ETP48400-C4B1 Embedded Power

User Manual

Issue	04
Date	2022-06-11

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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
- Hardware installation engineers
- Installation and commissioning 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.

Symbol	Description
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 04 (2022-06-11)

Modified contents of **6.4 Installing DC Output Power Cables**.

Issue 03 (2021-09-28)

Modified contents of **About This Document**.

Issue 02 (2021-08-15)

- Changed the name of the intelligent power distribution unit from iDCDB48-300-17A to iDMU48-300B-17A.
- Added **8.12 (Optional) Setting iDMU48-300B-17A Parameters**.

Issue 01 (2021-03-15)

This issue is the first official release.

The monitoring software version is V100R021C10.

Contents

1 Safety Precautions

1.1 General Safety

Statement

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "CAUTION", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. The Company will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

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

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

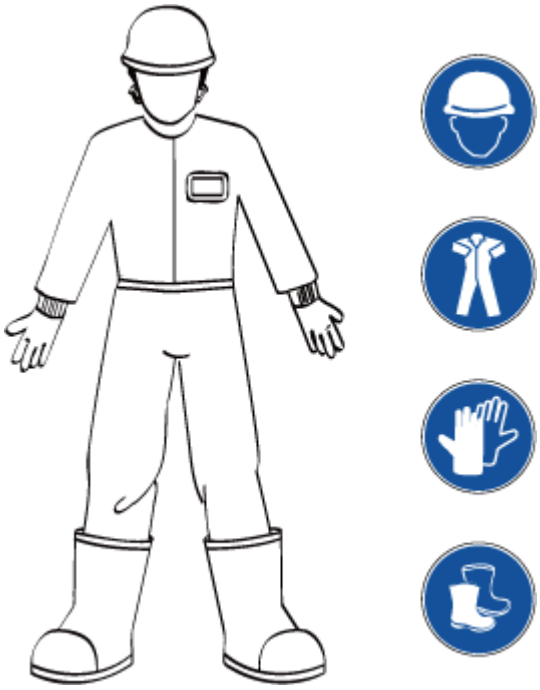
The Company will not be liable for any consequences of the following circumstances:

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

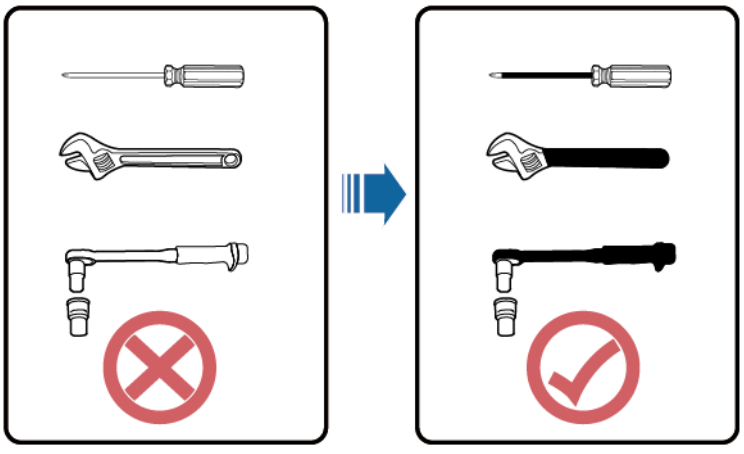
- Storage conditions that do not meet the requirements specified in this document

General Requirements

- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.

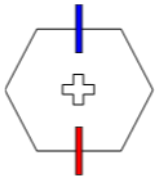


- Use insulated tools or tools with insulated handles, as shown in the following figure.

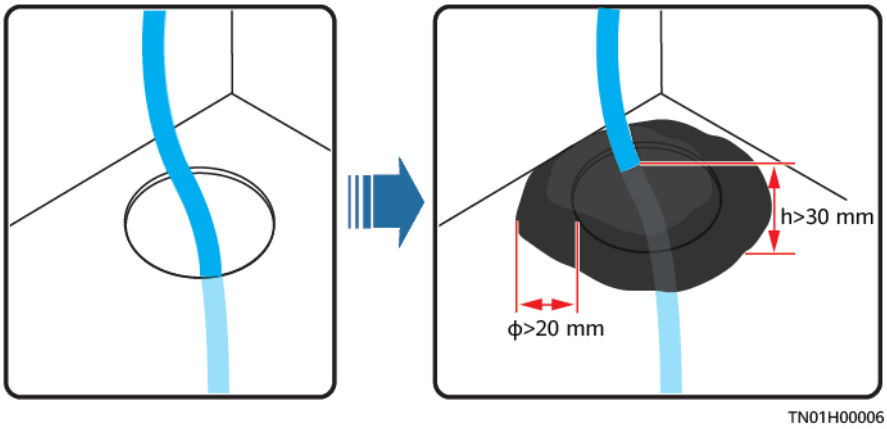


- Follow the specified procedures for installation, operation, and maintenance.
- Ensure that bolts are tightened with a torque wrench and marked using red or blue color. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm if the bolts are tightened and then mark them in

red. (The marks should cross the edges of the bolts, as shown in the following figure.)



- Before installing, operating, or maintaining a cabinet, clean up any water, ice, snow, or other sundries on the top of the cabinet to prevent sundries from falling into the cabinet when you open the cabinet door.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- 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 sundries on the backplane, baseplate, and boards.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.
- Do not stop using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.
- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- All cable holes should be sealed. Seal the used cable holes with firestop putty. Seal the unused cable holes with the caps delivered with the cabinet. The following figure shows the criteria for correct sealing with firestop putty.



- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of a cabinet.

Personal Safety

- If there is a probability of personal injury or equipment damage during operations on the equipment, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Do not power on the equipment before it is installed or confirmed by professionals.

Symbol Conventions

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

Symbol	Description
	Indicates a part exposed to high voltage. This symbol warns operators that both direct and indirect contact with the power grid voltage is fatal. This symbol is attached to a position with dangerous voltages or a power protective cover which may be removed during maintenance.
	Warns users of overheating. This symbol is attached to a device surface that may overheat and cause scalding. It warns users not to touch the surface during operations or maintenance. Users should wear heat insulation gloves before operations to prevent scalding.
 or 	Indicates protection earthing. This symbol is attached next to a protection ground terminal next to grounded equipment and an external ground system. An equipment ground cable is connected to an external ground bar through the protection ground terminal.
	Indicates equipotential bonding. This symbol is found with equipotential terminals inside equipment.
	Indicates electrostatic discharge (ESD). This symbol is used in all electrostatic sensitive areas. Before operating equipment in these areas, wear ESD gloves or an ESD wrist strap.
	Capacitors store hazardous energy. Open the chassis one minute after all power supplies are disconnected.
	Indicates that the equipment is safe to use at altitudes below 2000 m.

Symbol	Description
	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 the blades when the fan is rotating.
 or   or 	This symbol is used when the usage of a device port cannot be clearly described. It prompts users to refer to the instruction. This symbol can be used in but not limited to the following scenarios: 1. For a multi-power device, use it near the power supply to replace the multi-power supply identifier. The symbol indicates that the device has multiple power inputs. Therefore, when powering off the device, you must disconnect all power inputs. 2. If there are multiple output interfaces, use the symbol near the output interfaces. Connect cables according to the rated power output and configuration parameter information in the instruction. 3. If there are multiple slots, use the symbol near the slot information. For details, see the description of slot information, restrictions on boards, and usage conditions in the instruction.

1.2 Personnel Requirements

- Personnel who plan to install or maintain the equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.

NOTE

- Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
- Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

1.3 Electrical Safety

Grounding

- The protective ground of the equipment should be reliably connected to the ground screw on the metal enclosure (grounding resistance ≤ 0.1 ohm).
- For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protection ground.

AC and DC Power

DANGER

- The power system is energized by power sources with hazardous voltage. Direct or indirect contact (through damp objects) with the power sources may result in electric shock.
- Non-standard and improper operations may result in fire or electric shock.
- Do not connect or disconnect power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- If the power supply to the equipment is permanently connected, install an easily accessible disconnector at the exterior of the device.
- Before making electrical connections, switch off the disconnector on the upstream device to cut off the power supply if people may contact energized components.
- If a "high electricity leakage" tag is attached on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the AC power supply; otherwise, electric shock as a result of electricity leakage may occur.
- Before installing or removing a power cable, turn off the power switch.

- Before connecting a power cable, check that the label on the power cable is correct.
- Before connecting the power supply, ensure that cable connections are correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.

Cabling

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables behind the air intake and exhaust vents of the equipment.
- Ensure that cables meet the VW-1 flame spread rating requirements.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that all cables are securely bound. Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- If an AC input power 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 the bending radius of each cable is at least five times the diameter of the cable.
- 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.

ESD

- When installing, operating, and maintaining the equipment, comply with the ESD protection regulations and wear the ESD clothing, gloves, and wrist strap.
- When holding a board, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package boards with ESD packaging materials before storing or transporting them.

1.4 Installation Environment Requirements

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- Ensure that there are no acid, alkaline, or other corrosive gases in the installation place.
- Do not place the equipment near heat sources or exposed fire sources, such as electric heaters, microwave ovens, roasters, water heaters, furnace fire, candles, or other places where high temperature may occur. Otherwise, the enclosure will melt or the equipment will heat up, which can cause a fire.
- 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.

- Before installing the equipment into a cabinet, ensure that the cabinet is secured and will not tilt or fall down due to loss of balance, which can cause personal injury or equipment damage.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

Installation at Heights

Working at heights refers to operations that are performed at least 2 meters above the ground.

Do not at heights in any of the following situations:

- Rainwater remains on steel pipes or other risky conditions exist. After the preceding conditions no longer exist, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.
- When working at heights, comply with local relevant laws and regulations.
- Only trained and qualified personnel are allowed to work at heights.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

DANGER

- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- 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.
- Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
- 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.
- Do not loiter when working at heights. Do not sleep at heights.

- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.
- Operators who violate the safety regulations are responsible for accidents caused. The supervisor has to bear the responsibility accordingly.

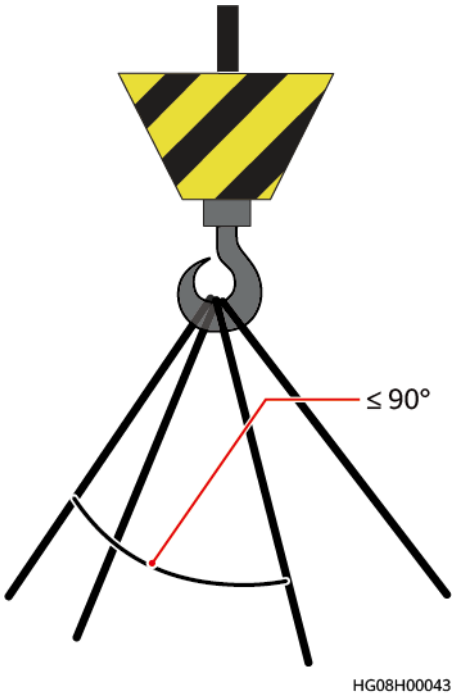
1.5 Mechanical Safety

Hoisting Devices

DANGER

Do not walk under hoisted objects.

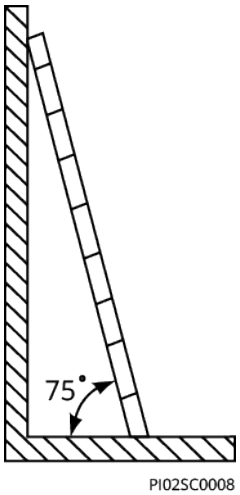
- Only trained and qualified personnel are allowed to perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables is no more than 90 degrees, as shown in the following figure.



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

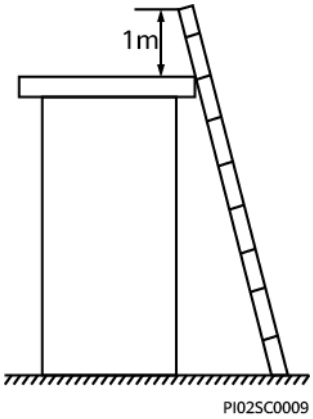
Using Ladders

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



When climbing a ladder, take the following precautions to reduce risks and ensure safety:

- Keep your body steady.
- Do not climb higher than the fourth rung of the ladder from the top.
- To climb onto a roof, ensure that the ladder top is at least one meter higher than the roof line, as shown in the following figure.



- Ensure that your body's center of gravity does not shift outside the legs of the ladder.

Drilling Holes

When drilling holes into a wall or floor, observe the following safety precautions:

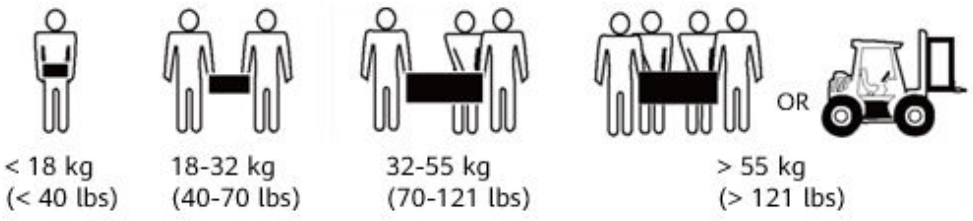
NOTICE

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

- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.

- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules (such as power supply units, fans, and boards) that are installed in the equipment because they cannot support the weight of the equipment.

1.6 Battery Safety

If no battery is involved, skip this section.

Before installing, operating, or maintaining batteries, read the battery manufacturer's instructions. Observe the safety precautions provided in this document which are supplemental to the safety instructions provided by the battery manufacturer.

Basic Requirements

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

DANGER

- Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. Overheating may cause battery explosion.
- Do not burn batteries. Otherwise, the batteries may explode.
- To avoid leakage, overheating, fire, or explosions, do not disassemble, alter, or damage batteries, for example, insert sundries into batteries or immerse batteries in water or other liquids.
- When replacing a battery, use a battery of the same model or type. Improper replacement may cause the battery to explode.
- Do not connect a metal conductor to the battery poles or touch the battery terminals. Otherwise, the battery may be short-circuited and heat up, which can cause injuries such as burning.

To ensure safety during battery installation, operation, and maintenance, pay attention to the following:

- Do not wear conductive articles such as watches, bracelets, bangles, and rings.
- Wear goggles, rubber gloves, and protective clothing to avoid damage caused by electrolyte in the case of electrolyte overflow. If a battery overflows, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.
- Use dedicated insulated tools.
- Move batteries in the required direction. Do not place a battery upside down or tilt it.
- Keep the battery loop disconnected during installation and maintenance.
- Do not drop, squeeze, or puncture a battery. Protect batteries from external high pressure to prevent internal short circuits and overheating.

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
- Do not use a damaged battery.
- To prevent injuries or explosion, do not allow children or pets to swallow or bite a battery.
- If batteries experience discoloration, deformation, abnormal heating, or other abnormalities during working, charging, or storage, stop using the batteries and replace them with new ones.
- Batteries can work properly with the allowed charge and discharge parameters when the temperature is within the specified range. If the temperature is outside the specified range, the battery charge and discharge performance and safety are affected.

Battery Installation

Before installing batteries, observe the following safety precautions:

- Install batteries in a dry and cool environment with good ventilation, which is away from high temperature and flammable materials, and take precautions against fire.
- Place and secure batteries horizontally.
- Note the polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, the battery may be short-circuited.
- When installing a battery string, retain at least one breakpoint to prevent a loop being formed. After checking that the installation is correct, close the breakpoints to finish the installation.
- During the installation, insulate the terminals of cables connecting batteries. Ensure that the terminals do not come into contact with metal components such as the cabinet.
- Secure battery cables or copper bars by tightening bolts to the required torque. Loose connections will result in excessive voltage drop or cause batteries to burn out in the case of excessive current.
- Check battery connections periodically, ensuring that all screws are securely tightened.

Battery Short Circuit

DANGER

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

- If permitted, disconnect the batteries in use before performing any other operations on them.
- To avoid battery short circuit, do not maintain batteries with power on.

Flammable Gas

NOTICE

- Do not use unsealed lead-acid batteries.
- To prevent fire or corrosion, ensure that flammable gas (such as hydrogen) is properly exhausted for lead-acid batteries.

Lead-acid batteries emit flammable gas when used. Ensure that batteries are kept in a well-ventilated area and take preventive measures against fire.

Battery Leakage

NOTICE

Battery overheating causes deformation, damage, and electrolyte overflow.

If the battery temperature is higher than 60°C, check the battery for electrolyte overflow. If the electrolyte overflows, handle the leakage immediately.

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

⚠ WARNING

When the electrolyte overflows, absorb and neutralize the electrolyte immediately. When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may cause damage.

If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate ($NaHCO_3$) or sodium carbonate (Na_2CO_3).

Lithium Battery

The safety precautions for lithium batteries are similar to those for lead-acid batteries except that you also need to observe the following precautions.

⚠ WARNING

There is a risk of explosion if the model of the replaced battery is incorrect.

- A battery can be replaced only with a battery of the same or similar model recommended by the manufacturer.
- When handling a lithium battery, do not place it upside down, tilt it, or bump it with other objects.

- Keep the lithium battery loop disconnected during installation and maintenance.
- When the ambient temperature is lower than the lower limit of the operating temperature (charge is forbidden at 0°C), do not charge the lithium battery. Otherwise, a short circuit would occur inside the battery.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

2 Product Overview

2.1 Overview

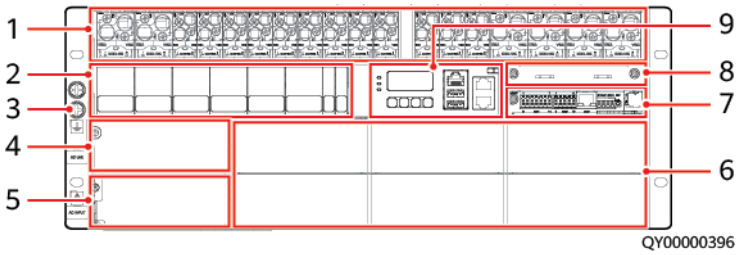
The ETP48400-C4B1 is an embedded power system that converts AC power into DC power. It supplies –48 V and –57 V constant voltage to equipment. The maximum capacity of the ETP48400-C4B1 is 24 kW. It can be used at newly built sites and capacity expansion and reconstruction scenarios of existing sites.

System features:

- Branch measurement management: Each circuit breaker can monitor and report data such as the current, power, and energy consumption.
- Differentiated backup management: Each circuit breaker can be powered off independently and multiple power-off modes (voltage mode, power mode, capacity mode, time mode, scheduled power-off, and no backup in exemption periods) are supported.
- Usage management: Circuit breakers can be managed by usage. The usages of circuit breakers include **Customized Load**, **BLVD Load**, **LLVD1-4 Loads**, **Power Cascading Port**, **DC DG**, **Solar Energy**, **Lithium Battery**, **Lead-acid Battery**, and **Other**.
- Customizable capacity of intelligent circuit breakers: Users can set the circuit breaker capacity (range: 3 A to the rated capacity) based on the current required by loads.
- High temperature protection for intelligent circuit breakers: When the temperature inside the branch circuit breaker is too high, the circuit breaker generates a high temperature protection alarm and automatically switches off.
- Remote management: Circuit breakers can be remotely controlled to power on and power off.

2.2 Appearance

Figure 2-1 ETP48400-C4B1



(1) DC output branches (upper)
(2) DC output branches (lower, reserved)
(3) Ground screw
(4) Space for the AC module
(5) Space for the AC input module
(6) Space for rectifiers
(7) User interface module UIM05D1
(8) Space for the communications expansion module
(9) SMU02C

Table 2-1 System configurations

Item	Configurations
Number of AC inputs	• One AC input: Install an AC output module in the space for the AC module. • Two AC inputs: Install an AC input module in the space for the AC module. (The two AC input modules are switched manually and locked by a mechanical part.)
AC input module	For details, see **Table 2-3**.
AC output module	For details, see **Table 2-4**.
DC output branch (default configuration before delivery)	• LLVD: 2 x 125 A/1P, 3 x 63 A/1P • BLVD: 5 x 63 A/1P, 4 x 32 A/1P
Battery branch (default configuration)	4 x 125 A/1P
Monitoring module	SMU02C
Rectifier	R4850G2/R4850G5/R4875G5/R4850S5/R4850G6
Communications expansion module	NIM01C3/CIM02C
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

Figure 2-2 Intelligent circuit breaker (iCBD)

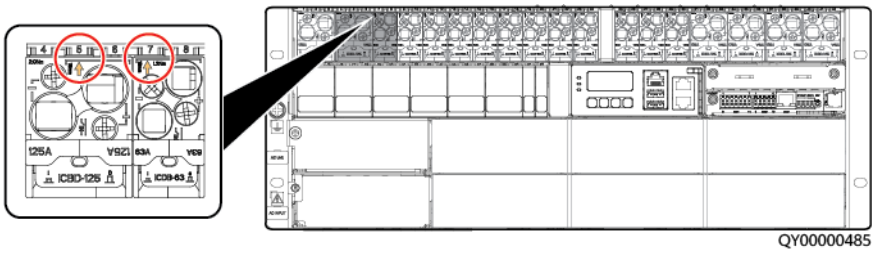


Table 2-2 Intelligent circuit breaker (iCBD)

Circuit Breaker Slot No.	Features
The number indicated by the arrow is the slot number of the circuit breaker. On the LUI, WebUI, or NMS, the circuit breaker slot number corresponds to the branch number, such as branch 5 and branch 7 in the preceding figure.	The intelligent circuit breaker integrates the power-off and measurement functions.

NOTE

The intelligent circuit breaker is powered by the UIM. If the UIM is faulty or removed, the intelligent circuit breaker cannot be switched on or off over remote management or local LUI. In this case, you can only operate the circuit breaker handle to switch on or off the intelligent circuit breaker.

Table 2-3 AC input module

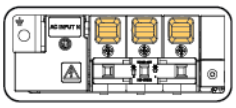
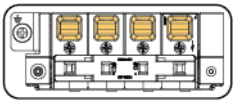
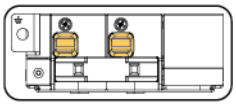
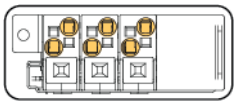
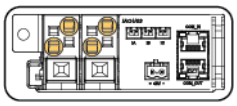
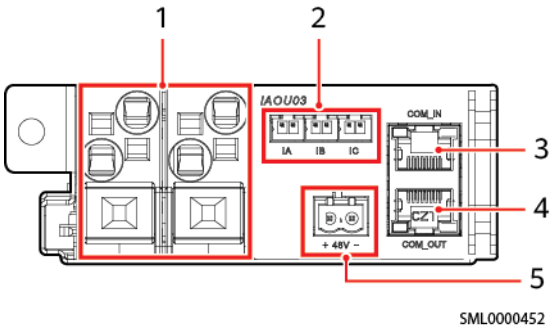
Model and Basic BOM Number	Appearance	Specifications	Input System	Maximum Capacity
AIU03-63C (02312KUQ-002)		63 A/3P + N terminal	220/380 V AC three-phase four-wire	24 kW
AIU03-63D (02312MMH-002)		63 A/4P	220/380 V AC three-phase four-wire	24 kW
AIU02-125B (02312MKG)		125 A/2P	110 V AC dual–live wire, compatible with 220 V AC single-phase	18 kW

Table 2-4 AC output module

Model and Basic BOM Number	Appearance	Specifications
AOU03-16C (02312WSX)		3 x 16 A/1P circuit breaker
iAOU03-16B (02312WSX-001)		2 x 16 A/1P circuit breakers + 1 x AC meter (48 V power supply)

iAOU03-16B

Figure 2-3 iAOU03-16B



(1) AC output circuit breakers (2) AC detection cable ports (3) COM_IN port (reserved)

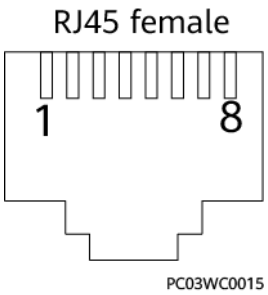
(4) COM_OUT port (5) Power port (reserved)

Communications Port	Communications Parameter	Communications Protocol
COM_IN/COM_OUT	Baud rate: 4800 bit/s, 9600 bit/s, 19200 bit/s, 38400 bit/s, 115200 bit/s	Modbus protocol
NOTE All the preceding ports are protected by security mechanisms.		

NOTE

When the iAOU03-16B is installed in the power subrack, the iAOU03-16B communication is performed over the backplane of the power subrack. You do not need to connect a communications cable to the COM port on the iAOU03-16B panel.

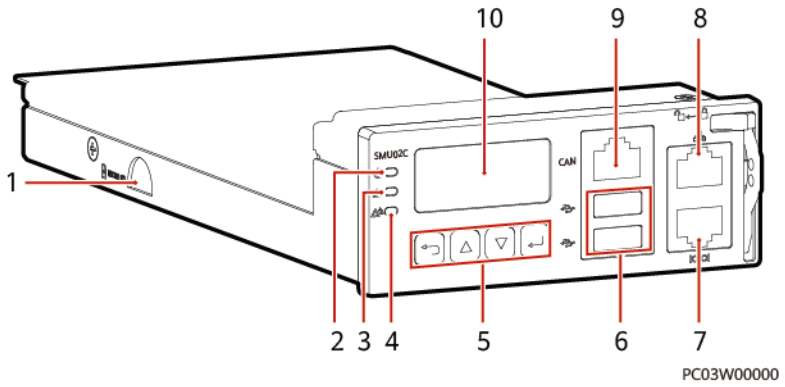
Table 2-5 COM port pin definitions

COM Port Pins	Pin	Signal	Description
	1	RS485_RX+	RS485 data, positive
	2	RS485_RX-	RS485 data, negative
	3	N/A	N/A
	4	RS485_TX+	RS485 data, positive
	5	RS485_TX-	RS485 data, negative
	6–8	N/A	N/A

3 Components

3.1 Monitoring Module SMU02C

Figure 3-1 SMU02C



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

Indicators

Table 3-1 Indicator description

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

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

Buttons

Table 3-2 Button description

Button	Name	Description
▲	Up	Press ▲ or ▼ to browse menus or select 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. • To increase or decrease a parameter value quickly, press and hold ▲ or ▼. • Hold down ↵ and ⮌ for 10s to restart the SMU. • Hold down ↵ and ▲ (or ▼) for 2s to increase (or decrease) the LCD contrast.		

SD Card Slot

An SD card is used to store up to 32 GB photos shot by the camera.

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 Communication 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.

Communications Port	Communications Parameter	Communications Protocol	Function
CAN	Baud rate: 125 kbit/s	CAN protocol	Connects to Huawei southbound devices.
NOTE All the preceding ports are protected by security mechanisms.			

