



User Manual



Opti L16
RS-C51314F

Contents

1. Information	4
1.1 Validity	4
1.2 Target Group	4
1.3 Levels of Warning Messages	4
1.4 Symbol Description	5
1.4.1 Symbols on products label	5
1.4.2 Other symbols	6
1.5 Abbreviation Description	6
2. Safety Precautions	8
2.1 General Safety	8
2.2 Battery Safety	9
2.3 Personnel Safety	10
2.4 Personnel Requirements	10
2.5 Battery Emergency Measures	11
3. Product Overview	12
3.1 Introduction	12
3.2 Features	13
3.3 Specification	13
3.3.1 Appearance	13
3.3.2 Dimension	15
3.3.3 Parameters	15
4. System Installation	18
4.1 Checking Before the Installation	18
4.1.1 Unpacking	18
4.1.2 Scope of Delivery	18
4.2 Preparing Tools and Instruments	21
4.3 Installation	22
4.3.1. Flooring Mounting(with footed glass)	26
4.3.2. Flooring Mounting(with wheels)	28
5. Electrical Connections	35
5.1 Safety Precautions	35
5.2 Electrical Connections	36
5.2.1 Grounding cable connection	36
5.2.2 Communication cable connection	36
5.2.3 Battery-Inverter connection	41
5.2.4 Connection of collector	45
6. System Running	45
6.1 Battery Commissioning	45
6.1.1 LED description	45
6.1.2 Communication protocol selection	46
6.1.3 Recommended inverter parameter settings	47
6.2 System Power On/Off	48
6.2.1 System Power On	48
6.2.2 System Power-Off	48
6.3 Protection Function	49
7. System Maintenance	51
7.1 Routine Maintenance	51
7.2 Troubleshooting and FAQ	52
8. Transport, Storage	54
9. Disposal of Battery	54

1. Information

1.1 Validity

This document is valid for: RS-C51314F produced by Shenzhen Topband Battery Co., LTD in term of its installation, electrical connection, commissioning, maintenance and troubleshooting methods. Please read this manual carefully, understand the safety information and be familiar with the operation instructions before installing and using the product.

1.2 Target Group

- This document is intended for:
- Installer
- System engineer
- Technical support engineer
- User

1.3 Levels of Warning Messages

The following levels of warning messages may occur when handling the product:

Symbol	Description
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Indicates warning information about device or environment security which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

1.4 Symbol Description

1.4.1 Symbols on products label

Label	Definition
	Beware of electrical shock
	Do not place the battery within children/pet touchable area.
	Do not place the battery near heat source and flammable material
	Do not expose the battery to direct sunlight, rain and snow.
	Do not short circuit the battery
	Recycle label
	WEEE designation

1.4.2 Other symbols

Label	Definition
 Qualified person	Indicates activities that can only be performed by qualified persons
	Grounding point

1.5 Abbreviation Description

Abbreviation	Definition
Battery/battery pack/battery module	Single RS-C51314F rechargeable lithium iron phosphate battery pack including cells, BMS and enclosure etc.
Battery system/cluster	Multiple RS-C51314F battery pack connected in parallel with power, communication and grounding cables and installation auxiliaries.
BMS	Battery management system Electronical Unit to ensure lithium cells' safety and display information or control the battery work mode.
SOC	State of charge The battery state of charge refers to the percentage of the remaining capacity and rated capacity of the battery.
SOH	State of health The battery health status refers to the percentage between the full charged capacity and the rated capacity of the battery.
DIP switch	Dual in-line package switch
COCP	Charge over current protection
DOCP	Discharge over current protection
COVP	Cell over voltage protection

POVP	Pack over voltage protection
CHTP	Charge high temperature protection
DHTP	Discharge high temperature protection
CUVP	Cell under voltage protection
PUVP	Pack under voltage protection
CLTP	Charge low temperature protection
DLTP	Discharge low temperature protection
SCP	Short circuit protection

2. Safety Precautions

2.1 General Safety

Declaration

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "WARNING", and "DANGEROUS" statements in this document don't cover all the safety instructions. They are only supplements to the safety instructions. TOPBAND will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

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

- Operation beyond the conditions specified in this document.
- Installation or use in environments that cannot meet relevant international, national, or local standards.
- Do not observe the safety precautions specified in the warning signs and protection labels on the equipment.
- Unauthorized modification to the product or software code or removal of the product.
- Damage caused during transportation by the customer.
- Equipment damage due to force majeure, such as storms, flood, earthquakes, fire.
- Failure to follow the operation instructions and safety precautions on the product and in this document.
- Damage caused by storage conditions that do not meet the requirements specified in related documents.
- Damage caused by storage conditions that do not meet the requirements specified in related documents.

General Requirements

DANGEROUS

- Do not work with power on during installation or wiring operation.
- Do not install, use, or operate outdoor equipment and cables in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Please observe the warning signs and protective measures on the product.
- Please use the tools specified in this manual to install and operate this product.
- Do not use water to clean the electrical components inside or outside of a cabinet.
- Do not open the rear cover plate without authorization.
- Before contacting any conductor, please confirm whether the conductor is charged to avoid the electric shock.
- Check that the equipment is not damaged. For example, check that the battery is not dropped, bumped, or dented on the enclosure.
- Without prior consent from the manufacturer, do not alter the internal structure or installation procedure of the equipment.

NOTE

During transportation, turnover, installation, cable connection, and maintenance, comply with the national and local laws, regulations, and relevant standards.

Understand the components and functioning of a grid-tied PV power system and relevant local standards.

2.2 Battery Safety

- Before using the battery system, please ensure that the power line is connected correctly. Do not connect the wrong or reverse, otherwise it may cause irreversible damage to the battery system.
- Do not dismantle, modify, repair the battery box without the permission of the manufacturer, otherwise it may be dangerous or cause system damage.
- Do not collide, drag, squeeze or crush the equipment. It may cause product damage.
- To prevent explosions and personal injuries, do not place batteries in a fire.
- Do not place the battery in a high temperature environment, otherwise the battery life may decay, seriously it may cause battery explosion and fire.

- If the battery cannot start, please contact the manufacturer's after-sales service personnel. Otherwise, permanent damage to the battery may be caused.
- To prevent electric shock, please disconnect the charging power supply before installing the batteries.
- Do not use the battery case or the whole product is clearly defective or damaged.
- To ensure that the battery is not damaged in normal use, please arrange professionally trained personnel to install and maintain products according to the manual.

2.3 Personnel Safety

DANGEROUS

- When using or operating the equipment, if found the potential safety problem or equipment failure, please terminate the operation immediately, report to the responsible person and take effective measures.
- Before installation and maintenance, please ensure that the mains or other power generation equipment is disconnected. Prohibit to install, maintain and move the battery with power.
- When wiring, please strictly follow the sequence requirements of this manual to avoid wrong connection and reverse connection.

2.4 Personnel Requirements

NOTE

- Personnel who plan to install or maintain equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

2.5 Battery Emergency Measures

Battery electrolyte leakage

- Avoid contact with leaked liquids or gases in the case of battery leakage or abnormal odor. Contact professionals to deal immediately. Electrolyte is corrosive and can cause irritation and chemical burns. Should you come into direct contact with the battery electrolyte, do as follows:
- Inhalation: Evacuate contaminated areas, get fresh air immediately, and seek immediate medical attention.
- Eye contact: Immediately flush your eyes with water for at least 15 minutes, do not rub your eyes, and seek medical attention immediately.
- Skin contact: Wash the contact areas immediately with soap and water and seek medical attention immediately.
- Ingestion: Emetic and seek immediate medical attention.

Battery Fire

- If a fire occurs, power off the system if it is safe to do so. Avoiding smoke damage to personnel, please open the windows to keep ventilation.
- Extinguish the fire with carbon dioxide, FM-200. Do not extinguish the fire with water or ABC dry powder fire extinguisher. Personnel involved in the fire extinguishing must wear protective clothing and self-contained breathing apparatus.
- After the fire is put out, the battery module needs to be cooled, then moved out of the battery compartment.

3. Product Overview

3.1 Introduction

The **RS-C51314F** battery is designed for residential application and works as a storage unit in the photovoltaic system. It is a 51.2V lithium battery system, with BMS inside. It could be operated in both on-grid, back-up and off-grid modes with compatible inverters. The following illustration shows basic application of this battery. It also includes following devices to have a complete running system.

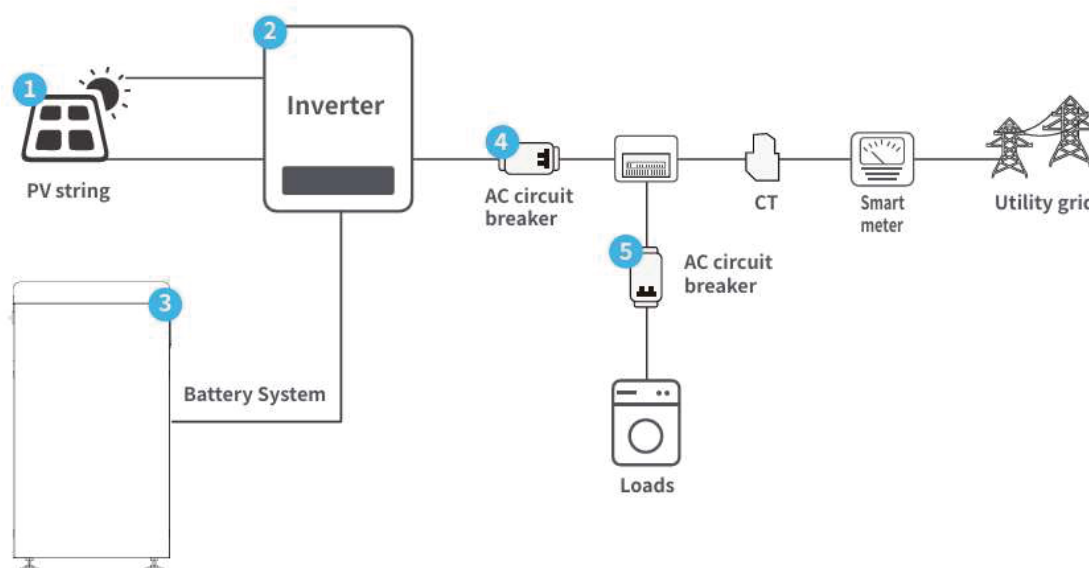


Figure3-1-1

CAUTION

This electrical connection in this diagram is only for illustration, please follow the Manual suggestions of related devices and operate in accordance with locally applicable connection requirements, standards, and directives.

3.2 Features

- Highest safety, battery is made from LiFePO₄ chemistry and comply with highest international safety and transport standard.
- Modular and flexible, support up to 32 units in parallel to expand the system energy.
- Built-in pre-charge circuit to avoid rush current when connecting with different inverter/chargers.
- Automatic dynamic addressing function when connected multiple batteries together.
- Support a maximum of 96% DOD under off-grid and back-up application
- Built in BMS provide warning and protection functions including over-discharged, over-charged, over-current, short-circuit and high/low temperature.
- The product comes with a roller, which can be adjusted to a fixed mode or attached to the wall using accessories.
- Compatible with new cloud platform and app by WiFi or Bluetooth
- CAN/RS485 port for external communication and upgrade the BMS firmware.

