

LUNA2000-2.0MWH-1H0, 2H0 Smart String ESS

User Manual

Issue 02
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About This Document

Purpose

This document describes the installation, electrical connections, commissioning, maintenance, and troubleshooting of LUNA2000-2.0MWH-1H0 and LUNA2000-2.0MWH-2H0 Smart String ESS (also referred to as ESS). Before installing and operating the ESS, ensure that you are familiar with the features, functions, and safety precautions provided in this document.

Intended Audience

This document is intended for photovoltaic (PV) plant operating personnel and qualified electricians.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all updates made in previous issues.

Issue 02 (2021-11-15)

Updated [1.3-Electrical Safety](#).
Updated [1.4-Storage and Installation Environment Requirements](#).
Updated [1.5-Transportation requirements](#).
Updated [1.7-Battery Safety](#).
Updated [2-Overview](#).
Updated [3.2-Space Requirements](#).
Updated [3.3-Foundation Requirements](#).
Updated [4.2-Installing the ESS](#).
Updated [4.3-Installing Components](#).
Updated [5-Installing Cables](#).
Updated [7.4-Powering On the Distribution Transformer](#).
Updated [7.5-Powering On the ESS](#).
Updated [8-SmartLogger Web-based Deployment](#).
Updated [9.5-Powering Off the ESS](#).
Updated [9.6-Powering Off the Distribution Transformer](#).
Updated [10-Alarm Reference](#).
Updated [11-FAQ](#).

Issue 01 (2021-08-30)

This issue is used for first office application (FOA).

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1 Safety Information

1.1 General Safety

Statement

Before installing, operating, and maintaining the equipment, carefully read this document and observe all safety instructions provided herein and written on the equipment itself.

The information provided under the "NOTICE", "CAUTION", "WARNING", and "DANGER" headings within this manual is not intended to cover all applicable safety policies, and instead acts as a supplement to the comprehensive safety information provided. Huawei will not be liable for any consequence that may arise due to violations of general safety requirements or safety standards concerning the design, production, and usage of the equipment.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and any resulting malfunction, component damage, personal injury, or property damage will not be covered under the warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are considered supplementary to local laws and regulations.

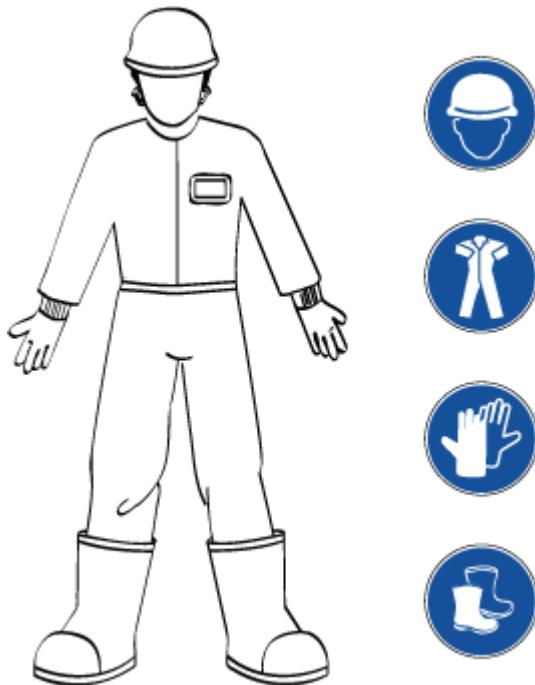
The Company will not be liable for any consequences in any of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments which are not specified in relevant international or national standards
- Unauthorized modifications to the product or software code, or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, and storms

- Damage during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document

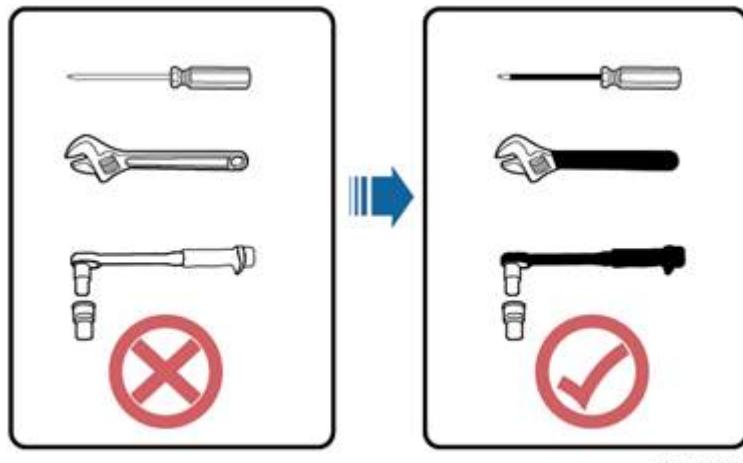
General Requirements

- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.



- Follow the specified procedures for installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- In the case of a fire, immediately leave the building or the equipment area, and activate the fire alarm or call emergency services. Do not re-enter the building or affected area until it has been deemed safe by qualified professionals.
- Do not stop using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.

- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- Use insulated tools or tools with insulated handles.



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- All cable holes should be sealed. Seal the used cable holes with firestop putty.
- Do not obscure, damage, or block any warning labels on the equipment.
- When installing the equipment, use a torque wrench with a proper range to tighten the screws according to the instructions.
- Ensure that power is off during installation.
- Repaint any scratched surfaces caused during equipment transportation or installation in a timely manner. Scratched equipment should not be exposed to an outdoor environment for extended periods.
- Secure the device to the ground or other stable objects before operation.
- Do not use water to clean electrical components inside or outside of a cabinet.
- Do not change the structure or installation sequence of equipment without permission.
- Do not touch a running fan with your fingers, components, screws, tools, or boards before the fan is powered off or stops running.

Personal safety

- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Use tools correctly to prevent personal injury or equipment damage.
- Do not touch the energized equipment, as the enclosure is hot.
- Do not power on the equipment before it is installed or confirmed by professionals.

1.2 Personnel Requirements

- Understand the composition and working principles of the ESS as well as relevant local standards.

- Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).
 - Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
 - Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
 - Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

1.3 Electrical Safety

Grounding

- For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.

General Requirements

 **DANGER**

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the local electric utility company before connecting the equipment to the grid.

- Ensure that the cables you have prepared meet local regulations.
- Use dedicated insulated tools when working with high voltages.

AC and DC Power

 **DANGER**

Do not install or remove power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- Before installing or removing a power cable, turn off the power switch.
- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- Only qualified professionals can replace a damaged component.

Cabling

- When routing cables, ensure at least 30 mm clearance between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables around the air inlet and outlet of the equipment.
- Use flame retardant cables, and the flame retardant rating should comply with local laws and regulations.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that the cables are properly connected and insulated, and meet specifications.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
 - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
 - Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle.
- When selecting, connecting, and routing cables, follow local safety regulations and rules.

ESD

NOTICE

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

- Wear ESD gloves before touching a device or holding a board or PSU.
- When holding a board or PSU, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package removed boards or PSUs with ESD packaging materials before storing or transporting them.

1.4 Storage and Installation Environment Requirements

Storage Requirements

- The total storage and transportation time of the ESS cannot exceed eight months (starting from delivery).
- The storage environment requirements are as follows:
 - a. Ambient temperature: 0–40°C; recommended storage temperature: 20–30°C
 - b. Relative humidity: 5% to 80%
 - c. Place the equipment in a dry and clean place with proper ventilation.
 - d. Keep the equipment in a place that is away from corrosive organic solvents and gases.
 - e. Keep the equipment away from direct sunlight.
 - f. Keep the equipment at least 2 meters away from heat sources.
- The main power loop must be disconnected during storage. It is recommended that the auxiliary power supply be powered on to ensure that the monitoring system works properly.

NOTE

- The temperature and humidity log data, storage environment photos, inspection reports, and other proof must be available to show that the storage requirements are met.
- Batteries should not be stored or left unused for long periods of time. If a lithium battery is stored for a long time, capacity loss may occur. After a lithium battery is stored for 12 months in the recommended storage temperature, the irreversible capacity loss rate is 3%–10%.

Installation Environment Requirements

- When installing the ESS, comply with the fireproof distance or firewall requirements specified in local standards, including but not limited to *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems*.

- Take protection and isolation measures for the ESS, such as erecting fences, walls, and safety warning signs to prevent personal injury or property damage caused by unauthorized access during operations.
- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- If any liquid is detected inside the equipment, immediately disconnect the power supply and contact the administrator.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- Do not install the battery outdoors in salt-affected areas because it may corrode and cause fires. A salt area refers to the region within 2 km from the coast or prone to sea breeze. The regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

High-altitude installation requirements

- Working at heights refers to operations that are performed at least 2 meters above the ground.
- Do not work at heights if the steel pipes are wet or other potential danger exists. After the preceding conditions no longer exist, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.
- When working at heights, comply with local relevant laws and regulations.
- Only trained and qualified personnel are allowed to work at heights.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.
- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.

- Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.

1.5 Transportation requirements

The product passes the certifications of the 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 (Part 2: Performance Test of the Rules for the Inspection of Packaging for Exporting Dangerous Goods). This product belongs to class 9 dangerous goods.

The product can be delivered to the site directly and transported by land and water:

- Vehicle load bearing requirements: The weight of a single container is about 30 tons.
- Speed limit: 80 km/h on flat roads and 60 km/h on rough roads.
- Stacking requirements at ports and during shipping: A maximum of five ESSs can be stacked.

The packing case must be secured for transportation, compliant with related China national standards, and printed with signs such as anti-collision and moisture prevention. Affected by external environment factors, such as temperature, transportation, and storage, the product specifications may vary and are subject to that of the delivery date.

Protect the equipment from the following situations:

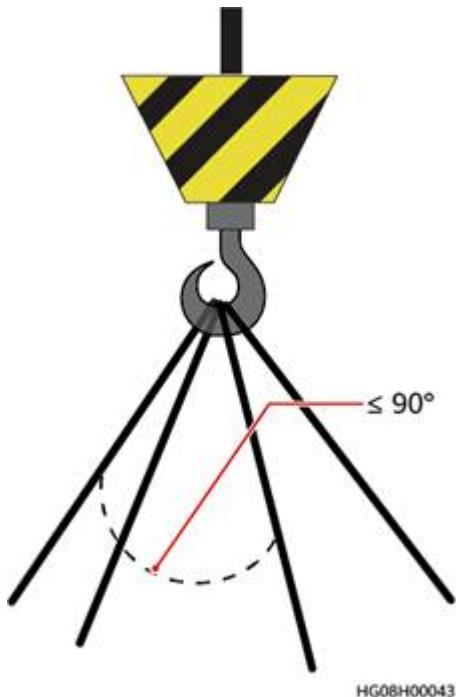
- Being dampened by rains, snows, or falling into water
- Falling or mechanical impact
- Being upside-down or tilted

1.6 Mechanical Safety

Hoisting

- Do not walk under hoisted objects.
- Only trained and qualified personnel are allowed to perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.

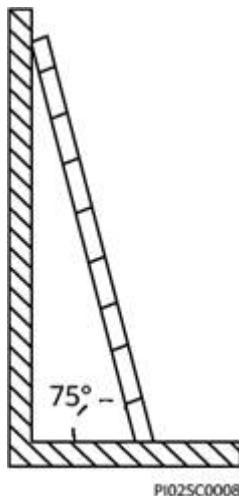
- Ensure that the angle formed by two hoisting cables is no more than 90 degrees, as shown in the following figure.



- Do not drag steel ropes and hoisting tools or bump hoisted objects against hard objects during hoisting.

Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle ruler can be used for measurement. Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.



- When climbing a ladder, take the following precautions to reduce risks and ensure safety:
 - Keep your body steady.
 - Do not climb higher than the fourth rung of the ladder from the top.
 - Ensure that your body's center of gravity does not shift outside the legs of the ladder.

Drilling Holes

When drilling holes into the ground, observe the following safety precautions:

NOTICE

Do not drill holes into the equipment. Otherwise, the electromagnetic shielding of the equipment may be affected and components or cables inside may be damaged. Metal shavings from drilling may short-circuit boards inside the equipment.

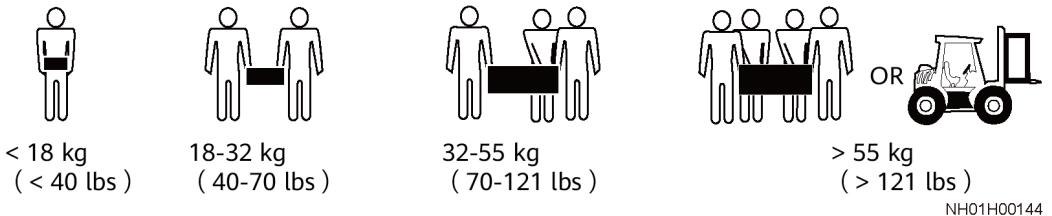
- Customer consent must be obtained prior to drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

Moving Heavy Objects

⚠ DANGER

When pulling the equipment out of a cabinet, be aware of unstable or heavy objects on the cabinet to prevent injury.

- Be cautious to prevent injury when moving heavy objects.



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- When moving the equipment by hand, wear protective gloves to prevent injury.
- Do not scratch the equipment surface or damage components and cables when moving the equipment.
- When transporting the equipment using a forklift truck, ensure that the forks are properly positioned so that the equipment does not topple. Before moving the equipment, secure it to the forklift truck using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Move the equipment with caution. Any bumping or falling may damage the equipment.

1.7 Battery Safety

Basic Requirements

Before operating batteries, carefully read the safety precautions for battery handling and master the correct battery connection methods.

DANGER

- Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. The battery may cause a fire if overheated.
- To avoid leakage, overheating, or fire, do not disassemble, alter, or damage batteries. For example, do not insert foreign objects into batteries or place batteries in water or other liquids.
- Batteries must be stored indoor and separated from other materials.
- Wear goggles, rubber gloves, and protective clothing to avoid damage caused by electrolyte in the case of electrolyte overflow. If a battery overflows, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.
- Use dedicated insulation tools to install the equipment and connect cables.
- Move batteries in the required direction. Do not place a battery upside down or tilt it.
- Keep the battery loop disconnected during installation and maintenance.
- Use batteries of specified models. Using batteries of other models may damage the batteries.

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries may result in environmental pollution.
- The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and fire extinguishers.

Battery Installation

Before installing batteries, observe the following safety precautions:

- Install batteries in a well-ventilated, dry, and cool environment that is far away from heat sources, flammable materials, moisture, extensive infrared radiation, organic solvents, and corrosive gases. Take fire prevention measures.
- Place and secure batteries horizontally.
- Ensure that the batteries are installed in the correct polarity and are not short-circuited.
- Check battery connections periodically, ensuring that all screws are securely tightened.
- When installing batteries, do not place installation tools on the batteries.

Battery Short Circuit

 **DANGER**

Battery short circuits can generate high instantaneous current and release a great amount of energy, which may cause equipment damage or personal injury.

To avoid battery short circuit, do not operate the battery with power on.

Lithium Battery

Pay attention to the following precautions when working on lithium batteries:

 **WARNING**

Replacing batteries with the incorrect model may cause fire.

- Replace batteries with the model recommended by the manufacturer.
- When handling a lithium battery, do not place it upside down, tilt it, or bump it with other objects.
- Keep the lithium battery loop disconnected during installation and maintenance.
- Do not charge a battery when the ambient temperature of the battery cabin is below the lower limit of the operating temperature (charging is forbidden at 0°C). Low-temperature charging may cause crystallization, which will result in a short circuit inside the battery.

- Use batteries within the allowed temperature range. Otherwise, the battery performance and safety will be compromised.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

1.8 Maintenance and Replacement

 **DANGER**

High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Prior to maintenance, power off the equipment and strictly comply with the safety precautions in this document and relevant documents.

- Maintain the equipment with sufficient knowledge of this document and using proper tools and testing equipment.
- Before maintaining the equipment, power it off and follow the instructions on the delayed discharge label to ensure that the equipment is powered off.
- Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.
- If the equipment is faulty, contact your dealer or vendor.
- The equipment can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the equipment.

2 Overview

2.1 Model Description

Product Model

This document involves the following product models:

- LUNA2000-2.0MWH-1H0
- LUNA2000-2.0MWH-2H0

Figure 2-1 LUNA2000-2.0MWH-2H0 model number

LUNA2000-2.0MWH-2H0

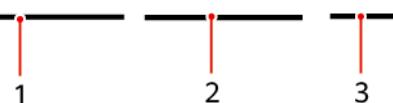


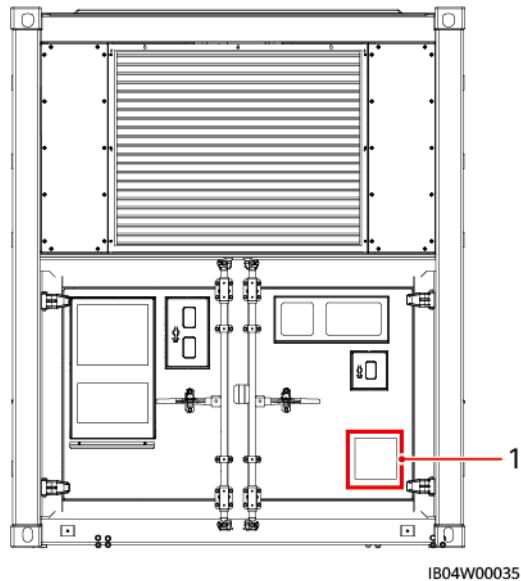
Table 2-1 Model number description

No.	Meaning	Description
1	Series name	LUNA2000: Smart String ESS
2	Capacity level	2.0MWH: The nominal capacity is 2064 kWh
3	Backup power	<ul style="list-style-type: none">• 1H0: Applies to scenarios where the backup duration is greater than or equal to 1 hour.• 2H0: Applies to scenarios where the backup duration is greater than or equal to 2 hours.

Model Identification

You can view the product model on the nameplate on the side of the container.

Figure 2-2 Position of the model label



(1) Position of the model label

Figure 2-3 LUNA2000-2.0MWH-1H0 nameplate



Figure 2-4 LUNA2000-2.0MWH-2H0 nameplate



2.2 Label Description

Label	Name	Meaning
	Electric shock warning	High voltage may occur after the device is powered on. Only qualified and trained electrical technicians are allowed to install and operate the device.
	Grounding symbol	Indicates the position for connecting the ground cable.
	Height label	The equipment is high. You may need tools such as an insulation stool or a step ladder to facilitate operation.

Label	Name	Meaning
HWFU 000000 0	Container No. label	Displays the equipment container number.

2.3 Functions and Features

Functions

The Smart String ESS LUNA2000-2.0MWH-1H0 and LUNA2000-2.0MWH-2H0 (excluding the Smart PCS) can manage charge and discharge of the DC power rectified by the Smart PCS for power grid peak shaving and frequency regulation.

Features

The ESS is a prefabricated all-in-one energy storage system that integrates the prefabricated modular structure system, power supply and distribution system, monitoring system, environment control system, fire extinguishing system, and integrated cabling system. It features high safety and reliability, fast deployment, low cost, high efficiency, and intelligent management.

- One controller per rack
 - Each battery rack is connected to a Smart Rack Controller that manages the charge and discharge of the rack independently, improving the available capacity and system availability and supporting the mixed use of old and new batteries.
- One optimizer per pack
 - a. Fully leverages the module capacity in the battery racks.
 - b. The battery pack can be replaced directly without manual SOC calibration. The replacement time is reduced and experts are not required onsite.
- Flexible and phased deployment
 - Flexible replacement and capacity expansion: The capacity of a PV plant can be expanded by adding ESSs without changing the AC power loop.

2.4 Working Modes

The ESS can work in operating, standby, or shutdown mode.

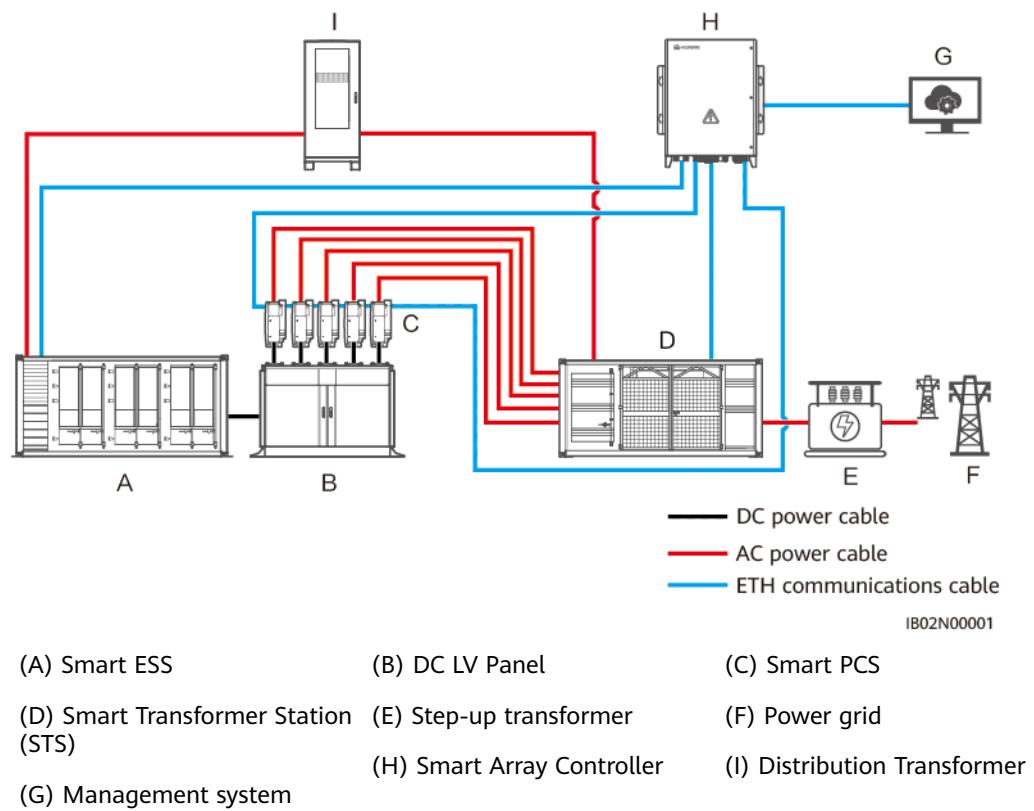
Table 2-2 Working mode description

Operating Mode	Description
Operating	<p>In this mode:</p> <ul style="list-style-type: none">• The ESS charges and discharges the batteries.• The ESS enters shutdown mode after detecting a fault or receiving a shutdown command.• The ESS enters standby mode after receiving a standby command.
Standby	<p>The ESS enters standby mode after receiving a standby command. In this mode:</p> <ul style="list-style-type: none">• The ESS continuously performs status check and enters operating mode once the operating requirements are met.• The ESS enters shutdown mode when receiving a shutdown command or detecting a fault after startup.
Shutdown	<ul style="list-style-type: none">• In standby or operating mode, the ESS enters shutdown mode after detecting a fault or receiving a shutdown command.• In shutdown mode, the ESS enters operating mode after detecting a startup command or that faults are cleared.

2.5 Typical Application Scenarios

The system consists of the Smart ESS (including the Smart Rack Controller), DC LV Panel, Smart PCS, Smart Transformer Station, Distribution Transformer, and step-up transformer.

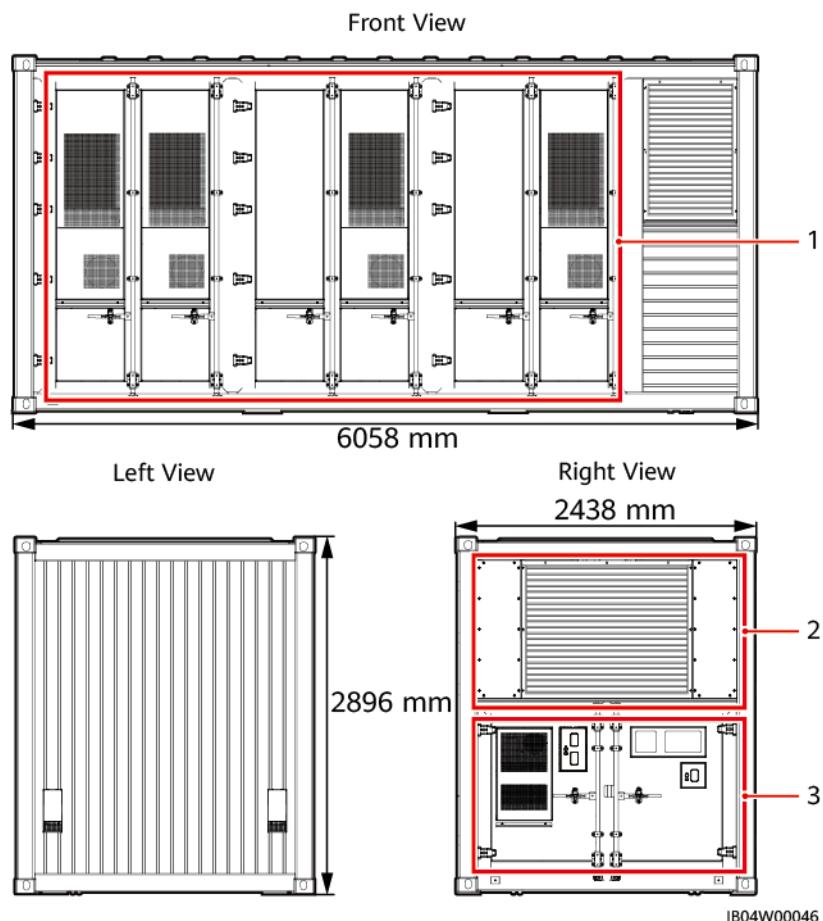
Figure 2-5 Networking application



2.6 Appearance

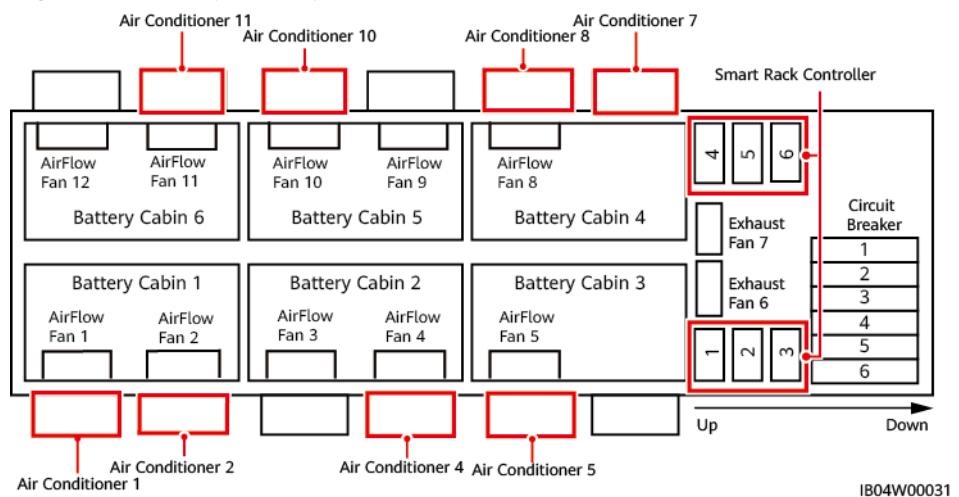
2.6.1 LUNA2000-2.0MWH-1H0 Appearance

Figure 2-6 LUNA2000-2.0MWH-1H0 appearance



(1) Battery cabin	(2) Smart Rack Controller cabin	(3) Control unit cabin
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Figure 2-7 Component position of LUNA2000-2.0MWH-1H0



2.6.2 LUNA2000-2.0MWH-2H0 Appearance

Figure 2-8 LUNA2000-2.0MWH-2H0 appearance

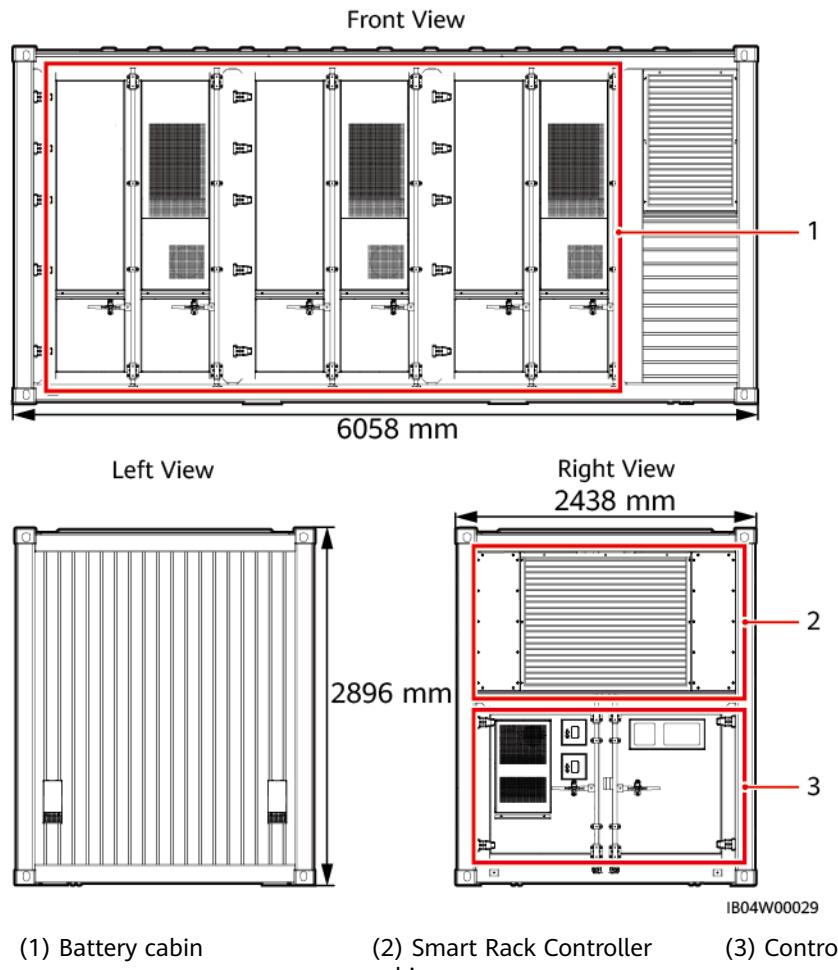
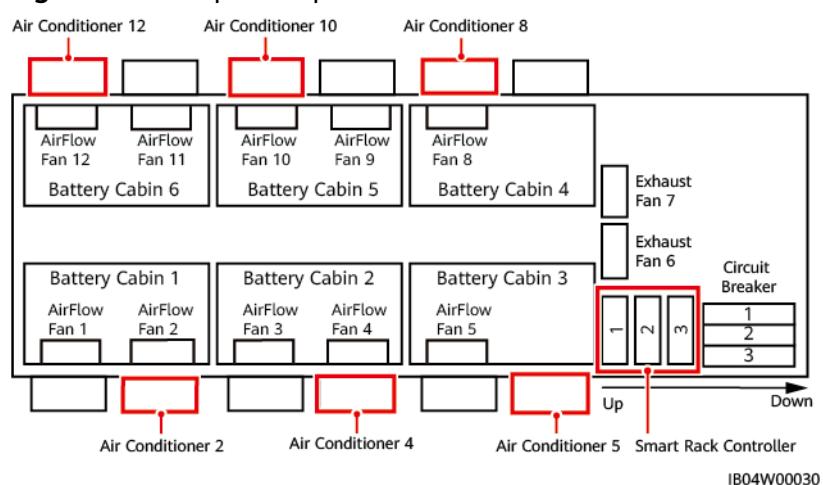


Figure 2-9 Component position of LUNA2000-2.0MWH-2H0



2.7 ESS Composition

2.7.1 Battery Cabin

Figure 2-10 Configurations of LUNA2000-2.0MWH-1H0 air conditioners and battery packs in the battery cabin

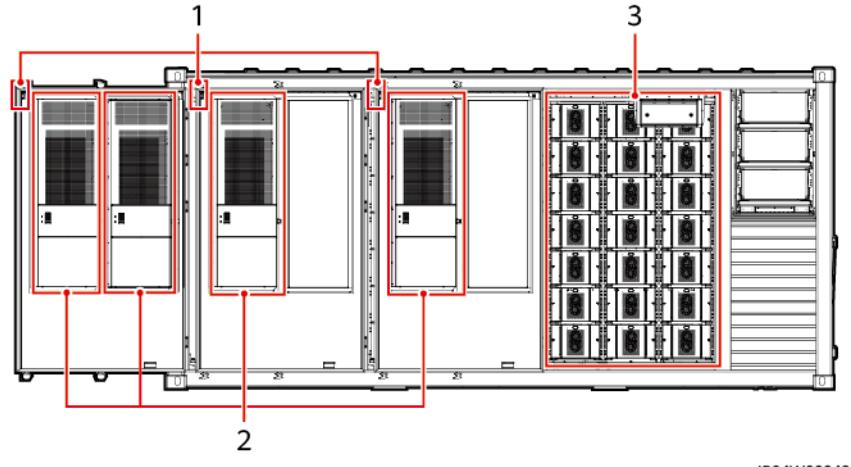


Figure 2-11 Configurations of LUNA2000-2.0MWH-2H0 air conditioners and battery packs in the battery cabin

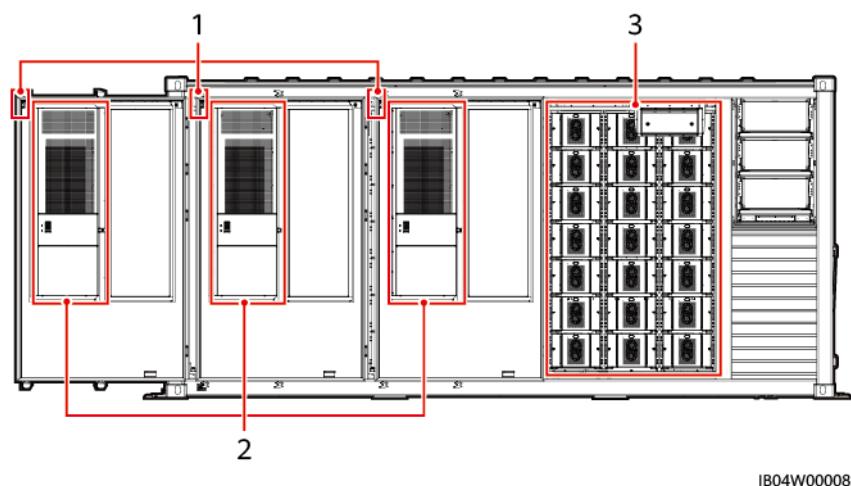
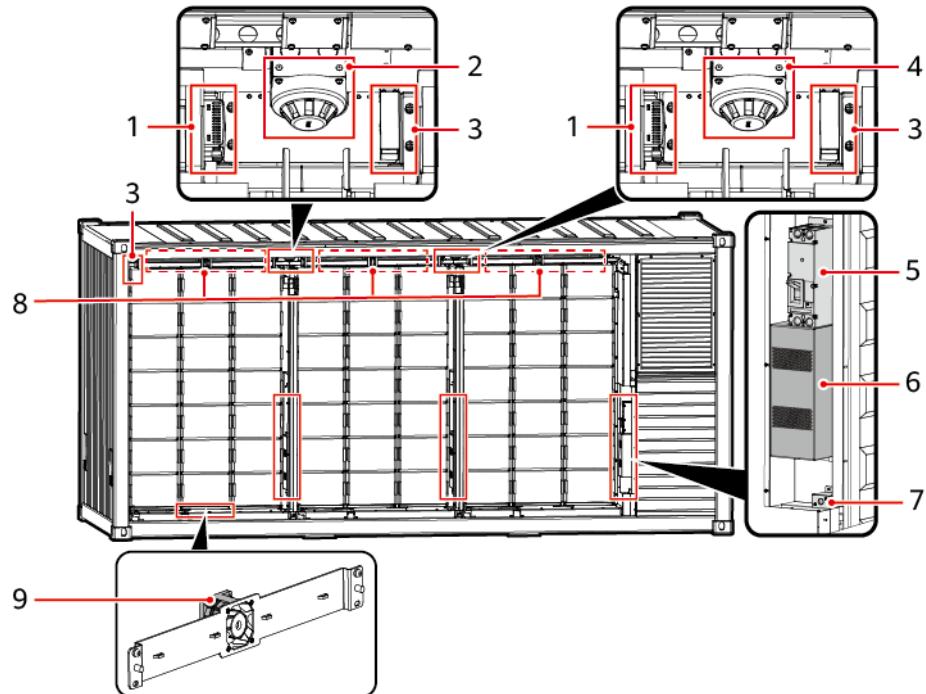


Table 2-3 Components in the battery cabin

No.	Board/ Module	Manda tory/ Option al	Quantity Configured for an ESS	Description
1	Door status sensor	Manda tory	6	Monitors the front door status of the battery cabin.
2	Air conditioner in the battery cabin	Manda tory	<ul style="list-style-type: none"> • LUNA2000-2.0 MWH-1H0: 8 • LUNA2000-2.0 MWH-2H0: 6 	Dissipates heat for components in the control unit cabin.
3	Battery pack	Manda tory	126	The battery pack is a combination of batteries connected in series and output through a pair of positive and negative terminals. Each battery pack is configured with a pack optimizer and a battery monitoring unit (BMU).

Figure 2-12 Battery cabin component configuration 1



IB04W00011

Figure 2-13 Battery cabin component configuration 2

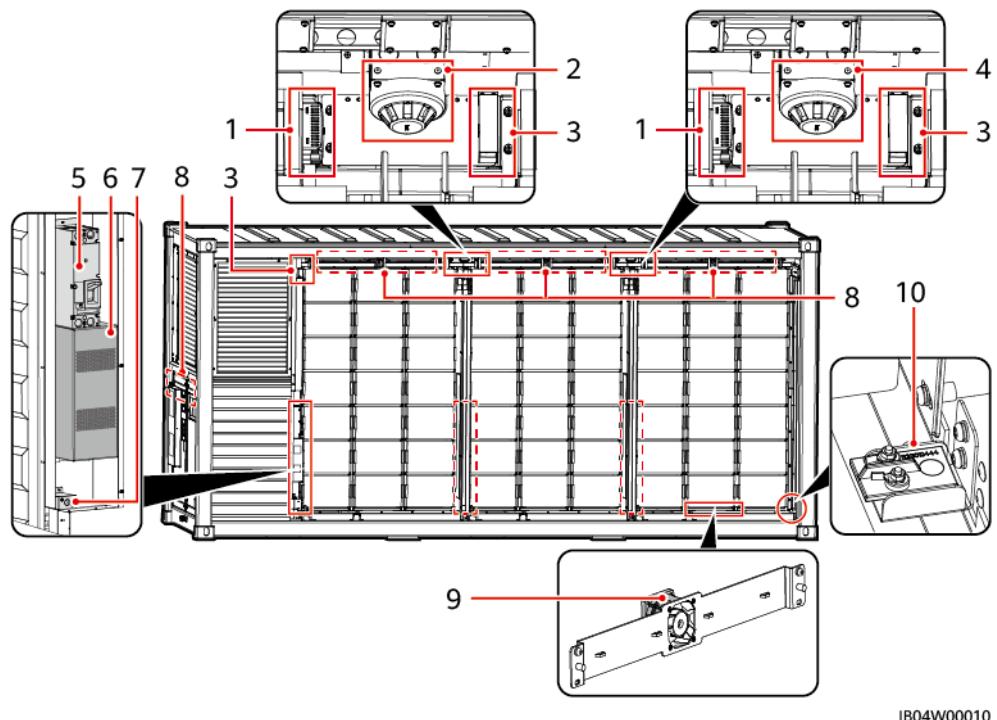


Table 2-4 Components in the battery cabin

No.	Board/Module	Mandatory/Optional	Quantity Configured for an ESS	Description
1	T/H sensor	Mandatory	4	Detects the indoor temperature and humidity in real time.
2	Smoke Detector	Mandatory	2	Common photoelectric smoke sensor (voltage output type)
3	CO sensor	Mandatory	6	Detects the concentration of CO in combustible gases and is used for fire exhaust to prevent explosion inside the ESS.
4	Heat Detector	Mandatory	2	Monitors the temperature of the battery cabin.
5	Circuit breaker	Mandatory	6	Provides short-circuit protection and disconnects the high-voltage circuit of the battery rack.

No.	Board/ Module	Manda tory/ Option al	Quantity Configured for an ESS	Description
6	Fuse	Manda tory	<ul style="list-style-type: none"> • LUNA2000-2.0 MWH-1H0: 12 • LUNA2000-2.0 MWH-2H0: 6 	Provides short-circuit protection.
7	Black start button	Manda tory	6	Used for black start of the ESS.
8	Light	Manda tory	6	Used to illuminate the interior of the control unit cabin.
9	Airflow fan	Manda tory	10	Facilitates the exhaust fans.
10	Water sensor	Manda tory	1	Detects water based on the resistance change between both electrodes.

Figure 2-14 Configuration of the air intake and exhaust modules in the battery cabin

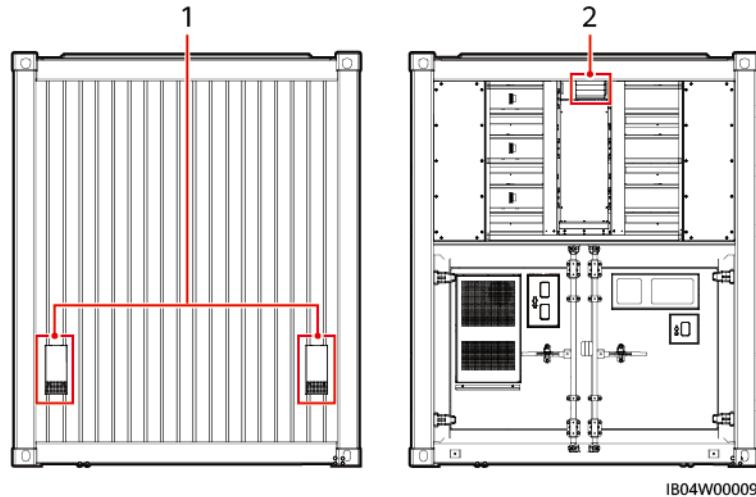


Table 2-5 Components in the battery cabin

No.	Board/ Module	Manda tory/ Option al	Quantity Configured for an ESS	Description
1	Air intake module	Manda tory	2	Consists of the labyrinth and air filter foam.

No.	Board/ Module	Manda tory/ Option al	Quantity Configured for an ESS	Description
2	Air exhaust module	Manda tory	1	Consists of the fan module and air filter foam.

