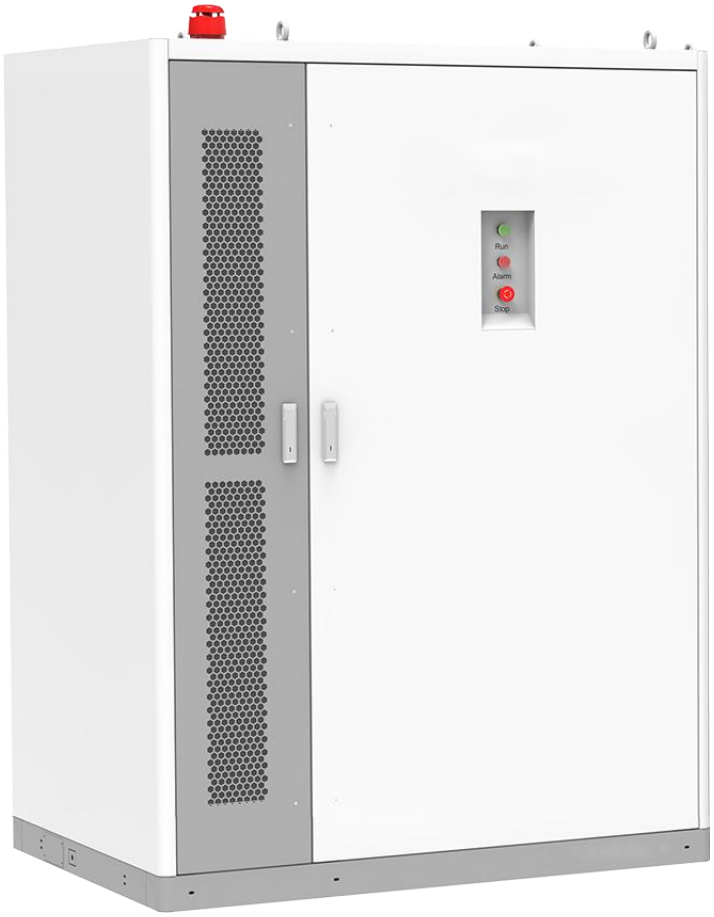


User Manual

Rechargeable Lithium-ion Battery

HZEB-HCT-200

Integrated Energy Storage System

V2.0.0.20240919

Contents

1. Foreword

This Manual revolves around our company's HZEB-HCT-200 product. HZEB-HCT-200 is an integrated lithium iron phosphate (LFP) battery energy storage system (BESS). Please read this Manual carefully before installing and using the product, understand the safety information and be familiar with the relevant information, and carefully follow the instructions during the installation process. If you have any questions, please contact the supplier for advice and explanations.

1.1 Applicable product

This Manual applies to the following model of our company:

HZEB-HCT-200

※ In this Manual, unless otherwise specified, any reference to the "system" or "energy storage system" indicates the product of that model.

1.2 Applicable personnel

This Manual is only applicable to the professionals who are familiar with local regulations, standards, and electrical systems, have received professional training, and are familiar with the relevant knowledge of this product. Including but not limited to:

Technical support engineer
Installation engineer
Commissioning engineer
Electrical engineer
Maintenance engineer

1.3 Legal statement

Please note that our company may make modifications to contents of this Manual without prior notice. If any changes are made to the information, we will not notify you separately.

1.4 Other statements

Before transporting, storing, installing, operating, using, or maintaining the equipment, please read this Manual thoroughly. Operate strictly according to this Manual and adhere to all safety precautions indicated on the equipment and in this Manual. In this Manual, "Equipment" refers to the products, software, components, spare parts, and/or services related to this Manual; "the Company/our company" refers to the manufacturer (producer), seller, or service provider of the equipment; and "You" refers to the entity responsible for transporting, storing, installing, operating, using, or maintaining the equipment.

The "Danger," "Warning," and "Caution" items in this Manual do not represent all the safety measures that must be followed. You must also comply with relevant international, national, or regional standards, as well as industry practices. The Company assumes no liability for any damage resulting from non-compliance with safety operation requirements or violations of design, production, and equipment safety standards.

The equipment shall be used in an environment that meets the design specifications. Failure to do so may result in equipment faults, functional abnormalities, or component damage, which will not be covered by the equipment's quality warranty. Additionally, the Company will not be liable for any personal injury, property damage, or other losses that may arise from such conditions.

All activities, including transportation, storage, installation, operation, use, and maintenance, must comply with applicable laws, regulations, standards, and codes.
Reverse engineering, decompiling, disassembling, modifying, implanting, or otherwise studying the internal logic of the equipment, obtaining the software source code, or infringing on intellectual property is prohibited. Additionally, the results of any performance testing of the equipment's software must not be disclosed.

The Company shall not be held responsible for any of the following situations or their consequences:

- Damage to the equipment caused by earthquakes, floods, volcanic eruptions, landslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, or other force majeure events;
- Operating outside the conditions specified in this Manual;
- Installation and usage environments out of the scope of relevant international, national, or regional standards;
- Installation and use by unqualified personnel;
- Failure to operate according to the instructions and safety warnings provided in the product and documentation;
- Unauthorized disassembly, modification of the product, or alteration of the software code;
- Damage caused by transportation conducted by you or a third party you have authorized;
- Damage resulting from storage conditions that do not meet the requirements specified in the product documentation;
- Materials and tools provided by you that do not meet local laws, regulations, and relevant standards;
- Damage caused by your or a third party’s negligence, intentional actions, gross misconduct, improper operation, or reasons not attributable to our company.

1.5 Revision history

The latest version in the "Revision history" contains updates from all previous versions of the document.

V1.0.0.20240221
- First issue.

V1.1.0.20240312
- Updated to delete the information related to the explosion-proof exhaust system

V1.1.1.20240312
- Updated the system dimension layout

V1.2.0.20240313
- Updated file images

V2.0.0.20240919
- Updated the major version and the documentation

2. Safety

2.1 Safety instructions

Before proceeding with any work, please read all safety instructions carefully and follow them when operating the battery.

Incorrect operation may result in:

- Injury or death of operators or third parties;
- Damage to the system hardware.

Skills that qualified personnel shall have:

- Training in installation, commissioning, and hazard handling of the electrical system;
- Understanding of this Manual and other related documents;
- Understanding of local regulations and directives.

This Manual may use the following symbols to highlight information, and their meanings are as follows:

Indicates a hazardous situation that, if not avoided, will result in high-level risks such as death or serious injury.

Indicates possible damage or injury that, if not avoided, will result in medium-to-low-level risks such as injury or damage.

Indicates potential risks of equipment damage or safety warnings that, if not avoided, may result in equipment damage, data loss, reduced performance, or other unforeseen outcomes.

2.2 Personal safety

Do not perform installation, maintenance, or repair operations while the equipment is energized! Ensure that at least two personnel are present on the site during maintenance or repair activities.

2.2.1 Personnel requirements

- Only professional electricians or qualified personnel are authorized to perform operations on this product.
- Operators should be thoroughly familiar with the structure and operating principles of the entire

energy storage system.

- Operators should be thoroughly familiar with this Manual.
- Operators should be thoroughly familiar with the relevant standards of the country/region where the project is located.

2.2.2 Safety warning operations

When performing installation, routine maintenance, or repairs on the battery pack, to prevent unauthorized personnel from coming near, making incorrect operations, or causing accidents, please follow these warning procedures:

- Place clear signs in front of and behind the battery pack and at the switches to prevent accidental switching.
- Install warning signs or safety barriers near the operating area.
- After completing maintenance or repairs, always remove the cabinet door key and store it securely.

2.3 Electrical safety

Do not perform installation while the equipment is energized. This can cause fire or personal injury.

2.3.1 Electrical precautions

- Do not touch terminals or conductors connected to the power grid.
- Pay attention to all instructions or safety documentation related to connections with the power grid and adhere to the warning labels on the product.
- Follow the safety precautions listed in this Manual and other related documents for the equipment.
- Perform a preliminary visual inspection of the equipment before operation to check for damage or other hazards.
- Check that all external equipment and circuit connections are secure.
- Ensure the equipment is in a safe condition before operating.

2.3.2 ESD safety

- Avoid unnecessary contact with circuit boards.
- Follow electrostatic discharge protection guidelines, such as wearing anti-static wrist straps.

2.3.3 Precautions for battery pack

- There is a lethal high voltage between the positive and negative terminals of the energy storage battery pack.
- Damaged equipment or system malfunctions may cause electric shock and fire.
- When maintaining the equipment, the connection between the energy storage inverter and the energy storage battery pack is completely disconnected.

2.4 Environmental safety

Danger

Do not place the equipment in flammable, explosive, or dusty environments, as this may cause fire or explosion hazards.

2.4.1 Escape way requirements

To ensure that staff can quickly evacuate the scene in case of an accident, please follow the below:

- Do not place flammable or explosive materials around the battery pack.
- Do not block or occupy escape routes with clutter or in any other manner.

2.4.2 Moisture protection

- Do not use the product in environments exceeding the specified humidity levels.

2.5 Mechanical safety

Danger

When performing work at heights, always wear safety helmets and other protective equipment, and secure yourself to stable structural components to prevent falls.
Before installing equipment, ensure it is properly secured to avoid tipping, which could cause injuries or damage to personnel and equipment.

2.5.1 General requirements

- During transportation and installation, any scratches must be promptly repaired. Do not allow scratched areas to remain exposed for extended periods.
- Do not perform welding, cutting, and other operations on the equipment without authorization.
- Use tools correctly and ensure proper handling techniques.
- When working at heights, use wooden or insulated ladders; do not use single-step ladders.
- When using a ladder, ensure it is placed on a stable, flat surface, and have someone hold the ladder while you work.

2.5.2 Requirements for heavy object moving

- Prepare for load-bearing before moving heavy objects.
- When multiple people are involved in moving, distribute the load evenly to ensure balanced weight distribution.
- Wear protective gloves, safety shoes, and other safety gear when moving heavy objects.

2.5.3 Forklift and lifting requirements

- When using a forklift, ensure the forks are in the center position before lifting to prevent tipping.
- Before moving, secure the equipment to the forklift with ropes. During movement, assign a dedicated person to supervise.
- Lifting personnel must complete and pass relevant training before being allowed to perform the

work.

- Place warning signs and barriers to isolate the lifting area.
- The lifting conditions must meet the operational requirements
- Do not allow personnel to walk underneath during lifting operations.
- During lifting operations, ensure the angle of the lifting cables is less than 90°.

2.6 Specification for live test

There is a lethal high voltage between the positive and negative terminals of the energy storage battery pack.
Ensure that two people are involved in the operation to maintain safety.

2.6.1 Live line measurement

The equipment contains high voltage, and accidental contact may result in fatal electric shock. Therefore, when performing live line measurements:

- ensure proper protective measures are in place (such as wearing insulated gloves and insulated footwear).

2.6.2 Use of measuring equipment

When conducting electrical measurements, connections, trial runs, and other operations on equipment:

- Select high-quality measuring equipment that matches the range and conditions required for the site requirements.
- Ensure that the measuring equipment is connected and used correctly and according to standards to prevent hazards such as electrical arcs.

2.7 Equipment safety

Fencing, walls, or other protective measures must be installed around the equipment. Safety warning signs should be posted to isolate the area, preventing unauthorized personnel from entering or causing accidental operations during equipment operation, thereby avoiding personal injury or property damage.

- The equipment installation and layout must meet the installation protection requirements specified by local standards, including but not limited to the requirements of *Design Code for Electrochemical Energy Storage Station* (GB 51048-2014) and *Standard for the Installation of Stationary Energy y Storage Systems* (NFPA 855).
- Before installing, operating, or maintaining the battery, read the relevant instructions and follow the manufacturer's requirements.
- Please use the battery within the specified temperature range.
- If the battery is accidentally exposed to water, do not continue with the installation. Move it to a

safe location and arrange for prompt disposal.

■ Before installing the battery, check that the battery pack enclosure is free from damage or deformation.

2.8 Product disposal

Caution

When disposing of the product, do not treat it as regular waste.

■ The Company has priority rights for the recycling of discarded batteries.

■ For discarded batteries not recycled by the Company, please contact a local authorized recycling organization or manufacturer for disposal and recycling.

Note: This Manual may not cover all possible situations during operation, maintenance, or repair. If you encounter circumstances not explained in this Manual, please follow the relevant local regulations and standards and contact the Company promptly.

3. Product Introduction

3.1 Energy storage system introduction

The energy storage system involves the process of storing energy in a medium or device and then releasing it when needed. The energy storage system includes input and output devices of energy and materials, along with energy conversion and storage devices. Energy storage technologies can be classified into several categories, including physical energy storage, electrochemical energy storage, and electromagnetic energy storage.

The electrochemical energy storage system is a system that uses electrochemical batteries as the storage carrier and employs power conversion systems (PCS) to store and release electrical energy in a cyclic manner. The essence of an electrochemical energy storage system is to convert electrical energy into chemical energy, which is then stored and later released through the mechanism of chemical battery, ultimately converting back into electrical energy to be fed into the power grid. Compared with other energy storage technology routes, the electrochemical energy storage system is characterized by higher energy density, moderate response speed, and wide range of applications, and is easier to mass-produce, install, and operate and maintain, thus having excellent potential for large-scale promotion.

Electrochemical energy storage includes forms such as lithium-ion, sodium-ion, and liquid flow. Among these, lithium-ion technology is the most mature and is currently the widely recognized route in the market.

In an energy storage system, storage battery serves as a critical device for energy storage and plays a key role in adapting to various usage scenarios.

3.2 Product function

The system consists of a battery compartment and an electrical compartment. It can control PCS to charge or discharge by issuing instructions through EMS. The energy input and output of the energy storage system are 400 VAC, and the maximum charge and discharge current of the system is 140 A/0.5C.

