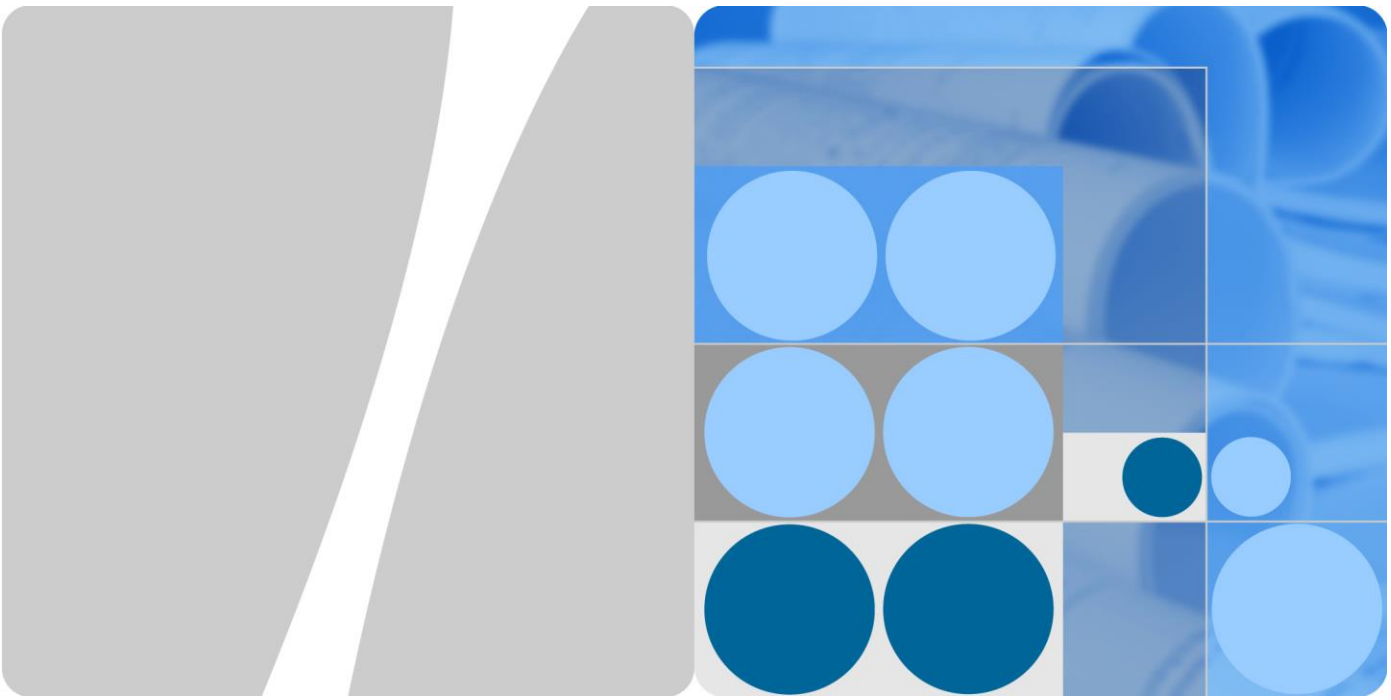

ETP4830-A1 Embedded Power

User Manual

Issue 14

Date 2020-03-02

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Preface

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 engineer
- Technical support engineer
- Maintenance engineer

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 14 (2020-03-02)

Added the content of the COM port and RS485/RS232 port.

Added the SNMPV1 and SNMPV2 protocol description.

Updated the acronyms and abbreviations.

Issue 13 (2019-10-25)

Modified contents about the rectifier.

Issue 12 (2018-09-21)

Modified section "4.2.5 Connecting the DC Output Power Cable".

Modified section "4.2.6 Connecting the Battery Cable".

Issue 11 (2018-04-20)

Added section "3.4 Power Monitor Interface Unit MUE02B".

Added section "4.1.4 Installing a MUE02B".

Added section "4.2.4 Installing Cables for MUE02B".

Issue 10 (2017-08-08)

Modified section "2.3 Configuration".

Modified section "4.2.6 Connecting the Battery Cable".

Issue 09 (2016-01-28)

Added section "4.2.8 Connecting the Dual-Live of IT 230 V Net or TN 208 V Net AC Input Power Cable".

Issue 08 (2014-10-30)

Added section "6.5 Setting Battery Parameters".

Issue 07 (2014-07-18)

Modified "6.5 Setting Battery Parameters".

Added section "6.6 (Optional) Setting DC Parameters".

Issue 06 (2014-02-20)

Added section "4.2.2 (Optional) Installing Dry Contact Signal Cables".

Added section "6.4 Setting System Type".

Issue 05 (2013-07-02)

Add the configuration of R4815G1, SMU01A and SMU01C.

Issue 04 (2013-05-07)

Optimized the content of the document, including standardizing the terminology and improving the accuracy of the description.

Issue 03 (2013-04-18)

Modify operating temperature, input voltageand output voltage.

Issue 02 (2012-12-03)

Port description is modified.

Issue 01 (2012-05-11)

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.

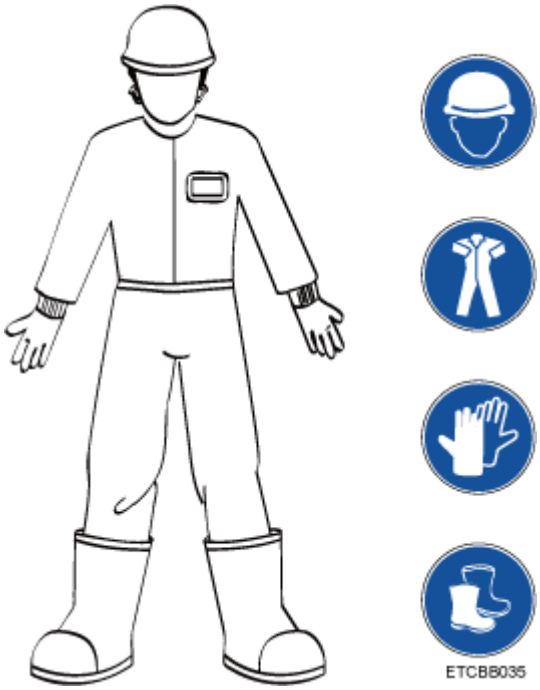
Huawei will not be liable for any consequences of the following circumstances:

- 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

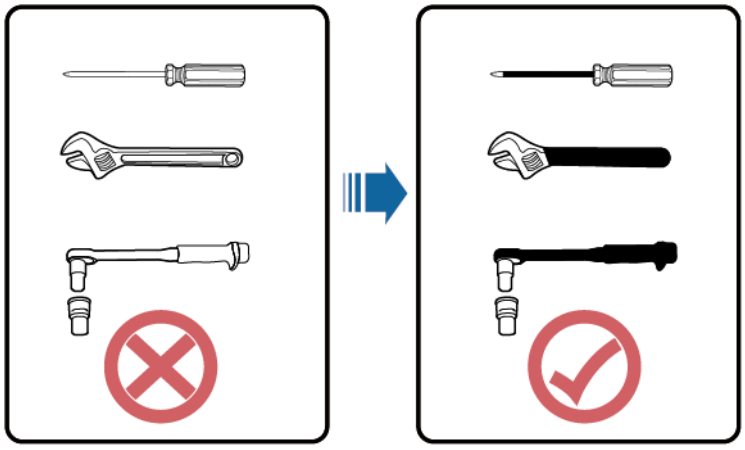
General Requirements

- 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.

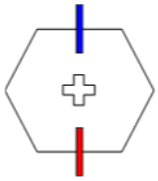
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.



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

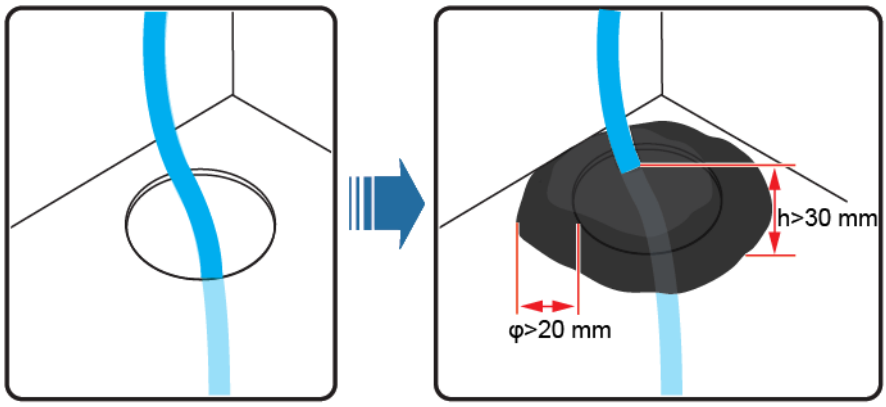


- Follow the specified procedures for installation, operation, and maintenance.
- Ensure that bolts are tightened with a torque wrench and marked using red or blue color. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm if the bolts are tightened and then mark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

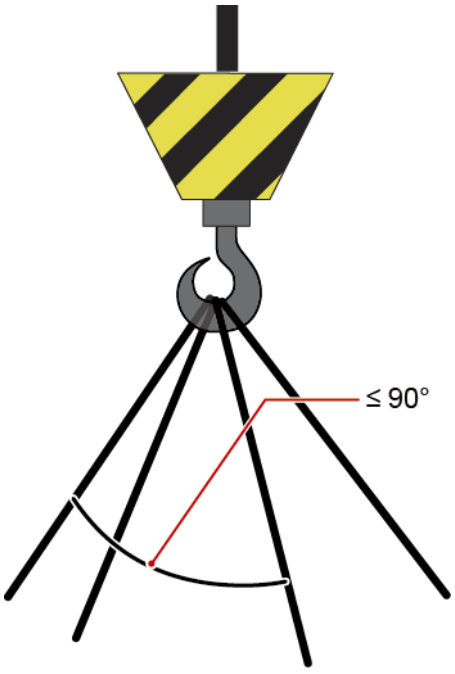
1.5 Mechanical Safety

Hoisting Devices

DANGER

Do not walk under hoisted objects.

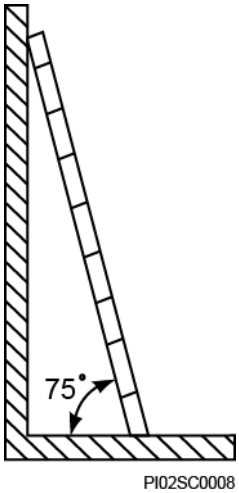
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables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

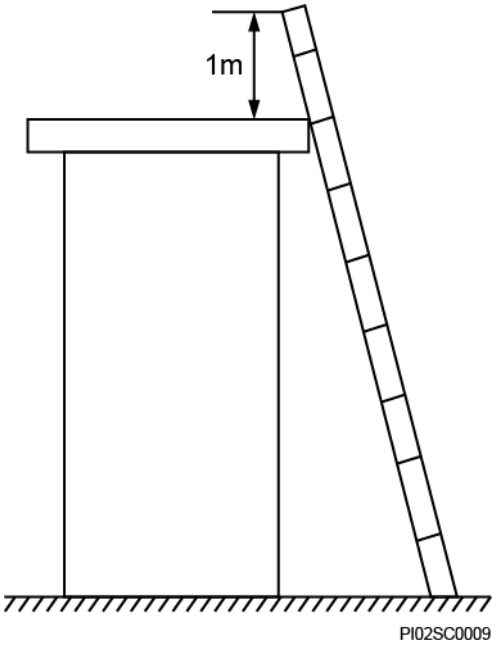
Using Ladders

- 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:

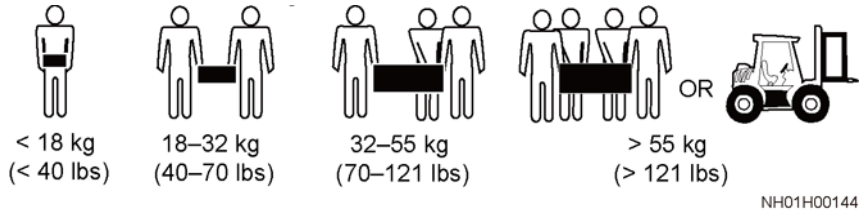
NOTICE

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 ETP4830-A1 is a box-type power system that supplies power for -48 V DC communications equipment. It uses 15 A rectifiers and provides a maximum output current of 30 A.

2.2 Features

The ETP4830-A1 has the following features:

- Supports a wide voltage range of 85 V AC to 300 V AC.
- Provides comprehensive battery management.
- The SMU01A communicates with Huawei Network Ecosystem (NetEco) and third-party element management systems (EMSs) over various security protocols, such as the access network master/slave protocol, YDN protocol, Simple Network Management Protocol (SNMP), featuring flexible networking. It implements remote unattended management.
- The SMU01B supports access network master/slave protocols, which allows Huawei access network communications equipment to connect to the U2000.
- The SMU01C connects to the power and environment over YDN protocol and access network host over master/slave protocols.
- Displays information on a liquid crystal display (LCD) and provides buttons for operations.
- Supports electronic labels.
- Rectifiers and the site monitoring unit (SMU) are hot-swappable.
- Allows high-efficiency and standard-efficiency rectifiers with the same capacity to coexist.
- The rectifier power factor is 0.99.

2.3 Configuration

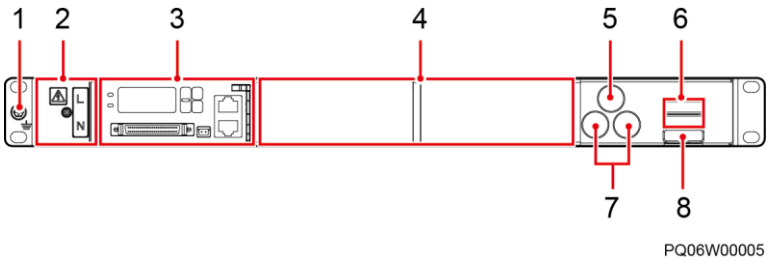
Table 2-1 ETP4830-A1 configuration

Item	Configuration		
PDU	AC input	230 V AC single-phase three-wire (L, N), compatible with 230 V AC dual-live-wire (L, L)	
	DC power distribution	Battery fuse	One 20 A
		Load fuse	Two 20 A
SMU	The following SMUs are supported: • One SMU01A • One SMU01B • One SMU01C		
Rectifier	The following rectifiers are supported: • One to two R4815G1s • One to two R4815N1s **NOTE** • The R4815G1 and R4815N1 can be installed together.		

