CUBE 70-50 71kWh Box-71KWh Outoor enegy stoage system

User Manual

Declaation: The ownership and interpretation rights of this document belong to VOLTA ENERGY DISTRIBUTORS (PTY) LTD. in South Africa. Without written permission from VOLTA ENERGY DISTRIBUTORS (PTY) LTD., it may not be copied or disclosed to third parties.

● This ocument is copyighted by VOLTA ENERGY DISTRIBUTORS (PTY) LTD.

Note

The products and services you purchase shall be subject to the commercial contract and terms of VOLTA ENERGY DISTRIBUTORS (PTY) LTD. All or part of the products and services described in this document may not be within the scope of your purchase or use. Unless otherwise agreed in the contract, VOLTA Energy makes no express or implied representations or warranties regarding the content of this document.

Due to product version upgrades or other reasons, the content of this document may be updated periodically. Unless otherwise agreed, this document is for use only and all statements, information, and recommendations in this document do not constitute any express or implied warranties.

VOLTA ENERGY DISTRIBUTORS (PTY) LTD.
☎ head-offce:012 880 1510
Website：http://voltaenergy.co.za/

Content

Note ---------- 02

Overview ---------- 04

01/Safety precautions ----- 05

- 1.1 Declaration
- 1.2 Personal Safety
- 1.3 General requirements
- 1.4 Battery leakage treatment measures
- 1.5 Fire handling measures
- 1.6 Battery recycling and treatment
- 1.7 Personnel Requirements
- 1.8 Electrical Safety
- 1.9 Grounding Requirements

02/Product introduction --- 09

- 2.1Function Introduction
- 2.2 Appearance Description
- 2.3 Label Description
- 2.4 Working mode
- 2.5 System Topology Diagram

03/Transportation requirements---17

04/Storage requirements -------18

05/Site Introduction ----------18

- 5.1 Site selection requirements
- 5.2 Space requirements

06/Installation preparation---19

- 6.1 Pre-installation inspection
- 6.2 Installation preparation

07/Installation of energy storage system - 20

- 7.1 Mechanical Installation
- 7.2 Electrical connections
- 7.3 External connections

08/System power on ---------- 30

- 8.1 Inspection before power on
- 8.2 Power on steps

09/Maintenance ---------- 31

- Overview
- 9.1 Fault hanling
- 9.2 Maintenance and upkeep
- 9.3 Daily maintenance

10/Quality guarantee --------- 34

- 10.1 Warranty period
- 10.2 Exemption from Liability

11/Note ---------- 35

Preface

Overview

This document mainly introduces the Magic Box-71KWh outdoor integrated energy storage system, including product introduction, application scenarios, system maintenance, and related technical data. Before installing and using the energy storage system, please carefully read this manual, understand safety information, and be familiar with the functions and characteristics of the energy storage system.

Applicable objects

This document is mainly applicable to the follo

wing engineers:

- Sales personnel
- System Engineer
- Installation and after-sales personnel

Symbol Description

The following symbols may appear in this article, and their meanings are as follows:

Symbol	Description
Danger	Indicates a high-risk hazard that, if not avoided, will result in death or serious injury.
Warming	Indicates a hazard with moderate risk that may lead to death or serious injury if not avoided.
Note	Indicates a hazard with a low level of risk that, if not avoi ded, may result in minor or moderate injury.
Notice	Used to transmit device or environmental safety warning information. If not avoided, it may lead to device damage, data loss, decreased device performance, or other unpredictable results.
Description	Additional explanation of key information in the main text. "Explanation" is not a safety warning information and does not involve personal, equipment, or environmental injury information.

01/Safety precautions

1.1 Declaration

When installing, operating, and maintaining equipment, it is necessary to first read this manual and follow all safety precautions marked on the equipment and in the manual. When opening the packaging of a new product for the first time, please check the product and packing list. If there is any damage or missing parts to the product, please contact your local dealer.

The "instructions", "precautions", "warnings", and "dangers" in the manual do not represent all safety precautions that should be followed, but only serve as supplements to all safety precautions. Our company does not assume any responsibility for any violation of general safety operation requirements or violation of safety standards for design, production, and use of equipment.

This equipment should be used in an environment that meets the design specificati ons, otherwise it may cause equipment failure, resulting in equipment functional abnormalities or component damage, personal safety accidents, property damage, etc., which are not within the scope of equipment quality assurance.

Local laws, regulations, and norms should be followed when installing, operating, and maintainin g equipment. All safety precautions stated in the manual are only supplementary to local laws, regulations, and norms.

Our company is not responsible for any of the following situations or their consequences:

- Equipment damage caused by earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, and force majeure; Not operating under the usage conditions specified in this manual;
- The installation and use environment does not comply with relevant international, national or regional standards;
- Unauthorized disassembly, modification of products or modification of software codes;
- Not following the operating instructions and safety warnings in the product and documentation;
- Damage caused by you or your commissioned third-party transportation;
- Damage caused by storage conditions not meeting product requirements;
- Exceeding the product's service life.

1.2 Personal safety

Danger

Live operation is strictly prohibited during the installation process. It is prohibited to install or remove cables with electricity. When the cable core comes into contact with the conductor, it may generate an arc, electric spark, or fire explosion, which can cause fire or personal injury.

Danger

When the equipment is electrified, non-standard and incorrect operation may cause fire, electric shock or explosion, resulting in personal injury or property damage.

Danger	It is strictly prohibited to wear conductive objects such as watches, bracelets, bracelets, rings, necklaces, etc. during the homework process to avoid electric shock and burns.
Danger	Special insulation tools must be used during the homework process to avoid electric shock injury or short circuit faults. The insulation withstand voltage level must meet local laws, regulations, standards, and specifications.
Alarm	Special protective equipment must be used during the homework process, such as wearing protective clothing, insulated shoes, go ggles, safety helmets, insulated gloves, etc.

1.3 General requirements

- It is strictly prohibited to install, use, and operate outdoor equipment and cables (including but not limited to handling equipment, operating equipment and cables, plugging and unplugging signal interfaces
- connected to outdoor, high-altitude operations, outdoor installation, etc.) in adverse weather conditions such as lightning, rain, snow, and level six strong winds.
- In the process of equipment operation, if any faults that may cause personal injury or equipment
- damage are found, the operation should be immediately terminated, reported to the person in charge, and effective protective measures should be taken;
- After installing the equipment, empty packaging materials in the equipment area, such as cartons, foam, plastics, cable ties, etc., shall be removed.
- It is prohibited to directly contact, use other conductors to contact, or indirectly contact the power supply equipment through damp objects. Before touching any conductor surface or terminal, the voltage at the contact point should be measured to confirm that there is no risk of electric shock.
- In case of fire, evacuate the building or equipment area and press the fire alarm bell, or call the fire alarm hotline. Under any circumstances, it is strictly prohibited to re-enter a burning building.
- Under no circumstances should the structure or installation sequence of the equipment be changed without the manufacturer's permission.
- Do not power on the device until it has been installed or confirmed by a professional.

1.4 Battery leakage treatment measures

- Ensure adequate ventilation. Remove all ignition sources.
- Quickly evacuate personnel to a safe area, away from the leakage area and in an upwind direction.
- Use personal protective equipment. Avoid inhaling vapors, smoke, gases, or dust.
- Take measures to prevent further leaks or spills while ensuring safety.
- Remove all ignition sources and use fire-resistant tools and riot equipment.
- When a leak occurs, avoid contact with the leaked liquid or gas. Electrolytes are corrosive and contact may cause skin irritation and chemical burns. If in contact with battery electro
- lyte, the following measures need to be taken.
- Inhalation: Evacuate contaminated areas, immediately transfer to fresh air, and maintain s mooth breathing; If breathing is difficult,
- Provide oxygen for inhalation; If the patient ingests or inhales this substance, mouth to mo uth artificial respiration is not allowed; If breathing stops. Perform cardiopulmonary resusci tation immediately; Seek medical assistance immediately.

- Skin contact: Immediately remove contaminated clothing, wash the skin contact area with plenty of water and soap, and seek medical assistance immediately.
- Eye contact: Immediately remove contaminated clothing, wash the skin contact area with plenty of water and soap, and seek medical assistance immediately.
- Accidental ingestion: Do not induce vomiting, do not feed anything from the mouth to unconscious individuals, seek medical assistance immediately.

1.5 Fire handling measures

- If a fire occurs, the system should be powered off while ensuring safety.
- If a small fire occurs and the flames do not spread to the high-voltage battery section, carbon dioxide or ABC dry powder fire extinguishers can be used to extinguish the fire.
- When thoroughly inspecting a fire, do not come into contact with any high-voltage compo nents and always use insulated tools for inspection.
- When extinguishing a fire, a breathing mask (compliant with MSHA/NIosh requirements or equivalent) should be worn and full body protective clothing should be worn. Prevent
- fire water from contaminating surface and groundwater systems.

⚠ Danger	When the battery temperature is too high, it can cause deformation, damage, electrolyte overflow, and leakage of toxic gases. Please do not approach to avoid skin irritation and chemical burns.

1.6 Battery recycling and processing

- Please dispose of waste batteries in accordance with local laws and regulations, and do not dispose of batteries as household waste.
- When the battery exceeds its service life and is unusable, please contact the battery
- recycling company for disposal.
- If the battery leaks or bulges, please contact technical support or battery recycling company for disposal. Avoid exposing scrapped batteries to high humidity or corrosive environments.
- Avoid exposing the battery to high temperatures or direct sunlight.

1.7 Personnel requirements

- The personnel responsible for installing and maintaining equipment must first undergo strict training, master the correct operating methods, understand various safety precautions and
- relevant standards of the country/region where they are located.
- Personnel involved in special scenarios such as electrical operations, high-altitude operations, and special equipment operations must have the special operation qualifications required by the local country/region.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain equipment.
- Only qualified professionals are allowed to dismantle safety facilities and repair equipment. The replacement of equipment or components (including software) must be completed by professional or authorized personnel.

