DC-100kWh-EC00
C&I Battery Energy Storage System
User Manual

*Due to domestic and foreign regulatory requirements, as well as differences in appearance and layout because of differences in product standards and specifications, no special explanations and distinctions will be outlined for the product picture on this page. The actual project requirements shall prevail.

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Jiangsu Weiheng Intelligent Technology Co., Ltd.

Address: Shengxiang, Yaxi Community, Luoshe Town, Huishan District, Wuxi, Jiangsu Province
Zip Code: 214000
Website: weiheng-tech.com

Website: www.weiheng-tech.com

Preface

Overview

This document mainly describes how to install, connect, commission, and troubleshoot the DC-100kWh-EC00 energy storage system (hereinafter referred to as the "energy storage system"). Please read this manual carefully to get familiar with the safety instructions and functions, and features of the energy storage system before installing and using the energy storage system

Target Audience

This manual is intended for operators and qualified electrical technicians in power plants.

Symbol Conventions

For the purpose of this document, the following symbols that may exist herein mean as below.

Symbol	Description
Danger	A high-risk hazardous situation which, if not avoided, will result in death or serious injury.
Warning	A moderate-risk hazardous situation which, if not avoided, could result in death or serious injury.
Caution	A low-risk hazardous situation which, if not avoided, could result in mild or moderate injury.

Notice	This is used to convey device or environment safety warning information. Users are alerted of possible equipment damage, data loss, performance degradation, or unpredictable results, if not avoided. "Notice" involves no personal injury.
Description	This is used to highlight important/key information, best practices, and tips. "Note" is not safety warning information and involves no personal injury, equipment damage, or environment hazard.

Revision History

The revision history summarizes descriptions of each document update. The latest issue of the document contains all changes made in previous issues.

Document Version 01 (April 25, 2025)

V1.0 Draft version

目录

1 Safety Precautions

1.1 General Safety Requirements

Please read this manual and follow the symbols on the device and all safety precautions in this manual before installing, operating, and maintaining the system.

The "Notice", "Caution", "Warning" and "Danger" in this manual do not represent all the safety precautions users should follow but only serve as a supplement to all the safety precautions. The Company does not assume any liability for damage or loss due to violation of general safety requirements or safety standards for the design, production and use of the system.

The system must be used in an environment that meets the design specifications. Otherwise, the system may be faulty. The resulting malfunction, component damage, personal injury, and property losses are not covered by the warranty.

Comply with local laws and regulations, and codes when installing, operating, and maintaining the system. The safety precautions in this manual only serve as supplements to local laws and regulations and codes.

The Company shall not be liable in any of the following situations:

- The system is installed and operated in an environment that does not meet requirements in applicable international, national, and regional standards.
- The system is not operated under the conditions of use described in this manual.

- The product is disassembled or modified, or the software code is modified without authorization.
- The system is not operated according to instructions for use and safety precautions in the manual.
- Equipment damage caused by abnormal natural environment (force majeure, such as earthquake, fire, storm, flood, debris flow, etc.).
- Damage caused by customer's failure to comply with shipping and installation requirements.
- Damage caused by improper storage conditions.
- Hardware damage or data corruption caused by customer's negligence, incorrect operation, or intentional damage.
- System damage caused by third parties or customers, including damage caused by improper relocation and installation of the system, as well as damage caused by improper adjustment, change or removal of identification marks.
- Defects, malfunctions or damages caused by acts, events, omissions or accidents beyond the reasonable control of the Seller, including power outage, electrical failure, theft, war, riot, civil unrest, terrorism, and intentional or malicious damage.

General Requirements

Danger

High voltage exits in the system. Improper operations may result in electric shock or fire, leading to death, serious personal injury, or property damage. Please:

- Follow the operation procedure and safety precautions provided in this manual and other related documents.
- Follow the warning signs, warnings and protective measures indicated on the system.
- Follow the instructions provided in this manual, use the correct tools, and know how to correctly use these tools.
- Follow the safety regulations of the power plant, such as operation ticket and work ticket system.
- Do not approach the system except for system operators. Erect a temporary warning sign or fence to isolate the operation area.
- The warning sign, warning information, and protective measures must be legible. Do not alter, damage or cover the content, and replace if necessary.

- Do not perform installation, connection, maintenance, and replacement operations with power on.
- Do not clean the electrical components inside the system with water.
- Check the system for damage, such as holes, dents, or other signs of possible internal damage.
- Check that the pre-installed cables are securely connected.
- Check that the components inside the system are not displaced. Do not modify the structure or installation sequence without authorization.
- Do not power up the system when the system is not fully installed or confirmed by a professional.
- Measure the voltage at the contact before touching any conductor surface or terminal and ensure that the PE cable of the system or component to be repaired is reliably grounded and that there is no risk of electric shock.
- Press the emergency stop button and notify the site manager when any liquid dampens the system.
- Do not open the cabinet door when the system is operating.
- Wear arc protection clothing in the initial power-up or when you operate the main circuit with power on.

Caution

- ● Do not perform arc welding, drilling, or cutting operations on the system. Such operations may damage the sealing property of the entire cabinet, degrade the electromagnetic shielding performance of the system, or damage internal components and cables. Metal scraps generated during operations may enter the system, resulting in an electrical short circuit, malfunction or equipment damage.
- The housing is hot when the system is operating. Do not touch the housing. Otherwise, burn injury may occur.
- Immediately stop the system when a fault is detected that may cause personal injury or equipment damage, then report the event to the person in charge, and take effective protection measures.
- Evacuate from the scene immediately when the fire alarm is triggered.
- Close and lock the cabinet door when the equipment under operation and maintenance is left unattended temporarily.

Notice

- Transport, transfer, install, connect, and maintain the system in strict accordance with the laws, regulations, and related standards of your country or region.
- User-supplied materials and tools required for operation shall meet the laws, regulations, and related standards of your country or region.
- The system can be connected to the grid only when permitted by the electric power department of your country or region.
- Clean the water, snow, ice, or other debris, if any, on the cabinet top before opening the cabinet door for installation, operation or maintenance to prevent debris from falling into the cabinet.

Description

- Do not perform reverse engineering, decompilation, disassembly, reprogramming, implantation, or other derived operations on the software. Never research the internal implementation of the device in any way, obtain the source code of the software, steal intellectual property rights, nor disclose the results of any software performance tests.
- You are advised to prepare your own camera device and record the detailed information of installation, operation, and maintenance.

1.2 Personnel Requirements

- Only qualified personnel can operate the equipment, including transportation, transfer, installation, cable connection, and maintenance. Wear personal protective equipment that meets local safety protection requirements while operating the equipment.
- Operators must receive the relevant training and pass the examinations of the Company and have professional knowledge of the energy storage system.

Description

For qualification requirements, refer to your local laws and regulations and industrial standards.

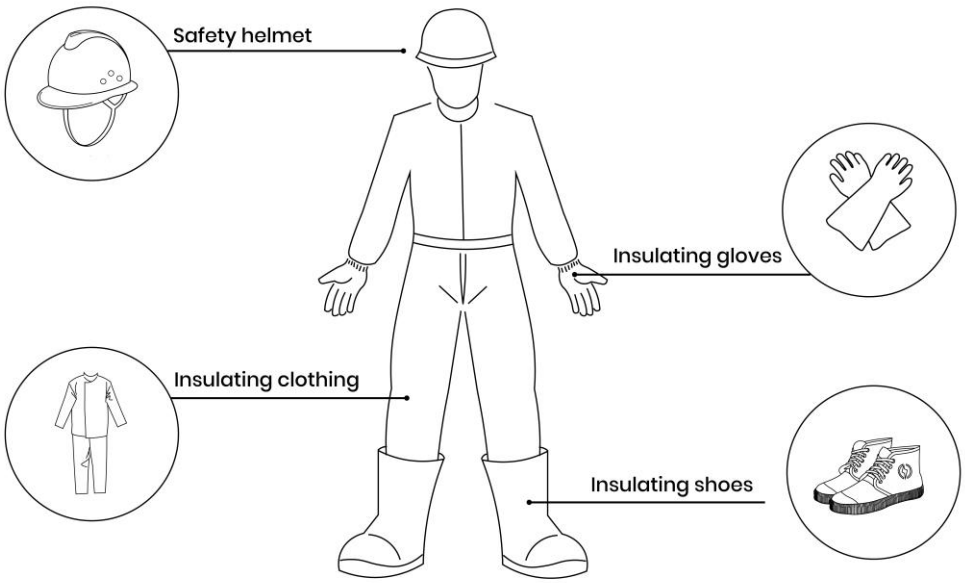


Figure 1-1 Wearing method of PPE

- Do not wear conductive objects such as watches, bracelets, rings, and necklaces during installation, operation, and maintenance to avoid burn injury due to electric shock.
- Transport, transfer, install, connect, and maintain the system in strict accordance with the laws, regulations, and related standards of your country or region.
- Keep familiar with the compositions and working principles of the energy

storage system and operate the equipment according to the User Manual.

1.3 Storage and Installation Environment Requirements

General Requirements

Description

- Keep certificates demonstrating compliance with product storage requirements, for example, temperature and humidity log data, storage environment photos, and inspection reports.
- Do not store the energy storage system for a prolonged period of time. Long-term storage of a lithium battery will result in capacity loss. A lithium battery will generally be subject to irreversible capacity loss of 3% to 10% when it is stored at the recommended storage temperature for more than 12 months.
- Store the product in a clean and dry place that is free of dust and water vapor erosion. Avoid rain or ground water erosion.
- The ambient air must not contain corrosive or flammable gases.
- Do not tilt the product or store it upside-down.
- The devices, except for lithium battery packs, stored for two years or more, must be inspected and tested by professionals before being put into use.

Storage Requirements of Energy Storage System

- Do not stack up.
- Ensure that the storage area is level (long-term or temporary).
- Keep the cabinet door tightly closed.
- Storage temperature: -30°C to +60°C, humidity: 5%RH to 95%RH.
- The energy storage system contains a lithium battery pack. Avoid direct sunlight or rain, and keep the environment dry, well-ventilated, and clean. There is no large amount of infrared radiation, organic solvents, or corrosive gases. Keep away from the ignition source.
- The lithium battery pack must not be stored and transported for more than five months in total (calculated from the date of delivery). Beyond this timelimit, the lithium battery pack must be recharged to 30% SOC and then subject to SOC calibration. Otherwise, the battery performance may be degraded and the service life may be reduced.
- The warehouse keeper should make monthly statistics on the

storage capacity of energy storage systems, regularly inform the planning sequence of the inventory of energy storage systems, and recharge the energy storage systems that are stored for an extended period of time.
- The FIFO principle must be strictly followed for the delivery of energy storage systems.

Installation Environment Requirements

For site selection, refer to **3.1 Site Selection Requirements**. The following installation requirements must be met:

- Energy storage systems should be installed and arranged according to fire-break distance or fire partition wall requirements in your local standards, including but not limited to *GB 51048-2014 Design code for electrochemical energy storage station* and *NFPA 855 Standard for the installation of stationary energy storage systems*.
- Never place the equipment in an environment with flammable or explosive gas or smoke, nor perform any operations in such an environment.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to transporting equipment, operating equipment and cables, plugging and unplugging signal cables connected to outdoor ports, working at heights, or installing outdoors) in severe weather conditions such as lightning, rain, snow, and force 6 wind or higher.
- Protective measures such as fences and enclosures must be set up for energy storage systems, and safety warning signs must be erected for isolation to prevent unauthorized personnel from accessing the equipment when it is operating. Otherwise, personal injury or property damage may occur.
- Do not block the vents and cooling system when the equipment is operating to prevent fire hazards due to high temperatures.
- The equipment should be installed in an area away from liquid, and should not be installed under water pipes and air outlets that are prone to condensation. Do not install the equipment under the air conditioner vent, air vent, or cable leading-out window of the equipment room to prevent liquid from entering the equipment and causing malfunction or short circuit.

- Keep the installation location away from an ignition source. Keep the equipment away from flammable or explosive materials.
- If the equipment is installed in a vegetated area, in addition to routine weeding, the foundation beneath the equipment needs to be hardened to prevent weeds.

Requirements for Working at Heights

- Take protective measures, wear PPEs including a safety helmet, safety belt, and waist strap, and tie the safety belt and waist strap to a rigid structure. Do not hang to an unstable moving object or metal with sharp edges to prevent the hook from slipping, leading to falling accidents.
- Define a restricted zone by setting a visible sign reading "No Entry" when working at heights.
- Do not stack scaffolding, springboards, and other foreign matters on the ground underneath the work platform. Personnel on the ground should not stay or pass through underneath the work platform.
- Do not throw objects at heights to the ground or from the ground to the height. Instead, use ropes, hanging baskets, elevated vehicles, or cranes to transport objects.
- Inspect the scaffolding, springboard, and work platform for safety to guarantee that the structure is rigid and the scaffolding is not overloaded.
- Do not work at heights on rainy days or other dangerous situations. When this happens, always ask the safety director and engineers to re-inspect various operation equipment for safety before proceeding with working at heights.
- Erect fences and signs at edges and openings when working at heights to prevent missing steps.
- Carry the operating apparatuses and tools to prevent the tools from falling.
- The person in charge of the site and the safety officer should immediately point out operations against regulations, if any and hold them accountable for correction before proceeding with operations.

1.4 Unloading and Transport Requirements

Danger

Maintain and unload the lithium battery pack in accordance with your local laws and regulations and industrial standards. Improper unloading may result in damage or short circuit, leading to electrolyte leakage, breakage, explosion or fire hazard.

Notice

This product has passed 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 packaging for export dangerous goods - Part 2: Performance test*, and this product belongs to Class 9 dangerous goods.

Shipping conditions:

- Check the energy storage system before shipping that the cabinet is intact, the cabinet door is closed and tightened, no foreign body is extended from the cabinet, and no smoke or smell of scorching is detected.

Description

Handle the equipment with due care during loading and unloading and transport and take protective measures against moisture. With environmental limitations (such as temperature, transport, and storage), technical specifications shall be subject to the date of delivery.

Transport requirements:

- The energy storage system or battery shall not be transported by railway or air.
- For sea transport requirements, refer to *International Maritime Dangerous Goods Code* (IMDG CODE).
- For land transport requirements, refer to ADR or JT T617.
- Meet the regulatory requirements of the transport regulatory authorities of the departure country, the transit country, and the destination country.
- Comply with the international rules for the transport of dangerous goods and the regulatory requirements of the respective national transport regulatory authorities.

- The transport process is fully monitored.
- The vehicle used for land transport shall be capable of carrying a single energy storage system weighing about 2700 kg.
- Speed limit for land transport: 80 km/h on a level road and 60 km/h on a rough road. In case of conflict, the local traffic regulations shall prevail.
- Do not stack up at ports or during sea transport.
  Avoid the following conditions during transport:
- Falling into water.
- Fall or mechanical impact.
- Upside-down or tipping over.

Description

If any one of the preceding situations occurs, initiate an emergency plan as described in Section 1.9.

1.5 Electrical Safety

Cabling Requirements

- Do not push cables directly down from the transport vehicle.
- Do not route cables through air inlet and outlet of the equipment.
- Tie cables of same type together. Route cables of different types at least 30 mm apart. Do not twine or cross cables each other.
- Always seal cable holes with sealing mud upon completion of cabling or it is left unattended for a short period of time to avoid tiny animals.
- The insulation layer may be aged or damaged when cables are used at high temperatures. The cables should be at least 30 mm away from the heating device or heat source.
- Select cables that comply with local laws and regulations.
- The edges of cable ducts and holes must be free of burr and well protected.
- Protect cable ducts and holes against damage due to sharp edges and burrs.
- Cables used in the energy storage system must be securely connected, properly insulated, and of appropriate

specifications.

- After cables are connected, fix them with cable supports and cable clips. Ensure that cables in the backfilling area are tightly fitting to the ground to prevent deformation or damage caused by stress on cables during backfilling.
- At extreme low temperature, violent shock or vibration may result in brittle cracking of plastic cable sheath. The following requirements should be met to guarantee construction safety:
  - ✧ All cables should be routed and installed under temperature above 0°C. Handle cables with due care, especially in a low-temperature environment.
  - ✧ If cables are stored at temperature lower than 0°C, store cables at room temperature for at least 24 hours before routing.

Grounding Requirements

- Do not damage the grounding conductor.
- Do not operate the equipment without a ground conductor installed.
- First install the PE conductor for the equipment to be grounded. The PE conductor shall be removed in the last step when the equipment is to be removed.
- The primary grounding body shall be permanently connected to the protective grounding net. Check the electrical connections before the operation to ensure that the equipment is reliably grounded.
- The ground impedance shall meet GB 50054 and local electrical standards.

AC and DC Control Requirements

- Cut off the power switch before installing and removing the power cord.
- Check that the power cord is correctly identified before connecting.
- If there are multiple power inputs, cut off all power inputs and wait until the equipment is fully powered off before operating the equipment.

Operation, Maintenance, and Repair Safety Requirements

1. Cut off the respective circuit protection switch before connecting or removing a cable.
2. Erect a warning sign reading "Don't Turn On" at disconnected switches.
3. Use an electroscope at the corresponding voltage rating to check for power and ensure that the equipment has been completely powered off.
4. If there are charged bodies nearby, cover or wrap them with an insulating board or tape.
5. Connect the circuit to be repaired to the grounding circuit with a grounding wire reliably before operation, maintenance, and repair.

   Notice

   - Check that cables are correctly identified before connecting.
   - If there are multiple power inputs, cut off all power inputs and wait until the equipment is fully powered off before operating the equipment.

6. Upon completion of maintenance, remove the grounding wire between the circuit to be repaired and the grounding circuit.

1.6 Mechanical Safety

Lifting Safety

Notice

- This equipment shall be lifted with a lifting bracket.
- When using a forklift for transportation, ensure that the forklift has sufficient load capacity and that the center of gravity of the equipment is positioned between the forks to prevent personal injury and equipment damage.
- The forklift must have a load capacity of at least 2 tons (≥2t).
- It is recommended that the forklift forks have a length of at least 1.5 meters (≥1.5m), a width between 60 cm and 80 cm, and a thickness between 25 cm and 70 cm.

