

ETP4860-B1A2 Embedded Power

User Manual

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HUAWEI TECHNOLOGIES CO., LTD.



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About This Document

Purpose

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

The figures provided in this document are for reference only.





Intended Audience


This document is intended for:

- Sales engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

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

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

Change History

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

Issue 05 (2021-12-01)

Updated [4.1.1 Cables](#).

Issue 04 (2021-01-05)

Updated [6 Commissioning](#).

Issue 03 (2020-02-10)

Updated [3 Components](#).

Issue 02 (2019-09-12)

Added contents about the WiFi function.

Upgraded installation procedures.

Issue 01 (2019-07-12)

This issue is the first official release.

Software version: SMU V500R002C20, LIVE-C APP V100R001C80.

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1 Safety Precautions

1.1 General Safety

Statement

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

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

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

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

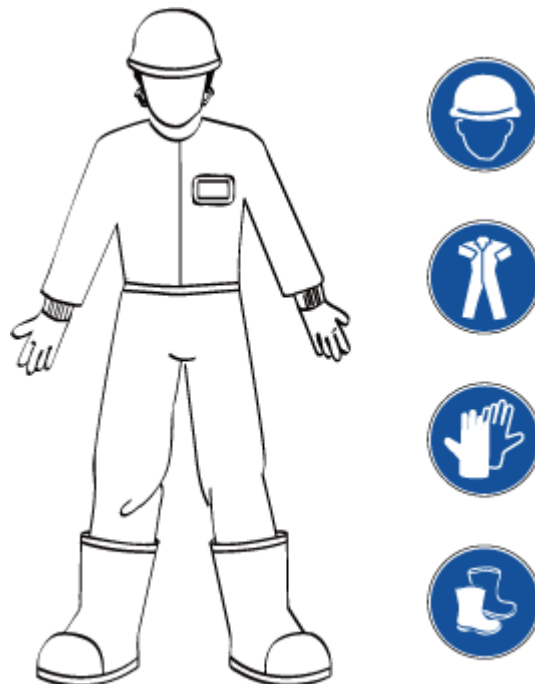
The Company will not be liable for any consequences of the following circumstances:

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

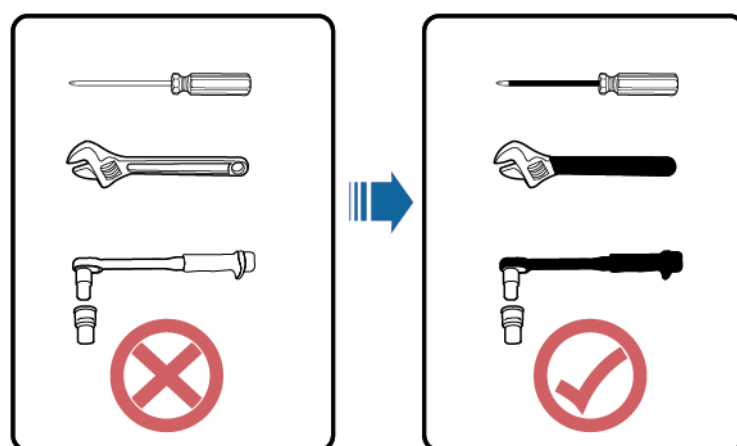
- Storage conditions that do not meet the requirements specified in this document

General Requirements

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



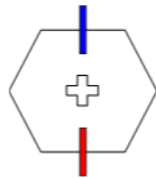
- Use insulated tools or tools with insulated handles, as shown in the following figure.



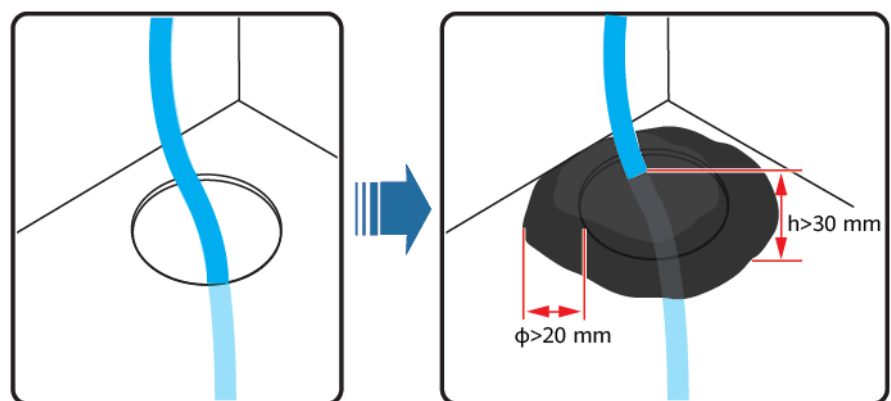
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- Follow the specified procedures for installation, operation, and maintenance.
- Ensure that bolts are tightened with a torque wrench and marked using red or blue color. Installation personnel mark tightened bolts in blue. Quality inspection personnel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



TN01H00006










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








Personal Safety

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

Symbol Conventions

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

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

Symbol	Description
	Indicates that the equipment is not safe to use in tropical climates.
 or 	Indicates a fan assembly or moving part. This symbol is silkscreened on or attached to the panel of a fan assembly, warning operators to keep away. Do not touch the blades when the fan is rotating.
 or  or  or 	<p>This symbol is used when the usage of a device port cannot be clearly described. It prompts users to refer to the instruction. This symbol can be used in but not limited to the following scenarios:</p> <ol style="list-style-type: none"> 1. For a multi-power device, use it near the power supply to replace the multi-power supply identifier. The symbol indicates that the device has multiple power inputs. Therefore, when powering off the device, you must disconnect all power inputs. 2. If there are multiple output interfaces, use the symbol near the output interfaces. Connect cables according to the rated power output and configuration parameter information in the instruction. 3. If there are multiple slots, use the symbol near the slot information. For details, see the description of slot information, restrictions on boards, and usage conditions in the instruction.

1.2 Personnel Requirements

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

 NOTE

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

1.3 Electrical Safety

Grounding

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

AC and DC Power

 DANGER

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

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

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

Cabling

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables behind the air intake and exhaust vents of the equipment.
- Ensure that cables meet the VW-1 flame spread rating requirements.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that all cables are securely bound. Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- If an AC input power cable is connected to the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.

ESD

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

1.4 Installation Environment Requirements

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- Ensure that there are no acid, alkaline, or other corrosive gases in the installation place.
- Do not place the equipment near heat sources or exposed fire sources, such as electric heaters, microwave ovens, roasters, water heaters, furnace fire, candles, or other places where high temperature may occur. Otherwise, the enclosure will melt or the equipment will heat up, which can cause a fire.
- Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation

vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.

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

Installation at Heights

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

Do not at heights in any of the following situations:

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

 **DANGER**

- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
 - Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
 - Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
 - Do not perform operations on the upper and lower layers at the same time. If unavoidable, install a dedicated protective shelter between the upper and lower layers or take other protective measures. Do not pile up tools or materials on the upper layer.
 - Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.
 - Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
 - Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
 - Dismantle the scaffolding from top down after finishing the job. Do not dismantle the upper and lower layers at the same time. When removing a part, ensure that other parts will not collapse.
 - Do not loiter when working at heights. Do not sleep at heights.
-
- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.
 - Operators who violate the safety regulations are responsible for accidents caused. The supervisor has to bear the responsibility accordingly.

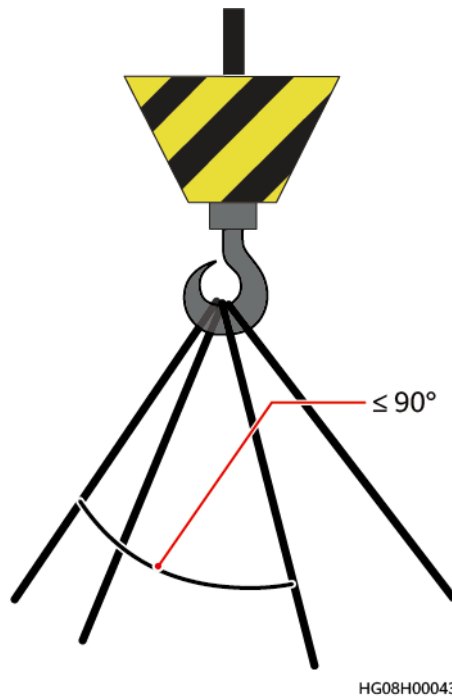
1.5 Mechanical Safety

Hoisting Devices

 **DANGER**

Do not walk under hoisted objects.

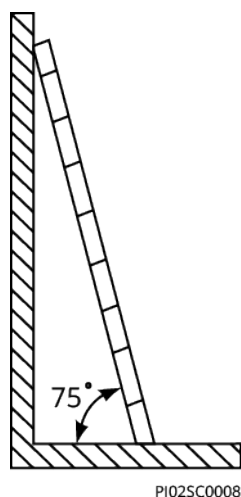
- Only trained and qualified personnel are allowed to perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting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



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

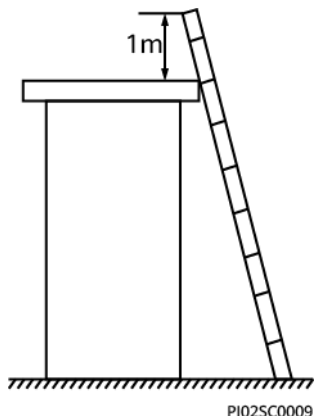
Using Ladders

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



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

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



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

Drilling Holes

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

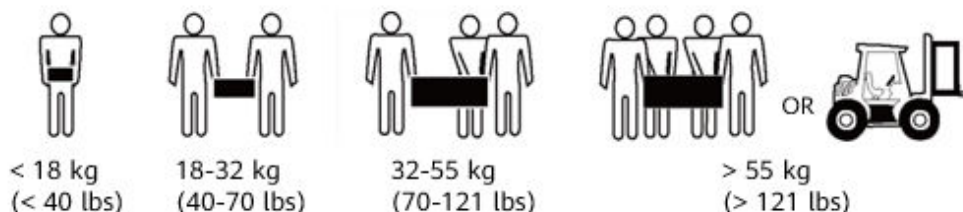
NOTICE

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

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

Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects.



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

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

1.6 Battery Safety

If no battery is involved, skip this section.

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

Basic Requirements

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

 DANGER

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

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

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

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

Battery Installation

Before installing batteries, observe the following safety precautions:

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

Battery Short Circuit



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

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

Flammable Gas

NOTICE

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

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

Battery Leakage

NOTICE

Battery overheating causes deformation, damage, and electrolyte overflow.

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

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

WARNING

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

If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate (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 observe the following precautions.

WARNING

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

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

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

2 Overview

2.1 Introduction

The ETP4860-B1A2 is an embedded power system that supplies power to -48 V DC telecom equipment. It has a maximum output current of 60 A.

2.2 System Features

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

2.3 System Configurations

Table 2-1 System configuration

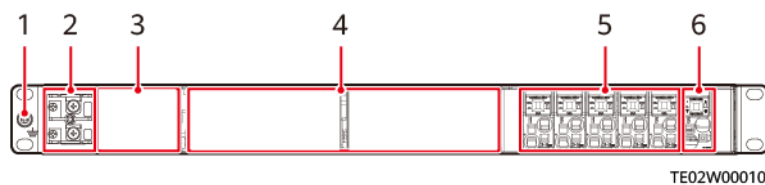
Item	System Configuration
Subrack	1 U power system
Power distribution unit (PDU)	<ul style="list-style-type: none">• AC or DC input: M4 OT wiring terminal• DC output: supports a maximum of four 32 A circuit breakers or one 16 A circuit breakers.• Battery route: one 50 A circuit breaker <p>NOTE When the circuit breaker is switched off, the -48 V (-) circuit is disconnected, and the RTN (+) circuit is connected.</p>

Item	System Configuration
Rectifier	A maximum of two R4830G1s or R4815G1s (R4830G1 and R4815G1 support HVDC input) can be configured.
Monitoring module	SMU11B or SMU11C

3 Components

3.1 Appearance

Figure 3-1 Appearance

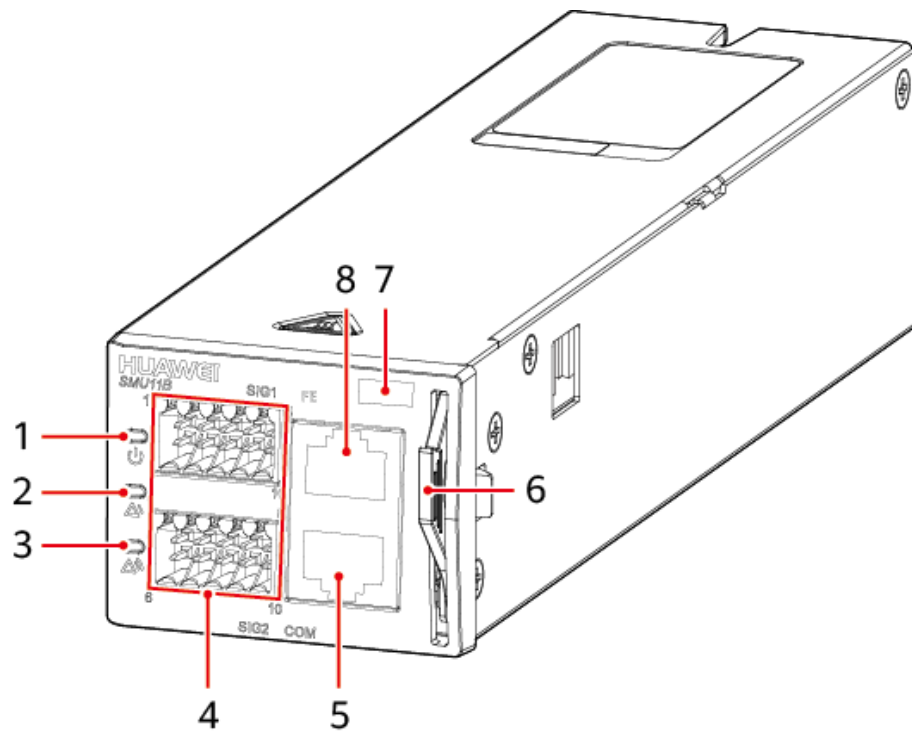


- | | | |
|--------------------------|---------------------------|-----------------------------|
| (1) Ground screw | (2) Input terminals | (3) Space for SMU |
| (4) Space for rectifiers | (5) Load circuit breakers | (6) Battery circuit breaker |

3.2 SMU11B

Appearance

Figure 3-2 SMU11B appearance



TM10I20150

- (1) Running indicator
- (2) Minor alarm indicator
- (3) Major alarm indicator
- (4) Wiring terminals
- (5) Communications port COM
- (6) Handle
- (7) Position of the SN code
- (8) Communications port FE

Indicators

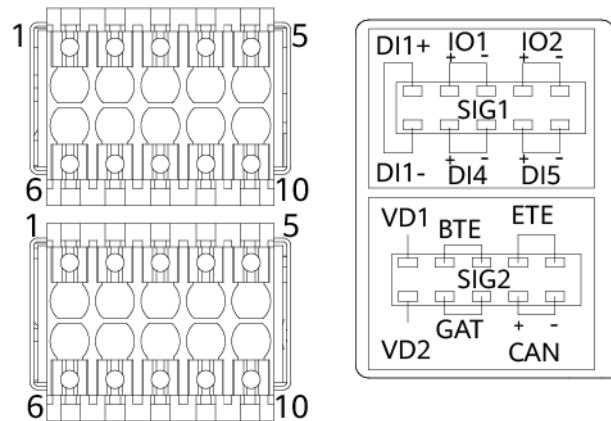
Table 3-1 Indicator description

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

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

Wiring Terminals

Figure 3-3 Wiring terminals



WYR0000597

Table 3-2 Pin definitions for SIG1 wiring terminals

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

Pin	Signal	Description
5	IO2-	

Table 3-3 Pin definitions for SIG2 wiring terminals

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

Communications Ports

Table 3-4 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
COM	Baud rate: 9600 bit/s, 19200 bit/s, 115200 bit/s autonegotiation	Master/slave protocol	Connects to a Huawei NMS.
		-	Provides 12 V power supply for external devices.
FE	10M/100M autonegotiation	SNMP	Connects to a third-party management system.
		BIN protocol	Connects to a Huawei NMS.