Notice	Professional personnel: Familiar with equipment principles and structures, with training or experience in operating equipment, able to understand potential sources and levels of hazards during equipment installation, operation, and maintenance
Notice	Trained personnel: Personnel who have received appropriate technical and safety training and have necessary experience, can be aware of the dangers that may arise when performing a certain operation, and can take measures to minimize the danger to themselves or other personnel.

1.8 Electrical safety

⚠ Danger	Before making electrical connections, please ensure that the equipment is not damaged, otherwise it may cause electric shock or fire.
⚠ Danger	Irregular and incorrect operations may cause accidents such as fires or electric shocks.
⚠ Danger	During the homework process, it is necessary to prevent foreign objects from entering the interior of the equipment, otherwise it may cause equipment short circuit failure or damage, load power reduction or power loss, and personal injury.
⚠ Alarm	When installing equipment that needs to be grounded, the protective ground wire must be installed first; When dismantling equipment, the protective ground wire must be removed last.
⚠ Note	No cables are allowed to pass through the air inlet and outlet of the equipment.

1.9 Grounding requirements

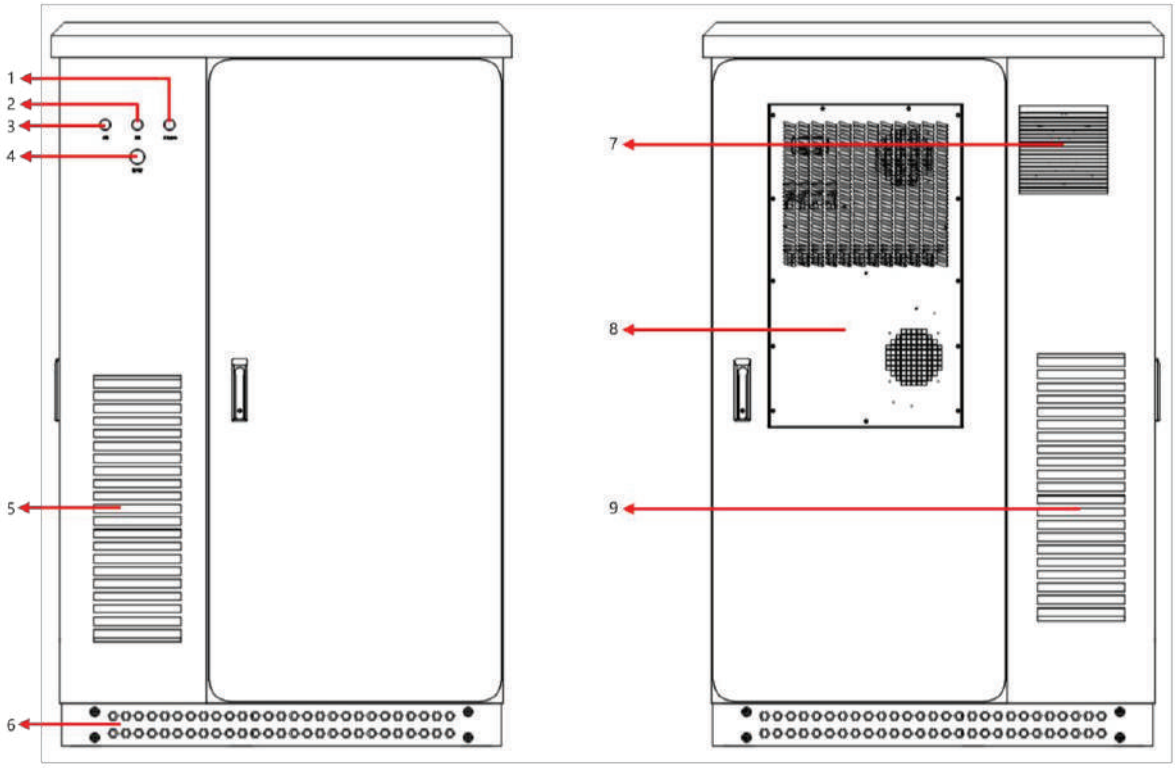
- When installing equipment that needs to be grounded, the protective ground wire must
- be installed first; When dismantling equipment, the protective ground wire must be removed last.
- The grounding impedance of the equipment should meet the requirements of local elect rical standards.
- It is prohibited to operate equipment without installing grounding conductors.

02/Product introduction

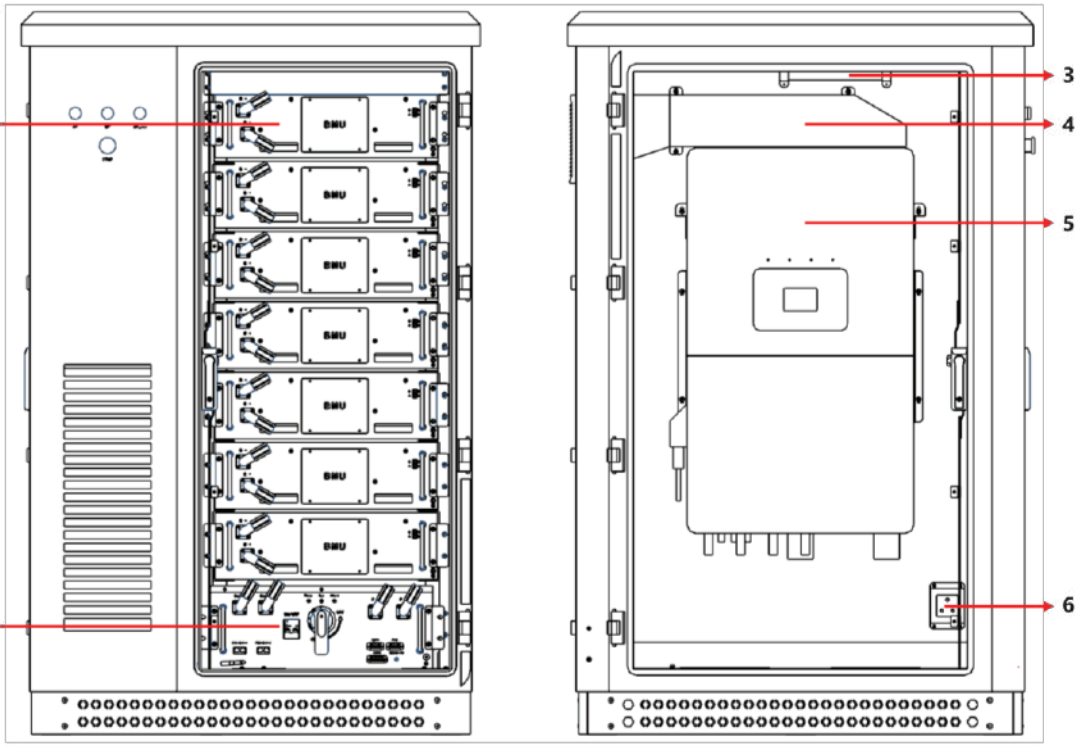
2.1 Function introduction

This product adopts advanced energy storage technology, which has efficient charging and discharging performance, can achieve fast energy conversion, and has multiple protection mechanisms, including overcharge protection, overdischarge protection, overcurrent protection, etc., to ensure the safe operation of the energy storage system. The product is widely used in the field of outdoor energy storage, including but not limited to storing the energy generated by solar power during the day for use at night or when the battery is low; Balancing the load of the power grid, peak shaving and valley filling, and improving the stability and reliability of the power grid.

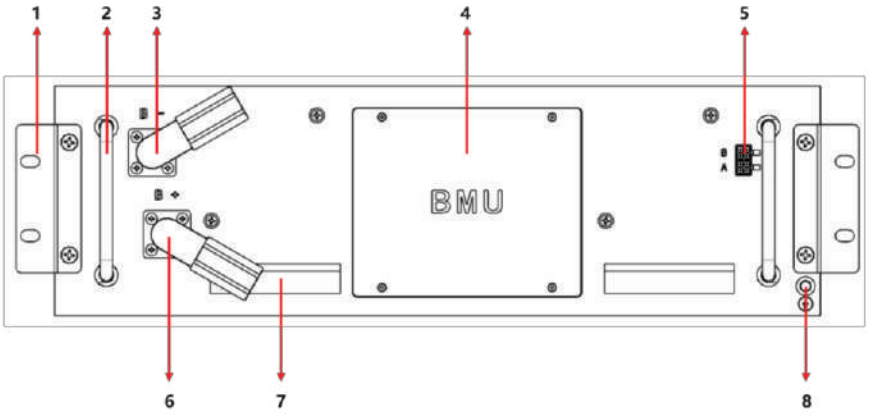
2.2 Appearance Description



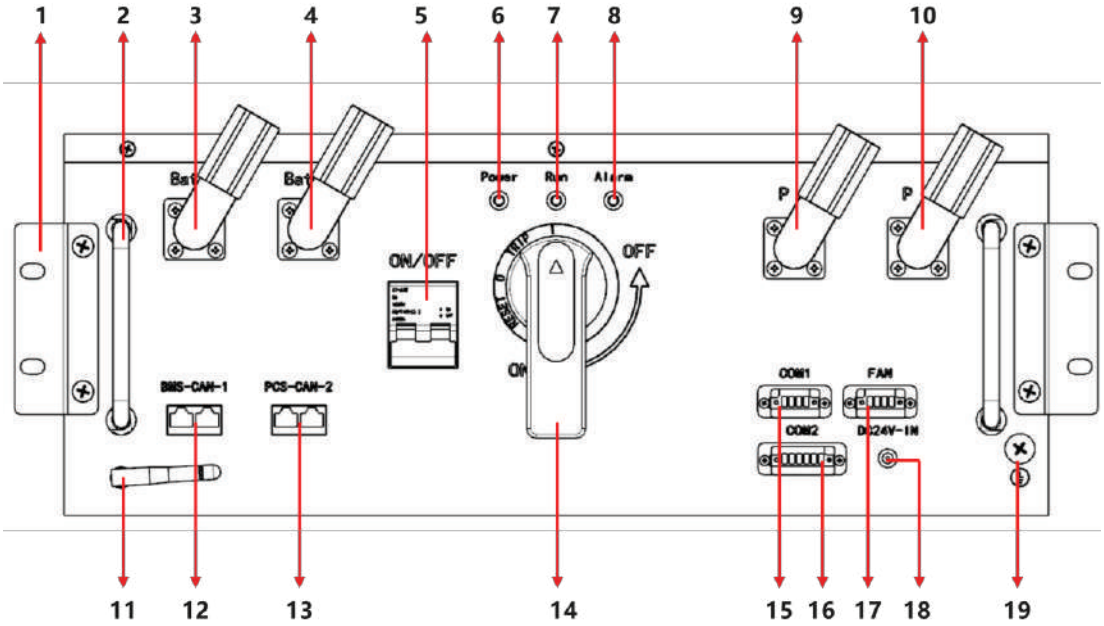
❶ Cabinet malfunction dicator light	❷ Cabinet DC indicator light	❸ Cabinet AC indicator light
❹ Emergency Stop Switch	❺ Front heat dissipation window of cabinet	❻ Bottom baffle
❼ PCS heat dissipation	❽ Air conditioner system	❾ Rear cooling window of cabinet