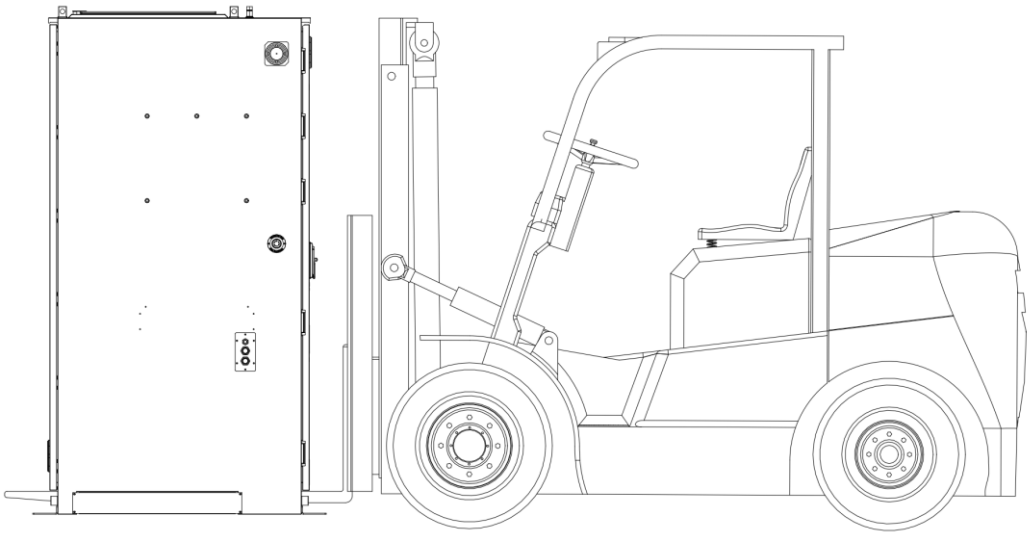
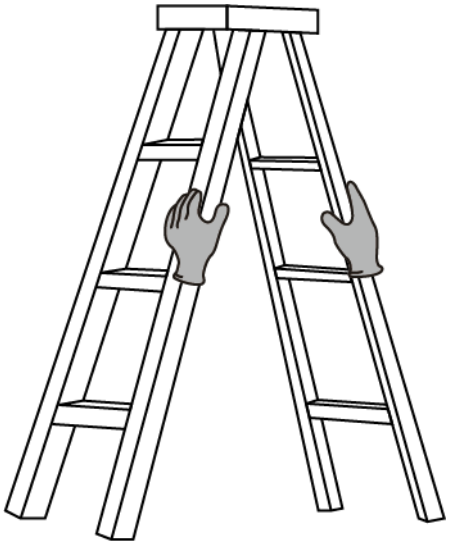


Diagram 1-2 Transportation Diagram

Ladder Safety

- Do not use a straight ladder.
- Please check that the ladder is in good condition and meets load capacity requirements before use.
- Use a wooden ladder or fiberglass ladder to ascend a height.
- A platform ladder with guard is preferred for ascending a height. All four feet must be fixed and the ladder is held securely by someone when an operator is working at heights.
- If a herringbone ladder is used, the rope must be secured and the ladder is held securely by someone when an operator is working at heights.



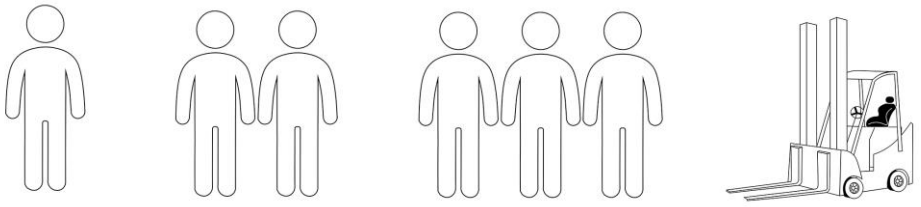
- Please pay attention to the following rules to reduce the risk and guarantee safety when climbing the ladder.
  - **Keep your body in a stable posture.**
  - **The maximum standing height of the operator's feet should not exceed the fourth step of the ladder from the top down.**
  - **Make sure your center of body weight does not deviate from the edge of the ladder assembly.**

Drilling Safety Outside Equipment Body

- Before drilling, select a proper position to ensure that no short circuit exists.
- Always wear PPEs including goggles and protective gloves during drilling operation.
- Cover the equipment during drilling operations to prevent debris from falling into the equipment. Clean up debris immediately after drilling.

Handling Safety

- Work together with the number of workers as recommended in the drawing to get prepared for moving heavy loads.



- Always wear PPEs including protective gloves and anti-smashing shoes when handling the equipment with hands.
- Do not scratch the surface of the equipment, damage components, or damage cables when handling the equipment.
- A forklift, if used, shall hold the equipment in the middle to prevent tipping over. Before moving, please fasten the equipment to the forklift with a rope, and when moving, assign a person to care for the movement.
- Move the equipment with due care to avoid impact or falling.

-

1.7 Battery Safety

Statements

The Company shall not be responsible for damages caused by the battery provided by the Company due to the following reasons:

- Extended storage, capacity loss or irreversible battery damage due to delayed charging on the customer side.
- Battery damage caused by delayed acceptance on the customer side.
- Degraded battery performance due to incorrect system operation management policy on the customer side.
- Unauthorized change to battery pack usage scenario on the customer or third party side without prior notice to the Company, for example, connecting an extra load to the battery pack or mixing the battery pack provided by the Company with that provided by other manufacturers, including but not limited to mixing battery packs from different manufacturers or of different rated capacities.
- Direct damage to the battery pack because the equipment operating environment or external power supply parameters fail to meet environment requirements for normal operation, including too high or low operating temperature of the battery pack.
- Frequent overdischarge due to improper maintenance, unauthorized on-site capacity expansion, or failure to fully charge the battery pack for a prolonged period of time on the customer side.
- Failure to correctly maintain the battery pack according to the User Manual, including but not limited to, checking whether the cooling system is in good condition, the high voltage wiring harness is loose or broken, and the screws fixing the structural parts are loose.
- The lithium battery pack is stolen.
- Lithium battery pack beyond the warranty period.

General Requirements

Danger

- Do not expose the lithium battery pack to high temperature or heat source, such as direct sunlight, ignition source, transformer, heater, etc. Too high temperature of the lithium battery pack may lead to fire or explosion hazard.
- Do not disassemble, modify, or destroy the lithium battery pack, for example, inserting a foreign body or immersing it in water or other liquid, to avoid leakage, overheating, fire or explosion hazard of the battery pack.
- The lithium-ion battery energy storage system is at high risk of fire hazard. Take into full account the following safety risks before operating the battery:
  - The electrolyte in the lithium battery pack is flammable, toxic and volatile.
  - The thermal runaway of the lithium battery pack will produce flammable gases, as well as harmful gases such as CO and HF.
  - There is a risk of deflagration and explosion caused by accumulated combustible gas after the thermal runaway of the lithium battery pack.

- If the lithium battery pack is flooded unexpectedly, stop the installation and then transport it to the safety isolation point, and apply for replacement parts in time.
- The storage area shall avoid direct sunlight or rain. Keep the environment dry, well-ventilated, and clean. There is no large amount of infrared radiation, organic solvents, or corrosive gases.
- The lithium battery packs shall be stored with their original packages in a separate warehouse. Do not store them together with other materials. Do not store them outdoors. Do not stack lithium battery packs up too high. The site must be equipped with the necessary firefighting facilities, such as a fire sandbox, fire extinguisher, etc.
- The energy storage system shall be regularly checked for firefighting safety at least once a month.
- Do not remove the original package of the lithium battery pack under normal circumstances. Ask a specialist to recharge the lithium battery pack when necessary. Install the lithium battery pack into its original package after recharging.
- In outdoor scenes, you are advised to power up the lithium

battery pack within 24 hours after it is unpacked. Otherwise, place the lithium battery pack indoors in a dry, non-corrosive gas environment.

- The lithium battery pack must be correctly placed according to the "Keep Upright" symbol or label on the package to avoid battery leakage due to upside-down for an extended period of time.
- The lithium battery pack should avoid impact.
- Handle the lithium battery pack according to orientation requirements. Do not place it upside down or tilt it.
- Please use the lithium battery pack within the temperature range specified in this Manual. Do not charge the lithium battery pack when the ambient temperature is lower than the operating temperature lower limit. Otherwise, charging at low temperatures will result in condensation, leading to a short circuit of the lithium battery pack.
- Please dispose of scrapped lithium battery packs according to local laws and regulations. Do not dispose of lithium battery packs as household waste. Improper disposal of lithium battery packs may result in environmental pollution.
- Do not use damaged lithium battery packs (dented housing or other damage). Damaged lithium battery packs may release flammable gases. Do not store damaged lithium battery packs near good ones.
- Store damaged lithium battery packs in a place free of flammable materials and erect a "No Entry" sign.
- Check damaged lithium battery packs for signs of smoke, fire hazard, electrolyte leakage or heating during storage.

Recharging Requirements

- Recharge stored lithium battery packs at least every 5 months. Otherwise, the battery performance may be degraded and the service life may be reduced.
- You can get the time of production of lithium battery packs through their SN or consulting with the service engineer of the Company.

Installation Requirements of Lithium Battery packs

Description

Check that the lithium battery pack is in good condition before installation. Any one of the following symptoms is deemed as a malfunction of the lithium battery pack:

- The housing of the lithium battery pack is obviously deformed or damaged.
- The total positive voltage or total negative voltage of the lithium battery pack is far below the specification range.

- Please use the lithium battery pack of the specified specification. A non-genuine lithium battery pack can be easily damaged.
- Please check whether the package is in good condition before installing the lithium battery pack. Do not use the lithium battery pack with damaged package.
- Place the lithium battery pack at a level and solid surface.
- Do not place installation tools or loads on the lithium battery pack during installation.
- Pay attention to the polarity of the lithium battery pack during installation. Do not short-connect positive and negative poles.
- Tighten the connection terminals with a torque wrench and regularly check that connection terminals are not loose.

Short-circuit Protection

Danger

Short-circuit may produce transient current surge and release a large amount of energy that may lead to personal injury or property loss.

- Wrap the exposed cable terminals in the lithium battery pack with insulating tape during installation and maintenance.
- Prevent foreign bodies (such as conductive objects, screws, and liquid) from entering the lithium battery pack, causing short circuits.

Hazard and Toxicity

Danger

- Hazard: A damaged lithium battery pack may cause heating or electrolyte leakage. The electrolyte is flammable, and if the electrolyte leaks, the lithium battery pack should be immediately kept away from the ignition source.
- Toxicity: The steam produced by the combustion of the lithium battery pack may irritate the eyes, skin and throat.

Exception Handling Measures

Danger

- When there is electrolyte leakage or abnormal odor, do not expose to the leaking liquid or gas. Stay away and contact a professional immediately. A professional shall wear PPEs including goggles, rubber gloves, gas mask, and protection suit to prevent the harm caused by electrolyte spillage.
- The electrolyte is corrosive and exposure may cause skin irritation and chemical burns. The following measures should be taken if you expose to the electrolyte.
  - Inhalation: Evacuate from the contaminated area, move to fresh air immediately, and seek medical attention immediately.
  - Eye contact: Immediately flush eyes with plenty of fresh water for at least 15 minutes. Do not rub your eyes. Seek medical attention immediately.
  - Skin contact: Wash contact areas immediately with plenty of soapy water, and seek medical attention immediately.
  - Ingestion: Seek medical attention immediately.

When Lithium Battery pack Falls

- When the lithium battery pack falls (with or without packing materials), but the appearance is not significantly deformed or damaged, and there is no obvious odor, smoke, and fire, perform the following operations on the premise of guaranteeing safety:
  - Warehouse: Evacuate personnel, ask a professional to transport the lithium battery pack to an open and safe place with mechanical tools, and contact the service engineer of the Company. Rest the equipment for 1 hour and check that the temperature of the lithium battery pack is within the range of room temperature ± 10℃ before proceeding.
  - Site: Evacuate personnel, shut down the energy storage system, ask a professional to transport the battery pack to an open and safe place with mechanical tools, and contact the service engineer of the Company. Rest the equipment for 1 hour before proceeding.

- If there is obvious odor, damage, smoke or fire when the lithium battery pack falls, immediately evacuate personnel, contact a professional, and call firemen. The professionals on-site shall use fire fighting facilities to extinguish the fire on the premise of guaranteeing safety.
- Stop using the lithium battery pack when it falls. Instead, contact the service engineer of the Company for evaluation.

1.8 Maintenance and Replacement

⚠Caution

Ensure that the remaining components are secure before removing a component from the cabinet.

- Assign two or more persons on site to maintain the energy storage system.
- Cover charged parts nearby with insulating materials during maintenance.
- Do not open the cabinet door in rainy, snowy, thunder, dusty, or foggy weather.
- Do not touch the fan in operation with any objects (such as fingers, parts, screws, or tools) while the fan is running before the fan is powered off and stops.
- Do not power on the equipment before trouble is eliminated.
- When inspecting the system with power on, pay attention to the hazard sign on the equipment. Do not stand near the cabinet door.
- Wait at least 15 minutes after devices except for the lithium battery pack are powered off. Ensure that these devices are completely powered off before performing operations.
- Erect a warning sign reading "Don't Turn On" at disconnected switches during maintenance.
- When the power unit of the energy storage system is replaced or cables are changed, manually start wiring test and run topology identification to avoid malfunction.
- Lock the cabinet door immediately after maintenance and replacement, fix the safety rope, and keep the key safe.

1.9 Emergency Plan

When dangerous accidents occur on site, including but not limited to the following accidents, give priority to personal safety and contact the service engineer of the Company.

In Case of Fire

Danger

Suggestions for on-site operation and maintenance personnel:

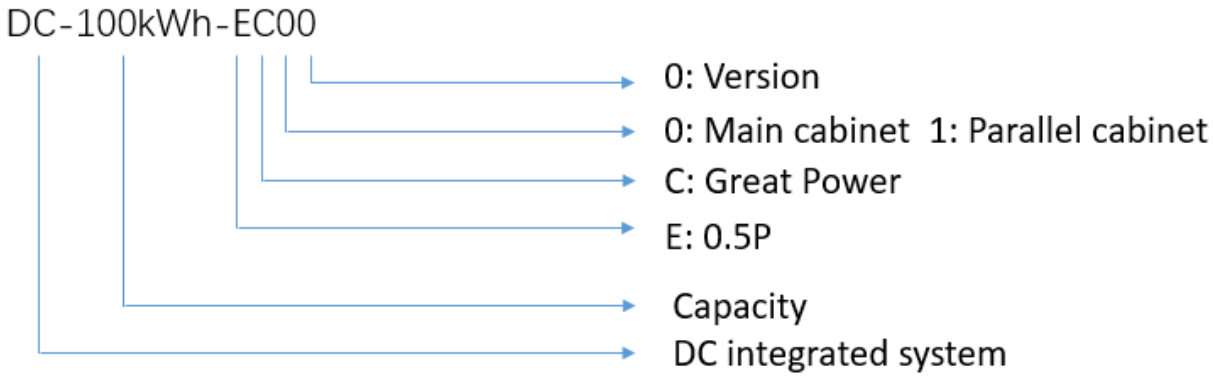
1. In case of fire, evacuate personnel from the building or equipment area and press the fire alarm bell. Immediately call your fire emergency number to notify professional firemen, and provide them with relevant product information, including but not limited to the type of lithium battery packs, the capacity of the energy storage system, and the layout of lithium battery packs.
2. Do not enter the burning building or equipment area again under any circumstances, and do not open the cabinet door. Isolate and guard the scene and erect a sign reading "No Entry".
3. Call your fire emergency number and remotely power the system off on the premise of ensuring personal safety.
4. Provide on-site firemen with relevant product information, including but not limited to: the type of lithium battery packs, the capacity of the energy storage system, the layout of lithium battery packs, and the User Manual.
5. After the fire is extinguished by firemen, the professionals shall take measures in accordance with local laws and regulations. Do not open the cabinet door without authorization.
6. Maintenance after an incident: Contact the service engineer of the Company for evaluation.

Suggestions for firemen:

1. Have knowledge of product information provided by the operation and maintenance personnel, including but not limited to the type of lithium battery packs, the capacity of the energy storage system, the layout of lithium battery packs, and the User Manual.
2. Do not open the cabinet door when the internal safety of the energy storage system cannot be guaranteed.
3. Please follow local firefighting regulations.

2 About Product

2.1 Model Description



Product Model Description:

This document mainly covers the following product models:

DC-100kWh-EC00

DC-100kWh-EC10

DC-86kWh-EC00

DC-71kWh-EC00

DC-57kWh-EC00

2.2 Functions and Features

Functions

The energy storage system integrates high-capacity battery packs, EMS, monitoring system and fire suppression system. Together with the hybrid inverter, it can support self-consumption, off-grid backup power, and TOU mode, and is suitable for a variety of industrial and commercial scenarios.

Features

1. High Energy Density

- The system uses 280Ah lithium-ion batteries, and the dimension of a single cabinet is only 750mm×1150mm×2250mm (W×D×H).

2. Flexible Application
   - The capacity of a single cabinet can be selected from 57-100kWh, and it supports three units in parallel. Multiple units can be installed side by side.
3. Safe and Reliable
   - IP55 protection, C5 anti-corrosion, suitable for a variety of environments.
   - Four-level active and passive fire protection ensures comprehensive safety.

