cable between inverters operating on different phases.**

Prior to connecting the parallel cable, remove the two screws securing the parallel port cover. To prevent loss, the cover may be fastened to the designated screw holes located on the left side of the unit.

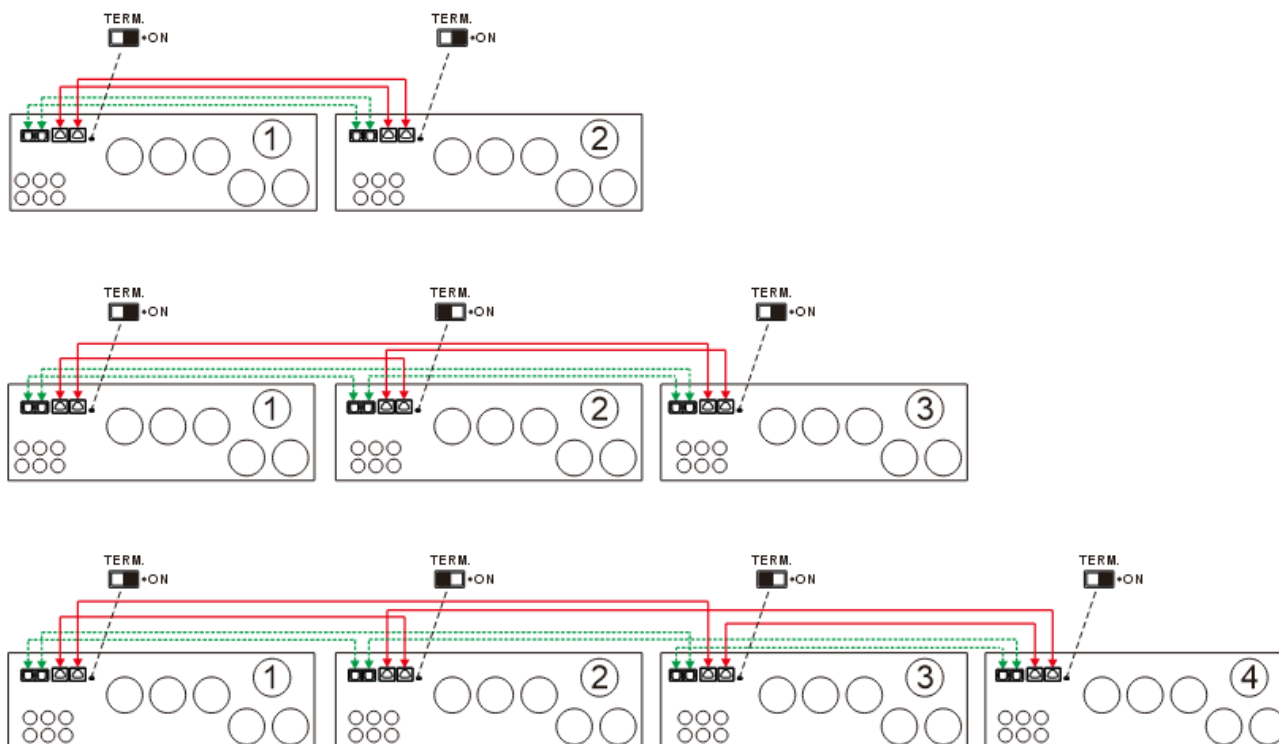


- Illustration of cable connections:



N=2	#1 - #2
N=3	#1 - #2 #1 - #3 #2 - #3
N=4	#1 - #2 #1 - #3 #2 - #4 #3 - #4
N=5	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #5
N=6	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #6
N=7	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #7
N=8	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #8 #7 - #8
N=9	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #8 #7 - #9 #8 - #9
N=10	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #8 #7 - #9 #8 - #10 #9 - #10
N=11	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #8 #7 - #9 #8 - #10 #9 - #11 #10 - #11
N=12	#1 - #2 #1 - #3 #2 - #4 #3 - #5 #4 - #6 #5 - #7 #6 - #8 #7 - #9 #8 - #10 #9 - #11 #10 - #12 #11 - #12

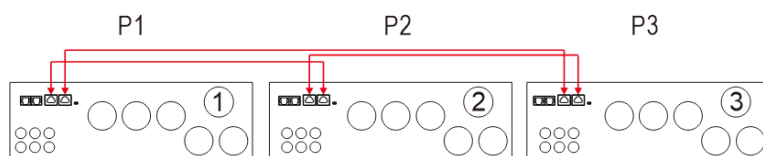
Examples of 2, 3, and 4 units paralleled in a single-phase system.



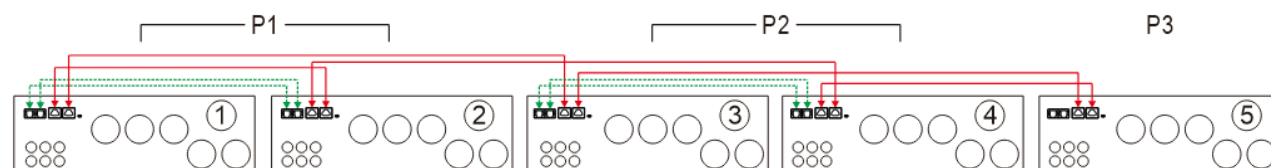
NOTE: Set the “Terminator Selection” toggle switch to “ON” on the first and last inverters. Do not enable the switch on the other inverters.

Example of 3, 5 and 6 units paralleled in a three phase system.

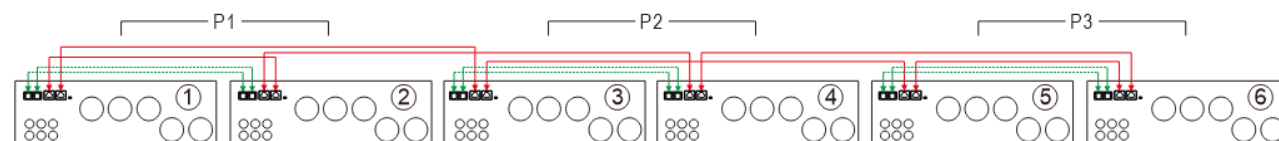
(1 unit for P1, 1 unit for P2, 1 unit for P3)



(2 units for P1, 2 units for P2, 1 unit for P3)



(2 units for P1, 2 units for P2, 2 units for P3)



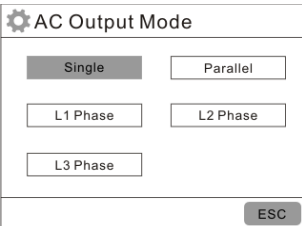
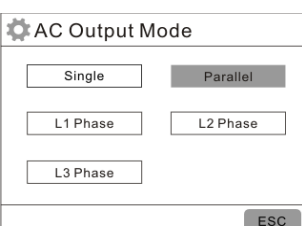
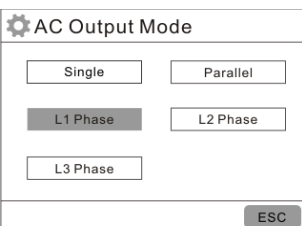
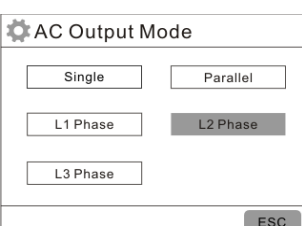
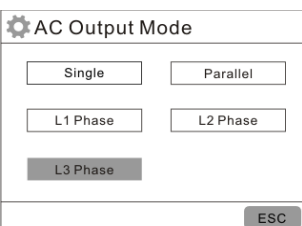
5. PV Connection

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:

Description	Selectable option	
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.	Single 	When the unit is operated alone, please select "Single"
	Parallel 	When the units are used in parallel for single phase application, please select "Parallel". Please refer to 4-1 for detailed information.
	L1 phase: 	When the units are operated in 3-phase application, please choose phase to define each inverter. It is required to have at least 3 inverters or maximum 12 inverters to support three-phase equipment. It's required to have at least one inverter in each phase or it's up to 10 inverters in one phase. Please refers to 4-2 for detailed information.
	L2 phase:  L3 phase: 	Please select "L1 phase" for the inverters connected to L1 phase, "L2 phase" for the inverters connected to L2 phase and "L3 phase" 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.

Code Reference:

Description	Icon on
Unidentified unit master or slave	
Master unit	
Slave unit	
L1 phase	
L2 phase	
L3 phase	

7. Commissioning

Parallel in single phase

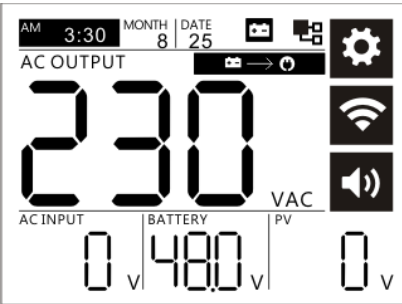
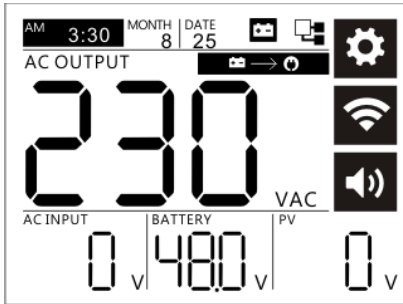
Step 1: Check the following requirements before commissioning:

- 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 of each unit. And then shut down all units.

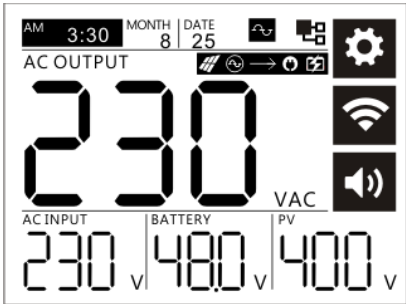
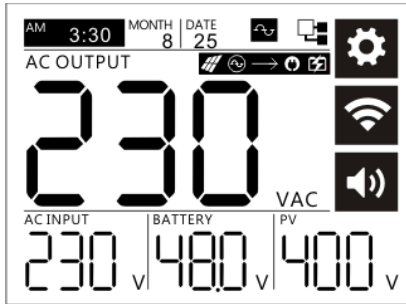
NOET: It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

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

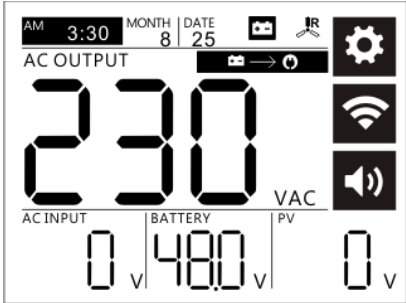
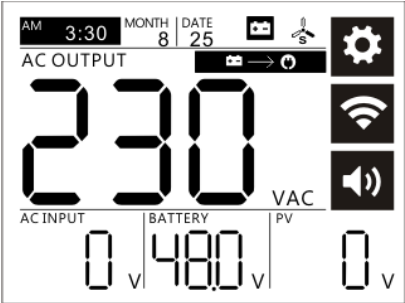
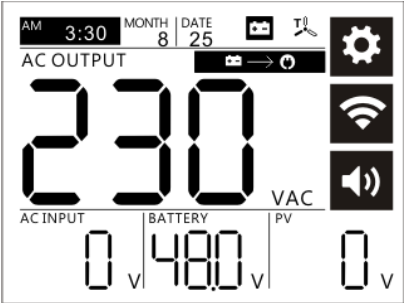
Step 1: Check the following requirements before commissioning:

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

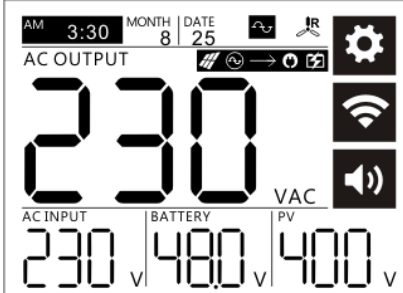
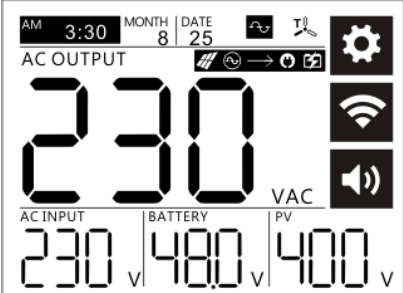
Step 2: Turn on all units and configure AC output mode as P1, P2 and P3 sequentially. And then shut down all units.