- Battery charging: The energy storage converter (hereinafter referred to as PCS) is connected to the high-voltage cluster control box. Under the control system's scheduling, the PCS manages battery charging, storing excess energy in the battery.
- Battery discharge: When the grid is insufficient to supply power to the load, the system needs to use the control system to manage the battery to provide power to the load, with the stored energy in the battery being output to the load through the PCS.

3.3 Product characteristics

The energy storage system is made up of lithium iron phosphate battery cells with high energy density, low cost, and high safety, connected in a certain series-parallel manner. The system integrates the power supply and distribution system, battery management system, energy management system, thermal management system, fire suppression system, etc., so it has the characteristics of safety, reliability, rapid deployment, and intelligent management. Also, it can

achieve a wide range of application effects in various scenarios through various devices.

- Equipped with comprehensive, multi-level battery warning and protection strategies, ensuring high safety
- Equipped with comprehensive communication and monitoring functions, ensuring continuous and stable operation for a long time
- Equipped with automatic fire alarm and automatic fire extinguishing system inside the cabinet
- Equipped with an intelligent temperature control system inside the cabinet, minimizing the impact of external environmental conditions on the internal equipment and making the system suitable for a wide range of applications

3.4 Product parameters

Battery specification	HZEB-HCT-200
Battery type	LPF
Rated energy	200.7kWh
Rated voltage	716.8V
Operating voltage range	627.2~806.4V
Rated current	140A（0.5C）
AC specification	
Rated power	100kw
AC rated voltage	400V
Wiring	3P4L+PE
Rated frequency	50Hz
Maximum AC current	144A
System specification	
Dimensions	1500*1329.5*2185
Weight	2500kg
Temperature range	-20℃~55℃
Humidity range	5%~90% (non-condensing)
Protection level	IP54
Noise	80dB
Altitude	≤2000m
Cooling mode	Intelligent air cooling
Communication mode	Ethemnet /RS485/CAN/USB

Table Product parameters

3.5 Dimensions and layout

3.5.1 Product dimensions

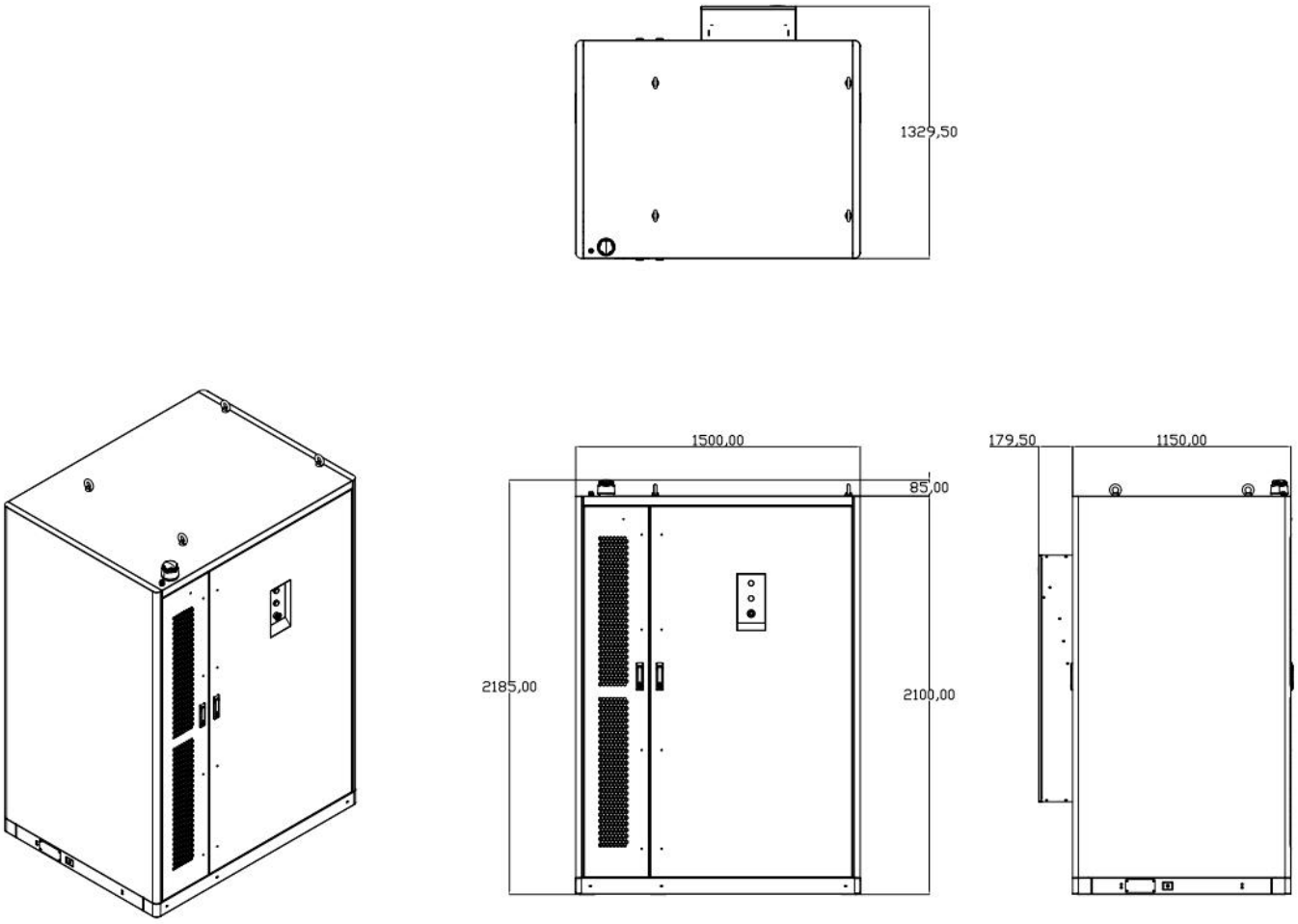


Figure Product dimensions

3.5.2 Product layout

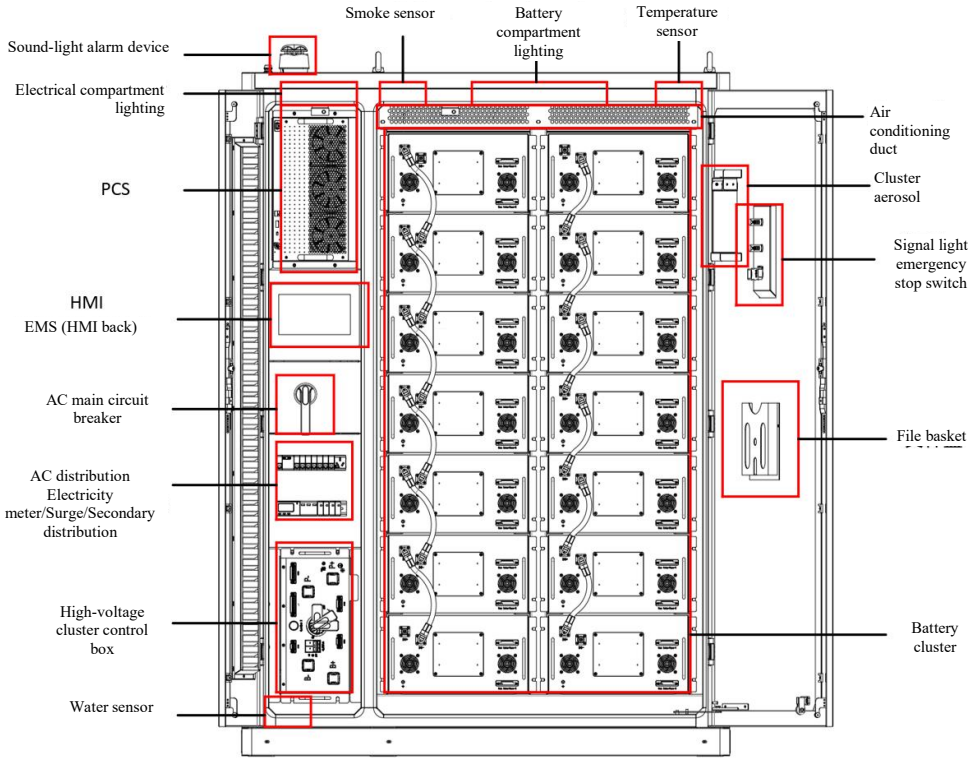


Figure Front layout

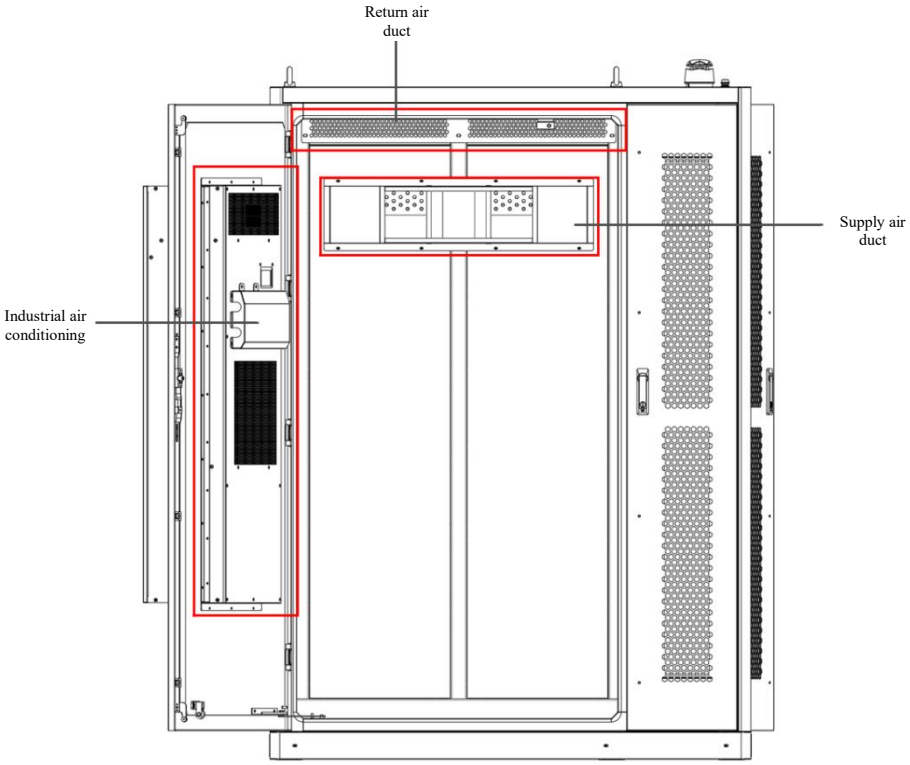


Figure Back layout

3.6 Introduction of product components

3.6.1 Battery pack

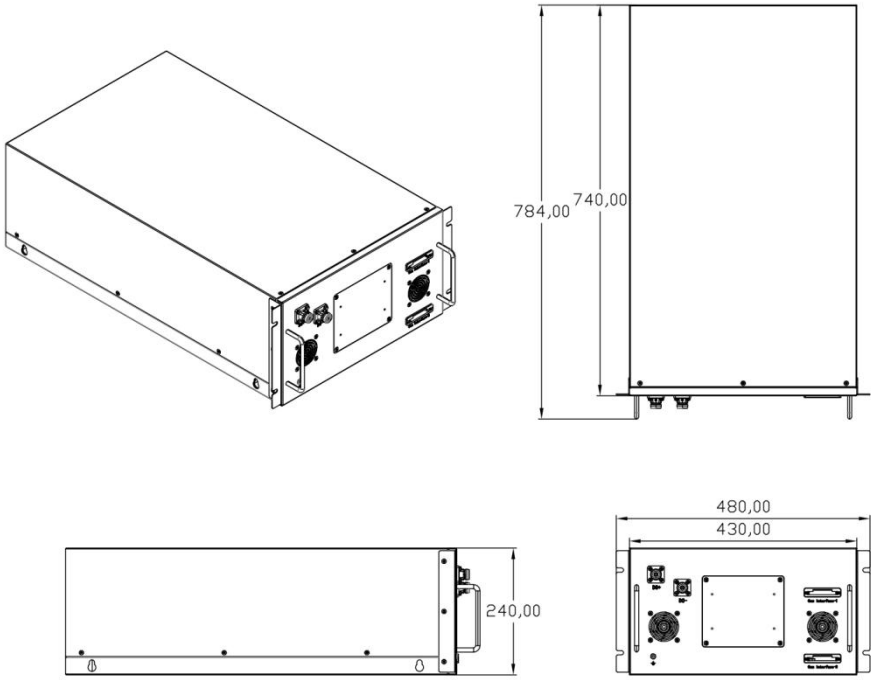


Figure Dimensions of battery pack

Technical parameters of battery pack:

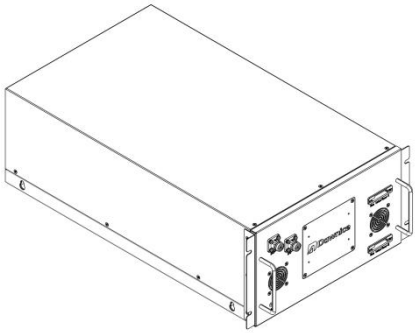
Unit	Model/Description	HZ-PACK-15
	Cell type	LFP280Ah
	Maximum charge rate	0.5C
	Rated charge-discharge rate	0.5C
	Maximum discharge rate	0.5C
	Cell combination method	1P16S
	Nominal capacity	280Ah
	Nominal energy	14.336kWh
	Nominal voltage	51.2V
	Operating voltage range	43.2～57.6V
	Operating temperature range	Discharge: -10°C−55°C;
		Charging: 0°C−55°C

