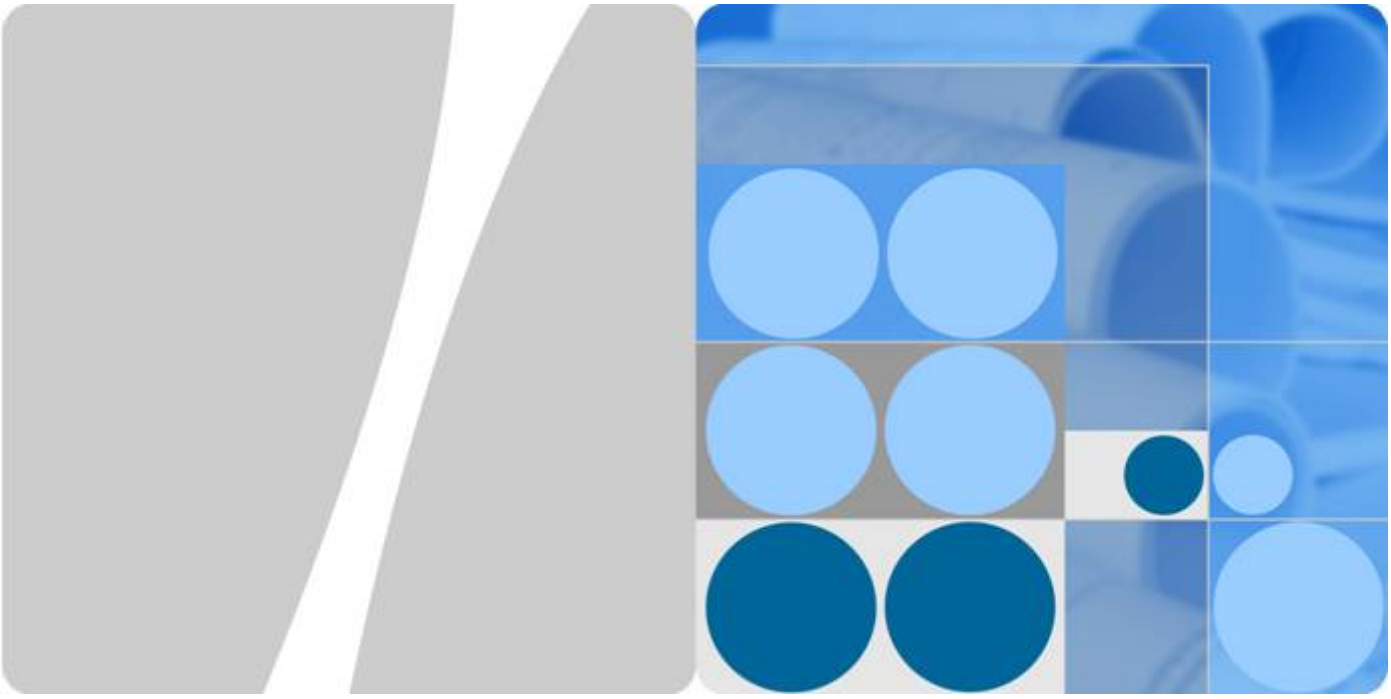

HUAWEI USG6000 Series
V100R001 & V500R001

Hardware Guide

Issue 08
Date 2017-06-30

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About This Document

Related Version

The following table lists the product version related to this document.

Product Name	Version
The USG6000 series has the following models: ● USG6300 – USG6305 – USG6305-W – USG6306 – USG6308 – USG6310S – USG6310S-W – USG6310S-WL-OVS – USG6310 – USG6320 – USG6330 – USG6350 – USG6360 – USG6370 – USG6380 – USG6390 – USG6390E ● USG6500 – USG6507 – USG6510 – USG6510-WL – USG6530 – USG6550 – USG6570 ● USG6600 – USG6620 – USG6630 – USG6650 – USG6660 – USG6670 – USG6680	V100R001 V500R001

Intended Audience

This document describes hardware structure, installation guide, and hardware maintenance. The content of this document includes the appearance and specifications of the product, the

supported expansion cards, preparation before the installation, installation, cabling, and hardware replacement.

This document is intended for installation personnel and administrators who install and maintain USG. The installation personnel or administrators must have experience in the installation and maintenance of networking devices.

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.

Command Conventions

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

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	Items (keywords or arguments) in brackets [ ] are optional.

Convention	Description
{ x | y | ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x | y | ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x | y | ... } *	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[x | y | ...] *	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.
&<1-n>	The parameter before the & sign can be repeated 1 to n times.
#	A line starting with the # sign is comments.

GUI Conventions

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

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in **boldface**. For example, click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder**.

Update History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

Updates in Issue 08 (2017-06-30) of Product Version V500R001C60

The eighth commercial release has the following update:

Added the support of the megabit optical transceiver for the USG6306/6308/6330/6350/6360/6507/6530. For details, see **Megabit Optical Transceiver**.

Updates in Issue 07 (2017-03-28) of Product Version V500R001C50

The seventh commercial release has the following updates:

- Added the support of hard disk combination SM-HDD-SAS1200G-B for the 1 U device (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/

6507/6530/6550/6570/6620/6630). For details, see **Hard Disk Combination SM-HDD-SAS1200G-B**. If you use SM-HDD-SAS1200G-B hard disk combination on V500R001C50 earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the FW version.

- Added the support of hard disk unit SM-HDD-SAS1200G-A for the 3 U device (USG6650/6660/6670 and USG6680-AC). For details, see **Hard Disk Unit SM-HDD-SAS1200G-A**. If you use SM-HDD-SAS1200G-A hard disks on V500R001C50 earlier versions, the SM-HDD-SAS1200G-A hard disks will be identified as non-Huawei hard disks. You need to upgrade the FW version.
- The 1 U model (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630) and 3 U model (USG6650/6660/6670/6680) can be installed into a 19-inch standard cabinet using the extension guide rail (part number: 21242247).

Updates in Issue 06 (2016-08-19) of Product Version V500R001C30SPC100

The sixth commercial release has the following updates:

- Added descriptions of desktop devices **USG6305**, **USG6305-W**, **USG6310S**, **USG6310S-W**, **USG6310S-WL**, **USG6510**, and **USG6510-WL**.
- Added the description of the 1 U **USG6390E**.
- The USG6650/6660/6670 and USG6680-AC support the hard disk unit SM-HDD-SAS600G-A. For details, see **Hard Disk Unit SM-HDD-SAS600G-A**. If you use SM-HDD-SAS600G-A hard disks on V500R001C20SPC200 earlier versions, the SM-HDD-SAS600G-A hard disks will be identified as non-Huawei hard disks. You need to upgrade the FW version.
- The 1 U model (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630) supports SM-HDD-SAS600G-B hard disk combination. For details, see **Hard Disk Combination SM-HDD-SAS600G-B**. If you use SM-HDD-SAS600G-B hard disk combination on V500R001C30SPC100 earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the FW version.

Updates in Issue 05 (2015-07-30) of Product Version V100R001C30SPC100

The fifth commercial release has the following updates:

- Changed the matching power adapter of the USG6320 from 60 W to 36 W. For details, see **USG6310/6320 Power Supply System**.
- Changed the BOM code of the 10GE optical module with an 80 km transmission distance from 02310JFE to 02310SNN, and the corresponding external model from LE2MXSC80FF0 to SFP-10G-ZR.

Updates in Issue 04 (2015-03-25) of Product Version V100R001C30

The fourth commercial release has the following updates:

- Added the **USG6306/6308**.
- Added the **USG6507**.

Updates in Issue 03 (2015-01-26) of Product Version V100R001C20SPC700

The third commercial release has the following updates:

- The AC power module of the USG6680 is increased from 350 W to 700 W. For details, see **USG6680 Hardware Overview**.
- The 1 U device and 3 U device can be mounted in a 19-inch standard cabinet through adjustable guide rails. For details, see **Mounting a 1 U Device in a Cabinet** and **Mounting a 3 U Device in a Cabinet**.

Updates in Issue 02 (2014-10-20) of Product Version V100R001C20SPC200

The second commercial release has the following updates.

The following hardware models are added based on V100R001C10:

- **USG6310**
- **USG6330/6350/6360**
- **USG6530**
- **2.3.1 USG6620/6630**

Updates in Issue 01 (2014-06-13) of Product Version V100R001C10SPC100

Initial commercial release.

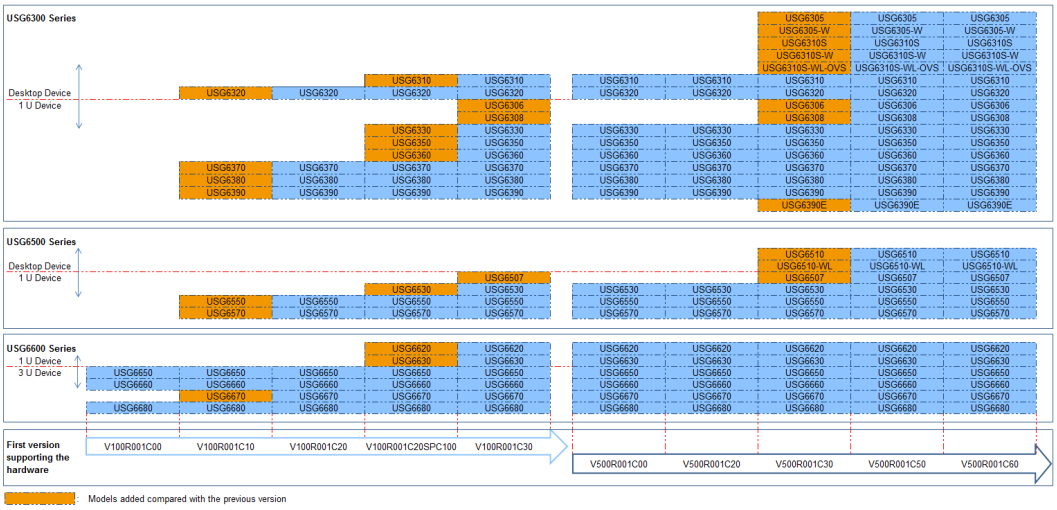
Contents

1 Software Versions Compatible with Hardware

This section describes software versions compatible with the USG hardware.

The USG has its software versions constantly updated and optimized ever since its launch. **Figure 1-1** displays software versions compatible with the USG and version evolution.

Figure 1-1 Software Versions Compatible with Hardware



2 Hardware Overview

2.1 USG6300 Product Series

The USG6300 product series includes USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6310/6320/6306/6308/6330/6350/6360/6370/6380/6390/6390E. These models are 1 U devices with an integrated structure and fit into a 19-inch standard cabinet. A larger model number indicates a higher performance.

2.1.1 USG6305

The USG6305 is a 1-U desktop device that provides fixed ports and does not support expansion.

2.1.1.1 Device Overview

The USG6305 is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, and uses an external power adapter to supply power. The device does not support port expansion.

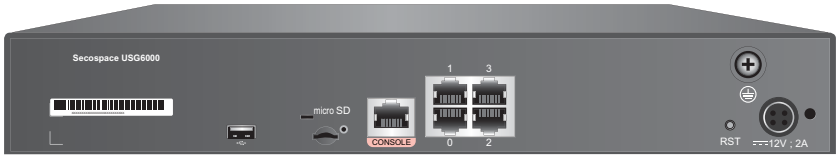
Appearance

Figure 2-1 illustrates the appearance of the USG6305.

Figure 2-1 Appearance of USG6305

Front view

Rear view



Ports

The USG6305 provides the following fixed ports:

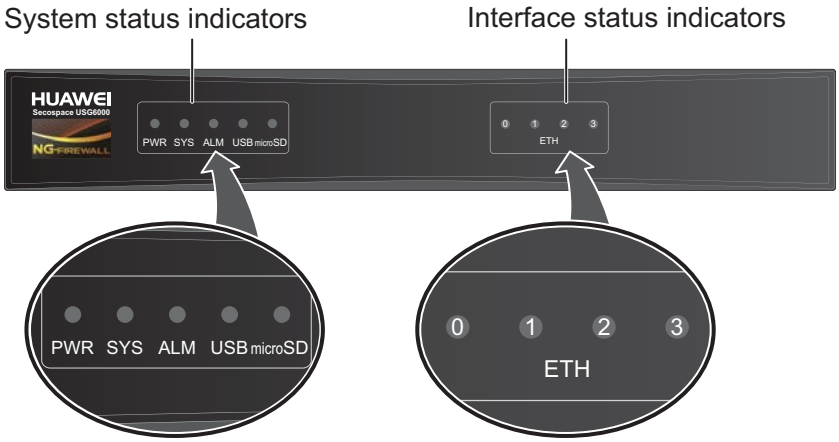
- 1 console port (RJ45)
- 1 USB 2.0 port
- 1 micro SD card slot
- 4 10/100/1000M autosensing Ethernet electrical ports

2.1.1.2 Front Panel

The USG6305 front panel provides system and port status indicators.

Figure 2-2 illustrates the front panel of the USG6305.

Figure 2-2 USG6305 front panel



Name	Description
Interface status indicators 0 to 3 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

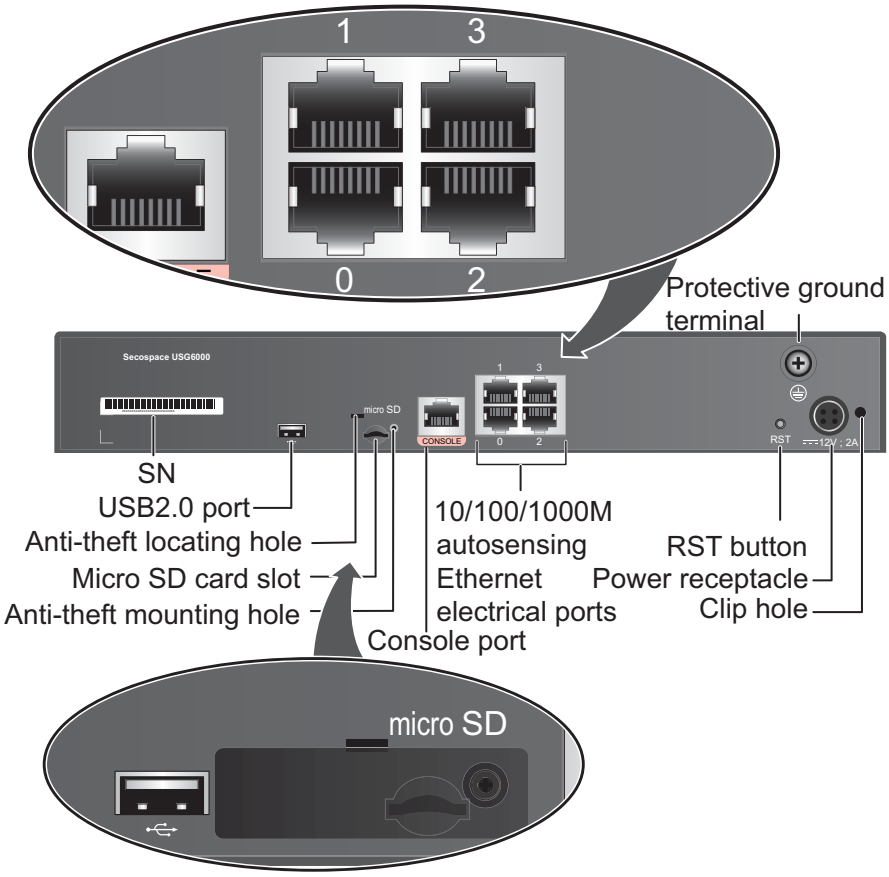
Name	Description
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.

2.1.1.3 Rear Panel

The rear panel of the USG6305 provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-3 illustrates the rear panel of the USG6305.

Figure 2-3 USG6305 rear panel



Name	Description
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 3 (RJ45)	4 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/3. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.1.4 Power Supply System

The USG6305 does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-4** illustrates the appearance of the power adapter.

Figure 2-4 Appearance of the 24W power adapter

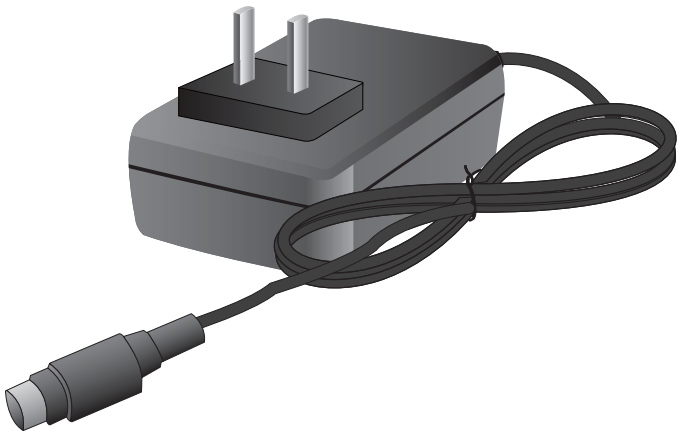


Table 2-1 lists the functions of the 24W power adapter.

Table 2-1 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-2 lists the technical specifications of the 24W power adapter.

Table 2-2 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm

Item	Description
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.1.1.5 Heat Dissipation System

The USG6305 does not have fans and uses natural cooling.

2.1.1.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6305.

Table 2-3 lists the technical specifications of the USG6305.

Table 2-3 USG6305 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported

Item		Description
4G LTE Data Card		Supported
Dimensions and weight		
Dimensions (H[b] x W[a] x D)		44 mm x 300 mm x 220 mm
Weight		1.55 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		0.8 A
Maximum output power		24 W
Heat dissipation		
Fan module		Has no fan and uses natural cooling.
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		4 10/100/1000M autosensing Ethernet electrical ports
Micro SD card slot		1
Expansion slot		None
Environment specifications[c]		
System reliability	MTBF (year)	14.08
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing
Altitude		5,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.1.2 USG6305-W

The USG6305-W is a 1-U desktop device that provides fixed ports, supports WLAN access, and does not support expansion.

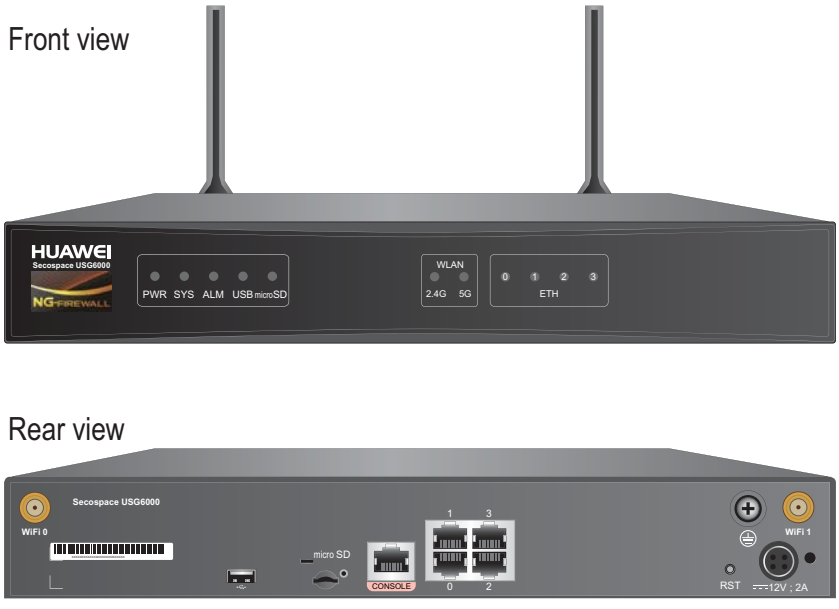
2.1.2.1 Device Overview

The USG6305-W is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, supports WLAN access, and uses an external power adapter to supply power. The device does not support port expansion.

Appearance

Figure 2-5 illustrates the appearance of the USG6305-W.

Figure 2-5 Appearance of USG6305-W



Ports

The USG6305-W provides the following fixed ports:

- 1 console port (RJ45)
- 1 USB 2.0 port

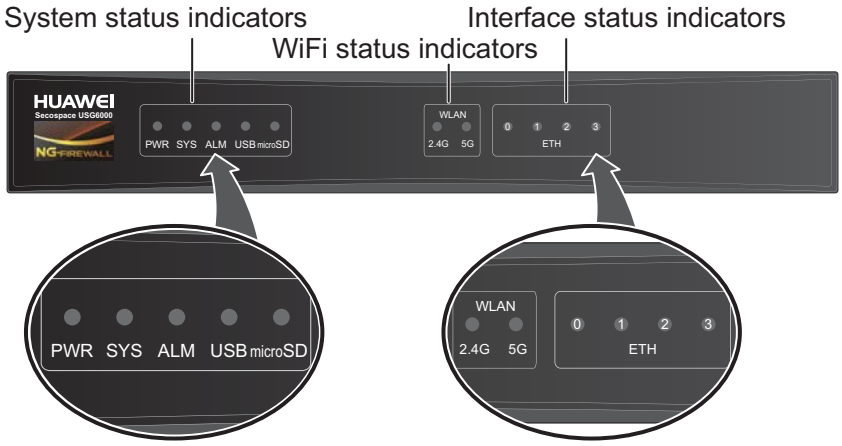
- 1 micro SD card slot
- 2 WiFi antenna connectors (IEEE 802.11 a/b/g/n/ac)
- 4 10/100/1000M autosensing Ethernet electrical ports

2.1.2.2 Front Panel

The USG6305-W front panel provides system, WiFi and port status indicators.

Figure 2-6 illustrates the front panel of the USG6305-W.

Figure 2-6 USG6305-W front panel



Name	Description
Interface status indicators 0 to 3 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.

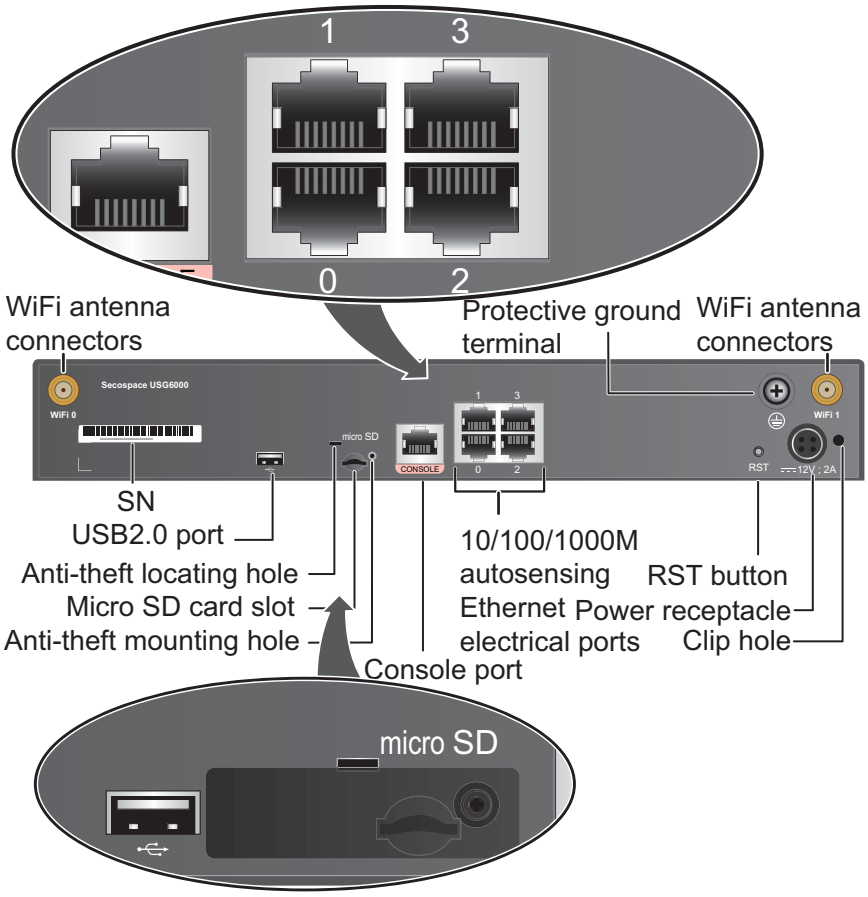
Name	Description
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.
WiFi status indicators	
WLAN 2.4G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connecting. ● Blink every two seconds (0.5 Hz): The device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.
WLAN 5G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connecting. ● Blink every two seconds (0.5 Hz): The device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.

2.1.2.3 Rear Panel

The rear panel of the USG6305-W provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-7 illustrates the rear panel of the USG6305-W.

Figure 2-7 USG6305-W rear panel



Name	Description
WiFi antenna connector	Connect to the WiFi antennas to receive or send data in WLAN network. For details, see **A.1.9 WiFi Antenna**.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.

Name	Description
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 3 (RJ45)	4 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/3. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.2.4 Power Supply System

The USG6305-W does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-8** illustrates the appearance of the power adapter.

Figure 2-8 Appearance of the 24W power adapter

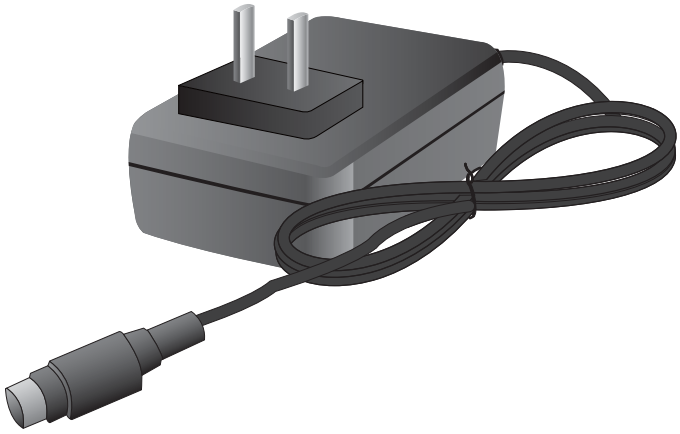


Table 2-4 lists the functions of the 24W power adapter.

Table 2-4 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-5 lists the technical specifications of the 24W power adapter.

Table 2-5 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)

Item	Description
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.1.2.5 Heat Dissipation System

The USG6305-W does not have fans and uses natural cooling.

2.1.2.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6305-W.

Table 2-6 lists the technical specifications of the USG6305-W.

Table 2-6 USG6305-W Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44 mm x 300 mm x 220 mm

Item		Description
Weight		1.60 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		0.8 A
Maximum output power		24 W
Heat dissipation		
Fan module		Has no fan and uses natural cooling.
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		● 4 10/100/1000M autosensing Ethernet electrical ports ● 2 WiFi antenna connectors
Micro SD card slot		1
Expansion slot		None
WiFi access specifications		
Wireless standards		IEEE 802.11 a/b/g/n/ac
Wireless rate		300 Mbit/s
Frequency bands		● 2.412 GHz to 2.472 GHz ● 5.18 GHz to 5.825 GHz
Maximum transmit power[c]		● 2.4 GHz: 15 dBm ● 5 GHz: 20 dBm
Environment specifications[d]		
System reliability	MTBF (year)	13.8
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing

Item	Description
Altitude	5,000 m
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. The actual transmit power depends on local laws and regulations. ● d. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.1.3 USG6310S

The USG6310S is a 1-U desktop device that provides fixed ports and does not support expansion.

2.1.3.1 Device Overview

The USG6310S is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, and uses an external power adapter to supply power. The device does not support port expansion.

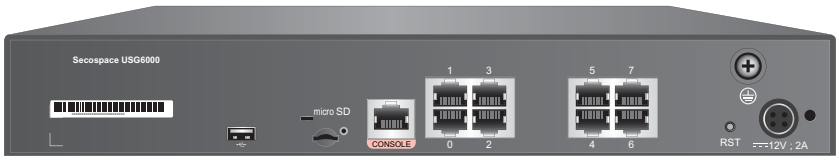
Appearance

Figure 2-9 illustrates the appearance of the USG6310S.

Figure 2-9 Appearance of USG6310S

Front view

Rear view



Ports

The USG6310S provides the following fixed ports:

- 1 console port (RJ45)
- 1 USB 2.0 port
- 1 micro SD card slot

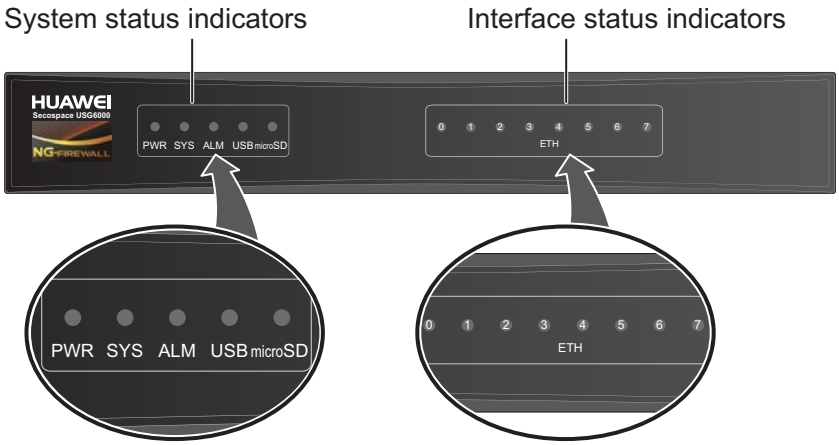
- 8 10/100/1000M autosensing Ethernet electrical ports

2.1.3.2 Front Panel

The USG6310S front panel provides system and port status indicators.

Figure 2-10 illustrates the front panel of the USG6310S.

Figure 2-10 USG6310S front panel



Name	Description
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.

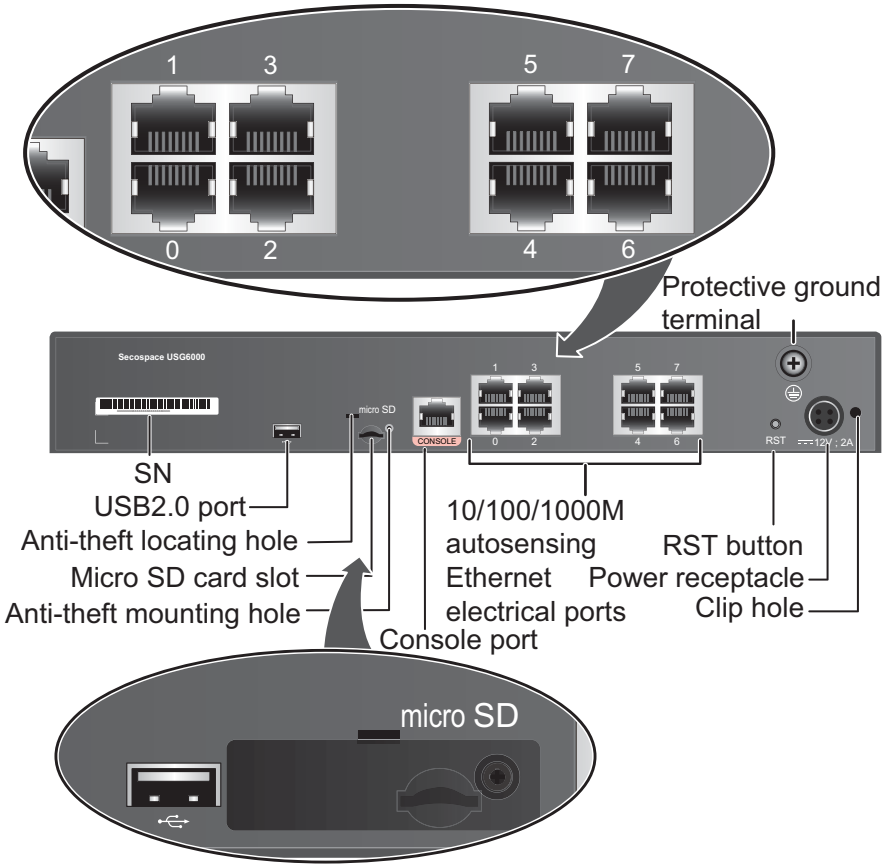
Name	Description
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.

2.1.3.3 Rear Panel

The rear panel of the USG6310S provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-11 illustrates the rear panel of the USG6310S.

Figure 2-11 USG6310S rear panel



Name	Description
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

Name	Description
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.3.4 Power Supply System

The USG6310S does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-12** illustrates the appearance of the power adapter.

Figure 2-12 Appearance of the 24W power adapter

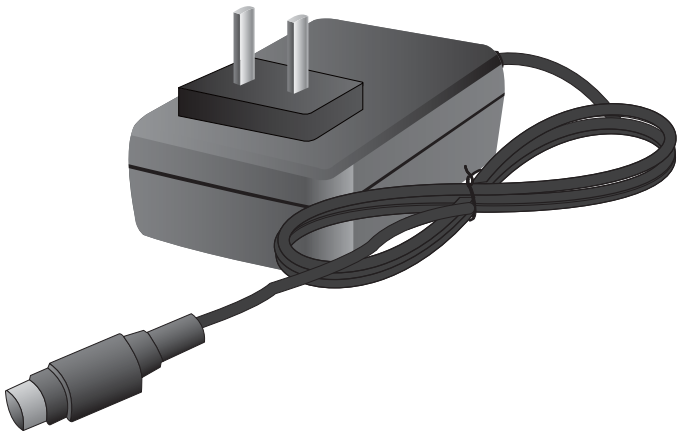


Table 2-7 lists the functions of the 24W power adapter.

Table 2-7 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-8 lists the technical specifications of the 24W power adapter.

Table 2-8 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm

Item	Description
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.1.3.5 Heat Dissipation System

The USG6310S does not have fans and uses natural cooling.

2.1.3.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6310S.

Table 2-9 lists the technical specifications of the USG6310S.

Table 2-9 USG6310S Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported

Item		Description
4G LTE Data Card		Supported
Dimensions and weight		
Dimensions (H[b] x W[a] x D)		44 mm x 300 mm x 220 mm
Weight		1.55 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		0.8 A
Maximum output power		24 W
Heat dissipation		
Fan module		Has no fan and uses natural cooling.
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		8 10/100/1000M autosensing Ethernet electrical ports
Micro SD card slot		1
Expansion slot		None
Environment specifications[c]		
System reliability	MTBF (year)	14.08
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing
Altitude		5,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.1.4 USG6310S-W

The USG6310S-W is a 1-U desktop device that provides fixed ports, supports WLAN access, and does not support expansion.

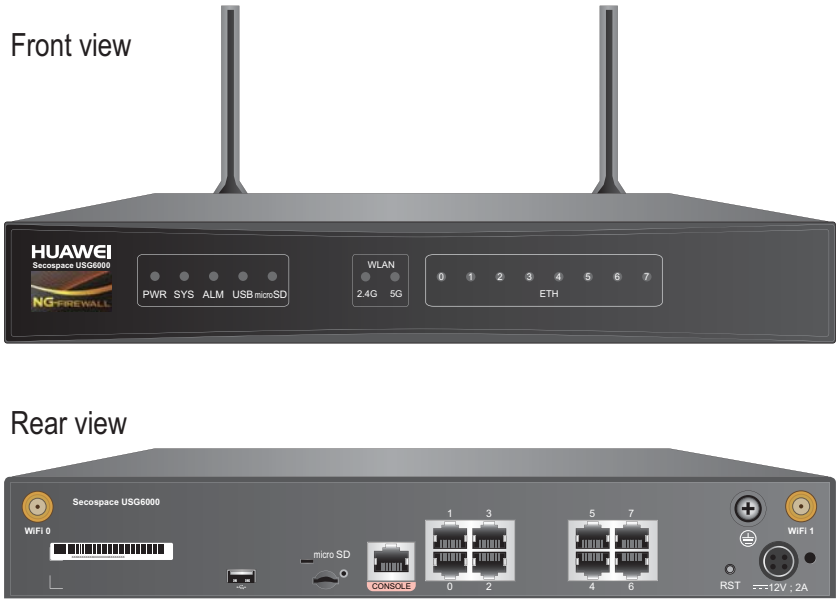
2.1.4.1 Device Overview

The USG6310S-W is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, supports WLAN access, and uses an external power adapter to supply power. The device does not support port expansion.

Appearance

Figure 2-13 illustrates the appearance of the USG6310S-W.

Figure 2-13 Appearance of USG6310S-W



Ports

The USG6310S-W provides the following fixed ports:

- 1 console port (RJ45)
- 1 USB 2.0 port

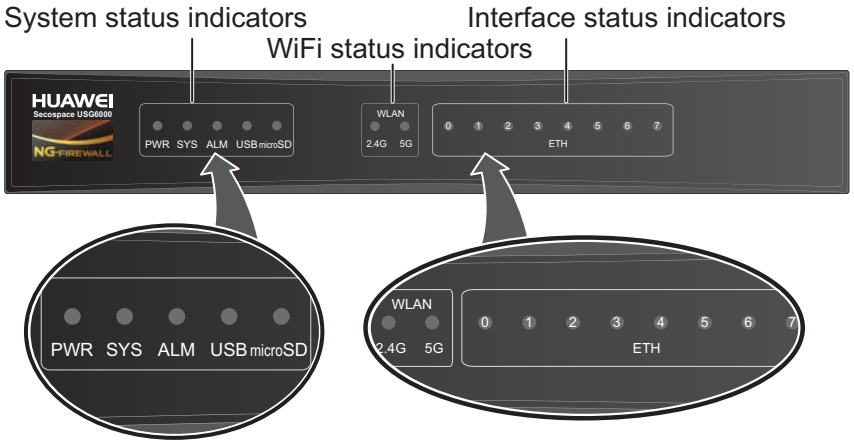
- 1 micro SD card slot
- 2 WiFi antenna connectors (IEEE 802.11 a/b/g/n/ac)
- 8 10/100/1000M autosensing Ethernet electrical ports

2.1.4.2 Front Panel

The USG6310S-W front panel provides system, WiFi and port status indicators.

Figure 2-14 illustrates the front panel of the USG6310S-W.

Figure 2-14 USG6310S-W front panel



Name	Description
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.

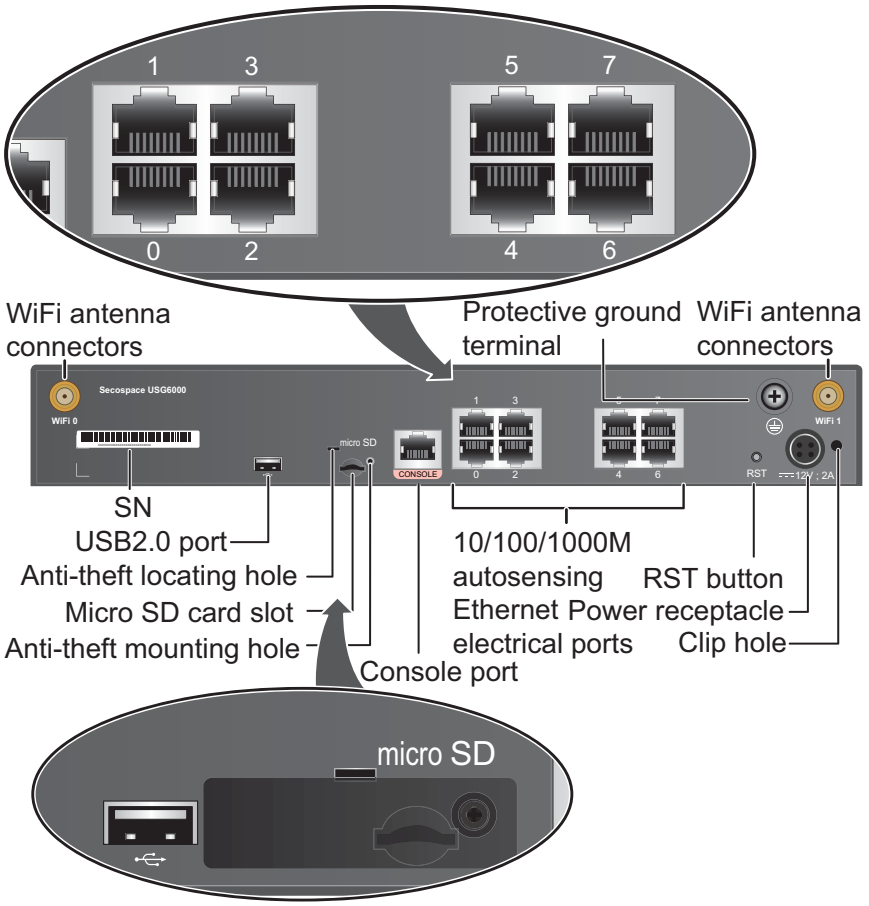
Name	Description
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.
WiFi status indicators	
WLAN 2.4G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connecting. ● Blink every two seconds (0.5 Hz): The device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.
WLAN 5G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connecting. ● Blink every two seconds (0.5 Hz): The device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.

2.1.4.3 Rear Panel

The rear panel of the USG6310S-W provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-15 illustrates the rear panel of the USG6310S-W.

Figure 2-15 USG6310S-W rear panel



Name	Description
WiFi antenna connector	Connect to the WiFi antennas to receive or send data in WLAN network. For details, see **A.1.9 WiFi Antenna**.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.

Name	Description
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.4.4 Power Supply System

The USG6310S-W does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-16** illustrates the appearance of the power adapter.

Figure 2-16 Appearance of the 24W power adapter

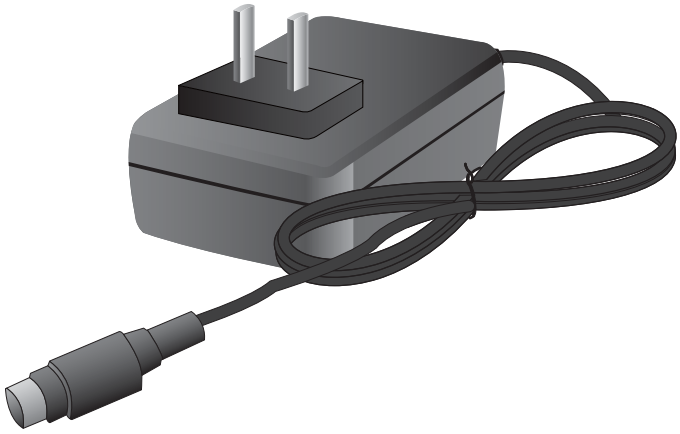


Table 2-10 lists the functions of the 24W power adapter.

Table 2-10 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-11 lists the technical specifications of the 24W power adapter.

Table 2-11 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)

Item	Description
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.1.4.5 Heat Dissipation System

The USG6310S-W does not have fans and uses natural cooling.

2.1.4.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6310S-W.

Table 2-12 lists the technical specifications of the USG6310S-W.

Table 2-12 USG6310S-W Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44 mm x 300 mm x 220 mm

Item		Description
Weight		1.60 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		0.8 A
Maximum output power		24 W
Heat dissipation		
Fan module		Has no fan and uses natural cooling.
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		● 8 10/100/1000M autosensing Ethernet electrical ports ● 2 WiFi antenna connectors
Micro SD card slot		1
Expansion slot		None
WiFi access specifications		
Wireless standards		IEEE 802.11 a/b/g/n/ac
Wireless rate		300 Mbit/s
Frequency bands		● 2.412 GHz to 2.472 GHz ● 5.18 GHz to 5.825 GHz
Maximum transmit power[c]		● 2.4 GHz: 15 dBm ● 5 GHz: 20 dBm
Environment specifications[d]		
System reliability	MTBF (year)	13.8
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing

Item	Description
Altitude	5,000 m
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. The actual transmit power depends on local laws and regulations. ● d. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.1.5 USG6310S-WL-OVS

The USG6310S-WL-OVS is a 1-U desktop device that provides fixed ports, supports LTE uplink connection and WLAN access, and does not support expansion.

2.1.5.1 Device Overview

The USG6310S-WL-OVS is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, supports LTE uplink connection and WLAN access, and uses an external power adapter to supply power. The device does not support port expansion.

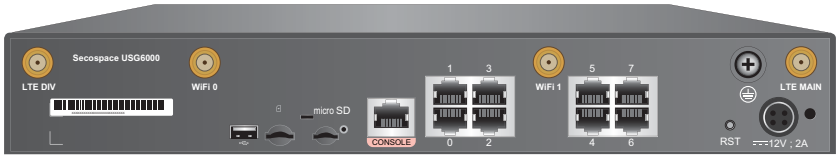
Appearance

Figure 2-17 illustrates the appearance of the USG6310S-WL-OVS.

Figure 2-17 Appearance of USG6310S-WL-OVS

Front view

Rear view



Ports

The USG6310S-WL-OVS provides the following fixed ports:

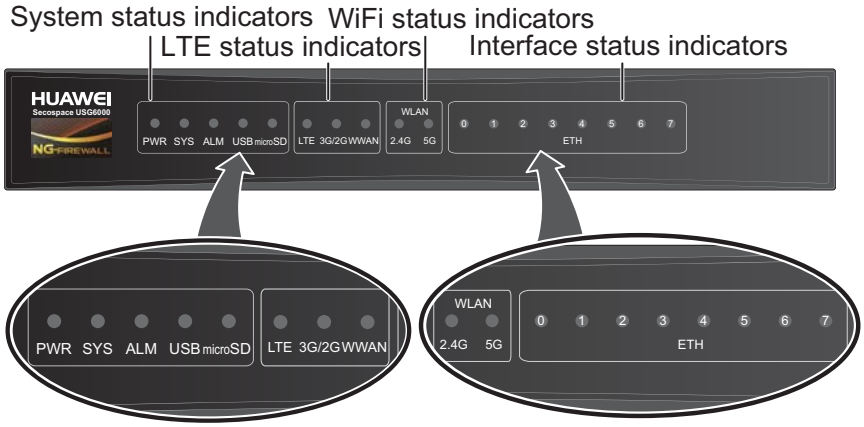
- 1 console port (RJ45)
- 1 USB 2.0 port
- 1 micro SD card slot
- 1 SIM card slot
- 2 WiFi antenna connectors (IEEE 802.11 a/b/g/n/ac)
- 2 LTE antenna connectors (4G LTE, 3G UMTS, and 2G GSM)
- 8 10/100/1000M autosensing Ethernet electrical ports

2.1.5.2 Front Panel

The USG6310S-WL-OVS front panel provides system, LTE, WiFi and port status indicators.

Figure 2-18 illustrates the front panel of the USG6310S-WL-OVS.

Figure 2-18 USG6310S-WL-OVS front panel



Name	Description
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.
LTE status indicators	
LTE indicator (green)	● Steady on: The signal strength of the LTE 4G link is high. ● Blink twice every second (2 Hz): The signal strength of the LTE 4G link is at middle range. ● Blink every two seconds (0.5 Hz): The signal strength of the LTE 4G link is low. ● Off: There is no LTE 4G signal.
3G/2G indicator (green)	● Steady on: The signal strength of the 3G/2G link is high. ● Blink twice every second (2 Hz): The signal strength of the 3G/2G link is at middle range. ● Blink every two seconds (0.5 Hz): The signal strength of the 3G/2G link is low. ● Off: There is no 3G/2G signal.
WWAN indicator (green)	● Steady on: The LTE 4G/3G/2G link is connected or activated. ● Blink twice every second (2 Hz): The LTE 4G/3G/2G network is accessed, and data is being transmitted. ● Off: The LTE 4G/3G/2G link is disconnected or is not activated.
WiFi status indicators	
WLAN 2.4G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connected. ● Blink every two seconds (0.5 Hz): A device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.

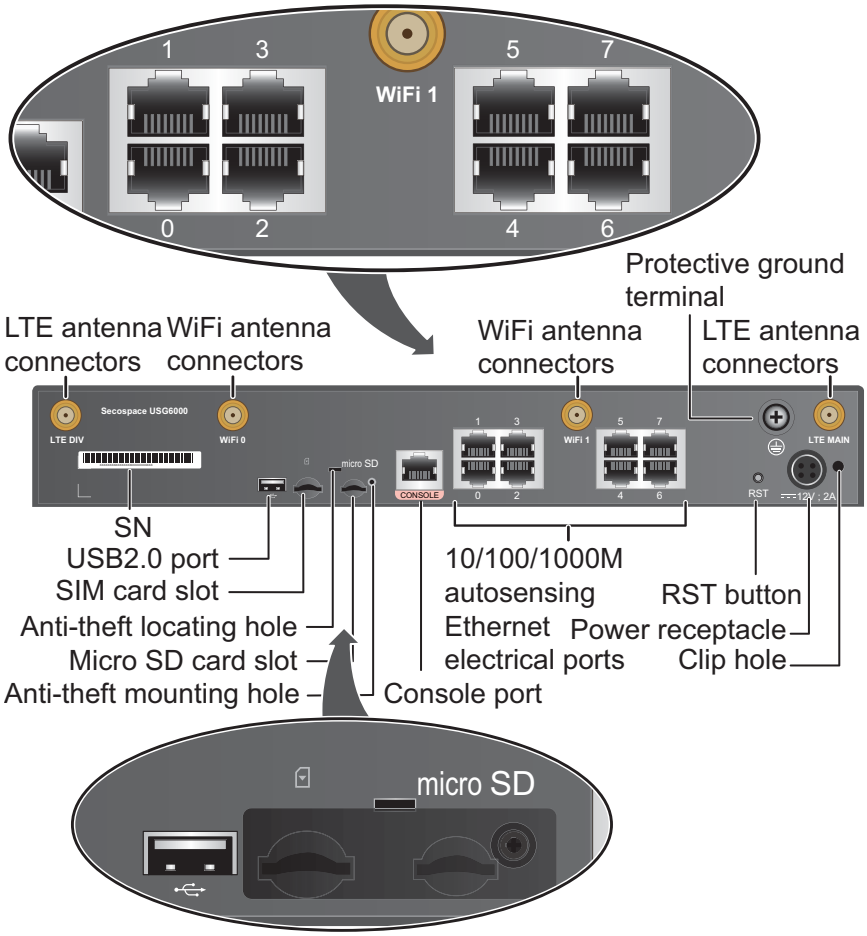
Name	Description
WLAN 5G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connected. ● Blink every two seconds (0.5 Hz): A device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.

2.1.5.3 Rear Panel

The rear panel of the USG6310S-WL-OVS provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-19 illustrates the rear panel of the USG6310S-WL-OVS.

Figure 2-19 USG6310S-WL-OVS rear panel



Name	Description
LTE antenna connector	LTE antenna connectors include a MAIN antenna connector and a DIV antenna connector. The antennas work together. ● The MAIN antenna transmits and receives LTE signals. ● The DIV antenna helps improve the quality of received LTE signals. The connectors connect to the LTE antennas to realize wireless LTE access. For details, see **A.1.8 LTE Antenna**.
WiFi antenna connector	WiFi antennas connectors connect to the WiFi antennas realize wireless WLAN access. For details, see **A.1.9 WiFi Antenna**.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
SIM card slot	The SIM card slot allows you to insert a standard SIM card. The slot supports such standards as 4G LTE, 3G UMTS, and 2G GSM.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.

Name	Description
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.5.4 Power Supply System

The USG6310S-WL-OVS does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-20** illustrates the appearance of the power adapter.

Figure 2-20 Appearance of the 24W power adapter

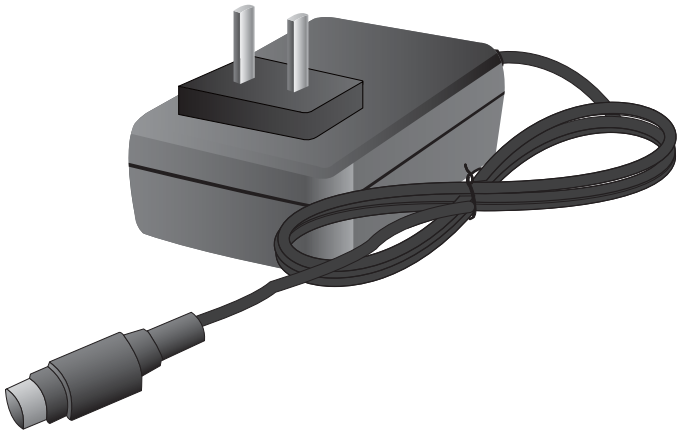


Table 2-13 lists the functions of the 24W power adapter.

Table 2-13 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.

Item	Description
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-14 lists the technical specifications of the 24W power adapter.

Table 2-14 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.1.5.5 Heat Dissipation System

The USG6310S-WL-OVS does not have fans and uses natural cooling.

2.1.5.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6310S-WL-OVS.

Table 2-15 lists the technical specifications of the USG6310S-WL-OVS.

