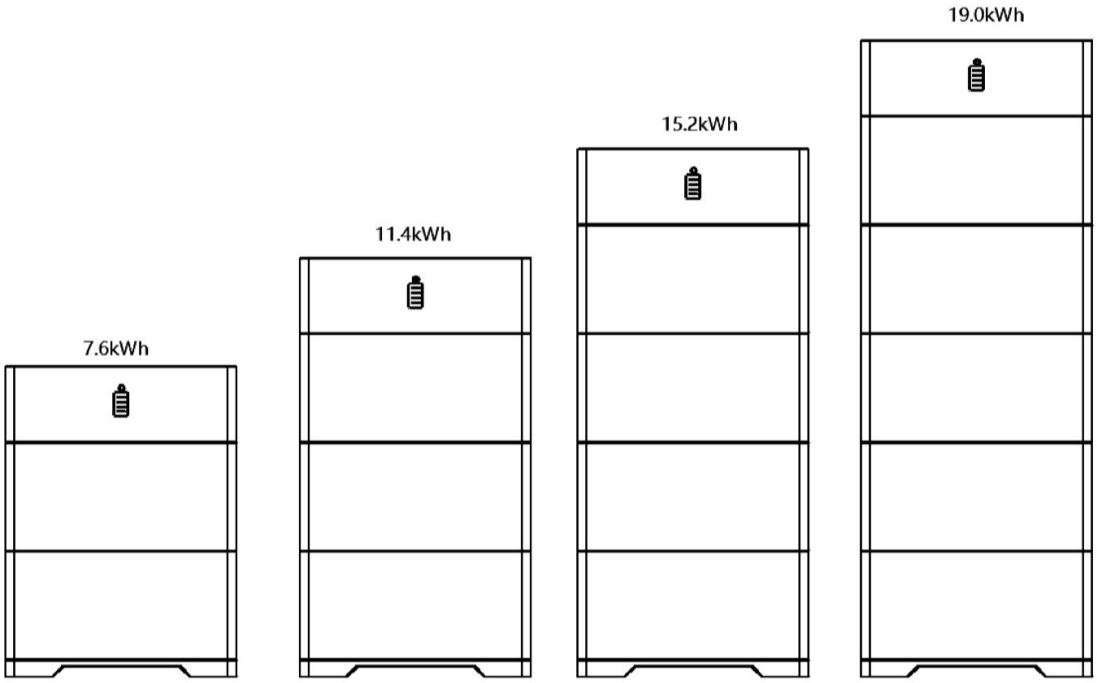
SlimLine E20
SlimLine Energy Storage System (High Voltage)
User Manual



BLH-HV-Slim-7.6
BLH-HV-Slim-11.4
BLH-HV-Slim-15.2
BLH-HV-Slim-19

SlimLine

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Symbol Conventions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE
NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this type of safety message.

Table 1 Safety messages

Product Handling Guide

			
<18 kg <40 lb	18-32 kg 40-70 lb	32-55 kg 70-120 lb	>55 kg >120 lb

Manual Intended Audience

The operation in this document can only be performed by qualified personnel with the following skills:

- Personnel who plan to install or maintain battery equipment and inverter must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnels are allowed to install, operate, maintain the equipment, remove safety facilities and inspect the equipment, who are specialist according to IEC 60 364 or DIN VDE 0105, and qualified on the basis of proven knowledge of relevant norms, regulations, accident prevention regulations and operating conditions and have been authorized by the person responsible for the safety of the component/system to carry out the necessary work.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

Table of Contents

1 Safety Messages and Precautions

1.1 Declaration

Please read this manual carefully before installation, operation and maintenance. Inappropriate use may lead to injury or even death for the user or third parties. Material damage to the battery and other equipment can also occur. All operations should be performed by a qualified person.

Manufacturer will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- The installation and use environment do not comply with relevant international or national and regional standards.
- Failure to follow the operation instructions and safety messages on the batteries and in this document
- Product damage caused by the irresistible natural disaster
- Damage caused during transportation by the customer
- Damage caused by storage conditions that do not meet the requirements specified in related documents
- Due to the negligence, improper operation, or intentional damage, the hardware of the device causes damage

1.2 General Safety Requirements

⚠ DANGER

- Ensure the shells of battery pack are properly grounded before operation.
- Do not dispose of batteries in a fire or hash chemicals. The batteries may explode.
- The disassembly of batteries may generate internal short circuit, which may cause firing, or other problems.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- Batteries theoretically do not have flowing electrolyte, but in the event of any leakage and contact with skin, eyes, or other parts of the body, flush the electrolyte with water immediately and seek medical attention.
- The battery may be damaged due to impact or other reasons during transportation or assembly. If the battery is found to have any abnormal characteristics, such as the shell is damaged, the electrolyte gas, the electrolyte leak, etc. The battery shall not be used. Contact the dealer or installer to replace it.
- Do not expose the cable externally which may cause short-circuit to battery or electric shock to human.
- Do not touch the output terminals of battery pack while it is working. The DC cables connected to an inverter may be live. Touching live DC cables may result in death or serious injury due to electric shock.
- When performing high voltage operations, use dedicated insulation tools.

⚠ WARNING

- Wear suitable personal protective equipment for all work on the battery system.
- Before installation, be sure to cut off the power grid and ensure that the battery is in the shutdown mode.
- For the equipment that needs to be grounded, install the protective earthing (PE) cable first when installing the equipment and remove the PE cable last when removing the equipment. Do not operate the equipment in the absence of a properly installed grounded conductor.
- Remove metal objects from your body while operating, such as watches, necklaces and rings.
- Connect all cables according to the instructions, ensure no reverse connection for positive and negative poles. No external short circuit.
- Do not connect the battery to utility grid or AC source directly.
- Do not mix and match this battery with other battery.
- If a fire occurs, pure water, ABC or carbon dioxide extinguisher can be used.

NOTICE

- Inspect the package contents upon receipt. Notify the dealer if there are any damages.
- Do not operate this battery pack in direct sunlight, in contact with fluids, or where there is excessive dust or high humidity.
- Do not lay tools or metal parts on top of battery.
- Do not place inflammables around the equipment.
- Wear ESD gloves when handling the equipment. Do not wear clothes prone to static electricity
- The battery modules cannot be stored at high temperatures (greater than 60 °C)
- The battery system must only be used as stationary equipment. If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down.

2 Product Introduction

2.1 Overview

The Lithium-Ion Battery Pack System is a high-power DC battery system for use with inverter. It contains two parts, one is battery module, and the other is control box.

It can store and release electric energy based on the requirements of the inverter management. Built-in intelligent BMS (Battery management system), which can manage and monitor the battery voltage, temperature, current and other information. The energy and power of battery pack system can be configured according to different requirements.

2.2 Battery Capacity Description

The battery supports power and energy expansion. One control box supports a maximum of five battery expansion modules. The energy of each module is 3.8 kWh.

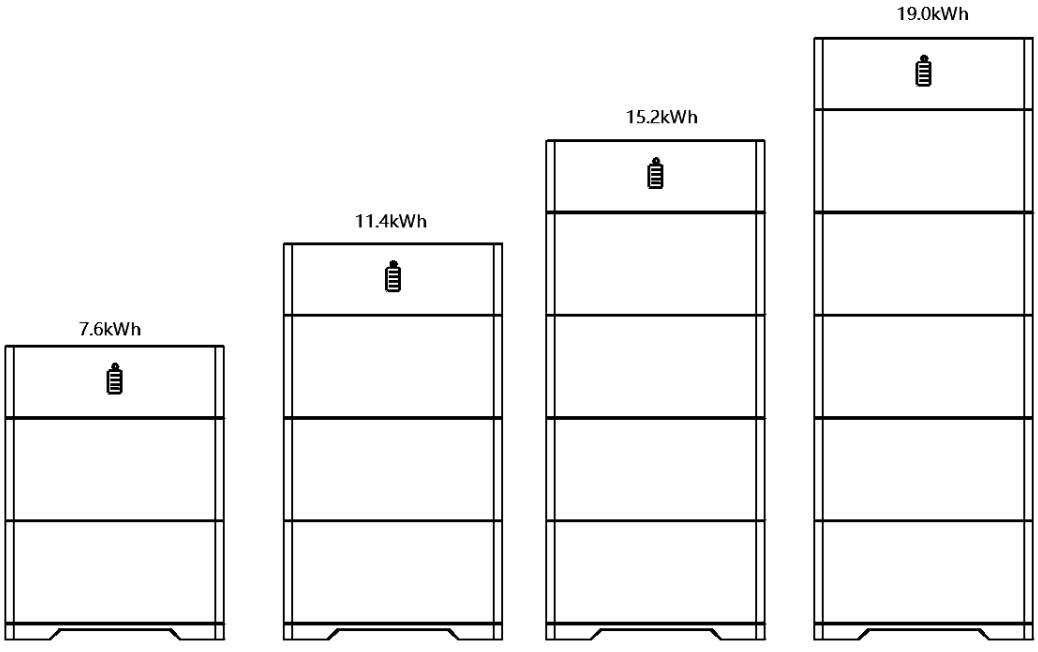


Figure 1 Modules in series for power and energy expansion

2.3 Battery application in Networking

The battery is applicable to the grid-tied systems of residential rooftop PV plants.

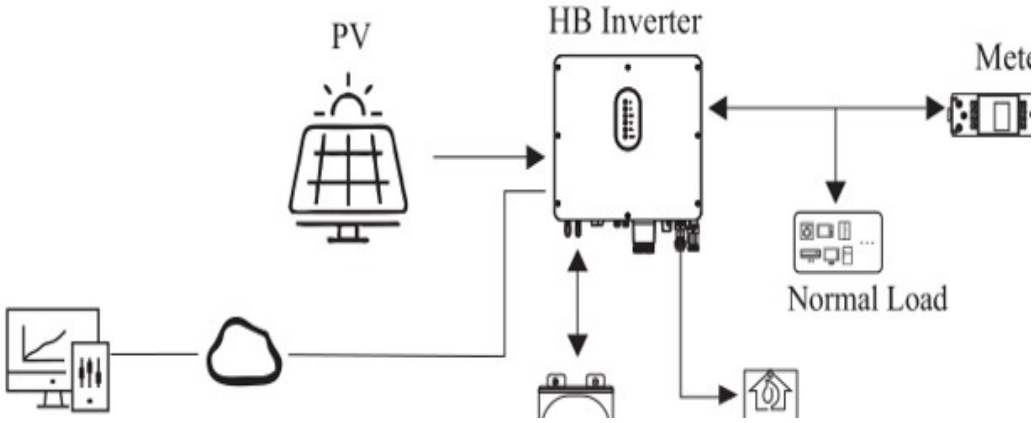


Figure 2 System networking

2.4 Battery Pack System Description

2.4.1 Battery Appearance

This topic describes the battery appearance.

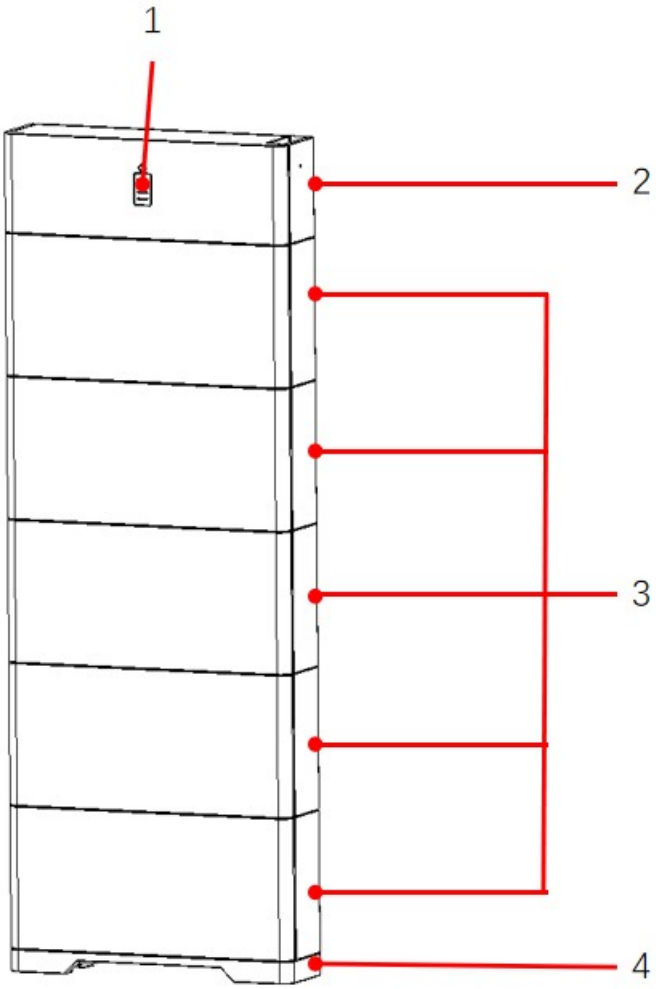


Figure 3 Battery appearance

(1) Power button and SOC / status LEDs

(2) Control Box

(3) Battery modules

(4) Base

2.4.2 Control Box Description

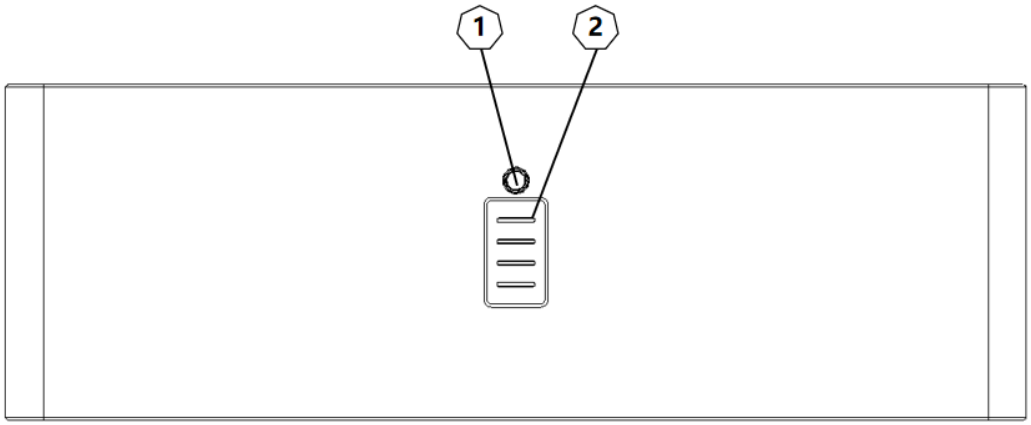
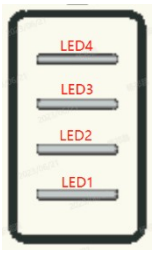


Figure 4 Control Box Front Panel

No	Information Introduction	Description
1	Power button with LED	A power button with green LED, for switching the battery on / off and displaying whether the battery is started. For starting up and shutting down the battery pack: Pressing the button for 3 seconds to shut down the battery pack when it is in active status. Pressing the button for 3 seconds to wake up the battery pack when it is in shut down status. After starting the battery pack, the green LED inside the power button will be lit up.
2	SOC and status LED	 Four white and red dual-color LEDs for displaying remaining capacity and fault signal. SOC displaying logic：

		a) When SOC is 0%, LED1, LED2, LED3, LED4 are off. b) When SOC is 1%~25%, LED1 is on. c) When SOC is 26%~50%, LED1 and LED2 are on. d) When SOC is 51%~75%, LED1, LED2 and LED3 are on. e) When SOC is 76%~100%, LED1, LED2, LED3 and LED4 are on. Fault displaying logic: When all four LEDs are blinking red, that means the battery pack has minor fault that is recoverable. When all four LEDs are steady red, that means the battery pack has major fault that is unrecoverable.