Table Technical parameters of battery pack

3.6.2 High-voltage cluster control box

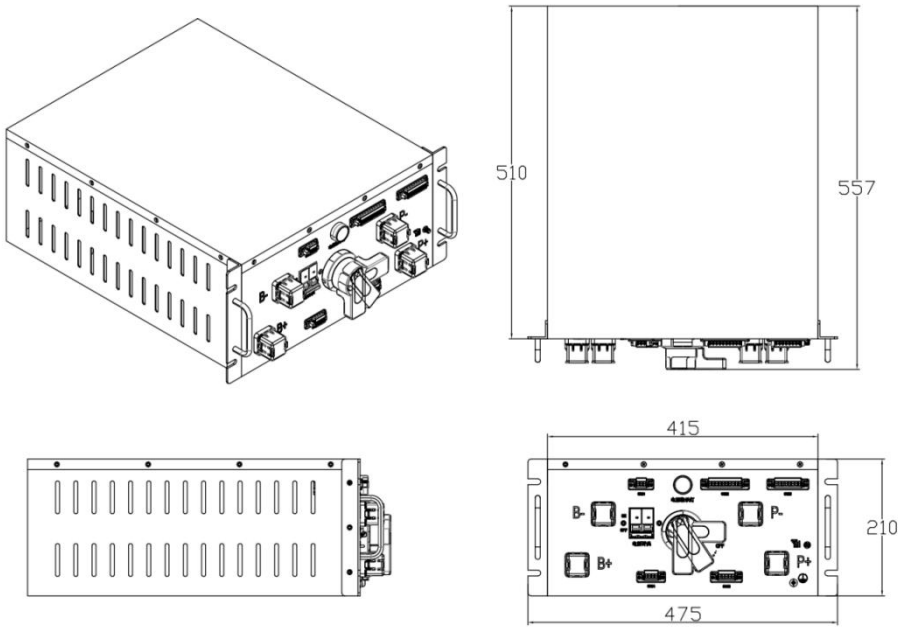


Figure Dimensions of high-voltage cluster control box

3.6.2.1 Control panel

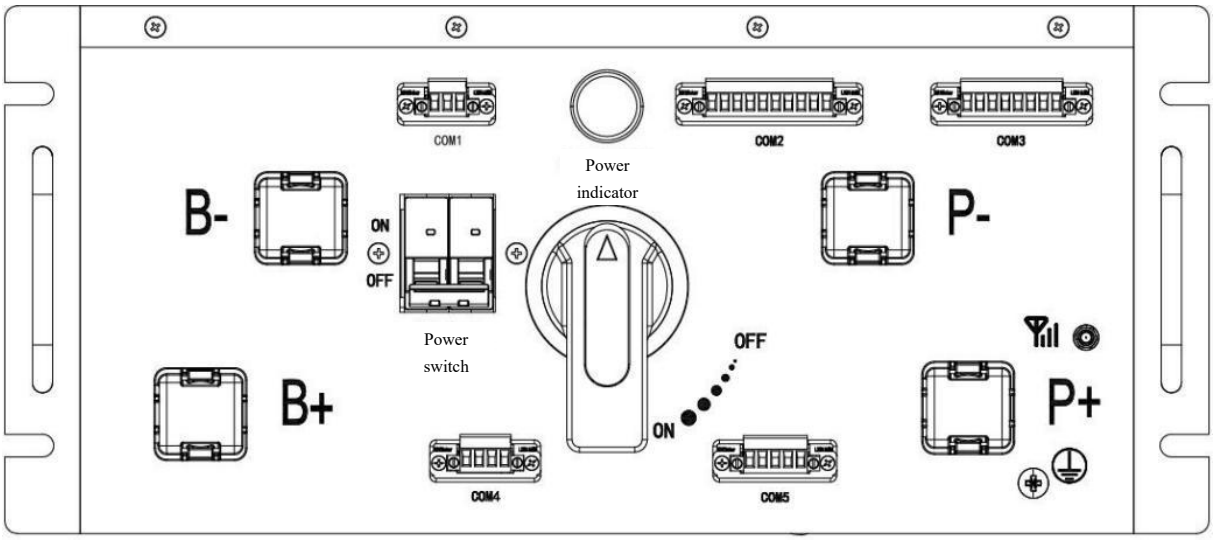


Figure Panel of high-voltage cluster control box

Power input/output interface definition:

Interface Definition	Function Description	Remark
B+	Battery cluster input positive terminal	Connect to the battery cluster positive terminal, with the interface using a M8 bolt
B-	Battery cluster input negative terminal	Connect to the battery cluster negative terminal, with the interface using a M8 bolt
P+	PCS input positive terminal	Connect to the PCS positive terminal, with the interface using a M8 bolt
P-	PCS input negative terminal	Connect to the PCS negative terminal, with the interface using a M8 bolt

Table Definition of power interface for high-voltage cluster control box

Definition of communication interface:

No.	I/O	COM Port	Definition	Function Description
1	I	COM1(3P)	AC220V-N	N
2	/		/	/
3	I		AC220V-L	L
1	I/O	COM2(10P)	CAN1R	Terminal resistor
2	I/O		CAN1H	Isolated CAN (Connect to PCS or external device)
3	I/O		CAN1L	
4	I/O		CAN1G	
5	I/O		RS485-A1	Isolated 485 (Connect to PCS or external device)
6	I/O		RS485-B1	
7	I/O		RS485-G1	
8	I/O		RS485-A0	Non-isolated 485 (Connect to display screen or external device)
9	I/O		RS485-B0	
10	I/O		RS485-G0	
1	O	COM3(8P)	GND	Switch quantity detection Short circuit effective
2	O		SWITCH_IN	
3	/		SW2_IN	Dry contact 2 (0.1 A)
4	I/O		SW2_OUT	
5	I/O		SW1_IN	Dry contact 1 (0.1 A)
6	/		SW1_OUT	
7	O		24V+_OUT	Output 24 V+ (Rated 75 W)
8	O		24V-_OUT	Output 24 V- (Rated 75 W)
1	I/O	COM4(4P)	DEBUG_CANH	Debug CANH
2	I/O		DEBUG_CANL	Debug CANL
3	I		24V+_IN	Input 24 V+
4	I		24V-_IN	Input 24 V-
1	I/O	COM5(5P)	SPI-H	Intranet daisy chain communication H
2	I/O		SPI-L	Intranet daisy chain communication L
3	/		/	/
4	O		FAN+	Fan power output 24 V+
5	O		FAN-	Fan power output 24 V-

Table Definition of communication interface for high-voltage cluster control box

3.6.3 Energy storage inverter

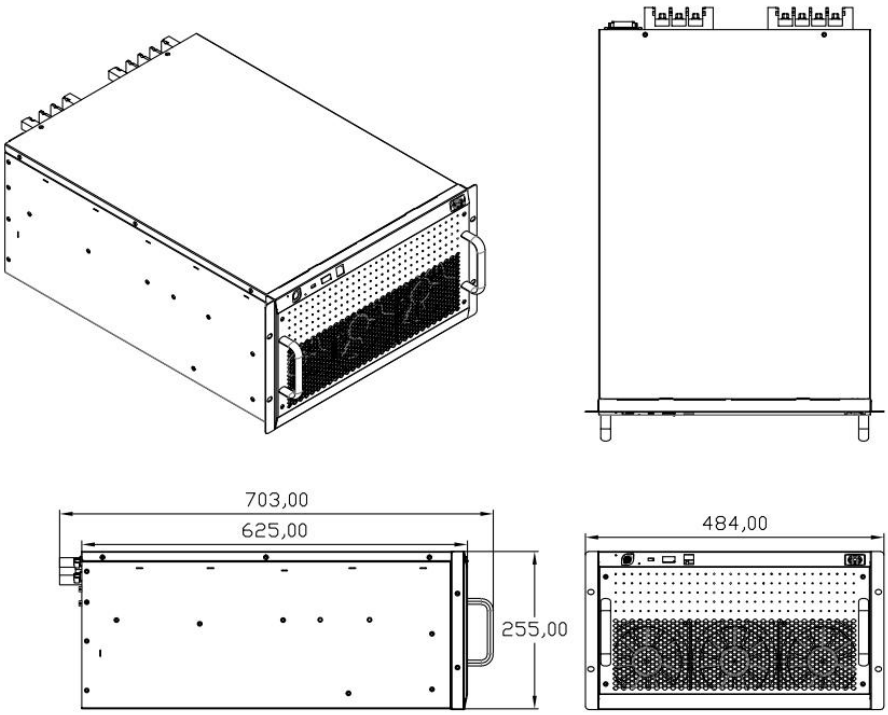


Figure Exterior dimensions of inverter

Inverter parameters

Item	EPCS105-AM
DC-side	
Voltage range at full load (V)	615~950（3W+PE）/680~950（3W+N+PE）
Maximum current	170A
AC-side	
Rated voltage	230/400
Voltage deviation	-10%~+15%
AC output type	（3W+PE）/（3W+N+PE）
Rated output power (kW)	105
Maximum output power (kW)	116
Maximum current (A)	167
Rated grid frequency (Hz)	50/60
Power factor	0.99
Power factor range	1 (leading)−1 (lagging)
Current distortion rate	<3% (rated power)
Overload capacity	110% long-term
Maximum discharge efficiency	98.5%
System parameters	
Dimensions (mm)	484*703*256.5
Altitude (m)	4,000 (derating over 2,000)
Operating temperature	-30°C−55°C (derating over 45°C)
Storage temperature	-45°C−70°C
Humidity	0%RH−95%RH, non-condensing
Cooling method	Intelligent forced air cooling

Communication interface	CAN/RS485
Reference standards	GB/T 34120-2017, GB/T 34133-2017, EN 62477, EN IEC 61000, EN50549-1,
Power grid support	L/HVRT, active and reactive power control

Table Inverter parameters

3.6.4 Thermal management system

3.6.4.1 Battery pack fan

The battery box cooling fans are controlled individually for each battery cluster, with the battery management main control unit managing the start and stop of the fans for each cluster. The battery management system (BMS) can control the fan operation based on the collected cell temperatures. By default, when the BMS detects that the temperature of any cell exceeds 28°C, it activates the fans for the corresponding battery cluster. Conversely, the fans will be turned off when the temperature of the entire cluster falls below 25°C.

Fan parameters:

Item	Remark
Rated voltage	DC24V
Working voltage	DC 21.6V-26.4V
Start-up voltage	≤ DC 12V(ON/OFF)
Running current	110mA±10%
Noise	28.0dB

Table Fan parameters of battery pack

Control strategy for battery box fan:

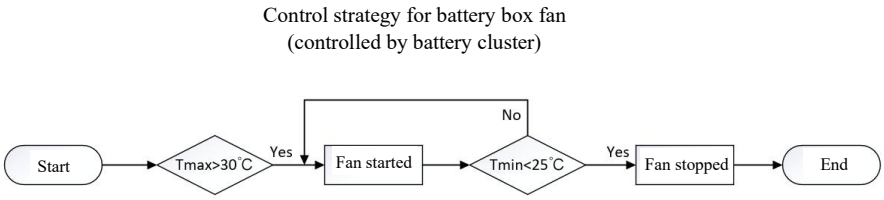


Table Battery pack fan control logic

3.6.4.2 Industrial temperature control air conditioning

The industrial air conditioning for energy storage is an industrial air conditioning unit specifically designed for the energy storage system. It features an integrated structure and high airflow design, providing a safe, reliable, and energy-efficient precision temperature control solution. The air conditioning offers both cooling and heating functions to meet various environmental application needs.

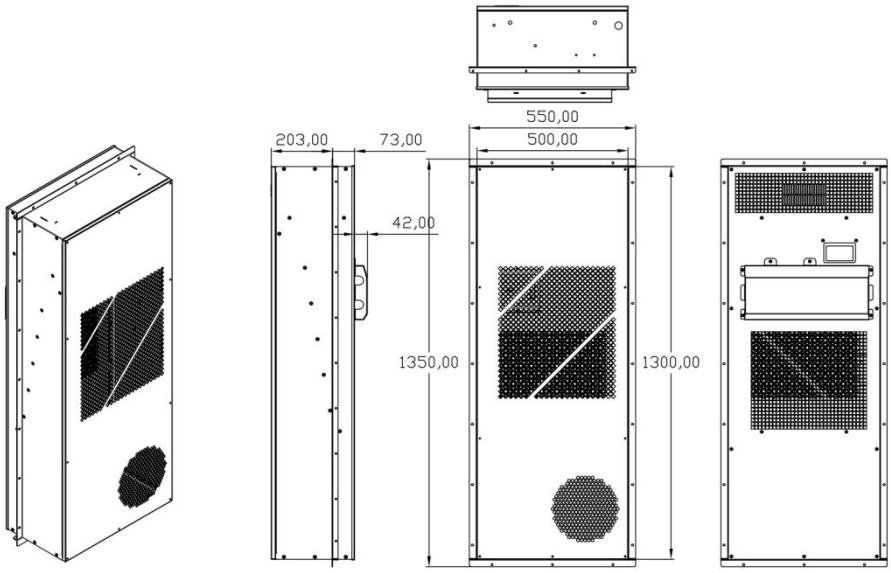


Figure Exterior dimensions of air conditioning

Air conditioning parameters

Item	Remark
Power supply	AC 220V 50Hz
Rated power	1.6/1.2kW
Rated current	7.1/5.4A
Rated cooling capacity	3.2kW
Heating power	1kW
Air flow of internal blower	1300m³/h
Air flow of external blower	1300m³/h
Temperature control range	20~50°C
Humidity control	Yes
Ambient temperature	-40~50°C
Refrigerant	R134a
Noise	70dB
Condensation treatment	Collect to the water pan and discharge through the drainage pipe
Installation method	Installation of wall-mounted bracket
Protection level	IP55
External dimensions	550*276*1350mm
Net weight	About 75 kg

Table Industrial air conditioning parameters

Air conditioning control strategy:

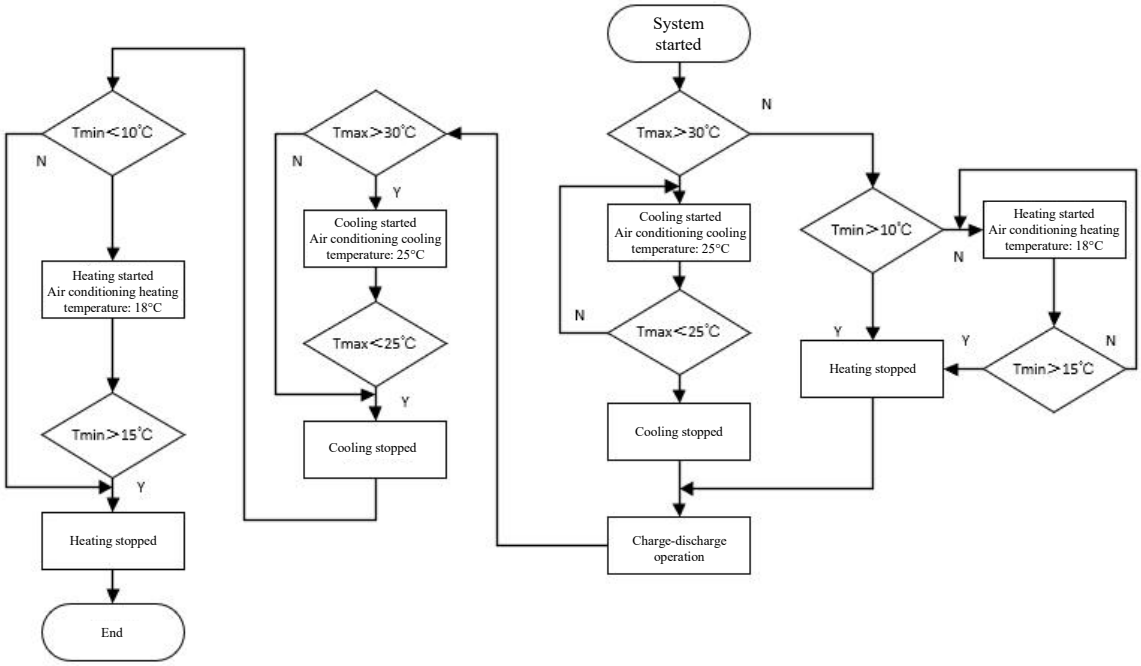


Figure Control logic of industrial air conditioning

3.6.5 Fire protection system

3.6.5.1 Fire protection layout

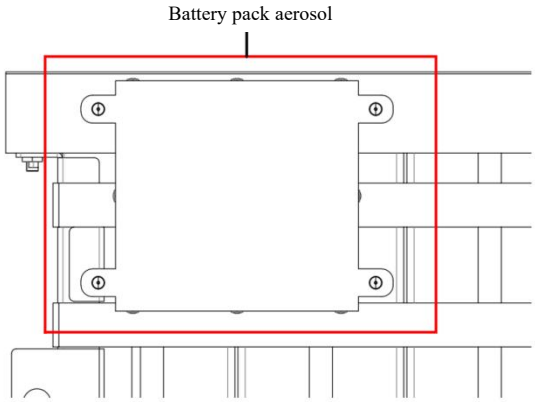


Figure Diagram of battery pack fire protection

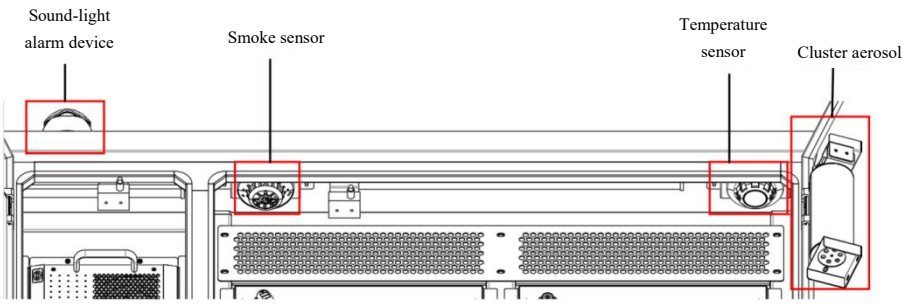


Figure Installation diagram of battery cabinet fire protection system

3.6.5.2 Working principle of fire protection equipment

● Only the smoke sensor is triggered, the sound-light alarm starts working, but the cluster aerosol device does not start

● Only the temperature sensor is triggered, the sound-light alarm starts working, but the cluster aerosol device does not start

● Both the smoke sensor and the temperature sensor are triggered, the sound-light alarm starts working, the cluster aerosol is triggered to spray, and EMS issues the air conditioning stop command and PCS stop command

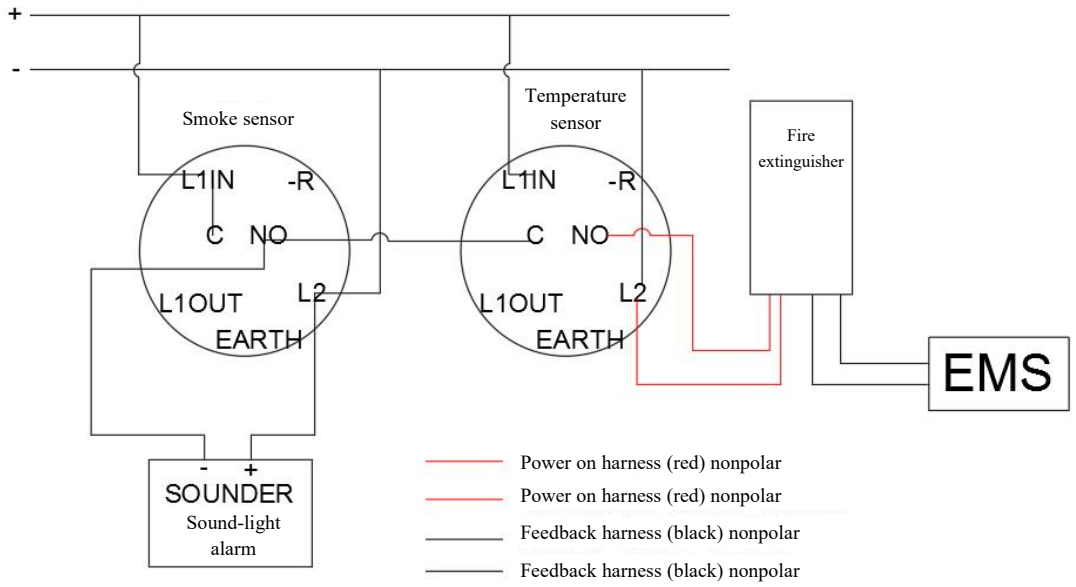


Figure Working principle of fire protection system

3.6.5.3 Fire extinguishing mechanism

The inhibitory effect of aerosol on fires is mainly reflected in the following aspects:

Fire extinguishing agents generally operate through mechanisms such as isolation, suffocation, cooling, or chemical suppression, with different agents utilizing various mechanisms. The aerosol primarily works through two mechanisms: cooling through endothermic decomposition and chemical suppression in both the gas and solid phases, which act synergistically. Additionally, the gaseous components in the byproducts of the aerosol fire extinguishing agent also play a supportive role.

1) Cooling and extinguishing effect of endothermic decomposition

The cooling effect of the aerosol fire extinguishing agent primarily relies on the endothermic decomposition of metal oxides and carbonates. Since the heat released by a fire in a short period is limited, if the solid particles in the aerosol can absorb a portion of this heat quickly, the flame temperature will decrease. This reduces the heat radiated to the combustion surface and the energy used to break down vaporized combustible molecules into free radicals, thereby suppressing the combustion reaction to some extent.

2) Gaseous chemical suppression

Under the effect of heat, the vaporized metal ions from the decomposition of the aerosol fire extinguishing agent, such as Sr, K, Mg, or cations that have lost electrons, exist in the form of vapor. These ions participate in multiple chain reactions with the active radicals in the combustion process, such as H•, •OH, and O•. For example, considering Sr:

$$Sr+2•OH \rightarrow Sr(OH)_2$$
$$Sr+O• \rightarrow SrO$$
$$Sr(OH)_2+2H• \rightarrow Sr+2H_2O$$

As this process continues, the active radicals in the combustion are significantly consumed, resulting in a continuous decrease in their concentration, and the combustion is suppressed.

3) Solid chemical suppression

The solid particles in the aerosol fire extinguishing agent can adsorb intermediates such as •OH, H•, and O• from chain reactions. These particles then catalyze the recombination of these members into stable molecules, effectively interrupting the branching chain reactions of the combustion process. For example, considering K:

$$K_2O(s)+2H(g) \rightarrow 2KOH(s)$$
$$KOH(s)+OH(g) \rightarrow KO(s)+H_2O(g)$$
$$K_2O(s)+O(g) \rightarrow 2KO(s)$$
$$KO(s)+H(g) \rightarrow KOH$$

In the described extinguishing mechanisms, various methods interact and work synergistically. However, the gas transport and the endothermic cooling effects of metal oxides or carbonates serve primarily as auxiliary effects. The main extinguishing effect relies on the chemical suppression in both the gas and solid phases.

3.6.5.4 Condensed aerosol fire extinguishing device

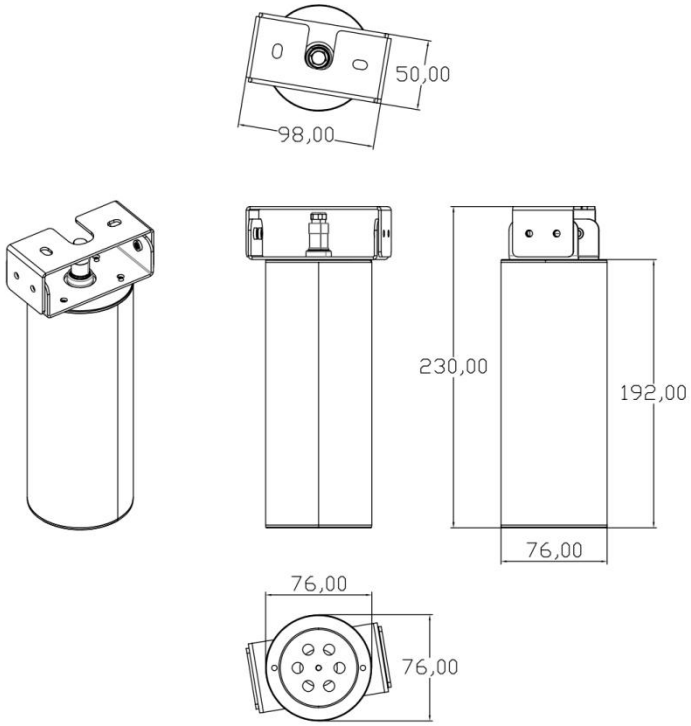


Figure Diagram of condensed aerosol fire extinguishing device

Technical parameters

JAD300-U01	Items	Technical Parameters
	Starting mode	Electrical starting
	Feedback signal	Passive switch signal
	Protection space	5 m³
	Validity	15 years
	Dimensions	Φ76×192mm
	Operating environment	-40℃~+54℃
	Executive standards	UL2775/EN15276/AS4487/XF499.1

Table Technical parameters of condensed aerosol fire extinguishing device

3.6.5.5 Temperature sensor

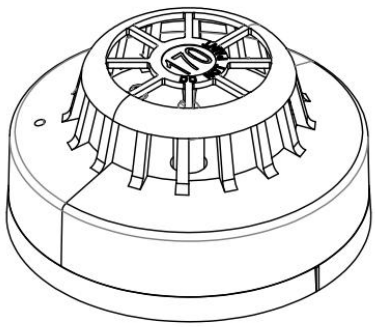


Figure Diagram of temperature sensor

Technical Parameters

958CHL1000	Items	Technical parameters
	Output voltage	9 to 33V
	Quiescent current	24V：55μA
	Alarm voltage	6 V to 28 V
	Alarm voltage	24V：52mA
	Storage temperature	-30℃ to +80℃
	Operating temperature	CS/CR: -20°C to +80°C
	Ambient humidity	0%RH−95%RH, non-condensing
	IP	IP54
	Executive standards	CPR, LPCB, VdS, VNIIPO, SBSC, FG, BOMBA
	Dimensions	Diameter 100 mm × height 42 mm (with base 50 mm)

Table Technical parameters of temperature sensor

3.6.5.6 Smoke sensor

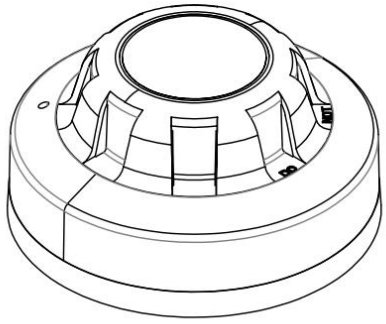


Figure Diagram of smoke sensor

Technical parameters

958CHL1000	Items	Technical parameters
	Output voltage	9 to 33V
	Quiescent current	30 - 50 μA at 24 V
	Alarm voltage	6 V to 28 V
	Alarm current	52 mA at 24 V
	Alarm LED light current	4 mA
	Operating temperature	-20℃～+60℃
	Ambient humidity	0%RH−95%RH, non-condensing
	IP	IP23D

	Executive standards	EN 54-7, LPCB, VdS, DIBt, BOSEC, FG, CPR and SBSC
	Dimensions	Diameter 100 mm × height 42 mm (with base 50 mm)

