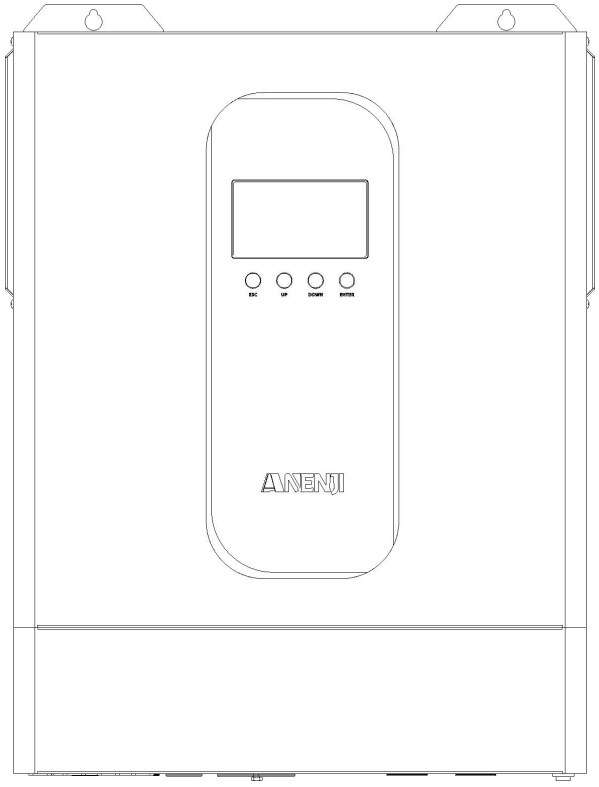
# USER MANUAL




## HYBRID SOLAR INVERTER/CHARGER

## 8.5KVA/11.0KVA 230Vac

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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. Fuse is 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.

# INTRODUCTION

This is a multi-function inverter/charger, combining functions of inverter, MPPT solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

## Features

1. Pure sine wave inverter
2. Inverter running without battery
3. Built-in MPPT solar controller
4. Configurable input voltage range for home appliances and personal computers via LCD setting
5. Configurable battery charging current based on applications via LCD setting
6. Configurable AC/Solar Charger priority via LCD setting
7. Compatible to mains voltage or generator power
8. Auto restart while AC is recovering
9. Overload/ Over temperature/ short circuit protection
10. Smart battery charger design for optimized battery performance
11. Cold start function

## Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also includes following devices to have a complete running system:

1. Generator or Utility.
2. PV modules (option)

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

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

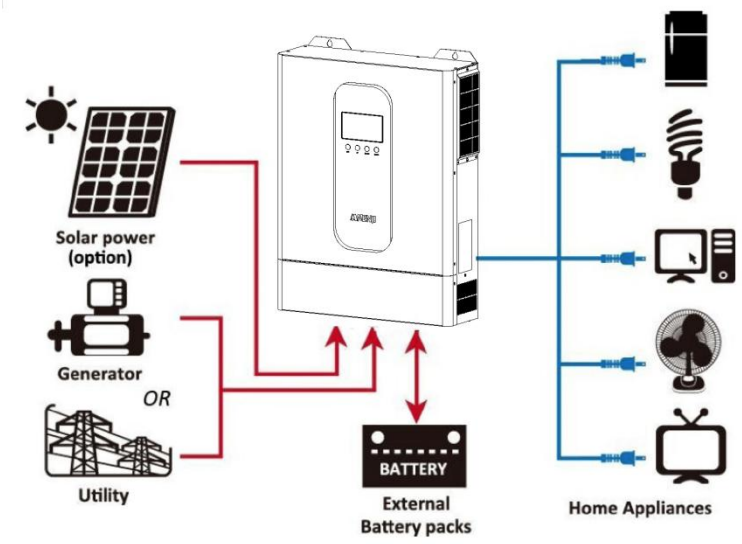
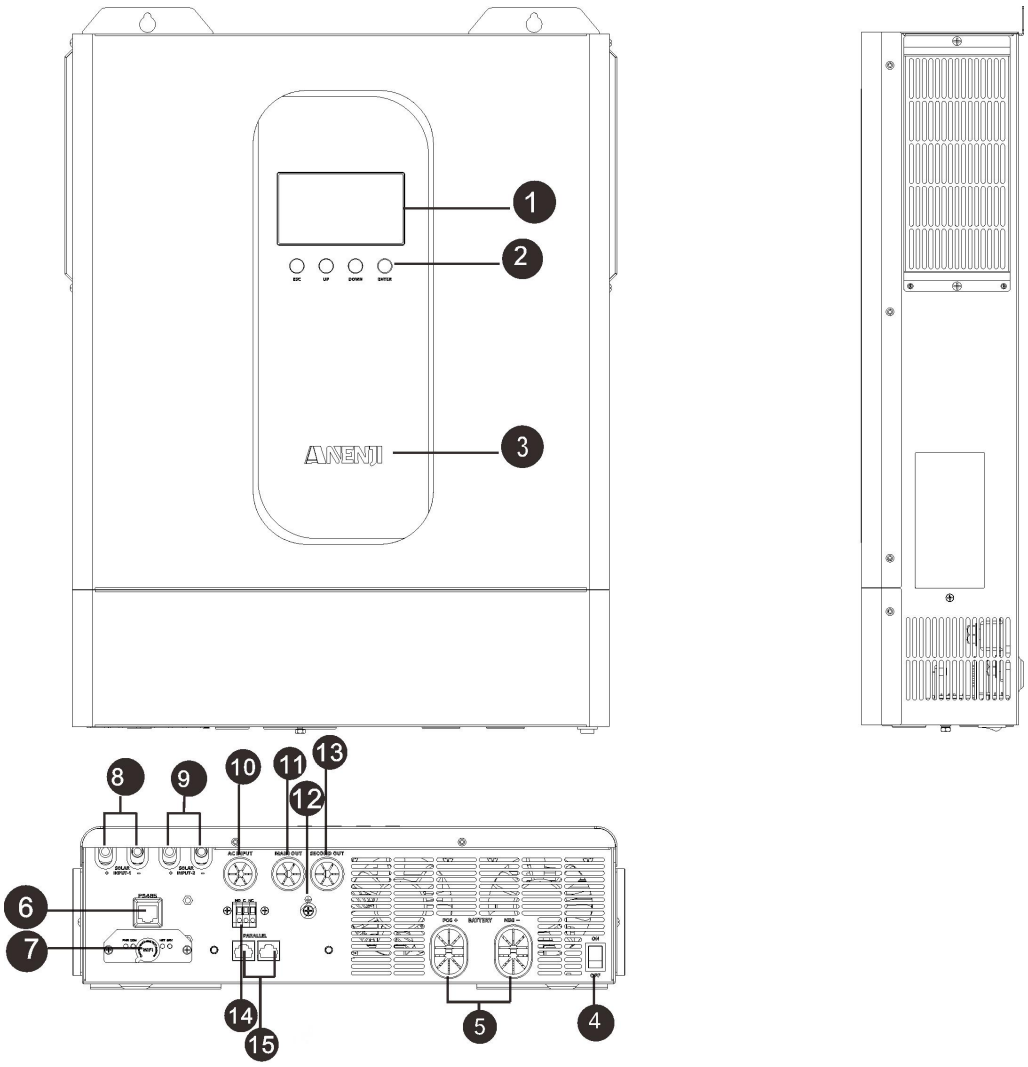



Figure 1 Hybrid Power System

# PRODUCT OVERVIEW




1.LCD display
2.Function buttons
3.RGB Indicator
4.Power on/off switch
5.Battery negative/ positive outlet hole
6.RS485 communication port (RJ45)
7.WiFi antenna port
8.PV1 input
9.PV2 input
10.AC input
11.Main out
12.Grounding
13.Second out
14.Dry contact port
15.Parallel communication port
(only for parallel model)

# INSTALLATION

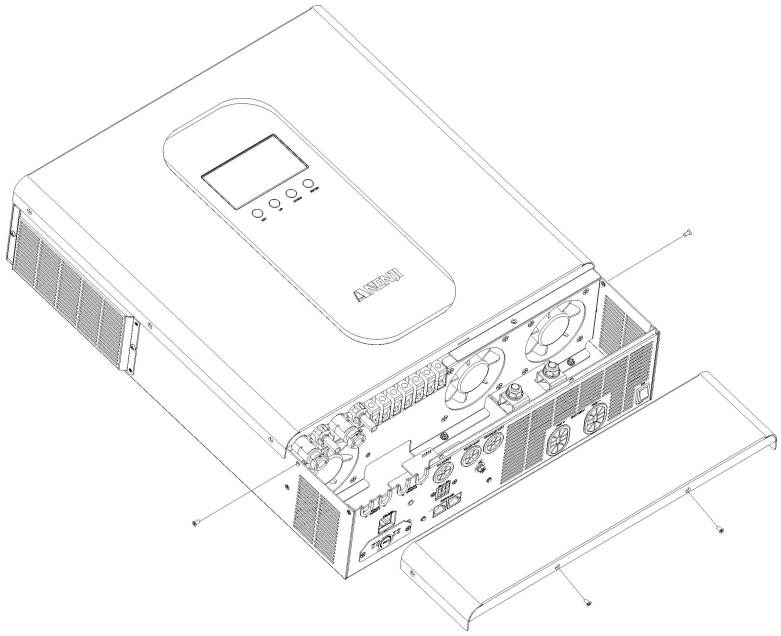
## Unpacking and Inspection

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:

1. The unit x 1
2. User manual x 1
3. PV connector x 4
4. Battery fuse x 1 (Only 11K)
5. WiFi antenna x 1

## Preparation

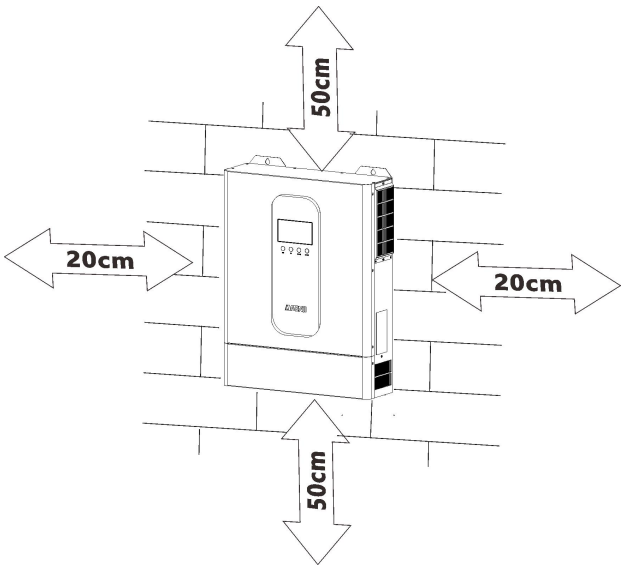
Before connecting all wirings, please take off bottom cover by removing four screws as shown below.



## Mounting the Unit

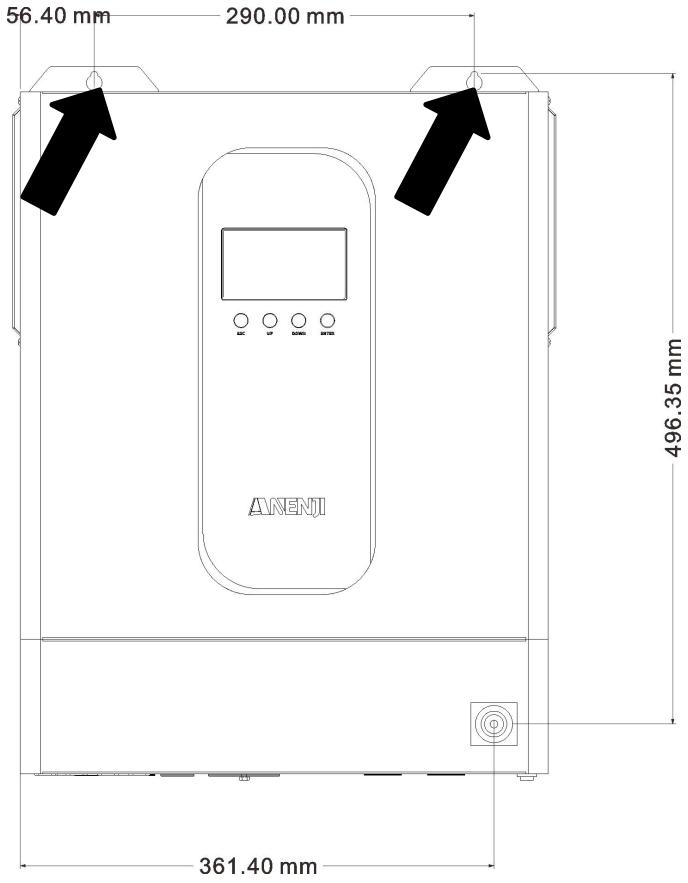
Consider the following points before selecting where to install:

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




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

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




## Battery Connection

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

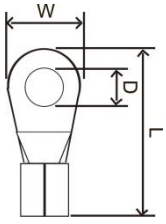
**WARNING! All wiring must be performed by a qualified personnel.**

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

**Recommended battery cable 、Terminal size:**

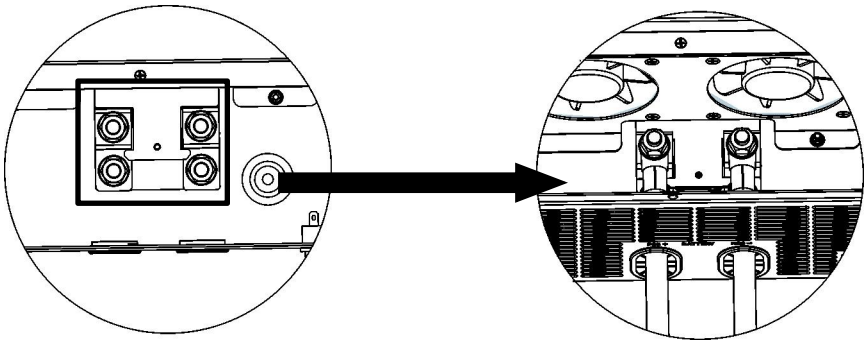
| Model | Maximum Amperage | Battery capacity | Wire Size | Cable mm2 | Terminal size(mm) | | | Torque value |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | W | D | |
| 8.5KVA | 180A | 400AH | 4AWG*2 | 25*2 | 37 | 22 | 8.4 | 10~12 Nm |
| 11.0KVA | 220A | 600AH | 2AWG*2 | 35*2 | 37 | 22 | 8.4 | 10~12 Nm |

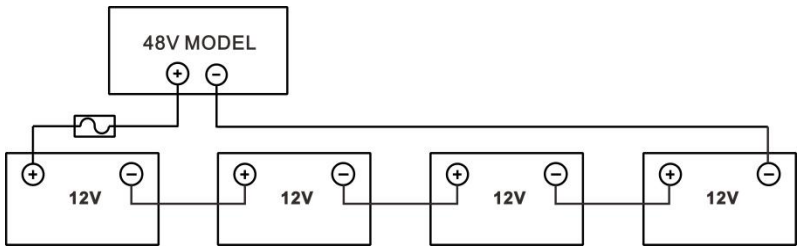
**Terminal size:**




Please follow below steps to implement battery connection:

1. Make positive and negative cables based on recommended terminal size.
2. Connect all battery packs as units requires. It's suggested to use recommended battery capacity.
3. Insert battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 10-12Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and battery cables are tightly screwed to the battery connector.






