ETP48400-C3B1, ETP48400-C3B2 Embedded Power

User Manual

Issue 08

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HUAWEI

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About This Document

Purpose

This document describes a DC power system in terms of product overview, components, installation, commissioning, maintenance, and operations for the site monitoring unit (SMU) and rectifiers.

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 document are defined as follows.

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

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Symbol	Description
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 08 (2023-05-30)

Updated the safety information in this document.

Updated the step 3 in the section "Connecting the Lithium Battery Supply."

Issue 07 (2022-06-28)

Added the cable connections of the DCDB48-400-4C.

Issue 06 (2021-05-10)

Updated **2.1 Product Overview** and **4.1.2 Tools**.

Issue 05 (2020-03-25)

Updated **6.9 Setting Peak Shaving parameters**.

Issue 04 (2020-01-07)

Updated some contents.

Issue 03 (2019-11-18)

Updated some contents.

Issue 02 (2019-10-25)

Added the description about DCDB parameter settings.

Deleted the description about the app.

Issue 01 (2019-05-30)

This issue is the first official release.

The SMU software version is SMU V500R003C00.

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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

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- 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.

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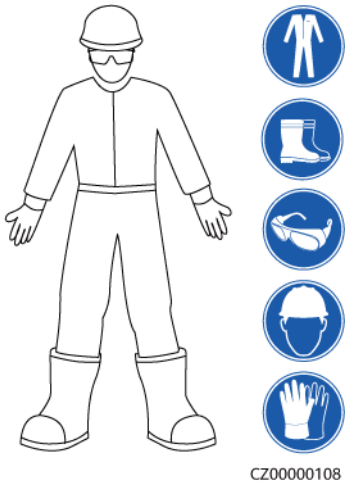
WARNING

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

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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.

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CAUTION

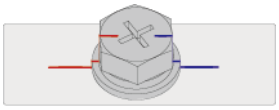
Do not route cables near the air intake or exhaust vents of the equipment.

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 should 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.

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- 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.

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.

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- 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.

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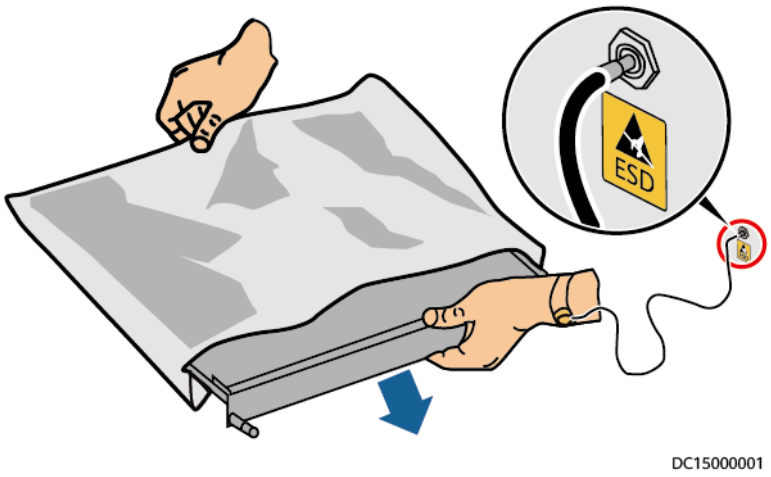
Figure 1-2 Wearing an ESD wrist strap



- 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.

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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 rodent guards 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.

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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.

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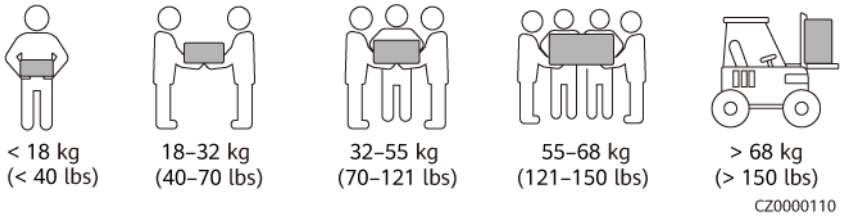
- When performing operations over the top of the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

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°.

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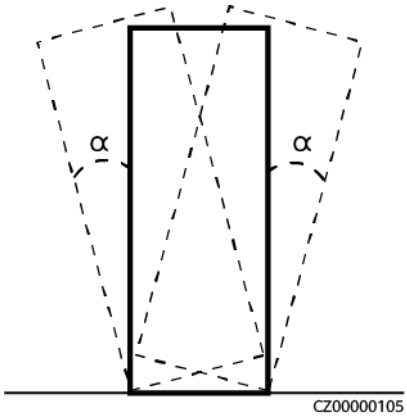

Working at Heights

- Any operations performed 2 meters or higher above the ground should 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 should be transported by slings, hanging baskets, highline trolleys, 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.

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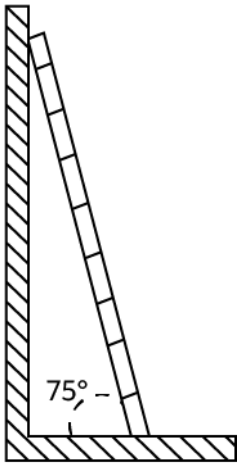
- Platform ladders with protective rails are preferred. Single ladders are not recommended.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned and held firm.

- 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.



- 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.

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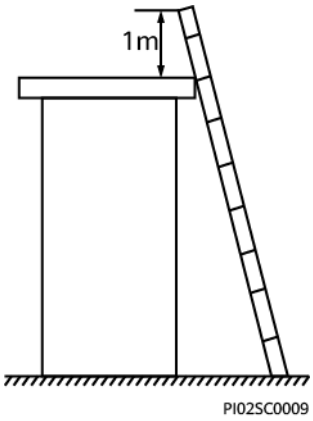

1.5 Battery Safety

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 releases 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 sundries into batteries, squeeze batteries, or immerse batteries in water or other liquids.

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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 manufacturer.

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 improperly treated, 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 production of gases such as CO and H_2. To prevent fire or device corrosion, ensure that flammable gas is properly exhausted.

DANGER

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

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 extinguishing facilities, such as fire fighting sands 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.

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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 damage or other consequences to the batteries it provides due to the following reasons:

- Batteries are damaged 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.
- Batteries are damaged because 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 damaged, fall, leak, or crack due to improper operations or incorrect connection.
- After being installed and connected to the system, the batteries are not powered on in time due to your reasons, which causes damage to the batteries due to overdischarge.

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- Batteries are damaged because they are not accepted in time due to your reasons.
- You set battery operating parameters incorrectly.
- Different types of batteries, such as batteries of different vendors, rated capacity specifications, or aging degrees, are used together, accelerating capacity attenuation.
- Batteries are frequently overdischarged due to your improper maintenance, you expand the load capacity without notifying us, or have not fully charge batteries for a long time.
- You do not perform battery maintenance based on the operation guide, such as failure to check battery terminals regularly.
- Batteries are damaged because you do not store them in accordance with storage requirements (for example, in an environment that is damp or prone to rain).
- Batteries are not charged as required during storage due to your reasons, resulting in capacity loss or other irreversible damages to the batteries.
- Batteries are damaged due to your or a third party's reasons, for example, relocating or reinstalling the batteries without complying with the Company's requirements.
- You change the battery use scenarios without notifying the Company.
- You connect extra loads to the batteries.
- The battery storage period has exceeded the upper limit.
- The battery warranty period has expired.

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 not provided by it.

- 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 additional safety precautions, see the instructions provided by the battery manufacturer.
- 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.
- Do not short-circuit the battery loop. A short circuit automatically triggers battery protection. Repeated short circuits may lead to battery faults and other risks including fire.

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- 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.
- 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 a battery within 24 hours 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.
- 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 irritant or scorched smell around the battery.
- 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.
- The bottom of the battery must be at least 10 cm away from the ground to prevent water intrusion and battery burning.
- 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 are left unused 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.

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- 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. Should 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.

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2 Product Overview

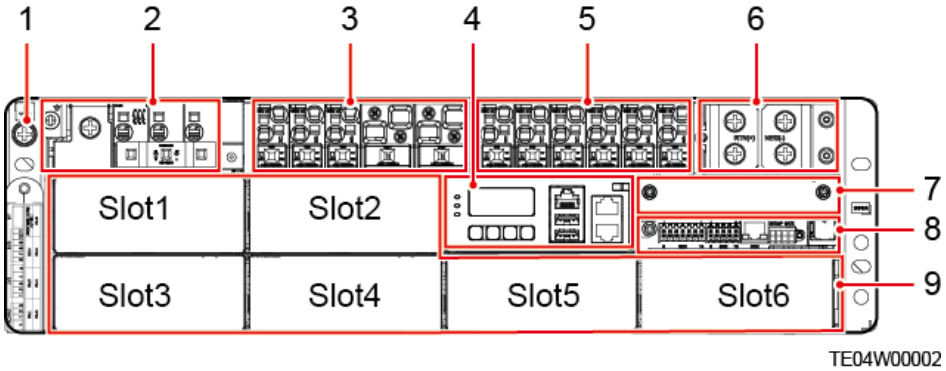
2.1 Product Overview

The ETP48400-C3B1 and ETP48400-C3B2 are embedded power systems that convert AC power into DC power. They supply –48 V or –57 V constant voltage to load equipment. The maximum capacity of the ETP48400-C3B1 is 24 kW, and the maximum capacity of the ETP48400-C3B2 is 18 kW. They apply to newly built sites as well as capacity expansion and reconstruction of existing sites. The intelligent power distribution unit DCDB48-200-16B/DCDB48-200-16B-XXX and lead-acid battery box DCDB48-400-4C are optional components.

2.2 Product Introduction

ETP48400-C3B1/ETP48400-C3B2

Figure 2-1 ETP48400-C3B1 appearance



(1) Ground screw
(2) AC input module
(3) LLVD power distribution
(4) SMU02C
(5) BLVD power distribution
(6) Battery wiring ports
(7) Reserved slot for CIM02C/NIM01C3
(8) UIM05B1
(9) Space for rectifiers

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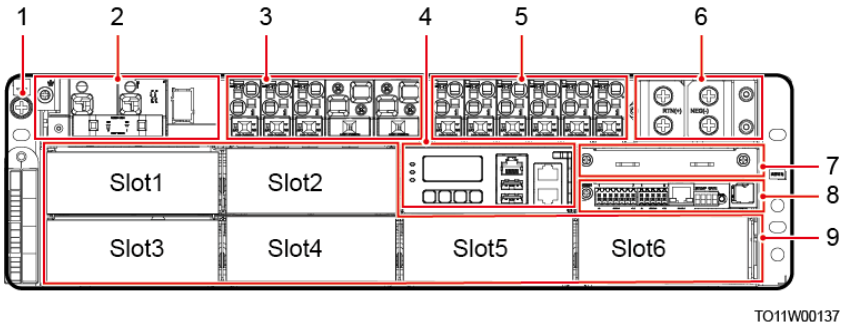
Figure 2-2 ETP48400-C3B2 appearance



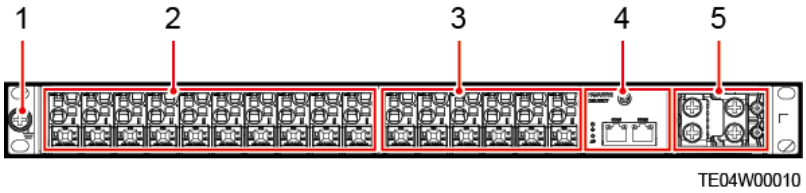
(1) Ground screw
(2) AC input module
(3) LLVD power distribution
(4) SMU02C
(5) BLVD power distribution
(6) Battery wiring ports
(7) Reserved slot for CIM02C/ NIM01C3
(8) UIM05B1
(9) Space for rectifiers

Table 2-1 System specifications

Item	ETP48400-C3B1	ETP48400-C3B2
AC input system	220/380 V AC three-phase four-wire, compatible with 220 V AC single-phase	120/240 V AC dual–live wire
DC power distribution	• LLVD: two 125 A and three 63 A circuit breakers • BLVD: two 63 A, two 32 A, and two 16 A circuit breakers	
Surge protection	• AC surge protection: nominal surge discharge current: 30 kA (8/20 µs), five times respectively in the positive and negative directions • DC surge protection: 10 kA (8/20 µs) in differential mode, 20 kA (8/20 µs) in common mode	

(Optional) Intelligent Power Distribution Unit

Figure 2-3 DCDB48-200-16B appearance



(1) Ground screw
(2) LLVD power distribution
(3) BLVD power distribution
(4) DMU02C1
(5) DC input ports

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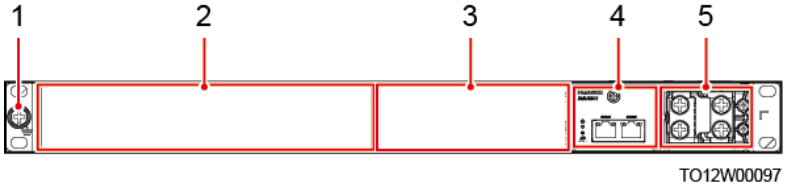
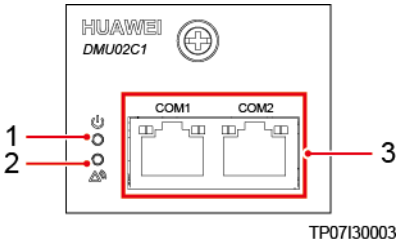
Figure 2-4 DCDB48-200-16B-XXX appearance



(1) Ground screw
(2) LLVD power distribution
(3) BLVD power distribution
(4) DMU02C1
(5) DC input ports

Figure 2-5 DMU02C1 panel



(1) Run indicator
(2) Alarm indicator
(3) RS485 communications ports

Table 2-2 Indicator description

Name	Color	Status	Description
Run indicator	Green	Off	The DMU is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The communications is normal.
		Blinking fast (4 Hz)	The communications fails.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm is generated.

Table 2-3 Communication port description

Communications Port	Communications Parameter	Communications Protocol
COM1/COM2	Baud rate: 9600 bit/s	Modbus protocol
NOTE All these ports are protected by a security mechanism.		

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Figure 2-6 Communication port pins

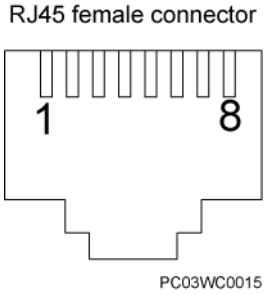
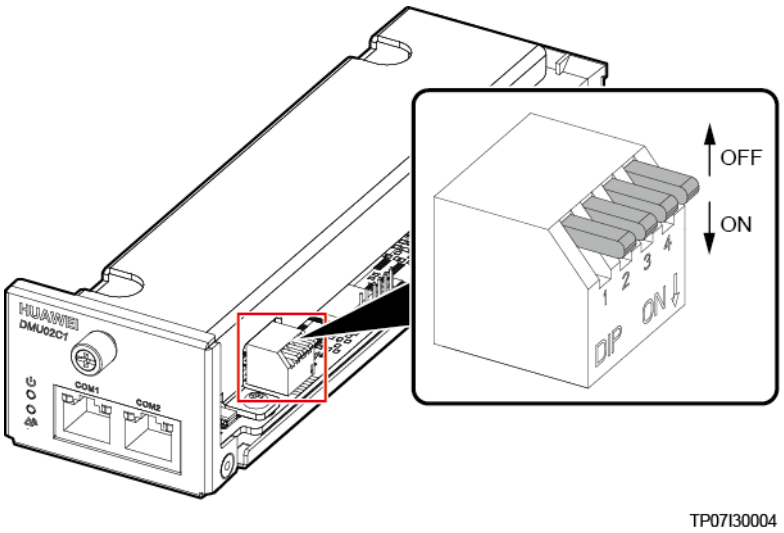


Table 2-4 Pin definitions for the RS485 port

Pin	Signal	Description
1	TX+	Transmits data over RS485
2	TX-	
4	RX+	Receives data over RS485
5	RX-	
3, 6, 7, 8	NA	–

Figure 2-7 DIP switch



NOTE

- When multiple DCDB48-200-16Bs are cascaded, you need to set the address DIP switch for the DMU02C1.
- If one DCDB48-200-16B is installed, you do not need to set the address DIP switch for the DMU02C1.

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Table 2-5 DIP switch description

Address of Intelligent Power Distribution Unit	Pin 1	Pin 2
1	OFF	OFF
2	OFF	ON
3	ON	OFF
4	ON	ON

NOTE

- If one contactor and one shunt are installed, for example, in a DCDB48-200-16B-4731, set pin3 to OFF and pin4 to OFF.
- If two contactors and one shunt are installed, for example, in a DCDB48-200-16B-4731-008, set pin3 to OFF and pin4 to ON.

Table 2-6 DCDB specifications

Item	DCDB48-200-16B	DCDB48-200-16B-XXX
Input voltage	40–60 V DC	
Total input current	Maximum: 200 A	
DC power distribution	• BLVD power distribution: two 1-pole 16 A, two 1-pole 20 A, and two 1-pole 32 A circuit breakers • LLVD power distribution: four 1-pole 32 A and six 1-pole 63 A circuit breakers	Supports a maximum of 16 circuit breakers. • BLVD configuration: A maximum of six 16 A, 20 A, 32 A, 40 A, or 63 A circuit breakers can be installed. • LLVD configuration 1: A maximum of ten 16 A, 20 A, 32 A, 40 A, or 63 A circuit breakers can be installed. • LLVD configuration 2: A maximum of seven 16 A, 20 A, 32 A, 40 A, or 63 A circuit breakers and two 80 A, 100 A, or 125 A circuit breakers can be installed.
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 255 mm	
Weight	≤ 10 kg	
Installation mode	Installed in a 19-inch rack	
Cabling mode	Routed in and out from the front	
Maintenance mode	Maintained from the front	

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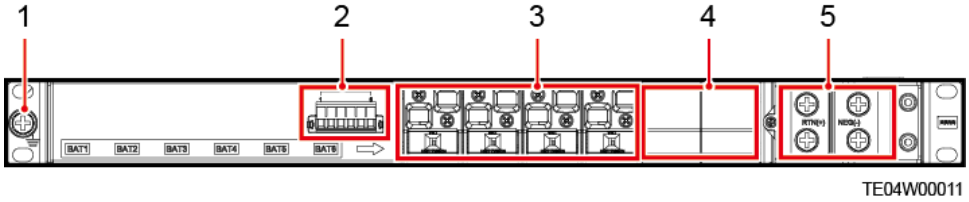
(Optional) DCDB48-400-4C

Figure 2-8 DCDB48-400-4C appearance



(1) Ground screw

(2) Battery circuit breaker status detection ports

(3) Battery power distribution

(4) Space reserved for battery power distribution

(5) DC input ports

Table 2-7 DCDB48-400-4C specifications

Item	Specifications
Input voltage	40–60 V DC
Total input current	Maximum: 400 A
DC power distribution	Four 1-pole 125 A circuit breakers
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 180 mm
Weight	≤ 4 kg
Installation mode	Installed in a 19-inch rack
Cabling mode	Routed in and out from the front
Maintenance mode	Maintained from the front

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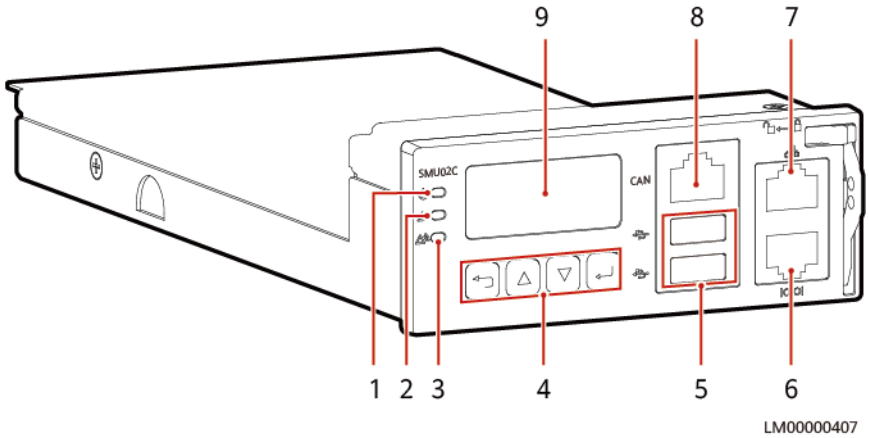
3 Components

3.1 Monitoring Module SMU02C (02312MML-009)

Figure 3-1 SMU02C



(1) Running indicator	(2) Minor alarm indicator	(3) Major alarm indicator
(4) Buttons	(5) USB ports (protected by a security protection mechanism)	(6) RS485/RS232 communications port
(7) FE port	(8) CAN communications port	(9) LCD

Indicators

Table 3-1 Indicator description

Item	Color	Status	Description
Running indicator	Green	Off	The SMU is faulty or has no DC input.

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Item	Color	Status	Description
		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.
		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.

Buttons

Table 3-2 Button description

Button	Name	Description
	Up	Scrolls menu items and sets parameters.
	Down	
	Back	Returns to the previous menu without saving the settings.
	OK	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves the submenu settings.
Note: • The LCD screen becomes dark if no button is pressed within 30s. • You need to log in again if no button is pressed within 1 minute. • Press and hold  or  to increase or decrease a parameter value quickly. • Hold down  and  for 10s to restart the SMU. • Hold down  and  (or ) for 2s to increase (or decrease) the LCD contrast.		

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USB Port

You can quickly deploy a site, import and export configuration files, export run logs, and upgrade software by inserting the USB flash drive that is specially used for site deployment into the USB port.

After installing a dedicated WiFi module on the USB port, you can access the WebUI locally.

NOTICE

Using a WiFi module not provided by the Company may cause function abnormalities or data loss. The Company will not be liable for any loss caused thereby.

Communications Ports

Table 3-3 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
FE	10M/100M autonegotiation	SNMP protocol	Connects to a third-party NMS.
		BIN protocol	Connects to a Huawei NMS.
		HTTPS protocol	Connects to a PC and manages the SMU over the WebUI.
		TCP-Modbus protocol	Adapts to Huawei TCP-Modbus and connects to a third-party NMS.
RS485/RS232	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	Master/Slave protocol	Connects to a Huawei NMS.
		YDN protocol	Connects to a third-party NMS.
CAN	Baud rate: 125 kbit/s	CAN protocol	Connects to Huawei southbound devices.
NOTE All the preceding ports are protected by security mechanisms.			