Figure 3-2 Communications port pin definitions

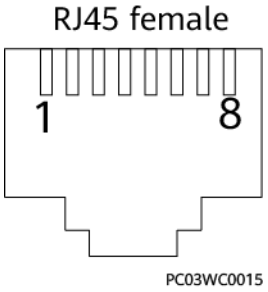


Table 3-4 Pin definitions for the FE port

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)

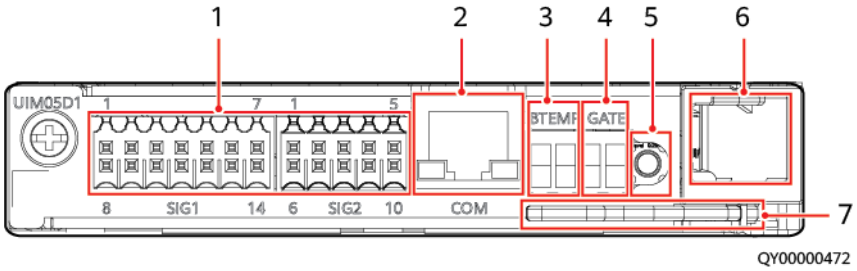
Pin	Signal	Description
8	Null	-

Table 3-6 Pin definitions for the CAN port

Pin	Signal	Description
1	RX+	Receive data over RS485.
2	RX-	
3	Null	-
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 UIM05D1

Figure 3-3 Panel



(1) Dry contacts and sensor ports

(2) Communications port COM

(3) Battery temperature sensor port

(4) Door status sensor port

(5) Button (reserved)

(6) Cable hole for fan cables

(7) Handle

Figure 3-4 Dry contacts

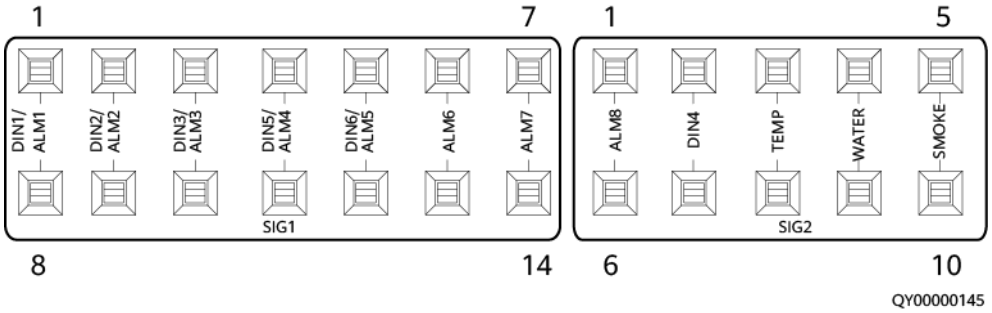


Figure 3-5 COM port pin definitions

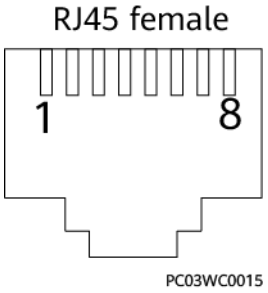


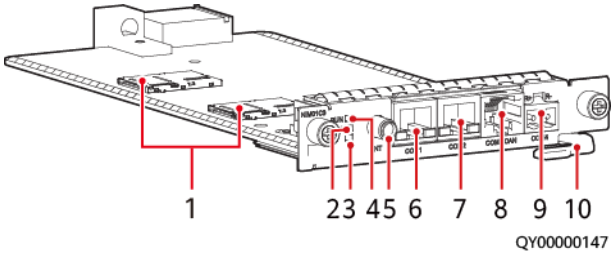
Table 3-7 COM port pin definitions

Pin	Signal	Description
1	RS485_RX+	RS485 data, positive
2	RS485_RX-	RS485 data, negative
3	12V	Supplies power.
4	RS485_TX+	RS485 data, positive
5	RS485_TX-	RS485 data, negative
6	GND	Grounding
7	N/A	N/A
8	GND	Grounding

3.3 (Optional) Communications Expansion Module NIM01C3

The communications expansion module NIM01C3 is used for 4G communication. It also extends the RS485/CAN ports of the SMU for connecting to southbound communications equipment.

Figure 3-6 Panel



(1) SIM card slots (2 PCS) (2) Alarm indicator (3) 4G indicator

(4) Running indicator (5) ANT antenna port (6) COM1 port

(7) COM2 port (8) COM3/CAN port (9) COM4 port

(10) Handle

Indicator

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 network is connected.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm is generated.
Running indicator	Green	Off	The NIM01C3 is not running because it is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The NIM01C3 is running and communicating with the host properly.
		Blinking fast (4 Hz)	The NIM01C3 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 a COM1, COM2, or COM3 port

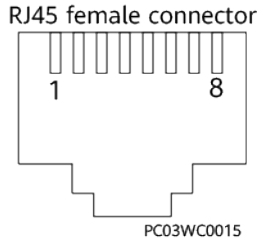


Table 3-10 Pin definitions for a COM1 or COM2 port

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

Table 3-11 Pin definitions for a COM3 or CAN port

Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX–	
3	N/A	-
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

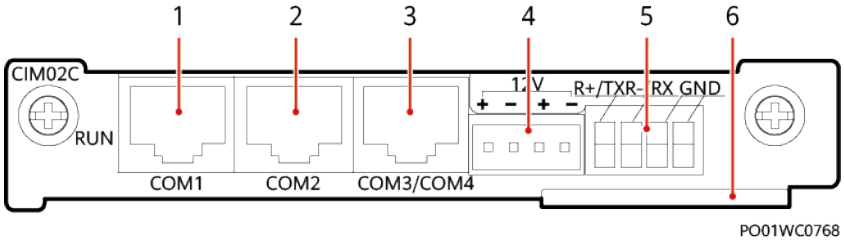
Table 3-12 Pin definitions for a COM4 port

Pin	Signal	Description
R+	RS485+	RS485 data +
R–	RS485–	RS485 data –

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.

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.	

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

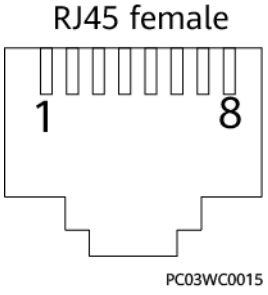


Table 3-14 Pin definitions for the COM1 and COM2 ports

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

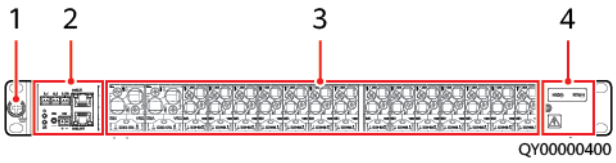
Pin	Signal	Description
1	RS485_RX+	Receive data over RS485.
2	RS485_RX-	
3	RS232_RXD	Receives data over RS232.
4	RS485_TX+	Transmit data over RS485.
5	RS485_TX-	
6	GND	Grounding
7	CANH/RS232_TXD	CAN data, positive/Transmits data over RS232.
8	CANL	CAN data, negative

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

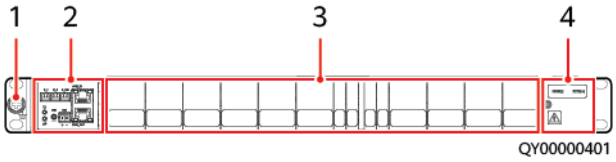
3.5 (Optional) Intelligent Power Distribution Unit iDMU48-300B-17A

Figure 3-10 iDMU48-300B-17A (01075872)



(1) Ground screw
(2) Communication module DMU03C1
(3) Intelligent DC output circuit breakers
(4) DC input port

Figure 3-11 iDMU48-300B-17A (01075872-001)



(1) Ground screw
(2) Communication module DMU03C1
(3) Space for intelligent DC output circuit breakers
(4) DC input port

Figure 3-12 Intelligent circuit breaker (iCBD)

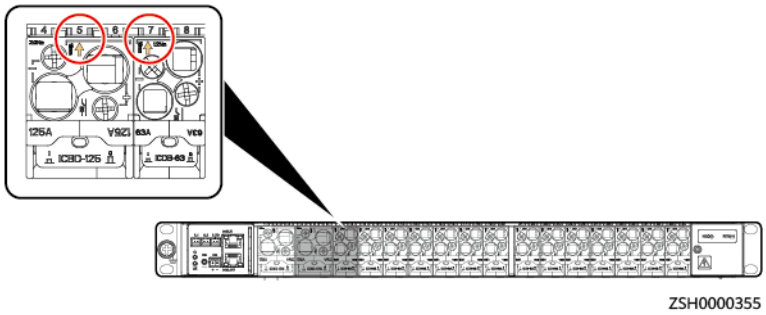
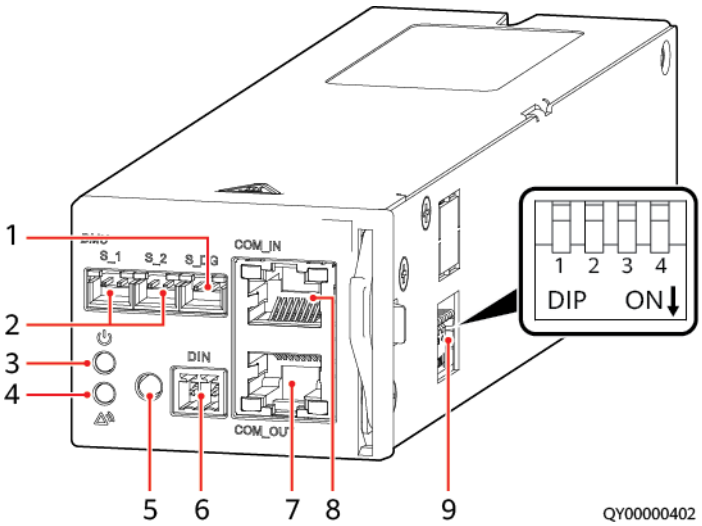


Table 3-17 Intelligent circuit breaker (iCBD)

Circuit Breaker Slot No.	Feature
The number indicated by the arrow is the slot number of the circuit breaker. On the LUI, WebUI, or network management system (NMS), the circuit breaker slot number corresponds to the branch number, such as branch 5 and branch 7 in the preceding figure.	The intelligent circuit breaker integrates the power-off and measurement functions.

Figure 3-13 DMU03C1



(1) DG status detection port
(2) Mains status detection ports
(3) Running indicator
(4) Alarm indicator
(5) WiFi button
(6) Dry contact
(7) COM_OUT port
(8) COM_IN port
(9) DIP switch

Indicator

Table 3-18 DMU03C1 indicator description

Item	Color	Status	Description
Running indicator	Green	Off	The DMU03C1 is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The communication is normal.
		Blinking fast (4 Hz)	The communication fails.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm has been generated.

WiFi Button

- If you need to manage the power system over the LIVE-C app, connect to the app over WiFi.

  NOTE

  The iDMU can be managed using the LIVE-C app only when it functions as a differentiated backup unit.

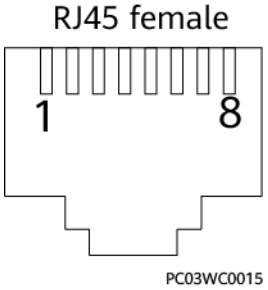
- WiFi button: By default, the WiFi function is disabled. If you hold down the WiFi button for more than 10s, the status changes.
- WiFi password reset: Press the WiFi button three times within 10 seconds to restore the WiFi password to the factory settings.

Communications Ports

Table 3-19 Communication port description

Port	Communications Parameter	Communications Protocol
COM_IN/COM_OUT	Baud rate: 9600 bit/s	YDN protocol or Modbus protocol
NOTE The preceding ports are protected by security mechanisms.		

Figure 3-14 Communications port pins



NOTE

The communications ports on the DMU03C1 are RS485 ports that support four-wire and two-wire cables.

Table 3-20 RS485 port pin definition

Pin	Signal	Description
1	RS485+	RS485 positive
2	RS485-	RS485 negative
4	RS485+	RS485 positive
5	RS485-	RS485 negative
3, 6, 7, 8	N/A	-

DIP Switch

Table 3-21 DIP switch description

Subrack Address	pin1	pin2	pin3	pin4
1	OFF	OFF	Reserved, undefined	Scenario DIP switch. Set to OFF by default.
2	OFF	ON		
3	ON	OFF		
4	ON	ON		

NOTE

- Pin 1 and pin 2 are address DIP switches. If two or more iDMU48-300B-17A are cascaded, you need to set the DMU03C1 address DIP switches. A maximum of four iDMU48-300B-17A can be cascaded.
- Pin 4 is a scenario DIP switch. If pin 4 is set to OFF and the power distribution unit is used together with an SMU, the power-off sensor detection function is not supported. If pin 4 is set to ON, the power distribution unit is a differentiated backup unit and supports the power-off sensor detection function.

Technical Specifications

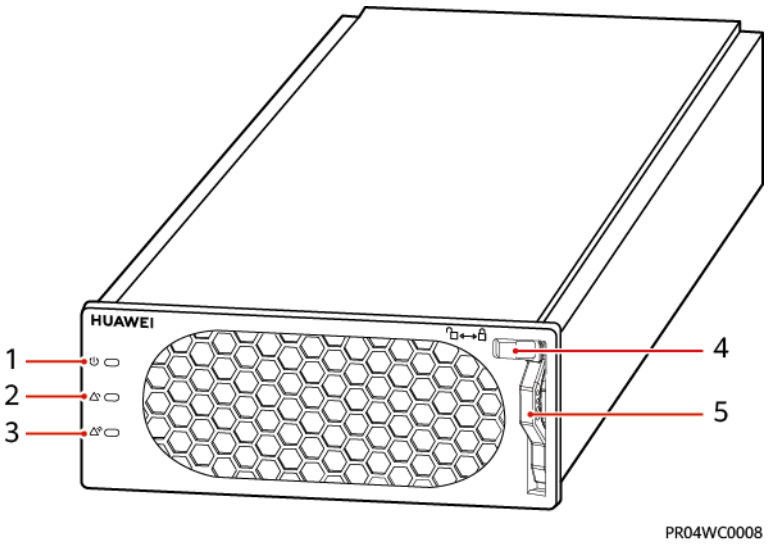
Table 3-22 iDMU configurations

Item	iDMU48-300B-17A (01075872)	iDMU48-300B-17A-001 (01075872-001)
Input voltage	40–60 V DC	
Total input current	Maximum current: 300 A	
DC power distribution	2 x 125 A/1P, 10 x 63 A/1P, 4 x 32 A/1P	Supports a maximum of 17 circuit breakers.
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 310 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	

3.6 Rectifier

A rectifier converts AC input power into stable DC power.

Figure 3-15 Appearance



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

(4) Locking latch (5) Handle

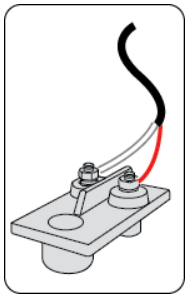
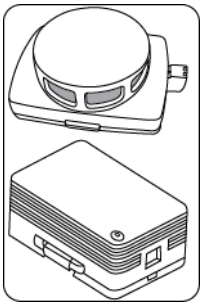
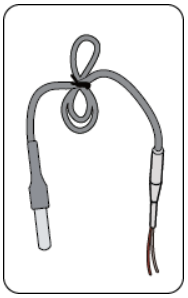
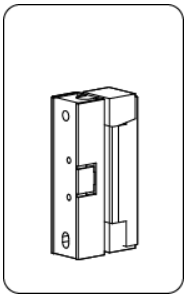
Table 3-23 Indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The rectifier has an AC input.
		Off	The rectifier has no AC input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4 Hz	The rectifier is loading an application program.
Alarm indicator	Yellow	Off	No alarm is generated.
		Steady on	• A warning is generated due to ambient overtemperature. • The rectifier has generated a protection shutdown alarm due to ambient overtemperature or undertemperature.

Indicator	Color	Status	Description
			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.

3.7 (Optional) Sensors

Table 3-24 Sensors

Sensor	Water Sensor	Smoke Sensor	Battery Temperature Sensor	Door Status Sensor	Digital Temperature and Humidity Sensor
Exterior					
Function	Monitors the site for water in real time.	Detects smoke in real time.	Monitors the temperature of lead-acid batteries in real time.	Detects the door status in real time.	Measures the ambient temperature and humidity in real time.

DIP Switch on a Digital Temperature and Humidity Sensor

Figure 3-16 DIP switch 1

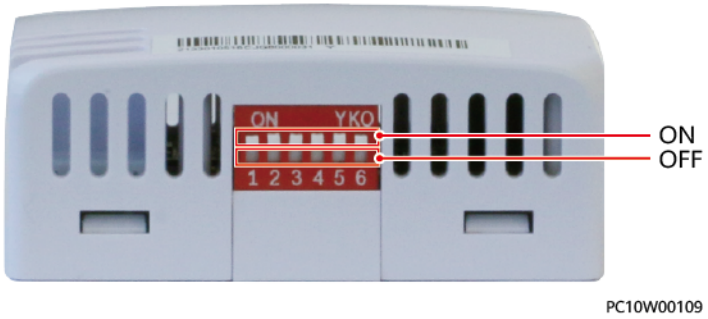


Figure 3-17 DIP switch 2

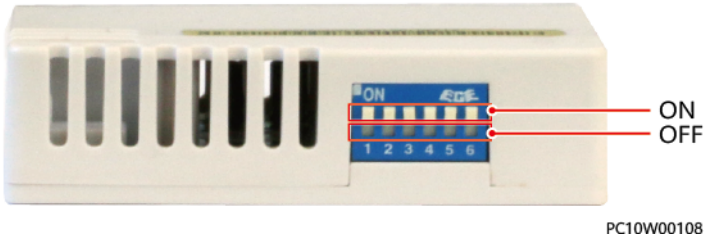


Table 3-25 DIP switch settings

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

3.8 ESM-48100B1

Figure 3-18 Panel and ports

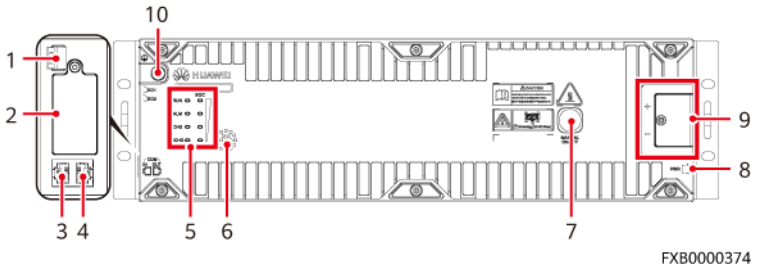


Table 3-26 Port description

No.	Silk Screen	Item
1	DO1	Alarm output dry contacts
	DO2	
2	/	IoT module installation space (reserved)
3	COM_ IN	Communications ports
4	COM_ OUT	
5	/	Buzzer (The ESM supports the buzzer alarm function. After the buzzer alarm function is enabled, the buzzer buzzes when the ESMU detects that the ESM is stolen through the software lock, intelligent displacement lock, or IoT module.)
6	RUN	Running indicator
	ALM	Alarm indicator
	CHG	Charge indicator
	DCHG	Discharge indicator
	SOC	SOC indicator
7	PWR	PWR activation port (The ESM can be activated if an external voltage ranging from 43.2 V to 58 V is connected.)
8	+	ESM power ports
	-	
9	MANUAL ON/OFF	Button for manual power-on/off
10	GND	Protective ground

Table 3-27 DO1 and DO2 port description

Silk Screen	Definition	Description	Alarm Status
DO1	Fault or major alarm	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Cell voltage sampling fault, cell temperature sampling fault, charge converter output short-circuit, relay coil short-circuit, charge low temperature protection, discharge low temperature protection, charge high temperature protection, discharge high temperature protection, power module internal overtemperature protection, discharge converter output short-circuit, input reverse connection, BMU anti-theft lock, overload lockout due to component failure, serial number conflict, input/output discharge overvoltage lockout, and discharge overcurrent lockout	(Configurable) By default, an alarm is generated if the dry contact is open.
DO2	Overload warning, overdischarge protection	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Discharge undervoltage alarm, discharge undervoltage protection, and discharge overcurrent warning	

Table 3-28 Communications port pins

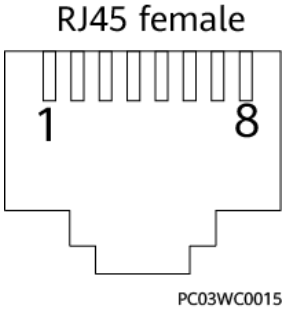
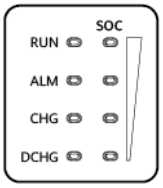
Pin Definition	RJ45 Pin	Signal	Definition	Description
	1	RS485 T+	RS485 transmission +	• Four-wire RS485 communication, complying with the Modbus protocol and master/slave protocol. • Support the baud rate of 9600 bit/s.
	2	RS485 T-	RS485 transmission –	
	3	NC	Reserved	
	4	RS485 R+	RS485 reception +	
	5	RS485 R-	RS485 reception –	
	6	NC	Reserved	-
	7	CANH	CAN communication +	Used to report alarms to a monitoring unit and exchange data between ESMs connected in parallel.
	8	CANL	CAN communication –	

Table 3-29 LED indicator description

Indicator	Silk Screen	Item	Color	Description
	RUN	Running indicator	Green	Steady on: Communication is normal (including board startup, self-check, software loading, and board power-on when not loaded; excluding sleep when the input/output port or activation port is energized). Off: The ESM is in sleep mode. Blinking slowly: The LUI is querying data. Blinking fast: Communication is interrupted.
	ALM	Fault indicator	Red	Steady on: There is a fault or major alarm. Off: There is no fault or major alarm. Blinking slowly: The ESM is locked for theft prevention.
	CHG	Charge indicator	Green	Steady on: The ESM is being charged. Off: The ESM is open-circuited or discharging.
	DCHG	Discharge indicator	Green	Steady on: The ESM is discharging. Off: The ESM is open-circuited or being charged.

Indicator	Silk Screen	Item	Color	Description
	SOC	SOC indicators	Green	1. 0–24% SOC • 25% indicator: blinking • Other SOC indicators: off 2. 25%–49% SOC • 25% indicator: steady on • 50% indicator: blinking • Other SOC indicators: off 3. 50%–74% SOC • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: blinking • Other SOC indicator: off 4. 75%–99% SOC • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: steady on • 100% indicator: blinking 5. 100% SOC The four SOC indicators are steady on.
Notes: • Major alarm: The ESM needs to be maintained immediately. • Minor alarm: The ESM does not require maintenance, but sends a reminder to remote maintenance personnel. • Blinking slowly: on for 1s and then off for 1s • Blinking fast: on for 0.125s and then off for 0.125s • If the SOC indicators are off and other indicators are blinking, the ESM enters the maintenance mode. • When the ESM is in sleep mode, the fault indicator is off except for reverse connection protection.				

Activation and Startup

Table 3-30 Activation mode

Item	Requirement
PWR activation	The PWR activation port receives 43.2–58 V DC power for at least 5s.

Item	Requirement
MANUAL ON/OFF activation	Hold down the MANUAL ON/OFF button for at least 5s and less than 15s.
Power port activation	The power port receives 43.2–58 V DC power for at least 5s.
Notes: 1. The MANUAL ON/OFF button is a contact button. The interval for pressing the button should be greater than 0.5s; otherwise, the operation is ineffective. 2. If you power off the ESM that is in charging, discharging, or disconnected mode by holding down the MANUAL ON/OFF button, you need to hold down this button again to reactivate the ESM. 3. If the intelligent displacement lock function is enabled for the ESM, the shutdown and maintenance functions of the MANUAL ON/OFF button will become ineffective. To use this button, you need to disable the intelligent displacement lock/GPS function. The default undervoltage protection threshold of the ESM is 46 V.	

NOTE

- **Sleep mode**: The BMS is in sleep mode before it is activated. The BMS can enter the offline mode only after it is activated. If the BMS enters the sleep mode after you press the MANUAL ON/OFF button, the DSP keeps working as long as the power port or PWR port receives effective input voltage.
- **Offline mode**: The ESM is disconnected from the battery busbar and does not supply power. The BMS enters the offline mode when it is reactivated, the ESM voltage is low, fault protection occurs, or a shutdown command is received. When the fault is rectified, or the BMS receives a startup command (after receiving a shutdown command), or the BMS enters the charge mode (after the BMS enters this mode due to low battery voltage), the ESM switches to another mode based on its status or system status.
- **Charge mode**: The ESM is charging. When certain conditions are met, the mode is switched to another mode.
- **Discharge mode**: The ESM discharges. When certain conditions are met, the mode is switched to another mode.
- **Maintenance mode**: Switch to this mode when you need to replace an ESM. Under this mode, the ESM does not charge or discharge, and the indicators blink fast.

