ETP48200-B2A1 Embedded Power

User Manual

Issue	07
Date	2024-03-10

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About This Document

Purpose

This document describes the power system in terms of overview, installation, commissioning, maintenance, and technical specifications.

Figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Sales engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

The symbols that may be found in this manual 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.

Symbol	Description
NOTE	Supplements 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 the changes made in earlier issues.

Issue 07 (2024-03-10)

Updated **4.4.11.3 Installing 110 V AC Dual-Live Wire Input Power Cables**.

Issue 06 (2023-01-20)

Updated **6.4 LIVE-C APP (SMU11C)**.

Added **6.3 Site App (SMU11C)** and **7.2 Common Maintenance Operations on the Site App (SMU11C)**.

Updated the safety information in this document.

Issue 05 (2022-11-10)

Updated **3 Components**.

Updated **4.1.1 Cables**.

Issue 04 (2021-01-05)

Updated **6 System Commissioning**.

Issue 03 (2020-02-10)

Updated **3 Components**.

Issue 02 (2019-09-19)

Added the description about the WiFi function.

Issue 01 (2019-07-12)

This issue is the first official release.

Software version: SMU V500R002C20, LIVE-C APP V100R001C80

Contents

1 Safety Information

Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The **Danger**, **Warning**, **Caution**, and **Notice** statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.**

The equipment should be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- Equipment damage due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and extreme weather conditions
- Operation beyond the conditions specified in this document

- Installation or use in environments that do not comply with international, national, or regional standards
- Installation or use by unqualified personnel
- Failure to follow the operation instructions and safety precautions on the product and in the document
- Unauthorized modifications to the product or software code or removal of the product
- Damage caused during transportation by you or a third party authorized by you
- Storage conditions that do not meet the requirements specified in the product document
- Failure to comply with local laws, regulations, or related standards due to the materials and tools prepared by you
- Damage caused by your or a third party's negligence, intentional breach, gross negligence, or improper operations or damage not caused by the Company

1.1 Personal Safety

DANGER

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

DANGER

Non-standard and improper operations on the energized equipment may cause fire or electric shocks, resulting in property damage, personal injury, or even death.

DANGER

Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

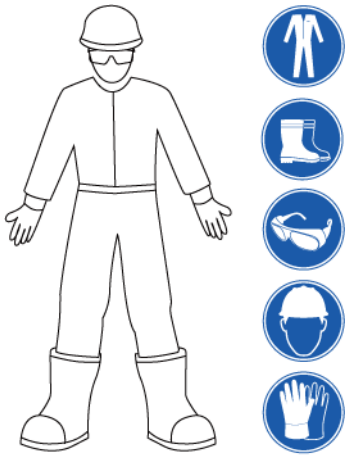
DANGER

During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The insulation and voltage resistance must comply with local laws, regulations, standards, and specifications.

WARNING

During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

Figure 1-1 Personal protective equipment



General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- 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.
- Do not power on the equipment before it is installed or confirmed by professionals.
- Do not touch the power supply equipment directly or with conductors such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock.
- Do not touch a running fan with your hands, components, screws, tools, or boards. Otherwise, personal injury or equipment damage may occur.
- 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 enter the affected building or equipment area under any circumstances.

Personnel Requirements

- Only professionals and trained personnel are allowed to operate the equipment.
  - Professionals: personnel who are familiar with the working principles and structure of the equipment, 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 trained in technology and safety, 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

- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- 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 perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Electrical Safety

DANGER

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

DANGER

Non-standard and improper operations may result in fire or electric shocks.

DANGER

Prevent foreign matter from entering the equipment during operations. Otherwise, equipment damage, load power derating, power failure, or personal injury may occur.

WARNING

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.

CAUTION

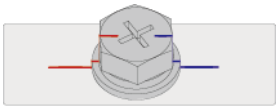
Do not route cables near the air intake or exhaust vents of the equipment.

CAUTION

Do not directly connect aluminum cables to prevent electrochemical corrosion of copper and aluminum.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Install temporary fences or warning ropes and hang "No Entry" signs around the operation area to keep unauthorized personnel away from the area.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.
- Ensure that bolts are tightened with a torque tool and marked in red and blue after double-check. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm that the bolts are tightened and then mark them in red. (The marks must cross the edges of the bolts.)



- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Ensure that all slots are installed with boards or filler panels. Avoid hazards caused by hazardous voltages or energy on boards. Ensure that the air channel is normal, control electromagnetic interference, and prevent dust and other foreign objects on the backplane, baseplate, and boards.
- After the installation is complete, ensure that protective cases, insulation tubes, and other necessary items for all electrical components are in position to avoid electric shocks.

- If the power supply to the equipment is permanently connected, install an easily accessible disconnector at the exterior of the device.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- Before maintaining a downstream electrical or power distribution device, turn off the output switch on the power supply equipment.
- During equipment maintenance, attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers as well as warning signs to prevent accidental connection. The equipment can be powered on only after troubleshooting is complete.
- If fault diagnosis and troubleshooting need to be performed after power-off, take the following safety measures: Disconnect the power supply. Check whether the equipment is live. Install a ground cable. Hang warning signs and set up fences.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- 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.
- Ensure that the protective ground point of the equipment is reliably connected to the ground screw of the metal enclosure (connection resistance: ≤ 0.1 ohm).
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protective ground point.
- If high touch current may occur on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the power supply; otherwise, electric shock as a result of touch current may occur.

Cabling

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.

- Ensure that all cables are properly connected and insulated, and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- If a cable is connected to the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.
- When cable connection is completed or paused for a short period of time, seal the cable holes with sealing putty immediately to prevent small animals or moisture from entering.
- Secure buried cables using cable supports and cable clips. Ensure that the cables in the backfill area are in close contact with the ground to prevent cable deformation or damage during backfilling.
- If the external conditions (such as the cable layout or ambient temperature) change, verify the cable usage in accordance with the IEC-60364-5-52 or local laws and regulations. For example, check that the current-carrying capacity meets requirements.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle. Otherwise, the cable performance may deteriorate due to cable damage, which affects the current-carrying capacity and temperature rise.

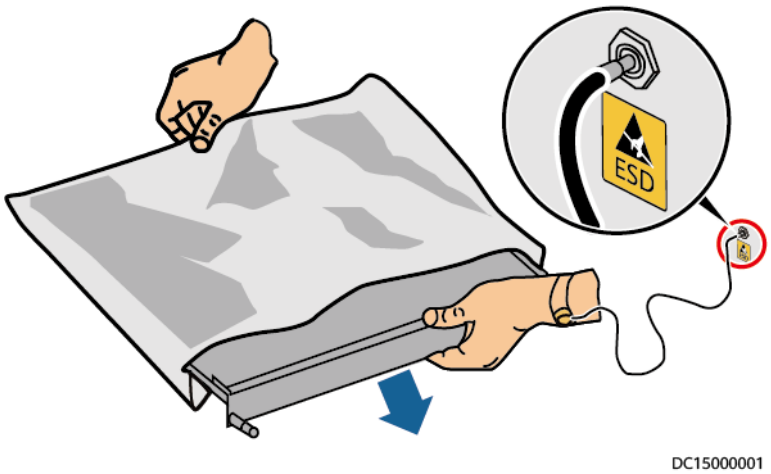
Electrostatic Discharge (ESD)

NOTICE

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

- When touching the equipment and handling boards, modules with exposed circuit boards, or application-specific integrated circuits (ASICs), observe ESD protection regulations and wear ESD clothing and ESD gloves or a well-grounded ESD wrist strap.

Figure 1-2 Wearing an ESD wrist strap



- When holding a board or a module with exposed circuit boards, hold its edge without touching any components. Do not touch the components with bare hands.
- Package boards or modules with ESD packaging materials before storing or transporting them.

1.3 Environment Requirements

DANGER

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

DANGER

Do not store any flammable or explosive materials in the equipment area.

DANGER

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

WARNING

Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under 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.

WARNING

To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

General Requirements

- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- 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, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Before opening doors during the installation, operation, and maintenance of the equipment, clean up any water, ice, snow, or other foreign objects on the top of the equipment to prevent foreign objects from falling into the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- Ensure that the equipment room provides good heat insulation, and that the walls and floor are dampproof.
- Install protective devices at the door of the equipment room to prevent rodents and insects from entering the room.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.4 Mechanical Safety

DANGER

When working at heights, wear a safety helmet and safety harness or waist belt 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.

WARNING

Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

WARNING

Before installing equipment in a cabinet, ensure that the cabinet is securely fastened with a balanced center of gravity. Otherwise, tipping or falling cabinets may cause bodily injury and equipment damage.

WARNING

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

WARNING

Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

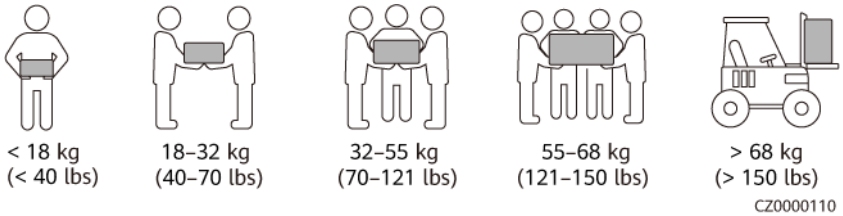
General Requirements

- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed for an extended period of time.
- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.

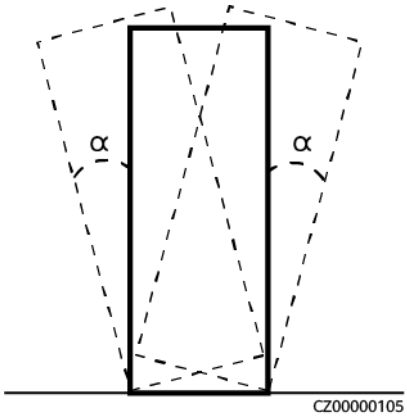
- When performing operations over the top of the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.



- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from scratching the surface of the equipment or damaging the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- When transporting the equipment using a pallet truck, ensure that the forks are properly positioned so that the equipment does not topple. Before moving the equipment, secure it to the pallet truck using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Transport the equipment by sea or on roads with good conditions. Minimize jolt and tilt during transportation.
- Ensure that tilt angle of the cabinet meets the requirements shown in the figure. The tilt angle α of the packed cabinet must be less than or equal to 15°. After the cabinet is unpacked, its tilt angle α must be less than or equal to 10°.



Working at Heights

- Any operations performed 2 meters or higher above the ground must be supervised properly.
- Only trained and qualified personnel are allowed to work at heights.
- Do not work at heights when steel pipes are wet or other risky situations exist. After the preceding conditions no longer exist, the safety owner and relevant technical personnel need to check the involved equipment. Operators can begin working only after safety is confirmed.
- Set a restricted area and prominent signs for working at heights to warn irrelevant personnel away.
- Set guard rails and warning signs at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other objects on the ground under the area involving working at heights. Do not stay or pass under the area involving working at heights.
- Carry operation machines and tools properly to prevent equipment damage or personal injury caused by falling objects.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects shall be transported by slings, hanging baskets, aerial work platforms, or cranes.
- Do not perform operations on the upper and lower layers at the same time. If unavoidable, install a dedicated protective shelter between the upper and lower layers or take other protective measures. Do not pile up tools or materials on the upper layer.
- Dismantle the scaffolding from top down after finishing the job. Do not dismantle the upper and lower layers at the same time. When removing a part, ensure that other parts will not collapse.
- Ensure that personnel working at heights strictly comply with the safety regulations. The Company is not responsible for any accident caused by violation of the safety regulations on working at heights.
- Behave cautiously when working at heights. Do not rest at heights.

Using Ladders

- Use wooden or insulated ladders when you need to perform live-line working at heights.

- Platform ladders with protective rails are preferred. Single ladders are not recommended.
- 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 and held firm.

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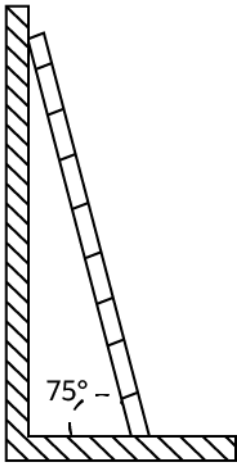
- When climbing up the ladder, keep your body stable and your center of gravity between the side rails, and do not overreach to the sides.
- When a step ladder is used, ensure that the pull ropes are secured.
- If a single ladder is used, the recommended angle for the ladder against the floor is 75 degrees, as shown in the following figure. A square can be used to measure the angle.



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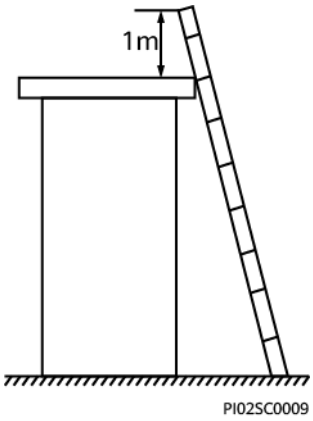
- If a single ladder is used, ensure that the wider end of the ladder is at the bottom, and take protective measures to prevent the ladder from sliding.
- If a single ladder is used, do not climb higher than the fourth rung of the ladder from the top.
- If you use a single ladder to climb up to a platform, ensure that the ladder is at least 1 m higher than the platform.



1.5 Battery Safety

DANGER

Do not connect the positive and negative poles of a battery together. Otherwise, the battery may be short-circuited. Battery short circuits can generate high instantaneous current and release a large amount of energy, which may cause battery leakage, smoke, flammable gas release, thermal runaway, fire, or explosion. To avoid battery short circuits, do not maintain batteries with power on.

DANGER

Do not expose batteries at high temperatures or around heat sources, such as scorching sunlight, fire sources, transformers, and heaters. Battery overheating may cause leakage, smoke, flammable gas release, thermal runaway, fire, or explosion.

DANGER

Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire.

DANGER

To avoid leakage, smoke, flammable gas release, thermal runaway, fire, or explosion, do not disassemble, alter, or damage batteries, for example, insert foreign matter into batteries, squeeze batteries, or immerse batteries in water or other liquids.

DANGER

There is a risk of fire or explosion if the model of the battery in use or used for replacement is incorrect. Use a battery of the model recommended by the vendor.

DANGER

Battery electrolyte is toxic and volatile. Do not get contact with leaked liquids or inhale gases in the case of battery leakage or odor. In such cases, stay away from the battery and contact professionals immediately. Professionals must wear safety goggles, rubber gloves, gas masks, and protective clothing, power off the equipment, remove the battery, and contact technical engineers.

DANGER

A battery is an enclosed system and will not release any gases under normal operations. If a battery is used improperly, for example, burnt, needle-pricked, squeezed, struck by lightning, overcharged, or subject to other adverse conditions that may cause battery thermal runaway, the battery may be damaged or an abnormal chemical reaction may occur inside the battery, resulting in electrolyte leakage or release of gases such as CO and H_2. To prevent fire or equipment corrosion, ensure that flammable gases are properly exhausted.

DANGER

The gases generated by a burning battery may irritate your eyes, skin, and throat. Take protective measures.

WARNING

Install batteries in a dry area. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.

WARNING

Before installing and commissioning batteries, prepare fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers, according to construction standards and regulations. Before putting into operation, ensure that fire fighting facilities that comply with local laws, regulations are installed.

WARNING

During storage or transportation, or before unpacking, ensure that the packing cases are intact and the batteries are correctly placed according to the labels on the packing cases. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cases. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

WARNING

After unpacking batteries, place them in the required direction. Do not place a battery upside down, lay it on one side, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

WARNING

Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.

WARNING

After batteries are discharged, charge them in time to avoid damage due to overdischarge.

Statement

The Company shall not be liable for any battery damage, personal injury, death, property loss, and/or other consequences caused by the following reasons:

- Force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions
- The battery warranty period has expired.
- Actions that do not follow instructions in the user manual or direct advice from the Company, including but not limited to the following scenarios:
  - The onsite equipment operating environment or external power parameters do not meet the environment requirements for normal operation, for example, the actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.

- Batteries are dropped or incorrectly operated or connected.
- Batteries are overdischarged due to delayed acceptance or power-on after battery installation.
- Battery running parameters are incorrectly set.
- Different types of batteries, for example, batteries of different brands or rated capacities, are used together without prior approval from the Company.
- Batteries are frequently overdischarged due to improper battery maintenance.
- Battery use scenarios are changed without prior approval from the Company.
- Battery maintenance is not performed according to the instructions in the user manual, for example, failing to check battery terminals regularly.
- Batteries are not transported, stored, or charged according to the instructions in the user manual.
- Instructions from the Company are not followed during battery relocation or reinstallation.

General Requirements

NOTICE

To ensure battery safety and battery management accuracy, use batteries provided by the Company. The Company is not responsible for any faults of batteries provided by other vendors.

- Before installing, operating, and maintaining batteries, read the battery vendor's instructions and comply with their requirements. The safety precautions specified in this document are highly important and require special attention. For additional safety precautions, see the instructions provided by the battery vendors.
- Use batteries within the specified temperature range. When the ambient temperature of the batteries is lower than the allowed range, do not charge the batteries to prevent internal short circuits caused during low-temperature charging.
- Do not reversely connect the positive and negative battery terminals. Otherwise, a battery alarm will be generated and batteries may be damaged.
- To prevent dust buildup that may damage the equipment, install battery modules after dust-prone operations in the equipment room are completed.
- Do not short-circuit a battery. A short circuit will trigger battery protection. Repeated short circuits may lead to battery faults and other risks including fire.
- Batteries cannot be connected in series. Connecting them in series will trigger battery protection and may cause battery damage or other risks including fire.
- Before unpacking batteries, check whether the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.

- Do not unpack batteries in an environment where the temperature and humidity are uncontrollable. Before unpacking batteries, keep them still for 24 hours in an environment where the temperature and humidity are under control.
- In an indoor scenario, you are advised to power on a battery within seven days after unpacking. If the battery cannot be powered on in time, put it in the original packing case and place it in a dry indoor environment without corrosive gas.
- In an outdoor scenario, you are advised to power on batteries within 24 hours after unpacking. If the batteries cannot be powered on in time, put them in the original packaging and place them in a dry indoor environment without corrosive gases.
- Do not use a damaged battery (such as damage caused when a battery is dropped, bumped, bulged, or dented on the enclosure), because the damage may cause electrolyte leakage or flammable gas release. In the case of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other devices or flammable materials and keep it away from non-professionals.
- Before working on a battery, ensure that there is no irritating or burning smell around the battery.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, remove the objects from the batteries and the surrounding area.
- To safeguard against water intrusion and subsequent battery carbonization, ensure that the bottom of a battery remains more than 10 cm above ground level.
- If a battery is accidentally exposed to water, do not install it. Move it to a safe place for isolation and contact technical engineers in a timely manner.
- Check whether the positive and negative battery terminals are grounded unexpectedly. If so, disconnect the battery terminals from the ground.
- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.
- If batteries will not be used for a long period of time, store and charge them according to the battery requirements.
- Do not charge or discharge batteries by using a device that does not comply with local laws and regulations.
- Keep the battery loop disconnected during installation and maintenance.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.
- If a battery is faulty, its surface temperature may be high. Do not touch the battery to avoid scalds.
- The actual specifications may vary depending on external factors, such as temperature, transportation, and storage.

Short-Circuit Protection

- When installing and maintaining batteries, wrap the exposed cable terminals on the batteries with insulation tape.

- Avoid foreign objects (such as conductive objects, screws, and liquids) from entering a battery, because this may cause short circuits.

Leakage Handling

NOTICE

Electrolyte overflow may damage the equipment. It will corrode metal parts and boards, and ultimately damage the boards.

Electrolyte is corrosive and can cause irritation and chemical burns. If you come into direct contact with the battery electrolyte, do as follows:

- Inhalation: Evacuate from contaminated areas, get fresh air immediately, and seek immediate medical attention.
- Eye contact: Immediately wash your eyes with water for at least 15 minutes, do not rub your eyes, and seek immediate medical attention.
- Skin contact: Wash the affected areas immediately with soap and water and seek immediate medical attention.
- Intake: Seek immediate medical attention.

Recycling

- 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 or an explosion.
- If a battery leaks or is damaged, contact technical support or a battery recycling company for disposal.
- If batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose waste batteries to high temperatures or direct sunlight.
- Do not place waste batteries in environments with high humidity or corrosive substances.
- Do not use faulty batteries. Contact a battery recycling company to scrap them as soon as possible to avoid environmental pollution.

2 Overview

2.1 Introduction

The ETP48200-B2A1 is an embedded power system that supplies power to –48 V DC telecom equipment. It has a maximum output current of 200 A.

