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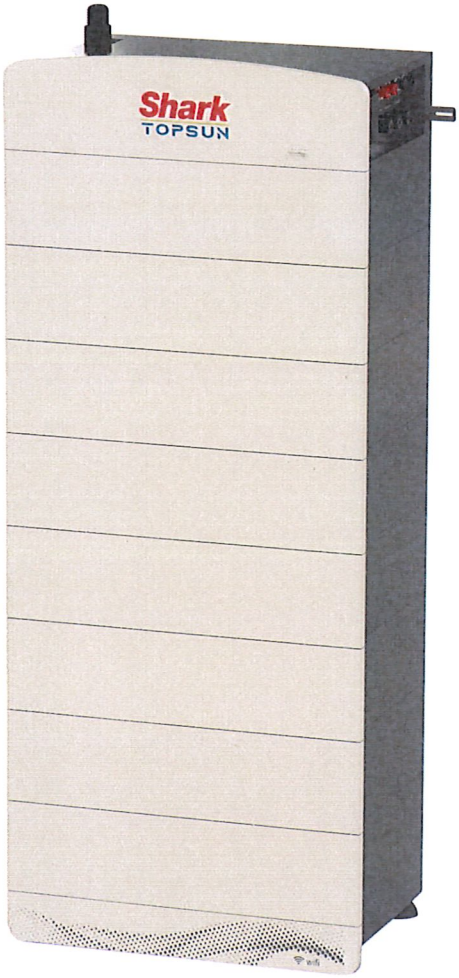
USER MANUAL

深圳市海盾新能源股份有限公司
文管中心
生效 2024-11-19 日期
受控文件



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REMOTE
UPGRADE

深圳市海盾新能源股份有限公司
文管中心
生效

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V1.1

2024.11.19

2024.11.19

HIGH VOLTAGE ESS

Preface

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Limitation of Liability

Equipment manufacturers are not directly responsible for damage to the battery system or for loss of property damage to the battery system or loss of property caused by the following circumstances:

• Without the authorisation of the equipment manufacturer, the battery system has been modified or replaced.

• None of the technicians of equipment manufacturers change or delete the serial number of the battery system.

• The design and installation of systems consisting of equipment does not comply with standards,safety and protection

• Regulations and other relevant requirements.

• Damage to equipment caused by failure to comply with the requirements of the power system manual.

• Damage to equipment caused by improper use or misuse of battery system.

• Damage to equipment caused by insufficient ventilation of the battery system.

• Battery system maintenance procedures did not meet acceptable standards.

• Damage to equipment caused by force majeure, such as earthquakes, storms, lightning, surges, fires, etc.

Version History

The latest version in the revision log contains the updated contents of all previous document versions .

Contents

01 Safety Tips

Danger

• The battery system is a high voltage system. Before operating the equipment in the system, please turn off the power to avoid danger and strictly follow the instructions in this manual. All safety precautions and safety signs on the equipment.

• Only professionals are allowed to operate the battery system. Professionals must be familiar with local regulations and electrical systems, have received professional training, and be familiar with Knowledge related to this product.

• Do not use if batteries or control box are visibly defective, damaged, or missing.

• Do not disassemble or modify any part of the battery or control box without official authorization from the equipment manufacturer.

• Battery damage may cause electrolyte leakage. If the electrolyte leaks, do not touch the leaked electrolyte and volatile gases, and contact the after-sales service center for help immediately.

Warn

If you come into contact with leaked material, do the following:

• Inhalation of spilled material: Evacuate from contaminated area and seek medical help immediately.

• Eye contact: Rinse with water for at least 15 minutes and seek medical help immediately.

• Skin contact: Wash the contacted area thoroughly with soap and water and seek medical help immediately.

• In case of ingestion: Induce vomiting and seek medical help immediately.

• Do not move the battery system when the external battery expansion module is connected. If you need to replace or add batteries, make sure the batteries are new batteries from the same batch, brand, and manufacturer, or contact the after-sales service center.

Careful

transportation :

- Ensure that the battery system is not damaged during transportation and storage.
- Be careful and consider the weight when lifting the battery or control box.
- Wear gloves when handling batteries.
- Do not hit, pull, drag, or step on the device, and do not place extraneous objects into any part of the battery module.
- Transportation must be carried out by trained professionals and operations during the process must be recorded.
- Make sure the device is placed firmly and not tilted. Toppling of the device may cause damage to the device and personal injury.
- Make sure there is a CO2, Novac 1230 or FM-200 fire extinguisher near the equipment .
- When extinguishing a fire , please use a fire extinguisher with the recommended materials. Do not use water or ABC dry powder fire extinguishers. Firefighters must wear protective clothing. and self-contained breathing apparatus.
- When the ambient temperature exceeds 150°C, there is a risk of explosion of the battery .
- When installing and maintaining heavy equipment, please use appropriate tools and take protective measures. Improper operation can result in personal injury.
- When working with high voltage, use special insulated tools.
- Using cables in high temperature environments may cause aging and damage of the insulation layer. The distance between the cables and the heating device or the heat source area should be as close as possible. At least 30mm.
- Cables of the same type should be bundled together, and cables of different types should be laid at least 30 mm apart . They must not be entangled or crossed.

EU Declaration of Conformity

Equipment that can be sold in the European market meets the following directive requirements:

- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (R o HS)
- Waste Electrical and Electronic Equipment 2012 / 19/ EU

02 Product Introduction

2.1 Product Description

• This document mainly introduces the product overview, application scenarios, installation , commissioning, maintenance and technical parameters of the Home ESS-ATOM HS Series high-voltage energy storage battery system (hereinafter referred to as: battery system) .

• The energy storage battery system is mainly composed of a battery module (hereinafter referred to as: battery) and a high-voltage control box (hereinafter referred to as: control box) .

Each battery system model is as follows:

Battery System	Number of batteries	Number of control boxes	Number of bases
STS HV-CUBE-15.36	3	1	1
STS HV-CUBE-20.48	4	1	1
STS HV-CUBE-25.60	5	1	1
STS HV-CUBE-30.72	6	1	1
STS HV-CUBE-35.84	7	1	1
STS HV-CUBE-40.96	8	1	1

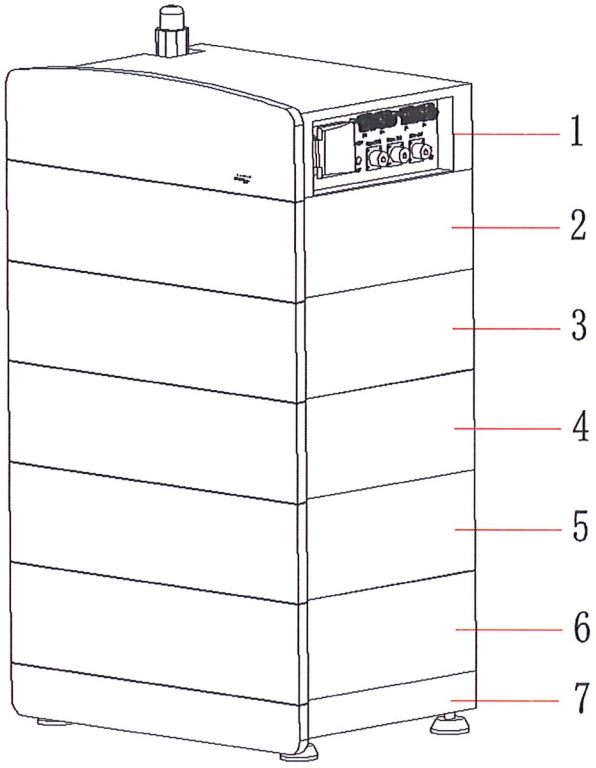
2.2 Symbol Description

symbol	describe	symbol	describe
	There are potential hazards when the equipment is in operation. Please take precautions.		Keep open flames or ignition sources away from the device.
	High voltage hazard. There is high voltage when the inverter is running. Please make sure that the inverter is powered off when operating the inverter.		The device should be kept out of reach of children.
	There is a risk of explosion in extreme cases.Please use the device reasonably.		Do not use water to extinguish fire.
	The device contains corrosive electrolyte. Please avoid contact Leaking electrolyte or volatile gas.		The device cannot be disposed of as household waste. Dispose of the device in accordance with local laws and regulations. Or send it back to the device manufacturer.
	Please read the product manual carefully before operating the device.		The device should be placed in the correct place and recycled in accordance with local environ-mental regulations .

