User Manual

M125G261A

Liquid-cooling Energy Storage Cabinet

File version-202509-V1-EN

Information is subject to change without notice during product improvement.

About This Manual

Applicable Product

This manual provides an overview of the key features, performance parameters, system principles, and structural design of the M125G261A all-in-one energy storage and charging system. It also includes detailed guidelines for installation, operation, maintenance, and system management.

Before installing or operating the system, it is essential to read this manual carefully, review all safety information, and ensure a thorough understanding of the system's functions and characteristics.

Model name: M125G261A

For Readers

This manual is intended for personnel responsible for the installation, operation, maintenance, and other related work on this product. Readers must have certain electrical and related technical knowledge. All installation work must and may only be carried out by professional technicians. Professional technicians must meet the following requirements:

- Professional training and qualification recognition
- Read this manual thoroughly and familiarize yourself with the safety precautions related to operation
- Familiar with local standards and relevant safety regulations for electrical installations

Use of Symbols

To ensure the personal and material safety of users when using the product and to use the product more efficiently and correctly, the manual contains relevant information and uses the following symbols to highlight it. The following symbols may be used in this manual. Please read them carefully to make better use of this manual.

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

Symbol	Meaning
⚠ DANGER	To warn of urgent hazardous situations which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Used to warn of a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Used to transmit warnings about devices or environmental safety Failure to avoid this may result in damage to the device, loss of data, reduced device performance or other unforeseeable consequences. Personal injury is not included.
NOTE	To highlight important/critical information, best practices, tips, etc. This is not a safety warning and there is no danger to people, equipment or the environment.

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Revision History

Version	Revision Date	Revision Content	Person in Charge
V0.0	2025.08.12	First release	Tong Chenglong
V1.0	2025.09.04	Revised	Ecosolex Product Solution

1. General Safety Precautions

1.1. General Safety

Declaration

Before transporting, storing, installing, operating, and maintaining the equipment, please read this manual first and strictly follow all safety precautions on the equipment and in this manual.

The "NOTE", "WARNING", "CAUTION", and "DANGER" items in the manual do not represent all safety precautions that should be followed; they are only supplementary to all safety precautions. Topband Co., Ltd. shall not be liable for any consequences arising from violations of general safety operating requirements or violations of safety standards for designing, producing, and using the equipment. This equipment should be used in an environment that meets the design specifications; otherwise, equipment failure may occur. Any resulting abnormal equipment functions, component damage, personal safety accidents, property losses, etc., are not covered by the equipment's quality assurance.

When transporting, storing, installing, operating, and maintaining the equipment, local laws, regulations, and standards must be complied with. The safety precautions in this manual are only supplementary to local laws, regulations, and standards.

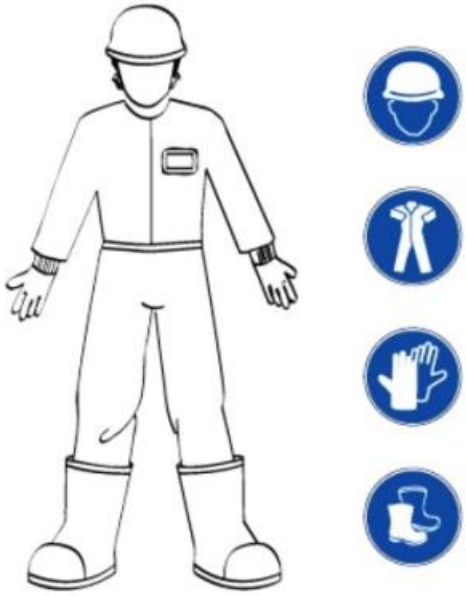
Topband Co., Ltd. shall not be liable for any of the following circumstances.

1) Operation outside the conditions of use specified in this manual.
2) Installation and use environment exceeding the provisions of relevant international or national standards.
3) Unauthorized disassembly, alteration of the product, or modification of the software code.
4) Failure to follow the operating instructions and safety warnings in the product documentation.
5) Equipment damage caused by abnormal natural environments (force majeure, such as earthquakes, fires, storms, etc.).
6) Transportation damage caused by the customer's own transport.
7) Damage caused by storage conditions that do not meet the requirements of the product documentation.
8) Damage to the equipment's hardware or data due to customer negligence, improper operation, or intentional damage.
9) System damage caused by third-party or customer reasons, including handling and installation that do not comply with the requirements of this manual, as well as adjustments, alterations, or removal of identification marks that do not comply with the requirements of this manual.

General Requirements

1) Do not install, use, or operate outdoor equipment and cables in harsh weather conditions such as lightning, rain, snow, and winds of level 6 or higher (this includes but is not limited to moving equipment, operating equipment and cables, inserting/removing connectors from outdoor signal ports, working at heights, outdoor installation, etc.).
2) Do not wear conductive items such as watches, bracelets, bangles, rings, necklaces, etc., during installation, operation, and maintenance to avoid electrical shock burns.

3) During installation, operation, and maintenance, you must use specialized protective equipment, such as insulated gloves, goggles, safety clothing, safety helmet, safety shoes, etc., as shown in the figure below.



4) Installation, operation, and maintenance must be carried out in the sequence of steps described in the instruction manual.

5) Before touching any conductor surface or terminal, measure the voltage at the contact point to confirm there is no risk of electric shock.

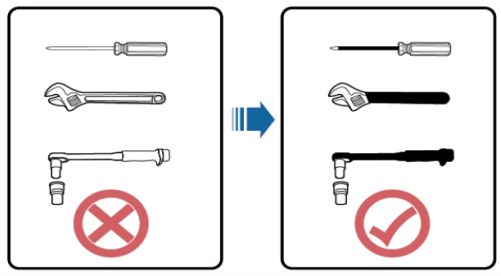
6) After installing the equipment, remove empty packaging materials such as cartons, foam, plastic, and cable ties from the equipment area.

7) In case of a fire, evacuate the building or equipment area and press the fire alarm, or call the fire department. Under no circumstances should you re-enter a burning building.

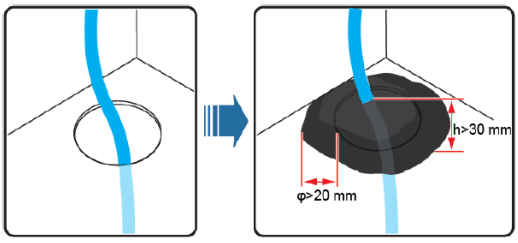
8) Do not disable protective devices or ignore warnings, cautions, and precautions in the manual and on the equipment. Promptly replace danger signs that have become unclear due to long-term use.

9) Only personnel operating the equipment are allowed to approach it.

10) The handles of the tools used must have insulation protection, or insulated tools should be used, as shown in the figure below.



11) All cable holes must be sealed. Use fire-retardant putty to seal holes with cables running through them, and use the cabinet's own covers to seal unused cable holes. The standard for correct sealing with fire-retardant putty is shown in the figure below.



12) Do not tamper with, damage, or block any labels and nameplates on the equipment.

13) When installing equipment, use a tool to tighten the screws.

14) Do not perform live operations during installation.

15) Any paint scratches that occur during transportation and installation of the equipment must be repaired in a timely manner. The scratched parts must not be exposed to the outdoor environment for a long time.

16) Before operation, the equipment should be securely fixed to the floor or other stable objects, such as a wall or installation rack.

17) Do not use water to clean the electrical components inside or outside the cabinet.

18) Do not alter the structure, installation sequence, etc., of the equipment without authorization.

19) Before the fan is powered off and stops rotating, do not touch the running fan with fingers, components, screws, tools, or boards, to avoid personal injury or equipment damage.

Personal Safety

1) If a fault that could cause personal injury or equipment damage is discovered during equipment operation, immediately terminate the operation, report to the person in charge, and take effective protective measures.

2) To avoid the risk of electric shock, do not connect Safety Extra-Low Voltage (SELV) circuits to Telecommunication Network Voltage (TNV) circuits.

3) Do not power on the equipment until it is fully installed or confirmed by professionals.

1.2. Personnel Requirements

1) Personnel responsible for installing and maintaining Topband Co., Ltd. equipment must first undergo rigorous training, understand various safety precautions, and master correct operating methods.

2) Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.

3) Only qualified professionals are allowed to remove safety facilities and inspect the equipment.

4) Personnel operating the equipment, including operators, trained personnel, and professionals, should have the special operation qualifications required by the local country, such as high-voltage operation, working at heights, and special equipment operation qualifications.

5) Professionals: Persons with training or experience in equipment operation, who can clearly identify the sources and extent of various potential hazards during equipment installation, operation, and maintenance.

6) Trained personnel: Persons who have received corresponding technical training and have necessary experience, are aware of the potential dangers to themselves during certain operations, and can take measures to minimize the risks to themselves and other personnel.

7) Operators: Personnel who may come into contact with the equipment, other than trained personnel and professionals.

8) Replacing equipment or components (including software) must be done by professionals or authorized personnel.

1.3. Electrical Safety

Grounding Requirements

1) For equipment that needs to be grounded, the protective ground cable must be installed first during installation; when removing the equipment, the protective ground cable must be removed last.

2) Do not damage the ground conductor.

3) Do not operate the equipment without a properly installed ground conductor.

4) The equipment should be permanently connected to the protective ground. Before operating the equipment, check its electrical connection to ensure it is reliably grounded.

General Requirements

1) When performing high-voltage operations, please use specialized insulated tools.

AC and DC Operation Requirements

⚠ DANGER	• Do not install or remove power cables with power on. Instantaneous contact between the power cable core and a conductor can cause arcs or sparks, which may lead to fire or personal injury.

1) If the equipment is marked with a "high leakage current" symbol, the protective ground terminal of the equipment casing must be grounded before connecting the AC input power to prevent electric shock from the equipment's leakage current.

2) Before installing or removing power cables, you must first turn off the power switch.

3) Before connecting power cables, you must first confirm that the power cable labels are correct before proceeding with the connection.

4) If the equipment has multiple inputs, disconnect all inputs and wait for the equipment to be completely powered off before operating on it.

5) It is not recommended to configure a circuit breaker with leakage protection function.

6) If the power cable is damaged, it must be replaced by the manufacturer, its service agent, or a professional to avoid risk.

7) Personnel performing high-voltage operations and installing AC equipment must have high-voltage and AC operation qualifications.

Cabling Requirements

1) Cables used in high-temperature environments may suffer from aging and damage to the insulation layer. The distance between cables and heating components or heat source areas must be at least 30mm.

2) Cables are not allowed to pass through the equipment's air intake or exhaust vents.

3) Cables should meet the VW-1 flame retardant rating requirement.

4) Cables of the same type should be bundled together. Different types of cables should be laid out at least 30mm apart, and they are prohibited from being intertwined or crossed.

5) If AC input cables are routed into the cabinet from the top, they should be bent into a U-shape outside the cabinet before entering.

6) At low temperatures, severe impacts or vibrations may cause the plastic sheath of the cable to crack. To ensure construction safety, the following requirements should be followed:

   a. All cables should be laid and installed at temperatures above 0°C. When handling cables, especially in low-temperature environments, handle with care.

   b. If cables are stored at temperatures below 0°C, they must be moved to a room temperature environment and stored for more than 24 hours before being laid out.

7) Do not perform non-standard operations such as pushing cables directly off a vehicle.

8) The selection, erection, and routing of cables must comply with local laws, regulations, and standards.

ESD Requirement

NOTE

- Electrostatic discharge (ESD) generated by the human body can damage electrostatic-sensitive components on the circuit board, such as large-scale integrated circuits (LSI).

1) Static electricity generated by the human body can damage static-sensitive components on boards, such as large-scale integrated circuits (LSI). Before touching the equipment, handling boards or application-specific integrated circuit (ASIC) chips, you must wear ESD gloves or an ESD wrist strap, with the other end of the wrist strap properly grounded.

2) When holding a board, you must hold it by its edges where there are no components. Do not touch the components with your hands.

3) Boards that have been removed must be packaged in ESD packaging materials before storage or transportation.

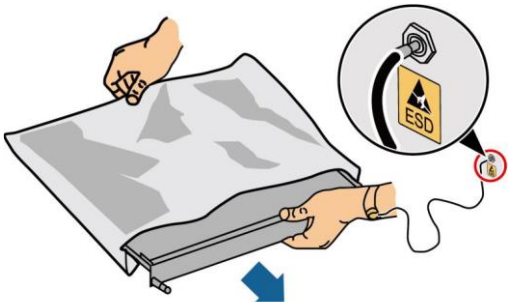


Figure 1.3-1 Schematic diagram of wearing an ESD wrist strap

Zero-to-Ground Voltage

It is recommended that users balance the three-phase load to keep the zero-to-ground voltage below 2V, meeting power distribution requirements.

1.4. Installation Environment Requirements

1) Do not install, use, or operate outdoor equipment and cables in harsh weather conditions such as lightning, rain, snow, and winds of level 6 or higher (this includes but is not limited to moving equipment, operating equipment and cables, inserting/removing connectors from outdoor signal ports, working at heights, outdoor installation, opening doors, etc.).

2) While the equipment is running, do not block the ventilation openings or heat dissipation system to prevent fire due to high temperatures.

3) The equipment should be installed in an area far from liquids. Do not install it below locations prone to condensation, such as under water pipes or air vents; do not install it below locations prone to water leakage, such as air conditioning vents, ventilation vents, or equipment room cable entry windows, to prevent liquid from entering the equipment and causing faults or short circuits.

4) If liquid is found inside the equipment, immediately turn off the power and notify the administrator.

5) Do not place the equipment in an environment with flammable or explosive gases or smoke, and do not perform any operations in such an environment.

6) The equipment room should have good thermal insulation, and the walls and floor should be moisture-proof.

7) Install anti-rodent barriers at the equipment room door.

8) When installing the equipment, ensure that the installation surface is solid and meets the load-bearing requirements of the equipment.

9) Do not install the equipment in areas with strong vibrations, loud noises, or strong electromagnetic field interference.

Working at Heights

1) Any operation performed 2 meters or more above the ground is considered working at heights.

2) In any of the following situations, work at heights should be stopped: steel pipes are wet from rain, and other situations that may pose a danger. After the above situations have passed, the company's safety officer and relevant technical personnel must inspect all work equipment and confirm their agreement before work can resume.

3) The requirements of local regulations for working at heights must be met.

4) Personnel must be trained and certified to be qualified for working at heights.

5) Before working at heights, carefully inspect climbing tools and safety equipment, such as safety helmets, safety harnesses, ladders, planks, scaffolding, lifting equipment, etc. If they do not meet the requirements, they must be immediately improved or work at heights must be refused. Take safety precautions, wear a safety helmet, safety harness or waist rope, and fasten it to a solid structural member. Do not hang it on an unstable mobile object or a metal object with sharp edges to prevent the hook from slipping and causing a fall accident.

6) At the site of work at heights, a hazardous restricted area should be marked off with prominent signs, and unauthorized personnel are strictly prohibited from entering.

7) Carry operating machinery and tools properly to prevent tools from falling and injuring others.

8) Personnel working at heights are not allowed to throw objects from a height to the ground, nor are they allowed to throw objects from the ground to a height. Objects should be transported by strong ropes, hanging baskets, aerial work platforms, or cranes.

9) At the edges and openings of areas involving work at heights, guardrails and signs should be set up to prevent falls.

10) On the ground below the area of work at heights, do not pile up scaffolding, planks, or other objects. Personnel on the ground are not allowed to stay or pass directly under the area of work at heights.

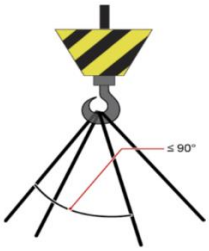
11) Scaffolding, planks, workbenches, etc., for work at heights must be inspected and certified for safety before use, ensuring a solid structure. Scaffolding must not be overloaded.

12) The site manager and safety officer, upon discovering that personnel working at heights are not following regulations, should immediately point it out and order them to correct it; otherwise, their work must be stopped.

1.5. Mechanical Safety

Hoisting Safety

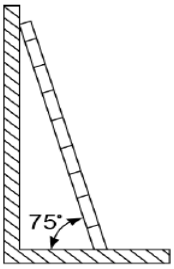
1) The foundation where hoisting operations are performed must meet the load-bearing requirements of the crane.
2) Do not walk under the crane boom or the hoisted object during hoisting operations.
3) Personnel performing hoisting operations must be trained and certified to be qualified for the job.
4) Hoisting tools must be inspected, and fully functional tools should be used.
5) Before hoisting, ensure that the hoisting tools are securely fastened to a load-bearing fixed object or wall.
6) During hoisting, ensure that the angle between the two ropes is not greater than 90°, as shown in the figure below.



7) During hoisting, do not drag the steel wire ropes or lifting equipment, and do not bump them against hard objects.

