DLXNPOWER



Air-Cooled 100-120kWh LFP Energy Storage Cabinet User Manual

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Abbreviations

Abbr.	Full Name	中文
BMS	Battery Management System	电池管理系统
BMU	Battery Monitor Unit	电池PACK 管理单元
BCU (or RCU)	Battery Cluster Management Unit (or Rechargeable Cluster Unit)	电池簇管理单元 (或主控模块)
SOC	State of Charge	电池荷电状态
SOP	State of Power	电池功率状态
SOE	State of Energy	电池能量状态
SOH	State of Health	电池健康度

Safety Instructions and Warnings

Before using this product, please carefully read and comply with the following safety notes and warnings to ensure personal safety and equipment safety during operation. Key points are as follows: Do not disassemble the battery module by yourself; the battery module shall always be placed upright; prevent the battery from short circuiting; do not use damaged battery modules; avoid over-discharging or over-charging the battery; keep away from high-temperature environments and open flames; observe environmental requirements during storage; and keep the product out of reach of children. To guarantee safe and reliable operation, thoroughly read the safety-related statements in this product manual before use and strictly follow the instructions for operation.

Our products and manuals are continuously improved and upgraded to enhance customer satisfaction. If there are discrepancies between this manual and the actual product, this may be due to version updates. Please refer to the physical product. Should you have any questions, please contact our company.

Scope of Application

This manual covers the following equipment:

- **DLXN-GC100 Outdoor Battery Cluster**
- **DLXN-GC120 Outdoor Battery Cluster**

The following uses the 120 kWh outdoor battery cluster (Model: DLXN-GC120) as an example. Content is for reference only, please refer to the specifications of the actual model.

I. Product Overview

I.1 Product Introduction

This product uses aluminum-cased 0.5C/3.2V/314Ah LiFePO4 cells as the energy storage medium, featuring safety, long cycle life, high system efficiency, modular design, and easy installation and maintenance. PACKs are assembled using laser spot-welding technology. Each battery module PACK consists of 20 cells connected in series (1P20S/64V/314Ah), with a rated capacity of 20 kWh. Six battery PACKs are connected in series to form one cluster, with a total energy of 120 kWh, connected to the BMS high-voltage box and hybrid inverter.

The complete system components are listed in Table 1 below:

Table 1: System Component List

No.	Product	Description	Unit	Qty
1	Energy Storage Battery Pack	120 kWh	Set	1
2	Battery Management System	RCU+BMU two-tier architecture for battery status monitoring and safety protection	Set	1
3	Fire Suppression System	Aerosol	Set	1
4	HVAC System	1.5 kW	Set	1

I.2 Product Parameter Specifications

Table 2: Product Specifications

No.	Item	Specification
1	Nominal Voltage	384V
2	Nominal Capacity	314Ah
3	Operating Voltage Range	342V-432V
4	Cluster Configuration	1P120S
5	Standard Charge Current	157A
6	Standard Discharge Current	157A

7	Discharge Temperature	-20~55℃
8	Charge Temperature	0-55℃
9	Dimensions (WxDxH)	674*1230*2150mm

I.3 Main Features:

- Complete automatic fire suppression system: includes temperature and smoke detectors, aerosol fire extinguishing devices, and audio-visual alarms.
- Intelligent HVAC system: automatically activates when ambient temperature exceeds the set value, maintaining the temperature within range to ensure stable equipment operation.
- The BMS in the high-voltage box uses a two-tier architecture: the BCU master controller (cabinet level) and the BMU slave controller (PACK level). The BMU precisely collects voltage and temperature data from each cell for real-time battery status monitoring. The BCU communicates with BMU modules via daisy-chain to detect individual cell voltage and temperature, and measures external parameters such as total battery voltage, charge/discharge current, and ground insulation resistance. Using appropriate algorithms, it estimates and monitors internal battery states (capacity, SOC, SOH), enabling charge/discharge management, thermal management, cell balancing, and fault alarm. Details as follows:

  ➢Communication supports RS485 and CAN;

  ➢ Voltage acquisition per cluster: 0-1000 V;

  ➢ Current acquisition per cluster: 0-150 A;

  ➢ Slave module power supply: 9-32 Vdc (24 Vdc recommended);

  ➢ Battery pack fan power supply: 9-32 Vdc (24 Vdc recommended);

  ➢ Cluster status data processing: aggregates real-time battery pack data from slave modules via CAN communication, enabling battery charge/discharge management and control;

➢ Battery (cell/module) protection and alarm for: over-voltage, under-voltage, voltage spread, over-current, under-current, over-temperature, under-temperature, temperature spread, short circuit, insulation fault, and relay diagnostics;

I.4 Applicable Standards

Table 3: Key Referenced Standards

Standard No.	Name
GB/T 36558-2023	General Technical Conditions for Electrochemical Energy Storage Systems in Power Systems
GB/T 36276-2023	Lithium-ion Batteries for Electrical Energy Storage
GB/T 34131-2023	Battery Management Systems for Electrical Energy Storage
GB/T 34120-2023	Power Conversion Systems for Electrochemical Energy Storage Systems
NB/T 33014-2014	Code for Operation and Control of Electrochemical Energy Storage Systems Connected to Distribution Networks
NB/T 33015-2025	Acceptance Specification for Grid-Connected User-Side Electrochemical Energy Storage Systems
NB/T 33016-2014	Test Code for Electrochemical Energy Storage Systems Connected to Distribution Networks
GB 7251	Low-Voltage Switchgear and Controlgear Assemblies
GB 21966-2008	Safety Requirements for Transport of Lithium Primary and Secondary Batteries
GB/T 4208-2017	Degrees of Protection by Enclosures (IP Code)
GB/T 13384-2008	General Technical Conditions for Packaging of Mechanical and Electrical Products
DL/T 2528-2022	Fundamental Terminology of Electrical Energy Storage
GB/T 2423	Basic Environmental Testing Procedures for Electronic and Electrical Products

II. Structure and Installation

II.1 Cabinet Structure and Internal Layout

(1) Exterior Description:

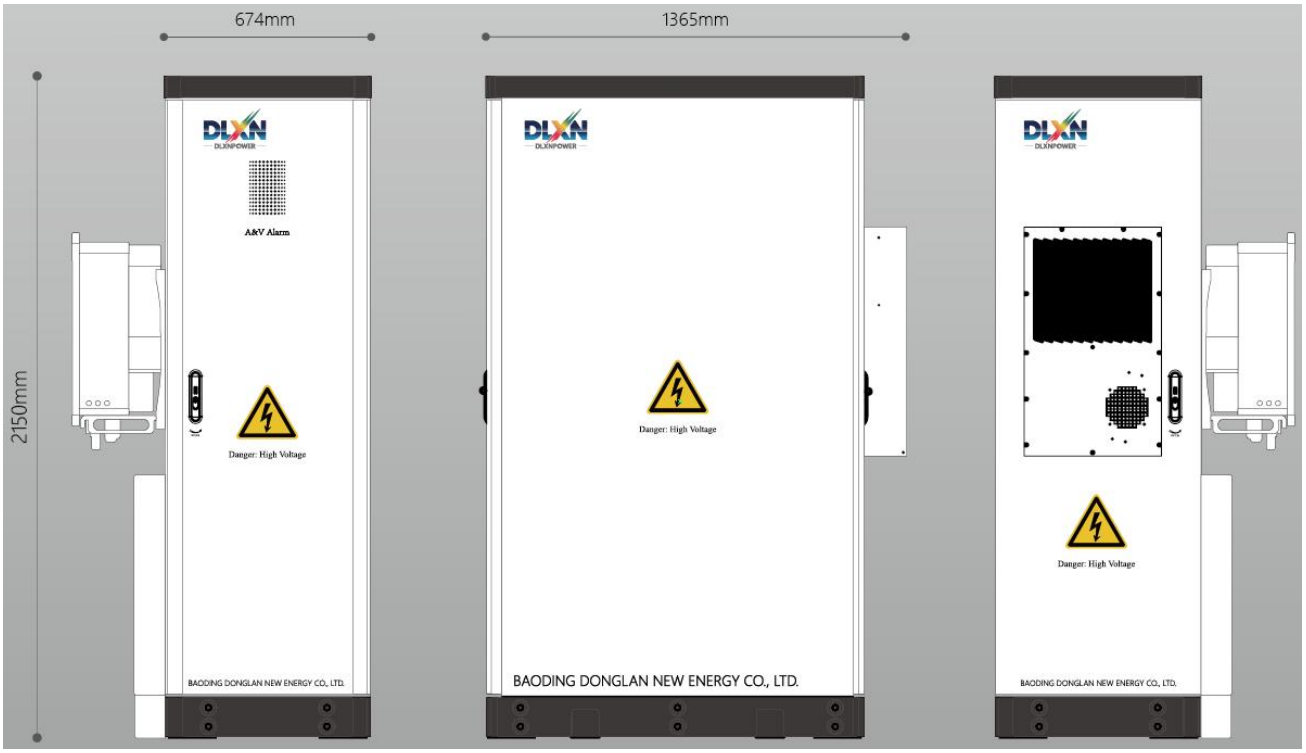


Fig. 2.1 Cabinet Exterior

This product features a high-strength metal frame and sheet-metal construction, forming an integrated outdoor protection cabinet. Overall cabinet dimensions (W x H x D) are 674 mm x 1230 mm x 2150 mm (excluding air conditioner); total depth with air conditioner is approximately 1368 mm. The front has a single-door design, providing direct access to all core components for operation and maintenance; the rear has ventilation grilles. The entire cabinet is rated IP55 with anti-corrosion grade C3; surfaces are pre-treated and coated to withstand harsh outdoor environments.