Table 2-15 USG6310S-WL-OVS Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44 mm x 300 mm x 220 mm
Weight	1.65 kg
Power specifications	
AC power	Supported (external AC power adapter)
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current	0.8 A
Maximum output power	24 W
Heat dissipation	
Fan module	Has no fan and uses natural cooling.
Port density	
Console port	1 (RJ45)
USB 2.0 port	1
Mandatory service ports	● 8 10/100/1000M autosensing Ethernet electrical ports ● 2 WiFi antenna connectors ● 2 LTE antenna connectors
Micro SD card slot	1
Expansion slot	None

Item		Description
WiFi access specifications		
Wireless standards		IEEE 802.11 a/b/g/n/ac
Wireless rate		300 Mbit/s
Frequency bands		● 2.412 GHz to 2.472 GHz ● 5.18 GHz to 5.825 GHz
Maximum transmit power[c]		● 2.4 GHz: 15 dBm ● 5 GHz: 20 dBm
LTE access specifications		
Standards and frequency bands		● FDD LTE: Band 1, Band 2, Band 3, Band 4, Band 5, Band 7, Band 8, Band 20, all bands with diversity ● WCDMA/HSDPA/HSUPA/HSPA+: Band 1, Band 2, Band 5, Band 8, all bands with diversity ● GSM/GRPS/EDGE: 850 MHz/900 MHz/1800 MHz/1900 MHz
Rate		● FDD LTE: uplink rate of 50 Mbit/s and downlink rate of 150 Mbit/s ● WCDMA CS: uplink rate of 64 kbit/s and downlink rate of 64 kbit/s ● WCDMA PS: uplink rate of 384 kbit/s and downlink rate of 384 kbit/s ● HSPA+: uplink rate of 5.76 Mbit/s and downlink rate of 21.6 Mbit/s ● DC-HSPA+: uplink rate of 5.76 Mbit/s and downlink rate of 42 Mbit/s ● GRPS: uplink rate of 85.6 kbit/s and downlink rate of 85.6 kbit/s ● EDGE: uplink rate of 236.8 kbit/s and downlink rate of 236.8 kbit/s
Environment specifications[d]		
System reliability	MTBF (year)	12.75
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing

Item	Description
Altitude	5,000 m
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. The actual transmit power depends on local laws and regulations. ● d. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.1.6 USG6310/6320

The USG6310/6320 is a 1-U desktop device that provides fixed ports and does not support expansion.

2.1.6.1 Device Overview

The USG6310/6320 is a 1-U desktop device with an integrated structure. The device provides fixed ports, a built-in fan module, and uses an external power adapter to supply power. The device does not support port expansion.

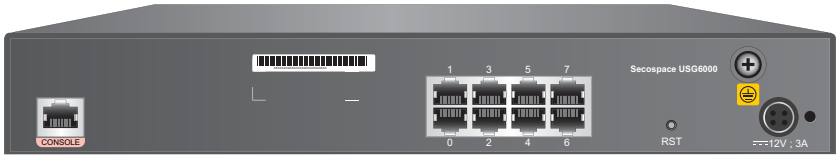
Appearance

Figure 2-21 illustrates the appearance of the USG6310/6320.

Figure 2-21 Appearance of USG6310/6320

Front view

Rear view



Ports

The USG6310/6320 provides the following fixed ports:

- 1 console port (RJ45)
- 1 USB 2.0 port

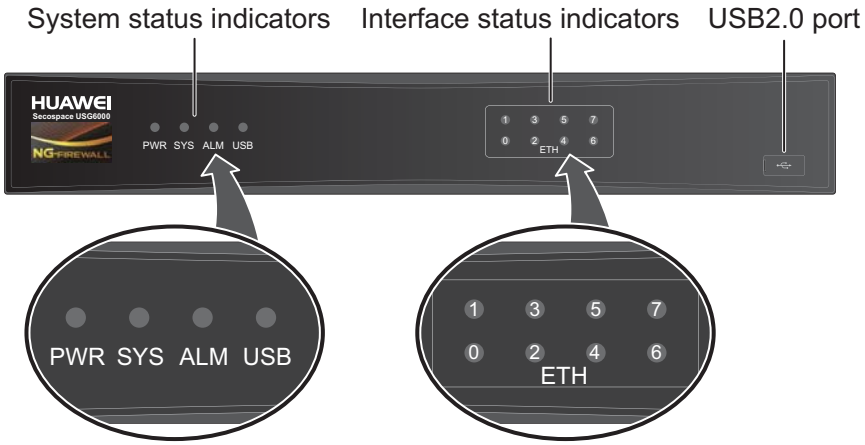
- 8 10/100/1000M autosensing Ethernet electrical ports

2.1.6.2 Front Panel

The USG6310/6320 front panel provides a USB 2.0 port and system and port status indicators.

Figure 2-22 illustrates the front panel of the USG6310/6320.

Figure 2-22 USG6310/6320 front panel



Name	Description
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

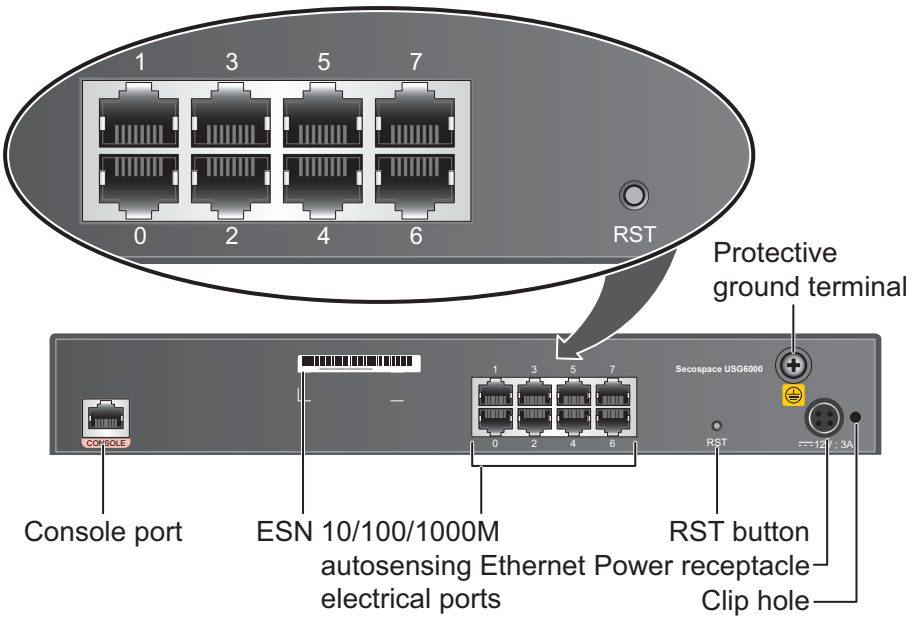
Name	Description
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.

2.1.6.3 Rear Panel

The rear panel of the USG6310/6320 provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-23 illustrates the rear panel of the USG6310/6320.

Figure 2-23 USG6310/6320 rear panel



Name	Description
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

Name	Description
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.1.6.4 Power Supply System

The USG6310/6320 does not have a built-in power module and requires an external 36W power adapter.

36W Power Adapter

The 36W power adapter converts AC power to DC power for the device. **Figure 2-24** illustrates the appearance of the power adapter.

Figure 2-24 Appearance of the 36W power adapter

Table 2-16 lists the functions of the 36W power adapter.

Table 2-16 Functions of the 36W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-17 lists the technical specifications of the 36W power adapter.

Table 2-17 Technical specifications of the 36W power adapter

Item	Description
Dimensions (H x W x D)	32 mm x 53.95 mm x 99.45 mm
Weight	0.22 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	1.0 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	3 A
Maximum output power	36 W

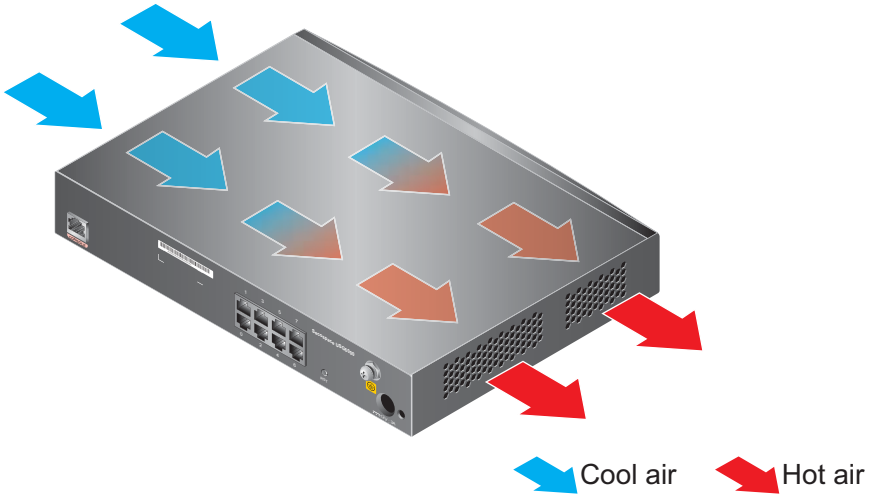
2.1.6.5 Heat Dissipation System

The USG6310/6320 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

The device provides a left-to-right air flow, as shown in **Figure 2-25**. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-25 System air flow



2.1.6.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6310/6320.

Table 2-18 lists the technical specifications of the USG6310/6320.

Table 2-18 USG6310/6320 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 2 GB
Flash	16 MB
CF card	1 GB
Hard disk	Not supported
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported

Item		Description
Dimensions and weight		
Dimensions (H[b] x W[a] x D)		44.5 mm x 300 mm x 220 mm
Weight		1.58 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		1.0 A
Maximum output power		36 W
Heat dissipation		
Fan module		Built-in fan module, cannot be removed.
Number of fans		1
Air flow (hot air flow, viewed facing the rear panel)		Left-to-right air flow
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		8 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		None
Environment specifications[c]		
System reliability	MTBF (year)	19.06
	MTTR (hour)	1
Short term[d] operating temperature		-5°C to 55°C
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing
Altitude		5,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term.	

2.1.7 USG6306/6308/6330/6350/6360

The USG6306/6308/6330/6350/6360 has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disk, and expansion cards, are supported.

2.1.7.1 Device Overview

The USG6306/6308/6330/6350/6360 uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disk, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-26 illustrates the appearance of the USG6306/6308/6330/6350/6360.

Figure 2-26 Appearance of USG6306/6308/6330/6350/6360

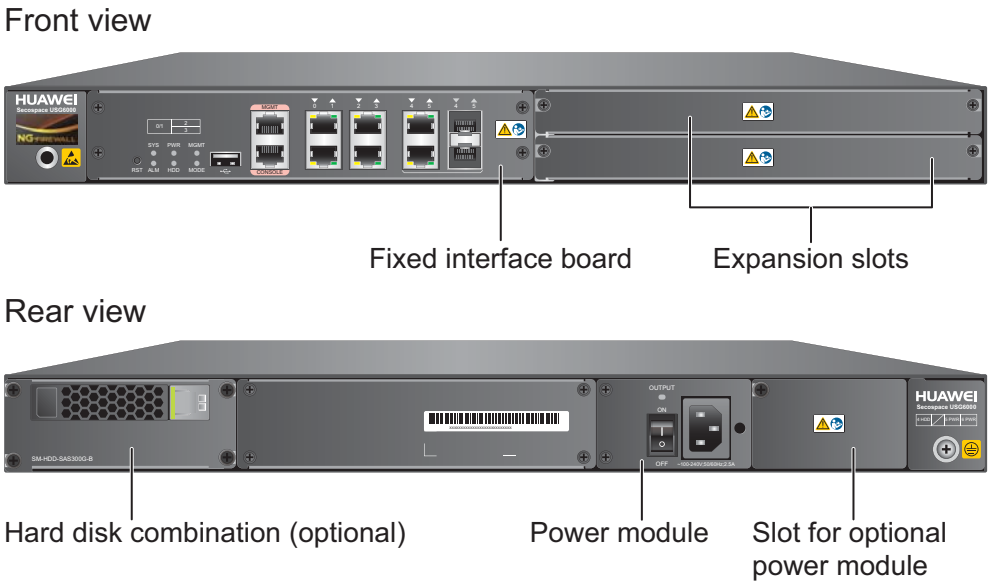


Table 2-19 describes the functions of the USG6306/6308/6330/6350/6360 components.

Table 2-19 Functions of the USG6306/6308/6330/6350/6360 components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. Table 2-20 lists the supported expansion cards.
Power module	Build-in 150 W power module is provided by default, but you can optionally add a 170 W power module for 1+1 power redundancy. If two power modules are used and PWR6 power module fails, the other can support the entire system so that you can replace the PWR6 faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)

- 1 USB 2.0 ports
- 2 GE Combo ports
- 4 10/100/1000M autosensing Ethernet electrical ports

Table 2-20 lists the supported types of expansion cards.

Table 2-20 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

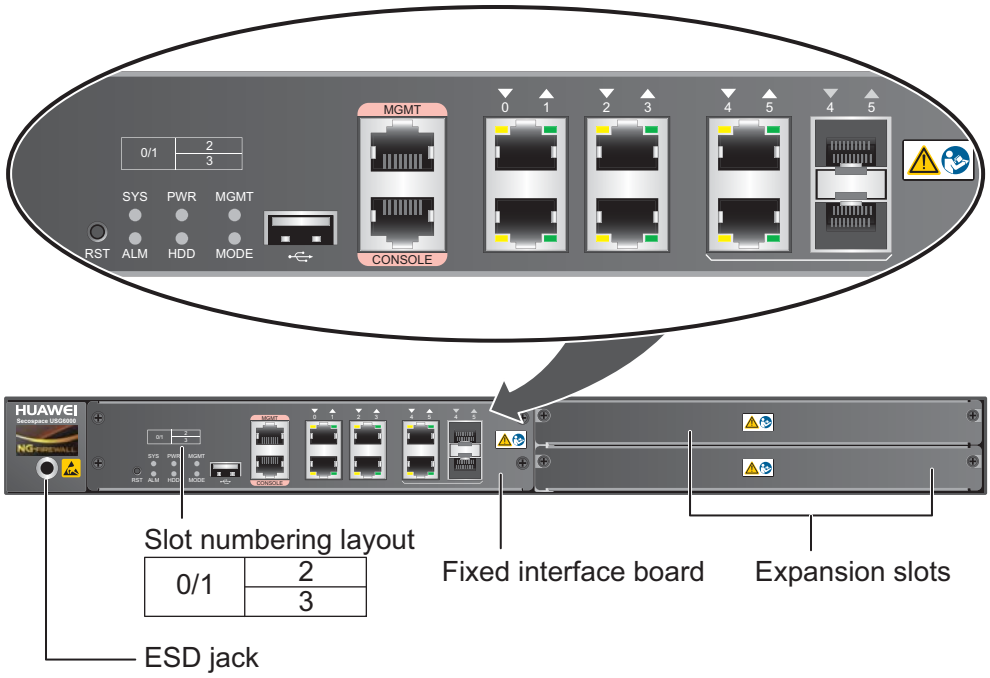
WSIC: Wide Service Interface Card

2.1.7.2 Front Panel

The front panel of the USG6306/6308/6330/6350/6360 provides fixed ports, ESD jack, and expansion slots.

Figure 2-27 illustrates the front panel of the USG6306/6308/6330/6350/6360.

Figure 2-27 USG6306/6308/6330/6350/6360 Front Panel

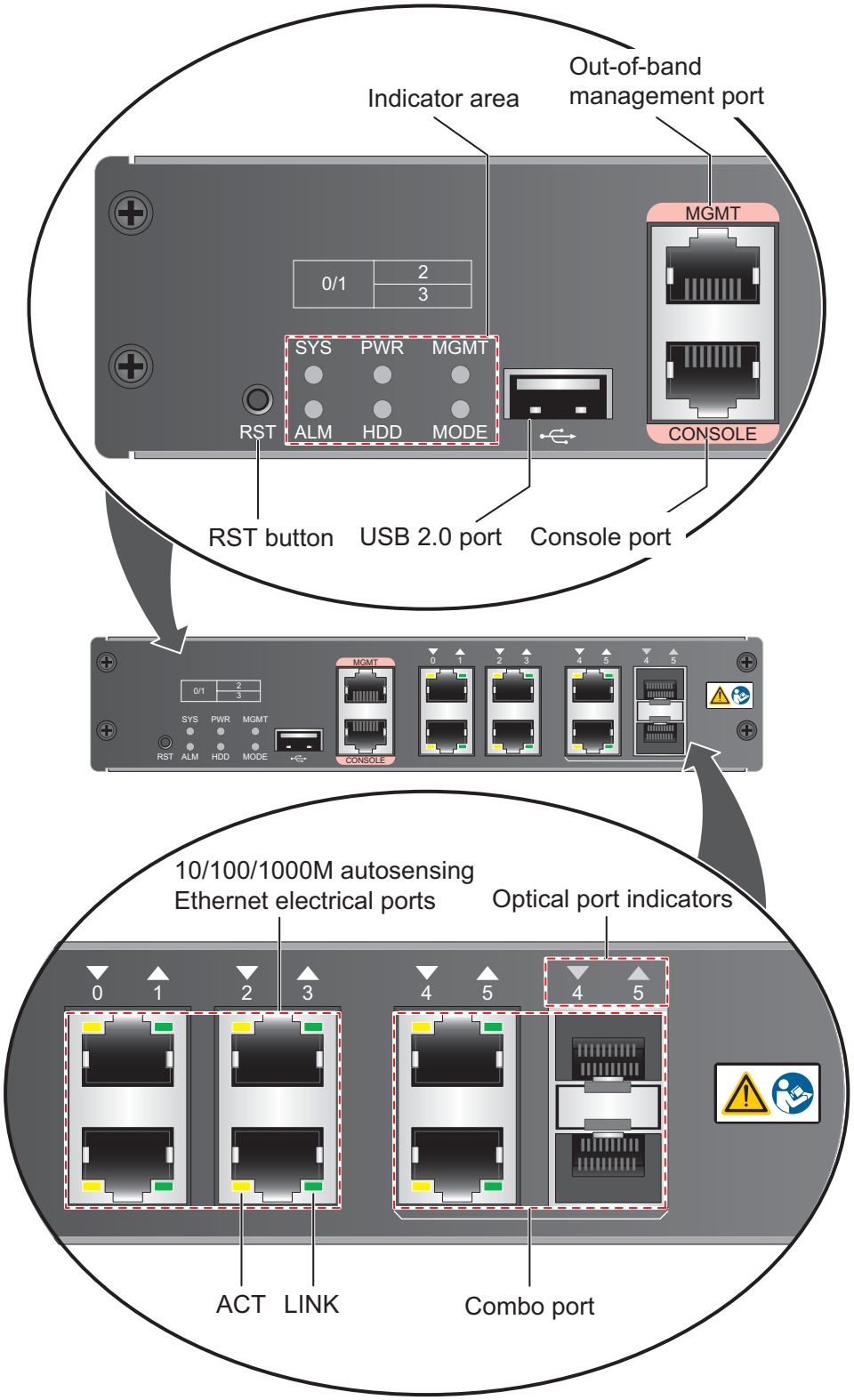


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed interface board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed interface board

Figure 2-28 illustrates the fixed interface board panel of the USG6306/6308/6330/6350/6360.

Figure 2-28 Fixed interface board panel of the USG6306/6308/6330/6350/6360



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
0 to 3 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/3.
4 to 5 (RJ45 + SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Combo ports. Combo ports are logic ports. One combo port can work as a GE electrical interface or a GE optical port. Each combo port has only one internal forwarding port. When the electrical port is enabled, the optical port is disabled. When the optical port is enabled, the electrical port is disabled. The electrical and optical ports of a combo port use the same interface view, numbered from GigabitEthernet 1/0/4 to GigabitEthernet 1/0/5. By default, the combo port is used as an electical port. You can use the **combo enable** { **copper** | **fiber** } command to set the working mode of combo ports according to network requirements. Each optical port supports a **Megabit Optical Transceiver** or a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 4 to 5 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

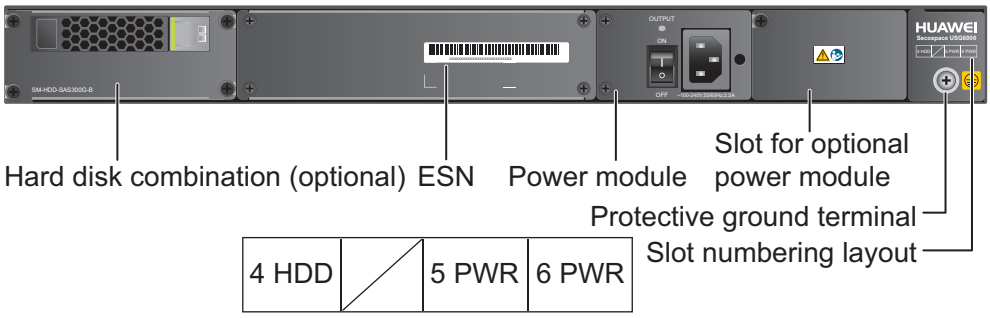
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.1.7.3 Rear Panel

The rear panel of the USG6306/6308/6330/6350/6360 provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-29 illustrates the rear panel of the USG6306/6308/6330/6350/6360.

Figure 2-29 USG6306/6308/6330/6350/6360 rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. PWR5 is the standard power module, which is built-in and not pluggable. An optional PWR6 power module is supported to provide 1+1 power redundancy. When PWR5 is working, PWR6 is hot-swappable. For details, see **2.1.7.4 Power Supply System**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

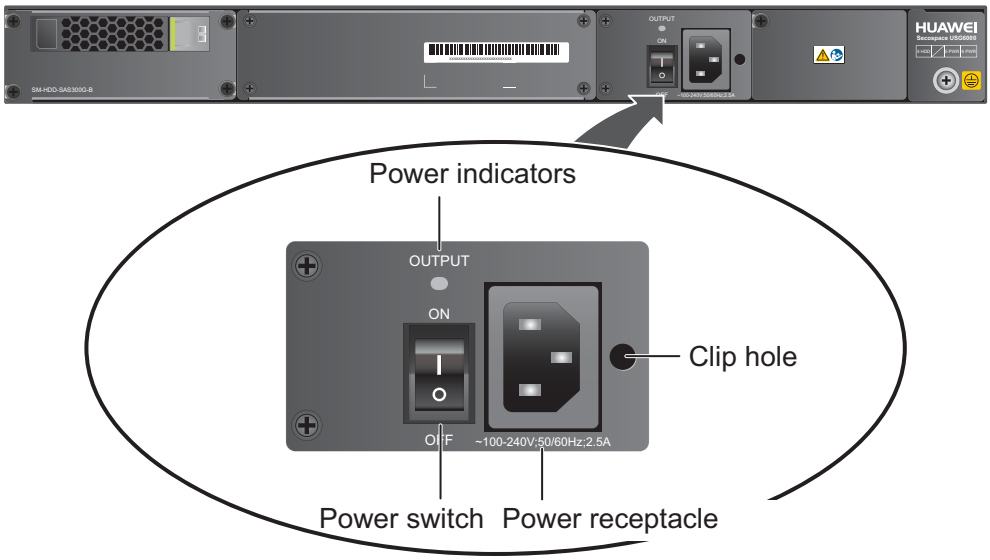
2.1.7.4 Power Supply System

By default, the USG6306/6308/6330/6350/6360 has a built-in 150W AC power module, but you can optionally add a 170W power module for 1+1 power redundancy.

150W AC Power Module

The 150W AC power module converts AC power to DC power for the device. The power module is built-in and cannot be removed. **Figure 2-30** illustrates the appearance of the AC power module.

Figure 2-30 Appearance of the 150W AC power module



Name	Description
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-21 lists the functions of the 150W AC power module.

Table 2-21 Functions of the 150W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.

Item	Description
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	Not Supported.

Table 2-22 lists the technical specifications of the 150W AC power module.

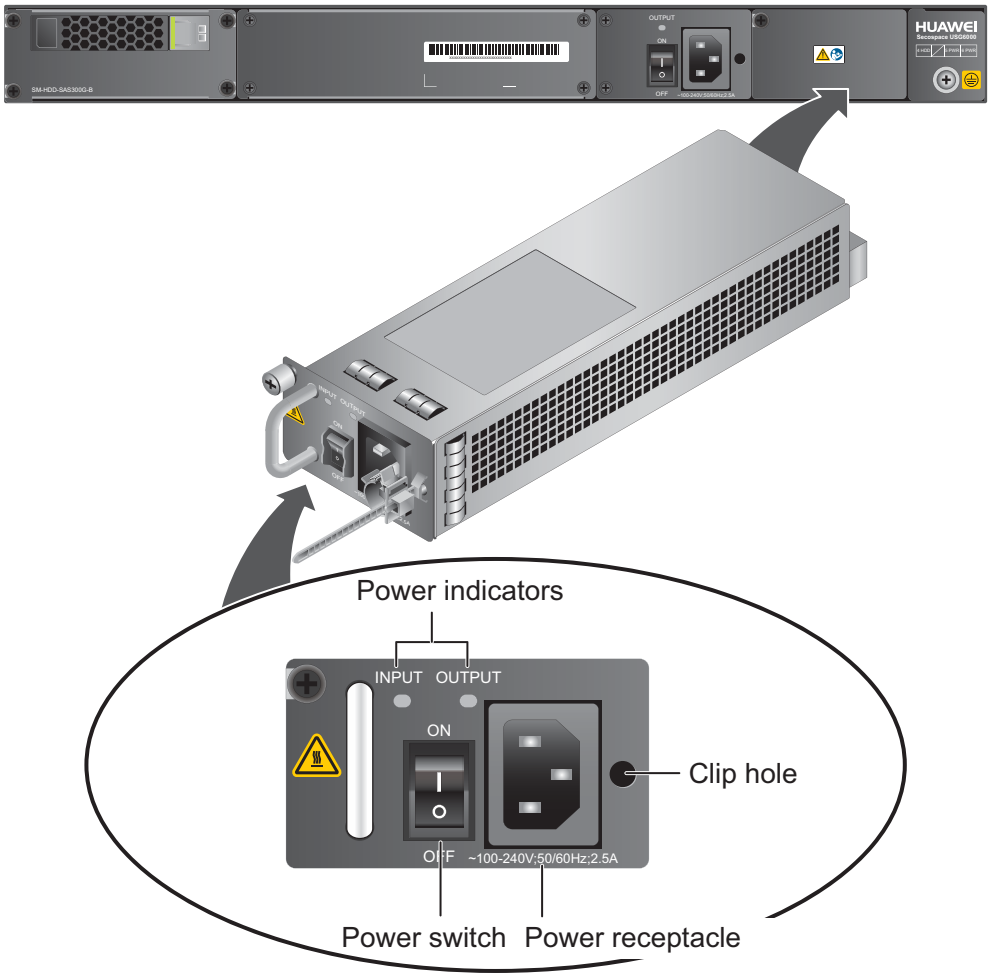
Table 2-22 Technical specifications of the 150W AC power module

Item	Description
Form	Built-in module
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	12.5 A
Maximum output power	150 W

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-31** illustrates the appearance of the AC power module.

Figure 2-31 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.

Name	Description
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-23 lists the functions of the 170W AC power module.

Table 2-23 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a 170W power module without interrupting device operation.

Table 2-24 lists the technical specifications of the 170W AC power module.

Table 2-24 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg

Item	Description
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

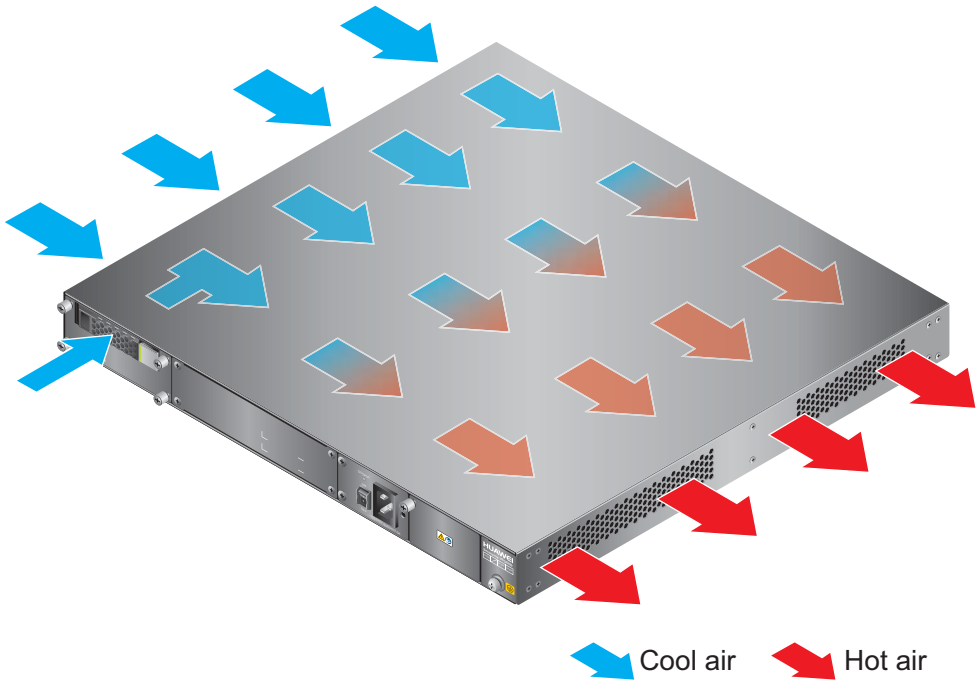
2.1.7.5 Heat Dissipation System

The USG6306/6308/6330/6350/6360 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-32 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-32 System air flow



2.1.7.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6306/6308/6330/6350/6360.

Table 2-25 lists the technical specifications of the USG6306/6308/6330/6350/6360.

Table 2-25 USG6306/6308/6330/6350/6360 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 4 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm

Item		Description
Weight		Standard: 6 kg Fully configured: 8 kg
Power specifications		
AC power		Supported; 150 W built-in power module (default) and 170 W hotswappable power module (optional)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)		2.5 A
DC power		Not supported.
Maximum output power		150 W (default) or 170 W (optional)
Heat dissipation		
Fan module		Built-in fan module, cannot be removed.
Number of fans		3
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		● 2 GE Combo ports ● 4 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	11.58
	MTTR (hour)	1

Item		Description
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

NOTE

- a. The width does not include the size of mounting ears.
- b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.
- d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term.
- e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.

2.1.8 USG6370/6380/6390

The USG6370/6380/6390 has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disk, and expansion cards, are supported.

2.1.8.1 Device Overview

The USG6370/6380/6390 uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disk, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-33 illustrates the appearance of the USG6370/6380/6390.

Figure 2-33 Appearance of USG6370/6380/6390

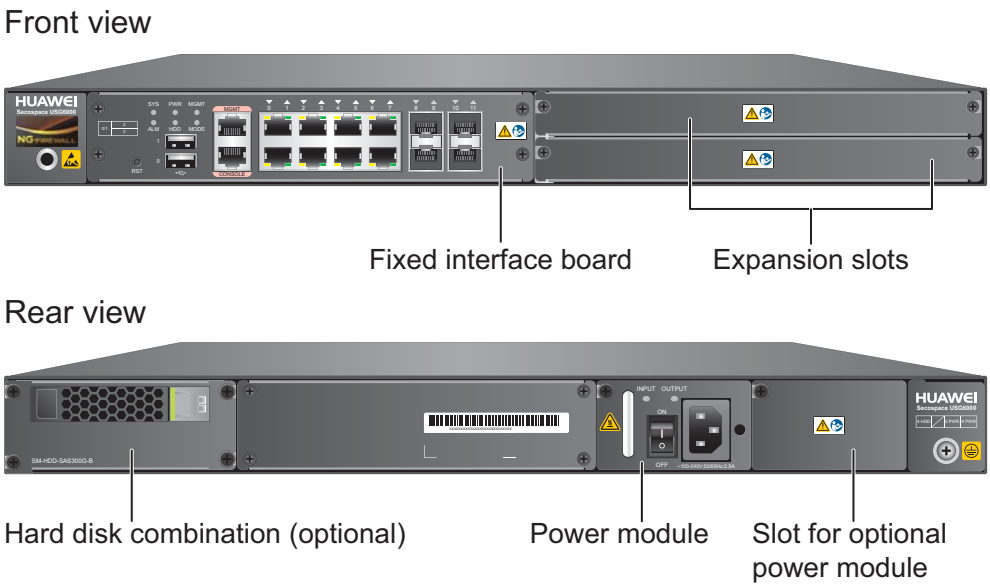


Table 2-26 describes the functions of the USG6370/6380/6390 components.

Table 2-26 Functions of the USG6370/6380/6390 components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-27** lists the supported expansion cards.
Power module	By default, AC power module is provided. Two power modules are supported to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 2 USB 2.0 ports
- 4 GE optical ports
- 8 10/100/1000M autosensing Ethernet electrical ports

Table 2-27 lists the supported types of expansion cards.

Table 2-27 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

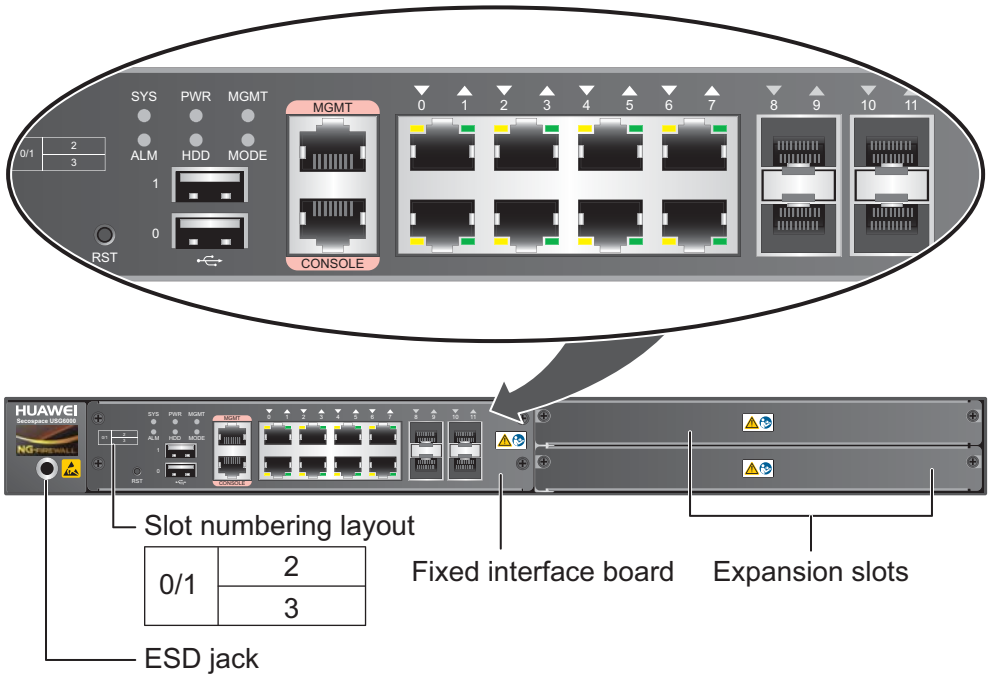
WSIC: Wide Service Interface Card

2.1.8.2 Front Panel

The front panel of the USG6370/6380/6390 provides fixed ports, ESD jack, and expansion slots.

The front panel of the USG6370/6380/6390 is pictured in **Figure 2-34**.

Figure 2-34 USG6370/6380/6390 front panel

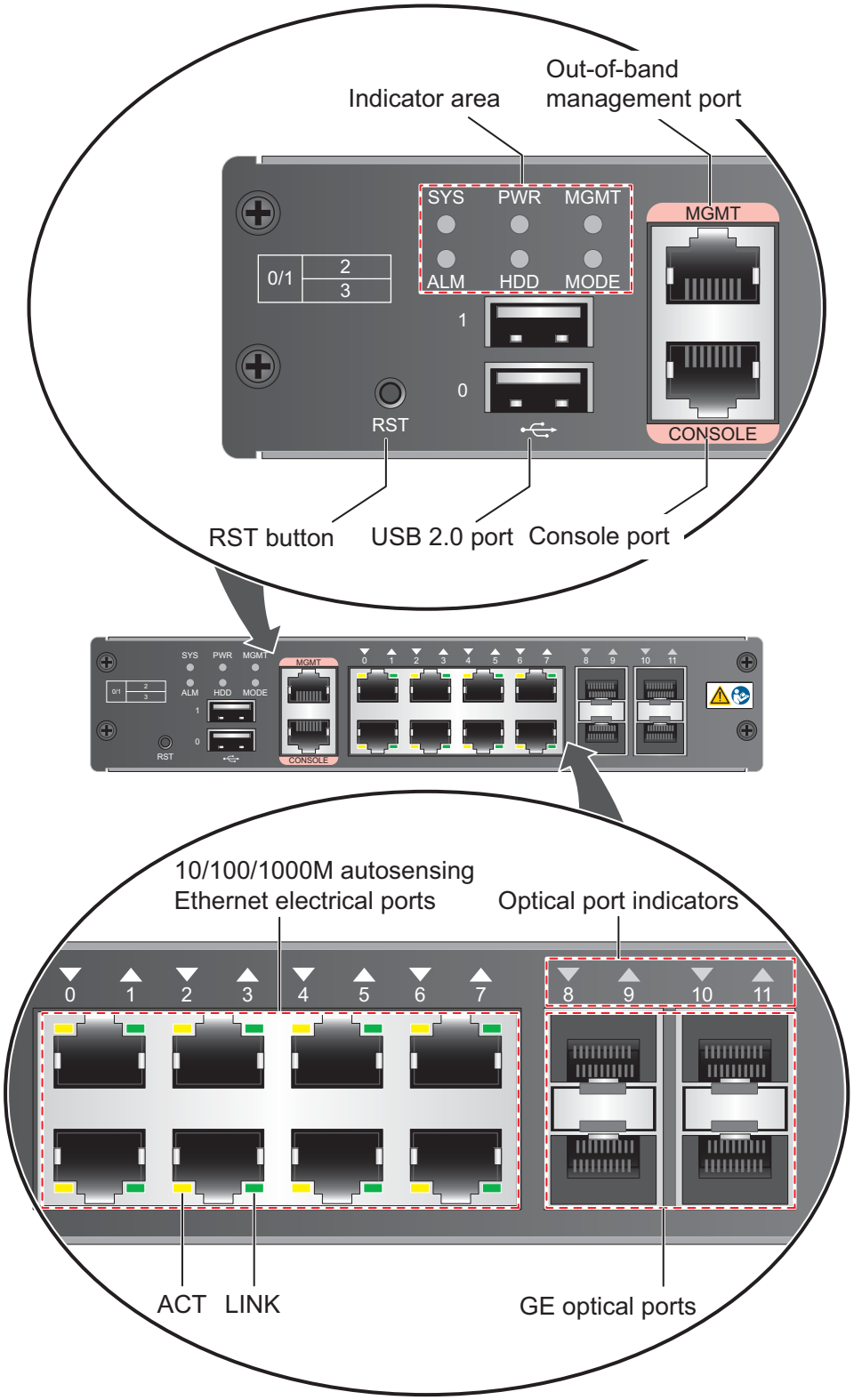


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed interface board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed interface board

Figure 2-35 illustrates the fixed interface board panel of the USG6370/6380/6390.

Figure 2-35 Fixed interface board panel of the USG6370/6380/6390



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB0 and USB1 ports	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
0 to 7 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are eight 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/7.
8 to 11 (SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four GE optical ports numbered from GigabitEthernet 1/0/8 to GigabitEthernet 1/0/11. Each port requires a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 8 to 11 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

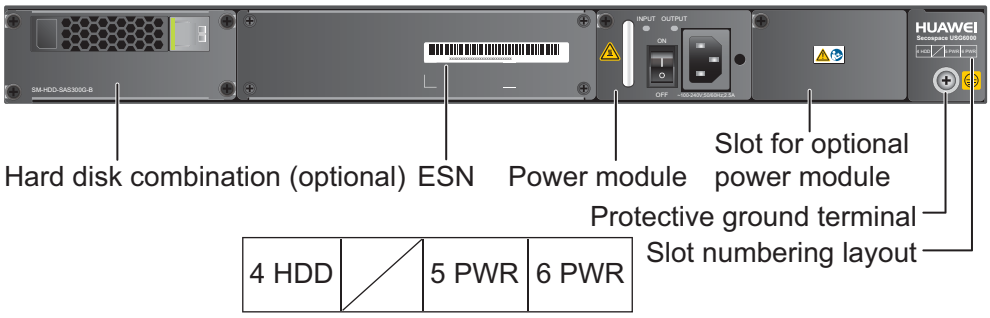
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.1.8.3 Rear Panel

The rear panel of the USG6370/6380/6390 provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-36 illustrates the rear panel of the USG6370/6380/6390.

Figure 2-36 USG6370/6380/6390 rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. One power module is provided by default, but two power modules are supported to provide 1+1 power redundancy. If two power modules are used and one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.1.8.4 Power Supply System**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

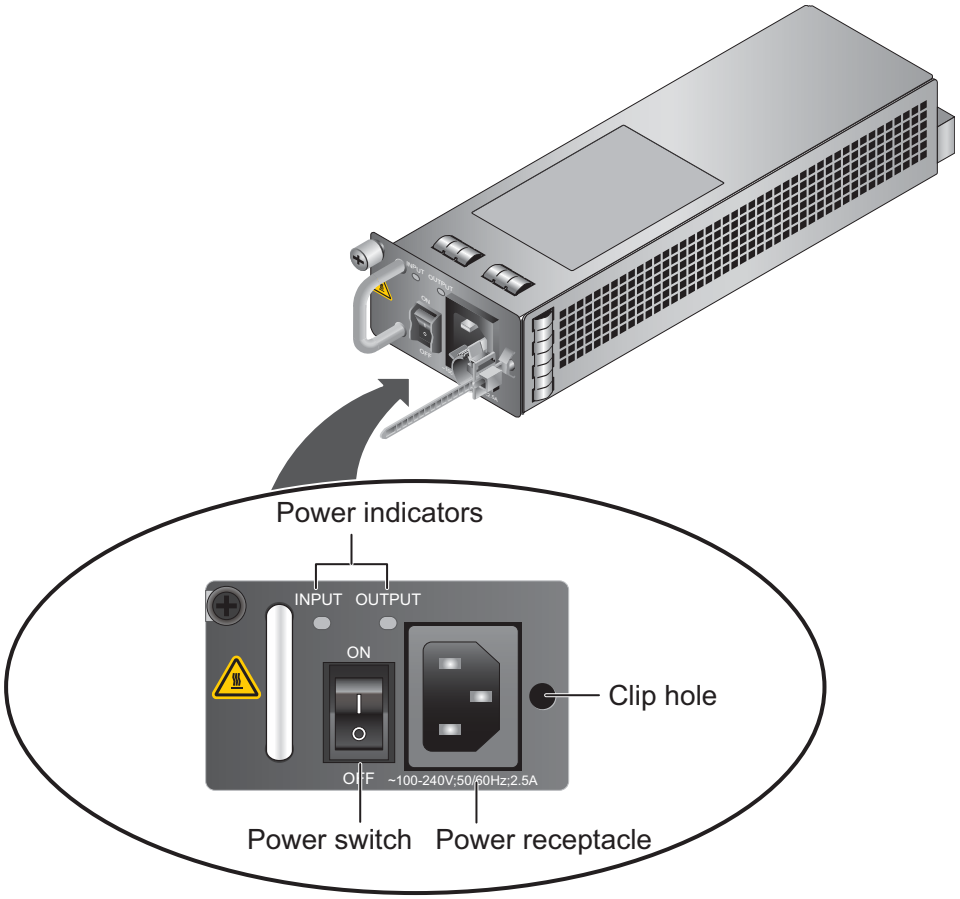
2.1.8.4 Power Supply System

By default, the USG6370/6380/6390 has a 170W AC power module, but two power modules are supported for 1+1 power redundancy.

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-37** illustrates the appearance of the AC power module.

Figure 2-37 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-28 lists the functions of the 170W AC power module.

Table 2-28 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-29 lists the technical specifications of the 170W AC power module.

Table 2-29 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	

Item	Description
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

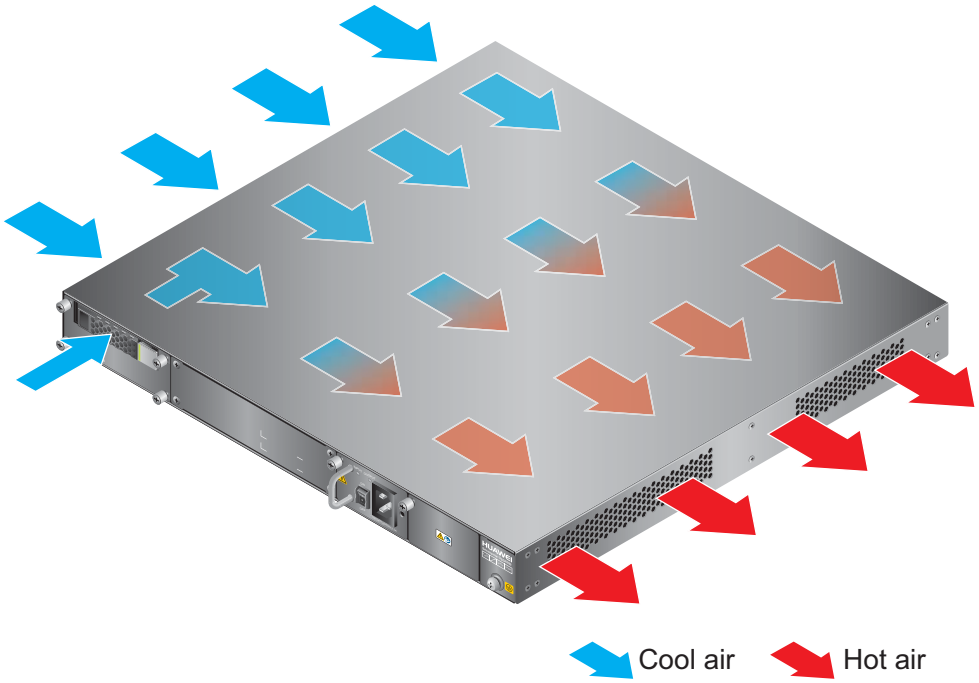
2.1.8.5 Heat Dissipation System

The USG6370/6380/6390 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-38 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-38 System air flow



2.1.8.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6370/6380/6390.

Table 2-30 lists the technical specifications of the USG6370/6380/6390.

Table 2-30 USG6370/6380/6390 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.1 GHz processor
Memory	DDR3 4 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm
Weight	Standard: 6 kg Fully configured: 8.6 kg
Power specifications	
AC power	Supported. By default, one power module is provided, but two power modules are supported. If two power modules are used and one module fails, you can hot-swap the faulty power module.
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	2.5 A
DC power	Not supported.
Maximum output power	170 W
Heat dissipation	
Fan module	Built-in fan module, cannot be removed.
Number of fans	5
Air flow (hot air flow, viewed facing the rear panel)	Intake on the front and left sides, exhaust on the right side

Item		Description
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		2
Mandatory service ports		● 4 GE optical ports ● 8 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	11.96
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.1.9 USG6390E

The USG6390E has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disks, and expansion cards, are supported.

2.1.9.1 Device Overview

The USG6390E uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disks, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-39 illustrates the appearance of the USG6390E.

Figure 2-39 Appearance of USG6390E

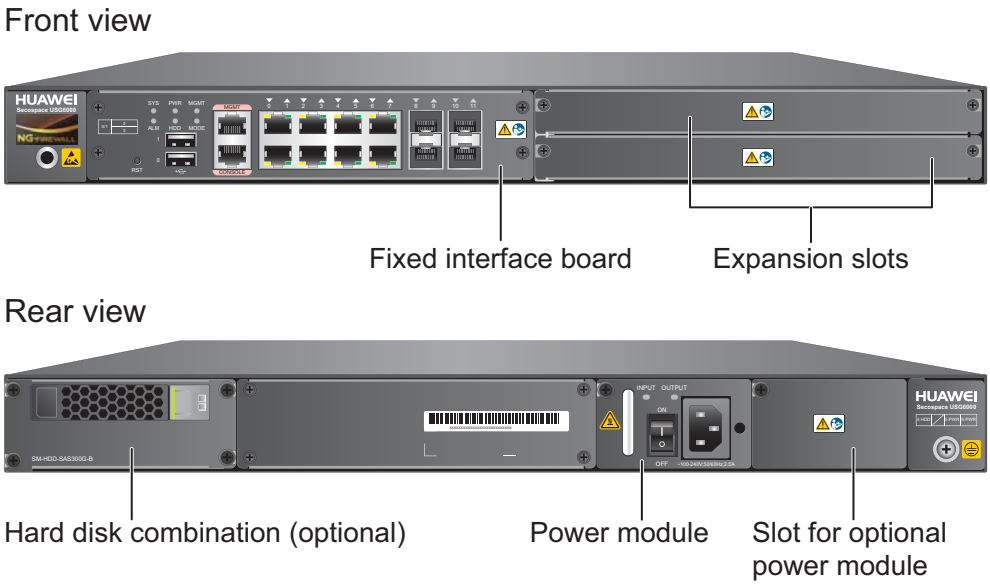


Table 2-31 describes the functions of the USG6390E components.

Table 2-31 Functions of the USG6390E components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. Table 2-32 lists the supported expansion cards.
Power module	By default, AC power module is provided. Two power modules are supported to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 2 USB 2.0 ports

- 4 GE optical ports
- 8 10/100/1000M autosensing Ethernet electrical ports

Table 2-32 lists the supported types of expansion cards.

Table 2-32 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

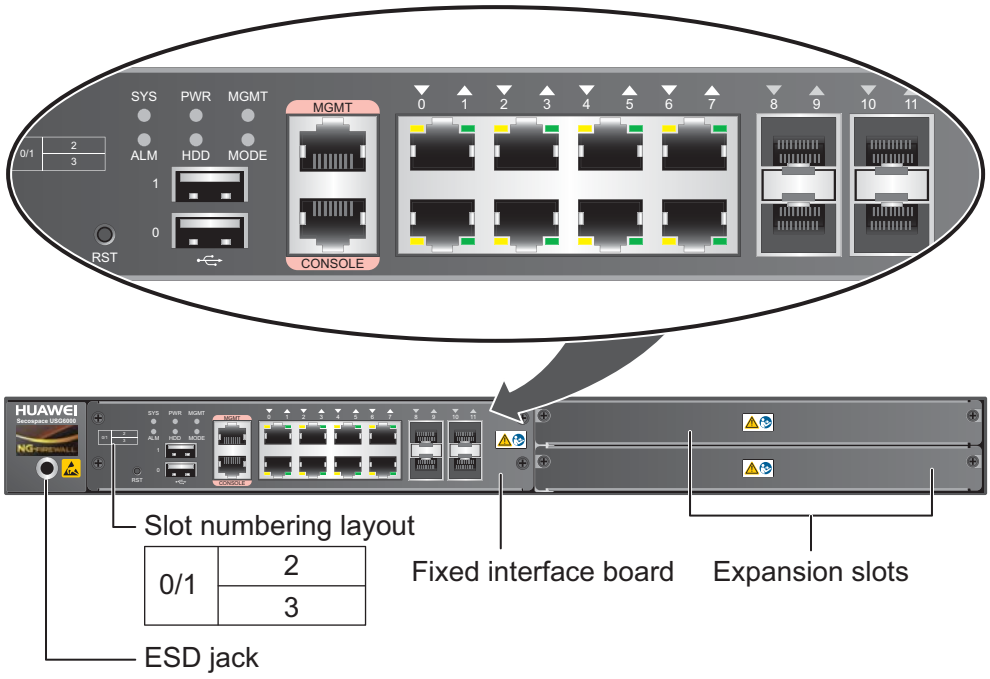
WSIC: Wide Service Interface Card

2.1.9.2 Front Panel

The front panel of the USG6390E provides fixed ports, ESD jack, and expansion slots.

The front panel of the USG6390E is pictured in Figure 2-40.

Figure 2-40 USG6390E front panel

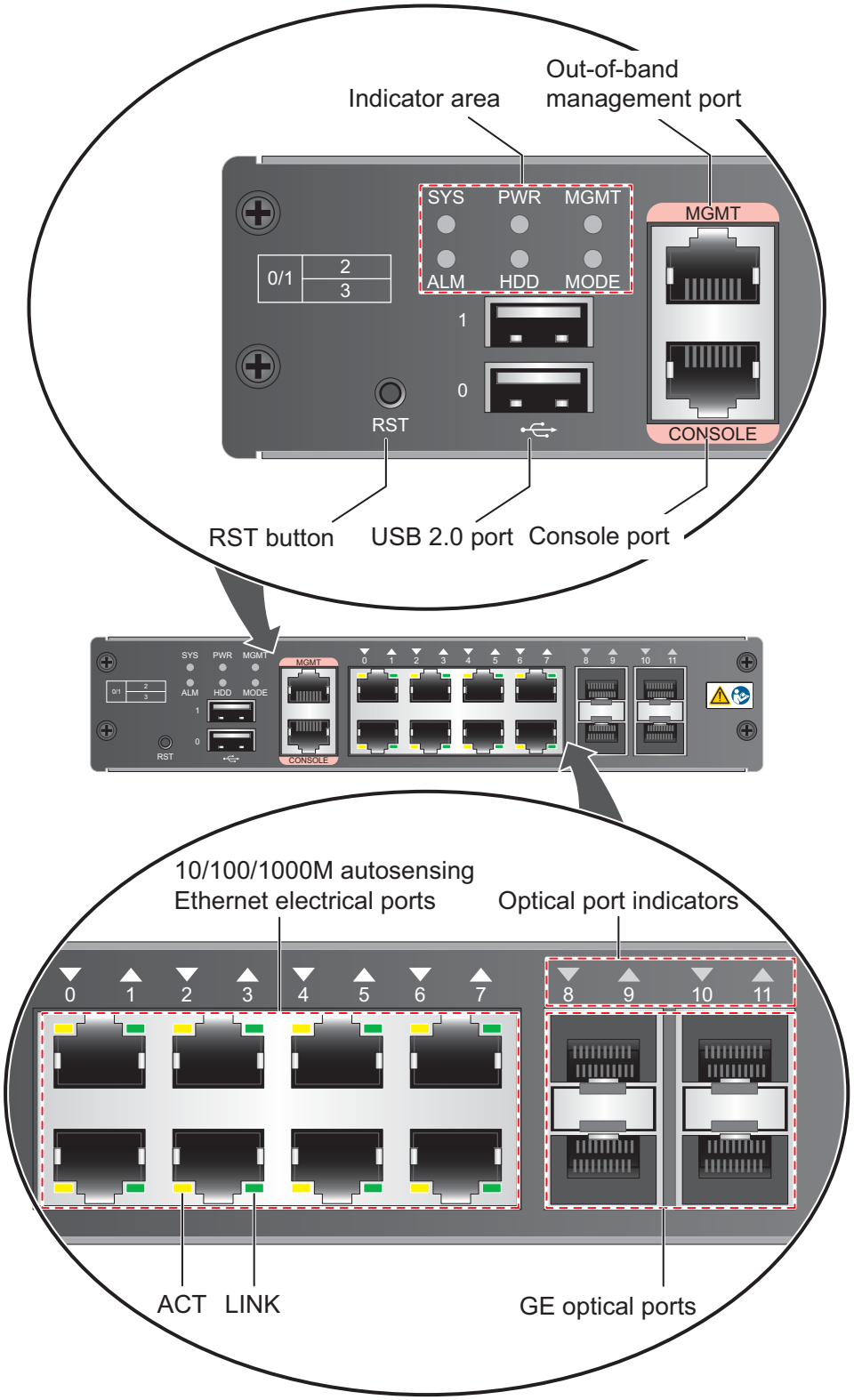


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed interface board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed interface board

Figure 2-41 illustrates the fixed interface board panel of the USG6390E.