2.7.2 Control Unit Cabin

Figure 2-15 Configuration of components on the control unit cabin

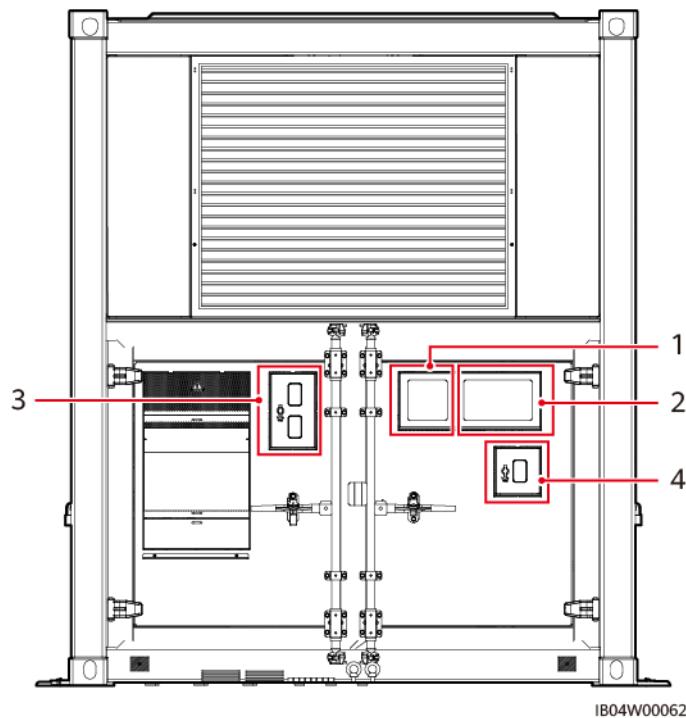
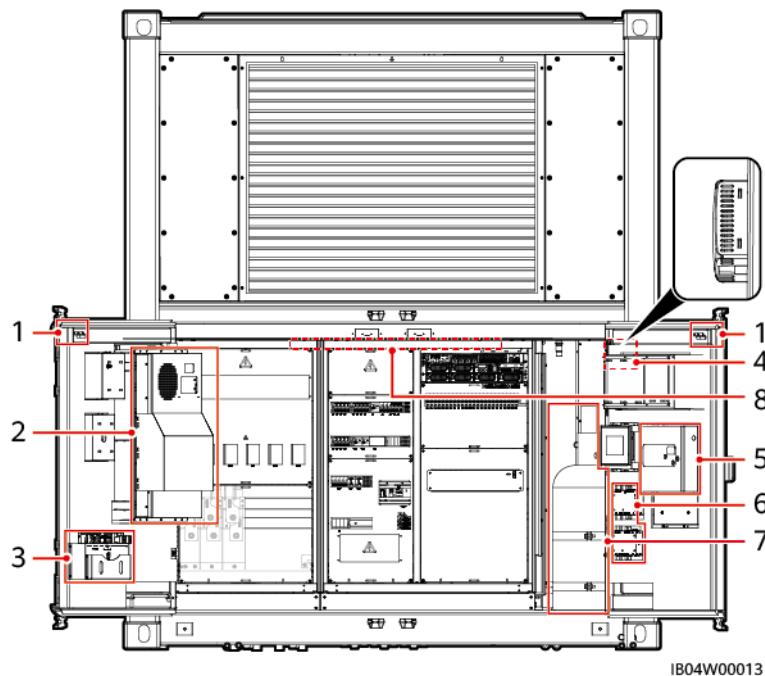


Table 2-6 Configuration of components on the control unit cabin

No.	Board/ Module	Manda tory/ Option al	Quantity Configured for an ESS	Description
1	Fire alarm horn/strobe	Manda tory	1	Used for audible and visual alarm in the area where an accident occurs.
2	Gas release alarm	Manda tory	1	Used for audible and visual alarm in the extinguishant protection area.

No.	Board/Module	Mandatory/Optional	Quantity Configured for an ESS	Description
3	Extinguisher abort button	Mandatory	1	
4	ESS emergency stop	Mandatory	1	-

Figure 2-16 Configuration of components in the control unit cabin**Table 2-7** Configuration of components in the control unit cabin

No.	Board/Module	Mandatory/Optional	Quantity Configured for an ESS	Description
1	Door status sensor	Mandatory	2	Monitors the door status of the control unit cabin.
2	Air conditioner in the control unit cabin	Mandatory	1	Dissipates heat for components in the control unit cabin.

No.	Board/Module	Mandatory/Optional	Quantity Configured for an ESS	Description
3	Document holder	Mandatory	1	-
4	T/H sensor	Mandatory	1	Detects the indoor temperature and humidity in real time.
5	Fire control panel	Mandatory	1	Used for fire alarms and automatic fire extinguishing control. For details, see the fire control panel manual included with the ESS.
6	Exhaust controller	Mandatory	2	Controls exhaust fans.
7	Fire cylinder	Mandatory	1	Stores fire extinguishant and its components include an electromagnetic valve, pressure gauges, and pipes.
8	Lights	Mandatory	1	Used to illuminate the interior of the control unit cabin.

Figure 2-17 Components in the control unit cabin of LUNA2000-2.0MWH-1H0

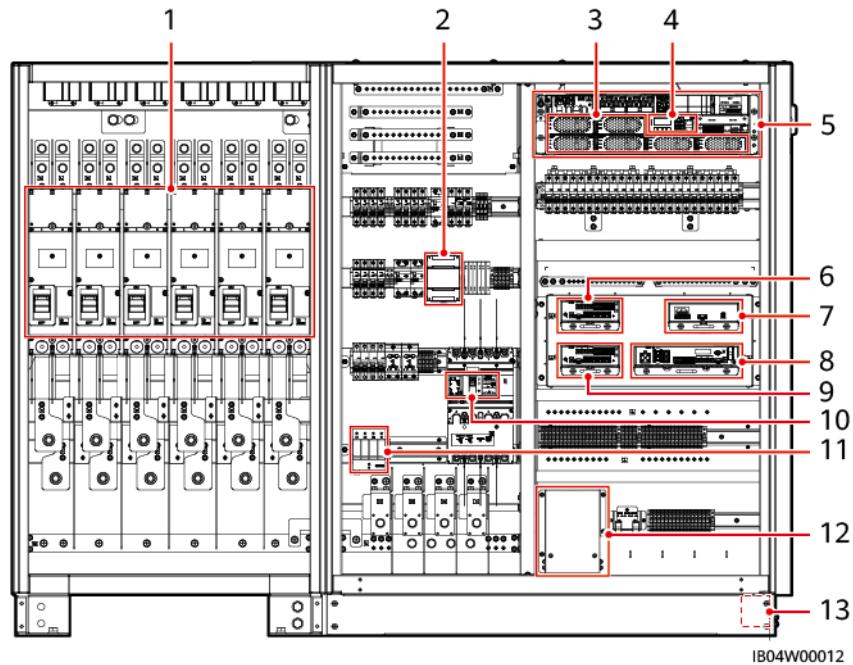


Figure 2-18 Components in the control unit cabin of LUNA2000-2.0MWH-2H0

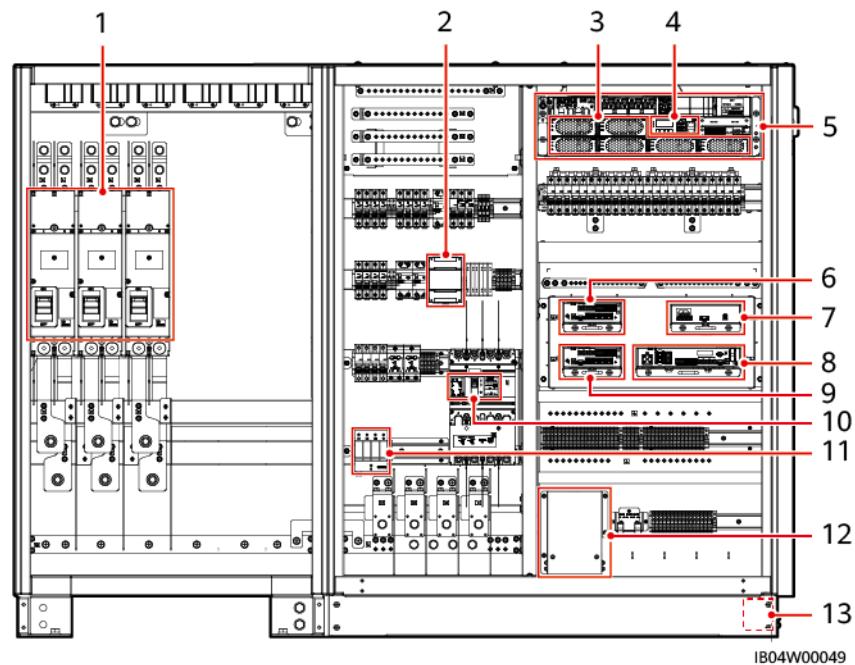


Table 2-8 Components for the power supply and distribution system

No.	Board/ Module	Manda tory/ Optio nal	Quantity Configure d for an ESS	Description
1	DC circuit breaker	Manda tory	<ul style="list-style-type: none"> • LUNA2000-2.0MWH-1H0: 6 • LUNA2000-2.0MWH-2H0: 3 	Provides short-circuit protection and DC circuit disconnection.
2	AC meter	Manda tory	1	Collects information about the auxiliary AC input power supply.
3	PSU	Manda tory	6	Converts AC input power into stable DC power.
4	SMU02C	Manda tory	1	Collects PSU information and controls PSU output.
5	ETP48400-C3B1	Manda tory	1	An embedded power subrack
6	SmartModu le	Option al	1	Converges interfaces, converts protocols, and collects data for devices in the ESS, and expands ports for the CMU.

No.	Board/ Module	Manda tory/ Optio nal	Quantity Configure d for an ESS	Description
7	Adapter	Manda tory	1	Supplies power to the CMU and SmartModule of the ESS.
8	Central monitoring unit (CMU)	Manda tory	1	Aggregates interfaces, converts protocols, collects, stores, and monitors data, and performs unified monitoring and local maintenance for devices in the ESS.
9	SmartModu le	Manda tory	1	Converges interfaces, converts protocols, and collects data for devices in the ESS, and expands ports for the CMU.
10	AC circuit breaker	Manda tory	1	Provides short-circuit protection and disconnects the auxiliary power supply circuit of the ESS.
11	AC surge protective device (SPD)	Manda tory	1	Provides AC surge protection.
12	Fiber manageme nt tray	Manda tory	1	Holds optical fibers.
13	Water sensor	Manda tory	1	Detects water based on the resistance change between both electrodes.

2.7.3 Smart Rack Controller Cabin

Figure 2-19 Configuration of components in the Smart Rack Controller cabin of LUNA2000-2.0MWH-1H0

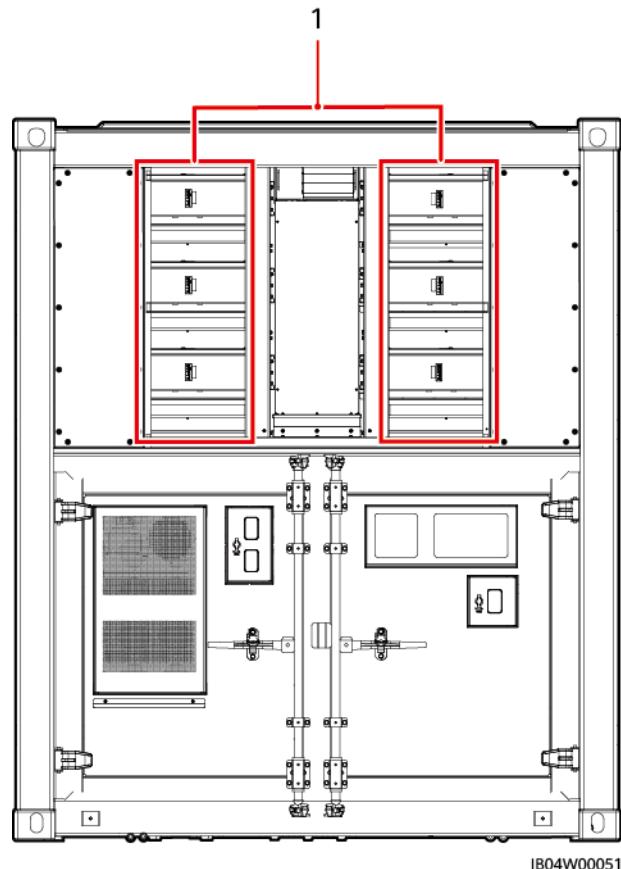


Figure 2-20 Configuration of components in the Smart Rack Controller cabin of LUNA2000-2.0MWH-2H0

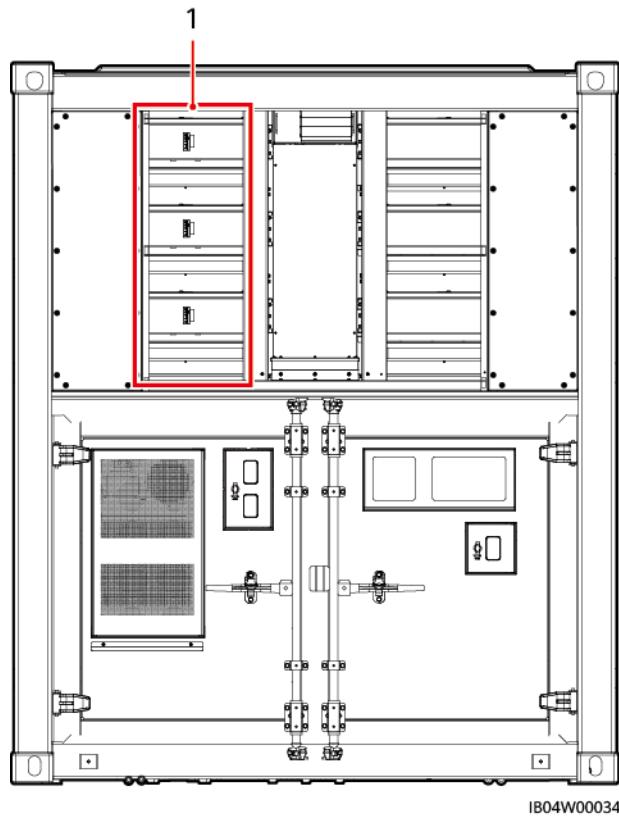


Table 2-9 Configuration of components in the Smart Rack Controller cabin

No.	Board/ Module	Manda tory/ Optio nal	Quantity Configured for an ESS	Description
1	Smart Rack Controller	Manda tory	<ul style="list-style-type: none">• LUNA2000-2.0 MWH-1H0: 6• LUNA2000-2.0 MWH-2H0: 3	Manages charge and discharge of the battery rack.

2.8 Components

2.8.1 Power Supply and Distribution System

2.8.1.1 Battery Pack

Figure 2-21 Battery pack appearance

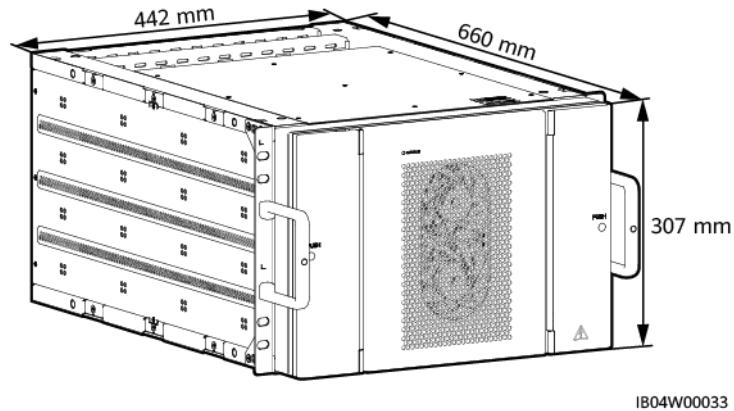


Table 2-10 Battery pack technical specifications

Parameters	Battery Pack
Model	ESM51320AS1
Cell material	Lithium iron phosphate
Cell capacity	3.2 V/320 Ah
Battery configuration	16 cells in a battery pack
Rated voltage	51.2 V
Nominal energy	16.38 kWh
Charging and discharging rate	$\leq 1C$
Net weight	≤ 140 kg
Dimensions (H x W x D)	307 mm x 442 mm x 660 mm
Cooling mode	Air cooled
IP rating	IP20
Storage temperature	0°C to 40°C
Transportation temperature	-40°C to +60°C
Equalization mode	Passive cell equalization
Communications port	CAN 2.0

2.8.1.2 Smart Rack Controller

Figure 2-22 Smart Rack Controller appearance

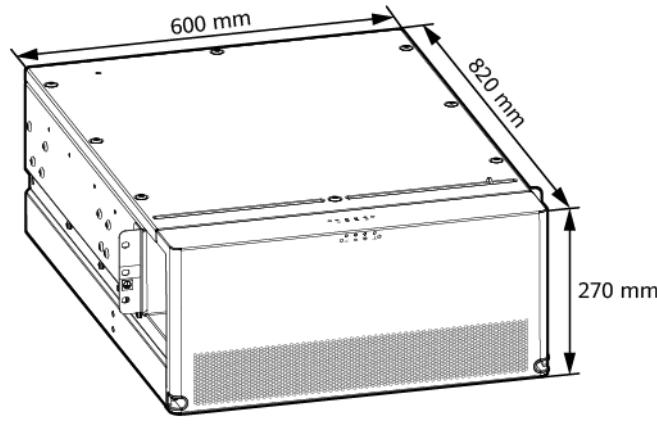


Table 2-11 Efficiency

Technical Specifications	Smart Rack Controller
Maximum efficiency	≥ 99.0%

Table 2-12 Battery side

Technical Specifications	Smart Rack Controller
Number of battery strings	2
Minimum startup voltage	350 V
Rated power of a single battery string	172 kW
Rated power of a battery pack	344 kW

Table 2-13 Bus side

Technical Specifications	Smart Rack Controller
Number of battery strings connected to the bus	2
Maximum DC voltage	1500 V
Rated operating voltage	1200 V
Rated working current of a single battery string	143.3 A

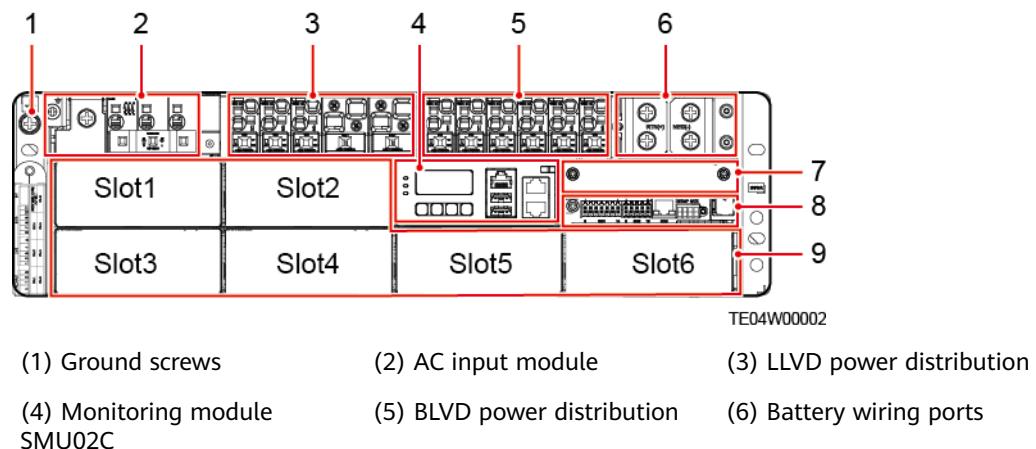
Table 2-14 General specifications

Technical Specifications	Smart Rack Controller
Parallel mode	Two parallel Smart Rack Controllers on the battery side and two on the bus side
Overvoltage category	Bus side DC II
Dimensions (H x W x D)	270 mm x 600 mm x 820 mm
Net weight	≤ 90 kg
IP rating	IP66
DC surge protection on the bus side	Type II
Operating temperature range	-30°C to +60°C
Operating humidity range	0-100% (non-condensing)
Storage temperature	-40°C to +70°C
Storage humidity	5%-95% RH
Cooling mode	Intelligent air cooling
Maximum Operating Altitude	4000 m
Communications port	CAN, RS485, FE

2.8.1.3 ETP48400-C3B1

The ETP48400-C3B1 is an embedded power system that converts AC power into DC power. It supplies DC constant voltage to the equipment.

Figure 2-23 ETP48400-C3B1 appearance



(7) Reserved slot for the communications expansion module CIM02C/NIM01C3 (8) User interface module UIM05B1 (9) Space for PSUs

Table 2-15 ETP48400-C3B1 technical specifications

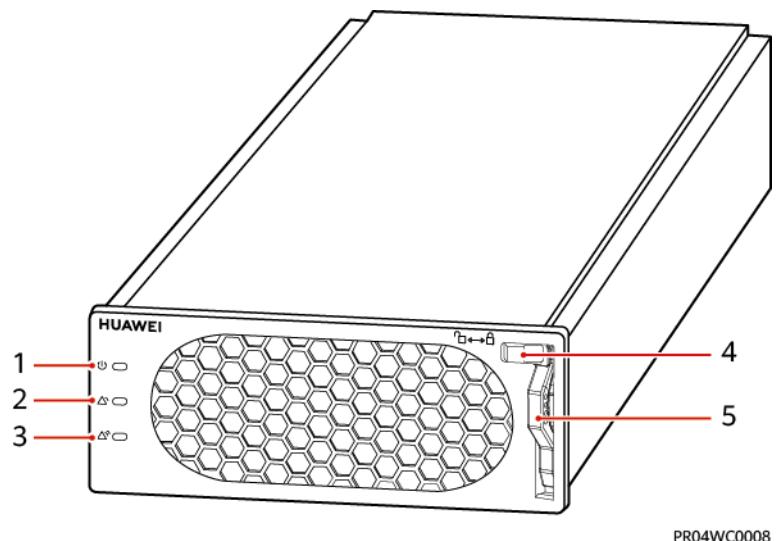
Item	ETP48400-C3B1
AC input system	Three-phase 380 V/400 V AC; 3W + N + PE; 50 Hz/60 Hz

2.8.1.4 Rectifier Module PSU

The PSU (R4875G) converts AC input power into stable DC power.

Appearance

Figure 2-24 Appearance of the PSU



(1) Power indicator (2) Alarm indicator (3) Fault indicator
 (4) Locking latch (5) Handle

Indicators

Table 2-16 Indicator description

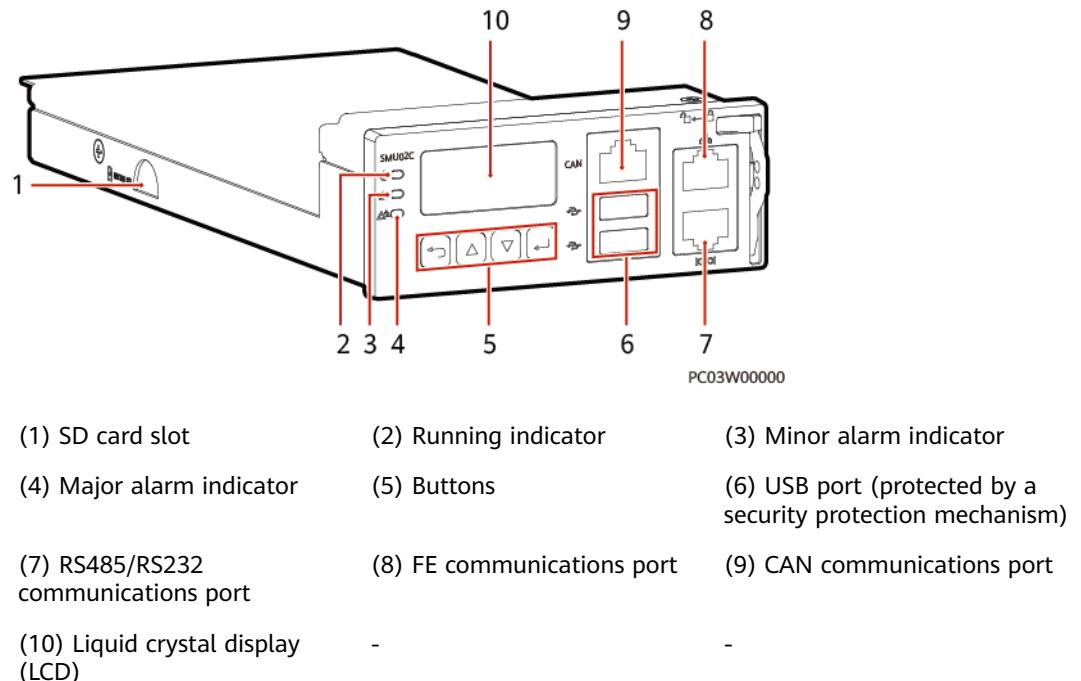
Indicator	Color	Status	Description
Power indicator	Green	Steady on	The PSU has an AC input.
		Off	There is no AC input.
		-	The PSU is damaged.

Indicator	Color	Status	Description
		Blinking at 0.5 Hz	Querying is in progress.
		Blinking at 4 Hz	The PSU is loading the application program.
Alarm indicator	Yellow	Off	The PSU does not generate any protection alarm.
		Steady on	<ul style="list-style-type: none"> • A warning is generated due to ambient overtemperature. • A shutdown protection alarm is generated due to ambient overtemperature or undertemperature.
			AC input overvoltage or undervoltage protection is triggered.
			The PSU is hibernating.
		Blinking at 0.5 Hz	The communication between the PSU and the monitoring module is interrupted.
Fault indicator	Red	Off	The PSU is normal.
		Steady on	The PSU locks out due to output overvoltage.
			The PSU has no output due to an internal fault.

2.8.1.5 SMU02C

Appearance

Figure 2-25 SMU02C appearance



Indicators

Table 2-17 Indicator description

Name	Color	Status	Description
Running indicator	Green	Off	The SMU is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The SMU is running properly and communicating with the host properly.
		Blinking fast (4 Hz)	The SMU is running properly but fails to communicate with the host.
Minor alarm indicator	Yellow	Off	No minor or warning alarm is generated.
		Steady on	A minor or warning alarm is generated.
Major alarm indicator	Red	Off	No critical or major alarm is generated.

Name	Color	Status	Description
		Steady on	A critical or major alarm is generated.

Buttons

Table 2-18 Button description

Button	Name	Description
	Up	Press  or  to scroll through the menus or to change the value of a parameter.
	Down	
	Cancel	Returns to the previous menu without saving the settings.
	Enter	<ul style="list-style-type: none"> Enters the main menu from the standby screen. Enters a submenu from the main menu. Saves menu settings on a submenu.

Note:

- The LCD screen becomes dark if no button is pressed within 30s.
- You need to log in again if no button is pressed within 1 minute.
- To increase or decrease a parameter value quickly, press and hold  or .
- Press and hold  and  for 10s to restart the SMU.
- Press and hold  and  (or 

Initial Password

The LCD supports two-level password management for different users.

Table 2-19 Two-level password management

Level	Operation Permission	Password
Engineer	All permissions except for changing the administrator password and resetting the web password	000001
Administrator	All permissions	012589 ^a

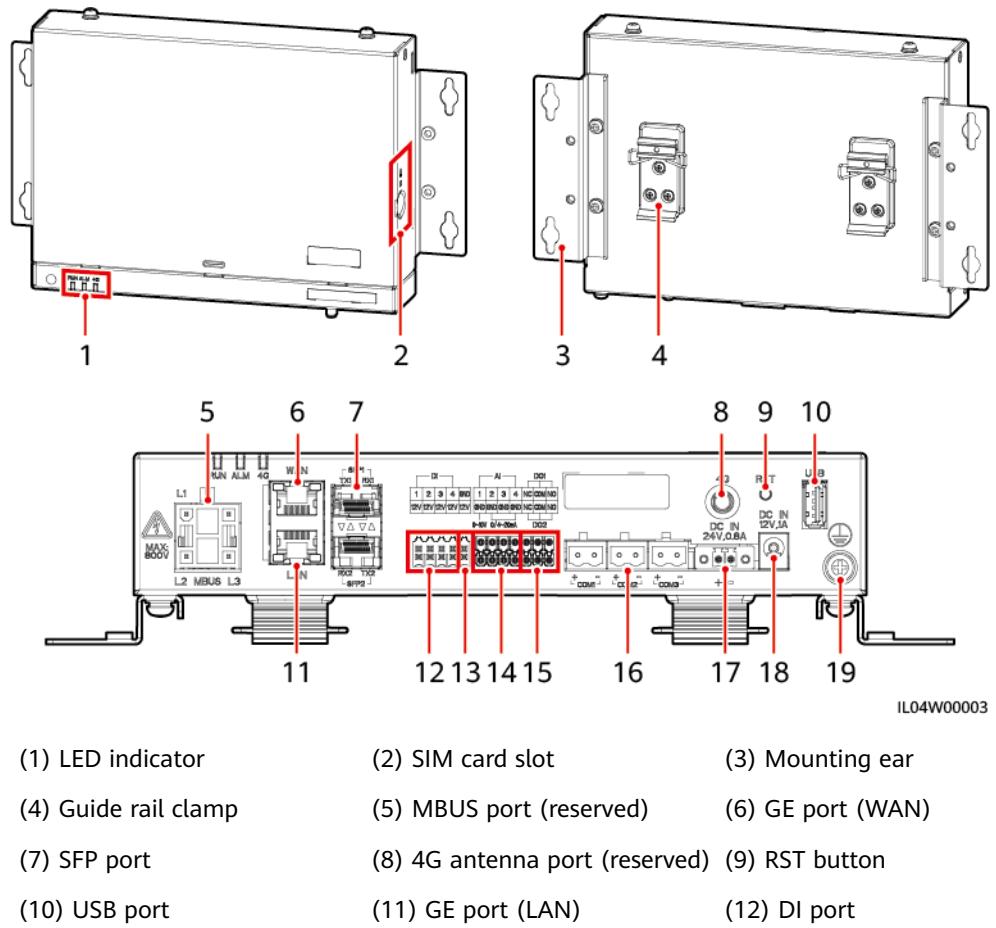
a: The administrator password can be used only by administrators. Do not provide the password to third-party maintenance personnel.

2.8.2 Monitoring System

2.8.2.1 CMU

Appearance

Figure 2-26 Appearance of the CMU



(13) 12 V output power port	(14) AI port	(15) DO port
(16) COM port	(17) 24 V input power port	(18) 12 V input power port
(19) Protective ground point	-	-

Indicators

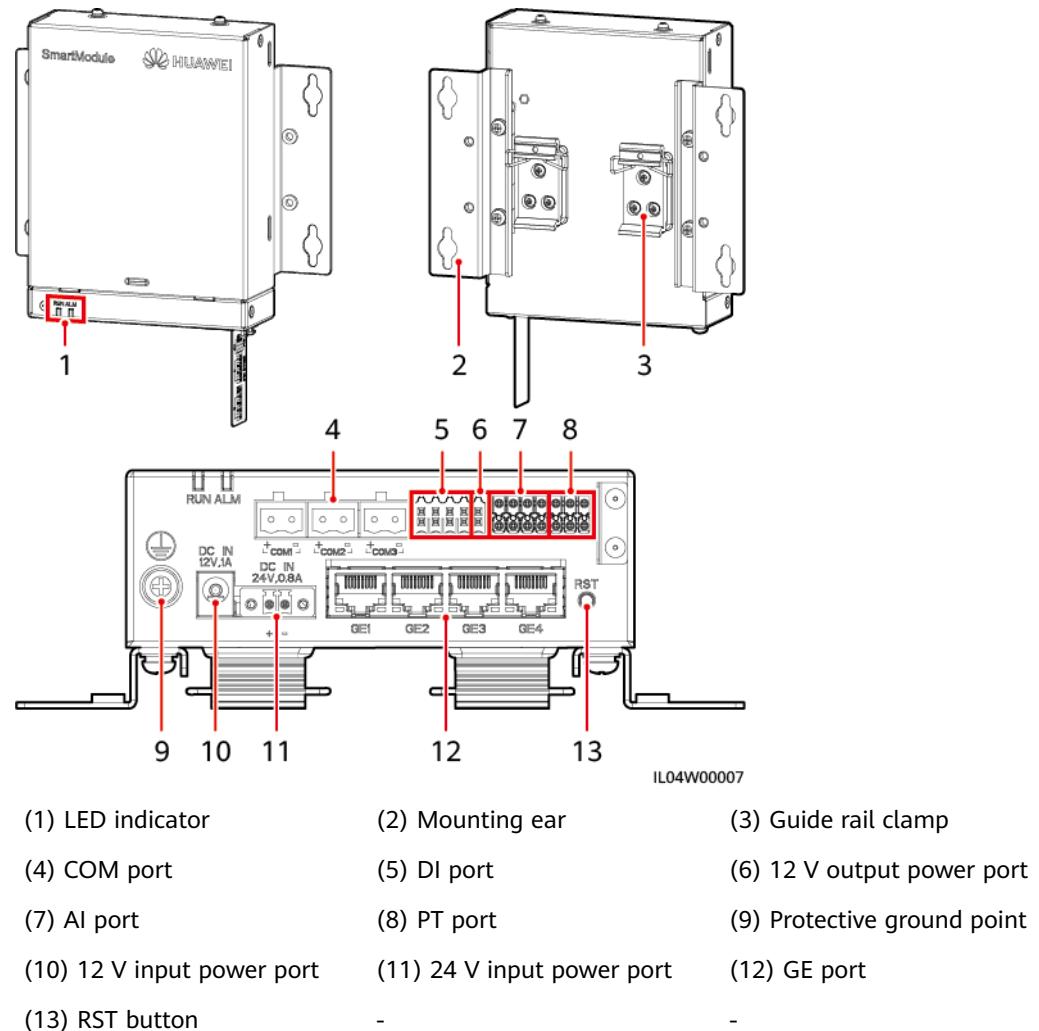
Table 2-20 Indicators

Indicator	Status		Description
Running indicator (RUN) 	Green off		Not powered on
	Blinking green slowly (on for 1s and then off for 1s)		The communication with the management system is normal.
	Blinking green fast (on for 0.125s and then off for 0.125s)		The communication with the management system is interrupted.
Alarm/maintenance indicator (ALM) 	Alarm status	Red off	No system alarm is generated.
		Blinking red slowly (on for 1s and then off for 4s)	The system raises a warning alarm.
		Blinking red fast (on for 0.5s and then off for 0.5s)	The system raises a minor alarm.
		Steady red	The system raises a major alarm.
	Maintenance status	Green off	No local maintenance is in progress.
		Blinking green slowly (on for 1s and then off for 1s)	Local maintenance is in progress.
		Blinking green fast (on for 0.125s and then off for 0.125s)	Local maintenance fails or the connection to the app is to be set up.
		Steady green	Local maintenance succeeded.

2.8.2.2 SmartModule

Appearance

Figure 2-27 Appearance of the SmartModule



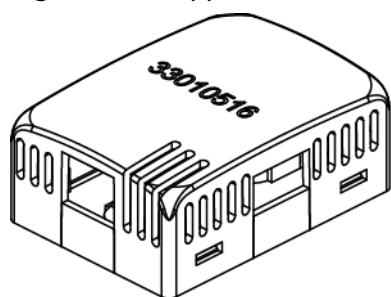
Indicators

Indicators	Status		Description
Running indicator (RUN) 	Green off		Not powered on
	Blinking green slowly (on for 1s and then off for 1s)		The communication with the CMU is normal.
	Blinking green fast (on for 0.125s and then off for 0.125s)		The communication with the CMU is interrupted.
Alarm/maintenance indicator (ALM) 	Alarm status	Red off	No alarm is raised for the SmartModule.
		Blinking red slowly (on for 1s and then off for 4s)	The SmartModule runs with an expired digital certificate.
		Blinking red fast (on for 0.5s and then off for 0.5s)	The SmartModule digital certificate is invalid.
	Steady red		Reserved

2.8.3 Environmental Control System

2.8.3.1 T/H sensor

Figure 2-28 Appearance of the T/H sensor



The T/H sensor uses an RJ45 connector.

 **NOTE**

The appearance of the T/H sensor depends on the actual delivery.

Figure 2-29 Pins of an RJ45 connector

RJ45 female connector

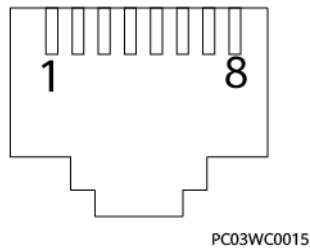


Table 2-21 Pin definitions of an RJ45 connector

Pin	Description
Pin 1 or Pin 4	A
Pin 2 or Pin 5	B
Pin 3	V+
Pin 6	Reserved
Pin 7	Reserved
Pin 8	V-

Table 2-22 T/H sensor technical specifications

Technical Specifications	T/H sensor
Temperature measuring range	-20°C to +80°C
Temperature precision	$\leq \pm 0.5^\circ\text{C}$ (25°C) $\leq \pm 1^\circ\text{C}$ (full measuring range)
Operating temperature	-20°C to +80°C
Operating voltage	9–16 V DC
Storage temperature	-40°C to +80°C
Signal output	Two RJ45 ports, bidirectional cascading

2.8.3.2 Air Conditioner in the Control Unit Cabin

Figure 2-30 Appearance of the air conditioner in the control unit cabin

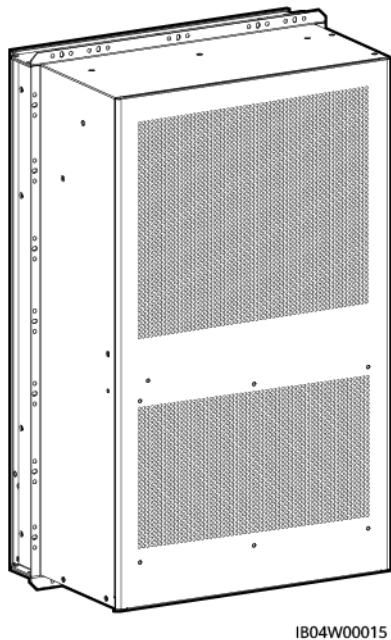


Table 2-23 Technical specifications of the air conditioner in the control unit cabin

Technical Specifications	Air Conditioner in the Control Unit Cabin
Air conditioner model	PC3000D-3
Operating temperature	-30°C to +55°C
Rated DC input voltage	-48 V DC
Rated DC input power	1015 W
Rated input current	20.5 A
Cooling capacity (L35/ L35)	2000 W
Heating capacity	1100 W
Dimensions (H x W x D)	<ul style="list-style-type: none">746 mm x 446 mm x 300 mm (without flanges)783 mm x 479 mm x 300 mm (with flanges)
Net weight	40 kg
IP rating	IP55
Refrigerant	R134a
Surface treatment	Electrostatic spraying

2.8.3.3 Air Conditioner in the Battery Cabin

Figure 2-31 Appearance of the air conditioner in the battery cabin

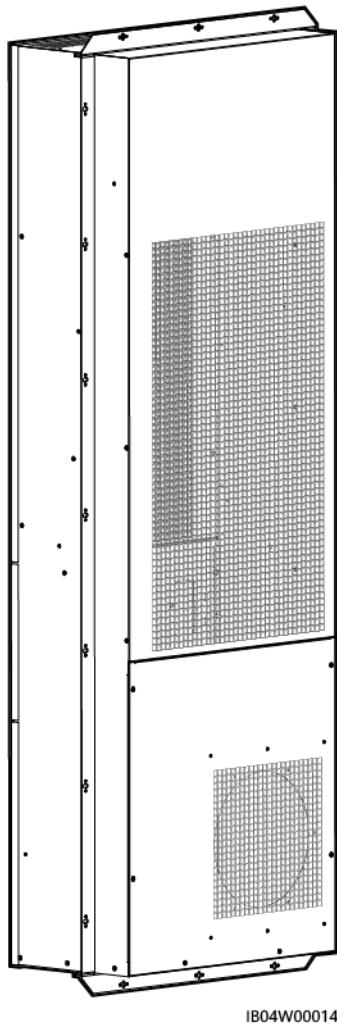


Table 2-24 Technical specifications of the air conditioner in the battery cabin

Technical Specifications	Air Conditioner in the Battery Cabin
Air conditioner model	PC6H
Rated voltage	208–230 V AC
Rated cooling capacity (W)	<ul style="list-style-type: none">• 6350 W (L25/L45)• 9300 W (L25/L35)
Rated heating capacity (W)	3000 W (PTC)
Rated cooling power	<ul style="list-style-type: none">• 4150 W (L25/L45)• 4120 W (L25/L35)
Rated heating power	3000 W (PTC)

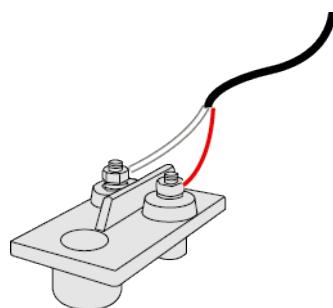
Technical Specifications	Air Conditioner in the Battery Cabin
Refrigerant (g)	R134a
Operating temperature	-30°C to +55°C
Humidity	5%–100% RH
Dimensions (H x W x D)	1770 mm x 620 mm x 300 mm (with flanges)
Transport performance	Transported by train, vehicle, air, or sea
IP rating	IP55
Fire-retardant performance	Complies with UL94.
External circulation corrosion	Complies with DKBA0.450.0065.
Safety	Complies with EN60335, IEC 60950, UL60950, UL1995, and UL484.
Net weight	125 kg

2.8.3.4 Electrode Water Sensor

The water sensor detects water based on the resistance change between both electrodes.

When the electrodes detect water, they are short-circuited and the CMU reports an alarm.

Figure 2-32 Appearance of the electrode water sensor



PO01WC0769

Table 2-25 Technical specifications of the electrode water sensor

Technical Specifications	Electrode Water Sensor
Operating temperature	-40°C to +80°C
Storage temperature	-40°C to +80°C

2.8.3.5 Door Status Sensor

Figure 2-33 Appearance of the door status sensor

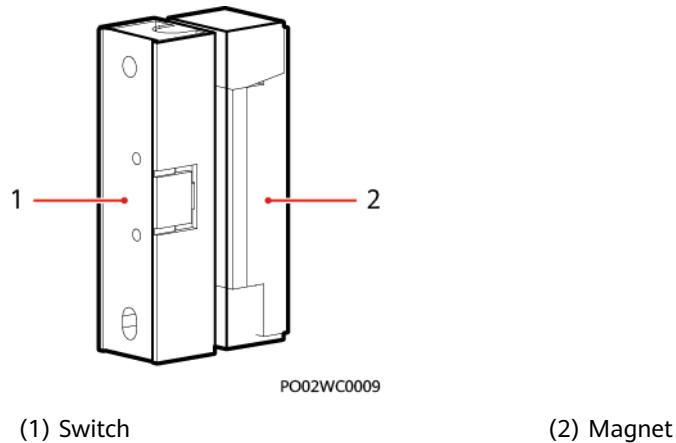
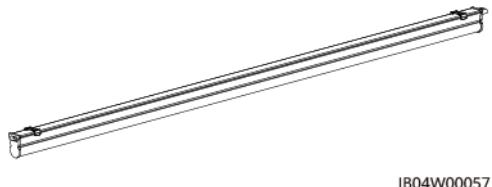


Table 2-26 Technical specifications of the door status sensor

Technical Specifications	Door Status Sensor
Connection method	Wiring terminals
Rated current	500 mA
Startup distance	25–45 mm
Rated Power	10 W
Securing method	Screw
Hole spacing	40±0.8 mm
Switch voltage	100 V DC (Max)
Contact withstand voltage	150 V DC (Max)
Impedance	0.3 ohms
Switch status	Steady on
Outer material	White acrylonitrile butadiene styrene (ABS) engineering plastic

2.8.3.6 Light

Figure 2-34 Appearance of the lights



IB04W00057

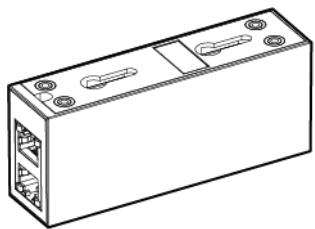
Table 2-27 Technical specifications of the lights

Technical Specifications	Light
Installation mode	Ceiling-mounting
Type	LED lights
Light holder	Integrated with the lights
IP rating	IP20
Electrical insulation class	CLASS I, in compliance with IEC 60598
Rated voltage	220 V AC
Frequency	50 Hz
Power	10.5 W (68×0.2W)
Color temperature	5700 k
Color	White

2.8.4 Fire Extinguishing System

2.8.4.1 CO Sensor

Figure 2-35 Appearance of the CO sensor



IB03W00001

Figure 2-36 Pins of an RJ45 connector

RJ45 female connector

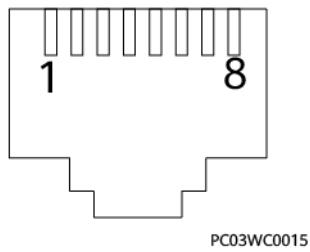


Table 2-28 Pin definitions of an RJ45 connector

Pin	Description
Pin 1 or Pin 4	A
Pin 2 or Pin 5	B
Pin 3	V+
Pin 6	Reserved
Pin 7	Reserved
Pin 8	V-

Table 2-29 Technical specifications of the CO sensor

Technical Specifications	CO Sensor
Dimensions (H x W x D)	40 mm x 97 mm x 25 mm
Operating voltage	8–30 V DC
Stability	≤ ±3% FS/year
Precision	≤ ±10% FS
Power consumption	0.12 W
Output signal	RS485
Operating temperature	–25°C to +55°C
Humidity	5%–95% RH (non-condensing)
Resolution	≤ 30 ppm
Response time	≤ 60s
Cabling mode	RJ45 network port
Installation mode	Gourd-shaped mounting hole/nut/magnet

2.8.4.2 Air Exhaust Module

The air exhaust module is the actuator of the active air exhaust system. When the combustible gas is released from the battery, the air exhaust module reduces the concentration of combustible gas in the battery cabin.

