ME-GSE-S3.6K/ME-GSE-S4.6K/ME-GSE-S5K

Single-Phase Hybrid Inverter

Quick Guide

File Version: 1.0

Date: 2024-08-19

Change History

The change history contains each document update. The latest version includes all the changes made in earlier versions.

File Version 1.0 (2024-08-19)

This version is the first official release.

Contents

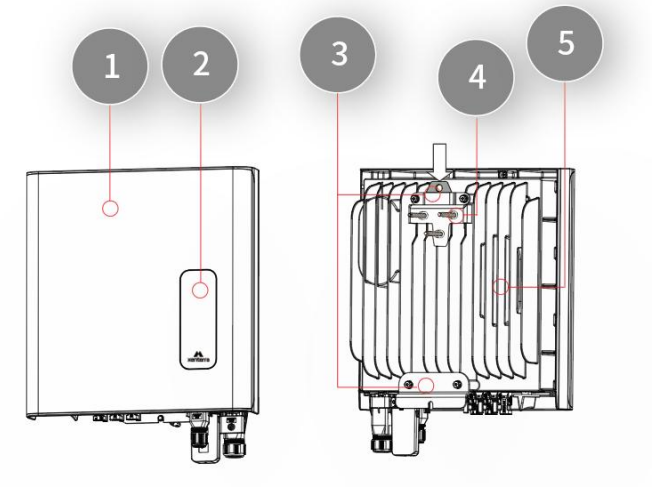
⚠ Notice

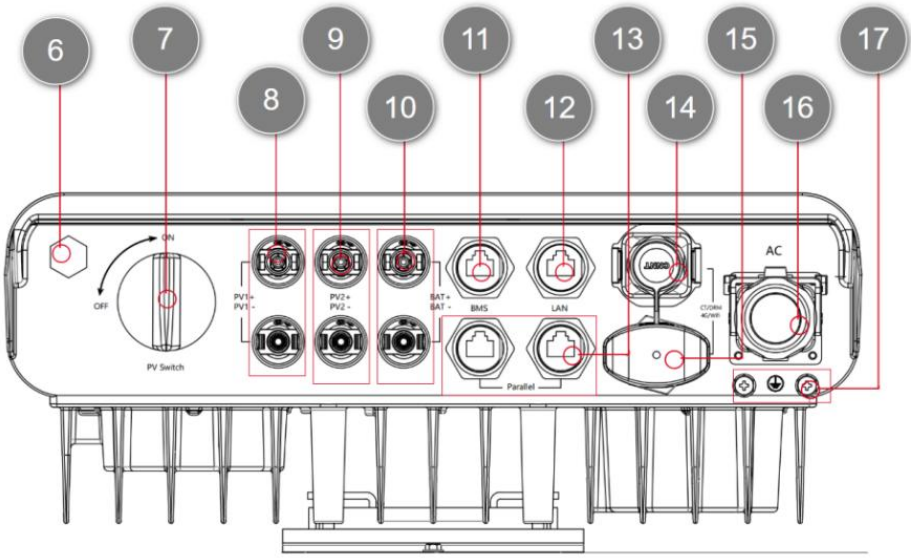
- The contents of this document may be updated from time to time due to product version upgrades or other reasons. Unless otherwise agreed, this document is intended as a guide to use only, and all statements, information and recommendations contained in this document do not constitute any express or implied warranty.
- Before installing the device, please read the user manual for product information and safety precautions.
- All installation operations of the device must be carried out by a trained and specialized electrical technician. The operator must wear personal protective equipment.
- Before installing the device, please check that the items are complete and that there is no visible external damage according to the Packing List. If any items are missing or there is any damage, please contact your dealer.
- Damage to the device caused by failure to follow the documentation is not covered by the device warranty.
- The cable colors shown in the electrical connection diagrams provided in this section are for reference only. Select cables in accordance with local cable specifications.

1. Product Introduction

ME-GSE-S3.6K/ME-GSE-S4.6K/ME-GSE-S5K is a single-phase hybrid inverter, whose main function is to convert the DC power generated by PV strings into AC power to feed into grid, and also supports the conversion of AC power to DC power for storage in batteries for backup use.

2. Product Appearance





Part Name			
1	Front cover	2	LED indicators
3	Hanging kit	4	Wall mount bracket
5	Heat sink	6	Ventilation valve
7	PV DC switch	8	DC input terminals (PV1+, PV1-)
9	DC input terminals (PV2+, PV2-)	10	Battery terminals (BAT+/BAT-)
11	Battery communication port (RJ45)	12	Ethernet communication terminals (RJ45)
13	Parallel port (RJ45)	14	Communications port (CT & METER)
15	4G/WIFI port (USB)	16	AC port (L, N, PE)
17		Ground point (PE)	

3. Technical Data

Model	ME-GSE-S3.6K	ME-GSE-S4.6K	ME-GSE-S5K
Battery Input Data			
Battery Type		Li-Ion	
Nominal Battery Voltage (V)		450	
Battery Voltage Range (V)		450 ~ 550	
Max. Charging Current (A)	10	12	13
Max. Discharging Current (A)	10	12	13
PV String Input Data			
Max. PV Input Power (W)	4680	5980	6500
Max. PV Input Voltage (V)		550	
Start-up Voltage (V)		120	
MPPT Voltage Range (V)		90 ~ 500	
Rated PV Input Voltage (V)		380	
Max. Operating PV Input Current (A)		13	
Max. Input Short-Circuit Current (A)		18	
Number of MPP Trackers		2	
Number of Strings per MPPT		1	
AC Output Data (On-grid)			
Rated AC Input/Output Active Power (W)	3600	4600	5000
Max. AC Input/Output Apparent Power (VA)	3800	4800	5500
Rated AC Input/Output Current (A)	16.4 / 15.7/ 15.0	20.9/ 20.0/ 19.2	22.7/ 21.7/ 20.8
Max. AC Input/Output Current (A)	17.3/ 16.5/ 15.8	21.8/ 20.8/ 20.0	25/ 23.9/ 22.9
Peak Power (off-grid) (W)		1.2 times rated power	
Power Factor Adjustment Range		0.85 leading to 0.85 lagging	

Rated Input/Output Voltage (V)	220/230/240
Rated Input/Output Grid Frequency(Hz)	50/60
Grid Connection Form	L+N+PE
Total Current Harmonic Distortion THDi	<3% (of nominal power)
Efficiency	
Max.PV to AC Efficiency	97.0%
European Efficiency	96.3%
Max. Battery to AC Efficiency	97.3%
Max.PV to Battery Efficiency	98.8%
MPPT Efficiency	99.8%
Protection	
PV Insulation Resistance Detection	Integrated
Residual Current Monitoring	Integrated
PV Reverse Polarity Protection	Integrated
Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
General Data	
Operating Temperature Range (°C)	-25 ~ +60 , >45°C Derating
Relative Humidity	0 ~ 95% RH
Max. Operating Altitude (m)	4000
Cooling Method	Nature Convection
User Interface	APP
Communication with BMS	RS485
Communication with Meter	RS485
Communication with Portal	WiFi / Ethernet
Weight (kg)	16
Dimension (W × H × D mm)	376 × 396 × 145
Topology	Non-isolated

Self-consumption at Night (W)	<6
Ingress Protection Rating	IP65
Mounting Method	Wall Bracket
Safety / EMC Standard	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2
Grid Regulation	CEI 0-21, EN 50549

4. Installation

4.1 Installation Site and Environment

The hybrid inverter is an IP65 outdoor version and can be installed outdoors or indoors. When the unit is installed indoors, the unit must not be obstructed by the structure of the building, the furnishings or equipment of the room. The device is naturally ventilated. Therefore, the installation location should be clean, dry and adequately ventilated. The installation location must allow free access for installation and maintenance and the front cover must not be obstructed.