2.3 Appearance

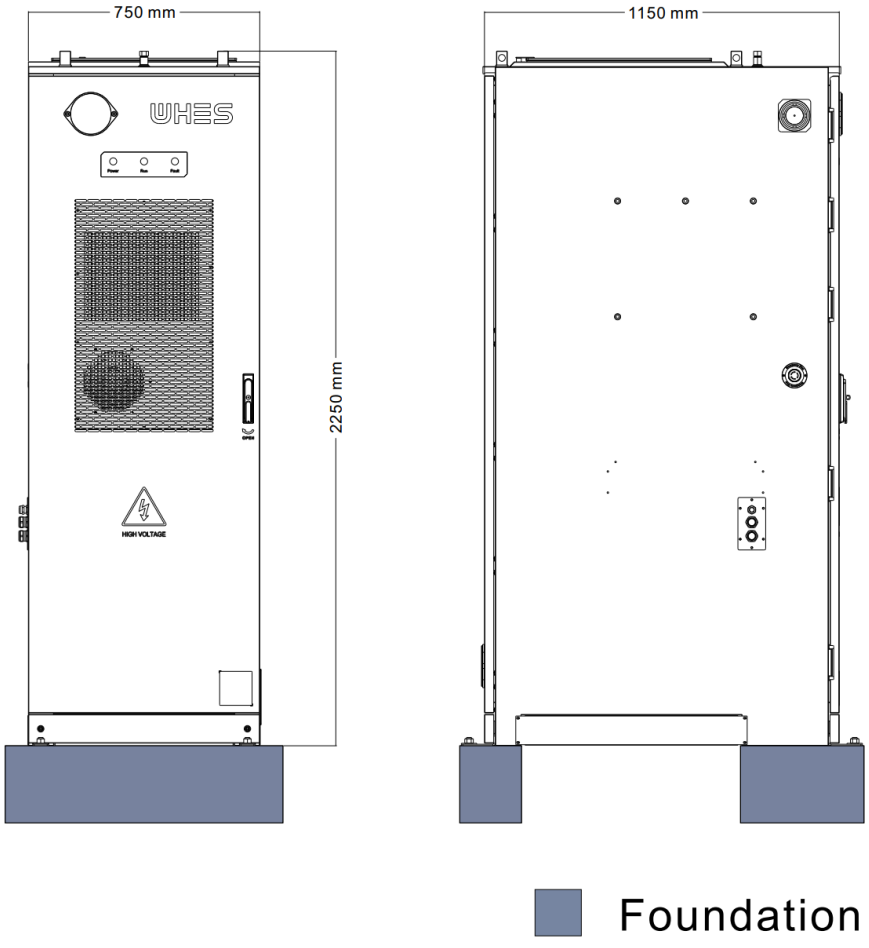


Figure 2-1 Appearance and Dimensions

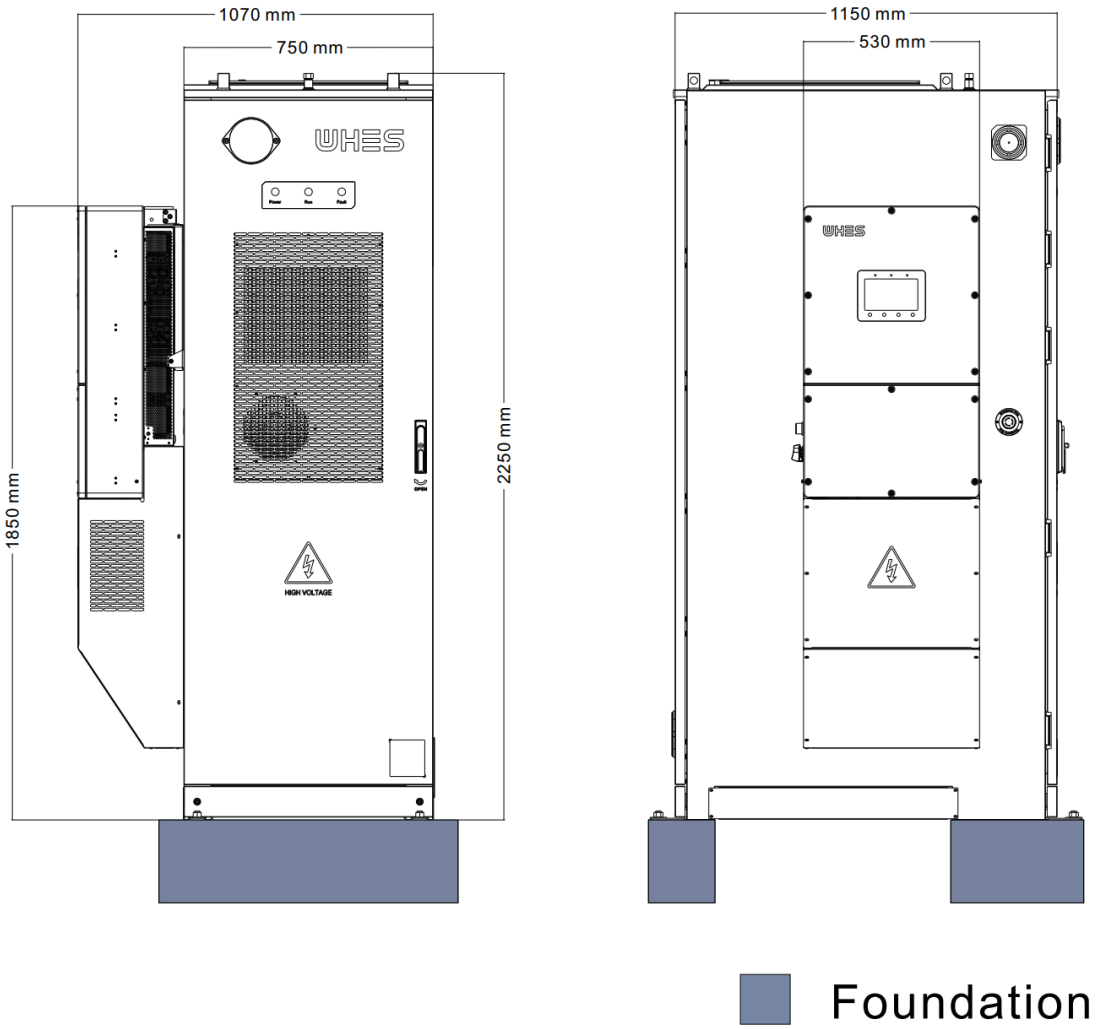


Figure 2-2 Appearance and Dimensions with Inverter

2.4 Parts

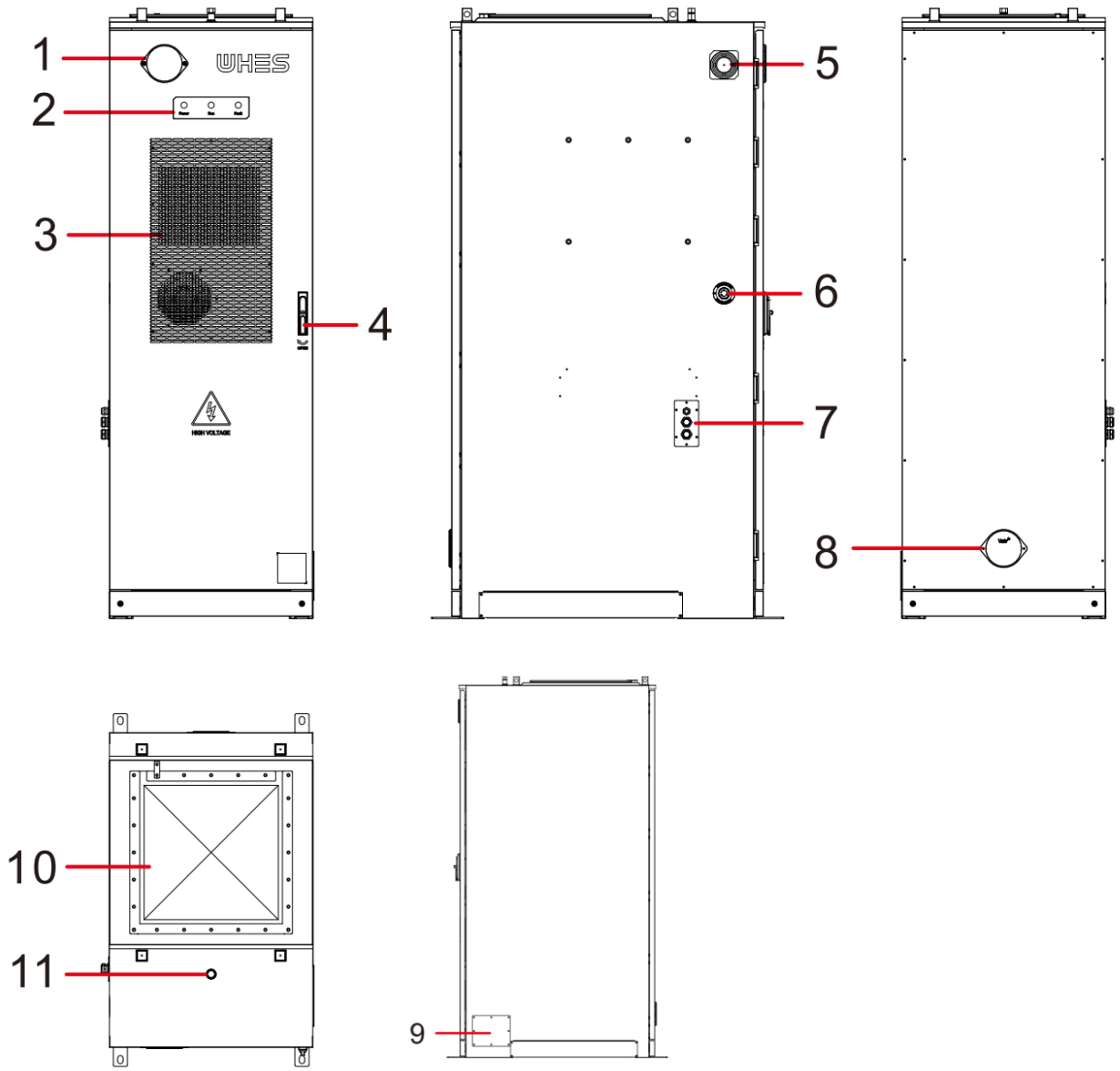


Figure 2-3 External Components of the Cabinet 1

Table 2-1 Component Configuration 1

No.	Model	Quantity	Description
1	Air Exhaust Port	1	Release combustible gas, ensuring safe operation.
2	Indicator Light	3	Power：white，power light. Run：green，run inductor light. Fault：red，fault inductor light.
3	Air Inlet and Outlet Vents	1	Air inlet and outlet of air conditioning
4	Door Pull	1	You can use this pull to open and close the door.

5	Sound and Light Alarm	1	
6	Emergency Stop Button	1	You can press this button to stop the system immediately when the equipment malfunctions.
7	Waterproof Cable Gland	3	Waterproofing for cable penetration holes.
8	Air Intake Port	1	Air inlet, cooperating with the exhaust outlet to vent combustible gases.
9	Parallel Connection Port	1	Used for routing DC parallel connection cables.
10	Explosion Vent	1	Designed to release internal pressure in a controlled direction, ensuring safety.
11	Water Sprinkler	1	DN15 interface.

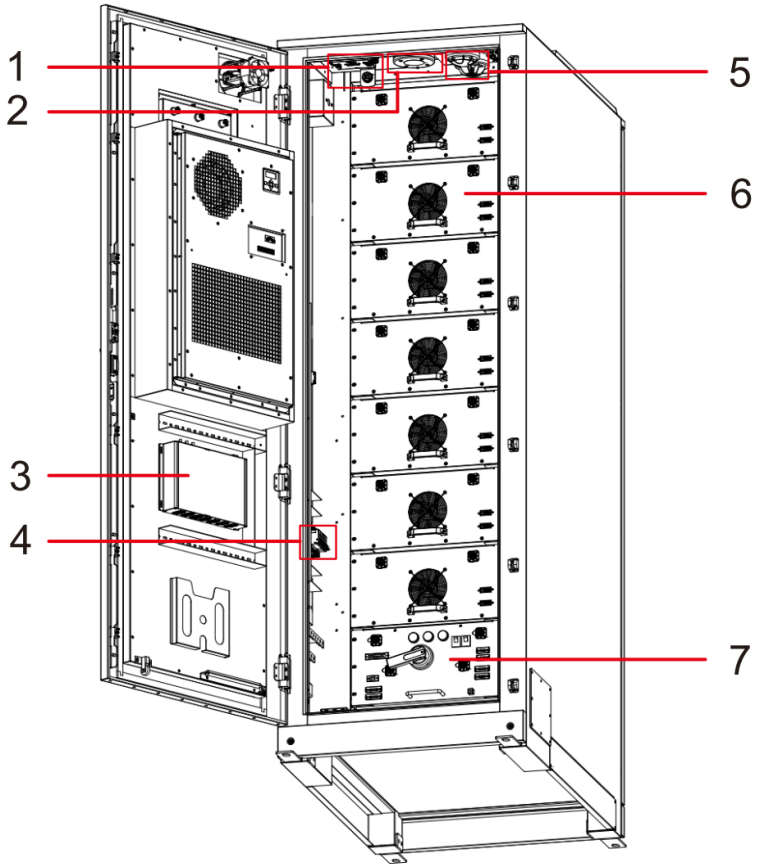


Figure 2-4 Internal Cabinet Components 2

Table 2-2 Internal Cabinet Components 2

NO.	Model	Quantity	Description
1	Gas detector (optional)	1	Detection device for combustible gases
2	Aerosol	1	Fire extinguisher
3	POWER Hub	1	Control equipments inside the cabinet
4	QF1~QF2	1	QF1： AC Main Power Switch QF2： AC Main Power Switch
5	Smoke、Temperature Detectors	1	Real-time monitoring of smoke and temperature inside the cabinet to trigger early warning protection
6	Packs	1	Battery packs
7	HV box	1	Monitoring and protecting battery cluster

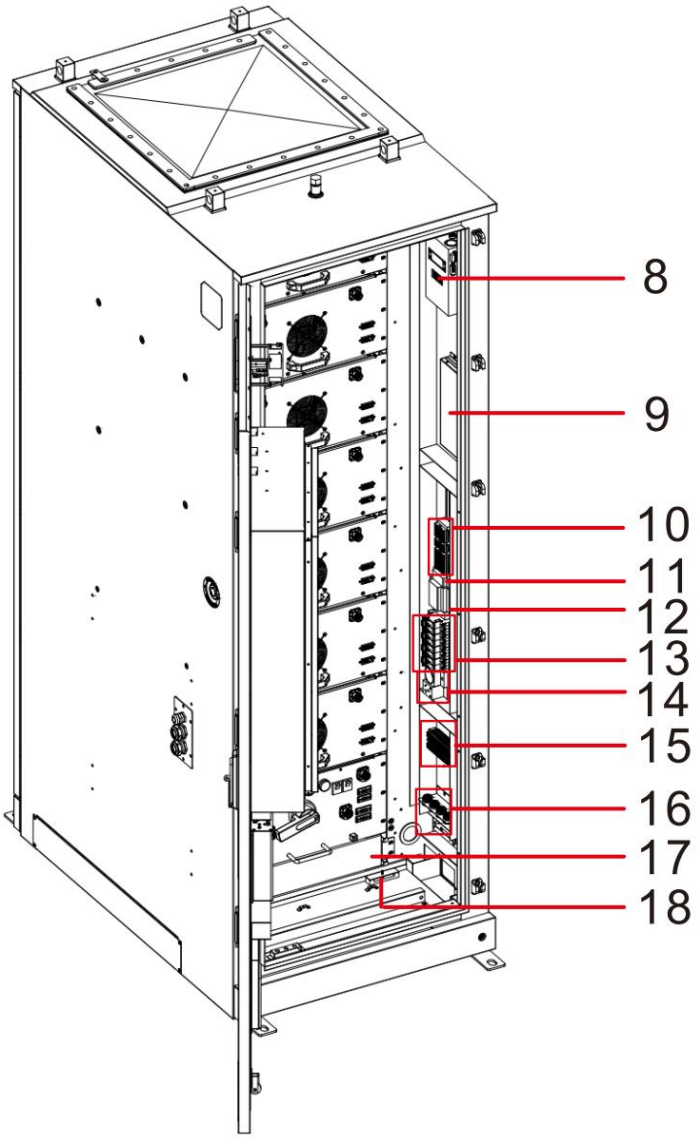


Figure 2-5 Introduction to the Components Inside the Cabinet - 2

Table 2-3 Internal Cabinet Components 3

NO.	Model	Quantity	Description
8	Dehumidifier	1	Reduce the humidity inside the cabinet to prevent equipment from being damaged by moisture.
9	BMS	1	Three-level management, used for battery side parallel control.
10	XT1: 1~11 Power1: 1~4 Power2: 1~7	1	Power distribution terminal
11	Water Leak Sensor	1	Detects water leak inside the cabinet to prevent water intrusion.
12	24V power	1	24V power supply
13	QF3~QF6	1	QF3： UPS power switch QF4：Debug socket switch QF5：HV box power switch

			QF6： 24V power switch
14	Socket	2	Debugging Socket
15	XT2: 1~24	1	Communication terminal block
16	RJ45	4	Communication network port
17	UPS	1	guaranteeing normal operation of the energy storage system upon power outage.
18	Water Sensor	1	Real-time monitoring of water leakage

2.4.1 Energy Storage Battery System

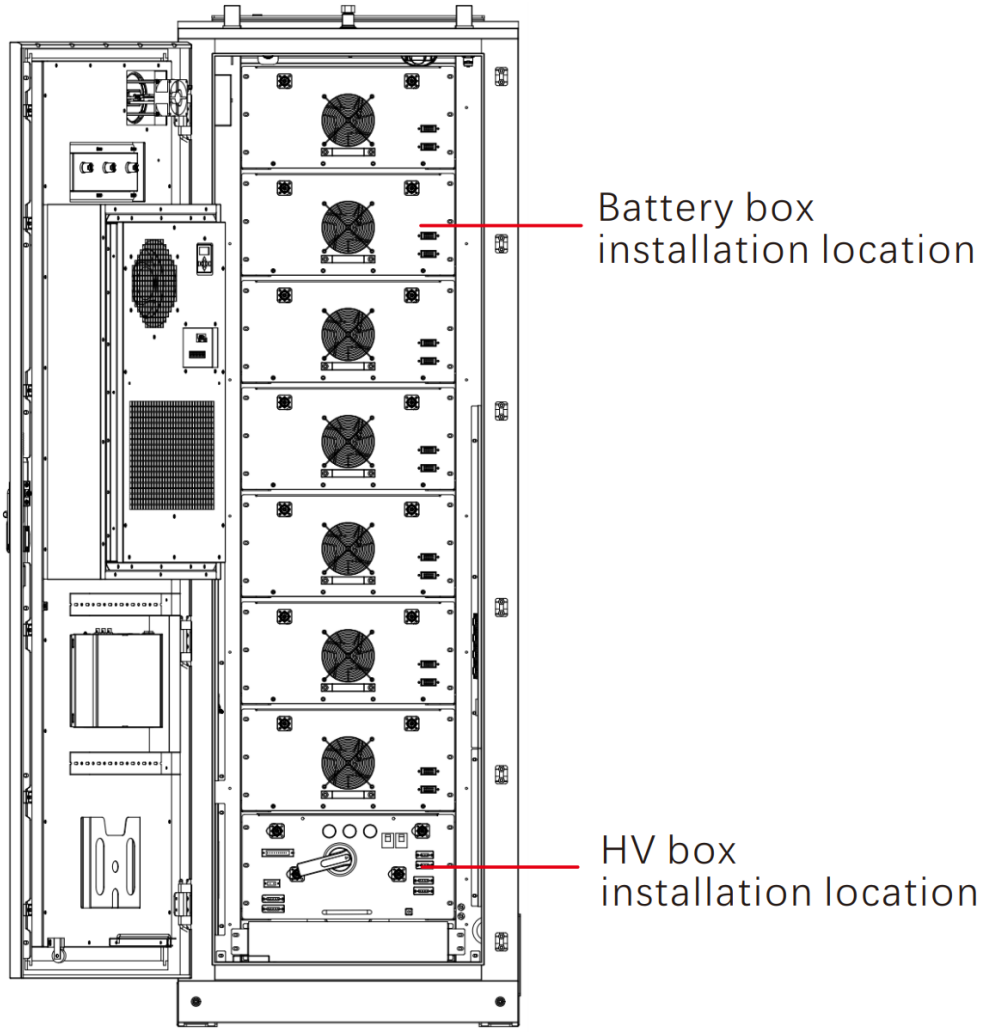


Figure 2-6 Schematic Diagram of the Battery System Position

2.4.1.1 High-voltage Box

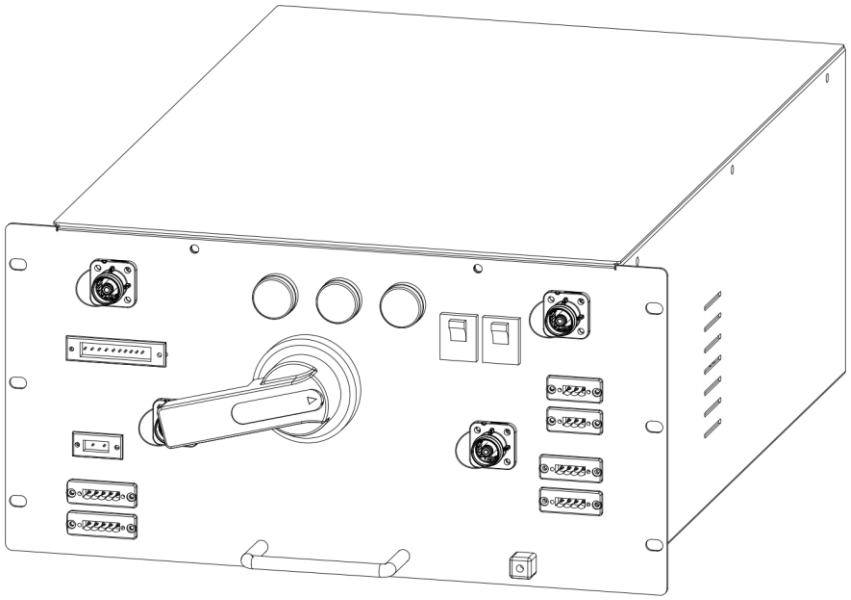


Figure 2-7 High-voltage Box External View

Description: The high-voltage control box is an intermediate unit connecting the battery cluster and the energy storage inverter. The high-voltage control box has the functions of detecting the battery cluster voltage, battery cluster current, insulation collection and battery cluster circuit contactor control.

