MUST®

100% PURE SINE WAVE HOME INVERTER

USER'S MANUAL

ENERGY STORAGE SYSTEM

3.5/5.5KW

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Appliances



4200-100008-0000

Table Of Contents

1 ABOUT THIS MANUAL 1
1.1 Purpose 1
1.2 Scope 1
2 SAFETY INSTRUCTIONS 1
3 INTRODUCTION 2
3.1 Features 2
3.2 Basic System Architecture 2
3.3 Product Dimension 4
3.4 Product Overview 5
3.5 Par List 6
4 INSTALLATION 6
4.1 Safety 6
4.2 Installation Location 6
4.3 Tools 7
4.4 Installation Steps 8
5 ELECTRICAL CONNECTION 10
5.1 Safety 10
5.2 System Diagram 10
5.3 Grounding 11
5.4 AC Input/Output Connection 11
5.5 PV Connection 13
5.6 Dry Contact Signal 14
6 OPERATION 15
6.1 Power ON 15
6.2 Power OFF 15
6.3 Display Panel 15
6.4 Display Setting 17
6.5 Operating Mode Description 18
6.6 LCD Setting 19
6.7 Connect to PC 25
6.8 Connect to Wi-Fi 25
6.9 Fault Reference Code 26
6.10 Warning Indicator 27
6.11 Trouble Shooting 28
7 SPECIFICATIONS 29
Table 1 Line Mode Specifications 29
Table 2 Charge Mode Specifications 30
Table 3 Battery Mode Specifications 31
Table 4 Battery Specifications 31
Table 5 General Specifications 31
8 Wi-Fi QUICK INSTALLATION GUIDELINE 32

1 ABOUT THIS MANUAL

1.1 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.

1.2 Scope

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

The following cases are not within the scope of warranty:

(1) Out of warranty.
(2) Series number was changed or lost.
(3) Battery capacity was declined or external damaged.
(4) Inverter was damaged caused of transport shift, remissness, ect external factor.
(5) Inverter was damaged caused of irresistible natural disasters.
(6) Not in accordance with the electrical power supply conditions or operate environment caused damage.

2 SAFETY INSTRUCTIONS



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

1. Before using this device, read all instructions and cautionary markings on the device and all appropriate sections of this manual.
2. Do not disassemble the device. 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.
3. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the device will not reduce this risk.
4. **CAUTION** – Only qualified personnel can install this device.
5. **NEVER** charge a frozen battery.
6. For optimum operation of this device, please follow required spec to select appropriate cable size. It's very important to correctly operate this device.
7. 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.
8. 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.
9. Fuses (1 piece of 200A,63VDC for 5.5KW and 3.5KW) are provided as over-current protection for the battery supply.
10. **GROUNDING INSTRUCTIONS** -This device should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this device.
11. **NEVER** cause AC input/output and DC input short circuited. Do NOT connect to the mains when AC input/output and DC input short circuits.
12. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this device back to local dealer or service center for maintenance.

3 INTRODUCTION

This is a multi-functional photovoltaic energy storage power station, integrated with Long-life Lithium battery, MPPT solar charge controller, high frequency pure sine wave inverter into one. 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. It is suitable for backup electric compartment and spontaneous self-use system.

Lithium battery pack adopts long-life cells and smart BMS, so that it has good performance and higher safety. MPPT solar charge controller adopts advanced MPPT method and intelligent battery management design, which ensures the acquisition of maximum energy. High frequency pure sine wave inverter adopts high frequency design, achievement high rate density, small size, simple operation and other advantages. The whole machine has high efficiency and small the empty load loss.

3.1 Features

- Pure sine wave inverter
- Dual AC output
- Long-life Lithium battery pack with smart BMS
- Smart battery charger design for optimized battery performance
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/ Over temperature/ short circuit protection
- Cold start function
- Built-in bluetooth and WI-FI
- Installation on wall or on the ground

3.2 Basic System Architecture

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

Generator or Utility.

PV modules (option)

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

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

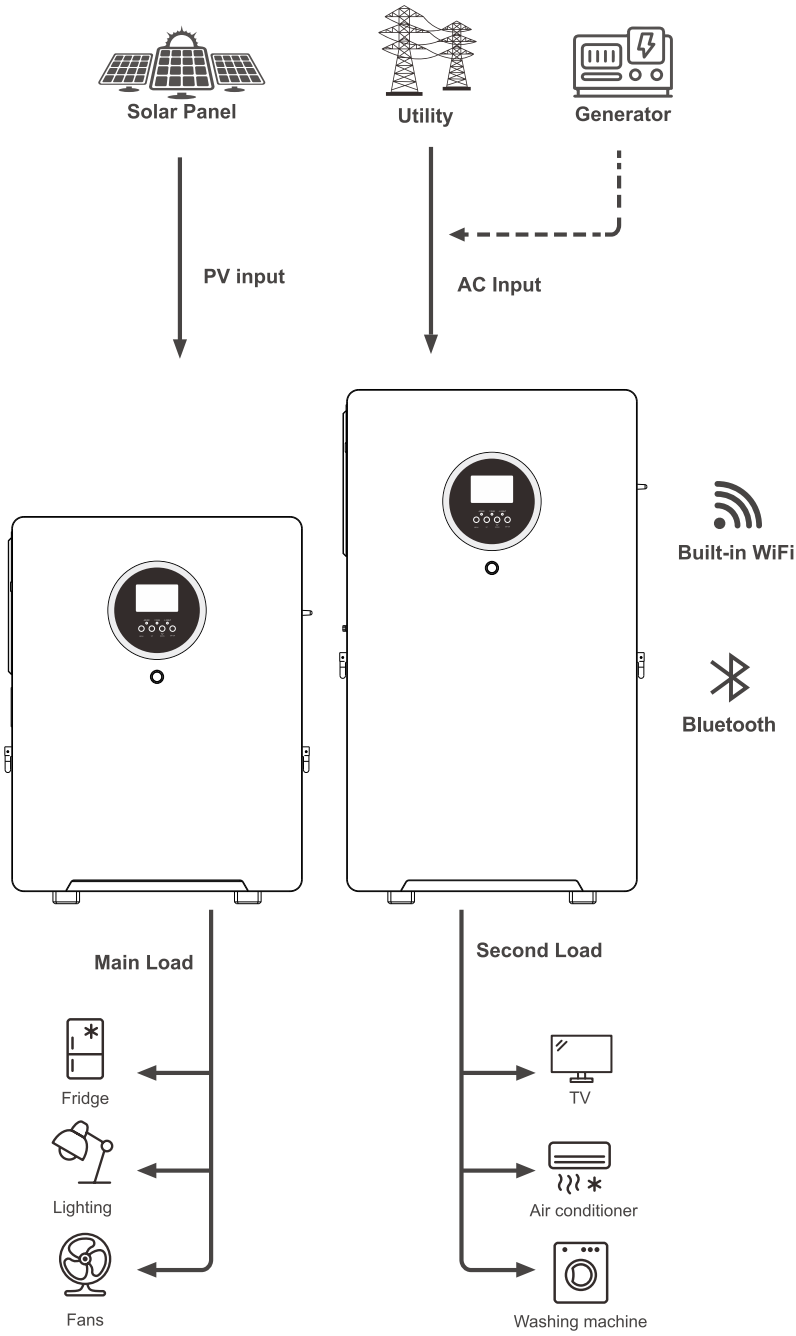
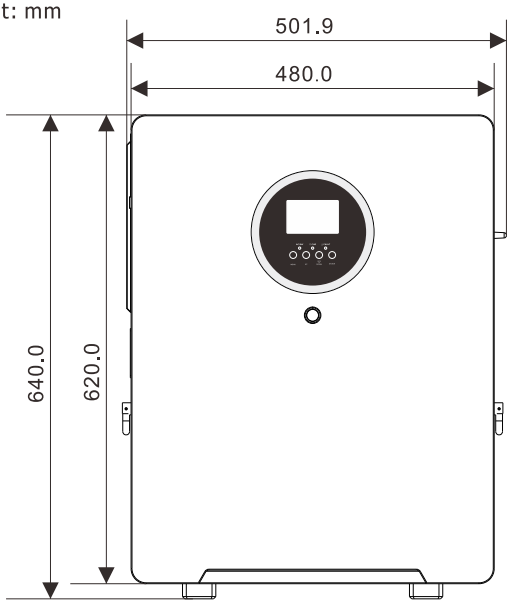
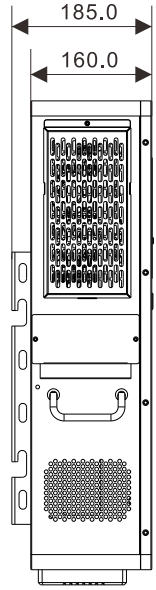


