

LiteStor Battery System

User Manual

10kWh/15kWh/20kWh Battery System

Version 01 /2024-8-13



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1. Security

General Safety Precautions

This system has strictly designed and tested in accordance with the international safety regulations. Please carefully read all safety instructions before beginning any work, and always adhere to them during operation. The operator (involved in system design, installation, operation, configuration, and maintenance) should be a qualified individual. Incorrect operation or handling can lead to serious accidents or cause the following:







- ✓ Injury or death of the operator or third parties
- ✓ Damage to the inverter and other equipment belonging to the operator or third parties

Important Safety Notice

There are many safety concerns that must be carefully addressed before, during, and after installation, as well as during future operation and maintenance. Below are important safety notices for operators, owners, and users to ensure the safe and proper use of this product.












DANGER

Dangers of High Voltage and High Current

-  To prevent electric shock, ensure that the PV switch, battery breaker, AC switch, and battery power are turned off before and during installation.
-  To avoid electric shock, do not open the inverter or connect/disconnect any wires (such as PV, battery, grid, communication, etc.) while the inverter is operating.
-  Do not operate the inverter while it is in use. In limited cases, only qualified personnel may touch the LCD and buttons, and other parts of the inverter should only be touched when the inverter is fully shut down.
-  Ensure that the inverter is properly grounded. Operators should verify that they are adequately protected by reasonable and professional insulation measures (such as personal protective equipment, PPE).
-  Before installation, operation, or maintenance, check that the existing wiring at the installation site is in good condition.
-  Confirm that the connections for the PV string, battery, and grid are secure to prevent equipment damage or operator injury due to poor connections.

WARNING











Avoiding Misoperation and Improper Use

-  All connections must comply with local and national regulations and standards.
-  The inverter system must be installed in the appropriate position and location as required by this manual.
-  Ensure that children and pets do not touch or accidentally operate the inverter and related systems.
-  Risk of burns from hot surfaces: The inverter enclosure may become hot during operation. Only touch the LCD and buttons while the inverter is running.
-  Do not place the battery in water or fire, as this may cause explosions or other life-threatening situations.
-  During installation, ensure the wires are connected correctly and do not reverse the connections.
-  To avoid short circuits, confirm the correct positive and negative connections with the meter before powering on the battery.
-  Do not puncture, strike, or step on the battery, as this can cause damage.
-  When removing devices or reconnecting power cables, disconnect the battery power and completely shut off all power sources.
-  In the event of a fire, use a dry powder fire extinguisher to extinguish the flames. Liquid fire extinguishers may cause explosions.
-  For safety, never disassemble any parts under any circumstances. Maintenance should be performed by certified technicians or our technical support personnel. Equipment failures caused by unauthorized tampering are not covered by the warranty.

NOTICE

- Before performing installation work, carefully read this manual.
- Qualified personnel must have training in electrical system installation and commissioning, and in handling hazards. They should also have a good understanding of this manual and other relevant documents, as well as familiarity with local regulations and directives.
- For safety, ensure the product is correctly installed before use.
- To use the product correctly, ensure compatibility and alignment with related equipment, and verify that parameters are set correctly.
- The environment and storage methods can impact the product's lifespan, so follow the user manual to ensure proper device operation.
- For long-term storage, the battery should be charged once every 50 months to maintain an SOC of 6%.
- Charge the battery within 24 hours after it has been fully discharged or after over-discharge protection has been activated.
- The theoretical standby time formula is: $T = C / I$ (where T is the standby time in hours, C is the battery capacity (Ah), and I is the total standby current of the device (A)).

※Do not mix batteries from different manufacturers, types, models, or new and old batteries.

	The battery voltage is higher than the safe voltage, and direct contact poses a risk of electric shock.
	Be cautious of fire hazards.
	The battery could be flammable and explosive.
	Discarded batteries cannot be disposed of in regular trash bins; they must be recycled by professionals.
	Read the user manual before use.
	Do not extinguish fires with water if the battery catches fire.
	Do not place the battery near open flames or incinerate it.
	Keep the battery out of the reach of children.
	After the battery has reached the end of its lifespan, it can be recycled and reused by a specialized recycling agency; do not dispose of it improperly.
	This battery product meets the requirements of European directives.

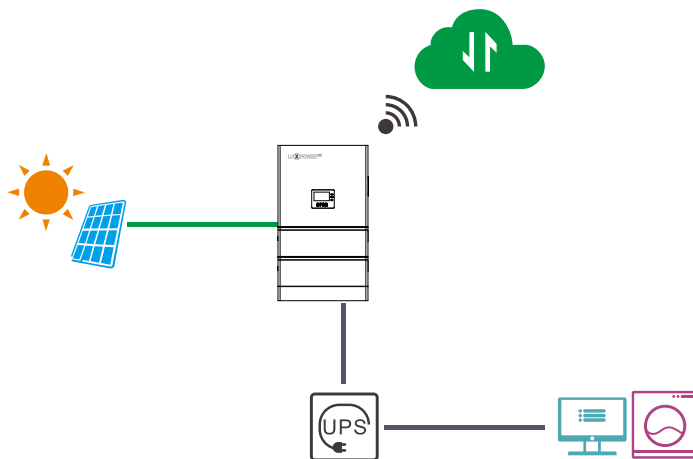
2. System and Product Introduction

2.1. System Overview

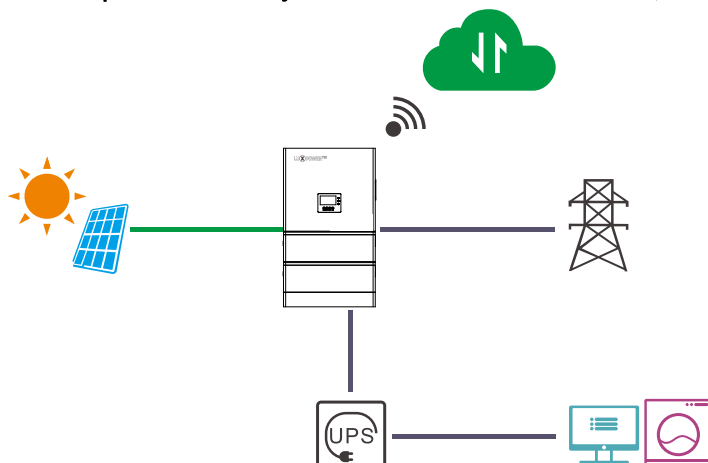
This system is a hybrid new energy generation system centered around an inverter, incorporating PV solar panels, lithium battery modules, and data collection. The system intelligently adjusts and distributes various energy sources, including PV, battery, and grid power, based on the power usage of the customer's household equipment, enabling the most economical use of energy for the customer.

The AC output is up to 10kW @ 200V. During the day, when sunlight and battery power are available, the system supplies power to the load using solar and battery power. At night, the battery discharges to supply power to the load until the battery level drops. Once the battery is depleted, the system switches to using AC power.

The off-grid system is connected as follows (automatically switches)

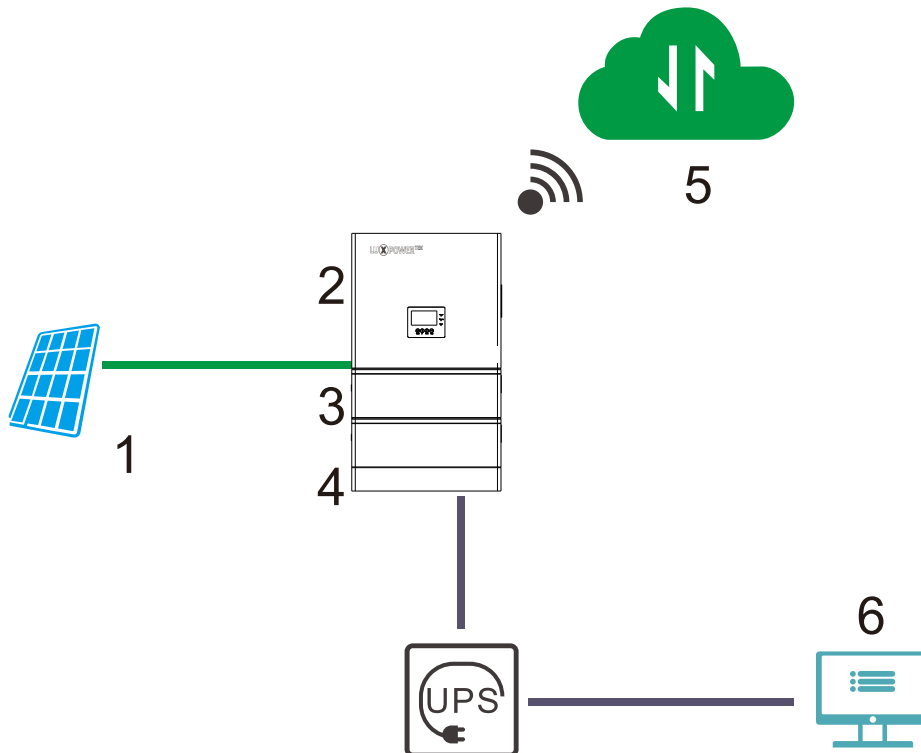


The AC power carrier system connection is as follows (automatically switches)



2.2. Product Introduction

The main functional products included in this system are as follows:



1. PV Solar Panels (Must be purchased separately by the customer): Supports a maximum power output of 18 kW, serving as a primary energy supplement during the day. If sunlight is sufficient, it can simultaneously meet the load demand and charge the battery.