Communications Port	Communications Parameter	Communications Protocol	Function
		HTTPS protocol	Connects to a PC and manages the SMU through the WebUI.
NOTE All these ports are protected by a security mechanism.			

Figure 3-4 Pins in the COM port

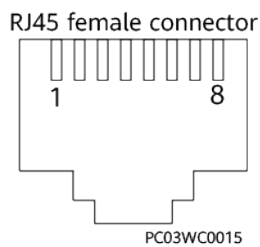


Table 3-5 Pin definitions for the COM port

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

Figure 3-5 Pins in the FE port

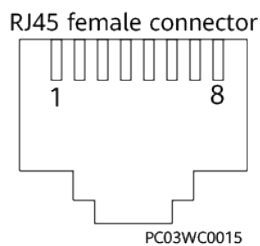
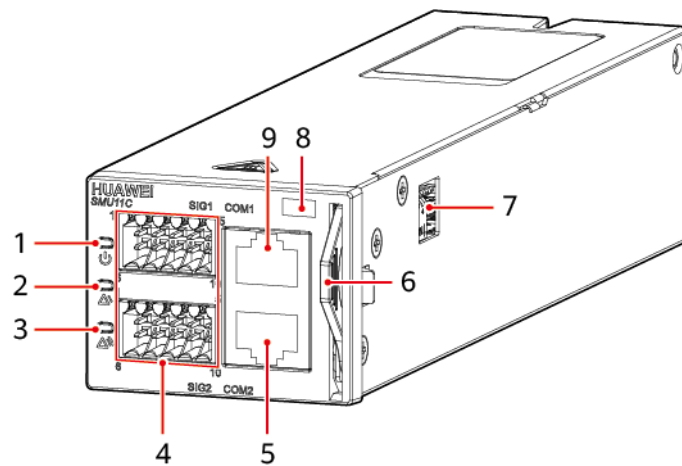


Table 3-6 Pin definitions for the FE port

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

3.3 SMU11C

Figure 3-6 SMU11C appearance



PQ13W00003

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

Indicator

Table 3-7 Indicator description

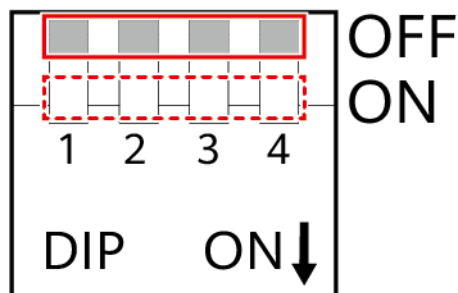
Item	Color	Status	Description
Run indicator	Green	Off	The SMU is faulty or has no power input.

Item	Color	Status	Description
		Blinking at long intervals (0.5 Hz)	The SMU is running properly and communicating with the host properly.
		Blinking at short intervals (4 Hz)	The SMU is running properly but fails to communicate with the host properly.
Minor alarm indicator	Yellow	Off	No minor or warning alarm is generated.
		Steady on	A minor or warning alarm is generated.
Major alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

DIP Switch

The dual in-line package switch (DIP switch) is used to set the northbound RS485 communications address.

Figure 3-7 DIP switch



TO11W00136

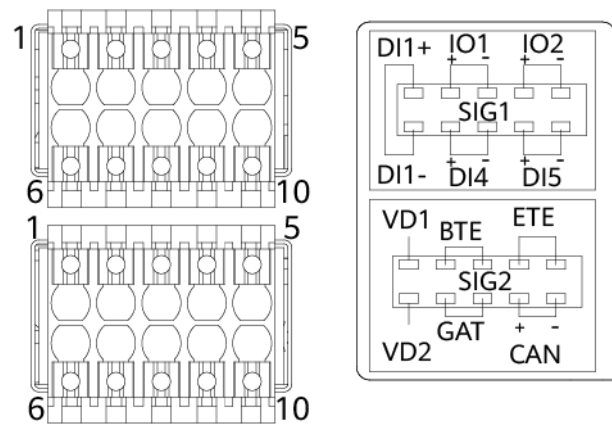
Table 3-8 DIP switch settings

Monitoring Address	Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF

Monitoring Address	Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

Wiring Terminals

Figure 3-8 Wiring terminals



LXP0000121

Table 3-9 Panel-mounted terminals

Pin	Signal	Description
1	DI1+	Dry contact input
6	DI1-	
2	IO1+	Dry contact input/Dry contact output (When the pin is used as a dry contact input, the alarm condition is as follows: the monitoring of

Pin	Signal	Description
3	IO1-	the SMU11C is normal when the dry contact input is disconnected, and an alarm is generated when the dry contact input is closed. When the pin is used as a dry contact output, the alarm action is as follows: the monitoring of the SMU11C is normal when the dry contact output is disconnected, and an alarm is generated when the dry contact output is closed.)
4	IO2+	Dry contact input/Dry contact output (When the pin is used as a dry contact input, the alarm condition is as follows: the monitoring of the SMU11C is normal when the dry contact input is disconnected, and an alarm is generated when the dry contact input is closed. When the pin is used as a dry contact output, the alarm action is as follows: the monitoring of the SMU11C is normal when the dry contact output is disconnected, and an alarm is generated when the dry contact output is closed.)
5	IO2-	
7	DI4+	Dry contact input
8	DI4-	
9	DI5+	Dry contact input
10	DI5-	

Table 3-10 Pin definitions

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

Pin	Signal	Description
10	CAN-	

Communications Ports

Table 3-11 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
COM1	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Master/slave protocol	Northbound communication port, connects to a Huawei NMS.
COM2	Baud rate: 9600 bit/s, 19200 bit/s, or 115200 bit/s	Master/slave protocol	Southbound and northbound multiplexing communication port <ul style="list-style-type: none"> Connects to a Huawei NMS. Connects to Huawei lower-level devices.
NOTE All these ports are protected by a security mechanism.			

Figure 3-9 Pins in the COM port

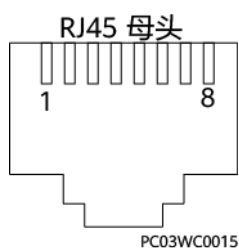


Table 3-12 Pin definitions for the COM1 port

Pin	Signal	Description
1	TX+	Transmits data over RS485.
2	TX-	
3	Reserved	-
4	RX+	Receives data over RS485.

Pin	Signal	Description
5	RX-	
6	PGND	Grounding (PE)
7	Reserved	-
8	Reserved	-

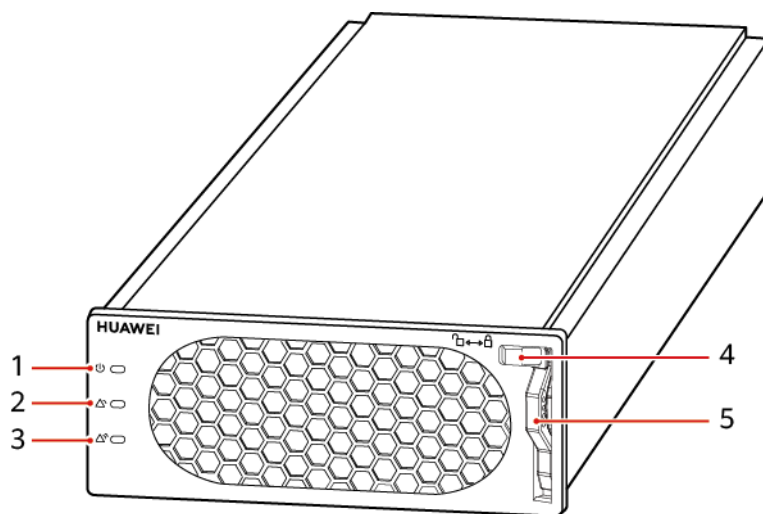
Table 3-13 Pin definitions for the COM2 port

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

3.4 Rectifier

A rectifier converts AC input power into stable DC power.

Figure 3-10 Appearance



PR04WC0008

- (1) Power indicator (2) Alarm indicator (3) Fault indicator
(4) Locking latch (5) Handle

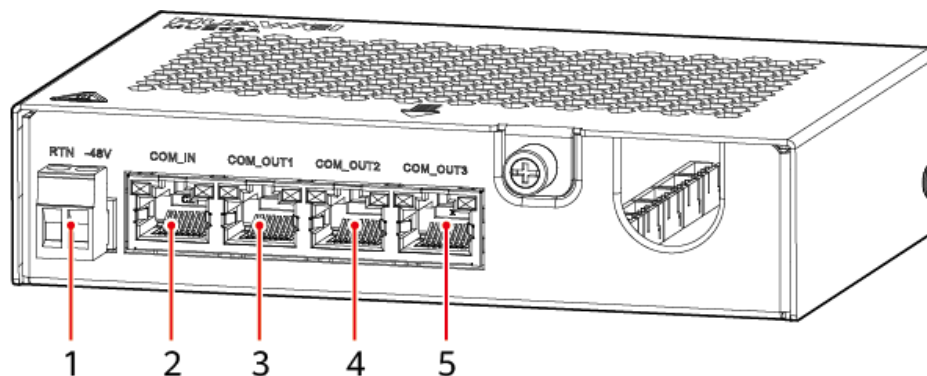
Table 3-14 Indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The rectifier has an AC input.
		Off	The rectifier has no AC input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
Blinking at 4 Hz	The rectifier is loading an application program.		
Alarm indicator	Yellow	Off	No alarm is generated.
		Steady on	<ul style="list-style-type: none"> • A warning is generated due to ambient overtemperature. • The rectifier has generated a protection shutdown alarm due to ambient overtemperature or undertemperature.
			AC input overvoltage or undervoltage protection has been triggered.
			The rectifier is in hibernation state.
Blinking at 0.5 Hz	The communication between the rectifier and the external device is interrupted.		
Fault indicator	Red	Off	The rectifier is normal.
		Steady on	The rectifier locks out due to output overvoltage.
The rectifier has no output due to an internal fault.			

3.5 Expansion Box MUE03A

Appearance

Figure 3-11 MUE03A appearance



PQ13W00006

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|
| (1) Power input port | (2) Communications port
COM_IN | (3) Communications port
COM_OUT1 |
| (4) Communications port
COM_OUT2 | (5) Communications port
COM_OUT3 | |

Power Input Port

Table 3-15 Pin definitions for the power input port

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

Communications Ports

Table 3-16 Communications port description

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

Communications Ports	Communications Parameter	Communications Protocol	Function
COM_OUT3			
NOTE All these ports are protected by a security mechanism.			

Figure 3-12 COM port pins

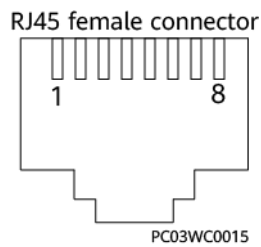


Table 3-17 Pin definitions for the COM_IN port

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

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

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

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

Wiring Terminals

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

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

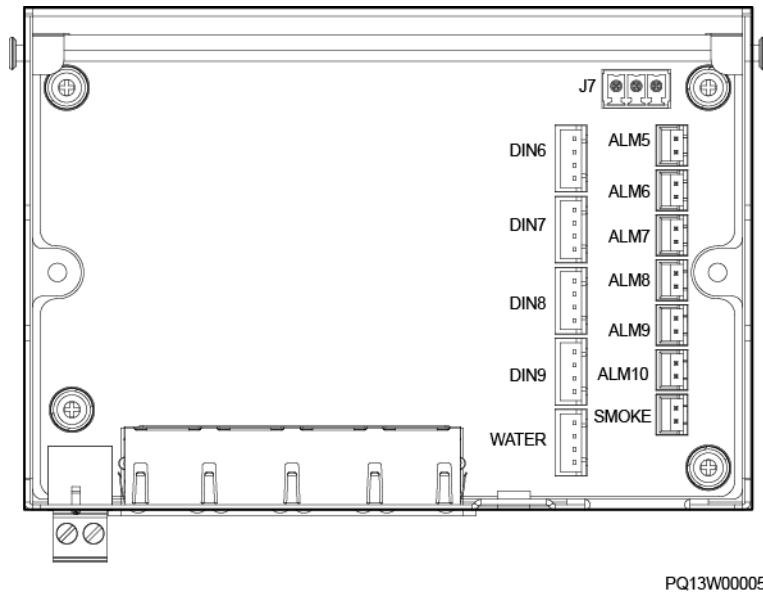


Figure 3-14 DIN and WATER pin definitions

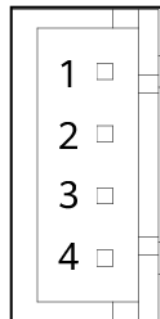


Table 3-19 DIN and WATER pin definitions

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

Figure 3-15 ALM and SMOKE pin definitions

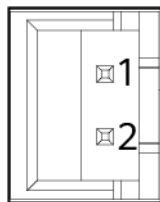


Table 3-20 ALM and SMOKE pin definitions

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

Figure 3-16 J7 pin definitions

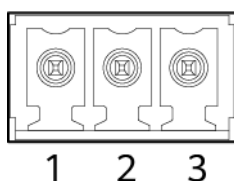


Table 3-21 J7 pin definitions

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

4 Installation

4.1 Installation Preparations

4.1.1 Cables

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

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

Table 4-1 Cables

Cable Type		Maximum Current (A)	Minimum Cross-Sectional Area (mm ²)	Maximum Cross-Sectional Area (mm ²)
PE cable		-	10	25
AC input power cable (single-phase, dual-live wire, HVDC)	Live wire L, L1, HVDC+	21.2	2.5	16
	Neutral wire N, live wire L2, HVDC-	21.2	2.5	16
DC output power cable	-	16	1.5	16
		32	4	16
Battery cable		50	10	16



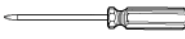




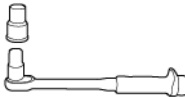
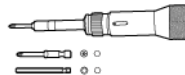
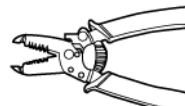
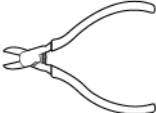
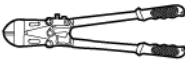
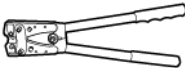
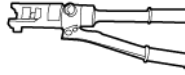

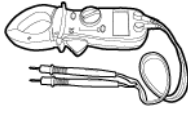

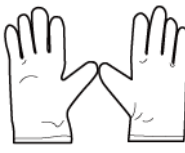

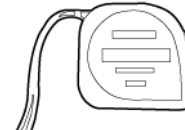
Cable Type	Maximum Current (A)	Minimum Cross-Sectional Area (mm ²)	Maximum Cross-Sectional Area (mm ²)
<p>NOTE</p> <ul style="list-style-type: none"> The data in the table is applicable when the ambient temperature is 30°C (in air) and cables are in a single loop. When the ambient temperature is not 30°C or cables in multiple loops are routed together, use cables with larger cross-sectional areas if the cabling distance is long. Battery cables should be able to withstand a temperature of at least 90°C. 			