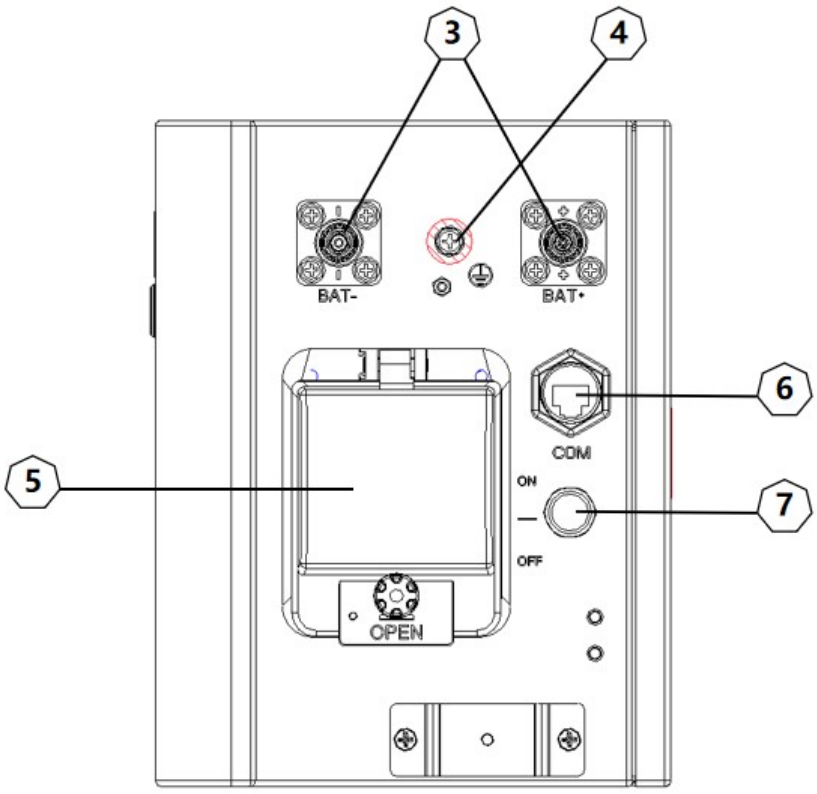


Figure 5 Control Box Side Panel

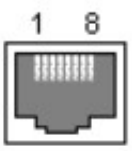
No	Information Introduction	Description
3	Battery power ports	“BAT+” is battery power positive port. “BAT-” is battery power negative port.
4	Protecting earthing terminal	Protecting earthing terminal
5	DC Breaker	This breaker controls the power supply for battery pack. Down: OFF Up: ON
6	Communication port	8 pins RJ45 ports for communication.  PIN1: 12VIN+, external 12VDC positive signal PIN2: 12VIN-, external 12VDC negative signal PIN3: CAN_GND PIN4: CAN_H PIN5: CAN_L PIN6: RS485_GND PIN7: RS485_A PIN8: RS485_B
7	Pressure relief valve	Prevent excessive internal pressure of battery pack

Figure 6 Control Box Bottom Panel

No	Information Introduction	Description
8	Bottom Connector	Control box bottom connector that connects to module top connector.

Table 2 Control box description

2.4.3 Battery Module Description

The standard capacity of a battery expansion module is 3.8 kWh.

Figure 7 Battery Module Bottom Panel

No	Information Introduction	Description
1	Bottom Connector	Module bottom connector that connects to module top connector.

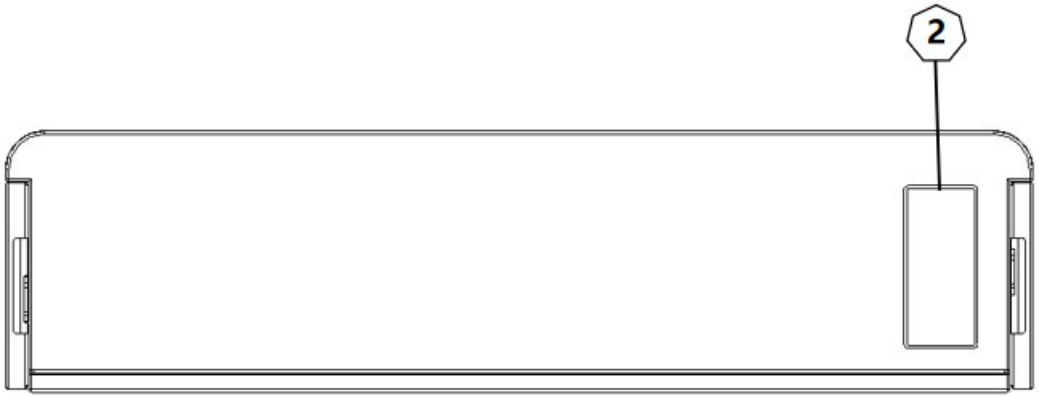


Figure 8 Battery Module Top Panel

No	Information Introduction	Description
2	Top Connector	Module top connector that connects to module or control box bottom connector.

Table 3 Battery module description

2.4.4 Base introduction

Figure 9 Base Top Panel

No	Information Introduction	Description
1	Top Connector	Base top connector that connects to module bottom connector.

Table 4 Base description

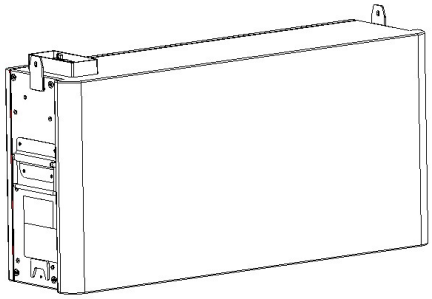
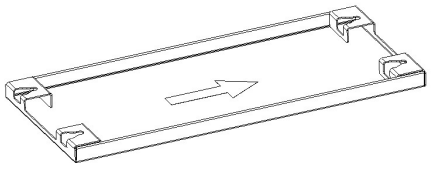
3 Battery Pack System Installation

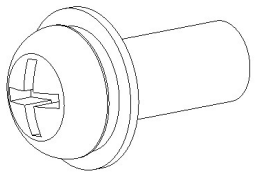
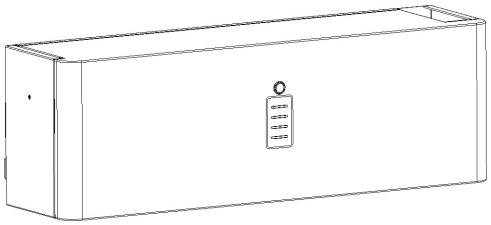
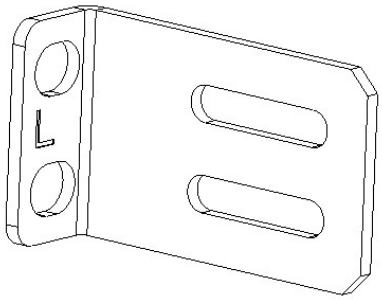
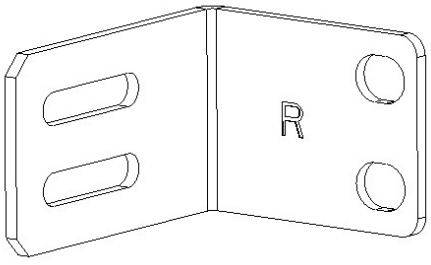
3.1 Inspection of package

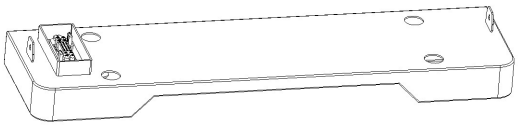
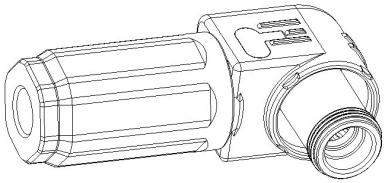
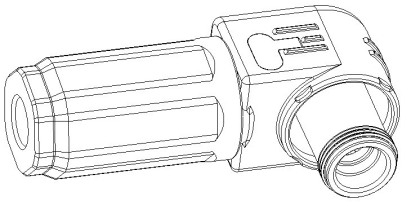
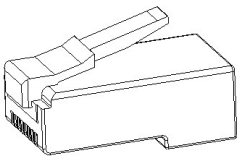
There are two kinds of package for one battery system, one for Control Box and another for Battery Module(quantity depends on energy volume you needed). When unpacking the package, please check the appearance ahead of installation. If the main body of the product is damaged, please consult the dealer, do not install the product.t.

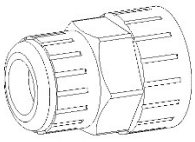
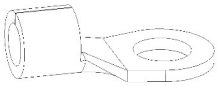
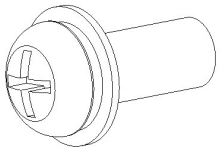
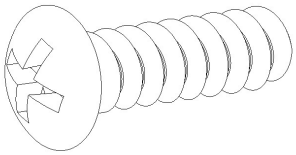
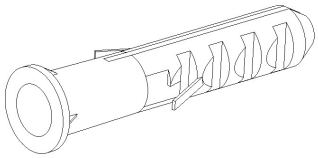
After unpacking the battery, check that the accessory delivered with the product are intact and free from any obvious damage. If any item is missing or damaged, please contact your dealer.

3.2 Delivery List

Item No.	Name	Quantity	Figure
Battery module package	Battery Modules	2/3/4/5	 Dimensions (W x D x H) : 670 mm x 170 mm x 315 mm Weight: Approx 37.5 Kg
	Side Covers	4/6/8/10	 Dimensions (W x D x H): 314.5 mm x 134.5 mm x 14.8 mm Weight: Approx 0.5 Kg

	M4 screw	4/6/8/10	 M4x10 mm, pan head, cross recessed
Control box package	Control Box	1	 Dimensions (W x D x H) : 670 mm x 170 mm x 220 mm Weight: Approx 12.5Kg
	Left wall mounting piece	1	 Dimensions (W x D x H) : 49 mm x 30 mm x 15 mm
	Right wall mounting piece	1	 Dimensions (W x D x H) : 40 mm x 30 mm x 49 mm

	Base	1	 Dimensions (W x D x H) : 670 mm x 170 mm x 50 mm Weight: Approx 4.5Kg
	Expansion bolt	4	 M8x80mm
	Connector Plug	1	 Connector Plug, Orange Mate with 6AWG wire
	Connector Plug	1	 Connector Plug, Black Mate with 6AWG wire
	RJ45 Crystal Head	2	 RJ45 Crystal Head-8P8C

	Plastic cover	2	 Plastic cover for sealing
	PE Terminal	2	 PE Terminal Mate with 10AWG wire, Yellow/Green
	M4 screw	6	 M4x10 mm, pan head, cross recessed
	Self-tapping screw PA6	4	 PA6x40 mm, pan head, cross recessed
	Expansion pipe	4	 φ6x40 mm, plastic

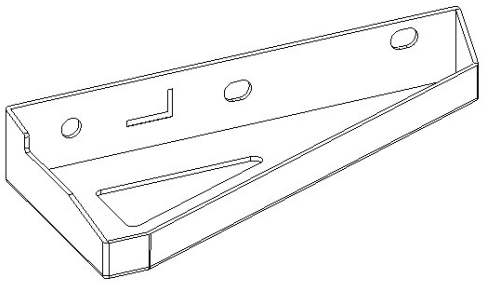
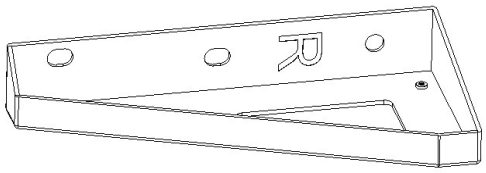
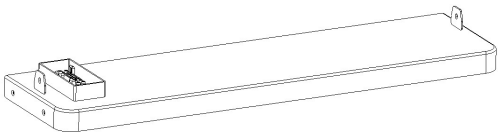
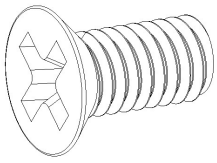
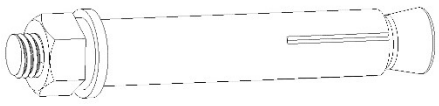
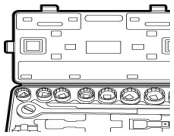
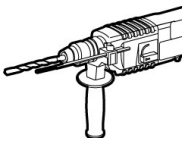
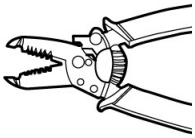
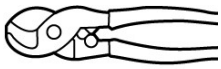
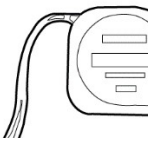
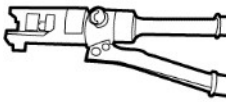
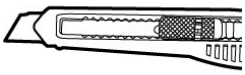
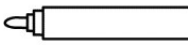
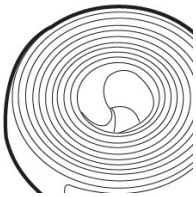
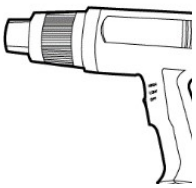
Wall mounting accessory (Optional)	Left wall mounting bracket	1	 Dimensions (W x D x H) : 300 mm x 140 mm x 50 mm
	Right wall mounting bracket	1	 Dimensions (W x D x H) : 300 mm x 140 mm x 50 mm
	Base bracket	1	 Dimensions (W x D x H) : 670 mm x 170 mm x 30 mm
	M4 screw	4	 M4x8 mm, flat head, cross recessed
	Expansion bolt	6	 M10x60mm

Table 5 Delivery list

3.3 Tools

The tools in the following table could be needed during the installation. Tools are not delivered with the battery..