Table Technical parameters of smoke sensor

3.6.5.7 Sound-light alarm device

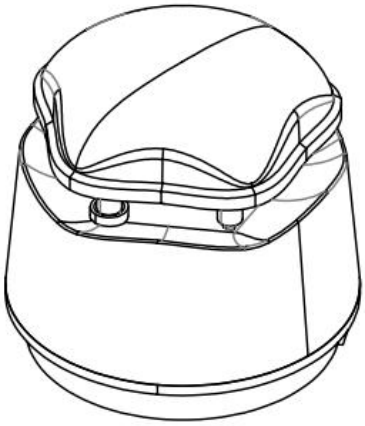


Figure Diagram of sound-light alarm device

Technical parameters

958CHL1000	Items	Technical parameters
	Working voltage	9～30V DC
	IP	Type A/IP 45 Std Base
	Operating temperature	-20℃～+70℃
	Decibel	High, Medium (-10 d B(A)) Low (-20 d B(A))
	Executive standards	EN 54-3

Table Technical parameters of sound-light alarm device

3.7 Working principle

3.7.1 Single topology structure

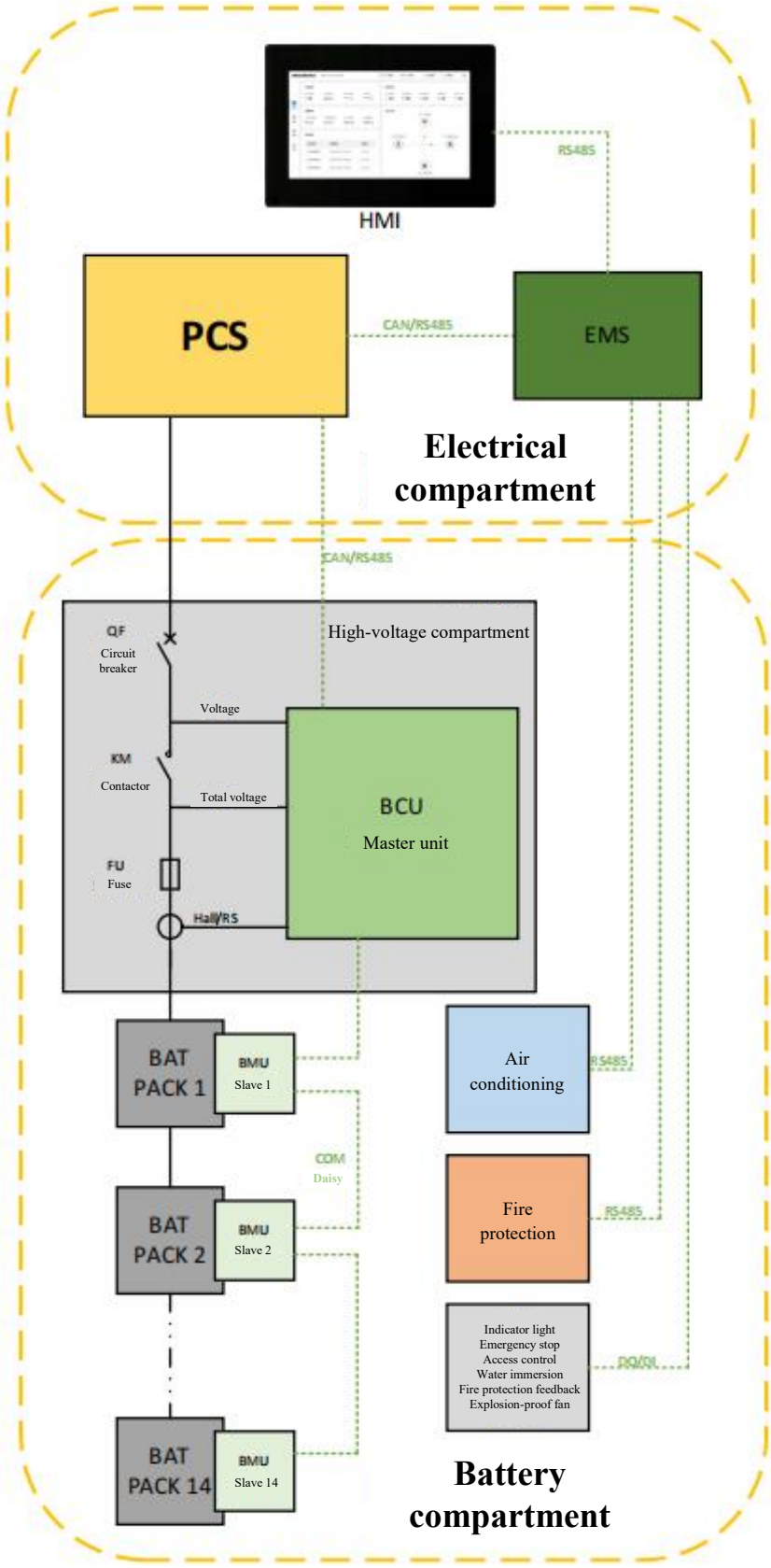


Figure Battery cabinet topology

3.7.2 Typical application scenario

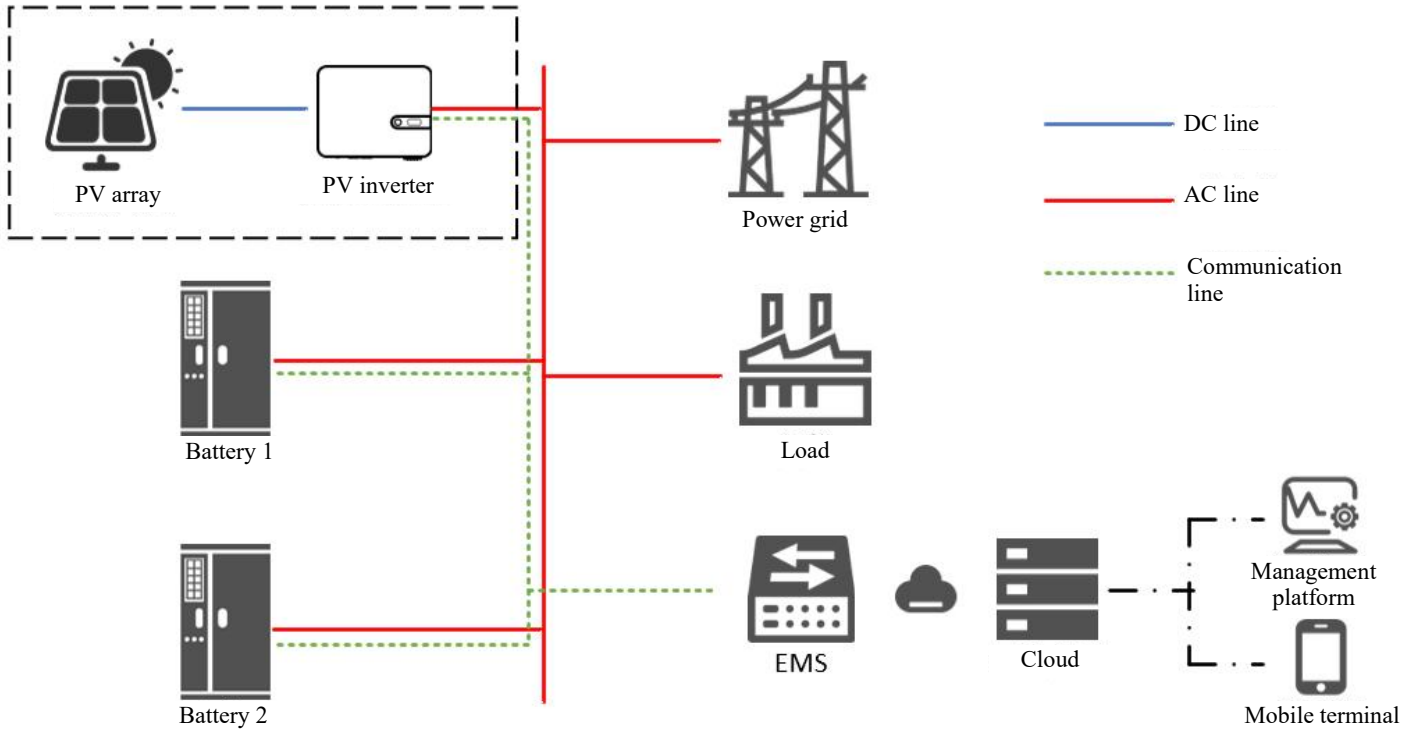


Figure Typical application scenario

※: Only the typical application scenario of this product is discussed here. The specific application is subject to real project situations.

4. Transportation and Transfer

4.1 Moving requirements

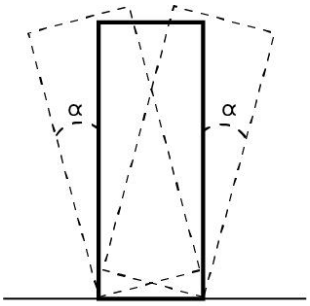
Warning

During the moving process, comprehensive safety measures must be implemented. When moving items, handle them gently and avoid dragging or throwing them on rough surfaces.

- When moving heavy objects, get ready to support the weight properly to avoid injury from being crushed or strained.
- When two or more people are moving heavy objects together, one person should be in charge of directing the process. Everyone should lift or lower the equipment simultaneously and in unison.
- When moving equipment manually, you should wear protective gloves and safety shoes, among other safety gear, to prevent injuries.
- When manually moving equipment, approach the object, squat down, and use the strength of your straightened legs rather than your back to lift it. Lift slowly and steadily, avoiding sudden jerks or twisting of the torso.
- When moving or lifting equipment, hold onto the equipment handles or support the bottom edge, rather than gripping handles attached to installed modules.
- Avoid lifting heavy objects quickly above waist height. Place the object on a workbench or

suitable surface at waist level first, adjust your grip, and then lift it.

- When moving heavy objects, apply force evenly and steadily. Move at a consistent, slow speed and position the object carefully to avoid impacts or drops that could scratch the equipment surface or damage components and cables.
- When moving heavy objects, be especially cautious around workbenches, ramps, stairs, and slippery areas. Ensure that doorways are wide enough to accommodate the equipment when moving through them to prevent injury or damage.
- When transporting heavy objects, move your feet rather than twisting your waist. If you need to lift and move the object simultaneously, first point your toes in the direction you intend to move, then proceed with the lift.
- When using a forklift, ensure the forks are positioned in the center to prevent tipping. Before moving, secure the equipment to the forklift with ropes. During movement, assign a dedicated person to supervise.
- The placement angle shall meet the requirements: with packaging, the tilt angle α shall be ≤15°, and after removing the packaging, it shall be ≤10°.



- During the moving and transportation of air conditioners, keep the unit in an upright position at all times. Do not place the air conditioner flat or on its side.

4.2 Transportation requirements

- Rough handling during loading and unloading is prohibited, as it may cause battery short circuits, damage (such as leakage or rupture), fire, or explosion.
- The moving shall be conducted in a way of keeping the battery in the specified orientation. Do not invert, tilt, drop the battery, expose it to mechanical impacts, or render it subjected to rain, snow, or immersion in water.
- Batteries must be transported separately. For cabinets equipped with batteries, transportation with the batteries installed is prohibited. If the cabinet needs to be transported or moved, the batteries must be removed first.
- The battery is certified according to UN38.3 (UN38.3: Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and is classified as a Class 9 hazardous material.
- The transport service provider must have qualifications for handling hazardous materials. The use of open-top vehicles is strictly prohibited.
- The battery can be shipped directly to the site, provided it meets the transportation requirements for vehicles, ships, and other modes of transport.
- The international regulations for the transport of hazardous materials shall be complied with, and the regulatory requirements of the origin country, transit countries, and destination country authorities shall be met.
- Sea transport or well-maintained highways shall be used for shipping; rail and air transports are not supported. During transport, bumps and tilting shall be minimized as much as possible.

- Sea transport shall adhere to the requirements of the *International Maritime Dangerous Goods Code*.
- Before transport, the battery packaging must be checked for completeness, integrity, and no signs of odor, leakage, smoke, or fire; otherwise, transport is prohibited.
- The transport packing must be sturdy and shall be handled with care during loading, unloading, and transportation. Moisture protection measures shall also be taken.

5. Storage

Caution

Due to the characteristics of lithium batteries, storage must adhere to specific battery storage requirements. Failure to do so may result in permanent damage or performance degradation.

- Battery packs shall not be stored for extended periods. Long-term storage of lithium batteries can lead to capacity loss, with an irreversible capacity loss of 3% to 10% typically occurring after 12 months at recommended storage temperatures.
- The batteries shall be stored in a clean and dry place and shall be protected from dust and moisture. Being eroded by rainwater or surface water shall be avoided.
- The environment must be free from corrosive or flammable gases.
- Batteries shall not be stored in a tilted or inverted manner.
- For equipment other than battery packs that has been stored for two years or more, it must be inspected and tested by a professional before use.

5.1 Energy storage system storage (excluding battery pack)

- Do not remove the packaging during long-term storage.
- Do not stack the system.
- Store (long-term or temporary) the system on a flat surface.
- Close the cabinet door tightly.
- Control the storage environment temperature at -40°C~+60°C and 5%RH~90%RH.