3.3 Specification

3.3.1 Appearance

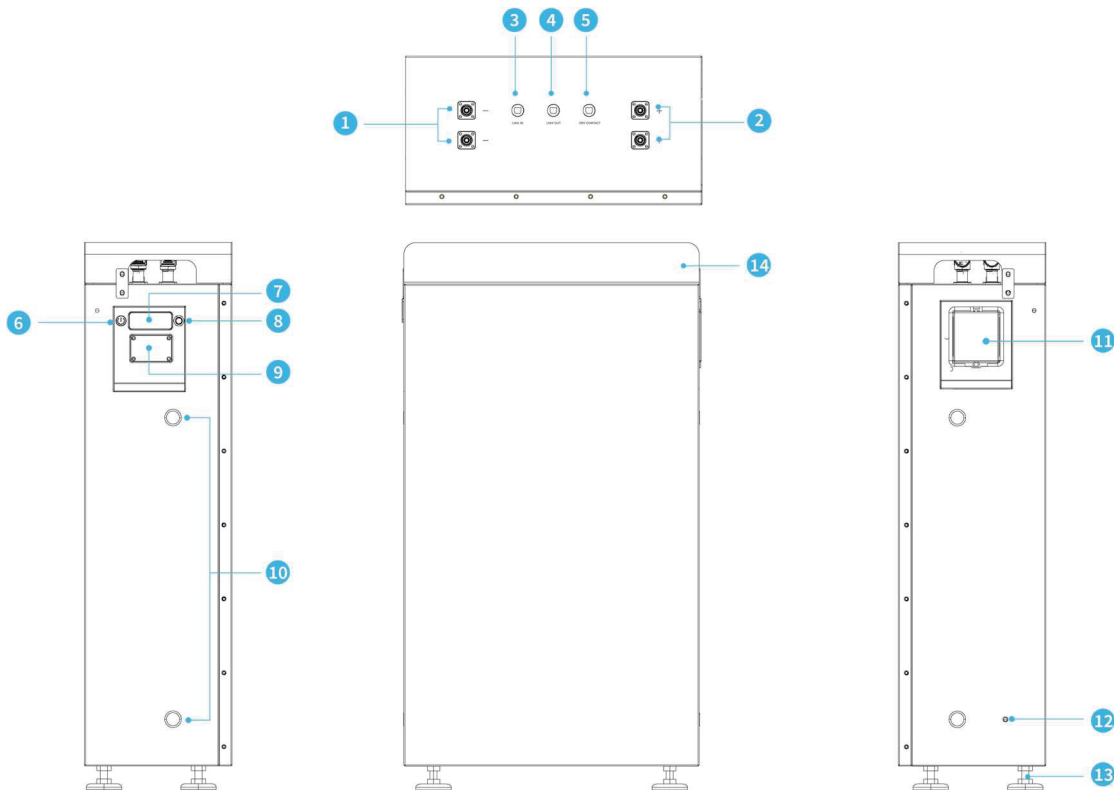


Figure3-3-1

No.	Name	Description
1	Negative Port	Used to connect the inverter/charger
2	Positive Port	
3	LINK IN	For internal and inverter communication
4	LINK OUT	
5	DRY CONTACT	For use with external dry contacts
6	POWER	Used to Power on/off battery
7	SOC Light	Used for displaying the SOC, run and alarm state
8	IOT	Used to communicate with WIFI
9	DIP Switch	Used for replacing the inverter protocol
10	Handle Point	For handling, installation and disassembly of battery
11	Breaker	Turn on/ off the circuits and have a protective effect
12	Grounding Point	Used to connect battery to ground
13	Footed glass	Used for fixing the battery
14	Shutter boX	For masking lines

3.3.2 Dimension

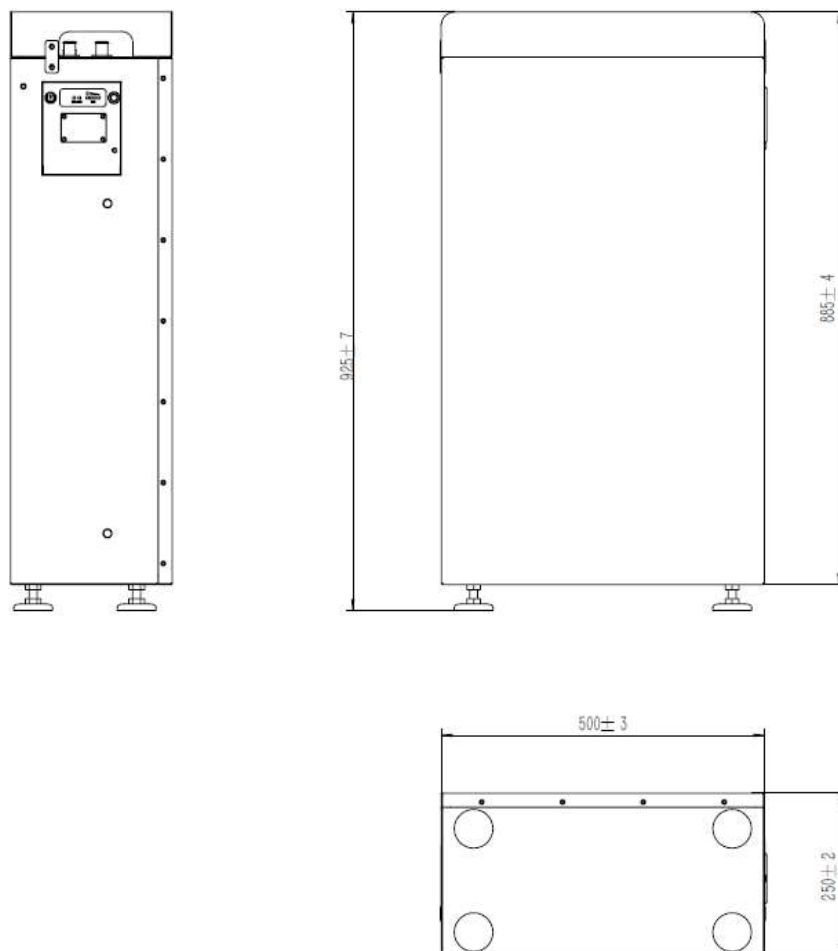


Figure3-3-2

3.3.3 Parameters

Items	Parameters
Nominal voltage	51.2 V
Nominal energy@0.2C	16.1KWh
Nominal capacity@0.2C	314Ah
Internal resistance@1khz AC	≤30 mOhm
Operation voltage range	(With communication): 48V~56V (Without communication): 44.8V~57.6V

Charge voltage		56.0V
Allowed MAX charge current		200A
Recommend charge current		≤150A
Allowed MAX discharge current		230A
Recommend discharge current		≤150A
Peak current limit		270A@15s
Short circuit protection		Yes
End Discharge		46.4V
Communication		CAN/RS485
Parallel and Series connection		Support Max. 32 in parallel
Cycle life		≥8000 cycles After Normal charge, discharge @0.2C current with 90%DOD, Repeat above process until discharge capacity reduce to 60% of initial value.
IP rating		IP65
Dimension(W*H*D)		500*925*250mm
Weight (without accessories)		~130kg (with footed glasses)
Operation temperature ¹		Charge: -20~55°C Discharge: -20~55°C
Heating		Yes
Operation altitude		<4000m
Self-discharge rate ²	Residual capacity	≤3%/month ≤15%/year
	Recover capacity	≤1.5%/Month ≤8%/ year

Storage environment ³	≤3 months	-10 ~ 45°C 5 ~ 90%RH
	> 3 months Recommend environment	15 ~ 35°C 45 ~ 85%RH
Compatible inverter list		SMA/Victron/Studer/Goodwe/Sunsky/Sol-Ark/Growatt/Voltronic/ALPHA-OUTBACK/Deye/Sofar/Solis/SAJ/LUXPOWER/MEGAREVO/Schneider/TBB/Mpp Solar/ SRNE
Installation types		Floor mounted/Wall-mounted
● Battery pack will stop work to protect itself when the temperature is out of the operation range. The optimum operating temperature range is from 15°C to 35°C, Frequent exposure to harsh temperatures may worsen the performance of the battery pack and cycle life. ● These conditions is based on battery pack is in sleep or power off mode. ● For long time storage, we recommend charge the battery over 50% SOC and if the battery does not have a sleep or power off mode, please consult TOPBAND first.		

4. System Installation

4.1 Checking Before the Installation

4.1.1 Unpacking

Before unpacking, Please check the followings:

1.Check the outer package for damage, such as cracking, deformation, opening or other signs of damage to the equipment. In case of damage, do not open the package to use the product, and please contact the dealer.

2.Check whether the model specification is correct. If the product does not match the specification, please contact the dealer.

3.Check whether the contents are complete and for any obvious external damage. If there is any missing or damage, please contact the dealer.

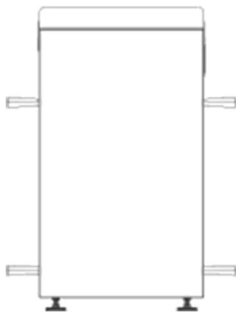


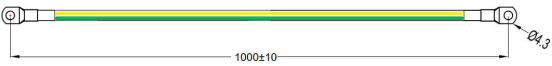
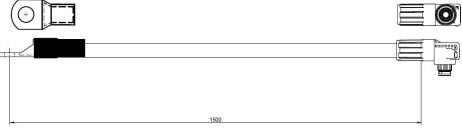
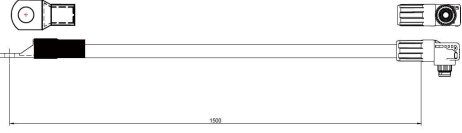
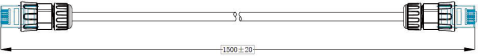
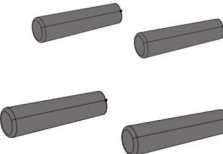
NOTE

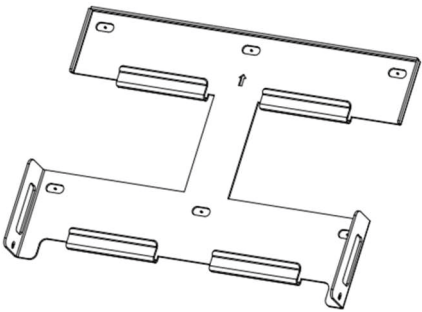
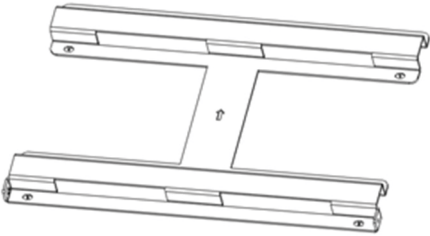
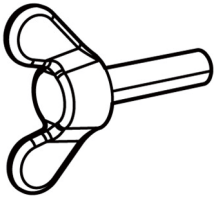
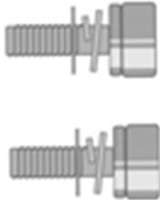
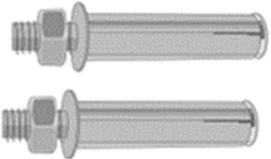
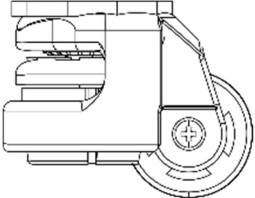
Please read the packing list to check the quantity of deliverables shipped in the box.

4.1.2 Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your supplier for supplementary delivery if the listed material is incomplete or damaged.

Unpacking List	Detail	Quantity
Battery pack		1
Fixed support		2

Expansion bolt (M6*100)		4
Bolt(M6)		2
Battery accessories	Detail	Quantity
Ground wire		1
Battery positive line (orange)		1
Battery negative line (black)		1
Battery communication line		1
Handle		4
User manual		1
Optional materials (Noted that each pack unit together with one type bracket as default)		

Wall mounted bracket 1 (fixing the wall)		1
Wall mounted bracket 2 (fixing the battery)		1
Thumbscrew M5*20		2
Cross recessed combination screw M8*20		8
Expansion bolt M8*60		6
leveling caster		4

4.2 Preparing Tools and Instruments

Category	Tools and meters	
Installation	 Diagonal pliers	 Art knife
	 Marker pen	 Percussion drill
	 Hammer	 Electric screwdriver
	 Crimping pliers PV-SC002	 Spanner
Personal protective articles	 Protective gloves	 Eye protector
	 Protective footwear	 Protective mask

NOTE

The battery will be installed in accordance with local electrical, building, fire and other codes or utility requirements as applicable to the installation and equipment, by qualified service personnel in accordance with the installation instructions and appropriate practices.

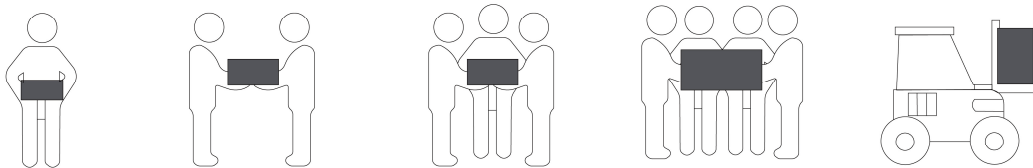
4.3 Installation

Installation environment

1. Ensure that the equipment is not installed in a flammable, explosive and corrosive environment before installation.
 2. The battery are only intended to be installed in attached or detached garages, sheds, enclosed utility closets, basements, storage or utility spaces within dwelling units and are not intended for installation in habitable spaces and livings spaces in dwelling units.
 3. Installation position to avoid direct sunlight, and build an awning if necessary.
 4. The installation position should avoid the range of exposure to children. The equipment may produce high temperature during operation, please beware of scald.
 5. The installation position should avoid rain and snow, not to affect the normal use of the equipment.
 6. The installation position should avoid the water pipes and cables in the wall, to avoid the unpredictable danger during drilling.
 7. The installation environment temperature and humidity should be within the appropriate range. Recommended temperature (Min./Max.): 41°F(5°C)~95°F(35°C). Relative Humidity (Min./Max.): 5%~75% RH
 8. The installation altitude should be below 4000m.
 9. The installation space shall meet the requirements of ventilation, heat dissipation and operation space.
 10. Keep away from the strong magnetic field and avoid electromagnetic interference. If there is a radio station or a wireless communication device below 30 MHz near the installation location, ensure that the distance between the battery and the wireless device is over 40m.
 11. The distance from the air outlet of PCS is more than 0.5 meters.
-

⚠ CAUTION

Moving heavy objects. Be careful to prevent injury when moving heavy objects. Select a suitable way to move heavy objects according to product weight. Refer to the following table.