Prohibited Installation Locations:

- Locations where children can reach the device.
- Locations where freezing temperatures can be reached, such as garages, carports or damp rooms and other locations.
- Locations where humidity and condensation rates exceed 90%.
- Locations where salt-rich and humid air can penetrate.
- Earthquake zones - additional safety measures are required.
- Sites above 4,000 meters above sea level.
- Locations with explosive atmospheres.
- Sites in direct sunlight or with extreme temperature fluctuations.
- Sites with flammable materials, gases, or explosive environments.
- The temperature of the chassis and heat sink will be high during the operation of the inverter, please do not install the inverter in a location that is easy to touch.
- Avoid installing the inverter on plasterboard walls or similar walls with poor sound

insulation to minimize noise disturbance during operation.

- Do not install the inverter in salt-hazardous areas (within 500 meters of the coast or areas affected by sea breeze) since it may corrode and cause a fire. The area affected by sea breezes varies according to meteorological conditions (e.g. typhoons, seasonal winds) or topographical conditions (presence of dykes, hills).

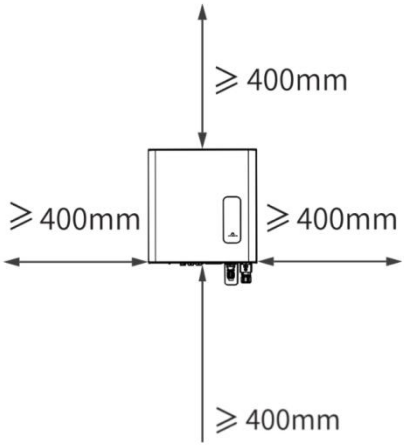
Recommended Installation Locations:

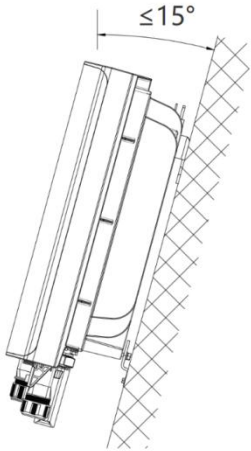
- The inverter should be installed in a well-ventilated environment to ensure good heat dissipation;
- It is recommended to choose the installation location with shade, or build an awning;
- The inverter mounting carrier must be fireproof;
- To ensure that the mounting surface is sturdy and meets the load-bearing requirements for mounting the inverter.
- Mount the inverter vertically or tilted back at an angle ⩽ 15° to facilitate machine heat dissipation.

Limited Distance of Installation to Neighboring Objects:

To ensure proper heat dissipation and facilitate safe and easy maintenance, installation should maintain the following minimum clearance distances around the energy storage system:

- Top: 400mm
- Front: 400mm
- Laterals: 400mm
- Mounting height of the inverter: ⩾400mm





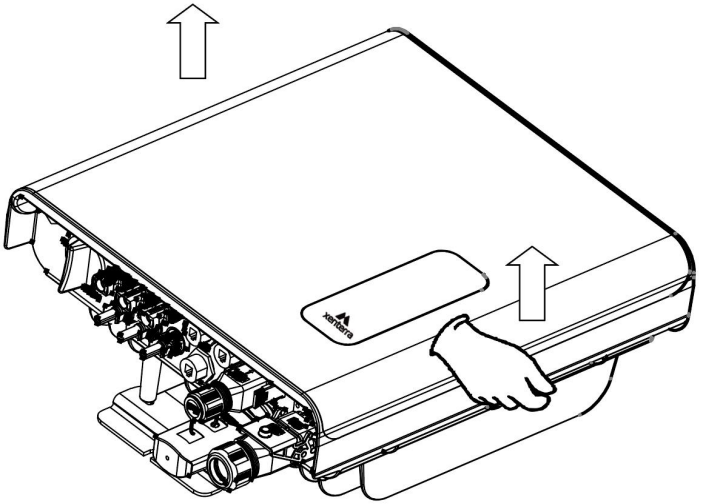
4.2 Inverter Installation

To handle the inverter safely, follow these steps:

Reach both hands into the grooves on both sides of the inverter and lift it out of the packing case and carefully carry the inverter to your designated installation location.

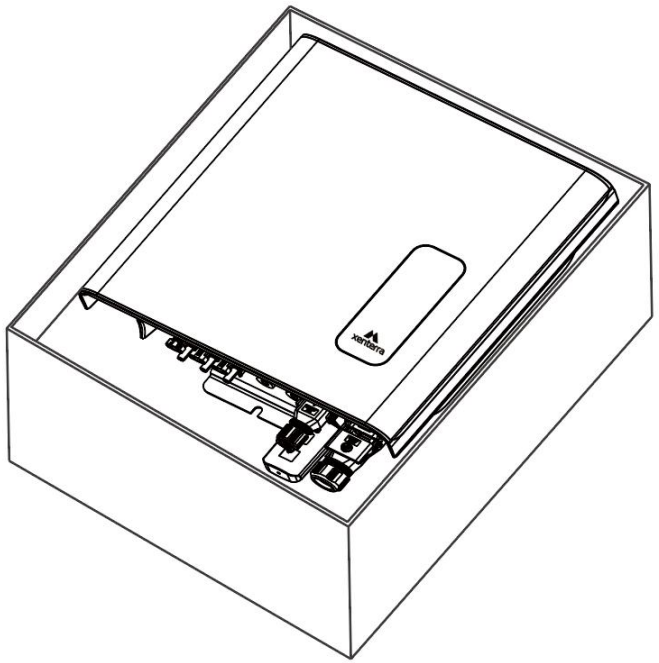
⚠ **Important note:**

- Handle the inverter with care to avoid dropping it and potentially injuring yourself;
- The terminals and interfaces at the bottom of the inverter cannot bear weight, so avoid placing them directly on the ground or other hard surfaces;
- To prevent damage to the shell, place foam or paper under the inverter when setting it on a surface.