2. Inverter (Core of the system): Intelligently manages PV, battery, and load, ensuring safe home energy use. The inverter provides stable and reliable 50 Hz/60 Hz, 200 Vac, and 100 Vac power output, supplying up to 10 kW for 200 V household appliances or up to 5 kW for 100 V appliances.

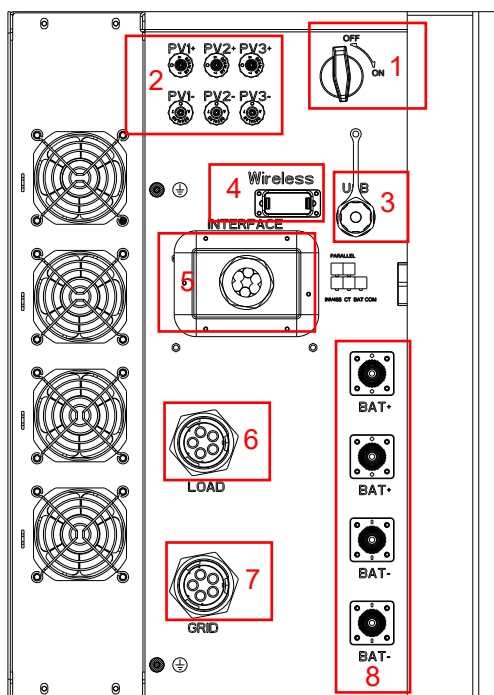
3. System Support Stand: Installed with a height of about 100 mm. Please avoid exposing it to typical short-term rainfall.

4. APP Application and Cloud Monitoring: The system allows various maintenance operations via APP and Web-based monitoring.

6. Household Electrical Appliances.

2.3. Interface overview

Inverter

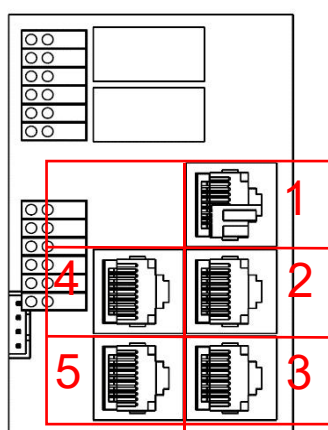


Communication Port Definitions

The cable box is located on the left side of the inverter.

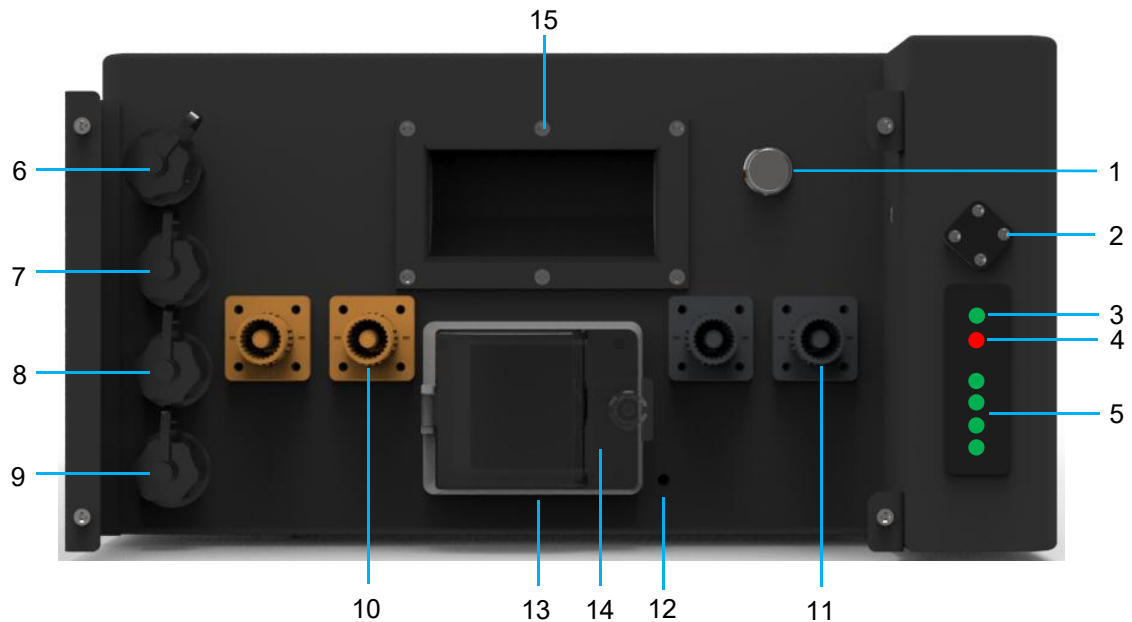
Below is an overview of the system cable box:

Item	Definition
1	PV Switch
2	PV Input
3	LCD Display USB Update Port
4	Monitoring Interface
5	Communication Port
6	Load Output
7	Grid Input
8	Battery Power Cable Connector



Battery Module

Item	Definition
1	Battery Communication Port
2	CT Connection Port
3	INV485
4	Reserved
5	Reserved



Item	Name	Definition
1	SW button	To activate the BMS, press the button. Press the button again to put the BMS into sleep mode.
2	Reset Button	Pressing for about 3 seconds will activate the battery from forced sleep mode.
3	RUN LED	The LED displays operational status.
4	ALM LED	The LED displays alarm indications.
5	SOC LED	The LED displays the state of charge.
6	485 Port	For communication using the RS485 protocol.
7	CAN Port	For communication using the CAN protocol.
8	COM In	For communication between batteries, from the module OUT of one battery to the IN of the next module.
9	COM Out	For communication between batteries, from the module OUT of one battery to the IN of the next module.
10	+(Positive) Connector	BAT+ for output and parallel connections.
11	-(Negative) Connector	BAT- for output and parallel connections.
12	Grounding (Earth)	For grounding connection.
13	Waterproof cover	Protects the DC breaker.
14	DC Breaker	DC 125A/MX+OF.
15	Handle	Located on the left and right sides.

3. Installation

3.1. Unpacking Inspection

To protect your rights, please check that the outer box has not been dropped, scratched, or damaged before installation. If everything looks normal, open the box as necessary to check if the product's appearance and accessories are intact.

3.2. Unpacking procedure

(1) Workbench Requirements: Place the confirmed inverter and battery cartons on a flat and sturdy table or floor.

(2) Message Recording: Record the SN (Serial Number) of the inverter, dongle, and battery module on the outer box.

(3) Appearance Inspection: After unpacking, first check the appearance of the inverter, battery, and system base for any scratches, deformation, or damage to the protective layer. Ensure that the SN of the inverter, dongle, and battery module inside the box matches the one on the outer box.

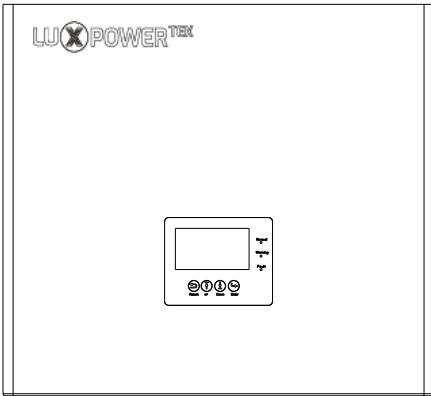


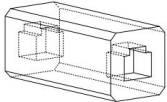
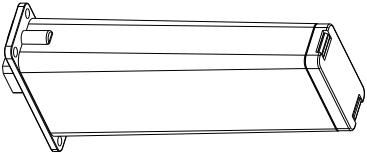

(4) Attachment Inventory: After confirming that the product's appearance is in good condition, check the types and quantities of items inside the packaging box to ensure that there are no missing or incorrect items.


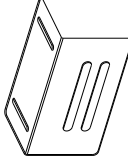
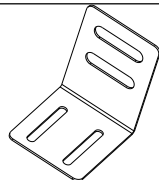





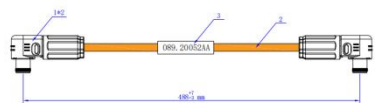


(5) Attachment List

3.3. Packing List for 10kWh System

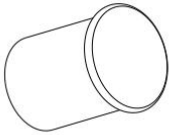
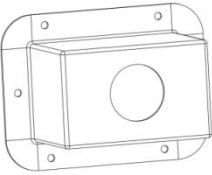
When unpacking, ensure that all of the following items are present and undamaged.

