PC-mini
Energy Storage System
User Manual

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Introduction

Overview

This document provides guidance on the installation, electrical connection, commissioning, and troubleshooting methods for the DC Cabinet Series energy storage battery cabinet (hereinafter referred to as the "energy storage battery cabinet"). Prior to installation, operation of the energy storage system (ESS), please read this manual carefully, ensuring comprehension of the safety information and familiarity with the system's functions and features.

Users

This manual applies to operators of the energy storage power station and qualified electrical technical personnel.

All installation and related operations must only be carried out by professional technical personnel. Professional technical personnel shall meet the following requirements:

- Have received specialized training
- Have thoroughly read this manual and fully understood the relevant safety precautions
- Be familiar with local standards and the relevant safety regulations for electrical systems

Symbol Convention

In this document, the following symbols may be used with the meanings described below.

Symbol	Description
DANGER	It indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
WARNING	It indicates a hazard with a moderate level of risk that, if not avoided, could result in death or serious injury.
CAUTION	It indicates a hazard with a low level of risk that, if not avoided, could cause minor or moderate injury.
BEWARE	It is used to convey warning information related to equipment or environmental safety. If not avoided, it may result in damage to equipment, loss of data, degradation of equipment performance, or other unpredictable consequences. The "BEWARE" symbol does not refer to personal injury.
NOTE	It is used to emphasize important/critical information, best practices, and tips. The "NOTE" symbol is not a safety warning and does not refer to personal injury, equipment damage, or environmental hazards.

Modification Record

The revision history tracks the description of all updates to the document. The latest version of the document contains all changes from previous revisions.

Document Edition: 01 (2025-6-4)

V1.0 (Initial version)

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V1.1

Revised some of the content descriptions to address several known issues.

Document Edition: 03 (2025-12-30)

V2.0

Adjust the manual description architecture.

Update the appearance and layout of the equipment, and optimize the description of internal components.

Table of Contents

1 Safety Precautions

1.1 General Safety

Declaration

Please thoroughly read this manual before installing, operating, and maintaining the equipment, and follow the markings present on the equipment, as well as all safety precautions outlined in this manual.

The "BEWARE", "CAUTION", "WARNING", and "DANGER" instructions contained in this manual do not cover all safety considerations that need to be observed, but are only intended to supplement all safety precautions. WHES disclaims any liability for damages resulting from failure to comply with general safe operation requirements or from violation of safety standards applicable to the design, production, and use of the equipment.

This equipment must be used in an environment that meets the design specifications, otherwise the equipment may fail, resulting in equipment malfunctions, component damage, personal safety accidents, property losses, etc., which are not covered by the quality warranty.

Be sure to install, operate and maintain the equipment in accordance with local laws, regulations, and specifications. The safety precautions contained in this manual are intended only to supplement local laws and regulations.

WHES shall not be held liable in any of the following circumstances:

- Installing or operating the equipment in an environment that exceeds applicable international, national, or local standards;
- Failure to operate the equipment under the conditions specified in this manual;
- Unauthorized disassembly, modification of the product or alteration of the software codes;
- Failure to operate the equipment in accordance with the operating instructions and safety warnings present on the product or outlined in the document;
- Damage to the equipment caused by abnormal natural environment (force majeure, such as earthquake, fire, storm, flood, mudslide);
- Damage caused by the customer's failure to comply with transport and installation requirements;

- Damage caused by storage conditions not meeting the requirements specified in the product document;
- Damage to the hardware or data of the equipment due to customer negligence, improper operation or intentional damage;
- Damage to the system caused by third parties or customers, including relocation and installation of the system not in accordance with the requirements of this manual, and adjustment, modification, or removal of identification marks not in accordance with the requirements of this manual;
- Defects, failures or damage caused by acts, events, negligence or accidents beyond the reasonable control of the Seller, including power outages or electrical failures, theft, war, riots, civil commotion, terrorism, intentional or malicious damage, etc.

General Requirements

DANGER

The equipment operates at high voltages and improper handling poses a risk of electric shock or fire, which may cause death, serious injury, or substantial property damage. Always operate according to instructions:

- Follow the operating procedures and safety precautions described in this manual and other relevant documents.
- Follow warning labels, cautions, and protective measures affixed to the equipment.
- Use the correct tools as specified in this manual and be proficient in the proper use of the tools.
- Comply with the safety regulations of the power plant, such as implementing the operation ticket and work ticket system.
- No one except the operator is allowed to access the equipment. Temporary warning signs or fencing must be erected to isolate the area during operation of the equipment.
- All warning labels, cautions, and protective measures affixed to the equipment shall remain legible. Unauthorized alteration, damage, or obstruction of such safety information is strictly prohibited. Any illegible markings shall be replaced in a timely manner.
- Do not perform installation, wiring, maintenance and replacement operations while the equipment is powered on.
- Do not clean the electrical components inside the equipment with water.
- Check the equipment for damage, such as holes, dents or other signs of possible internal damage.

- Check that the pre-installed cables of the equipment are securely connected.
- Check that the equipment is free from displacement of internal components, or unauthorized modification of internal structure and installation procedures.
- Do not power on the equipment until it has been installed or approved by qualified personnel.
- Measure the voltage at the contact point before touching any conductor surface or terminal, and confirm that the protective grounding conductor of the equipment or parts to be repaired is securely grounded to ensure that there is no risk of electric shock.
- Immediately press the EMERGENCY STOP switch and notify the on-site management if any liquid ingress is detected in the equipment.
- Do not open the cabinet door while the system is operating.
- For the first power - on of the equipment or when working in the live main - circuit area, it is recommended to wear level 1 arc - resistant clothing.

⚠CAUTION

- Do not perform arc welding, drilling, or cutting operations on the equipment. Such operations may damage the sealing of the entire enclosure, the electromagnetic shielding performance of the equipment, the internal components and cables, and the metal chips generated during the operation may cause short circuits, affecting the equipment function or causing equipment damage.
- The casing temperature is elevated during operation of the equipment, posing a risk of burns. Avoid physical contact with the equipment.
- If, during operation of the equipment, a fault is detected that may cause personal injury or damage to the equipment, stop operation immediately, notify the person in charge, and take effective protective measures.
- Evacuate the area immediately if an audible/visual fire alarm is activated.
- Close and lock the cabinet door if the equipment has to be left temporarily unattended during the maintenance procedure.

BEWARE

- All transport, transit, installation, wiring, and maintenance activities must comply with the applicable laws, regulations, and standards of the country/region where the work is performed.
- The materials to be prepared by the user and the tools required during operation must comply with the applicable laws, regulations, and standards of the country or region where the work is performed.
- Permission from the local power authority must be obtained before the equipment is connected to the grid.
- Before opening the cabinet door during installation, operation, and maintenance, be sure to remove any accumulated water, snow, or other debris from the top of the enclosure to prevent debris from falling into the enclosure.

NOTE

- It is prohibited to reverse engineer, decompile, disassemble, dismantle, adapt, implant, or perform other derivative operations on the equipment software. It is not allowed to research the internal implementation of the equipment, obtain the source code of the equipment software, or steal intellectual property rights in any way, nor is it allowed to disclose the results of any performance tests of the equipment software.
- It is recommended that users prepare video recording devices to document the detailed process of installation, operation, and maintenance of the equipment.

1.2 Personnel Requirements

All operations related to hoisting and transportation, installation and wiring, operation, and maintenance of the energy storage system must be performed by professional technical personnel in compliance with local regulations. Operating personnel shall meet the following requirements:

- Possess basic knowledge of electronics, electrical wiring, and mechanical systems, and be familiar with electrical and mechanical schematics.
- Be familiar with the structure and working principles of the energy storage cabinet, as well as the structure and working principles of the cabinet and its upstream and downstream equipment.
- Have received professional training related to electrical equipment installation and commissioning.
- Have the ability to respond to emergencies and hazardous situations during installation or commissioning.
- Be familiar with the relevant standards and regulations of the country/region where the project is located.
- Wear personal protective equipment (PPE) in compliance with local safety protection requirements when operating the equipment.

NOTE

Local regulations and industry standards shall be consulted for specific qualification requirements.

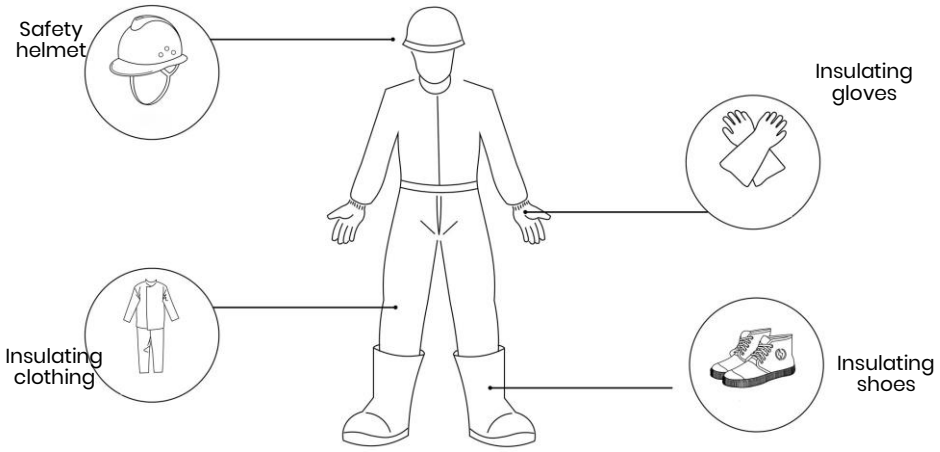


Figure 1-1 Illustration of Personal Protective Equipment

- Do not wear watches, bracelets, bangles, rings, necklaces, or other conductive items during installation, operation, or maintenance to prevent electric shock and burns.
- All transport, transit, installation, wiring, and maintenance activities must comply with the applicable laws, regulations, and standards of the country/region where the work is performed.
- It is important to ensure a comprehensive understanding of the construction and working principles of the entire ESS, and conduct all activities in accordance with the instructions provided in this manual.

1.3 Storage and Installation Environment Requirements

General requirements

NOTE

- During the storage period, relevant evidence demonstrating compliance with product storage requirements, including temperature and humidity logs, photos of the storage environment, and inspection reports, must be properly maintained.
- The storage environment must be maintained in a clean and dry condition to prevent dust and moisture contamination. The equipment shall be protected from exposure to rain or groundwater.
- The ambient air must not contain any corrosive or flammable gases.
- Do not store the equipment in a tilted or inverted position.
- Equipment that has been stored for two years or more should be inspected and tested by qualified personnel before being put into use.

EES Storage Requirements

- Stacking storage is prohibited.
- Store the equipment on a level surface (for long-term or temporary storage).
- Keep the cabinet door securely closed.
- Storage temperature: -30 °C~+60°C, humidity: 5%RH~95%RH.
- The energy storage system contains lithium battery packs and should be kept in a dry, well-ventilated area, protected from direct sunlight, rain, and sources of intense infrared radiation, organic solvents, corrosive gases, and ignition.
- The warehouse keeper should be responsible for monitoring the ESS inventory on a monthly basis and reporting it to the planning department on a regular basis, and should arrange for personnel to inspect the ESS that has been stored for an extended period in a timely manner.
- ESS must be shipped based on the "first in, first out" principle.

Installation Environment Requirements

For site selection, please refer to **3.2 Installation Environment Requirements**
The following requirements must also be met during on-site installation:

- The installation layout of the ESS must meet the local standard requirements for fire protection distance or fire walls, including but not limited to the requirements of GB 51048-2014: Design Code for Electrochemical Energy Storage Power Station and NFPA 855 Standard for the Installation of Stationary Energy Storage Systems.
- It is prohibited to place the equipment in an environment with flammable, explosive gases, or smoke, and to operate the equipment in such an environment.
- The installation, use, and operation of outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, plugging and unplugging outdoor signal interfaces, working at heights, and outdoor installation) is prohibited during thunderstorms, rain, snow, and winds of level 6 or above.
- It is recommended to install fences, walls, and other protective measures around the ESS, and erect safety warning signs to isolate the area and prevent unauthorized personnel from accessing the equipment during operation, which may result in personal injury or property damage.
- Do not block the vents and the cooling system during operation of the equipment to prevent fires caused by high temperatures.
- The equipment shall be installed in an area free from liquids and away from locations prone to condensation (such as under water pipes, air outlets) or prone to potential water leakage (such as under air conditioners, vents, machine room cable exit windows) to prevent liquid from entering the equipment and causing faults or short circuits.
- The installation site must be located away from sources of ignition, and no flammable or explosive materials shall be placed in the vicinity of the equipment.
- If the equipment is installed in an area with lush vegetation, periodic weeding and hardening of the soil beneath the equipment is required to prevent weed growth.

Elevated Work Requirements

- Implement proper safety protection measures, including using safety helmets, safety harnesses, waist safety belts, and attaching them to robust and reliable structural members. Do not hang them on moving unstable objects or sharp-edged metals, to prevent the hook from slipping and causing a fall accident.
- The elevated work site must be clearly designated as a restricted, hazardous area with prominent markings to deter unauthorized access.
- The ground area directly beneath the elevated work zone must be kept clear of any stacked scaffolding, planks, or other debris. Ground personnel are prohibited from staying or passing directly below the high-altitude operation area.
- Do not throw objects from a high place to the ground or vice versa. All items must be transported using appropriate methods such as ropes, hanging baskets, overhead vehicles, or cranes.
- All scaffolding, planks, and work platforms utilized for elevated work must undergo a thorough safety inspection and certification prior to use, ensuring structural reliability and preventing scaffold overloading.
- Elevated work must be immediately suspended during rain or other potentially hazardous conditions. Thereafter, WHES's safety supervisor and relevant technicians must inspect all equipment and give approval before elevated work can be safely resumed.
- All edges and openings within the elevated work zone shall be outfitted with guardrails and markings to prevent the risks of accidental falls or step-through incidents.
- Securely carry all necessary apparatus and tools during operations to prevent accidental falls.
- If an elevated worker is found to be violating safety protocols and performing construction work improperly, the site supervisor or safety officer must immediately issue a warning and instruct the worker to make corrections. Work may not be resumed until the elevated worker is in full compliance with established operating specifications.

1.4 Loading/Unloading and Transport Requirements

BEWARE

This product has been certified to comply with UN38.3 (UN38.3: Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2009 Rules for the Inspection of Packing for Export Dangerous Goods - Part 2: Performance Test, and is consequently classified as a Class 9 Dangerous Good.

Shipment conditions:
Energy storage system must be inspected prior to shipment to ensure that the enclosure is intact and undamaged, the cabinet doors are properly closed and locked, no foreign objects are protruding from the interior, and no indications of smoke or burning are present. Failure to meet any of these criteria will result in the shipment being prohibited.

NOTE

- The product must be inspected prior to shipment to ensure that the enclosure is intact and undamaged, the cabinet doors are properly closed and locked, no foreign objects are protruding from the interior, and no indications of smoke or burning are present. Otherwise, shipment is prohibited.
- During loading/unloading and transport, care should be taken to handle gently and provide moisture protection measures. Due to the influence of external environmental factors (such as temperature, transport and storage conditions), the product specifications are subject to the date of manufacture.
- The battery cabinet is not intended for railway or air transport methods.
- For sea transport, the International Maritime Dangerous Goods Code (IMDG) must be observed.
- For land transport, the requirements of the Authorization Dangerous Road (ADR) or JT/T 617-2018: Regulations concerning Road Transportation of Dangerous Goods must be followed.
- Comply with the regulatory requirements set forth by the transport authorities in the countries of origin, transit, and destination.
- Comply with international transport rules for dangerous goods and the regulatory requirements set forth by the transport authorities in relevant countries.
- Monitoring is required throughout the entirety of the transport process.

- Vehicle used for land transport must have sufficient load capacity.
- The speed limit for land transport is 80km/h on flat roads and 60km/h on rugged roads, with local traffic regulations taking precedence if they conflict with these guidelines.
- Stacking is prohibited during port handling and on-board transport. The following situations are strictly prohibited during transport: falling into water, dropping or mechanical impact, as well as inverting or overturning.

1.5 Electrical Safety

Wiring Requirements

- Do not push cables directly off the vehicle or otherwise mishandle them.
- Do not route cables through the air inlet/outlet of the equipment.
- Cables of the same type shall be bundled together, while cables of different types shall be spaced at least 30 mm apart without intertwining or crossing.
- If the site has to be left unattended temporarily after or during the wiring process, the cable openings must be immediately sealed using sealing mud to prevent the ingress of small animals.
- Cables used in high-temperature environments are susceptible to insulation aging and damage. A minimum clearance of 30 mm must be maintained between cables and heat-generating components or heat source peripheries.
- Select cables that are in compliance with local laws and regulations.
- Cable troughs and openings must be free of sharp edges and provided with appropriate protection.
- Cable conduits or openings shall be protected against damage from sharp edges or burrs.
- Cables used in the ESS must be firmly connected, well-insulated, and comply with the appropriate specifications.
- After wiring, the cables must be securely fixed using cable supports and clamps. For cables in backfilled soil areas, ensure they are in close contact with the ground to prevent deformation or damage during backfilling.
- At low temperatures, violent impact and vibration may cause the outer plastic sheath of the cables to become brittle and crack. To ensure construction safety, the following requirements shall be followed:
  - ✧ All cables must be laid and installed at temperatures above 0°C. Care should be taken when handling cables, especially in low-temperature environments.
  - ✧ If cables are stored at temperatures below 0°C, they must be placed at room temperature for at least 24 h prior to installation.

Grounding Requirements

- Do not damage grounding conductors.
- Do not operate the equipment without installed grounding conductors.
- For equipment requiring grounding, always install the protective ground wire first and remove it last.
- The main grounding body of the equipment must be permanently connected to the protective grounding network. Before operating the equipment, the electrical connection must be checked to ensure reliable grounding.
- The grounding impedance of the equipment shall meet the requirements applicable to local electrical standards

AC/DC Operation Requirements

- Before installing or removing the power cord, turn off the power switch first.
- Prior to connecting the power cord, verify that the label on the power cord is correct.
- If the equipment has multiple inputs, all inputs shall be disconnected and the equipment shall be completely de-energized before any work is performed.

Operation, Maintenance and Repair Safety Requirements

1. Turn off the circuit breaker before connecting or disconnecting any cables.
2. Place a "Do Not Close" warning sign on the open switch.
3. Use a voltage tester of the appropriate rating to verify the equipment is completely de-energized.
4. Cover or wrap any nearby live parts with insulating sheeting or tape.
5. Before performing any operation, maintenance or repair activities, connect the circuit to be repaired securely to the grounding circuit using a grounding wire.

BEWARE

- Prior to connecting cables, verify that the label on the cable is correct.
- If the equipment has multiple inputs, all inputs shall be disconnected and the equipment shall be completely de-energized before any work is performed.

6. After the repair is completed, remove the grounding wire between the repaired circuit and the grounding circuit.

1.6 Mechanical Safety

Safety Instructions for Ladder Use

- Using straight ladders is prohibited.
- Before using a ladder, ensure it is in good condition and the load capacity meets the requirements. Overloading is strictly prohibited.
- Use wooden or fiberglass ladders when working overhead where electricity may be involved.
- When working overhead, it is preferable to use platform ladders with guardrails, where all four feet are securely fixed and the ladder is held by one person.

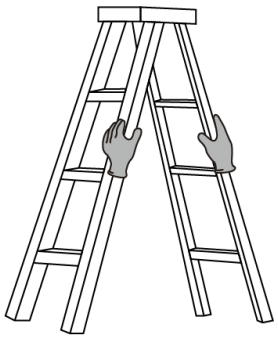


Figure 1-3 Holding Ladder

- For herringbone ladders, the rope must be secured and a person must hold the ladder during use.
- When climbing a ladder, please pay attention to the following actions to reduce danger and ensure safety.

⚠CAUTION

- Maintain a stable body posture.
- Stand on the ladder without exceeding the 4th rung from the top.
- Ensure your center of gravity remains within the ladder frame.

Equipment Exterior Drilling Safety

- Before drilling, carefully select the drilling location to avoid short circuits or other adverse effects.
- Wear safety goggles, gloves and other personal protective equipment when drilling.
- Effectively shield the equipment during drilling to prevent ingress of debris, and clean and remove debris promptly afterward.

Safety Instructions for Handling Heavy Objects

- When handling heavy objects, arrange for the number of people recommended in the diagram to ensure collaborative operation and load sharing.

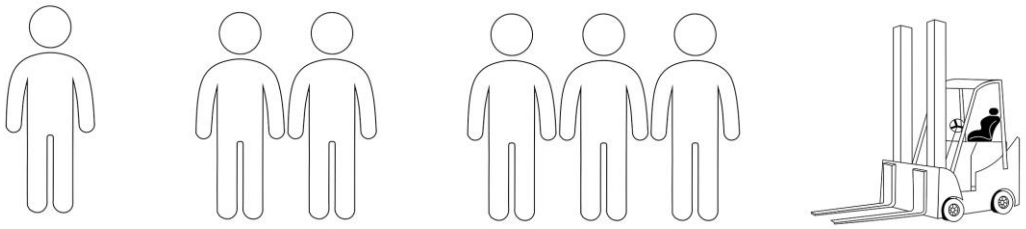


Figure 1-4 Installation Personnel Requirements

- Wear protective gloves, anti-smash anti-puncture safety shoes and other personal protective equipment when handling the equipment by hand.
- Protect the equipment from surface scratches or damage to internal components/cables during handling.
- For forklift handling, ensure the forks are centered under the load to prevent tipping. Secure the equipment to the forklift with ropes before moving, and assign a dedicated person to monitor during movement.
- Move the equipment carefully to avoid collisions or falls.

1.7 Battery Safety

Declaration

WHES will not be liable for damage to the battery supplied by WHES due to the following reasons:

- Battery capacity loss or irreversible damage caused by the customer's failure to charge the battery in a timely manner, resulting in expired storage.
- Damage to the battery caused by the customer's failure to accept the battery in a timely manner;
- Failure by the customer to properly set the system operation and management strategy, resulting in battery performance degradation;
- Unauthorized changes to the battery pack application scenario by the customer or a third party without prior notification to WHES, such as unauthorized connection of additional loads to the battery pack, and mixing the original battery pack with others, including different brands or varying rated capacities;
- Damage to the battery pack caused by the equipment operating environment or external power parameters failing to meet the normal operating requirements, including excessively high or low actual temperatures;
- Improper maintenance by the customer resulting in frequent over-discharge of the battery, capacity extension on site by the customer or long-term inability to fully charge the battery, etc.
- Failure by the customer to properly maintain the battery in accordance with the supplied equipment operating manual, including but not limited to ensuring the integrity of the cooling system, and addressing any loose or damaged HV cable harness or loose or missing structural fixing bolts;
- Theft of battery packs;
- Battery packs beyond the warranty period.

Basic Requirements

DANGER

- Do not expose the battery pack to high temperatures or near heating devices, such as direct sunlight, fire sources, transformers, heaters, etc. Overheating of the battery pack may cause fire or explosion hazards.
- Do not disassemble, modify, or damage the battery pack in any way (e.g. by inserting foreign objects, immersing in water or other liquids) to prevent battery pack leakage, overheating, fire or explosion.

- Lithium-ion battery energy storage systems pose a high risk of fire. Before performing any battery-related operations, it is essential to thoroughly consider the following safety risks:
  1. The electrolyte in the battery pack is flammable, toxic, and volatile.
  2. Thermal runaway of the battery pack may generate flammable and harmful gases such as carbon monoxide and hydrogen fluoride.
  3. The accumulation of flammable gases from thermal runaway of the battery pack poses a risk of combustion and explosion.
- The battery pack shall be stored with its original outer packaging in a dedicated warehouse, separated from other materials. Outdoor storage is prohibited. The stacking height must be maintained within safe limits. Firefighting facilities, such as fire sand and fire extinguishers, must be provided on site in accordance with regulations.
- For outdoor applications, it is recommended to charge an unpacked battery pack within 24 h. If timely charging is not possible, the battery pack shall be stored in a dry, indoor environment free of non-corrosive gases.

  Under normal circumstances, do not remove the outer packaging of the battery pack. Recharging, if necessary, must be performed by qualified personnel as per the specified requirements. The battery pack must be properly repackaged upon completion of recharging.
- The battery pack shall be properly oriented according to the anti-inversion label or marking on the packaging to prevent cell leakage from prolonged inverted storage.
- The ESS shall be subject to regular fire safety inspections, at least once a month.
- Use the battery pack only within the temperature range specified in this manual. Do not charge the battery pack when the ambient temperature is below the lower operating limit to prevent crystallization and internal short circuits.
- The battery pack must be protected from impacts.
- The storage location for damaged battery packs must be free of flammable materials, with access restricted to unauthorized personnel. During storage, damaged battery packs shall be monitored for signs of smoke, flames, electrolyte leakage, or heating.
- The battery pack that has been accidentally exposed to water must not be installed, but must be transported to a safe, isolated location for timely replacement with spare parts.
- The storage area must be protected from direct sunlight and rain, and must be dry, well ventilated, clean, and free from excessive infrared/ionizing radiation, organic solvents, and corrosive gases.

- Dispose of used battery packs in accordance with local laws and regulations. Do not treat them as household waste to prevent environmental contamination.
- Do not use damaged battery packs (such as dents or other damage on the casing), as damaged battery packs may release flammable gases and shall not be stored near undamaged products.

Recharging Requirements

WHES will not be liable for damage to the battery supplied by WHES due to the following reasons:

- Recharging is mandatory if the battery cabinet has not been charged for more than 5-12 months. Failure to adhere to the recharging schedule may compromise the performance and lifetime of the battery cabinet.
- The production completion date of the battery cabinet can be determined by querying the shipment records using the battery cabinet serial number (SN) or by consulting WHES's service engineers.

NOTE

- Use only the specified battery pack model. Use of non-specified models may result in damage to the battery cabinet.
- Before installing the battery pack, check whether the packaging is intact. Battery packs with damaged packaging must not be used.
- The battery pack must be placed horizontally and secured.
- Do not place any installation tools or debris on the battery pack during installation.
- When installing the battery pack, it is important to properly connect the positive and negative terminals. Short-circuiting the positive and negative terminals of the battery pack is strictly prohibited.
- When installing the battery pack, use a torque wrench to ensure that the terminals are tightened securely. Check the terminals on a regular basis for signs of loosening.

Battery Pack Short-Circuit Protection

DANGER

A short circuit in the battery pack may generate a large current surge and release significant energy, posing a serious risk of personal injury and property damage.

- When installing and maintaining the battery pack, use insulating tape to wrap the exposed wire terminals on the battery pack.
- Prevent foreign objects (such as conductive objects, screws, liquids) from entering the battery pack and causing short circuits.

Hazard and Toxicity Information

DANGER

- Hazard: A damaged battery pack may cause overheating or electrolyte leakage. Electrolyte is flammable. If leakage occurs, immediately move the battery cabinet away from any heat source.
- Toxicity: Vapors from a burning battery pack may cause irritation to the eyes, skin, and throat.

ountermeasures for Abnormal Battery Packs

DANGER

- In case of electrolyte leakage or an unusual odor, avoid contact with the leaking liquid or gas. Access shall be restricted to unauthorized personnel. Contact qualified personnel immediately for proper handling. Professionals must wear personal protective equipment, including goggles, rubber gloves, a gas mask, and protective clothing to protect against possible hazards caused by electrolyte spillage.
- Electrolyte is corrosive and may cause skin irritation and chemical burns. In case of exposure to electrolyte, the following measures must be taken:
- Inhalation: Evacuate the contaminated area, provide fresh air, and seek medical attention immediately.
- Eye contact: Immediately flush eyes with plenty of water for at least 15 min, without rubbing the eyes, and seek medical attention.
- Skin contact: Immediately wash the affected area with soap and water, and seek medical attention.
- Ingestion: Seek medical attention immediately.

Battery Pack Drop Incident

- If the battery pack falls (with or without packaging) but shows no visible deformation or damage, and no noticeable odor, smoke, or fire, proceed with caution and safety in mind as follows:
  - Warehouse: Evacuate personnel, use mechanical tools to transfer the battery pack to a safe, open area by qualified personnel, and contact WHES's service engineers. Allow the battery pack to rest for 1 h and monitor the temperature to ensure it remains within ambient temperature ±10°C before further proceeding.
  - ESS site: Evacuate personnel, close the ESS door, use mechanical tools to transfer the battery pack to a safe, open area by qualified personnel, and contact WHES's service engineers. Allow the battery pack to rest for 1 h before further proceeding.
- If the battery pack exhibits a noticeable odor, damage, smoke, or fire after a drop, immediately evacuate personnel, contact professionals, and promptly call emergency services. Professionals should use firefighting equipment to extinguish the fire while ensuring safety.
- Do not continue to use a dropped battery pack. Contact WHES's service engineers for evaluation.

1.8 Maintenance

CAUTION

Before removing any component from the cabinet, verify that all other components are securely fastened.

- A minimum of two people is required on site during ESS maintenance.
- During equipment maintenance, always use insulating materials to cover nearby live components.
- Do not open the cabinet door in severe weather conditions such as rain, snow, lightning, sandstorms, or heavy fog.
- Never allow objects (such as fingers, components, screws, or tools) to come into contact with a running fan before it is powered off or stops rotating.
- Do not power on the equipment before troubleshooting.
- During live system patrol inspections, observe hazard warnings on the equipment and avoid standing near the cabinet door.
- After shutting down the equipment other than the battery packs, wait 15 min to ensure complete de-energization before proceeding with any operation on the equipment.
- A "Do Not Close" warning sign must be displayed on any switch that is disconnected for maintenance.
- After replacing power components or changing wiring in the ESS, manually initiate wiring detection and topology identification to prevent system malfunctions.
- Lock the cabinet door, secure the safety cable, and keep the key in a safe location immediately after completing maintenance and replacement.

1.9 Emergency Procedures

In the event of an incident, including but not limited to those listed below, immediately take appropriate measures to ensure the safety of all personnel on site, and contact WHES's service engineers.