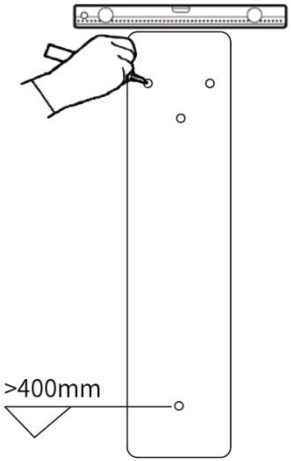
Installation:

Step 1. Before installation, remove the inverter from its packaging box and verify that all components are included;



Step 2. Use a Screw alignment paper(Wall Installation) or marking guide to determine the correct hole positions. Level the holes using a horizontal ruler and mark them with a marker.

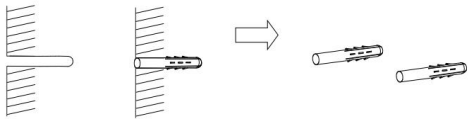
Recommended installation height: The lower hole should be at least 400mm above ground level;



Step 3. Drill a hole with a diameter of Φ8mm and depth of 45mm using a drill bit.

Insert a plastic expansion tube with dimensions Φ8*45mm into the hole. The following steps take cement wall or brick wall installation as an example.

⚠ **Warning**: Before drilling, ensure you avoid drilling into water or electricity lines to prevent electrical shock or flooding.

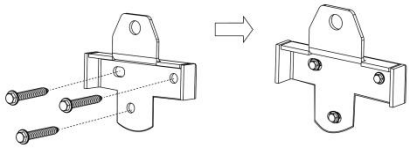


Drill hole with a diameter of Φ8mm and depth of 45mm

Insert a plastic expansion tube ϕ8*45

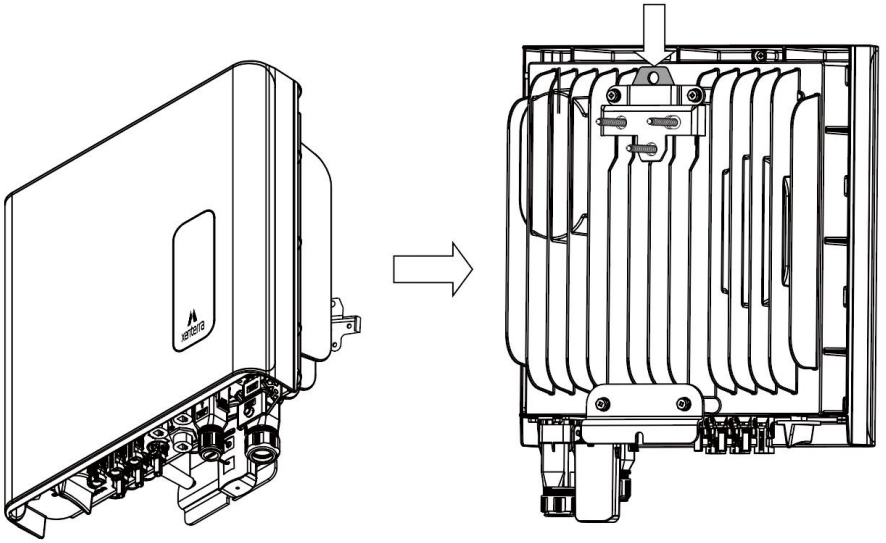
⚠ **Notice**: For wooden walls, you can skip this step and instead use screws (M5*45mm) to fix the mounting bracket.

Step 4. Assemble the wall mounting bracket;

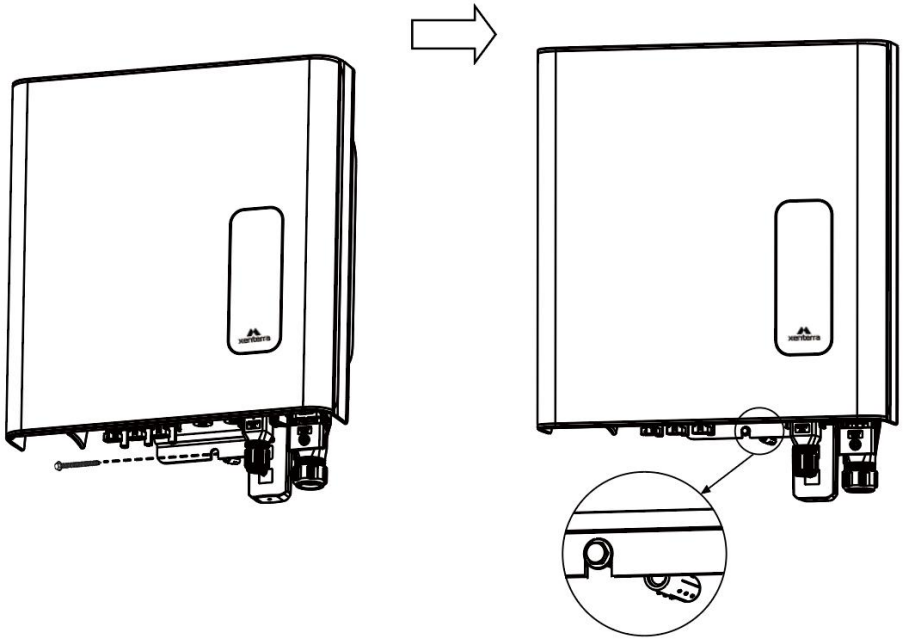


M5*45 screws

Step 5. Carefully hang the inverter onto the wall mounting bracket, ensuring that both upper and lower mounting brackets are securely attached;

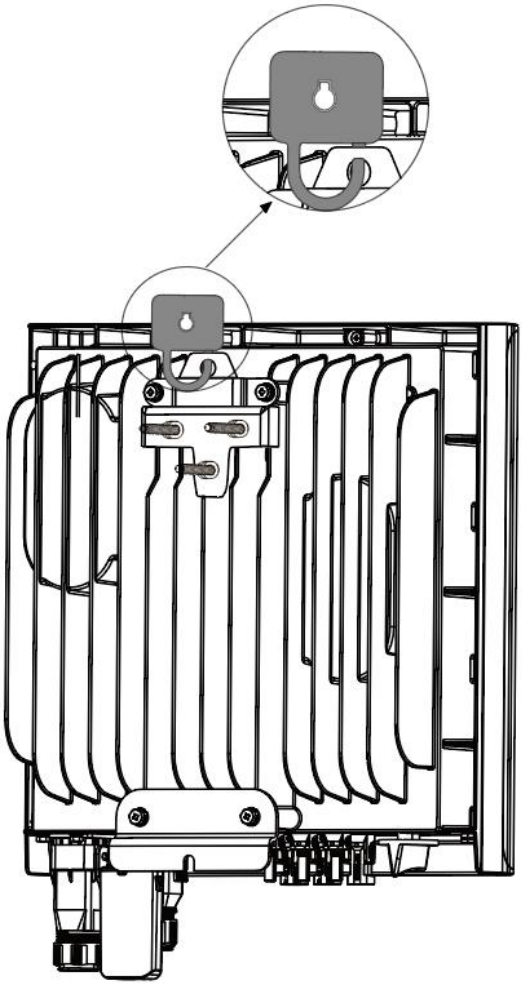


Step 6. Secure the lower mounting bracket to the wall with screws;