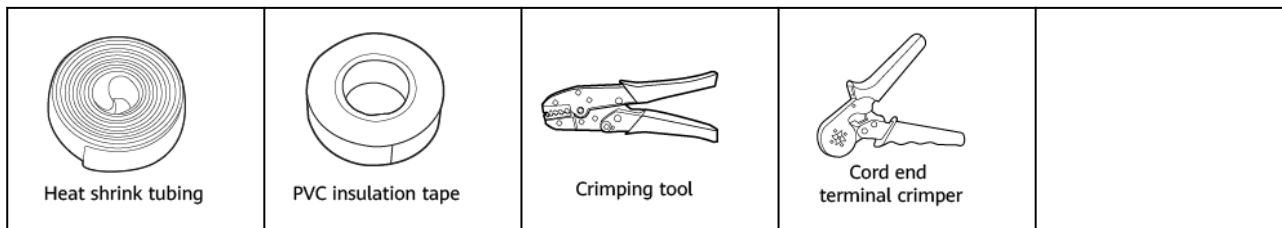
4.1.2 Tools

NOTICE

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

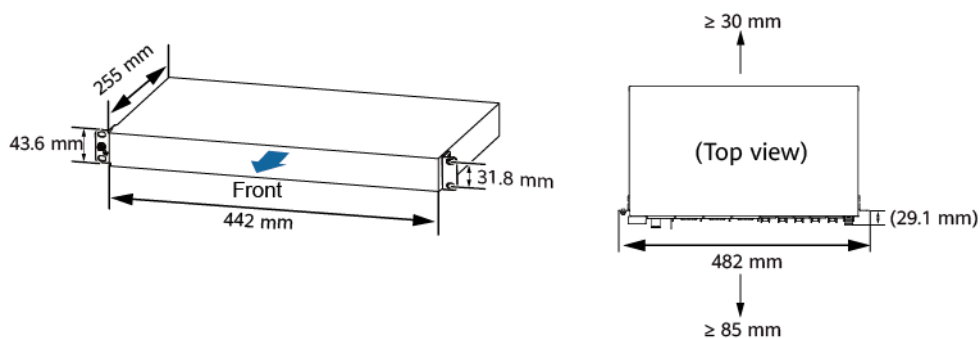
Table 4-2 Installation tools and instruments

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



4.1.3 Installation Dimensions

Figure 4-1 Installation dimensions



PQ13500001

NOTE

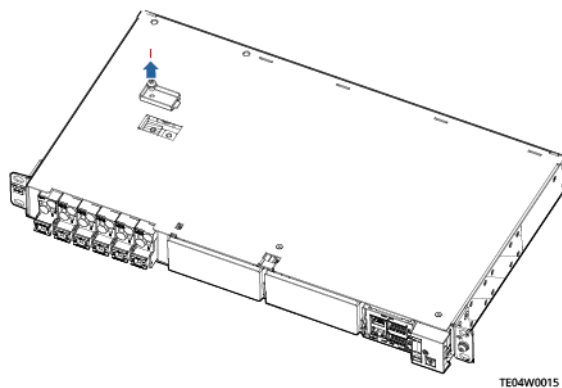
- 29.1 mm indicates that the distance between a power subrack mounting ear and the front of the subrack is about 29.1 mm.
- When installing subracks, ensure to reserve enough space for personnel to install cables.

4.2 Installing a Subrack

Procedure

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

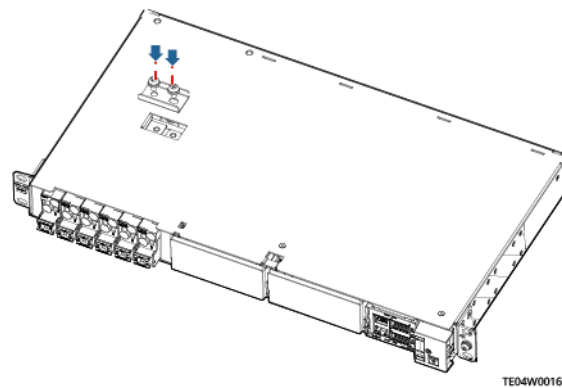
Figure 4-2 Removing the cover of the RTN ground bar at the bottom of the subrack



TE04W0015

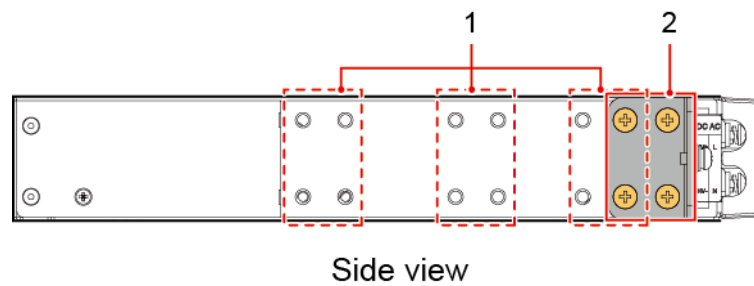
Step 2 (Optional) Install an RTN ground cable.

Figure 4-3 Install an RTN ground cable



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

Figure 4-4 Installation positions for mounting ears

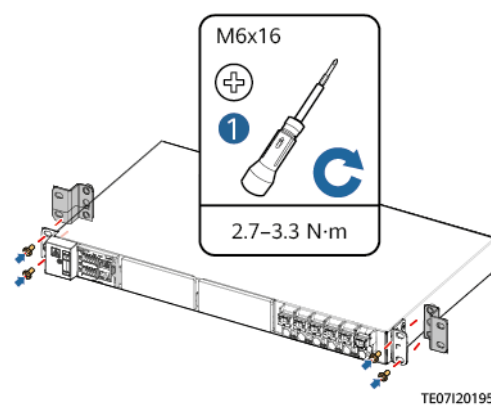


(1) Adjustable positions

(2) Default position

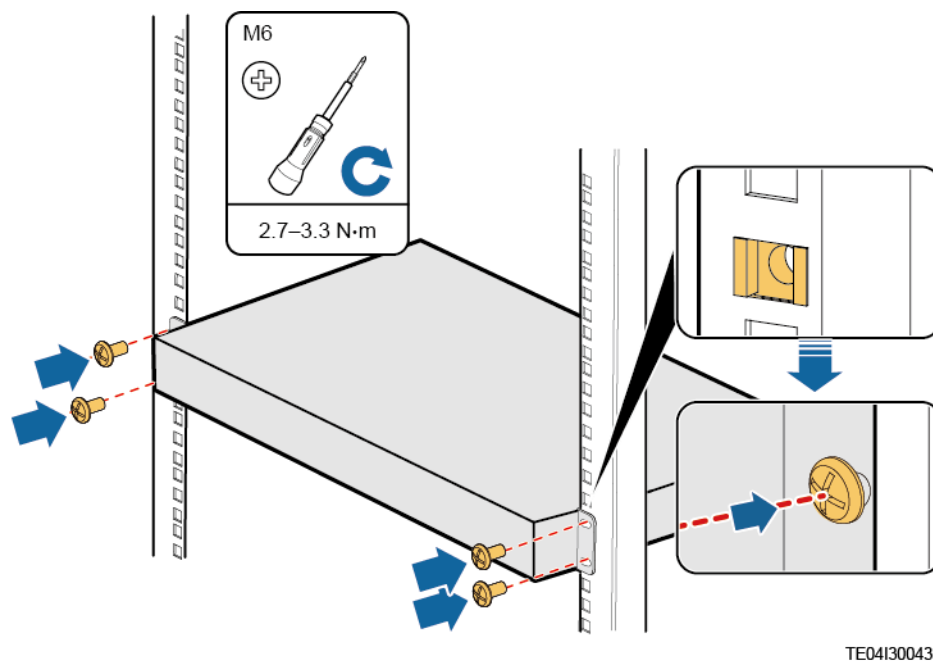
Step 4 (Optional) When installing on an ETSI rack, ensure to use the ETSI mounting ears.

Figure 4-5 Installing ETSI mounting ears



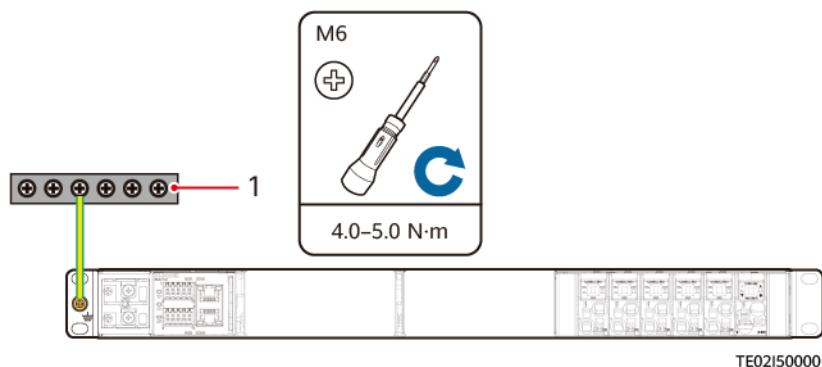
Step 5 Install the subrack in a 19-inch rack.

Figure 4-6 Installing a subrack



Step 6 Install a ground cable.

Figure 4-7 Installing a ground cable



(1) Site ground bar

----End

4.3 Installing Components

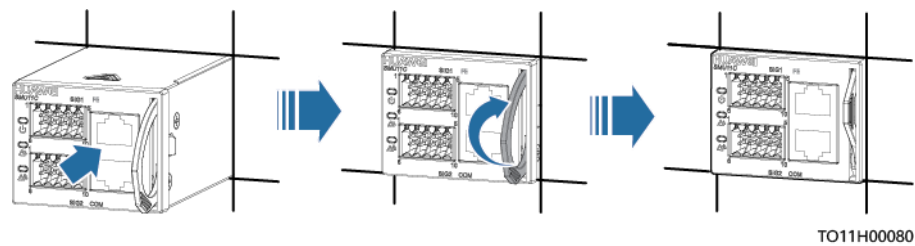
4.3.1 Installing an SMU11B

Procedure

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

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

Figure 4-8 Installing an SMU11B



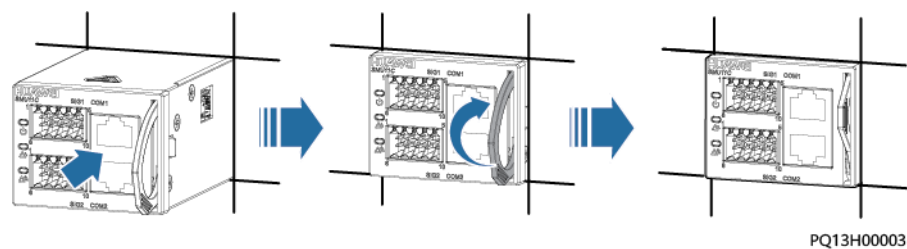
----End

4.3.2 Installing an SMU11C

Procedure

- Step 1** Set the DIP switch based on the assigned address.
- Step 2** Insert the SMU11C into the slot and slide it into the subrack along the guide rails.
- Step 3** Push the SMU11C handle upwards until it is in place.

Figure 4-9 Installing an SMU11C



----End

4.3.3 Installing a Rectifier

Prerequisites

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

NOTICE

- If the rectifier is damaged, contact your local 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.
- In an indoor scenario, you are advised to power on the rectifier within seven days after unpacking. If the rectifier cannot be powered on in time, place it in an indoor environment that is dry and without corrosive gas.
- In an outdoor scenario, you are advised to power on the rectifier within 24 hours after unpacking. If the rectifier cannot be powered on in time, place it in an indoor environment that is dry and without corrosive gas.

Procedure

Step 1 Push the locking latch towards the left.

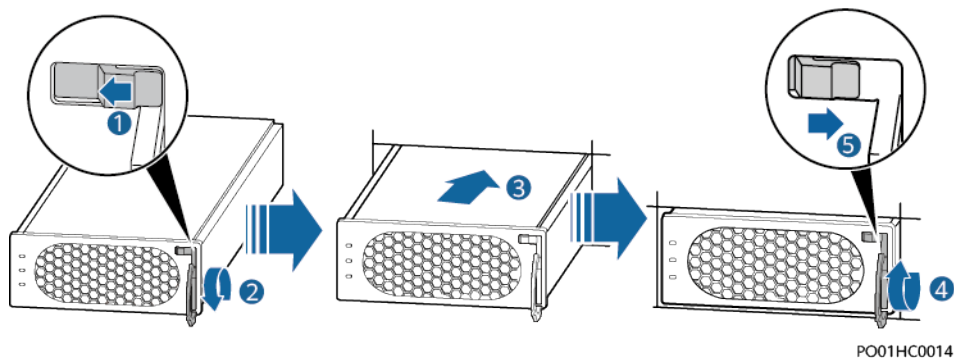
Step 2 Draw the handle downwards.

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

Step 4 Push the handle upwards.

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

Figure 4-10 Installing a rectifier



----End

4.4 Installing Cables

4.4.1 (Optional) Installing a Dry Contact Signal Cable

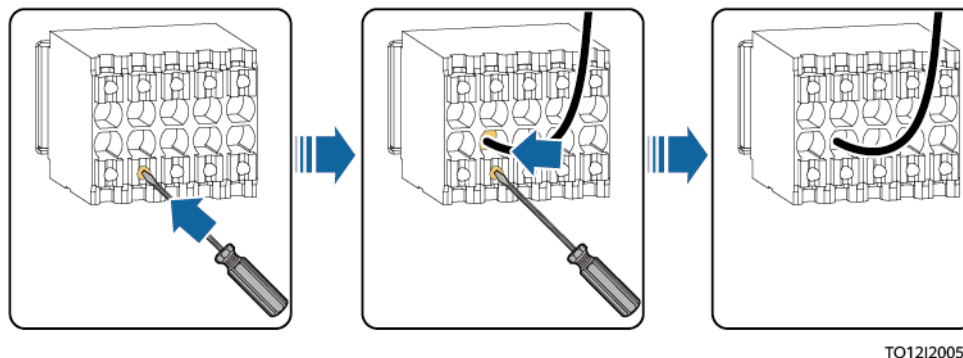
Procedure

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

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

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

Figure 4-11 Installing a dry contact signal cable



NOTE

Connect the output dry contacts to IO1 and IO2 ports.

----End

4.4.2 Installing Signal Cables for a Battery Temperature Sensor

Prerequisite

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

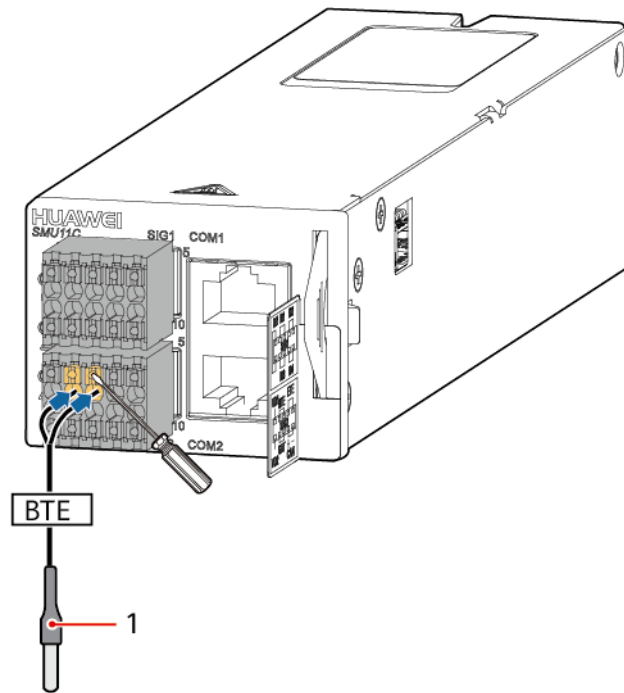
Procedure

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

NOTICE

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

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



PQ13130008

(1) Battery temperature sensor

----End

4.4.3 Installing Signal Cables for a Door Status Sensor

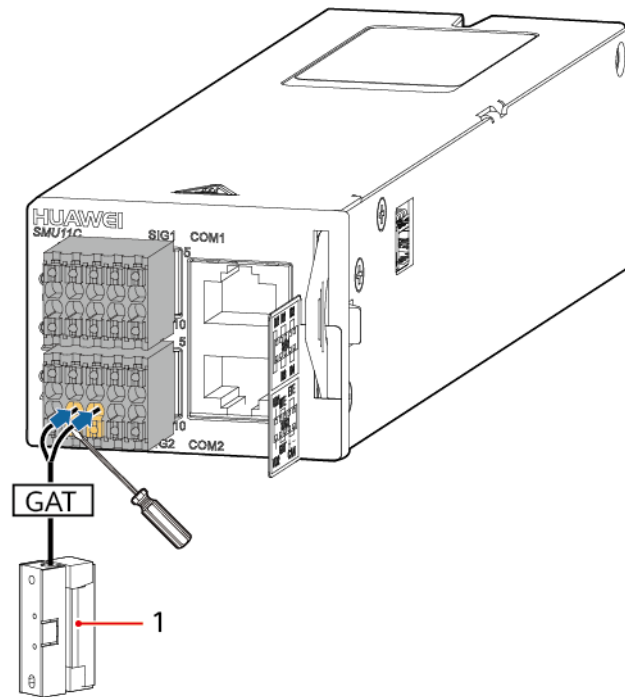
Prerequisite

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

Procedure

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

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



PQ13130007

(1) Door status sensor

----End

4.4.4 Installing an Alarm Signal Cable for the Cable Distribution Frame

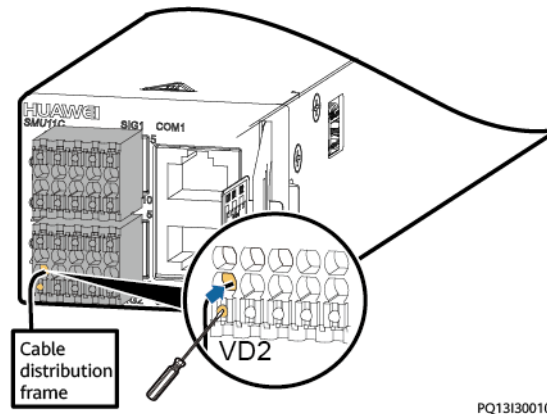
NOTE

Ensure that the RTN ground bar is installed.