Figure 2-37 Appearance of the air exhaust module

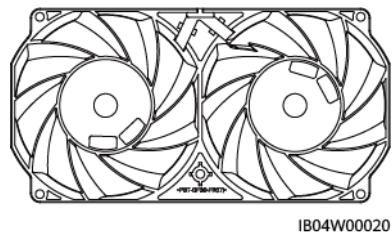


Table 2-30 Technical specifications of the air exhaust module

Technical Specifications	Air Exhaust Module
Dimensions (H x W x D)	38 mm x 194 mm x 99 mm
Operating voltage	36–72 V DC
Rated rotating speed	9500±10% RPM
Operating temperature	–25°C to +70°C

2.8.4.3 Air Exhaust Controller

The air exhaust controller TCUE receives commands from the CMU and adjusts the fan speed.

Figure 2-38 Air exhaust controller

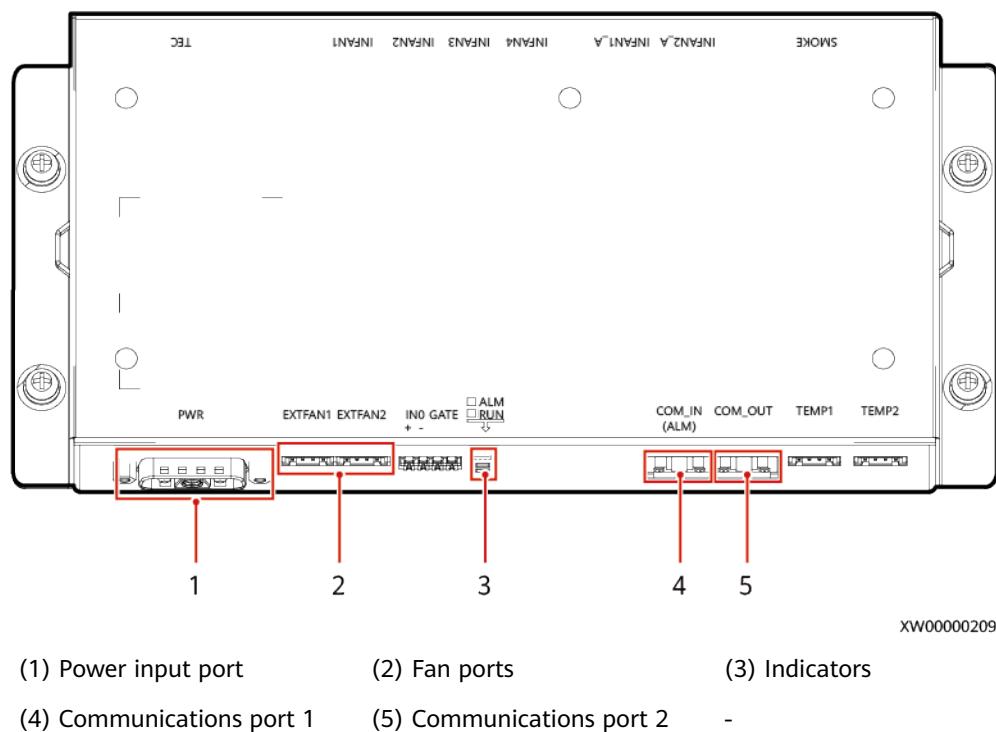


Table 2-31 Indicator description

Silk Screen	Color	Status	Description
RUN	Green	Steady on	Power supply to the board is normal but no program is running.
		Blinking at 0.5 Hz	The system is running properly.
		Blinking at 4 Hz	Serial port communication is interrupted or the board is not registered.
		Off	The system is not powered on.
ALM	Red	Steady on	Power supply to the board is normal but no program is running.
		Blinking at 0.5 Hz	An alarm is generated.
		Off	No alarm is generated.

2.8.4.4 Fire Control Panel

Figure 2-39 Appearance of the fire control panel

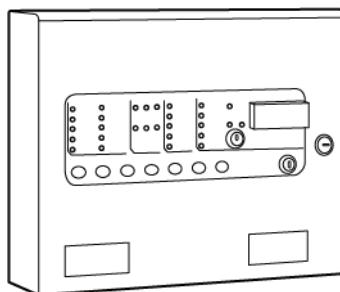


Table 2-32 Technical specifications of the fire control panel

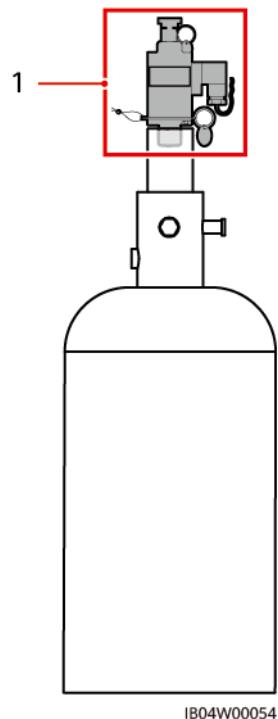
Technical Specifications	Fire Control Panel
Model	K11031M2
Dimensions (H x W x D)	385 mm x 310 mm x 90 mm
Operating voltage	<ul style="list-style-type: none">230 V+10%/-15% ACTwo 12 V 7Ah sealed lead acid in series
Power	AC Input ≤ 100 W
Capacity	<ul style="list-style-type: none">No. of detection circuits: 3No. of detector per zone: ≤ 32
Detector loop requirements	<ul style="list-style-type: none">Wire system of the detector loop: two-wire systemLength of the detector loop: ≤ 1000 m
Enclosure material	1.2 mm mild sheet steel
Operating temperature	-5°C (±3°C) to +55°C (±2°C)
Humidity	≤ 95% RH (non-condensing)
IP rating	IP30

2.8.4.5 Fire cylinder

NOTICE

- Fire cylinders should be protected from direct sunlight.

Figure 2-40 Appearance of a fire cylinder



(1) Position of the electromagnetic valve after installation

Table 2-33 Technical specifications of the fire cylinder

Technical Specifications	Fire Cylinder
Model	227M38UFAA
Operating voltage	24 V DC
Storage pressure (at 20°C)	2.5 Mpa
Maximum operating pressure (at 50°C)	4.2 Mpa
Startup mode	Electromagnetic startup
Electromagnetic startup voltage/current	24 V DC/0.6 A
Operating temperature	-10°C to +55°C
Relative humidity	≤ 95% RH (non-condensing at 40°C)
Outer diameter of cylinder	≤ 324 mm
Cylinder height	≤ 706 mm
Gas release time	6s to 10s
Hose	Length: 800 mm; diameter: DN20
Extinguishing Chemical	HFC-227ea

Technical Specifications	Fire Cylinder
Nominal Capacity	38 L

 **NOTE**

The fire cylinder is empty and needs to be disassembled and inflated. For details, see section 4.3.3.

2.8.4.6 Fire extinguishing board

Figure 2-41 Fire extinguishing board

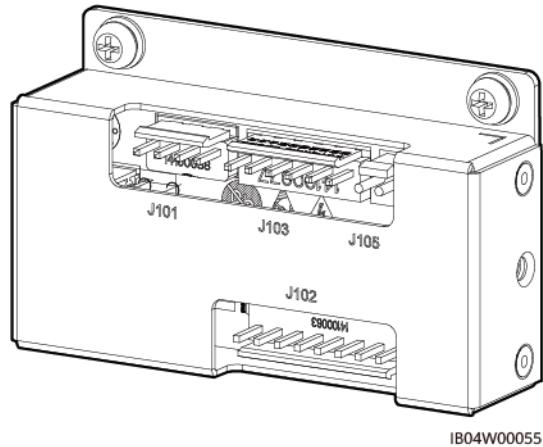
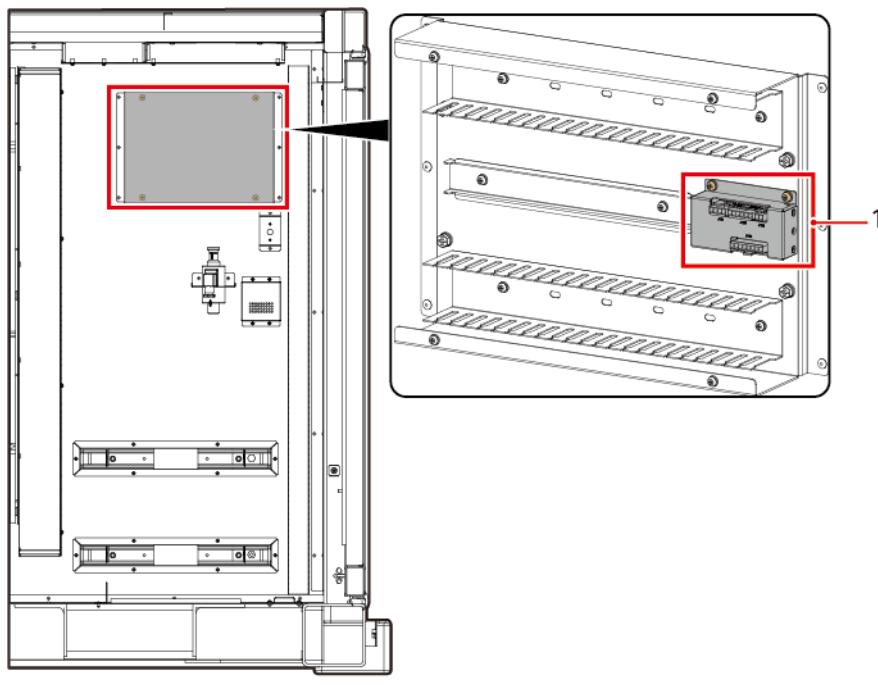


Figure 2-42 Position of the fire extinguishing board



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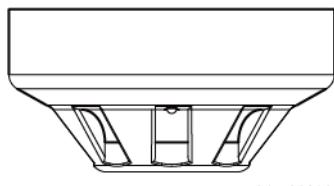
(1) Position of the fire extinguishing board

Table 2-34 Technical specifications of the fire extinguishing board

Technical Specifications	Fire Extinguishing Board
Model	ENF1DETAA
Operating voltage	24 V
Operating current	≤ 1 A
Operating temperature	- 30°C to +55°C
Humidity	$\leq 95\%$ RH (non-condensing)
Dimensions (H x W x D)	95 mm x 55 mm x 24 mm

2.8.4.7 Heat Detector

Figure 2-43 Appearance of the heat detector



IB04W00023

Table 2-35 Technical specifications of the heat detector

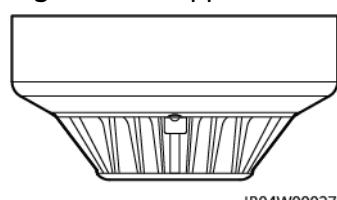
Technical Specifications	Heat Detector
Model	55000-121
Dimensions	100 mm diameter x 42 mm height
Operating voltage	Supply voltage: 9 V to 33 V
Net weight	Approx. 80 g
Alarm category	A1R
Enclosure material	Polycarbonate, white
Cabling mode	Non-polarized two-wire system
Operating current	Monitoring status < 55 μ A @24 V DC; alarm status < 52 mA
Operating temperature	-20°C to +90°C
Humidity	\leq 95% RH (non-condensing)
Protected area	About 50 m ² (storey height \leq 8 m), referring to GB50116-2013 Code for Design of Automatic Fire Alarm System
Applicable base	45681-200
IP rating	IP54

Table 2-36 Indicator description

Item	Color	Status	Description
Indicators	Red	Steady on	Enters alarm status
		Blinking	Enters monitoring status

2.8.4.8 Smoke Detector

The smoke detector can detect the smoke concentration in the environment.

Figure 2-44 Appearance of the smoke detector

IB04W00027

Table 2-37 Technical specifications of a smoke detector

Technical Specifications	Smoke Detector
Model	55000-316
Dimensions	100 mm diameter x 50 mm height (with mounting base)
Operating voltage	Supply voltage: 9 V DC to 33 V DC
Net weight	Approx. 99 g
Enclosure material	Polycarbonate, white
Cabling mode	Non-polarized two-wire system
Complied standard	EN 54-7, LPCB, VdS, DIBt, BOSEC, FG, CPR and SBSC
Operating current	<ul style="list-style-type: none"> Power-up surge current: 115 μA at 24 V Alarm LED current: 4 mA
Operating temperature	-20°C to +60°C
Humidity	\leq 95% RH (non-condensing)

Table 2-38 Indicator description

Item	Color	Status	Description
Indicator	Red	Steady on	Enters alarm status
		Blinking	Enters monitoring status

2.8.4.9 Fire Alarm Horn/Strobe

Figure 2-45 Appearance of the fire alarm horn/strobe

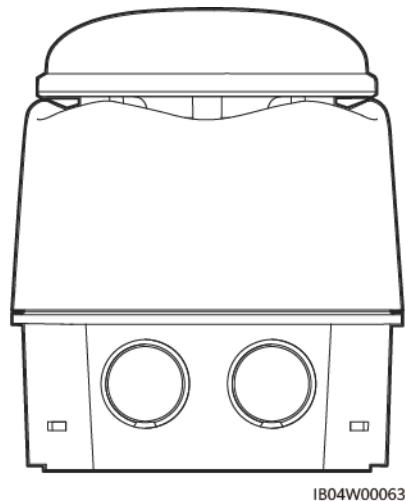


Table 2-39 Technical specifications of the fire alarm horn/strobe

Technical Specifications	Fire Alarm Horn/Strobe
Model	958CHL1001
Operating voltage	Bus 24 V DC
Operating current	55 mA MAX @24 V DC
Blinking frequency	1 Hz
Operating temperature	-20°C to +70°C
Humidity	≤ 95% RH (non-condensing)
Alarm volume	88+ dBA @24 V
Dimensions (H x W x D)	92 mm x 109 mm x 92 mm (with a base)
Enclosure material	ABS, red
Cabling mode	Two-wire system
IP rating	IP33C

Table 2-40 Indicator description

Item	Color	Status	Description
Indicators	Red	Steady on	Enters the alarm status.
		Blinking	Enters the monitoring status.

2.8.4.10 Gas Release Alarm

Figure 2-46 Appearance of the gas release alarm



IB04W00059

Table 2-41 Technical specifications of the gas release alarm

Technical Specifications	Gas Release Alarm
Model	K27102
Complied standard	EN50130-4: 2011
Operating voltage	-15 V DC to 30 V DC
Operating current	140 mA MAX @24 V DC
Operating temperature	-15°C to +40°C
Humidity	≤ 95% RH (non-condensing)
Dimensions (H x W x D)	300 mm x 195 mm x 50 mm
Net weight	Approx. 2 kg
Enclosure material	BS 00 A 05 grey - fine texture
Cabling mode	Two-wire system
IP rating	IP30

2.9 Working Principles

2.9.1 Battery circuit diagram of LUNA2000-2.0MWH-1H0

Figure 2-47 Battery circuit diagram 1 of the LUNA2000-2.0MWH-1H0

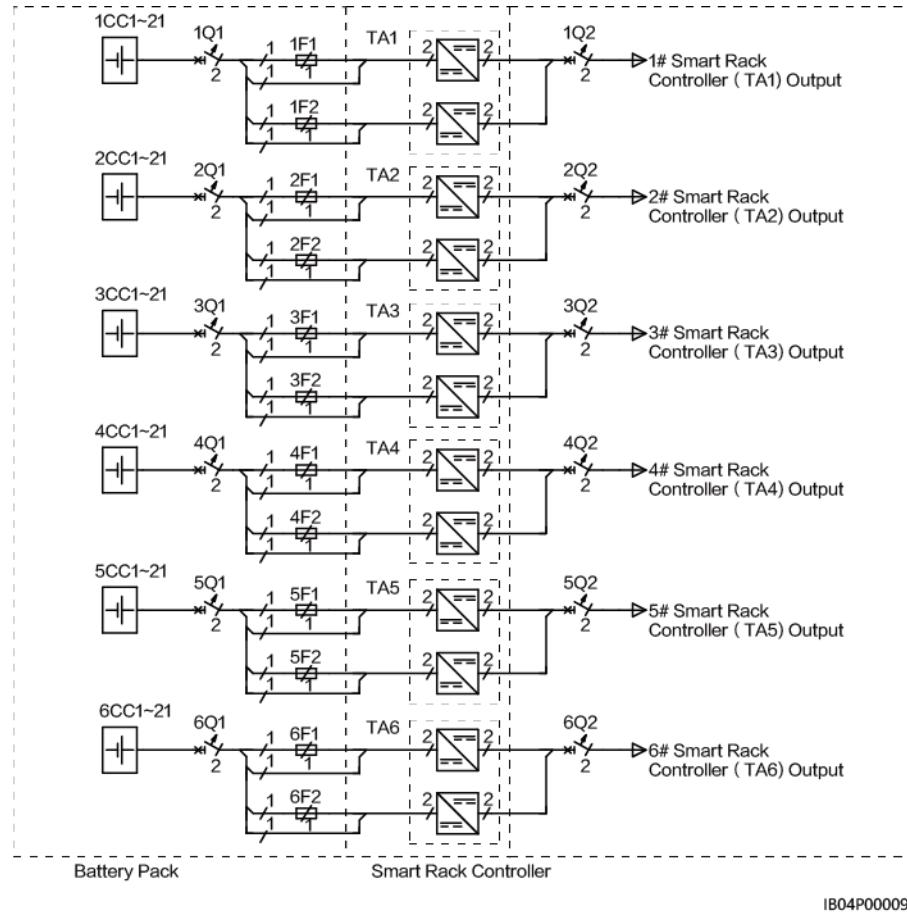


Figure 2-48 Battery circuit diagram 2 of the LUNA2000-2.0MWH-1H0

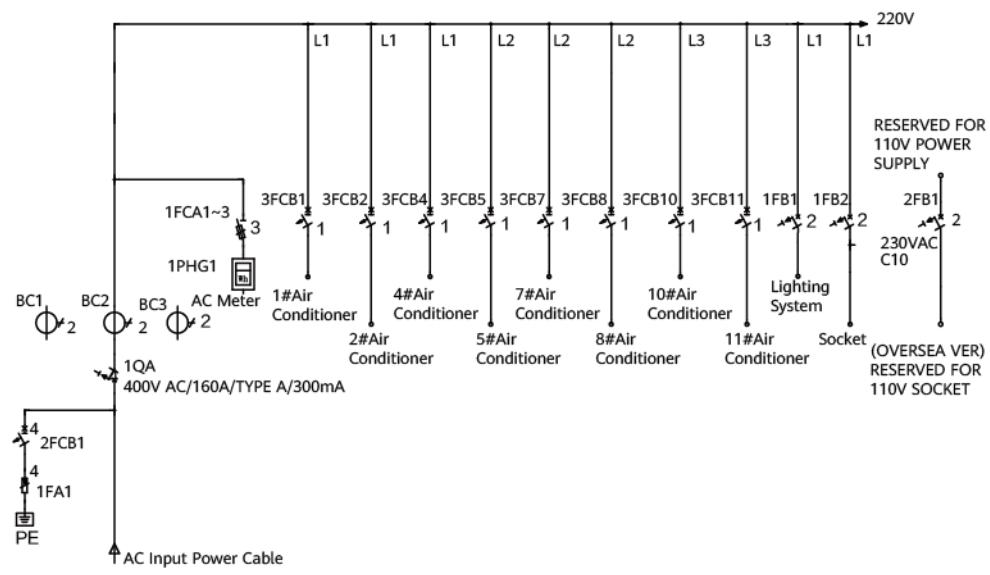


Figure 2-49 Battery circuit diagram 3 of the LUNA2000-2.0MWH-1H0

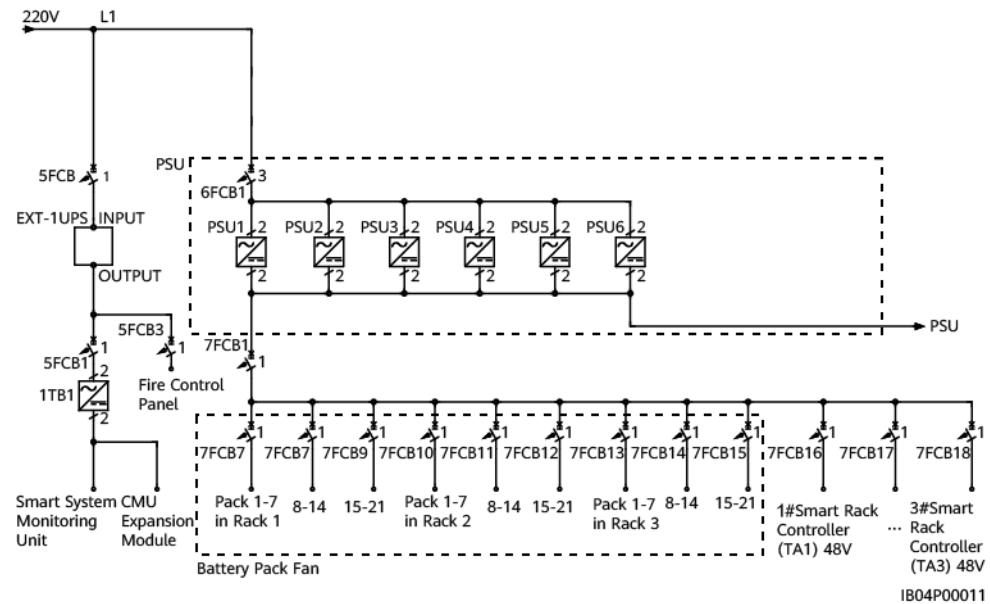
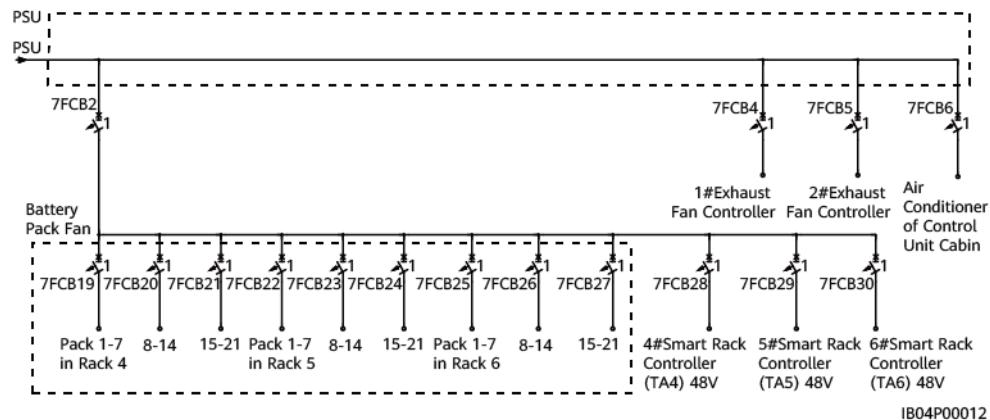


Figure 2-50 Battery circuit diagram 4 of the LUNA2000-2.0MWH-1H0



2.9.2 Battery circuit diagram of LUNA2000-2.0MWH-2H0

Figure 2-51 Battery circuit diagram 1 of the LUNA2000-2.0MWH-2H0

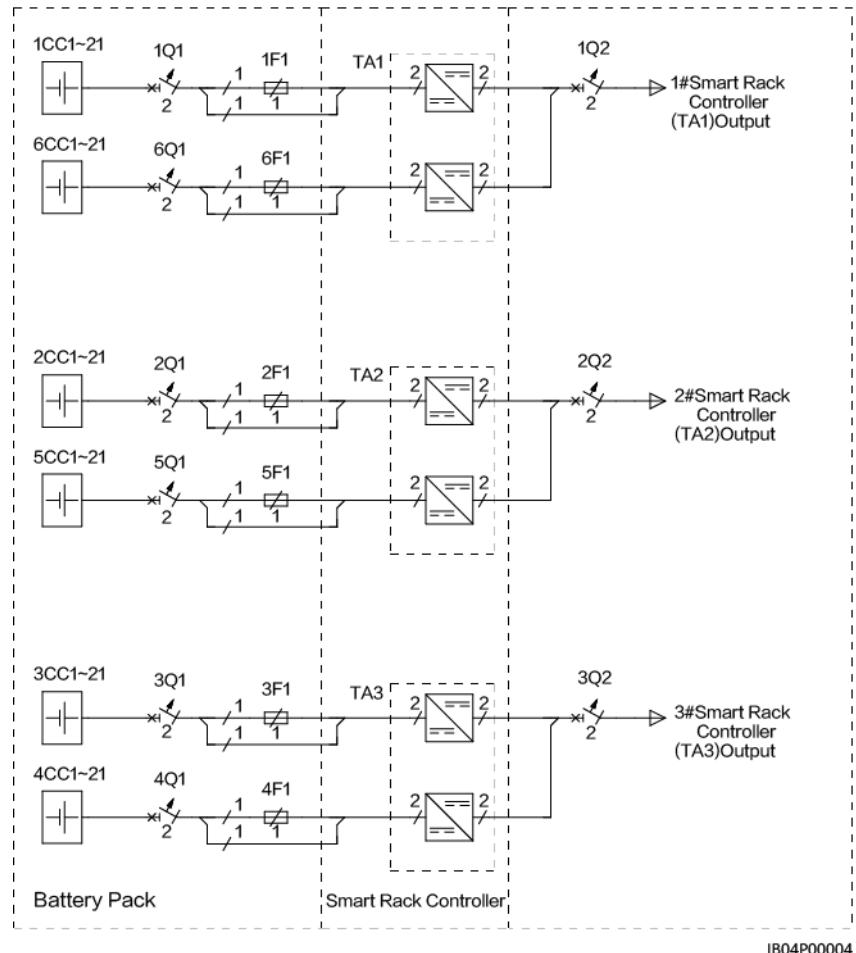


Figure 2-52 Battery circuit diagram 2 of the LUNA2000-2.0MWH-2H0

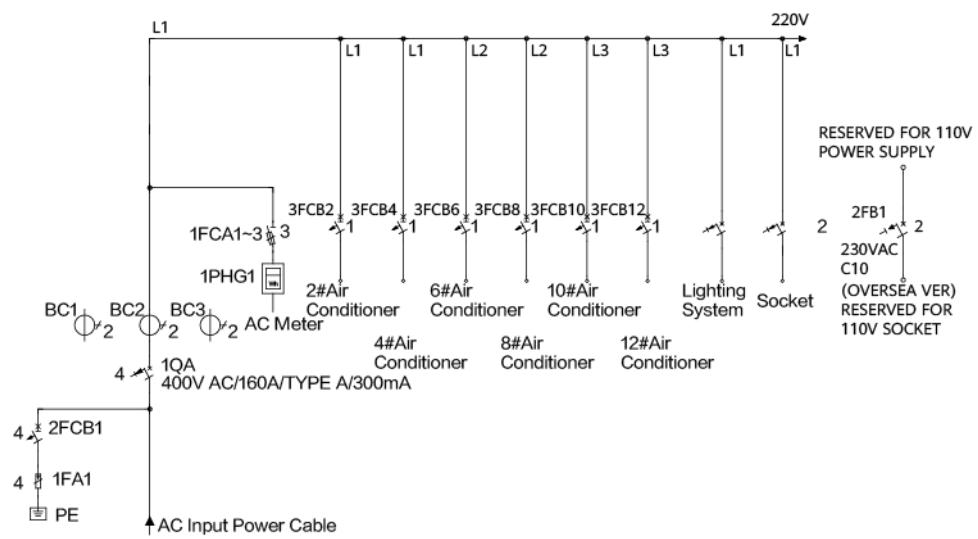


Figure 2-53 Battery circuit diagram 3 of the LUNA2000-2.0MWH-2H0

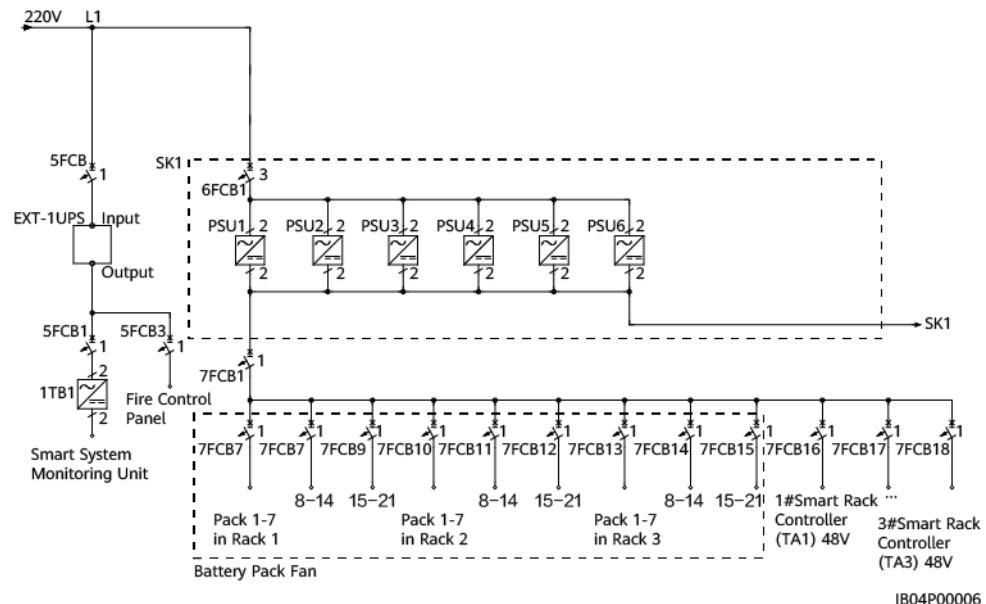
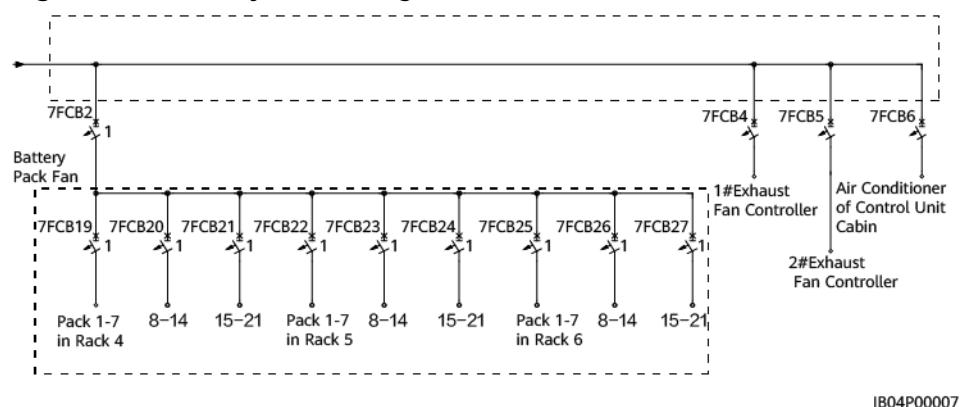


Figure 2-54 Battery circuit diagram 4 of the LUNA2000-2.0MWH-2H0



3 Site Requirements

3.1 Site Selection Requirements

The ESS applies to outdoor scenarios. The site selection requirements are as follows:

- Transportation to the site is convenient and the site fire protection facilities are reliable.
- The site area must meet the requirement and there is space for capacity expansion.
- The ground should be solid without spongy or soft soil, and should not be prone to water accumulation or subsidence.
- The site is in a well-ventilated place.
- The site is in a stable area far away from high-levels of noise and electromagnetic interference.
- The site is not above any underground facilities.
- The site is far away from dust, oil, smoke, harmful gases, and corrosive, flammable, or explosive objects.
- The site is at least 500 m away from any airports, landfills, and water areas.
- The site is an open area and at least 10 m away from any obstacles in all directions.
- The site is at least 50 m away from residential areas.
- The site should not be located in a low-lying land. The horizontal level of the site should be above the highest water level of that area.

3.2 Space Requirements

Clearance must be reserved for installation and O&M, as required in the following:

- Reserve at least 3 m and 2 m clearances on the long and short sides of the ESS respectively.

- The preceding clearance requirements are for reference only in terms of installation and O&M. The clearances must also comply with local fire control requirements.

3.3 Foundation Requirements

Before installation, build a concrete platform and trenches on the selected ground. The foundation construction requirements are as follows:

- The dimensions of the foundation should meet the installation and bearing requirements of the equipment.
- The average foundation strength should exceed 100 kg/cm^2 .
- The horizontal error between the foundation and the contact surface of the equipment should be less than 5 mm.

Bury a ground screen and reserve a ground copper bar at the ground position of the equipment. The ground copper bar should be a hot-dip zinc-coated flat steel sheet with a cross-sectional area of $40 \text{ mm} \times 4 \text{ mm}$. One end of the copper bar should be connected to the embedded ground screen, and the other end should be connected to the ground point of the equipment. When burying a ground screen, leave a sufficient slack for the ground bar to ensure its connection to the equipment.

- The ground resistance for the equipment should be less than or equal to 0.1 ohm.
- The ESS uses bottom cabling. Cables need to be pre-buried under the control unit cabin.
- The inner diameter of the protective tube should not be less than 1.5 times of the outer diameter of the cable (including the protective layer).
- The foundation should meet the local drainage requirements for the local historical maximum rainfall. Drained water should be disposed of in accordance with local laws and regulations.

Check Item

No.	Check Item	Acceptance Criteria
1	Cabling space at the bottom	If there is no maintenance space at the bottom, it is recommended that the cabling space at the bottom of the container be no less than 1.2 m. If there is maintenance space at the bottom, it is recommended that the cabling space at the bottom of the container be no less than 1.5 m.
2	Cable	The bending radius of the LV and MV cables is not less than 15 times the cable diameter. The voltage drop of the farthest loop does not exceed 5%. The sensitivity, voltage level, and thermal stability of the cables meet the local design specifications.

Figure 3-1 Concrete platform columns

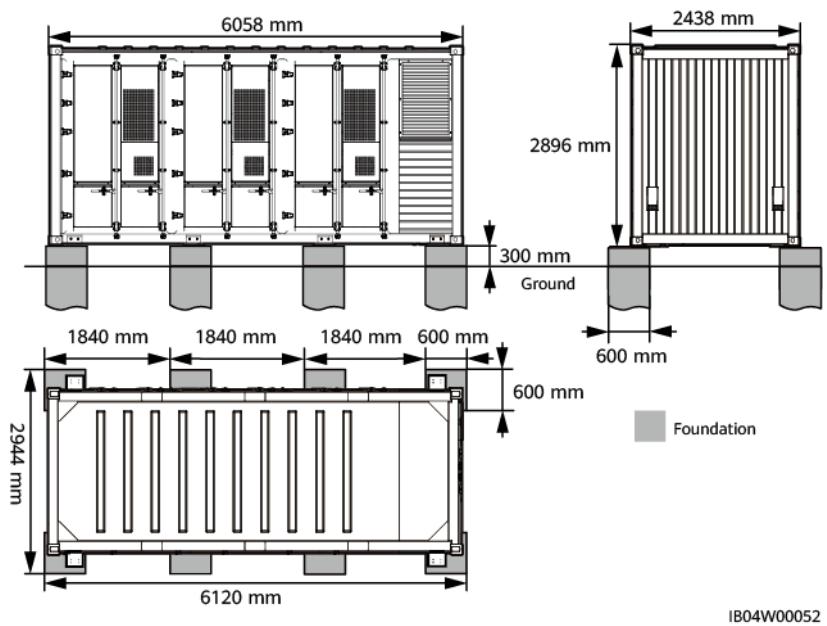
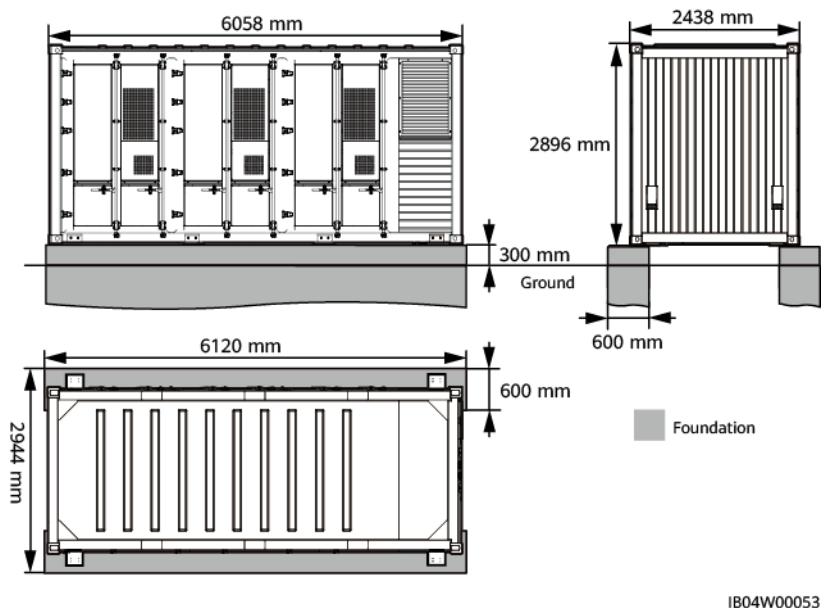


Figure 3-2 Concrete platform foundation



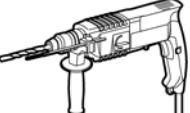
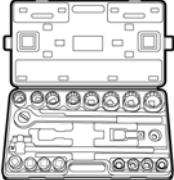
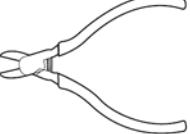
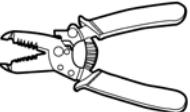
4 Installation

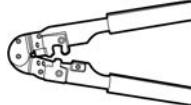
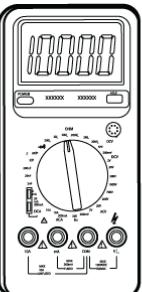
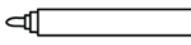
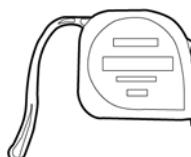
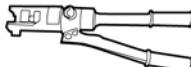
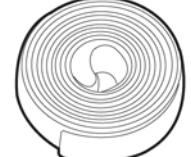
4.1 Installation Preparations

4.1.1 Preparing Tools

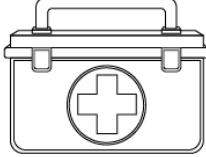
Before installation, the following tools need to be prepared.

Installation Tools

			
Hammer drill (with a $\Phi 14$ mm drill bit and a $\Phi 16$ mm drill bit)	Socket wrench set	Torque wrench	Diagonal pliers
			
Wire strippers	Flat-head screwdriver Head: 0.6 mm x 3.5 mm	Rubber mallet	Utility knife

			
Cable cutter	RJ45 crimping tool	Vacuum cleaner	Multimeter DC voltage measurement range ≥ 1500 V DC
			
Marker	Steel measuring tape	Digital or bubble level	Hydraulic pliers
			
Heat-shrink tubing	Heat gun	Cable tie	Insulation ladder
		-	-
Crane	Lifting rope		

Personal Protective Equipment (PPE)

			
Safety gloves	Safety goggles	Anti-dust mask	Safety shoes
			-
Reflective vest	Safety helmet	Medical kit	

4.1.2 Installation Environment Check

Check the site requirements one by one, and start installation only after all requirements are met. The Company will not be liable for any consequences in the case that the installation environment does not meet the requirements.

NOTE

Mark the safe zone: Use red caution belts to delimit a safe zone, clean up obstacles in the safe zone, and place construction signs and warning signs in prominent positions.

4.2 Installing the ESS

4.2.1 Determining the Installation Position of the ESS

Prerequisites

- The site requirements are met.
- Check and adjust the height of the concrete platforms to ensure that the height difference between the upper surfaces of all platforms does not exceed 5 mm.

NOTICE

Ensure that the concrete platforms meet requirements.

- Determine the installation position and orientation of the ESS based on site conditions.

Procedure

Step 1 Determine the reference points for installing the ESS on the concrete platforms. Mark the reference points using a marker.

Step 2 On the basis of the reference points, mark the mounting positions for the four corner fittings of the ESS using an ink fountain and a long soft measure tape.

NOTICE

When marking the positions for corner fittings, ensure that the four lines form a rectangle.