Inverter Box

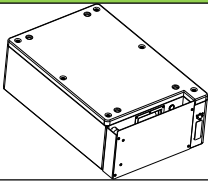


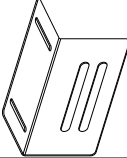

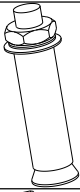
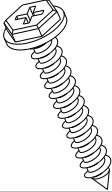
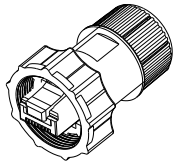
Item	Specifications	Quantity	Image
Inverter	10kW	1	
User manual		2	
CT Cable	1.3-inch CT, 10m	2	
CT Extender and Cable	10m	1	
4G Dongle	Black/L400mm	1	
Sim Card		1	

Battery Communication Cable		1	
Wall-Mounting bracket 1		1	
Wall-Mounting Bracket 2		2	
M6 Expansion Blots		6	
M6 Self-tapping Screws		6	
M5 Screws		7	
M4 Screws		2	
M3 Screws		6	
Power Cable – Positive 1	Red/35mm ² /L488mm	1	
Power Cable – Negative 1	Black/35mm ² /L343mm	1	
Power Cable – Positive 2	Red/35mm ² /L625mm	1	

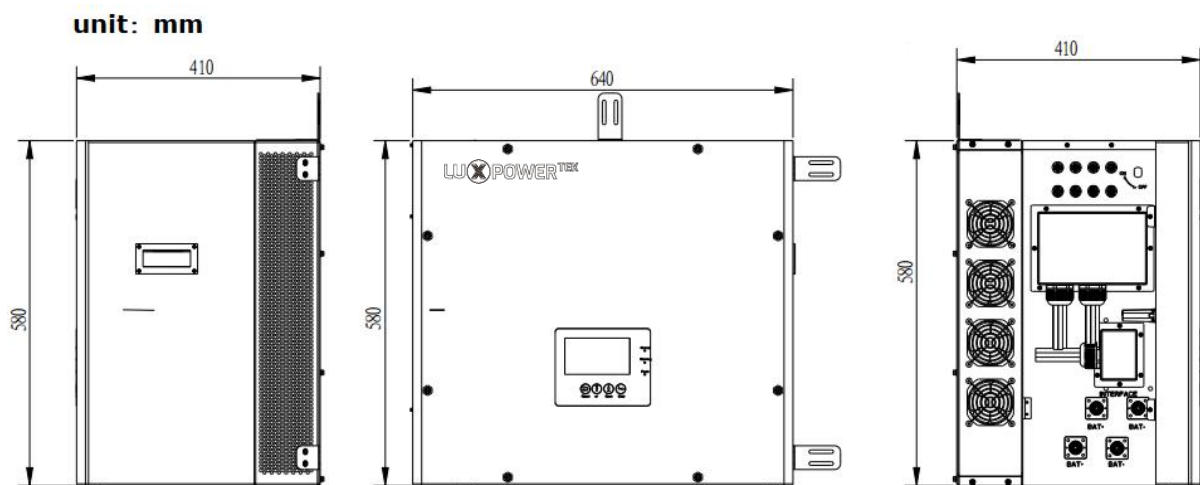
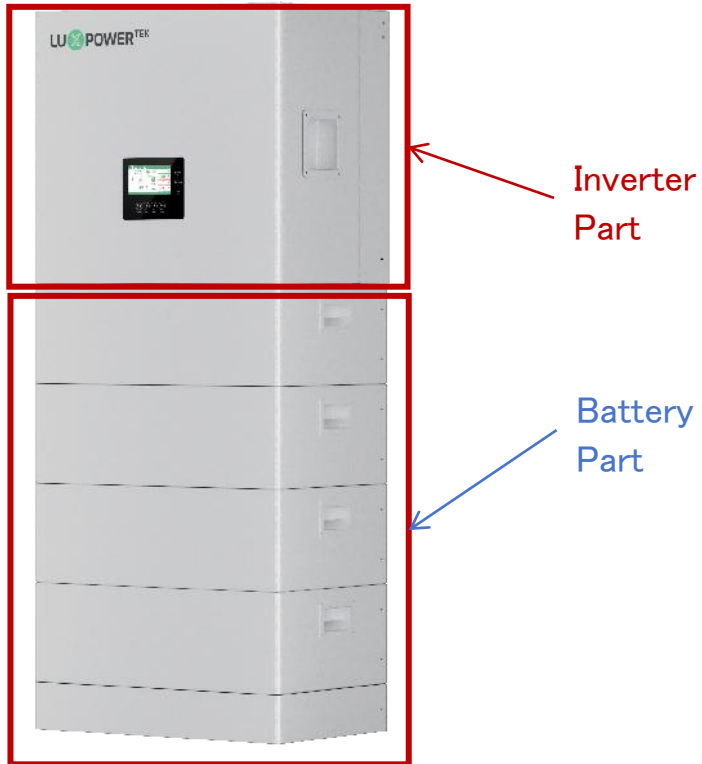
Power Cable – Negative 2	Black/35mm ² /L585mm	1													
PV Quick Connect Terminal – Positive		3													
PV Quick Connect Terminal – Negative		3													
AC Quick Connect Terminal		2													
Cardboard with Punch Marks		1	<table><tr><td colspan="2">inverter</td></tr><tr><td colspan="2">second pack</td></tr><tr><td colspan="2">first pack</td></tr><tr><td>left</td><td>right</td></tr><tr><td>:</td><td>:</td></tr><tr><td>:</td><td>:</td></tr></table>	inverter		second pack		first pack		left	right	:	:	:	:
inverter															
second pack															
first pack															
left	right														
:	:														
:	:														
Divider		1													
Base		1													
6-hole Waterproof Connector		1													

Waterproof Connector Cap / Φ7		2	
Waterproof Cover		1	

Battery Box

Item	Specifications	Quantity	Image
Battery	51.2V/100Ah	1	
Standard Communication Cable		1	
M6 Screws		4	
Wall-Mounting Bracket		2	
Grounding Cable	L400mm/4mm ²	1	
M6 Expansion bolts		4	
M6 Self-tapping Screws		4	
Female Side of Communication Port		4	

3.4. weight and Size



Inverter Weight and Size

Inverter Size (mm)	Net Weight (kg)	Package Size (mm)	Gross Weight (kg)
640*410*580mm	47kg	780*735*520mm	60kg

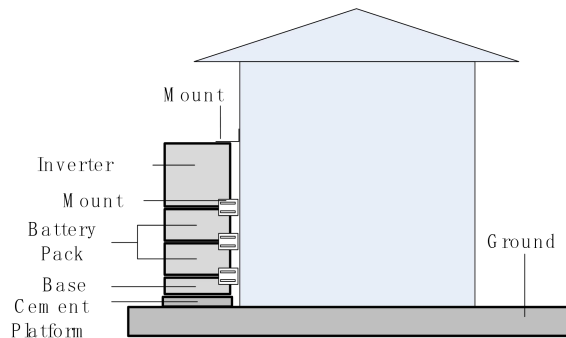
Battery Weight and Size per Module

Battery Size (mm)	Net Weight (kg)	Package Size (mm)	Gross Weight (kg)
640*410*212mm	62kg	720*509*283mm	65.5kg

4. Location Selection and Installation Steps

4.1. Installation Location Requirements

The system's battery pack and inverter are designed to meet IP65 waterproof and dustproof standards, making them suitable for general outdoor protection. The installation location of the system should be on a high, flat surface that facilitates drainage and prevents flooding, or a dedicated cement platform should be created for installation. Ensure that the distance between the system installation site and the house wall does not exceed a maximum gap of 120 mm. The location diagram is as follows:



4.2. System Installation Fixation

4.2.1. Installation Preparation

Safety Requirements

This system should only be installed by personnel who are trained in power systems and have sufficient knowledge of electrical systems.

During installation, you must always follow the safety regulations listed below as well as local safety regulations:

- All circuits connected to this power system with an external voltage of less than 51.2V must meet the SELV requirements as defined by IEC60950.
- The wiring of distribution cables must be reasonable, and protective measures must be taken to ensure that these cables are not touched during operation of the power equipment.
- When installing the battery system, the installer must wear the following protective items:



Protective Gloves



Safety Goggles



Safety Shoes

Environmental Requirements

Discharge Temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Charge Temperature: $0^{\circ}\text{C} \sim +50^{\circ}\text{C}$

Storage Temperature: $-10^{\circ}\text{C} \sim +35^{\circ}\text{C}$

Relative Humidity: 5% ~ 85% RH

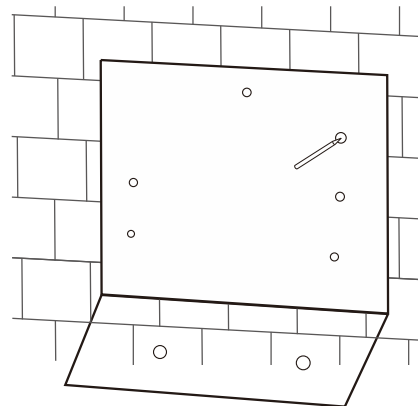
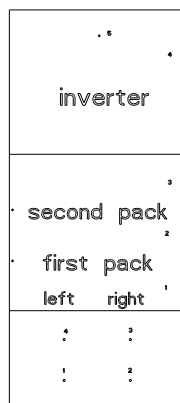
Altitude: Below 4000m

Operating Environment: Avoid direct sunlight, conductive dust, and corrosive gases. The following conditions must also be met:

- The installation surface must be flat.
- Avoid installing near flammable or explosive materials.
- The optimal ambient temperature is $15^{\circ}\text{C} \sim 30^{\circ}\text{C}$.

4.2.2. Positioning the Fixing Holes

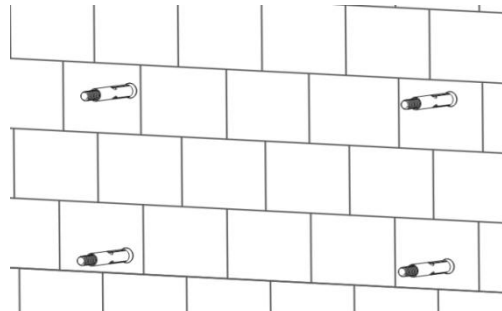
Using the prepared cement platform, use the mounting hole drilling guide paper or a marker pen to determine the fixing holes for the screw holes at the base of the support stand, and the battery and inverter wall mounting positions.