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Figure 3-2 Communications port pin definitions

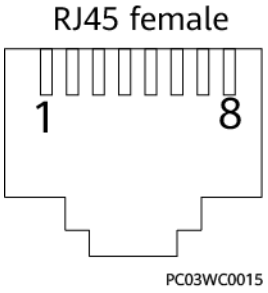

Table 3-4 Pin definitions for the FE port

Pin	Signal	Description
1	TX+	Transmit data over FE.
2	TX-	
3	RX+	Receive data over FE.
6	RX-	
4, 5, 7, 8	Null	-

Table 3-5 RS485/RS232 port pin definitions

Pin	Signal	Description
1	TX+	Transmit data over RS485.
2	TX-	
4	RX+	Receive data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Transmits data over RS232.
6	PGND	Protective earthing (PE)
8	Null	-

Table 3-6 Pin definitions for the CAN port

Pin	Signal	Description
1	RX+	Receive data over RS485.
2	RX-	
3	Null	-

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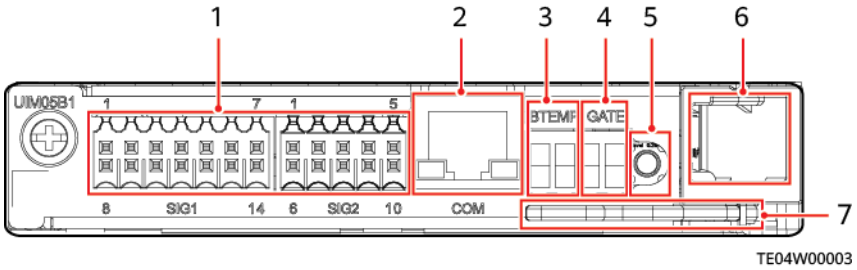
Pin	Signal	Description
4	TX+	Transmit data over RS485.
5	TX-	
6	Null	-
7	CANH	CAN bus high level
8	CANL	CAN bus low level

3.2 User Interface Module UIM05B1

Figure 3-3 Panel



(1) Dry contact and sensor ports

(2) COM communications port

(3) Battery temperature sensor port

(4) Door status sensor port

(5) Battery switch

(6) Cable hole for fan cables

(7) Handle

NOTE

The battery switch is used only when the mains is unavailable.

Figure 3-4 Dry contacts

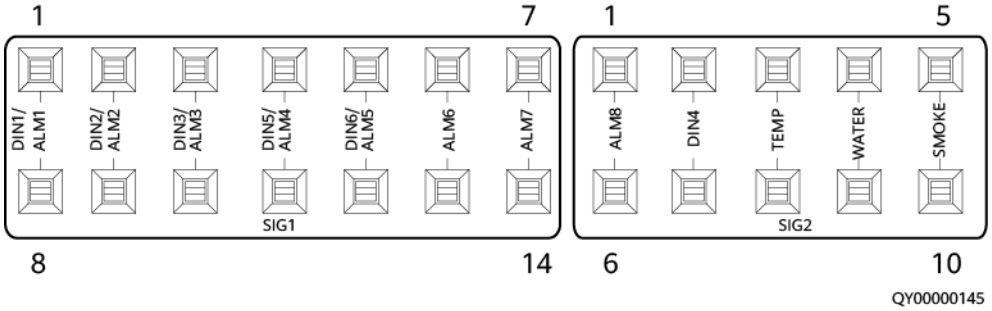


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Figure 3-5 Pins in a COM port

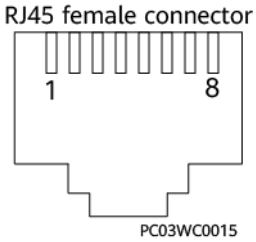

Table 3-7 Pin definitions for a COM port

Pin	Signal	Description
1	RS485_RX+	RS485 data +
2	RS485_RX–	RS485 data –
3	12 V	Power supply
4	RS485_TX+	RS485 data +
5	RS485_TX–	RS485 data –
6	GND	Grounding
7	N/A	-
8	GND	Grounding

3.3 Communications Expansion Module NIM01C3

The communications expansion module is used for 4G communication. It provides extra RS485/CAN ports for the SMU to connect to southbound communications equipment.

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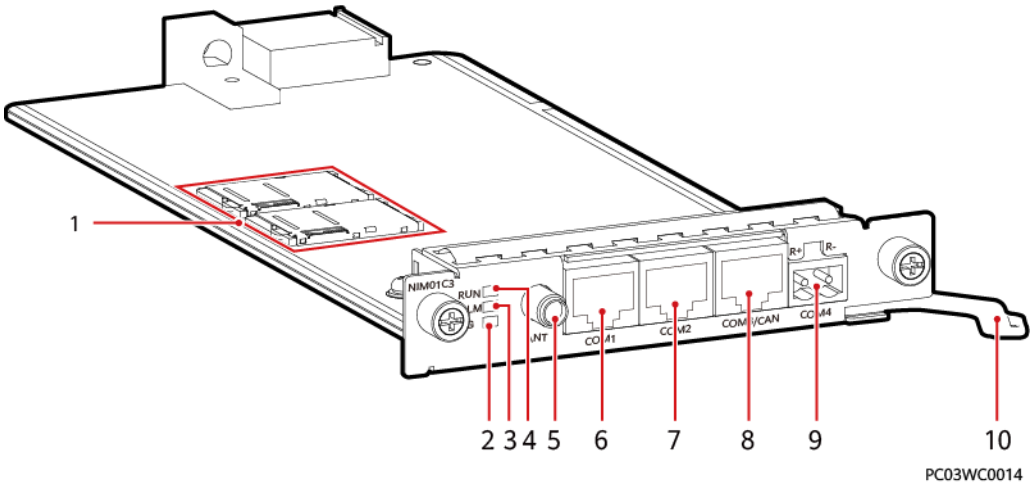
Figure 3-6 Panel



(1) SIM card slots (2 PCS)
(2) 4G indicator
(3) Alarm indicator
(4) Running indicator
(5) ANT antenna port
(6) COM1 port
(7) COM2 port
(8) COM3/CAN port
(9) COM4 port
(10) Handle

Indicators

Table 3-8 Indicator description

Item	Color	Status	Description
4G indicator	Green	Steady on	The dial-up connection is in the data service state.
		Blinking at intervals of 2s (on for 0.1s and then off for 1.9s)	A network has been registered.
		Blinking at intervals of 2s (on for 0.1s, off for 0.1s, on for 0.1s, and then off for 1.7s)	Network search is in progress or no available network is found.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm is generated.
Running indicator	Green	Off	The board is not running because it is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The board is running and communicating with the host properly.

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Item	Color	Status	Description
		Blinking fast (4 Hz)	The board is running properly, but fails to communicate with the host.

Communications Ports

Table 3-9 Communications port description

Communications Port	Communications Parameter	Description
COM1	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Supports master/slave and Modbus protocols. Supplies 12 V power.
COM2	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Supports master/slave and Modbus protocols. Supplies 12 V power.
COM3/CAN	Baud rate: 9600 bit/s	COM3: Supports master/slave and Modbus protocols. CAN: Supports the CAN protocol.
COM4	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Supports the Modbus protocol.

Figure 3-7 Pins in the COM1, COM2, or COM3 port

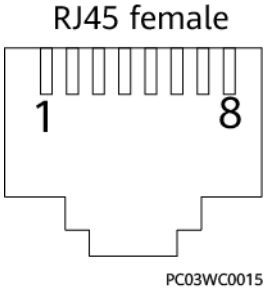

Table 3-10 Pin definitions for the COM1 and COM2 ports

Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX-	
3	12V	Power supply

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Pin	Signal	Description
4	RS485_TX+	Transmit data over RS485.
5	RS485_TX-	
6	Null	-
7	Null	-
8	GND	Grounding

Table 3-11 Pin definitions for the COM3/CAN port

Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX-	
3	Null	-
4	RS485_TX+	Transmit data over RS485.
5	RS485_TX-	
6	GND	Grounding
7	CANH	CAN bus high level
8	CANL	CAN bus low level

Table 3-12 Pin definitions for the COM4 port

Pin	Signal	Description
R+	RS485+	RS485 data, positive
R-	RS485-	RS485 data, negative

3.4 Communications Expansion Module CIM02C

The module is used to provide extra RS485/CAN ports for the SMU and supply 12 V power to southbound devices.

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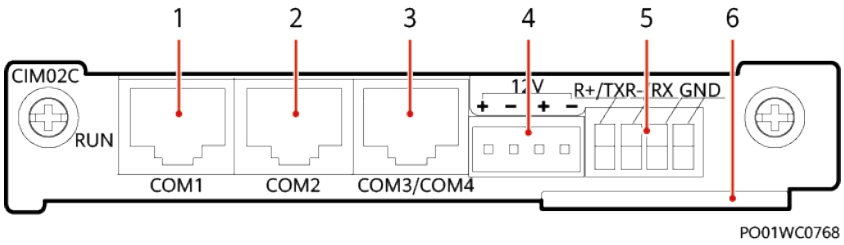
Figure 3-8 Panel



(1) COM1 port
(2) COM2 port
(3) COM3 or COM4 port
(4) 12 V power port
(5) COM5 port
(6) Handle

Table 3-13 Communications port description

Communications Port	Description	Communications Parameter
COM1	• Supports RS485. • Supplies 12 V power. • Connects to a smart device.	Baud rate: 9600 bit/s by default Options: 9600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s
COM2	• Supports RS485. • Supplies 12 V power. • Connects to a smart device.	
COM3/COM4	COM3 supports RS485 and connects to a smart device. When COM3 is used to connect to outdoor devices, reserve only the wires corresponding to pins 1, 2, 4, and 5 to avoid surge risks. COM4 supports RS232 and CAN. RS232 is used by default, which can be changed to CAN by using a jumper. For the operation method, see the appendix. COM4 mainly connects indoor smart devices. If it is connected to outdoor smart devices, surge risks may occur.	
COM5	• Supports RS485 and RS232. RS485 is used by default, which can be changed to RS232 by using a jumper. For the operation method, see the appendix. • Connects to an air conditioner.	

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Figure 3-9 Pin definitions for the COM1, COM2, COM3, or COM4 communication port

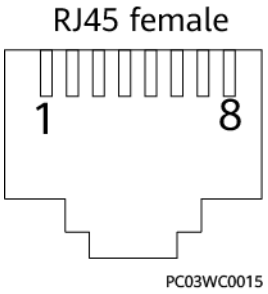

Table 3-14 Pin definitions for the COM1 and COM2 ports

Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX-	
3	12V	Power supply
4	RS485_TX+	Transmit data over RS485.
5	RS485_TX-	
6	Null	-
7	Null	-
8	GND	Grounding

Table 3-15 Pin definitions for the COM3 and COM4 ports

Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX-	
3	RS232_RXD	Receives data over RS232.
4	RS485_TX+	Transmit data over RS485.
5	RS485_TX-	
6	GND	Grounding
7	CANH/RS232_TXD	CAN data, positive/Transmits data over RS232.
8	CANL	CAN data, negative

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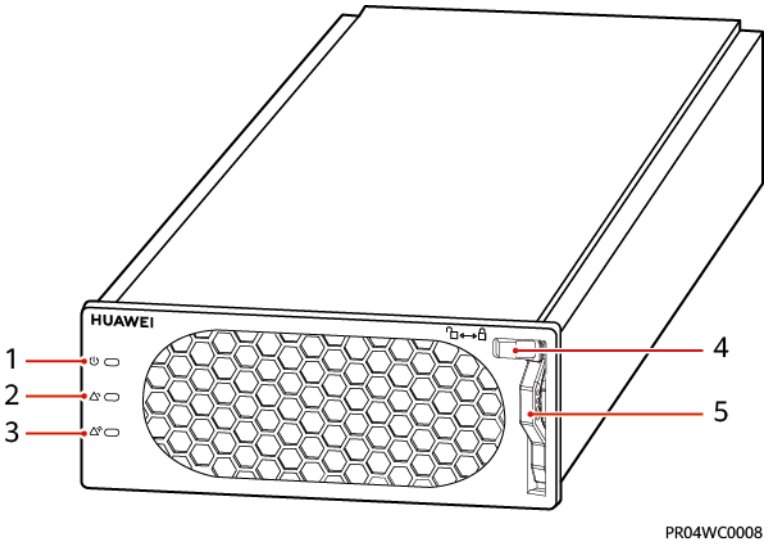
Table 3-16 COM5 communications port pin definitions

Silk Screen	Signal	Description
R+/TX	RS485+/ RS232_TXD	RS485 data, positive/Transmits data over RS232.
R-/RX	RS485-/ RS232_RXD	RS485 data, negative/Receives data over RS232.
GND	GND	Grounding

3.5 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 3-17 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.

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Indicator	Color	Status	Description
		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.

3.6 Digital Temperature and Humidity Sensor

A digital temperature and humidity sensor detects the indoor ambient temperature and humidity in real time.

Figure 3-11 Appearance 1

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Figure 3-12 Appearance 2

DIP Switch

The following figure shows the DIP switch on a digital T/H sensor. The following table describes the DIP switch settings.

Figure 3-13 DIP switch 1

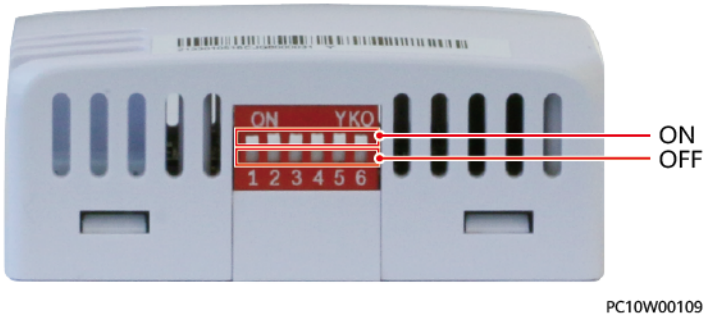

Figure 3-14 DIP switch 2

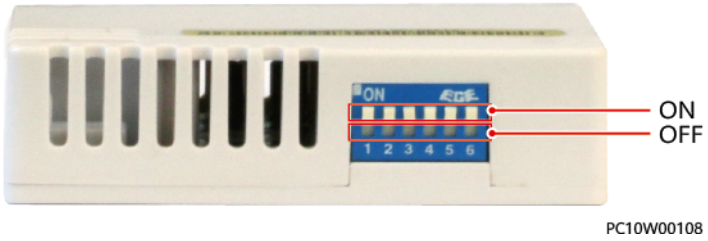

Table 3-18 DIP switch settings

Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4	Toggle Switch 5	Toggle Switch 6	T/H Sensor Address
ON	ON	OFF	OFF	ON	ON	51
OFF	OFF	ON	OFF	ON	ON	52

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4 System Installation

NOTICE

- To prevent the equipment from falling over, secure it to a pallet truck using ropes before moving it. Move the equipment with caution to avoid bumping or falling, which may damage the equipment.
- 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.

4.1 Preparing for the Installation

4.1.1 Preparing Cables

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

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

Table 4-1 Preparing cables for the ETP48400-C3B1 and ETP48400-C3B2

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area (mm^2)	Maximum Cross-Sectional Area (mm^2)
AIU03B (three-phase with the neutral wire connected)	Live wire	63	10 (cord end terminal with an insertion depth of 18 mm)	16 (bare wire)
	Neutral wire	63	16 (M6 OT terminal)	25 (bare wire)
	PE wire	63	16 (M6 OT terminal)	35 (bare wire)

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Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area (mm^2)	Maximum Cross-Sectional Area (mm^2)
AIU03C (three-phase with the neutral wire connected or disconnected)	Live wire L1	63	10 (cord end terminal with an insertion depth of 18 mm)	16 (bare wire)
	Live wire L2	63	10 (cord end terminal with an insertion depth of 18 mm)	16 (bare wire)
	Live wire L3	63	10 (cord end terminal with an insertion depth of 18 mm)	16 (bare wire)
	Neutral wire	63	10 (cord end terminal with an insertion depth of 18 mm)	16 (bare wire)
	PE wire	63	16 (M6 OT terminal)	35 (M6 OT terminal)
AIU02 (single-phase)	Live wire	144	25 (M6 OT terminal)	35 (M6 OT terminal)
	Neutral wire	144	25 (M6 OT terminal)	35 (M6 OT terminal)
	PE wire	90	16 (M6 OT terminal)	35 (M6 OT terminal)
AIU02 (dual-live wire)	Live wire L1	125	25 (cord end terminal with an insertion depth of 18 mm)	35 (cord end terminal with an insertion depth of 18 mm)
	Live wire L2	125	25 (cord end terminal with an insertion depth of 18 mm)	35 (cord end terminal with an insertion depth of 18 mm)
	PE wire	90	16 (M6 OT terminal)	35 (M6 OT terminal)
DC output power cable	-	16	1.5	16 (bare wire)
	-	32	4	16 (bare wire)
	-	63	10	16 (bare wire)
	-	80	10	35
	-	100	16	35
	-	125	25	35
Battery cable		350	35 (M6 OT terminal); 2 PCS	50 (M6 terminal with a width less than 16 mm); 2 PCS

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Cable Type	Maximum Current (A)	Minimum Cross-Sectional Area (mm^2)	Maximum Cross-Sectional Area (mm^2)

NOTE

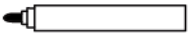
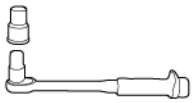
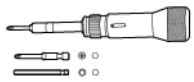
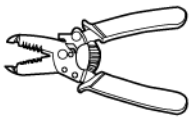
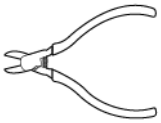
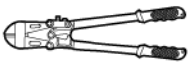
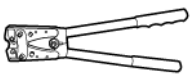
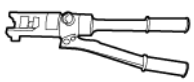
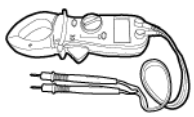
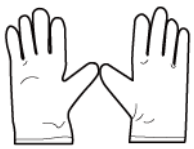
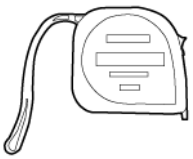
- The size data in the table is applicable when the ambient temperature is 30°C (in air) and only cables in a single loop are involved.
- When the ambient temperature is not 30°C or cables in multiple loops are routed together, use cables with larger cross-sectional areas if the cabling distance is long.
- 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

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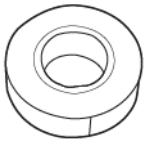
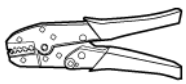
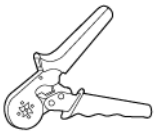
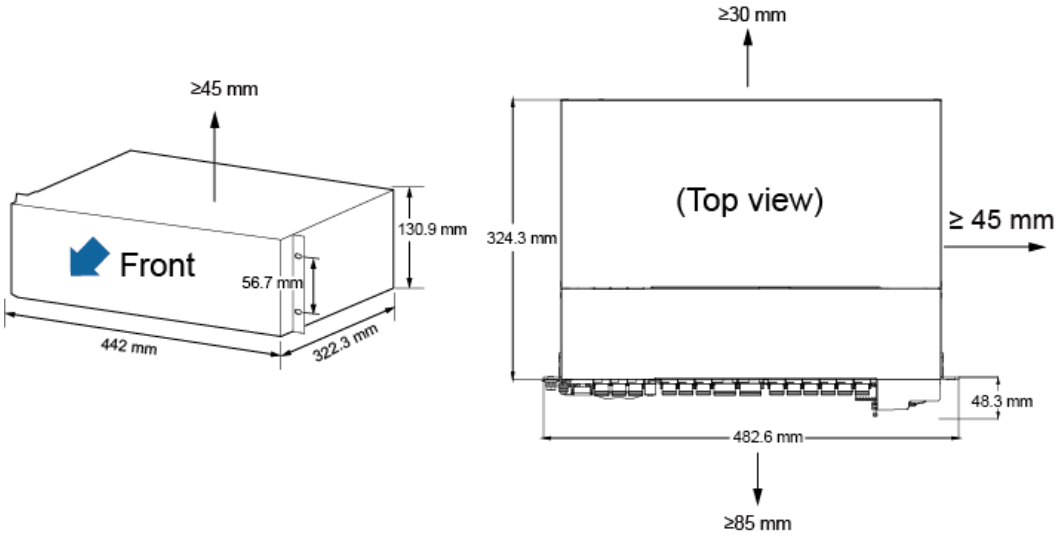
 Heat shrink tubing	 PVC insulation tape	 Crimping tool	 Cord end terminal crimper	

4.1.3 Installation Dimensions

Figure 4-1 Installation dimensions for the ETP48400-C3B1 and ETP48400-C3B2



NOTE

48.3 mm indicates that the distance between a power subrack mounting ear and the front of the subrack is about 48.3 mm.

Figure 4-2 Installation dimensions for an intelligent power distribution unit

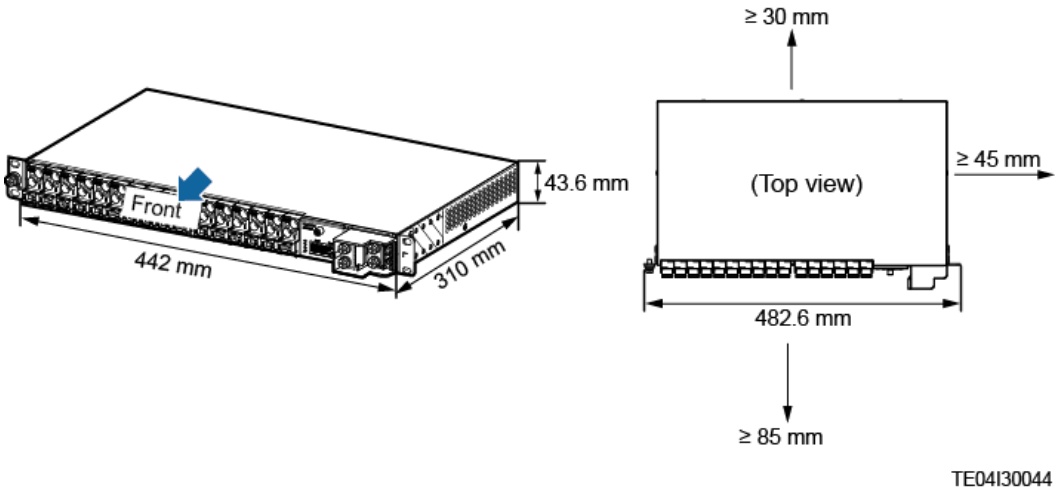


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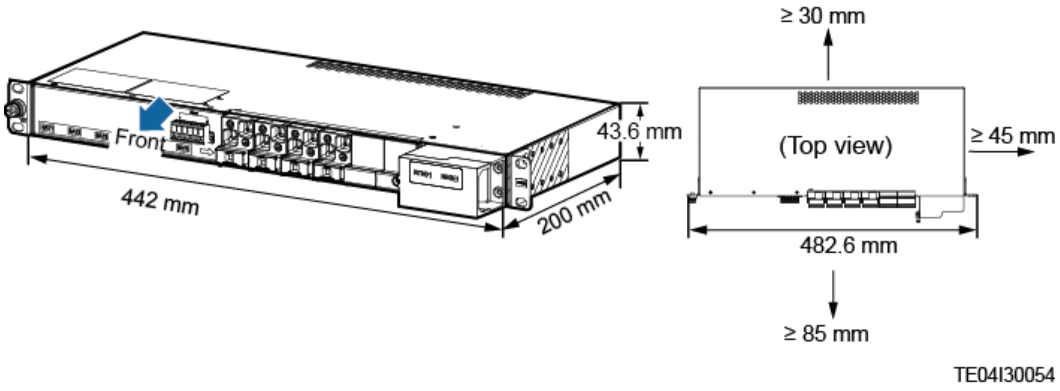
Figure 4-3 Installation dimensions for a lead-acid battery box

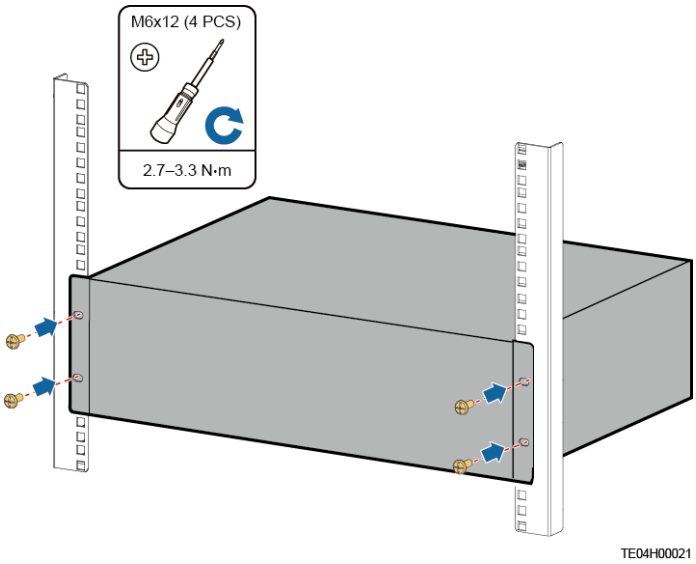


4.2 Installing Devices

Procedure

Step 1 Install a subrack in a 19-inch rack.