2.2 System Features

- Supports AC or HVDC input. AC input voltage range: 85–300 V AC; HVDC input voltage range: 85–420 V DC
- Comprehensive battery management
- One northbound FE port, one southbound RS485 port, and one CAN port on SMU11B; one northbound RS485 port, one southbound RS485 port, and one CAN port on SMU11C
- Communication and alarm functions; remote monitoring and online upgrade
- Hot-swappable rectifiers and monitoring module

2.3 System Configurations

Table 2-1 System configuration

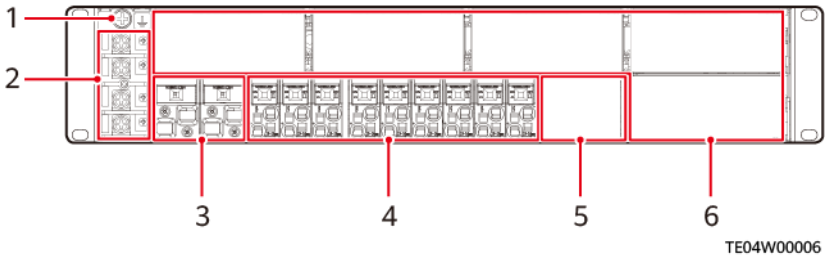
Item	System Configuration
Subrack	2 U power system

Item	System Configuration
Power distribution unit (PDU)	• AC or DC input: M6 OT wiring terminal • DC output: supports a maximum of two 80 A circuit breakers or four 63 A and two 40 A circuit breakers. • Battery route: A maximum of two 100 A circuit breakers are supported. **NOTE** When the circuit breaker is switched off, the –48 V (–) circuit is disconnected, and the RTN (+) circuit is connected.
Rectifier	A maximum of five R4830G1s, R4815G1s, (R4830G1 and R4815G1 support HVDC input) can be configured.
Monitoring module	SMU11B or SMU11C

3 Components

3.1 Appearance

Figure 3-1 Appearance

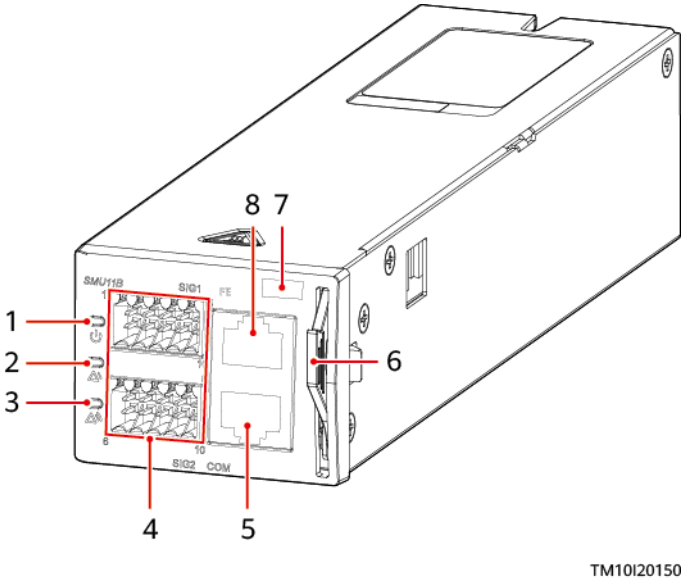


(1) Ground screw
(2) Input terminals
(3) Battery circuit breakers
(4) Load circuit breakers
(5) Space for SMU
(6) Space for rectifiers

3.2 SMU11B

Appearance

Figure 3-2 SMU11B appearance



(1) Running indicator (2) Minor alarm indicator (3) Major alarm indicator

(4) Wiring terminals (5) Communications port COM (6) Handle

(7) Position of the SN code (8) Communications port FE

Indicators

Table 3-1 Indicator description

Name	Color	Status	Description
Running indicator	Green	Off	The SMU is faulty or has no power input.
		Blinking slowly (0.5 Hz)	The SMU is running 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 alarm or warning is generated.
		Steady on	A minor alarm or warning is generated.

Name	Color	Status	Description
Major alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

Wiring Terminals

Figure 3-3 Wiring terminals

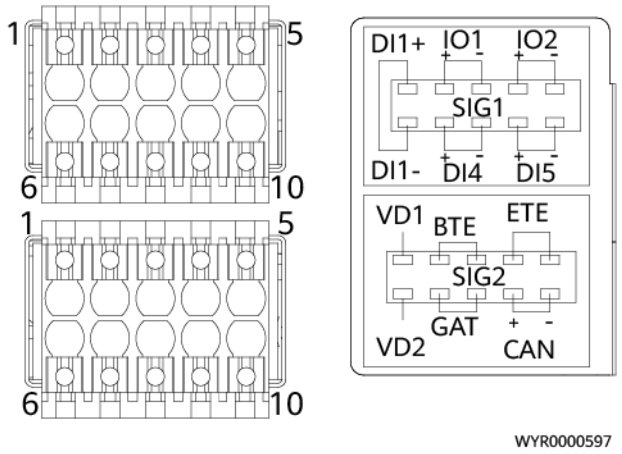


Table 3-2 Pin definitions for SIG1 wiring terminals

Pin	Signal	Description
1	DI1+	Dry contact input
6	DI1-	
7	DI4+	
8	DI4-	
9	DI5+	
10	DI5-	
2	IO1+	Dry contact input/Dry contact output (When used as a dry contact input, the alarm condition is as follows: normal when open, alarm when closed. When used as a dry contact output, the alarm action is as follows: open when normal, closed when alarm.)
3	IO1-	
4	IO2+	
5	IO2-	

Table 3-3 Pin definitions for SIG2 wiring terminals

Pin	Signal	Description
1	VD1	Battery midpoint voltage detection port 1
6	VD2	Battery midpoint voltage detection port 2
2	BTE	Battery temperature sensor port
3		
4	ETE	Ambient temperature sensor port
5		
7	GAT	Door status sensor port
8		
9	CAN+	CAN communications port
10	CAN-	

Communications Ports

Table 3-4 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
COM	Baud rate: 9600 bit/s, 19200 bit/s, 115200 bit/s autonegotiation	Master/slave protocol	Connects to a Huawei NMS.
		-	Provides 12 V power supply for external devices.
FE	10M/100M autonegotiation	SNMP	Connects to a third-party management system.
		BIN protocol	Connects to a Huawei NMS.
		HTTPS protocol	Connects to a PC and manages the SMU through the WebUI.
NOTE All these ports are protected by a security mechanism.			

Figure 3-4 Pins in the COM port

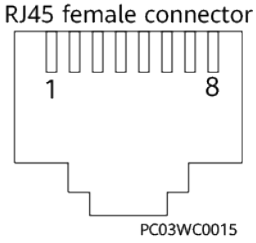


Table 3-5 Pin definitions for the COM port

Pin	Signal	Description
1	RS485+	RS485 data, positive
2	RS485-	RS485 data, negative
3	12V	Supply power
4	RS485+	RS485 data, positive
5	RS485-	RS485 data, negative
6	SCL	I^2C clock
7	SDA	I^2C data
8	GND	Ground

Figure 3-5 Pins in the FE port

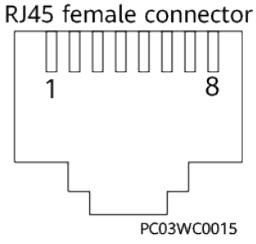


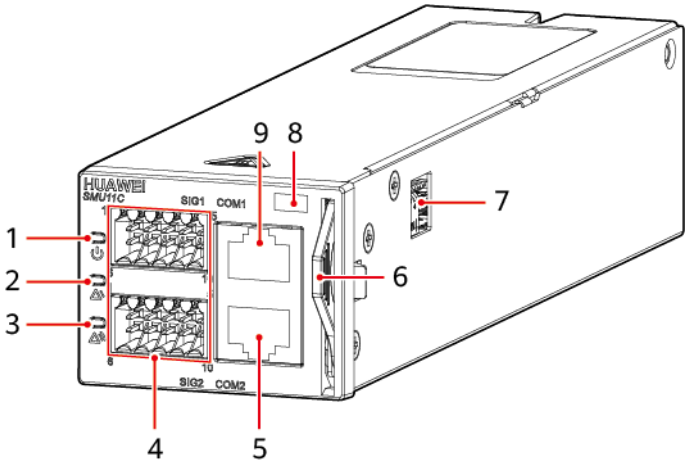
Table 3-6 Pin definitions for the FE port

Pin	Signal	Description
1	TX+	Transmits data over FE.
2	TX-	
3	RX+	Receives data over FE.
6	RX-	

Pin	Signal	Description
4, 5, 7 and 8	N/A	-

3.3 Monitoring Module SMU11C

Figure 3-6 SMU11C



(1) Running indicator
(2) Minor alarm indicator
(3) Major alarm indicator
(4) Wiring terminals
(5) Communications port COM2
(6) Handle
(7) DIP switch
(8) Position of the SN code
(9) Communications port COM1

Indicators

Table 3-7 Indicator description

Item	Color	Status	Description
Running indicator	Green	Off	The SMU is faulty or has no power 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 alarm or warning is generated.

Item	Color	Status	Description
		Steady on	A minor alarm or warning is generated.
Major alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

DIP switch

The DIP switch is used to set the northbound RS485 communications address.

Figure 3-7 DIP switch

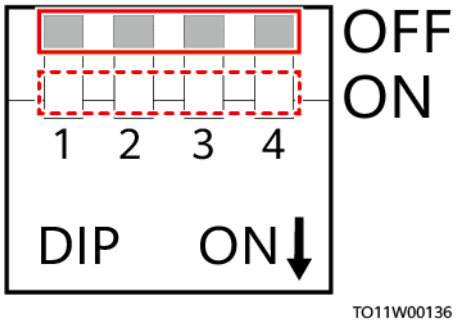


Table 3-8 DIP switch settings

SMU Address	Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON

SMU Address	Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

Wiring Terminals

Figure 3-8 Wiring terminals

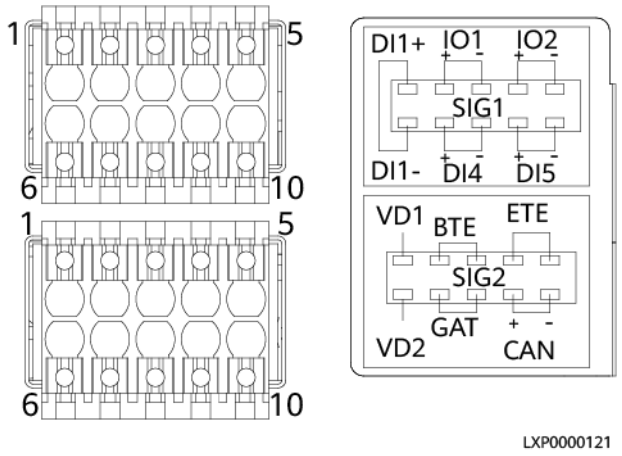


Table 3-9 Terminals on the panel

Pin	Signal	Description
1	DI1+	Input dry contact
6	DI1-	
2	IO1+	Dry contact input/Dry contact output (When the pin is used as an input dry contact, the alarm condition is as follows: No alarm is generated when the dry contact is open, and an alarm is generated when the dry contact is closed. When the pin is used as an output dry contact, the alarm condition is as follows: The dry contact is open when no alarm is generated, and the dry contact is closed when an alarm is generated.)
3	IO1-	

Pin	Signal	Description
4	IO2+	Dry contact input/Dry contact output (When the pin is used as an input dry contact, the alarm condition is as follows: No alarm is generated when the dry contact is open, and an alarm is generated when the dry contact is closed. When the pin is used as an output dry contact, the alarm condition is as follows: The dry contact is open when no alarm is generated, and the dry contact is closed when an alarm is generated.)
5	IO2-	
7	DI4+	Input dry contact
8	DI4-	
9	DI5+	Input dry contact
10	DI5-	

Table 3-10 Pin definition

Pin	Signal	Description
1	VD1	Midpoint voltage detection port 1
6	VD2	Midpoint voltage detection port 2
2	BTE	Battery temperature sensor port
3		
4	ETE	Ambient temperature sensor port
5		
7	GAT	Door status sensor port
8		
9	CAN+	CAN communications port
10	CAN-	

Communications Ports

Table 3-11 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
COM1	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Master/Slave protocol	Northbound communication port, connecting to the upper-layer NMS
COM2	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Master/Slave protocol	Southbound and northbound multiplexing communication port • Connects to a Huawei NMS. • Connects to Huawei lower-level devices.
NOTE All the preceding ports are protected by security mechanisms.			

Figure 3-9 Pins in the COM port

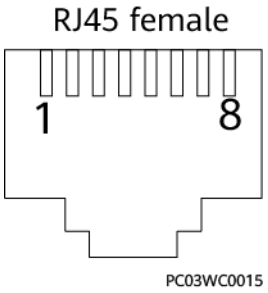


Table 3-12 Pin definitions for the COM1 port

Pin	Signal	Description
1	TX+	Transmit data over RS485.
2	TX-	
3	Null	-
4	RX+	Receive data over RS485.
5	RX-	

Pin	Signal	Description
6	PGND	Protective earthing (PE)
7	Null	-
8	Null	-

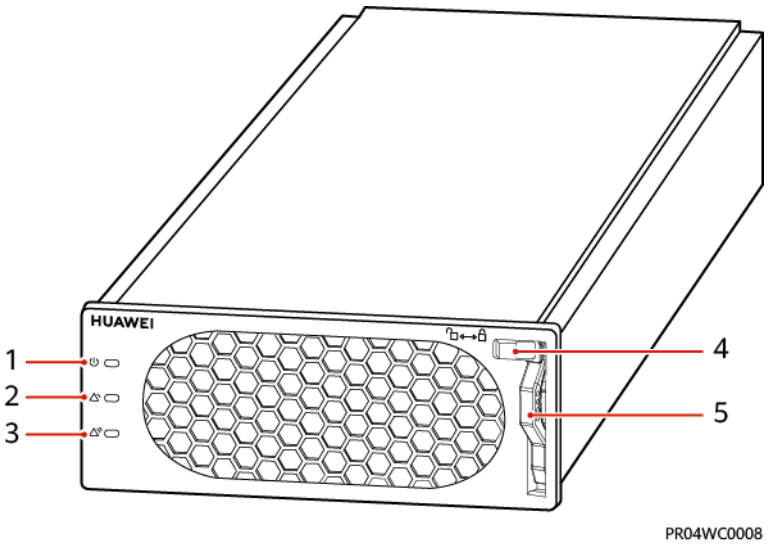
Table 3-13 Pin definitions for the COM2 port

Pin	Signal	Description
1	TX+	Transmit data over RS485.
2	TX-	
3	12V	12 V output (rated current: 500 mA)
4	RX+	Receive data over RS485.
5	RX-	
6	I^2C_SCL	I^2C clock signal
7	I^2C_SDA	I^2C data signal
8	PGND	PE

3.4 Rectifier

A rectifier converts AC input power into stable DC power.

Figure 3-10 Appearance



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) Locking latch (5) Handle

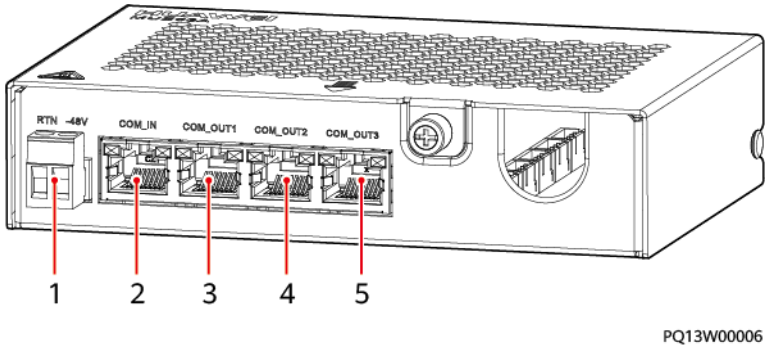
Table 3-14 Indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The rectifier has an AC input.
		Off	The rectifier has no AC input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4 Hz	The rectifier is loading an application program.
Alarm indicator	Yellow	Off	No alarm is generated.
		Steady on	• A warning is generated due to ambient overtemperature. • The rectifier has generated a protection shutdown alarm due to ambient overtemperature or undertemperature.
			AC input overvoltage or undervoltage protection has been triggered.
			The rectifier is in hibernation state.
		Blinking at 0.5 Hz	The communication between the rectifier and the external device is interrupted.
Fault indicator	Red	Off	The rectifier is normal.
		Steady on	The rectifier locks out due to output overvoltage.
			The rectifier has no output due to an internal fault.

3.5 Expansion Box MUE03A

Appearance

Figure 3-11 MUE03A appearance



(1) Power input port

(2) Communications port COM_IN

(3) Communications port COM_OUT1

(4) Communications port COM_OUT2

(5) Communications port COM_OUT3

Power Input Port

Table 3-15 Pin definitions for the power input port

Pin	Description
RTN	Power supply +
-48V	Power supply –

Communications Ports

Table 3-16 Communications port description

Communications Ports	Communications Parameter	Communications Protocol	Function
COM_IN	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Modbus protocol	Connects to the monitoring module.
COM_OUT1	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Modbus protocol	Connects to intelligent equipment.
COM_OUT2			
COM_OUT3			

Communications Ports	Communications Parameter	Communications Protocol	Function
NOTE All these ports are protected by a security mechanism.			

Figure 3-12 COM port pins

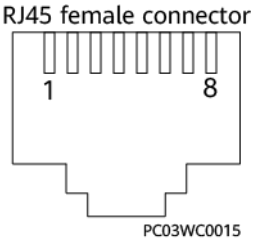


Table 3-17 Pin definitions for the COM_IN port

Pin	Signal	Description
1	RS485+	RS485 data +
2	RS485-	RS485 data –
3	12 V	Power supply
4	RS485+	RS485 data +
5	RS485-	RS485 data –
6	I^2C_SCL	I^2C clock signal
7	I^2C_SDA	I^2C data signal
8	GND	Ground (PE)

Table 3-18 Pin definitions for the COM_OUT1, COM_OUT2, and COM_OUT3 ports

Pin	Signal	Description
1	RS485+	RS485 data +
2	RS485-	RS485 data –
3	12 V	Power supply
4	RS485+	RS485 data +
5	RS485-	RS485 data –
6	Reserved	-

Pin	Signal	Description
7	Reserved	-
8	GND	Ground (PE)

Wiring Terminals

The MUE03A provides dry contact inputs, dry contact outputs, water sensor input, smoke sensor input, and 12 V power outputs. The wiring terminals are located inside the MUE03A.

Figure 3-13 Wiring terminals (without the panel, top view)

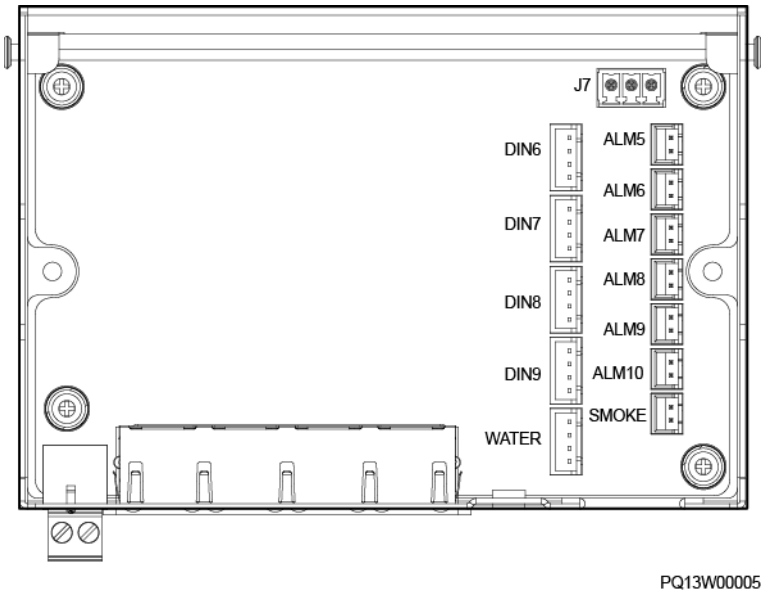


Figure 3-14 DIN and WATER pin definitions

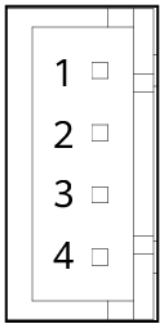


Table 3-19 DIN and WATER pin definitions

Terminal	Pin	Signal	Description
DIN6–DIN9	1	12 V	12 V output
	2	12 V	12 V output
	3	DIN N	Dry contact input
	4	GND	Ground (PE)
WATER	1	12 V	12 V output
	2	WATER	Water sensor signal input
	3	GND	Ground (PE)
	4	Reserved	–

Figure 3-15 ALM and SMOKE pin definitions

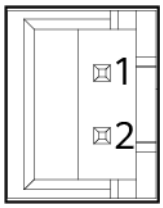


Table 3-20 ALM and SMOKE pin definitions

Terminal	Pin	Signal	Description
ALM5–ALM10	1	ALM+	Dry contact output +
	2	ALM-	Dry contact output –
SMOKE	1	SMOKE	Smoke sensor signal input
	2	12 V	12 V output

Figure 3-16 J7 pin definitions

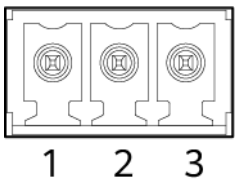


Table 3-21 J7 pin definitions

Terminal	Pin	Signal	Description
J7	1	12 V	12 V output
	2	GND	Ground (PE)
	3	Reserved	–

4 Installation

4.1 Installation Preparations

4.1.1 Cables

The cross-sectional area of a power cable depends on the current that will flow through and the voltage drop allowed for the cable.

The cable cross-sectional areas listed are for reference only.

Table 4-1 Cables

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area (mm^2)	Maximum Cross-Sectional Area (mm^2)
PE cable		-	10	25
AC input power cable (Three-Phase, Four-Wire)	Live wire L1, L2, L3	21.2	2.5	16
	Neutral wire N	21.2	2.5	16
AC input power cable (Single-Phase, Dual-Live Wire, HVDC)	Live wire L, L1, HVDC+	53	10	16
	Neutral wire N, Live wire L2, HVDC-	53	10	16

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area (mm^2)	Maximum Cross-Sectional Area (mm^2)
DC output power cable	-	16	1.5	16
		20	2.5	16
		32	4	16
		40	6	16
		50	10	16
		63	10	16
		80	16	35
		100	25	35
Battery cable		100	25	35

NOTE

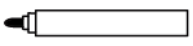
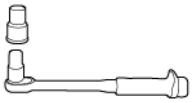
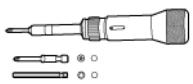
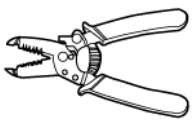
- The data in the table is applicable when the ambient temperature is 30°C (in air) and cables are in a single loop.
- When the ambient temperature is not 30°C or cables in multiple loops are routed together, use cables with larger cross-sectional areas if the cabling distance is long.
- Battery cables should be able to withstand a temperature of at least 90°C.