Figure 2-41 Fixed interface board panel of the USG6390E



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB0 and USB1 ports	USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device.
0 to 7 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are eight 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/7.
8 to 11 (SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four GE optical ports numbered from GigabitEthernet 1/0/8 to GigabitEthernet 1/0/11. Each port requires a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 8 to 11 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

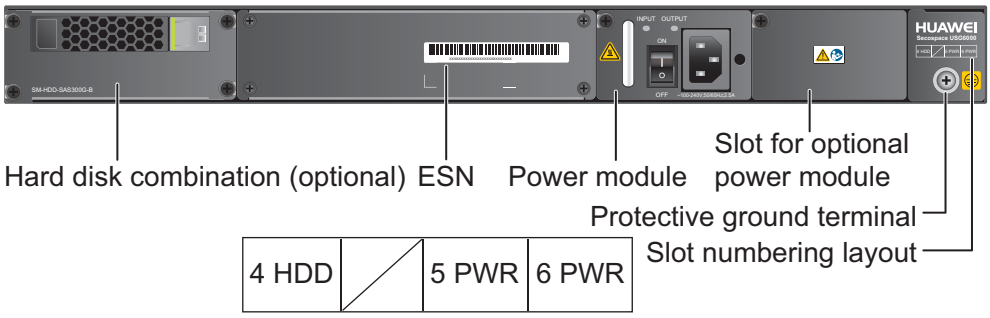
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.1.9.3 Rear Panel

The rear panel of the USG6390E provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-42 illustrates the rear panel of the USG6390E.

Figure 2-42 USG6390E rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. One power module is provided by default, but two power modules are supported to provide 1+1 power redundancy. If two power modules are used and one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.1.9.3 Rear Panel**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

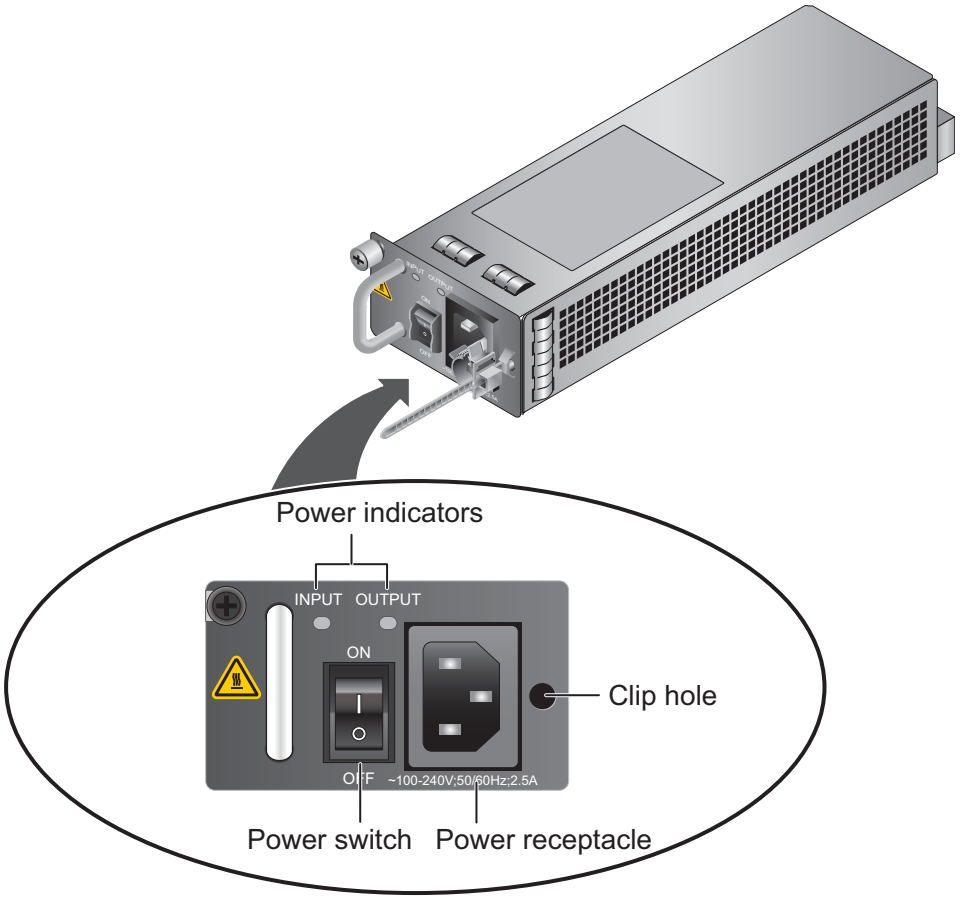
2.1.9.4 Power Supply System

By default, the USG6390E has a 170W AC power module, but two power modules are supported for 1+1 power redundancy.

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-43** illustrates the appearance of the AC power module.

Figure 2-43 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-33 lists the functions of the 170W AC power module.

Table 2-33 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-34 lists the technical specifications of the 170W AC power module.

Table 2-34 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	

Item	Description
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

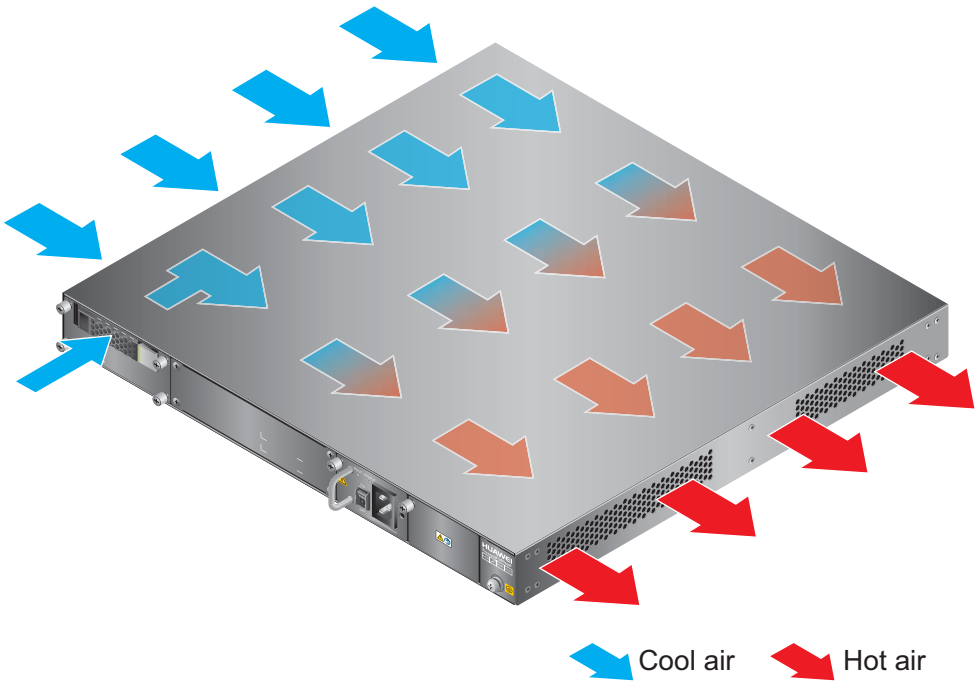
2.1.9.5 Heat Dissipation System

The USG6390E has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-44 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-44 System air flow



2.1.9.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6390E.

Table 2-35 lists the technical specifications of the USG6390E.

Table 2-35 USG6390E Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 8 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Not supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm
Weight	Standard: 6 kg Fully configured: 8.7 kg
Power specifications	
AC power	Supported. By default, one power module is provided. If two power modules are used and one module fails, you can hot-swap the faulty power module.
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	2.5 A
DC power	Not supported.
Maximum output power	170 W
Heat dissipation	
Fan module	Built-in fan module, cannot be removed.
Number of fans	5

Item		Description
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		2
Mandatory service ports		● 4 GE optical ports ● 8 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	10.08
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.2 USG6500 Product Series

The USG6500 product series includes USG6510/6510-WL/6507/6530/6550/6570. These models are 1 U devices with an integrated structure and fit into a 19-inch standard cabinet. A larger model number indicates a higher performance.

2.2.1 USG6510

The USG6510 is a 1-U desktop device that provides fixed ports and does not support expansion.

2.2.1.1 Device Overview

The USG6510 is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, and uses an external power adapter to supply power. The device does not support port expansion.

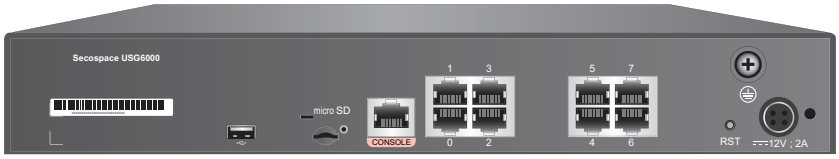
Appearance

Figure 2-45 illustrates the appearance of the USG6510.

Figure 2-45 Appearance of USG6510

Front view

Rear view



Ports

The USG6510 provides the following fixed ports:

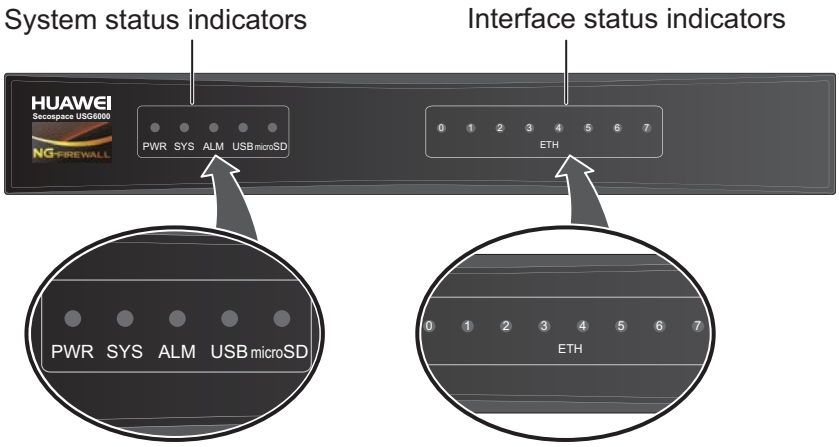
- 1 console port (RJ45)
- 1 USB 2.0 port
- 1 micro SD card slot
- 8 10/100/1000M autosensing Ethernet electrical ports

2.2.1.2 Front Panel

The USG6510 front panel provides system and port status indicators.

Figure 2-46 illustrates the front panel of the USG6510.

Figure 2-46 USG6510 front panel



Name	Description
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

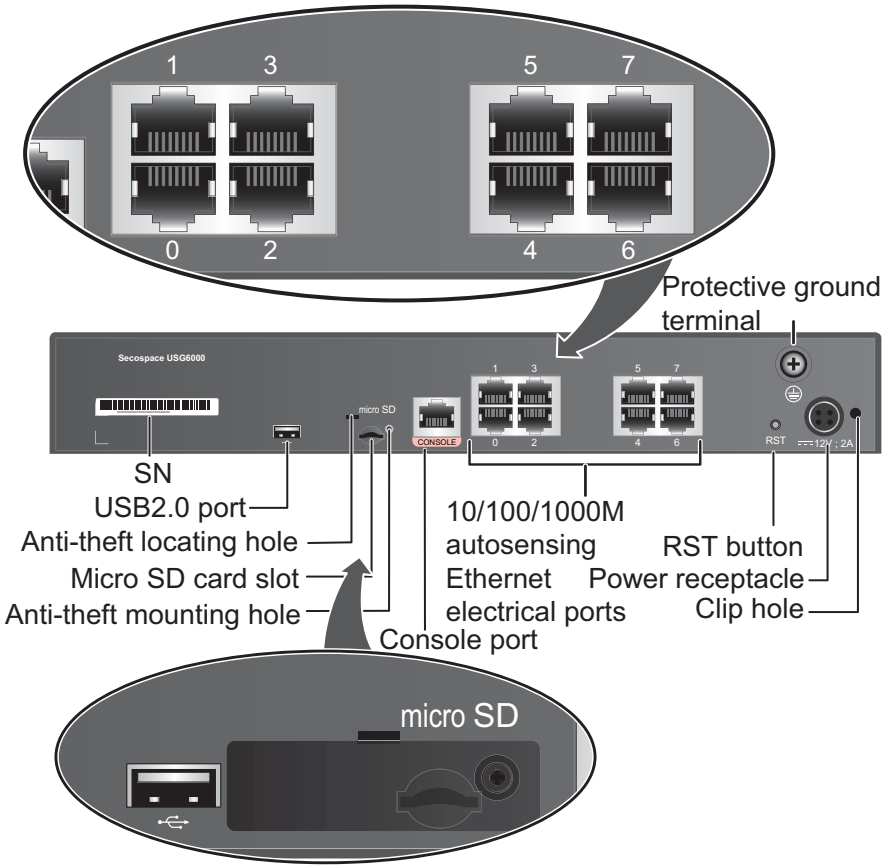
Name	Description
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.

2.2.1.3 Rear Panel

The rear panel of the USG6510 provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-47 illustrates the rear panel of the USG6510.

Figure 2-47 USG6510 rear panel



Name	Description
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.2.1.4 Power Supply System

The USG6510 does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-48** illustrates the appearance of the power adapter.

Figure 2-48 Appearance of the 24W power adapter

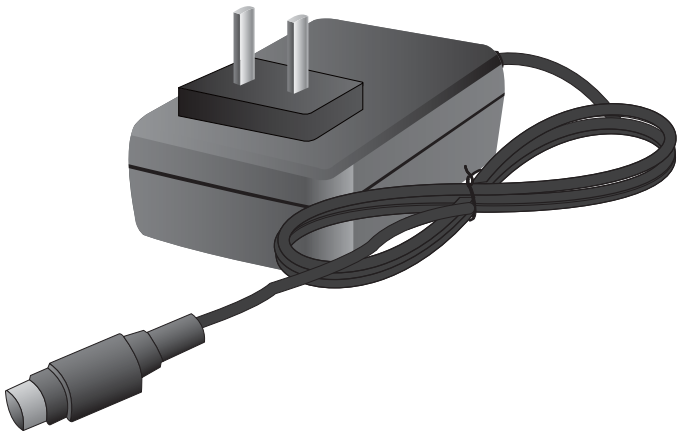


Table 2-36 lists the functions of the 24W power adapter.

Table 2-36 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-37 lists the technical specifications of the 24W power adapter.

Table 2-37 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm

Item	Description
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.2.1.5 Heat Dissipation System

The USG6510 does not have fans and uses natural cooling.

2.2.1.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6510.

Table 2-38 lists the technical specifications of the USG6510.

Table 2-38 USG6510 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported

Item		Description
4G LTE Data Card		Supported
Dimensions and weight		
Dimensions (H[b] x W[a] x D)		44 mm x 300 mm x 220 mm
Weight		1.55 kg
Power specifications		
AC power		Supported (external AC power adapter)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current		0.8 A
Maximum output power		24 W
Heat dissipation		
Fan module		Has no fan and uses natural cooling.
Port density		
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		8 10/100/1000M autosensing Ethernet electrical ports
Micro SD card slot		1
Expansion slot		None
Environment specifications[c]		
System reliability	MTBF (year)	14.08
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing
Altitude		5,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.2.2 USG6510-WL

The USG6510-WL is a 1-U desktop device that provides fixed ports, supports LTE uplink connection and WLAN access, and does not support expansion.

2.2.2.1 Device Overview

The USG6510-WL is a 1-U desktop device with an integrated structure. The device uses natural cooling, provides fixed ports, supports LTE uplink connection and WLAN access, and uses an external power adapter to supply power. The device does not support port expansion.

Appearance

Figure 2-49 illustrates the appearance of the USG6510-WL.

Figure 2-49 Appearance of USG6510-WL

Ports

The USG6510-WL provides the following fixed ports:

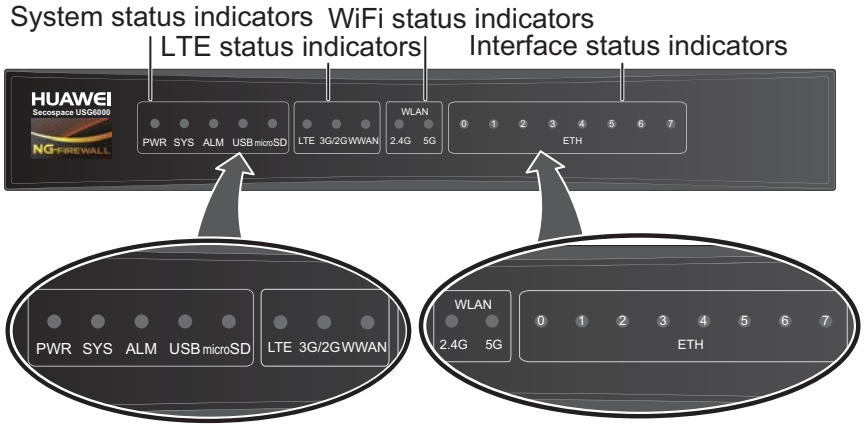
- 1 console port (RJ45)
- 1 USB 2.0 port
- 1 micro SD card slot
- 1 SIM card slot
- 2 WiFi antenna connectors (IEEE 802.11 a/b/g/n/ac)
- 2 LTE antenna connectors (4G FDD LTE/TDD LTE, 3G TD-SCDMA/WCDMA, and 2G GSM)
- 8 10/100/1000M autosensing Ethernet electrical ports

2.2.2.2 Front Panel

The USG6510-WL front panel provides system, LTE, WiFi and port status indicators.

Figure 2-50 illustrates the front panel of the USG6510-WL.

Figure 2-50 USG6510-WL front panel



Name	Description
Interface status indicators 0 to 7 (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected.
System status indicators	
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

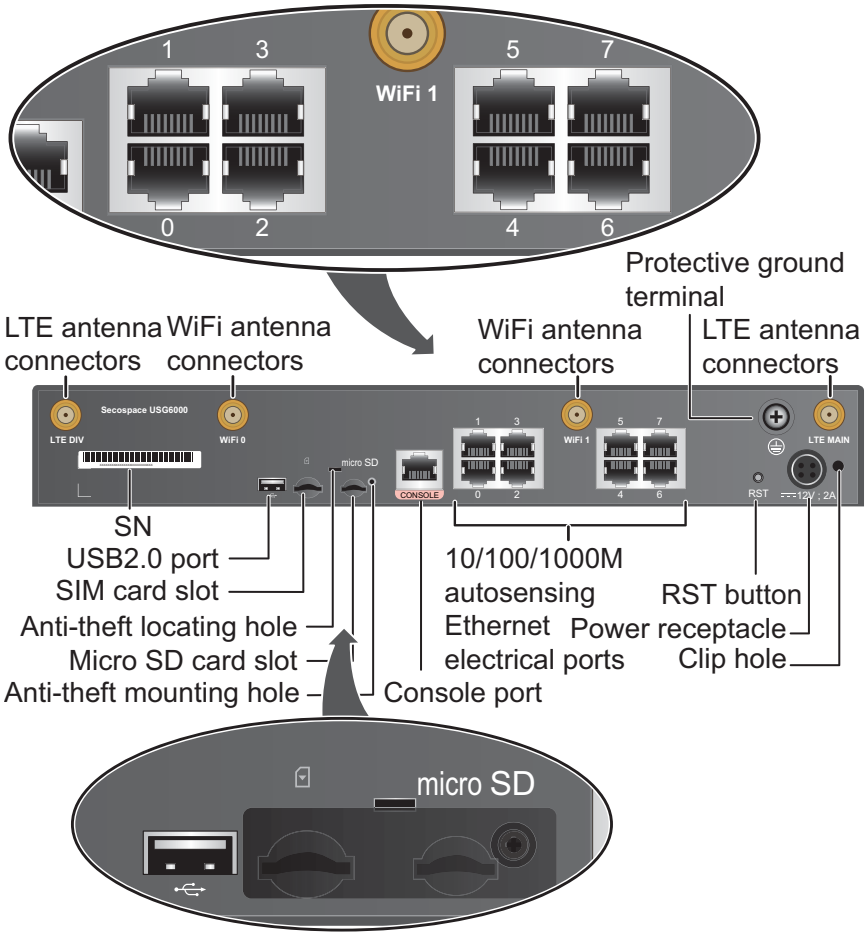
Name	Description
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally.
USB indicator (green)	● Steady on: The USB 2.0 port is connected. ● Off: The USB 2.0 port is disconnected.
Micro SD indicator (green)	● Steady on: The micro SD card is present. ● Off: The micro SD card is not detected.
LTE status indicators	
LTE indicator (green)	● Steady on: The signal strength of the LTE 4G link is high. ● Blink twice every second (2 Hz): The signal strength of the LTE 4G link is at middle range. ● Blink every two seconds (0.5 Hz): The signal strength of the LTE 4G link is low. ● Off: There is no LTE 4G signal.
3G/2G indicator (green)	● Steady on: The signal strength of the 3G/2G link is high. ● Blink twice every second (2 Hz): The signal strength of the 3G/2G link is at middle range. ● Blink every two seconds (0.5 Hz): The signal strength of the 3G/2G link is low. ● Off: There is no 3G/2G signal.
WWAN indicator (green)	● Steady on: The LTE 4G/3G/2G link is connected or activated. ● Blink twice every second (2 Hz): The LTE 4G/3G/2G network is accessed, and data is being transmitted. ● Off: The LTE 4G/3G/2G link is disconnected or is not activated.
WiFi status indicators	
WLAN 2.4G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connected. ● Blink every two seconds (0.5 Hz): A device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.
WLAN 5G indicator (green)	● Steady on: The channel is enabled, the SSID is allocated, but no device is connected. ● Blink every two seconds (0.5 Hz): A device is accessing WiFi. ● Blink twice every second (2 Hz): Data is being sent or received. ● Off: The channel is disabled, and the SSID is not allocated.

2.2.2.3 Rear Panel

The rear panel of the USG6510-WL provides fixed ports, a protective ground terminal, RST button, and power socket.

Figure 2-51 illustrates the rear panel of the USG6510-WL.

Figure 2-51 USG6510-WL rear panel



Name	Description
LTE antenna connector	LTE antenna connectors include a MAIN antenna connector and a DIV antenna connector. The antennas work together. ● The MAIN antenna transmits and receives LTE signals. ● The DIV antenna helps improve the quality of received LTE signals. The connectors connect to the LTE antennas to realize wireless access LTE network. For details, see **A.1.8 LTE Antenna**.
WiFi antenna connector	Connect to the WiFi antennas to realize wireless access WLAN network. For details, see **A.1.9 WiFi Antenna**.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

Name	Description
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
SIM card slot	The SIM card slot allows you to insert a standard SIM card. The slot supports such standards as 4G FDD LTE/TDD LTE, 3G TD-SCDMA/ WCDMA, and 2G GSM.
Micro SD card slot	The micro SD card slot allows you to insert a micro SD card to record logs and reports in real time. The micro SD card is optional. You can purchase one (BOM code: 06010308, model: SDSDQAE-064G, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm) from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
0 to 7 (RJ45)	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/7. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. Three to five seconds later, when the SYS and ALM indicators on the front panel are both blinking, release the RST button.
Power receptacle	Connects to the 4-pin plug of the power adapter.
Protective ground terminal	The M4 OT terminal connects the PGND cable to the ground point of the cabinet, workbench, or wall, or the ground bar in an equipment room.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

2.2.2.4 Power Supply System

The USG6510-WL does not have a built-in power module and requires an external 24W power adapter.

24W Power Adapter

The 24W power adapter converts AC power to DC power for the device. **Figure 2-52** illustrates the appearance of the power adapter.

Figure 2-52 Appearance of the 24W power adapter

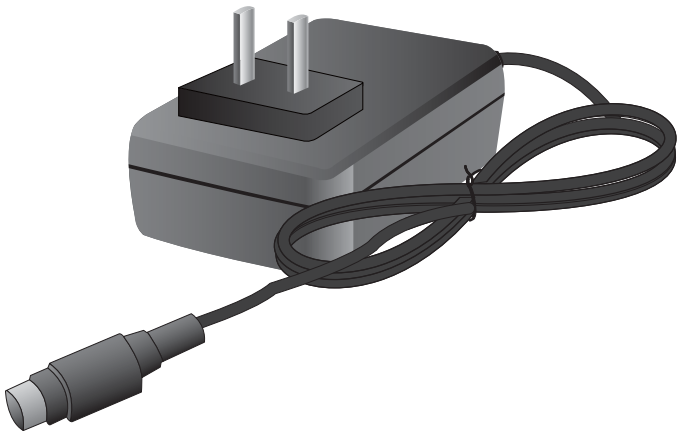


Table 2-39 lists the functions of the 24W power adapter.

Table 2-39 Functions of the 24W power adapter

Item	Description
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Heat dissipation	The power adapter does not have fans and uses natural cooling.

Table 2-40 lists the technical specifications of the 24W power adapter.

Table 2-40 Technical specifications of the 24W power adapter

Item	Description
Dimensions (H x W x D)	28 mm x 51 mm x 86 mm

Item	Description
Weight	0.15 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	0.8 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.4 V DC to 12.6 V DC
Maximum output current	2 A
Maximum output power	24 W

2.2.2.5 Heat Dissipation System

The USG6510-WL does not have fans and uses natural cooling.

2.2.2.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6510-WL.

Table 2-41 lists the technical specifications of the USG6510-WL.

Table 2-41 USG6510-WL Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 1 GB
Flash	32 MB
NAND Flash	512 MB
Micro SD card	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Hard disk	Not supported
SPUB (the service engine)	Not supported

Item	Description
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H[b] x W[a] x D)	44 mm x 300 mm x 220 mm
Weight	1.65 kg
Power specifications	
AC power	Supported (external AC power adapter)
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current	0.8 A
Maximum output power	24 W
Heat dissipation	
Fan module	Has no fan and uses natural cooling.
Port density	
Console port	1 (RJ45)
USB 2.0 port	1
Mandatory service ports	● 8 10/100/1000M autosensing Ethernet electrical ports ● 2 WiFi antenna connectors ● 2 LTE antenna connectors
Micro SD card slot	1
Expansion slot	None
WiFi access specifications	
Wireless standards	IEEE 802.11 a/b/g/n/ac
Wireless rate	300 Mbit/s
Frequency bands	● 2.412 GHz to 2.472 GHz ● 5.18 GHz to 5.825 GHz
Maximum transmit power[c]	● 2.4 GHz: 15 dBm ● 5 GHz: 20 dBm
LTE access specifications	

Item		Description
Standards and frequency bands		● FDD LTE: Band 1, Band 3, Band 8, all bands with diversity ● TDD LTE: Band 38, Band 39, Band 40, Band 41, all bands with diversity ● WCDMA: Band 1, Band 5, Band 8, Band 9, all bands with diversity ● TD-SCDMA: Band 34, Band 39 ● GSM/GRPS/EDGE: 1800 MHz/900 MHz
Rate		● FDD LTE: uplink rate of 50 Mbit/s and downlink rate of 150 Mbit/s @20M BW cat4 ● TDD LTE: uplink rate of 10 Mbit/s and downlink rate of 112 Mbit/s @20M BW cat4 ● WCDMA CS: uplink rate of 64 kbit/s and downlink rate of 64 kbit/s ● WCDMA PS: uplink rate of 384 kbit/s and downlink rate of 384 kbit/s ● HSPA+: uplink rate of 5.76 Mbit/s and downlink rate of 21.6 Mbit/s ● DC-HSPA+: uplink rate of 5.76 Mbit/s and downlink rate of 42 Mbit/s ● TD-HSPA: uplink rate of 2.2 Mbit/s and downlink rate of 2.8 Mbit/s ● TD-SCDMA PS: uplink rate of 384 kbit/s and downlink rate of 2.8 Mbit/s ● GRPS: uplink rate of 85.6 kbit/s and downlink rate of 85.6 kbit/s ● EDGE: uplink rate of 236.8 kbit/s and downlink rate of 236.8 kbit/s
Environment specifications[d]		
System reliability	MTBF (year)	12.75
	MTTR (hour)	1
Long term operating temperature		0°C to 45°C
Storage temperature		-40°C to 70°C
Operating relative humidity		5% RH to 95% RH, non-condensing
Storage relative humidity		5% RH to 95% RH, non-condensing
Altitude		5,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. The actual transmit power depends on local laws and regulations. ● d. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.	

2.2.3 USG6507/6530

The USG6507/6530 has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disks, and expansion cards, are supported.

2.2.3.1 Device Overview

The USG6507/6530 uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disk, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-53 illustrates the appearance of the USG6507/6530.

Figure 2-53 Appearance of USG6507/6530

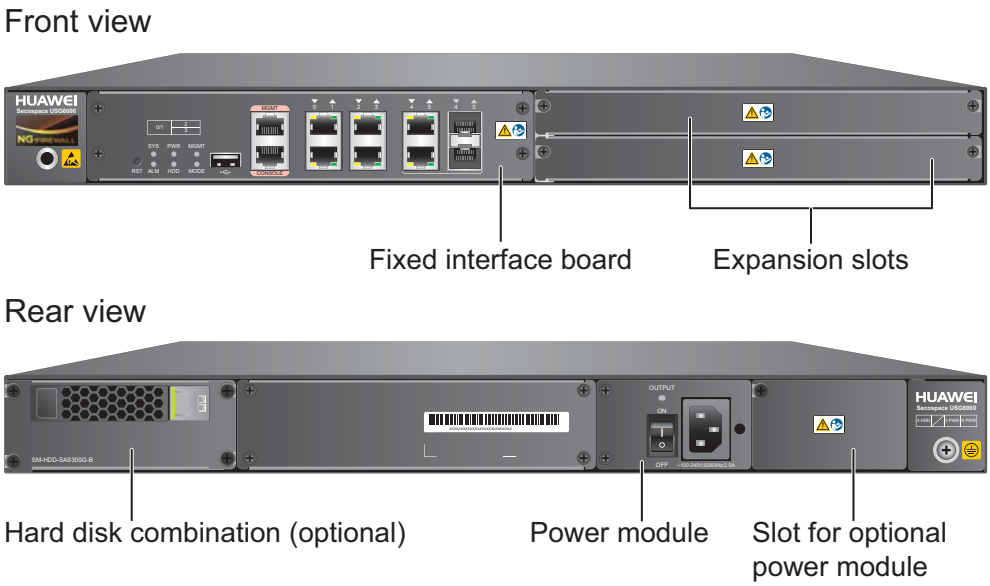


Table 2-42 describes the functions of the USG6507/6530 components.

Table 2-42 Functions of the USG6306/6308/6330/6350/6360 components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-43** lists the supported expansion cards.
Power module	Build-in 150 W power module is provided by default, but you can optionally add a 170 W power module for 1+1 power redundancy. If two power modules are used and PWR6 power module fails, the other can support the entire system so that you can replace the PWR6 faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 1 USB 2.0 ports
- 2 GE Combo ports
- 4 10/100/1000M autosensing Ethernet electrical ports

Table 2-43 lists the supported types of expansion cards.

Table 2-43 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

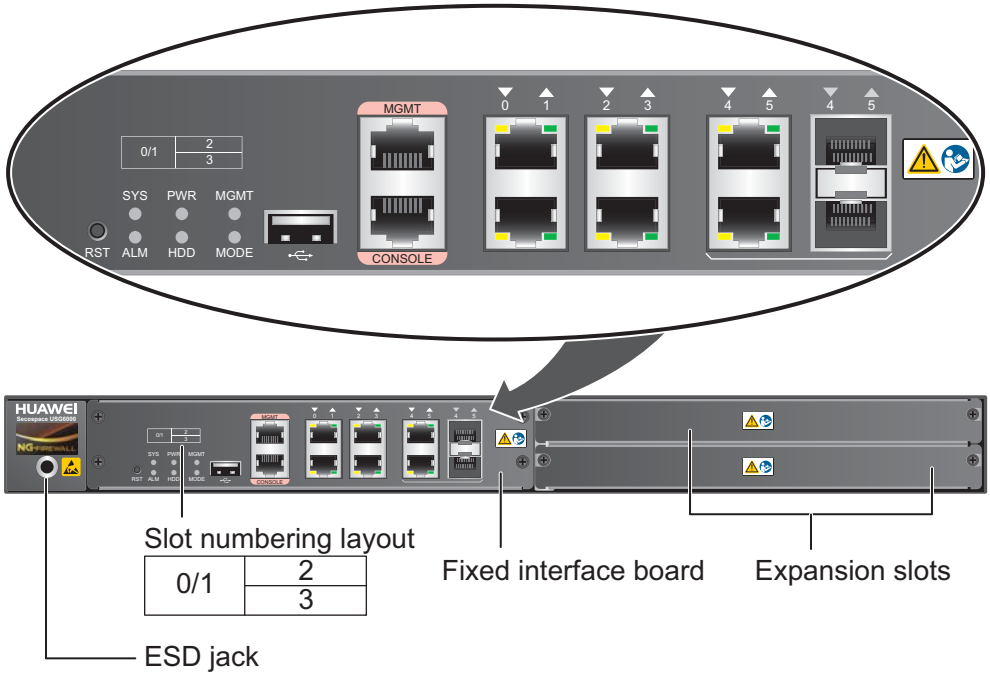
WSIC: Wide Service Interface Card

2.2.3.2 Front Panel

The front panel of the USG6507/6530 provides fixed ports, ESD jack, and expansion slots.

Figure 2-54 illustrates the front panel of the USG6507/6530.

Figure 2-54 USG6507/6530 Front Panel

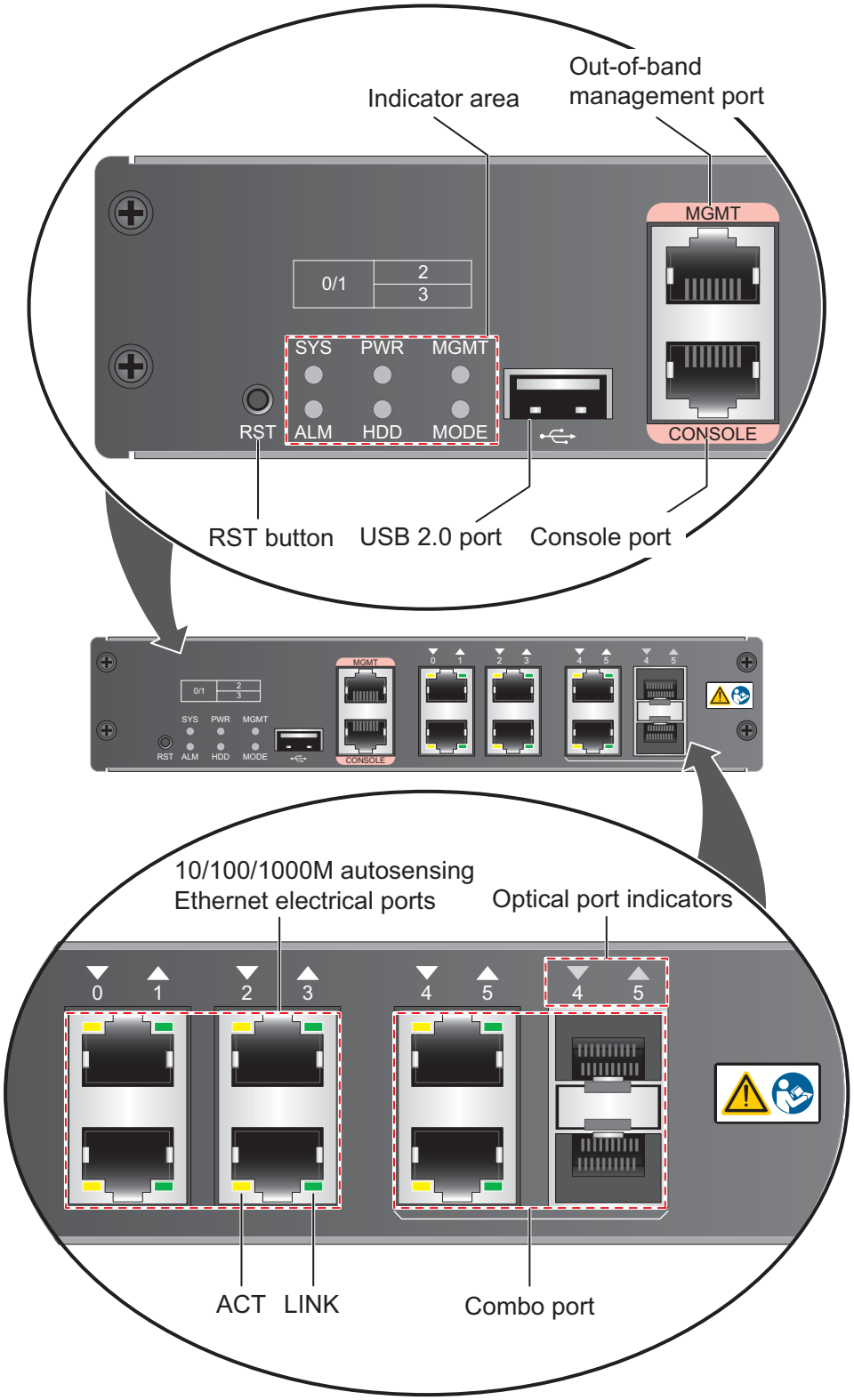


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed interface board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed interface board

Figure 2-55 illustrates the fixed interface board panel of the USG6507/6530.

Figure 2-55 Fixed interface board panel of the USG6507/6530



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB 2.0 port	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
0 to 3 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/3.
4 to 5 (RJ45 + SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Combo ports. Combo ports are logic ports. One combo port can work as a GE electrical interface or a GE optical port. Each combo port has only one internal forwarding port. When the electrical port is enabled, the optical port is disabled. When the optical port is enabled, the electrical port is disabled. The electrical and optical ports of a combo port use the same interface view, numbered from GigabitEthernet 1/0/4 to GigabitEthernet 1/0/5. By default, the combo port is used as an electical port. You can use the **combo enable** { **copper** | **fiber** } command to set the working mode of combo ports according to network requirements. Each optical port supports a **Megabit Optical Transceiver** or a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 4 to 5 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

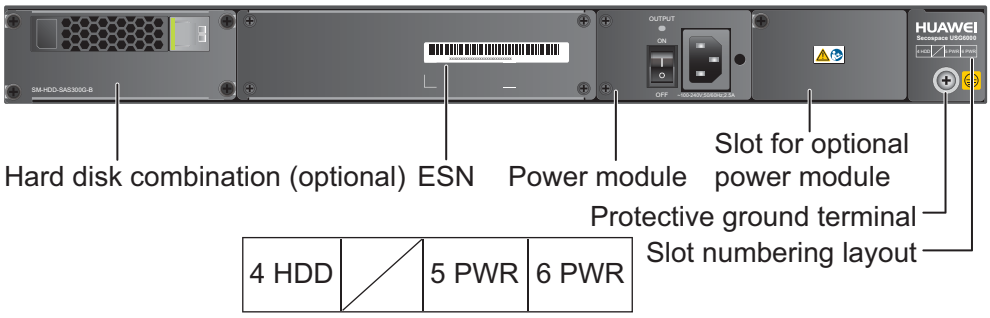
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.2.3.3 Rear Panel

The rear panel of the USG6507/6530 provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-56 illustrates the rear panel of the USG6507/6530.

Figure 2-56 USG6507/6530 rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. PWR5 is the standard power module, which is built-in and not pluggable. An optional PWR6 power module is supported to provide 1+1 power redundancy. When PWR5 is working, PWR6 is hot-swappable. For details, see **2.2.3.4 Power Supply System**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

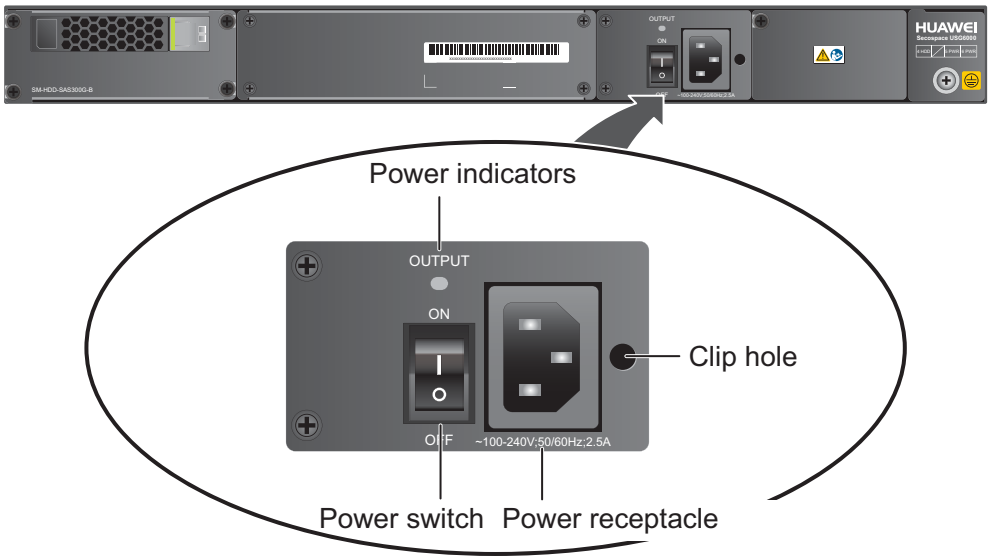
2.2.3.4 Power Supply System

By default, the USG6507/6530 has a built-in 150W AC power module, but you can optionally add a 170W power module for 1+1 power redundancy.

150W AC Power Module

The 150W AC power module converts AC power to DC power for the device. The power module is built-in and cannot be removed. **Figure 2-57** illustrates the appearance of the AC power module.

Figure 2-57 Appearance of the 150W AC power module



Name	Description
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-44 lists the functions of the 150W AC power module.

Table 2-44 Functions of the 150W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.

Item	Description
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	Not Supported.

Table 2-45 lists the technical specifications of the 150W AC power module.

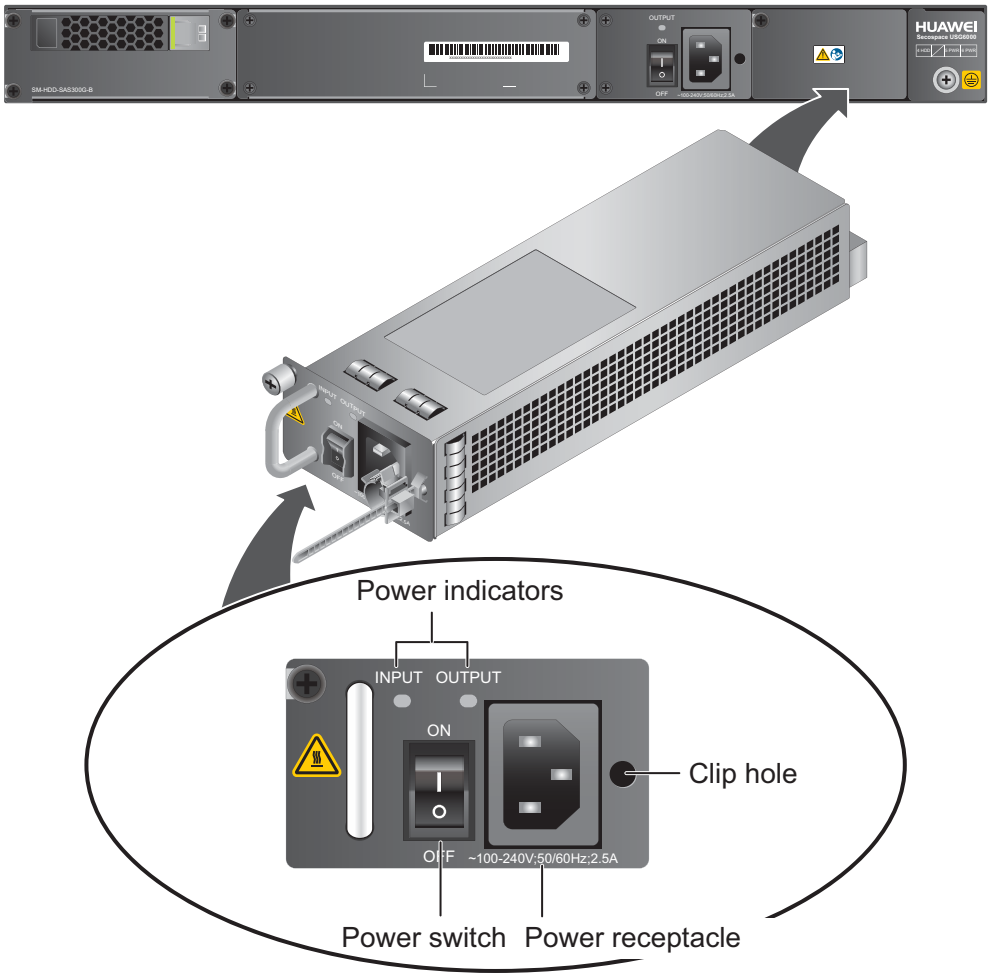
Table 2-45 Technical specifications of the 150W AC power module

Item	Description
Form	Built-in module
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	12.5 A
Maximum output power	150 W

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-58** illustrates the appearance of the AC power module.

Figure 2-58 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.

Name	Description
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-46 lists the functions of the 170W AC power module.

Table 2-46 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a 170W power module without interrupting device operation.

Table 2-47 lists the technical specifications of the 170W AC power module.

Table 2-47 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg

Item	Description
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

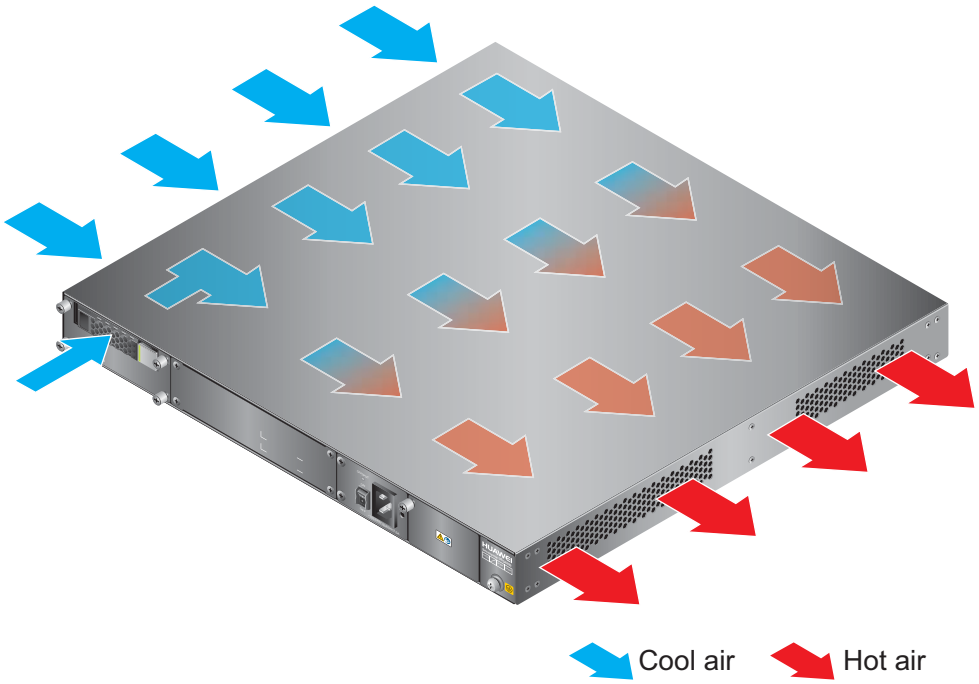
2.2.3.5 Heat Dissipation System

The USG6507/6530 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-59 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-59 System air flow



2.2.3.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6507/6530.

Table 2-48 lists the technical specifications of the USG6507/6530.

Table 2-48 USG6507/6530 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 4 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm

Item		Description
Weight		Standard: 6 kg Fully configured: 8 kg
Power specifications		
AC power		Supported; 150 W built-in power module (default) and 170 W hotswappable power module (optional)
Rated input voltage (AC)		100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)		90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)		2.5 A
DC power		Not supported.
Maximum output power		150 W (default) or 170 W (optional)
Heat dissipation		
Fan module		Built-in fan module, cannot be removed.
Number of fans		3
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		1
Mandatory service ports		● 2 GE Combo ports ● 4 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	11.58
	MTTR (hour)	1

Item		Description
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

NOTE

- a. The width does not include the size of mounting ears.
- b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack.
- d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term.
- e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.

2.2.4 USG6550/6570

The USG6550/6570 has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disks, and expansion cards, are supported.

2.2.4.1 Device Overview

The USG6550/6570 uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disk, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-60 illustrates the appearance of the USG6550/6570.

Figure 2-60 USG6550/6570 appearance

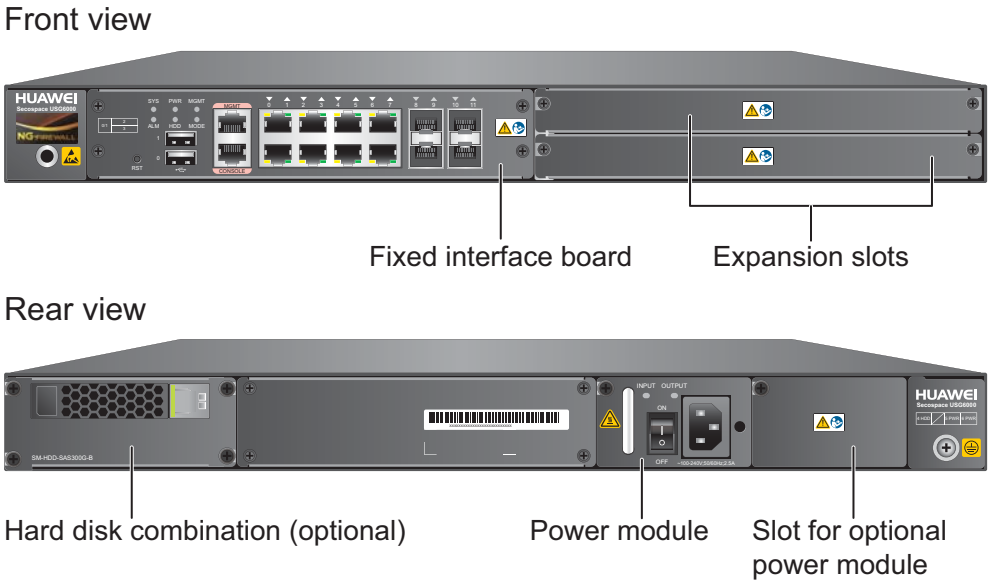


Table 2-49 describes the functions of the USG6550/6570 components.

Table 2-49 Functions of USG6550/6570 components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.

Name	Description
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-50** lists the supported expansion cards.
Power module	By default, an AC power module is provided. Two power modules are supported to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 2 USB 2.0 ports
- 4 GE optical ports
- 8 10/100/1000M autosensing Ethernet electrical ports

Table 2-50 lists the supported types of expansion cards.