Category	Tools			
Installation	 Torque wrench	 Torque socket wrench	 Hammer drill (with a drill bit of 13 mm)	 Phillips Screwdriver Bit
	 Wire strippers	 Cable cutter	 Crimping tool	 Steel measuring tape
	 Cord end terminal crimping tool	 Hydraulic pliers	 Utility knife	 Marker
	 Level	 Heat-shrink tubing (Diameter Ø7MM)	 Heat gun	 Multimeter (DC voltage measurement range ≥ 600 V DC)

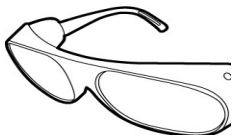
Personal protective equipment (PPE)	 Safety gloves	 Safety goggles	 Safety shoes	

Table 6 Tool list for installation

3.4 Installation environment

- Choose a dry, clean, neat well-ventilated and convenient location for installation, and use environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations
- Installation ambient temperature: 0 ℃ ~ 40 ℃, Relative humidity: 5 - 95 % (non-condensing)
- There are no inflammable and explosive objects near the installation position of the battery
- Install the battery on a solid brick-concrete structure and flat floor.

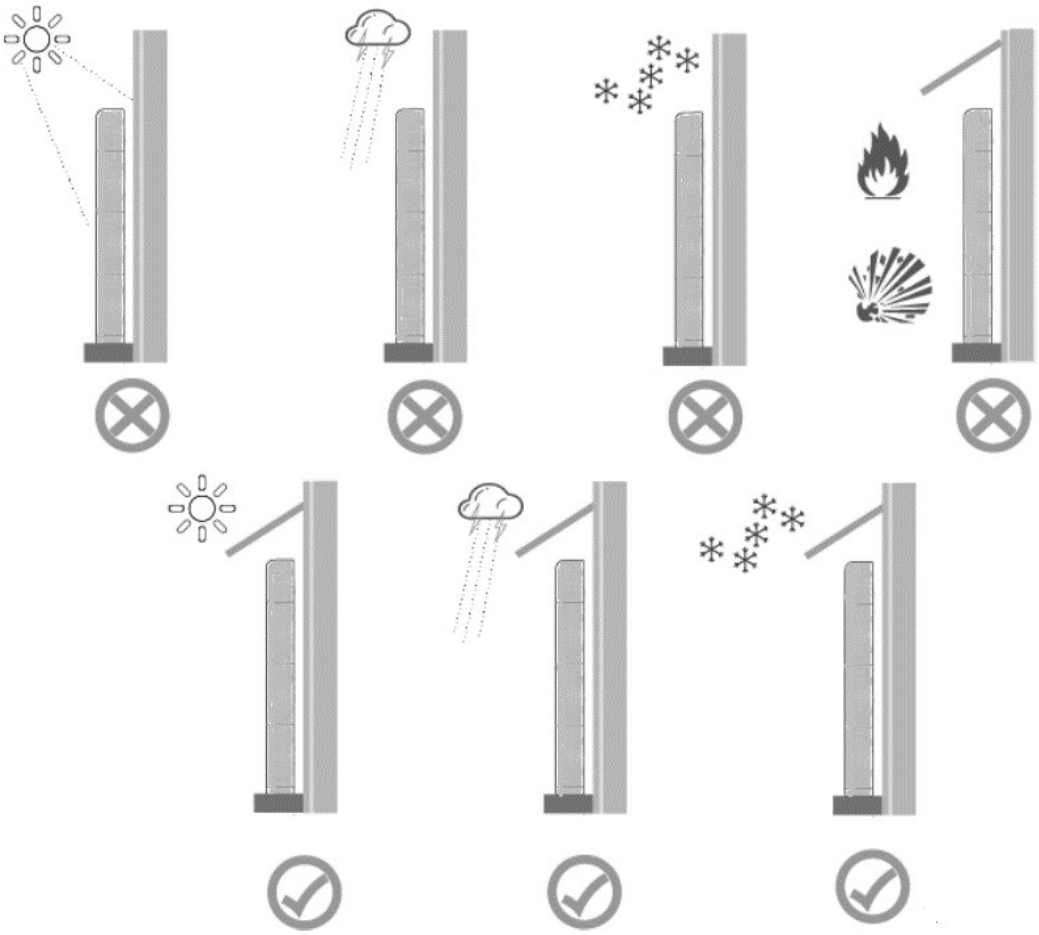


Figure 10 Installation environment

3.5 Determining the Installation Position

3.5.1 Installation Angle Requirement

The battery can be floor-mounted and wall-mounted. The installation angles

requirement is as follows:

- Do not install the battery at forward tilted, back tilted, side tilted, horizontal, or upside-down positions.

3.5.2 Installation Position Requirements

Install the battery on a solid concrete structure or concrete wall or floor. If other types of walls and floors are used, they must be made of fire-retardant materials and meet the load-bearing requirements of the equipment.

3.5.3 Installation Space Requirements

- During installation, ensure that there are no other devices or flammable or explosive materials around the batteries. Reserve adequate space for heat dissipation and safety isolation.
- When the battery is mounted on a wall, do not place any objects under the battery.

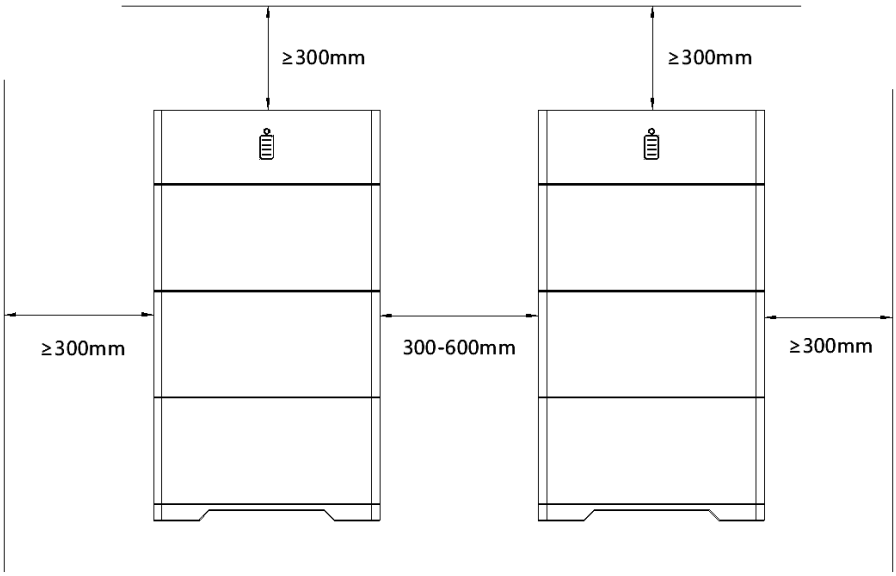


Figure 11 Installation space

Note：Flammable or explosive materials or devices should be far from the battery packs.

3.6 Installation Process

3.6.1 Floor-Mounted Installation

Installation Precautions

Step 1: Use Hammer drill to drill 4pcs Ø12mm hole on the floor and insert 4pcs M8x80mm expansion bolt to the holes.

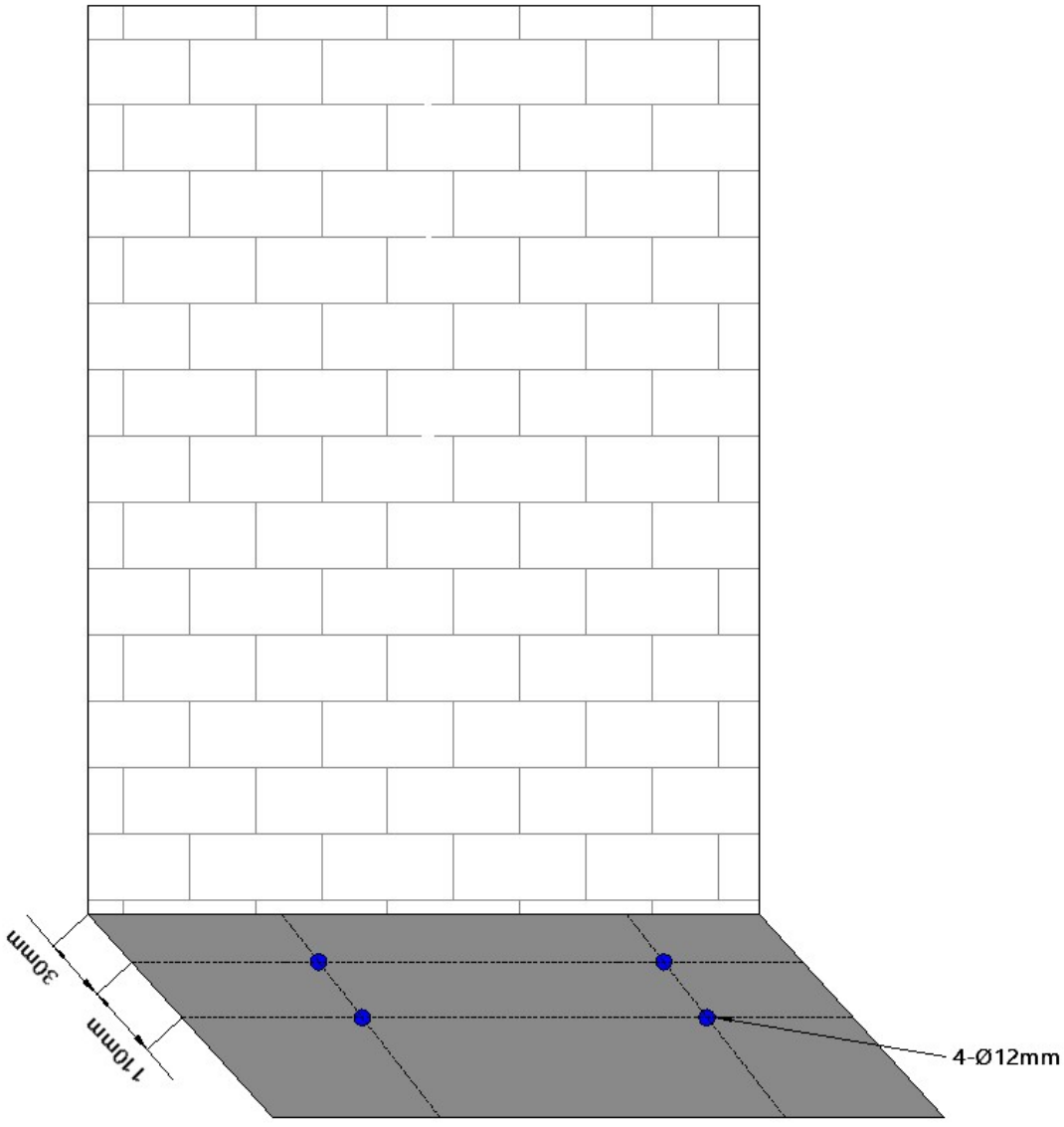


Figure 12 Dimensions of mounting holes for the system on the floor

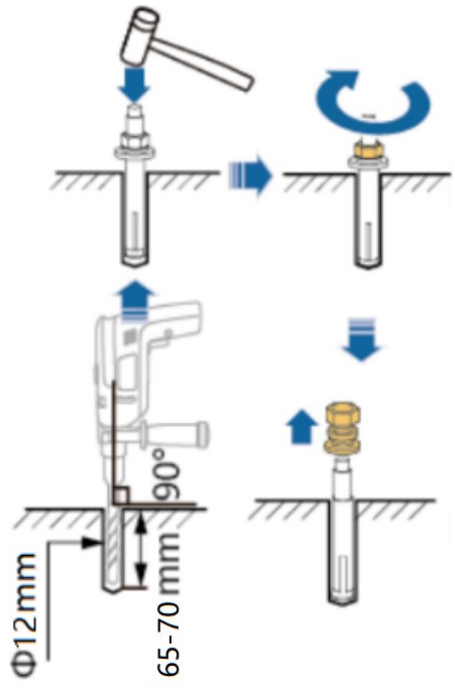


Figure 13 Installing expansion pipes

Step 2: Use the steel measuring tape to determine the drilling hole positions on the wall for securing the power control module, and mark the positions using a marker.