Procedure

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

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



PQ13130010

(1) Cable distribution frame

----End

4.4.5 Installing a Cable for the Expansion Box (SMU11B)

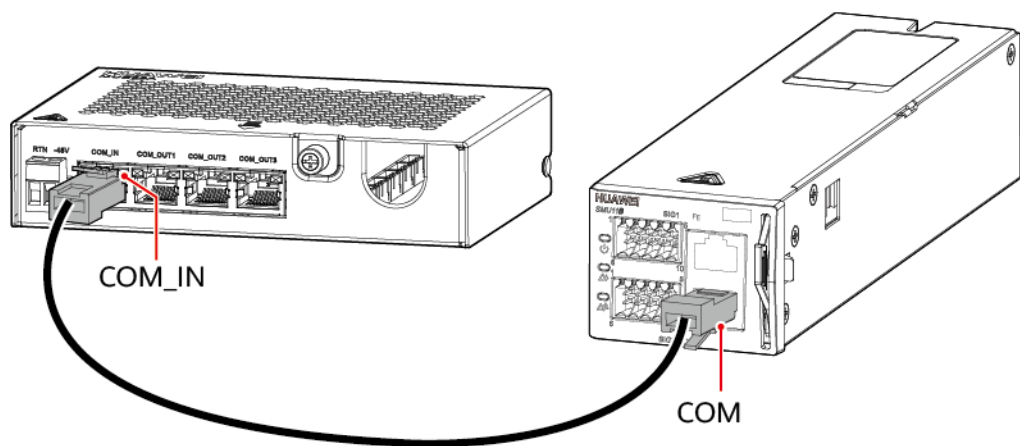
Prerequisites

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

Procedure

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

Figure 4-15 Installing a cable for the expansion box



PQ13130010-2

NOTE

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

----End

4.4.6 Installing a Cable for the Expansion Box (SMU11C)

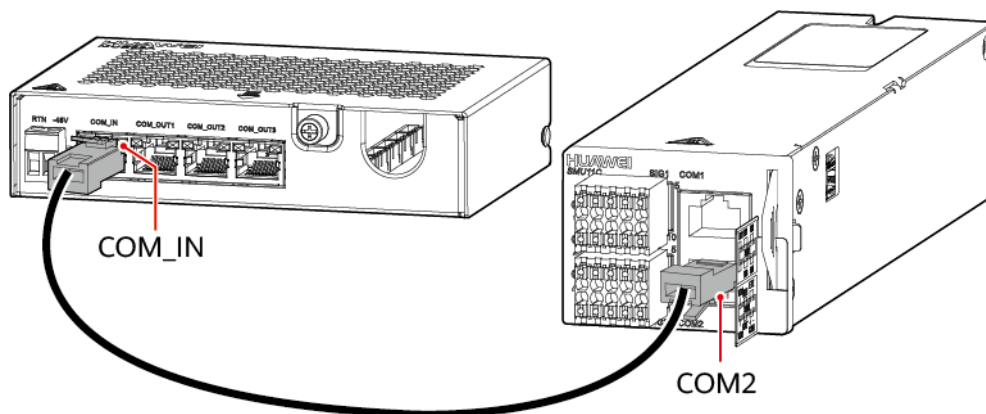
Prerequisites

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

Procedure

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

Figure 4-16 Installing a cable for the expansion box



PQ13130010

NOTE

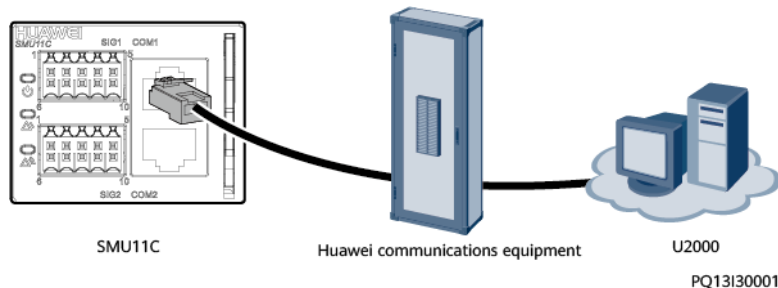
Ensure that the expansion box side with holes does not face downwards.

----End

4.4.7 Installing a Communications Cable (SMU11C)

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

Figure 4-17 Installing a communications cable



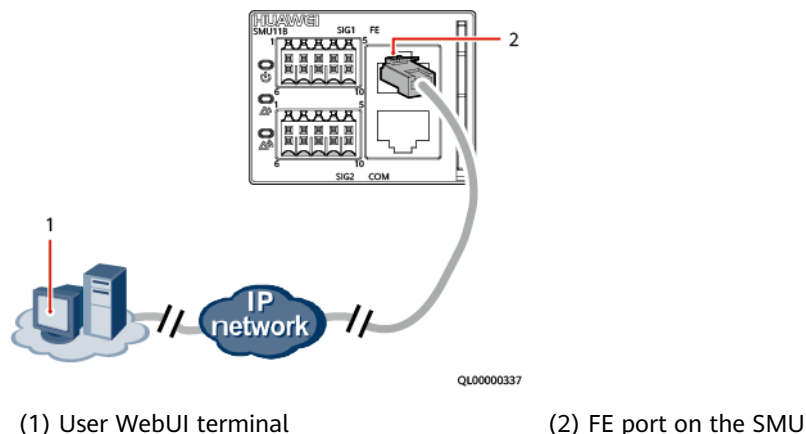
PQ13130001

4.4.8 Installing a Communications Cable (SMU11B)

4.4.8.1 U2000 Management

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

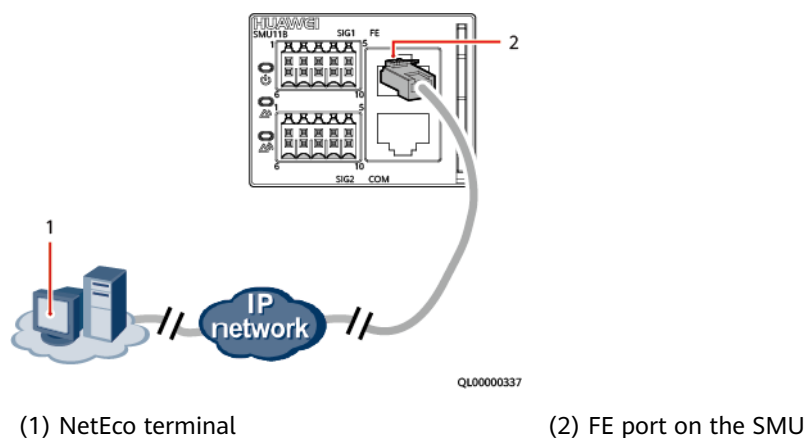
Figure 4-18 Installing a communications cable (SMU11B)



4.4.8.2 NetEco Management

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

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



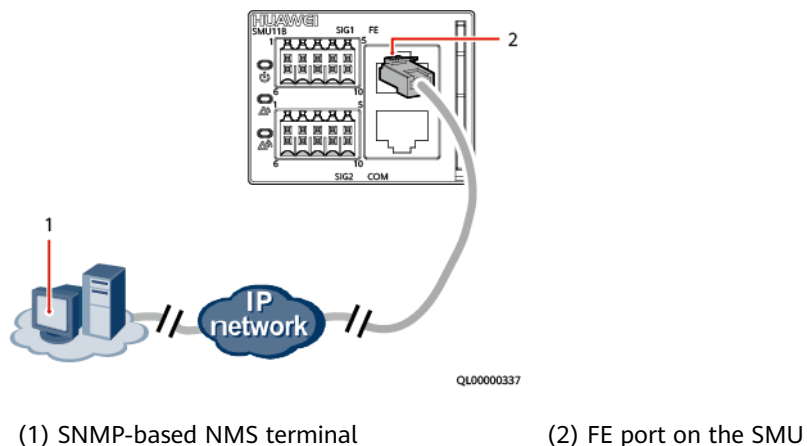
----End

4.4.8.3 Third-Party NMS Management (over SNMP)

Procedure

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

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



----End

4.4.9 Installing DC Output Power Cables

Prerequisite

⚠ DANGER

- Switch off the upstream input circuit breaker, and attach warning labels such as "Do not operate."
- Switch off all circuit breakers before installing the power cables.

Procedure

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

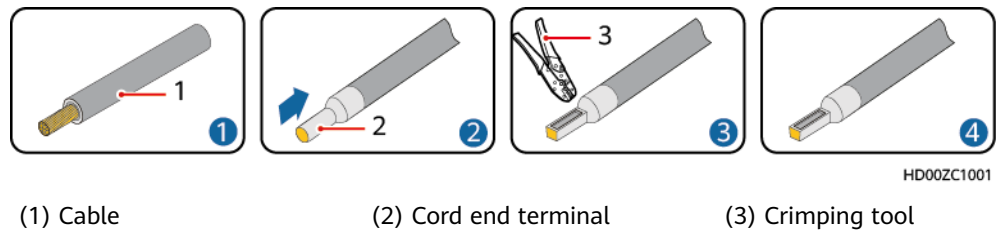
📖 NOTE

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

Table 4-3 Cables (small capacity circuit breakers)

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

Figure 4-21 Preparing a cord end terminal



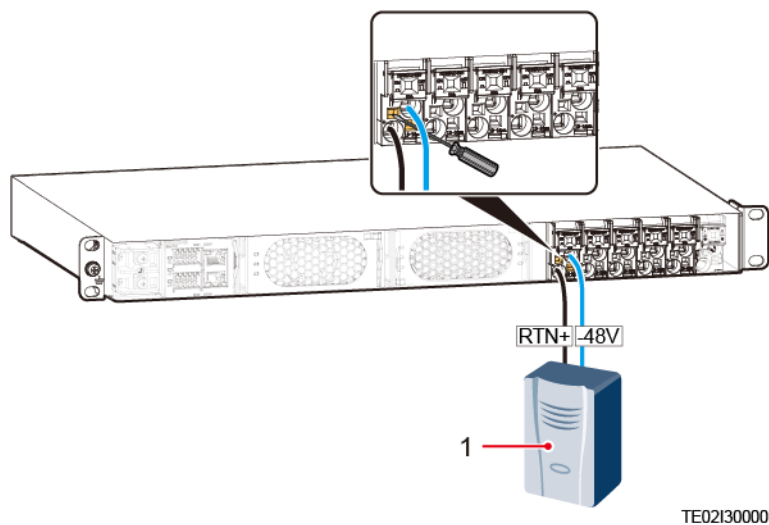
Step 2 Install DC output power cables.

CAUTION

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

1. Use a flat-head screwdriver (2 mm wide) to push the slider in a wiring hole in place.
2. Install a battery cable at the wiring hole.
3. Remove the screwdriver and ensure that the battery cable is securely installed.

Figure 4-22 Installing DC output power cables



----End

4.4.10 Installing Battery Cables

Prerequisites

 DANGER

- Smoking and sources of ignition are prohibited near batteries.
- Flip the battery switch to OFF before installing batteries.
- Comply with regulations and warnings issued by the battery manufacturer.
- Use tools with insulated handles. Using tools without insulated handles may cause personal injury or result in batteries burning out.
- Before handling batteries, wear goggles, rubber gloves, and protective clothes. Remove any conductors such as jewelry or watches.
- Ensure that battery acid does not come into contact with the eyes. If battery acid gets in the eyes, rinse the eyes with cold water for at least 15 minutes and then seek medical advice immediately. If battery acid comes into contact with skin or clothing, immediately wash the affected area with soap and water.
- Do not use metal or conductors to simultaneously touch two or more battery terminals. Do not use metal or conductors to simultaneously touch battery terminals and grounded objects (for example, the battery compartment); otherwise, transient short circuits will occur, which may produce sparks or explosions.
- During battery installation, ensure that the positive and negative battery terminals are correctly connected to prevent reverse polarity. First connect the negative battery cable and then connect the positive battery cable.
- Secure battery cables to the torque specified in battery documentation. Loose connections will result in excessive voltage drops or cause batteries to burn out when the current increases.

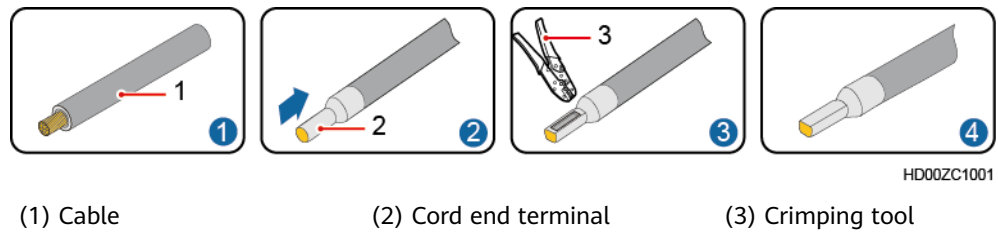
Procedure

- Step 1** Use cables (size: 10–16 mm²) and cord end terminals to prepare battery cables.

Table 4-4 Preparing cables

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

Figure 4-23 Preparing a cord end terminal



Step 2 Install the battery cables.

CAUTION

Do not connect battery cables to load circuit breakers. Batteries do not support current limiting, which may cause battery bulge or failure due to overcharge.

1. Use a flat-head screwdriver (2 mm wide) to push the slider in a wiring hole in place.
2. Install a battery cable at the wiring hole.
3. Remove the screwdriver and ensure that the battery cable is securely installed.