symbol	describe	symbol	describe
	Pay attention to personal protection during installation, operation and maintenance.		CE mark .
	RCM certification mark.		The protective grounding mark is used to indicate the protective grounding connec-tion location

03 Components Introduction

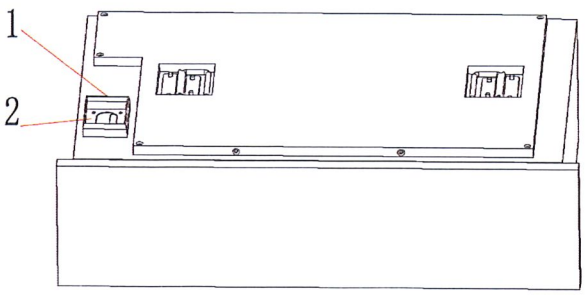
3.1 Battery System Introduction



Notice
• Make sure the control box is installed above the battery. Do not install the battery above the control box. • This article takes the configuration of 5 batteries as an example to introduce the product installation and wiring steps.

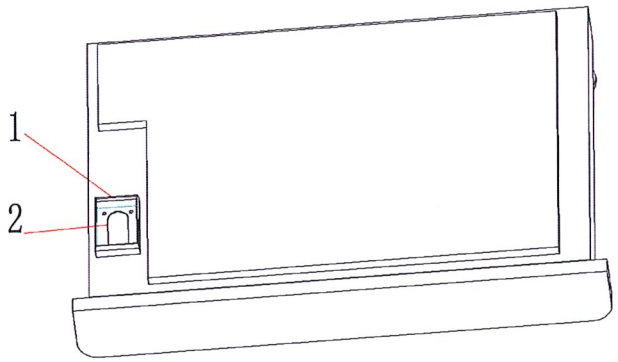
Serial number	Part
1	control box
2 ,3,4,5,6	Battery
7	Base

3.2 Battery Introduction



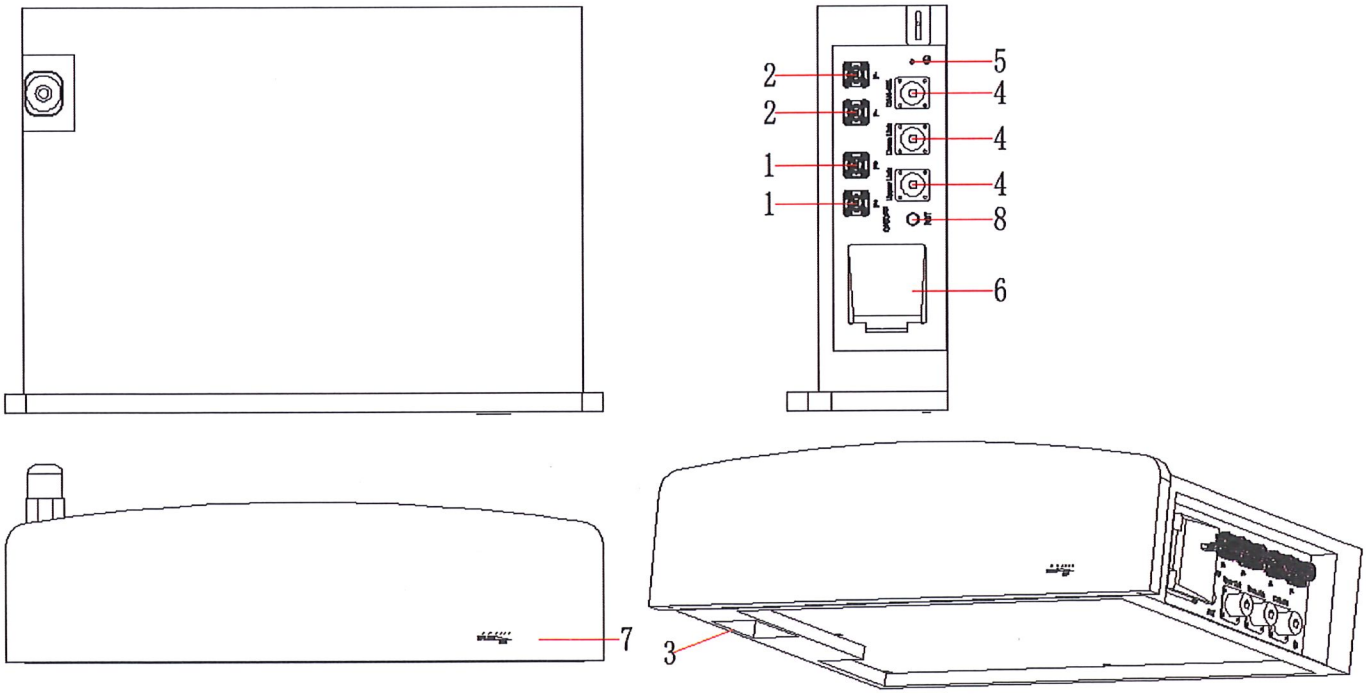
Serial number	Part
1	Guardrail
2	Blind Mate Connectors

3.3 Base Introduction



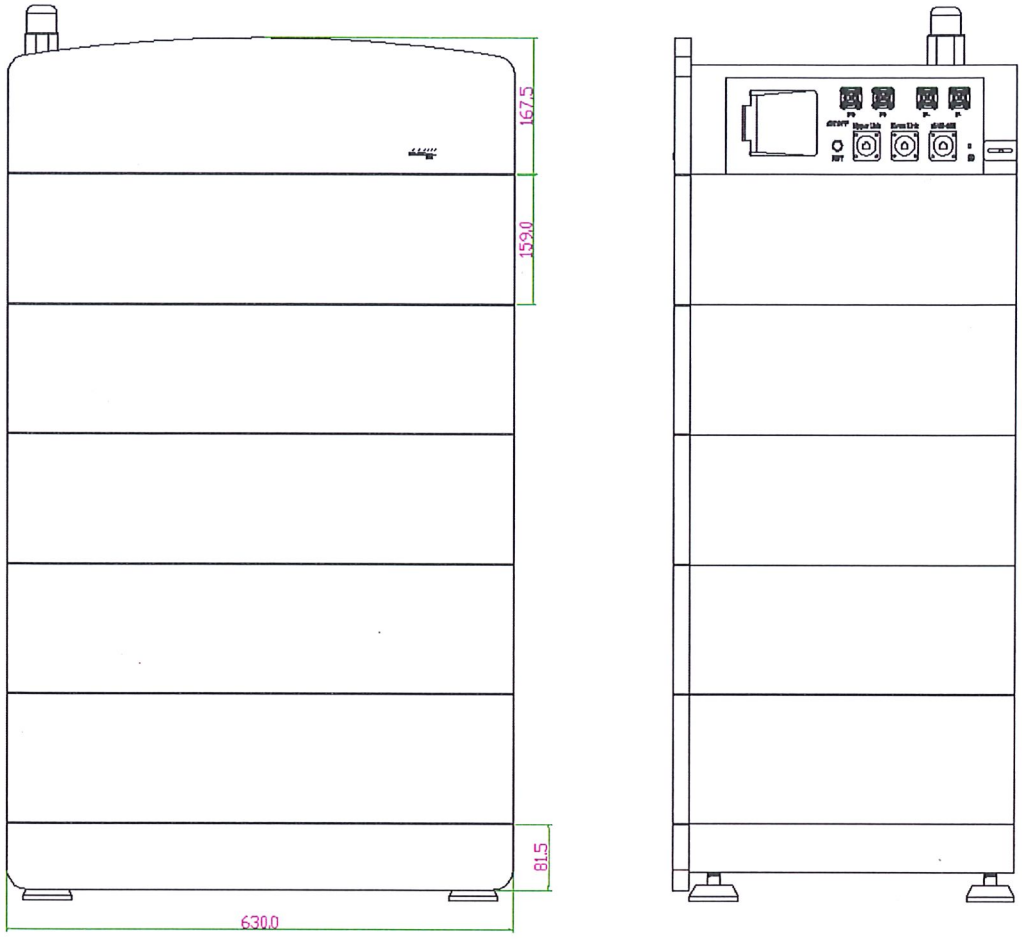
Serial number	Part
1	Guardrail
2	Blind Mate Connectors