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, 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.

Appendix II: BMS Communication Installation

1. Introduction

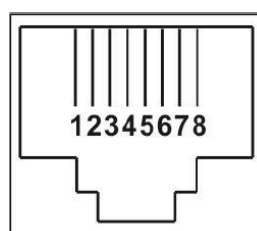
If connecting to lithium battery, it is recommended to purchase a custom-made RJ45 communication cable. Please check with your dealer or integrator for details.

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.

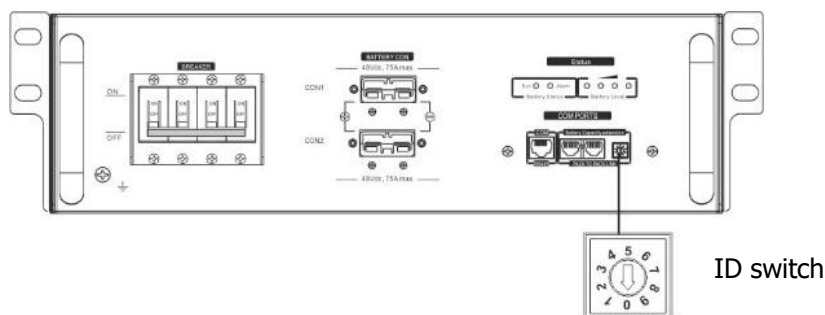
2. Pin Assignment for BMS Communication Port

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

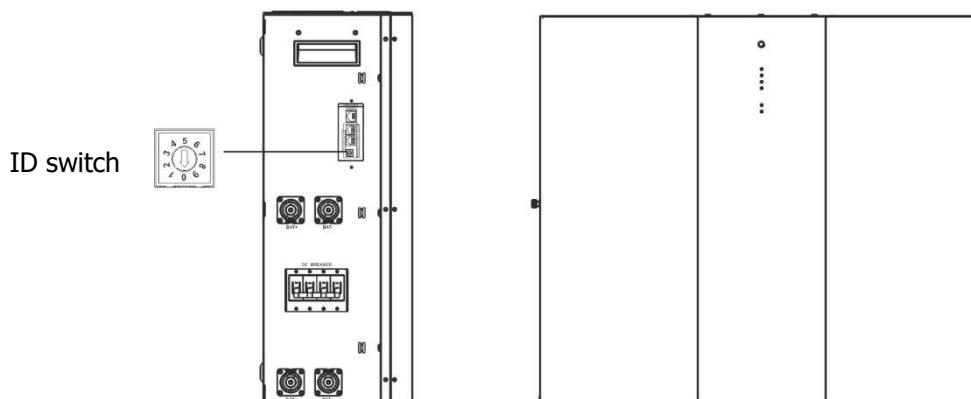


1. Lithium Battery Communication Configuration

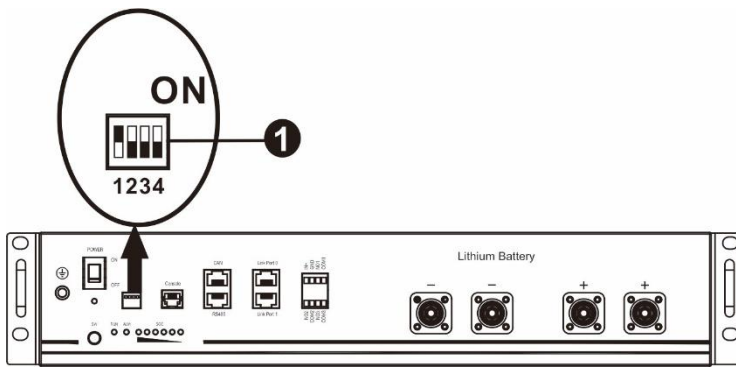
LIO-4810-150A



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.



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.

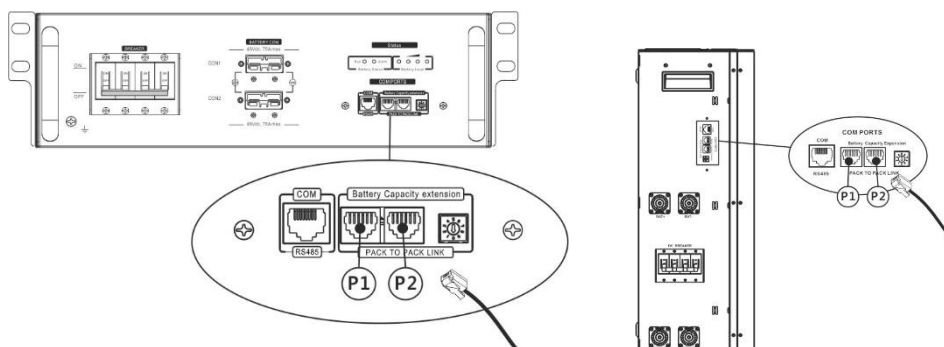
NOTE: The maximum groups of lithium battery is 5 and for maximum number for each group, please check with battery manufacturer.

2. Installation and Operation

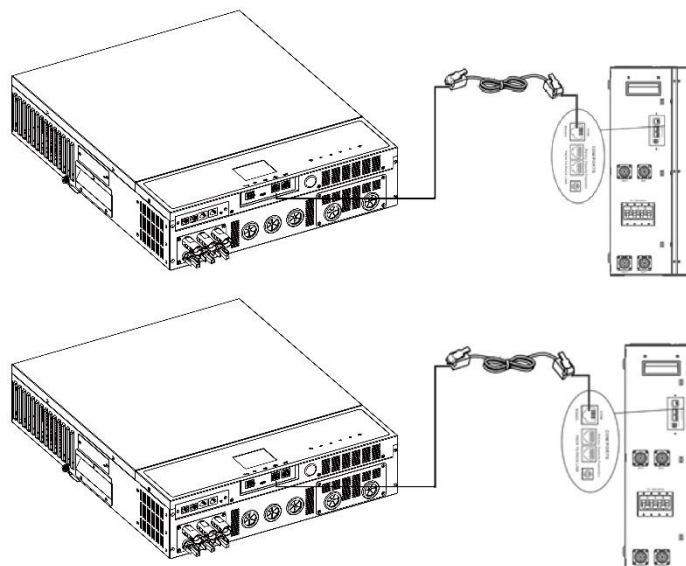
LIO-4810-150A/ESS LIO-I 4810

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.

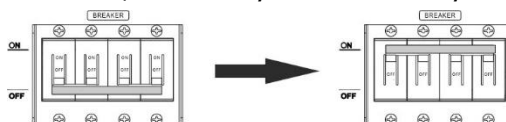


*** For multiple battery connection, please check battery manual for the details.**

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 Battery type. Others should be "USE".

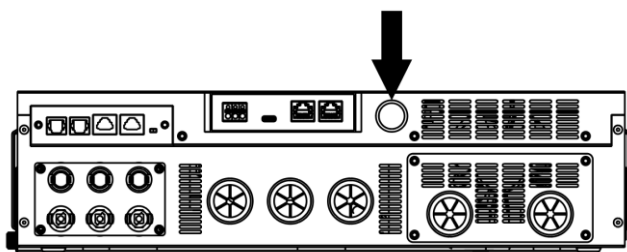
Step 3: Turn the breaker switch "ON". Now, the battery module is ready for DC output.



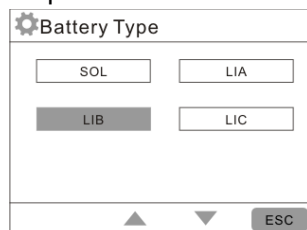
Step 4: Press Power on/off button on battery module for 5 secs, the battery module will start up.

*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 Battery type.

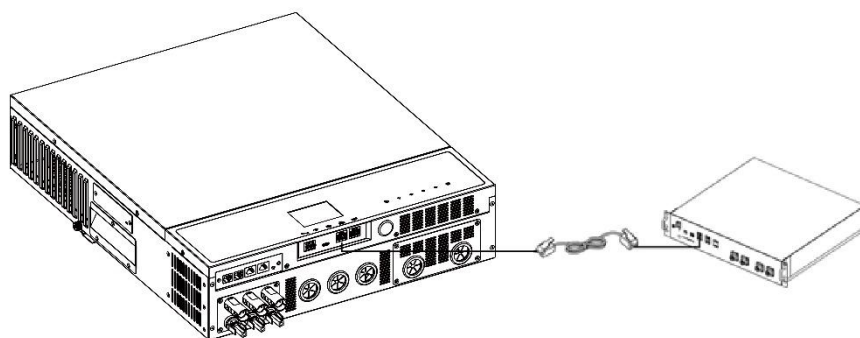


If communication between the inverter and battery is successful, the Li-battery icon  will light. Generally speaking, it will take longer than 1 minute to establish communication.

PYLONTECH

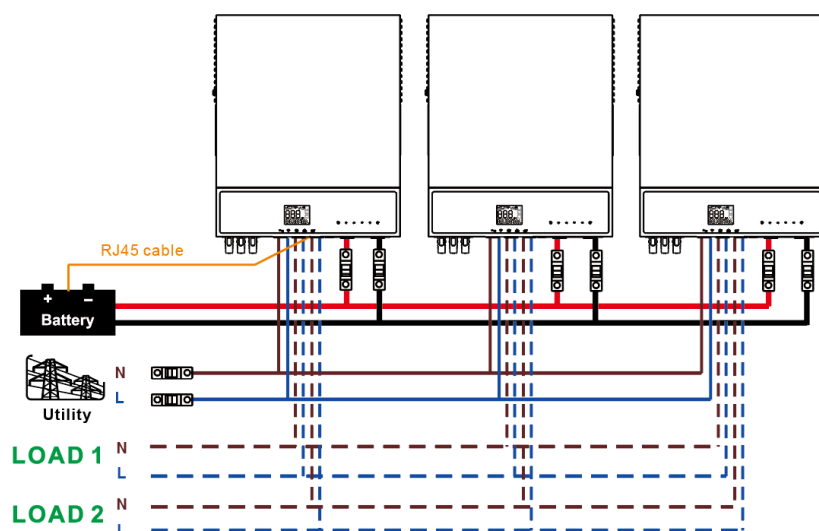
After configuration, please install LCD panel with inverter and Lithium battery with the following steps.

