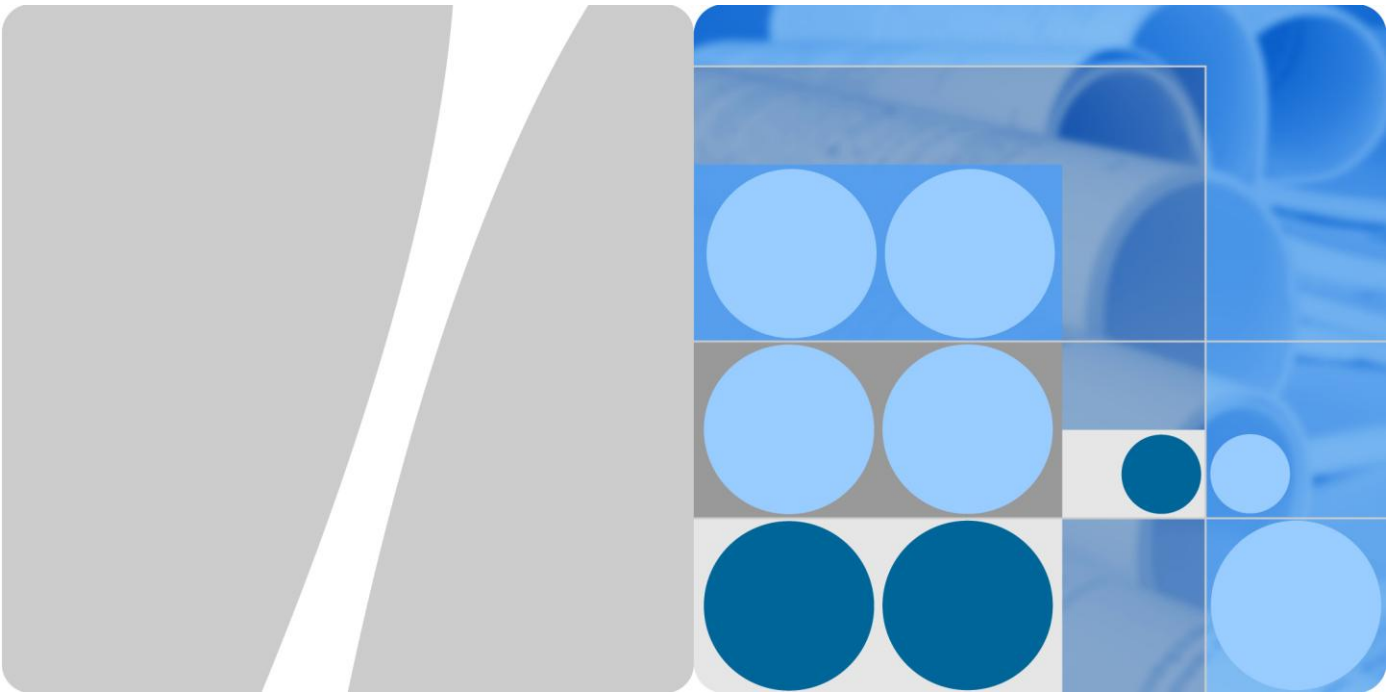


ETP4890-A2
V300R001
User Manual

Issue 08

Date 2014-10-30

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions

 and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Purpose

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

The figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Sales specialist
- Technical support personnel
- Maintenance personnel

Symbol Conventions

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

Symbol	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Calls attention to important information, best practices and tips. 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 08 (2014-10-30)

Chapter 6 Commissioning

Modified "6.5 Setting Battery Parameters".

Issue 07 (2014-02-20)

Chapter 4 Installation

Added section "4.3.2 (Optional) Installing Dry Contact Signal Cables".

Modified "Figure 4-5 Connecting the ground cable".

Modified "Figure 4-10 Connecting 220 V AC single-phase input power cables".

Modified "Figure 4-11 Connecting 110 V AC dual-live-wire input power cables".

Modified "Figure 4-13 Connecting 220/380 V AC three-phase, four-wire input power cables".

Chapter 6 Commissioning

Added section "6.4 Setting System Type".

Issue 06 (2013-12-10)

Modified section 1.5 **Configuration**.

Issue 05 (2013-07-02)

Add the configuration of R4830N2 and SMU01C.

Issue 04 (2013-05-30)

The operating temperature is modified.

Issue 03 (2013-05-06)

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

Issue 02 (2012-11-24)

Port description is modified.

Issue 01 (2012-08-13)

This issue is the first official release.

Contents

About This Document ii

1 Safety Precautions 1

1.1 General Safety Precautions 1
1.2 Electrical Safety 1
1.3 Battery Safety 2
1.4 Cable Layout 3
1.5 Mechanical Safety 4

2 Overview 6

2.1 Introduction 6
2.2 Model Number Description 6
2.3 Features 6
2.4 Working Principles 7
2.5 Configuration 8

3 Components 10

3.1 PDU 10
3.2 Rectifier 11
3.3 SMU 13
3.3.1 SMU01A 13
3.3.2 SMU01B 16
3.3.3 SMU01C 19

4 Installation 22

4.1 Installing a Subrack 22
4.2 Installing Components 23
4.2.1 Installing an SMU 23
4.2.2 Installing a Rectifier 24
4.3 Connecting Cables 24
4.3.1 Connecting the Ground Cable 25
4.3.2 (Optional) Installing Dry Contact Signal Cables 25
4.3.3 Connecting the Communications Cable 26
4.3.4 Connecting Load Cables 27
4.3.5 Connecting the Battery Cable 27

4.3.6 Connecting the AC Input Power Cable 27
5 Verifying the Installation 31
5.1 Checking Hardware Installation 31
5.2 Checking Electrical Connections 31
5.3 Checking Cable Installation 31
6 Commissioning 32
6.1 Connecting the AC Power Supply 32
6.2 Setting the Display Language 33
6.3 Setting Time and Date 33
6.3.1 SMU01A 33
6.3.2 SMU01B and SMU01C 33
6.4 Setting System Type 34
6.5 Setting Battery Parameters 34
6.5.1 SMU01A 34
6.5.2 SMU01B and SMU01C 35
6.6 (Optional) Setting Hibernation Parameters 35
6.6.1 SMU01A 35
6.6.2 SMU01B and SMU01C 35
6.7 (Optional) Setting Alarm Parameters 36
6.7.1 SMU01A 36
6.7.2 SMU01B and SMU01C 36
6.8 (Optional) Setting Communications Parameters 37
6.8.1 SMU01A 37
6.9 Connecting the Battery Supply 42
7 Maintenance 43
7.1 Routine Maintenance 43
7.2 Rectifying Common Faults 44
7.2.1 Mains Failure 44
7.2.2 AC Over Volt 44
7.2.3 AC Under Volt 44
7.2.4 DC Over Volt 45
7.2.5 DC Under Volt 45
7.2.6 Amb. Over Temp 45
7.2.7 Amb. Under Temp 46
7.2.8 Batt Over Temp 46
7.2.9 Batt Under Temp 47
7.2.10 Batt Chg.Overcur. 47
7.2.11 Load Fuse Break 47
7.2.12 Batt Loop Trip 48
7.2.13 Batt Off 48
7.2.14 Door Alarm 48

7.2.15 Water Alarm 49
7.2.16 Smoke Alarm 49
7.2.17 Rect Fault 49
7.2.18 Rect Protection 50
7.2.19 Single Rect Fault 50
7.2.20 Multi-Rect. Fault 50
7.2.21 Rect Comm Fault 51
7.3 Identifying Faults 51
7.3.1 Identifying Rectifier Faults 51
7.3.2 Identifying SMU Faults 53
7.3.3 Identifying PDU Faults 53
7.4 Replacing Components 54
7.4.1 Replacing a Rectifier 54
7.4.2 Replacing an SMU 55
7.4.3 Replacing a Battery String 56
A Technical specifications 57
B Electrical Conceptual Diagram 61
C Acronyms and Abbreviations 62

1 Safety Precautions

1.1 General Safety Precautions

- Ensure that the product is used in environments that meet its design specifications to avoid damaging components and voiding the warranty.
- Ensure that only trained and qualified personnel install, operate, and maintain Huawei equipment.
- Comply with local laws and regulations. The safety instructions in this document are only supplements to local laws and regulations.
- Do not operate the device or cables during thunderstorms.
- Remove metal objects such as watches, bracelets, and rings when using the product.
- Use insulated tools on the product.
- Follow specified procedures during installation and maintenance.
- Measure contact point voltage with an electric meter before touching a conductor surface or terminal. Ensure that the contact point has no voltage or it is within the specified range.
- Note that the load may power off during maintenance or fault location if the power system is not connected to a battery or if battery capacity is insufficient.
- Store cables for at least 24 hours at room temperature before laying out them if they were previously stored at sub-0 ℃.
- Routinely check installed equipment and perform maintenance according to the user manual; replace faulty components quickly to ensure that the device works properly.

1.2 Electrical Safety

Grounding Requirements

- When installing a device, install the ground cable first. When removing a device, remove the ground cable last.
- Before operating a device, ensure that the device is properly grounded.

AC and DC Operation Requirements

DANGER

- The power system is powered by a high-voltage power source. Direct or indirect contact (especially with a damp object) with a high-voltage power source may result in danger.
- Non-standard and improper operations may result in fire and electric shock.

- Before performing electrical connections, turn off the upstream protection switch for the device.
- Before connecting the AC power supply, ensure that electrical connections are complete.
- Before you connect cables to loads or battery cables, check cable and terminal polarities to prevent reverse connections.

ESD Requirements

- To prevent human static from damaging electrostatic-sensitive components, wear a well-grounded ESD wrist strap or a pair of ESD gloves when touching circuit boards.
- When holding a board, hold its edges. Do not touch chips or components.
- Removed boards must be packaged with ESD material for storage and transportation.

1.3 Battery Safety

Before installing, operating, and maintaining batteries, read the instructions provided by the battery vendor. The safety precautions in this document are for special attention. For more safety precautions, see the instructions provided by the battery vendor.

Basic Requirements

- Before installation and maintenance, wear goggles, rubber gloves, and protective clothes to prevent injury caused by electrolyte overflow.
- When handling a battery, ensure that its electrodes are upward. Leaning or reversing batteries is prohibited.
- Keep the battery loop disconnected during installation and maintenance.
- Secure battery cables to a torque specified in battery documentation. Loose connections will result in excessive voltage drop or cause batteries to burn out when the current is large.