In Case of Fire

DANGER

Recommendations for on-site operation and maintenance personnel:

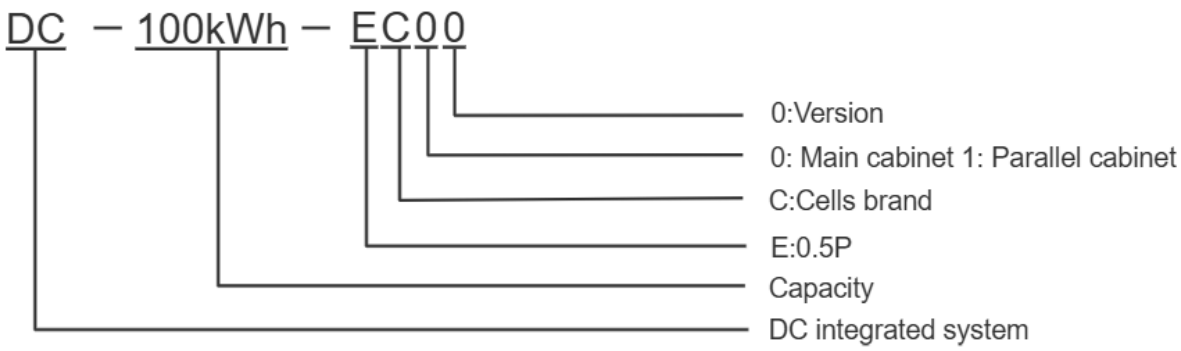
1. In case of fire, evacuate the building or equipment area and activate the fire alarm bell. Call the fire department and provide them with relevant product information, including but not limited to battery pack type, ESS capacity, and battery pack distribution.
2. Never re-enter the burning building or equipment area, or open the ESS door. Isolate and monitor the site, and restrict access to unauthorized personnel.
3. After contacting the fire department, remotely shut down the system while prioritizing your own safety.
4. Upon the arrival of professional firefighters, provide them with relevant product information, including but not limited to battery pack type, ESS capacity, battery pack distribution, and user manual.
5. Once professional firefighters confirm the fire is extinguished, allow qualified personnel to handle the situation according to local regulations. Do not open the ESS door without authorization.
6. Post-disaster product maintenance: Contact WHES's service engineers for evaluation.

Recommendations for fire professionals:

1. Review the product information provided by operation and maintenance personnel, including but not limited to battery pack type, ESS capacity, battery pack distribution, and the user manual.
2. Do not open the ESS door if the internal safety of the system cannot be guaranteed.
3. Please follow local fire regulations for fire extinguishing operations.

2 Product Introduction

2.1 Model Description



Product Model Description:

This document primarily focuses on the following product models:

DC-100kWh-EC00

DC-100kWh-EC10

DC-86kWh-EC00

DC-71kWh-EC00

DC-57kWh-EC00

2.2 Functions and Features

Function

The energy storage system (ESS) integrates a large-capacity battery pack, energy management system (EMS), monitoring system, and fire protection system. Combined with a hybrid inverter, the ESS system supports self-consumption, off-grid backup power, and time-of-use (TOU) power supply modes, etc, making it an ideal solution for various industrial and commercial scenarios.

Features

1. **High Energy Density**
   - The system is configured with 280Ah lithium-ion batteries and features a compact design with single cabinet dimensions of 750mm × 1150mm × 2250mm (W×D×H).
2. **Flexible Capacity Configuration**
   - The single cabinet capacity ranges from 57 to 100 kWh and enables parallel operation of up to three units. Multiple units can be installed side by side.
3. **Safety and Reliability**
   - IP55 protection rating and C5 corrosion resistance, ensuring high adaptability to various environments.
   - Four-level active and passive fire protection for comprehensive safety.

2.3. External Design

2.3.1 ESS External Design

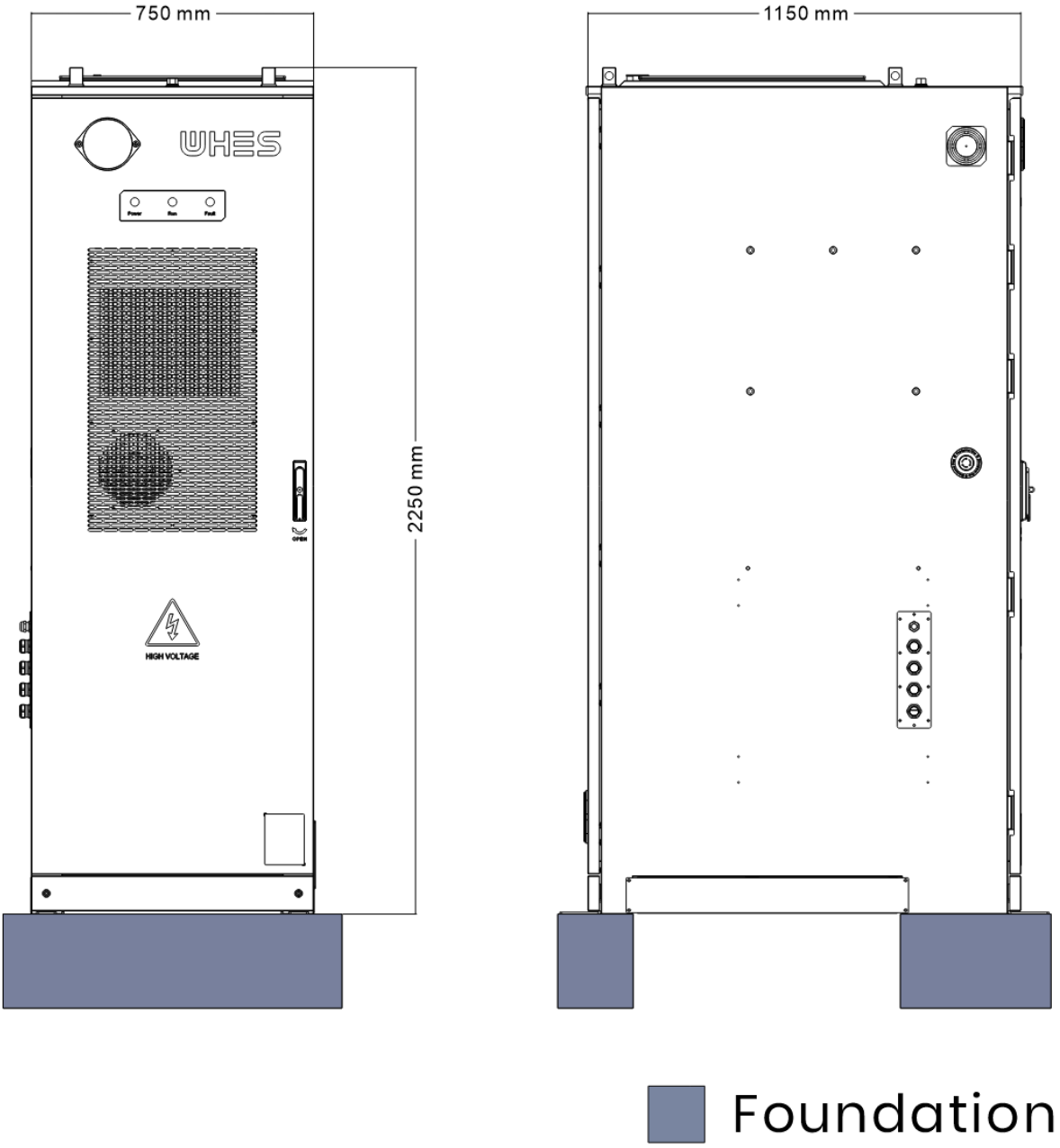


Figure 2-1 Appearance and Dimensions

NOTE

The foundation must be provided according to the construction site design drawings, which can be obtained from WHES's product manager.

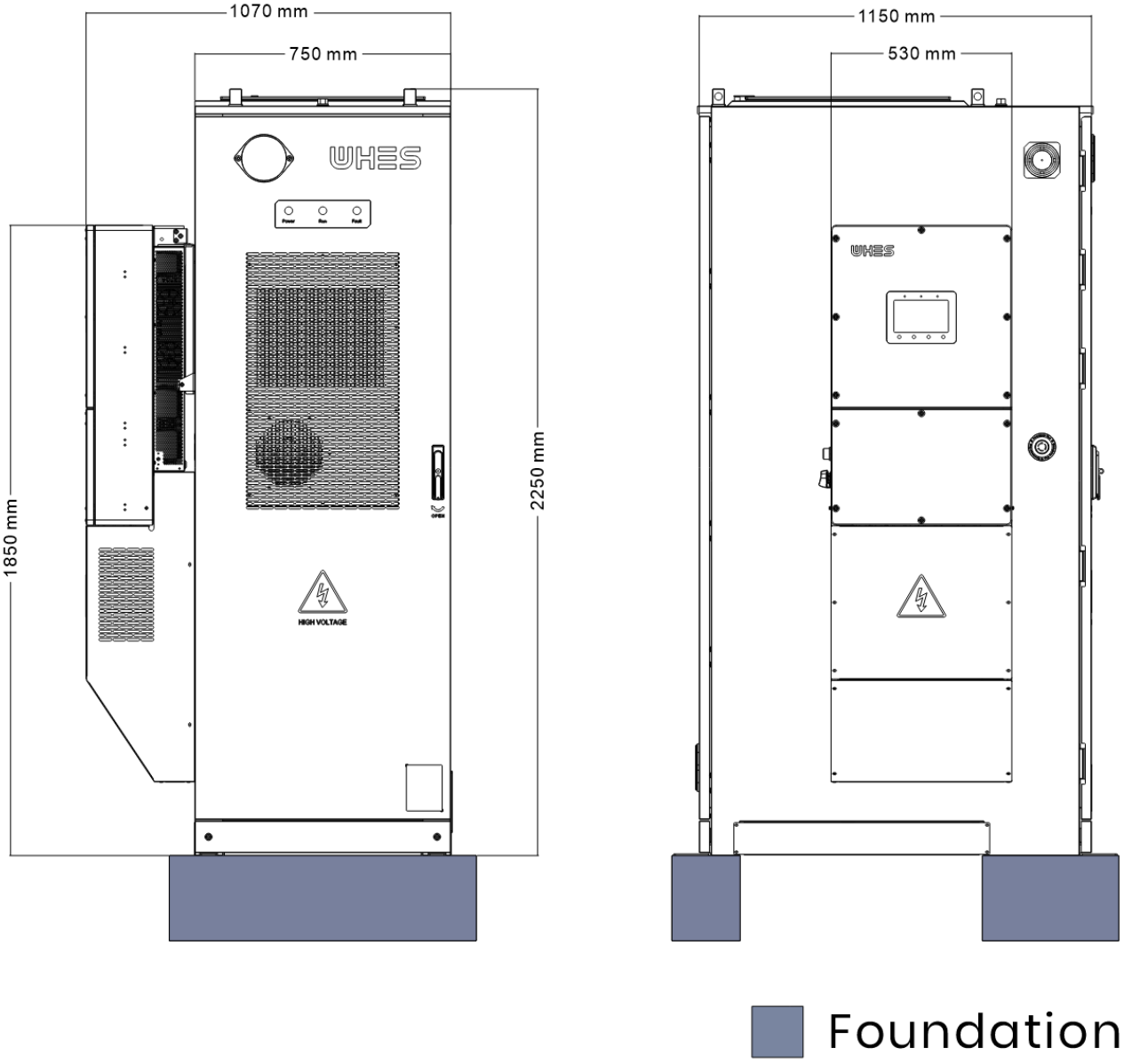


Figure 2-2 Appearance and Dimensions (Including AC-side Inverter)

NOTE

The AC-side hybrid inverter is an external device. For detailed specifications, please refer to the inverter User Manual.

2.3.2 Ventilation Design

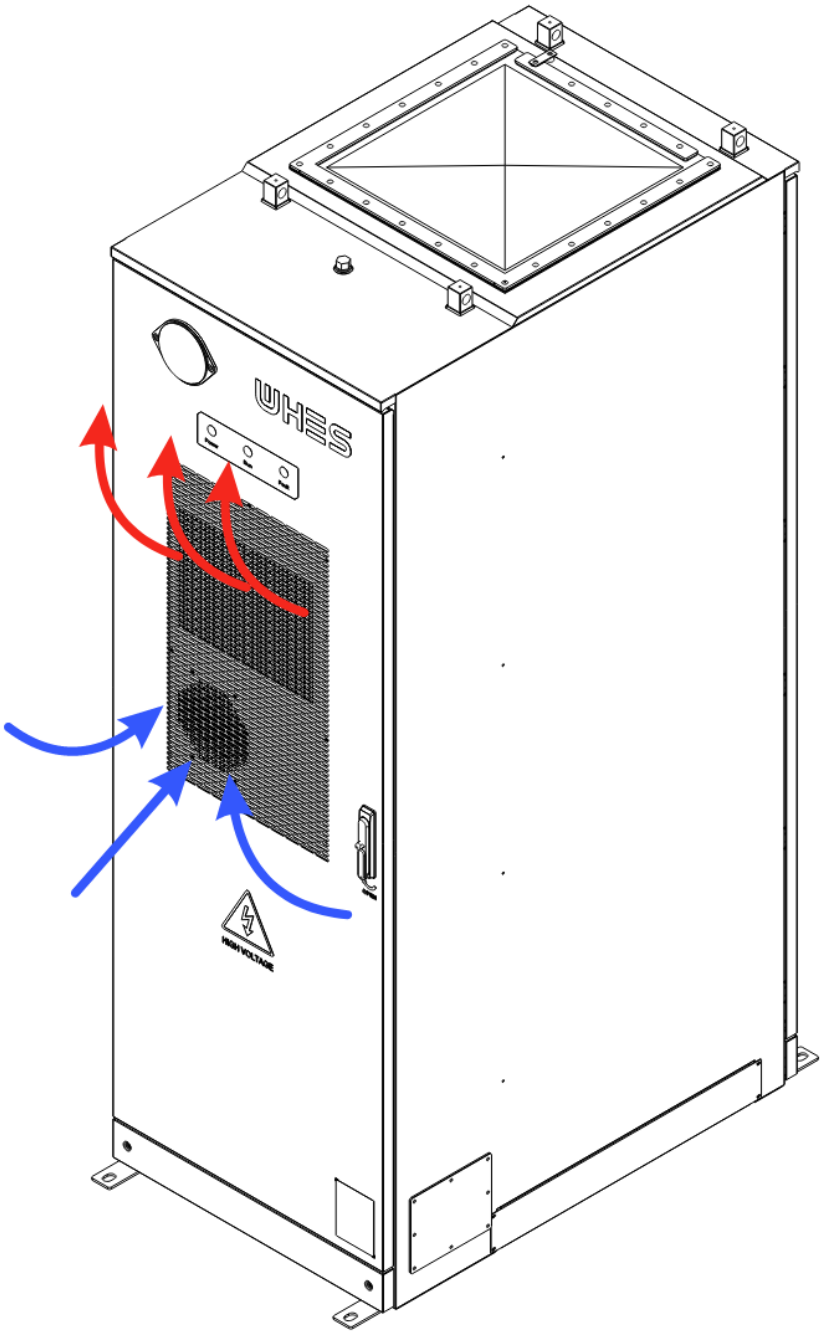


Figure 2-3 Ventilation Design

NOTE

When the equipment is in operation, please ensure that there are no obstacles blocking the front of the air inlet and outlet.

2.3.3 External Components

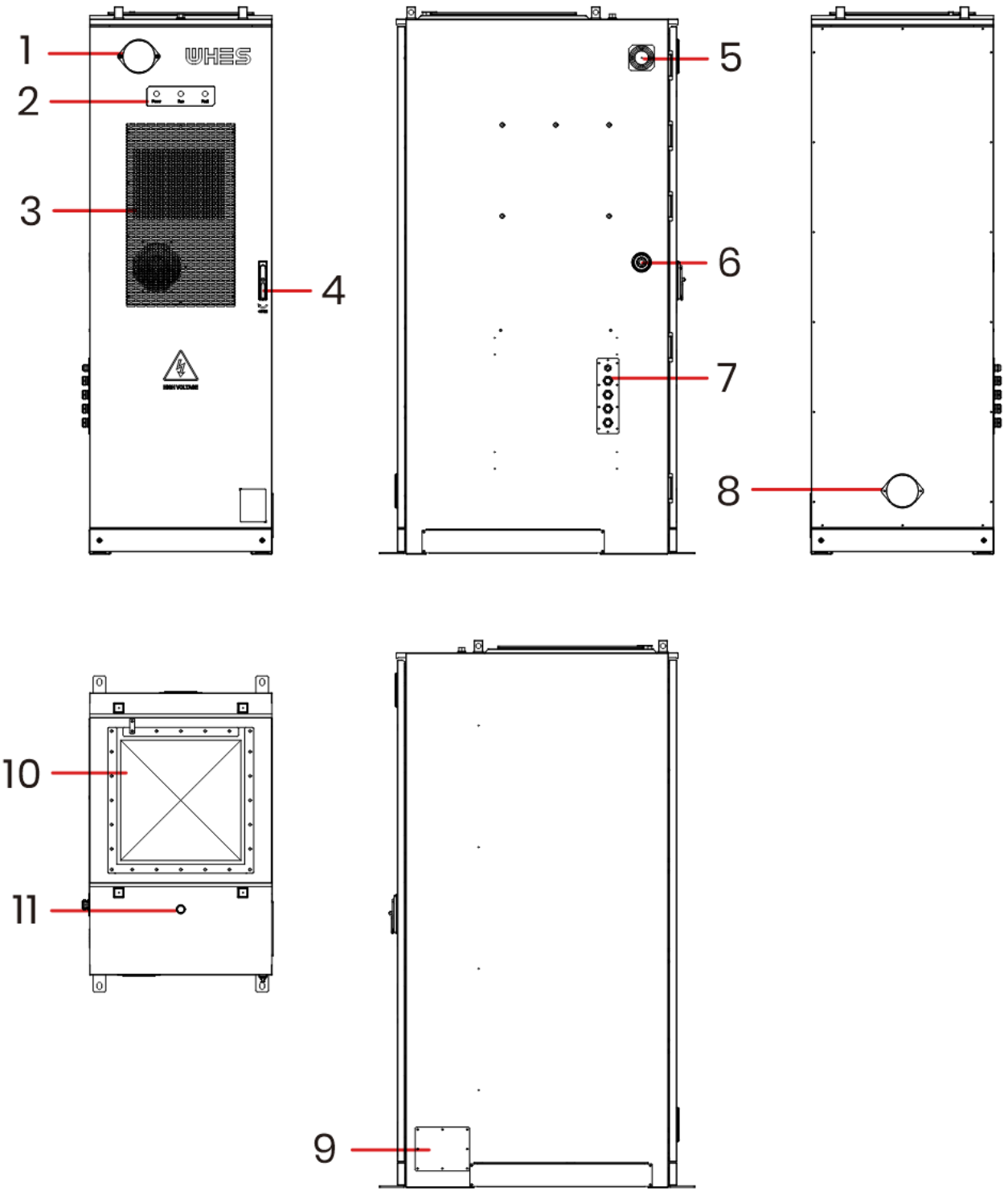


Figure 2-4 External Component Introduction

Table 2-1 Component Configuration

No.	Name	Description
1	Air Exhaust Unit	The exhaust unit discharges harmful gases to ensure safe operation.
2	Indicator	Power: White, power indicator Run: Green, run indicator Fault: Red, fault indicator
3	Air Conditioner and Air Inlet/Outlet Grille	Air conditioner heat dissipation outlet.
4	Door Lock	Turn the handle to open the control cabinet door.
5	Sound Light alarm	Both the lights and the buzzer will warn of safety simultaneously.
6	Emergency Stop Button	Press the button to stop the system in the event of an abnormal equipment condition.
7	Waterproof Gland	Waterproof through-wall connector for the cable harness from the cabinet interior to the inverter.
8	Air Intake Unit	The intake unit works with the air exhaust unit to facilitate the discharge of harmful gases.
9	Parallel Wiring Channel	DC-side parallel wiring channel.
10	Explosion Vent Panel (Optional)	Directional venting to quickly release internal pressure, and ensure cabinet safety.
11	Water Spraying Connection	DN15 external thread connector.

2.4 Internal Design

2.4.1 Internal Components

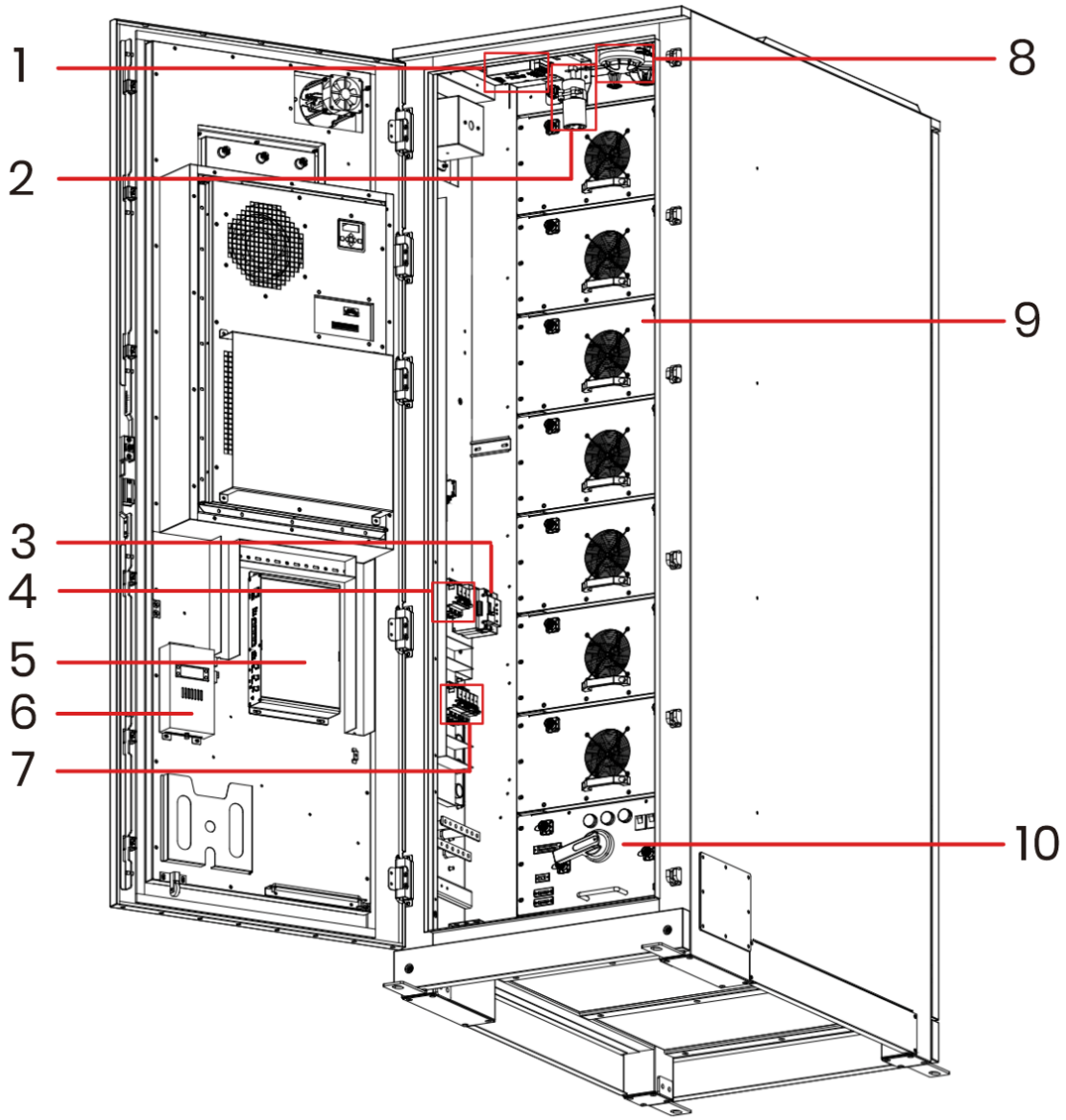


Figure 2-5 Internal Component Introduction-1

Table 2-2 Component Configuration 2

No.	Name	Description
1	Gas Detector (Optional)	Detect dangerous combustible gases
2	Aerosol	Aerosol fire extinguishing in seconds to suppress re-ignition without residue, and ensure cabinet safety.
3	ATS	Automatic switching of dual auxiliary power supplies
4	QF7	Power grid power switch
5	POWER Mind	Centralized management of internal cabinet equipment to optimize energy storage scheduling, and ensure efficient and safe system operation.
6	Dehumidifier	Reduce humidity to prevent the ESS from moisture damage.
7	QF1~QF2	QF1: Main auxiliary power switch QF2: Air conditioner power switch
8	Smoke and Temperature Detectors	Real-time smoke and temperature detection based on dual-signal fusion to trigger early warning and protective measures.
9	Battery Pack	Modular battery design, with a single unit capacity of 14.336 kWh. It supports series connection of 4 to 7 modules, and the capacity ranges from 57 to 100 kWh.
10	HV Box	Intelligent electrical isolation monitoring to enable safe and efficient power distribution.

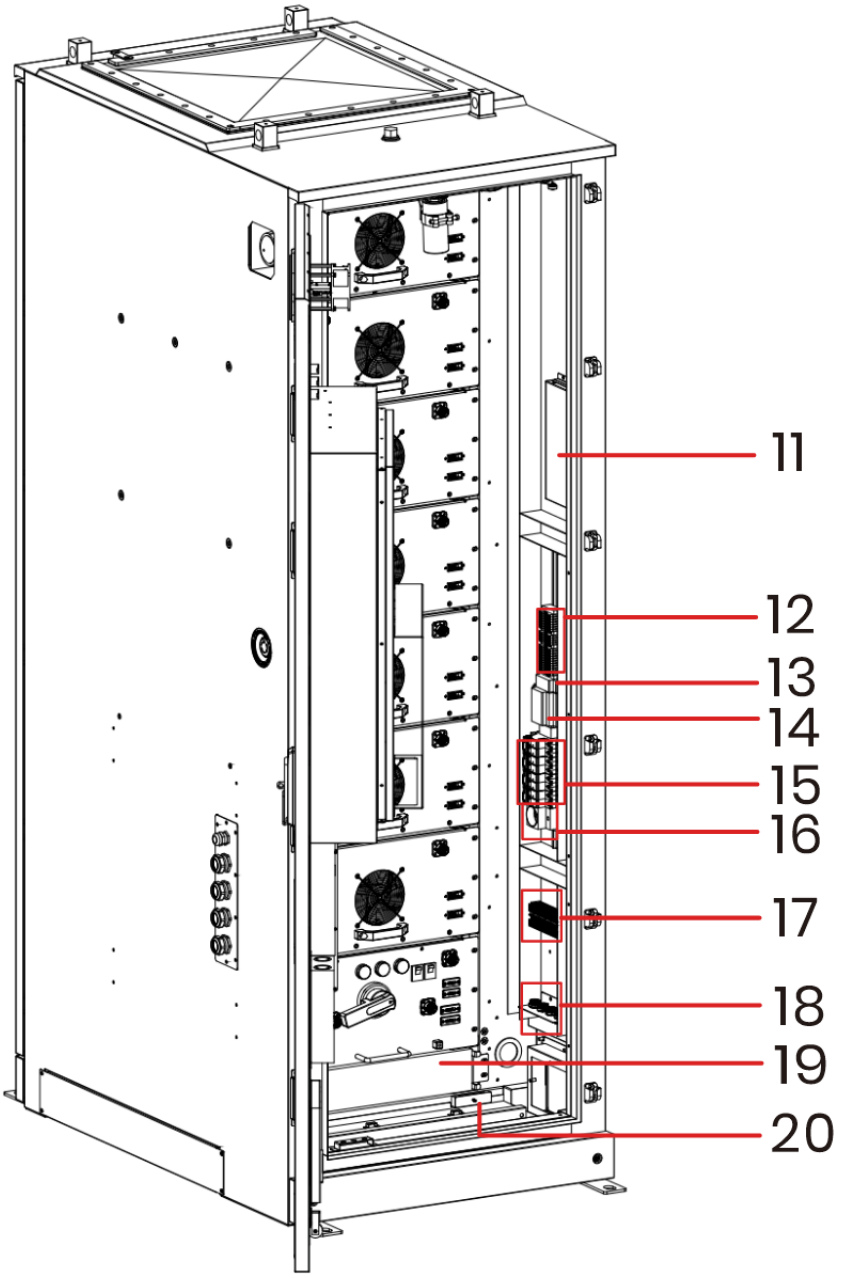


Figure 2-6 Internal Component Introduction-2

Table 2-3 Component Configuration 2

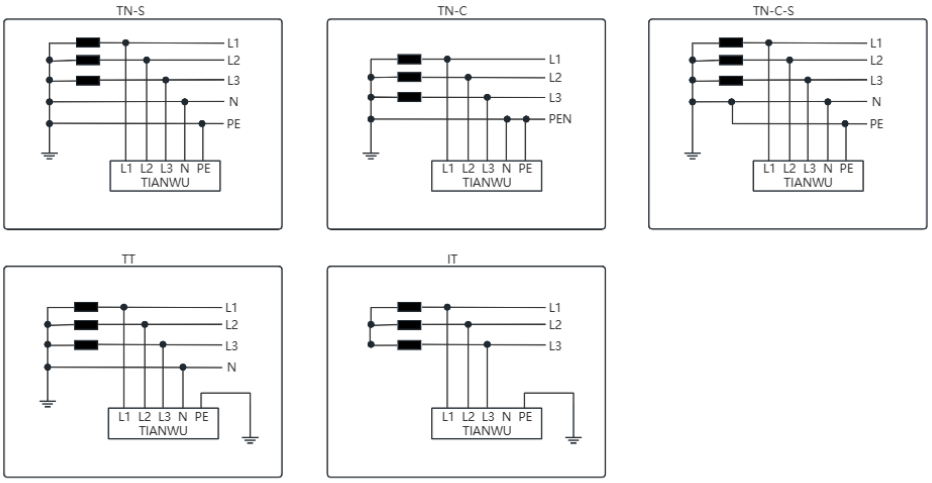
No.	Name	Description
11	BMS	Battery status monitoring to prevent over-voltage/over-temperature, and ensure cell safety.
12	XT1: 1~11 Power1: 1~4 Power2: 1~7	Distribution Terminal Block
13	Water immersion transmitter	Manage the water immersion sensor and support alarm functionality.
14	24V Power Supply	Provide 24V power output.
15	QF3~QF6	QF3: UPS power switch QF4: Commissioning socket switch QF5: HV box power switch QF6: 24V power supply module switch
16	Socket	Commissioning socket
17	XT2: 1~24	Communication Terminal Block
18	RJ45 Network Port	Communication network port
19	UPS	Provide stable auxiliary power output.
20	Water Immersion Sensor	Real-time water leakage detection, connected to the ACP for alarm activation.