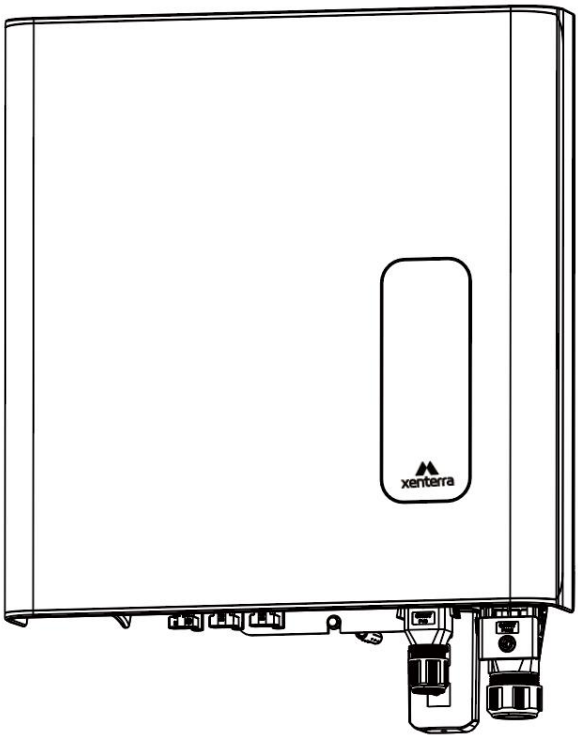


M5*45 screws and expansion tube ϕ8*45

Step 7. Install anti-theft lock;



Step 8. The installation is completed.



5. Electrical Connection

5.1 Preparations Before Installation

Precautions

⚠ Danger:

- Before connecting cables, ensure that all DC SWITCHES on the inverter are OFF. Otherwise, the high voltage of the inverter may result in electric shocks.
- The site must be equipped with qualified fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

⚠ Warning:

- The equipment damage caused by incorrect cable connections is beyond the warranty scope.
- Only certified electrician can perform electrical connection.
- Operation personnel must wear PPE when connecting cables.
- Before connecting cables to ports, leave enough slack to reduce the tension on the cables and prevent poor cable connections.

⚠ Caution:

- Stay away from the device when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and device damage.
- When routing PV cables, it is recommended that the positive and negative PV string cables be routed in different pipes to prevent cable damage and short circuits caused by improper operations during construction.

Cables prepared by users				
No.	Cable	Type	Conductor cross sectional area	Outer diameter
1	PE cable	Single-core outdoor copper cable	4mm² ~ 10mm²	-
2	AC cable	Two-core (L, N) or three-core (L, N, PE) outdoor copper cable	4mm² ~ 6mm²	10mm ~ 21mm
3	DC cable	Common outdoor PV cable in the industry	4mm² ~ 6mm²	5.5mm ~ 9mm
4	Ethernet communication cable	Outdoor shielded twisted pair cable	-	-
5	Other communication cables	-	0.5mm²~0.75mm²	-

5.2 Connecting PE Cables

Precautions

Danger:

Do not connect the neutral wire to the enclosure as a PE cable. If not properly connected, electric shocks may occur.

Procedure

Step 1. Crimp an OT terminal

Notice:

- Avoid scratching the core wire when stripping a cable.
- The cavity formed after the conductor crimp strip of the OT terminal is crimped must wrap the core wires completely. The core wires must contact the OT terminal closely.
- Wrap the wire crimping area with heat shrink tubing or insulation tape. The heat shrink tubing is used as an example.
- When using a heat gun, protect the equipment from being scorched.

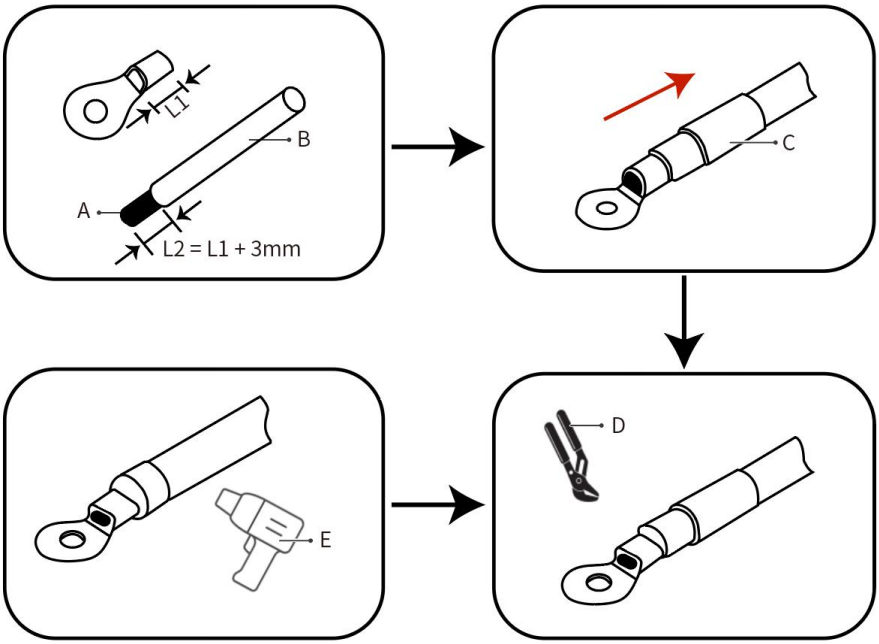
① Strip the PE cable, and the length of the bare wire core L2 is 3mm greater than the length of the cylindrical part L1 of the OT terminal;

② Sleeve the OT terminal on the outside of the exposed wire core and make sure that the wire core is completely wrapped by the conductor crimp piece of the OT terminal;

③ Use the heat shrink tubing to wrap the PE cable;

④ Use hydraulic pliers to crimp the OT terminal and heat shrink tubing;

⑤ Use a heat gun to blow solder the indentation joint.