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

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

## AC Input/Output Connection

**CAUTION!!** Before connecting to AC input power source, please install a **separate** AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 63A.

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

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

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

**Suggested cable requirement for AC wires**

| Model | Gauge | Torque Value |
|---|---|---|
| All Model | 6 AWG | 1.2~ 1.4Nm |

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

1.Before making AC input/output connection, be sure to open DC protector or disconnector first.

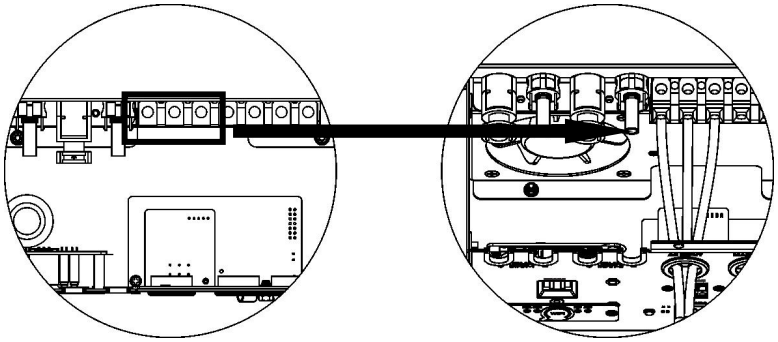
2.Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.

3.Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚**→Ground (yellow-green)**

**L→LINE (brown or black)**

**N→Neutral (blue)**



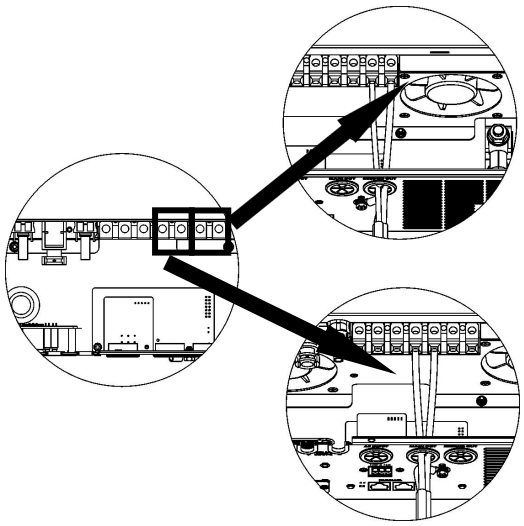
| | |
|---|---|
| ⚠ | **WARNING**:<br>Be sure that AC power source is disconnected before attempting to hardwire it to the unit. |

4.Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚**→Ground (yellow-green)**

**L→LINE (brown or black)**

**N→Neutral (blue)**



1. 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 dual output operation.

**CAUTION:** Appliances such as air conditioner are required 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 trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

# PV Connection

**CAUTION:** Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

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

| Model | Typical Amperage | Cable Size | Torque |
|---|---|---|---|
| All Model | 27A*2 | 10 AWG | 1.4~1.6 Nm |

**PV Module Selection:**
When selecting proper PV modules, please be sure to consider below parameters:

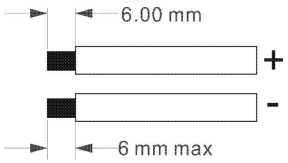
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

| **Solar Charging Mode** | | |
|---|---|---|
| **INVERTER MODEL** | 8.5KVA | 11.0KVA |
| **Max. PV Array Open Circuit Voltage** | 500VDC | |
| **PV Array MPPT Voltage Range** | 60VDC~500VDC | |
| **Max. PV INPUT CURRENT** | 27A*2 | |

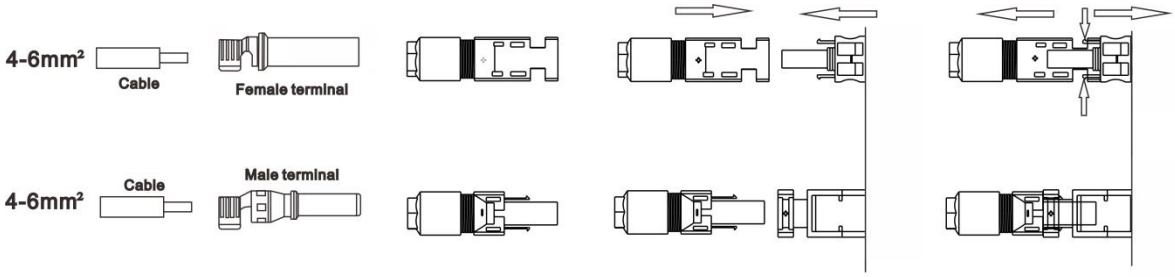
Take the 450Wp and 550Wp PV module as an example. After considering above two parameters, the recommended module configurations are listed in the table below. The recommended module configurations are fit for PV1 or PV2, for example: PV1 is 8 pcs in serial and PV1 could be 8 pcs in serial too, total quantity of panels is 16pcs.

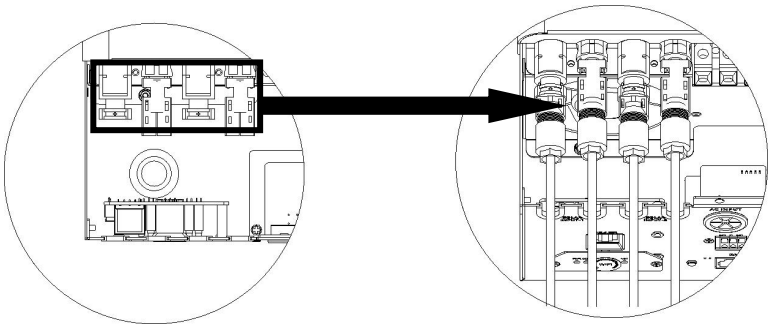
| | **SOLAR INPUT** | **Q'ty of panels** | **Total input power** | **Inverter Model** |
|---|---|---|---|---|
| Solar Panel Spec. (reference)<br>- 450Wp<br>- Vmp: 34.67Vdc<br>- Imp: 13.82A<br>- Voc: 41.25Vdc<br>- Isc: 12.98A | 3 pcs in serial | 3 pcs | 1,350 W | All Model |
| | 4 pcs in serial | 4 pcs | 1,800 W | |
| | 5 pcs in serial | 5 pcs | 2,250 W | |
| | 6 pcs in serial | 6 pcs | 2,700 W | |
| | 7 pcs in serial | 7 pcs | 3,150 W | |
| | 8 pcs in serial | 8 pcs | 3,600 W | |
| | 9 pcs in serial | 9 pcs | 4,050 W | |
| | 10 pcs in serial | 10 pcs | 4,500 W | |
| | 11 pcs in serial | 11 pcs | 4,950 W | |
| | 12 pcs in serial | 12 pcs | 5,400 W | |
| Solar Panel Spec. (reference)<br>- 550Wp<br>- Vmp: 42.48Vdc<br>- Imp: 12.95A<br>- Voc: 50.32Vdc<br>- Isc: 13.70A | SOLAR INPUT | Q'ty of panels | Total input power | Inverter Model |
| | 3 pcs in serial | 3 pcs | 1,650 W | All Model |
| | 4 pcs in serial | 4 pcs | 2,200 W | |
| | 5 pcs in serial | 5 pcs | 2,750 W | |
| | 6 pcs in serial | 6 pcs | 3,300 W | |
| | 7 pcs in serial | 7 pcs | 3,850 W | |
| | 8 pcs in serial | 8 pcs | 4,400 W | |
| | 9 pcs in serial | 9 pcs | 4,950 W | |

**PV Module Wire Connection:**




Please follow below steps to implement PV module connection:
1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

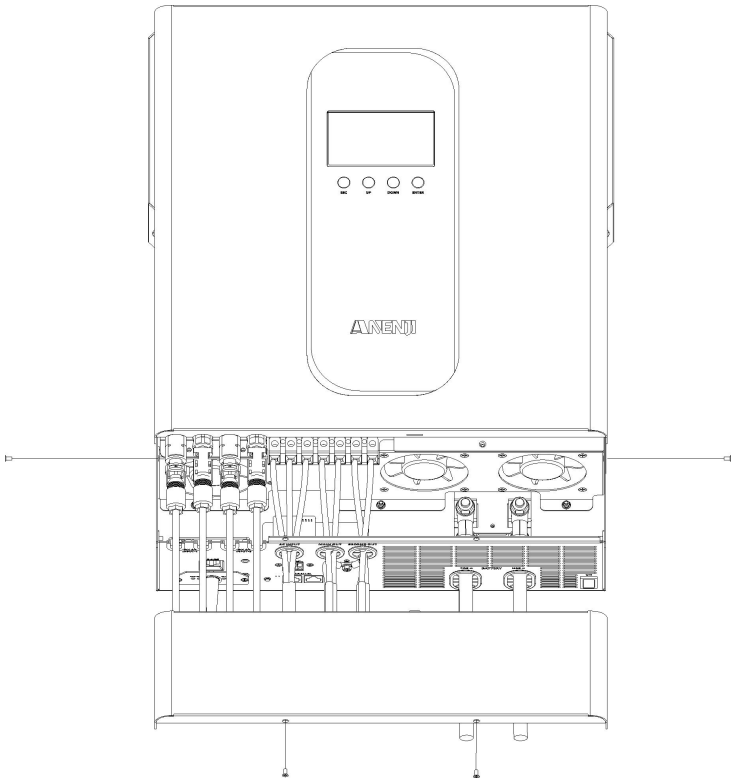


3. Make sure the wires are securely connected.

# Final Assembly

After connecting all wirings, please put bottom cover back by screwing four screws as shown below.



# Dry Contact Signal

There is one dry contact (3A/250VAC) available on the rear panel. When program 16 of F0 group is set as "Model1", it could be used to deliver signal to external device when battery voltage reaches warning level. When program 16 of F0 is set as "Model2" and the unit is working in battery mode, it could be used to trigger the grounding box to connect neutral and grounding of AC output together.

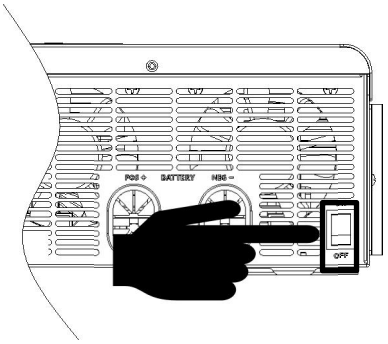
| Unit Status | Condition | | | Dry contact port: | |
|---|---|---|---|---|---|
| | | | | NC & C | NO & C |
| Power Off | Unit is off and no output is powered. | | | Close | Open |
| Power On | Output is powered from Utility. | | | Close | Open |
| | Output is powered from Battery or Solar. | Program 1 of F1 set as SUB | Battery voltage or Soc < Low DC warning voltage or Soc | Open | Close |
| | | | Battery voltage or Soc> setting value program 5 of F2 or battery charging reaches floating stage | Close | Open |
| | | Program 1 of F1 is set as SBU | Battery voltage < Setting value program 5 of F2 | Open | Close |
| | | | Battery voltage > setting value program 6 of F2 or battery charging reaches floating stage | Close | Open |

When program 16 of F0 is set as "Model2":

| Unit Status | Condition | Dry contact port: | |
|---|---|---|---|
| | | NC & C | NO & C |
| Power Off | Unit is off and no output is powered | Close | Open |
| Power On | Unit works in standby mode, line mode or fault mode | Close | Open |
| | Unit works in battery mode or power saving mode | Open | Close |

# OPERATION

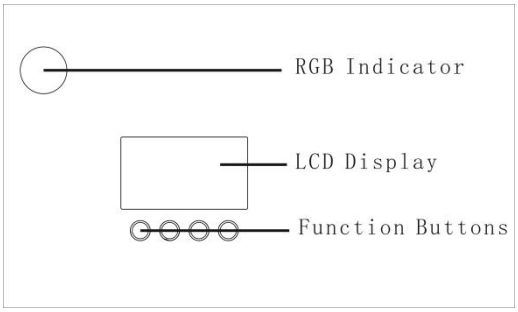
## Power ON/OFF




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

## Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.