(2) Internal Layout:

The internal layout is shown below:

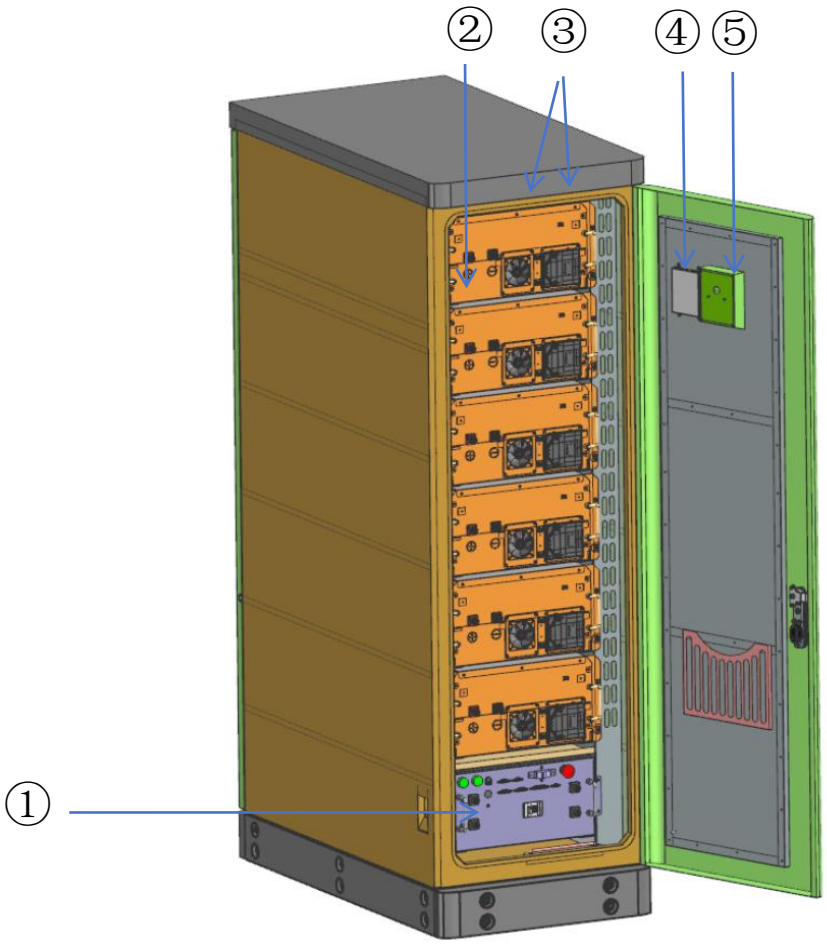


Fig. 2.2 Cabinet Internal Layout

Note: The images above are for reference only. Please refer to the actual product received.

Table 4: Cabinet Internal Layout Description

No.	Description
1	High-Voltage Box (BMS)
2	Battery Module (PACK)
3	Smoke and Temperature Detectors
4	Aerosol Fire Extinguishing Module
5	Fire Alarm with Audio-Visual Indicator

(3) High-Voltage Box External Terminals:

The high-voltage box exterior is shown below:

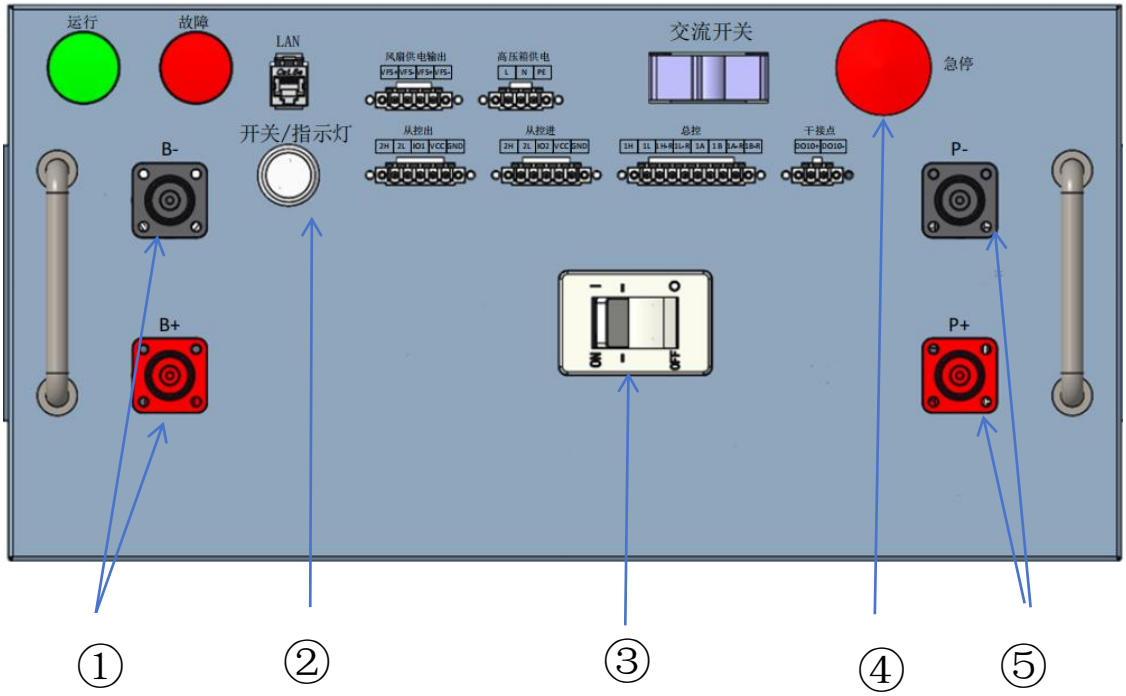


Fig. 2.3 High-Voltage Box Exterior

Table 5: High-Voltage Box External Terminal Description

No.	Description
1	HV Box Voltage Input - Battery Cluster Total +/- Terminals: B+, B-
2	HV Box Start Button
3	HV Box HV DC Output Isolation Switch
4	HV Box Emergency Stop Button
5	HV Box Voltage Output - Battery Cluster Total +/- Terminals: P+, P-

(4) Battery Module (PACK) External Terminals:

The battery module (PACK) exterior is shown below:

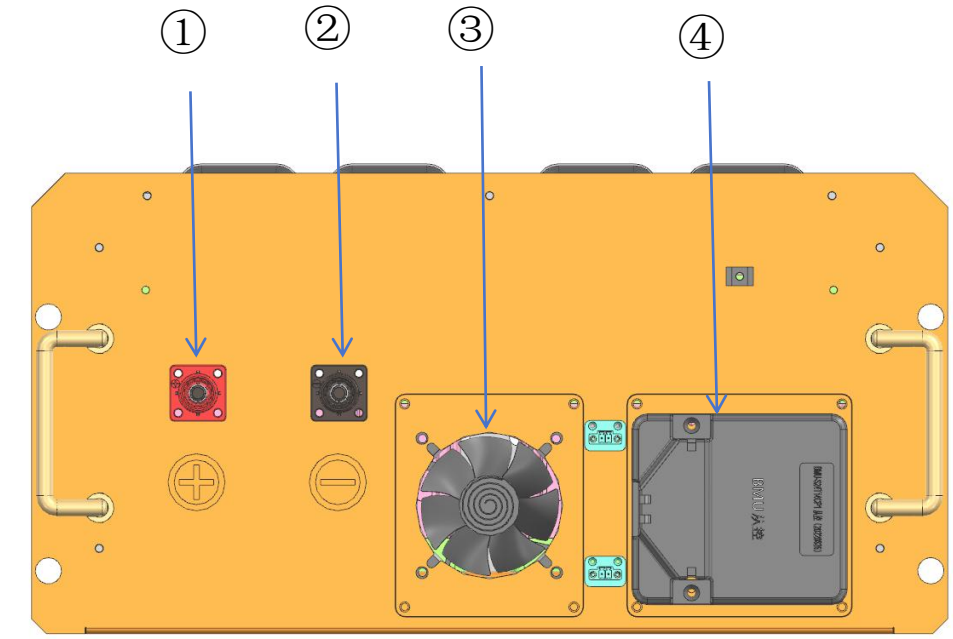


Fig. 2.4 Battery PACK Exterior

Table 6: Battery PACK External Terminal Description

No.	Description
1	Battery PACK Positive Terminal
2	Battery PACK Negative Terminal
3	Fan
4	BMU Slave Controller Module

II.2 Installation and Wiring Requirements

1 Pre-Installation Inspection

- Check delivered items:

Verify completeness of delivered items against the enclosed packing list.

- Inspect equipment:

Verify that the cabinet received matches the ordered model.

Inspect the product and internal equipment for any damage.

If any issues or questions are found, contact the carrier or our company immediately.

Note: Only equipment that is complete and free of damage may be installed! Before installation, ensure:

(1) The cabinet itself is intact and free of damage.

(2) All equipment inside the cabinet is intact and free of damage.

3 Foundation and Placement

- The equipment shall be installed on a flat, solid concrete foundation with a load-bearing capacity >= 2800 kg.
- The cabinet is securely fixed to the foundation through mounting holes at the four corners of the base; the supplied expansion bolt kit is recommended.
- The installation site should be protected from sand, rain, and snow, and free from severe vibration or explosive/corrosive gases.

The outdoor installation foundation requirements are shown below:

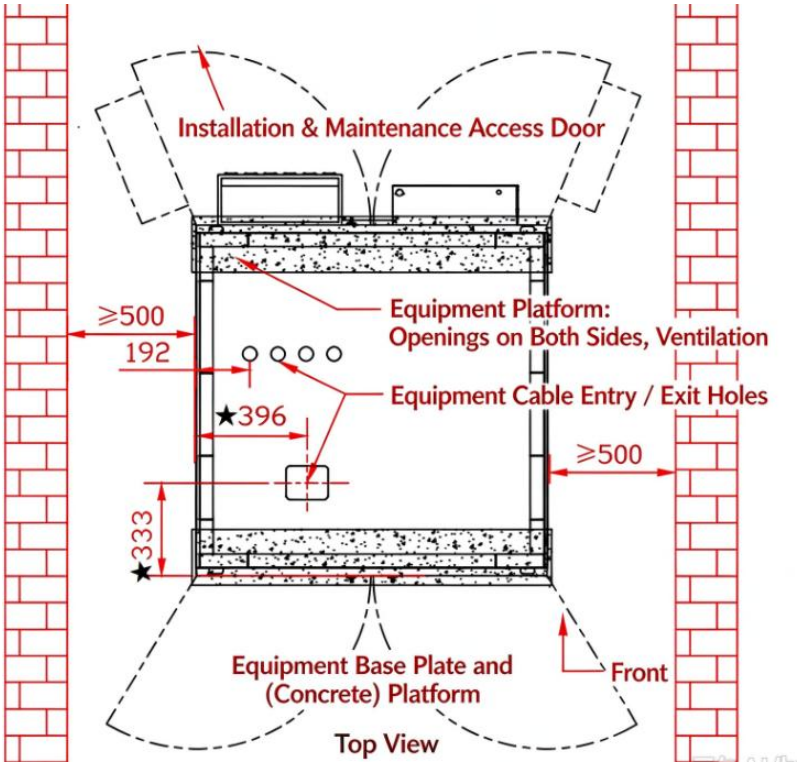


Fig. 2.5 Outdoor Installation Foundation

4 Layout Clearances

- Face-to-face layout: recommended clear distance >= 3 m between cabinet operating sides for forklift access and maintenance.
- Side-by-side layout: recommended distance from cabinet rear to walls or other obstructions >= 1.5 m for ventilation and maintenance; recommended gap between cabinets is 40 mm.
- Operating side (door opening side) recommended clearance to obstacles >= 1.5 m.