Figure 4-24 Installing battery cables

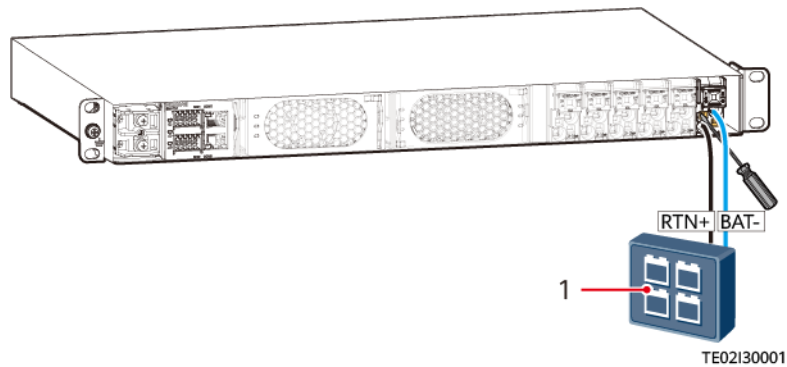


Figure 4-25 Installing lithium battery cables

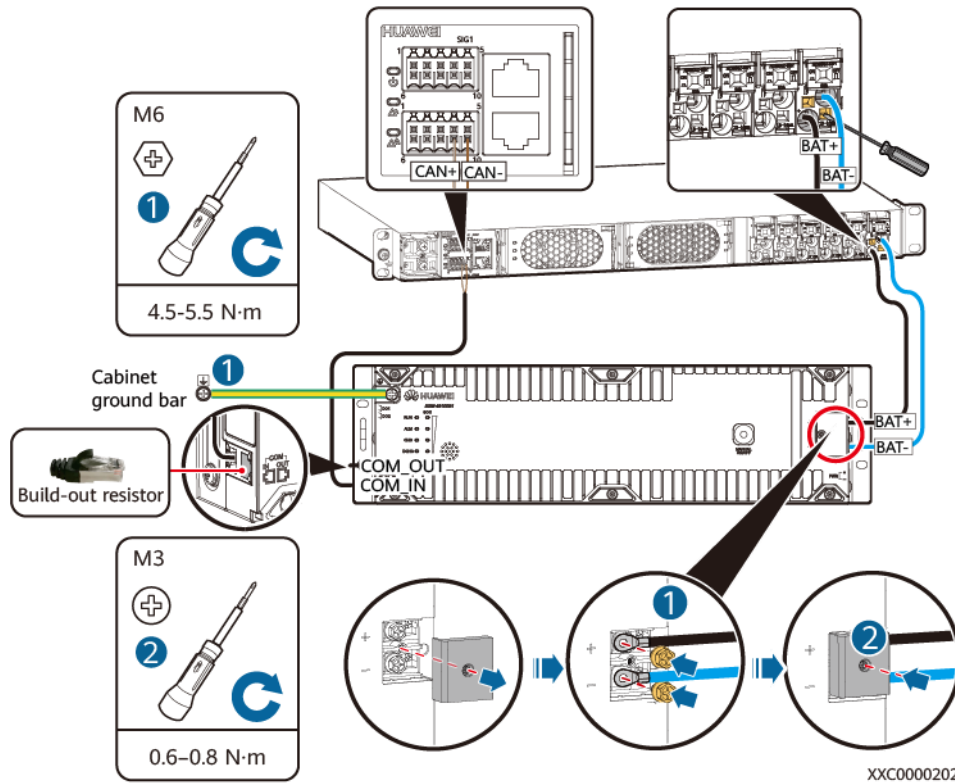



Table 4-5 Mapping between lithium battery and SMU communications ports

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

----End

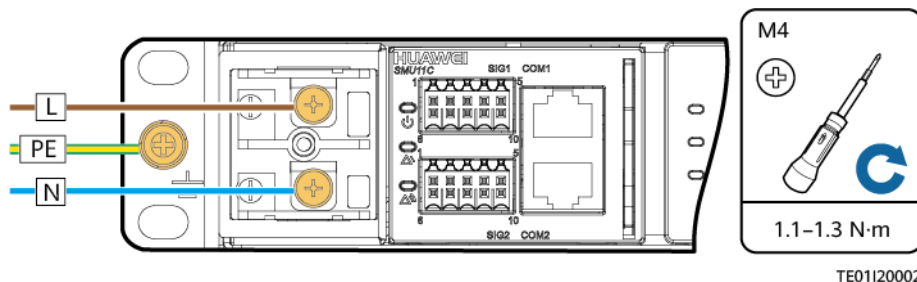
4.4.11 Installing Input Power Cables

4.4.11.1 Installing 220 V AC Single-Phase Input Power Cables

Procedure

- Step 1** Remove the protective cover from AC input terminals.
- Step 2** Connect the AC input power cables to the corresponding AC input terminals.

Figure 4-26 Installing 220 V AC single-phase input power cables



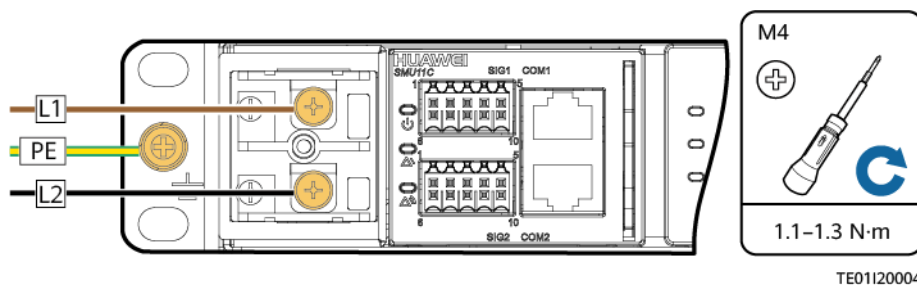
- Step 3** Reinstall the protective cover for the AC input terminals.
- End

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

Procedure

- Step 1** Remove the protective cover from AC input terminals.
- Step 2** Connect the AC input power cables to the corresponding AC input terminals.

Figure 4-27 Installing 110 V AC dual-live wire input power cables



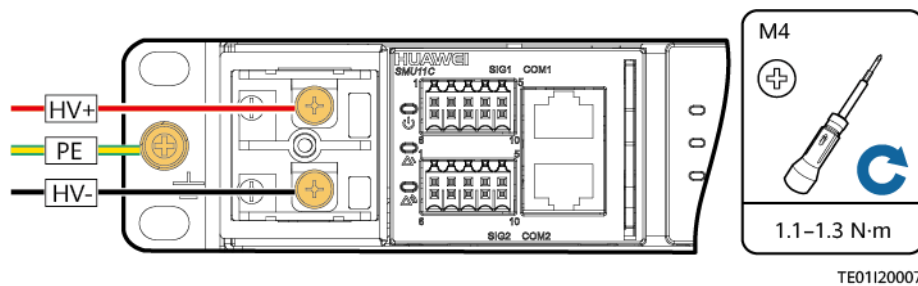
- Step 3** Reinstall the protective cover for the AC input terminals.
- End

4.4.11.3 Installing DC Input Power Cables

Procedure

- Step 1** Remove the protective cover from DC input terminals.
- Step 2** Connect the DC input power cables to the corresponding DC input terminals.

Figure 4-28 Installing DC input power cables



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

----End

5 Verifying the Installation

5.1 Checking Hardware Installation

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

5.2 Checking Electrical Connections

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

5.3 Checking Cable Installation

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

6 Commissioning

About This Chapter

NOTICE

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

6.1 Connecting the AC or DC Power Supply

Procedure

- Step 1** Measure the input voltage of the upstream input circuit breaker. The value should range from 85 V AC to 300 V AC or 85 V DC to 420 V DC.
- Step 2** Switch on the upstream input circuit breaker and measure the output voltage of the circuit breaker. The value should range from 85 V AC to 300 V AC or 85 V DC to 420 V DC.

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

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

----End

6.2 SMU11B

NOTE

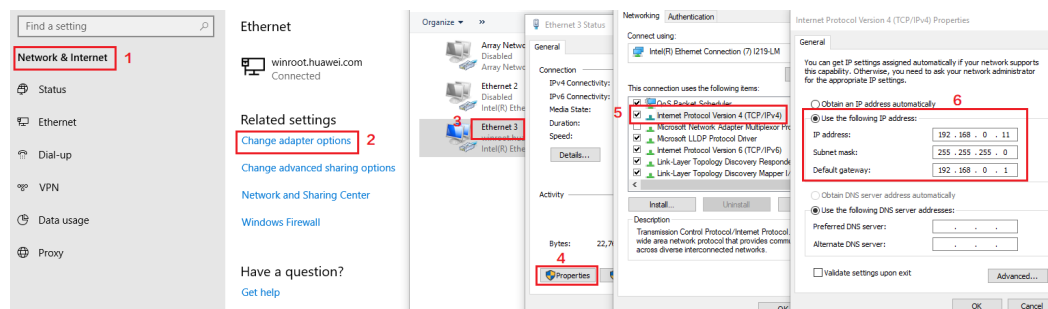
If the IP address of the SMU11B is changed on the WebUI, record the IP address for future login.

6.2.1 Logging In to the WebUI

Step 1 Set the PC IP address in the same network segment as the SMU IP address.

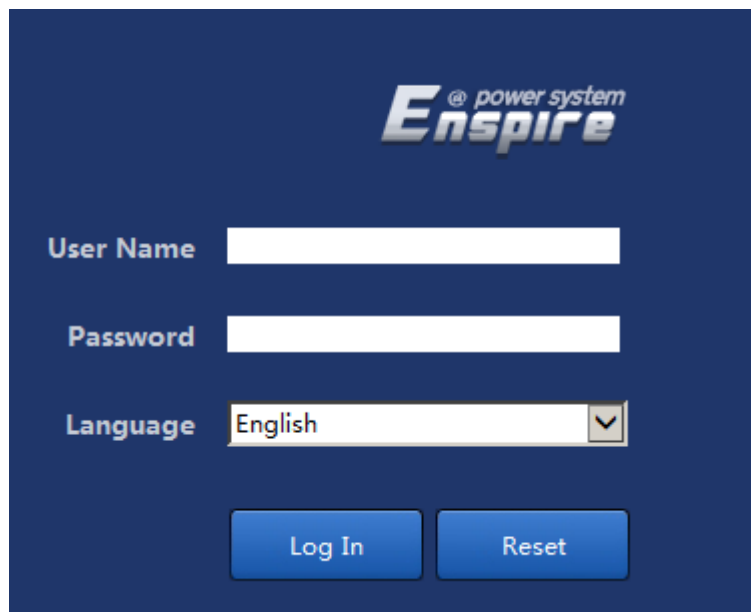
The SMU has a default IP address of 192.168.0.10, a subnet mask of 255.255.255.0, and a default gateway of 192.168.0.1, set the IP address to 192.168.0.11, subnet mask to 255.255.255.0, and default gateway to 192.168.0.1 on the PC.

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



Step 2 Enter **https://local IP address for the SMU** (default address: **https://192.168.0.10**) in the address box of Internet Explorer and press **Enter**. The login page is displayed.

Figure 6-2 Login Page



NOTE

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

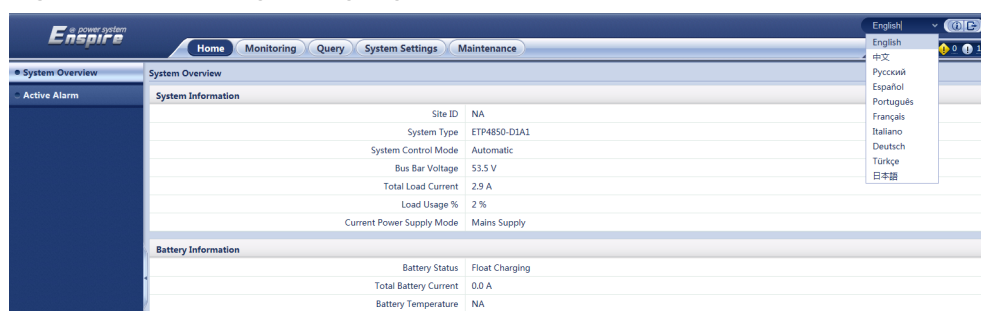
----End

6.2.2 Setting Parameters on the WebUI

Selecting a Language

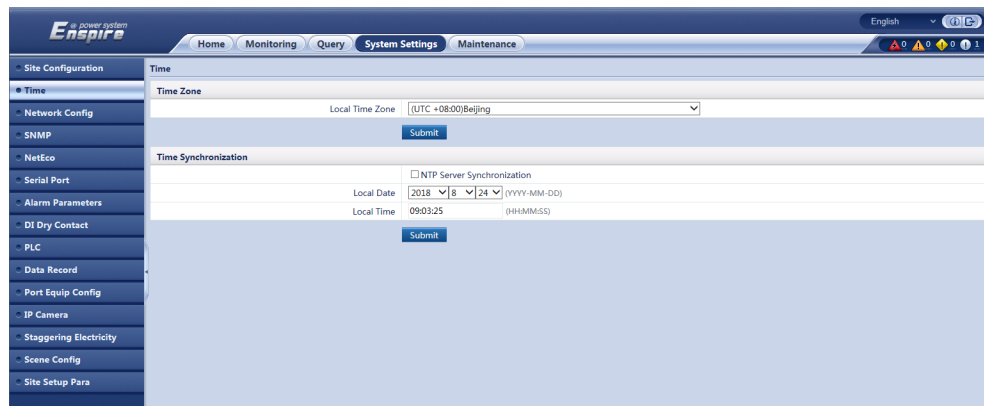
The SMU11B supports English, Chinese, French, Spanish, Portuguese, Russian, Italian, German, Turkish, and Japanese.

Figure 6-3 Selecting a language



Setting the Date and Time

Figure 6-4 Setting the date and time



(Optional) Disabling Door Status Alarms

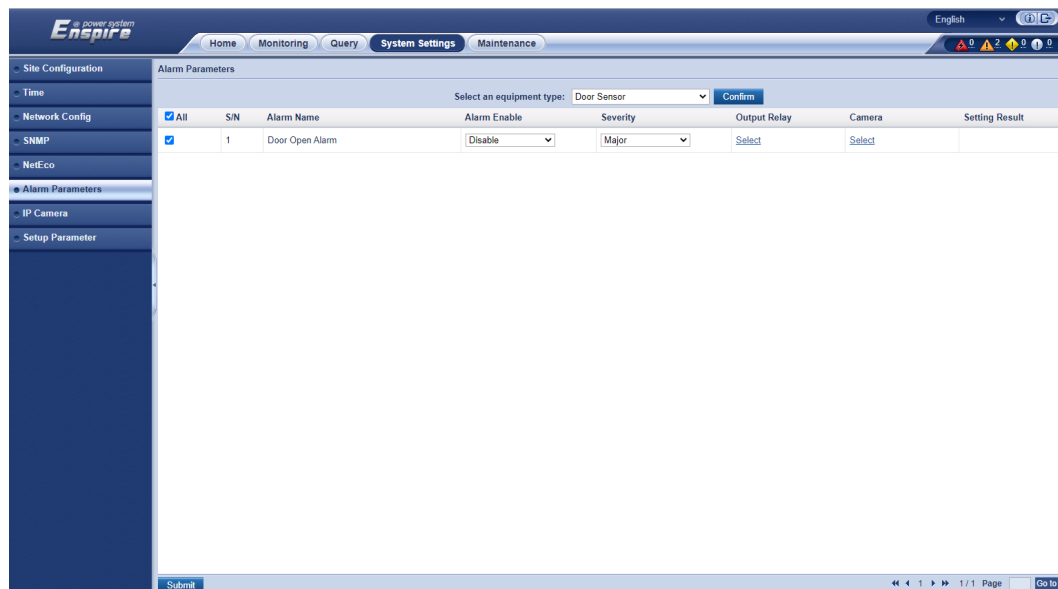
NOTE

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

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

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

Figure 6-5 Disabling the door status alarm



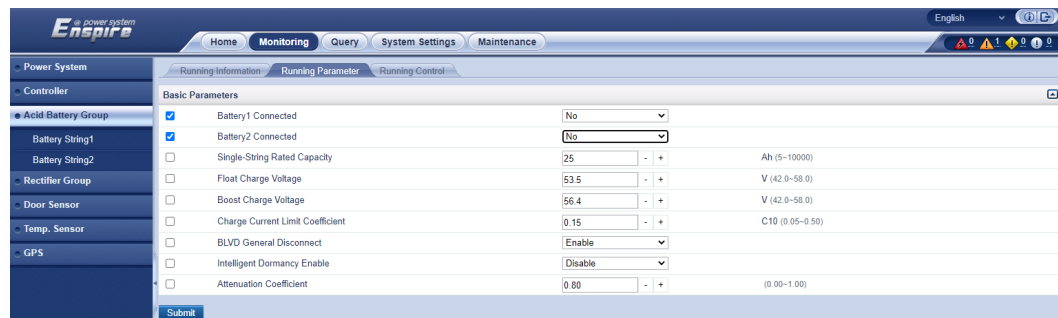
----End

Setting Basic Battery Parameters

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

NOTICE

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

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

Step 1 Set the battery detect way.

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

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

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

Step 3 (Optional) Set lithium battery parameters.