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

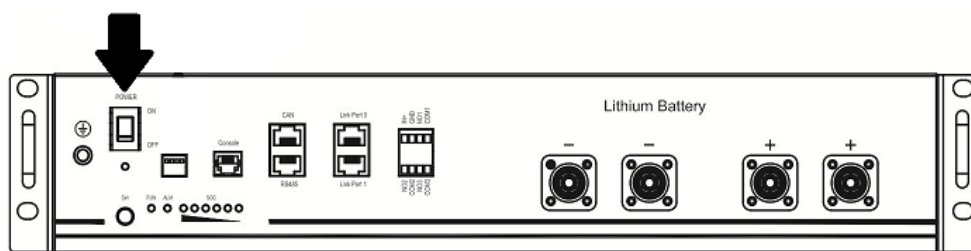


Note for parallel system:

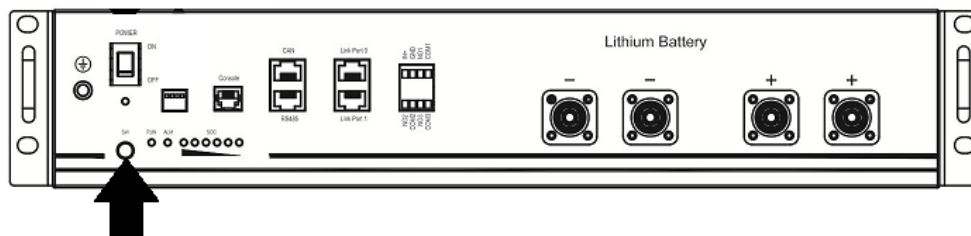
1. Only support common battery installation.
2. Use custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set this inverter battery type to "PYL" in LCD Battery type. Others should be "USE".



Step 2. Switch on Lithium battery.

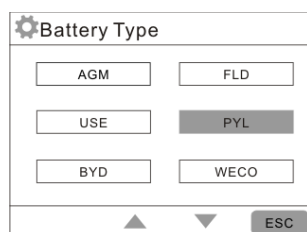


Step 3. Press more than three seconds to start Lithium battery, power output ready.



Step 4. Turn on the inverter.

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

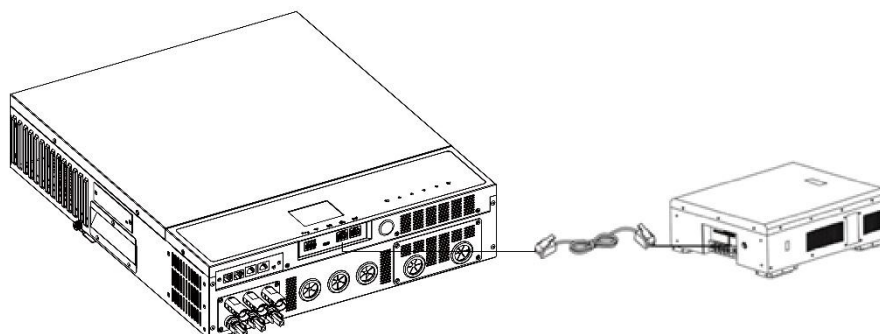


If communication between the inverter and battery is successful, the Li-battery icon  will light. Generally speaking, it will take longer than 1 minute to establish communication.

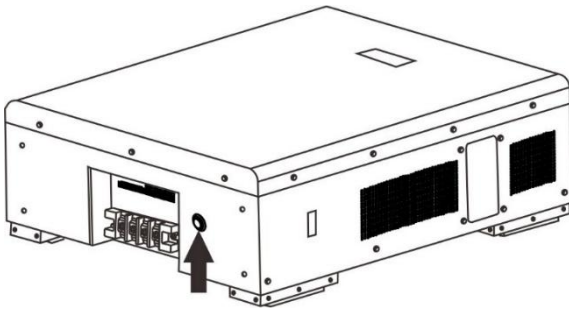
This function is to activate lithium battery automatically while commissioning. After battery wiring and commissioning is successfully, if battery is not detected, the inverter will automatically activate battery if the inverter is powered on.

WECO

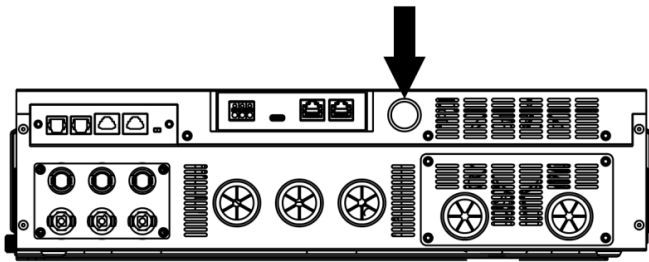
Step 1. Use a custom-made RJ45 cable to connect inverter and Lithium battery.



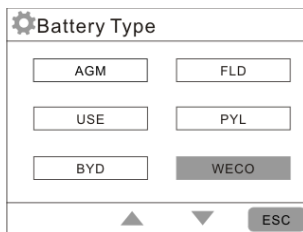
Step 2. Switch on Lithium battery.



Step 3. Turn on the inverter.



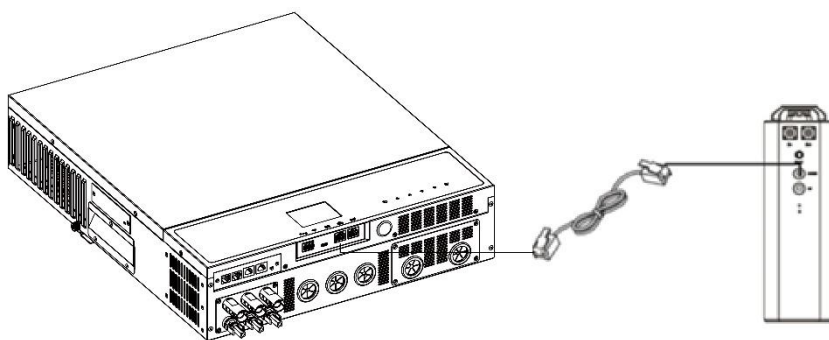
Step 4. Be sure to select battery type as "WECO".



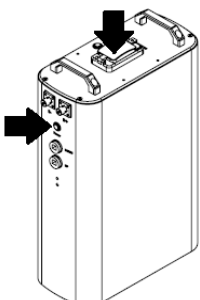
If communication between the inverter and battery is successful, the Li-battery icon  will light. Generally speaking, it will take longer than 1 minute to establish communication.

SOLTARO

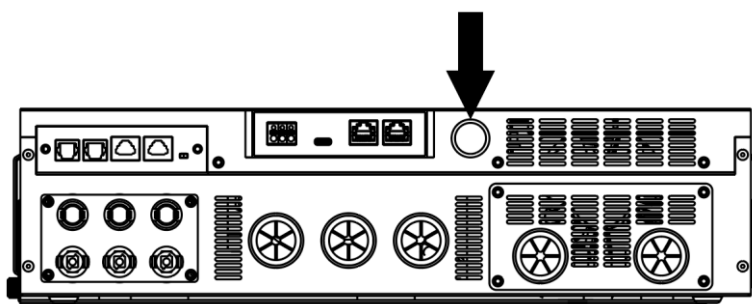
Step 1. Use a custom-made RJ45 cable to connect inverter and Lithium battery.



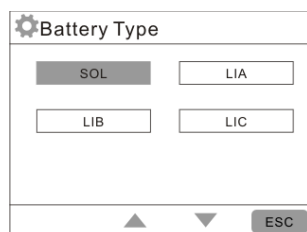
Step 2. Open DC isolator and switch on Lithium battery.



Step 3. Turn on the inverter.



Step 4. Be sure to select battery type as "SOL".



If communication between the inverter and battery is successful, the Li-battery icon  will light. Generally speaking, it will take longer than 1 minute to establish communication.

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

Event Code	Description
W10	BMS communication lost (This warning is active only when the battery type is configured as Lithium-Ion) - Initial Connection: If no communication signal is detected within 3 minutes of battery connection, the buzzer will sound. If the loss persists for 10 minutes, the inverter will suspend all charging and discharging to protect the battery. - Operational Interruption: If communication is lost after a successful initial connection, the buzzer will alarm immediately.
W16	If the Battery Management System (BMS) flags a status that prohibits active charging or discharging, the inverter will display W16 and immediately suspend all battery operations.
W17	If the BMS transmits a "charge prohibited" command, the inverter will display W17 and immediately suspend all charging operations.
W18	If the BMS transmits a "discharge prohibited" command, the inverter will display W18 and immediately suspend all discharging operations.
W19	When the BMS detects a critically low state of charge (SOC) or voltage level, it will transmit a "mandatory charge" command. The inverter will display W19 and prioritize charging the battery to prevent cell damage from over-discharge.

Appendix III: The Wi-Fi Operation Guide

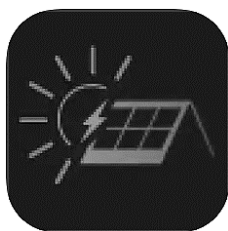
1. Introduction

By integrating the Wi-Fi module with the Energy-Mate App, users can achieve comprehensive remote monitoring and control of their inverter systems. The App leverages dedicated Wi-Fi connectivity to provide cloud-based data services, enabling users to monitor daily performance, query real-time device parameters, and execute remote commands. This interface simplifies device management and ensures optimal system oversight from any location. The Energy-Mate App is compatible with both iOS and Android platforms.