Preventing Battery Short Circuit

DANGER

Short circuits will generate high transient currents and release a great deal of energy, which may cause personal injury.

If conditions permit, disconnect the batteries in use before performing any other operations.

Preventing Flammable Gas

NOTICE

- Do not use unsealed lead-acid batteries.
- Place and secure lead-acid batteries horizontally to prevent device inflammation or corrosion due to flammable gas emitted from batteries.

Lead-acid batteries in use emit flammable gas. Therefore, store the batteries in a place with good ventilation, and take measures against fire.

Preventing Battery Leakage

NOTICE

High temperatures may result in battery distortion, damage, and electrolyte overflow.

When the battery temperature is higher than 60 ℃, check the battery for electrolyte overflow. If the electrolyte overflows, absorb and counteract the electrolyte immediately. When moving or handling a battery whose electrolyte leaks, exercise caution because the leaking electrolyte may hurt human bodies. When you find electrolyte leaks, use sodium bicarbonate ($NaHCO_3$) or sodium carbonate (Na_2CO_3) to counteract and absorb the leaking electrolyte.

Preventing Battery Overdischarge

After you connect batteries, ensure that the battery fuse is disconnected or the circuit breaker is OFF before powering on the power system. This prevents battery overdischarge, which damages batteries.

1.4 Cable Layout

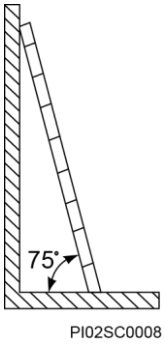
- When cables are used in a high temperature environment, the insulation layer may age and be damaged. Ensure that a sufficient distance exists between the cables and the DC busbar, shunt, and fuse.
- Signal cables must be bound separately from strong-current cables and high-voltage cables.
- Cables prepared by the customer must have the fire resistance capability.
- Cables must not pass behind the air exhaust vents of rectifiers in the cabinet.

1.5 Mechanical Safety

Using a Ladder

- Before using a ladder, ensure that the ladder is intact. Check the weight bearing capacity of the ladder. Do not overload the ladder.
- The recommended gradient of a ladder is 75 degrees. You can measure the gradient with a right square or your arms, as shown in Figure 1-1. When using a ladder, ensure that the wider feet of the ladder are downward, or take protection measures for the ladder feet to prevent the ladder from sliding. Ensure that the ladder is placed securely.

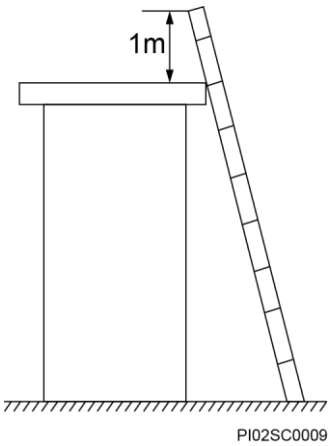
Figure 1-1 Proper angle of a ladder



- When climbing a ladder, observe the following precautions:
  - Ensure that the center of gravity of your body does not deviate from the edges of the two long sides.
  - To minimize the risk of falling, hold your balance on the ladder before any operation.
  - Do not climb higher than the fourth rung of the ladder (counted from up to down).

If you want to climb up a roof, ensure that the ladder top is at least one meter higher than the roof, as shown in Figure 1-2.

Figure 1-2 One meter higher than the roof



Drilling Holes

NOTICE

Do not drill holes on the subrack without permission. Non-standard drilling may affect electromagnetic shielding performance of the subrackand damage the internal cables, and metal scraps generated during drilling may short-circuit a circuit board.

- Before drilling holes on the subrack, remove the cables inside the rack.
- Wear goggles and protective gloves when drilling holes.
- After drilling, clean up metal shavings.

Moving Heavy Objects

- Be careful to prevent injury when moving heavy objects.
- Wear protective gloves when moving sharp objects.

2 Overview

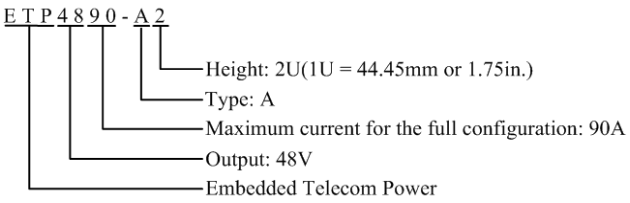
2.1 Introduction

The ETP4890-A2 is a box-type power system that supplies power for –48 V DC communications equipment. It uses 15 A or 30 A rectifiers and provides a maximum output current of 90 A.

2.2 Model Number Description

Figure 2-1 shows the ETP4890-A2 model number description.

Figure 2-1 ETP4890-A2 model number description



2.3 Features

The ETP4890-A2 has the following features:

- Supports a wide voltage range of 85 V AC to 300 V AC.
- Provides comprehensive battery management.
- The SMU01A communicates with Huawei Network Ecosystem (NetEco) and third-party network management systems (NMSs) over various security protocols, such as the Simple Network Management Protocol (SNMP) and Hypertext Transfer Protocol Secure (HTTPS), featuring flexible networking. It provides WebUI and implements remote unattended management.
- The SMU01B supports Huawei master/slave protocols and access network point-to-point protocols, which allows Huawei access network communications equipment to connect to the U2000.

- Displays information on a liquid crystal display (LCD) and provides buttons for operations.
- Supports electronic labels.
- Rectifiers and the site monitoring unit (SMU) are hot-swappable.
- Allows high-efficiency and standard-efficiency rectifiers with the same capacity to coexist.
- The rectifier power factor is 0.99.

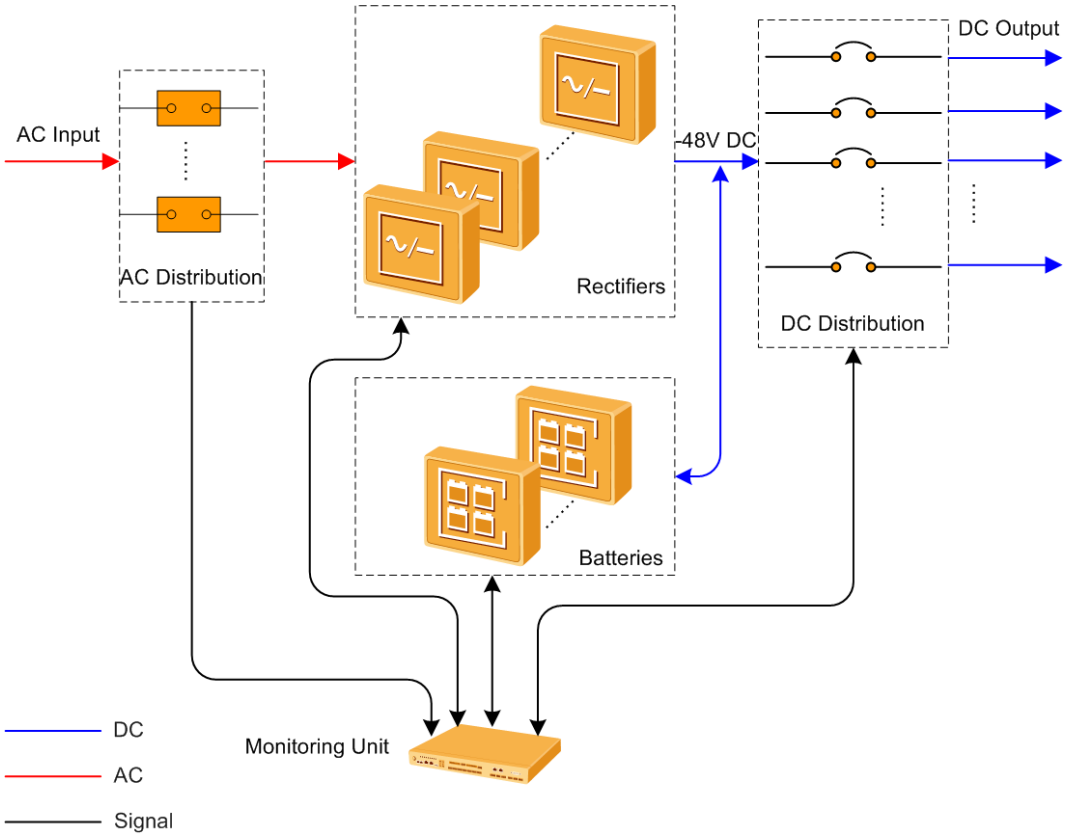
2.4 Working Principles

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

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

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

Figure 2-2 Conceptual diagram



2.5 Configuration

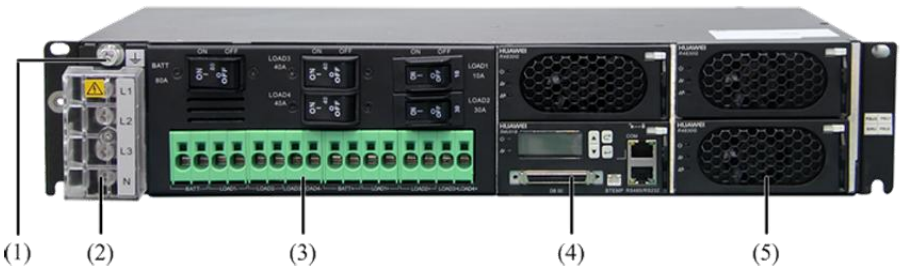
Table 2-1 describes the ETP4890-A2 configuration.

Table 2-1 ETP4890-A2 configuration

Item	Configuration		
PDU	AC input	220 V AC single-phase (default mode) 110 V AC dual-live wire 220/380 V AC three-phase, four-wire	
	DC power distribution	Battery circuit breaker	One 1-pole 80 A circuit breaker
		Load circuit breaker	Two 1-pole 40 A circuit breakers, one 1-pole 30 A circuit breaker, and one 1-pole 10 A circuit breaker
SMU	The following SMUs are supported: • One SMU01A • One SMU01B • One SMU01C		
Rectifier	The following rectifiers are supported: • Two to three R4830G1s • Two to three R4830N2s • Two to three R4815G1s • Two to three R4815N1s **NOTE** • The R4830G1 and R4830N2 can be installed together. • The R4815G1 and R4815N1 can be installed together.		

Figure 2-3 shows the ETP4890-A2 configuration.