Figure 4-4 Installing the ETP48400-C3B1 or ETP48400-C3B2 subrack



Step 2 Install an intelligent power distribution unit in the 19-inch rack.

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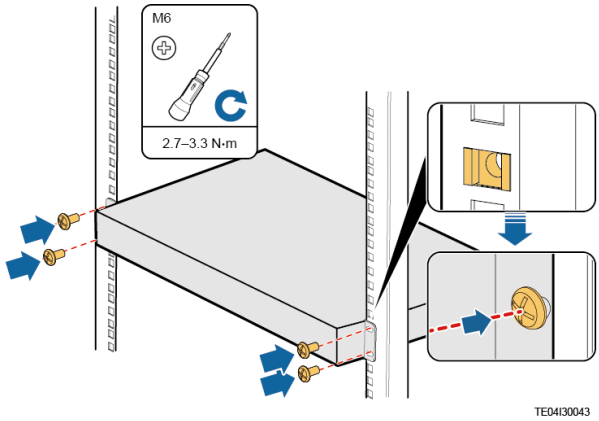
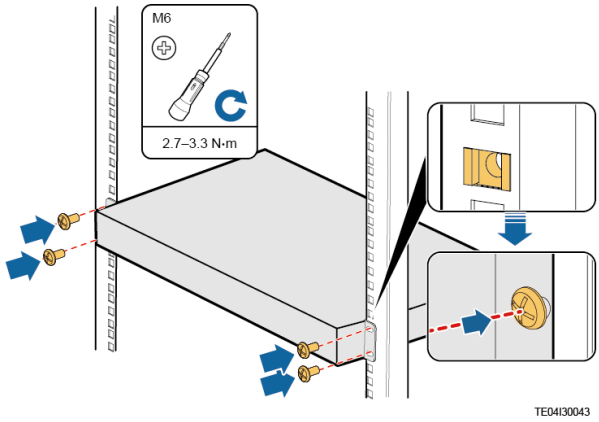
Figure 4-5 Installing an intelligent power distribution unit



Step 3 Install a lead-acid battery box in the 19-inch rack.

Figure 4-6 Installing a lead-acid battery box



----End

4.3 Installing Ground Cables

CAUTION

Ensure that the ground cables are installed securely. Inappropriate grounding may cause device damage and personal injury.

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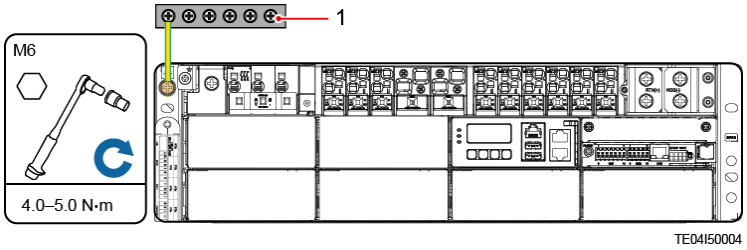
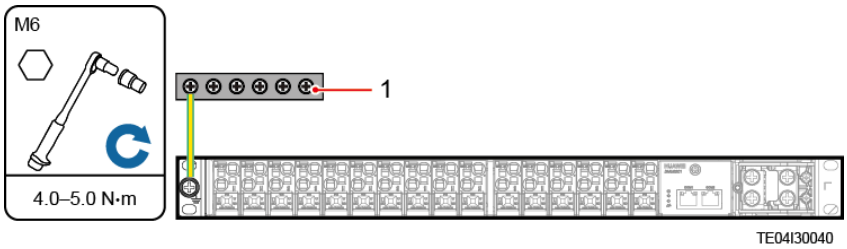
Figure 4-7 Installing a ground cable for the ETP48400-C3B1 or ETP48400-C3B2



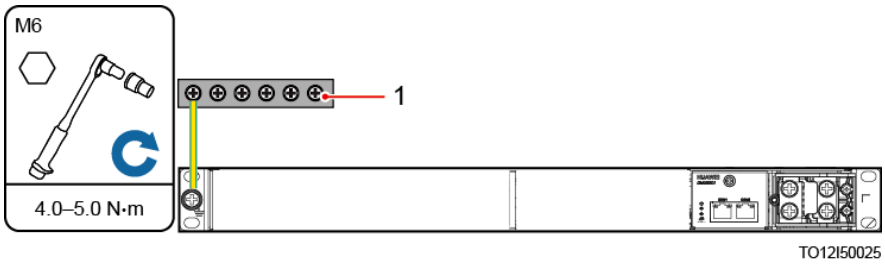
(1) Ground bar

Figure 4-8 Installing a ground cable for the DCDB48-200-16B



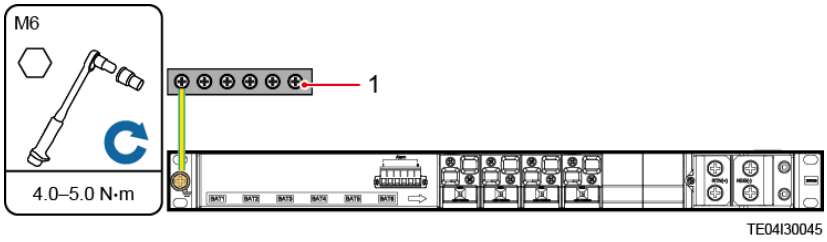
(1) Ground bar

Figure 4-9 Installing a ground cable for the DCDB48-200-16B-XXX



(1) Ground bar

Figure 4-10 Installing a ground cable for the lead-acid battery box



(1) Ground bar

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4.4 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.

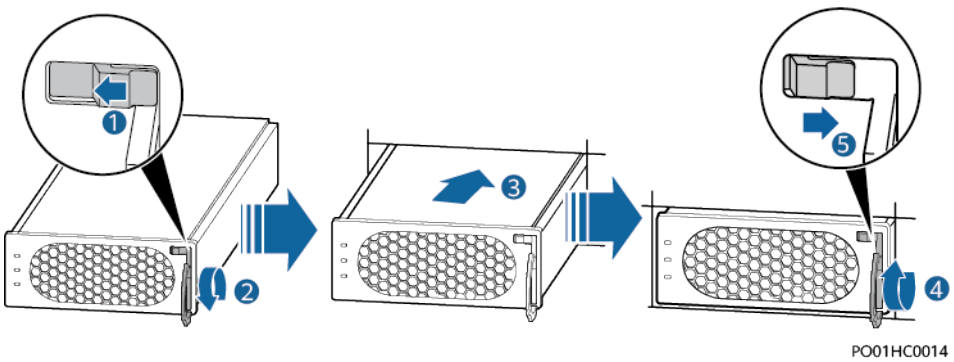
Step 2 Draw the handle downwards.

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 4-11 Installing a rectifier



----End

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4.5 Installing a Circuit Breaker

Prerequisites

If a circuit breaker is required, perform the following steps to install it.

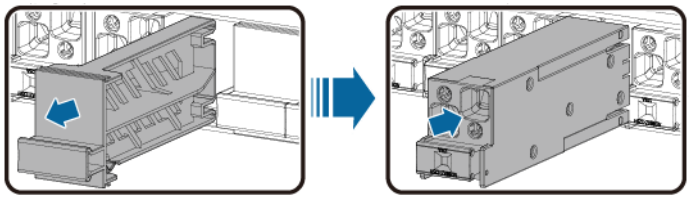
Procedure

Step 1 Install a circuit breaker in the slot.

Step 2 Switch off the circuit breaker to be installed. (The view window turns green.)

Step 3 Push the circuit breaker so that it is aligned with the subrack.

Figure 4-12 Installing a circuit breaker



----End

4.6 Installing a Digital Temperature and Humidity Sensor

Prerequisites

If a digital temperature and humidity sensor is required, perform the following steps to install it.

Procedure

Step 1 Attach the digital temperature and humidity sensor to the side panel of the cabinet.

NOTE

There is a magnet at the bottom of the digital temperature and humidity sensor, which can be directly attached to the side panel of the cabinet.

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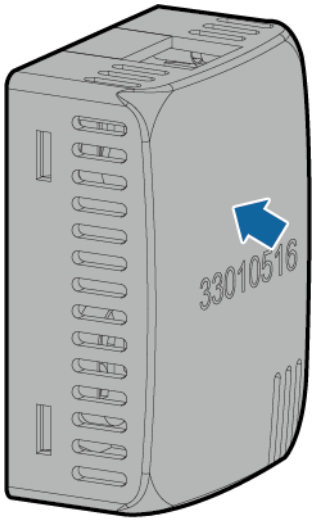
Figure 4-13 Installing a digital temperature and humidity sensor



Step 2 Connect the communications cable for the digital temperature and humidity sensor to the COM port on the communications expansion module or UIM.

NOTE

The communications cables in the figures are connected to communications expansion modules.

Figure 4-14 Installing a communications cable for a digital temperature and humidity sensor

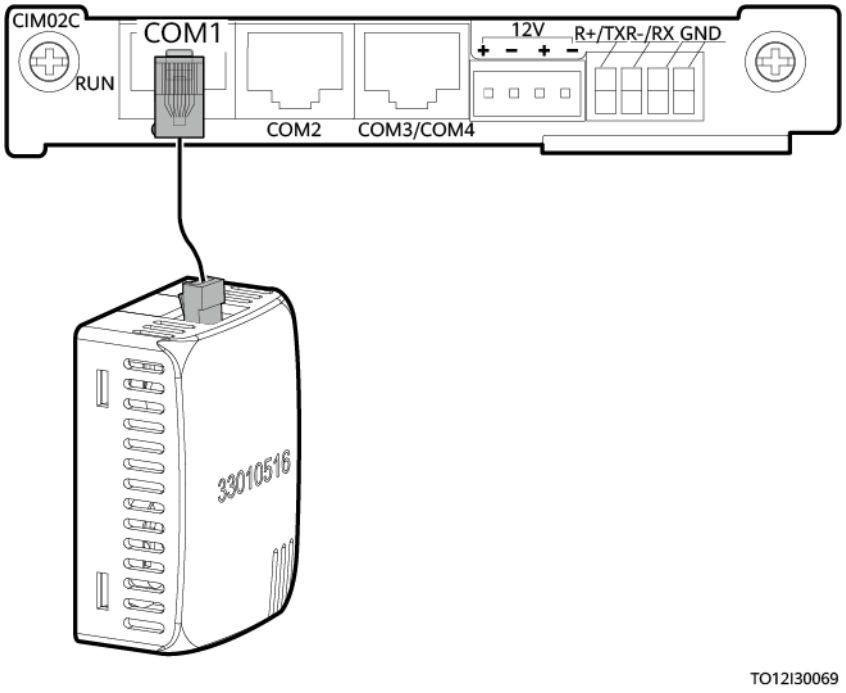


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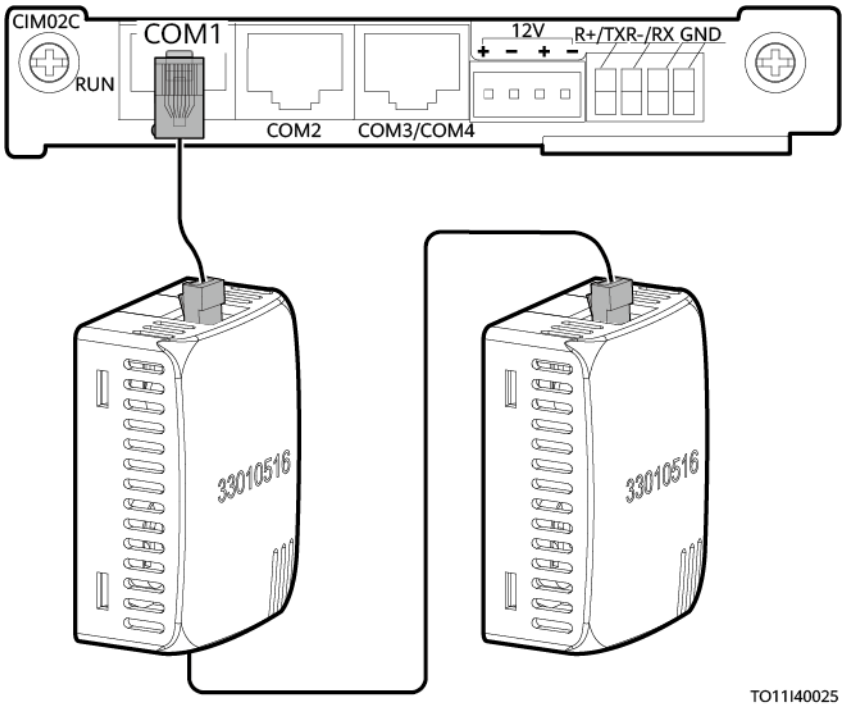
Figure 4-15 Installing communications cables for cascaded digital temperature and humidity sensors



Step 3 Set the DIP address.

Table 4-3 DIP switch settings

Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4	Toggle Switch 5	Toggle Switch 6	Address of Digital Temperature and Humidity Sensor
ON	ON	OFF	OFF	ON	ON	51
OFF	OFF	ON	OFF	ON	ON	52

----End

4.7 Installing a Communications Expansion Module NIM01C3

Context

If an NIM01C3 is required, perform the following steps to install it.

Procedure

Step 1 Wear an ESD wrist strap or ESD gloves.

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Step 2 Remove the filler panel from the slot for installing the communications expansion module.

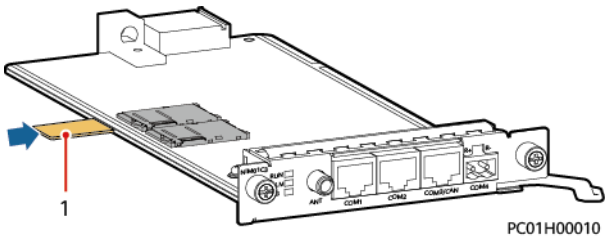
Step 3 (Optional) Install a SIM card in the communications expansion module.

NOTICE

This step is required if the NIM01C3 is used for 4G wireless networking.

The SIM card inserted into the communications expansion module (NIM01C3) should support GSM, WCDMA, TD-SCDMA, TDD, and FDD standards, and have the SMS and data service functions enabled.

Figure 4-16 Installing a SIM card



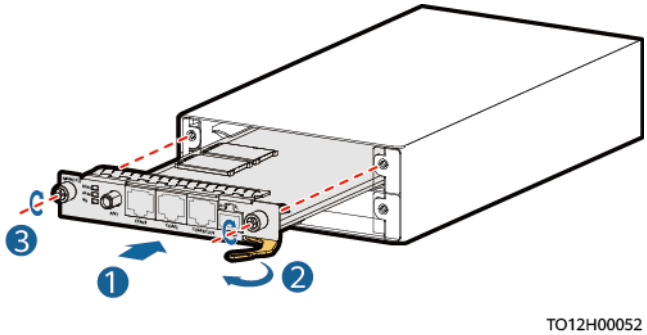
(1) SIM card

Step 4 Draw the handle rightwards.

Step 5 Gently insert the communications expansion module into its slot along the guide rails.

Step 6 Push the handle leftwards and tighten the screws.

Figure 4-17 Installing a communications expansion module NIM01C3



----End

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4.8 Installing a Communications Expansion Module CIM02C

Procedure

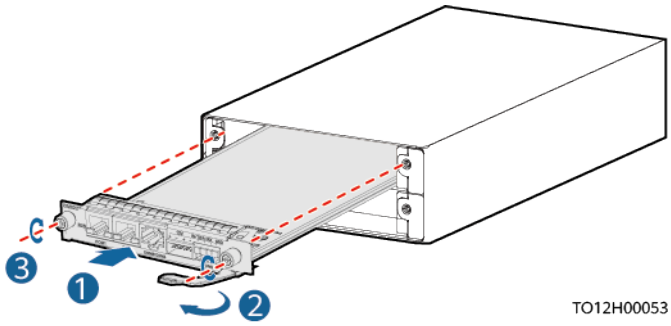
Step 1 Remove the filler panel from the slot for installing the communications expansion module.

Step 2 Draw the handle rightwards.

Step 3 Gently insert the communications expansion module into its slot along the guide rails.

Step 4 Push the handle leftwards and tighten the screws.

Figure 4-18 Installing a communications expansion module CIM02C



----End

4.9 (Optional) Installing Dry Contact Signal Cables

Procedure

Step 1 Press the contact plate using a flat-head screwdriver to flip the metal spring inside each dry contact.

Step 2 Connect the signal cables to the corresponding dry contacts.

Step 3 Remove the flat-head screwdriver and check that the signal cables are connected securely.

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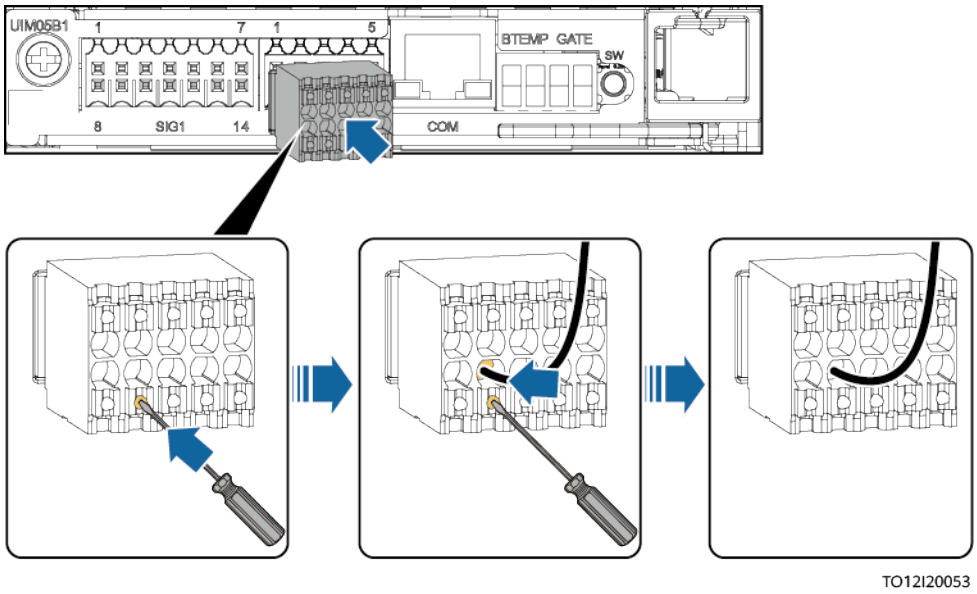
Figure 4-19 Installing a dry contact signal cable



----End

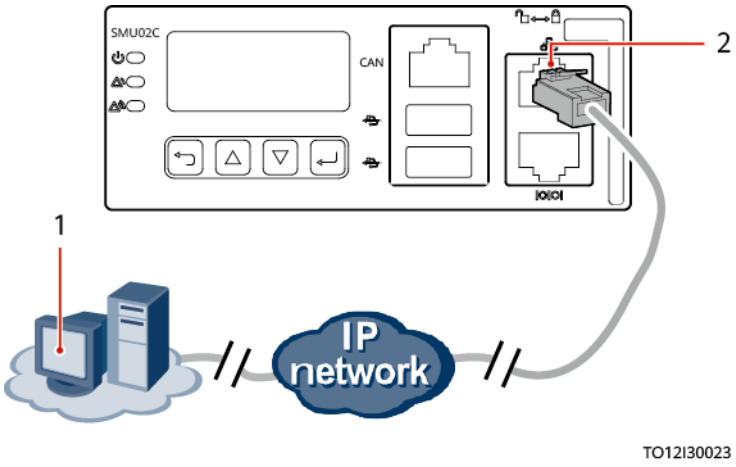
4.10 (Optional) Installing Communications Cables

4.10.1 WebUI Management

Procedure

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

Figure 4-20 Connecting a communications cable (for WebUI management)



(1) WebUI terminal

(2) FE port on the SMU

----End

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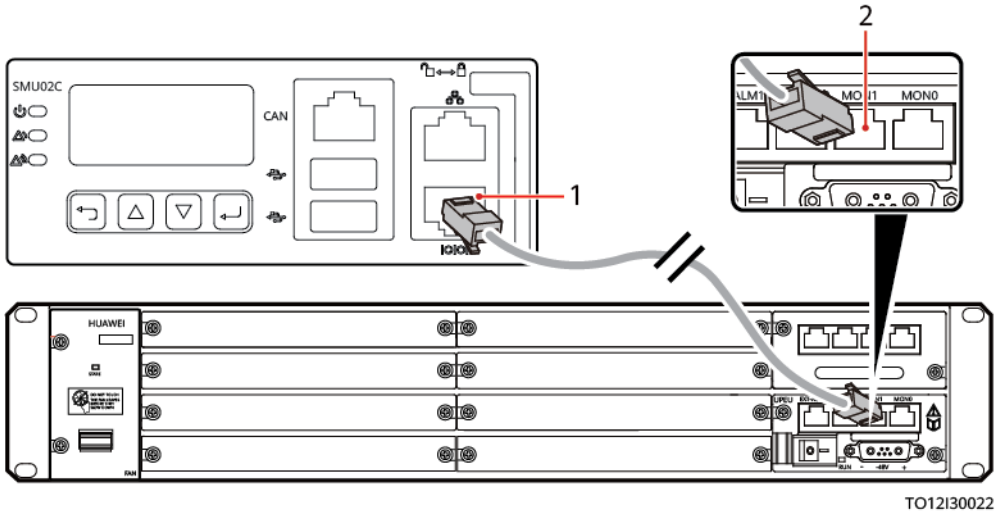
4.10.2 U2000-SPM Management

Procedure

Step 1 Connect one end of a network cable to the RS485/RS232 port on the SMU.

Step 2 Connect the other end to the MON0 or MON1 port on the BBU.