3.4 Control box components introduction



Serial number	Part
1	Power positive pole
2	Power negative pole
3	Blind Mate Connectors
4	Communication Interface
5	Protective grounding point
6	Air switch
7	Indicator Lights
8	Power switch button

3.5 Size Introduction



04 Storage and packaging

4.1 Storage Environment

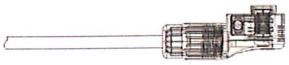
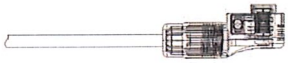
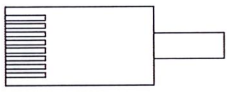
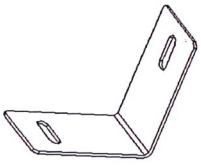
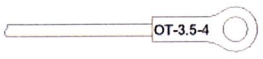
If the device is not installed and used immediately, make sure that the storage environment meets the following conditions:

- The equipment should be packed in a packaging box, and the packaging box should be sealed after placing desiccant in the box.
- If the device is not installed within 3 days after unpacking, it is recommended to store it in the packaging box.
- Storage SOC: 25%~50% SOC, a charge and discharge cycle is required every 3 months of storage.
- Storage temperature range: Storage at -20°C~45°C does not exceed 1 month; storage at 0~35°C does not exceed 1 year .
- Humidity range: 0~95% without condensation. Do not install the battery if there is condensation on the battery interface.
- The device should be stored in a cool place away from direct sunlight.
- The equipment should be stored away from flammable, explosive, corrosive and other items.
- Do not expose the equipment to rain.

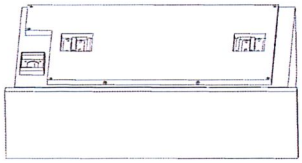
4.2 Packaging Information

• The battery system consists of three parts: battery, control box and base.
• Before unpacking the battery system, check the packaging for damage and verify the battery system model. If there is any abnormality, Do not open the packaging and contact the after-sales service center as soon as possible.
• After unpacking the battery system , please check whether the product is complete according to the packaging information. If there is any abnormality, please contact the After-sales service center as soon as possible.

Control box

 Control box x1	 Base x1	 Expansion bolt x4	 Orange power cable x 2
 Black power cable x 2	 Terminal resistance x1	 M4 Hexagon combination screw 2	 High pressure box anti-toppling support x2
 Cable x2	 User Manual x1	 Ground terminal cable x1	N / A
N / A	N / A	N / A	N / A

Battery



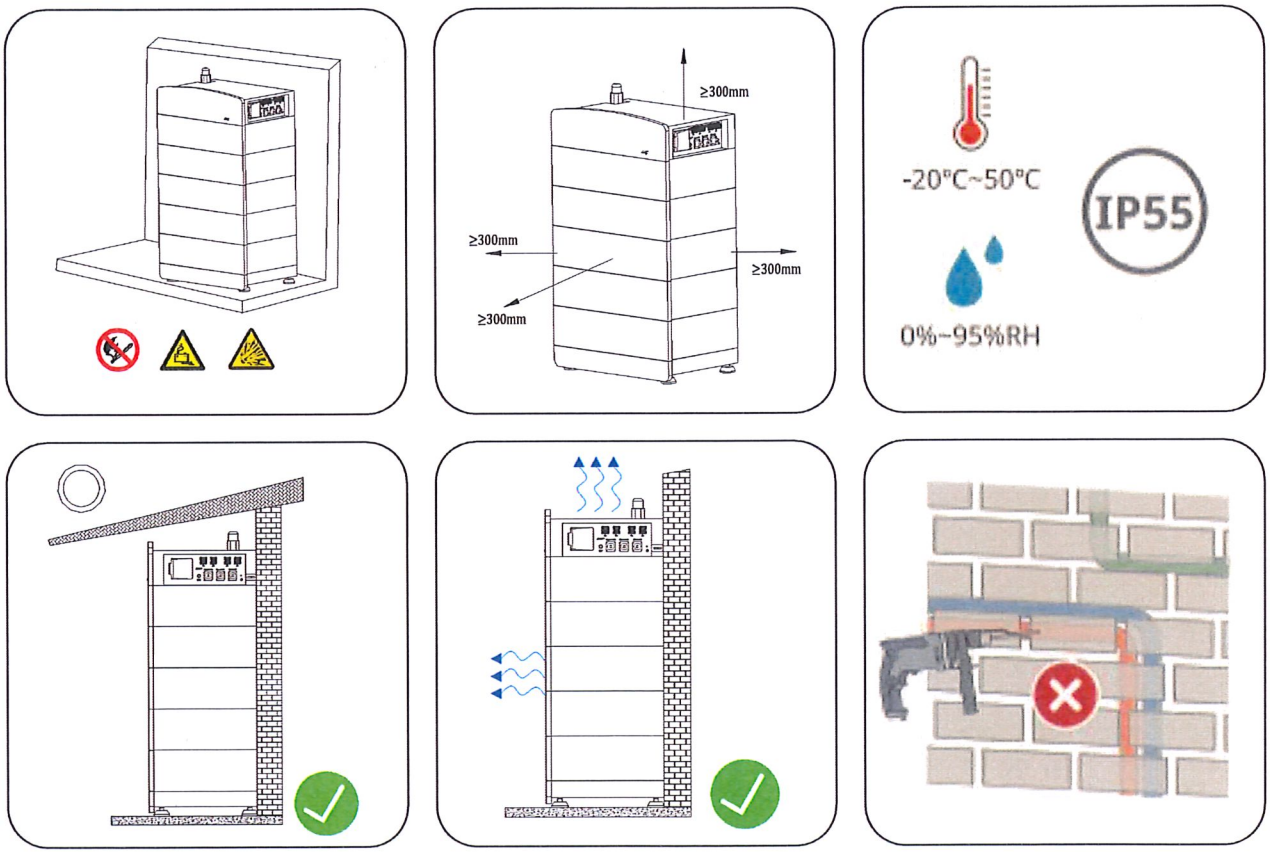
Battery N x1

05 System installation

5. 1 Installation Environment

• The battery system must be installed on a surface with sufficient load-bearing capacity and flatness. If the surface does not have sufficient support and flatness, other Measures can be taken to ensure this (such as building foundations, adding load-bearing plates, etc.) .
• The battery system needs to be mounted against a wall.
• The battery system works best in an environment with a temperature of 20~40°C.
• Avoid installing in an environment exposed to direct sunlight or rain.
• Avoid installing near high-temperature heat sources or low-temperature cold sources.
• Avoid installation in areas with extreme changes in ambient temperature.
• Avoid installing in strong interference environments.
• Avoid installing in areas that children can reach.
• Avoid installation in areas prone to water accumulation.
• Do not place flammable, explosive, corrosive items around the device .