Figure 4-1 Concrete platform columns

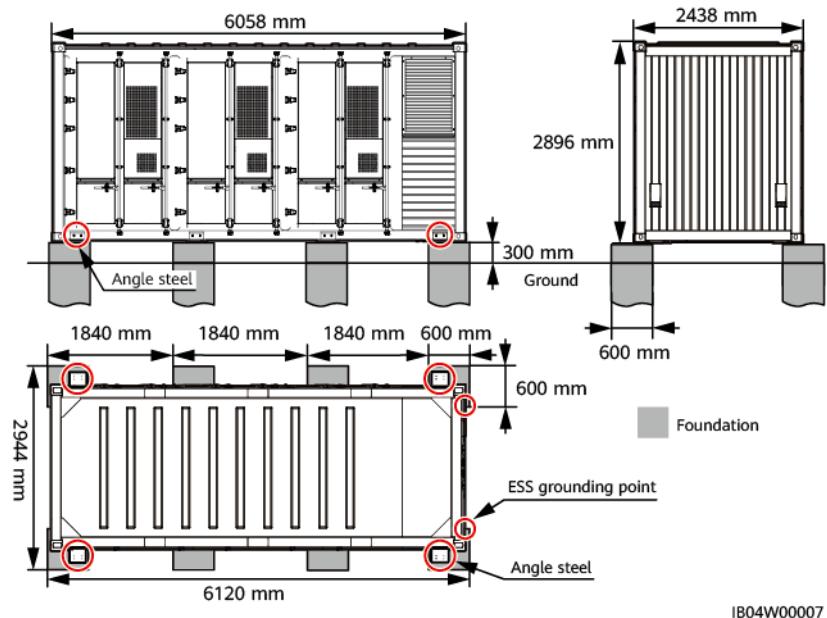
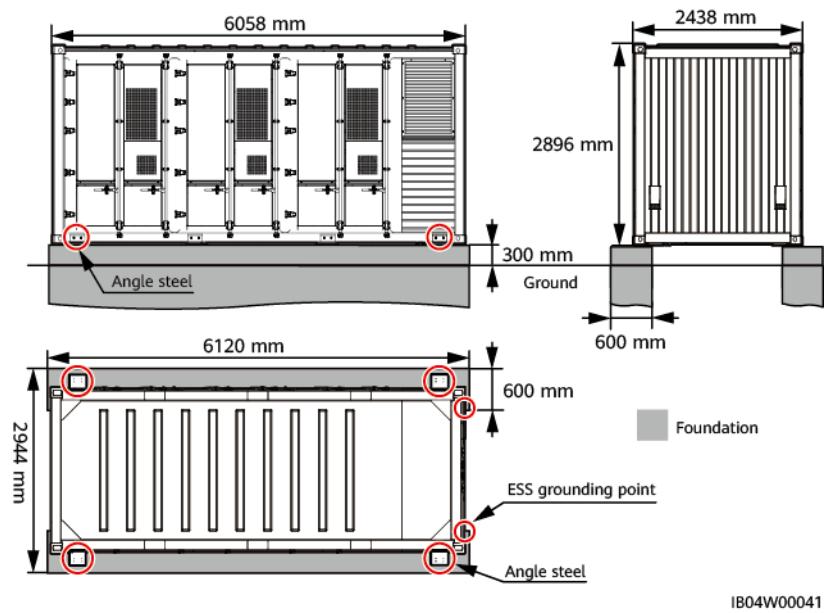


Figure 4-2 Concrete platform foundation



----End

4.2.2 Hoisting and Securing the ESS

Prerequisites

- Before hoisting, ensure that the crane and hoisting ropes meet the load-bearing requirements.
- When installing or removing the hoisting equipment, do not drag it on the ESS to prevent scratches.
- Before installing the equipment, check the ESS for damage, such as holes and cracks, and check the equipment model. If the appearance is abnormal or the equipment model is incorrect, contact your dealer.
- An appropriate crane is selected based on standards of the crane company and assessed by professionals onsite.
- The steel hoisting ropes are available.
- The doors of the ESS to be hoisted have been closed.
- It is recommended that the ESS be hoisted outdoors when the weather is clear and there is no wind.

Hoisting Precautions

Table 4-1 Hoisting precautions

Stage	Precautions
Before hoisting	Ensure that the crane can hoist a load greater than 50 t, and the working radius is not less than 10 m. If the onsite environment does not meet the required working conditions, ask a professional to assess the conditions.

Stage	Precautions
	<p>Only trained and qualified personnel should perform hoisting operations.</p>
	<p>Check that hoisting tools are complete and in good condition.</p>
	<p>Ensure that the hoisting tools are secured to a load-bearing object or wall.</p>
	<p>Ensure that the crane and steel hoisting ropes provide the required bearing capacity.</p>
	<p>All doors of the ESS should be locked.</p>
	<p>Ensure that the steel hoisting ropes are securely connected.</p>
	<p>It is recommended that the ESS be hoisted from left to right or from right to left to ensure successful hoisting.</p>
During hoisting	<p>Do not allow any unauthorized person to enter the hazardous areas and do not stand under the crane arm.</p>
	<p>Ensure that the crane is properly located and avoid long-distance hoisting.</p>
	<p>Ensure that the ESS is stable and the diagonal gradient of the ESS is less than or equal to 5 degrees.</p>
	<p>Ensure that the angle between two ropes is less than or equal to 90°.</p>
	<p>Lift and land the ESS slowly to prevent shock to the devices inside it.</p>
	<p>Remove the steel ropes after ensuring that the ESS is placed evenly on the concrete platforms.</p>
	<p>Do not drag steel ropes and hoisting tools or bump hoisted objects against hard objects during hoisting.</p>

NOTE

- You are advised to level concrete platforms before hoisting the ESS.
- The horizontal error of concrete platforms cannot exceed 5 mm.

Procedure

Step 1 Connect hoisting ropes, and hoist the ESS onto the concrete platforms.

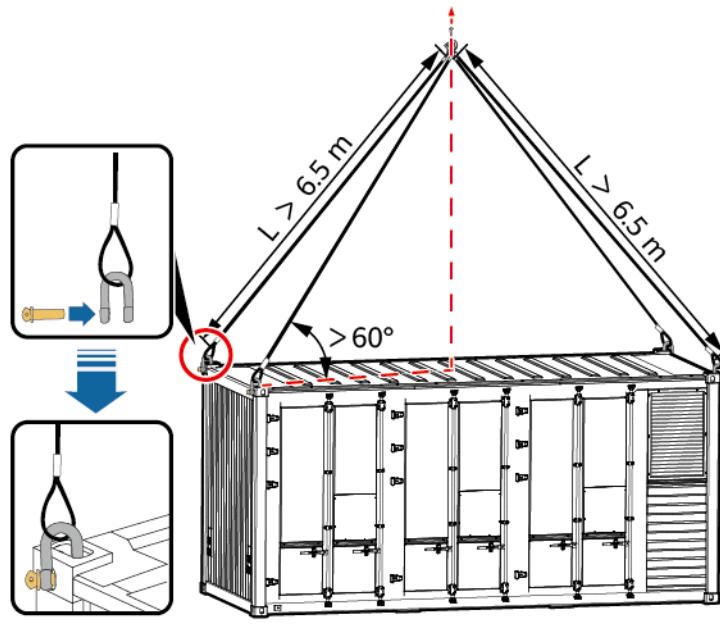
NOTICE

When hoisting the ESS, ensure that the four corner fittings of the ESS are aligned with the marked mounting positions for corner fittings on the concrete platforms.

NOTE

Prepare and install the lifting eyes and steel ropes.

Figure 4-3 Hoisting the ESS



IB04H00002

Step 2 Cut open the protective cover using a utility knife and remove the protective cover.

⚠️ WARNING

- When removing the protective cover, take protective measures for working at heights.
- Do not remove the protective cover in bad weather conditions such as rain and snow.

NOTE

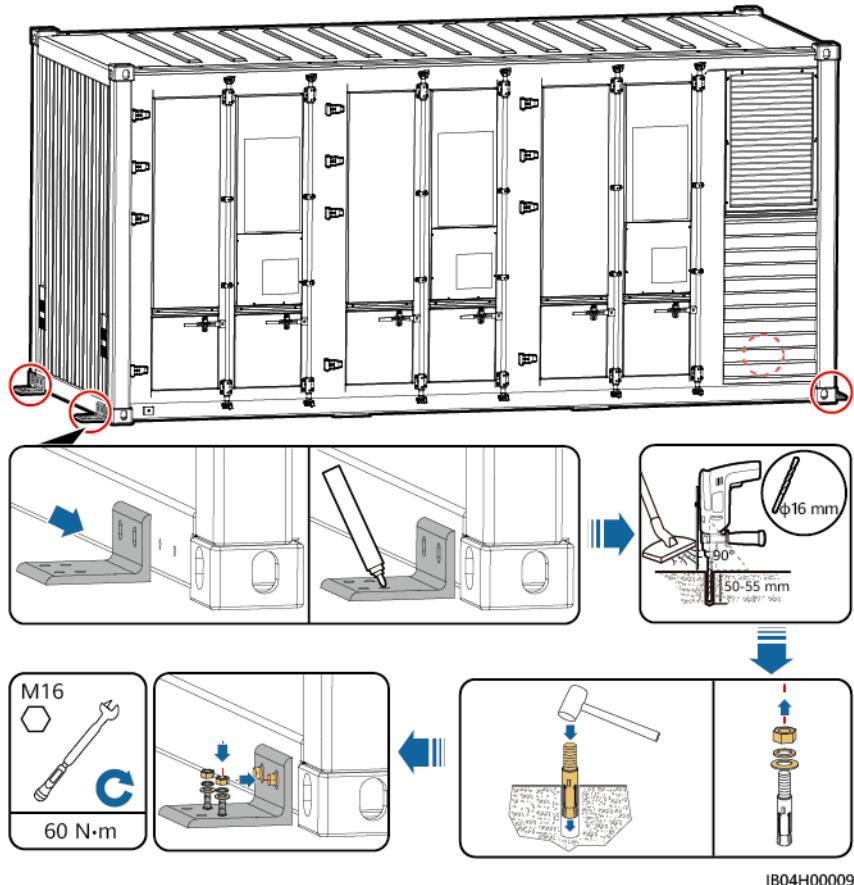
The protective covers are added to protect the ESS during transportation.

Step 3 Secure the ESS using four angle steels.

NOTICE

- The angle steel is stored in the carton in the control unit cabin. Open the door of the control unit cabin to obtain it.
- There are four mounting holes where angle steel brackets contact the base. Mark all mounting holes.
- Each angle steel bracket must be secured by two mounting holes. It is recommended that the outer two mounting holes be used. If steel bars in a concrete base block the drill bit or when the position deviation occurs during the first drilling, use the inner mounting holes.
- Ensure that the expansion bolts are tightened when securing the angle steel to the base.

Figure 4-4 Securing the ESS



----End

Follow-up Procedure

After the ESS is hoisted and installed, verify the installation to ensure normal use of products and smooth subsequent installation.

Table 4-2 Verifying the installation

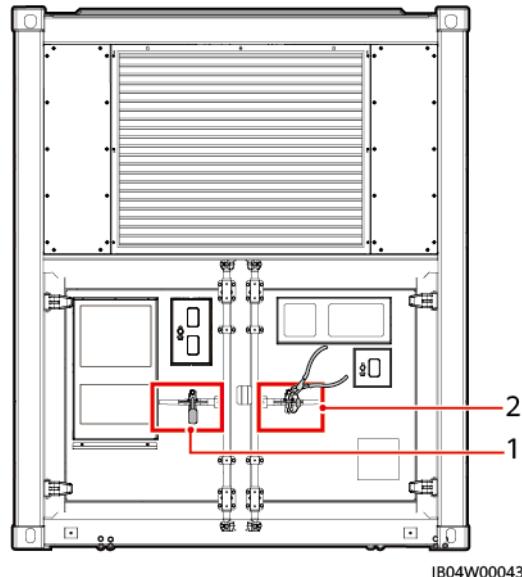
No.	Check Item	Check Method	Criteria
1	Bolts and nuts	Tighten the bolts and nuts again using a wrench.	Bolts and nuts are tightened.
2	Check whether the doors of the ESS can be opened and closed properly.	Open and close the doors of the ESS.	All doors of the ESS can be opened and closed properly.

4.2.3 Opening the Doors of the ESS

Procedure

Step 1 Use a cable cutter to cut off the TSA approved lock on the door of the control unit cabin.

Figure 4-5 Cut off the TSA

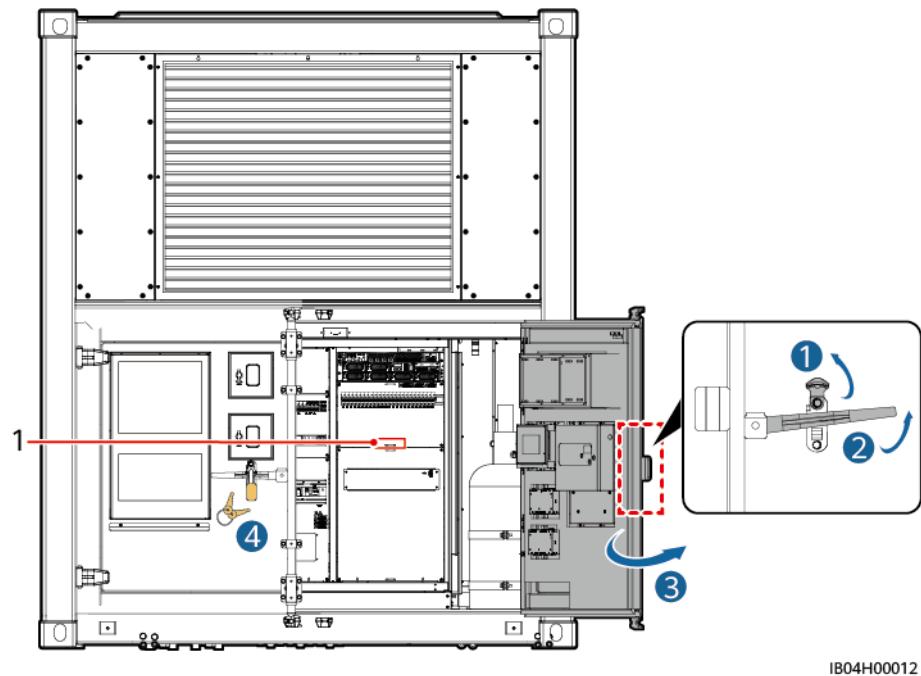


(1) Safety lock

(2) TSA approved lock

Step 2 Open the door, take the key from the control unit cabin, and use the key to open the safety lock.

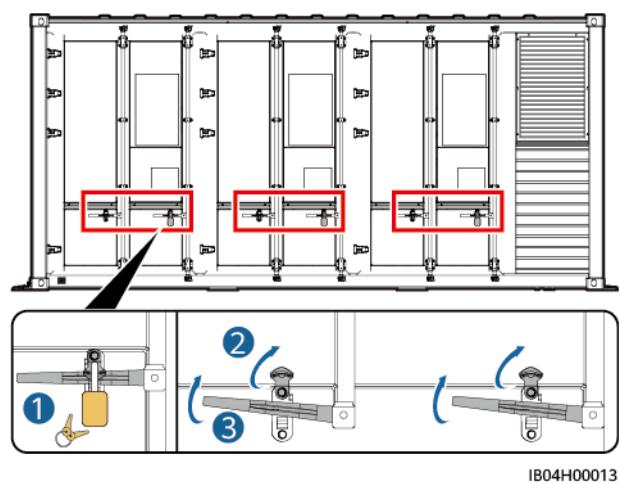
Figure 4-6 Unlocking the door on the left using the key



(1) Position of keys

Step 3 Use the key to open the safety locks on the right handle of the battery cabin, and then open the doors of the battery cabin.

Figure 4-7 Opening the doors of the battery cabin



----End

4.2.4 Grounding the ESS

Prerequisites

 CAUTION

- The grounding should comply with the local electrical safety regulations.
- Do not connect devices such as fuses and switches to ground cables.
- Connect ground cables to the ground points of the ESS enclosure or the main ground bar of the control unit cabin based on site requirements.

- The ESS is installed.
- The grounding requirements are clear.

Context

The ESS can be grounded using ground lugs or ground cables. The requirements are as follows:

- Ground lug: Use ground lugs made of hot-dip zinc-coated flat steel with a cross-sectional area of 40 mm x 4 mm, and the concrete platforms must be 300 mm above the ground.
- Ground cable

Table 4-3 Ground cable description

No.	Cable	Type	Cross-Sectional Area	Outer Diameter	Source
1	Ground cable	Single-core outdoor copper cable and M12 OT/DT terminals	16-240 mm ²	10-32 mm	Prepared by the customer

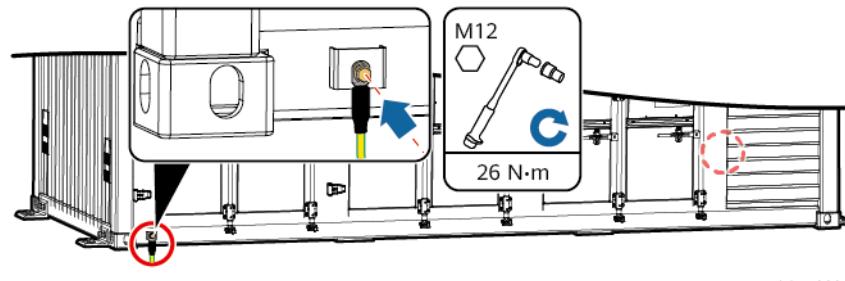
The specifications of the ground cable are subject to this table or calculated according to IEC 60364-5-54.

Connect ground cables

Method 1: Connect ground cables to the ground points of the ESS enclosure

Step 1 Connect ground cables to the ground points of the ESS using M12x30 stainless steel bolt assemblies. The ground cables can be routed through plastic-coated metal hoses based on site requirements.

Figure 4-8 Installing the ground cable



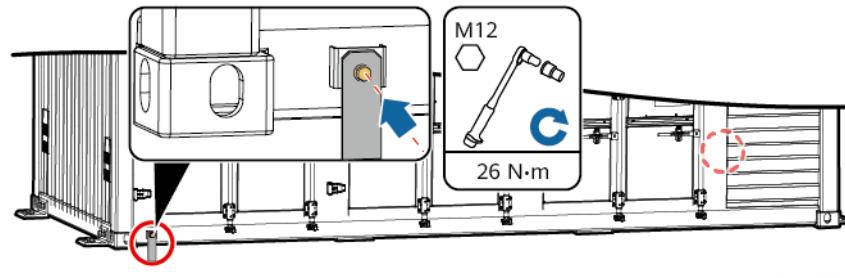
IB04H50001

Step 2 (Optional) Connect ground lugs to the ESS ground points using M12x30 stainless steel bolt assemblies.

NOTE

Before the installation, remove the tinfoil from the ground lugs.

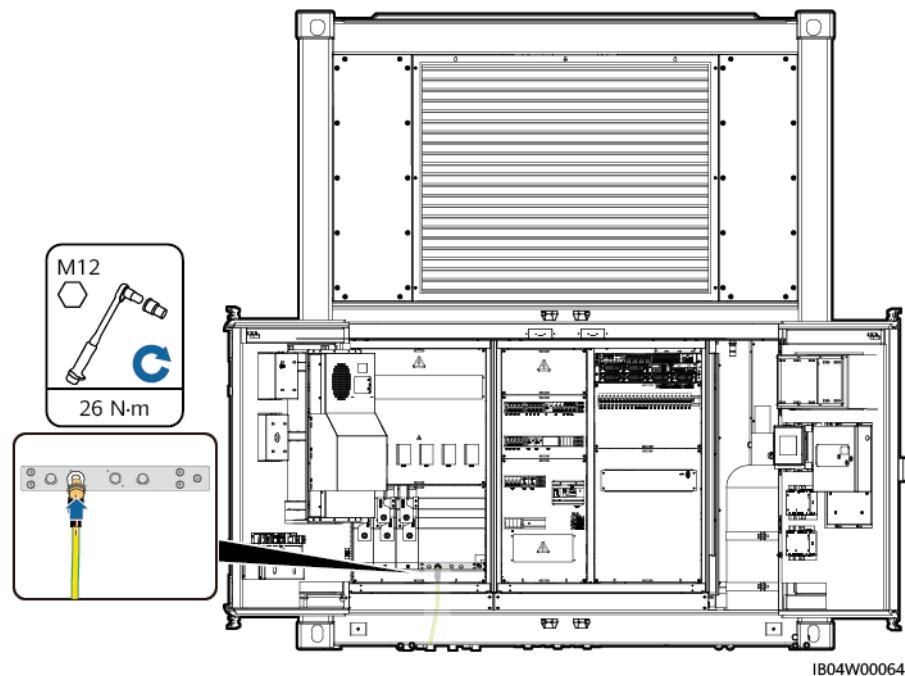
Figure 4-9 Installing ground lugs



IB04H50002

----End

Method 2: Connect the main ground bar of the control unit cabin



IB04W00064

4.3 Installing Components

4.3.1 Installing the PSU

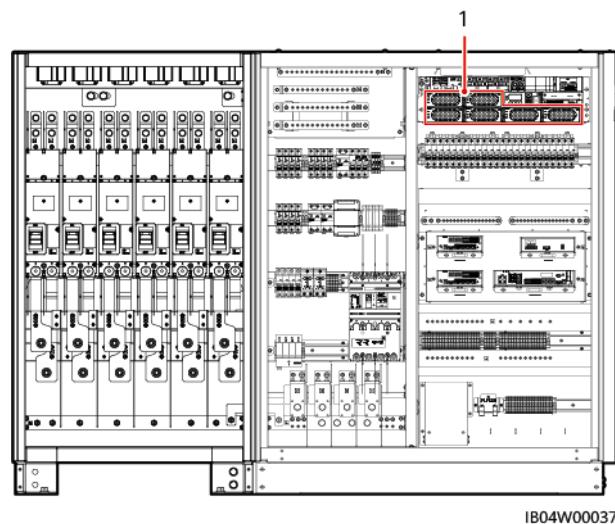
Prerequisites

- If the PSU is damaged, contact the local office.
- Do not put your hands into the PSU slot to avoid electric shock.
- When the PSU is running, a high temperature is generated around the air outlet at the rear. Do not touch the PSU or place cables or other objects on it.
- Determine the PSU installation position.

 CAUTION

In an outdoor scenario, power on the PSU within 24 hours after unpacking. Otherwise, place it in a dry indoor environment without corrosive gas.

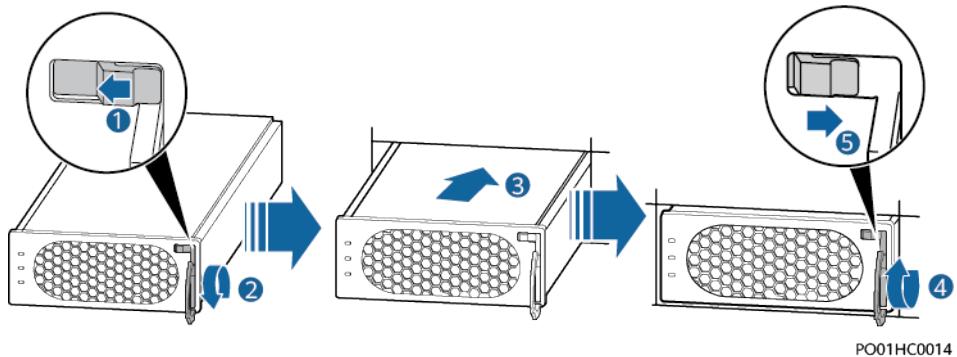
Figure 4-10 PSU installation position



Procedure

- Step 1** Push the locking latch leftward.
- Step 2** Pull out the handle.
- Step 3** Gently push the PSU into its slot along the guide rails.
- Step 4** Push the handle upward.
- Step 5** Push the locking latch rightward to lock the handle.

Figure 4-11 Installing the PSU



----End

4.3.2 Installing Copper Bars Between Battery Packs

Prerequisites

- The battery cabin door is open.
- The ESS is not powered on.

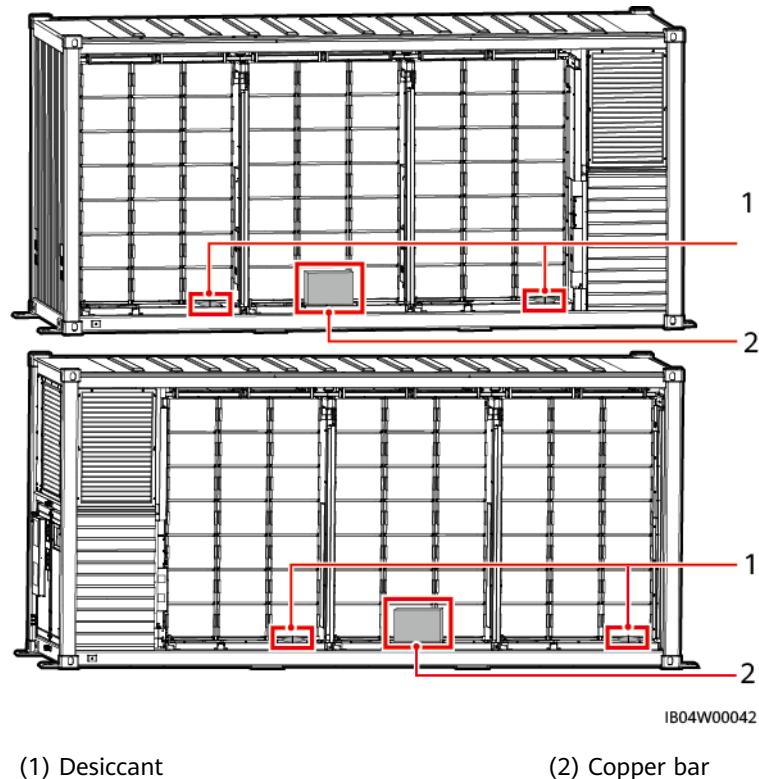
Procedure

Step 1 Take out the copper bars from the battery cabin.

 **NOTE**

Remove the desiccants from the battery cabin and dispose of them in accordance with the applicable local disposal act for waste.

Figure 4-12 Positions of the copper bars

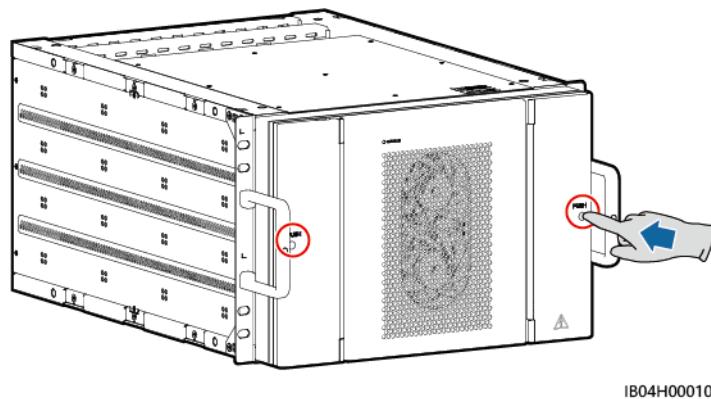


(1) Desiccant

(2) Copper bar

Step 2 Press and open the battery pack cover on the right side.

Figure 4-13 Opening the battery pack cover



Step 3 Wear insulation gloves and install copper bars between battery packs.

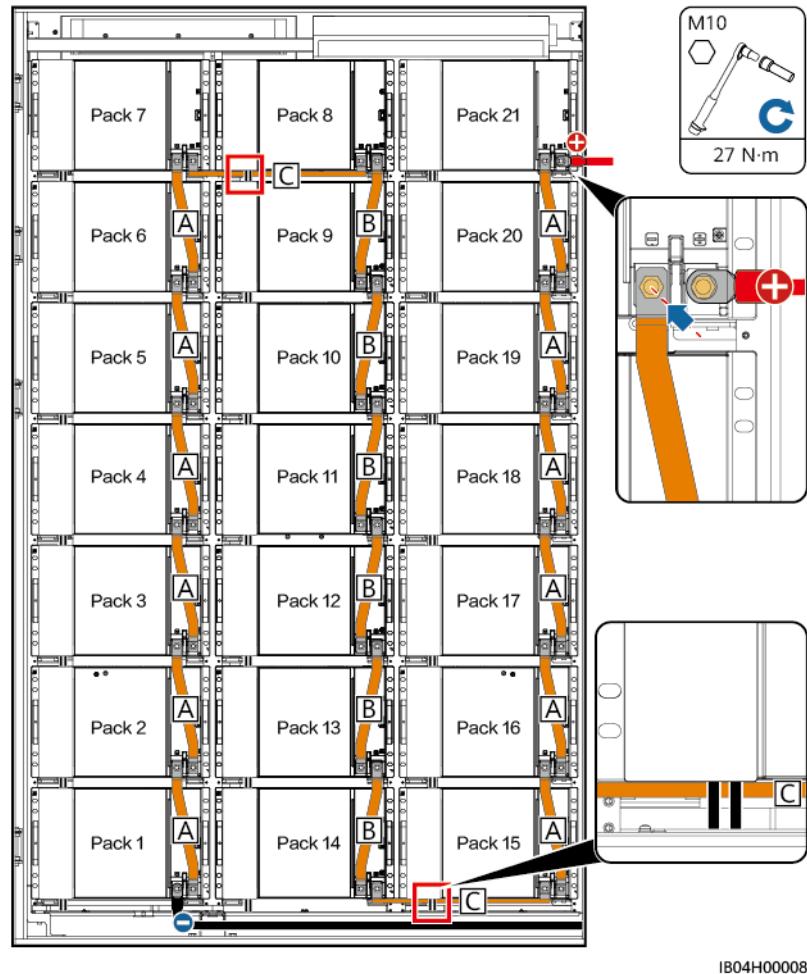
⚠ CAUTION

- Pre-install nuts according to the recommended torque of 27 N·m.
- Verify the torque of the installed nuts using a torque wrench set to 27 N·m.
- Mark the nuts whose torque has been verified using a marker.
- Use an extension rod for the torque wrench.

 NOTE

Three types of copper bars are included with the equipment and are identified by the silkscreens A, B, and C printed on the front.

Figure 4-14 Installing copper bars between battery packs



 CAUTION

When installing copper bar C, keep away from communications cables and fan power cables of battery packs to prevent cables from being squeezed.

Step 4 After installing the copper bars, close the battery pack cover.

Step 5 Close the battery cabin door.

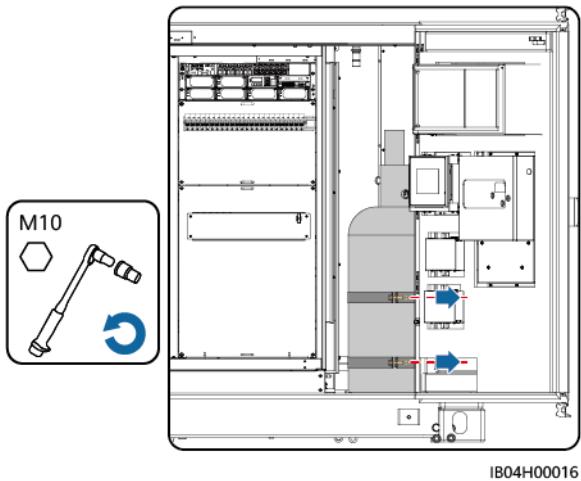
----End

4.3.3 Filling the Fire Cylinder with Extinguisher

 NOTE

This step applies only to the scenario where fire cylinders are used.

Step 1 Remove the fire cylinder.



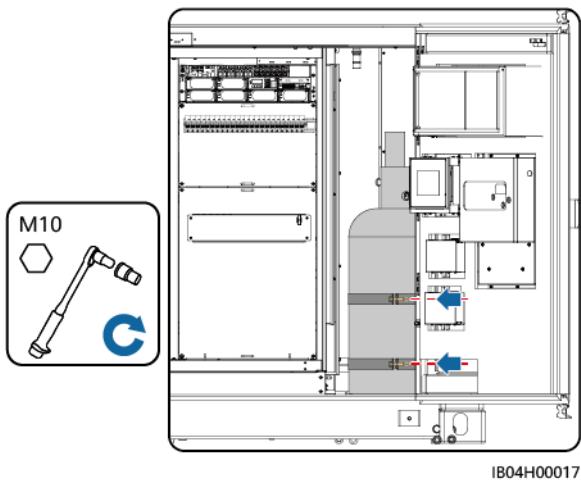
Step 2 Fill the fire cylinder with extinguishant.

 **NOTE**

This document does not provide details about how to fill the fire cylinder with extinguishant. Perform this operation in a dedicated station.

- Extinguishant Chemical: HFC-227ea.
- Extinguishant weight: 26 kg (maximum: 27 kg).
- Purity requirement: not less than 99.9%.
- Fire cylinder pressure: 2.5 MPa at 20°C. (verified by filling nitrogen)

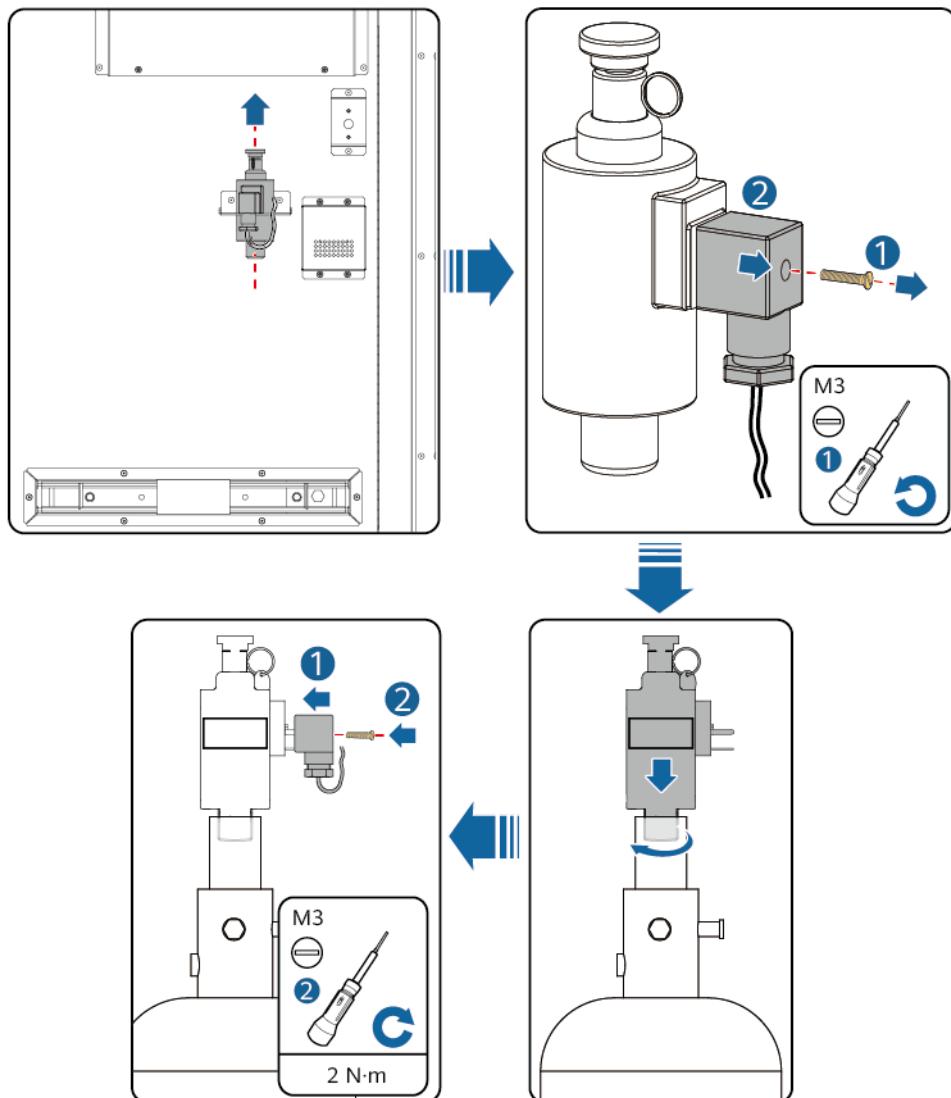
Step 3 Install the fire cylinder.



----End

4.3.4 Installing the Electromagnetic Valve

Figure 4-15 Installing the Electromagnetic Valve



IB04H00015

Procedure

- Step 1** Remove the electromagnetic valve from the bracket.
- Step 2** Remove the screws using a screwdriver and remove the electric control plug from the electromagnetic valve.
- Step 3** Tighten the electromagnetic valve clockwise to the top of the fire cylinder.
- Step 4** Insert the electric control plug and tighten the screws using a screwdriver.

⚠ CAUTION

For non-emergency manual operations, do not remove the safety pull ring.

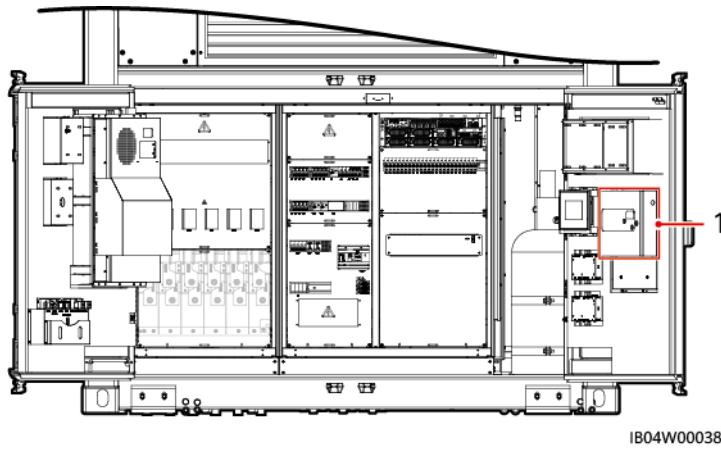
----End

4.3.5 Installing the Battery in the Fire Control Panel

Prerequisites

- If a battery is damaged, contact your local office.
- In an outdoor scenario, you are advised to power on the fire control panel within 24 hours after unpacking. Otherwise, place it in a dry indoor environment without corrosive gas.
- Determine the position of the fire control panel.

Figure 4-16 Position of the fire control panel



⚠ CAUTION

Do not damage components in the fire control panel during the installation.

Procedure

Step 1 Open the fire control panel and remove the cover.

Step 2 Install the battery and cover in the fire control panel.

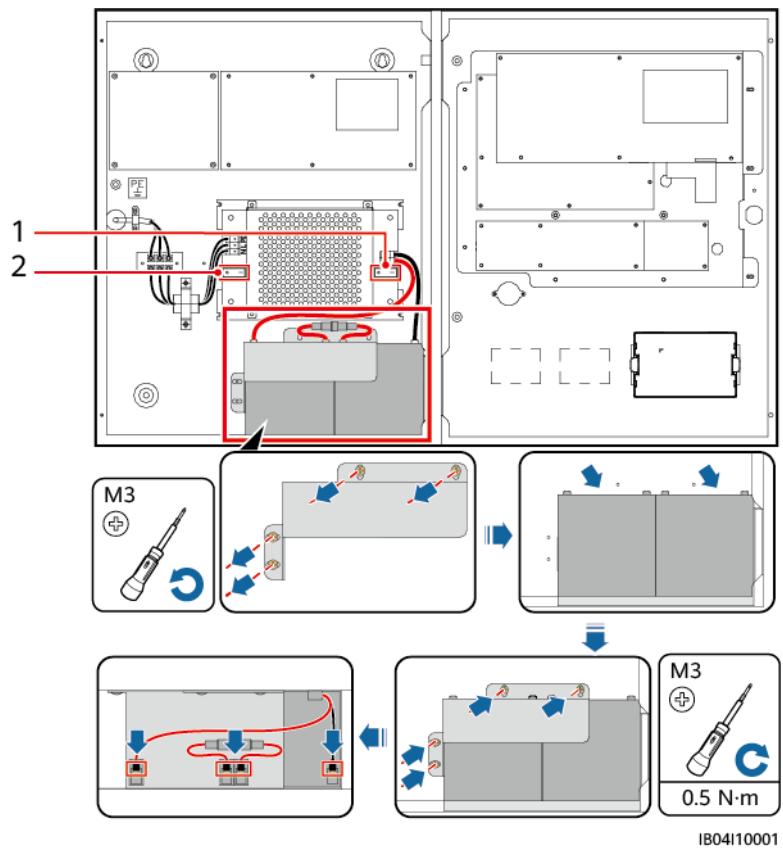
Step 3 Connect battery cables to the fire control panel.

📖 NOTE

To verify that the battery connection of the fire control panel works properly, perform the following steps:

1. Turn on the battery switch of the fire control panel and keep it running using the battery power supply.
2. Turn off the battery switch of the fire control panel.

Figure 4-17 Installing the battery in the fire control panel



(1) The right power switch in the fire control panel.

(2) The left power switch in the fire control panel.

Step 4 Turn off the fire control panel.

----End

5 Installing Cables

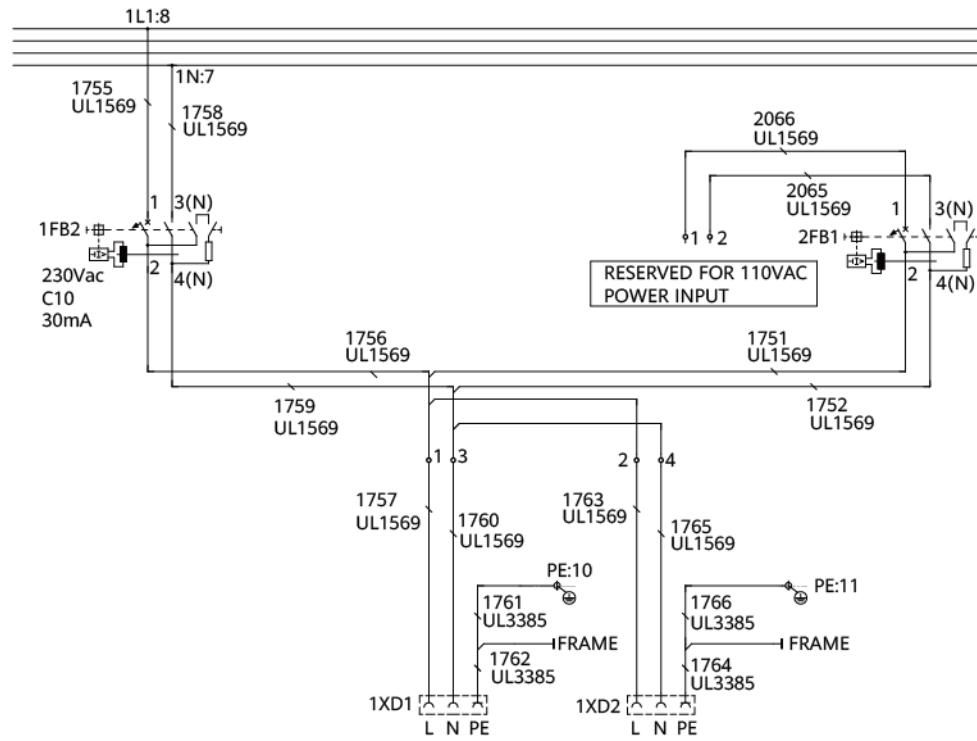
5.1 Preparing Cables

Table 5-1 Cable description

No.	Cable	Type	Conductor Cross-Sectional Area Range	Outer Diameter	Terminal	Source
1	DC power cable	Single-core/Two-core outdoor copper/copper-clad aluminum/aluminum alloy cable	<ul style="list-style-type: none"> Single-core cable: 185–400 mm² Two-core cable: 240–400 mm² 	<ul style="list-style-type: none"> Single core: 25–47 mm Two cores: 25–68 mm 	M12 OT/DT terminal	Prepared by the customer
2	AC input power cable (400 V)	Four-core/Five-core outdoor copper/copper-clad aluminum/aluminum alloy cable	35–185 mm ²	24.6–72 mm	M10 OT/DT terminal	Prepared by the customer
4	FE communication cable	CAT 5E outdoor shielded network cable, internal resistance ≤ 1.5 ohms/10 m	-	< 9 mm	Shielded RJ45 connector	Prepared by the customer
5	Optical cable	Supports the four-core or eight-core single-mode armored cable with the transmission wavelength of 1310 nm.	-	≤ 18 mm	-	Prepared by the customer

No.	Cable	Type	Conductor Cross-Sectional Area Range	Outer Diameter	Terminal	Source
The cable diameter must comply with local cable standards. The factors that affect cable selection include the rated current, cable type, routing mode, ambient temperature, and maximum expected line loss.						

5.2 Connecting Socket Cables



IB04P00015

Conntection wires for socket supply, onsite-installed:

- Option 1: Connections 1756 & 1759 are only used when 220/230 V AC socket is mounted.
- Option 2: Connections 1751 & 1752 are only used when 110 V AC socket is mounted.

Conntection wires for socket grounding, onsite-installed:

- Option 1: connections 1761 & 1766 are only used when the PE terminal is on the top of the socket.
- Option 2: connections 1762 & 1764 are only used when the PE terminal is on the bottom of the socket.

NOTE

Only one socket can be installed in some scenarios based on the installation guide rail space of the socket.