Table 2-50 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

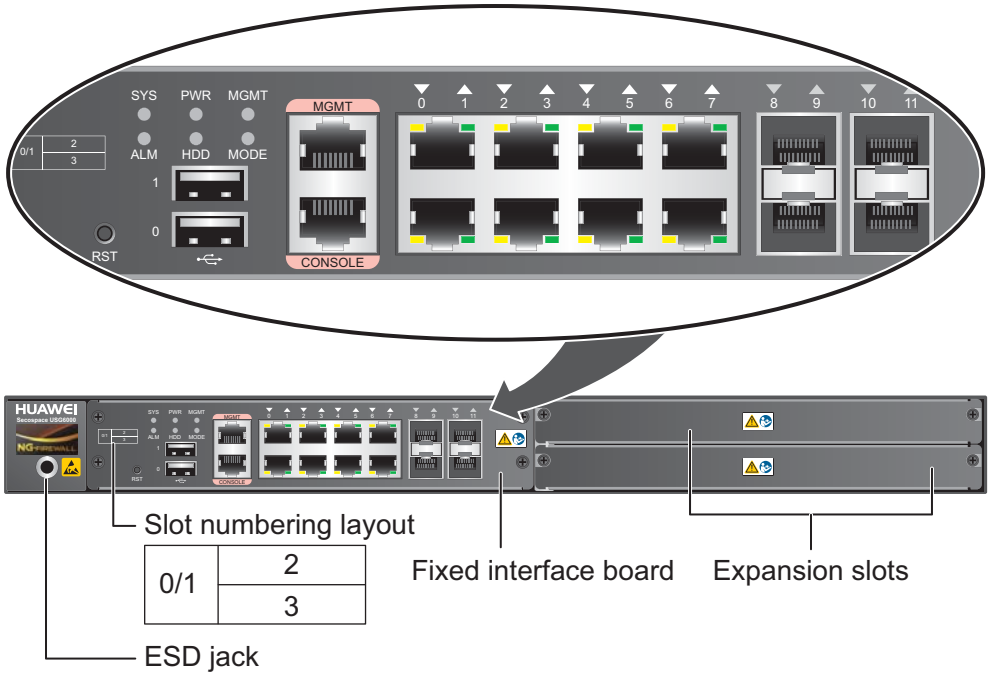
WSIC: Wide Service Interface Card.

2.2.4.2 Front Panel

The front panel of the USG6550/6570 provides fixed ports, ESD jack, and expansion slots.

The front panel of the USG6550/6570 is pictured in **Figure 2-61**.

Figure 2-61 USG6550/6570 front panel

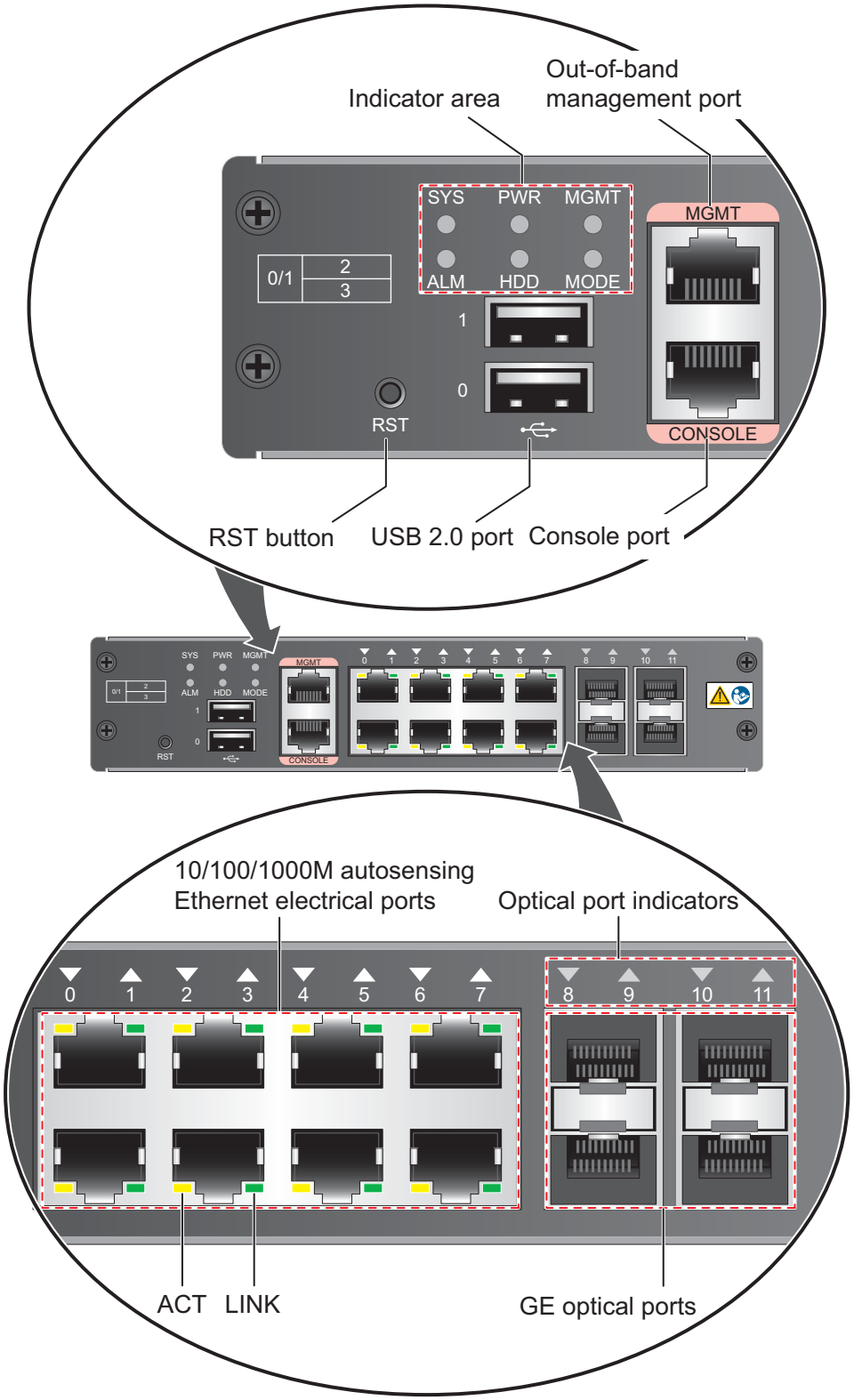


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed Interface Board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed Interface Board

Figure 2-62 illustrates the fixed interface board panel of the USG6550/6570.

Figure 2-62 USG6550/6570 fixed interface board panel



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB0 and USB1 ports	● USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device. ● USB ports allow you to insert 4G LTE data cards. For details on the 4G LTE data cards, refer to **2.6 4G LTE Data Card**.
0 to 7 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are eight 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/7.
8 to 11 (SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four GE optical ports numbered from GigabitEthernet 1/0/8 to GigabitEthernet 1/0/11. Each port requires a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 8 to 11 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

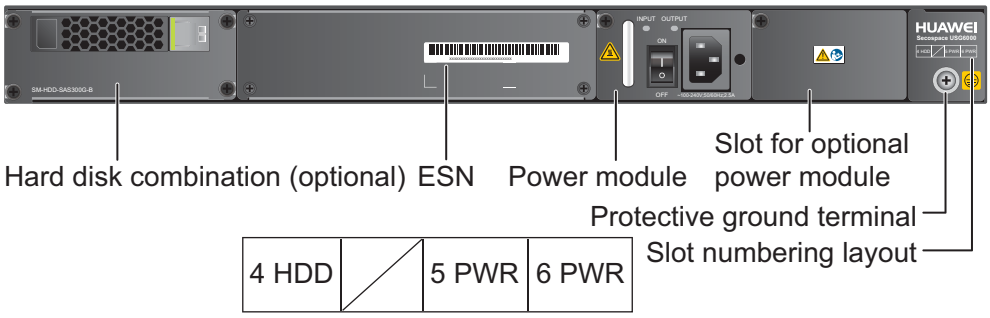
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.2.4.3 Rear Panel

The rear panel of the USG6550/6570 provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-63 illustrates the rear panel of the USG6550/6570.

Figure 2-63 USG6550/6570 rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. One power module is provided by default, but two power modules are supported to provide 1+1 power redundancy. If two power modules are used and one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.2.4.4 Power Supply System**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

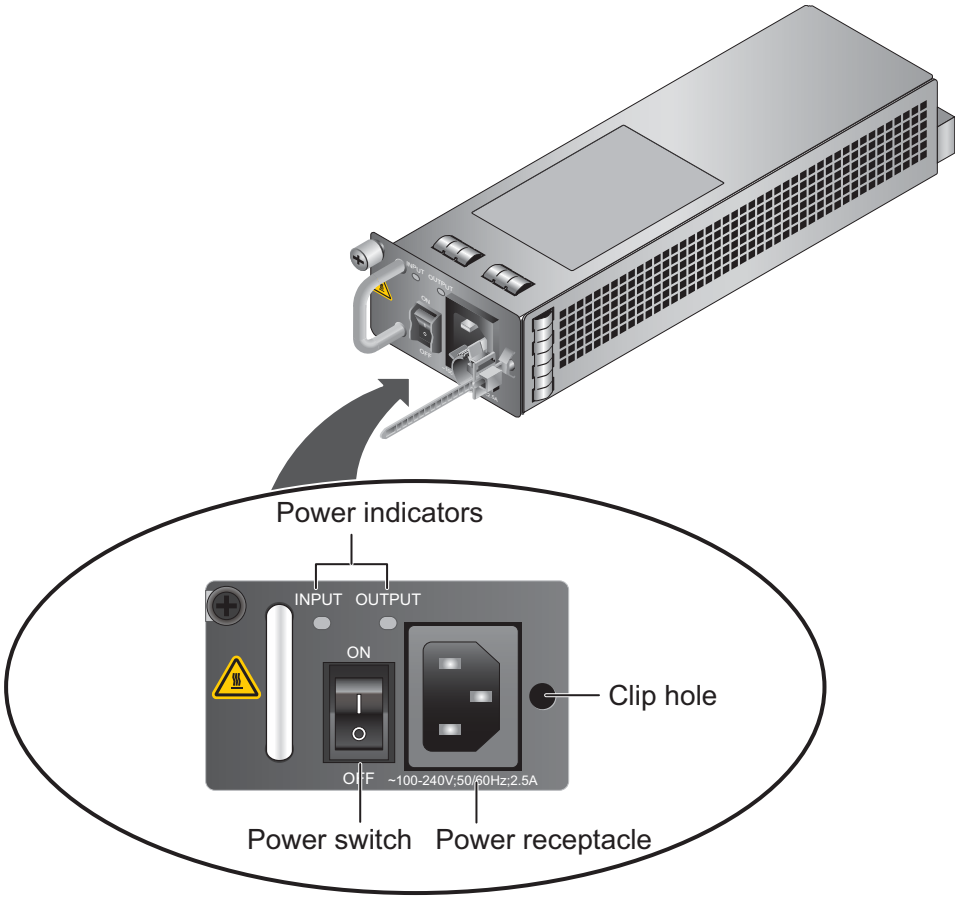
2.2.4.4 Power Supply System

By default, the USG6550/6570 has a 170W AC power module, but two power modules are supported for 1+1 power redundancy.

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-64** illustrates the appearance of the AC power module.

Figure 2-64 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-51 lists the functions of the 170W AC power module.

Table 2-51 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-52 lists the technical specifications of the 170W AC power module.

Table 2-52 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	

Item	Description
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

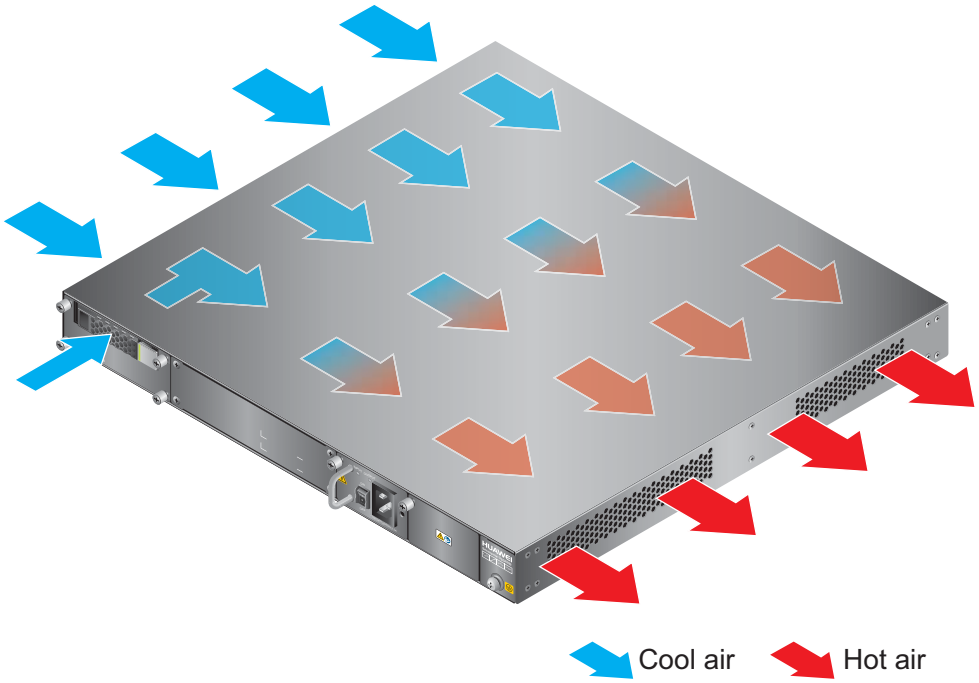
2.2.4.5 Heat Dissipation System

The USG6550/6570 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-65 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-65 System air flow



2.2.4.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6550/6570.

Table 2-53 lists the technical specifications of the USG6550/6570.

Table 2-53 USG6550/6570 technical specifications

Item	Description
System specifications	
CPU	Multi-core 1.1 GHz processor
Memory	DDR3 4 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm
Weight	Standard: 6 kg Fully configured: 8.6 kg
Power specifications	
AC power	Supported. By default, one power module is provided, but two power modules are supported. If two power modules are used and one module fails, you can hot-swap the faulty power module.
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	2.5 A
DC power	Not supported
Maximum output power	170 W
Heat dissipation	
Fan module	Built-in fan module, cannot be removed.
Number of fans	5
Air flow (hot air flow, viewed facing the rear panel)	Intake on the front and left sides, exhaust on the right side

Item		Description
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		2
Mandatory service ports		● 4 GE optical ports ● 8 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	11.96
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.3 USG6600 Product Series

The USG6600 product series includes USG6620/6630/6650/6660/6670/6680. The USG6600 uses an integrated structure design and fits into a 19-inch standard cabinet. USG6620/6630 has the same appearance and are all 1U devices. USG6650/6660/6670/6680 has the same appearance and are all 3U devices, but they have different standard expansion cards. A larger model number in the USG6600 series indicates a higher performance.

2.3.1 USG6620/6630

The USG6620/6630 has only AC models and no DC models and provides one power module and fixed ports by default. However, optional modules, such as an additional power module, hard disks, and expansion cards, are supported.

2.3.1.1 Device Overview

The USG6620/6630 uses an integrated chassis that contains the fixed interface board, power module, and fan module. You can also add some optional modules, such as hard disk, additional power module, and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-66 illustrates the appearance of the USG6620/6630.

Figure 2-66 Appearance of USG6620/6630

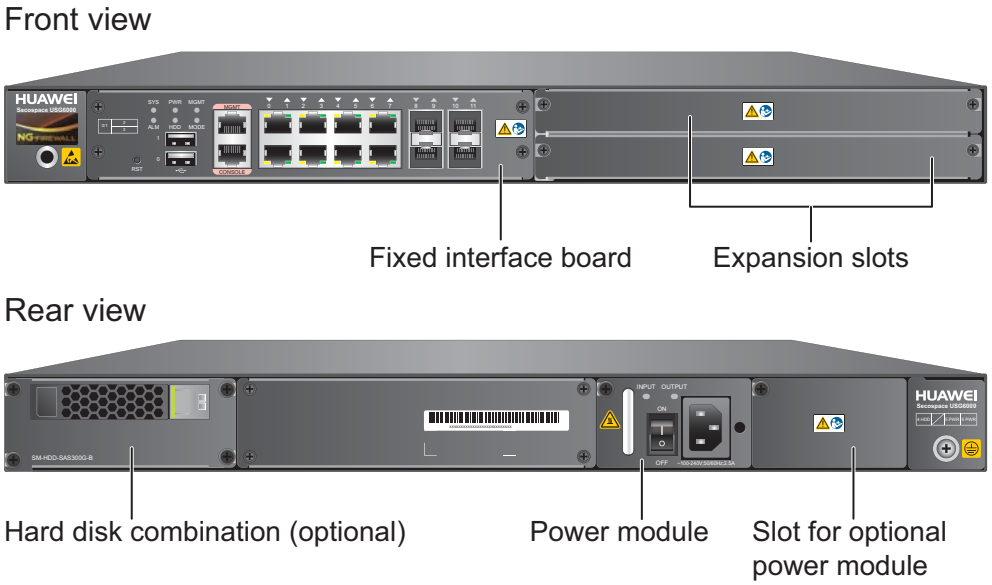


Table 2-54 describes the functions of the USG6620/6630 components.

Table 2-54 Functions of the USG6620/6630 components

Name	Description
Fixed interface board	The fixed interface board is the core component for system control and management and provides the management, forwarding, and control planes. The interface board also has an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.

Name	Description
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-55** lists the supported expansion cards.
Power module	By default, AC power module is provided. Two power modules are supported to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.
Hard disk combination	Hard disks are used to store logs and reports. The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B.

Ports

The fixed interface board provides the following ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 2 USB 2.0 ports
- 4 GE optical ports
- 8 10/100/1000M autosensing Ethernet electrical ports

Table 2-55 lists the supported types of expansion cards.

Table 2-55 Supported expansion cards

Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

NOTE

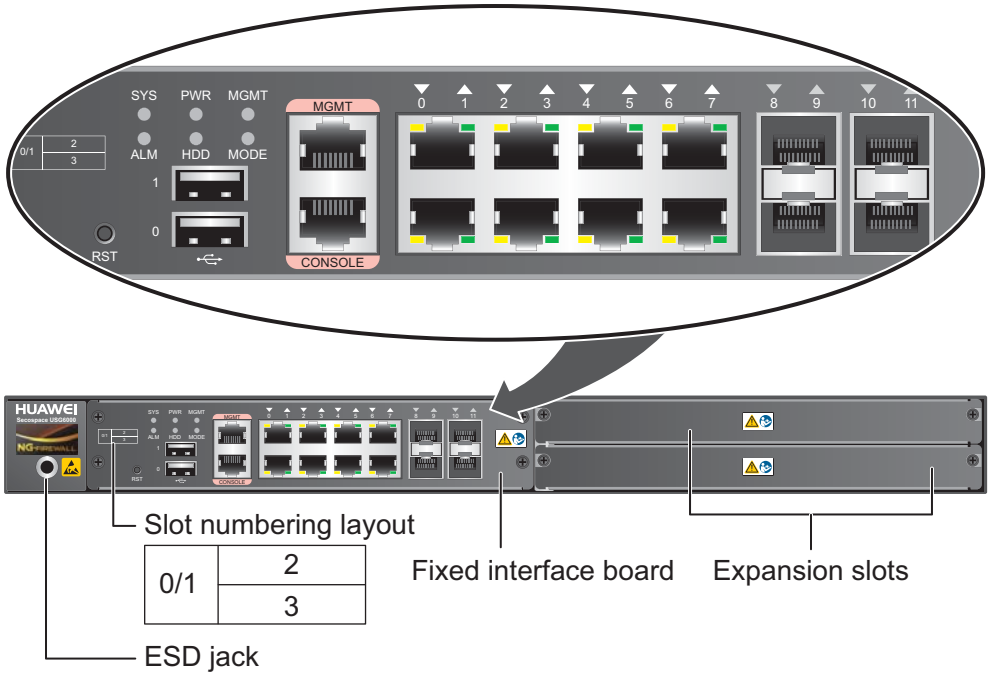
WSIC: Wide Service Interface Card

2.3.1.2 Front Panel

The front panel of the USG6620/6630 provides fixed ports, ESD jack, and expansion slots.

The front panel of the USG6620/6630 is pictured in **Figure 2-67**.

Figure 2-67 USG6620/6630 front panel

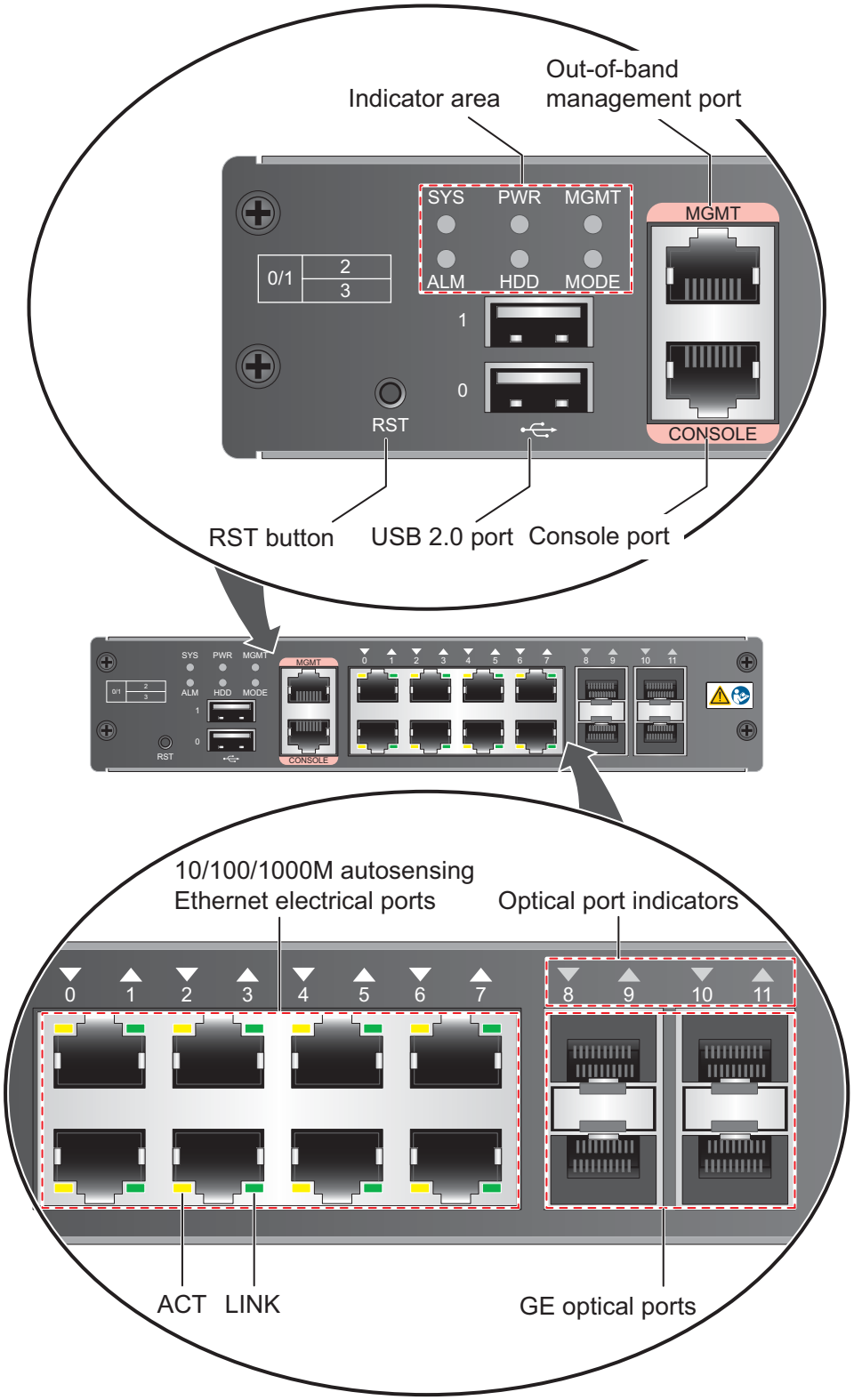


Name	Description
Slot numbering	Identifies the slot type and number, with 0 indicating the slot for the out-of-band MGMT port (GigabitEthernet 0/0/0), 1 the slot for the interface board, and 2 and 3 the WSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
Fixed interface board	The core component for system control and management. The interface board provides an out-of-band management port, console port, and USB port for management access. The interface board is built-in and cannot be removed. For details on the ports and indicators on the fixed interface board, see **Fixed interface board**.
Expansion slot	Provides two WSIC slots.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Fixed interface board

Figure 2-68 illustrates the fixed interface board panel of the USG6620/6630.

Figure 2-68 Fixed interface board panel of the USG6620/6630



Name	Description
Ports	

Name	Description
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. You can connect this port to the network port or any reachable port on a PC through a network cable. Then, you can use Telnet to access the CLI or use a web browser to access the web UI to configure, manage, and maintain the USG. **NOTE** The MGMT port cannot be used as a service port.
Console port (RJ45)	Console ports allow you to locally connect a PC to the device. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
USB0 and USB1 ports	USB ports allow you to insert USB devices for system software upgrades. For details on upgrades through USB devices, refer to the *Upgrade Guide* delivered with the device.
0 to 7 (RJ45) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are eight 10/100/1000M autosensing Ethernet electrical ports numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/7.
8 to 11 (SFP) **NOTE** Arrowheads show the positions of ports. A down arrowhead indicates a port at the bottom, and an up arrowhead indicates a port at the top.	Service ports. They are four GE optical ports numbered from GigabitEthernet 1/0/8 to GigabitEthernet 1/0/11. Each port requires a **Gigabit Optical Transceiver**.
Indicators	

Name	Description
SYS indicator (green)	● Steady on: The system is being powered on or restarted. ● Blink every two seconds (0.5 Hz): The system is running normally. ● Blink twice every second (2 Hz): The system is starting. ● Blink eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.
PWR indicator (green)	● Steady on: The power module works properly. ● Off: The power module is faulty or the power cable is disconnected.
HDD indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
MGMT indicator (green)	● Steady on: The link is connected. ● Blink eight times every second (8 Hz): Data is being sent or received. ● Off: The link is disconnected or not properly connected.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.
Indicator for optical ports 8 to 11 (green)	● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.
Others	

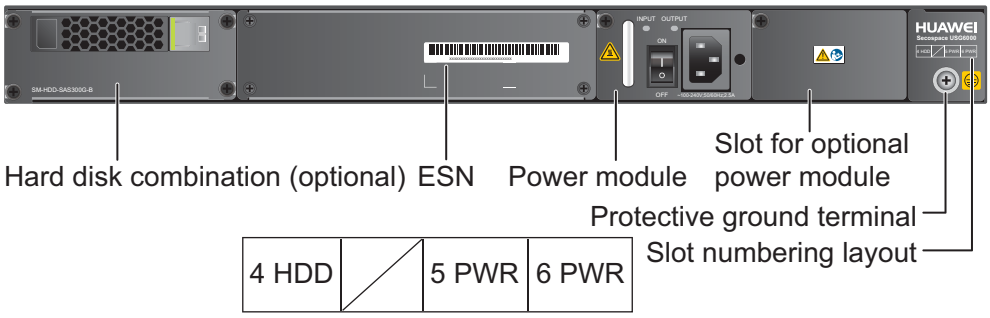
Name	Description
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. To do so, press and hold down the RST button and power on the device. When the MODE indicator of the fixed interface board blinks (about 3 to 5 seconds later), release the button. The device then starts with the default configuration. **NOTE** If the device has a hard disk installed, before pressing the RST button to reset, run the **disk offline** command in the user view. Wait about 30 seconds until the system indicates that the hard disk stops working and then press the RST button. Otherwise, the data may be lost or hard disk be damaged.

2.3.1.3 Rear Panel

The rear panel of the USG6620/6630 provides the power module, protective ground terminal, and hard disk slot for optional hard disk combination.

Figure 2-69 illustrates the rear panel of the USG6620/6630.

Figure 2-69 USG6620/6630 rear panel



Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
Power modules (in slots PWR5 and PWR6)	Provides power input and distribution for the device. One power module is provided by default, but two power modules are supported to provide 1+1 power redundancy. If two power modules are used and one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.3.1.4 Power Supply System**.

Name	Description
Hard disk combination (in slot HDD4)	The device supports optional hard disk combination SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B. Hard disks are used to store logs and reports, and they can be purchased from Huawei if necessary. ● SM-HDD-SAS300G-B hard disk combination consists of a hard disk card and SM-HDD-SAS300G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS300G-B hard disk combination, see **2.5.4 Hard Disk Combination SM-HDD-SAS300G-B**. ● SM-HDD-SAS600G-B hard disk combination consists of a hard disk card and SM-HDD-SAS600G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS600G-B hard disk combination, see **2.5.5 Hard Disk Combination SM-HDD-SAS600G-B**. ● SM-HDD-SAS1200G-B hard disk combination consists of a hard disk card and SM-HDD-SAS1200G-A hard disk. The hard disks are 2.5-inch SAS hard disks. For details on SM-HDD-SAS1200G-B hard disk combination, see **2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B**. If no hard disk is installed, a filler panel must be installed on slot HDD4 to ensure normal air flow and keep out dust. **NOTICE** ● The USG starts to support SM-HDD-SAS600G-B hard disk combination since V500R001C30SPC100. If you use SM-HDD-SAS600G-B hard disk combination on earlier versions, the SM-HDD-SAS600G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version. ● The USG starts to support SM-HDD-SAS1200G-B hard disk combination since V500R001C50. If you use SM-HDD-SAS1200G-B hard disk combination on earlier versions, the SM-HDD-SAS1200G-B hard disk combination will be identified as non-Huawei hard disks. You need to upgrade the software version.
SN	The serial number that uniquely identifies the device. The SN of the device must be provided to the local technical support personnel of Huawei to apply for a license.
Protective ground terminal	The M4 OT terminal of the ground cable is connected to the protective ground terminal of the device, and the other terminal of the ground cable is connected to the ground point of the cabinet or workbench or the ground bar of the equipment room.

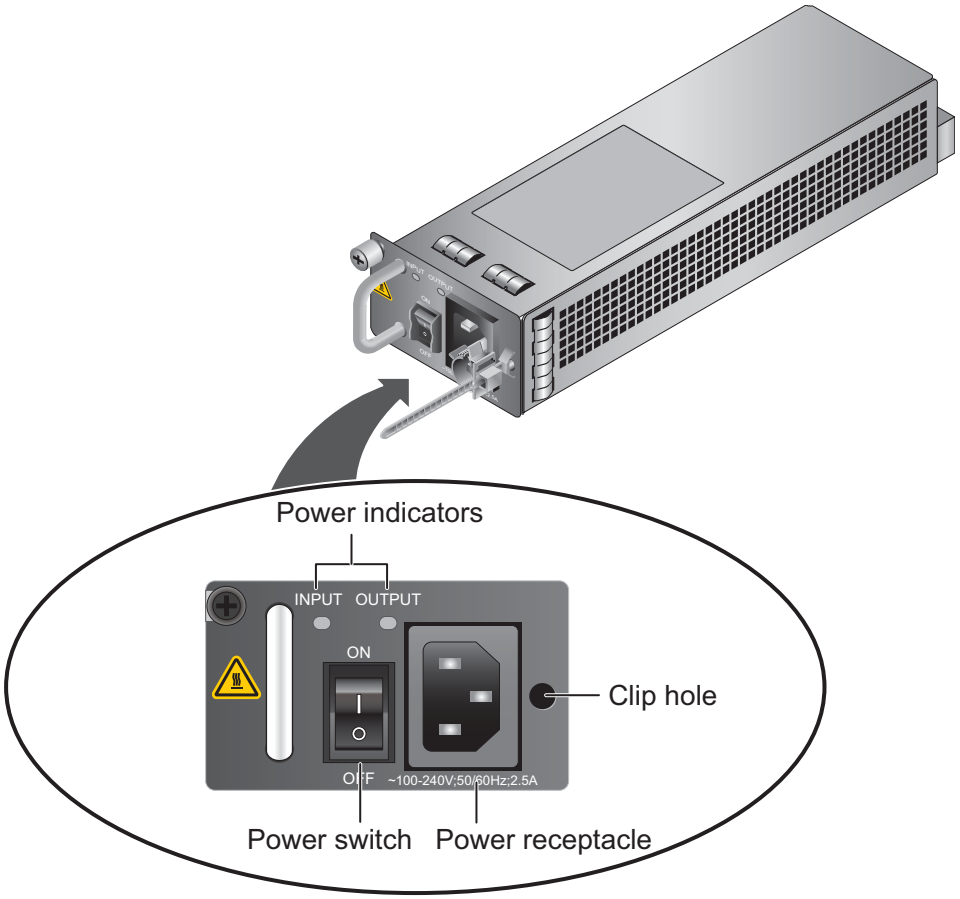
2.3.1.4 Power Supply System

By default, the USG6620/6630 has a 170W AC power module, but two power modules are supported for 1+1 power redundancy.

170W AC Power Module

The 170W AC power module converts AC power to DC power for the device. **Figure 2-70** illustrates the appearance of the AC power module.

Figure 2-70 Appearance of the 170W AC power module



Name	Description
INPUT (green)	● Steady on: The input of the AC power module is normal. ● Off: The input of the AC power module is abnormal.
OUTPUT (green)	● Steady on: The output of the AC power module is normal. ● Off: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable. The power cable clip is installed before shipment.

Table 2-56 lists the functions of the 170W AC power module.

Table 2-56 Functions of the 170W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power adapter does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-57 lists the technical specifications of the 170W AC power module.

Table 2-57 Technical specifications of the 170W AC power module

Item	Description
Model	Power-AC-B
Dimensions (H x W x D)	40 mm x 69 mm x 195 mm
Weight	0.82 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	2.5 A
Output	

Item	Description
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output current	14.2 A
Maximum output power	170 W

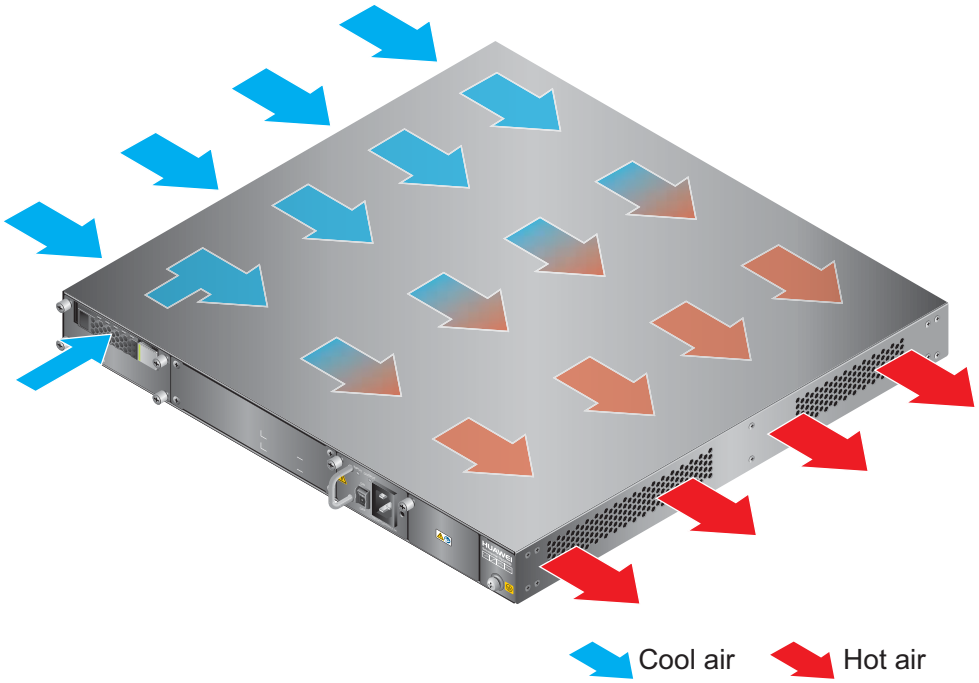
2.3.1.5 Heat Dissipation System

The USG6620/6630 has a built-in fan module for heat dissipation.

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

Figure 2-71 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation sloton the front side, and the air exhaust is on the right side. The built-in fan module locates at the air exhaust and cannot be removed.

Figure 2-71 System air flow



2.3.1.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6620/6630.

Table 2-58 lists the technical specifications of the USG6620/6630.

Table 2-58 USG6620/6630 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.0 GHz processor
Memory	DDR3 8 GB
Flash	16 MB
CF card	2 GB
Hard disk	Optional hot-swappable 300GB, 600GB or 1200GB 2.5-inch SAS hard disk. The hard disk unit is hot-swappable, but the hard disk combination is not hot-swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Not supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	44.4 mm x 442 mm x 421 mm
Weight	Standard: 6 kg Fully configured: 8.7 kg
Power specifications	
AC power	Supported. By default, one power module is provided. If two power modules are used and one module fails, you can hot-swap the faulty power module.
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	2.5 A
DC power	Not supported.
Maximum output power	170 W
Heat dissipation	
Fan module	Built-in fan module, cannot be removed.
Number of fans	5
Air flow (hot air flow, viewed facing the rear panel)	Intake on the front and left sides, exhaust on the right side
Port density	

Item		Description
Out-of-band management port		1 (RJ45)
Console port		1 (RJ45)
USB 2.0 port		2
Mandatory service ports		● 4 GE optical ports ● 8 10/100/1000M autosensing Ethernet electrical ports
Expansion slot		2×WSIC
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	10.08
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 1 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.3.2 USG6650/6660

The USG6650/6660 has a 2XG8GE expansion card and an 8GEF expansion card by default; USG6650 has only AC models, and USG6660 has both AC and DC models.

2.3.2.1 Device Overview

The USG6650/6660 uses an integrated chassis that contains the SPUA (main processing unit), interface card, power module, and fan module. You can also add some optional modules, such as hard disk and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-72 illustrates the appearance of the USG6650/6660.

Figure 2-72 Appearance of USG6650/6660

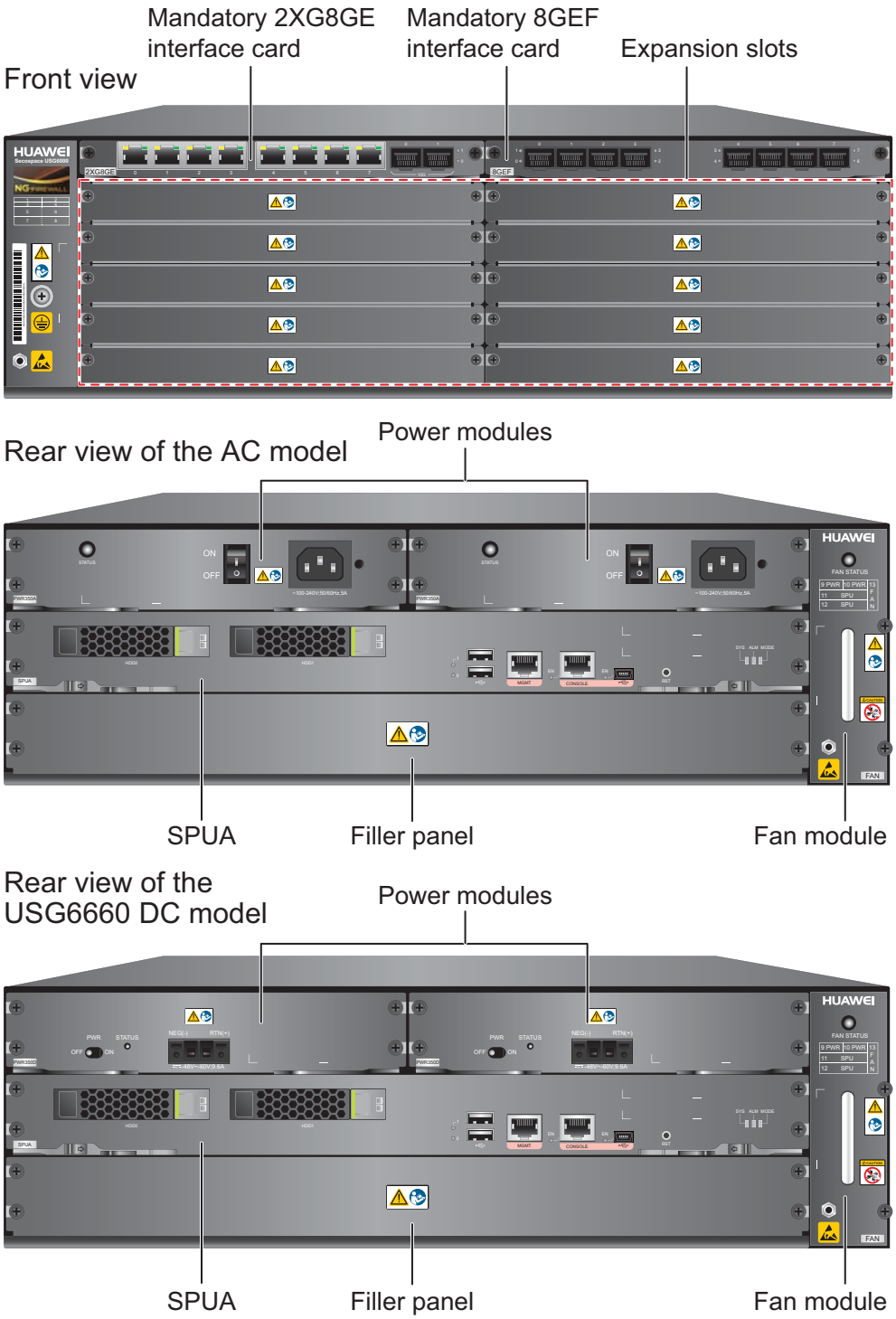


Table 2-59 describes the functions of the USG6650/6660 components.

Table 2-59 Functions of the USG6650/6660 components

Name	Description
SPUA (the main processing unit)	SPUA is the core component for system control and management and provides the management, forwarding, and control planes and an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. It can use the hard disk SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A to record logs and reports in real time. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Interface card (mandatory)	The interface card provides gigabit and 10-gigabit electrical and optical ports. The interface card is installed before shipment and can be moved to another slot. The interface card is not hot-swappable.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-60** lists the supported expansion cards.
Power module	By default, the USG6650 has two AC power modules and does not support DC. By default, the USG6660 has two DC or AC power modules for 1+1 power redundancy so that if one power module is faulty, it can be hot-swapped.
Fan module	The fan module provides air flow for heat dissipation. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute.
Filler panel	Ensures normal air flow and keeps out dust.

Ports

The SPUA provides the following fixed ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 1 console port (mini USB)
- 2 USB 2.0 ports

By default, the USG6650/6660 has a 2XG8GE interface cards and an 8GEF interface card to provide the following service ports:

- 8 GE optical ports
- 8 10/100/1000M autosensing Ethernet electrical ports
- 2 10GE optical ports

The six expansion slots on the USG6650/6660 support the expansion cards listed in **Table 2-60**.

NOTE

The slots are divided into two types: one for Wide Service Interface Cards (WSIC) and the other for Extended Service Interface Cards (XSIC). An XSIC is twice as high as a WSIC. An XSIC slot can also hold a WSIC card, but only in the lower part, and in this case, no other card can be installed in the upper part.

Table 2-60 Supported expansion cards

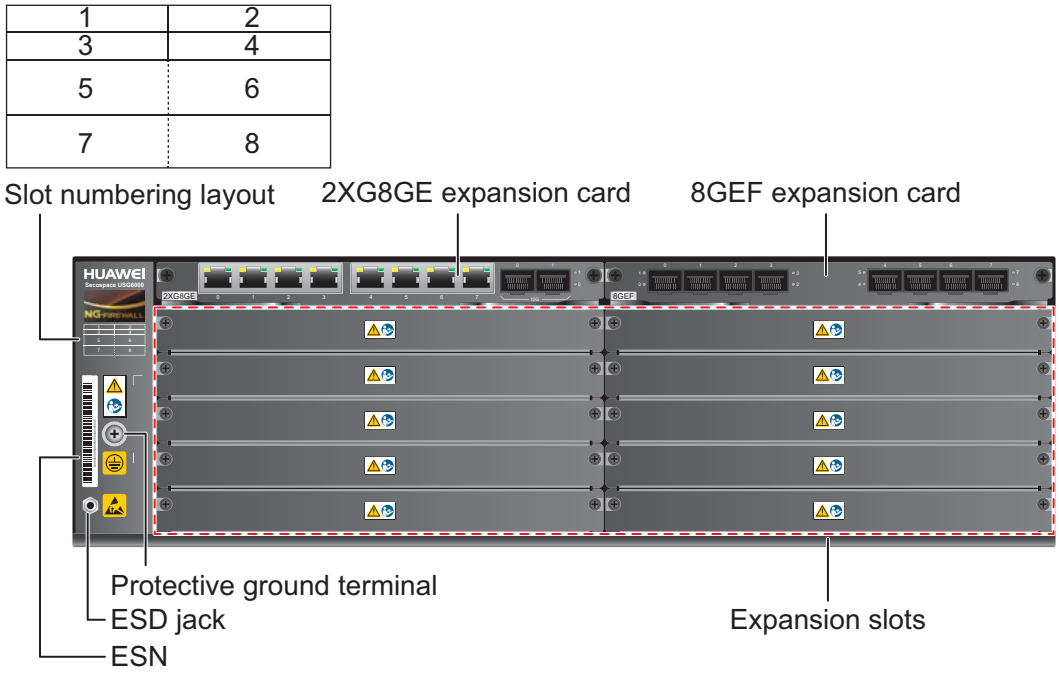
Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

2.3.2.2 Front Panel

By default, the USG6650/6660 front panel has a 2XG8GE interface card, an 8GEF interface card, a protective ground terminal, an ESD jack, and some expansion slots.

The front panel of the USG6650/6660 is pictured in **Figure 2-73**.

Figure 2-73 USG6650/6660 front panel



Name	Description
Slot numbering	Indicates the slot numbering layout. Slots 1 through 4 are WSIC slots, and slots 5 through 8 are XSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. The slot number is the number described in this row. When a WSIC is installed in the lower part of an XSIC slot, the slot number of the WSIC is the XSIC slot number. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
2XG8GE expansion card (in slot 1)	The 2XG8GE card is mandatory and provides eight gigabit RJ45 Ethernet ports and two 10-gigabit SFP+ ports. The interfaces on the interface card are numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/9 (left to right). For details on the 2XG8GE interface card, see **2.4.2 2XG8GE WSIC Interface Card**.
8GEF expansion card (in slot 2)	The 8GEF interface card is mandatory and provides eight GE SFP ports. The interfaces on the interface card are numbered from GigabitEthernet 2/0/0 to GigabitEthernet 2/0/7 (left to right). For details on the interface card, see **2.4.3 8GEF WSIC Interface Card**.
Expansion slot	Provides two WSIC slots and four XSIC slots. When a WSIC is installed in the lower part of an XSIC slot, install a filler panel on the empty upper part of the slot to ensure a normal air flow and keep out dust.

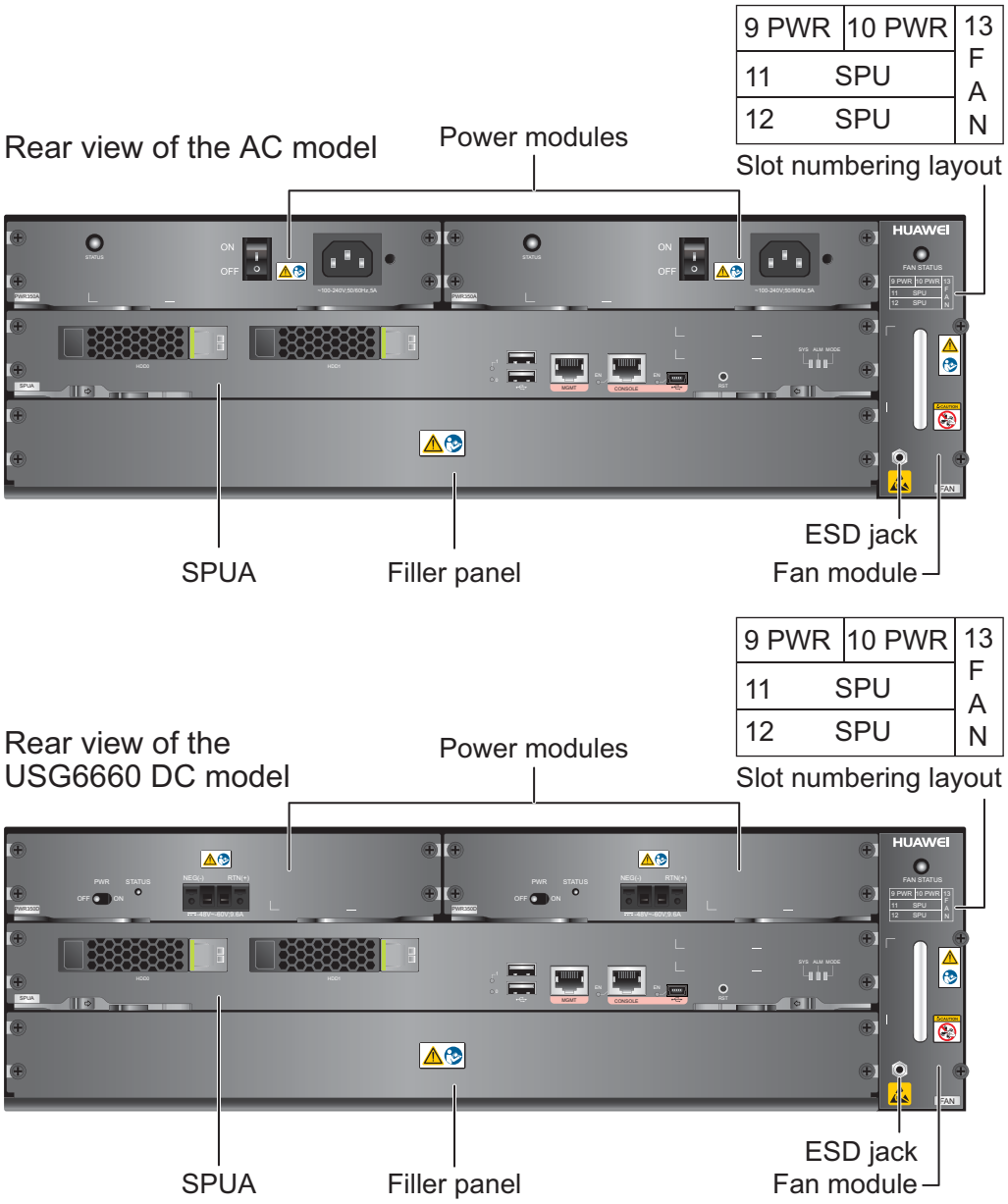
Name	Description
Protective ground terminal	The M4 OT terminal connects the PGND cable to a cabinet, the ground point of the workbench, or the ground bar in an equipment room.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

2.3.2.3 Rear Panel

The USG6650/6660 rear panel provides power modules, a fan module, and boards, such as SPU.

Figure 2-74 illustrates the rear panel of the USG6650/6660.

Figure 2-74 USG6650/6660 rear panel



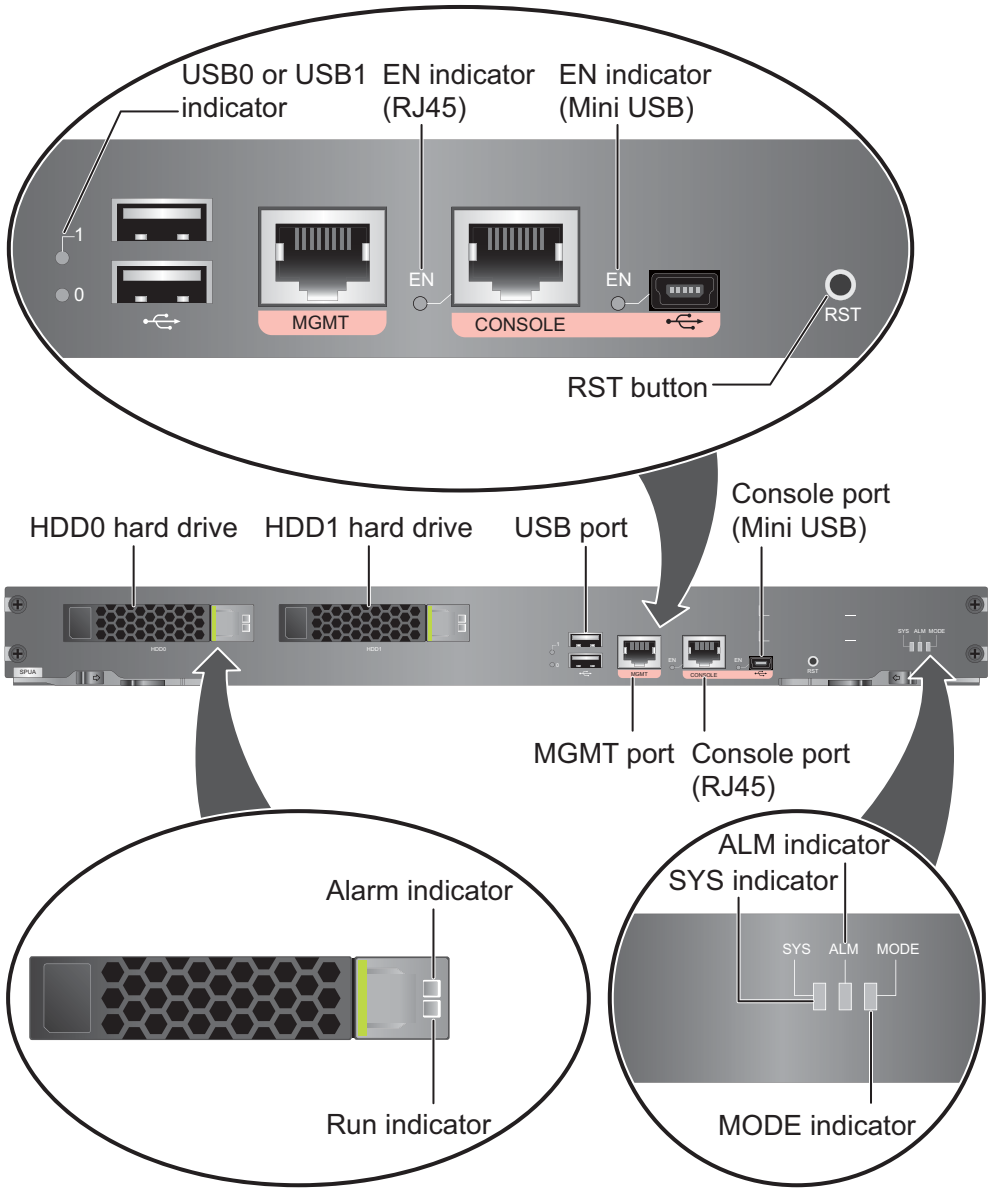
Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
SPUA (the main processing unit, in slot SPU11)	The core component for system control and management. SPUA provides an out-of-band management port, console port, and USB port for management access. SPUA can optionally provide one or two hard disks (SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A) as required. SPUA is installed in slot SPU11 and cannot be removed. For details, see **SPUA (the main processing unit)**.

