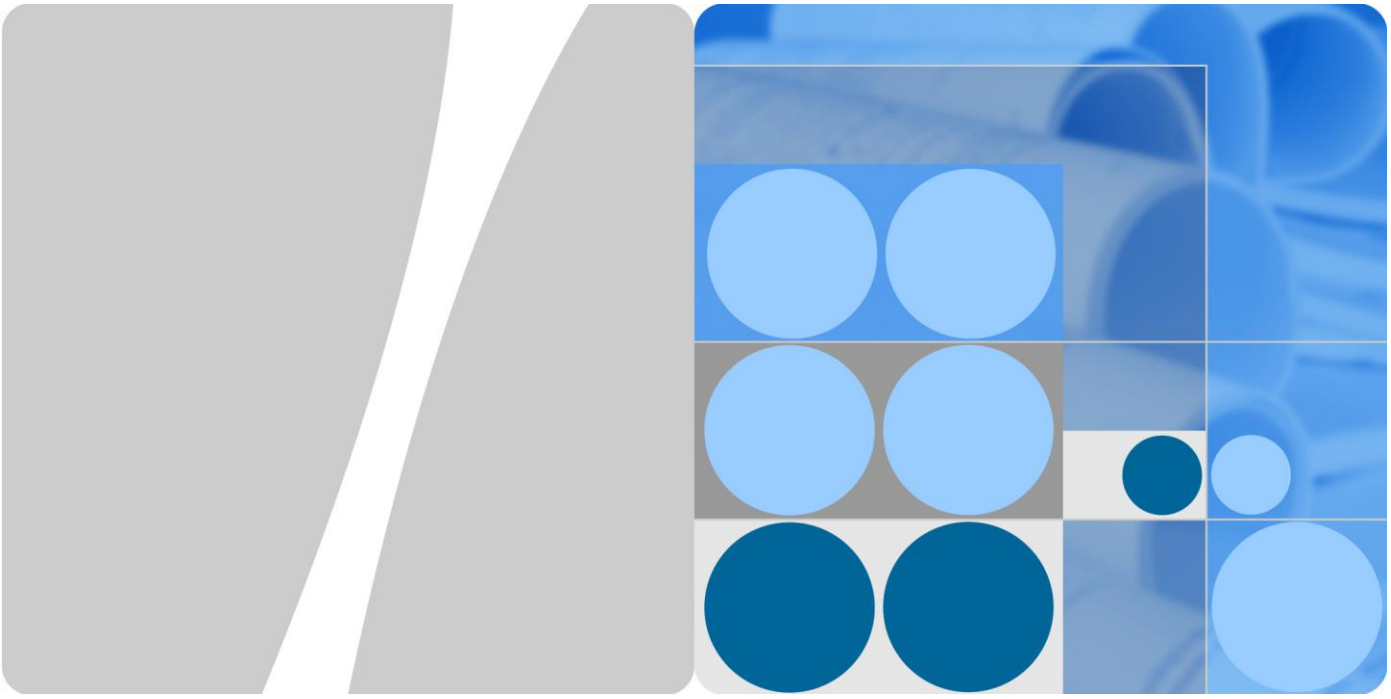

ETP48300-C6D2 Embedded Power

User Manual

Issue 06

Date 2020-04-07

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About This Document

Purpose

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

The figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Sales engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

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

Symbol	Description
	injury, equipment damage, and environment deterioration.

Change History

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

Issue 06 (2020-04-07)

Updated 6.7.1 (Optional) Setting Parameters Before Using WebUI.

Added the SNMPv1 and SNMPv2 protocol description.

Issue 05 (2019-08-30)

Deleted contents about the app.

Issue 04 (2019-02-28)

Optimized the content of the document.

Issue 03 (2015-02-02)

Chapter 4 Installation

Modified 4.7 Installing DC Output Power Cables.

Modified 4.9 Installing Battery Cables.

Added 4.10 (Optional) Installing Cables Between the DCDB and the Power Subrack.

Issue 02 (2014-08-20)

Modified all structural diagrams in the document.

Issue 01 (2013-11-26)

This issue is the first official release.

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. Huawei 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.

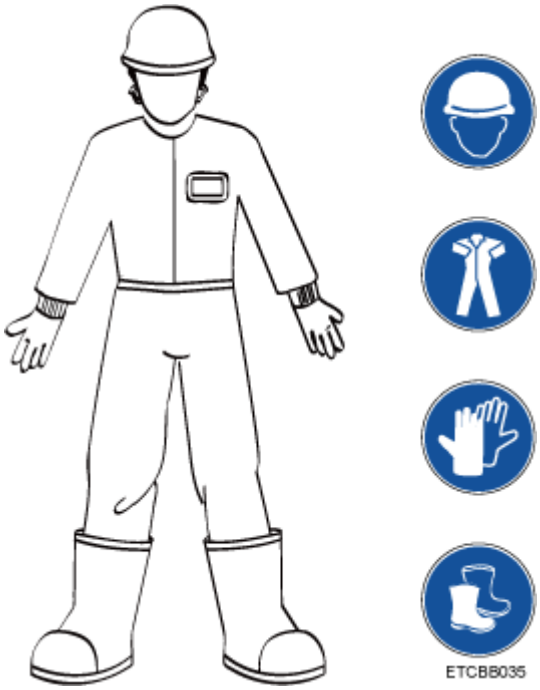
Huawei will not be liable for any consequences of the following circumstances:

- 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

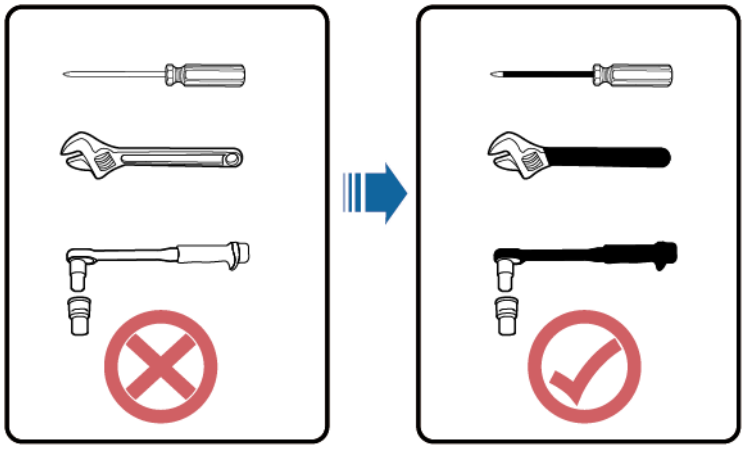
General Requirements

- 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.

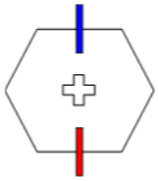
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.



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

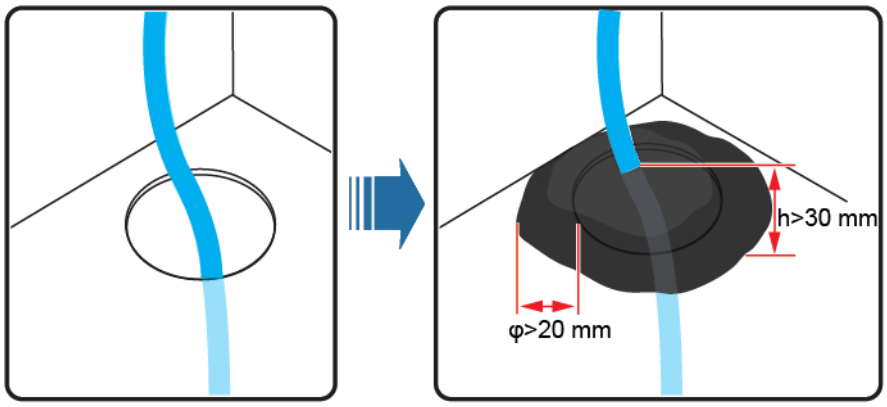


- Follow the specified procedures for installation, operation, and maintenance.
- Ensure that bolts are tightened with a torque wrench and marked using red or blue color. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm if the bolts are tightened and then mark 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 water, alcohol, oil, or other solvents to clean electrical components inside and outside 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 is fatal. Such areas include hazardous voltage points or protective power supply covers that 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.
	Indicates that the equipment is safe to use at altitudes below 2000 m (6561.6 ft.).
	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 	Indicates that users should refer to the instruction. This symbol is used when the usage of a device port cannot be clearly described. For example, 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 ports, use the symbol near the output ports. Connect cables according to the rated power output and configuration parameter information in the instruction. 3. If there are multiple slots, use the symbol near the slot

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

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, and 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.

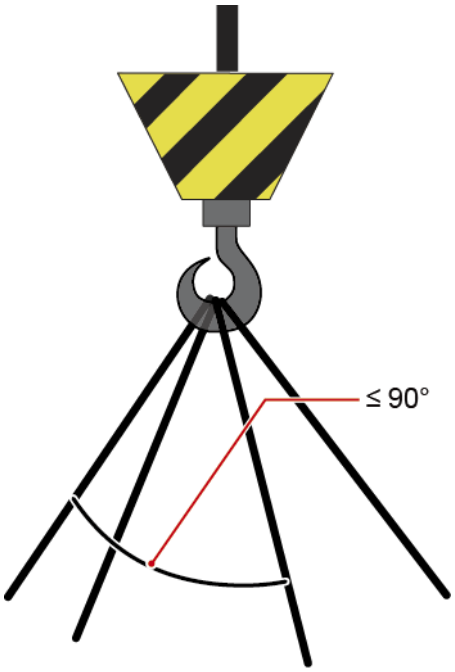
1.5 Mechanical Safety

Hoisting Devices

DANGER

Do not walk under hoisted objects.

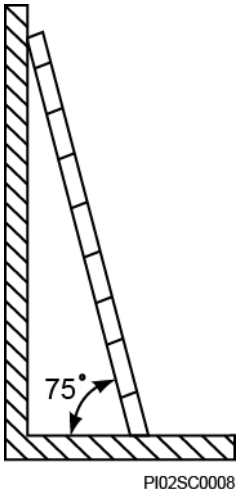
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables 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.

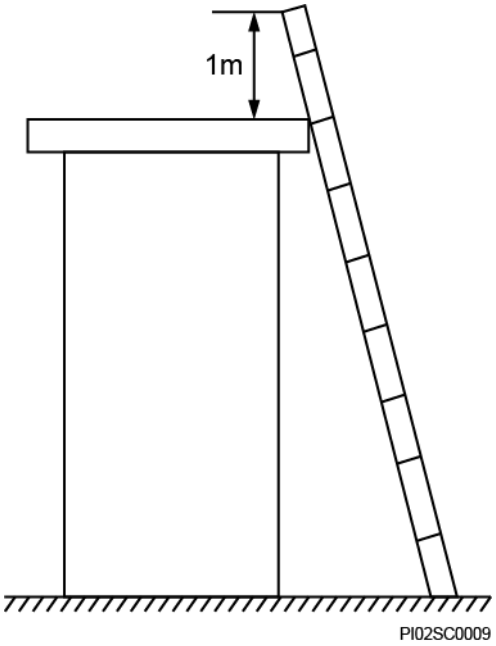
Using Ladders

- 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 rule 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:

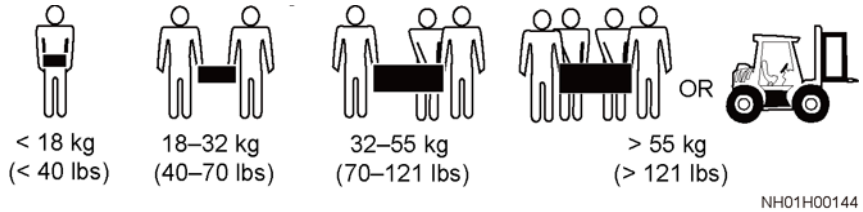
NOTICE

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. The safety precautions specified in this document are highly important precautions that require special attention. For additional safety precautions, see the 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 devices, such as sunlight, fire sources, transformers, and heaters. Excessive heat exposure may cause the batteries to explode.
- 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 prevent skin contact with electrolyte in the case of electrolyte overflow. If a battery leaks, 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 bolts 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.
- 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 spillage.

If the battery temperature exceeds 60°C, check for and promptly handle any leakage.

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 hurt human bodies.

If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate (NaHCO3) or sodium carbonate (Na2CO3).

Lithium Battery

The safety precautions for lithium batteries are similar to those for lead-acid batteries except that you also need to note the precautions described in this section.

⚠ WARNING

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

- 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 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 Overview

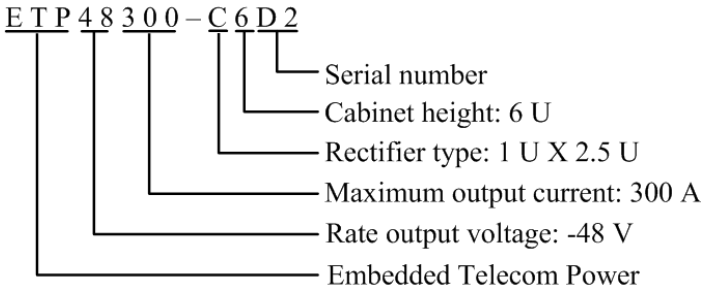
2.1 Introduction

The ETP48300-C6D2 is an embedded telecom power system and provides power for -48 V DC communications equipment with a maximum current of 300 A.

2.2 Model Number Description

Figure 2-1 shows the ETP48300-C6D2 model number description.

Figure 2-1 ETP48300-C6D2 model number description



2.3 System Features

- Rectifier voltage input range of 85 V AC to 300 V AC.
- Comprehensive battery management.
- Network application over a fast Ethernet (FE) port and an RS485/RS232 port.
- Communication with Huawei NetEco or third-party network management systems (NMSs) over protocols such as the Simple Network Management Protocol (SNMP) and Hypertext Transfer Protocol Secure (HTTPS) to enable remote management and unattended working.
- Remote software upgrade.
- Liquid crystal display (LCD) for display and operations.

- Web user interface (WebUI) for display and operations.
- Display in multiple optional languages, such as English, Chinese, Italian, French, Spanish, Portuguese, Russian, German, Turkish and Japanese.
- Hot swapping of rectifiers and the SMU.
- Rectifier power factor up to 0.99.
- A maximum of six lead-acid battery strings are supported in lead-acid battery scenario.
- A maximum of nine lithium battery strings are supported in lithium battery scenario.

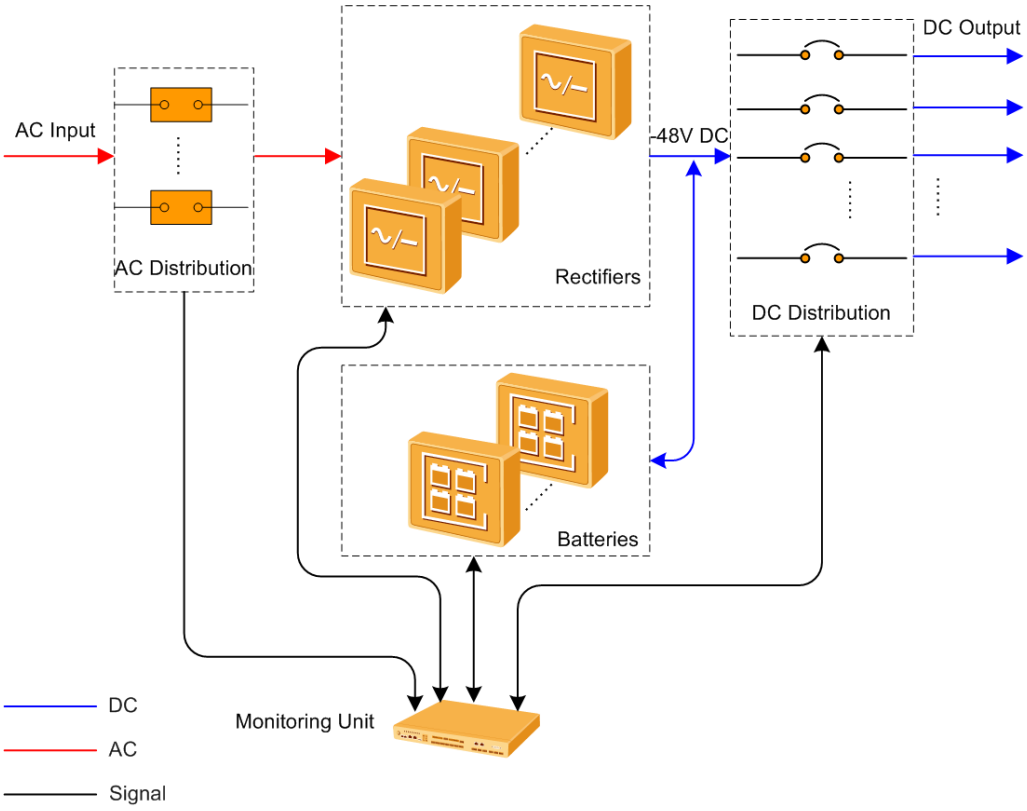
2.4 Working Principles

Figure 2-2 shows the conceptual diagram. AC power enters rectifiers through the AC power distribution unit (PDU). The rectifiers convert the AC power input into -48 V DC power output, which is directed by the DC PDU to DC loads along different routes.

When the AC power is normal, rectifiers power DC loads and charge batteries. When the AC power is absent, rectifiers stop working and batteries start to power loads. After the AC power resumes, rectifiers power DC loads and charge batteries again.

The SMU monitors the operating status of each component in the power system in real time and performs appropriate intelligent control. When detecting a fault, the SMU generates an alarm.

Figure 2-2 Conceptual diagram



2.5 Configurations

Table 2-1 describes the ETP48300-C6D2 configurations.