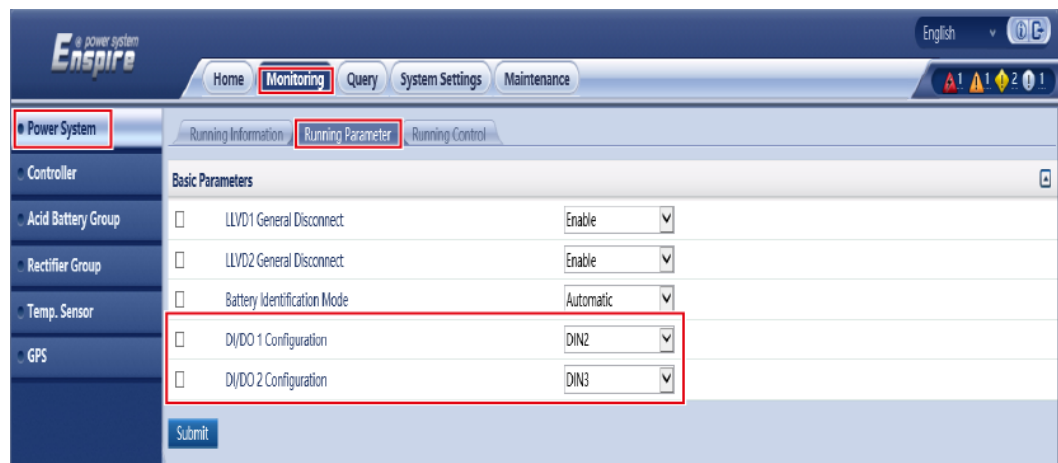
Path: **Monitoring > Lithium Battery Group > Running Parameter > Basic Parameters**

----End

Configuring IO Ports

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

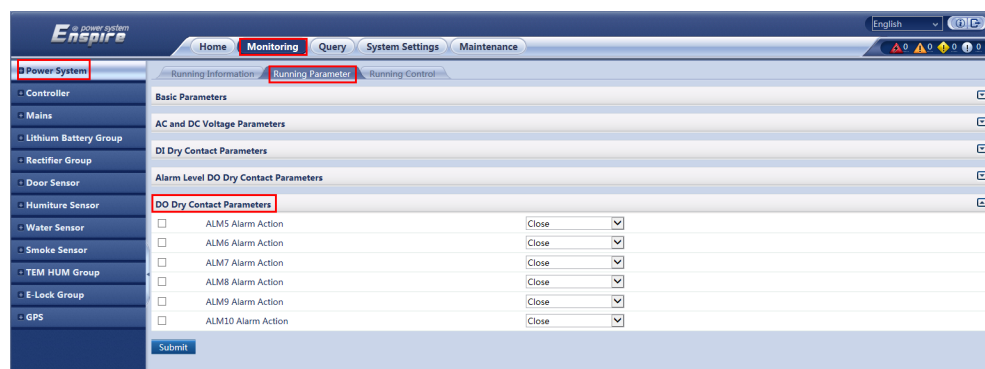
Figure 6-7 Configuring IO ports



Setting Alarm Actions for Dry Contact Outputs

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

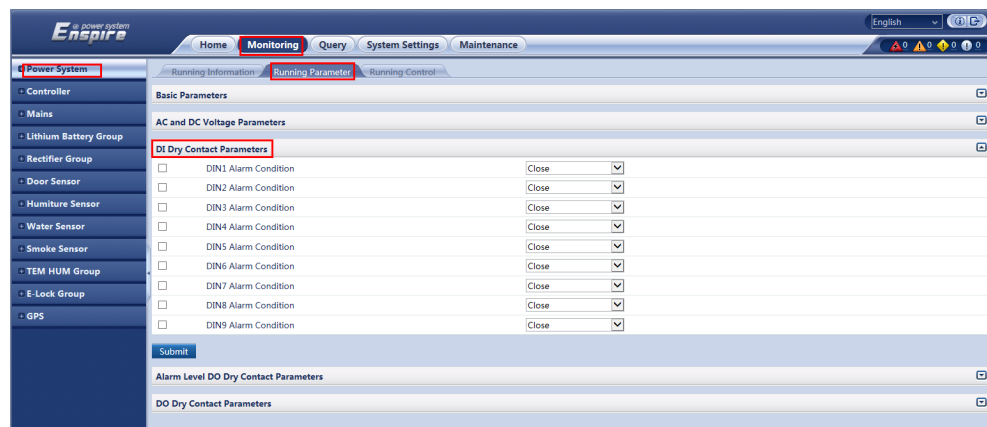
Figure 6-8 Setting alarm actions for dry contact outputs



Setting Alarm Conditions for Dry Contact Inputs

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

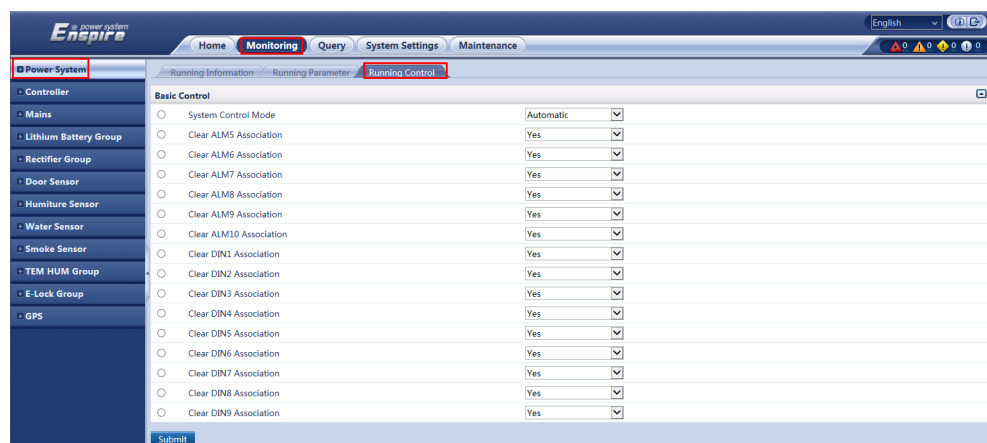
Figure 6-9 Setting alarm conditions for dry contact inputs



Clearing Associations Between Alarms and Dry Contacts

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

Figure 6-10 Clearing associations between alarms and dry contacts



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

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

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

Path: **System Settings > Alarm Parameters**

Step 2 Select a device type and set alarm parameters.

Figure 6-11 Setting the alarm enable option, alarm severity, and associated relays

	All	S/N	Alarm Name	Alarm Enable	Severity	Output Relay	Camera	Setting Result
	<input type="checkbox"/>	1	AC Failure	Enable	Major	Select	Select	
	<input type="checkbox"/>	2	AC Overvoltage	Enable	Minor	Select	Select	
	<input type="checkbox"/>	3	AC Undervoltage	Enable	Minor	Select	Select	
	<input type="checkbox"/>	4	Bus Bar Ultra Overvoltage	Disable	Major	Select	Select	
	<input type="checkbox"/>	5	Bus Bar Overvoltage	Enable	Major	Select	Select	
	<input type="checkbox"/>	6	Bus Bar Ultra Undervoltage	Disable	Critical	Select	Select	
	<input type="checkbox"/>	7	Bus Bar Undervoltage	Enable	Major	Select	Select	
	<input type="checkbox"/>	8	Unknown System Type	Enable	Critical	Select	Select	
	<input type="checkbox"/>	9	Load Fuse Break	Enable	Major	Select	Select	
	<input type="checkbox"/>	10	Long AC Failure	Disable	Major	Select	Select	

----End

6.3 LIVE-C APP (SMU11C)

6.3.1 Installing the LIVE-C APP

Prerequisites

There is a mobile phone running Android 5.0 or later.

Procedure

- Step 1** Obtain the latest LIVE-C APP installation package from Huawei technical support.
- Step 2** Install the LIVE-C APP on the mobile phone.

Figure 6-12 LIVE-C APP icon

----End

6.3.2 Logging In to the LIVE-C App

Prerequisites

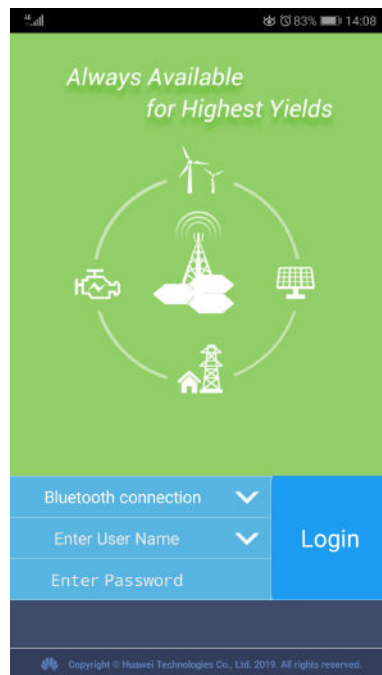
- You have obtained the LIVE-C app user name and password.
- The mobile phone should be within 10 m away from the power equipment.
- The mobile phone app may be occasionally disconnected due to difference in phone model and Bluetooth signal strength. Please try again 5 minutes later.
- Certain mobile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

Procedure

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

Step 2 Tap **Power System Delivery** and access the login screen.

Figure 6-13 Login screen



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

NOTE

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

Step 4 Enter the user name and password. (initial user name: **liveapp**, initial password: **Changeme_123**)

NOTICE

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

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

----End

6.3.3 Setting Parameters

Setting the Display Language

The SMU supports English, Chinese, and Japanese.

Path: Choose **Me** > **Language** on the login screen.

Setup Wizard

You can use the setup wizard to set the date, time, and site ID for the system.

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

(Optional) Disabling Door Status Alarms

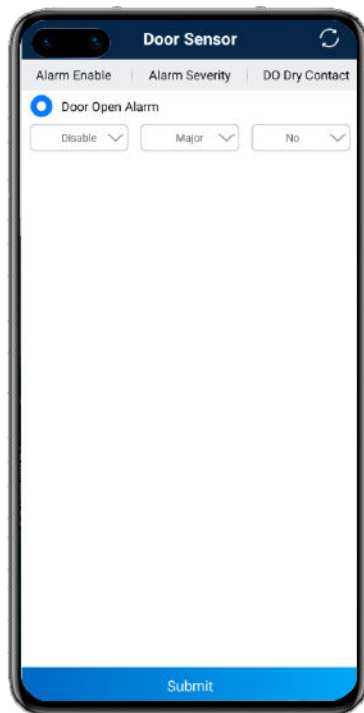
NOTE

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

Step 1 Set **Door Open Alarm** to **Disable** and tap **Submit**.

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

Figure 6-14 Disabling the door status alarm



----End

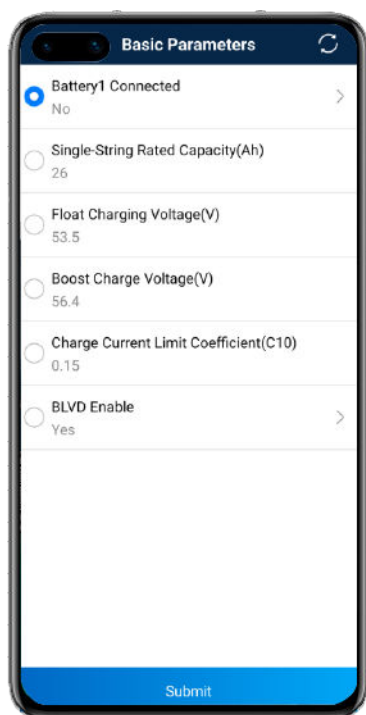
Setting Basic Battery Parameters

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

NOTICE

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

Figure 6-15 Setting battery parameters (no battery connected)



Step 1 Set the battery type.

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

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

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

Step 3 (Optional) Set lithium battery parameters.

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

----End

Configuring IO Ports

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

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

Setting Alarm Actions for Dry Contact Outputs

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

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

Setting Alarm Conditions for Dry Contact Inputs

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

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

Clearing Associations Between Alarms and Dry Contacts

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

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

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

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

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

Path: **System Settings > Alarm Settings**

Step 2 Select a device type and set alarm parameters.

----End

6.4 Connecting the Battery Supply

Prerequisites

NOTICE

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

Procedure

- Step 1** Switch on the battery circuit breakers.
- Step 2** Check whether the batteries communicate properly. If the run indicator on a battery is steady on, the battery communicates properly with the monitoring device. If it blinks fast (4 Hz), the communication between them is interrupted. If so, check whether the communications cable is properly connected.
- Step 3** Observe the batteries for 15 minutes. The batteries are running properly if the alarm indicators are off.
- Step 4** Set all the circuit breakers to the appropriate status based on site requirements.
- Step 5** Observe the power system for 15 minutes. If no alarm (except the door status alarm) is generated on the SMU during this period, the current and voltage for batteries and loads are normal.

NOTE

If the door status sensor is not configured and you need to disable the door status sensor alarm, refer to [Setting the Alarm Enable Option, Alarm Severity, and Associated Relays](#) or [Setting the Alarm Enable Option, Alarm Severity, and Associated Relays](#).

----End

7 Maintenance

7.1 Common Maintenance Operations on the WebUI (SMU11B)

Backing Up the Current Settings

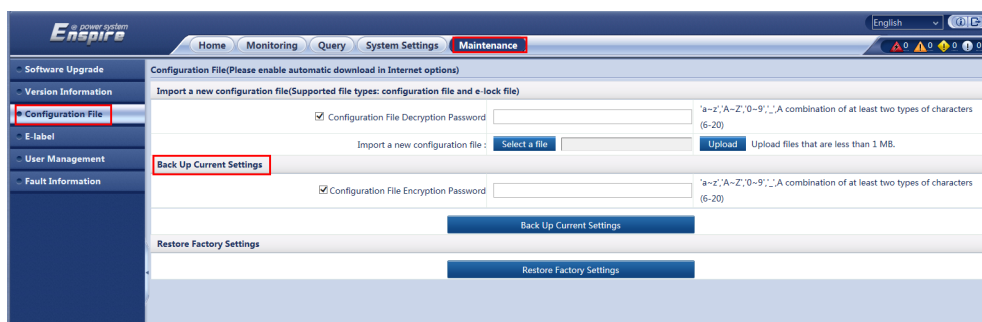
The configuration file contains all user configuration information (such as parameter values and alarm configurations) about the current system.

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

NOTICE

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

Figure 7-1 Backing up the current settings



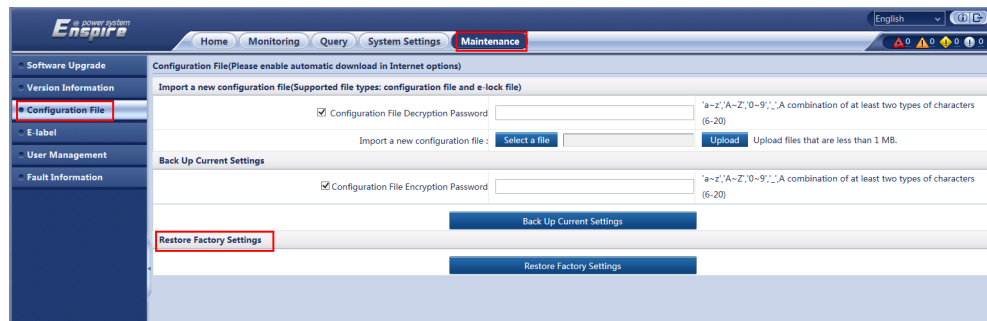
Restoring Factory Defaults

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

NOTICE

After factory defaults are restored, the monitoring unit restarts.