5.2 Battery pack storage

- Batteries shall be stored indoors, away from direct sunlight and rain, in a dry and well-ventilated area. The surroundings shall be clean, free from excessive infrared or other radiation, organic solvents, corrosive gases, and conductive metallic dust and shall be kept away from heat and ignition sources.
- If a battery shows signs of fault (such as carbonization, leakage, swelling, or water ingress), it must be promptly transferred to a hazardous materials storage area, kept at least 3 m away from flammable materials, and disposed of as soon as possible.
- Batteries shall be placed according to the packaging labels. Do not store them upside down, on their side, or tilted. Ensure stacking complies with the requirements specified on the outer packaging.
- Batteries shall be stored separately from other equipment and shall be avoided stacking too high. The site must have fire-fighting facilities that meet the requirements, such as fire sand and fire extinguishers.
- After discharging, batteries may experience static power consumption of internal modules and

self-discharge, which could lead to damage from over-discharge. Batteries shall not be stored in a low-charge state and promptly recharged on that score. If a battery experiences a permanent fault due to a lack of recharging beyond the recommended period, the Company will not provide warranty services. Scenarios triggering low-charge storage include but are not limited to:

- Battery power cables or signal lines are not connected
- The battery cannot enter charging mode due to a system fault after discharging in an energy storage system
- The battery cannot enter charging mode due to improper configuration of the energy storage system
- The battery cannot enter charging mode due to prolonged loss of AC power
- The battery cannot enter charging mode due to the control system, PCS (Power Conversion System), or main circuit components not being properly closed or engaged

5.3 Storage environment

- Environmental temperature: -30°C—+50°C (excluding battery pack)
- Environmental temperature: 0°C−30°C (battery pack); it is recommended to store the battery pack in a constant temperature environment of 25°C. Long-term storage may affect the performance and service life of the battery.
- Relative humidity: 5%RH−90%RH (recommended around 45%RH).
- Dry, ventilated, and clean.
- Avoid contact with corrosive organic solvents, gases, and other substances.
- Avoid direct sunlight.
- Keep 2 m or more away from heat sources.
- When storing, disconnect from the external connection. If there is an indicator light on the battery pack panel, the indicator light shall be in the off state.
- Report any overdue storage promptly.
- When shipping batteries, follow the first-in, first-out principle.
- Move batteries gently during transport, and avoid damaging them.

6. Installation Site

6.1 Location requirements

- This system is only applicable to outdoor scenes.
- The installation environment shall have the horizontal surface elevated above the historical highest water level of the current area and at least 300 mm above the ground. The installation location must not be in a low-lying area.
- The installation site and a 3-meter surrounding area of the energy storage system or energy storage station shall be free of vegetation and flammable plants to prevent fires caused by wildfires during high summer temperatures.
- The safety distance between the energy storage system and buildings shall comply with local fire safety regulations or standards.
- The safety distances for the energy storage system are as follows: at least 12 m from Class A production buildings, at least 10 m from Class B production buildings, at least 10 m from Class C, D, and E production buildings with a fire resistance rating of Grade I or II, at least 12 m from Class C, D, and E production buildings with a fire resistance rating of Grade III, and at least 12 m from residential buildings. If the exterior walls of adjacent buildings are non-combustible and have no doors, windows, or exposed combustible eaves, the fire safety distance can be reduced by 25% from the previously specified distances.
- If the specified safety distances cannot be met, a fire wall must be installed between the battery equipment room, energy storage room, or energy storage installation area and Class C, D, and E buildings. The fire wall shall have a fire resistance rating of at least 3 hours and extend 1 m beyond the outer contours of the energy storage system in terms of length and height. Additionally, the fire wall design shall consider space requirements for equipment transportation, installation, and maintenance.
- The energy storage system or energy storage station must be situated in an environment free from explosion or fire risk.
- The site should have convenient transportation access and reliable fire suppression system equipment.

Description 1

- During the installation, commissioning, and operation phases of the energy storage system, the fire safety principle shall be prioritized. At least two gas fire extinguishers, such as those using halon, perfluorohexane, or carbon dioxide, shall be placed near each unit.
- Reserve a water fire extinguishing system interface for the energy storage system site.
- Ensure the site meets the immediate space requirements and provides additional space for future expansion based on the full lifecycle needs.
- Choose a place with good ventilation.
- Do not install the energy storage system in areas prone to salt damage or pollution, as it will suffer from corrosion. It is suitable for use in the following or better environments:
  - The energy storage system is suitable for outdoor environments more than 2,000 m from the coast. It is not recommended for use within 500 m–2,000 m of the coast (if needed, confirm with the distributor or our engineers). The system shall not be used within 500 m of the coast.
  - 1,500 m–3,000 m away from heavy pollution sources such as smelters, coal mines, and thermal power plants.

■ 1,000 m−2,000 m away from moderate pollution sources such as chemical, rubber, and electroplating.

■ 500 m−1,000 m away from light pollution sources such as food, leather, heating boilers, slaughterhouses, centralized garbage dumps, and sewage treatment plants

Description 2

If the safety distance at the selected site does not meet relevant national standards, it is advisable to choose a new location. The site shall avoid scenarios not recommended by industry standards and regulations, including but not limited to the following areas, regions, and locations:

- Areas with strong vibration, intense noise sources, and significant electromagnetic interference.
- Places with dust, oil smoke, harmful gases, or corrosive gases.
- Places where corrosive, flammable, or explosive materials are produced or stored.
- Places with existing underground facilities.
- Areas with poor geological conditions, such as rubber soil, soft soil layers, or surfaces prone to water accumulation and subsidence.
- Areas beneath water reservoirs, water landscapes, or water intake rooms.

Description 3

- If placement in a potentially water-accumulating area is unavoidable, it is an alternative to install barriers and drainage facilities or elevate the ground.
- Cable trenches shall not be used as drainage pathways. Penetrations for cables through walls or floors must be fire-stopped.
- Areas with seismic fault lines or seismic zones with a risk level higher than magnitude 9.
- Areas prone to direct hazards such as mudslides, landslides, quicksand, or sinkholes.
- Within the boundaries of mining subsidence (displacement) zones.
- Within the blast danger zones.
- Areas that could be submerged if a dam or levee were to fail.
- Important sanitary protection zones for water supply sources.
- Historical and cultural heritage protection zones.
- Crowded places, high-rise buildings, and underground structures.
- Intersections of arterial street and heavily trafficked areas.

Site selection for flood and drainage control:

- For a large-scale electrochemical energy storage system (with a power rating of ≥100 MW), the site design elevation shall be higher than the 1% flood level or the highest historical flood level.
- For medium and small-scale electrochemical energy storage systems (with a power rating of <100 MW), the site design elevation shall be higher than the 2% flood level or the highest historical flood level.
- If the site design elevation cannot meet the above requirements, choose an alternative site or implement various flood and drainage measures based on different conditions.
- For energy storage stations along rivers, lakes, or coastal areas affected by wind and waves, flood protection facilities shall be designed to accommodate a 2% wave height plus an additional 0.5 m for safety.
- When there is significant runoff entering or crossing the site perimeter, it is advisable to install ditches or drainage (cut-off) channels to manage surface water drainage systematically.

Fence against illegal entry:

It is recommended to use solid walls or fences for isolation and protection around the energy storage area. The fence should have a lockable gate, and its height should be greater than 2.2 m.

Firewalls may replace part or all of the fencing, depending on the design considerations.

6.2 Foundation requirements

Foundation design requirements:

- The energy storage system must be installed on a concrete or other non-combustible surface, provided that the installation plane is level, stable, and even, with sufficient load-bearing capacity. Installation on surfaces with depressions or inclines is prohibited.
- The equipment foundation shall be designed based on a load-bearing capacity of 2,750 kg per unit. If the foundation load-bearing capacity is insufficient, it must be reassessed.
- The bottom of the equipment foundation pit must be thoroughly compacted and levelled.
- After excavation of the equipment foundation, water exposure and disturbance are prohibited. Otherwise, the excavation shall continue and the disturbed material shall be replaced.
- The horizontal deviation between the equipment foundation and the equipment contact surface must not exceed 3 mm.
- The foundation must be higher than the local historical highest water level and at least 300 mm above the ground.
- Drainage facilities are to be constructed based on local geology and municipal drainage requirements to prevent water accumulation at the equipment foundation. The equipment foundation must meet the drainage requirements for the area's historical maximum rainfall, and the discharged water is to be treated in accordance with local laws and regulations.
- When constructing the equipment foundation, it is necessary to consider the routing of energy storage system cables by reserving trenches or entry holes.
- The reserved holes in the equipment foundation and the entry holes at the bottom of the equipment shall be properly sealed.
- Users must verify the foundation design parameters of the energy storage system based on the project's installation environment, geology, and seismic requirements.

6.3 Forklift requirements

- The energy storage system is prohibited from moving after the battery pack harness has been installed.
- If using a forklift for cabinet installation, the forklift load capacity must be ≥3 t.
- If using a forklift for battery pack installation and maintenance, the forklift load capacity must be ≥1 t.
- Recommended fork length: 1,300 mm−1,500 mm, width: 80 mm−160 mm, and thickness: 25 mm−80 mm.
- Forklift lifting height: When the foundation height is ≤0.3 m, the lifting height is ≥2 m; when the foundation height is >0.3 m, the lifting height increases accordingly.

6.4 Lifting requirements

Personnel involved in lifting operations must receive relevant training and be certified as competent before they can perform the tasks.

- The lifting area must be marked with temporary warning signs or fenced off for isolation.
- The foundation for lifting operations must meet the load-bearing requirements for the crane.
- Before lifting, the crane and lifting ropes shall be confirmed to meet the load-bearing requirements.

- Before lifting, the lifting tools shall be securely fixed to fixed structures or walls that meet the load-bearing standards.
- During lifting operations, it is strictly prohibited to walk under the crane boom or the lifted load.
- During lifting operations, it is prohibited to drag wire ropes or lifting equipment and use hard objects for impact.
- During lifting, the angle between the two cables shall not exceed 90°.
- When installing or dismantling lifting equipment, it is not allowed to drag it across the cabinet to prevent scratches.
- It is prohibited to perform lifting or moving operations after the battery pack has been installed in the energy storage system.

Lifting precautions:

Before lifting:

- Crane lifting capacity ≥3 t, working radius ≥2 m. If the on-site working conditions do not meet requirements, consult a professional for assessment.
- Personnel involved in lifting operations must receive relevant training and be certified as competent before they can perform the tasks.
- Lifting tools must be inspected and complete before use.
- Ensure that lifting tools are securely fixed to load-bearing structures or walls.
- When using outdoors, it is recommended to perform lifting operations in clear, calm weather conditions.
- Confirm that the crane and steel cables meet the requirements before proceeding with the lift.
- The doors of the equipment have all been closed and locked.
- Ensure the safe and reliable connection of steel cables.
- It is recommended to use a left-to-right or right-to-left lifting sequence to ensure a smooth lifting operation.

During lifting:

- Unauthorized personnel must not enter the lifting area, and no one shall stand under the crane boom.
- Ensure the crane is positioned correctly and avoid long-distance lifting.
- Maintain stability, ensuring that the diagonal tilt of the cabinet does not exceed 5°.
- Ensure that the angle between the two cables does not exceed 90°.
- Lift and place the equipment gently. Lower the cabinet slowly and steadily to avoid impacting the internal components.
- When the cabinet contacts the base, wait until the load on the base is evenly distributed before removing the lifting cables.
- Do not drag wire ropes or lifting equipment, and avoid equipment collisions.
- Only proceed with lifting subsequent cabinets after the initial cabinet has been securely fixed.

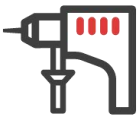
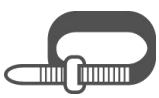
7. Equipment Installation

7.1 Preparation before installation

Prepare tools:

- The illustrated tools are for reference only, please refer to the actual product.
- Due to varying site conditions, this tool list may not cover all possible tools. Installers and users shall prepare any additional tools based on the actual situation.

Mounting tools:

 Slotted insulated screwdriver	 Phillips insulated screwdriver	 Wire stripper	 Diagonal pliers
 Wire cutter	 Art knife	 Wrench	 Rubber hammer
 Electric hand drill	 Cable drilling tool	 Cutting machine	 Tape
 Levelling instrument	 Vernier caliper	 Steel ruler	 Brush
 Cable tie	 Multimeter	 Heat gun	 Dust collector

 Lifting cable	 Insulation ladder	 Forklift	 Crane

Figure Installation tools diagram

Personal protective tools:

 Insulating gloves	 Protective gloves	 Reflective vest	 Safety belt
 Insulated shoes	 Safety helmet	 Goggles	 Protective mask

Figure Protective tools diagram

7.2 Product installation

- Step 1: Open the cabinet door and remove the items and accessories inside the cabinet
- Step 2: Confirm that the moving parts inside the cabinet are securely fixed
- Step 3: Close the cabinet door and lock it securely
- Step 4: Remove the bottom baffle

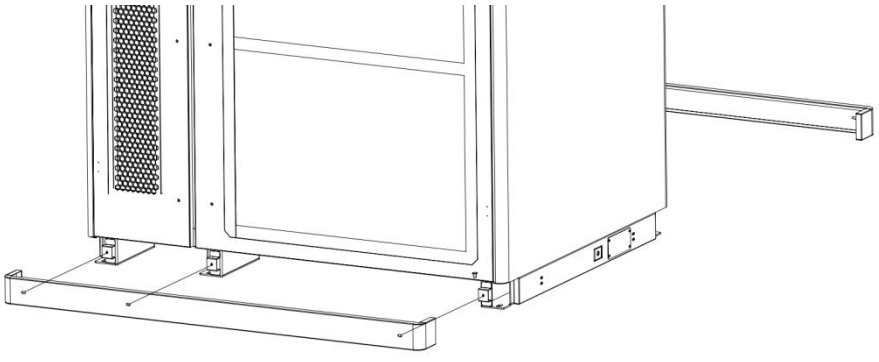


Figure Diagram of disassembly and assembly of bottom baffle

- Step 5: Use forklift① (or hoist②) to move the battery cabinet

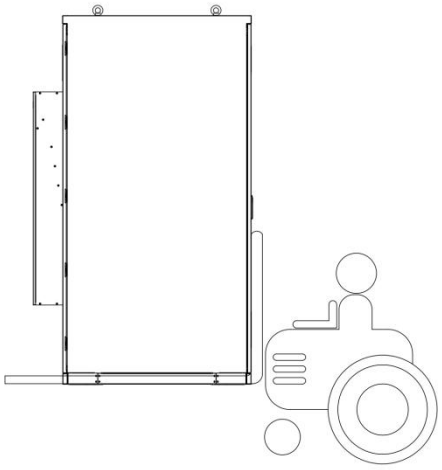


Figure Forklift operation diagram

Note①: During forklift operations, only front and rear lifting are allowed. Lifting from the sides can cause the forklift to tip over due to a shift in the center of gravity, which may result in personnel injury and equipment damage.