2.5 Grid Type

The ESS supports the following grid types: TN-S, TN-C, TN-C-S, TT, and IT.

BEWARE

For TN-S, TN-C, TN-C-S, and TT systems, the ESS neutral (N) conductor must be connected to the utility grid.



3 Equipment Installation

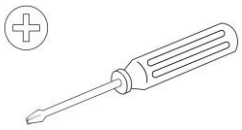
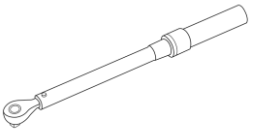
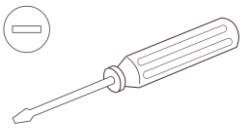
3.1 Preparations Before Installation

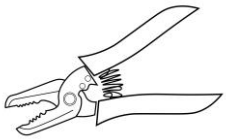
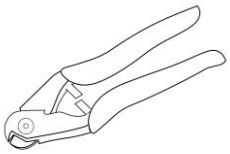
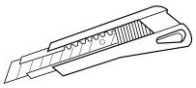
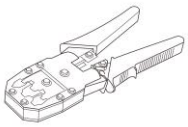
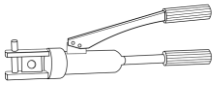
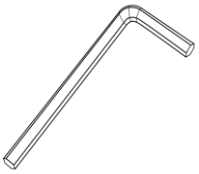
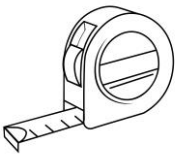
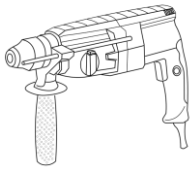
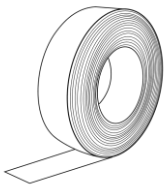
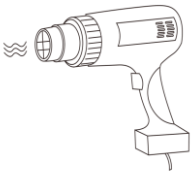
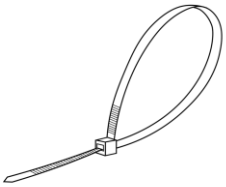
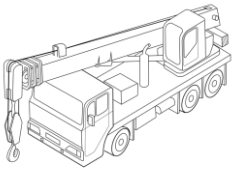
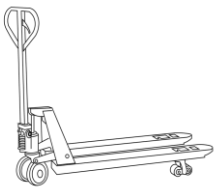
3.1.1 Tool Preparation

NOTE

- The illustrated tools are for reference only and may differ from actual tools.
- Due to varying site conditions, this tool list may not be exhaustive. On-site installers and users are responsible for preparing unlisted tools based on actual needs.

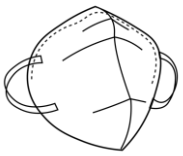
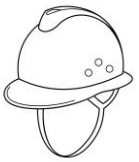
Installation Tools

			
Phillips Insulated Torque Screwdriver	Insulated Torque Socket Wrench (including extension rod) ● Socket size: 7mm~19mm ● Socket depth: ≥32mm ● Socket interface compatible with torque wrench ● Torque range: 1.2N·m~45N·m	Flathead Insulated Torque Screwdriver Driver	Diagonal Pliers

 Wire Strippers	 Wire Cutters	 Rubber Hammer	 Utility Knife
 Crimping Tool	 Hydraulic Pliers	 Hex Wrench: 5mm~12mm	 Multimeter DC Voltage range ≥1500V DC
 Steel Tape Measure	 Spirit Level	 Vacuum Cleaner	 Impact Drill
 Impact Drill Bit Φ16mm	 Heat Shrink Tubing	 Heat Gun	 Cable Tie
 Insulated Ladder	 Crane	 Manual Forklift	 Forklift

 Lifting Rope & Shackle Rope length: ≥1500mm	 Crowbar

Personal Protective Equipment

 Insulating Gloves	 Protective Gloves	 Goggles	 Dust Mask
 Insulating Shoes	 Reflective Vest	 Safety Helmet	 Seat Belts

3.1.2 Inspect The Deliverables

Outer Packaging Inspection

Before unpacking the equipment, inspect the outer packaging for visible damage such as holes, cracks, or other signs of possible internal damage, and verify that the product model is correct. If the packaging appears abnormal or the equipment mode does not match, do not open the packaging and contact your dealer immediately.

NOTE

- It is recommended to remove the outer packaging within 24h before preparing to install the cabinet.

WARNING

- If the cabinet height exceeds 2 m, ensure appropriate safety precautions for elevated work are in place when removing the outer packaging.

Deliverable Inspection

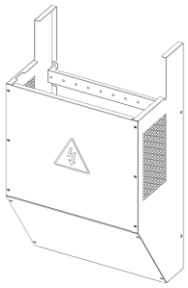
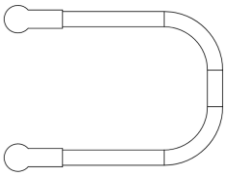
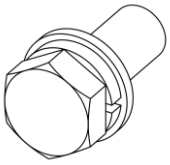
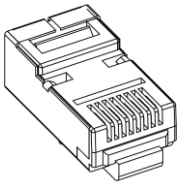
WARNING

- Check whether the actual cabinet received is consistent with the ordered model.
- Check the energy storage cabinet and its internal equipment to ensure there is no damage.
- If you find any problems or have any questions, please contact the carrier or our company in a timely manner.

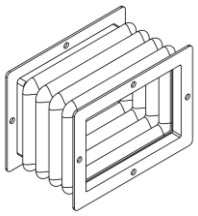
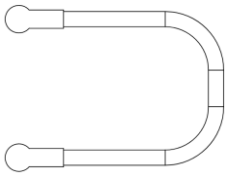
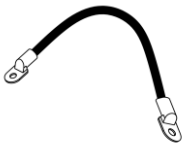
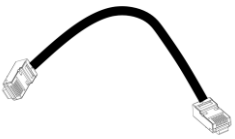
BEWARE

- Check if the equipment has any paint bumps or damages. To prevent rust, it is recommended to carry out paint repairs.

Packing List

A  Cable Cover	B  Power Cable	C  35mm² Grounding Wire*2	D  M5*16 Screw*25
E  M10*30 Screw*5	F  RJ45 Crystal Head*5	G  OT2.5-6 Terminal*10	H  Cable Tie*20

For DC parallel system configurations, the following accessories are also included.

A  Silicone Coil	B  Power Cable	C  Power cable*2	B  communication cable	D  M5*14 Screw*10

3.2 Installation Environment Requirements

3.2.1 Site Selection Requirements

BEWARE

The site shall be selected in accordance with GB 51048: Design Code for Electrochemical Energy Storage Power Station, NFPA 855: Standard for the Installation of Stationary Energy Storage Systems, and applicable local regulations.

The ESS is designed for outdoor installation. For indoor application, refer to local regulations. General site selection requirements:

- Select the installation site at a high elevation above the maximum historical water level rather than in a low-lying area.
- Maintain a minimum distance of 2 km from airports, landfills, riverbanks, and dams.
- Choose a spacious location and ensure a 10m unobstructed area around the site.
- Maintain a minimum distance of 50 m from residential areas to avoid noise pollution.
- Ensure convenient access to transportation facilities and reliable fire suppression systems.
- Provide sufficient space for current and future needs, including potential expansion throughout the life cycle.
- Choose a well-ventilated location.
- Avoid installing the ESS outdoors in saline areas where the ESS is prone to corrosion and subsequent potential fires. Saline areas refer to areas within 2 km of the coastline or affected by sea winds. Areas affected by sea winds vary based on meteorological conditions (e.g., typhoons, seasonal winds) and terrain features (e.g., dikes, hills).

NOTE

1. If the selected site fails to meet national standards for safety clearance, it is recommended to select a new site.
2. If no suitable alternative site is available, it is recommended to install a fire wall with a minimum 3 h fire resistance rating for safety, with adequate space for equipment transport, installation and maintenance.
3. According to T/CEC 373-2020, the length and height of the firewall shall extend 1 m beyond the outer perimeter of the prefabricated cabin. According to NFPA855-2020: Standard for the Installation of Stationary Energy Storage Systems, an independent fire wall with a 1 h fire resistance rating allows the spacing to be reduced to 914 mm.

Site selection shall exclude locations, areas, and places that are not recommended by industry standards and regulations, including but not limited to:

- Areas with high vibration, noise, or electromagnetic interference;
- Places where dust, fumes, harmful or corrosive gases are produced or are present;
- Places where corrosive, flammable, or explosive materials are produced or stored;
- Places with existing underground facilities;
- Areas with poor geological conditions, such as rubber soil, soft soil layers, or areas prone to water accumulation and subsidence;
- Earthquake faults and areas with seismic intensity greater than 9 degrees;
- Locations susceptible to direct hazards such as mudslides, landslides, quicksand, or caves;
- Locations affected by mining subsidence (dislocation) hazards;
- Areas affected by explosion hazards;
- Areas at risk of flooding due to dam or dike failure;
- Important water source and sanitary protection zones;
- Historical and cultural relic protection zones;
- Crowded areas, high-rise buildings, and underground structures.

3.2.2 Installation Space Requirements

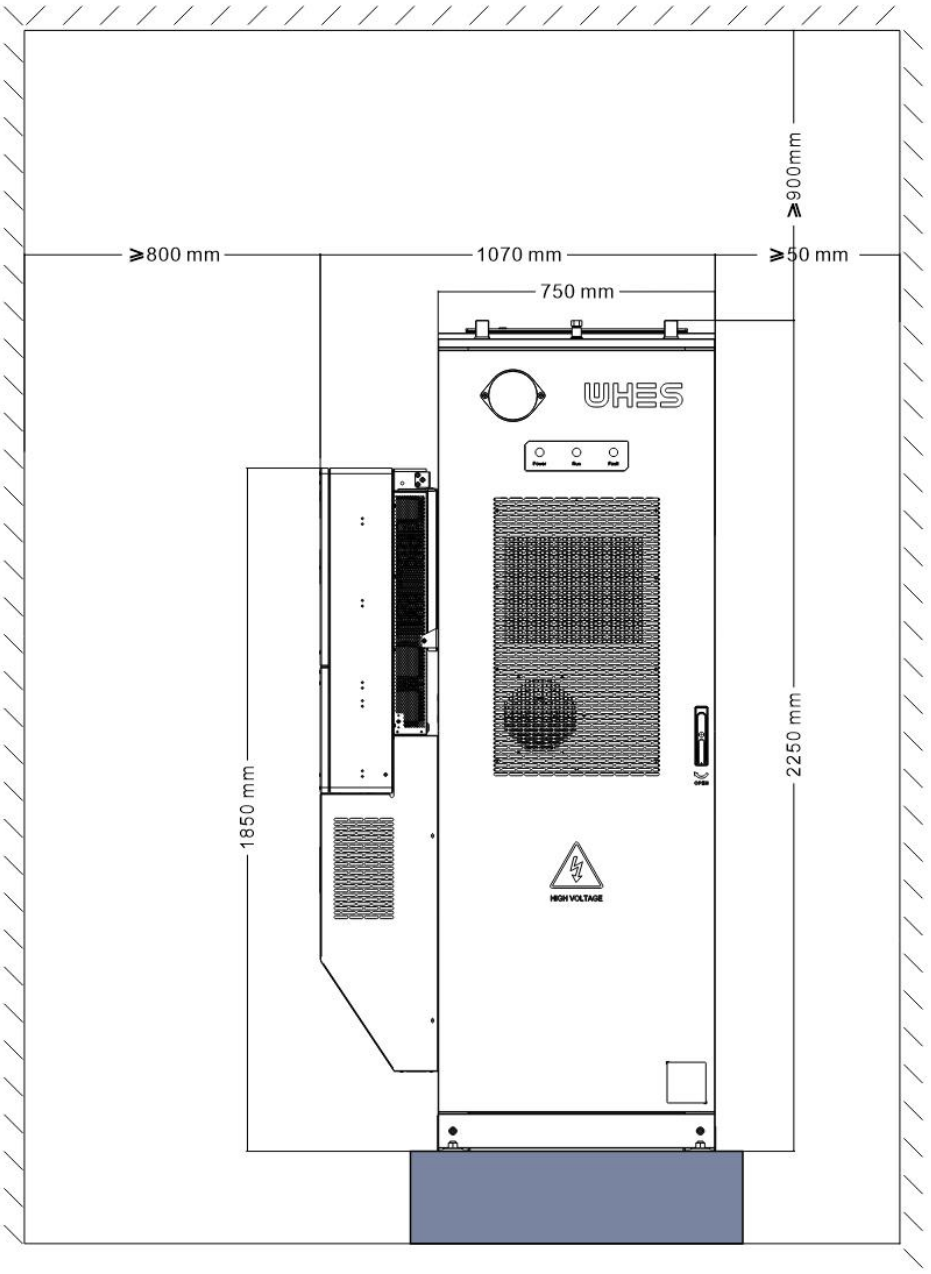


Figure 3-1 Front view of floor-mounted installation

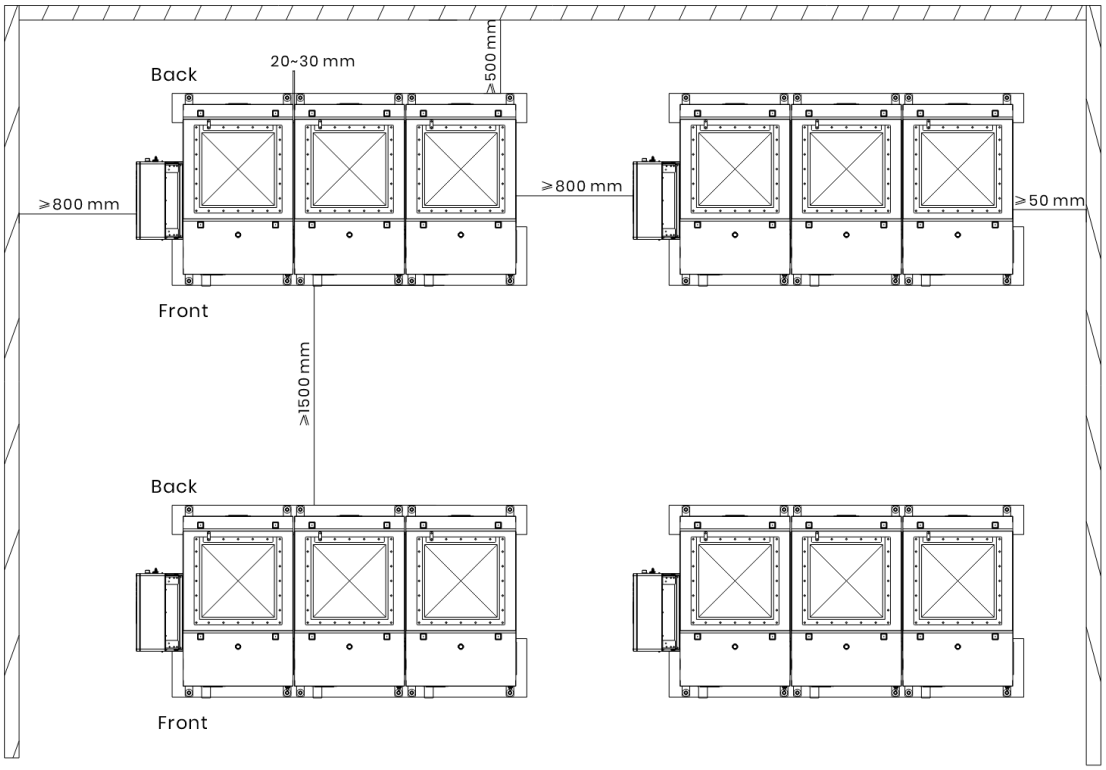


Figure 3-2 Side-by-side Installation (Top View)

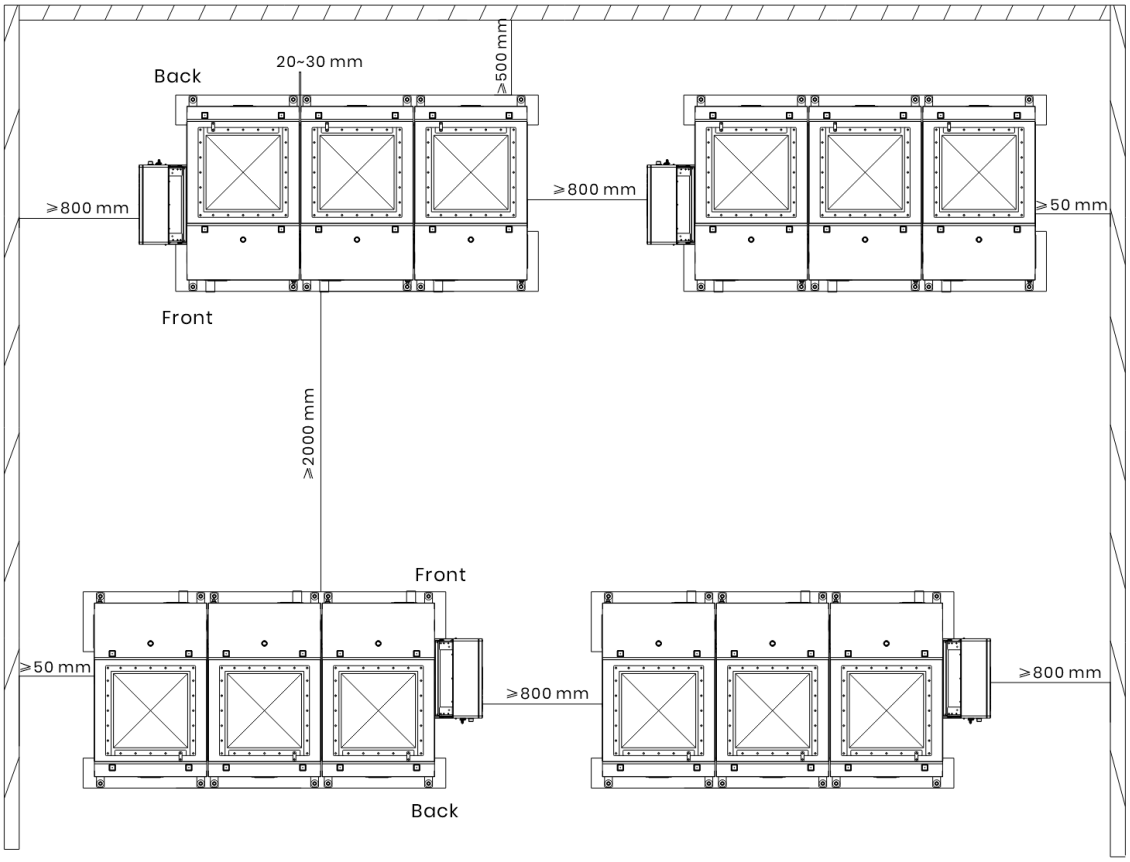


Figure 3-3 Face-to-face Installation (Top View)

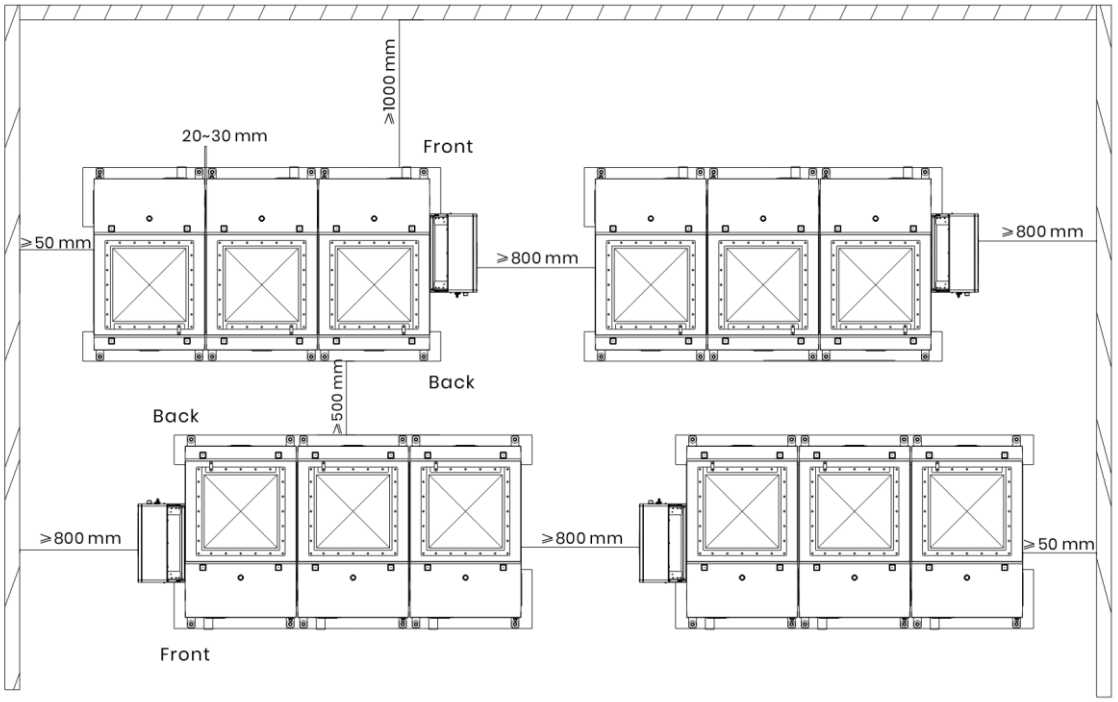


Figure 3-4 Back-to-back Installation (Top View)

3.2.3 Install Equipment-Master

Step 1 Remove the wooden box of the ESS.

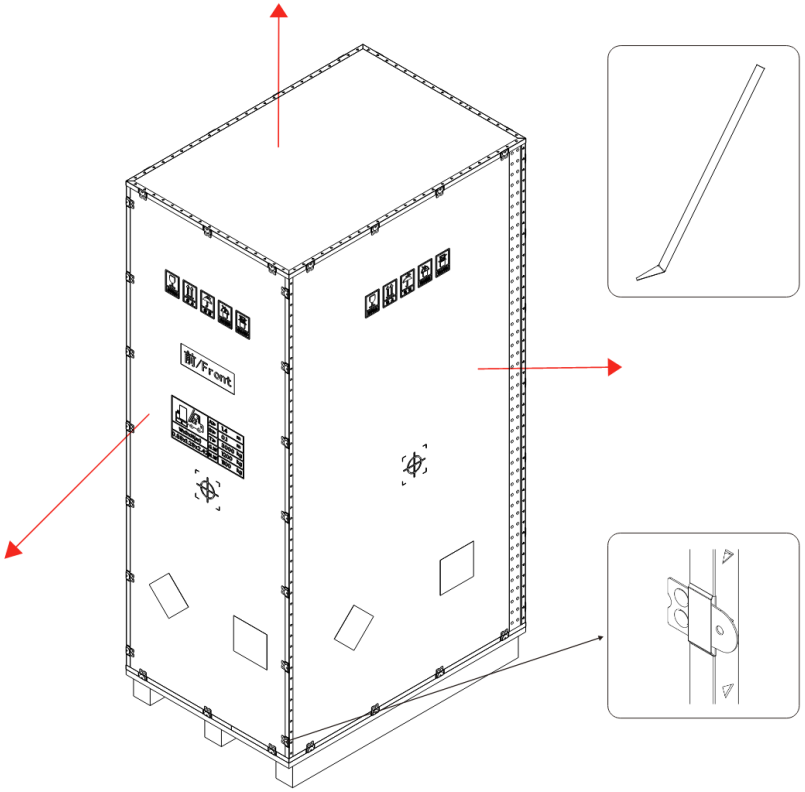


Figure 3-5 Remove the wooden box

Step 2 Remove the EPE of the ESS.

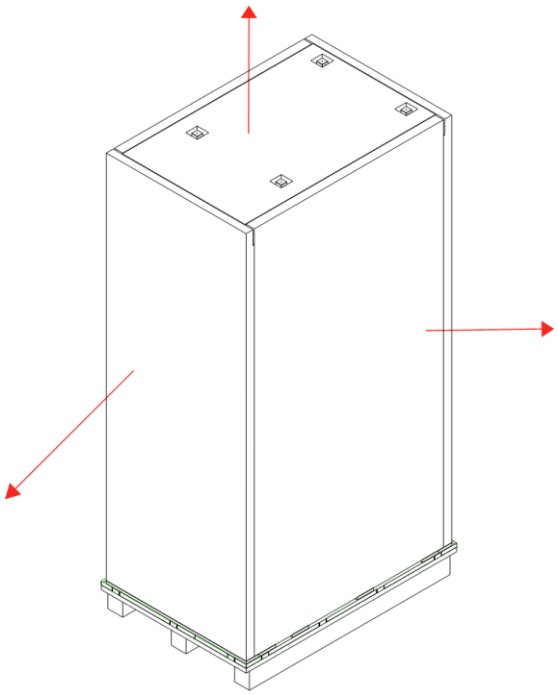


Figure 3-6 Remove the EPE

Step 3 Remove Front and rear bottom sealing plates.

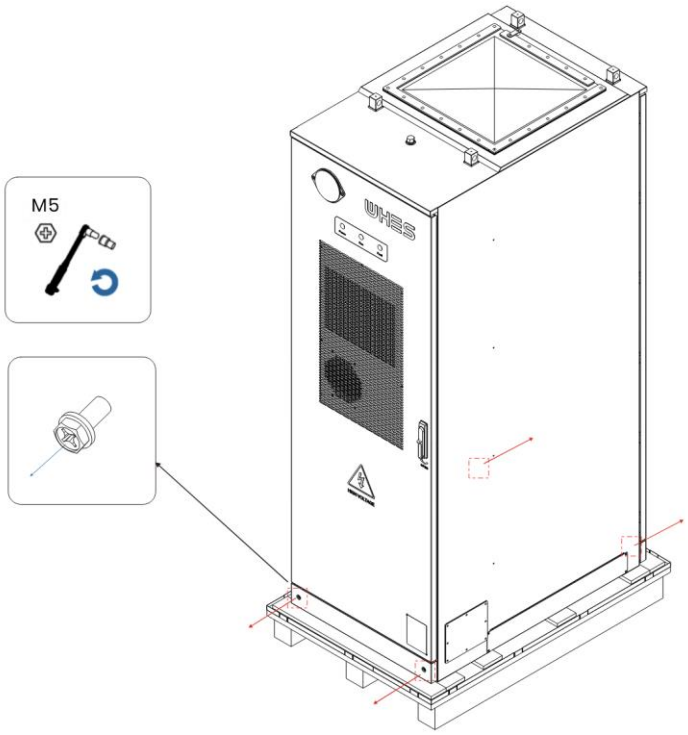


Figure 3-7 Remove Front and rear bottom sealing plates

Step 4 Remove the wooden pallet and the fixing brackets.

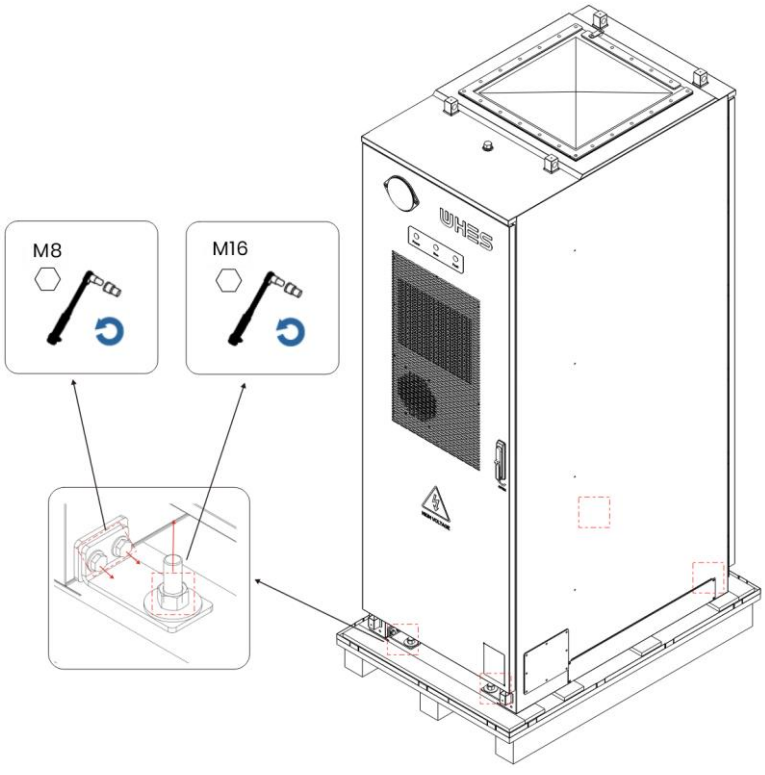


Figure 3-8 Remove the wooden pallet and the fixing brackets

Step 5 Drill holes on the foundation and install expansion screws (M16×90, 4 pcs in total).

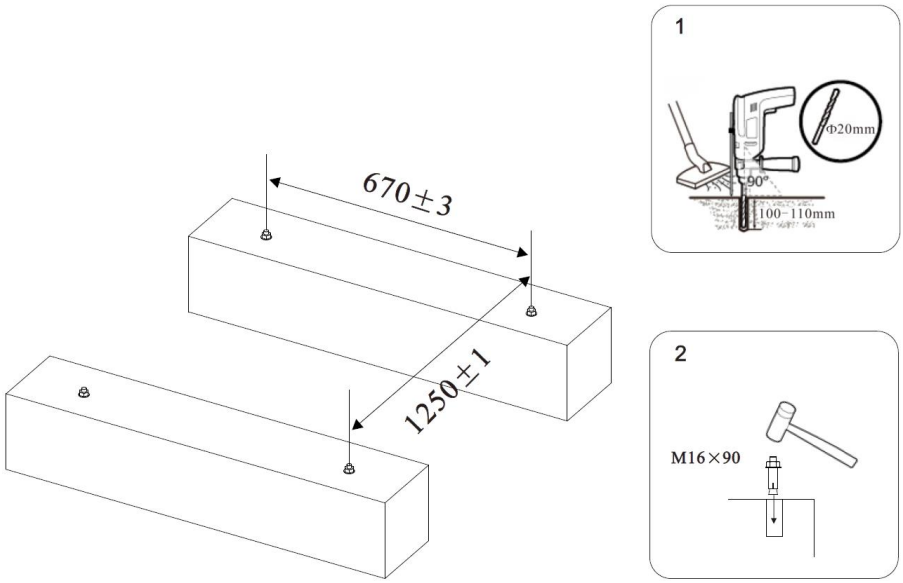


Figure 3-9 Drill holes on the foundation and install expansion screws

Step 6 Move the cabinet to the mounting platform.