Figure 2-3 ETP4890-A2 configuration diagram



(1) Ground screw (2) AC input terminals (3) DC output ports

(4) Space for installing SMU (5) Space for installing rectifiers

NOTICE

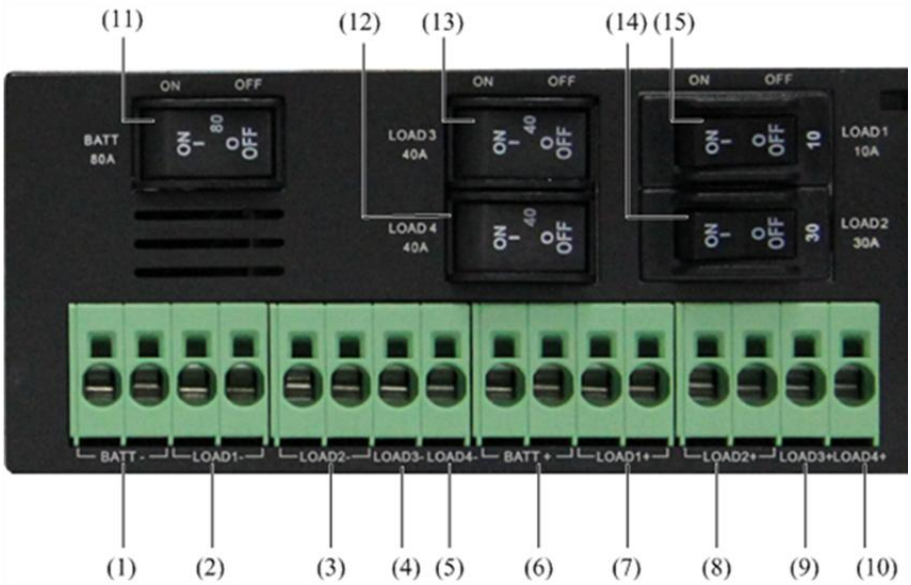
Do not exchange the SMU slot with the rectifier slot. Otherwise, the SMU and rectifier may be damaged.

3 Components

3.1 PDU

Figure 3-1 shows the power distribution unit (PDU) panel.

Figure 3-1 PDU panel



(1) BATT- port
(2) LOAD1- port
(3) LOAD2- port
(4) LOAD3- port
(5) LOAD4- port
(6) BATT+ port
(7) LOAD1+ port
(8) LOAD2+ port
(9) LOAD3+ port
(10) LOAD4+ port
(11) BATT circuit breaker
(12) LOAD4 circuit breaker
(13) LOAD3 circuit breaker
(14) LOAD2 circuit breaker
(15) LOAD1 circuit breaker

NOTE

The port marked – is a negative port. The port marked + is a positive port.

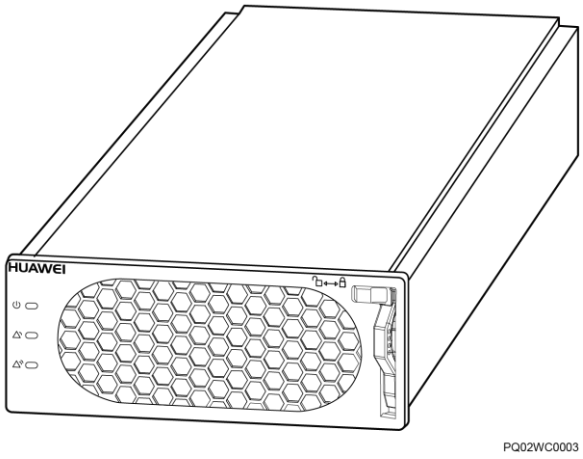
3.2 Rectifier

Rectifiers convert AC input into stable DC output.

Appearance

Figure 3-2 shows a rectifier.

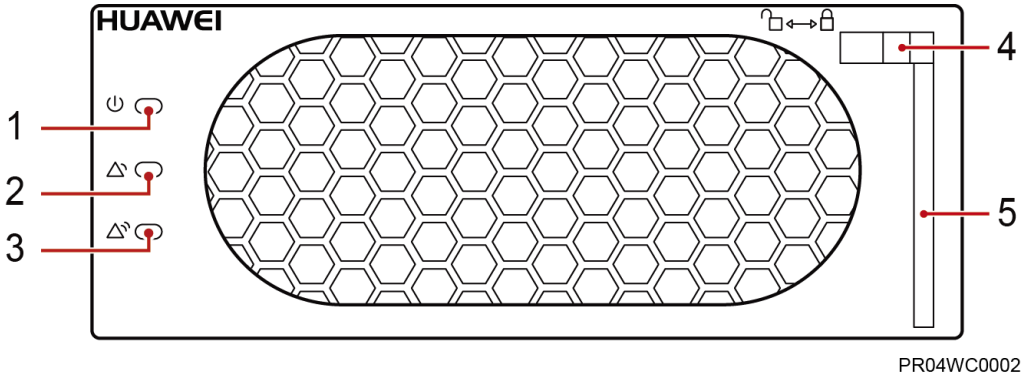
Figure 3-2 Rectifier



Panel

Figure 3-3 shows the rectifier panel.

Figure 3-3 Rectifier front panel



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

(4) Locking latch (5) Handle

Indicators

Table 3-1 describes the indicators on the rectifier panel.

Table 3-1 Rectifier indicators

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

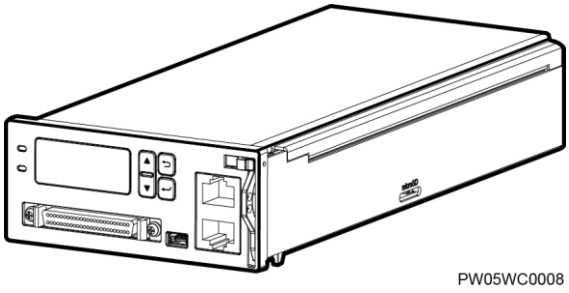
3.3 SMU

3.3.1 SMU01A

Appearance

Figure 3-4 shows an SMU01A.

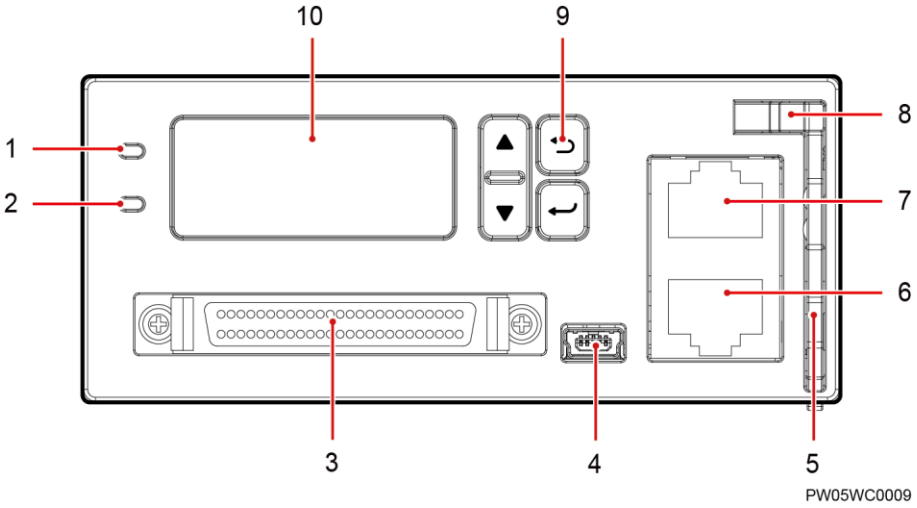
Figure 3-4 SMU01A



Panel

Figure 3-5 shows the SMU01A panel.

Figure 3-5 SMU01A panel



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

Buttons

Table 3-2 describes the buttons on the panel.

Table 3-2 Button description

Button	Name	Description
 or 	Up or Down	Allows you to view menu items and set the value of a menu item.
	Back	Returns to the previous menu without saving the settings.
	Enter	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves the menu settings.
NOTE • The LCD screen becomes dark if no button is pressed within 5 minutes. • You need to log in again if no button is pressed within 8 minutes.		

Communications Ports

Table 3-3 describes the communications ports.

Table 3-3 Communications ports

Port	Communications Mode	Communications Parameters
COM	FE	Autonegotiation
	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
RS485/RS232	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
NOTE All the preceding ports are protected by a security mechanism.		

Figure 3-6 Communication port

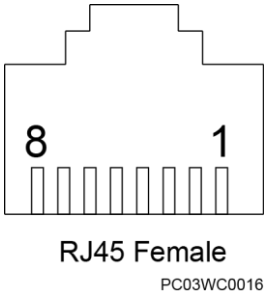


Table 3-4 describes the pins in the COM port that is used as an FE port. Table 3-5 describes the pins in the COM port that is used as an RS485/RS232 port.

Table 3-4 Pins in the COM port (used as an FE port)

Pin	Signal	Description
1	TX+	Sends data over FE.
2	TX-	
3	RX+	Receives data over FE.
6	RX-	
4, 5, 7, 8	None	N/A

Table 3-5 Pins in the RS485/RS232 port

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Connects to the ground.
8	None	N/A

3.3.2 SMU01B

Appearance

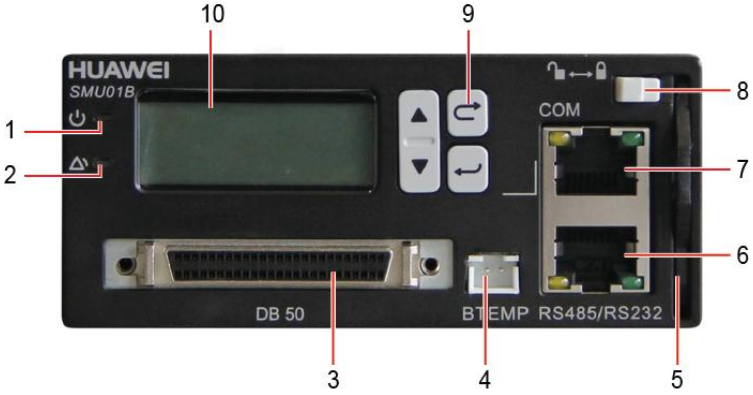
Figure 3-7 shows an SMU01B.

Figure 3-7 SMU01B

Panel

Figure 3-8 shows the SMU01B panel.

Figure 3-8 SMU01B panel



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

Buttons

Table 3-6 describes the buttons on the panel.

Table 3-6 Button description

Button	Name	Description
 or 	Up or Down	Allows you to view menu items and set the value of a menu item.
	Back	Returns to the previous menu without saving the settings.
	Enter	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves the menu settings.
NOTE • The LCD screen becomes dark if no button is pressed within 5 minutes. • You need to log in again if no button is pressed within 8 minutes.		