Ladder Use Safety

1) When electrical work at heights is possible, use a wooden or fiberglass ladder.
2) When using a step ladder, the pull rope must be secure, and someone must hold the ladder during work.
3) Before using a ladder, please confirm that it is intact and that its load-bearing capacity meets the requirements. Do not overload it.
4) The ladder should be placed on a stable surface. The ideal angle of inclination for a ladder is 75°, which can be measured with a protractor, as shown below. When using a ladder, the wider foot should be at the bottom, or protective measures should be taken at the bottom of the ladder to prevent slipping.



5) When climbing a ladder, please pay attention to the following actions to reduce risk and ensure safety:
    a. Keep your body stable.

b. The highest point where the operator's feet stand should not exceed the 4th step from the top of the ladder.

c. Ensure that your center of gravity does not shift beyond the side rails of the ladder frame.

Drilling Safety

1) The following safety precautions should be considered when drilling holes in walls or floors:

NOTE

- Do not drill holes in the equipment. Drilling holes will damage the electromagnetic shielding performance of the equipment, damage internal components and cables, and the metal shavings produced during drilling can cause short circuits in the circuit boards.

2) Obtain consent from the customer, contractor, and Topband Co., Ltd. before drilling.

3) Wear goggles and protective gloves when drilling.

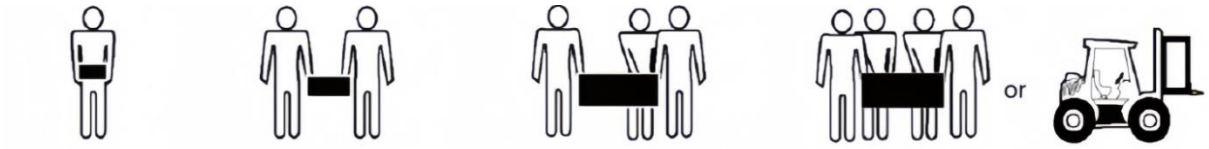
4) When drilling, protect the equipment from debris. After drilling, clean up the debris in a timely manner.

Moving Heavy Objects Safety

DANGER

- When pulling equipment out of a cabinet, be aware of potentially unstable or heavy equipment on it to avoid being crushed or hit.

1) Be prepared to bear the weight when moving heavy objects to avoid being crushed or strained.



＜18 kg/40 lbs　18~32kg/40~70lbs　32~55kg/70~121lbs　＞55kg/121lbs

2) When moving equipment by hand, wear protective gloves, safety shoes, and other safety gear to avoid injury.

3) When moving or lifting equipment, hold it by its handles or the bottom edge, not by the handles of installed modules (such as power modules, fan modules, or boards).

4) During equipment handling, avoid scratching the cabinet surface or damaging components and cables of the cabinet.

5) When using a forklift for transport, the forklift must be positioned in the middle to prevent tipping. Before moving, use ropes to secure the equipment to the forklift; during movement, a dedicated person must be assigned to watch over it.

6) When transporting, try to choose railway, sea, or good road conditions for transportation to ensure equipment safety. During transportation, try to minimize jolts and tilting.

7) Move the cabinet carefully to avoid any collisions or drops that could damage the equipment.

1.6. Equipment Safety

Energy Storage System Safety

1) Do not open the cabinet door when the system is running.

2) When the energy storage system is faulty, avoid standing at the cabinet door (including within the door's opening range).

3) Evacuate the site immediately after the fire alarm horn/strobe is triggered.

Battery Safety

1) Before performing battery operations, you must carefully read the safety precautions for operation and master the correct connection method for the batteries.

DANGER

- Do not expose batteries to high temperatures or around heat sources, such as direct sunlight, fire sources, transformers, heaters, etc. Battery overheating can cause explosions.
- Do not burn batteries, as this can cause them to explode.
- Do not disassemble, modify, or damage batteries (such as inserting foreign objects, immersing in water or other liquids), as this can cause battery leakage, overheating, fire, or explosion.

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2) Wear goggles, rubber gloves, and protective clothing to prevent harm from electrolyte leakage. If the battery leaks, do not let your skin or eyes come into contact with the leaked liquid. If contact occurs, rinse immediately with clean water and seek medical attention.

3) Use specialized insulated tools.

4) When transporting batteries, they should be transported in the direction required by the battery. Do not place them upside down or tilted.

5) During installation, maintenance, and other operations, the battery circuit should remain disconnected.

6) Use the specified type of battery. Using a non-specified type of battery may cause battery damage.

7) Dispose of used batteries according to local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries can cause them to explode.

8) The site must be equipped with required fire-fighting facilities, such as fire sand, dry powder fire extinguishers, etc.

NOTE

- To ensure the safety of battery use and the accuracy of battery management functions, please use the batteries configured with the product cabinet by Topband Co., Ltd.. Topband Co., Ltd. is not responsible for any battery-related faults if non-Topband Co., Ltd. configured batteries are used.

Battery Installation Specifications

1) After unpacking the batteries, place them in the required direction. Do not place them upside down, on their side, upright, tilted, or stacked. Avoid any impacts or drops that could cause battery damage and scrapping.

2) Before battery installation, to ensure safety, pay attention to the following basic precautions:

3) The battery installation location should be a ventilated, dry, and cool environment, far from heat sources, flammable materials, moisture, environments with high levels of infrared radiation, organic solvents, and corrosive gases, and fire prevention measures should be taken. The batteries should be placed horizontally and secured.

4) During battery installation, pay attention to the positive and negative poles. It is strictly forbidden to short-circuit the positive and negative poles of the same battery or the same battery string, as this will cause a short circuit.

5) Periodically check the battery connection terminal screws to confirm they are tightened and not loose.

6) Do not place installation tools on the batteries during installation.

Battery Short-Circuit Protection

DANGER

- A battery short circuit will generate a large instantaneous current and release a large amount of energy, which may cause personal injury and property damage.

1) To avoid battery short circuits, batteries are not allowed to be maintained online.

Special Scenarios for Lithium Batteries

The safety precautions for lithium battery operation refer to those for lead-acid batteries, with the following additional points to note.

WARNING

- There is a risk of explosion if the battery is replaced with an incorrect model.

1) Only replace with the same or a similar model of battery recommended by the manufacturer.

2) When transporting lithium batteries, do not turn them upside down, tilt them, or collide with them.

3) During installation, maintenance, and other operations, the lithium battery module circuit must be kept disconnected.

4) When the ambient temperature is below the lower limit of the operating temperature, charging is prohibited (charging is prohibited at 0°C) to avoid internal short circuits caused by crystallization during low-temperature charging.

5) Do not use beyond the temperature range, as it will affect battery performance and safety.

6) Do not throw the lithium battery module into a fire source.

7) When maintenance is complete, the used lithium battery modules should be returned to the maintenance depot.

1.7. Others

Transportation, Storage, and Maintenance

1) For long-term storage, a charge-discharge cycle must be performed every 3 months as specified in the datasheet, and the storage capacity should be kept at 50% SOC;

   Storage temperature: 0°C to 40°C;

   Storage humidity: 5% RH to 95% RH;

   Store in a clean, dry, well-ventilated area, with facilities to protect against sand, rain, and snow; in an environment free of corrosive and explosive gases.

2) Storing the battery in a low state of charge may lead to over-discharge damage. Please recharge it in a timely manner.

3) After the battery is fully discharged, it needs to be recharged within 24 hours, otherwise it may cause damage to the battery. Recharging method: After powering on the equipment, turn on the grid side, and set the charging power and charging time through the EMS:

   a. When the minimum single cell voltage is greater than 2.75V: set to 100kW charge for 1 hour to recharge;

   b. When the minimum single cell voltage is less than 2.75V: set to 10kW charge for 30 minutes, then set to 100kW charge for 1 hour;

   c. When the minimum single cell voltage is less than 2.0V: the cell may have irreversible damage, contact Topband Co., Ltd. for handling.

Warnings and Precautions

Before using the battery, please carefully read the specifications, user manual, and warning labels on the battery case. Improper use of the battery may cause it to overheat and get damaged. Shenzhen Topband Co., Ltd. Battery Co., Ltd. is not responsible for any accidents caused by operations not in accordance with the specifications. To ensure the safe use and handling of the battery, please read the operating instructions carefully before use.

2. Product Introduction

2.1. Product Overview

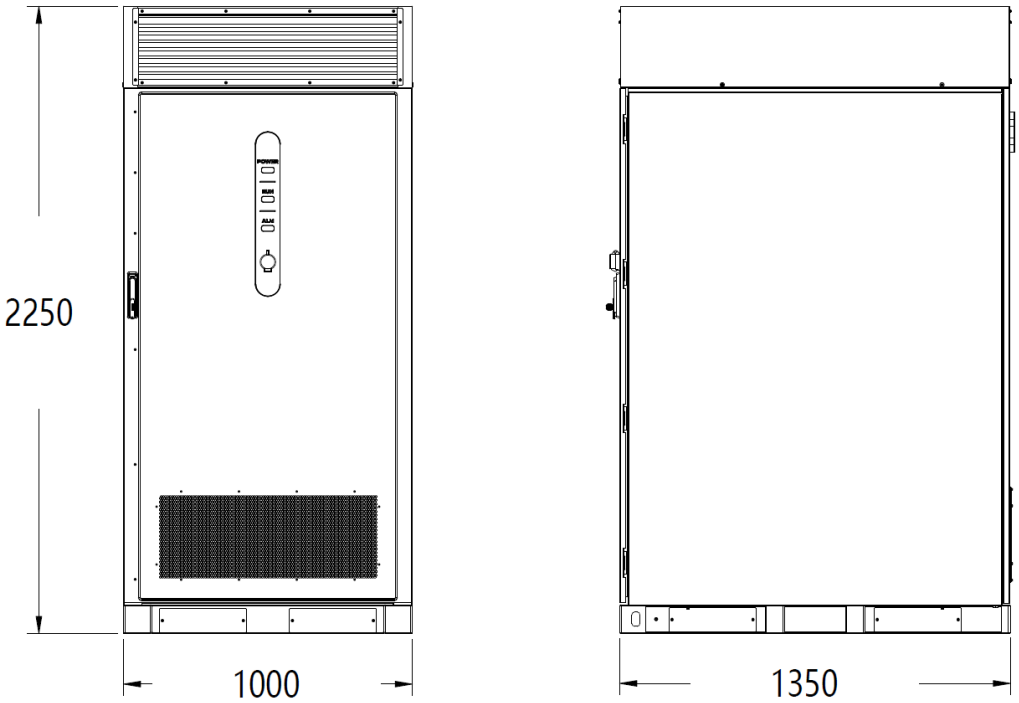


Figure 2.1-1 Product appearance and dimensions (unit: mm)

The system consists of 5 units of 166.4V 314Ah modules, 1 set of high-voltage control box, 1 unit of 100kW inverter (bidirectional inverter), 1 liquid cooling unit, and 1 set of fire suppression device. The system corresponds to 832V 314Ah, with a rated energy of 261.248kWh. The system uses an outdoor cabinet installation, featuring liquid cooling for heat dissipation and a fire alarm function.

Table 2-1 System Parameters

No.	Item	Parameter
1	Series-Parallel Configuration	260S1P
2	Rated Voltage	832V
3	Rated Capacity	314Ah
4	Rated Energy	261.248kWh
5	Operating Voltage Range	728V～949V
6	Max. Charging Current	170A @ 25±5°C
7	Recommended Charging Current	≤157A
8	Max. Discharging Current	170A @ 25±5°C

2.2. Component Introduction

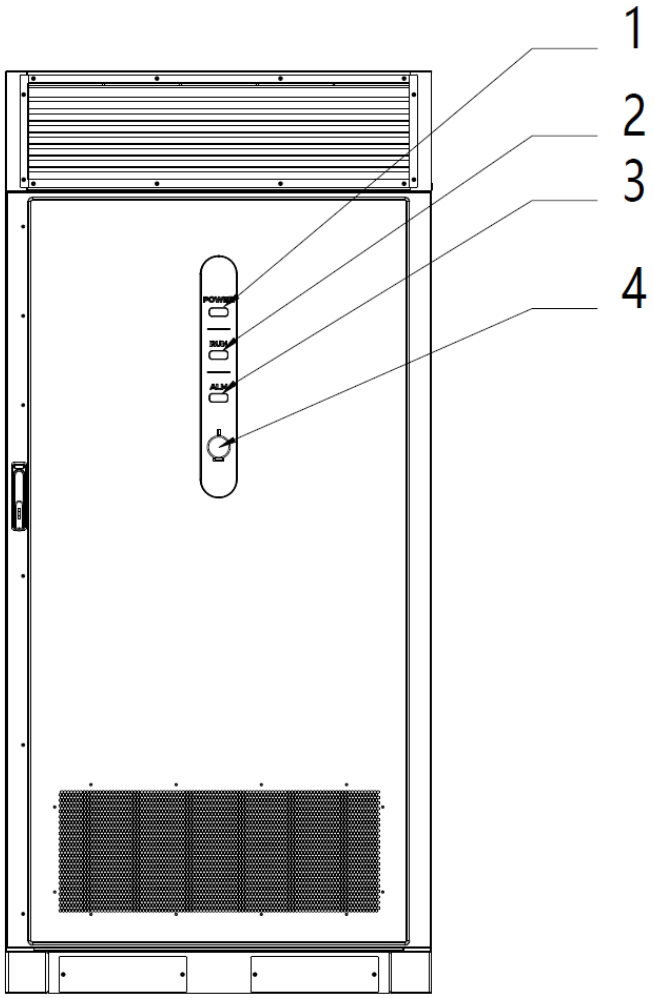


Figure 2.2-1 Component Introduction (Door Closed)

Table 2-2 External Configuration

No.	Description	Explanation
1	Power Indicator	Displays mains power status (light is on when mains power is present, off when absent)
2	Run Indicator	Displays running status (light blinks every 0.5s during system charging, stays on during system discharging/standby)
3	Alarm Indicator	Displays fault alarms
4	Emergency Stop Switch	Used for emergency power-off

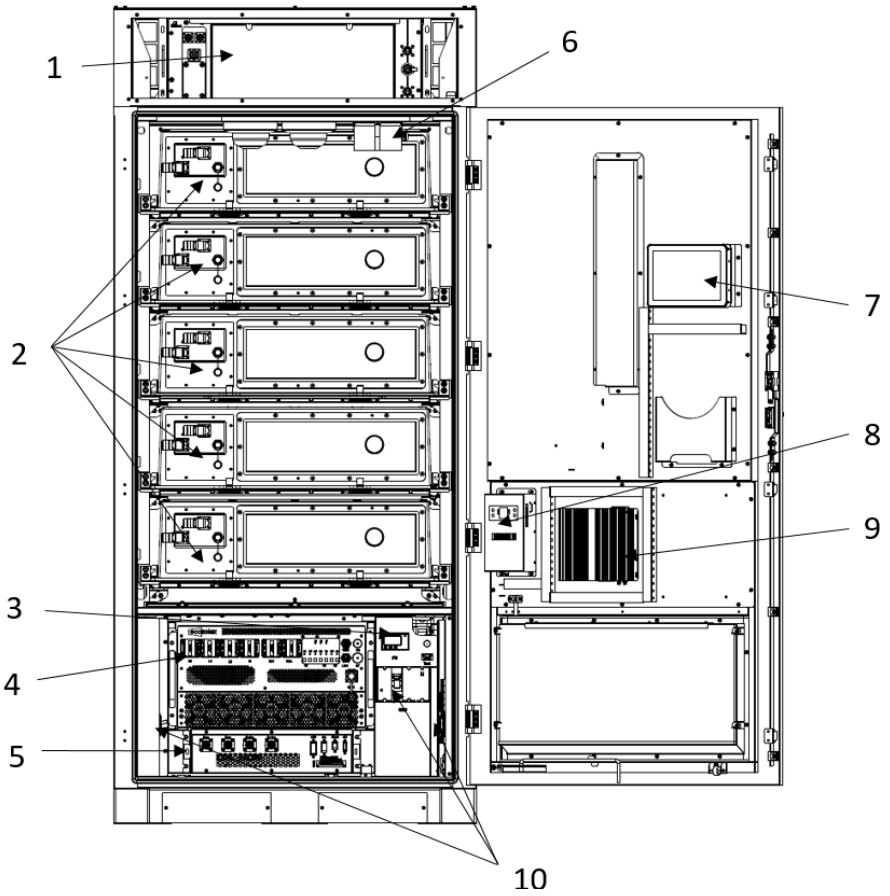


Figure 2.2-2 Component Introduction (Front View)

Table 2-3 Internal Configuration

No.	Description	Explanation
1	Liquid Cooling Unit	Used for heat dissipation and heating
2	Liquid Cooling Module	5 liquid cooling modules
3	PM	Power Meter
4	PCS	Bidirectional conversion between DC and AC
5	High-Voltage Box	Controls power-on/off of battery modules, detects information of each module
6	Fire Suppression Device	Used for fire prevention and control
7	Display Screen	Used for local data monitoring and O&M
8	Dehumidifier	Reduces humidity on the battery side
9	EMS	Energy Management System
10	User Operation Switches	Power distribution area operations