❶ Energy storage module box	❷ Energy storage PDU control box	❸ Hot aerosol
❹ PCS heat dissipation air duct	❺ PCS(Optional)	❻ Socket



❶ Mounted bracket of energy storage module box	❷ Energy storage module box handle	❸ Energy storage module box Bat-
❹ BMU Panel	❺ Fan/Communication Connection Port	❻ Energy storage module box Bat+
❼ Air outlet of energy storage module box	❽ Ground wire screw hole	/



❶ PDU control box mounted bracket	❷ PDU control box handle	❸ DC terminal Bat+
❹ DC terminal Bat-	❺ Miniature circuit breaker	❻ Power indicator light
❼ Running indicator lamp	❽ Fault indicator light	❾ Load side P-
❿ Load terminal P+	⓫ WIFI signal module	⓬ BMS communication port
⓭ PCS communication port	⓮ Load end circuit breaker	⓯ Air conditioning module communication port
⓰ Auxiliary Port	⓱ Fan output port	⓲ Repair power supply port
⓳ Ground wire screw hole	/	/

2.3 Label description

Box identification instructions:

Pictures	Name	Meaning
	QCidentification	This identification is the QC/PASSED identification.
	Grounding identification	This product must be grounded during installation and use.
	High voltage warning signs	This product is a high-voltage product, non-standard operation will cause serious consequences.
	Device operationwarning signs	This product is non removable and cannot be maintained.Non professionals from our company are not allowed to open it.
	Electrical operationwarning signs	This product is a high-voltage electrical product, and it needs to be operated by personnel with professional knowledge.
	Electric shock warningsigns	This product is a high-voltage live product and requires professional personnel to operate and maintain it.
	Prohibited signs	Indicates that the component is not removable and cannot be maintained
	Product identification	Indicates battery module parameter information

Nameplate pattern:

2.4 Working mode

The main function of the Magic Box outdoor all-in-one machine is to convert the high-voltage direct current generated by external photovoltaic modules into low-voltage direct current and store it in the battery through an inverter. It can also convert the direct current of the battery into alternating current through the inverter for use by the load or integration into the power grid.

All-in-one machine status light

On the high-voltage control box inside the cabinet, there are three LED lights, namely "PO WER", "RUN", and "ALARM", The LED display status and operation are detailed in the table below.

Status	Normal/Alarm/ Protection	Indicator light					Description
		Power	Run	Alarm			
Shutdown	Normal	●	●	●			ALL OFF
		OFF	OFF	OFF			
Power on	Normal	●	●	●			Turn on 2 lights
		ON	ON	OFF			
Chage	Normal	●	●	●			Turn on 2 lights
		ON	ON	OFF			
Over voltage protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
Under voltage protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
O ver current protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
Temperature protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			

On the external shell of the cabinet, there are three LED lights, namely "AC", "DC", and "ARM", The LED display status and operation are detailed in the table below.

Status	Normal/Alarm/ Protection	Indicator light					Description
		Power	Run	Alarm			
Shutdown	Normal	●	●	●			ALL OFF
		OFF	OFF	OFF			
AC connected	Normal	●	●	●			Turn on 2 lights
		ON	OFF	OFF			
DC connected	Normal	●	●	●			Turn on 2 lights
		OFF	ON	OFF			
AC-DC Connected	Normal	●	●	●			Turn on 2 lights
		ON	ON	OFF			
Charge /Discharge	Normal	●	●	●			Turn on 2 lights
		ON	ON	OFF			
Overvoltage protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
Undervoltage protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
Overcurrent protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			
Temperature protection	Alarm/Protection	●	●	●			Turn on 2 lights
		ON	OFF	ON			

Note1: Multiple battery modules+1 high-voltage box can be integrated into one battery system. The default rated number of series boxes for battery modules is 7. If the number exceeds or decreases by 7, the technical specifications must be determined with our company's technical personnel. If it is not confirmed with our technical personnel, our company will not assume any responsibility. Any increase or decrease in the series connection of battery modules must be accompanied by modifications to the relevant control parameters of the battery high-voltage box. The modifications must be confirmed with our company's technical personnel before they can be adjusted and used.

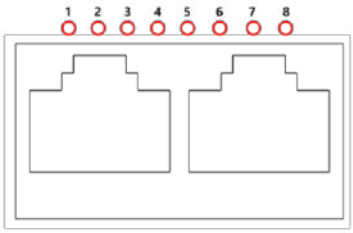
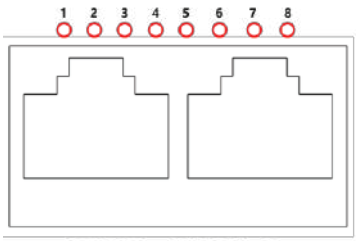
Note2: High salt spray (above C4), high temperature (ambient temperature>35℃), high humidity (humidity ≥ 95% or condensation), high ultraviolet (UV index ≥ 10), and special environmental areas, high altitude (above 1500 meters), customers must emphasize and point out. If not specified, regular products will be supplied by default, and our company will not be responsible for any losses caused by the above environment.

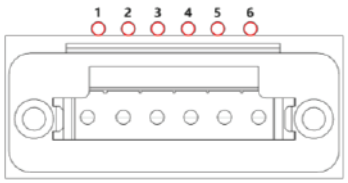
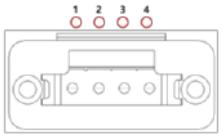
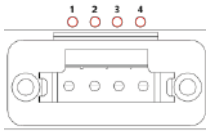
Note3 After low-temperature storage, after installation in an environment of ≤ -5 ℃, the indoor temperature should be heated to 25 ℃ -35 ℃ and kept for 3 days before charging and discharging.

Note4: In any case, the working current of the battery module shall not exceed 120A. Using it beyond the range may cause irreversible damage to the battery and pose safety risks. Any losses caused by this situation are not covered by the warranty,

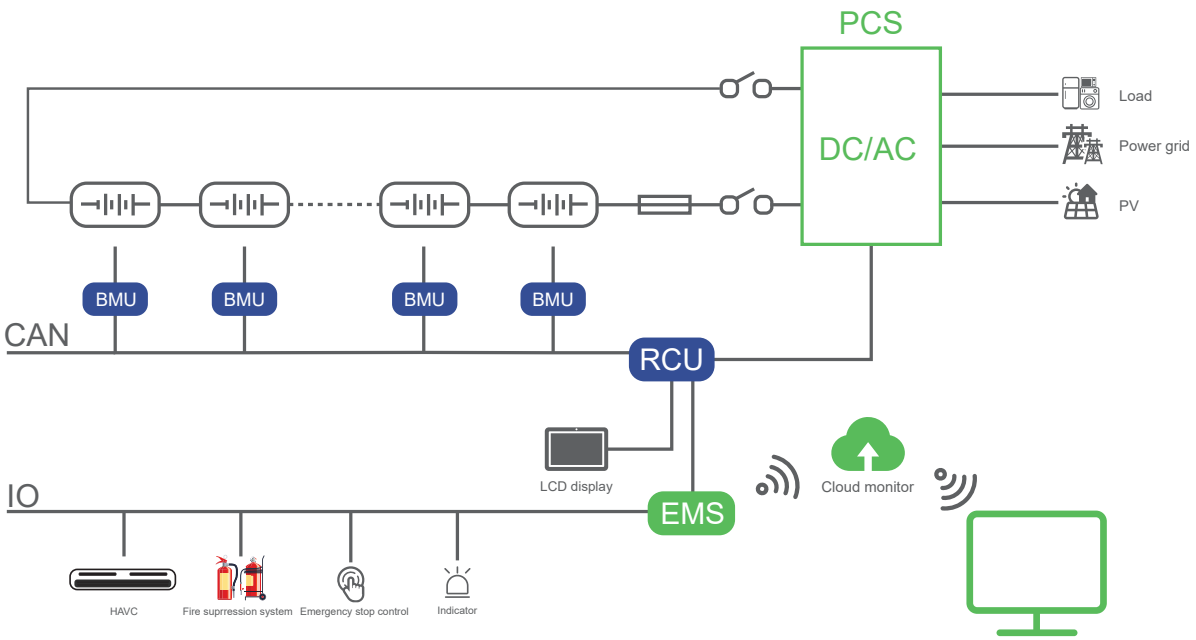
2.5Port definition

Used to identify connection endpoints and transmit data to services

Port	NO.	Definition	Function
 BMS-CAN-1	1	CAN0 H	BMS debugging port
	2	CAN0 L	
	3	-	-
	4	CAN1 H	PCS communication port
	5	CAN1 L	
	6	DO	Parallel detection
	7	-	-
	8	GND	Parallel detection
 PCS-CAN-2	1	-	
	2	-	
	3	-	-
	4	CAN1 H	PCS communication port
	5	CAN1 L	
	6	DI	Parallel detection
	7	-	-
	8	GND	Parallel detection

Port	NO.	Definition	Function
 COM2	1	485A1	Air conditioning communication port
	2	485B1	
	3	RUN+	Running indicator light+
	4	ERR+	Fault indicator light+
	5	GND-	Indicator light-
	6	-	-
 COM1	1	485A0	Display communication port
	2	485B0	
	3	Vo+	DC 24V+
	4	Vo-	DC 24V-
 FAN	1	FAN+	Fan output
	2	FAN-	
	3	BMU-H	Master-slave communication
	4	BMU-L	

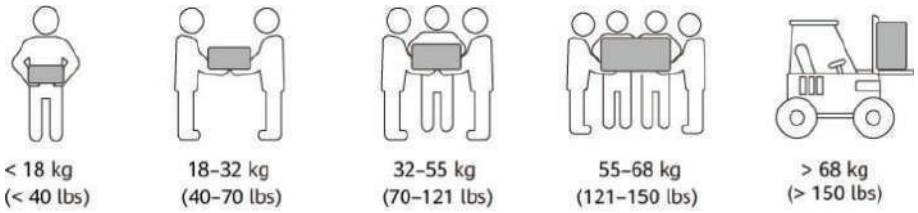
2.6System topology diagram



03/Transportation requirements

Danger	Rough loading and unloading are strictly prohibited, otherwise it may cause battery short circuit, damage (leakage, rupture, etc.), fire or explosion, etc
Alarm	During transportation, it is prohibited to use the terminals, bolts, or cables of the battery to avoid damaging the battery and causing personal injury.
Alarm	Batteries must be transported separately. For cabinets with batteries installed, transportation with batteries is prohibited. If transportation or movement of cabinets is required, the batteries must be removed first.