**RGB Indicator**

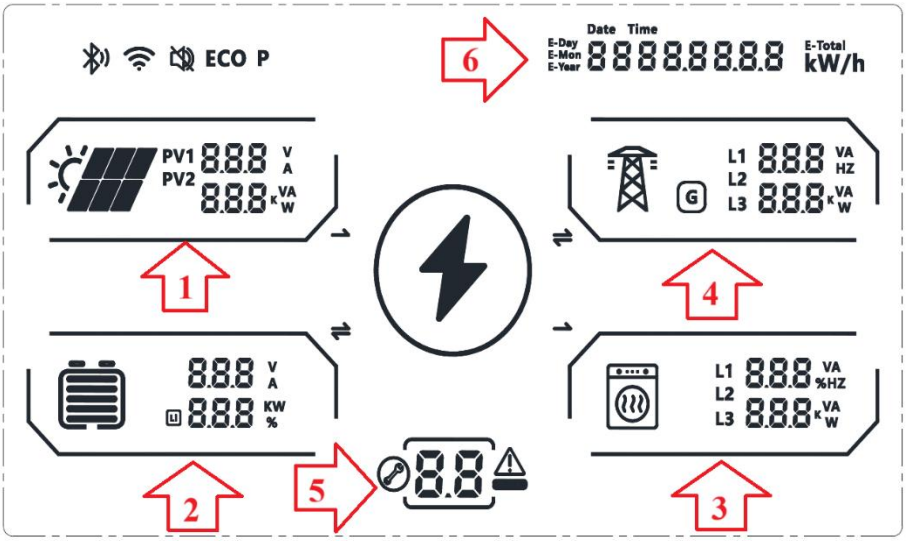
| RGB Indicator (Default) | | | **Messages** |
|---|---|---|---|
| Inverter mode | Green | Solid On | Output is powered by battery or PV in battery mode<br>Battery is fully charged or isn't charged. |
| | | Flashing | Battery is charging with 2s-on and 1s-off |
| AC mode | Blue | Solid On | Output is powered by AC or PV in AC mode<br>Battery is fully charged or isn't charged |
| | | Flashing | Battery is charging with 2s-on and 1s-off |
| Standby mode | Cyan | Solid On | Battery is fully charged or isn't charged |
| | | Flashing | Battery is charging with 2s-on and 1s-off |
| Fault mode | Red | Solid On | Fault occurs in the inverter. |
| Bypass mode | Purple | Solid On | Working in AC mode without charging |
| Charging mode | Yellow | Solid On | Battery is fully charged, when switch is off |
| | | Flashing | Battery is charging, when switch is off |

**Function Keys**

| **Function Key** | **Description** |
|---|---|
| ESC | To exit setting mode |
| UP | To go to previous selection |
| DOWN | To go to next selection |
| ENTER | To confirm the selection in setting mode or enter setting mode |

# LCD Display

The LCD display information will be switched in turns by pressing keys. All of information could be show in 1/2/3/4/5 area of LCD




**1). LCD display explanation**

**Area 1:** it could show PV data, such as PV voltage/current/power;

**Area 2:** it could show battery data, such as battery voltage/current/power/SOC;

**Area 3:** it could show ac-output data, such as output voltage/current/power/ percentage/ frequency;

**Area 4:** it could show ac-input data, such as input voltage/current/power/ percentage/ frequency;

**Area 5:** it could show setting program code/Eco/buzzer/error/warning;

**Area 6:** it could show power generation/time/date;

**2). LCD data polling display mode**

**Simultaneously polling data:** Press "UP" or "DOWN" button to show all data from area-1 to area-4 simultaneously and all dates will be updated with pressing. Press the ESC key to return the initial data

**Independent polling data:** Data of area 1-4 could be polling displayed independently as follow:

(1). Press "Enter" key, circle icon of area 1 will be flashing, press "UP" or "DOWN" to display data of area 1

(2). Continue to press "Enter" key, circle icon of area 2 will be flashing, press "UP" or "DOWN" to display data of area 2

(3). Continue to press "Enter" key, circle icon of area 3 will be flashing, press "UP" or "DOWN" to display data of area 3

(4). Continue to press "Enter" key, circle icon of area 4 will be flashing, press "UP" or "DOWN" to display data of area 4

(5). Continue to press "Enter" key, circle icon of area 1 will be flashing, it would come back to area 1.

**3). LCD setting display**

After pressing and holding "Enter" key for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit. When the unit enter setting mode the LCD display as follow:

**Area 5:** it could show setting program code;

**Area 6:** it could show setting program meaning;

**Area 1:** it could show setting minimum value, if the setting program has minimum value;

**Area 4:** it could show setting maximum value, if the setting program has maximum value;

**Area 2:** it could show setting program item;

**Area 3:** it could show setting current value which could be set;

### 4).Other display

Please press and hold the key "Down" for a long time on main menu page, you could see the follow information in area 6

(1). Software Version;

(2). Model code Version;

(3). CPU type;

(4). Hardware Version;

# LCD Setting

1. Pressing and holding ENTER button for 3 seconds, the unit will enter setting groups mode.

Press "UP" or "DOWN" button to select setting groups. There are 5 groups setting menu include F0/F1/F2/F3/F4, press "ENTER" button to confirm the selection or ESC button to exit.

**F0:** Setting general parameters

**F1:** Setting AC output parameters

**F2:** Setting battery parameters

**F3:** Setting time parameters

**F4:** Setting systems parameters

2. Press "ENTER" button to confirm the selection groups or ESC button to return selection groups or exit.

Remark: Max[A,B] takes the larger value of both A and B and Min[A,B] takes the smaller value of both A and B

**Setting F0 Programs:**

| Program | Description | Selectable option | |
|---|---|---|---|
| 01 | AC input voltage range | Appliances (default) | If selected, acceptable AC input voltage range will be within 90-280VAC. |
| | | UPS | If selected, acceptable AC input voltage range will be within 170-280VAC. |
| | | Generator | If selected, acceptable AC input voltage range will be within 170-280VAC and compatible with generators. Note: Because generators are unstable, maybe the output of inverter will be unstable too. |
| 02 | Power saving mode enable/disable Note: The parallel system can only be disabled | Saving mode disable (default) | If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected. |
| | | Saving mode enable | If enabled, the output of inverter will be off when connected load is pretty low or not detected. |
| 03 | Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode. Note: The parallel system can only be enabled | Bypass disable | Bypass enable (default) |

| | | | |
|---|---|---|---|
| 04 | Auto restart when overload occurs | Restart disable<br> | Restart enable (default)<br> |
| 05 | Auto restart when over temperature occurs | Restart disable<br> | Restart enable (default)<br> |
| 06 | Auto bypass<br>When selecting "auto", if the mains power is normal, it will automatically bypass, even if the switch is off. | manual(default)<br> | auto<br> |
| 07 | Auto return to default display screen | Return to default display screen (default)<br> | If selected, no matter how users switch display screen, it will automatically return to default display screen after no button is pressed for 1 minute. |
| | | Stay at latest screen<br> | If selected, the display screen will stay at latest screen user finally switches. |
| 08 | Backlight control | Backlight on<br> | Backlight off(default)<br> |
| 09 | Buzzer mode | Mode1<br> | Buzzer mute |
| | | Mode2<br> | The buzzer sounds when the input source changes or there is a specific warning or fault |
| | | Mode3<br> | The buzzer sounds when there is a specific warning or fault |
| | | Mode4(default)<br> | The buzzer sounds when there is a fault |
| 10 | Modbus ID Setting | Modbus ID Setting Range ： 001(default)~247 | |
| 16 | Dry contact mode<br>Please check the function in chapter about" Dry Contact Signal" | Model1:(default)<br> | it could be used to deliver signal to external device when battery<br>voltage reaches warning level. |
| | | Model2:<br> | Allow neutral and grounding of AC output is connected together.<br>This function is only available when the inverter is working with<br>external grounding box.Only when the inverter is working in<br>battery mode, it will trigger grounding box to connect neutral<br>and grounding of AC output.<br>Neutral and grounding of AC output is connected. |

| | | | |
|---|---|---|---|
| 17 | Allow neutral and grounding of AC output is connected together | Disable: Neutral and grounding of AC output is disconnected. (Default).<br> | Enable: Neutral and grounding of AC output is connected.<br> |
| 18 | When multiple peaks appear in the PV power curve, this item can be set to perform MPPT scan maximum power | No scanning<br> | Disable scanning |
| | | Periodic scanning<br> | Automatically scan the PV power curve every hour |
| | | Power fluctuation scan<br> | Every few minutes, a comparison of PV power will be conducted, and if the fluctuation exceeds ±20%, a scan of the PV power curve will be triggered. |
| | | Periodic/power fluctuation scan<br> | Periodic scanning and Power fluctuation scan are effective simultaneously |

**Setting F1 Programs:**

| Program | Description | Selectable option | |
|---|---|---|---|
| 01 | Output source priority | SUB priority (default)<br> | Solar->Utility->Battery<br>Solar energy is charged first and then power to the loads<br><br>If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time |
| | | SBU priority<br> | Solar-> Battery ->Utility<br>Solar energy provides power to the loads as first priority<br><br>If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.<br><br>Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 05 of F2 group |
| | | SUF priority<br> | Solar->Utility->Battery<br>If solar energy is sufficient to all connected loads and charge battery, the solar energy could feedback to the grid<br><br>If solar energy is not sufficient to power all connected loads, utility energy will supply power to the loads at the same time |
| 02 | AC output mode | | Single: This inverter is used in single phase application. |
| | | | Parallel: This inverter is operated in parallel system. |
| | | | The inverter is operated in L1 phase in 3-phase application |
| | | | The inverter is operated in L2 phase in 3-phase application |
| | | | The inverter is operated in L3 phase in 3-phase application |
| 03 | Output voltage | 230V(default)<br>The available voltage settings are 220V, 230V, 240V | |
| 04 | Output frequency | 50Hz(default)<br>The available frequency settings are 50Hz and 60Hz | |

| | | | |
|---|---|---|---|
| 06 | Salve output source priority<br>The priority is available after setting application period, the units will turn to salve<br>priority in the setting period from main priority | OFF(default)<br> | Turn off salve output source priority |
| | | SUB priority<br> | The function is the same as in program 01 of F1 |
| | | SBU priority<br> | |
| | | SUF priority<br> | |
| 07 | Start timer setting for salve output source priority<br>- Hours setting | 00(default)<br>The setting range is from 00 to 23 of every day | |
| 08 | Start timer setting for salve output source priority<br>- Minutes setting | 00(default)<br>The setting range is from 00 to 59 of every hour | |
| 09 | End timer setting for salve output source priority<br>- Hours setting | 00(default)<br>The setting range is from 00 to 23 of every day | |
| 10 | End timer setting for salve output source priority<br>- Minutes setting | 00(default)<br>The setting range is from 00 to 59 of every hour | |
| 11 | second output (OP2) control<br>Note: Only available in single system | Enable (default)<br> <br>If selected parallel mode, the parameter is fixed at 'Disable'. | Second output (OP2) is allowed |
| | | Disable<br> | Second output (OP2) is forbidden |
| 12 | Setting the second output (OP2) overload warning pointNote: Only available in single system | Set the OP2 overload warning point. If the set value is exceeded, 3D warning will be displayed. Setting range is from 10% to 100% and the default setting is 50% | |
| 13 | Setting the timer to turn on second output (OP2)<br>- Hours setting<br>Note: Only available in single system | 00(default)<br>Setting range is from 00 to 23 | If you set the time from 00 to 00, OP2 will be always on.<br>If you set the time to 07 to 13, OP2 will be turned on from 7:00 to 13:00.During this period, OP2 will be turned off if battery voltage reaches the setting value in program 08 of F2. |
| 14 | Setting the timer to turn off second output (OP2)<br>- Hours setting<br>Note: Only available in single system | 00(default)<br>Setting range is from 00 to 23 | |

**Setting F2 Programs:**

| Program | Description | Selectable option | |
|---|---|---|---|
| 01 | Battery type | | AGM (default) |
| | | | Flooded |
| | | | User-Defined<br>If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program03/04/08 of F2 |
| | | | Support PYLON US2000 Protocol（3.5 Version） |
| | | | Standard communication Protocol 2 from inverter supplier |
| | | | If "LIB" is selected, the battery default value is fit for lithium battery without communication battery charge voltage and low DC cut-off voltage can be set up in program03/04/08 of F2 |
| 02 | Charger source priority: To configure charger source priority | If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below: | |
| | | Solar first<br> | Solar energy will charge battery as priority.<br>Utility will charge battery only when solar energy is not available |
| | | Solar and Utility (default)<br> | Solar energy and utility will charge battery at the same time |
| | | Only Solar<br> | Solar energy will be the only charger source no matter utility is available or not |
| | | Solar residual<br> | Solar energy will support all connected loads as first priority, the residual energy will charge battery |
| 03 | Bulk charging voltage (C.V voltage) | If self-defined or LIB is selected in program 01 of F2, this program can be set up | |
| | | 56.4V(default)<br>If program 01 of F2 is not LIB, the default is 56.4V and setting range is from value of program 04 of F2 to 62V;<br>If program 01 of F2 is LIB, the default is 56.4V and setting range is from value of program 04 of F2 to 58V | |

| | | | |
|---|---|---|---|
| 04 | Floating charging voltage | If self-defined or LIB is selected in program 01 of F2, this program can be set up | |
| | | If program 01 of F2 is not LIB, the default setting is 54.0V and setting range is from 48.0V to the value of program 03 of F2<br>If program 01 of F2 is LIB, the default setting is 56.4V and setting range is from 48.0V to the value of program 03 of F2 | |
| 05 | Setting voltage or Soc point back to utility source when selecting "SBU priority". | Lithium battery without communication | If program 01 of F2 is not LIB, the default setting is 46.0V and setting range is as follow:<br>Max[44V, 07 of F2 +0.1V]~Min[06 of F2-0.1V,57.2V]<br>If program 01 of F2 is LIB, the default setting is 52.0V and setting range is as follow:<br>Max[44V, 07 of F2+0.1V]~Min[06 of F2-0.1V,57.2V] |
| | | Lithium battery with communication | Default 20%<br>setting range is as follow:<br>Max[5%, 07 of F2+1%]~Min[06 of F2-1%,96%] |
| 06 | Setting voltage point back to battery mode when selecting "SBU priority" in program 01(F1). | Battery fully charged (default)<br> | setting is battery fully charged and setting range is as follow:<br>Max[48V, 05 of F2+0.1V]~ [03 of F2 - 0.5V or Full] |
| | | Lithium battery with communication | Default 30%<br>Setting range is as follow:<br>Max[10%, 05 of F2+1%]~100% |
| 07 | Setting cut off voltage point or SOC percentage on the Main output (OP1) | Lithium battery without communication | If program 01 of F2 is not LIB, the default is 44.0V, setting range is from program 08 of F2 to Min [05 of F2-0.1V , 54V]<br>If program 01 of F2 is LIB, the default is 51.9V, setting range is as from 08 of F2 to Min [05 of F2-0.1V , 54V] |
| | | Lithium battery with communication | Default 15%<br>Setting range is from program 08 of F2 to Min[05 of F2 - 1%,95%] |
| 08 | Setting cut off voltage point or SOC percentage on the second output (OP2)<br>Note: Only available in single system | Lithium battery without communication | If program 5 is not LIB, the default is 42.0V, setting range is from 40v~Min[07 of F2,54V].If selected parallel mode, this parameter is fixed at 40v.<br>If program 5 is LIB, the default is 50.0V, setting range is from 40v~Min[07 of F2,54V] |
| | | Lithium battery with communication | Default 10%.If selected parallel mode, this parameter is fixed at 0%.<br>Setting range is from 0% to program 07 of F2 |
| 09 | Maximum charging current: To configure total charging current for solar and utility chargers.<br>(Max. charging current = utility charging current + solar charging current) | Single mode:80A (default)<br>Parallel mode:30A (default) | 8.5KW Model：<br>If selected, acceptable charging current range will be within 10-140A，but it shouldn't be less than the AC charging current(program 10 of F2)<br>11.0KW Model：<br>If selected, acceptable charging current range will be within 10-160A，but it shouldn't be less than the AC charging current (program 10 of F2) |
| 10 | Maximum utility charging current | Single mode:60A (default)<br>Parallel mode:30A (default) | If selected, acceptable charging current range will be within 5-120A, but the max setting value must be less than the value of program 09 of F2 |