Figure 4-21 Connecting a communications cable



(1) RS232/RS485 port on the SMU (2) MON1 port on the BBU

----End

4.10.3 NetEco Management

Networking Mode 1: FE Port

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

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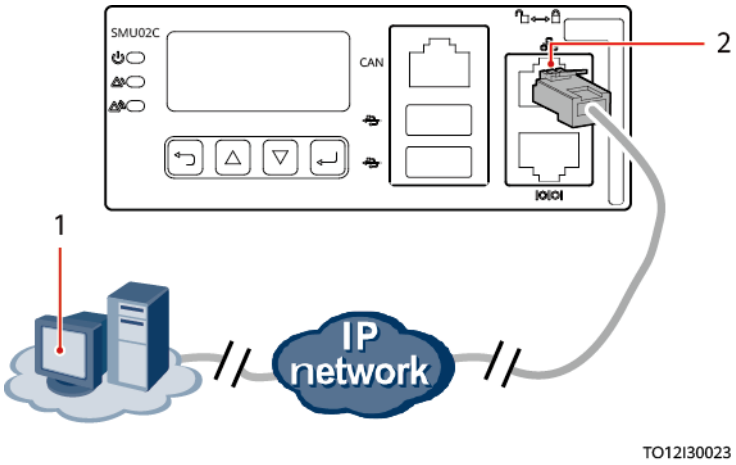
Figure 4-22 Connecting a communications cable to the FE port



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

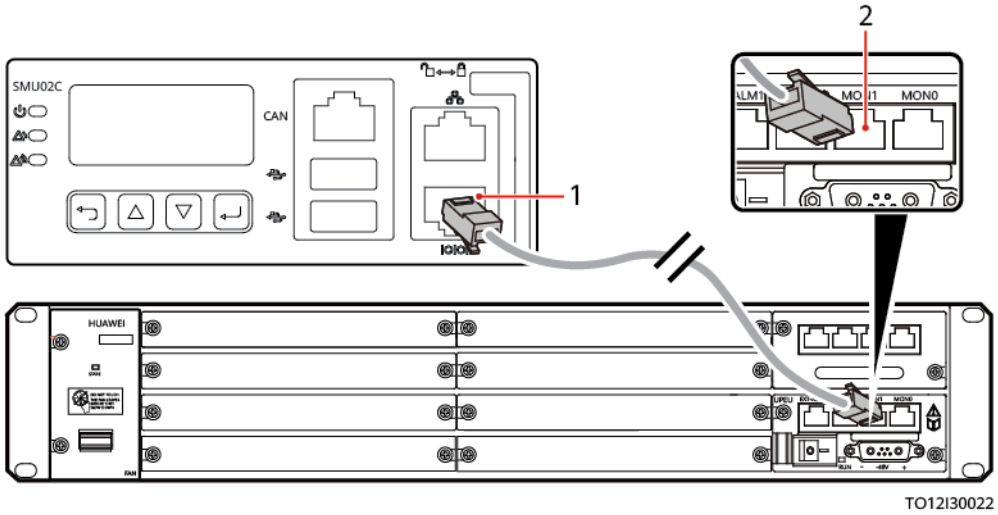
----End

Networking Mode 2: RS485 Port

Step 1 Connect one end of a network cable to the RS485/RS232 port on the SMU.

Step 2 Connect the other end to the MON0 or MON1 port on the BBU.

Figure 4-23 Connecting a communications cable to the RS485 port



(1) RS232/RS485 port on the SMU (2) MON1 port on the BBU

----End

4.10.4 Third-party NMS Management (SNMP Protocol)

Procedure

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

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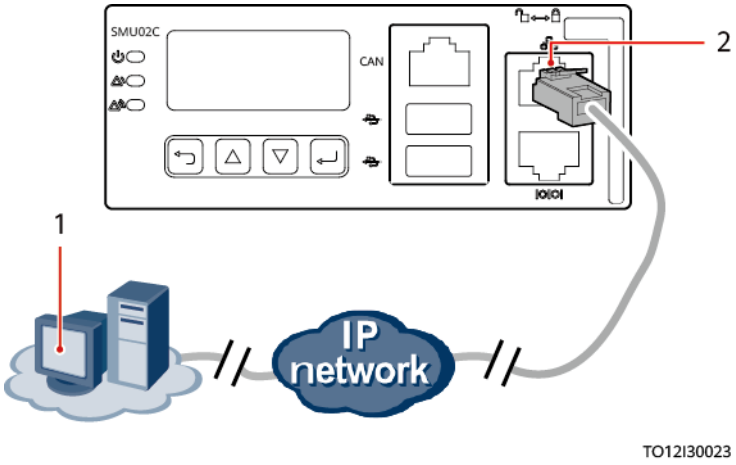
Figure 4-24 Connecting a communications cable (for third-party NMS management)



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

----End

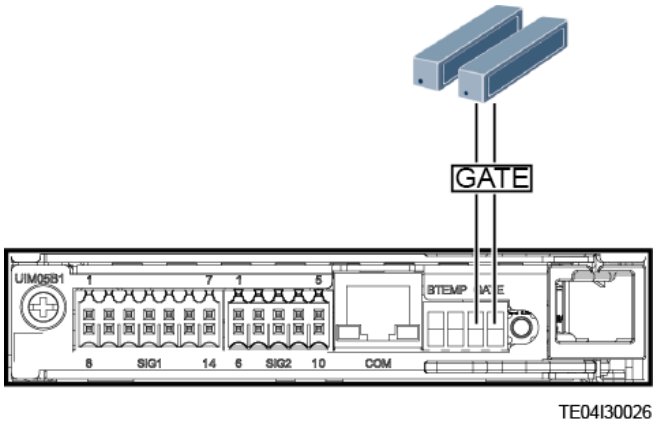
4.11 Installing Sensor Cables

4.11.1 Installing Door Status Sensor Cables

Procedure

Step 1 Connect door status sensor cables to the GATE ports on the UIM.

Figure 4-25 Installing cables for a door status sensor



----End

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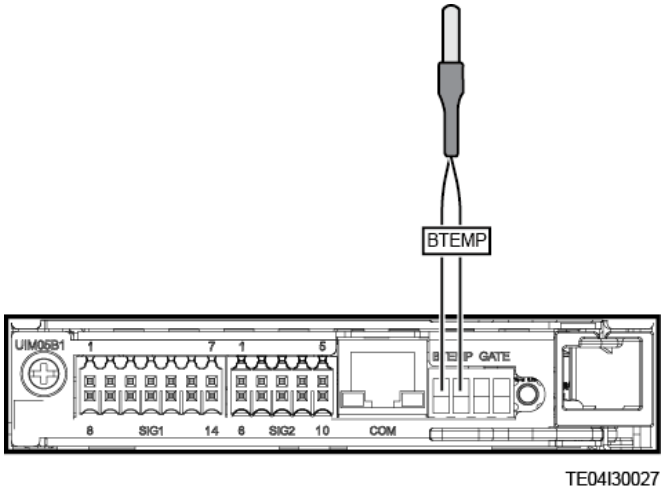
4.11.2 Installing Battery Temperature Sensor Cables

Procedure

Step 1 Connect the battery temperature sensor cables to the BTEMP port on the UIM.

Figure 4-26 Installing battery temperature sensor cables



----End

4.11.3 Installing Smoke Sensor Cables

Procedure

Step 1 ProcedureConnect smoke sensor cables to the SMOKE ports on the UIM.

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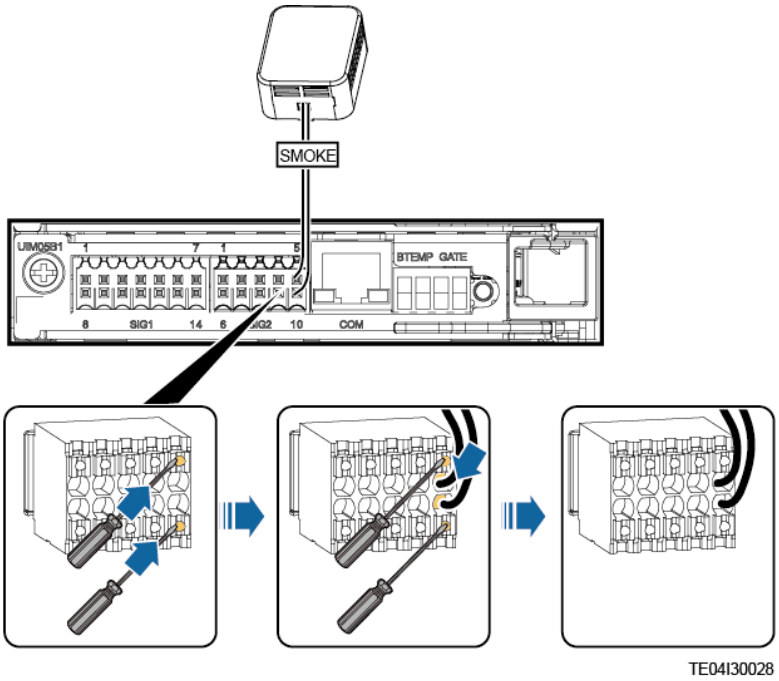
Figure 4-27 Installing smoke sensor cables



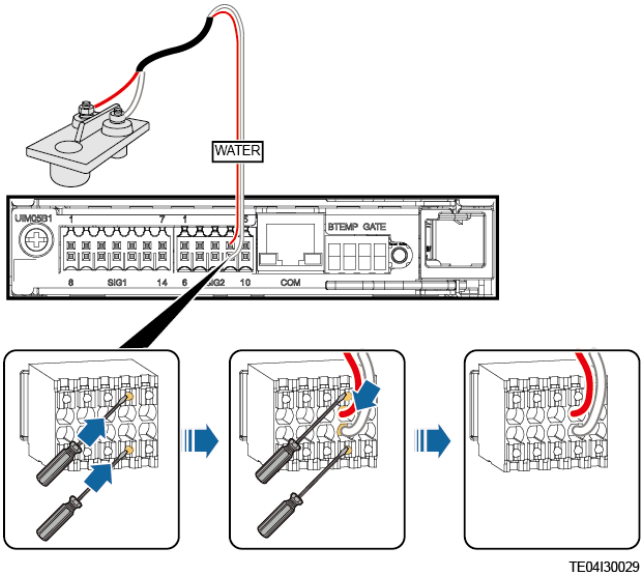
----End

4.11.4 Installing a Water Sensor Cable

Procedure

Step 1 Connect the water sensor cable to the WATER ports on the UIM.

Figure 4-28 Installing a water sensor cable



----End

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4.12 Installing Cables

DANGER

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Ensure that the upstream AC input circuit breakers are OFF, and attach warning labels such as "Do not operate."
- Switch off all circuit breakers before installing cables.

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

- If cables are routed in front of the power subrack, the minimum bending radius of the cables is 80 mm.
- If cables are routed on the top of the power subrack, it is recommended that 2 U be reserved for cabling.
- If the preceding conditions are not met, you are advised to use super flexible cables.
- 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.

4.12.1 Installing DC Output Power Cables

Connecting DC Output Power Cables to 125 A Circuit Breakers

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

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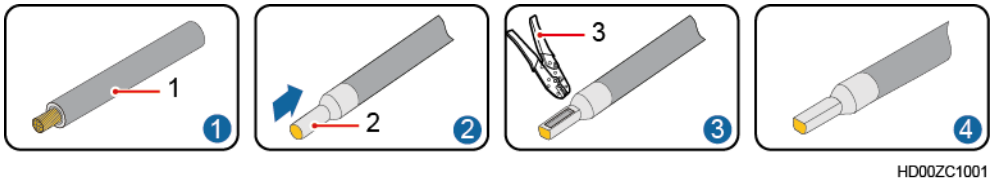
Table 4-4 Preparing cables

Cross-Sectional Area	Recommended Cord End Terminal Specifications	Recommended Bare Wire Specifications
10 mm^2	Pre-insulated and with an insertion depth of 18 mm	25–35 mm^2 **NOTICE** Cord end terminals are recommended. When bare wires are used, you are advised to add heat shrink tubing to ensure that the wire ends are not split.
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	
35 mm^2	Not pre-insulated; with an insertion depth of 18 mm	

Figure 4-29 Preparing a cord end terminal



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

Step 2 Install DC output power cables.

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

NOTICE

Tighten the screws until they are flush with the thread, indicating that the screws are fastened properly.

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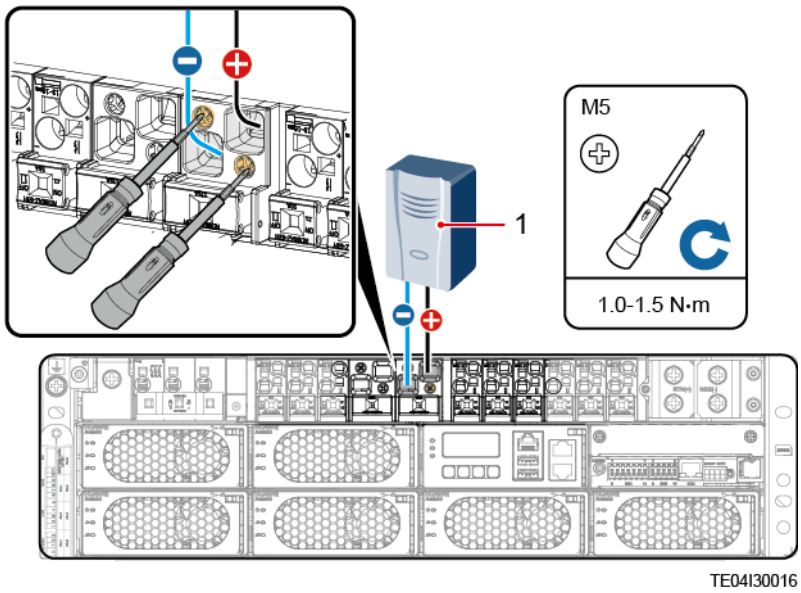
Figure 4-30 Installing DC output power cables



(1) DC load

----End

Connecting DC Output Power Cables to 63 A Circuit Breakers

Step 1 Use cables (cross-sectional area: 1.5–16 mm^2) and cord end terminals to prepare DC output power cables.

Table 4-5 Preparing cables

Cross-Sectional Area	Recommended Cord End Terminal Specifications	Recommended Bare Wire Specifications
1.5 mm^2	Pre-insulated and with an insertion depth of 18 mm	16 mm^2 **NOTICE** Cord end terminals are recommended. When bare wires are used, you are advised to add heat shrink tubing to ensure that the wire ends are not split.
4 mm^2	Pre-insulated and with an insertion depth of 18 mm	
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 (supports bare wire installation)	

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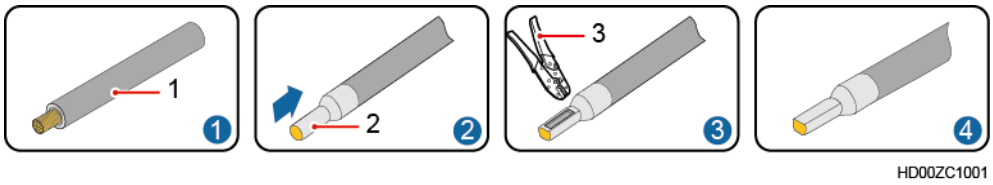
Figure 4-31 Preparing a cord end terminal

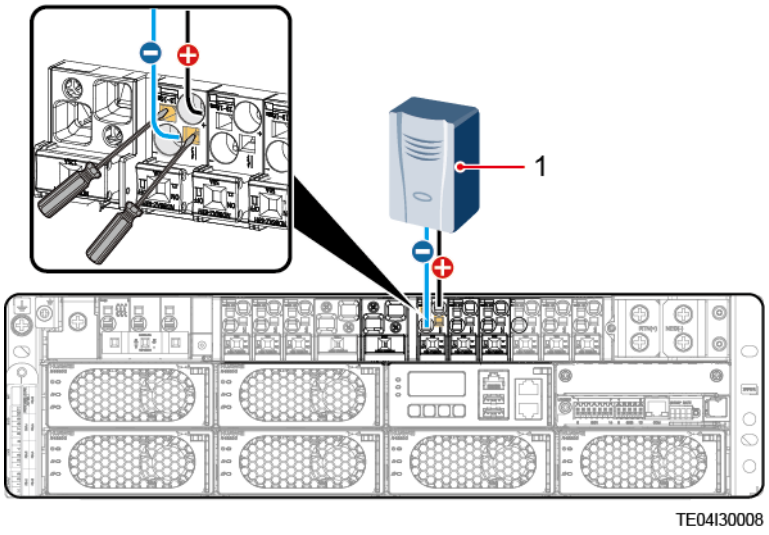


(1) Cable (2) Cord end terminal (3) Crimping tool

Step 2 Install DC output power cables.

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

Figure 4-32 Installing DC output power cables



(1) DC load

----End

4.12.2 Installing a 220/380 V AC Three-Phase Four-Wire Input Power Cable

Procedure

Step 1 Use cables (cross-sectional area: 10–16 mm^2), cord end terminals, and OT terminals to prepare an AC input power cable.

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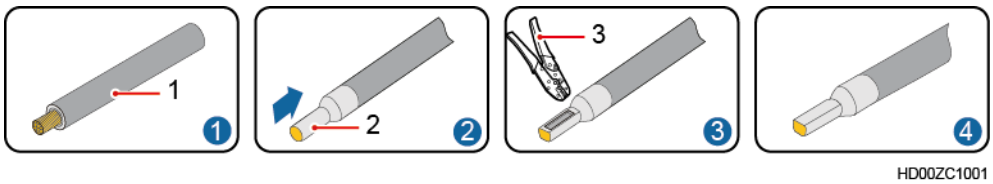
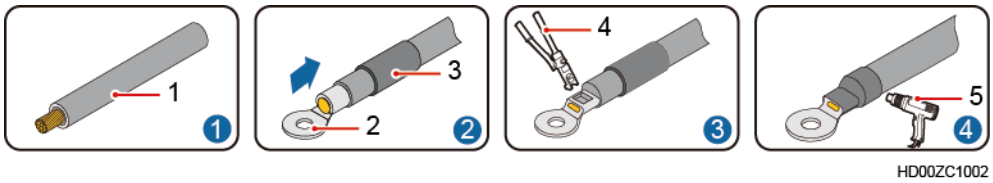
Figure 4-33 Preparing a cord end terminal



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

Figure 4-34 Preparing an OT terminal



(1) Cable (2) OT terminal (3) Heat shrink tubing

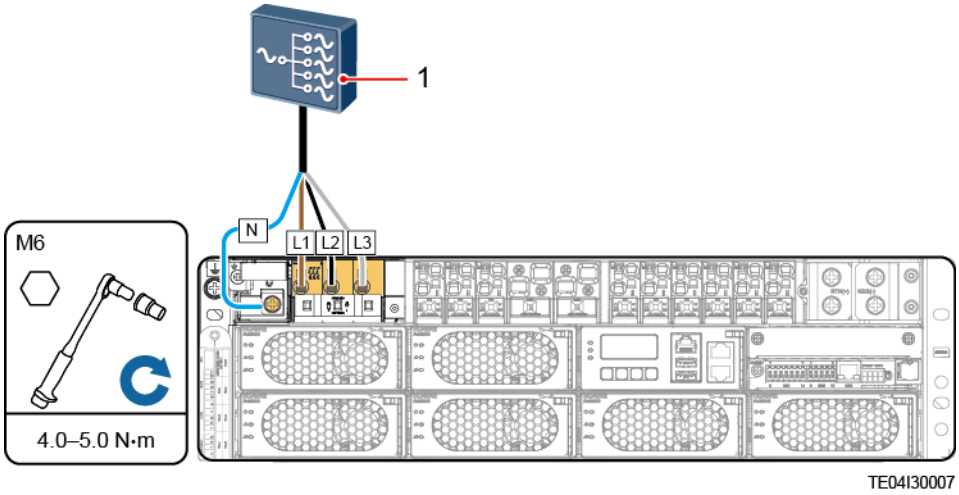
(4) Hydraulic pliers (5) Heat gun

Step 2 Remove the protective cover from the N wiring position.

Step 3 Connect the AC input power cable to corresponding AC input circuit breakers.

Step 4 Reinstall the protective cover on the N wiring position.

Figure 4-35 Installing a 220/380 V AC three-phase four-wire input power cable



(1) Alternating current distribution box (ACDB)

----End

4.12.3 Installing 220 V AC Single-Phase Input Power Cables

Procedure

Step 1 Install a short-circuit copper bar and remove the protective cover from the short-circuit copper bar.

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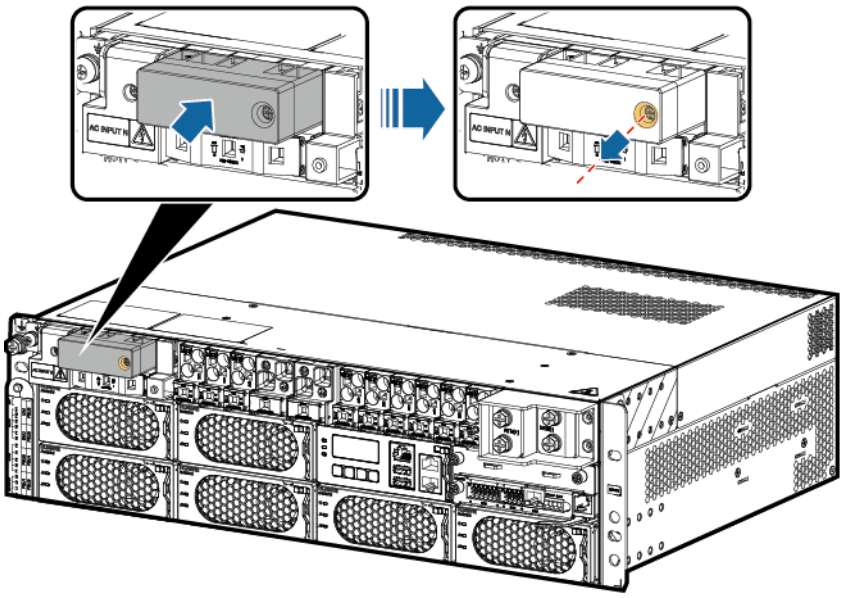
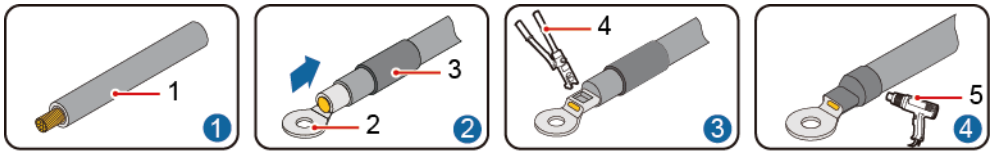
Figure 4-36 Installing a short-circuit copper bar



TE04H00006

Step 2 Use cables (cross-sectional area: 10–35 mm^2), cord end terminals, and OT terminals to prepare AC input power cables.

Figure 4-37 Preparing an OT terminal



HD00ZC1002

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

Step 3 Install AC input power cables.

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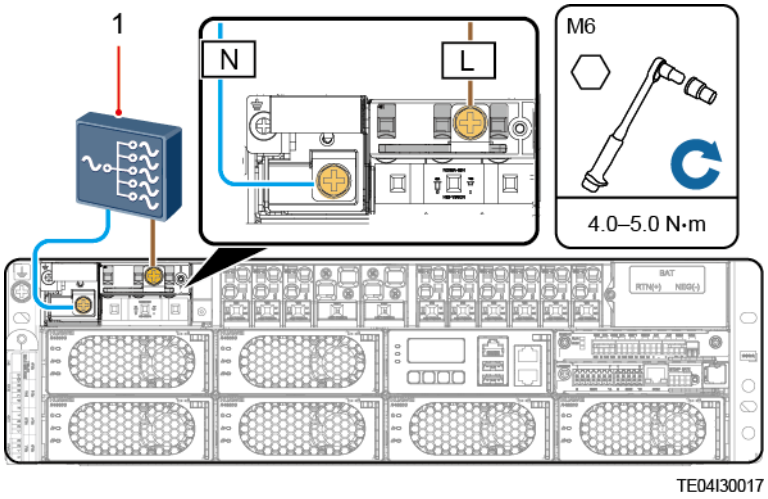
Figure 4-38 Installing 220 V AC single-phase input power cables



(1) AC distribution box

Step 4 Reinstall the protective cover for the short-circuit copper bar.