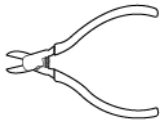
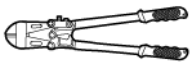
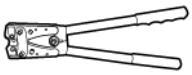
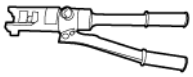
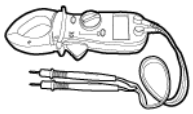
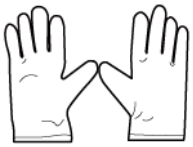
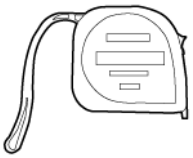
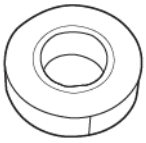
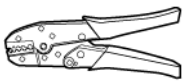
4.1.2 Tools

NOTICE

Use tools with insulated handles. The following table is for reference only.

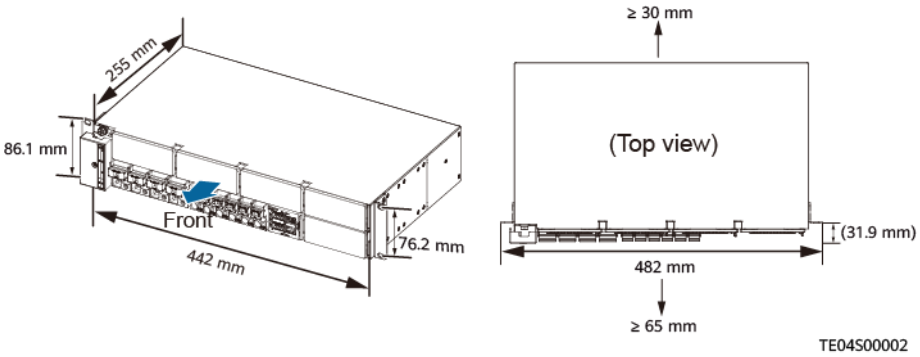
Table 4-2 Installation tools and instruments

 Utility knife	 Marker	 Phillips screwdriver (M4.5 and M5)	 Flat-head screwdriver	 Torque wrench
 Combination wrench	 Adjustable wrench	 Socket wrench	 Torque screwdriver	 Wire stripper

 Diagonal pliers	 Wire clippers	 Power cable crimping tool	 Hydraulic pliers	 Heat gun
 Clamp meter	 ESD wrist strap	 ESD gloves	 Protective gloves	 Steel measuring tape
 Heat shrink tubing	 PVC insulation tape	 Crimping tool	 Cord end terminal crimper	

4.1.3 Installation Dimensions

Figure 4-1 Installation dimensions



NOTE

- 31.9 mm indicates that the distance between a power subrack mounting ear and the front of the subrack is about 31.9 mm.
- When installing subracks, ensure to reserve enough space for personnel to install cables.

4.1.4 Requirements for Cable Routing

- Ensure that cables are more than 20 mm away from heat sources to prevent damage (melting, aging, or breakage) to the cable insulation layer.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- 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.

- Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- Route and bind ground cables and signal cables separately.
- Route and bind AC power cables, DC power cables, signal cables, and communications cables separately.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.

4.2 Installing a Subrack

DANGER

Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

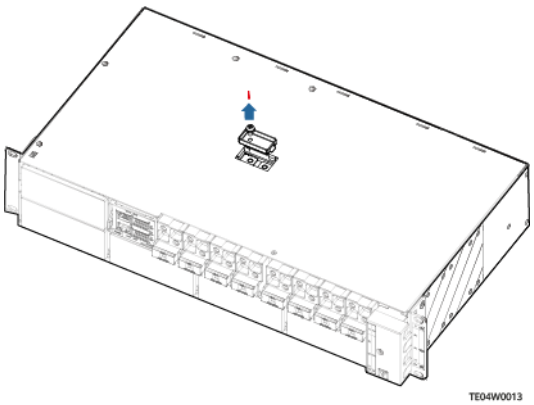
NOTICE

- To prevent the equipment from falling over, secure it to a pallet truck using ropes before moving it. Exercise caution when moving the equipment to avoid bumping or falling. Otherwise, the equipment may be damaged.
- After placing the equipment in the installation position, unpack it and take care to prevent scratches. Keep the equipment stable during unpacking.
- After unpacking, check whether the fastening components and removable components are loose. If they are loose, notify the carrier and manufacturer immediately.

Procedure

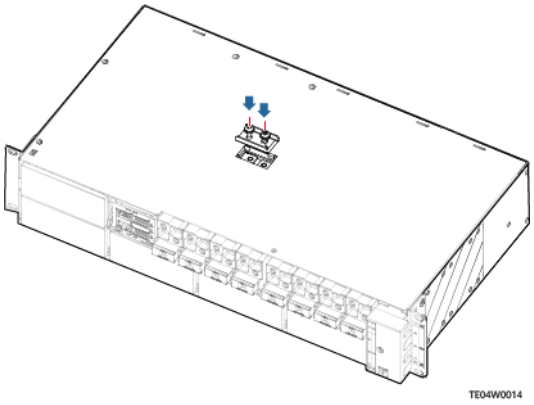
Step 1 (Optional) Remove the cover of the RTN ground bar at the bottom of the subrack.

Figure 4-2 Removing the cover of the RTN ground bar at the bottom of the subrack



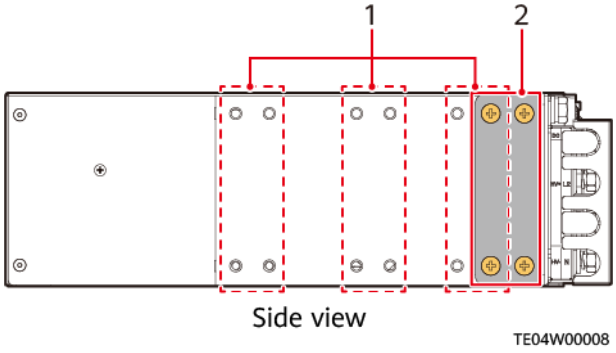
Step 2 (Optional) Install an RTN ground cable.

Figure 4-3 Install an RTN ground cable



Step 3 (Optional) Relocate the mounting ears based on the cabinet depth.

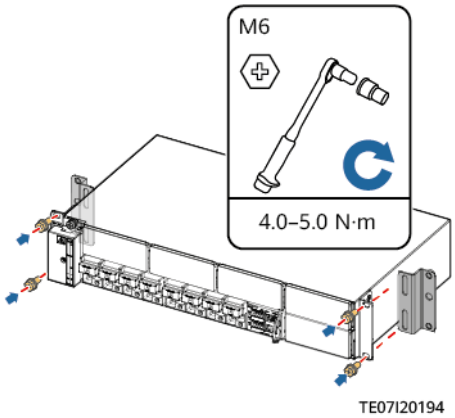
Figure 4-4 Installation positions of mounting ears



(1) Adjustable positions (2) Default position

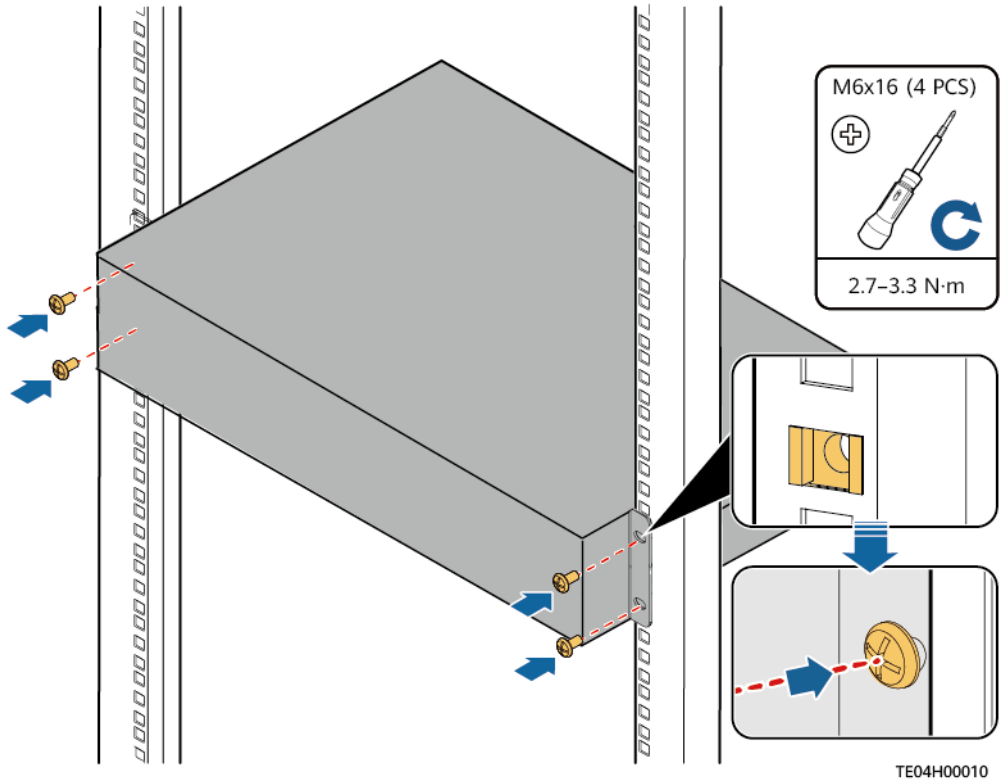
Step 4 (Optional) When installing on an ETSI rack, ensure to use the ETSI mounting ears.

Figure 4-5 Installing ETSI mounting ears



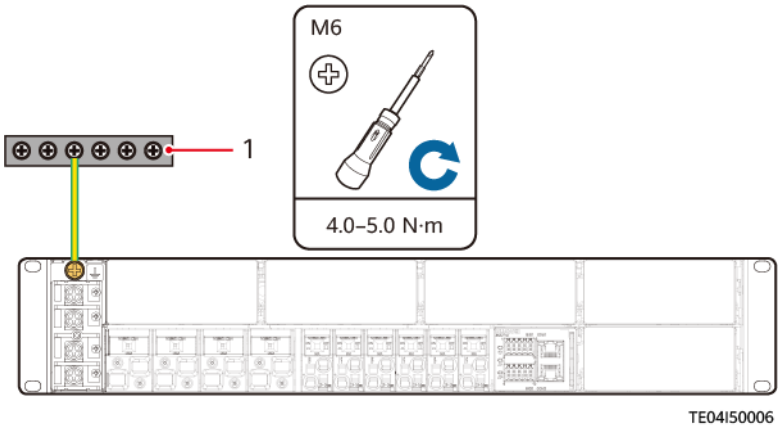
Step 5 Install the subrack in a 19-inch rack.

Figure 4-6 Installing a subrack



Step 6 Installing a ground cable.

Figure 4-7 Installing a ground cable



(1) Site ground bar

----End

4.3 Installing Components

DANGER

Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

NOTICE

- To prevent the equipment from falling over, secure it to a pallet truck using ropes before moving it. Exercise caution when moving the equipment to avoid bumping or falling. Otherwise, the equipment may be damaged.
- After placing the equipment in the installation position, unpack it and take care to prevent scratches. Keep the equipment stable during unpacking.
- After unpacking, check whether the fastening components and removable components are loose. If they are loose, notify the carrier and manufacturer immediately.

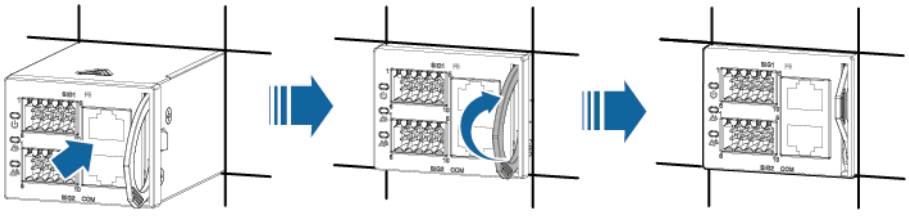
4.3.1 Installing an SMU11B

Procedure

Step 1 Insert the SMU11B into the slot and slide it into the subrack along the guide rails.

Step 2 Push the SMU11B handle upwards until it is in place.

Figure 4-8 Installing an SMU11B



----End

4.3.2 Installing an SMU11C

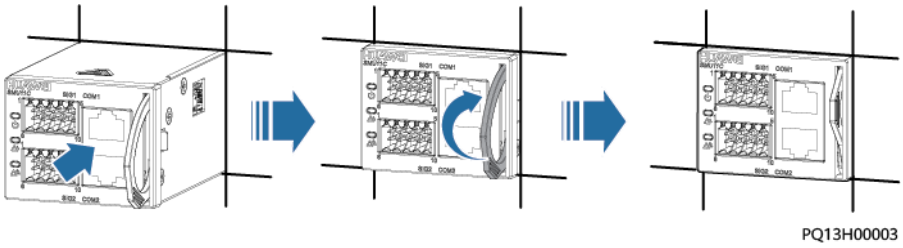
Procedure

Step 1 Set the DIP switch based on the assigned address.

Step 2 Insert the SMU11C into the slot and slide it into the subrack along the guide rails.

Step 3 Push the SMU11C handle upwards until it is in place.

Figure 4-9 Installing an SMU11C



----End

4.3.3 Installing a Rectifier

Prerequisites

- The rectifier is intact after being unpacked.
- The filler panel has been removed from the rectifier slot.

NOTICE

- If the rectifier is damaged, contact your local office.
- The rectifier slot presents a risk of electric shock. Do not touch the slot with your hands.
- High temperature is generated around the air exhaust vent when the rectifier is running. Do not touch the vent with your hands or cover the vent with cables or other objects.
- In an outdoor scenario, you are advised to power on the module within 24 hours after unpacking. If the module cannot be powered on in time, place it in a dry indoor environment without corrosive gas.
- In an indoor scenario, you are advised to power on the module within seven days after unpacking. If the module cannot be powered on in time, place it in a dry indoor environment without corrosive gas.

Procedure

Step 1 Push the locking latch towards the left.

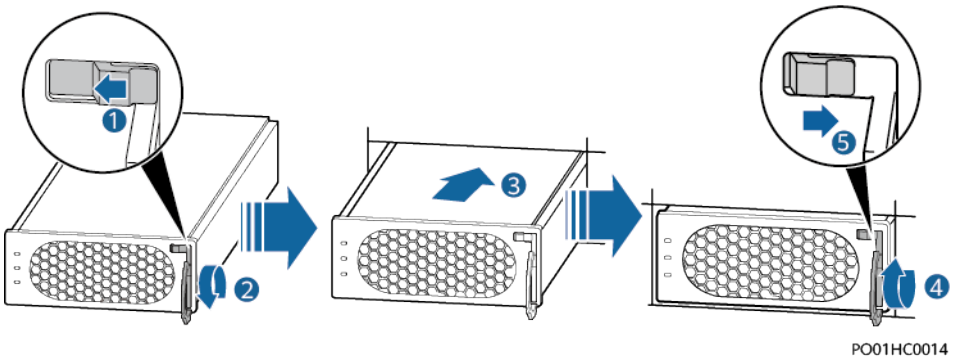
Step 2 Draw the handle downwards.

Step 3 Gently push the rectifier into its slot along the guide rails.

Step 4 Push the handle upwards.

Step 5 Push the locking latch towards the right to secure the handle.

Figure 4-10 Installing a rectifier



----End

4.4 Installing Cables

DANGER

Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

CAUTION

Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

NOTICE

- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are at least 30 mm away from each other without entanglement and overlapping.
- When routing cables, reserve at least 30 mm clearance between the cables and heat-generating components or areas. This prevents deterioration or damage to the cable insulation layer.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- Ensure that cables meet the VW-1 flame spread rating requirements.

4.4.1 (Optional) Installing a Dry Contact Signal Cable

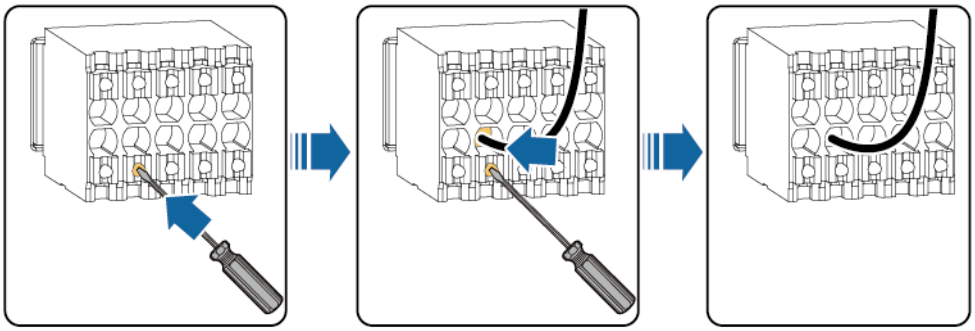
Procedure

Step 1 Use a flat-head screwdriver to hold the contact in a dry contact port.

Step 2 Install a signal cable in the dry contact port.

Step 3 Remove the screwdriver and check that the signal cable is securely connected to the dry contact.

Figure 4-11 Installing a dry contact signal cable



NOTE

Connect the output dry contacts to IO1 and IO2 ports.

----End

4.4.2 Installing Signal Cables for a Battery Temperature Sensor

Prerequisite

If a battery temperature sensor is required, perform the following steps to install the cable.

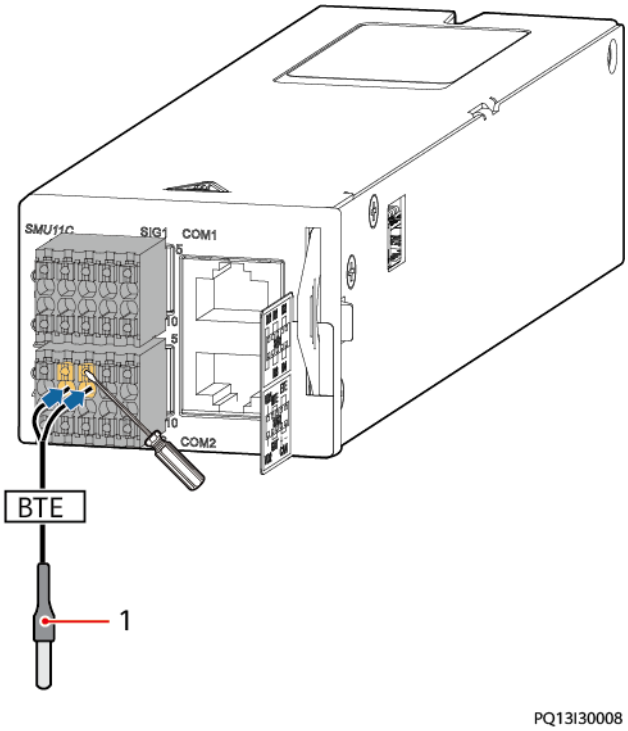
Procedure

Step 1 Connect the signal cable of the battery temperature sensor to the SIG2 port BTE on the SMU.

NOTICE

- Ensure that the metal probe of the temperature sensor is not in contact with a metal or an energized conductor.
- The battery temperature sensor should not be directly exposed to sunlight, be placed near an air vent or air conditioner vent, or come into direct contact with a heat source or cold source.

Figure 4-12 Installing signal cables for a battery temperature sensor



(1) Battery temperature sensor

----End

4.4.3 Installing Signal Cables for a Door Status Sensor

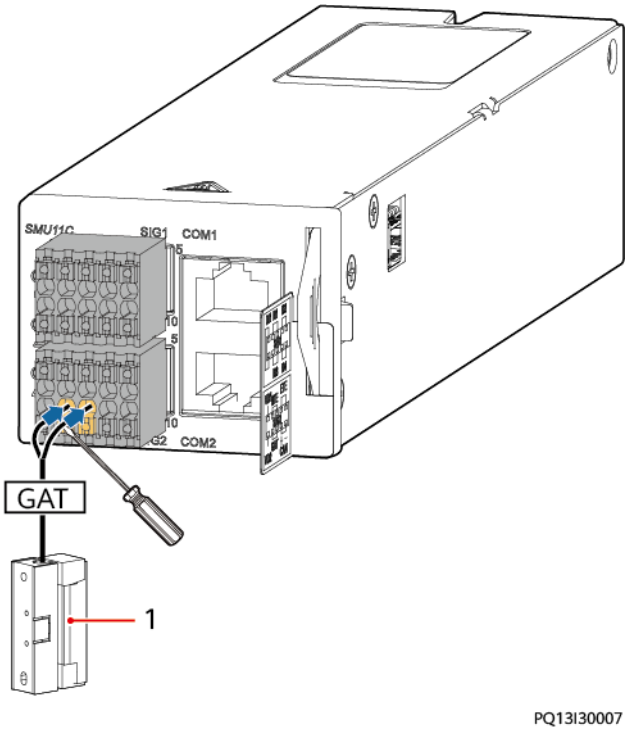
Prerequisite

If a door status sensor is required, perform the following steps to install the cable.

Procedure

Step 1 Connect the signal cable of the door status sensor to the SIG2 port GAT on the SMU.

Figure 4-13 Installing signal cables for a door status sensor



(1) Door status sensor

----End

4.4.4 Installing an Alarm Signal Cable for the Cable Distribution Frame

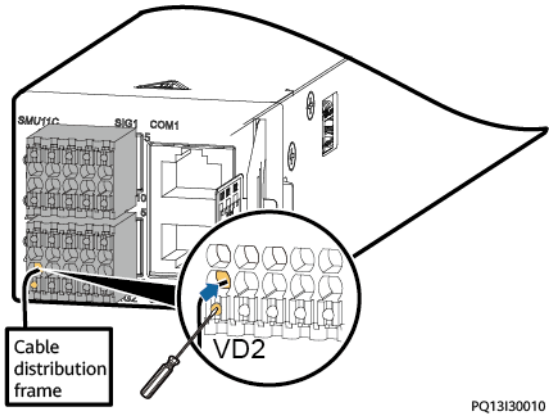
NOTE

Ensure that the RTN ground bar is installed.

Procedure

Step 1 Connect the alarm signal cable for the cable distribution frame to the VD2 port on the monitoring module.