4.2.3. Drilling the Fixing Holes

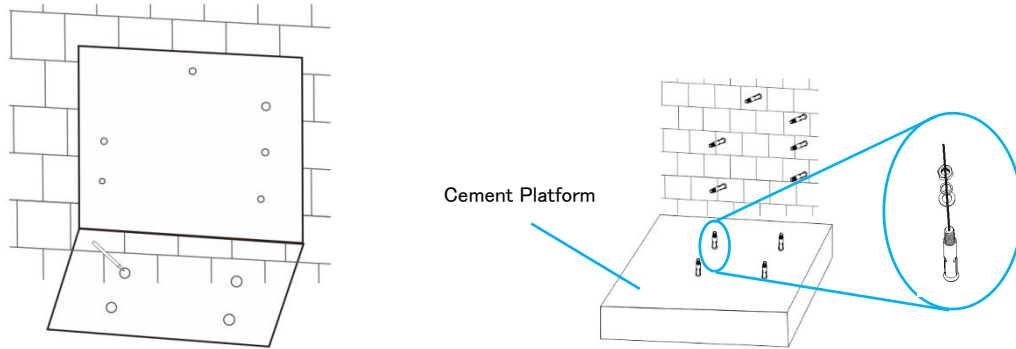
an impact d

Remove the positioning punch guide paper, and use drill to create expansion screw holes with a diameter of M6 and a depth of more than 50 mm in the cement platform and cement wall.



4.2.4. Installing the Support Stan

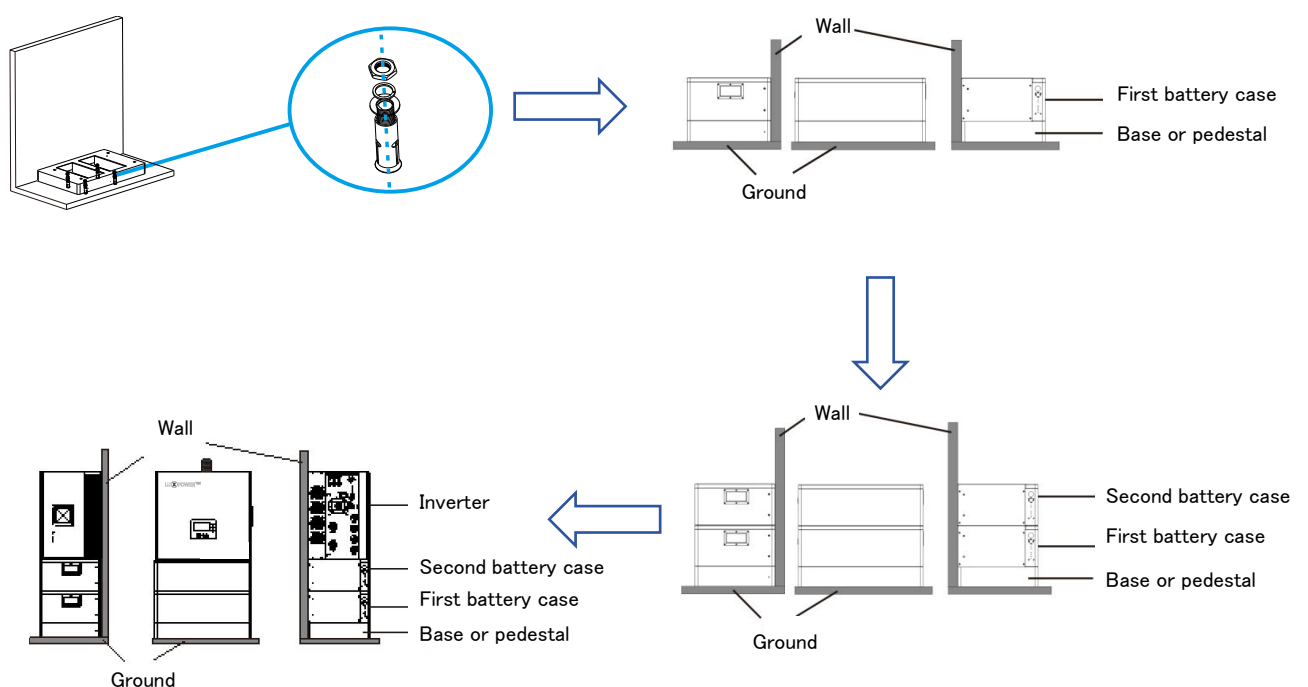
Drive the expansion screws into the screw holes in the cement platform, leaving 15 ~ 20 mm of the screws exposed, and remove the nuts and washers. Tighten the support base (regardless of front or back), use tools to lock the nuts, and ensure there is no looseness.



4.2.5. Installing the Battery Pack

When installing the inverter, since the battery modules are heavy, two people must lift them, or a small crane should be used to install the system support stand. There is no primary or secondary order for the batteries. The system is allocated based on the base capacity of a 10 kWh battery. If you want to add battery modules, you can expand them later. After aligning the battery pack, it must be fixed to the wall using fixing brackets between the battery pack and the chassis.

以下图片内容待调整（语言，排版）



Step 1: Take out the base from the inverter packaging and fix it to the cement platform with expansion screws.

Step 2: Remove the battery from the packaging box, and place it on the base with the anti-slip rubber mat facing down, stacking the two batteries sequentially.

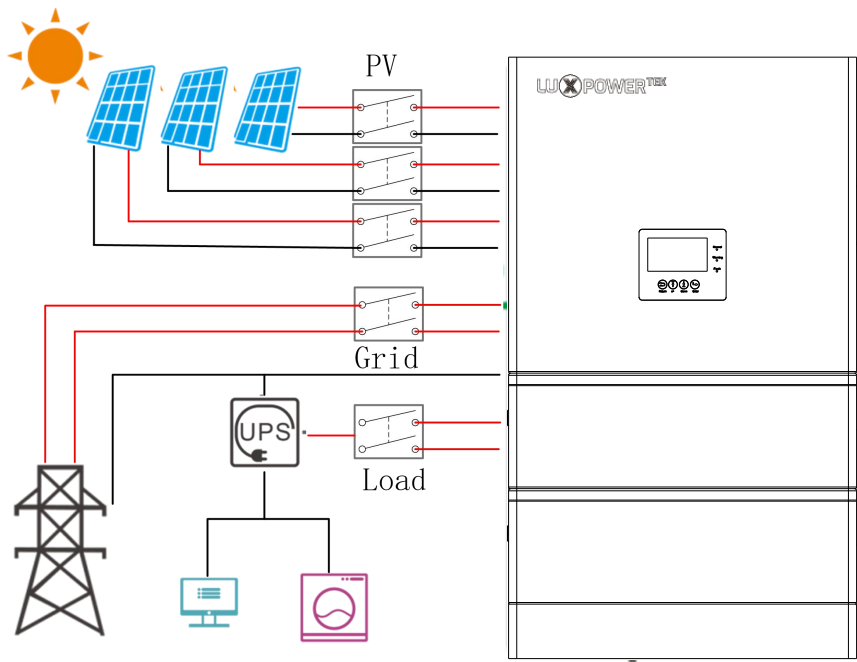
Step 3: Take the inverter out of the packaging box and stack it on top of the batteries. Once stacking is complete, first confirm whether the expansion screw fixing hole position on the wall is correct, and install the fixings last.

4.2.6. Breaker Installation

For the system to operate normally or during maintenance, customers need to separately purchase and install the PV DC switch, load AC switch, and Grid AC switch. Please refer to the following table for switch selection.

	Specifications	Quantity
PV Breaker	25A/600Vdc/2P	3
Load Breaker	63A/240Vac/2P	1
Grid Breaker	75A/240Vac/2P	1

An overview diagram of the breaker installation positions in the system is provided below.



4.3. Precautions

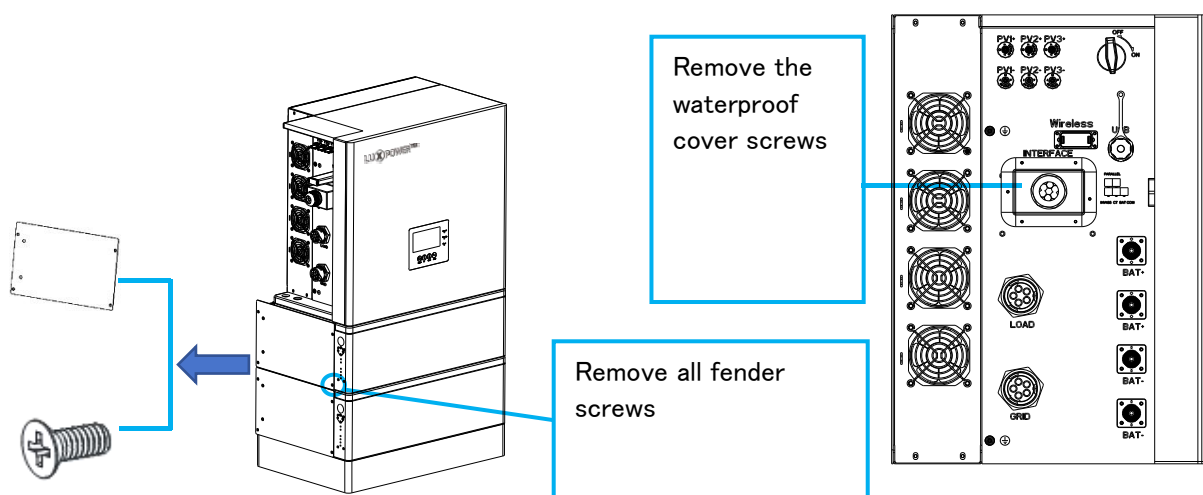
When installing the system, be careful not to bump the product, and ensure that the surface protective coating is not damaged.