Name	Description
Filler panel (in slot SPU12)	Ensures normal air flow and keeps out dust.
Fan module (in slot FAN13)	The fan module provides air flow for heat dissipation. The slot numbering layout and ESD jack are also located in the fan module. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute. For details, see **2.3.2.5 Heat Dissipation System**.
Power modules (in slots PWR9 and PWR10)	Provides power input and distribution for the device. Two DC or AC power modules are mandatory to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.3.2.4 Power Supply System**.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

SPUA (the main processing unit)

The SPUA is pictured in **Figure 2-75**.

Figure 2-75 SPUA



Name	Description
Hard Disk Ports and Indicators	

Name	Description
HDD0 or HDD1	Hard disk slot, supporting one SM-HDD-SAS300G-A or SM-HDD-SAS600G-A hard disk. The hard disks are optional. You can purchase one or two hard disks from Huawei if needed. To ensure hard disk data reliability, you are advised to purchase two hard disks with the same capacity to create RAID1 for data backup. For details, see **2.5.1 Hard Disk Unit SM-HDD-SAS300G-A**, **2.5.2 Hard Disk Unit SM-HDD-SAS600G-A** and **2.5.3 Hard Disk Unit SM-HDD-SAS1200G-A**. **NOTICE** ● Ensure that two hard disks with the same capacity are used for creating RAID. Otherwise, creating RAID fails. ● The FW starts to support SM-HDD-SAS600G-A hard disks since V500R001C20SPC200. If you use SM-HDD-SAS600G-A hard disks on earlier versions, the SM-HDD-SAS600G-A hard disks will be identified as non-Huawei hard disks. You need to upgrade the FW version. ● The USG starts to support SM-HDD-SAS1200G-A hard disk since V500R001C50. If you use SM-HDD-SAS1200G-A hard disk on earlier versions, the SM-HDD-SAS1200G-A hard disk will be identified as non-Huawei hard disks. You need to upgrade the software version.
HDD0 or HDD1 hard disk alarm indicator (red)	● Steady on: HDD0 or HDD1 hard disk fails. ● Off: HDD0 or HDD1 hard disk is running normally.
HDD0 or HDD1 hard disk run indicator (green)	● Steady on: HDD0 or HDD1 hard disk is present. ● Blink: HDD0 or HDD1 hard disk is reading or writing data. ● Off: HDD0 or HDD1 hard disk is not detected.
USB Ports and indicators	
USB0 and USB1 ports	USB ports allow you to insert USB devices for system software upgrades. For details, refer to the *Upgrade Guide* delivered with the device.
USB0 or USB1 port indicator (green)	● Steady on: USB0 or USB1 is connected. ● Off: USB0 or USB1 is not connected.
Console Ports and Indicators	
Console port (RJ45)	Console ports allow you to locally connect to the device. The RJ45 and mini USB console ports cannot be used simultaneously. If both console ports are connected, only the mini USB console port can be used. ● You can use a mini-USB-to-USB cable to connect the mini USB console port on the device to the USB port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device. ● You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a

Name	Description
Console port (Mini USB)	serial port terminal program on your PC to access, configure, and manage the device.
EN indicator (RJ45, green)	● Steady on: The console port (RJ45) is in use. ● Off: The console port (RJ45) is not in use.
EN indicator (Mini USB, green)	● Steady on: The console port (Mini USB) is connected and in use. ● Off: The console port (Mini USB) is not in use.
Others	
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device. **NOTE** The MGMT port cannot be used as a service port.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. Press and hold down the RST button and power on the device. Three to five seconds later, when the MODE indicator on SPUA is blinking, release the RST button to restore the default settings. **NOTE** If a hard disk is installed on the device, you must run the **disk offline** command in system view and wait for approximately 30 seconds until the system displays that the hard disk has stopped working before pressing the RST button. Otherwise, the data may be lost or the hard disk be damaged.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.

Name	Description
SYS indicator (green)	● On: The system is powering on or restarting. ● Blinks every two seconds (0.5 Hz): The system is running normally. ● Blinks twice every second (2 Hz): The system is starting. ● Blinks eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

Table 2-61 describes the SPUA specifications.

Table 2-61 SPUA specifications

Item	Description
Silkscreen	SPUA
Dimensions (H x W x D)	40.14 mm x 402.80 mm × 270.00 mm
Weight	1 kg
Power	109 W

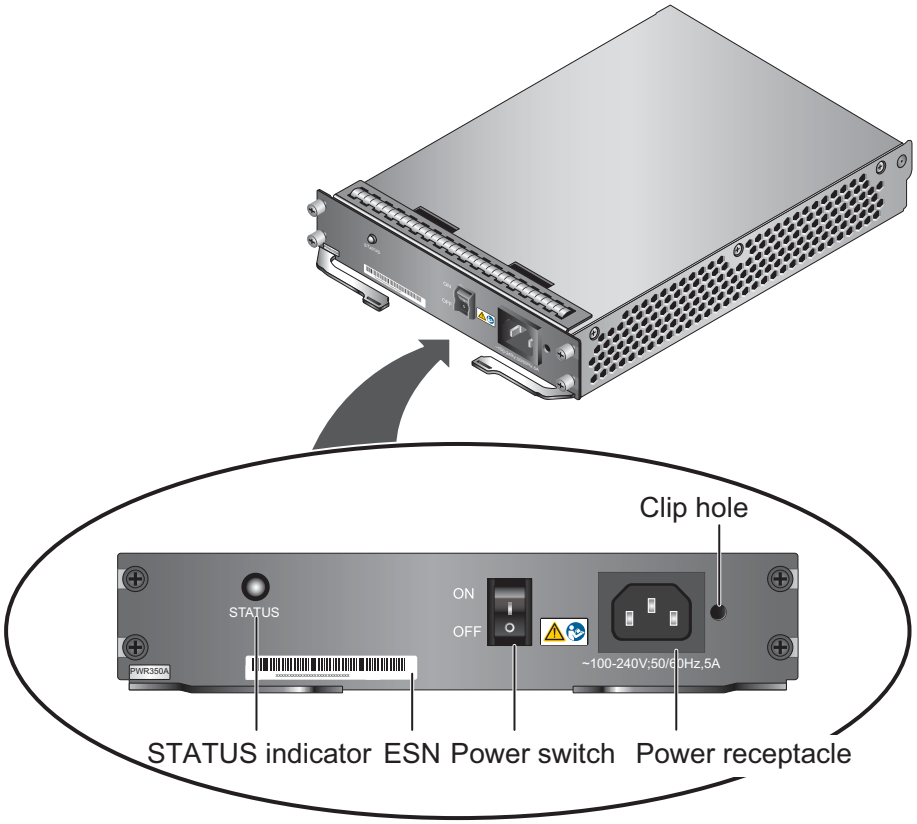
2.3.2.4 Power Supply System

The USG6650/6660 supports two 350 W power modules for 1+1 redundancy. USG6650 supports only AC power modules, and USG6660 supports both AC and DC power modules.

350 W AC Power Module

The 350 W AC power module converts AC power to DC power for the device. Figure 2-76 illustrates the appearance of the AC power module.

Figure 2-76 Appearance of the 350 W AC power module



Name	Description
STATUS indicator (green/red)	● Steady green: The output of the AC power module is normal. ● Steady red: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
SN	The serial number that uniquely identifies the power module.
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

Table 2-62 lists the functions of the 350 W AC power module.

Table 2-62 Functions of the 350 W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-63 lists the technical specifications of the 350 W AC power module.

Table 2-63 Technical specifications of the 350 W AC power module

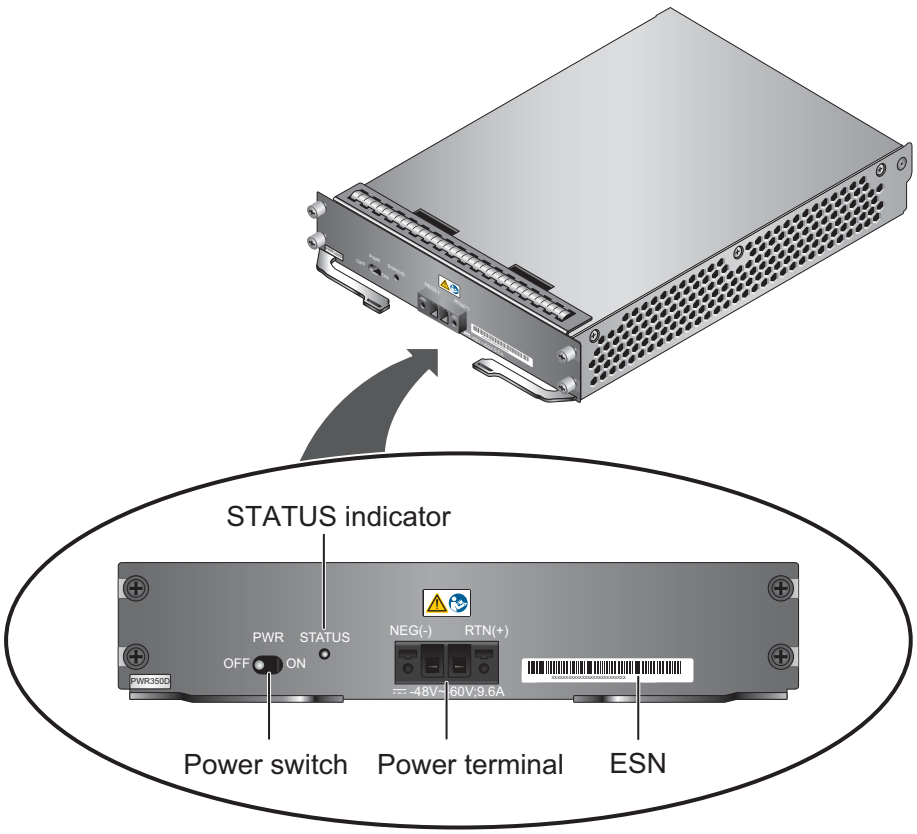
Item	Description
Silkscreen	PWR350A or PAC-350WD-L **NOTE** Currently, the 350W AC power module used on the USG is PAC-350WD-L. In the early time, the 350W AC power module used on the USG is PWR350A. The two types of power modules provide the same function and can serve as spare parts for each other.
Dimensions (H x W x D)	38.5 mm x 201.0 mm x 260.5 mm
Weight	1.45 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)

Item	Description
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	350 W

350 W DC Power Module

The 350 W DC power module is a DC-input and DC-output power module. **Figure 2-77** illustrates the appearance of the DC power module.

Figure 2-77 Appearance of the 350 W DC power module



Name	Description
Power switch	The power switch allows you to turn on or off the power output.
STATUS indicator (green/red)	● Steady green: The output of the DC power module is normal. ● Steady red: The output of the DC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power cable terminal	Connect the black wire to the RTN (+) terminal and the blue wire to the NEG (-) terminal.
SN	The serial number that uniquely identifies the power module.

Table 2-64 lists the functions of the 350 W DC power module.

Table 2-64 Functions of the 350 W DC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-65 lists the technical specifications of the 350 W DC power module.

Table 2-65 Technical specifications of the 350 W DC power module

Item	Description
Silkscreen	PWR350D
Dimensions (H x W x D)	38.5 mm x 201.0 mm × 260.5 mm
Weight	1.50 kg
Input	
Rated input voltage range	-48 V DC to -60 V DC
Maximum input voltage range	-40 V DC to -72 V DC
Maximum input current	9.6 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	350 W

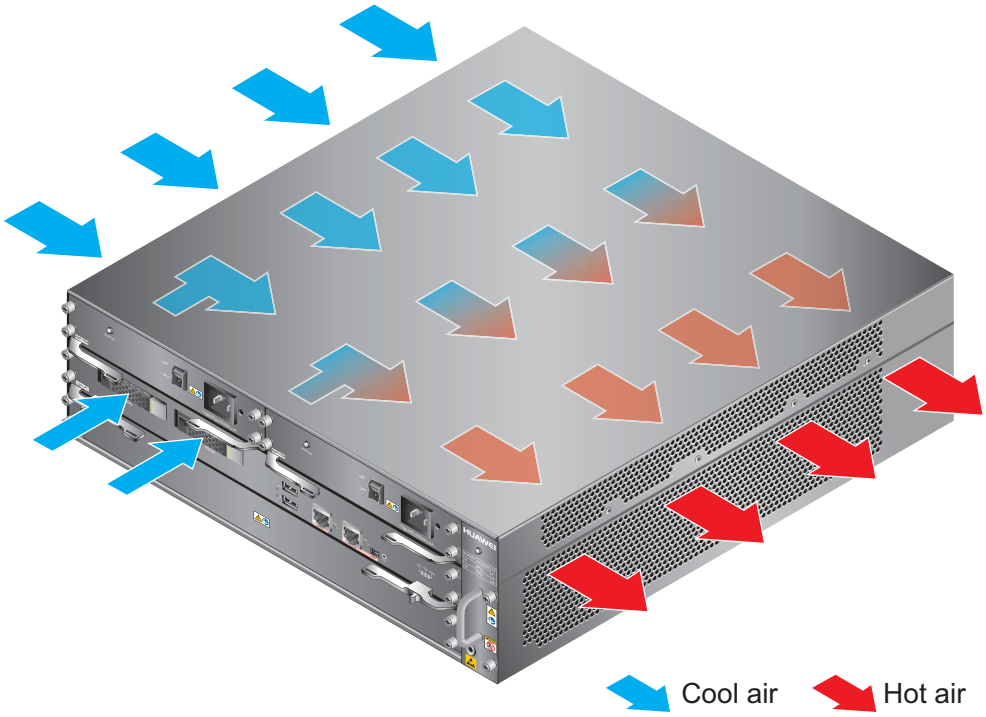
2.3.2.5 Heat Dissipation System

The USG6650/6660 provides a dedicated fan module for heat dissipation.

System Air Flow

Figure 2-78 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation sloton the front side, and the air exhaust is on the right side. The fan module locates at the air exhaust of the system.

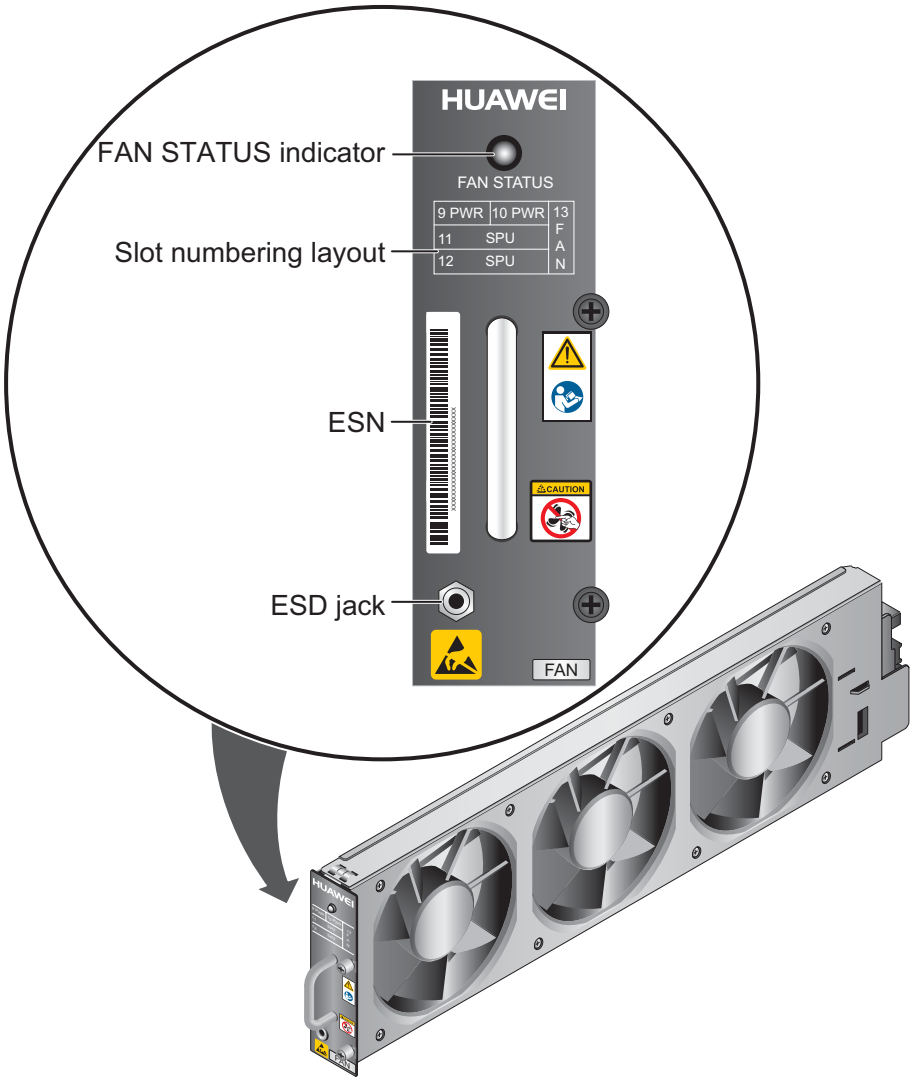
Figure 2-78 System air flow



Fan Module

The fan module supports hot swapping. The fan module consists of a fan tray, fans, and a fan control board (FCB). **Figure 2-79** illustrates the appearance of the fan module.

Figure 2-79 Appearance of the fan module



Name	Description
FAN STATUS indicator (green/red)	● Blink green every two seconds (0.5 Hz): The fan module is running normally. ● Blink green four times every second (4 Hz): The communication between the fan module and the device is lost. ● Blink red: The fan module is faulty and an alarm is generated.
Slot numbering	The slot numbering indicate the slot numbers and layout. For example, 13 FAN means that the fan module is installed in slot 13.
SN	The serial number that uniquely identifies the fan module.

Name	Description
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Table 2-66 lists the technical specifications of the fan module.

Table 2-66 Technical specifications of the fan module

Item	Description
Silkscreen	FAN
Dimensions (H x W x D)	27.4 mm × 478.6 mm × 125.7 mm
Weight	1.45 kg
Maximum power	90 W
Maximum wind pressure	226 Pa
Maximum capacity	543 CFM
Maximum noise	66.8 dB
Working voltage range of individual fans	7 V DC to 15 V DC
Dimensions (H x W x D) of each fan	25.4 mm x 120.0 mm x 120.0 mm
Number of fans	3

Fan Speed Adjustment Policy

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

2.3.2.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6650/6660.

Table 2-67 lists the technical specifications of the USG6650/6660.

Table 2-67 USG6650/6660 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.2 GHz processor
Memory	DDR3 16 GB
Flash	64 MB
CF card	2 GB
Hard disk	Optional. Purchase one or two 2.5-inch SAS hard disks (300GB/600GB/1200GB available) from Huawei as required. Two hard disks with the same capacity can form RAID1 back up and are hot swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Not supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	130.5 mm x 442 mm x 470 mm
Weight	Standard: 18 kg Fully configured: 24 kg
Power specifications	
AC power	Supported, 1+1 power redundancy, hot-swappable
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	5 A
DC power	Supported only by USG6660, 1+1 power redundancy, hot-swappable
Rated input voltage (DC)	-48 V to -60 V
Maximum input voltage (DC)	-40 V to -72 V
Maximum input current (DC)	9.6 A
Maximum output power	350 W
Heat dissipation	
Fan module	Supported, hot-swappable
Number of fans	3

Item		Description
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 RJ45 and 1 Mini USB (only either of them can be used at a time)
USB 2.0 port		2
Mandatory service ports		● 8 GE optical ports ● 8 10/100/1000M autosensing Ethernet electrical ports ● 2 10GE optical ports
Expansion slot		6 WSIC slots or 2 WSIC slot + 4 XSIC slots
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	27.07
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 3 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.3.3 USG6670

The USG6670 has both AC and DC models and provides two 2XG8GE expansion cards and one 8GEF expansion card by default.

2.3.3.1 Device Overview

The USG6670 uses an integrated chassis that contains the SPUA (main processing unit), interface card, power module, and fan module. You can also add some optional modules, such as hard disk and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-80 illustrates the appearance of the USG6670.

Figure 2-80 Appearance of USG6670

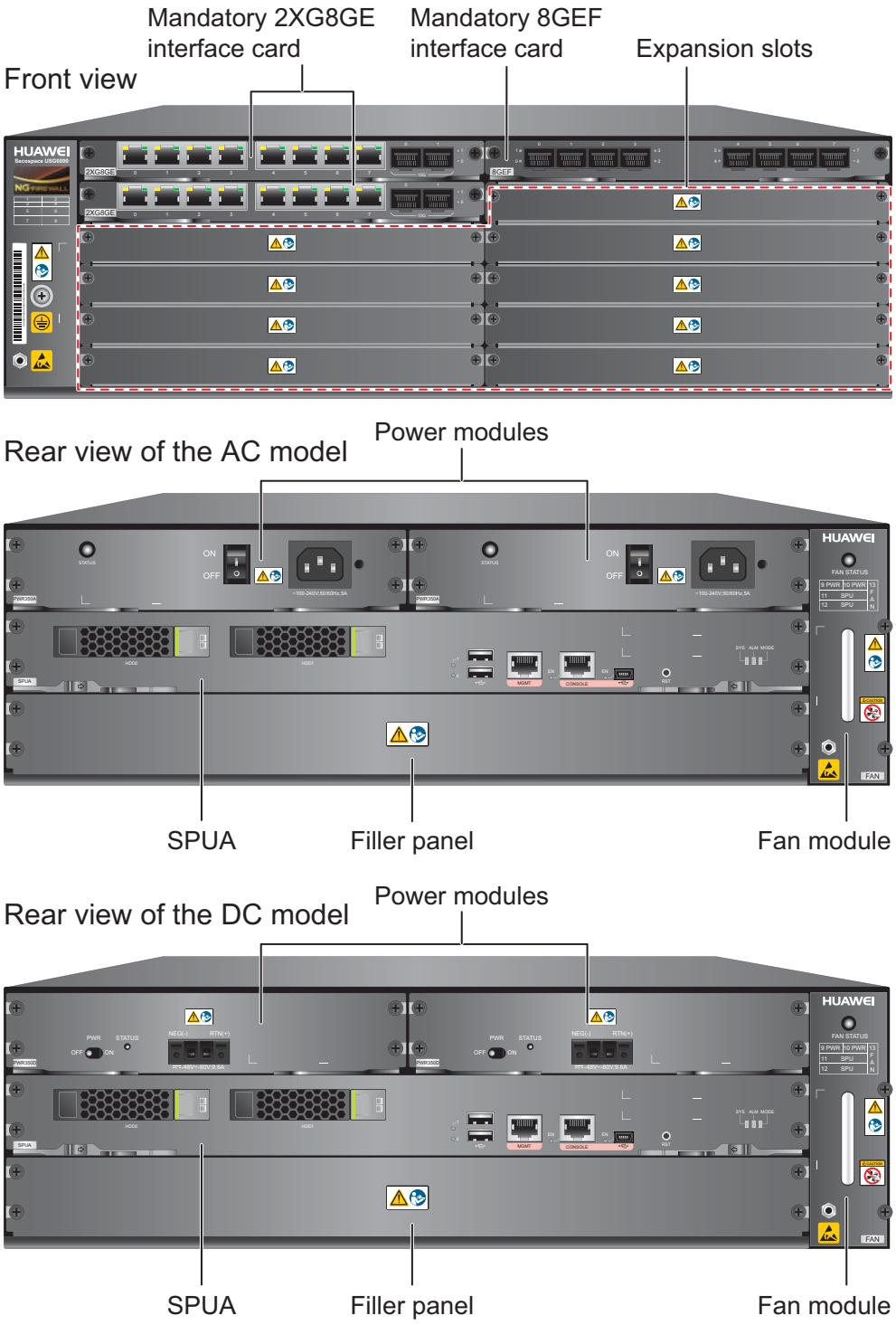


Table 2-68 describes the functions of the USG6670 components.

Table 2-68 Functions of the USG6670 components

Name	Description
SPUA (the main processing unit)	SPUA is the core component for system control and management and provides the management, forwarding, and control planes and an intelligent awareness engine. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. It can use the hard disk SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A to record logs and reports in real time. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
Interface card (mandatory)	The interface card provides gigabit and 10-gigabit electrical and optical ports. The interface card is installed before shipment and can be moved to another slot. The interface card is not hot-swappable.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-69** lists the supported expansion cards.
Power module	Two DC or AC power modules are mandatory to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.
Fan module	The fan module provides air flow for heat dissipation. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute.
Filler panel	Ensures normal air flow and keeps out dust.

Ports

The SPUA provides the following fixed ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 1 console port (mini USB)
- 2 USB 2.0 ports

The USG6670 by default has two 2XG8GE interface cards and one 8GEF interface card to provide the following service ports:

- 8 GE optical ports
- 16 10/100/1000M autosensing Ethernet electrical ports
- 4 10GE optical ports

The five expansion slots on the USG6670 support the expansion cards listed in **Table 2-69**.

NOTE

The slots are divided into two types: one for Wide Service Interface Cards (WSIC) and the other for Extended Service Interface Cards (XSIC). An XSIC is twice as high as a WSIC. An XSIC slot can also hold a WSIC card, but only in the lower part, and in this case, no other card can be installed in the upper part.

Table 2-69 Supported expansion cards

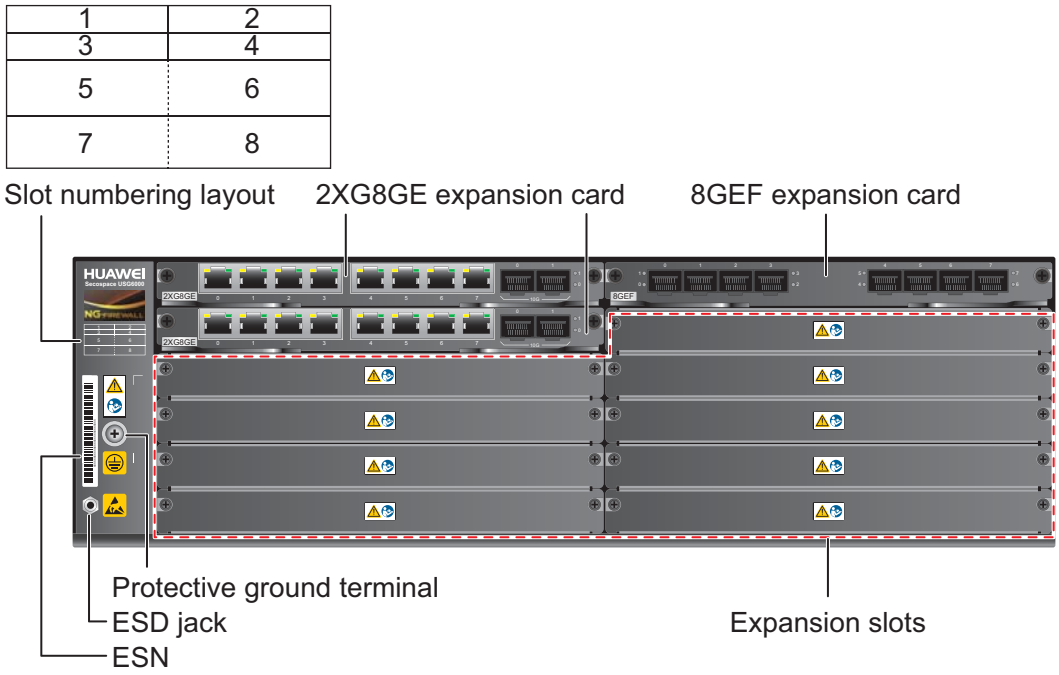
Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

2.3.3.2 Front Panel

By default, the USG6670 front panel has two 2XG8GE interface cards, one 8GEF interface card, a protective ground terminal, an ESD jack, and some expansion slots.

The front panel of the USG6670 is pictured in **Figure 2-81**.

Figure 2-81 USG6670 front panel



Name	Description
Slot numbering	Indicates the slot numbering layout. Slots 1 through 4 are WSIC slots, and slots 5 through 8 are XSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. The slot number is the number described in this row. When a WSIC is installed in the lower part of an XSIC slot, the slot number of the WSIC is the XSIC slot number. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
2XG8GE expansion card (in slot 1)	The 2XG8GE card is mandatory and provides eight gigabit RJ45 Ethernet ports and two 10-gigabit SFP+ ports. The interfaces on the interface card are numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/9 (left to right). For details on the 2XG8GE interface card, see **2.4.2 2XG8GE WSIC Interface Card**.
2XG8GE expansion card (in slot 3)	The 2XG8GE interface card is mandatory. The interfaces on the interface card are numbered from GigabitEthernet 3/0/0 to GigabitEthernet 3/0/9 (left to right).
8GEF expansion card (in slot 2)	The 8GEF interface card is mandatory and provides eight GE SFP ports. The interfaces on the interface card are numbered from GigabitEthernet 2/0/0 to GigabitEthernet 2/0/7 (left to right). For details on the interface card, see **2.4.3 8GEF WSIC Interface Card**.

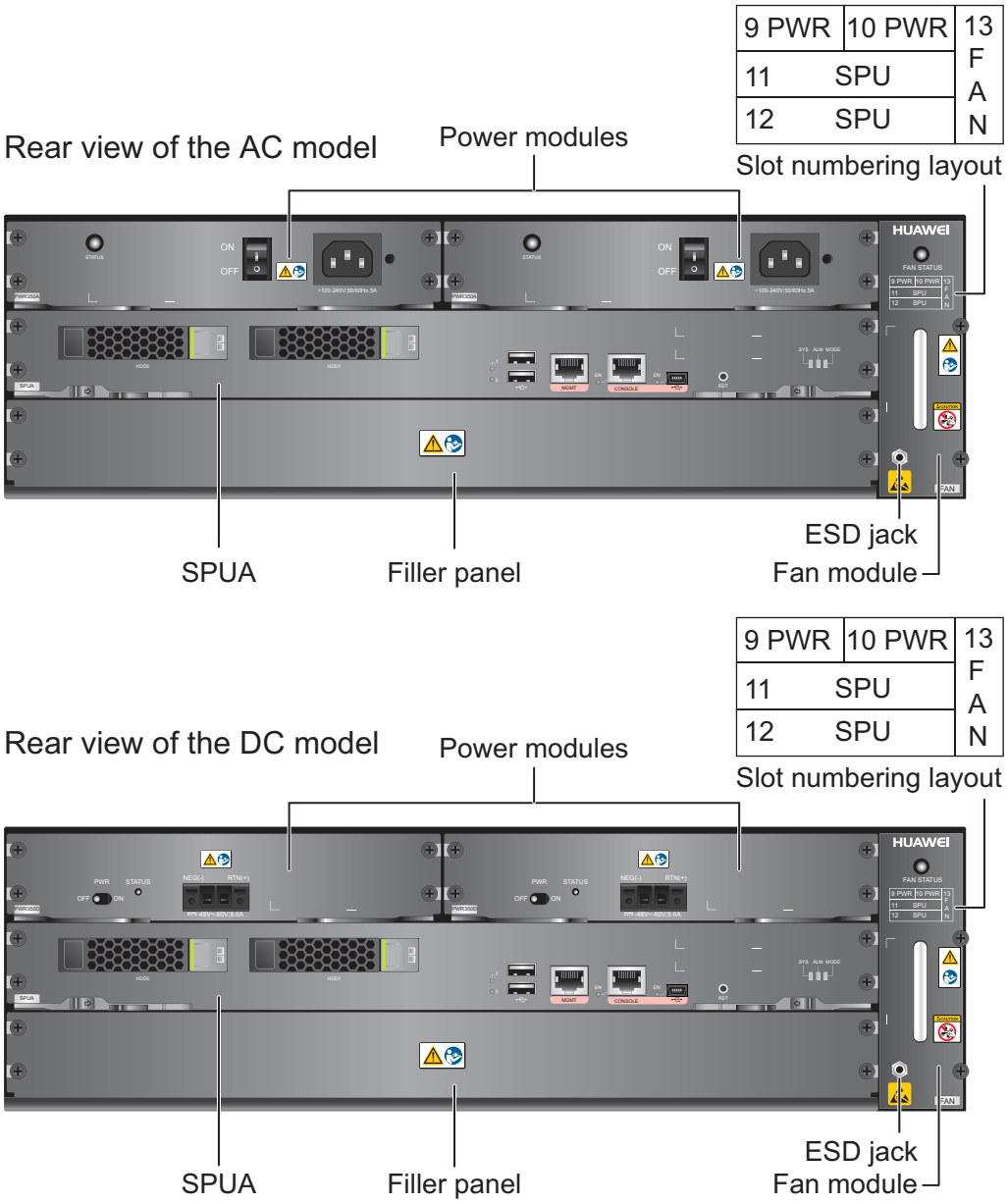
Name	Description
Expansion slot	Provides one WSIC slot and four XSIC slots. When a WSIC is installed in the lower part of an XSIC slot, install a filler panel on the empty upper part of the slot to ensure a normal air flow and keep out dust.
Protective ground terminal	The M4 OT terminal connects the PGND cable to a cabinet, the ground point of the workbench, or the ground bar in an equipment room.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

2.3.3.3 Rear Panel

The USG6670 rear panel provides power modules, a fan module, and boards, such as SPU.

Figure 2-82 illustrates the rear panel of the USG6670.

Figure 2-82 USG6670 rear panel



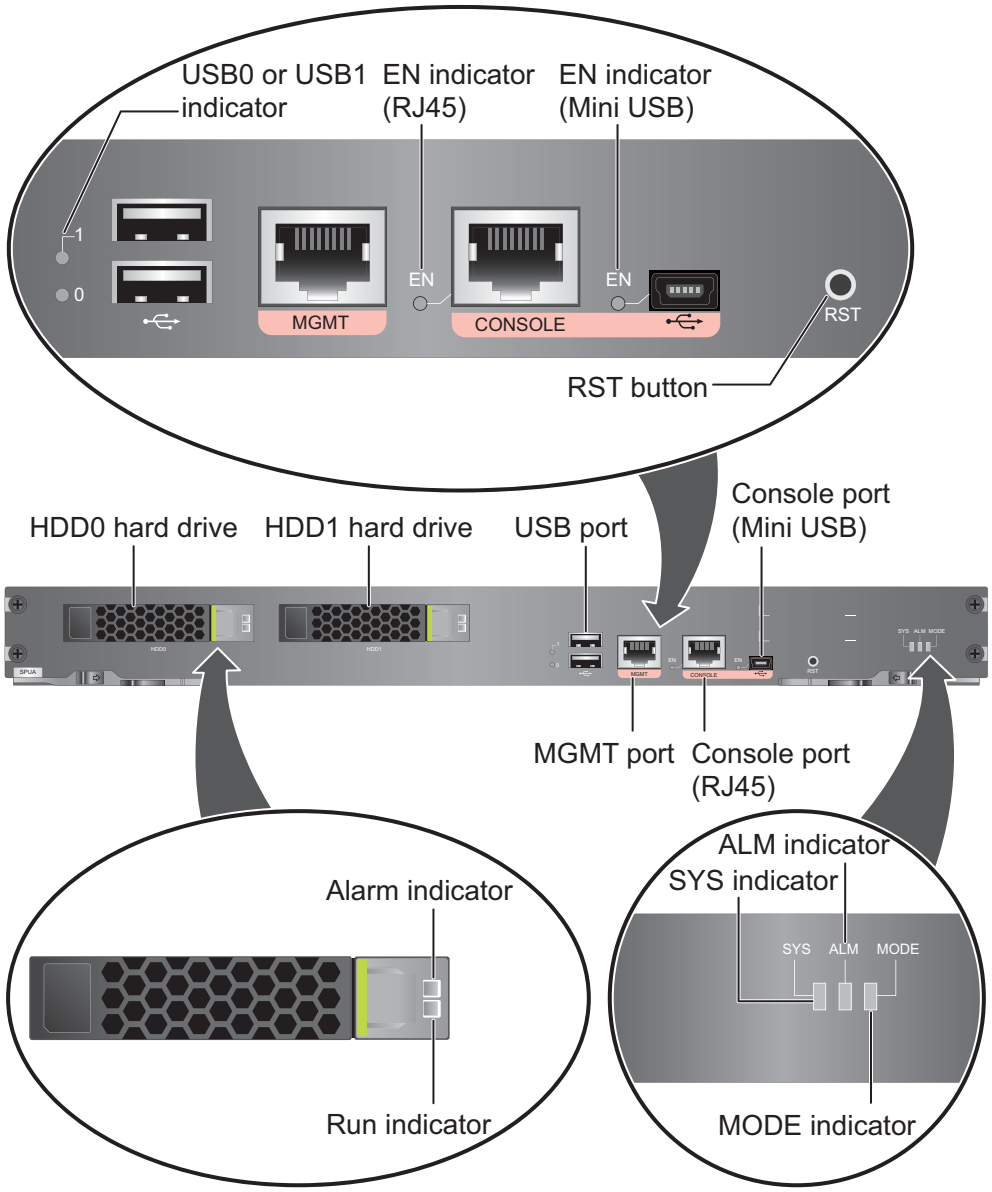
Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
SPUA (the main processing unit, in slot SPU11)	The core component for system control and management. SPUA provides an out-of-band management port, console port, and USB port for management access. SPUA can optionally provide one or two hard disks (SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A) as required. SPUA is installed in slot SPU11 and cannot be removed. For details, see **SPUA (the main processing unit)**.

Name	Description
Filler panel (in slot SPU12)	Ensures normal air flow and keeps out dust.
Fan module (in slot FAN13)	The fan module provides air flow for heat dissipation. The slot numbering layout and ESD jack are also located in the fan module. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute. For details, see **2.3.3.5 Heat Dissipation System**.
Power modules (in slots PWR9 and PWR10)	Provides power input and distribution for the device. Two DC or AC power modules are mandatory to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.3.3.4 Power Supply System**.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

SPUA (the main processing unit)

The SPUA is pictured in **Figure 2-83**.

Figure 2-83 SPUA



Name	Description
Hard Disk Ports and Indicators	

Name	Description
HDD0 or HDD1	Hard disk slot, supporting one SM-HDD-SAS300G-A or SM-HDD-SAS600G-A hard disk. The hard disks are optional. You can purchase one or two hard disks from Huawei if needed. To ensure hard disk data reliability, you are advised to purchase two hard disks with the same capacity to create RAID1 for data backup. For details, see **2.5.1 Hard Disk Unit SM-HDD-SAS300G-A**, **2.5.2 Hard Disk Unit SM-HDD-SAS600G-A** and **2.5.3 Hard Disk Unit SM-HDD-SAS1200G-A**. **NOTICE** ● Ensure that two hard disks with the same capacity are used for creating RAID. Otherwise, creating RAID fails. ● The FW starts to support SM-HDD-SAS600G-A hard disks since V500R001C20SPC200. If you use SM-HDD-SAS600G-A hard disks on earlier versions, the SM-HDD-SAS600G-A hard disks will be identified as non-Huawei hard disks. You need to upgrade the FW version. ● The USG starts to support SM-HDD-SAS1200G-A hard disk since V500R001C50. If you use SM-HDD-SAS1200G-A hard disk on earlier versions, the SM-HDD-SAS1200G-A hard disk will be identified as non-Huawei hard disks. You need to upgrade the software version.
HDD0 or HDD1 hard disk alarm indicator (red)	● Steady on: HDD0 or HDD1 hard disk fails. ● Off: HDD0 or HDD1 hard disk is running normally.
HDD0 or HDD1 hard disk run indicator (green)	● Steady on: HDD0 or HDD1 hard disk is present. ● Blink: HDD0 or HDD1 hard disk is reading or writing data. ● Off: HDD0 or HDD1 hard disk is not detected.
USB Ports and indicators	
USB0 and USB1 ports	USB ports allow you to insert USB devices for system software upgrades. For details, refer to the *Upgrade Guide* delivered with the device.
USB0 or USB1 port indicator (green)	● Steady on: USB0 or USB1 is connected. ● Off: USB0 or USB1 is not connected.
Console Ports and Indicators	
Console port (RJ45)	Console ports allow you to locally connect to the device. The RJ45 and mini USB console ports cannot be used simultaneously. If both console ports are connected, only the mini USB console port can be used. ● You can use a mini-USB-to-USB cable to connect the mini USB console port on the device to the USB port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device. ● You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a

Name	Description
Console port (Mini USB)	serial port terminal program on your PC to access, configure, and manage the device.
EN indicator (RJ45, green)	● Steady on: The console port (RJ45) is in use. ● Off: The console port (RJ45) is not in use.
EN indicator (Mini USB, green)	● Steady on: The console port (Mini USB) is connected and in use. ● Off: The console port (Mini USB) is not in use.
Others	
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device. **NOTE** The MGMT port cannot be used as a service port.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. Press and hold down the RST button and power on the device. Three to five seconds later, when the MODE indicator on SPUA is blinking, release the RST button to restore the default settings. **NOTE** If a hard disk is installed on the device, you must run the **disk offline** command in system view and wait for approximately 30 seconds until the system displays that the hard disk has stopped working before pressing the RST button. Otherwise, the data may be lost or the hard disk be damaged.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.

Name	Description
SYS indicator (green)	● On: The system is powering on or restarting. ● Blinks every two seconds (0.5 Hz): The system is running normally. ● Blinks twice every second (2 Hz): The system is starting. ● Blinks eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

Table 2-70 describes the SPUA specifications.

Table 2-70 SPUA specifications

Item	Description
Silkscreen	SPUA
Dimensions (H x W x D)	40.14 mm x 402.80 mm × 270.00 mm
Weight	1 kg
Power	109 W

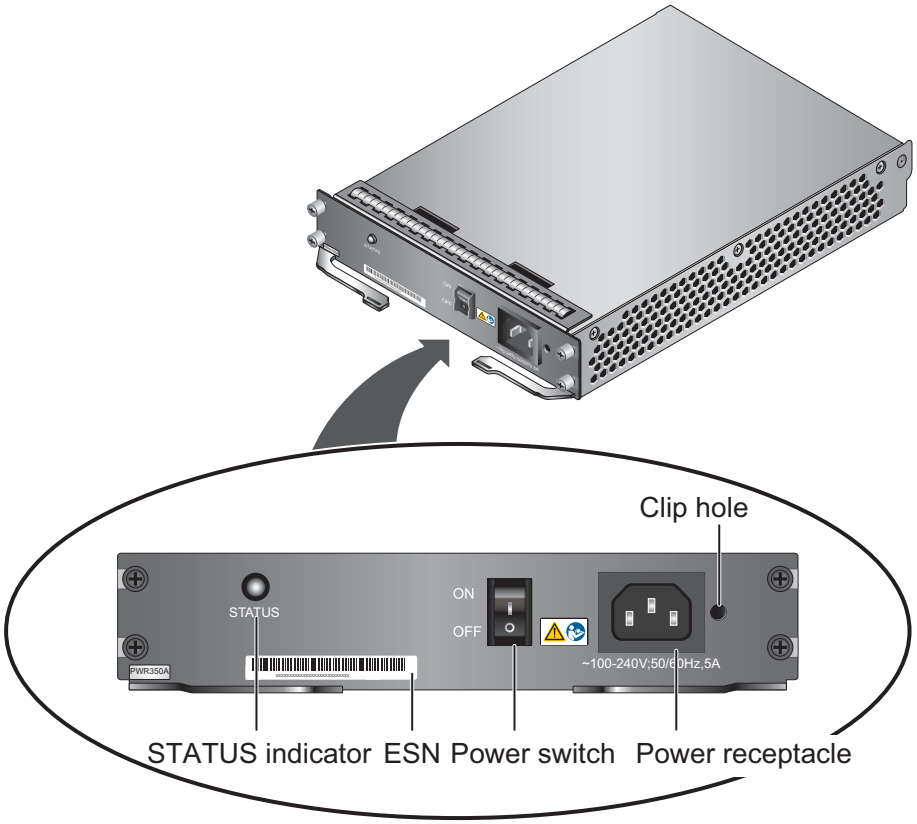
2.3.3.4 Power Supply System

The USG6670 has two 350 W AC or DC power modules for 1+1 power redundancy.

350 W AC Power Module

The 350 W AC power module converts AC power to DC power for the device. **Figure 2-84** illustrates the appearance of the AC power module.

Figure 2-84 Appearance of the 350 W AC power module



Name	Description
STATUS indicator (green/red)	● Steady green: The output of the AC power module is normal. ● Steady red: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
SN	The serial number that uniquely identifies the power module.
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

Table 2-71 lists the functions of the 350 W AC power module.

Table 2-71 Functions of the 350 W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-72 lists the technical specifications of the 350 W AC power module.

Table 2-72 Technical specifications of the 350 W AC power module

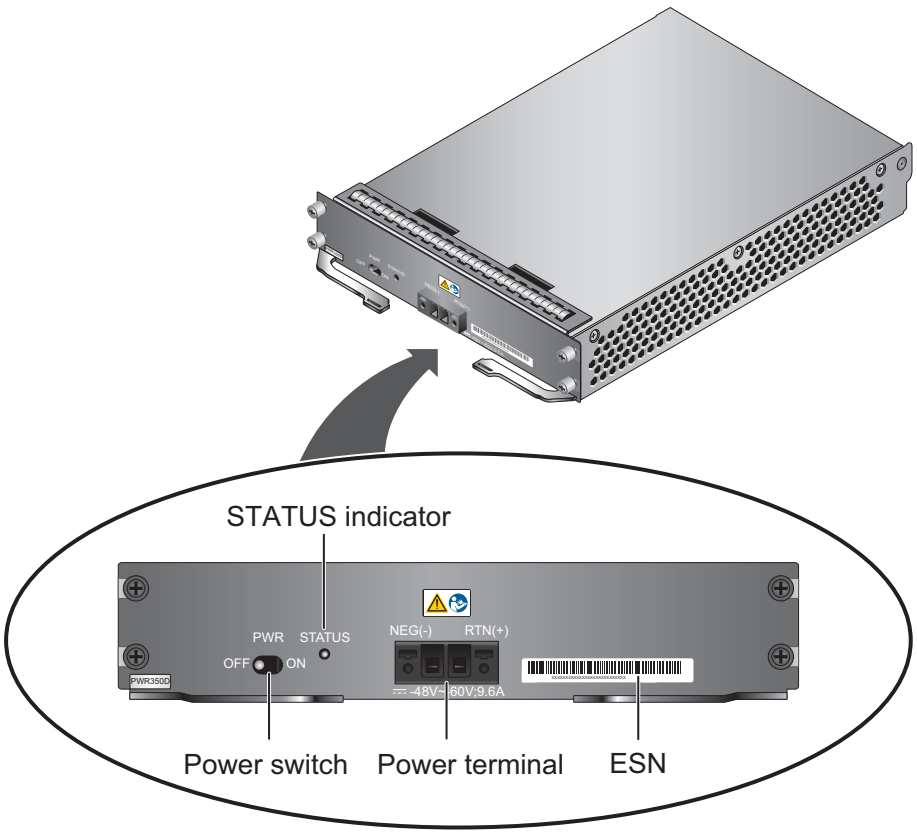
Item	Description
Silkscreen	PWR350A or PAC-350WD-L **NOTE** Currently, the 350W AC power module used on the USG is PAC-350WD-L. In the early time, the 350W AC power module used on the USG is PWR350A. The two types of power modules provide the same function and can serve as spare parts for each other.
Dimensions (H x W x D)	38.5 mm x 201.0 mm x 260.5 mm
Weight	1.45 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)

Item	Description
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	5 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	350 W

350 W DC Power Module

The 350 W DC power module is a DC-input and DC-output power module. **Figure 2-85** illustrates the appearance of the DC power module.

Figure 2-85 Appearance of the 350 W DC power module



Name	Description
Power switch	The power switch allows you to turn on or off the power output.
STATUS indicator (green/red)	● Steady green: The output of the DC power module is normal. ● Steady red: The output of the DC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power cable terminal	Connect the black wire to the RTN (+) terminal and the blue wire to the NEG (-) terminal.
SN	The serial number that uniquely identifies the power module.

Table 2-73 lists the functions of the 350 W DC power module.

Table 2-73 Functions of the 350 W DC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-74 lists the technical specifications of the 350 W DC power module.

Table 2-74 Technical specifications of the 350 W DC power module

Item	Description
Silkscreen	PWR350D
Dimensions (H x W x D)	38.5 mm x 201.0 mm × 260.5 mm
Weight	1.50 kg
Input	
Rated input voltage range	-48 V DC to -60 V DC
Maximum input voltage range	-40 V DC to -72 V DC
Maximum input current	9.6 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	350 W

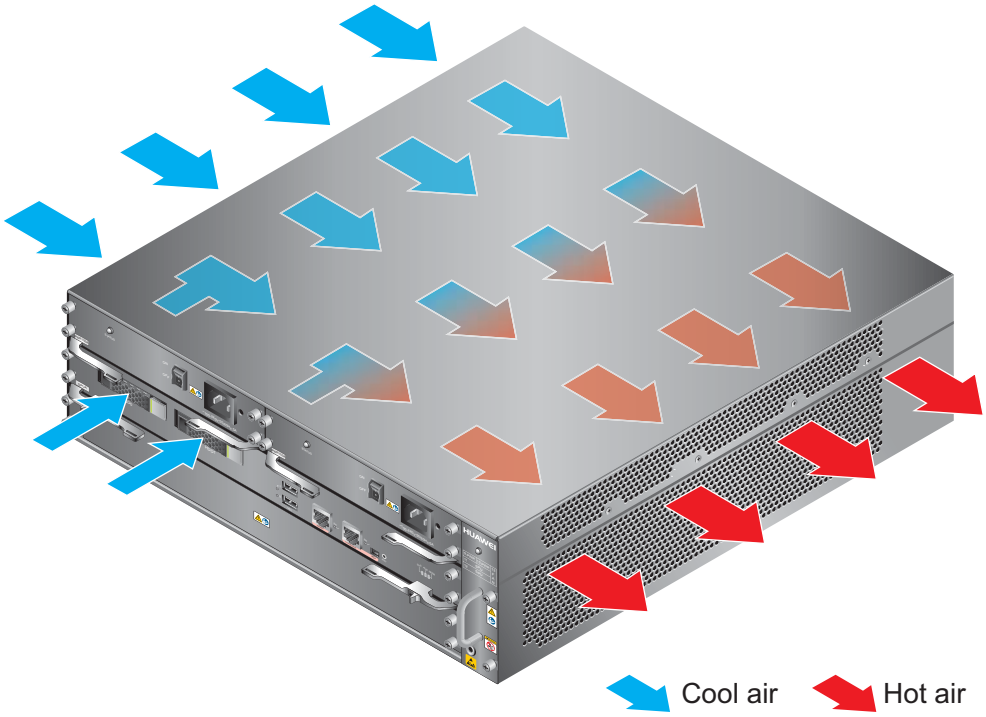
2.3.3.5 Heat Dissipation System

The USG6670 provides a dedicated fan module for heat dissipation.

System Air Flow

Figure 2-86 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation sloton the front side, and the air exhaust is on the right side. The fan module locates at the air exhaust of the system.