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)

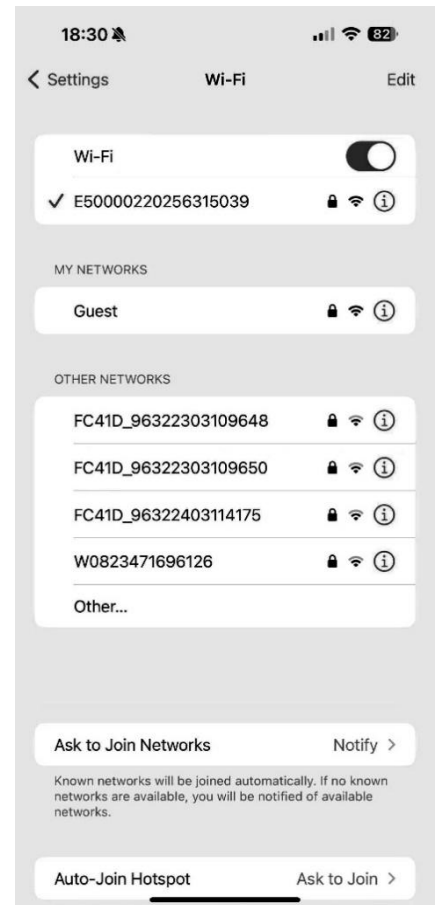
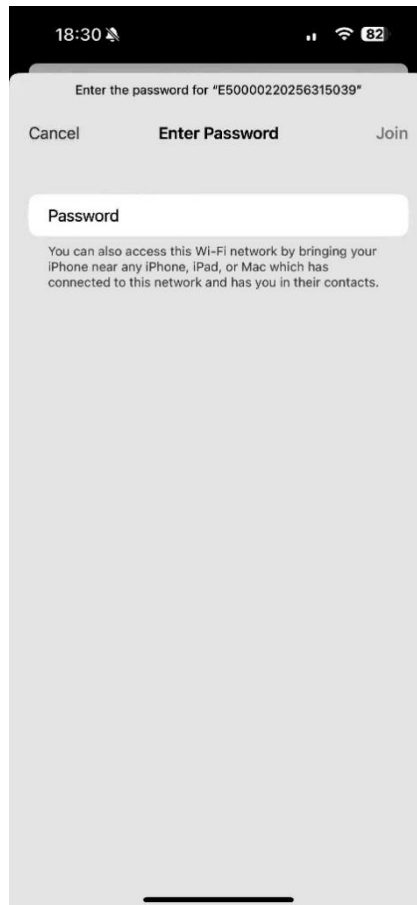
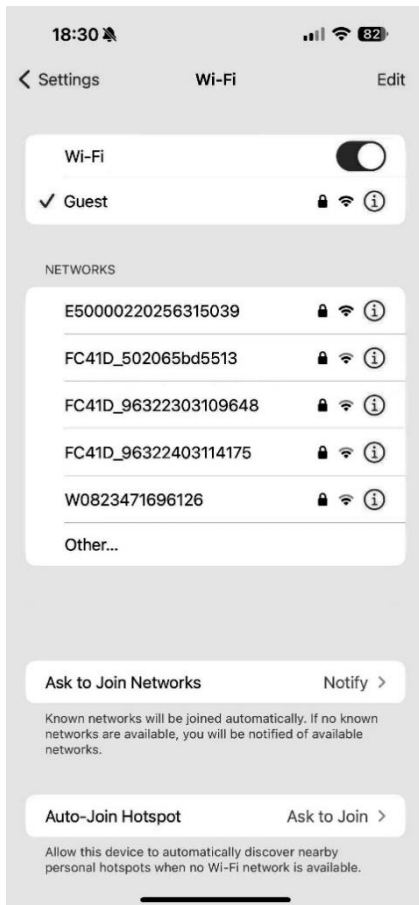
2-2. Initial Setup

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

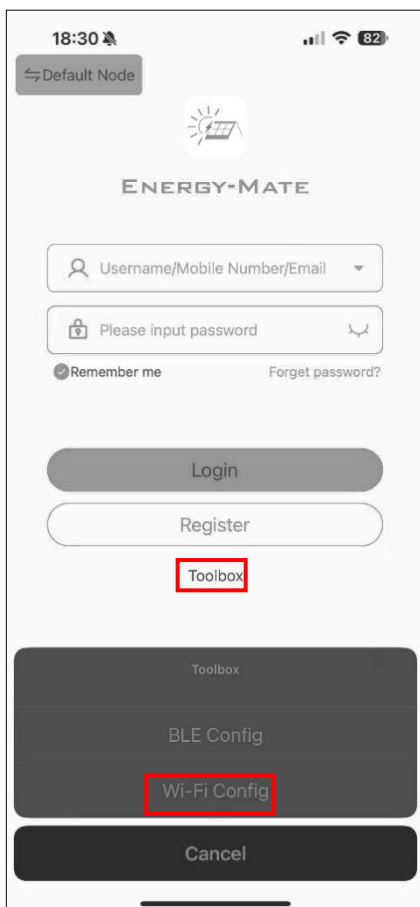
Local Wi-Fi Configuration

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

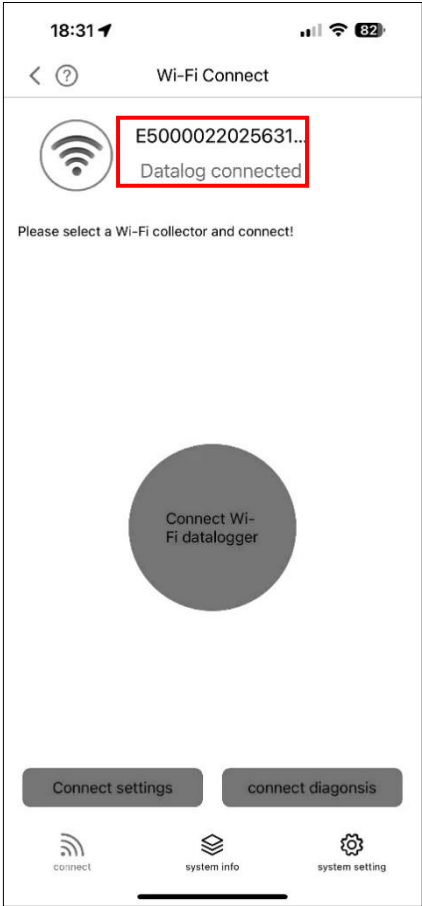
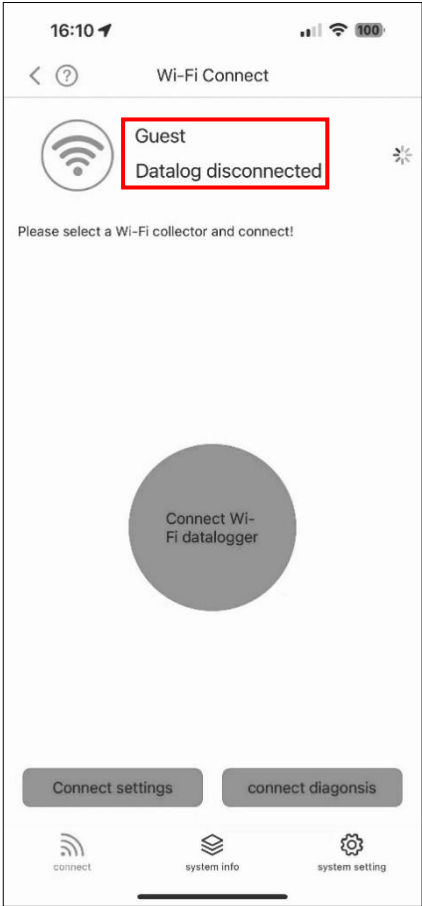
- Turn on the unit.
- Open the Wi-Fi settings from your smart phone.
- Connect your smart phone to the Wi-Fi module. The Wi-Fi module PN number is 18 digits.
- Default password for the Wi-Fi module is: 12345678.



- 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.

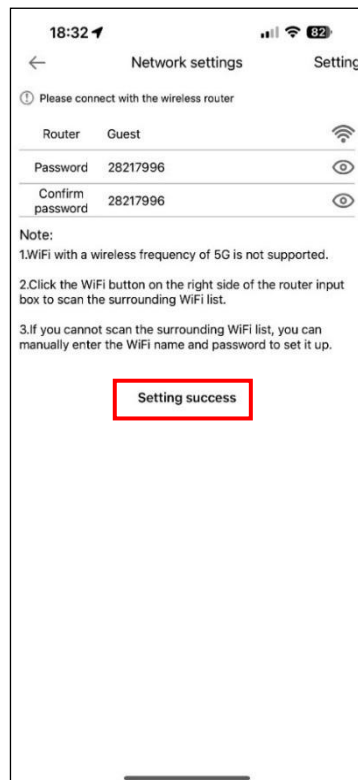
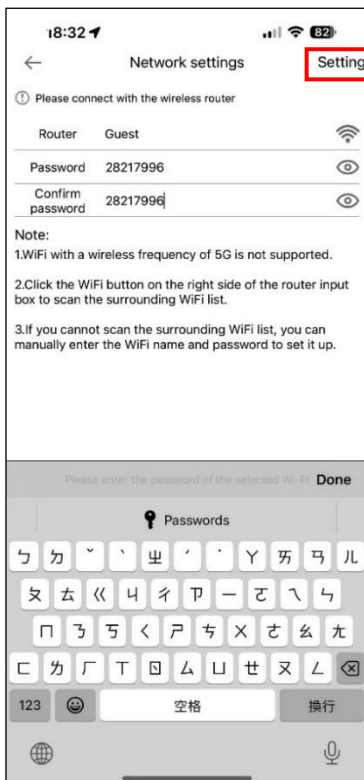
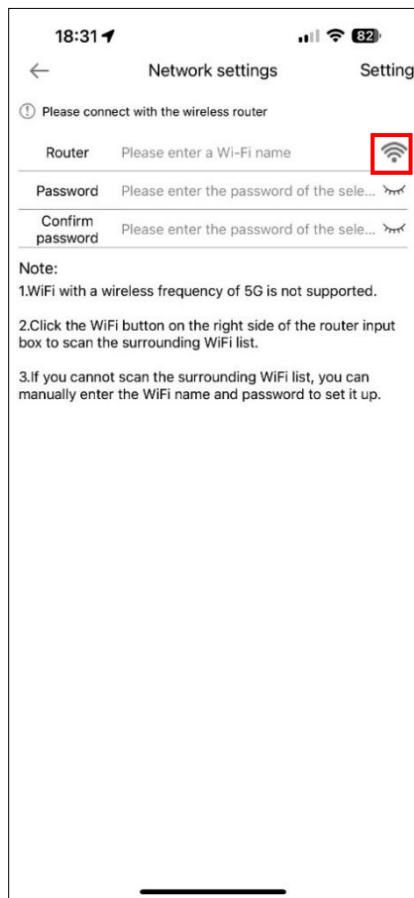
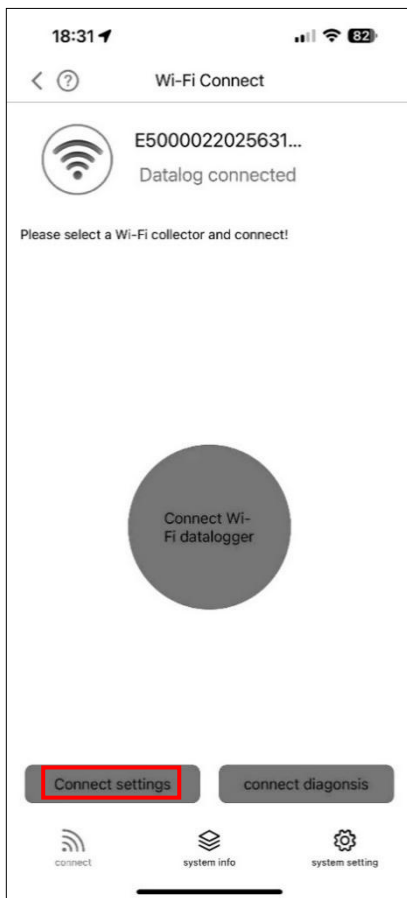