Weight	Method	Recommendation
<18 kg (40lbs)	Manual handling	1 person
18~32 kg (40~70lbs)	Manual handling	2 persons
32-55 kg (70~121lbs)	Manual handling	3 persons
55~68 kg (121~150lbs)	Manual handling	4 persons
>68 kg (150lbs)	Moving device	Forklift

Installation requirements:

- Do not install the battery forward, inverted, backward and roll.
- Please choose solid brick structure, concrete wall and ground for installation. If other walls and ground are selected, the wall and ground should be built of flame-retardant materials and can meet the load-bearing requirements of the battery.
- When installing, please ensure that there is no other unrelated equipment and inflammable, explosive items around. Enough space should be reserved to ensure the heat dissipation and safety isolation.
- When installing on the wall, items should be prevented under the battery.
- When installing, to be close to the wall to prevent the battery from dumping.
- Check whether the power cable pair(s) used meets the maximum current requirement for operation.

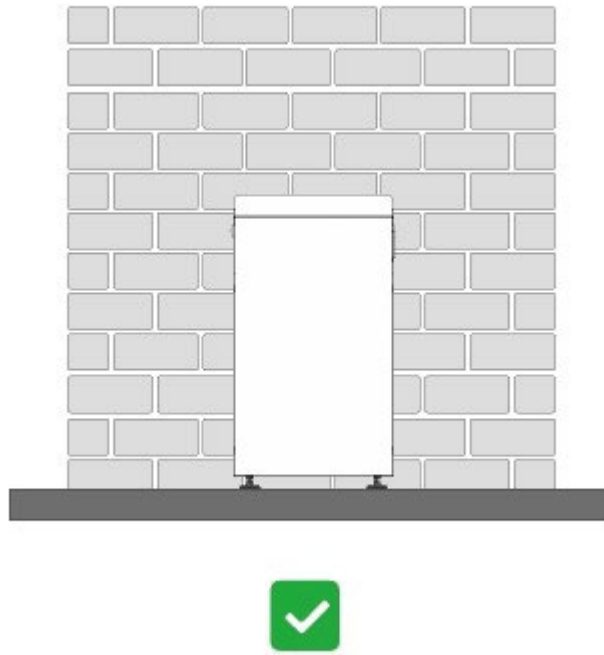


Figure 4-3-1

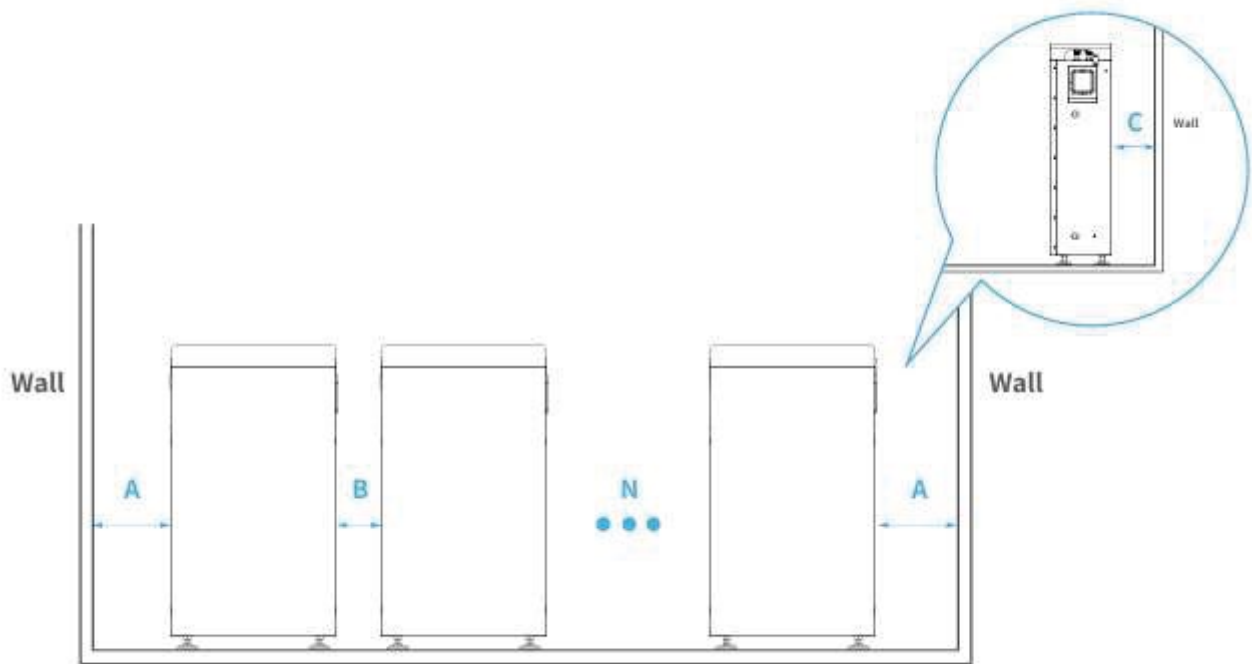
Installation not allowed

Inclined installation	Left/Right side flip	Direct upside down

Figure4-3-2

CAUTION

Batteries should be installed in a clean flat place with no direct sunlight, away from water and fire sources, and at a suitable temperature. The installation location is recommended to meet the size requirements of the figure below:

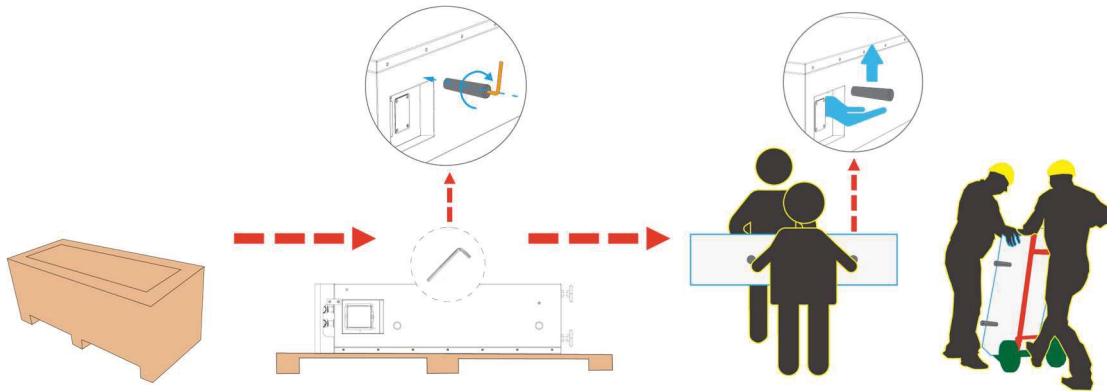


NOTE: This requirement only applies to floor-mounted installation.

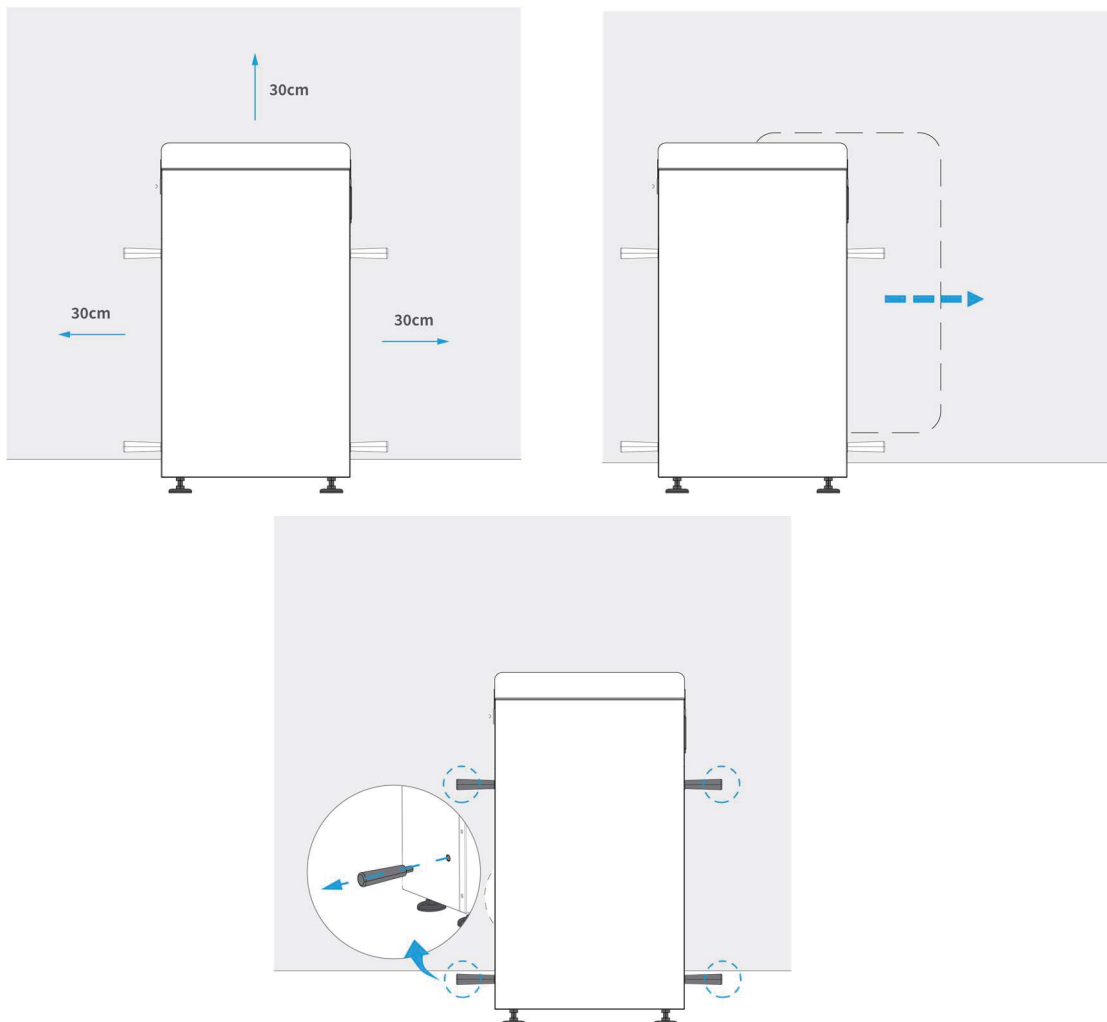
Item	Distance(mm)
A	400
B	200
C	30

4.3.1. Flooring Mounting(with footed glass)

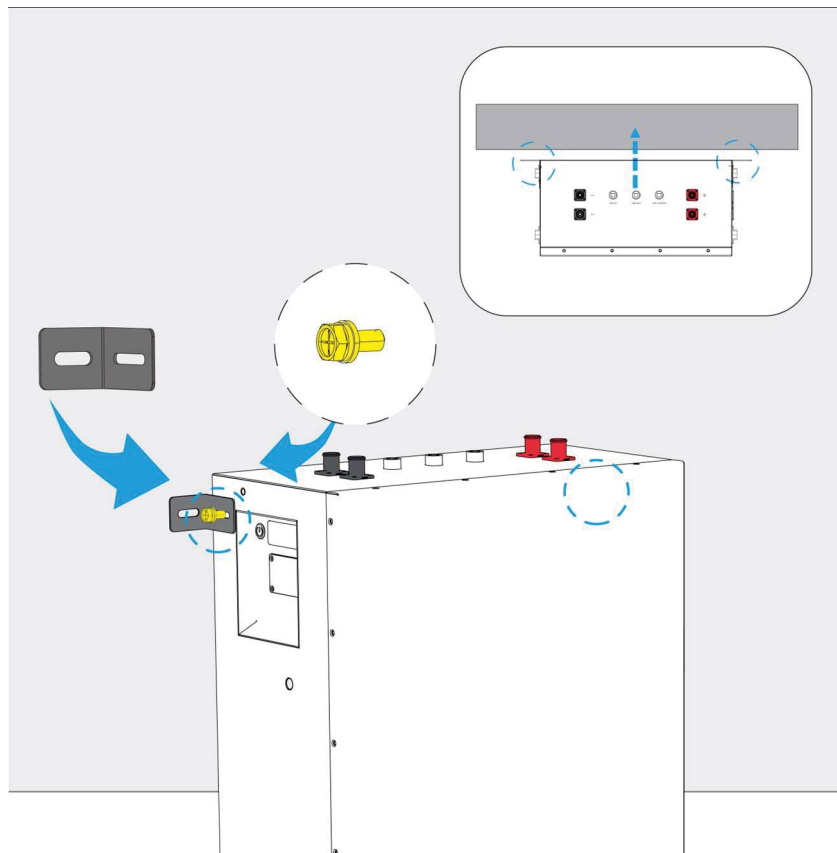
1. Open the wooden box and install the handles on both sides of the battery. Transport or use other equipment to deliver the batteries to the designated location



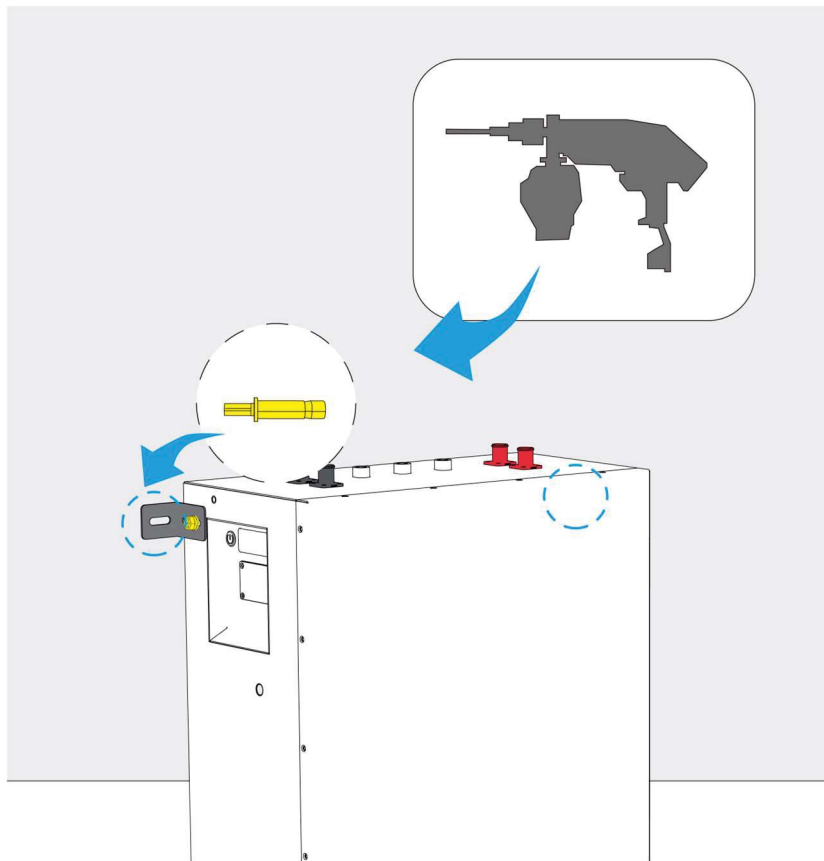
2. According to the design requirements, determine the installation position of the battery on a flat ground and draw a line mark.