5.3 Installing DC Power Cables

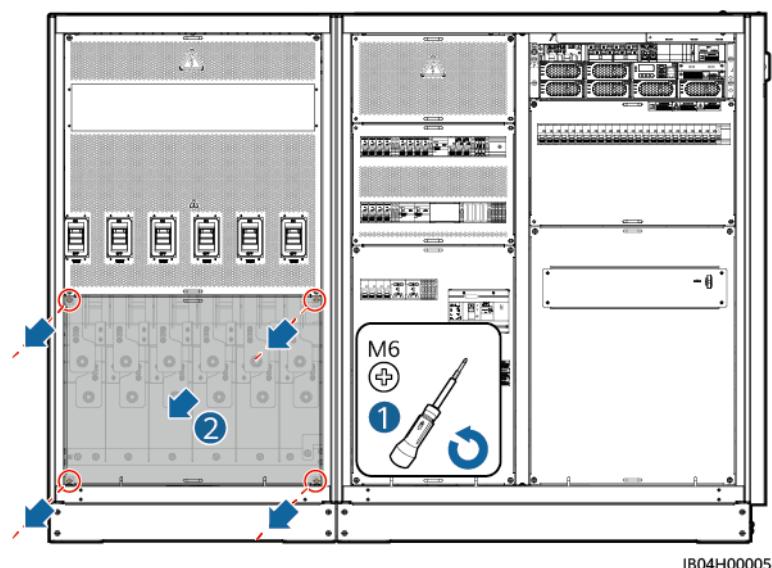
Prerequisites

- The ESS is not powered on.
- The DC power cables have been pre-buried.
- The OT/DT terminals have been crimped. For details, see [B Crimping an OT or DT Terminal](#).

Procedure

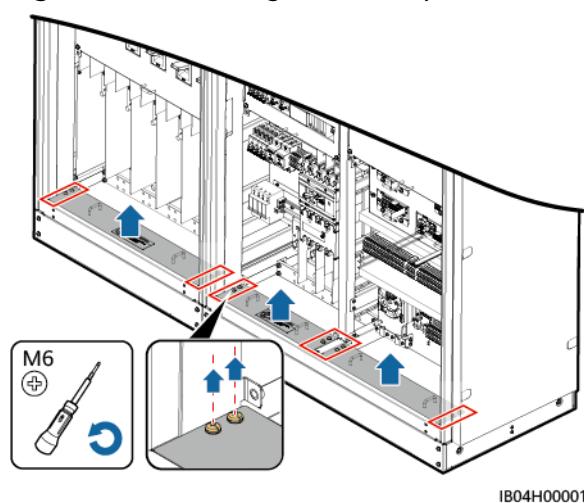
Step 1 Remove the protective cover

Figure 5-1 Removing the protective cover



Step 2 Remove the baffle plates for the DC power cables.

Figure 5-2 Removing the baffle plates for the DC power cables



Step 3 Connect the DC power cables.

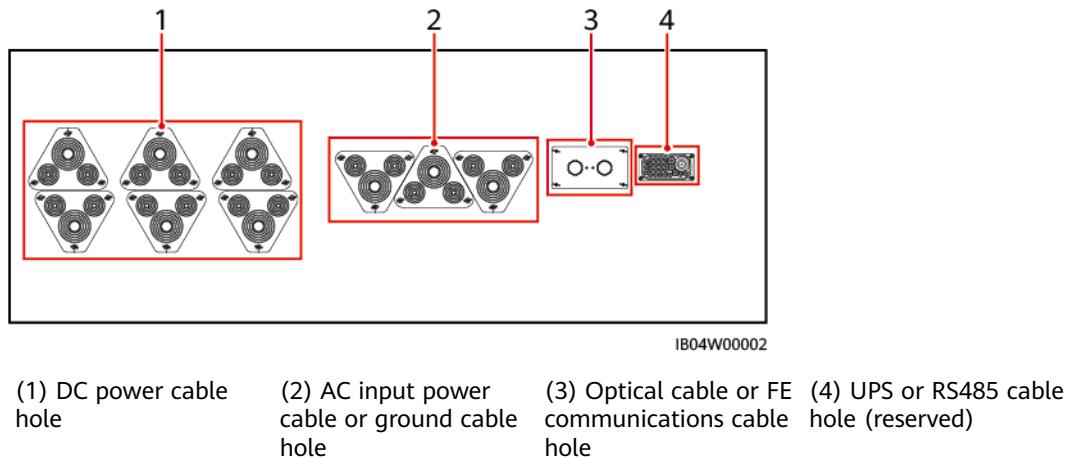
NOTICE

- The screw assembly whose model is subject to the delivery should be tightened according to the corresponding standard torque.
- Partially tighten the nuts of the DC power cables to a torque of 5 N·m when securing the cables.
- The wiring terminal must be installed with heat-shrink tubing at the crimping area of the cable conductor to ensure that the electrical clearance between the conductors is greater than 20 mm.
- Lay out the DC power cables according to the design, route the cables to the wiring positions on the corresponding switches, and label the cables.

NOTE

- Tighten the nuts using the socket wrench with an extension rod. The length of the extension rod is greater than 30 cm. Secure the screw assembly using an adjustable wrench.
- After connecting the DC power cables, ensure that the OT terminals are properly attached to the copper bar and that the DC power cables point vertically downwards.

Figure 5-3 DC power cable positions at the bottom



CAUTION

1. Pre-install nuts according to the recommended torque of 47 N·m.
2. Verify that the torque of the installed bolts is 47 N·m using a torque wrench.
3. Mark the nuts whose torque has been verified using a marker.

NOTE

When armored cables are used, it is recommended that the armored layer be grounded at the opposite side.

Figure 5-4 Connect the single-core DC power cables of LUNA2000-2.0MWH-1H0

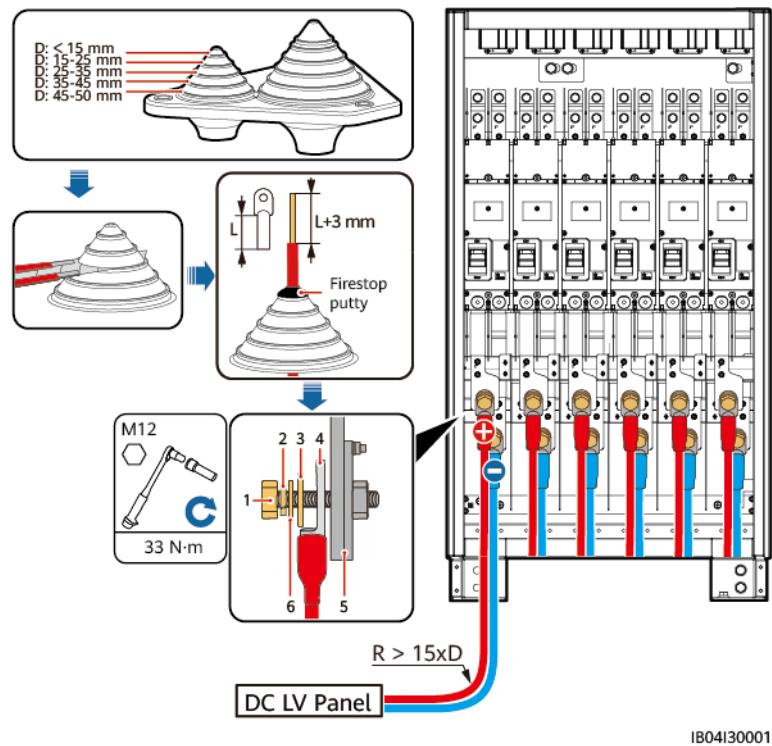
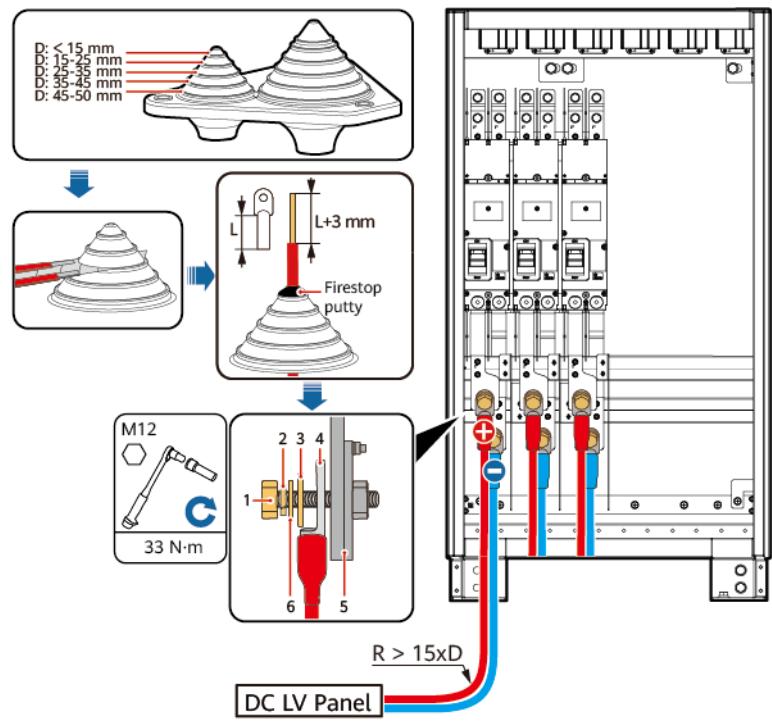
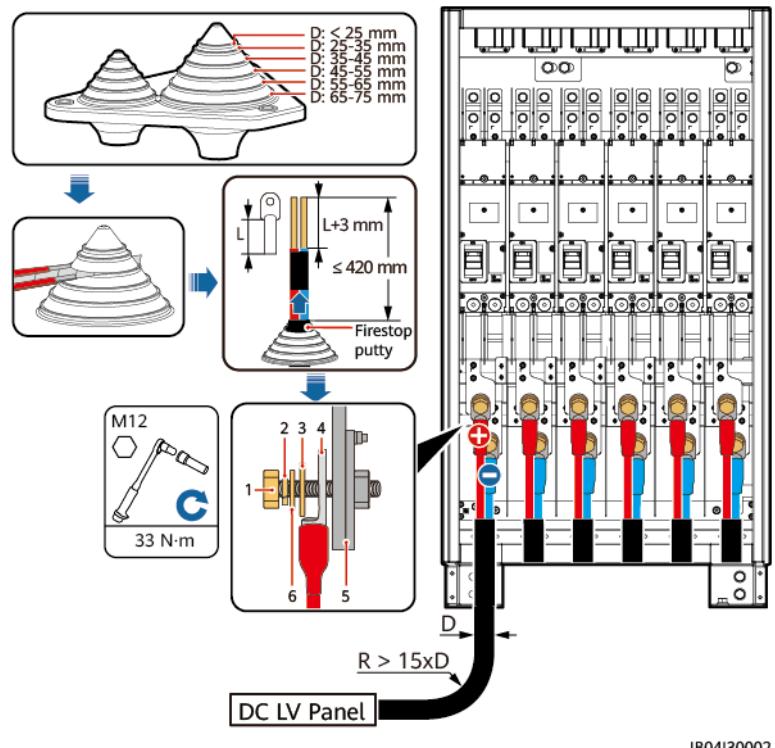


Figure 5-5 Connect the single-core DC power cables of LUNA2000-2.0MWH-2H0



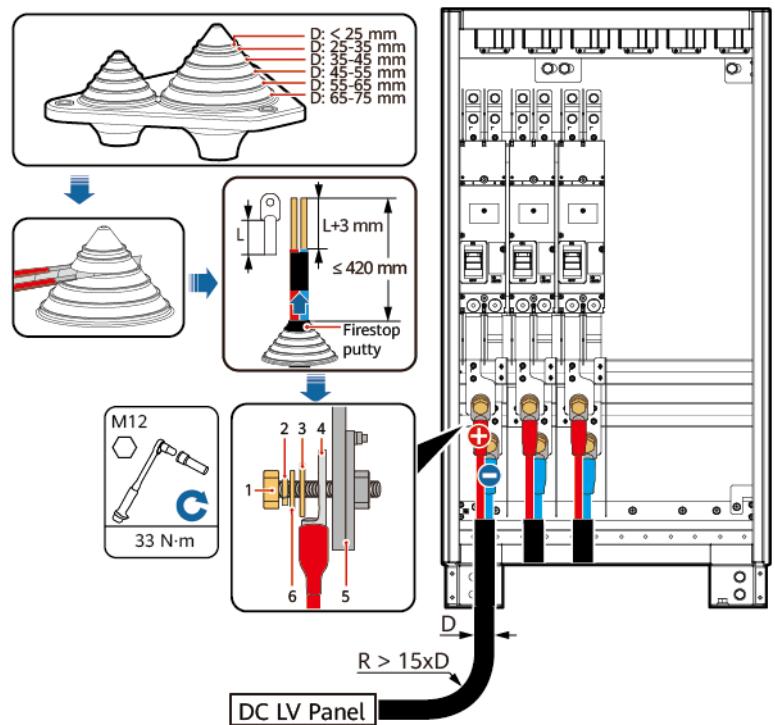
(1) Screw assembly	(2) Spring washer	(3) Large washer (optional)
(4) Wiring terminals	(5) Copper bar	(6) Flat washer

Figure 5-6 Connect the single-core DC power cables of LUNA2000-2.0MWH-1H0



IB04I30002

Figure 5-7 Connecting two-core DC power cables of LUNA2000-2.0MWH-2H0



IB04I30004

(1) Screw assembly	(2) Spring washer	(3) Large washer (optional)
(4) Wiring terminals	(5) Copper bar	(6) Flat washer

Step 4 Use firestop putty to seal the cable holes at the bottom.

Step 5 Install the removed cover.

----End

5.4 Installing AC Input Power Cables

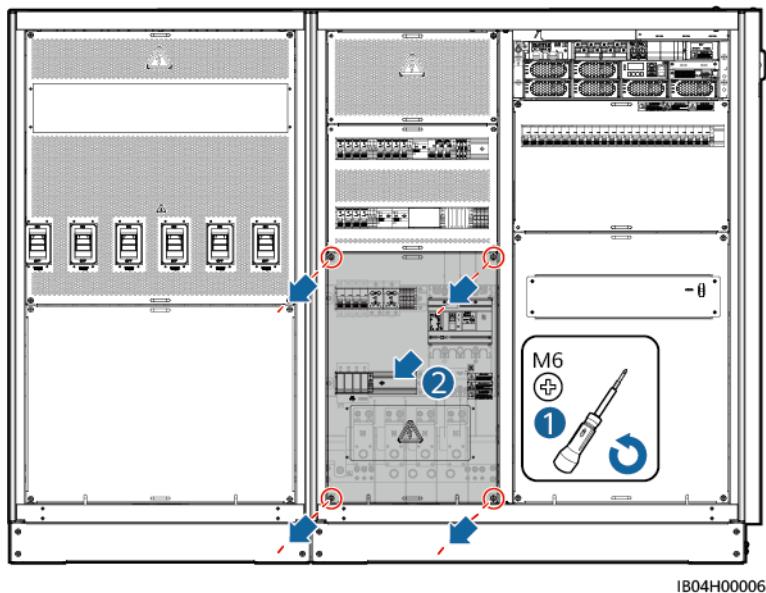
Prerequisites

- The ESS is not powered on.
- AC input power cables have been pre-buried.
- The OT/DT terminals of the AC input power cables have been crimped. For details, see [B Crimping an OT or DT Terminal](#).

Procedure

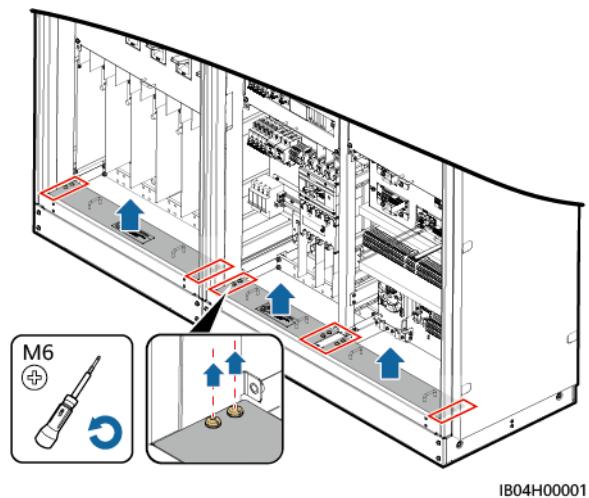
Step 1 Remove the protective cover.

Figure 5-8 Removing the protective cover



Step 2 Remove the baffle plates for the AC input power cables.

Figure 5-9 Removing the baffle plates for the AC input power cables

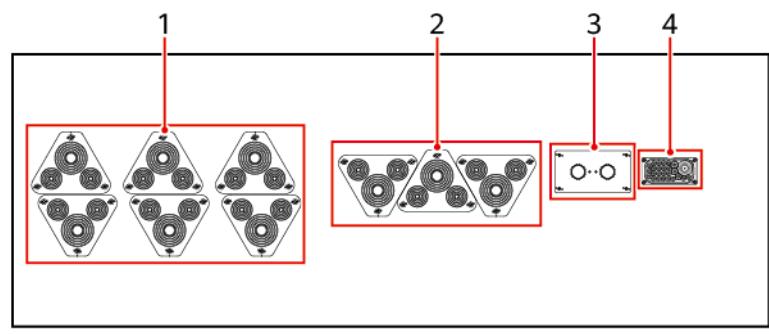


Step 3 Connect AC input power cables.

NOTICE

- The screw assembly whose model is subject to the delivery should be tightened according to the corresponding standard torque.
- Partially tighten the nuts of the AC input power cables to a torque of 5 N·m when securing the cables.
- The wiring terminal must be installed with heat-shrink tubing at the crimping area of the cable conductor to ensure that the electrical clearance between the conductors is greater than 20 mm.
- Lay out the AC input power cables according to the design, route the cable to the wiring positions on the corresponding switches, and label the cables.

Figure 5-10 AC input power cable positions at the bottom



(1) DC power cable hole

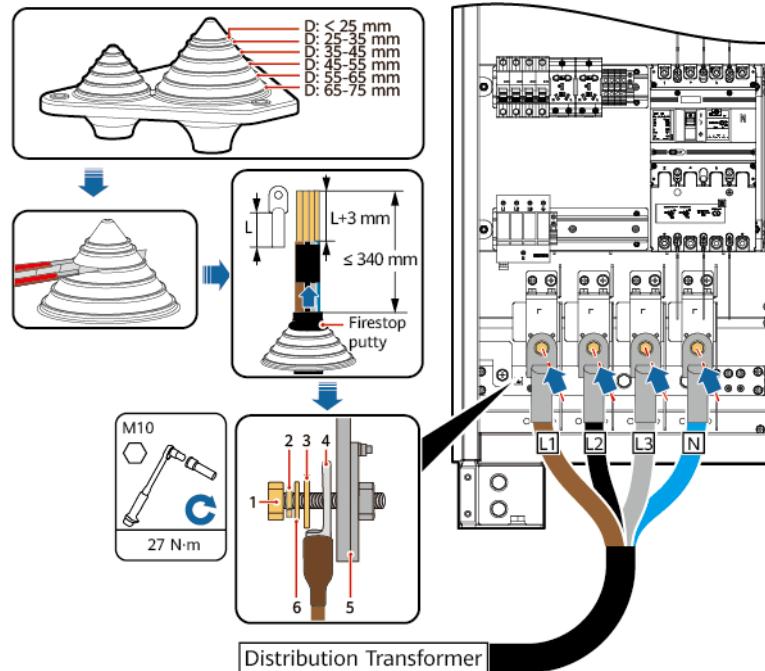
(2) AC input power cable or ground cable hole

(3) Optical cable or FE communications cable hole (reserved)
(4) UPS or RS485 cable hole (reserved)

⚠ CAUTION

1. Pre-install nuts according to the recommended torque of 27 N·m.
2. Verify that the torque of the installed bolts is 27 N·m using a torque wrench.
3. Mark the nuts whose torque has been verified using a marker.

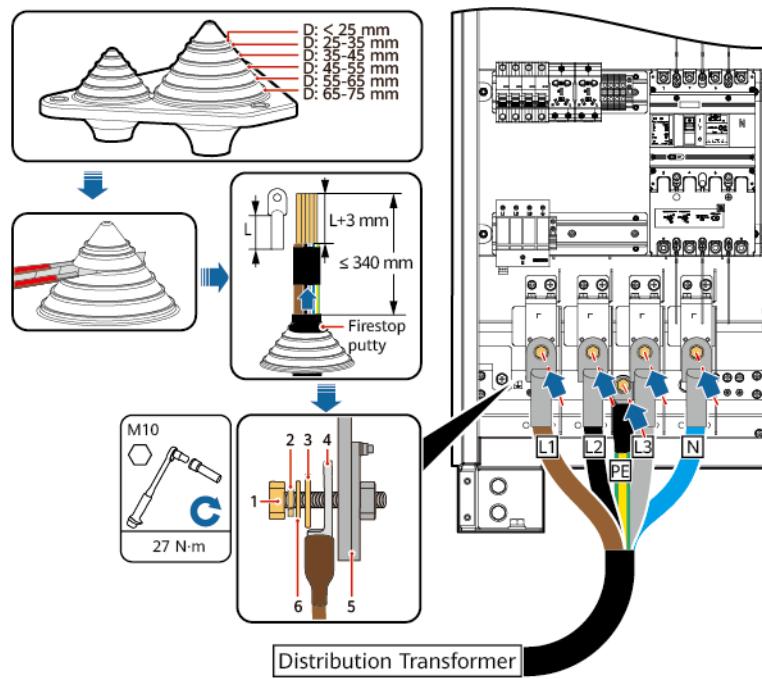
Figure 5-11 Connecting the four-core AC input power cables (excluding the ground cable and including the neutral wire)



IB04I20002

(1) Screw assembly	(2) Spring washer	(3) Large washer (optional)
(4) Wiring terminals	(5) Copper bar	(6) Flat washer

Figure 5-12 Connecting the five-core AC input power cable (including the ground cable and the neutral wire)



IB04I20001

(1) Screw assembly	(2) Spring washer	(3) Large washer (optional)
(4) Wiring terminals	(5) Copper bar	(6) Flat washer

Step 4 Use firestop putty to seal the cable holes at the bottom.

----End

⚠ CAUTION

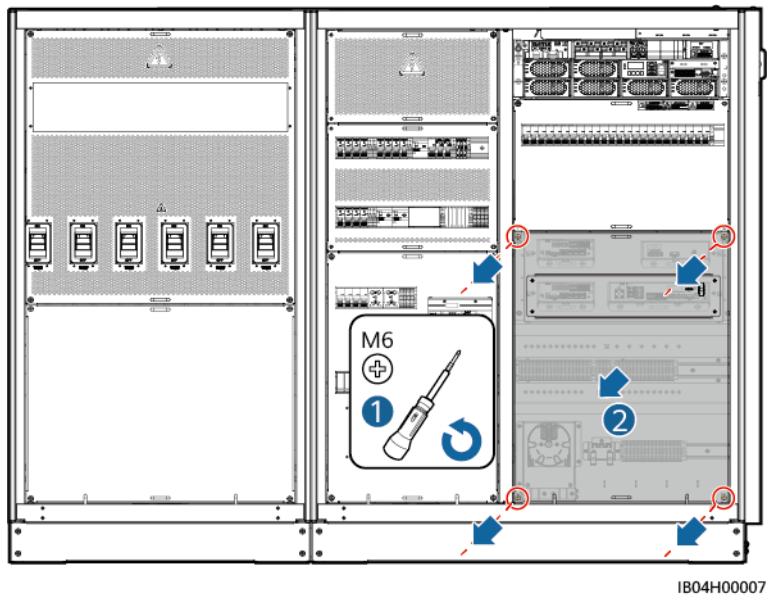
When connecting AC input power cables, ensure that the cables are not damaged or disconnected. Ensure that the neutral wire is securely connected. Otherwise, AC power devices in the system may be damaged.

5.5 Installing Signal Cables

5.5.1 Installing FE Communications Cables

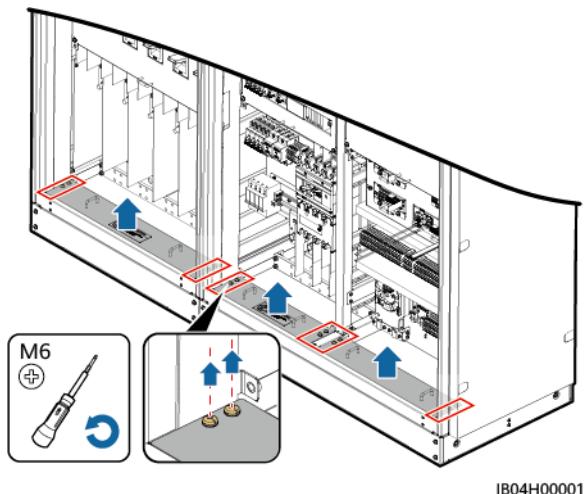
Step 1 Remove the protective cover.

Figure 5-13 Removing the protective cover



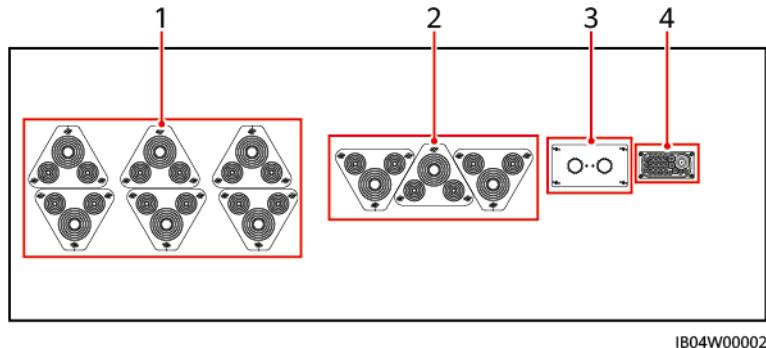
Step 2 Remove the baffle plates for the signal cables.

Figure 5-14 Removing the baffle plates for the signal cables



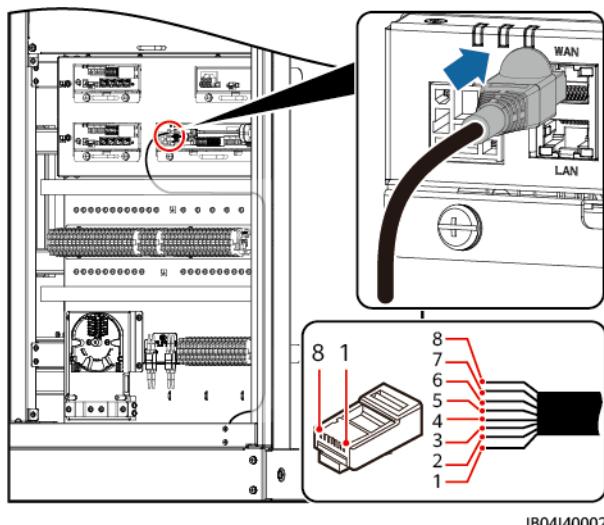
Step 3 Connect the FE communications cables to the **WAN** ports on the CMU.

Figure 5-15 Optical cable positions at the bottom



(1) DC power cable hole (2) AC input power cable or ground cable hole (3) Optical cable or network cable hole (4) UPS or RS485 cable hole (reserved)

Figure 5-16 Connecting FE communications cables



(1) White-and-orange (2) Orange (3) White-and-green (4) Blue
(5) White-and-blue (6) Green (7) White-and-brown (8) Brown

Step 4 Bind the cables.

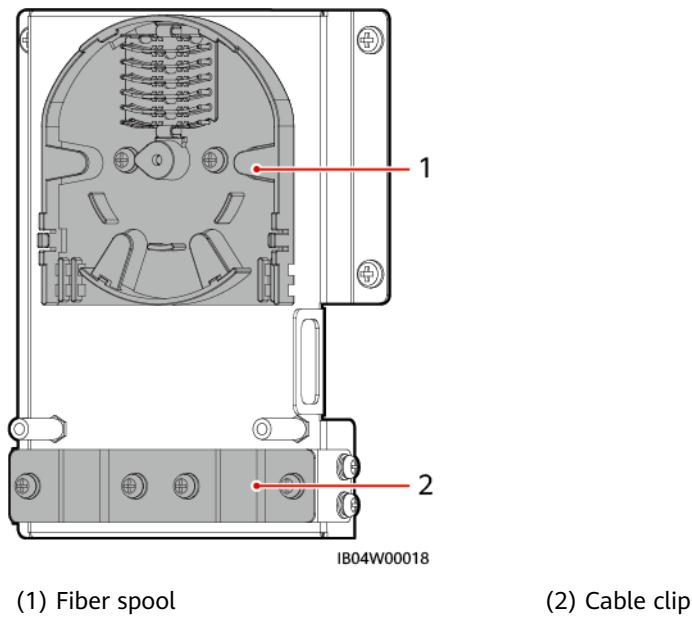
----End

5.5.2 Installing Optical Cables

NOTICE

Only professionals are allowed to connect optical cables.

Figure 5-17 Optical Terminal Box (ATB) interior

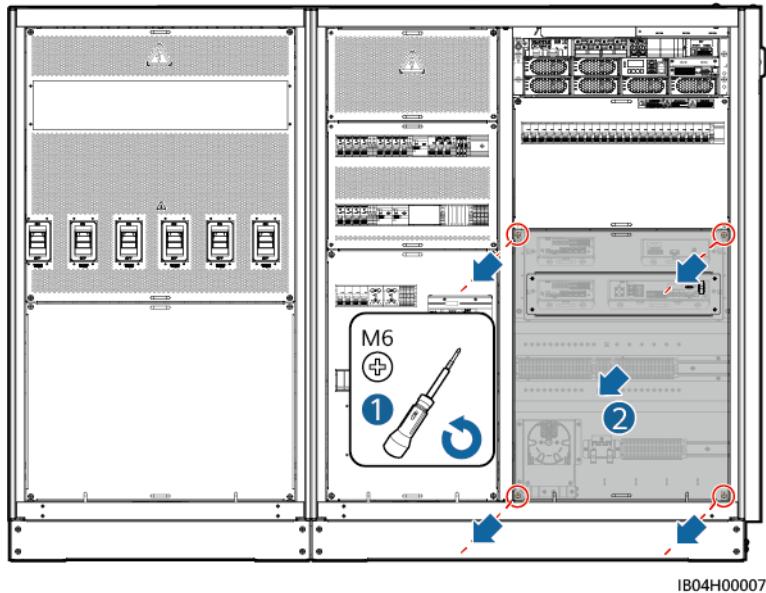


(1) Fiber spool

(2) Cable clip

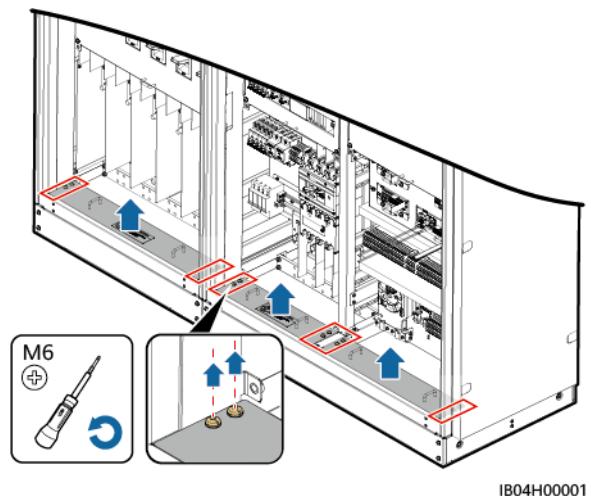
Step 1 Remove the protective cover.

Figure 5-18 Removing the protective cover



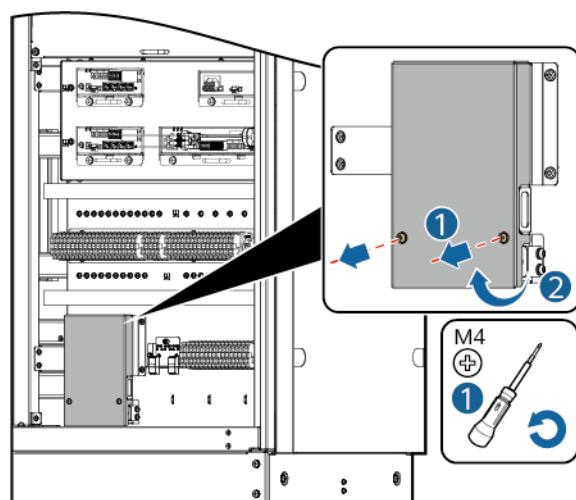
Step 2 Remove the baffle plates for the optical cables.

Figure 5-19 Removing the baffle plate for the optical cables



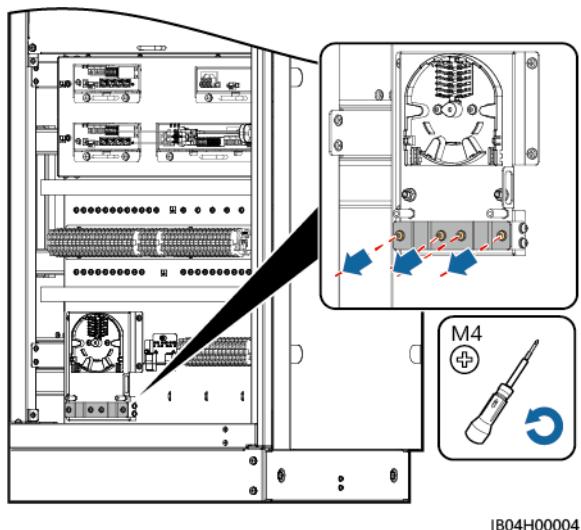
Step 3 Remove the external mechanical parts from the ATB.

Figure 5-20 Removing external mechanical parts



Step 4 Remove the optical cable fastener.

Figure 5-21 Removing a fastener



Step 5 Connect one end of the optical jumper to the fiber adapter.

Step 6 Route the other end of the optical jumper through the cable hole on the side of the ATB, and connect the cable to the ATB.

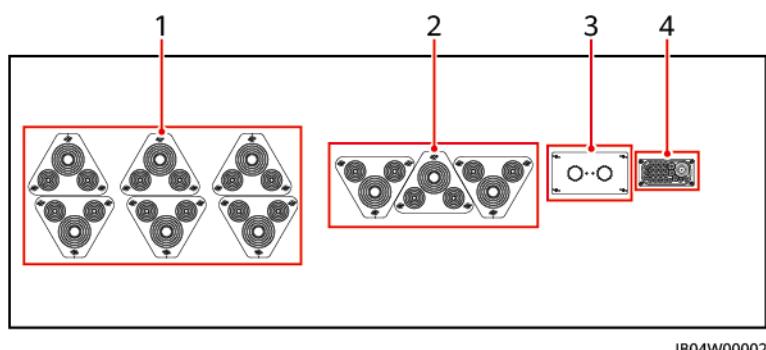
Step 7 Connect the peripheral optical cable to the ATB, splice the optical cable and the optical jumper, and wind the spliced cable around the fiber spool on the ATB.

Step 8 Install an optical module on the CMU panel, connect one end of the optical jumper to the optical module, and connect the other end to the fiber adapter.

NOTICE

Only professionals are allowed to splice fibers.

Figure 5-22 Optical cable positions at the bottom



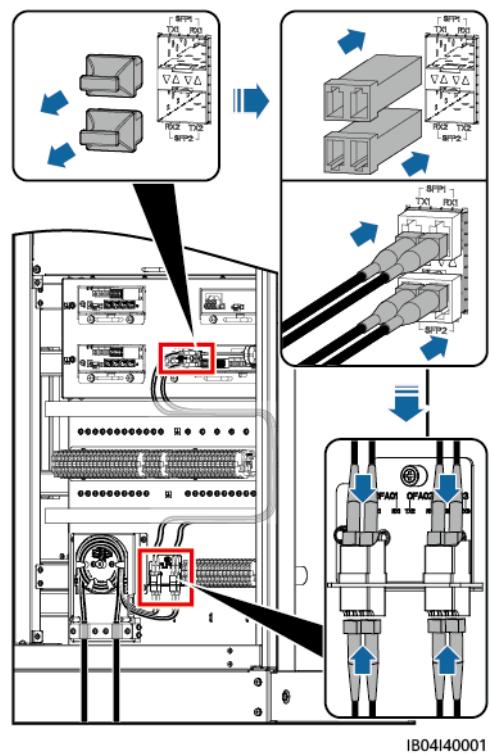
(1) DC power cable hole

(2) AC input power cable or ground cable hole

(3) Optical cable or FE communications cable hole

(4) UPS or RS485 cable hole (reserved)

Figure 5-23 Connecting optical cables



Step 9 Check that the cables are connected correctly and securely. Then reinstall the optical cable fastener and external mechanical parts.

Step 10 Use firestop putty to seal the cable holes at the bottom.

----End

6 Checking Before Power-On

Item	No.	Check Item	Acceptance Criteria
General inspection	1	Equipment appearance	<ul style="list-style-type: none">• The equipment is intact and free from rust or paint flake-off. If paint flakes off, repaint the equipment.• The labels on the equipment are clear. Damaged labels must be replaced.
	2	Cable appearance	<ul style="list-style-type: none">• Cable sheathings are properly wrapped and not damaged.• Cable hoses are intact.
	3	Cable connections	<ul style="list-style-type: none">• Cables are connected in the designed positions.• Terminals are prepared as required and securely connected.• Labels on both ends of each cable are clear and specific, and attached in the same direction.
	4	Cable layout	<ul style="list-style-type: none">• Electrical and ELV cables are routed separately.• Cables are neat and tidy.• Cable tie joints are evenly cut without burrs.• Cables are placed properly and reserve some slack at bending points to avoid stress.• Cables are routed neatly without twists or crossovers in the cabinet.
	5	Switch	<ul style="list-style-type: none">• The DC LV Panel switch is set to OFF.• The battery rack switch is set to OFF.

Item	No.	Check Item	Acceptance Criteria
ESS	1	Installation	<ul style="list-style-type: none"> The installation meets the design requirements. The ESS is level, and each door can be opened properly.
	2	Grounding	Each ESS has at least two ground points and is grounded securely with a ground resistance of 0.1 ohm or less.
	3	Accessory	The number and positions of external accessories installed meet design requirements.
	4	Label	All labels are correct, clear, and complete.
	5	Cleanliness	The ESS is clean and tidy inside, without any unnecessary cables, cable ends, terminals, or tools. No garbage is found outside the equipment.
Battery cabin	1	Circuit breaker	The MCCBs are set to OFF.
	2	Copper bar	The copper bar is not deformed, and no foreign objects are placed on the copper bar.
	3	Fuse	There is no indication for broken fuses.
	4	Cable	The bolts for installing the cables are tightened and the cables are not loose.
	5	Cable hole sealing	Cable holes have been sealed.
	6	Component	All components are intact.
	7	Foreign object	Remove all foreign objects from the battery cabin, such as tools and remaining installation materials.
Control unit cabin	1	SPD	The SPD indicator is green.
	2	AC meter	The buttons of the AC meter function properly and the screen is free of cracks.
	3	Cable	The bolts for installing the cables are tightened and the cables are not loose.
	4	Foreign object	There are no foreign objects in the control unit cabin, such as packing materials.
	5	Component (such as PSU, CMU, adapter, fire control panel)	All components are intact.

7 Powering On the System

7.1 Power-on Process

Figure 7-1 Power-on process of LUNA2000-2.0MWH-1H0

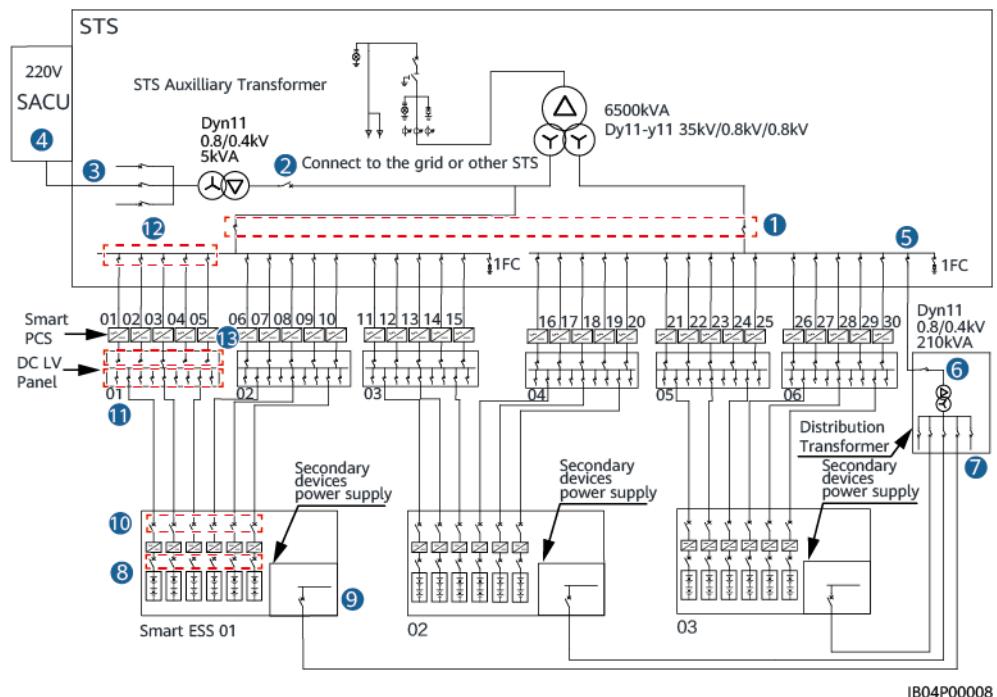
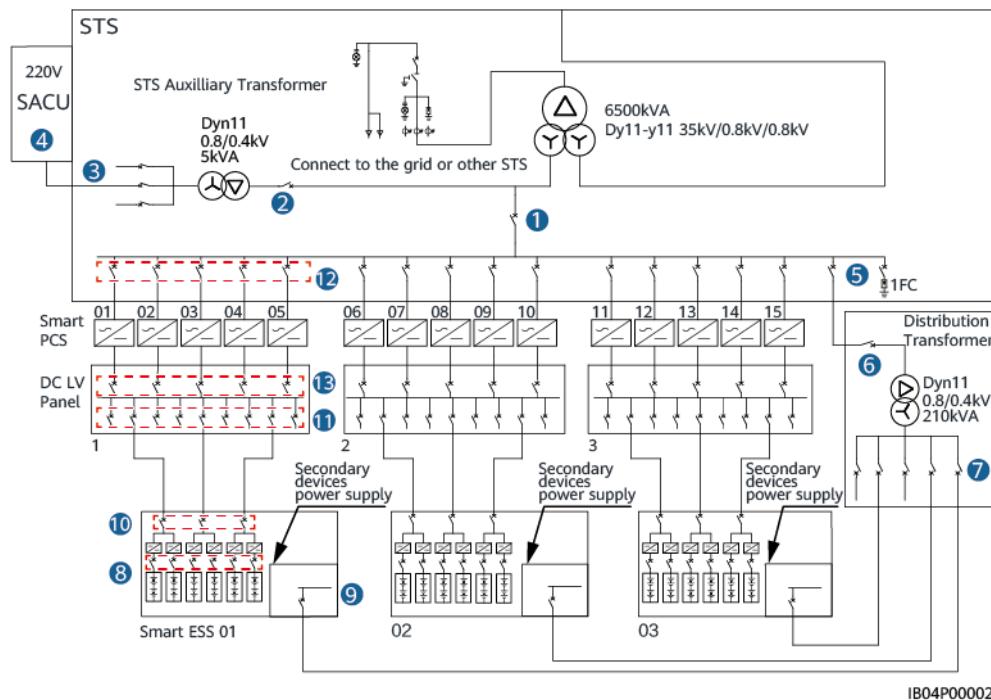


Figure 7-2 Power-on process of LUNA2000-2.0MWH-2H0



NOTICE

- Check the equipment before power-on. For details, see the corresponding user manual.
- Before the first power-on, check that cables are correctly connected.
- Incorrect cable connections may cause damage to the STS or the Smart PCS. Verify the cable connections between the STS and the Smart PCS for the initial power-on. If any exception occurs during the power-on process, stop the operation. You can proceed with the operation only after the exception has been handled.