A	Core wire	B	Insulation layer
C	Heat shrink tubing	D	Hydraulic pliers
E		Heat gun	

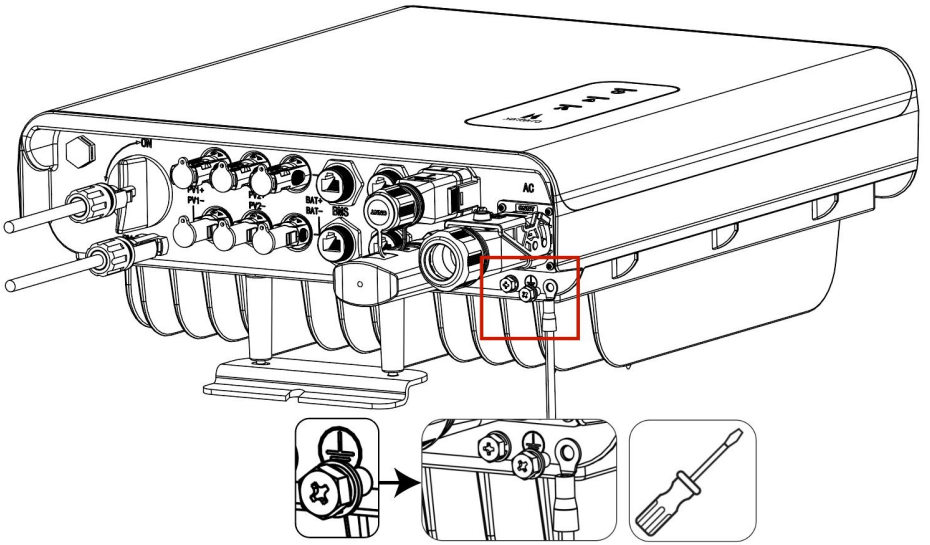
Step 2. Connect the PE cable

⚠ **Notice:**

- Ensure that the PE cable is connected securely.
- You are advised to use the right ground point and reserve the other ground point for future use.

① Remove the grounding screw from the right grounding point.

② Connect the PE cable to the chassis and secure the grounding screw with a screwdriver.



5.3 Connecting an AC Output Cable

Precautions

An AC switch must be installed on the AC side of the inverter to ensure that the device can be safely disconnected from the power grid.

⚠ **Warning:**

- Do not connect loads between the inverter and the AC switch that directly connects to the inverter. Otherwise, the switch may trip by mistake.

- If an AC switch is used with specifications beyond local standards, regulations, or the manufacturer's recommendations, the switch may fail to turn off in a timely manner in case of exceptions, causing serious faults.

⚠ **Caution:**

- The protective layer of the AC output cable is located inside the connector, and the core should be completely inside the terminal hole without leakage and the cable connection is tight. Failure to do so may result in the device not operating properly or damage to the device after operation.
- Each inverter must be equipped with an AC output switch. Multiple inverters cannot connect to the same AC output switch.
- The Hybrid Inverter is integrated with a comprehensive residual current monitoring unit. Once detecting that the residual current exceeds the threshold, the hybrid inverter immediately disconnects itself from the power grid.
- If the external AC switch can perform earth leakage protection, the rated leakage action current should be greater than or equal to 100mA.
- If multiple inverters connect to the general residual current device (RCD) through their respective external AC switches, the rated leakage action current of the general RCD should be greater than or equal to the number of inverters multiplied by 100mA.
- A knife switch cannot be used as an AC switch.

Procedure

Step 1. Connect the AC output cable to the AC connector;

⚠ **Notice:**

- The PE point at the AC output port is used only as a PE equipotential point, and cannot substitute for the PE point on the enclosure.
- Keep the AC output cable and the PE cable close to each other.
- Keep the AC output cable and the PV input cable close to each other.
- Ensure that the cable jacket is inside the connector.
- Ensure that the exposed core is totally inserted into the cable hole.
- Ensure that AC output cable is secured. Failing to do so may cause the device not operating properly or damage to its AC connector.

- Ensure that the cable is not twisted.
- Strip the insulation layers of the AC output cable by the recommended length (12–16 mm) to ensure that the cable conductors are completely inside the conductor insertion points and no insulation layer is pressed into the conductor insertion points. Otherwise, the device may fail to run properly or be damaged during operation.

① Unscrew the plastic lock nut of the power plug and open the terminal top cover;

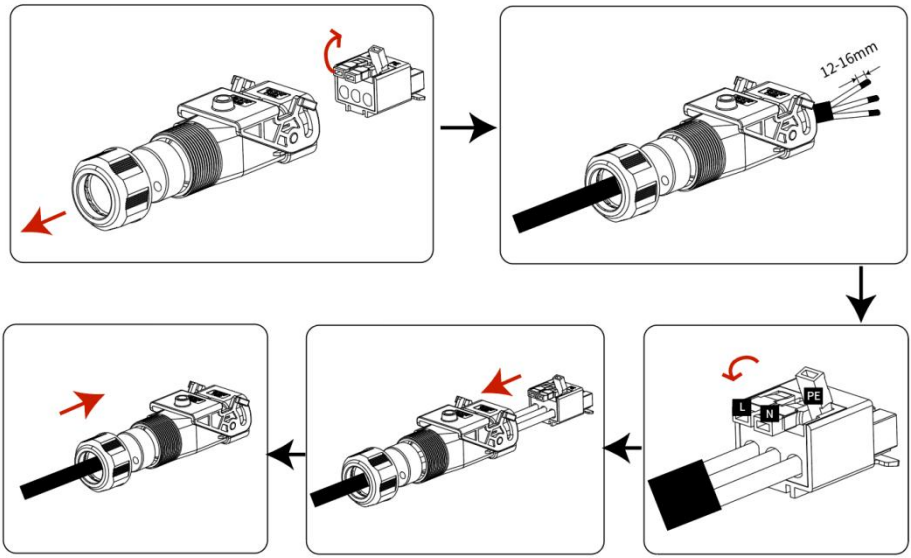
② Make the AC output cable go through the power plug;

③ Separate the three wires of the three-core cable and strip the insulation layer by 12-16mm;

④ Insert the L cable, N cable and PE cable into the corresponding wiring holes;

⑤ Insert the terminal into the power plug;

⑥ Retighten the nut.



Note: Two-core and three-core wire wiring method is the same, the two-core wire is not connected to PE hole.