- After entering the Wi-Fi configuration page, please note that the connected Wi-Fi name **must** be the **same as your Wi-Fi module PN number**, and the status **must** be **connected**. If not, please return to the login page, connect your smart phone to the Wi-Fi module, and re-enter the Wi-Fi configuration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

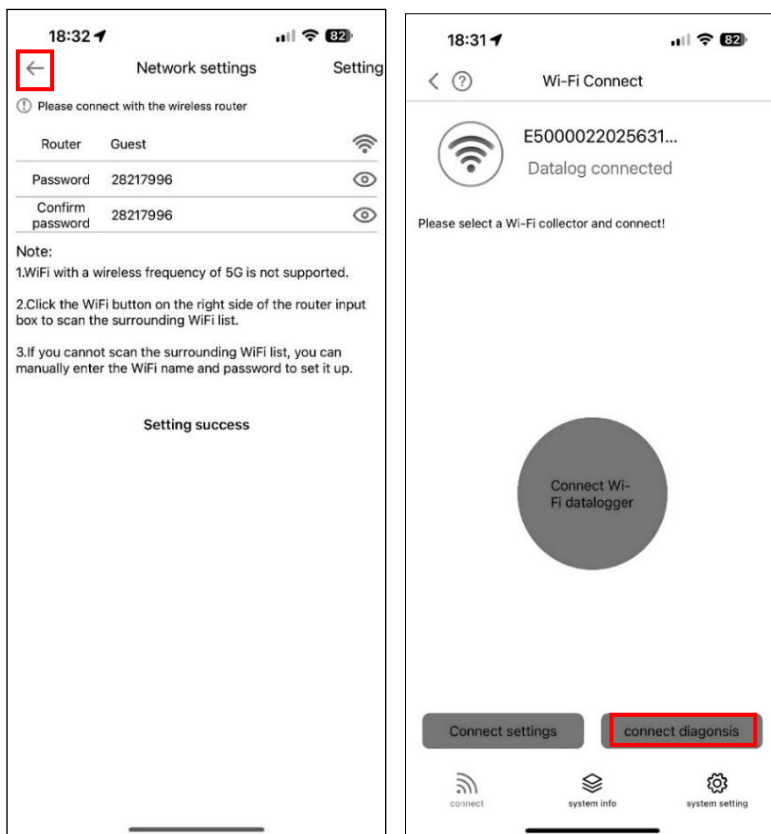
The Wi-Fi module connection is successfully	The Wi-Fi module connection failed
You can proceed to the next step to configure the network. 	Please return to the login page, connect your smart phone to the Wi-Fi module, and re-enter the Wi-Fi configuration page. 

- 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**.

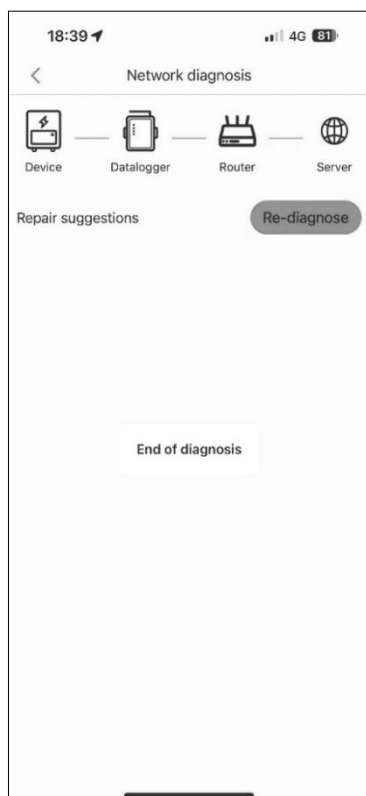


- Click  to return to the Wi-Fi configuration page. Click "Connect diagnosis" to check the connection status.



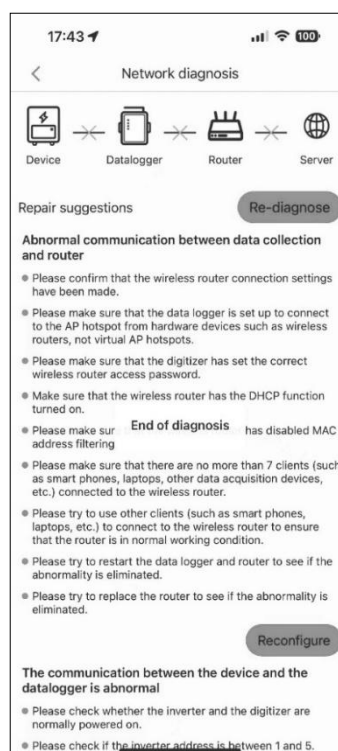
The configuration is **successfully**

Green lines between device, datalogger, router, and server.

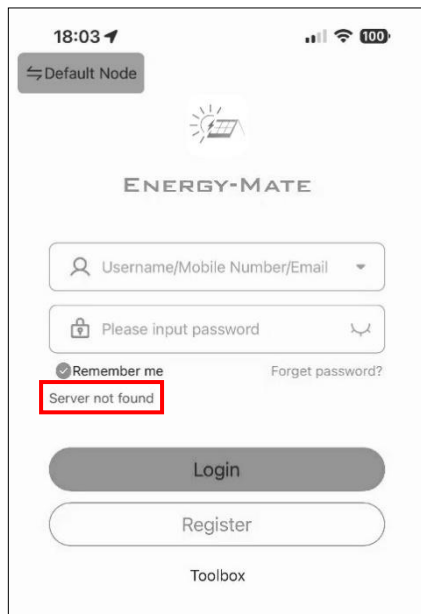


The configuration **failed**

Red crosses between device, datalogger, router, and server. Please refer to APP instructions to re-configure.



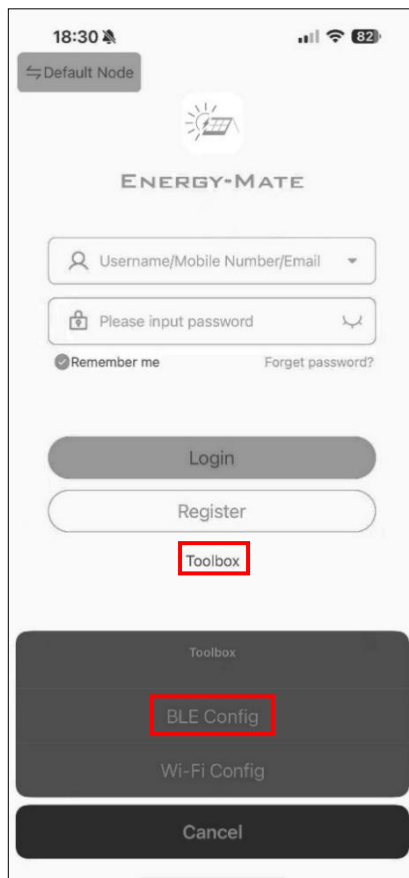
avoid automatic connection and unable to access the network. The login page will prompt "Server not found".



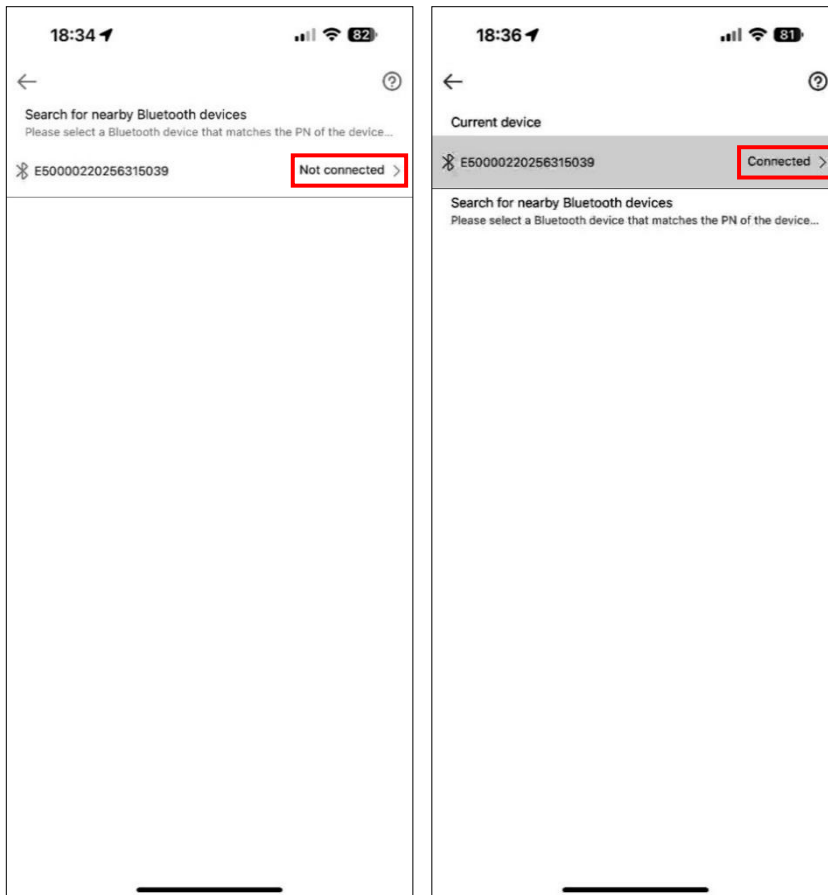
Bluetooth Configuration

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.