If the material of the wall for fixing the battery and inverter is wood instead of cement, there is no need to pre-drill holes.

5. System Connection and Requirement

After installing and fixing the battery and inverter, the system can proceed with connecting the battery power lines, communication lines, and the inverter power and communication lines. Before performing the wiring connection operations, remove the protective parts related to the inverter and battery.

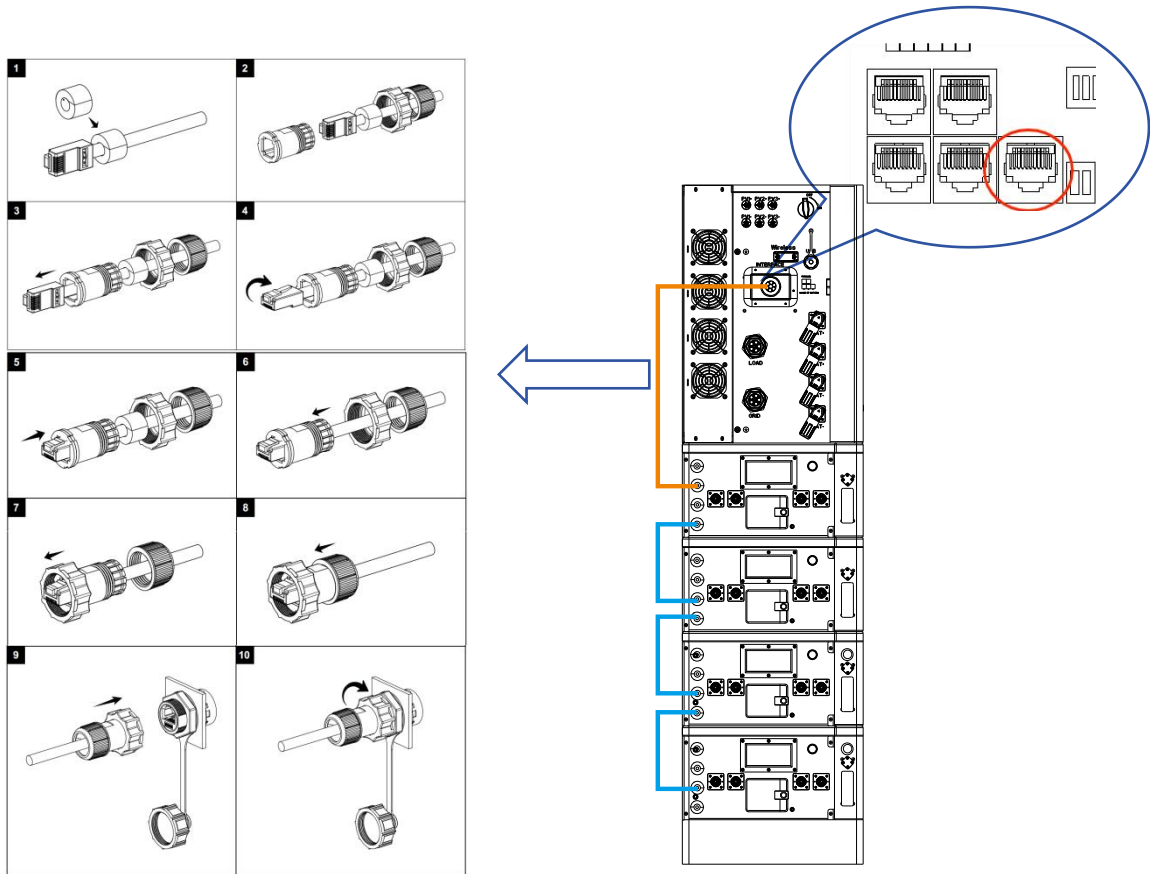
Remove the two fenders protecting the battery interface, as well as the waterproof cover protecting the inverter interface.



5.1. Inverter and Battery Communication Line Connection

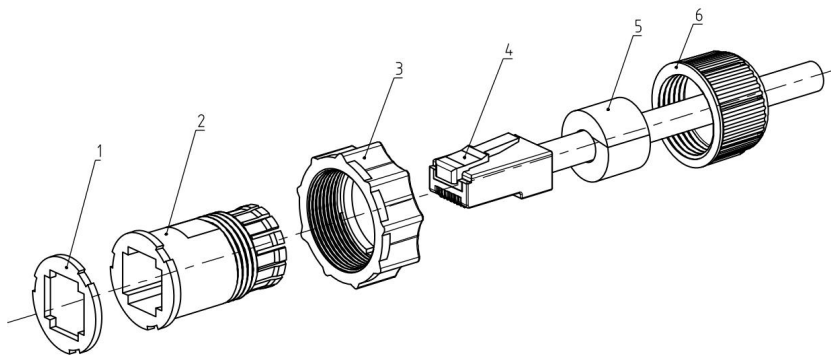
Connect the COM IN and COM OUT communication ports between the two battery modules using the battery communication line accessories (short line). After ensuring the communication lines are securely connected, waterproofing measures must be taken. The connection position is shown in the diagram below.

The CAN port of the battery module closest to the inverter in the system and the BAT communication port of the inverter are connected using the orange communication line accessory (long line). Proper waterproofing measures must be applied to the communication lines. The connection position is shown in the diagram below.



Note: The communication line from the battery to the inverter and the waterproof cover for the communication board need to be installed after the CT installation is completed.

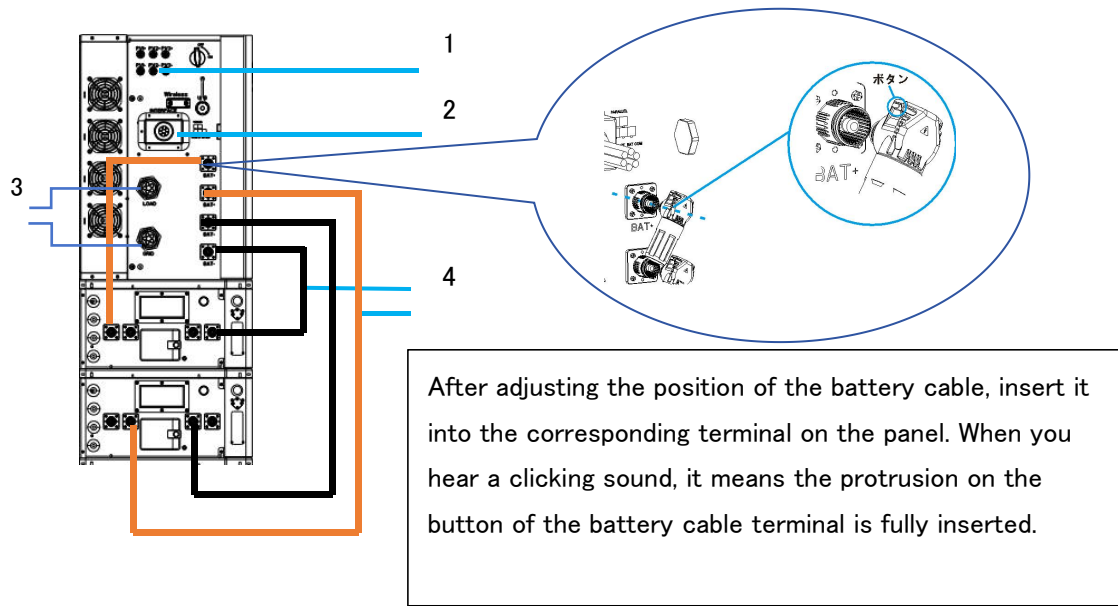
Communication Terminals Structure



5.2. Battery Power Line Connection

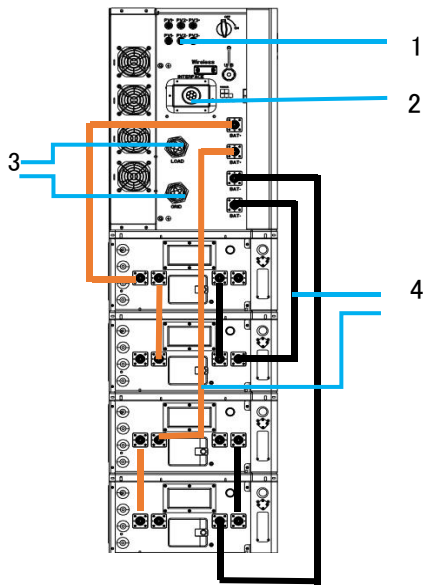
The maximum current of the battery modules in the system is 100 A, while the maximum current for inverter charging is about 250 A. After connecting the power line cables, it is necessary to inspect and ensure a stable and reliable connection, to avoid overheating, high temperatures, and burning due to poor contact.