Figure 4-14 Installing an Alarm Signal Cable for the Cable Distribution Frame



(1) Cable distribution frame

----End

4.4.5 Installing a Cable for the Expansion Box (SMU11B)

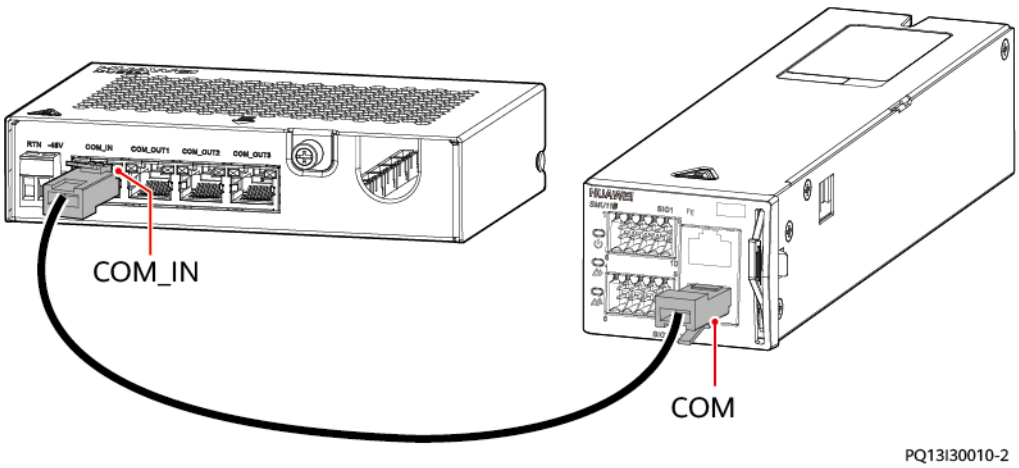
Prerequisites

If an expansion box is required, perform the following steps to install the cable.

Procedure

Step 1 Connect one end of a communications cable to the COM_IN port on the expansion box, and connect the other end to the COM2 port on the SMU.

Figure 4-15 Installing a cable for the expansion box



NOTE

Ensure that the expansion box side with holes does not face downwards.

----End

4.4.6 Installing a cable for the Expansion (SMU11C)

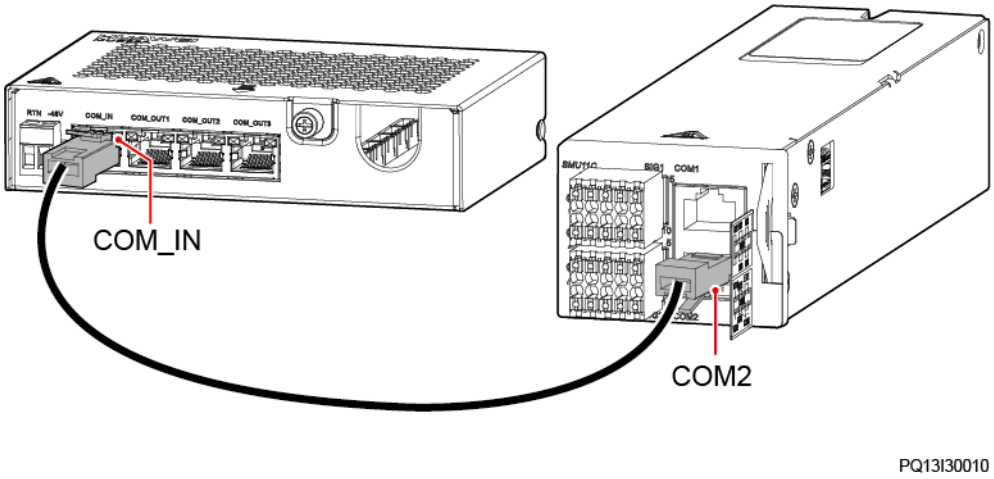
Prerequisites

If an expansion box is required, perform the following steps to install the cable.

Procedure

Step 1 Connect one end of a communications cable to the COM_IN port on the expansion box, and connect the other end to the COM2 port on the SMU.

Figure 4-16 Installing a cable for the expansion box



NOTE

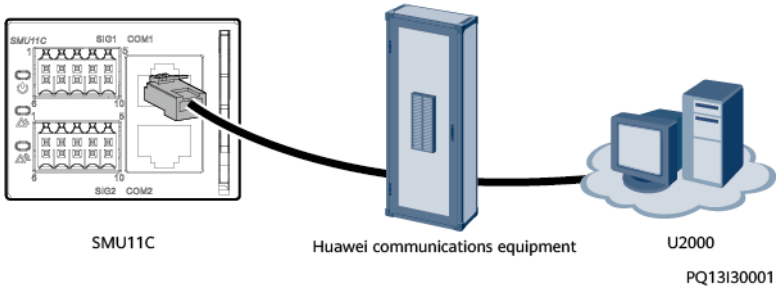
Ensure that the expansion box side with holes does not face downwards.

----End

4.4.7 Installing a Communications Cable (SMU11C)

When using the U2000 network management system to remotely manage the power system, connect the COM1 port on the SMU11C to the corresponding serial port on the Huawei access network equipment using a communications cable.

Figure 4-17 Installing a communications cable (SMU11C)

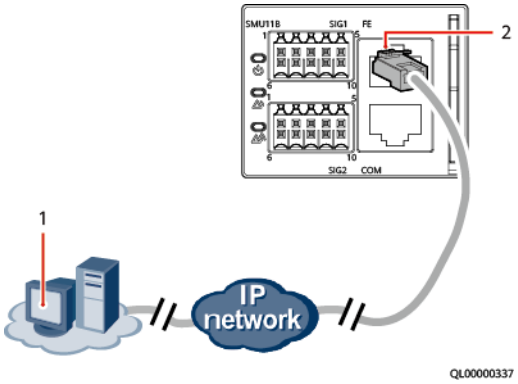


4.4.8 Installing a Communications Cable (SMU11B)

4.4.8.1 U2000 Management

Step 1 When using the U2000 network management system to remotely manage the power system, connect the FE port on the SMU11B to the corresponding serial port on the Huawei access network equipment using a communications cable.

Figure 4-18 Installing a communications cable (SMU11B)



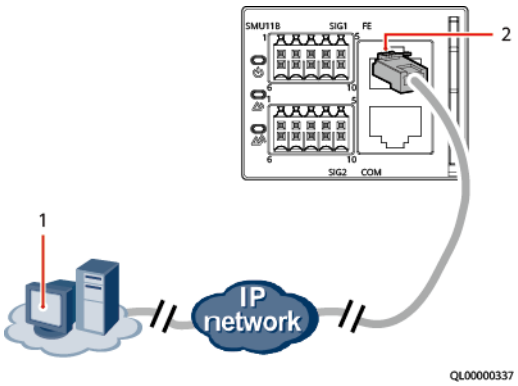
(1) User WebUI terminal (2) FE port on the SMU

----End

4.4.8.2 NetEco Management

Step 1 Connect the FE port on the SMU by using a network cable.

Figure 4-19 Connecting a communications cable (over the FE port)



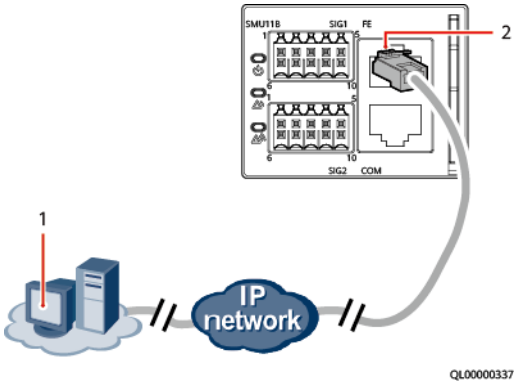
(1) NetEco terminal (2) FE port on the SMU

----End

4.4.8.3 Third-Party NMS Management (over SNMP)

Step 1 Connect the FE port on the SMU by using a network cable.

Figure 4-20 Connecting a communications cable (over SNMP)



(1) SNMP-based NMS terminal (2) FE port on the SMU

----End

4.4.9 Installing DC Output Power Cables

Installing DC Output Power Cables to Large Capacity Circuit Breakers

Step 1 Use cables (cross-sectional area: 10–35 mm^2) and cord end terminals to prepare DC output power cables.

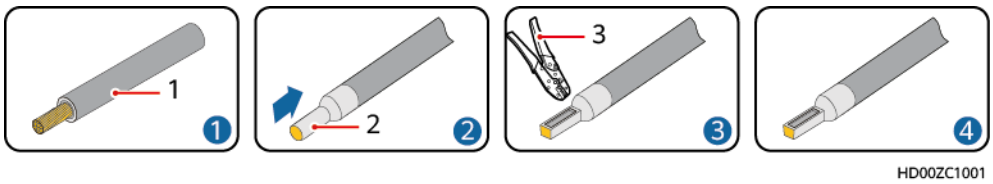
NOTE

The large capacity circuit breakers include but are not limited to 80 A, 100 A, and 125 A circuit breakers.

Table 4-3 Cables

Cross-Sectional Area	Recommended Cord End Terminal Specifications	Recommended Cable Types
10 mm^2	Pre-insulated and with an insertion depth of 18 mm	-
16 mm^2	Pre-insulated and with an insertion depth of 18 mm	-
25 mm^2	Pre-insulated and with an insertion depth of 18 mm	Super flexible cable
35 mm^2	Not pre-insulated and with an insertion depth of 18 mm	Super flexible cable

Figure 4-21 Preparing a cord end terminal



(1) Cable (2) Cord end terminal (3) Crimping tool

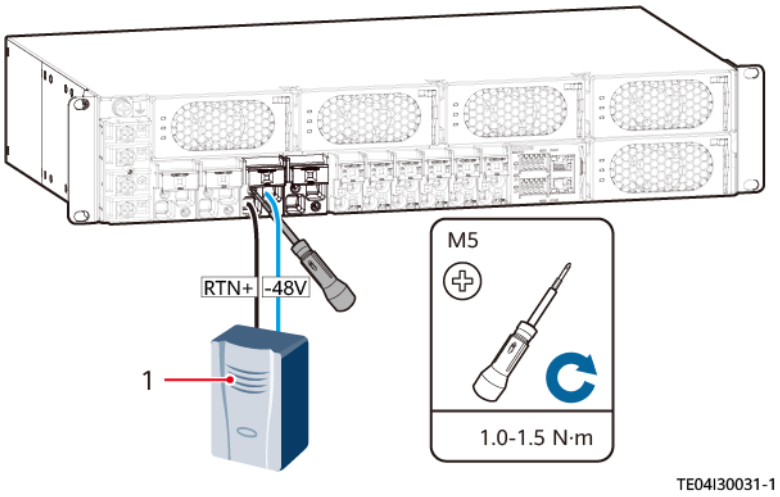
Step 2 Install DC output power cables.

CAUTION

- Connect cables to appropriate load circuit breakers based on the load capacity.
- Do not connect load cables to battery circuit breakers. Otherwise, the power system may break down.

1. Loosen the screws on the holes for the DC output circuit breakers.
2. Connect DC output power cables to corresponding holes of the DC output circuit breakers.
3. Tighten the screws on the holes for the DC output circuit breakers.

Figure 4-22 Installing DC output power cables



(1) DC load

----End

Installing DC Output Power Cables to Small Capacity Circuit Breakers

Step 1 Use cables (cross-sectional area: 0.75–16 mm^2) and cord end terminals to prepare DC output power cables.

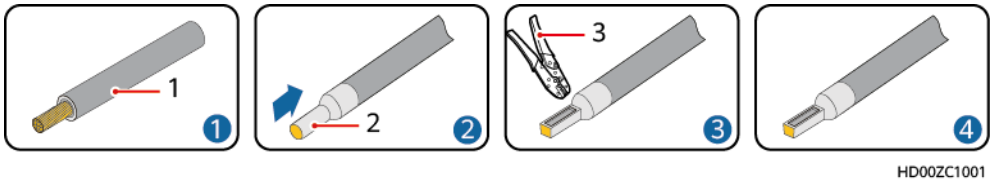
NOTE

The small capacity circuit breakers include but are not limited to 16 A, 32 A, and 63 A circuit breakers.

Table 4-4 Cables

Cross-Sectional Area	Recommended Cord End Terminal Specifications
0.75–6 mm^2	Pre-insulated and with an insertion depth of 12–18 mm^2
10 mm^2	Pre-insulated and with an insertion depth of 18 mm
16 mm^2	Not pre-insulated and with an insertion depth of 18 mm

Figure 4-23 Preparing a cord end terminal



(1) Cable (2) Cord end terminal (3) Crimping tool

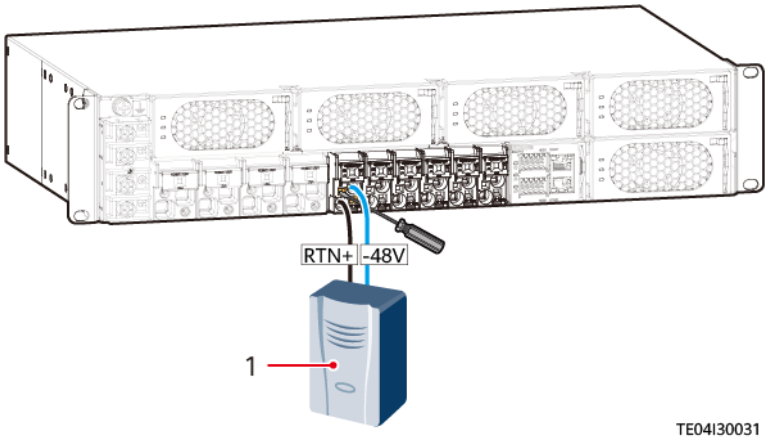
Step 2 Install DC output power cables.

CAUTION

- Connect cables to appropriate load circuit breakers based on the load capacity.
- Do not connect load cables to battery circuit breakers. Otherwise, the power system may break down.

1. Insert the flat-head screwdriver (2 mm wide) into holes on the DC output circuit breakers.
2. Connect DC output power cables to corresponding holes of the DC output circuit breakers.
3. Remove the flat-head screwdriver.

Figure 4-24 Installing DC output power cables



(1) DC load

----End

4.4.10 Installing Battery Cables

Before installing, operating, and maintaining batteries, read the battery manufacturer's instructions and comply with their requirements. The safety precautions specified in this document are highly important and require special attention. For more safety precautions, see the instructions provided by the battery manufacturer.

DANGER

- Note the polarities when installing batteries. Do not connect the positive and negative poles of a battery or battery string together. Otherwise, the battery may be short-circuited.
- Do not smoke or have an open flame around batteries.
- The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and carbon dioxide fire extinguishers.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.
- Do not use metal to simultaneously touch two or more terminals of a battery or simultaneously touch a terminal of the battery and a grounded device. Otherwise, short circuits may occur.
- During battery installation, ensure that the positive and negative battery terminals are correctly connected to prevent reverse polarity. Connect the negative battery cable and then the positive battery cable.
- Charging the lithium battery at a low temperature may cause a short circuit inside the cell, causing explosion.
- Store batteries in a dry, clean, and well-ventilated environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases. Do not expose batteries to sunlight or water and keep them far away from sources of ignition.
- Do not immerse battery cables in water. Do not place battery cables in places that can be directly exposed to rain.
- Ambient humidity: ≤ 95% RH. The IP rating of the outdoor cabinet must be IPX4 or higher.
- If battery acid gets in the eyes, rinse the eyes with cold water for at least 15 minutes and then seek medical advice immediately. If battery acid comes into contact with skin or clothing, immediately wash the affected area with soap and water.

WARNING

- Do not move a battery by holding its terminals, bolts, or cables. Otherwise, the battery may be damaged.
- Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.

CAUTION

- When moving batteries, do not remove protective components such as protective covers or waterproof caps from battery terminals.
- Install and secure batteries horizontally from the bottom up to prevent falling over due to imbalance.
- Before installing batteries, ensure that the battery circuit breakers in the power system are OFF or that the battery fuses are removed.
- When connecting batteries, ensure that the spring washer on the screw is leveled, that the protruding part of the terminal on the cable faces outwards, and that the cable is intact.
- Do not connect two or more cables to the positive or negative power port of a battery in parallel.
- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

NOTICE

- To prevent the equipment from falling over, secure it to a pallet truck using ropes before moving it. Exercise caution when moving the equipment to avoid bumping or falling. Otherwise, the equipment may be damaged.
- After placing the equipment in the installation position, unpack it with caution to prevent scratches. Keep the equipment stable during unpacking.
- After unpacking, check whether the fastening components and removable components are loose. If they are loose, notify the carrier and manufacturer immediately.
- Before unpacking batteries, check whether the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.
- If the installation environment is in poor condition, take dustproof and anti-condensation measures (for example, use a dust cover, plastic film, or fabric cloth) after unpacking batteries to prevent condensation and dust buildup, which may corrode batteries.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are at least 30 mm away from each other without entanglement and overlapping.
- When routing cables, reserve at least 30 mm clearance between the cables and heat-generating components or areas. This prevents deterioration or damage to the cable insulation layer.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- Ensure that cables meet the VW-1 flame spread rating requirements.
- Before installing lithium batteries, ensure that the running indicator is off. Use a multimeter to check that the lithium battery power port has no voltage.
- At least two persons are required to move a lithium battery.

Procedure

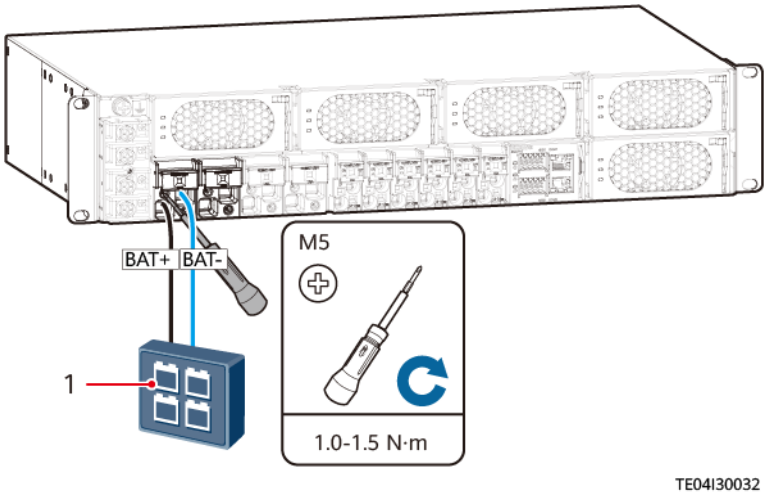
Step 1 Connect battery cables to the battery circuit breaker.

Step 2 Connect the cables securely.

⚠ CAUTION

Do not connect battery cables to load circuit breakers because batteries are without current limiting protection. Batteries may expand or fail due to overcharge.

Figure 4-25 Installing lead-acid battery cables



(1) Lead-acid battery string

Figure 4-26 Installing lithium battery cables

CAUTION

Batteries from the same manufacturer, of the same model, and in the same batch are recommended.

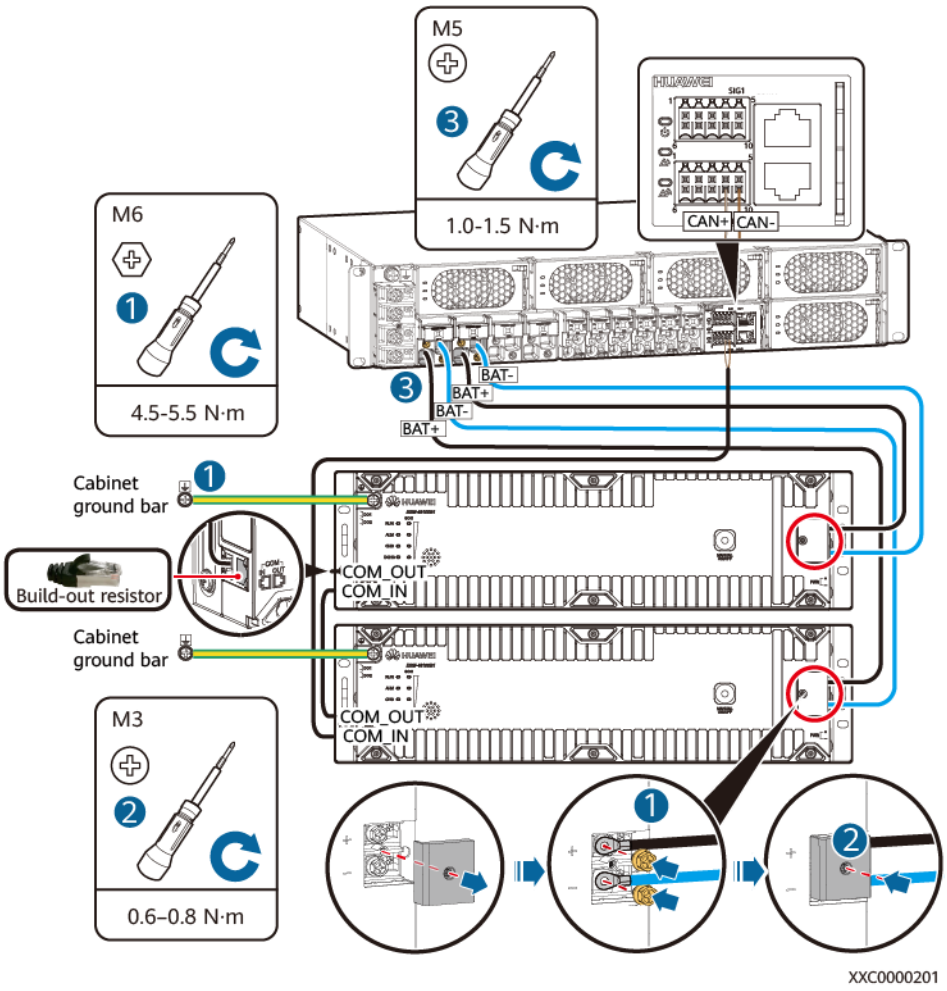


Table 4-5 Mapping between lithium battery and SMU communications ports

Lithium Battery Communications Port			SMU Communications Port
RJ45 female connector 1 8 PC03WC0015	1	RS485 T+	-
	2	RS485 T-	
	3	NC	
	4	RS485 R+	
	5	RS485 R-	
	6	NC	
	7	CANH	CAN+
	8	CANL	CAN-

----End

4.4.11 Installing Input Power Cables

4.4.11.1 Installing 220/380 V AC Three-Phase Four-Wire Input Power Cables

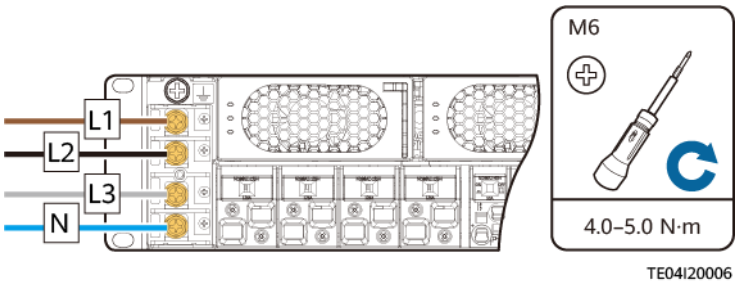
Procedure

Step 1 Remove the protective cover from AC input terminals.