Technical Specifications

Table 3-31 Technical specifications

Item	Specifications
Dimensions (W x D x H)	• 442 mm x 396 mm x 130 mm (excluding mounting ears) • 482 mm x 396 mm x 130 mm (including mounting ears)
Weight	≤ 44 kg
Nominal voltage	48 V DC

Item	Specifications
Equalized charge voltage	53.5 V DC
Float charge voltage	53.4 V DC
Maximum charge/ discharge current	100 A/100 A at 35°C
Maximum charge/ discharge power	4800 W
Operating ambient temperature	Charge: 0°C to 45°C; discharge: –20°C to +45°C
Relative humidity	5%–95%
Atmospheric pressure	61–113 kPa
Installation mode	Installed in a 19-inch rack
Maintenance mode	Maintained from the front
Altitude	0–4000 m (When the altitude ranges from 2000 m to 4000 m, the highest operating temperature decreases by 1°C for each additional 200 m.)
Ripple and noise	≤ 200 mV
IP rating	IP40
Other requirements	Indoor scenario: ● There should be 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). Outdoor scenario: ● There should be no conductive dust, corrosive gas, or explosion hazard. ● Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with Class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

3.9 (Optional) ESM-48150B1

Figure 3-19 Panel and ports

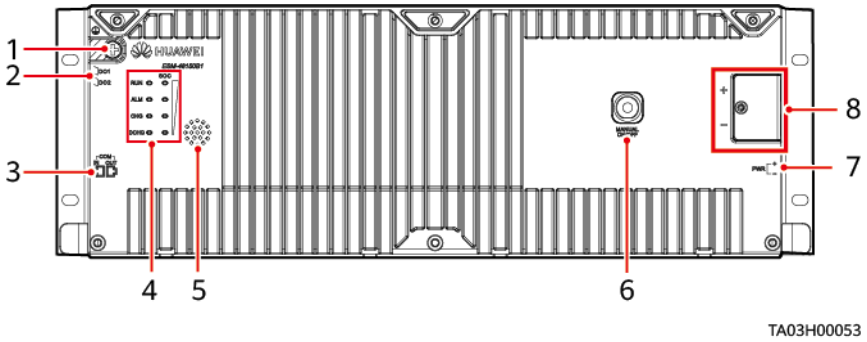


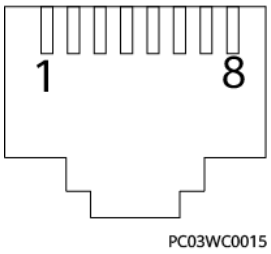
Table 3-32 Port description

No.	Silk Screen	Item
1	GND	Protective ground
2	DO1	Alarm output dry contacts
	DO2	
3	COM_ IN	Communications ports
	COM_ OUT	
4	RUN	Running indicator
	ALM	Alarm indicator
	CHG	Charge indicator
	DCHG	Discharge indicator
	SOC	SOC indicator
5	/	Buzzer (The ESM supports the buzzer alarm function. After the buzzer alarm function is enabled, the buzzer buzzes when the ESMU detects that the ESM is stolen through the software lock, intelligent displacement lock, or IoT module.)
6	MANUAL ON/OFF	Button for manual power-on/off
7	PWR	PWR activation port (The ESM can be activated if an external voltage ranging from 43.2 V to 59 V is connected.)
8	+	ESM power ports
	-	

Table 3-33 DO1 and DO2 port description

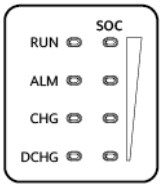
Silk Screen	Definition	Description	Alarm Status
DO1	Fault or major alarm	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Relay coil short-circuit, electrochemical cell voltage sampling fault, busbar overvoltage lockout during discharge, discharge overcurrent lockout, overload after component failure, electrochemical cell fault, discharge overcurrent protection, discharge short-circuit protection, reverse connection protection, board internal overtemperature protection, electrochemical cell temperature sampling exception, main relay open-circuit detection, short-circuit protection for the MOSFET on the battery side, battery charge high temperature protection, battery charge low temperature protection, battery discharge high temperature protection, battery discharge low temperature protection, serial number conflict, and BMU anti-theft lock	(Configurable) By default, an alarm is generated if the dry contact is open.
DO2	Overload warning, overdischarge protection	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Battery string undervoltage protection, electrochemical cell undervoltage protection, battery string discharge undervoltage alarm, electrochemical cell discharge undervoltage alarm, and discharge overcurrent warning	

Table 3-34 Communications port pins

Pin Definition	RJ45 Pin	Signal	Definition	Description
RJ45 female  PC03WC0015	1	RS485 T+	RS485 transmission +	• Four-wire RS485 communications, complying with the Modbus protocol • Support the baud rate of 9600 bit/s.
	2	RS485 T-	RS485 transmission –	
	3	NC	Reserved	
	4	RS485 R+	RS485 reception +	
	5	RS485 R-	RS485 reception –	
	6	NC	Reserved	-

Pin Definition	RJ45 Pin	Signal	Definition	Description
	7	CANH	CAN communication +	Used to report alarms to a monitoring unit and exchange data between ESMs connected in parallel.
	8	CANL	CAN communication –	

Table 3-35 LED indicator description

Indicator	Silk Screen	Item	Color	Description
	RUN	Running indicator	Green	Steady on: Communication is normal (including board startup, self-check, software loading, and board power-on when not loaded; excluding sleep when the input/output port or activation port is energized). Off: The ESM is in sleep mode or is shut down. Blinking slowly: The LUI is querying data. Blinking fast: Communication is interrupted.
	ALM	Fault indicator	Red	Steady on: There is a fault or major alarm. Off: There is no fault or major alarm. Blinking slowly: The ESM is locked for theft prevention.
	CHG	Charge indicator	Green	Steady on: The ESM is being charged. Off: The ESM is open-circuited or discharging.
	DCHG	Discharge indicator	Green	Steady on: The ESM is discharging. Off: The ESM is open-circuited or being charged.

Indicator	Silk Screen	Item	Color	Description
	SOC	SOC indicators	Green	1. 0–24% SOC • 25% indicator: blinking • Other SOC indicators: off 2. 25%–49% SOC • 25% indicator: steady on • 50% indicator: blinking • Other SOC indicators: off 3. 50%–74% SOC • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: blinking • Other SOC indicator: off 4. 75%–99% SOC • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: steady on • 100% indicator: blinking 5. 100% SOC The four SOC indicators are steady on.
Notes: • Major alarm: The ESM needs to be maintained immediately. • Minor alarm: The ESM does not require maintenance, but sends a reminder to remote maintenance personnel. • Blinking slowly: on for 1s and then off for 1s • Blinking fast: on for 0.125s and then off for 0.125s • If the SOC indicators are off and other indicators are blinking, the ESM enters the maintenance mode. • When the ESM is in sleep mode, the fault indicator is off except for reverse-connection protection.				

Activation and Startup

Table 3-36 Activation mode

Item	Requirement
PWR activation	The PWR activation port receives 43.2–59 V DC power for at least 5s.

Item	Requirement
MANUAL ON/OFF activation	Hold down the MANUAL ON/OFF button for at least 5s and less than 15s.
Power port activation	The power port receives 43.2–59 V DC power for at least 5s.
Notes: 1. The MANUAL ON/OFF button is a contact button. The interval for pressing the button should be greater than 0.5s; otherwise, the operation is ineffective. 2. If you have powered off the ESM that is in charging, discharging, or disconnected mode by holding down the MANUAL ON/OFF button, you need to hold down this button again to reactivate the ESM.	

NOTE

- **Sleep mode**: The BMS is in sleep mode before it is activated. The BMS can enter the offline mode only after it is activated. If the BMS enters the sleep mode after you press the MANUAL ON/OFF button, the DSP keeps working as long as the power port or PWR port receives effective input voltage.
- **Offline mode**: The ESM is disconnected from the battery busbar and does not supply power. The BMS enters the offline mode when it is reactivated, the ESM voltage is low, fault protection occurs, or a shutdown command is received. When the fault is rectified, or the BMS receives a startup command (after receiving a shutdown command), or the BMS enters the charge mode (after the BMS enters the offline mode due to low battery voltage), the ESM switches to another mode based on its status or system status.
- **Charge mode**: The ESM is charging. When certain conditions are met, the mode is switched to another mode.
- **Discharge mode**: The ESM discharges. When certain conditions are met, the mode is switched to another mode.
- **Maintenance mode**: Switch to this mode when you need to replace an ESM. Under this mode, the ESM does not charge or discharge, and the indicators blink fast.

Technical Specifications

Table 3-37 Technical specifications

Item	Specifications
Dimensions (W x D x H)	• 442 mm x 560 mm x 160 mm (excluding mounting ears) • 482 mm x 560 mm x 160 mm (including mounting ears)
Weight	65 kg
Nominal voltage	51.2 V DC
Equalized charge voltage	56.4 V DC
Float charge voltage	55.5 V DC

Item	Specifications
Maximum charge/ discharge current	100 A/100 A at 35°C
Maximum charge/ discharge power	4800 W
Operating ambient temperature	Charge: 0°C to 45°C; discharge: –20°C to +45°C
Relative humidity	5%–95%
Atmospheric pressure	61–113 kPa
Installation mode	Installed in a 19-inch rack
Maintenance mode	Maintained from the front
Altitude	0–4000 m (When the altitude ranges from 2000 m to 4000 m, the highest operating temperature decreases by 1°C for each additional 200 m.)
Ripple and noise	≤ 200 mV
IP rating	IP40
Other requirements	Indoor scenario: ● There should be 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). Outdoor scenario: ● There should be no conductive dust, corrosive gas, or explosion hazard. ● Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with Class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

4 Installation Preparations

4.1 Preparing Cables

All cables must comply with local regulations, standards, and customer requirements.

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

The copper cable specifications are for reference only. Choose proper cables based on site requirements.

NOTICE

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

Table 4-1 Preparing cables

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area	Maximum Cross-Sectional Area
AIU03-63C (three-phase, four-wire)	Live wire L1	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Live wire L2	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Live wire L3	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Neutral wire	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	PE wire	-	16 mm^2/6 AWG	35 mm^2/2 AWG

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area	Maximum Cross-Sectional Area
AIU03-63D (three-phase, four-wire)	Live wire L1	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Live wire L2	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Live wire L3	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	Neutral wire	63	10 mm^2/6 AWG	35 mm^2/2 AWG
	PE wire	-	16 mm^2/6 AWG	35 mm^2/2 AWG
AIU02-125B (dual–live wire)	Live wire L1	125	35 mm^2/2 AWG	35 mm^2/2 AWG
	Live wire L2	125	35 mm^2/2 AWG	35 mm^2/2 AWG
	PE wire	-	16 mm^2/6 AWG	35 mm^2/2 AWG
AIU02-125B (single phase)	Live wire	125	35 mm^2/2 AWG	35 mm^2/2 AWG
	Neutral wire	125	35 mm^2/2 AWG	35 mm^2/2 AWG
	PE wire	-	16 mm^2/6 AWG	35 mm^2/2 AWG
AC output power cable	Live wire	16	1.5 mm^2/14 AWG	16 mm^2/6 AWG
	Neutral wire	16	1.5 mm^2/14 AWG	16 mm^2/6 AWG
DC output power cable	-	32	4 mm^2/10 AWG	16 mm^2/6 AWG
	-	63	10 mm^2/6 AWG	16 mm^2/6 AWG
	-	125	35 mm^2/2 AWG	35 mm^2/2 AWG
Battery cable		125	35 mm^2/2 AWG	35 mm^2/2 AWG

NOTE

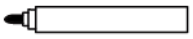
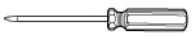
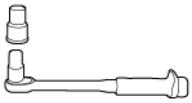
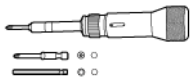
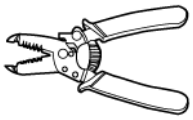
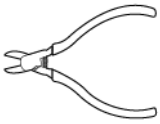
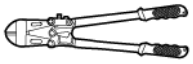
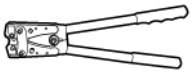
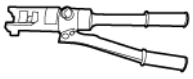
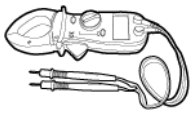
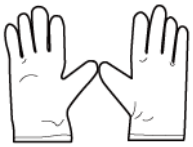
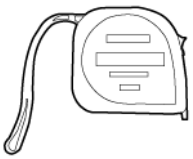
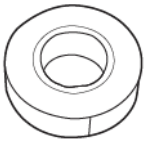
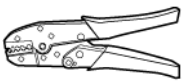
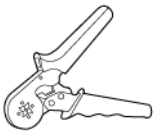
- If a cord end terminal is configured, strip the cable based on the length of the cord end terminal. If no cord end terminal is configured, you are advised to use a cord end terminal with an insertion depth of 18 mm.
- The size data in the table is applicable when the ambient temperature is 30°C (in 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.
- Power cables should be able to withstand at least 105°C.

4.2 Preparing Tools

NOTICE

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

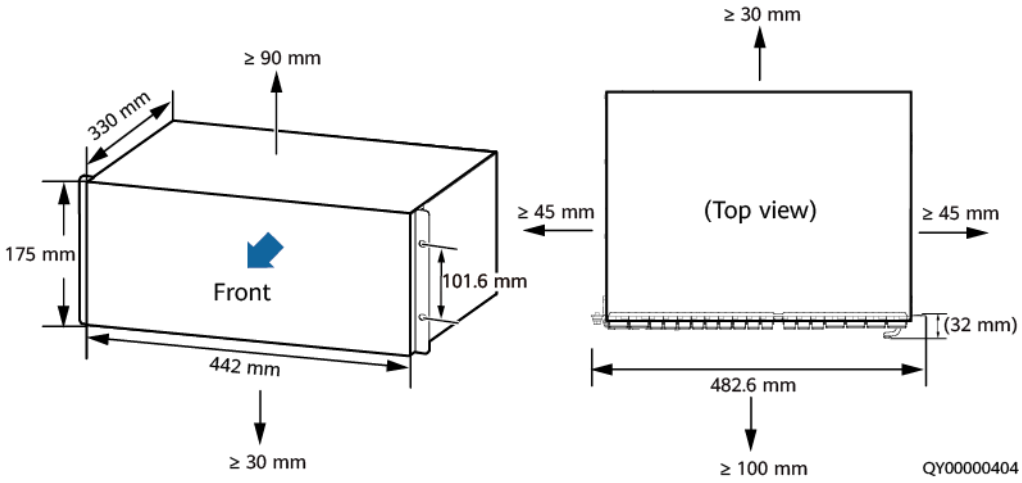
Table 4-2 Installation tools and instruments

 Utility knife	 Marker	 Phillips screwdriver (M4.5 and M5)	 Flat-head screwdriver	 Torque wrench
 Combination wrench	 Adjustable wrench	 Socket wrench	 Torque screwdriver	 Wire stripper
 Diagonal pliers	 Wire clippers	 Power cable crimping tool	 Hydraulic pliers	 Heat gun
 Clamp meter	 ESD wrist strap	 ESD gloves	 Protective gloves	 Steel measuring tape
 Heat shrink tubing	 PVC insulation tape	 Crimping tool	 Cord end terminal crimper	

5 Installing Components

5.1 Installing a Subrack

Figure 5-1 ETP48400-C4B1 installation dimensions



NOTE

32 mm indicates the distance between a power subrack mounting ear and the front of the subrack.

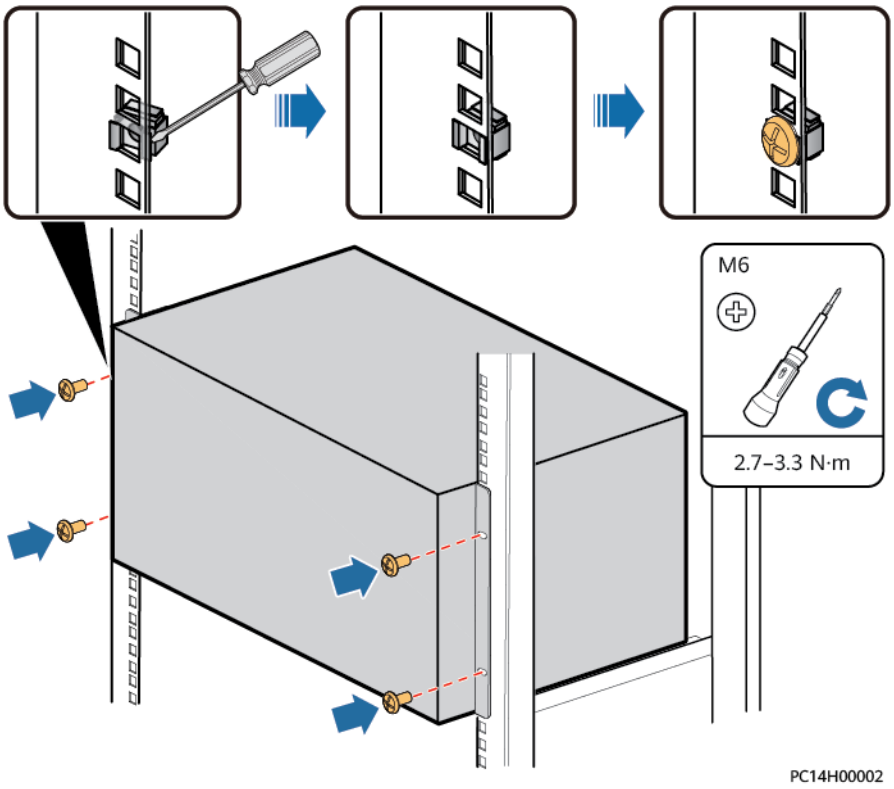
Procedure

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

NOTICE

The subrack can be installed in a 19-inch rack with guide rails or a tray. Check whether the load-bearing capability meets requirements.

Figure 5-2 Installing a subrack

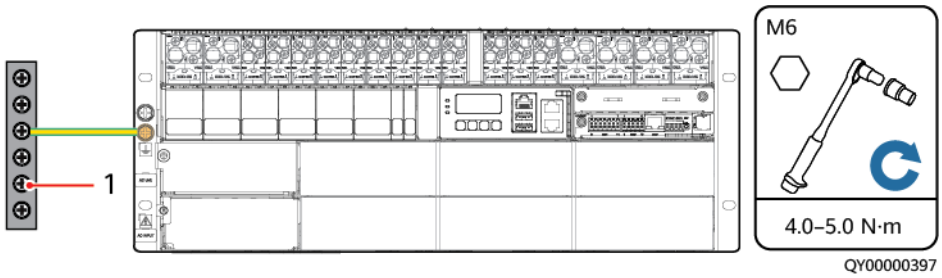


Step 2 Install a ground cable for the subrack.

CAUTION

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

Figure 5-3 Installing a ground cable for the ETP48400-C4B1



(1) Ground bar

----End

5.2 (Optional) Installing a Communications Expansion Module NIM01C3

Procedure

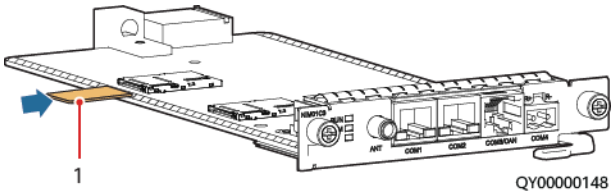
Step 1 Remove the filler panel from the slot for installing the communications expansion module.

Step 2 Install a SIM card in the communications expansion module.

NOTICE

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 5-4 Installing a SIM card



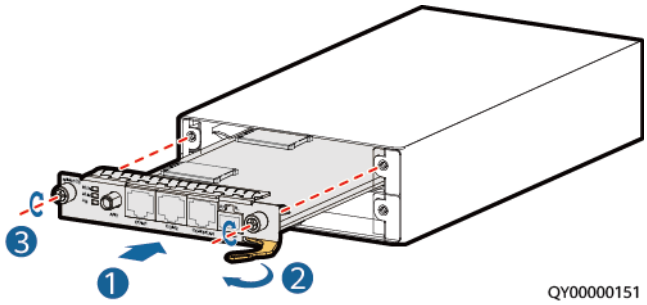
(1) SIM card

Step 3 Pull the handle rightward.

Step 4 Gently push the communications expansion module into its slot along the guide rails.

Step 5 Push the handle leftward and tighten the screws.

Figure 5-5 Installing a communications expansion module NIM01C3



----End

5.3 (Optional) Installing a Communications Expansion Module CIM02C

Procedure

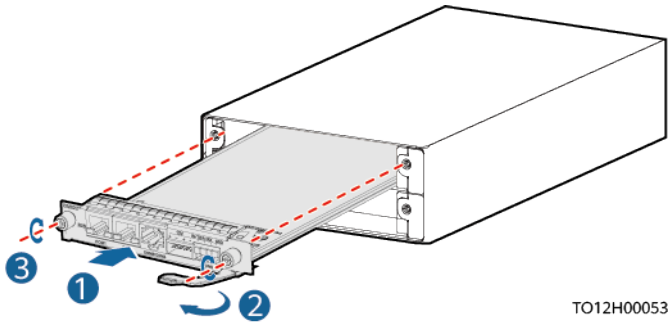
Step 1 Remove the filler panel from the slot for installing the communications expansion module.

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 5-6 Installing a communications expansion module CIM02C



----End

5.4 Installing Rectifiers

Prerequisites

- The rectifier delivered onsite is complete and intact after unpacking and acceptance.
- The filler panel has been removed from the slot.

Figure 5-7 Rectifier slot numbers

1 (L1)	2 (L2)	3 (L3)
4 (L1)	5 (L2)	6 (L3)

QY00000427

NOTICE

- Install rectifiers in ascending order of the numbers.
- If a rectifier is damaged, contact your local Huawei office.
- To avoid electric shock, do not put your hands into a rectifier slot.
- When a rectifier is running, a high temperature is generated around the air exhaust vent at the rear. Do not touch the vent or cover the vent with cables or other objects.
- In an outdoor scenario, you are advised to power on the rectifier within 24 hours after unpacking. If the rectifier 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 rectifier within seven days after unpacking. If the rectifier cannot be powered on in time, place it in a dry indoor environment without corrosive gas.

Procedure

Step 1 Push the locking latch leftward.

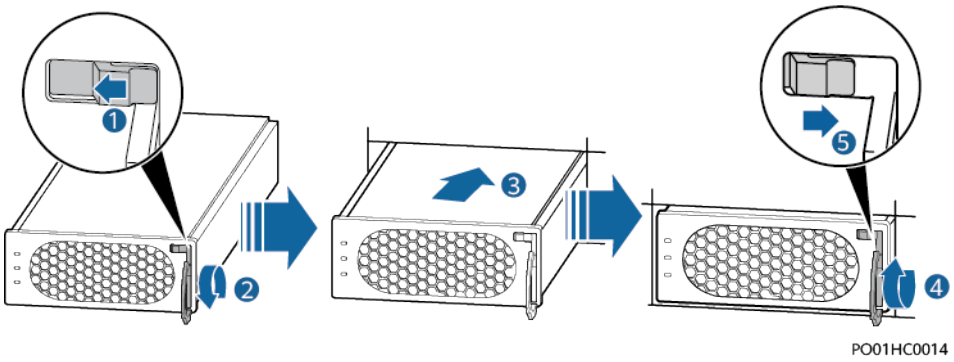
Step 2 Pull out the handle.

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

Step 4 Push the handle upward.

Step 5 Push the locking latch rightward to lock the handle.

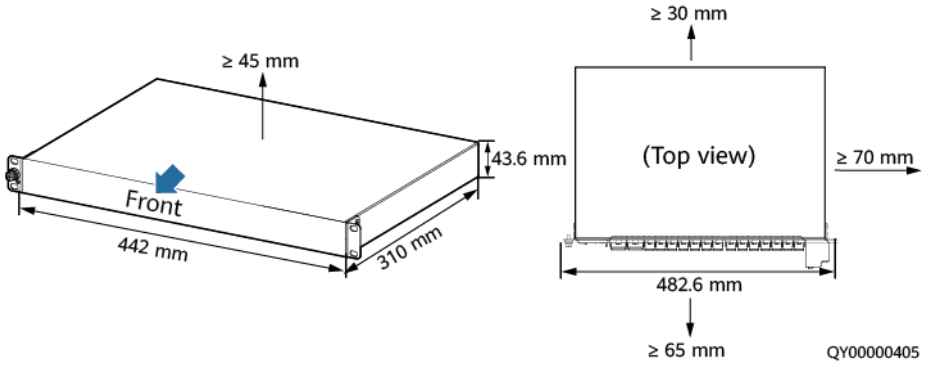
Figure 5-8 Installing a rectifier



----End

5.5 (Optional) Installing an iDMU

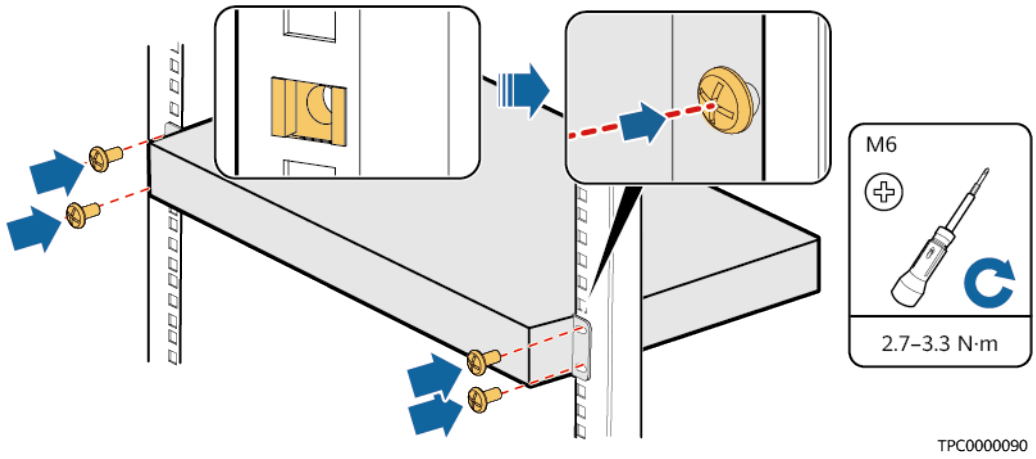
Figure 5-9 Installation dimensions



Procedure

Step 1 Install the iDMU in the 19-inch rack.

Figure 5-10 Installing the iDMU

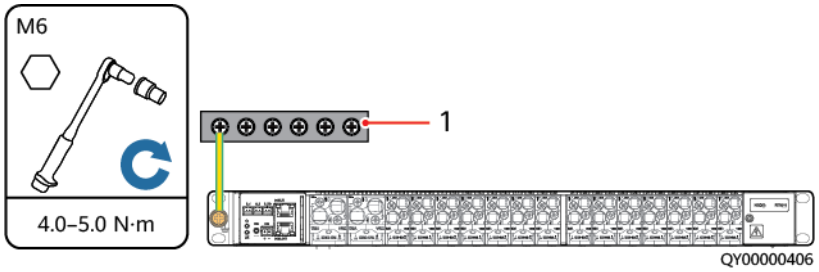


Step 2 Install a ground cable for the iDMU.

CAUTION

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

Figure 5-11 Installing a ground cable for the iDMU (01075872 is used as an example)



(1) Cabinet ground bar

----End

5.6 Installing a Circuit Breaker

Prerequisites

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

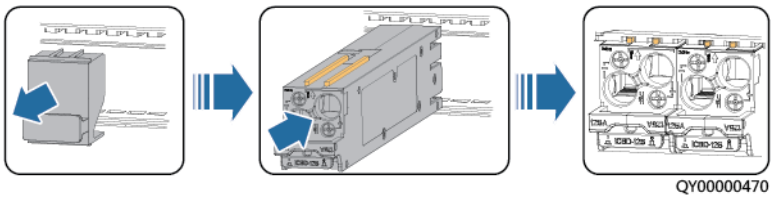
Procedure

Step 1 Remove the filler panel from the circuit breaker slot.

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

Step 3 Insert the circuit breaker into the correct slot and gently push it along the guide rails until it clicks into place.

Figure 5-12 Installing a circuit breaker



----End

6 Installing Cables

DANGER

- 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.

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.
- You are advised to use copper-core cables as the AC input cables of the power system. The cross-sectional area of the AC input power cables must meet the load requirements. Aluminum-core cables are not recommended.
- If you use aluminum-core cables, the cross-sectional area of the cables must meet the load requirements. Use copper to aluminum adapter wiring terminals and crimp them according to the standard installation specifications.