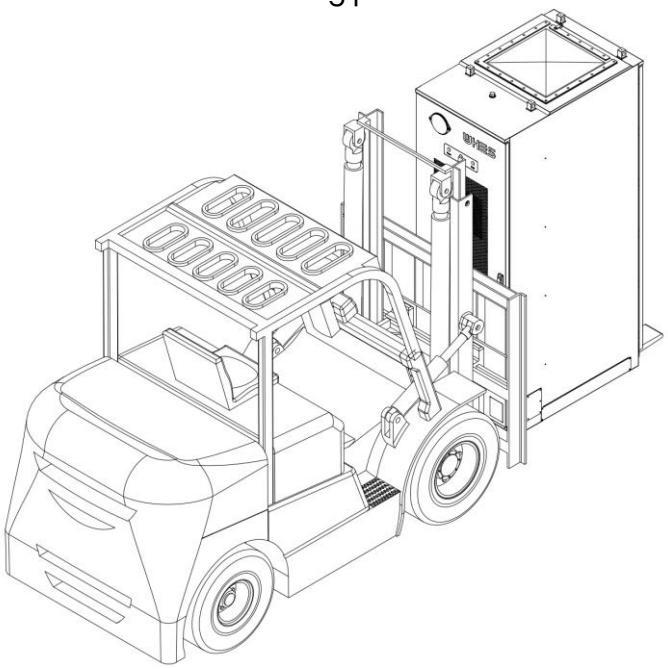


Figure 3-10 Move the ESS to the Foundation by A Forklift

BEWARE

When using a forklift to move the equipment, secure the equipment with appropriate straps based on the actual situation to prevent the risk of overturning.

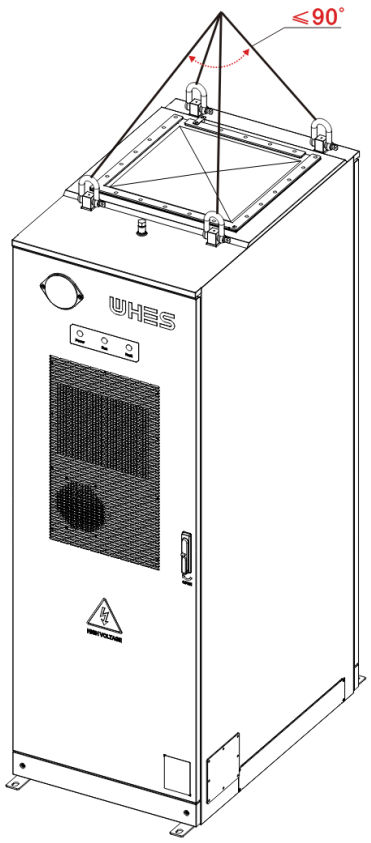


Figure 3-11 Move the Cabinet to the Foundation by A Crane

BEWARE

- This equipment must be lifted using a lifting frame.
- Before starting lifting operations, verify that all lifting tools are securely attached to load-bearing fixtures or walls with specified load capacities.
- During lifting operations, avoid dragging steel cables or spreaders, or striking them with hard objects.
- Never walk under the crane boom or lifted objects when handling heavy loads.
- Temporary warning signs or fencing must be erected to isolate the lifting area.
- Ensure that the angle between the two cables remains ≤ 90° during the lifting process, as illustrated in the diagram below.
- Use flexible slings or straps, each with a load capacity of at least 3 tons.
- The hook should be at least 1 m from the top of the cabinet.
- The cabinet should not be tilted greater than 10°.
- It is recommended to use an M20 D-shackle and a four-leg sling with a minimum length of 1500 mm.

Step 7 Secure the cabinet to the installation platform and install the fixing brackets.

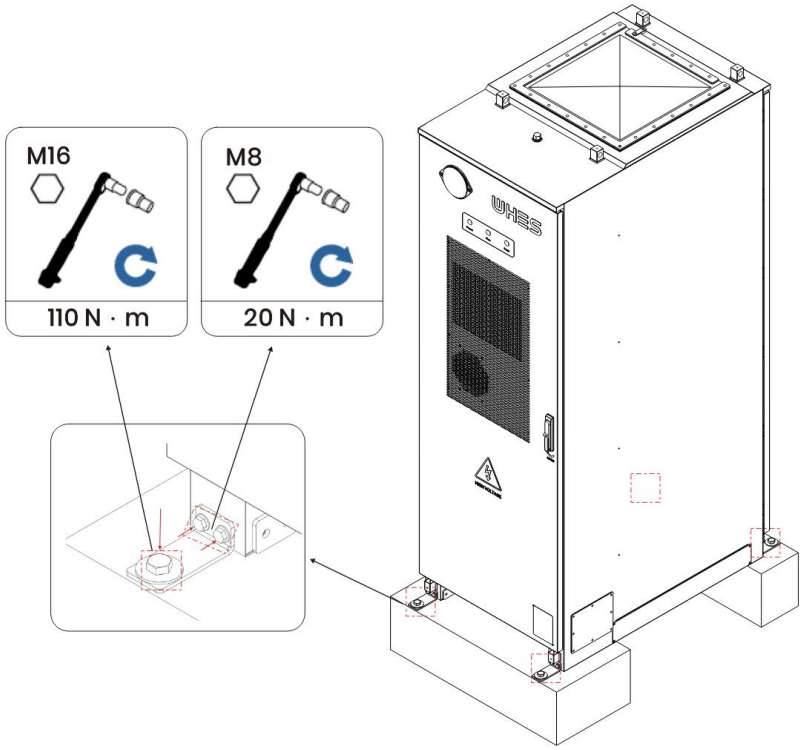


Figure 3-12 Secure the Cabinet to the Installation Platform and Install the Left and Right Cover Plates

Step 10 Install and secure the inverter

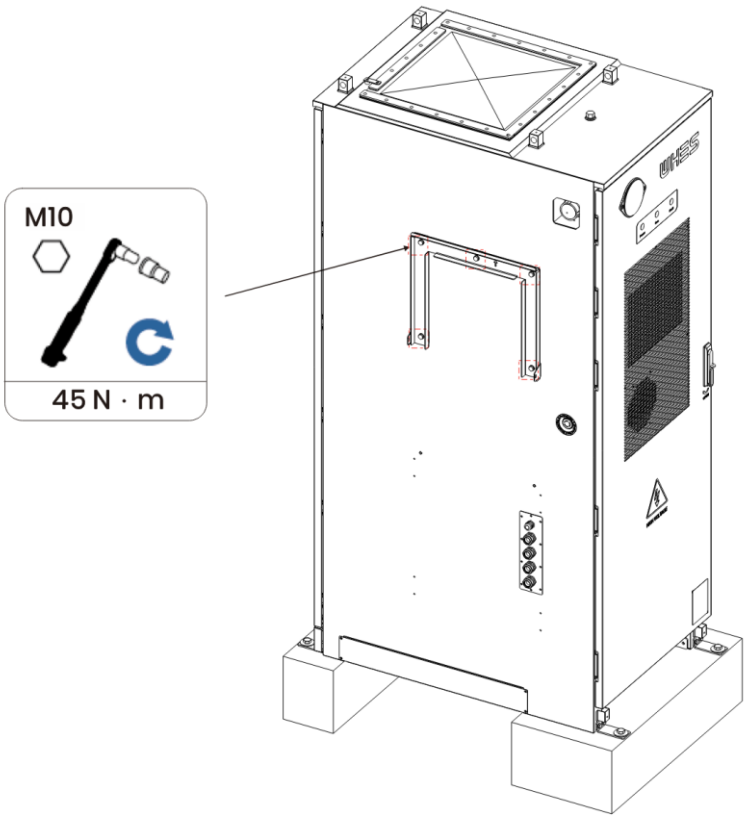


Figure 3-13 Install and Secure the Inverter Back Panel

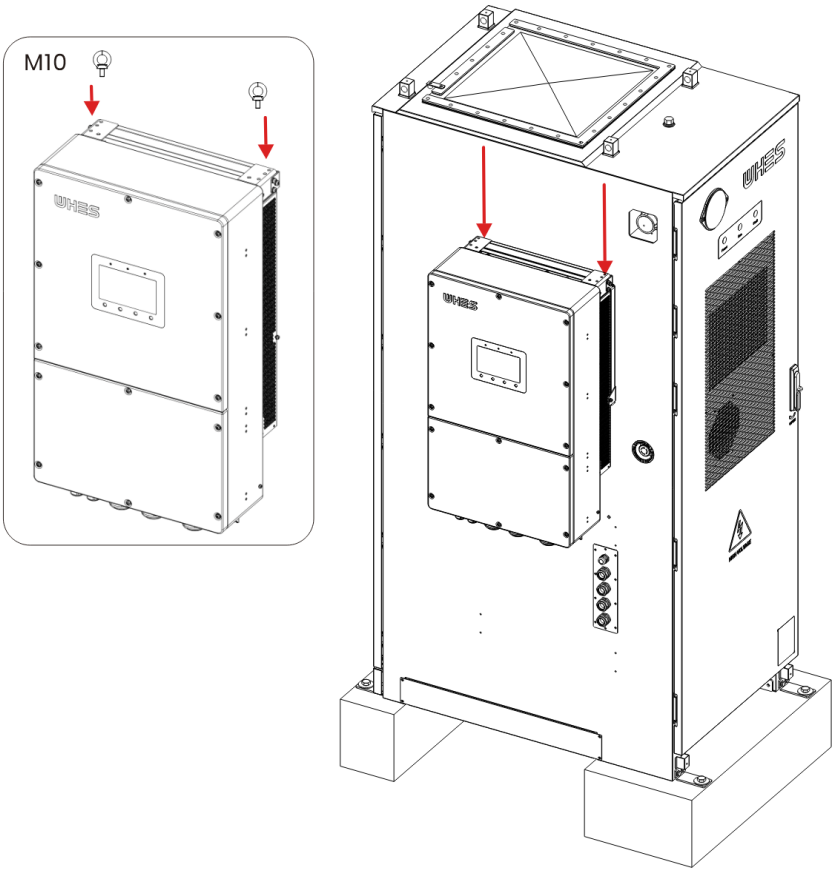


Figure 3-14 Lift the Inverter to the Back Panel

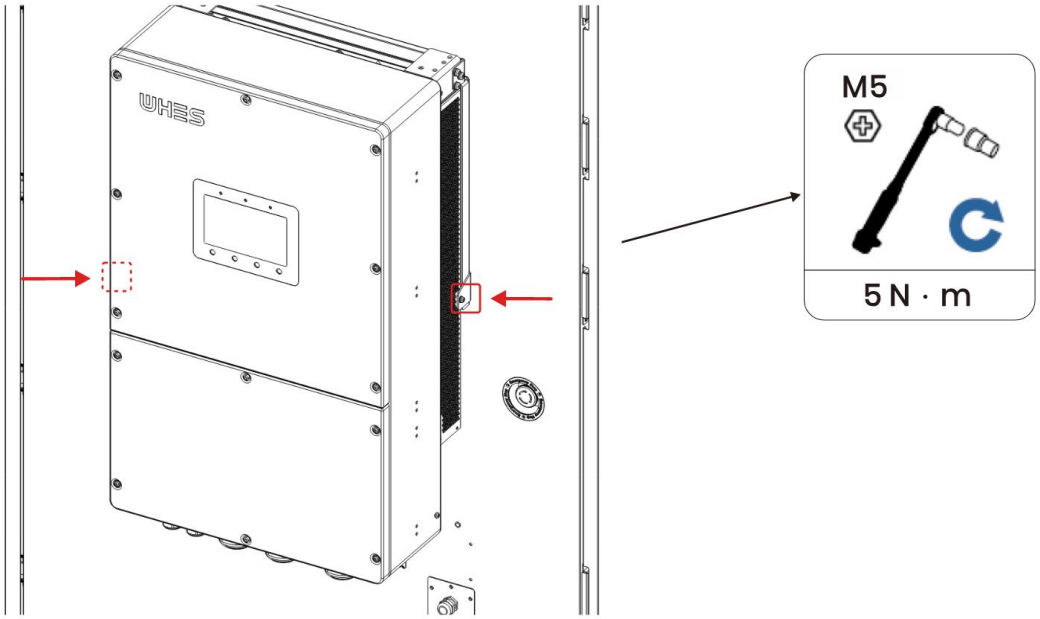


Figure 3-15 Install and Secure the Inverter

3.2.4 Install Equipment-Slave

Step 1 Remove the wiring cover plates between the cabinets.

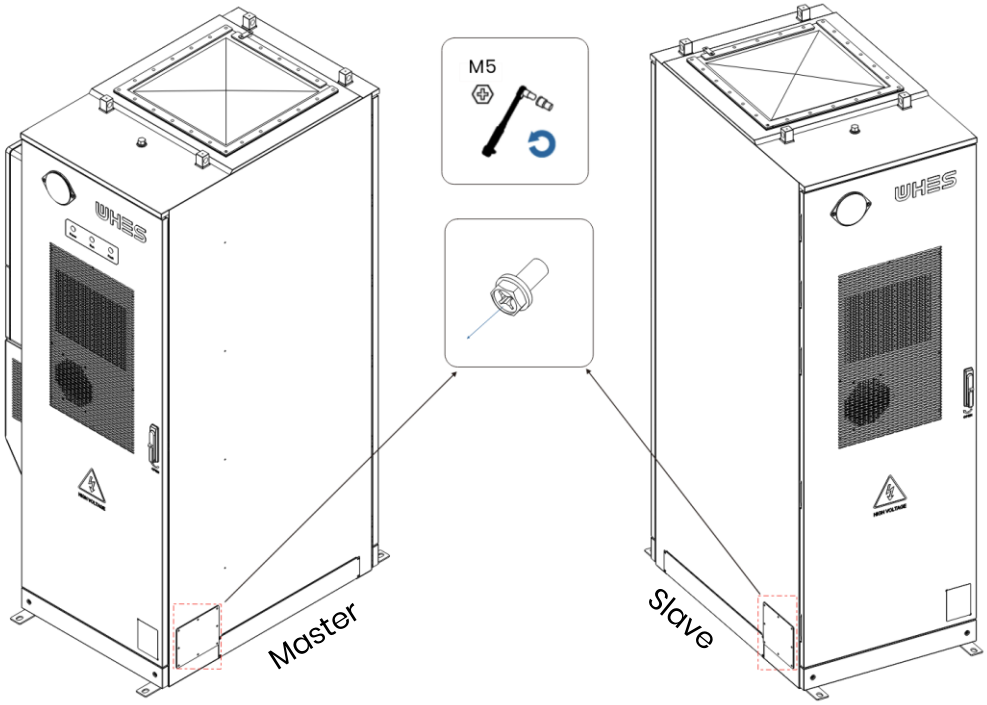


Figure 3-16 Remove the wiring cover plates between the cabinets

Step 2 Open the cabinet doors.

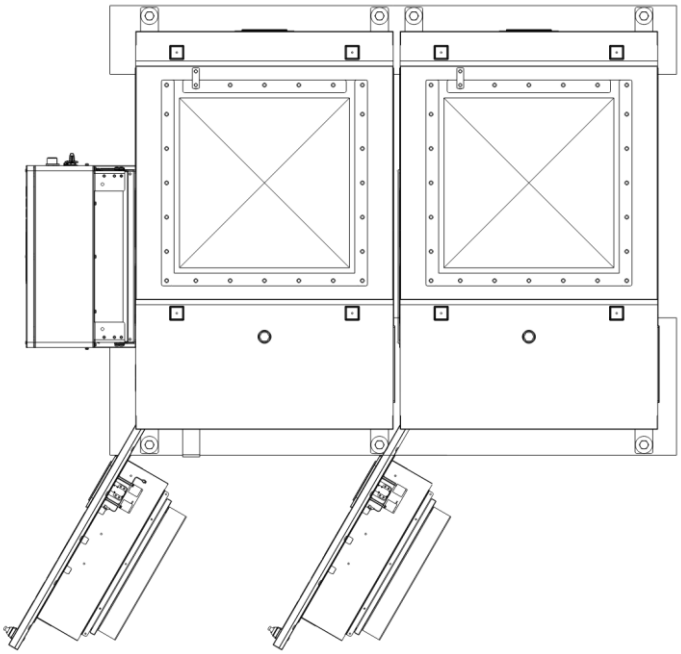


Figure 3-17 Open the cabinet doors

Step 3 Remove the bottom shielding cover plate and the PC protective plate.

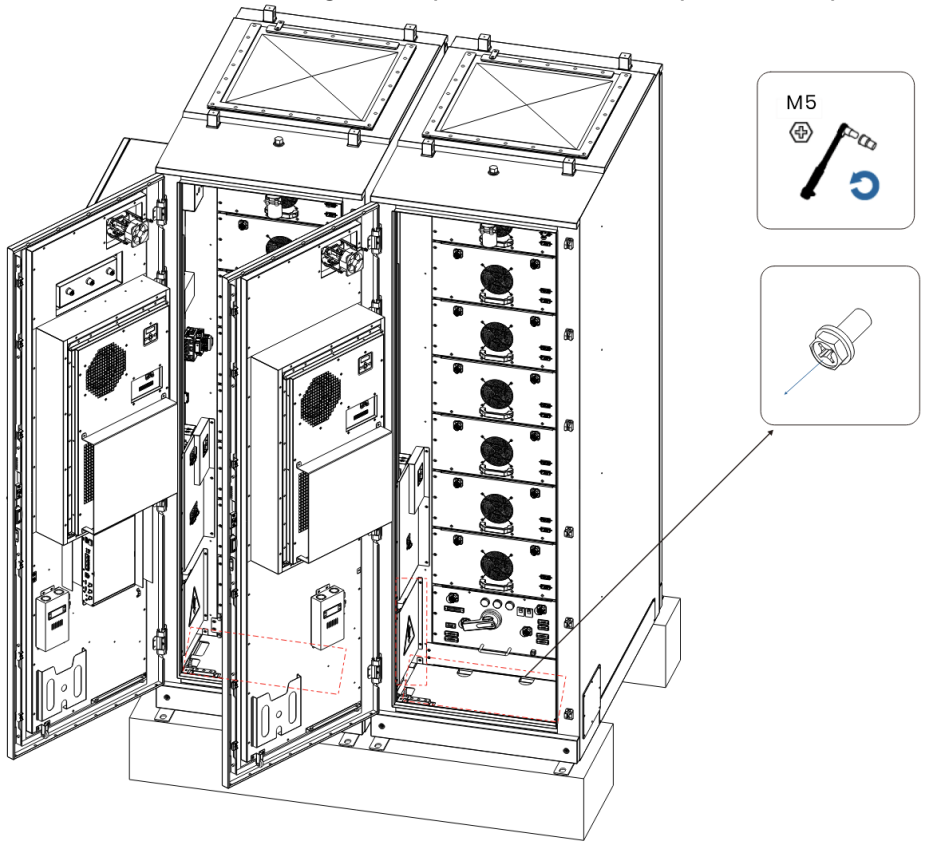


Figure 3-18 Remove the bottom shielding cover plate and the PC protective plate.

Step 4 Install the silicone coil.

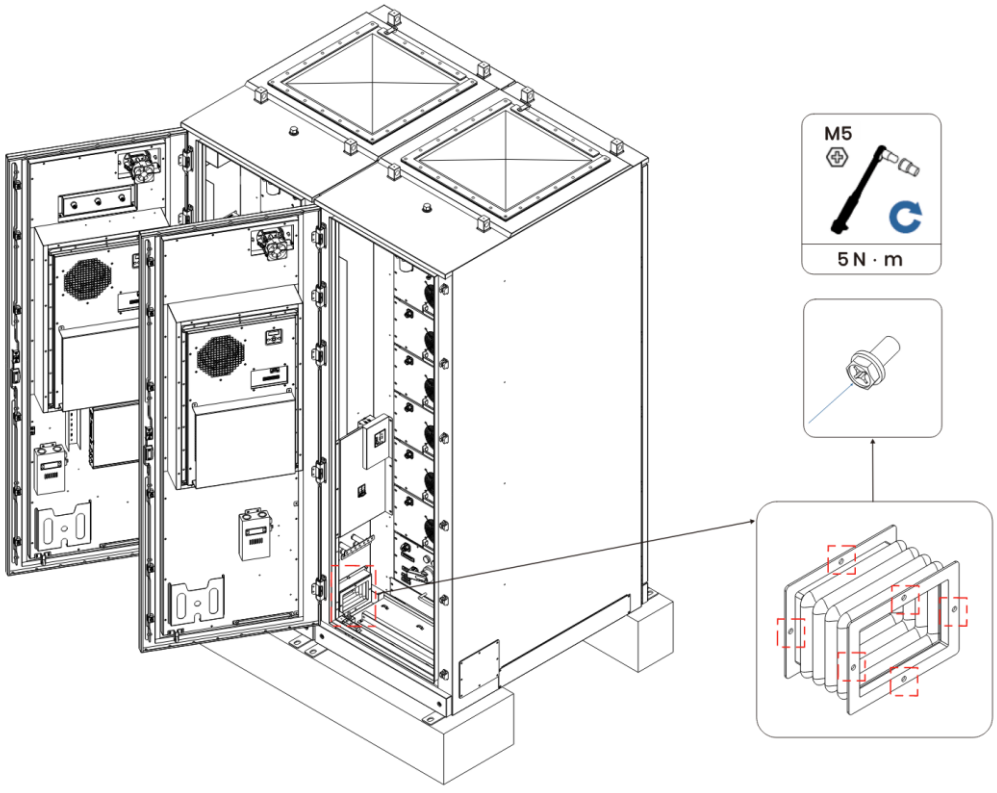


Figure 3-19 Install the silicone coil

4 Electrical Connection

4.1 System Schematic Diagram

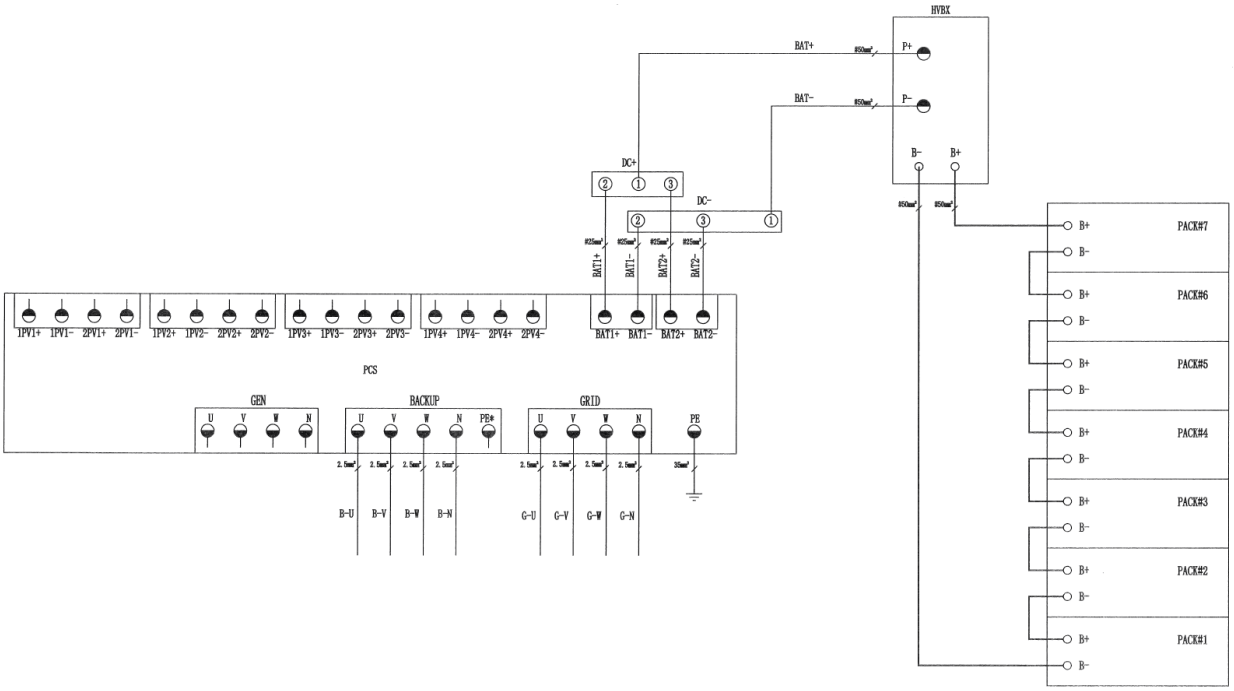


Figure 4-1 system principle diagram

BEWARE

Figure 4-1 shows the internal system schematic diagram of the main unit. For the backup unit and other detailed issues, please contact our company's after-sales service personnel.

4.2 Cable Preparation

Name	Type	Cross Sectional Area
AC Input Line	3-core outdoor copper wire	50mm² (single-core)
Neutral Input Line	Single-core outdoor copper wire	≥25mm2
Protective Ground Wire	Single-core outdoor copper wire	≥25mm2

BEWARE

The cable cross-sectional areas listed in the table represent the minimum values necessary for the normal operation of a single system. For multi-machine parallel operation, the cable sizes need to be adjusted accordingly.

4.3 Grounding Wire Connection

Step 1 Install the grounding busbar.

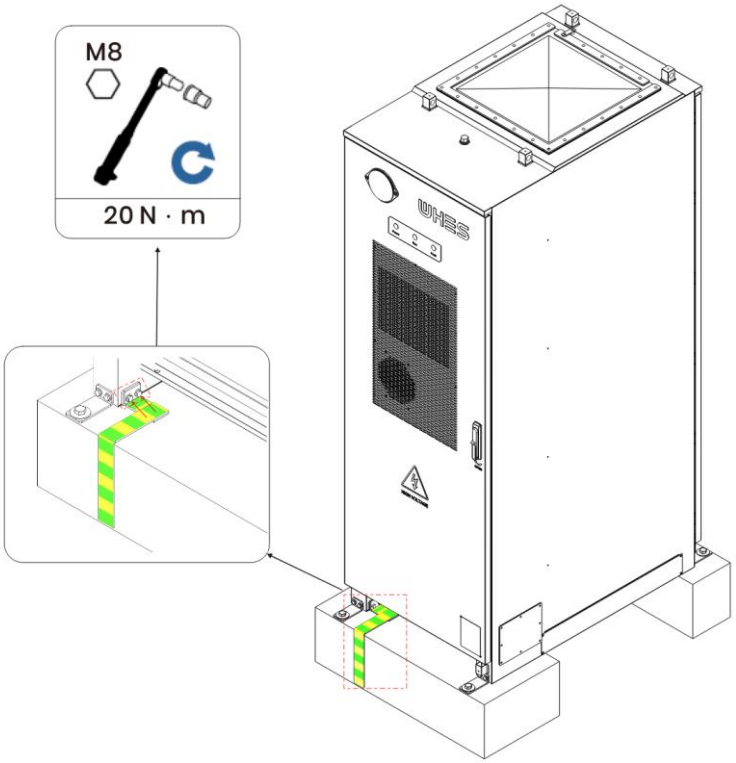


Figure 4-1 Install the Grounding Busbar

Step 2 Install Front and rear bottom sealing plates.

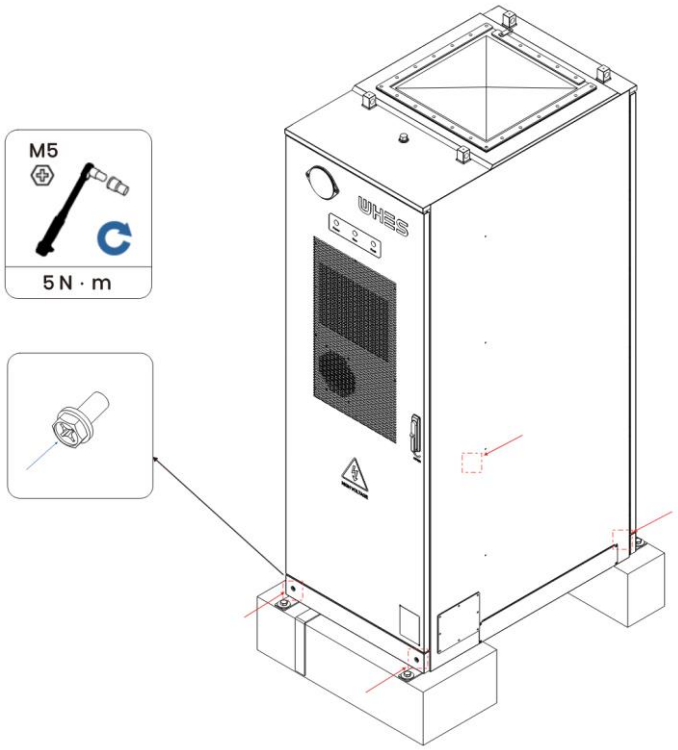


Figure 4-2 Install Front and rear bottom sealing plates

Step 3 Connect the Inverter Grounding Wire

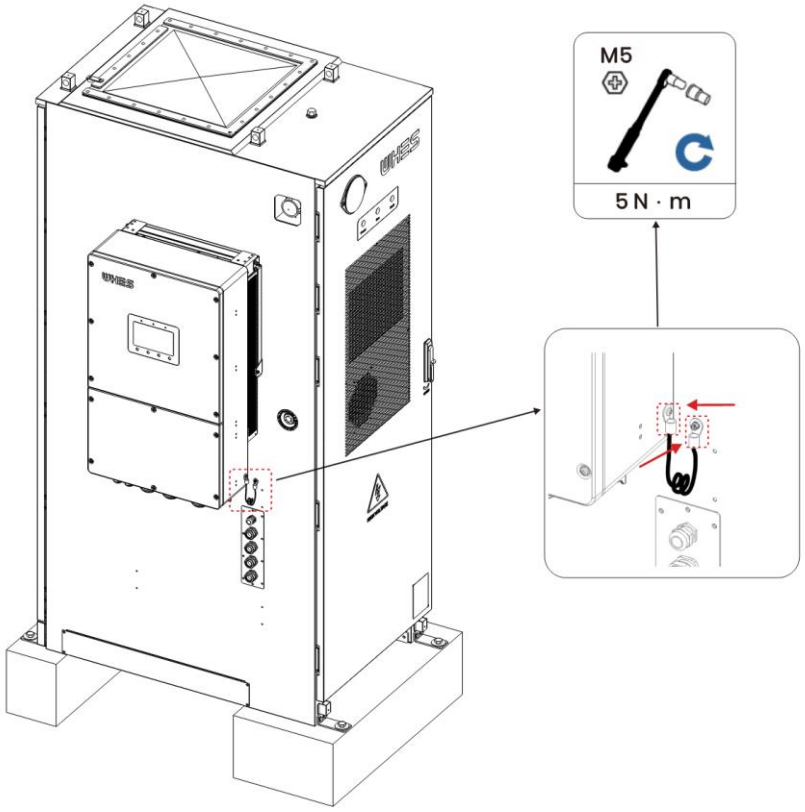


Figure 4-3 Connect the Inverter Grounding Wire

Step 4 Install the cable shroud panels.