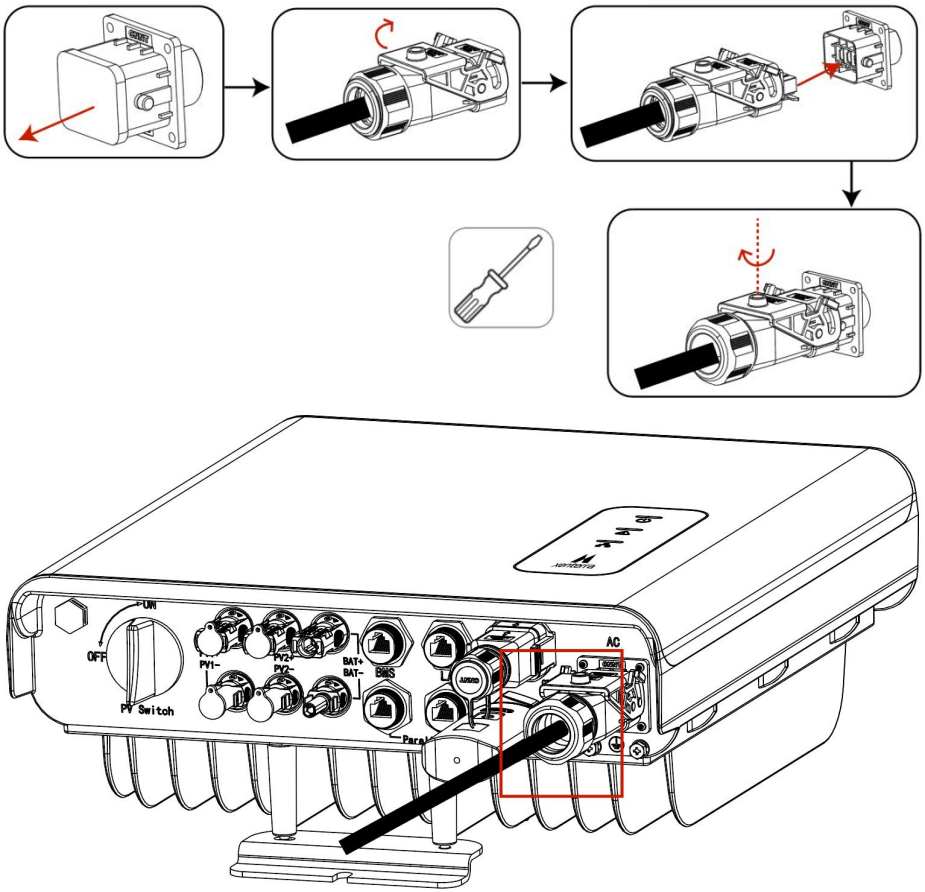
Step 2. Connect the AC connector to the AC output port, and check the route of the AC output power cable.

① Remove the AC connector protective cover;

② Open the AC connector snap;

③ Insert the connector ferrule into the interface;

④ Fasten the snap again and secure the AC connector with a screwdriver.



5.4 Connecting PV Input Cables

Precautions

⚠ **Danger:**

- Before connecting the PV input cables, ensure that the DC voltage is within the safe range (lower than 60V DC) and that the PV switch on the inverter is OFF. Failing to do so may result in electric shocks.
- When the device is running, it is not allowed to work on the PV input cables, such as connecting or disconnecting a PV string or a PV module in a PV string. Failing to do so may cause electric shocks.
- If no PV string connects to a DC input terminal of the inverter, do not remove the watertight cap from the DC input terminals. Otherwise, the IP rating of the device will be affected.

⚠ **Warning:**

- Ensure that the following conditions are met. Otherwise, the device may be damaged, or even a fire could happen.
- Ensure that the PV module output is well insulated to ground.
- Use the MC4 positive and negative metal terminals and DC connectors delivered with the device. Using incompatible positive and negative metal terminals and DC connectors may result in serious consequences.
- The DC input voltage of the inverter shall not exceed maximum input voltage under any circumstance.
- The polarities of electric connections are correct on the DC input side. The positive and negative terminals of a PV string connect to corresponding positive and negative DC input terminals of the inverter.

Procedure

Step 1. Assemble a DC connector

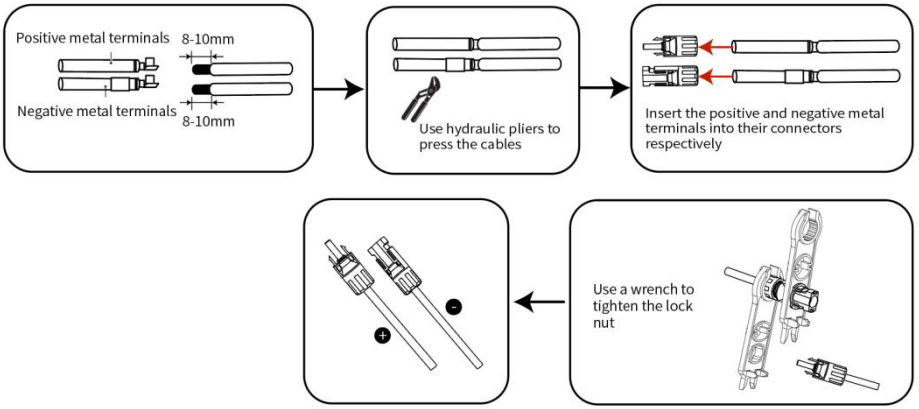
① Connect the positive and negative cables of the DC input cable to the positive and negative metal terminals respectively;

② Use hydraulic pliers to press the cables firmly onto the metal terminals, ensuring they

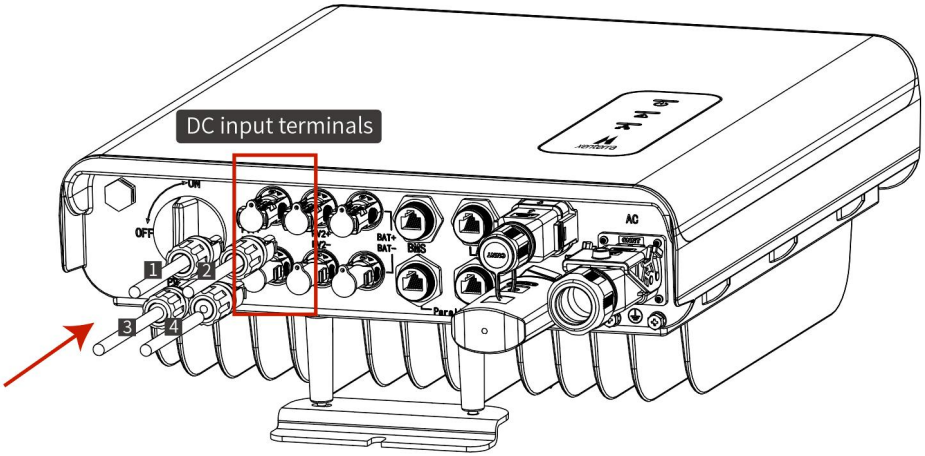
cannot be accidentally pulled out;

③ Insert the positive and negative metal terminals into the positive and negative connectors respectively;

④ Use a wrench to tighten the lock nut until the wrench slips.



Step 2. Insert the positive and negative connectors into corresponding DC input terminals on the device.



5.5 Connecting Battery Cables

Danger:

- Battery short circuits may cause personal injury. The high transient current generated by a short circuit may release a surge of power and cause fire.
- Do not connect or disconnect the battery cable when the device is running. Failing to do so may cause electric shocks.
- Before connecting the battery cables, ensure that the DC switch on the BMS Control Module and all the switches connecting to the inverter are OFF, and the inverter has no residual electricity. Otherwise, the high voltage of the inverter and battery may result in electric shocks.
- If no battery connects to the inverter, do not remove the watertight cap from the battery terminal. Otherwise, the IP rating of the inverter will be affected. If a battery connects to the device, set aside the watertight cap. Reinstall the watertight cap immediately after removing the connector. The high voltage of the battery terminal may result in electric shocks.