3 Components

3.1 Appearance

Figure 3-1 Appearance



(1) Ground screw	(2) AC input terminals (behind the cover)	(3) Space for the SMU
(4) Space for rectifiers	(5) Battery fuse	(6) DC output terminals
(7) Load fuses	(8) Battery wiring terminal	

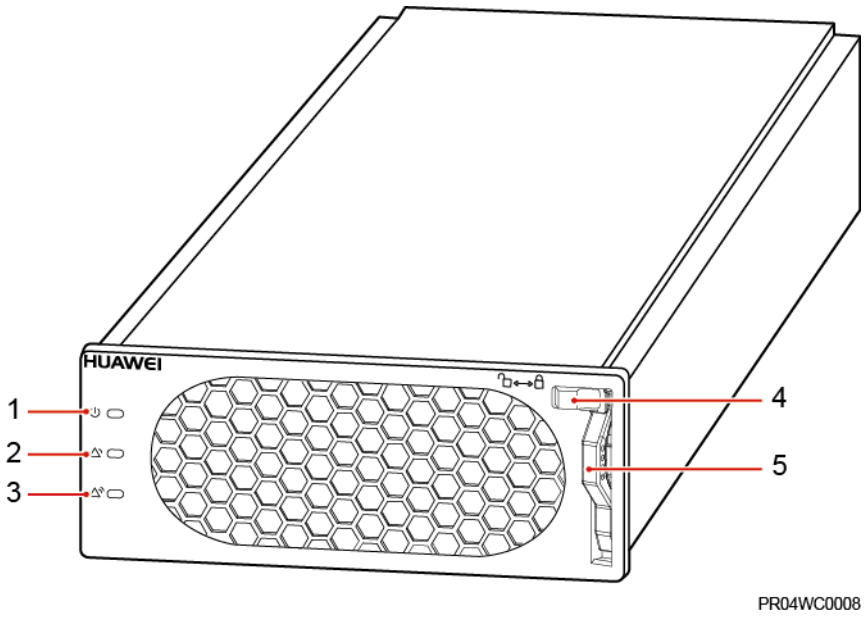
NOTICE

Do not mix up the slots for installing the SMU and rectifier. Otherwise, the SMU and rectifier may be damaged.

3.2 Rectifier

A rectifier converts AC input power into stable DC power.

Figure 3-2 Appearance



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

(4) Locking latch (5) Handle

Table 3-1 Indicator description

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

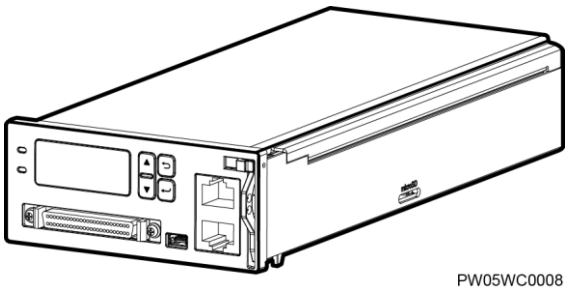
Indicator	Color	Status	Description
		Blinking at 0.5 Hz	The communication between the rectifier and the external device is interrupted.
Fault indicator	Red	Off	The rectifier is normal.
		Steady on	The rectifier locks out due to output overvoltage.
			The rectifier has no output due to an internal fault.

3.3 SMU

3.3.1 SMU01A

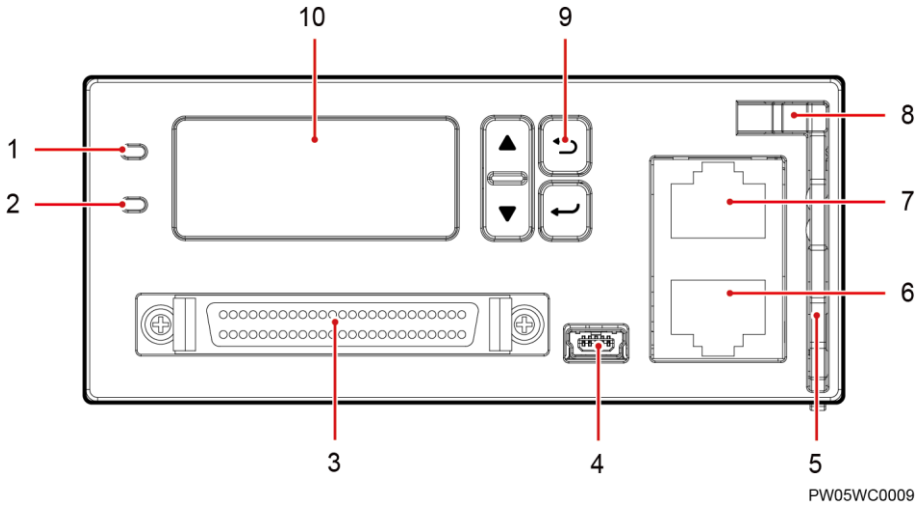
Appearance

Figure 3-3 SMU01A appearance



Panel

Figure 3-4 SMU01A panel



(1) Run indicator (2) Alarm indicator (3) DB50 port

(4) USB port (reserved) (5) Handle (6) RS485/RS232 port

(7) COM port (8) Locking latch (9) Buttons

(10) LCD

Indicators

Table 3-2 Indicator description

Name	Color	Status	Description
Running status indicator	Green	Off	The SMU01A is faulty or has no DC input.
		Blinking at 0.5 Hz	The SMU01A runs properly and communicates with the host properly.
		Blinking at 4 Hz	The SMU01A runs properly but does not communicate with the host properly.
Alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

LCD

You can set parameters and view information on the LCD using the four buttons beside on the SMU01A panel.

Buttons

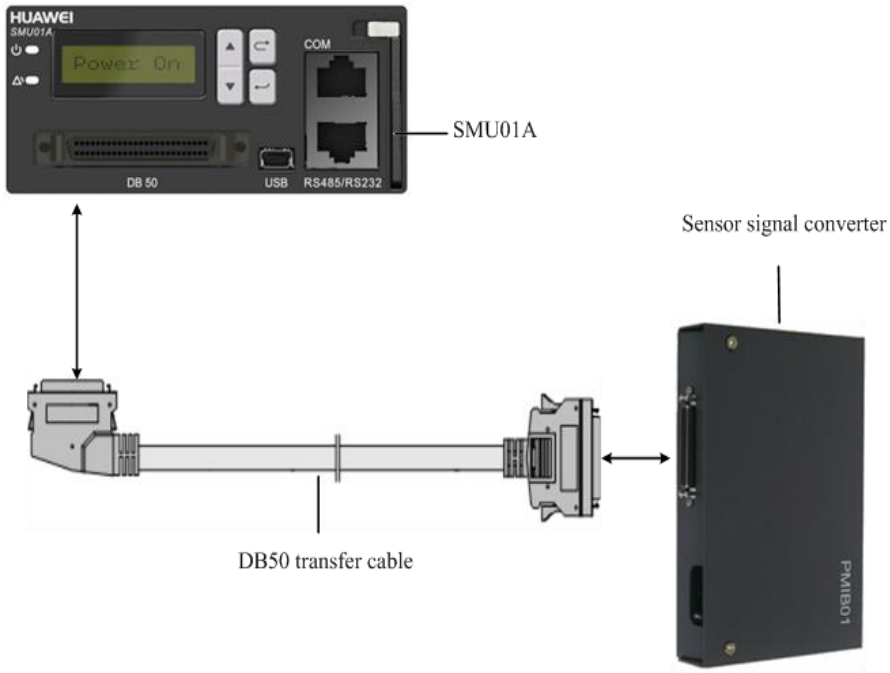
Table 3-3 Button description

Button	Name	Description
 and 	Up and down	Go to the previous or next menu item and select a value.
	Back	Return to the previous menu without saving the settings.
	Enter	• Enter the main menu from the standby screen. • Enter a submenu from the main menu. • Save the menu settings.
NOTE • The LCD backlight turns off if no button is pressed for 5 minutes. • Re-login is required if no button is pressed for 8 minutes.		

DB50 Port

The DB50 port is connected to the sensor signal converter by using the DB50 transfer cable. The DB50 port detects analog parameters and Boolean values, and provides controlled signal outputs.

Figure 3-5 Connection between the DB50 port and the sensor signal converter



NOTE

The DB50 transfer cable and sensor signal converter are extended components of the SMU01A.

The number of dry contact outputs is determined by the quantity of terminals on the sensor transfer box.

Figure 3-6 DB50 port pin definitions

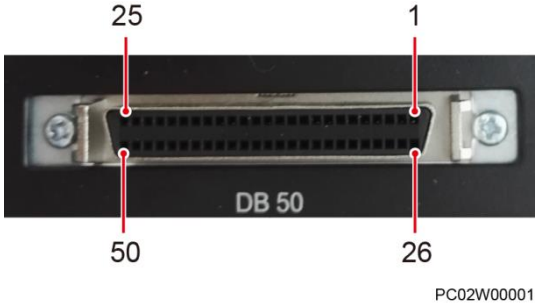


Table 3-4 DB50 port pin definitions

Pin	Signal	Description	Pin	Signal	Description
1~3	12V+	12 V power supply	27	JK1+	Dry contact output
4~5	GND	Signal ground	28	JK1-	
6	SIM1	Battery midpoint voltage	29	JK2+	
7	SIM2		30	JK2-	

Pin	Signal	Description	Pin	Signal	Description
8	FU1+	Battery fuse blown detection	31	CONT1O+	
9	NC	None	32	CONT1O-	
10	GND	GND	33	CONT2O+	
11	VHUM	Ambient humidity measurement (4–20 mA current type)	34	CONT2O-	
12	VBTEM1	Battery temperature measurement 1 (4–20 mA current type)	35	RX-	RS485 receive
13	VBTEM2	Battery temperature measurement 2 (4–20 mA current type)	36	RX+	
14	VTEM1	Ambient temperature measurement 1 (4–20 mA current type)	37	TX-	RS485 transmit
15	VTEM2	Ambient temperature measurement 2 (NTC type)	38	TX+	
16~22	JTD1~JTD7	Reserved digital signals 1–7	39~40	NC	None
23	SMOKE	Smoke sensor detector	41	SCL_BK	I2C communication signal
24	WATER	Water detector	42	SDA_BK	
25	DOOR	Door status sensor detector	43~49	NC	None
26	WIRE	Distribution frame monitoring result	50	5V_OUT	5 V power supply

USB Port

The universal serial bus (USB) port is not used in this version.

Communications Ports

The SMU01A communicates with the host over communications ports.

Table 3-5 SMU01A Communications port description

Port	Communications Mode	Communications Parameter	Protocol Compliance
COM	FE	Autonegotiation	SNMP protocol
	RS485/RS232	Baud rate: 9600 bit/s or 19,200 bit/s	Master/slave protocol or YDN protocol
RS485/RS232	RS485/RS232	Baud rate: 9600 bit/s or 19,200 bit/s	Master/slave protocol or YDN protocol

NOTE

- All ports are protected by a security mechanism.
- The COM port is multiplexed as an FE port and RS485/RS232 port. The SMU implements adaptive detection 30 min after startup. If no network cable is connected within 30 min, it communicates through RS485/RS232 by default. To use the FE port for communication, perform network detection on the LCD to implement another adaption. LCD path: **Main Menu** > **Control** > **Site Summary** > **Network Detect**
- After the port is selected, only either of the communication modes RS485 and RS232 can be used at a time.

Figure 3-7 Communications port

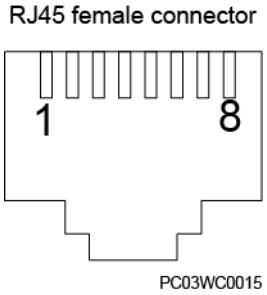


Table 3-6 describes the pins in the COM port used as an FE port. Table 3-7 describes the pins in the COM port used as an RS485/RS232 port.

Table 3-6 Pins in the COM port (used as an FE port)

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

Pin	Signal	Description
4, 5, 7, 8	Reserved	N/A

Table 3-7 Pins in the COM port (used as a RS485/RS232 port)

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Protective grounding.
8	Reserved	N/A

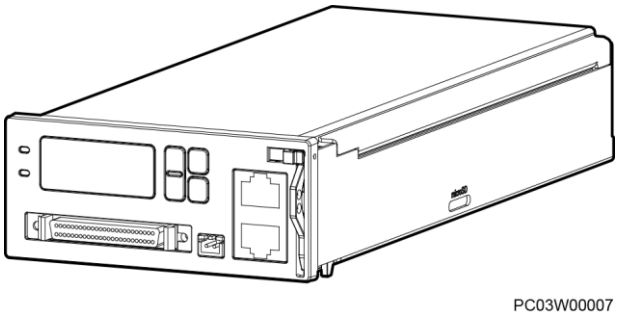
Table 3-8 Pins in the RS485/RS232 port

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Protective grounding.
8	Reserved	N/A

3.3.2 SMU01B

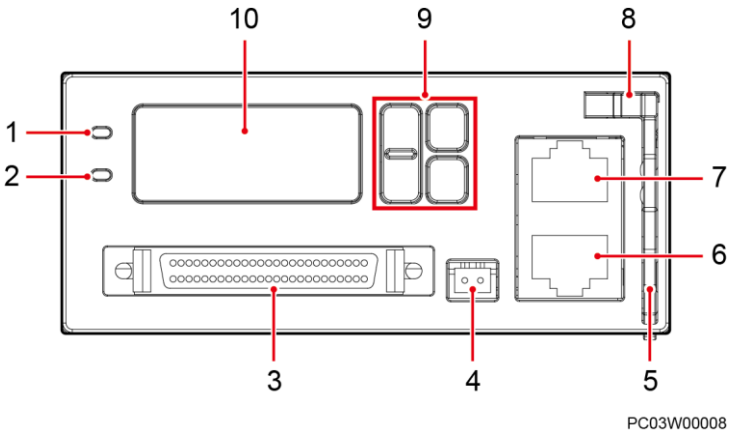
Appearance

Figure 3-8 SMU01B



Panel

Figure 3-9 SMU01B panel



(1) Run indicator
(2) Alarm indicator
(3) DB50 port
(4) Battery temperature sensor port
(5) Handle
(6) RS485/RS232 port
(7) COM port
(8) Locking latch
(9) Four buttons
(10) Liquid crystal display (LCD)

Indicators

Table 3-9 Indicator description

Name	Color	Status	Description
Running status	Green	Off	The SMU01B is faulty or has no power

Name	Color	Status	Description
indicator			input.
		Blinking at 0.5 Hz	The SMU01B runs properly and communicates with the host properly.
		Blinking at 4 Hz	The SMU01B runs properly but does not communicate with the host properly.
Alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

LCD

You can set parameters and view information on the LCD using the four buttons beside on the SMU01B panel.