- When handling heavy objects, preparations should be made for load-bearing to avoid being crushed or twisted by heavy objects.



- When multiple people are handling heavy objects simultaneously, it is necessary to consider factors such as height, and make a reasonable personnel allocation to ensure a balanced distribution of equipment weight.
- When two or more people are moving heavy objects together, one person should command to lift or lower the equipment at the same time, ensuring a uniform pace.
- When handling equipment by hand, safety equipment such as protective gloves and safety shoes should be worn to prevent equipment from falling and causing injury.
- When moving or lifting the device, you should hold the device handle or support the bottom edge of the device, rather than the handle of the installed module inside the device.
- The handling of heavy objects must be balanced and stable with force; Move at a uniform and low speed; The positioning should be stable and slow, avoiding any impact or falling that may scratch the surface of the equipment or damage the components and cables of the equipment.
- When handling heavy objects, special attention should be paid to workbenches, slopes, stairs, and other areas that are prone to slipping. When handling heavy objects through thresholds, ensure that the width of the door is sufficient for the equipment to pass through, in order to prevent fingers from being hit or scratched.
- When using a forklift for transportation, the forklift must be forked in the middle position to prevent tipping over. Before moving, please fasten the equipment to the forklift with ropes; When moving, a dedicated person is required to take care of it.

04/Storage requirements

The battery should be stored within the temperature and humidity range specified in this product specification. If it has been installed and used for a long time (more than three months), it is recommended to charge the battery extra every three months. Before long-term storage (90-180 days), the battery SOC needs to be charged to 70-80% or above. If storage is ≤ 90 days, the battery SOC needs to be charged to 60-70% or above. In addition, when storing batteries, it is necessary to ensure that the circuit breaker and air switch are both closed.

Notices If the battery is not stored for a long time according to the above instructions, the cycle life of the battery cells will correspondingly decrease.

- Store in a clean and dry place, and prevent the erosion of dust and water vapor.
- It is prohibited to suffer from rainwater or water erosion on the ground. Do not tilt or invert storage.
- When the storage time of devices other than battery packs is two years or more, they must be inspected and tested by professional personnel before they can be stored

05/Site requirements

5.1 Site selection requirements

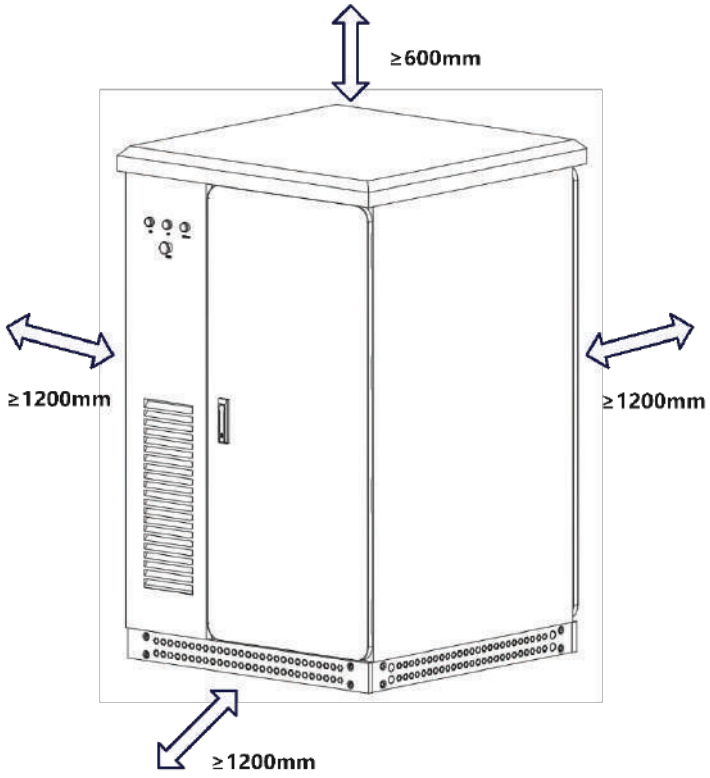
Notices The following site selection requirements should always comply with relevant regulations and standards, as well as local regulatory requirements.

The site selection requirements for energy storage systems are as follows:

- Energy storage systems are suitable for indoor scenarios as well as outdoor energy storage.
- The installation level should be higher than the historical highest water level in the area and at least 300mm above the horizontal ground. The installation location should not be in low-lying areas.
- The installation site and surrounding area of energy storage systems or power stations should be free of vegetation and flammable plants to prevent wildfires caused by high temperatures in summer from causing energy storage system fires.

5.2 Space requirements

Notices The following figure shows the minimum space requirements for installation, and the equipment space requirements also need to meet the site selection requirements.



06/Installation preparation

6.1 Pre-installation inspection

Check the wooden box

Before opening the outer packaging of the wooden box, please check for visible damage, such as holes, cracks, or other signs of internal damage, and verify the model. If there are any packaging abnormalities or model discrepancies, please do not open them and contact your dealer as soon as possible

It is recommended to remove the outer packaging within 24 hours before preparing to install the equipment.

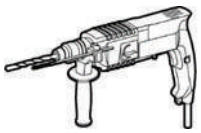
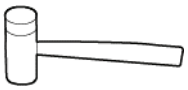
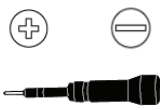
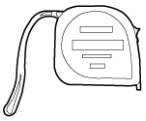
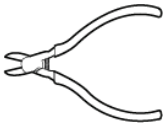
Check deliverables

After unpacking the wooden box, please check if the delivery is complete and free from any obvious external damage. If any ite ms are missing or damaged, please contact your dealer.

Description Please refer to the "Packing List" inside the packaging box for the quan tity of delivered items to be shipped with the box

6.2Preparation of installation tools

Description The illustrated tools are for reference only, please refer to the actual product.

Tools and instruments			
 Impact drill (drill bit set)	Insulation torque socket wrench	 Rubber hammer	 Cross/straight insulated t orque screwdriver
Multimeter	 Steel tape measure	Horizontal ruler	Cable tie
T-shaped hook	 Diagonal pliers	Manual Forklift	Electric forklift

Personal protective tools			
Insulated gloves	Protective gloves	Goggles	Dust mask
Insulated shoes	Reflective Vest	Safety helmet	/

07/Installation of energy storage system

7.1 Mechanical installation

Danger

This system is a high-pressure energy storage equipment and belongs to dangerous goods. Non professionals and improper operation and use may cause serious consequences such as electric shock, combustion, and explosion. The installation and maintenance of the battery system must be operated by professional technicians, and relevant safety rules must be strictly followed during use

Step1

Count the components, remove the energy storage battery module Packaging of PDU control box and energy storage sheet metal cabinet, and packaging of accessories, counting of structural accessories

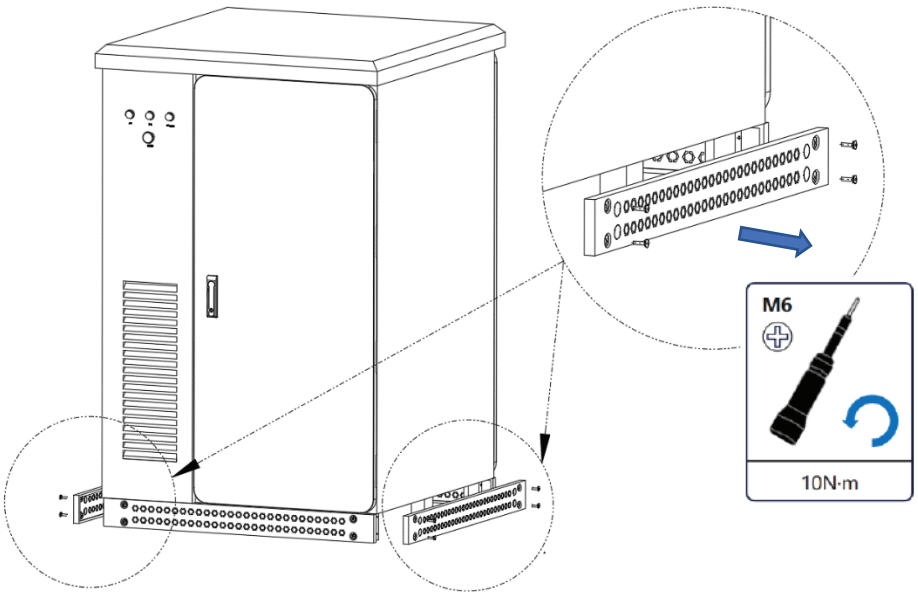
Parts	Qty	Note
Energy storage sheet metal cabinet	1	See list
Energy storage module box	7	See list
Energy storage PDU control box	1	See list