<table>
<tr><td rowspan="5">11</td><td rowspan="5">Slave charger source priority<br>The priority is available after setting application period, the units will turn to salve priority in the setting period form main priority</td><td>OFF(default)<br> </td><td>Turn off slave charger source priority</td></tr>
<tr><td>Solar first<br> </td><td rowspan="4">The function is the same as in program 02 of F2 group</td></tr>
<tr><td>Solar and Utility<br>(default)<br> </td></tr>
<tr><td>Only Solar<br> </td></tr>
<tr><td>Solar residual<br> </td></tr>
<tr><td>12</td><td>Start timer setting for salve charger source priority<br>- Hours setting</td><td colspan="2">00(default)<br>The setting range is from 00 to 23 of every day</td></tr>
<tr><td>13</td><td>Start timer setting for salve charger source priority<br>- Minutes setting</td><td colspan="2">00(default)<br>The setting range is from 00 to 59 of every hour</td></tr>
<tr><td>14</td><td>End timer setting for salve output charger priority<br>- Hours setting</td><td colspan="2">00(default)<br>The setting range is from 00 to 23 of every day</td></tr>
<tr><td>15</td><td>End timer setting for salve charger source priority<br>- Minutes setting</td><td colspan="2">00(default)<br>The setting range is from 00 to 59 of every hour</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Bulk charging time (C.V stage)</td><td>Automatically (Default):<br> </td><td>If selected, inverter will judge this charging time automatically</td></tr>
<tr><td>5 min<br> </td><td rowspan="2">The setting range is from 5 min to 900 min. Increment of each click is 5 min</td></tr>
<tr><td>900 min<br> </td></tr>
<tr><td colspan="2">If “User-Defined” or” LIB” is selected in program 01 of F2 group, this program can be set up</td></tr>
</table>

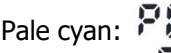
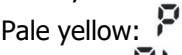
| | | | |
|---|---|---|---|
| 17 | Battery equalization | Battery equalization<br> | Battery equalization disable (default)<br> |
| | | If "Flooded" or "User-Defined" is selected in program 01 of F2, this program can be set up | |
| 18 | Battery equalization voltage | Default setting is 58.4V<br>Setting range is floating voltage(program 04 of F2)~ 62V | |
| 19 | Battery equalized time | 60min (default)<br>Setting range is from 0min to 900min. Increment of each click is 5min | |
| 20 | Battery equalized timeout | 120min (default)<br>Setting range is from 0min to<br>900 min. Increment of each click is 5 min | |
| 21 | Equalization interval | 30days (default)<br> | Setting range is from 1 to 90 days.<br>Increment of each click is 1 day |
| 22 | Equalization activated immediately | Enable<br> | Disable (default)<br> |
| | | If equalization function is enabled in program 17 of F2, this program can be set up. If "Enable" is selected in this program, it's to activate battery equalization immediately and LCD main page will show " ". If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 21 of F2 setting. At this time, " " will not be shown in LCD main page | |
| 23 | Manual activate the lithium battery setting | Disable(default)<br> | Default: disable activation |
| | | Active<br> | When program 01 of F2 is selected "User-Defined" or "LIB" or "LIx" as lithium battery, when the battery is not detected, if you want to activate the lithium battery at a time, you could select it |
| 24 | Automatic activation for lithium battery | | Default: disable activation |
| | | Auto<br> | When program 01 of F2 is selected "LIx" as lithium battery, when the battery is not detected, the unit or PV will activate automatically the lithium battery at a time. If you want to activate automatically the lithium battery，you must restart the unit. |
| 25 | Max battery discharge current setting | OFF(Default)<br> | When the battery discharge current more than the setting value, the unit will stop discharging and go to bypass mode or standby mode. The setting range is from 50 to 500 |

| | | |
|---|---|---|
| 26 | lithium battery activation time | When lithium battery activation function is available, the activation time could be set, the setting range is 6s~300s,the default time is 6s; |

**Setting F3 Programs:**

| Program | Description | Selectable option |
|---|---|---|
| 01 | Date setting | Set the machine date, which can be set as year, month, day |
| 02 | Time setting | Set the machine time, which can be set in hours and minutes |

**Setting F4 Programs:**

| Program | Description | Selectable option | |
|---|---|---|---|
| 01 | Reset all stored data of PV generated power and output load energy | Reserve data(default) | Reset generated energy data |
| 02 | RGB mode -Checking RGB Indicator table | Mode 1(Default) | RGB LED is working normally |
| | | Mode 2 | RGB LED is working with only the unit is in fault mode |
| | | Mode 3 | RGB LED is always OFF |
| | | Mode 4 | RGB LED shows as model 1 and whether battery is fully charged or not， RGB LED won't be flashing at any time |
| | | Mode 5 | RGB LED shows as model 1 and whether battery is fully charged or not，RGB LED will be flashing |
| 03 | RGB brightness adjustment | Adjust the brightness of RGB within the range of 30% to 100%,default 80%. | |
| 04 | RGB Light Color selection in inverter Mode | Setting RGB colors for inverter mode. | The available colors for selection are as follow:<br>Red: <br>Green: <br>Blue: <br>Cyan: <br>Purple: <br>Yellow: <br>White: <br>Pale cyan:  <br>Pale yellow:  <br>Pale blue: <br>Pink: <br>If the setting is successful, the color will replace the default color |
| 05 | RGB Light Color selection in AC Mode | Setting RGB colors for off AC mode. | |
| 06 | RGB Light Color selection in standby Mode | Setting RGB colors for standby mode | |
| 07 | RGB Light Color selection in bypass Mode | Setting RGB colors for bypass mode | |
| 08 | RGB Light Color selection in charging Mode | Setting RGB colors for charging mode | |

**Fault Reference Code**

There are seven groups about fault code, a fault code consist of group code and number, group code is first and number is last, such as C0.

A: Inverter group fault code

B: battery group fault code

C: PV group fault code

D: Output group fault code

E: Parallel group fault code

F: Other group fault code

G: Grid group fault code

| Fault Code | Fault Event | Icon on |
|---|---|---|
| A0 | Output short circuited. | |
| A1 | Output voltage is too high. | |
| A2 | Over current or surge | |
| A3 | Over DC voltage in AC output | |
| A4 | Inverter current offset is too high | |
| A5 | Output voltage is too low | |
| A6 | Inverter negative power | |
| B0 | Battery voltage is too high | |
| B1 | DCDC over current | |
| B2 | DC/DC current offset is too high | |
| C0 | PV over current | |
| C1 | PV over voltage | |
| C2 | PV1 current offset is too high | |
| C3 | PV2 current offset is too high | |
| D0 | Overload time out | |
| D1 | Op current offset is too high | |
| D2 | Op2 current offset is too high | |
| F0 | Over temperature of inverter module | |

| | | |
|---|---|---|
| F1 | Over temperature of PV module | |
| F2 | Over temperature of DCDC module | |
| F3 | Bus voltage is too high | |
| F4 | Bus soft start failed | |
| F5 | Bus voltage is too low | |
| F6 | Hardware incompatibility | |
| F7 | Screen communication abnormality | |

# Warning Indicator

There are seven groups about warning code, a warning code consist of group code and number, number is first and group code is last, such as 0B.

A: Inverter group fault code

B: battery group fault code

C: PV group fault code

D: Output group fault code

E: Parallel group fault code

F: Other group fault code

G: Grid group fault code

| Warning Code | Warning Event | Audible Alarm | Icon flashing |
|---|---|---|---|
| 0B | Battery low | Beep once every second | |
| 1B | Battery is not connected | None | |
| 2B | Battery equalization | None | |
| 3B | Battery low and it isn't up to the setting value of program 06 of F2 group | Beep twice every 3 seconds | |
| 4B | Lithium battery communication is abnormal | Beep once every 0.5 second | |
| 5B | Battery discharge overcurrent | None | |
| 1C | PV energy is too weak | Beep twice every 3 seconds | |
| 0D | Overload | Beep once every 0.5 second | |
| 1D | Output power derating | Beep twice every 3 seconds | |
| 3D | The load exceeds the set value of program 12 of F1 | None | |
| 0F | Temperature is too High | Beep three times every second | |

# BATTERY EQUALIZATION

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

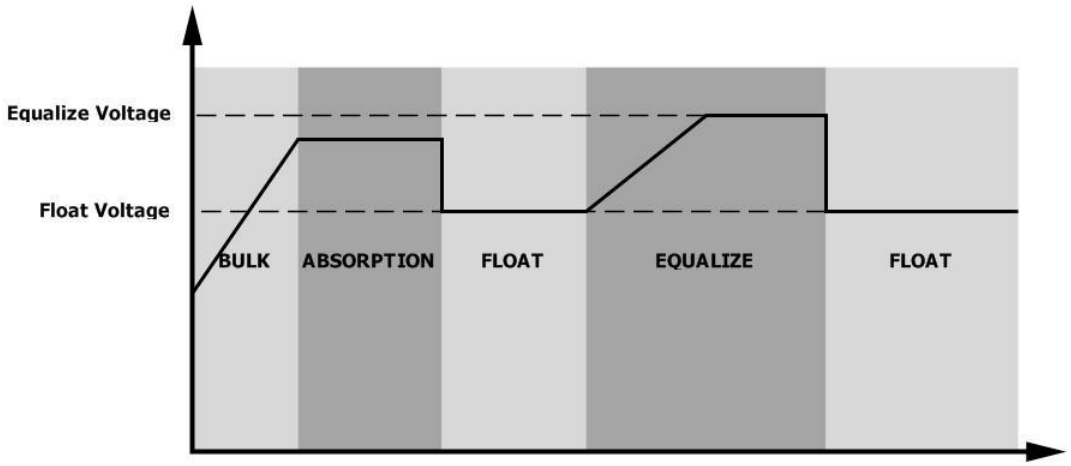
**1. How to Apply Equalization Function**

You must enable battery equalization function in monitoring LCD setting program 17 of F2 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 21 of F2.
2. Active equalization immediately in program 22 of F2.