Step 2 Remove the short-circuit copper bar.

Step 3 Connect the AC input power cables to the corresponding AC input terminals.

Figure 4-27 Installing 220/380 V AC three-phase four-wire input power cables



Step 4 Reinstall the protective cover for the AC input terminals.

----End

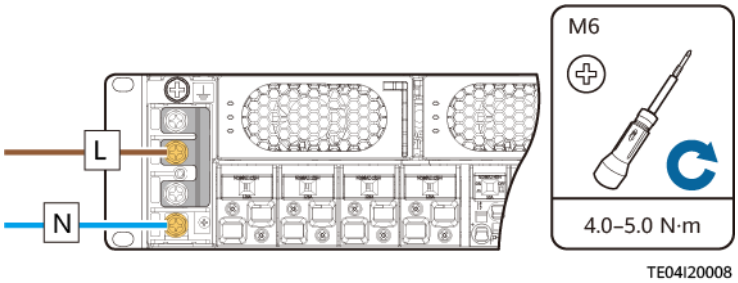
4.4.11.2 Installing 220 V AC Single-Phase Input Power Cables

Procedure

Step 1 Remove the protective cover from AC input terminals.

Step 2 Connect the AC input power cables to the corresponding AC input terminals.

Figure 4-28 Installing 220 V AC single-phase input power cables



Step 3 Reinstall the protective cover for the AC input terminals.

----End

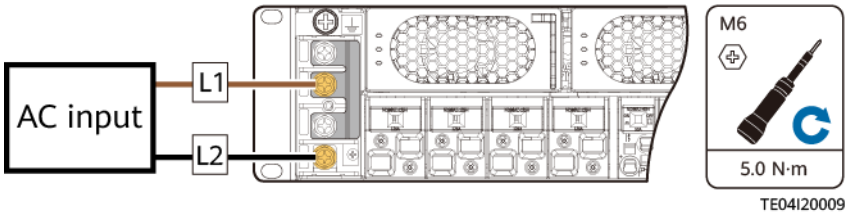
4.4.11.3 Installing 110 V AC Dual-Live Wire Input Power Cables

Procedure

Step 1 Remove the protective cover from AC input terminals.

Step 2 Connect the AC input power cables to the corresponding AC input terminals.

Figure 4-29 Installing 110 V AC dual-live wire input power cables



Step 3 Reinstall the protective cover for the AC input terminals.

----End

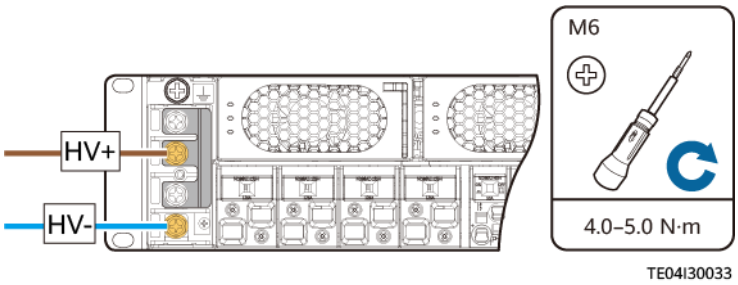
4.4.11.4 Installing DC Input Power Cables

Procedure

Step 1 Remove the protective cover from DC input terminals.

Step 2 Connect the DC input power cables to the corresponding DC input terminals.

Figure 4-30 Installing DC input power cables



Step 3 Reinstall the protective cover for the DC input terminals.

----End

5 Verifying the Installation

5.1 Checking Hardware Installation

- Check that all screws, especially those used for electrical connections, are secured. Check that flat washers and spring washers are installed properly.
- Check that rectifiers are completely inserted into their respective slots and properly locked.

5.2 Checking Electrical Connections

- Check that all circuit breakers are OFF or all fuses are disconnected.
- Check that flat washers and spring washers are securely installed for all OT terminals and that all the OT terminals are intact and properly connected.
- Check that batteries are correctly installed and that battery cables are correctly connected, and not short circuits exist.
- Check that input and output power cables and ground cables are correctly connected, and not short circuits exist.

5.3 Checking Cable Installation

- Check that all cables are securely connected.
- Check that all cables are arranged neatly and bound properly to their nearest cable ties, and are not twisted or overly bent.
- Check that cable labels are properly and securely attached in the same direction.

6 System Commissioning

DANGER

Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

NOTICE

- The following commissioning procedure may result in power failure and/or alarms. Inform the alarm center before and after the procedure.
- The commissioning involves various technologies. Only trained personnel are allowed to perform commissioning. Perform operations strictly in compliance with the manual.
- The commissioning is performed with power on. During commissioning, stand on dry insulating objects, and remove conductive articles such as watches and rings. Use insulated tools.
- Do not establish contact between electrical points that have different voltages.
- Before switching on units or components, ensure that their status meets requirements.
- When you are performing operations and do not want others to operate, attach the label "Currently being serviced. Do not switch on." to the power distribution equipment.
- During commissioning, shut down the device immediately if any fault is detected. Rectify the fault and proceed with the commissioning.

6.1 Connecting the AC or DC Power Supply

Procedure

Step 1 Measure the input voltage of the upstream input circuit breaker. The value should range from 85 V AC to 300 V AC or 85 V DC to 420 V DC.

Step 2 Switch on the upstream input circuit breaker and measure the output voltage of the circuit breaker. The value should range from 85 V AC to 300 V AC or 85 V DC to 420 V DC.

Step 3 Check that the indicators on the rectifiers are steady green.

Step 4 Measure the voltage between the -48 V busbar and the RTN+ busbar. The value should range from -42 V DC to -58 V DC.

----End

6.2 SMU11B

NOTE

If the IP address of the SMU11B is changed on the WebUI, record the IP address for future login.

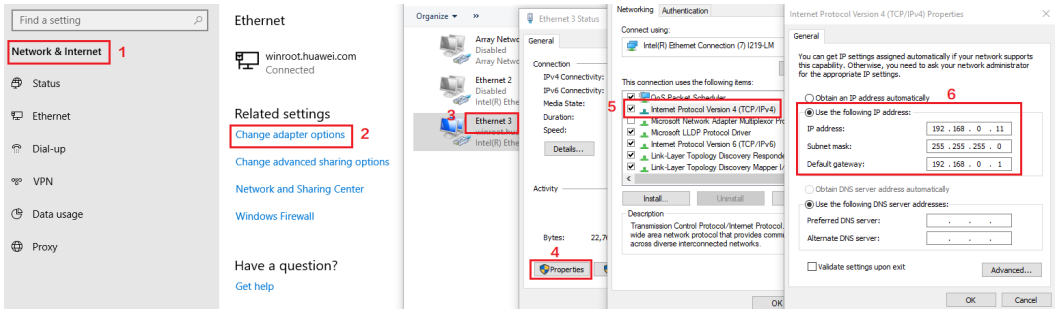
6.2.1 Log into the WebUI (SMU11B)

Step 1 Connect the network port on your laptop to the FE port on the SMU using a network cable.

Step 2 Set the PC IP address in the same network segment as the SMU IP address.

The SMU has a default IP address of 192.168.0.10, a subnet mask of 255.255.255.0, and a default gateway of 192.168.0.1, set the IP address to 192.168.0.11, subnet mask to 255.255.255.0, and default gateway to 192.168.0.1 on the PC.

Figure 6-1 Setting the PC IP address (Windows 10 is used as an example)



Step 3 Enter **https://*local IP address for the SMU*** (default address: https://192.168.0.10) in the address box of Internet Explorer and press **Enter**. The login page is displayed.

Figure 6-2 Login Page

NOTE

- The preset user names include **admin**, **engineer**, and **operator**, and the preset password is **Changeme**. The user names are intended for administrators, engineers, and operators respectively.
- Change the preset password when you first log in to ensure system security.

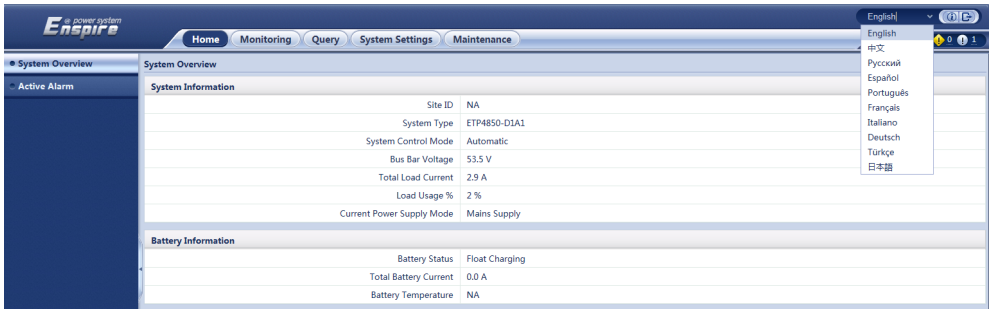
----End

6.2.2 Setting Parameters on the WebUI (SMU11B)

Selecting a Language

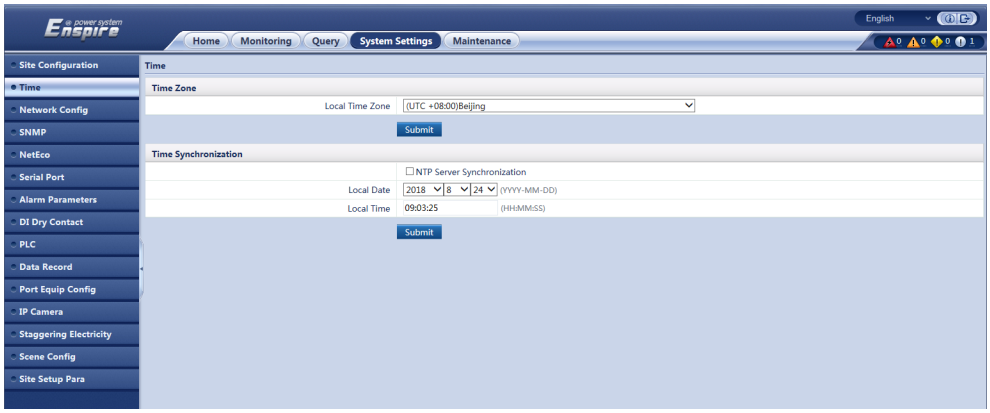
The SMU11B supports English, Chinese, French, Spanish, Portuguese, Russian, Italian, German, Turkish, and Japanese.

Figure 6-3 Selecting a language



Setting the Date and Time

Figure 6-4 Setting the date and time



(Optional) Disabling Door Status Alarms

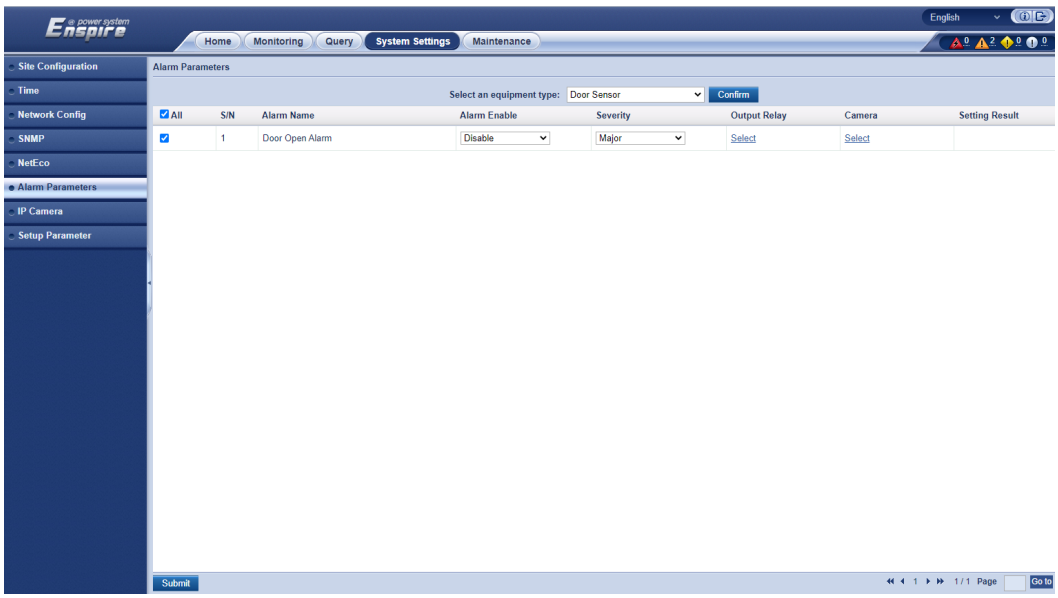
NOTE

If the power system is not connected to a door status sensor, disable the door status alarm.

Step 1 Set **Alarm Enable** to **Disable** and click **Submit**.

Path: **System Settings** > **Alarm Parameters** > **Door Sensor**> **Door Open Alarm**"

Figure 6-5 Disabling the door status alarm



----End

Setting basic battery parameters

Basic battery parameters are fundamental for the SMU to manage batteries and should be set based on the actual number and capacity of battery strings connected.

NOTICE

- Incorrectly setting basic battery parameters affects the battery charge and discharge management and reduces the battery lifespan.
- If no battery is connected to the power system, set **Battery n Connected** to **No** and click **Submit**. Path: **Monitoring** > **Acid Battery Group** > **Running Parameter** > **Basic Parameters**

Step 1 Set the battery detect way.

Path: **Monitoring** > **Power System** > **Running Parameter** > **Basic Parameters**

Step 2 (Optional) Set lead-acid battery parameters.

Path: **Monitoring** > **Acid Battery Group** > **Running Parameter** > **Basic Parameters**

Step 3 (Optional) Set lithium battery parameters.

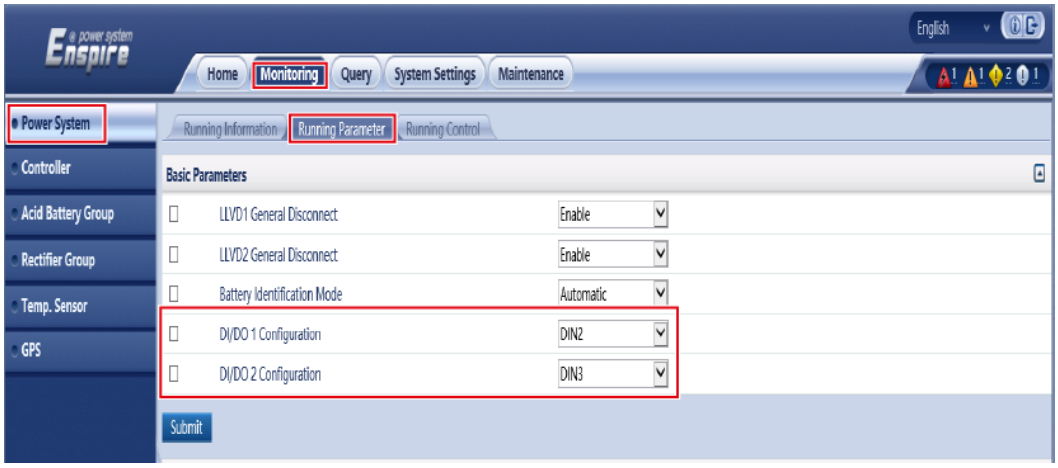
Path: **Monitoring** > **Lithium Battery Group** > **Running Parameter** > **Basic Parameters**

----End

Configuring IO Ports

You can set the IO ports on the SMU panel to dry contact inputs or outputs based on site requirements.

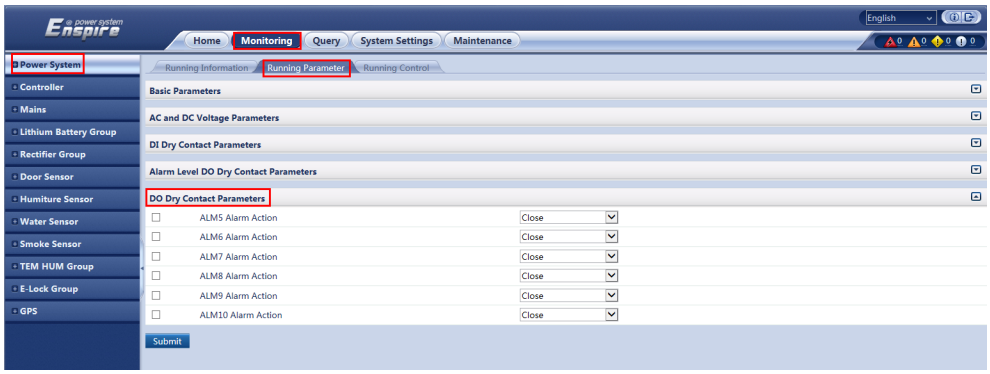
Figure 6-6 Configuring IO ports



Setting Alarm Actions for Dry Contact Outputs

You can set alarm actions for dry contact outputs based on site requirements. The initial status is as follows: When an alarm is generated, dry contacts are closed; when no alarm is generated, dry contacts are open.

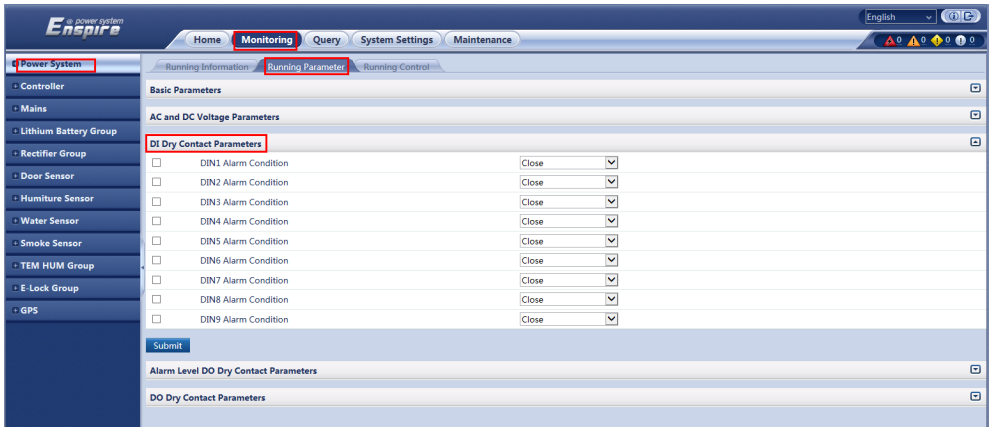
Figure 6-7 Setting alarm actions for dry contact outputs



Setting Alarm Conditions for Dry Contact Inputs

You can set alarm conditions for dry contact inputs based on site requirements. For example, if **DIN1 Alarm Condition** is set to **Close**, the SMU generates a **DIN1 Alarm** for dry contact input DIN1 when it is closed.

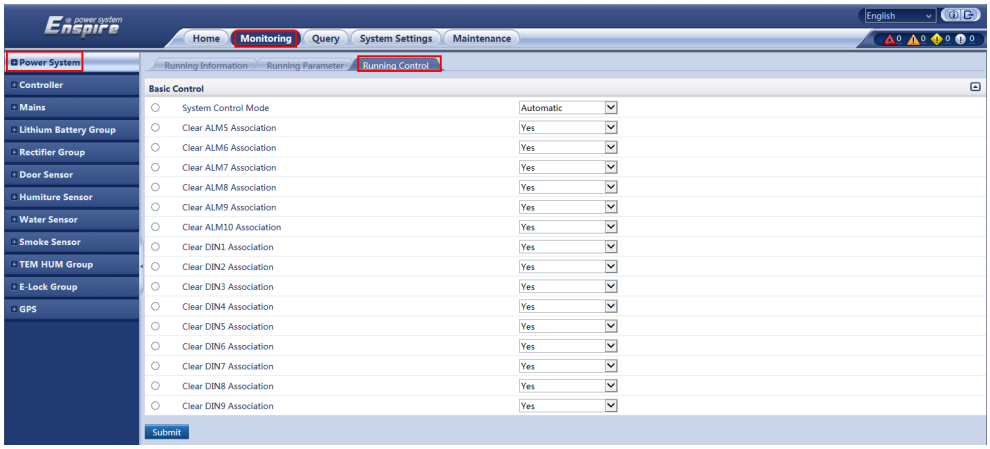
Figure 6-8 Setting alarm conditions for dry contact inputs



Clearing Associations Between Alarms and Dry Contacts

You can clear associations between all alarms and each dry contact output.