Communications Ports

Table 3-7 describes the communications ports.

Table 3-7 Communications ports

Port	Communications Mode	Communications Parameters
COM	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
RS485/RS232	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
Note: All the preceding ports are protected by a security mechanism.		

Figure 3-9 Communication port

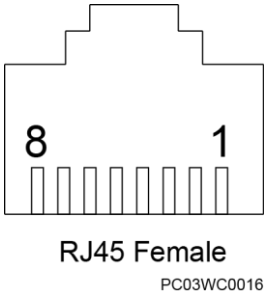


Table 3-8 describes the pins in the COM port and RS485/RS232 port.

Table 3-8 Pins in the RS485/RS232 port

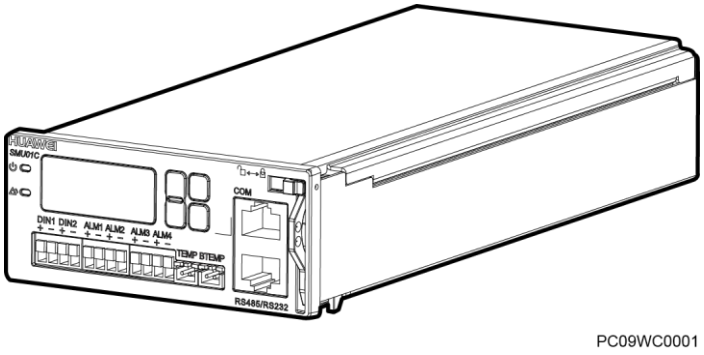
Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Connects to the ground.
8	None	N/A

3.3.3 SMU01C

Appearance

Figure 3-10 shows an SMU01C.

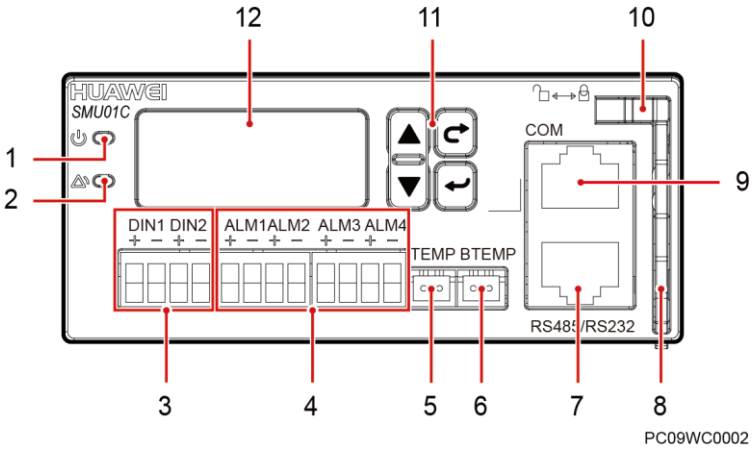
Figure 3-10 SMU01C



Panel

Figure 3-11 shows the SMU01C panel.

Figure 3-11 SMU01C panel



(1) Run indicator	(2) Alarm indicator	(3) DIN ports (reserved Boolean value inputs)
(4) ALM ports (relays)	(5) Ambient temperature sensor port	(6) Battery temperature sensor port
(7) RS485/RS232 port	(8) Handle	(9) COM port
(10) Locking latch	(11) Four buttons	(12) Liquid crystal display (LCD)

Dry contact ports

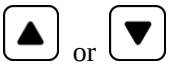
Table 3-9 Dry contact ports description

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

Buttons

Table 3-10 describes the buttons on the panel.

Table 3-10 Button description

Button	Name	Description
	Up or Down	Allows you to view menu items and set the value of a menu item.
	Back	Returns to the previous menu without saving the settings.
	Enter	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves the menu settings.
NOTE • The LCD screen becomes dark if no button is pressed within 5 minutes. • You need to log in again if no button is pressed within 8 minutes.		

Communications Ports

Table 3-11 describes the communications ports.

Table 3-11 Communications ports

Port	Communications Mode	Communications Parameters
COM	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
RS485/RS232	RS485/RS232	Baud rate: 9600 bits/s or 19,200 bits/s
Note: All the preceding ports are protected by a security mechanism.		

Figure 3-12 Communication port

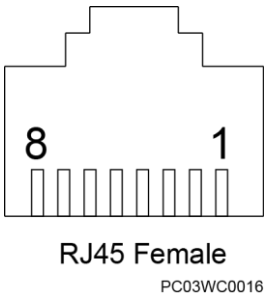


Table 3-12 describes the pins in the COM port and RS485/RS232 port.

Table 3-12 Pins in the RS485/RS232 port

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Connects to the ground.
8	None	N/A

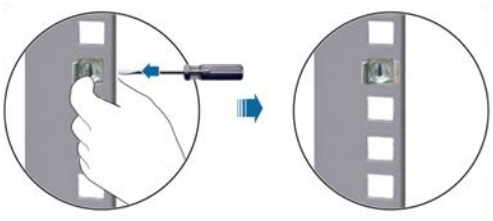
4 Installation

4.1 Installing a Subrack

Procedure

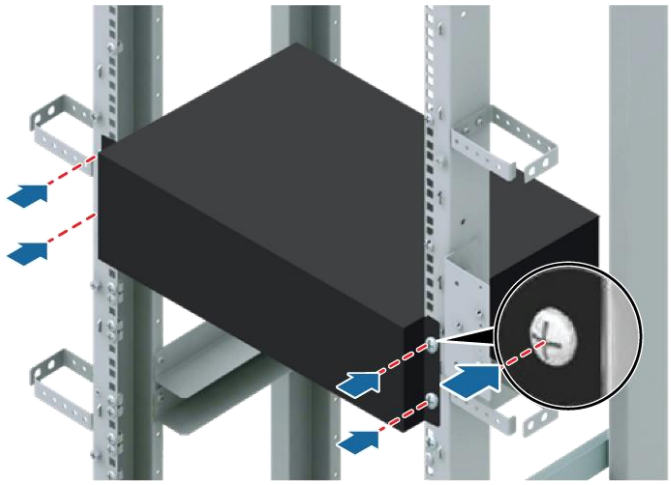
Step 1 Install the floating nuts.

Figure 4-1 Installing floating nuts



Step 2 Install the ETP4890-A2 in a 19-inch rack.

Figure 4-2 Installing a subrack



NOTE

The ETP4890-A2 can be installed in a European Telecommunications Standards Institute (ETSI) rack if the required mounting ears are available.

----End

4.2 Installing Components

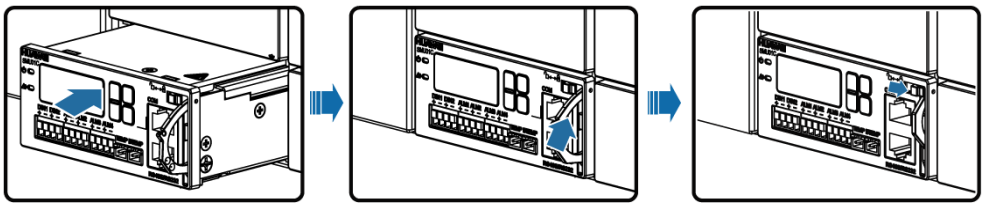
4.2.1 Installing an SMU

Procedure

Step 1 Insert a new SMU into the slot, push the locking latch towards the left, and pull out the handle.

Step 2 Slide the SMU into the subrack along the guide rail, and push the locking latch to the right to secure the handle.

Figure 4-3 Installing an SMU



----End

4.2.2 Installing a Rectifier

Procedure

Step 1 Push the locking latch towards the left.

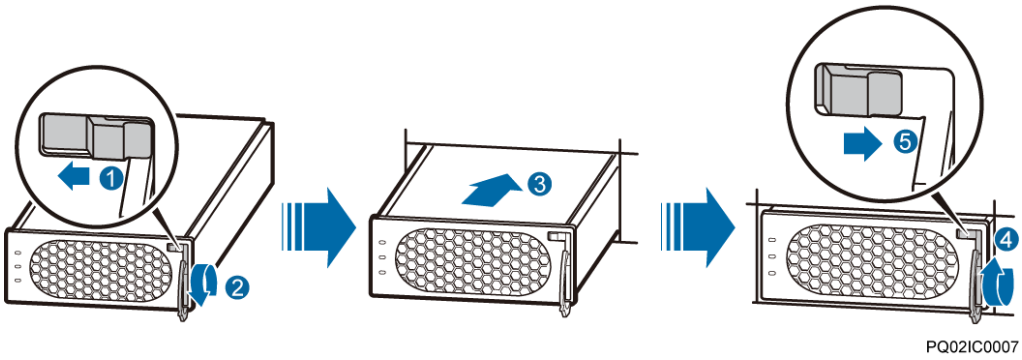
Step 2 Draw the handle downwards.

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

Step 4 Push the handle upwards.

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

Figure 4-4 Installing rectifiers



----End

4.3 Connecting Cables

DANGER

Before connecting a cable, ensure that the AC power input is off.

4.3.1 Connecting the Ground Cable

Figure 4-5 shows how to connect the ground cable (an M6 OT terminal is used for the cable).

Figure 4-5 Connecting the ground cable

(1) Ground bar

4.3.2 (Optional) Installing Dry Contact Signal Cables

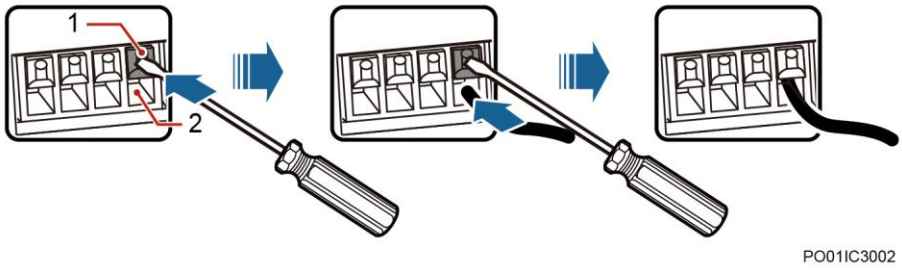
Procedure

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

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

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

Figure 4-6 Installing a dry contact signal cable



(1) Contact plate (2) Dry contact

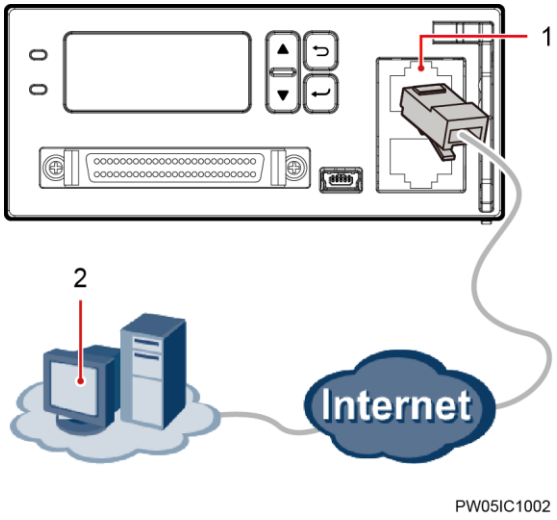
----End

4.3.3 Connecting the Communications Cable

Connecting a Communications Cable to the SMU01A

Connect a communications cable to the COM port on the SMU01A when you use the Web UI, NetEco, or SNMP to remotely manage the power supply system, as shown in Figure 4-7.