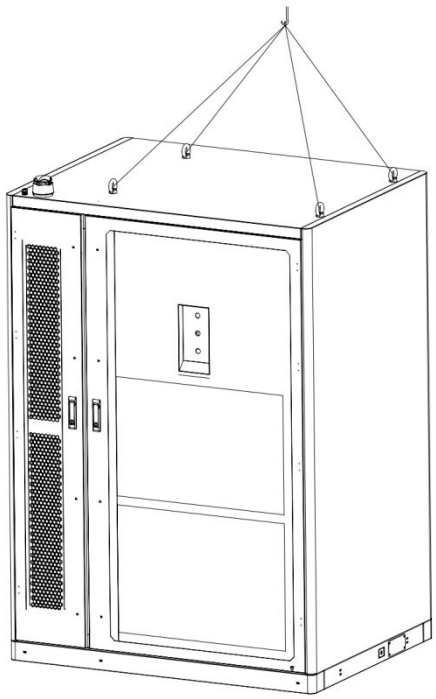


Figure Lifting diagram

Note②: During lifting operations, the angle between any two cables shall not exceed 90°. Exceeding this angle may lead to lifting accidents, causing injury to personnel and damage to equipment.

- Step 6: Secure the energy storage battery cabinet with bolts

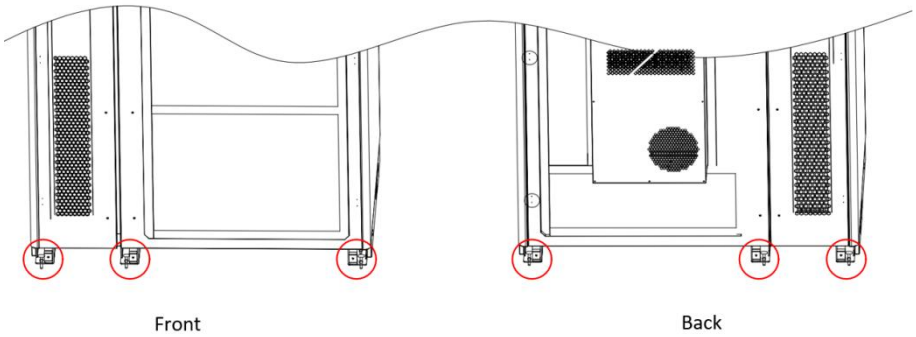


Figure Fixing diagram

——End

8. Cable Installation

8.1 Cable preparation

Before installing cables, check the following accessories:

Name	Type	Conductor Cross-section	Source
Battery pack connecting line	Prefabricated DC cable (With bellows)	35mm²	System-provided
Battery-cluster control box connecting line	Prefabricated DC cable (With bellows)	35mm²	System-provided
Cluster control box-inverter connecting line	Prefabricated DC cable (With bellows)	35mm²	Preinstalled
Inverter-AC circuit breaker	Prefabricated DC cable (With bellows)	35mm²	Preinstalled
Slave communication cable	Prefabricated cable (Wrapped with fabric material)	1.5mm²	System-provided
Master-slave communication cable	Prefabricated cable (Wrapped with fabric material)	1.5mm²	System-provided
Grid access cable	Hard-core copper wire	35mm²	Customer-provided

Table Fixing diagram

8.2 Installation of battery cabinet cables

Danger

Before installing cables, ensure all electrical switches are turned off to prevent electric shock and ensure the safety of the installation personnel.

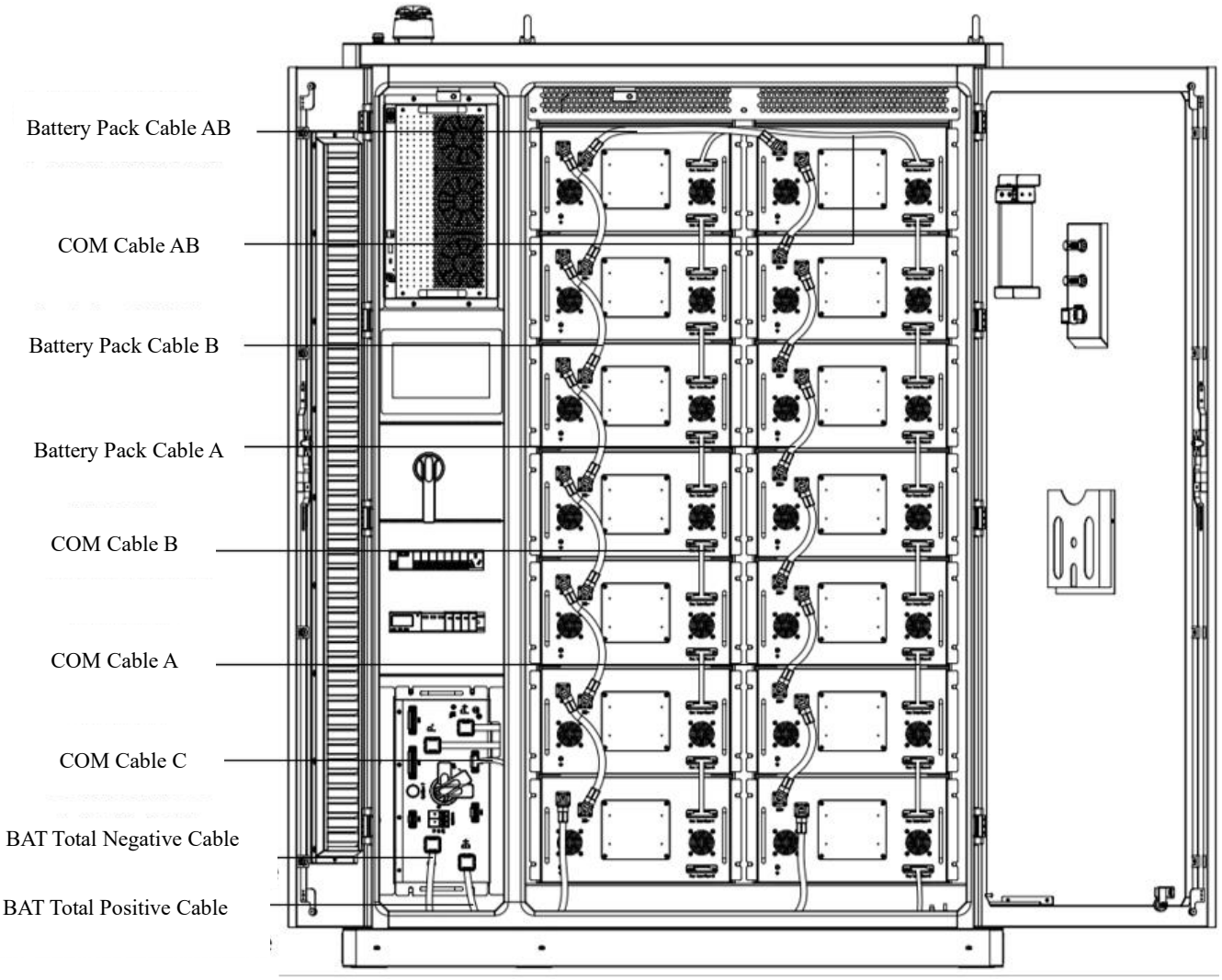


Figure Harness installation diagram

- Step 1: Check that the high-voltage cluster control box circuit breaker is in the "OFF" state
- Step 2: Install the communication harness from the high-voltage cluster control box in sequence

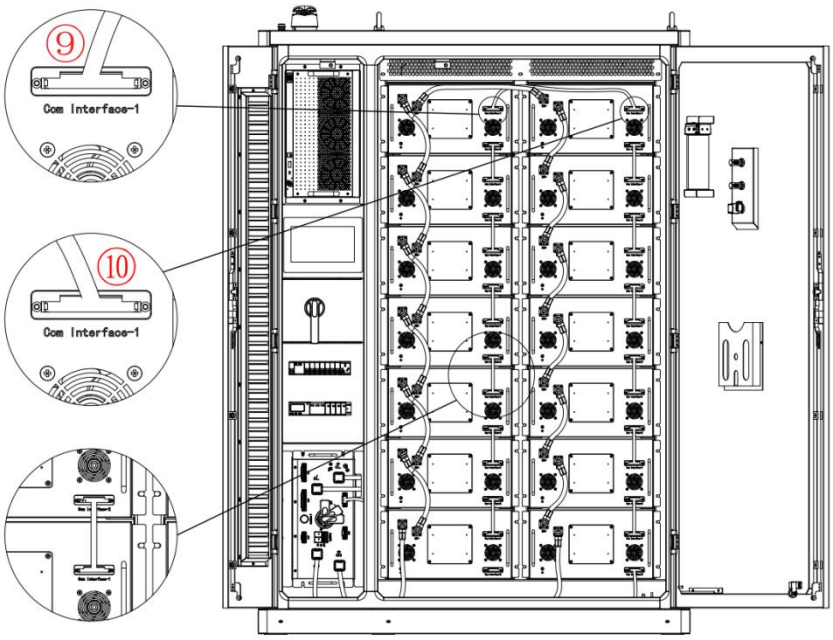


Figure Installation diagram of battery pack communication cables

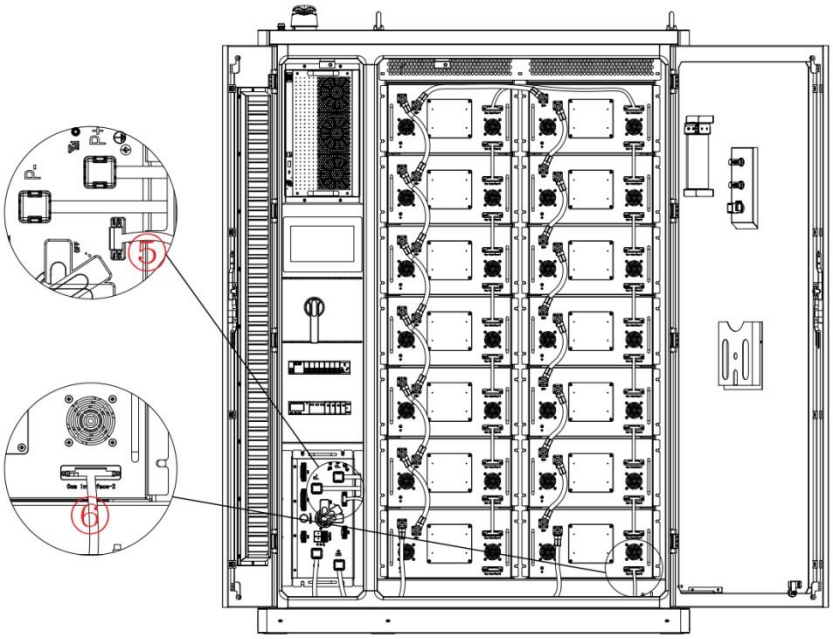


Figure Installation diagram of cluster control box communication cables

- Step 3: Install battery pack cables A and B in sequence

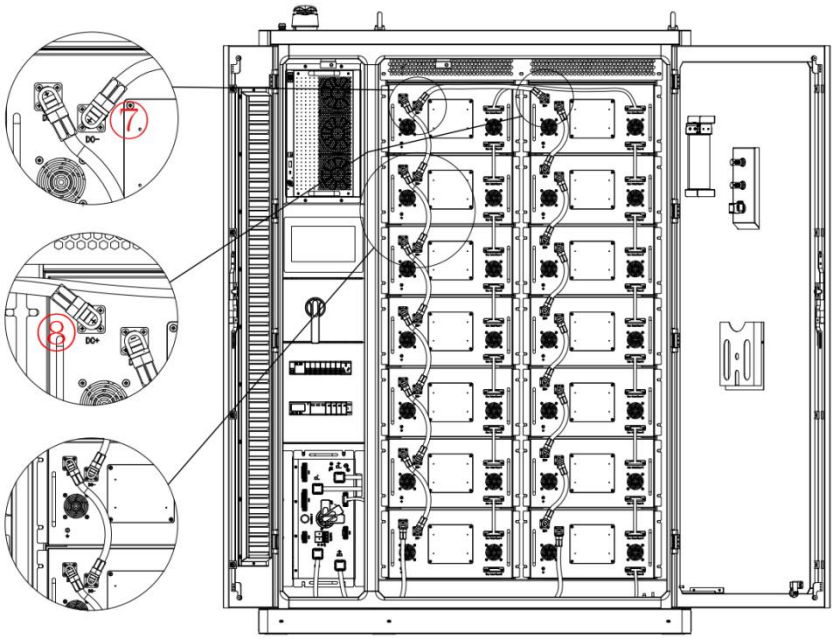


Figure Installation diagram of battery pack cables

- Step 4: Install the battery pack total positive cable; install the end ④ and then the end ②
- Step 5: Install the battery pack total negative cable; install the end ③ and then the end ①