5 Electrical Wiring

5.1 Safety Precautions

(1) Personnel Safety

- Personnel performing high-voltage operations or installing AC equipment must be qualified for high-voltage and AC electrical work;
- During installation, maintenance, and other operations, personnel must take appropriate protective measures such as wearing anti-static clothing and gloves, and remove conductive items such as jewelry and watches to avoid electric shock or burns.

(2) Operational Safety

- Before using this product, carefully read the "Safety Precautions" to ensure correct and safe operation;
- Place clear labels on front and rear switches to prevent accidental switch closure;
- Operate strictly in accordance with requirements;
- Avoid using this equipment in direct sunlight, rain, or humid environments;
- Do not place the equipment in fire or near electric heaters, furnaces, or similar devices;
- Provide your own fire extinguisher and use it properly in case of fire.

(3) Electrical Safety

- Electrical connections must be made strictly as described in this manual;
- Before powering on, verify that the equipment is properly grounded and all wiring connections are correct;
- Use dedicated tools when performing high-voltage and AC operations;

- When the equipment needs to be moved or rewired, disconnect the power supply and ensure the equipment is fully de-energized before proceeding;
- Inverter maximum load capacity is 50 kW; the total power of all loads must not exceed 50 kW. If motor or other inductive loads are present, ensure that the combined transient peak power does not exceed 50 kW, as this may damage the inverter;

If the system will not be used for an extended period, turn off all battery and controller switches, and power on every 3 months to top up the battery, maintaining a minimum SOC of 30%.

5.2 Electrical Wiring

- Grid connection: via waterproof cable entry at the cabinet bottom or side, using (3W+PE) three-phase three-wire or (3W+N+PE) three-phase four-wire AC cable; cable rating shall be selected based on maximum current (>=200 A) and on-site short-circuit capacity.
- Grounding: the cabinet has a dedicated ground busbar; a green/yellow conductor of the specified cross-section must be used to connect reliably to the site grounding grid. Grounding resistance shall be <= 4 ohms.
- Communication cables: shielded twisted-pair cable is recommended for external communications, routed through conduit or cable trays, and kept away from strong electromagnetic interference sources.

II.3 Packaging, Transportation, and Storage

Packaging: The product is packed in a sturdy wooden crate or steel-frame box with shock-absorbing material inside. The exterior is clearly labeled with product information, gross weight, dimensions, orientation mark, rain protection mark, and fragile mark.

Transportation: During transport, avoid severe vibration, impact, inversion, and exposure to sun and rain. Mixing with corrosive items is strictly prohibited. Air-ride or shock-absorbing vehicles are recommended.

Storage: For long-term storage, place in a dry, ventilated indoor environment free of corrosive gases. Recommended ambient temperature: 25 +/- 5 deg C; humidity: 45%-85%. The battery system should be stored at

40%-60% SOC. If storage exceeds 3 months, a supplementary charge every 3 months is recommended to maintain battery health.

Note： Note: The air conditioner must never be tilted during handling, storage, or operation. Ensure it remains upright at all times; do not lay it flat or invert it.

II.4 Operating Environment Conditions

The equipment placement area must have good ventilation. Avoid the following operating environments:

- Locations exceeding specified limits (temperature: -10 deg C to 50 deg C, relative humidity: 0%-95% RH) -- excessively hot, cold, or humid environments;
- Locations with direct sunlight or near heat sources;
- Locations subject to vibration or impact;
- Locations with dust, corrosive substances, volatile gases, conductive metal dust, or high salt content.
- The equipment placement area must have good ventilation and be kept away from water sources, heat sources, corrosive agents, and flammable/explosive materials;

Table 7: Operating Environment Conditions

Environmental Parameter	Specification	Remarks
Altitude	2000 m (max)	
Extreme Max Temperature	55 deg C (max)	
Extreme Min Temperature	-20 deg C (min)	
Annual Average Temperature	40 deg C (max)	
Operating Humidity	0%-95% RH (non-condensing)	
Installation Location	Outdoor	
Installation Inclination	<= 5 deg	Relative to vertical mounting surface

III. Trial Operation

III.1 Pre-Start Inspection

Before trial operation, thoroughly inspect the equipment installation. Pay particular attention to verifying that DC and AC voltages meet inverter requirements, and that polarity and phase sequence are correct.

Verify that all connections comply with relevant standards and that the system is properly grounded. Grounding resistance is critical to overall system safety and must meet requirements before the first trial operation: grounding resistance must not exceed 4 ohms.

Note：All electrical connections must comply with national and local electrical codes. Before trial operation, ensure that all switches on both DC and AC sides are in the OFF position.

III.2 Equipment Wiring Instructions

1、Battery PACK to High-Voltage Box Connection:

Connect the positive and negative terminals of battery packs 1-6 in series sequentially; the total positive and total negative of the battery string connect to the 'B+ and B-' terminals on the left side of the high-voltage box;