Figure 3-1 System Diagram

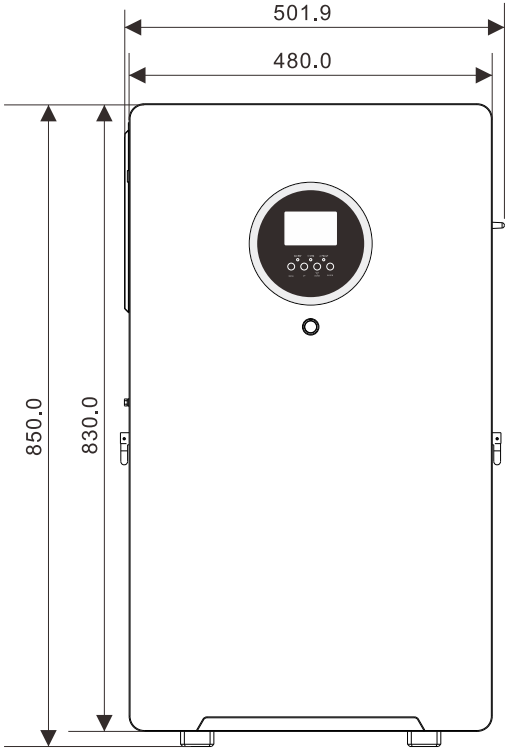
3.3 Product Dimension

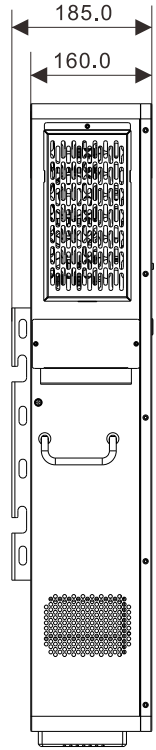
Unit: mm





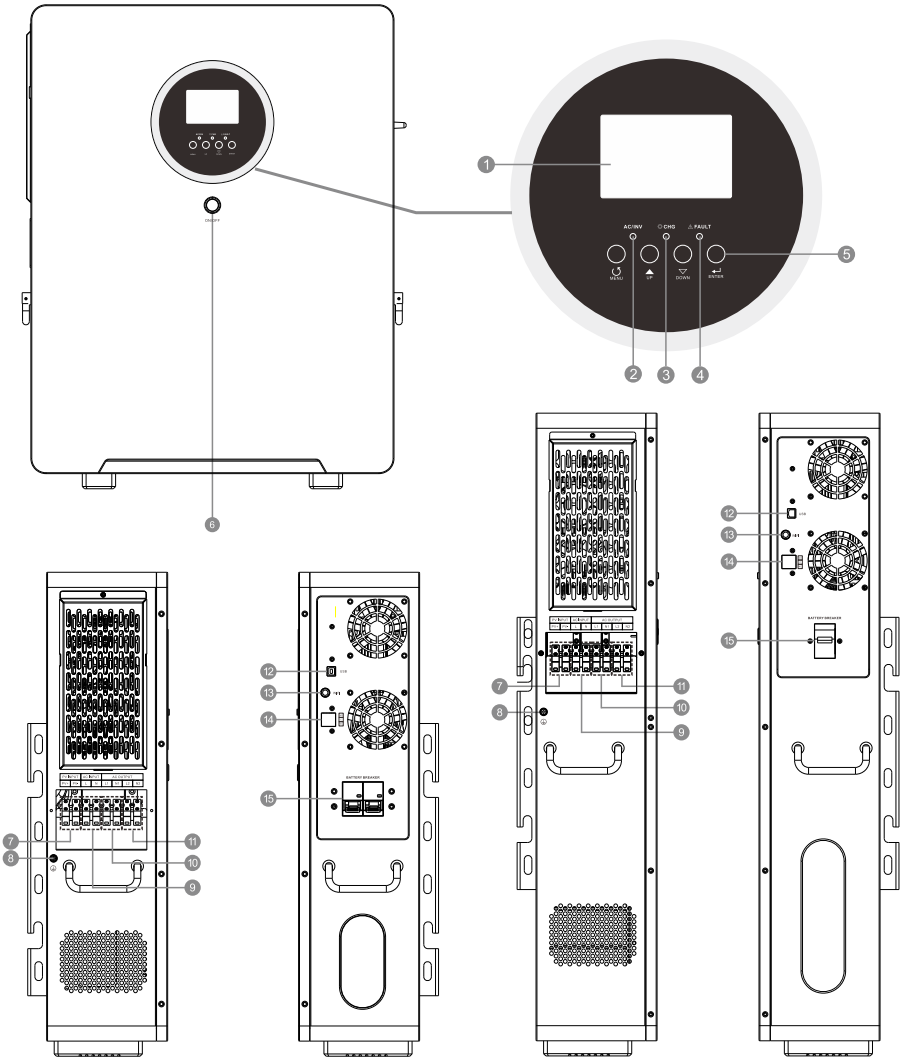
3.5KW Model





5.5KW Model

3.4 Product Overview

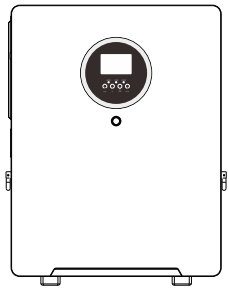
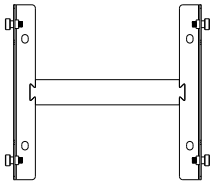
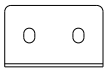


3.5KW Model **5.5KW Model**

1. LCD Display
2. Status Indicator
3. Charging Indicator
4. Fault Indicator
5. Function Buttons
6. Power ON/OFF Switch
7. PV input
8. Gounding Screw
9. AC input
10. AC Output(Main Load)
11. AC Output(Second Load)
12. USB Communication Port
13. WI-FI Antenna
14. Dry Contact
15. Battery Breaker

3.5 Part List

Items contained in the package are shown in the table below.

			
Machine X 1	Mounting bracket X 1	USB cable X 1	User manual X 1
			
Fix block X 1	Wi-Fi antenna X 1	Ring terminal X 3	Blasting screw X 4

4 INSTALLATION

4.1 Safety

⚠	**DANGER** **Danger to life due to fire or explosion** Despite careful construction, electrical devices can cause fires. Do not install the device where flammable materials are stored. Do not mount the device on flammable construction materials.
⚠	**DANGER** All electrical installations shall be done in accordance with the local and national electrical codes. Do not remove the casing. Inverter and battery contain no user serviceable parts. All wiring and electrical installation should be conducted by a qualified service personnel.

4.1 Installation Location

This is guidance for installer to choose a suitable installation location, to avoid potential damages to device and operators.

- The installation location must be flat and level, and suitable for the device's weight and dimensions for a long period of time.
- Select the installation location where the status display can be easily viewed.
- The humidity of the installation location should be 0~95% without condensation.
- The installation location must be free and safe to access at all times.
- Don’t put anything on top of or cover the device.
- Do not install the unit near television antennae or any other antennae/antennae cables.
- The device requires adequate cooling space. Ensure good ventilation for the inverter to ensure the heat escape adequately. The ambient temperature should be below 40°C to ensure optimum operation.
- The device should not be installed in direct sunlight and should have some coverage from the elements.

- Observe the minimum clearances to walls, other objects as shown in the diagrams and figure below in order to guarantee sufficient heat dissipation.

Direction	Min. clearance(mm)
Top	300
Sides	300
Front	300

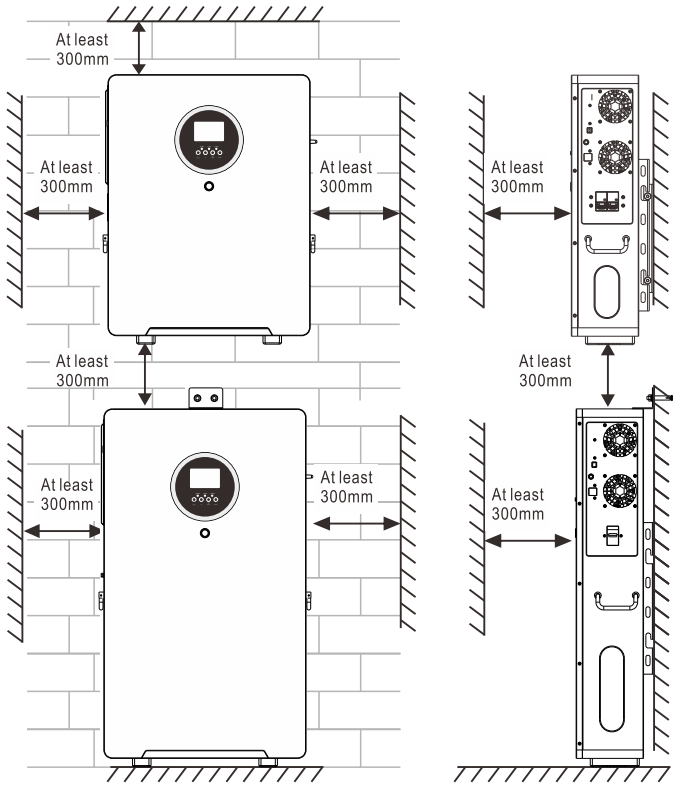
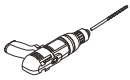
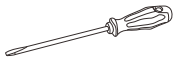
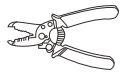
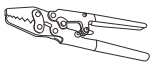
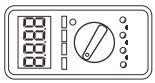


Figure 4-1
Installation
Clearance

4.2 Tools

Please refer to the tools that will be used during installation in the following table.