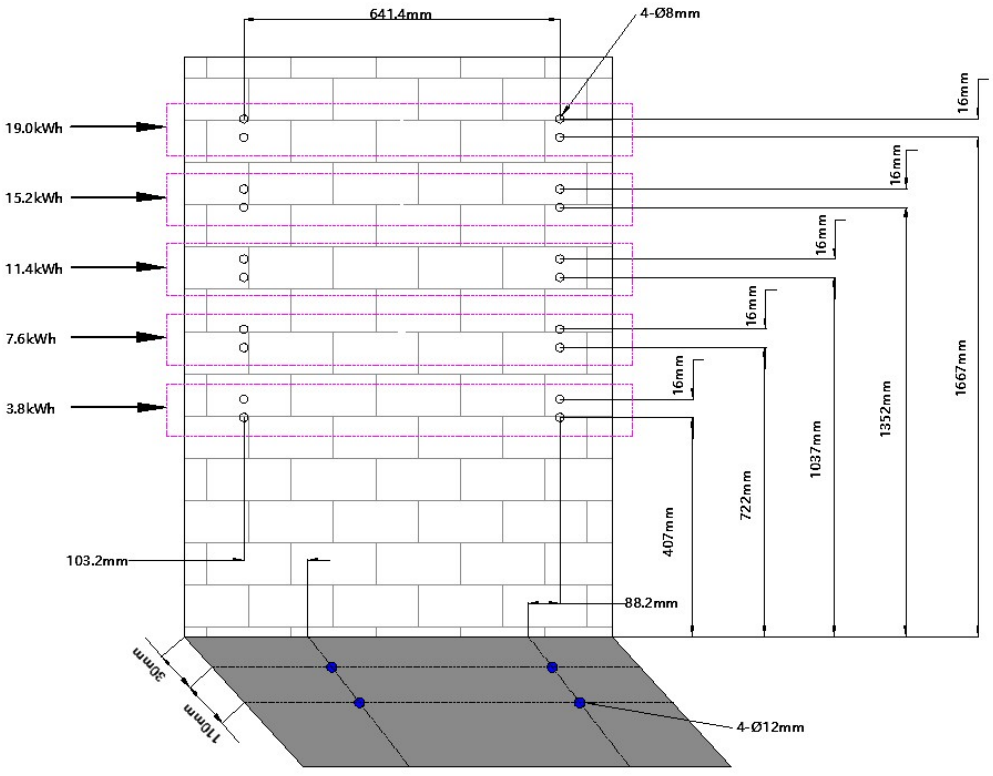


Figure 14 Dimensions of mounting holes for the base on the wall

Step 3: Use Hammer drill to drill **4pcs** Ø8mm holes on the wall and insert 4pcs Ø6mm expansion pipe to the hole. **PLEASE** select proper hole position according to battery system total energy.

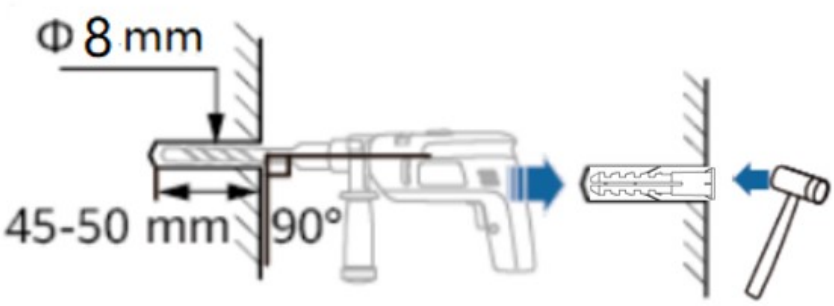


Figure 15 Installing expansion bolts

⚠ DANGER

When drilling holes, avoid the water pipes and power cables buried in the wall.

NOTICE

To prevent dust inhalation or contact with eyes, wear safety goggles and a dust mask when drilling holes.

- Wipe away any dust in or around the holes and measure the hole distances. If the holes are inaccurately positioned, drill holes again.
- Level the head of the expansion sleeve with the concrete wall or floor after removing the nut, spring washer, and flat washer. Otherwise, the mounting kit will not be securely installed on the wall or ground.
- Loosen the nut, spring washer, and flat washer of the expansion bolt at the bottom.

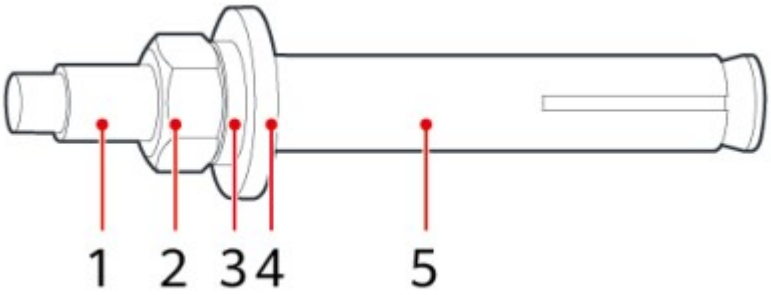


Figure 16 Expansion bolt structure diagram

1 Bolt 2 Nut 3 Spring washer 4 Flat washer 5 Expansion sleeve

Step 4: Use Level to make sure the floor is flat. If not, please make it flat before installation.

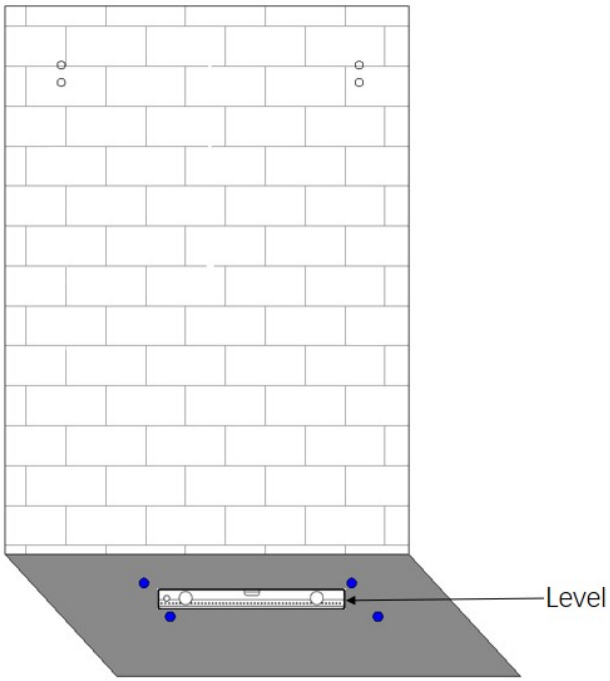


Figure 17 Use level to check the floor

Step 5: Place the base on the floor next to the wall and fix with 4pcs expansion bolts on the floor, the torque should be 10 N.m.

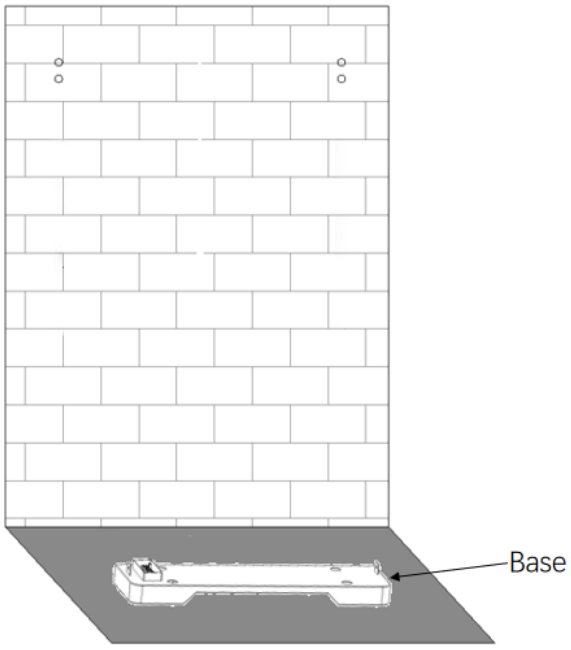


Figure 18 Install the base on the floor

3.6.2 Wall-Mounted Installation

Installation Precautions

Step 1: Use the steel measuring tape to determine the drilling hole positions on the wall for securing the power control module, and mark the positions using a marker.

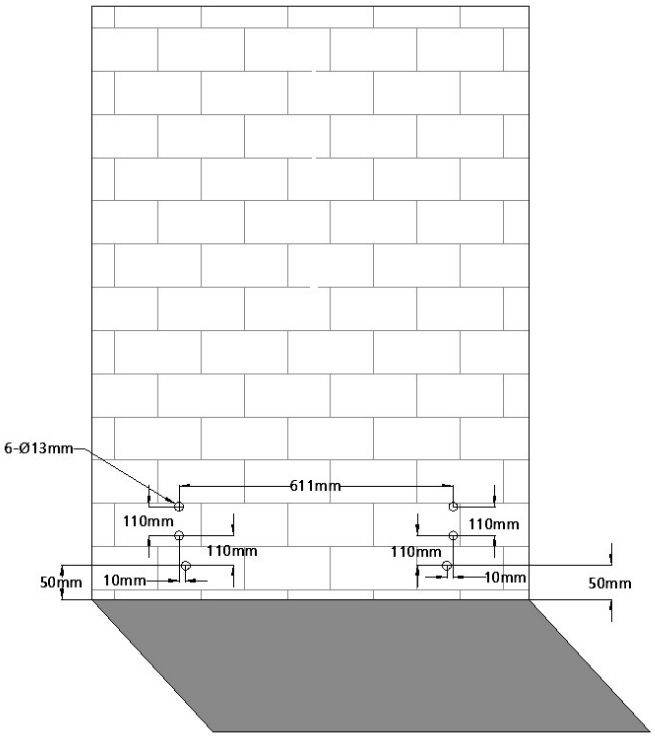


Figure 19 Dimensions of mounting holes on the wall for wall mounting pieces

Step 2: Use Hammer drill to drill 6pcs Ø13mm hole on the wall and insert the 6pcs M10 expansion bolt to the hole.

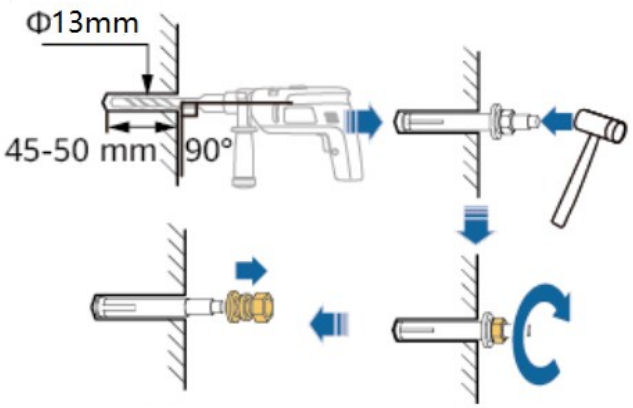


Figure 20 Installing expansion bolts

Step 3: Use the steel measuring tape to determine the drilling hole positions on the wall for securing the power control module, and mark the positions using a marker.

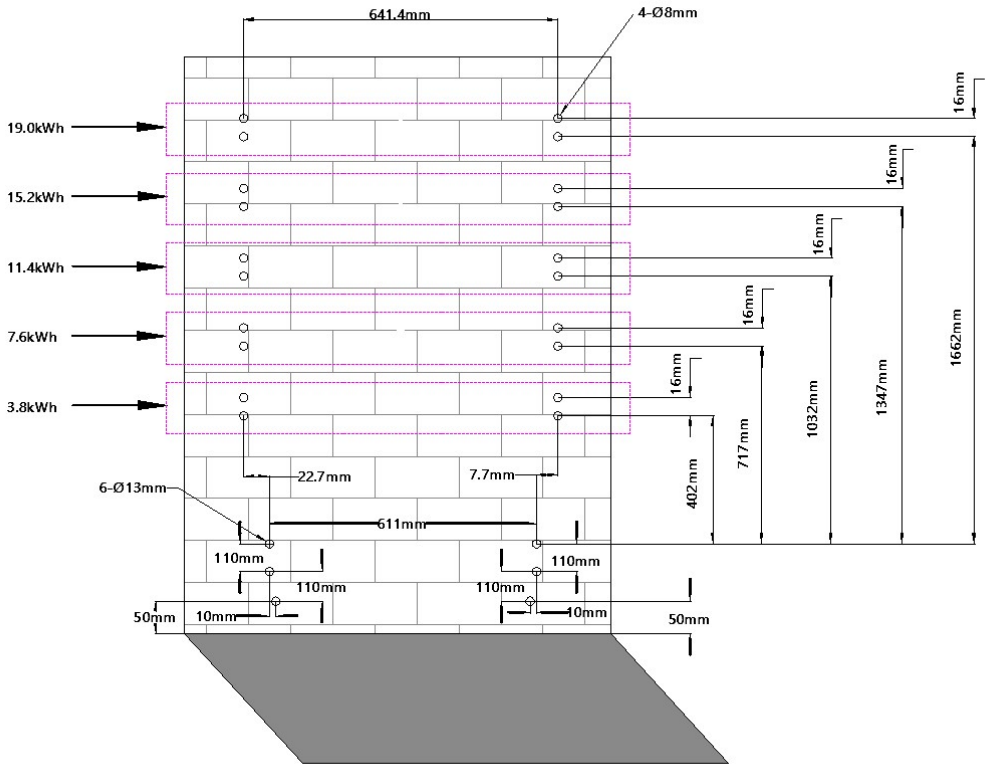


Figure 21 Dimensions of mounting holes for the base on the wall

Step 4: Use Hammer drill to drill **4pcs** Ø8mm holes on the wall and insert 4pcs Ø6mm expansion pipe to the hole. **PLEASE** select proper hole position according to battery system total energy.

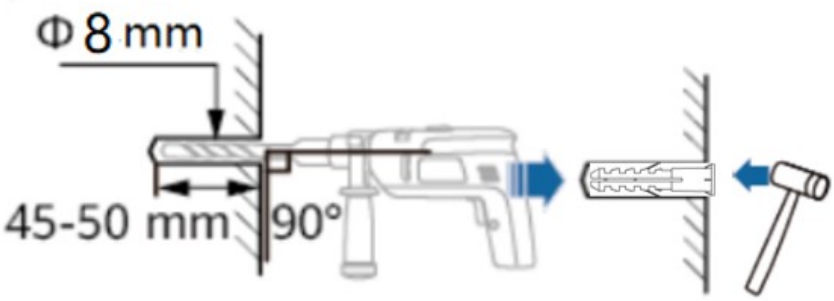


Figure 22 Installing expansion bolts

Step 5: Fix the Left wall mounting bracket and the right wall mounting bracket by expansion bolts on the wall, the torque should be 10 N.m.