Figure 4-7 Connecting a communications cable to the SMU01A COM port

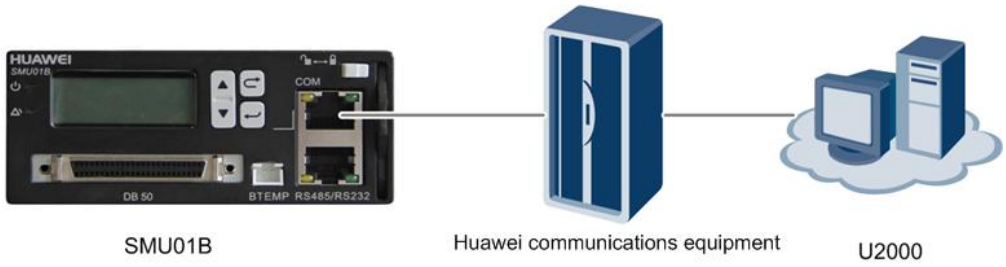


(1) COM port (2) Remote management

Connecting a Communications Cable to the SMU01B

Connect the COM port on the SMU01B to the corresponding serial port on the Huawei access network communications equipment using a communications cable when you use the U2000 network management system to remotely manage the power supply system, as shown in Figure 4-8.

Figure 4-8 Connecting a communications cable to the SMU01B COM port



4.3.4 Connecting Load Cables

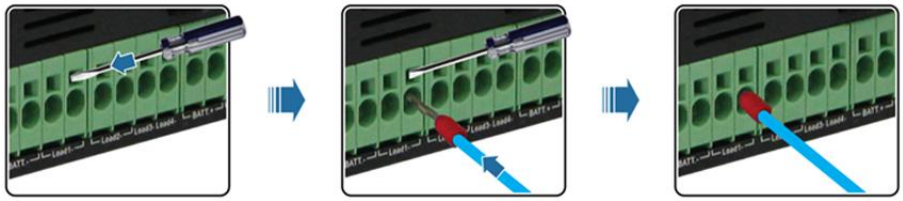
Procedure

Step 1 Open a load cable port using a flat-head screwdriver.

Step 2 Insert a load cable into the load cable port.

Step 3 Secure the load cable by drawing out the screwdriver.

Figure 4-9 Connecting a load cable



----End

4.3.5 Connecting the Battery Cable

Connecting battery cables is similar to connecting load cables. For details, see 4.3.4 Connecting Load Cables.

4.3.6 Connecting the AC Input Power Cable

DANGER

Before connecting the AC input power cable:

- Install a circuit breaker for upper-level device to protect the power system.
- Switch the corresponding circuit breaker for the upper-level device to OFF.

Connecting the 220 V AC Single-Phase AC Input Power Cables

Procedure

Step 1 Remove the protective cover over AC input terminals.

Step 2 Connect the neutral wire (an M6 OT terminal is used for the cable) to the N wiring terminal.

Step 3 Connect the live wire (an M6 OT terminal is used for the cable) to the L2 wiring terminal.

Figure 4-10 Connecting 220 V AC single-phase input power cables

Step 4 Install the removed protective cover.

----End

Connecting 110 V AC Dual-Live Wire Input Power Cables

Procedure

Step 1 Remove the protective cover over AC input terminals.

Step 2 Connect the L1 live wire (an M6 OT terminal is used for the cable) to the L2 wiring terminal.

Step 3 Connect the L2 live wire (an M6 OT terminal is used for the cable) to the N wiring terminal.

Figure 4-11 Connecting 110 V AC dual-live wire input power cables

Step 4 Install the removed protective cover.

----End

Connecting the 220/380 V AC Three-Phase AC Input Power Cables

Procedure

Step 1 Remove the protective cover over AC input terminals.

Step 2 Loosen the screws of L1, L2, and L3 and remove the short-circuit busbar.

Figure 4-12 Removing the busbar

(1) Short-circuit busbar

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

Step 4 Connect the three live wires (M6 OT terminals are used for the cables) to the L1, L2, and L3 wiring terminals correspondingly.

Figure 4-13 Connecting 220/380 V AC three-phase, four-wire input power cables

Step 5 Remove the plastic baffles from the side of the protective cover by needle-nose pliers.

Figure 4-14 Removing the plastic baffles

(1) Plastic baffle

Step 6 Install the removed protective cover.

----End

5 Verifying the Installation

5.1 Checking Hardware Installation

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

5.2 Checking Electrical Connections

- Check that all circuit breakers or fuses are OFF.
- 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-circuited.
- Check that input and output power cables and ground cables are correctly connected and not short-circuited.

5.3 Checking Cable Installation

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

6 Commissioning

NOTICE

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

6.1 Connecting the AC Power Supply

Procedure

Step 1 Check whether the voltage across the input ports of AC input circuit breakers for the upper-level device is the same as the local voltage. If no, ask professionals to rectify the fault.

Step 2 Switch on the AC input circuit breakers for the upper-level device.

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

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

----End

6.2 Setting the Display Language

After powering on the SMU, select English by pressing ▲ or ▼ on the LCD, and then press ↵ to enter the standby screen.

NOTE

If you select an undesired language, remove and then insert the SMU. Select a language again after the SMU restarts.

6.3 Setting Time and Date

6.3.1 SMU01A

Set the time and date for the SMU01A as required.

Table 6-1 Time and date parameters for the SMU01A

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

NOTE

The default user name of SMU01A is **admin**, and the default password is **001**.

6.3.2 SMU01B and SMU01C

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

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

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

NOTE

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

6.4 Setting System Type

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

Table 6-3 Setting system type

Main Menu	Second-Level Menu	Third-level Menu	Default Value	Setting Value
Settings	Site Summary	System Type	Standard	ETP4890

6.5 Setting Battery Parameters

NOTICE

If battery parameters are incorrectly set, batteries will deteriorate early. Set the parameters strictly based on actual requirements.

6.5.1 SMU01A

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

Table 6-4 Battery parameters for the SMU01A

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

6.5.2 SMU01B and SMU01C

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

Table 6-5 Battery parameters for the SMU01B and SMU01C

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

6.6 (Optional) Setting Hibernation Parameters

6.6.1 SMU01A

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

Table 6-6 Hibernation parameter for the SMU01A

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

6.6.2 SMU01B and SMU01C

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

Table 6-7 Hibernation parameter for the SMU01B and SMU01C

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

6.7 (Optional) Setting Alarm Parameters

6.7.1 SMU01A

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

Table 6-8 Alarm parameters for the SMU01A

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

6.7.2 SMU01B and SMU01C

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

Table 6-9 Alarm parameters for the SMU01B and SMU01C

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

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

6.8 (Optional) Setting Communications Parameters

6.8.1 SMU01A

Setting Parameters Before WebUI Management

Before you use the WebUI to remotely manage the SMU01A, set the required IP parameters.

Procedure

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

Step 2 Set the IP address, subnet mask, and gateway address as shown in Table 6-10.

Table 6-10 IP parameters

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

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

----End

Setting Parameters Before NetEco Management

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

Procedure

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

Step 2 Set the IP address, subnet mask, and gateway address as shown in Table 6-11.

Table 6-11 IP parameters

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

Step 3 Set the IP addresses and ports for the active and standby servers of the NetEco, as described in Table 6-12.

Table 6-12 NetEco parameters

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting
Settings	Comm Para	NetEco Main IP	58.251.159.136	Set this parameter to the IP address of the active NetEco server.
		NetEco Bak IP	58.251.159.136	Set this parameter to the IP address of the standby NetEco server.
		NetEco Port	31220	Set a port for the NetEco.

----End

Setting Parameters Before SNMP Management

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

Procedure

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

Step 2 Set the IP address, subnet mask, and gateway on the LCD, as described in Table 6-13.

Table 6-13 IP parameters

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

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

NOTICE

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

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

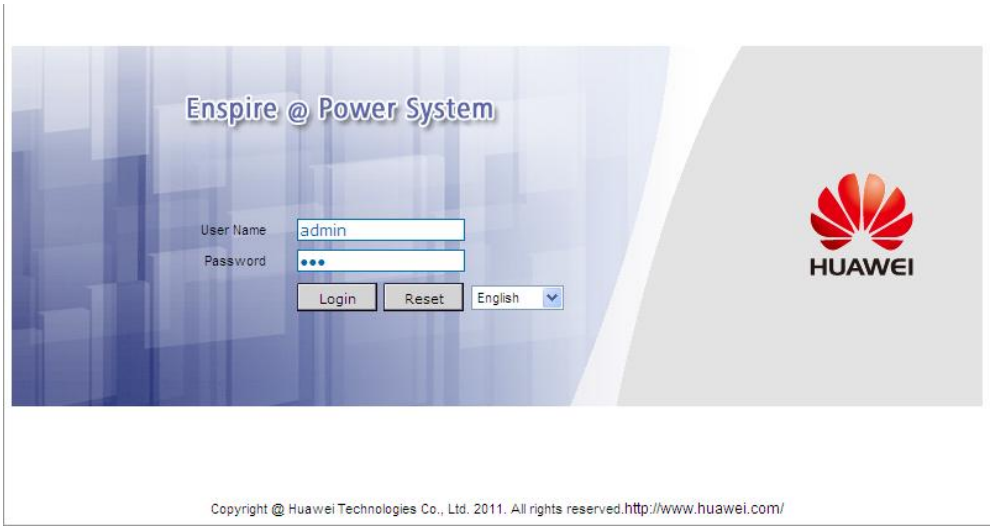
Assume that the SMU IP address is 192.168.0.10 and its subnet mask is 255.255.255.0. Set the PC IP address to 192.168.0.11 and its subnet mask to 255.255.255.0.