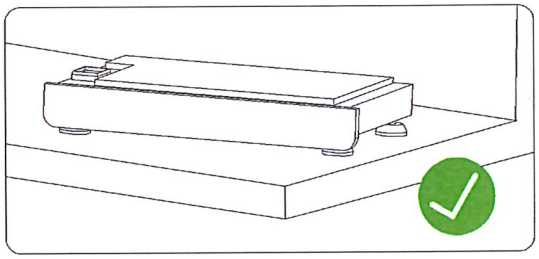
5.2 Position Requirements



5.3 Installing the battery system

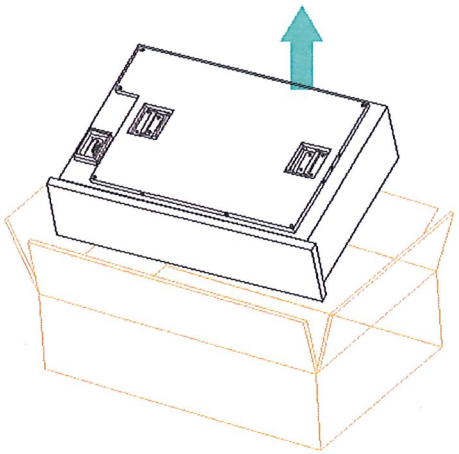
Notice

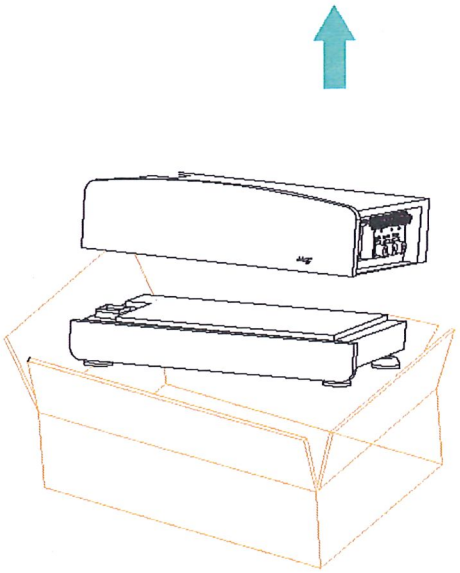
Before installation, check that the ground is flat and has no tilt .
Make sure the base is vertical and flat against the ground.
Make sure the base is against a wall and that the arrow on the base is facing outward when placed .
Make sure all batteries are against the wall and placed with the arrows on the batteries facing outwards.
Placing the upper battery, make sure the holes on the upper and lower layers are aligned.
Make sure the battery holder is tight against the wall.
Be careful not to drop the battery .
Avoid installing anti-tip brackets on the same side.



Step 1: Remove the battery, base, and control box from the carton.
Step 2: Place the base against a wall.
Step 3: Install the battery on the base.
Step 4 Repeat Steps 1 to 2 to install the second to fifth batteries from bottom to top.
Step 5: Install the control box anti-tipping support.
Step 6: Place the control box firmly over the installed battery, mark the holes with a marker, and remove the control box.
Step 7: Use a hammer drill to drill holes. (Aperture: 6mm, depth: 50mm).
Step 8: Tighten the expansion screws. Torque requirement: 10N · m. Ensure that the control box is securely installed.

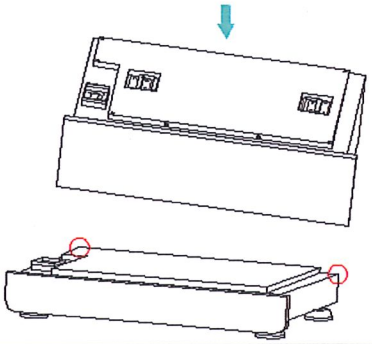
1





2

3



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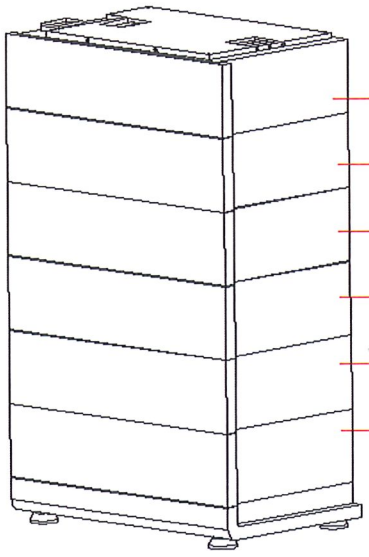
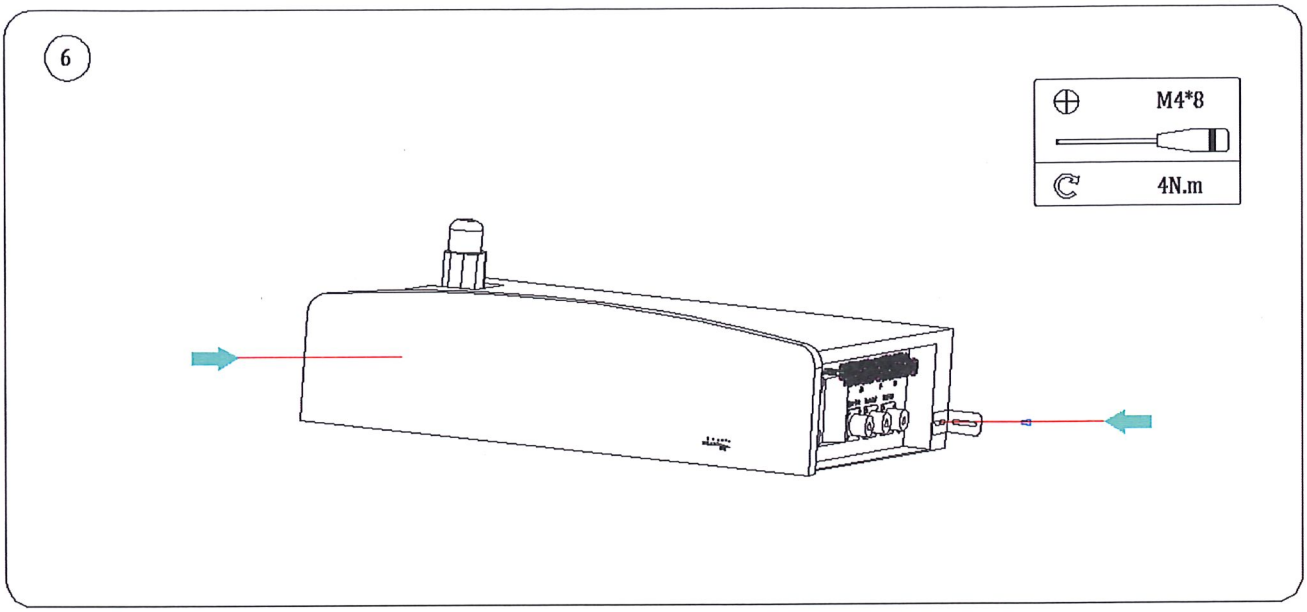
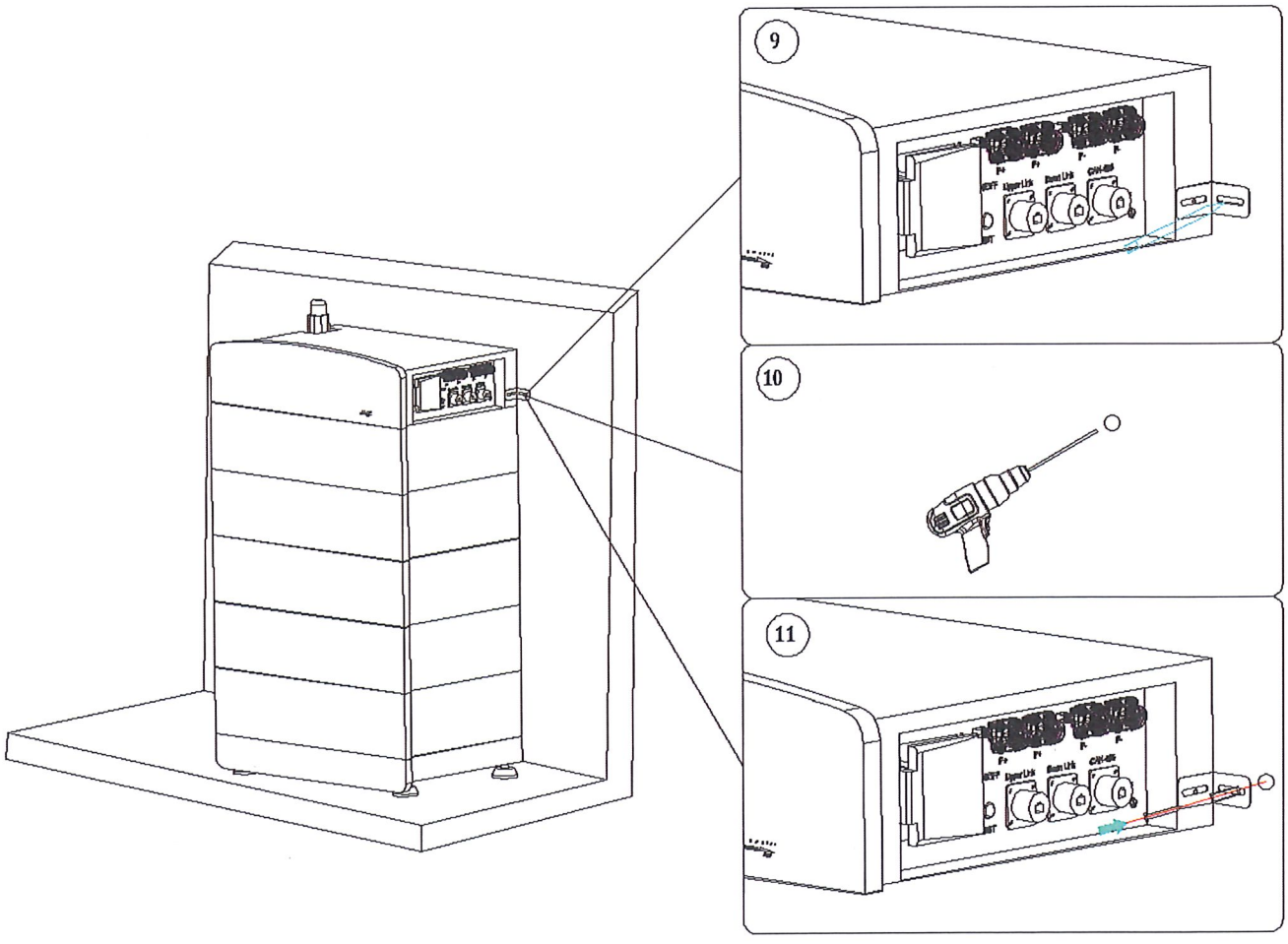