Object	Tool	Model	Function
1		Hammer drill Recommend drill dia.10mm	Drill holes on the wall
2		Screwer	Lock the screws
3		Wire stripper	Strip wire
4		Crimping tools	To crimp power cables
5		Multimeter	Measuring voltage

4.3 Installation Steps

Notice: You can install the device on the wall or on the ground.

A. Installation On the Ground

- **Step 1** Remove the device from the package. Check if the device's appearance is intact, and check if all items in the part list are in the package.

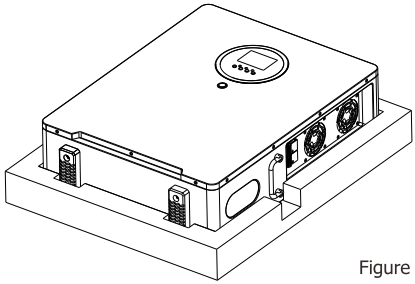


Figure 4-2

- **Step 2** Assemble the fixed block on the top of the device.

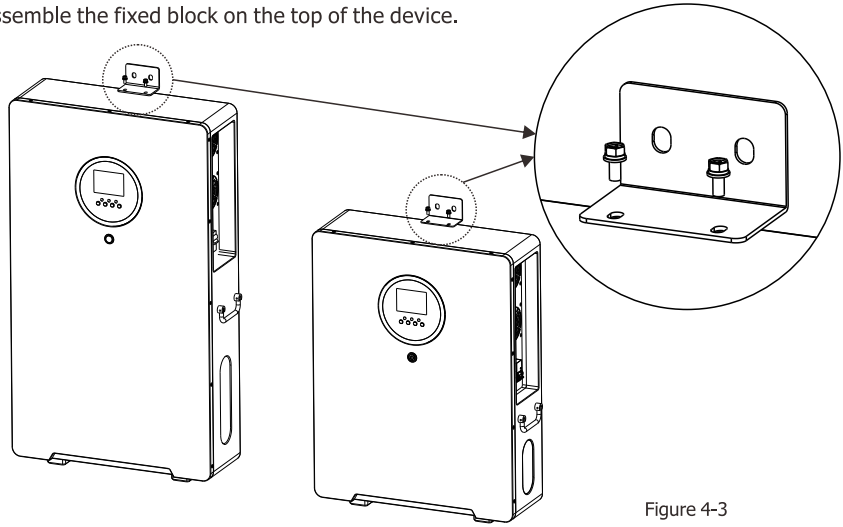


Figure 4-3

- **Step 3** Place the device parallel to the wall. Mark the holes position on the wall. Use a Φ10mm drill to drill holes at a depth of about 70mm in the wall for subsequent fixation of the fixed block.

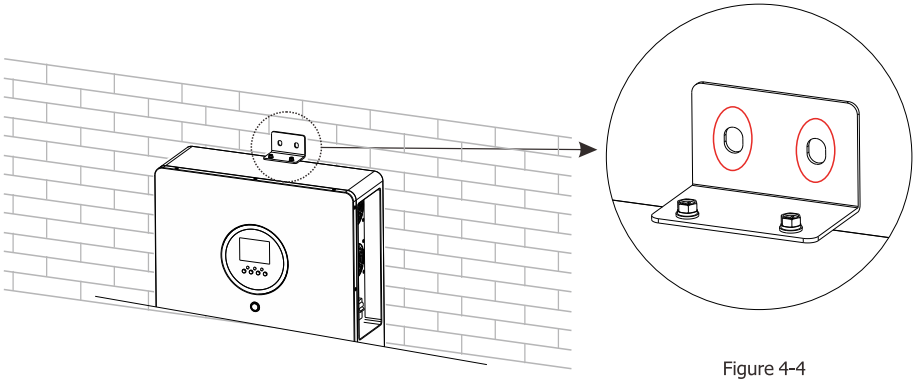


Figure 4-4

• **Step 4** Use blasting screws to fix the device to the wall to prevent it from dumping.

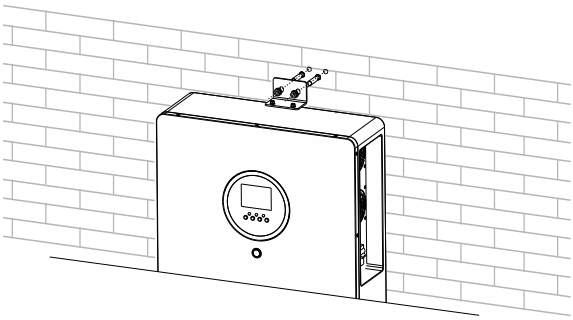


Figure 4-5

B. Installation On the Wall

• **Step 1** Remove the device from the package. Check if the device's appearance is intact, and check if all items in the part list are in the package.

• **Step 2** Choose a suitable height to install the mounting bracket. Mark the holes position on the wall. The dimension of bracket is shown below.

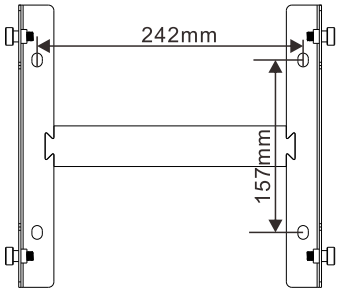


Figure 4-6

• **Step 3** Use a Φ10mm drill to drill holes at a depth of about 60mm in the wall for subsequent fixation of the mounting bracket.

• **Step 4** Use blasting screws to fix the mounting bracket to the wall.

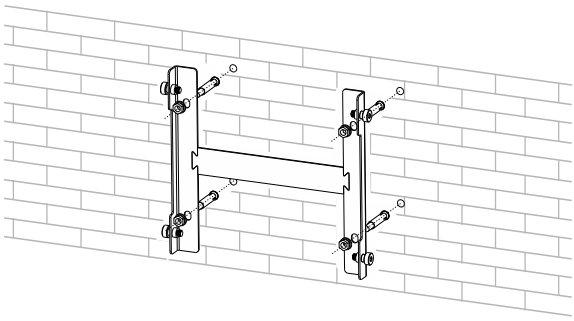


Figure 4-7

• **Step 5** Hang the device onto the mounting bracket and adjust the position.

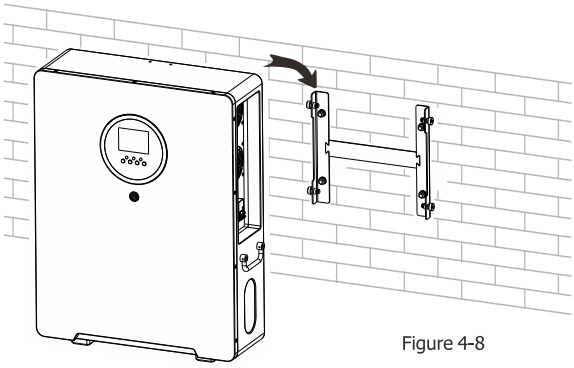


Figure 4-8

5 ELECTRICAL CONNECTION

5.1 Safety

⚠	**DANGER** **Danger to life due to lethal voltages!** High voltages which may cause electric shocks are present in the conductive parts of the inverter. Prior to performing any work on the device, disconnect the device on the AC side, PV side. **Danger of damage to electronic components due to electrostatic discharge.** Take appropriate ESD precautions when replacing and installing the device.
⚠	**WARNING** **Grounding** Before connecting the power cables, you much connect ground wire first.
⚠	**NOTE** The electrical connection must be carried out by professional technicians. Professional personnel must wear personal protective equipment such as insulating gloves, insulating rubber shoes and safety helmet when making electrical connections. Electrical connections should follow appropriate rules such as conductor cross-sectional area, fuses, and grounding protection.