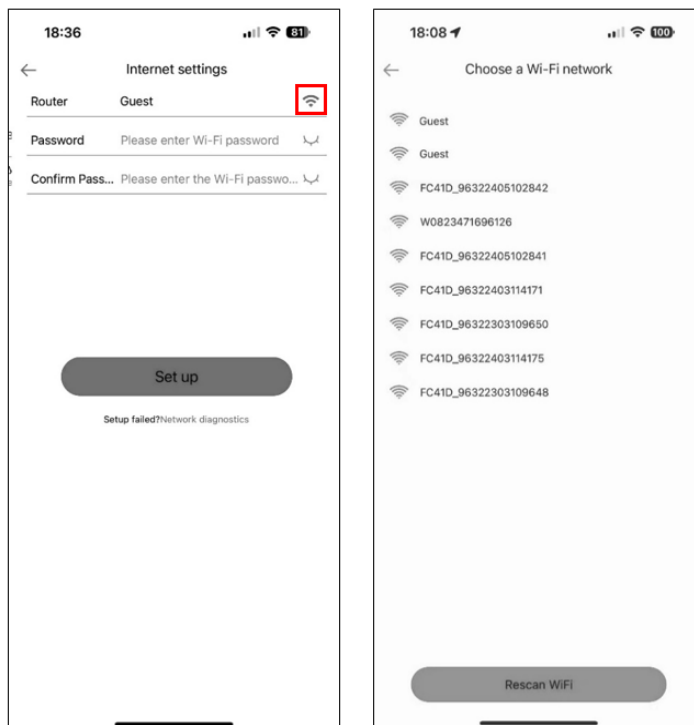


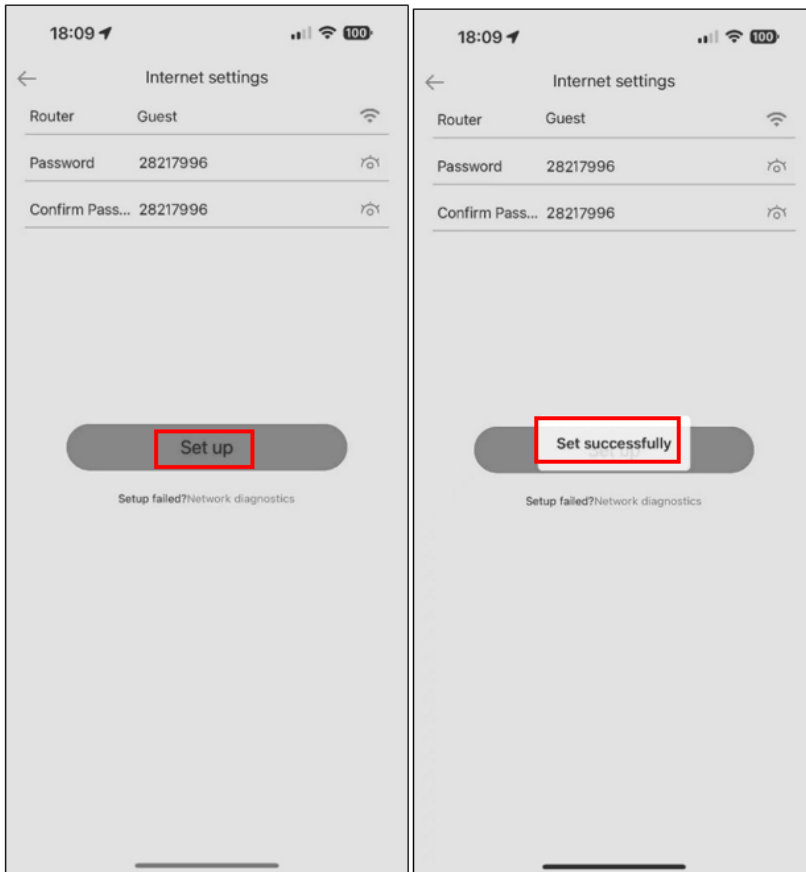
- Connect your smart phone to the Wi-Fi module through Bluetooth.



- 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.

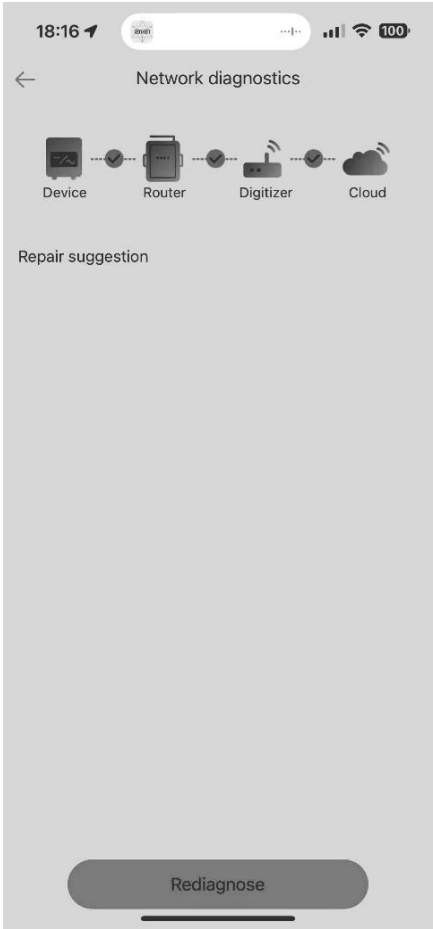
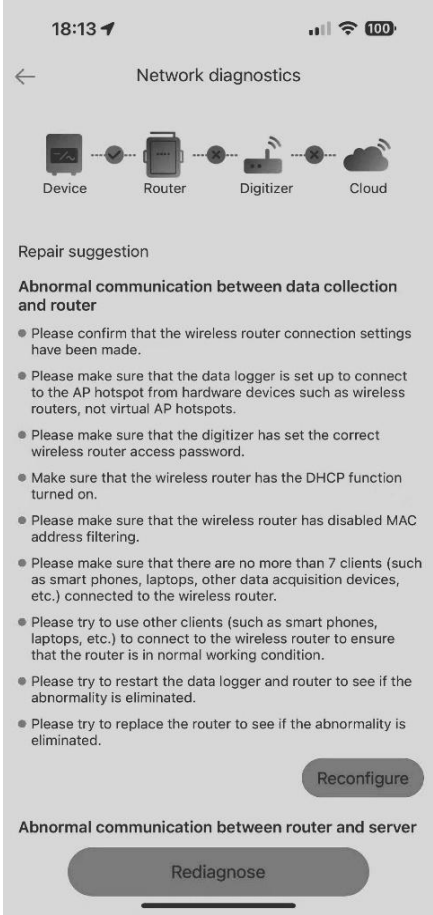
The Wi-Fi module only could connect the router at **2.4GHz**.



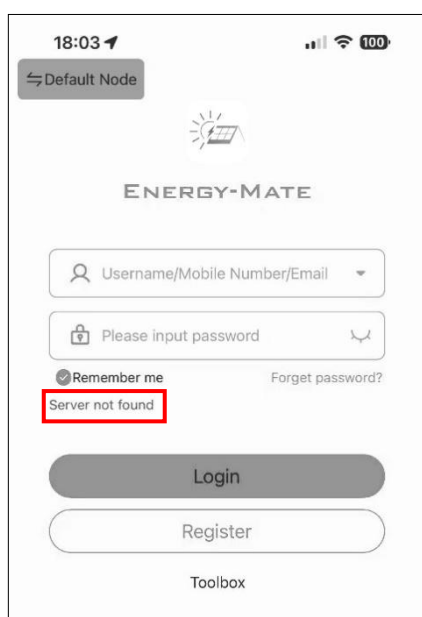


- Click "Network diagnosis" to check the connection status.



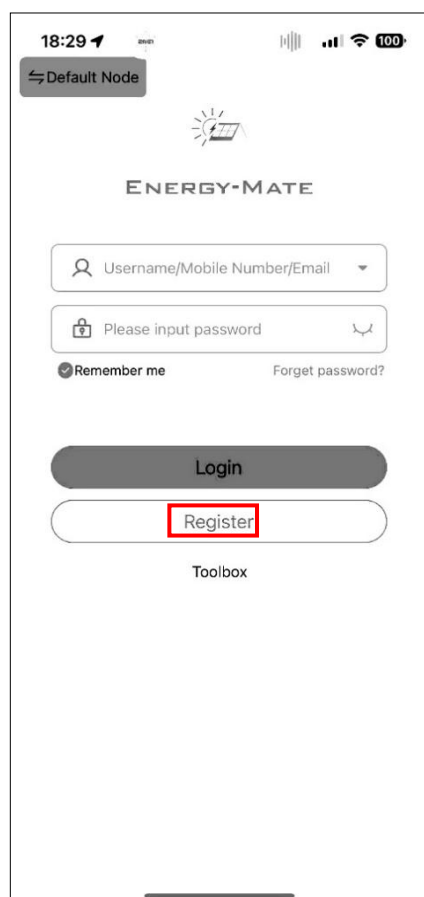
The configuration is successfully	The configuration failed
Green lines between device, data logger, router, and server. 	Red crosses between device, data logger, router, and server. Please refer to APP instructions to reconfigure. 

- 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.



18:29 100%

Default Node

ENERGY-MATE

Username/Mobile Number/Email

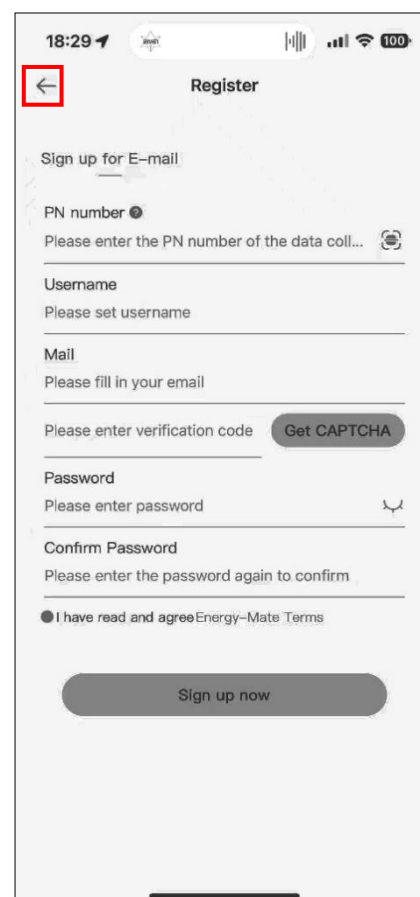
Please input password

☒ Remember me Forget password?

Login

Register

Toolbox



18:29 100%

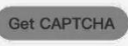
Register

Sign up for E-mail

PN number 
Please enter the PN number of the data coll... 