Notice

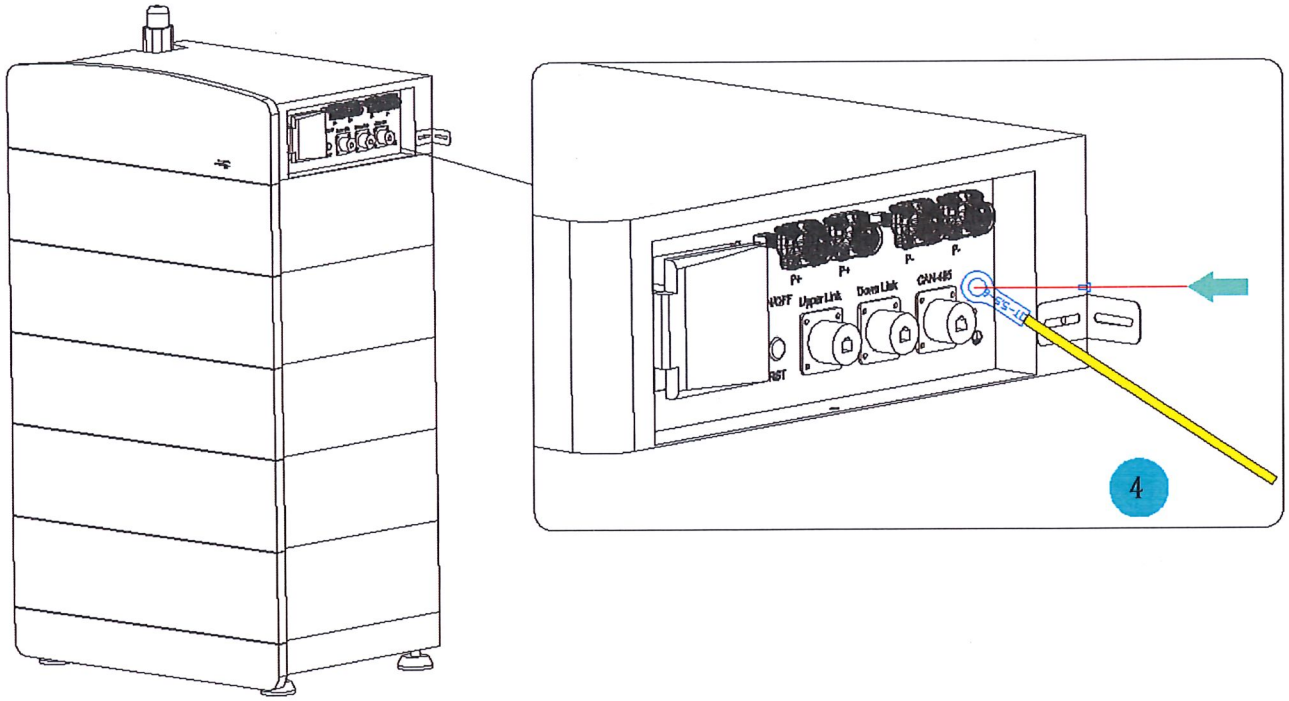
- When punching holes, you need to use cardboard or other covering materials to cover the equipment to avoid dust .
- The control box anti -tipping bracket must be close to the wall, with the bottom vertically close to the battery.
- Be careful not to drop the control box.



5.4 Electrical connections

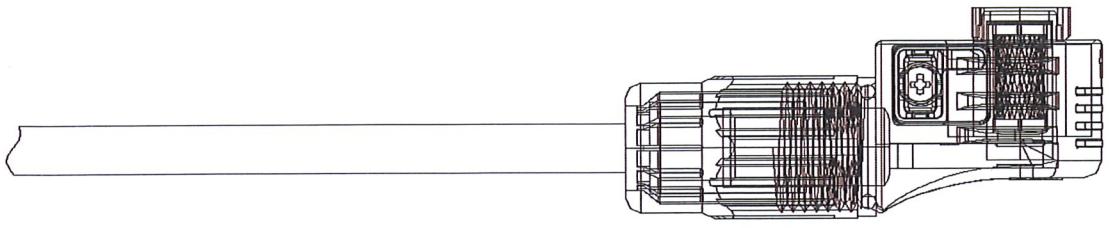
5.4.1 Ground Wire Connection

Notice
• When installing equipment, the protective ground wire must be installed first; when removing equipment, the protective ground wire must be removed last. • Connect the ground wire of the control box .