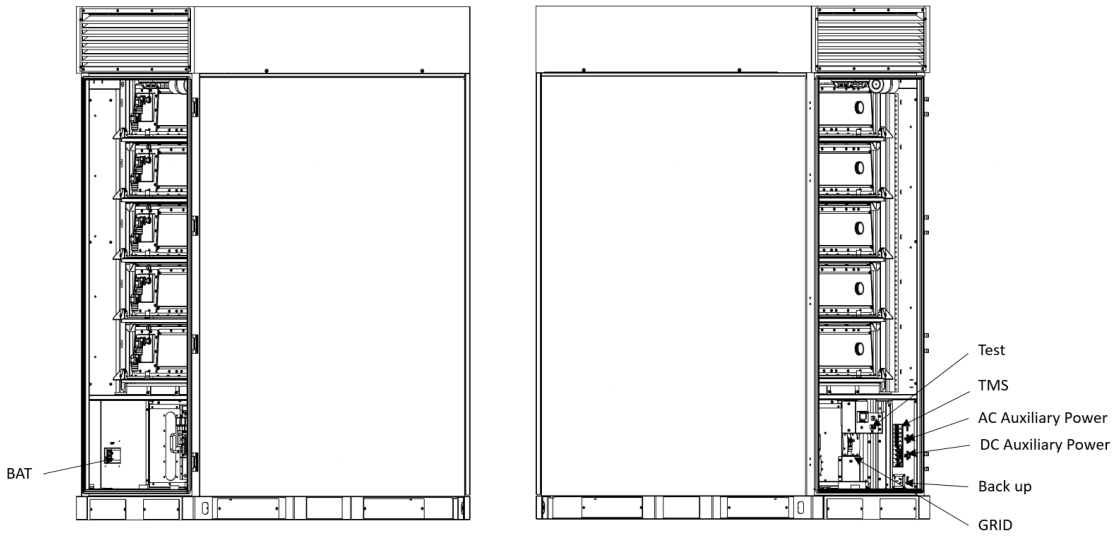


Figure 2.2-3 Power Distribution Compartment Panel

Table 2-4 Power Distribution Compartment Panel Introduction

No.	Module Description	Function Description
1	Test	BMS debugging interface
2	TMS	Liquid cooling unit power switch
3	AC Auxiliary Power	AC auxiliary power switch
4	DC Auxiliary Power	DC auxiliary power switch
5	Backup	Backup power socket
6	GRID	Grid power switch
7	BAT	Battery cluster DC switch

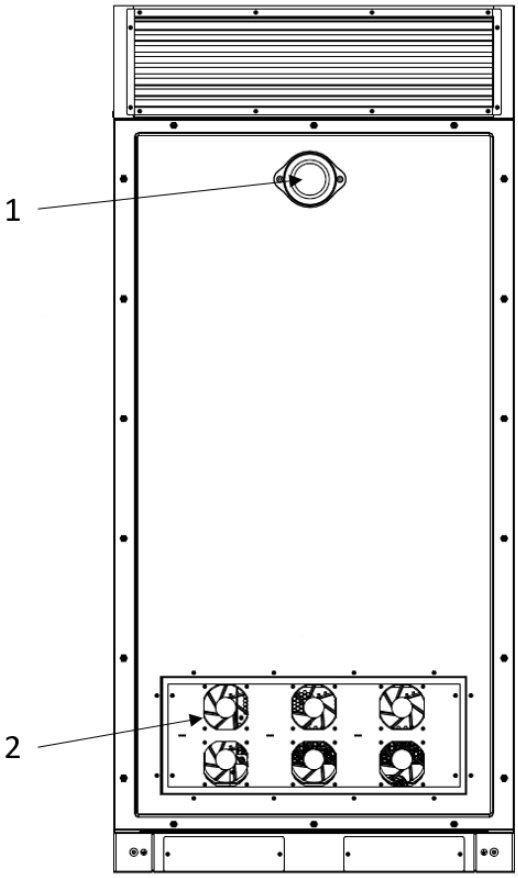


Figure 2.2-4 Component Introduction (Rear View)

Table 2-5 Component Configuration

No.	Description	Explanation
1	Pressure Relief Valve	Emergency pressure relief to prevent excessive internal cabinet pressure
2	Fan	Used for heat dissipation in the power distribution compartment

2.2.1. Battery Module

The battery module contains a battery pack composed of cells, which is the power source for the entire system. The bottom of the battery module is a liquid cooling plate.

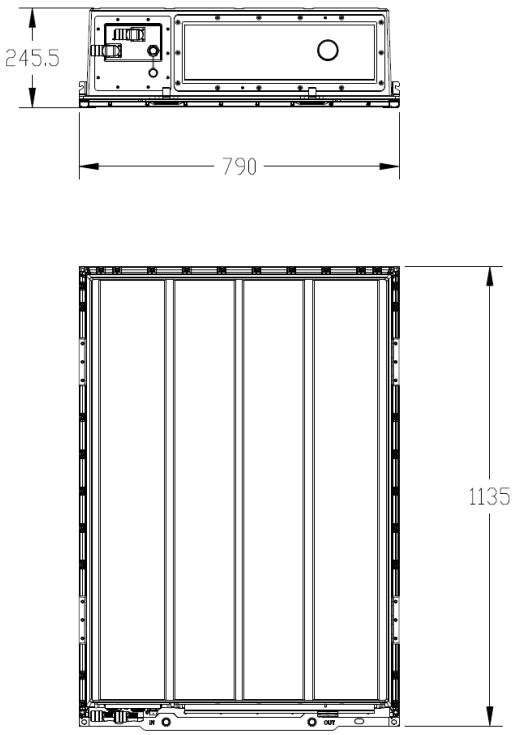


Figure 2.2-5 Battery Module Dimensions (unit: mm)

Table 2-6 Battery Module Parameters

No.	Item	Parameter
1	Series-Parallel Configuration	52S1P
2	Rated Voltage	166.4V
3	Rated Capacity	314Ah
4	Rated Energy	52.2496kWh
5	Internal Resistance	≤20mΩ @1kHz AC, 30%SOC
6	Rated Charging Voltage	166.4V
7	Max. Charge/Discharge Current	170A@25±5°C
8	Recommended Charging Current	≤157A
9	Dimensions	W: 790±2mm, D: 1135±2mm, H: 245.5±2mm
10	Weight	≈330kg

2.2.2. High-Voltage Box

The high-voltage box is used to collect information such as voltage, current, and temperature, and to execute system operation strategies and protection functions in conjunction with the BMS. It contains the protective components for the entire system, such as relays, circuit breakers, fuses, etc. The interface

definitions are as follows. The dimensions and interface definitions of the high-voltage module are as follows:

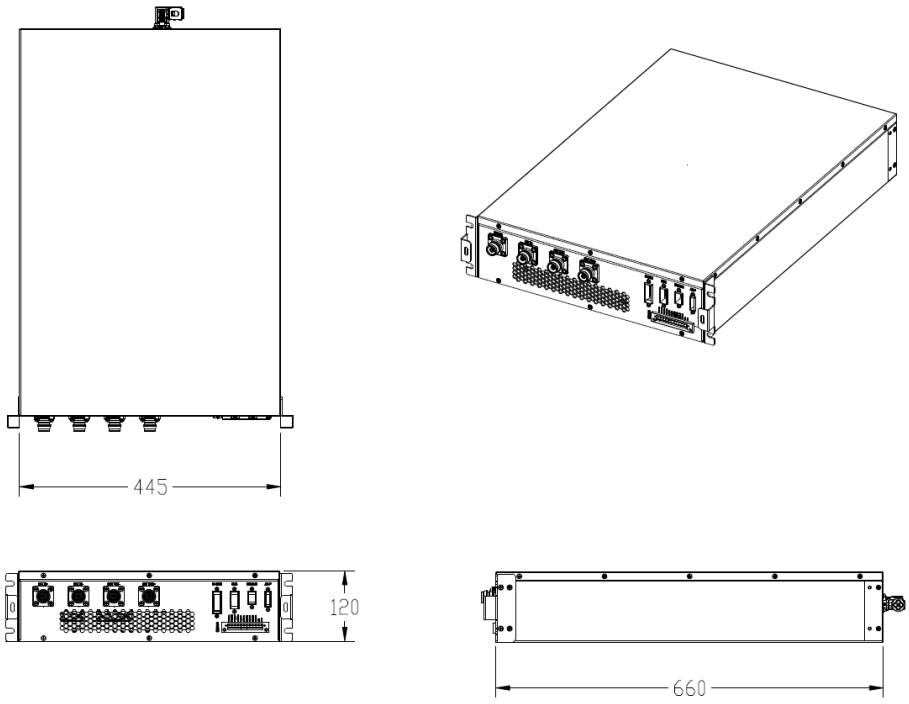


Figure 2.2-6 High-Voltage Box Specifications (unit: mm)

Table 2-7 High-Voltage Box Parameters

No.	Item	Parameter
1	Max. Operating Voltage	1000V
2	Max. Operating Current	200A
3	Communication to EMS	RS485
4	Communication to PCS	CAN
5	Communication to Module	CAN
6	Panel Terminals	BAT IN+/BAT IN-: DC input port
		OUT PUT+/OUT PUT-: DC output port
		M-COM: Indicator board control port
		BMU: Module communication port
		COMM2: EMS 24V port
		AC-P: AC/DC 24V port
		COMM1: BMS external communication port
7	Operating Temperature	-20~55°C
8	IP Rating	IP20
9	Dimensions	W: 445±2mm, D: 660±2mm, H: 120±2mm
10	Weight	≈30kg

2.2.3. Battery Cluster

The entire battery cluster is composed of 5 units of 166.4V 314Ah battery modules, resulting in a 261.248kWh battery cluster.

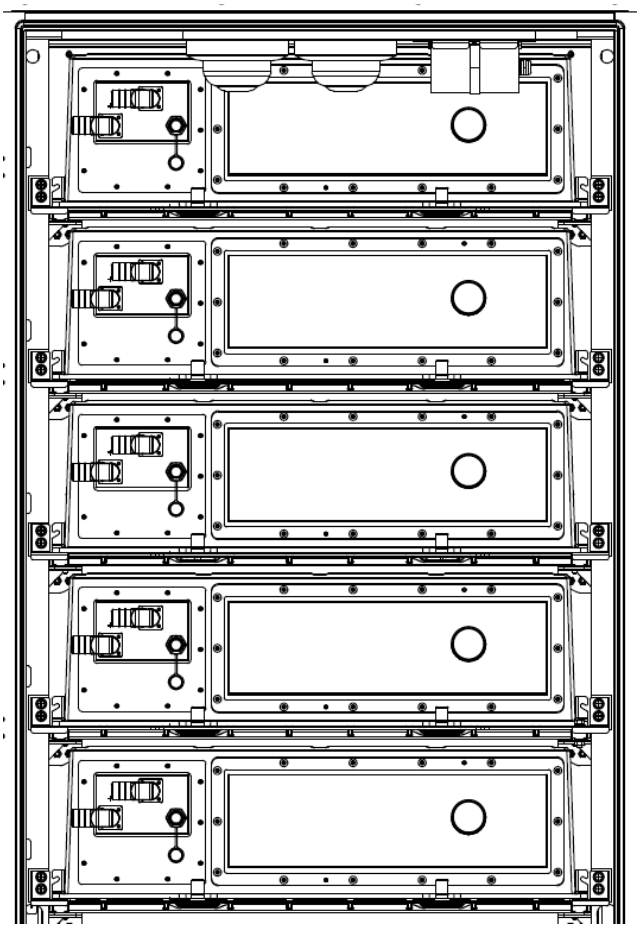


Figure 2.2-7 Battery Cluster Schematic Diagram

Table 2-8 Battery Cluster Parameters

No.	Item	Parameter
1	Series-Parallel Configuration	260S1P
2	Rated Voltage	832V
3	Rated Capacity	314Ah
4	Rated Energy	261.248kWh
5	Operating Voltage Range	728V～949V
6	Internal Resistance	≤100mΩ @1kHz AC
7	Max. Charge/Discharge Current	170A @25±5°C
8	Recommended Charging Current	≤157A

2.2.4. Power Conversion System (PCS)

This product is configured with a modular converter with a rated power of 125kW, supporting bidirectional energy flow and a wide range of battery voltages, meeting the needs of different application scenarios with flexible installation and use.

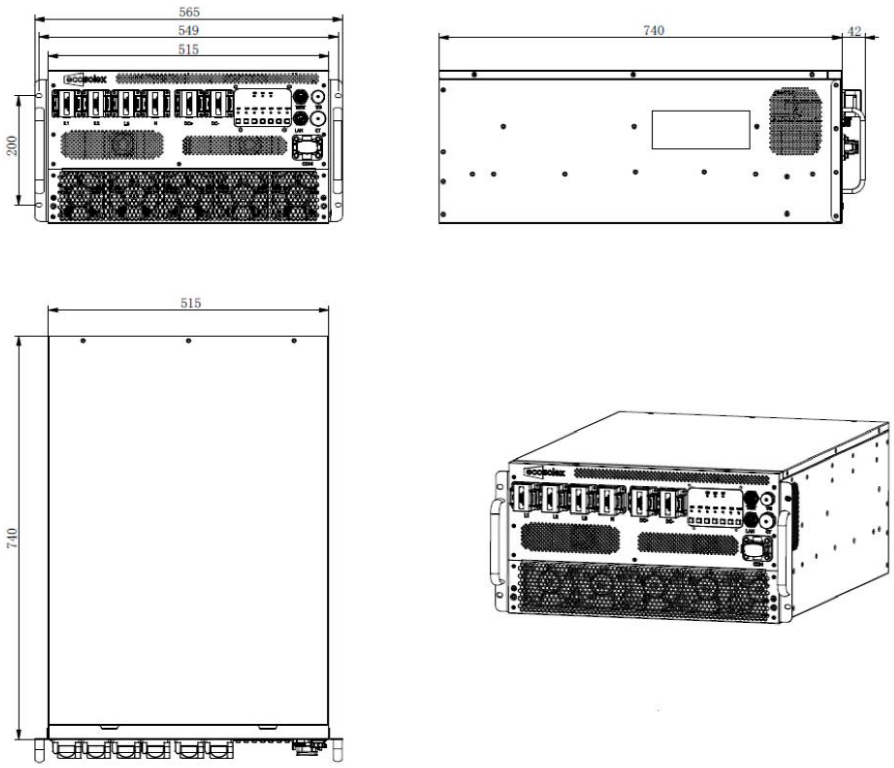


Figure 2.2-8 PCS Dimensions (unit: mm)

Table 2-9 PCS Technical Parameters

No.	Item	Parameter
DC Side Parameters		
1	DC Voltage Range	600V～1000V
2	Max. DC Current	198A
3	Max. DC Power	125kW
AC Grid-tied Parameters		
4	Rated AC Power	125kW
5	Overload Capability	110% (continuous), 120% (1 min)
6	Rated Voltage	400V
7	Rated AC Current	180A
8	AC Connection Type	Three-phase four-wire
9	Grid Voltage Range	340V～460V
10	Grid Frequency Range	50Hz/60Hz ±2.5Hz
11	Total Harmonic Distortion (THD) of Current	≤3% (Full load)
12	Power Factor	-1～1

13	DC Component of Current	≤0.5%
14	Charge/Discharge Switching Time	＜100ms
Other Parameters		
15	Max. Conversion Efficiency	≥99%
16	Allowable Ambient Temperature	-30°C ～60°C (≥50°C derating)
17	Allowable Relative Humidity	≤95%
18	Noise	≤75dB
19	IP Rating	IP20
20	Max. Operating Altitude	3000m (＞2000m derating)
21	Dimensions (W*H*D)	520*240*680mm
22	Weight	70kg
23	Cooling Method	Smart air cooling
24	BMS Communication Interface	RS485 / CAN
25	EMS Communication Interface	Enthernet / RS485

2.2.5. Energy Storage Controller

The local EMS all-in-one unit is a specialized device for the energy storage industry. It can simultaneously interface with BMS, PCS, power meters, cooling systems, fire suppression systems, temperature and humidity sensors, and other devices. Combined with AI algorithms, it intelligently handles strategy management and control mechanisms at the edge, performing statistical analysis of data. It also supports interfacing with a cloud-based EMS platform, uploading necessary data to the cloud EMS system, and receiving strategies and control commands from the platform.