Procedure	Item	Remarks
1	Powering on the STS (including the STS Auxiliary Transformer)	Corresponding to number 1, number 2, and number 3 in the power-on flowchart
2	Powering On the Smart Array Controller (SACU)	Corresponding to number 4 in the power-on flowchart

Procedure	Item		Remarks
3	Powering on the Distribution Transformer (Huawei or non-Huawei equipment)		Corresponding to number 5, number 6, and number 7 in the power-on flowchart
4	Powering On the ESS	Switching on the DC circuit breakers of the rack in the battery cabin	Corresponding to number 8 in the power-on flowchart
5		Powering on the secondary devices (turning on the AC switches and then the DC switches)	Corresponding to number 9 in the power-on flowchart
6		Switching on the DC circuit breakers in the control unit cabin	Corresponding to number 10 in the power-on flowchart
7	Turning on the switches at battery side of the DC LV Panel		Corresponding to number 11 in the power-on flowchart
8	Powering on the Smart PCS	Turning on the switches at AC side of the Smart PCS	Corresponding to number 12 in the power-on flowchart
9		Turning on the switches at DC side of the Smart PCS	Corresponding to number 13 in the power-on flowchart

NOTE

After the system is powered on, you are advised to use a thermal imager to check whether the DC power cables and AC input power cables in the control unit cabin of the ESS are in good contact.

7.2 Powering On the Smart Transformer Station (STS)

- If a Huawei STS is used, see the corresponding product documents.
- If non-Huawei transformer is used, see the corresponding product documents from the manufacturer.

7.3 Powering On the Smart Array Controller (SACU)

Prerequisites

- You have completed the power-on check.
- You have put on proper personal protective equipment (PPE).
- Ensure that the power voltage of the SACU is within the operating voltage range, and the three-phase input voltage is within the operating voltage range of the MBUS CCO.

Procedure

Step 1 Turn on the single-phase power switch that controls the power supply from the remote transformer station to the SACU.

Step 2 Turn on the three-phase power switch that controls the power supply from the remote transformer station to the SACU.

- If the SACU supports the access of one MBUS route, turn on the corresponding three-phase power switch.
- If the SACU supports the access of two MBUS routes, turn on the corresponding three-phase power switches.

Step 3 Check that the input voltages of all switches of the SACU are within the operating voltage ranges using a multimeter.

Step 4 Turn on the QF03 single-phase input switch on the SACU.

Step 5 Turn on the three-phase input switch on the SACU.

- If the SACU supports the access of one MBUS route, turn on the FU01 switch.
- If the SACU supports the access of two MBUS routes, turn on the FU01 and FU02 switches.

Step 6 Adjust the support bar, close the cabinet door, and tighten the screws.



If a screw used for securing the cabinet door is lost, use the spare security torx screw included in the accessory bag.

----End

7.4 Powering On the Distribution Transformer



Before connecting the power supply, ensure that all switches of the Distribution Transformer are turned off.

Procedure

Step 1 Turn on the SPD switch MCB 6FB7 on the 400 V side of the auxiliary transformer cabinet.

Step 2 Turn on the incoming power switch MCCB 6QA on the 800 V side of the auxiliary transformer cabinet.

 **NOTE**

When the transformer is powered on, a loud buzz will be generated. Then the buzz is weakened rapidly and becomes stably low.

Step 3 Turn on the meter switch MCB 6FB8 in the auxiliary transformer cabinet.

 **NOTE**

The digital display meter is started, showing that the line voltage at the low-voltage side is about 400 V, the phase voltage is about 230 V, and the current is 0 A.

Step 4 Turn on the auxiliary circuit switch MCB 6FB9 in the auxiliary transformer cabinet.

 **NOTE**

- The heat exchanger fan starts. The heat exchanger performs the self-check program first, and the internal fan rotates for approx. The internal fan stops and the external fan rotates for about 10s. After the self-check is complete, the heat exchanger enters the normal operating mode, and the internal fan keeps running at a low speed.

When the smoke sensor is started, the green indicator blinks slowly and no alarm sound is generated.

- The transformer temperature sensor is started to display the current transformer temperature.

----End

7.5 Powering On the ESS

NOTICE

- Before turning on the switches in the secondary devices of the ESS, check that the AC voltage of the auxiliary power supply and bus voltage are within the normal ranges.
- If the ESS has not been used for six months or longer after being installed, it must be checked and tested by professionals before operation.
- Do not open the battery compartment door after power-on. Otherwise, the system will shut down.

Procedure

Figure 7-3 Switches in the Control Unit Cabin of LUNA2000-2.0MWH-1H0

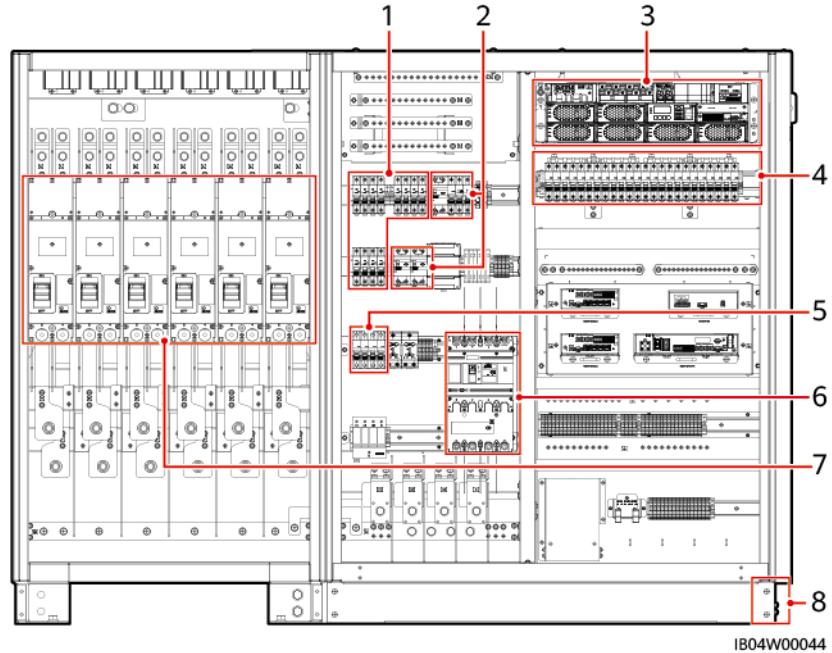
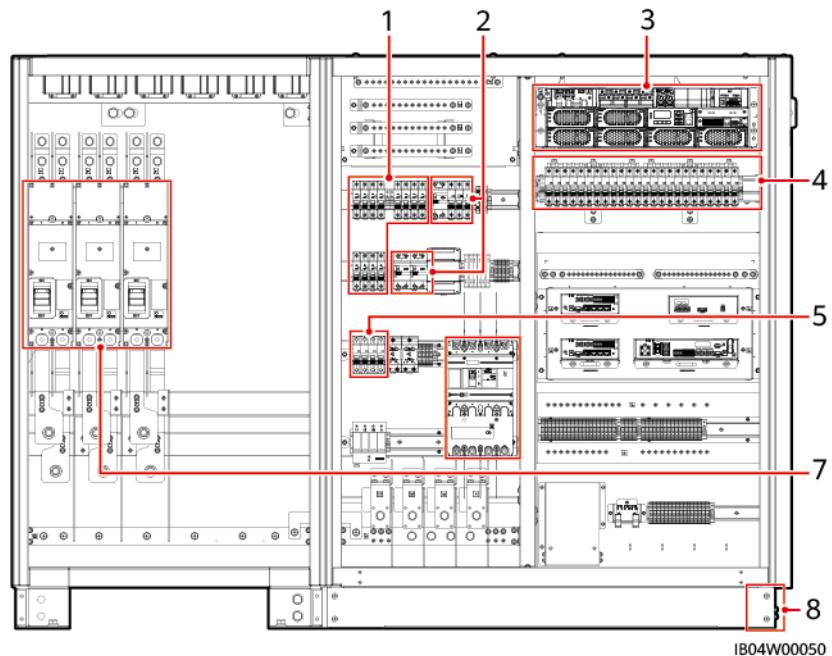


Figure 7-4 Switches in the Control Unit Cabin of LUNA2000-2.0MWH-1H0



(1) AC power switch of the air conditioner	(2) Fire control panel switch, lighting switch, 220/230 V socket switch, and CMU adapter switch	(3) PSU AC input switch, DC input switch, exhaust fan controller switch, and air conditioner switch in the control unit cabin	(4) Battery pack fan switch and Smart Rack Controller switch
(5) SPD switch	(6) AC main input switch of the ESS	(7) DC circuit breaker in the control unit cabin	(8) Water sensor

 **NOTE**

Switches labeled SPARE are reserved switches.

Step 1 Switch on circuit breaker 2FCB1 on the SPD (corresponding to number 5 in the figure) and check that the SPD display window is green.

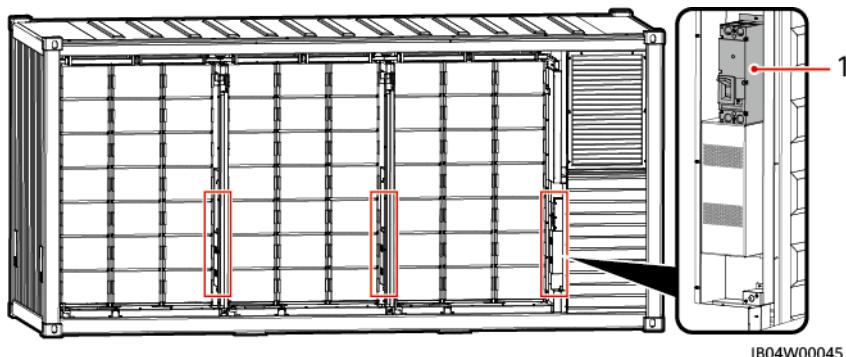
Step 2 Switch on the circuit breaker 1QA for the AC input power cable of the ESS. (corresponding to number 6 in the figure)

 **CAUTION**

- After turning on the main switch, immediately check that the L1, L2, and L3 phase voltages are 220 V AC/230 V AC.
- If the phase voltage displayed on the digital display meter is 400 V or other values, the cables between the L1, L2, L3, and N wires may be incorrectly connected. In this case, check the cables. Do not power on devices before checking cables. Otherwise, devices such as air conditioners may be damaged.

Step 3 Switch on the DC output circuit breakers 1Q1–6Q1 of battery racks in the Battery Cabin.

Figure 7-5 Positions of the DC output circuit breakers of battery racks in the battery cabin



(1) Positions of the DC output circuit breakers of battery racks in the battery cabin

Step 4 Switch on all circuit breakers of the ESS power distribution system.

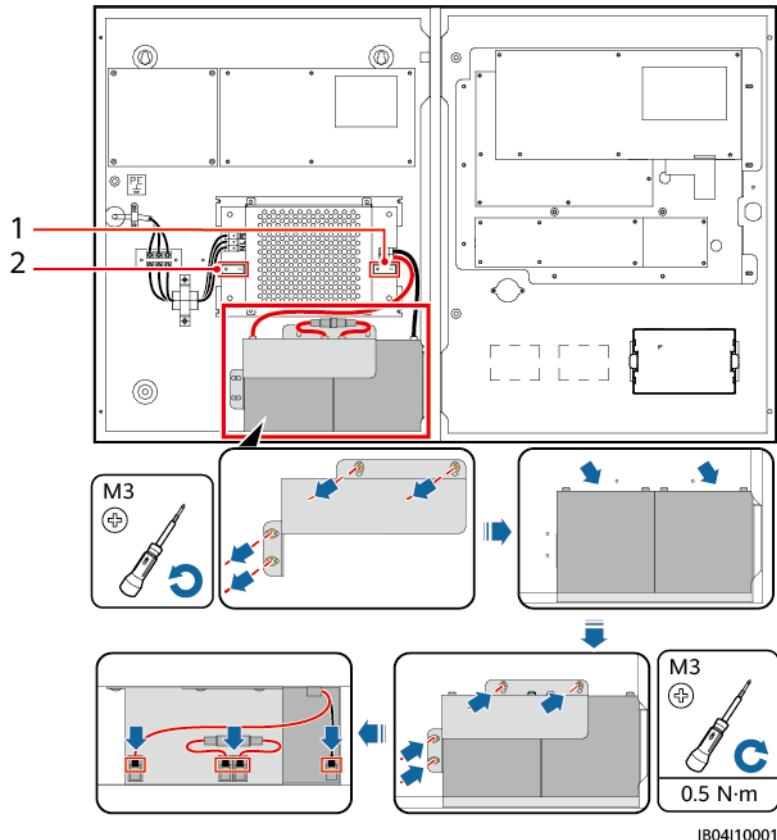
1. Switch on the AC power circuit breakers of the air conditioner in sequence. (corresponding to number 1 in the figure)
 - LUNA2000-2.0MWH-1H0: Switch on the circuit breakers 3FCB1, 3FCB2, 3FCB4, 3FCB5, 3FCB7, 3FCB8, 3FCB10, 3FCB11 in sequence.
 - LUNA2000-2.0MWH-2H0: Switch on the circuit breakers 3FCB2, 3FCB4, 3FCB6, 3FCB8, 3FCB10, 3FCB12 in sequence.
2. Switch on UPS circuit breaker 5FCB^a, ESS adapter circuit breaker 5FCB1, lighting system circuit breaker 1FB1, 220/230 V socket circuit breaker 1FB2 in sequence. (corresponding to number 2 in the figure)

 **NOTE**

a: The UPS connection terminal is reserved in the ESS. Switch 5FCB is the input switch of the UPS (if connected), which is the upper-level switch of the adapter switch 5FCB1 and the fire control panel switch 5FCB3.

3. Switch on the fire control panel circuit breaker 5FCB3 (corresponding to number 2 in the figure), Open the fire control panel and turn on the two power switches inside.

Figure 7-6 Position of the power switch in the fire control panel



(1) Position of the right power switch
in the fire control panel

(2) Position of the left power switch
in the fire control panel

4. On the ETP48400-C3B1 subrack, switch on the PSU AC input circuit breaker 6FCB1, the DC input circuit breakers 7FCB1 and 7FCB2 (This switch controls the DC auxiliary power input to the battery pack fan and the Smart Rack Controller), the exhaust fan controller circuit breakers 7FCB4 and 7FCB5, and the air conditioner circuit breaker 7FCB6 of the control unit cabin in sequence. (corresponding to number 3 in the figure)
5. Switch on the circuit breakers 7FCB7–7FCB15 and 7FCB19–7FCB27 of the battery pack fan in sequence. (corresponding to number 4 in the figure)
6. Switch on the circuit breakers of the Smart Rack Controller. (corresponding to number 4 in the figure)
 - LUNA2000-2.0MWH-1H0: Switch on the circuit breakers 7FCB16–7FCB18 and 7FCB28–7FCB30.
 - LUNA2000-2.0MWH-2H0: Switch on the circuit breakers 7FCB16–7FCB18.

Step 5 Switch on the DC circuit breakers in the control unit cabin. (corresponding to number 7 in the figure)

- LUNA2000-2.0MWH-1H0: Switch on the DC circuit breakers 1Q2 to 6Q2.
- LUNA2000-2.0MWH-2H0: Switch on the DC circuit breakers 1Q2 to 3Q2.

----End

7.6 Powering On the Battery Side of the DC LV Panel

 **CAUTION**

If any exception occurs during the power-on process, stop the operation. You can proceed with the operation only after the exception has been handled.

At least two persons are required for the first power-on. One person operates the MCCB on the ESS side, while the other person observes the running status on the DC LV Panel side.

Step 1 Power on the battery side of the DC LV Panel.

1. Check that DC circuit breakers 1Q2, 2Q2, 3Q2, 4Q2, 5Q2, and 6Q2 in the control unit cabin of the ESS are switched on.
2. Switch on the DC circuit breakers on the battery side of the DC LV Panel.

----End

7.7 Powering On the Smart PCS

Precautions

NOTICE

- Before turning on the AC switch between the Smart PCS and the power grid, check whether the AC voltage is within the required range using a multimeter. (See the local power grid standard.)
- If the Smart PCS has not been used for six months or longer after being installed, it must be checked and tested by professionals before operation.

Procedure

- Step 1 Turn on the AC switch between the Smart PCS and the power grid.
- Step 2 Turn on the DC switches between the Smart PCS and the DC LV Panel busbar.
- Step 3 Deliver a startup command on the SUN2000 app, SmartLogger, or the management system, and wait for the system to soft start.
- Step 4 Observe the LED indicators to check the running status of the Smart PCS.

----End

Indicator Description

You can view the running status of the Smart PCS by observing the LED indicators on the panel.

Figure 7-7 LED indicators

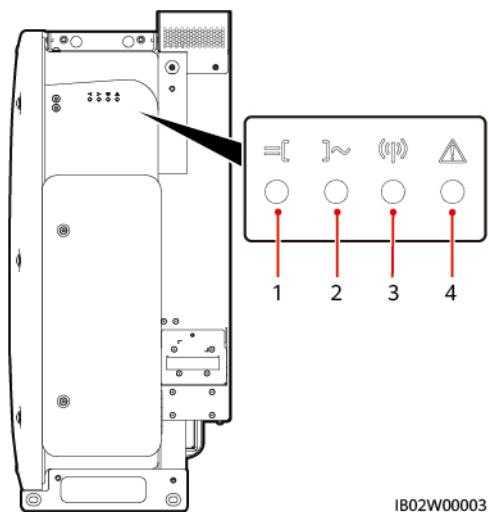


Table 7-1 LED indicators

No.	Category	Indicator Status	Description
1		Steady green	The DC side is properly connected, and the voltage on the DC side is greater than or equal to 500 V.
		Blinking green slowly	The device is in standby mode.
		Blinking red fast	An environmental fault occurs on the DC side.
		Off	The DC side is not properly connected, or the voltage on the DC side is less than 500 V.
2		Steady green	The device is operating in grid-tied mode.
		Blinking green slowly	The system environment is normal and the device is not in the working state.
		Blinking red fast	An environmental fault occurs on the AC side.
		Off	The AC side is not connected to the power grid.
3		Blinking green fast	The device receives data through the northbound FE ports.
		Off	The device has not received data through the FE ports in at least 10s.
4		Steady red	A major alarm is generated on the device.
		Blinking red fast	A minor alarm is generated on the device.
		Blinking red slowly	A warning is generated on the device.
		Blinking green slowly	The device is under local maintenance or shuts down after receiving a command.
		Off	No alarm is generated, and no local maintenance operations are performed.

 **NOTE**

- Local maintenance refers to the operation of inserting a WLAN module or USB data cable into the USB port of the device. For example, connecting to the SUN2000 app through the WLAN module.
- If alarms are generated during the local maintenance, the fault/maintenance indicator shows the local maintenance state first. After the WLAN module or USB cable is removed, the indicator shows the alarm state.

8 SmartLogger Web-based Deployment

Prerequisites

1. All devices onsite have been commissioned.
2. The system is powered on and alarms are cleared.
3. The commissioning equipment is available onsite.
4. Before the deployment, wait until the air conditioner adjusts the temperature inside the cabinet and the temperature of batteries to the specified temperature range (5°C to 45°C).

8.1 Preparations and WebUI Login

Prerequisites

- The operating system of Windows 7 or later is supported.
- Browser: Chrome 52, Firefox 58, or Internet Explorer 9, or a later version is recommended.

Procedure

Step 1 Connect the network cable between the network port of the PC and the WAN or LAN port of the SmartLogger.

Step 2 Set the IP address for the PC on the same network segment as the SmartLogger IP address.

Connected Port	Item	SmartLogger Default Value	Example PC Setting
LAN port	IP address	192.168.8.10	192.168.8.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.8.1	192.168.8.1
WAN port	IP address	192.168.0.10	192.168.0.11
	Subnet mask	255.255.255.0	255.255.255.0

Connected Port	Item	SmartLogger Default Value	Example PC Setting
	Default gateway	192.168.0.1	192.168.0.1

NOTE

- When the IP address of the WAN port is in the network segment from 192.168.8.1 to 192.168.8.255, set the default gateway to 192.168.8.1 and the IP address of the LAN port to 192.168.3.10. If the connected port is a LAN port, you need to adjust the network configuration of the PC.
- It is recommended that the PC be connected to the LAN port of the SmartLogger or the GE port of the SmartModule. When the PC is connected to the GE port of the SmartModule, adjust the network configuration of the PC to the configuration mode when the PC is connected to the LAN port of the SmartLogger.

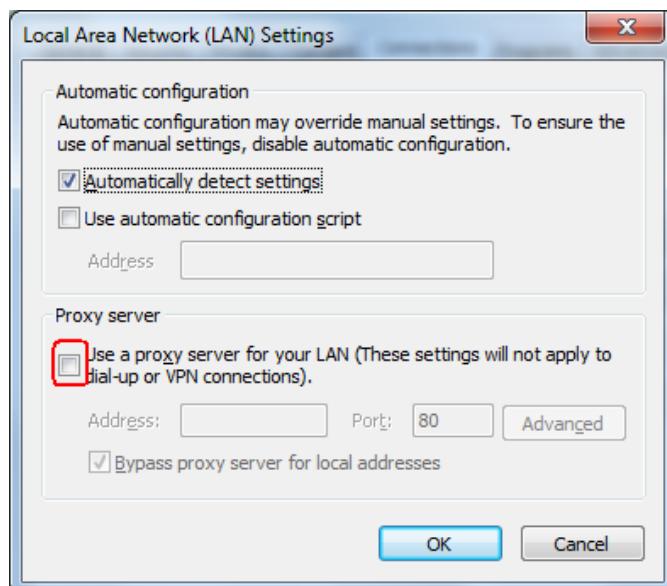
Step 3 Set LAN parameters.

NOTICE

- If the SmartLogger is connected to a local area network (LAN) and a proxy server has been set, you need to cancel the proxy server settings.
- If the SmartLogger is connected to the Internet and the PC is connected to the LAN, do not cancel the proxy server settings.

- Open Internet Explorer.
- Choose **Tools > Internet Options**.
- Click the **Connections** tab and then click **LAN settings**.
- Clear **Use a proxy server for your LAN**.

Figure 8-1 LAN settings



5. Click **OK**.

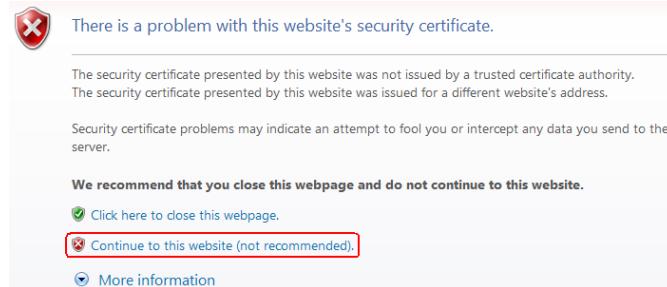
Step 4 Log in to the SmartLogger WebUI.

1. In the address box of a browser, enter <https://XX.XX.XX.XX> (XX.XX.XX.XX is the IP address of the SmartLogger) and press Enter. The login page is displayed. If you log in to the WebUI for the first time, a security risk warning is displayed. Click **Continue to this website** to log in to the WebUI.

 **NOTE**

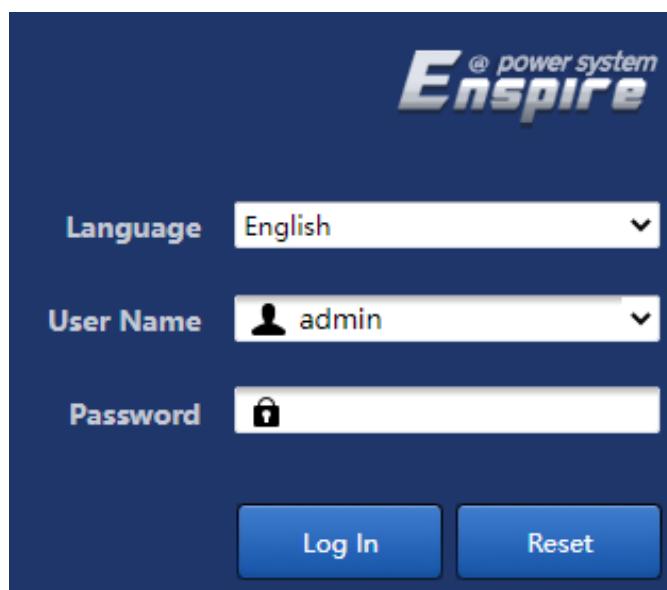
- It is recommended that users use their own certificates. If the certificate is not replaced, the security risk warning will be displayed during each login.
- After logging in to the WebUI, you can import a certificate under **Maintenance > Security Settings > Network Security Certificate**.
- The imported security certificate needs to be bound to the SmartLogger IP address. Otherwise, the security risk warning will still be displayed during login.

Figure 8-2 Security risk warning



2. Specify **Language**, **User Name**, and **Password**, and click **Log In**.

Figure 8-3 Login page (Initial login when the user name is displayed as admin)



NOTE

In this scenario, you need to update the SmartLogger to V800R021C10SPC020 or later.

Parameter	Description
Language	Set this parameter as required.
User Name	Default value: admin
Password	<ul style="list-style-type: none"> – The initial password is Changeme. – Use the initial password upon first power-on and change it immediately after login. Then, use the new password to log in again.

NOTE

Updating the SmartLogger to V800R021C10SPC020 or later:

- Method 1: Log in as admin using your new password.
- Method 2: Log in as installer using your app login password (the initial password is 00000a).

Figure 8-4 Login page (Initial login when the user name is null)

The screenshot shows the SmartLogger login interface. At the top is the 'Enspire' logo. Below it are three input fields: 'Language' set to 'English', 'User Name' (empty), and 'Password' (empty). At the bottom are two buttons: 'Log In' and 'Reset'.

IL03J00002

NOTE

In this scenario, the SmartLogger software version is V800R021C10SPC020 or later.

Parameter	Description
Language	Set this parameter as required.
User Name	Log in as installer.

Parameter	Description
Password	Set the login password as prompted.

NOTE

- Protect the password by changing it periodically, and keep it secure. If you lose the password, the device must be restored to its factory settings. Huawei will not be held liable for any losses resulting from improper password management.
- You will be locked out for 10 minutes after five failed password attempts in five minutes.
- A dialog box with recent login information is displayed after login. Click **OK**.

----End

Follow-up Procedure

If any page is blank or a menu cannot be accessed after you log in to the WebUI, clear the cache, refresh the page, or log in again.

8.2 Commissioning Using Deployment Wizard

Procedure

Step 1 Log in as **admin** to access the deployment wizard page.

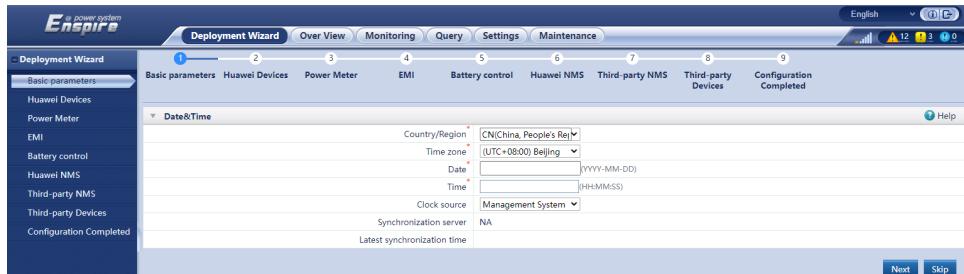
Step 2 Set corresponding parameters as prompted. For details, see **Help** on the page.

NOTE

During parameter setting, click **Previous**, **Next**, or **Skip** as required.

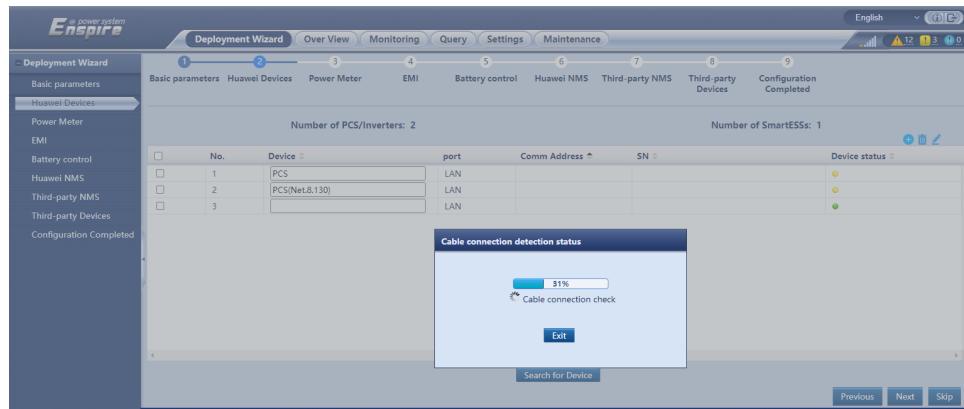
1. Complete settings on the **Basic parameters** page.

Figure 8-5 Setting basic parameters



2. After Huawei devices are connected, click **Search for Device** to check cable connections, identify the topology, and rectify alarms.

Figure 8-6 Cable connection detection

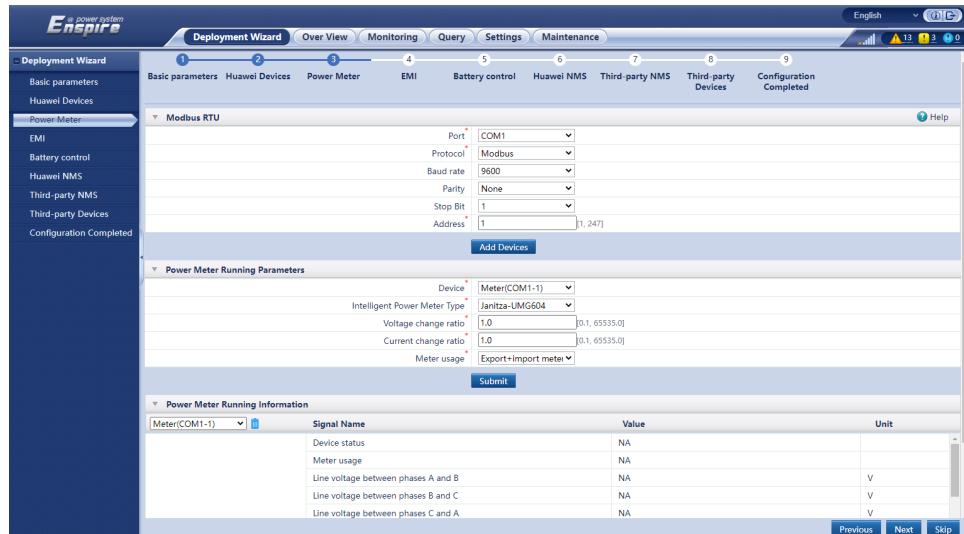


 **NOTE**

- When a user clicks **Search for Device**, cable connections (DC and AC) will be checked before device search (not applicable to third-party devices), and device address will be automatically allocated.
- After the cable connection check and device search are complete, if a cable connection alarm is generated, you can click the alarm icon  to view the corresponding alarm information.
- If an alarm is generated when the cable connection check fails, click the alarm icon  to view the alarm cause and handling suggestions. After the fault is rectified, check the cable connection again.
- After the cable connection check and device search are complete, click  to view the corresponding topology information.
- After a device is added or deleted, you need to click **Search for Device** again. Otherwise, the system topology will not update.

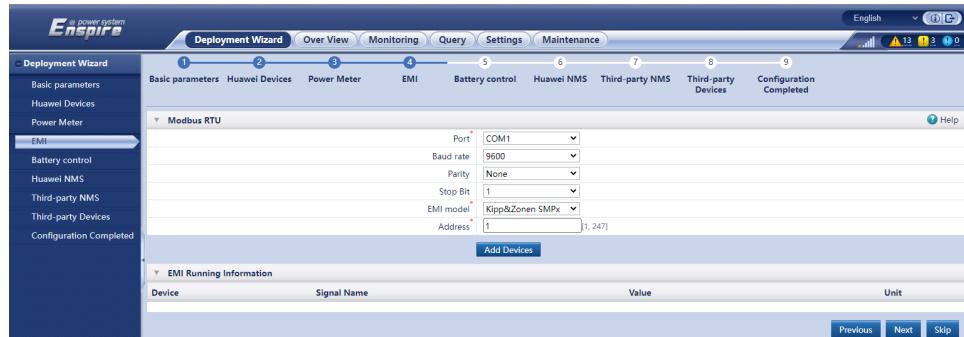
3. Connect to the power meter.

Figure 8-7 Setting power meter parameters



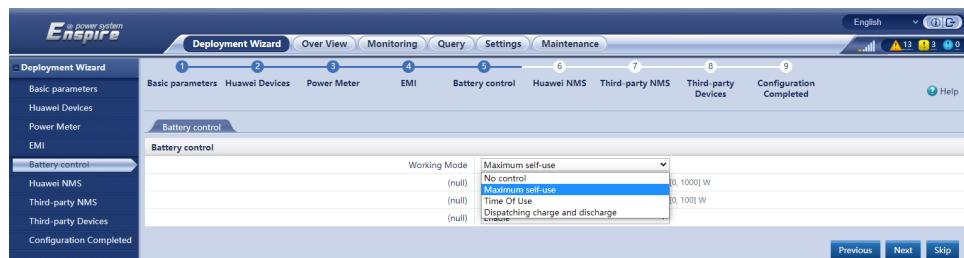
4. Connect to the EMI.

Figure 8-8 Setting EMI parameters



- Click **Setting > Battery control** to set the battery working mode.

Figure 8-9 Working modes



Working Mode	Description
No control	SmartLogger directly delivers the external scheduling power limit. No other power scheduling control is performed. The power is automatically controlled by the device.
Maximum self-consumption	<ul style="list-style-type: none"> This mode applies to areas where the electricity price is high, or areas where the FIT subsidy is low or unavailable. Excess PV energy is stored in batteries. When PV power is insufficient or no PV power is generated at night, batteries discharge to supply power to the loads, improving the self-consumption rate of the PV system and the self-sufficiency rate of residential energy, and reducing electricity costs. The SmartLogger performs battery scheduling based on the external scheduling power limit and the preceding policies.

Working Mode	Description
Time Of Use	<ul style="list-style-type: none"> - This mode applies to scenarios where the price difference between peak and off-peak hours is large. - You can manually set the charge and discharge time segments to lower the electricity cost. You need to enable Fed to grid in Battery control when the electricity price is low at night, the power grid charges the batteries. When the electricity price is high, the batteries discharge to supply power to the loads. - Click Add to set the charge/discharge time. A maximum of 14 time segments can be set. During the charging period, the power grid charges the batteries, and during the discharging period, the batteries discharge to supply power to the loads. In other time segments that are not set, the batteries do not discharge, and the PV modules and grid supply power to the loads. (In grid-tied/off-grid mode, if the grid fails, the batteries can discharge at any time.) - In some countries, the grid is not allowed to charge batteries. Therefore, this mode cannot be used. - The SmartLogger performs battery scheduling based on the external scheduling power limit and the preceding policies.
Scheduled charge/discharge	<ul style="list-style-type: none"> - This mode applies to scheduling scenarios in ground-mounted plants. - In scheduled discharge, the AC output aims to reach the target value of the scheduled active power: PV power supply is prioritized. If the PV power is sufficient, the system outputs at the target value and the excess PV power is used to charge the batteries. If the PV power is insufficient, the batteries supplies power. - In scheduled charge, the AC output aims to reach the target value of the scheduled active power: If the battery charging power is insufficient or the PCS power is limited, the grid supplies power. If the batteries have excess power, PV power is used to charge the batteries.

- Set the working mode to **Scheduled charge/discharge**.

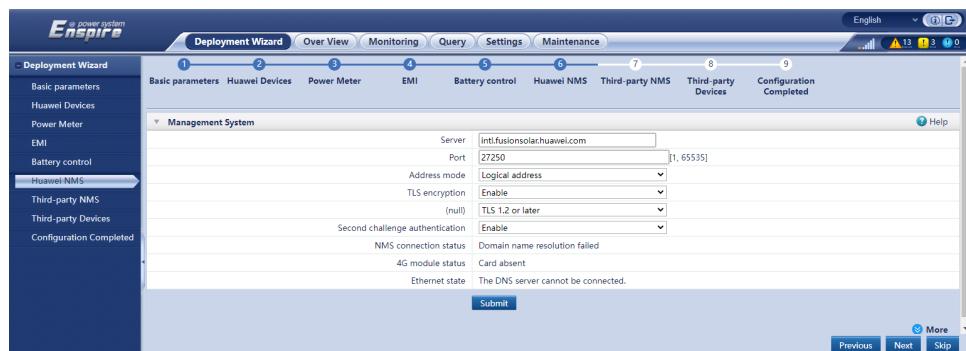
Figure 8-10 Scheduled charge/discharge



Parameter	Description
SOC Auto Calibration	<ul style="list-style-type: none"> Enable: Automatic SOC calibration is enabled. If the total charge and discharge energy reaches the threshold or the calibration function has not been triggered for 30 days, the SOC automatic calibration is performed. The SOC automatic calibration is performed in battery racks. During calibration, the cut-off SOC settings will be ineffective. Disable: Automatic SOC calibration is disabled.

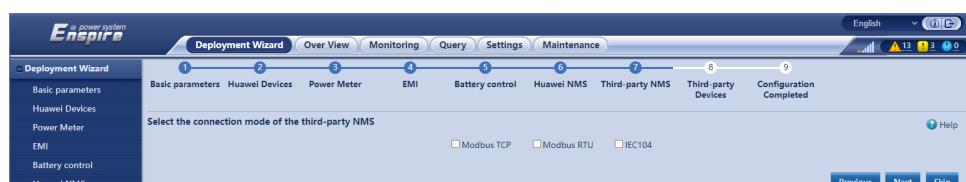
- Connect to Huawei NMS.

Figure 8-11 Huawei NMS



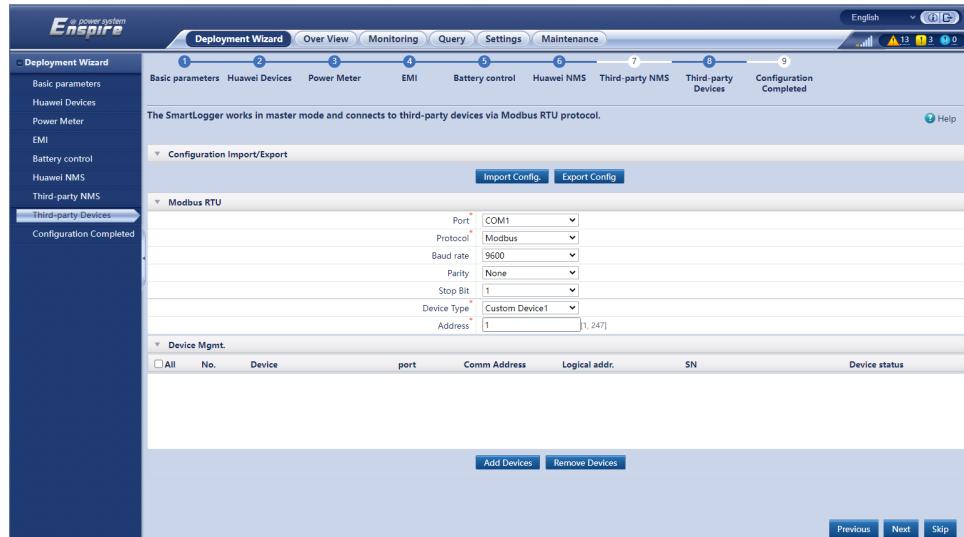
- Connect to a third-party NMS.

Figure 8-12 Third-party NMS



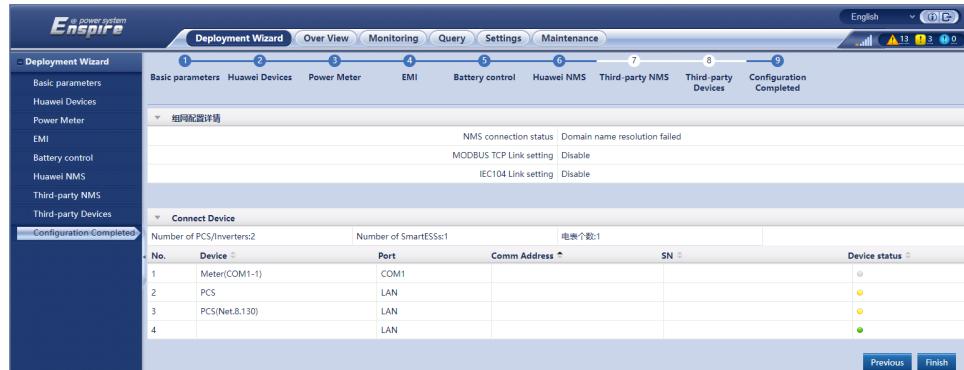
- Connect to third-party devices.

Figure 8-13 Third-party device



9. Complete the configuration.

Figure 8-14 Completing the configuration



----End

8.3 Check Alarms

Step 1 Log in to the SmartLogger WebUI and check whether an alarm is generated. If no alarm is generated, proceed with the power-on operations. If an alarm is generated, clear the alarm by referring to the handling suggestions.

Step 2 Short-circuit the water sensor and check whether a water alarm is generated on the SmartLogger WebUI:

- If a water alarm is generated, the water sensor is properly connected. In this case, the water alarm will be cleared after the short circuit is removed.
- If no water alarm is generated, check whether the water sensor cable is properly connected.