Username
Please set username

Mail
Please fill in your email

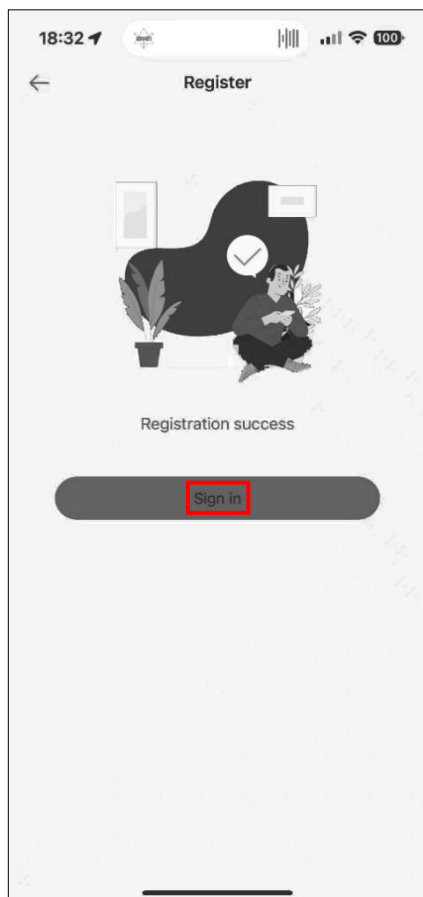
Please enter verification code 

Password
Please enter password

Confirm Password
Please enter the password again to confirm

☒ I have read and agree Energy-Mate Terms

Sign up now

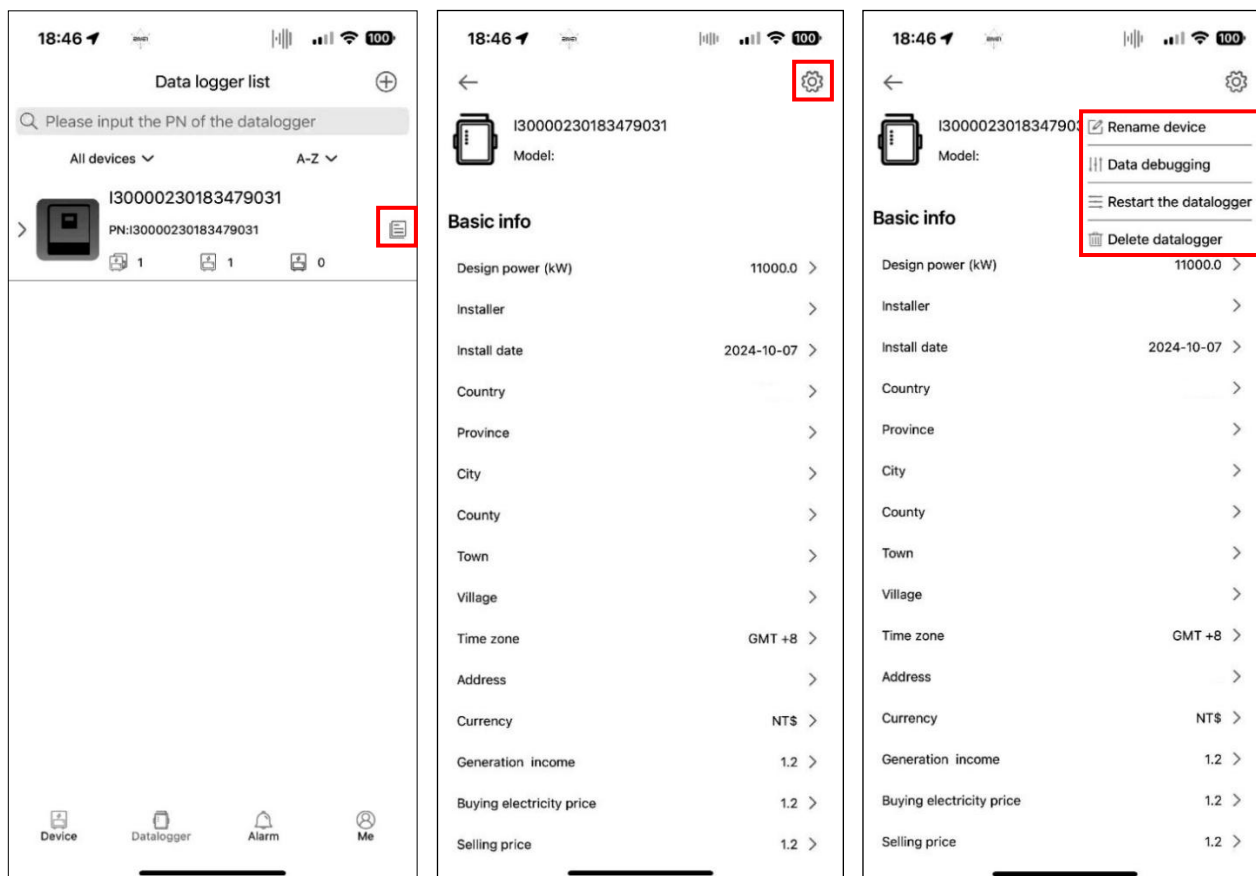


2-4 Datalogger

- 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.

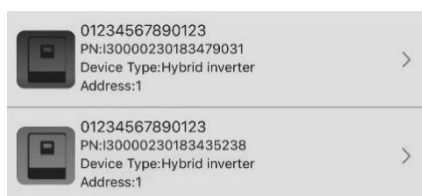
>		I30000230183435238 PN:I30000230183435238	 0	 0	 0	
>		I30000230183479031 PN:I30000230183479031	 1	 1	 0	

- 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.

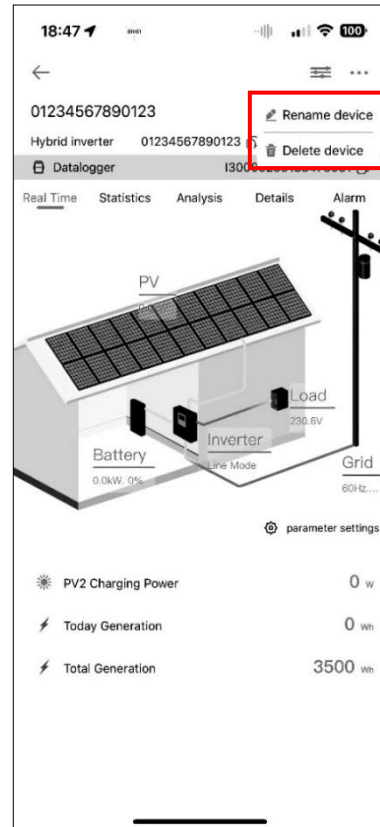
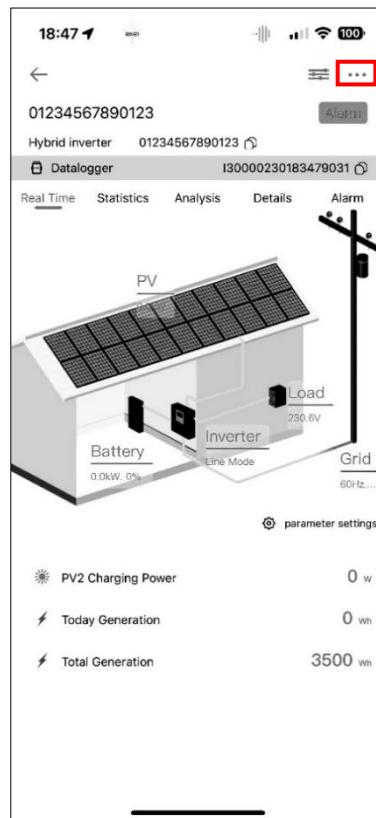
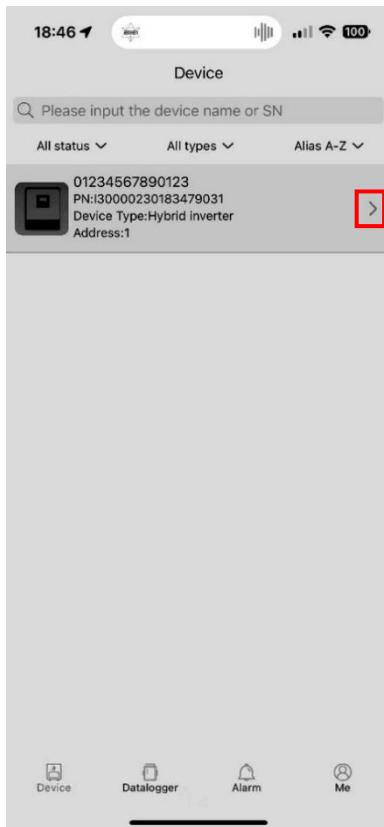


2-5 Device

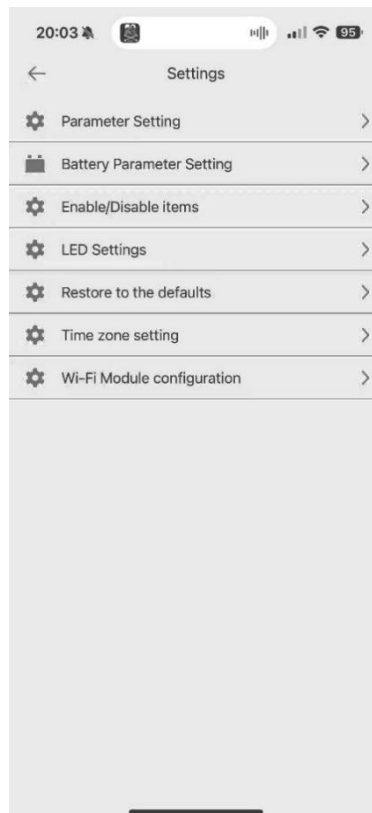
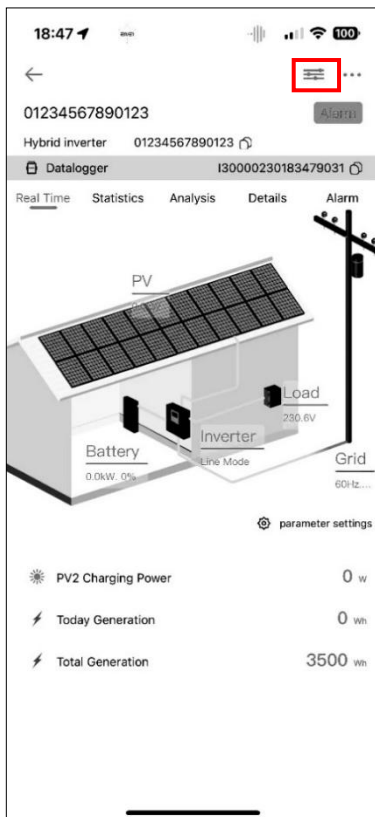
- Choose Device page to see the inverter list.
 - ◆ Gray icon means inverter is offline.
 - ◆ Green icon means inverter is online and no warnings and faults.
 - ◆ Yellow icon means inverter is online and has a warning.
 - ◆ Red icon means inverter is online and has a fault.



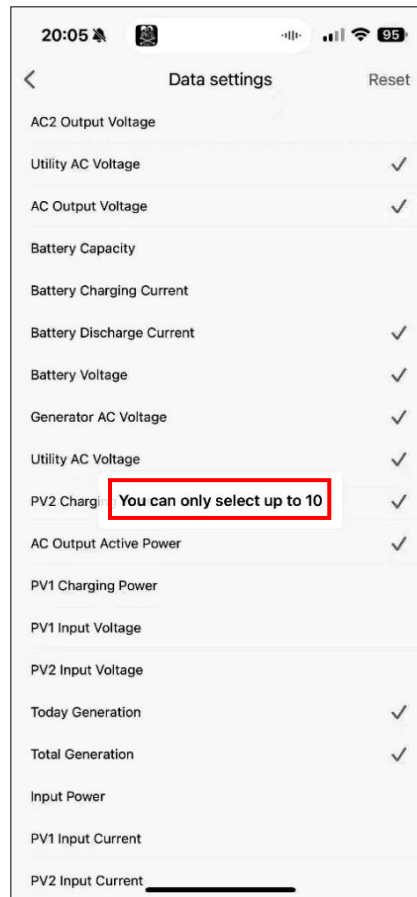
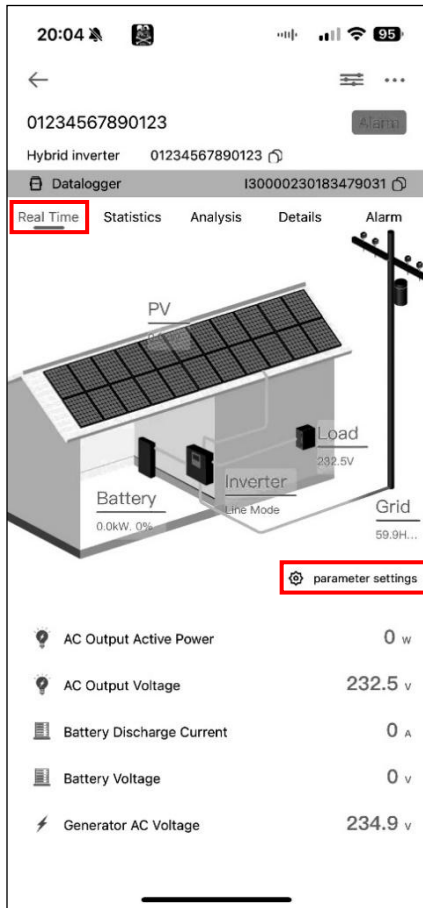
- Click  to see the inverter information.
- Click  to rename device and delete device.
 - ◆ Rename device: rename the inverter name.
 - ◆ Delete device: delete the inverter. The Wi-Fi module information in the datalogger page will **not be deleted**. Even if deleted, you **cannot** add Wi-Fi module under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