The high-voltage control box is equipped with circuit breakers, contactors, fuses, current sensors (shunts), battery cluster control management modules (BMS master control modules), switching power supplies, etc. The battery cluster control management module (BMS master control module) built into the high-voltage control box has CAN and RS-485 communication bus interfaces, which can realize the use scenarios of BMS secondary architecture and BMS three-level architecture energy storage system, and realize the control, protection and data communication functions of energy storage battery clusters.

Table 2-4 Specification

Item	Specification
DC rated voltage	DC 1000V
AC rated voltage	AC 220V
Communication protocol	CAN， RS485
Dimension（W*D*H）	467*595*232mm
Weight	50kg

2.4.1.2 Battery Pack

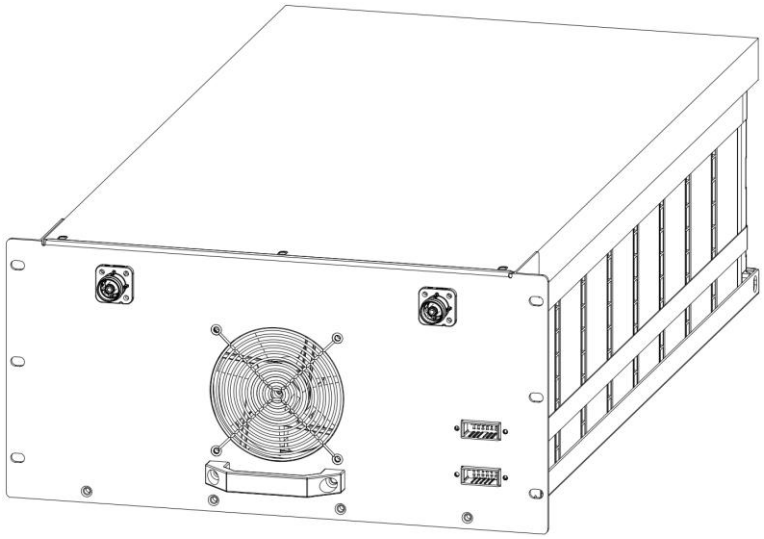


Figure 2-8 Battery Pack External View

Description: The battery box includes 16 280Ah batteries connected in series (1P16S configuration).

Table 2-5 Specification

NO.	Item	Specification	Note
1	Model	PDCN-14A-L10.5C280-1P	
	Configurations	IP16S	
2	Nominal Capacity	280Ah	Ambient Temperature: 25°C±5°C
3	Available energy	14,336kWh	
4	Rated voltage	51.2V DC	3.2V/cell (IP16S)
5	Charging cut-off voltage	56.8V DC	3.55V/cell (Recommend)
6	Discharging cut-off voltage	44.8V DC	2.8V/cell (Recommend)
7	Maximum operating voltage range	DC41.6~37.6V	2.6~3.6V/cell
8	Rated charging Rate	7.168kW	0.5C
9	Rated Discharge Rate	7.168kW	0.5C
10	Maximum charging current	173A	25 45°C_5min
11	Maximum Discharge Current	173A	25 45°C_5min
12	Maximum operating temperature range	0°C~55°C	Current limited to 0 at 55°C

13	Optimal working temperature of cell	25°C~45°C	
14	Storage temperature	-30°C~60°C	Recommended -10°C~35°C
15	Humidity	≤95%RH	No-leakage
16	Weight	102±1.0kg	Reference value
17	Dimension	W470(±2mm)*D333(±2 mm)*H225(±1mm)	Reference value
18	Cycle life	6000 次 (80% SOH)	100%DOD, @25°C, 0.5C
		8000 次 (70% SOH)	100%DOD, @25°C, 0.5C
		9500 次 (60% SOH)	100%DOD, @25°C, 0.5C

2.4.2 Air Cooling System

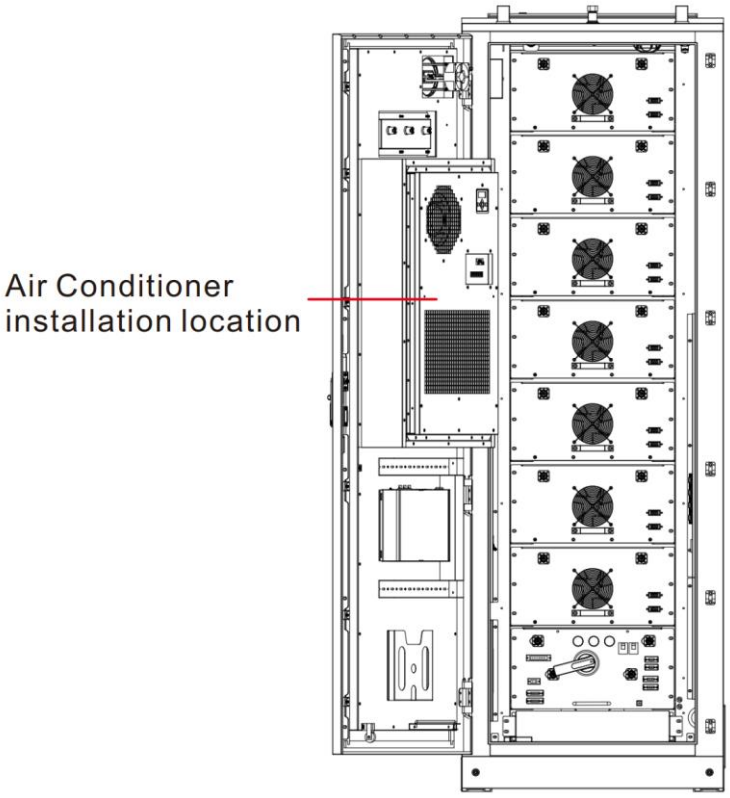


Figure 2-9 Air cooling System Location Diagram

2.4.2.1 Air Conditioner

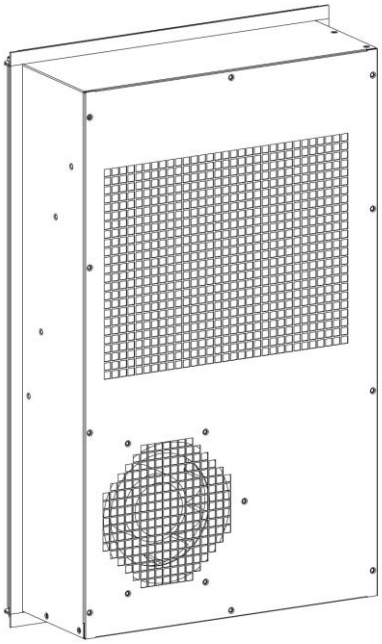


Figure 2-10 Air Conditioner External View

Description: The air conditioner is a door-mounted structure and is used to control the temperature inside the cabinet to ensure that the battery operates within the appropriate temperature range.

Table 2-7 Specification

NO.	Item	Specification
1	Dimension (H×W×D)	746×446×200mm
2	Dimension with flange (H×W×D)	783×483×200mm
3	Weight	35kg
4	Installation	Door installation
5	Application Environment	Outdoor
6	Operating temperature	-40 to +55 ℃
7	Noise	65 dB
8	IP level	IP55
9	Refrigerant	R134a
10	RoHS2	Yes
11	Cooling capacity L35 L35	2000/2300 W
12	Heating capacity	1050 W

13	Cooling input power L35 L35	850/1000 W
14	Cooling input current L35 L35	3.8/4.5 A
15	Internal circulation air volume	650 m^3/h
16	Maximum operating current	6.5 A
17	Power supply range	187~254 V, 50/60 Hz
18	Rated operating voltage - controller	230 V, 50/60 Hz
19	Rated operating voltage - cooling/heating system	230 V, 50/60 Hz

2.4.3 Environmental Control Systems

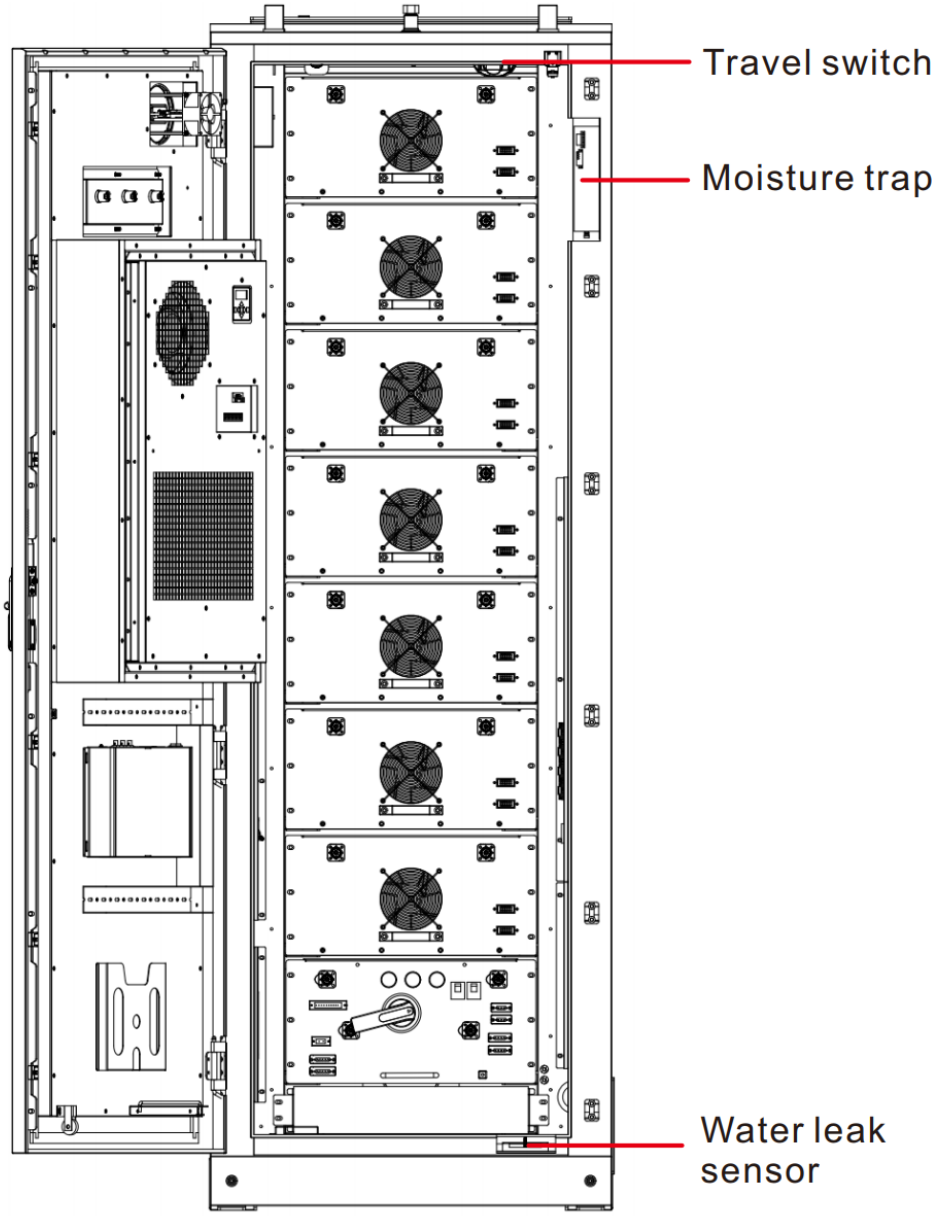


Figure 2-11 Schematic Diagram of Environmental Control System

2.4.3.1 Travel Switch

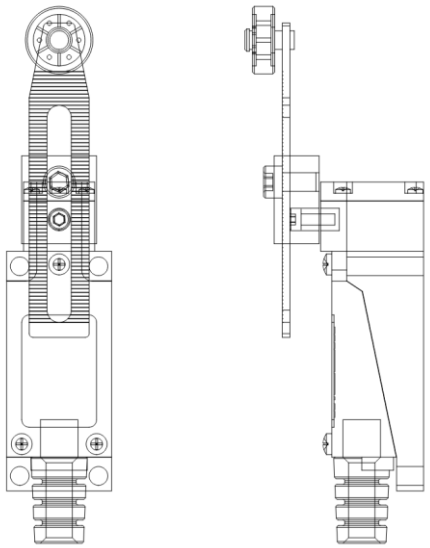


Figure 2-12 Appearance of Travel Switch

Description: The travel switch is suitable for control circuits for the travel control of the motion mechanism, the change of the motion direction or speed, the automatic control of the machine tool, the limiting action of the motion mechanism, and the travel or sequence control.

Table 2-8 Specification

Name	Specification
Protection level	IP62
Operating frequency	20times/min
Ambient temperature	-5°C~+40°C
Relative humidity	The relative humidity should not exceed 50% when the maximum temperature is +40°C. Higher relative humidity is permitted at a lower temperature. For example, when the humidity reaches 90% at 20°C, special measures should be taken for condensation occasionally caused by temperature changes.
Rated voltage	AC-15:380V DC-13:220V
Rated operating current	AC-15:0.8A DC-13:0.16A
Installation Category	Ⅱ
Pollution degree	3

Rated insulation voltage	415V
Rated impulse withstand voltage	2.5kV
Altitude	≤2000m

2.4.3.2 Water Leak Sensor

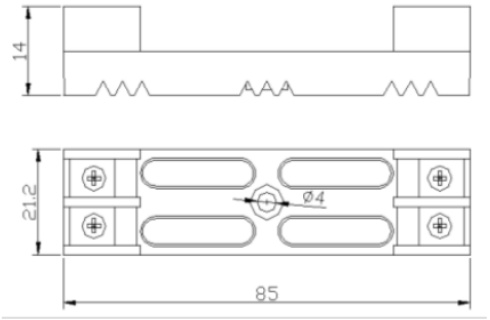


Figure 2-13 Appearance of Water Sensor

Description: The sensor needs to be used with a transducer (see 2.4.4.3). The impedance changes when the water leak sensor is wetted between two stages. Based on this principle, the dedicated integrated chip amplifies, shapes, and compares the wetting input signal and outputs a dry contact or high-low level change signal to indicate whether the location whether the transducer is located is wetted.

Table 2-9 Specification

Model	JS-DP Series
Operating temperature	-20°C~60°C
Operating humidity	0%RH ~95%RH
Weight	40g

2.4.3.4 Dehumidifier

Figure 2-14 Appearance of Dehumidifier

Description: Small size, light weight, convenient installation; Automatic operation and manual dehumidification function switch, temperature start value and dehumidification start value can be adjusted; The dehumidification air duct takes the initiative to induce coagulation and discharge gas to heat and dehumidify, which effectively achieves the comprehensive treatment of moisture-proof and dehumidification in the enclosed space of electric gas cabinet.

Table 2-10 Specification

Item	Specification	Item	Specification
Working power supply	AC220V	Dehumidification efficiency	380mL±5%/24h （60W 35℃RH=85% situation）
Heating power	50 ~ 300W	Dehumidification temperature	5℃ ~ 45℃
Power selection	20W~60W	Operating temperature	-25℃ ~ 75℃
Humidity detection range	20%RH~98%RH	Temperature detection range	-20℃ ~ 85℃
Dehumidification start value	25%RH~98%RH	Temperature start value	1℃ ~ 55℃
Humidity measurement accuracy	±3%RH	Temperature measurement accuracy	±1℃
Display Mode	6 Digital display	Display resolution	0.1
Shell material	Aluminum Alloy	Dimensions	180×62×110mm

			（W × D × ）
Net Weight	1kg	Aqueduct	Silicone D10mm

2.4.4 Fire Protection System

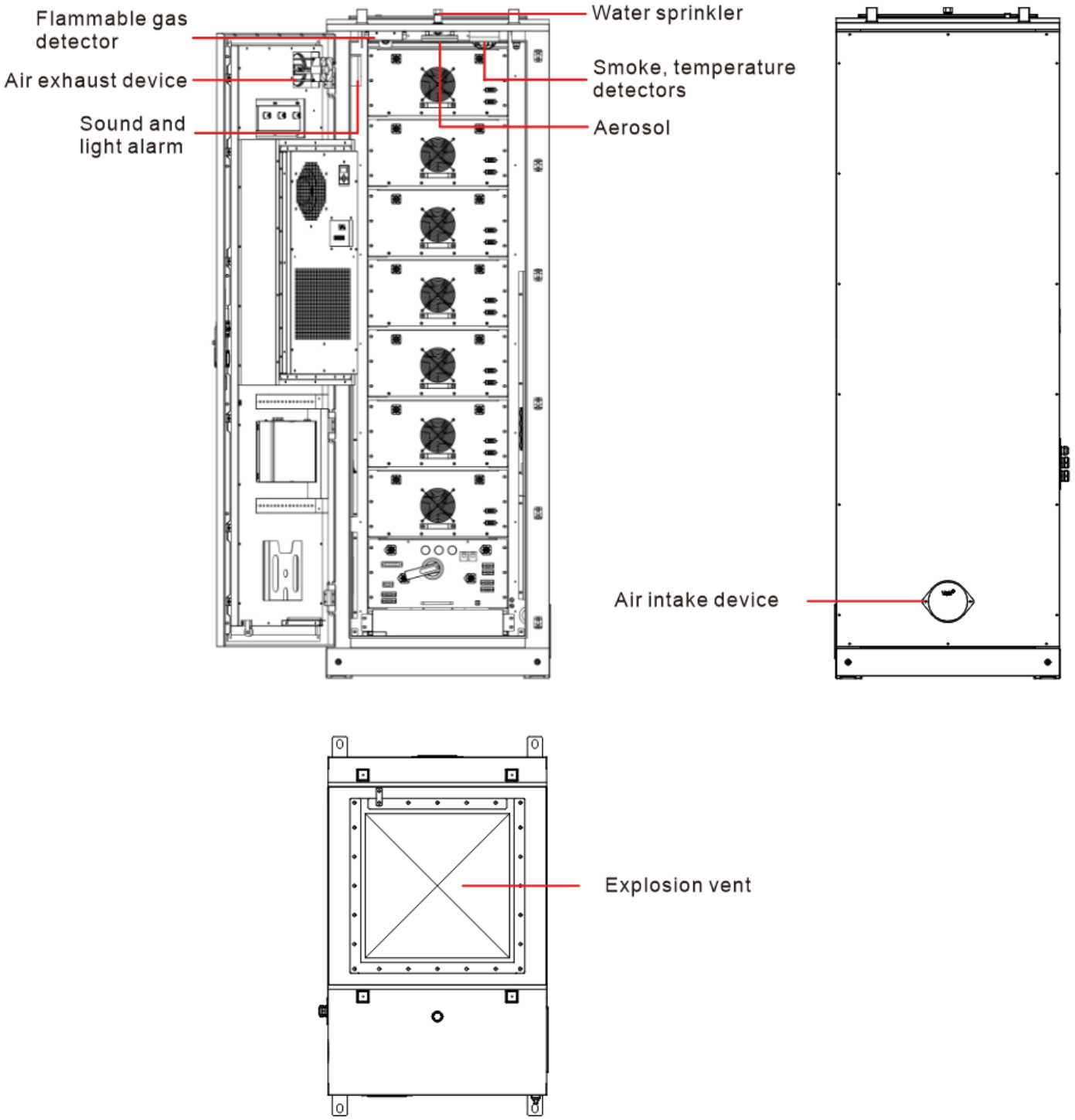


Figure 2-15 Front View of Fire Protection System

2.4.4.1 Fire Host

Figure 2-16 Appearance of Fire Host

Description: This module is a Li-ion Tamer supporting interface product (LT-SEN-IM), which can help customers use it independently and directly. It is suitable for small energy storage application scenarios such as outdoor energy storage cabinets and independent lithium-ion battery racks.