Table 2-1 ETP48300-C6D2 configurations

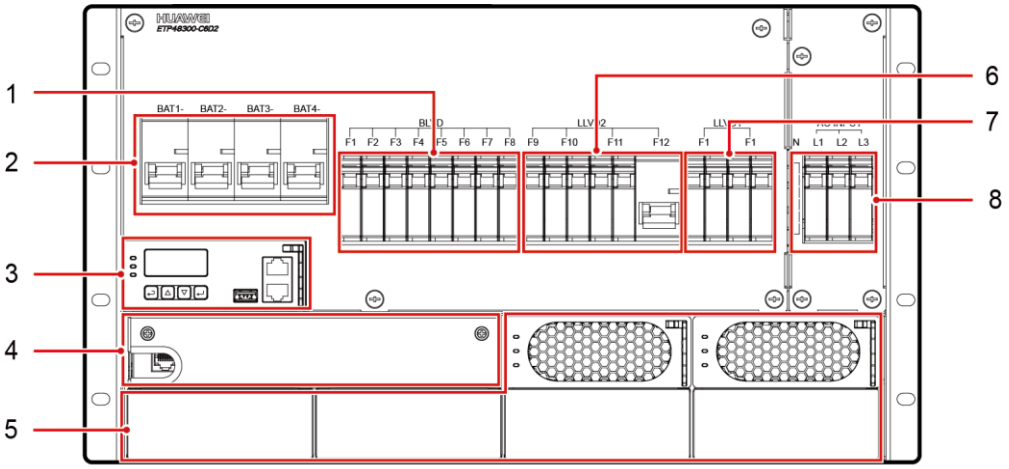
Item	Configurations
Subrack	• 2 U space for installing rectifiers • 4 U space for installing power distribution components
SMU	SMU02B
User interface module (UIM)	UIM02C
Rectifier	A maximum of six R4850G2s

3 Components

3.1 Appearance

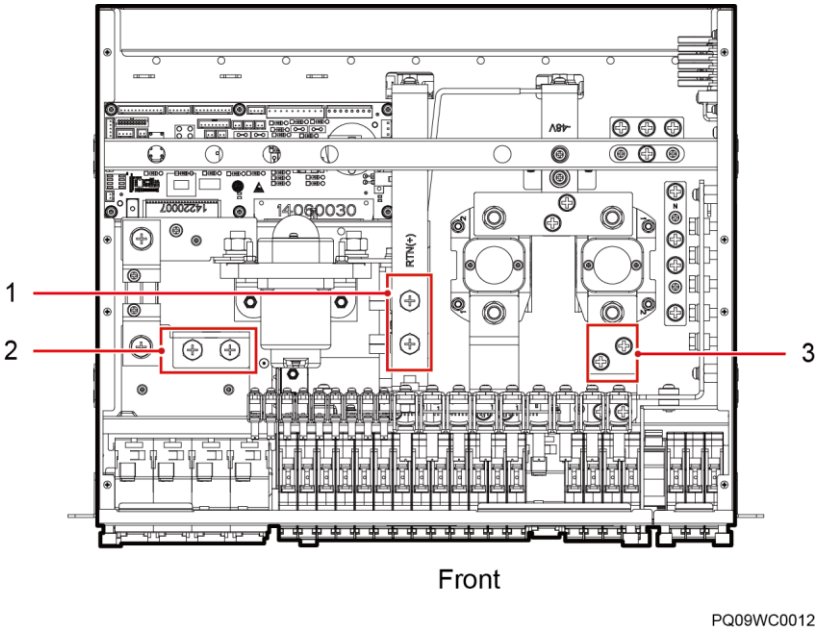
Figure 3-1 and Figure 3-2 show the appearance of ETP48300-C6D2.

Figure 3-1 Appearance of the ETP48300-C6D2 (front view)



(1) Battery low voltage disconnection (BLVD) circuit breakers	(2) Battery circuit breakers	(3) SMU02B
(4) UIM02C (behind the cover)	(5) Space for installing rectifiers	(6) Load low voltage disconnection (LLVD2) circuit breakers
(7) LLVD1 circuit breakers	(8) AC input circuit breaker and terminal	

Figure 3-2 Appearance of the ETP48300-C6D2 (top view without the top cover)



(1) RTN(+) wiring terminals (reserved)

(2) Negative battery terminals (reserved)

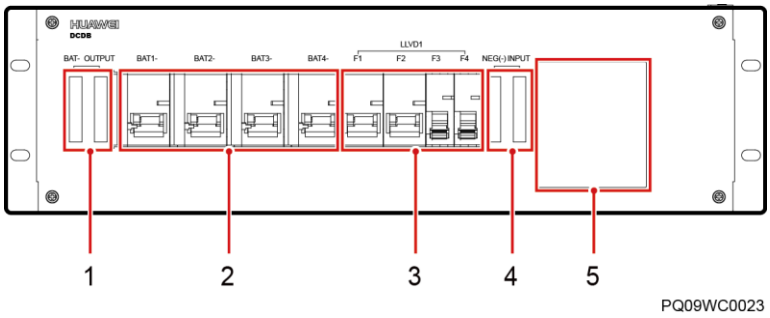
(3) Negative wiring terminals for LLVD1 (reserved)

NOTE

The reserved terminals shown in Figure 3-2 are used to connect battery cables and LLVD1 cables for a new DCDB.

DCDB

Figure 3-3 Appearance of the DCDB



(1) Negative battery wiring terminals

(2) Battery circuit breakers

(3) LLVD1 circuit breakers

(4) Negative load wiring terminals

(5) RTN+ busbar (behind the cover)

3.2 PDU

Table 3-1 describes the PDU specification of ETP48300-C6D2. Table 3-2 describes the specification of DCDB.

Table 3-1 PDU specification of the ETP48300-C6D2

Item	Specifications
Input system	220/380 V AC, three-phase, four-wire compatible with 220 V AC single-phase
AC input circuit breaker	One 3-pole 50 A
Load route	• BLVD circuit breakers: two 1-pole 32 A, two 1-pole 20 A, four 1-pole 10 A • LLVD1 circuit breakers: two 2-pole 100 A circuit breakers • LLVD2 circuit breakers: two 2-pole 100 A, one 1-pole 63 A, one 1-pole 125 A
Battery route	Four 1-pole 125 A circuit breakers
DC surge protection	Differential mode: 10 kA; common mode: 20 kA, 8/20μs

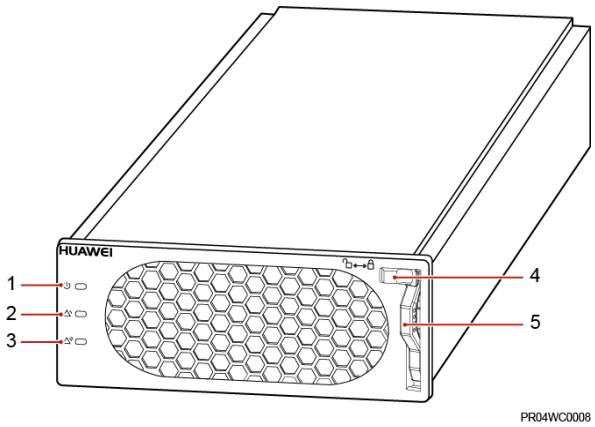
Table 3-2 Specification of the DCDB

Item	Specifications
Load route	Two 1-pole 100 A circuit breakers, two 1-pole 16 A circuit breakers
Battery route	Four 1-pole 125 A circuit breakers

3.3 Rectifier

Rectifiers convert AC input into stable DC output.

Figure 3-4 Rectifier



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

(4) Locking latch (5) Handle

Table 3-3 Rectifier indicator description

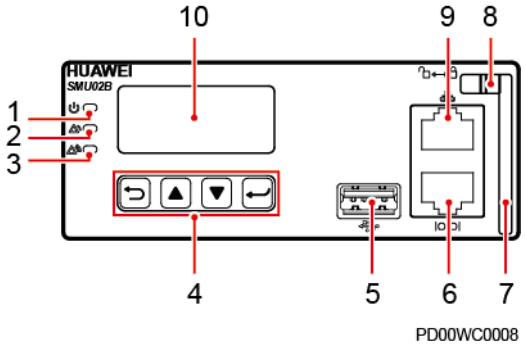
Indicator	Color	Status	Description
Run indicator	Green	Steady on	The rectifier has an AC power input.
		Off	The rectifier has no AC power input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4 Hz	The rectifier is loading an application program.
Alarm indicator	Yellow	Off	No alarm has been generated.
		Steady on	• The rectifier has generated an alarm due to ambient overtemperature. • The rectifier has generated an alarm for shutdown due to ambient overtemperature or undertemperature.
			The rectifier is protecting itself against AC input overvoltage or undervoltage.
			The rectifier is hibernating.
		Blinking at 0.5 Hz	The communication between the rectifier and the SMU has been interrupted.
Fault indicator	Red	Off	The rectifier is running properly.
		Steady on	The rectifier has been locked out due to

Indicator	Color	Status	Description
			output overvoltage.
			The rectifier has no output due to an internal fault.

3.4 SMU02B

Panel

Figure 3-5 SMU02B panel



(1) Run indicator
(2) Minor alarm indicator
(3) Major alarm indicator
(4) Buttons
(5) USB port (protected by a security mechanism)
(6) RS485/RS232 port
(7) Handle
(8) Locking latch
(9) Fast Ethernet (FE) port
(10) LCD

Indicators

Table 3-4 Indicator description

Name	Color	Status	Description
Run indicator	Green	Off	The SMU is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The SMU is running properly and communicating with the host properly.
		Blinking fast (4 Hz)	The SMU is running properly but fails to communicate with the host properly.

Name	Color	Status	Description
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 3-5 Button description

Button	Name	Description
	Up	Press **Up** and **Down** to scroll through the menus or to change the value of a parameter.
	Down	
	Cancel	Returns to the previous menu without saving the settings.
	Enter	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves menu settings on a submenu.

NOTE

- The LCD screen becomes dark if no button is pressed within 30 seconds.
- You need to log in again if no button is pressed within 1 minute.
- To increase or decrease a parameter value quickly, hold down  or  .
- To restart the SMU, hold down  and  for 10 seconds.
- To increase (or decrease) the LCD contrast ratio, hold down  and  (or ) for 2 seconds.

USB Ports

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

After installing the specific WiFi module using the USB port, you can access the WebUI locally, which facilitates operations.

NOTICE

Using WiFi modules provided by another vendor may cause data loss or function exception. Consequences arising from this will not be borne by Huawei.

Communications Ports

Table 3-6 Communication port description

Communications Port	Communications Parameter	Communications Protocol
FE	10/100M autonegotiation	HTTPS, NetEco protocol, SNMP and TCP-Modbus protocol
RS485/RS232	Baud rate: 1200bit/s, 2400bit/s, 4800bit/s, 9600bit/s, 14400bit/s, 19200bit/s, 115200bit/s	Master/slave protocol, YDN protocol, and Modbus protocol
NOTE All these ports are protected by a security mechanism.		

Figure 3-6 FE/RS485/RS232 port pins

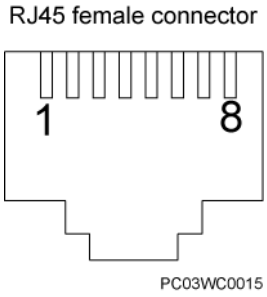


Table 3-7 Pin definitions for the FE port

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

Table 3-8 Pin definitions for the RS485/RS232 port

Pin	Signal	Description
1	TX+	Transmits data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Transmits data over RS232.
6	PGND	Connects to the ground.
8	NA	–

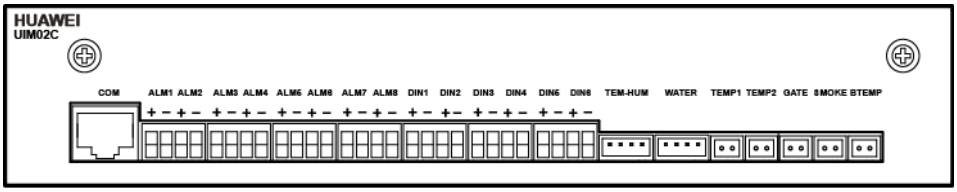
3.5 UIM02C

Panel

The user interface module (UIM02C) supports eight dry contact outputs, nine dry contact inputs (including universal DIN1-6, smoke, water, and door status), four analog parameter inputs (including temperature and humidity, ambient temperature, and battery temperature).

3.5 UIM02C shows a UIM02C panel.

Figure 3-7 UIM02C panel



Ports

Table 3-9 UIM02C ports

Port Type	Silk Screen	Description
Sensor port	TEM-HUM	Temperature and humidity sensor
	WATER	Water sensor
	TEMP1	Ambient temperature sensor 1
	TEMP2	Battery temperature sensor 2

Port Type	Silk Screen	Description
	GATE	Door status sensor
	SMOKE	Smoke sensor
	BTEMP	Battery temperature sensor 1
Dry contact input	DIN1	**NOTE** For the associations between the dry contact input ports and alarms, see the appendix.
	DIN2	
	DIN3	
	DIN4	
	DIN5	
	DIN6	
Dry contact output	ALM1	**NOTE** For the associations between the dry contact output ports and alarms, see the appendix.
	ALM2	
	ALM3	
	ALM4	
	ALM5	
	ALM6	
	ALM7	
	ALM8	
Communications port	COM	RS485 port

Communication Port

Table 3-10 COM communication port description

Communication Port	Communications Parameter	Communications Protocol	Function
COM port	Baud rate: 9600 bit/s, 19200 bit/s	M/S and Modbus protocol	Connects to lower-level devices such as the battery voltage detector, DC Air Conditioner.
NOTE The COM port supports the security mechanism.			

Figure 3-8 Pins in the COM port

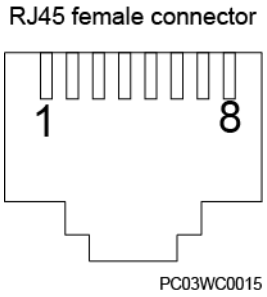


Table 3-11 Pin definitions for the COM port

Pin	Signal	Description
1	RX+	Receives data over RS485.
2	RX-	
4	TX+	Sends data over RS485.
5	TX-	
6	PGND	Connects to the ground.
3, 7, 8	None	N/A

Pins

Figure 3-9 shows the pin numbers of the sensor ports. Table 3-12 defines the pins.

Figure 3-9 UIM02C pin numbers

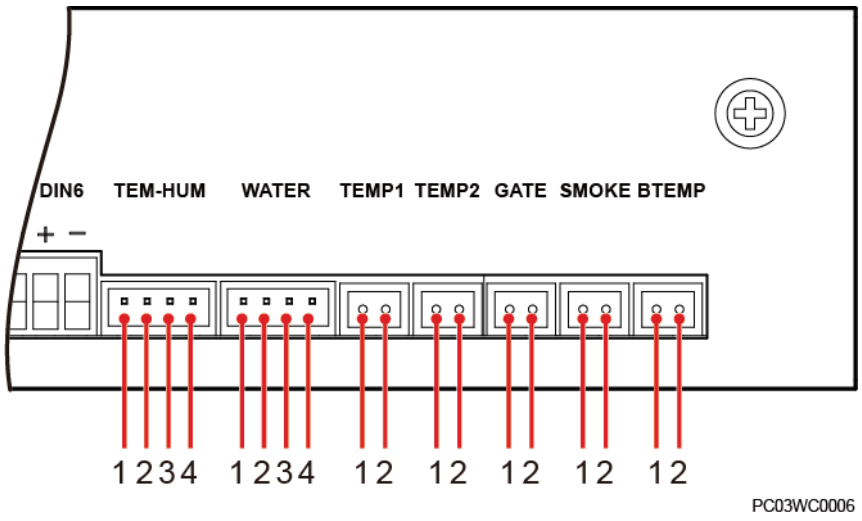


Table 3-12 UIM02C pin definitions

Silkscreen	No.	Pin Definitions
TEM-HUM	1	12 V
	2	ENV_TEMP
	3	12 V
	4	ENV_HUM
WATER	1	12 V
	2	WATER
	3	GND
	4	Not defined
TEMP1	1	GND
	2	TEMP1
TEMP2	1	GND
	2	TEMP2
GATE	1	GATE+
	2	GATE-
SMOKE	1	SMOKE
	2	12 V
BTEMP	1	GND
	2	BTEMP1

4 Installation

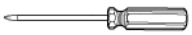
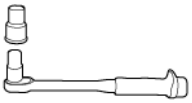
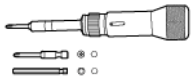
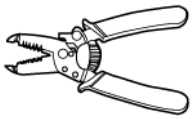
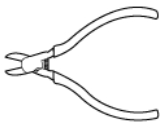
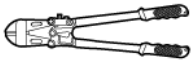
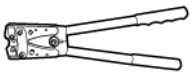
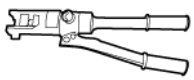
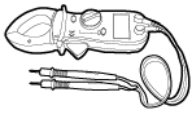
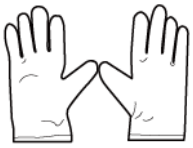
4.1 Installation Preparations

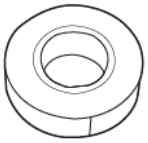
4.1.1 Tools

NOTICE

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

Table 4-1 Installation tools and instruments

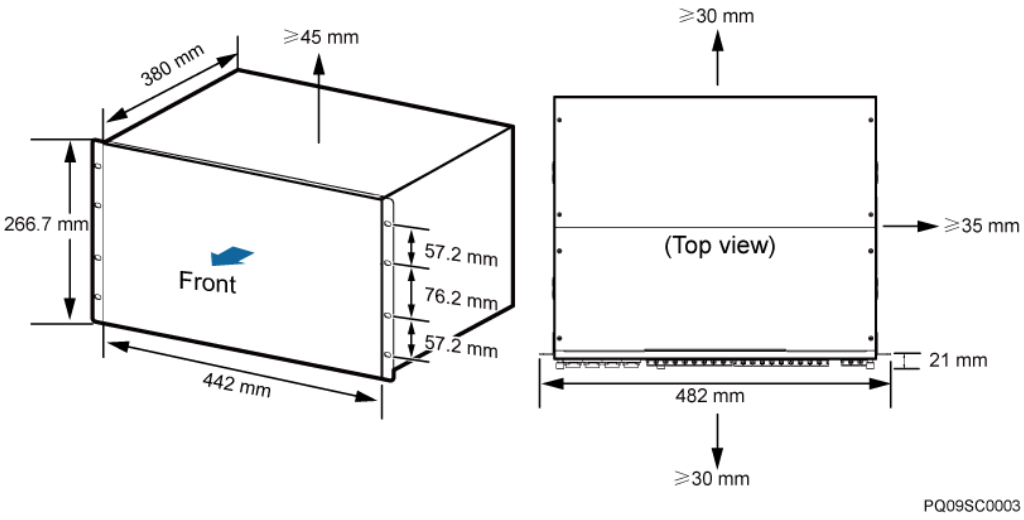
 Utility knife	 Marker	 Phillips screwdriver	 Flat-head screwdriver	 Torque wrench
 Combination wrench	 Adjustable wrench	 Socket wrench	 Torque screwdriver	 Wire stripper
 Diagonal pliers	 Wire clippers	 Power cable crimping tool	 Hydraulic pliers	 Heat gun
 Clamp meter	 ESD wrist strap	 ESD gloves	 Protective gloves	 Steel measuring tape

 Heat shrink tubing	 PVC insulation tape			

4.1.2 Installation Dimensions

Figure 4-1 shows the installation dimensions.