Buttons

Table 3-10 Button description

Button	Name	Description
▲ or ▼	Up or Down	Allows you to view menu items and set the value of a menu item.
↩	Back	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 the menu settings.
NOTE • The LCD screen becomes dark if no button is pressed within 5 minutes. • You need to log in again if no button is pressed within 8 minutes.		

Communications Ports

The communication port is used for communication with the host and can also manage southbound equipment.

Table 3-11 Communications ports

Port	Communications Mode	Communications Parameters	Protocol Compliance
COM	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s	Master/slave protocol
RS485/RS232	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s	Master/slave protocol

NOTE

- All the preceding ports are protected by a security mechanism.
- The COM port can only be used as a northbound port to connect to the access network device, and the RS485/RS232 port can be used as a northbound port or a southbound port. You can choose to switch through the configuration mode. The master mode corresponds to the southbound mode and the slave mode corresponds to the northbound mode. The RS485/RS232 port will automatically switch the master-slave mode when communication fails, so there is no need to specifically configure the port mode. The baud rate is 9600bit/s and 19200bit/s adaptive.

Figure 3-10 Communications port

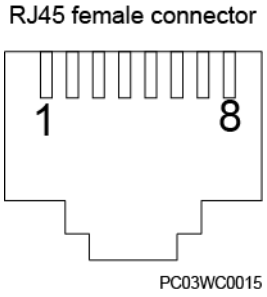


Table 3-12 describes the pins in the COM port and RS485/RS232 port.

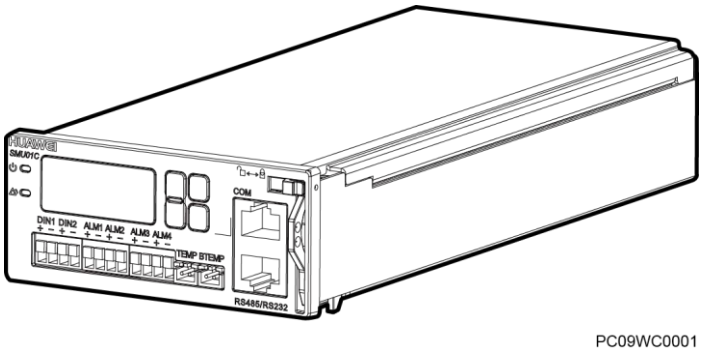
Table 3-12 Pins in the RS485/RS232 port

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Protective grounding.
8	Reserved	N/A

3.3.3 SMU01C

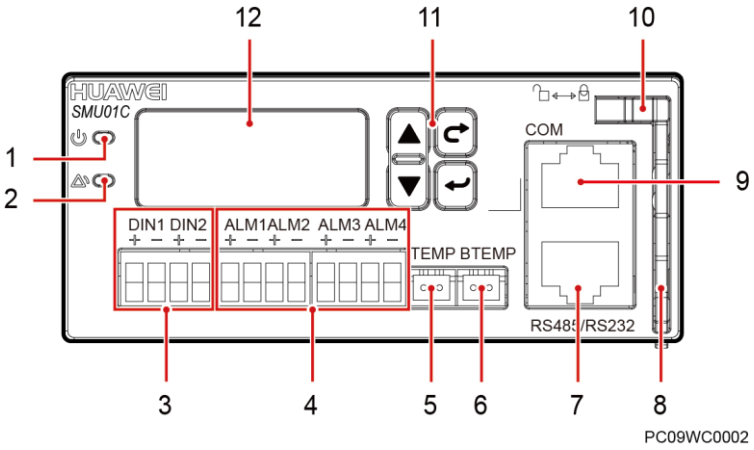
Appearance

Figure 3-11 SMU01C



Panel

Figure 3-12 SMU01C panel



(1) Run indicator	(2) Alarm indicator	(3) Dry contact input ports
(4) Dry contact output ports	(5) Ambient temperature sensor port	(6) Battery temperature sensor port
(7) RS485/RS232 port	(8) Handle	(9) COM port
(10) Locking latch	(11) Four buttons	(12) Liquid crystal display (LCD)

Indicators

Table 3-13 Indicator description

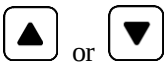
Name	Color	Status	Description
Running status indicator	Green	Off	The SMU01C is faulty or has no DC input.
		Blinking at 0.5 Hz	The SMU01C runs properly and communicates with the host properly.
		Blinking at 4 Hz	The SMU01C runs properly but does not communicate with the host properly.
Alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

LCD

The SMU01C provides a liquid crystal display (LCD) to display power system information in real time.

Buttons

Table 3-14 Button description

Button	Name	Description
	Up or Down	Allows you to view menu items and set the value of a menu item.
	Back	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 the menu settings.
NOTE • The LCD screen becomes dark if no button is pressed within 5 minutes. • You need to log in again if no button is pressed within 8 minutes.		

Dry contact ports

Table 3-15 Dry contact ports description

Port Type	Silk-screen	Description	Default Alarms
Dry contact input port	DIN1	Dry contact input 1	Reserved
	DIN2	Dry contact input 2	Reserved
Dry contact output port	ALM1	Dry contact output 1	Major Alarm Mains Fault, DC Over Volt, DC Under Volt, Batt Off, Batt Loop Trip, Rect Fault, Load Fuse Trip
	ALM2	Dry contact output 2	Minor Alarm AC Over Volt, AC Under Volt, Amb. Over Temp1, Amb. Under Temp1, Batt Over Temp, Batt Under Temp, Rect Protect, Rect Comm Fail, Batt Over Curr, Dig. Input1 ALM, Dig. Input2 ALM, Batt Discharge
	ALM3	Dry contact output 3	Reserved
	ALM4	Dry contact output 4	Reserved

Communications Ports

Table 3-16 Communications ports

Port	Communications Mode	Communications Parameters	Protocol Compliance
COM	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s	Master/slave protocol or YDN protocol
RS485/RS232	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s	Master/slave protocol or YDN protocol

NOTE

- Supports RS485 and RS232 serial ports.
- The COM ports and RS485/RS232 ports work in active/standby mode. Either of them is at work.
- The RS485 and RS232 serial ports are mutually exclusive.
- All the preceding ports are protected by a security mechanism.

Figure 3-13 Communications port

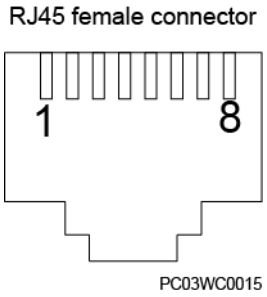


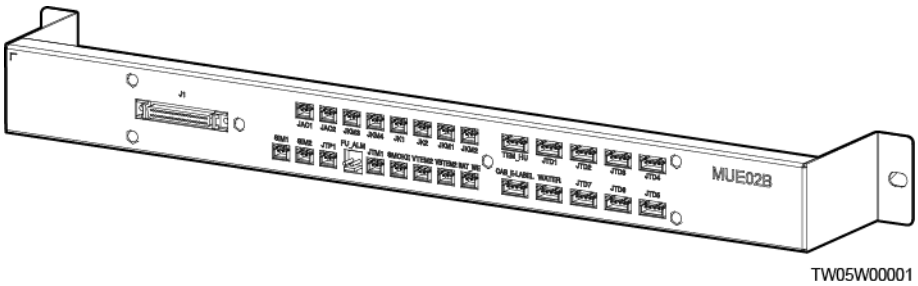
Table 3-17 describes the pins in the COM port and RS485/RS232 port.

Table 3-17 Pins in the RS485/RS232 port

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Protective grounding.
8	Reserved	N/A

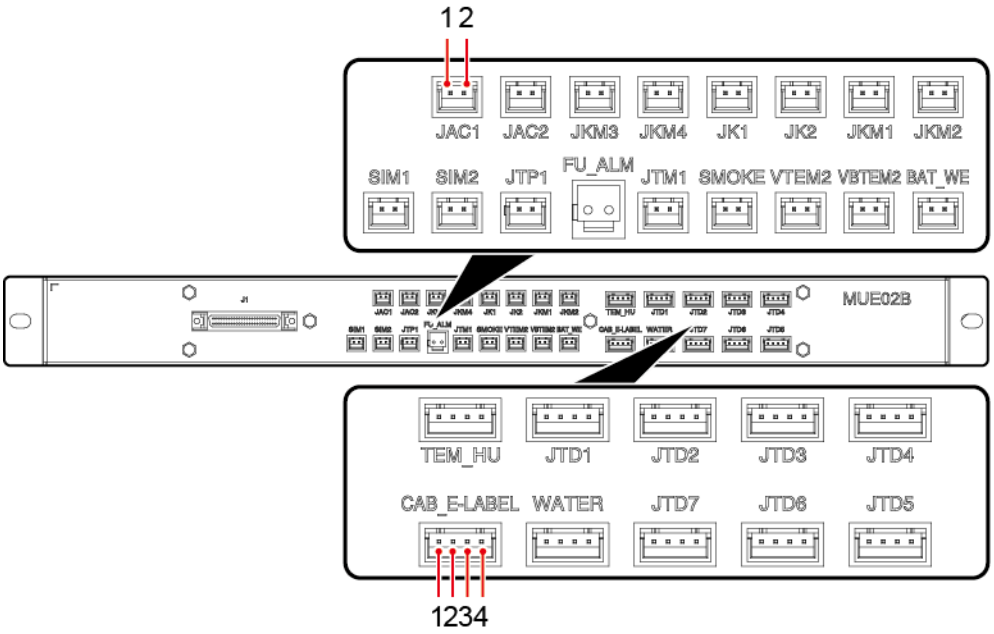
3.4 Power Monitor Interface Unit MUE02B

Figure 3-14 Appearance



Ports

Figure 3-15 Ports



NOTE

Except the J1 port, the port pins of MUE02B are numbered from left to right.

Table 3-18 Panel ports

Silk Screen	Pin	Pin Definition	Description
JAC1, JAC2, JKM3, JKM4, JK1, JK2, JKM1, JKM2	1	-	Digital signal, indicating the dry contact output
	2	-	
SIM1, SIM2	1	Signal cable	Analog signal, indicating the voltage monitoring result
	2	Reserved	
JTP1	1	Signal cable	Digital signal, indicating the distribution frame monitoring result
	2	Reserved	
FU_ALM	1	Signal cable	Analog signal, indicating the battery fuse blown monitoring result
	2	Reserved	
JTM1	1	Signal cable	Digital signal, indicating the door status monitoring result
	2	+12 V	
SMOKE	1	Signal cable	Digital signal, indicating the smoke sensor monitoring result
	2	+12 V	

Silk Screen	Pin	Pin Definition	Description
VTEM2	1	+12 V	Analog signal, indicating ambient temperature monitoring result 2
	2	Signal cable	
VBTEM2	1	+12 V	Analog signal, indicating battery temperature monitoring result 2
	2	Signal cable	
BAT_WE	1	+12 V	Analog signal, indicating battery temperature monitoring result 1
	2	Signal cable	
TEM_HU	1	+12 V	Analog signal, indicating ambient temperature and humidity monitoring result
	2	Temperature signal cable	
	3	+12 V	
	4	Humidity signal cable	
JTD1, JTD2, JTD3, JTD4, JTD5, JTD6, JTD7	1	+12 V	Digital signal, indicating the dry contact input
	2	+12 V	
	3	Signal cable	
	4	Ground cable	
WATER	1	+12 V	Digital signal, indicating the water sensor monitoring result
	2	Signal cable	
	3	Ground cable	
	4	Reserved	
CAB_E-LABEL	1	+5 V	Electronic cabinet label
	2	Clock signal cable	
	3	Data signal cable	
	4	Ground cable	

Figure 3-16 J1 ports of MUE02B

Table 3-19 J1 ports description

Pin	Pin Definition	Description	Pin	Pin Definition	Description
1–3	+12 V	12 V power supply +	27	JK1+	Dry contact output 1 +
4–5	GND	Signal ground	28	JK1–	Dry contact output 1 –
6	SIM1	Battery midpoint voltage	29	JK2+	Dry contact output 2 +
7	SIM2	Battery midpoint voltage	30	JK2–	Dry contact output 2 –
8	FU1+	Battery fuse	31	CONT1O+	Dry contact output 3 +
9	NC	Reserved	32	CONT1O–	Dry contact output 3 –
10	GND	Signal ground	33	CONT2O+	Dry contact output 4 +
11	VHUM	Ambient humidity	34	CONT2O–	Dry contact output 4 –
12	VBTEM1	Ambient temperature	35	B485_R–	RS485 receive +
13	VBTEM2	NTC temperature	36	B485_R+	RS485 receive +
14	VTEM1	4–20 mA temperature	37	B485_T–	RS485 transmit –
15	VTEM2	NTC temperature	38	B485_T+	RS485 transmit +
16–22	JTD1–JTD7	Reserved digital signals 1–7	39–40	NC	Reserved
23	SMOKE	Smoke sensor	41	SCL_BK	I2C communication signal

Pin	Pin Definition	Description	Pin	Pin Definition	Description
24	WATER	Water	42	SCL_BK	I2C communication signal
25	DOOR	Door status sensor	43–49	NC	Reserved
26	WIRE	Distribution frame monitoring result	50	5 V_OUT	5 V power supply +