6.1 (Optional) Installing a Dry Contact Signal Cable

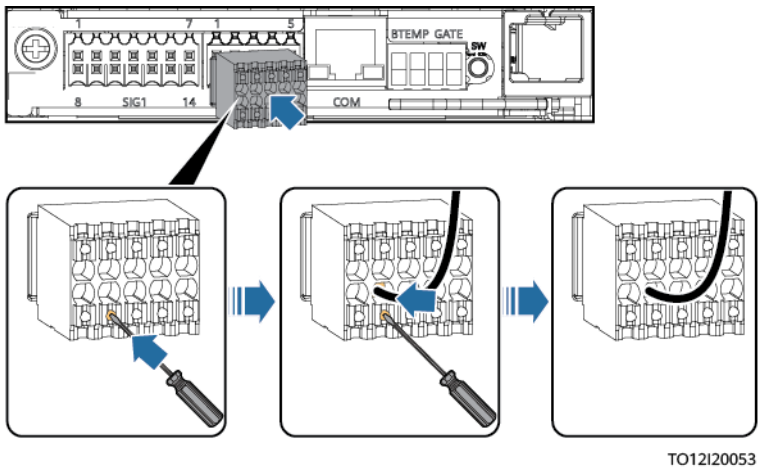
Procedure

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

Step 2 Connect a signal cable to the dry contact.

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

Figure 6-1 Installing a dry contact signal cable



----End

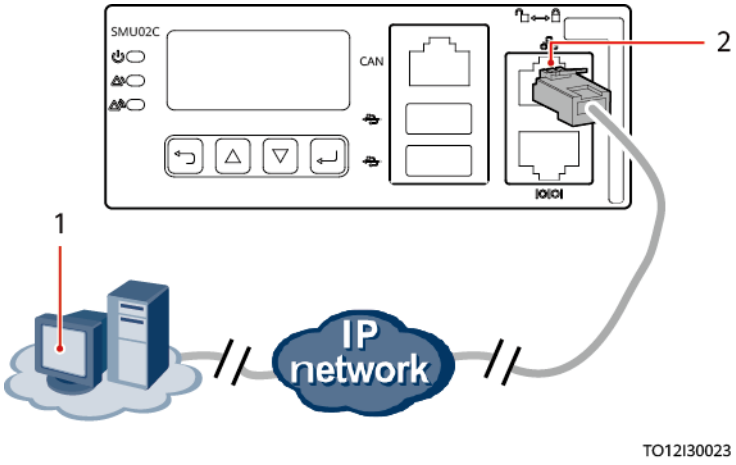
6.2 (Optional) Installing Communications Cables

6.2.1 WebUI Management

Procedure

Step 1 Connect the FE port on the site monitoring unit (SMU) by using a network cable.

Figure 6-2 Connecting a communications cable (for WebUI management)



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

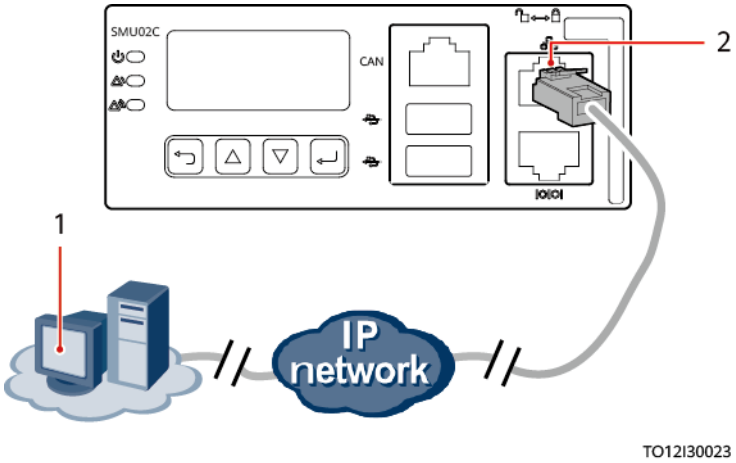
----End

6.2.2 NetEco Management

Networking Mode 1: FE Port

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

Figure 6-3 Connecting a communications cable (over the FE port)



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

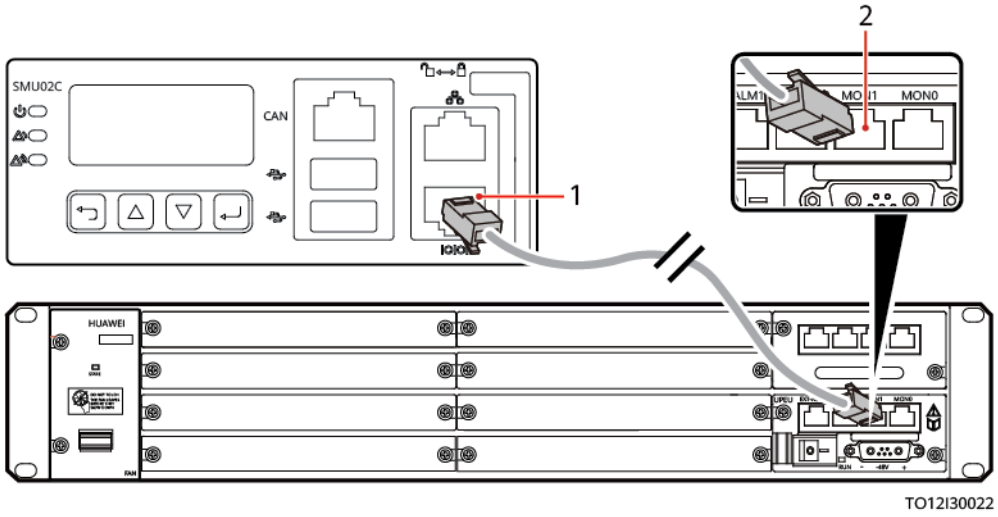
----End

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 of the cable to the MON0 or MON1 port on Huawei BBU.

Figure 6-4 Connecting a communications cable (over the RS485 port)



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

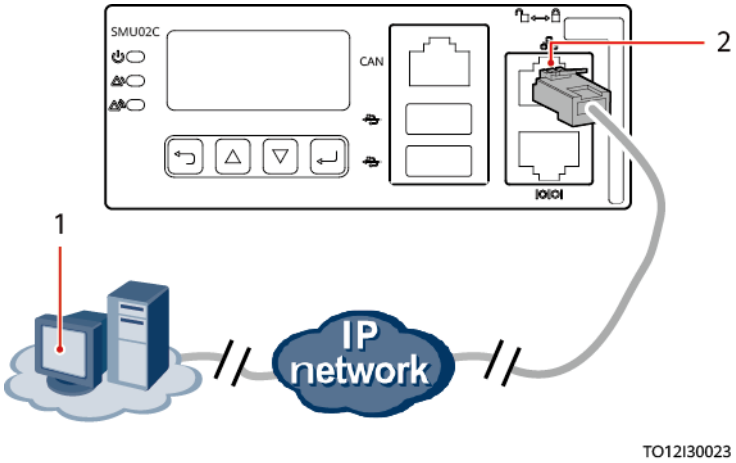
----End

6.2.3 Third-Party NMS Management (over SNMP)

Procedure

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

Figure 6-5 Connecting a communications cable (for third-party NMS management)

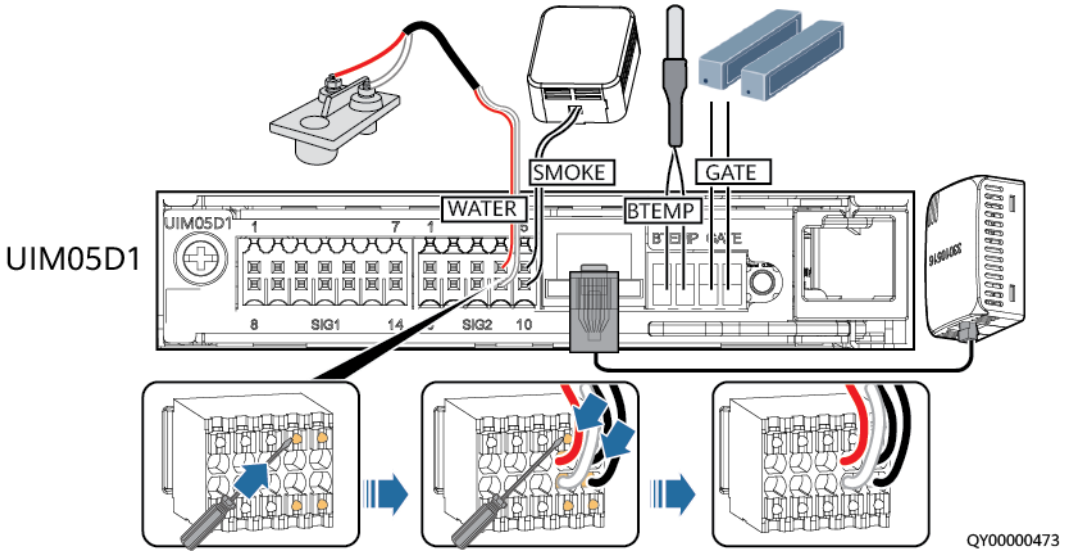


(1) SNMP-based NMS terminal (2) FE port on the SMU

----End

6.3 Installing Sensor Cables

Figure 6-6 Connecting sensor cables to the UIM05D1



NOTE

- If a digital T/H sensor is configured, directly connect the sensor cable to the COM port on the UIM05D1.
- If multiple digital T/H sensors are cascaded, you need to set the DIP switch.

Table 6-1 DIP switch settings for T/H sensors

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

6.4 Installing DC Output Power Cables

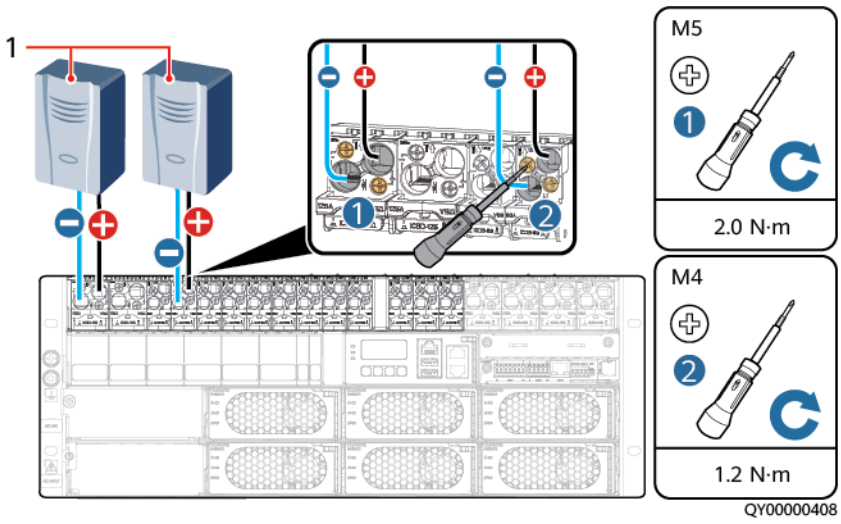
Step 1 Use cables and cord end terminals to prepare DC output power cables.

NOTICE

If the cross-sectional area of the cable ranges from 10 mm^2 to 25 mm^2, use pre-insulated cord end terminals to prepare the power cable. If the cross-sectional area of the cable is 35 mm^2, use cord end terminals without pre-insulation to prepare the power cable.

Step 2 Install DC output power cables.

Figure 6-7 Installing DC output power cables for the ETP48400-C4B1



(1) DC load

----End

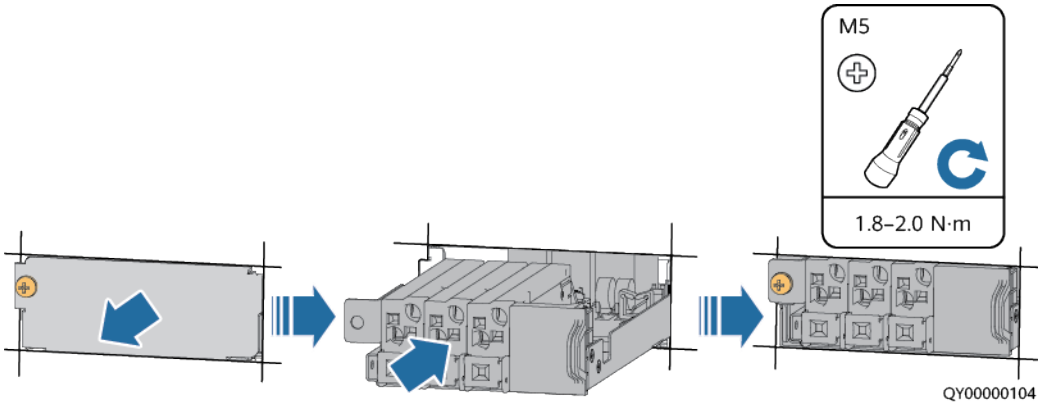
6.5 Installing AC Output Cables

6.5.1 Installing an AC Output Module and Cables

Procedure

Step 1 Install an AC output module.

Figure 6-8 Installing an AC output module

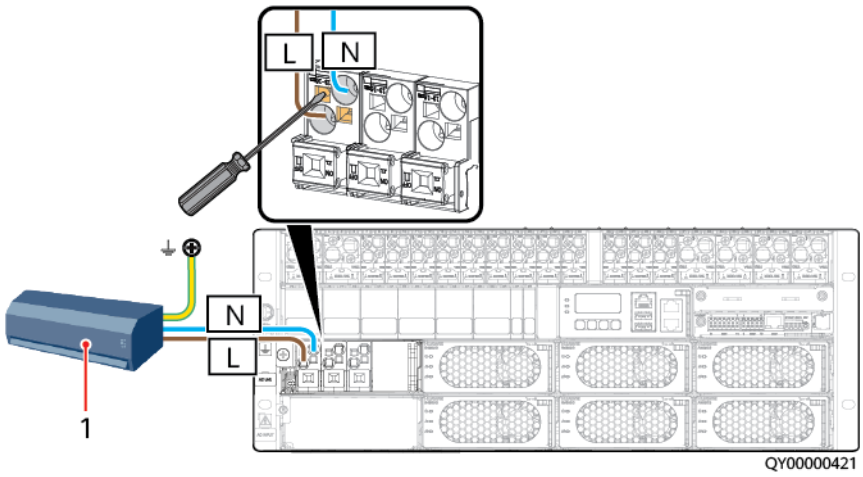


Step 2 Use cables and cord end terminals to prepare AC output power cables.

Step 3 Install AC output power cables.

1. Insert a flat-head screwdriver (2 mm wide) into the wiring holes on the AC output circuit breaker.
2. Install the AC output power cables at the wiring holes on the circuit breaker.
3. Remove the flat-head screwdriver.

Figure 6-9 Installing AC output power cables for the ETP48400-C4B1



(1) AC load

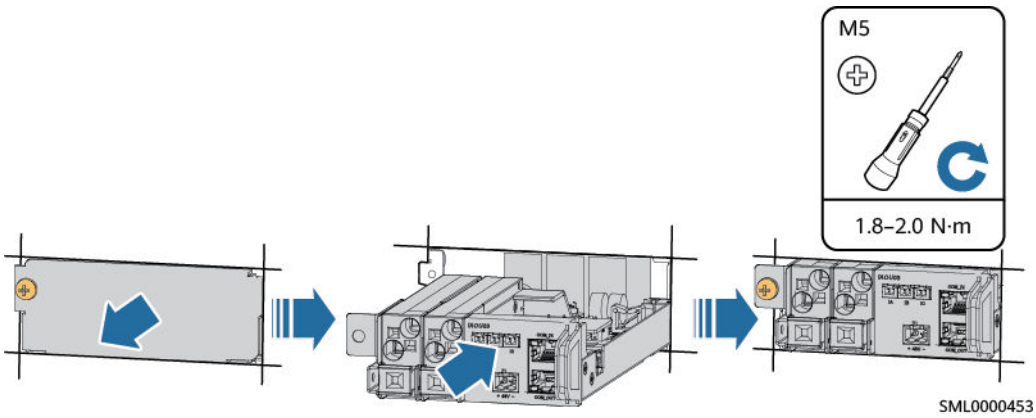
----End

6.5.2 Installing an Intelligent AC Output Module and Cables (Optional)

Procedure

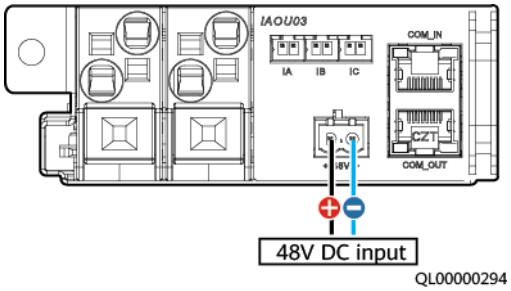
Step 1 Install an intelligent AC output module.

Figure 6-10 Installing an intelligent AC output module



Step 2 Install DC input power cables.

Figure 6-11 Installing DC input power cables

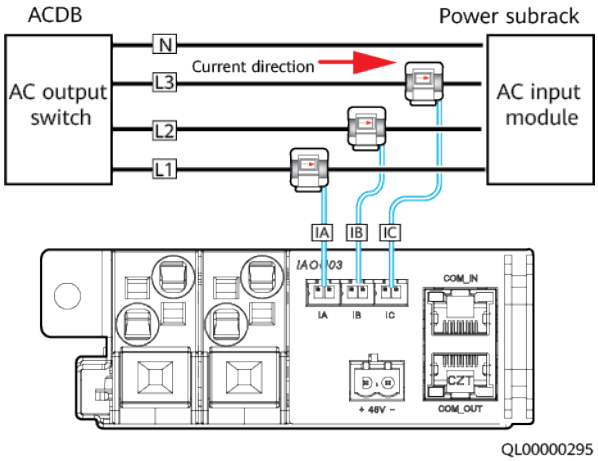


Step 3 Install AC detection cables.

NOTICE

When installing the current transformer, ensure that the current direction is the same as the arrow direction on the current transformer.

Figure 6-12 Installing AC detection cables



NOTE

The IA, IB, and IC of the AC meter must correspond to the live wires L1, L2, and L3 on the monitored device respectively. The preceding figure uses three-phase four-wire as an example.

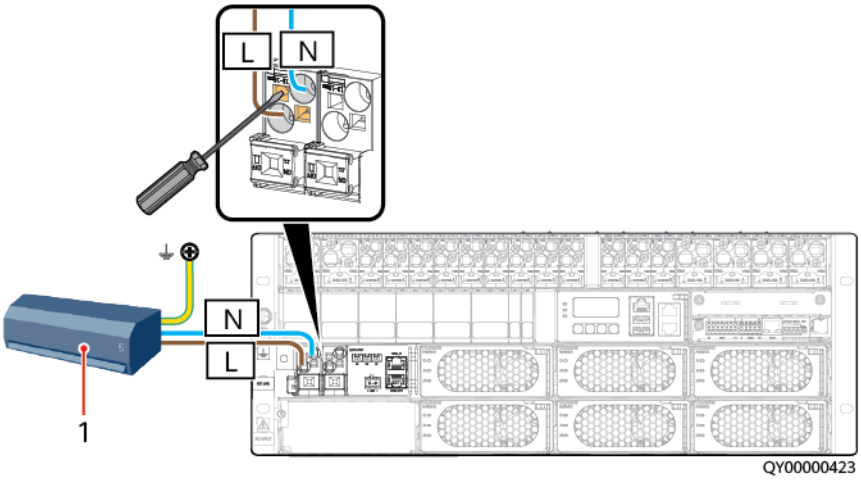
- If the power system uses three-phase four-wire, install an AC current transformer for the IA, IB, and IC respectively.
- If the power system uses dual-live wire, install an AC current transformer for both the IA and IB.
- If the power system uses single-phase, install an AC current transformer only for the IA.

Step 4 Use cables and cord end terminals to prepare AC output power cables.

Step 5 Install AC output power cables.

1. Insert a flat-head screwdriver (2 mm wide) into the wiring holes on the AC output circuit breaker.
2. Install the AC output power cables at the wiring holes on the circuit breaker.
3. Remove the flat-head screwdriver.

Figure 6-13 Installing AC output power cables for the ETP48400-C4B1



(1) AC load

----End

6.6 Installing AC Input Power Cables

6.6.1 Installing an AC Input Module

Table 6-2 Installing an AC input module

Number of Inputs	ETP48400-C4B1
One input	The input modules of different models are installed in the same way. **Figure 6-14** shows how to install an AIU03-63D.
Two inputs	The input modules of different models are installed in the same way. **Figure 6-15** shows how to install two AIU03-63Ds. **NOTE** • The system does not support two AC inputs connected at the same time. To prevent the two inputs from being connected at the same time, install a mechanical interlock spring when installing the two AC input modules. • When the spring hole is pushed upward, AC input 2 is connected. When the spring hole is pushed downward, AC input 1 is connected.

NOTICE

Ensure that the ground screws for the AC module are installed.

Figure 6-14 Installing an AC input module (using AIU03-63D as an example)

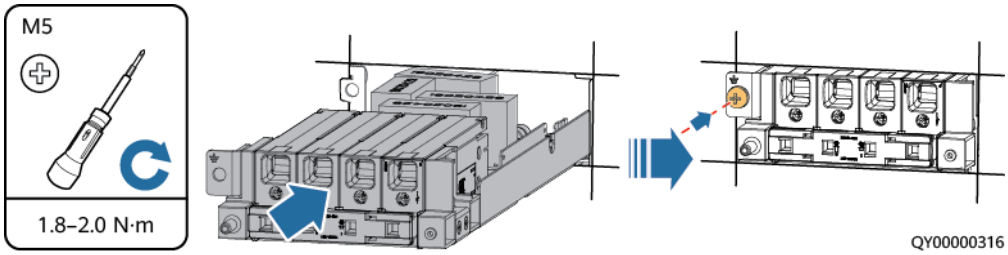
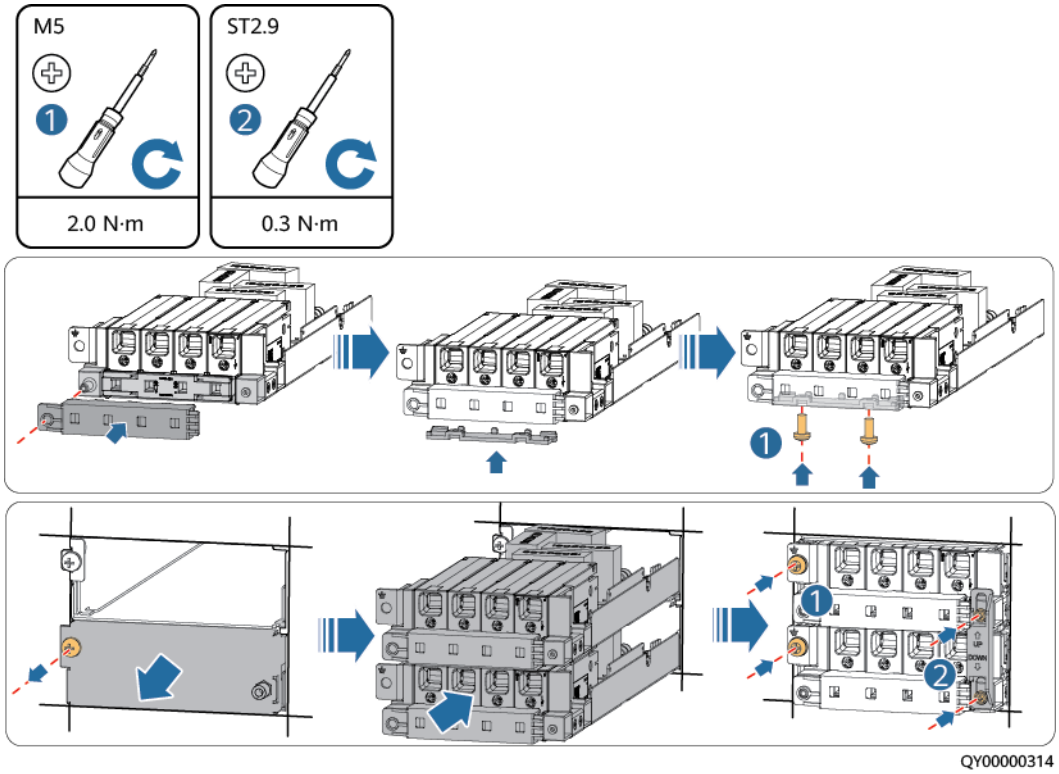
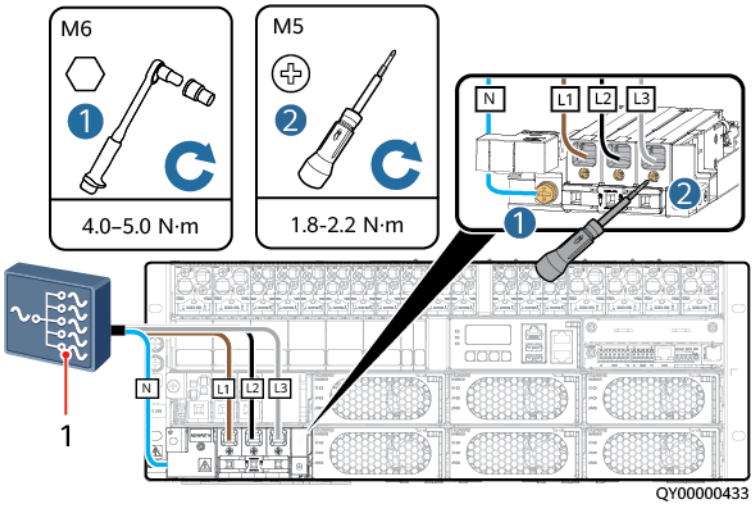


Figure 6-15 Installing two AC input modules (using AIU03-63Ds as an example)



6.6.2 Installing AC Input Power Cables

Figure 6-16 Installing an AC input power cable (The following figure shows how to install an AC input power cable to the AIU03-63C)



(1) Alternating current distribution box (ACDB)

Table 6-3 Installing AC input power cables for the AIU03-63C

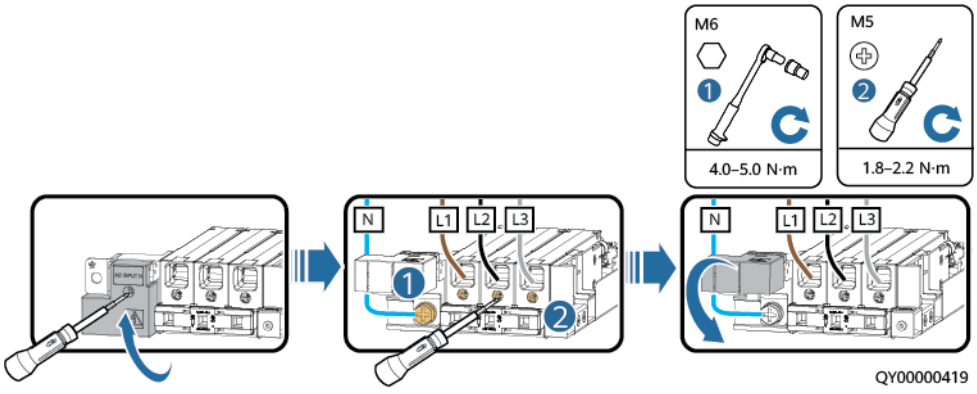
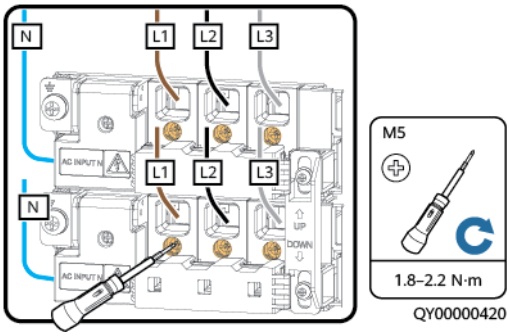
Number of Inputs	Wiring Diagram
One input	
Two inputs	

Table 6-4 Installing AC input power cables for the AIU03-63D

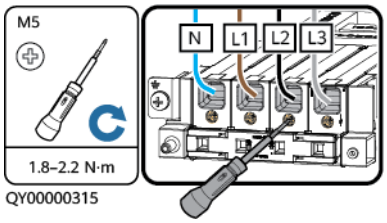
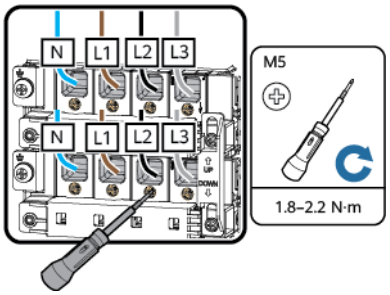
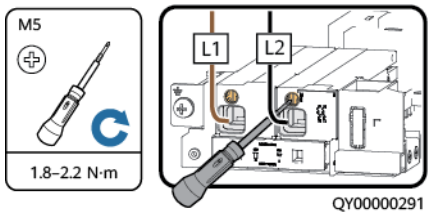
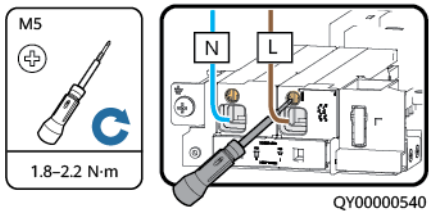
One Input	Two Inputs
	

Table 6-5 Installing AC input power cables for the AIU02-125B

One Input	
Dual–live wire	
Single phase	

6.7 Installing iDMU Cables

Procedure

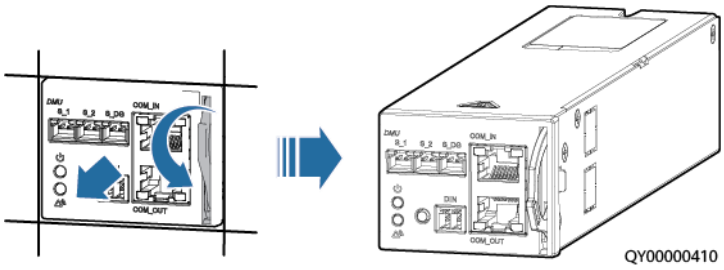
Step 1 (Optional) Set the DIP switch address.