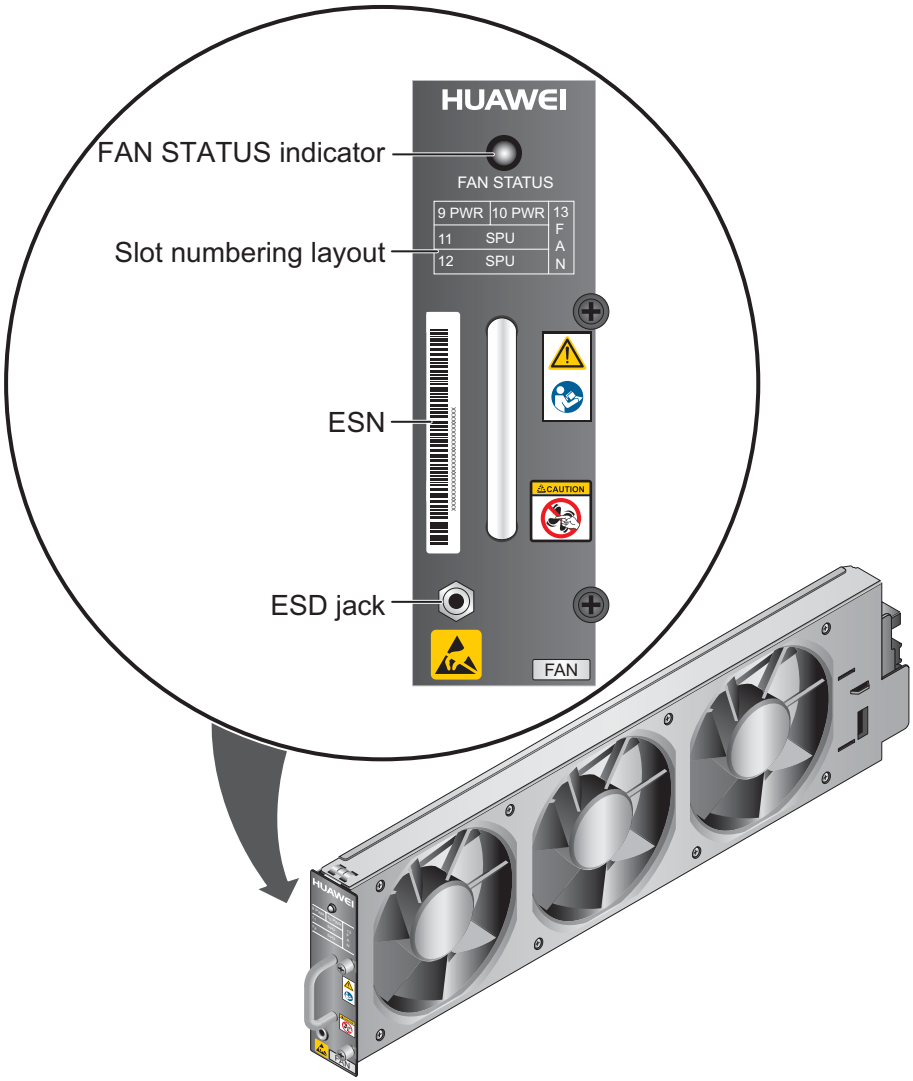
Figure 2-86 System air flow



Fan Module

The fan module supports hot swapping. The fan module consists of a fan tray, fans, and a fan control board (FCB). **Figure 2-87** illustrates the appearance of the fan module.

Figure 2-87 Appearance of the fan module



Name	Description
FAN STATUS indicator (green/red)	● Blink green every two seconds (0.5 Hz): The fan module is running normally. ● Blink green four times every second (4 Hz): The communication between the fan module and the device is lost. ● Blink red: The fan module is faulty and an alarm is generated.
Slot numbering	The slot numbering indicate the slot numbers and layout. For example, 13 FAN means that the fan module is installed in slot 13.
SN	The serial number that uniquely identifies the fan module.

Name	Description
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Table 2-75 lists the technical specifications of the fan module.

Table 2-75 Technical specifications of the fan module

Item	Description
Silkscreen	FAN
Dimensions (H x W x D)	27.4 mm × 478.6 mm × 125.7 mm
Weight	1.45 kg
Maximum power	90 W
Maximum wind pressure	226 Pa
Maximum capacity	543 CFM
Maximum noise	66.8 dB
Working voltage range of individual fans	7 V DC to 15 V DC
Dimensions (H x W x D) of each fan	25.4 mm x 120.0 mm x 120.0 mm
Number of fans	3

Fan Speed Adjustment Policy

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

2.3.3.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6670.

Table 2-76 lists the technical specifications of the USG6670.

Table 2-76 USG6670 technical specifications

Item	Description
System specifications	
CPU	Multi-core 1.2 GHz processor
Memory	DDR3 16 GB
Flash	64 MB
CF card	2 GB
Hard disk	Optional. Purchase one or two 2.5-inch SAS hard disks (300GB/600GB/1200GB available) from Huawei as required. Two hard disks with the same capacity can form RAID1 back up and are hot swappable.
SPUB (the service engine)	Not supported
4G LTE Data Card	Not supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	130.5 mm x 442 mm x 470 mm
Weight	Standard: 20 kg Fully configured: 24 kg
Power specifications	
AC power	Supported, 1+1 power redundancy, hot-swappable
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	5 A
DC power	Supported, 1+1 power redundancy, hot-swappable
Rated input voltage (DC)	-48 V to -60 V
Maximum input voltage (DC)	-40 V to -72 V
Maximum input current (DC)	9.6 A
Maximum output power	350 W
Heat dissipation	
Fan module	Supported, hot-swappable
Number of fans	3

Item		Description
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 RJ45 and 1 Mini USB (only either of them can be used at a time)
USB 2.0 port		2
Mandatory service ports		● 8 GE optical ports ● 16 10/100/1000M autosensing Ethernet electrical ports ● 4 10GE optical ports
Expansion slot		5 WSIC slots or 1 WSIC slot + 4 XSIC slots
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	23.67
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[e]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[e]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Storage relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude		Without hard disk: 5,000 m With hard disk(s): 3,000 m

Item	Description
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 3 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.3.4 USG6680

The USG6680 has both AC and DC models and provides two 2XG8GE expansion cards, one 8GEF expansion card, and one SPUB (service engine) by default.

2.3.4.1 Device Overview

The USG6680 uses an integrated chassis that contains the SPUA (main processing unit), SPUB (service engine), interface card, power module, and fan module. You can also add some optional modules, such as hard disk and expansion cards, to improve system reliability and add more ports.

Appearance

Figure 2-88 illustrates the appearance of the USG6680.

Figure 2-88 Appearance of USG6680

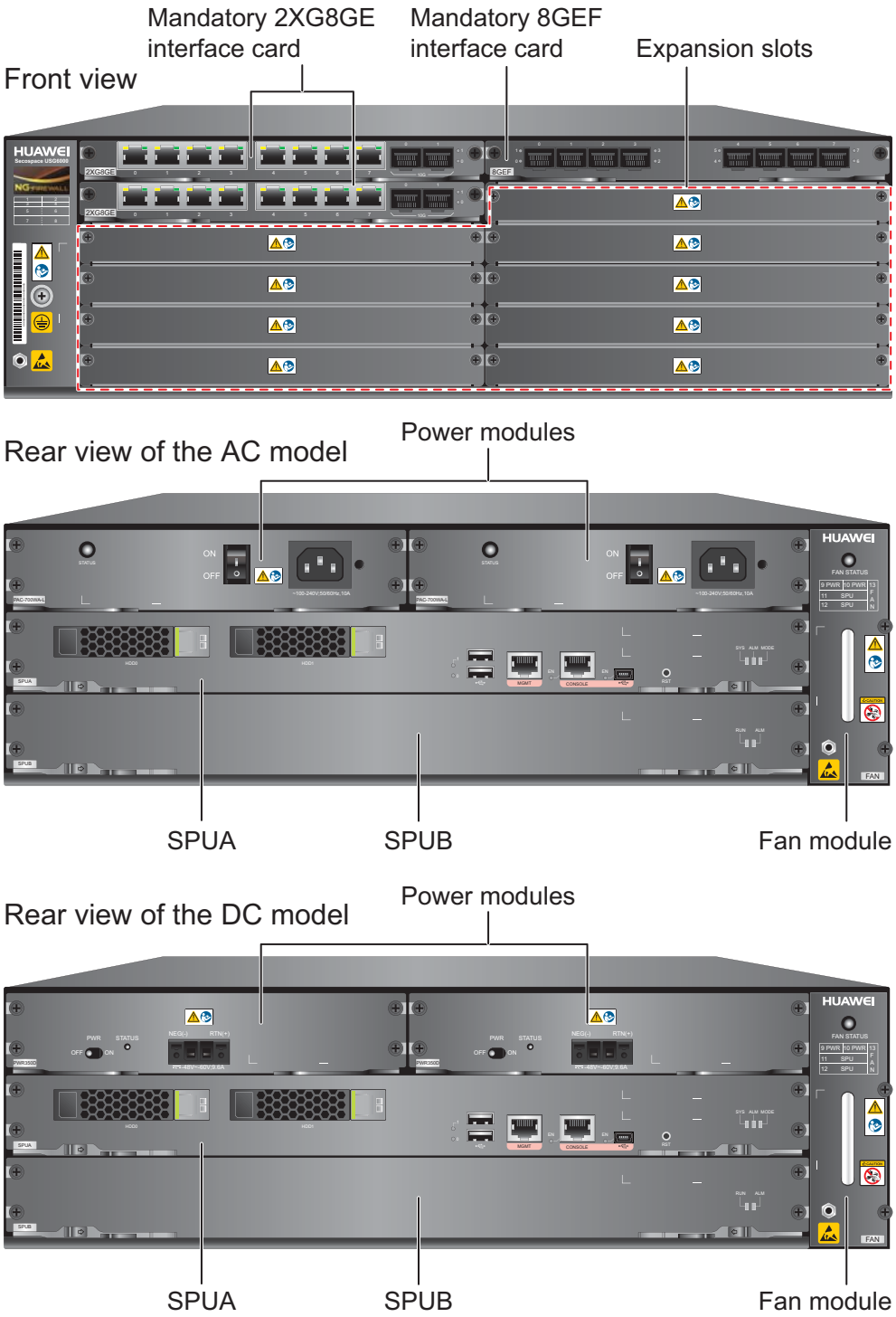


Table 2-77 describes the functions of the USG6680 components.

Table 2-77 Functions of the USG6680 components

Name	Description
SPUA (the main processing unit)	SPUA is the core component for system control and management and provides the management, forwarding, and control planes. Meanwhile, both SPUA and SPUB have an intelligent awareness engine (IAE) and provide intelligent awareness service. ● Management plane: provides ports for configuration, test, and maintenance and implements such functions as running status monitoring, environment monitoring, log and alarm processing, system loading, and system upgrades. It can use the hard disk SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A to record logs and reports in real time. ● Forwarding plane: parses and processes packets and associates with other planes to forward, discard, or translate packets. ● Control plane: obtains user authentication information and sends authentication results to the forwarding plane, so that the forwarding plane can process packets based on user information. ● Intelligent awareness engine: is aware of the service of each packet, parses the content to identify the application of the packet as well as the file, virus, URL, email field, intrusion, and attack information in the packet or flow, and provides the forwarding plane with the detection result for further processing.
SPUB (the service engine)	SPUB has an IAE to provide content security. The CPU resources of SPUB on the USG6680 are dedicated for the IAE. Therefore, USG6680 has a higher performance than other USG products.
Interface card (mandatory)	The interface card provides gigabit and 10-gigabit electrical and optical ports. The interface card is installed before shipment and can be moved to another slot. The interface card is not hot-swappable.
Expansion slot	Expansion slots are reserved for expansion cards to provide more ports or functions. **Table 2-78** lists the supported expansion cards.
Power module	Two DC or AC power modules are mandatory to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation.

Name	Description
Fan module	The fan module provides air flow for heat dissipation. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute.

Ports

The SPUA provides the following fixed ports:

- 1 out-of-band management port (RJ45)
- 1 console port (RJ45)
- 1 console port (mini USB)
- 2 USB 2.0 ports

The USG6680 by default has two 2XG8GE interface cards and one 8GEF interface card to provide the following service ports:

- 8 GE optical ports
- 16 10/100/1000M autosensing Ethernet electrical ports
- 4 10GE optical ports

The five expansion slots on the USG6680 support the expansion cards listed in **Table 2-78**.

NOTE

The slots are divided into two types: one for Wide Service Interface Cards (WSIC) and the other for Extended Service Interface Cards (XSIC). An XSIC is twice as high as a WSIC. An XSIC slot can also hold a WSIC card, but only in the lower part, and in this case, no other card can be installed in the upper part.

Table 2-78 Supported expansion cards

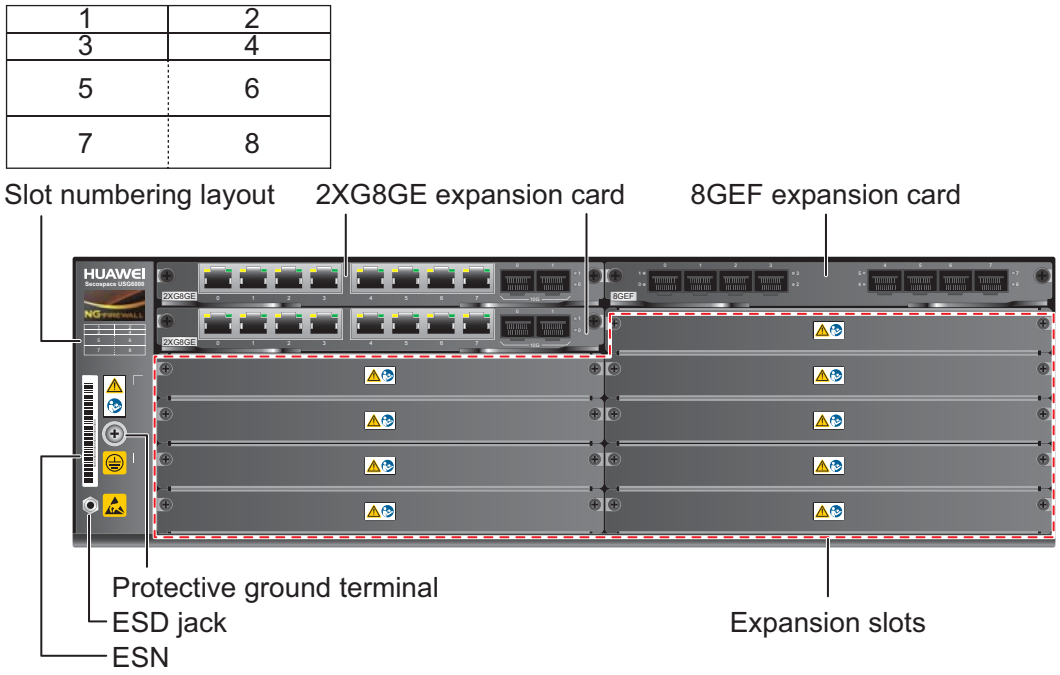
Expansion Card	Description
8GE WSIC Interface Card	Provides eight gigabit RJ45 Ethernet ports.
2XG8GE WSIC Interface Card	Provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports.
8GEF WSIC Interface Card	Provides eight gigabit SFP ports.
4GE-BYPASS WSIC Card	Provides two electrical bypass links.

2.3.4.2 Front Panel

By default, the USG6680 front panel has two 2XG8GE interface cards, one 8GEF interface card, a protective ground terminal, an ESD jack, and some expansion slots.

The front panel of the USG6680 is pictured in **Figure 2-89**.

Figure 2-89 USG6680 front panel



Name	Description
Slot numbering	Indicates the slot numbering layout. Slots 1 through 4 are WSIC slots, and slots 5 through 8 are XSIC slots. Interfaces are numbered in the format of "interface type A/B/C", where: ● A is the slot number of the interface card. The slot number is the number described in this row. When a WSIC is installed in the lower part of an XSIC slot, the slot number of the WSIC is the XSIC slot number. ● B is the daughter card number, which is 0 because no daughter card is installed now. ● C is the interface number, which begins with 0 and is numbered from bottom to top and left to right.
2XG8GE expansion card (in slot 1)	The 2XG8GE card is mandatory and provides eight gigabit RJ45 Ethernet ports and two 10-gigabit SFP+ ports. The interfaces on the interface card are numbered from GigabitEthernet 1/0/0 to GigabitEthernet 1/0/9 (left to right). For details on the 2XG8GE interface card, see **2.4.2 2XG8GE WSIC Interface Card**.
2XG8GE expansion card (in slot 3)	The 2XG8GE interface card is mandatory. The interfaces on the interface card are numbered from GigabitEthernet 3/0/0 to GigabitEthernet 3/0/9 (left to right).
8GEF expansion card (in slot 2)	The 8GEF interface card is mandatory and provides eight GE SFP ports. The interfaces on the interface card are numbered from GigabitEthernet 2/0/0 to GigabitEthernet 2/0/7 (left to right). For details on the interface card, see **2.4.3 8GEF WSIC Interface Card**.

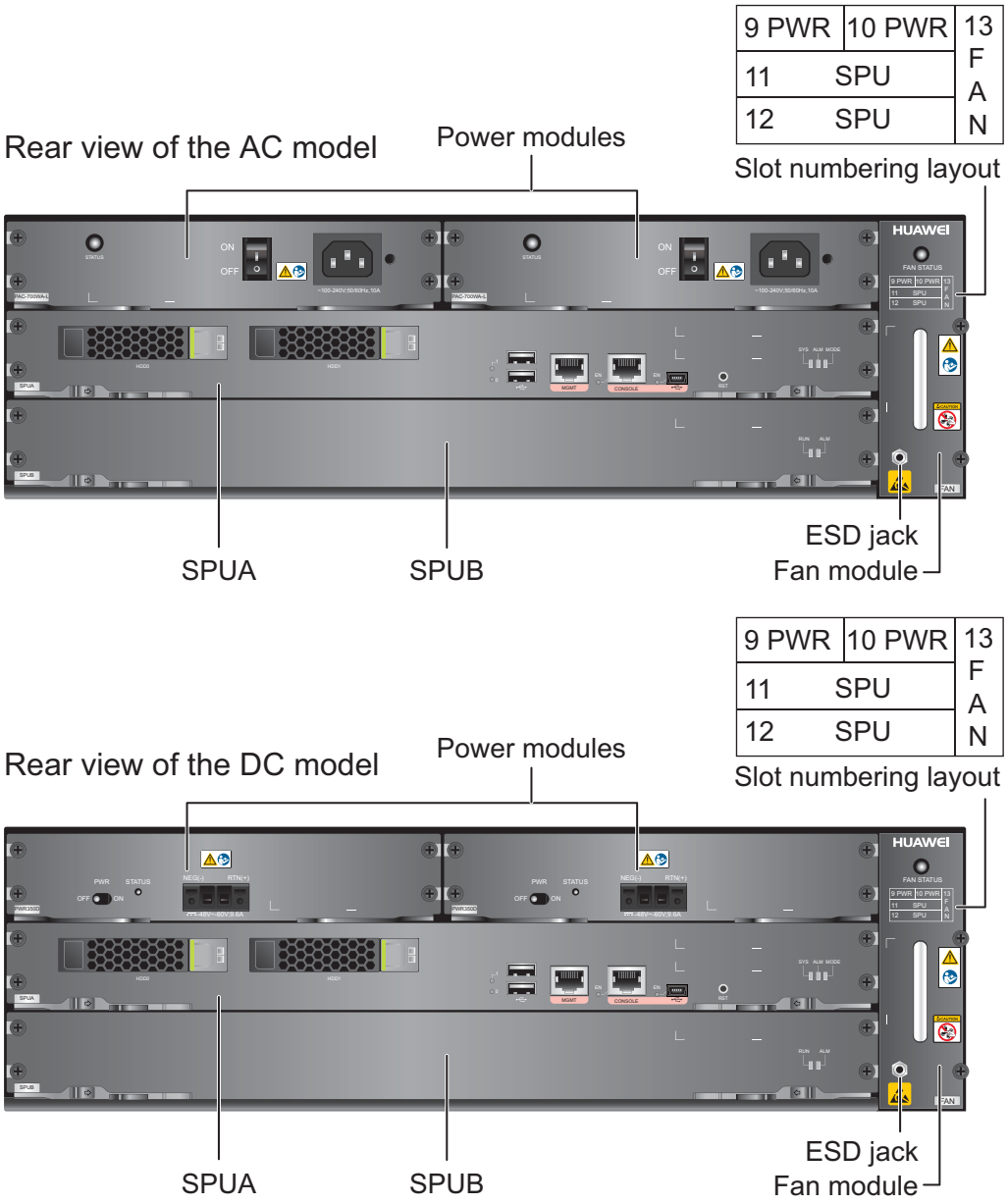
Name	Description
Expansion slot	Provides one WSIC slot and four XSIC slots. When a WSIC is installed in the lower part of an XSIC slot, install a filler panel on the empty upper part of the slot to ensure a normal air flow and keep out dust.
Protective ground terminal	The M4 OT terminal connects the PGND cable to a cabinet, the ground point of the workbench, or the ground bar in an equipment room.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.
SN	The serial number that uniquely identifies the device. When applying for a license file, you must provide the SN of the device.

2.3.4.3 Rear Panel

The USG6680 rear panel provides power modules, a fan module, and boards, such as SPU.

The rear panel of the USG6680 is pictured in **Figure 2-90**.

Figure 2-90 USG6680 rear panel



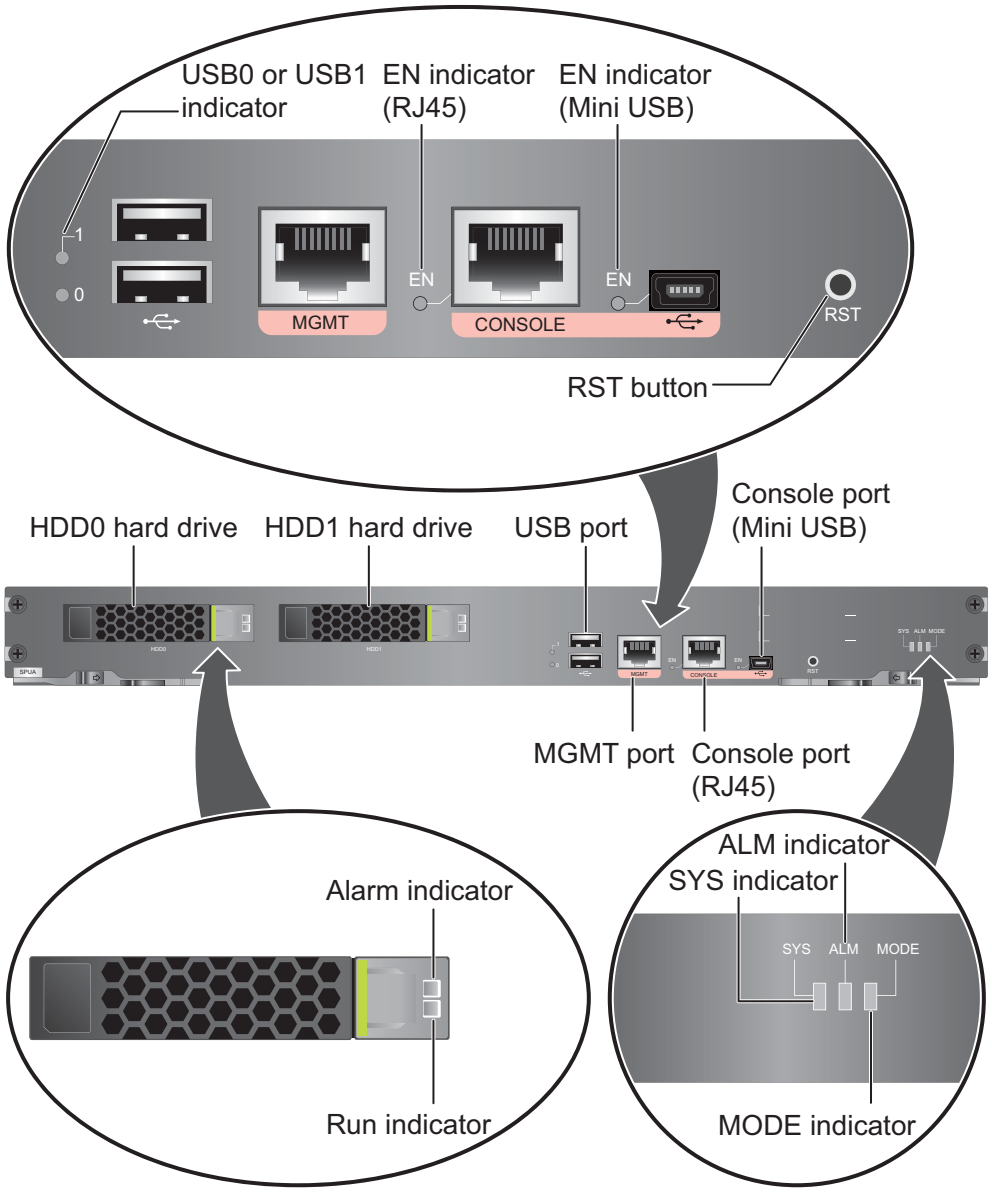
Name	Description
Slot numbering	Indicates the layout of the slots, including the slot number and module type.
SPUA (the main processing unit, in slot SPU11)	The core component for system control and management. SPUA provides an out-of-band management port, console port, and USB port for management access. SPUA can optionally provide one or two hard disks (SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A) as required. SPUA is installed in slot SPU11 and cannot be removed. For details, see **SPUA (the main processing unit)**.

Name	Description
SPUB (the service engine, in slot SPU12)	SPUB has an IAE to provide content security. SPUB is installed in slot SPU12 and cannot be removed. For details, see **SPUB (the service engine)**.
Fan module (in slot FAN13)	The fan module provides air flow for heat dissipation. The slot numbering layout and ESD jack are also located in the fan module. The fan module supports hot-swapping and can be replaced without interrupting device operation. However, to prevent overheating, do not operate the device without a functioning fan module for more than one minute. For details, see **2.3.4.5 Heat Dissipation System**.
Power modules (in slots PWR9 and PWR10)	Provides power input and distribution for the device. Two DC or AC power modules are mandatory to provide 1+1 power redundancy. If one power module fails, the other can support the entire system so that you can replace the faulty power module without interrupting device operation. For details, see **2.3.4.4 Power Supply System**.
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

SPUA (the main processing unit)

The SPUA is pictured in **Figure 2-91**.

Figure 2-91 SPUA



Name	Description
Hard Disk Ports and Indicators	

Name	Description
HDD0 or HDD1	Hard disk slot, supporting one SM-HDD-SAS300G-A or SM-HDD-SAS600G-A hard disk. The hard disks are optional. You can purchase one or two hard disks from Huawei if needed. To ensure hard disk data reliability, you are advised to purchase two hard disks with the same capacity to create RAID1 for data backup. For details, see **2.5.1 Hard Disk Unit SM-HDD-SAS300G-A**, **2.5.2 Hard Disk Unit SM-HDD-SAS600G-A** and **2.5.3 Hard Disk Unit SM-HDD-SAS1200G-A**. **NOTICE** ● Ensure that two hard disks with the same capacity are used for creating RAID. Otherwise, creating RAID fails. ● Only the USG6680-AC supports the SM-HDD-SAS300G-A, SM-HDD-SAS600G-A and SM-HDD-SAS1200G-A hard disks. The USG6680-DC supports only the SM-HDD-SAS300G-A hard disk. ● The FW starts to support SM-HDD-SAS600G-A hard disks since V500R001C20SPC200. If you use SM-HDD-SAS600G-A hard disks on earlier versions, the SM-HDD-SAS600G-A hard disks will be identified as non-Huawei hard disks. You need to upgrade the FW version. ● The USG starts to support SM-HDD-SAS1200G-A hard disk since V500R001C50. If you use SM-HDD-SAS1200G-A hard disk on earlier versions, the SM-HDD-SAS1200G-A hard disk will be identified as non-Huawei hard disks. You need to upgrade the software version.
HDD0 or HDD1 hard disk alarm indicator (red)	● Steady on: HDD0 or HDD1 hard disk fails. ● Off: HDD0 or HDD1 hard disk is running normally.
HDD0 or HDD1 hard disk run indicator (green)	● Steady on: HDD0 or HDD1 hard disk is present. ● Blink: HDD0 or HDD1 hard disk is reading or writing data. ● Off: HDD0 or HDD1 hard disk is not detected.
USB Ports and indicators	
USB0 and USB1 ports	USB ports allow you to insert USB devices for system software upgrades. For details, refer to the *Upgrade Guide* delivered with the device.
USB0 or USB1 port indicator (green)	● Steady on: USB0 or USB1 is connected. ● Off: USB0 or USB1 is not connected.
Console Ports and Indicators	
Console port (RJ45)	Console ports allow you to locally connect to the device. The RJ45 and mini USB console ports cannot be used simultaneously. If both console ports are connected, only the mini USB console port can be used. ● You can use a mini-USB-to-USB cable to connect the mini USB console port on the device to the USB port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.

Name	Description
Console port (Mini USB)	● You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use a serial port terminal program on your PC to access, configure, and manage the device.
EN indicator (RJ45, green)	● Steady on: The console port (RJ45) is in use. ● Off: The console port (RJ45) is not in use.
EN indicator (Mini USB, green)	● Steady on: The console port (Mini USB) is connected and in use. ● Off: The console port (Mini USB) is not in use.
Others	
MGMT port	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is GigabitEthernet 0/0/0 and the default IP address of the interface is 192.168.0.1. After this port is connected to your PC through network cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device. **NOTE** The MGMT port cannot be used as a service port.
RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. The RST button can also be used to restore the default settings. Press and hold down the RST button and power on the device. Three to five seconds later, when the MODE indicator on SPUA is blinking, release the RST button to restore the default settings. **NOTE** If a hard disk is installed on the device, you must run the **disk offline** command in system view and wait for approximately 30 seconds until the system displays that the hard disk has stopped working before pressing the RST button. Otherwise, the data may be lost or the hard disk be damaged.
MODE indicator (green)	● Steady on: Hot standby is not configured, or hot standby is configured but the device is the standby device in an active/standby mode or the hot standby mode is load balancing. ● Off: Hot standby is configured in active/standby mode and the device is the standby device.
ALM indicator (red)	● Steady on: The system is faulty. For example, the power-on self test (POST), power voltage, or temperature is abnormal. ● Off: The system is running normally. **NOTE** If the system starts with dual power modules but one power module is not powered on, the ALM indicator is steady red, but the system is operating properly.

Name	Description
SYS indicator (green)	● On: The system is powering on or restarting. ● Blinks every two seconds (0.5 Hz): The system is running normally. ● Blinks twice every second (2 Hz): The system is starting. ● Blinks eight times every second (8 Hz): The system software or configuration file is being upgraded. ● Off: The system is faulty.

Table 2-79 describes the SPUA specifications.

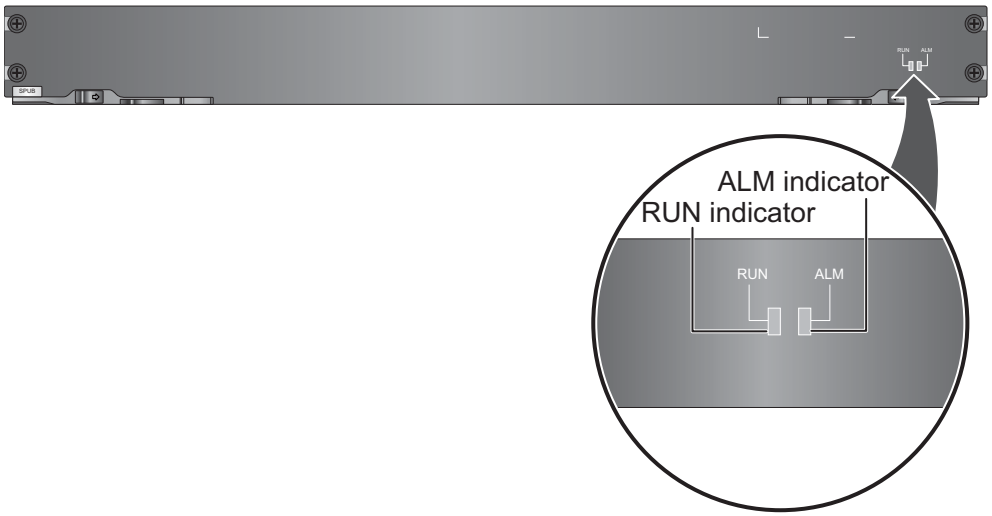
Table 2-79 SPUA specifications

Item	Description
Silkscreen	SPUA
Dimensions (H x W x D)	40.14 mm x 402.80 mm × 270.00 mm
Weight	1 kg
Power	109 W

SPUB (the service engine)

The SPUB is pictured in Figure 2-92.

Figure 2-92 SPUB



Name	Description
RUN indicator (green)	● Steady on: SPUB is powering on or restarting. ● Blinks every two seconds (0.5 Hz): SPUB is running normally. ● Blinks twice every second (2 Hz): SPUB is starting. ● Blinks eight times every second (8 Hz): SPUB is being upgraded. ● Off: SPUB is faulty.
ALM indicator (red)	● Steady on: SPUB is faulty. For example, the power-on self test (POST), power voltage, or temperature, is abnormal. ● Off: SPUB is running normally.

Table 2-80 describes the SPUB specifications.

Table 2-80 SPUB specifications

Item	Description
Silkscreen	SPUB
Dimensions (H x W x D)	40.14 mm x 402.80 mm × 270.00 mm
Weight	0.8 kg
Power	74.8 W

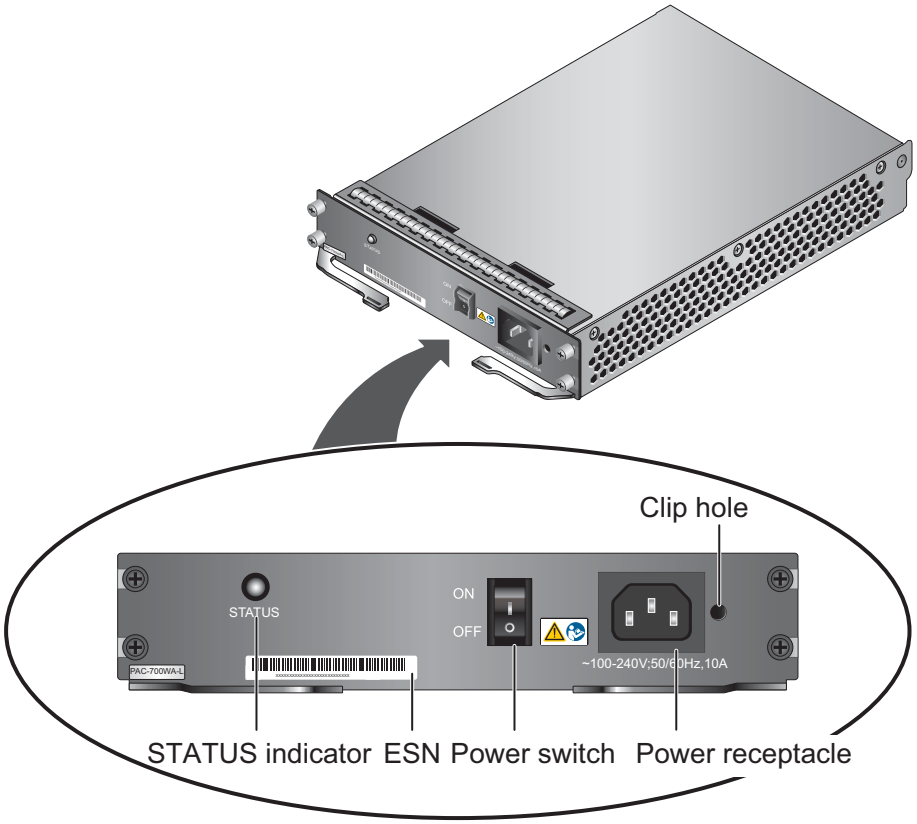
2.3.4.4 Power Supply System

The USG6680 has two 700 W AC or 350 W DC power modules for 1+1 power redundancy.

700 W AC Power Module

The 700 W AC power module converts AC power to DC power for the device. **Figure 2-93** illustrates the appearance of the AC power module.

Figure 2-93 Appearance of the 700 W AC power module



Name	Description
STATUS indicator (green/red)	● Steady green: The output of the AC power module is normal. ● Steady red: The output of the AC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
SN	The serial number that uniquely identifies the power module.
Power switch	The power switch allows you to turn on or off the power output.
Power receptacle	Connects the C13 plug of the AC power cable.
Clip hole	The hole is used to install the power cable clip, which is used to bind and fix the power cable.

Table 2-81 lists the functions of the 700 W AC power module.

Table 2-81 Functions of the 700 W AC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-82 lists the technical specifications of the 700 W AC power module.

Table 2-82 Technical specifications of the 700 W AC power module

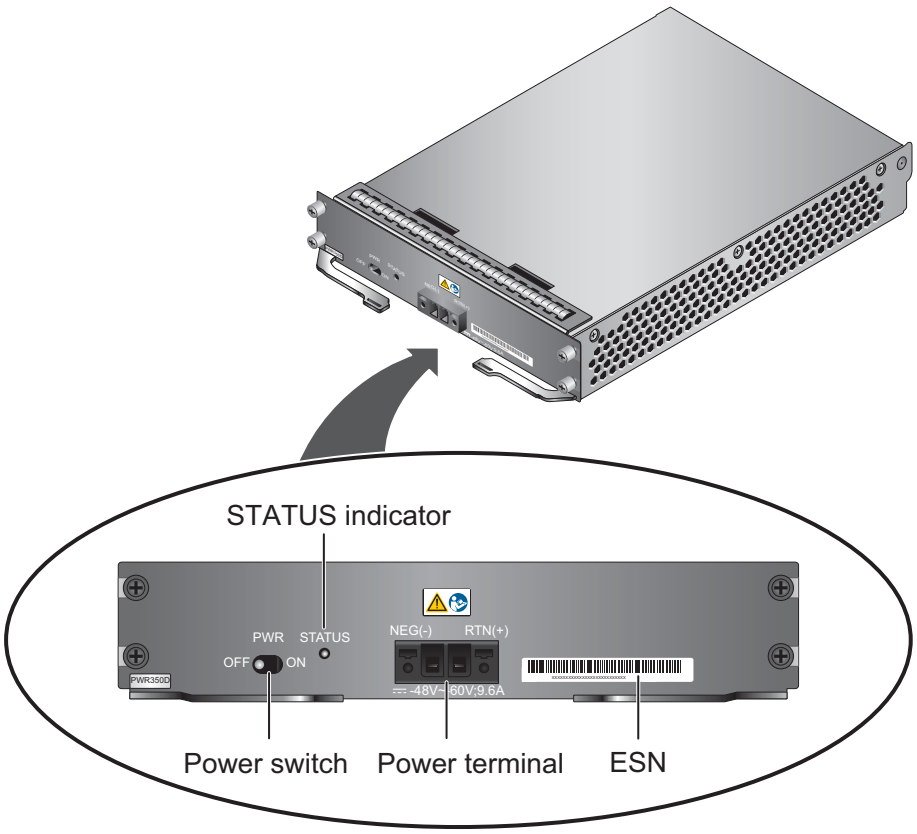
Item	Description
Silkscreen	PAC-700WA-L
Dimensions (H x W x D)	38.5 mm x 201.0 mm × 260.5 mm
Weight	1.45 kg
Input	
Rated input voltage range	100 V AC to 240 V AC (50 Hz/60 Hz)
Maximum input voltage range	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current	10 A
Output	

Item	Description
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	700 W

350 W DC Power Module

The 350 W DC power module is a DC-input and DC-output power module. **Figure 2-94** illustrates the appearance of the DC power module.

Figure 2-94 Appearance of the 350 W DC power module



Name	Description
Power switch	The power switch allows you to turn on or off the power output.

Name	Description
STATUS indicator (green/red)	● Steady green: The output of the DC power module is normal. ● Steady red: The output of the DC power module is abnormal or in protection state (except hiccup mode protection state, in which the indicator blinks).
Power cable terminal	Connect the black wire to the RTN (+) terminal and the blue wire to the NEG (-) terminal.
SN	The serial number that uniquely identifies the power module.

Table 2-83 lists the functions of the 350 W DC power module.

Table 2-83 Functions of the 350 W DC power module

Item	Description
Input undervoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overvoltage protection	Stops power output and automatically restores power output after the input voltage becomes normal.
Input overcurrent protection	Stops power output and does not automatically restore power output after the input current becomes normal.
Output current limiting protection	Intermittently provides output and automatically restores normal output after the output current falls within a normal range.
Output overvoltage protection	Intermittently stops output and automatically restores output after the overvoltage condition is removed.
Output short circuit protection	Intermittently provides output and automatically restores normal output after the output short circuit is removed.
Overtemperature protection	When the temperature of the power module reaches a preset threshold, the power module stops power output and will automatically restore power output after the temperature drops back to the normal range.
Heat dissipation	The power module does not have fans. The heat dissipation is provided by the fan module of the device.
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Table 2-84 lists the technical specifications of the 350 W DC power module.

Table 2-84 Technical specifications of the 350 W DC power module

Item	Description
Silkscreen	PWR350D
Dimensions (H x W x D)	38.5 mm x 201.0 mm × 260.5 mm
Weight	1.50 kg
Input	
Rated input voltage range	-48 V DC to -60 V DC
Maximum input voltage range	-40 V DC to -72 V DC
Maximum input current	9.6 A
Output	
Rated output voltage	12 V DC
Maximum output voltage range	11.64 V DC to 12.36 V DC
Maximum output power	350 W

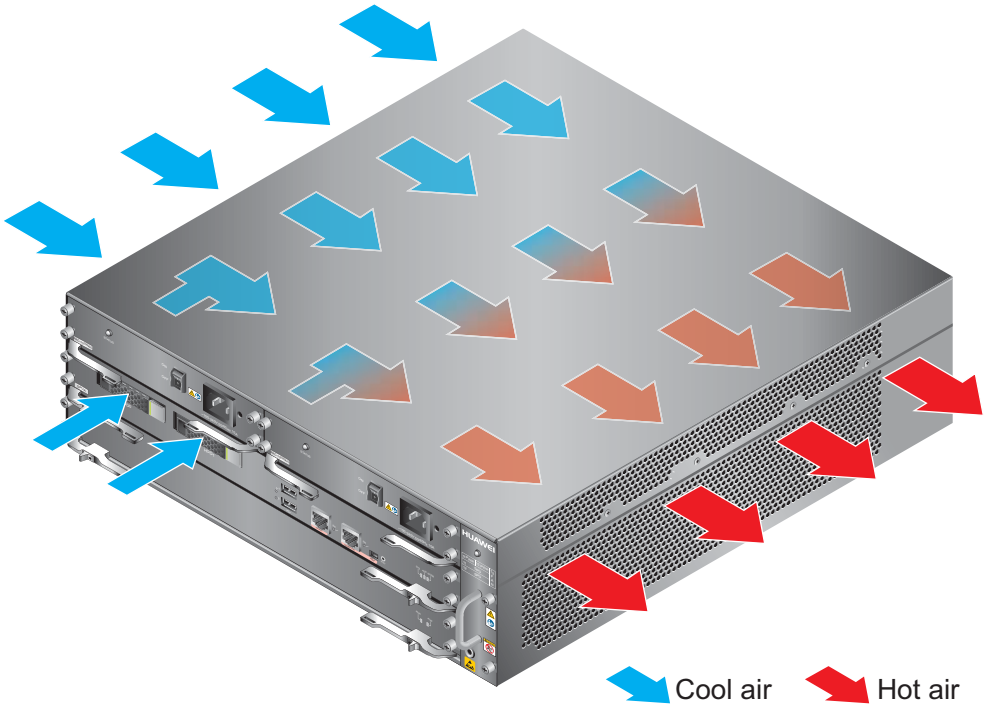
2.3.4.5 Heat Dissipation System

The USG6680 provides a dedicated fan module for heat dissipation.

System Air Flow

Figure 2-95 illustrates the air flow of the device. The air intake areas include the left side and the hard disk installation slot on the front side, and the air exhaust is on the right side. The fan module locates at the air exhaust of the system.

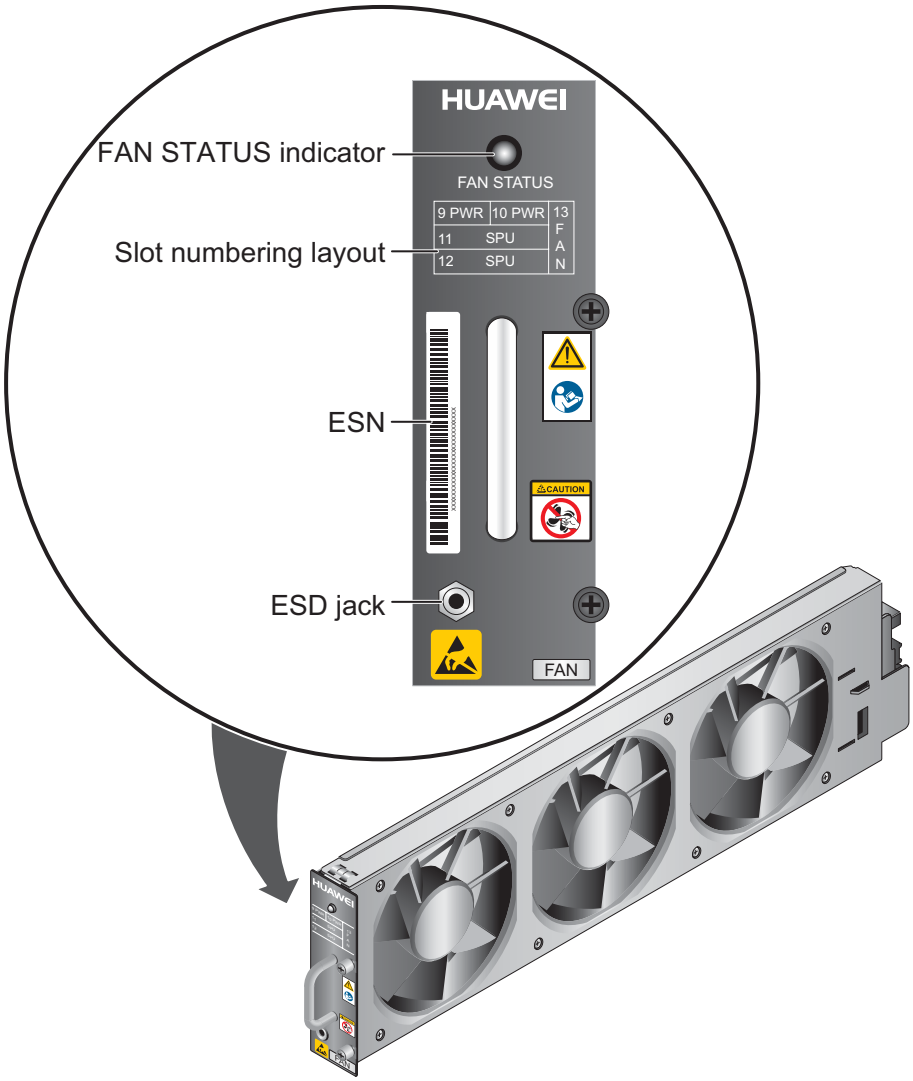
Figure 2-95 System air flow



Fan Module

The fan module supports hot swapping. The fan module consists of a fan tray, fans, and a fan control board (FCB). **Figure 2-96** illustrates the appearance of the fan module.

Figure 2-96 Appearance of the fan module



Name	Description
FAN STATUS indicator (green/red)	● Blink green every two seconds (0.5 Hz): The fan module is running normally. ● Blink green four times every second (4 Hz): The communication between the fan module and the device is lost. ● Blink red: The fan module is faulty and an alarm is generated.
Slot numbering	The slot numbering indicate the slot numbers and layout. For example, 13 FAN means that the fan module is installed in slot 13.
SN	The serial number that uniquely identifies the fan module.

Name	Description
ESD jack	The equipment end of the wrist strap is inserted into the ESD jack. For the wrist strap to be effective, ensure that the device is already grounded.

Table 2-85 lists the technical specifications of the fan module.

Table 2-85 Technical specifications of the fan module

Item	Description
Silkscreen	FAN
Dimensions (H x W x D)	27.4 mm × 478.6 mm × 125.7 mm
Weight	1.45 kg
Maximum power	90 W
Maximum wind pressure	226 Pa
Maximum capacity	543 CFM
Maximum noise	66.8 dB
Working voltage range of individual fans	7 V DC to 15 V DC
Dimensions (H x W x D) of each fan	25.4 mm x 120.0 mm x 120.0 mm
Number of fans	3

Fan Speed Adjustment Policy

The device adopts the automatic fan speed adjustment technology to monitor the temperature of key components. If the internal device temperature is higher than the specified value, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. In this way, the fan module enables the device to run in normal temperature, ensuring device running security and reliability.

2.3.4.6 Technical Specifications

This section describes the dimensions, weight, and power and environment specifications of the USG6680.

Table 2-86 lists the technical specifications of the USG6680.

Table 2-86 USG6680 Technical Specifications

Item	Description
System specifications	
CPU	Multi-core 1.2 GHz processor
Memory	DDR3 16 GB
Flash	64 MB
CF card	2 GB
Hard disk	Optional. Purchase one or two 2.5-inch SAS hard disks (300GB/600GB/1200GB available) from Huawei as required. Two hard disks with the same capacity can form RAID1 back up and are hot swappable. **NOTE** The USG6680-AC supports three types of hard disks: 300 GB, 600 GB and 1200 GB. The USG6680-DC supports only the 300 GB hard disk.
SPUB (the service engine)	Supported
4G LTE Data Card	Not supported
Dimensions and weight	
Dimensions (H^b x W^a x D)	130.5 mm x 442 mm x 470 mm
Weight	Standard: 20 kg Fully configured: 26 kg
Power specifications	
AC power	Supported, 1+1 power redundancy, hot-swappable
Rated input voltage (AC)	100 V to 240 V, 50 Hz/60 Hz
Maximum input voltage (AC)	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current (AC)	10 A
Maximum output power (AC)	700 W
DC power module	Supported, 1+1 power redundancy, hot-swappable
Rated input voltage (DC)	-48 V to -60 V
Maximum input voltage (DC)	-40 V to -72 V
Maximum input current (DC)	9.6 A
Maximum output power (DC)	350 W
Heat dissipation	

Item		Description
Fan module		Supported, hot-swappable
Number of fans		3
Air flow (hot air flow, viewed facing the rear panel)		Intake on the front and left sides, exhaust on the right side
Port density		
Out-of-band management port		1 (RJ45)
Console port		1 RJ45 and 1 Mini USB (only either of them can be used at a time)
USB 2.0 port		2
Mandatory service ports		● 8 GE optical ports ● 16 10/100/1000M autosensing Ethernet electrical ports ● 4 10GE optical ports
Expansion slot		USG6680-AC: 5 WSIC slots USG6680-DC: 2 WSIC slots with 2XG8GE or 3 WSIC slots without 2XG8GE[e]
Types of expansion cards		● 8GE-WSIC-8×1GE RJ45 interface card ● 2XG8GE-WSIC-8×1GE RJ45+2×10GE SFP+ interface card ● 8GEF-WSIC-8×1GE SFP interface card ● 4GE-BYPASS-WSIC-2×electrical links Bypass card
Environment specifications[c]		
System reliability	MTBF (year)	19.18
	MTTR (hour)	1
Ambient temperature	Short-term[d]	Without hard disk: -5°C to 55°C With hard disk(s)[f]: 5°C to 40°C
	Long-term	Without hard disk: 0°C to 45°C With hard disk(s)[f]: 5°C to 40°C
Storage temperature		-40°C to 70°C
Operating relative humidity		Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing

Item	Description
Storage relative humidity	Without hard disk: 5% RH to 95% RH, non-condensing With hard disk(s): 5% RH to 90% RH, non-condensing
Altitude	Without hard disk: 5,000 m With hard disk(s): 3,000 m
NOTE ● a. The width does not include the size of mounting ears. ● b. The height is 3 U (1 U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards. ● c. Temperature and humidity are measured 1.5 m above the floor and 0.4 m in front of the rack when no protection plate exists before or after the rack. ● d. The short term operating conditions mean that the continuous operating period does not exceed 48 hours and the accumulative total period within a year does not exceed 15 days. If the continuous operating period exceeds 48 hours or the total period within a year exceeds 15 days, it is regarded as long term. ● e. As the maximum output power of a USG6680-DC is 350 W, to prevent insufficient power supply, you can insert up to three WSICs without 2XG8GE or two WSICs with 2XG8GE in the five expansion slots. ● f. The ambient temperature change rate of a device with hard disk(s) is less than or equal to 20°C per hour.	

2.4 Expansion Card

The USG supports multiple types of expansion cards, which increase the number of interfaces, and bypass cards, which provide enhanced reliability.

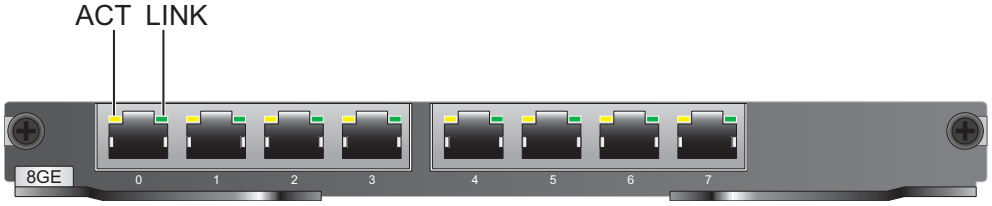
2.4.1 8GE WSIC Interface Card

This interface card provides eight gigabit RJ45 ports for packet exchange and device management, but does not support hot swap.

Panel

Figure 2-97 illustrates the appearance of the 8GE card panel.

Figure 2-97 8GE card panel



Name	Description
0 to 7 (RJ45)	Eight 10/100/1000M autosensing Ethernet electrical ports.
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.

Port Description

Table 2-87 lists the attributes of ports on the 8GE card.

Table 2-87 Attributes of ports on the 8GE card

Attribute	Description
Connector type	RJ45
Cable	Standard Ethernet cable
Working mode	Full-duplex/Half-duplex
Rate	10/100/1000 Mbit/s autosensing
Port standard	IEEE 802.2/802.3
Frame format	Ethernet_II
Network protocol	TCP/IP

Technical Specifications

Table 2-88 lists the technical specifications of the 8GE card.