Step 5 Enter the SMU IP address in the address box on the PC. Log in to the WebUI on the login page shown in Figure 6-1.

NOTE

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

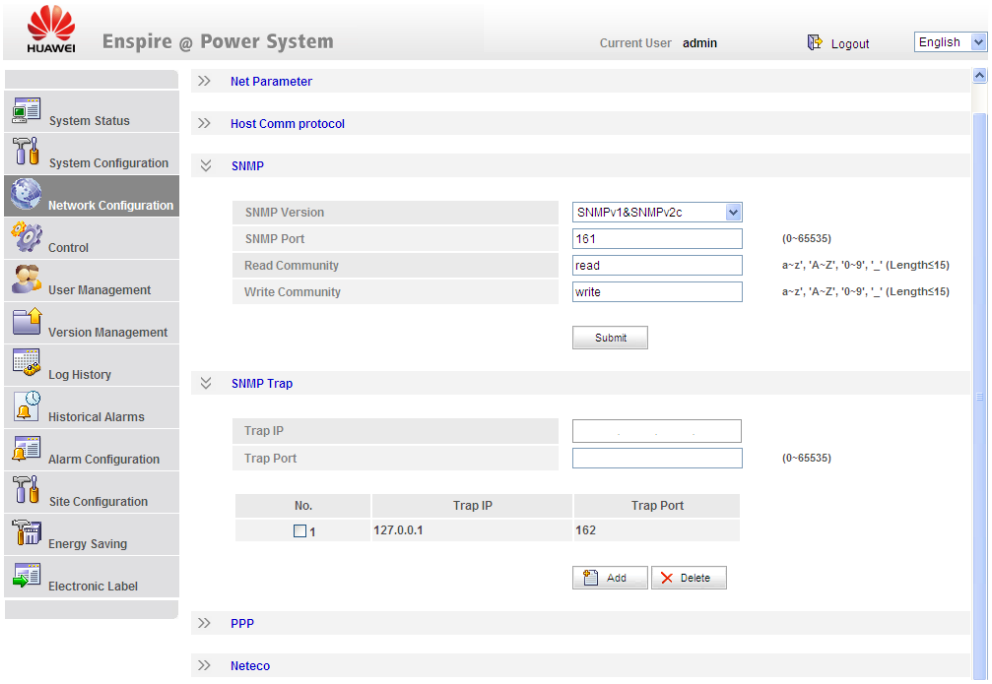
Figure 6-1 WebUI login page



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

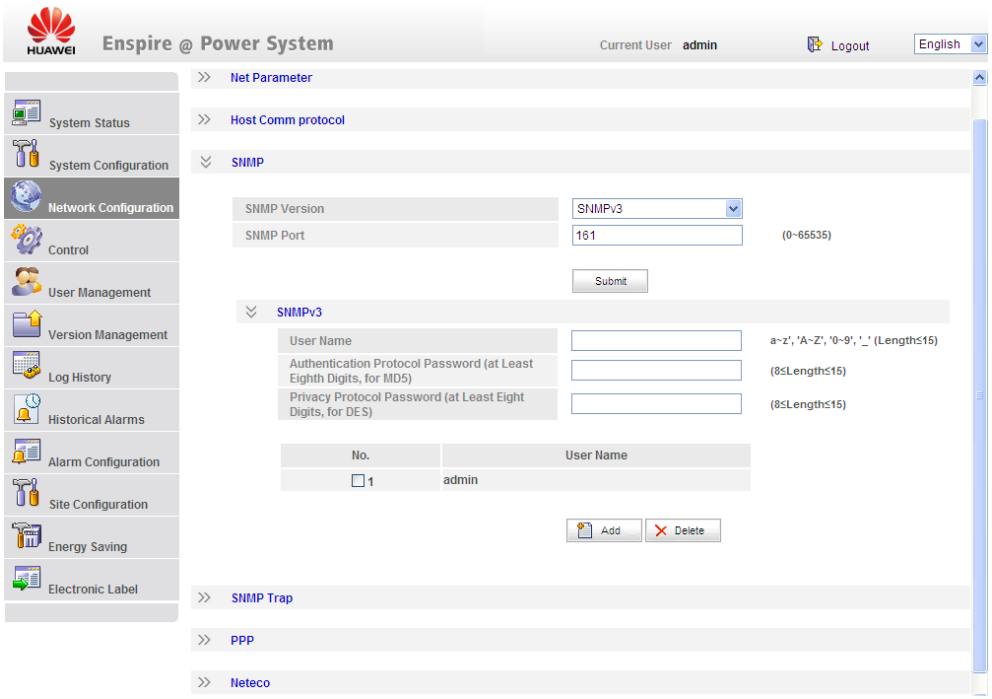
1. If the SNMP version is SNMPv1 or SNMPv2c, set **SNMP Port**, **Read Community**, and **Write Community**, as shown in Figure 6-2.

Figure 6-2 SNMPv1 and SNMPv2c parameters



2. If the SNMP version is SNMPv3, set **User Name**, **Authentication Protocol Password**, and **Privacy Protocol Password**, as shown in Figure 6-3.

Figure 6-3 SNMPv3 parameters



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

Step 8 Upload the MIB libraries **HUAWEI-MIB.mib** and **HUAWEI-SITE-MONITOR-MIB.mib** to the NMS.

----End

6.9 Connecting the Battery Supply

Prerequisites

NOTICE

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

Procedure

Step 1 Switch off the AC circuit breaker for the upper-level device, and then switch on the battery circuit breaker on PDU.

Step 2 Switch on the AC circuit breaker for the upper-level device, and then switch on the load circuit breakers on PDU.

Step 3 Check whether the battery voltage and system output voltage are the same as the voltages displayed on the SMU LCD. If not, ask the technical support personnel to rectify the fault.

Step 4 Set the battery and load circuit breakers based on the site requirements.

Step 5 Observe the power system for 15 minutes. If no alarm is generated on the SMU LCD, the voltage and current for batteries and loads are normal. In this case, clean and leave the site.

----End

7 Maintenance

7.1 Routine Maintenance

Maintain the ETP4890-A2 periodically based on site requirements. The recommended maintenance interval is six months.

Table 7-1 Routine maintenance checklist

Item	Maintenance Content			
	Check That	**Check Method**	**Repair When**	**Measures**
Electrical connection	The AC input voltage is normal.	Using a multimeter	The AC input voltage does not fall between 210 V AC and 230 V AC.	For details, see 7.2 Rectifying Common Faults and 7.3 Identifying Faults.
	The output voltage is normal.		The battery low voltage disconnection (BLVD) or load low voltage disconnection (LLVD) voltage does not fall between -42 V DC and -58 V DC.	
Preventive inspection	The indicators are normal.	Visual observation	Alarms are generated.	
Grounding inspection	The connection between the ground point and the ground bar in the cabinet is normal.	Using a multimeter	The resistance between the ground point and the ground bar is greater than 0.1 ohm.	Secure or replace the ground cable.

7.2 Rectifying Common Faults

7.2.1 Mains Failure

Possible Causes

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

Measures

1. Check whether the AC input cable is loose. If yes, secure the AC input cable.
2. Check whether the upstream AC input circuit breaker is OFF. If yes, rectify the back-end circuit fault and then switch on the circuit breaker.
3. Check whether the AC input voltage is lower than 50 V AC. If yes, handle the mains grid fault.

7.2.2 AC Over Volt

Possible Causes

- The AC overvoltage alarm threshold is not set properly on the SMU.
- The power grid is faulty.

Measures

1. Check whether the AC overvoltage alarm threshold is properly set. If no, adjust it to a proper value.
2. Check whether the AC input voltage exceeds the AC overvoltage alarm threshold (280 V AC by default). If yes, handle the AC input fault.

7.2.3 AC Under Volt

Possible Causes

- The AC undervoltage alarm threshold is not set properly on the SMU.
- The power grid is faulty.

Measures

1. Check whether the AC undervoltage alarm threshold is properly set. If no, adjust it to a proper value.
2. Check whether the AC input voltage is below the AC undervoltage alarm threshold (180 V AC by default). If yes, handle the AC input fault.

7.2.4 DC Over Volt

Possible Causes

- The DC overvoltage alarm threshold is not set properly on the SMU.
- Rectifiers are faulty.
- The power system voltage is set too high in manual mode.

Measures

1. Check whether the DC overvoltage alarm threshold (58 V DC by default) is properly set. If no, adjust it to a proper value.
2. Remove the rectifiers one by one and check whether the alarm is cleared. If the alarm still exists, reinstall the rectifier. If the alarm is cleared, replace the rectifier.
3. Check whether the system voltage is set too high in manual mode. If yes, confirm the reason and adjust the voltage to normal after the operation.

7.2.5 DC Under Volt

Possible Causes

- An AC power failure occurs.
- The DC undervoltage alarm threshold is not set properly on the SMU.
- Rectifiers are faulty.
- The system configuration is not proper.
- The power system voltage is set too low in manual mode.

Measures

1. Check whether an AC power failure occurs. If yes, resume the AC power supply.
2. Check whether the DC undervoltage alarm threshold (45 V DC by default) is properly set. If no, adjust it to a proper value.
3. Check whether the power system capacity is insufficient for the loads due to rectifier failures. If yes, replace the faulty rectifier.
4. Check whether the load current is greater than the current power system capacity. If yes, expand the power system capacity or reduce the load power.
5. Check whether the system voltage is set too low in manual mode. If yes, confirm the reason and adjust the voltage to a proper value after the operation.

7.2.6 Amb. Over Temp

NOTE

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

Possible Causes

- The ambient overtemperature alarm threshold is not set properly on the SMU.
- The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.
- The ambient temperature sensor is faulty.

Measures

1. Check whether the ambient temperature alarm threshold (50 ℃ by default) is properly set on the SMU. If no, adjust it based on site requirements.
2. Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
3. Check whether the ambient temperature sensor is faulty. If yes, replace the temperature sensor.

7.2.7 Amb. Under Temp

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

Possible Causes

- The ambient undertemperature alarm threshold is not set properly on the SMU.
- The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.
- The ambient temperature sensor is faulty.