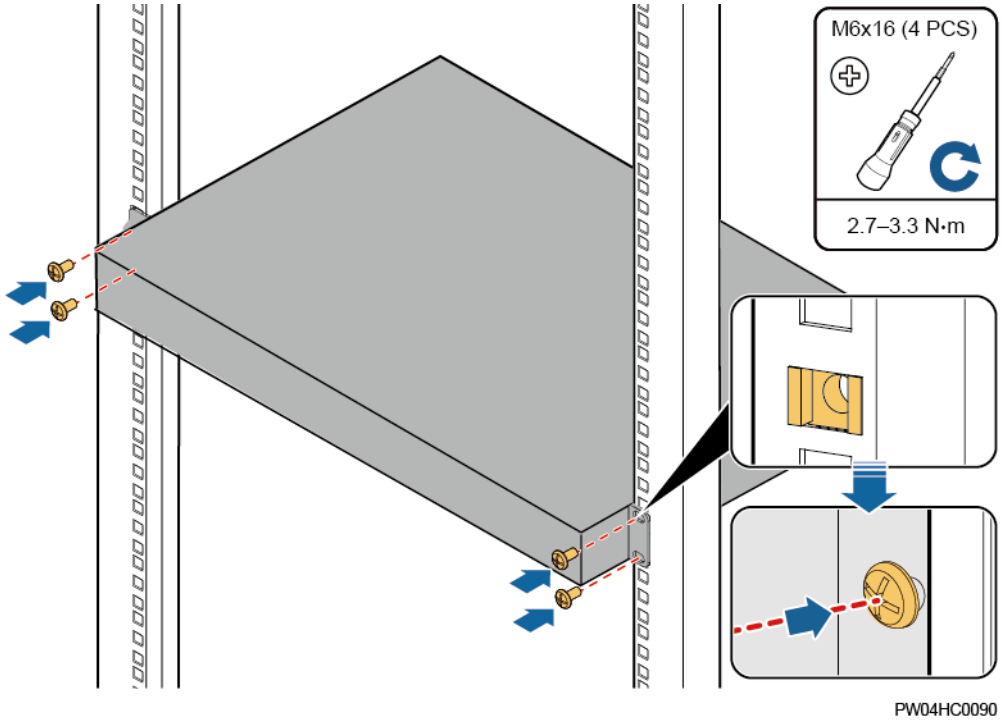
4 Installation

4.1 Installing Components

4.1.1 Installing a Subrack

Install the subrack in 19-inch rack, as shown in Figure 4-1.

Figure 4-1 Installing a subrack



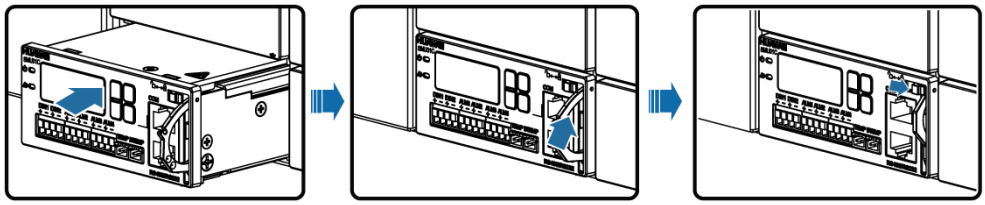
4.1.2 Installing an SMU

Procedure

Step 1 Push the locking latch towards the left, and pull out the handle.

Step 2 Slide the SMU into the subrack along the guide rail, push in the handle, and then push the locking latch towards the right.

Figure 4-2 Installing an SMU



----End

4.1.3 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.

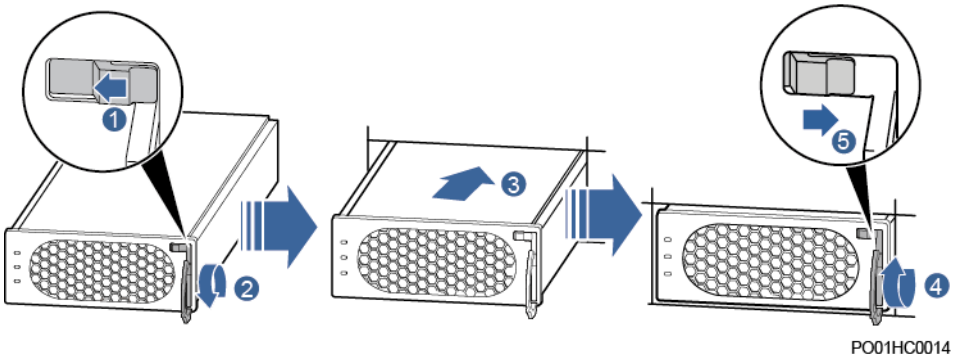
Step 2 Draw the handle downwards.

Step 3 Insert the rectifier into the slot and slide the rectifier into the subrack along the guide rails.

Step 4 Push the handle upwards.

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

Figure 4-3 Installing a rectifier



----End

4.1.4 Installing a MUE02B

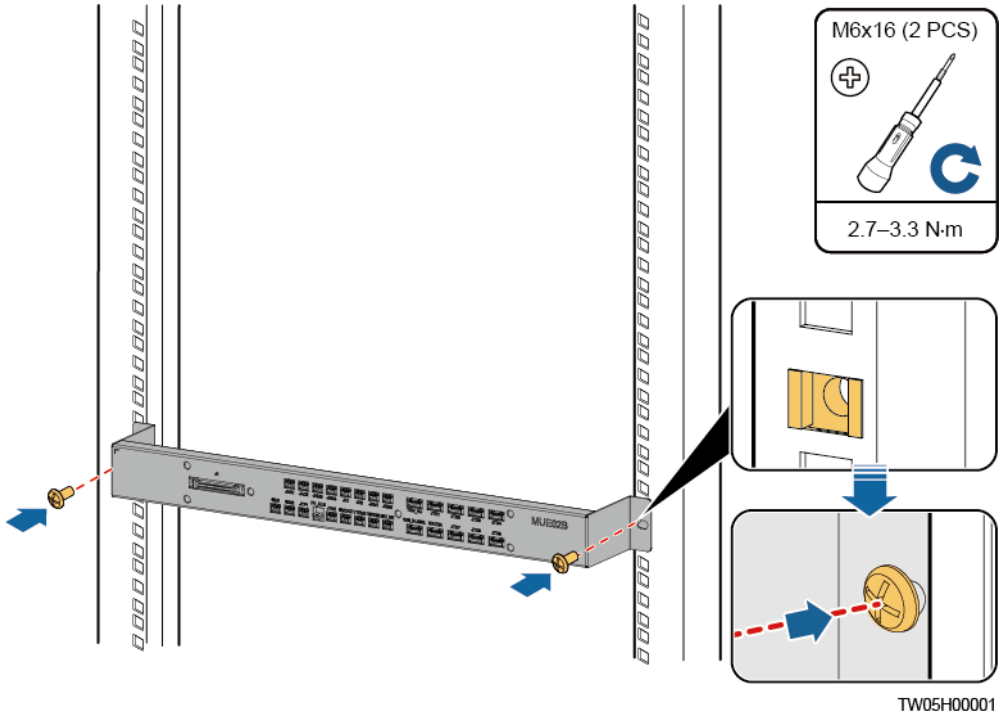
Prerequisites

If a MUE02B is configured, perform the following steps to install it.

Procedure

Step 1 Install the MUE02B in 19-inch rack.

Figure 4-4 Installing a MUE02B



----End

4.2 Installing Cables

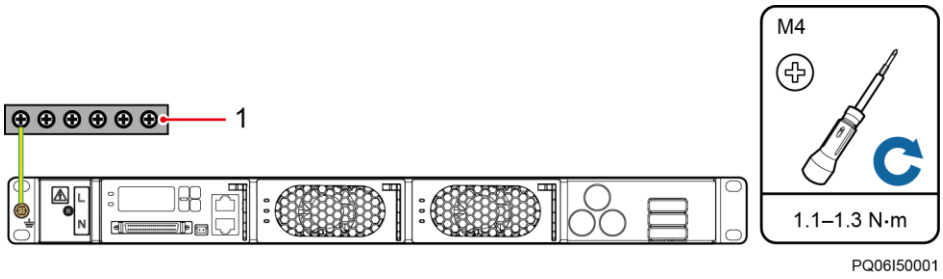
DANGER

- Ensure that the upstream AC input circuit breaker is OFF, and attach warning labels such as "Do not operate."
- Before installing cables, switch all the circuit breakers to OFF and remove the fuses that need to connect to cables.

4.2.1 Connecting the Ground Cable

Figure 4-5 shows how to connect the ground cable (an M4 OT terminal is used for the cable).

Figure 4-5 Connecting the ground cable



(1) Ground bar

4.2.2 (Optional) Installing Dry Contact Signal Cables

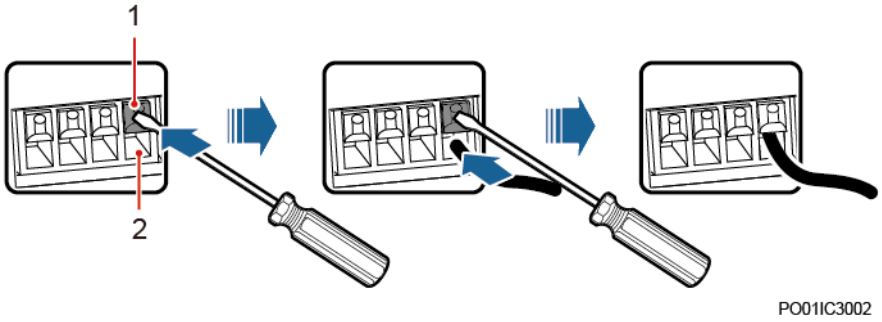
Procedure

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

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

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

Figure 4-6 Installing a dry contact signal cable



(1) Contact plate (2) Dry contact port

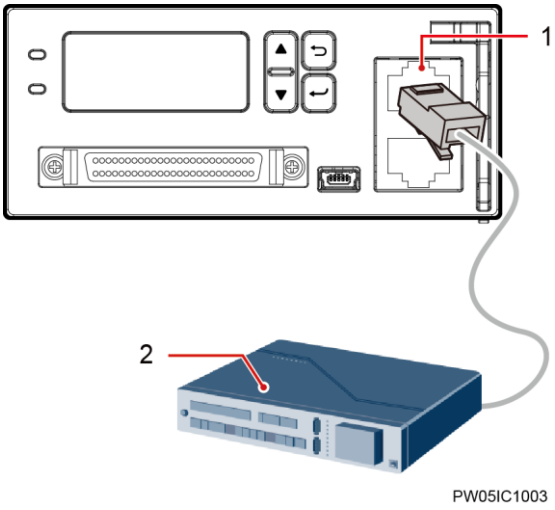
----End

4.2.3 Connecting the Communications Cable

Connecting a Communications Cable to the SMU01A

Connect a communications cable to the COM port of the SMU01A when the power system connects to a power and environment monitoring device, as shown in Figure 4-7.

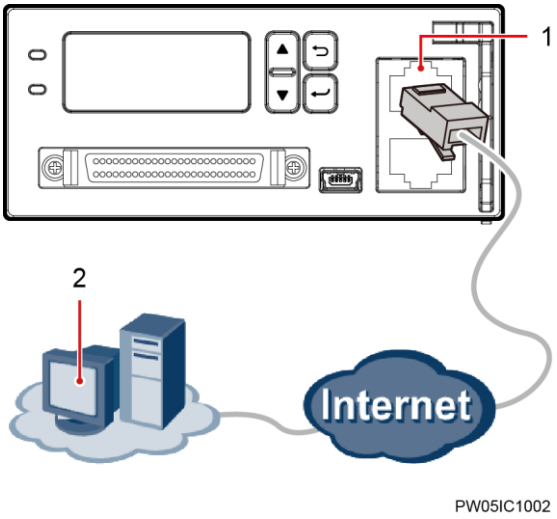
Figure 4-7 Connecting the SMU01A and the power and environment monitoring device



COM port Power and environment monitoring device

Connect a communications cable to the COM port on the SMU01A when you use the NetEco, or SNMP to remotely manage the power supply system, as shown in Figure 4-8.

Figure 4-8 Connecting a communications cable to the SMU01A COM port

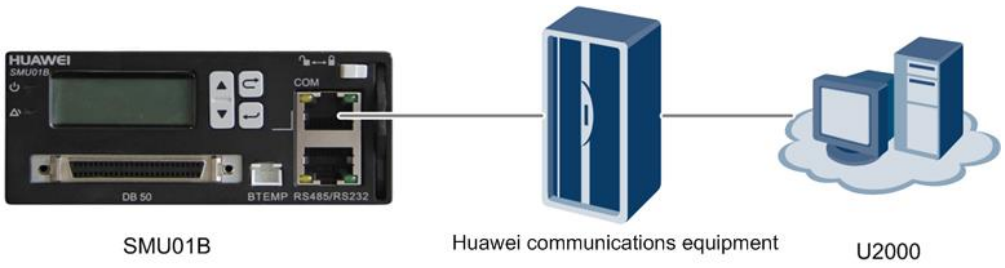


(1) COM port (2) Remote management

Connecting a Communications Cable to the SMU01B

Connect the COM port on the SMU01B to the corresponding serial port on the Huawei access network communications equipment using a communications cable when you use the U2000 network management system to remotely manage the power supply system, as shown in Figure 4-9.