3. After placing the battery in the designated position, use 2 screws of M6 to secure two fixed supports to the left and right side of the battery.

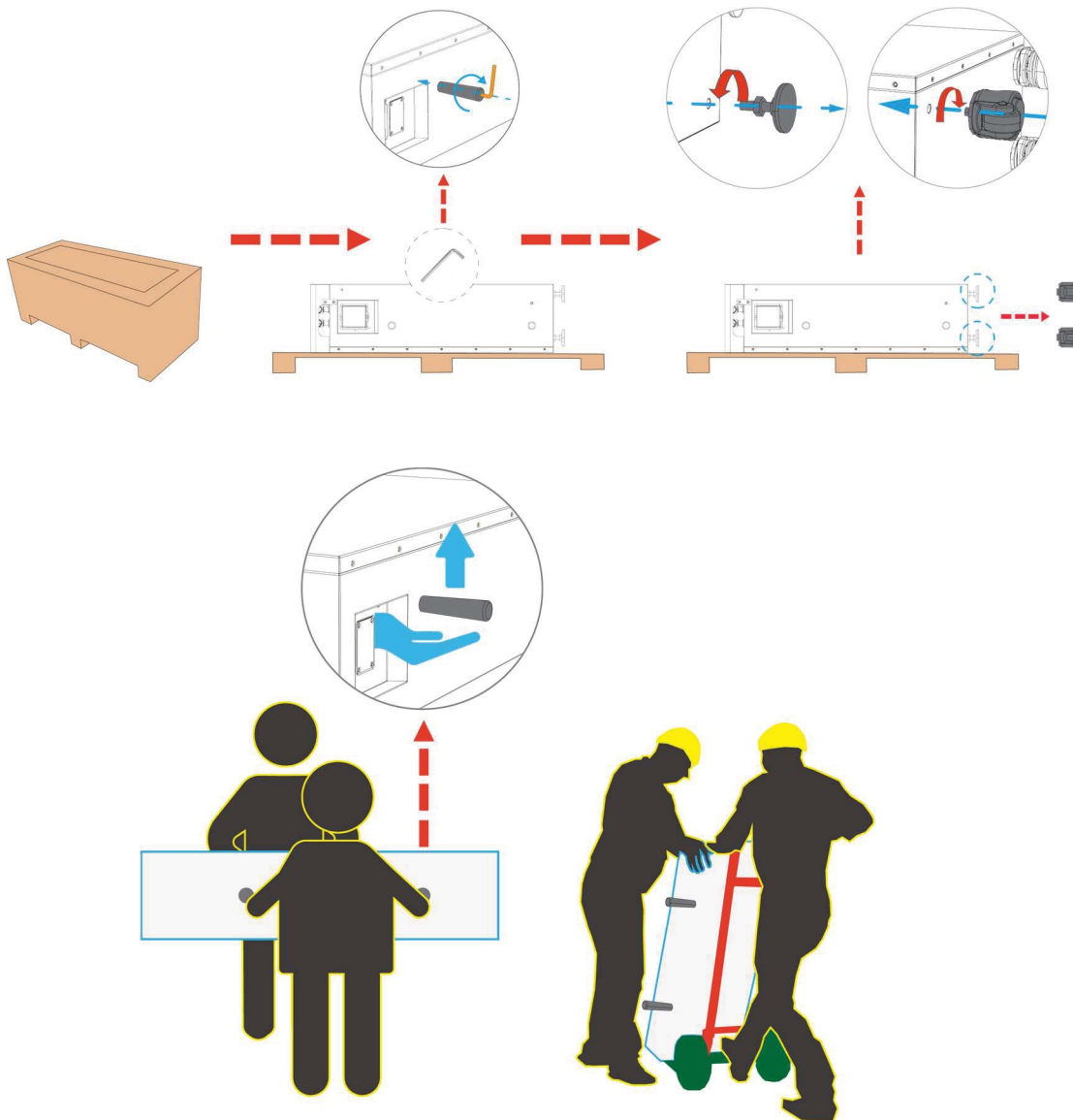


4. Place the battery about 30mm away from the wall, and then mark locations of two assembly holes. Drill two holes and secure the battery to the wall.

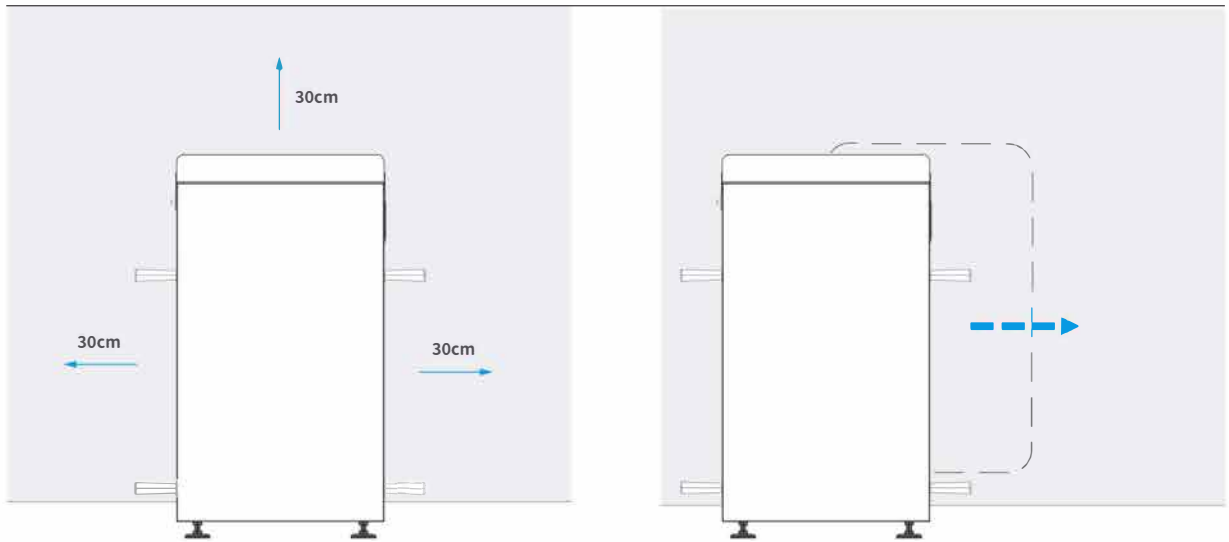


4.3.2. Flooring Mounting(with wheels)

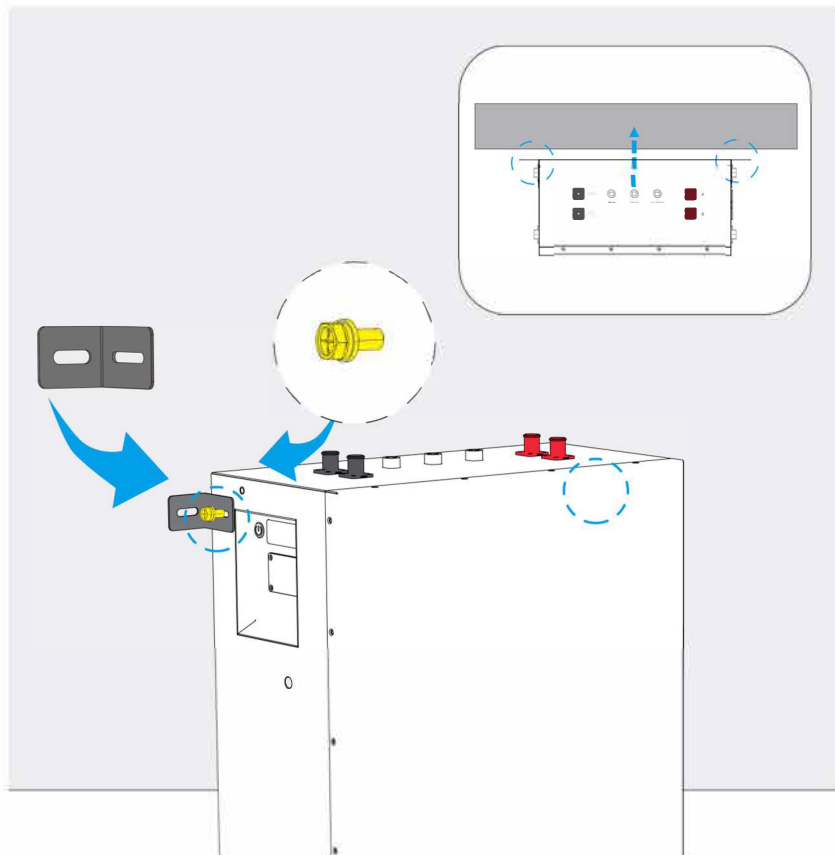
1. Open the wooden box and install the handles on both sides of the battery, replace the foot glass with wheels. Transport or use other equipment to deliver the batteries to the designated location



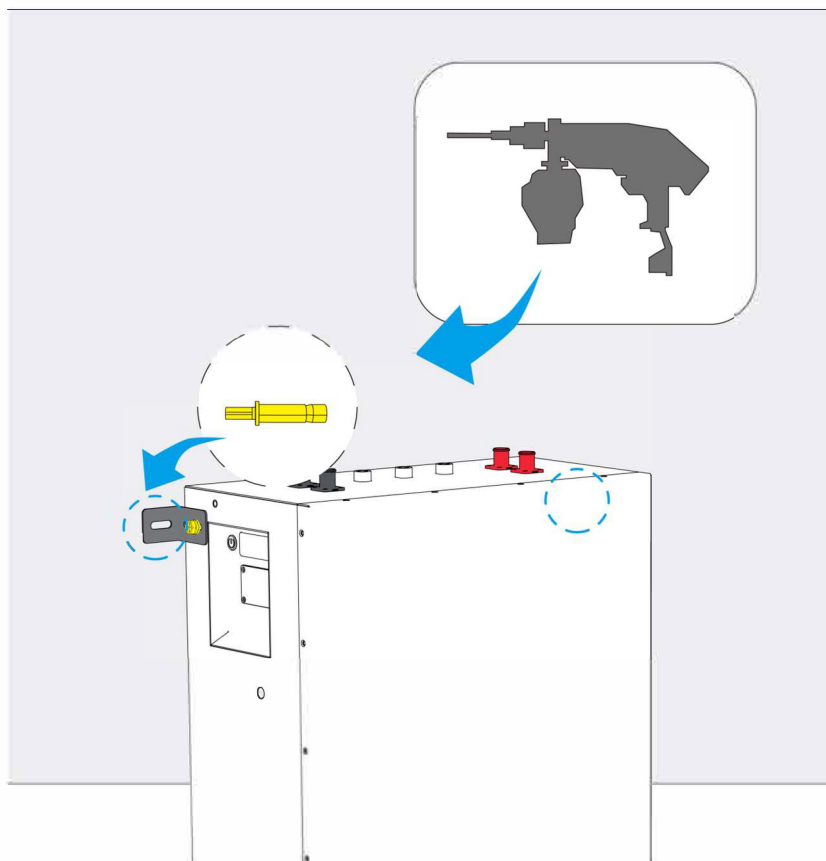
2. According to the design requirements, determine the installation position of the battery on a flat ground and draw a line mark.