Table 2-88 Technical specifications of the 8GE card

Item	Description
Model	WSIC-8GE
Silkscreen	8GE
Dimensions (H x W x D)	19.82 mm x 201.00 mm x 230.00 mm
Weight	0.5 kg
Typical power consumption	11.3 W

Item	Description
Maximum power consumption	12.8 W
Typical heat consumption	38.6 BTU/hour
Maximum heat consumption	43.7 BTU/hour
Available slot	WSIC or lower part of the XSIC slot

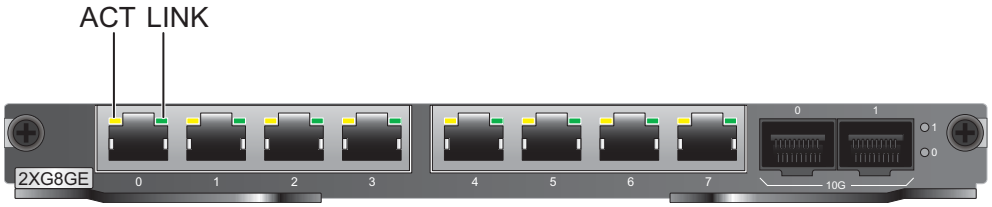
2.4.2 2XG8GE WSIC Interface Card

This interface card provides eight gigabit RJ45 ports and two 10-gigabit SFP+ ports for packet exchange and device management, but does not support hot swap.

Panel

Figure 2-98 illustrates the appearance of the 2XG8GE card panel.

Figure 2-98 2XG8GE card panel



Name	Description
Ports	
0 to 7 (RJ45)	Eight 10/100/1000M autosensing Ethernet electrical ports.
Port 0 (SFP+)	10-gigabit SFP+ port: The port number is 8, and the port connects to the **10GE Optical Transceiver**.
Port 1 (SFP+)	10-gigabit SFP+ port: The port number is 9, and the port connects to the **10GE Optical Transceiver**.
Indicators	
LINK indicator (green)	● Steady on: The link is connected. ● Off: The link is disconnected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.

Name	Description
Indicator 0 (green)	● Steady on: The link of SFP+ port 0 is connected. ● Blink: Data is being sent or received through SFP+ port 0. ● Off: The link of SFP+ port 0 is disconnected.
Indicator 1 (green)	● Steady on: The link of SFP+ port 1 is connected. ● Blink: Data is being sent or received through SFP+ port 1. ● Off: The link of SFP+ port 1 is disconnected.

Port Description

Table 2-89 lists the attributes of ports on the 2XG8GE card.

Table 2-89 Attributes of ports on the 2XG8GE card

Name	Attribute	Description
8 x gigabit RJ45 port	Connector type	RJ45
	Cable	Standard Ethernet cable
	Working mode	Full-duplex/Half-duplex
	Rate	10/100/1000 Mbit/s autosensing
	Port standard	IEEE 802.2/802.3
	Frame format	Ethernet_II
	Network protocol	TCP/IP
2 x 10-gigabit SFP+ port	Connector type	SFP+
	Port cable	Optical fiber (The port requires a 10-gigabit optical transceiver.)
	Working mode	Full duplex
	Rate	10 Gbit/s
	Port standard	IEEE 802.3ae
	Frame format	Ethernet_II
	Network protocol	TCP/IP

Technical Specifications

Table 2-90 lists the technical specifications of the 2XG8GE card.

Table 2-90 Technical specifications of the 2XG8GE card

Item	Description
Model	WSIC-2XG8GE
Silkscreen	2XG8GE
Dimensions (H x W x D)	19.82 mm x 201.00 mm x 230.00 mm
Weight	0.5 kg
Typical power consumption	20 W
Maximum power consumption	22.1 W
Typical heat consumption	68.2 BTU/hour
Maximum heat consumption	75.4 BTU/hour
Available slot	WSIC or lower part of the XSIC slot

2.4.3 8GEF WSIC Interface Card

This interface card provides eight gigabit SFP ports, but does not support hot swap. SFP optical transceivers must be installed on the SFP ports for optical fiber connection.

Panel

Figure 2-99 illustrates the appearance of the 8GEF card panel.

Figure 2-99 8GEF card panel

Name	Description
0 to 7 (SFP)	Eight gigabit SFP ports numbered from 0 to 7. Each port connects to a **Gigabit Optical Transceiver**.
Indicators 0 through 7 (green)	Operating status indicators of ports 0 through 7: ● Steady on: The link of the port is connected. ● Blink: Data is being sent or received through the port. ● Off: The link of the port is disconnected.

Port Description

Table 2-91 lists the attributes of ports on the 8GEF card.

Table 2-91 Attributes of ports on the 8GEF card

Attribute	Description
Connector type	SFP
Cable	Optical fiber (The port requires a gigabit optical transceiver.)
Working mode	Full duplex
Rate	1000 Mbit/s
Port standard	IEEE 802.2/802.3
Frame format	Ethernet_II
Network protocol	TCP/IP

Technical Specifications

Table 2-92 lists the technical specifications of the 8GEF card.

Table 2-92 Technical specifications of the 8GEF card

Item	Description
Model	WSIC-8GEF
Silkscreen	8GEF
Dimensions (H x W x D)	19.82 mm x 201.00 mm × 230.00 mm
Weight	0.5 kg
Typical power consumption	11.5 W
Maximum power consumption	13.5 W
Typical heat consumption	39.2 BTU/hour
Maximum heat consumption	46.1 BTU/hour
Available slot	WSIC or lower part of the XSIC slot

2.4.4 4GE-BYPASS WSIC Card

This card provides two electrical bypass links, but does not support hot swap. When the USG is powered off or faulty, the traffic bypasses the USG for a direction connection between the upstream and downstream devices of the USG, ensuring service continuity.

The 4GE-BYPASS card provides four GE RJ45 ports that form two bypass port pairs. Each bypass port pair forms an electrical link bypass while both the member ports work at Layer 2. The Layer-2 electrical link bypass works in either of the following states:

- Working state

  The USG runs properly. The data flows along Layer-2 links enter the USG for security service processing.

- Protection state

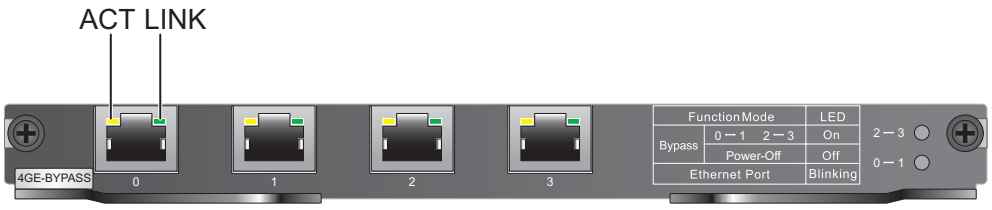
  When the USG is powered off or becomes faulty, the data on Layer-2 links bypasses the USG and is transmitted between the upstream and downstream devices, ensuring availability. After the USG recovers, the Layer-2 electrical link bypass works in the working state.

The four GE RJ45 ports on this card can be used as Layer-3 ports.

Panel

Figure 2-100 illustrates the appearance of the 4GE-BYPASS card panel.

Figure 2-100 4GE-BYPASS card panel



Name	Description
Ports 0 and 1 (RJ45)	Two 10/100/1000M autosensing Ethernet electrical ports numbered 0 and 1. The two ports form a bypass port pair. When working as the upstream and downstream ports on the same Layer-2 link, the two ports form a bypass link. When working at Layer-3, the two ports are both standard RJ45 ports.
Ports 2 and 3 (RJ45)	Two 10/100/1000M autosensing Ethernet electrical ports numbered 2 and 3. The two ports form a bypass port pair. When working as the upstream and downstream ports on the same Layer-2 link, the two ports form a bypass link. When working at Layer-3, the two ports are both standard RJ45 ports.
LINK indicator (green)	● Off: The link is disconnected. ● Steady on: The link is connected.
ACT indicator (yellow)	● Blink: Data is being sent or received. ● Off: No data is being sent or received.

Name	Description
Indicator 0-1 (green)	Status indicator of the Layer-2 bypass link formed by GE0 and GE1 ● Steady on: The card is powered on. The bypass formed by GE0 and GE1 is in protection state. ● Blink: The card is powered on. The bypass formed by GE0 and GE1 is in working state. ● Off: The card is powered off. The bypass formed by GE0 and GE1 is in protection state.
Indicator 2-3 (green)	Status indicator of the Layer-2 bypass link formed by GE2 and GE3 ● Steady on: The card is powered on. The bypass formed by GE2 and GE3 is in protection state. ● Blink: The card is powered on. The bypass formed by GE2 and GE3 is in working state. ● Off: The card is powered off. The bypass formed by GE2 and GE3 is in protection state.

Port Description

Table 2-93 lists the attributes of ports on the 4GE-BYPASS card.

Table 2-93 Attributes of ports on the 4GE-BYPASS card

Attribute	Description
Connector type	RJ45
Cable	Standard Ethernet cable
Working mode	Full-duplex/Half-duplex
Rate	10/100/1000 Mbit/s autosensing
Port standard	IEEE 802.2/802.3
Frame format	Ethernet_II
Network protocol	TCP/IP

Technical Specifications

Table 2-94 lists the technical specifications of the 4GE-BYPASS card.

Table 2-94 Technical specifications of the 4GE-BYPASS card

Item	Description
Model	WSIC-4GE-BYPASS
Silkscreen	4GE-BYPASS
Dimensions (H x W x D)	19.82 mm x 201.00 mm x 230.00 mm
Weight	0.5 kg
Typical power consumption	12.8 W
Maximum power consumption	13.6 W
Typical heat consumption	43.7 BTU/hour
Maximum heat consumption	46.4 BTU/hour
Available slot	WSIC or lower part of the XSIC slot

2.5 Hard Disk

Hard disks store log and report data. Different models support different types of hard disk modules.

2.5.1 Hard Disk Unit SM-HDD-SAS300G-A

The hard disk unit SM-HDD-SAS300G-A consists of the 2.5-inch SAS300G hard disk and hard disk tray.

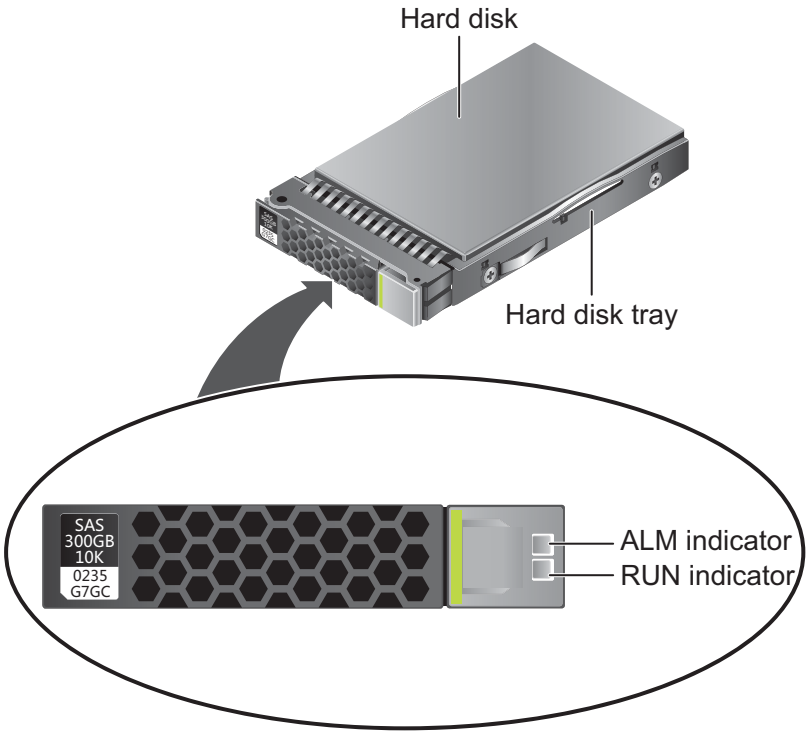
The hard disk unit SM-HDD-SAS300G-A provides the following functions:

- Stores log and report data.
- Works with another hard disk unit to form a RAID1 for reliable service data backup. Once the working hard disk fails, the system automatically reads data from the mirror hard disk, ensuring non-stop services.
- Supports hot swap. If a hard disk fails, you can replace it without powering off the USG. After the replacement, you can restore data from the mirror hard disk.

Appearance

Figure 2-101 illustrates the appearance of the hard disk unit SM-HDD-SAS300G-A.

Figure 2-101 Appearance of the hard disk unit SM-HDD-SAS300G-A



Name	Description
Hard disk tray	The hard disk tray supports and holds the hard disk and facilitates hard disk insertion or removal.
Hard disk	2.5-inch SAS300G hard disk, BOM code: 0235G7GC
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-95 lists the technical specifications of the hard disk unit SM-HDD-SAS300G-A.

Table 2-95 Technical specifications of the hard disk unit SM-HDD-SAS300G-A

Item	Description
Dimensions (H x W x D)	15.2 mm x 76.5 mm × 153.3 mm
Capacity	300 GB
Port type	SAS

Item	Description
Rotational speed	10000 RPM
Typical power consumption	5 W
Maximum power consumption	7 W
Typical heat consumption	17.1 BTU/hour
Maximum heat consumption	23.9 BTU/hour

2.5.2 Hard Disk Unit SM-HDD-SAS600G-A

The hard disk unit SM-HDD-SAS600G-A consists of the 2.5-inch SAS 600G hard disk and hard disk tray.

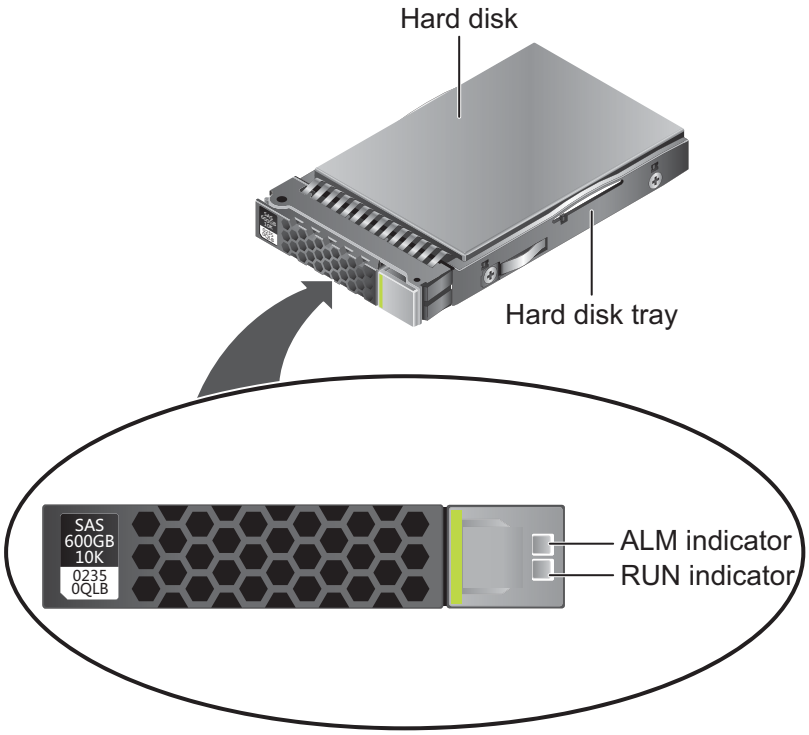
The hard disk unit SM-HDD-SAS600G-A provides the following functions:

- Stores log and report data.
- Works with another hard disk unit to form a RAID1 for reliable service data backup. Once the working hard disk fails, the system automatically reads data from the mirror hard disk, ensuring non-stop services.
- Supports hot swap. If a hard disk fails, you can replace it without powering off the USG. After the replacement, you can restore data from the mirror hard disk.

Appearance

Figure 2-102 illustrates the appearance of the hard disk unit SM-HDD-SAS600G-A.

Figure 2-102 Appearance of the hard disk unit SM-HDD-SAS600G-A



Name	Description
Hard disk tray	The hard disk tray supports and holds the hard disk and facilitates hard disk insertion or removal.
Hard disk	2.5-inch SAS600G hard disk, BOM code: 02350QLB
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-96 lists the technical specifications of the hard disk unit SM-HDD-SAS600G-A.

Table 2-96 Technical specifications of the hard disk unit SM-HDD-SAS600G-A

Item	Description
Dimensions (H x W x D)	15.2 mm x 76.5 mm × 153.3 mm
Capacity	600 GB
Port type	SAS

Item	Description
Rotational speed	10000 RPM
Typical power consumption	7 W
Maximum power consumption	9 W
Typical heat consumption	23.9 BTU/hour
Maximum heat consumption	30.7 BTU/hour

2.5.3 Hard Disk Unit SM-HDD-SAS1200G-A

The hard disk unit SM-HDD-SAS1200G-A consists of the 2.5-inch SAS 1200G hard disk and hard disk tray.

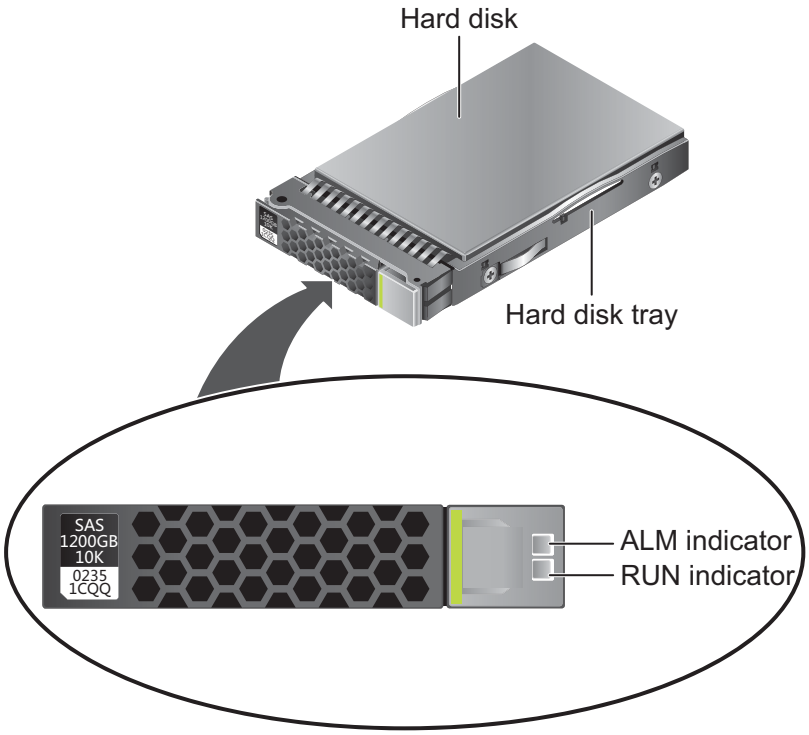
The hard disk unit SM-HDD-SAS1200G-A provides the following functions:

- Stores log and report data.
- Works with another hard disk unit to form a RAID1 for reliable service data backup. Once the working hard disk fails, the system automatically reads data from the mirror hard disk, ensuring non-stop services.
- Supports hot swap. If a hard disk fails, you can replace it without powering off the USG. After the replacement, you can restore data from the mirror hard disk.

Appearance

Figure 2-103 illustrates the appearance of the hard disk unit SM-HDD-SAS1200G-A.

Figure 2-103 Appearance of the hard disk unit SM-HDD-SAS1200G-A



Name	Description
Hard disk tray	The hard disk tray supports and holds the hard disk and facilitates hard disk insertion or removal.
Hard disk	2.5-inch SAS1200G hard disk, BOM code: 02351CQQ
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-97 lists the technical specifications of the hard disk unit SM-HDD-SAS1200G-A.

Table 2-97 Technical specifications of the hard disk unit SM-HDD-SAS1200G-A

Item	Description
Dimensions (H x W x D)	15.2 mm x 76.5 mm × 153.3 mm
Capacity	1200 GB
Port type	SAS

Item	Description
Rotational speed	10000 RPM
Typical power consumption	7 W
Maximum power consumption	10.5 W
Typical heat consumption	23.9 BTU/hour
Maximum heat consumption	35.8 BTU/hour

2.5.4 Hard Disk Combination SM-HDD-SAS300G-B

The hard disk combination SM-HDD-SAS300G-B consists of the hard disk card and hard disk unit SM-HDD-SAS300G-A.

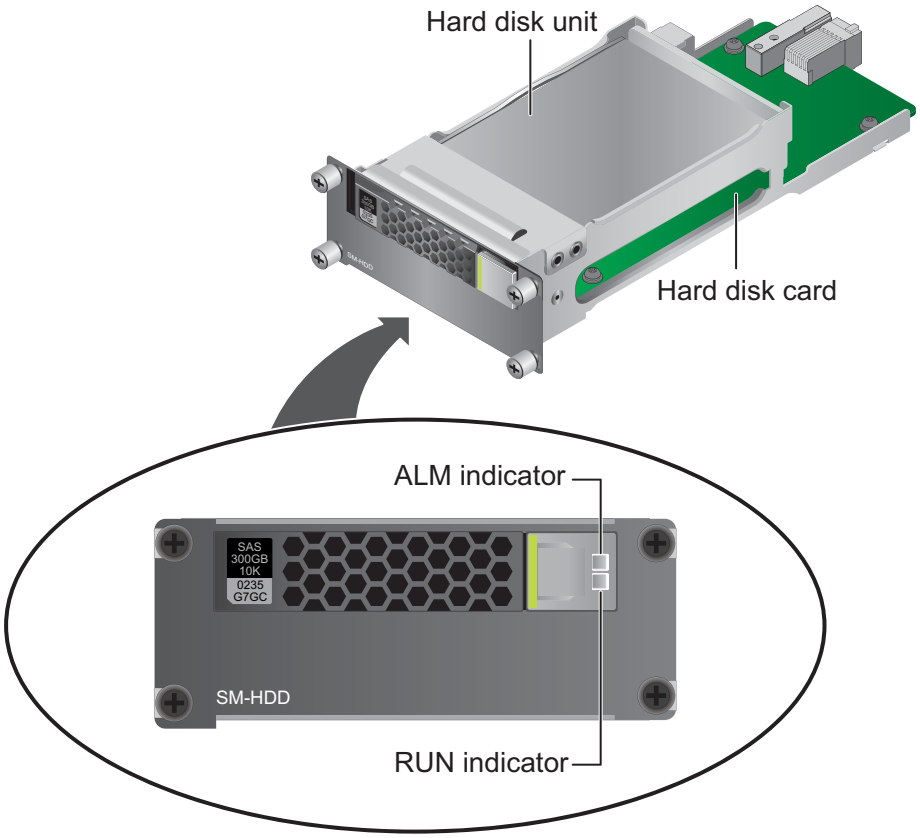
The hard disk combination SM-HDD-SAS300G-B provides the following functions:

- Stores log and report data.
- Hard disk unit SM-HDD-SAS300G-A is hot-swappable, but the hard disk card is not.

Appearance

Figure 2-104 illustrates the appearance of the hard disk combination SM-HDD-SAS300G-B.

Figure 2-104 Appearance of the hard disk combination SM-HDD-SAS300G-B



Name	Description
Hard disk unit	For details about the hard disk unit SM-HDD-SAS300G-A, see **2.5.1 Hard Disk Unit SM-HDD-SAS300G-A**.
Hard disk card	The hard disk card provides an SAS port for hard disk reading and writing and fixes the hard disk unit.
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-98 lists the technical specifications of the hard disk combination SM-HDD-SAS300G-B.

Table 2-98 Technical specifications of the hard disk combination SM-HDD-SAS300G-B

Item	Description
Dimensions (H x W x D)	41 mm x 103 mm × 218 mm
Capacity	300 GB
Hard disk unit port type	SAS
Rotational speed	10000 RPM
Typical power consumption	12.2 W
Maximum power consumption	13 W
Typical heat consumption	41.6 BTU/hour
Maximum heat consumption	44.4 BTU/hour

2.5.5 Hard Disk Combination SM-HDD-SAS600G-B

The hard disk combination SM-HDD-SAS600G-B consists of the hard disk card and hard disk unit SM-HDD-SAS600G-A.

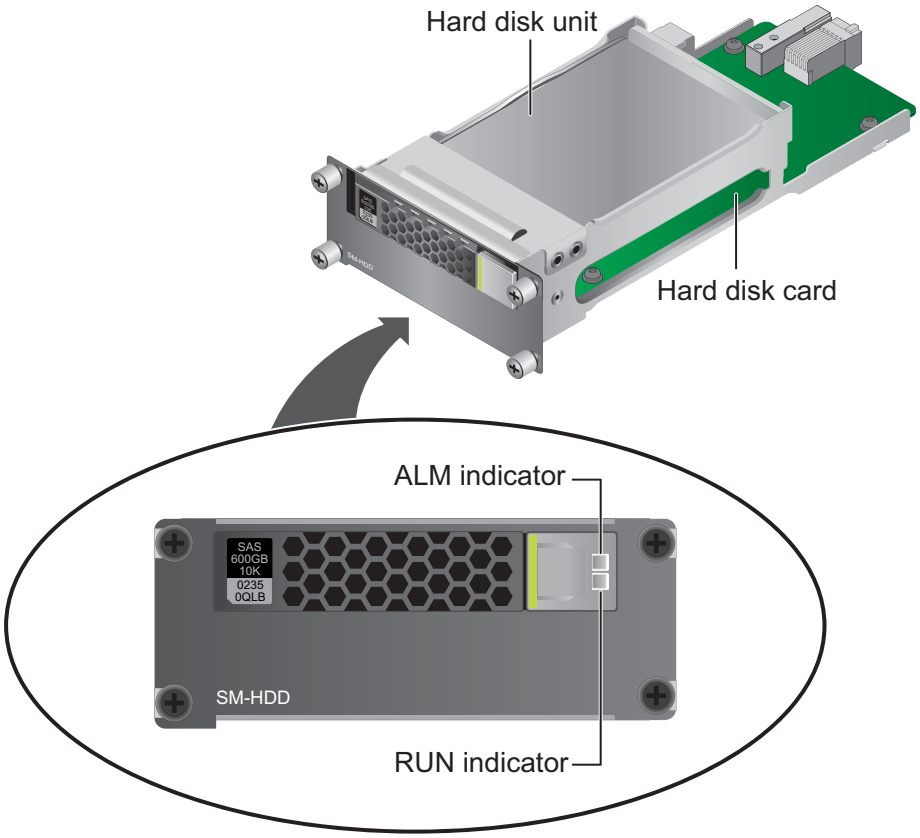
The hard disk combination SM-HDD-SAS600G-B provides the following functions:

- Stores log and report data.
- Hard disk unit SM-HDD-SAS600G-A is hot-swappable, but the hard disk card is not.

Appearance

Figure 2-105 illustrates the appearance of the hard disk combination SM-HDD-SAS600G-B.

Figure 2-105 Appearance of the hard disk combination SM-HDD-SAS600G-B



Name	Description
Hard disk unit	For details about the hard disk unit SM-HDD-SAS600G-A, see **2.5.2 Hard Disk Unit SM-HDD-SAS600G-A**.
Hard disk card	The hard disk card provides an SAS port for hard disk reading and writing and fixes the hard disk unit.
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-99 lists the technical specifications of the hard disk combination SM-HDD-SAS600G-B.

Table 2-99 Technical specifications of the hard disk combination SM-HDD-SAS600G-B

Item	Description
Dimensions (H x W x D)	41 mm x 103 mm × 218 mm
Capacity	600 GB
Hard disk unit port type	SAS
Rotational speed	10000 RPM
Typical power consumption	12.2 W
Maximum power consumption	15 W
Typical heat consumption	41.6 BTU/hour
Maximum heat consumption	51.2 BTU/hour

2.5.6 Hard Disk Combination SM-HDD-SAS1200G-B

The hard disk combination SM-HDD-SAS1200G-B consists of the hard disk card and hard disk unit SM-HDD-SAS1200G-A.

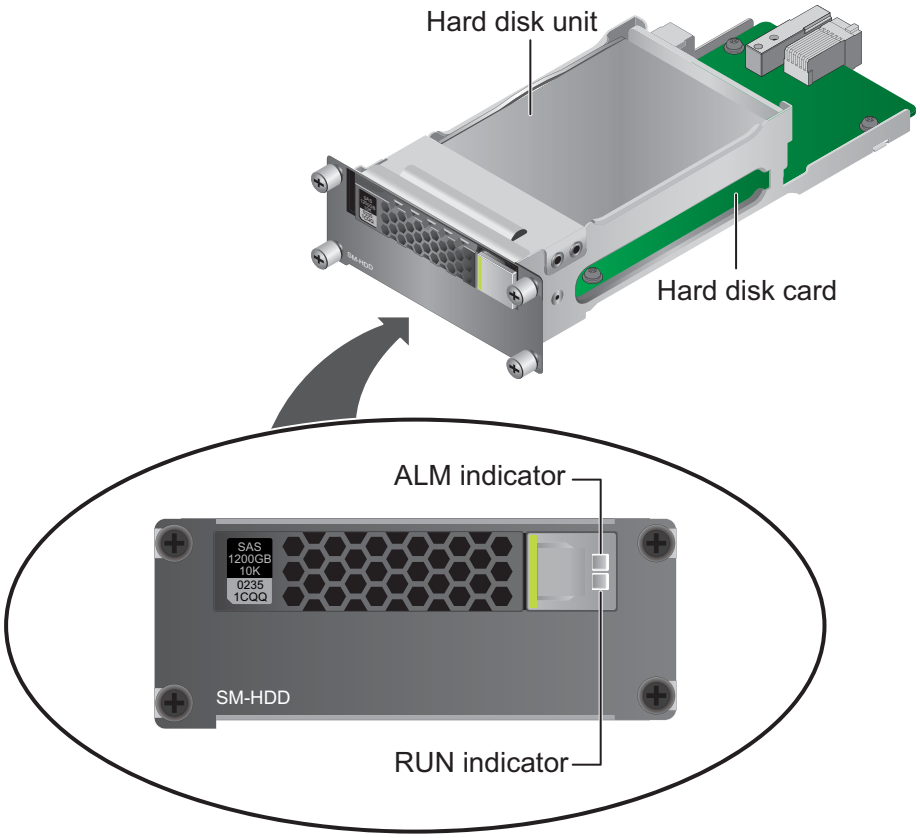
The hard disk combination SM-HDD-SAS1200G-B provides the following functions:

- Stores log and report data.
- Hard disk unit SM-HDD-SAS1200G-A is hot-swappable, but the hard disk card is not.

Appearance

Figure 2-106 illustrates the appearance of the hard disk combination SM-HDD-SAS1200G-B.

Figure 2-106 Appearance of the hard disk combination SM-HDD-SAS1200G-B



Name	Description
Hard disk unit	For details about the hard disk unit SM-HDD-SAS1200G-A, see **2.5.3 Hard Disk Unit SM-HDD-SAS1200G-A**.
Hard disk card	The hard disk card provides an SAS port for hard disk reading and writing and fixes the hard disk unit.
ALM indicator (red)	● Steady on: The hard disk fails. ● Off: The hard disk is running properly.
RUN indicator (green)	● Steady on: The hard disk is running. ● Blink: Data is being read from or written to the hard disk. ● Off: The hard disk is not detected.

Technical Specifications

Table 2-100 lists the technical specifications of the hard disk combination SM-HDD-SAS1200G-B.

Table 2-100 Technical specifications of the hard disk combination SM-HDD-SAS1200G-B

Item	Description
Dimensions (H x W x D)	41 mm x 103 mm × 218 mm
Capacity	1200 GB
Hard disk unit port type	SAS
Rotational speed	10000 RPM
Typical power consumption	12.5 W
Maximum power consumption	16 W
Typical heat consumption	42.7 BTU/hour
Maximum heat consumption	54.6 BTU/hour

2.6 4G LTE Data Card

The USB interface of the device supports various types of 4G LTE data cards. You should purchase the interface cards according to the network environment.

Table 2-101 shows the technical specifications of the 4G LTE data cards.

Table 2-101 Technical specifications of the 4G LTE data cards

Model	Standard	Frequency band
E3276s-861	TDD	1900/2300/2600MHz
	FDD	2600MHz
E3276s-150	FDD	800/900/1800/2100/2600MHz
E3372s-153	FDD	800/900/1800/2100/2600MHz
E8278s-602	TDD	2600MHz
	FDD	800/900/1800/2600MHz
E3372h-153	FDD	800/900/1800/2100/2600MHz
	UMTS	900/2100MHz
	EDGE	850/900/1800/1900MHz

Model	Standard	Frequency band
E3372h-607	TDD	2300MHz
	FDD	700/900/1800/2100/2600MHz
	UMTS	900/2100MHz
	EDGE	850/900/1800/1900MHz
E3276s-500	FDD	850/2600MHz
	UMTS	850/1900/2100MHz
	EDGE	850/900/1800/1900MHz
E3372h-510	FDD	700/850/AWS/1900/2100/2600MHz
	UMTS	850/AWS/1900/2100MHz
	EDGE	850/900/1800/1900MHz

NOTE

The actual transmission rate of the 4G LTE data card depends on the carrier network.

3 Hardware Installation

3.1 Installation Preparation

This section describes the safety precautions that you must observe and the tools that must be prepared before you install the USG.

3.1.1 Precautions

This section describes the precautions that you must observe before installing the USG. Misoperation may cause personal injury or damage to the USG.

NOTE

This section describes common precautions related to installation. For more precautions, see *Safety and Regulatory Compliance Information*.

Safety Precautions

To ensure your own personal safety and to help protect your device from damage, observe the safety warnings on device labels and in the operation manual.

Information marked **NOTICE**, **CAUTION**, **WARNING**, and **DANGER** in the operation manual is not exhaustive, but supplements safety precautions.

Local Laws and Regulations

Comply with local laws and regulations while performing operations on the device. All safety precautions in the operation manual only supplement local safety regulations.

Basic Installation Requirements

Requirements for Huawei installation and maintenance personnel before they can perform related operations are as follows:

- Only qualified and trained engineers can install, operate, and maintain Huawei equipment.
- Only qualified professionals can remove safety facilities and troubleshoot Huawei equipment.

- Only authorized or certified personnel can replace Huawei components (including software).
- Installation and maintenance personnel must report all faults and errors that may cause safety issues to the person in charge.

Personal Safety Warnings

- Do not operate or cable the device during electrical storms.
- To avoid electric shock, do not connect the safety extra-low voltage (SELV) terminal to the telephone-network voltage (TNV) terminal.
- To avoid possible eye damage, do not look into the optical cable outlet without eye protection.
- Wear an antistatic suit, ESD gloves, and ESD wrist strap and remove any jewelry and watches before entering the equipment room to avoid possible electrical shock or injury.
- In the event of fire, evacuate the equipment room and nearby areas and pull the fire alarm or call your local emergency number.

Device Security Precautions

- Fix the device on the ground or other secure places, such as against the wall or on the mounting shelf.
- Do not block the air vent when the device is running.
- Tighten the screws with proper tools when installing the panels.
- Remove all plastic packing materials from the equipment room after the installation is complete.

3.1.2 Installation Environment Check

Before you install a USG, verify that the installation environment meets requirements to ensure the normal running and extended life time of the USG.

Table 3-1 lists installation environment check items.

Table 3-1 Installation environment checklist

Check Item	Requirement	Compliance
Ventilation and heat dissipation	Complies with requirements in **A.3.1 Device Position**.	☐ Y ☐ N ☐ N/A
Stability		☐ Y ☐ N ☐ N/A
Grounding		☐ Y ☐ N ☐ N/A
Temperature	Complies with requirements in **A.3.2 Humidity, Temperature, and Cleanness**.	☐ Y ☐ N ☐ N/A
Relative humidity		☐ Y ☐ N ☐ N/A
Cleanness		☐ Y ☐ N ☐ N/A
Electrostatic discharging	Complies with requirements in **A.3.3 ESD Requirements**.	☐ Y ☐ N ☐ N/A

Check Item	Requirement	Compliance
Surge protection	Complies with requirements in **A.3.4 Lightning Protection and Grounding**.	☐ Y ☐ N ☐ N/A
Power supply facility	Complies with requirements in **A.3.5 Power Supply**.	☐ Y ☐ N ☐ N/A
Electromagnetic shielding	Complies with requirements in **A.3.6 Electromagnetic Protection**.	☐ Y ☐ N ☐ N/A

3.1.3 Instruments Required for the Installation

This section describes the instruments and meters for installing the USG.

Table 3-2 lists the required instruments and meters for USG installation.

Table 3-2 Required instruments and meters

Category	Instrument/Meter
Measuring and lineation instruments	● Ruler: used to measure length. ● Marker: used to indicate specific lengths with drawn lines.
Fastening tools	● Flat-head screwdriver: used to fasten small screws and bolts. ● Phillips screwdriver: used to fasten small screws and bolts.
Drilling tools	● Hammer drill: used to drill mounting holes during wall-mounting. ● Vacuum cleaner: used to remove dust and debris produced while drilling holes. ● Hammer: used to drive the hollow wall anchors into mounting holes.
Pliers	● Needle-nose pliers: used to hold small fittings and twist fine wires in a narrow workplace. ● Diagonal cutting pliers: used to cut insulated sleeves and tie wraps.
Auxiliary tools	● Knife: used to peel the insulated sleeve from the cable. ● Ladder: used to access overhead cabling.

Category	Instrument/Meter
Special tools	● Wire stripper: used to peel the insulated sleeve of the communication cable. ● RJ-45 crimping tool: used to crimp RJ-45 cables for telephony and Ethernet applications. ● Crimping tool: used to crimp the metal sleeve at the ends of coaxial cables. ● ESD gloves: used to protect the device from being damaged by static electricity. ● ESD wrist strip: used to protect the device from being damaged by static electricity. ● Protective gloves: used to shield hands from being injury by sharp objects.
Meters	● Network cable tester: used to test whether a network cable is connected and check the connection sequence in a network cable. ● Optical power meter: used to test the optical power. ● Optical attenuator: used to measure optical attenuation. ● Multimeter: used to test insulation within the cabinet, cable connections, and electric performance specifications of the device, such as the voltage, current, and resistance. ● Ground resistance tester: used to measure the ground resistance. ● Configuration terminal (A common PC is also applicable).

3.2 Installing a Desktop Device (USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL)

This chapter provides the cabinet-mounting, workbench-mounting, wall-mounting, and cable connection methods of the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL.

3.2.1 Mounting a Device to a Specified Location

The USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL can be mounted into a 19-inch standard cabinet. When no cabinet is available, install the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL on a workbench or a wall.

3.2.1.1 Mounting a Device into a Cabinet

The USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL can be mounted in a 19-inch standard cabinet using mounting ears.

Context

Required instruments:

- Phillips screwdriver
- Floating mounting bar

Before installing the USG, check the following items:

- The cabinet is stable.
- The position for the USG in the cabinet is well arranged.
- Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.
- The device to be installed is staged near the cabinet for convenience.

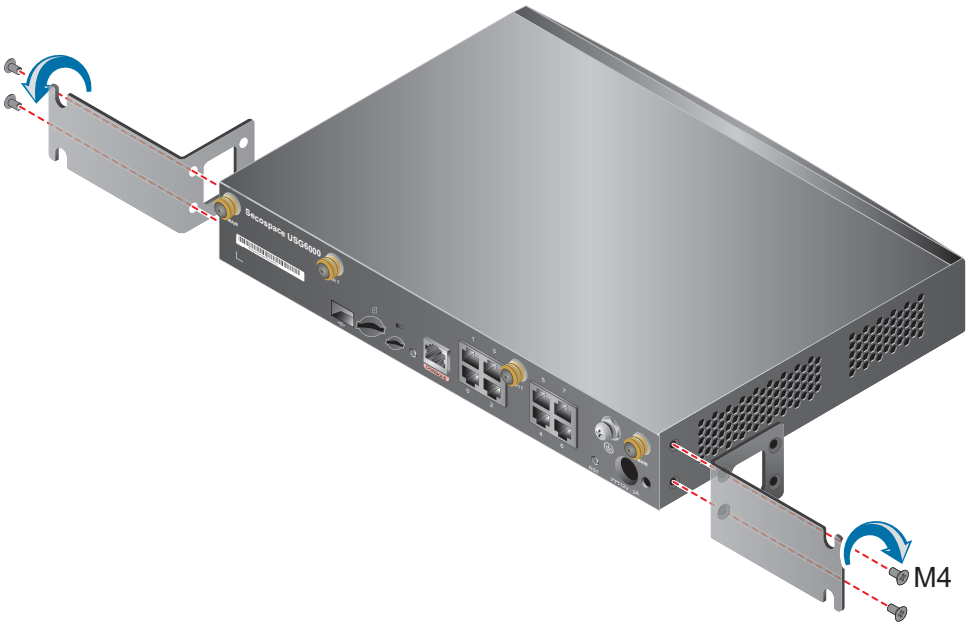
You can place either end of the USG chassis towards the cabinet door. In this manual, the rear panel of the USG is towards the cabinet door.

Procedure

Step 1 Install mounting ears on the chassis.

Use a Phillips screwdriver to fix the mounting ears to both sides of the chassis with M4 screws, as shown in **Figure 3-1**.

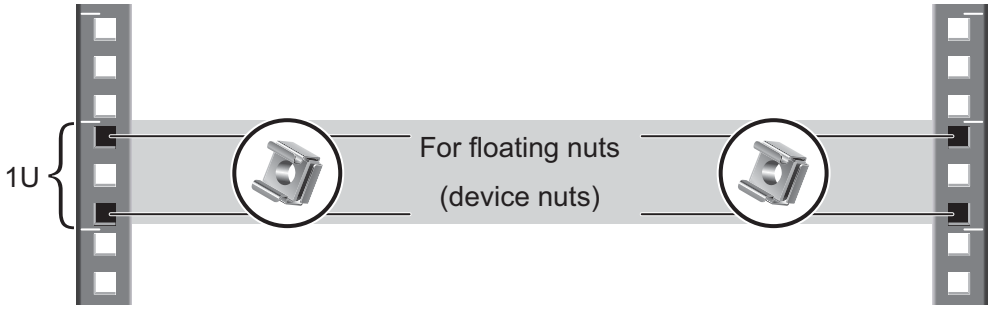
Figure 3-1 Installing the mounting ears on the chassis



Step 2 Install floating nuts.

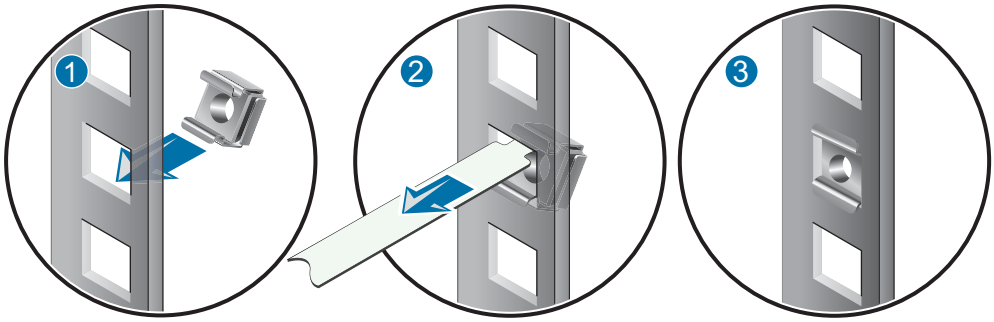
Figure 3-2 illustrates the positions of floating nuts.

Figure 3-2 Positions of floating nuts



Use M6 screws to fix the floating nuts at the positions specified in **Figure 3-2**, as shown in **Figure 3-3**.

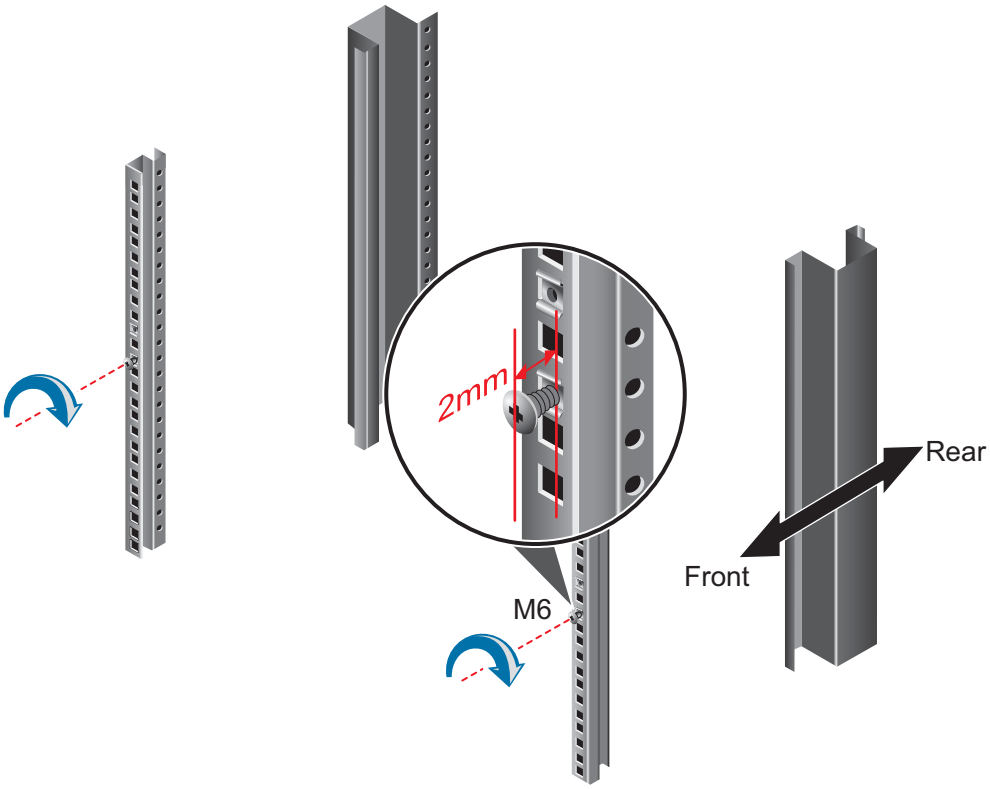
Figure 3-3 Installing floating nuts



Step 3 Mount the USG in the cabinet.

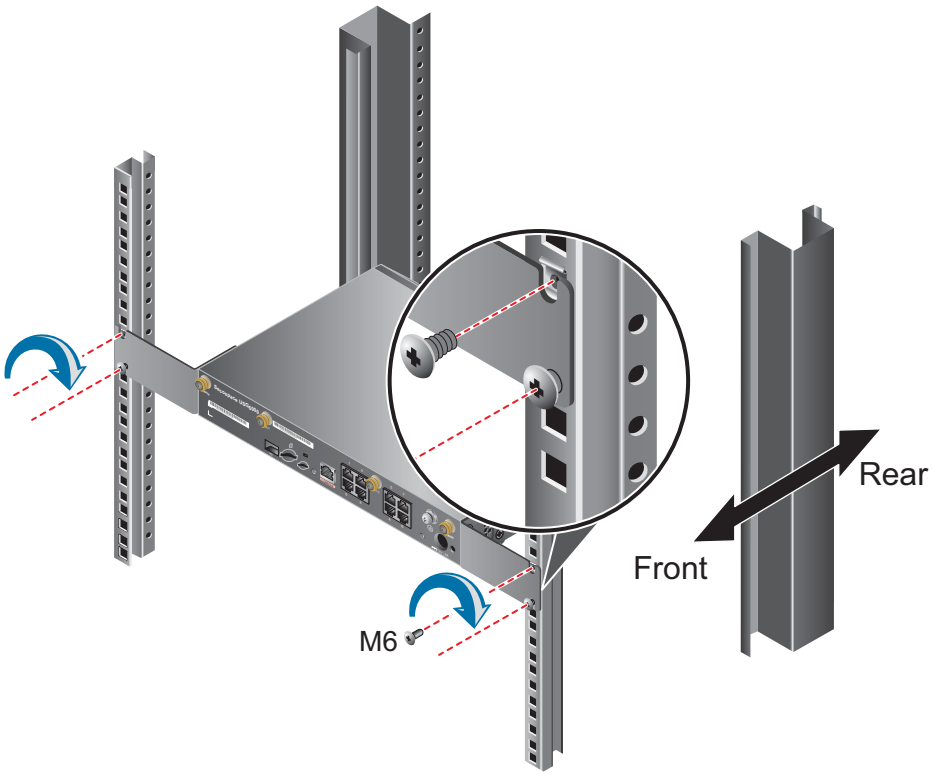
1. Use a Phillips screwdriver to fix M6 screws into two floating nuts of the lower row but do not secure them, leaving a 2 mm spacing, as shown in **Figure 3-4**.

Figure 3-4 Installing M6 screws to the cabinet



2. Lift the USG, move it to the cabinet, and hang the mounting ears onto the protruding M6 screws.
3. Use a Phillips screwdriver to secure the M6 screws, install M6 screws for the upper row, and fix the USG into the cabinet through mounting ears, as shown in **Figure 3-5**.

Figure 3-5 Mounting the USG in a cabinet



----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG is placed securely inside the cabinet.
- Ensure that the exhaust of the USG is not blocked by other objects.

3.2.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL on a workbench.

Context

The workbench must be:

- Reliably grounded.
- Clean, firm, and securely installed.

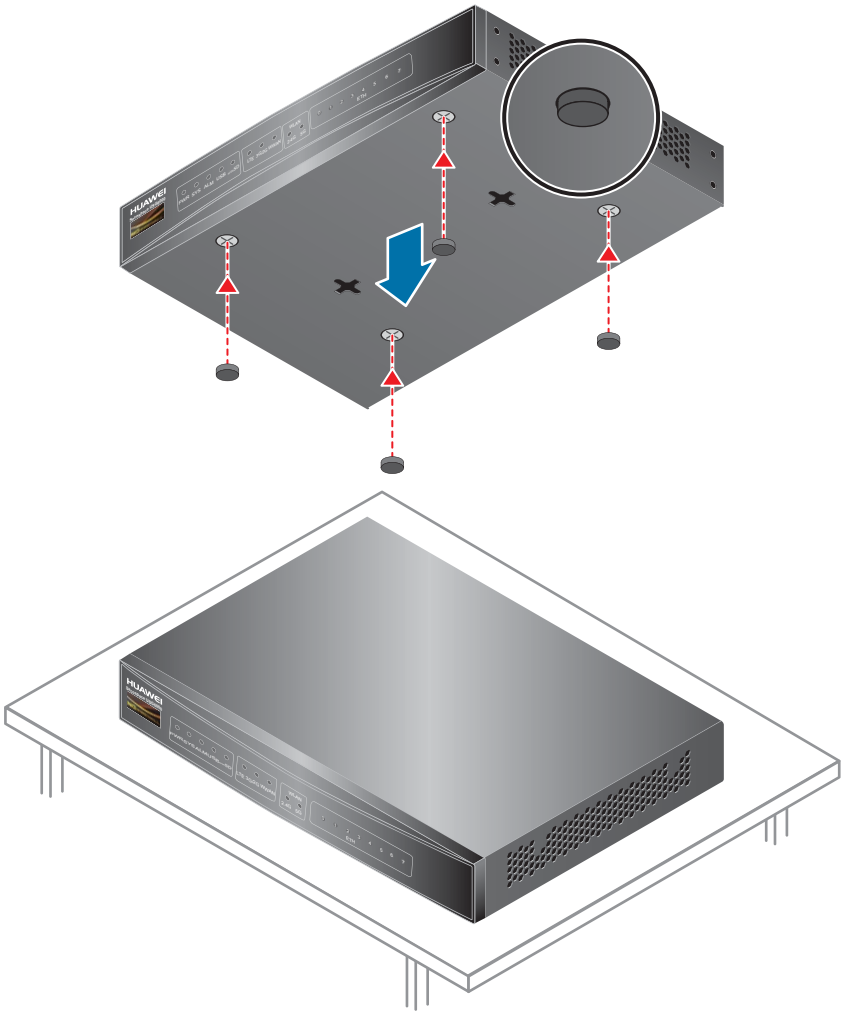
Four rubber feet are delivered with the USG, and four round notches are located at the bottom of the device to hold the rubber feet.

Procedure

Step 1 Fix the rubber feet to the round notches at the bottom of the USG.

Step 2 Place the USG on the workbench.

Figure 3-6 Placing the USG with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG is securely placed on the workbench.
- No object blocks the exhaust of the USG, and there is at least 10 cm of distance between the USG and surrounding devices.
- There are no heavy objects on the USG.

3.2.1.3 Mounting a Device Against a Wall

When no cabinet is available, you can mount the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL on a wall. The customer must have screws for wall-mounting.