Figure 4-1 Installation dimensions



NOTE

(21 mm): indicates that the distance between the installation plane of power subrack mounting ear and the front of the subrack is about 21 mm.

4.1.3 Requirements for Cable Routing

- Ensure that cables are more than 20 mm away from heat sources to prevent damage (melting, aging, or breakage) to the cable insulation layer.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- Route and bind ground cables and signal cables separately.
- Route and bind AC power cables, DC power cables, signal cables, and communications cables separately.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.

4.1.4 Unpacking and Acceptance

Procedure

Step 1 Check whether the packing cases are intact. If a packing case is severely damaged or wet, identify the cause and report the issue to your local Huawei office.

Step 2 Unpack the cases.

Step 3 Check the quantity of components against the packing lists attached to the packing cases. If the quantity differs from that specified on the packing lists, identify the cause and report the issue to your local Huawei office.

----End

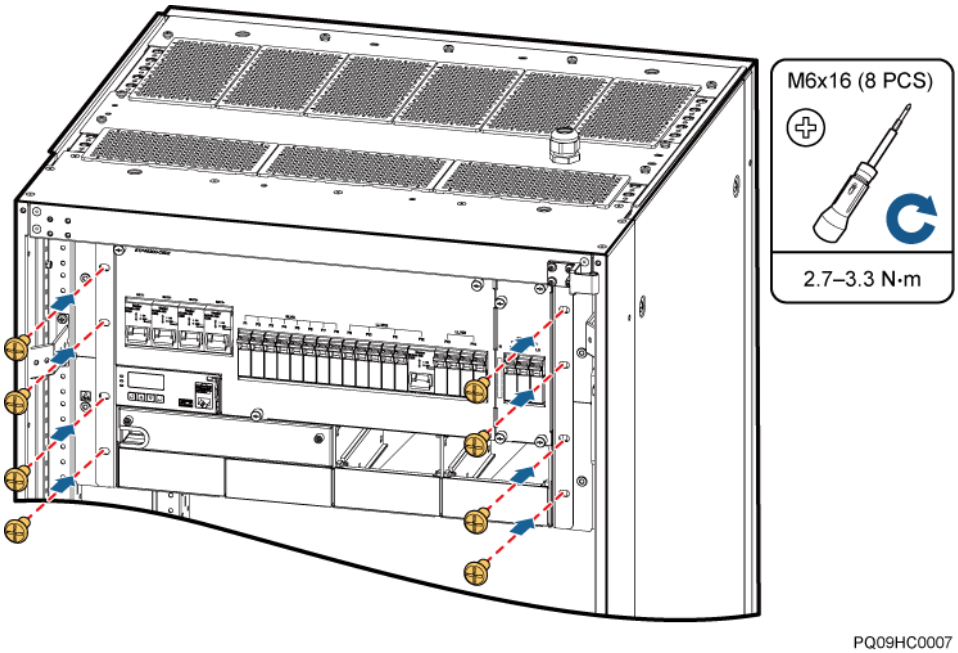
4.2 Installing a Subrack

Procedure

Step 1 Remove the top cover from the subrack.

Step 2 Install the subrack to a 19-inch rack.

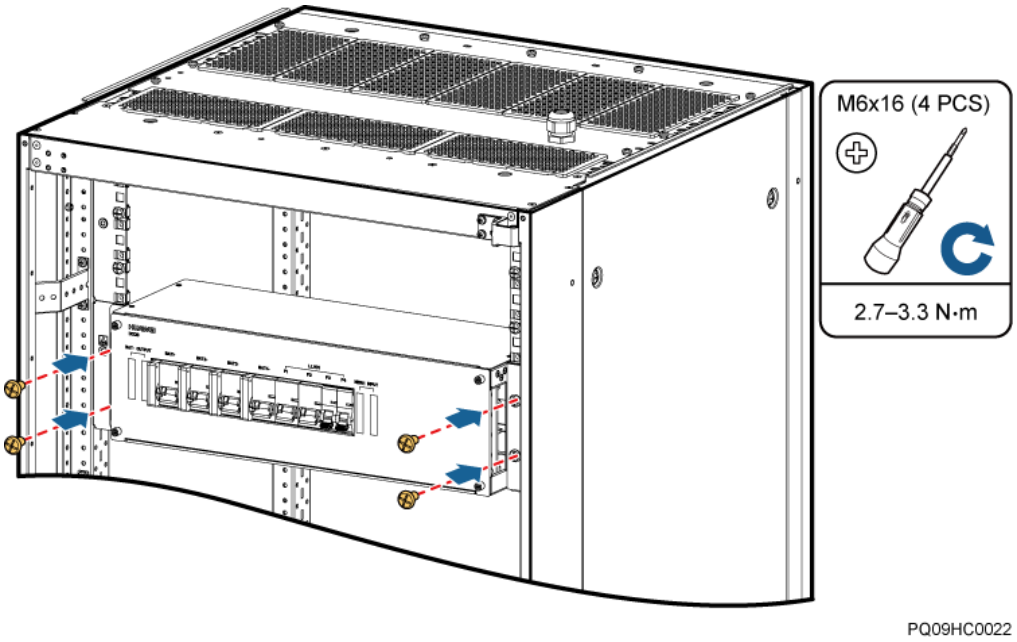
Figure 4-2 Installing a subrack



Step 3 Remove the top cover from the DCDB.

Step 4 Install the DCDB to a 19-inch rack.

Figure 4-3 Installing a DCDB



----End

4.3 Installing a Rectifier

Prerequisites

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

NOTICE

- If the rectifier is damaged, contact your local Huawei office.
- The rectifier slot presents a risk of electric shock. Do not touch the slot with your hands.
- High temperature is generated around the air exhaust vent when the rectifier is running. Do not touch the vent with your hands or cover the vent with cables or other objects.

Procedure

Step 1 Push the locking latch towards the left.

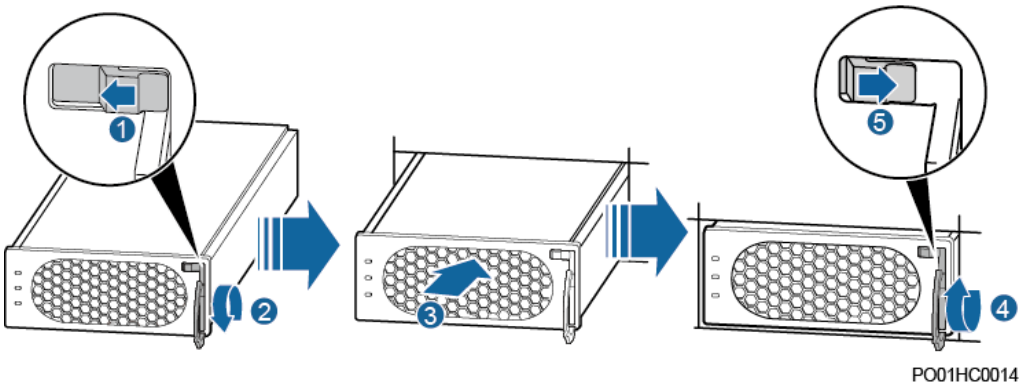
Step 2 Draw the handle downwards.

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

Step 4 Push the handle upwards.

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

Figure 4-4 Installing a rectifier



----End

4.4 Installing a Subrack RTN+ Ground Cable

Context

One end of the RTN+ ground cable has been connected to the subrack, and the other end bound to the beam on the top of the subrack.

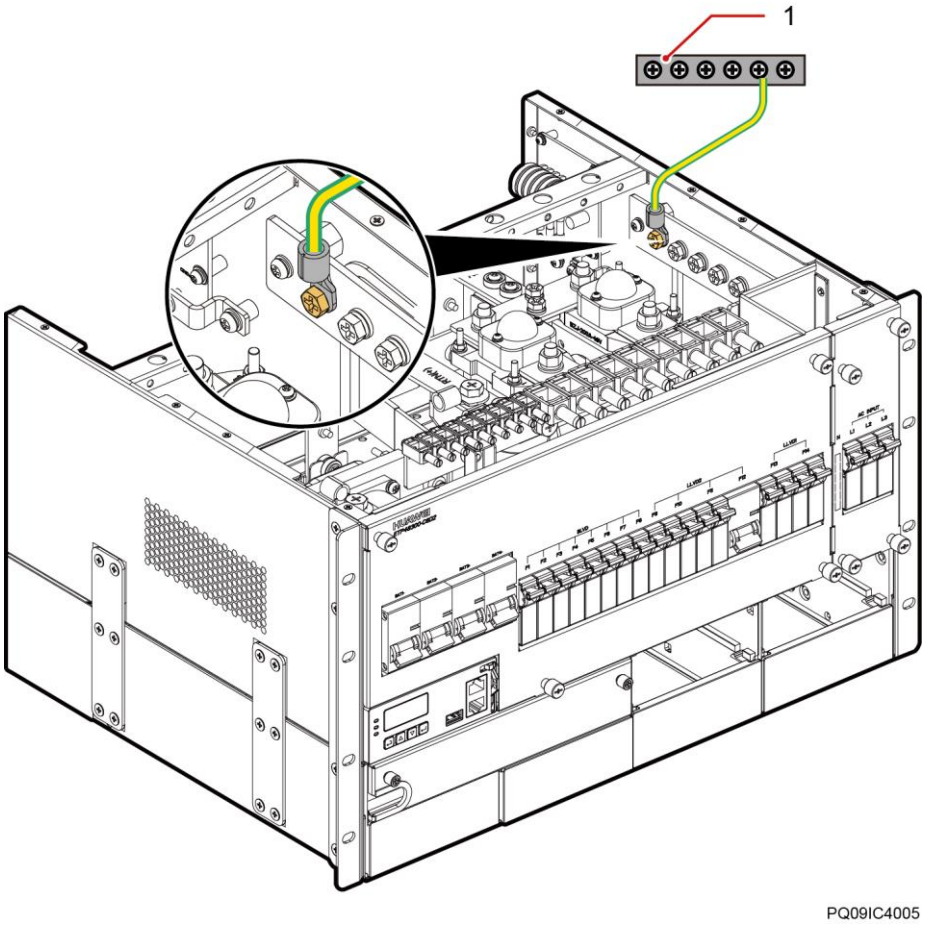
Procedure

Step 1 Locate the ground cable bound to the beam on the top of the subrack.

Step 2 Secure the other end of the ground cable to the cabinet ground bar.

> **CAUTION**
>
> Ensure that the ground cable is installed securely. If devices are not properly grounded, damage to devices or human injuries may occur.

Figure 4-5 Installing the subrack RTN+ ground cable



(1) Cabinet ground bar

----End

4.5 (Optional) Installing Dry Contact Signal Cables

Procedure

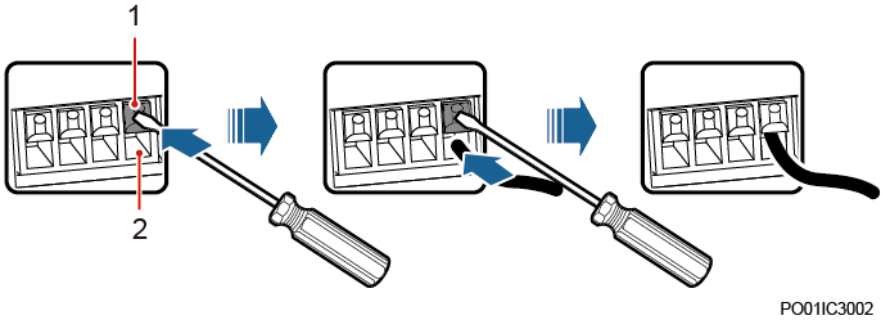
Step 1 Remove the cover from the UIM02C.

Step 2 Press the contact plate using a flat-head screwdriver to flip the metal spring inside each dry contact.

Step 3 Connect the signal cables to the corresponding dry contacts.

Step 4 Put away the flat-head screwdriver and check that the signal cables are securely connected.

Figure 4-6 Installing a dry contact signal cable



(1) Contact plate (2) Dry contact port

----End

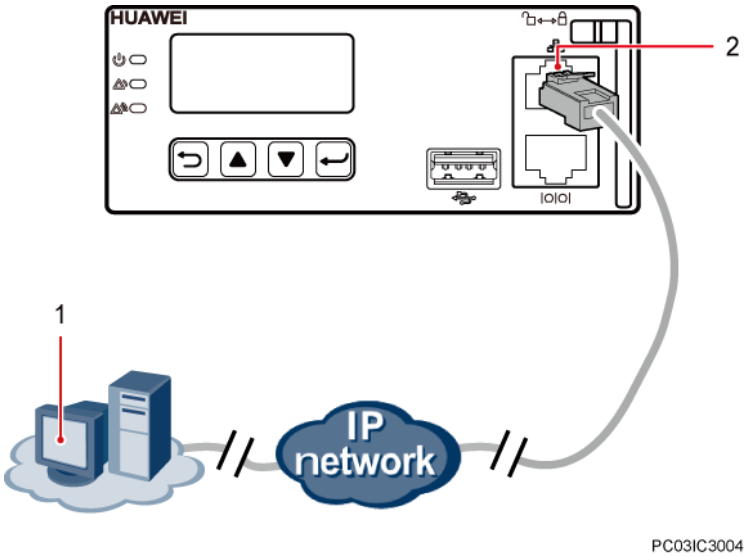
4.6 (Optional) Installing Communications Cables

4.6.1 WebUI Management

Procedure

Step 1 Connect the FE port on the site monitoring unit (SMU) by using a network cable, as shown in Figure 4-7.

Figure 4-7 Connecting a communications cable (for WebUI management)



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

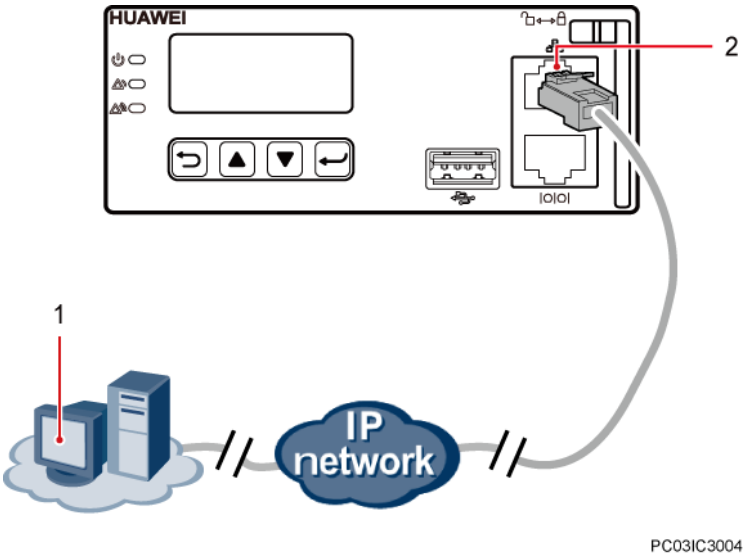
----End

4.6.2 NetEco Management

Networking Mode 1: FE Port

Step 1 Connect the FE port on the SMU by using a network cable, as shown in Figure 4-8.