Measures

1. Check whether the ambient undertemperature alarm threshold (0 ℃ by default) is properly set on the SMU. If no, adjust it based on site requirements.
2. Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
3. Check whether the ambient temperature sensor is faulty. If yes, replace the ambient temperature sensor.

7.2.8 Batt Over Temp

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

Possible Causes

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

Measures

1. Check whether the battery overtemperature alarm threshold (50 ℃ by default) is properly set. If no, adjust it to a proper value.
2. Check whether the battery temperature controlling system is faulty. If yes, rectify the fault. The alarm is cleared when the battery temperature falls within the allowed range.
3. Check whether the battery temperature sensor is faulty. If yes, replace the temperature sensor.

7.2.9 Batt Under Temp

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

Possible Causes

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

Measures

1. Check whether the battery undertemperature alarm threshold (0 ℃ by default) is properly set. If no, adjust it to a proper value.
2. Check whether the battery temperature controlling system is faulty. If yes, rectify the fault. The alarm is cleared when the battery temperature falls within the allowed range.
3. Check whether the battery temperature sensor is faulty. If yes, replace the temperature sensor.

7.2.10 Batt Chg.Overcur.

Possible Causes

- The rectifier communication is interrupted.
- Poor contact of the SMU.
- The SMU is faulty.

Measures

1. Check whether an alarm is generated for rectifier communication interruption. If yes, remove the rectifier and reinstall it to check whether the alarm is cleared. If the alarm still exists, replace the rectifier.
2. Remove the SMU and reinstall it to check whether the alarm is cleared. If the alarm still exists, replace the SMU.

7.2.11 Load Fuse Break

Possible Causes

- The load circuit breaker trips or fuse is blown.
- The load circuit breaker or fuse detection cable is disconnected.

Measures

1. Check whether the load circuit breaker trips or fuse is blown. If yes, rectify the back-end circuit fault and then switch on the circuit breaker or replace the fuse.
2. Check whether the load circuit breaker or fuse detection cable is disconnected. If yes, reconnect the cable.

7.2.12 Batt Loop Trip

Possible Causes

- The battery circuit breaker trips or battery fuse detection cable is disconnected.
- The battery circuit breaker trips or battery fuse is blown.
- The contactor is faulty.

Measures

1. Check whether the battery circuit breaker trips or battery fuse detection cable is disconnected. If yes, reconnect the cable.
2. Check whether the battery circuit breaker trips or battery fuse is blown. If yes, rectify the battery loop fault and then switch on the circuit breaker or replace the fuse.
3. Manually switch on or switch off the battery contactor and check the battery current changes accordingly. If no, replace the contactor.

7.2.13 Batt Off

Possible Causes

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

Measures

1. Check whether an AC power failure occurs. If yes, resume the AC power supply.
2. Check whether batteries are manually disconnected. If yes, confirm the reason of the manual disconnection, and reconnect the batteries after the operation.
3. Check whether the battery disconnection voltage (43 V DC by default)is set too high on the SMU. If yes, adjust it to a proper value.
4. Check whether the power system capacity is insufficient for the loads due to rectifier failures. If yes, replace the faulty rectifier.
5. Check whether the load current is greater than the current power system capacity. If yes, expand the power system capacity or reduce the load power.

7.2.14 Door Alarm

NOTE

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

Possible Causes

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

Measures

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

7.2.15 Water Alarm

NOTE
This alarm is generated only for the power system that has water sensors installed.

Possible Causes

- Water intrudes into the cabinet.
- The water sensor is faulty.

Measures

1. Check whether water intrudes into the cabinet. If yes, wipe the water with dry cotton or other tools and rectify the fault.
2. Check whether the water sensor is faulty. If yes, replace the water sensor.

7.2.16 Smoke Alarm

NOTE
This alarm is generated only for the power system that has smoke sensors installed.

Possible Causes

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

Measures

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

7.2.17 Rect Fault

Possible Causes

- The rectifier is in poor contact.
- The rectifier is faulty.

Measures

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

7.2.18 Rect Protection

Possible Causes

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

Measures

1. Check whether the AC input voltage exceeds the upper threshold of the rectifier working voltage. If yes, rectify the power supply fault and then resume the power supply.
2. Check whether the AC input voltage is below the lower threshold of the rectifier working voltage. If yes, rectify the power supply fault and then resume the power supply.
3. Check whether the ambient temperature is higher than the normal operating temperature of the rectifier. If yes, check and rectify the temperature unit fault.
4. Remove the rectifier that generates the alarm and reinstall it after the indicator turns off. If the alarm still exists, replace the rectifier.

7.2.19 Single Rect Fault

Possible Causes

- The subrack or slot connector is faulty.
- The rectifier is faulty.
- The monitoring unit is faulty.

Measures

1. Remove the rectifier and check whether the slot connector is damaged or deformed. If yes, repair or replace the subrack or slot connector.
2. If the alarm persists after the rectifier is reinstalled, replace the rectifier.
3. If the alarm persists after the monitoring unit is restarted, replace the monitoring unit.

7.2.20 Multi-Rect. Fault

Possible Causes

- The subrack or slot connector is faulty.
- The rectifier is faulty.
- The monitoring unit is faulty.

Measures

1. Remove the rectifier and check whether the slot connector is damaged or deformed. If yes, repair or replace the subrack or slot connector.
2. If the alarm persists after the rectifier is reinstalled, replace the rectifier.
3. If the alarm persists after the monitoring unit is restarted, replace the monitoring unit.

7.2.21 Rect Comm Fault

Possible Causes

- The rectifier is removed.
- The rectifier is in poor contact.
- The rectifier is faulty.

Measures

1. Check whether the rectifier is removed. If yes, reinstall it.
2. If the rectifier is in position, remove the rectifier and reinstall it.
3. If the alarm still exists, replace the rectifier.

7.3 Identifying Faults

7.3.1 Identifying Rectifier Faults

Table 7-2 Identifying rectifier faults

Symptom	Possible Cause	Measures
The Run indicator (green) is off.	There is no AC input, or the rectifier is faulty.	Check whether the AC input is normal. If the AC input is normal, replace the rectifier. If the AC input is normal and the green indicators on all rectifiers are off, replace the AC/DC power distribution subrack.
The Run indicator (green) is blinking (0.5 Hz).	The rectifier is being queried manually.	Exit the query status. The Run indicator recovers to be steady on.
The Run indicator (green) is blinking (4 Hz).	Software is being loaded.	After software loading is complete, the indicator stops blinking.

Symptom	Possible Cause	Measures
The Alarm indicator (yellow) is steady on.	• The rectifier protects against overtemperature. • The rectifier protects against AC input overvoltage or undervoltage. • The rectifier is faulty.	• If the ambient temperature is higher than the upper threshold, lower the ambient temperature. • If the air intake vent or the air exhaust vent is blocked, unblock it. • If the AC input is abnormal, ask mains maintenance personnel to rectify the fault. • If the fault persists, the rectifier may be faulty. In this case, replace the faulty rectifier.
The Alarm indicator (yellow) is blinking.	Communication between the rectifier and the SMU is interrupted.	Clean the edge connector of the faulty rectifier. If the Alarm indicator is still blinking, check the SMU and the AC/DC power distribution subrack.
The Fault indicator (red) is steady on.	The rectifier protects against output overvoltage.	• If a single rectifier is locked, remove the rectifier whose indicator is steady red, and then power on the rectifier after the indicator turns off. If the overvoltage still occurs, replace the rectifier. • If multiple rectifiers are locked, remove all rectifiers and reinstall them one by one to locate the faulty rectifiers. Then replace faulty rectifiers.
	The rectifier has no output due to an internal fault.	Replace the faulty rectifier.

7.3.2 Identifying SMU Faults

Table 7-3 Identifying SMU faults

Symptom	Cause	Measures
The Run indicator (green) is off.	There is no input.	• Check whether the green indicators on rectifiers are steady on. If yes, the input to the ETP48150-A3 is normal. • Reseat the SMU. If the fault persists, replace the SMU.
The Run indicator (green) is blinking fast.	The SMU fails to communicate with the host.	Check whether the communication between the SMU and the host is normal.
The Alarm indicator (red) is steady on.	A major or critical alarm is generated.	Query the current alarm on the host or SMU LCD to identify the fault.

7.3.3 Identifying PDU Faults

Table 7-4 Identifying PDU faults

Symptom	Cause	Measures
Load disconnection	The positive and negative cables of the load are reversely connected.	Ensure that the positive and negative cables are properly connected.
Battery disconnection	The positive and negative cables of batteries are reversely connected.	Ensure that the positive and negative cables are properly connected.

7.4 Replacing Components

NOTICE

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

7.4.1 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.

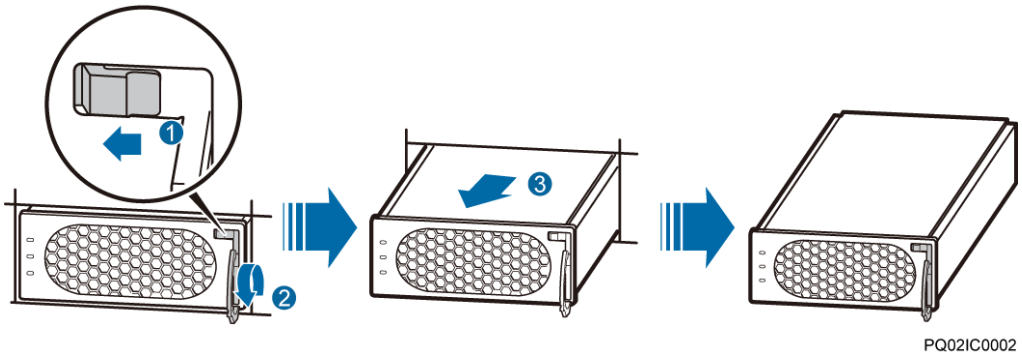
Procedure

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, as shown in Figure 7-1.