5.2 System Diagram

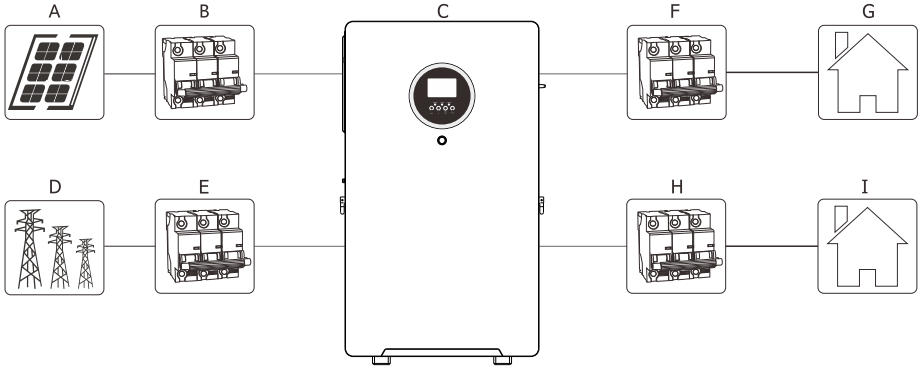


Figure 5-1

Position	Description
A	PV module
B	PV side breaker
C	Energy storage system
D	Utility grid
E	AC input breaker
F	AC output breaker (Main load)
G	Main load
H	AC output breaker (Second load)
I	Second load

5.3 Grounding

The device must be connected to the AC grounding conductor of the power distribution grid via the ground screw (PE) ⏚.Use ring terminals contained in the package to crimp the contact.
To reduce risk of injury, please use the proper recommended cable size as below.

Model	Gauge	Torque Value
3.5KW	12 AWG	1.4~ 1.6Nm
5.5KW	10 AWG	

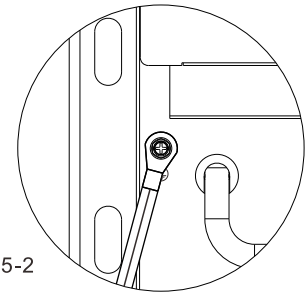


Figure 5-2

5.4 AC Input/Output Connection

⚠ **CAUTION!!** Before connecting to AC input power source, please install a separate AC breaker between the device and AC input power source. This will ensure the device can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 40A for 3.5KW model and 63A for 5.5KW model.
CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT misconnect input and output connectors.

⚠ **WARNING**
All wiring must be performed by a qualified personnel.
It's very important for system safety and efficient operation to use appropriate cable for AC input and output connection.

Please use the proper recommended cable size as below.

Model	Gauge	Torque Value
3.5KW	12 AWG	1.4~ 1.6Nm
5.5KW	10 AWG	

Before making AC input/output connection, be sure that battery breaker is OFF. Please follow below steps to implement AC input/output connection:
●**Step1** Take off the terminal cover as shown as figure 5-3.

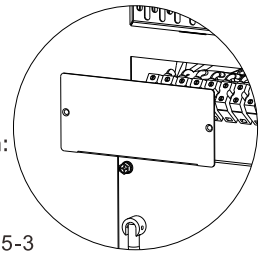
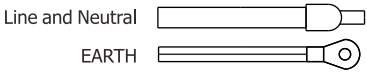


Figure 5-3

●**Step2** Remove insulation sleeve about 10mm for conductors.
●**Step3** Insert the conductor of Line and Neutral into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.
●**Step4** Insert the conductor of Grounding into the ring terminal and crimp the contact.



●**Step5** Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor first.

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

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

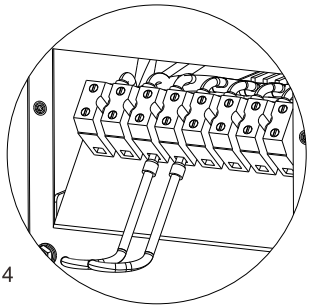


Figure 5-4

●**Step6** 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)**

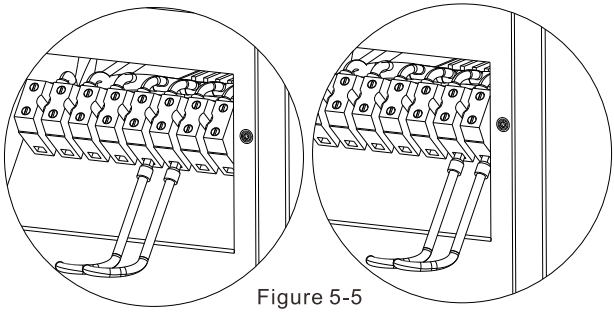


Figure 5-5

●**Step7** 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 working in parallel 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.

5.5 PV Connection

⚠	**CAUTION:** Important Please install separately a DC circuit breaker between inverter and PV modules. It's very important for system safety and efficient operation to use appropriate cable for PV module connection.

⚠	**WARNING: Shock Hazard** Risk of electric shock and fire, use only with PV modules, and with a maximum system voltage of 500Vdc.All wiring must be performed by a qualified personnel. It's very important for system safety and efficient operation to use appropriate cable for PV module connection.

5.5.1 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 system.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.
3. Max. Power Voltage (Vmpp) of PV modules should be close to best Vmp of inverter or within Vmp range to get best performance. If one PV module can not meet this requirement, it's necessary to have several PV modules in series connection. Refer to below table.

Note:* Vmp: panel max power point voltage.

The PV charging efficiency is maximized while PV system voltage is close to Best Vmp.

Maximum PV module numbers in Series: Vmpp of PV module*X pcs = Best Vmp of Inverter or Vmp range

PV module numbers in Parallel: Max. charging current of inverter/Impp

Total PV module numbers=maximum PV module numbers in series*PV module numbers in parallel

Solar Charging Mode		
MODEL	**3.5KW**	**5.5KW**
Max. PV Array Open Circuit Voltage	450Vdc	
PV Array MPPT Voltage Range	60~360Vdc	
Typical PV Input Current	18A	27A
Nominal Battery voltage	25.6Vdc	51.2Vdc
Max. Charging Current	100A	

Recommended PV module configuration

PV Module Spec (reference) Maximum Power (Pmaxl): 425W Max. Power Voltage Vmpp(V) :38.6V Max. Power Current Impp(A) :11.02A Open Circuit Voltage Voc(V) :45.80V Short Circuit Current Isc(A) :11.81A	Total solar input power	Solar input	Q'ty of modules
	2550W	6 pieces in series	6 pcs
	2975W	7 pieces in series	7 pcs
	3400W	8 pieces in series	8 pcs
	5100W	6pieces in series 2 strings in parallel	12 pcs
	5950W	7pieces in series 2 strings in parallel	14 pcs

5.5.2 Connecting PV Input Power Cables

To reduce risk of injury, please use the proper recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque Value
3.5KW	18A	12AWG	1.4 ~ 1.6 Nm
5.5KW	27A	10AWG	1.4 ~ 1.6 Nm

Please follow below steps to implement PV module connection:

- **Step 1** Remove cable glands from the positive and negative connectors.
- **Step 2** Insert the conductor into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.
- **Step 3** Insert PV input wires according to polarities indicated on terminal block and tighten the terminal screws.

PV+ →PV input Positive (Red) +
PV- →PV input Negative (Black) −

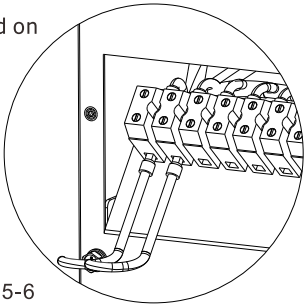


Figure 5-6

- **Step 4** Make sure the wires are securely connected.
- **Step 5** After connecting all AC and PV wirings, put the terminal cover back.

5.6 Dry Contact Signal

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.

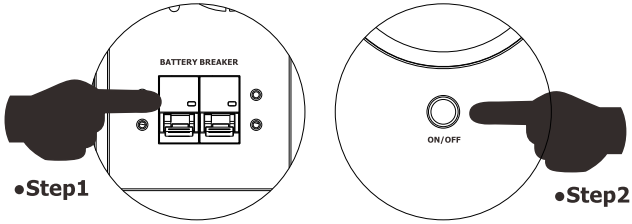
Unit status	Condition			Dry contact port: NC C NO	
				NC&C	NO&C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	output is powered from Utility			Close	Open
	Output is powered from Battery or Solar.	Program 37=VOL	Battery voltage<Setting value in Program 20	Open	Close
			Battery voltage>Setting value in Program 21	Close	Open
		Program 37=SOC	SOC of Lithium battery<5%+ Setting value in Program 38	Open	Close
			SOC of Lithium battery>35%+ Setting value in Program 38	Close	Open

6 OPERATION

6.1 Power ON

Once the device has been properly installed and the wirings are connected well, please follow below steps to turn on the device.

- **Step1** Close the battery breaker on the right side of the device.
- **Step2** Wait for a few seconds, switch the ON/OFF switch on the front of the device to turn it on.



- **Step3** Close the AC output breaker to get AC power from the device.
- **Step4** Close the PV input breaker to get power from PV module and charge the battery.
- **Step5** Close the AC input breaker to get power from grid and charge the battery.