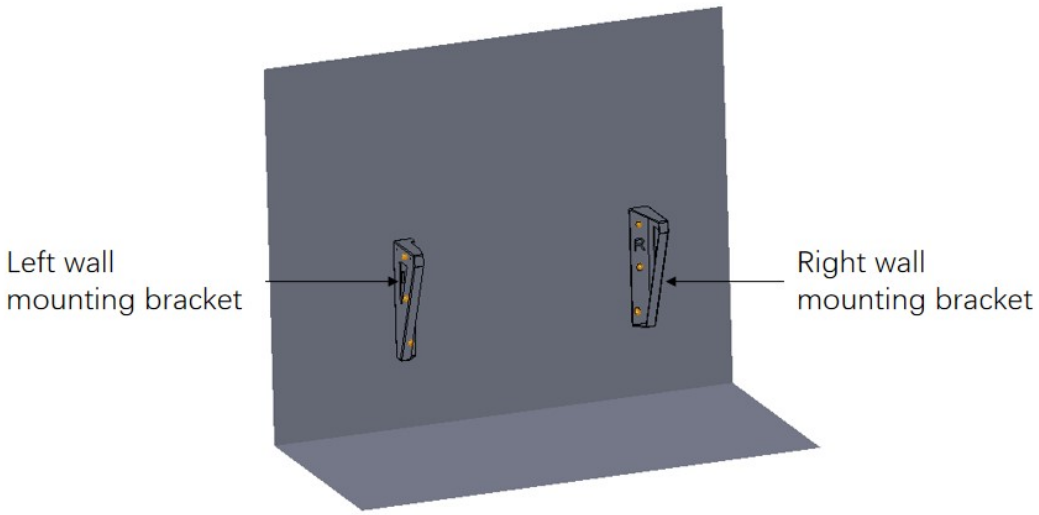


Figure 23 Fix the wall mounting bracket on the wall

Step 6: Place the base bracket to the wall mounting bracket and fix it with 4pcs M4 screws, the torque should be 2 N.m.

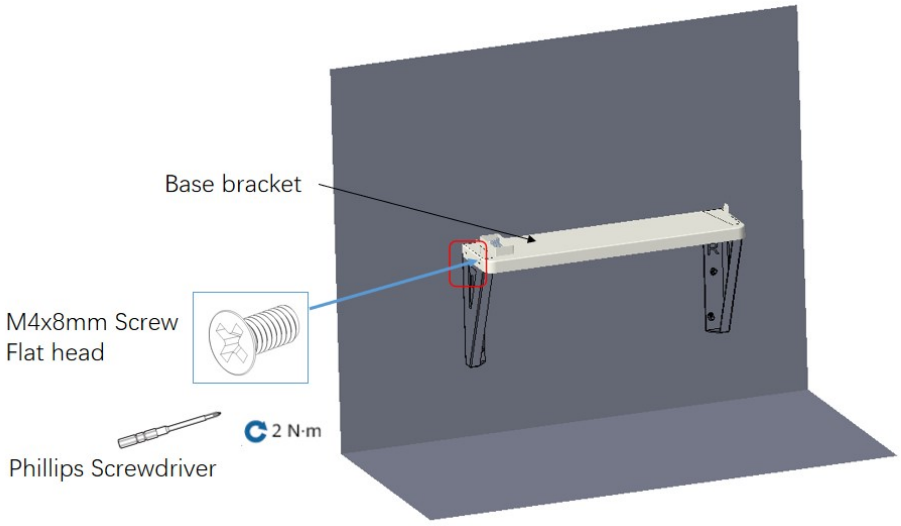


Figure 24 Fix the base bracket

3.6.3 Installation of battery modules and control box

Step 1: Install the 1st battery module on the base as follow and fix with 2pcs screws of M4x10mm which is pan head, the torque should be 2 N.m.

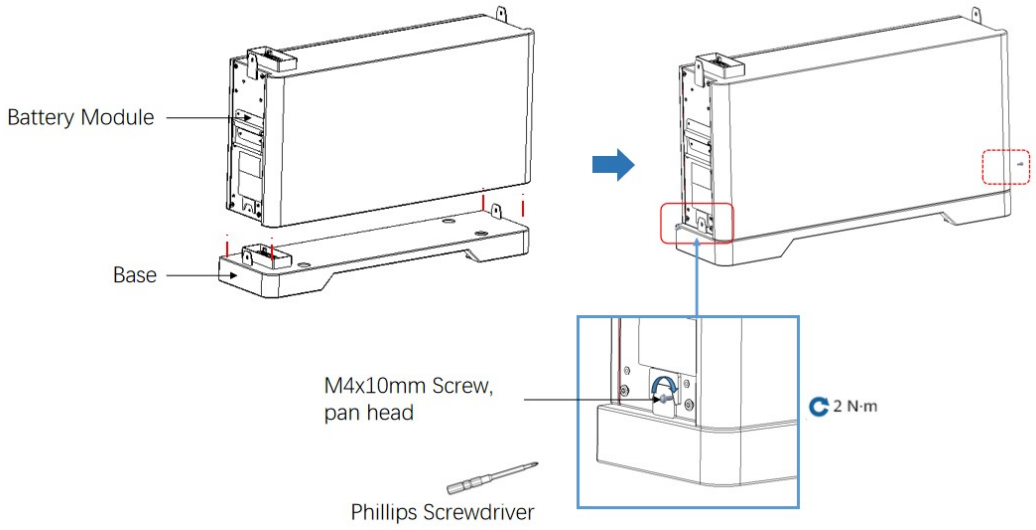


Figure 25 Install the 1st battery module

⚠ CAUTION
For safety, the battery module needs to be moved by 2-3 persons

Step 2: Install the 2nd battery module as follow and fix with 2pcs screws of M4x10mm which is pan head, , the torque should be 2 N.m.

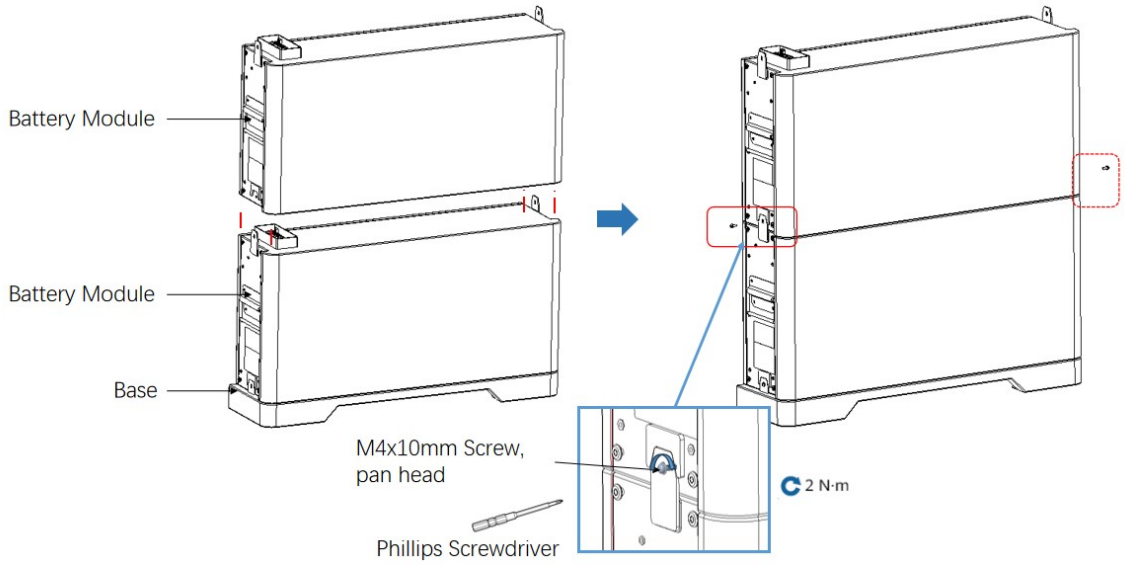


Figure 26 Install the 2nd battery module

Step 3: Install the 3rd battery module and fix with 2pcs screws of M4x10mm which is pan head, then repeat the operation until all battery modules have been installed.

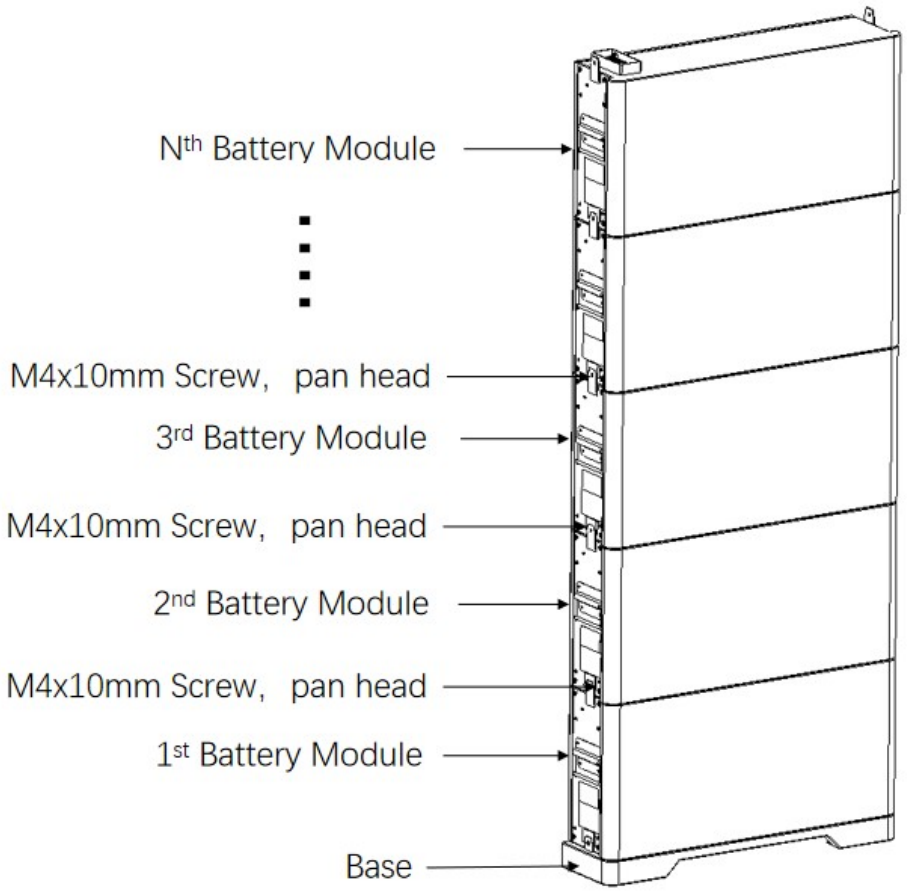


Figure 27 Install the rest battery modules

Step 4: Remove the side cover from the control box.

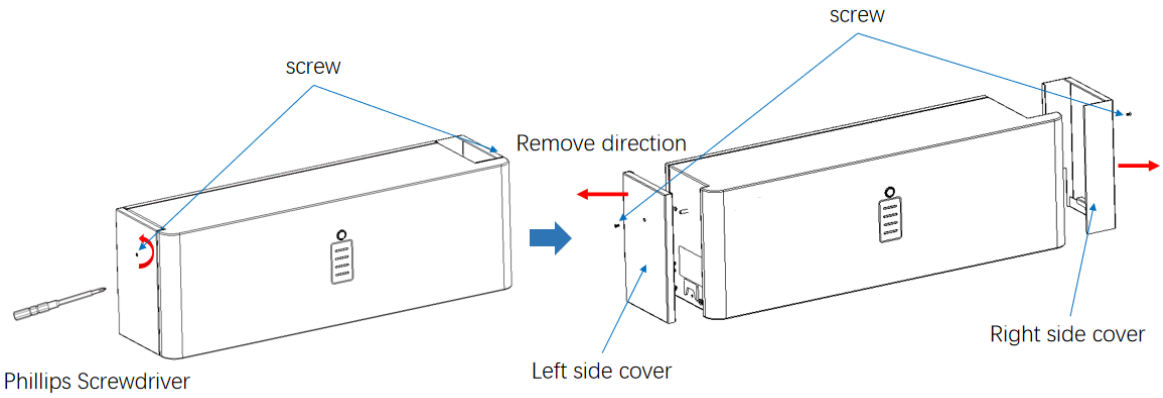


Figure 28 Remove the side cover from the control box

⚠ CAUTION

For safety, please make sure the DC breaker on the control box it is OFF before installing the control box.

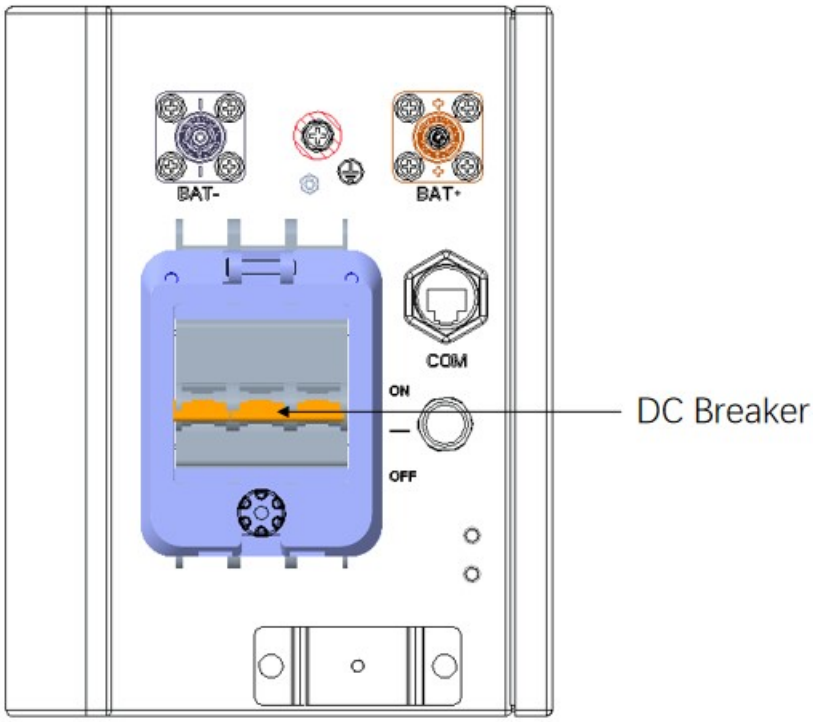


Figure 29 DC Breaker on the control box

Step 5: Install left wall mounting piece and right wall mounting piece to the control box and fix them with M4x10mm screws, the torque should be 2 N.m.