Figure 7-1 Removing a rectifier

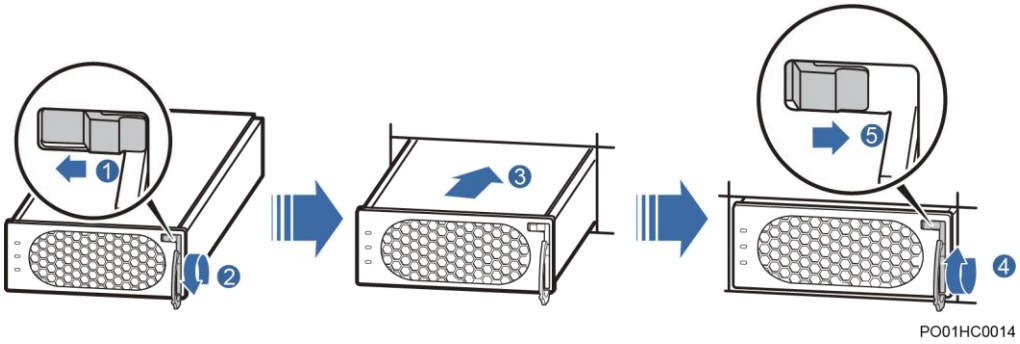


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

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

Step 6 Gently slide the rectifier into the subrack along the guide rail, and lock the handle, as shown in Figure 7-2.

Figure 7-2 Installing a rectifier



Step 7 Take off protective gloves.

----End

Follow-up Procedure

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

7.4.2 Replacing an SMU

Prerequisites

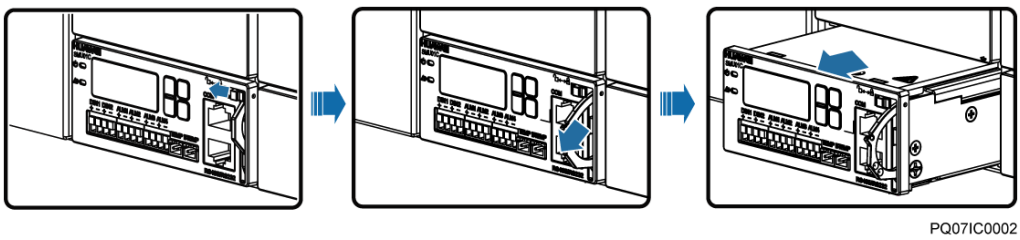
- You have obtained an ESD wrist strap, a pair of protective gloves, an ESD box or bag.
- The new rectifier is intact.

Procedure

Step 1 Push the locking latch towards the left.

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

Figure 7-3 Removing an SMU

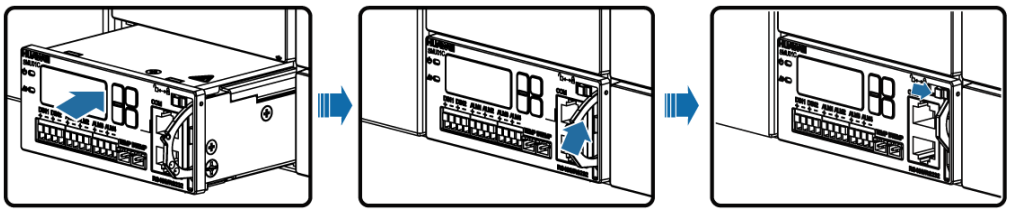


Step 3 Insert a new SMU into the slot, push the locking latch towards the left, and pull out the handle.

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

Step 5 Reset SMU parameters.

Figure 7-4 Installing an SMU



----End

Follow-up Procedure

Repair the replaced SMU.

7.4.3 Replacing a Battery String

Procedure

Step 1 Ensure that the AC input power supply is normal.

Step 2 Switch off the battery circuit breaker.

Step 3 Replace batteries. Ensure that the positive and negative battery cables are properly connected.

Step 4 Switch on the battery circuit breaker.

Step 5 Wait until the system is powered on automatically. Check that the battery status is normal (that is, no battery loop broken alarm is generated and the battery charging current is not 0.).

----End

A Technical specifications

Table A-1 Technical specifications

Category	Item	Specifications
Environmental conditions	Operating temperature	–40 ℃ to +70 ℃ **NOTE** ETP4890-A2 can still run 8 hours at the temperature of 70 ℃.
	Storage temperature	–40 ℃ to +70 ℃
	Transportation temperature	–40 ℃ to +70 ℃
	Operating humidity	5% to 95% RH (non-condensing)
	Storage humidity	5% to 95% RH (non-condensing)
	Altitude	0 m to 4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature is derated by 1 ℃ for each additional 200 m.
AC input	Input mode and input voltage	220 V AC single-phase compatible with 220/380 V AC three-phase, four-wire • Input range: 85 V AC to 300 V AC (phase voltage) • Rated input: 220 V AC to 240 V AC (phase voltage) 110 V AC dual-live-wire • Input range: 85 V AC to 300 V AC (line voltage) • Rated input: 220 V AC to 240 V AC (line voltage)
	Input frequency	45 Hz to 65 Hz (rated frequency: 50/60 Hz)
	Power factor	≥ 0.99 (rated load)
DC output	Output voltage range	–42 V DC to –58 V DC

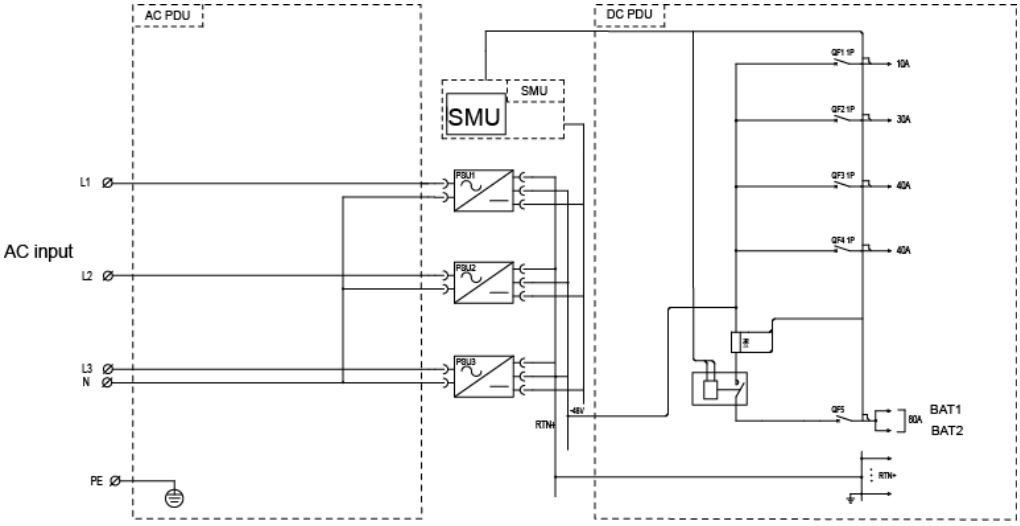
Category	Item	Specifications
	Default output voltage	–53.5 V DC
	Maximum output power	4800 W
	Regulated voltage precision	≤ ±0.6%
	Peak-to-peak noise voltage	≤ 200 mV (0 Hz to 20 MHz, rated input voltage and rated output load)
	Others	No damage is caused if a storage battery is connected reversely.
AC input protection	AC input overvoltage protection threshold	Overvoltage protection is performed when the single-phase AC input voltage exceeds the AC input overvoltage protection threshold (300 V AC by default).
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output resumes.
	AC input undervoltage protection threshold	Undervoltage protection is performed when the single-phase AC input voltage is below the AC input undervoltage protection threshold (85 V AC by default).
	AC input undervoltage recovery threshold	When the voltage is restored to 90 V AC, the output resumes.
DC output protection	DC output overvoltage protection threshold	–58.5 V DC to –60.5 V DC
Rectifier	Efficiency	• R4830G1: Highest efficiency: ≥ 96% ≥ 95% (230 V AC, 45%-80% load) • R4830N2: Highest efficiency: ≥ 94% ≥ 93% (230 V AC, 30%-100% load) • R4815G1: Highest efficiency: ≥ 96% ≥ 95% (220 V AC, 40%-100% load) • R4815N1: Highest efficiency: ≥ 94% ≥ 93% (220 V AC, 30%-100% load)

Category	Item	Specifications
	Output Power	• R4830G1: 1600 W (input voltage range: 176-300 V AC), 800 W (input voltage range: 85-175 V AC, linearly derated) • R4830N2: 1605 W (input voltage range: 176-300 V AC), 755 W (input voltage range: 85-175 V AC, linearly derated) • R4815G1: 870 W (input voltage range: 176-300 V AC), 435 W (input voltage range: 85-175 V AC, linearly derated) • R4815N1: 1000 W (input voltage range: 176-300 V AC), 470 W (input voltage range: 85-175 V AC, linearly derated)
	Overvoltage protection	Range: 58.5 V DC to 60.5 V DC 1. When the overvoltage occurs inside the rectifier due to a fault, the rectifier experiences a deadlock. 2. When the external voltage is higher than 63 V DC for more than 500 ms, the rectifier experiences a deadlock.
EMC	CE/RE	CISPR 22/EN 55022 Class B
	Harmonic	IEC 61000-3-12
	Fluctuation and blinking	IEC 61000-3-3
	ESD	Contact discharge: 6 kV (criterion B) Air discharge: 8 kV (criterion B) Signal port discharge: 2 kV (criterion R)
	EFT	Signal port: 1 kV; Power port: 2 kV criterion B
	RS	Signal port: 3 V/m; Power port: 10 V/m criterion A
	CS	Signal port: 3 V; Power port: 10 V criterion A
	SURGE	For AC power ports, wave 8/20(1.2/50)us Differential mode: 2 kV Common mode: 4 kV criterion B
	DIP	IEC61000-4-11
Others	Surge protection	For AC power ports, Differential mode: 5 kA Common mode: 5 kA

Category	Item	Specifications
	Safety and regulatory design	Complies with IEC 60950-1/GB 4943 and passes the certification of the Conformite Europeenne (CE) and Technical Watch-Over Association (TUV).
	MTBF	250,000 hours (at 25 ℃)
Structure	Power system (H x W x D)	86.1 mm x 442 mm x 255 mm
	Weight	≤ 10 kg (33.08 lb)(include 3PCS rectifiers and 1PCS SMU)
	Protection level	IP20
	Installation	Equipped with different types of mounting ears to adapt to 19-inch cabinets and European Telecommunications Standards Institute (ETSI) cabinets
	Maintenance	Operated and maintained from the front
	Cooling	Fan-cooled

B Electrical Conceptual Diagram

Figure B-1 ETP4890–A2 electrical conceptual diagram



C Acronyms and Abbreviations

A	
ATS	automatic transfer switch
ACDB	alternating current distribution box
I	
IP	Internet Protocol
L	
LCD	liquid crystal display
N	
NMS	network management system
P	
PDM	Power Distribution with Mechanical Switch
PE	protective earth
S	
SMU	site monitor unit
T	
TCP	Transmission Control Protocol
U	
USB	Universal Serial Bus