5.2.1. For a 10 kWh capacity system, the battery power line connection method and schematic diagram are as follows:



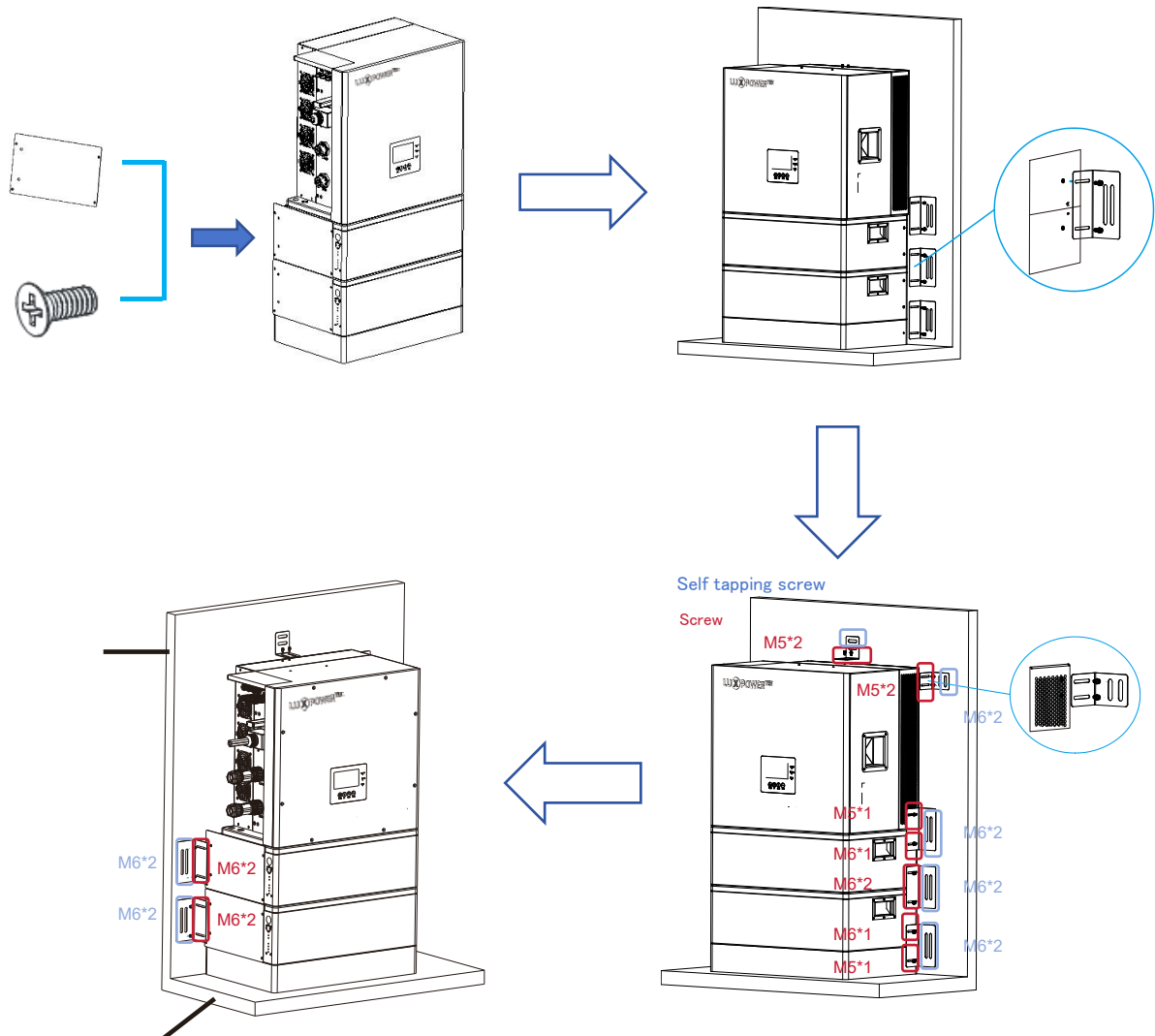
	10kWh System
1	PV Cable
2	Communication Cable
3	AC Cable
4	Battery Power Cable

5.2.2. For a 20 kWh capacity system, please refer to the connection method in the diagram below.



	20kWh System
1	PV Cable
2	Communication Cable
3	AC Cable
4	Battery Power Cable

5.3. Installation of Fixing Components(图片需要修改)



Step 1: After the installation of the battery communication line and the battery power line is completed, restore the guard on the wiring panel side.

Step 2: Ensure the system is aligned correctly before starting the installation of the fixings.

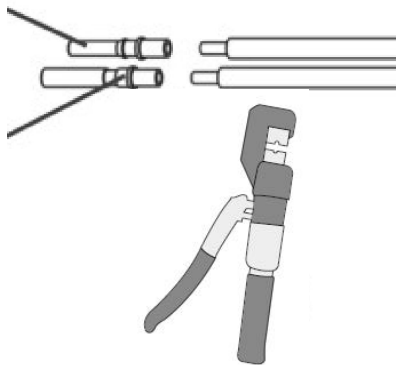
Step 3: The fixing components on the right side of the battery are installed between the bottom bracket and the battery, between the batteries, and between the battery and the inverter. The fixing components on the left side of the battery are installed individually for each battery. There is one fixing component on the top and right sides of the inverter, which are different in model from the fixing components on the left and right sides of the battery.

Step 4: Only after confirming that the inverter, battery, and bottom bracket do not shake, the installation is considered complete.

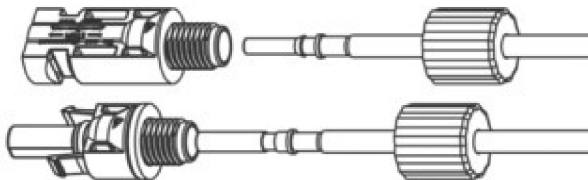
5.4. PV Cable Connection

(1) The system inverter's PV input has a maximum current of 18 A. It is recommended to use cables with a cross-sectional area of 3–6 square millimeters and a voltage rating of 1000V. To connect the cables from the PV, you need to crimp the supplied MC4 metal terminal cores. After stripping about 6 to 8 mm of wire, use a special tool to ensure the terminal is securely crimped. The crimping process is as follows:

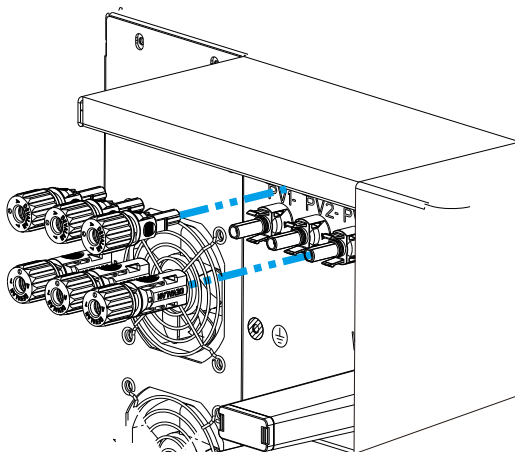
① Stripping the Wire



② The PV wire passes through the pair of positive and negative waterproof heads. The metal terminal core is inserted into the corresponding positive or negative PV terminal housing, and the PV terminal waterproof restriction is locked.

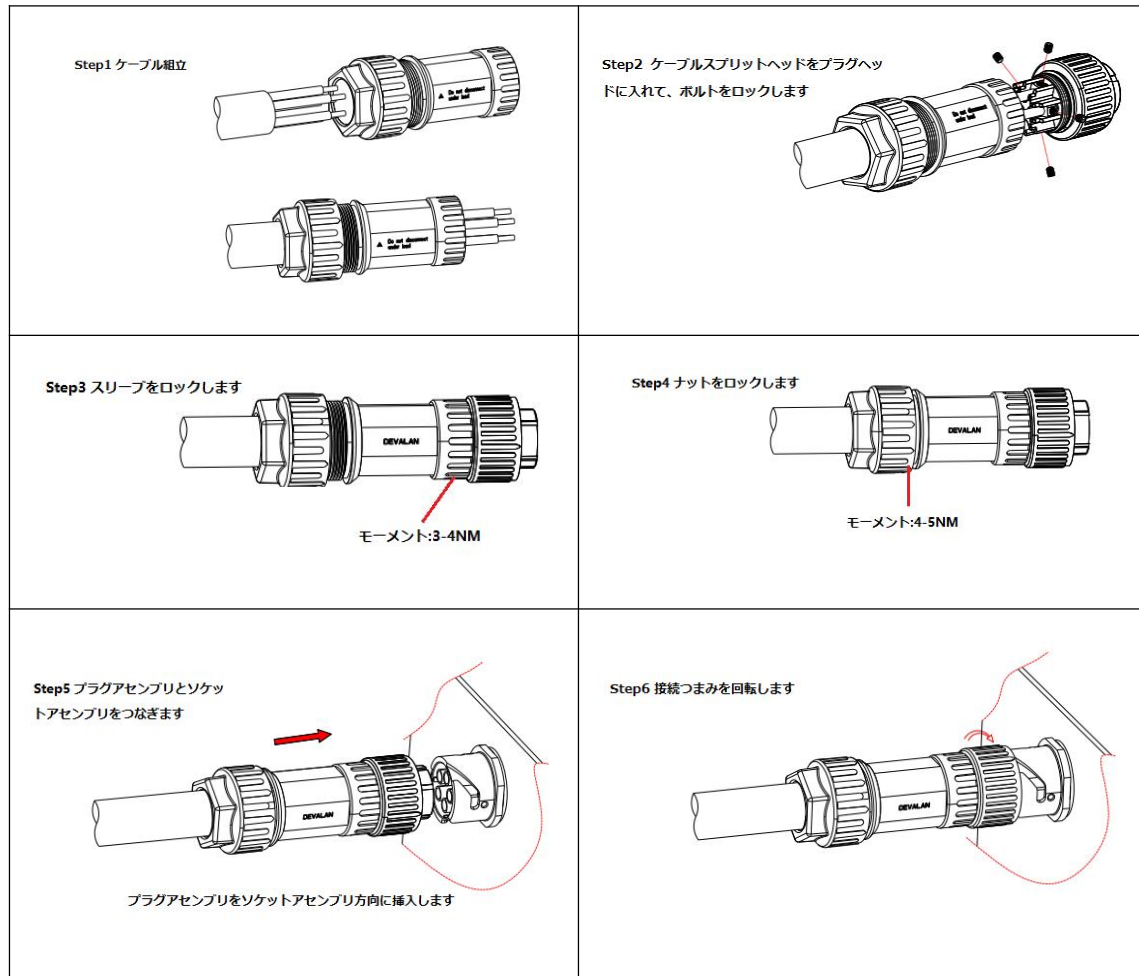


(2) Insert the corresponding PV solar panel string into the inverter, ensuring you hear a clicking sound to confirm that the terminal pair is inserted into place.