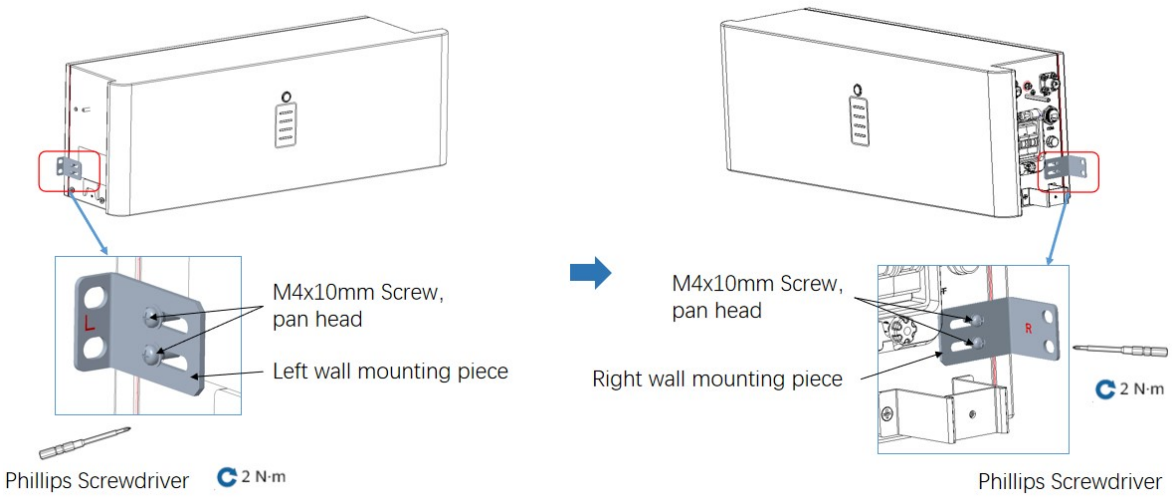


Figure 30 Install wall mounting piece to the control box

Step 6: Install the control box on the top as follow, then fix it with M4x10mm screws as well, the torque should be 2 N.m.

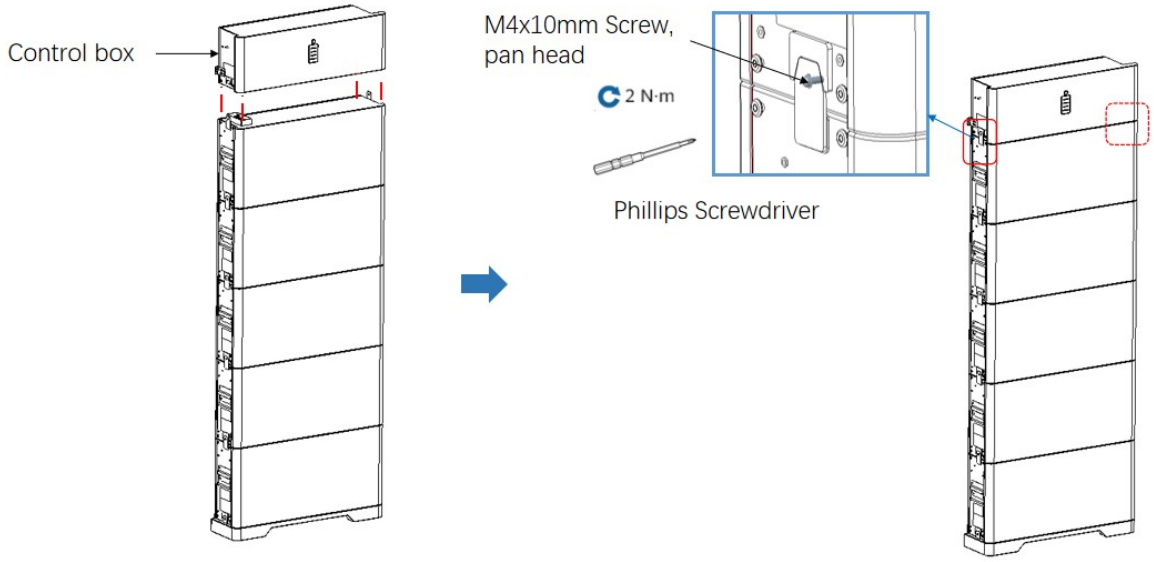


Figure 31 Install the control box

Step 7: Fix the whole system to the wall by self-tapping screws of PA6x40mm.

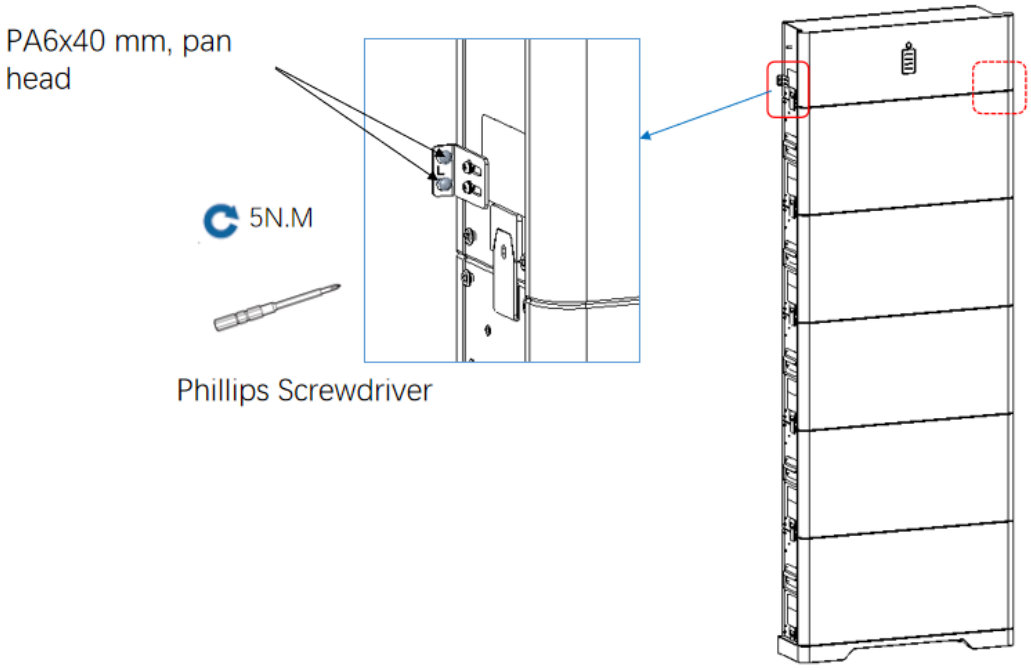


Figure 32 Install the whole system to the wall

3.6.4 Preparing Cables

Connect DC input power cables(prepared by the customer) to connectors ("+" and "–") which are delivered with the product.

Step 1: Crimping DC connectors.

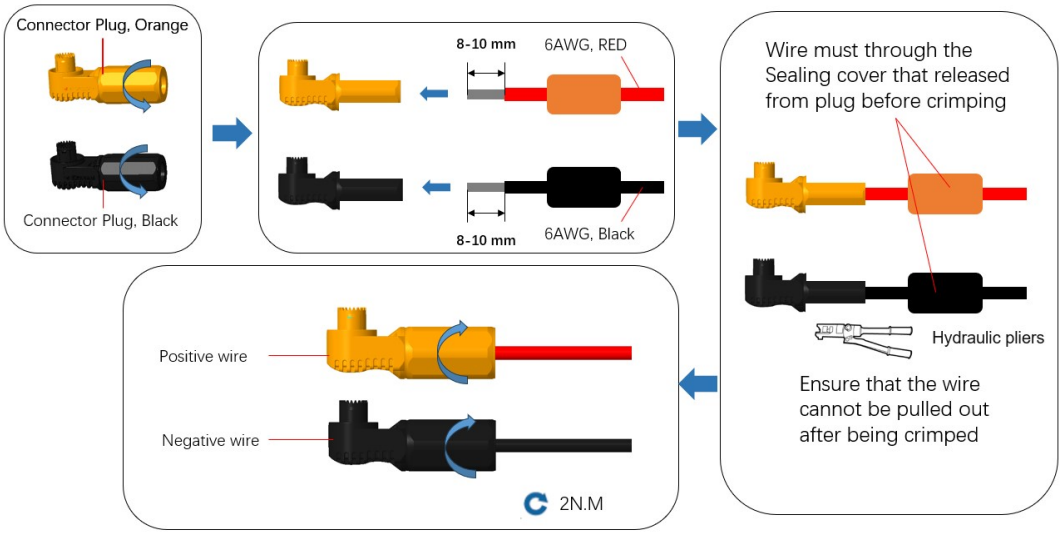


Figure 33 Connect the DC cable from battery system to the inverter

NOTICE

- It is advised to use 6AWG or equivalent cable for DC input power connection from battery system to the inverter;
- The total length of DC power cable depends on the actual distance and route from battery system to the inverter.
- DC cable another end terminals for connecting the inverter please refer to user's manual instructions of corresponding inverter.

Step 2: Installing Outdoor shielded twisted pair cable to RJ45 Crystal Head as wire color sequence shown in Figure 28

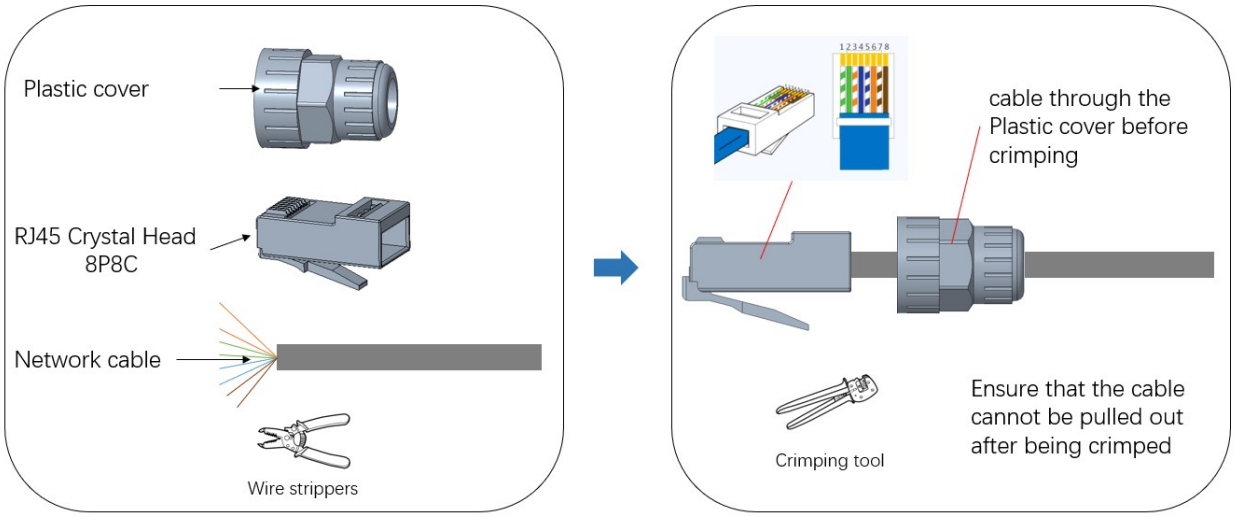
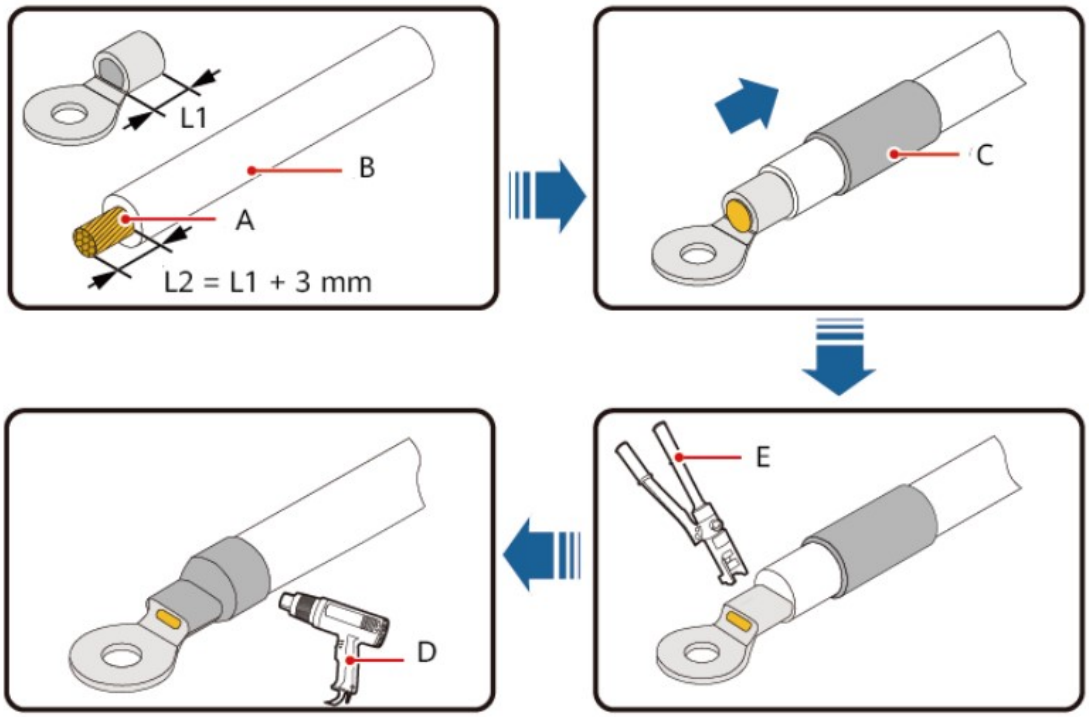


Figure 34 Crimping the signal cable

Step 3: Crimping a PE terminal(delivered with the product) to PE cable(10AWG or equivalent, prepared by the customer).The total length of PE wire depends on the actual distance and route from battery system to the grounding point.