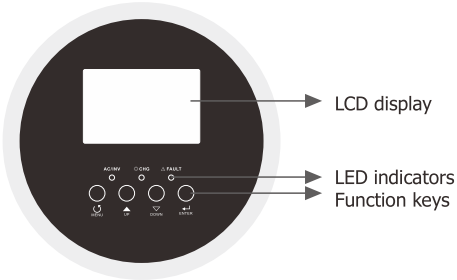
6.2 Power OFF

Please follow below steps to turn off the device.

- **Step1** Turn off all load and open the AC output breaker, do not open under load.
- **Step2** OPEN the PV input breaker.
- **Step3** OPEN the AC input breaker.
- **Step4** Switch the ON/OFF switch to turn off the device.
- **Step5** OPEN the battery breaker, if you don't use the device for a long time.

6.3 Display Panel

The operation and display panel, shown in figure below, includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



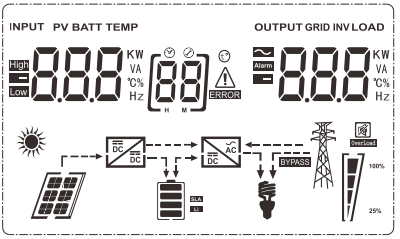
6.3.1 LED Indicator

LED Indicator			Messages
AC/ INV	Green	Solid On	Output is powered by grid in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Yellow	Flashing	Charging condition exists.
⚠ FAULT	Red	Solid On	Fault occurs in the device.
		Flashing	Warning condition occurs in the inverter.

6.3.2 Function Keys

Function Keys	Description
MENU	Enter reset mode or setting mode go to previous selection.
UP	Increase the setting data.
DOWN	Decrease the setting data.
ENTER	Enter setting mode and Confirm the selection in setting mode go to next selection or exit the reset mode.

6.3.3 LCD Display Icons



Icon	Function description
Input Source Information and Output Information	
	Indicates the AC information.
	Indicates the DC information.
KW VA ℃% Hz	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current. Indicate output voltage, output frequency, load in VA, load in Watt and discharging current.
Configuration Program and Fault Information	
	Indicates the setting programs.
ERROR	Indicates the warning and fault codes. Warning: flashing ⚠ with warning code. Fault: lighting ERROR with fault code.
Battery Information	
Li	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
Load Information	
OVER LOAD	Indicates overload.
100% 25%	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.

0%~24%	25%~49%	50%~74%	75%~100%

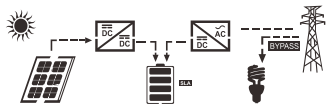
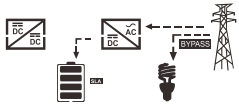
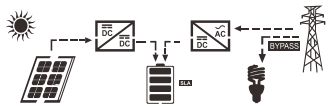
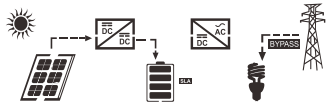
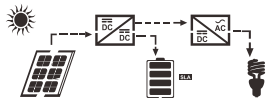
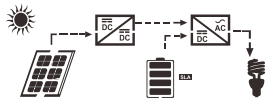
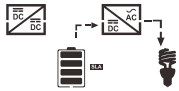
Mode Operation Information	
	Indicates unit connected to the mains.
	Indicates unit connected to the PV panel.
BYPASS	Indicates load is supplied by utility power.
	Indicates the solar charger is working.
	Indicates the DC/AC inverter circuit is working.
Mute Operation	
	Indicates unit alarm is disabled.

6.4 Display Setting

The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: battery voltage, battery current ,inverter voltage, inverter current, grid voltage, grid current, load in Watt, load in VA, grid frequency, inverter frequency, PV voltage, PV charging power, PV charging output voltage, PV charging current.

Selectable information	LCD display
Battery voltage/SOC from BMS	
Battery temperature/current from BMS	
Battery voltage/DC discharging current	
Inverter output voltage/Inverter output current	
Grid voltage/Grid current	
Load in Watt/VA	
Grid frequency/Inverter frequency	
PV voltage and power	
PV charger output voltage and MPPT charging current	

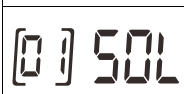
6.5 Operating State Description

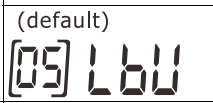
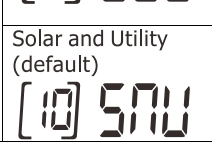
Operation state	Description	LCD display
Utility-Tie state	PV energy is charger into the battery and utility provide power to the AC load.	PV is on  PV is off 
Charge state	PV energy and grid can charge batteries.	
Bypass state	Error are caused by inside circuit error or external reasons such as over temperature, and so on.	
Off-Grid state	The device will provide output power from battery and PV power.	Inverter power loads from PV energy  Inverter power loads from battery and PV energy  Inverter power loads from battery only 
Stop mode	The device stop working if you turn off the device by the soft key or error has occurred in the condition of no grid.	

6.6 LCD Setting

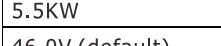
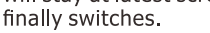
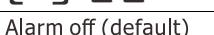
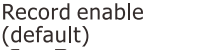
After pressing and holding "ENTER" button for 2 seconds, the unit will enter setting mode. Press "UP"or "DOWN" button to select setting programs. And then, press "ENTER" or "MENU" button to confirm the selection and exit.

Setting Programs:

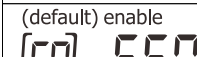
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection		Solar energy provides power to the loads as first priority. If battery voltage has been higher than the setting point in program 21 for 5 minutes, the inverter will turn to battery mode, solar and battery will provide power to the load at the same time. When the battery voltage drops to the setting point in program 20, the inverter will turn to bypass mode, utility provides power to the load only, and the solar will charge the battery at the same time.
			Solar energy provides power to the loads as first priority. If battery voltage has been higher than the setting point in program 21 for 5 minutes, and the solar energy has been available for 5 minutes too, the inverter will turn to battery mode, solar and battery will provide power to the load at the same time. When the battery voltage drops to the setting point in program 20, the inverter will turn to bypass mode, utility provides power to the load only, and the solar will charge the battery at the same time.
		(default) 	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.

02	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.
		VDE 	If selected, acceptable AC input voltage range will conform to VDE4105(184VAC-253VAC).
		GEN 	When the user uses the device to connect the generator, select the generator mode.
03	Output voltage		Set the output voltage amplitude, (220VAC-240VAC).
04	Output frequency	50HZ(default) 	60HZ 
05	Solar supply priority		Solar energy provides power to charge battery as first priority.
		(default) 	Solar energy provides power to the loads as first priority.
06	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable 	Bypass enable (default) 
07	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
08	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
10	Charger source priority: To configure charger source priority	If this device is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 	Solar energy and utility will charge battery at the same time.

		Only Solar 	Solar energy will be the only charger source no matter utility is available or not.
		If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
11	Maximum solar charging current （Max. charging current=utility charging current +solar charging current)	3.5KW/5.5KW	
		100A (default) 	Setting range is from 1 A to 100A. Increment of each click is 1A.
13	Maximum utility charging current (Max. charging current= utility charging current + solar charging current)	3.5KW	
		30A (default) 	Setting range is from 1 A to 60A. Increment of each click is 1A.
		5.5KW	
		60A (default) 	Setting range is from 1 A to 100A. Increment of each click is 1A.
17	Bulk charging voltage (C.V voltage)	3.5KW	
		28.2V (default) 	Setting range is from 24.0V to 29.2V. Increment of each click is 0.1V.
		5.5KW	
		56.4V (default) 	Setting range is from 48.0V to 58.4V. Increment of each click is 0.1V.
18	Floating charging voltage	3.5KW	
		27.0V (default) 	Setting range is from 24.0V to 29.2V. Increment of each click is 0.1V.
		5.5KW	
		54.0V (default) 	Setting range is from 48.0V to 58.4V. Increment of each click is 0.1V.
19	Low DC cut off battery voltage or SOC setting	3.5KW	
		22.4V (default) 	Setting range is from 20.0V to 24.0V. Increment of each click is 0.1V.
		5.5KW	
		44.8V (default) 	Setting range is from 40.0V to 48.0V. Increment of each click is 0.1V.