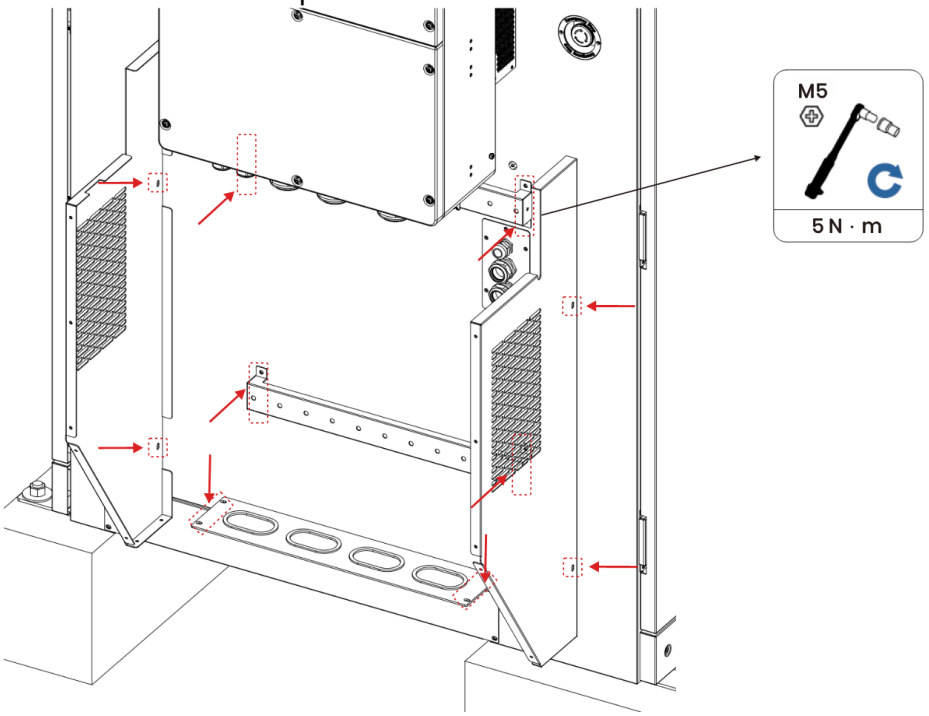


Figure 4-4 Install the Cable Shroud Panels

4.4 DC Side Connection

4.4.1 DC Output Wiring

Step 1 Open the cabinet doors.

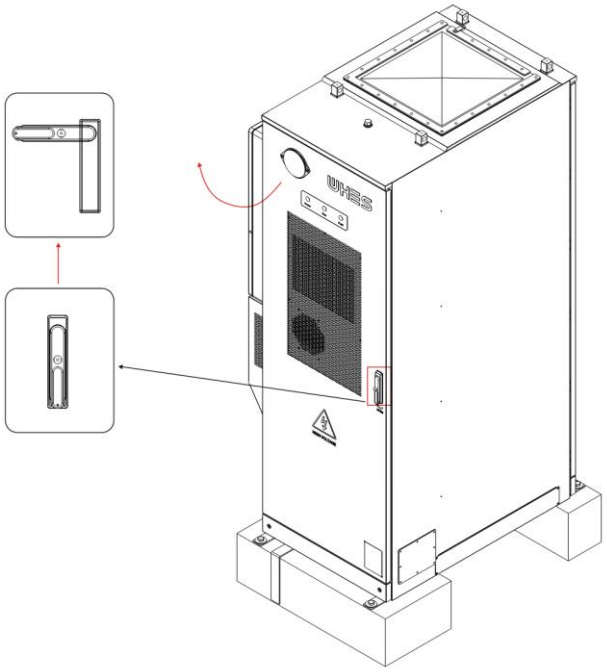


Figure 4-5 Open the Front Door of the Battery Compartment

Step 2 Connect the power cables.

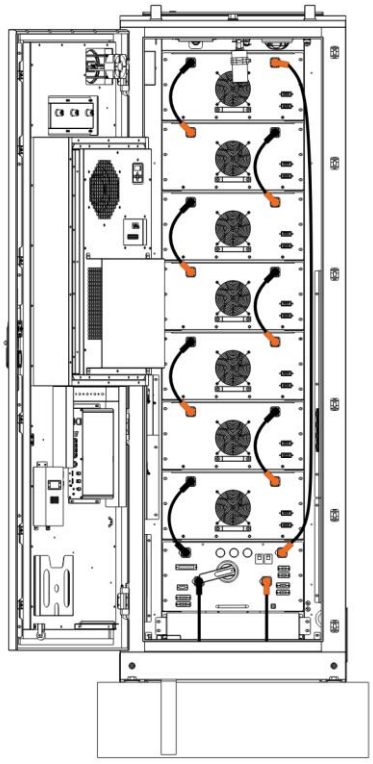


Figure 4-6 Install the Power Cables

Step 3 Close the front door of the battery compartment.

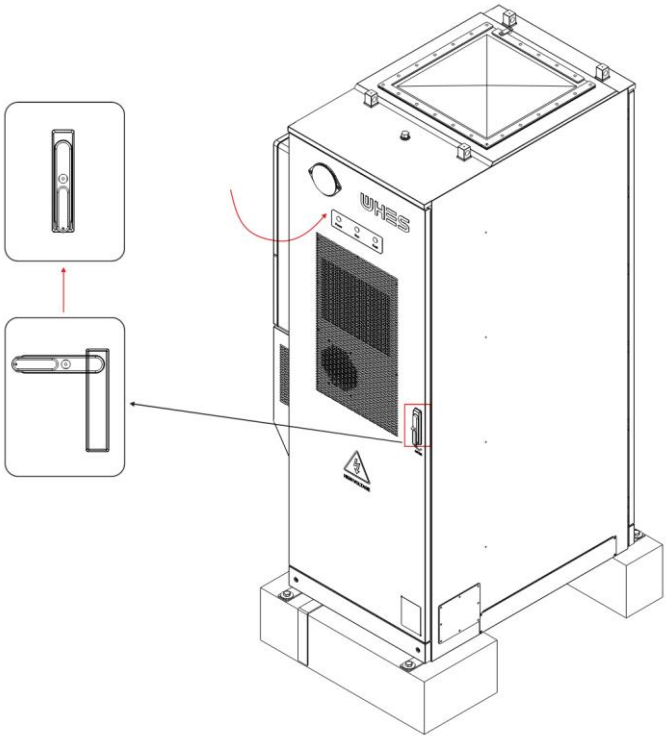


Figure 4-7 Close the Front Door of the Battery Compartment

4.4.2 DC Side Parallel Connection

Step 1 Connect DC cables.

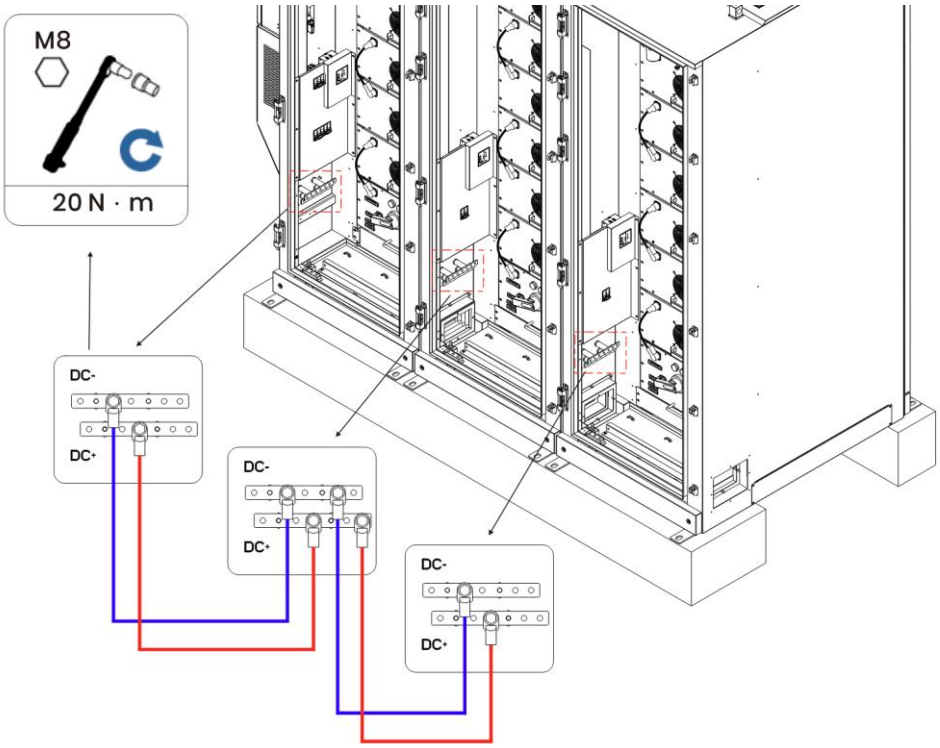


Figure 4-8 Connect DC cables

Step 2 Remove the communication cable cover plate.

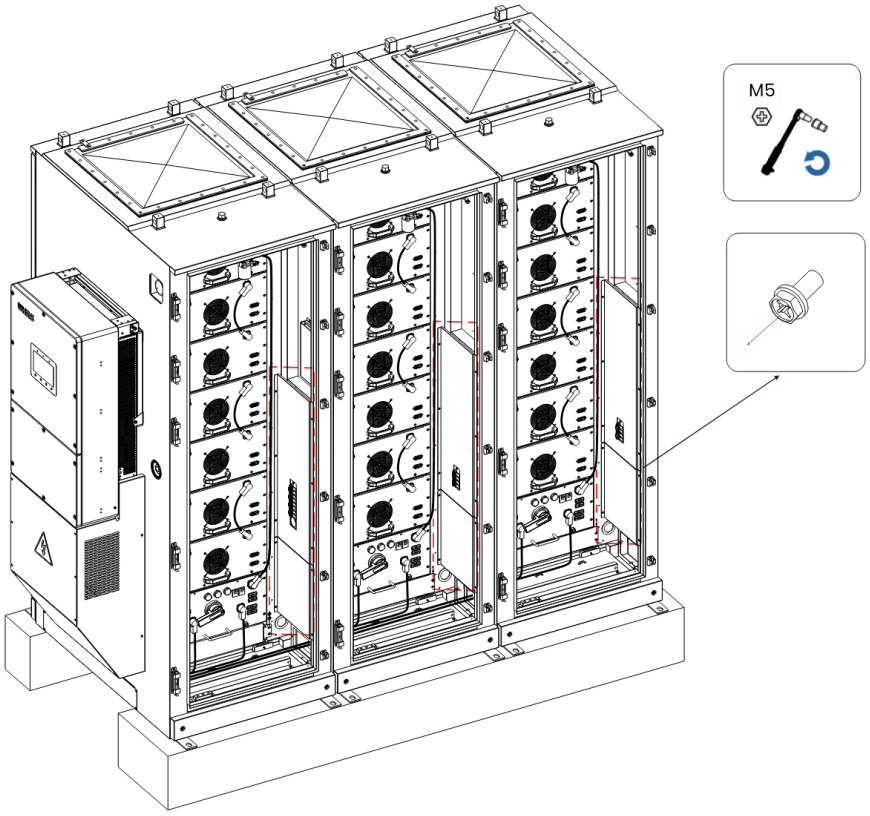


Figure 4-9 Remove the communication cable cover plate

Step 3 Connect the communication cables

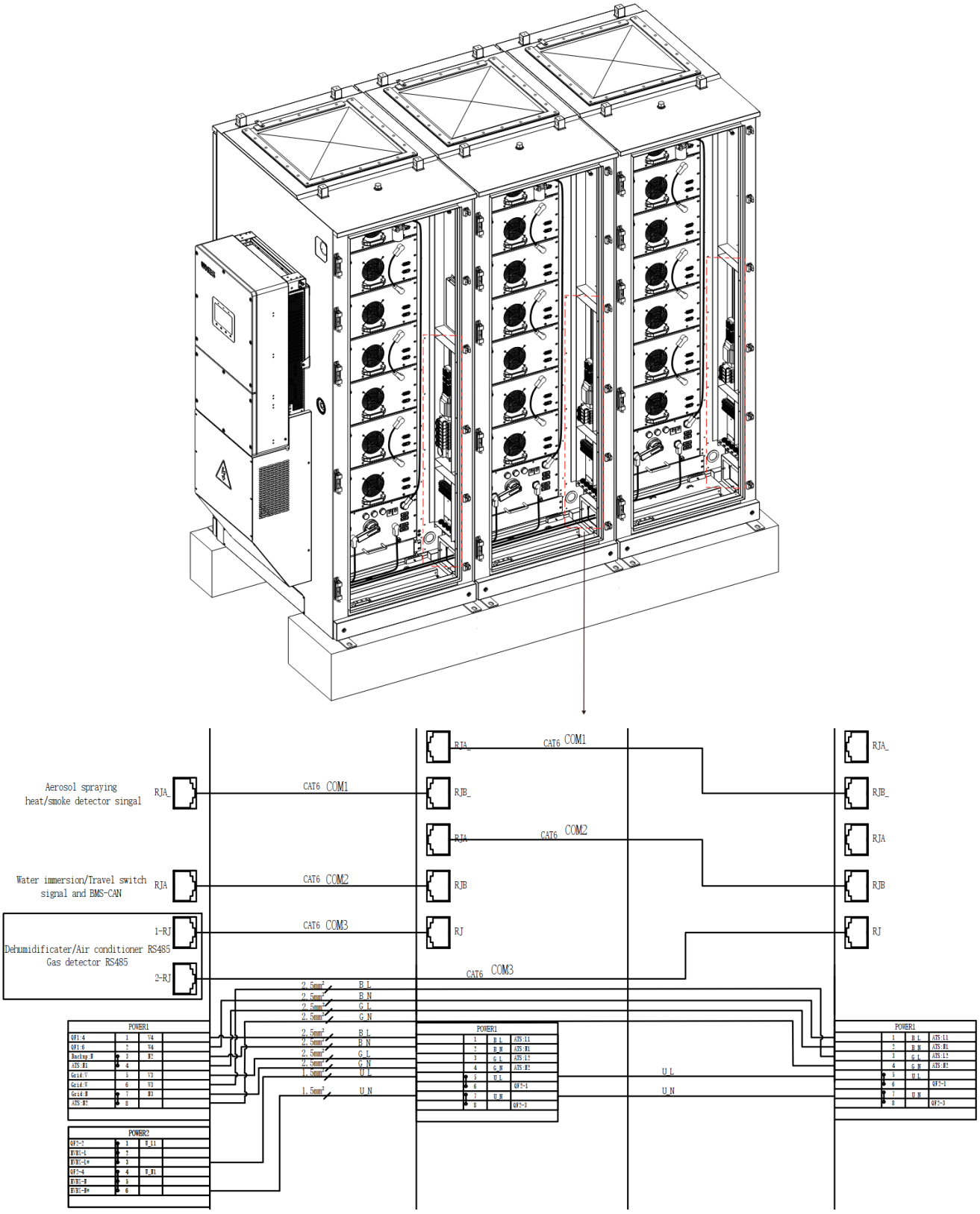


Figure 4-10 Connect network cables

Step 4 Install the bottom shielding cover plate，PC protective plate，and network cable cover plate.

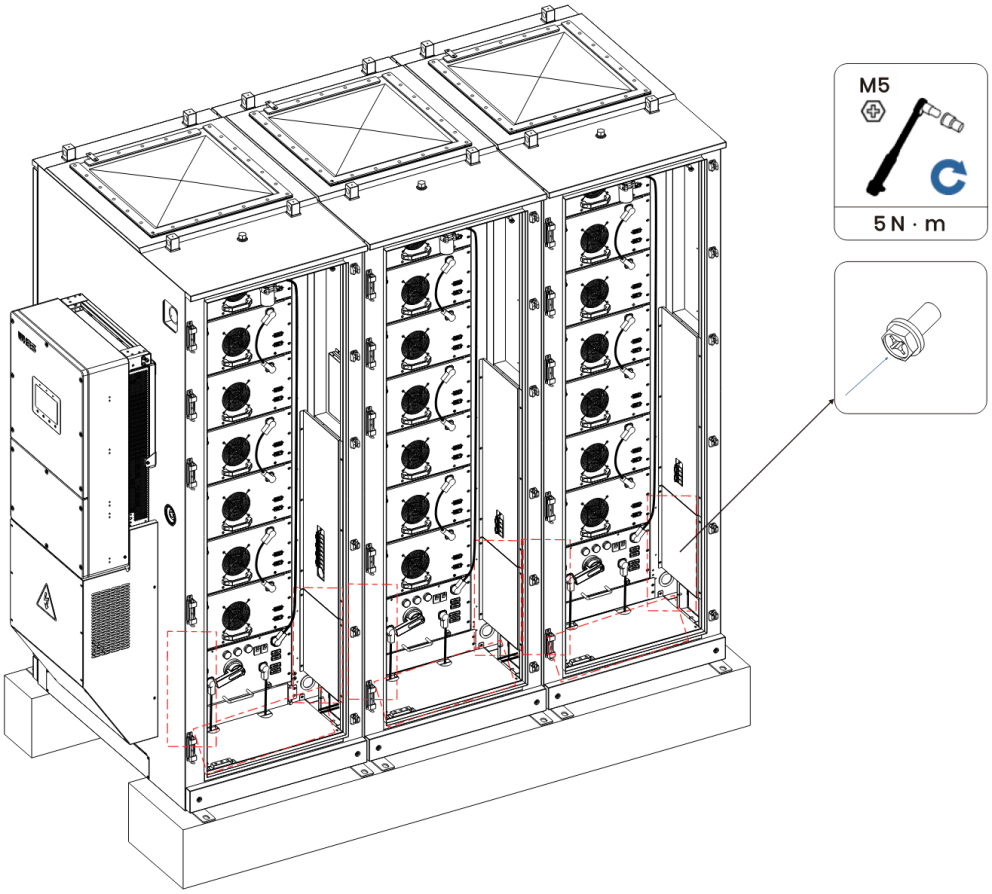


Figure 4-11 Install the plates

Step 5 Close the front doors.

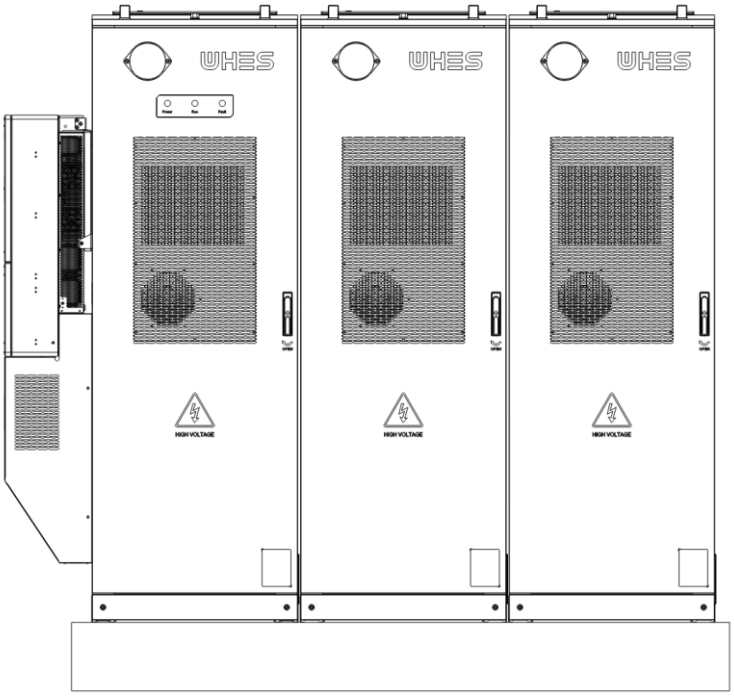


Figure 4-12 Close the front doors

4.5 AC Side Connection

4.5.1 AC Output Wiring

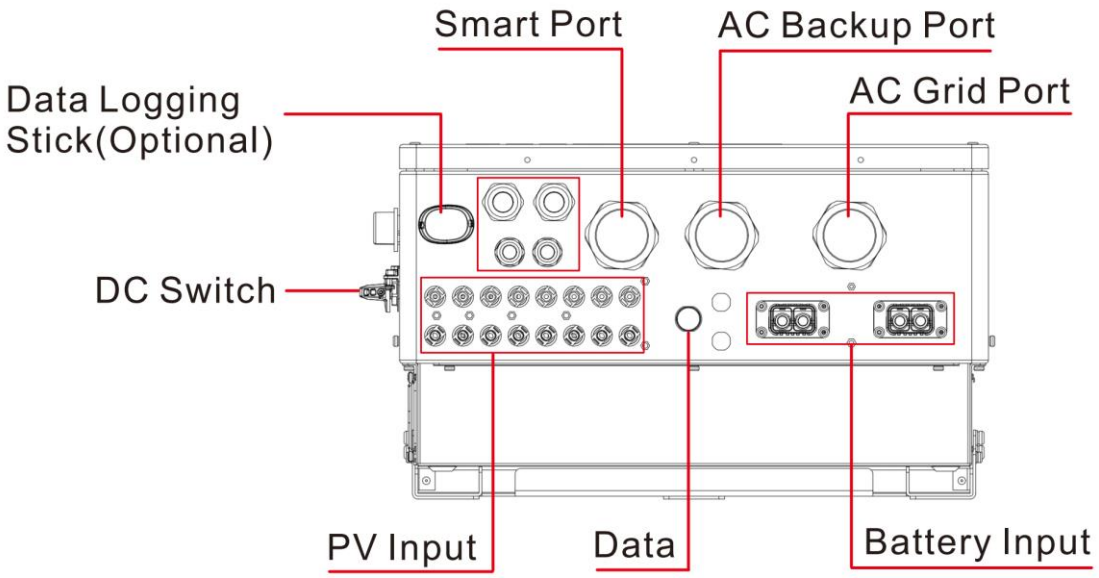


Figure 4- 8 Inverter Interfaces

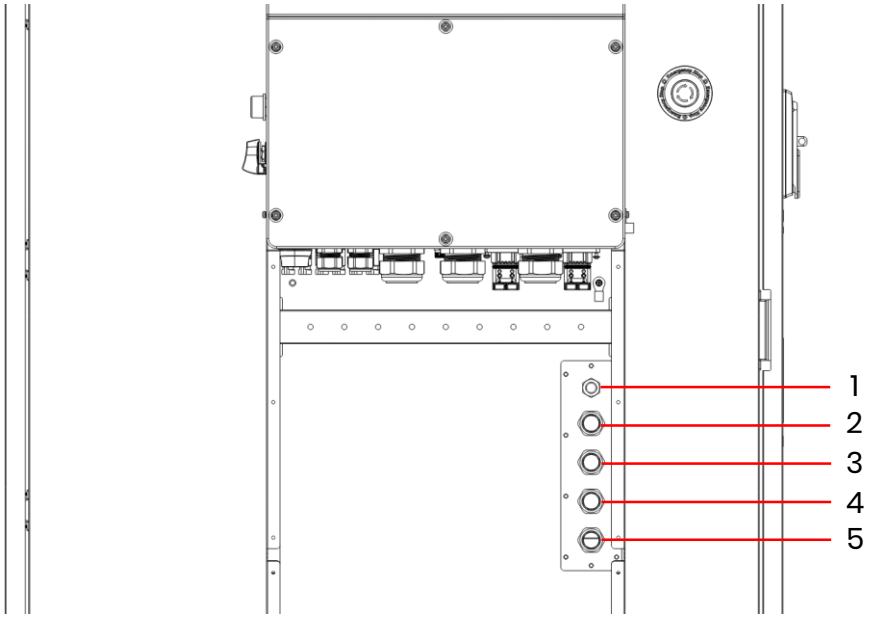


Figure 4-9 Indication of Outgoing Lines in the Cabinet

Table 4-1 Indication of qualification

Number	Type	Quantity	Remarks
1	Auxiliary power supply line	4	Connect to the PCS-Backup port
2	Communication network cable	2	Connect separately to the EMS and BMS1 ports of the PCS
3	/	/	Reserved entry hole
4	/	/	Reserved entry hole
5	Battery-powered cable	4	Connect to the DC input port of the PCS

BEWARE

Regarding the cable information for outgoing wires inside the cabinet, only a descriptive explanation is provided herein; for specific wiring positions and installation methods, please refer to the corresponding AC-side inverter user manual.

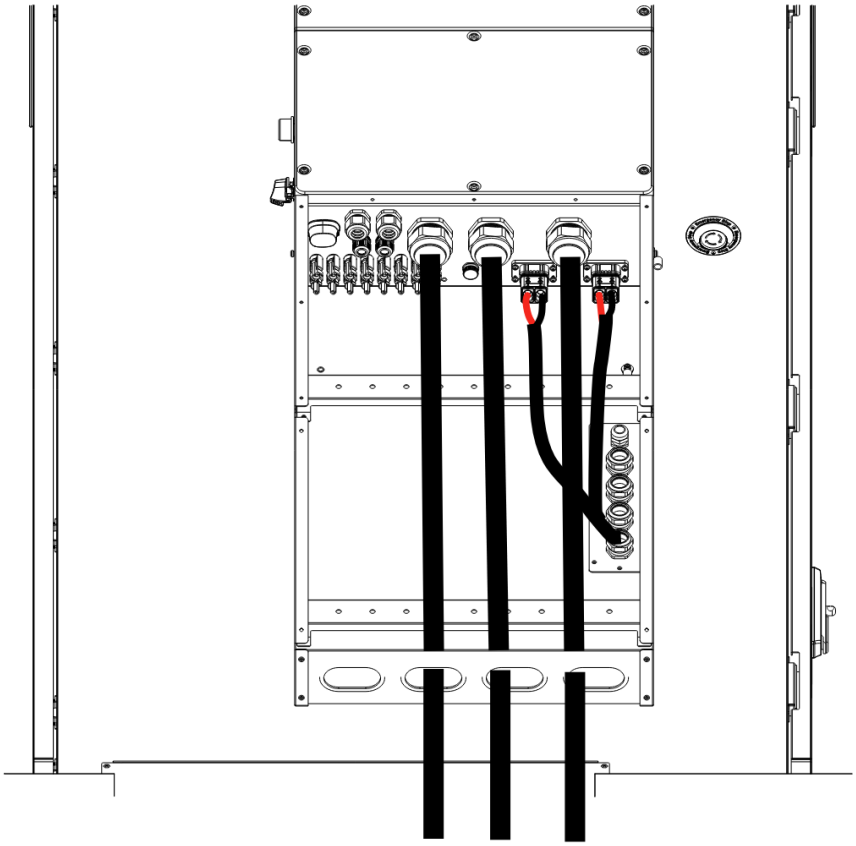


Figure 4-10 Connect AC and DC Cable

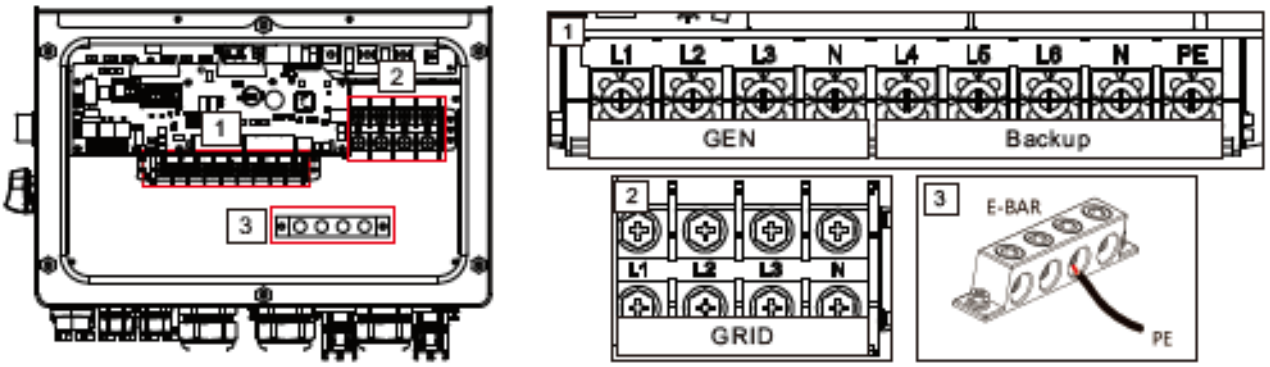


Figure 4-11 Connection position of the communication cable

Table 4-1 Indication of qualification

Number	Type	Remarks
1	GEN	Connection positions of diesel generators and photovoltaic inverters
2	Backup	Load connection positions
3	GRID	Grid connection positions
4	E-BAR	Ground wire connection positions

4.7 Ethernet Communication Wiring

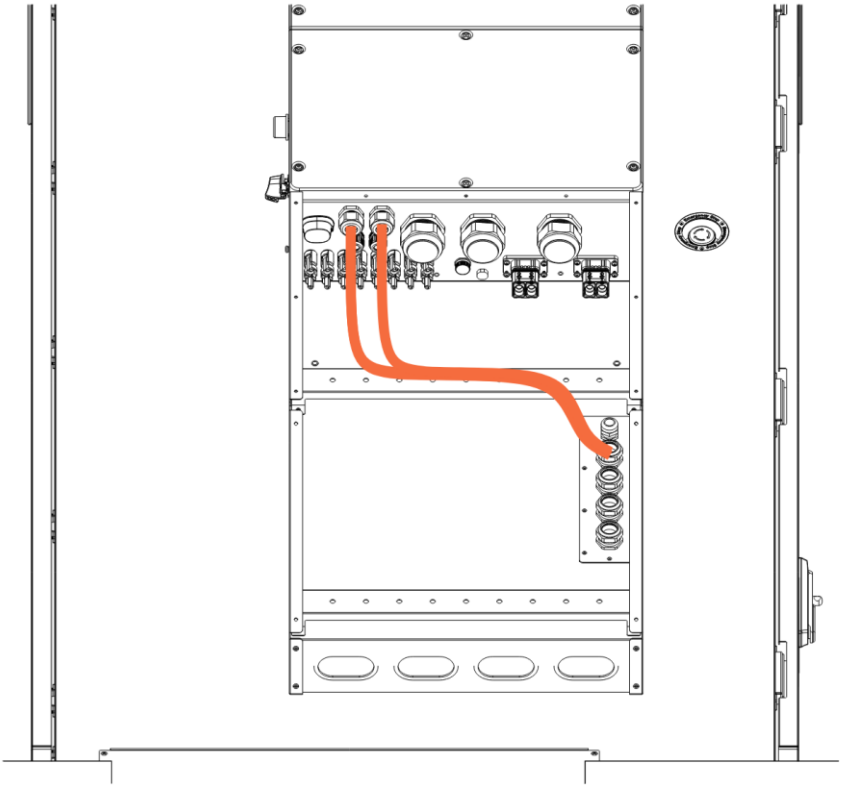


Figure 4-12 Connect Ethernet Communication Wire

Number	Battery cabinet	PCS
1	EMS communication line	EMS
2	BMS communication line	BMS1

BEWARE

For the specific location of the communication cable connection, please refer to THA_Manual_S6-EH3P(29.9-50)K-H_V1.0

4.8 Final wiring steps

Step 1 Install the cable shroud panel.