Table 2-11 Specification

Item	Specification
Operating temperature range	-20°C ~ 70°C
Humidity range (non-condensing)	5% ~ 95% RH
Dimension (H x W x D)	140mm×85mm×32.8mm
Weight	365g
Input voltage range	15V ~ 32V DC
Input Current	5mA ~ 13mA
Maximum Power	0.5W
Relay load capacity	30V DC/125V AC, 2A DC/0.5A AC
RJ45 output	5V DC, 53mA
Maximum number of connected nodes	12
Maximum communication distance between nodes	12 m
Status reading frequency	1 sec/times

2.4.4.2 Smoke and Temperature Detector

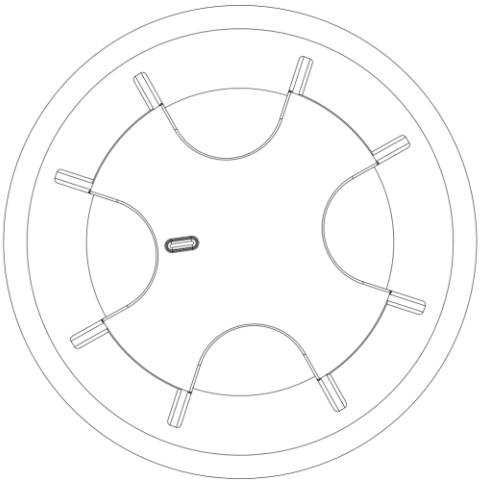


Figure 2-17 Appearance of Smoke Sensor

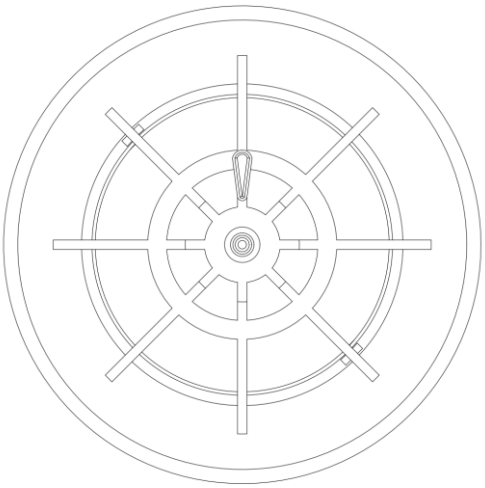


Figure 2-18 Appearance of Temperature Sensor

Description: Description: The smoke and temperature detectors in the energy storage cabinet are mainly responsible for real-time monitoring of environmental smoke and temperature changes, and judging abnormal conditions through dual signal fusion. They support remote alarm signal output and linkage with the fire protection system to ensure the safe operation of the battery modules in the cabinet and improve the overall protection level and reliability of the energy storage system.

Table 2-12 Specification

No.	Specification	Value
1	Operating voltage	24V DC（16V ~ 28V）
2	Standby current	≤60μA
3	Alarm current	10mA ~ 30mA
4	Indicator status	The red light flashes when normal, and stays on when alarm occurs

5	Explosion proof signs	Exib II CT6 Gb
6	Explosion-proof certification number	CE12.2146 (temperature detector) / CE11.2130 (smoke detector)
7	Safety parameters	U_0=28V, I_0=93mA (temperature C_0=0.083μF, L_0=4mH)
8	Alarm reset method	Momentary power failure (Minimum 5 sec, voltage ≤2.5V DC)
9	Operating temperature range	temperature: -10°C ~ +50°C (A1R)、-10°C ~ +65°C (BS) smoker detector: -10°C ~ +55°C
10	Relative humidity	≤95% (Non-condensing)
11	Shell material	ABS
12	Protection level	IP33 (temperature detector) / IP23 (smoker detector)
13	Dimensions (diameter x height)	Temperature detector: Φ100mm×53.3mm (with base) Smoker detector: Φ100mm×54.5mm (with base)
14	Installation hole distance	45mm ~ 75mm
15	Weight	Temperature detector: about130g Smoker detector: about 110g

2.4.4.3 Sound and Light Alarm

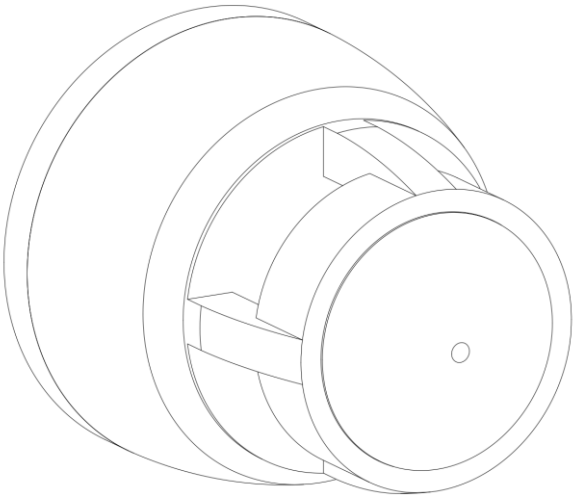


Figure 2-19 Appearance of Sound and Light Alarm

Description: This sound and light alarm can sound a sound and light alarm when it is triggered. It can be used in conjunction with a bus-type fire alarm controller through an output module. When the fire alarm controller issues a start command, the output module will start the sound and light alarm according to the command. Subsequently, the sound and light alarm will send out a dazzling visual alarm signal and a harsh auditory alarm signal to remind the personnel at the accident site that a fire has occurred at the scene and the necessity of taking relevant evacuation measures, thereby preventing the fire accident from expanding.

Table 2-13 Technical Parameters

Model	AW-D316
Operating voltage	24V DC（20 V～28 V）
Operating current	≤100 mA
EN54 - 23 Coverage	C - 3 - 8/W - 2.4 - 6
Flash color and frequency	White，0.5 HZ
Light output	Comply EN54 - 23
Protection level	IP21C
Operating temperature	-10℃ ～ +55℃
Relative humidity	≤95%，No condensation
Material	Flame retardant polycarbonate / acrylonitrile-butadiene-styrene copolymer
Dimension	Diameter 100 mm × high 100.5 mm(with base)
Mounting hole spacing	45 mm ～ 70 mm

Weight	about 266g (with base)

2.4.4.4 Aerosol

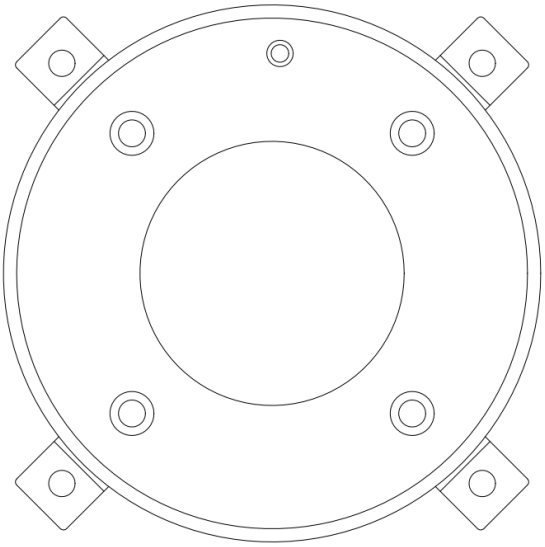


Figure 2-20 Appearance of Aerosol

Description: The aerosol generator is a highly efficient fixed fire extinguishing system component. Once triggered, the device instantly releases a fully submerged aerosol cloud that quickly spreads and covers the entire protected area, extinguishing Class A (solid), Class B (liquid), and Class C (gas) fires through the dual effects of chemical suppression and suffocation.

Table 2-14 Technical Parameters

Specification	Value
Model	11-1
Part Number	DSPA-ART00011
Dimensions	122×22 mm
Total weight	550 g
Compound weight	110 g
Volume coverage	0.9~2.5 m³
Discharge time	8 sec
Activation current	1.3A
Operation conditions	-40°C~75°C，maximum 95% humidity (54°C)

Colour	Stand RAL 3000

2.4.4.5 Air Intake and Exhaust Device

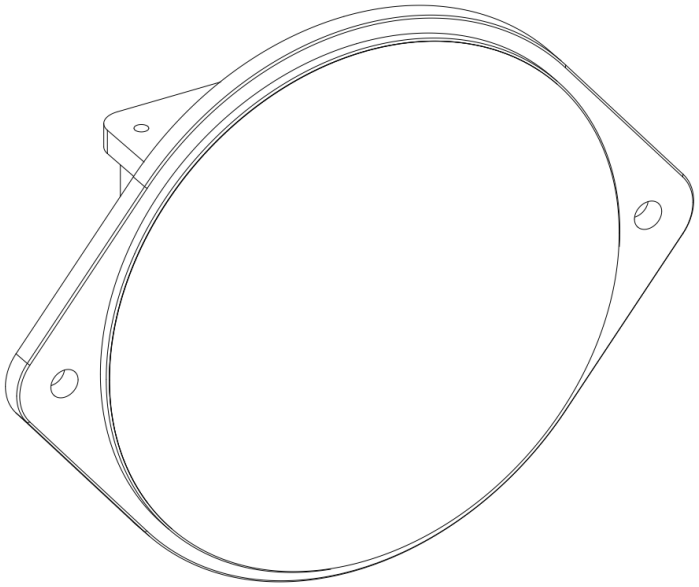


Figure 2-21 Appearance of Air Intake

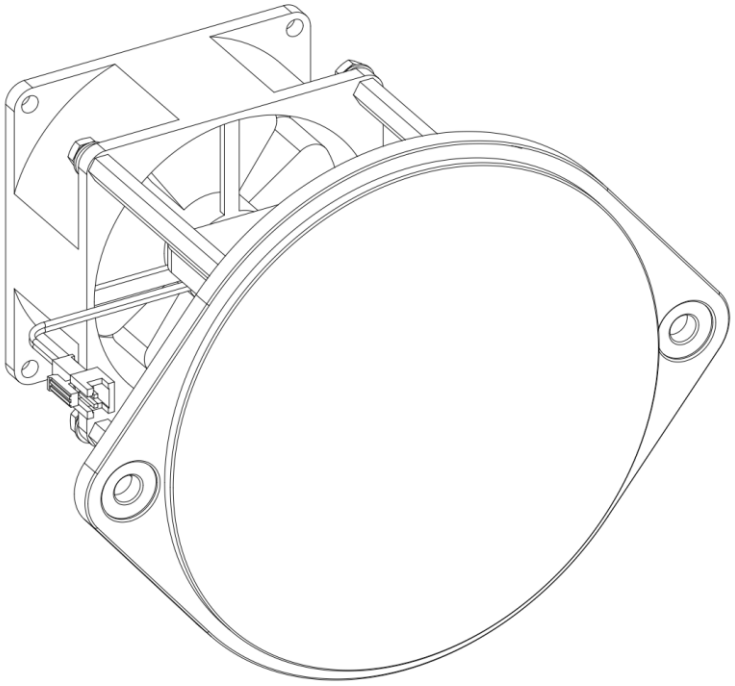


Figure 2-22 Appearance of Air Exhaust

Description: Component description: When the internal sensor detects abnormal pressure or smoke, it triggers a 24V positive voltage signal to drive the electric push rod to push out, the valve opens

directionally and quickly releases high-pressure gas and smoke to avoid the risk of explosion; after the pressure relief is completed, a 24V reverse voltage is automatically applied to retract the electric push rod, the valve is accurately closed, and the system is restored to a sealed state, forming a fully closed-loop safety mechanism with the core advantages of rapid response and reusability.

Table 2-15 Technical Parameters

NO.	Item	Specification	Value
1	Basic Protection	Waterproof grade	IP66
		Operating temperature range	-20℃ ~ +80℃
		Corrosion resistance grade	External C4H InternalC3H
		Environmental standards	ROHS 2.0
		Design life	10 years
2	Performance	Exhaust area (after open)	>5836 mm²
		Electric propulsion drive voltage	DC24V (Minimum 18V Start)
		Electric propulsion power/current	<2W / 0.05A±15%
		Travel speed and distance	4mm/s，30mm travel
		Wiring method	Red is positive and black is negative, automatic power-off protection (risk of burning if over 100s)
		Wiring specifications	UL1007#24AWG，290mm
3	Cooling fan	Fan power/current	48W / 2.0A±15%
		Voltage/speed	DC24V / 13650 RPM
		Air volume range	121.2~134.7 CFM
		Dimension	80×80×38mm
		Wiring specifications	UL1007#24AWG, 300mm

2.4.4.6 Explosion Vent

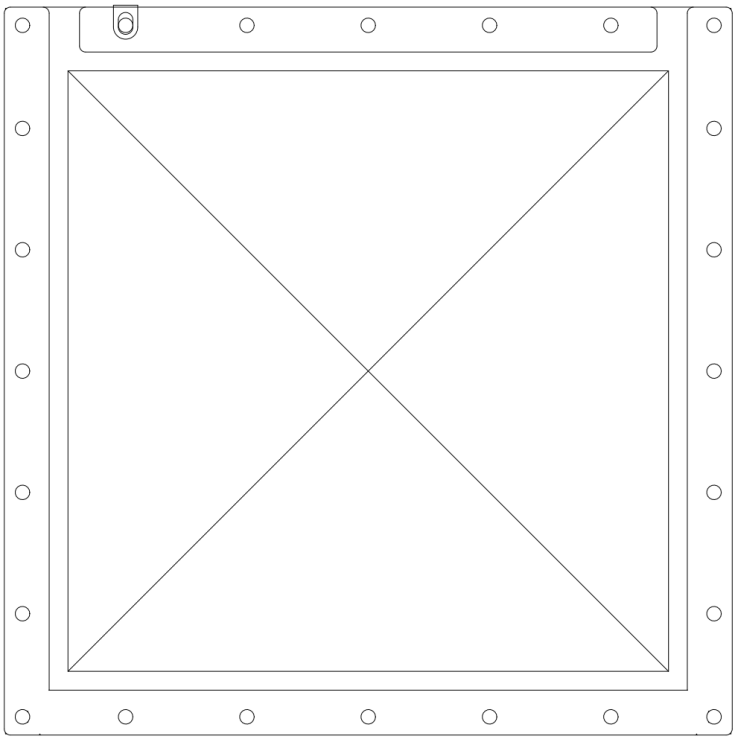


Figure 2-23 Appearance of Explosion Vent

Description: Component description: The explosion venting plate is a key safety component of the energy storage cabinet. It is used to release high-pressure gas and smoke in a directional manner to prevent the cabinet from exploding when the internal pressure suddenly rises due to battery abnormalities (such as thermal runaway or short circuit). The explosion venting plate is installed on the top and linked with the smoke and temperature detection and fire extinguishing system to form a multi-layer protection as the last line of defense. At the same time, it reduces secondary risks through directional pressure relief channels to ensure the safety of equipment and personnel.