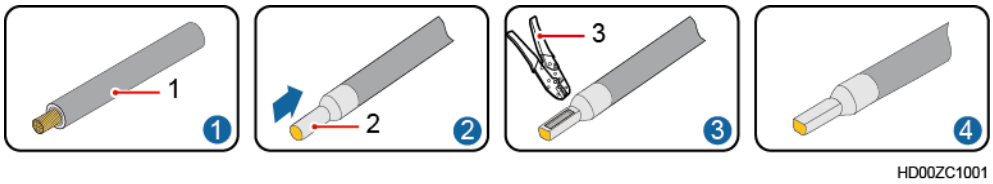
----End

4.12.4 Installing 120/240 V AC Dual-Live Wire Input Power Cables

Procedure

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

Figure 4-39 Preparing a cord end terminal



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

Step 2 Install AC input power cables.

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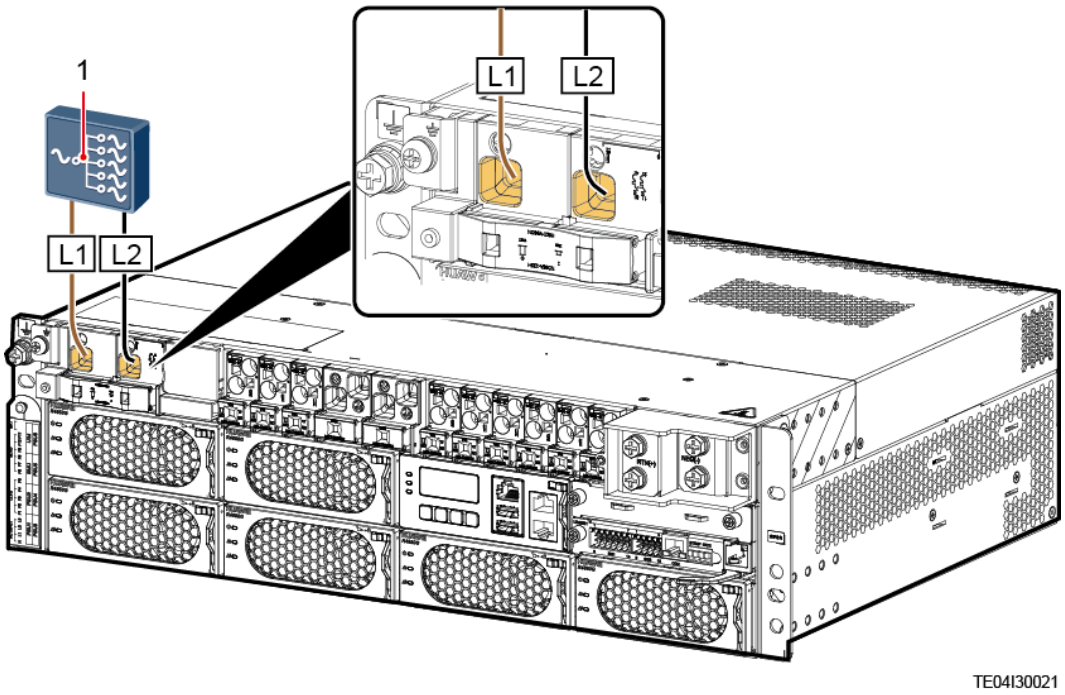
Figure 4-40 Installing AC input power cables



(1) ACDB

----End

4.12.5 Installing Cables for an Intelligent Power Distribution Unit

NOTE

The methods for installing cables between the intelligent power distribution unit and other power subracks are similar. The following uses one of them as an example.

Procedure

Step 1 Install power cables for the intelligent power distribution unit.

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Figure 4-41 Installing power cables for the DCDB48-200-16B intelligent power distribution unit

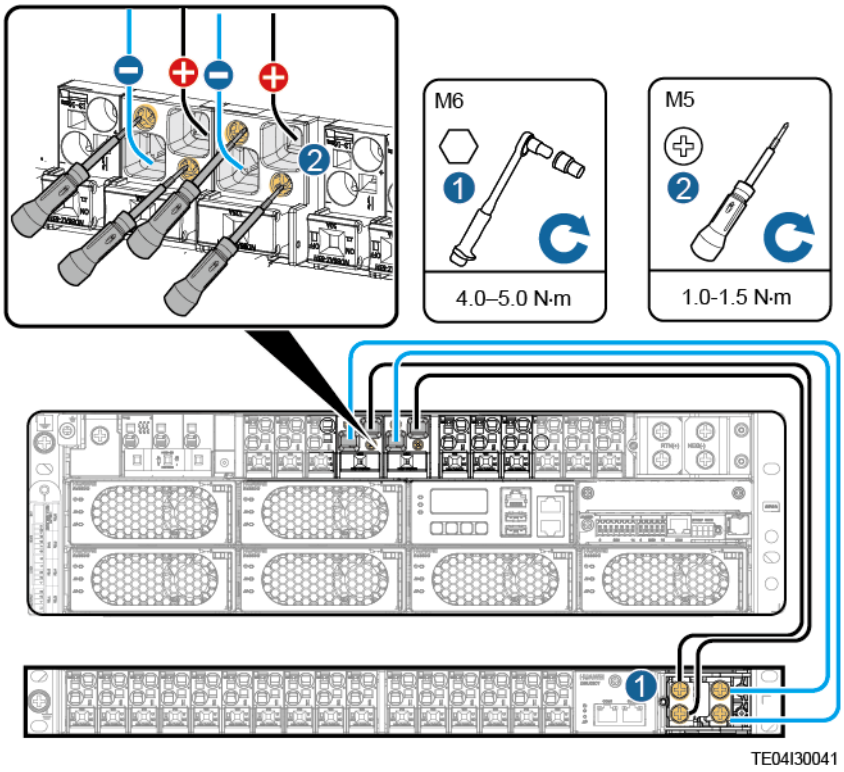
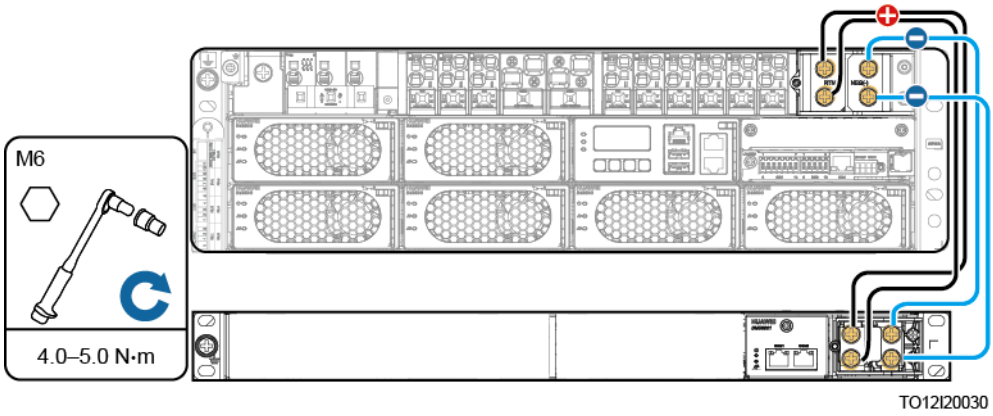


Figure 4-42 Installing power cables for the DCDB48-200-16B-XXX intelligent power distribution unit



Step 2 Install DC output power cables for the intelligent power distribution unit.

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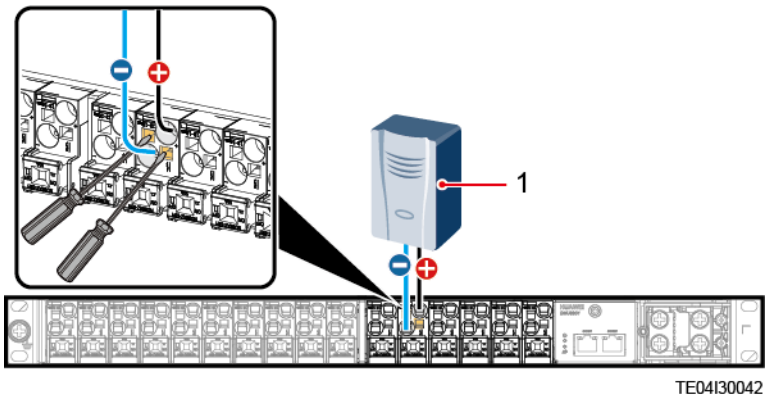
Figure 4-43 Installing DC output power cables for the intelligent power distribution unit



(1) DC load

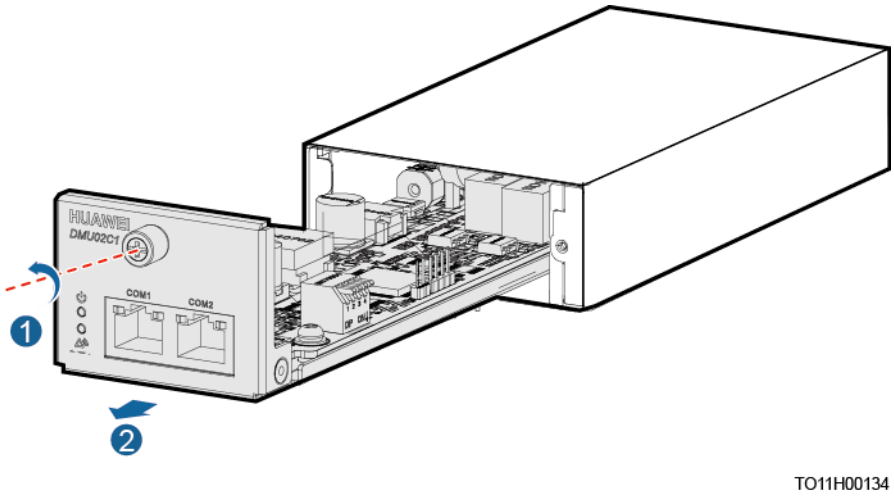
Step 3 (Optional) Set the DIP address.

NOTE

When multiple intelligent power distribution units are cascaded, set the DIP address.

1. Remove the DMU02C1.

Figure 4-44 Removing the DMU02C1



2. Set the DIP address.

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Figure 4-45 DIP switch

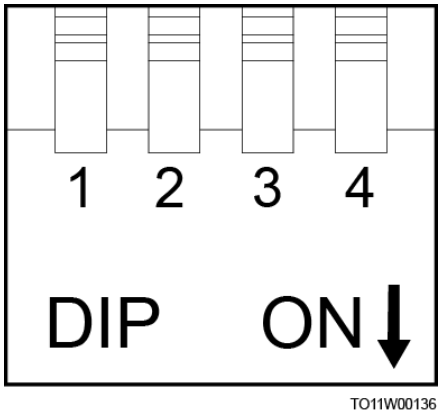

Table 4-6 DIP switch description

Address of Intelligent Power Distribution Unit	Pin 1	Pin 2
1	OFF	OFF
2	OFF	ON
3	ON	OFF
4	ON	ON
NOTE – If one contactor and one shunt are installed, for example, in a DCDB48-200-16B-4731, set pin3 to OFF and pin4 to OFF. – If two contactors and one shunt are installed, for example, in a DCDB48-200-16B-4731-008, set pin3 to OFF and pin4 to ON.		

3. Reinstall the DMU02C1.

Step 4 Install communications cables for the intelligent power distribution unit.

Figure 4-46 Installing a communications cable for one intelligent power distribution unit

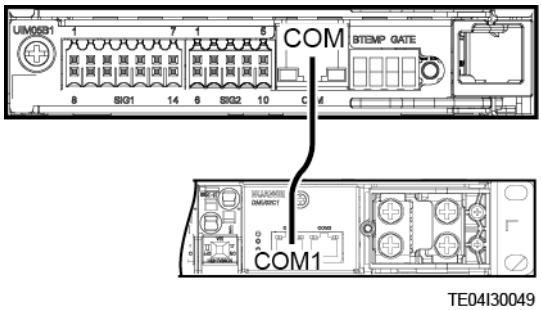

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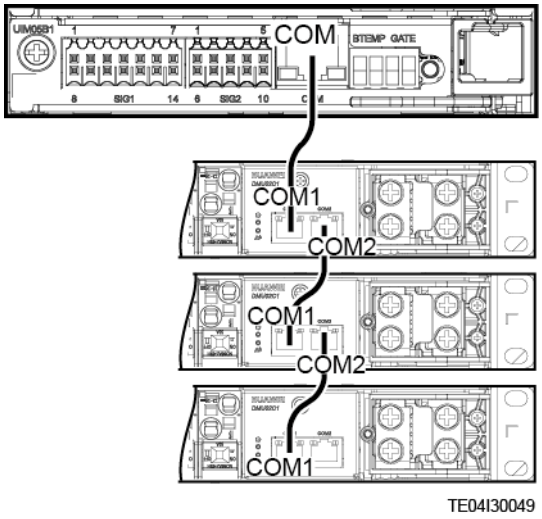
Figure 4-47 Installing communications cables for multiple intelligent power distribution units



----End

4.12.6 Installing Cables for a Lead-Acid Battery Box

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 additional safety precautions, see the instructions provided by the battery manufacturer.

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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 firefighting equipment, such as fire sand boxes 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.
- 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.
- The cables between the lead-acid battery box and other power subracks are installed in a similar way. The following uses one type of power subrack as an example.

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.

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⚠ 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, which may damage the equipment.
- 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.
- 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 supplier 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.

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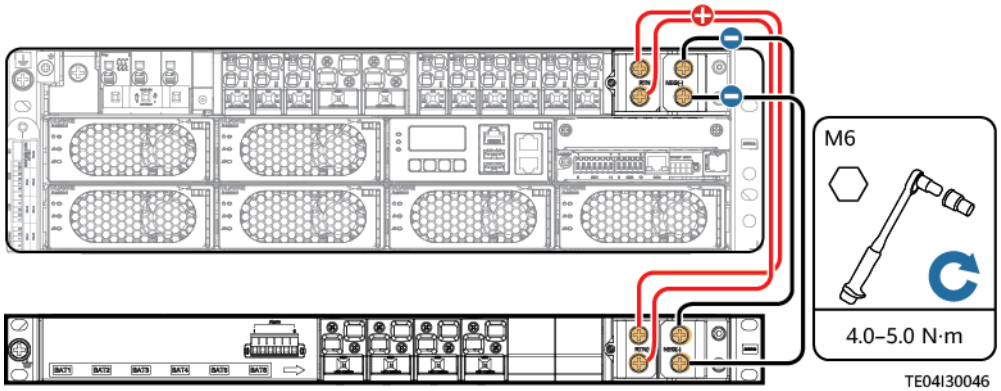
Procedure

Step 1 Install power cables for the lead-acid battery box.

NOTE

Only one lead-acid battery box can be connected to one power subrack.

Figure 4-48 Installing power cables for the lead-acid battery box



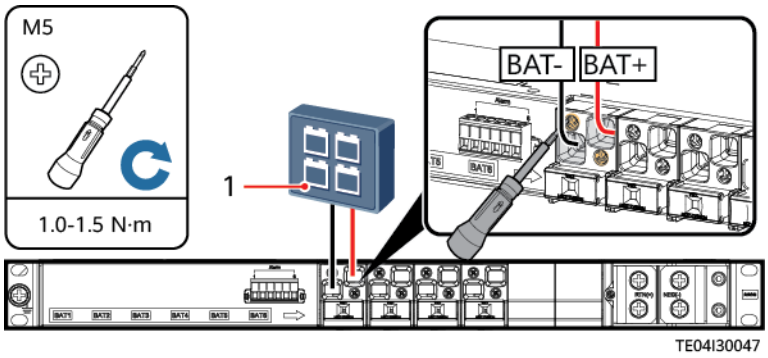
Step 2 Switch off the battery circuit breakers.

Step 3 Install battery cables for the lead-acid battery box.

NOTE

Only one battery string can be connected to one circuit breaker.

Figure 4-49 Installing battery cables for the lead-acid battery box



(1) Battery string

Step 4 Install a fuse detection cable for the lead-acid battery box.

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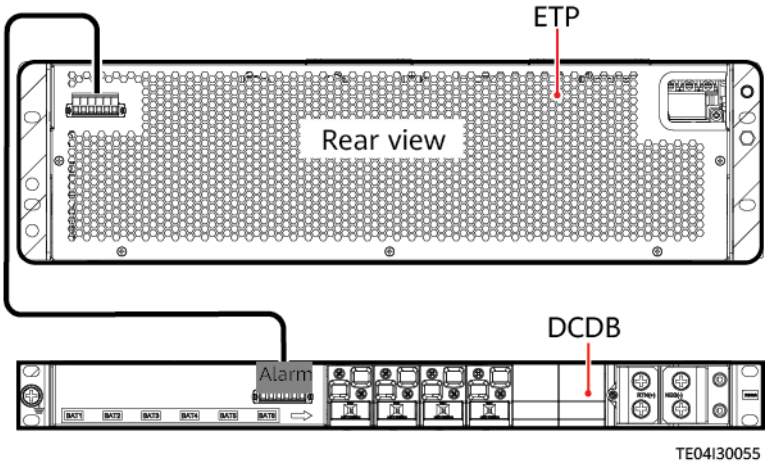
Figure 4-50 Installing a fuse detection cable for the lead-acid battery box



----End

4.12.7 Installing Lithium Batteries and 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 additional safety precautions, see the instructions provided by the battery manufacturer.

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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 firefighting equipment, such as fire sand boxes 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.
- Low temperature charging may cause short circuits inside the electrochemical cell and 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 is IPX4 or higher.

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.

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CAUTION

- When moving batteries, do not remove protective components such as protective covers or waterproof caps from battery terminals.
- Ensure that batteries are from the same manufacturer, of the same model, and in the same batch.
- 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.

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NOTICE

- To prevent the equipment from falling over, secure it to a pallet truck or forklift using ropes before moving it. Exercise caution when moving the equipment to avoid bumping or falling, which may damage the equipment.
- 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.
- 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.
- This section uses one battery as an example.

Procedure

Step 1 Install a lithium battery in a 19-inch rack.

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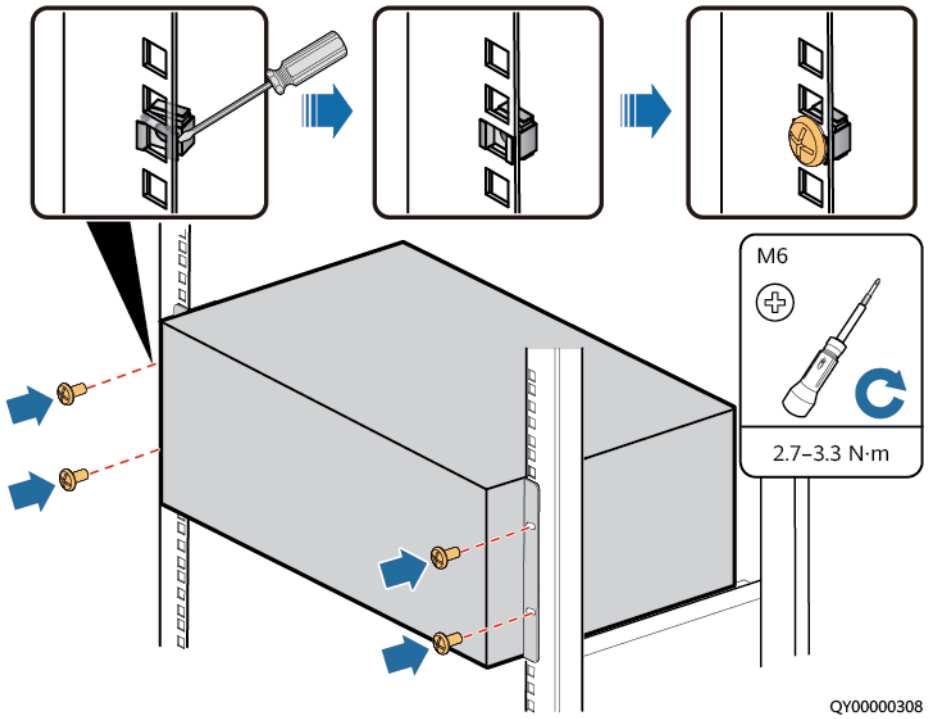
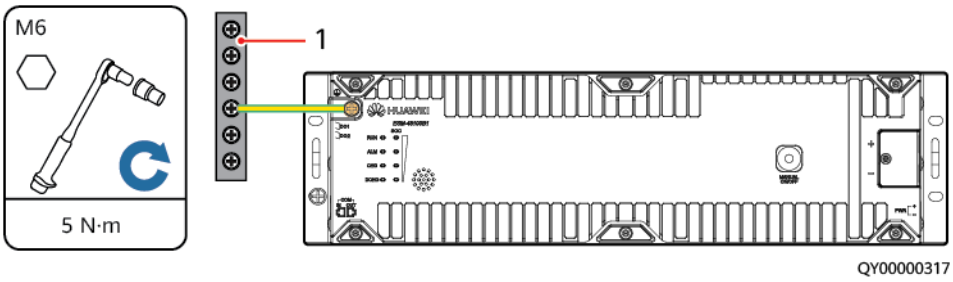
Figure 4-51 Installing a lithium battery



Step 2 Install a ground cable for the lithium battery.

Figure 4-52 Installing a ground cable for the lithium battery



(1) Ground bar

Step 3 Install communications cables and a termination resistor for the lithium batteries.

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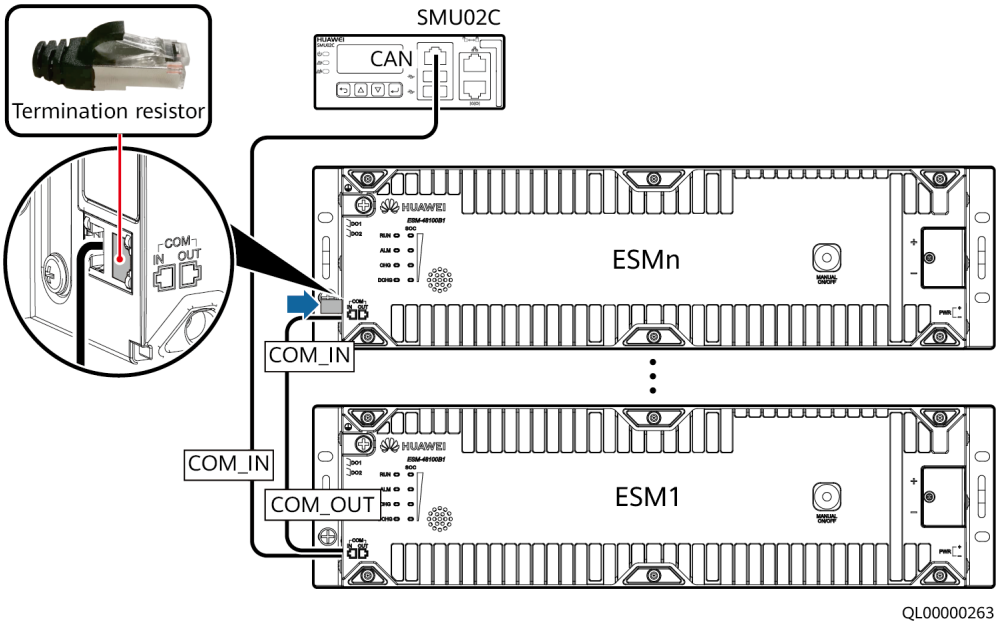
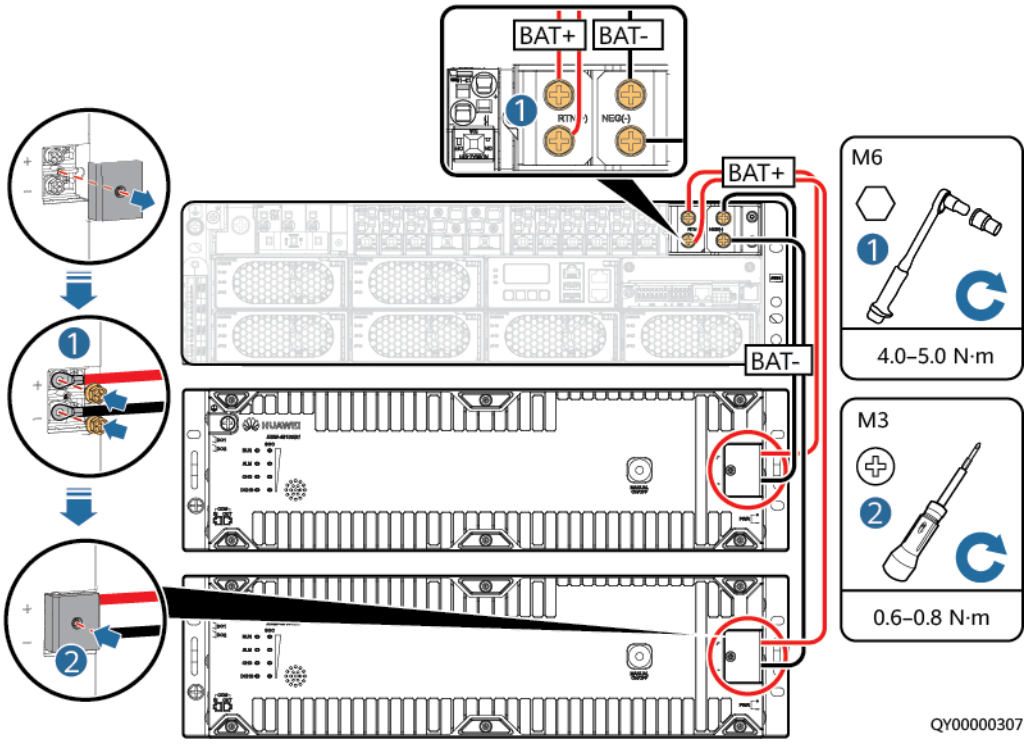
Figure 4-53 Installing communications cables for lithium batteries



Step 4 Install lithium battery power cables.