NOTE

A maximum of four iDMUs can be cascaded. If multiple iDMUs are cascaded, set the DIP switch address.

1. Take out the DMU03C1.

Figure 6-17 Taking out the DMU03C1



2. Set the DIP switch address.

Figure 6-18 DIP switch

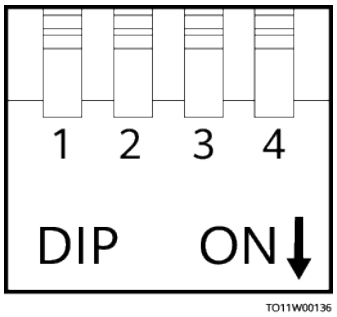


Table 6-6 DIP switch description

Subrack Address	Pin 1	Pin 2	Pin 3	Pin 4
1	OFF	OFF	Reserved, undefined	Scenario DIP switch. Set to OFF by default.
2	OFF	ON		
3	ON	OFF		
4	ON	ON		

NOTE

- Pin 1 and pin 2 are address DIP switches. If two or more iDMUs are cascaded, you need to set the DMU address DIP switches. A maximum of four iDMUs can be cascaded.
- Pin 4 is a scenario DIP switch. If pin 4 is set to OFF and the power distribution unit is used together with an SMU, the power-off sensor detection function is not supported. If pin 4 is set to ON, the power distribution unit is a differentiated backup unit and supports the power-off sensor detection function (AC power-on and power-off self-management).

3. Reinstall the DMU03C1.

Step 2 Install communications cables for the iDMU.

NOTE

If digital temperature and humidity sensor is configured, connect the communications cable of the iDMU to the COM port of the sensor.

Figure 6-19 Connecting communications cables of the intelligent power distribution units to the UIM05D1

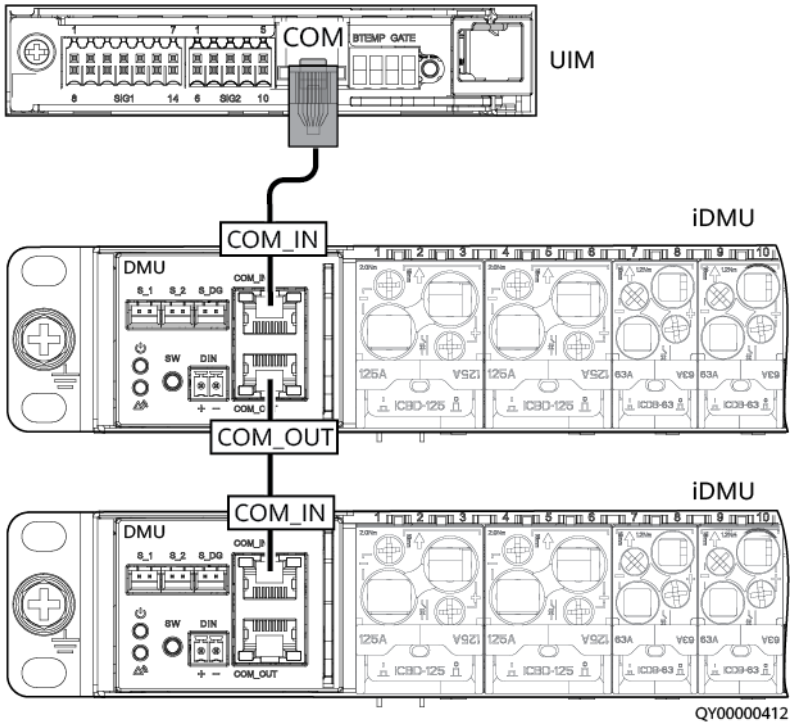
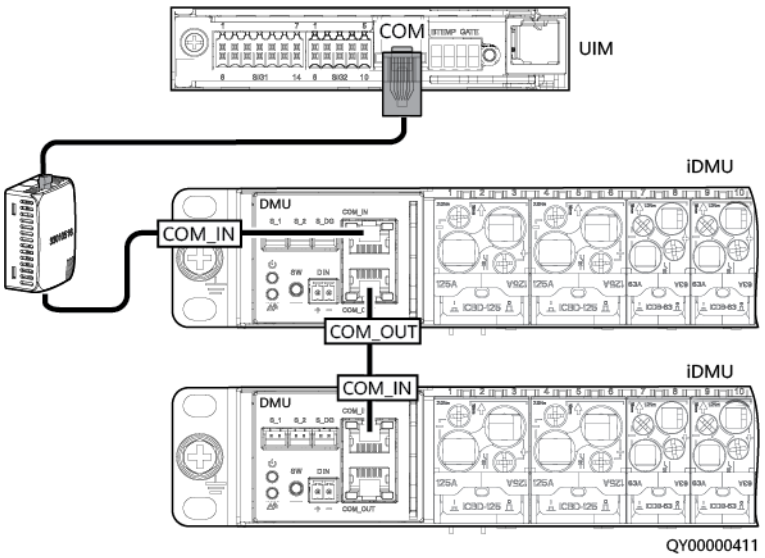


Figure 6-20 Connecting communications cables of the intelligent power distribution units to the digital T/H sensor



Step 3 Remove the protective cover from the DC input wiring terminals.

Step 4 Install power cables for the iDMU.

CAUTION

The black cable is the positive cable, and the blue cable is the negative cable. Install cables based on the silkscreen on the panel. The following figure is for reference only.

Figure 6-21 Installing power cables for the iDMU (method 1)

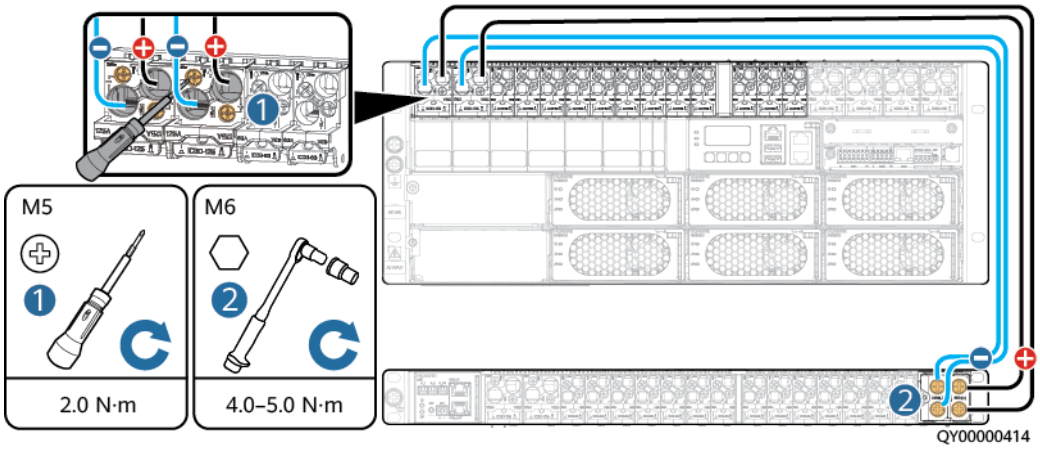
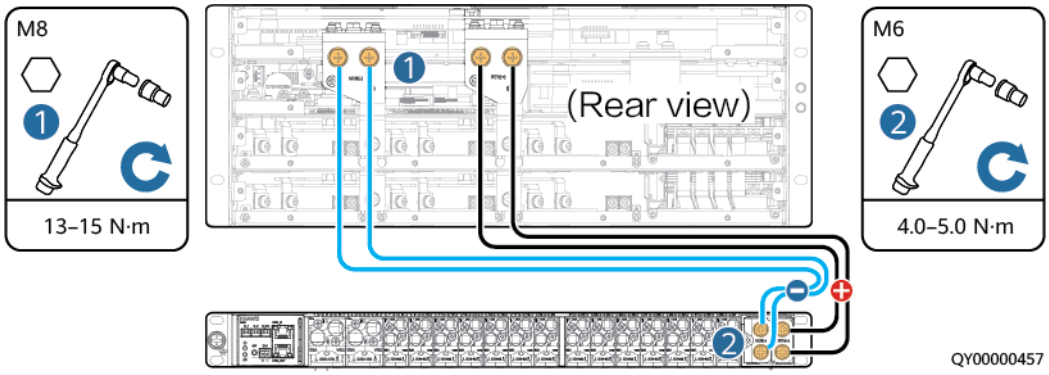
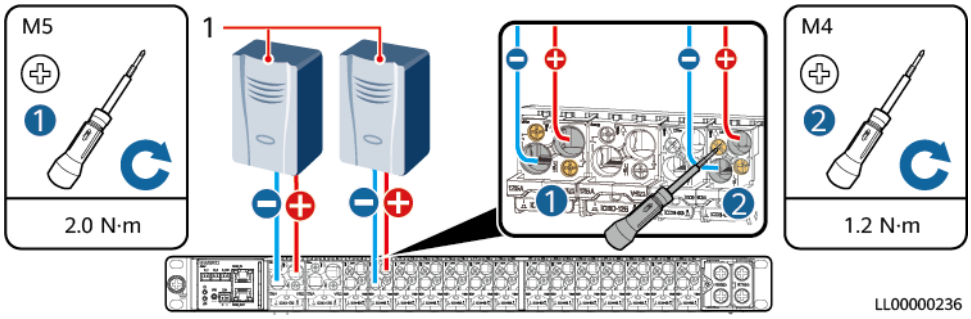


Figure 6-22 Installing power cables for the iDMU (method 2)



Step 5 Install DC output power cables for the iDMU.

Figure 6-23 Installing DC output power cables for the iDMU



(1) DC load

Step 6 Reinstall the protective cover on the DC input wiring terminals.

----End

6.8 Installing Lithium Batteries and Cables

Prerequisites

It is recommended that ESMs are from the same manufacturer, of the same model, and in the same batch.

Comply with regulations and warnings issued by the ESM manufacturer.

Before installing ESMs, ensure that the battery circuit breakers in the power system are OFF or that the battery fuses are removed.

DANGER

- Smoking and sources of ignition are prohibited near batteries.
- Switch off the upstream battery circuit breakers before installing batteries.
- Comply with regulations and warnings issued by the battery manufacturer.
- Use tools with insulated handles. Using tools without insulated handles may cause personal injury or result in batteries burning out.
- Before handling batteries, wear goggles, rubber gloves, and protective clothes. Remove any conductive objects, such as watches, bracelets, bangles, and rings.
- Do not use metal to simultaneously touch two or more battery terminals or touch battery terminals and grounded objects (for example, the battery compartment); otherwise, transient short circuits occur, which may produce sparks or explosions.
- 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.
- Secure battery cables to a torque specified in the battery documentation. Loose connections will result in excessive voltage drops or cause batteries to burn out when the current is high.
- Low temperature charging may cause short circuits inside the electrochemical cell and explosion.
- Install the 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 the 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.

NOTICE

- 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.
- Install ESMs on the lower layer and then the upper layer.
- At least two persons are required to move a lithium battery.
- This section uses one battery as an example.

NOTE

Lithium batteries of different models are installed in the same way. This section describes how to install an ESM-48100B1.

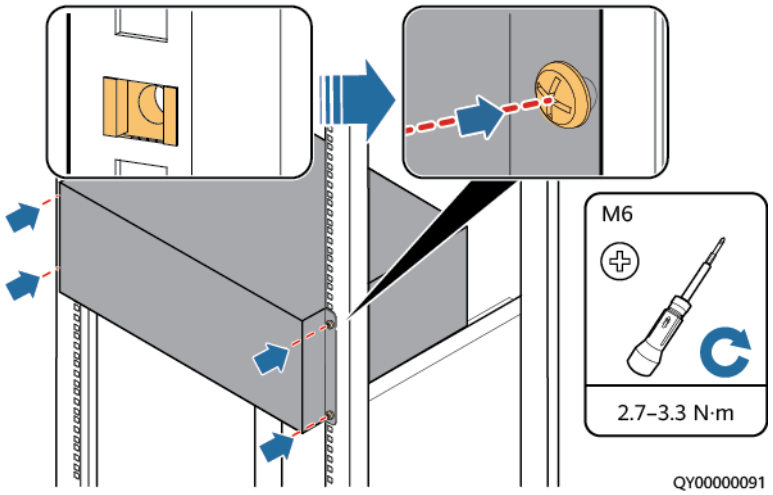
Procedure

Step 1 Install the lithium battery on the battery rack.

NOTICE

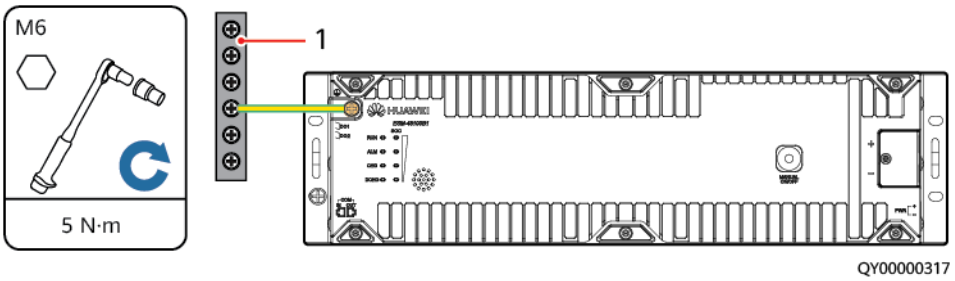
The ESM can be installed in a 19-inch rack with guide rails or a tray. Check whether the load-bearing capability meets requirements.

Figure 6-24 Installing an ESM



Step 2 Install a ground cable for the lithium battery.

Figure 6-25 Installing a ground cable for the lithium battery (using one lithium battery as an example)



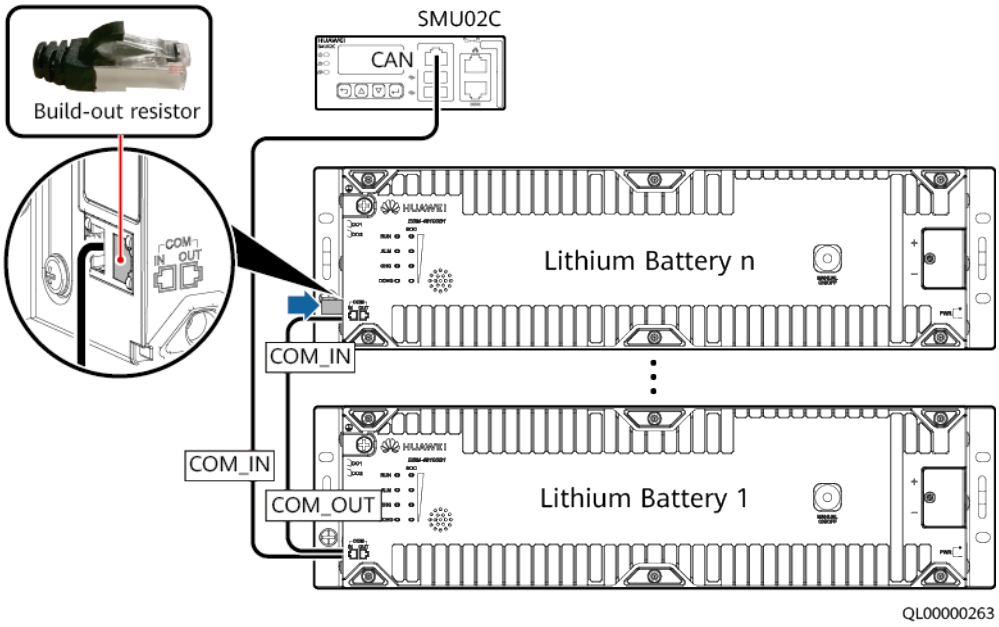
(1) Ground bar

Step 3 Install communications cables and a build-out resistor for the lithium battery.

NOTICE

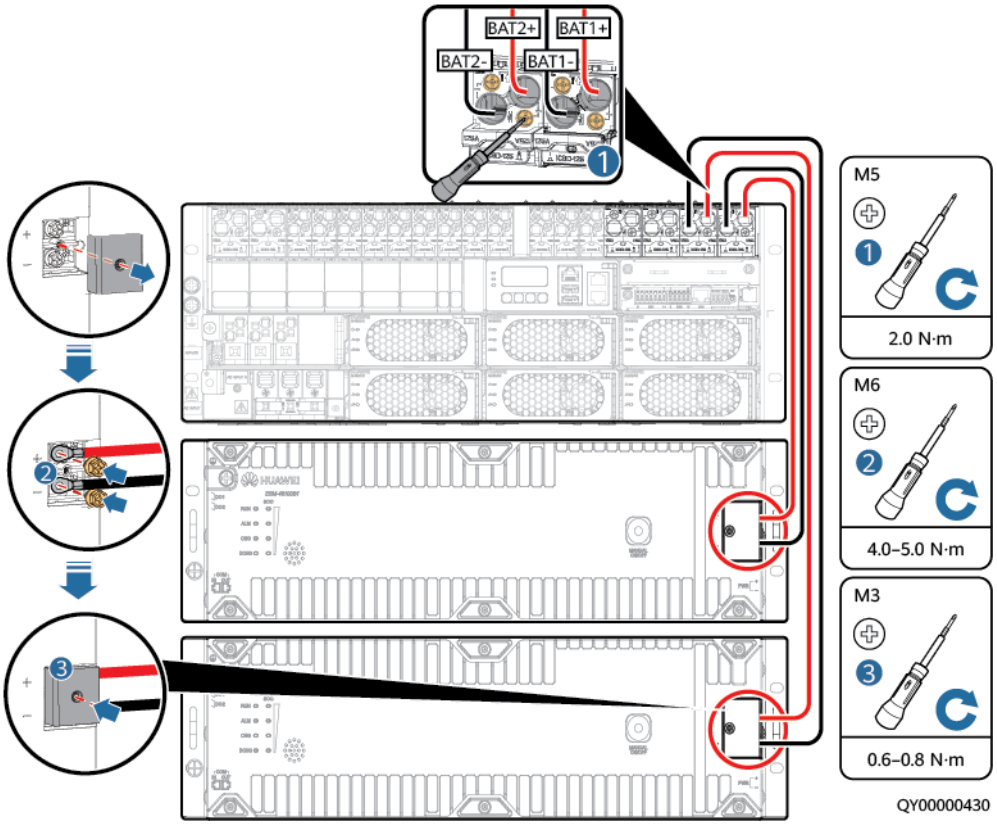
During installation, the lithium battery should be put at the last level of the CAN communication and the build-out resistor should be installed on the last lithium battery.

Figure 6-26 Installing communications cables for the lithium batteries



Step 4 Install lithium battery power cables.

Figure 6-27 Installing lithium battery cables



----End

6.9 Installing Lead-Acid Battery Cables

Prerequisites

Ensure that the lead-acid batteries are from the same manufacturer, of the same model, and in the same batch.

Comply with regulations and warnings issued by the battery manufacturer.

Before installing the batteries, ensure that the battery circuit breakers in the power system are OFF or that the battery fuses are removed.

DANGER

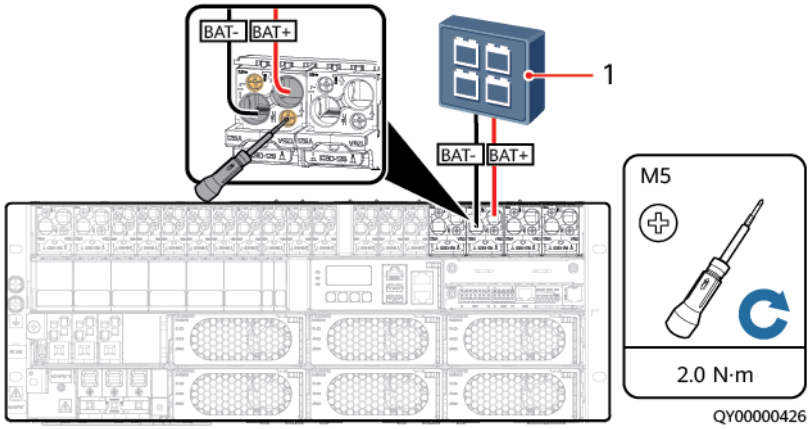
- Smoking and sources of ignition are prohibited near batteries.
- Switch off the upstream battery circuit breakers before installing batteries.
- Comply with regulations and warnings issued by the battery manufacturer.
- Use tools with insulated handles. Using tools without insulated handles may cause personal injury or result in batteries burning out.
- Before handling batteries, wear goggles, rubber gloves, and protective clothes. Remove any conductive objects, such as watches, bracelets, bangles, and rings.
- Do not use metal to simultaneously touch two or more battery terminals or touch battery terminals and grounded objects (for example, the battery compartment); otherwise, transient short circuits occur, which may produce sparks or explosions.
- 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.
- Secure battery cables to a torque specified in the battery documentation. Loose connections will result in excessive voltage drops or cause batteries to burn out when the current is high.
- Low temperature charging may cause short circuits inside the electrochemical cell and explosion.
- Install the 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 the 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.

Step 1 Loosen the screws on the wiring holes for battery cables.

Step 2 Install a battery cable at the wiring hole.

Step 3 Tighten the screws to secure the cable.

Figure 6-28 Installing battery cables for the ETP48400-C4B1



(1) Battery string

----End

7 Verifying the Installation

7.1 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.

7.2 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.
  a. Switch off the upstream AC input circuit breaker and switch on the AC input circuit breaker of the power system. Set the multimeter to the ohm position and check that the resistance between L-L and L-N is infinite, which means that there is no short circuits between the three phases of the AC input circuit breaker.
  b. Switch off the upstream AC input circuit breaker and switch on the AC output circuit breaker of the power system. Set the multimeter to the ohm position and check that the resistance between L-L and L-N is infinite, which means that there is no short circuits between the three phases of the AC output circuit breaker.
  c. Remove the rectifiers, switch off the battery circuit breaker, and switch on the DC output circuit breaker. Set the multimeter to the ohm position and check that the resistance between the positive and negative terminals of the DC output circuit breaker is infinite, which means that there is no short circuits between the positive and negative terminals of the DC output circuit breaker.

7.3 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.

8 System Commissioning

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.

8.1 Connecting the AC Power Supply

Procedure

Step 1 Ensure that the AC input circuit breaker is OFF and the voltage of the upstream AC input circuit breaker is between 85 V AC to 300 V AC.

Step 2 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 3 Check that the RUN indicator on the rectifier is steady on.

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

8.2 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.

NOTE

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

8.3 Setting Wizard

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

Table 8-1 Setting parameters

Item	Settings
Time Zone	Set this parameter to the local time zone.
Date and Time	Set this parameter to the local date and time.
Battery Factory	Set these parameters as required.
Battery Model	Set these parameters as required. **NOTE** • In the lithium battery scenario, the battery model is ESM-A by default. You do not need to set this parameter. • In the lead-acid battery scenario or the scenario where lead-acid batteries and lithium batteries are used together, set **Battery Model** to the lead-acid battery model.
The SMU may restart.	Yes
Battery n Connected	If the battery route is connected to lead-acid batteries, set **Battery n Connected** to **Yes** for this battery route and that for other routes to **No**. **NOTE** This parameter is a lead-acid battery parameter and does not need to be set in the lithium battery scenario.

Item	Settings
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. • 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 battery strings (a 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**.

8.4 Setting the Date and Time

NOTE

- The LCD backlight turns off if no button is pressed within 30 seconds.
- Re-login is required if no button is pressed within 1 minute.
- The preset password for login is **000001**.

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

Table 8-2 Setting the date and time

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Settings
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 to the local time zone.
		Date and Time	-	Set 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.

8.5 Setting Sensor Parameters

Set sensor parameters based on site requirements.

Table 8-3 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	
			Temp1 Sensor	
			Temp2 Sensor	
			Batt. Temp. Sensor1	

8.6 (Optional) Setting Rectifier Addresses

Context

This operation can be performed only on the LCD.