		10%(default) 	If program 37 is set to the SOC percentage method, the low DC cut-off SOC percentage will be able to be set. Setting range is from 0%-90%. Increment of each click is 1%
20	Low DC warning and battery stop discharging voltage when grid is available	3.5KW	
		23.0V (default) 	Setting range is from 22.0V to 29.0V.Increment of each click is 0.1V.Low DC warning voltage will be fixed to setting value.
		5.5KW	
		46.0V (default) 	Setting range is from 44.0V to 58.0V. Increment of each click is 0.1V. Low DC warning voltage will be fixed to setting value.
21	Low DC warning recover and battery stop charging voltage when grid is available	3.5KW	
		26.4V (default) 	Setting range is from 22.0V to 29.0V. Increment of each click is 0.1V. Low DC warning recover voltage will be fixed to setting value.
		5.5KW	
		52.8V (default) 	Setting range is from 44.0V to 58.0V. Increment of each click is 0. 1V. Low DC warning recover voltage will be fixed to setting value.
22	Auto turn page	(default) 	If selected, the display screen will auto turn the display page.
			If selected, the display screen will stay at latest screen user finally switches.
23	Backlight control	Backlight on 	Backlight off(default) 
24	Alarm control	Alarm on (default) 	Alarm off 
25	Beeps while primary source is interrupted	Alarm on 	Alarm off (default) 
27	Record Fault code	Record enable (default) 	Record disable 

<table>
<tr><td rowspan="2">28</td><td rowspan="2">Solar power balance: When enabled, solar input power will be automatically adjusted according to connected load power.</td><td>Solar power balance enable
  </td><td>If selected, the solar input power will be automatically adjusted according to the following formula: Max. Input solar power = Max. battery charging power + Connected load power when the machine in OffGrid workstate.</td></tr>
<tr><td>Solar power balance disable (default)
  </td><td>If selected, the solar input power will be the same to max. Battery charging power no matter how much loads are connected. The max.battery charging power will be based on the setting current in program 11 (Max. solar power = Max.battery charging power).</td></tr>
<tr><td>30</td><td>Battery equalization</td><td>Battery equalization
  </td><td>Battery equalization disable(default)
  </td></tr>
<tr><td rowspan="4">31</td><td rowspan="4">Battery equalization voltage</td><td colspan="2">3.5KW</td></tr>
<tr><td>28.8V (default)
  </td><td>Setting range is from 24.0V to 29.2V.
Increment of each click is 0.1V.</td></tr>
<tr><td colspan="2">5.5KW</td></tr>
<tr><td>57.6V (default)
  </td><td>Setting range is from 48.0V to 58.4V.
Increment of each click is 0.1V.</td></tr>
<tr><td>33</td><td>Battery equalization time</td><td>60min(default)
  </td><td>Setting range is from 5 min to 900min.
Increment of each clink is 5min.</td></tr>
<tr><td>34</td><td>Battery equalization timeout</td><td>120min(default)
  </td><td>Setting range is from 5 min to 900min.
Increment of each clink is 5min.</td></tr>
<tr><td>35</td><td>Equalization interval</td><td>30days(default)
  </td><td>Setting range is from 0 to 90days.
Increment of each clink is 1 day.</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
  </td><td>Disable(default)
  </td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If “Enable”is selected in this program, it’s to activate battery equalization immediately and LCD main page will shows “ E9 ”. If “Disable” is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, “ E9 ” will be shown in LCD main page too.</td></tr>
<tr><td>37</td><td>BMS control method</td><td>Voltage method(default)
  </td><td>SOC Percent method
  </td></tr>
</table>

38	SBU mode: Battery stop discharging percent When SOC is available	20 % (default) 	Setting range is from 5% to 95% Increment of each click is 1%.
39	SBU mode: Battery stop charging percent When SOC is available	95 % (default) 	Setting range is from 10% to 100% Increment of each click is 1%.
59	Dual output enable/disable	disable 	If disable,the second load will follow the main load.
		(default) enable 	If enable,the program 60 will work.
60	Second load DC cut-off battery voltage or SOC setting	3.5KW	
		23.0V (default) 	Setting range is from 22.0V to 29.0V. Increment of each click is 0.1V.
		5.5KW	
		46.0V (default) 	Setting range is from 44.0V to 58.0V. Increment of each click is 0.1V.
		25%(default) 	If program 37 is set to the SOC percentage method, the second load DC cut-off SOC percentage will be able to be set. Setting range is from 10% to 100% Increment of each click is 1%.

After pressing and holding "MENU" button for 6 seconds, the unit will enter reset model. Press "Up"and "DOWN" button to select programs. And then ,press "ENTER" button to exit.

	(default) 	Reset setting disable.
		Reset setting enable.

6.7 Connect to PC

Use the USB communication cable to connect the device and PC through USB-A communication port on the right side of the device.

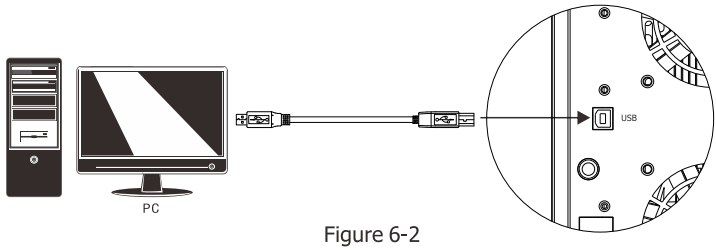


Figure 6-2

Download the software by link on the first page of this manual into PC and follow instruction on screen to install the monitoring software. You can monitor the status of the device on the PC.

For the detailed software operation, please consult the seller if you have any questions.

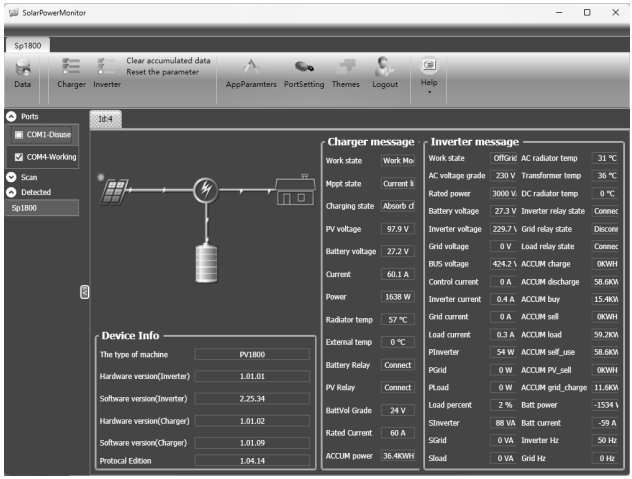


Figure 6-3

6.8 Connect to Wi-Fi

The device has a built-in Wi-Fi module. You can remotely monitor the status of the device on the cloud by connecting to the Wi-Fi network. If you want to use this function, please install the Wi-Fi antenna. The Wi-Fi quick installation guideline is on the last chapter of the manual, please refer to the guideline to connect to the Wi-Fi network.

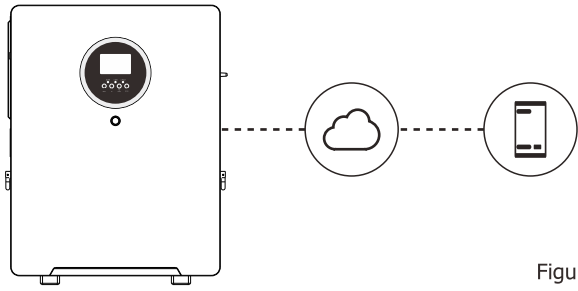


Figure 6-4

6.9 Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off	
02	Inverter transformer over temperature	
03	Battery voltage is too high or AC input L/N wires are reversed	
04	Battery voltage is too low	
05	Output short circuited	
06	Inverter output voltage is high	
07	Overload time out	
08	Inverter bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
21	Inverter output voltage sensor error	
22	Inverter grid voltage sensor error	
23	Inverter output current sensor error	
24	Inverter grid current sensor error	
25	Inverter load current sensor error	
26	Inverter grid over current error	
27	Inverter radiator over temperature	
31	Solar charger battery voltage class error	
32	Solar charger current sensor error	
33	Solar charger current is uncontrollable	
41	Inverter grid voltage is low	
42	Inverter grid voltage is high	

43	Inverter grid under frequency	
44	Inverter grid over frequency	
51	Inverter over current protection error	
52	Inverter bus voltage is too low or component temperature is to high	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Inverter control current sensor error	
58	Inverter output voltage is too low or component temperature is to high	

6.10 Warning Indicator

Warning Code	Warning Event	Icon on
61	Fan is locked when inverter is on.	
62	Fan 2 is locked when inverter is on.	
63	Battery is over-charged.	
64	Low battery.	
67	Overload.	
70	Output power derating.	
72	Solar charger stops due to low battery.	
73	Solar charger stops due to high PV voltage.	
74	Solar charger stops due to over load.	
75	Solar charger over temperature.	
76	PV charger communication error.	
77	Parameter error.	