Figure 4-54 Installing lithium battery power cables



----End

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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.

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6 Commissioning

DANGER

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

NOTICE

- Performing commissioning procedure provided in this chapter may result in power failure or alarms. Inform the alarm center before commencing the procedure and after completing the procedure.
- Commissioning should be performed by trained personnel according to the commissioning instructions provided in this chapter.
- Commissioning is performed with the power on. Before you perform commissioning, remove any conductors such as jewelry or watches, stand on dry insulating material, and use insulated tools.
- During commissioning, do not establish contact between electrical points that have different electric currents.
- Check that the status of a unit or component meets requirements before turning on its switch.
- If you are maintaining or servicing equipment and do not want others to perform any operation, attach the label "Currently being serviced. Do not switch on." to the equipment.
- During commissioning, shut down the power system immediately if any fault is detected. Rectify the fault, start the power system, and proceed with the commissioning.

6.1 Powering on Lead-Acid Batteries

Procedure

Step 1 Measure the voltage between battery strings. The value should range from –42 V DC to –58 V DC.

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Step 2 Switch the battery circuit breaker on the lead-acid battery box to ON.

Step 3 Press the battery switch for 2s to 5s. When you hear a sound from the contactor, power-on is complete.

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 Connecting the Lithium Battery Supply

NOTICE

- After the monitoring module identifies the lithium battery, the monitoring module restarts.
- After power-on, turn off the output of the lithium battery if the site is not in use temporarily.

Procedure

Step 1 Switch on the lithium battery circuit breaker.

Step 2 Press the Manual ON/OFF button on the lithium battery to activate the lithium battery.

Step 3 Hold the battery switch for 2s to 5s. When you hear a sound from the contactor, the system is powered on.

Step 4 Check whether the lithium batteries communicate properly. If the run indicator on a lithium 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 5 Observe the lithium batteries for 15 minutes. The lithium batteries are running properly if the alarm indicators are off.

Step 6 Set all circuit breakers to the appropriate status based on site requirements.

Step 7 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.

----End

6.3 Setting the Display Language

After powering on the SMU, press  or  on the LCD to select a display language. Then press  to enter the standby screen.

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NOTE

- If an undesired language is selected, reseat and restart the SMU and then select the desired language.
- The preset password is **000001**.

6.4 Setting Deployment Wizard

After **Setup Wizard Init** is displayed on the LCD, set the following parameters.

Table 6-1 Parameter settings

Item	Setting Value
Setting the time zone.	Set this parameter to the local time zone.
Set the date and time	Set this parameter to the local date and time.
Battery manufacturer	Set the parameters based on site conditions. **NOTE** • If the battery model is set to ESM-A, you do not need to set battery parameters after the SMU restarts. • If the battery model is set to lead-acid battery, perform the following steps to set battery parameters after the SMU restarts:
Battery model	
The SMU may restart.	Yes
Battery 1 Connected	Yes/No **NOTE** • If battery routes 1 and 2 are respectively connected to a battery string (a battery string consists of four 12 V, 150 Ah batteries in series), set **Battery 1 Connected** and **Battery 2 Connected** to **Yes** and others to **No**, and set **Single-String Cap.** to 150 Ah. • If battery route 1 is connected to two parallel battery strings (one battery string consists of four 12 V, 150 Ah batteries in series), set **Battery 1 Connected** to **Yes** and others to **No**, and set **Single-String Cap.** to 300 Ah.
Battery 2 Connected	
Battery 3 Connected	
Battery 4 Connected	
Single-String Cap.	Rated capacity of each battery string **NOTE** A battery string includes a set of batteries controlled by one circuit breaker or fuse.
The SMU may restart.	Yes

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6.5 Setting the Date and Time

NOTE

- The LCD screen becomes dark if no button is pressed within 30s.
- You need to log in again if no button is pressed within 1 minute.
- The preset password is **000001**.

Set the date and time as required. Skip the setting if they have been correctly set in the setup wizard.

Table 6-2 Setting the date and time

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Setting Wizard	Date and Time **NOTE** The date and time vary with time zones. Set the time zone, date, and time based on the local situation.	Time Zone	UTC +08:00 Beijing	Set this parameter to the local time zone.
		Date and Time	-	Set this parameter to the local date and time.
		NTP Enable	No	Yes/No **NOTE** Set the parameter to **Yes** if you need to synchronize the SMU time and the site network server time.

6.6 Setting the AC Input System

Set the AC input system based on site requirements.

Table 6-3 Setting the AC input system

Main Menu	Second-Level Menu	Third-Level Menu	Setting	Value
Parameters Settings	Mains	AC Mode	Set to the local power supply system.	• 2-Phase 2-Wire • 1-Phase • 3-Phase 4-Wire

6.7 Setting the 57 V Constant Voltage Parameter

Set the 57 V constant voltage parameter based on site requirements.

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Table 6-4 Setting the 57 V constant voltage parameter

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting	Value
Parameters Settings	Li Battery	Basic Parameters	Work Mode	57V Mode	• 57V Mode • 48V Mode

6.8 Setting DCDB Parameters

Set DCDB parameters based on site requirements.

Table 6-5 Setting peak shaving parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Value
Parameters Settings	DC Power	DMU	LLVD n Enabled	Enable/ Disable
			LLVD n Mode	Voltage Mode/ Time Mode
			LLVD n Voltage	36.0-56.0 V
			LLVD n Recon Volt	37.0-58.0 V
			LLVD n Time	0–6000 min
			LLVD Delay Time	5-90s

6.9 Setting Peak Shaving parameters

Set peak shaving parameters based on site requirements.

Table 6-6 Setting peak shaving parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting Description
Parameters Settings	AC Peak Shaving	AC parameters	Mains Peak Shave Enb	Enable or disable the peaking shaving function. When the mains capacity or circuit breaker capacity is insufficient, you are advised to enable the peak shaving function.

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Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting Description
			Cap for Peak Shave	• If the input transformer power is insufficient, set this parameter to the transformer power (unit: kW). • If the input transformer power is sufficient, keep the default value.
			Breaker Rated Curr	• If the circuit breaker capacity is insufficient, set this parameter to the circuit breaker capacity (unit: A). • If the circuit breaker capacity is sufficient, keep the default value.
			Derating Coef	Indicates the high temperature derating coefficient of the circuit breaker. Keep the default value (0.8) unless otherwise specified.
		Peak Shaving Para	Rated Phase Volt	Set the parameter based on the rated voltage of the power grid. Default value: 220 V.
			Peak Shaving SOC	If power failure occurs, reserve the battery capacity for peak shaving.
			Peak Shaving SOC (Mix.)	
			Power-On Hysteresis for LLVD in Peak Shaving	By default, this parameter does not need to be set.
			Batt Backup Enable	Indicates whether the peak shaving battery is used as the backup battery in the case of power failure. Default value: No.
			Allow A/C Shutdown in Peak Shaving	Indicates whether the air conditioner can be turned off during peak shaving. You are advised to disable this function.
			Allow LLVD n Disconnection in Peak Shaving	Indicates whether to power off the minor loads when the battery capacity reserved for peak shaving is fully discharged.

6.10 Setting Sensor Parameters

Set sensor parameters based on site requirements.

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Table 6-7 Setting sensor parameters

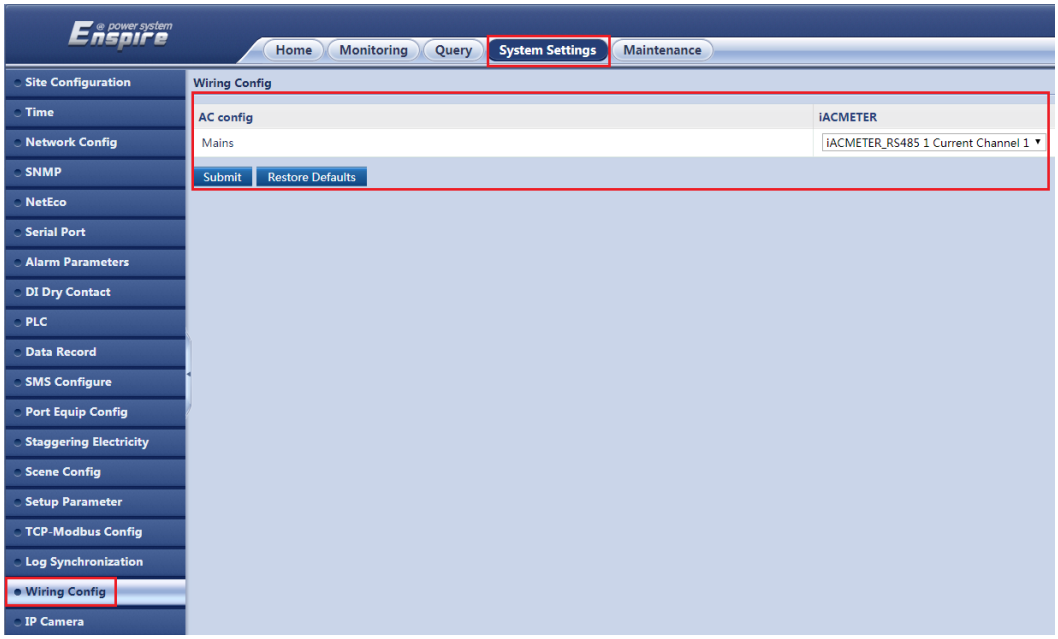
Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Settings
Parameters Settings	Setup Parameter	Sensor Config	Door Sensor	Yes, No **NOTE** Set these parameters to **Yes** or **No** as required.
			Water Sensor	
			Smoke Sensor	
			Batt. Temp. Sensor	
			Temp1 Sensor	

6.11 Setting the Mains Collection Channel

Procedure

Step 1 On the WebUI, set the mains collection channel.

Figure 6-1 Setting the mains collection channel



----End

6.12 Setting Communications Parameters

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6.12.1 (Optional) Setting Parameters for WebUI Management

Operating Environment

Operating system: Windows XP or later

Browser: Internet Explorer 8.0 or later, Firefox 13 or later, or Chrome 20

NOTE

Internet Explorer is used as an example to illustrate all WebUI operations mentioned in this document.

Configuring the LAN

NOTICE

- If the SMU is connected to a local area network (LAN) and a proxy server has been selected, cancel the proxy server settings.
- If the SMU is connected to the Internet but your computer is connected to a LAN, do not cancel the proxy server settings. Otherwise, you cannot access the SMU.

To cancel the proxy server settings on the PC, perform the following steps:

Step 1 Open Internet Explorer.

Step 2 Choose **Tools** > **Internet Options**.

Step 3 Click the **Connections** tab and click **LAN settings**.

Step 4 Deselect **Use a proxy server for your LAN**.

Figure 6-2 Canceling proxy server settings 1

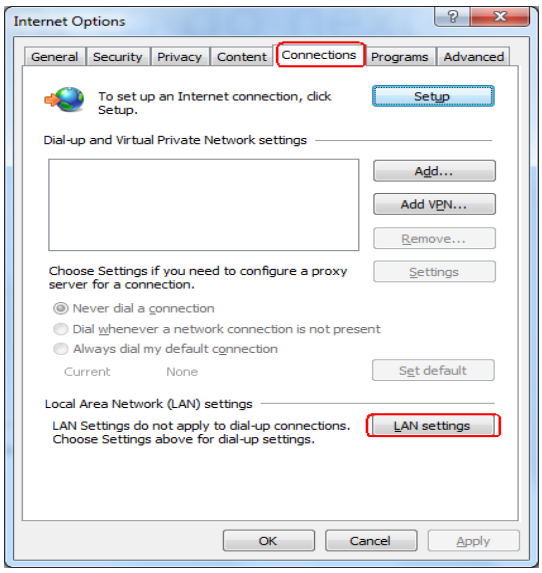

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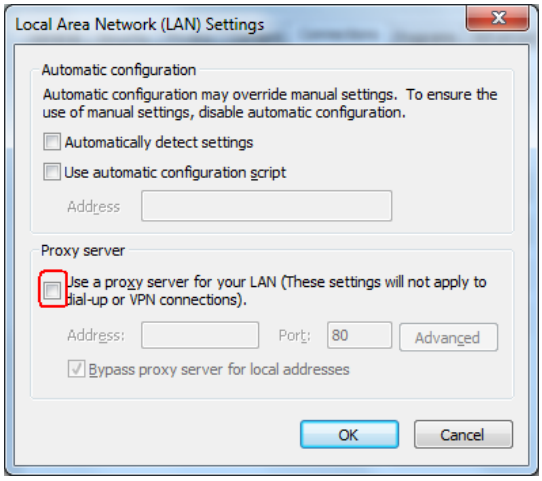
Figure 6-3 Canceling proxy server settings 2



Step 5 Click **OK**.

----End

Configuring Internet Explorer Security Settings

NOTICE

Configure Internet Explorer security setting before you perform the following operations.

- Export historical logs, historical data, statistics, and battery test records.
- Upload system configuration files.
- Download system configuration files.
- Upgrade the software.

To modify Internet Explorer security settings, perform the following steps:

Step 1 Open Internet Explorer.

Step 2 Choose **Tools** > **Internet Options**.

Step 3 Click the **Security** tab.

Step 4 Click **Internet** and then **Custom level**. After you specify Internet security settings, click **Local intranet** and then **Custom level**.

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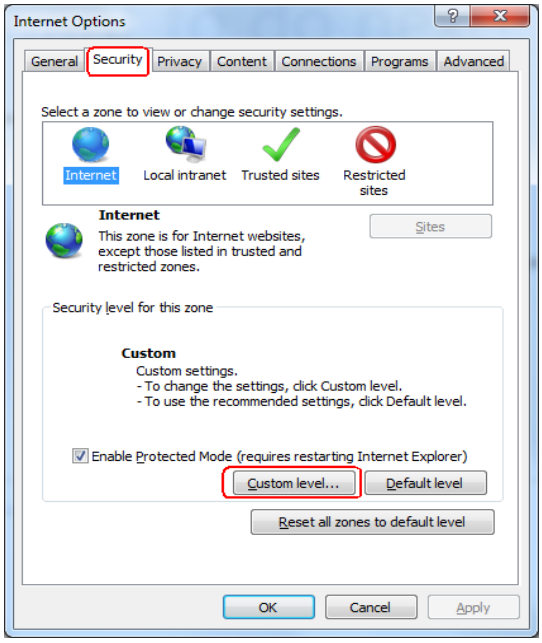
Figure 6-4 Internet Explorer security



Step 5 Specify the security settings.

Enable the following functions:

- Initialize and script ActiveX controls not marked as safe for scripting.
- Allow previously unused ActiveX controls to run without prompt.
- Include local directory path when uploading files to a server.
- Enable automatic prompting for file downloads.

Figure 6-5 Internet Explorer security setting 1

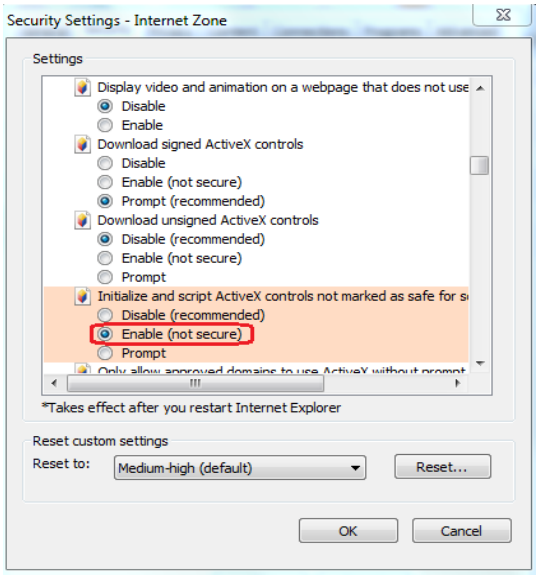


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Figure 6-6 Internet Explorer security setting 2

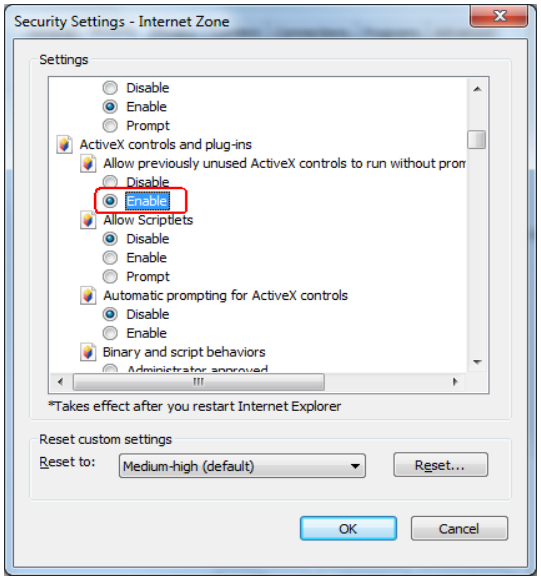

Figure 6-7 Internet Explorer security setting 3

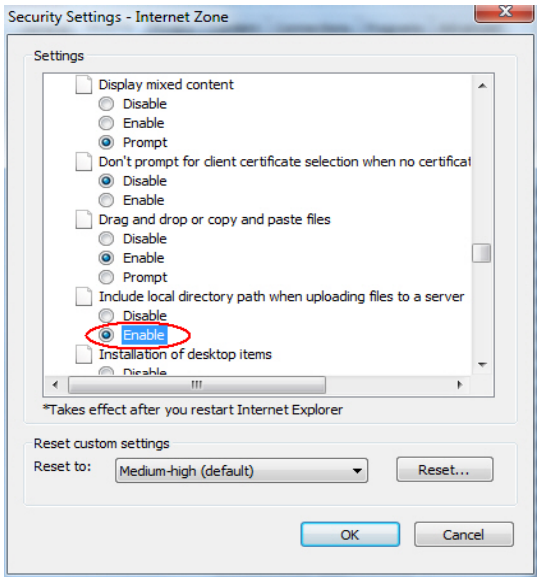

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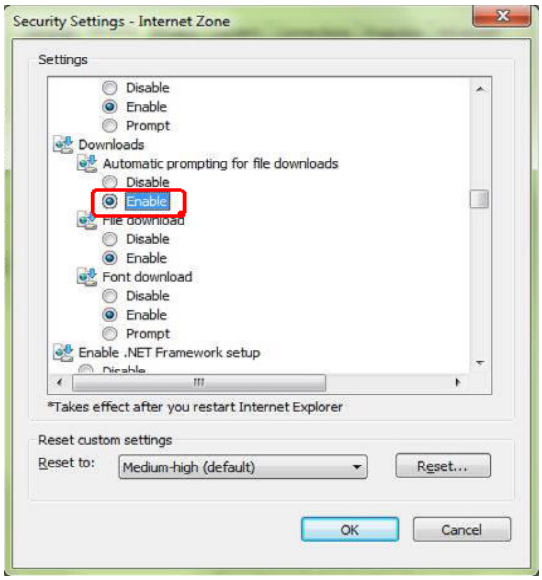
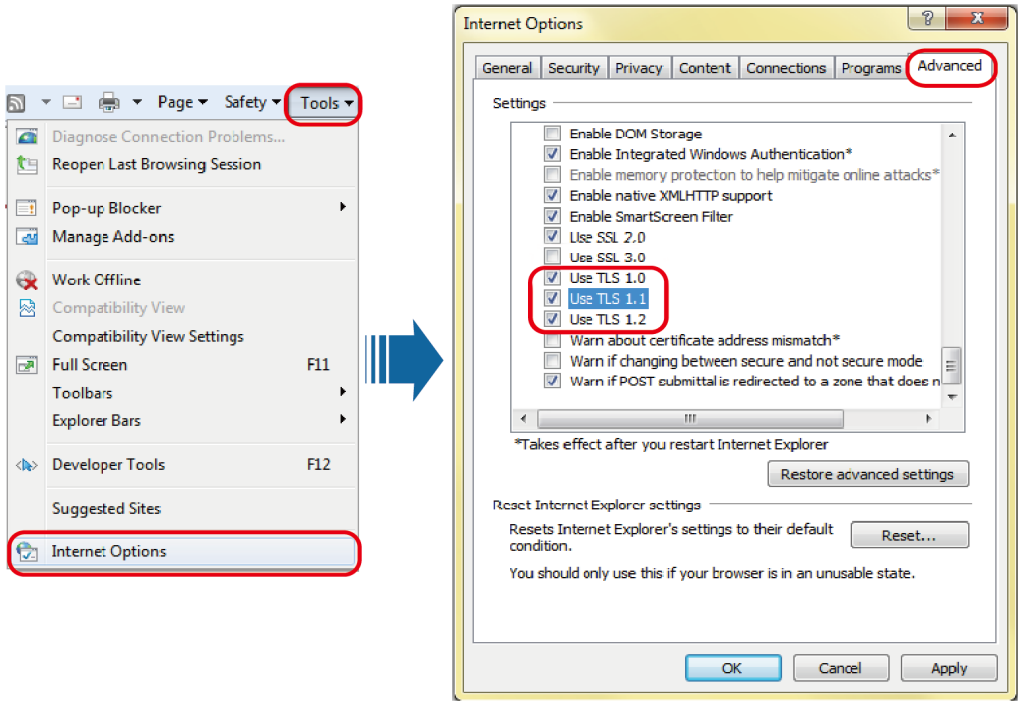
Figure 6-8 Internet Explorer security setting 4



Step 6 Click **OK**.