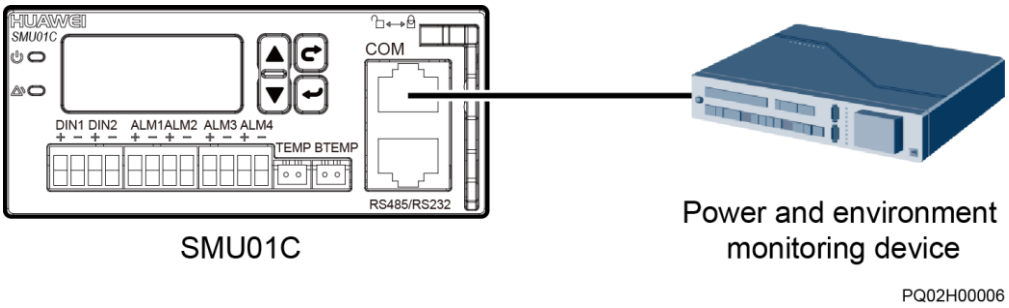
Figure 4-9 Connecting a communications cable to the SMU01B COM port



Installing SMU01C Communications Cables

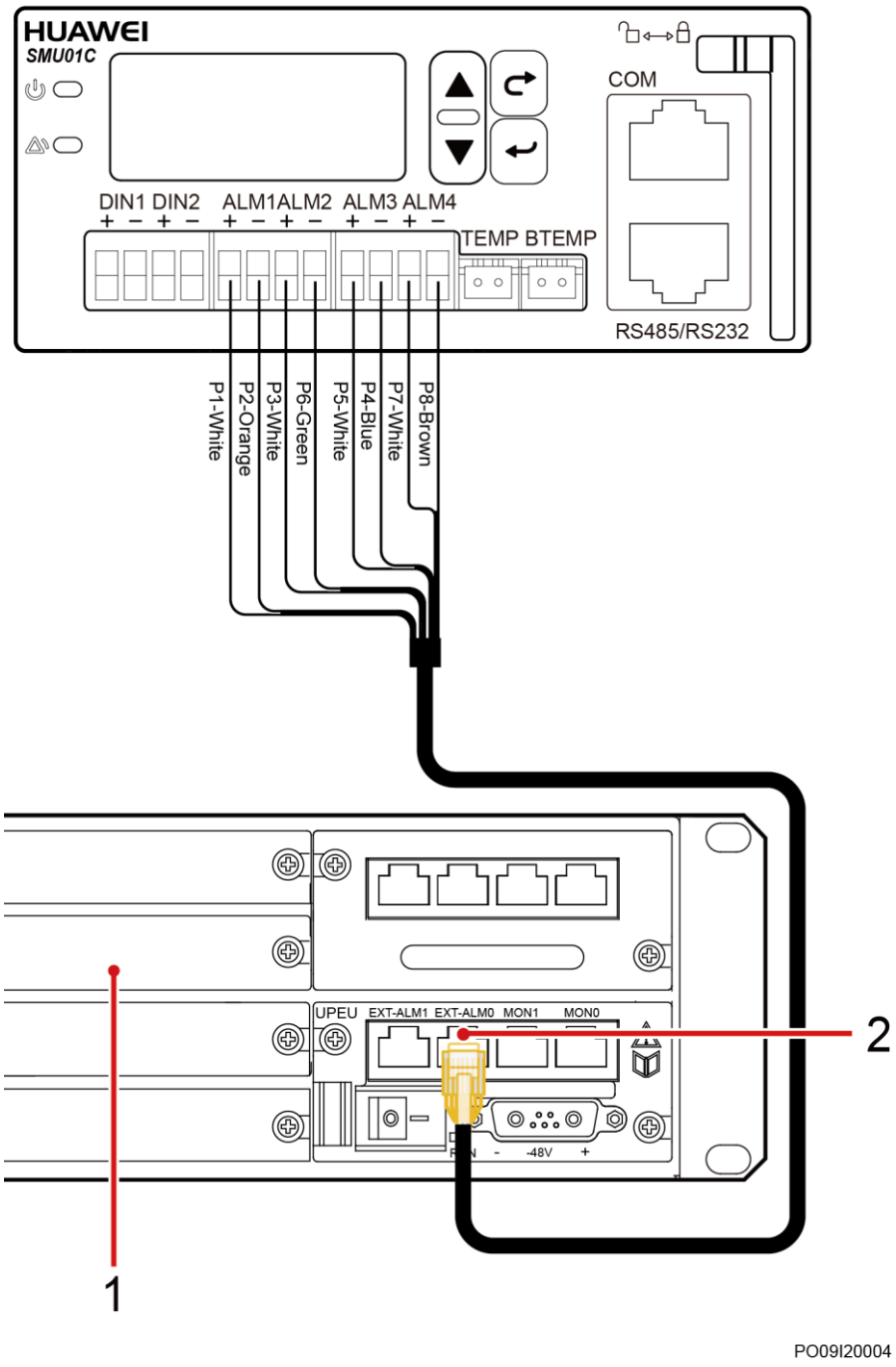
If the power system connects to a power and environment monitoring device, connect a communications cable to the COM port on the SMU01C.

Figure 4-10 Connecting the SMU01C and the power and environment monitoring device



Alarm signals of the power system can be uploaded over dry contacts. Connect dry contact signal cable to the EXT-ALM0 port on the BBU.

Figure 4-11 Connecting the SMU01C and the BBU



(1) BBU (2) EXT-ALM0 port

4.2.4 Installing Cables for MUE02B

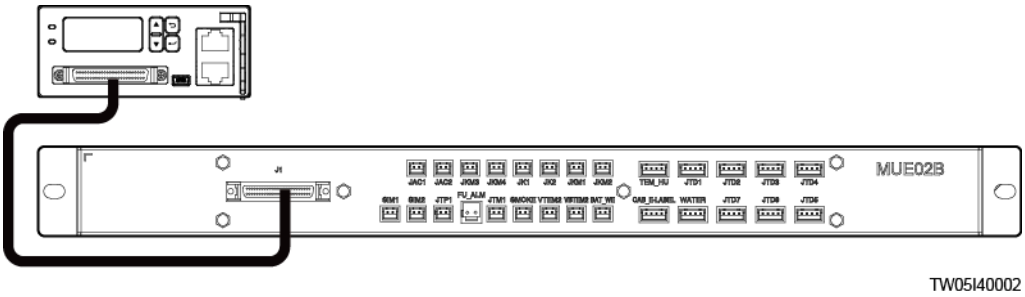
Prerequisites

If SMU01A and MUE02B are configured, perform the following steps.

Procedure

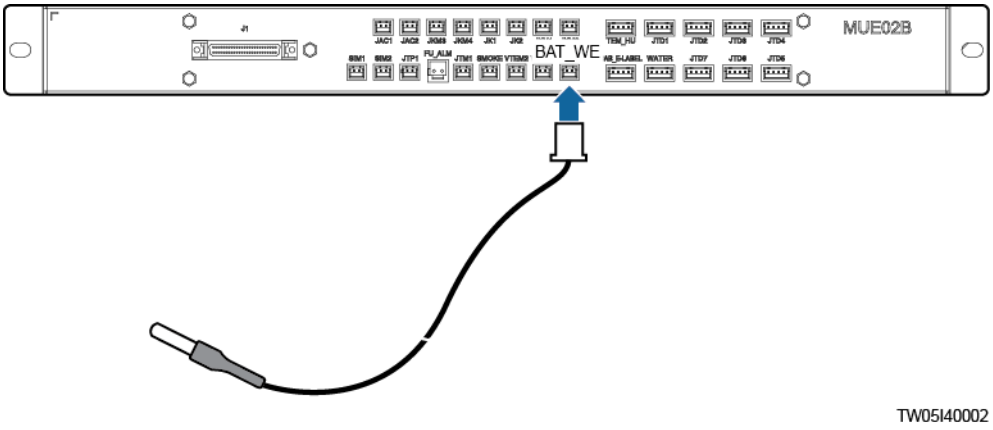
Step 1 Connect one end of the communication cable to the J1 port on the MUE02B, and the other end to the DB50 port on the SMU01A.

Figure 4-12 Installing communication cables



Step 2 Connect the signal cable for the battery temperature sensor to the BAT_WE port on the MUE02B.

Figure 4-13 Installing a signal cable for the battery temperature sensor



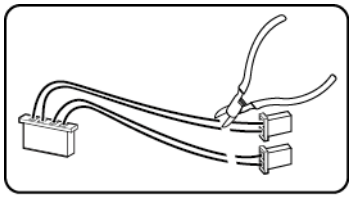
----End

4.2.5 Connecting the DC Output Power Cable

Procedure

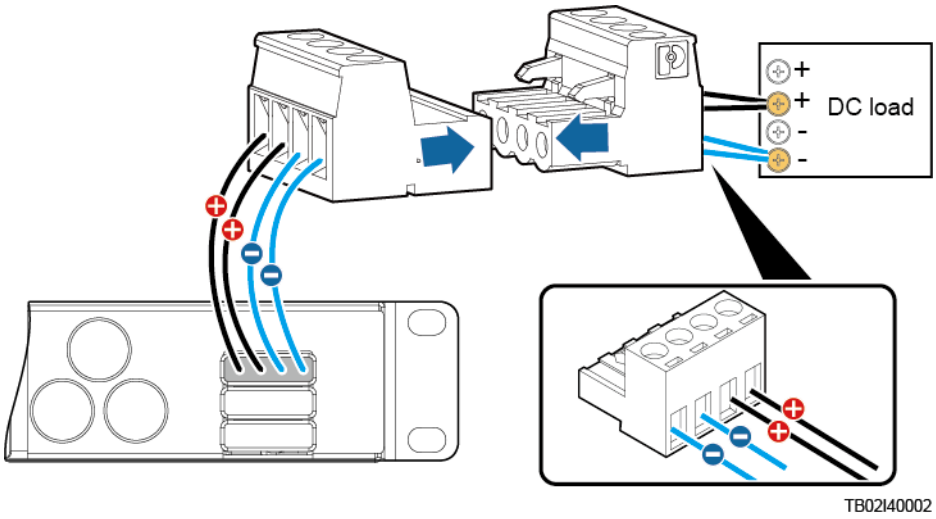
Step 1 Cut off the two 2-pin terminals at one end of the DC output power cable.

Figure 4-14 Cutting off the cable terminals



Step 2 Connect the DC output power cable.

Figure 4-15 Connecting the DC output power cable

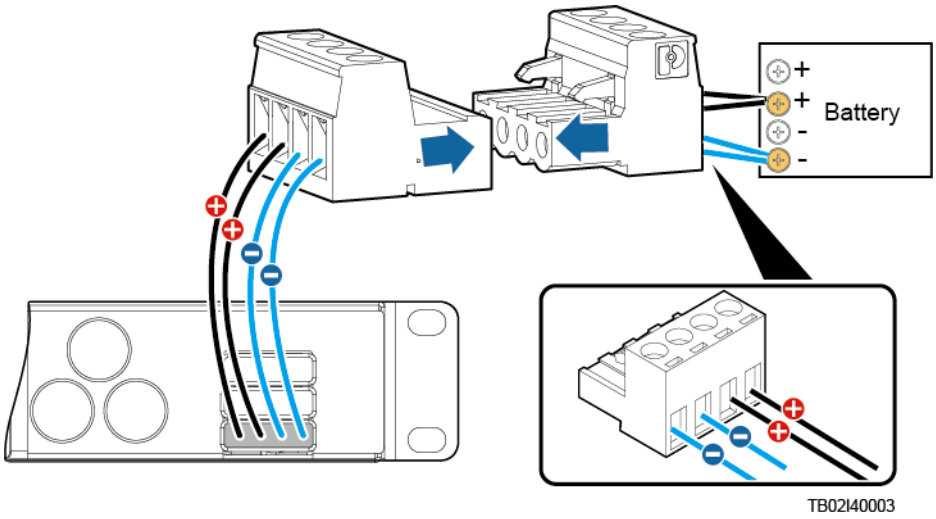


----End

4.2.6 Connecting the Battery Cable

The method of installing the battery cable is the same as that of installing the DC output power cable. For details, see 4.2.5 Connecting the DC Output Power Cable.

Figure 4-16 Connecting the battery cable



4.2.7 Connecting the 230 V AC Single-Phase of TN 400 V Net or TT 400 V Net Input Power Cable

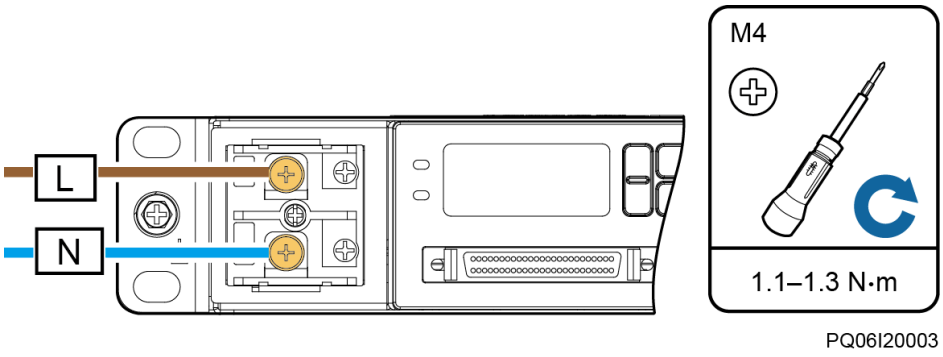
Procedure

Step 1 Remove the protective cover over AC input terminals.

Step 2 Connect the neutral wire (an M4 OT terminal is used for the cable) to the wiring terminal marked as N.

Step 3 Connect the live wire (an M4 OT terminal is used for the cable) to the wiring terminal marked as L.

Figure 4-17 Connecting the single-phase AC input power cable



Step 4 Reinstall the protective cover.

----End

4.2.8 Connecting the Dual-Live of IT 230 V Net or TN 208 V Net AC Input Power Cable

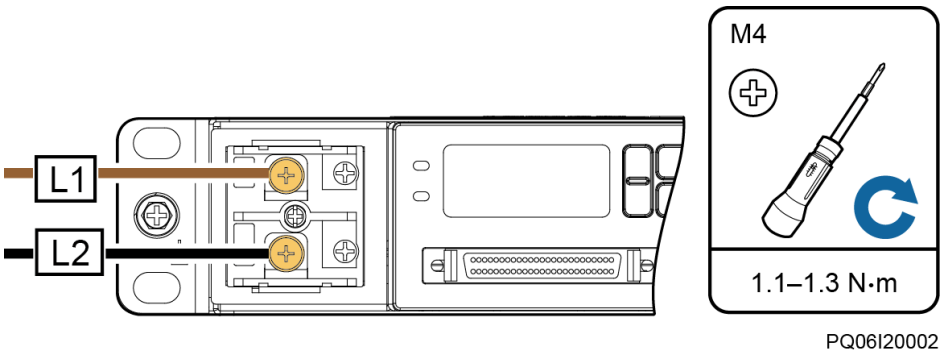
Procedure

Step 1 Remove the protective cover over AC input terminals.

Step 2 Connect the L1 wire (an M4 OT terminal is used for the cable) to the wiring terminal marked as L.