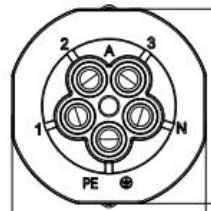
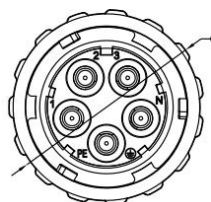


5.5. Load Cable Connection(配图更改)

The system inverter Load port outputs a maximum current of 50 A, and it is recommended to use cables with a cross-sectional area of 10–15 square millimeters. To connect the cable from the inverter Load port, use the supplied customer terminal to crimp the cable. When connecting, ensure the terminal head has proper waterproofing measures. The cable connected to the accessory client needs to be stripped by 8–12 mm, then locked using a terminal tool.

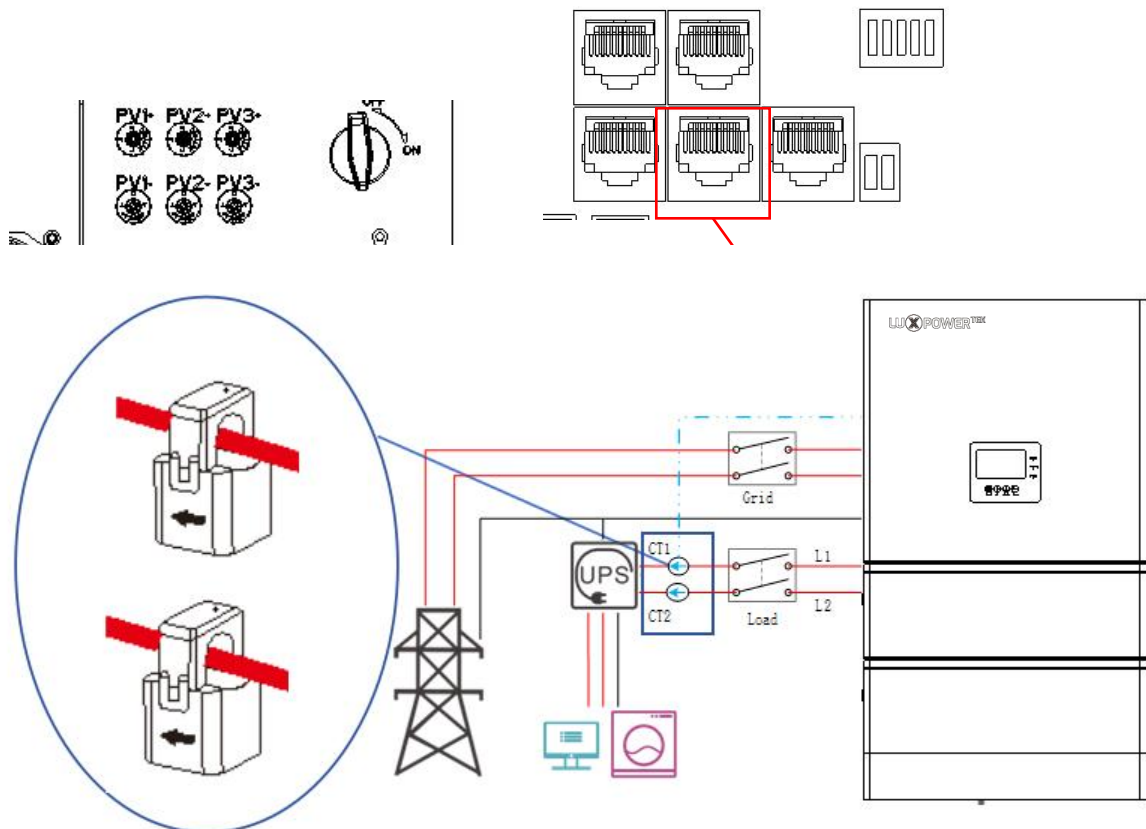


Note: The 5-pin socket of the inverter uses only four pins: Pin 1, Pin 2, Pin N, and Pin PE. Pin N is connected to neutral, and Pin PE is connected to the ground. For the other two pins, Pin 1 is connected to Grid L1 or Load L1, and Pin 2 is connected to Grid L2 or Load L2. The customer's plug must be wired to correspond to the defined configuration of the inverter's socket.



5.6. Current Sampling CT Installation Position

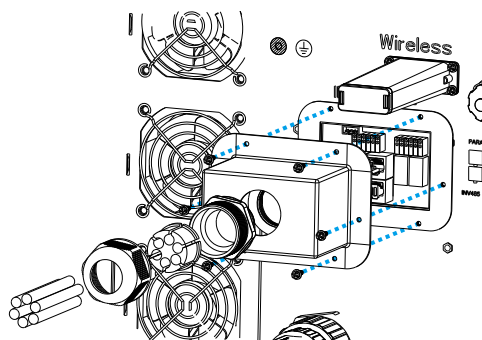
The system needs to add load power sampling at the Load port as needed. Before the inverter outputs to Load, it should follow the CT in the fixed position direction. Refer to the diagram below for the direction and position of the CT arrow.



The communication line of the CT is connected to the interface board through the waterproof cover along with the battery communication line, and the waterproof cover is locked.。

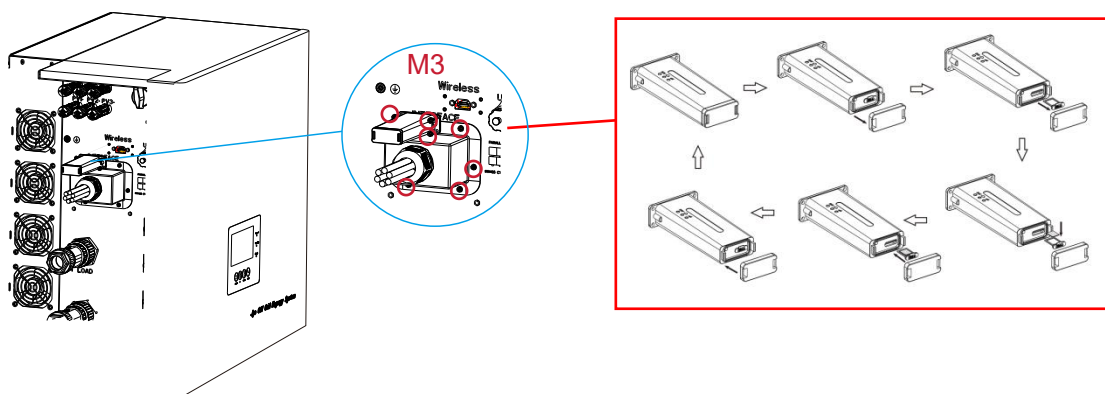
5.7. Grid Cable Connection (图片嵌入方式修改以及下方机械图放大没有放在框里)

The system inverter's Grid input terminal has a maximum current of 75 A, and the maximum wire gauge is 4 AWG. When selecting and purchasing cables, please note these specifications. For the cable from the inverter Grid switch to the inverter mains input port, you need to use the supplied customer terminal to crimp the cable, ensuring the terminal head has proper waterproofing measures. The cable connected to the accessory client should be stripped by 8–12 mm, similar to the Load cable connection operation.



5.8. Dongle Installation

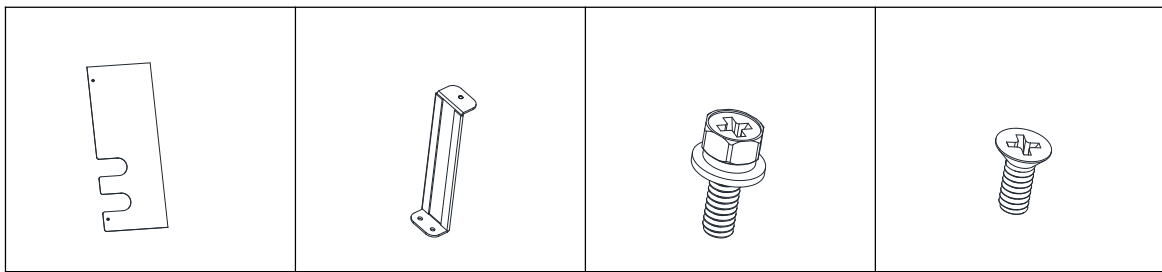
Remove the 4G dongle from the inverter, remove the waterproof cover at the tail of the dongle module, install the Nano SIM communication data card through the removed card holder, and restore the waterproof cover to its original state. Lock the 4G dongle module into the inverter.