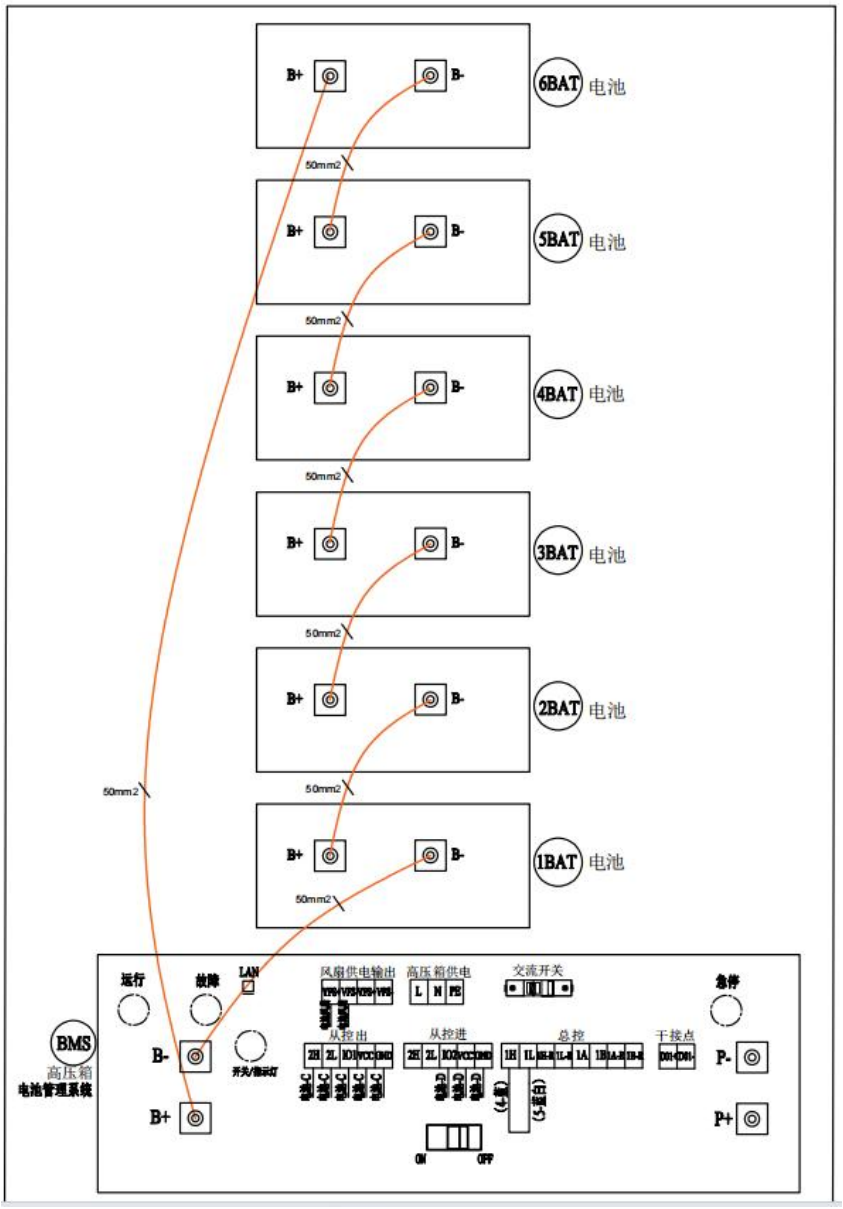


Fig. 3.1 Battery Positive/Negative Wiring Diagram

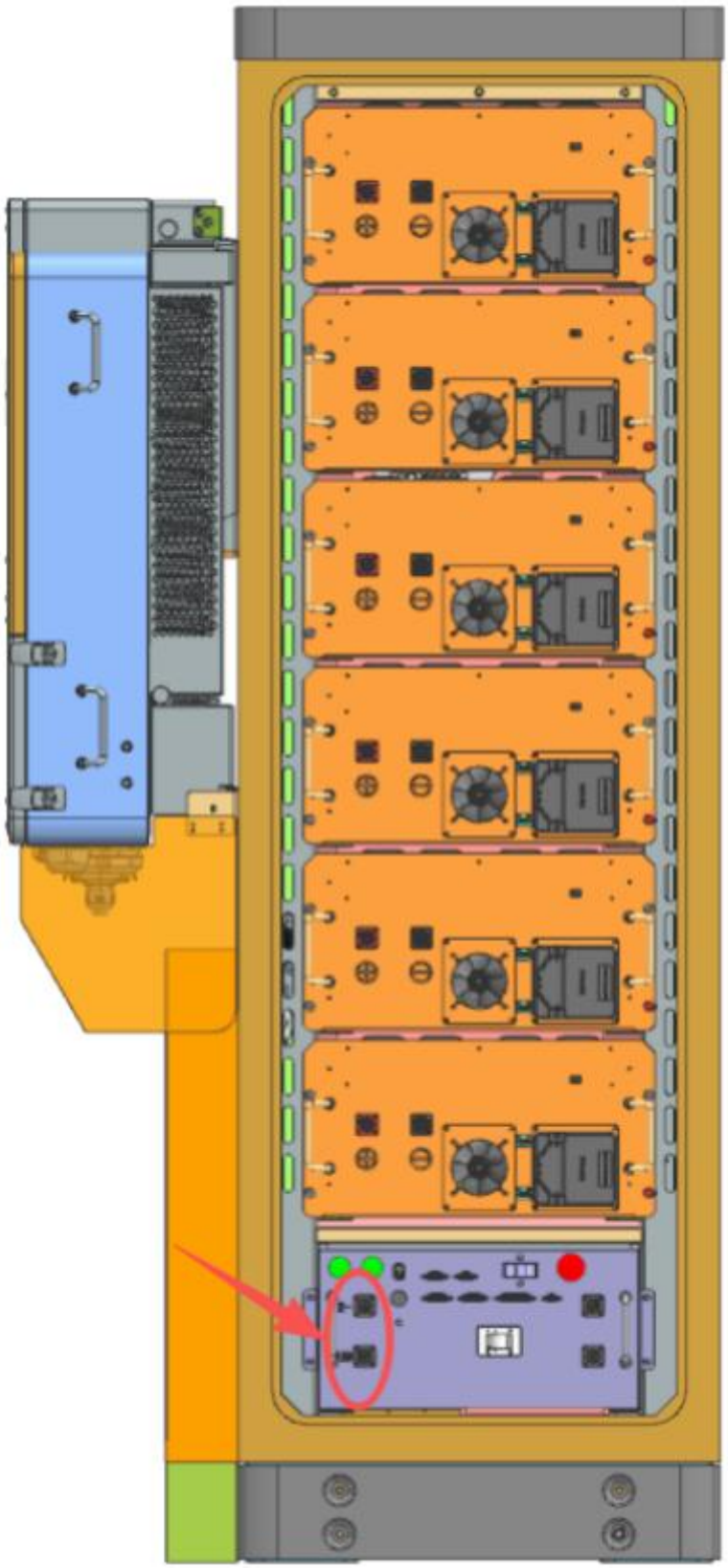


Fig. 3.2 High-Voltage Box BMS to Battery PACK Wiring (Cabinet Internal Detail)

The high-voltage box BMS detail is shown below:

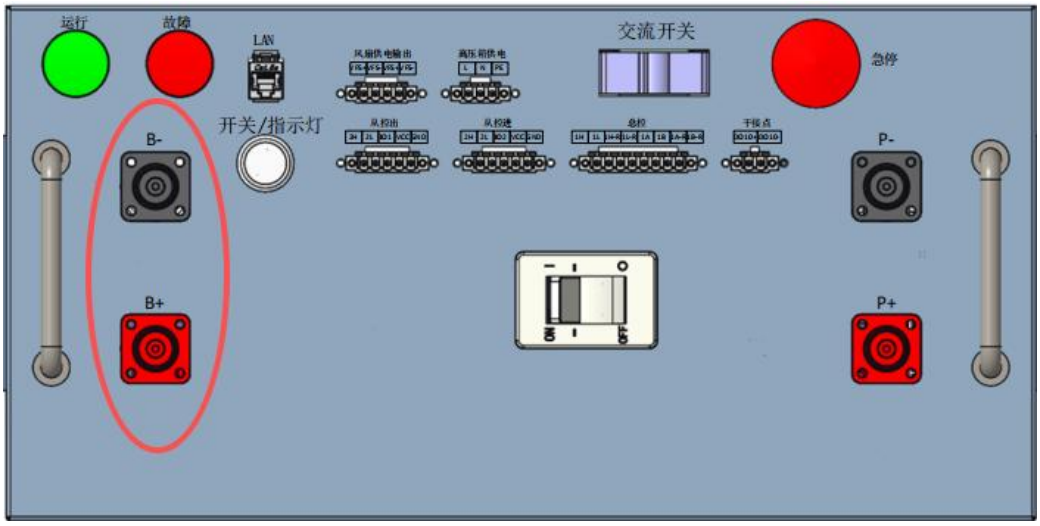


Fig. 3.3 High-Voltage Box BMS to Battery Wiring

2. Battery Cluster to Inverter Power Terminal Connection:

The 'P+ and P-' power terminals on the right side of the high-voltage box connect to the inverter's 'BATTERY' terminals 'BAT+ and BAT-';

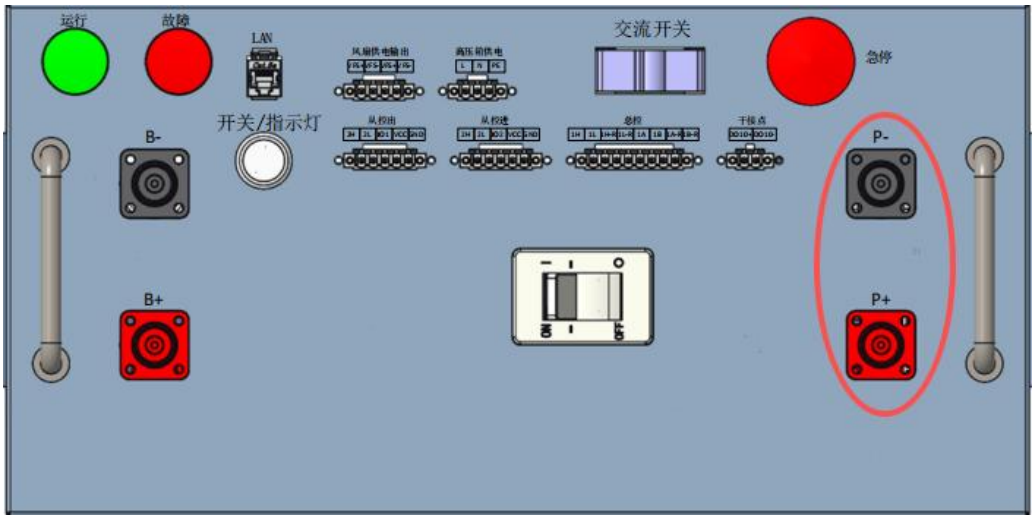


Fig. 3.4 High-Voltage Box BMS to Inverter Battery Terminal Wiring

Our battery clusters are compatible with multiple inverter brands. Only the most commonly used inverters are listed here: Growatt, INVT, GoodWe, Solis, etc.

（1）Battery power terminals of the 50 kW Growatt inverter are shown below:

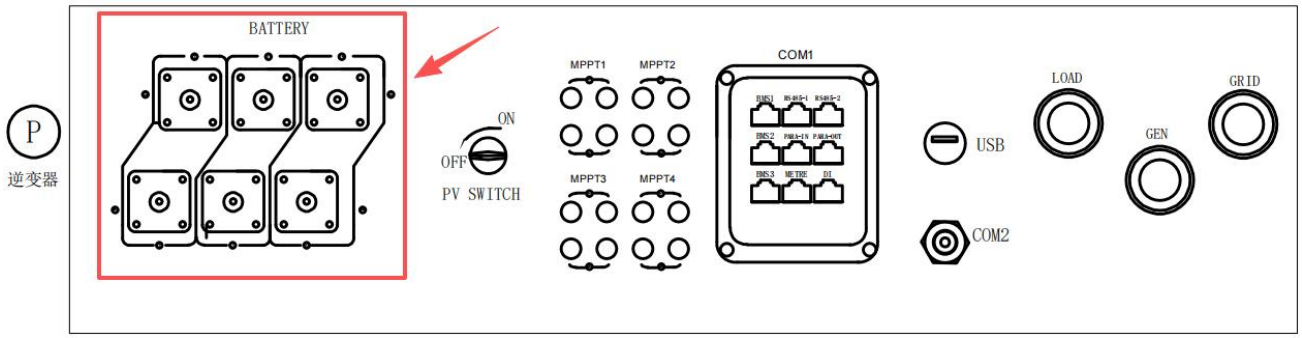


Fig. 3.5 50 kW Growatt Inverter Battery Terminal Wiring

（2）Battery power terminals of the 50 kW INVT inverter are shown below:

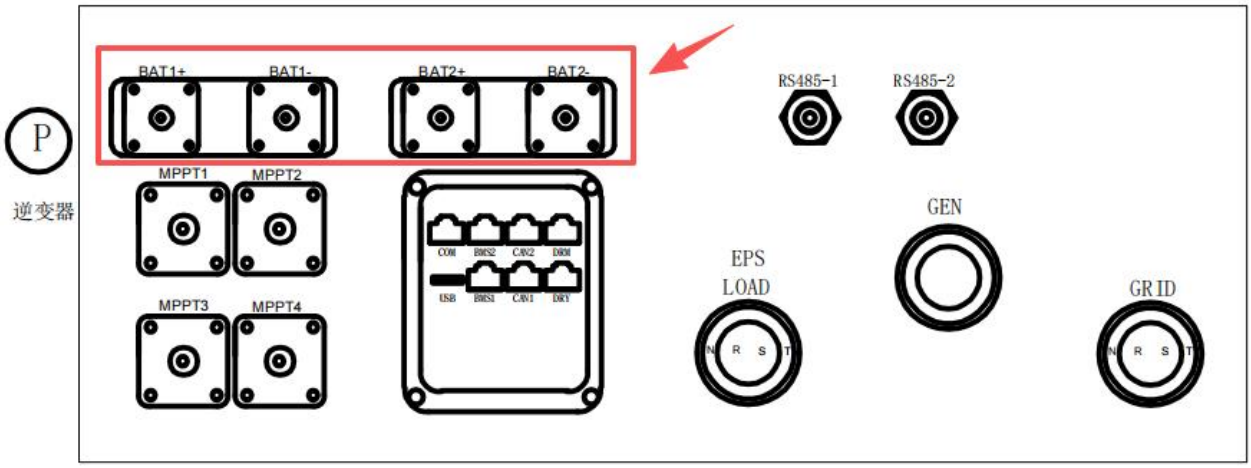


Fig. 3.6 50 kW INVT Inverter Battery Terminal Wiring

Actual photo of the 50 kW INVT inverter is shown below:

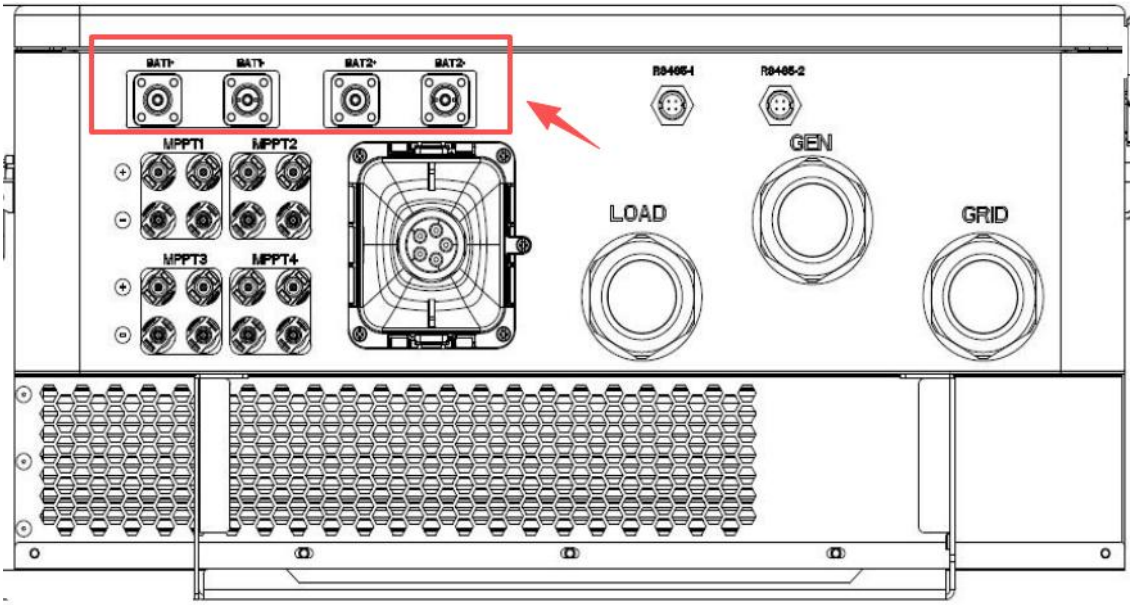


Fig. 3.7 50 kW INVT Inverter Battery Terminal Wiring (Actual Photo)

（3）Battery power terminals of the 50 kW GoodWe inverter are shown below:

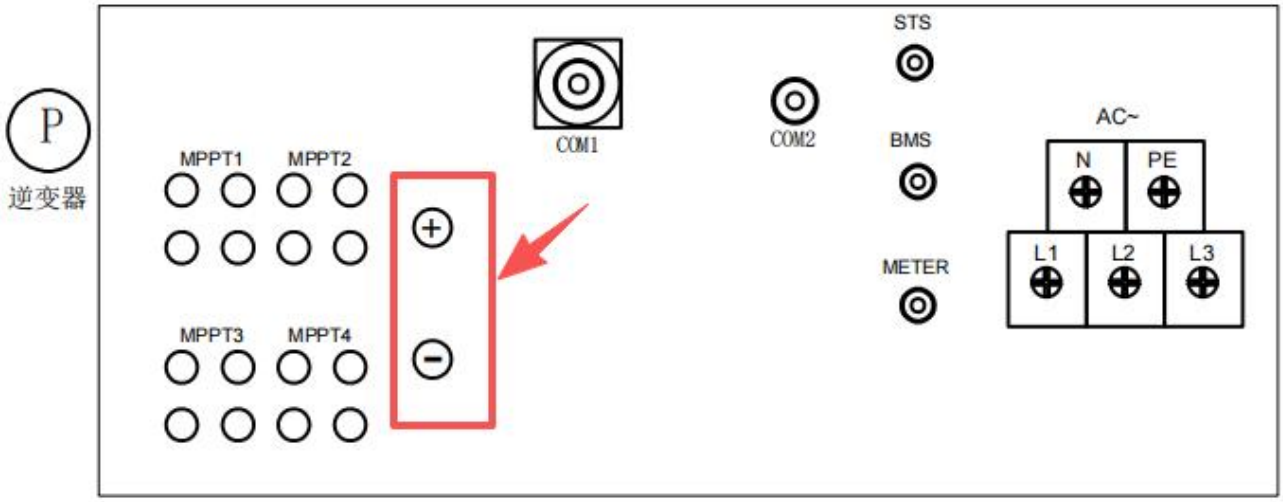


Fig. 3.8 50 kW GoodWe Inverter Battery Terminal Wiring

（4）**Battery power terminals of the 50 kW Solis inverter are shown below:**

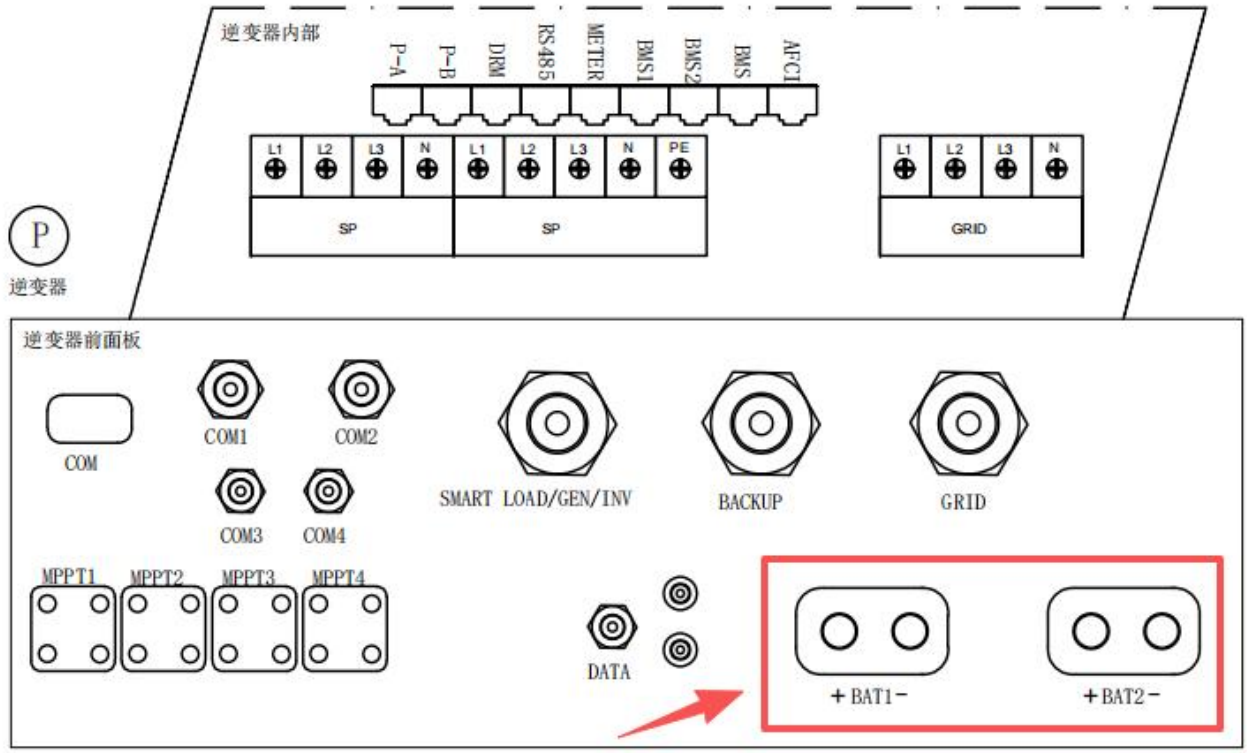


Fig. 3.9 50 kW Solis Inverter Battery Terminal Wiring

3. Battery to Inverter Communication Cable Connection:

The H,L communication terminals on the Master Control of the high-voltage box connect to the inverter's communication port;