5.4.2 Power line connection

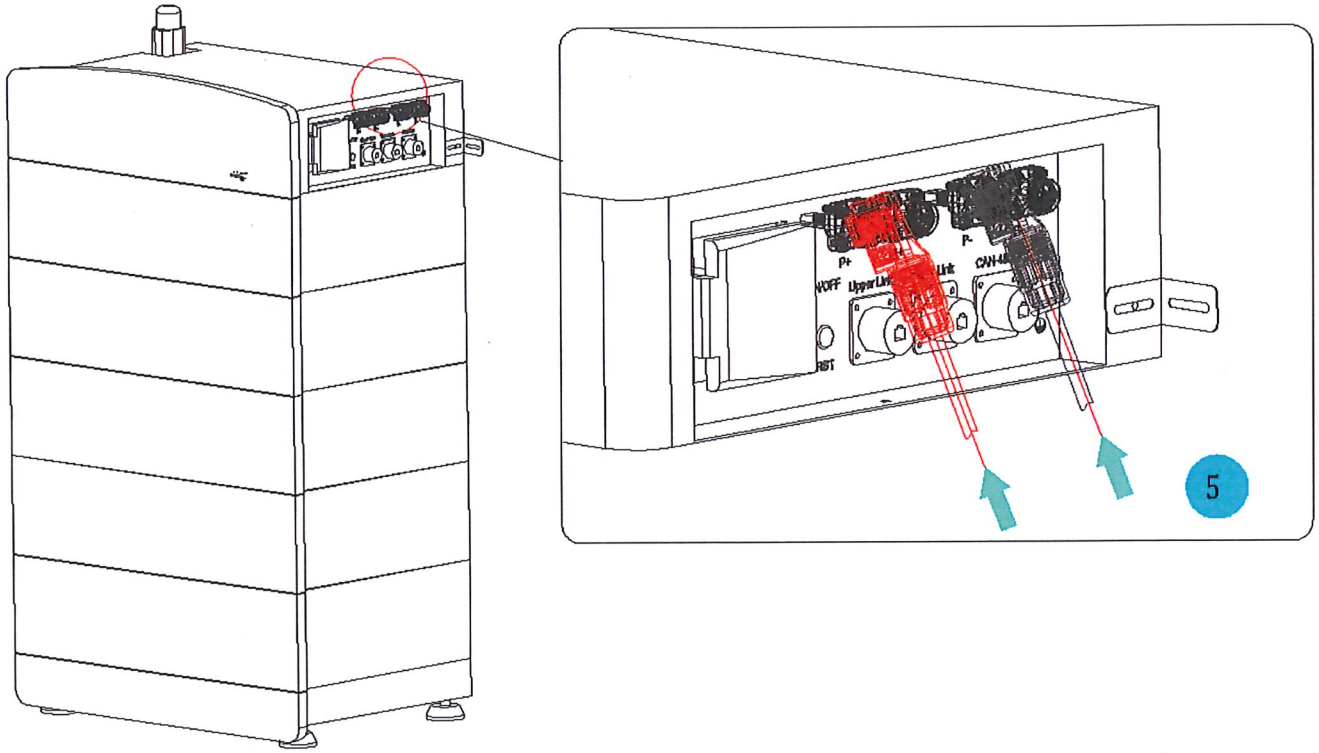
Notice
• The battery system is a high-voltage system. Please turn off the power before connecting the power line to avoid danger. • Please use the matching DC input cable . • Connect any one of the two power interfaces. The reserved power interface needs to be covered with a protective cover .



Notice

• The battery system used with the Home ESS-HV Series inverter has a power line conductor cross-sectional area of 16mm2 (AWG 6) .

Step 1 : Connect the power wires.

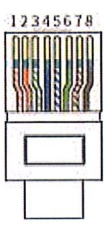


5.4.3 Communication line connection

Notice

• The battery has 3 communication interfaces, all of which use RJ45 crystal sockets, and the screen printing on the box is PCS, Down Link, and Upper Link respectively .
• Battery communication cable needs to be prepared by yourself.
• For the communication line production on the battery side, please refer to the following communication interface definition.

1. RJ45 crystal



2. Battery side PCS communication interface definition:

PIN	Definition
1	RS485_1A
2	RS485_1B
3	/
4	CAN 3 _ H
5	CAN 3 _ L
6	/
7	RS485_2B
8	RS485_2A

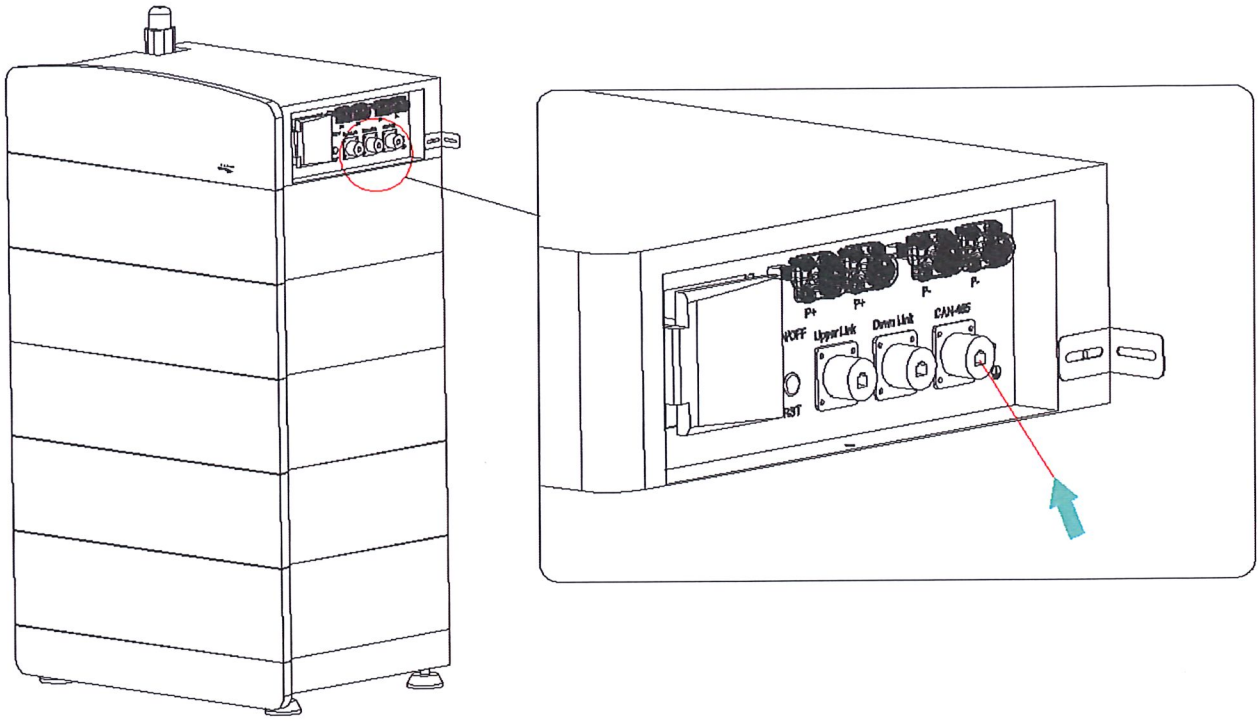
3. Definition of DownLink communication interface on battery side:

PIN	Definition
1	ADDR_DO
2	GND
4	CAN 2 _ H
5	CAN 2 _ L
3.6.7.8	N / A

4. Definition of Upper Link communication interface on battery side:

PIN	Definition
1	ADDR_DI
2	GND
4	CAN 2 _ H
5	CAN 2 _ L
3.6.7.8	N / A

Step 1 : Connect the communication cable to the battery.