Step 7 Click the **Advanced** tab and select **Use TLS 1.0**, **Use TLS 1.1**, and **Use TLS 1.2**.

Figure 6-9 Internet Explorer security setting 5



Step 8 Click **OK**.

----End

Setting SMU Parameters

Step 1 Apply for a fixed IP address to the site or equipment room network administrator.

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Step 2 Set the IP address, subnet mask, and gateway address on the SMU LCD.

Table 6-8 IP parameters

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Setting Wizard	Network Parameters	IP Address	192.168.0.10	Set this parameter according to the address information provided by the network administrator.
		Subnet Mask	255.255.255.0	Set this parameter according to the address information provided by the network administrator.
		Default Gateway	192.168.0.1	Set this parameter according to the address information provided by the network administrator.

----End

Logging In to the WebUI

Step 1 Set the laptop IP address to be in the same network segment as the SMU IP address.

For example, if the SMU has an 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.

Step 2 Enter **https://monitoring IP address** (such as https://192.168.0.10) in the address box of the browser, and then press **Enter** to enter the WebUI login page.

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Figure 6-10 WebUI login page

NOTE

The preset user names include **admin**, **engineer**, and **operator**, and the preset password is **Changeme**. The user names are respectively used by administrators, engineers, and operators.

Change the preset password upon your first login to ensure the system security.

----End

6.12.2 (Optional) Setting Parameters Before Using U2000-SPM

Context

NOTICE

If a Huawei BBU is deployed, set the **Northbound** and **M/S Protocol** parameters.

Procedure

Step 1 Set the port mode, communications protocol type, baud rate, and communications address on the SMU LCD.

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Table 6-9 Communications parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Setting
Parameters Settings	Comm. Parameters	Serial Port	Northbound	Port Mode	Manual	Manual
				Protocol Type **NOTE** **Protocol Type** is displayed only when **Port Mode** is set to **Manual**.	M/S Protocol	M/S Protocol
		M/S Protocol	Baud Rate	-	9600	9600
			Comm. Address	-	3	3

----End

6.12.3 (Optional) Setting Parameters Before Using NetEco

Networking Mode 1: FE Port

Step 1 Apply for a fixed IP address to the site or equipment room network administrator.

Step 2 Set the IP type, IP address, subnet mask, and gateway address on the LCD.

Table 6-10 Setting IP parameters

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Setting Wizard	Network Parameters	IP Type	IPv4	Set this parameter as required.
		IP Address	192.168.0.10	Set this parameter based on the IP address assigned by the network administrator.
		Subnet Mask	255.255.255.0	Set this parameter based on the subnet mask provided by the network administrator.
		Default Gateway	192.168.0.1	Set this parameter based on the gateway address assigned by the network administrator.

Step 3 Set **IP Addresses** and **Ports** for the active servers of the NetEco on the LCD.

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Table 6-11 Setting NetEco parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
Parameters Settings	Comm. Parameters	Network Parameters	NetEco Primary IP	192.168.0.10	Set this parameter to the IP address of the primary NetEco server.
			NetEco Backup IP	192.168.0.10	Set this parameter to the IP address of the backup NetEco server.
			NetEco Port Number	31220	Set this parameter to the port number of the NetEco.

----End

Networking Mode 2: RS485 Port

Step 1 Check the port mode, protocol type, baud rate, and communications address on the SMU LCD.

Table 6-12 Communications parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Setting
Parameters Settings	Comm. Parameters	Serial Port	Northbound	Port Mode	Automatic	Manual
				Protocol Type **NOTE** This parameter is available only when **Port Mode** is set to **Manual**.	M/S Protocol	M/S Protocol
		M/S Protocol	Baud Rate	-	9600	9600
			Comm. Address	-	3	3

----End

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6.12.4 (Optional) Setting Parameters Before Using SNMP Management

Prerequisites

NOTE

You can set SNMP parameters remotely or locally on the WebUI.

Before setting SNMP parameters, obtain the information listed in **Table 6-13** from the SNMP-based NMS.

Table 6-13 Information obtained from the NMS

Item	Description
SNMP Version	SNMP version and port number used for communication between the SMU and the NMS. The SNMP version can be **SNMPv1**, **SNMPv2c**, or **SNMPv3**.
SNMP Port Number	
Read Community Name	If you use SNMPv1 or SNMPv2c, enter the read and write community names that comply with the NMS. Otherwise, the ECC800-Pro will not connect to the NMS. The read community name must be different from the write community name.
Write Community Name	
User Name	To enhance the security, you need a user name and password for authentication if you use SNMPv3. After the authentication succeeds, the SMU can communicate with the NMS.
MD5/SHA Password	
DES/AES Password	
Trap Target Address	IP address and port number used for reporting alarm trap packets
Trap Port	
Trap Community	If you use SNMPv1 or SNMPv2c, this parameter is the community name used for reporting alarm trap packets.

NOTE

- The standard protocols SNMPv1 and SNMPv2c have security risks. You are advised to use the secure protocol SNMPv3.
- The standard encryption algorithms MD5 and DES have security risks. You are advised to use the secure encryption algorithms SHA and AES

Procedure

Step 1 Log in to the WebUI.

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NOTE

The preset user name is **admin**, and the preset password is **Changeme**.

Step 2 Enter the **System Settings** page and choose **SNMP**.

- If there are two or more NMSs and the SNMP versions support both SNMPv1 or SNMPv2c and SNMPv3: Set **SNMP Version** to **ALL** in **SNMP**, and set **SNMP Port Number**, **Read Community Name**, and **Write Community Name**. Then click **Add** in **SNMPv3**, and set **User Name**, **MD5/SHA Password**, and **DES/AES Password**. Then click **Confirm**.
- SNMPv1 or SNMPv2c: Set **SNMP Version** in **SNMP** to **SNMPv1&SNMPv2c**, set **SNMP Port Number**, **Read Community Name**, and **Write Community Name**, and click **Confirm**.
- SNMPv3: Set **SNMP Version** in **SNMP** to **SNMPv3**, click **Add** in **SNMPv3**, set **User Name**, **MD5/SHA Password**, and **DES/AES Password**, and click **Confirm**.

Step 3 Click **Add** in **SNMP Trap**.

- If **SNMP Version** is set to **SNMPv1** or **SNMPv2c**, set **Trap Target Address**, **Trap Port**, and **Trap Community**.
- If **SNMP Version** is set to **SNMPv3**, set **Trap Target Address**, **Trap Port**, and **SNMPv3 User Name**.

NOTE

The SNMP version here can be different from that in **Step 2**.

Step 4 In **Mib File**, click **Export** to export the MIB file and then import it into the NMS.

NOTE

If there is only one NMS, perform **Step 4** only once.

----End

6.13 Connecting the AC Power Supply

Procedure

Step 1 Switch on the AC input circuit breaker and measure the output voltage of the AC input circuit breaker. The value should range from 85 V AC to 300 V AC.

Step 2 Check that the RUN indicator on the rectifier is steady on.

Step 3 Set all circuit breakers to the appropriate status based on site requirements.

Step 4 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.

----End

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6.14 Subsequent Operations

Procedure

Step 1 Reinstall the removed panels (if any).

Step 2 The subrack surface paint should be intact. If paint peels off, repair the paint to prevent corrosion.

Step 3 Clean the site and leave there.

----End

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7 Maintenance

DANGER

- Wear dedicated protective gears and use insulated tools to avoid electric shocks or short circuits.
- If the power circuit breaker trips or the fuse is broken, rectify the fault and power on the device again. Do not directly switch on the circuit breaker or replace the fuse to avoid device faults or sparks.

7.1 Routine Maintenance

Perform routine maintenance based on site requirements. The recommended maintenance interval is six months. If any fault occurs, rectify it in a timely manner.

NOTICE

Do not maintain devices on raining days, preventing water from entering and damaging devices.

7.1.1 AC and DC Power Distribution

Table 7-1 AC and DC power distribution maintenance

No.	Maintenance Item	If...	Then...
1	Check for AC input undervoltage.	• AC input power cables have a large voltage drop. • AC input power cables are in poor contact. • The mains voltage is too low.	1. Replace AC input power cables with shorter or thicker cables. 2. Connect AC input power cables securely. 3. Provide the voltage data to the power supplier.

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No.	Maintenance Item	If...	Then...
2	Check for AC input overvoltage.	The mains voltage is too high.	Provide the voltage data to the power supplier.
3	Check whether the AC input voltage is open-phase.	• AC input power cables are in poor contact, short-circuited, or damaged. • The mains supply has failed.	1. Check and rectify the cables. 2. Provide the open-phase data to the power supplier.
4	Check whether a DC output circuit breaker is OFF and a fuse is blown.	• Load overcurrent occurs. • Load short-circuit occurs.	Rectify any overcurrent or short circuit. Turn on the circuit breaker or replace the fuse.
5	Check for DC busbar overvoltage.	A rectifier is abnormal.	Replace the abnormal rectifier.
6	Check for DC busbar undervoltage.	• The AC power supply has failed. • The system is overloaded. • A rectifier is abnormal.	1. Resume the AC power supply. 2. Check the load status and rectify faults if any. 3. Replace the abnormal rectifier.

7.1.2 Rectifier

Table 7-2 Rectifier maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check the green indicator status (normal: steady on).	Off: • There is no AC input. • The rectifier is faulty.	1. Check the rectifier AC input. 2. Replace the rectifier.

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No.	Maintenance Item	Possible Fault Cause	Suggestion
2	Check the yellow indicator status (normal: off).	Steady on: • Because the ambient temperature is high, the rectifier power is limited. • Because the ambient temperature exceeds the upper or lower threshold, the rectifier shuts down for protection. • AC input over/ undervoltage protection is triggered. • The rectifier is in hibernation.	1. Check the ambient temperature status, and clean the cabinet air channel. 2. Rectify faults in the indoor temperature control system. 3. Check the AC input voltage. 4. The rectifier is in hibernation. No action is required.
		Blinking: • The rectifier communication has failed • The rectifier is faulty.	1. Check that the rectifier communications cable is securely connected. 2. Replace the rectifier.
3	Check the red indicator status (normal: off).	Steady on: • The rectifier is latched off due to output overvoltage. • The rectifier is faulty.	1. Check that the cabinet is not connected to an external DC power source that has a voltage of greater than 58.5 V DC. 2. Check that the rectifier output voltage is within 58.5 V DC. 3. Replace the rectifier.

7.1.3 Monitoring Unit

Table 7-3 SMU maintenance

No.	Maintenance Item	Possible Cause	Suggestion
1	Check the green indicator status.	• Off: There is no DC input. • Off: The SMU is faulty.	1. Check that the DC input power cable is securely connected. 2. Check that the communications cable is securely connected. 3. Replace the SMU.

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No.	Maintenance Item	Possible Cause	Suggestion
2	Check the yellow indicator status.	• Steady on: A minor alarm or warning is generated. • Steady on: The SMU is faulty.	1. Check related components based on alarms. 2. Replace the SMU.
3	Check the red indicator status.	• Steady on: A critical or major alarm is generated. • Steady on: The SMU is faulty.	1. Check related components based on alarms. 2. Replace the SMU.
4	Check the LCD display status.	• The LCD cable is loose. • The SMU is faulty.	1. Check that the LCD cable is securely connected. 2. Replace the SMU.
5	Check that the SMU can communicate with the NMS.	• The communications cable is loose. • Networking parameters are not correctly set.	1. Check that the communications cable is securely connected. 2. Check that networking parameters are correctly set.

7.1.4 Parameters on the SMU

Table 7-4 SMU parameter maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check whether the displayed battery capacity and number of battery strings are the same as the actual data.	• Parameters are set incorrectly. • The number of batteries is changed, or batteries are replaced.	Set battery parameters again.
2	Check **Charge Current Limit Coefficient**. The value is typically **0.15C10** and adjustable.	N/A	Change the value as required. Otherwise, retain **0.15C10**.
3	Check whether the displayed battery temperature is the same as the actual temperature.	• The battery temperature sensor is faulty. • The SMU is faulty.	1. Replace the battery temperature sensor. 2. Replace the SMU.

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No.	Maintenance Item	Possible Fault Cause	Suggestion
4	Check whether the displayed total load current is the same as the actual current measured by a clamp meter.	• Battery current detection fault. • The SMU is faulty.	1. Check that the current monitoring cable is securely connected. 2. Replace the SMU.
5	Check whether the displayed battery charge current is the same as the actual current measured by a clamp meter.	• The current monitoring cable is loose. • The SMU is faulty.	1. Check that the current monitoring cable is securely connected. 2. Replace the SMU.
6	Check whether the difference between the displayed DC output voltage and the measured DC busbar voltage is less than 0.5 V DC.	• The cabinet busbar and cables are loose or in poor contact. • The SMU is faulty.	1. Check and secure the cabinet busbar and cable connections. 2. Replace the SMU.

7.1.5 Cables

Table 7-5 Cable maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check whether signal cables and power cables are separately bound.	Cables are not properly installed.	Bind signal cables and power cables separately.
2	Check whether all cables are bound properly.	Cables are not properly installed.	Bind cables properly.
3	Check whether the cabinet ground bar is securely connected to the site or equipment room ground point.	Cables are not properly installed.	Connect the cabinet ground bar to the site or equipment room ground point.
4	Check whether ground cables are rusty.	Cables corrode after being used for a long time.	Replace rusty cables.
5	Check whether cables have overheated and are deteriorating.	• Cables are too thin. • Cables are not properly routed.	• Replace the cables with cables of the required thickness. • Route the cables properly.

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No.	Maintenance Item	Possible Fault Cause	Suggestion
6	Check whether the cable near the output port of the circuit breaker is overheated.	• Cables are too thin. • Cables are not properly installed.	• Replace the cables. • Reinstall the cables (strip the cables for 18 mm) and ensure that the cables are securely connected.
7	Check whether copper wires are exposed at the circuit breaker wiring terminals.	Cables are not properly installed.	• Use standard terminals. • Insulate exposed copper wires.
8	Check whether cables are misshapen by metal parts.	Cables are not properly installed.	Replace the cables and adjust the cable routing.
9	Check whether cables pass behind the air exhaust vents of rectifiers.	Cables are not properly installed.	Adjust the cable routing to prevent cable overheating.
10	Check whether cable insulation is damaged.	Cable insulation is damaged.	Reinsulate the cables with insulation tape.

7.2 Identifying Component Faults

7.2.1 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.

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7.2.2 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.

7.2.3 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.

7.2.4 Locating AC Input Module Faults

The following lists the AC input module faults:

- The AC surge protector is faulty.
- Under normal AC power supply, if the rectifier has no output after the circuit breaker is switched on (the upstream has power), the circuit breaker is faulty.

7.3 Replacing Components

NOTICE

- Ensure that loads are supplied with power when replacing major components. For example, keep the switches for primary loads in the ON position, and do not turn off the battery switch and AC input switch at the same time.
- Seek the customer's prior consent if load disconnection is required.
- Rectifiers and the SMU are hot-swappable.

7.3.1 Replacing an SMU02C

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools 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.

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NOTE

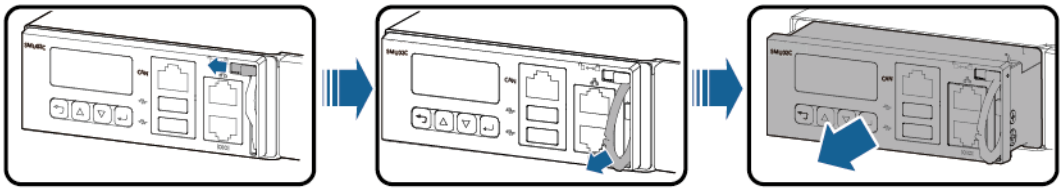
Record the software version of the old SMU. If the old SMU is damaged and version information cannot be viewed, send the bar codes of the old SMU and cabinet to technical support engineers.

Step 2 Disconnect the communications cable from the SMU02C panel and record the cable information.

Step 3 Push the locking latch leftward.

Step 4 Pull the handle outwards and remove the SMU02C from the subrack.

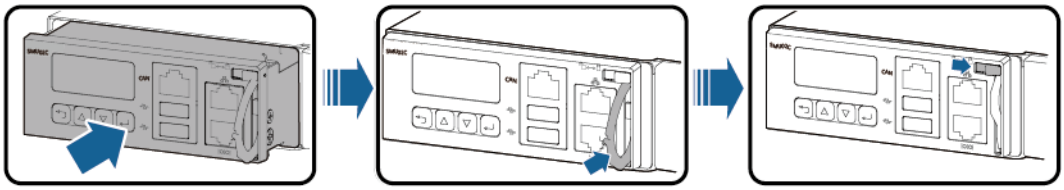
Figure 7-1 Removing the SMU02C



Step 5 Place the new SMU02C in the slot, push the locking latch leftwards, and pull out the handle.

Step 6 Gently push the SMU02C along the guide rails until it is engaged. Close the handle, and push the locking latch rightwards.

Figure 7-2 Installing the SMU02C



Step 7 Reconnect the communications cable to the SMU02C panel based on the recorded information.

Step 8 Set SMU02C parameters.

NOTE

After installing the new SMU, power on the SMU and check the software version of the new SMU. If the software version of the new SMU is earlier than that of the old SMU, upgrade the software.

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.

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7.3.2 Replacing a UIM05B1

Prerequisites

- The ESD wrist strap, ESD gloves, ESD box or bag, and toolbox are available.
- The new UIM05B1 is intact.

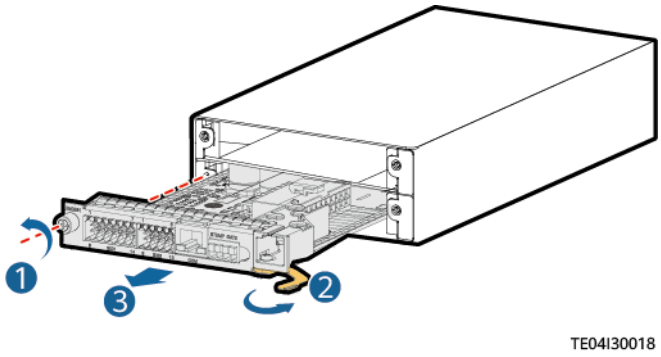
Procedure

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

Step 2 Record the connection positions of cables on the UIM05B1 panel and remove the cables.

Step 3 Loosen the screws on the UIM05B1 panel, pull the handle until it is engaged, and take out the UIM05B1.

Figure 7-3 Removing the UIM05B1



Step 4 Install the new UIM05B1.

Step 5 Install the cables based on the recorded information.

Step 6 Disconnect the ground cable from 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.

7.3.3 Replacing an NIM01C3

Prerequisites

- An ESD wrist strap, protective gloves, an ESD box or bag, cabinet door key, and required tools are available.
- The new NIM01C3 is intact.

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Procedure

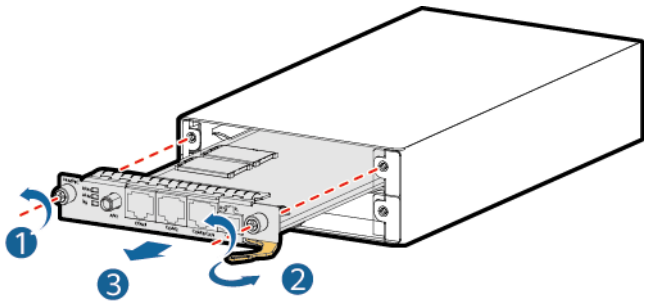
Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Record the positions where cables connect to the NIM01C3 panel, and then disconnect the cables.

Step 3 Loosen the screws on both sides of the NIM01C3 panel.

Step 4 Pull the handle rightwards and remove the NIM01C3.

Figure 7-4 Removing an NIM01C3

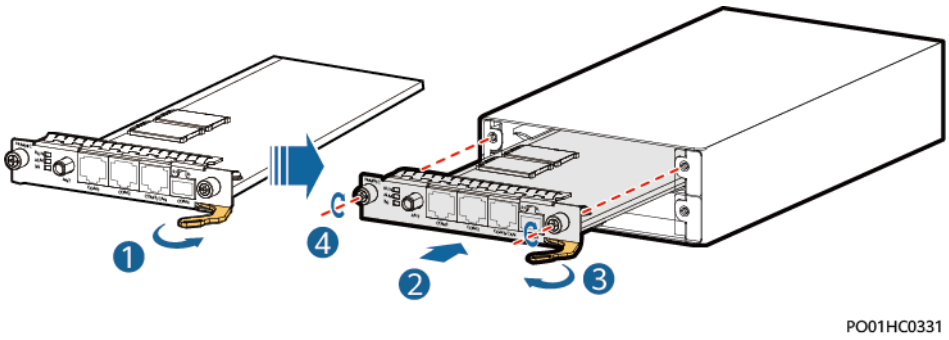


Step 5 Remove the SIM card from the SIM card slot in the NIM01C3, and insert the card into the SIM card slot in the new NIM01C3. Skip this step if no SIM card is installed.

Step 6 Place the new NIM01C3 at the entry to the appropriate slot in the SMU subrack, and push the NIM01C3 until its front panel is flush with the front panel of the SMU subrack.

Step 7 Push the handle inwards until it is engaged, and then tighten the screws.

Figure 7-5 Installing the NIM01C3



Step 8 Connect the cables to the new NIM01C3 panel 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

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Follow-up Procedure

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

7.3.4 Replacing a CIM02C

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new CIM02C is intact.

Procedure

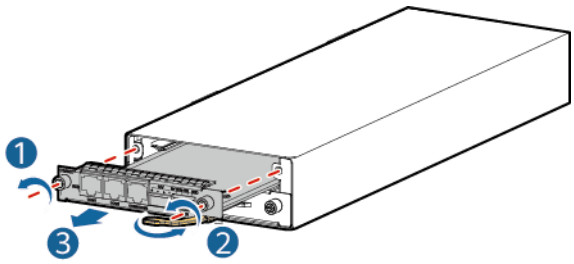
Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

Step 2 Note where cables are connected to the CIM02C panel. Record these positions and disconnect the cables.

Step 3 Loosen the screws on both sides of the CIM02C panel.

Step 4 Pull the handle rightwards and take out the CIM02C.

Figure 7-6 Removing the CIM02C

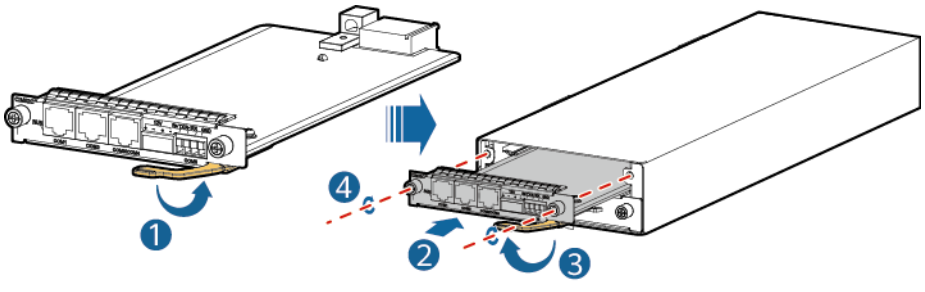


TM07H00022

Step 5 Place the new CIM02C into the correct slot in the subrack, and push the CIM02C until its front panel is flush with the front panel of the subrack.

Step 6 Push the handle inwards until it is engaged, and then tighten the screws.