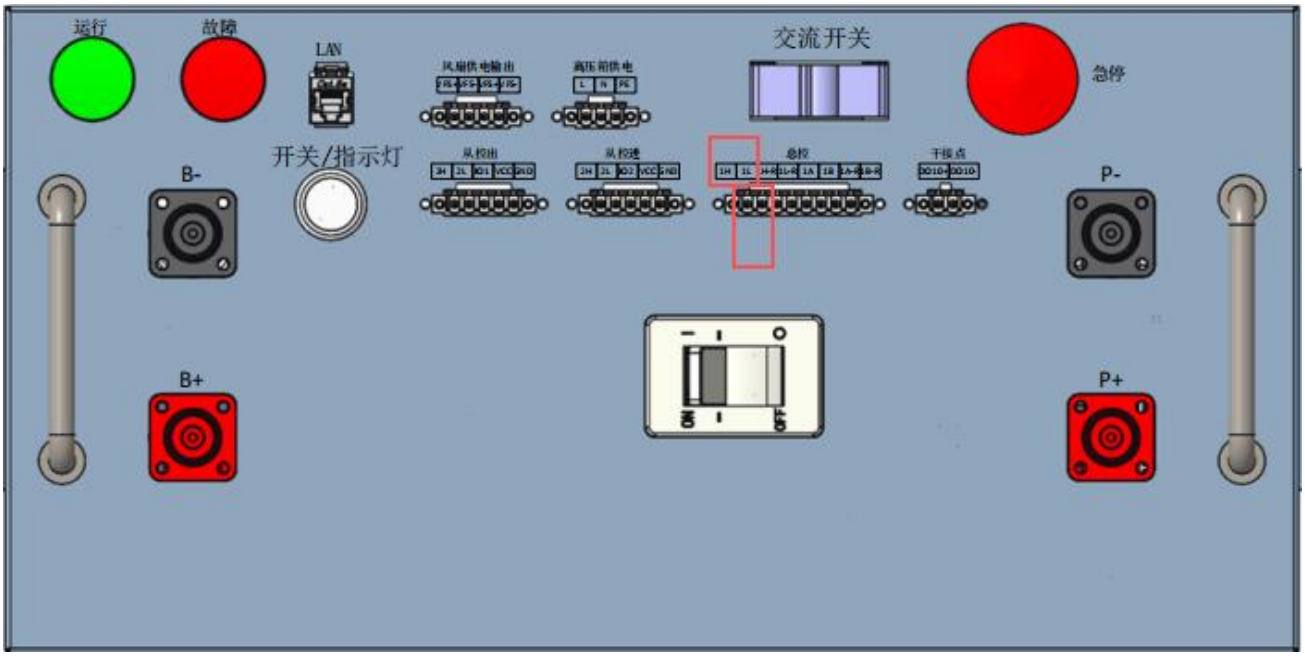


Fig. 3.10 High-Voltage Box BMS Communication Terminals

Inverter communication ports:

(1) **50 kW Growatt Inverter**:

The H,L communication terminals on the Master Control of the high-voltage box connect via network cable to the inverter COM1 > BMS1 port:



Fig. 3.11 50 kW Growatt Inverter Communication Terminals (Actual Photo)

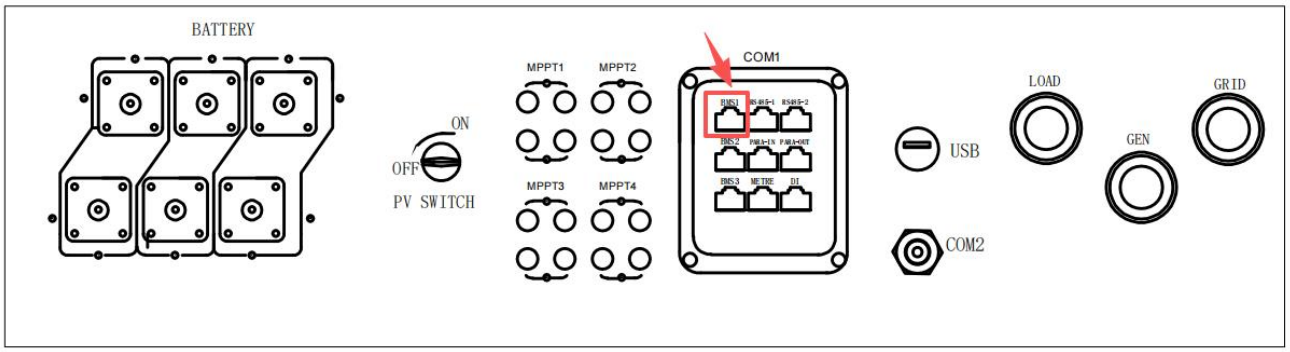


Fig. 3.12 50 kW Growatt Inverter Communication Terminals

Enlarged view of the communication terminals is shown below:

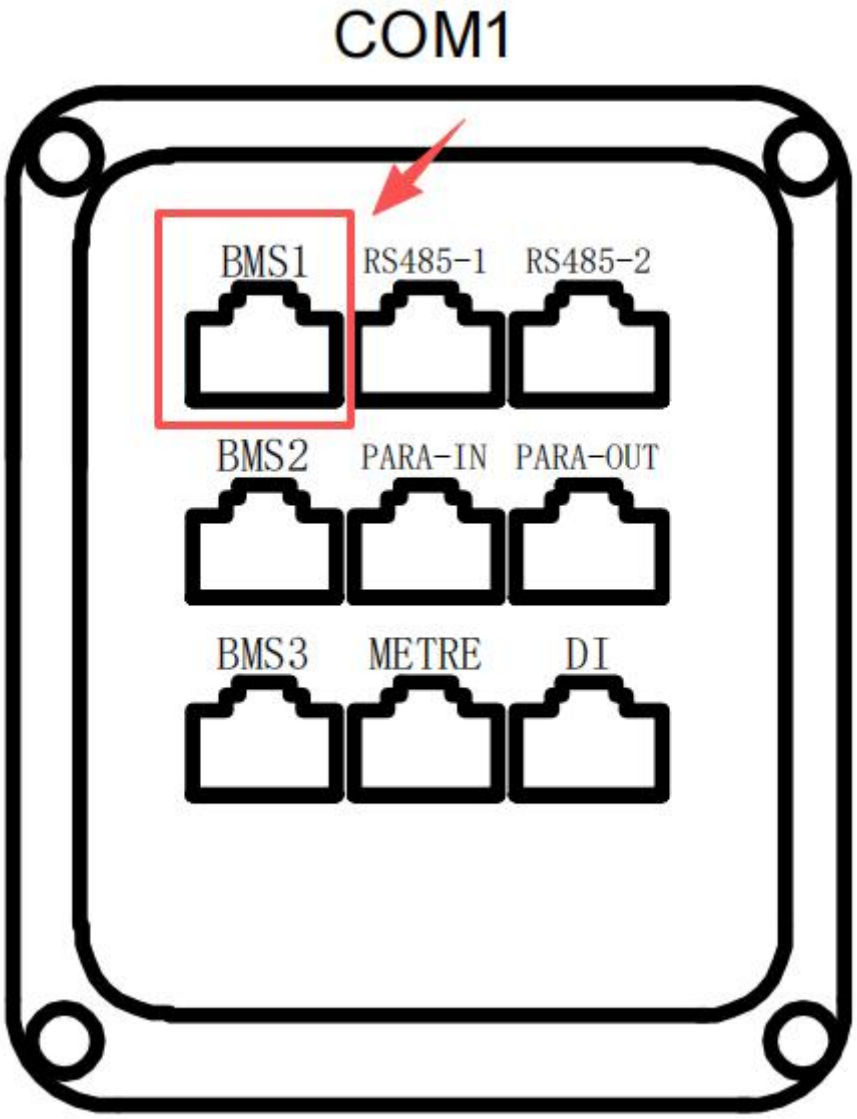


Fig. 3.13 50 kW Growatt Inverter Communication Terminals (Enlarged)

(2) **50 kW INVT Inverter:**

The H,L terminals on the Master Control of the high-voltage box connect via network cable to the inverter BMS1 port;

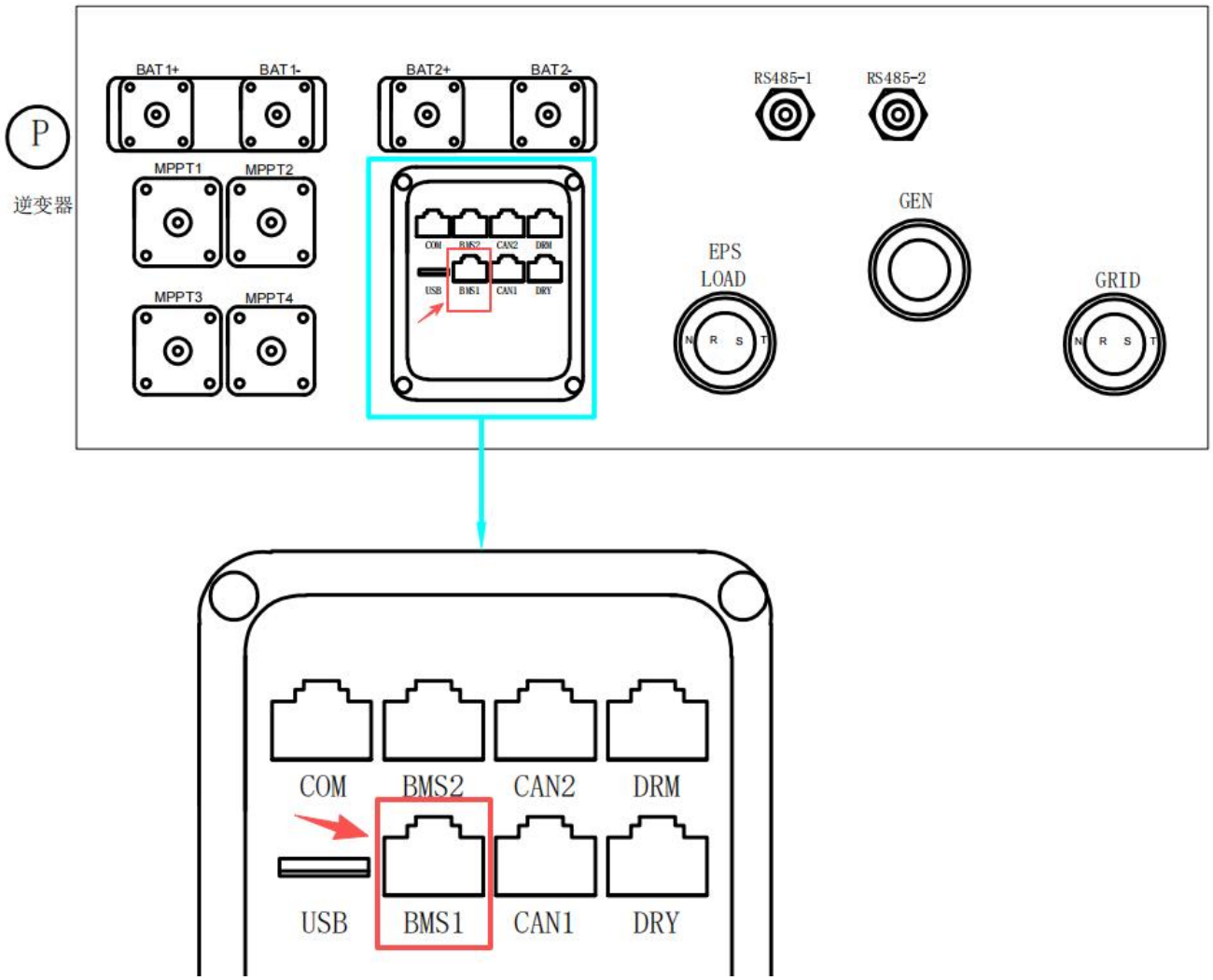


Fig. 3.14 50 kW INVT Inverter Communication Terminals

(3) **50 kW GoodWe Inverter:**

The H,L terminals on the Master Control of the high-voltage box connect via network cable to the inverter's BMS port, as shown below:

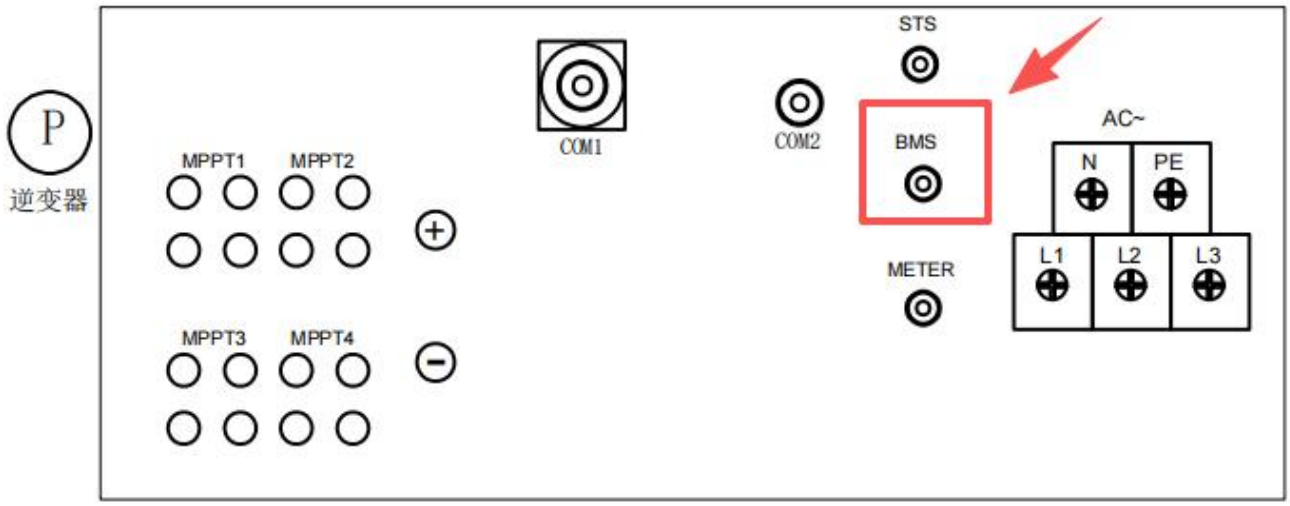


Fig. 3.15 50 kW GoodWe Inverter Communication Terminals

(4) **50 kW Solis Inverter:**

The H,L terminals on the Master Control of the high-voltage box connect via network cable to the inverter's internal BMS1 port;

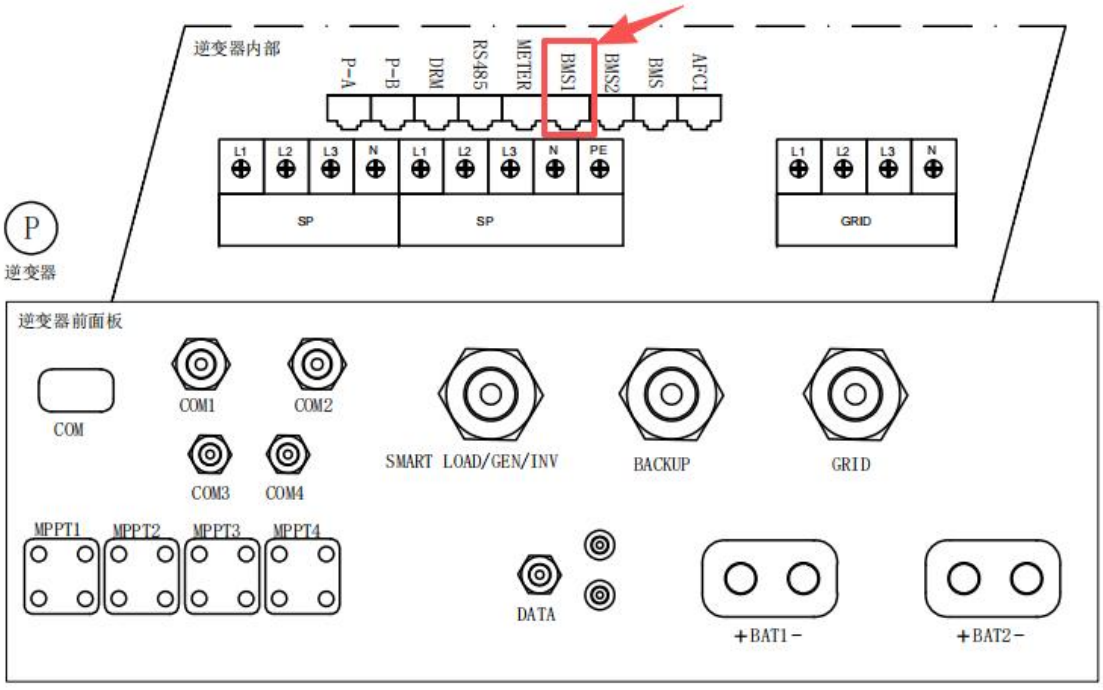


Fig. 3.16 50 kW Solis Inverter Communication Terminals

4. Cabinet HVAC and Fire Suppression System Wiring:

Cabinet cooling system: A 1.5 kW outdoor cabinet air conditioner is used, comprising a compressor, evaporator, condenser, condenser fan, evaporator fan, and cooling components such as a capillary tube and dry filter. The sealed internal circulation effectively protects internal equipment from adverse environmental conditions, using clean air to regulate the cabinet's internal environment.

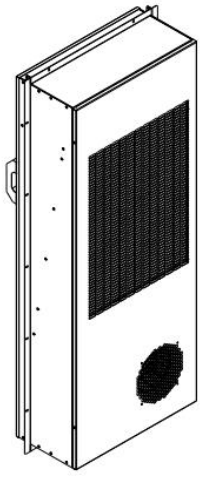


Fig. 3.13 Cabinet Air Conditioner

Fire suppression system: Includes temperature and smoke detectors, fire alarm with audio-visual indicator, and aerosol fire extinguishing devices. Each battery module is equipped with an aerosol fire suppression system that responds immediately to thermal runaway in a battery PACK, extinguishing fires in their early stage.

The air conditioner operates on single-phase AC 220V power, drawn from the inverter's 'LOAD' or 'BACKUP' output terminals (terminal appearance and position vary by inverter brand; diagrams are schematic only; refer to the actual inverter). The fire suppression system operates on DC 24V power, supplied by a Mean Well switching power supply. The wiring diagram is shown below:

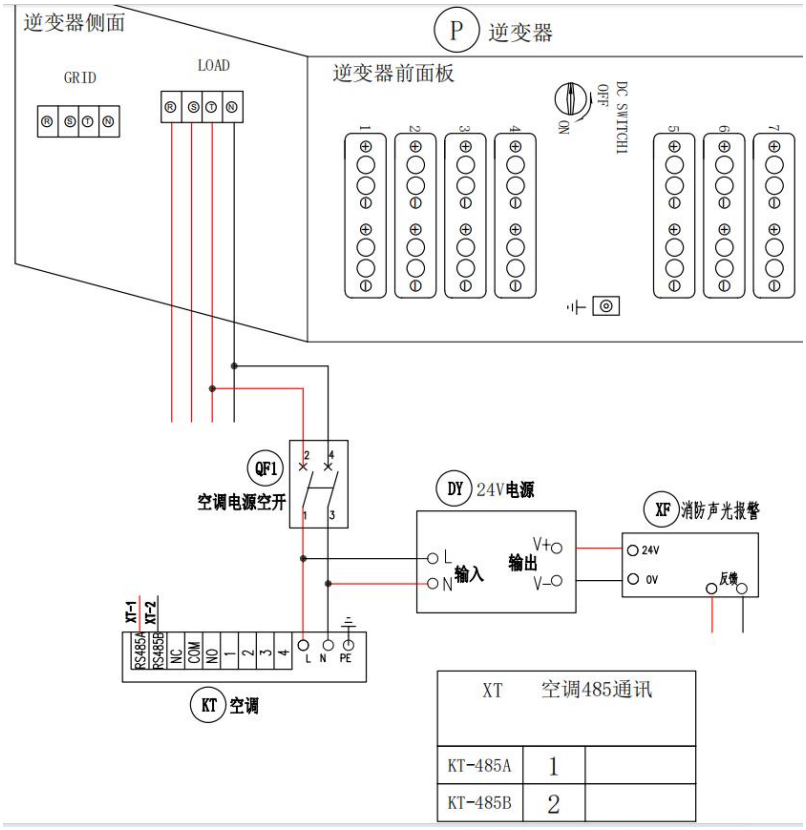


Fig. 3.14 Cabinet HVAC and Fire Suppression System Wiring Diagram



Fig. 3.15 Cabinet HVAC and Fire Suppression Power Supply Components (Actual Photo)