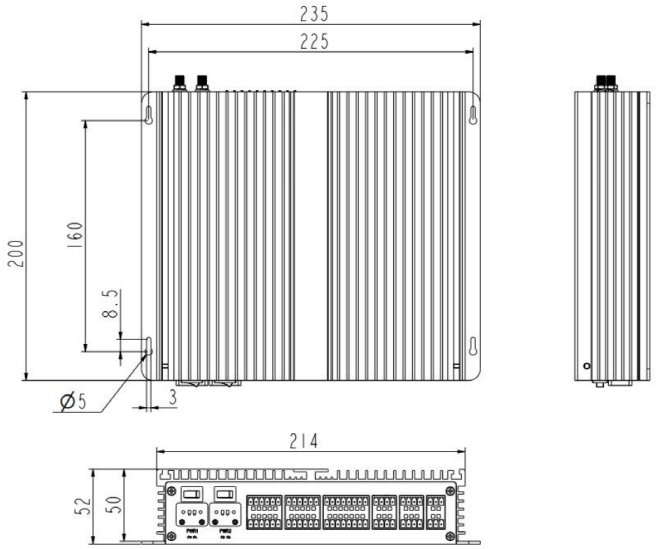


Figure 2.2-9 Controller Dimensions (unit: mm)

Table 2-10 Technical Parameters

Module	Item	Parameter
System Parameters		
1	CPU	NXP i.MX6ULL; ARM Cortex-A7 792 MHz
2	Main Frequency	800 MHz
3	Memory	512 MB
4	Storage	eMMC 8 GB
5	Operating System	RT-Linux 4.1
Interface Types		
6	Ethernet	2-way redundant (DC 9～36V)
7	RS-485	6 ports, with signal indicators
8	RS-485/RS-232	2 ports (Note: RS-485 and RS-232 share pins, switchable via software), with signal indicators
9	DI	8 channels, supports both dry and wet contacts, with isolation protection
10	DO	8 channels, relay isolated, normally open, resistive load 3A/5A 250 VAC / 30 VDC
11	AI	4 channels, 0–20 mA, 0–10 V, ±1%, sampling rate 40 sps
12	CAN Bus	2 ports

13	Wi-Fi	Supports Wi-Fi 6, both 2.4 GHz and 5 GHz bands
14	4G	Default CAT1 (optional CAT4 and global version)
Hardware Parameters		
15	Operating Voltage	Main power input DC 12V, supports DC 9–36V wide range; reverse polarity and overcurrent protection included
16	TF Card	1 slot
17	USB 2.0	1 port
18	SIM Card	Supports dual SIM, single standby
19	Installation	DIN rail or bracket mounting
20	Dimensions	214*120*45 mm (L*W*H, excluding DIN rail and antenna base)
Environmental Parameters		
21	Operating Temperature	-30°C ～70°C
22	Storage Temperature	-40°C ～85°C
23	Operating Humidity	5%–95% RH (non-condensing)
24	Storage Humidity	5%–95% RH (non-condensing)

2.2.6. Liquid Cooling Unit

The liquid cooling unit injects a certain amount of water into the machine's internal water tank. The refrigeration system cools the water, and then the internal circulation water pump injects the low-temperature chilled water into the equipment that needs cooling. The chilled water carries away the heat from inside the equipment, and the high-temperature hot water flows back into the water tank for cooling again.

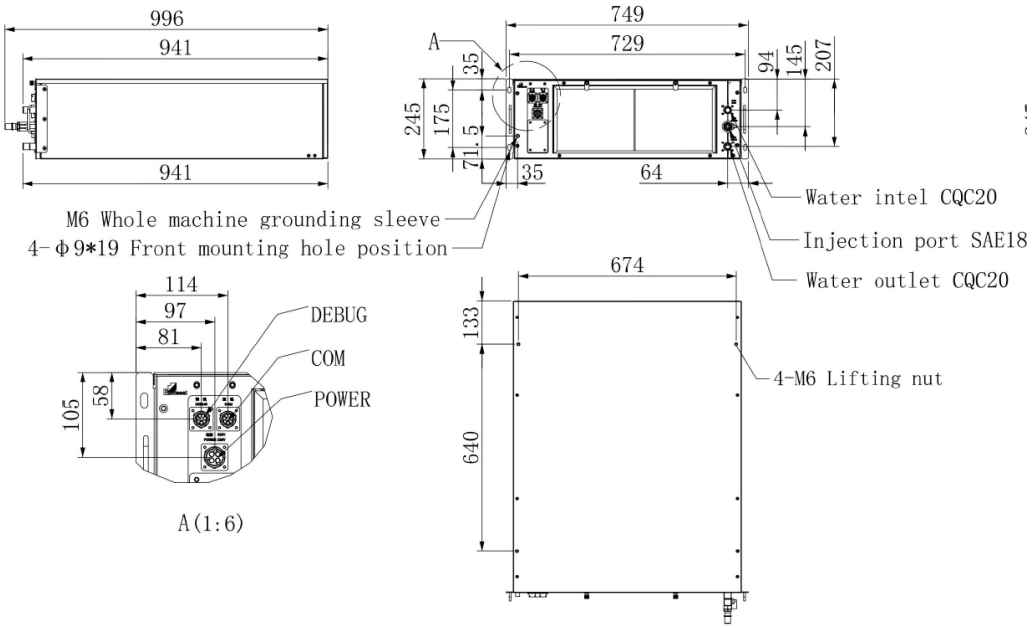


Figure 2.2-10 Chiller Unit Appearance

Table 2-11 liquid cooling Unit Main Parameters

Module	Item	Parameter
Dimensions, Weight & Installation		
1	Dimensions (W*D*H)	700*900*245mm
2	Weight (without coolant)	75kg
3	Installation Method	Drawer type
4	Application Environment	Outdoor
Environmental Protection & Performance		
5	Operating Environment Range	-30°C～+55°C
6	Storage Environment Range	-40°C～+70°C
7	Operating Altitude	0~4000m (≥1000m, derating 3% per 1000m)
8	Noise Level @L45/W18	75dB(A)
9	IP Rating	IPX5, meets outdoor IP55 environment operation
10	Refrigerant	R134a
11	Coolant	50% ethylene glycol aqueous solution
12	RoHS Certification	Yes
Cooling/Heating Capacity		

13	Cooling Capacity	5.0kW
14	Heating Capacity	2.0kW
15	Outlet Water Temperature	18°C
Circulating Water Flow		
16	Rated Circulating Water Flow	46.5@60kPa L/min
Power Consumption		
17	Cooling Input Power @L35/W18	2.50kW
18	Heating Input Power @Tu=10°C	2.35kW
19	Self-circulation Mode Power (single water pump operation)	0.25kW
20	Max. Power Consumption	3.60kW
Power System		
23	Rated Operating Voltage	220～240V 50/60Hz
24	Supported Voltage Range	220±15%, 50/60±3Hz
25	Max. Operating Current	19.2A

2.2.7. Fire Suppression System

This fire suppression system is a PACK-level + cluster-level aerosol automatic fire extinguishing system. The system workflow is as follows:

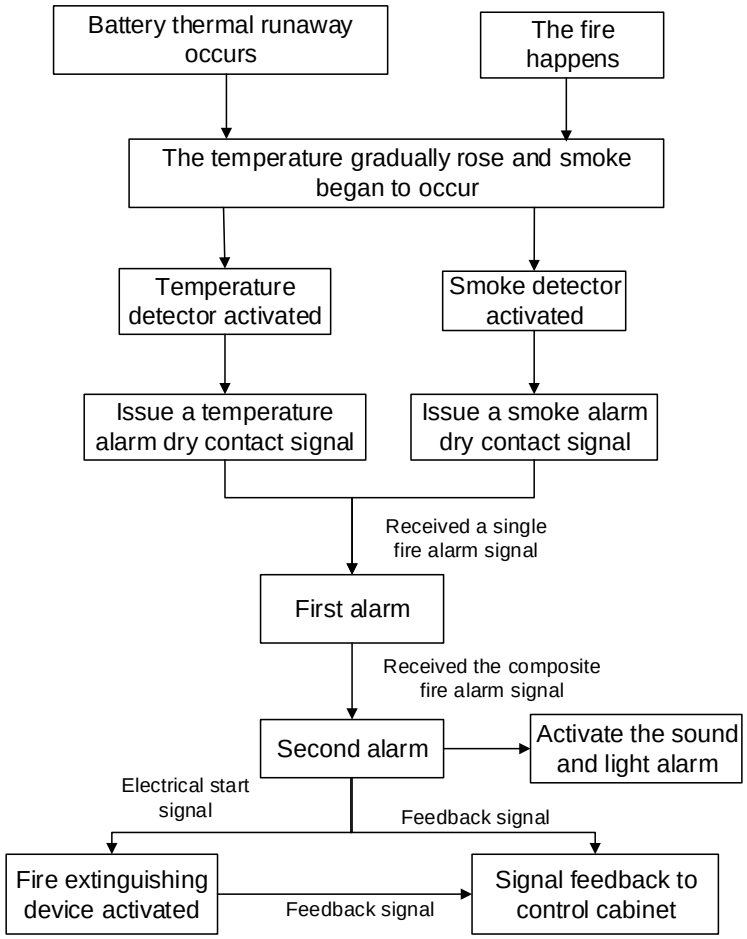


Figure 2.2-11 Fire Suppression System Workflow Diagram

2.2.7.1. PACK-level Fire Suppression

The PACK fire suppression system uses a thermal activation solution. When a fire occurs due to battery thermal runaway or a short circuit in electronic components, the temperature inside the box rises rapidly to about 185°C or an open flame appears. The thermal sensitive wire detects the fire in the first instance and activates the suppression device inside the box to extinguish the fire, while simultaneously sending feedback to the BMU.

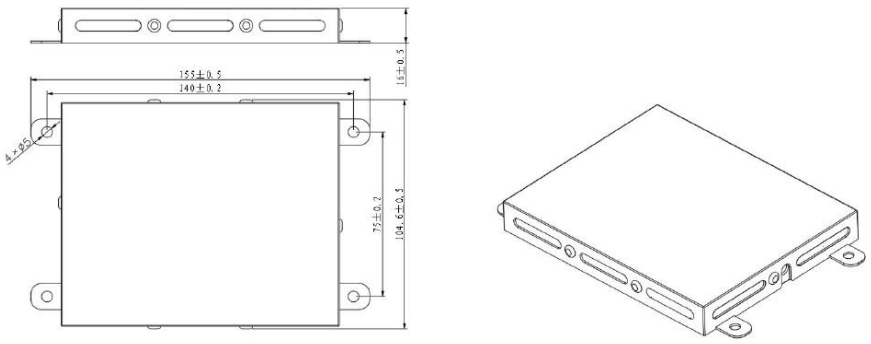


Figure 2.2-12 PACK-level Fire Suppression Appearance and Dimensions

Table 2-12 PACK-level Fire Suppression Main Parameters

No.	Item	Parameter
1	Operating Environment Temperature Range	-40°C～+70°C
2	Activation Method	Dual electric-thermal start (no separate electric start)
3	Discharge Time	≤15s
4	Oxidizer Name and Content	Strontium nitrate, potassium nitrate 50%～58%
5	Nozzle Thermal Spacing at 400°C, 200°C, 75°C	0.2m, 0.3m, 0.4m
6	Net Weight per Unit	380±40g
7	Dimensions	155×104×16mm
8	Protection Volume	2m³
9	Thermal Initiator Activation Temperature	185±10°C
10	Validity Period	10 years

2.2.7.2. Cluster-level Fire Suppression

The cluster-level fire suppression system uses an electrical activation solution for active detection. When battery thermal runaway spreads outside the module or a wiring harness catches fire, the smoke and temperature detectors respond in a timely manner, performing detection, alarm, and extinguishing actions.

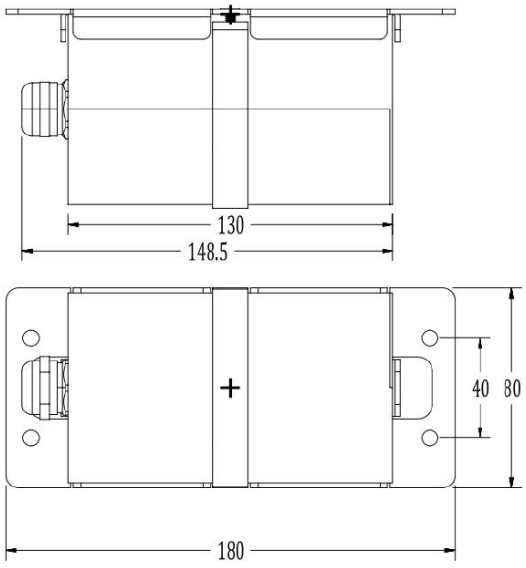


Figure 2.2-13 Cluster-level Fire Suppression Appearance and Dimensions

Table 2-13 Cluster-level Fire Suppression Main Parameters

No.	Item	Parameter
1	Operating Environment Temperature Range	-50°C～+95°C
2	Dimensions	Φ76mm*130mm

3	Weight	1.5kg
4	Protection Volume	1.5m³
5	Discharge Delay Time	≤5s
6	Discharge Duration	≤15s
7	Extinguishing Concentration	100g/m³
8	Effective Lifespan	10 years
9	Thermal Activation Temperature	180°C±10°C
10	Activation Current	≥700 (mA, DC)
11	Safe Current	≥150 (mA, DC)

3. Pre-installation Preparation

3.1. Installation Environment

The energy storage system is suitable for outdoor scenarios only and must be deployed outdoors; indoor deployment is not supported. General site selection requirements are as follows:

1) Do not install the battery cabinet in locations with high/low temperatures or humidity that exceed the technical specifications.

2) The battery cabinet should be far from water sources, heat sources, and flammable and explosive materials. Avoid installing the battery in environments with direct sunlight, dust, volatile gases, corrosive substances, and excessive salt content.

3) The installation site must not be in a low-lying area; the installation surface level should be higher than the highest historical water level in the area.

4) The safety distance from production buildings should comply with local fire regulations or standards.

5) It is strictly forbidden to install the battery cabinet in a working environment with conductive metal dust.

3.2. Clearance Requirements

A certain amount of space must be reserved around the cabinet for operation and ventilation:

1) A minimum of 1200mm of ventilation and operation space must be reserved in the front.

2) For a single unit, a minimum of 600mm of ventilation and operation space must be reserved on the left and right sides; for multiple units, the far left and far right sides must have at least 600mm of ventilation and operation space.

3) A minimum of 1200mm of ventilation and operation space must be reserved at the back.

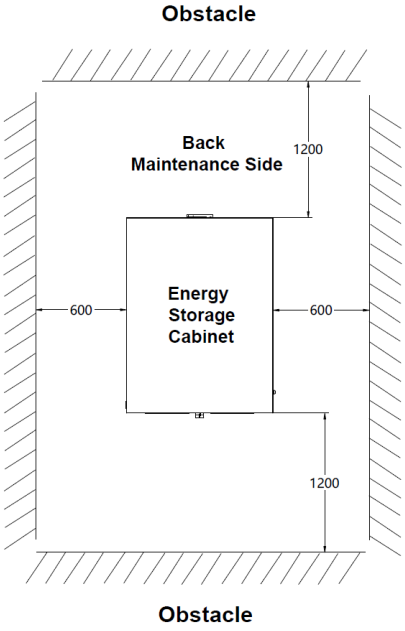


Figure 3.2-1 Single Unit Layout Schematic

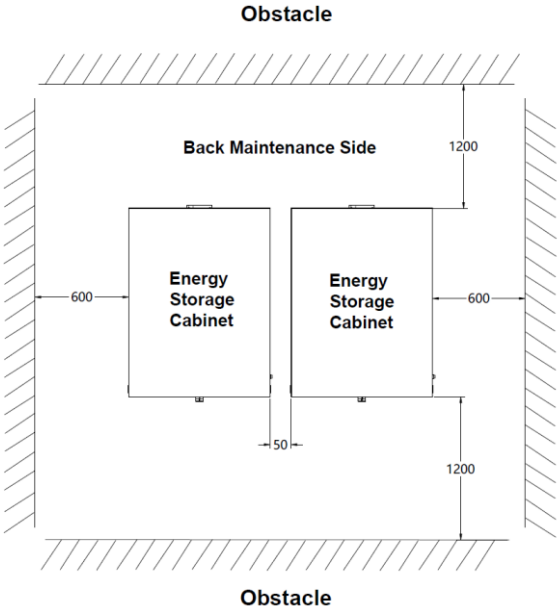


Figure 3.2-2 Two Unit Layout Schematic

3.3. Tools and Instruments Preparation

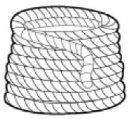
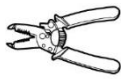
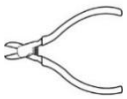
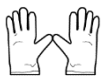
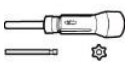
DANGER

- Use insulated tools to avoid electric shock.

NOTE

- The tools shown are for reference only, please refer to the actual items.
- Due to varying site conditions, this tool list may not be exhaustive. On-site installation personnel and users should prepare tools according to the actual situation.