Figure 7-2 Restoring factory defaults



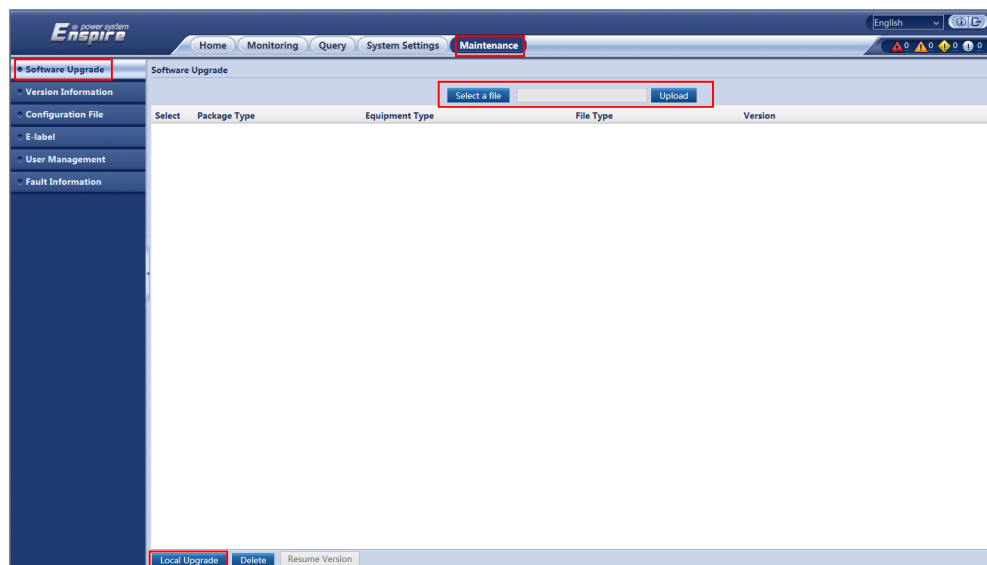
Upgrading Software

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

NOTICE

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

Figure 7-3 Upgrading software

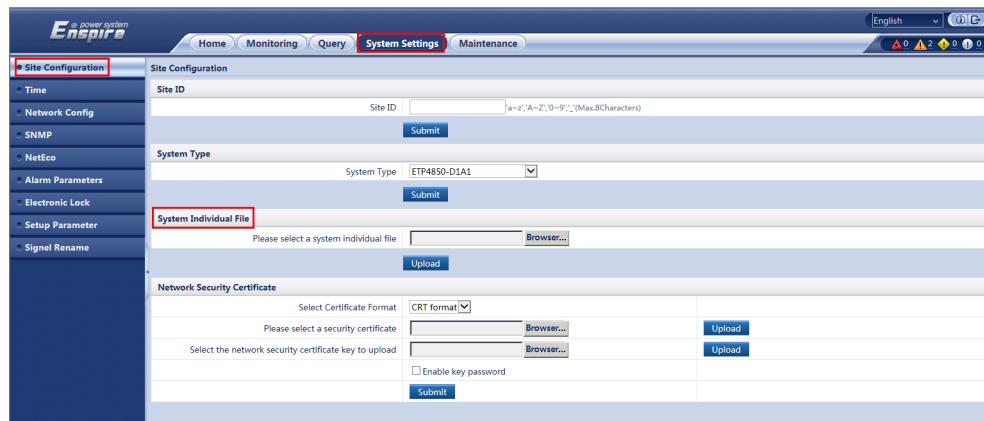


Importing an Individual File

The SMU restarts after an individual file is imported.

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

Figure 7-4 Importing an individual file



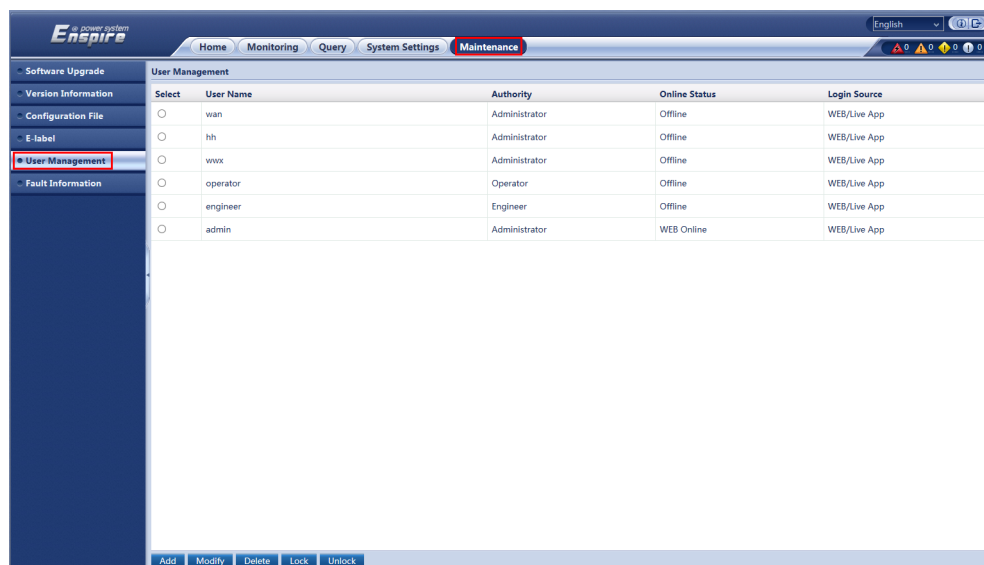
Step 2 Find the individual file (for example, ETP48200-B2A1_V1.4) based on the recorded file storage path, select and import it.

----End

Changing a User Password

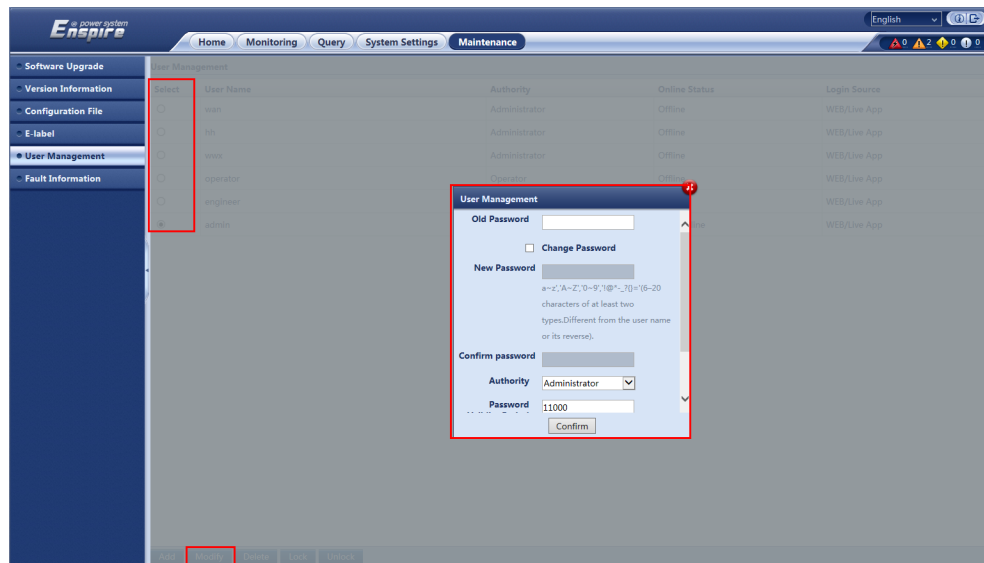
Step 1 Choose **Maintenance > User Management**. The user management page is displayed.

Figure 7-5 User management page



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

Figure 7-6 Changing the password



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

NOTE

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

Change the password in compliance with the following rules:

- The password must contain 6 to 20 characters.
- The password must consist of at least two of the following types: digits, uppercase letters, lowercase letters, and special characters (! @ * - _ ? { } = /).
- The password must be different from the previous two passwords.
- The password must be different from the user name or its reverse.

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

----End

Changing WiFi Password

You can locally access the WebUI using WiFi.

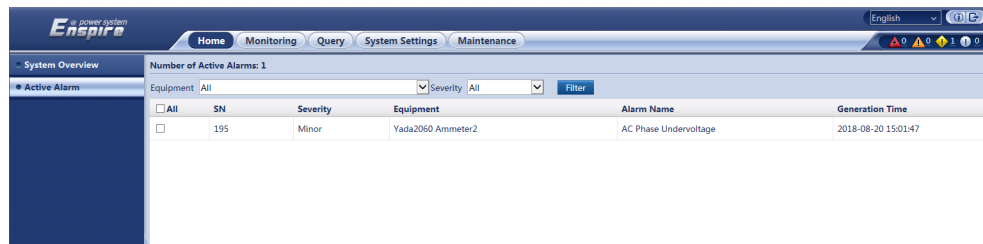
NOTICE

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

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

Viewing Active Alarms

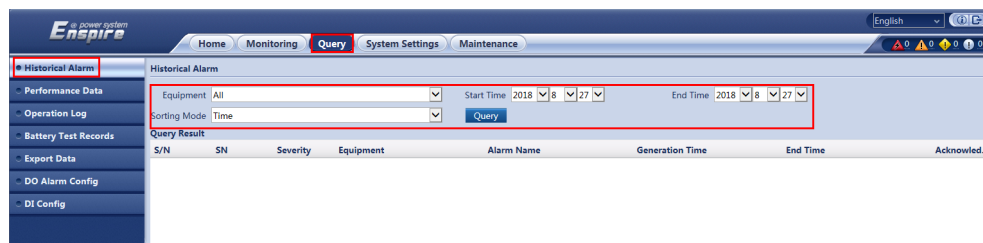
Figure 7-7 Viewing active alarms



Viewing Historical Alarms

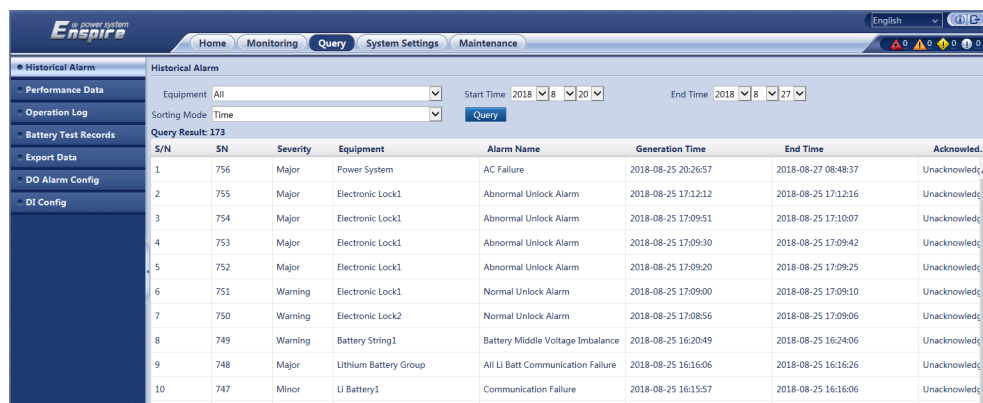
Step 1 To filter out historical alarms.

Figure 7-8 Filtering out historical alarms



Step 2 To view historical alarms.

Figure 7-9 Viewing historical alarms

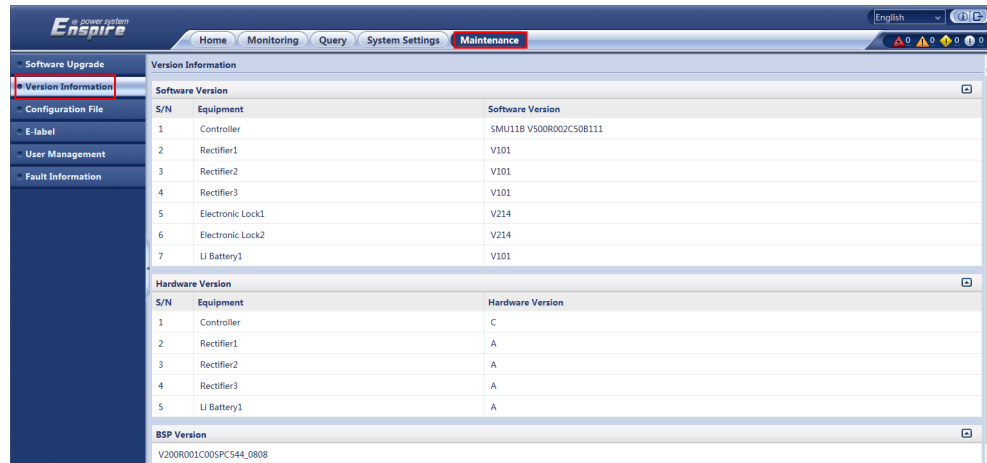


----End

Viewing Version Information

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

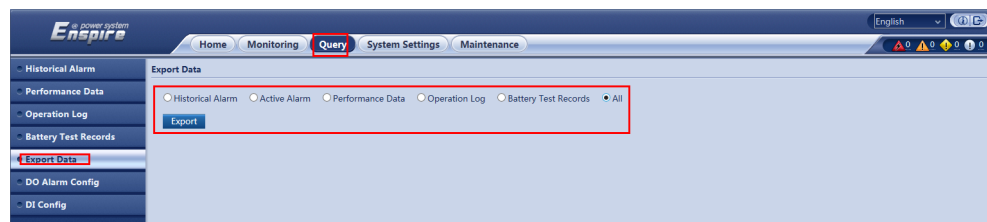
Figure 7-10 Viewing version information



Exporting Maintenance Information

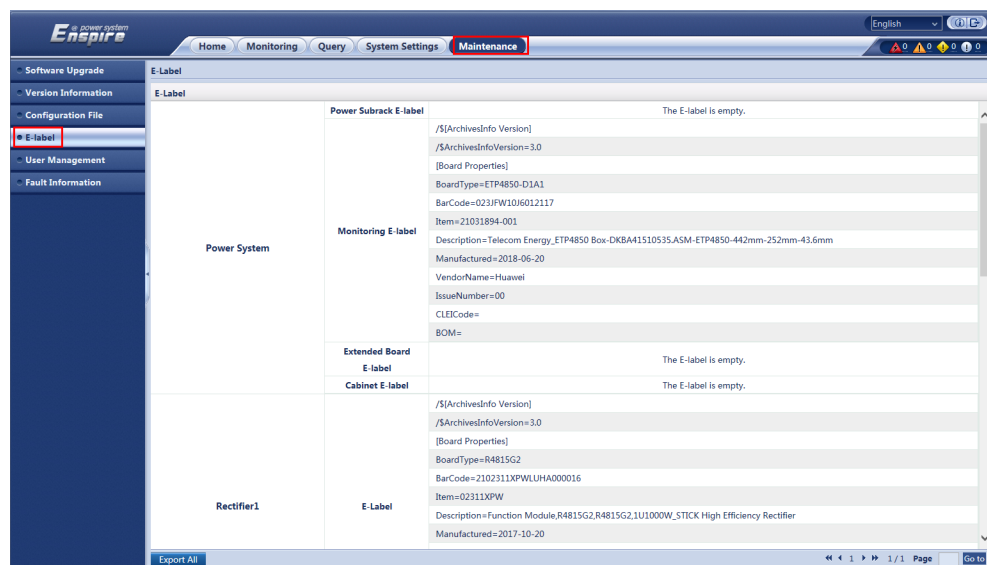
Step 1 To export historical data.

Figure 7-11 Exporting historical data

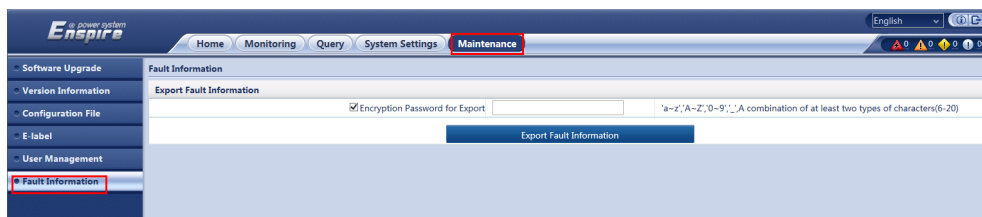


Step 2 To export e-label information.

Figure 7-12 Exporting e-label information



Step 3 To export fault information.

Figure 7-13 Exporting fault information

----End

7.2 Common Maintenance Operations on the LIVE-C APP (SMU11C)

Upgrading the Software

- The SMU restarts after the software is upgraded.
- The latest LIVE-C app upgrade package has been acquired from Huawei technical support.

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

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

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

----End

Changing a User Password

For security purposes, change your password periodically.

Path: **System Settings > Change Password**

Restoring Factory Settings

The SMU restarts after factory settings are restored.

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

Resetting the SMU

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

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

Setting the System Control Mode

The value of **System Control Mode** is **Automatic** by default. When it is **Manual**, you can use the LIVE-C APP to control rectifier startup/shutdown, output voltage,

and output current as well as battery connection/disconnection and equalized/float charge.

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

Deleting the Rectifiers Failing in Communication

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

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

Collecting Rectifier Fault Information

If rectifier alarms cannot be cleared according to Rectifying Common Faults, **Collect Fault Info** can be performed to export rectifier data, which can be provided to Huawei technicians for rectifier fault diagnosis.