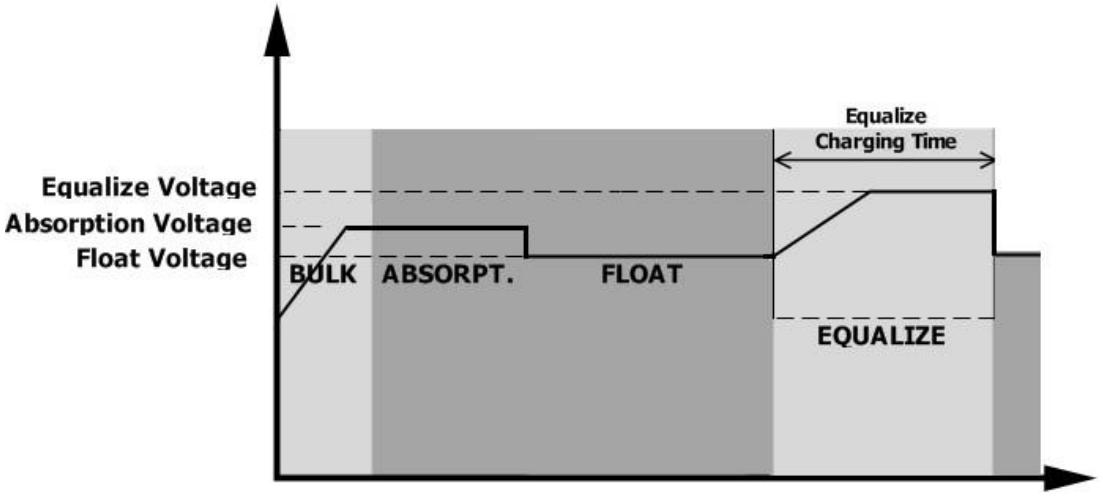
**2. When to Equalize**

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

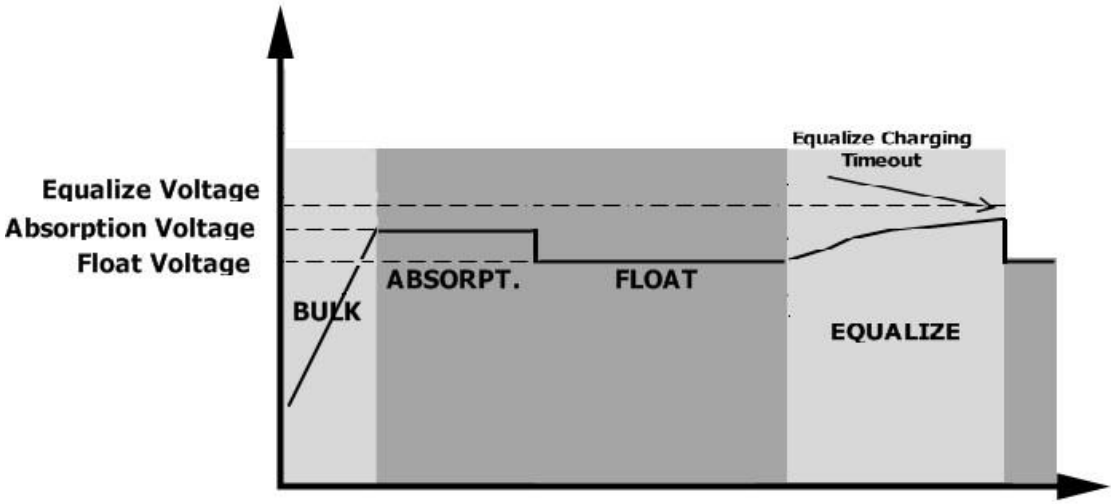



**3. Equalize charging time and timeout**

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



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



# SETTING FOR LITHIUM BATTERY

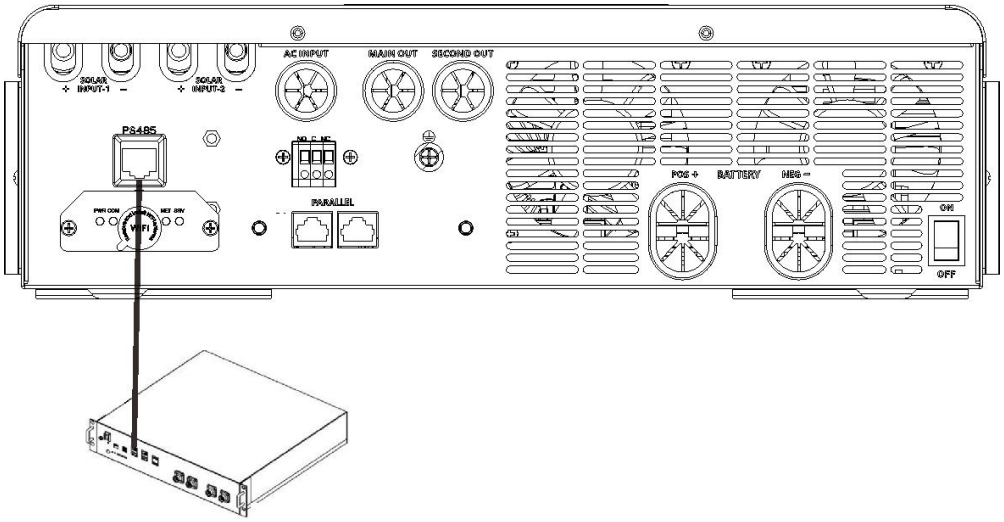
## Lithium Battery Connection

If choosing lithium battery for the inverter, you are allowed to use the lithium battery only which we have configured. There're two connectors on the lithium battery, RS485 port of BMS and power cable.

Please follow below steps to implement lithium battery connection:

1). Assemble battery terminal based on recommended battery cable and terminal size (same as Lead acid, see section Lead-acid Battery connection for details).

2). Connect the end of RS485 port of battery to BMS(RS485) communication port of inverter.




**Lithium battery communication and setting**

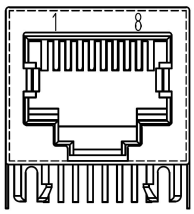
if choosing lithium battery, make sure to connect the BMS communication cable between the battery and the inverter. This communication cable delivers information and signal between lithium battery and the inverter. This information is listed below:

- 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.

**Connect the end of RS485 of battery to RS485 communication port of inverter**

Make sure the lithium battery RS485 port connects to the inverter is Pin to Pin, the communication cable is inside of package and the inverter RS485 port pin assignment shown as below:

| Pin number | RS485 Port |
|---|---|
| PIN1 | RS485-B |
| PIN2 | RS485-A |
| PIN7 | RS485-A |
| PIN8 | RS485-B |



## Setting for PYLON US2000 lithium battery

1. PYLONTECH US2000 lithium battery setting:

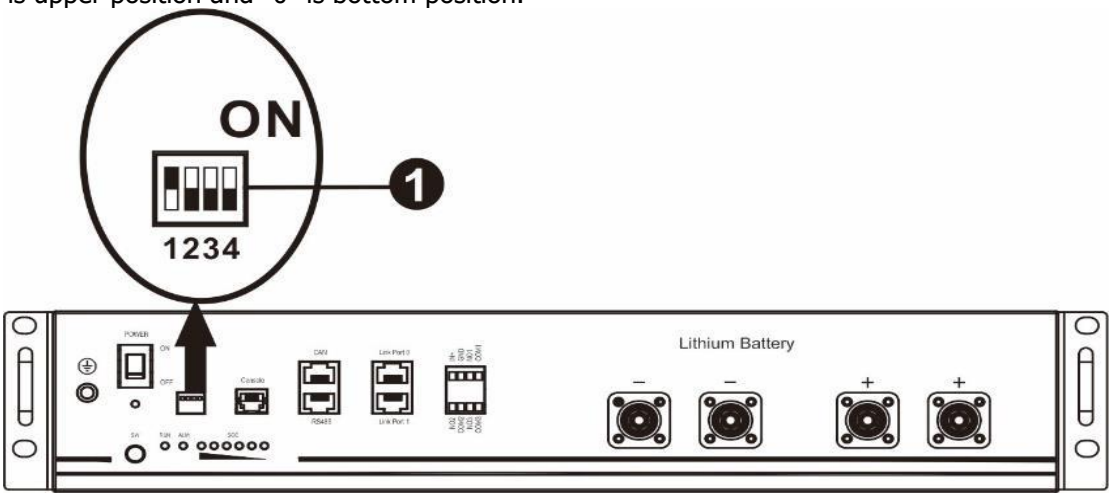
Dip Switch: There are 4 Dip Switches that sets different baud rate and battery group address. If switch position is turned to the "OFF" position, it means "0". If switch position is turned to the "ON" position, it means "1".

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.

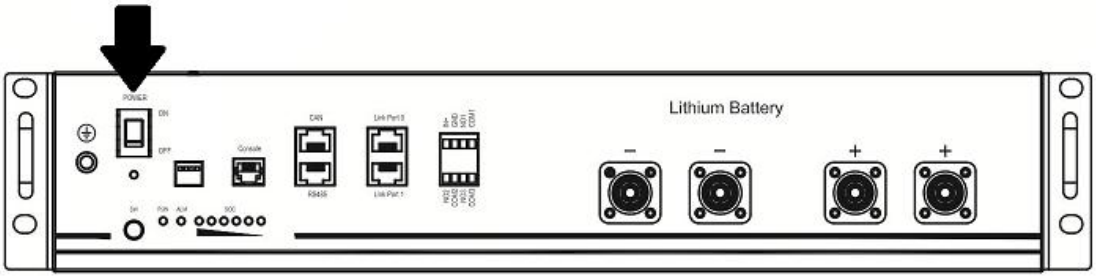
**NOTE:** "1" is upper position and "0" is bottom position.



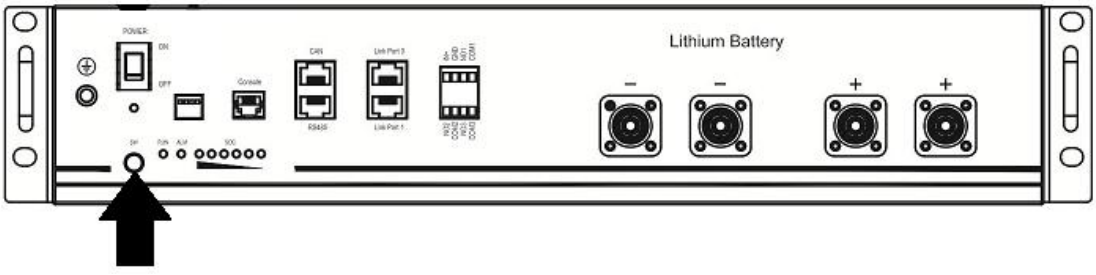

2. Process of install

Step 1. Use the RS485 cable to connect inverter and Lithium battery.

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 "Li2" in LCD program 5.

If communication between the inverter and battery is successful, the battery icon Li on LCD display will light

## Setting for lithium battery without communication

This suggestion is used for lithium battery application and avoid lithium battery BMS protection without communication, please finish the setting as follow:

Recommended method 1：Set battery type as "LIB " in program 01 of F2;

Recommended method 2：Setting as follow:

Before starting setting，you must get the battery BMS specification：

A. Max charging voltage

B. Max charging current

C. Discharging protection voltage

2. Set battery type as "LIB " in program 01 of F2;

3. Set C.V voltage as Max charging voltage of BMS-0.5V in program 03 of F2;

4. Set floating charging voltage as C.V voltage in program 03 of F2;

5. Set Low DC cut-off voltage ≥discharging protection voltage of BMS+3V;

6. Set Max charging current in program 09 of F2 which must be less than the Max charging current of BMS.

7. Setting voltage point back to utility source when selecting "SBU priority" in program 05 of F2.

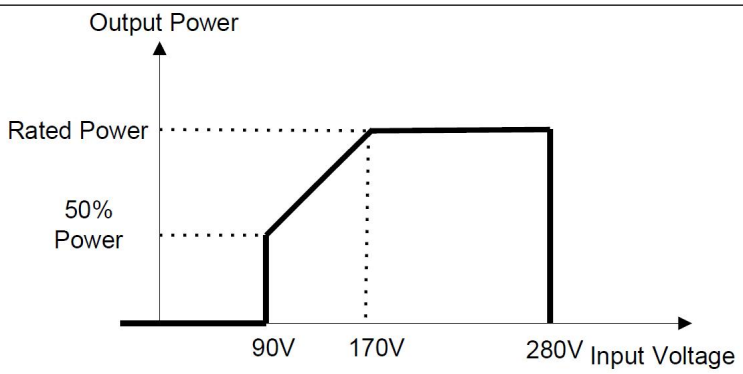
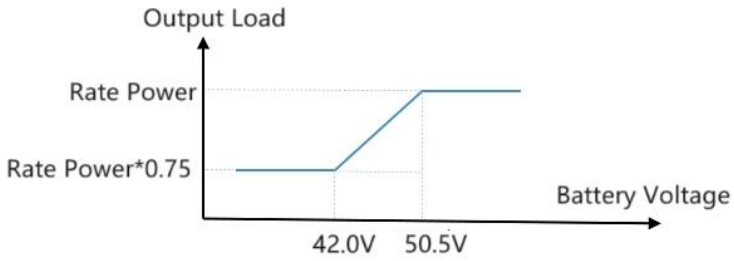
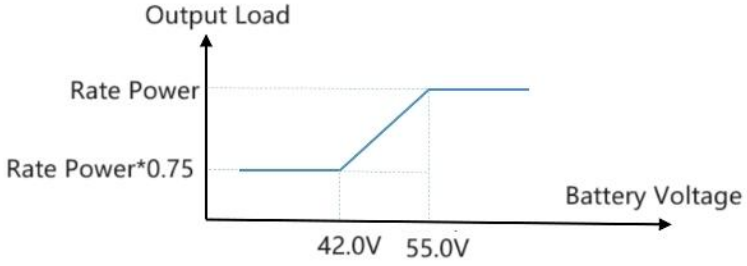
The setting value must be ≥Low DC cut-off voltage+2V，or else the inverter will have a warning as battery voltage low.

Remark:

1. you'd better to finish setting without turn on the inverter(just let the LCD show, no output);
2. when you finish setting, please restart the inverter.

# SPECIFICATIONS

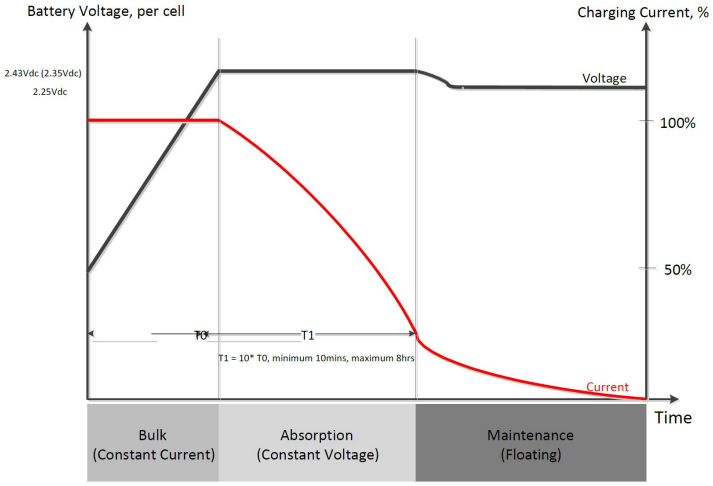
## Table 1 Line Mode Specifications

| INVERTER MODEL | 8.5KVA | 11.0KVA |
|---|---|---|
| **Input Voltage Waveform** | Sinusoidal (utility or generator) | |
| **Nominal Input Voltage** | 230Vac | |
| **Low Loss Voltage** | 170Vac±7V (UPS)<br>90Vac±7V (Appliances) | |
| **Low Loss Return Voltage** | 180Vac±7V (UPS);<br>100Vac±7V (Appliances) | |
| **High Loss Voltage** | 280Vac±7V | |
| **High Loss Return Voltage** | 270Vac±7V | |
| **Max AC Input Voltage** | 300Vac | |
| **Nominal Input Frequency** | 50Hz / 60Hz (Auto detection) | |
| **Low Loss Frequency** | 40±1Hz | |
| **Low Loss Return Frequency** | 42±1Hz | |
| **High Loss Frequency** | 65±1Hz | |
| **High Loss Return Frequency** | 63±1Hz | |
| **Output Short Circuit Protection** | Battery mode: Electronic Circuits | |
| **Efficiency (Line Mode)** | >95% (Rated R load, battery full charged ) | |
| **Transfer Time** | 10ms typical (UPS); 20ms typical (Appliances) | |
| **Output power derating:**<br>When AC input voltage drops to 95V or 170V depending on models, the output power will be derated. |  | |
| **Output power derating:**<br>When battery voltage drops to 50.5V(8.5K)/ 55.0V(11K), the output power will be derated. |  <br>8.5KW Output power derating<br>  <br>11.0 KW Output power derating | |