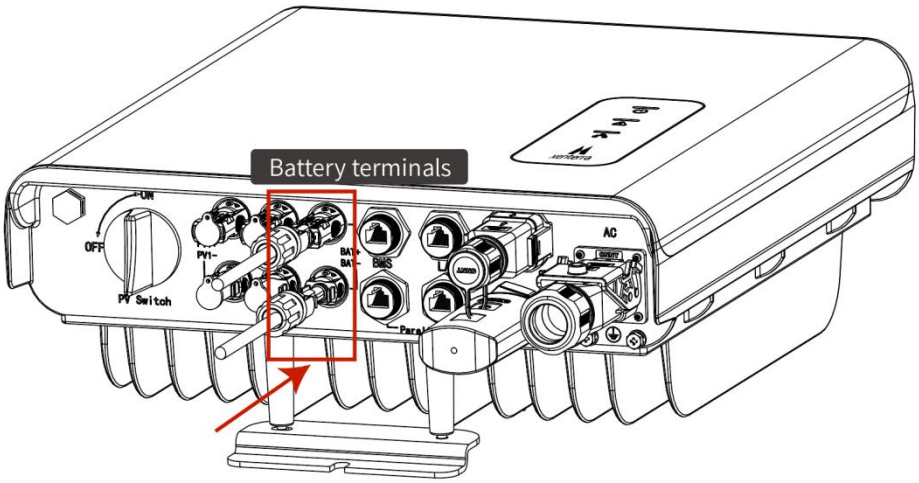
Warning:

- Do not connect loads between the inverter and the battery.
- The battery cables must be connected correctly. That is, the positive and negative terminals of the battery connect to the positive and negative battery terminals on the inverter respectively. Otherwise, the device may be damaged, or even a fire could happen.

Procedure

Step 1. Refer to 4.3 Connecting an AC Output Power Cable to assemble the positive and negative connectors.

Step 2. Plug the positive and negative connectors into the corresponding battery terminals of the inverter.



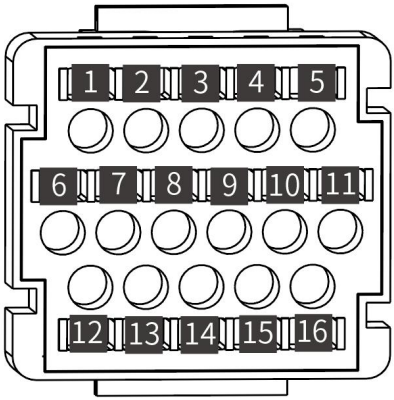
5.6 Connecting Signal Cables

⚠ **Notice：** When laying out signal cables, separate them from power cables and keep them away from strong interference sources to prevent communication interruption.

Procedure

Step 1. Connect the signal cable to the corresponding signal connector;

Step 2. Connect the signal connector to the corresponding port.



Port definition					
No.	Description	Remark	No.	Description	Remark
1	RS485A D-	MODBUS power meters	9	RS485B D-	Reserved RS485 port for connecting other vendors' devices
2	RS485A D+		10	RS485B GND	
3	RS485A GND		11	12V +	12V output power supply
4	CT-P	CT	12	12V GND	
5	CT-N		13	RLY NO	Dry contact for other vendors' products
6	DRM	DRM	14	RLY C	
7	DRM-GND		15	-	
8	RS485B D+	Reserved RS485 port for connecting other vendors' devices	16	-	

5.7 Connecting BMS Communication Cables

Precautions

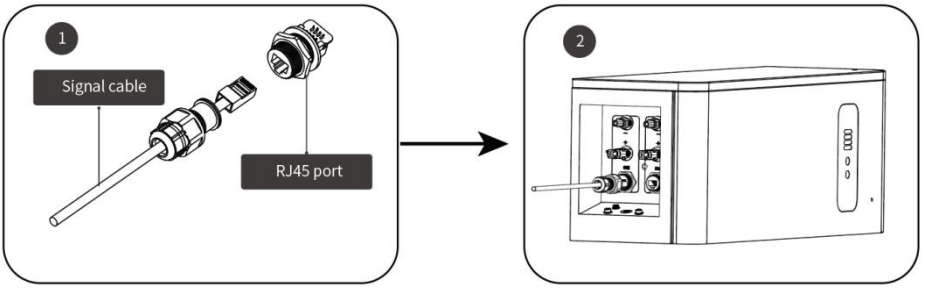
⚠ **Note:** When arranging the signal cables, please pay attention to separate the signal cables from the power cables, and avoid large sources of interference, so as to avoid the signal being interfered with, resulting in communication being affected.

Procedure

Step 1. Unscrew the nut of the signal cable;

Step 2. Insert the signal cable into the Ethernet communication terminal(RJ45);

Step 3. Tighten the nut.



6. Fault Diagnosis and Solutions

6.1 Verification before Power-On

Items to Check		
No.	Item	Acceptance criteria
1	The inverter is installed correctly	The inverter is installed correctly and securely.
2	All SWITCHES are Off	The PV switch and all the switches connecting to the inverter are OFF.
3	Cables connected in place	The AC output power cable, DC input power cable, battery cable, and signal cable are connected correctly, securely, and reliably.
4	Sealed and unused terminals and ports	Unused terminals and ports are locked by watertight caps.
5	Reliable grounding	The PE cable is connected correctly, securely, and reliably.
6	Well-arranged cables	Cables are routed properly as required by the customer.
7	Installation environment meets	The installation space is proper, and the

Items to Check		
No.	Item	Acceptance criteria
	the requirements	installation environment is clean and tidy.

6.2 System Power-On

Prerequisites

- Before turning on the AC switch between the device and the power grid, use a multimeter to check that the AC voltage is within the allowed range.
- Before the device is put into operation for the first time, ensure that the parameters are set correctly by professional personnel. Incorrect parameter settings may result in noncompliance with local grid connection requirements and affect the normal operations of the equipment.

Procedure

Step 1. If the battery port of the device is connected to a battery, turn on the auxiliary power switch of the battery and then the battery switch.

Step 2. Turn on the AC switch between the inverter and the power grid.

Step 3. Turn on the DC switch between the PV string and the inverter if there is any.

Step 4. Turn on the PV switch at the bottom of the inverter.

Step 5. Observe the LEDs to check the inverter operating status.