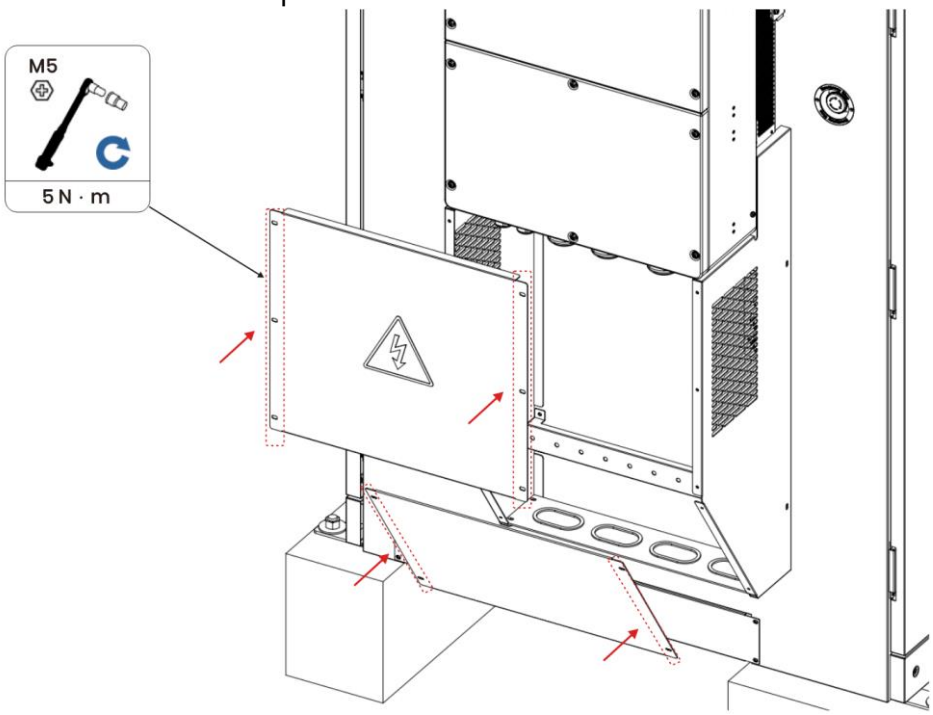


Figure 4-13 Install the Cable Shroud Panel

Step 2 Installation is complete.

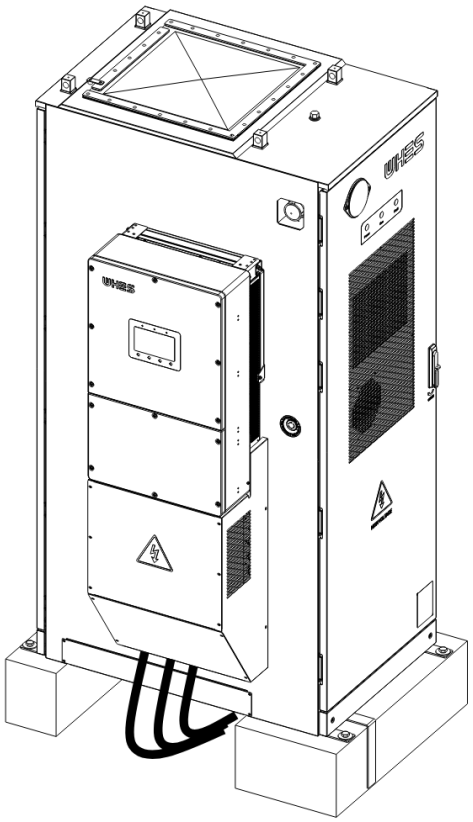


Figure 4-21 Complete the Installation

5 System Power-On & Power-Off

5.1 Pre-Power-On Inspection

No.	Inspection Item	Acceptance Criteria
1	Equipment Appearance	The equipment is intact and free of visible damage, rust, or peeling paint. Repaint any areas with peeling paint.
		All labels on the equipment are clearly visible and legible. Replace damaged labels promptly.
2	Cable Appearance	Cable protective layers are well wrapped and free of visible damage.
		Cable conduits/hoses are intact.
3	Cable Connection	Cable connections are correctly positioned according to the design.
		Terminals are properly installed in accordance with specifications, and connections are secure and reliable.
		All cables are clearly identified at both ends with legible labels that are oriented in a consistent manner.
4	Cable Routing	Cables are routed by separating strong and weak power systems.
		Cabling is organized in a neat and orderly manner.
		Cable ties are trimmed flush, eliminating sharp edges or protrusions.
		Bends are properly managed with sufficient slack, without over-tensioning cables.
		All cables are routed straight and smooth inside the cabinet, avoiding crossovers.
5	Switch	All circuit breakers in the power distribution cabinet are in the OFF position.
		All switches in the HV box are in the OFF position. (battery cabinet)
6	Enclosure Grounding	Each enclosure has at least two securely connected grounding points with a maximum contact resistance of 0.1Ω.

7	Identification	Identification is correct, legible, and complete.
8	Sealing of Cable Openings	All cable openings are properly sealed.
9	Battery Pack	All battery pack are free of visible damage.
10	Foreign Objects	All foreign objects such as tools, and leftover installation materials are removed from the cabinet.
11	Power Distribution Area Cover Plate	The cover plates in the power distribution area are free of visible cracks, dents, scratches, breakage, or looseness.

5.2 Circuit Breaker Description

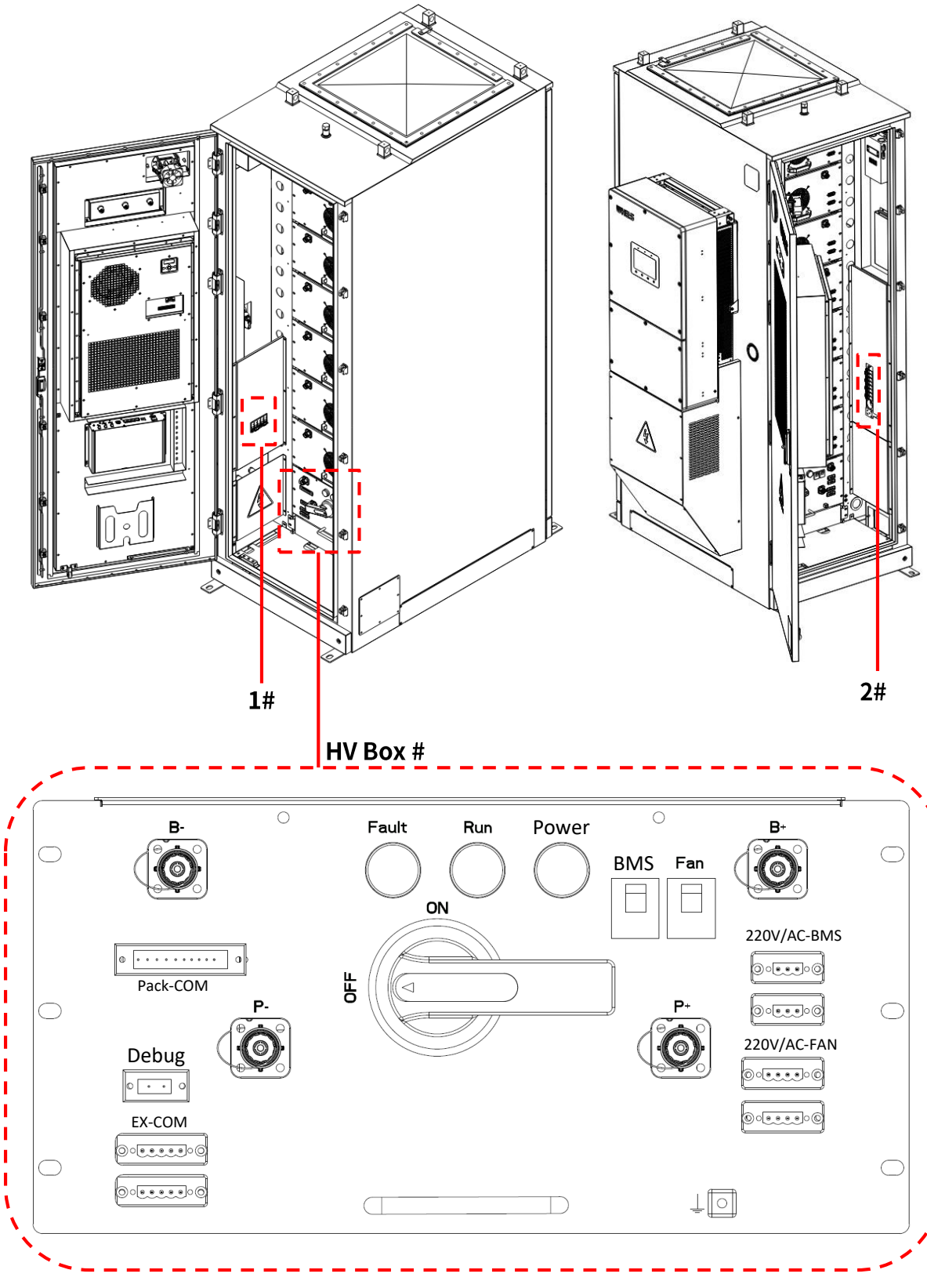


Figure 5-1 Schematic diagram of switch position

Table 5-1 Circuit Breaker List

No.	Name	Function
1#	QF1	Main auxiliary power switch
	QF2	Air conditioner power switch
2#	QF3	UPS power switch
	QF4	Commissioning socket switch
	QF5	HV box power switch
	QF6	24V power supply module switch
HV Box #	DC ON / OFF	DC Switch-disconnectors
	Power	HV Box power switch
	BMS	Power switch
	FAN	Fan switch

5.3 Power-On Procedure

Table 5- 2 Power-On Procedure

Step	Item	Remark
1	Configure the inverter according to the inverter manual to complete the initialization configuration.	/
2	Turn on the UPS.	Press and hold ON/MUTE until you hear the power-on sound and the display shows ON.
3	Close QF5 HV box power switch and QF6 power supply module switch	After closing QF6, verify that Power Mind main control switch is in the closed position.
4	Close HV box all switches	Wait for the battery to be powered on (Run indicator light is steadily on).
5	Power on the inverter according to the inverter manual.	/
6	Close QF1, QF2, QF3, QF4 breaker groups in sequence	The energy storage battery cabinet is powered on.
Note a: This table represents the startup process of the master device; Please refer to steps 2-6 for the power-up procedure of the slave		

BEWARE

When equipment installation and commissioning are completed, there is no need to switch off the power supply to the system; simply follow the power-off procedure. If the equipment needs to be powered off for maintenance, please refer to **5.4 Power-Off Procedure** in this section.

5.4 Power-Off Procedure

Table 5-3 Power-Off Procedure

Step	Item	Remark
1	Open QF1, QF2, QF3, QF4 breaker groups in sequence.	The energy storage battery cabinet is powered off.
2	Power off the inverter according to the inverter manual.	/
3	Open all switches of the HV box.	Wait for the battery to be powered off (Run indicator light goes off).
4	Open QF5 HV box power switch and QF6 power supply module switch.	After opening, verify that the Power Mind main control switch is in the open position.
5	Turn off the UPS.	Press and hold ON/MUTE until you hear the power-off sound and the display turns off.

6 System Commissioning

6.1 Prepare and Enter WHES OS

Operating Procedure
Step 1: Connect the computer to any LAN port of the switch labeled “NET1” using an Ethernet cable.
Step 2: Verify that the computer’s current IP address is 133.144.155.XXX.
Step 3: Open a web browser and enter 133.144.155.209:8080/lite to access the WHES OS interface.

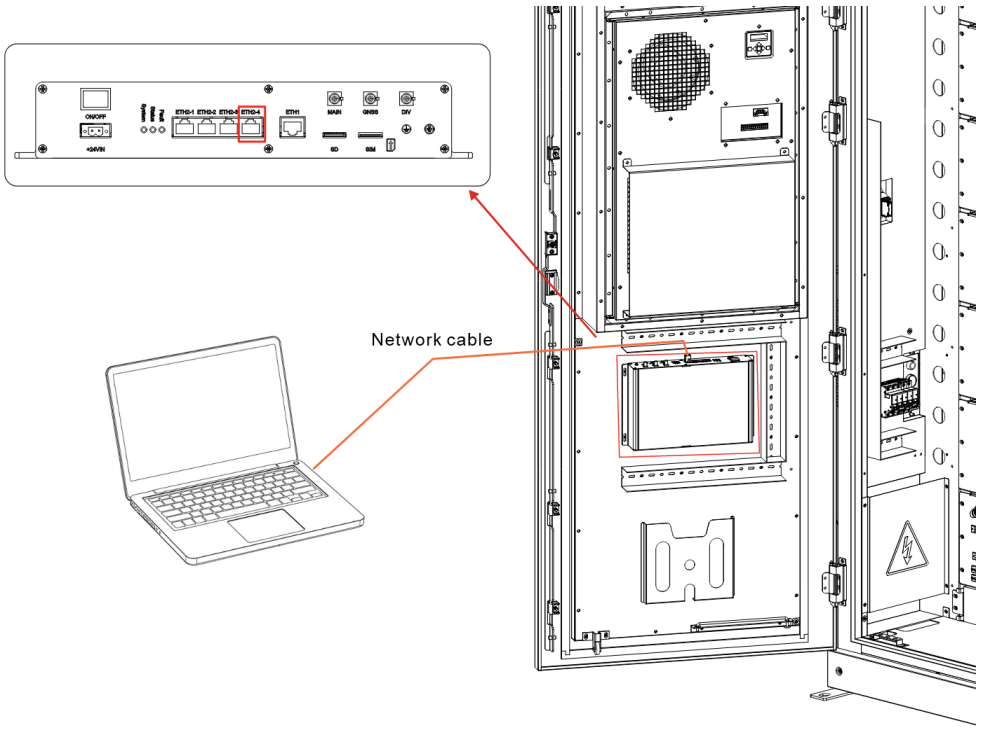


Figure 6-1 Diagram Wiring Diagram for Communication Cables

6.2 Introduction to the WHES OS Interface

6.2.1 WHES OS Home Page Overview

1. After entering the interface, language, time zone, display settings, and other parameters can be configured in the upper-right corner.
2. This page displays the energy flow of the energy storage cabinet, as well as the real-time operating status of the battery, grid, and load. Alarm information indicates system operating conditions, and the data is refreshed every 5 seconds.
3. The flow diagram shows the grid power and energy, the power, energy, and SOC of the energy storage cabinet, and the load power.
4. Operating Status of the Energy Storage Cabinet:

    ● Charging: Indicates that the system is currently charging.

    ●Discharging: Indicates that the system is currently discharging.

    ●Offline: Indicates that the system is not connected or is out of service.

    ●Standby: Indicates that the system is functioning normally, with no faults and no charging or discharging activity.

    ●Shutdown: Indicates that the system has stopped operating.

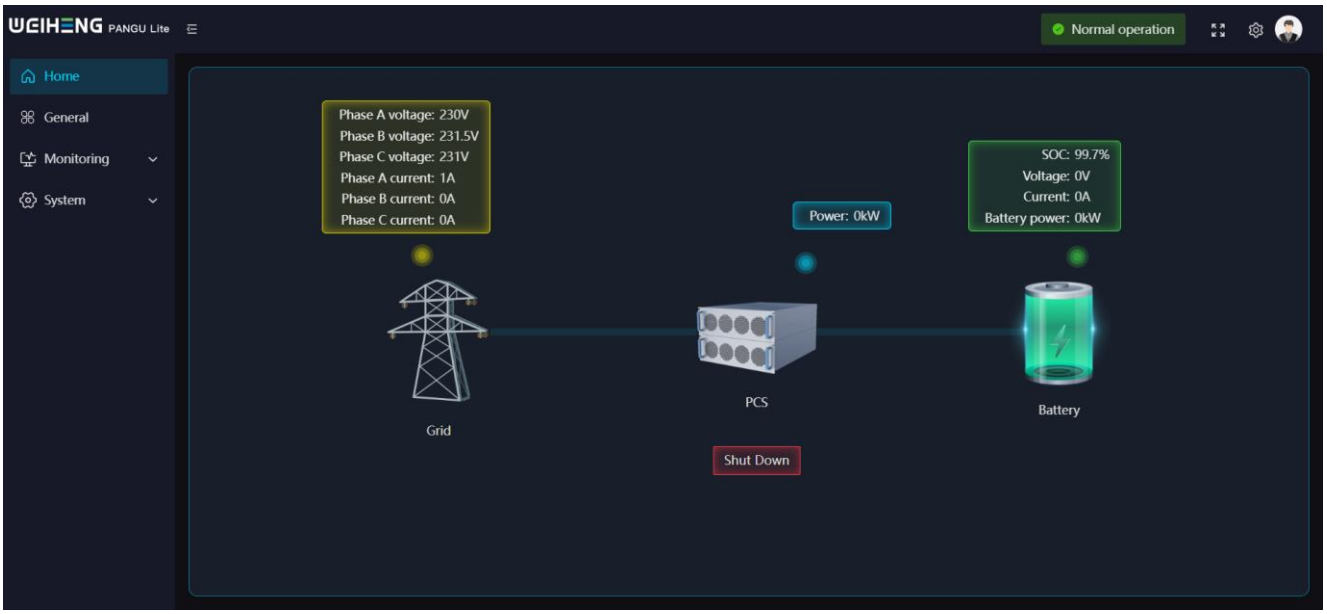


Figure 6-1 Home Page

6.2.2 Energy Storage System Overview

Displays the basic system information, including the rated power, rated capacity, maximum charge/discharge power, number of PCS units, number of battery clusters, total charge /discharge power, commissioning time, days of safe operation, currentavailable/usable charge and discharge capacity, SOH and SOC, total grid consumption and total grid feed-in energy, today's revenue, and the real-time charge/discharge power curve.

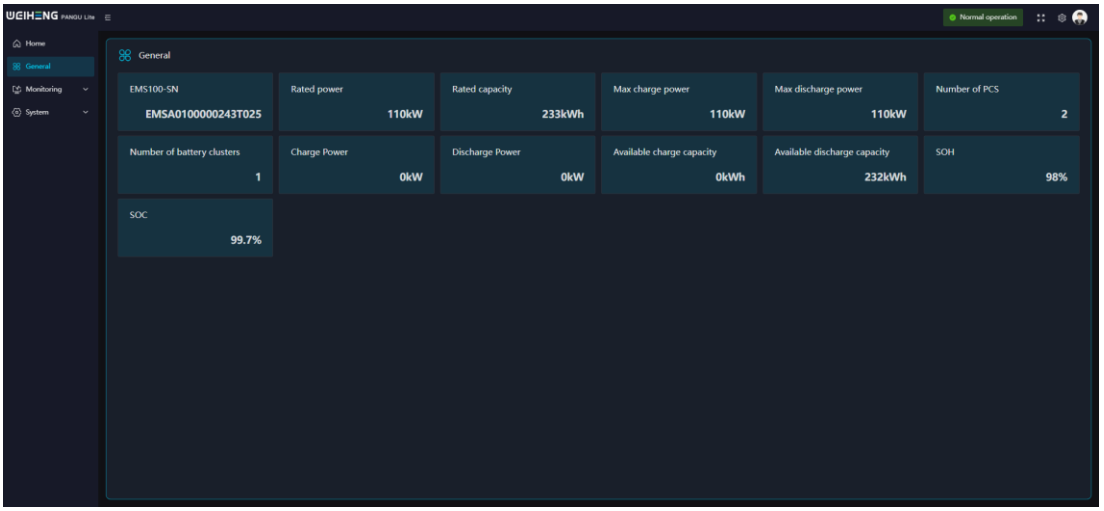


Figure 6-2 Energy Storage System Overview

6.2.3 Operational Monitoring

PCS Interface:
Real-time monitoring of DC current, DC voltage, and three-phase phase voltage data. Monitors all operating states of the PCS. Displays PCS operational data as well as simulation data.

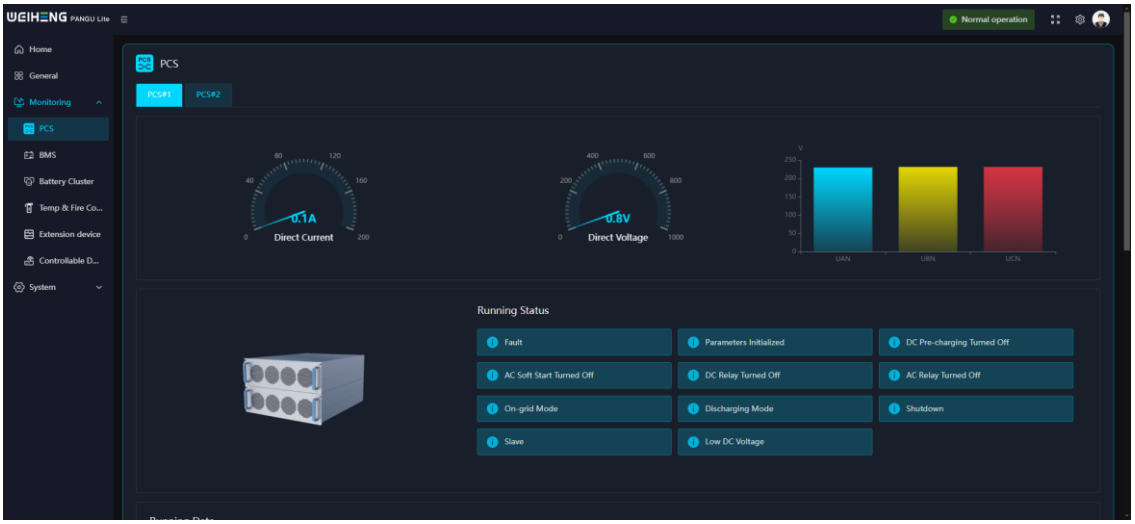


Figure 6-3 PCS Interface

BMS Interface:

This interface displays monitoring information for SOC and SOH, operating status, and detailed operational data of the battery BMS. It also provides real-time monitoring information for all battery clusters, including their current status and data.

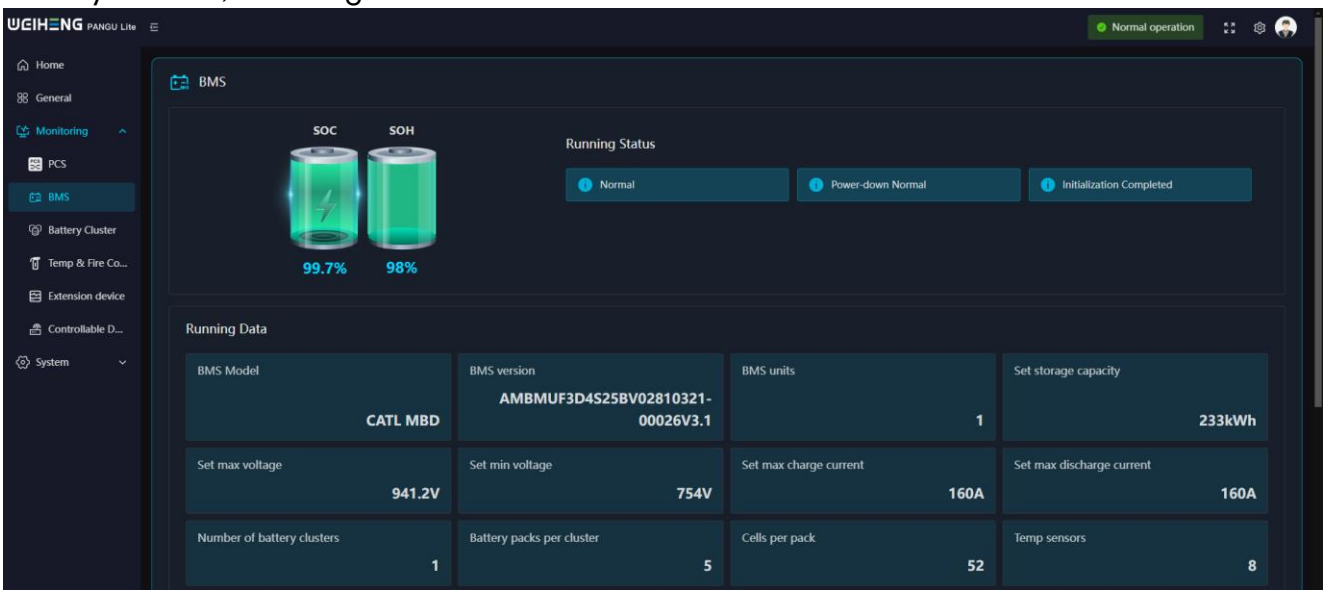


Figure 6-4 BMS Interface

Battery Cluster Interface:

This interface monitors the voltage and temperature of each individual battery within the battery pack, and tracks all operational data of the entire battery cluster.

Voltage(V)	BMU1	BMU2	BMU3	BMU4	BMU5
Cell1	3.363	3.36	3.367	3.36	3.38
Cell2	3.363	3.361	3.362	3.361	3.38
Cell3	3.36	3.367	3.361	3.359	3.379
Cell4	3.368	3.367	3.361	3.361	3.379
Cell5	3.364	3.363	3.361	3.361	3.381
Cell6	3.367	3.367	3.367	3.362	3.381
Cell7	3.367	3.363	3.362	3.36	3.38
Cell8	3.363	3.368	3.361	3.37	3.383
Cell9	3.365	3.362	3.361	3.36	3.38
Cell10	3.367	3.366	3.359	3.359	3.379
Cell11	3.362	3.359	3.367	3.366	3.374
Cell12	3.361	3.367	3.368	3.359	3.373
Cell13	3.361	3.367	3.367	3.361	3.379

Figure 6-5 Battery Cluster Interface

Temperature Control & Fire Protection Interface:
This interface monitors the supply and return water temperature, pressure, and operating status of the water-cooling system. It also monitors the operating status of the air-conditioning equipment and fire protection devices.

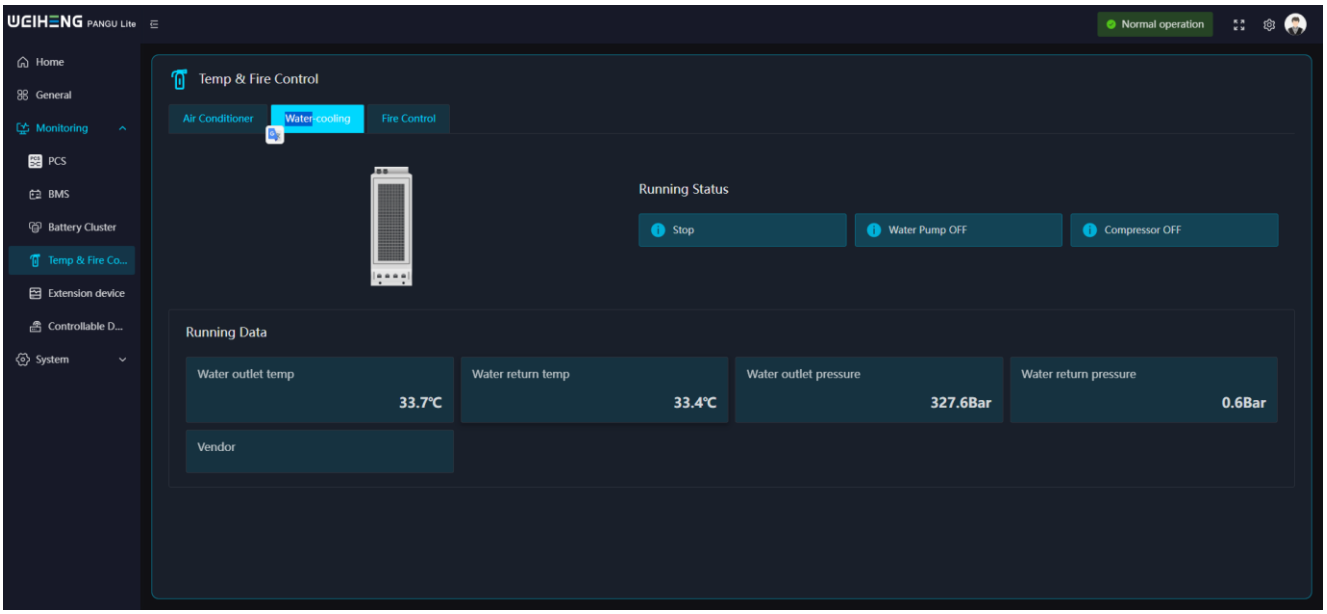


Figure 6-6 Temperature Control & Fire Protection Interface

6.2.4 System Configuration

System Status Interface:
This interface allows users to view the system's operating status and perform system control operations.