## Table 2 Inverter Mode Specifications

| INVERTER MODEL | 8.5KVA | 11.0KVA |
|---|---|---|
| **Rated Output Power** | 8.5KVA/8.5KW | 11.0KVA/11.0KW |
| **Parallel Capability** | YES, 6units | YES, 6units |
| **Dual output function** | Yes<br>Only available in single system | Yes<br>Only available in single system |
| **Max.main output power** | 8.5KVA/8.5KW | 11.0KVA/11.0KW |
| **Max.second output power** | 5.0KVA/5.0KW | 5.5KVA/5.5KW |
| **Output Voltage Waveform** | Pure Sine Wave | |
| **Output Voltage Regulation** | 230Vac±5% | |
| **Output Frequency** | 60Hz or 50Hz | |
| **Peak Efficiency** | 94% | |
| **Overload Protection** | 5.5s@≥140% load; 10.5s@100%~140% load | |
| **Surge Capacity** | 2* rated power for 5 seconds | |
| **Nominal DC Input Voltage** | 48Vdc | |
| **Cold Start Voltage** | 46.0Vdc | |
| **Low DC Warning Voltage**<br>Just for AGM and Flooded<br>@ load < 20%<br>@ 20% ≤ load < 50%<br>@ load ≥ 50% | 44.0Vdc<br>42.8Vdc<br>40.4Vdc | |
| **Low DC Warning Return Voltage**<br>Just for AGM and Flooded<br>@ load < 20%<br>@ 20% ≤ load < 50%<br>@ load ≥ 50% | 46.0Vdc<br>44.8Vdc<br>42.4Vdc | |
| **Low DC Cut-off Voltage**<br>Just for AGM and Flooded<br>@ load < 20%<br>@ 20% ≤ load < 50%<br>@ load ≥ 50% | When OP2 is allowed<br>OP2 OP1<br>42.0Vdc 45.2Vdc<br>40.8Vdc 44.0Vdc<br>38.4Vdc 41.6Vdc | When OP2 is forbidden<br>OP1<br>45.2Vdc<br>44.0Vdc<br>41.6V |

## Table 3 Charge Mode Specifications

| **Utility Charging Mode** | | | |
|---|---|---|---|
| **INVERTER MODEL** | | **8.5KVA** | **11.0KVA** |
| **Charging Current (Max) (AC+PV)** | | 140Amp | 160Amp |
| **AC Charging Current (Max)** | | 120Amp (@ $V_{I/P}$=230Vac) | |
| **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** | | | |
| **INVERTER MODEL** | | **8.5KVA** | **11.0KVA** |
| **Rated Power** | | 5000W*2 | 5500W*2 |
| **Max. PV Array Open Circuit Voltage** | | 500Vdc | |
| **PV Array MPPT Voltage Range** | | 60Vdc~500Vdc | |
| **Max. MPPT Charge Current** | | 140A | 160A |
| **Max. Input Current** | | 27A*2 | 27A*2 |

## Table 4 General Specifications

| **INVERTER MODEL** | **8.5KVA** | **11.0KVA** |
|---|---|---|
| **Safety Certification** | CE | |
| **Operating Temperature Range** | -10°C to 55°C | |
| **Storage temperature** | -15°C~ 60°C | |
| **Humidity** | 5% to 95% Relative Humidity (Non-condensing) | |
| **Dimension(D*W*H), mm** | 540x403x122 | |
| **Net Weight, kg** | 15.8 | 16.3 |

# TROUBLE SHOOTING

| Problem | LCD/LED/Buzzer | Explanation / Possible cause | What to do |
|---|---|---|---|
| Unit shuts down automatically during startup process. | LCD/LEDs and uzzer will be active for 3 seconds and then complete off. | The battery voltage is too low | Re-charge battery.<br>Replace battery. |
| No response after power on. | No indication. | 1.The battery voltage is far too low.<br>2.Battery polarity is connected reversed. | Check if batteries and the wiring are connected well.<br>Re-charge battery.<br>Replace battery. |
| Mains exist but the unit works in battery mode. | Input voltage is displayed as 0 on the LCD and green LED is flashing. | Input protector is tripped | Check if AC breaker is tripped and AC wiring is connected well. |
| | Green LED is flashing. | Insufficient quality of AC power. (Shore or Generator) | 1.Check if AC wires are too thin and/or too long.<br>2.Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS Appliance) |
| | Green LED is flashing. | Set "SBU" or "SUB" as the priority of output source. | Change output source priority to Utility first. |
| When the unit is turned on, internal relay is switched on and off repeatedly. | LCD display and LEDs are flashing | Battery is disconnected. | Check if battery wires are connected well. |
| Buzzer beeps continuously and red LED is on. | Fault code D0 | Overload error. The inverter is overload 100% and time is up. | Reduce the connected load by switching off some equipment. |
| | Fault code A2 | Output short circuited. | Check if wiring is connected well and remove abnormal load. |
| | Fault code F2 | Internal temperature of inverter component is over 100°C. | Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. |
| | Fault code B0 | Battery is over-charged. | Return to repair center. |
| | | The battery voltage is too high. | Check if spec and quantity of batteries are meet requirements. |
| | Fault code A1/A5 | Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac) | 1.Reduce the connected load.<br>2.Return to repair center |
| | Fault code F3/F4 | Internal components failed. | Return to repair center. |
| | Fault code A2 | Over current or surge. | Restart the unit, if the error happens again, please return to repair center. |
| | Fault code F5 | Bus voltage is too low. | |
| | Fault code A3 | Output voltage is unbalanced. | |
| | Another fault code | | If the wires is connected well, please return to repair center. |

# Parallel Installation Guide

## Instruction

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

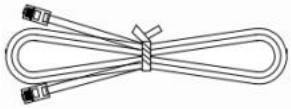
1. Parallel operation in single phase with up to 6 units. The supported maximum output power is 8.5KW-8.5KVA/11KW-11KVA *6pcs.

2. Maximum 6 units work together to support three-phase equipment. 4 units support one phase maximum. The supported maximum output power is 8.5KW-8.5KVA*6pcs/11KW-11KVA *6pcs, one phase can be up to 8.5KW-8.5KVA *4pcs/11KW-11KVA *4pcs.

**NOTE:** If this unit is bundled with parallel cable, this inverter is default supported parallel operation.

## Package Contents

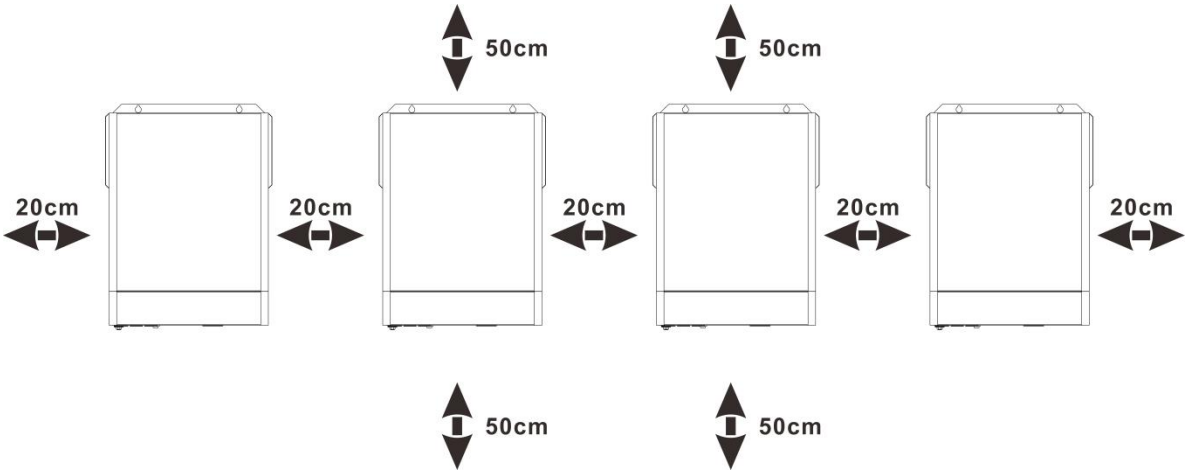
In parallel kit, you will find the following items in the package:



Parallel communication cable

## Mounting the Unit

When installing multiple units, please follow below chart.




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

# Wiring Connection

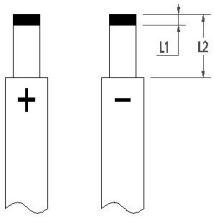
## NOTICE: It's requested to connect to battery for parallel operation.

The cable size of each inverter is shown as below:

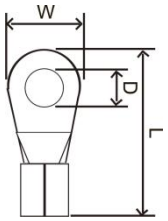
Recommended battery cable and terminal size for each inverter:

| Model | Maximum Amperage | Battery capacity | Wire Size | Cable mm2 | Terminal size(mm) | | | Torque value |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | W | D | |
| 8.5KVA | 180A | 400AH | 4AWG*2 | 25*2 | 37 | 22 | 8.4 | 10~12 Nm |
| 11.0KVA | 220A | 600AH | 2AWG*2 | 35*2 | 37 | 22 | 8.4 | 10~12 Nm |

**Stripping Length:**




**Terminal size:**




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

Recommended AC input and output cable size for each inverter:

| Model | Gauge | Torque Value |
|---|---|---|
| All Model | 6 AWG | 1.2~ 1.4Nm |

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

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

**CAUTION!!** Please install the breaker at the battery and AC input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or AC input. The recommended mounted location of the breakers is shown in the figures in Point 5.

Recommended breaker specification of battery for each inverter:

| Model | 1 unit* |
|---|---|
| 8.5KVA | 200A/60VDC |
| 11.0KVA | 250A/60VDC |

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

Recommended breaker specification of AC input with single phase:

| Model | 2 units | 3 units | 4 units | 5 units | 6 units |
|---|---|---|---|---|---|
| All Model | 100A | 150A | 200A | 250A | 300A |

**Note1:** Also, you can use 63A breaker for only 1 unit, and each inverter has a breaker at its AC input.

Recommended battery capacity

| Inverter parallel numbers | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Battery Capacity | 800AH | 1200AH | 1600AH | 2000AH | 2400AH |

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

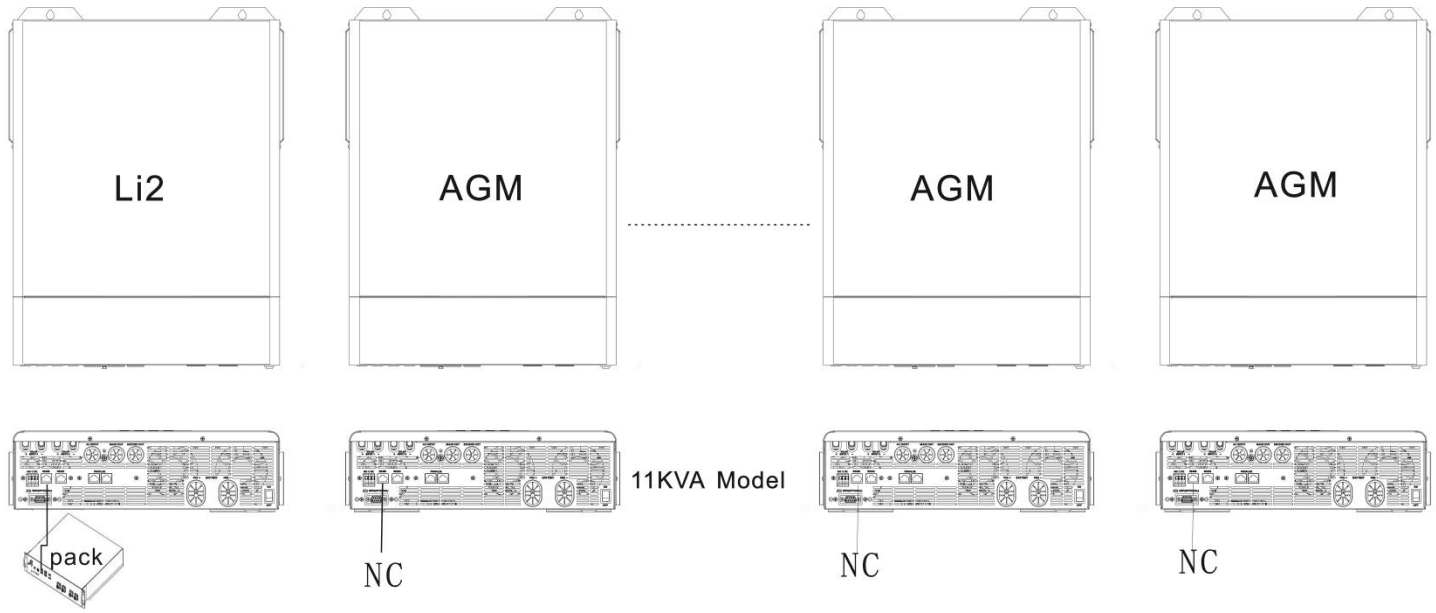
**Communicating with battery BMS in parallel system**

1. Only support common battery installation

2. 2. Use RJ45 cable to connect any one of inverters (no need to connect to a specific inverter) and Lithium battery.

3. Simply set this inverter battery type to "Li 2" in LCD program 01(F2). Others should be default value "AGM".

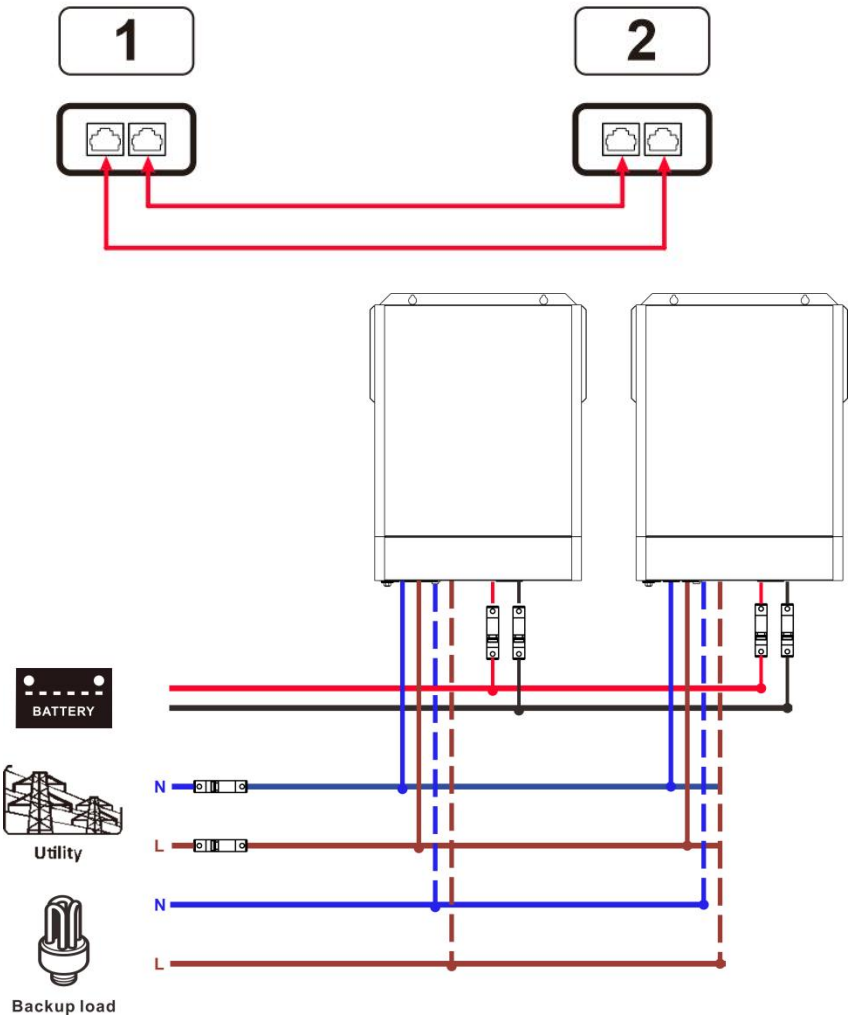
**Note:** Make sure only one inverter is connected RJ45 cable and only the one is set as Lithium in LCD program 01(F2).