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

Figure 35 Crimping PE wire

3.6.5 Installing Cables to the control box

Step 1: Make sure the battery system DC breaker is at OFF position. Connecting the positive wire and the negative wire to the control box.

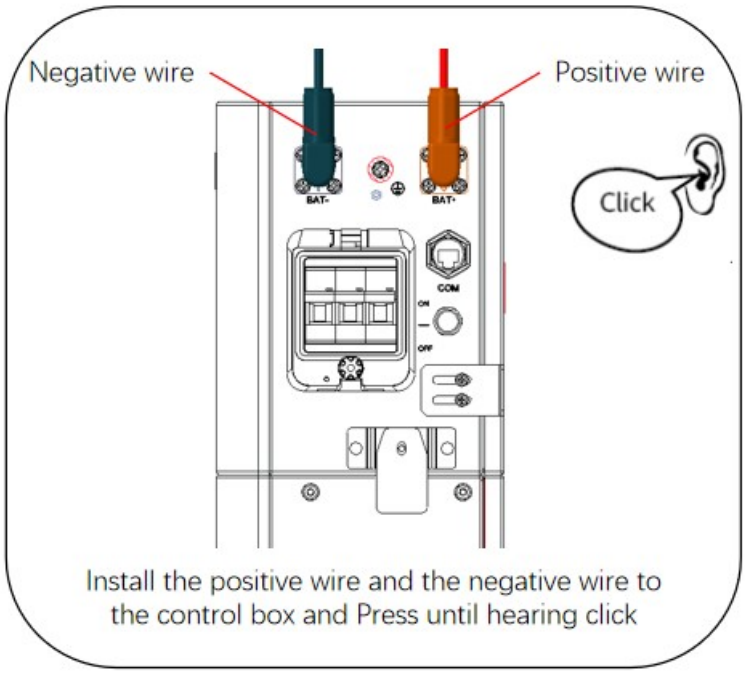


Figure 36 Install the positive and negative wire

Step 2: Connecting the PE wire from the control box to the grounding point.

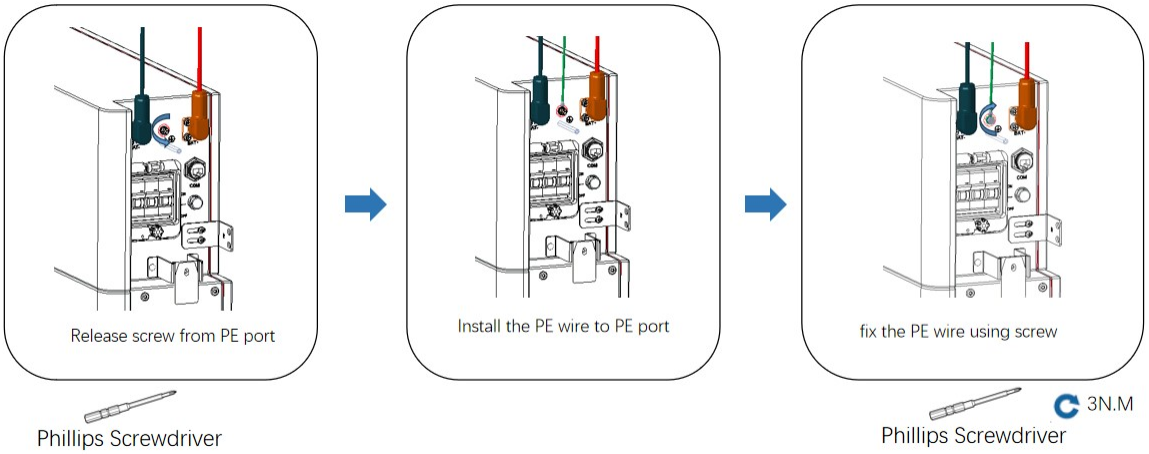


Figure 37 Install the PE wire

Step 3: Connect the signal cable from the control box to the inverter.

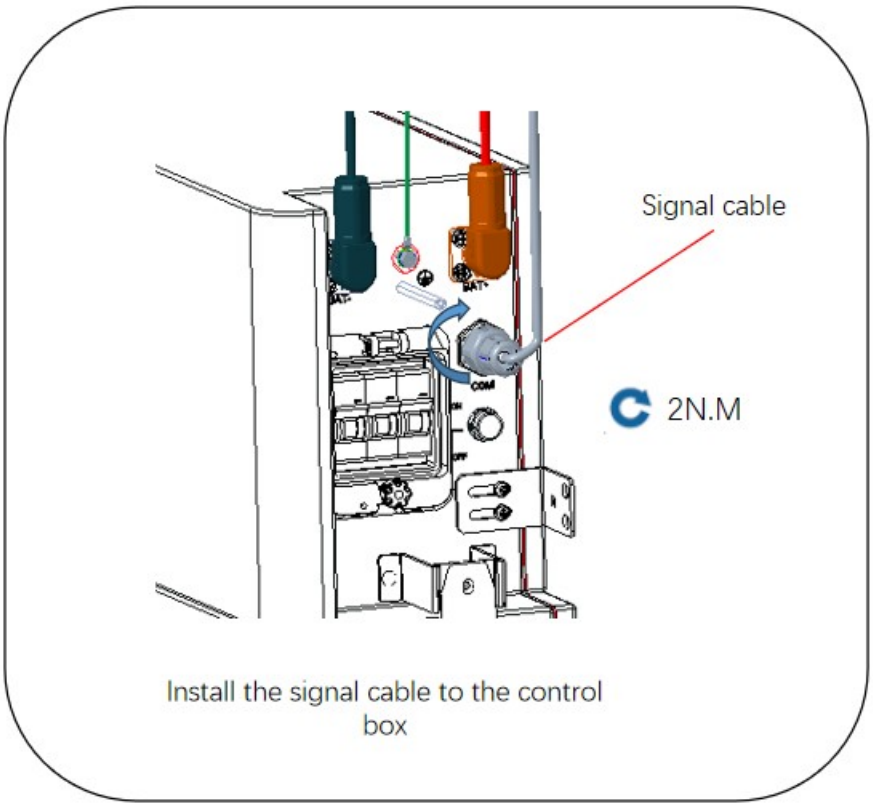


Figure 38 Install the Signal cable

Definition of COM port

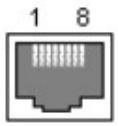
COM Port 	PIN1: 12VIN+, external 12VDC positive signal PIN2: 12VIN+, external 12VDC positive signal PIN3: GND of CAN PIN4: CAN_H PIN5: CAN_L PIN6: GND of RS485 PIN7: RS485_A, noninverting Driver Output/Receiver Input. PIN8: RS485_B, inverting Driver Output/Receiver Input.

Table 7 Pins definition of communication port

⚠ CAUTION

Risk of injury due to short circuit of battery module:

Injuries may result if the battery module is short circuit due to use power cables or conductor to short between output ports B+ and B- of battery module, need to take careful during connection

Risk of injury due to electric shock during connecting cables;

Wear suitable personal protective equipment for all work on the battery system.

3.6.6 Installing side cover to the battery module and the control box

Step 1: Open breaker cover and turn the breaker from OFF to ON.

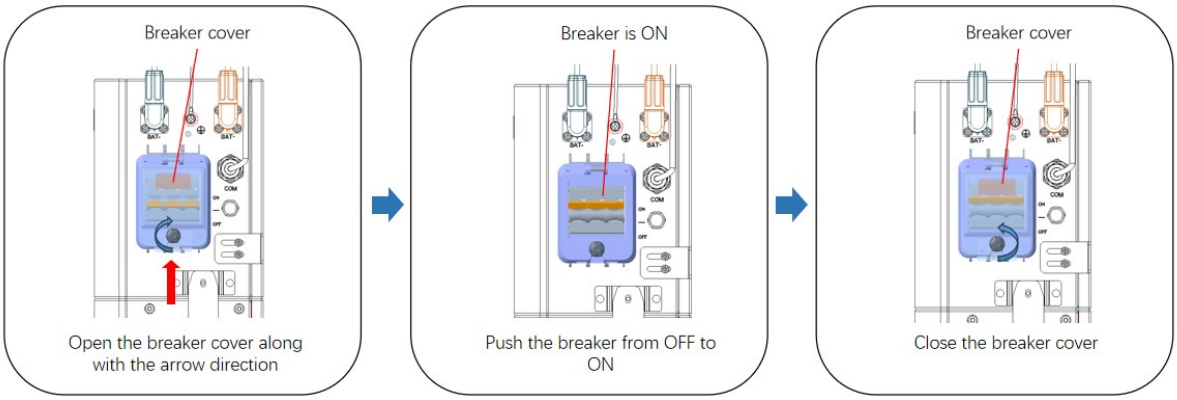
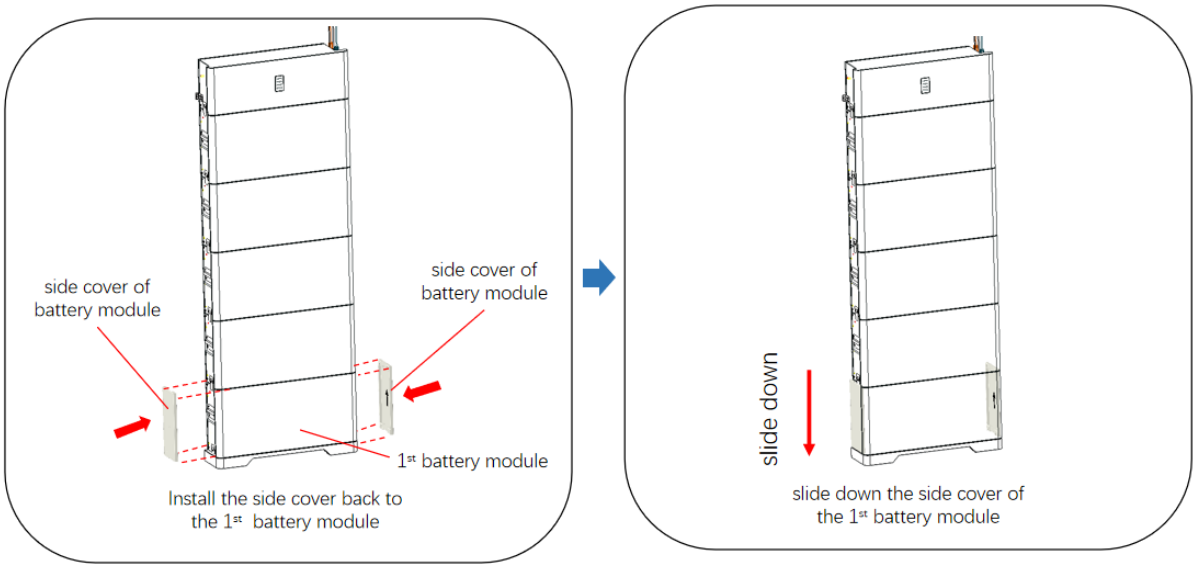


Figure 39 Breaker

Step 2: Install the side covers to the battery module. The side cover must be installed from the bottom battery modules until all battery modules have been installed.



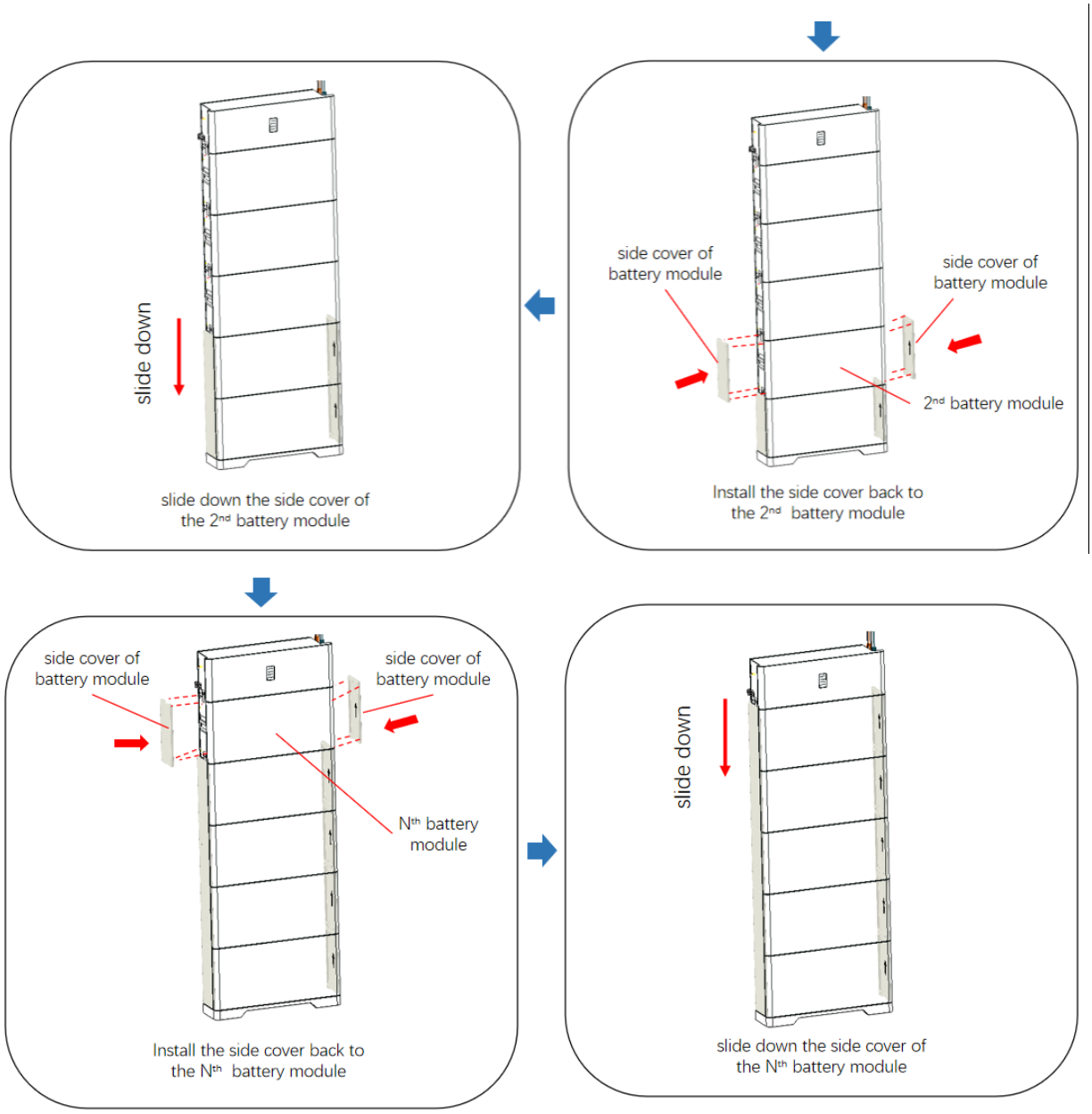


Figure 40 Install the side cover of battery module

NOTICE

- When installing the side covers, notice the arrow marks inside shall face upwards to assure correct direction.