III.3 Power-on Operation Procedure

1. Reset the emergency stop button on the high-voltage box (rotate clockwise).

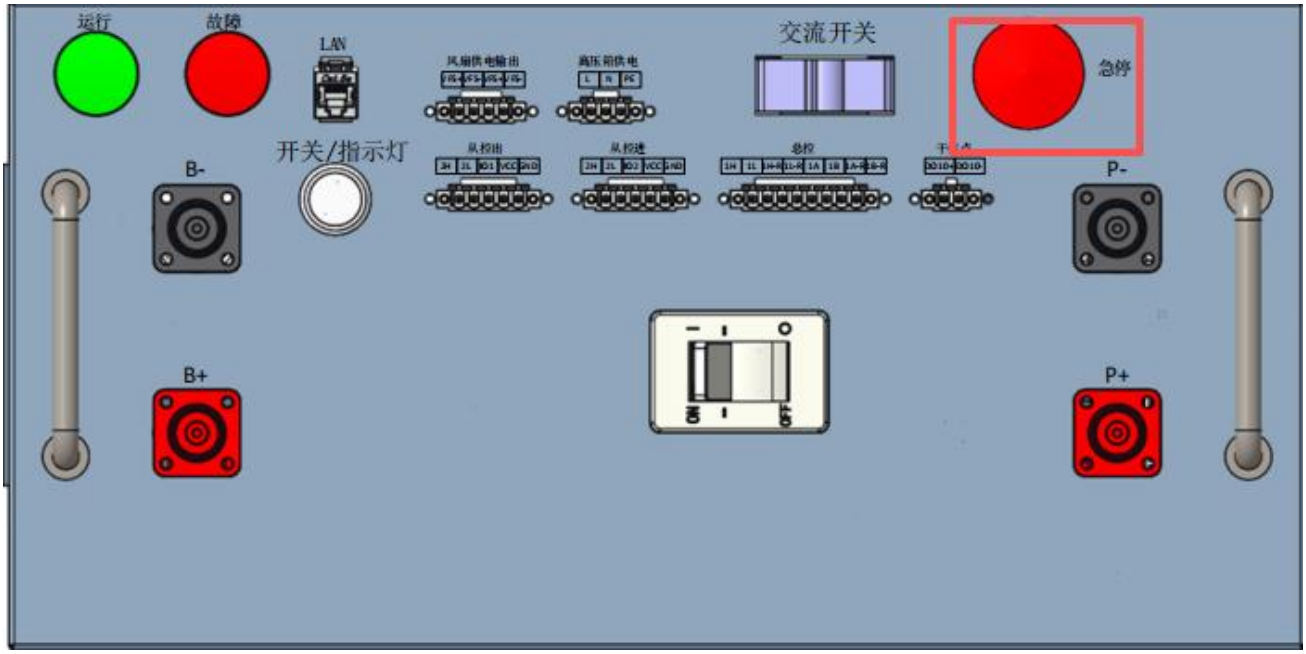


Fig. 3.16 High-Voltage Box Detail

2. Press and hold the power/indicator button on the high-voltage box; wait for the running indicator to light up. Once the system self-check is complete, switch the isolation switch from OFF to ON;

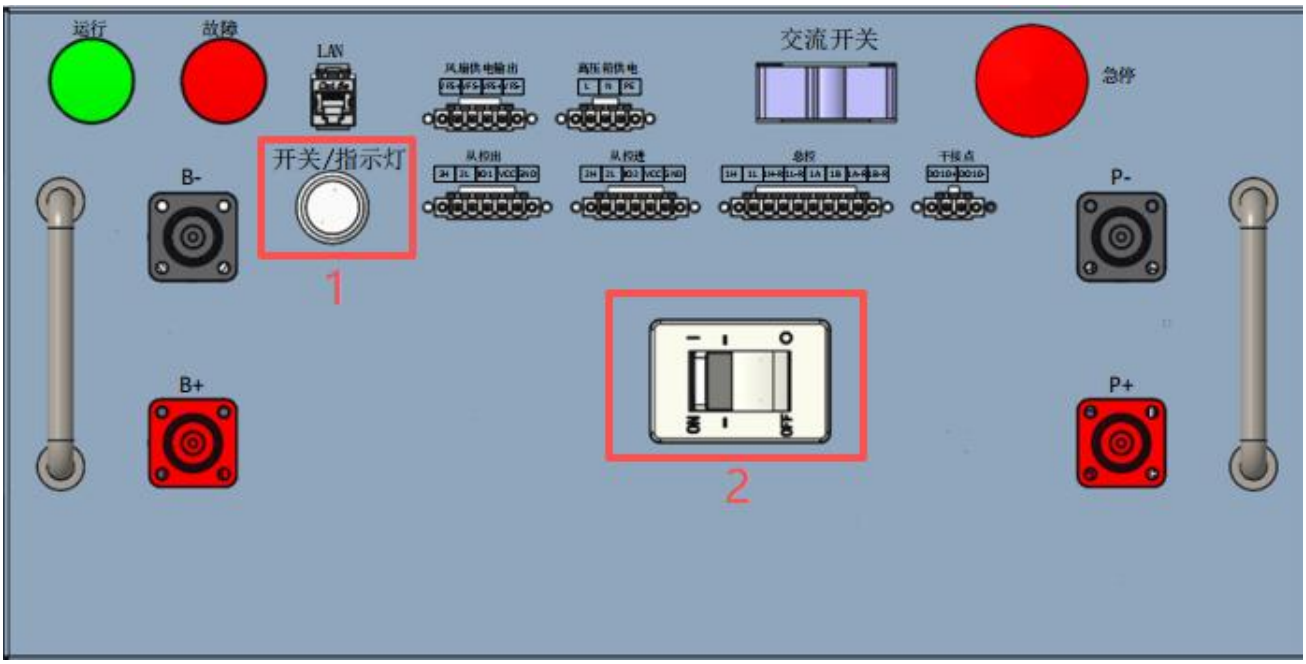


Fig. 3.17 High-Voltage Box Detail

III.4 Power-off Operation Procedure

1. Switch the isolation switch on the high-voltage box from ON to OFF, then press the emergency stop button. Wait until the running indicator and power/indicator button are fully extinguished;

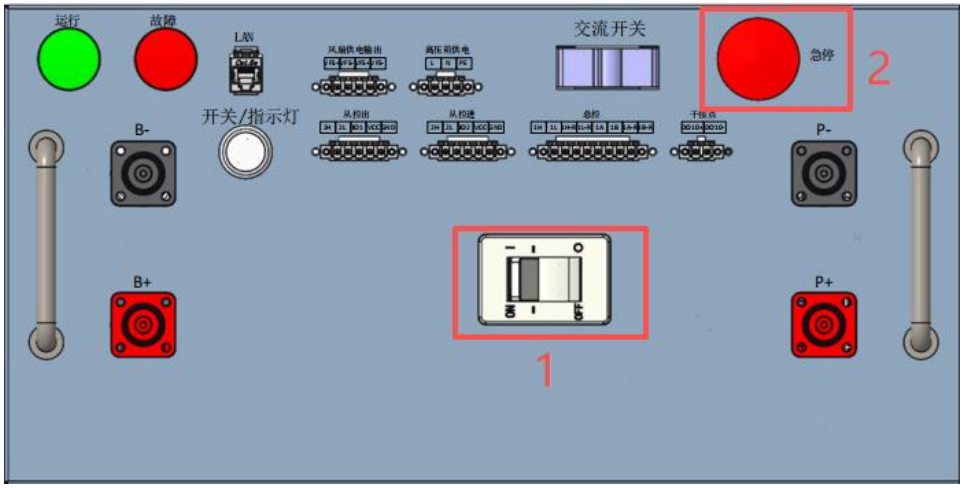


Fig. 3.18 High-Voltage Box Detail

2. If the system will not be used for an extended period, disconnect one cable at the midpoint among the six battery packs.

IV. Routine Inspection and Maintenance Requirements

To ensure long-term safe, stable, and efficient operation of the energy storage system, users or maintenance personnel are advised to follow the routine inspection and maintenance guidance below.

Exterior, foundation, and environment inspection is the foundation. A monthly cabinet exterior inspection is recommended to check for corrosion, deformation, or seal deterioration, and to keep the equipment clean. Every six months, verify that the installation foundation is stable and that electrical connections are tight. Daily (or remotely), monitor the environment around the equipment to ensure adequate ventilation and no accumulation of flammable materials.

Electrical system and data inspection is the core of operation and maintenance. Daily monitoring of system operating status, key parameters (such as SOC, SOH), and alarm information should be performed via local or cloud platforms, with anomalies recorded. Every six months, inspect all power and communication cable connections and condition. Annually, have a qualified professional test the system grounding resistance to ensure it meets safety requirements. Quarterly, verify that the system data logging function is operating correctly.

Thermal management and fire suppression system inspection is critical for safety and longevity. Monthly air conditioner checks should include: verifying wiring connections are secure; ensuring no obstructions near internal/external circulation inlet/outlet vents; manually spinning the fan to check for smooth rotation and unusual sounds; inspecting the drain pipe for deformation or blockage; checking condenser cleanliness and cleaning with compressed air; and regularly cleaning the filter (dust buildup can cause compressor overheating, poor circuit board cooling, and even short circuits. Proper cleaning can reduce equipment failure rates by approximately 30%). At least 1-2 deep cleanings per year are recommended, typically before summer (April) and after (October), to handle high-load operation. Monthly verification of fire suppression controller status is required; clean detector exteriors quarterly; and inspect external water fire suppression connections every six months.

WARNING: All maintenance work must be performed by qualified professionals. Before any maintenance, disconnect the power supply and signal cables first; reconnect them after maintenance is complete.

V. Quality Guarantee

Products that malfunction during the warranty period will be repaired or replaced free of charge.

1. During the warranty period, the purchase invoice and date must be presented, and the product trademark must be clearly visible; otherwise, the warranty claim may be denied.

2. The company reserves the right to decline warranty coverage in the following cases:

- The complete unit or components have exceeded the free warranty period.
- Damage caused during transportation.
- Incorrect installation, modification, or use.
- Operation in environments exceeding those specified in this manual.
- Tamper-evident label damage, equipment malfunction, or damage caused by installation, repair, modification, or disassembly by non-company service personnel.
- Equipment malfunction or damage caused by the use of non-standard or non-company parts or software.
- Installation or use beyond the scope specified in relevant international standards.
- Damage caused by force majeure.

If a product malfunction falls under the above cases and the customer requests repair service, the company's service center may provide paid repair service upon assessment.

Contact Us

If you have any questions about this product, please contact us. Contact details are as follows:

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