Figure 4-8 Connecting a communications cable (over the FE port)



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

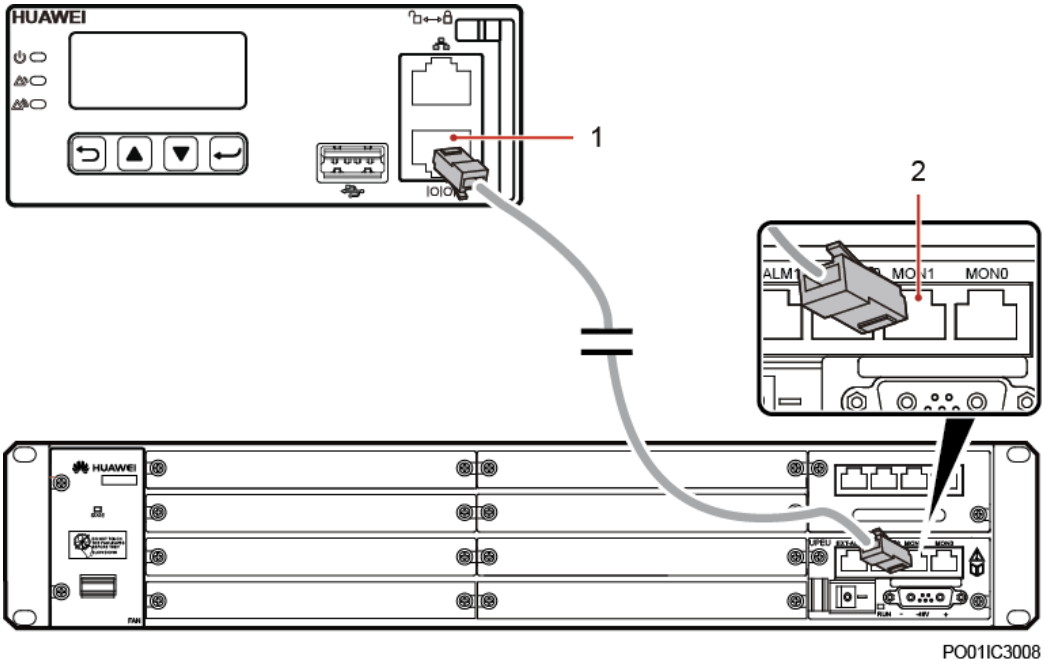
----End

Networking Mode 2: RS485 Port

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

Step 2 Connect the other end to the MON1 port on the BBU, as shown in Figure 4-9.

Figure 4-9 Connecting a communications cable (over the RS485 port)



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

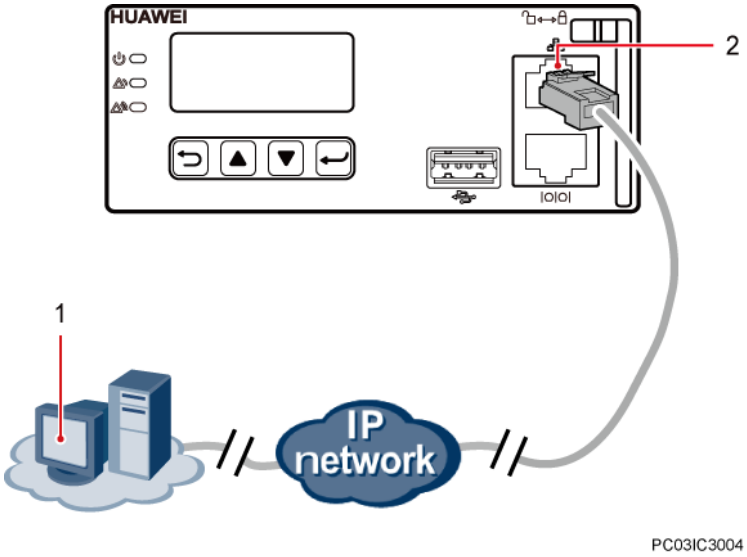
----End

4.6.3 Third-Party NMS Management (over SNMP)

Procedure

Step 1 Connect the FE port on the SMU by using a network cable, as shown in Figure 4-10.

Figure 4-10 Connecting a communications cable (over SNMP)



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

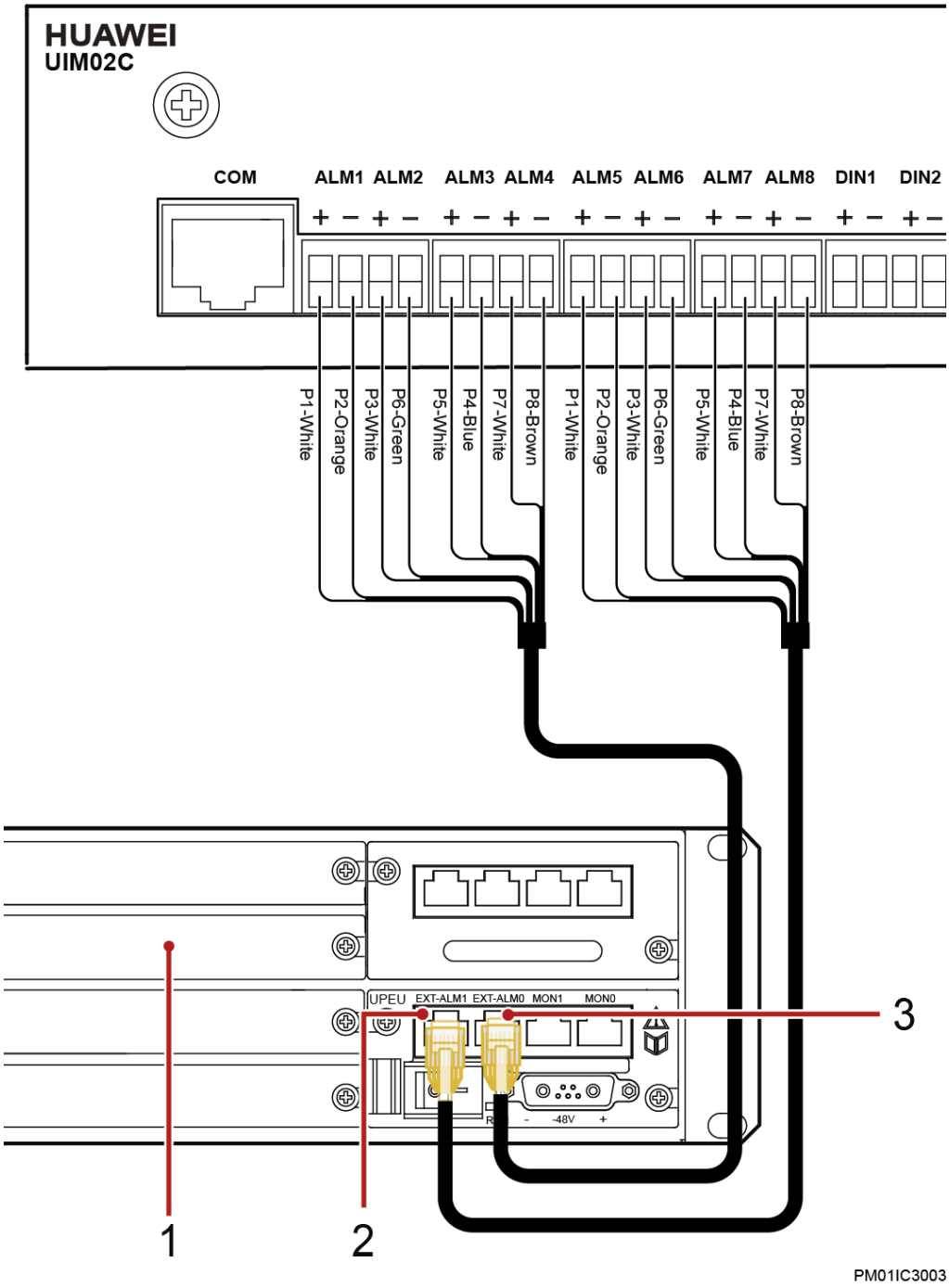
----End

4.6.4 Connecting to Huawei BBU (over Dry Contacts, M2000 Management)

Procedure

Step 1 Alarm signals are sent over dry contacts. Connect the dry contact signal cable to the EXT-ALM port on the BBU, as shown in Figure 4-11.

Figure 4-11 Connecting the UIM02C and the BBU



(1) BBU (2) EXT-ALM1 port (3) EXT-ALM0 port

NOTE

- In the SRAN site based on the BSC6900, the external alarm port number scope of the two slots is 0 to 7.
- In the non-SRAN site based on the BSC6900, the scope is 0 to 15.

- In the non-SRAN site based on the BSC6000, the scope is 1 to 16.

----End

4.7 Installing DC Output Power Cables

DANGER

- Ensure that the upstream AC input circuit breaker is OFF, and attach labels such as "No operations allowed."
- Switch off all circuit breakers before installing power cables.

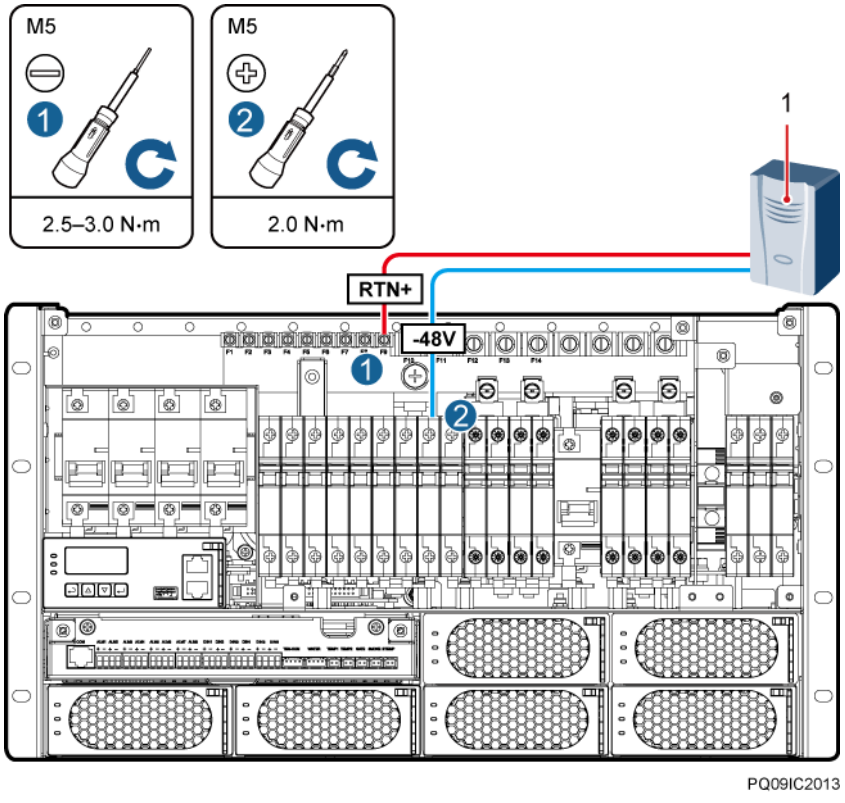
Installing DC Output Power Cables for Subrack

Step 1 Remove the cover from the PDU.

Step 2 Secure the negative DC output cable to the DC output circuit breaker based on the actual loads.

Step 3 Secure the positive DC output cable to the corresponding screw on the RTN+ busbar.

Figure 4-12 Installing DC output power cables for subrack



(1) Load

----End

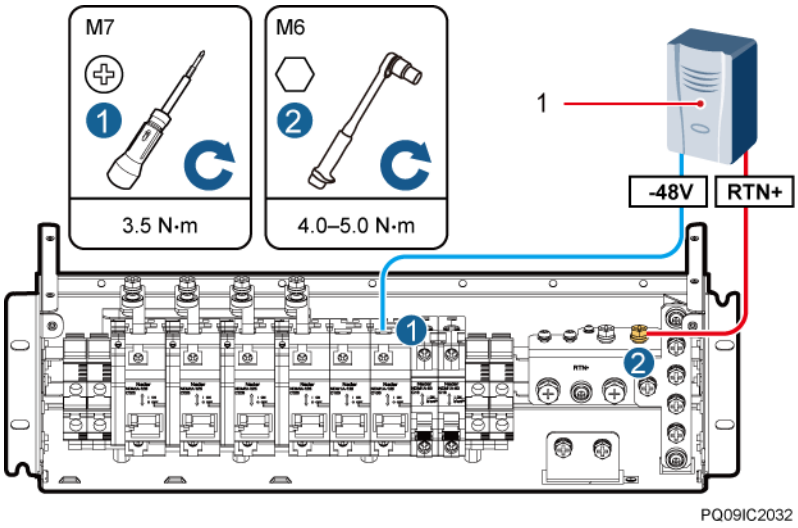
(Optional) Installing DC Output Power Cables for DCDB

Step 1 Remove the front cover from the DCDB.

Step 2 Secure the negative DC output cable to the DC output circuit breaker based on the actual loads.

Step 3 Secure the positive DC output cable to the corresponding screw on the RTN+ busbar.

Figure 4-13 Installing DC output power cables for DCDB



(1) Load

----End

4.8 Installing Battery Middle Point Voltage Monitoring Cables

Context

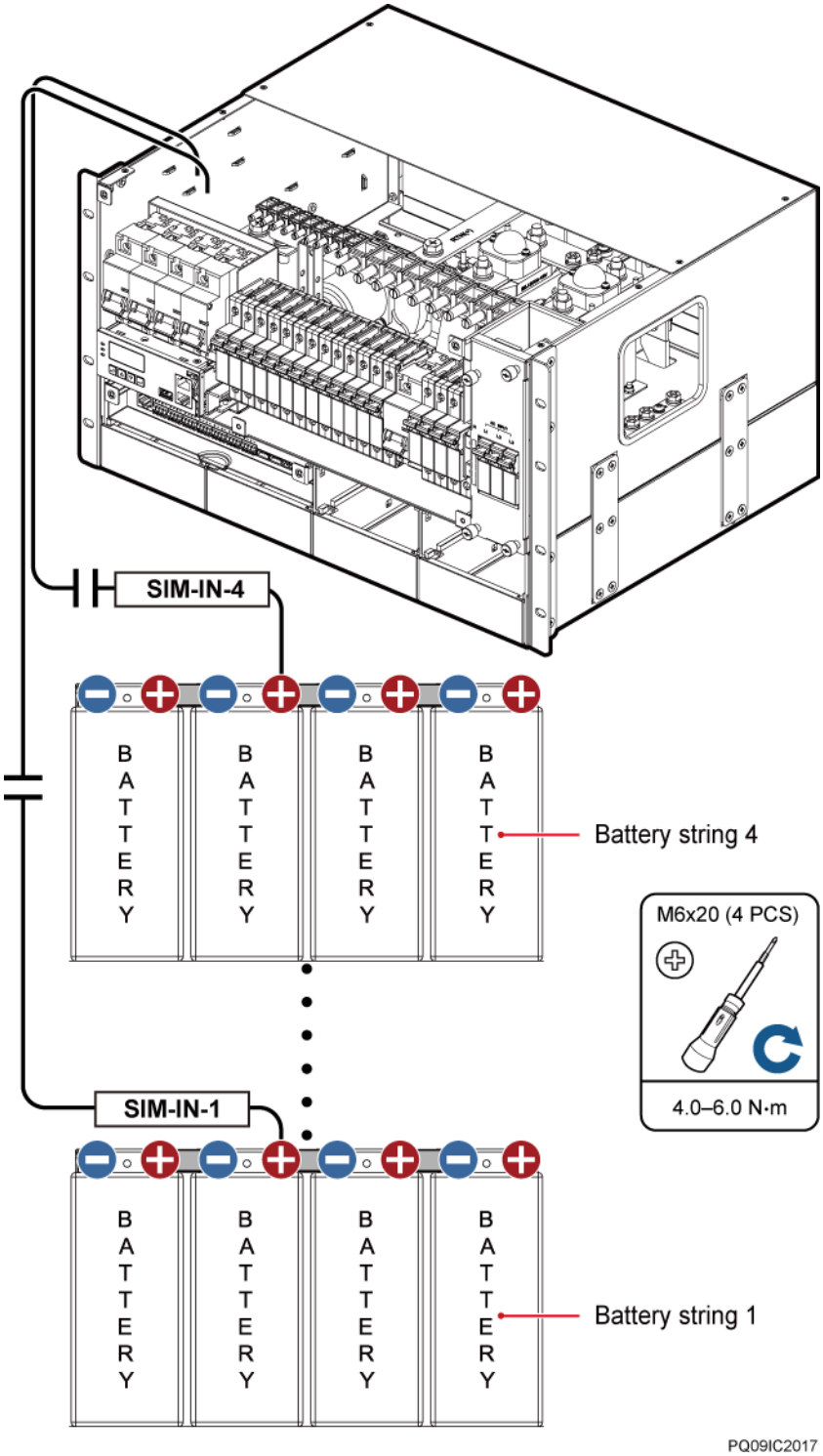
The subrack reserves eight battery middle point voltage monitoring cables. One end of the cables has been connected to the subrack. This section uses four battery strings as an example. Connect the middle point voltage monitoring cables to the corresponding battery strings according to label numbers (SIM-IN-1, SIM-IN-2, SIM-IN-3, SIM-IN-4). If eight battery strings are installed, connect the other four middle point voltage monitoring cables to the corresponding battery strings according to label numbers (SIM-OUT-1, SIM-OUT-2, SIM-OUT-3, SIM-OUT-4).

Procedure

Step 1 Locate the battery middle point voltage monitoring cables bound to the left side of the subrack.

Step 2 Connect the cables to the middle point voltage monitoring terminals on the corresponding battery strings according to label numbers.

Figure 4-14 Installing battery middle point voltage monitoring cables



----End

4.9 Installing Battery Cables

DANGER

- Smoking and sparks are prohibited near batteries.
- Switch off battery circuit breakers before installing batteries.
- Comply with regulations and warnings of the battery manufacturer.
- Use tools with insulated handles, otherwise, batteries may be burnt out and personal injury may occur.
- During battery operations, wear goggles, rubber gloves, and protective clothes. Remove conductive articles such as watches, bracelets, and rings.
- If battery acid gets in the eyes, rinse with cold water for more than 15 minutes and seek media advice immediately. If battery acid contacts skin or clothing, wash with soap and water immediately.
- Do not use metal to simultaneously contact two or more battery terminals. Do not use metal to simultaneously touch battery terminals and grounded objects (for example, battery compartment); otherwise, transient short circuit occurs, which produces sparks or explosion.
- During battery installation, never short-circuit or reversely connect positive and negative battery terminals. Connect the negative battery cable before the positive battery cable.
- Secure battery cables to a torque specified in battery documentation. Loose connections will result in excessive voltage drop or cause batteries to burn out when the current is large.