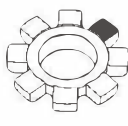
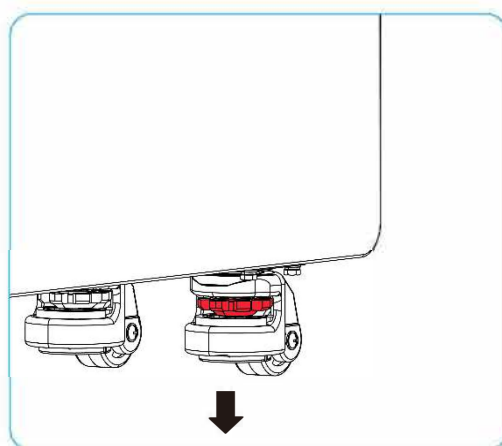
3. After placing the battery in the designated position, use 2 screws of M6 to secure two fixed supports to the left and right side of the battery.



4. Place the battery about 30mm away from the wall, and then mark locations of two assembly holes. Drill two holes and secure the battery to the wall.



5. Adjust the left and right screws to the appropriate position to ensure that the battery is perpendicular to the ground and adjust the bottom wheel to fixed mode.

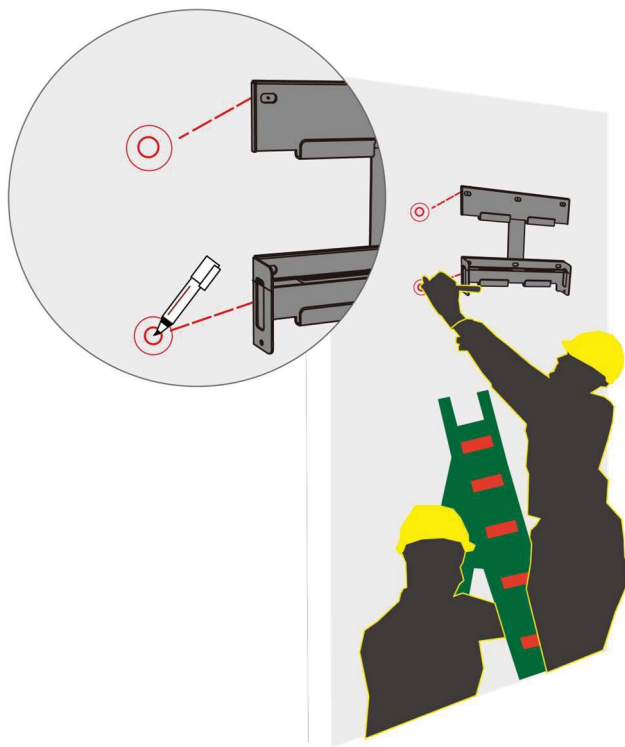


Turn right to down
The support foot

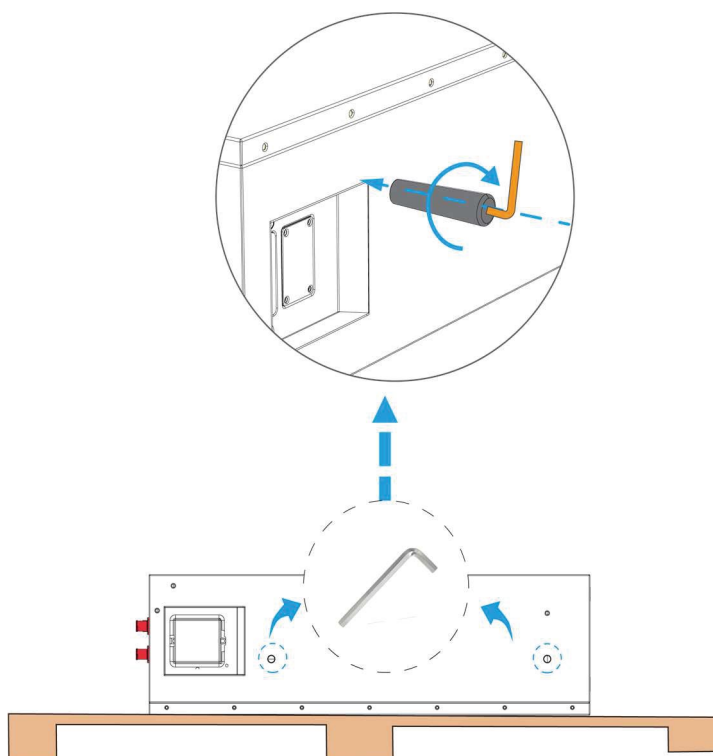
wheel fixing method

4.3.3. Wall Mounting

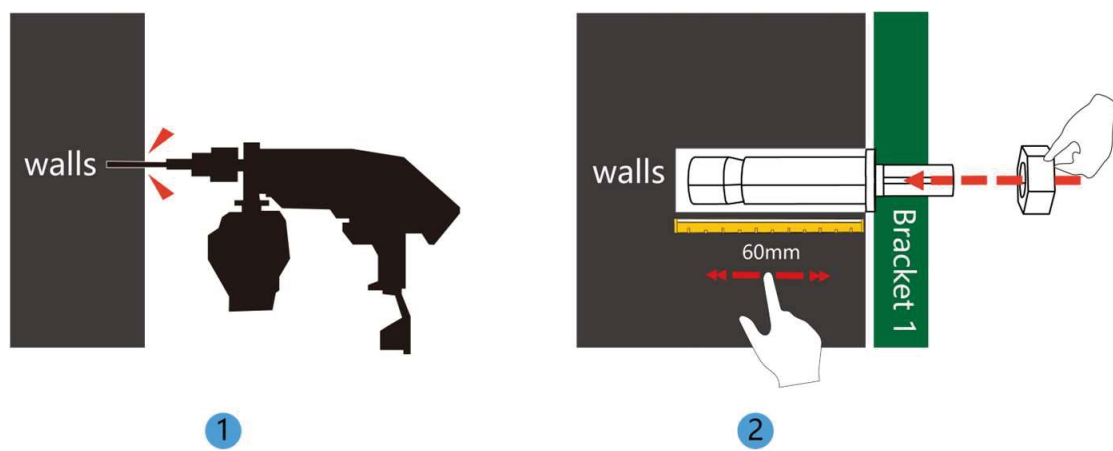
1. Take out the wall mounting bracket 1, place it onto the wall horizontally and mark the holes position on the panel.



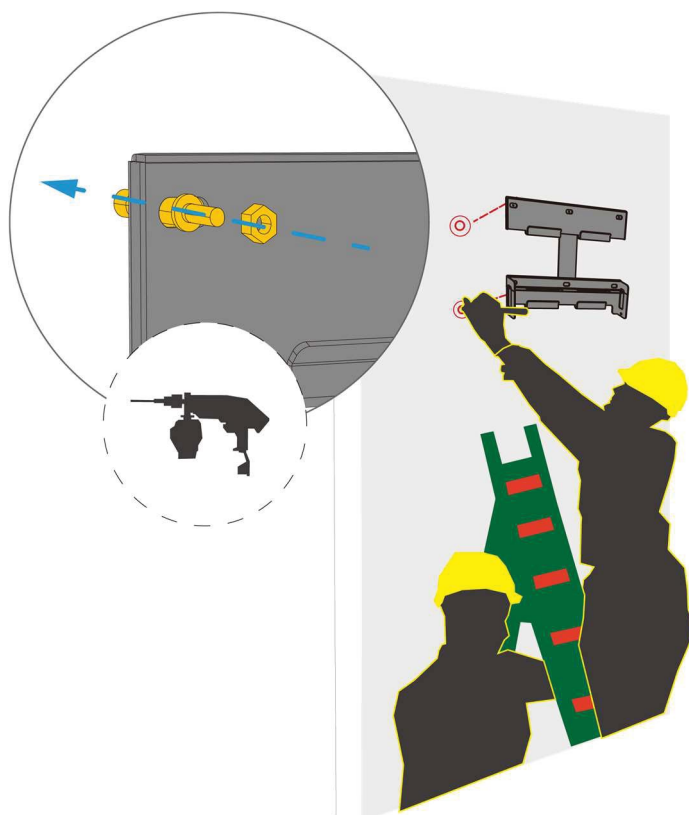
2. Open the wooden box and install the handles on both sides of the battery



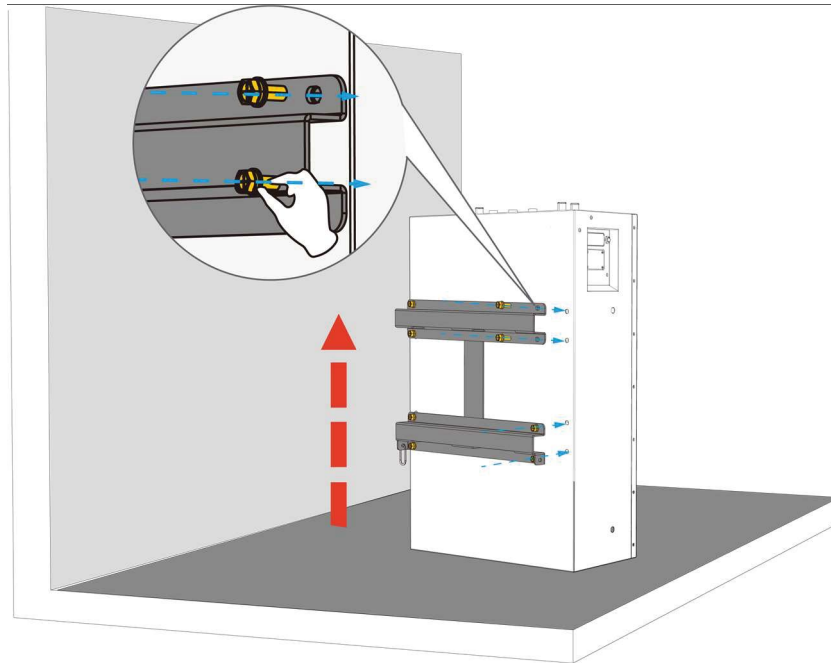
3. Drill holes in the wall for the M8 expansion bolt. The drilling depth should be at least 60 mm, insert the bolt.



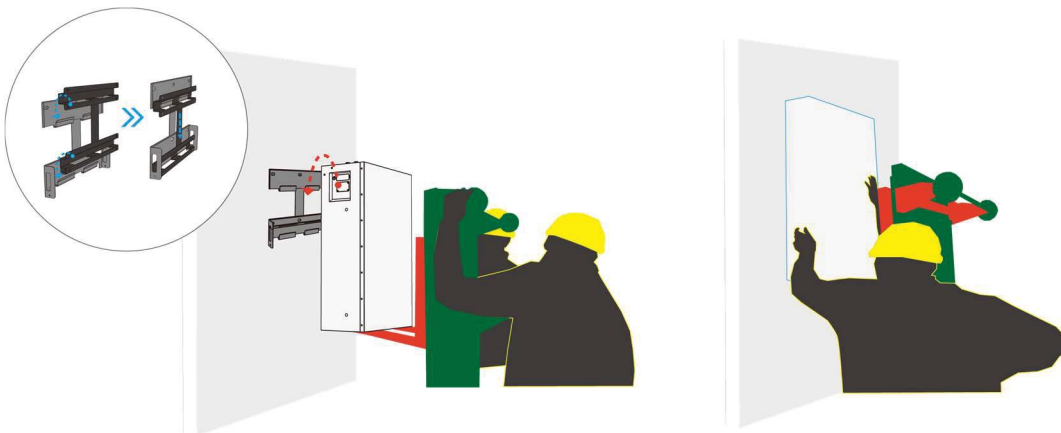
4. Fix the bracket 1 with the nuts.



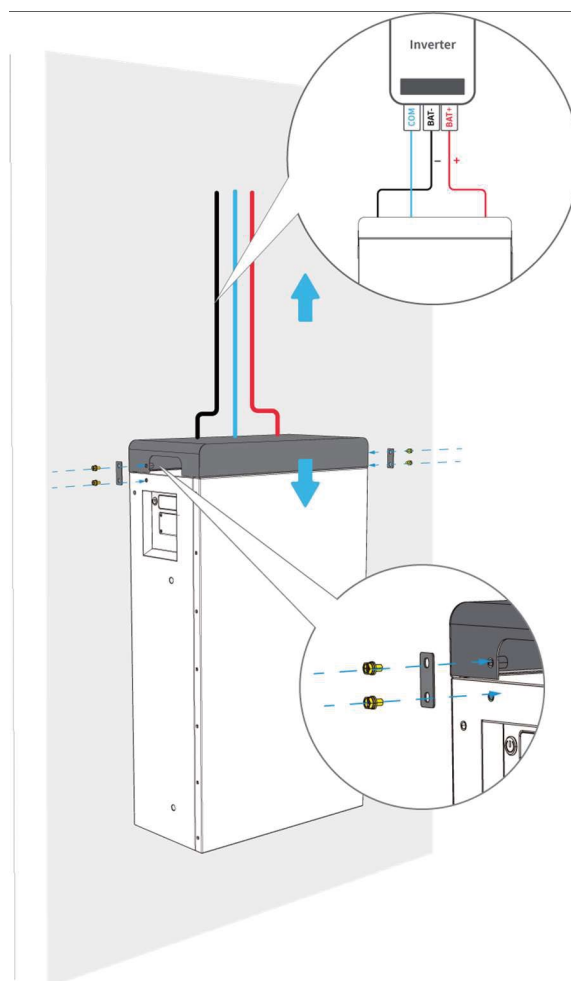
5. Lift the battery up and vertical to the ground. Fixing the battery and the bracket 2 using the combination screw M6*16 and tighten it using a screwdriver.