Figure 6-9 Clearing associations between alarms and dry contacts



Setting the Alarm Enable Option, Alarm Severity, and Associated Relays

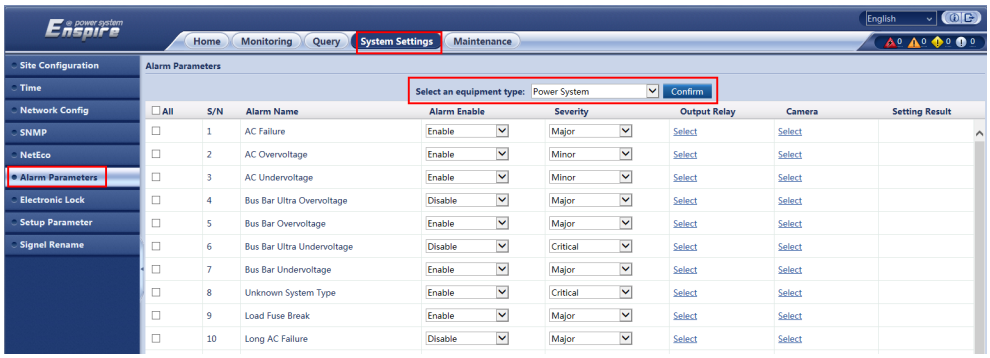
- You can enable or disable each alarm, set the severity for each alarm, or associate each alarm with relays that have specific dry contact outputs based on site requirements.
- If an alarm is enabled, the SMU generates the alarm when the alarm condition is met. If an alarm is disabled, the SMU does not generate the alarm.
- Alarm severities are classified into critical, major, minor, and warning.

Step 1 Access the **Alarm Parameters** menu.

Path: **System Settings** > **Alarm Parameters**

Step 2 Select a device type and set alarm parameters.

Figure 6-10 Setting the alarm enable option, alarm severity, and associated relays



----End

6.3 Site App (SMU11C)

NOTICE

If the BOM number of SMU11C is 02312LSH-001, the SMU11C can only connect to the Site app through WiFi for commissioning.

For SMU11C with other BOM numbers, preferentially connect the SMU11C to the Site app through Bluetooth for commissioning. If the connection fails, connect the SMU11C to the Site app through WiFi.

6.3.1 Installing the Site App

Prerequisites

- There is a mobile phone running Android 8.0 or later.
- The mobile phone can properly connect to the Internet.
- The SMU supports the connection of the app.

Procedure

Step 1 Log in to the technical support website (**https://support.huawei.com/enterprise/en/index.html**).

Step 2 Search for **DP_Site.apk** and select **Software and Tools**.

Step 3 Download the **DP_XXXXX_Site.apk** installation package with the latest update time.

Step 4 Import the installation package to the mobile phone and install the Site app on the mobile phone.

Figure 6-11 Site app icon

----End

6.3.2 Logging In to the Site App (WiFi Connection)

Prerequisites

- The GPS positioning function must be enabled on the mobile phone to allow the app to obtain the GPS positioning permission.
- You have obtained the Site app user name and password.
- The mobile phone is within 10 m (without obstacles) away from the SMU.
- The app may be occasionally disconnected due to difference in phone model and WiFi signal strength. Connect again later.

Procedure

Step 1 Tap the Site app icon to open the app.

Step 2 Set the device type to **Site**. The login screen is displayed.

Step 3 On the login screen, choose **WiFi Connection**, and search for and select a nearby power supply device with a WiFi module.

NOTE

The device SN (see the label) and WiFi name have the same last six digits.

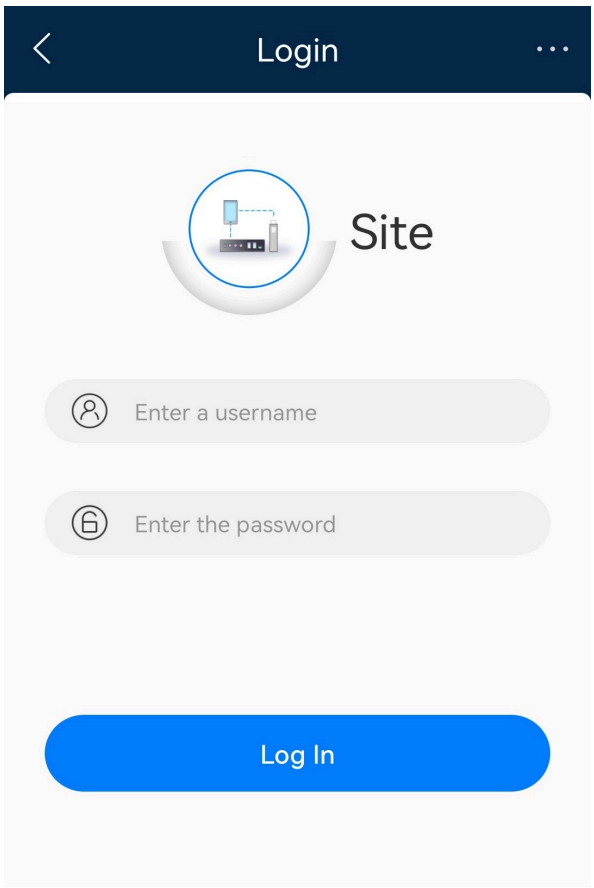
Step 4 When connecting to the SMU for the first time, you need to enter the WiFi password. (Preset password: **Changeme**)

Step 5 Enter the user name and password. The preset user name is **liveapp**, and the preset password is **Changeme_123**.

NOTICE

- After the first login, change the password immediately to improve account security and prevent unauthorized network attacks, such as data tampering.
- The Company will not be liable for any security issues caused by your failure to change the default password in time or password loss after changing. (The password cannot be retrieved if it is lost.)

Figure 6-12 Logging in to the Site app



Step 6 Tap **Next**. The **Home** screen is displayed.

----End

6.3.3 Logging In to the Site App (Bluetooth Connection)

Prerequisites

- The GPS positioning function must be enabled on the mobile phone to allow the app to obtain the GPS positioning permission.
- You have obtained the Site app user name and password.
- The mobile phone is within 10 m (without obstacles) away from the SMU.
- The app may be occasionally disconnected due to difference in phone model and Bluetooth signal strength. Connect again later.

Procedure

Step 1 Tap the Site app icon to open the app.

Step 2 Set the device type to **Site**. The login screen is displayed.

Step 3 On the app login screen, tap **Bluetooth Connection** to search for and select a nearby Bluetooth device.

NOTE

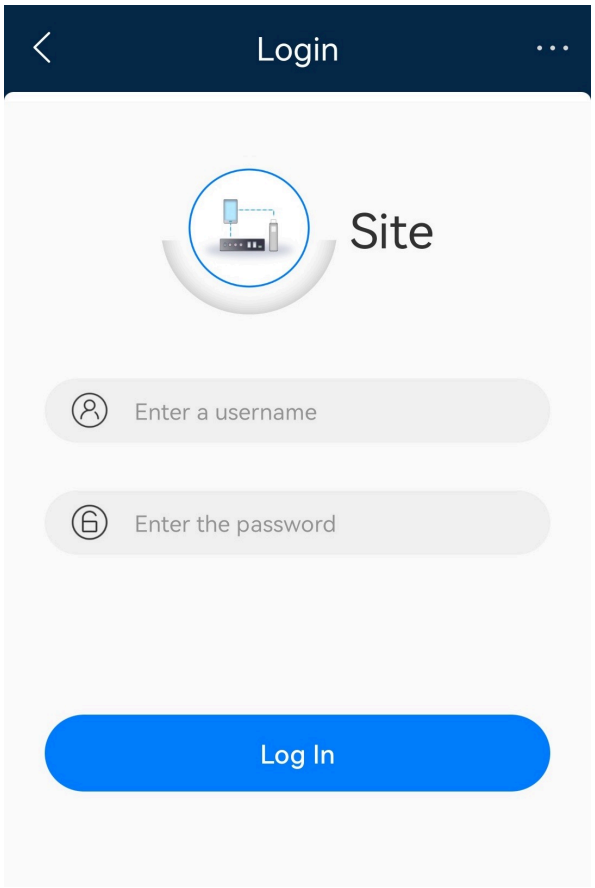
The Bluetooth name is the same as the MAC address labeled near the SMU11C nameplate.

Step 4 Enter the user name and password. The preset user name is **liveapp**, and the preset password is **Changeme_123**.

NOTICE

- After the first login, change the password immediately to improve account security and prevent unauthorized network attacks, such as data tampering.
- The Company will not be liable for any security issues caused by your failure to change the preset password in time or password loss after changing. (The password cannot be retrieved if it is lost.)

Figure 6-13 Logging in to the Site app



Step 5 Tap **Next**. The **Home** screen is displayed.

----End

6.3.4 Setting Parameters

NOTICE

When communicating with a Huawei access network main equipment, the power supply synchronizes the parameters of the main equipment. Therefore, the power system parameters need to be set through the main equipment. For details, see the related documents of the main equipment.

Site Deployment

You can set the date, time, and site ID for the system on this screen.

Path: **Maintenance** > **OM Tool** > **Site Deployment**

(Optional) Disabling the Door Status Alarm

NOTE

If the power system is not connected to a door status sensor, disable the door status sensor alarm.

Disable the door status alarm, and tap **Submit**.

Path: **Alarm** > **Alarm Settings** > **Door Sensor** > **Door Open Alarm**

Setting Basic Battery Parameters

Basic battery parameters are fundamental for the SMU to manage batteries and should be set based on the actual number and capacity of battery strings connected.

NOTICE

- Setting basic battery parameters incorrectly affects the battery charge and discharge management and reduces the battery lifespan.
- If no battery is connected to the power system, set **Battery N Connected** to **No**. Path: **Home** > **Battery Group** > **Configuration** > **Battery N Connected**

Step 1 Set the battery type.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, and choose **Basic Parameters** > **Battery Type**.

Step 2 (Optional) Set lead-acid battery parameters.

Path: On the home screen, tap **Battery Group** > **Configuration**, tap the edit icon on the right, and set basic battery parameters as required.

Step 3 (Optional) Set lithium battery parameters.

Path: On the home screen, tap **Lithium Battery Group** > **Configuration**, tap the edit icon on the right, and set basic lithium battery parameters as required.

----End

Configuring IO Ports

You can set the IO ports on the SMU panel to dry contact inputs or outputs based on site requirements.

Path: On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, and choose **Basic Parameters** > **DI/DO N Configuration**.

Setting Alarm Actions for Dry Contact Outputs

You can set alarm actions for dry contact outputs based on site requirements. The initial status is as follows: When an alarm is generated, dry contacts are closed; when no alarm is generated, dry contacts are open.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, choose **DO Parameters**, and set alarm actions for dry contact outputs as required.

Setting Alarm Conditions for Dry Contact Inputs

You can set alarm conditions for dry contact inputs based on site requirements. For example, if you set **DIN1 Alarm Condition** to **Close**, the SMU generates a DIN1 alarm when DIN1 is closed.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, choose **DI Parameters**, and set alarm actions for dry contact inputs as required.

Clearing Associations Between Alarms and Dry Contacts

You can clear associations between alarms and each dry contact output.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, choose **Basic Control** > **Clear ALM *N* Association**, and clear the association between dry contacts and alarms as required.

Setting the Alarm Enable Option, Alarm Severities, and Associated Relays

- You can enable or disable each alarm, set the severity for each alarm, or associate each alarm with relays that have specific dry contact outputs based on site requirements.
- If an alarm is enabled, the SMU generates the alarm when the alarm condition is met. If an alarm is disabled, the SMU does not generate the alarm.
- There are four alarm severities: critical, major, minor, and warning.

Step 1 Tap **Alarm** and tap the alarm configuration icon in the upper right corner. Access the **Alarm Settings** menu.

Step 2 Select a device type and set alarm parameters.

----End

6.4 LIVE-C APP (SMU11C)

NOTICE

If the BOM number of the SMU11C is 02312LSH-001, use the Site app for commissioning.

6.4.1 Installing the LIVE-C App

Prerequisites

- There is a mobile phone running Android 6.0 or later.
- The mobile phone can properly connect to the Internet.

Procedure

Step 1 Search for LIVE-C app on the Huawei technical support website and obtain the latest installation package.

Step 2 Install the LIVE-C app on the mobile phone.

Figure 6-14 LIVE-C app icon

----End

6.4.2 Logging In to the LIVE-C App

Prerequisites

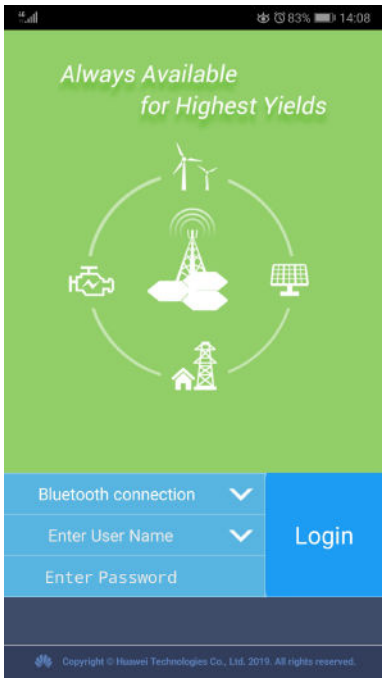
- You have obtained the LIVE-C app user name and password.
- The GPS positioning function must be enabled on the mobile phone to allow the app to obtain the GPS positioning permission.
- The mobile phone should be within 10 m away from the power equipment.
- The mobile phone app may be occasionally disconnected due to difference in phone model and Bluetooth signal strength. Please try again 5 minutes later.
- Certain mobile phones may fail to connect in automatic Bluetooth pairing mode due to Android system differences. Please select the manual pairing mode to connect. Locate the pairing request in the notice column and enter the pairing PIN 0000 or 000000.

Procedure

Step 1 Tap the LIVE-C app icon to access the home screen.

Step 2 Tap **Power System Delivery** to enter the login screen.

Figure 6-15 Login Screen



Step 3 Tap **Bluetooth connection** in the login screen of the APP, to search and connect for power equipment with Bluetooth nearby.

NOTICE

The power equipment SN and Bluetooth name have the same last six digits.

Step 4 Enter the user name and password. (initial user name: live app, initial password: Changeme_123)

NOTICE

- After the first login, change the password immediately to improve account security and prevent unauthorized network attacks, such as data tampering.
- The Company will not be liable for any security issues caused by your failure to change the default password in time or password loss after changing. (The password cannot be retrieved if it is lost.)

Step 5 Tap **Login** to access **Main Function Menu** and view the operating parameters of the power equipment.

----End

6.4.3 Setting Parameters

NOTICE

When communicating with a Huawei access network main equipment, the power supply synchronizes the parameters of the main equipment. Therefore, the power system parameters need to be set through the main equipment. For details, see the related documents of the main equipment.

Setting the Display Language

The SMU supports English, Chinese, and Japanese.

Path: On the home screen, choose **Me** > **Language**.

Site Deployment

You can set the date, time, and site ID for the system on this screen.

Path: **Site Deployment** > **Guide Open Station**

(Optional) Disabling the Door Status Alarm

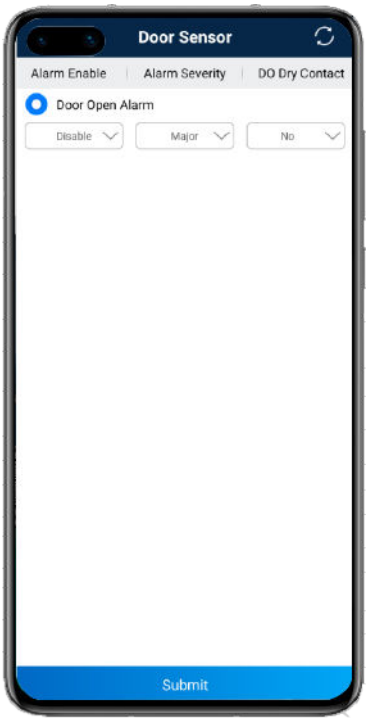
NOTE

If the power system is not connected to a door status sensor, disable the door status sensor alarm.

Step 1 Disable the door status alarm, and tap **Submit**.

Path: **System Settings** > **Alarm Settings** > **Door Sensor** > **Door Open Alarm**

Figure 6-16 Disabling the door status alarm



----End

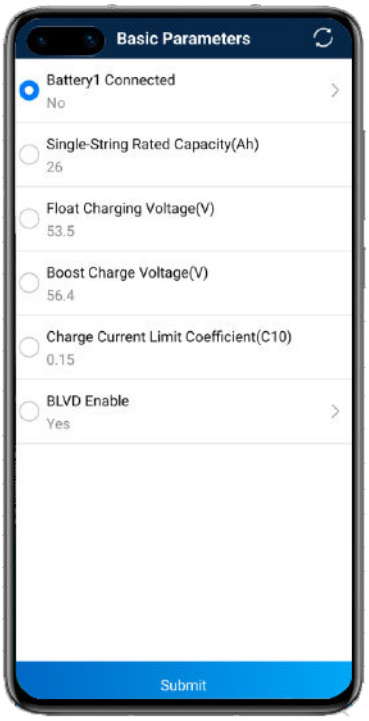
Setting Basic Battery Parameters

Basic battery parameters are fundamental for the SMU to manage batteries and should be set based on the actual number and capacity of battery strings connected.

NOTICE

- Setting basic battery parameters incorrectly affects the battery charge and discharge management and reduces the battery lifespan.
- If no battery is connected to the power system, set **Battery N Connected** to **No**. Path: **Site Configuration** > **Battery Group** > **Basic Parameters** > **Battery N Connected**

Figure 6-17 Setting battery parameters (no battery connected)



Step 1 Set the battery type.

Path: **Site Configuration** > **Power System** > **Basic Parameters** > **Battery Type**

Step 2 (Optional) Set lead-acid battery parameters.

Path: **Site Configuration** > **Battery Group** > **Basic Parameters**

Step 3 (Optional) Set lithium battery parameters.

Path: **Site Configuration** > **Li Battery Group** > **Basic Parameters**

----End

Configuring IO Ports

You can set the IO ports on the SMU panel to DI or DO based on site requirements.

Path: **Site Configuration** > **Power System** > **Basic Parameters** > **DI/DO N Config**

Setting Alarm Actions for Dry Contact Outputs

You can set alarm actions for dry contact outputs based on site requirements. The initial status is as follows: When an alarm is generated, dry contacts are closed; when no alarm is generated, dry contacts are open.

Path: **Site Configuration** > **Power System** > **DO Dry Contact Parameters**

Setting Alarm Conditions for Dry Contact Inputs

You can set alarm conditions for dry contact inputs based on site requirements. For example, if you set **DIN1 Alarm Condition** to **Close**, the SMU generates a DIN1 alarm when DIN1 is closed.

Path: **Site Configuration** > **Power System** > **DI Dry Contact Parameters**

Clearing Associations Between Alarms and Dry Contacts

You can clear associations between alarms and each dry contact output.

Path: **Site Configuration** > **Power System** > **Basic Control** > **Clear ALM N Association**

Setting the Alarm Enable Option, Alarm Severities, and Associated Relays

- You can enable or disable each alarm, set the severity for each alarm, or associate each alarm with relays that have specific dry contact outputs based on site requirements.
- If an alarm is enabled, the SMU generates the alarm when the alarm condition is met. If an alarm is disabled, the SMU does not generate the alarm.
- There are four alarm severities: critical, major, minor, and warning.

Step 1 Access the **Alarm Settings** menu.

Path: **System Settings** > **Alarm Settings**

Step 2 Select a device type and set alarm parameters.

----End

6.5 Connecting the Battery Supply

Prerequisites

NOTICE

To avoid damage to batteries, switch on the battery circuit breaker only after you correctly set battery parameters on the SMU.

Procedure

Step 1 Switch on the battery circuit breakers.

Step 2 Check whether the batteries communicate properly. If the run indicator on a battery is steady on, the battery communicates properly with the monitoring device. If it blinks fast (4 Hz), the communication between them is interrupted. If so, check whether the communications cable is properly connected.

Step 3 Observe the batteries for 15 minutes. The batteries are running properly if the alarm indicators are off.

Step 4 Set all the circuit breakers to the appropriate status based on site requirements.

Step 5 Observe the power system for 15 minutes. If no alarm (except the door status alarm) is generated on the SMU during this period, the current and voltage for batteries and loads are normal.

NOTE

If the door status sensor is not configured and you need to disable the door status sensor alarm, refer to **Setting the Alarm Enable Option, Alarm Severity, and Associated Relays** or**Setting the Alarm Enable Option, Alarm Severities, and Associated Relays** or**Setting the Alarm Enable Option, Alarm Severities, and Associated Relays**.

----End

7 System Maintenance

DANGER

Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

7.1 Common Maintenance Operations on the WebUI (SMU11B)

Backing Up the Current Settings

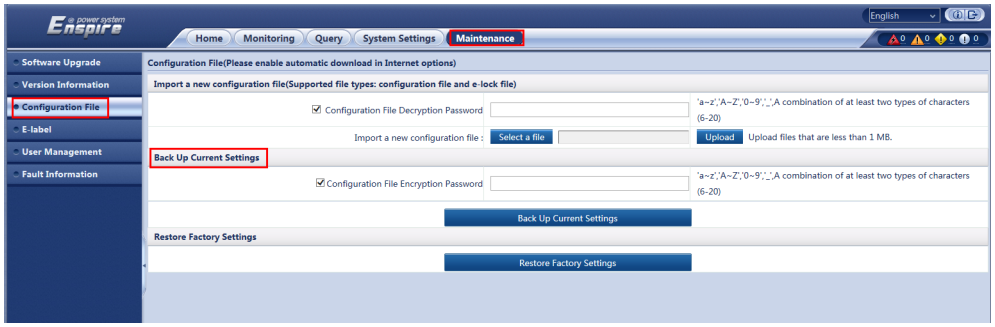
The configuration file contains all user configuration information (such as parameter values and alarm configurations) about the current system.

You can back up the configuration file to a local computer over the WebUI.

NOTICE

When importing the backup configuration file, ensure that the system types of the exported and imported configuration files are consistent.