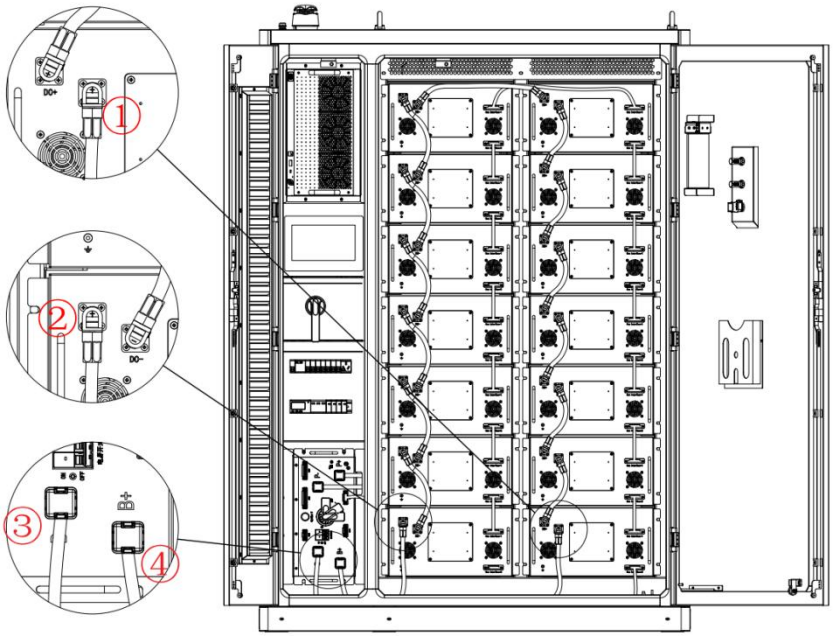


Figure Installation diagram of battery pack total positive and negative cables

——End

8.3 Cable installation at grid side

Installation diagram:

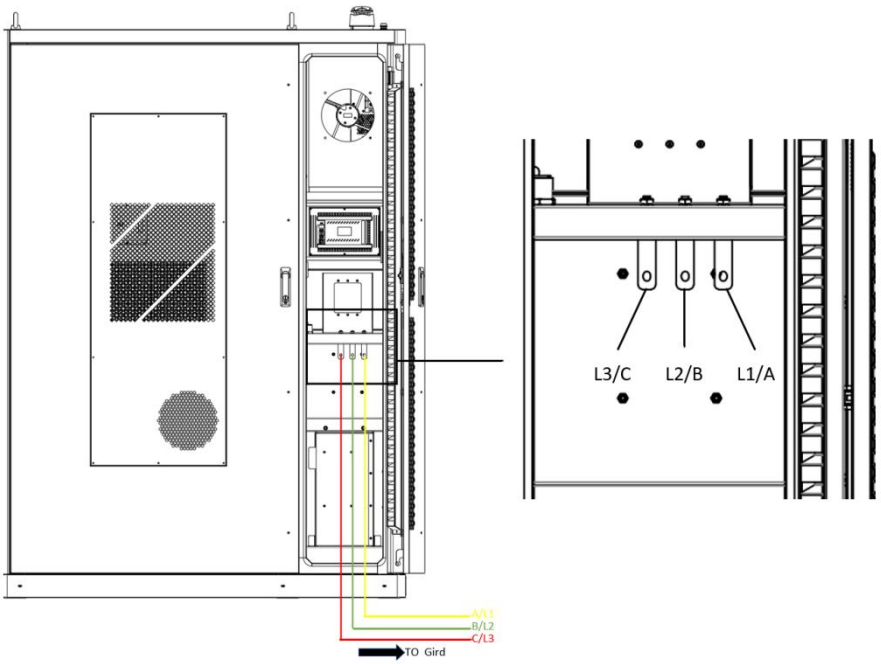


Figure Location of connection to three-phase grid

9. System Power On

Note: This process is applicable for typical DC-side energy storage battery recommendations. For actual applications, please refer to the energy storage system operational requirements and local laws and regulations.

9.1 Inspection before power on

No.	Inspection Item	Inspection Content
1	Equipment appearance	● The equipment appearance is intact and undamaged. If there is paint peeling, please repair the paint. ● The equipment labels are clear and visible, and damaged labels should be replaced in time.
2	Cable appearance	● The cable protection layer is wrapped intact without obvious damage. ● The conduit cable and hose are intact.
3	Cable connection	● The cable connection position is the same as the design. ● The terminal production meets the specifications and the connection is firm and reliable.
4	Cable routing	● The wire buckle joints are cut neatly without any exposed spikes or other phenomena. ● A margin is left as required at the turning point and tightening is not allowed.
5	Switch	● The external distribution cabinet switch is in the OFF state. ● The battery cluster switch is in the OFF state.

Table Inspection before power on

9.2 Power on procedure

Step	Item	Remark
1	Grid connected AC distribution cabinet power on	As shown in ①
2	AC distribution power on	As shown in ②
3	AC main switch of the energy storage system power on	As shown in ③
4	AC distribution box of the energy storage system power on	As shown in ④
5	Battery cluster DC circuit breaker power on	As shown in ⑤
6	Cluster control box auxiliary power supply power on	As shown in ⑥
Note: Before closing any switch, necessary safety checks shall be conducted		

Table Power on procedure

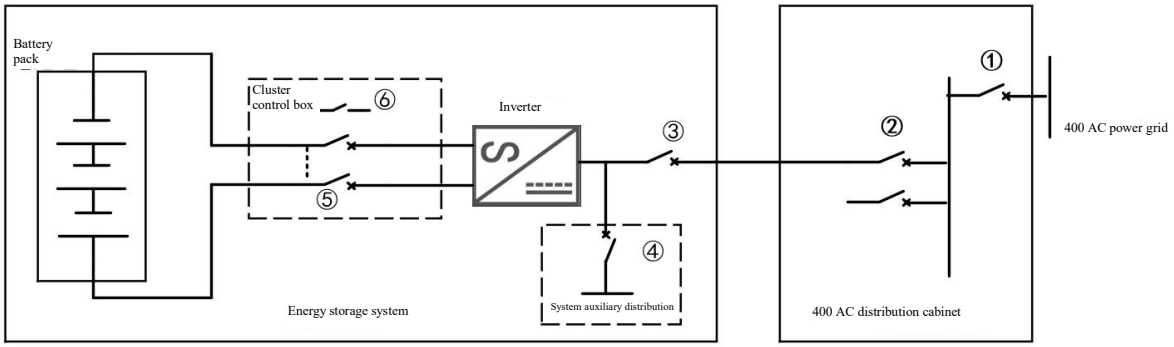


Figure Power on procedure diagram

9.3 AC-side power on

Prerequisite requirements:

- The pre-power on inspection has been completed.
- The operator is wearing personal protective equipment.
- The three-phase voltage is confirmed within the normal range before closing the circuit breaker.
- The three-phase electrical phase sequence is confirmed correct before closing the circuit breaker.

Operation steps:

- Step 1: Close the single-phase switch of the remote protection control system (if any).
- Step 2: Close the remote three-phase switch.
- Step 3: Measure the input voltage with a multimeter to ensure that it is within the normal operating voltage range.
- Step 4: Close the single-phase switch of the near end protection control system (if any).
- Step 5: Close the near end three-phase switch.
- Step 6: Measure the output voltage with a multimeter to ensure that it is within the normal operating voltage range.

——End

9.4 DC-side power on

Prerequisite requirements:

- The pre-power on inspection has been completed.
- The operator is wearing personal protective equipment.
- The AC main switch of the energy storage system is confirmed to be connected to the three-phase voltage within the normal range.
- The AC main switch of the energy storage system is confirmed to be connected to the three-phase electrical phase sequence correctly.
- The battery pack is confirmed to be connected correctly.
- The battery pack, cluster control box, and inverter are confirmed to be connected correctly.
- The power input/output protection cover of the cluster control box is confirmed to be securely closed.

Operation steps:

- Step 1: Close the auxiliary distribution switch of the battery cabinet
- Step 2: Close the miniature circuit breaker of the cluster control box
- Step 3: Close the DC circuit breaker of the cluster control box

——End

10. System Power Off

Note: This process is applicable for the typical application scenario. For actual applications, please refer to the energy storage system operational requirements and local laws and regulations.

10.1 Stop instruction issue

Prerequisite

When the system is working normally, it is connected to the bus and operates with power

Operation steps

➢Step 1: Log in to the web smart energy storage cloud platform, click on "Site System - Energy Management", reduce the planned power to "0" and save it.

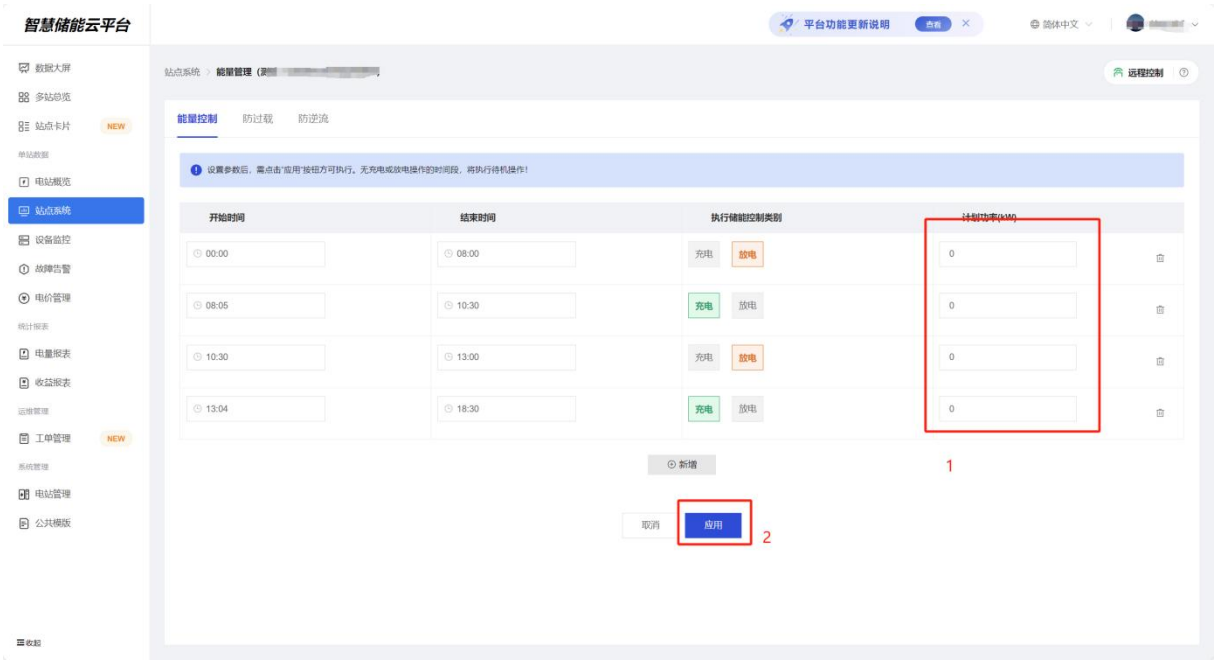


Figure Energy Storage Cloud Platform - Energy Control

➢Step 2: Click on "Equipment Monitoring - PCS" to check the AC active power and confirm that the power has stopped.

➢Step 3: Click on "Equipment Monitoring - PCS" to check the DC power and confirm that the power has stopped

➢Step 4: Click on "Equipment Monitoring - BMS" to check the current and confirm that the battery has exited the charging and discharge state

——End

10.2 Energy storage system power off

Operation steps:

- Step 1: Disconnect the distribution switch of the energy storage system
- Step 2: Disconnect the AC main switch of the energy storage system
- Step 3: Disconnect the DC main switch of the energy storage system

——End

10.3 AC distribution power off

Operation steps:

- Step 1: Disconnect the AC distribution switch
- Step 2: Disconnect the power distribution switch of the grid connection point

——End

11. System Maintenance

11.1 Maintenance instructions

With the increase in service life and the influence of environmental temperature, humidity, dust, and vibration, the components inside the energy storage system will age, which will affect the performance of the energy storage system and even lead to malfunctions that cannot function properly.

Therefore, it is necessary to implement daily and regular maintenance on the energy storage system to ensure its normal operation and service life. All measures and methods that contribute to the good working condition of energy storage systems belong to the scope of maintenance work.

In case of a fault, please contact our company. At the same time, provide the following information to offer you with better service:

- Photos of the fault site.
- Model and serial number of the faulty product.
- Information on relevant components connected to the product.
- Installation and connection plan for energy storage system.
- Fault information and brief description.

11.2 Maintenance precautions

Warning

Only personnel who have received relevant training and qualifications can perform maintenance operations on the energy storage system.

Caution

When performing maintenance, avoid leaving metal items such as screws and washers inside the energy storage system to prevent potential damage to the system.

When servicing and maintaining the energy storage system, safety shall be the top priority. To protect the operators, the rules below must be followed:

- Disconnect the external connection of the energy storage system.
- Ensure that the energy storage system is not accidentally powered on.
- Before maintenance, use a multimeter to measure and ensure that the components being maintained are not electrified.
- Ensure that the system is well grounded.

11.3 Maintenance details

Maintenance Item	Maintenance Content	Recommended Period
Record keeping	Export data via USB and save backup.	1 month
System inspection	Observe the appearance of the energy storage system for any damage, deformation, or rust. Observe various parameters during operation. Use a thermal imaging device or other detection system to monitor the heating situation. Check whether the ventilation, ambient temperature, humidity, dust and other environmental conditions around the inverter meet the requirements.	3 months
Air conditioning service	Check for dust. Use compressed air for cleaning. Replace the air filter screen.	3 months
Safety functions	Check whether the emergency stop button is faulty. Check whether the command issuance function is faulty.	6 months
Identification inspection	Check the warning signs and other equipment identifications on the machine body. If they are found to be blurry or damaged, replace them in time.	6 months
Electrical connection	Check all electrical connections for looseness or poor contact. Check whether all cables and metal surfaces in contact with the skin are damaged or scratched. Check whether the insulation wrapping tape of all wiring terminals has fallen off Check for signs of overheating in the screw position. Check whether there is any color change in the wiring copper bars and screws.	12 months
Circuit breaker maintenance	Check the circuit breakers for failure. Check whether the circuit breaker or load switch is damaged.	12 months

Table Maintenance details