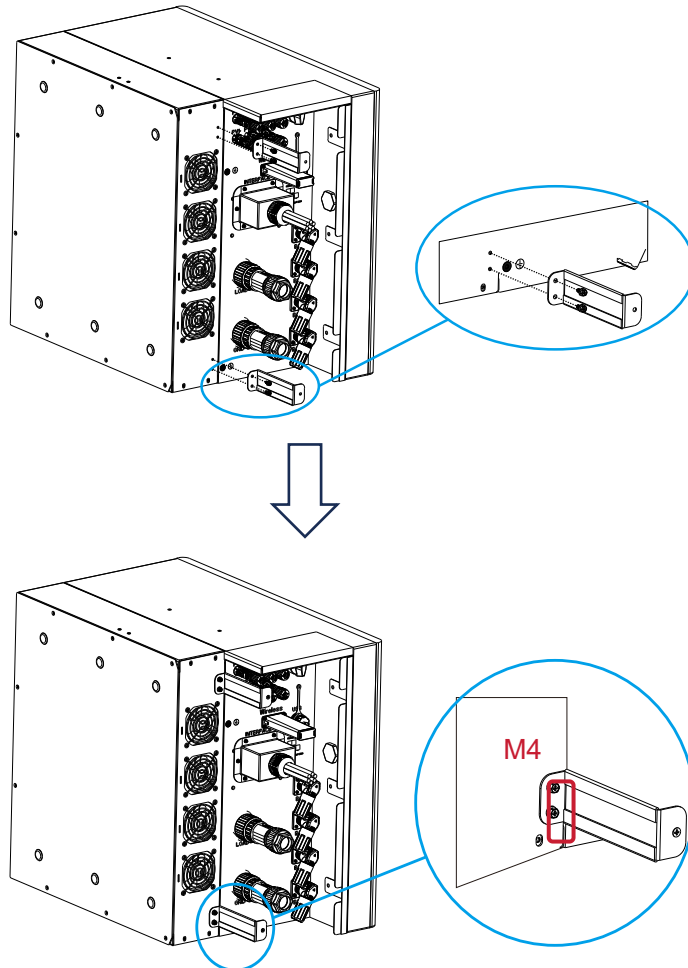
Note: The data card should be activated first to avoid downtime due to unpaid ongoing charges.

5.9. Installation of Side Cover

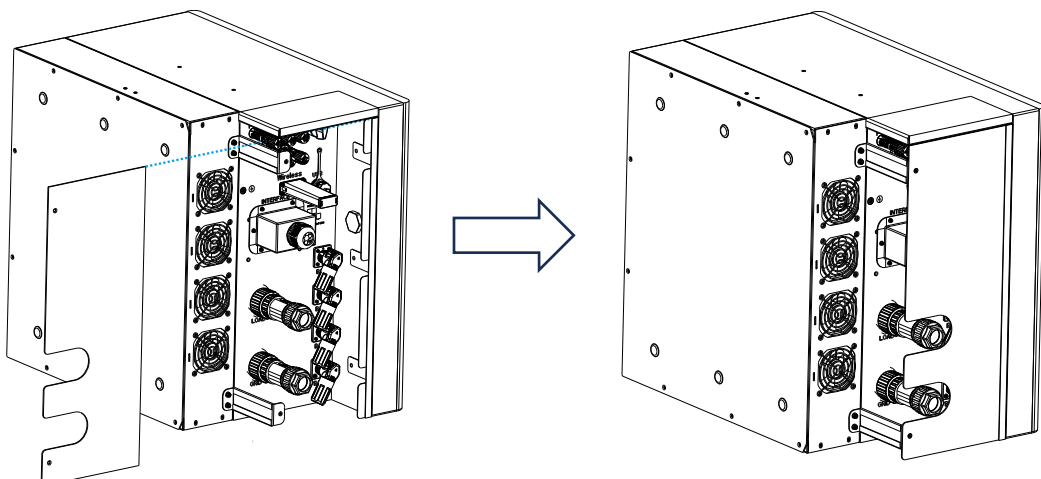
- (1) Remove the side cover, cover support bracket, and screws.



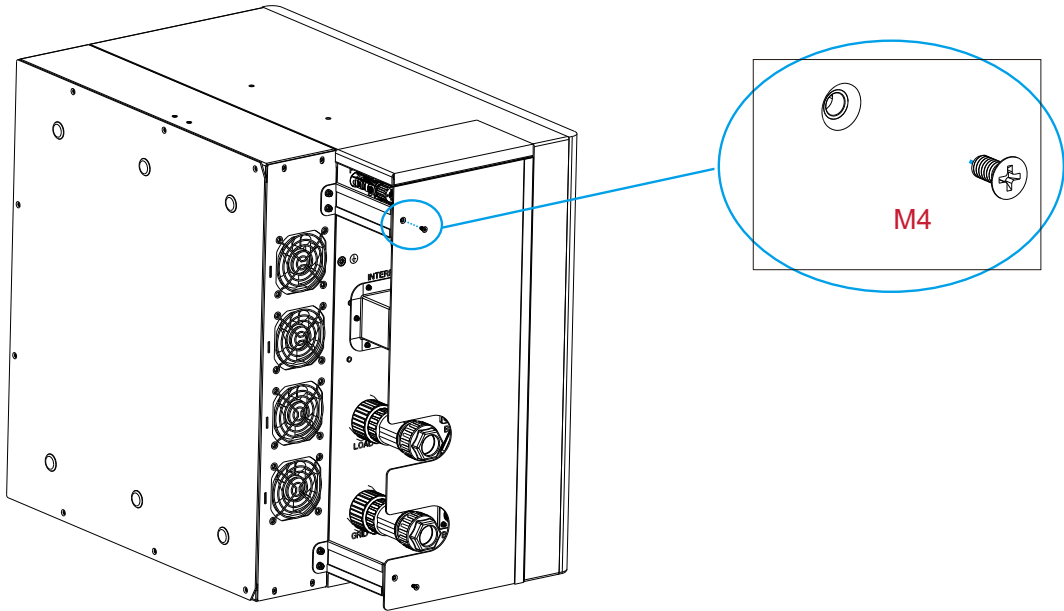
(2) Attach one end of the support bracket to the inverter fan fixing sheet metal, and lock and secure it with screws.



(3) Arrange the wires, insert the end of the side cover without holes into the gap position of the inverter support rod, and lock and secure it with screws.



(4) Fix the lock screws and support bracket on the opposite side of the cover.



6. Start-Up Steps

6.1. Confirm PV and PV Power-On:

* Check the minimum ambient temperature at the installation site. The rated Voc shown on the solar panel nameplate is obtained at a temperature of 25° C. The Voc of the solar panel increases as the ambient temperature decreases. Ensure that the maximum solar string voltage at the lowest temperature does not exceed the inverter's maximum input voltage of 550V for safety.

- The inverter is equipped with triple MPPT. For MPPT1, MPPT2, and MPPT3, users can connect one string each.
- The inverter automatically limits the total input current for MPPT1/MPPT2/MPPT3 to **18A/18A/18A**.
- The inverter limits the total solar input power to a maximum of **18 kW**.

Use a multimeter to confirm there is no mistake in the polarity and connection of the PV to the inverter, and ensure the current voltage also meets the inverter requirements. After confirmation, close the PV switch inside the inverter and the system PV DC switch. If the inverter is normal, it will light up and enter standby mode. Once the inverter LCD confirms that the PV voltage of each string is normal, you can proceed with the next operation.

6.2. Confirm Battery and Power-On

After confirming that the connection of the system battery power line is reliable and that the polarity is correct, you can close the battery module casing and perform the button switch operation. Wait for successful communication between the inverter and the battery, then enter the charging operation mode. Use a clamp ammeter to compare with the LCD and confirm if the charging power is correct.

6.3. Confirm Load Output Voltage and Power Supply

Use a multimeter to check whether the voltage and frequency between L1 N, L2 N, L1 L2 before the load switch are correctly output according to the inverter settings of 100V/200V, 50Hz, or 60Hz. If there is no mistake, you can close the Load switch to power the subsequent devices.

6.4. Confirm Grid Input Voltage

Before closing the Grid switch, use a tester to check whether the LN and LL voltages of the Grid input terminal are normal. After confirming there is no error, close the Grid switch. Then operate on the LCD to set the inverter to AC Charge mode and perform the battery charging test. Observe whether the battery charging power and Load terminal load power are displayed normally. After the check is complete, you can exit AC Charge mode. If there is an abnormality in the Load power in AC Charge mode, check whether there is an error with the CT on L1 and L2, or if the CT direction is reversed, correct the error, and then exit AC Charge mode.

6.5. Confirm Battery Capacity Balance

The system must operate stably for a long time to ensure the application life of the lithium battery pack. It is necessary to ensure the uniformity of the battery's initial capacity. Therefore, after powering on, confirm that the battery pack SOC in the system is the same (the difference does not exceed the acceptable range) through the battery SOC LED or a more accurate upper-level device.