Figure 8-1 Rectifier slot numbers

1 (L1)	2 (L2)	3 (L3)
4 (L1)	5 (L2)	6 (L3)

QY00000427

Procedure

Step 1 Set **Rect. Address Settings** to **Yes**.

Table 8-4 Setting rectifier addresses

Main Menu	Second-Level Menu	Setting
Setting Wizard	Rect. Address Settings	Yes

Step 2 Press ▼ to select **1. Rectifier Address**.

Step 3 Observe the indicators on rectifiers. If the power indicator (green) on a rectifier blinks at 0.5 Hz, the rectifier is selected. Set the rectifier address to the numbers shown in **Figure 8-1** based on the rectifier position.

Step 4 Set the addresses for all rectifiers in the subrack one by one.

Step 5 Press ▼ to select **Save Settings**, and then press ↵ to save the settings.

----End

8.7 (Optional) Setting the Rectifier Antitheft Function

Prerequisites

- This parameter can be set only when all rectifiers support the antitheft function.
- If you need to enable the antitheft function for rectifiers, perform the following step.

Procedure

Step 1 Set **Enable Lock** to **Enable**.

Table 8-5 Rectifier antitheft settings

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Setting
Parameters Settings	Digital Power	Rectifier	Rectifier Group	Enable Lock	Enable

----End

8.8 (Optional) Setting the Lithium Battery Antitheft Function

NOTE

To enable the antitheft function for the lithium battery, perform the following step.

Procedure

Step 1 Set **iLock Enable** to **Lock Enable**.

Table 8-6 Lithium battery antitheft settings

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
Parameters Settings	Li Battery	Basic Parameters	iLock Enable	Lock Disable	Lock Enable

----End

8.9 Setting the AC Input System

Set the AC input system based on site requirements.

Table 8-7 Setting the AC input system

Main Menu	Second-level Menu	Third-Level Menu	Setting
Parameters Settings	Mains	AC Mode	Set to the local power supply input system.

8.10 (Optional) Setting the Hybrid Use Scenario Parameters

If both lead-acid batteries and lithium batteries are connected to the system, you need to set the battery hybrid use parameter.

Table 8-8 Setting the battery type

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
Parameters Settings	Setup Parameter	Basic Parameters	Hybrid Scenario	Yes
			Battery Factory	Set this parameter based on the connected lead-acid battery vendor.
			Battery Model	Set this parameter to the lead-acid battery model based on site requirements.

Table 8-9 Setting iMix Enabled

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
Parameters Settings	Digital Power	Digital Power	iMix Enabled **NOTE** This parameter is displayed only when **Hybrid Scenario** is set to **Yes**.	Enable

8.11 Setting Intelligent Circuit Breaker Parameters

8.11.1 Setting the Usage of Intelligent Circuit Breakers

Context

Circuit breakers can be managed by usage. The usages of circuit breakers include **Customized Load**, **BLVD Load**, **Power Cascading Port**, **DC DG**, **Solar Energy**, **Lithium Battery**, **Lead-acid Battery**, and **Other**.

- **Customized Load**: Set when a device that needs to be configured with a disconnection mode and disconnection parameter is connected. (The default disconnection mode is **Voltage Mode**, and the default disconnection voltage is **44 V**.)
- **BLVD Load**: Set when primary loads are connected.
- **Power Cascading Port**:
  - Set when a DC power distribution unit (such as iDMU48-300B-17A) that supports the measurement function is added.
  - Set when Huawei solar PV distribution units (such as the PVDU-100A1, PVDU-150A1, PVDU-150A3, and PVDU-200A1) are connected in the solar access scenario.
- **DC DG**: Set when a DC DG is connected. The circuit breaker can be used to collect statistics on the DG energy yield.
- **Solar Energy**: Set when a third-party solar power supply unit (48 V power supply) is connected. The circuit breaker can be used to collect statistics on solar energy yield.
- **Lithium Battery**: Set based on the connected lithium battery branch.
- **Lead-acid Battery**: Set based on the connected lead-acid battery branch.
- **Other**: Set when other 48 V power supply devices are connected.

Procedure

Step 1 Set the usage of the branch based on the device connected to the circuit breaker.

Table 8-10 Setting branch usage parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Value Range
Parameters Settings	Digital Power	DC Output Distribut.	Branch Usage Config 1	Branch n Usage Config	Customized Load, BLVD Load, Power Cascading Port, DC DG, Solar Energy, Lithium Battery, Lead-acid Battery, and Other
			Branch Usage Config 2	Branch n Usage Config	

----End

8.11.2 Setting the Capacity of a Circuit Breaker

You can set the circuit breaker capacity when the circuit breaker usage is set to load branch (BLVD Load/Customized Load), general power distribution branch (Power Cascading Port/DC DG/Solar Energy/Other), or battery power distribution branch (Lithium Battery/Lead-acid Battery).

Table 8-11 Setting basic branch parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Value Range
Parameters Settings	Digital Power	DC Output Distribut.	Load Branch n	Customized Breaker Capacity	Rated Circuit Breaker Capacity	3 A to rated capacity of the circuit breaker **NOTE** • Set the circuit breaker capacity based on the actual load current. • The capacity of the circuit breaker cannot exceed the through-current capacity of the cable and the rated capacity of the circuit breaker.
			General Power Distribution Branch n	Customized Breaker Capacity	Rated Circuit Breaker Capacity	
			Battery Power Distribution Branch n	Customized Breaker Capacity	Rated Circuit Breaker Capacity	

8.11.3 Setting the Branch User and Load Type

If branch usage is set to **BLVD Load** or **Customized Load**, you can set the user and load type.

Table 8-12 Setting basic branch parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Value Range
Parameters Settings	Digital Power	DC Output Distribut.	Load Branch	User	None	User 1 to user 10, None

8.11.4 Setting Customized Load Disconnection Parameters

Context

- Voltage mode: When an AC power failure occurs, you can perform disconnection management based on the battery discharge voltage.
- Consumption mode: When an AC power failure occurs, disconnection management is performed based on the backup power configured for the load branch.
- Capacity mode: When an AC power failure occurs, you can perform disconnection management based on the battery discharge capacity.
- Time mode: When an AC power failure occurs, you can perform disconnection management based on the power failure duration.
- High-temperature power-off mode: You can perform disconnection management based on the ambient temperature (reported by the ambient temperature sensor).
- Planned power-off mode: You can perform disconnection management based on the preset time segment.
- Exempt period without backup power: When an AC power failure occurs, you can perform disconnection management within the specified period.

Procedure

Step 1 Set load disconnection parameters based on site requirements.

Table 8-13 Setting customized load disconnection parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Setting	Value Range
Parameters Settings	Digital Power	DC Output Distribut.	Branch Usage Config	Branch n Usage Config	Customized Load	-
			Load Branch n	Enb Load Discon	Enable	Disable/Enable
				Load Discon Mode	Voltage Mode	Voltage Mode, Capacity Mode, Consumption Mode, Time Mode
				Load Discon Volt	44.0 V	36.0–56.0
				Load Recon Volt	51.5 V	37.0–58.0
				Load Discon Power	0.00 kWh	0.00–65.00

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Setting	Value Range
				Load Discon Cap	15%	0–99
				Load Discon Time	360 min	0–1440
				Enb HTD	Disable	Disable/Enable
				HTD Temp	65°C	25.0–80.0
				Enb PD	Disable	Disable/Enable
				PD Start Time	00:00:00	HH:MM:SS
				PD Duration	0 min	0–1440
				Exempt Period No Bk	Disable	Disable/Enable
				Exempt Start Time	00:00:00	HH:MM:SS
				Exempt Duration	0 min	0–1440

----End

8.11.5 Setting Disconnection Parameters for Lead-Acid Batteries

Step 1 Set disconnection parameters for lead-acid batteries.

Table 8-14 Setting disconnection parameters for batteries on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Setting	Value Range
Parameters Settings	Digital Power	DC Output Distribut.	Branch Usage Config	Branch n Usage Config	Lead-acid Battery	-
	Battery	BLVD Parameters	BLVD General Discon.	-	Enable	Enable, Disable
			BLVD Disconnect Mode	-	Voltage Mode	Capacity Mode, Time Mode, Voltage Mode

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Setting	Value Range
			BLVD LVD Voltage	-	43.2 V	36.0–56.0
			BLVD Con. Volt	-	51.5 V	37.0–58.0
			BLVD Capacity	-	5%	0–99
			BLVD Time	-	480 min	5–1000
			BLVD Delay Time	-	60s	3–90

----End

8.12 (Optional) Setting iDMU48-300B-17A Parameters

Setting the Power Source

Set the power source based on the actual power cable connection of the iDMU.

- **Busbar**: The 48 V power cable of the iDMU is connected to the busbar of the power subrack.
- **Power Cascading Port**: The 48 V power cable of the iDMU is connected to the circuit breaker of an intelligent subrack.
- **LLVD1 to LLVD4**: The 48 V power cable of the iDMU is connected to the circuit breaker of a non-intelligent subrack.
- **Battery Port**: reserved.

Table 8-15 Setting the power source parameter on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Value Range
Parameters Settings	Digital Power	iDMU	Basic Parameters	Src of Pwr Supply	Busbar, LLVD1 to LLVD4, Power Cascading Port, or Battery Port

Setting the Circuit Breaker Usage

Circuit breakers can be managed by usage. The usages of a circuit breaker include **Customized Load** and **Other**.

- **Customized Load**: Set when a device that needs to be configured with a disconnection mode and disconnection parameter is connected. (The default disconnection mode is **Voltage Mode**, and the default disconnection voltage is **44 V**.)
- **Other**: Set when other 48 V power supply devices are connected.

Table 8-16 Setting the circuit breaker usage on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Value Range
Parameters Settings	Digital Power	iDMU	Basic Parameters	Branch n Usage Cfg	Customized Load, Other

Setting the Circuit Breaker Capacity

You can set the circuit breaker capacity when the circuit breaker usage is set to load branch (**Customized Load**) or general power distribution branch (**Other**).

Table 8-17 Setting the circuit breaker capacity on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Value Range
Parameters Settings	Digital Power	iDMU	LOAD-iCBD n	Customized Capacity	Rated Circuit Breaker Capacity	3 A to rated capacity of the circuit breaker **NOTE** • Set the circuit breaker capacity based on the actual load current. • The capacity of the circuit breaker cannot exceed the through-current capacity of the cable and the rated capacity of the circuit breaker.

Setting the User Type for Customized Loads

Table 8-18 Setting basic branch parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Default Value	Value Range
Parameters Settings	Digital Power	iDMU	LOAD-iCBD n	User Config	None	User 1 to User 10, None

Setting Customized Load Disconnection Parameters

- Voltage mode: When an AC power failure occurs, you can perform disconnection management based on the battery discharge voltage.
- Consumption mode: When an AC power failure occurs, you can perform disconnection management based on the backup power configured for the load branch.
- Capacity mode: When an AC power failure occurs, you can perform disconnection management based on the battery discharge capacity.
- Time mode: When an AC power failure occurs, you can perform disconnection management based on the power failure duration.
- High-temperature power-off mode: You can perform disconnection management based on the ambient temperature (reported by the ambient temperature sensor).
- Planned power-off mode: You can perform disconnection management based on the preset time segment.
- Exempt period without backup power: When an AC power failure occurs, you can perform disconnection management within the specified period.

Table 8-19 Setting customized load disconnection parameters on the LCD

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Value Range
Parameters Settings	Digital Power	iDMU	LOAD-iCBD n	Enb Load Discon	Disable/Enable
				Load Discon Mode	Voltage Mode, Capacity Mode, Consumption Mode, Timing Mode
				Load Discon Volt	36.0–56.0
				Load Recon Voltage	37.0–58.0
				Load Discon Cons	0–100000

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Fifth-Level Menu	Value Range
				Load Discon Cap	0–99
				Load Discon Time	0–6000
				Enb HTD	Disable/Enable
				HTD Temp	25.0–80.0
				Enb PD	Disable/Enable
				PD Start Time	HH:MM:SS
				PD Duration	0–1440
				Exempt Period No Bk	Disable/Enable
				Exempt Start Time	HH:MM:SS
				Exempt Duration	0–1440

8.13 Setting Battery Parameters

NOTE

In the lithium battery scenario, you do not need to set battery parameters.

8.13.1 Setting Parameters (Lithium Battery + Lead-Acid Battery)

Step 1 Set lithium battery parameters.

Table 8-20 Setting lithium battery parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
Parameters Settings	Li Battery	Basic Parameters	Priority Charger	Enable, Disable

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
			Cycle Mode	**Li-Ion And Acid cycle**: Lithium batteries and lead-acid batteries switch between each other to discharge based on the configured discharge capacity. **NOTE** This parameter is displayed when **Discharger Mode** is set to **Constant Volt Dischg**. When **Discharger Mode** is set to **Auto**, both lithium batteries and lead-acid batteries discharge.
				Li-Ion primary: Lithium batteries discharge preferentially. When lithium batteries discharge to the configured depth of discharge (DOD), lead-acid batteries discharge. **NOTE** This parameter is displayed when **Discharger Mode** is set to **Constant Volt Dischg**. When **Discharger Mode** is set to **Auto**, both lithium batteries and lead-acid batteries discharge.
				Li-Ion standby: Lead-acid batteries discharge preferentially. When lead-acid batteries discharge to the configured DOD, lithium batteries discharge.

Step 2 Set lead-acid battery parameters.

Table 8-21 Setting lead-acid battery parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
Parameters Settings	Battery	Basic Parameters	Battery n Connected **NOTE** This parameter is displayed when branch usage is set to **Lead-acid Battery**.	Yes, No **NOTE** If a battery power distribution route is connected to lead-acid batteries, set **Battery n Connected** to **Yes** for this route and to **No** for other routes.
			Single-String Cap.	A battery string includes a set of batteries controlled by one circuit breaker or fuse.

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
		Other Parameters	Battery Install Time	Set this parameter to the current time.
			Battery Cable Length	Set these parameters based on site requirements. **NOTE** • When each battery string is connected to the RTN+ busbar over one cable, set **Battery Cable Length** to half of the total length of cables between both ends of a battery string and the positive and negative busbars, and set **Batt Cable CS Area** to the cross-sectional area of the cable. • When each battery string is connected to the RTN+ busbar over two cables, set **Battery Cable Length** to half of the total length of a suite of cables between both ends of a battery string and the positive and negative busbars, and set **Batt Cable CS Area** to the sum of the cross-sectional areas of the two cables.
			Batt Cable CS Area	

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 battery strings (a 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**.

----End

8.13.2 Setting Battery Parameters (Lead-Acid Battery)

Table 8-22 Setting battery parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Settings
Parameters Settings	Acid Battery	Basic Parameters	Float Charge Voltage	Set this parameter as required.
			Boost Charge Voltage	Set this parameter as required.

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Settings
			Charge Limit Coef. **NOTE** This parameter is not displayed for the fast charge battery (FCB). The SMU automatically adjusts the parameter based on the battery charging status and the ambient temperature.	Set this parameter as required.
		Other Parameters	Battery Install Time	Set this parameter to the current time.
			Battery Cable Length	Set these parameters as required. **NOTE** • When each battery string is connected to the RTN+ busbar using one cable, set **Battery Cable Length** to half of the total length of cables between both ends of a battery string and the positive and negative busbars, and set **Batt Cable CS Area** to the cross-sectional area of the cable. • When each battery string is connected to the RTN+ busbar using two cables, set **Battery Cable Length** to half of the total length of a suite of cables between both ends of a battery string and the positive and negative busbars, and set **Batt Cable CS Area** to the sum of the cross-sectional areas of the two cables.
			Batt Cable CS Area	

8.14 Setting the 57 V Constant Voltage Output Parameter

NOTE

This parameter is set only in the lithium battery scenario.

Table 8-23 Setting the 57 V constant voltage output parameter

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Settings
Parameters Settings	Li Battery	Basic Parameters	Work Mode	48 V mode/57 V mode **NOTE** Set this parameter as required.

8.15 Setting Communications Parameters

8.15.1 (Optional) Setting Parameters Before Using WebUI

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 8-2 Canceling proxy server settings 1

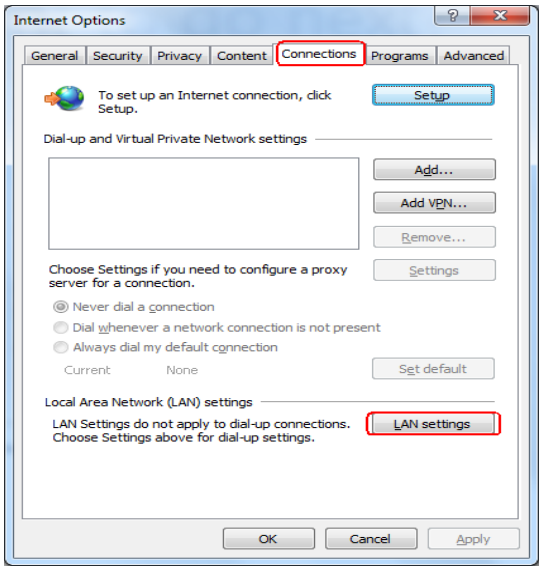
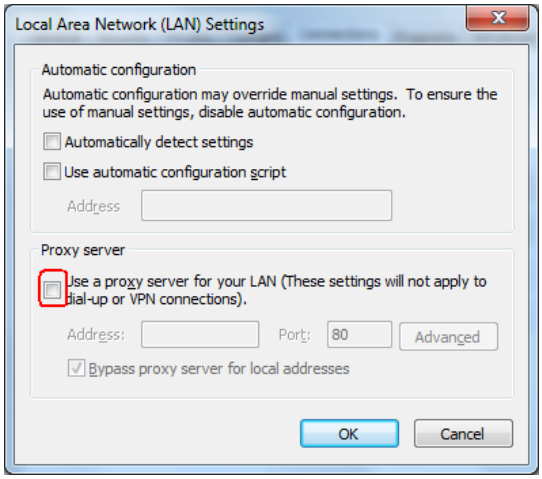


Figure 8-3 Canceling proxy server settings 2



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:

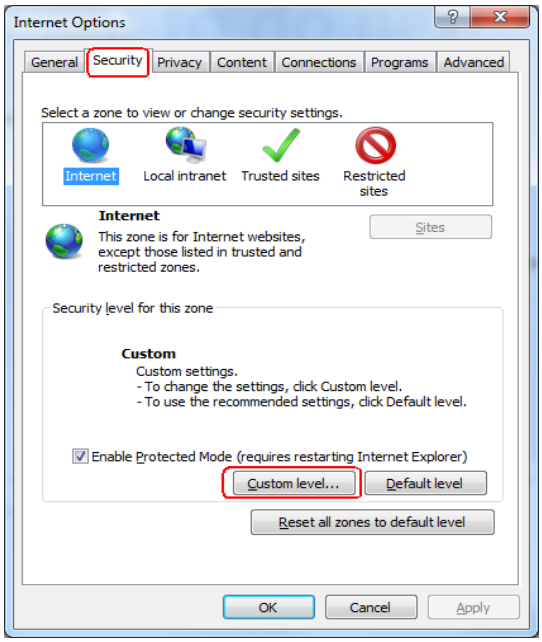
Step 1 Open Internet Explorer.

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**.

Figure 8-4 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 8-5 Internet Explorer security setting 1

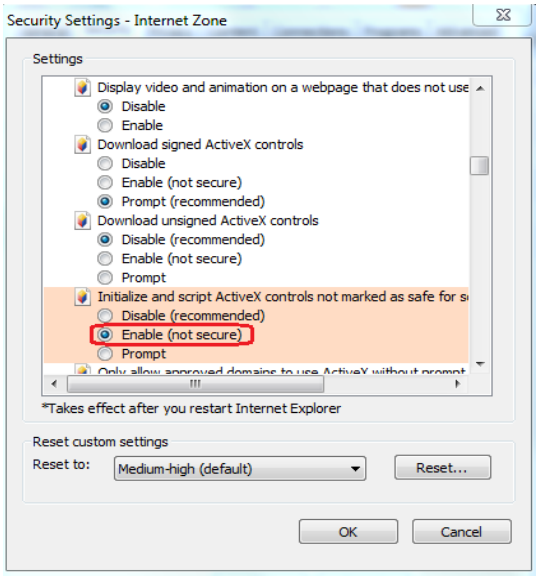


Figure 8-6 Internet Explorer security setting 2

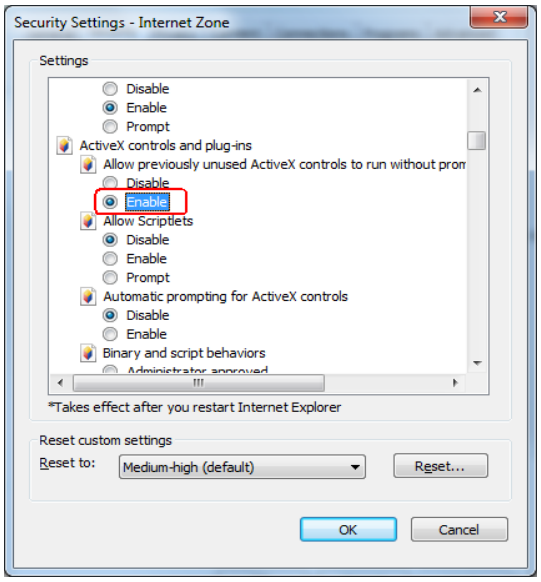


Figure 8-7 Internet Explorer security setting 3

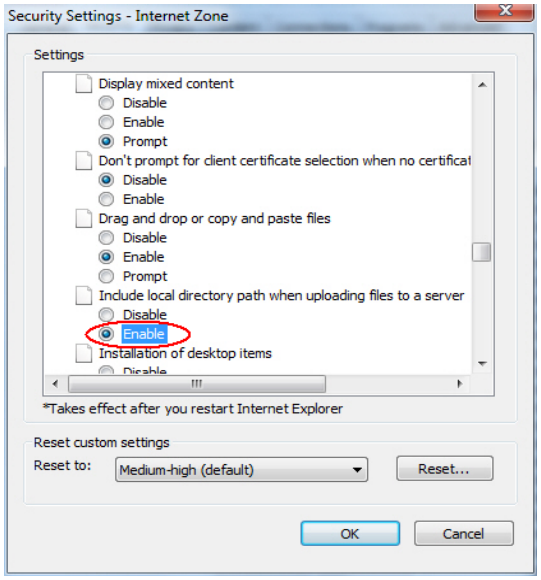
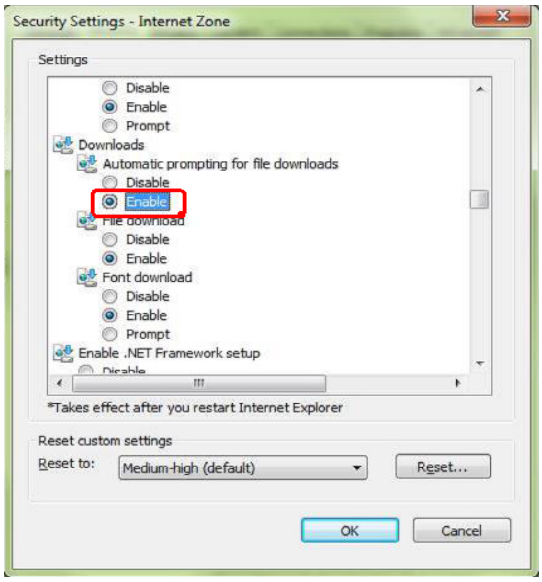


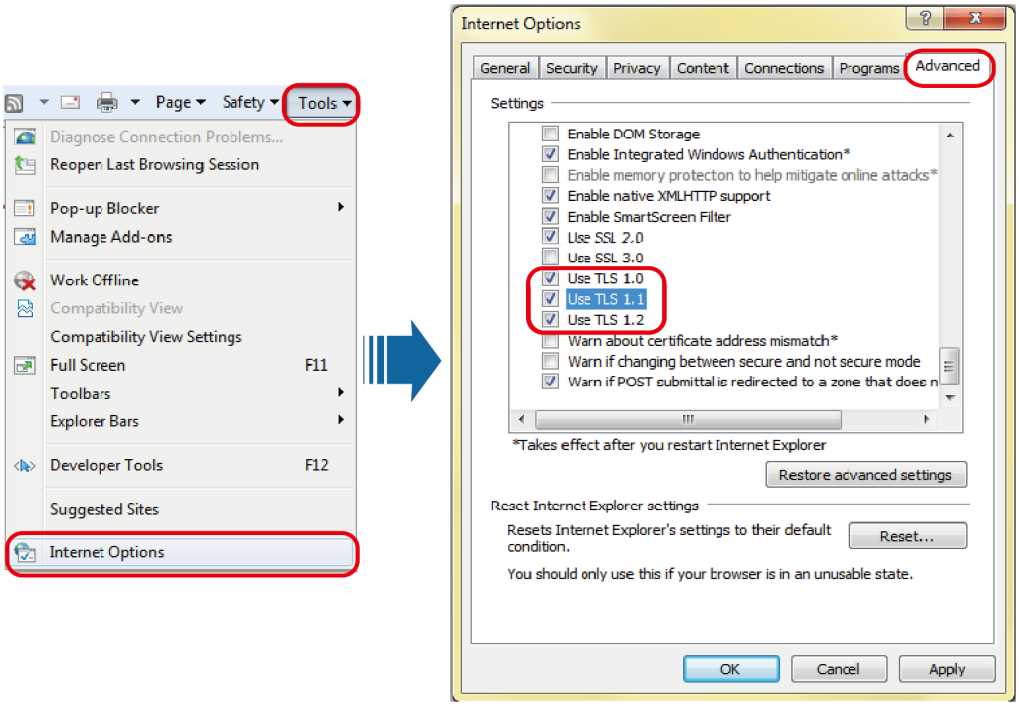
Figure 8-8 Internet Explorer security setting 4



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 8-9 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.

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

Table 8-24 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.

Figure 8-10 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

8.15.2 (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 8-25 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.

Table 8-26 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 8-27 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

8.15.3 (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 8-28** from the SNMP-based NMS.

Table 8-28 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	

Item	Description
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.

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

8.16 (Optional) Setting Staggering Electricity Parameters

Set parameters for staggering electricity based on site requirements.

NOTE

The power system does not support peak shaving and staggering electricity functions to be enabled at the same time.

Procedure

Step 1 Log in to the WebUI.

Step 2 On the WebUI, choose **System Settings> Staggering Electricity**, set staggering parameters and click **Submit**.