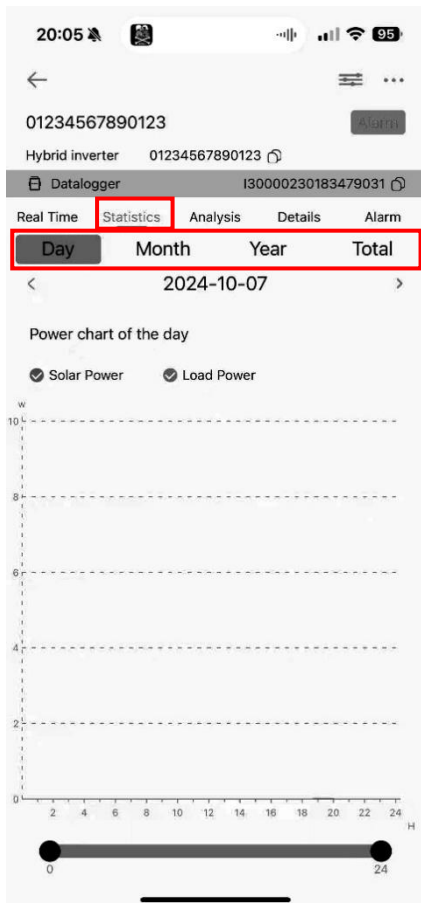
- Click  to enter setting parameters page. The setting items on the parameter page will be different based on different models.



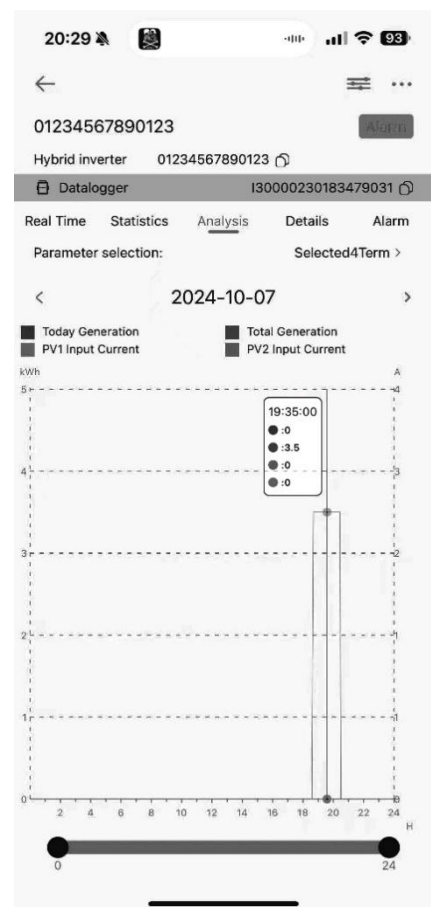
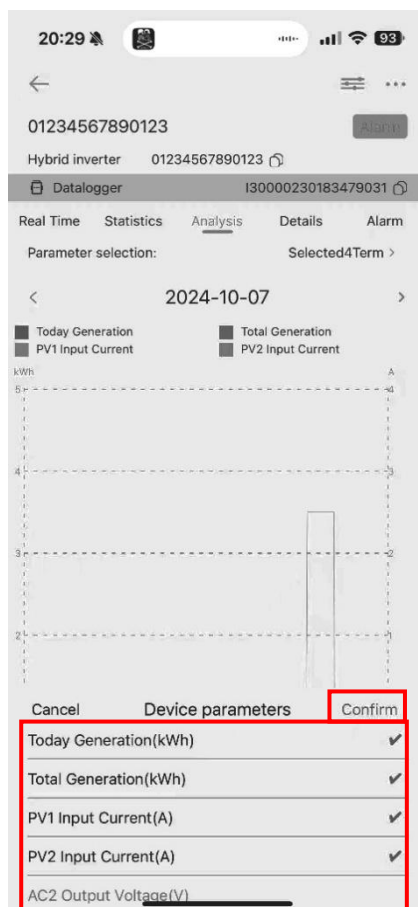
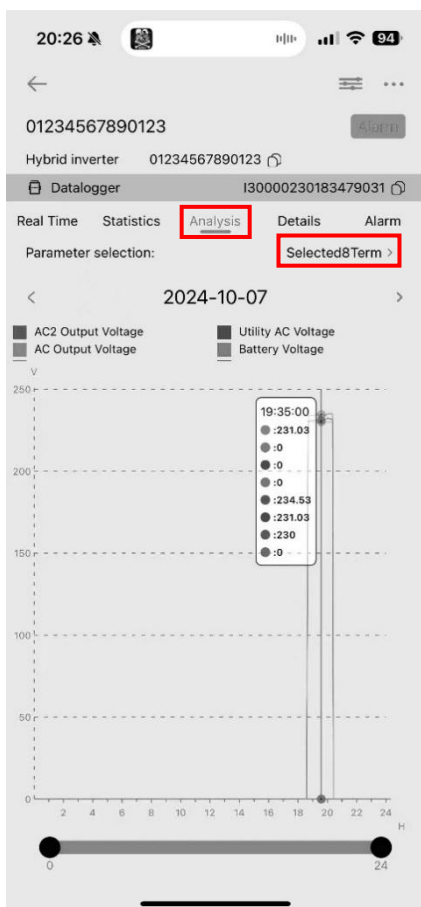
- Click "Real Time" to see the inverter real-time data. Click "parameter settings" to choose data you want to see on the real time page. You can choose up to **10 data**.



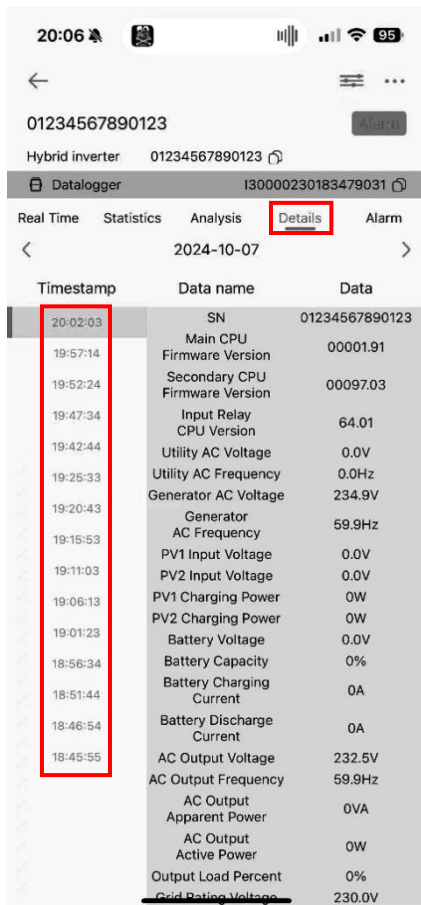
- Click "Statistics" to see the inverter solar power per hour, day, month and year.
Day: Click the button to query the hourly power generation data of the current day.
Month: Click the button to query the daily power generation data of the current month.
Year: Click the button to query the monthly power 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.



20:06 01234567890123 Alarm

Hybrid inverter 01234567890123

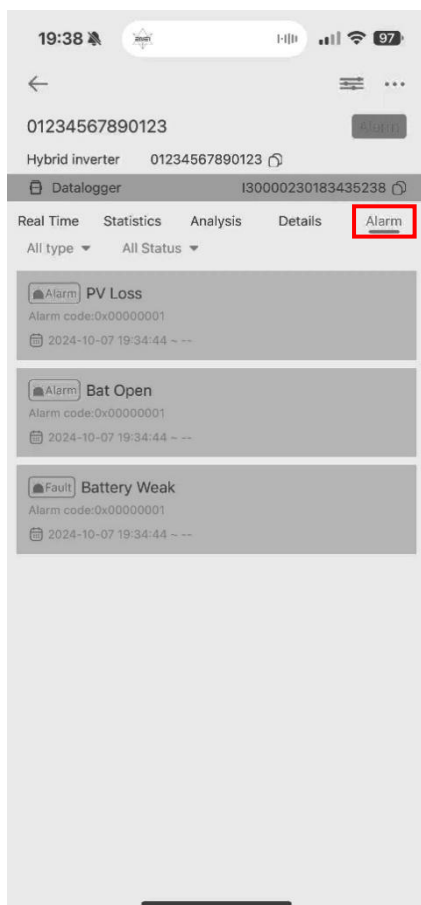
Datalogger I30000230183479031

Real Time Statistics Analysis **Details** Alarm

< 2024-10-07 >

Timestamp	Data name	Data
20:02:03	SN	01234567890123
19:57:14	Main CPU Firmware Version	00001.91
19:52:24	Secondary CPU Firmware Version	00097.03
19:47:34	Input Relay CPU Version	64.01
19:42:44	Utility AC Voltage	0.0V
19:25:33	Utility AC Frequency	0.0Hz
19:20:43	Generator AC Voltage	234.9V
19:15:53	Generator AC Frequency	59.9Hz
19:11:03	PV1 Input Voltage	0.0V
19:06:13	PV2 Input Voltage	0.0V
19:01:23	PV1 Charging Power	0W
18:56:34	PV2 Charging Power	0W
18:51:44	Battery Voltage	0.0V
18:46:54	Battery Capacity	0%
18:45:55	Battery Charging Current	0A
	Battery Discharge Current	0A
	AC Output Voltage	232.5V
	AC Output Frequency	59.9Hz
	AC Output Apparent Power	0VA
	AC Output Active Power	0W
	Output Load Percent	0%
	Grid Rating Voltage	230.0V

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



19:38 01234567890123 Alarm

Hybrid inverter 01234567890123

Datalogger I30000230183435238

Real Time Statistics Analysis Details **Alarm**

All type All Status

Alarm PV Loss
Alarm code:0x00000001
2024-10-07 19:34:44 ~ --
Alarm Bat Open
Alarm code:0x00000001
2024-10-07 19:34:44 ~ --
Fault Battery Weak
Alarm code:0x00000001
2024-10-07 19:34:44 ~ --

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.