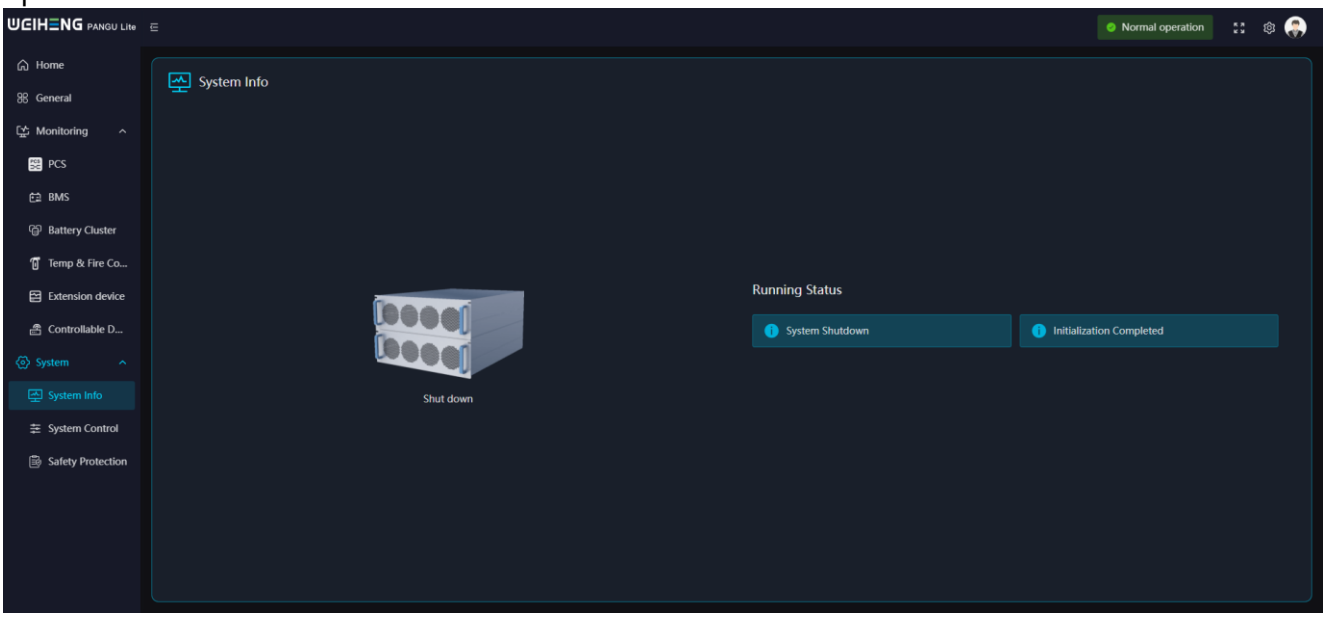


Figure 6-7 System Status Interface

System Control Interface:

This interface allows control of the energy storage system, including system on/off, system reset, grid switch, control mode, minimum discharge SOC, power factor, power control, and coordination control switches.

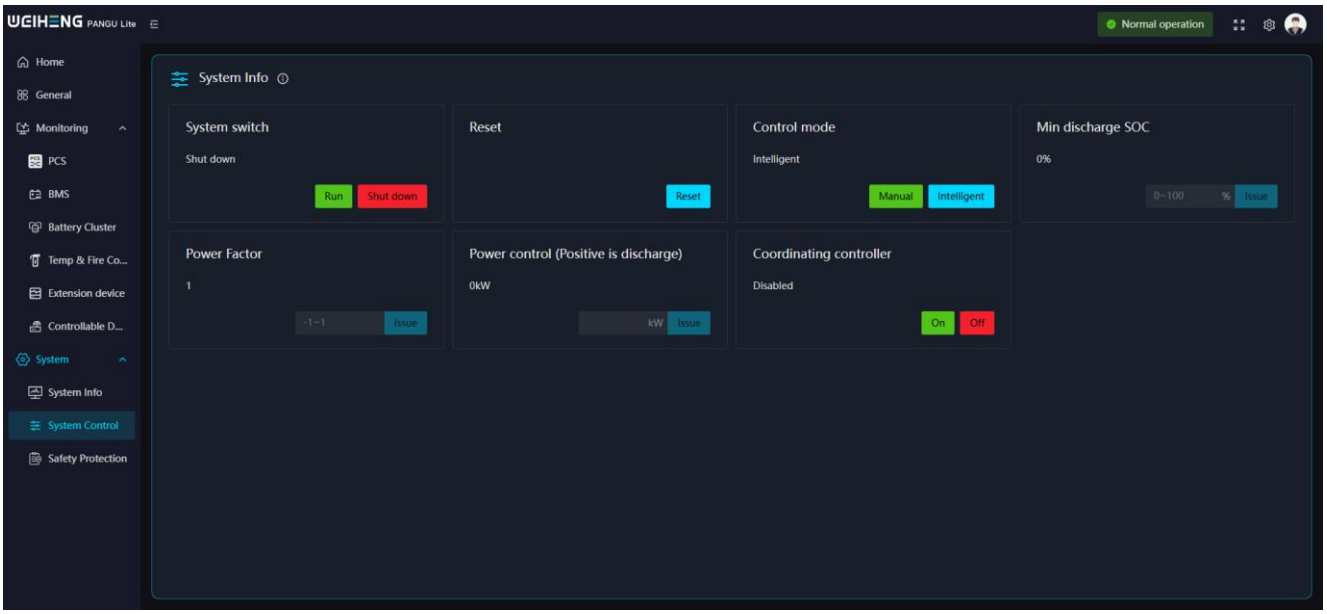


Figure 6-8 System Control Interface

6.3 Power-On with WHES OS

Operating Steps

Step 1: Access the System Control within the System Configuration interface, click the Power On button, and observe that the device status changes to Grid-Connected Operation.

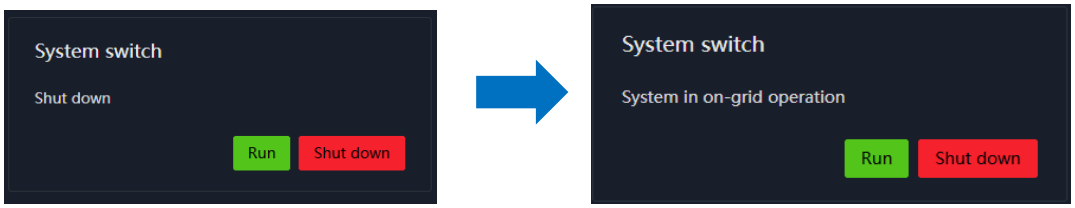


Figure 6-9 Power-On Step 1

Step 2: Check the Home Page to verify that the PCS operating status has changed to Standby.

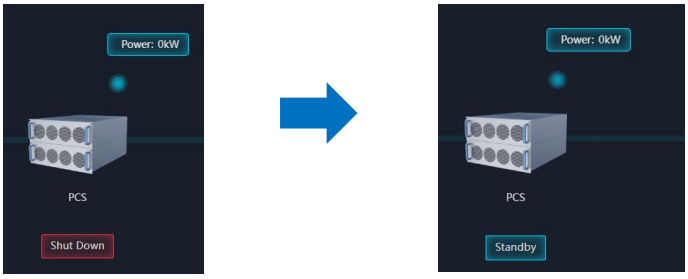


Figure 6-10 Power-On Step 2

Step 3: Navigate to the Power Station Control Strategy interface, create a new strategy, configure the charge/discharge power, schedule, and SOC, then click the Apply button.

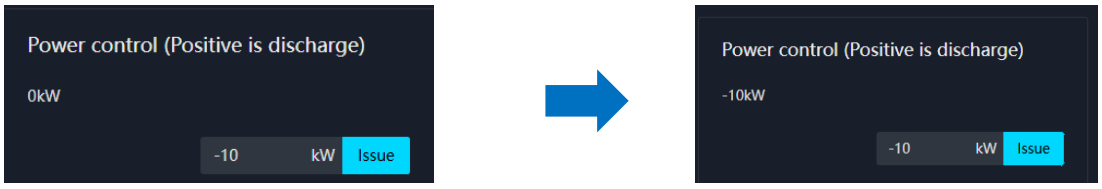


Figure 6-11 Power-On Step 3

Step 4: Check the Home Page to verify that the PCS operating status has changed to Charging, and observe the system's real-time operating power.

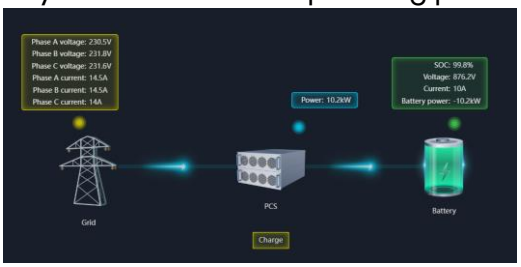


Figure 6-12 Power-On Step 4

6.4 Power-Off with WHES OS

Operation Procedures

Step 1: Navigate to "System Configuration > System Control", enter 0 kW in the "Power Control" module, and click the "Apply" button.

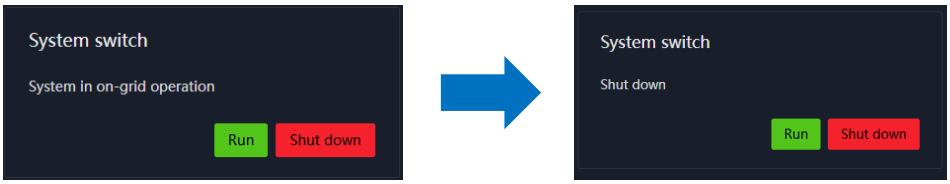


Figure 6-13 Power-Off Step 1

Step 2: Check the "Home" screen to verify that the PCS is in standby mode.

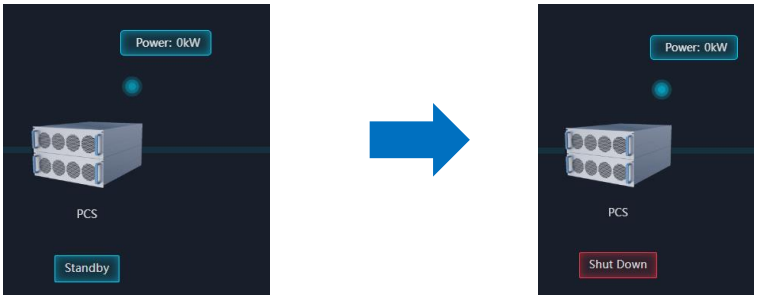


Figure 6-14 Power-Off Step 2

Step 3: Navigate to "System Configuration > System Control", click the "Stop" button, and verify that the equipment status has been switched to inactive mode.

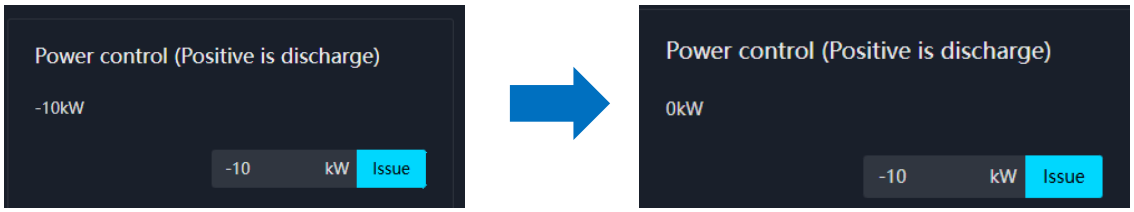


Figure 6-15 Power-Off Step 3

Step 4: Check the "Home" screen to verify that the PCS is in inactive mode, indicating that the equipment has been shut down

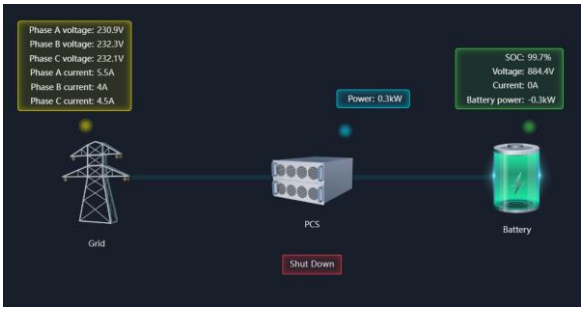


Figure 6-16 Power-Off Step 4

7 Fire Protection System

7.1 Fire Protection System Components

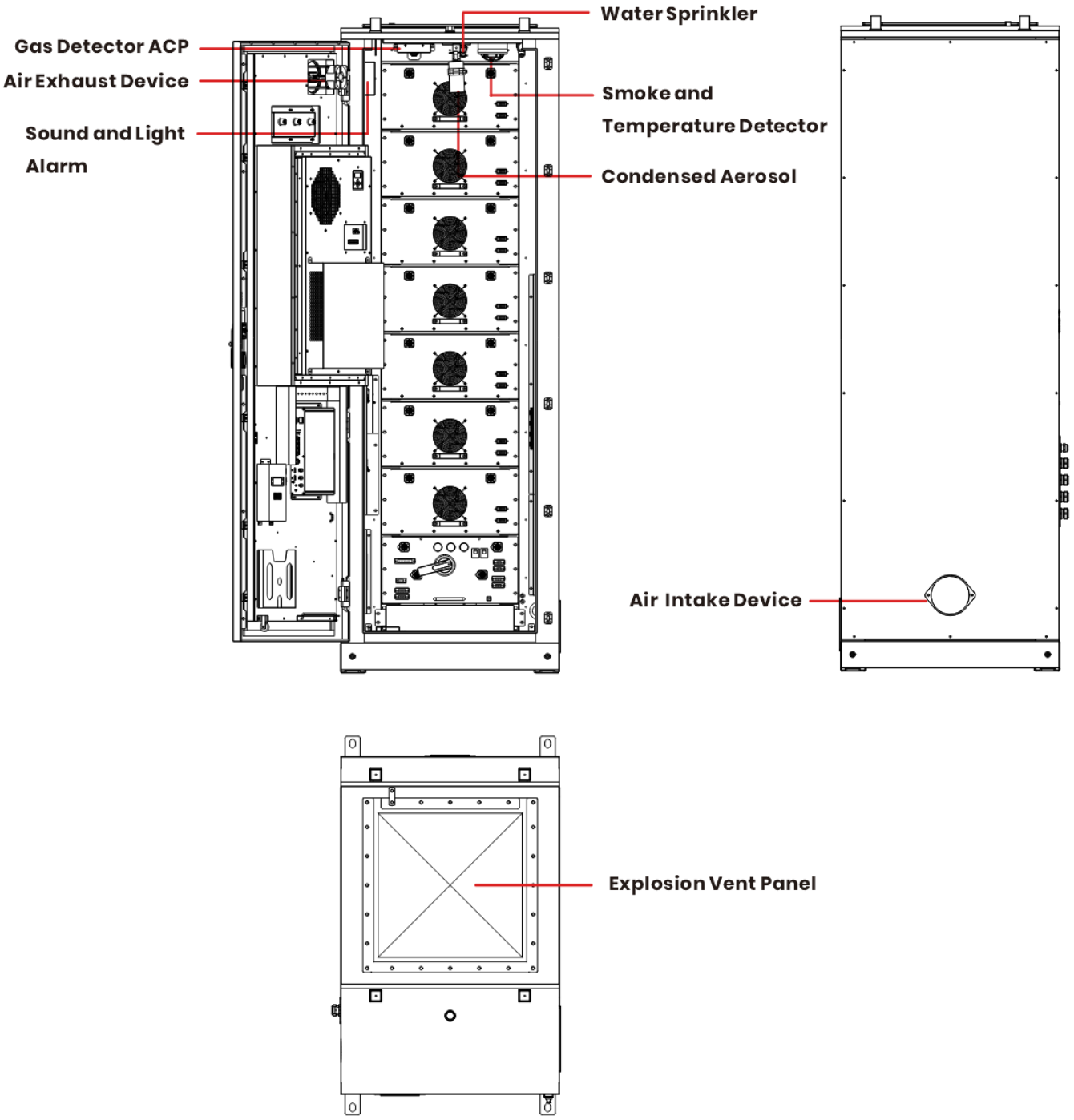


Figure 7-1 Fire Protection System - Front View

7.1.1 Smoke and Temperature Detector

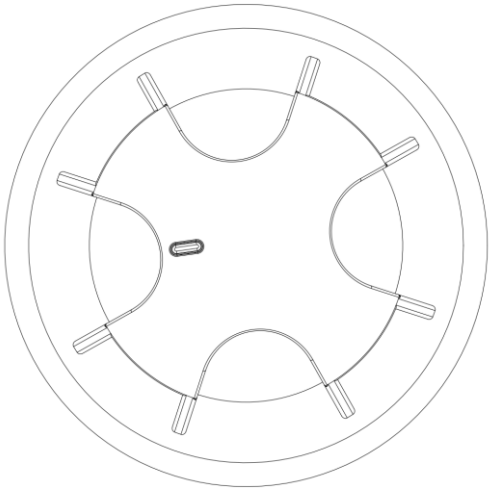


Figure 2-16 Smoke Detector

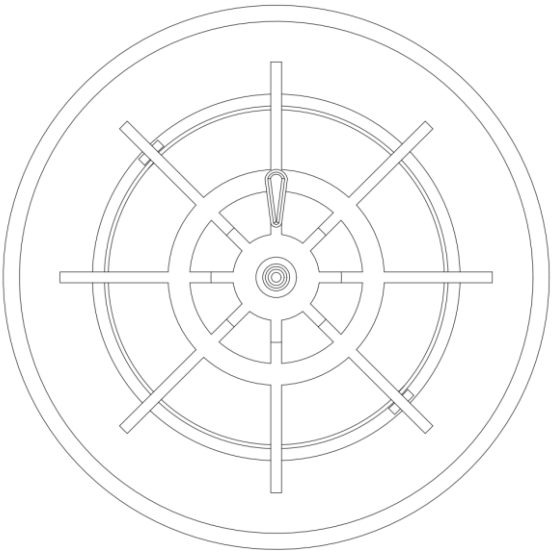


Figure 2-17 Temperature Detector

Component Description: The smoke and temperature detectors in the energy storage cabinet are designed to monitor environmental smoke and temperature changes in real time and identify abnormal conditions based on dual signals. It supports remote alarm signal output and integration with the fire protection system, ensuring the safe operation of the battery module within the cabinet and enhancing the overall protection and reliability of the ESS.

Table 2-8 Technical Parameters

No.	Model/Spec	Value
1	Operation Voltage	24V DC (16V ~ 28V)
2	Standby Current	≤60μA
3	Alarm Current	10mA ~ 30mA
4	Indicator Light Status	The red light flashes during normal operation and remains steady when an alarm is triggered.
5	Explosion Protection Mark	Exib II CT6 Gb
6	Explosion-proof Certification No.	CE12.2146 (temperature detector) / CE11.2130 (smoke detector)
7	Safety Parameters	U_0=28V, I_0=93mA (temperature detector: C_0=0.083μF, L_0=4mH)
8	Alarm Reset Method	Instantaneous power cutoff (min. 5 s, voltage ≤ 2.5 V DC)
9	Operating Temperature Range	Temperature detector: -10°C ~ +50°C (A1R), -10°C ~ +65°C (BS) Smoke detector: -10°C ~ +55°C
10	Relative Humidity	≤95% (non-condensing)
11	Casing Material	ABS flame-retardant material
12	Protection Rating	IP33 (temperature detector) / IP23 (smoke detector)
13	Dimensions (Diameter × Height)	Temperature detector: Φ100mm×53.3mm (including base) Smoke detector: Φ100mm×54.5mm (including base)
14	Mounting Hole Spacing	45mm ~ 75mm
15	Weight	Temperature detector: ~130g Smoke detector: ~110g

7.1.2 Sound Light Alarm

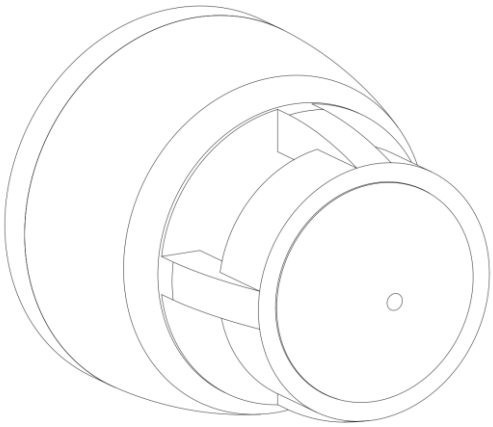


Figure 2-18 sound light alarm - Appearance

Component Description: This audible and visual alarm can provide audible and visual alerts when triggered. It can be used with a bus-type fire alarm controller via the output module. When the fire alarm controller issues a start command, the output module activates the audible and visual alarm accordingly. Then, the audible and visual alarms emit intense visual alerts and piercing audible signals to notify on-site personnel of the fire occurrence and the necessity to implement evacuation measures, thereby preventing the fire incident from escalating.

Table 2-11 Technical Parameters

Device model	AW-D316
Operation Voltage	Power supply: 24 V DC (20 V ~ 28 V)
Operating Current	≤100 mA
EN54 - 23 Coverage	C - 3 - 8/W - 2.4 - 6 (see the figure below for volume coverage)
Flash Color and Frequency	White, 0.5 Hz
Light Output	According to EN54 - 23
Protection Rating	IP21C
Working Temperature	-10℃～ +55℃
Relative Humidity	≤ 95% (non-condensing)
Lens/Housing Material	Flame-retardant polycarbonate/acrylonitrile-butadiene-styrene (ABS) copolymer
Measurement	Diameter 100 mm × height 100.5 mm (including base)
Mounting Hole Spacing	45 mm ~ 70 mm
Weight	Approx. 266 g (including base)

7.1.3 Aerosol

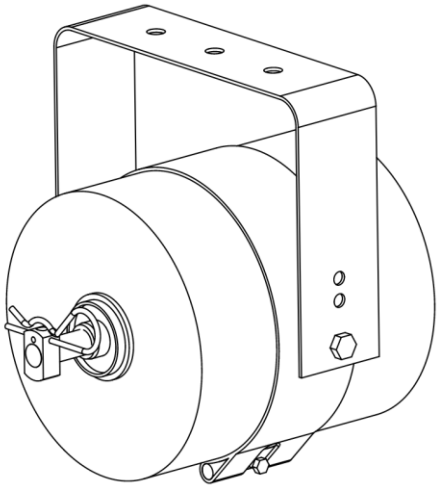


Figure 2-19 Aerosol Appearance

Component Description: The DSPA aerosol generator is a high-efficiency fixed fire extinguishing component, featuring a **non-pressure design** that allows for direct installation in the confined space to be protected. After activation, the device releases a fully flooded aerosol cloud that quickly spreads to cover the entire protected area, and effectively extinguishes Class A (solid), Class B (liquid), and Class C (gas) fires through the dual effects of chemical suppression and suffocation.

Table 2-12 Technical Parameters

Model/Spec	Value
Model	60T (long)
Aerosol Mass	60 grams
Weight	0.49 kgs. /1.1 lbs.
Length	155 mm/ 6.10 inches
Diameter	51 mm/ 2.00 inches
Discharge Time	8.5 Seconds

NOTE

The following fire protection parts are optional accessories, and can be provided upon request. These accessories will not affect the normal operation of the fire protection system.

7.1.4 Explosion Vent Panel (Optional)

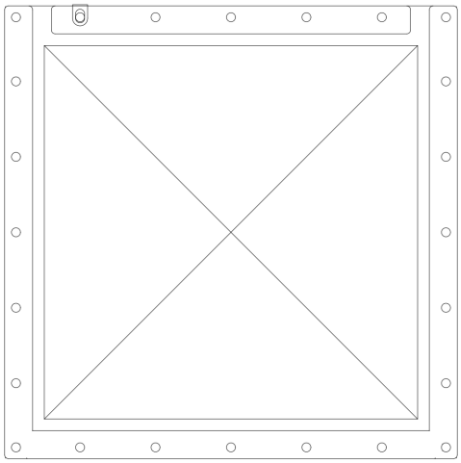


Figure 2-20 Explosion Vent Panel

Component Description: The explosion vent panel plate is an important safety component of the energy storage cabinet. It is designed to release high-pressure gas and smoke in a controlled manner, preventing the cabinet from exploding in the event of a sudden rise in internal pressure due to battery abnormalities such as thermal runaway or short circuit. The explosion vent panel is installed on the top of the enclosure and is linked with the smoke and temperature detection and fire extinguishing system, creating a multi-layer protection strategy as the last line of defense. It is also used to minimize secondary hazards through directional pressure venting channels, ensuring the safety of both equipment and personnel.

Table 2-10 Technical Parameters

Model/Spec	Value
ATEX Certification	ATEX II GD - INERIS15ATEX0001X_ Type VL
Protection Level (IP Degree of Protection)	IP65 (compliant with IEC 60529)
Static Pressure (Pstatl)	<500 mbar
Standard Static Pressure (Pstatl standard)	100 mbar +/-15% @22°C
Pressure Change Rate (Kgr)	dp/dt <130 bar/s
Maximum Pressure (Pmax)	<12 bar
Maximum Rated Pressure (Pred, max)	<1.8 bar
Material (In - ox 304L)	Stainless Steel 1.4307
Material (In - ox 316L)	Stainless Steel 1.4404
Gasket (Joint / gasket)	SILICONE UL50E - UL157
Temperature Range (Temperature)	-55...+200 °C

7.1.5 Gas Detector ACP (Optional)

Figure 2-21 Gas Detector Module

Component Description: This module offers a compatible interface for the Li-ion Tamer (LT-SEN-IM), enabling customers to use it independently without the need for an additional controller for Li-ion Tamer detectors. It is suitable for compact energy storage application scenarios, including outdoor energy storage cabinets and independent lithium-ion battery racks. This module facilitates system integration for manufacturers before leaving the factory, eliminating the need for on-site interconnection between cabinets.

Table 2-10 Technical Parameters

Model/Spec	Value
Operating Temperature Range	-20°C ~ 70°C
Humidity Range (Non-condensing)	5% ~ 95% RH
Dimensions (H×W×T)	140mm×85mm×32.8mm
Transportation Weight	365g
Input Voltage Range	15V ~ 32V DC
Input Current	5mA ~ 13mA
Max Power	0.5W
Relay Load Capacity	30V DC/125V AC, 2A DC/0.5A AC
RJ45 Output	5V DC, 53mA

7.1.6 Gas Detector (Optional)

Figure 2-22 Gas Interface Module

Component Description: The combustible gas detector monitors real-time concentrations of combustible gases (such as methane, propane, and hydrogen) in the environment. When levels reach a preset danger threshold, it immediately activates an audible and visual alarm, cuts off the power supply, or initiates the fire extinguishing system to prevent gas accumulation and mitigate the risk of explosions or fires.

Table 2-10 Technical Parameters

Model/Spec	Value
Temperature (Operating)	-10 to +60°C
Temperature (Storage)	-10 to +70°C
Humidity	5 to 95% relative humidity
Maximum Temperature Change	8.6°C per minute
Sensor	Ø 28.6 x 25.4 mm
Monitor Cable	165 mm *
Connector Type	Female RJ45
Wire Type	Brown (Power +)
Wire Type	Green/White (Ground)
Wire Type	Brown/White (Signal +)
Product Safety	UL/IEC 61010
EMC	EN 60326 - 1 compliant with EU Directive (2014/30/EU)
RoHS	RoHS 3 EU 2015/863

7.1.7 Intake and Exhaust Device (Optional)

NOTE

If the intake and exhaust fan is not selected for installation, the original installation position of the intake and exhaust fan will be default equipped with a spring explosion-proof valve. The specific parameters shall be subject to the physical product.

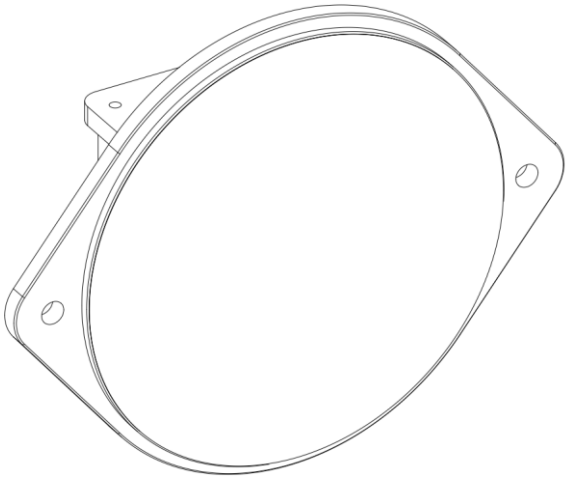


Figure 2-23 Air intake device

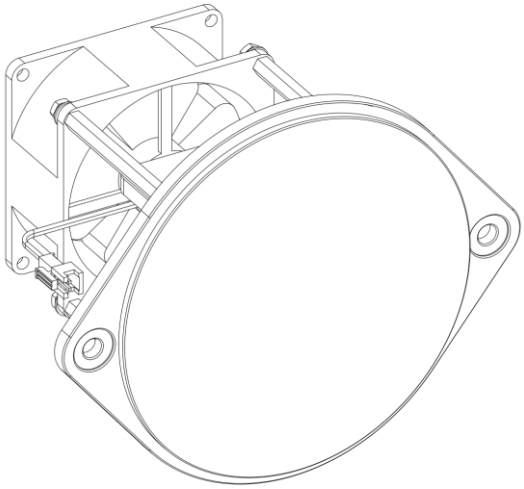


Figure 2-24 Air exhaust device

Component Description: Once abnormal pressure or smoke is detected by the internal sensors, a 24V forward-phase voltage signal is triggered to activate the electric actuator. The actuator then extends and drives the valve to open in a specific direction, allowing for the quick discharge of high-pressure gases and smoke, thus preventing explosion risks. Upon completing pressure relief, a 24V reverse-phase voltage is automatically applied to retract the electric actuator, which then precisely closes the valve and restores the system to an airtight state. This

establishes a closed-loop safety mechanism that highlights the core advantages of rapid response and reusability.