6.11 Trouble Shooting

Problem	LCD/LED/Buzzer	Explanation/Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low.	1. Re-charge the battery. 2. Return to repair center if the error still exists.
No response after power on.	No indication.	1. Battery breaker is opend. 2.The battery voltage is far too low. 3.Ambient temperature is too high or too low. 4. Battery is protected by BMS.	1.Close the battery breaker. 2.Re-charge the battery. 3.Operate at the appro. ambient temperature. 4.Return to repair center if the error still exists.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input breaker is tripped.	Check if AC breaker is tripped or AC wiring is connected right .
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check generator (if applied) is working well or check if input voltage range setting is correct. (APL,GEN)
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LED are flashing.	Battery breaker is opened.	Close the battery breaker.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The device is overload 110% and time is up.	Reduce the connected load.
	Fault code 05	Output short circuited.	Check if wiring is connected right and remove abnormal load.
	Fault code 02	Internal temperature of device component is over 90℃.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 03	Battery is over charged.	Stop charging the battery.
		AC input L/N wires are reversed	Check AC input.
	Fault code 01	Fan fault.	Replace the fan.
	Fault code 06/58	Output abnormal .(Output voltage below than 95Vac or is higher than 150Vac)	1.Reduce the connected load. 2.Return to repair center if the error still exists.
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	1.Reduce the connected load. 2.Restart the unit. 3.Return to repair center if the error still exists.
	Fault code 52	Inverter bus voltage is too low or component temperature is to high.	
	Fault code 55	Output voltage is unbalanced.	
	Fault code 56	1.Battery breaker is opened 2.Battery is protected by BMS. 3.Fuse is burnt.	1.Close the battery breaker. 2.Re-charge the battery. 3.Return to repair center if the error still exists.

7 SPECIFICATIONS

Table 1 Line Mode Specifications

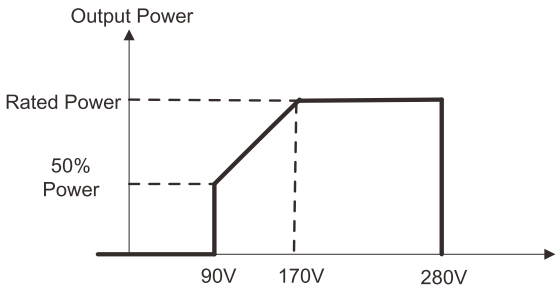
MODEL	3.5KW	5.5KW
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	90Vac±7V(APL,GEN); 170Vac±7V(UPS) 186Vac±7V(VDE)	
Low Loss Return Voltage	100Vac±7V(APL,GEN);180Vac±7V(UPS) 196Vac±7V(VDE)	
High Loss Voltage	280Vac±7V(APL, UPS,GEN) 253Vac±7V(VDE)	
High Loss Return Voltage	270Vac±7V(APL,UPS,GEN) 250Vac±7V(VDE)	
Max AC Input Voltage	300Vac	
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40Hz±1Hz(APL,UPS,GEN) 47.55Hz±0.05HZ(VDE)	
Low Loss Return Frequency	42Hz±1Hz(APL,UPS,GEN) 47.55Hz±0.05HZ(VDE)	
High Loss Frequency	65Hz±1Hz(APL,UPS,GEN) 51.5Hz±0.05HZ(VDE)	
High Loss Return Frequency	63Hz±1Hz(APL,UPS,GEN) 50.05Hz±0.05Hz(VDE)	
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms typical (UPS,VDE) 20ms typical (APL)	
Output power derating: When AC input voltage drops to 170V depending on models, the output power will be derated	230Vac model: 	

Table 2 Charge Mode Specifications

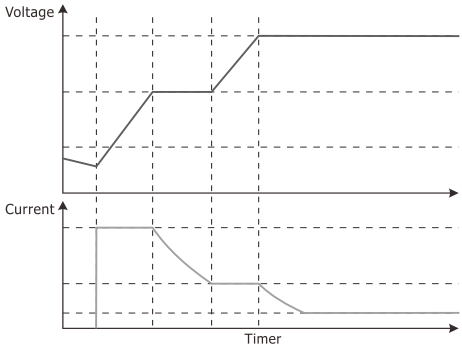
MODEL	3.5KW	5.5KW
Battery Voltage	25.6Vdc	51.2Vdc
Utility Charging Mode		
Max. Charging Current @Nominal Input Voltage	60A(±4A)	100A(±4A)
Charging Algorithm	4-Step	
Solar Charging Mode		
Max.PV Array Open Circuit Voltage	450Vdc	
Normal Operating Voltage Range	60-360Vdc	
Typical PV Input Current	18A	27A
Max. Charging Current	MPPT-100A (±4A)	
Charging Algorithm	4-Step	
Standby Power Consumption	2W	
Battery Voltage Accuracy	+/-0.3%	
PV Voltage Accuracy	+/-2.5V	
Joint Utility and Solar Charging		
Max Charging Current	100A(± 4A) (GRID:60A max)	100A(± 4A) (GRID:100A max)
Default Charging Current	100A(± 4A)	100A(± 4A)
Charging algorithm		

Table 3 Battery Mode Specifications

MODEL	3.5KW	5.5KW
Rated Output Power	3500W	5500W
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	50Hz or 60Hz	
Peak Efficiency	92%	
Overload Protection	1s@≥150% load;10s@105%~150% load	
Nominal DC Input Voltage	24Vdc	48Vdc
Cold Start Voltage	23.0Vdc	46.0Vdc
Low DC Warning Voltage	23.0Vdc(Settable)	46.0Vdc(Settable)
Low DC Cut-off Voltage	22.4Vdc	44.8Vdc
High DC Recovery Voltage	29Vdc	58Vdc
High DC Cut-off Voltage	30Vdc	60Vdc

Table 4 Battery Specifications

MODEL	3.5KW		5.5KW
Battery Chemistry	LiFePO4		
Nominal Voltage	25.6V		51.2V
Capacity	125Ah	200Ah	100Ah
Nominal Energy	3200Wh	5120Wh	5120Wh
Rated Charge/Discharge Current	125A	150A	100A
Recommend Depth of Discharge	90%		

Table 5 General Specifications

MODEL	3.5KW(125Ah)	3.5KW(200Ah)	5.5KW
Dimension (D*W*H), mm	648*480*185	850*480*185	850*480*185
Operating Temperature Range	Charge:0°C ~ 50°C Discharge:-10°C ~ 50°C		
Storage Temperature	-15°C~ 35°C		
Humidity	5%~95% RH (No condensation)		
Altitude Without Derating	2000m		
Protection Degree	IP20		
Safety Certification	CE		

8 Wi-Fi QUICK INSTALLATION GUIDELINE

8.1 Preparation

1.Ensure that the Wi-Fi antenna is properly installed .
2.The power of the device is on.
3.Ensure that there is a good Wi-Fi network at the location of the device.

8.2. Login and register

8.2.1 Sign up

Download and install the APP via scanning the QR code on the cover of the manual.
Open the APP and click the "Sign up" button to enter the registration page. You can register by your phone number or e-mail address , than click "Send" to get the verification code.After entering the verification code and login password, and click "Sign up" to complete the account registration.

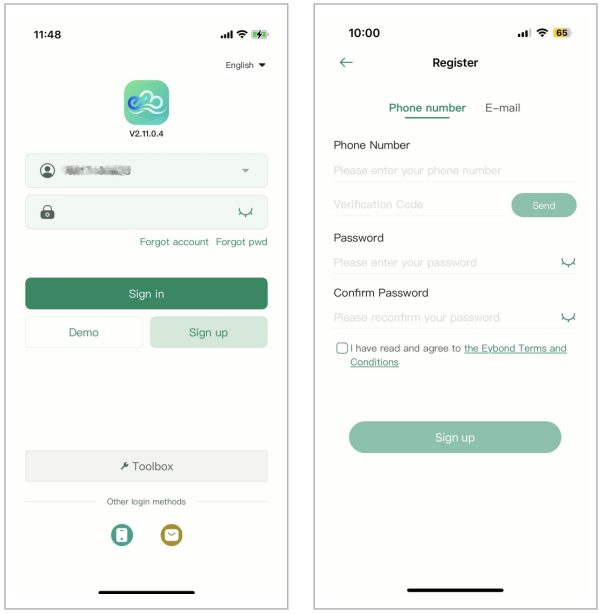
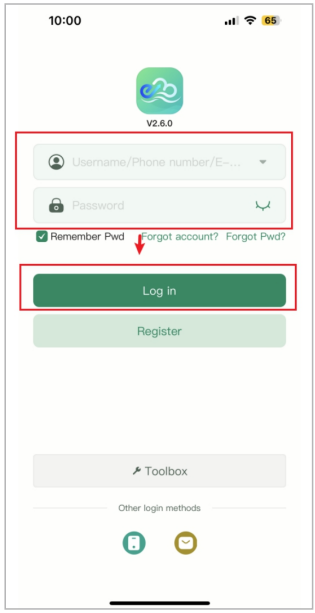