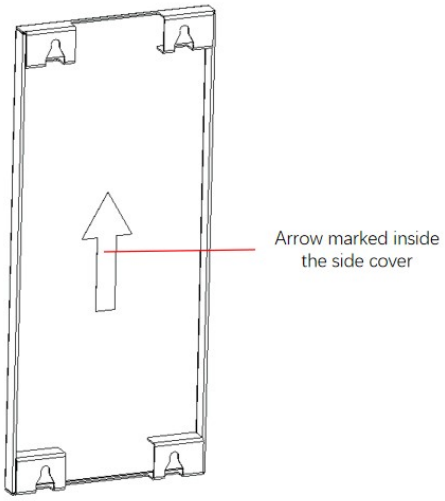


Figure 41 Install the side cover of control box

Step 3: After electrical connections are complete, check that cables are correctly and securely connected between battery system and inverter, install the control box side covers, and secure them by screws delivered with the product.

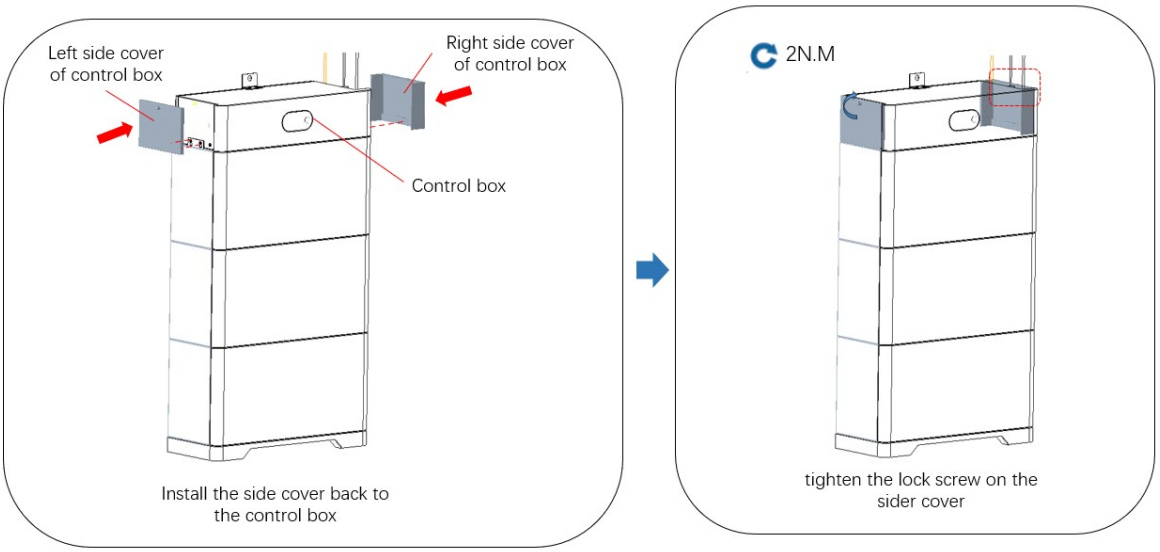


Figure 42 Install the side cover of control box

4 System Commissioning

4.1 Preparation before running:

1) Confirm the battery system is securely installed
2) The environment should be good ventilation
3) No external objects or parts are left on top of the battery system
4) Cables are properly distributed and well protected from mechanical damage
5) Ensure that all terminals are properly and securely connected and the battery cabinet is properly grounded

4.2 Try to run the battery system:

Step 1: Switch the DC breaker of battery packs to "ON" position, press the power button in control box for 3 seconds to wake up the battery packs from shutdown status (To connect the system 12V supply can also wake up battery pack).

Step 2: Check the condition of SOC and status LEDs in control box. If some or all the SOC and status LEDs are white rather than all blinking or steady red, then the battery packs are in normal working condition. If the LEDs of power button are blinking or steady red, it means there is fault in battery packs, check the fault information through communication.

Step 3: Starting up the inverter, set the inverter according to its manual to charge and discharge the battery pack for one cycle. Check that whether the battery pack can be operated normally with inverter. If after a complete charge and discharge cycle the battery side has no protection and fault information is transmitted to the inverter, and no fault is triggered at the inverter side, it means the battery packs can be matched to the inverter.

4.3 Battery packs power-off

If the battery is not in use or needs maintenance, please follow below steps to let battery packs power-off.

Step 1: Set the inverter to stop charging and discharging the battery packs.

Step 2: Turn off the switch between inverter and battery packs.

Step 3: Press the power button on the battery packs for 3 seconds. Wait until all the LEDs are off.

Step 4: Switch the DC breakers of battery pack to “OFF” position.

⚠ CAUTION

For safety, please make sure the DC breaker on the control box it is OFF before maintenance

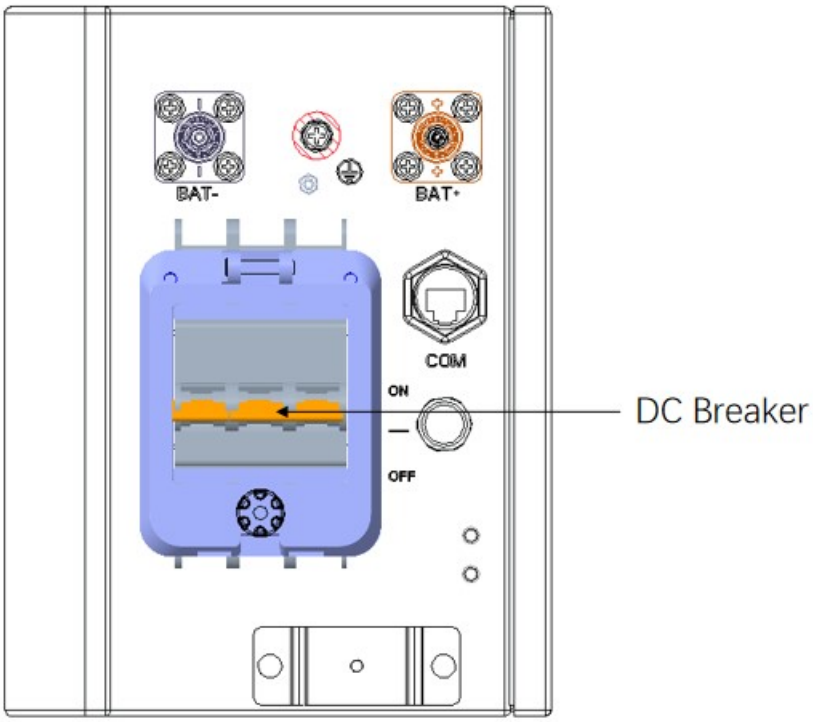


Figure 43 DC Breaker on the control box

5 Battery Pack Parameters

5.1 Battery pack specification

Items	Standard	Remarks
Nominal Voltage	102.4V*N	N is the Battery module quantity
Standard Charge Voltage	112V*N	N is the Battery module quantity
Max charge voltage	115.2V*N	N is the Battery module quantity
Typical Capacity	37Ah	Under 18.5A discharge after standard charge at 25°C.
Net Weight (+/-3%)	12KG	For main control box
	38KG	For battery module
	4.5KG	For base
Standard Continuous Discharge Power/Current	18.5A average	
Maximum Continuous Discharge Power /Current	37A	Not for cycle life
Standard Charge Method	112V *N, 18.5A CC (constant current) charge to 112V*N, then CV 112V*N charge till charge current decline to 1.8A.	N is the Battery module quantity
Operating Environment Temperature range	Charge: -10°C ~50°C	Charge derating occurs between-10°C~10°C. Discharge derating occurs between-10°C~0°C, 45°C~55°C.
	Discharge: -10°C ~55°C	

<table>
<tr><td rowspan="3">Storage Temperature Range</td><td>-20 °C ~25 °C for 12 months (recommend)</td><td rowspan="3">Storage Temperature Range: -20 °C ~ 45 °C

Note：For more long-term storage of batteries, it is recommended to control temperature between -20 °C ~ 25 °C, and humidity is below 95 %RH, and then if it is allowed, please maintain battery with one charging and discharging cycle every six months, if not allowed, please charge and discharge battery once per year.</td></tr>
<tr><td>25 °C ~35 °C for 3 months</td></tr>
<tr><td>35°C ~ 45°C for 1 month</td></tr>
<tr><td>Environment humidity Range</td><td><95%RH, non-condensing</td><td></td></tr>
</table>

Table 8 Battery pack parameters

5.2 Model selection guide

Model number	RESS-BS-7.6-H0	RESS-BS-11.4-H0	RESS-BS-15.2-H0	RESS-BS-19-H0
System				
Battery System Energy (kWh)	7.6	11.4	15.2	19
Usable Energy (kWh) [1]	7.2	10.8	14.4	18.1
Numbers of Battery Modules	2	3	4	5
Rated Battery Voltage (V)	204.8	307.2	409.6	512
Operating Battery Voltage Range (V)	179.2~224	268.8~336	358.4~448	448~560
Recommended Charging/Discharging Power (kW)	3.3	5.0	6.6	8.3
Max. Output Power (kW) [2]	6.6	9.9	13.2	16.5
Recommended Charging/Discharging Current(A)	18.5	18.5	18.5	18.5
Max. Charging/Discharging Current(A)	37	37	37	37
System Dimensions (W*H*D) (mm)	670*900*170	670*1215*170	670*1530*170	670*1845*170
System Net Weight (kg)(+/-3%)	94	132	170	208
Communication	RJ45 (RS485, CAN)			
Module				
Battery Module Model number	RESS-BM-10237-H0			
Battery Module Energy	3.8			

(kWh)	
Battery Module Usable Energy (kWh)	3.6
Rated Battery Module Voltage(V)	102.4
Battery Module Dimensions (W*H*D) (mm)	670*315*170
Battery Module Net Weight (kg)	38
Battery Control Box	
Battery Control Box Model number	RESS-BC-51237-H0
Max. Working Voltage (V)	576
Control Box Dimensions (W*H*D) (mm)	670*220*170
Control box Net Weight (kg)	12
Environment	
Operating Temperature	Charge: -10°C ~50°C Discharge: -10°C ~55°C
Operating Humidity	0~95%RH, non-condensing
Operating Altitude	<=3000m
Installation	Wall-mounted or Floor-mounted
Ingress Protection Rating	IP65
Warranty	10years
Cycle life	>=7000 cycles [5]
Certification	IEC62619/CE/UKCA/UN38.3

Table 9 Selection guide

[1]Test Conditions - Temperature 25°C, at the beginning of life, cell charge voltage between 2.8~3.5V, 0.5C.

[2]Depends on the max. battery charge/discharge power of the inverter and BMS communication between intverter and battery system.

[3]+/-3%, For acurate proudct weight please refer to actual product packging label.

[4]Charge derating occure between-10°C~10°C. Discharge derating occure between-10°C~0°C, 45°C~55°C.

[5]25°C ambient temperature, recommended charging/discharging current.

6 Trouble shooting

According to the severity of the fault, the fault status of battery pack is defined as major fault and minor fault. In general, minor fault can recover automatically after fault condition is resolved, while major fault needs to contact supplier for service.

Refer to below table for trouble shooting

Phenomenon	Fault severity	Possible cause	Trouble shooting
Battery cannot be started up by pressing power button, power LED in power button is not lit up	Minor	DC breaker of battery pack is off	Turn on DC breaker on battery pack and try again
	Major	Fuses in power loop failed	Contact supplier for service
Battery cannot discharge, SOC and status LEDs in are blinking red	Minor	Protection against under-voltage	Check the event list of inverter via APP to see if there is battery under voltage event, and make it charge the battery pack
		Protection against over-temperature or under-temperature (cell temperature is lower than -20 °C or higher than 65 °C).	Check the battery pack temperature via inverter's APP. If battery pack temperature is higher than 65°C, wait for the temperature to drop to 55°C. If battery pack temperature is lower than -20°C, wait for the temperature to rise to -10°C.
		Protection against over current	Remove some unimportant load, set a lower load power limit of inverter, and wait for 60 seconds
Battery cannot charge, SOC and status	Minor	Protection against over-voltage	Set the inverter to discharge battery.

LEDs in are blinking red		Protection against over-temperature or under-temperature (cell temperature is lower than 0 °C or higher than 55 °C).	Check the battery pack temperature via inverter's APP. If battery pack temperature is higher than 55°C, wait for the temperature to drop to 50°C. If battery pack temperature is lower than -20°C, wait for the temperature to rise to -10°C
		Protection against over current	Set a lower charging power limit of inverter, and wait for 60 seconds
SOC and status LEDs are steady red	Major	Cells failure; Contactor in battery pack failed; Battery pack EOL;	Contact supplier for service

Table 10 Trouble shooting list

7 Acronyms and abbreviations

Battery system	Rechargeable Lithium-Ion Battery Pack
DC	Direct current power supply
BMS	Battery Management System
CC-CV	Constant current to constant voltage
APP	Application
EOL	End of life

Table 11 Acronyms and abbreviations