Table 3-1 Tools and Instruments to Prepare

			
Electric forklift	Crane	Lifting rope	Wire stripper
			
Impact drill	Diagonal cutting pliers	Multimeter	Heat gun
Insulated tape	Cable cutter	Cable tie	Electrician's knife
			
ESD gloves	Lead rubber gloves	Heat-resistant gloves	Insulated protective shoes
			
Torque screwdriver	Insulated torque wrench	Phillips screwdriver (M4/M6)	

3.4. Checking Deliverables

Before unpacking the equipment's outer packaging, please check if the deliverables are complete and if there is any obvious external damage. Open the cabinet door to take out the installation parts shipped with the cabinet, and check the deliverables and their quantities against the packing list to ensure there are no missing items.

Table 3-2 Deliverables List

Component	Quantity	Remarks
Cabinet		
Module	5	Installed inside the cabinet
Battery Rack	1	
Fire Suppression Device	1	
Liquid Cooling Unit	1	
Dehumidifier	1	
High-Voltage Box	1	
Power Converter System (PCS)	1	
EMS	1	
Cabinet Installation Hardware Accessories	1	See Chapter 13 for details on items shipped with the cabinet

4. Installation

4.1. Foundation Construction

NOTE

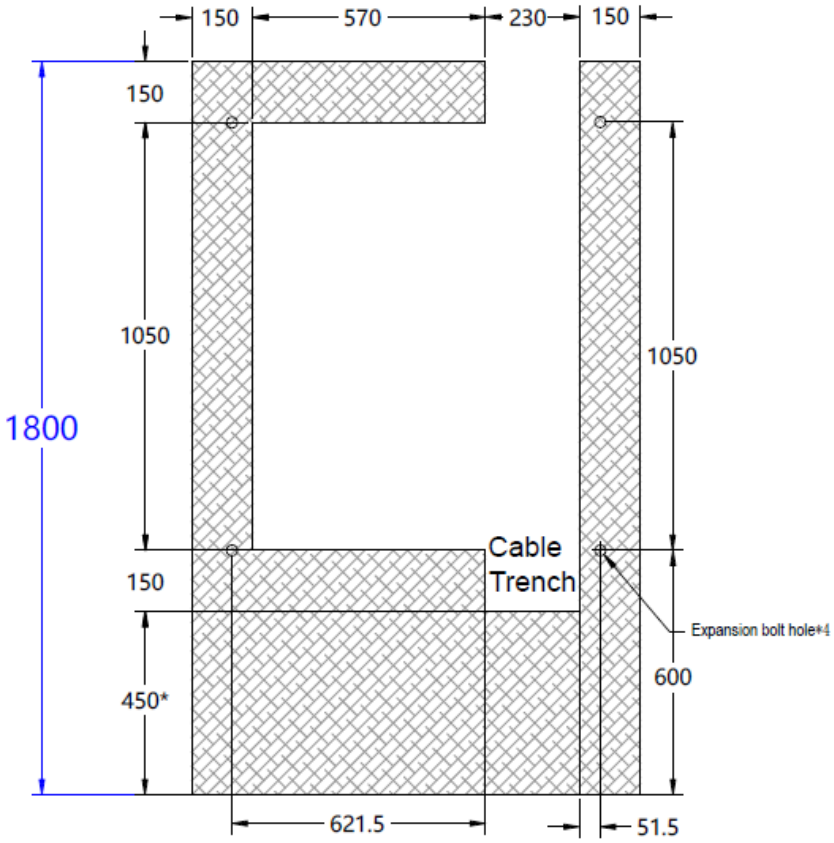
- The installation foundation drawing is for reference. The specific installation foundation should be determined based on the actual situation.

CAUTION

- The cabinet weighs approximately 3T, and the foundation strength must meet the cabinet's load-bearing requirements.
- Installation distance requirement: The cabinet's rear door panel should be ≥1200mm from the wall; the distance between cabinets should be at least ≥50mm.
- Sealing measures should be taken around the base to prevent small animals such as rats and snakes from entering the cabinet.
- A cable trench should be set between the cabinet and the wall for cabinet cable entry connection.
- External grounding is provided by a grounding copper bar at the back of the cabinet, from which a lead wire can be run for grounding.
- A drainage trench should be provided around the foundation, connecting to the site's drainage ditch nearby.

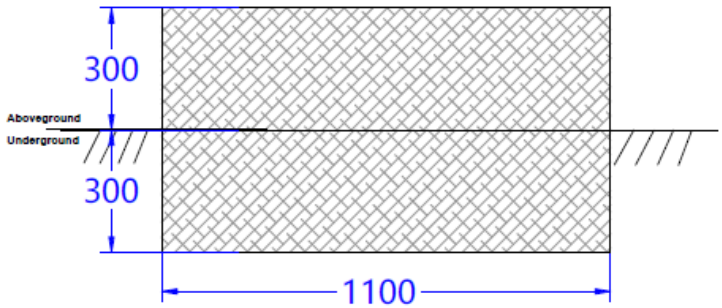
Foundation Design Requirements

1) The energy storage system must be installed on a concrete or other non-combustible surface. The installation surface must be level, solid, flat, and have sufficient load-bearing capacity; no depressions or slopes are allowed.
2) The bottom of the foundation pit for the equipment must be compacted and leveled.
3) After the equipment foundation is excavated, it is strictly forbidden to be disturbed by water. If disturbed by water, it should be re-excavated and backfilled.
4) The levelness tolerance of the contact surface between the equipment foundation and the cabinet is ≤3mm.
5) The foundation must be higher than the local historical highest water level and at least 300mm above the horizontal ground level.



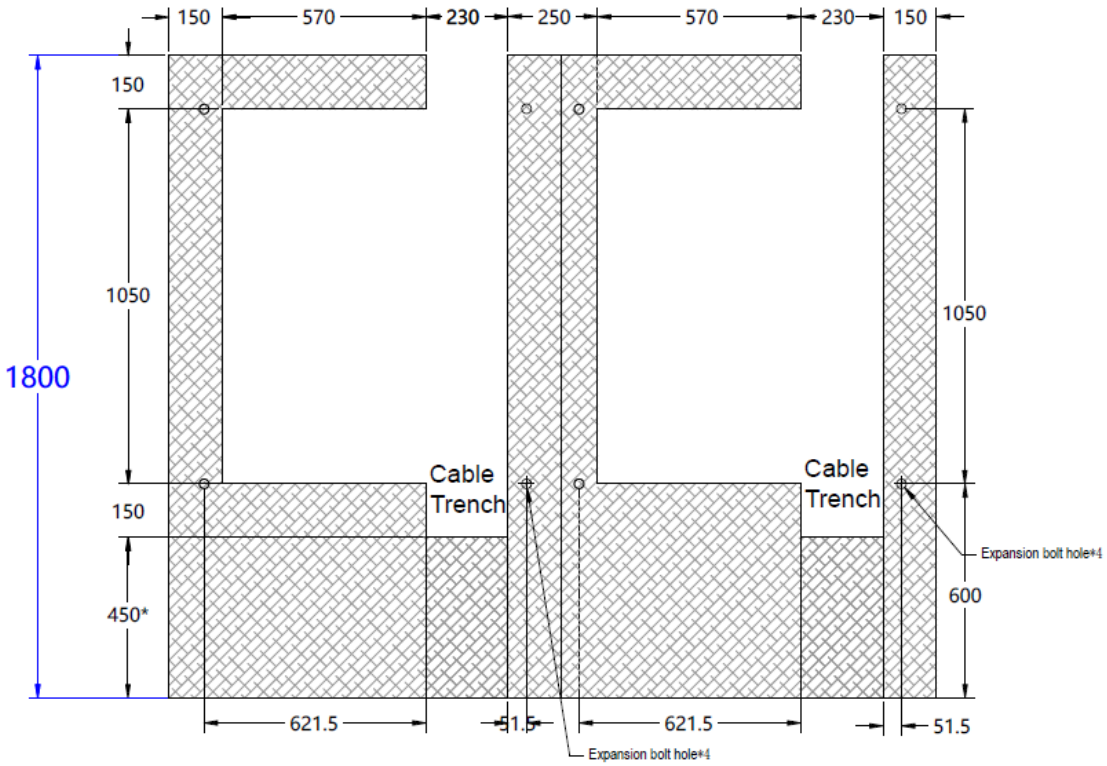
*Note: The front 450mm of the cable trench is a user operation platform that can be adjusted by oneself.

Vertical View



Front View

Figure 4.1-1 Single Unit Foundation Schematic (unit: mm)



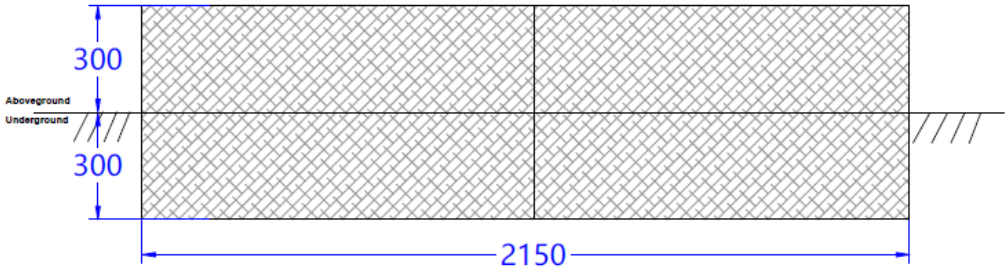


Figure 4.1-2 Two Unit Foundation Schematic (unit: mm)

4.2. Installing the Cabinet

Step 1

According to the design requirements, determine the installation position of the cabinet on a flat surface and mark it with a line. Drill holes at the marked points, insert expansion screws, and remove the nuts.

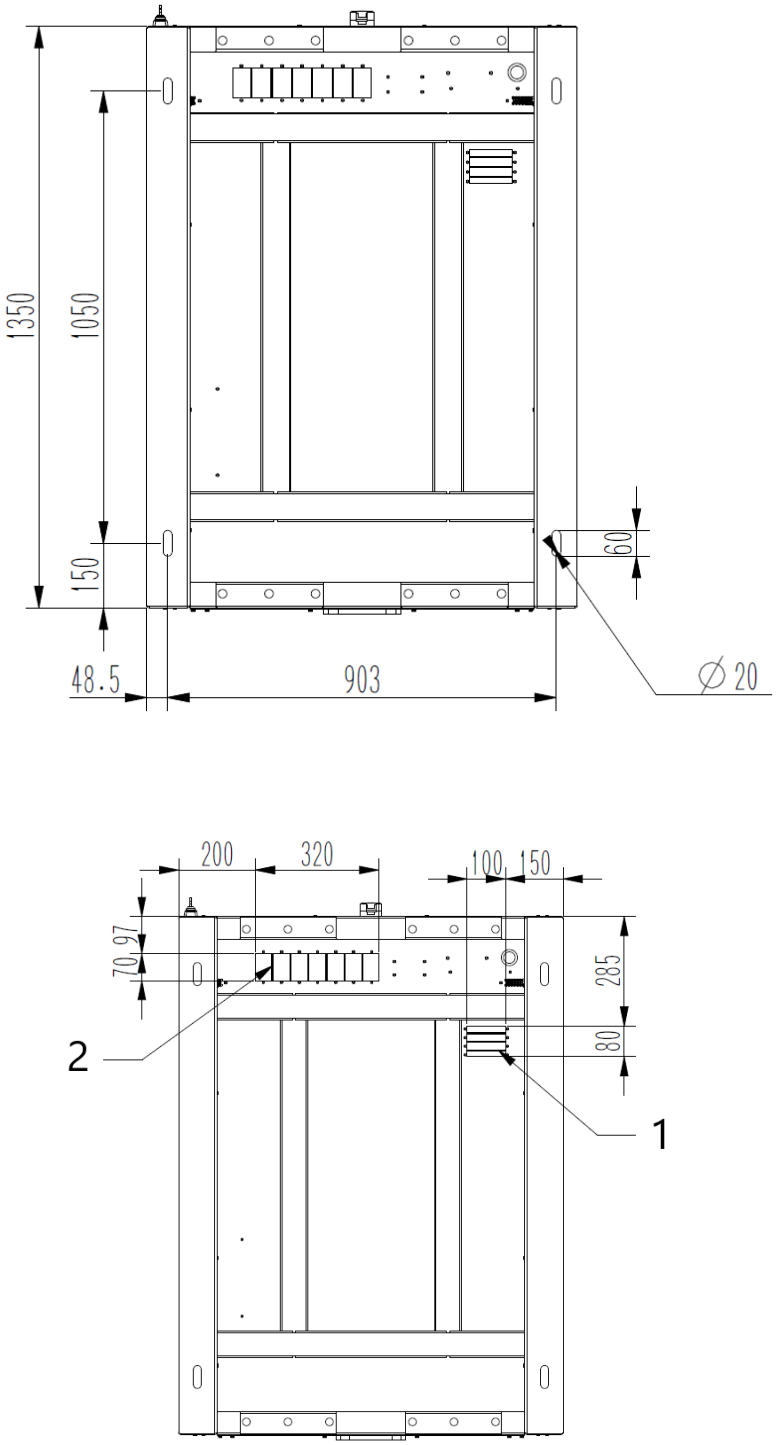


Figure 4.2-1 Marking the cabinet position (Note: 1—Main cable entry; 2—Backup cable entry; unit: mm)

Step 2

Forklift Installation: Use a forklift to transport the battery cabinet to the marked position.

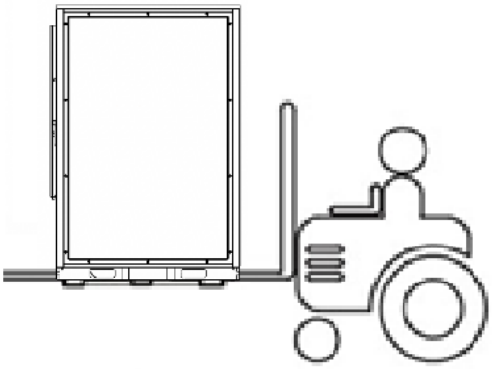
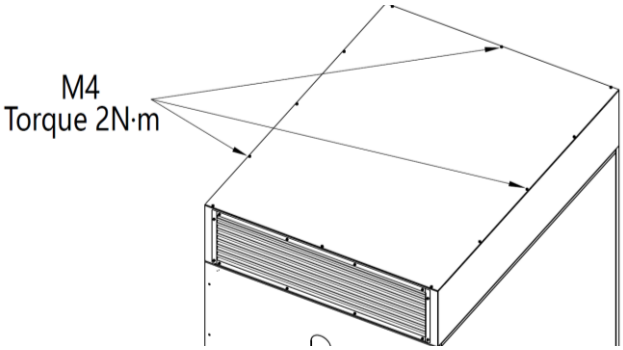


Figure 4.2-2 Cabinet Transportation

Or Crane Installation: Remove the top cover of the cabinet (as shown below), then fix the lifting hooks to the lifting points on the top of the cabinet. Use a crane to fix the lifting slings to the four hooks and install the cabinet at the marked position. Finally, remove the hooks and reinstall the top cover.



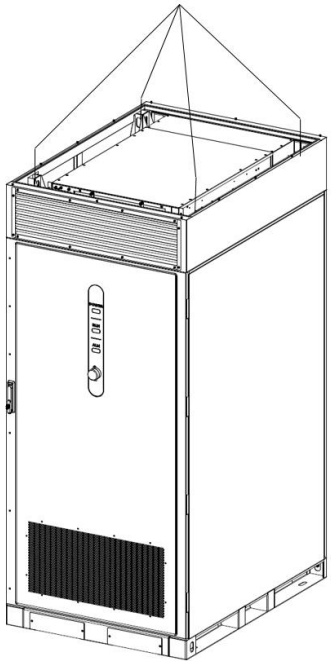


Figure 4.2-3 Cabinet Hoisting

Step 3

After installation, check if the cabinet is level and if the distance between cabinets meets the requirements.

Step 4

Fix the nuts onto the expansion bolts to secure the cabinet.