Step2

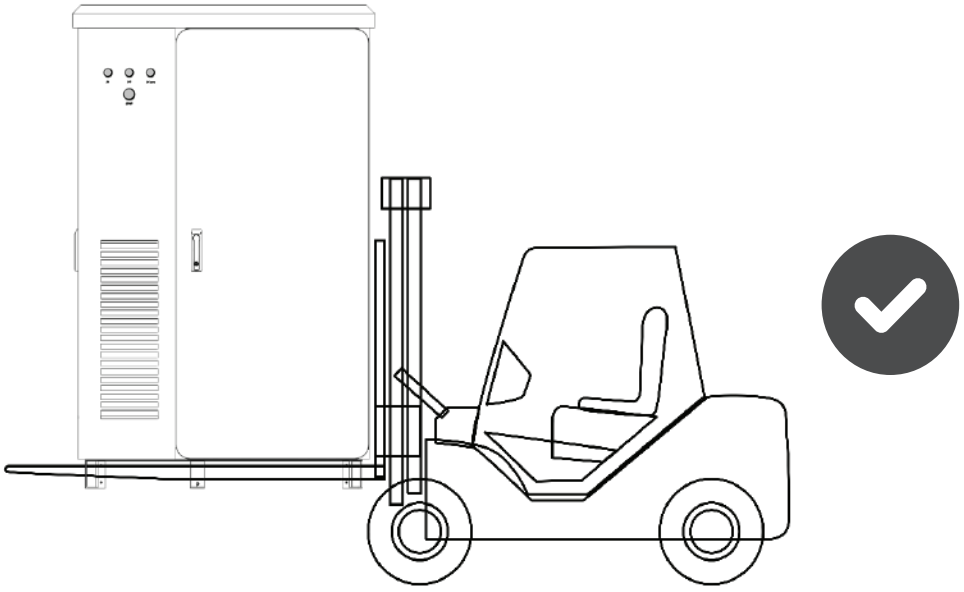
Install energy storage battery modules, high-voltage control boxes, and rack components;

1. Remove the surrounding bottom plates of the energy storage sheet metal cabinet and transport the cabinet to the installation position using an electric forklift.
2. Mark the fixed holes at the bottom of the cabinet and use an impact drill (M10 drill bit) to drill the ground to a depth of about 100mm to expand it
   Fix the screw holes, and finally use M10 * 80 expansion screws to fix the frame base to the ground. (Recommended torque 44 ± 0.5Nm)
3. Install the air conditioner into the cabinet and secure it to the cabinet using M6 * 12 hexagonal cylindrical head combination screws.

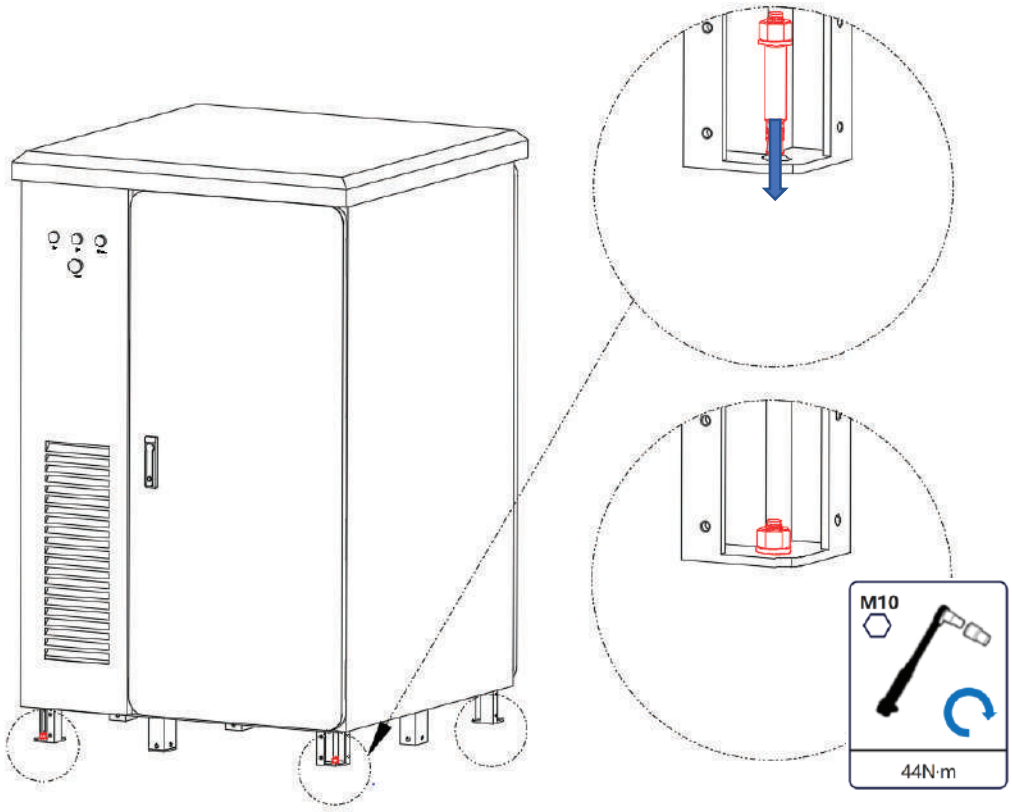
A Remove the surrounding bottom plate of the sheet metal cabinet