6. Attach the battery to the wall through folk lifting device.



7. Complete the module installation.



Reminder

⚠ DANGEROUS

- Before drilling, make sure to avoid the water and electricity lines embedded in the wall to keep away from danger.

⚠ NOTICE

- To prevent dust from entering human respiratory tract or eyes when punching, operators should wear protective goggles and dust masks.
- After using the impact drill to punch the holes, you need to use a vacuum cleaner to clean up the internal and external micro-dust of the holes, and then measure the holes distance, and for the holes with large errors need to be repositioned and punched.
- The upper surface of the expansion tube of the expansion screw must be guaranteed to be level with the cement wall or ground, not concave out of the cement wall and ground, otherwise the engineering installation is not level on the wall or ground.

5. Electrical Connections

5.1 Safety Precautions



DANGEROUS

- Before making electrical connections, please ensure that the battery breaker and all switches associated with all energy storage systems are "OFF", otherwise electrical connections may result in a risk of electric shock.
- Make sure that the appliance is disconnected when connecting it, otherwise there may be a risk of electric shock.
- Please strictly observe the safety precautions in the operating instructions and the safety signs on the equipment.
- All operations, cables and component specifications used in the electrical connection process must comply with local laws and regulations.
- When crimping the terminal block, please ensure that the cable conductor and terminal block are in full contact, do not crimp the cable insulation and terminal block together, otherwise the equipment may not operate or the terminal block may become hot after operation, resulting in a safety hazard.



WARNING

- Damage to the equipment caused by incorrect wiring is not covered by the equipment warranty.
- Operations relating to electrical connections must be carried out by a specialist electrical technician.
- The technician must wear personal protective equipment when carrying out operations related to electrical connections.



NOTE

All electrical connection diagrams in this section refer to cable colors for information purposes only and should be selected in accordance with local cable standards (yellow and green wires may be used for earthing protection only).

5.2 Electrical Connections

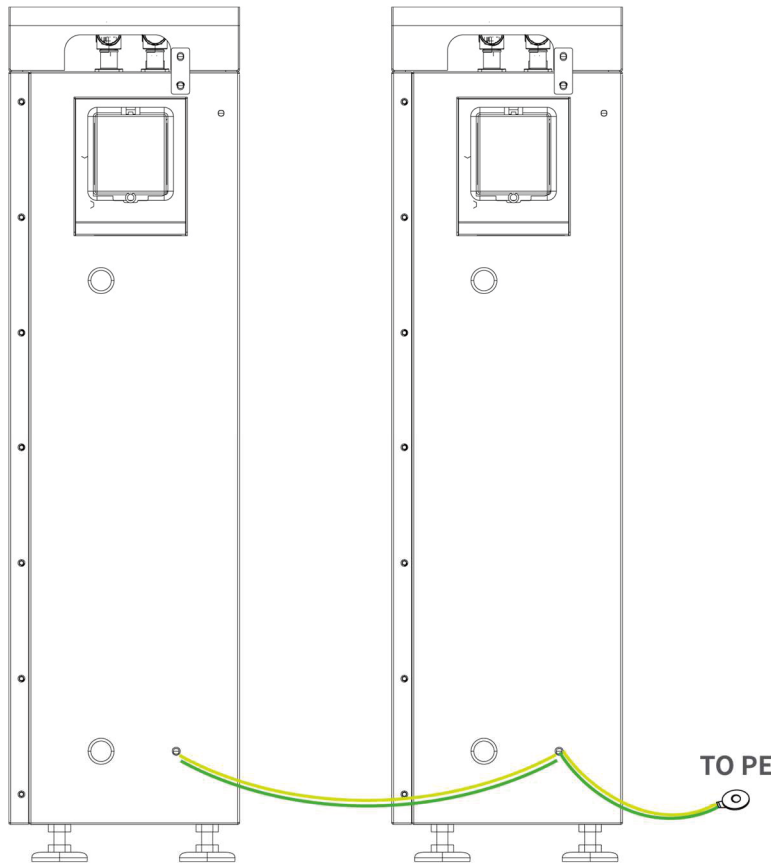
5.2.1 Grounding cable connection

Your battery system must be well grounded. Proceed as follows:

Step 1: Take out the grounding screw on the battery panel, and get the cable conductor through it.

Step 2: Fix them together, with a cylinder screwdriver and tighten it.

Step 3: Fix the other end to the customer's ground point.



 **CAUTION**

5.2.2 Communication cable connection

- RS-C51314F battery contain three RJ45 communication interfaces, and all the wiring definition are consistent.
- There are 3 ports: IN/OUT/DRY CONTACT, please check 3.3.1 to connect cables correctly.
- The communication cable for connection is supplied optional. If is not selected, the cables need to be provided by the user.
- Be careful to avoid misuse of lines used for communication between Hybrid inverter and battery, battery and battery.

- Try to avoid cross-connection
- If damaged after use, the user can refer to the following wiring definitions to make their own.

Step 1: The shielding box is fixed by screws on both sides. The screws on both sides are removed.

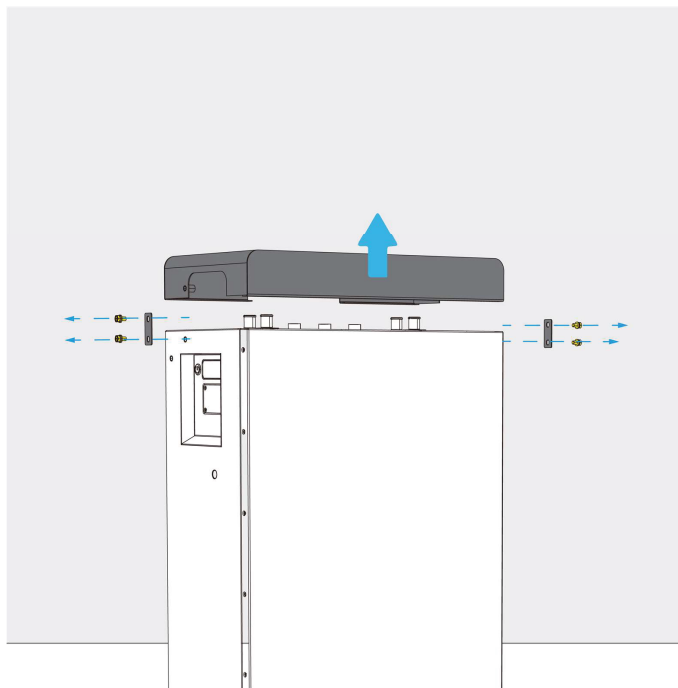
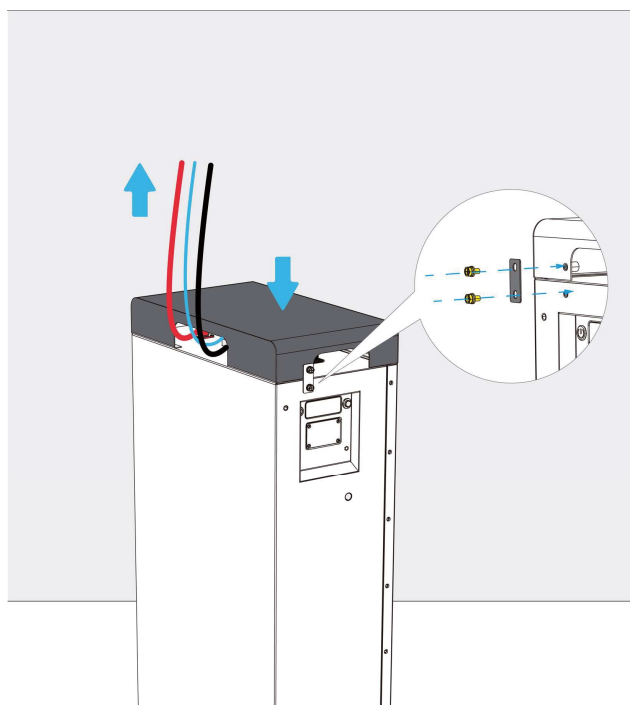
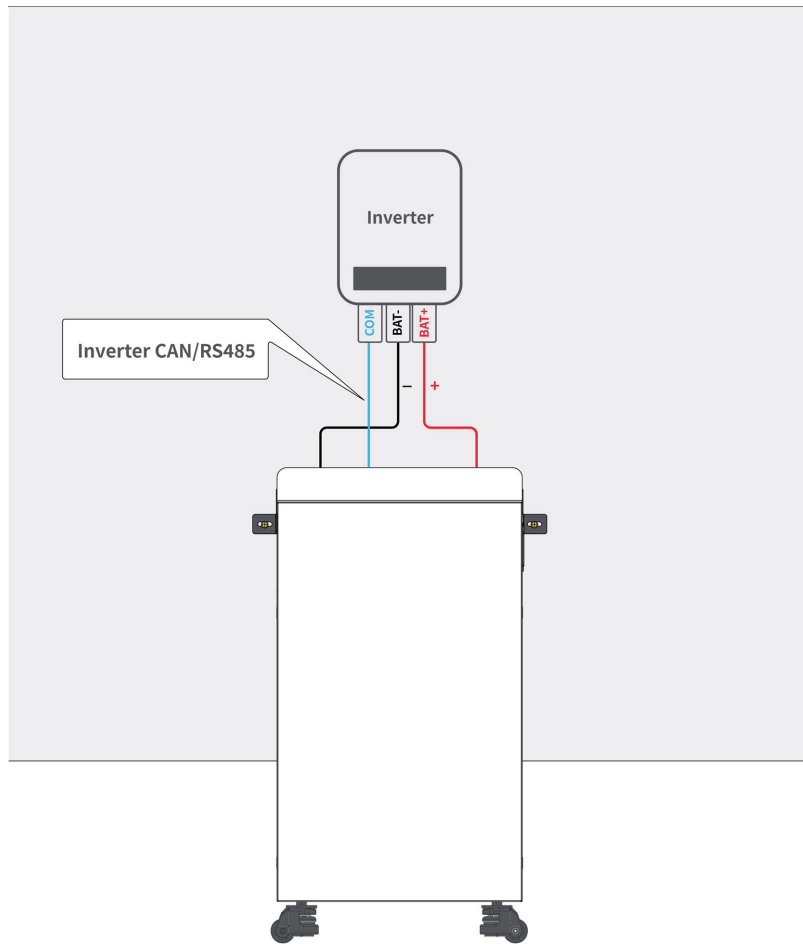


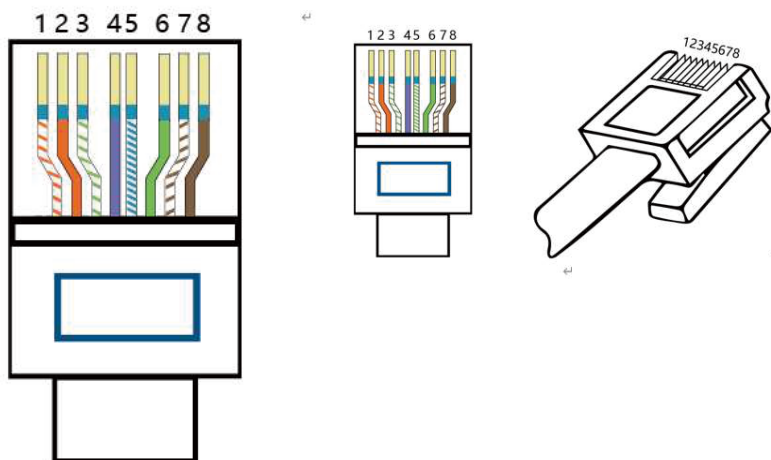
Figure5-2-2

Step 2: Remove the waterproof cover at the battery communication port (refer to 3.3.1), and insert the communication network cable into the RJ45 communication port, and secure it.





RJ45 Terminal



ire5-2-2

IN

PIN	COM	Description
1	DIB	Communicating with inverter/ Parallel communication between battery modules
2	DIA	
3	SGND	Grounding
4	CAN-H1	Communicating with inverter or connecting to a computer
5	CAN-L1	
6	SGND	Grounding
7	RS485-A	Parallel communication between battery modules
8	RS485-B	

OUT

PIN	COM Right	Description
1	DOB	Parallel communication between battery modules
2	DOA	
3	SGND	Grounding
4	CAN-H1	Connecting to a computer, parallel communication between battery modules
5	CAN-L1	
6	SGND	Grounding
7	RS485-A2	Parallel communication between battery modules
8	RS485-B2	

DRY CONTACT

PIN	COM Right	Description
1	K1B	After the charging protection is triggered, this dry contact is connected.
2	K1A	
3	/	/
4	RSD	External emergency stop
5	RSD	
6	/	/
7	K2B	After the charging protection is triggered, this dry contact is connected.
8	K2A	

5.2.3 Battery-Inverter connection

CAUTION

- Confirm inverter AC input and PV input is disconnected before wiring connection, and the DC/AC signal switch of inverter/charger is off status
- The shielding box is fixed by screws on both sides. The screws on both sides are removed.
- Remove the waterproof cover at the battery communication port (refer to 5.2.2), and insert the communication network cable into the RJ45 communication port, and secure it.