Figure 8-15 Position of Electrode Water Sensor in Battery Cabin

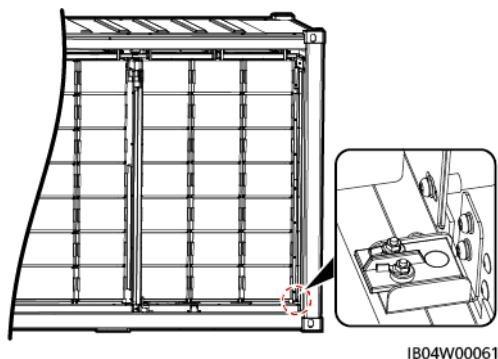
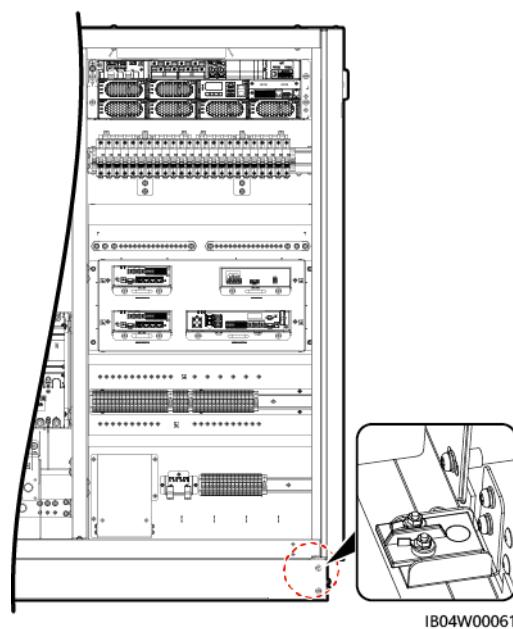
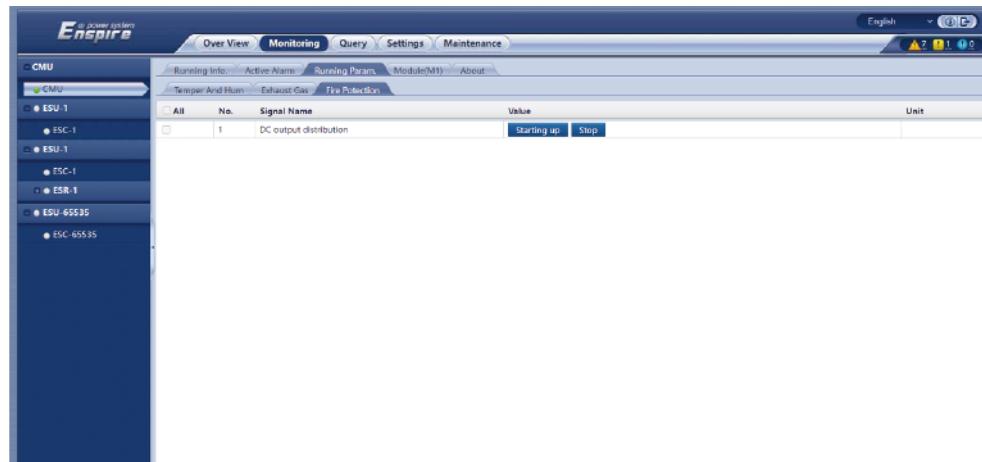


Figure 8-16 Position of Electrode Water Sensor in Control Unit Cabin



After the alarm is cleared, choose **Monitoring > Running Param > Fire Protection > Starting up** on the SmartLogger WebUI.

Figure 8-17 Page of restoring the power supply



----End

9 Powering Off the System

9.1 Power-off Process

Figure 9-1 Power-off process of LUNA2000-2.0MWH-1H0

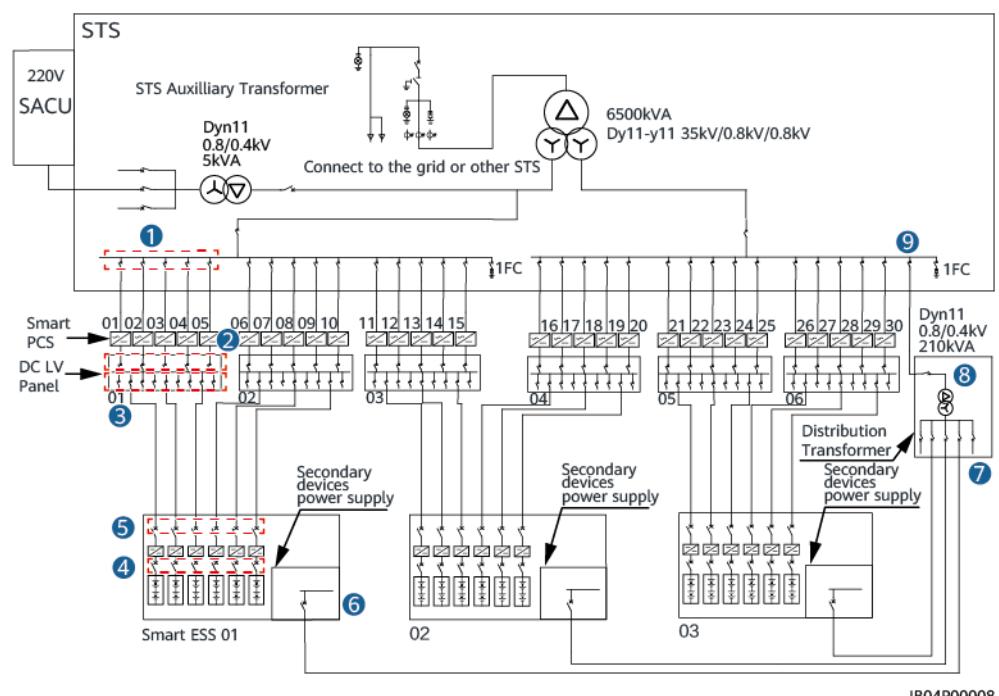
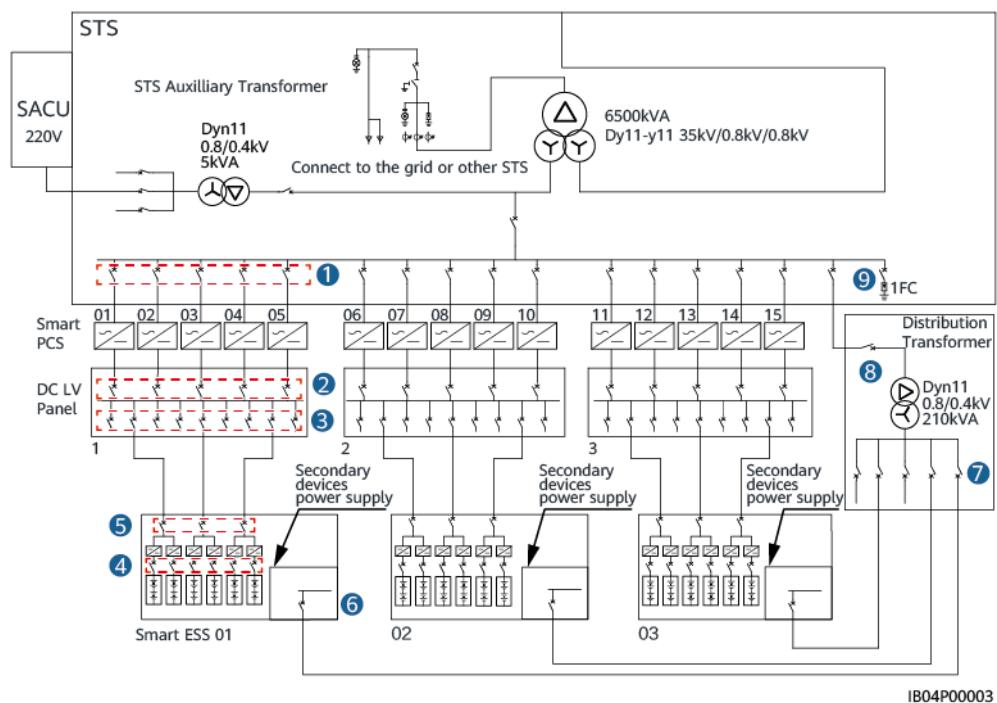


Figure 9-2 Power-off process of LUNA2000-2.0MWH-2H0



NOTE

Before powering off the system, shut down the entire system on the SmartLogger WebUI, including the Smart PCS and the Smart Rack Controller.

Procedure	Item		Remarks
1	Powering off the Smart PCS	Powering off the AC side of the Smart PCS	Corresponding to number 1 in the power-off flowchart
2		Powering off the DC side of the Smart PCS	Corresponding to number 2 in the power-off flowchart
3	Powering off the battery side of the DC LV Panel		Corresponding to number 3 in the power-off flowchart
4	Powering off the ESS	Switching off the DC circuit breakers of the rack in the battery cabin	Corresponding to number 4 in the power-off flowchart
5		Switching off the DC circuit breakers in the control unit cabin	Corresponding to number 5 in the power-off flowchart
6		Powering off the secondary devices (turning off the DC switches and then the AC switches)	Corresponding to number 6 in the power-off flowchart

Procedure	Item	Remarks
7	Powering off the Distribution Transformer (Huawei or non-Huawei equipment)	Corresponding to number 7, 8, and 9 in the power-off flowchart

9.2 Delivering a Shutdown Command on the SmartLogger

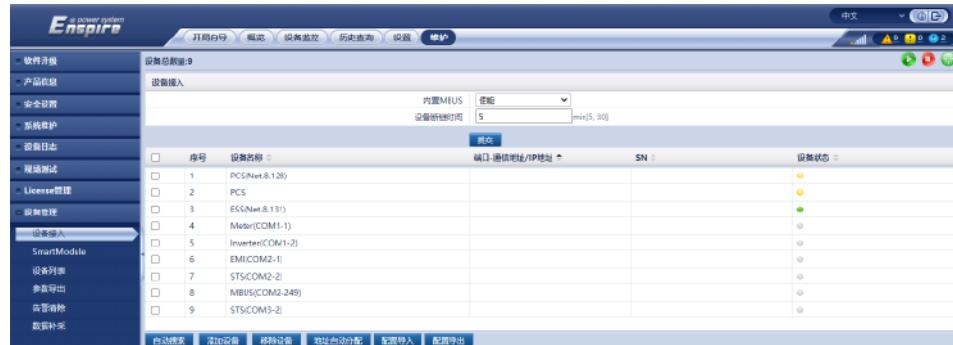
Prerequisites

The system has connected to the grid and is running properly.

Procedure

Step 1 Log in to the SmartLogger WebUI, choose **Maintenance > Connect Device**, and click  to shut down the Smart PCS and Smart Rack Controller.

Figure 9-3 Shutdown command



Step 2 Choose **Device Monitoring > PCS > > Running Info..** Check the device status, active power, and DC voltage to verify that the shutdown is successful.

Step 3 Choose **Device Monitoring > CMU > > Running Info..** Check the rated power and total output voltage of the rectifier to ensure that the shutdown is successful.

Step 4 Choose **Overview > Active Alarms** to view system alarms generated after the shutdown. If any alarm is generated, handle the alarm according to the alarm handling suggestions.

----End

9.3 Powering Off the Smart PCS

Procedure

- Step 1** Wear proper personal protective equipment (PPE).
- Step 2** Turn off the AC switch between the Smart PCS and the grid.
- Step 3** Open the AC maintenance compartment door, install a support bar, and use a multimeter to measure the voltage between the AC terminal block and the ground. Ensure that the AC side of the Smart PCS is disconnected.
- Step 4** Turn off the DC switch between the Smart PCS and the DC LV Panel busbar.
- Step 5** Open the DC maintenance compartment door, install a support bar, and use a multimeter to measure the voltage between the DC terminal block and the ground. Ensure that the DC side of the Smart PCS is disconnected.

----End

9.4 Powering Off the Battery Side of the DC LV Panel

- Step 1** Turn off the switches on the battery side of the DC LV Panel.

----End

9.5 Powering Off the ESS

Switching Off the DC Circuit Breakers of the Rack in the Battery Cabin

- Step 1** Turn off output switches 1Q1, 2Q, 3Q, 4Q1, 5Q1, and 6Q1 of each battery rack in the ESS.

----End

Switching Off the DC Circuit Breakers in the Control Unit Cabin

- Step 1** Switch off DC output circuit breakers 1Q2, 2Q2, and 3Q2 of the ESS.

----End

Powering Off the Secondary Devices of the ESS

- Step 1** Switch off all circuit breakers of the ESS power distribution system.
 1. Switch off the AC power circuit breakers of the air conditioner in sequence. (corresponding to number 1 in the figure)
 - LUNA2000-2.0MWH-1H0: Switch off the circuit breakers 3FCB1, 3FCB2, 3FCB4, 3FCB5, 3FCB7, 3FCB8, 3FCB10, 3FCB11 in sequence.
 - LUNA2000-2.0MWH-2H0: Switch off the circuit breakers 3FCB2, 3FCB4, 3FCB6, 3FCB8, 3FCB10, 3FCB12 in sequence.

2. Switch off the fire control panel circuit breaker 5FCB3, Open the fire control panel and turn off the power switch inside, Switch off lighting system circuit breaker 1FB1, 220 V socket circuit breaker 1FB2, and ESS adapter circuit breaker 5FCB1 in sequence. (corresponding to number 2 in the figure)
3. Switch off the circuit breakers 7FCB7–7FCB15 and 7FCB19–7FCB27 of the battery pack fan in sequence. (corresponding to number 4 in the figure)
4. Switch off the circuit breakers of the Smart Rack Controller. (corresponding to number 4 in the figure)
 - LUNA2000-2.0MWH-1H0: Switch off the circuit breakers 7FCB16–7FCB18 and 7FCB28–7FCB30.
 - LUNA2000-2.0MWH-2H0: Switch off the circuit breakers 7FCB16–7FCB18.
5. On the ETP48400-C3B1 subrack, the DC input circuit breakers 7FCB1 and 7FCB2 (This switch controls the DC auxiliary power input to the battery pack fan and the Smart Rack Controller), the exhaust fan controller circuit breakers 7FCB4 and 7FCB5, and the air conditioner circuit breaker 7FCB6 of the control unit cabin in sequence, switch off the PSU AC input circuit breaker 6FCB1. (corresponding to number 3 in the figure)

Step 2 Switch off circuit breaker 1QA for the AC input power cable of the ESS.

Step 3 Switch off circuit breaker 2FCB1 of the SPD.

----End

9.6 Powering Off the Distribution Transformer

 CAUTION

Follow the relevant power operation procedure. Wear high-voltage insulation gloves, insulation shoes, and safety helmets, and use operation levers.

Procedure

- Step 1** Turn off the auxiliary circuit switch MCB 6FB9 in the auxiliary transformer cabinet.
- Step 2** Turn off the meter switch MCB 6FB8 in the auxiliary transformer cabinet.
- Step 3** Turn off the incoming power switch MCCB 6QA on the 800 V side of the auxiliary transformer cabinet.
- Step 4** Turn off the SPD switch MCB 6FB7 on the 400 V side of the auxiliary transformer cabinet.

----End

10 Alarm Reference

Alarm severities are defined as follows:

- Major: The equipment is faulty. As a result, the output power decreases or the grid-tied power generation is stopped.
- Minor: Some components are faulty without affecting the grid-tied power generation.
- Warning: The equipment works properly. The output power decreases or some authorization functions fail due to external factors.

Table 10-1 CMU common alarms and troubleshooting measures

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3800	Water alarm	Major	Cause ID=1 Water leaked into battery compartment.	1. Check whether water leaks into the container. 2. Check whether water leaks into the battery compartment.
			Cause ID=2 Water leaked into power distribution compartment.	1. Check whether water leaks into the container. 2. Check whether water leaks into the power distribution compartment.
3801	Door Status Alarm	Warning	Cause ID=1- 6 Battery compartment doors 1-6 are open. Cause ID=7 Power distribution compartment door is open.	-
3802	Fire Alarm	Major	Cause ID=1 Smoke or overheating detected in battery compartment.	Check whether smoke or fire occurs in the battery compartment of the container. If yes, press the emergency fire protection start button. If not, reset the system.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
			Cause ID=2 The battery compartment is on fire.	<ol style="list-style-type: none"> 1. Check whether smoke or fire is present in the battery cabin of the container. If yes, keep away from the container. If not, press the fire protection emergency stop button and reset the system. 2. If the pressure of the fire cylinder is low, replace the fire cylinder.
3803	Fire Extinguishing System Fault	Major	Cause ID=1 Sensor or controller fault.	<ol style="list-style-type: none"> 1. Check the fire protection system and the fault code. 2. Contact your dealer or Huawei technical support.
3804	AC SPD fault	Major	Cause ID=1 AC SPD fault.	<ol style="list-style-type: none"> 1. Check the cable connection to the AC SPD. 2. Replace the AC SPD.
3805	Air Conditioner Temperature High	Major	Cause ID=1-13 1. The return air temperature sensor of the air conditioner in the battery cabin is faulty. 2. The high temperature alarm threshold is not properly set.	<ol style="list-style-type: none"> 1. Replace the air conditioner return air temperature sensor. 2. Re-evaluate and set the overtemperature alarm threshold. 3. If the fault persists, contact your dealer or Huawei technical support.
3806	Air Conditioner Temperature Low	Major	Cause ID=1-13 1. The return air temperature sensor of the air conditioner in the battery cabin is faulty. 2. The low temperature alarm threshold is not properly set.	<ol style="list-style-type: none"> 1. Replace the air conditioner return air temperature sensor. 2. Re-evaluate and set the low temperature alarm threshold. 3. If the fault persists, contact your dealer or Huawei technical support.
3807	Air Conditioner Internal Fan Fault	Major	Cause ID=1-13 1. The fan does not have a primary power supply. 2. The cable is not connected securely or correctly. 3. The fan is faulty.	<ol style="list-style-type: none"> 1. Check whether the power supply is normal. 2. Check whether the cables are securely and correctly connected based on the circuit diagram. 3. Replace the fan. 4. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3808	Air Conditioner External Fan Fault	Major		
3809	Air Conditioner Compressor Fault	Major	Cause ID=1-13 1. The cable is not connected securely or correctly. 2. The compressor protector is disconnected.	1. Check whether the cables are securely and correctly connected based on the circuit diagram. 2. Check whether the compressor coil is open-circuited. If yes, wait until the coil cools down and the compressor coil automatically resets. 3. If the fault persists, contact your dealer or Huawei technical support.
3810	Air Conditioner Return Air Temperature Sensor Faulty	Major	Cause ID=1-13 1. The cable is not connected securely or correctly. 2. The sensor is damaged, open-circuited, or short-circuited.	1. Check whether the cables are securely and correctly connected based on the circuit diagram. 2. Replace the temperature sensor. 3. If the fault persists, contact your dealer or Huawei technical support.
3811	Air Conditioner Return Air Temperature Sensor Fault	Major		
3812	Air Conditioner System High Pressure Alarm	Major	Cause ID=1-13 1. The condenser is blocked or has scale. 2. The condenser fan is faulty. 3. The external air flow experiences a shortcut or is blocked.	1. Clean the outdoor heat exchanger. 2. Repair or replace the outdoor fan. 3. Check whether there are obstacles in front of the air or exhaust vent of the outdoor fan. 4. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3813	Air Conditioner AC Overvoltage	Major	<p>Cause ID=1-13</p> <ol style="list-style-type: none"> 1. The input voltage is higher than the overvoltage threshold. 2. The overvoltage threshold setting is improper. 3. The voltage test device is faulty. 	<ol style="list-style-type: none"> 1. Check the voltage of the input power supply. If the voltage is too high, check the power distribution device. 2. Check whether the overvoltage threshold is correctly set. If not, adjust it to a proper range. 3. Replace the voltage test device on the control board. 4. If the fault persists, contact your dealer or Huawei technical support.
3814	Air Conditioner AC Undervoltage	Major	<p>Cause ID=1-13</p> <ol style="list-style-type: none"> 1. The input voltage is lower than the undervoltage threshold. 2. The undervoltage threshold setting is improper. 3. The voltage test device is faulty. 	<ol style="list-style-type: none"> 1. Check the voltage of the input power supply. If the voltage is too low, check the power distribution device. 2. Check whether the undervoltage threshold is correctly set. If not, adjust it to a proper value. 3. Replace the voltage test device on the control board. 4. If the fault persists, contact your dealer or Huawei technical support.
3815	Air Conditioner AC Power Failure	Major	<p>Cause ID=1</p> <ol style="list-style-type: none"> 1. The power supply device is faulty or disconnected. 2. The power supply circuit is disconnected. 	<ol style="list-style-type: none"> 1. Check the voltage of the input power supply and the power supply device. 2. Check whether the power supply circuit is abnormal. 3. If the fault persists, contact your dealer or Huawei technical support.
3816	Air Conditioner Evaporator Temperature Sensor Fault	Minor	<p>Cause ID=1-13</p> <ol style="list-style-type: none"> 1. The cable is not connected securely or correctly. 2. The sensor is damaged, open-circuited, or short-circuited. 	<ol style="list-style-type: none"> 1. Check whether the cables are securely and correctly connected based on the circuit diagram. 2. Replace the temperature sensor. 3. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3817	Air Conditioner Condenser Temperature Sensor Fault	Minor		
3818	Air Conditioner Ambient Temperature Sensor Fault	Minor		
3819	Air Conditioner Evaporator Frozen	Minor	Cause ID=1-13 1. The air intake or exhaust is blocked. 2. The indoor fan is faulty. 3. The cooling system cannot be shut down in a timely manner. 4. The evaporator temperature sensor is faulty.	1. Check that the air intake vent and air exhaust vent of the equipment room are not blocked. 2. Check whether the indoor fan works properly. 3. Check the main control board of the cooling system and related electrical control. 4. Replace the temperature sensor. 5. If the fault persists, contact your dealer or Huawei technical support.
3820	Frequent Air Conditioner System High Pressure Alarm	Major	Cause ID=1-13 1. The condenser is blocked or has scale. 2. The condenser fan is faulty. 3. The external air flow experiences a shortcut or is blocked.	1. Clean the outdoor heat exchanger. 2. Repair or replace the outdoor fan. 3. Check whether there are obstacles in front of the air or exhaust vent of the outdoor fan. 4. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3821	Air Conditioner DC Overvoltage	Major	<p>Cause ID=1-13</p> <ol style="list-style-type: none"> 1. The input voltage is higher than the overvoltage threshold. 2. The overvoltage threshold setting is improper. 3. The voltage test device is faulty. 	<ol style="list-style-type: none"> 1. Check the voltage of the input power supply. If the voltage is too high, check the power distribution device. 2. Check whether the overvoltage threshold is correctly set. If not, adjust it to a proper range. 3. Replace the voltage test device on the control board. 4. If the fault persists, contact your dealer or Huawei technical support.
3822	Air Conditioner DC Undervoltage	Major	<p>Cause ID=1-13</p> <ol style="list-style-type: none"> 1. The input voltage is lower than the undervoltage threshold. 2. The undervoltage threshold setting is improper. 3. The voltage test device is faulty. 	<ol style="list-style-type: none"> 1. Check the voltage of the input power supply. If the voltage is too low, check the power distribution device. 2. Check whether the undervoltage threshold is correctly set. If not, adjust it to a proper value. 3. Replace the voltage test device on the control board. 4. If the fault persists, contact your dealer or Huawei technical support.
3825	A UPS alarm has been generated.	Major	<p>Cause ID=1</p> <p>A UPS alarm has been generated.</p>	Troubleshoot the fault by referring to the alarm troubleshooting section in the UPS user manual.
3826	Combustible Gas Alarm	Major	<p>Cause ID=1</p> <ol style="list-style-type: none"> 1. The safety valve of the lithium battery is open, and combustible gas is leaked. 2. Lithium battery thermal runaway occurs. 	<ol style="list-style-type: none"> 1. If no fire occurs, shut down the system and start the exhaust fan. 2. If a fire occurs, close the container door, start the fire protection system, and stay far away from the container.
3849	Air Exhaust Malfunction	Major	<p>Cause ID=1</p> <p>There are too many faulty exhaust fans.</p>	<ol style="list-style-type: none"> 1. Repair the exhaust fan based on the fault alarm. 2. On the maintenance screen, check that the exhaust fan is correctly connected.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
			Cause ID=2 There are too many faulty TCUs.	<ol style="list-style-type: none"> Repair the TCU based on the fault alarm. On the maintenance screen, check that the TCU is correctly connected.
3850	Combustible Gas Detection Malfunction	Major	Cause ID=1 Too many combustible gas sensor failures.	<ol style="list-style-type: none"> Repair the device based on the fault alarm of the combustible gas sensor. On the Maintenance page, check that the combustible gas sensor is properly connected.
3851	Exhaust Fan Faulty	Major	Cause ID=1-12 Exhaust fan is faulty.	<ol style="list-style-type: none"> Check whether the cable connection of the exhaust fan is correct. Check whether the TCU connected to the exhaust fan works properly. Check whether the exhaust fan is faulty. If yes, replace it.
3827	Ambient Temperature High	Major	Cause ID=1 The ambient temperature in the battery cabin is too high.	<ol style="list-style-type: none"> Check whether the air conditioners in the battery cabin are faulty. Check whether the doors of the battery cabin are completely closed.
			Cause ID=2 The ambient temperature of the control unit cabin is too high, which triggers system derating or shutdown.	<ol style="list-style-type: none"> Check whether the air conditioners in the control unit cabin are faulty. Check whether the doors of the control unit cabin are completely closed.
3852	Ambient Temperature Low	Major	Cause ID=1 The ambient temperature in the battery cabin is too low.	<ol style="list-style-type: none"> Check whether the air conditioners in the battery cabin are faulty. Check whether the doors of the battery cabin are completely closed.
			Cause ID=2 The ambient temperature in the control unit cabin is too low.	<ol style="list-style-type: none"> Check whether the air conditioners in the control unit cabin are faulty. Check whether the doors of the control unit cabin are completely closed.
3828	Condensation Risk	Minor	Cause ID=1 Condensation risk exists in the battery compartment.	<ol style="list-style-type: none"> Check whether the air conditioners in the battery cabin are faulty. Check whether the doors of the battery cabin are completely closed.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
			Cause ID=2 Condensation risk exists in the power distribution compartment.	1. Check whether the air conditioners in the control unit cabin are faulty. 2. Check whether the doors of the control unit cabin are completely closed.
3829	All T/H Sensors Faulty	Minor	Cause use ID=1 There are too many faulty temperature and humidity sensors in the battery cabin.	1. Repair T/H Sensors based on the alarm. 2. On the maintenance screen, check that the T/H Sensor is correctly connected.
			Cause ID=2 There are too many faulty temperature and humidity sensors in the control unit cabin.	
3830	Temperature and Humidity Control Malfunction	Major	Cause ID=1 There are too many faulty air conditioners in the battery cabin.	1. Repair the air conditioner based on the alarm. 2. On the maintenance screen, check that the air conditioner is correctly connected.
			Cause ID=2 There are too many faulty air conditioners in the control unit cabin.	
3848	T/H Control Mode: Manual	Minor	Cause ID=1 The temperature and humidity control mode is set to manual.	After the commissioning is complete, set the temperature and humidity control mode to automatic.
3833	Rectifier Fault	Major	Cause ID=1-6 The rectifier hardware is faulty.	1. Replace rectifier. 2. If the fault persists, contact your dealer or Huawei technical support.
3834	Rectifier Protection	Major	Cause use ID=1-6 1. The AC voltage is abnormal. 2. The ambient temperature is too high.	1. Check the AC input voltage. 2. Check that the air vent of rectifier is not blocked and the ambient temperature is within the normal range. 3. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3835	Rectifier Communication Failure	Major	Cause ID=1-6 1. The rectifier has been removed. 2. The rectifier is faulty and not working.	1. Remove rectifier and then insert it 1 minute later. 2. Replace rectifier or the monitoring module. 3. If the fault persists, contact your dealer or Huawei technical support.
3836	Rectifier Power Failure	Major	Cause ID=1-6 The AC loop is disconnected.	1. Check whether the AC input is normal. If the input is normal, replace rectifier. 2. If the fault persists, contact your dealer or Huawei technical support.
3837	Rectifier Output Overvoltage	Major	Cause ID=1-6 Lockout has occurred due to output overvoltage.	1. Remove rectifier and then insert it 1 minute later. 2. If the fault persists, contact your dealer or Huawei technical support.
3838	T/H Sensor Communication Failure	Minor	Cause ID=1 T/H sensor communication failed.	1. Check whether the communications cable of the device is correctly connected. 2. Check whether the power supply of the device is normal.
3839	Air Conditioner Communication Failure	Minor	Cause ID=1-13 Air Conditioner communication failed.	
3840	CO Sensor Communication Failure	Minor	Cause ID=1-6 CO Sensor communication failed.	
3841	H ₂ Sensor Communication Failure	Minor	Cause ID=1 H ₂ sensor 1 communication failed.	
3842	ESU Communication Failure	Minor	Cause ID=1-6 ESU communication failed.	

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3843	TCU Communication Failure	Minor	Cause ID=1-2 TCU communication failed.	
3844	Rectifier Communication Failure	Minor	Cause ID=1 Rectifier communication failed.	
3845	SmartModule Communication Failure	Minor	Cause ID=1 SmartModule communication failed.	<ol style="list-style-type: none"> 1. Check whether the communications cable of the device is correctly connected. 2. Check whether the power supply of the device is normal. 3. Check whether a certificate expiration alarm exists in the alarm list.
3846	CMU Communication Failure	Minor	Cause ID=1 CMU communication failed.	<ol style="list-style-type: none"> 1. Check whether the communications cable of the device is correctly connected. 2. Check whether the power supply of the device is normal.
3851	Exhaust Fan Faulty	Minor	Cause ID=1 - 12 Exhaust fan is faulty.	<ol style="list-style-type: none"> 1. Check whether the cable connection of the exhaust fan is correct. 2. Check whether the TCU connected to the exhaust fan works properly. 3. Check whether the exhaust fan is faulty. If yes, replace it.
3853	ESU Physical Location Failure	Minor	Cause ID=1 ESU physical location failure.	Check whether the communications cable of the ESU is connected properly.
3856	Battery fault protection	Major	Cause ID=1 Some battery modules fail critically, causing the system to shut down.	Perform maintenance based on the faulty battery module alarm and its handling suggestions.
			Cause ID=2 The temperature of some battery modules is too low. As a result, the system charge limit is exceeded.	

 NOTE

- The ESC-No ID is the same as that displayed on the app. The ID is 1 on the left and 2 on the right. A maximum of two ESC-No IDs are supported.
- The ESR-CabinetNo ID is the same as that displayed on the app. The ID is 1 on the left and 2 on the right. A maximum of two ESR-CabinetNo IDs are supported.
- ESM-SlotNo indicates the slot number of the battery module.

Table 10-2 Common fault alarms of the intelligent battery cluster controller

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3014	Cluster controller exception	Major	Cause ID = 1-34 A serious fault occurs in the internal circuit of the cluster controller.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Turn on the battery switch and then the bus switch to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.
3015	Cluster controller battery overvoltage	Major	Cause ID = 1-3 Battery cables are incorrectly connected, or the battery voltage exceeds the maximum operating voltage of the power module.	<ol style="list-style-type: none"> 1. Check whether a battery module overvoltage alarm is generated in the cluster. If yes, clear the alarm by referring to the handling suggestions. 2. Determine the position of the input and output circuit breakers associated with [ESC-No]. 3. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes.
3016	Cluster controller battery undervoltage	Major	Cause ID = 1-3 Batteries are not securely connected or are abnormal.	<ol style="list-style-type: none"> 4. Check the cable connection to the battery side of the power control module by referring to the maintenance manual. 5. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 6. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3017	Cluster controller battery short circuit	Major	Cause ID = 1-3 The battery cable is incorrectly connected.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether there is voltage at both ends of the battery switch. If there is no voltage, check whether the cable is short-circuited or grounded. 4. Check the cable connection to the battery side of the power control module by referring to the maintenance manual. 5. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 6. If the alarm persists, contact your dealer or technical support.
3018	Battery reverse connection of the cluster controller	Major	Cause ID = 1-3 Battery cables are reversely connected.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether the copper bars and cables on the battery side of the power control module are reversely connected by referring to the product maintenance manual. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3019	Cluster controller bus side overvoltage	Major	Cause ID = 1-3 The bus cable is not correctly connected or the bus voltage exceeds the maximum operating voltage of the power module.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check the cable connection to the power control module bus by referring to the product maintenance manual. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.
3020	Reverse connection on the bus side of the cluster controller	Major	Cause ID = 1-3 The positive and negative poles of the bus are reversely connected.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether the cable between the busbar-side copper bar of the power control module and the DC PDC is reversely connected by referring to the product maintenance manual. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3021	Abnormal insulation resistance of the cluster controller	Major	<p>Cause ID = 1-3</p> <ol style="list-style-type: none"> 1. The battery is short-circuited to the ground. 2. The environment where the battery is located is moist, and the insulation between the circuit and the ground is poor. 	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check the battery output resistance to ground (both on the battery side and the bus side). If a short circuit occurs or the insulation is insufficient, rectify the fault. 4. Check whether the protection grounding cables of the system are correctly connected. 5. If the impedance is lower than the specified protection threshold in rainy and cloudy days, set <code><cf id="Bold">Insulation resistance protection</cf></code> using the mobile app, SmartLogger, or NMS.
3022	The temperature of the cluster controller is too high.	Minor	<p>Cause ID = 1-9</p> <ol style="list-style-type: none"> 1. The installation position of the cluster controller is not well ventilated. 2. The ambient temperature is excessively high. 3. The cluster controller is abnormal. 	<ol style="list-style-type: none"> 1. Check whether the ventilation in the installation position of [ESC-No] is good and whether the ambient temperature exceeds the upper limit. 2. If the ventilation is poor or the ambient temperature exceeds the upper threshold, improve the ventilation and heat dissipation. 3. Check whether the internal or external fan of the cluster controller is faulty. 4. If the ventilation and ambient temperature both meet requirements, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3023	Cluster Controller Battery Terminal Overtemperature	Major	Cause ID = 1-3 Battery terminals are not securely connected.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether the torque of the bolts on the battery side of the power control module meets the requirements. For details, see the DCDC replacement section in the maintenance manual. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.
3024	Cluster Controller Bus Terminal Overtemperature	Major	Cause ID = 1-3 The bus terminal is not securely connected.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether the torque of the bolts on the busbar side of the power control module meets the requirements by referring to the DCDC replacement section in the maintenance manual. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.
3025	The cluster controller version does not match.	Minor	Reason ID = 1-2 The upgrade does not complete normally.	<ol style="list-style-type: none"> 1. Version mismatch on [ESC-No]. Please update. 2. If the update fails for multiple times, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3026	The internal fan of the cluster controller is faulty.	Warning	Reason ID = 1-2 The internal fan is short-circuited, the power supply is insufficient, or the fan is damaged.	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Turn on the battery switch and then the bus switch to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.
3040	The cluster controller bus is incorrectly connected.	Major	Cause ID = 1 The output buses in the 1C scenario are not connected in parallel.	<ol style="list-style-type: none"> 1. If the subarray topology identification is in progress, wait until the subarray completes the topology identification or exit the topology identification. 2. Locate the input and output circuit breakers associated with [ESC-No]. 3. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 4. Check the cable connection to the bus side of the power control module by referring to the quick installation guide. 5. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 6. If the alarm persists, contact your dealer or technical support.
3053	The external fan of the cluster controller is faulty.	Warning	Cause ID = 1-3 The external fan is short-circuited, the power supply is insufficient, the fan is damaged, or the air channel is blocked.	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Check whether the fan blades are damaged. If yes, clear the foreign matter around the fan, and install a new fan. 4. Turn on the battery switch and then the bus switch to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3054	The cluster controller NTC is abnormal.	Warning	Reason ID = 1-2 The NTC is short-circuited, open-circuited, or not securely connected.	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch and then the bus switch, and wait for 5 minutes. 3. Turn on the battery switch and then the bus switch to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.

Table 10-3 BMU common alarms and troubleshooting measures

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3027	The battery module monitoring board is abnormal.	Major	Cause ID = 1-20 The internal circuit of the battery module monitoring device is faulty.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.
3028	Battery module internal error.	Major	Cause ID = 1-8 A major fault occurs in the battery module.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch. 3. Replace the battery module. 4. Contact the dealer or customer service center.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3029	The battery module is locked.	Major	Reason ID = 1-2 The battery module triggers the same fault for multiple times.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 24 hours. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.
			Cause ID = 3-5 The battery module triggers the same fault for multiple times.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3030	Battery Module Fan Fault	Major	<p>Cause ID = 1</p> <p>The fan is short-circuited.</p> <p>The power supply is insufficient.</p> <p>The fan is damaged.</p> <p>The fan is blocked.</p>	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the fan plate is damaged, clear the foreign matter around the fan, check whether the power supply is normal, and reinstall the fan. 4. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.
3031	Battery Pack Temperature Imbalance	Minor	<p>Cause ID = 1</p> <p>The temperature between electrochemical cells in the battery module is unbalanced.</p>	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the air conditioners and fans work properly and whether the ambient temperature is too high. 4. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3032	Battery module overvoltage	Major	Reason ID = 1-2 The voltage of the battery module or the electrochemical cell in the module is too high.	<ol style="list-style-type: none"> 1. Check the alarm module associated with the ESC device corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command and wait for 5 minutes. 3. If the alarm is cleared, send a startup command. If the alarm persists after 20 minutes, contact your dealer or Huawei technical support.
3044	ESM Overcurrent	Major	Cause ID = 1 The battery module current exceeds the maximum operating current for a long time.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3045	Battery module overtemperature	Major	<p>Reason ID = 1-2</p> <ol style="list-style-type: none"> 1. The installation position of the battery module is not well ventilated. 2. The ambient temperature is excessively high. 3. The cluster controller is abnormal. 	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the installation position is well ventilated and whether the ambient temperature exceeds the upper limit. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation, check whether the copper bar is properly connected, or check whether the air conditioner is running properly. 4. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3046	Battery module low temperature	Major	Reason ID = 1-2 The ambient temperature is too low and charging and discharging protection is triggered.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the ambient temperature of the installation position exceeds the lower limit. If the ambient temperature is too low, improve the installation environment or check whether the air conditioner is running properly. 4. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.
3047	Battery module undervoltage	Major	Reason ID = 1-2 The battery module voltage or electrochemical cell voltage is too low.	<ol style="list-style-type: none"> 1. If charging is allowed, [Energy storage unit-CabinetNo battery expansion module-SlotNo] can be charged with a current greater than 35 A when the inverter is running. 2. If the alarm persists after the battery is charged for 1 hour, contact your dealer or Huawei technical support.
			Cause ID = 3 The battery module voltage or electrochemical cell voltage is too low.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3036	The optimization unit is abnormal.	Major	<p>Cause ID = 1-4</p> <p>A major fault occurs on the internal circuit of the optimization unit in the battery module.</p>	<ol style="list-style-type: none"> 1. Confirm the position of [ESR-CabinetNo ESM-SlotNo] and the corresponding input and output circuit breakers of the ESC. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence, and send a startup command. 4. If the alarm persists, contact your dealer or technical support. 5.
3037	Optimization unit overtemperature	Minor	<p>Cause ID = 1-3</p> <ol style="list-style-type: none"> 1. The installation position of the battery module is not well ventilated. 2. The ambient temperature is excessively high. 3. The cluster controller is abnormal. 4. The optimization unit does not work properly. 	<ol style="list-style-type: none"> 1. Confirm the position of [ESR-CabinetNo ESM-SlotNo] and the corresponding input and output circuit breakers of the ESC. 2. Check the ventilation and whether the ambient temperature of the battery exceeds the upper threshold. 3. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 4. If the ventilation and ambient temperature meet requirements, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3038	Optimization unit terminal overtemperature	Major	Cause ID = 1 The terminal is not securely connected.	<ol style="list-style-type: none"> 1. Confirm the [ESR-CabinetNo ESM-SlotNo] position and the corresponding input and output circuit breakers. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check the cable connections to battery modules and optimization units by referring to the quick installation guide. 4. Check that the power cables are securely connected. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.
3039	The optimization unit version does not match.	Major	Reason ID = 1-2 The upgrade does not complete normally.	<ol style="list-style-type: none"> 1. The optimization unit version in [ESR-CabinetNo ESM-SlotNo] does not match. Please perform the upgrade again. 2. If the update fails multiple times, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3043	The SOH of the ESM is low.	Warning	Cause ID = 2 The battery module SOH is too low.	<ol style="list-style-type: none"> 1. Confirm the position of [ESR-CabinetNo ESM-SlotNo] and the corresponding input and output circuit breakers of the ESC. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Replace the [ESR-CabinetNo ESM-SlotNo] battery module by referring to the quick installation guide of the product. 4. Check that the power and monitoring cables are securely connected. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.
3041	Loose copper bar connection for the battery module	Major	Cause ID = 1 The copper bar of the battery module is loosely connected.	<ol style="list-style-type: none"> 1. Confirm the position of [ESR-CabinetNo ESM-SlotNo] and the corresponding input and output circuit breakers of the ESC. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the [ESR-CabinetNo ESM-SlotNo] battery module copper bar is securely connected by referring to the quick installation guide of the product. 4. Check that the power cables are securely connected. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.
3048	ESM Auxiliary Power Supply Fault	Warning	Cause ID = 1 The relay control of the black start auxiliary power is faulty.	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch, bus switch, and

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
			Cause ID = 2 The black start button is faulty.	AC power supply switch, and wait for 5 minutes.
			Cause ID = 3 Black boot auxiliary power-off error.	3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command.
			Cause ID = 4 The black-start function cannot be enabled.	4. If the alarm persists, contact your dealer or technical support.
			Cause ID = 5 The main/auxiliary source disable control is faulty.	

Table 10-4 BCU common alarms and troubleshooting measures

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3013	Cluster Controller Battery Module Communication Abnormal	Major	Cause ID = 1 The cluster controller monitoring module fails to communicate with the battery module.	<ol style="list-style-type: none"> 1. Determine the position of the input and output circuit breakers associated with the ESC corresponding to [ESR-CabinetNo ESM-SlotNo]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the ESM [ESR-CabinetNo ESM-SlotNo] communications cable is correctly connected. 4. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3033	The communication of the cluster controller power control module is abnormal.	Major	Cause ID = 1 The cluster controller monitoring module fails to communicate with the power module.	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 4. If the alarm persists, contact your dealer or technical support.
3034	The battery cable of the cluster controller is incorrectly connected.	Major	Cause ID = 1 Cables are incorrectly connected between the battery cluster and the corresponding power module.	<ol style="list-style-type: none"> 1. If the subarray topology identification is in progress, wait until the subarray completes the topology identification or exit the topology identification. 2. Locate the input and output circuit breakers associated with [ESC-No]. 3. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 4. Check whether the [ESR-CabinetNo] battery cluster and power module are correctly connected by referring to the quick installation guide. 5. Check that the power cables are securely connected. Turn on the AC power switch, battery switch (step 4), and bus switch in sequence. 6. If the alarm persists, contact your dealer or technical support. 7.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
3035	The position of the cluster controller battery module is abnormal.	Major	<p>Cause ID = 1</p> <ol style="list-style-type: none"> 1. The configured number of battery modules does not match the actual number. 2. The system has not identified the battery module address. 3. The address is not identified again after the battery module is replaced. 4. The battery module cable is not properly connected. 	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the communications cables between battery modules under [ESR-CabinetNo] are correctly connected by referring to the quick installation guide of the product. Check whether the configured number of battery modules matches the actual number. 4. After verifying that the battery power cable is correctly connected, turn on the battery switch and bus switch in sequence to send a startup command. 5. If the alarm persists, contact your dealer or technical support.
3042	The quick shutdown cable of the cluster controller is incorrectly connected.	Major	<p>Cause ID = 1</p> <p>The inter-cluster quick shutdown cable is incorrectly connected.</p>	<ol style="list-style-type: none"> 1. If the subarray topology identification is in progress, wait until the subarray completes the topology identification or exit the topology identification. 2. Locate the input and output circuit breakers associated with [ESC-No]. 3. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 4. Refer to the quick installation guide of the product and check whether the quick power-off cable between the ESR-CabinetNo battery clusters is correctly connected. 5. Check that the power cables are securely connected. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 6. If the alarm persists, contact your dealer or technical support.