Figure 8-11 Setting staggering electricity parameters

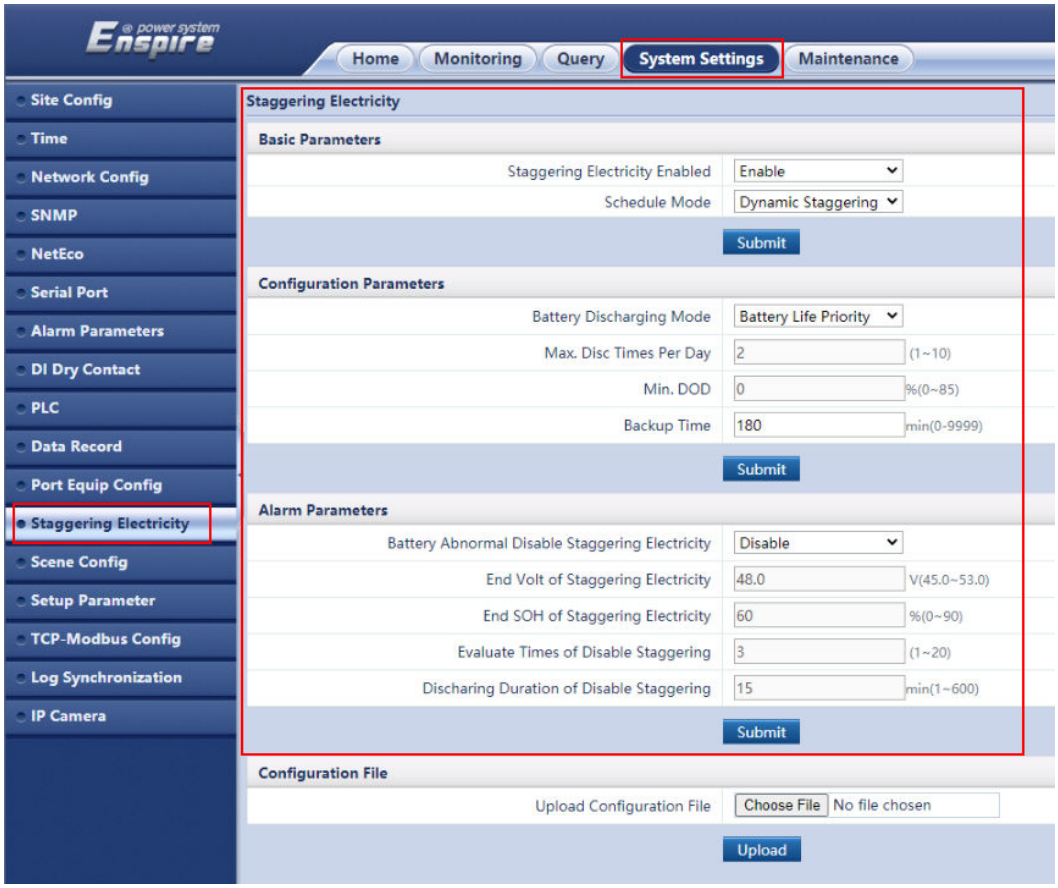


Table 8-29 Setting staggering electricity parameters (on the LCD)

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Value Range	Setting Description
Parameters Settings	Staggering Elec Para	Stag Elec Enb	Enable	Enable, Disable	Set this parameter to **Enable** when the staggering function is required.
		Schedule Mode	Fixed Staggering	Fixed Staggering, Debug Staggering, Dynamic Staggering	This parameter does not need to be set by default.
		Battery Disc Mode	Battery Life Priority	Battery Life Priority, Staggering Priority	This parameter does not need to be set by default.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Value Range	Setting Description
		Max Disc Times Per Day	2	1 to 10	Set this parameter based on the number of electricity price peaks. **NOTE** A lead-acid battery can be discharged for a maximum of two times.
		Max Disc Cap Per Day	-	5~50%	This parameter applies to the lead-acid battery scenario. The default maximum DOD is automatically configured based on the battery model. You do not need to set manually.
		Max. DOD Each Time	50%	0 to 85%	This parameter applies to the lithium battery scenario or hybrid use scenario and can be configured in the fixed staggering or debug staggering mode. The maximum DOD can be manually set based on the configured staggering battery capacity.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Value Range	Setting Description
		Min. DOD	0	0~85%	This parameter applies to the dynamic staggering mode and can be set based on the staggering battery capacity. **NOTE** Set this parameter to **0** if no battery is configured in dynamic staggering mode.
		Backup Time	180min	0~9999min	This parameter applies to the dynamic staggering mode. Set this parameter based on the actual backup time required by the site.
		Batt Abn Disable Sta	Disable	Enable, Disable	This parameter does not need to be set by default.
		Star Time	2000-01-01 00:00:00	-	Set this parameter in debug staggering mode.
		End Time	2000-01-01 00:00:00	-	
		End Volt of Stag Elec	48.0 V	45.0 to 53.0 V	This parameter does not need to be set by default.
		End SOH of Stag Elec	60%	0 to 90	This parameter does not need to be set by default.
		Time of Disable Stag	3	1 to 20	This parameter does not need to be set by default.
		Duration of Disable Stag	15 min	1 to 600	This parameter does not need to be set by default.

Step 3 Obtain the electricity price template and fill in the staggering configuration.

NOTE

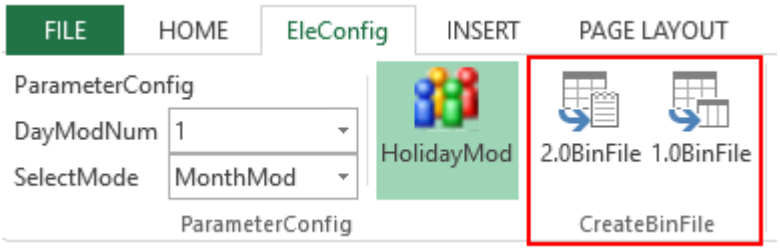
Obtain the electricity price template from the NetEco.

Step 4 Save the electricity price template and generate a Bin file.

NOTE

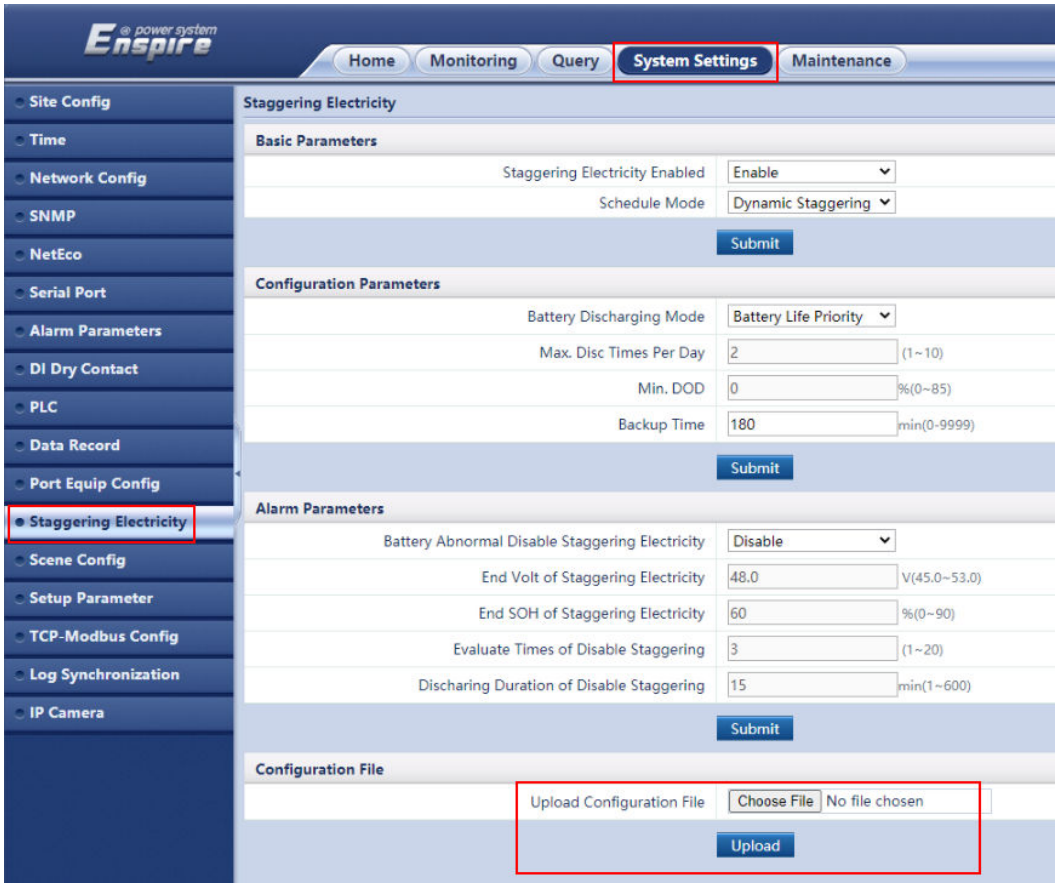
- For versions earlier than SMU V500R003C10, the 1.0 Bin file needs to be generated.
- For SMU V500R003C10 and its later versions, 1.0 Bin or 2.0 Bin files can be generated.

Figure 8-12 Generating a Bin file



Step 5 Select the generated Bin file and click **Upload**.

Figure 8-13 Uploading configuration files



----End

8.17 (Optional) Setting AC Peak shaving Parameters

Set peak shaving parameters based on site requirements.

NOTE

The power system does not support peak shaving and staggering electricity functions to be enabled at the same time.

Table 8-30 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.
			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.)	

Main Menu	Second -Level Menu	Third-Level Menu	Fourth-Level Menu	Setting Description
			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.

8.18 Connecting the Lead-Acid Battery Supply

Procedure

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

Step 2 Switch on the lead-acid battery circuit breakers.

WARNING

Before manually switching on the battery circuit breaker, check whether the SMU generates a battery reverse connection alarm. If the alarm is generated, do not manually switch on the battery circuit breaker. Check whether battery cables are correctly connected.

Step 3 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

8.19 Connecting the Lithium Battery Supply

Procedure

Step 1 Switch on the lithium battery circuit breakers.

> **WARNING**
>
> Before manually switching on the battery circuit breaker, check whether the SMU generates a battery reverse connection alarm. If the alarm is generated, do not manually switch on the battery circuit breaker. Check whether battery cables are correctly connected.

Step 2 Check whether the lithium batteries communicate properly. If the running indicator on a lithium battery is steady on, the lithium battery communicates properly with the monitoring device. If the indicator blinks fast (4 Hz), the communication is interrupted. In this case, check that the communications cable is properly connected.

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

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

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

----End

8.20 Connecting the Load Supply

Procedure

Step 1 Switch on all load circuit breakers one by one. During the process, measure the busbar voltage using a clamp meter after switching on each circuit breaker. Then continue to switch on another circuit breaker after ensuring that the busbar voltage is between 45.5 V DC and 57.6 V DC.

----End

9 Subsequent Operations

Procedure

Step 1 Reinstall removed panels (if any).

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

Step 3 Clean the site and leave.

----End

10 System Maintenance

DANGER

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.

10.1 Routine Maintenance

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

NOTICE

Do not perform maintenance on rainy days. Otherwise, rainwater can enter the system and damage devices and components.

10.1.1 AC and DC Power Distribution

Table 10-1 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.
2	Check for AC input overvoltage.	The mains voltage is too high.	Provide the voltage data to the power supplier.

No.	Maintenance Item	If...	Then...
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.

10.1.2 SMU

Table 10-2 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.
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.

No.	Maintenance Item	Possible Cause	Suggestion
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.

10.1.3 Parameters on the SMU

Table 10-3 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.
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.

No.	Maintenance Item	Possible Fault Cause	Suggestion
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.

10.1.4 Rectifier

Table 10-4 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.
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.

10.1.5 Cables

Table 10-5 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.
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.

10.2 Identifying Component Faults

10.2.1 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.

10.2.2 UIM Troubleshooting

If a communication failure alarm is displayed on the LCD, the UIM is faulty.

10.2.3 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.

10.2.4 Identifying Circuit Breaker Faults

The SMU shows a load fuse/fuse blown alarm, and the possible cause is circuit breaker tripping. If the downstream device still has no power (the busbar is energized) after the circuit breaker is switched on, the circuit breaker is faulty and needs to be replaced.

10.2.5 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.

10.3 Replacing Components

NOTICE

- Ensure that loads are powered on during replacement. For example, switch on the circuit breakers for primary loads, and do not disconnect both the battery input and AC input from the loads.
- Obtain prior written consent from customers if load disconnection is required.
- Rectifiers and the SMU are hot-swappable.

10.3.1 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.

NOTE

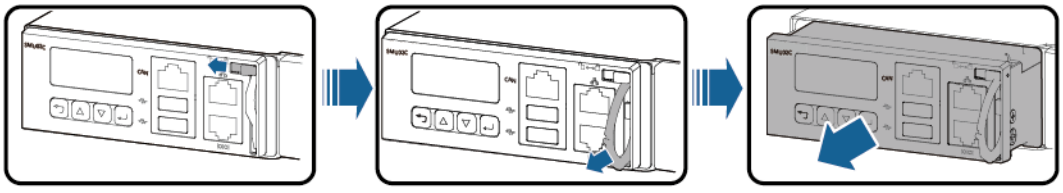
Record the software version of the old SMU. If the old SMU is damaged and version information cannot be viewed, send the bar codes of the old SMU and cabinet to technical support engineers.

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

Step 3 Push the locking latch leftwards.

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

Figure 10-1 Removing the SMU02C



PC03I00000

Step 5 Remove the SD card from the side of the SMU02C.

NOTE

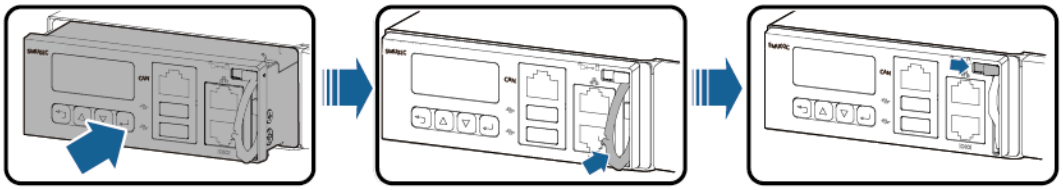
If no SD card is installed, go to **Step 7**.

Step 6 Insert the SD card into the new SMU02C.

Step 7 Place the new SMU02C in the slot, push the locking latch leftwards, and pull out the handle.

Step 8 Gently push the SMU02C along the guide rails until it is engaged. Close the handle, and push the locking latch rightwards.

Figure 10-2 Installing the SMU02C



Step 9 Reconnect the communications cable to the SMU02C panel based on the recorded information.

Step 10 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 11 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.

10.3.2 Replacing a UIM05D1

Prerequisites

- The ESD wrist strap, ESD gloves, ESD box or bag, and toolbox are available.
- The new UIM05D1 is intact.

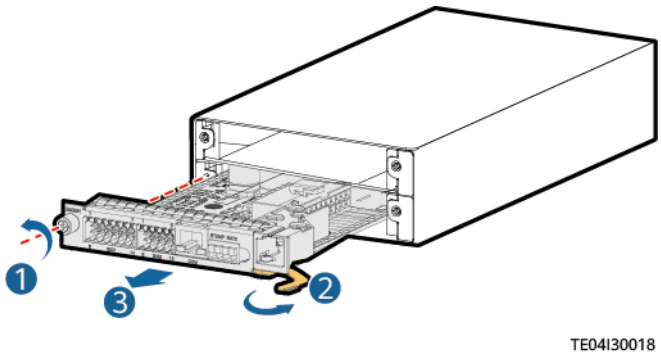
Procedure

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 UIM05D1 panel and remove the cables.

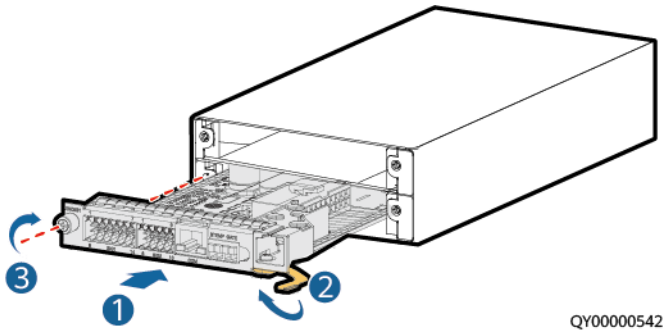
Step 3 Loosen the screws on the UIM05D1 panel, pull the handle until it is engaged, and take out the UIM05D1.

Figure 10-3 Removing the UIM05D1



Step 4 Install the new UIM05D1.

Figure 10-4 Installing the UIM05D1.



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

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

10.3.3 Replacing an NIM01C3

Prerequisites

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

Procedure

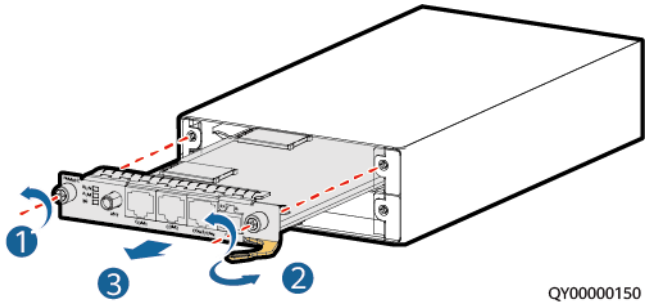
Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

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

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

Step 4 Pull the handle rightward and remove the NIM01C3.

Figure 10-5 Removing an NIM01C3

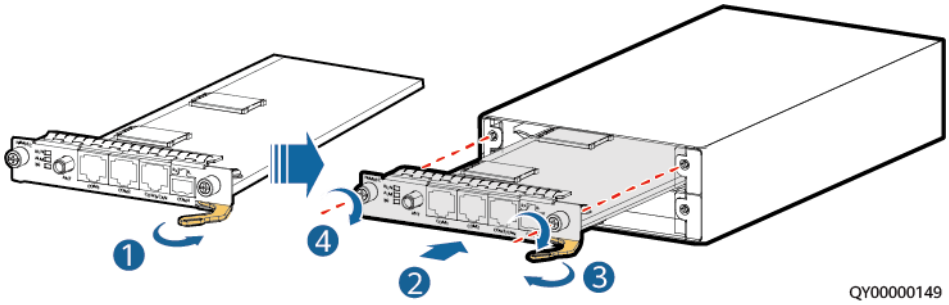


Step 5 Remove the SIM card from the SIM card slot in the NIM01C3, and insert the card into the SIM card slot in the new NIM01C3. Skip this step if no SIM card is installed.

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

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

Figure 10-6 Installing an 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

Follow-up Procedure

Pack the removed components and send them to the local Huawei warehouse.

10.3.4 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

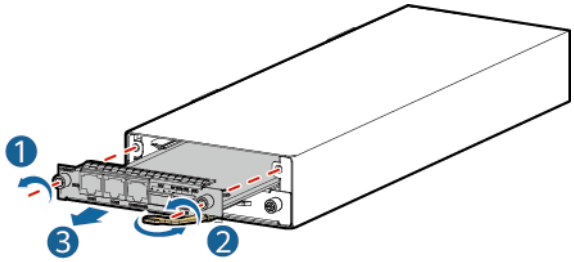
Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

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 10-7 Removing the CIM02C

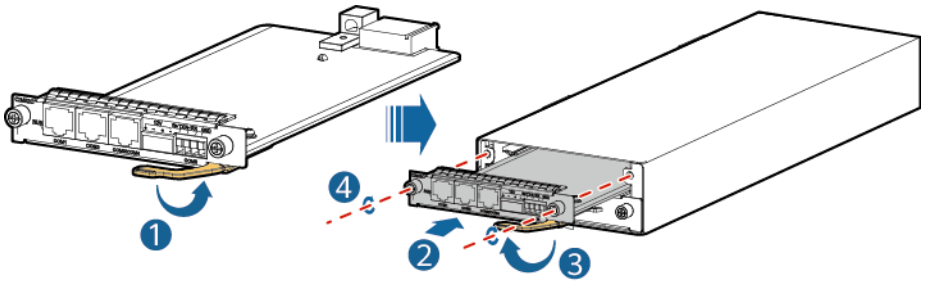


TM07H00022

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 10-8 Installing the CIM02C



PQ00HC0096

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

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.

10.3.5 Replacing a PSU

Prerequisites

- The ESD wrist strap and key to the cabinet door are available.
- The new PSU is intact.

> **CAUTION**
>
> To prevent burns, exercise caution when removing a PSU because it may be hot as a result of continuous operation.

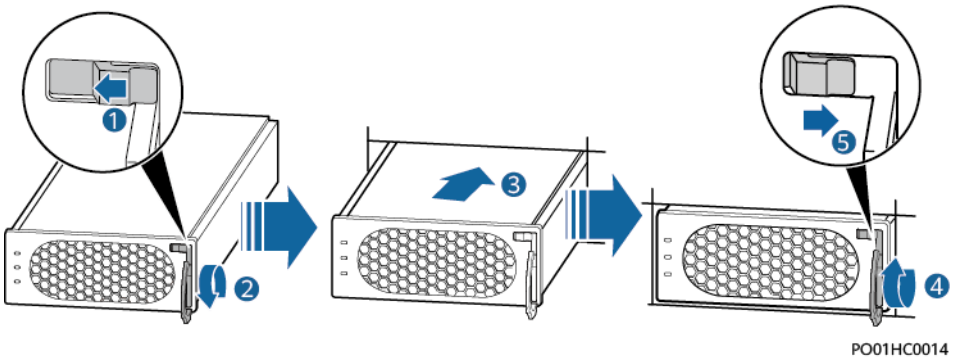
Procedure

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

Step 2 Remove the faulty PSU.

Step 3 Install the new PSU in the correct slot.

Figure 10-9 Installing the PSU



Step 4 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

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

10.3.6 Replacing a DMU03C1

Prerequisites

- The protective gloves and cabinet door key are available.
- The new DMU03C1 is intact.

CAUTION

- Do not remove the DMU03C1 that carries loads. Otherwise, the DMU03C1 may be damaged.
- Continuous operation of the DMU03C1 will generate high temperature. Exercise caution when removing the DMU03C1 to avoid scalds.

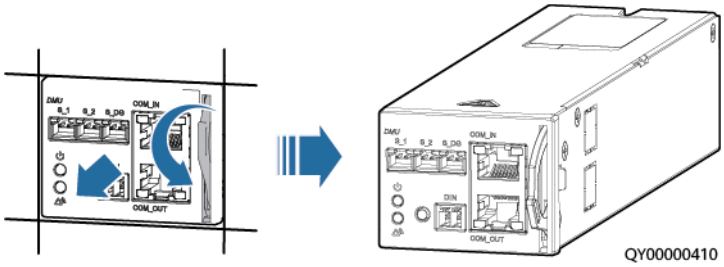
Procedure

Step 1 Wear the protective gloves.

Step 2 Record the cable connections on the DMU03C1 and remove the cables.

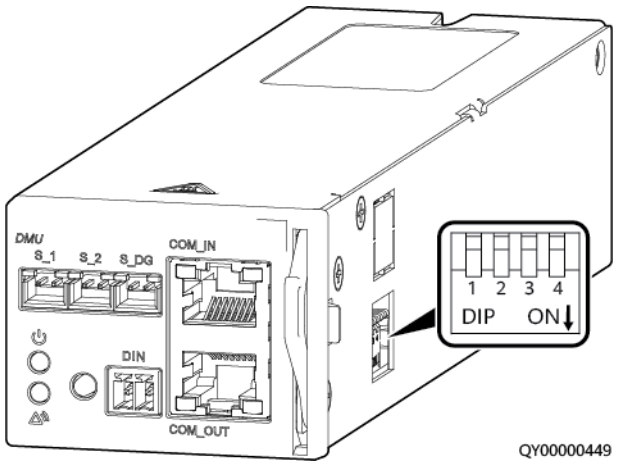
Step 3 Remove the old DMU03C1.

Figure 10-10 Removing the old DMU03C1



Step 4 Record the DIP switch address of the old DMU03C1.

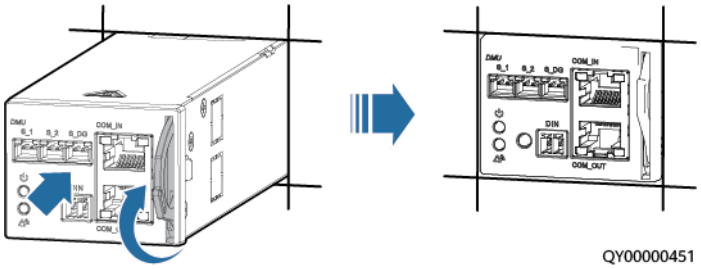
Figure 10-11 DIP switch



Step 5 Install the new DMU03C1.

1. Set the DIP switch address of the new DMU03C1 to the same as that of the old DMU03C1.
2. Install the new DMU03C1.

Figure 10-12 Installing the new DMU03C1



Step 6 Reconnect the cables based on the recorded information.

Step 7 Take off the protective gloves.

----End

Follow-up Procedure

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

10.3.7 Replacing a Circuit Breaker

Prerequisites

- Tools are available.
- The new circuit breaker is intact.

Procedure

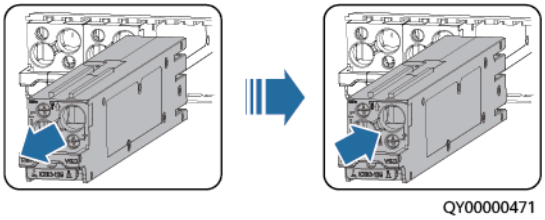
Step 1 Switch off the circuit breaker to be replaced.

Step 2 Record the cable connections, remove the cables, and insulate them.

Step 3 Pull out the faulty circuit breaker horizontally along the guide rails.

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

Figure 10-13 Replacing a circuit breaker



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

Step 6 Switch on the circuit breaker.

----End

Follow-up Procedure

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

10.3.8 Replacing an AC Input Module

Prerequisites

- Tools are available.
- The new AC input module is intact.

NOTICE

- Power off the system before replacing an AC input module. 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 AC input module to be replaced.

Step 2 Record the cable connections, remove the cables, and insulate them.

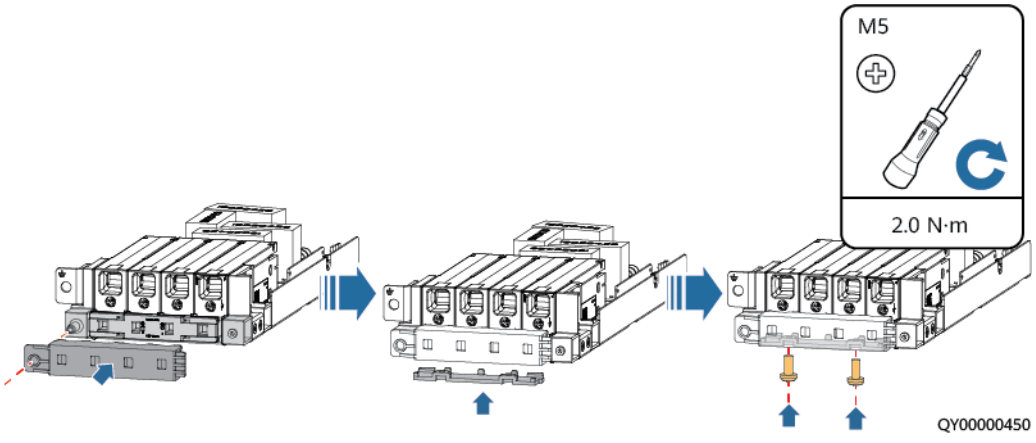
Step 3 After removing the mechanical interlock spring, remove the old AC input module.