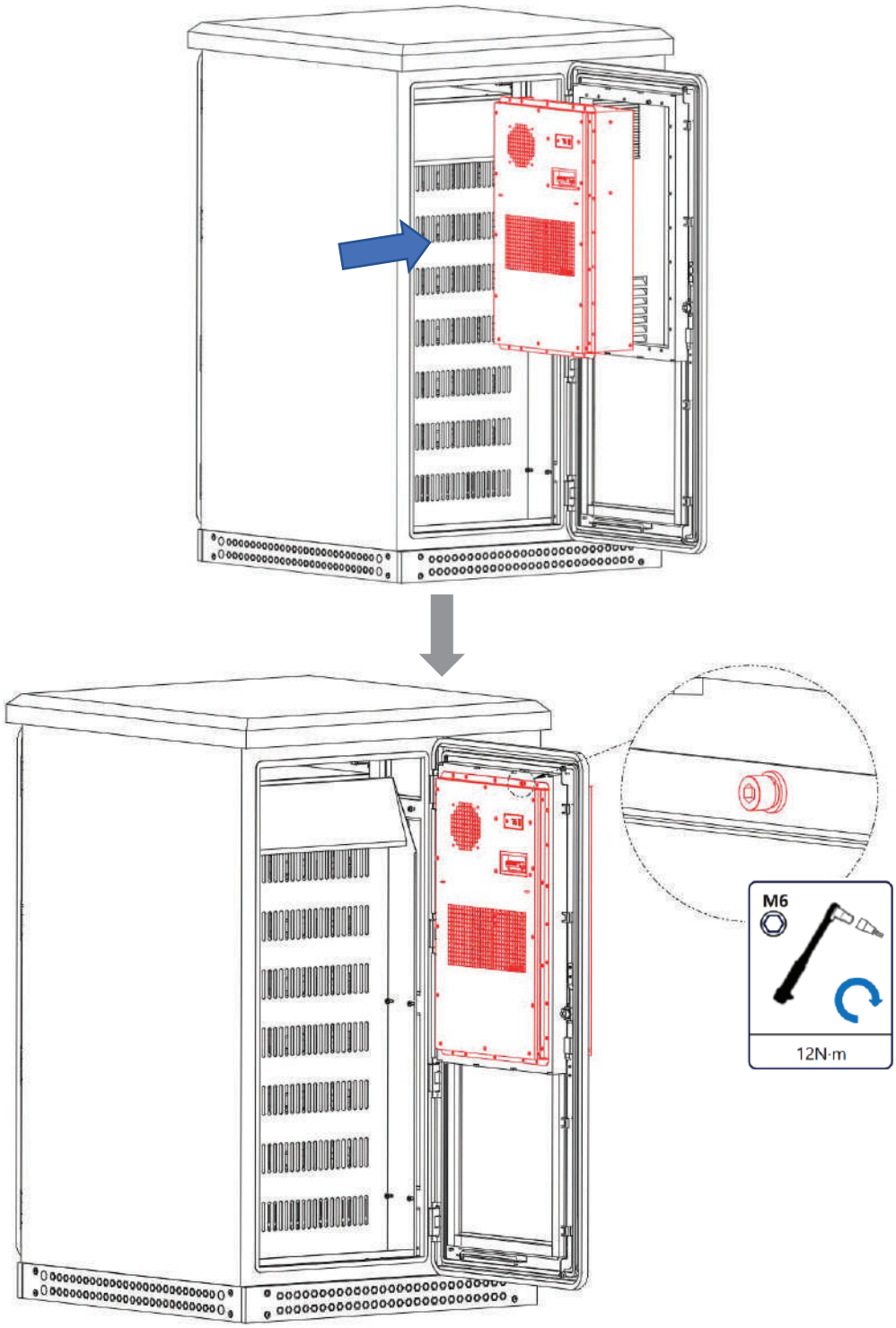
B.Transportation energy storage cabinet



B-1 Install fixed energy storage cabinets

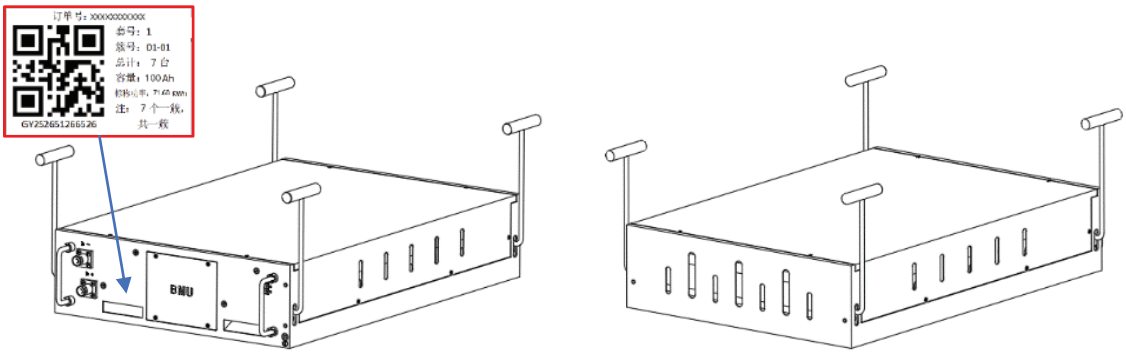


B-2 Installing the air conditioning system

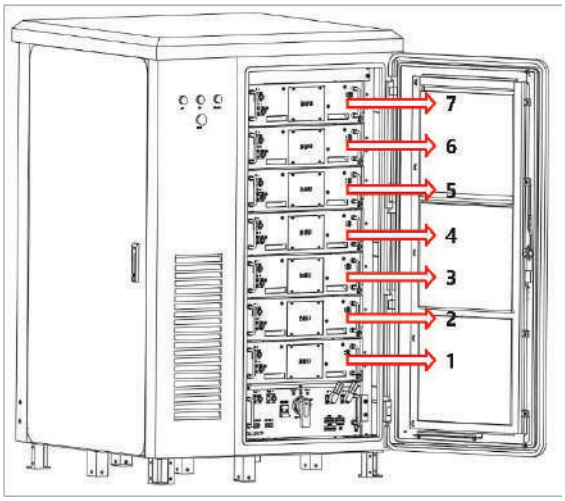


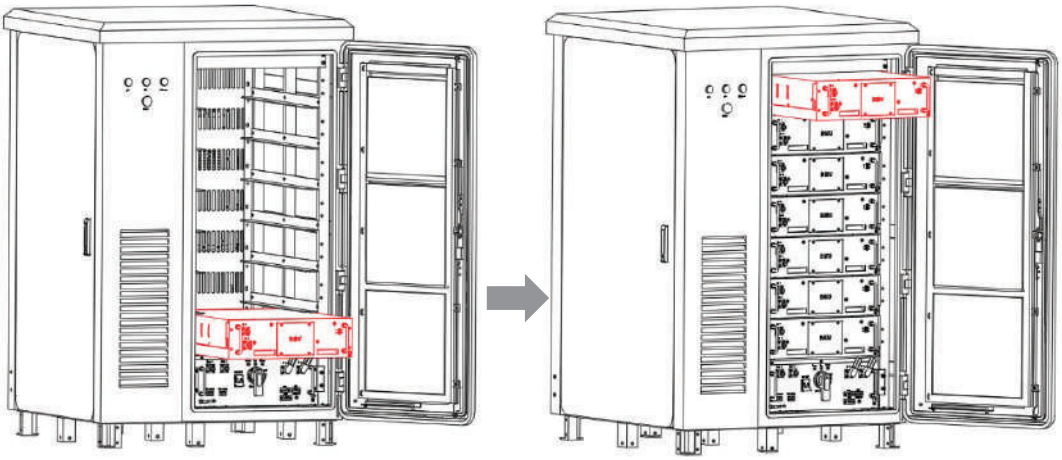
3.Lift out the unpacked modules using a T-shaped hook and install them in the cabinet from bottom to top.

C Select the energy storage module to prepare for installation



C-1 Install the energy storage modules in the order shown in the following diagram

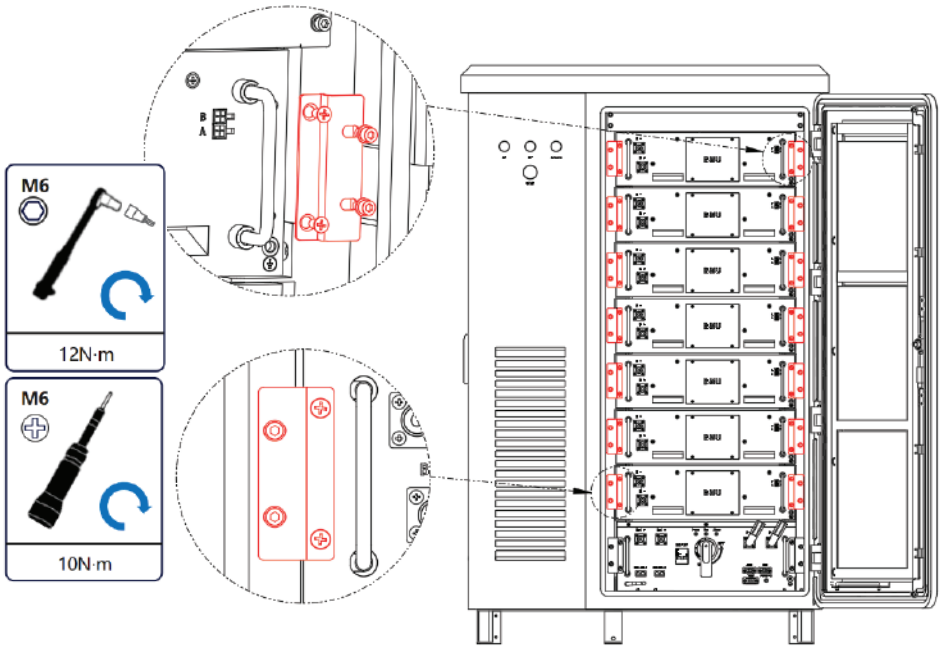




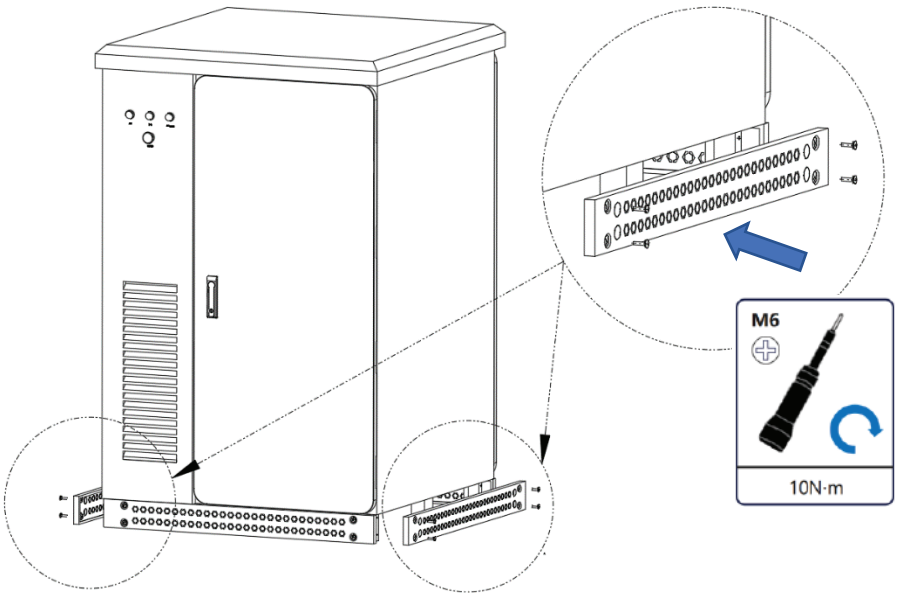
4. Use the hanging ears of the energy storage module box to lock and fix the box onto the cabinet in sequence.

5. Finally, install and lock the cabinet bottom plate securely.

D Install the mounted bracket of the energy storage module box



D-1 Install the cabinet bottom plate

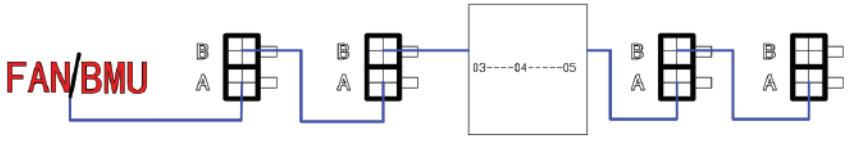


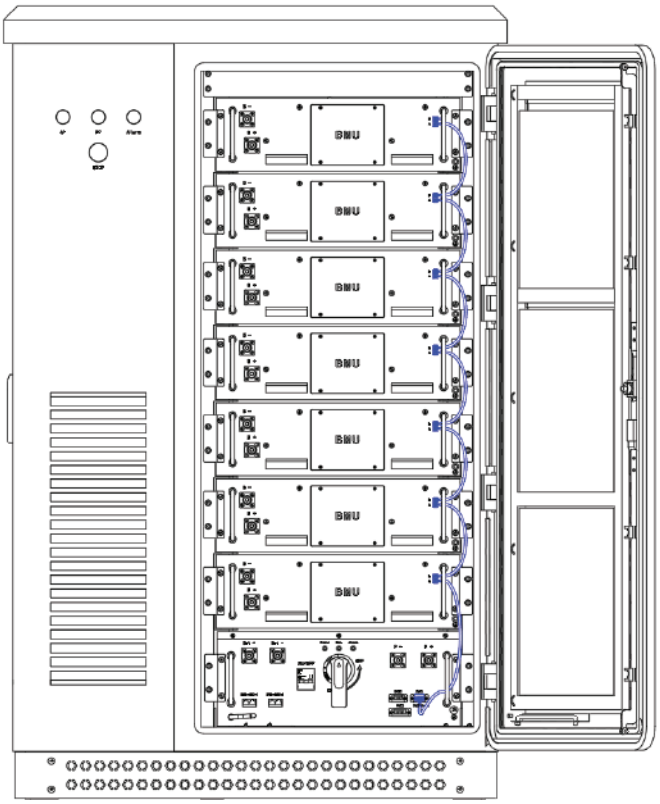
7.2 Electrical connections

Count the connecting components and differentiate them according to cable labels

Parts	Qty	Note
Energy storage master-slave power cable Bat+	1	See list
Energy storage master-slave power cable Bat-	1	See list
Energy storage series power cable	6	See list
Master slave communication cable of energy storage system	1	See list
Energy storage communication /fan connection cable	6	See list