Step 3 Connect the L2 wire (an M4 OT terminal is used for the cable) to the wiring terminal marked as N.

Figure 4-18 Connecting the dual-live wire AC input power cable



Step 4 Reinstall the protective cover.

----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

6.1 Connecting the AC Power Supply

Procedure

Step 1 Check whether the voltage between the input terminals of the upstream AC input circuit breaker is the same as the local voltage. If not, ask professionals to rectify the fault.

Step 2 Switch on the upstream AC input circuit breaker.

Step 3 Check the Run indicator (green) on the rectifier panel. If it is steady on, the rectifier is successfully powered on.

Step 4 Check the Run indicator (green) and LCD on the SMU panel. If the indicator is blinking and the LCD is on, the SMU is successfully powered on.

----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

6.3.1 SMU01A

Set the date and time for the SMU01A as required.

Table 6-1 Date and time parameters for the SMU01A

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Settings
Settings	System Para	Set Date	-	Local date
		Set Time	-	Local time
		Set Time Zone	GMT+08:00	Local time zone

NOTE

The preset user name for the SMU01A is **admin**, and the preset password is **001**.

6.3.2 SMU01B and SMU01C

Set the time and date for the SMU01B and SMU01C as required.

Table 6-2 Time and date parameters for the SMU01B and SMU01C

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Settings	System Settings	Date	-	Local date
		Time	-	Local time

NOTE

- The preset user name of SMU01B is **admin**, and the preset password is **00200**.
- The preset user name of SMU01C is **admin**, and the preset password is **000001**.

6.4 Setting System Type

If the SMU01A is configured, set the system type based on the actual situation, as described in Table 6-3. If the SMU01B or SMU01C is configured, you do not need to reset the system type.

Table 6-3 Setting system type

Main Menu	Second-Level Menu	Third-level Menu	Default Value	Setting Value
Settings	Site Summary	System Type	Standard	ETP4830

6.5 Setting Battery Parameters

NOTICE

If battery parameters are incorrectly set, batteries will wear out earlier than necessary. Set the parameters strictly according to requirements.

6.5.1 SMU01A

Set **Qty of Battery** to **1**, set **Rated Capacity** to the total capacity of battery strings, and set **Charge Coef** as required.

Table 6-4 Battery parameters for the SMU01A

Main Menu	Second-Level Menu	Default Value	Settings
Quick Settings	Qty of Battery	1	1
	Rated Capacity	65 Ah	Battery string capacity
	Charge Coef	0.15 C10	Range: 0.05 C10-0.25 C10

6.5.2 SMU01B and SMU01C

Set **Battery String** to **1**, set **Capacity** to the total capacity of battery strings, and set **Charge Coef** as required.

Table 6-5 Battery parameters for the SMU01B and SMU01C

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Settings	Batt Settings	Battery String	1	1
		Capacity	40 Ah	Battery string capacity
		Charge Coef	0.15 C10	Range: 0.05 C10-0.25 C10

6.6 (Optional) Setting DC Parameters

Set DC parameters as required.

Table 6-6 DC parameters

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Range
Settings	DC Settings	FC Volt	53.5 V	47.0-56.5 V (≤ BC Volt)
		BC Volt	56.5 V	53.5-57.0 V (FC Volt ≤ BC Volt ≤ DC Over Volt – 1 V)
		Over Volt	58.0 V	58.0-60.0 V
		Under Volt	45.0 V	43.1-51.5 V
		BLVD Enable	Yes	Yes, No
		BLVD Volt	43.0 V	38.0-44.9 V

6.7 (Optional) Setting Hibernation Parameters

6.7.1 SMU01A

Set **Rect Redund Ena** to **Enable** if you need to use the intelligent hibernation function of the rectifiers.

Table 6-7 Hibernation parameter for the SMU01A

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Settings	PSU Summary	Rect Redund Ena	Disable	Enable

6.7.2 SMU01B and SMU01C

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

Table 6-8 Hibernation parameter for the SMU01B and SMU01C

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Settings	Rect Settings	Sleep Enable	No	Yes

6.8 (Optional) Setting Alarm Parameters

6.8.1 SMU01A

Set the following alarm parameters as required if you need to enable the alarm function or modify the alarm severity and relay association.

Table 6-9 Alarm parameters for the SMU01A

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Settings
Settings	Alarm Setting	Site Summary	Internal Fault **NOTE** The **Internal Fault** alarm is used as an example.	Enable	Set the parameter as required.
				MA	Set the parameter as required.
				None	Set the parameter as required.
	Site Summary	DO (1-8) Alarm Act	-	Close	Set the parameter as required.
		DI (1-8) Alarm	-	Close	Set the parameter as required.

6.8.2 SMU01B and SMU01C

Set the following alarm parameters as required if you need to enable the alarm function or modify the alarm severity and relay association.

Table 6-10 Alarm parameters for the SMU01B and SMU01C

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
Settings	Alarm Setting	Alarm Severity	AC Volt Low/High **NOTE** Take the **AC Over Volt** alarm as an example.	Major	Set the parameter as required.
		Digital Alarm	Digital No. 1 **NOTE** Take **Digital No. 1** as an example.		
			Mode	High	Set the parameter as required.
		Relay Relate	AC Volt Low/High (Alarm) **NOTE**		

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Setting
			Take the **AC Volt Low/High** alarm as an example.		
			Relate Relay	None	Set the parameter as required.
			Default type	NC	Set the parameter as required.

6.9 (Optional) Setting Communications Parameters

6.9.1 SMU01A

Set SMU01A communications parameters based on actual requirements.

The SMU01A is connected to Huawei communications equipment over an RS485/RS232 port. You can set communications addresses of Huawei communications equipment on the LCD.

If the SMU01A is connected to an Ethernet over a COM port, you need to set the IP address, subnet mask, and gateway on the LCD based on those assigned by customers and then perform other operations.

On the LCD, you can choose **Quick Setting** to change the IP address, subnet mask, and gateway of the SMU01A.

Table 6-11 IP parameters

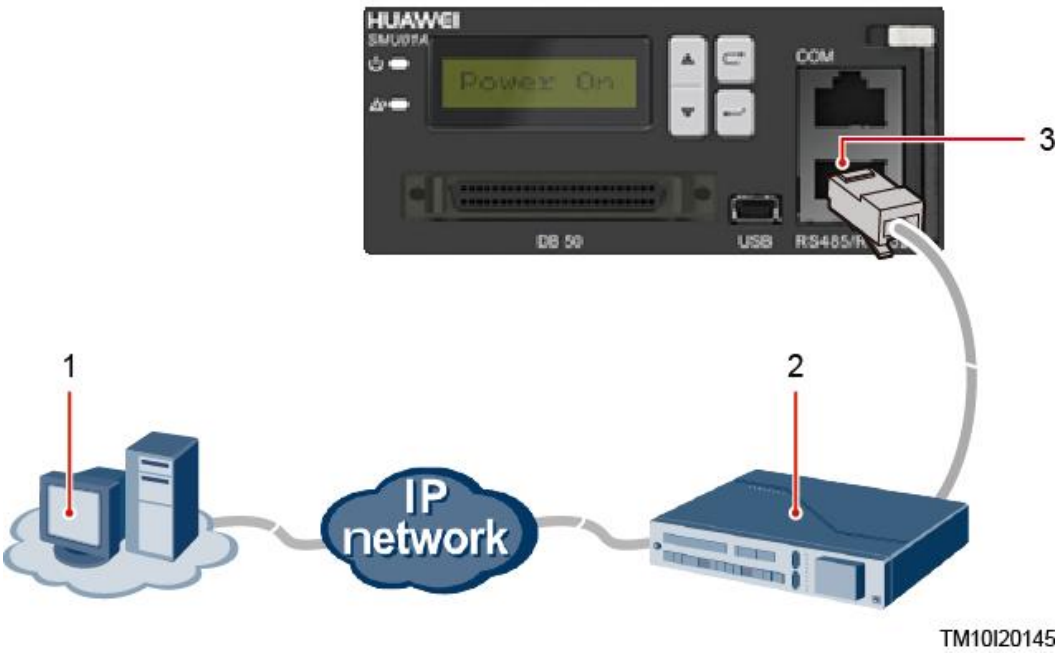
Main Menu	Second-Level Menu	Default Value	Setting
Quick Setting	IP Address	192.168.0.10	Set this parameter based on the address assigned by the network administrator.
	Subnet Mask	255.255.255.0	Set this parameter based on the address assigned by the network administrator.
	Gateway	192.168.0.1	Set this parameter based on the address assigned by the network administrator.

Communicating with Huawei Communications Equipment or Power and environment monitoring device

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 corresponding port on the power and environment monitoring device, as shown in Figure 6-1.

Figure 6-1 Connecting a communications cable

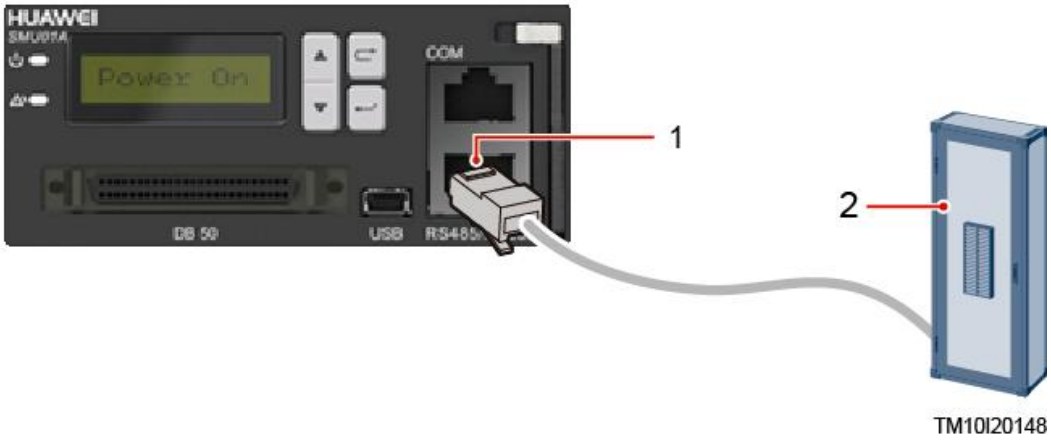


(1) Power and environment network management system (NMS)

(2) Power and environment monitoring device

(3) RS485/RS232 port on the SMU

Figure 6-2 Connecting a communications cable for Huawei communications monitoring device



(1) RS485/RS232 port on the SMU

(2) Huawei communications monitoring device

Step 3 Set host communications address and host communications baud rate on the LCD.

Table 6-12 Setting communications parameters

Main Menu	Second-Level Menu	Third-Level Menu	Setting
Settings	Communication Parameter	Host Comm Addr	0
		Host Baudrate	9600

----End

Communicating with the NetEco over SNMP

Before setting SNMP parameters, obtain the information listed in the following table from the SNMP NMS.

Table 6-13 Information obtained from the NMS

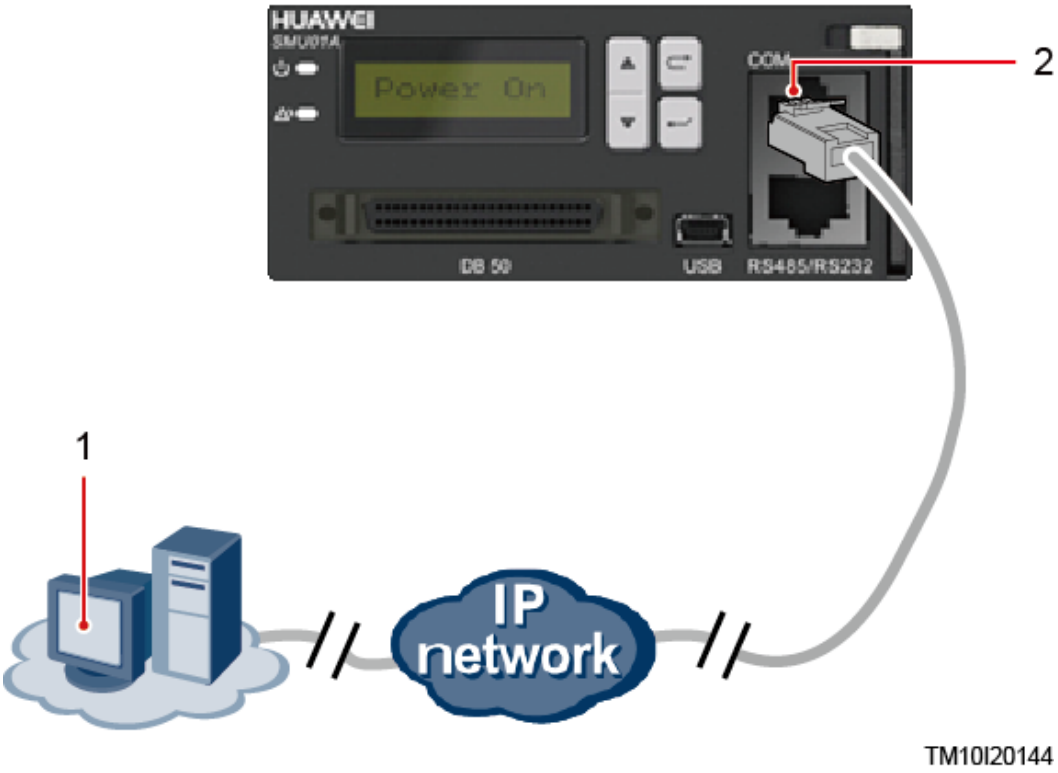
Item	Description
SNMP Version	SNMP version and port number used for communication between the SMU and NMS. The SNMP version can be set to **ALL**, **SNMPV1-V2**, or **SNMPV3**.
SNMP Port	
Read Commun	Each value needs to contain 8 to 15 characters, which are a combination of at least two of the following types: lowercase letters a–z, uppercase letters A–Z, digits 0–9. If you use SNMPv1 or SNMPv2c, enter the read and write community names 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 Commun	
User Name	Each value needs to contain 1 to 15 characters, including lowercase English letters (a-z), uppercase English letters (A-Z), digits (0-9). **NOTE** To enhance security, a user name and password are required for authentication if SNMPv3 is used. After the authentication succeeds, the SMU can communicate with the NMS.
SHA/MA5 Passw	Each value needs to contain 8 to 15 characters, which are a combination of at least two of the following types: lowercase letters a–z, uppercase letters A–Z, digits 0–9. The SHA/MA5 Passw must be different from the AES/DES Passw. **NOTE** To enhance security, a user name and password are required for authentication if SNMPv3 is used. After the authentication succeeds, the SMU can communicate with the NMS.
AES/DES Passw	
Trap IP	IP address and port number used for reporting alarm trap packets
Trap Port	

Item	Description
SNMP Trap Ver	The SNMP trap version can be set to **SNMPv2c**, **SNMPv3_User1**, **SNMPv3_User2**, or **SNMPv1**.