Installing Battery Cables for Subrack

Step 1 Connect negative battery cables for battery strings 1–4 to the corresponding battery circuit breakers.

Step 2 Connect positive battery cables for battery strings 1–4 to the RTN+ busbar.

Battery cables are connected in the same way. The following figure shows how to connect battery cables for one battery string.

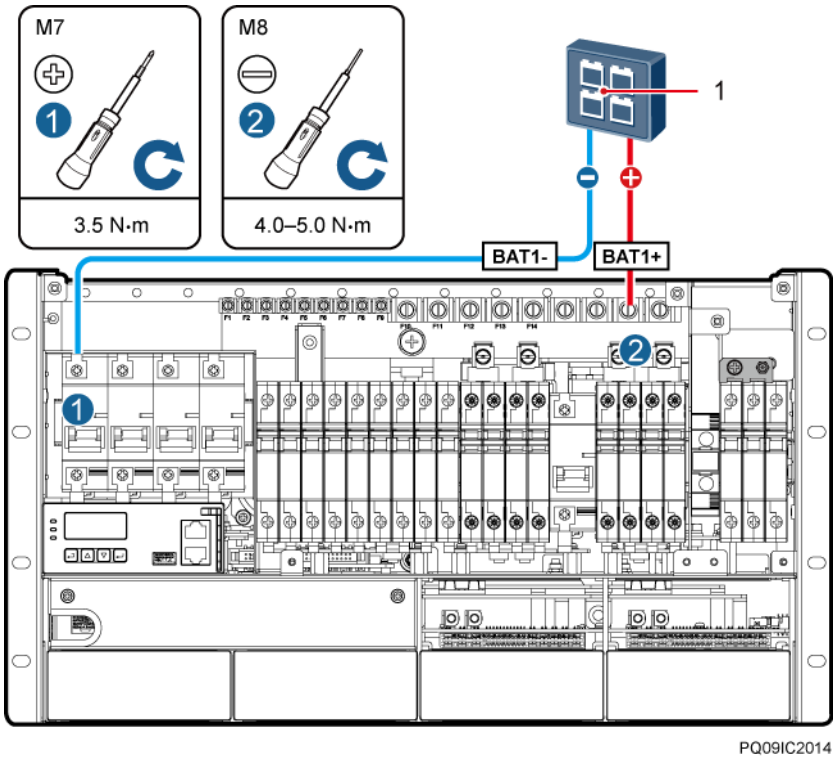
NOTE

More than four battery strings connected in parallel are not recommended. If necessary, contact battery experts for assessment.

NOTICE

When only one battery string is required, connect it to the place numbered 1, as shown in Figure 4-15. Otherwise, the battery current cannot be measured.

Figure 4-15 Installing battery cables for subrack



(1) Battery string 1

----End

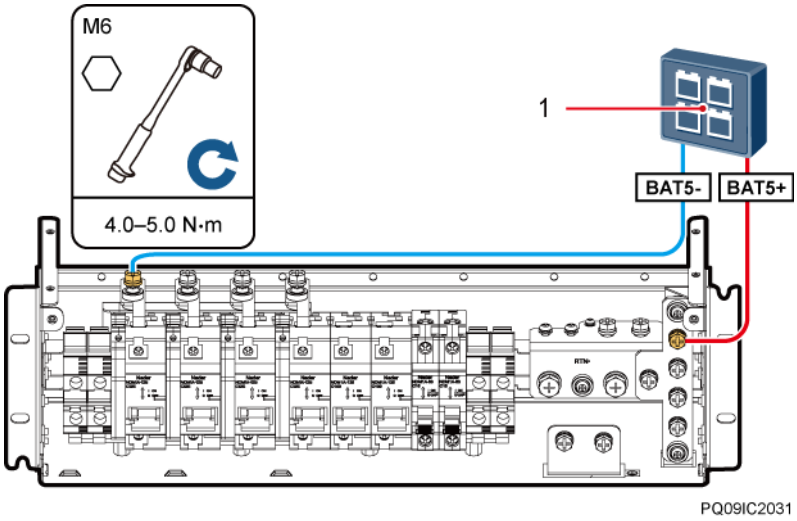
(Optional) Installing Battery Cables for DCDB

Step 1 Connect negative battery cables for battery strings 5–8 to the corresponding battery circuit breakers.

Step 2 Connect positive battery cables for battery strings 5–8 to the RTN+ busbar.

Battery cables are connected in the same way. The following figure shows how to connect battery cables for one battery string.

Figure 4-16 Installing battery cables for DCDB



(1) Battery string 5

----End

4.10 (Optional) Installing Cables Between the DCDB and the Power Subrack

DANGER

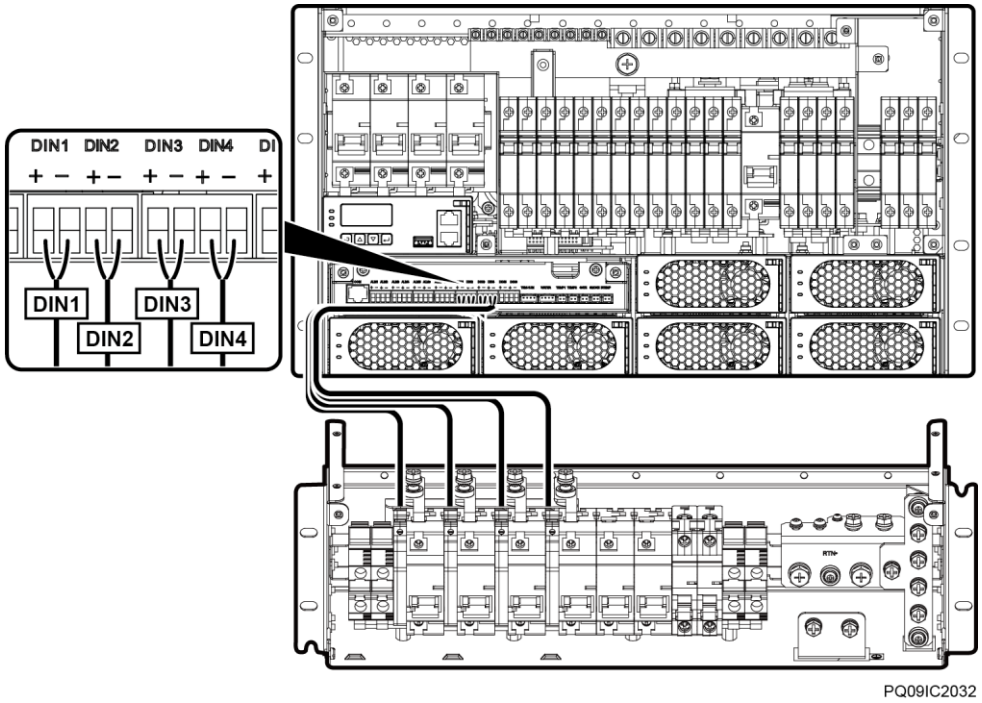
- Ensure that the upstream AC input circuit breaker is OFF, and attach labels such as "No operations allowed."
- Switch off all circuit breakers before installing power cables.

Installing Battery Circuit Breaker Detection Cables for the DCDB

One end of DCDB battery circuit breaker detection cables have been connected to the auxiliary contacts of DCDB battery circuit breakers.

Step 1 Locate the DCDB battery circuit breaker detection cables and connect the other end of the cables to the corresponding ports on the UIM02C in the power subrack based on the silk screen information.

Figure 4-17 Installing battery circuit breaker detection cables for the DCDB



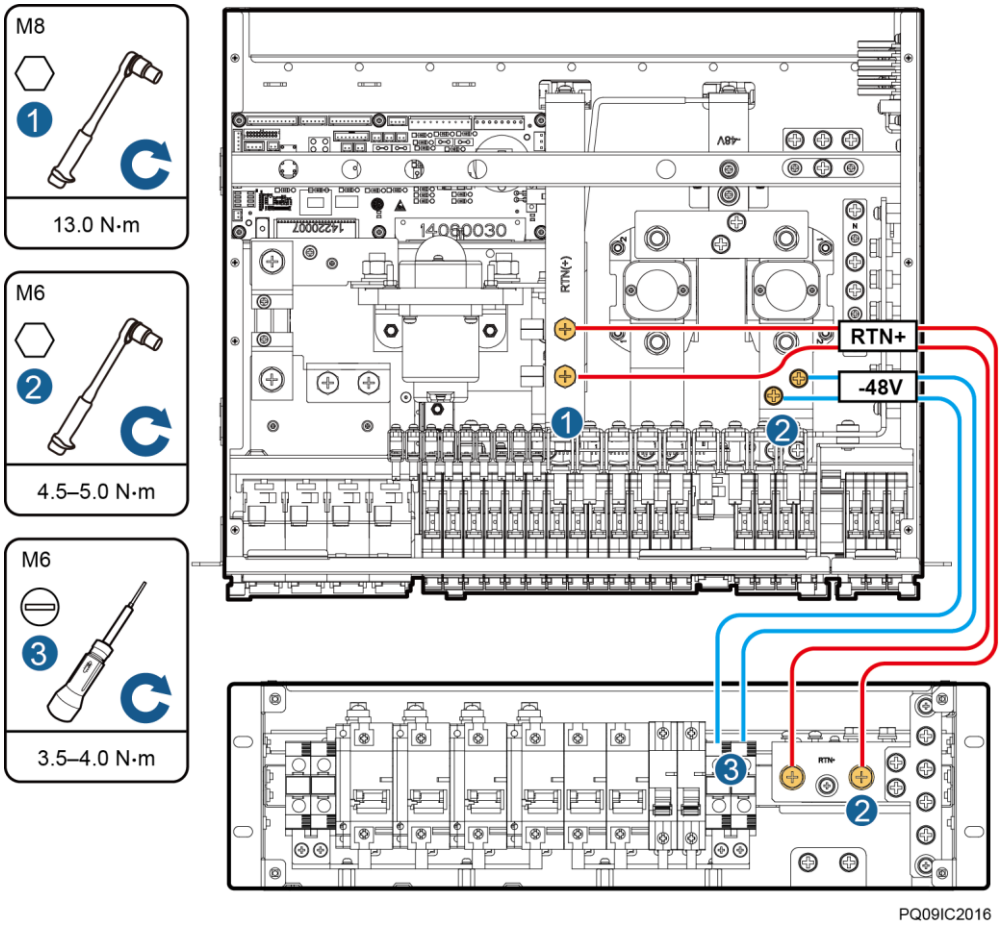
----End

(Optional) Installing DC Input Power Cables for DCDB

Step 1 Secure one end of the negative DC input power cables to the reserved negative wiring terminals for loads on the subrack, and the other end to the negative load wiring terminals on the DCDB.

Step 2 Secure one end of positive DC input power cables to the reserved RTN+ wiring terminals on the subrack, and the other end to the corresponding wiring terminals on the RTN+ busbar on the DCDB.

Figure 4-18 Installing DC input power cables for DCDB



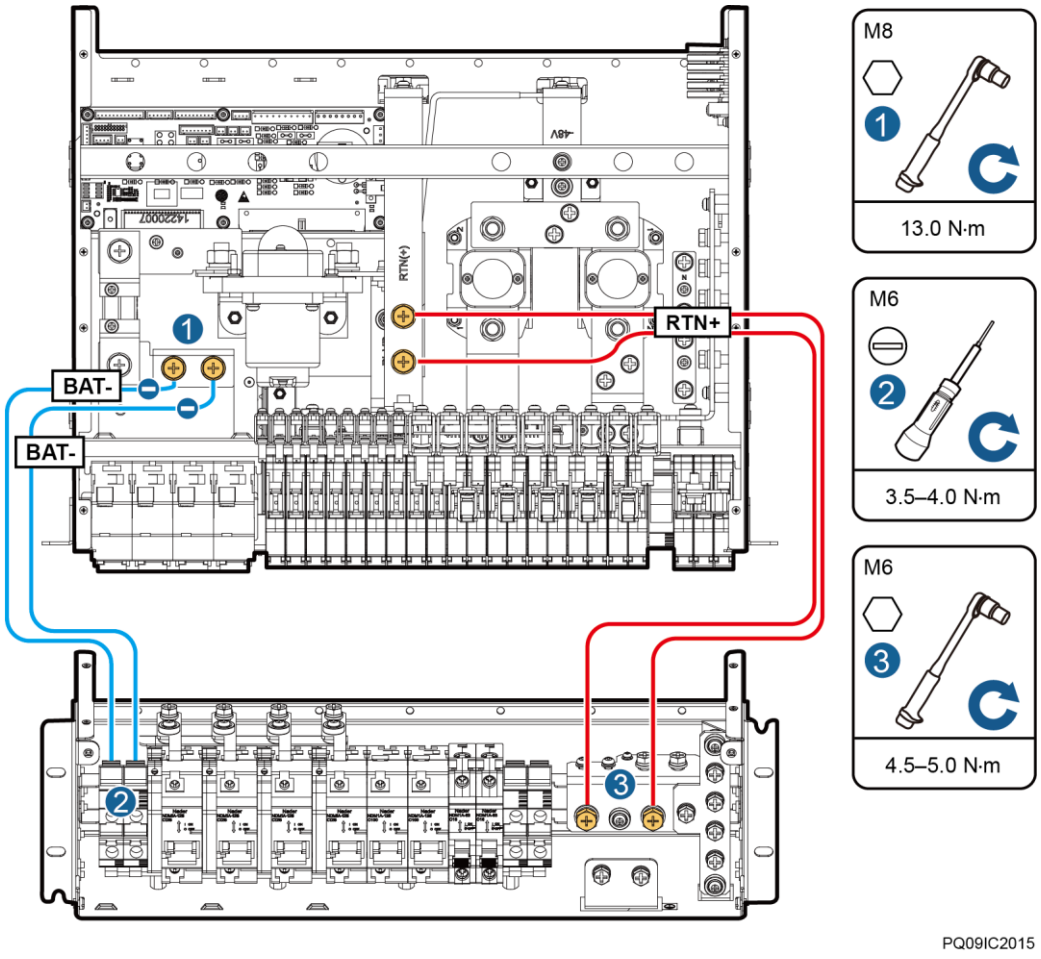
----End

Installing Battery Cables Between the DCDB and the Power Subrack

Step 1 Secure one end of negative battery cables to the reserved negative battery terminals on the subrack, and the other end to the corresponding negative battery wiring terminals on the DCDB.

Step 2 Secure one end of positive battery cables to the reserved RTN+ wiring terminals on the subrack, and the other end to the corresponding wiring terminals on the RTN+ busbar on the DCDB.

Figure 4-19 Installing battery cables between the DCDB and the power subrack



----End

4.11 Installing AC Input Power Cables

DANGER

- Ensure that the upstream AC input circuit breaker is OFF, and attach labels such as "No operations allowed."
- Switch off all circuit breakers before installing power cables.

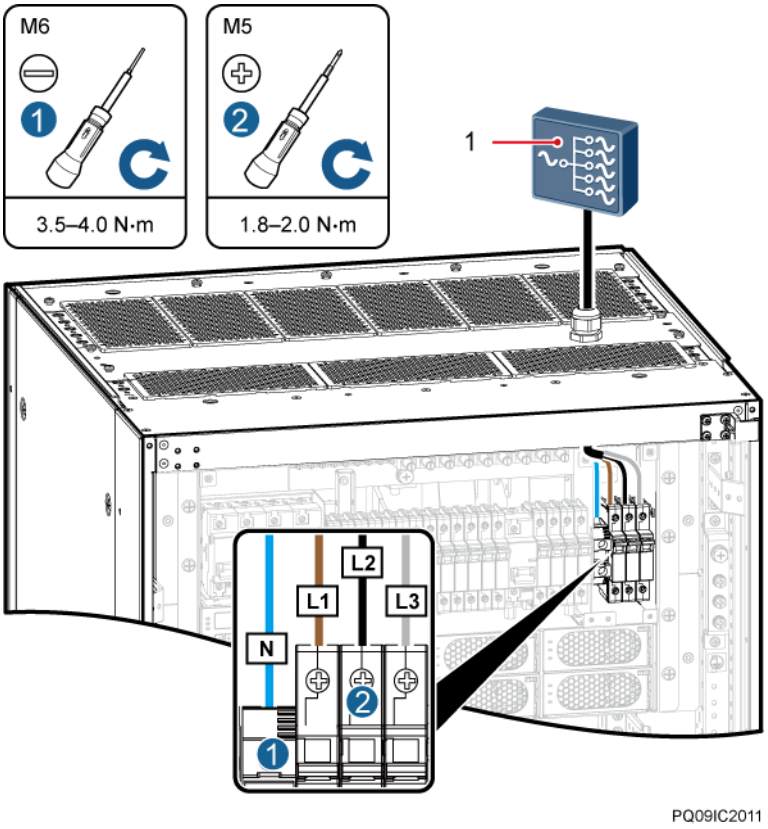
The ETP48300-C6D2 supports the 220/380 V AC three-phase, four-wire and 220 V AC single-phase input systems. Install AC input power cables based on site requirements.

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

Procedure

Step 1 Secure the AC input power cables to the AC input circuit breakers and terminal, as shown in Figure 4-20.

Figure 4-20 Installing the 220/380 V AC three-phase, four-wire input power cables



(1) Alternating current distribution box (ACDB)

----End

4.11.2 Installing the 220 V AC Single-Phase Input Power Cables

Prerequisites

Take the short circuit copper bar from the accessory bag and remove the insulation cover from the copper bar.

NOTE

Properly store the insulation cover and reinstall it after installing the AC input power cable.