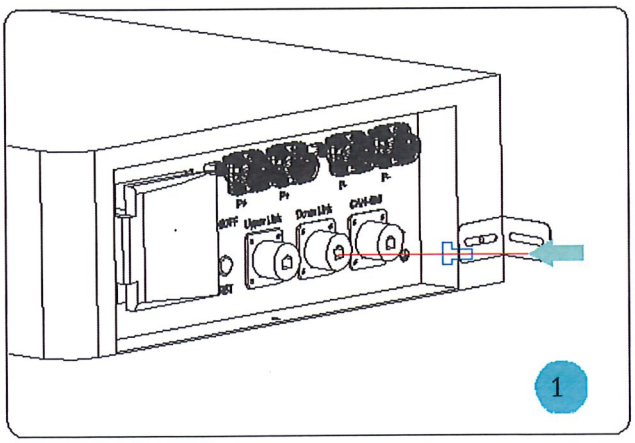


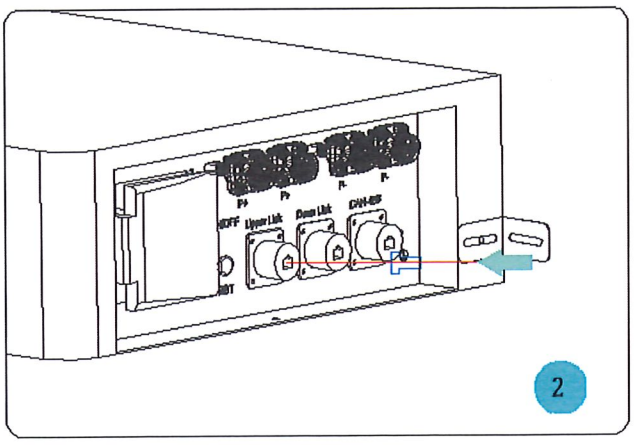
5.4.4 Installation terminal resistance

Notice

If the terminal resistor is not installed, it will cause cluster interlock failure and the system will not work properly . Please only install the terminal battery in the first cluster and the last cluster .

Step 1: Install the terminal resistor into the first cluster of communication ports .
Step 2: Install the terminal resistor into the last cluster communication port .





06 System Operation

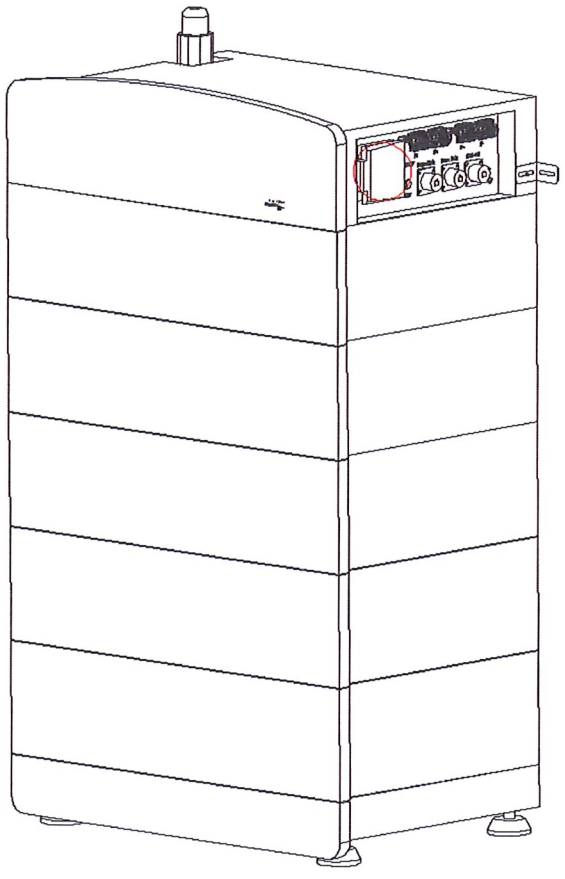
6.1 Check before power on

When the battery system is powered on, be sure to check the following to prevent system damage .

serial number	Check items
1	The equipment is installed firmly, the installation location is convenient for operation and maintenance, the installation space is convenient for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	The protective ground wire , power wire, communication wire, and terminal resistor are connected correctly and securely.
3	The cable bundling complies with the routing requirements, is reasonably distributed, and is not damaged.
4	Unused ports are blocked.

6.2 Battery Power-up

Close the air switch.



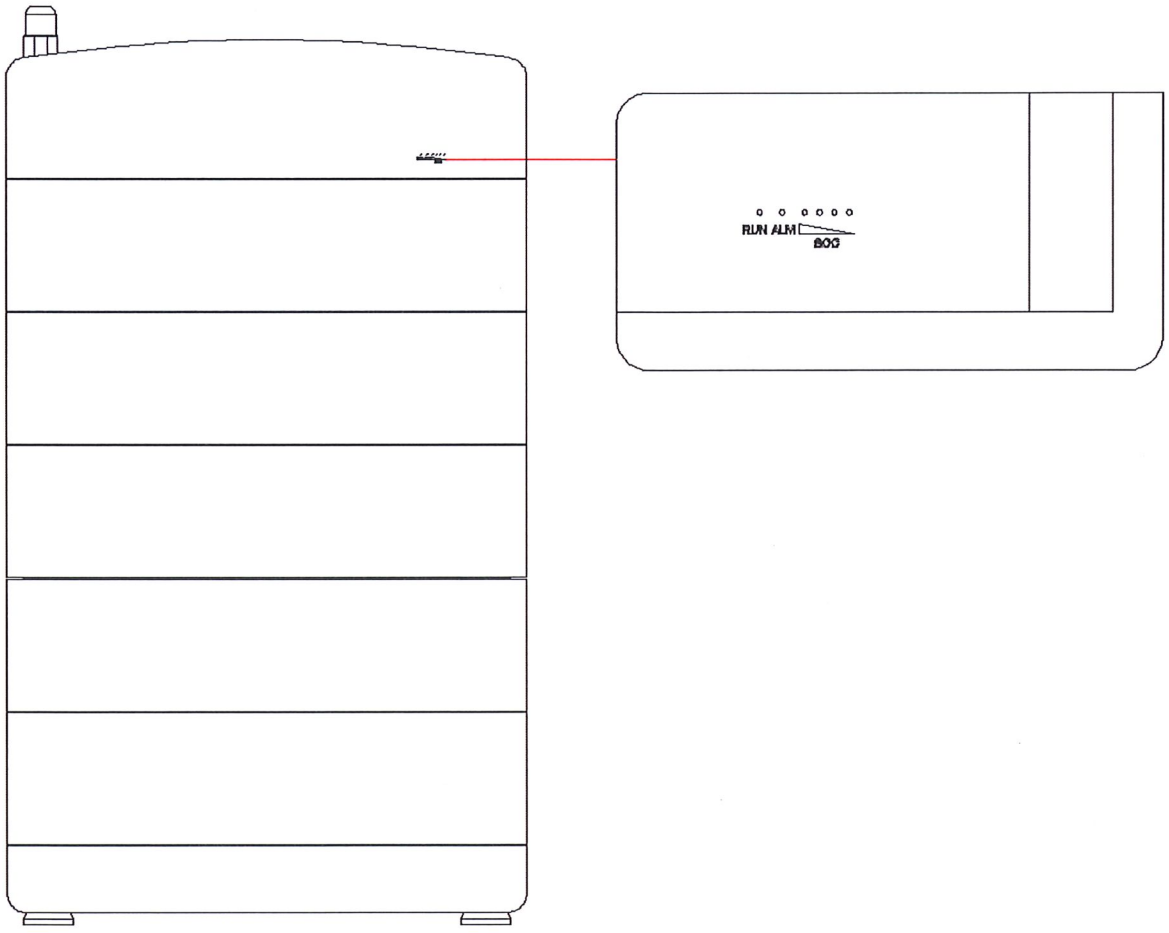
6.3 Setting battery parameters

the battery system and the inverter are successfully connected, select the correct battery option on the inverter :

Notice
If you select the wrong battery model, the message "Battery selection is abnormal" will appear. Please select the battery according to the correct configuration.