Procedure

Step 1 Connect a network cable to the COM port on the SMU.

Figure 6-3 Connecting a communications cable



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

Step 2 Apply to the site or equipment room network administrator for a fixed IP address.

Step 3 Set **IP Address**, **Subnet Mask**, and **Gateway** on the SMU's LCD.

Table 6-14 IP parameters

Main Menu	Second-Level Menu	Default Value	Settings
Quick Settings	IP Address	192.168.0.10	Set this parameter according to the address assigned by the network administrator.

Main Menu	Second-Level Menu	Default Value	Settings
	Subnet Mask	255.255.255.0	Set this parameter according to the address assigned by the network administrator.
	Gateway	192.168.0.1	Set this parameter according to the address assigned by the network administrator.

Step 4 Set the IP addresses and ports for the active and standby servers of the NetEco on the SMU's LCD.

Table 6-15 NetEco parameters

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Settings
Settings	Comm Para	NetEco Main IP	58.251.159.136	Set an IP address for the active NetEco server.
		NetEco Bak IP	58.251.159.136	Set an IP address for the standby NetEco server.
		NetEco Port	31220	31220 **NOTE** Please contact Huawei technical support if you need change the port number.

Step 5 Access the **Settings** > **Comm Para** screen and select **SNMP Version**.

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.

- In the scenario where there are more than two NMSs, and the SNMP versions include **ALL** or **SNMPV1-V2** and **SNMPV3**: Set **SNMP Version** to **ALL**, set **SNMP Port**, **Read Commun**, **Write Commun**, **User Name**, **SHA/MD5 Passw**, and **AES/DES Passw**, and press↵.
- **SNMPV1-V2**: Set **SNMP Version** to **SNMPV1-V2** and set **SNMP Port**, **Read Commun**, and **Write Commun**.
- **SNMPv3**: Set **SNMP Version** to **SNMPV3**, and set **User Name**, **SHA/MD5 Passw**, and **AES/DES Passw**.

Step 6 Set **Trap IP**, **Trap Port**, and **SNMP Trap Ver**.

Step 7 Enter **https://*NetEco IP address: port number for NetEco login*** (for example, **https://10.10.10.1:31943**) in the address box of the browser and press **Enter** to go to the NetEco login page.

Figure 6-4 NetEco login page

Step 8 Enter the correct user name and password and click **Log In**.

NOTE

To obtain the NetEco user name and password, contact the site or equipment room network administrator.

----End

Communicating with a Third-Party EMS over SNMP

Before you use SNMP to perform remote management, set the required parameters.

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.

Table 6-16 IP parameters

Main Menu	Second-Level Menu	Default Value	Setting
Quick Settings	IP Address	192.168.0.10	Set this parameter according to the address assigned by the network administrator.
	Subnet mask	255.255.255.0	Set this parameter according to the address assigned by the network administrator.
	Gateway	192.168.0.1	Set this parameter according to the address assigned by the network administrator.

Step 3 Connect the network port on your PC to the FE port on the SMU.

NOTICE

The SMU has only one FE port. Remove the existing network cable from the FE port before you perform step 3 and reconnect the network cable after you finish setting the parameters.

Step 4 Set the PC IP address in the same network segment as the SMU IP address set in step 2.

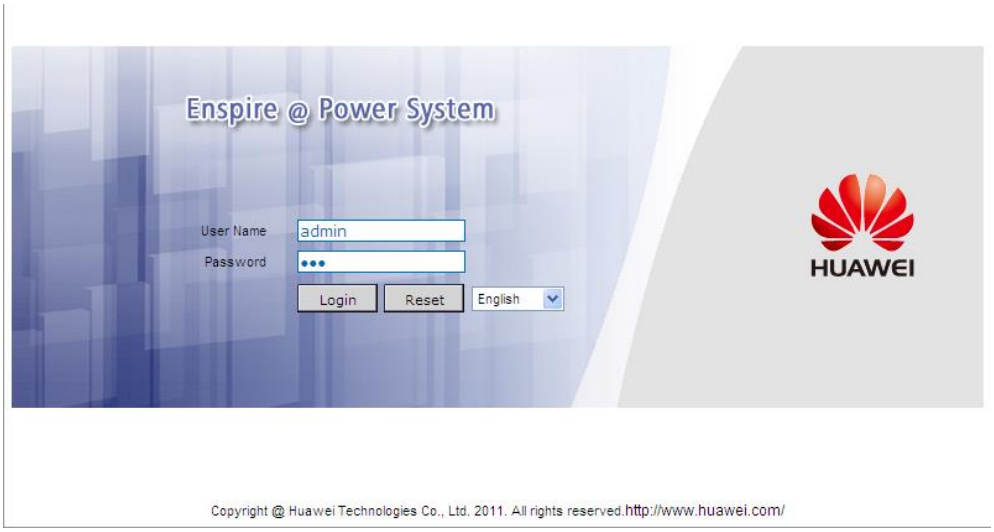
Assume that the SMU IP address is 192.168.0.10 and its subnet mask is 255.255.255.0. Set the PC IP address to 192.168.0.11 and its subnet mask to 255.255.255.0.

Step 5 Enter the SMU IP address in the address box on the PC. Log in to the WebUI on the login page shown in Figure 6-5.

NOTE

The default user name is **admin**, and the preset password is **001**.

Figure 6-5 WebUI login page



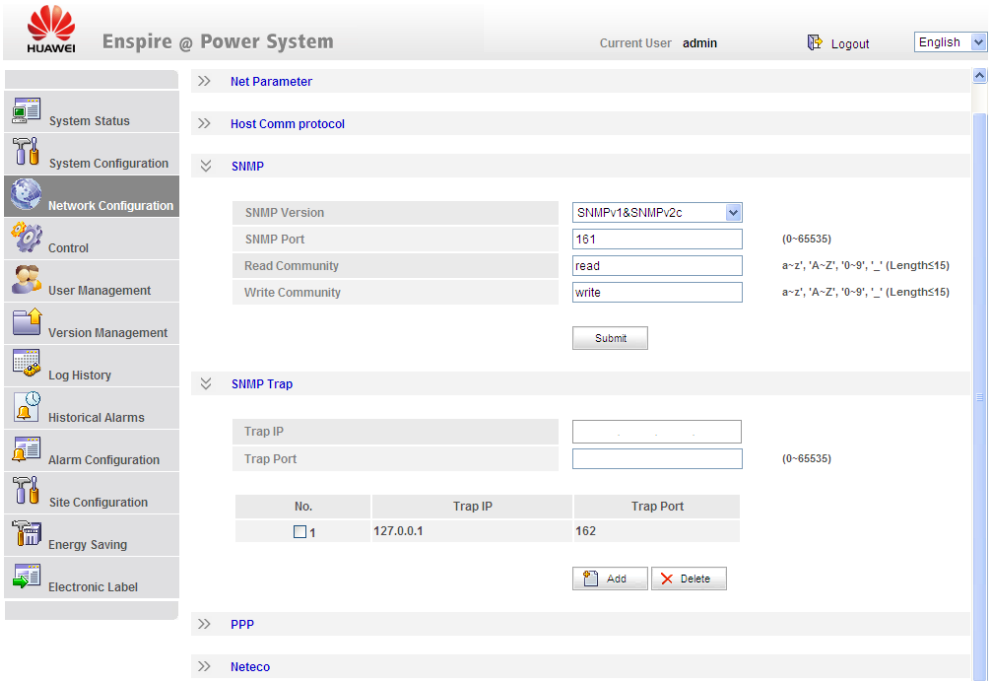
Step 6 On the **Network Configuration** page, select **SNMP**.

NOTE

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

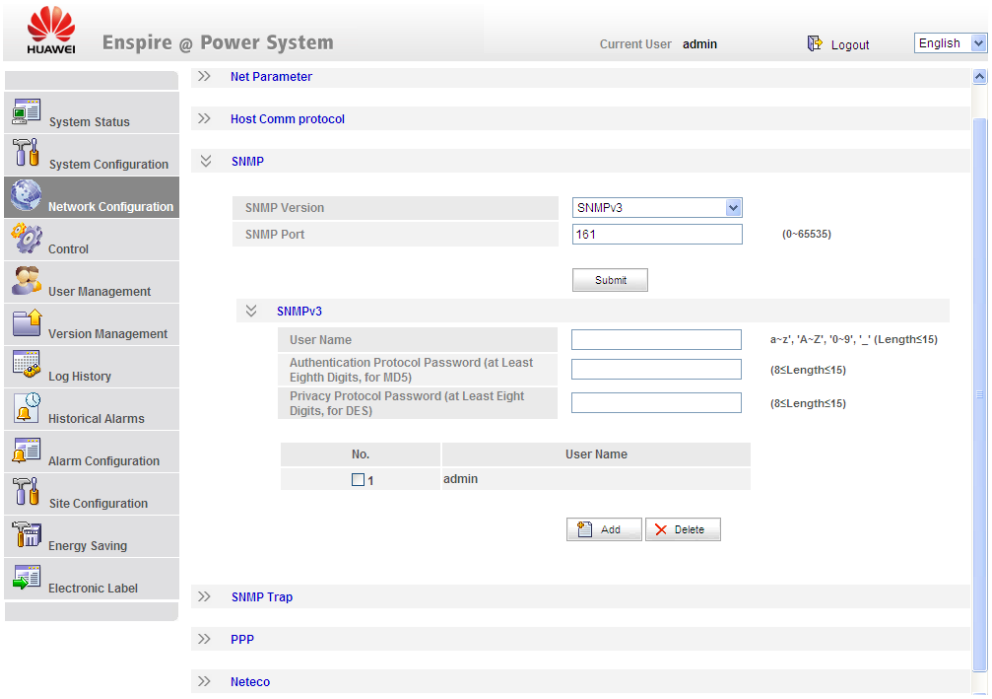
1. If the SNMP version is SNMPv1 or SNMPv2c, set **SNMP Port**, **Read Community**, and **Write Community**, as shown in Figure 6-6.

Figure 6-6 SNMPv1 and SNMPv2c parameters



2. If the SNMP version is SNMPv3, set **User Name**, **Authentication Protocol Password**, and **Privacy Protocol Password**, as shown in Figure 6-7.

Figure 6-7 SNMPv3 parameters



Step 7 Set the SNMP trap destination address and trap port.

NOTE

Set the trap address (a maximum of two addresses) and trap port on the **Network Configuration** tab page. The trap IP address is the server IP address. The IP port is the alarm listening port and its default value is **162**.

Step 8 After obtaining the MIB file from Huawei technical support, upload the MIB libraries **HUAWEI-MIB.mib** and **HUAWEI-SITE-MONITOR-MIB.mib** to the NMS.

----End

NOTE

The SMU01A cannot communicate with Huawei communications equipment, Power and environment monitoring device, and third-party EMS (over SNMP) at the same time.

6.9.2 SMU01B and SMU01C

Set the communications addresses of Huawei communications equipment on the LCD.

Table 6-17 LCD menu

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Value Range	Setting
Settings	Com Settings	Address	-	0	0-30	Set the parameter as required.

6.10 Connecting the Battery Supply

Prerequisites

NOTICE

To avoid damage to batteries, reinstall the battery fuse only after correctly setting the battery parameters for the monitoring unit.

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. If no alarm (excluding door alarms) is generated on the LCD of the SMU during this period, the voltage and current for batteries and loads are normal.

----End

7 Maintenance

7.1 Routine Maintenance

Routine maintenance is required periodically based on the site requirements. The recommended maintenance interval is six months. If any fault is detected, rectify it in time.

Table 7-1 Routine maintenance checklist

Maintenance Item	Check Item	Check Method	Repair When	Measures
Electrical connection	The AC input voltage is normal.	Using a multimeter	The AC input voltage exceeds the threshold.	For details, see 7.2 Rectifying Common Faults and 7.3 Identifying Faults.
	The output voltage is normal.		The battery low voltage disconnection (BLVD) or load low voltage disconnection (LLVD) voltage exceeds the threshold.	
Preventive inspection	The indicators are normal.	Visual observation	Alarms are generated.	
Grounding inspection	The connection between the ground point and the ground bar in the cabinet is normal.	Using a multimeter	The resistance between the ground point and the ground bar is greater than 0.1 ohm.	Secure or replace the ground cable.

7.2 Rectifying Common Faults

7.2.1 Mains Failure

Possible Causes

- The AC input power cable is faulty.
- The upstream 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 upstream 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 Amb. Over Temp

NOTE

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

Possible Causes

- The ambient overtemperature alarm threshold is not set properly on the SMU.

- 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 ambient temperature alarm threshold (50°C by default) is properly set on the SMU. If no, adjust it based on site requirements.
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.

7.2.7 Amb. Under Temp

NOTE

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

Possible Causes

- The ambient undertemperature alarm threshold is not set properly on the SMU.
- 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 ambient undertemperature alarm threshold (0°C by default) is properly set on the SMU. If no, adjust it based on site requirements.
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.

7.2.8 Batt Over Temp

NOTE

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

Possible Causes

- The battery overtemperature alarm threshold is not set properly on the SMU.
- The battery temperature controlling system is faulty.
- The battery temperature sensor is faulty.

Measures

1. Check whether the battery overtemperature alarm threshold (50°C by default) is properly set. If no, adjust it to a proper value.
2. Check whether the battery temperature controlling system is faulty. If yes, 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 yes, replace the temperature sensor.

7.2.9 Batt Under Temp

NOTE

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

Possible Causes

- The battery undertemperature alarm threshold is not set properly on the SMU.
- The battery temperature controlling system is faulty.
- The battery temperature sensor is faulty.