NOTE

- If there is one input, skip the steps related to the mechanical interlock spring.
- If there are two inputs, the mechanical interlock spring needs to be removed.

Step 4 Install the mechanical interlock handle on the new AC input module.

Figure 10-14 Installing a mechanical interlock handle



Step 5 Install the new AC input module and mechanical interlock spring.

Step 6 Connect cables to the AC input module based on the recorded cable information.

Step 7 Switch on the AC input module.

----End

10.3.9 Replacing an AC Output Module

Prerequisites

- You have obtained the toolbox.
- The new AC output module is intact.

NOTICE

- Power off the system before replacing an AC output module. Do not operate with power on.
- Power-off will disconnect power supply to loads. Obtain prior consent from customers before replacing an AC output module.

Procedure

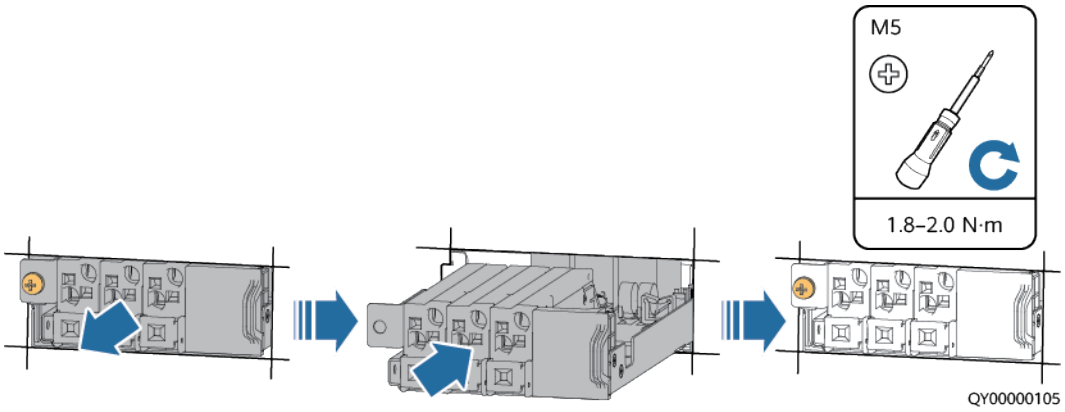
Step 1 Switch off the circuit breaker of the AC output module to be replaced.

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

Step 3 Loosen the screws that secure the AC output module and remove the module.

Step 4 Install a new AC output module and connect cables based on the recorded information.

Figure 10-15 Replacing an AC output module



Step 5 Switch on the circuit breakers of the AC output module.

----End

A Technical Specifications

Table A-1 Technical specifications

Category	Item	Specifications
Environmental specifications	Operating temperature	–40°C to +65°C (When the ambient temperature ranges from –33°C to +55°C, the power system works properly. When the ambient temperature ranges from 55°C to 65°C, the output power linearly derates by 20%. When the ambient temperature is –40°C, the power system can start properly after the AC power supply is connected. There is no requirement on the output voltage waveform at startup.)
	Transport temperature	–40°C to +70°C
	Storage temperature	–40°C to +70°C
	Operating humidity	5%–95% RH (non-condensing)
	Transportation 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, high temperature derating applies and the operating temperature decreases by 1°C for each additional 200 m.
	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

Category	Item	Specifications
	Power factor	≥ 0.99 (rated voltage input, 50%–100% load)
DC output	Output voltage range	• 48 V mode: –42 V DC to –58 V DC (–53.5 V DC by default) • 57 V mode: –48 V DC to –57 V DC (–57 V DC by default)
	Regulated voltage precision	≤ ±1%
	Peak-to-peak noise voltage	≤ 200 mV (0–20 MHz)
	Psophometrically weighted noise voltage	≤ 2 mV (meets this standard at rated output voltage points of 53.5 V and 57 V)
	Current sharing imbalance	≤ ±5% (20%–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	Range: –58.5 V DC to –60.5 V DC
EMC specifications	Conducted emission (CE)	• AC port: EN 55032, Class B • DC port: EN 55032, Class A[1] • Signal port: EN 55032, Class B
	Radiated emission (RE)	EN 55032, Class B
	Harmonic current	EN 61000-3-12
	Voltage fluctuation and flicker	EN 61000-3-11
	Electrostatic discharge (ESD)	IEC 61000-4-2 Enclosure port: contact discharge of 6 kV and air discharge of 8 kV; signal port: contact discharge of 2 kV
	Electrical fast transient (EFT)	IEC 61000-4-4 AC and DC power ports: 2 kV

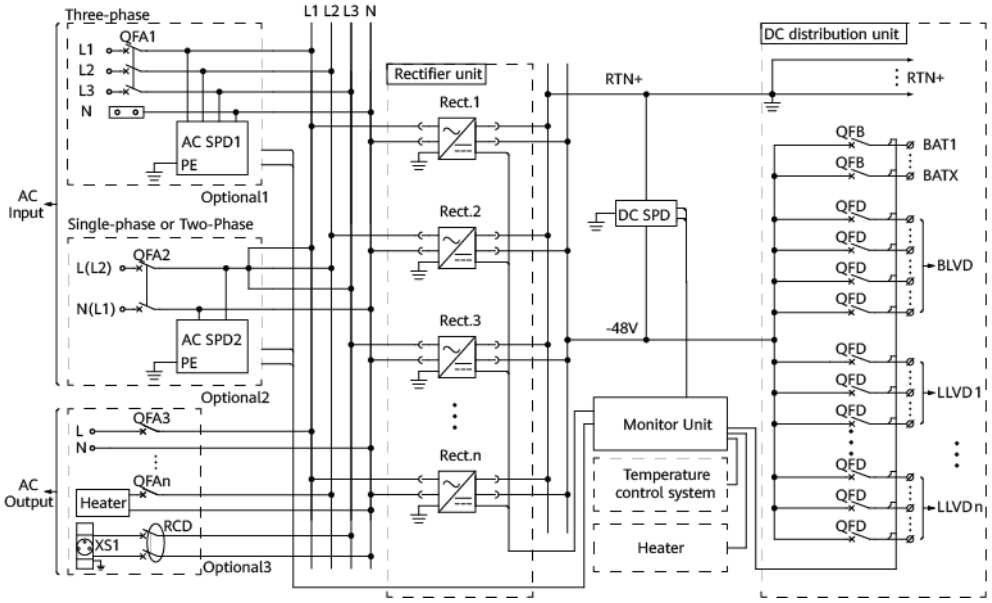
Category	Item	Specifications
	Radiated susceptibility (RS)	IEC 61000-4-3 10 V/m
	Conducted susceptibility (CS)	IEC 61000-4-6 Power port: 10 V; signal port: 3 V
	Surge susceptibility	IEC 61000-4-5 AC and DC power ports: 2 kV (8/20 μs) in differential mode and 4 kV (8/20 μs) in common mode
	Voltage dip	Complies with IEC 61000-4-11.
Others	Mean time between failures (MTBF)	200,000 hours (at 25°C)
Structure	Power system dimensions (H x W x D)	175 mm x 482.6 mm x 330 mm
	Weight	≤ 19 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
	Cooling mode	Free cooling

NOTE

1. This is a class A product and may cause radio interference in residential areas. Therefore, users may be required to take appropriate measures.

B Electrical Conceptual Diagram

Figure B-1 ETP48400-C4B1 electrical conceptual diagram

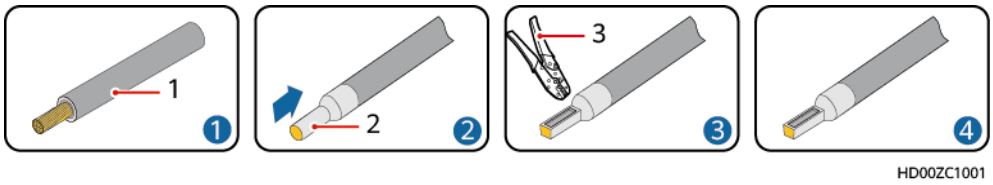


C Preparing Terminals

Cut a cable of a proper length and install terminals.

Preparing a Cord End Terminal

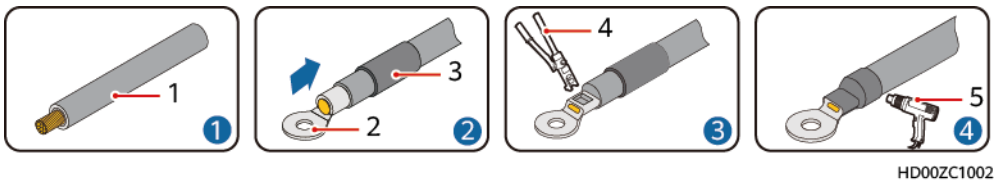
Figure C-1 Preparing a cord end terminal



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

Preparing an OT Terminal

Figure C-2 Preparing an OT terminal



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

(4) Hydraulic pliers (5) Heat gun

D Associations Between UIM Dry Contacts and Alarms

Table D-1 Associations between dry contacts and alarms

Port Type	Silkscreen	Associate Alarm
Dry contact input	DIN4	User-defined
Dry contact output The default setting (closed: alarm; open: normal) can be modified. **NOTE** DIN1/ALM1, DIN2/ALM2, DIN3/ALM3, DIN5/ALM4, and DIN6/ALM5 are multiplexing ports. They are dry contact outputs by default.	DIN1/ALM1	AC power failure, long-time AC power failure (disabled by default)
	DIN2/ALM2	DC output overvoltage, DC output ultra overvoltage, DC output undervoltage, DC output ultra undervoltage, or lithium battery overdischarge
	DIN3/ALM3	Single rectifier fault (redundant) (disabled by default), single rectifier fault (non-redundant) (disabled by default), multi-rectifier fault, all-rectifier communication failure, communication failure, rectifier fault, rectifier protection
	DIN5/ALM4	AC SPD fault, DC SPD fault
	DIN6/ALM5	Fuse blown alarm (load circuit breaker), fuse blown alarm (general circuit breaker), battery fuse blown alarm (lithium battery and lead-acid battery)
	ALM6	Lead-acid battery: battery high temperature, battery very high temperature, battery low temperature, battery very low temperature Lithium battery: battery high temperature, battery low temperature Temperature and humidity sensor: high ambient temperature, very high ambient temperature, low ambient temperature

Port Type	Silkscreen	Associate Alarm
	ALM7	Door status alarm (including the power cabinet, battery cabinet, and equipment cabinet)
	ALM8	Power cabinet temperature control Fan 1 fault, fan 2 fault, fan 3 fault, high temperature at the return air vent When an external direct ventilation battery cabinet or a heat exchanger equipment cabinet is used: High temperature at the air exhaust vent, low temperature at the air exhaust vent, high temperature at the air intake vent, low temperature at the air intake vent, high temperature at the return air vent, low temperature at the return air vent, EXTFAN1 fault, EXTFAN2 fault, INFAN1 fault, INFAN2 fault, INFAN3 fault, INFAN4 fault, TEC 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

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

- 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 E-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 E-1**, and insert the jumper caps into pins 2 and 3.

Figure E-1 COM4 and COM5 port jumper positions

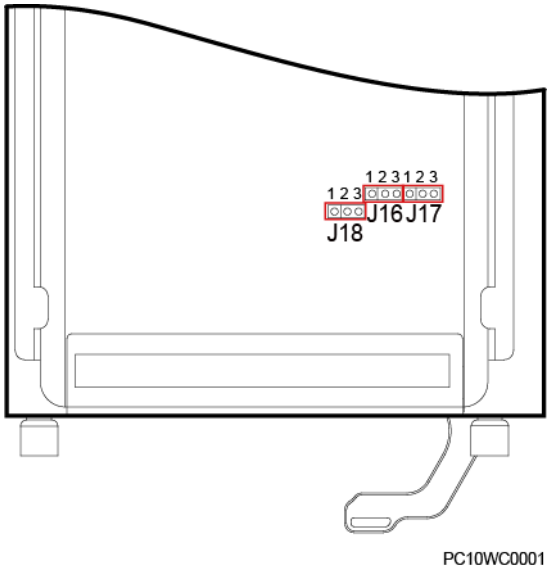
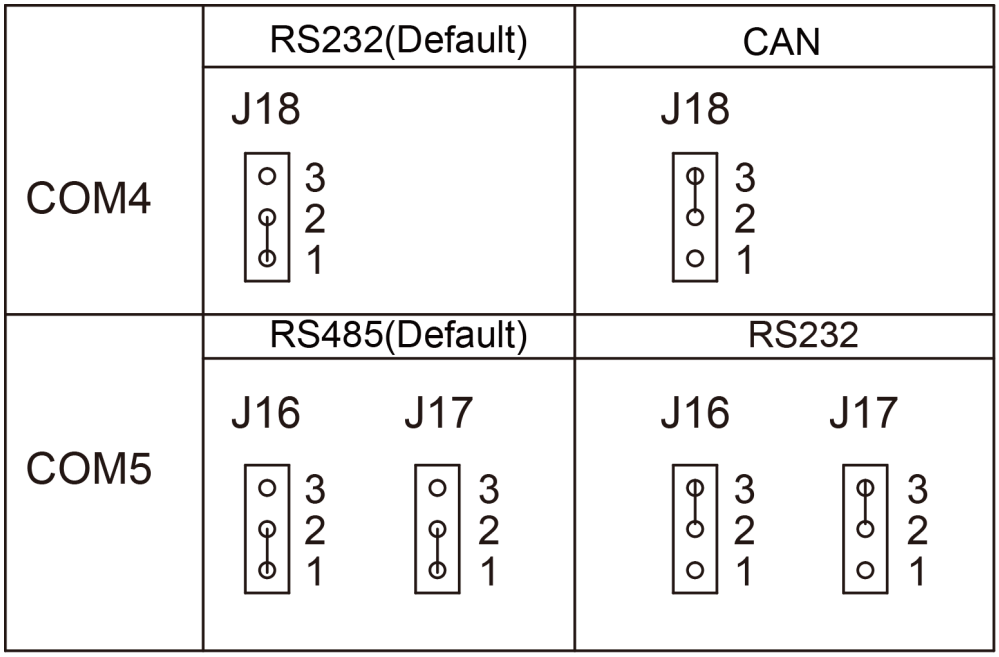


Figure E-2 Jumper connection rules for the COM4 and COM5 ports



F MPPT Function Description

Prerequisites

- The MPPT function is used to trace the optimal output power point of the AC input to ensure the highest output power of the rectifiers.
- The function applies to scenarios where the grid power is unstable, power supply distance is long and cable diameters are insufficient. In these scenarios, the AC input power cannot meet the power supply requirements of loads, and rectifiers restart repeatedly.
- For example, if the AC current is 28 A, the power supply distance exceeds 1 km, and the cross-sectional area of the cable is 10 mm^2. In this case, you are advised to enable this function.

NOTICE

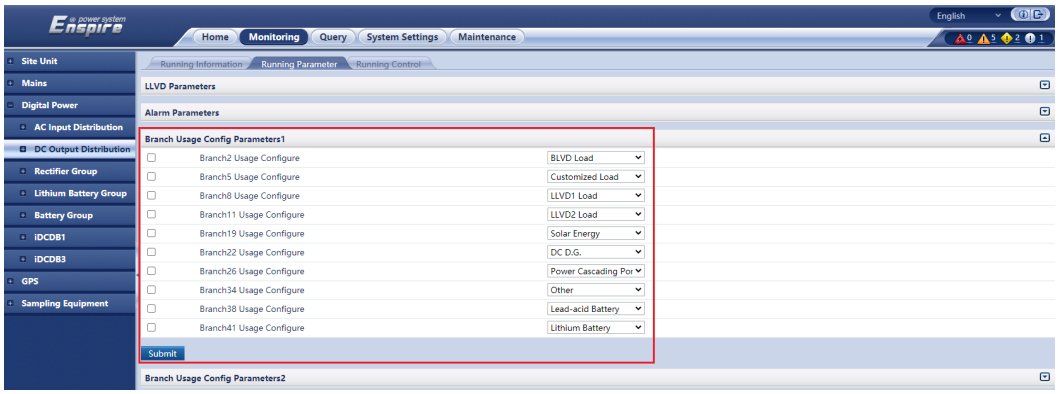
- To enable the MPPT function, you need to purchase a corresponding NetEco license.
- All configured rectifiers should support the MPPT function.

G Remotely Managing Intelligent Circuit Breaker Parameters

Setting the Usage of Intelligent Circuit Breakers

The usages of circuit breakers include **Customized Load**, **BLVD Load**, **LLVD1-4 Load**, **Power Cascading Port**, **DC DG**, **Solar Energy**, **Lithium Battery**, **Lead-acid Battery**, and **Other**.

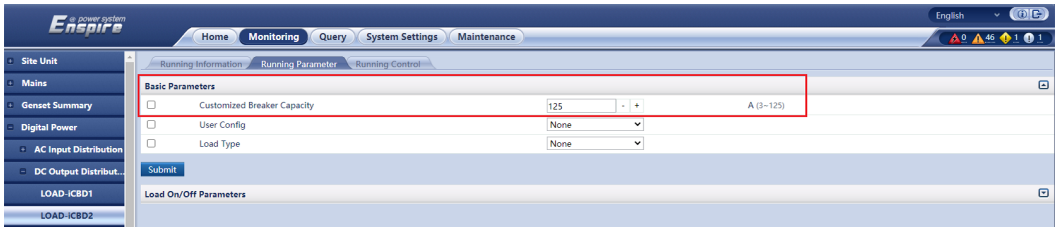
Figure G-1 Setting branch usage configuration parameters



Setting the Circuit Breaker Capacity

You can set the circuit breaker capacity when the circuit breaker usage is set to load branch (BLVD Load/LLVD1-4 Load/Customized Load), general power distribution branch (Power Cascading Port/DC DG/Solar Energy/Other), or battery power distribution branch (Lithium Battery/Lead-acid Battery).

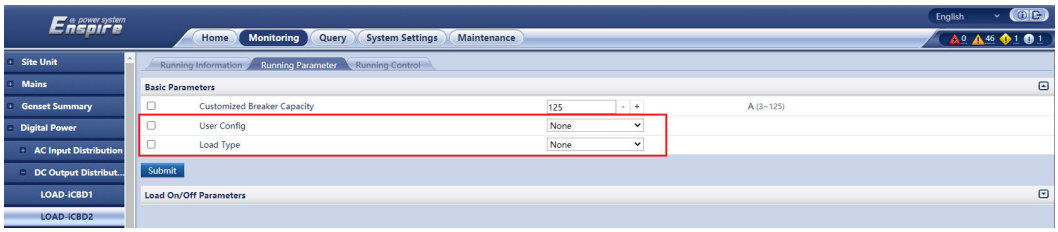
Figure G-2 Setting basic branch parameters (using customized loads as an example)



Setting the Branch User and Load Type

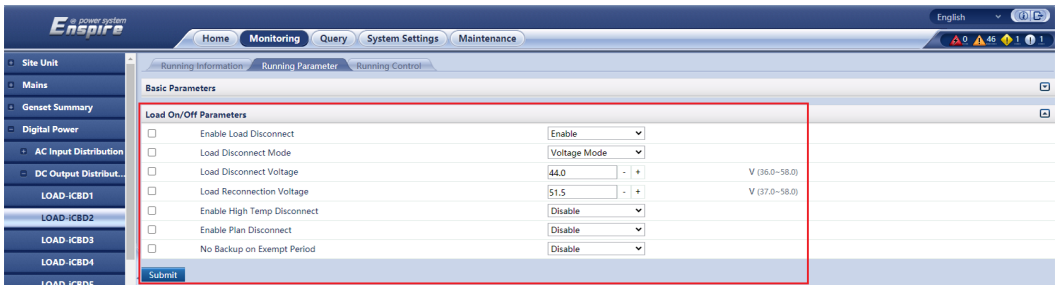
If branch usage is set to **Customized Load** or **BLVD Load**, you can set the user and load type.

Figure G-3 Setting basic branch parameters (using customized loads as an example)



Setting Customized Load Disconnection Parameters

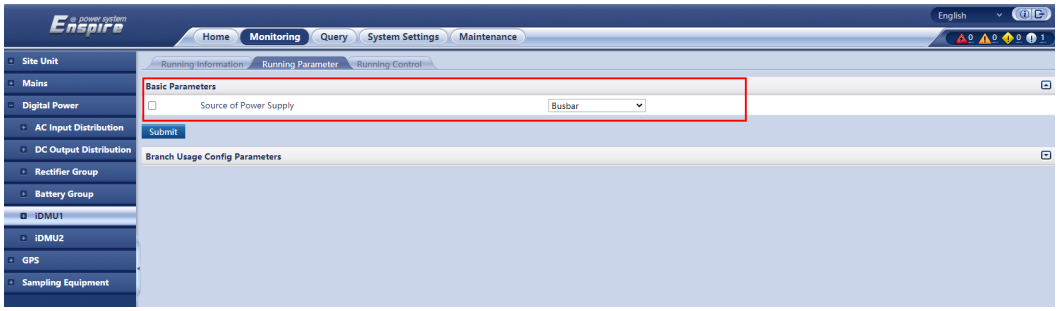
Figure G-4 Setting customized load disconnection parameters



H Remotely Managing an iDMU48-300B-17A

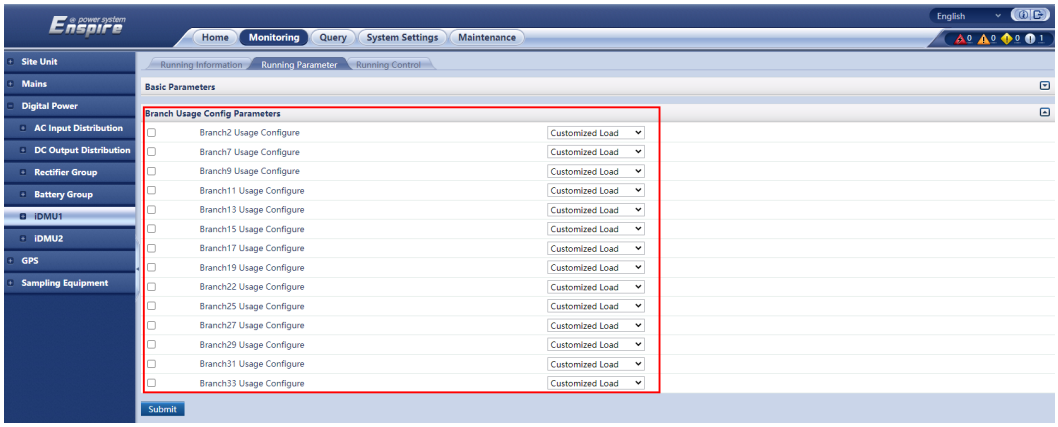
Setting the iDMU Power Source

Figure H-1 Setting the iDMU power source



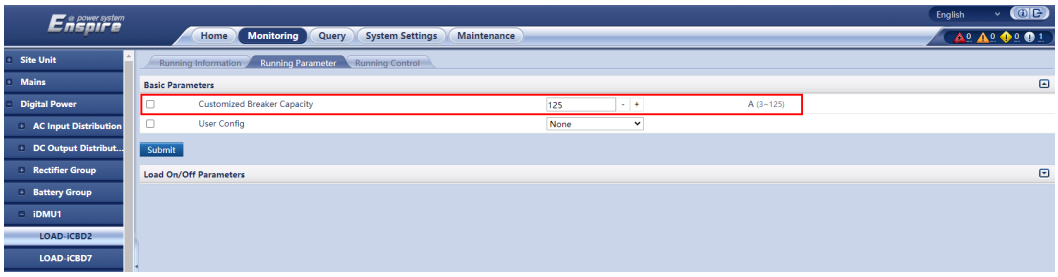
Setting the iDMU Circuit Breaker Usage

Figure H-2 Setting branch usage configuration parameters



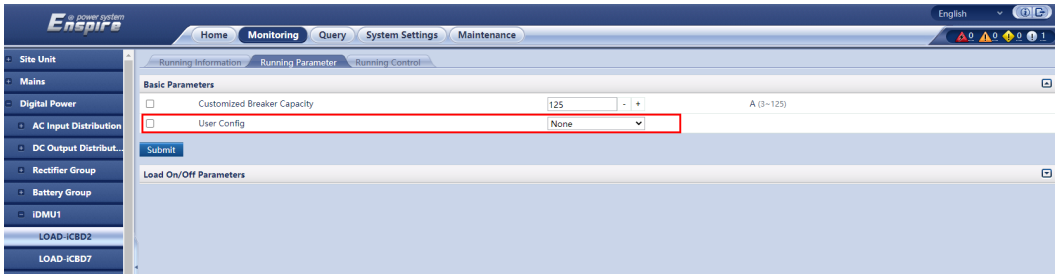
Setting the Circuit Breaker Capacity

Figure H-3 Setting the circuit breaker capacity (using a customized load as an example)



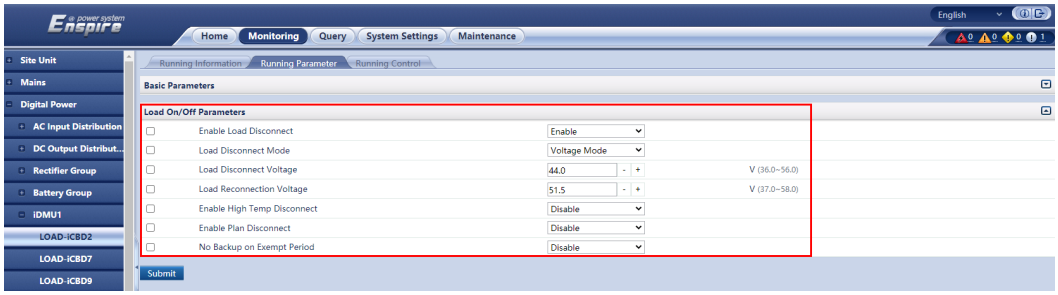
Setting the User Type for Customized Loads

Figure H-4 Setting the user type for customized loads



Setting Customized Load Disconnection Parameters

Figure H-5 Setting customized load disconnection parameters



I Acronyms and Abbreviations

B	
BLVD	battery low voltage disconnection
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
LLVD	load low voltage disconnection
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	
THD	total harmonic distortion
U	
UIM	user interface module