Communication cable wiring

Attach the battery to the PCS by connecting the communication line into the “485” or “CAN” port , battery positive line into the “+” port and battery negative line into the “-” port.

Wiring diagram allowed:

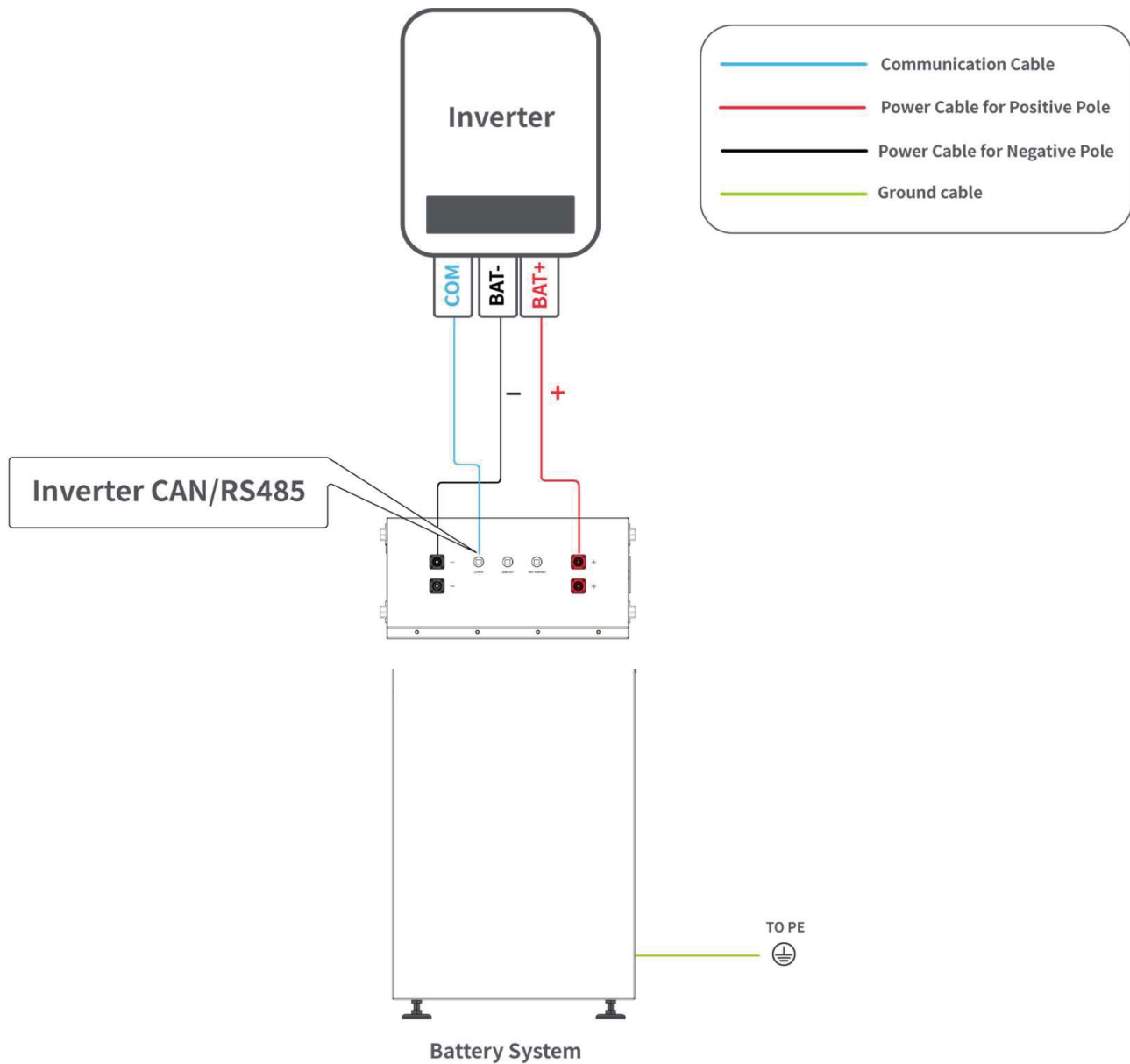


Figure5-2-4

Multiple towers and inverters cable wiring

Step 1: Attach one battery to another one by connecting the communication line from “OUT” port of

previous battery to the “IN” port of the next battery.

Step 2: Connecting Master battery CAN or 485 port to PCS communication port via inverter communication cable (customized).

Step 3: Ensure that all batteries are switched off, battery positive line into “+” port and battery negative line into the “P-” port through a Busbar to connect PCS.

Multiple pairs cable wiring:

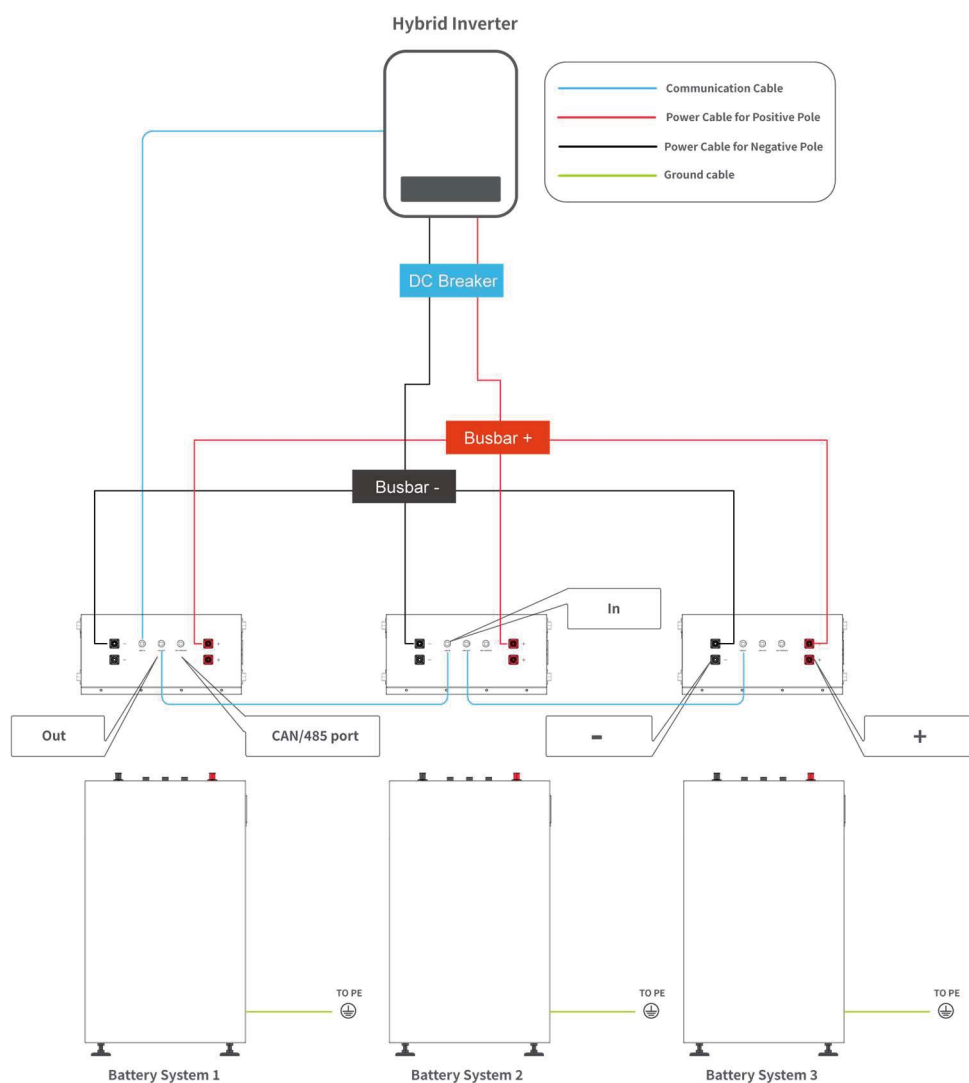


Figure5-2-6

 NOTE

The power cables used in the parallel operation should be the same. It is strongly recommended to use the bus bar to connect multiple batteries in parallel. Considering system stability, when you install multiple batteries, please always keep a certain capacity margin of 30~50%. It is recommended to configure the inverter capacity with battery energy in 1: 2 proportion.

 NOTE

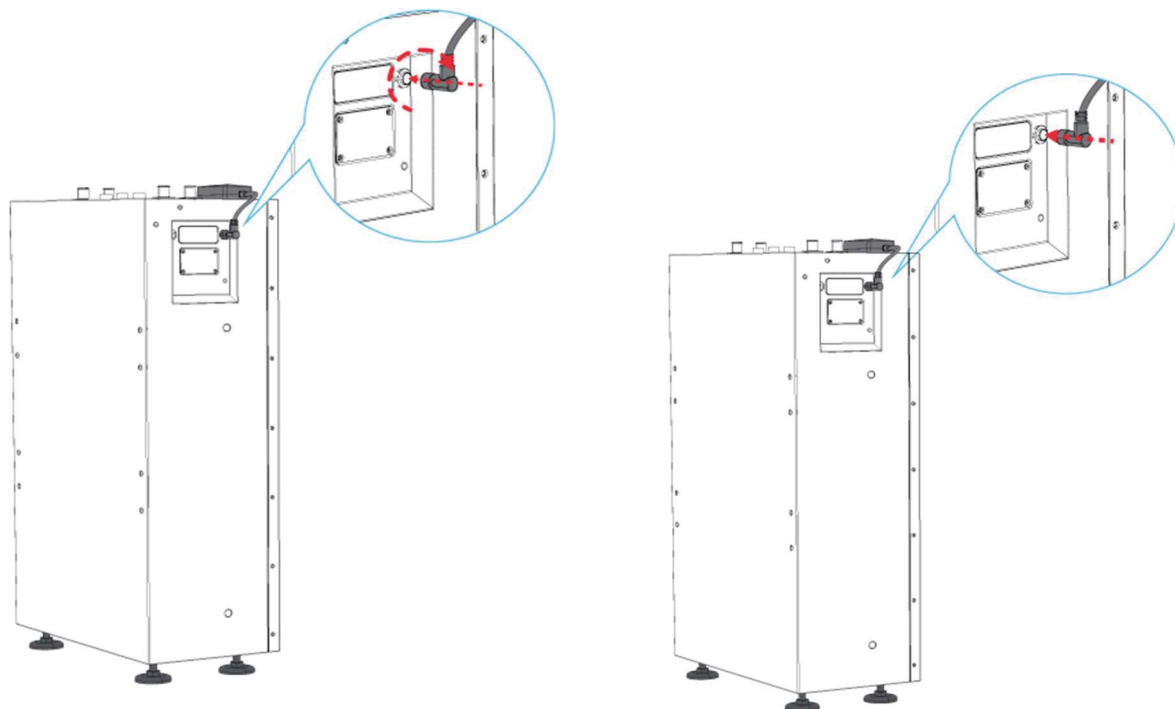
- The maximum communication cable length is required to be less than 15m between inverter/charge and battery.
- The maximum power cable length is suggested to be less than 10m between inverter/charge and battery.

 CAUTION

The maximum allowable current per power cord is 200A, with 150A recommended for continuous use, and the maximum allowable current for the battery terminals is 250A, with 150A recommended for continuous use. Please use the appropriate number of power cord pairs according to the site configuration and local connection requirements, standards and directives.

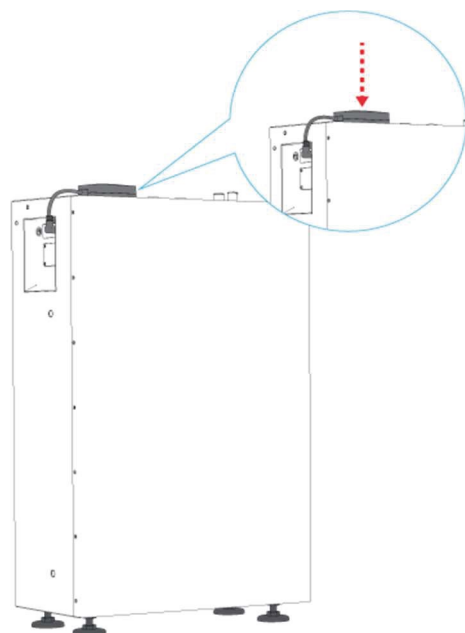
5.2.4 Connection of collector

Step 1: The collector plug is inserted into the battery IoT port. Note that the collector plug groove is aligned with the convex slot of the battery collector socket



Step 2: Tighten the collector plug thread cap clockwise so that the collector plug is closely connected to the battery IoT port

Step 3: Magnetic mounting: A strong magnet inside the collector box, can be directly installed on the surface of the battery



6. System Running

6.1 Battery Commissioning

The battery system allows you to select protocols compatible with the inverter and monitor battery status via the screen.