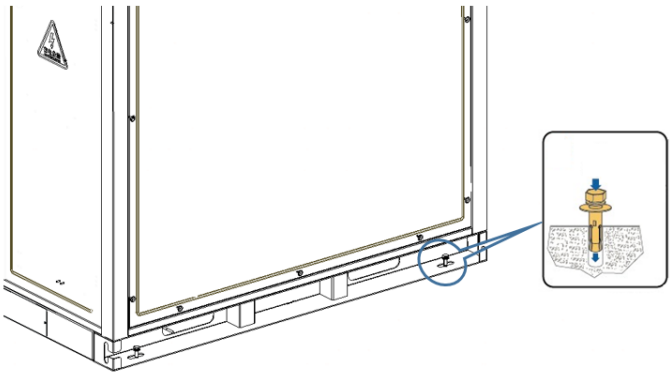
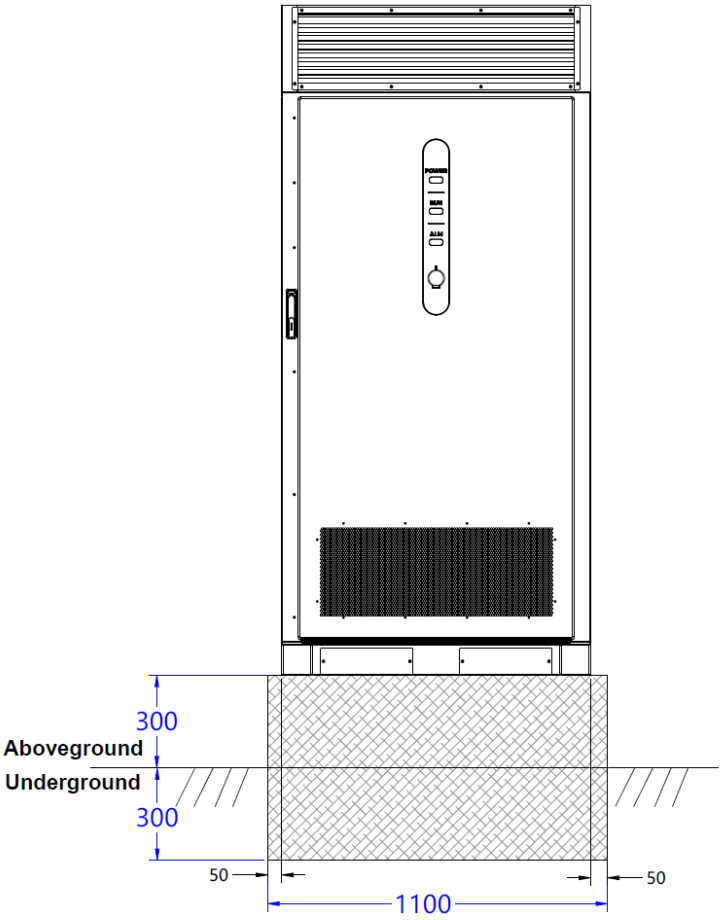


Figure 4.2-4 Securing the cabinet (Expansion bolt M12: torque 40N.m)



Single Unit Base Schematic

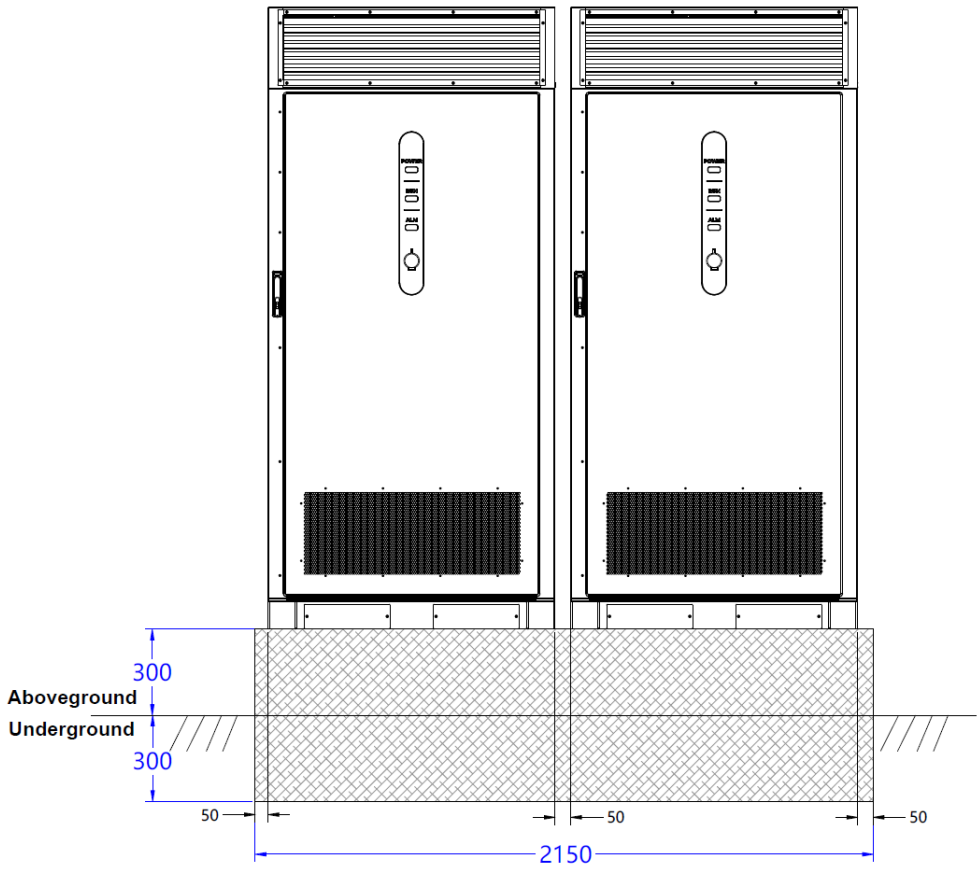


Figure 4.2-5 Cabinet Installation Position Diagram (unit: mm)

5. System Wiring

DANGER

- During installation, pay attention to the positive and negative poles. It is strictly forbidden to short-circuit the positive and negative poles, as this will cause a battery short circuit.
- Please wear insulated gloves and use insulated tools to avoid electric shock or short-circuit faults.
- Smoking or using open flames near the battery is prohibited.

NOTE

- The cable colors in all electrical connection diagrams in this chapter are for reference only. The selection of cables should comply with local standards.
- When routing cables, place them along the cable trays inside the cabinet to avoid interfering with other cables in the cabinet.

5.1. Cable Preparation

Table 5-1 Customer-Prepared Cable Harnesses

Type	Specification	Quantity	Remarks
Phase A	Recommended (UL, 2/0 AWG) 70 mm² yellow cable and M8 SC type terminal*1	1	L1/U/R
Phase B	Recommended (UL, 2/0 AWG) 70 mm² green cable and M8 SC type terminal*1	1	L2/V/S
Phase C	Recommended (UL, 2/0 AWG) 70 mm² red cable and M8 SC type terminal*1	1	L3/W/T
N Phase	Recommended (UL, 2/0 AWG) 70 mm² blue cable and M8 SC type terminal*1	1	N
Ground Cable	Recommended (UL, 2 AWG) 35 mm² yellow-green dual-color cable and M8 SC type terminal*1	1	PE

5.2. Installing the Ground Cable

Step 1

Prepare the ground cable from Table 5-1, using the M8 screw on the external grounding bar. The location of the external grounding copper bar is as follows (present on both the left and right sides of the cabinet's rear).

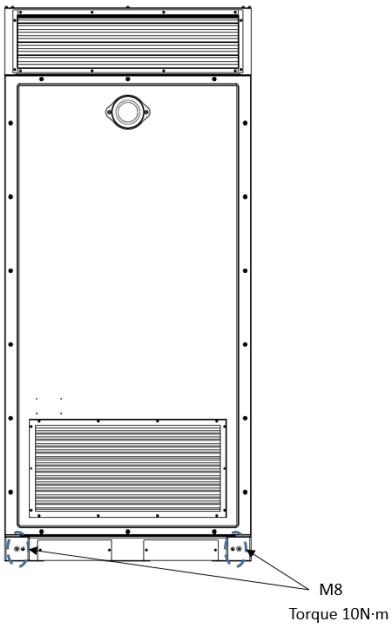


Figure 5.2-1 Cabinet External Grounding Hole

Step 2

Use an M8 screw to tighten the ground cable.

5.3. Electrical Wiring

DANGER	• Before installation, ensure that all circuit breaker switches on the high-voltage module and in the power distribution compartment are in the OFF state.

NOTE	• In the following wiring diagrams, the yellow, green, red, and blue wires represent A, B, C, and N wires, respectively.

Step 1

Remove all front panels of the power distribution compartment.

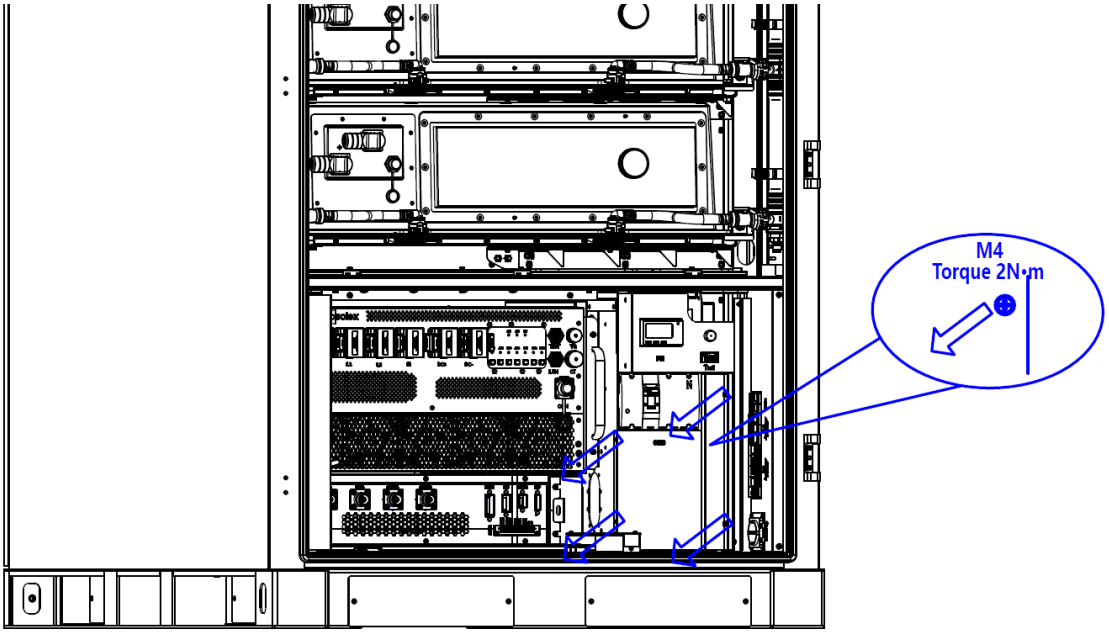


Figure 5.3-1 Removing the front panel

Step 2

Connect the cable harness (Customer to provide) from the lower side of the GRID circuit breaker to the power grid. A, B, C, N should be connected in the sequence of yellow, green, red, blue, and routed out from the cabinet's bottom cable entry port (as shown in the figure, remove the baffle plate of the bottom entry port). Recommended cable harness terminal is M8.

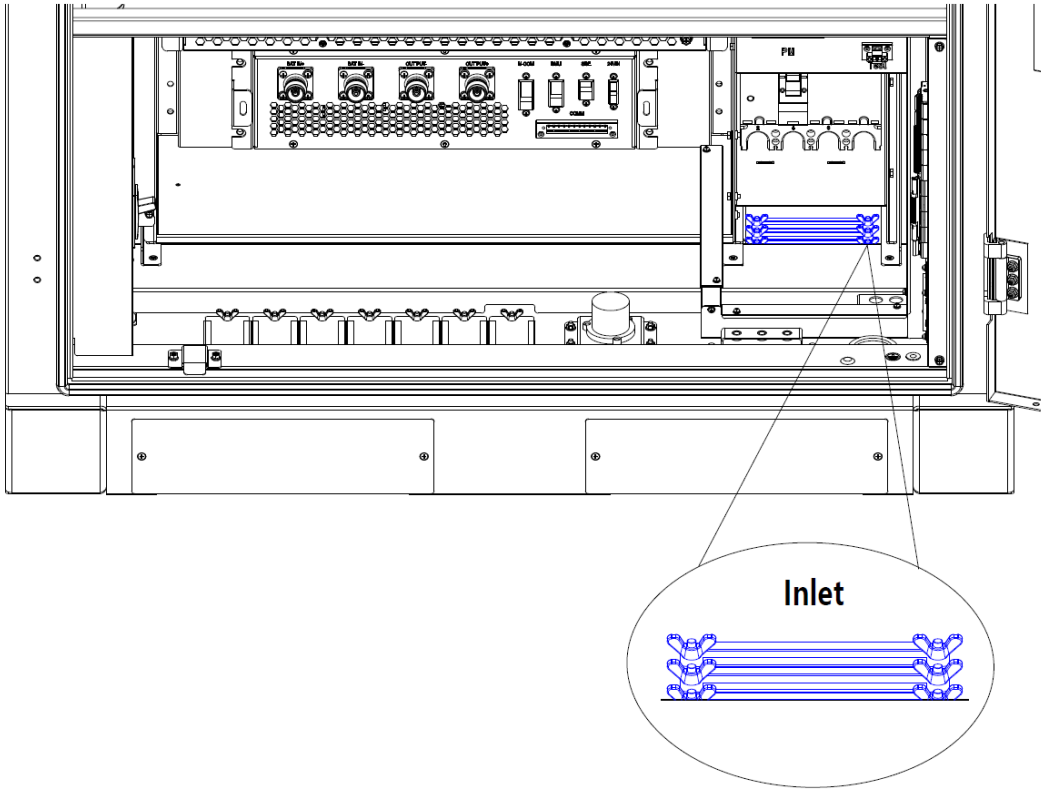


Figure 5.3-2 Bottom Cable Entry Port

Step 3

Check if all wiring parts are correctly connected in the following sequence and are secure.

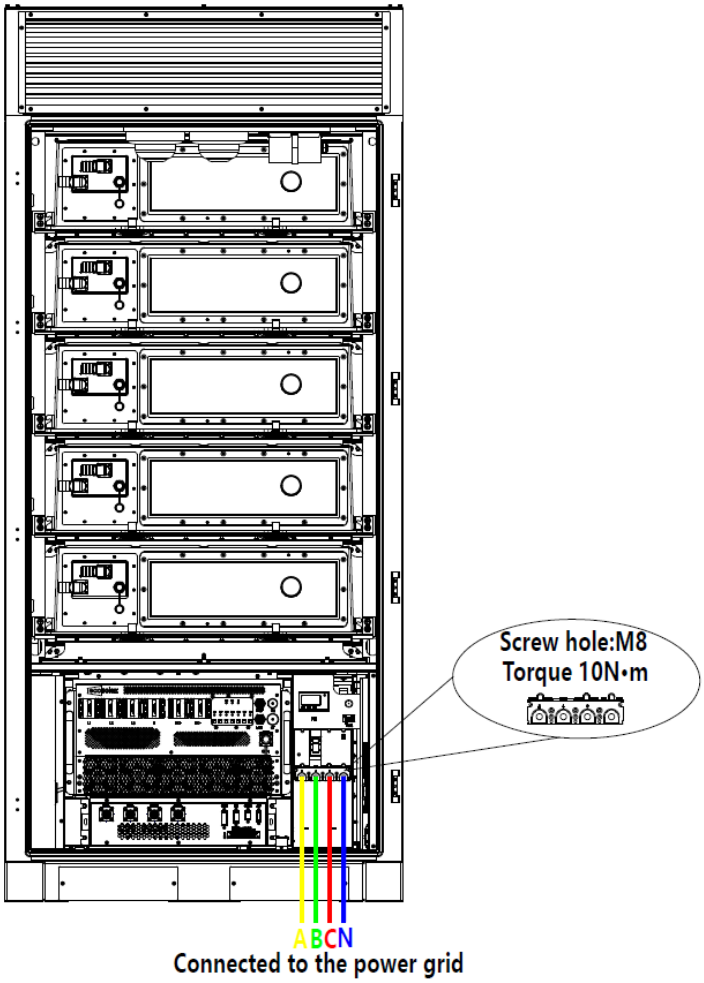


Figure 5.3-3 Complete System Wiring Diagram

Step 4

Install all front panels of the power distribution compartment.

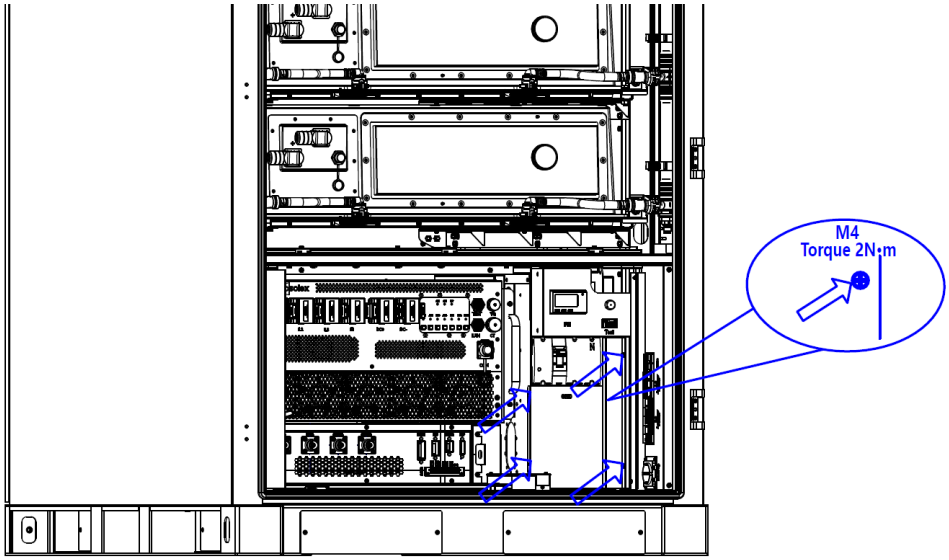


Figure 5.3-4 Installing the front panel

Step 5

After confirming the length of the A/B/C/N cables at the bottom, all cable entry holes must be sealed. Use fire-retardant putty to seal the used cable holes, and use the cabinet's own covers to seal the unused cable

holes. The correct standard for sealing with fire-retardant putty is shown in the figure below. (The sealing height of the fire-retardant putty must be >30mm, and the sealing radius must be more than 20mm larger than the cable hole radius).