Figure 7-7 Installing the CIM02C



PQ00HC0096

Step 7 Reconnect the cables to the new CIM02C panel based on the information you recorded.

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Step 8 Disconnect the ground cable from 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.

7.3.5 Replacing a DMU02C1

Prerequisites

- The protective gloves and cabinet door key are available.
- The new DMU02C1 is intact.

CAUTION

- Do not remove the DMU02C1 that is loaded. Otherwise, it may be damaged.
- To prevent burns, exercise caution when removing a DMU02C1 because it may be hot as a result of continuous operation.

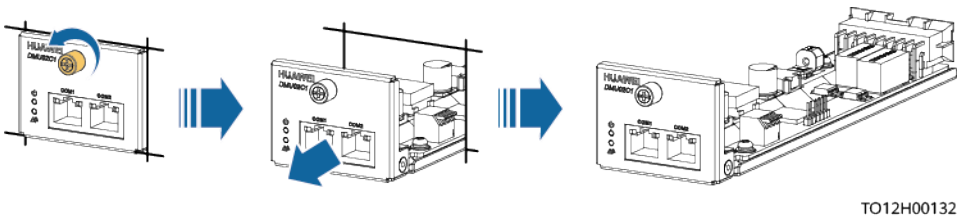
Procedure

Step 1 Put on the protective gloves.

Step 2 Note where cables are connected to the DMU02C1 panel. Record these positions and disconnect the cables.

Step 3 Remove the old DMU02C1.

Figure 7-8 Removing the old DMU02C1



Step 4 Record the DIP address on the old DMU02C1.

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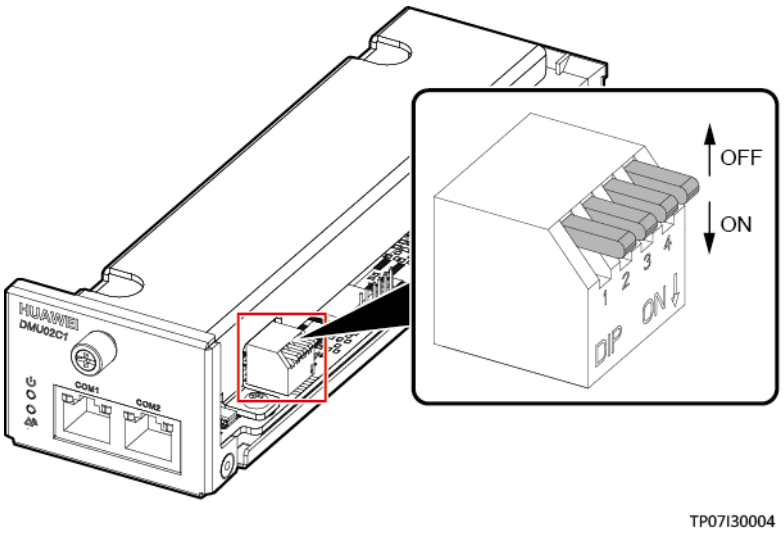
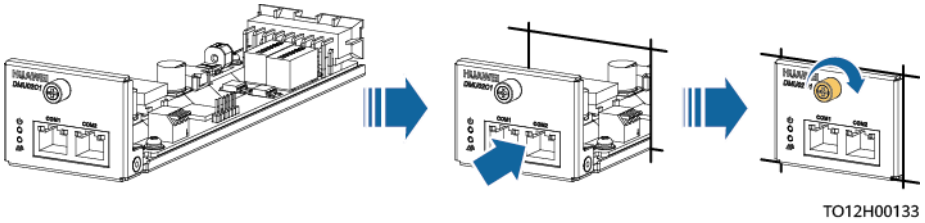
Figure 7-9 DIP switch



Step 5 Install the new DMU02C1.

1. Set the DIP switch on the new DMU02C1 based on the DIP switch settings on the old DMU02C1 to ensure consistency.
2. Install the DMU02C1.

Figure 7-10 Installing the new DMU02C1



Step 6 Reconnect the cables based on the information you recorded.

Step 7 Remove the protective gloves.

----End

Follow-up Procedure

Pack the removed component and have it sent to the local warehouse.

7.3.6 Replacing a Rectifier

Prerequisites

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

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CAUTION

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

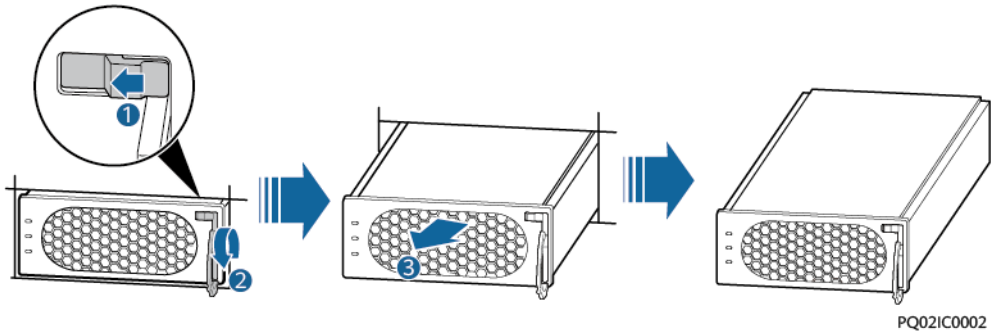
Procedure

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 7-11 Removing a rectifier

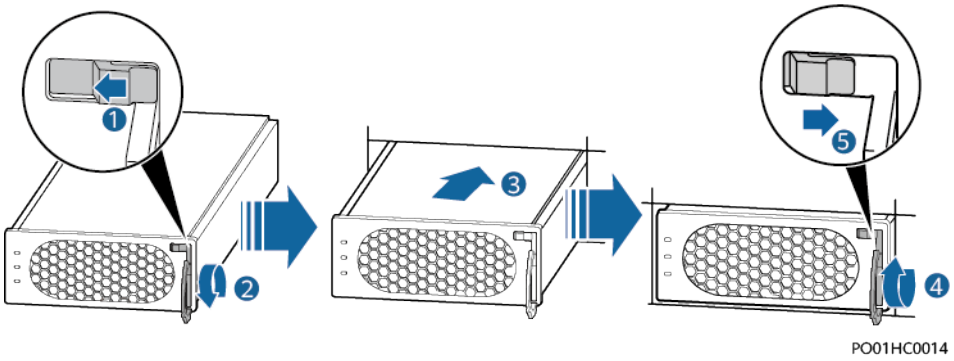


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

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 7-12 Installing a rectifier



Step 7 Take off protective gloves.

----End

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Follow-up Procedure

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

7.3.7 Replacing a Circuit Breaker

Prerequisites

- You have obtained the toolbox.
- The new circuit breaker is intact.

NOTICE

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

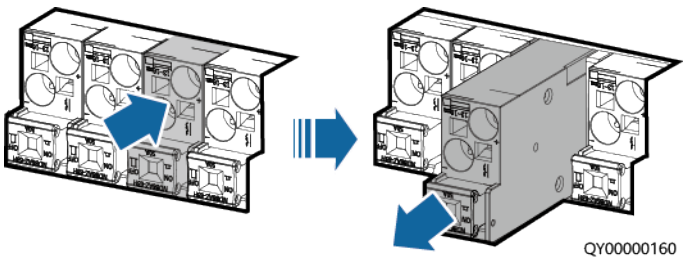
Procedure

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 Push the faulty circuit breaker along the guide rails and pull it out horizontally.

Figure 7-13 Removing a circuit breaker



Step 4 Put the new circuit breaker to the slot and push it along the guide rails until it is in position.

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 components and send them to the local Huawei warehouse.

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7.3.8 Replacing an AC Input Module

Prerequisites

The required tools are available and the new AC input module is intact.

NOTICE

- Power off the AC input module before replacing it.
- Power-off will cause load devices to be shut down. Before replacing the AC input module, obtain the customer's approval.

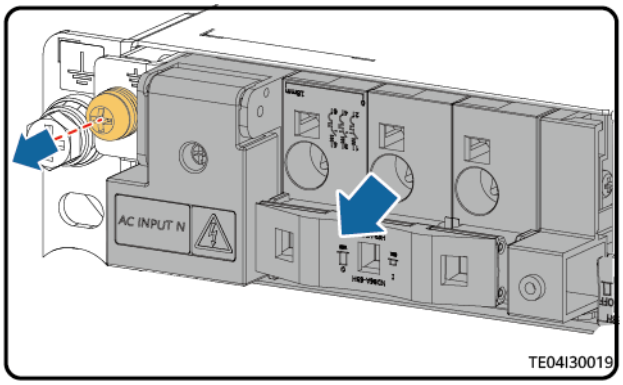
Procedure

Step 1 Switch off the circuit breaker on the AC input module.

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

Step 3 Remove the AC input module.

Figure 7-14 Removing the AC input module



Step 4 Install the new AC input module.

Step 5 Install the AC input power cables based on the recorded information.

Step 6 Switch on the AC input module.

----End

Follow-up Procedure

Pack the removed parts and send it to the local Huawei warehouse.

7.3.9 Replacing a Digital Temperature and Humidity Sensor

Prerequisites

- Tools and the key to the cabinet door are available.
- The new digital temperature and humidity sensor is intact.

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Procedure

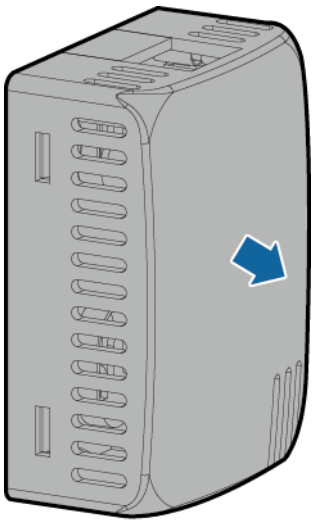
Step 1 Record cable information and installation positions.

Step 2 Record the DIP switch settings.

Step 3 Disconnect the cable from the communications port on the sensor.

Step 4 Remove the faulty sensor.

Figure 7-15 Removing a sensor



Step 5 Set the DIP switch of the new sensor based on the recorded information.

Step 6 Install a new sensor.

Step 7 Connect cables based on the recorded information.

----End

Follow-up Procedure

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

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A How Do I Install a Hall Effect Sensor?

NOTICE

When installing the hall effect sensor, ensure that the direction of current is the same as that of the arrow on the hall effect sensor.

Figure A-1 Installing a Hall effect sensor 1

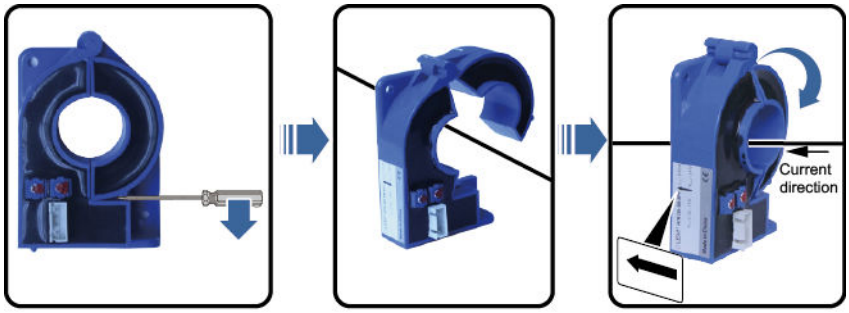

Figure A-2 Installing a Hall effect sensor 2

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B Technical Specifications

Table B-1 Technical specifications

Category	Item	Specifications
Environment conditions	Operating temperature	–40°C to +65°C (When the ambient temperature is between –33°C and +55°C, the power system works properly. When the ambient temperature is greater than 55°C and less than or equal to 65°C, the output power is linearly derated to 80%. When the ambient temperature is –40°C, the power system can start properly after AC power is applied.)
	Transportation temperature	–40°C to +70°C
	Storage temperature	–40°C to +70°C
	Operating humidity	5%–95% 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.
	Noise	System audible noise: ≤ 60 dBA at 25°C, ≤ 72 dBA at 40°C; meets class 3.1 requirements of ETSI 300753.

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Category	Item	Specifications
	Others	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 frequency	45–66 Hz; rated frequency: 50 Hz/60 Hz
	Power factor	≥ 0.99 (rated input voltage, 50%–100% load)
DC output	Output voltage	–53.5 V DC
	Maximum output power	• ETP48400-C3B1: 24 kW • ETP48400-C3B2: 18 kW
	Regulated voltage precision	≤ ±1%
	Peak-to-peak noise voltage	≤ 200 mV (0–20 MHz)
	Psophometrically weighted noise voltage	≤ 2 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	290–300 V AC
	AC input undervoltage protection threshold	≤ 80 V AC
	AC input undervoltage recovery threshold	80–90 V AC
DC output protection	DC output overvoltage protection threshold	–56 V DC to –60.5 V DC (default: 59.5 V DC)
EMC specifications	Conducted emission	• AC port: EN 55032, Class B • DC port: EN 55032, Class A[1] • Signal port: EN 55032, Class B
	Radiated interference	EN 55032, Class B

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Category	Item	Specifications
	Harmonic current	IEC 61000-3-12
	Voltage flicker and fluctuation	IEC 61000-3-11
	Electrostatic discharge (ESD)	IEC 61000-4-2
	Electrical fast transient (EFT)	IEC 61000-4-4
	Radiated susceptibility (RS)	IEC 61000-4-3
	Conducted susceptibility (CS)	IEC 61000-4-6
	Surge susceptibility	IEC 61000-4-5
	Voltage dip	IEC 61000-4-11
Others	MTBF	200,000 hours (at 25°C)
Structure	Dimensions (H x W x D)	ETP48400-C3B1/ETP48400-C3B2: 130 mm x 482 mm x 330 mm
	Weight	≤ 20 kg (excluding rectifiers)
	IP rating	IP20
	Installation mode	Installed in a 19-inch rack
	Cabling mode	Routed in and out from the front
	Maintenance mode	Maintained from the front
	Heat dissipation mode	Free cooling

NOTE

1. 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.

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C 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 hazardous voltage or a power protective cover which may be removed during maintenance.
	Warns users of overheating. This symbol is attached to equipment 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 protective earthing (PE). This symbol is attached next to a PE terminal or a terminal that connects the equipment to an external ground system. An equipment ground cable is connected to an external ground bar through the PE 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.

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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.
 or	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 rotating blades.
 or   or 	This symbol is used when the usage of an equipment 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 supply device, use it near the power supply to replace the multi-power supply identifier. This symbol indicates that the device has multiple power inputs. Therefore, when powering off the equipment, you must disconnect all power inputs. 2. If there are multiple output ports, use the symbol near the output ports. 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 area. For details, see the slot information, restrictions on boards, and usage conditions in the instruction.

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D Electrical Conceptual Diagrams

Figure D-1 ETP48400-C3B1 electrical conceptual diagram

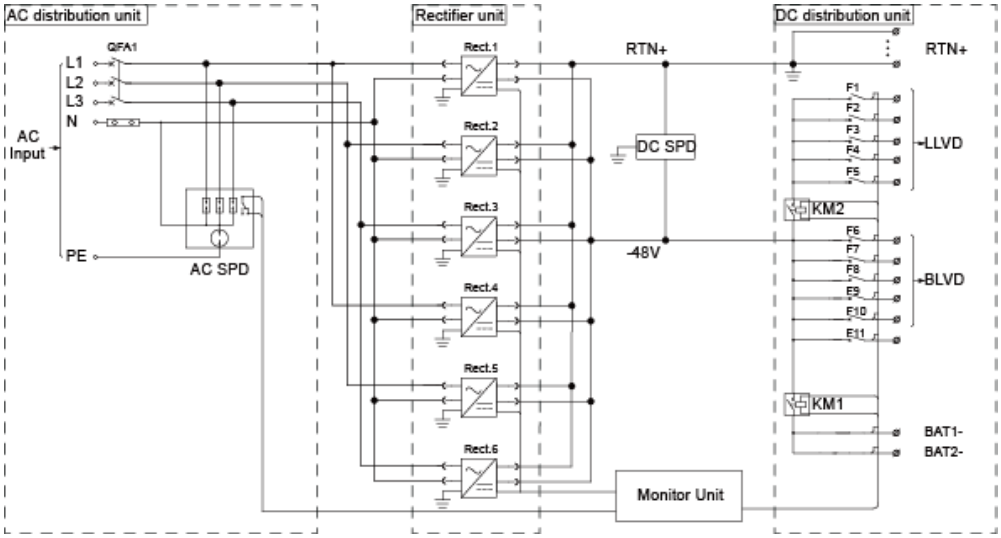
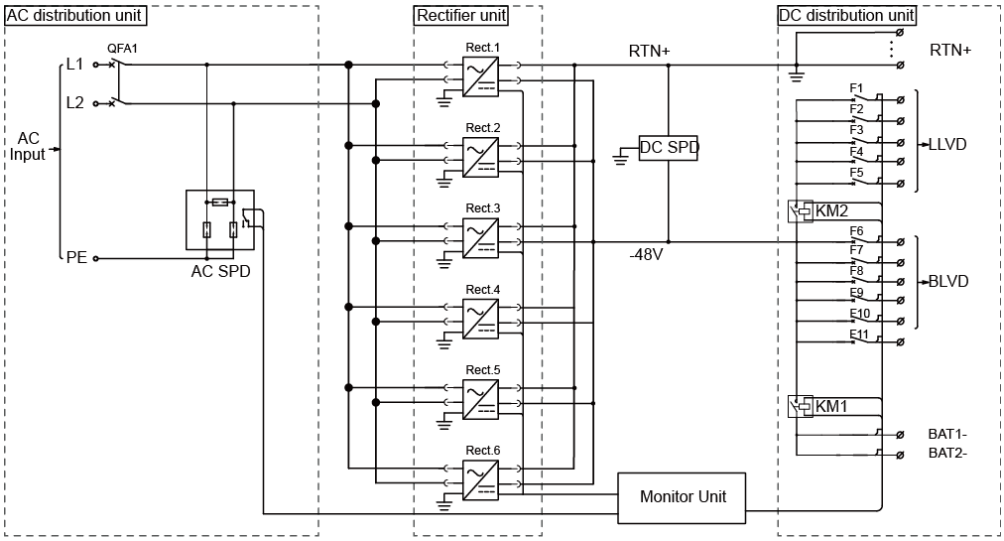


Figure D-2 ETP48400-C3B2 electrical conceptual diagram



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E Associations Between UIM Dry Contacts and Alarms

Table E-1 Associations between dry contacts and alarms

Port Type	Silk Screen	Associated Alarm
Dry contact input	DIN4	Dry contact input 4
Dry contact output Default setting (closed: alarm; open: normal). The setting can be modified. **NOTE** The DIN/ALM1-5 is a multiplexing port.	DIN1/ALM1	AC failure Long-time AC failure (disabled by default)
	DIN2/ALM2	Busbar overvoltage Busbar ultra overvoltage Busbar undervoltage Busbar ultra undervoltage Lithium battery discharge
	DIN3/ALM3	Single-rectifier fault – redundancy (disabled by default) Single-rectifier fault – non-redundancy (disabled by default) Multi-rectifier fault All-rectifier communication failure Rectifier fault Rectifier protection Communication failure
	DIN5/ALM4	AC SPD fault DC SPD fault
	DIN6/ALM5	Load fuse blown Battery fuse blown

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Port Type	Silk Screen	Associated Alarm
	ALM6	High battery temperature Very high battery temperature Low battery temperature Very low battery temperature High ambient temperature Very high ambient temperature Low ambient temperature
	ALM7	Door status alarm
	ALM8	Power cabinet temperature control: Fan 1 fault, fan 2 fault, fan 3 fault, high temperature of the return air vent When an external direct ventilation battery cabinet or a heat exchanger cabinet is used: Air outlet overtemperature, air outlet undertemperature, air inlet overtemperature, air inlet undertemperature, return air vent overtemperature, return air vent undertemperature, EXTFAN1 fault, EXTFAN2 fault, INFAN1 fault, INFAN2 fault, INFAN3 fault, INFAN4 fault, TEC air conditioner fault When an external PC300D or air conditioner is used: High air conditioner temperature, air conditioner internal fan fault, air conditioner external fan fault, air conditioner compressor fault, communication failure

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F How Do I Change the Communications Protocol for COM4 and COM5?

- To use CAN for communication through the COM4 port:

  Take out the CIM02C, remove the jumper caps from pins 1 and 2 in the J18 position shown in **Figure F-1**, and insert the jumper caps into pins 2 and 3.
- To use RS232 for communication through the COM5 port:

  Take out the CIM02C, remove the jumper caps from pins 1 and 2 in the J16 and J17 positions shown in **Figure F-1**, and insert the jumper caps into pins 2 and 3.

Figure F-1 COM4 and COM5 port jumper positions

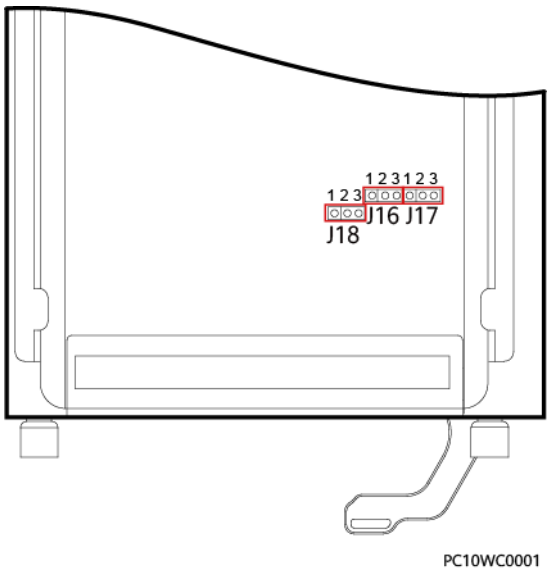

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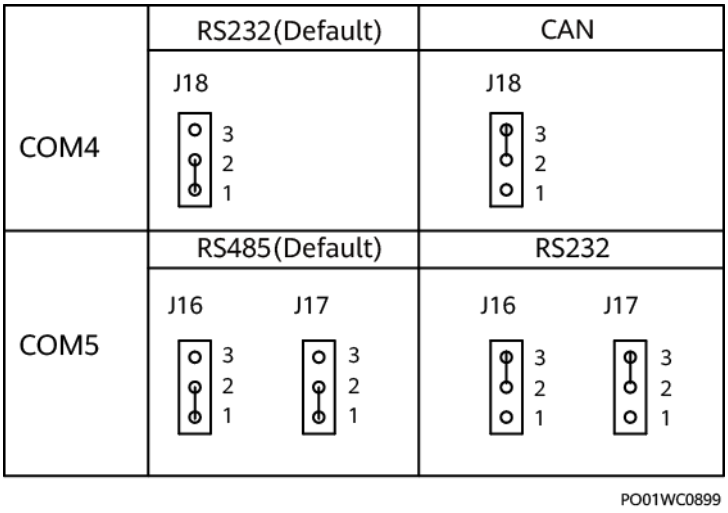
Figure F-2 Jumper connection rules for the COM4 and COM5 ports



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G Acronyms and Abbreviations

E	
EFT	electrical fast transient
EMC	electromagnetic compatibility
ESD	electrostatic discharge
H	
HTTPS	Hypertext Transfer Protocol Secure
I	
IP	Internet Protocol
L	
LCD	liquid crystal display
M	
MTBF	mean time between failures
R	
RS	radiated susceptibility
S	
SMU	site monitoring unit
SNMP	Simple Network Management Protocol
SPD	surge protection device
T	

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THD	total harmonic distortion
U	
UIM	user interface module

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