6.1.1 LED description

SOC light								
state	Charging				Discharging			
SOC	L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●
0%	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1% ~ 25%	FLASH2	OFF	OFF	OFF	ON	OFF	OFF	OFF
26% ~ 50%	ON	FLASH2	OFF	OFF	ON	ON	OFF	OFF
51% ~ 75%	ON	ON	FLASH2	OFF	ON	ON	ON	OFF
75% ~ 99%	ON	ON	ON	FLASH2	ON	ON	ON	ON
100%	ON	ON	ON	ON	ON	ON	ON	ON

Mode	Status	RUN	ALM	LED indicator				Description
		●	●	●	●	●	●	
Power off	-	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby	Normal	FLASH1	OFF	According to battery SOC				See note
	Warning	FLASH1	FLASH3					
Charge	Normal	ON	OFF	According to battery SOC (highest SOC LED: FLASH2)				See note
	Warning	ON	FLASH3					
	COCP	FLASH1	OFF	According to battery SOC				Stop charging
Discharge	Normal	FLASH3	OFF	According to battery SOC				See note
	Warning	FLASH3	FLASH3					
	CUVP/PUVP	OFF	FLASH3	OFF	OFF	OFF	OFF	Stop discharging
	DOCP	OFF	ON	OFF	OFF	OFF	OFF	Stop discharging
Temperature	CHTP/DHTP CLTP/DLTP	OFF	ON	OFF	OFF	OFF	OFF	Stop charging/dis charging
Failure	Cell/NTC failure Sensor failure MOS failure Reversed polarity /SCP	OFF	ON	OFF	OFF	OFF	OFF	Stop charging/dis charging

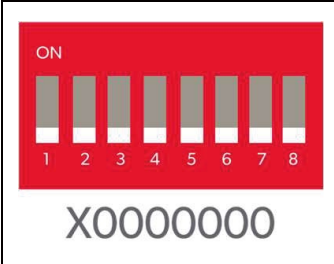
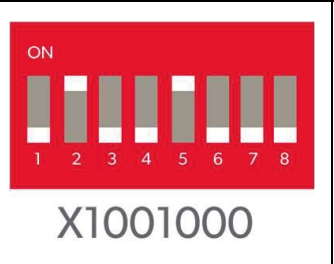
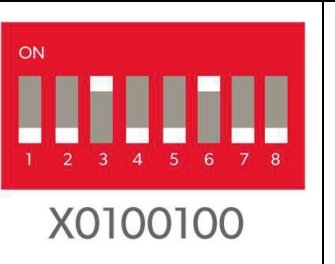
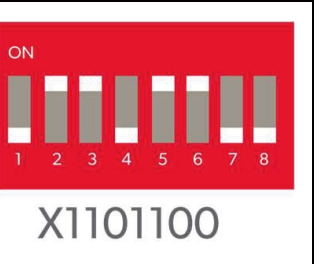
FLASH Type	ON	OFF
FLASH1	0.25S	3.75S
FLASH2	0.5S	0.5S
FLASH3	0.5S	1.5S

6.1.2 Communication protocol selection

The RS-C51314F is equipped with the function of matching multiple inverters, and the inverter protocol needs to be switched according to the DIP switch address.

Remove ADD (refer to 3.3.1) using a screwdriver, and select your DIP switch settings as shown in the following picture.

DIP										
Priority	Remark	RS485 Protocol			RS485 COMMUNICATION COMPATIBLE INVERTERS	CAN Protocol			CAN COMMUNICATION COMPATIBLE INVERTERS	Reserved
1		2	3	4		5	6	7		8
ON:	The protocol is controlled by IOT.	0	0	0	Voltronic	0	0	0	Victron	
		1	0	0	SRNE	1	0	0	Pylon/SolArk/Solis/Goodwe/Deye/Growatt/SAJ/Megarevo/INVT/Sermatec/MUST/Sunsynk	
OFF:	The protocol is controlled by DIP.	0	1	0	LUXPOWER	0	1	0	Schneider	
		1	1	0	PYLON	1	1	0	LUXPOWER	
Keep all batteries the same setting		Master: according to inverter								

			
---	---	--	---

6.1.3 Recommended inverter parameter settings

No.	Inverter setting parameters	Detail
1	Absorption voltage	56.0V
2	Float voltage	55.2V
3	Re-charge/Generator start voltage	$\geq 50V$
4	Re-start voltage	52V
3	Low SOC limit (Grid-tied)	10%
5	Low SOC cut-off	4%
6	Low Voltage cut-off	48.0V
7	Rated charging current limited value	150A*N (N is the Quantity of the battery pack)
8	Rated discharging current limited value	150A*N (N is the Quantity of the battery pack)
9	Max. charging current limited value	200A*N (N is the Quantity of the battery pack)
10	Max. discharging current limited value	230A*N (N is the Quantity of the battery pack)
11	Force charge	Enable

For more information about connecting with different inverter/charger, please contact your supplier for technical support.

 CAUTION

If your system is a back-up or off-grid system, make sure your configuration can cover the worst situation to avoid battery to be over-discharged.

6.2 System Power On/Off

- Before operating the product, be sure to check the following to prevent damage to the system.
- All cables are wired correctly and firmly.
- All fasteners including bolts and screws are tightened firmly.
- No bystanders or animals enter the working area.
- Keep foreign objects , especially metal, away from the battery .
- The installation environment meets the requirements, ensuring a reasonable installation space, a clean and tidy environment and no construction leftovers.

6.2.1 System Power On

 NOTICE

RS-C51314F Please power up within 24 hours of opening the package; for later maintenance, power down for no more than 24 hours.

1. Turn on the inverter switch. If a circuit breaker exists between the inverter and the battery, turn on the circuit breaker.
2. Close the circuit breaker on the battery and press the power switch on the battery. Once the LCD screen lights up, you can use the battery system normally.
3. After you finish your work, please switch off the BMS switch ,and then the service switch.

6.2.2 System Power-Off

 DANGEROUS

- When operating and maintaining the battery system, please disconnect the energy

storage system from the power supply. Operating the equipment with electricity may cause damage to the equipment or risk of electric shock.

- After the system is powered down, there may still be residual power and heat in the chassis, which may cause electric shock or burns. Therefore, after the system has been powered down for 5 minutes, wear protective gloves before operating the energy storage system. Make sure that all the lights of the energy storage system are off before performing maintenance operations on the system.

1. Switch the circuit breaker on the battery to OFF
2. Turn off the inverter
3. Disconnect the electrical connection between the battery and the inverter.
4. Turn off the push button switch on battery.

6.3 Protection Function

Items	Description	Remark
Charge end COVP POVP	The BMS will stop charging if any cell or PACK voltage reach the protection value and it will be auto-released only when both Pack and cell voltage back to the release voltage range or there is efficient discharge current.	
Discharge end CUVP PUVP	The BMS will stop discharging if any cell or PACK voltage is under the protection value and it will be released only when all the cell voltage back to the release voltage range or there is efficient charge current.	Can Automatic recovery. Please charge timely, otherwise it may be in Low-power mode to be over-discharged and damage battery.
CHTP DHTP	The BMS will stop charging or discharging or both if any cell/environment/MOS temperature is beyond the range.	Automatic recovery when temperature falls.
CLTP DLTP	The BMS will stop charging or discharging or both if any cell/environment/MOS temperature is under the range.	Automatic recovery when temperature rise.

COCP	The BMS will stop charging when the charging current is higher than the protection value. And it will release from the protection when the system delays time is met.	Automatic recovery. If locked after three consecutive times, manual intervention is required.
DOCP	The BMS will stop discharging when the discharging current is higher than the protection value. And it will release from the protection when the system delays time is met	Automatic recovery. If locked after three consecutive times, manual intervention is required.
SCP Reversed polarity	The BMS will stop charging when detect short circuit or reversed polarity.	Charge to release. Manual press reset.
Temperature, Voltage, Current sensor failure	Enter the failure mode, manual intervention is required no charging and discharging.	Manual intervention.
Sleep mode	After reaching a certain condition, BMS will enter dormancy mode to reduce BMS consumption	Charge, press reset or restart to activate.

7. System Maintenance

7.1 Routine Maintenance



CAUTION

When performing maintenance such as system cleaning, electrical connections, etc., perform the system power down operation first.

Maintenance List

Inspection content	Inspection method	Maintenance cycle
System cleaning	Regularly check the air inlet and outlet for shading and dust dirt	At least not once every three months
System operation status	- Observe the appearance of the battery system for damage or deformation - Whether there are abnormal sounds during the operation of the battery system - During the operation of the energy storage system, check whether the parameters are correct	Semi-annually
Electrical connection	- Check the cable connection for disconnection and looseness - Check the cable for damage, focusing on whether the skin of the cable in contact with the metal surface has signs of cuts. - Check the unused DC input terminal, energy storage terminal, COM port, and knob switch, whether they are in the locked state.	Every six months after the first transfer test
Environment	Check if there is any debris accumulation around the system, if so, please clean it up to avoid affecting the battery heat dissipation.	Semi-annually

7.2 Troubleshooting and FAQ

Items	Solution	Measure
Unable to start	1. Power on battery and press RESET 6s to observe whether the battery can be started. 2. Charge the battery use a charger or inverter to provide 54~57.6V voltage and observe it can be started.	If the abnormal status still alive after above steps, please contact your supplier. If there is any other situation(s) excluding in this table, turn off the fault battery, contact your supplier.
Unable to charge	1. Check whether the cable connection between the battery and the inverter/charger is correct. 2. Check whether the inverter/charger setting is correct. 3. Check whether the battery is in charge protection mode, if yes, try to discharge the battery.	
Unable to discharge	1. Check whether the cable connection between the battery and the inverter/charger is correct 2. Check whether the battery occurs short circuit, reverse connection, pre-charge failure during connection inverter etc. 3. Check whether the battery is in discharge protection mode, if yes, try to charge the battery.	
High/Low temperature	1. Stop the battery system for a while, check whether the installation location temperature meet the requirement. 2. Avoid continuous full charging and discharging.	
High current	Check the configuration and parameters setting on the inverter/charger is correct.	
ALM always on	1. Check the fault information on the inverter APP or display if possible. b. Ask your supplier to offer BMS monitoring software to locate the reason and back to them for solution.	

Communic ation fail	1. Check the communication cable type is correct and is contacted well. 2. Check the DIP switch setting is correct. 3. Check the inverter protocol related setting is correct. 4. Check both battery and inverter are working properly.	
------------------------	--	--

Q1: Battery maximum SOC is 98~99% and never goes to 100%SOC during daily cycle use, why?

This is normal and have no influence on capacity, usually BMS will calibrate the SOC to 100% when reached cut-off current or trigger HVP, however, to avoid battery from being overcharged and to extend the cycle life as longer as possible, we left a room and set a charging profile to let battery charge slowly near full, please float the battery about 0.5~1 hour to calibrate the SOC.

Q2: 'High voltage' and 'cell unbalance' warning and alarm in rare cases, does it mean battery is damaged?

No. This is not unusual and happened on new batteries that are not balanced yet, please lower the maximum charge voltage (56V) and float the battery via grid or generator. If not solved, please contact your supplier.

Q3: When having multiple batteries in parallel connection, the battery on the end can't be fully charged.

Pay attention to your wiring diagram, please always follow the manual wiring advises and choose proper cable size and pair.

Q4: The current is 0A when connecting with a very small load at the situation that having multiple batteries in parallel connection, how to solve it?

Each BMS has a threshold current of 0.5A (~25W) before it begins to report, this leads the inaccurate display of the current.

Q5: SOC is not accurate or suddenly jumps to 100% during charging.

This mostly happen in off-grid applications on batteries that have not been calibrated SOC for

a long time or situations that are similar to Q4 that with inverter in Idle mode or a small DC load or store the battery for a long time, we suggest fully charging at once the batteries per month refer to Q1.

Q6: The system is still running when the inverter log shows 'internal failure' Warning.

This is our logic and this warning flag indicates there is 1 or more module(s) is in communication offline from the system, the system will derating and until communication is recovered.

Q7: Inverter pulling power from Grid to charge batteries in self-consumption mode.

When reached certain conditions such as low state of charge etc., battery will send charge request to ask inverter to charge the batteries, to avoid this, please discharge DOD as manual suggested.

8. Transport, Storage

- Do not violently shake, impact or squeeze, and prevent sun and rain during the transportation.
- Do light take and put and strictly prevent falling, rolling, and heavy pressure during loading and unloading.
- The battery should be placed in a dry, clean, dark, and well-ventilated indoor environment for long-term storage, and the recommended storage temperature range is 15~35°C.
- No harmful gases, flammable and explosive products and corrosive chemical substances in the storage location.
- The batteries should be stored and transported in close to 50% SOC, do not store over 80%SOC for long time.
- If do not use for a long time, the battery needs to be charged every 6 months.
- No fall down, no pile up over 5 layers, and keep face up.

9. Disposal of Battery

Disposal of battery must comply with the local applicable disposal regulations for electronic waste and used batteries, please review your local Battery recycling or management regulations or contact your supplier for more information.



Shenzhen Topband Lithium Battery Co., Ltd.
China . Topang Industrial Park, Shiyan Town, Baoan District, Shenzhen
Service Hotline:+86-0755-27651888
Mail: service@topband.com.cn
Website: www.topband.com.cn