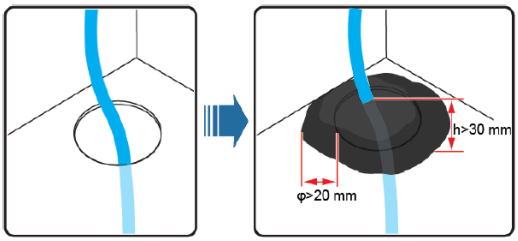


Figure 5.3-5 Fire-retardant Putty Sealing Schematic

Step 6

Remove the antenna from the wrap packaging and fix the antenna's magnetic base to the top of the cabinet.

6. Operating Instructions

6.1. Post-Installation Check

DANGER

- Personnel responsible for installing and maintaining the equipment must first undergo rigorous training, understand various safety precautions, and master correct operating methods.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Please wear insulated gloves and use insulated tools to avoid electric shock or short-circuit faults.

Check Step

Step 1: Check that the battery boxes and cabinet are all securely fixed.

Step 2: Check that the connections between battery boxes, and between the battery boxes and the high-voltage module, are secure.

Step 3: Check that the communication and power supply harnesses between the battery boxes, and between the battery boxes and the high-voltage module, are securely connected.

Step 4: Check that the communication harnesses between the EMS and the high-voltage module, PCS, fire suppression system, dehumidifier, and liquid cooling unit are securely connected.

Step 5: Check that the connections of the water inlet and outlet on the battery boxes and the liquid cooling unit are secure.

Step 6: Check that the wiring in the power distribution compartment, liquid cooling unit, and PCS is securely fixed.

Step 7: Check that the harnesses between the power distribution compartment, liquid cooling unit, and PCS are securely connected.

6.2. Single System Power-On Procedure

6.2.1. Check Before Power-On

Table 6-1 Check items before power-on

No.	Check Item	Acceptance Criteria
1	Circuit Breakers	● BAT breaker (battery DC switch) is in OFF position. ● GRID breaker (grid-side power switch) is in OFF position. ● DC POWER, AC POWER, and TMS switches are in OFF position.
2	Water Inlet/Outlet Plugs	● Properly tightened, no looseness.
3	Battery Modules	● Battery module is securely fixed, no looseness.
4	Cable Connections	● Module wiring is firm, no looseness. ● Communication cables are firmly connected, no looseness.

5	Ground Cable Installation	• Cabinet grounding point is securely connected to external grounding.
6	Power Cable Installation	• GRID side power cable connections ABCN follow the system wiring diagram (Fig. 5-4): green/yellow/red/blue.
7	Antenna Installation	• Antenna has been removed from its packaging and securely fixed to the top of the cabinet.

6.2.2. Power-On Procedure

⚠ DANGER	• Please wear insulated gloves and use insulated tools to avoid electric shock or short-circuit faults. • Before powering on, confirm that all switches and upstream switches are in the off state.Please wear insulated gloves and use insulated tools to avoid electric shock or short-circuit faults.

⚠ CAUTION	• Before powering on, please confirm that all items in the post-installation check have been completed. • During the power-on process, observe continuously. If any abnormality is found, immediately power off the battery, identify and resolve the cause, and then continue with the power-on procedure. • If the battery is powered down or discharged during installation and commissioning, please recharge it promptly to prevent damage from over-discharge. • After powering off, you need to wait for 1 minute before powering on again.

Step 1: Before powering on the battery, all switches and circuit breakers must be disconnected.

Step 2: Check that all power harnesses and communication line terminals are correctly connected.

Step 3: Close the DC POWER, AC POWER, BAT, TMS, and GRID switches in sequence. Supply power from the grid side. Check the system data on the display screen. If the data is normal, the entire machine has started successfully.

6.3. System Commissioning

Prerequisite: The system has been successfully powered on, and all alarms have been cleared.

In the display screen interface, set the peak-valley mode according to Chapter 7, "Display Screen Operation," and then click "Start" to begin.

6.4. Post-Installation Check

6.4.1. Power-On Procedure

Step 1: Log in to the operator account on the local web page, username: 123, password: 123456. Switch to the home page and click "Shutdown".

Step 2: Disconnect the GRID, BAT, TMS, AC POWER, and DC POWER switches in sequence.

6.4.2. Emergency Power-Off

Step 1: Open the protective cover of the emergency stop switch on the front door of the cabinet. **Step 2:** Press the emergency stop switch.

7. Local Web Operation

7.1. User Access and Login

The EMS interface provides three levels of access rights: Observer, Operator, and Administrator. Upon first access, the system defaults to the Observer level.

Figure 7.1-1 Main Interface

Click the **Exit** button in the upper left corner to return to the login page. You can select the corresponding access level for login. The Observer role does not require a password. The default password for the Operator role is **123456**.

- **Observer**: Can view the status, data, and alarm information of the energy storage cabinet, but cannot perform any settings.
- **Operator**: In addition to the Observer permissions, can configure power on/off, operating mode, and charge/discharge power of the energy storage cabinet.
- **Administrator**: Manufacturer-level access, reserved for after-sales service and maintenance.

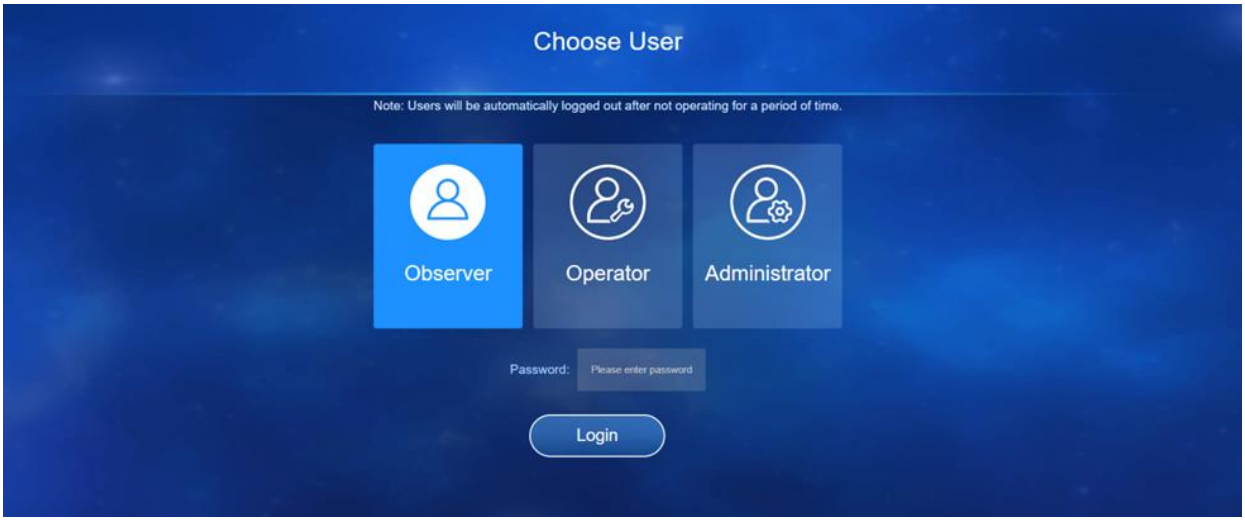


Figure 7.1-2 Login Interface

7.1.1. Menu

Taking the Administrator role as an example:

- At the bottom left of the home page are the Data, Settings, and Alarm buttons.
- At the bottom right is the Power On/Off button.
- At the top right is the Refresh button.

Figure 7.1-3 Main Interface after Login

7.1.2. User Login

Users can log in through the pop-up window to switch between three types of login users: viewer, operator, and administrator, and input passwords. Clicking the password input text box brings up a numeric keypad for password entry. The Energy Storage Mode, Device Commissioning, and System Configuration modules require operator-level or higher user permissions to view and operate.

Viewer User: Can view the status, data, and alarm information of the energy storage cabinet, but cannot make settings.

Operator User: In addition to the above permissions, can perform settings for the energy storage cabinet's startup/shutdown, working mode, charge/discharge power, etc.

Administrator User: Manufacturer's permission, for after-sales maintenance.

7.2. System Settings

7.2.1. Peak Valley Mode Settings

On this page, you can configure peak-valley time schedules and automatic charge/discharge strategies for specific dates. To activate the strategy, the Enable Configuration option at the top of the page must be set to either Manual or Automatic.

The system will prioritize the configuration for specific dates. If no specific date is set, the default peak-valley time strategy will be applied. Click Submit to save the configuration, which will take effect immediately.

Figure 7.2-1 Peak Valley Mode Setting Interface

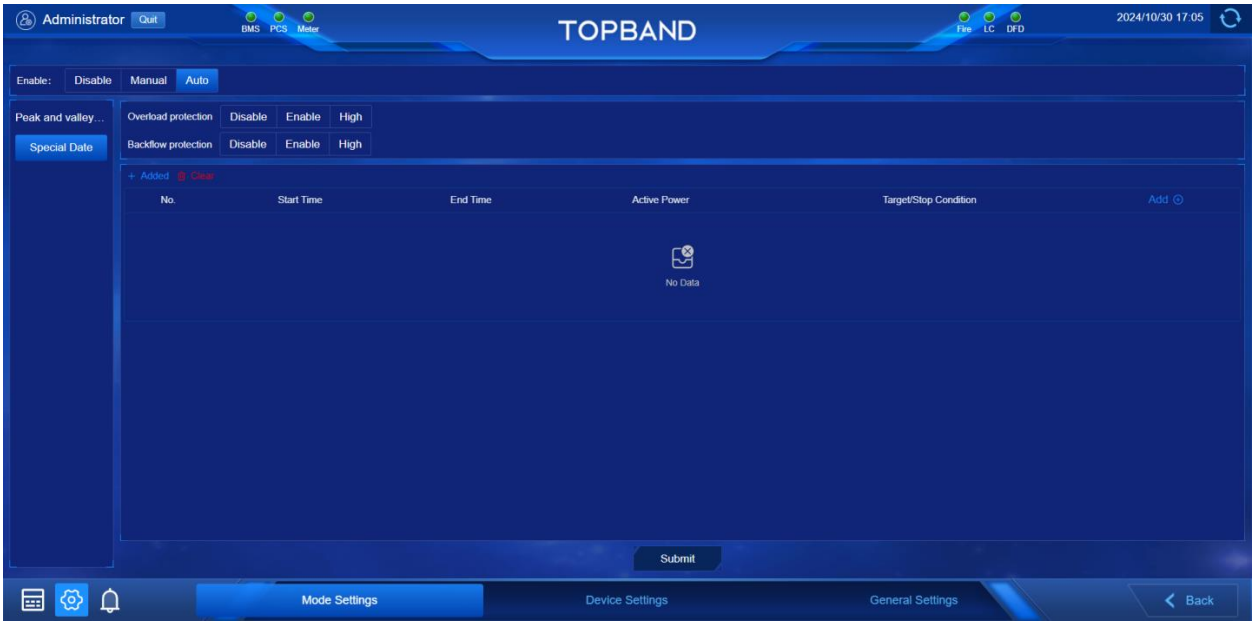


Figure 7.2-2 Special Date Setting Interface

7.2.2. General Settings

On the General Settings page, you can configure the EMS time and time zone, as well as switch between Chinese and English languages.

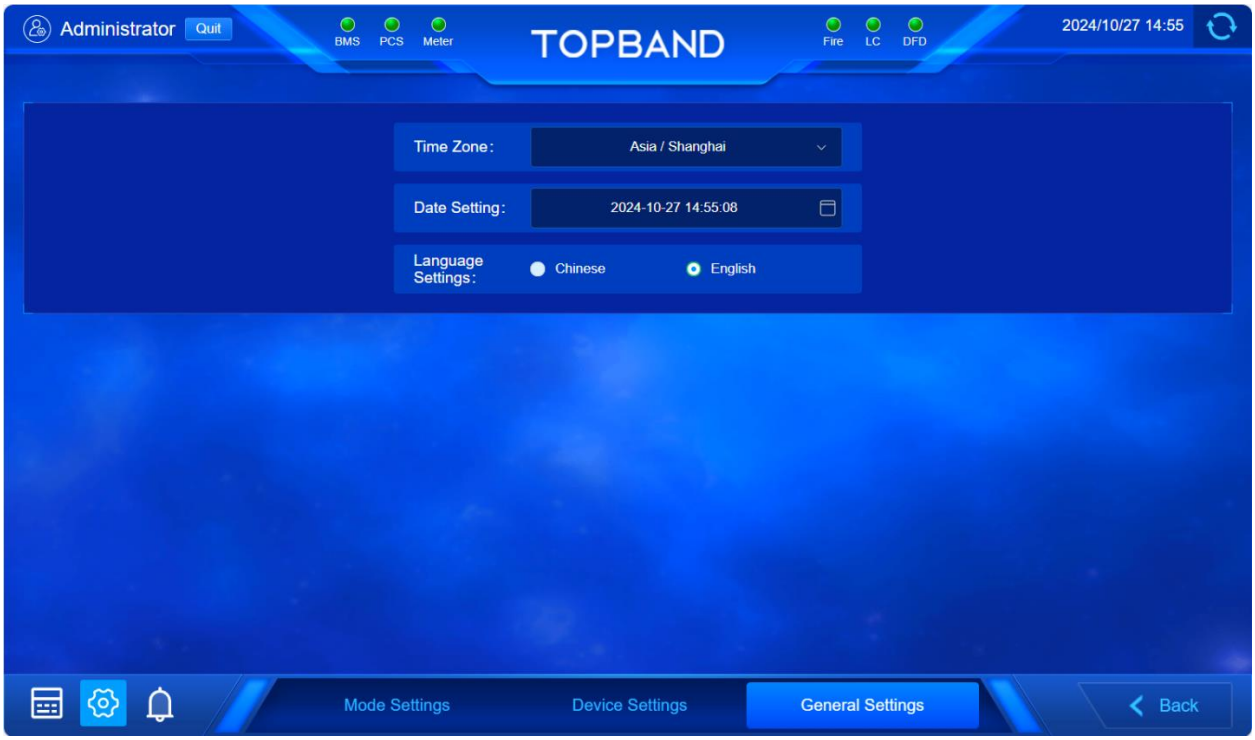


Figure 7.2-3 General Setting Interface

7.3. SCADA

After tapping the Data button on the Home page, you will enter the Details page. At the bottom center, tap to switch between the device data you want to view. Tap the Back button to return to the Home page.

Figure 7.3-1 BMS Data Interface

7.4. Alarm Information

Tap the Alarm icon button. When an alarm occurs, the Alarm icon on the Home page turns red. Tap it to enter the Alarm Information page. If an alarm is triggered, the corresponding alarm information will be displayed with a red background.

7.4.1. BMS Alarm

Figure 7.4-1 BMS Alarm Interface

7.4.2. Alarm Records

Figure 7.4-1 Alarm Records Interface

7.5. Master-Slave Connection

For instructions on performing the master-slave connection, refer to 'Master-Slave Communication Environment Setup'.

8. Cloud Platform and Mobile APP (Optional) Operating Instructions

If users need to connect to the Topband Co., Ltd. cloud platform, please refer to the "Ecosolex Smart Energy Management System Operation Manual" for cloud platform operating instructions, and the "Ecosolex Smart Energy Management System APP - Operation Manual" for APP (optional) operating instructions.

9. Product Nameplate and Packaging

Users can identify the equipment through the nameplate. The information on the nameplate includes: equipment model, main technical parameters, production date, etc.