Figure 7-1 Backing up the current settings



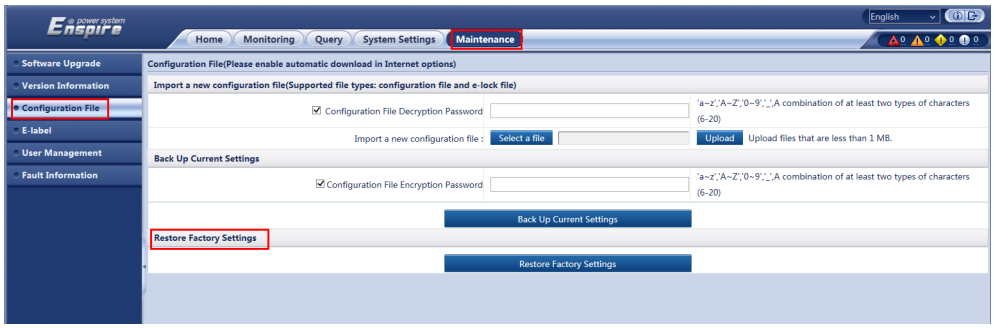
Restoring Factory Defaults

After factory defaults are restored, all parameter values change to their default factory values. You are advised to back up the current settings before restoring factory defaults.

NOTICE

After factory defaults are restored, the monitoring unit restarts.

Figure 7-2 Restoring factory defaults



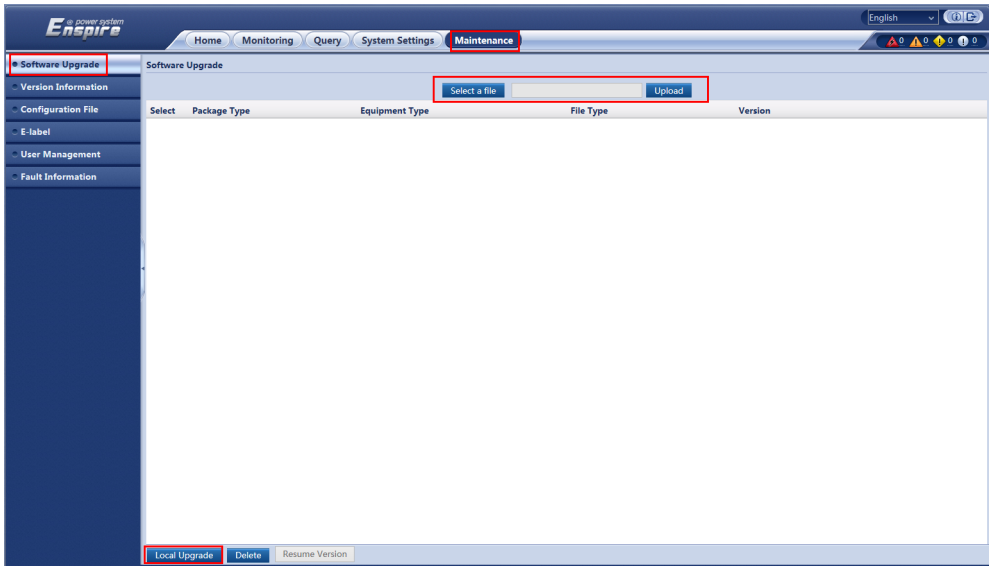
Upgrading Software

You can use the WebUI to upgrade software for the SMU BSP, SMU, intelligent device SO library package, and southbound devices.

NOTICE

- To retain pre-upgrade parameters, back up the data before upgrading software.
- The SMU will restart automatically after the software for the BSP, SMU, and intelligent device SO library package is upgraded.
- Exercise caution to choose the version rollback function during software upgrade. After version rollback, the user accounts created are deleted, and the initial user name and password are required for login.

Figure 7-3 Upgrading software

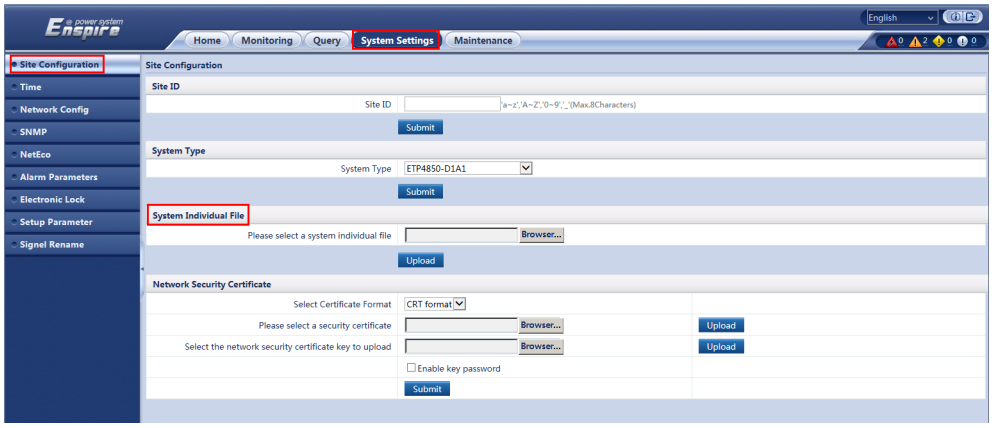


Importing an Individual File

The SMU restarts after an individual file is imported.

Step 1 Access the **System Individual File** menu.

Figure 7-4 Importing an individual file



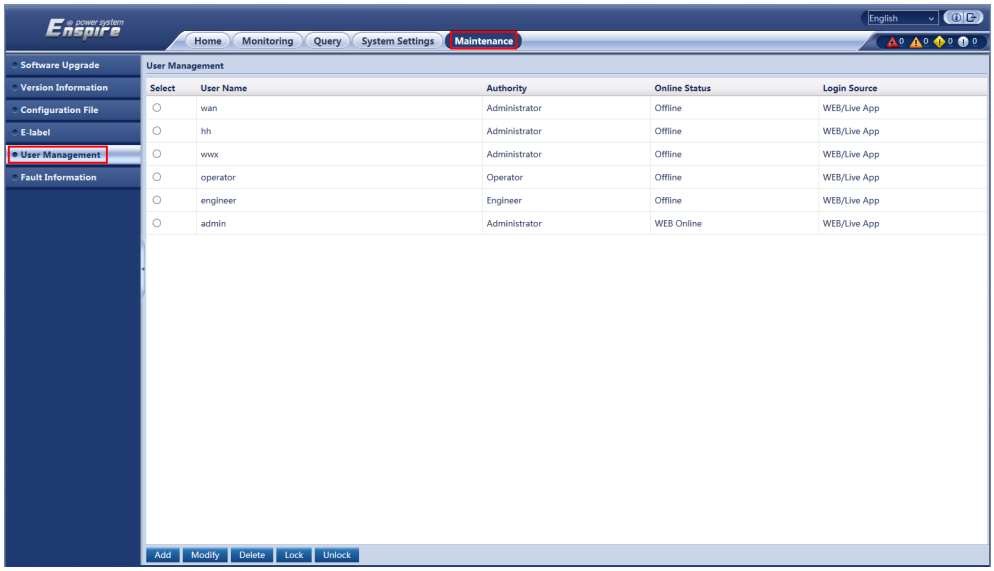
Step 2 Find the individual file (for example, ETP48200-B2A1_V1.4) based on the recorded file storage path, select and import it.

----End

Changing a User Password

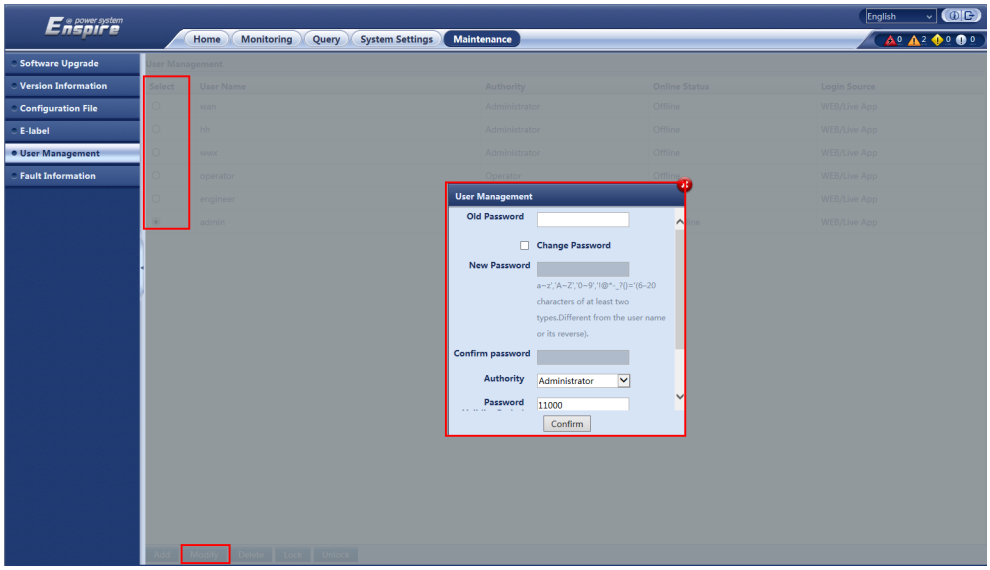
Step 1 Choose **Maintenance** > **User Management**. The user management page is displayed.

Figure 7-5 User management page



Step 2 Select the user whose password needs to be changed and click **Modify**. The dialog box for modifying user information is displayed.

Figure 7-6 Changing the password



Step 3 Select **Change Password**, set **New Password** and **Confirm Password**, and click **Confirm**. The **Recertification** dialog box is displayed.

NOTE

The administrator needs to set **Old Password** only when changing the administrator's own password.

Change the password in compliance with the following rules:

- The password must contain 6 to 20 characters.
- The password must consist of at least two of the following types: digits, uppercase letters, lowercase letters, and special characters (! @ * - _ ? { } = /).

- The password must be different from the previous two passwords.
- The password must be different from the user name or its reverse.

Step 4 Set **Password of Current Login User** and click **Submit**.

----End

Changing WiFi Password

You can locally access the WebUI using WiFi.

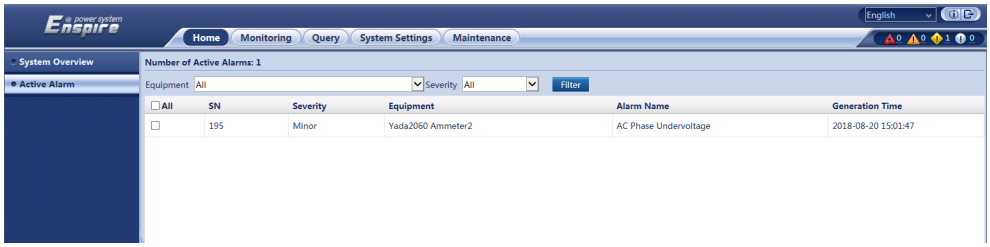
NOTICE

- You are advised to periodically change the WiFi password to improve account security and prevent unauthorized network attacks, such as data tampering.
- Huawei will not be liable for any loss caused by your failure to change the password in time or to keep the new password properly.

Change the WiFi account password: choose **System Settings** > **Network Config** > **WIFI**.

Viewing Active Alarms

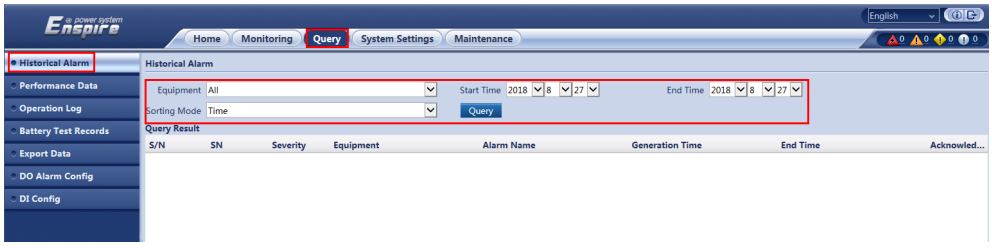
Figure 7-7 Viewing active alarms



Viewing Historical Alarms

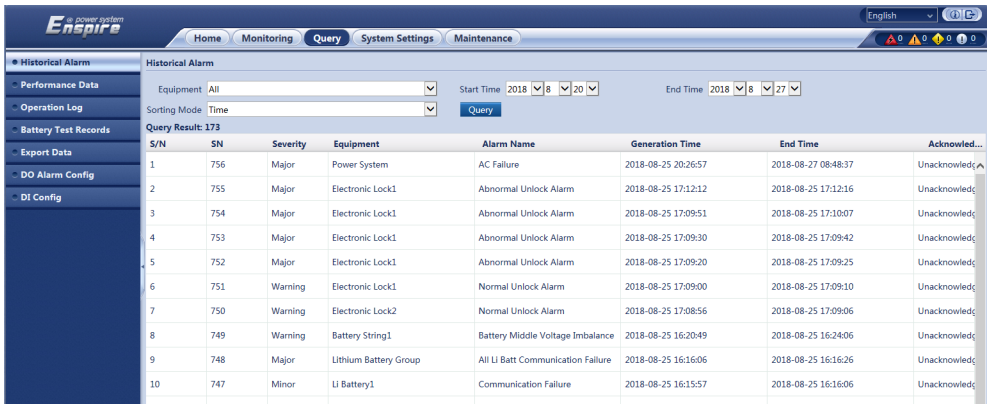
Step 1 To filter out historical alarms.

Figure 7-8 Filtering out historical alarms



Step 2 To view historical alarms.

Figure 7-9 Viewing historical alarms

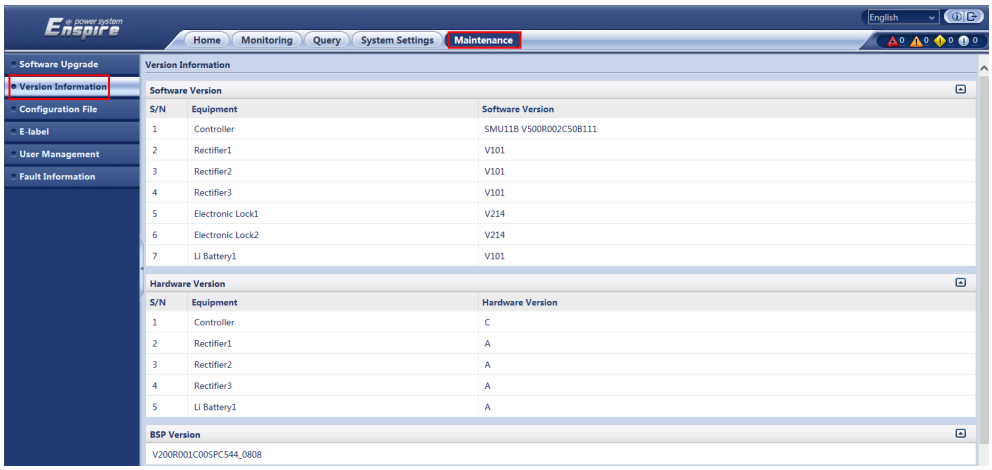


----End

Viewing Version Information

View the Monitoring unit version number to facilitate fault diagnosis and check whether the upgrade is successful.

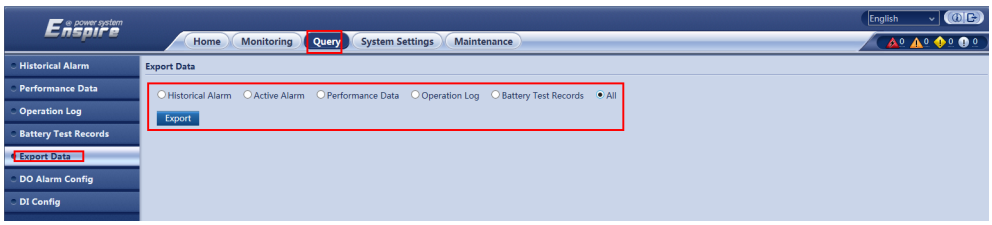
Figure 7-10 Viewing version information



Exporting Maintenance Information

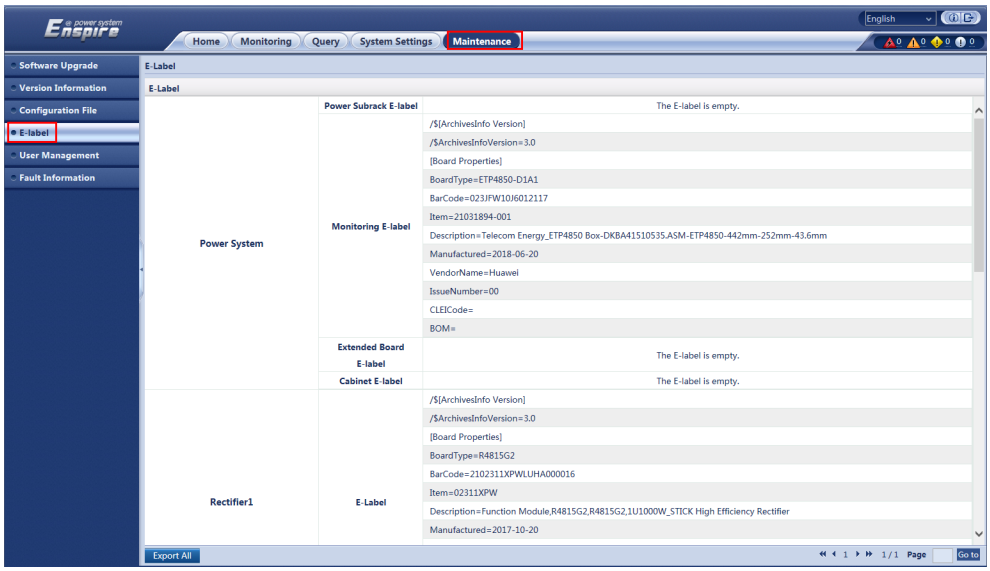
Step 1 To export historical data.

Figure 7-11 Exporting historical data



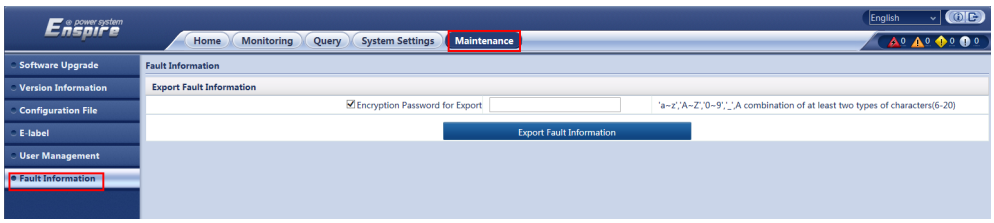
Step 2 To export e-label information.

Figure 7-12 Exporting e-label information



Step 3 To export fault information.

Figure 7-13 Exporting fault information



----End

7.2 Common Maintenance Operations on the Site App (SMU11C)

Upgrading Software

- The system restarts after the software is upgraded.
- Obtain the latest software package from Huawei technical support.

Step 1 Access the **Upgrade Management** menu. Path: **Maintenance** > **OM Tool** > **Upgrade Management**

Step 2 Select the upgrade file to be imported and click **Upload**.

Step 3 After the software is uploaded, click **Upgrade**.

----End

Changing a User Password

For security purposes, change your password periodically.

Path: **Me** > **Change Password**

Restoring Factory Defaults

The SMU restarts after factory settings are restored.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, and choose **Basic Control** > **Restore Factory Settings**.

Resetting the SMU

Resetting the SMU takes several minutes. During the resetting, the SMU cannot monitor or manage rectifiers, batteries, and other connected devices. Resetting the SMU has no impact on parameter settings. There is no need to set parameters again.

On the home screen, choose **Power System** > **Configuration**, tap the edit icon on the right, and choose **Basic Control** > **Reset SMU**.

Setting the System Control Mode

The value of **System Control Mode** is **Automatic** by default. When it is set to **Manual**, you can use the Site app to control the rectifier output voltage, output current coefficient, and battery equalized/float charge.

Step 1 Path: **Home** > **Power System** > **Configuration**

Step 2 Tap the edit icon on the right, choose **Basic Control** > **System Control Mode**, and set the system control mode as required.

----End

Deleting the Rectifiers Failing in Communication

After you remove one or more rectifiers, the SMU generates a communication failure alarm. If you confirm that the rectifiers will not be reinstalled, manually delete the information about the removed rectifiers.

Path: **Home** > **Rectifier Group** > **Configuration** > **Basic Control** > **Delete Rectifier Failed in Communication**

Collecting Rectifier Fault Information

If rectifier alarms cannot be cleared, you can collect and export fault information and provide the data to technical support engineers for fault locating.

Path: **Home** > **Rectifier Group** > **Configuration** > **Fault Information Collection Control** > **Collect Fault Information**

Switching Between Equalized Charge and Float Charge for Lead-Acid Batteries

- You can manually switch between equalized charge and float charge when **System Control Mode** is **Manual**.
- Batteries keep in equalized charge status after equalized charge is manually enabled. When the float charge conditions are met (for example, time for

equalized charge expires), the batteries automatically transfer to float charge status.

Path: **Home** > **Battery Group** > **Configuration** > **Basic Control** > **Equalized/Float Charge Control**

Exporting Fault Logs, Historical Alarms, and Battery Test Records

You can export fault logs, historical alarms, and battery test records from the Site app to easily and quickly collect information and locate faults.

Choose **Maintenance** > **OM Tool** > **Log Export Download**, select the logs to be exported, and tap **Download**.

Exporting E-Labels

You can view and export e-labels of the power subrack, monitoring board, and extension board from the Site app.

Path: **Maintenance** > **OM Tool** > **E-Label**

7.3 Common Maintenance Operations on the LIVE-C App (SMU11C)

Upgrading Software

- The SMU restarts after the software is upgraded.
- Obtain the latest LIVE-C app upgrade file from Huawei technical support.

Step 1 Access the **SMU upgrade management** menu.

Path: **OM Tool** > **SMU upgrade management**

Step 2 Select the upgrade file (for example, SMU11C V500R002C10B218) and import it.

----End

Changing a User Password

For security purposes, change your password periodically.

Path: **System Settings** > **Change Password**

Restoring Factory Defaults

The SMU restarts after factory settings are restored.

Path: **Site Configuration** > **Power System** > **Basic Control** > **Restore Factory Settings**

Resetting the SMU

Resetting the SMU takes several minutes. During the resetting, the SMU cannot monitor or manage rectifiers, batteries, and other connected devices. Resetting the

SMU has no impact on parameter settings. There is no need to set parameters again.