2.5 Operating Principle

2.5.1 System Topology Diagram

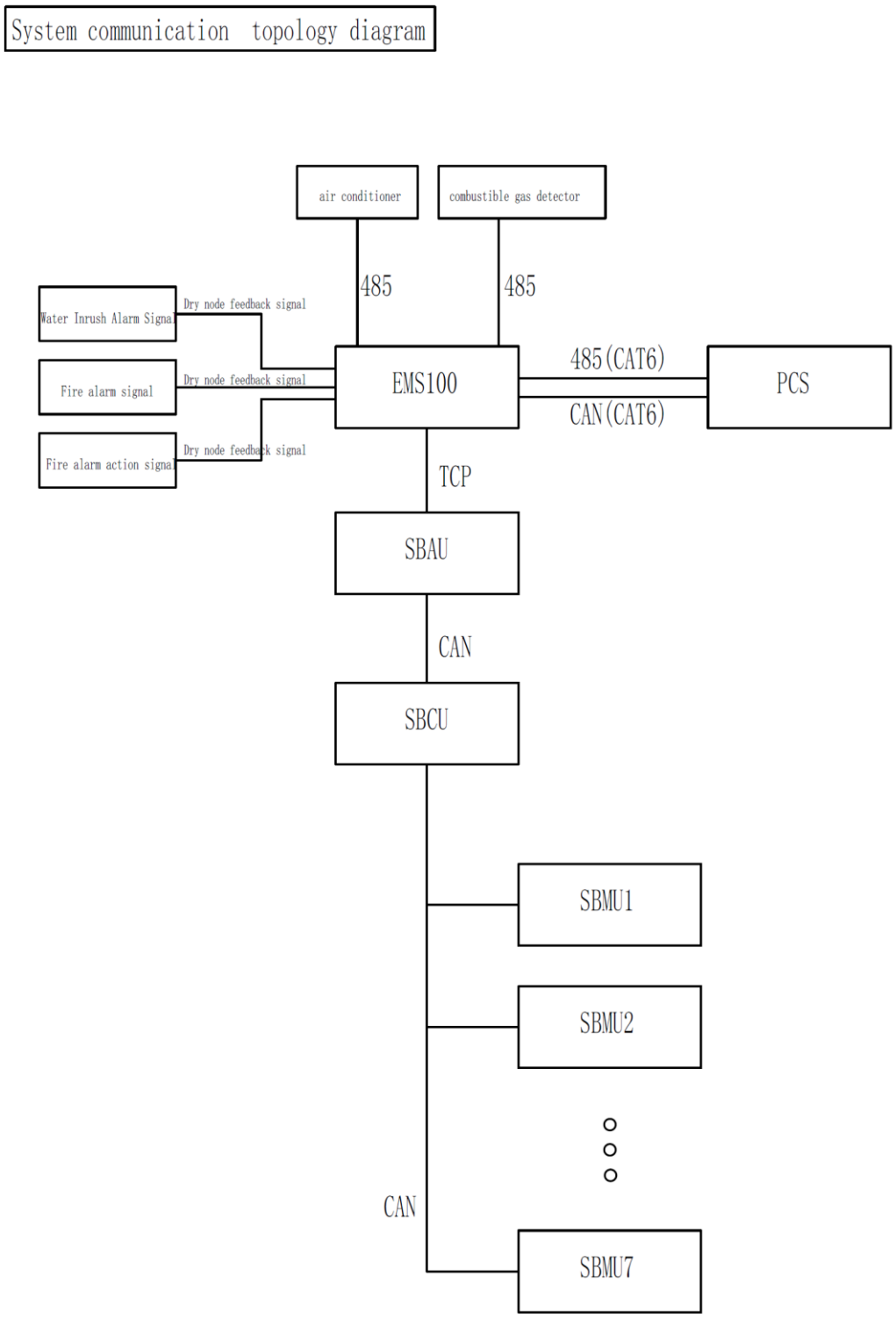


Figure 2-24 Circuit Block Diagram

2.5.2 Fire Protection Logic Diagram

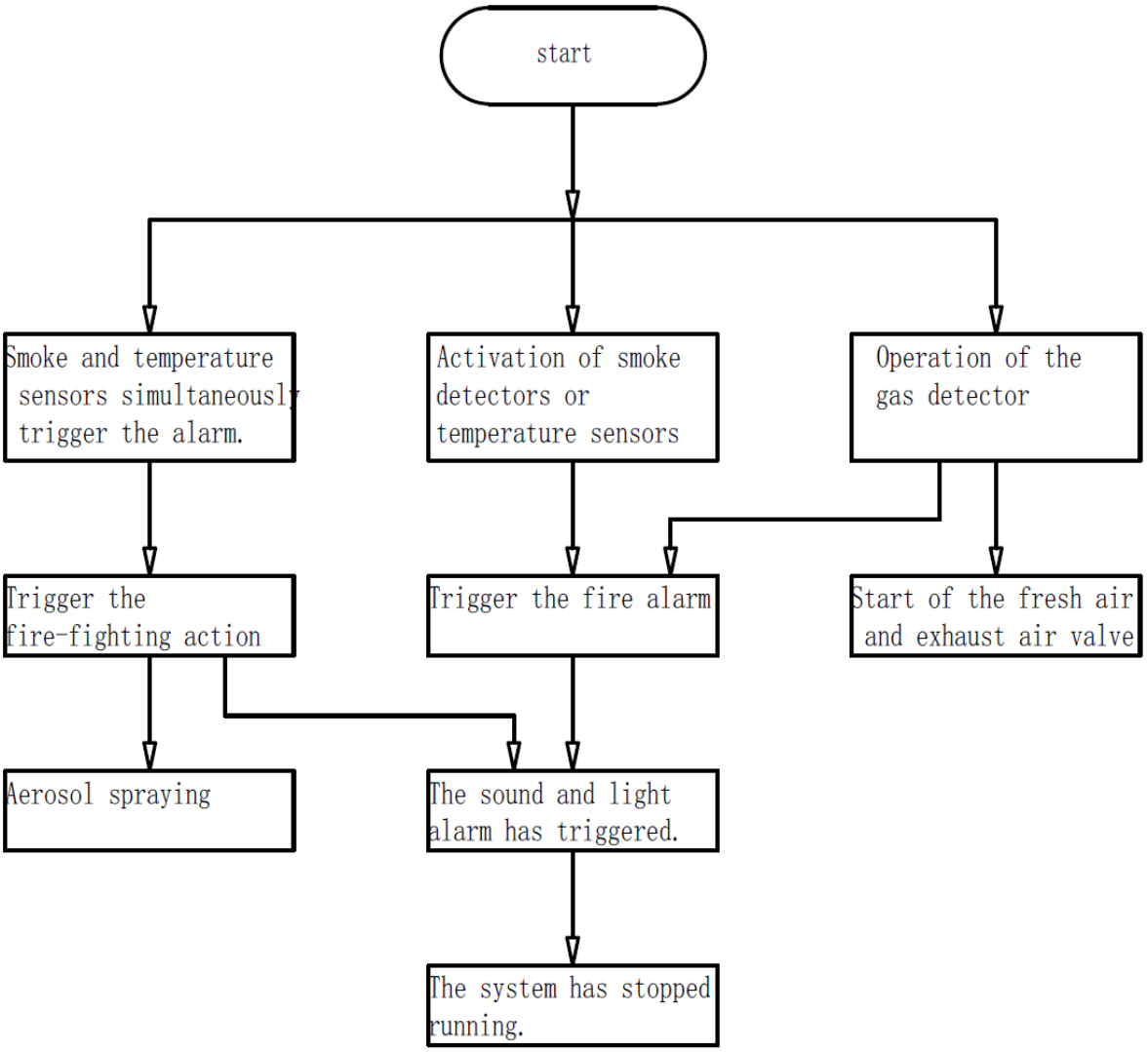


Figure 2-25 Fire Protection Logic Diagram

2.6 Application Scenarios

The system combined with the hybrid inverter can be applied to a variety of industrial and commercial scenarios, including self- consumption, off-grid backup, feed in grid priority, TOU and other scenarios. IP55 and C5 protection support outdoor installation. Flexible design, the system can support up to 300kWh through expansion.

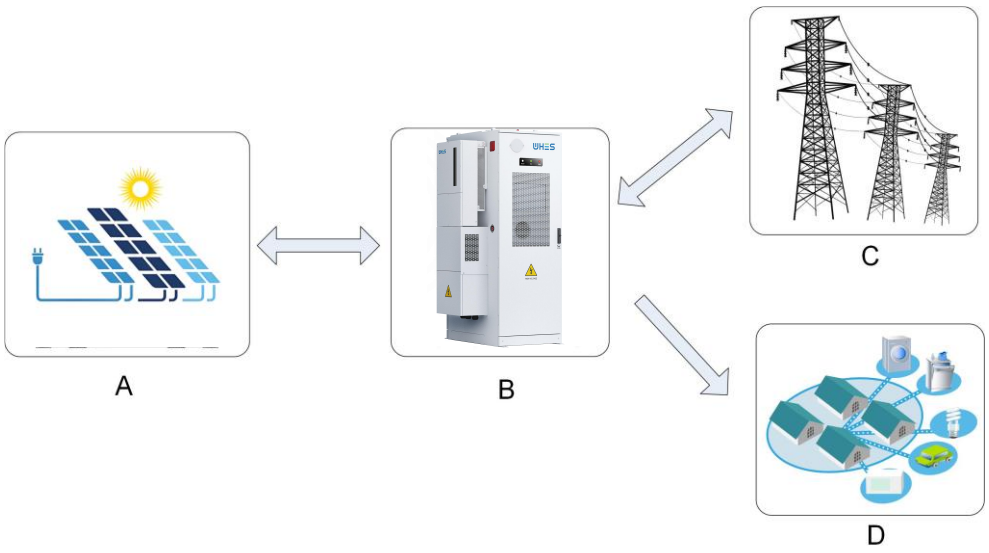


Figure 2-26 Application diagram

Table 2-11 Application diagram description

Name	Device	Description
A	PV panels	
B	DC-100kWh-EC00 (with inverter)	。
C	Grid	/
D	Loads	/

3 Site Requirements

3.1 Site Selection Requirements

Notice

The site should be selected according to *GB 51048 Design code for electrochemical energy storage station*, *NFPA 855 Standard for the installation of stationary energy storage systems*, and local laws and regulations.

The energy storage system is suitable for outdoor applications and deployed outdoors. For indoor applications, refer to local laws and regulations. General site selection requirements:

- The system should not be installed in low-lying areas, and the installation level should be greater than the highest water level on records in this area.
- There should be at least a 2 km distance from the airport, landfill, river bank or dam.
- Select an open location and ensure that there are no obstacles within 10 m of the site.
- Keep at least 50 m away from residential areas to avoid noise pollution.
- The installation area shall have convenient transportation conditions and be equipped with a reliable fire suppression system.
- The future requirements for the site area must be taken into account, and there should be sufficient reserve space for future needs throughout the life cycle.
- Select a well-ventilated place.
- The energy storage system, when installed in a place subject to salt damage, may be corroded and thus cause fire hazards. Do

not install the energy storage system outdoors in salt-affected areas. Salt damage areas are those within 2 km of the coast or affected by sea breezes. The areas affected by sea breezes vary with meteorological conditions (for example, typhoons, and seasonal winds) or topographical conditions (for example, dams and hills).

Description

1. It is recommended to relocate the site When the safety distance cannot meet the requirements of applicable national standards.
2. If there is no more suitable site, it is recommended to install a fire division wall capable of resisting fire for no less than 3 hours for security protection purposes, and the space requirements for equipment transportation, installation, and maintenance shall be taken into account.
3. As recommended in T/CEC 373-2020, the length and height of the fire division wall shall exceed the outer contour of the prefabricated module by 1 m each, and as described in NFPA 855-2020 Standard for installation of stationary energy storage systems, the spacing can be reduced to 914 mm when there is an independent fire division wall capable of resisting fire for at least 1 hour.

Site selection should avoid scenarios that are not recommended by industry standards and regulations, including but not limited to the following locations, regions, and venues:

- Areas with strong vibration, strong noise source and strong electromagnetic field interference.
- A place where dust, oil fumes, harmful gases, or corrosive gases are produced or exist.
- A place where corrosive, flammable or explosive materials are produced or stored.
- Places with existing underground facilities.
- Ground with adverse geological conditions such as rubber soil and soft soil layer, and ground prone to water accumulation and subsidence.
- Earthquake area with earthquake fault and fortification intensity greater than 9 degrees.
- Areas with direct hazards such as debris flow, landslides, quicksand or karst caves.
- Within the boundary of mining subsidence (fault dislocation)

areas.

- Within the range of blasting hazard.
- Areas likely to be flooded if a dam or levee breaks.
- Important water source sanitation protection area.
- Protected areas of historical relics and monuments.
- Crowded places, high-rise buildings, and underground buildings.

3.2 Forklift Requirements

- Before using a forklift, make sure that the forklift meets the load-bearing requirements: the load-bearing capacity needs to be ⩾5t.
- The recommended fork blade length is ⩾1.5m.

4 Installation

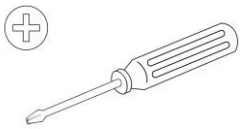
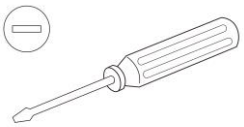
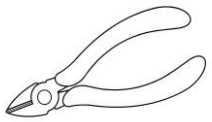
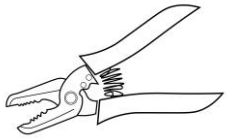
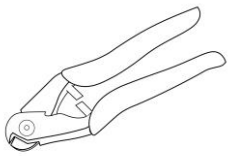
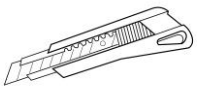
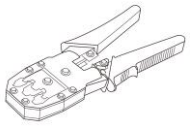
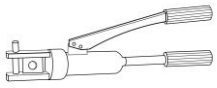
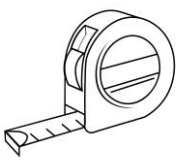
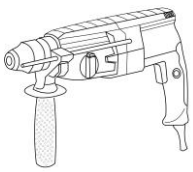
4.1 Preparations before Installation

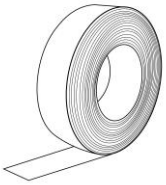
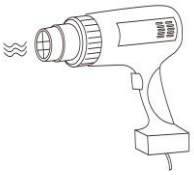
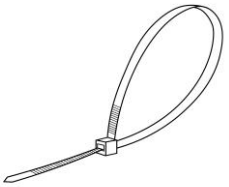
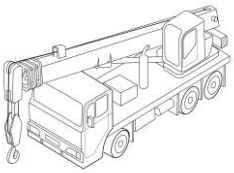
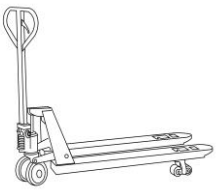
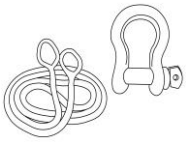
4.1.1 Tools

Description

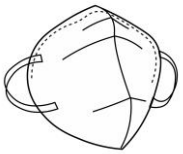
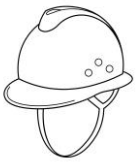
- The tools given here are for reference only.
- The tool list may not list tools that may be rarely used on site, depending on site conditions. On-site installers and users are advised to prepare tools that are not listed.

Installation Tools

 Phillips insulated torque screwdriver	 Insulated torque socket wrench (including extension bar) • Socket specification: 7 mm to 19 mm • Socket depth ≥ 32 mm • The socket coupling matches the torque wrench Torque range: 1.2 N·m to 45 N·m	 Slotted insulated torque screwdriver	 Diagonal pliers
 Wire stripper	 Wire cutter	 Rubber hammer	 Utility knife
 Crimping tool	 Hydraulic tongs	 Allen wrench： 5mm~12mm	 Multimeter with DC voltage measuring range ≥1500V DC
 Steel tape	 Spirit level	 Vacuum cleaner	 Impact drill

 Drill bit Φ16mm	 Heat shrink tubing	 Hot air gun	 Cable tie
 Insulating ladder	 Crane	 Manual forklift	 Forklift
 Lifting rope and lifting eye, rope length	 Crowbar		

PPE

 Insulating	 Protective	 Goggles	 Dust mask
 Insulating shoes	 Reflective vest	 Safety helmet	 Safety belt

4.1.2 Pre-installation inspection

Checking Outer Package

Before unpacking the device, check the packaging for visible damage, such as holes, cracks, or other signs of possible internal damage, and verify the device model. If there are any packaging abnormalities or the device model does not match, do not unpack it and contact your dealer as soon as possible.

Description

You are advised to unpack the cabinet within 24 hours before installing it.

Warning

If the cabinet is more than 2 m high, please take protective measures for working at heights when removing the outer package.

Checking Deliverables

Check the deliverables for completeness or visible appearance damage before removing the outer package. For any omission or damage, contact your vendor.

4.2 Installing Energy Storage System and Cables

Precaution

Danger

- Before making electrical connections, please ensure that all switches of the energy storage system are in the "OFF" position. Otherwise, the high voltage that exists in the energy storage system may lead to electric shock.
- Measure the voltage at the contact before touching any conductor surface or terminal and ensure that the PE cable of the system or component to be repaired is reliably grounded and that there is no risk of electric shock.

Warming

- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.
- Only professional electrical technicians can perform related operations of electrical connection.
- When making electrical connections, operators must wear personal protective equipment.

Description

The cable colors in the electrical connection diagrams in this section are for reference only. The cables must be selected in strict accordance with local cable standards. The yellow and green cables can only be used for protective earthing.

Installation Procedure

Step 1 Remove the outer package of the energy storage system

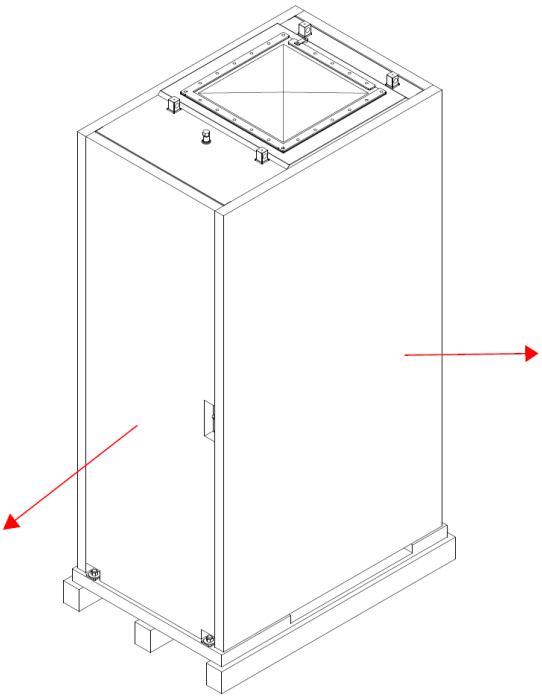


Figure 4-1 Remove the Outer Package

Step 2 Remove the front and rear plates.

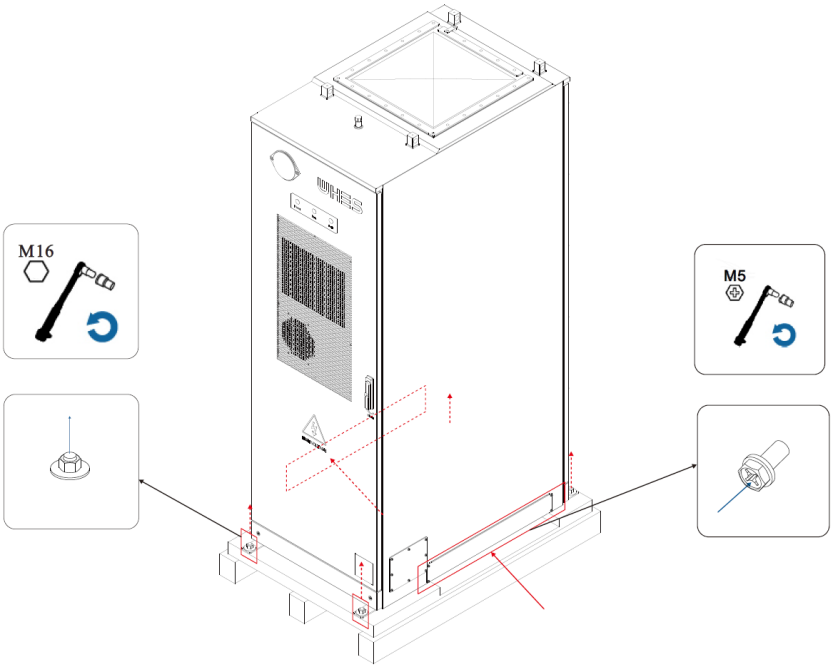


Figure 4-2 Remove the front and rear plates

Step 3 Drill holes on the installation foundation and install expansion screws (M16×90, four screws).

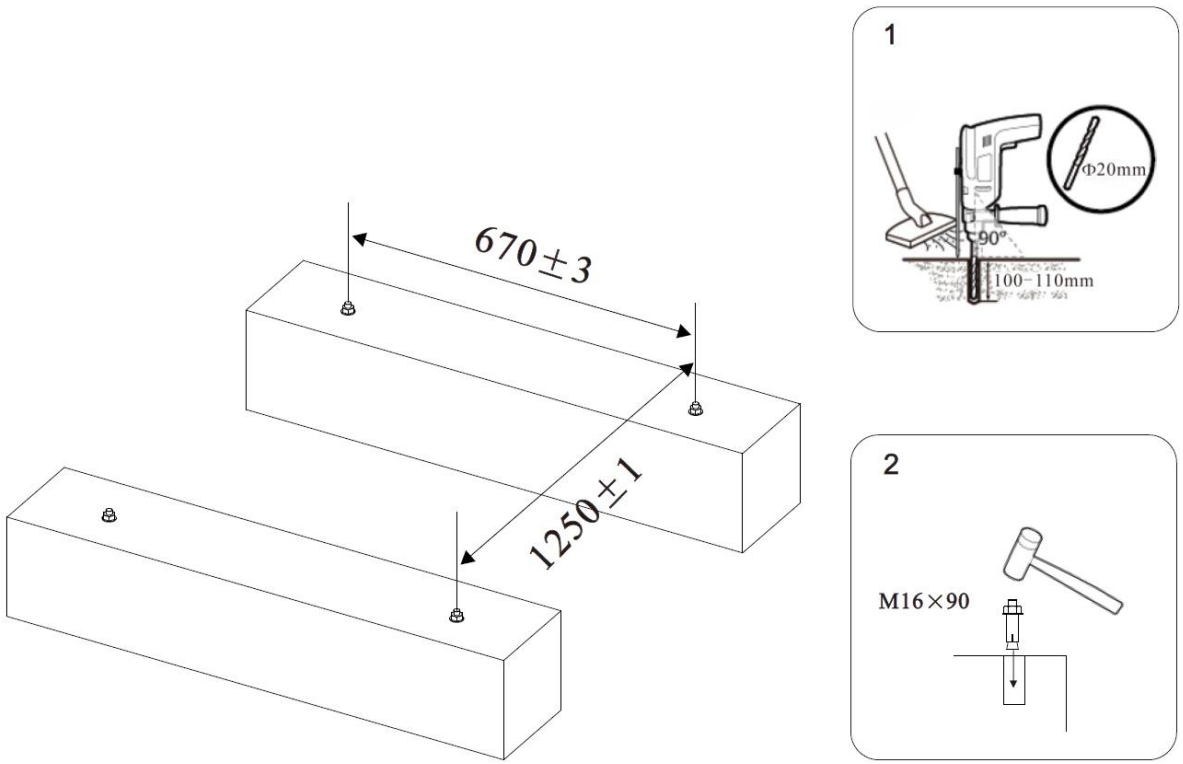


Figure 4-3 Drill doles on the installation foundation

Step 4 Use a forklift to move or lift the equipment to the installation platform.