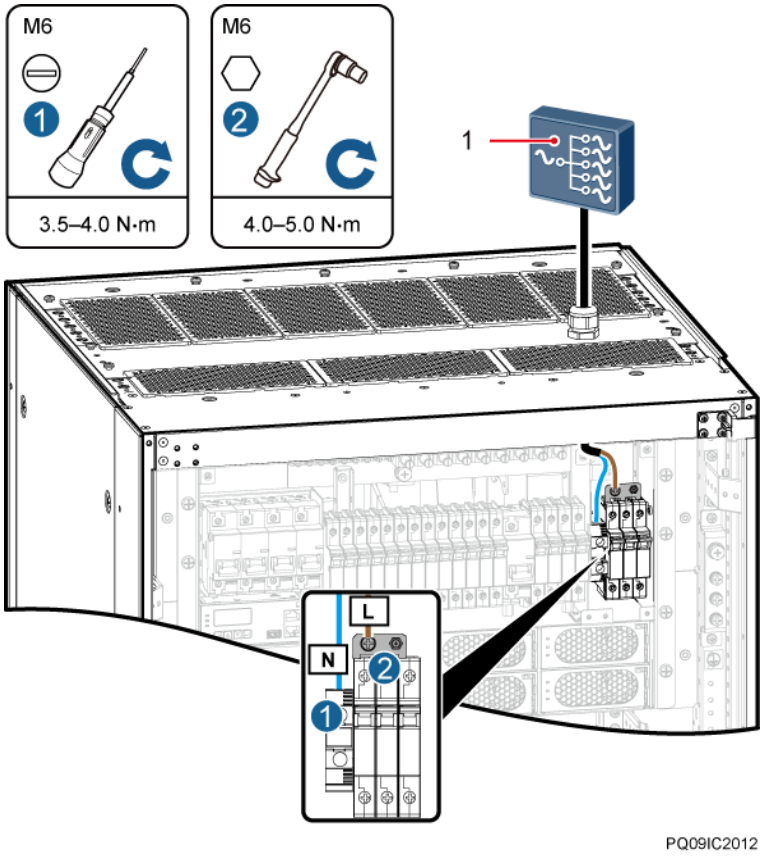
Procedure

Step 1 Install the short circuit copper bar to the AC input circuit breaker.

Step 2 Connect the live wire to the corresponding wiring screw on the short circuit copper bar.

Step 3 Connect the neutral wire to the neutral wiring terminal.

Figure 4-21 Installing the 220 V AC single-phase input power cables



(1) ACDB

----End

5 Verifying the Installation

5.1 Checking Hardware Installation

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

5.2 Checking Electrical Connections

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

5.3 Checking Cable Installation

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

6 Commissioning

NOTICE

- The following commissioning procedure may result in power failure or alarm generation. Inform the alarm center before and after the procedure.
- The commissioning involves various technologies. Only trained personnel are allowed to perform commissioning. Perform operations strictly in compliance with the manual.
- The commissioning is performed with power on. During commissioning, stand on dry insulating objects, and remove conductive articles such as watches and rings. Use insulated tools.
- During operations, do not contact two electric bodies that have different currents.
- During commissioning, check that the status of the related unit or component meets requirements before turning on any switch.
- When you are performing operations and do not want others to operate, attach the label "Do not turn on the switch because operations are in process." to the power distribution device.
- During commissioning, shut down the device immediately if any fault is detected. Rectify the fault and proceed with the commissioning.

6.1 Connecting the AC Power Supply

Procedure

Step 1 Measure the input voltage on the AC input circuit breaker. The value should range from 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 indicators on the rectifiers are 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

6.2 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.

6.3 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.

Table 6-1 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.

6.4 Setting Battery Parameters

Set **Battery1 Connected**, **Battery2 Connected**, **Battery3 Connected**, **Battery4 Connected**, **Battery5 Connected**, **Battery6 Connected**, **Battery7 Connected**, **Battery8 Connected**, **Rated Capacity**, **Installation Time** as required.

Table 6-2 Setting battery parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
Parameters Settings	Battery	Basic Parameters	Battery1 Connected	Yes	If *N* battery strings are connected, set

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
			Battery2 Connected	Yes	**Battery1 Connected** to **Battery *N* Connected** to **Yes**, and set the other parameters to **No**.
			Battery3 Connected	Yes	
			Battery4 Connected	Yes	
			Battery5 Connected	No	
			Battery6 Connected	No	
			Battery7 Connected	No	
			Battery8 Connected	No	
			Rated Capacity	150 Ah	Rated capacity of the batteries in a battery string. **NOTE** The batteries connected to one circuit breaker or fuse are called a battery string.
		Other Parameters	Installation Time	N/A	Set this parameter to the current date.

NOTE

- If battery routes 1 and 2 are respectively connected to a battery string (each battery string consists of four 12 V, 150 Ah batteries in series), set **Battery1 Connected** and **Battery2 Connected** to **Yes** and others to **No**, and set **Rated Capacity** to **150 Ah**.
- If battery route 1 is connected to two battery strings in parallel (each battery string consists of four 12 V, 150 Ah batteries in series), set **Battery1 Connected** to **Yes** and others to **No**, and set **Rated Capacity** to **300 Ah**.

6.5 (Optional) Setting Sensor Parameters

Set sensor parameters based on site requirements.

Table 6-3 Setting sensor parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
Parameters Settings	Power System	Sensor Config.	Door sensor	None	Set to **Yes** or **None** based on site requirements.
			Water sensor	None	
			Smoke sensor	None	
			Ambient Temp. Sensor	None	
			Ambient Humi. Sensor	None	
			Batt. Temp. Sensor 1	None	

6.6 (Optional) Setting the Hibernation Parameter

Set **Hibernation Enable** to **Yes** if you need to use the intelligent hibernation function of the rectifiers.

Table 6-4 Setting the hibernation parameter

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Parameters Settings	Energy Saving	Hibernation Enable	No	Yes

6.7 Setting Communications Parameters

6.7.1 (Optional) Setting Parameters Before Using WebUI

Prerequisites

- Supported operating system: Windows XP or later
- Browser: Internet Explorer 8.0 or later, FireFox 13 or later, and Chrome 20

Procedure

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

Step 2 Set the IP address, subnet mask, and gateway on the LCD, as shown in Table 6-5.

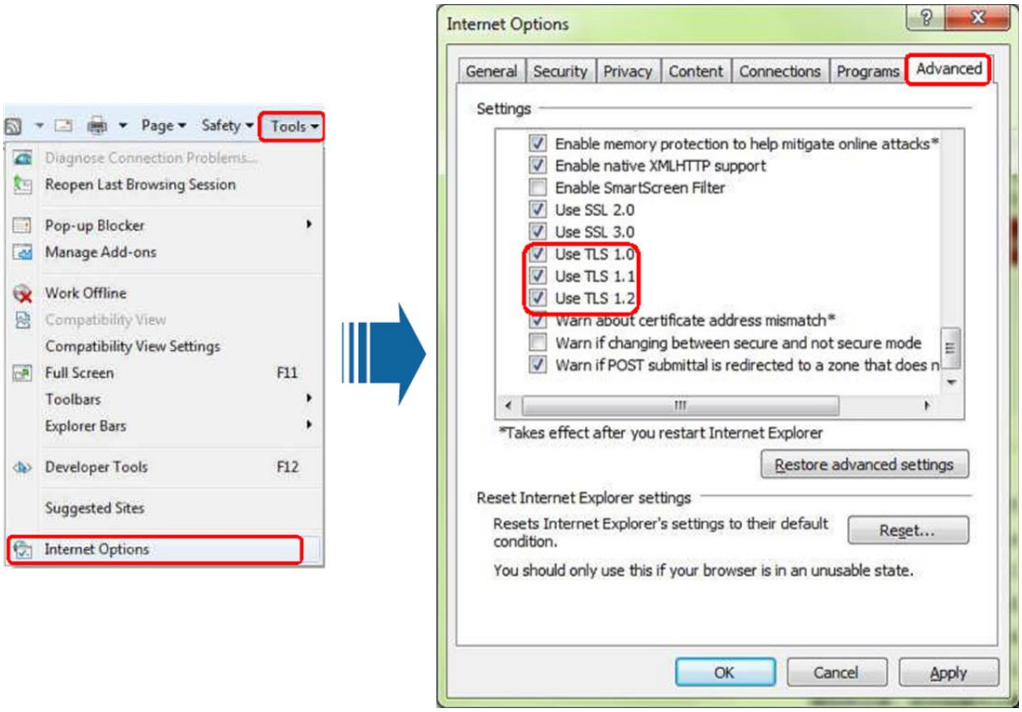
Table 6-5 IP parameters

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

Step 3 Open the browser (for example, Internet Explorer 8) and choose **Tools** > **Internet Options**.

Step 4 Click the **Advanced** tab and select **Use TLS 1.0**, **Use TLS 1.1**, and **Use TLS 1.2**.

Figure 6-1 Internet Explorer security setting

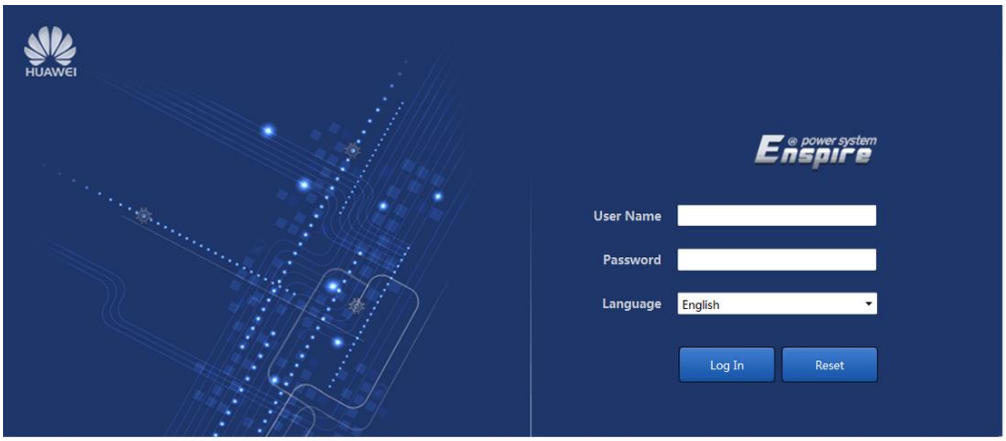


Step 5 Enter the IP address for the SMU in the address box of Internet Explorer (for example: https://192.168.0.10). Log in to the WebUI on the login page shown in Figure 6-2.

NOTE

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

Figure 6-2 Login page



PC03C00051

----End

6.7.2 (Optional) Setting Parameters Before Using NetEco

Networking Mode 1: FE Port

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

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

Table 6-6 IP parameters

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

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

Table 6-7 NetEco parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Settings
Parameters Settings	Comm. Parameters	Network Parameters	NetEco Primary IP	192.168.0.10	Set an IP address for the active NetEco server.
			NetEco Backup IP	192.168.0.10	Set an IP address for the standby NetEco server.
			NetEco Port Number	31220	31220 **NOTE** Please contact Huawei technical support if you need change the port number.

----End

Networking Mode 2: RS485 Port

Step 1 Set **Port Mode** to **Manual**, **Protocol Type** to **M/S Protocol**, **Baud Rate** to **9600**, and **Comm. Address** to **3**.

Table 6-8 Communications parameters

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

----End

6.7.3 (Optional) Setting Parameters Before Using SNMP

Prerequisites

NOTE

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

Before setting SNMP parameters, obtain the information listed in Table 6-9 from the NMS.

Table 6-9 Information obtained from the NMS

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

NOTE

- The standard protocols SNMPv1 and SNMPv2 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. For details, see 6.7.1 (Optional) Setting Parameters Before Using WebUI.

Step 2 Access the **System Settings** page and set **SNMP**.

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

Step 3 In **SNMP Trap**, click **Add**, set **Trap Target Address** and **Trap Port** and set **Trap community**, and choose **SNMP Version**.

NOTE

SNMP Version in this place can be different from the version in Step 2.

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

NOTE

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

----End

Follow-up Procedure

You can query the power system operating status, active alarms, and the names of user-defined dry contact inputs, and configure dry contact outputs on the NMS that is connected over SNMP.

6.8 Connecting the Battery Supply

Prerequisites

NOTICE

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

Procedure

Step 1 Switch on the battery circuit breakers.

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

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

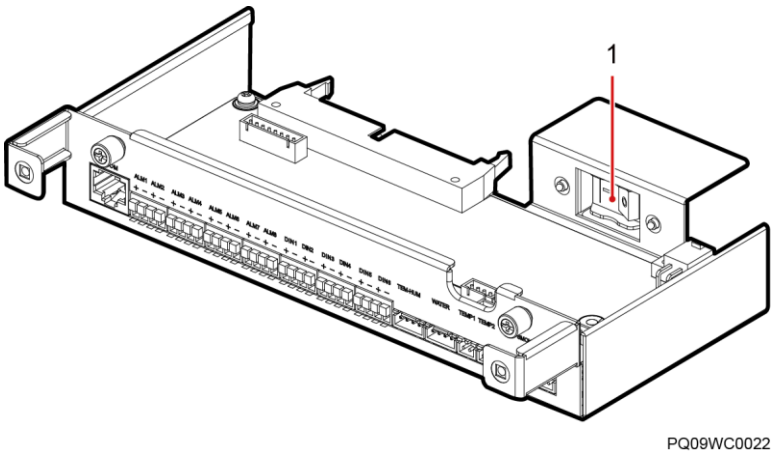
Step 4 Switch all the circuit breakers to the appropriate status based on site requirements.

Step 5 Observe the power system for 15 minutes. During this period of time, if no alarm is generated on the LCD of the SMU, the voltages and currents for batteries and loads are normal.

NOTICE

- The battery switch is in the AUTO position by default before delivery and the system is under automatic control.
- Take out the UIM02C and flip the battery switch to MANUAL only when you need to power on the battery forcibly. Remember to flip the battery back to AUTO after the commissioning.

Figure 6-3 Battery switch



(1) Battery switch

----End

6.9 Subsequent Operations

Procedure

Step 1 Reinstall the removed cover or panel (if there is).

Step 2 The paint on the surface of the subrack should be kept intact. Therefore, any damaged paint must be repaired.

Step 3 Clean the site and leave.

----End

7 Maintenance

7.1 Routine Maintenance

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

Table 7-1 Routine maintenance checklist

Maintenance Item	Check Item	Check Method	Scenario for Repair	Measures
Electricity	The AC input voltage is normal.	Clamp meter	The AC input voltage is beyond the normal range.	For details, see 7.3 Identifying Component Faults.
	The output voltage is normal.		The battery branch or load branch voltage exceeds the specified range (-42 V DC to -58 V DC).	
Preventive maintenance inspection	The indicators are normal.	Observe indicators	Alarms are generated.	
Grounding	The ground point properly connects to the ground bar in the cabinet.	Clamp meter	The resistance between the ground point and the ground bar is greater than 0.1 ohm.	Secure the ground cable to the ground point again or replace the ground cable.

7.2 Rectifying Common Faults

7.2.1 AC Failure

Possible Causes

- The AC input power cable is faulty.
- The AC input circuit breaker is OFF.
- The power grid is faulty.

Measures

1. Check whether the AC input cable is loose. If so, secure the AC input cable.
2. Check whether the AC input circuit breaker is OFF. If so, handle the fault which caused the AC input circuit breaker to turn OFF and then switch on the circuit breaker.
3. Check whether the AC input voltage is lower than 50 V AC. If so, handle the power grid fault.

7.2.2 AC Over Volt

Possible Causes

- The AC overvoltage alarm threshold is incorrectly set on the SMU.
- The power grid is faulty.

Measures

1. Check whether the AC overvoltage alarm threshold is correctly set. If not, set the threshold to the correct value.
2. Check whether the AC input voltage exceeds the AC overvoltage alarm threshold (280 V AC by default). If so, handle the AC input fault.

7.2.3 AC Under Volt

Possible Causes

- The AC undervoltage alarm threshold is incorrectly set on the SMU.
- The power grid is faulty.

Measures

1. Check whether the AC undervoltage alarm threshold is correctly set. If not, set the threshold to the correct value.
2. Check whether the AC input voltage is below the AC undervoltage alarm threshold (180 V AC by default). If so, handle the AC input fault.

7.2.4 DC Over Volt

Possible Causes

- The DC overvoltage alarm threshold is incorrectly set on the SMU.

- The power system voltage has been manually set to a very high value.
- Rectifiers are faulty.

Measures

1. Check whether the DC overvoltage alarm threshold (58 V DC by default) is correctly set. If not, set the threshold to the correct value.
2. Check whether the system voltage has been manually set to a very high value. If so, check with other maintenance personnel whether the voltage can be changed to a normal value.
3. Remove the rectifiers one by one and check whether the alarm is cleared. If the alarm still exists, reinstall the rectifier. If the alarm is cleared, replace the rectifier.

7.2.5 DC Under Volt

Possible Causes

- An AC power failure has occurred.
- The DC undervoltage alarm threshold is incorrectly set on the SMU.
- The system configuration is incorrect.
- The power system voltage has been manually set to a very low value.
- Rectifiers are faulty.

Measures

1. Check whether an AC power failure has occurred. If so, rectify the fault to restore the AC power supply.
2. Check whether the DC undervoltage alarm threshold (45 V DC by default) is correctly set. If not, set the threshold to the correct value.
3. Check whether the load current is greater than the present power system capacity. If so, expand the power system capacity or reduce the load power.
4. Check whether the system voltage has been manually set to a very low value. If so, check with other maintenance personnel whether the voltage can be changed to a normal value.
5. Check whether faulty rectifiers have resulted in insufficient power system capacity for the loads. If so, replace the faulty rectifiers.