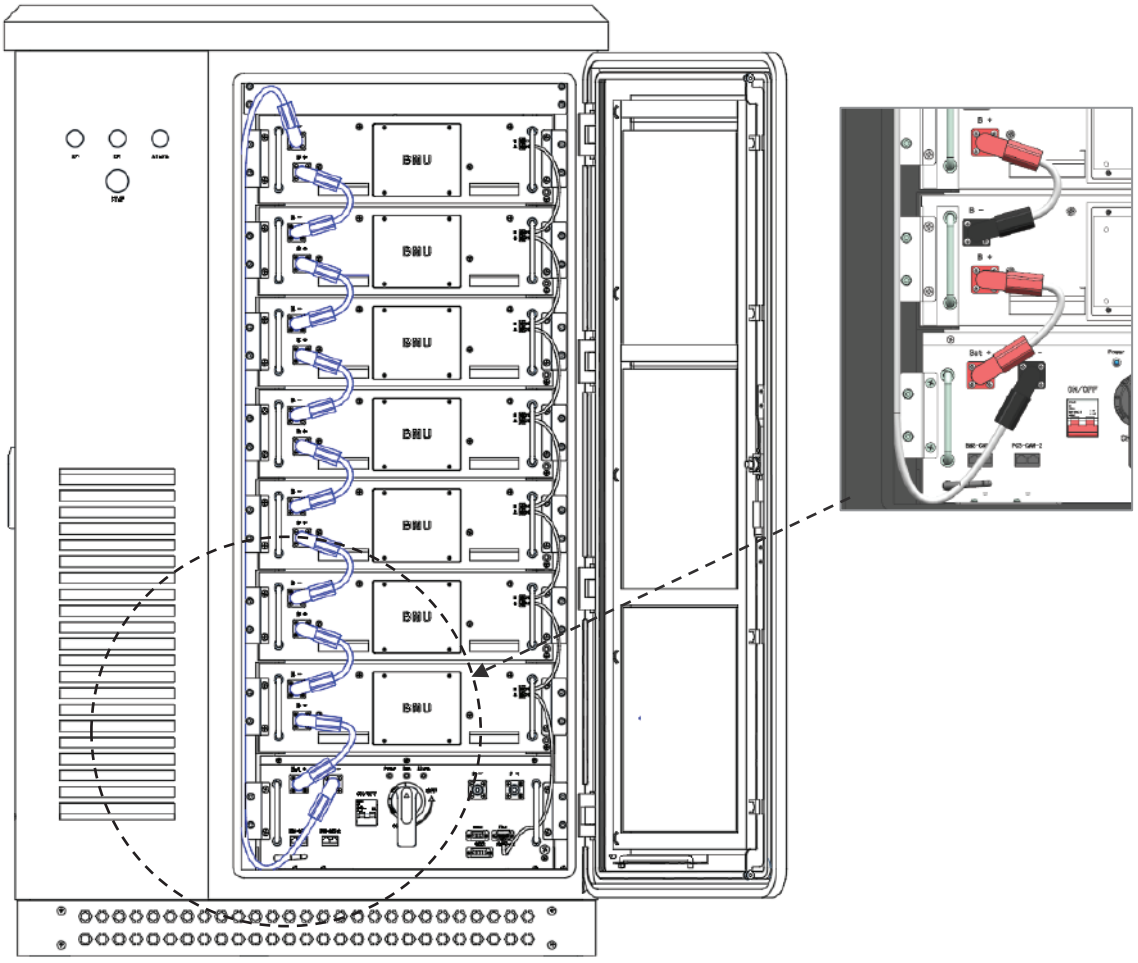
1.Connect the connectors on each box according to the line markings on the cable according to the fan/communication connection diagram.





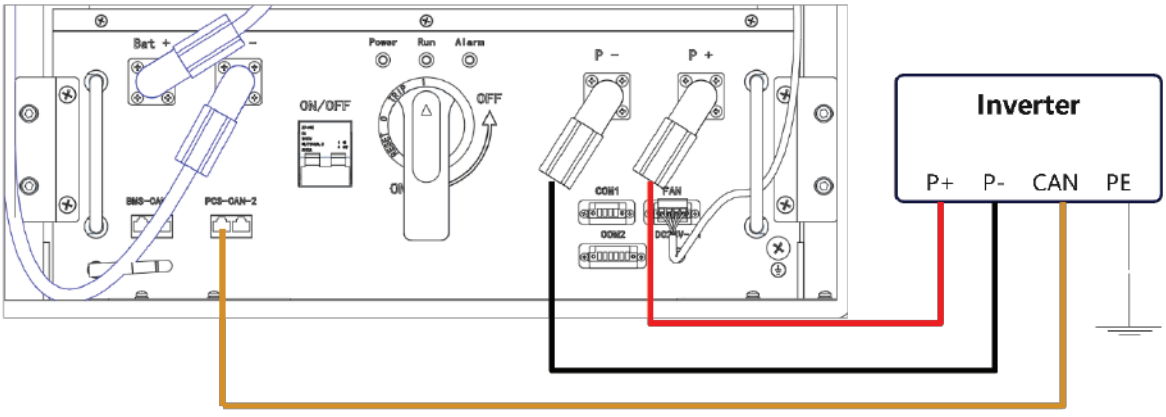
2. Install the energy storage series power cable on the module connector according to the battery cluster layout diagram, and confirm that the power cable aviation plug terminal is securely connected to the module connector.
3. After installation, set the multi-meter to the V DC position, connect the negative probe to the negative connector of the high-voltage box, and connect the positive probe to the positive connector of the high-voltage box. Check if the total voltage is correct.

Description: Check polarity by color: distinguish between the black and orange ends of the power cable, the orange end corresponds to the orange connector, the black end corresponds to the black connector, the orange position is the positive pole of the battery, and the black position is the negative pole of the battery.

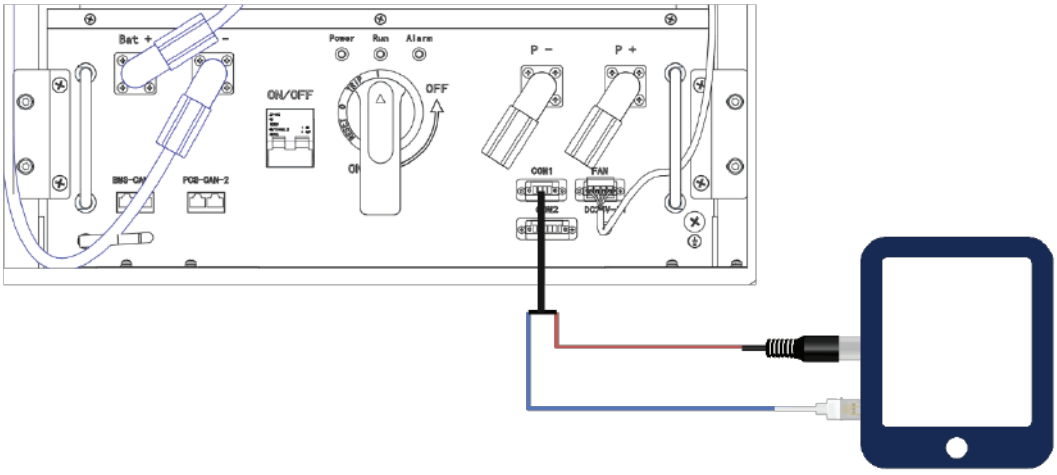


7.2 Other Connection

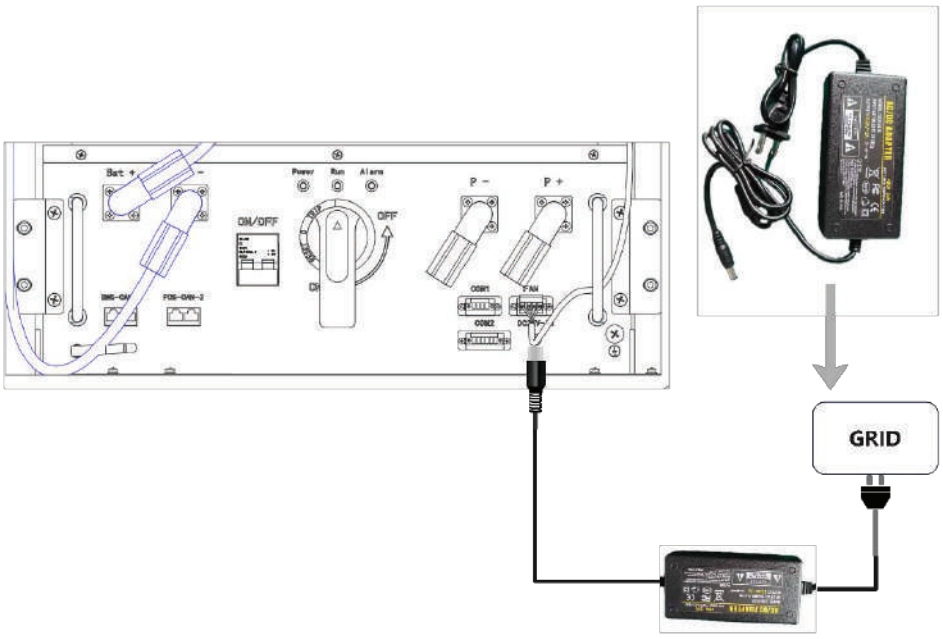
PCS Connection



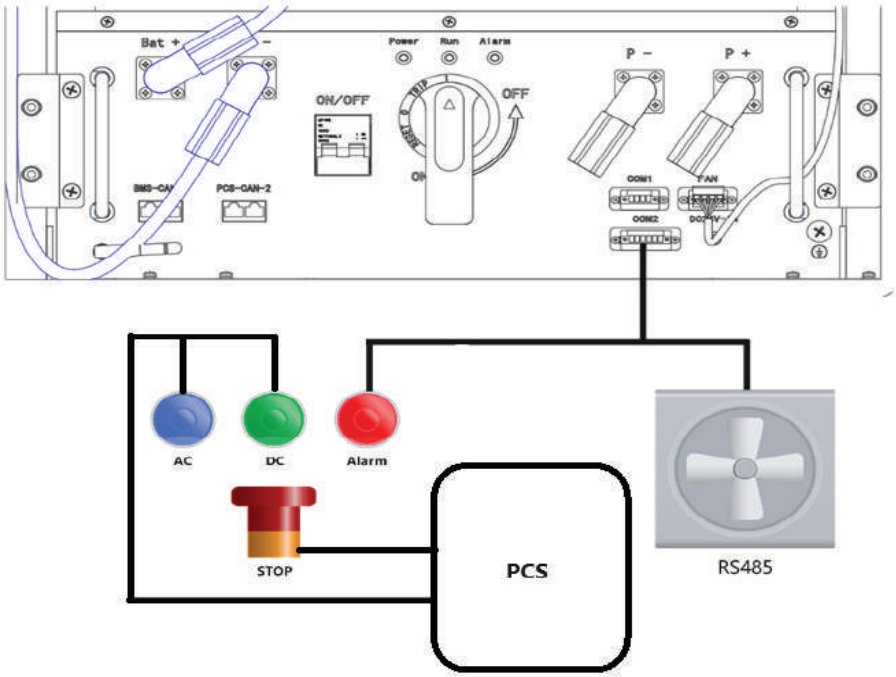
Display screen connection (optional)