6.4 Indicator light status description

6.4.1 Indicator light diagram

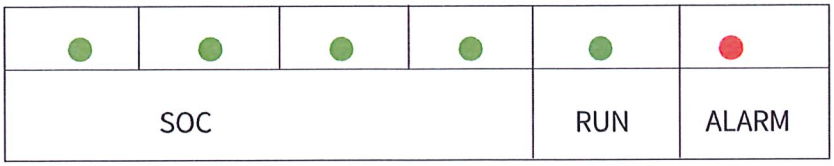


6.4.2 Indicator light function

It has 6 LED lights, 4 white LED lights are power indicators for the current battery system SOC, and 1 red LED

The lights are fault indications for alarm and protection, and 1 white LED light is for battery standby, charging, and discharging status.

1 running light, 1 warning light, 4 capacity indicator lights.



Capacity indicator

state		Charge				Discharge			
Capacity indicator light		L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●
The remaining capacity	0~25%	Off	Destroy	Destroy	Flash	Destroy	Destroy	Destroy	Always on
	25~50%	Destroy	Destroy	Flash	Always on	Destroy	Destroy	Always on	Always on
	50~75%	Destroy	Flash	Always on	Always on	Destroy	Always on	Always on	Always on
	⩾75%	Flash	Always on	Always on	Always on	Always on	Always on	Always on	Always on
Running lights		Long bright				Flash			

Operation

Flashing Description

Flashing mode	Bright	Destroy
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

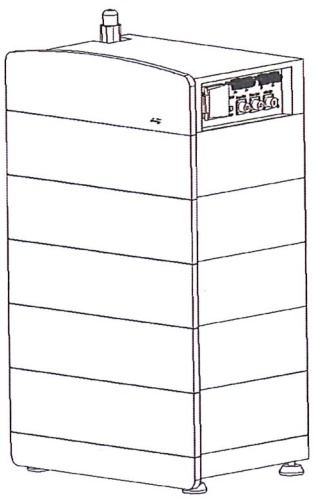
Status Indicator

system status	Operating status	ALM	RUN	SOC				Illustrate
		●	●	●	●	●	●	
Shutdown	Hibernation	Destroy	Destroy	Destroy	Destroy	Destroy	Destroy	Total destruction
Standby	normal	Destroy	Flash 1	Destroy	Destroy	Destroy	Destroy	standby mode
	normal	Destroy	Always on	According to the power indicator				Maximum LED flash 2
	Alerts	Destroy	Always on	According to the power indicator				Maximum LED flash 2
	Overvoltage protection	Destroy	Flash 1	Destroy	Destroy	Destroy	Destroy	
	Temperature and overcurrent protection	Always on	Flash 1	Destroy	Destroy	Destroy	Destroy	
Discharge	normal	Destroy	Flash 3	According to the power indicator				According to the constant light indicator
	Alerts	Destroy	Flash 3					
	Temperature , over current, short circuit, etc. protection	Always on	Flash 1	Destroy	Destroy	Destroy	Destroy	Stop discharging, when the mains is offline, it will be forced to sleep after 48 hours without any action
	Undervoltage protection	Destroy	Destroy	Destroy	Destroy	Destroy	Destroy	Stop discharge

Note: When the system has zero drift current, the battery system status will switch frequently. To prevent the indicator light from jumping, the indicator light display logic is ⩾ 0.6A for charging status and ⩽ -0.6A for discharging status. The actual battery system status is judged based on the zero drift current of 0.3A .

6.5 Battery power down

shutting down a battery system, follow these steps in order to prevent damage to the system:
Power off method:
1. Disconnect the air switch.
2. Confirm that the indicator light on the control box is off



07 Technical Parameters

Parameter	Specifications						
Module quantity	2S	3S	4S	5S	6S	7S	8S
Total capacity / total capacity	100Ah 96Ah						
Useable capacity / Available capacity	10.24	15.36	20.48	25.60	30.72	35.84	40.96
Total energy / total power range kWh	590*414						
Size (W * D) mm	515	675	835	995	1155	1315	1475
Size (H) mm	120	168	216	264	312	360	408
Weight kg Nominal voltageNominal voltage V	102.4	153.6	204.8	256.0	307.2	358.4	409.6

08 Maintenance

Maintenance Items	Maintenance cycle
Check whether the anti -dump bracket is installed loosely. If so, tighten the corresponding position.	Every 6 months
Check whether the shell is damaged. If so, please repaint it or contact the after-sales service center.	Every 6 months
Check whether the exposed wires are worn. If so, replace the corresponding cables or contact the after-sales service center.	Every 6 months
Check whether there is any debris accumulated around the battery. If there is any, please clean it up to avoid affecting the heat dissipation of the battery.	Every 6 months
Check for water or pests to avoid long-term intrusion into the battery.	Every 6 months

Warn

- If you find any problem that may affect the battery or energy storage inverter system, please contact after-sales personnel. Unauthorized disassembly is prohibited.
- If you find that the copper wire inside the conductive wire is exposed, do not touch it. There is a high voltage danger. Please contact after-sales personnel. Do not disassemble it without permission.
- If any other emergency occurs , please contact after-sales personnel immediately and operate under the guidance of after-sales personnel, or wait for after-sales personnel to come to the scene. operate .

09 Troubleshooting

The alarm levels are defined as follows:
★ Serious alarm: The system fails, causing some energy storage functions to malfunction and cannot be restored to normal, requiring power off and restart or maintenance.
★Minor alarm: The system is temporarily protected due to some short-term surge overshoot. The fault can be automatically eliminated after returning to the normal range. Some of them can be restarted by resetting the overload option without powering off for maintenance.
★Common fault alarm list

Serial number	Alarmitems	Alarmlevel	Causes	Suggestions
1	Cell voltage is too high (>3.7V)	Severe alarm	Battery overcharge	Stop battery charging
2	Cell voltage is too low (>2.3V)	Severe alarm	Battery overdischarge	Stop battery discharging
3	Total voltage is too high (>59.2V*module)	Severe alarm	Battery overcharge	Stop battery charging
4	Total voltage is too low (<36.4V*module)	Severe alarm	Battery overdischarge	Stop battery discharging
5	Battery discharge temperature is too high (>63°C)	Severe alarm	Battery discharge current is too large, ambient temperature is too high	Disconnect the charging and discharging circuit
6	Battery discharge temperature is too high (>63°C)	Severe alarm	Battery discharge current is too large, ambient temperature is too high	Disconnect the charging and discharging circuit
7	Battery discharge temperature is too low (<-20°C)	Minor alarm	Ambient temperature is too low	Disconnect the charging and discharging circuit, and restart the system after the ambient temperature rises
8	Battery charging temperature is too low (<0°C)	Minor alarm	Ambient temperature is too low	Disconnect the charging and discharging circuit, and restart the system after the ambient temperature rises
9	Insulation alarm (<100R/V)	Severe alarm	Poor system grounding/ internal circuit output short circuit	Power off the system, detect grounding impedance,
10	Communication alarm	Minor alarm	Poor communication circuit wiring	Detect positive and negative impedance
11	Total positive relay alarm	Severe alarm	Relay overcurrent adhesion	Check the continuity of \ the high-voltage box and PCS communication line