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

Switching Between Equalized and Float Charge for Lead-Acid Batteries

- You can manually switch between equalized charge and float charge when the system works in manual control mode.
- Batteries keep in boost charge state after boost charge is manually started. When the float charge conditions are met (for example, time for boost charge expires), the batteries automatically switch to the float charge state.

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

Connecting and Disconnecting the Lead-Acid Battery Supply

NOTICE

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

You can manually connect or disconnect the battery supply when the system works in manual control mode.

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

Exporting Historical Alarms, and Battery Test Records

You can export historical alarms, and battery test records on the LIVE-C APP to quickly collect information and locate system faults.

Path: **OM Tool > Data Download**

Exporting Fault Logs

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

Path: **OM Tool > Fault Information**

Exporting E-label Information

You can view and export e-label information about the power subrack, monitoring board, and rectifier on the LIVE-C APP.

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

7.3 Routine Maintenance

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

Table 7-1 Routine maintenance checklist

Maintenance Item	Maintenance Task	Check Method	Scenario for Repair	Measures
Electricity	The AC input voltage is normal.	Clamp meter	The AC input voltage is beyond the normal range.	For details, see 7.4 Identifying Component Faults .
	The output voltage is normal.		The battery branch or load branch voltage exceeds the specified range (-42 V DC to -58 V DC).	
Preventive maintenance inspection	The indicators are normal.	Observe indicators	Alarms are generated.	
Grounding	The ground point properly connects to the ground bar in the cabinet.	Clamp meter	The resistance between the ground point and the ground bar is greater than 0.1 ohm.	

7.4 Identifying Component Faults

7.4.1 Identifying Rectifier Faults

The following lists the rectifier faults

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

7.4.2 Identifying SMU Faults

The following indicate that the SMU is faulty:

- The DC output is normal but the green indicator on the SMU is off.
- The SMU has an obvious fault, such as crash-down or no response after startup.
- With alarm reporting enabled, the SMU does not report alarms when the power system is faulty.
- The SMU reports an alarm when the power system is not faulty.
- The SMU fails to communicate with the connected lower-level devices even though the communications cables are correctly connected.
- Communication between the SMU and all rectifiers fails even though the rectifiers and the communications cables are normal.
- The SMU cannot monitor AC or DC power distribution when communications cables are intact and AC and DC power distribution is normal.
- Parameters cannot be set or running information cannot be viewed on the SMU.

7.4.3 Identifying Circuit Breaker Faults

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

7.5 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.
-

7.5.1 Replacing a Rectifier

Prerequisites

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

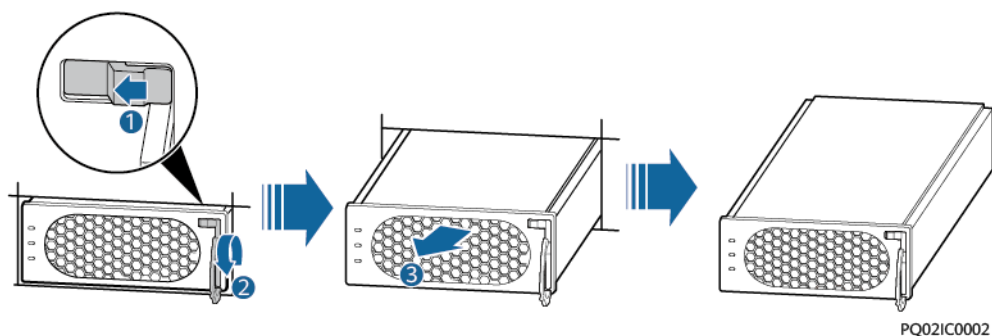
CAUTION

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

Procedure

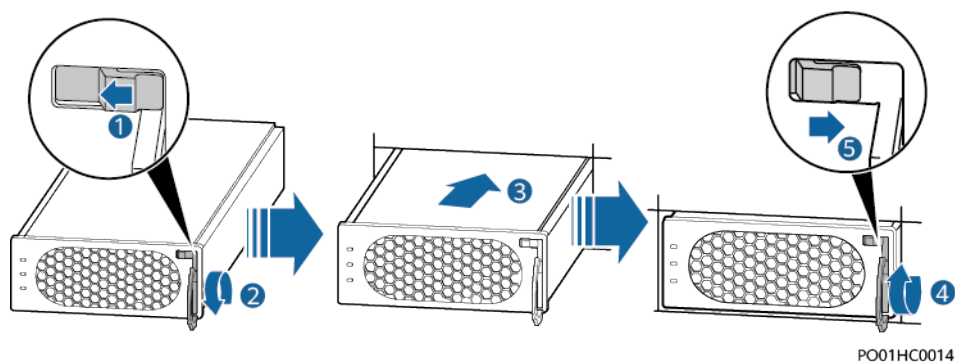
- Step 1** Put on protective gloves.
- Step 2** Push the locking latch at the right side of the panel towards the left.
- Step 3** Gently draw the handle outwards, and then remove the rectifier from the subrack.

Figure 7-14 Removing a rectifier



- Step 4** Push the locking latch on the new rectifier towards the left, and pull out the handle.
- Step 5** Place the new rectifier at the entry to the correct slot.
- Step 6** Gently slide the converter into the slot along guide rails until it is engaged. Close the handle, and push the locking latch towards the right to lock the handle.

Figure 7-15 Installing a rectifier



Step 7 Take off protective gloves.

----End

Follow-up Procedure

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

7.5.2 Replacing an SMU11B

Prerequisites

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

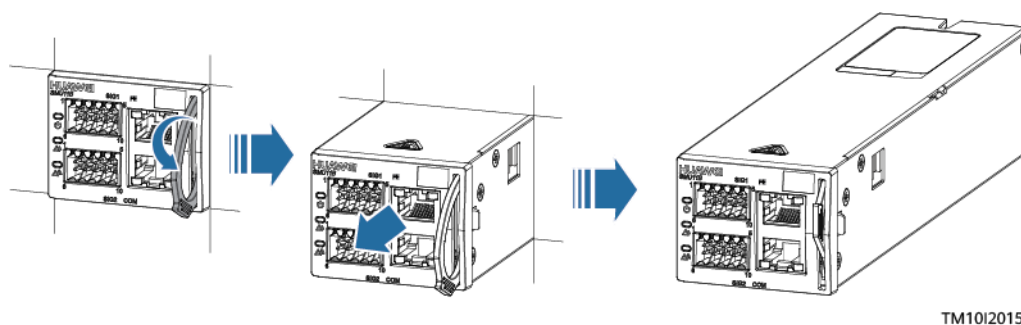
Procedure

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

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

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

Figure 7-16 Removing the old SMU

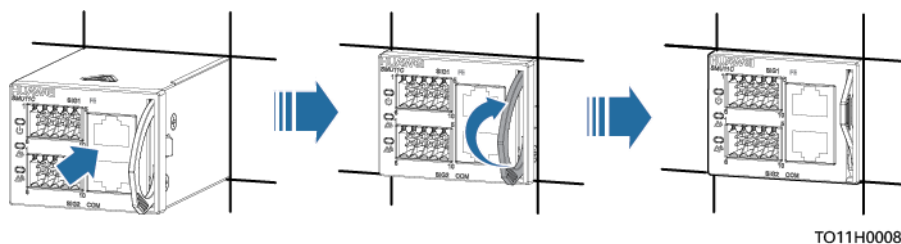


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Step 4 Insert the new SMU into the slot and slide it into the subrack along the guide rails.

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

Figure 7-17 Installing the new SMU



TO11H00080

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

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

----End

Follow-up Procedure

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

7.5.3 Replacing an SMU11C

Prerequisites

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

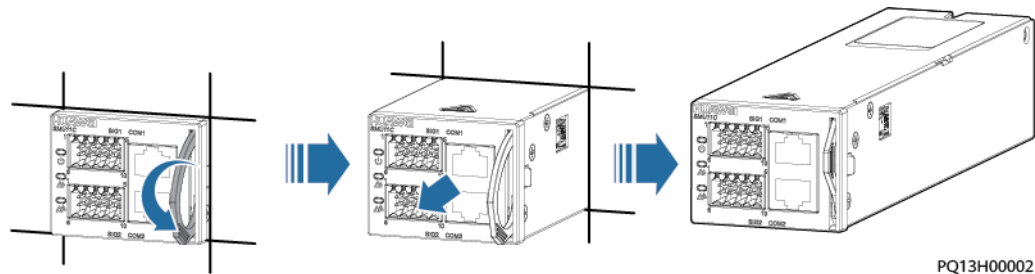
Procedure

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

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

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

Figure 7-18 Removing the old SMU



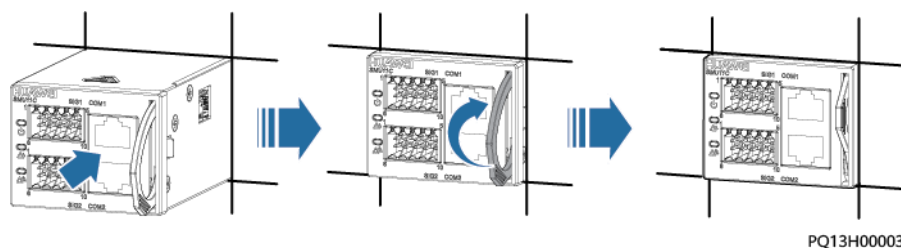
Step 4 Record the DIP switch settings on the SMU.

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

Step 6 Insert the new SMU into the corresponding slot and slide it along the guide rails until it is in position.

Step 7 Push the handle of the SMU upward until it is in place.

Figure 7-19 Installing a new SMU



- Step 8** Connect the signal cable terminals and COM communications cables to the panel of the new SMU based on the recorded information.
- Step 9** Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.
- End

Follow-up Procedure

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

7.5.4 Replacing a Circuit Breaker

Prerequisites

The new circuit breaker is intact.

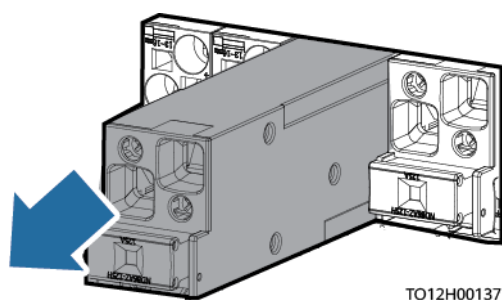
NOTICE

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

Procedure

- Step 1** Switch off the circuit breaker to be replaced.
- Step 2** Record the connection positions of cables, remove the cables, and insulate them.
- Step 3** Remove the faulty circuit breaker.

Figure 7-20 Removing a circuit breaker



- Step 4** Install the new circuit breaker.
- Step 5** Connect cables to the circuit breaker based on the recorded cable information.
- Step 6** Switch on the circuit breaker.
- End

Follow-up Procedure

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

A Technical Specifications

Table A-1 Technical specifications

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

Item	Parameter Name	Description
	Voltage range	85–420 V DC
DC output	Output voltage range	–42 V DC to –58 V DC
	Default output voltage	–53.5 V DC
	Maximum output power	4000 W
	Regulated voltage precision	$\leq \pm 1\%$
	Peak-peak noise voltage	≤ 200 mV
	Unbalance of load sharing	$\leq \pm 5\%$ (50%–100% load)
AC input protection	AC input overvoltage protection threshold	> 300 V AC
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output restores.
	AC input undervoltage protection threshold	< 80 V AC
	AC input undervoltage recovery threshold	When the voltage is restored to 85 V AC, the output restores.
DC input protection	DC input overvoltage protection threshold	> 420 V DC
	DC input overvoltage recovery threshold	When the voltage is restored to 414 V DC, the output restores.
DC output protection	DC output overvoltage protection threshold	Range: 56–60 V DC
EMC specifications	Conducted emission	Input ports: CISPR 22/EN 55032 Class B (AC input); Class A ¹ (DC input)
		Output ports: CISPR 22/EN 55032 Class A
	Radiated interference	CISPR 22/EN 55032 Class B
	Harmonic	IEC 61000-3-2/12
	Fluctuation and flicker	IEC 61000-3-3/11
	Electrostatic discharge (ESD)	Enclosure port: contact discharge 6 kV, air discharge 8 kV (criterion B); contact discharge 8 kV, air discharge 15 kV (criterion R); signal port: contact discharge 2 kV (criterion R)
	Electrical fast transient (EFT)	Signal port: 1 kV; power port: 2 kV (criterion B)
	Radiated susceptibility (RS)	10 V/m field strength (criterion A)

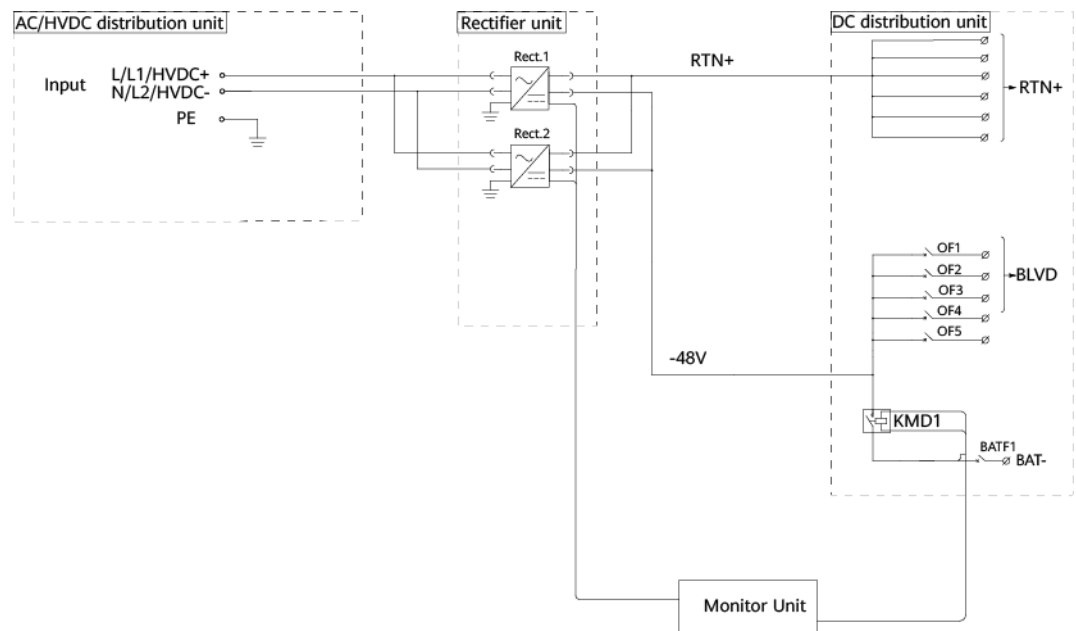
Item	Parameter Name	Description
	Conducted susceptibility (CS)	Power port: 10 V; signal port: 3 V (criterion A)
	Surge susceptibility (Surge)	AC power port: horizontal 6 kV (line to line), vertical 6 kV (single-wire to ground), 1.2/50 μ s (criterion B) DC power port: 2 kV in differential mode, 4 kV in common mode, 1.2/50 μ s (criterion B) Signal cables inside the cabinet: 1 kV in common mode, 1.2/50 μ s (criterion B) Signal cables outside the cabinet: 2 kV in common mode, 1.2/50 μ s (criterion B)
	Voltage dip (DIP)	Complies with IEC 61000-4-11.
Others	Safety design	Complies with IEC 60950-1/IEC 62368-1/IEC 62368-1/GB 4943 and CE certification.
	MTBF	250,000 hours
Structure	Power supply system	Dimensions (H x W x D): 43.6 mm x 442 mm x 255 mm (without mounting ears)
	Weight	\leq 10 kg (including two rectifiers and one monitoring module)
	IP rating	IP20
	Installation mode	Horizontally and vertically installed in a 19-inch rack
	Maintenance mode	Maintained from the front
	Heat dissipation mode	Free cooling

 **NOTE**

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

B Electrical Conceptual Diagram

Figure B-1 Electrical conceptual diagram



C Acronyms and Abbreviations

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

S

SMU

site monitoring unit

T

THD

total harmonic distortion