7.2.6 Batt Chg. Overcur.

Possible Causes

- Rectifier communication is interrupted.
- SMU connections are loose.
- The SMU is faulty.

Measures

1. Check whether an alarm has been generated for interrupted rectifier communication. If so, remove the rectifier, reinstall it, and check whether the alarm is cleared. If the alarm still exists, replace the rectifier.

2. Remove the SMU, reinstall it, and check whether the alarm is cleared. If the alarm still exists, replace the SMU.

7.2.7 LLVD1 Disconnected

Possible Causes

- An AC power failure occurs.
- Loads are manually disconnected.
- The load disconnection voltage is set too high on the SMU.
- Rectifiers are faulty.
- The system configuration is not proper.

Measures

1. Check whether an AC power failure occurs. If yes, resume the AC power supply.
2. Check whether loads are manually disconnected. If yes, confirm the reason of the manual disconnection, and reconnect the loads after the operation.
3. Check whether the load disconnection voltage (45 V DC by default) is set too high on the SMU. If yes, adjust it to a proper value.
4. Check whether the power system capacity is insufficient for the loads due to rectifier failures. If yes, replace the faulty rectifier.
5. Check whether the load current is greater than the current power system capacity. If yes, expand the power system capacity or reduce the load power.

7.2.8 LLVD2 Disconnected

Possible Causes

- An AC power failure occurs.
- Loads are manually disconnected.
- The load disconnection voltage is set too high on the SMU.
- Rectifiers are faulty.
- The system configuration is not proper.

Measures

1. Check whether an AC power failure occurs. If yes, resume the AC power supply.
2. Check whether loads are manually disconnected. If yes, confirm the reason of the manual disconnection, and reconnect the loads after the operation.
3. Check whether the load disconnection voltage (44 V DC by default) is set too high on the SMU. If yes, adjust it to a proper value.
4. Check whether the power system capacity is insufficient for the loads due to rectifier failures. If yes, replace the faulty rectifier.
5. Check whether the load current is greater than the current power system capacity. If yes, expand the power system capacity or reduce the load power.

7.2.9 BLVD Disconnected

Possible Causes

- An AC power failure has occurred.
- Batteries are manually disconnected.
- The battery disconnection voltage has been set to a very high value on the SMU.

Measures

1. Check whether an AC power failure has occurred. If so, rectify the fault to restore the AC power supply.
2. Check whether batteries are manually disconnected. If so, check with other maintenance personnel whether the batteries can be reconnected.
3. Check whether the battery disconnection voltage (43 V DC by default) has been set to a very high value on the SMU. If so, adjust it to a normal value.

7.2.10 Batt Loop Trip

Possible Causes

- The battery circuit breaker or fuse detection cable is loosely connected.
- The battery circuit breaker has tripped or the battery fuse has blown.
- The contactor is faulty.

Measures

1. Check whether the battery circuit breaker or fuse detection cable is loosely connected. If so, reconnect the cable.
2. Check whether the battery circuit breaker has tripped or the battery fuse has blown. If so, rectify the battery loop fault and then switch on the circuit breaker or replace the fuse.
3. Manually switch on or switch off the battery contactor and check whether the battery current changes accordingly. If not, replace the contactor.

7.2.11 High Amb. Temp.

NOTE

This alarm is generated only for the power system that has an ambient temperature sensor installed.

Possible Causes

- The high ambient temperature alarm threshold is incorrectly set.
- The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.
- The ambient temperature sensor is faulty.

Measures

1. Check whether the high ambient temperature alarm threshold (50°C by default) is correctly set. If no, adjust it to a proper value.

2. Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
3. Check whether the ambient temperature sensor is faulty. If yes, replace the temperature sensor.

7.2.12 Low Amb. Temp.

NOTE

This alarm is generated only for the power system that has an ambient temperature sensor installed.

Possible Causes

- The low ambient temperature alarm threshold is incorrectly set.
- The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.
- The ambient temperature sensor is faulty.

Measures

1. Check whether the low ambient temperature alarm threshold (0°C by default) is correctly set. If no, adjust it to a proper value.
2. Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
3. Check whether the ambient temperature sensor is faulty. If yes, replace the ambient temperature sensor.

7.2.13 High Amb. Humi.

NOTE

This alarm is generated only for the power system that has a humidity sensor installed.

Possible Causes

- The high ambient humidity alarm threshold is incorrectly set.
- The humidity is too high in the cabinet where the humidity sensor is located.
- The humidity sensor is faulty.

Measures

1. Check whether the high humidity alarm threshold (80% RH by default) is correctly set. If no, adjust it to a proper value.
2. Check whether water intrudes into the cabinet. If yes, wipe the water with dry cotton or other tools and rectify the fault.
3. Check whether the humidity sensor is faulty. If yes, replace the humidity sensor.

7.2.14 Low Ambient Humidity

NOTE

This alarm is generated only for the power system that has a humidity sensor installed.

Possible Causes

- The low ambient humidity alarm threshold is incorrectly set.
- The humidity is too low in the cabinet where the humidity sensor is located.
- The humidity sensor is faulty.

Measures

1. Check whether the low humidity alarm threshold (10% RH by default) is correctly set. If no, adjust it to a proper value.
2. Check whether the humidity inside the cabinet is too low. If yes, adjust the humidity. The alarm is cleared when the humidity returns to the allowed range.
3. Check whether the humidity sensor is faulty. If yes, replace the humidity sensor.

7.2.15 Batt. High Temp.

NOTE

This alarm is generated only for the power system that has a battery temperature sensor installed.

Possible Causes

- The high battery temperature alarm threshold is incorrectly set.
- The battery temperature control system is faulty.
- The battery temperature sensor is faulty.

Measures

1. Check whether the high battery temperature alarm threshold (50°C by default) is correctly set. If not, set the threshold to the correct value.
2. Check whether the battery temperature control system is faulty. If so, rectify the fault. The alarm is cleared when the battery temperature falls within the allowed range.
3. Check whether the battery temperature sensor is faulty. If so, replace the temperature sensor.

7.2.16 Batt. Low Temp.

NOTE

This alarm is generated only for the power system that has a battery temperature sensor installed.

Possible Causes

- The low battery temperature alarm threshold is incorrectly set on the SMU.
- The battery temperature control system is faulty.
- The battery temperature sensor is faulty.

Measures

1. Check whether the low battery temperature alarm threshold (-10°C by default) is correctly set. If not, set the threshold to the correct value.

2. Check whether the temperature control system for the battery compartment is faulty. If so, rectify the fault. The alarm is cleared when the temperature in the battery compartment becomes normal.
3. Check whether the battery temperature sensor is faulty. If so, replace the battery temperature sensor.

7.2.17 Door Alarm

NOTE

This alarm is generated only for the power system that has door status sensor installed.

Possible Causes

- The cabinet doors are open.
- The door status sensor is faulty.

Measures

1. Close cabinet doors.
2. Check whether the door status sensor is faulty. If yes, replace the door status sensor.

7.2.18 Water Alarm

NOTE

This alarm is generated only for the power system that has a water sensor installed.

Possible Causes

- There is water inside the cabinet.
- The water sensor is faulty.

Measures

1. Check whether there is water inside the cabinet. If so, remove the water with dry cotton or other tools and then locate and rectify the fault.
2. Check whether the water sensor is faulty. If the water sensor is faulty, replace it.

7.2.19 Smoke Alarm

NOTE

This alarm is generated only for the power system that has a smoke sensor installed.

Possible Causes

- There is smoke inside the cabinet.
- The smoke sensor is faulty.

Measures

1. Check whether there is smoke inside the cabinet. If so, disconnect the power supply from the cabinet, handle the fault, and then restart the system and clear the alarm on the SMU.
2. Check whether the smoke sensor is faulty. If the smoke sensor is faulty, replace it.

7.2.20 Rect Fault

Possible Causes

- Rectifier connections are loose.
- A rectifier is faulty.

Measures

1. Check the Fault indicator on the rectifier panel. If it is steady red, remove the rectifier, and then reinstall it after the indicator turns off.
2. If the alarm persists, replace the rectifier.

7.2.21 Rect Protection

Possible Causes

- The rectifier input voltage is too high.
- The rectifier input voltage is too low.
- The ambient temperature is too high.
- The rectifier is abnormal.

Measures

1. Check whether the AC input voltage exceeds the upper threshold for rectifier working voltage. If so, locate and rectify the power supply fault and restore the power supply.
2. Check whether the AC input voltage is below the lower threshold for rectifier working voltage. If so, locate and rectify the power supply fault and restore the power supply.
3. Check whether the ambient temperature is higher than the maximum operating temperature of the rectifier. If so, locate and rectify the temperature control system fault.
4. Remove the rectifier that has generated the alarm and reinstall it after the indicator turns off. If the alarm persists, replace the rectifier.

7.2.22 Rect Comm Fault

Possible Causes

- A rectifier has been removed.
- Rectifier connections are loose.
- A rectifier is faulty.

Measures

1. Check whether a rectifier has been removed. If so, reinstall it.
2. If the rectifier is in position, remove the rectifier and reinstall it.
3. If the alarm persists, replace the rectifier.

7.2.23 Load Loop Break

Possible Causes

- The load circuit breaker has tripped or the load fuse has blown.
- The load circuit breaker or the fuse detection cable is disconnected.

Measures

1. Check whether the load circuit breaker has tripped or the load fuse has blown. If so, locate and rectify the circuit fault, and then switch on the circuit breaker or replace the fuse.
2. Check whether the load circuit breaker or fuse detection cable is disconnected. If so, reconnect it.

7.2.24 DC SPD Fault

Possible Causes

- The DC SPD detection cable is disconnected.
- The DC SPD is faulty.

Measures

1. Check whether the DC SPD detection cable is disconnected. If so, reconnect the cable.
2. If the DC SPD detection cable is reliably connected, replace the DC SPD.

7.3 Identifying Component Faults

7.3.1 Identifying Circuit Breaker Faults

The following indicate that the circuit breaker is faulty:

- The circuit breaker cannot be switched to ON/OFF after the short circuit fault for its end circuit is rectified.
- When the circuit breaker is switched to ON and its input voltage is normal, the voltage between the two ends of the circuit breaker exceeds 1 V.
- The input voltage is normal, but the resistance between both ends of the circuit breaker is less than 1 kΩ when the circuit breaker is OFF.

7.3.2 Identifying Rectifier Faults

A rectifier is damaged if any of the following conditions is not met:

- When the rectifier does not communicate with the SMU and the AC input voltage is around 220 V, the green indicator on the rectifier is steady on, the yellow indicator is blinking, the red indicator is off, and the rectifier output is normal.
- The SMU can perform equalized charging, float charging, and current limiting control for the rectifier when the communication cable to the rectifier is correctly connected and communication is established between the rectifier and the SMU.

7.3.3 Identifying SMU Faults

The following indicate that the SMU is faulty:

- 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 when the power system is not faulty.
- The SMU fails to communicate with the connected lower-level devices even though the communications cables are correctly connected.
- Communication between the SMU and all rectifiers fails even though the rectifiers and the communications cables are normal.
- The SMU cannot monitor AC or DC power distribution when communications cables are intact and AC and DC power distribution is normal.
- Parameters cannot be set or running information cannot be viewed on the SMU.

7.4 Replacing Components

NOTICE

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

7.4.1 Replacing a Rectifier

Prerequisites

- Protective gloves and the cabinet door key are available.
- The new rectifier is intact.

⚠ CAUTION

To prevent burns, exercise caution when removing a rectifier because the rectifier may be hot as a result of continuous operation.

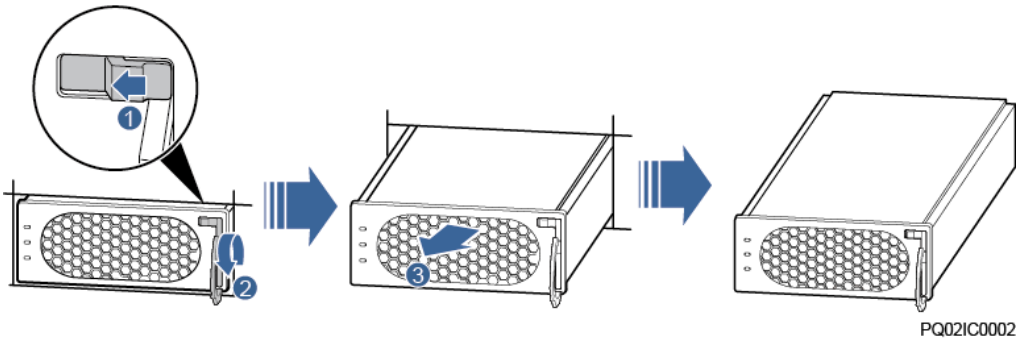
Procedure

Step 1 Wear protective gloves.

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

Step 3 Gently draw the handle outwards, and then remove the rectifier from the subrack, as shown in Figure 7-1.

Figure 7-1 Removing a rectifier

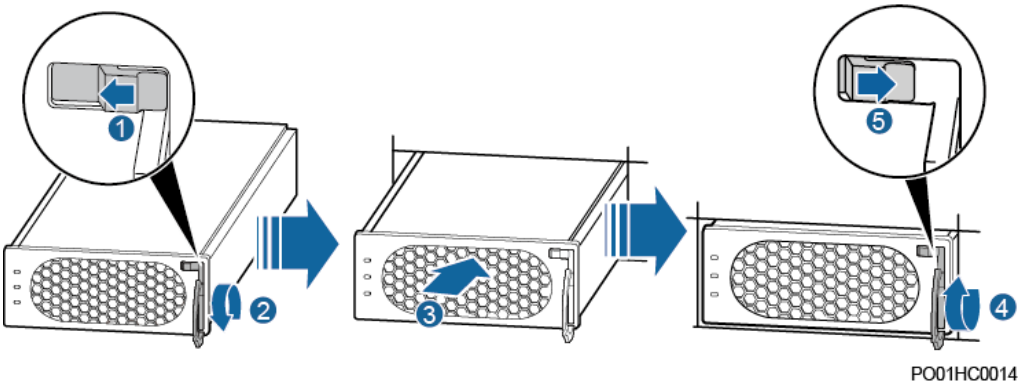


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

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

Step 6 Gently slide the rectifier into the slot along the guide rails until it is engaged. Close the handle, and push the locking latch towards the right to lock the handle, as shown in Figure 7-2.

Figure 7-2 Installing a rectifier



Step 7 Remove the protective gloves.

----End

Follow-up Procedure

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

7.4.2 Replacing an SMU

Prerequisites

- The cabinet door key is available.

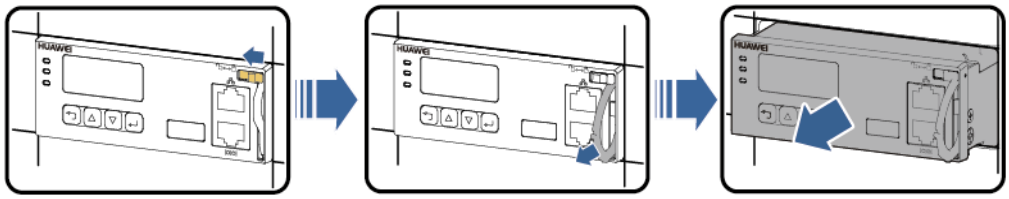
- The new SMU is intact.

Procedure

Step 1 Push the locking latch towards the left.

Step 2 Pull the handle outwards and remove the SMU, as shown in Figure 7-3.

Figure 7-3 Removing an SMU

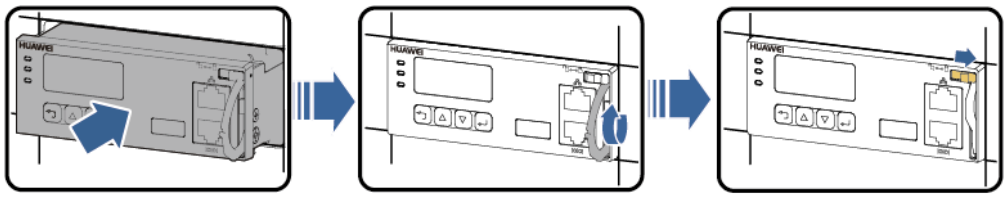


Step 3 Insert the new SMU into the subrack, push the locking latch towards the left, and pull out the handle.

Step 4 Slide the SMU into the subrack slowly along the guide rails, push in the handle, and then push the locking latch towards the right.

Step 5 Reset the parameters on the SMU.

Figure 7-4 Installing an SMU



----End

Follow-up Procedure

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

7.4.3 Replacing a UIM

Prerequisites

- Prepare an ESD wrist strap or a pair of ESD gloves, an ESD box or bag, the cabinet door key, and a maintenance tool box.
- Check that the new UIM is intact.

Procedure

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

Step 2 Remove the insulation cover from the UIM02C.