# Parallel Operation in Single phase

Two inverters in parallel:

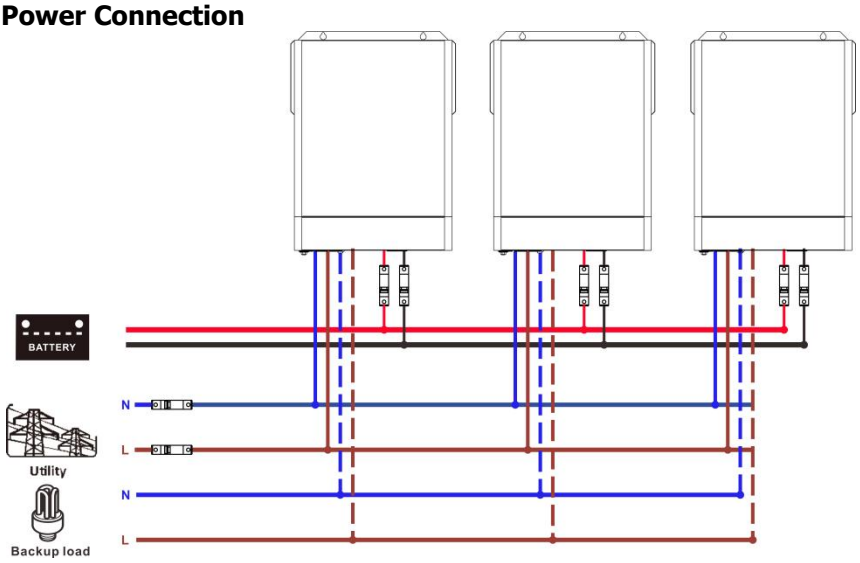
**Power Connection**



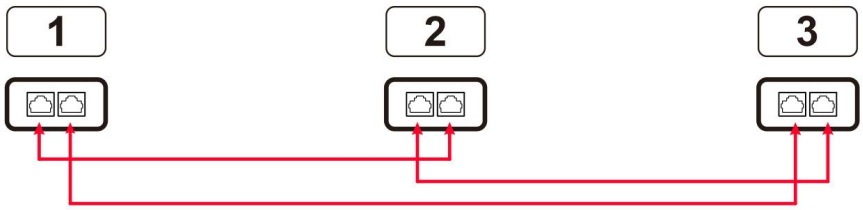

**Communication Connection**

Three inverters in parallel:

**Power Connection**

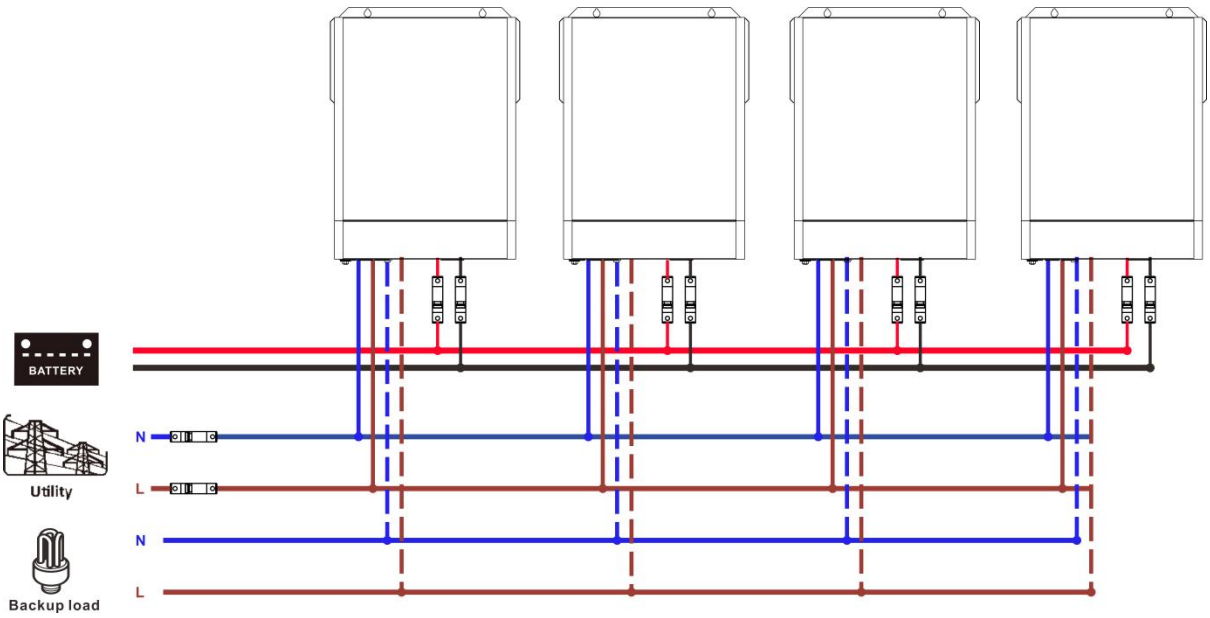



**Communication Connection**




Four inverters in parallel:

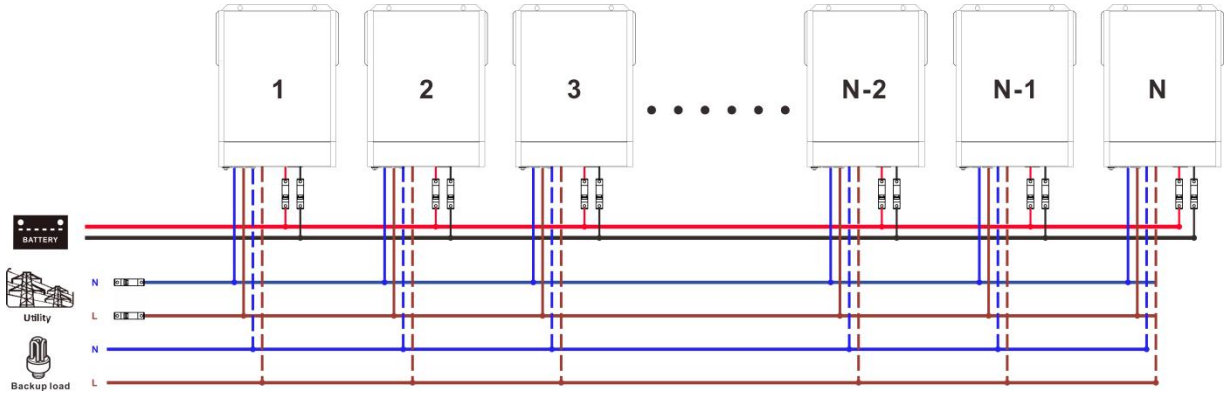
**Power Connection**



Communication Connection

More than four inverters in parallel:

**Power Connection**



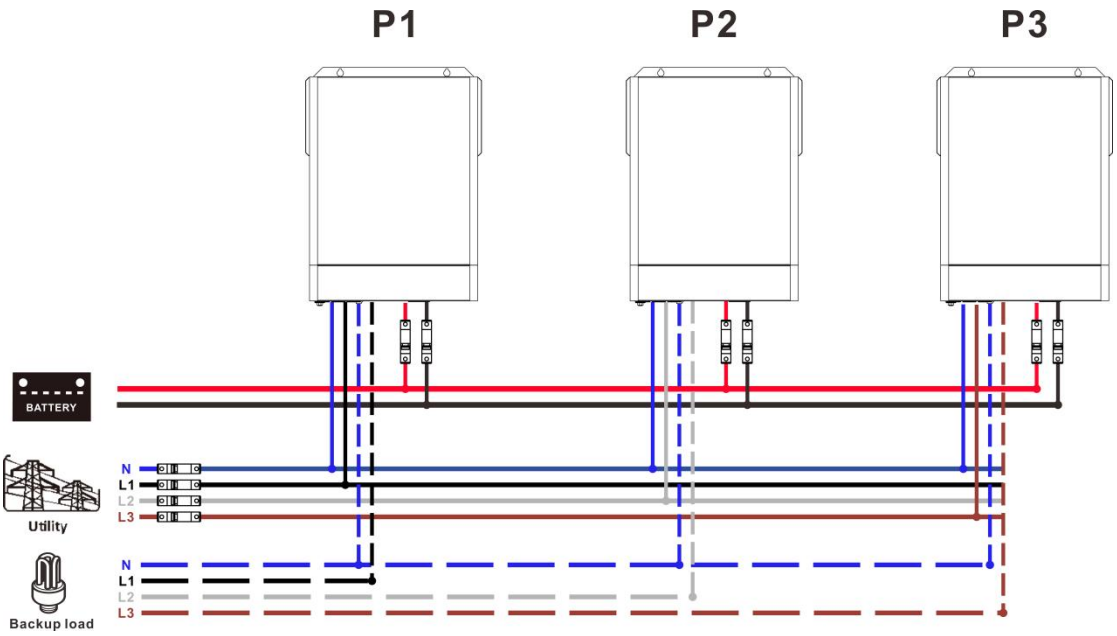

**Communication Connection**

**Note: Nmax=**6units.

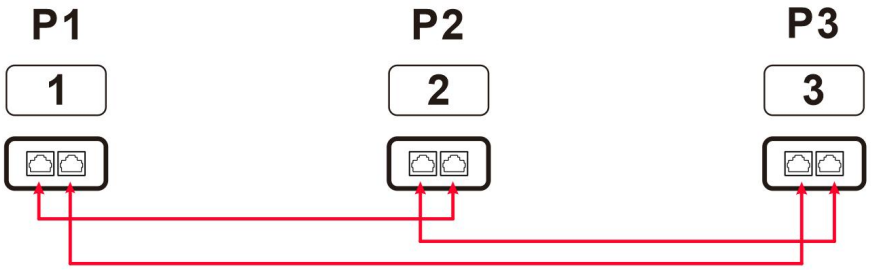
# Support 3-phase equipment

One inverter in each phase:

**Power Connection**




**Communication Connection**



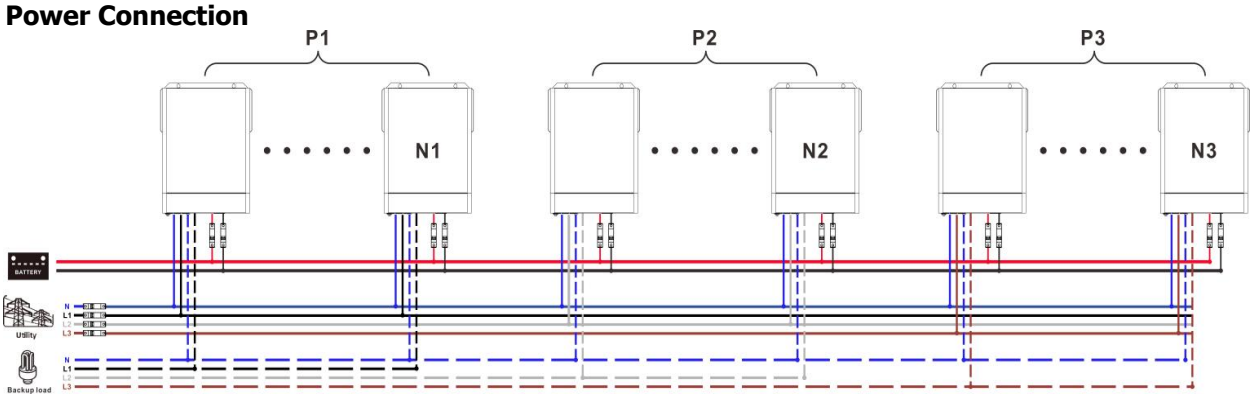
More than three inverters in three phases:

**Note:** It's up to customer's demand to pick 4 inverters in any phase.

P1: L1-phase, P2: L2-phase, P3: L3-phase.