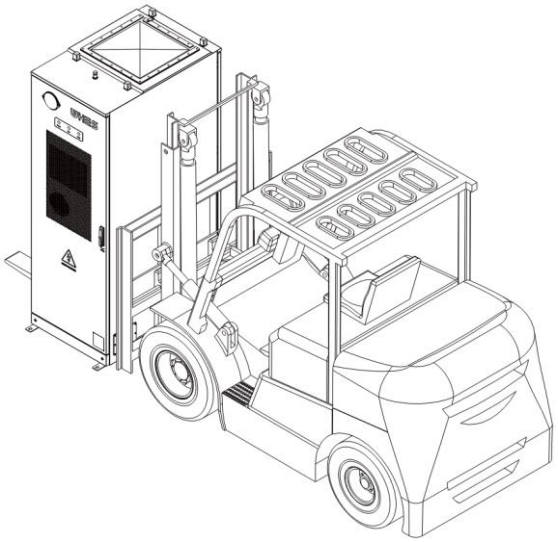


Figure 4-4 Use a forklift to move the equipment to the installation platform

Notice

When a forklift is used to move the equipment, bind and fix the equipment according to site conditions to prevent tipping over

Step 5 Fix the energy storage system.

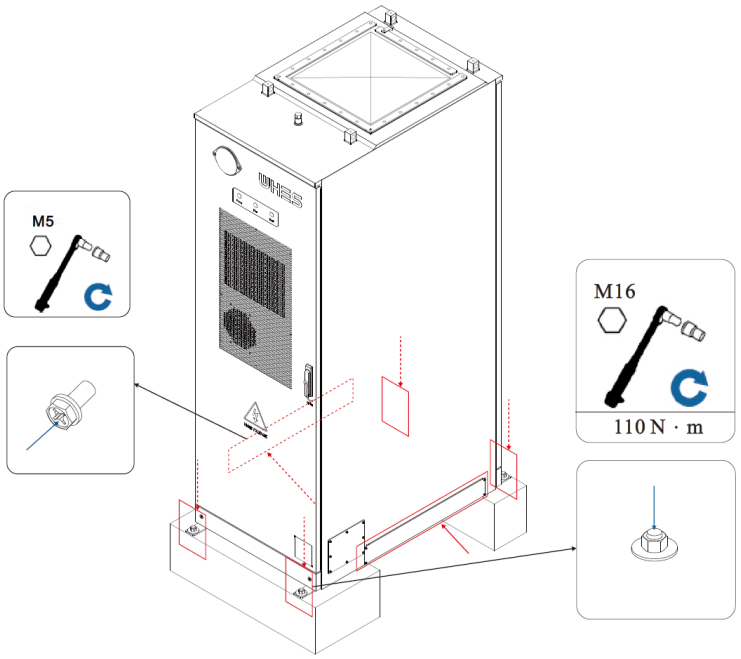


Figure 4-5 Fixing to the installation platform and installing the left and right cover plates

Step 6 Remove the front and rear cover plates.

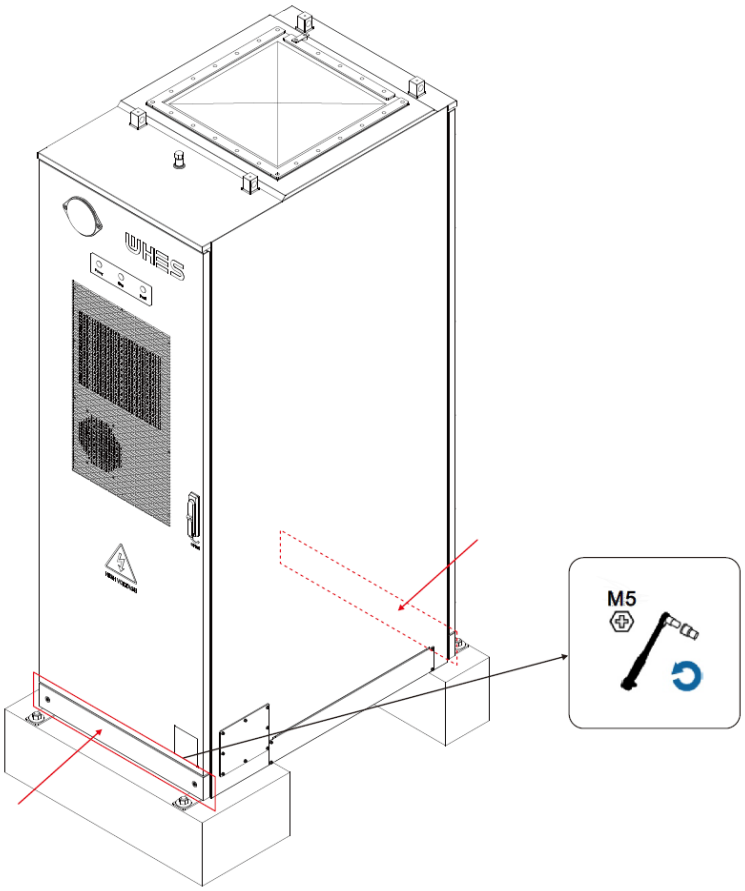


Figure 4-6 Removing the front and rear cover plates

Step 6 Install the grounding bar.

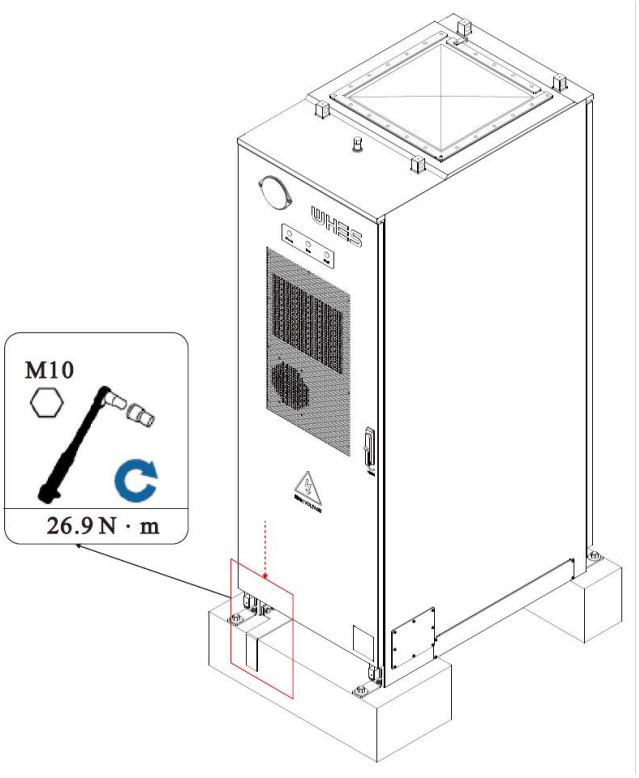


Figure 4-6 Installing the grounding bar

Step 7 Install the front and rear cover plates.

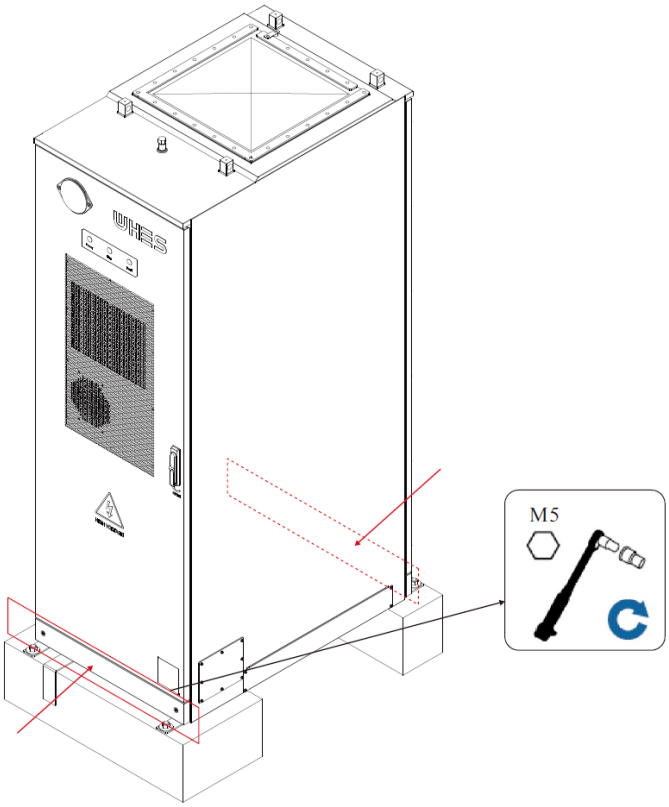


Figure 4-7 Installing the front and rear cover plates

Step 8 Open the front door of the battery compartment.

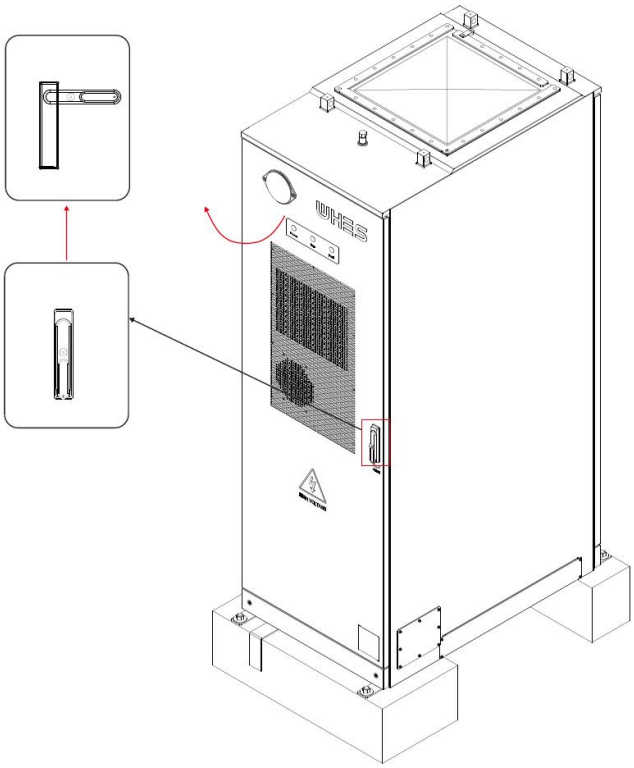


Figure 4-8 Opening the front door of the battery compartment

Step 9 Cabinet combination plan

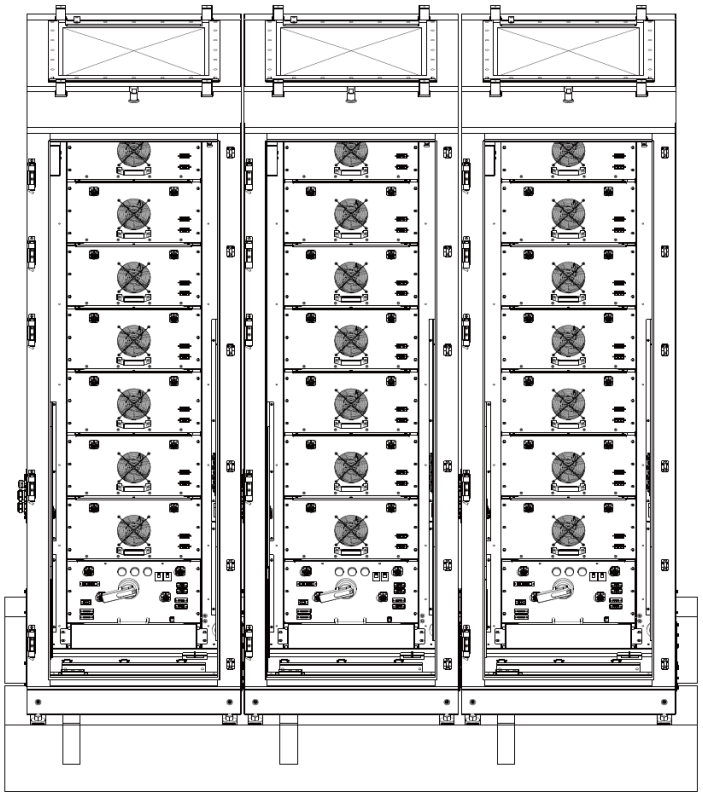


Figure 4-9 Cabinet combination scheme

Step 13: Install the power cables**.**

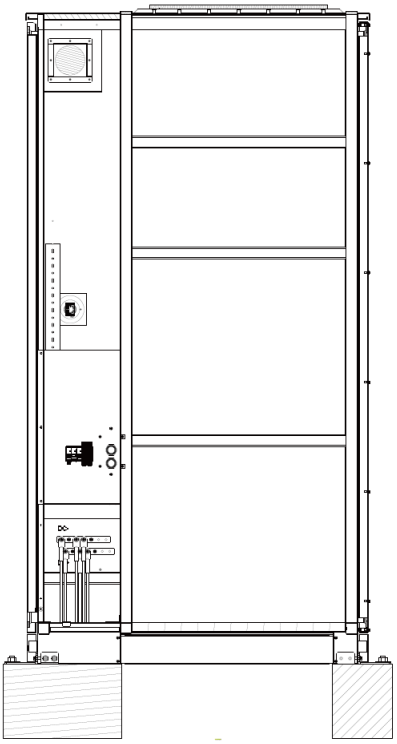


Figure 4-10 Installing the power cable

Step 10 Close the front door of the battery compartment.

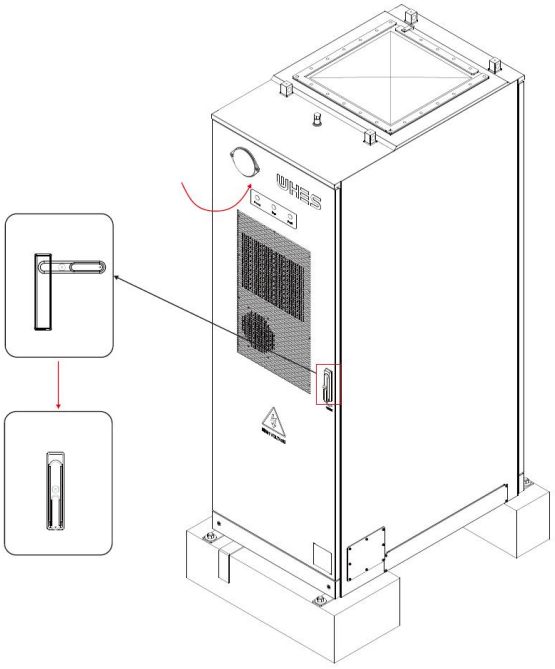


Figure 4-11 Closing the front door of the battery compartment

5 Power On

5.1 Checklist before Power On

SN	Check Item	Acceptance Criteria
1	Equipment appearance	The equipment is free of appearance defect, damage, rusting, or painting defect. If painting peels off, please repair the paint.
		The label on the equipment is legible. Replace a damaged label immediately.
2	Cable appearance	The cable sheath is intact and free of visible damage.
		The cable duct is in good condition.
3	Cable connection	Cable connections are consistent with the design drawing.
		Terminals are manufactured in strict accordance with standards and securely and reliably connected.
		Labels at two ends of various cables are legible and uniformly oriented.
4	Cable layout	HV cables and LV cables are properly routed and separated.
		Cables are routed in a pleasant style.
		Cable connectors are cut to a proper length without burr
		Suitable length is reserved at turns as required. Do not pull cables tight at turns
		Cables are routed straightly and smoothly without crossing in the cabinet.
5	Switch	The circuit breaker of the distribution cabinet is in OFF position.
		The HV box switch is in the OFF position.
6	Copper bar in the lithium battery cabinet	Each cabinet has at least two grounding points, and the grounding is reliable, with a lap resistance of ≤0.1Ω.

7	foreign matter	Clear all foreign objects inside the cabinet, such as tools, remaining installation materials, etc.
8	Distribution area baffle	The baffles in the power distribution area shall be free of cracks, dents, scratches, cracks or looseness.
9	Each sub-component (EMS, BMS, UPS, etc.)	There is no damage on the surface of each sub-component.

5.2 Power-On Procedure

Table 5-1 Power-on procedure

Procedure	Item	Remark
1	Turn on the UPS power supply, close QF5, QF6; supply power to the high-voltage box and communication equipment.	You need to long press the "Power" button on the UPS to turn on the AC power output; long press the "Power" button for 10 seconds until it displays ON.
2	Perform the PCS power-on procedure.	For PCS power-on steps, please refer to the PCS User Manual.
3	After the PCS is powered on, close the device auxiliary power QF1.	/
4	Close QF2, QF3, and QF4 in sequence.	Provide power to UPS, air conditioners and other equipment.
5	The energy storage cabinet is powered on.	/
Note a: For the steps of using the equipment, please refer to the inverter user manual; or contact our after-sales engineer.		

6 Technical Specifications

Model	DC-100kWh-EC00
Battery Data	
Rated capacity (kWh)	100
Rated voltage (VDC)	358
Voltage range （VDC)	313.6-397.6
Battery type	LFP(LiFePO4)
Cell specification	3.2V/280Ah
Pack	1P16S
Basic Specification	
Level of protection	IP55
Operating temperature range	-20~55°C (derating > 45°C)
Cooling method	Air-cooling
Max. attitude	2000m
Communication port	Modbus，TCP/IP
Noise	<65dB
Dimensions (W x Dx H)	750*1150*2250mm
Weight(kg)	~1100

7 Maintenance

7.1 Terms Explanation

- Normal operating: Refers to the system that works every day.
- Intermittent operating: Refers to a system that does not have a fixed monthly running frequency and cannot guarantee daily work.
- Long-time unused: The battery system that has not started working for more than 5 months (the battery system needs to be charged to 50% SOC before being suspended).

7.2 Operating Instructions for Normal Operating System

- Perform battery maintenance on the system every twelve months to prevent battery damage. Refer to Section 9.6 for specific maintenance operating method.
- Conduct an inspection of ESS every twelve months (refer to Appendix 1) and make inspection record.

7.3 Operating Instructions for Intermittent Operating System

- The operating instructions are the same as those of normal operating system.

7.4 Operating Instructions for Long-time Unused System

- SOC range of battery storage: 30%~50%., avoid long-term storage of batteries below 15% SOC. If the battery is not used for a long time, it is necessary to cut off the power-consuming equipment in time.
- Perform battery maintenance on the system every five months to prevent battery damage. Refer to Section 9.6 for specific maintenance operating method.
- Before the first usage of long-time unused system, the battery system must be fully charged at least once to activate the battery system in order to recover the battery performance to the best condition.