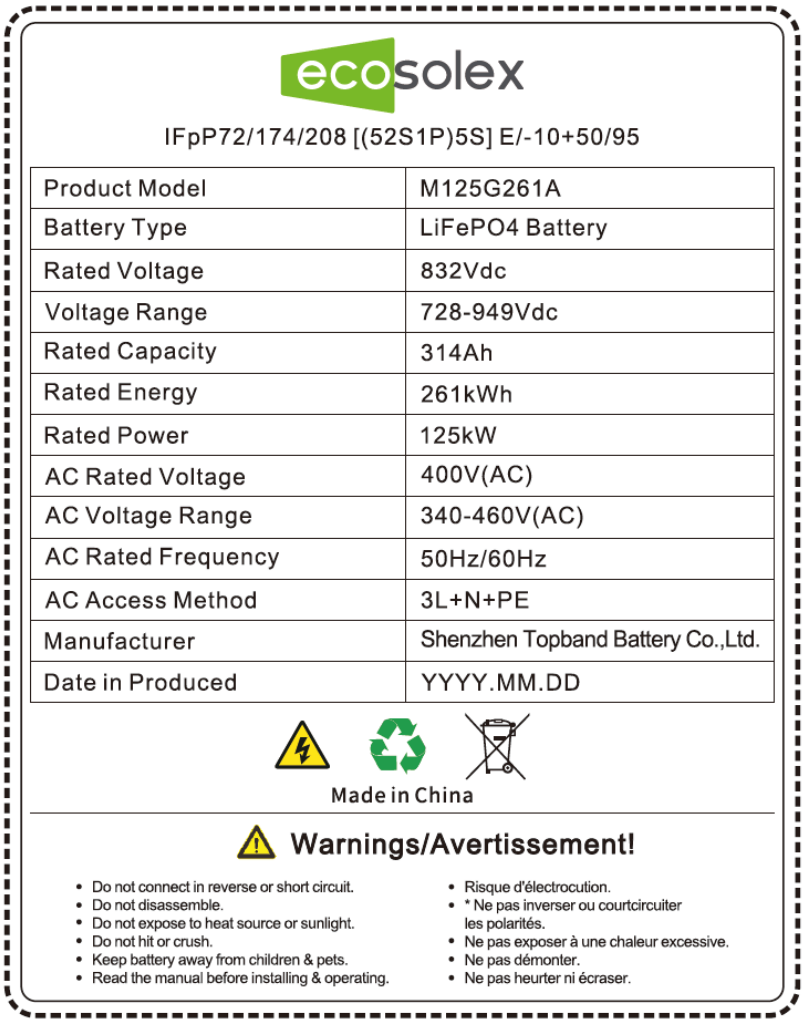


Figure 9-1 M125G261A Nameplate

The product is shipped in a wooden crate, as shown in the figure below.

Table 9-1 Product Packaging Data Sheet

Type	Weight (kg)	Dimensions (mm)	Volume (m³)
Energy Storage Cabinet	approx. 2520	1110*1460*2430	3.938

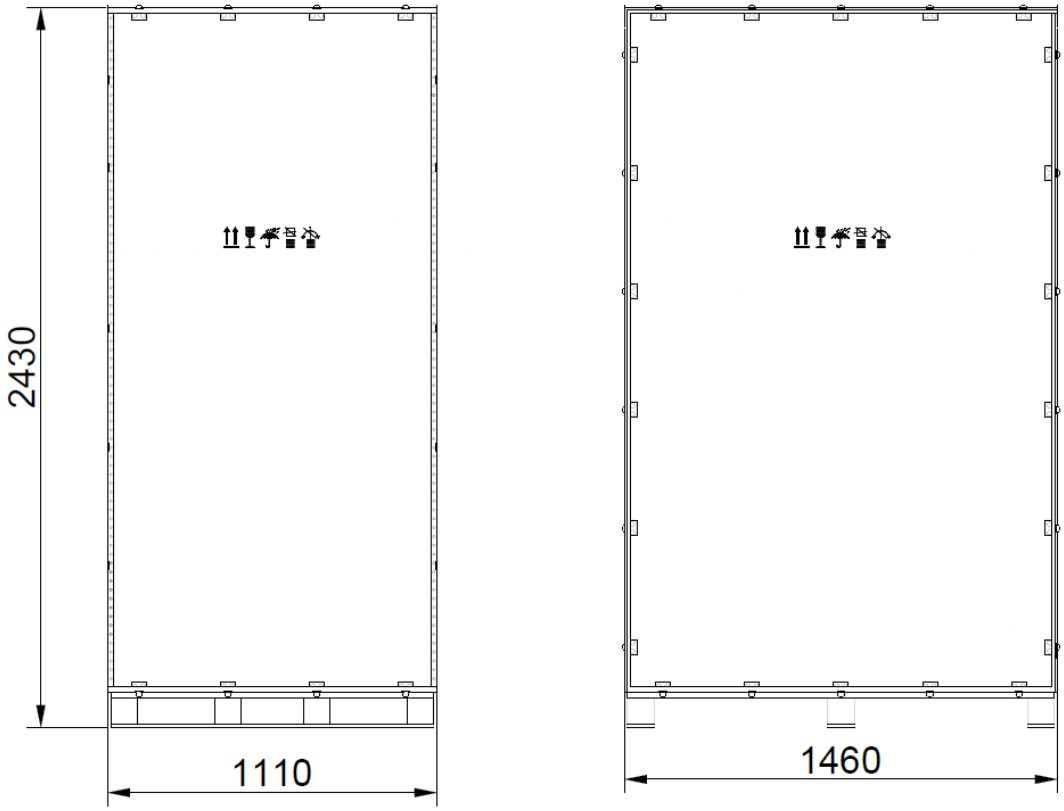


Figure 9-2 Product Packaging Schematic (unit: mm)

10. Routine Maintenance

NOTE

- All internal maintenance and servicing of the battery cabinet must be performed using insulated tools and should be carried out by personnel who have received relevant training. Devices behind protective covers that require tools to open are not user-serviceable. For maintenance needs, please consult Topband Co., Ltd.
- The battery cabinet must be regularly maintained according to the requirements below; otherwise, it will affect the normal operation of the battery cabinet and reduce its normal service life.

The battery system needs to be checked at least once a month to see if the cell voltage and temperature are normal. Check historical data to see if any serious faults have occurred.

Table 10-1 Maintenance Instruction List

Check Item	Acceptance Criteria	Abnormal Handling Method	Maintenance Cycle
Single Cell Voltage	Single cell voltage is between 2.6V and 3.7V	Contact Topband Co., Ltd. personnel for handling	1 month
Single Cell Temperature	Temperature is between -20°C and 55°C	Contact Topband Co., Ltd. personnel for handling	1 month
After a single full charge, all cluster SOCs are 100		Perform another complete charge-discharge cycle	3 months
Historical Fault Content	Check the cause for level 1 and 2 faults; provide feedback for level 3 faults	Contact Topband Co., Ltd. personnel for handling	1 month
Fault Indicator Light Normalcy	Fault indicator light can flash	Contact Topband Co., Ltd. personnel for handling	1 month
Run Indicator Light Normalcy	Run indicator light can stay on	Contact Topband Co., Ltd. personnel for handling	1 month
Fan Operation	Fan should work normally	Contact Topband Co., Ltd. personnel for handling	1 month
Air Inlet/Outlet	No foreign objects, dust, or blockages	Clear foreign objects, dust, blockages	1 month
Internal Cabinet Components	No significant dust accumulation on internal and door components, and no damage, corrosion, etc.	If there is excessive dust, clean it with tools. Damaged or corroded components need to be replaced.	6 months
System Status	No excessive noise, vibration, or other abnormal phenomena during equipment operation	Check the source of the abnormality. If unable to resolve, contact Topband Co., Ltd. personnel.	6 months
Cabinet Status	No obvious rust on the cabinet, no signs of water ingress, no abnormal bending	Contact Topband Co., Ltd. personnel for handling	1 year
Harness Abnormality	No abnormalities in power and communication harnesses	Replace the harness	1 year

Circuit Breaker Screw Status	No rust, no significant oxidation	Replace screws	1 year
Liquid Cooling Unit Operation	Liquid cooling unit should work normally	Contact Topband Co., Ltd. personnel for handling	6 months
Dehumidifier Operation	Dehumidifier should work normally	Contact Topband Co., Ltd. personnel for handling	6 months
Liquid Cooling Unit	No water leakage at the water outlet and inlet	Visually and by touch inspect for any leakage	6 months
	Sufficient refrigerant	Check the system for leaks, replenish refrigerant	6 months
	No loose electrical cables or terminals	After powering off for at least 1 minute, tighten loose cables with a screwdriver.	6 months
	No aging, damage, abnormal heating, or other anomalies on electrical cables	After powering off for at least 1 minute, replace the power cables.	6 months
	No dust on the wiring panel area	After powering off for at least 1 minute, clean the dust with a brush.	6 months

11. Troubleshooting

When encountering the alarms listed in the table below during daily operation, you can troubleshoot and handle them according to the possible causes and handling methods in the table.

Table 11-1 Common Alarms and Troubleshooting

Alarm Type	Alarm Content	Possible Cause	Troubleshooting Method
EMS	BMS communication alarm	1. Loose BMS communication harness	1. Check if the connection harness is loose or if the harness is damaged; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	PCS communication alarm	1. PCS not powered on 2. Loose communication harness	1. Check if the connection harness is loose or if the harness is damaged; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	Power meter communication alarm	1. Power meter not powered on 2. Loose communication harness	1. Check if the connection harness is loose or if the harness is damaged; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	Air conditioner/Liquid cooling unit communication alarm	1. Air conditioner/Liquid cooling unit not powered on 2. Loose communication harness	1. Check if the connection harness is loose or if the harness is damaged; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	Smoke/Temperature/Fire suppression alarm	1. Fire suppression activated, smoke or local overheating inside the battery cabinet 2. Fire suppression not activated, heat source or dense smoke near the cabinet	1. Please remotely monitor for 30 minutes for any other abnormalities (e.g., abnormal temperature, battery voltage, battery temperature, hydrogen concentration). If so, please shut down the system remotely. During remote monitoring, do not approach the battery cabinet, do not open the cabinet door. 2. If there are no other abnormalities during remote monitoring, arrange for safety-trained personnel to go to the site and observe continuously from a safe distance for 30 minutes. If there is smoke or fire, please shut down the system remotely, and people at the scene should move away as quickly as possible and call the fire department.. 3. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	Water immersion alarm	1. Water at the bottom of the cabinet	1. Clean up the water at the bottom of the cabinet.
BMS	Module communication abnormal alarm	1. Loose communication line between high-voltage box and module 2. Loose communication line between modules 3. Damaged BMU	1. Check if the connection harness is loose or if the harness is damaged; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	Single cell undervoltage protection	1. Battery not charged for a long time after being depleted 2. BMS/PCS abnormal, did not respond to discharge protection threshold	1. Restart the system, charge until normal; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;

	Single cell overvoltage protection	1. BMS/PCS abnormal, did not respond to charge protection threshold	1. Restart the system, let it rest for over 30 minutes, then discharge until normal; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling;
	Charge overcurrent alarm/protection	1. Scheduled power is too high	1. Dispatch a reasonable power schedule 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling
	Discharge overcurrent alarm/protection	1. Scheduled power is too high	1. Dispatch a reasonable power schedule 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling
	Cell charge high temperature alarm	1. Liquid cooling unit not started 2. Insufficient refrigerant in liquid cooling unit	1. Check the cooling system 2. Replace the refrigerant 3. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling
	Cell discharge high temperature alarm	1. Liquid cooling unit not started 2. Insufficient refrigerant in liquid cooling unit	1. Check the cooling system 2. Replace the refrigerant 3. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling
PCS	Bus imbalance	1. Abnormal PCS drive 2. Instantaneous large AC current output, device protection 3. Abnormal insulation of battery to ground	1. Can be reset and restarted. Fault clearing time is about 1 hour after DC power is cut off, longer if not powered off. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	A/B/C/N phase hardware overcurrent	1. Grid environment distortion rate exceeds limit 2. Abnormal device drive, etc.	1. Can be reset and restarted. If the fault occurs more than 3 times in 1 day, manual intervention is required to confirm the on-site grid quality. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	Voltage THDU exceeds limit	1. AC system voltage distortion rate exceeds device protection value	1. Can be reset and restarted. Check if the grid THDU exceeds 15%, confirm the instantaneous power of the load is within the design range of the system's power distribution. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	System over/under frequency	1. Grid frequency exceeds device protection upper limit 2. Grid abnormality	1. After clearing the fault, perform a restart operation; 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	System phase sequence error	1. Incorrect AC wiring phase sequence 2. Abnormal AC voltage sampling sensor	1. Requires PCS to auto-reset. Restart after troubleshooting on-site. Check that ABCN phase sequence corresponds between modules. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
	DC bus software overvoltage	1. High-voltage box disconnected during charge/discharge 2. Device overvoltage/undervoltage protection in constant voltage mode 3. Abnormal DC voltage sampling sensor	1. Can be reset and restarted. Need to confirm if the high-voltage box contactor has tripped or if there is a DC fuse issue, DC soft start not disengaged, etc. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.

	BMS communication fault	1. Communication with BMS timed out, communication disconnected for longer than protection threshold	1. Can be reset and restarted. Automatically resets after communication is restored. 2. If the fault cannot be reset, contact Topband Co., Ltd. personnel for handling.
Liquid Cooling Unit	Outlet water high/low temperature alarm	1. Faulty outlet water temperature probe. 2. Leakage in the cooling medium circulation system.	1. Replace the outlet water temperature probe. 2. Check for leaks, repair and replenish the cooling medium. 3. If the fault is not reset, contact Topband Co., Ltd. personnel for handling.
	Water refill alarm	1. Insufficient cooling liquid in the chiller.	1. Use a refill pump to add cooling liquid.
	Abnormal power down	1. Improper user operation, power cut off directly without shutdown. 2. Temporary power outage from the supply grid.	1. No action required. The alarm will automatically clear after a few seconds.

12. Emergency Handling

When a hazardous incident, including but not limited to the following, occurs on site, please prioritize the personal safety of on-site personnel and contact our company's service engineers.

DANGER

When a battery box is dropped or subjected to strong impact

- If there is obvious odor, damage, smoke, fire, etc., evacuate personnel immediately, call for emergency services, and contact professionals. Professionals should use fire-fighting facilities to extinguish the fire and take other measures while ensuring safety.
- If there is no obvious deformation or damage to the appearance and no obvious odor, smoke, or fire, operate under the premise of ensuring safety:
  .1. **In a warehouse:** Evacuate personnel, have professionals use mechanical tools to move the battery to an open and safe place, and contact our service engineers. Let it rest for 1 hour and monitor the battery temperature to be within room temperature ±10°C before handling.
  .2. **At the project site:** Evacuate personnel, close the energy storage system door, have professionals use mechanical tools to move the battery to an open and safe place, and contact our service engineers. Let it rest for 1 hour before handling.

DANGER

In case of flood

- If it is safe to do so, power off the system and lock the cabinet door.
- If any part of the battery is submerged in water, do not touch the battery to avoid electric shock.
- Do not use a battery that has been submerged in water. Contact a battery recycling company for disposal.

DANGER

In case of external fire

- If an external fire occurs, power off the system if it is safe to do so.
- Use a carbon dioxide, FM-200, or ABC dry powder fire extinguisher to extinguish the fire.
- Firefighters should avoid contact with high-voltage components during fire fighting, as this could lead to a risk of electric shock.
- High battery temperatures can cause battery deformation, damage, and leakage of electrolyte and toxic gases. Wear respiratory protective equipment and do not get close to avoid skin irritation and chemical burns.

In case of fire extinguisher agent release or fire

Suggestions for on-site O&M personnel:

- In case of fire, evacuate the building or equipment area, press the fire alarm, and immediately call the fire department. Notify professional firefighters and provide them with relevant product information, including but not limited to: battery pack type, energy storage system capacity, battery pack location and distribution, etc.
- Under no circumstances should you re-enter the burning building or equipment area. Do not open the energy storage system door. Isolate and monitor the site, and keep irrelevant personnel away.
- After calling the fire department, remotely power off the system (e.g., smart pad-mounted substation, smart energy storage controller, auxiliary power supply equipment, combiner box power supply, etc.) under the condition of ensuring your own safety.
- After professional firefighters arrive, provide them with relevant product information, including but not limited to: battery pack type, energy storage system capacity, battery pack location and distribution, user manual, etc.

⚠ DANGER

- After the fire is confirmed to be extinguished by professional firefighters, it should be handled by professionals in accordance with local regulations. Do not open the energy storage system door without authorization.
- Post-disaster product maintenance: Contact our company's service engineers for evaluation.

Suggestions for professional firefighters:

- For product information, please refer to the information provided by O&M personnel, including but not limited to: battery pack type, energy storage system capacity, battery pack location and distribution, user manual, etc.
- Do not open the energy storage system door until its internal safety can be ensured.
- Firefighting operations should follow local fire regulations.In case of external fire

13. Accessories List

A single battery system (cluster/domain system) includes the following accessories (placed in the accessory box).

Table 13-1 Accessories List

No.	Type	Specification	Quantity	Description
1	Fastener	M12*80 expansion bolt + nut	4pcs	For fixing the cabinet to the ground
2	Fastener	Phillips small countersunk head screw M4*10	8pcs	Cabinet lock base sealing plate
3	Fastener	Base sealing plate	4pcs	
4	Auxiliary Material	Fire-retardant putty	2kg	
5	Document	Certificate of Conformity	1pcs	
6	Document	Shipping Inspection Report	1pcs	