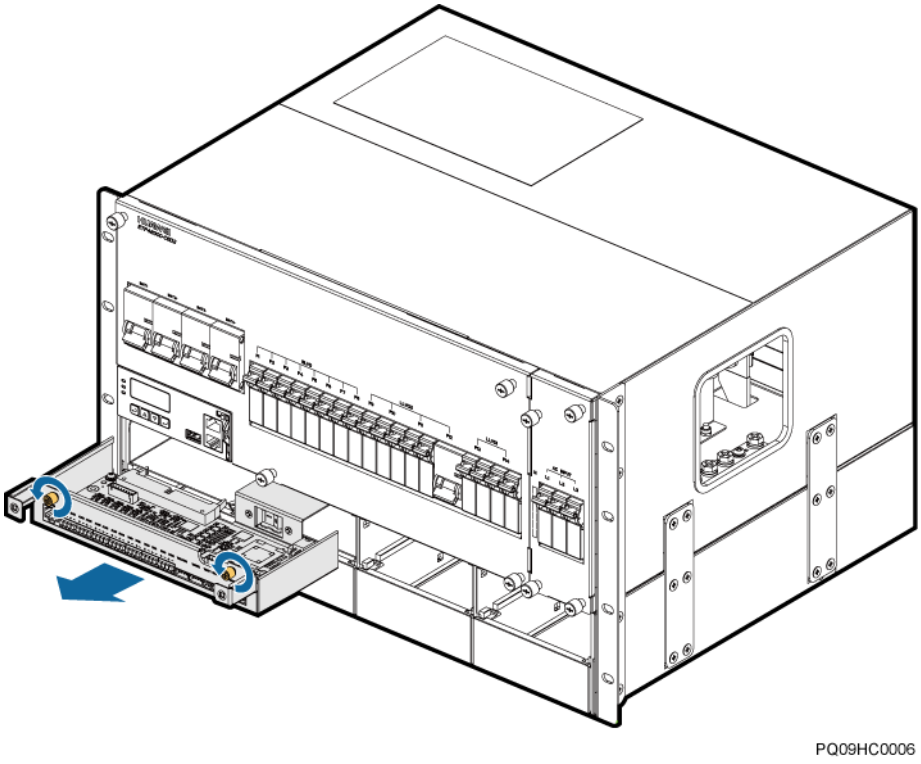
Step 3 Record the positions on the UIM02C panel for connecting signal cables and disconnect the cables.

Step 4 Unscrew the UIM02C panel and remove the UIM02C, as shown in Figure 7-5.

NOTICE

Gently pull out the UIM02C less than or equal to 100 mm to avoid damaging cables.

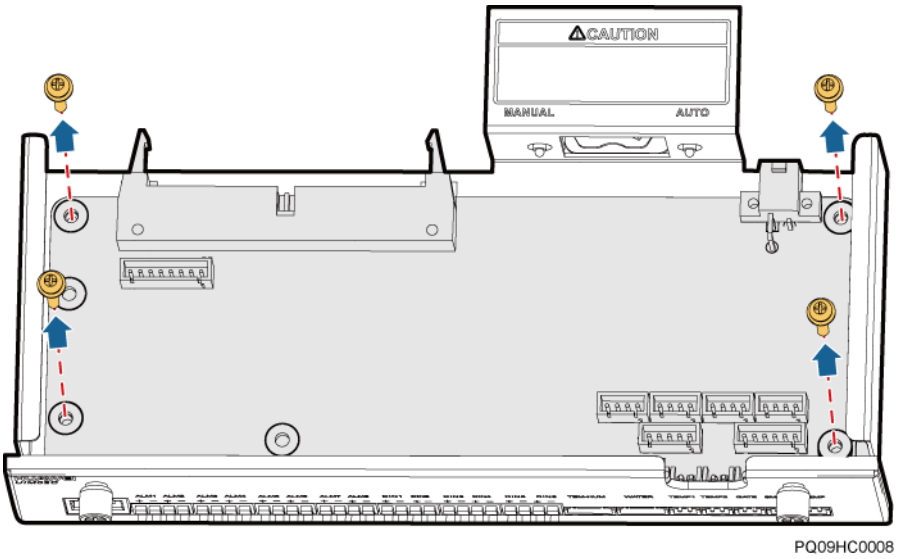
Figure 7-5 Removing the UIM02C



Step 5 Record the positions where the UIM02C backplane connects to all the cables, and then disconnect the cables.

Step 6 Remove the printed circuit board (PCB).

Figure 7-6 Removing the PCB



Step 7 Take out the new PCB and install it.

Step 8 Connect all cables back to the new UIM02C based on the record made previously.

Step 9 Push in the UIM02C and tighten the screws.

Step 10 Reconnect signal cables to the UIM02C panel based on the records.

Step 11 Reinstall the insulation cover onto the UIM02C.

Step 12 Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap or ESD gloves.

----End

Follow-up Procedure

Send the faulty PCB for repair.

7.4.4 Replacing a Circuit Breaker

Prerequisites

DANGER

Before replacing an AC circuit breaker, switch off the upstream input circuit breaker.

- The cabinet door key, insulation tape, and required tools are available.
- The new circuit breaker is intact and has the same specifications as the circuit breaker to be replaced.

Procedure

Step 1 Switch off the circuit breaker that is to be replaced.

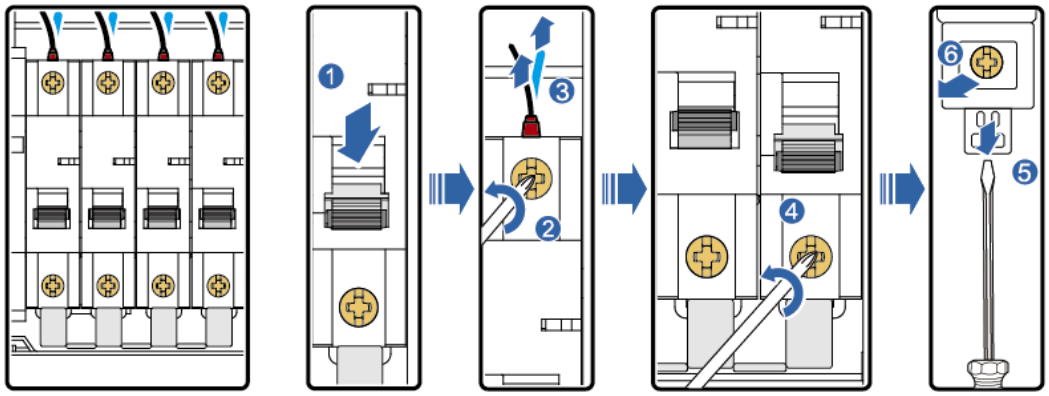
Step 2 Record the positions where the output cable and signal cable terminals connect to the circuit breaker.

Step 3 Loosen the screw that secures the upper port of the circuit breaker using a Phillips screwdriver, and remove the output power cable and signal cable terminals. Wrap the cable and terminals using insulation tape.

Step 4 Loosen the screw that secures the lower port of the circuit breaker using a Phillips screwdriver, and open the buckle at the base of the circuit breaker using an insulated flat-head screwdriver.

Step 5 Remove the circuit breaker from the guide rail. Figure 7-7 shows how to remove the circuit breaker.

Figure 7-7 Removing the circuit breaker



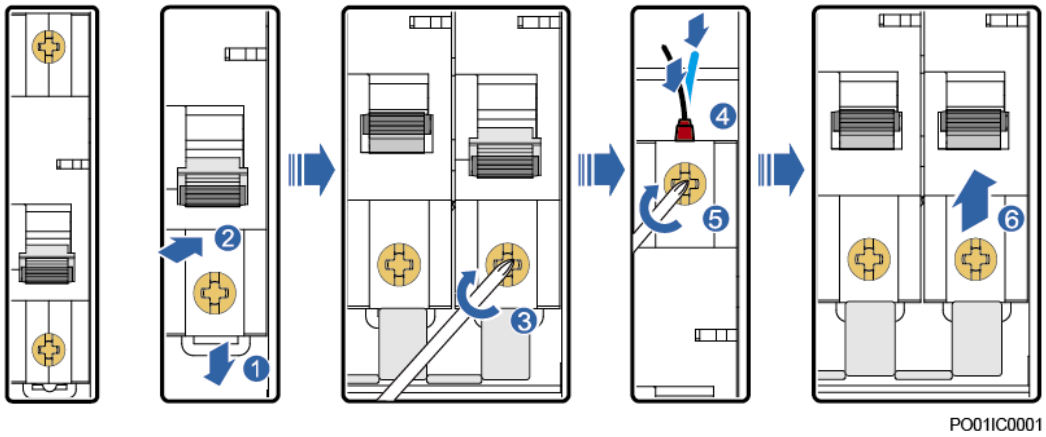
Step 6 Switch off the new circuit breaker. Press the buckle at the circuit breaker base using an insulated flat-head screwdriver and install the new circuit breaker. Then remove the screwdriver so that the buckle secures the circuit breaker to the guide rail.

Step 7 Tighten the screw that secures the lower port of the circuit breaker.

Step 8 Remove the insulation tape from the output power cable and signal cable terminals. Then connect the output power cable and signal cable terminals to the upper port of the circuit breaker and tighten the screw.

Step 9 Switch on the circuit breaker. Figure 7-8 shows how to install the new circuit breaker.

Figure 7-8 Installing the new circuit breaker



----End

Follow-up Procedure

Check that the load fuse blown alarm has disappeared.

A Technical Specifications

Table A-1 Technical specifications

Category	Item	Specification
Environmental requirements	Operating temperature	-40°C to +65°C
	Transportation temperature	-40°C to +70°C
	Storage temperature	-40°C to +70°C
	Operating humidity	5% RH to 95% RH (non-condensing)
	Transportation humidity	5% RH to 95% RH (non-condensing)
	Storage humidity	5% RH to 95% RH (non-condensing)
	Altitude	0 m to 4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1°C for each additional 200 m.
AC input	Input system	220/380 V AC, three-phase, four-wire compatible with 220 V AC single-phase
	Input frequency	45 Hz to 66 Hz (rated frequency: 50 Hz or 60 Hz)
	Power factor (PF)	≥ 0.99 (rated input, with loads)
DC output	Output voltage range	-42 V DC to -58 V DC
	Default output voltage	-53.5 V DC
	Output power	18000 W
	Regulated voltage precision	≤ ±1% (The output voltage is within 53.5±0.1 V, with 50% load

Category	Item	Specification
		percentage.)
	Peak-to-peak noise voltage	≤ 200 mV (under rated input voltage and load power)
	Noise weighting	≤ 2 mV (300 Hz to 3400 Hz, input voltage ≤ 264 V AC)
	Unbalance of load sharing	≤ ±5% (with 50% to 100% loads)
AC input protection	AC input overvoltage protection threshold	> 300 V AC
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output resumes.
	AC input undervoltage protection threshold	< 85 V AC
	AC input undervoltage recovery threshold	When the voltage is restored to 90 V AC, the output resumes.
DC output protection	DC output overvoltage protection threshold	-58.5 V DC to -60.5 V DC
Electromagnetic compatibility (EMC) specifications	Conducted emission (CE)	Input port: Class B of CISPR 22/EN 55022
		Output port: Class A of CISPR 22/EN 55022
	Radiated interference	CISPR 22/EN 55022 class B
	Harmonic current	IEC 61000-3-12
	Voltage fluctuation	IEC 61000-3-3
	Electrostatic discharge (ESD)	IEC61000-4-2 Shell ports: contact discharge of 6 kV and air discharge of 8 kV; signal ports: contact discharge of 2 kV
	Electrical fast transient (EFT)	IEC61000-4-4 Signal port: 1 kV; power port: 2 kV
	Radiated susceptibility (RS)	IEC61000-4-3 Level 3; field strength: 10 V/m
	Conducted susceptibility (CS)	IEC61000-4-6 Signal port: 3 V; power port: 10 V
	Surge immunity	IEC61000-4-5 AC power ports: Differential mode: 2 kV; common mode: 4 kV

Category	Item	Specification
	Voltage dips immunity (DIP)	IEC 61000-4-11
Others	Surge protection	DC power port: differential mode: 10 kA (8/20 μs); common mode: 10 kA (8/20 μs)
	Safety design	Complies with IEC/EN60950-1 and GB4943 and passes TUV and CE.
	Mean time between failures (MTBF)	200,000 hours
Structure	Cabinet dimensions (H x W x D)	• ETP48300–C6D2: 266.7 mm x 482 mm x 380 mm • DCDB: 133 mm x 482 mm x 160 mm
	Weight	≤ 25 kg (excluding rectifiers)
	Protection level	IP20
	Installation mode	Equipped with mounting ears to adapt to 19-inch cabinets
	Cable routing	Routed in and out from the top
	Maintenance mode	Maintained from the front
	Heat dissipation	Natural cooling

B Electrical Conceptual Diagram

Figure B-1 ETP48300-C6D2 electrical conceptual diagram

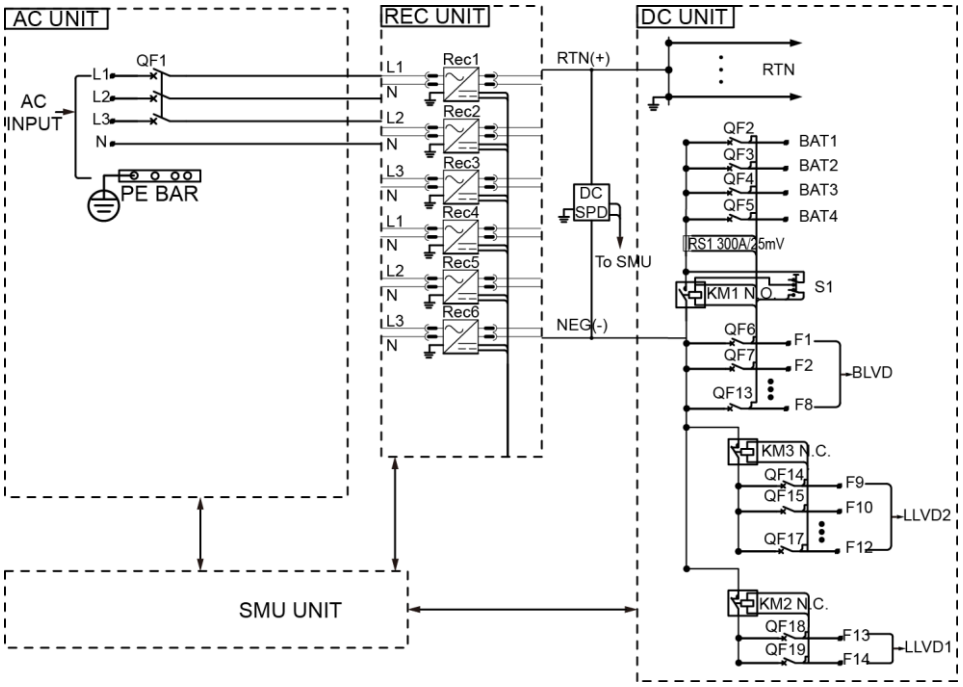
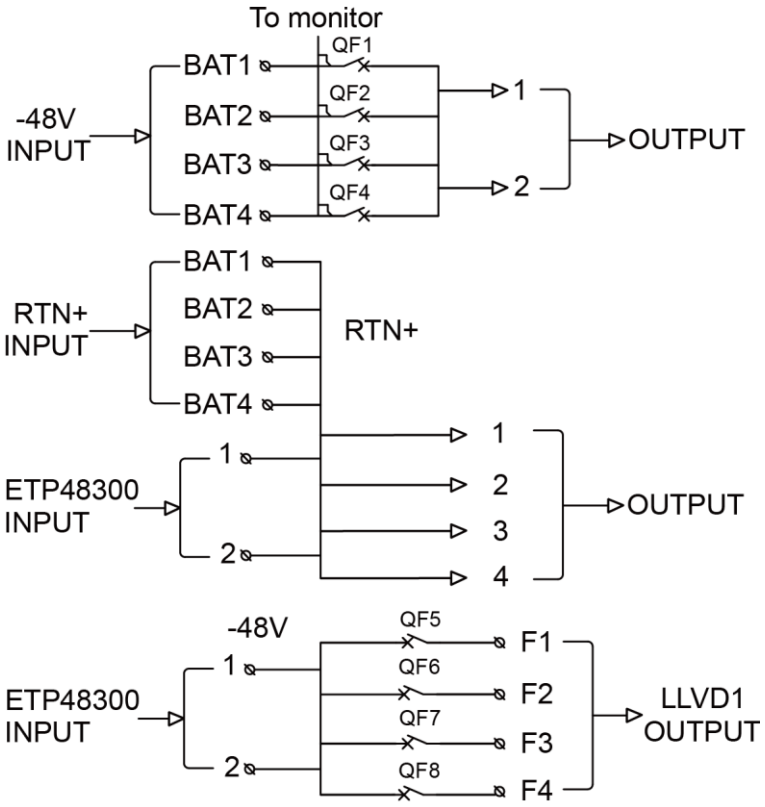


Figure B-2 DCDB electrical conceptual diagram



C Associations Between Alarms and the Dry Contacts on the UIM

Table C-1 Associations between alarms and dry contacts

Port	Silk Screen	Associated Alarm
Dry contact input	DIN1	Dry contact input 1 (Extended battery 5 fuse break)
	DIN2	Dry contact input 2 (Extended battery 6 fuse break)
	DIN3	Dry contact input 3 (Extended battery 7 fuse break)
	DIN4	Dry contact input 4 (Extended battery 8 fuse break)
	DIN5	Dry contact input 5
	DIN6	Dry contact input 6
Dry contact output Default mode (Close: alarm; Open: normal) can be modified as required.	ALM1	LLVD1 Disconnected
	ALM2	LLVD2 Disconnected
	ALM3	DC Overvoltage, DC Ultra Overvoltage, BLVD Disconnected
	ALM4	AC Failure, Long Mains Failure, AC Overvoltage, AC Undervoltage
	ALM5	All Rectifiers Fail to Communicate, Rectifier Overvoltage, Rectifier Power Failure, Rectifier Protection, Rectifier Communication Failure, Load Fuse Break, Battery Fuse Break, Rectifier Fault (Redundant), Rectifier Fault (Non-redundant), Multi-Rectifier Fault
	ALM6	Rectifier Fault
	ALM7	Reserved

Port	Silk Screen	Associated Alarm
	ALM8	Reserved

D Acronyms and Abbreviations

A	
ACDB	alternating current distribution box
B	
BBU	baseband unit
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

P	
PDU	power distribution unit
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