Tips
If the energy storage system is not used for a long time, it will cause irreversible damage to the battery. Please perform regular maintenance.

7.5 Operating Method of Battery Maintenance

In order to ensure the long-term safe and reliable operation of your energy storage system, please read and follow the instructions below:

Maintenance process:
Plan 1 This plan is applicable when SOC of the battery system is low

1.Discharge the battery system to the cut-off condition (Average cell voltage< 3.1V or the lowest voltage<2.8V), then stop discharging, standing for 1 hour.

2.Full charging automatically to the battery system (The highest voltage>3.65V), after charging, standing for 1 hour.

3.Discharge the battery system to 50% and stop

Plan 2 This plan is applicable when SOC of the battery system is high

1.Full charging automatically to the battery system (The highest voltage>3.65V), after charging, standing for 1 hour.
2.Discharge the battery system to the cut-off condition (Average cell voltage< 3.1V or the lowest voltage<2.8V), then stop discharging, standing for 1 hour.
3.Charge the battery system to 50% and stop

Tips
1.Check to ensure environmental safety, system safety, no alarm, no fault before performing maintenance operations. 2.After the battery maintenance of ESS is completed, you can notify our after-sales engineer to perform data analysis for free.

A Crimping OT/DT Terminals

OT/DT Terminal Requirements

- When a copper core cable is used, a copper terminal must be used.
- When a copper-clad aluminum cable is used, a copper terminal must be used.
- When an aluminum alloy cable is used, a copper-to-aluminum adapter terminal or an aluminum terminal with copper-to-aluminum adapter tab must be used.

Notice

- Do not connect an aluminum terminal directly to the terminal block. Otherwise, electrochemical corrosion may occur, affecting the reliability of cable connection.
- When a copper-to-aluminum adapter terminal or an aluminum terminal with copper-to-aluminum adapter tab is used, the requirements defined in IEC61238-1 must be met.
- When a copper-to-aluminum adapter tab is used, the front and back sides shall be identified. The aluminum side of the tab contacts the aluminum terminal and the copper side contacts the terminal block.

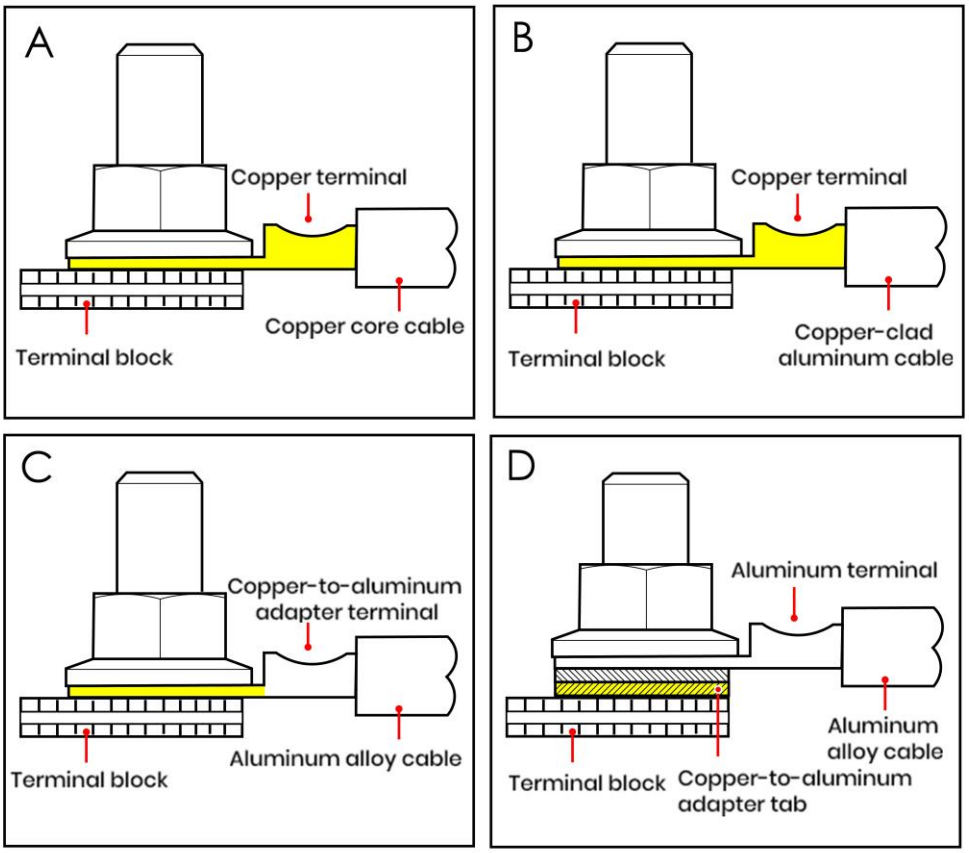


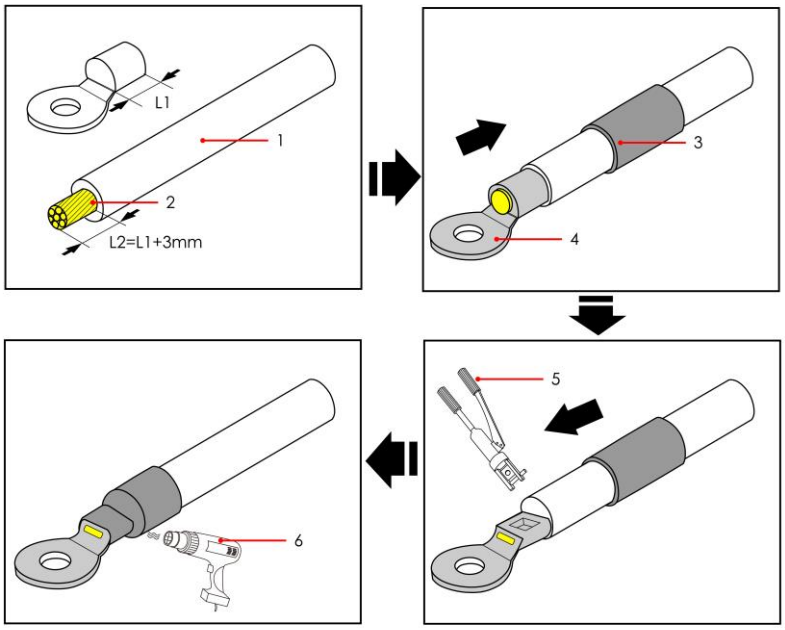
Figure A-1 OT/DT terminal requirements

Crimping OT/DT Terminals

Notice

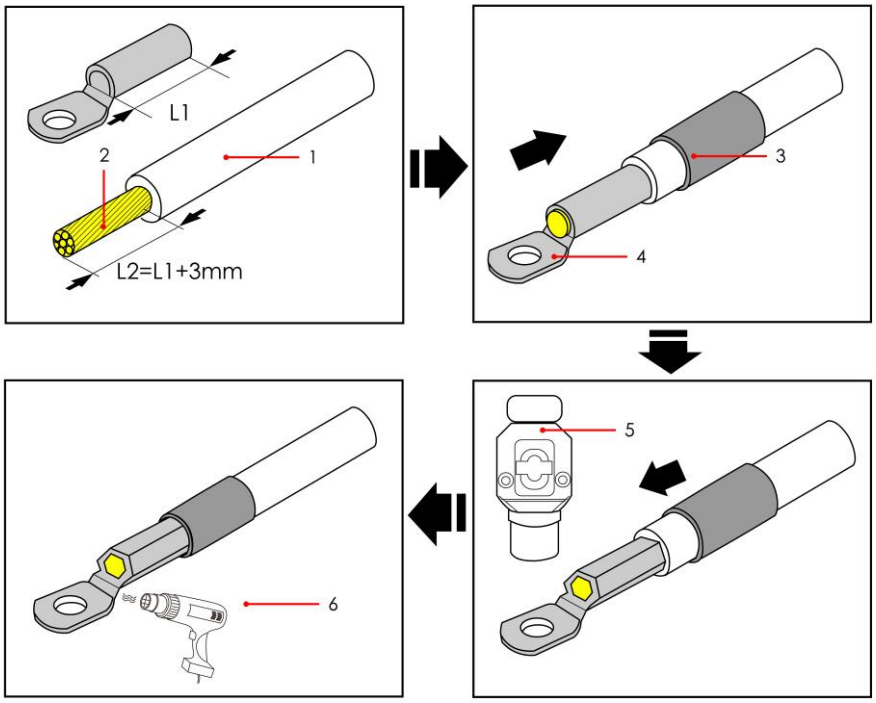
- Do not damage the core while stripping.
- The cavity formed after crimping the conductor tab of the OT/DT terminal should completely cover the core, and the core should be tightly bonded to the OT/DT terminal without loosening.
- The crimping point can be covered with heat shrink tubing or insulation tape. Here, the heat shrink tubing is used as an example.
- Take protective measures when using a hot air gun to prevent equipment damage.

Figure A-2 Crimping OT terminal



(1) Cable (2) Core (3) Heat shrink tubing (6) Hot air gun
(4) OT terminal (5) Hydraulic tongs

Figure A-3 Crimping DT terminal



(1) Cable (2) Core (3) Heat shrink tubing
(4) DT terminal (5) Hydraulic tongs (6) Hot air gun

B How to Repair Paint

Preconditions

- Do not repair paint in bad weather conditions such as rain, snow, wind, sand storm, without shelter outdoors.
- The paint that meets the requirements has been prepared according to the color palette provided at the time of delivery.

Important

The equipment appearance shall be in good condition. Immediately repair paint if any painting defect exists.

Description

Visually inspect the painting defect and prepare necessary tools and materials. The number of materials is subject to on-site evaluation for paint repair.

Table B-1 Paint repair

Degree of Painting Defect	Tools and Materials	Operation Procedure	Description
Light scratches (The steel sheet substrate is not exposed)	Spray paint or paint, brush (for small-area repainting), fine sandpaper, anhydrous ethanol, cotton cloth, and spray gun (for large-area repainting).	Go through step 1, step 2, step 4, and step 5.	1. For the color of the top coating (acrylic paint), refer to the color palette provided at the time of delivery and Pantone color
Stains or rusting that cannot be wiped off			

Deep scratches (The primer is broken and the steel sheet substrate is exposed)	Spray paint or paint, zinc-rich primer, brush (for small-area repainting), fine sandpaper, anhydrous ethanol, cotton cloth, spray gun (for large-area repainting).	Go through step 1, step 2, step 3, step 4, and step 5.	code indicated on the color palette. 2. Spray paint or brush painting is recommended for small scratches and small-area stains and rusting. 3. A spray gun is recommended for a large number of scratches and large-area stains and rusting. 4. The paint film should be as thin and uniform as possible, the paint film should not be droplet shaped, and the surface should be smooth. 5. Rest the painted surface for about 30 minutes before proceeding with subsequent operations.
Logo and pattern defects	For logo or pattern defects, identify the logo size and color code, and then ask a local painting service provider to establish a repainting plan and make repairs according to logo size, color, and defect condition.		
Pitting	1. When the pitting area is less than 100 mm2 and the depth is less than 3 mm, pitting area should be filled with unsaturated polyester resin putty (Poly-Putty base), and then repainted as deep scratches. 2. When the pitting area is larger than 100 mm2 and the depth is greater than 3 mm, ask your local service provider to put forward a repainting solution according to actual needs.		

Cabinet color number standard

Table B-2 Paint repair

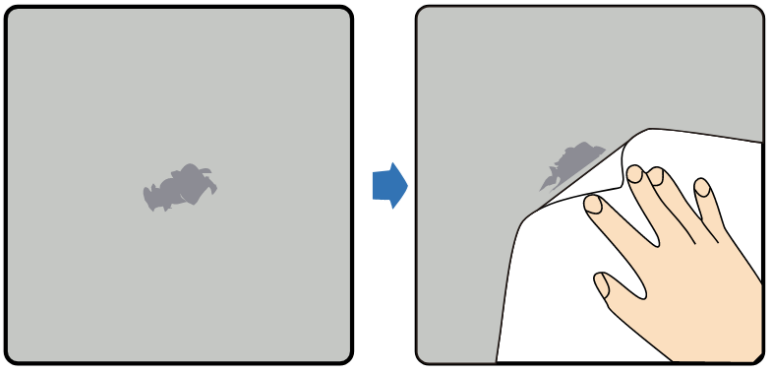
unit	Colour number

Top cover, base	RAL9016 small orange pattern
Shell, other sheet metal parts	RAL9016 small orange grain

Operation Procedure

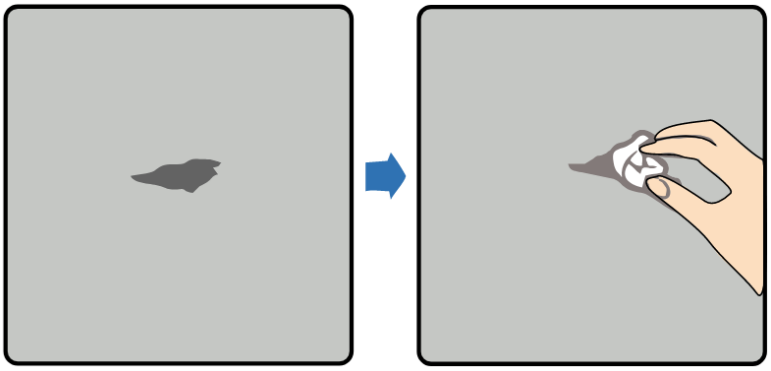
Step 1 Gently grind the damaged area with fine sandpaper to remove dirt or rust.

Figure B-1 Grind the damaged area with fine sandpaper



Step 2 Wet the cotton cloth with anhydrous ethanol, wipe the sanded area or the area to be repaired to remove surface dirt and dust, and then wipe dry with clean cotton cloth.

Figure B-2 Treat the damaged coating with anhydrous ethanol



Step 3 Apply zinc-rich primer to the damaged area with brush or spray gun

Notice

- If the substrate is exposed in the area to be repaired, an epoxy zinc-rich primer must be applied first until the substrate is not exposed after the paint is dry, and then an acrylic top coating should be applied.
- Select an epoxy zinc-rich primer or an acrylic top coating of the

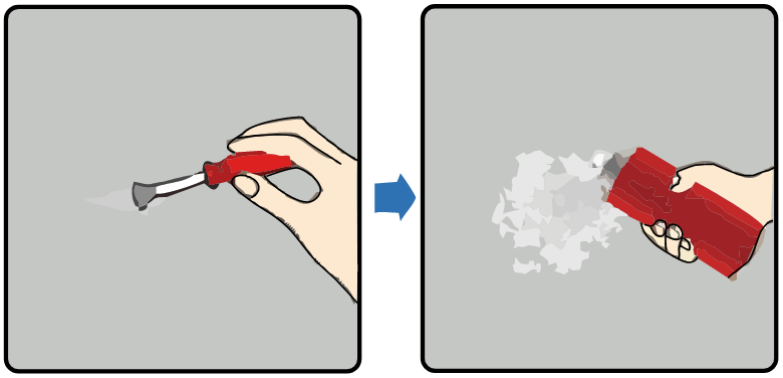
corresponding color according to the top coating color of the equipment.

Step 4 Select one of the methods of spray painting, brush painting, spray gun spraying according to paint defect degree to evenly repaint the damaged area until the coating defect is not visible.

Notice

- It should be noted that the paint film should be as thin and uniform as possible, the paint film should not be droplet shaped, and the surface should be smooth.
- If the patterns on the equipment use multiple colors, use tape and white paper to cover the parts of other colors other than the damaged paint before repainting to avoid contamination of other color parts during repainting operation.

Figure B-3 Repainting on damaged coating



Step 5 Upon completion of painting, leave the equipment rest for about 30 minutes, and then check whether the painting area meets the requirements.

Description

- The color of the painting area should match that of its surrounding area. Use a colorimeter to measure the color difference. Check that the color difference ΔE is not more than 3. If a colorimeter is not available, verify that there is no significant edge between the repainted area and its surrounding area. The painting area should also be free of swelling, scratching, peeling off or cracking.
- For spray painting, it is recommended to spray paint 3 times first, and then check whether the requirements are met. Repeat spraying paint

until requirements are met, when necessary.

C How to Recycle Used Batteries

Notice

- The Company does not recycle used batteries. The Customer needs to contact their local recycling plants for disposal of used batteries.
- If no local recycling plant is available, the Customer is recommended to contact recycling plants in their nearest countries or regions for disposal of used batteries.

Step 1 Contact your nearest recycling plant.
Step 2 The recycling plant evaluates the recycling cost.
Step 3 The recycling plant recycles used batteries in two ways:

- Door-to-door recycling service: A recycling plant will provide the door-to-door recycling service. This way, however, may incur time or transportation cost.
- Centralized recycling service: The Customer collects all recycled lithium batteries in a designated place and a recycling plant disposes of these used batteries in a centralized manner.

Description

The transportation cost incurred from the recovery service needs to be borne by the Customer.

Step 4 The recycling plant has full power to dispose of recycled batteries. The recycling plant has full power to dispose of recycled lithium batteries, without customer engagement.

D Contact Information

If you have any questions about this product, please feel free to contact us.

Table D-1 Customer support information

Country or Region	Customer Support Email	Telephone
China	salvator.xu@weiheng-tech.com	15852585119

E Abbreviations

A	
ACAN	CAN used for communication between inverter and MBMU
B	
BMS	Battery Management System
C	
CSC	Cell Supervision Circuit
CCAN	CAN used for communication between CSC and SBMU
CAN	Controller Area Network
E	
EMS	Energy Management System
I	
L	
LAN	local area network
M	
MCAN	CAN used for communication between MBMU and SBMU
S	
SOC	state of capacity
SCAN	CAN used for communication between CSU and SBMU SBMU 与 CSU

Appendix 1

Inspection project	Method	Yes-√ No- × Not applicable-O	Abnormal record
Is the fire extinguishing system	Visual inspection		
Whether the fire extinguishing system is within the validity period	Visual inspection		
Is the cooling system complete	Visual inspection		
Is the cooling system air duct blocked	Visual inspection		
Whether the appearance of the electric cabinet is deformed	Visual inspection		
Whether the appearance of the electric cabinet is rusted or damaged	Visual inspection		
Is there water vapor inside the electric cabinet	Visual inspection		
Whether the LV harness is loose or damaged	Visual inspection		
Whether the HV harness is loose or damaged	Visual inspection		
Whether the wiring harness interferes with the structural parts	Visual inspection		
Whether the high voltage connection is ablated	Visual inspection		
hether the fixing bolt of structural parts is loose or missing	Visual inspection		
Is there a foul smell in the battery compartment	Sniffing		
Is there a pungent smell in the electric cabinet	Sniffing		
Whether HV connection part has burnt smell	Sniffing		
Is the summary data complete	Monitor master computer		
Is the cell voltage data complete	Monitor master computer		
Is the cell temperature data complete	Monitor master computer		
Whether there is an abnormal alarm in the alarm bar	Monitor master computer		
Note: If any abnormalities are found during the inspection, please feedback in time, and contact the relevant personnel for processing.			