Figure 8-1

8.2.2 Login

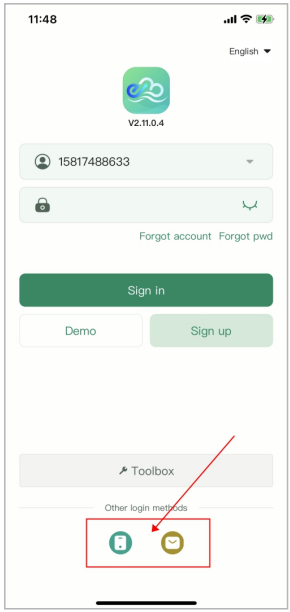
A.Password login

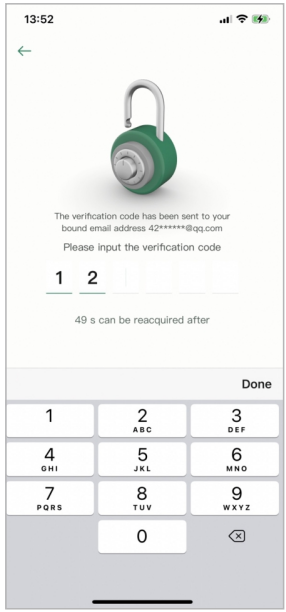
Enter the phone number or e-mail address password you just used to register including the password, and click "Login" .



B. Verification code login

Enter the mobile phone or e-mail address you used to register, click "Send" to get the verification code. After entering the verification code, the login succeeds.

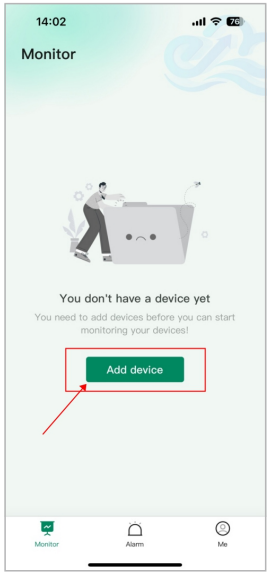


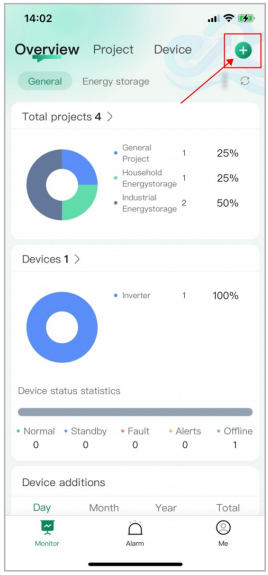


8.3 Add devices

There are two ways to add devices: Bluetooth and Scan code

After login, on the monitoring page, click "Add Device" or the "+" button in the upper right corner to enter the Add Device page.

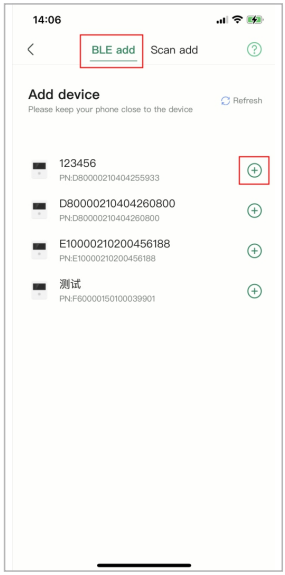




A. Adding by Bluetooth (Only devices with Bluetooth module are supported)

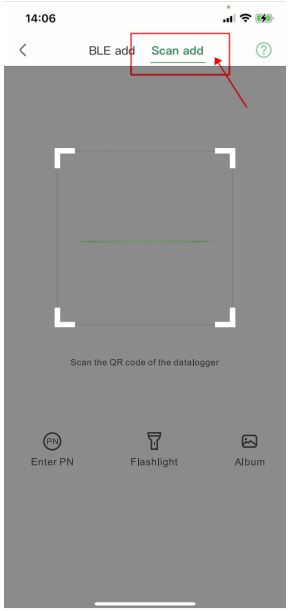
Allow your App to enable Bluetooth and location permissions when using Bluetooth to add features. If the Bluetooth permission is not enabled, nearby Bluetooth devices cannot be searched. And some Android phones need to open the location system to use.

After the device is powered on, click "BLE Add", select the device with the same name /PN as the device, and click the "+" icon.



B. Adding by scanning code

For external digital harvester, click "Scan add" to scan the QR code of the digital harvester, or click "Input PN" in the lower left corner to complete the device addition.



Attention:

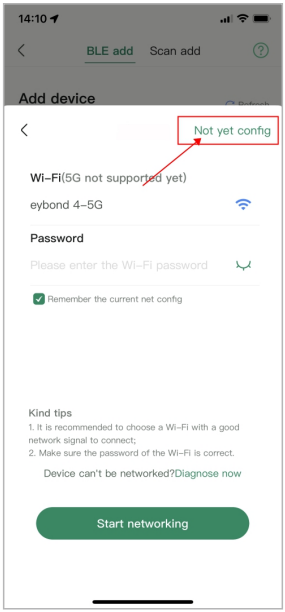
If it is a datalogger using GPRS or 4G module, the device shows "√" after the addition is successful. If the datalogger is a Wi-Fi module, the Network Configuration page is displayed for network configuration.

After adding devices, ensure that device data can be uploaded to the cloud. If the data harvester does not have a network, the data cannot be sent to the cloud.

8.4 Networking configuration (Bluetooth networking)

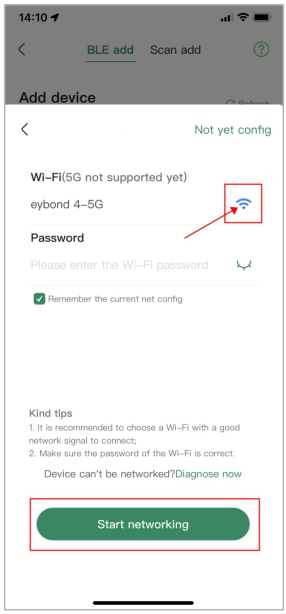
Note: Your datalogger must have Bluetooth capability, otherwise Bluetooth networking function cannot be used.

When adding a device, if your device is a Wi-Fi module, the network configuration page is displayed. If you do not need to connect to the network, you can click "Not yet" to skip the network configuration process.



Step1:

Tap "" select the router to be configured, enter the corresponding password, and click the "Start networking" button;

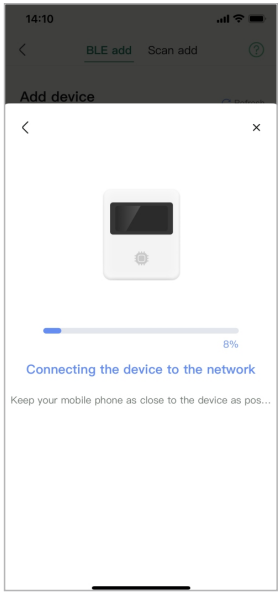


Attention:

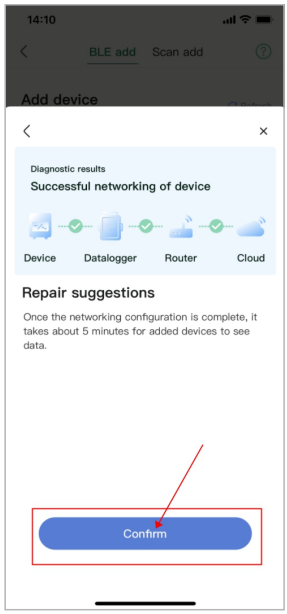
1. Ensure that the network signal is good and the network is unblocked
2. Routers in the 5G band are not currently supported. Please use routers in the 2.4G band
3. Ensure that the password of the router is correct

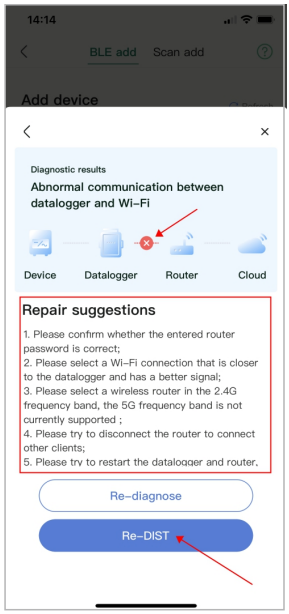
Step2:

After the configuration, wait 30 seconds. The APP will provide feedback based on the network distribution result



If the network is successfully configured, the device is successfully added. Wait 5 to 10 minutes and view the device data.
If the configuration fails, rectify the fault according to "Diagnosis Results and Troubleshooting Suggestions".





Scan QR code to check more information

SmartValue Operation Instruction

GUARANTEE CERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		

GUARANTEE CERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		