Path: **Site Configuration** > **Power System** > **Basic Control** > **Reset SMU**

Setting the System Control Mode

The value of **System Control Mode** is **Automatic** by default. When it is set to **Manual**, you can use the LIVE-C app to control rectifier startup/shutdown, output voltage, and output current as well as battery connection/disconnection and equalized/float charge.

Path: **Site Configuration** > **Power System** > **Basic Control** > **System Control Mode**

Deleting the Rectifiers Failing in Communication

After you remove one or more rectifiers, the SMU generates a communication failure alarm. If you confirm that the rectifiers will not be reinstalled, manually delete the information about the removed rectifiers.

Path: **Site Configuration** > **Rectifier Group** > **Basic Control** > **Delete Rectifier Failed in Communication**

Collecting Rectifier Fault Information

If rectifier alarms cannot be cleared, you can collect and export fault information and provide the data to technical support engineers for fault locating.

Path: **Site Configuration** > **Rectifier Group** > **Basic Control** > **Collect Fault Info**

Switching Between Equalized Charge and Float Charge for Lead-Acid Batteries

- You can manually switch between equalized charge and float charge when **System Control Mode** is **Manual**.
- Batteries keep in equalized charge status after equalized charge is manually enabled. When the float charge conditions are met (for example, time for equalized charge expires), the batteries automatically transfer to float charge status.

Path: **Site Configuration** > **Battery Group** > **Basic Control** > **Charge Control**

Connecting and Disconnecting the Lead-Acid Battery Supply

NOTICE

If the AC or DC power supply fails after you disconnect the battery supply, all loads will be powered off. Therefore, exercise caution with this operation.

You can manually connect and disconnect the battery supply when **System Control Mode** is **Manual**.

Path: **Site Configuration** > **Battery Group** > **Basic Control** > **BLVD Control**

Exporting Historical Alarms and Battery Test Records

You can export historical alarms and battery test records from the LIVE-C app to quickly collect information and locate faults.

Path: **OM Tool** > **Data Download**

Exporting Fault Logs

You can export fault logs from the LIVE-C app to quickly collect information and locate system faults.

Path: **OM Tool** > **Fault Information**

Exporting E-Labels

You can view and export e-labels of the power subrack, monitoring board, and rectifiers from the LIVE-C app.

Path: **OM Tool** > **E-label**

7.4 Routine Maintenance

Perform routine maintenance based on site requirements. The recommended maintenance interval is six months.

Table 7-1 Routine maintenance checklist

Maintenance Item	Maintenance Task	Check Method	Scenario for Repair	Measures
Electricity	The AC input voltage is normal.	Clamp meter	The AC input voltage is beyond the normal range.	For details, see **7.5 Identifying Component Faults**.
	The output voltage is normal.		The battery branch or load branch voltage exceeds the specified range (-42 V DC to -58 V DC).	
Preventive maintenance inspection	The indicators are normal.	Observe indicators	Alarms are generated.	
Grounding	The ground point properly connects to the ground bar in the cabinet.	Clamp meter	The resistance between the ground point and the ground bar is greater than 0.1 ohm.	Secure the ground cable to the ground point again or replace the ground cable.

7.5 Identifying Component Faults

7.5.1 Identifying Rectifier Faults

The following lists the rectifier faults

- The AC input and slot connector are normal, but the Fault indicator (red) is steady on or all indicators are off.
- The slot connector and SMU are normal, but the Alarm indicator (yellow) still blinks after the rectifier is reinstalled.
- The AC input and SMU are normal, but the SMU cannot control the rectifier.

7.5.2 Identifying SMU Faults

The following lists the SMU faults:

- The DC output is normal but the green indicator on the SMU is off.
- The SMU breaks down or cannot be started. Its LCD has abnormal display or buttons cannot be operated.
- With alarm reporting enabled, the SMU does not report alarms when the power system is faulty.
- The SMU reports an alarm whereas the power system does not experience the fault.
- The SMU fails to communicate with the connected lower-level devices even though the communications cables are correctly connected.
- Communication between the SMU and all rectifiers fails even though the rectifiers and the communications cables are normal.
- The SMU cannot monitor AC or DC power distribution when communications cables are intact and AC and DC power distribution is normal.
- Parameters cannot be set or running information cannot be viewed on the SMU.

7.5.3 Identifying Circuit Breaker Faults

If the load fuse is blown, it indicates that the circuit breaker trips. If the circuit breaker is switched on and the downstream device is still not powered (the busbar has power), the circuit breaker is faulty and needs to be replaced.

7.6 Replacing Components

NOTICE

- Performing maintenance or replacing components may interrupt power to the loads if battery reserve is insufficient. Ensure that the switches for primary loads are in the ON position and do not turn off the battery switch and the AC input switch at the same time.
- Obtain prior written consent from the customer if load disconnection is required.
- Do not perform maintenance on rainy days. Otherwise, rain water can enter the system and damage devices and components.

7.6.1 Replacing a Rectifier

Prerequisites

- You have obtained a pair of protective gloves and the cabinet door key.
- The new rectifier is intact.

⚠ CAUTION

Protect yourself from being burnt when moving the rectifier because the rectifier has a high temperature.

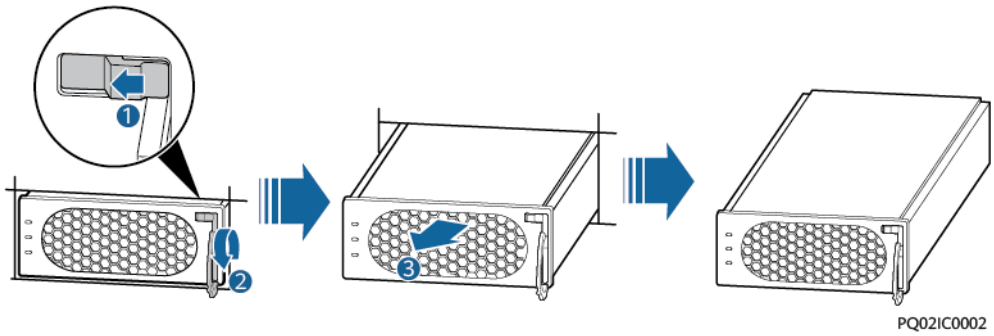
Procedure

Step 1 Put on protective gloves.

Step 2 Push the locking latch at the right side of the panel towards the left.

Step 3 Gently draw the handle outwards, and then remove the rectifier from the subrack.

Figure 7-14 Removing a rectifier

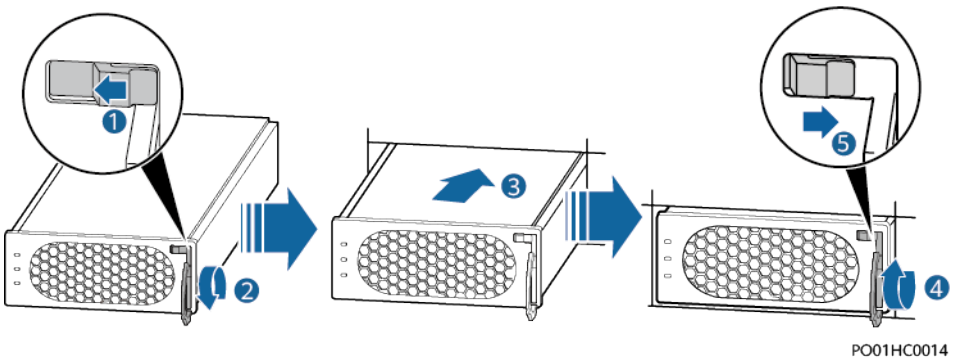


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

Step 5 Place the new rectifier at the entry to the correct slot.

Step 6 Gently slide the converter into the slot along guide rails until it is engaged. Close the handle, and push the locking latch towards the right to lock the handle.

Figure 7-15 Installing a rectifier



Step 7 Take off protective gloves.

----End

Follow-up Procedure

Pack the removed component, and return it to local warehouse.

7.6.2 Replacing an SMU11B

Prerequisites

- An ESD wrist strap, ESD gloves, and ESD box or bag are available.
- The new SMU is intact.

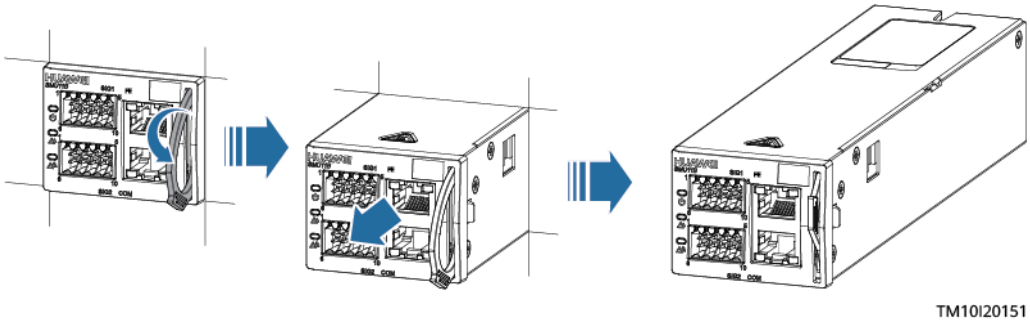
Procedure

Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Record all cable connections on the SMU11B panel and disconnect the cables.

Step 3 Pull out the handle of the SMU to remove it from the subrack.

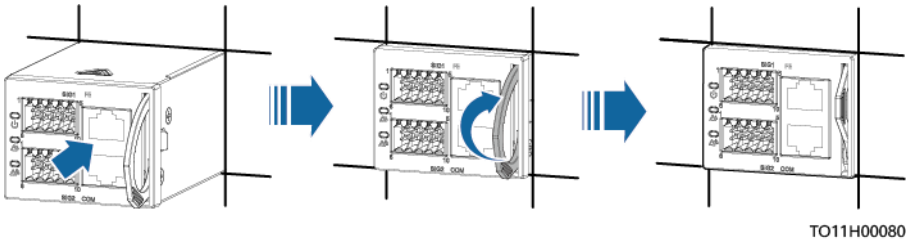
Figure 7-16 Removing the old SMU



Step 4 Insert the new SMU into the slot and slide it into the subrack along the guide rails.

Step 5 Push the handle upwards until it is in place.

Figure 7-17 Installing the new SMU



Step 6 Reconnect the cables to the new SMU11B panel based on the recorded information.

Step 7 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Put the replaced component in an ESD box or bag and return it to the local warehouse.

7.6.3 Replacing an SMU11C

Prerequisites

- An ESD wrist strap, ESD gloves, and ESD box or bag are available.
- The new SMU is intact.

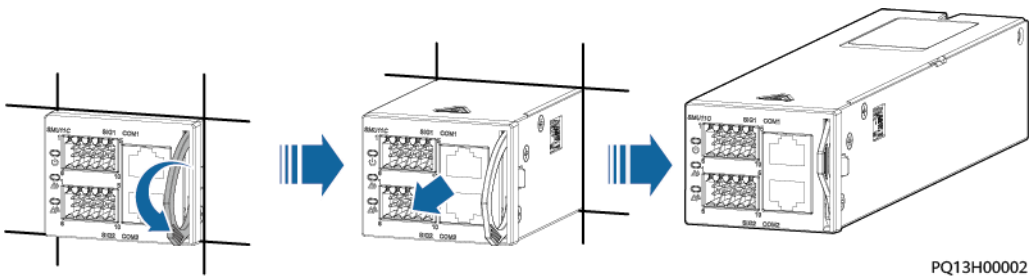
Procedure

Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Record the cable connection positions on the SMU panel, remove the COM communications cables, and remove the signal cable terminals.

Step 3 Pull out the handle to remove the SMU from the subrack.

Figure 7-18 Removing the old SMU



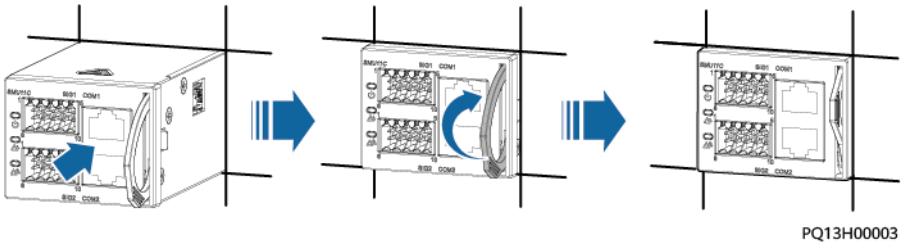
Step 4 Record the DIP switch settings on the SMU.

Step 5 Take out the new SMU and set the DIP switch based on the recorded information.

Step 6 Insert the new SMU into the slot and slide it into the subrack along the guide rails.

Step 7 Push the handle of the SMU upwards until it is in position.

Figure 7-19 Installing the new SMU



Step 8 Connect the signal cable terminals and COM communications cables to the panel of the new SMU based on the recorded information.

Step 9 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Put the removed component in an ESD box or bag and return it to the local warehouse.

7.6.4 Replacing a Circuit Breaker

Prerequisites

The new circuit breaker is intact.

NOTICE

- Before replacing a circuit breaker, switch the circuit breaker to OFF. Do not operate with power on.
- Power-off will disconnect the power supply to loads. Obtain prior consent from customers before replacing a circuit breaker.

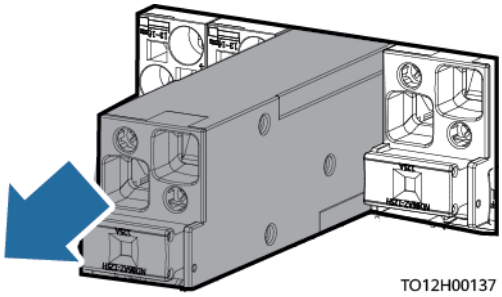
Procedure

Step 1 Switch off the circuit breaker to be replaced.

Step 2 Record the connection positions of cables, remove the cables, and insulate them.

Step 3 Remove the faulty circuit breaker.

Figure 7-20 Removing a circuit breaker



Step 4 Install the new circuit breaker.

Step 5 Connect cables to the circuit breaker based on the recorded cable information.

Step 6 Switch on the circuit breaker.

----End

Follow-up Procedure

Pack the removed component and send it to the local warehouse.

A Technical Specifications

Table A-1 Technical specifications

Item	Parameter Name	Description
Environment conditions	Operating temperature	–40°C to +65°C; when the operating temperature ranges from 55°C to 65°C, rectifier power is derated automatically.
	Transportation temperature	–40°C to +70°C
	Storage temperature	–40°C to +70°C
	Operating humidity	5%–90% RH (non-condensing)
	Storage humidity	5%–95% RH (non-condensing)
	Altitude	0–4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1°C for each additional 200 m.
	Other requirements	There is no conductive dust, corrosive gas, or explosion hazard. Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 3.1 requirements in ETSI EN 300 019-1-3 (V2.3.2 or a later version).
AC input	Input system	220/380 V AC three-phase four-wire (compatible with 220 V AC single-phase and 110 V AC dual-live wire)
	Rated voltage	200/346–240/415V AC
	Voltage range	85/148–300/520V AC
	Input frequency	45–65 Hz (rated frequency: 50 Hz/60 Hz)
DC input	Input system	HVDC (HV+, HV–) input

Item	Parameter Name	Description
	Rated voltage	380 V DC
	Voltage range	85–420 V DC
DC output	Output voltage range	–42 V DC to –58 V DC
	Maximum output power	10000W
	Regulated voltage precision	≤ ±1%
	Peak-peak noise voltage	≤ 200 mV
	Unbalance of load sharing	≤ ±5% (50%–100% load)
AC input protection	AC input overvoltage protection threshold	> 300 V AC
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output restores.
	AC input undervoltage protection threshold	< 80 V AC
	AC input undervoltage recovery threshold	When the voltage is restored to 85 V AC, the output restores.
DC input protection	DC input overvoltage protection threshold	> 420 V DC
	DC input overvoltage recovery threshold	When the voltage is restored to 414 V DC, the output restores.
DC output protection	DC output overvoltage protection threshold	Range: 56–60 V DC
EMC specifications	Conducted emission	Input ports: CISPR 22/EN 55032 Class B (AC input); Class A[1] (DC input)
		Output ports: CISPR 22/EN 55032 Class A
	Radiated interference	CISPR 22/EN 55032 Class B
	Harmonic	IEC61000-3-2/12

Item	Parameter Name	Description
	Fluctuation and flicker	IEC61000-3-3/11
	Electrostatic discharge (ESD)	Enclosure port: contact discharge 6 kV, air discharge 8 kV (criterion B); contact discharge 8 kV, air discharge 15 kV (criterion R); signal port: contact discharge 2 kV (criterion R)
	Electrical fast transient (EFT)	Signal port: 1 kV; power port: 2 kV (criterion B)
	Radiated susceptibility (RS)	10 V/m field strength (criterion A)
	Conducted susceptibility (CS)	Power port: 10 V; signal port: 3 V (criterion A)
	Surge susceptibility (Surge)	AC power port: horizontal 6 kV (line to line), vertical 6 kV (single-wire to ground), 1.2/50 μs (criterion B) DC power port: 2 kV in differential mode, 4 kV in common mode, 1.2/50 μs (criterion B) Signal cables inside the cabinet: 1 kV in common mode, 1.2/50 μs (criterion B) Signal cables outside the cabinet: 2 kV in common mode, 1.2/50 μs (criterion B)
	Voltage dip (DIP)	Complies with IEC 61000-4-11.
Others	Safety design	Complies with IEC 60950-1/IEC 62368-1/GB 4943 and CE certification.
	MTBF	250,000 hours
Structure	Dimensions (H x W x D)	86.1 mm x 442 mm x 255 mm (without mounting ears)
	Weight	≤16 kg (including five rectifiers and one monitoring module)
	IP rating	IP20
	Installation mode	Horizontally and vertically installed in a 19-inch rack
	Maintenance mode	Maintained from the front
	Heat dissipation mode	Free cooling

NOTE

This is a class A product and may cause radio interference in residential areas. Therefore, you may need to take adequate safety measures to prevent radio interference.

B Symbol Conventions

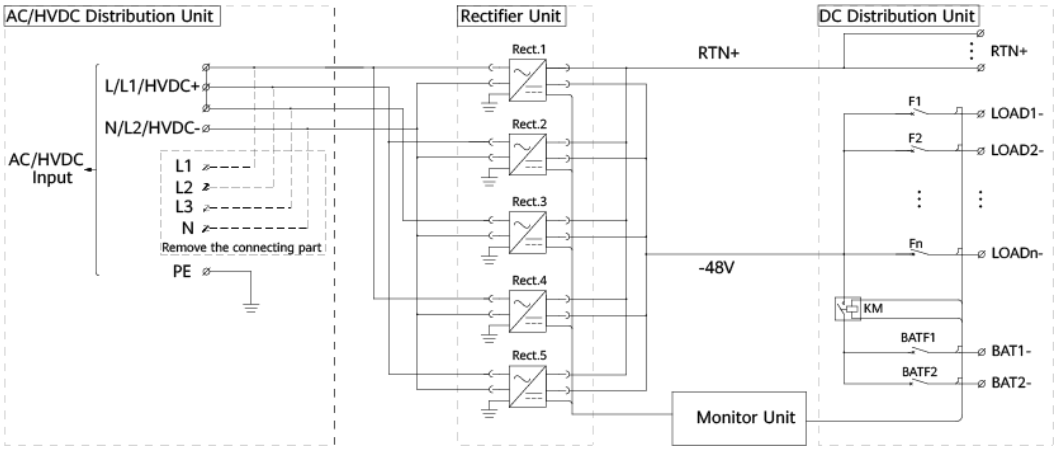
To ensure personal and equipment safety, observe all the safety instructions marked on the equipment when installing, operating, and maintaining the equipment.

Symbol	Description
	Indicates a part exposed to high voltage. This symbol warns operators that both direct and indirect contact with the power grid voltage is fatal. This symbol is attached to a position with dangerous voltages or a power protective cover which may be removed during maintenance.
	Warns users of overheating. This symbol is attached to a device surface that may overheat and cause scalding. It warns users not to touch the surface during operations or maintenance. Users should wear heat insulation gloves before operations to prevent scalding.
 or 	Indicates protection earthing. This symbol is attached next to a protection ground terminal next to grounded equipment and an external ground system. An equipment ground cable is connected to an external ground bar through the protection ground terminal.
	Indicates equipotential bonding. This symbol is found with equipotential terminals inside equipment.
	Indicates electrostatic discharge (ESD). This symbol is used in all electrostatic sensitive areas. Before operating equipment in these areas, wear ESD gloves or an ESD wrist strap.
	Capacitors store hazardous energy. Open the chassis one minute after all power supplies are disconnected.

Symbol	Description
	Indicates that the equipment is safe to use at altitudes below 2000 m.
	Indicates that the equipment is not safe to use in tropical climates.
	Indicates a fan assembly or moving part. This symbol is silkscreened on or attached to the panel of a fan assembly, warning operators to keep away. Do not touch the blades when the fan is rotating.
 or  or  or 	This symbol is used when the usage of a device port cannot be clearly described. It prompts users to refer to the instruction. This symbol can be used in but not limited to the following scenarios: 1. For a multi-power device, use it near the power supply to replace the multi-power supply identifier. The symbol indicates that the device has multiple power inputs. Therefore, when powering off the device, you must disconnect all power inputs. 2. If there are multiple output interfaces, use the symbol near the output interfaces. Connect cables according to the rated power output and configuration parameter information in the instruction. 3. If there are multiple slots, use the symbol near the slot information. For details, see the description of slot information, restrictions on boards, and usage conditions in the instruction.

C Electrical Conceptual Diagram

Figure C-1 Electrical conceptual diagram



D Acronyms and Abbreviations

A	
ACDB	alternating current distribution box
C	
CS	conducted susceptibility
D	
DI	digital input
DO	digital output
E	
EFT	electrical fast transient
EMC	electromagnetic compatibility
ESD	electrostatic discharge
I	
IP	Internet Protocol
M	
MTBF	mean time between failures
P	
PF	power factor
R	
RS	radiated susceptibility

S	
SMU	site monitoring unit
T	
THD	total harmonic distortion