Alarm ID	Alarm Name	Severity	Possible Causes	Troubleshooting Suggestions
			<p>Cause ID = 2</p> <p>The cable for quick shutdown in the cluster is incorrectly connected.</p>	<ol style="list-style-type: none"> 1. If the subarray topology identification is in progress, wait until the subarray completes the topology identification or exit the topology identification. 2. Locate the input and output circuit breakers associated with [ESC-No]. 3. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 4. Check whether the quick shutdown cable is correctly connected to the [ESR-CabinetNo] battery cluster by referring to the quick installation guide of the product. 5. Check that the power cables are securely connected. Turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 6. If the alarm persists, contact your dealer or technical support.
3052	AC Auxiliary Power Supply Fault of Cluster Controller	Major	<p>Cause ID = 1</p> <ol style="list-style-type: none"> 1. The AC power switch is OFF. 2. The AC power supply module is faulty. 	<ol style="list-style-type: none"> 1. Locate the input and output circuit breakers associated with [ESC-No]. 2. Send a shutdown command, turn off the battery switch, bus switch, and AC power supply switch, and wait for 5 minutes. 3. Check whether the AC auxiliary power switch of the cluster controller is turned on or whether the AC power supply is faulty. 4. After checking that the auxiliary AC power supply is normal, turn on the AC power supply switch, battery switch, and bus switch in sequence to deliver a startup command. 5. If the alarm persists, contact your dealer or technical support.

11 FAQ

11.1 How to Connect the ESS to the Smart PV Management System

Step 1 Enter <https://SmartPVMS> IP address: 31943 in the address box of a browser, and press **Enter**. The login page is displayed.

Step 2 Enter the username or mobile number, and password, and click **Log In**.

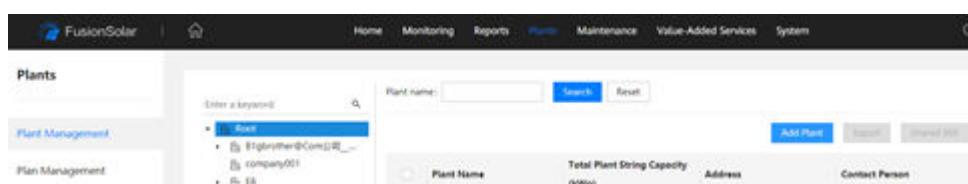


----End

11.2 How to Create a Plant

Step 1 Choose **Plants > Plant Management** from the main menu.

Step 2 On the **Plant Management** page, click **Add Plant**.



Step 3 Perform the next step as prompted.

Company:

Plant name:

Grid connection date: 2021-09-18

Contact person:

Contact method: Enter a phone number or an email address.

Owner's authorization obtained
If the content you entered involves third-party personal information, obtain authorization in advance.

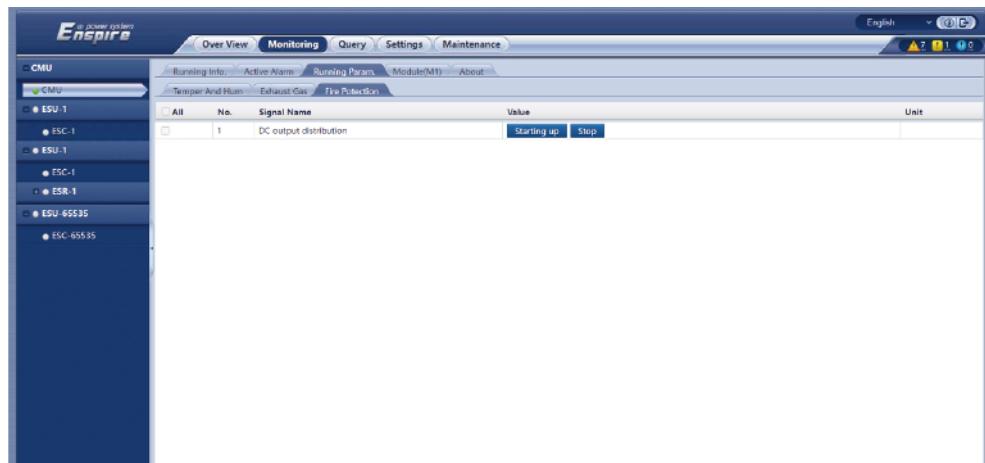
Cancel Next

----End

11.3 Why Does the PSU Not Start After the Water and Fire Alarms Are Cleared

Step 1 Choose **Monitoring > Running Param > Fire Protection > Starting up** on the SmartLogger WebUI.

Figure 11-1 Page of restoring the power supply



----End

11.4 How do I Level the ESS When Doors Cannot Be Opened or Closed

Step 1 Use a jack to support the ESS.

- Jack specification: 30 t
- Position requirements: a. For the concrete column foundation scenario, place the jack at the faulty door. b. For the concrete platform foundation scenario, place the jack at the side of the ESS.

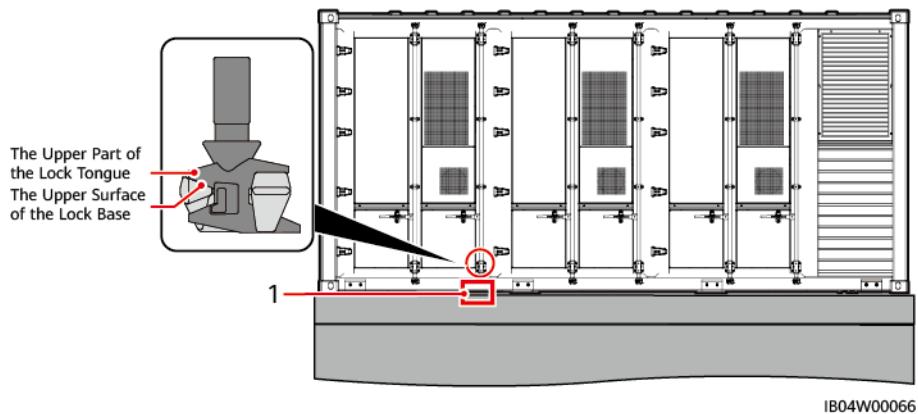
 **NOTE**

Wood sleepers can be used in the following circumstances.

- Insufficient jack height: Place wood sleepers underneath the jack.
- Earth ground: Use wood sleepers to extend contact area.

Step 2 Adjust the height with leveling washers.

Scenario 1: The Upper Part of the Lock Tongue Interferes With the Upper Surface of the Lock Base



(1) Position of leveling washers

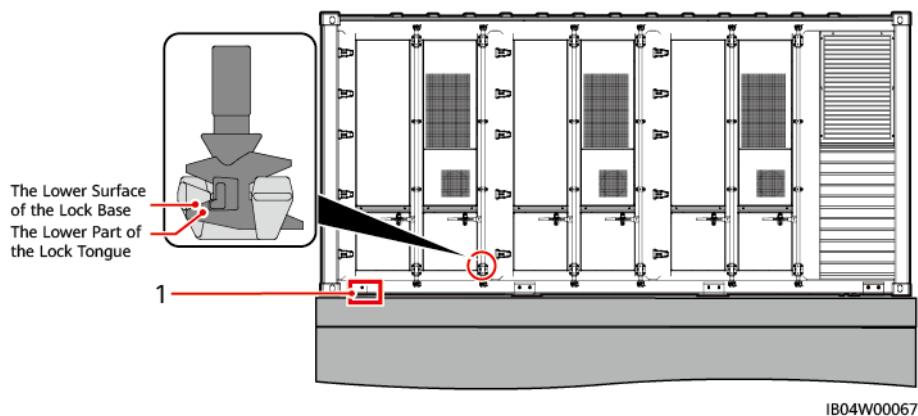
a. Concrete column foundation

Use leveling washers to raise ESS by 5–10 mm on the foundation columns nearest to the door hinge (the raising height may vary according to the actual conditions).

b. Concrete platform foundation

Use leveling washers to raise ESS by 5–10 mm on the foundation under the door hinge (the raising height may vary according to the actual conditions).

Scenario 2: The Lower Part of the Lock Tongue Interferes With the Lower Surface of the Lock Base



(1) Position of leveling washers**a. Concrete column foundation**

Use leveling washers to raise ESS by 5–10 mm on the foundation columns under the lock base farthest to the door hinge (the raising height may vary according to the actual conditions).

b. Concrete platform foundation

Use leveling washers to raise ESS by 5–10 mm on the foundation under the lock base farthest to the door hinge (the raising height may vary according to the actual conditions).

----End

12 Technical Data

Table 12-1 Technical Data

Technical Specifications	LUNA2000-2.0MWH-1H0 (320 Ah battery cell)	LUNA2000-2.0MWH-2 H0 (320 Ah battery cell)
Rated voltage on the bus side of the Smart Rack Controller	1200 V	1200 V
Maximum voltage on the bus side of the Smart Rack Controller	1500 V	1500 V
Smart Rack Controller model	ESC360KW-F	ESC360KW-F
Smart Rack Controller configuration	One battery rack is configured with a Smart Rack Controller.	Two battery racks are configured with a Smart Rack Controller.
Rated voltage of a single rack	1075.2 V	1075.2 V
Voltage range of a single rack	907–1227 V	907–1227 V
Battery pack model	ESM51320AS1	ESM51320AS1
Single-rack battery pack configuration	One battery rack is configured with 21 battery packs.	One battery rack is configured with 21 battery packs.
Nominal energy of a single rack	344.1 kWh	344.1 kWh
Nominal power	6 x 344 kW	3 x 344 kW
Rated charge and discharge current	6 x 287 A	3 x 287 A

Technical Specifications	LUNA2000-2.0MWH-1H0 (320 Ah battery cell)	LUNA2000-2.0MWH-2 H0 (320 Ah battery cell)
Charging and discharging rate	≤ 1C@40°C	≤ 0.5C@40°C
Rack balancing mode	Module-level proactive equalization	Module-level proactive equalization
Number of racks in the ESS	6	6
Battery capacity of the ESS	2064 kWh	2064 kWh
ESS container dimensions (H x W x D)	20 inch: 2896 mm x 6058 mm x 2438 mm	20 inch: 2896 mm x 6058 mm x 2438 mm
Net weight	≤ 30 tons	≤ 30 tons
IP rating	IP55	IP55
Operating temperature range	-30°C to +55°C	-30°C to +55°C
Storage temperature range	-40°C to +60°C	-40°C to +60°C
Operating humidity range	0-100% (non-condensing)	0-100% (non-condensing)
DC surge protection	Type II	Type II
Maximum operating altitude	4000 m	4000 m
Battery temperature control mode	Industrial air conditioning	Industrial air conditioning
Number of air conditioners in the battery cabin	8	6
Auxiliary power supply ^a	380 V/220 V AC ≤ 72 kVA	380 V/220 V AC ≤ 51 kVA
Fire extinguishing system	FM-200	FM-200
System communications port	Ethernet/optical fiber (standard configuration)	Ethernet/optical fiber (standard configuration)
System communications protocol	Modbus TCP	Modbus TCP

Technical Specifications	LUNA2000-2.0MWH-1H0 (320 Ah battery cell)	LUNA2000-2.0MWH-2H0 (320 Ah battery cell)
Certification standards	GBT 36276-2018, GBT 34131, UN38.3, CGC177	GBT 36276-2018, GBT 34131, UN38.3, CGC177
Note a: For the AC input port of the auxiliary power supply, the calculated short-circuit current should be less than or equal to 30 kA. When the calculated short circuit current is greater than or equal to 15 kA and a short circuit occurs in the AC power equipment of the system, the selective protection for upstream and downstream equipment cannot be implemented for some circuits.		

A Operations on the CMU WebUI

A.1 CMU WebUI Operations

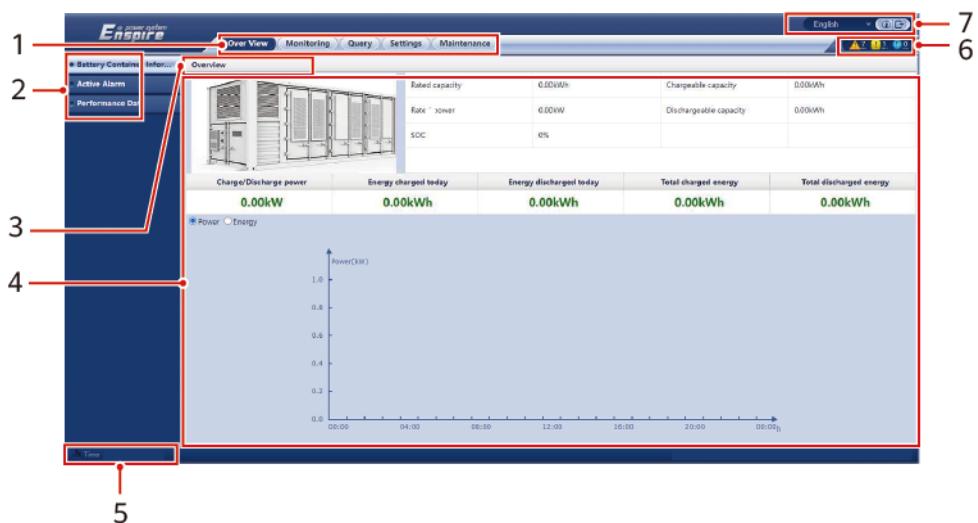
A.1.1 Introduction to WebUI

NOTICE

- The web software version corresponding to the WebUI screenshots in this document is FusionSolar V800R021C10. The screenshots are for reference only.
- The parameter names, value ranges, and default values are subject to change. The actual display prevails.

A.1.2 WebUI Layout

Figure A-1 WebUI layout



No.	Function	Description
1	First-level menu	Choose the corresponding first-level menu before you perform any operation over the WebUI.
2	Second-level menu	Under the first-level menu, choose the device to be queried or the parameter to be set under the second-level menu.
3	Third-level menu	After choosing a second-level menu, choose a third-level menu to access the query or setting page.
4	Details page	Displays details of the queried information or parameter setting.
5	System time	Displays the current system time.
6	Alarm icon	Displays the severities and number of active system alarms. You can click a number to access the alarm page.
7	Display language	Selects the display language or chooses to log out.

A.1.3 Icon Description

Icon	Description	Icon	Description
	Click the About icon to query the WebUI version information.		Click the Drop-down icon to choose a parameter or time.
	Click the Exit icon to log out.		Alarms are classified into major, minor, and warning ones. Click the Alarm icon to query an alarm.
	Click the Increase/Decrease icon to adjust time.		Click the Start icon to start the device.
	The Select icon indicates that a parameter is selected.		Click the Stop icon to shut down the device.
	The Select icon indicates that a parameter is not selected. Click the icon to select a parameter.		Click the Reset icon to reset the device.
	Hide icon and Display icon		The CMU is in Running state.

Icon	Description	Icon	Description
	<ul style="list-style-type: none"> The device is in Disconnection state. When the device is in Disconnection state, its parameters cannot be set. 		The CMU is in Loading state.
	The CMU is in Initializing, Power-off, Idle or other state in which the device is not feeding power into the grid.		Ascending order or descending order icon. Click the icon to sort parameters in ascending or descending order for the corresponding column.

A.1.4 WebUI Menus

Table A-1 WebUI menus

Main Menu	Second-Level Menu	Third-Level Menu	Function
Overview	ESS information	-	Queries ESS information.
	Active Alarm	-	Queries active alarms.
	Performance Data	-	Queries or exports performance data.
Monitoring	CMU	Running Info.	Queries the running information.
		Active Alarm	Queries active alarms.
		Running Param.	Set running parameters.
		Module(M1)	Queries the expansion module.
		About	Queries the version and communication information.
Query	Alarm History	-	Query historical alarms.
	Operation Log	-	Queries operation logs.
	Export Data	-	Exports historical alarms, energy yield, operation logs, and power grid scheduling data.

Main Menu	Second-Level Menu	Third-Level Menu	Function
Settings	User parameters	Date&Time	Sets the date and time.
	Comm. Param.	Wireless Network	<ul style="list-style-type: none"> • Sets parameters for the built-in WLAN. • Sets mobile data (4G/3G/2G) parameters.
		Wired Network	Sets wired network parameters.
		RS485	Sets RS485 parameters.
		Modbus TCP	Sets Modbus TCP parameters.
	Other parameters	-	-
Maintenance	Software Upgrade	-	Upgrades the CMU software.
	Product Information	-	Queries product information.
		-	<ul style="list-style-type: none"> • Changes the user password. • Sets the automatic logout time. • Upload a network security certificate. • Updates the key. • Sets web TLS1.0. • Sets digital signature verification.
		-	<ul style="list-style-type: none"> • Resets the system. • Restore factory settings. • Clears data. • Exports all configuration files. • Imports all configuration files.
		-	Exports device logs.
	Device Mgmt.	Connect Device	<ul style="list-style-type: none"> • Adds or removes a device. • Imports or exports configurations.
		SmartModule	<ul style="list-style-type: none"> • Removes the SmartModule. • Sets the authentication password.
		Clear Alarm	Clears device alarms.

A.2 Maintenance Operations

A.2.1 Preparations and WebUI Login

Prerequisites

- The operating system of Windows 7 or later is supported.
- Browser: Chrome 52, Firefox 58, or Internet Explorer 9, or a later version is recommended.

Procedure

Step 1 Connect the network cable between the network port of the PC and the WAN or LAN port of the SmartLogger.

Step 2 Set the IP address for the PC on the same network segment as the SmartLogger IP address.

Connected Port	Item	SmartLogger Default Value	Example PC Setting
LAN port	IP address	192.168.8.10	192.168.8.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.8.1	192.168.8.1
WAN port	IP address	192.168.0.10	192.168.0.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.0.1	192.168.0.1

NOTE

- When the IP address of the WAN port is in the network segment from 192.168.8.1 to 192.168.8.255, set the default gateway to 192.168.8.1 and the IP address of the LAN port to 192.168.3.10. If the connected port is a LAN port, you need to adjust the network configuration of the PC.
- It is recommended that the PC be connected to the LAN port of the SmartLogger or the GE port of the SmartModule. When the PC is connected to the GE port of the SmartModule, adjust the network configuration of the PC to the configuration mode when the PC is connected to the LAN port of the SmartLogger.

Step 3 Set LAN parameters.

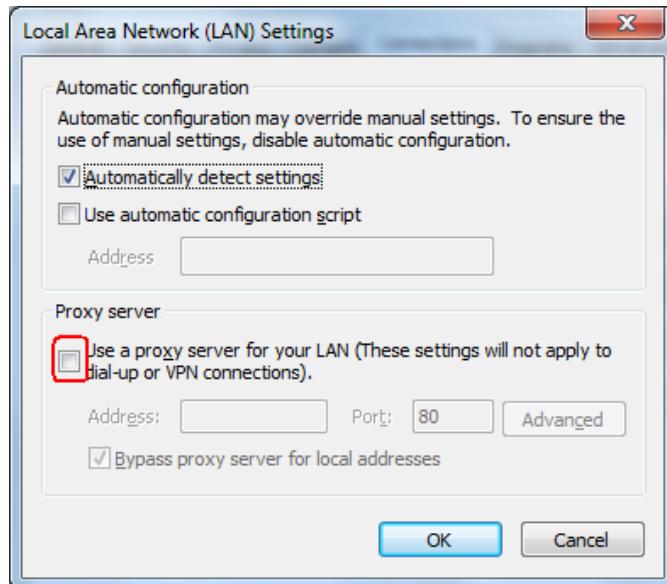
NOTICE

- If the SmartLogger is connected to a local area network (LAN) and a proxy server has been set, you need to cancel the proxy server settings.
- If the SmartLogger is connected to the Internet and the PC is connected to the LAN, do not cancel the proxy server settings.

1. Open Internet Explorer.

2. Choose **Tools > Internet Options**.
3. Click the **Connections** tab and then click **LAN settings**.
4. Clear **Use a proxy server for your LAN**.

Figure A-2 LAN settings



5. Click **OK**.

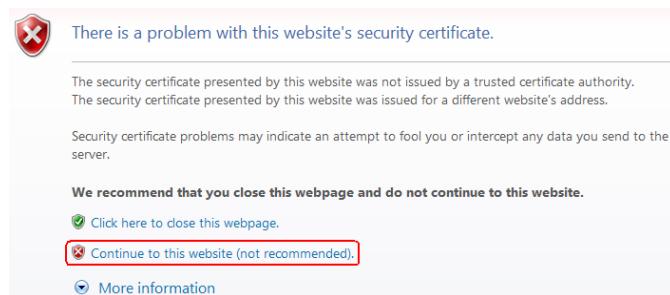
Step 4 Log in to the SmartLogger WebUI.

1. In the address box of a browser, enter <https://XX.XX.XX.XX> (XX.XX.XX.XX is the IP address of the SmartLogger) and press Enter. The login page is displayed. If you log in to the WebUI for the first time, a security risk warning is displayed. Click **Continue to this website** to log in to the WebUI.

 **NOTE**

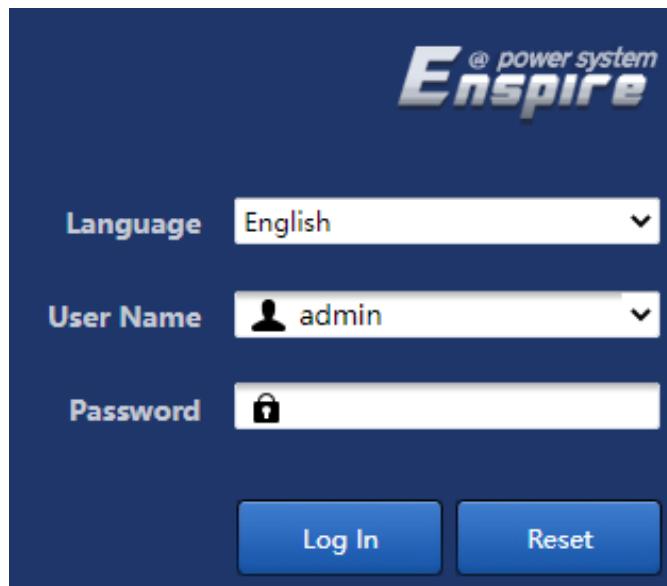
- It is recommended that users use their own certificates. If the certificate is not replaced, the security risk warning will be displayed during each login.
- After logging in to the WebUI, you can import a certificate under **Maintenance > Security Settings > Network Security Certificate**.
- The imported security certificate needs to be bound to the SmartLogger IP address. Otherwise, the security risk warning will still be displayed during login.

Figure A-3 Security risk warning



2. Specify **Language**, **User Name**, and **Password**, and click **Log In**.

Figure A-4 Login page (Initial Login When the User Name Is Displayed as Admin)



The screenshot shows the login interface for the Enspire system. The header features the 'Enspire' logo with the tagline '@ power system'. Below the header, there are three input fields: 'Language' (set to 'English'), 'User Name' (set to 'admin'), and a password field (represented by a lock icon). At the bottom of the form are two buttons: 'Log In' and 'Reset'.

 **NOTE**

In this scenario, you need to update the SmartLogger to V800R021C10SPC020 or later.

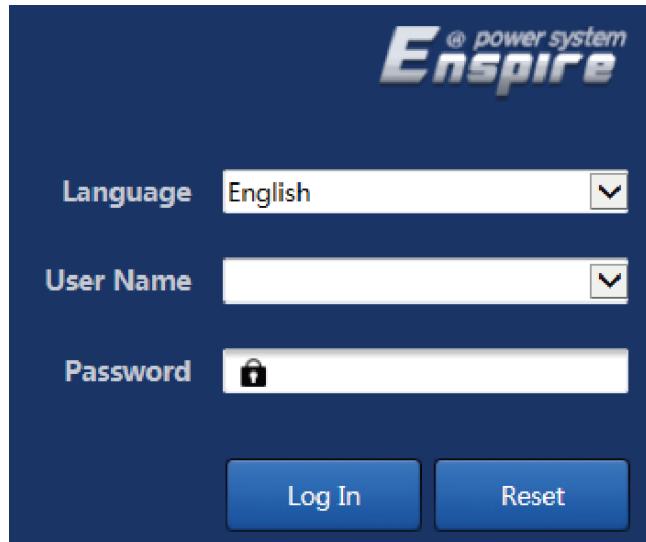
Parameter	Description
Language	Set this parameter as required.
User Name	Default value: admin
Password	<ul style="list-style-type: none">The initial password is Changeme.Use the initial password upon first power-on and change it immediately after login. Then, use the new password to log in again.

 **NOTE**

Updating the SmartLogger to V800R021C10SPC020 or later:

- Method 1: Log in as admin using your new password.
- Method 2: Log in as installer using your app login password (the initial password is 00000a).

Figure A-5 Login page (Initial Login When the User Name Is Null)



IL03J00002

 **NOTE**

In this scenario, the SmartLogger software version is V800R021C10SPC020 or later.

Parameter	Description
Language	Set this parameter as required.
User Name	Log in as installer.
Password	Set the login password as prompted.

 **NOTE**

- Protect the password by changing it periodically, and keep it secure. If you lose the password, the device must be restored to its factory settings. Huawei will not be held liable for any losses resulting from improper password management.
- You will be locked out for 10 minutes after five failed password attempts in five minutes.
- A dialog box with recent login information is displayed after login. Click **OK**.

----End

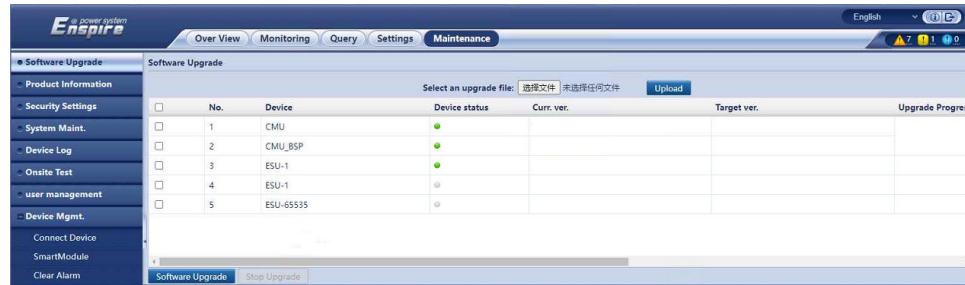
Follow-up Procedure

If any page is blank or a menu cannot be accessed after you log in to the WebUI, clear the cache, refresh the page, or log in again.

A.2.2 Upgrading the Software Version

Step 1 Upgrade the software.

Figure A-6 Software upgrade



----End

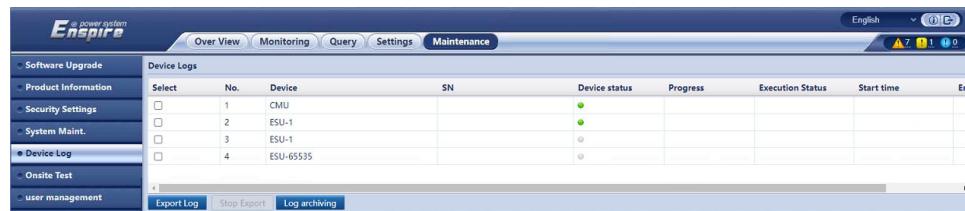


The **Stop Upgrade** function applies only to the devices waiting to be upgraded.

A.2.3 Exporting Device Logs

Step 1 Access the device log page.

Figure A-7 Exporting logs



Step 2 Select the device whose logs are to be exported and click **Export Log**.



Logs can be exported for a maximum of six devices of the same type at a time.

Step 3 Observe the progress bar and wait until the log export is complete.

Step 4 After the export is successful, click **Log archiving** to save the logs.

----End

A.2.4 Checking Alarms

Step 1 Choose **Overview > Active Alarm**.

Figure A-8 Checking alarms

Alarm ID	Severity	Device	Alarm Name	Generation time	Reason ID	Suggestion
3802	Major	CMU	Fire Alarm		1	Suggestion
3802	Major	CMU	Fire Alarm		2	Suggestion
3803	Major	CMU	Fire Extinguishing System Faulty		1	Suggestion
3801	Major	CMU	Door Status Alarm		7	Suggestion
3801	Major	CMU	Door Status Alarm		3	Suggestion
3801	Major	CMU	Door Status Alarm		2	Suggestion
3801	Major	CMU	Door Status Alarm		1	Suggestion
3853	Minor	CMU	ESU Physical Location Failure		1	Suggestion

----End

A.2.5 Clearing Alarms

You can clear all active and historical alarms for the selected device and re-collect alarm data.

Procedure

Step 1 Choose **Maintenance > Device Mgmt. > Clear Alarm**.

Figure A-9 Clearing alarms

All	No.	Device	SN	Device status
<input type="checkbox"/>	1	CMU		●
<input type="checkbox"/>	2	ESU-1		●
<input type="checkbox"/>	3	ESU-1		○
<input type="checkbox"/>	4	ESU-65535		○

Step 2 Select the name of the device whose alarms are to be cleared, click **Submit**, and choose **All**, **Locally synchronized alarms**, or **Alarms stored on devices** to clear alarms.

----End

NOTE

If alarms are cleared for the CMU, you must reset alarms on the management system. Otherwise, the SmartLogger cannot obtain the alarm information collected by the CMU after the alarms are cleared.

B Crimping an OT or DT Terminal

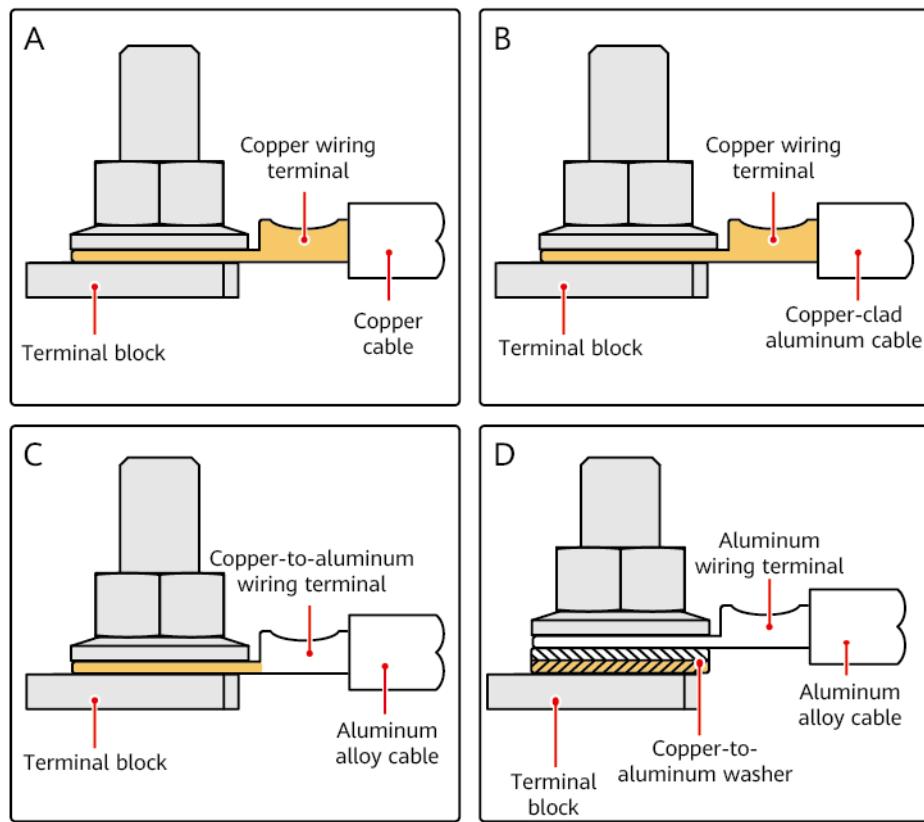
Requirements for OT/DT Terminals

- If a copper cable is used, use copper wiring terminals.
- If a copper-clad aluminum cable is used, use copper wiring terminals.
- If an aluminum alloy cable is used, use copper-to-aluminum wiring terminals, or aluminum wiring terminals with copper-to-aluminum washers.

NOTICE

- Do not connect aluminum wiring terminals to the terminal block. Otherwise electrochemical corrosion may occur, affecting the reliability of cable connections.
- Comply with the IEC 61238-1 requirements when using copper-to-aluminum wiring terminals, or aluminum wiring terminals with copper-to-aluminum washers.
- Ensure that the aluminum side of the washer contacts the aluminum wiring terminal, and the copper side contacts the terminal block.

Figure B-1 Requirements for OT/DT terminals

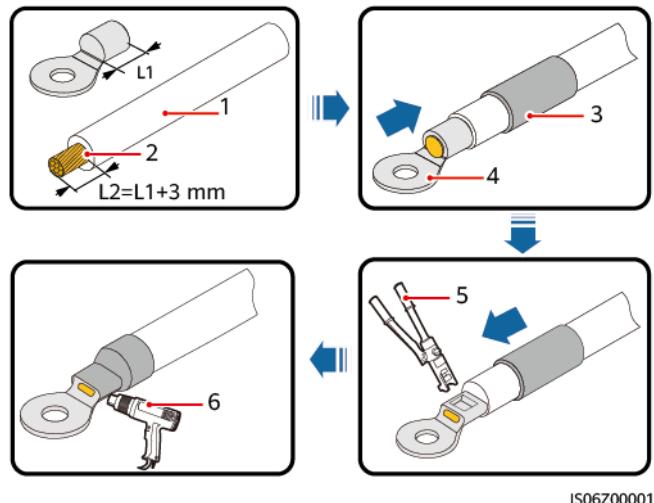


Crimping an OT or DT Terminal

NOTICE

- Avoid damaging the core wire when stripping a cable.
- The cavity formed after the conductor crimp strip of the OT or DT terminal has been crimped must wrap around the core wires completely. The core wires must be in close contact with the OT or DT terminal closely.
- Wrap the wire crimping area with heat-shrink tubing or insulation tape. The heat-shrink tubing is used in this section as an example.
- Use a heat gun carefully to avoid heat damage to the equipment.

Figure B-2 Crimping an OT terminal

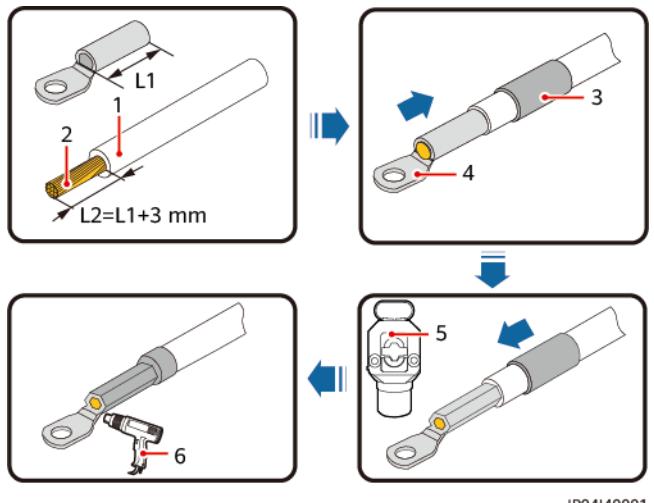


- (1) Cable
- (4) OT terminal

- (2) Core
- (5) Hydraulic pliers

- (3) Heat-shrink tubing
- (6) Heat gun

Figure B-3 Crimping a DT terminal



- (1) Cable
- (4) PT terminal

- (2) Core
- (5) Hydraulic pliers

- (3) Heat-shrink tubing
- (6) Heat gun

C Repainting the Equipment

Prerequisites

- Do not repaint the equipment under poor weather conditions, such as rain, snow, strong winds, and sandstorms, when there is no shelter outdoors.
- You have prepared the paint according to the color palette included with the equipment.

Repainting Description

The equipment should be intact. If the paint peels, repaint the area.

NOTE

Check the damaged area and prepare the appropriate tools and materials.

Table A-1 Repainting description

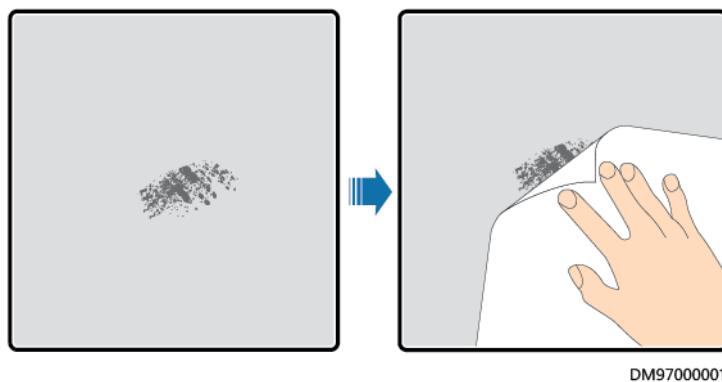
Paint Damage	Tools and Materials	Procedure	Description
Slight scratch (steel base material is intact)	Spray paint or paint, fine sandpaper, anhydrous alcohol, cotton cloth, and brush (required for repainting a small area) or paint gun (required for repainting a large area)	Steps 1, 2, 4, and 5	1. For the color of the finish coat (acrylic acid paint), see the included color palette and the Pantone number. 2. For a few smudges, scratches, or rust, manual paint spraying or brushing is recommended. 3. For many scratches or
Smudges and rust that cannot be removed			

Paint Damage	Tools and Materials	Procedure	Description
Deep scratch (primer damaged, steel base material exposed)	Spray paint or paint, zinc-rich primer, fine sandpaper, anhydrous alcohol, cotton cloth, and brush (required for repainting a small area) or paint gun (required for repainting a large area)	Steps 1, 2, 3, 4, and 5	large-area smudges and rust, use a paint gun to spray paint the area. 4. The paint coating should be thin and even. The surface should be smooth. There must not be any paint drops on the coating. 5. Leave the repainted area for about 30 minutes before performing any further operation.
Logo and pattern damage	If a logo or pattern has been damaged, obtain the logo size and color number and contact a local advertisement coating supplier to formulate a repair solution based on the logo size, color, and damage.		
Dent	1. If a dent is less than 100 mm ² in area and 3 mm in depth, fill the dent with Poly-Putty base and then perform the same operations as those for fixing deep scratches. 2. If a dent is greater than 100 mm ² in area or greater than 3 mm in depth, contact the local supplier for an appropriate repainting solution.		

Procedure

Step 1 Gently polish the damaged areas using fine sandpaper to remove smudges or rust.

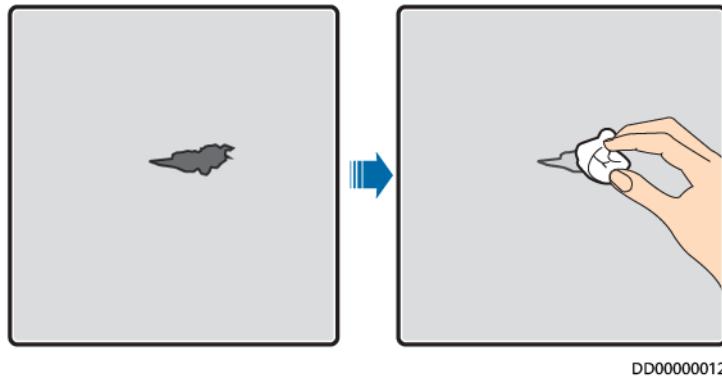
Figure C-1 Polishing a damaged area using sandpaper



DM97000001

Step 2 Dip a piece of cotton cloth into anhydrous alcohol and wipe the polished or damaged area to remove dirt or dust. Then wipe off the alcohol with a clean and dry cotton cloth.

Figure C-2 Wiping a polished or damaged area using anhydrous alcohol



Step 3 Paint zinc-rich primer on the damaged coat.

NOTICE

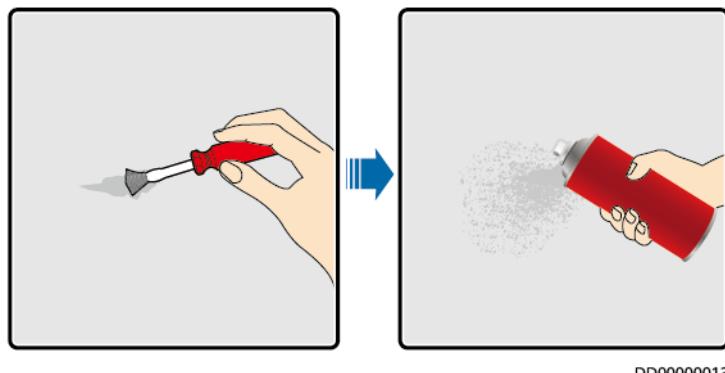
- If the base material is exposed, apply epoxy zinc-rich primer, wait until the paint has dried, and then apply an acrylic acid top coating.
- Select an epoxy zinc-rich primer or acrylic acid top coating with the same color as that of the equipment's surface coating.

Step 4 Apply paint evenly to the damaged area based on the damage degree until all damage traces are no longer visible.

NOTICE

- Ensure that the painting is thin, even, and smooth. There must not be any paint drops on the coating.
- In the case that an equipment pattern has different colors, to prevent undamaged areas and those with different colors as the damaged area from being polluted during repainting, cover such areas using white paper and adhesive tape before repairing paint.

Figure C-3 Repainting a damaged area



Step 5 Wait for 30 minutes and check whether the painting meets the requirements.

 **NOTE**

- The color of the repainted area must be consistent with that of the surrounding area. Use a colorimeter to measure the color difference (Δ_E), which should be less than or equal to 3. If a colorimeter is unavailable, ensure that there is no visible edge between the repainted area and the surrounding area. The paint should also be free of bulges, scratches, peeling, or cracks.
- If you choose to spray paint, it is recommended that you spray paint three times before checking the result. If the color does not meet the requirements, paint more times until the painting meets the requirements.

----End

Paint Supply Information

Table C-1 Painting requirements

Item	Specification
Primer thickness	60 μm
Intermediate coat thickness	120 μm
Top coat thickness	60 μm
Primer type	Epoxy zinc rich paint
Intermediate coat type	Zinc-rich paint
Color number of the top coat	Obtain the color number based on the color palette included with the equipment.

 **NOTE**

The following paint model list provided by Huawei is subject to change and for reference only. The price of paint and technical services are subject to local pricing.

Supplier	Location	Paint Model
Hempel	Equipment surface painting	<p>Zinc-rich primer for pretreatment: HEMPADUR ZINC (shopprimer) 1536C/19830</p> <p>Zinc-rich primer for the entire container: HEMPADUR ZINC (on line) 1536C/19830</p> <p>Intermediate coat: HEMPADUR FAST DRY 15560/12170</p> <p>Top coat: HEMPATHANE 55210/17630 (RAL9003)</p>
	Logo painting	<p>Red: HEMPATHANE 55210/57200 (RAL3020)</p> <p>Black: HEMPATHANE 55210-19990 (RAL9005)</p>
CMP	Equipment surface painting	<p>Zinc-rich primer for pretreatment: EPICON ZINC SC B-2 M (SHOP PRIMER)</p> <p>Zinc-rich primer for the entire container: EPICON ZINC SC B-2 M (ON LINE ZINC)</p> <p>Intermediate coat: EPICON SC PRIMER GREY CSC-9107</p> <p>Top coat: UNYMARINE SC FINISH WHITE CSC-9205 (RAL-9003)</p>
	Logo painting	<p>Red: UNYMARINE SC MARKING RAL-3020</p> <p>Black: UNYMARINE SC MARKING RAL-9005</p>

E Acronyms and Abbreviations

B

BCU	Battery Control Unit
BMU	Battery Monitoring Unit

C

CMU	Central Monitoring Unit
------------	-------------------------

E

ESS	Smart String ESS
ETH	Ethernet
ESU	Energy Storage Unit
ESC	Smart Rack Controller
ESR	Battery Rack
ESM	Battery Pack

L

LCD	Liquid Crystal Display
------------	------------------------

P

PSU Power Supply Unit

PCS Smart PCS

S

SACU Smart Array Controller

SMU Site monitoring unit

STS Smart Transformer
Station