Description of LED indicators		
LED Name	Status	Description
 Operation light	Blinking green at long intervals (on for 1s and then off for 1s)	The inverter is operating.
	Blinking green at short intervals (on for 0.3s and then off for 0.3s)	The inverter is upgrading.
	Blinking yellow slowly	The inverter is on standby.
	Off	The inverter is off.
 Malfunction Light	Steady red	Device failure.
	Off	No faults in the device.
 Grid light	Steady green	No grid failure(grid-tied mode)
	Steady yellow	The device has output in the off-grid mode.
	Off	Grid failure (grid-tied mode)/No output (off-grid mode)
 All lights	Alternate flashing	Device start-up and initialization.
 All lights	Flashing	The device is being positioned.

7. Commissioning and Configurations

7.1 Download Smart Energy app

Method 1. Scan the QR code and download the APP

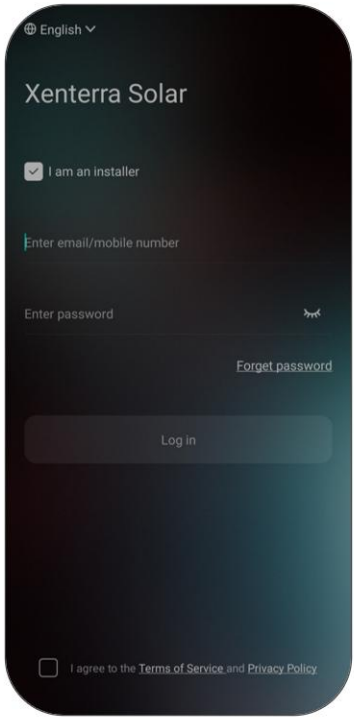
Method 2(IOS). Search for "Smart Energy" in the APP Store and download it.

Method 3(Android). Download link:

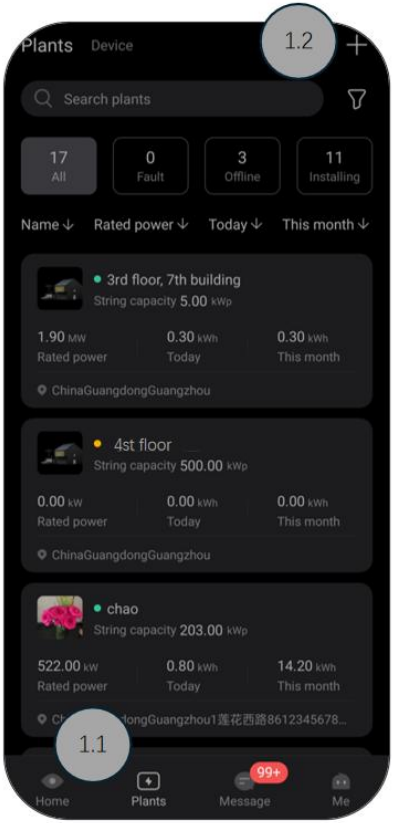
https://developer.hdlcontrol.com/AppDownload/HDLPhotovoltaicDownload.html

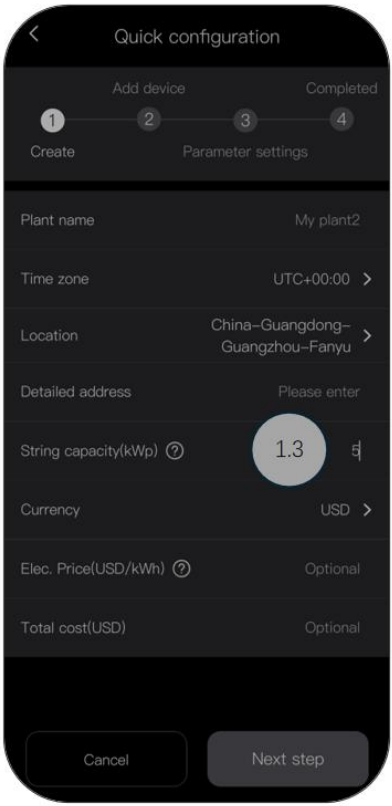
7.2 Device Commissioning

1. Login

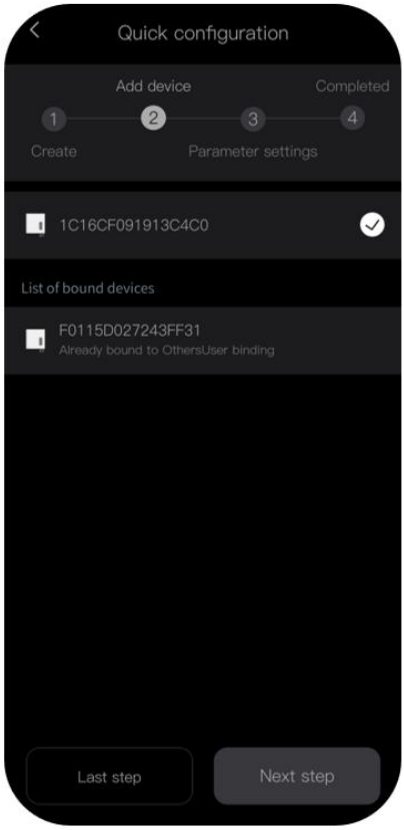


2. Create a Plant

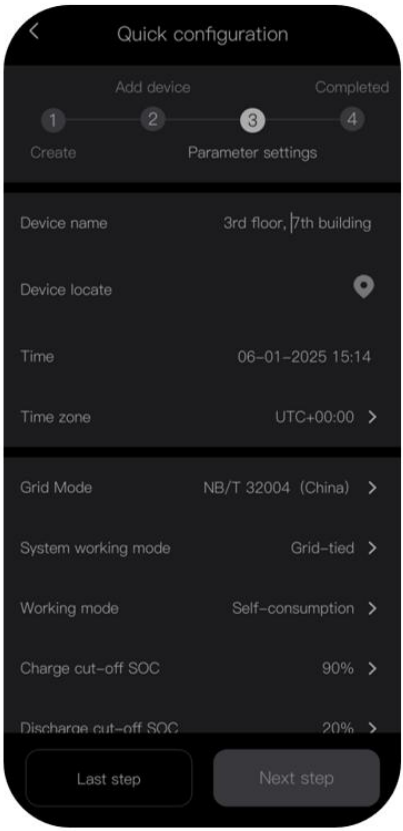




3. Search/add device



4. Set inverter parameters



8. Waste Disposal of Electrical and Electronic Equipment

How to dispose of this product (electrical and electronic equipment waste). This symbol on the product or its documentation indicates that it should not be disposed of at the end of its life with other household waste. Since uncontrolled disposal of waste may be harmful to the environment or to human health, please separate it from other types of waste and recycle it responsibly.This allows sustainable reuse of material resources. Individuals may contact the distributor who sold the product or inquire with their city hall about where and how they can dispose of this product so that it is recycled in an environmentally friendly manner. Companies may contact their suppliers and consult the conditions of their sales contract. This product should not be disposed of with other commercial waste.