Measures

1. Check whether the battery undertemperature alarm threshold (0°C by default) is properly set. If no, adjust it to a proper value.
2. Check whether the battery temperature controlling system is faulty. If yes, 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 yes, replace the temperature sensor.

7.2.10 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.

7.2.11 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.

7.2.12 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.

7.2.13 Batt Off

Possible Causes

- An AC power failure occurs.
- Batteries are manually disconnected.
- The battery 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 batteries are manually disconnected. If yes, confirm the reason of the manual disconnection, and reconnect the batteries after the operation.
3. Check whether the battery disconnection voltage (43 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.

7.2.14 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.

7.2.15 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.

7.2.16 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.

7.2.17 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.

7.2.18 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.

7.2.19 Single Rect Fault

Possible Causes

- The subrack or slot connector is faulty.
- A rectifier is faulty.
- The SMU is faulty.

Measures

1. Remove the rectifier and check whether the slot connector is damaged or deformed. If so, repair or replace the slot connector or the entire subrack.
2. Reinstall the rectifier. If the alarm persists, replace the rectifier.
3. Restart the SMU. If the alarm persists, replace the SMU.

7.2.20 Multi-Rect. Fault

Possible Causes

- The subrack or slot connectors are faulty.
- Rectifiers are faulty.
- The SMU is faulty.

Measures

1. Remove the rectifiers and check whether the slot connectors are damaged or deformed. If so, repair or replace the slot connectors or the entire subrack.
2. Reinstall the rectifiers. If the alarm persists, replace the rectifiers.
3. Restart the SMU. If the alarm persists, replace the SMU.

7.2.21 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.

7.3 Identifying Faults

7.3.1 Identifying Rectifier Faults

Table 7-2 Identifying rectifier faults

Symptom	Possible Cause	Corrective Measures
The Run indicator (green) is off.	There is no AC input, or the rectifier is faulty.	Check whether the AC input is normal. If the AC input is normal, replace the rectifier. If the AC input is normal and the green indicators on all rectifiers are off, replace the AC/DC power distribution subrack.
The Run indicator (green) is blinking (0.5 Hz).	The rectifier is being queried manually.	Exit the query status. The Run indicator becomes steady on again.
The Run indicator (green) is blinking (4 Hz).	Software is being loaded.	After software finishes loading, the indicator will stop blinking, without any user action required.
The Alarm indicator (yellow) is steady on.	• The rectifier is protecting itself against overtemperature. • The rectifier is protecting itself against AC input overvoltage or undervoltage. • The rectifier is faulty.	• If the ambient temperature is higher than the upper threshold, lower the ambient temperature. • If the air intake or exhaust vent is blocked, remove the blockage. • If the AC input is abnormal, ask maintenance personnel for the mains

Symptom	Possible Cause	Corrective Measures
		supply to rectify the fault. • If the fault persists, the rectifier may be faulty. Replace the faulty rectifier.
The Alarm indicator (yellow) is blinking.	Communication between the rectifier and the SMU is interrupted.	Clean the edge connector of the faulty rectifier. If the Alarm indicator is still blinking, check the SMU and the AC/DC power distribution subrack.
The Fault indicator (red) is steady on.	The rectifier is protecting itself against output overvoltage.	• If a single rectifier is locked, remove the rectifier that is indicating the fault, and then power on the rectifier after the indicator turns off. If overvoltage still occurs, replace the rectifier. • If multiple rectifiers are locked, remove all rectifiers and reinstall them one by one to locate the faulty rectifiers. Replace the faulty rectifiers.
	The rectifier has no output due to an internal fault.	Replace the faulty rectifier.

7.3.2 Identifying SMU Faults

Table 7-3 Identifying SMU faults

Symptom	Cause	Corrective Measures
The Run indicator (green) is off.	There is no input.	• Check whether the green indicators on rectifiers are steady on. If so, the input to the power subrack is normal. • Reseat the SMU. If the fault persists, replace the SMU.
The Run indicator (green) is blinking fast.	The SMU has failed to communicate with the host.	Check whether communication between the SMU and the host is normal.
The Alarm indicator (red) is steady on.	A major or critical alarm has been generated.	Query the active alarm on the host or SMU LCD to

Symptom	Cause	Corrective Measures
		identify the fault.

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.

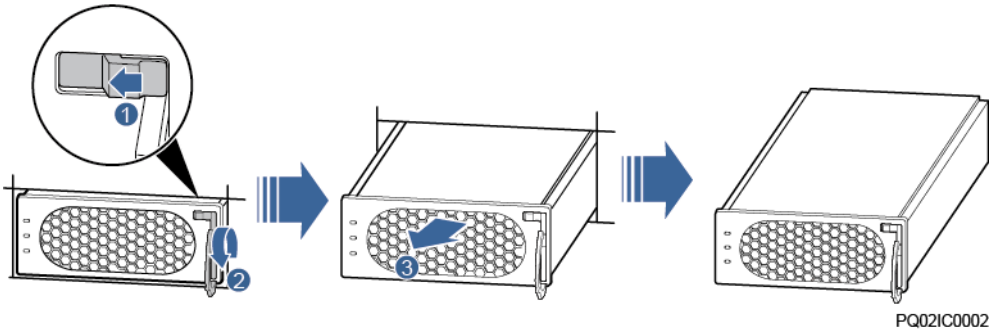
Procedure

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

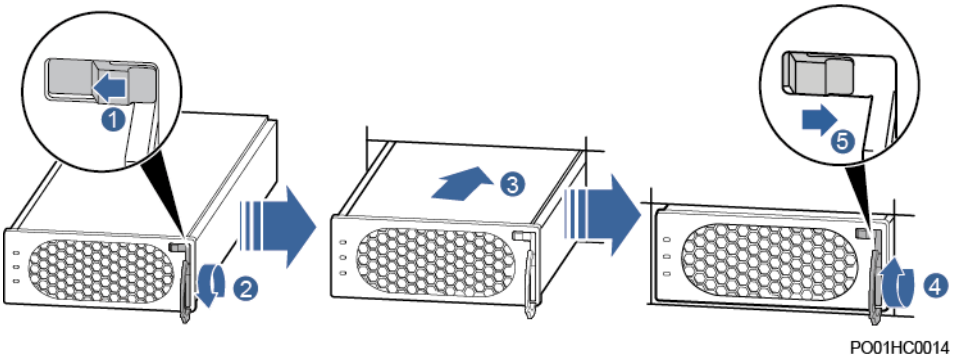


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

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

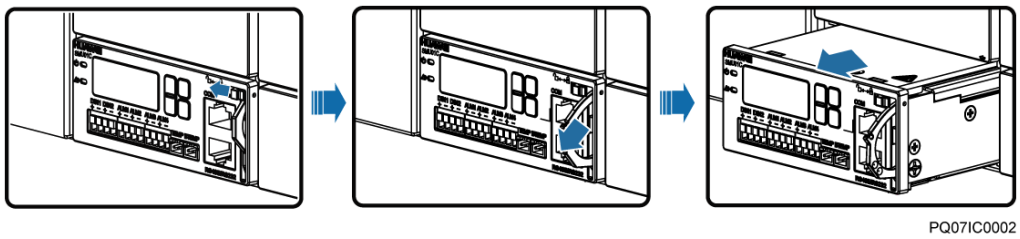
- You have obtained an ESD wrist strap, a pair of protective gloves, an ESD box or bag.
- The new rectifier is intact.

Procedure

Step 1 Push the locking latch towards the left.

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

Figure 7-3 Removing an SMU

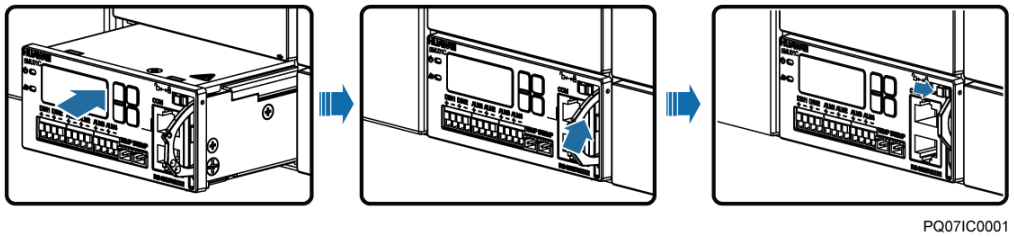


Step 3 Insert a new SMU into the slot, push the locking latch towards the left, and pull out the handle.

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

Step 5 Reset SMU parameters.

Figure 7-4 Installing an SMU



----End

Follow-up Procedure

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

A Technical Specifications

Table A-1 Technical Specifications

Category	Item	Specifications
Environmental conditions	Operating temperature	-40ºC to +70ºC **NOTE** The system can run for 8 hours at 70ºC.
	Transportation temperature	-40ºC to +70ºC
	Storage temperature	-40ºC to +70ºC
	Operating humidity	5%–95% RH (non-condensing)
	Storage humidity	5%–95% RH (non-condensing)
	Altitude	0-4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1ºC for each additional 200 m.
AC input	Input mode	230 V AC single-phase three-wire (L, N), compatible with 230 V AC dual-live-wire (L, L)
	Input frequency	45–66 Hz (rated frequency: 50/60 Hz)
	Power factor	≥ 0.99 (100% load)
DC output	Output voltage range	-42 V DC- -58 V DC
	Default output voltage	-53.5 V DC
	Maximum output power	2000 W
	Regulated voltage precision	≤ ±0.6%
	Peak-to-peak noise voltage	≤ 200 mV (0–20 MHz)

Category	Item	Specifications
AC input protection	AC input overvoltage protection threshold	Overvoltage protection is performed when the single-phase AC input voltage exceeds the AC input overvoltage protection threshold (300 V AC by default).
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output resumes.
	AC input undervoltage protection threshold	Undervoltage protection is performed when the single-phase AC input voltage is below the AC input undervoltage protection threshold (80 V AC by default).
	AC input undervoltage recovery threshold	When the voltage is restored to 85 V AC, the output resumes.
DC output protection	DC output overvoltage protection threshold	-58.5 V DC to -60.5 V DC
EMC	Conducted Emission (CE)	Input port: CISPR 22/EN 55022 Class B
		Output port: CISPR 22/EN 55022 Class A[1]
	Radiated emission (RE)	CISPR 22/EN 55022 Class B
	Harmonic	IEC 61000-3-2
	Fluctuation and blinking	IEC 61000-3-3
	ESD	Enclosure port: Contact discharge voltage: 6 kV (Class B); air discharge voltage: 8 kV (Class B); Signal port: Contact discharge voltage: 2 kV (Class R)
	Electrical fast transient (EFT)	The voltage at signal ports is 1 kV, and the voltage at the power ports is 2 kV (criterion B).
	Radiated susceptibility (RS)	Level 3; criterion: A; field strength: 10 V/m
	Conducted susceptibility (CS)	Signal port: 3 V (criterion A); power port: 10 V
	SURGE	• (For the AC power port) differential mode: ±2 kV; common mode: ±4 kV (criterion B) • (For the DC power port) differential mode: ±2 kV/2 ohms; common mode: ±2 kV/12 ohms, ±4 kV/12 ohms (+48 V and PE are short-circuited); isolation protection

Category	Item	Specifications
		enabled, criterion B • (For internal signal cables) differential mode: ±0.5 kV; common mode: ±1 kV; waveform: 8/20(1.2/50) μs, criterion B • (For external signal cables) differential mode: ±2 kV; common mode: ±4 kV; waveform: 8/20(1.2/50) μs, criterion B
	DIP	EN61000-4-11
Others	Safety and regulatory design	Complies with IEC/EN60950-1 and passes TUV and CE.
	Mean time between failures (MTBF)	250,000 hours
Structure	Dimensions (H x W x D)	43.6 mm x 442 mm x 255 mm
	Weight	≤10 kg (with rectifiers)
	Protection level	IP20
	Installation mode	Adapts to 19-inch cabinets and ETSI cabinets by using different types of mounting ears
	Maintenance mode	Maintained from the front

NOTE

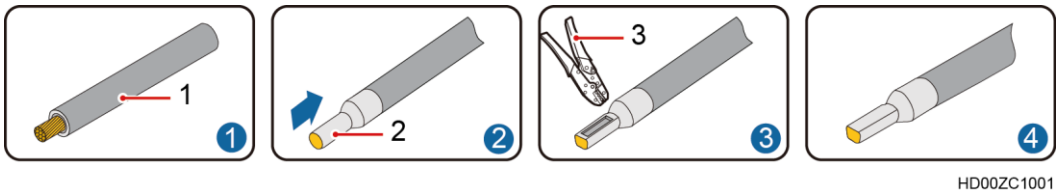
1: This is Class A Product. In a domestic environment this product may cause radio interference; therefore, the user is required to take appropriate measures.

B Preparing Terminals

This section describes how to prepare cord end terminals and OT terminals.

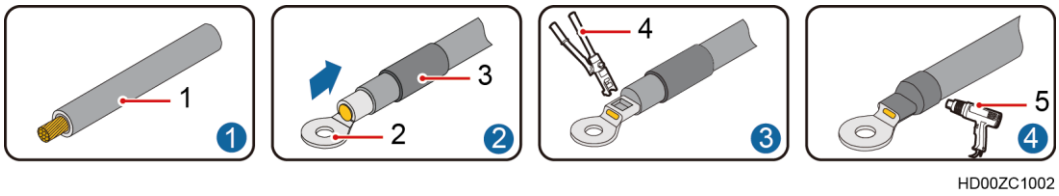
Cut a cable of a proper length and install an OT terminal or a cord end terminal. Figure B-1 and Figure B-2 show the procedures for preparing a cord end terminal and an OT terminal respectively.

Figure B-1 Preparing a cord end terminal



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

Figure B-2 Preparing an OT terminal



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

(4) Hydraulic pliers (5) Heat gun

C Acronyms and Abbreviations

E	
EMC	electromagnetic compatibility
I	
IEC	International Electrotechnical Commission
IP	Internet Protocol
L	
LCD	liquid crystal display
P	
PDU	Power Distribution Unit
PE	protective earth
PSU	power supply unit
S	
SMU	site monitoring unit
T	
TCP	Transmission Control Protocol
U	
USB	Universal Serial Bus