Maintenance port connection



Indicator light/air conditioning control connection



08/System power on

8.1 Inspection before power on

No	Inspection items	Acceptance criteria
1	**Equipment appearance**	The appearance of the equipment is intact, without damage, rust, or paint peeling. If there is paint peeling, please have professional personnel carry out repainting operations.
2	**Cable appearance**	The cable protective layer is intact without obvious damage. The conduit cables and hoses are intact
3	**Cable connection**	The cable connection position is the same as the design. The terminal production meets the standards and the connection is firm and reliable.
4	**Cable wiring**	The wiring meets the principle of separating strong and weak electricity. The cables are neat and aesthetically pleasing. Cut the wire buckle joints evenly without any exposed spikes or other phenomena. Leave a margin at the turning as required and do not tighten it. The wiring should be straight and smooth, and the cables inside the cabinet should avoid crossing. The labels at both ends of each cable are clear and consistent in orientation.
5	**Switch**	The external electrical connection switch is in the OFF state. The high-voltage box switch is in the OFF state.
6	**Sealing of wire holes**	• The cable through hole sealing has been completed (for cabinet type use)
7	**Foreign body**	Remove all foreign objects between clusters, such as tools, installation leftover materials, etc.
8	**Cabinet grounding**	• The grounding conductor is reliably connected to the grounding screw hole of the cluster.

8.2 Power on steps

Step	Operation item	Note
1	Load end circuit breaker open	Priority should be given to starting the pre charging circuit to protect electronic components
2	Miniature circuit breaker open	Power on the main control system
3		

Danger Please wear insulated gloves and use insulated tools to avoid electric s hock injuries or short circuit faults.

⚠ Note	During the power on process, the battery should be observed while being powered on. If any abnormal phenomena are found, the battery should be immediately powered off, and the cause should be identified and resolved before continuing to power on.
⚠ Note	Low battery state storage may cause over discharge and damage to the battery. Please replenish the battery in a timely manner.
Notice	After the assembly of the energy storage system, if it does not operate for more than six months, it must be inspected and tested by professional personnel before it can be put into operation.

09/Maintenance

Overview

The common problems and solutions of the product are detailed in the following text. This product is a high-voltage system, and maintenance and repair must be carried out by qualified and authorized personnel. When contacting dealers for technical support, please provide relevant product information so that our company can provide better services.

NO.	Information
1	Equipment name, specifications, serial number
2	Product usage conditions
3	Fault description
4	On site pictures/videos (if conditions permit)

9.1 Fault handling

NO.	Problem description	Possible reasons	Solution
1	The battery cannot be turned on	Battery undervoltage	Put the battery into a charging state until the undervoltage protection is released
		Battery main circuit disconnected	Check the connection status of the battery busbar/cable/fuse
2	No output after turning on the battery	Battery malfunction	View fault information and seek manufacturer resolution
		Pre-charge failed	Restart the battery for pre-charging action
3	SOC display inaccurate	Long term low load power	The battery needs to undergo a complete charge and discharge cycle
4	Fan not starting	Not connected to power supply	Please refer to Section 13 of this manual for details
		Single fan shutdown	Fan malfunction/poor power interface contact
5	Communication abnormality between master and slave control	Poor contact of communication cables	Check that the communication cable/connection port is securely plugged in
		Communication cable connection position error	The correct connection method is detailed in the product installation guide
6	Battery unable to communicate with inverter	Battery and inverter communication cable connection	1. Plug and unplug the communication cable and restart the computer 2. Program upgrade
Note: Once an unresolved fault is detected through troubleshooting, please turn off the battery pack according to the power-off steps before maintenance to avoid further excessive discharge of the system due to self consumption.			

9.2 Maintenance and upkeep

This product has an IP55 protection level and is suitable for outdoor use. However, due to the complex outdoor environment, such as high and low temperatures, humidity, dryness, vibration, dust, rain, sunlight, or long-term aging of equipment, all factors will have an impact on the product, reducing its performance and lifespan. Therefore, regular maintenance and replacement of components on equipment can help maintain normal operation and extend its service life.

- Product maintenance and upkeep must strictly follow the following guidelines to ensure the safety of operators and customer property.
- During maintenance or repair, please disconnect all external connections and connections to the internal power supply of the equipment. After disconnecting the device from the external power supply, use a multimeter to measure the voltage and ensure that the device is completely powered off.
- Before homework, please make maintenance and repair notices near and on the product to remind that the equipment is being maintained or repaired,
- Stay away from the equipment and avoid others operating the equipment or powering it on without authorization during maintenance.
- Before starting the homework, please do necessary grounding work and use insulation materials to insulate any items that may be conductive or live during operation.

- If the product is located outdoors, protective components need to be opened or removed during maintenance and repair. Therefore, please carry out all maintenance work in a clear and dry weather without wind or sand.
- During maintenance and repair, operators should wear insulation tools throughout the entire process and ensure proper insulation protection.
- Part of the maintenance work requires the removal of the protective components inside the machine. Please keep the disassembled screws and components safe and restore all removed protective components to their original state after the maintenance work is completed, ensuring that all screws are securely fastened.
- In some areas with harsh conditions, the maintenance cycle may be appropriately shortened.

9.3 Daily maintenance

Item	Method	Interval
system state	1. Check if there is any abnormal noise during the operation of the product 2. Check if there is any damage or deformation to the internal equipment of the cabinet 3. Check if the internal operating temperature of the cabinet is abnormal	Container once a year Indoor once every six months
Internal environment	1. Check if there is rust and oxidation on the metal components inside the cabinet 2. Check if there are any foreign objects or blockages in the internal air ducts of the cabinet	Container once every three years Once every two years indoors
cable	1. Check if the cable shielding insulation layer is intact 2. Check if the grounding cable of the cabinet is intact	Once every six months
Outside the cabinet	1. Check if there are flammable materials on the top of the cabinet 2. Check if there is any rust on the fixed sheet metal at the bottom of the cabinet 3. Check whether the cabinet sheet metal has discoloration, paint peeling, and other conditions	Once a year
Cabinet components	1. Check if there is rust on the cabinet sheet metal 2. Check if the cabinet door chains and switches are flexible 3. Check if the sealing strip of the cabinet is intact without damage or aging	Once a year
Equipment	1. Check the accumulation of dust on the air conditionin g radiator 2. Check if the cooling fan is operating properly, without damage or abnormal noise	Container once a year Indoor once every six months
Connect	1. Check if the sealing of the inlet and outlet holes of the cabinet is good 2. Check if the fixing torque of the busbar cable and copper bar screws is correct 3. Check if the connecting cables of the cabinet are intact, undamaged, and free of aging	Container once a year Indoor once every six months
Grounding and potential	1. Check if the grounding resistance value is less than 4Ω 2. Check if the equipotential connection inside the cabinet is c orrect	Once a year
Clean	1. Check the cleanliness inside the cabinet for any dirt or foreign objects 2. Check if there is any water accumulation, condensation, or other issues inside the cabinet 3. Check if there are any foreign objects or blockages in the cooling holes of the equipment	Half a year/time

System operation status	1. Check if all parameters (such as voltage, current, temperature, etc.) are normal when the system is running. 2. Check if the cabinet switch buttons (cabinet door switches,circuit breakers, and air switches) are flexible and have no abnormalities.	Half a year/time
Charging and discharging	1. It is recommended to fully charge and discharge the battery at regular intervals, calibrate the battery SOC, and improve the accuracy of the battery SOC	Half a year/time
Communication cables	1. Check if there are any abnormal conditions such as damage or looseness in the communication cable. 2. Check for aging of communication cables.	Half a year/time
Screw	1. Check if there are any screws falling off or other situations in the cabinet 2. Check if the torque of the cabinet screws meets the requirements Check if the power cable connection is loose	Half a year/time
Display	1. Check operating parameters (such as voltage SOC) 2. Check if the time displayed on the LCD screen is accurate	Half a year/time
Identification	1. Check all equipment identification and warning signs in the cabinet. If they are found to be blurry or damaged, please replace them in a timely manner.	Half a year/time

10/Quality guarantee

10.1 Warranty period

Within five years from the date of shipment, if any damage is caused by defects in the manufa cturing process rather than misuse by the user, our company will ensure repair or replacement provided that the product purchase invoice is provided and the product trademark is clear.

10.2 Exemption fr om liability

When the following situations occur, our company has the right to terminate the warranty agreement.

- The product has exceeded the warranty period.
- The product should be installed by non professionals.
- Not strictly following the storage requirements in the data for storage.
- The operating environment exceeds the data requirements.
- Unauthorized disassembly of products without company permission.
- Unauthorized modification, application, or exchange of product labels without the company's permission. Product damage caused by uncontrollable factors, such as natural disasters, theft, etc.

- ◎ Factors such as falls and collisions occur during product installation and transportation.
- ◎ Installation steps and precautions beyond those specified in international standards or materials.
- ◎ Exceeding the precautions and safety statements specified in international standards or materials.

11/Note

Any other terms not included in this product specification shall be determined by mutual agreement.

Note: Our company reserves the right to interpret and revise this document

VOLTA ENERGY DISTRIBUTORS (PTY) LTD

VOLTA head-office contact 012 880 1510

http://voltaenergy.co.za/