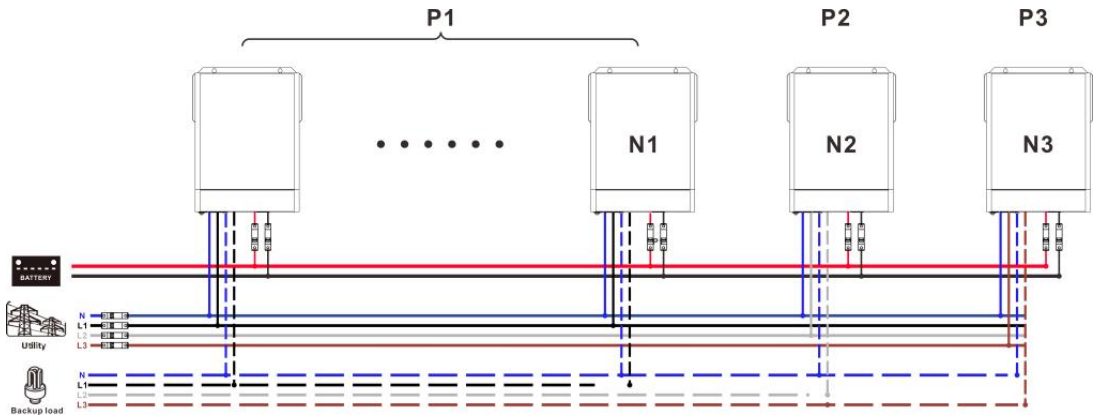
**N=N1+N2+N3, Nmax=6units.**

**Power Connection**



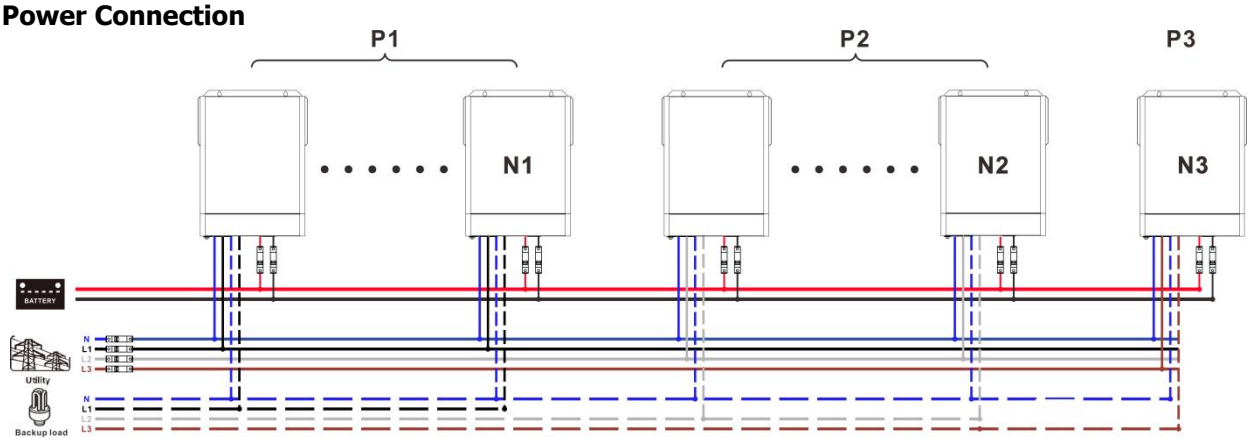

**N1max=4 units is in one phase and one inverter for the other two phases（N2=N3=1）:**

**Power Connection**




**N1max or N2max 4units is in one phase and one inverter for the P3 phase（N3=1）:**

**Power Connection**

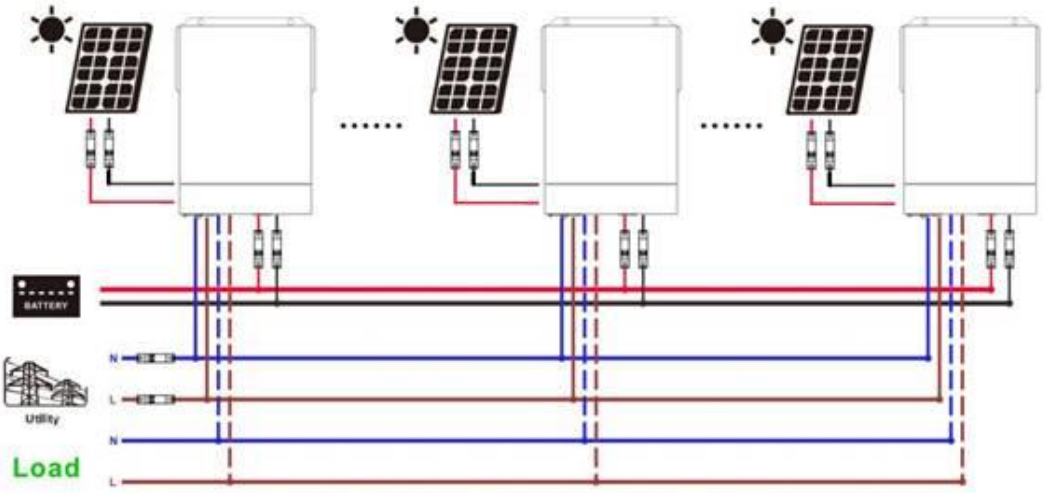



**Communication Connection**

## PV Connection

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

**CAUTION:** Each inverter should connect to PV modules separately.



# Commissioning

**Parallel in single/three phase**

Step 1: Check the following requirements before commissioning:

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

Step 2: Turn on each unit and set "PAL" or "3Px" in LCD setting program 02(F1) of each unit. And then shut down all units.

**NOET:** It's necessary to turn off each unit (Keep power on) when setting LCD program. Otherwise, the setting cannot be programmed.

Step 3: Turn on each unit.

**NOTE:** Master and slave units are randomly defined. If it is master, the icon P flashes, if it is slave unit, the icon P normally on.

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 detecting AC connection, they will work normally.

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.

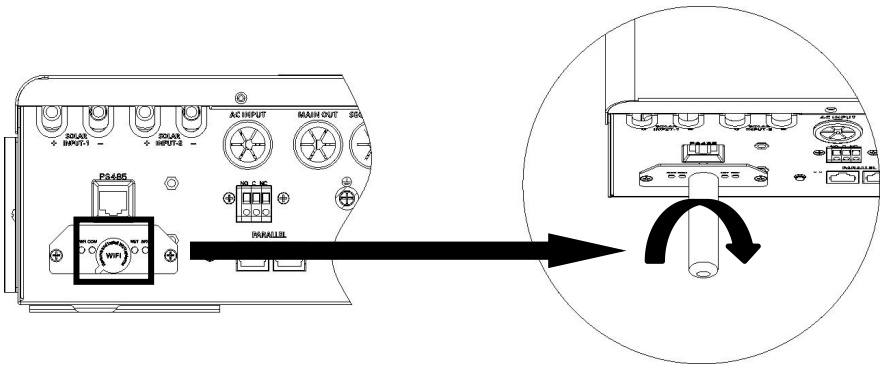
# Trouble shooting

| Situation | | Solution |
|---|---|---|
| Fault Code | Fault Event Description | |
| E0 | Host data loss | 1. Check if communication cables are connected well and restart the inverter.<br>2. If the problem remains, please contact your installer. |
| E1 | Synchronization data loss | 1. Check if communication cables are connected well and restart the inverter.<br>2. If the problem remains, please contact your installer. |
| E2 | Incompatible battery type | 1. Check the battery type setting to ensure that only the device connected to the BMS in the system is one of Li1 or Li2 or Li3<br>2. If the problem remains, please contact your installer. |
| E3 | Firmware version inconsistent | 1. Update all inverter firmware to the same version.<br>2. Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update.<br>3. After updating, if the problem remains, please contact your installer. |

| Situation | | Solution |
|---|---|---|
| Warning Code | Warning Event Description | |
| 0E | CAN communication loss | 1. Check if communication cables are connected well and restart the inverter.<br>2. If the problem remains, please contact your installer. |
| 1E | AC output mode setting is different. | 1. Switch off the inverter and check LCD setting program 02(F1).<br>2. For parallel system in single phase, make sure "PAL" is set on program 02(F1).<br>3. If the problem remains, please contact your installer. |
| 2E | The battery voltage of each inverter is not the same. | 1. Make sure all inverters share same groups of batteries together.<br>2. Remove all loads and disconnect AC input and PV input. Then, check battery voltage of all inverters. If the values from all inverters are close, please check if all battery cables are the same length and same material type. Otherwise, please contact your installer to provide SOP to calibrate battery voltage of each inverter.<br>3. If the problem remains, please contact your installer. |

# Wi-Fi Plug Pro Quick Installation Guideline

1.Schematic diagram of the Remove and install the wireless antenna

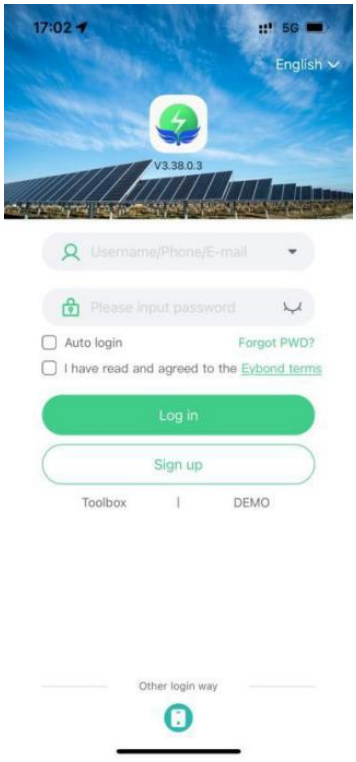


2.1 Download the APP

(1) Scan the QR code and download the APP (iPhone App Store; Android phone);

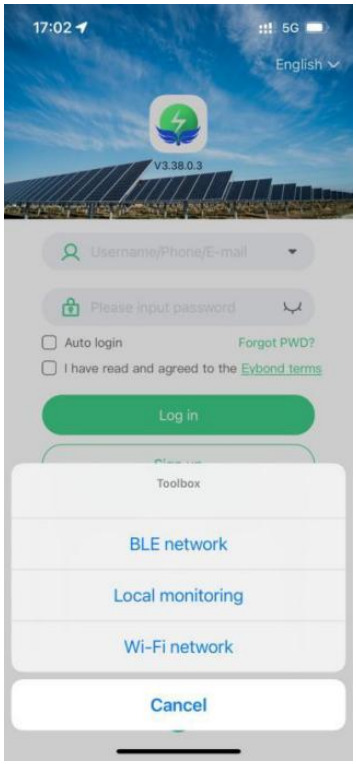
(2) Open the APP, click the "Registration" button, and select "Mobile phone Registration" or "Email Registration";

(3) Turn on Bluetooth or WiFi as needed.

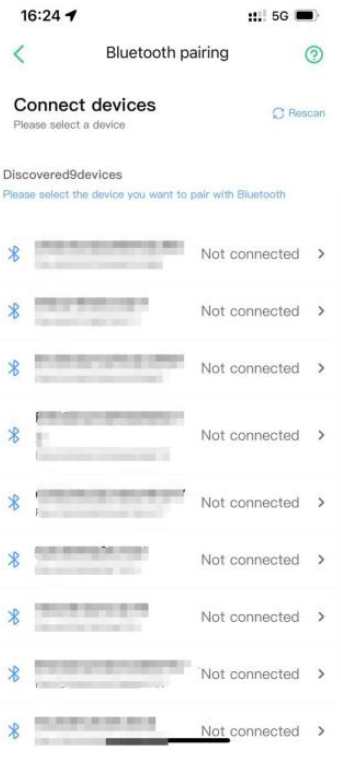


2.2 Bluetooth connected to the digital collector

(1) Click the "Toolbox" and select "BLE network" or "Wi-Fi network" as required;



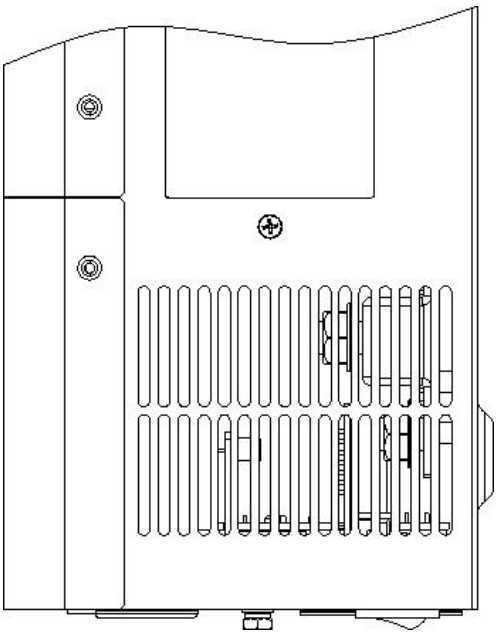

（2）If you choose the Bluetooth distribution network, you will automatically scan the nearby device on the "Bluetooth Pairing" page, find the PN corresponding to the digital collector, and click "Connect".

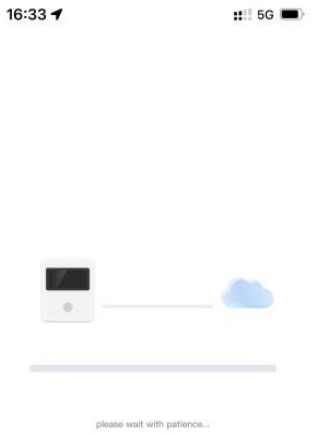
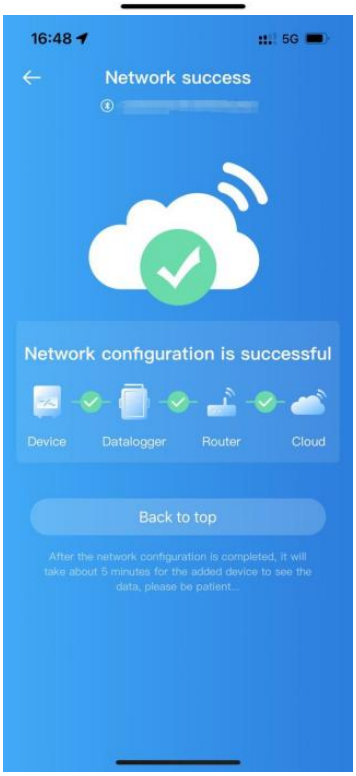
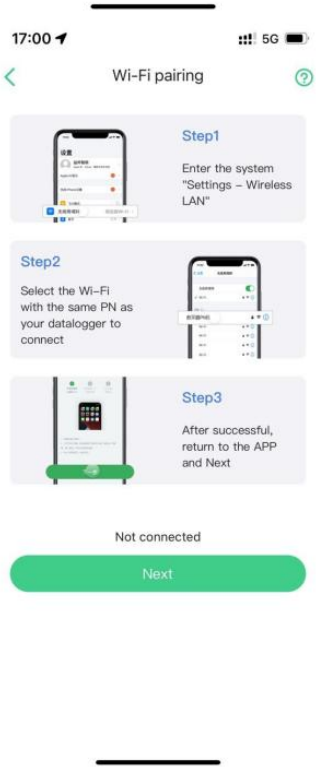


3. Add Datalogger

① Login the account and click the Datalogger button.Tap the"+" button on the top-right corner of the dataloager pag

② According to the prompts,type in the information to finish add datalogger The PN number is located next to the machine appliance label. (InitialPassword:12345678）



4. Networking Settings

(1) Select the corresponding 2.4G WiFi according to the prompts, fill in the password and click "Start Connecting to the Network"; prompt on the WiFi distribution network reference APP page.