,

Table 2-14 Technical Parameters

No.	Parameter Category	Key parameters	Specifications/Indicators
1	Basic Protection	Waterproof Level	IP66
		Operating Temperature Range	-20℃ ~ +80℃
		Anti-corrosion Grade	Exterior C4H (720h salt spray) / Interior C3H (72h salt spray)
		Environmental Standard	ROHS 2.0
		Design Life	10 years
2	Explosion-Proof Valve Performance	Exhaust Area (Opened)	>5836 mm²
		Electric Actuator Drive Voltage	DC 24V (minimum startup voltage: 18V)
		Electric Actuator Power/Current	<2W / 0.05A ±15% (inrush <0.3A)
		Stroke Speed & Distance	4mm/s, 30mm stroke
		Wiring Mode	Red positive, black negative; automatic power-off protection (burnout risk if >100s)
		Wiring Specification	UL1007 #24 AWG, wire length 290mm, female terminal
3	Cooling Fan	Fan Power/Current	48W / 2.0A ±15% (inrush <2A)
		Voltage/Speed	DC24V / 13650 RPM
		Airflow Range	121.2~134.7 CFM
		Measurement	80×80×38mm
		Wiring Specification	UL1007 #24 AWG, wire length 300mm, male terminal

7.2 Fire Protection System Control Logic

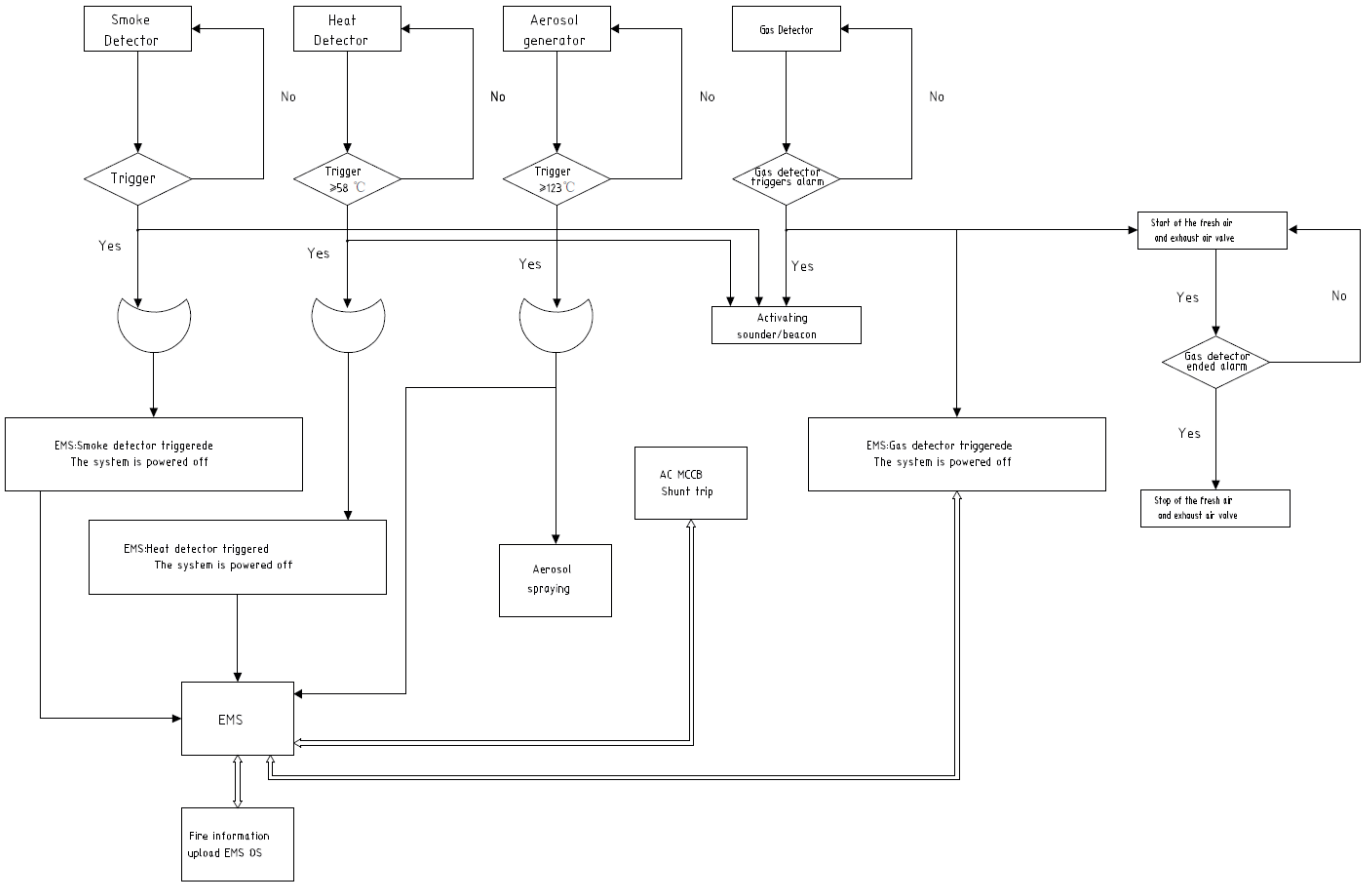


Figure 7-2 Fire protection logic diagram

BEWARE

Figure 7-2 is the fire protection logic diagram for the fully equipped version. For other versions, please contact our company's after-sales service personnel for obtaining the diagram.

7.3 Water-Based Fire Protection System

Single cabinet installation

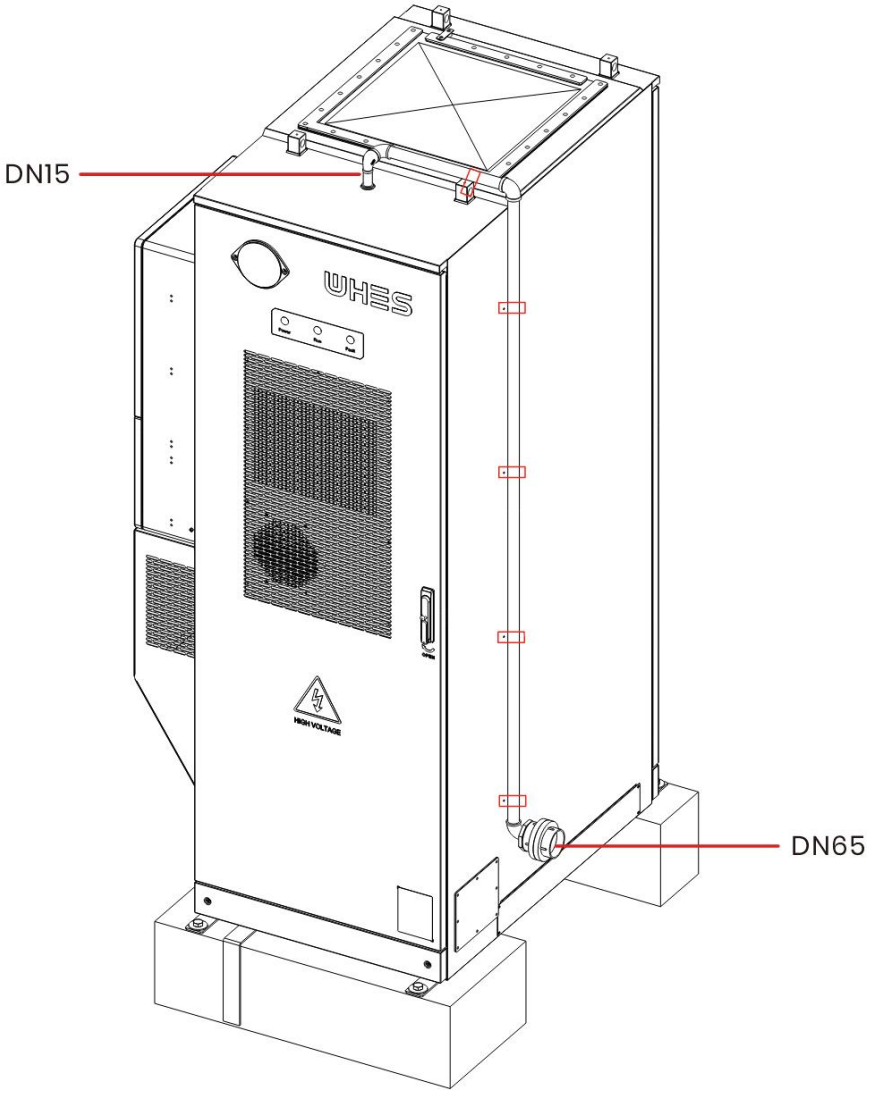


Figure 7-2 Single cabinet installation

Multiply cabinet installation

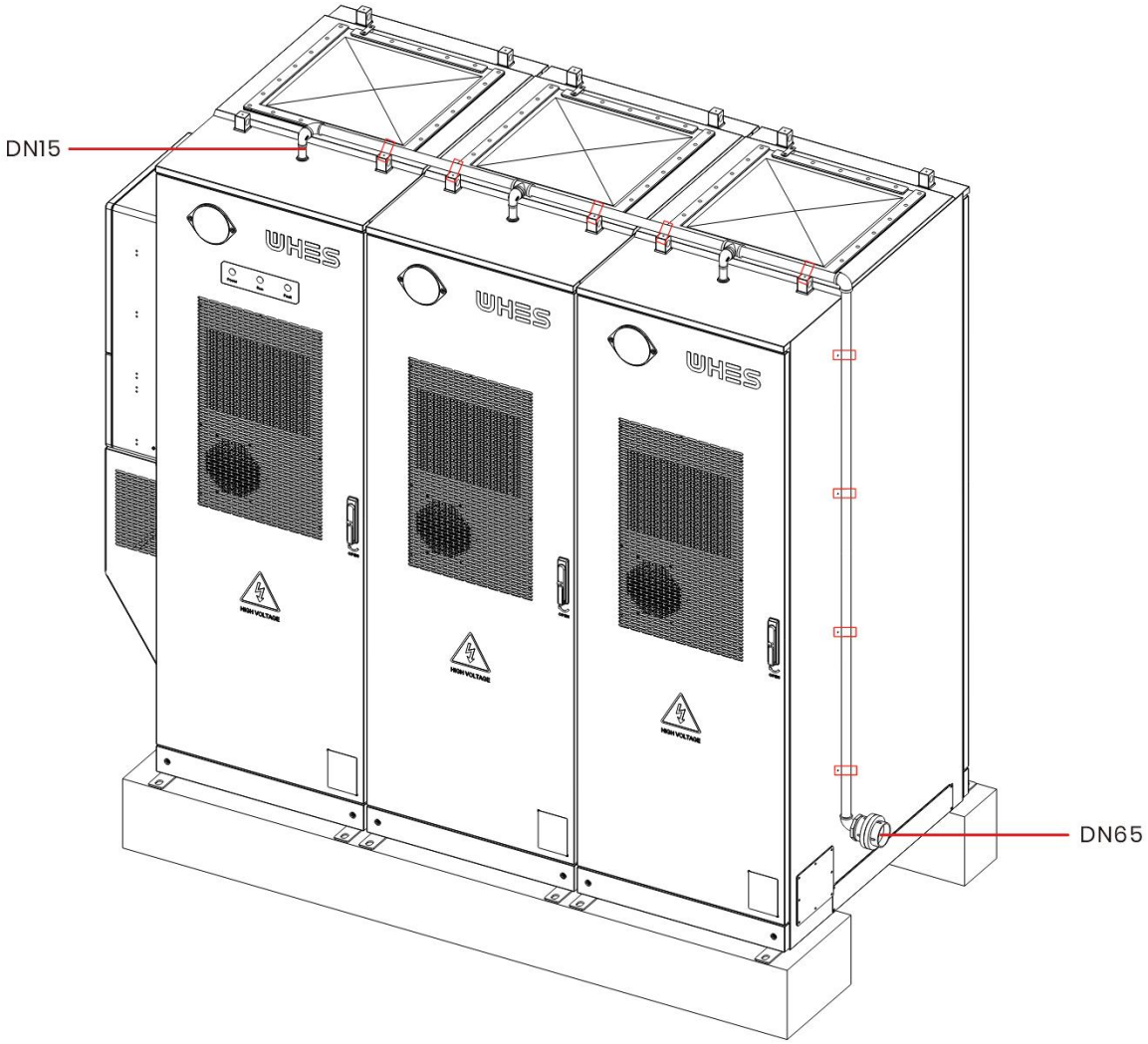


Figure 7-3 Multiply cabinet installation

8 Product Maintenance

8.1 Precautions Before Maintenance

Regular maintenance is required for the energy storage system. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.

⚠WARNING

- Do not perform maintenance on the energy storage system during heavy rain, strong winds, or other adverse weather conditions. The company shall not be held liable for any damage resulting from failure to comply with this warning.
- To avoid electric shock, do not perform any maintenance or repair operations beyond the scope of this user manual.
- Only qualified person can perform the maintenance for the energy storage system.

8.2 Maintenance Item

NOTE

- The maintenance interval of the product may be affected by on-site environmental conditions. If the operating environment contains heavy dust or frequent exposure to sand and dust, it is necessary to shorten the maintenance interval and correspondingly increase the maintenance frequency.

Table 8- 1 Maintenance Item

Maintenance Interval	Maintenance Item	Inspection Method
First Grid Connection	**Electrical connection**	Verify that the material and specifications of the input and output cables meet the required standards.
		Check whether the material, specifications, and installation orientation of the wiring terminals meet the required specifications.
		Inspect the cable connections for any loose contacts or short-circuit conditions.
		Verify that the cable phase sequence is correct.
		Check whether the cable insulation meets the requirements; an insulation resistance test must be performed.
		Verify that the equipment grounding resistance meets the specified requirements.
Once Every Six Months	**ESS status**	Check the cabinet for signs of oxidation, rust, or corrosion.
		Inspect the cabinet and internal equipment for any damage or deformation.
		Check the top and surrounding area of the cabinet for any flammable materials.
		Check whether the cabinet's welds to the foundation steel plate are secure and free from rust.
		Check whether the cabinet door locks and latches can open and close smoothly.
		Check whether the sealing strips and gaskets are securely installed.
		Inspect the inside of the cabinet for foreign objects, fallen screws, dust, dirt, or condensation.

		Check whether any internal equipment produces abnormal noise during operation.
		Check whether the internal temperature of the cabinet is excessively high.
		Check whether the internal humidity of the cabinet is within the normal range.
	Cables	Check whether the cables are damaged.
	Air inlet and outlet	Check the cabinet's air inlet and outlet for foreign objects and ensure they are not blocked.
	Safety Functions	Check the functionality of the emergency stop button.
		Check whether the warning labels on the equipment and other device markings are clear and undamaged. If any labels are faded or damaged, replace them promptly.
	Internal Component Inspection	Check whether the fans are operating normally and whether there is any abnormal noise.
		Check the temperature and dust accumulation on the heat sinks. If necessary, clean the heat sink and related modules using a vacuum cleaner.
		Replace the air filter if necessary.
	Component Maintenance	Perform a routine inspection for corrosion on all metal components.
		Perform an annual inspection of the contactors (including auxiliary and micro switches) to ensure proper mechanical operation.
		Check the operating parameters, with particular attention to voltage and insulation.
Once a Year	**Grounding of the cable shielding layer**	Check that the cable shielding and insulation sleeves have proper contact, and ensure that the grounding copper busbar is securely fastened.
	SPD and fuse	Check whether the surge protection devices and fuses are in good condition.
	Wiring and cable arrangement	Check whether the cable routing is proper and whether there is any insulation damage. Any abnormalities must be corrected immediately.
		Check that all cable entry and exit holes in the cabinet are properly sealed.
		Check whether the power cable connections are loose, and re-tighten them according to the previously specified torque.

		Inspect the power and control cables for any damage, paying particular attention to the outer sheath in areas contacting metal surfaces for signs of cuts or abrasions.
		Check whether the insulation tape on the power cable terminals is intact and not peeling off.
	Grounding Inspection	Check the grounding resistance; the value must not exceed 4 Ω.

A Crimping OT/DT Terminals

OT/DT Terminal Requirements

- For copper core cables, please use copper terminals.
- For copper-clad aluminum cables, copper terminals are required.
- For aluminum alloy cables, use copper-aluminum transition terminals, or aluminum terminals with copper-aluminum transition pads.

BEWARE

- It is strictly forbidden to connect aluminum terminals directly to terminal blocks, as this may cause electrochemical corrosion and affect the reliable cable connection.
- When using copper-aluminum transition terminals, or aluminum terminals with copper-aluminum transition pads, ensure compliance with IEC61238-1.
- When using copper-aluminum transition pads, ensure proper orientation so that the aluminum side of the pad contacts the aluminum terminal, and the copper side contacts the terminal block.

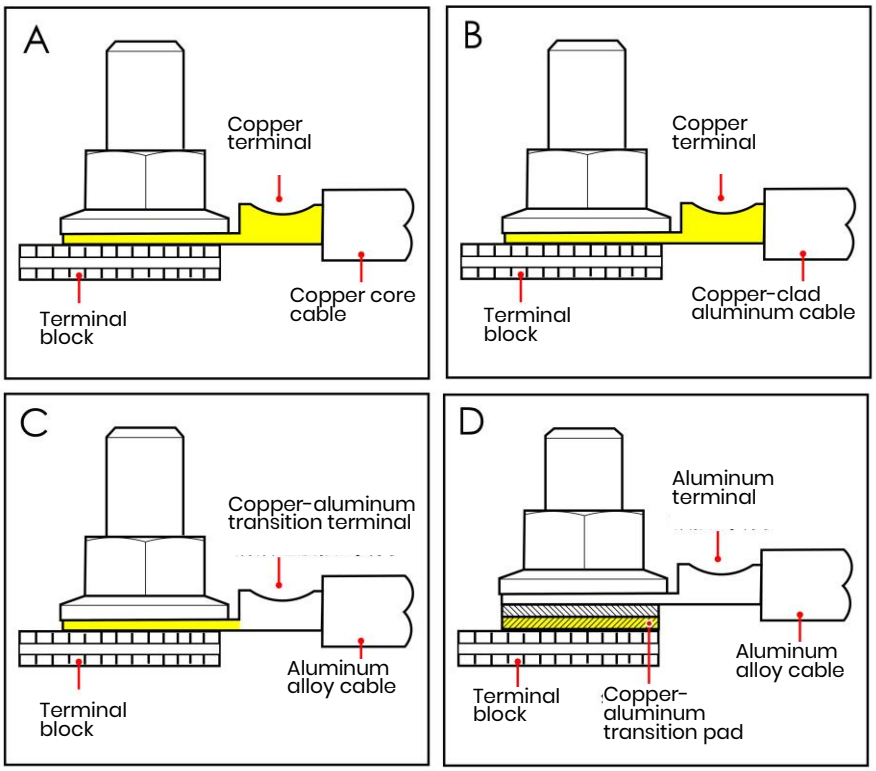


Figure A-1 OT/DT Terminal Requirements

Crimping OT/DT Terminals

BEWARE

- Do not scratch the conductor when stripping the cable.
- The cavity formed by the conductor crimping tab of the OT/DT terminal after crimping shall completely enclose the conductor, and the conductor shall be tightly connected to the OT/DT terminal without any looseness.
- The crimped area can be covered with heat shrink tubing or insulating tape. Below is an example of using heat shrink tubing.
- When using a heat gun, pay attention to safety precautions to prevent damage to the equipment.

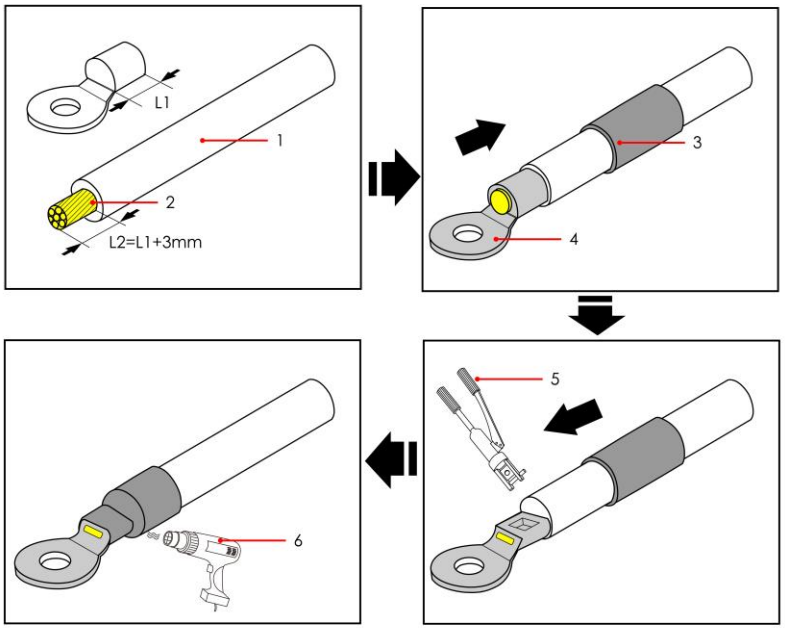


Figure A-2 Crimping OT Terminal

(1) Cable (2) Conductor (3) Heat shrink tubing
(4) OT terminal (5) Hydraulic crimping pliers (6) Heat gun

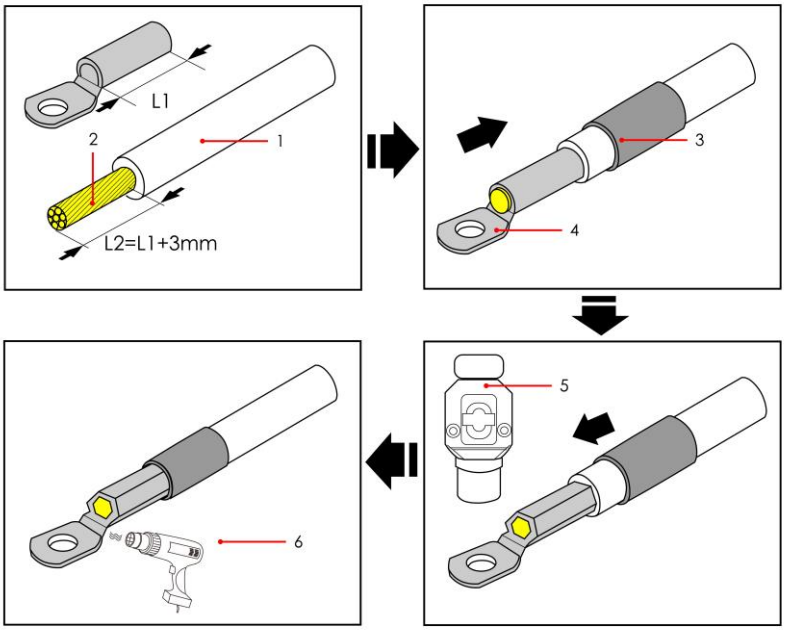


Figure A-3 Crimping DT Terminal

(1) Cable (2) Conductor (3) Heat shrink
(4) DT terminal (5) Hydraulic crimping pliers (6) Heat gun

B How to Recycle Used Batteries

BEWARE

- WHES does not provide battery recycling services. Customers are responsible for contacting local recyclers for disposal.
- If no local service is available, customers are advised to contact the nearest national recycler for disposal.

Step 1 Contact the nearest recycler.

Step 2 The recycler evaluates the recycling cost.

Step 3 The recycler recycles batteries using one of the following two methods:

- On-site recycling: The recycler collects lithium batteries from the customer site, at a price determined based on the actual travel distance/transportation cost and other factors.
- Centralized recycling: The customer brings all lithium batteries to be recycled to a designated location for centralized collection by the recycler.

NOTE

Transportation cost arising from the on-site recycling service is to be borne by the customer.

Step 4 The recycler is fully responsible for the disposal of the recycled batteries. The recycler takes full responsibility for disposing of the recycled lithium batteries, with no further involvement from the customer.

C Technical Data

Model	DC-57kWh-EC00	DC-71kWh-EC00	DC-86kWh-EC00	DC-100kWh-EC00 DC-100kWh-EC10
Battery Data				
Battery Type	LFP , 3.2 V / 280 Ah			
Battery PACK Configuration	1P*16S, 14.33 kWh			
Battery Capacity	57.34 kWh (14.33kWh * 4)	71.68 kWh (14.33kWh * 5)	86.02 kWh (14.33kWh * 6)	100 kWh (14.33kWh * 7)
Rated Battery Voltage / Voltage Range	204.8 V / 179.2…227.2 V	256 V / 224…284 V	307.2 V / 268.8…340.8 V	358.4 V / 313.6…397.6 V
Max. Charging/Discharging Current	150/150 A			
Max. Charging/Discharging Power	30.7 kW / 30.7 kW	38.4 kW / 38.4 kW	46 kW / 46 kW	53.7 kW / 53.7 kW
Rated Charging/Discharging Power	28.6 kW / 28.6 kW	35.8 kW / 35.8 kW	43 kW / 43 kW	50.1 kW / 50.1 kW
General Data				
Dimensions (W*D*H)	750*1150*2250 mm			
Weight	~0.83 t	~0.93 t	~1.03 t	~1.13 t
Operating Temperature Range	-20°C…+55°C			
Altitude	⩽2000 m			
Cooling	Smart Air Cooling			
Ingress Protection	IP 55			
Corrosion	C5			
Display	LED / APP			
Firefighting	Smoke detector, Heat detector, Alarm sounder, Aersol, Sprinkler Optional: Flammable gas detector, Vent plate			
Communication	RS485 / CAN			
Installation	Floor-standing			
Standard	IEC61000, IEC62040, IEC63056, IEC62477, UN38.3			

D Troubleshooting

According to Section 6.1, you can enter the PANGU interface. In the upper right corner of the interface  , you can view the fault alarm information.

Please troubleshoot according to the following methods. If the troubleshooting methods do not help you, please contact the after-sales service center. When contacting the after-sales service center, please collect the following information to facilitate quick problem-solving.
1.Software version, equipment installation time, time of failure occurrence, frequency of failure occurrence, etc.
2. Equipment installation environment, such as weather conditions, etc., system information, such as serial number, installation environment. It is recommended to provide photos, videos and other files to assist in problem analysis.
3. Grid conditions.
(Here, a table of common faults, their causes and solutions needs to be provided)

No.	Fault Description	Fault level	Solution
1	**Backup circuit breaker overload alarm**	**Instruction**	Please reduce backup load to prevent potential disconnection.
2	**Relay self-check failure**	**Emergency**	1. Restart the inverter after a complete power-off. 2. If the issue still persists, please contact customer service for further assistance.
3	**Busbar hardware overvoltage**	**Emergency**	This fault can be automatically restored. If the fault persists after waiting for 5 minutes, please follow these steps: 1.Turn off the DC input switchs and check whether the PV or battery input voltage exceeds the maximum input voltage of the inverter. 2. Restart the inverter after confirming that the previous step is normal. 3. If the issue still persists, please contact customer service for further assistance. Please note that, due to version updates, this fault was previously known as "OV-Vbatt-H" in certain earlier models.

4	**DC input overvoltage**	**Emergency**	1. Check if the PV string configuration is too high, causing the open-circuit voltage of the PV array to exceed the inverter's maximum input voltage. If so, reduce the length of strings to ensure the open-circuit voltage is within the inverter's specification range. 2. If the issue still persists, please contact customer service for further assistance.
5	**AC hardware overcurrent (ABC phases)**	**Emergency**	1. Check that the AC connection is correct. 2. Restart the inverter 3. If the fault is not eliminated after completing the above steps, please contact customer service.
6	**PV insulation failure**	**Emergency**	1、Remove all PV strings and connect them to the inverter one by one. With the help of the inverter alarm function, if the inverter does not continue to report errors after starting up, it means that the insulation of the string is good. If the inverter reports an error, it means that the newly connected string has bad insulation which does not meet the requirements. 2、Turn off the inverter, remove the PV strings, and use the multimeter to measure the DC voltage of the strings to ground respectively. The red test lead is connected to the positive or negative pole of the PV, and the black test lead is grounded. Observe whether the DC voltage drops to within 20V. If it is fixed as open circuit voltage (voltage between PV+ and -), there is poor insulation in the string. 3、Use a megger to measure the insulation resistance of the PV+/PV- cables between string and ground one by one. The impedance must be greater than 1MΩ. If it is less than this value, the insulation of the string is poor.
7	**Positive grounding fault**	**Emergency**	1. Restart the inverter after a complete power-off. 2. If the issue persists, check whether all PV cables are properly insulated from ground.

			For detailed assistance, please contact customer service.
8	**Negative grounding fault**	**Emergency**	1. Restart the inverter after a complete power-off. 2. If the issue persists, check whether all PV cables are properly insulated from ground. For detailed assistance, please contact customer service.
9	**System failure**	**Emergency**	1. Restart the inverter 2. If it has not been eliminated, contact the factory's customer service.
10	**Temperature over-temperature fault**	**Emergency**	1. Check whether the inverter installation position meets the requirements of the user manual 2. Try to reduce the ambient temperature 3. Restart the inverter after fifteen minutes 4. If the error persists, please contact the factory's customer service
11	**DC over-temperature fault**	**Emergency**	Contact the manufacturer's customer service and stop the machine to check the AC and DC terminals
12	**PCS communication failure**	**Emergency**	1. Check if the communication line from the PCS to the electrical cabinet is properly connected. 2. Check if the outer skin of the communication line is damaged. 3. Contact our company for handling.
13	**Air conditioning communication failure**	**Emergency**	1. Check if the air conditioner has been turned on. 2. Check if the outer casing of the communication cable is damaged. 3. Contact our company for handling.
14	**DC voltage low**	**Instruction**	The DC high voltage is not powered on. After power-on, the fault will recover by itself. 2. In case of any other situation, please contact our company for handling.

E Contact Details

Please contact us if you have any questions about this product.

Table D-1 Customer Service Contact Details

Country	E-mail	Phone
China	aftersales@whes.com	+86 4008776999

F Abbreviations

B	
BMS	Battery Management System
C	
CAN	Controller Area Network
E	
EMS	Energy Management System
L	
LAN	local area network
S	
SOC	state of capacity
U	
UPS	uninterruptible power system