Context

Tools

- Ruler
- Marker
- Hammer drill
- Vacuum cleaner
- Hammer
- Phillips screwdriver

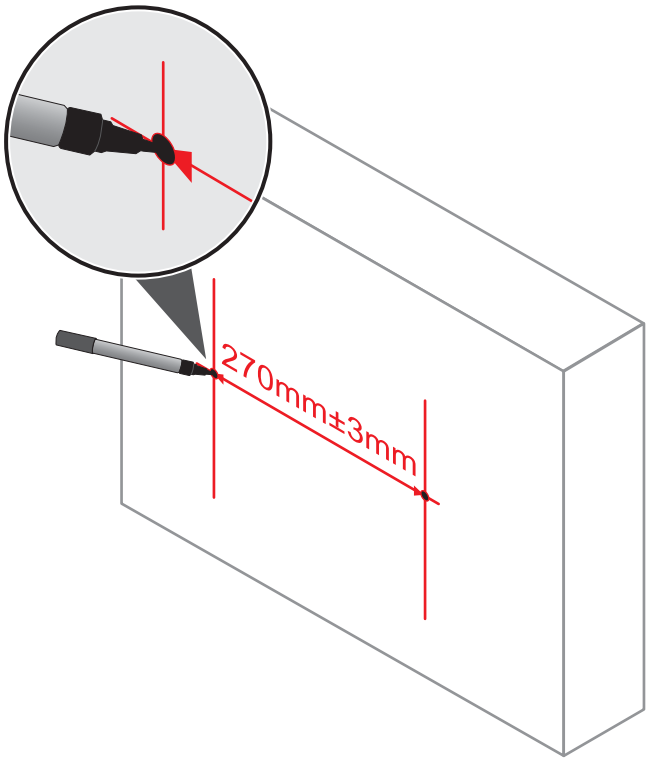
Procedure

Step 1 Determine the locations of two mounting holes on the wall using a ruler and mark the mounting holes with a marker. The mounting holes must be on the same horizontal level.

NOTE

- The wall must be a bearing wall. Otherwise, the wall is not suitable for wall-mounting.
- Ensure that the height of mounting holes is proper so that the indicators are easy to view.

Figure 3-7 Spacing between mounting holes



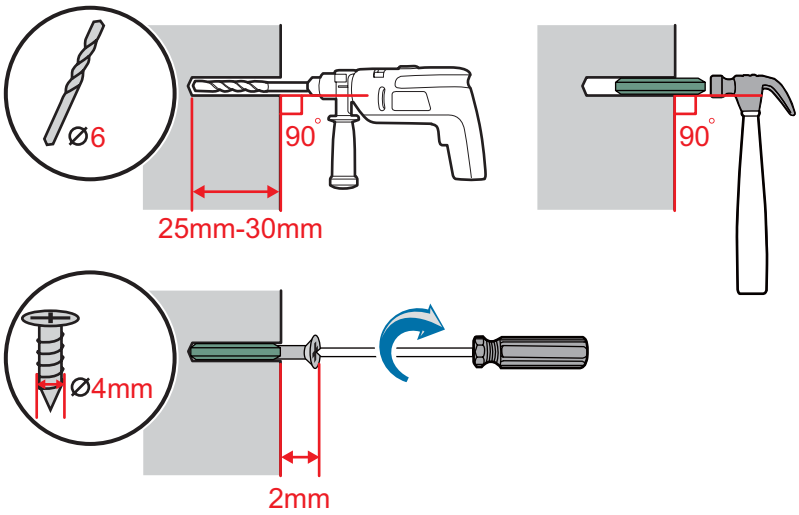
Step 2 Drill holes and install mounting screws.

NOTICE

Ensure that the mounting screws are secure and reliable. Otherwise, the tension after cables are connected may cause the USG6310/6320 to fall.

1. Select a proper drill according to the outer diameter of mounting screws. The outer diameter of mounting screws is not greater than 4 mm.
2. Hammer hollow wall anchors into the mounting holes.
3. Screw the mounting screws into the wall anchors using a Phillips screwdriver. Leave the screws protruding 2 mm from the wall.

Figure 3-8 Drilling holes and installing mounting screws

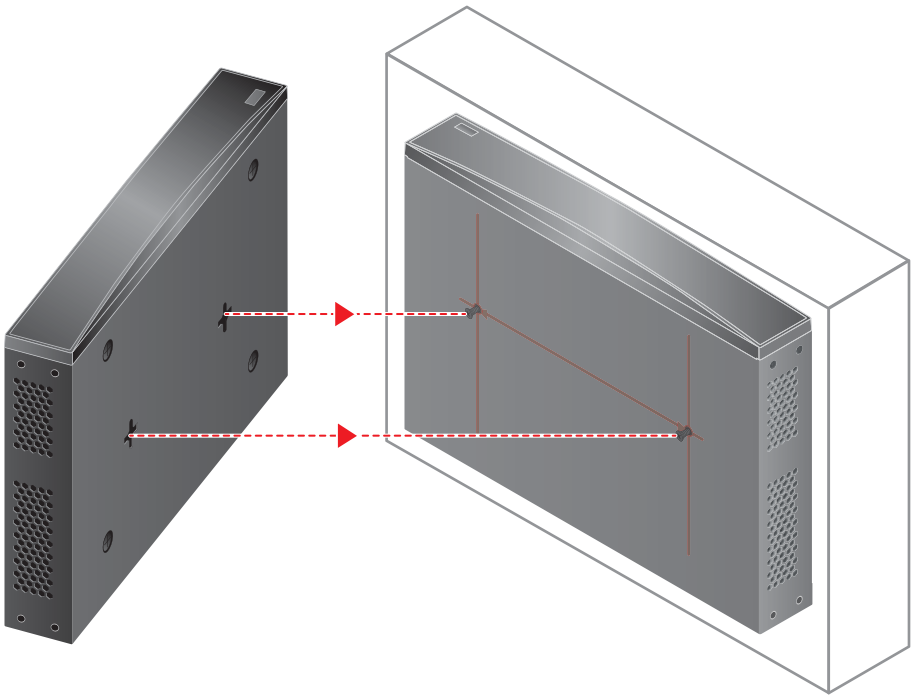


Step 3 Mount a USG on the wall by aligning the mounting brackets on the rear of the USG with the mounting screws.

NOTE

The USG supports upward mounting and downward mounting. To prevent water from entering into ports and causing device damage, you are advised to mount the USG with ports facing downward.

Figure 3-9 Mounting the USG on a wall



----End

Follow-up Procedure

After wall-mounting is complete, verify that:

- The USG is securely fixed on the wall.
- A clearance of 10 cm is maintained around the USG and the air flow is not blocked.

3.2.2 Connecting a PGND Cable

Connecting the PGND cable of a USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL correctly is a key measure of surge protection and resistance to interference. Before using the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL, correctly connect the PGND cable.

Prerequisites

The USG has been installed inside a cabinet.

Context

Instruments required:

- Phillips screwdriver
- Multimeter

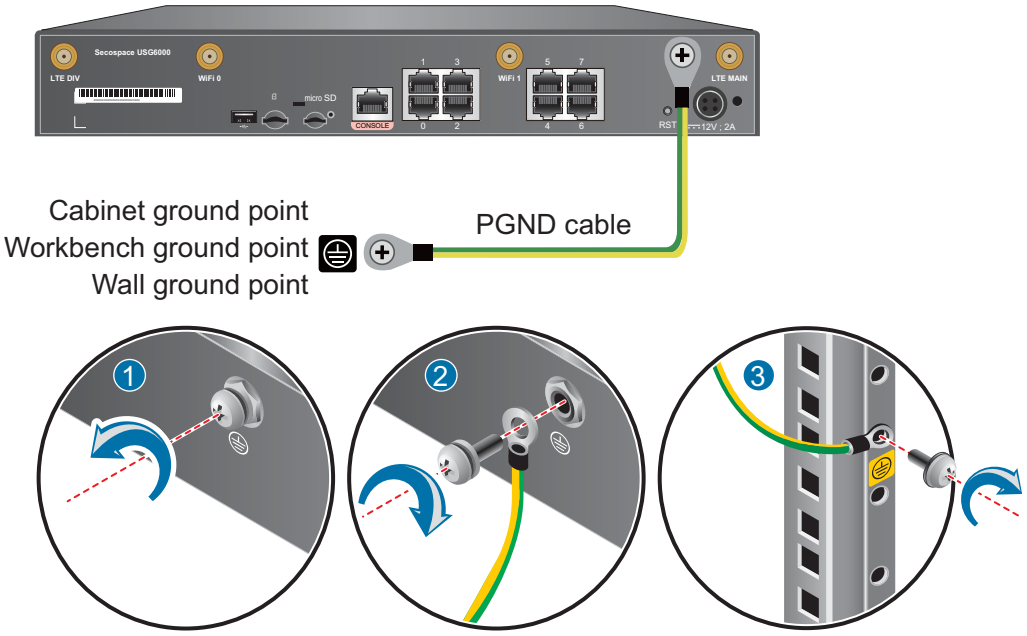
Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG rear panel.

Step 2 Align the M4 end of the PGND cable with the screw hole of the ground terminal and tighten the screw.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet, workbench, or wall.

Figure 3-10 Connecting a PGND cable



----End

Follow-up Procedure

Verify the following after the cabling is complete:

- The PGND cable is securely connected to the ground terminal.
- The electrical resistance between the ground terminal and ground point is less than 5 ohm on a multimeter.

3.2.3 Installing a Micro SD Card

This section describes how to install a micro SD card for the first time to avoid damages.

Context

Instruments required:

- Phillips screwdriver
- ESD wrist strap

NOTE

- Micro SD cards are optional and are not delivered with the device. If required, purchase the micro SD card (part number: 06010308) from Huawei. The micro SD card model is SDSDQAE-064G, the capacity is 64 GB, and dimensions (H x W x D) are 1 mm x 15 mm x 11 mm.
- The micro SD card can be installed no matter the device is powered off or the device is running. The installation methods are the same. In this section, the micro SD card is installed when the device is powered off.

NOTICE

- To replace the micro SD card when the USG is powered on, you must run the **sd-card offline** command in the system view first. After the system displays a message indicating that the micro SD card is offline, remove the micro SD card. Otherwise, the micro SD card might be damaged, and the data may be lost. For details, see **4.6 Replacing a Micro SD Card (USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL)**.
- Make sure that you have worn an ESD wrist strap and the strap is well grounded before you hold the micro SD card. Otherwise, the micro SD card may be damaged.

Procedure

Step 1 Determine the slot (the slot with a "micro SD" mark on the rear panel) for installing the micro SD card.

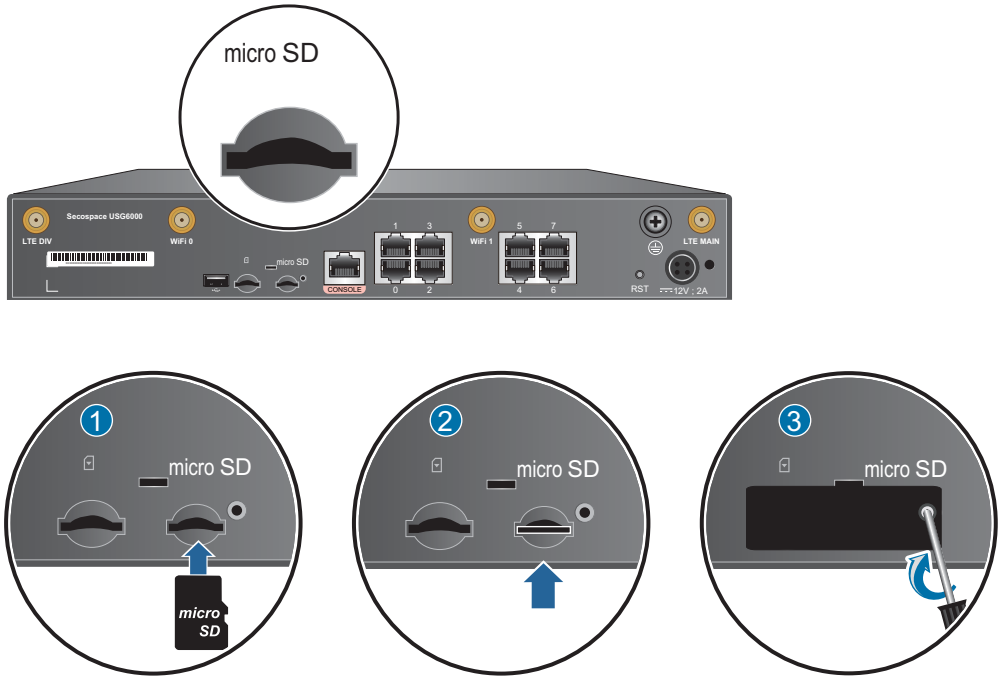
Step 2 Install the micro SD card and anti-theft board.

NOTE

- Note that the micro SD card must be installed with the face with words upwards.
- Do not use too much force; otherwise the micro SD or micro SD card slot might be damaged.

1. Insert the micro SD along the guide rail to the micro SD card slot.
2. When you hear a click, the micro SD card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 3-11 Installing the micro SD card and anti-theft board



----End

Follow-up Procedure

After the micro SD card is installed, power on the USG and run the **display sd-card information** command in any view to check the micro SD card installation and file system mounting status. If **SD Card Physical State** is **Present** and **SD Card File System State** is **Mounted**, the micro SD card is working properly.

- If **SD Card Physical State** is **Absent**, re-install the micro SD card and try again. If **SD Card Physical State** remains the same, the USG may fail to identify the micro SD card. You are advised to use another micro SD card.
- If **SD Card File System State** is **Unmounted**, the micro SD card format might not be **ext4.** You need to run the **reset sd-card** command in the system view to format the micro SD card.

3.2.4 Installing a SIM Card (USG6310S-WL-OVS/6510-WL)

The USG6310S-WL-OVS/6510-WL provides an internal LTE module which provides the LTE access function. To use the LTE access function, install the SIM card as instructed.

Context

Instruments required:

- Phillips screwdriver
- ESD wrist strap

NOTE

- The USG6310S-WL-OVS/6510-WL supports standard SIM cards. If the SIM card type is Micro or Nano, you need to purchase a SIM card tray. Because the SIM card tray and SIM card are bound through tapes, the surface might not be smooth. Exercise caution when you remove and insert the SIM card.
- The USG6310S-WL-OVS supports 4G LTE, 3G UMTS, and 2G GSM SIM cards. You need to purchase the corresponding SIM card.
- The USG6510-WL supports 4G FDD LTE/TDD LTE, 3G TD-SCDMA/WCDMA, and 2G GSM SIM cards. You need to purchase the corresponding SIM card.

NOTICE

- SIM cards are not hot swappable. Therefore, do not install the SIM card when the USG is powered on. Otherwise, the SIM card may be damaged or the function may become invalid.
- Make sure that you have worn an ESD wrist strap and the strap is well grounded before you hold the SIM card. Otherwise, the SIM card may be damaged.

Procedure

Step 1 Determine the slot (the slot with a  silkscreen on the rear panel) for installing the SIM card.

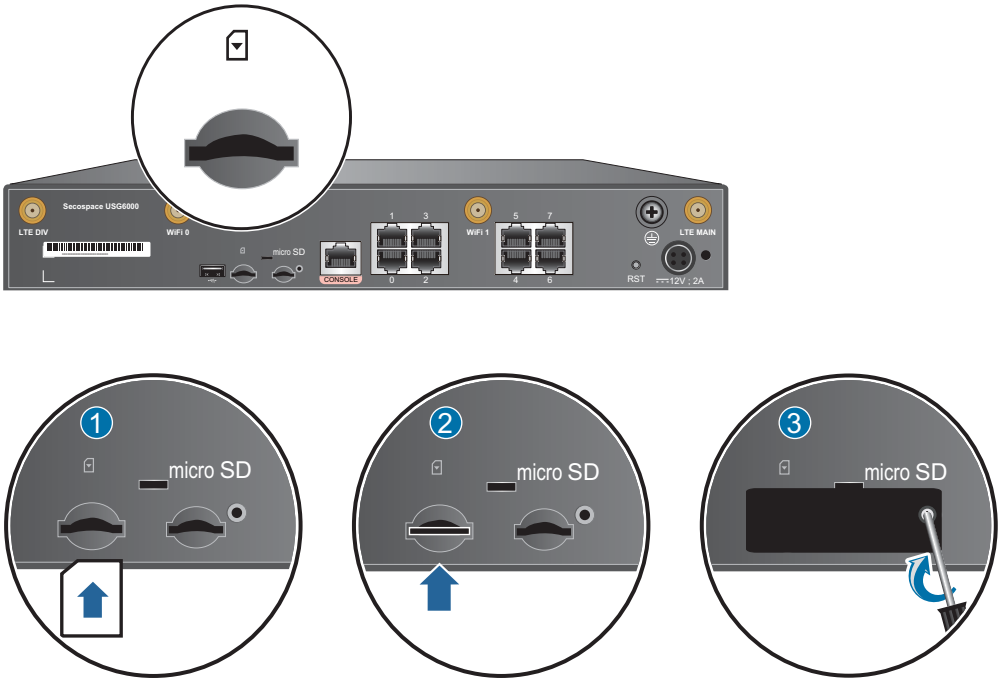
Step 2 Install the SIM card and anti-theft board.

NOTE

- Keep the notch on the SIM card in the same direction as the notch marked on the left of the SIM card slot.
- Do not use too much force; otherwise the SIM card or SIM card slot might be damaged.
- The anti-theft board is delivered with the device and can be used to protect both the micro SD card and SIM card. If both the micro SD card and SIM card need to be installed, you are advised to install both the cards before installing the anti-theft board.

1. Insert the SIM card along the guide rail to the SIM card slot.
2. When you hear a click, the SIM card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 3-12 Installing the SIM card and anti-theft board



----End

Follow-up Procedure

After the SIM card is installed and the USG is powered on, run the **display cellular** command in any view to check the SIM card status. If **SIM Status** in the command output is **OK**, the SIM card is working properly and has been identified by the USG.

3.2.5 Installing an Antenna (USG6305-W/6310S-W/6310S-WL-OVS/6510-WL)

The USG6305-W/6310S-W/6310S-WL-OVS/6510-WL provides an internal Wi-Fi module to provide the WLAN access function, and the USG6310S-WL-OVS/6510-WL provides an internal LTE module to provide the LTE access function. Both the WLAN and LTE access functions require antennas. This section describes how to install the antennas.

Context

NOTICE

- Do not install the antennas when the USG is powered on to prevent USG or antenna damage.
- Do not mix the Wi-Fi and LTE antennas. The interface of the Wi-Fi antenna does not match the LTE antenna, and the interface of the LTE antenna does not match the Wi-Fi antenna. Therefore, you must insert them in the correct interfaces to prevent damages to the antenna connectors.
- You are advised to place the LTE antenna at least 1.2 m away from the Wi-Fi antenna to prevent interference between signals.
- The LTE antenna is quite long. You need to fasten it with cable ties during cabling.

NOTE

The Wi-Fi and LTE cable antennas are delivered with the USG.

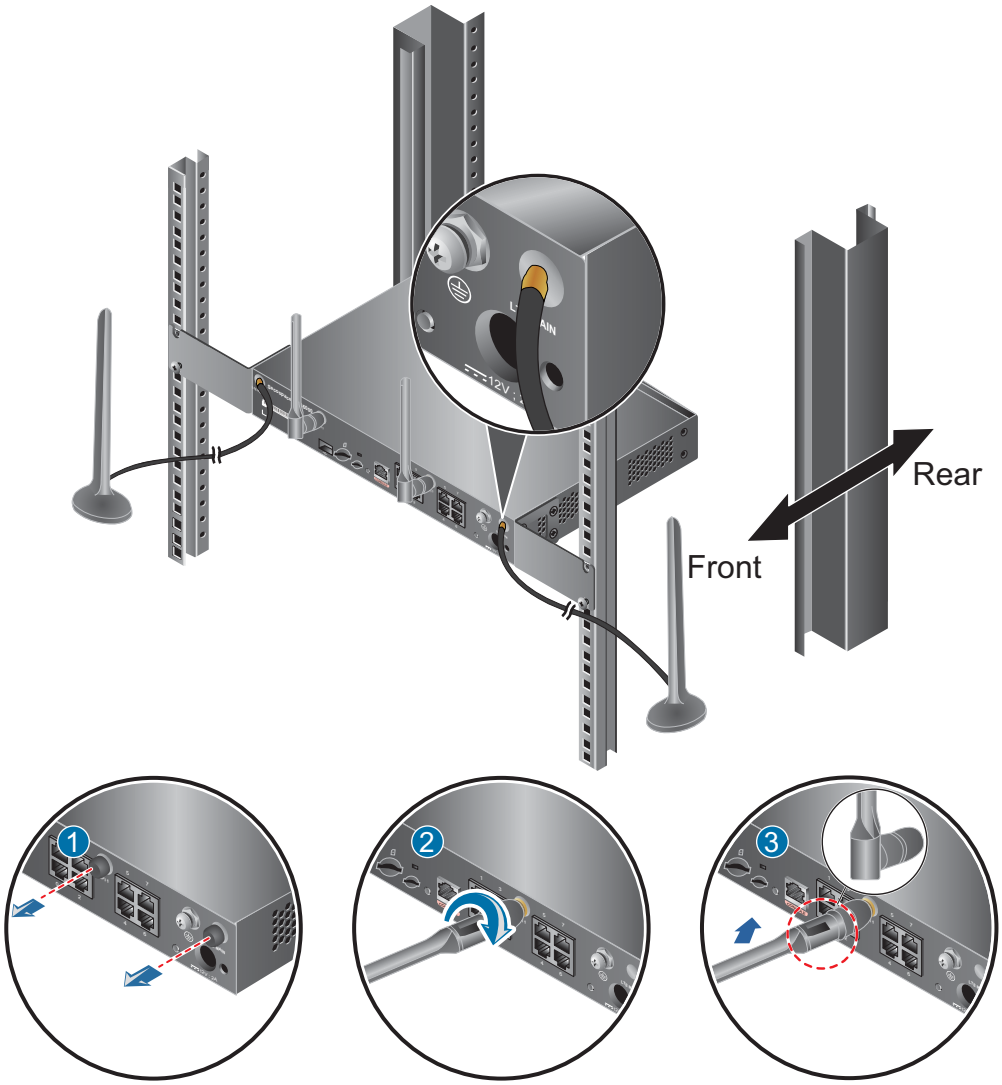
Procedure

Step 1 Determine the interfaces for installing the antennas. The interfaces with the "WiFi 0" and "WiFi 1" silkscreens on the rear panel are the interfaces for installing the Wi-Fi antenna, and the interfaces with the "LTE MAIN" and LTE DIV" silkscreens are the interfaces for installing the LTE antenna.

Step 2 Install the antennas.

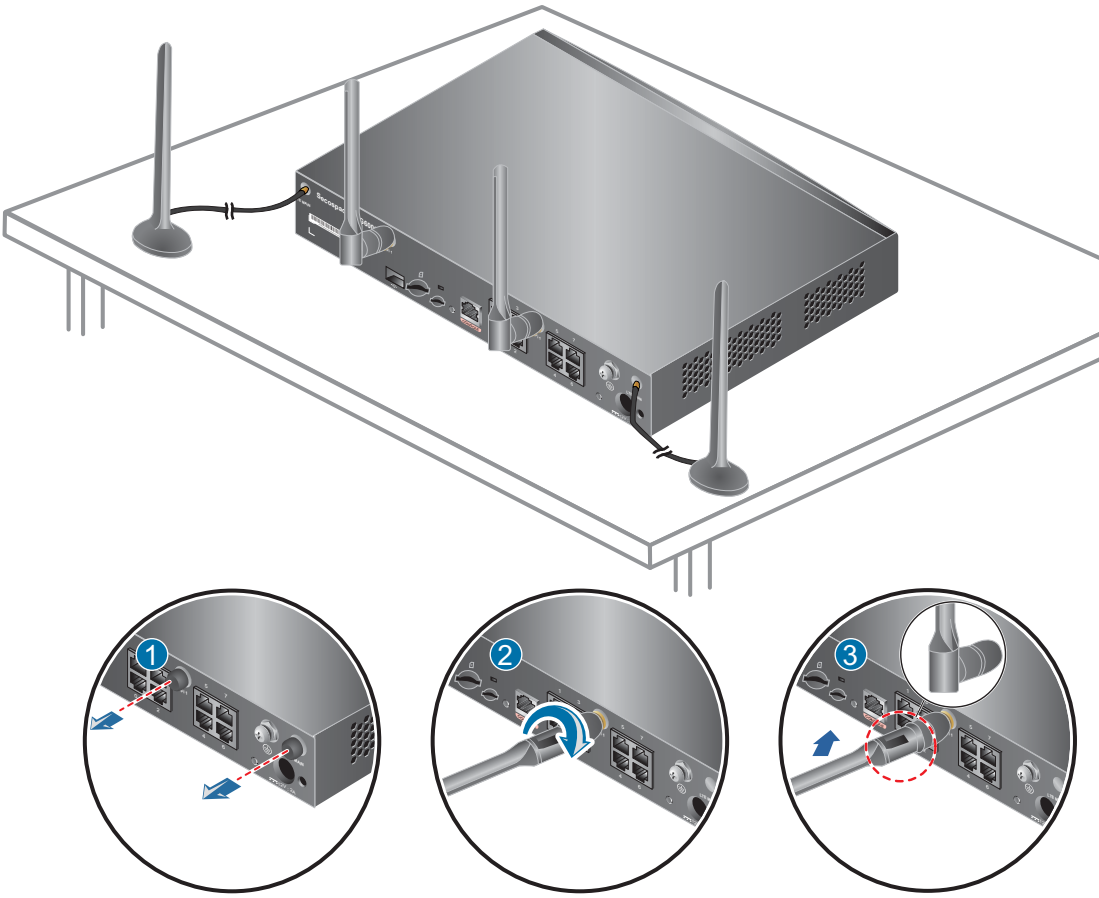
1. Take off the protective cap of the antenna connector.
2. Install the antenna into the antenna connector of the USG.
3. Adjust the direction of the antenna. In different scenarios, the directions of the antennas are different.
   - When the USG is installed in a cabinet, the Wi-Fi antenna should be vertical to the floor, and the LTE antenna should be placed outside the cabinet and be vertical to the floor. For example, place the LTE antenna on the top of the cabinet.

Figure 3-13 Installing the antennas (when the USG is installed in a cabinet)



- When the USG is installed on the workstation, the Wi-Fi antenna should be vertical to the workstation, and the LTE and Wi-Fi antennas should be placed based on the distance requirement and be vertical to the floor.

Figure 3-14 Installing the antennas (when the USG is installed on the workstation)

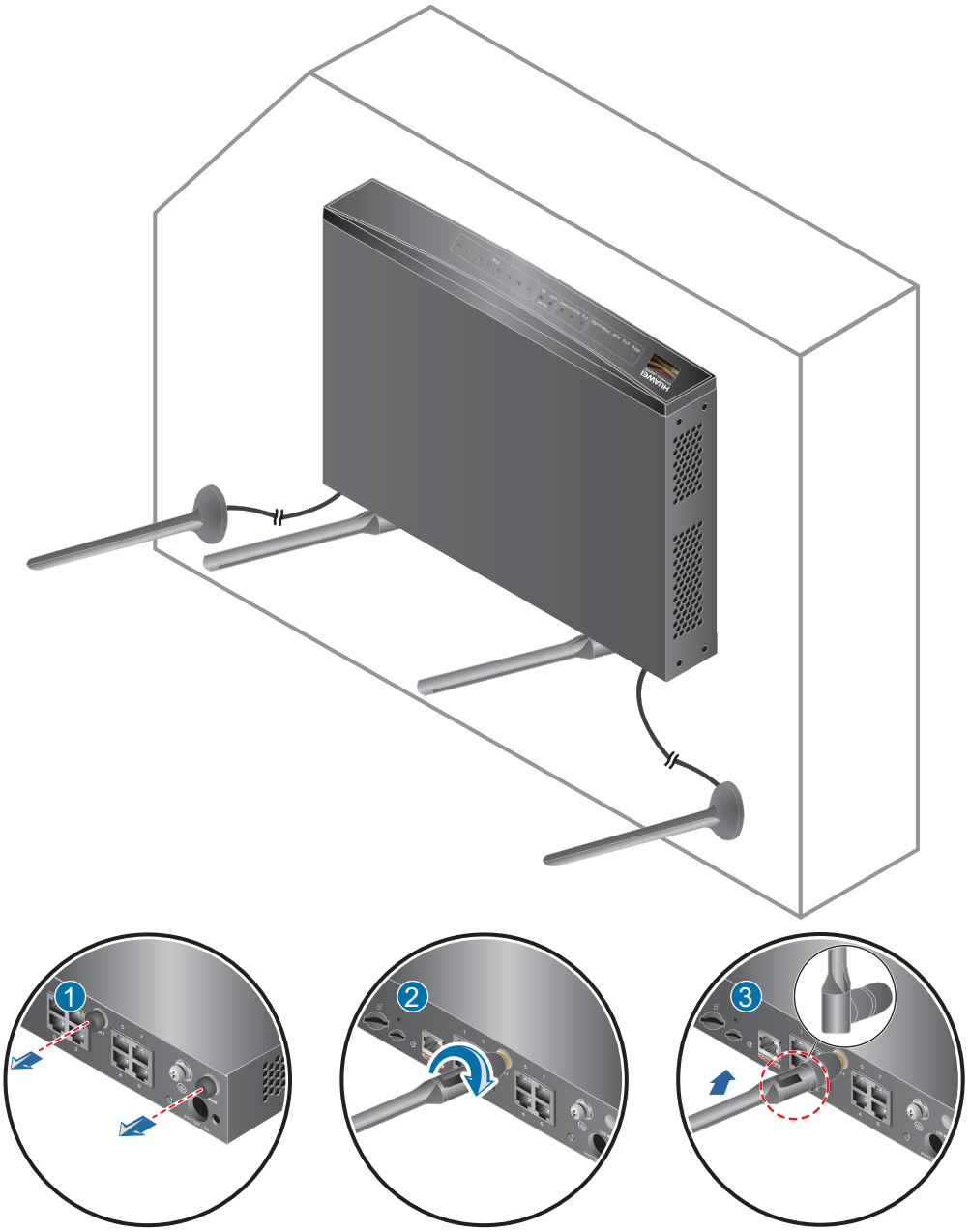


- When the USG is mounted to a wall, the Wi-Fi antenna should be vertical to the wall, and the LTE and Wi-Fi antennas should be placed based on the distance requirement and be vertical to the wall.

  NOTE

  The LTE antenna has a sucker at the bottom and can be sucked to the metallic surface. If there is no metallic surface on the wall, you can use strong tape to fix the LTE antenna on the wall.

Figure 3-15 Installing the antennas (when the USG is mounted to a wall)



----End

Follow-up Procedure

After the antennas are installed, do as follows:

- Before the USG is powered on: Check whether the cables and connectors are free of damage or breakage and are connected properly.
- After the USG is powered on: Run the **display cellular** command in any view to check the **Current RSSI** value. If the value is greater than -75 dbm, the signal is good. Otherwise, adjust the antennas.

NOTE

The USG is the Wi-Fi signal sender and cannot sense the signal strength. After the antennas are installed, check whether the interfaces are properly and reliably connected.

3.2.6 Connecting a Console Cable

After connecting a PC to the console port of a USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL.

Context

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG has been installed, and the ports to be connected are planned.
- Prepare cable labels.

  Before cable connection, labels must be prepared for the cable.

NOTICE

- Make sure that the PC and the USG are connected to the same ground point. Otherwise, the console port of the USG may be damaged.
- Pay attention to port numbering and make sure that the cable is connected to the correct port, preventing damage to ports or the device.

NOTE

You can purchase the console cable as required.

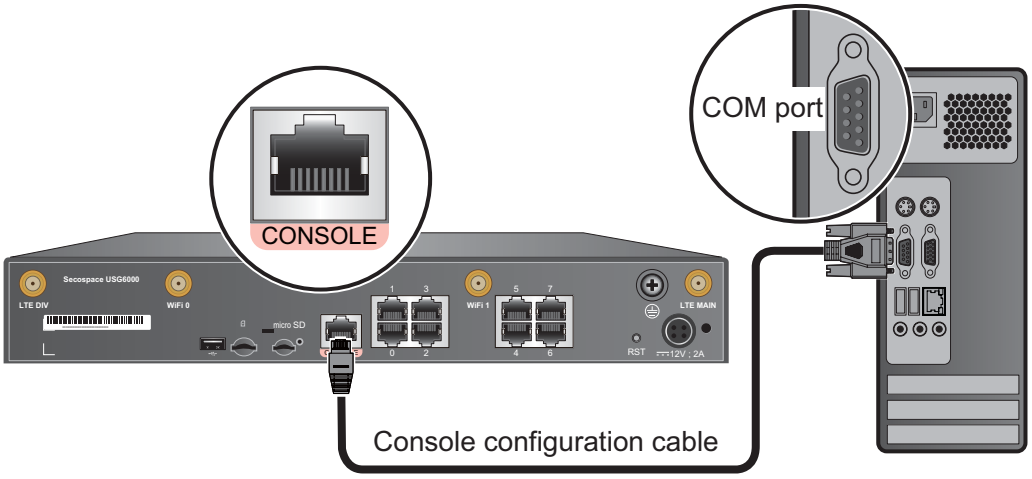
Procedure

Step 1 Before connecting a console cable, attach temporary labels to both ends of the cable for identification.

Step 2 Connect the RJ45 connector of the console cable to the console port (RJ45) of the USG.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 3-16 Connecting a console cable to the USG



Step 4 Remove the temporary labels and attach labels 2 cm away from connectors at both ends of the console cable.

----End

Follow-up Procedure

After the cable connection is complete, verify that:

- The labels at both ends of a cable are correct, clear, neat, and facing the same direction.
- Cables and connectors are free of damage or breakage and are connected properly.

To log in to the command configuration interface of the USG from the management PC, you must configure the terminal emulation program on the PC. The following examples use the Windows XP and Windows 7 operating systems.

- Windows XP
  a. Start the HyperTerminal (Windows operating system) or other third-party program that supports serial ports on the PC.
  b. Create a connection, select the serial port, and configure the serial port parameters as follows:
     - Bit per second: 9600
     - Data bit: 8
     - Parity: None
     - Stop bit: 1
     - Data flow control: None
  c. Click **OK**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.
- Windows 7

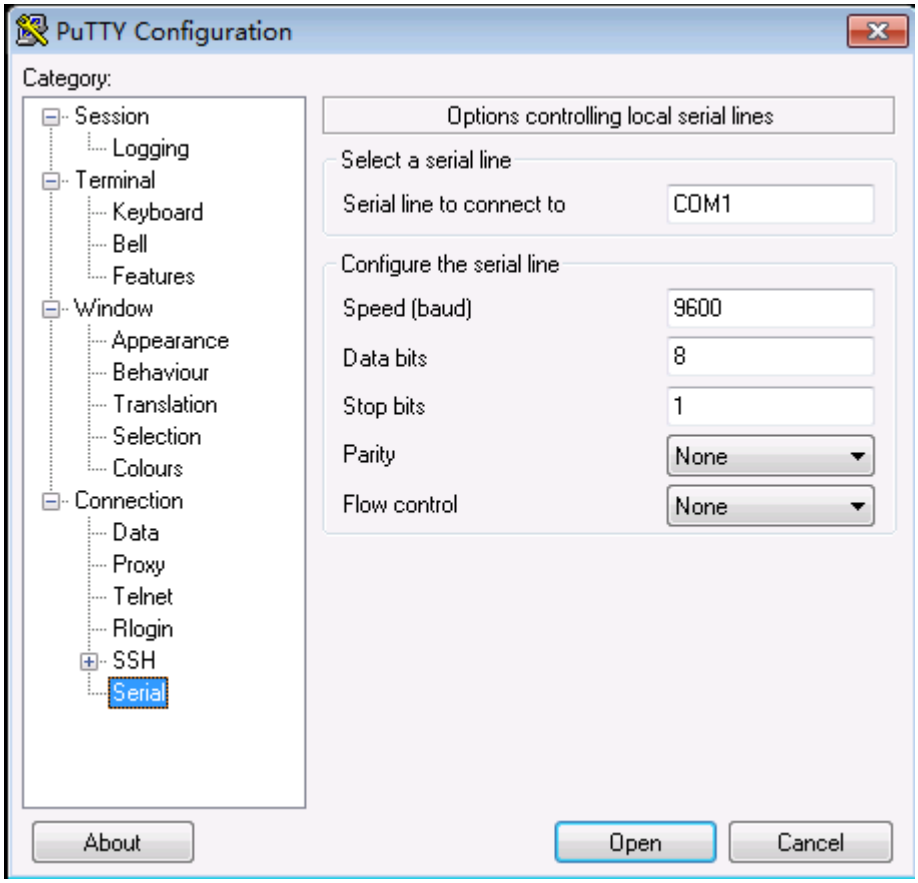
  Windows 7 does not include HyperTerminal like Windows XP did. However, you can download a HyperTerminal program, such as PuTTY, for free from the Internet. PuTTY is used as an example to describe the HyperTerminal configuration.

  a. Download the PuTTY software to the local device and double-click it to run the software.

b. Choose **Session** set the **Connection type** to **Serial**.

c. Set the PuTTY parameters.

Figure 3-17 Setting the PuTTY parameters for connecting the serial port to the USG



d. Click **Open**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.

For details on the console login, refer to the *Administrator Guide*.

3.2.7 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL and the other end to the Ethernet port of the peer device.

Context

Before connecting the Ethernet cable, perform the following operations:

- Check construction conditions.

  The peer device has been installed in the equipment room, and the port to which the Ethernet cable is to be connected has been determined.

- Check the cabling route.

The engineering document should specify the cabling route from the cabinet to the peer device in the equipment room, and the length of the cable is calculated based on the cabling path.

- Label the cable.

  The cable must be labeled before being connected to the devices.

Ethernet cables fall into crossover and straight through cables. Currently, Ethernet ports on most devices can dynamically adapt to both types of cables. Use proper cables for devices that do not support dynamic adaptation.

By electromagnetic compatibility, Ethernet cables can be classified into ordinary and shielded cables. The shielded cables are preferred due to their better electromagnetic compatibility.

NOTICE

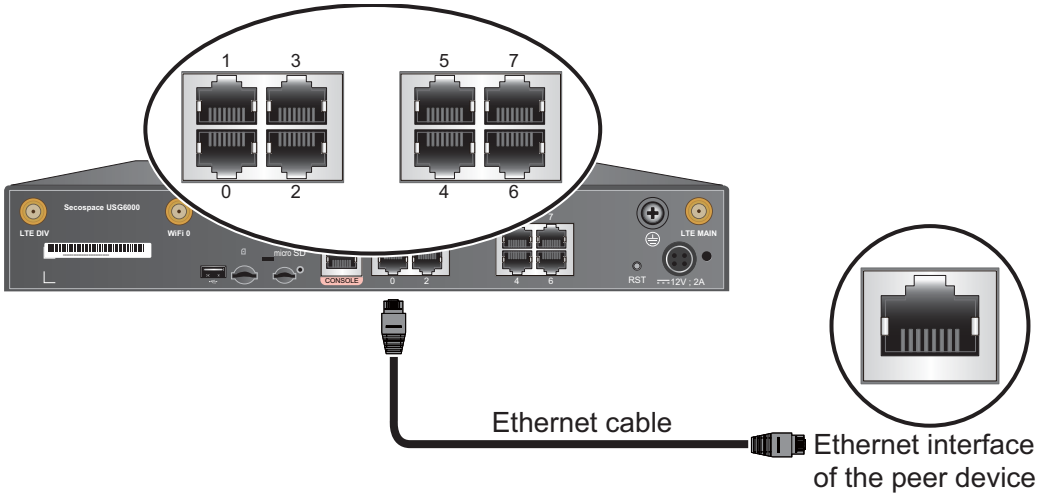
Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of the USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-18 Connecting an Ethernet cable



Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

Step 4 Remove the temporary labels and attach labels (2 cm away from connectors) at both ends of the Ethernet cable.

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.2.8 Connecting a Power Adapter

USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL provides a 24W power supply adapter, which can be directly connected to the power supply in the equipment room without requiring an AC power cable.

Context

Before connecting a power connector, ensure that the power source of the equipment room meets the input requirements of the USG power module.

Procedure

Step 1 Ensure that the PGND cable is properly grounded.

Step 2 Insert a cable-retention clip into the jack next to the power socket.

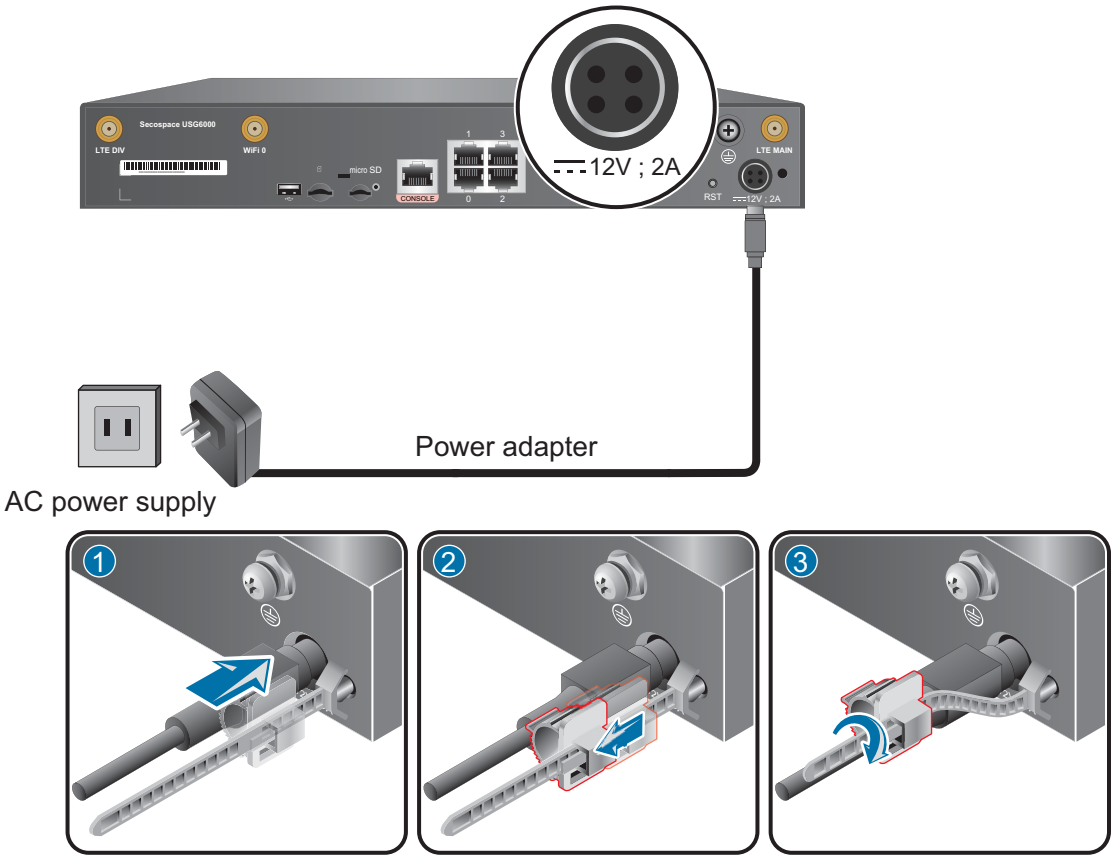
Step 3 Connect a power adapter.

1. Insert the 4-PIN connector of the power adapter into the power socket on the USG rear panel and adjust the cable-retention clip to an appropriate position.
2. Use a cable-retention clip to bundle the cable of the power adapter and adjust the cable-retention clip to fasten the cable.
3. Plug the other end of the power adapter to the AC power socket or the output of the AC power supply device.

   NOTE

   The USG does not have any power switch. The power supply switch determines the power-on and power-off of the USG.

Figure 3-19 Connecting a power adapter



----End

Follow-up Procedure

Verify the following after the connection is complete:

- The power cable is firmly connected to the power supply socket.
- If multiple USGs are deployed, the power cables of each USG are correctly labeled for distinction.

3.2.9 Powering On or Off the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL

This section describes how to power on or off the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL. To ensure the normal start and security of the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL, strictly follow the operation guide to power on or off the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.

- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

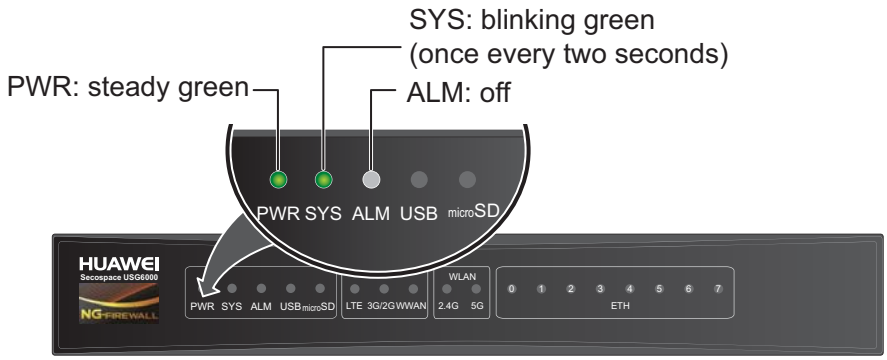
Procedure

- Power on the USG.

  The USG starts after the switch of the power supply device is turned on.

  You can identify the USG status based on indicators on the front panel. Indicators shown in **Figure 3-20** indicate that the USG is running normally.

  Figure 3-20 Indicators when the USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL runs normally



- Power off the USG.

  NOTICE

  Before powering off the USG, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

  If the USG will be administratively shut down for a long time, turn off the power switch. After powering off the USG, set it aside properly according to storage requirements.

----End

Follow-up Procedure

After the USG is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the *Administrator Guide*.

3.3 Installing a Desktop Device (USG6310/6320)

This chapter provides the cabinet-mounting, workbench-mounting, wall-mounting, and cable connection methods of the USG6310/6320.

3.3.1 Mounting a Device to a Specified Location

The USG6310/6320 can be mounted in a 19-inch standard cabinet. When no cabinet is available, install the USG6310/6320 on a workbench or a wall.

3.3.1.1 Mounting a Device in a Cabinet

The USG6310/6320 can be mounted in a 19-inch standard cabinet using mounting ears.

Context

Required instruments:

- Phillips screwdriver
- Floating mounting bar

Before installing the USG, check the following items:

- The cabinet is stable.
- The position for the USG in the cabinet is well arranged.
- Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.
- The device to be installed is staged near the cabinet for convenience.
- From the rear perspective of the chassis, the cooling wind of the USG flows in on the left and is exhausted on the right. When a USG and a device whose cooling wind flows in on the right and is exhausted on the left are installed in the same cabinet, adequate space must be reserved between them to avoid thermal cycles.

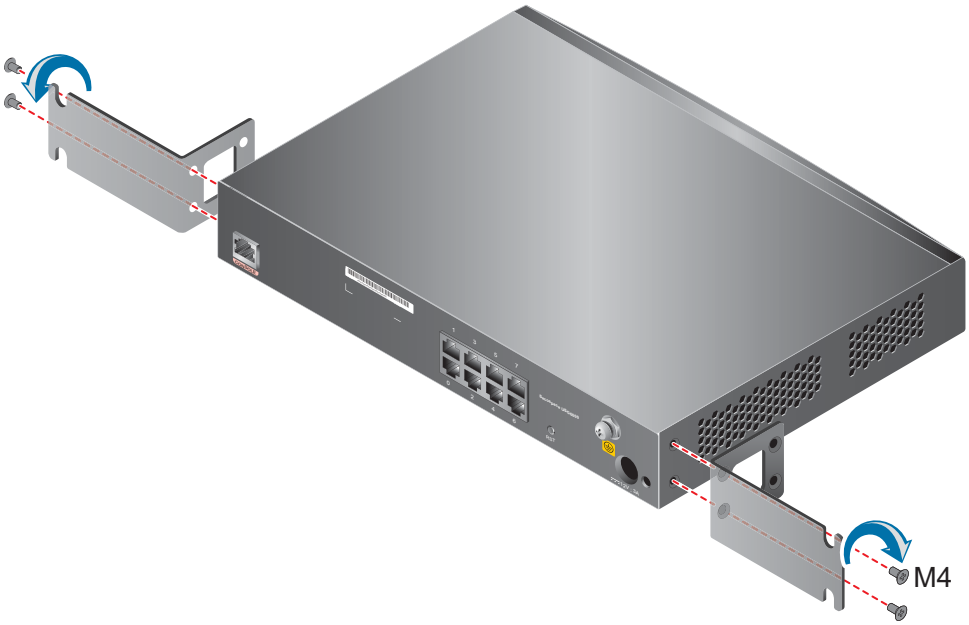
You can place either end of the USG chassis towards the cabinet door. In this manual, the rear panel of the USG is towards the cabinet door.

Procedure

Step 1 Install mounting ears on the chassis.

Use a Phillips screwdriver to fix the mounting ears to both sides of the chassis with M4 screws, as shown in **Figure 3-21**.

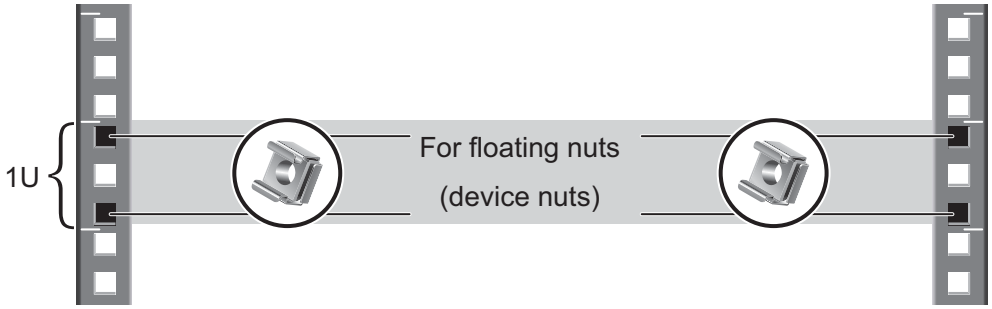
Figure 3-21 Installing the mounting ears on the chassis



Step 2 Install floating nuts.

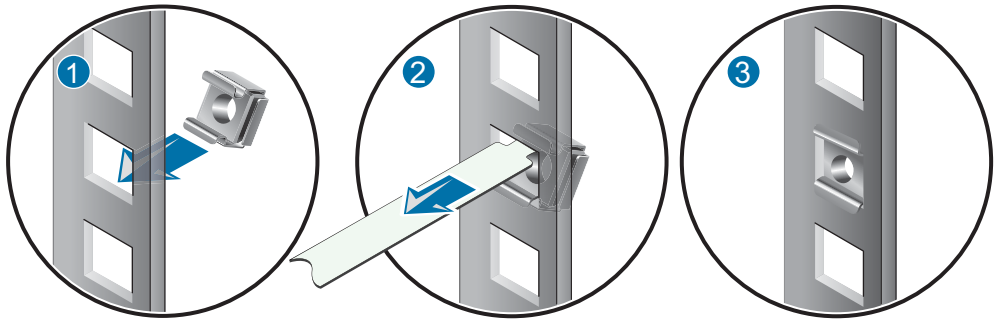
Figure 3-22 illustrates the positions of floating nuts.

Figure 3-22 Positions of floating nuts



Use M6 screws to fix the floating nuts at the positions specified in **Figure 3-22**, as shown in **Figure 3-23**.

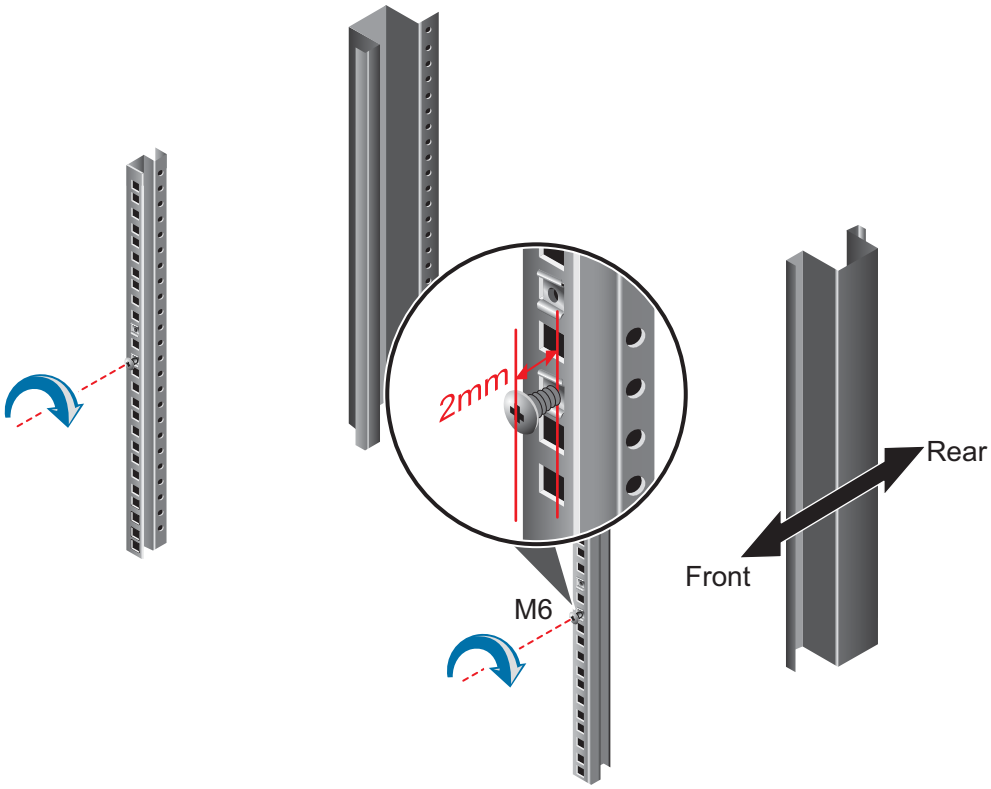
Figure 3-23 Installing floating nuts



Step 3 Mount the USG in the cabinet.

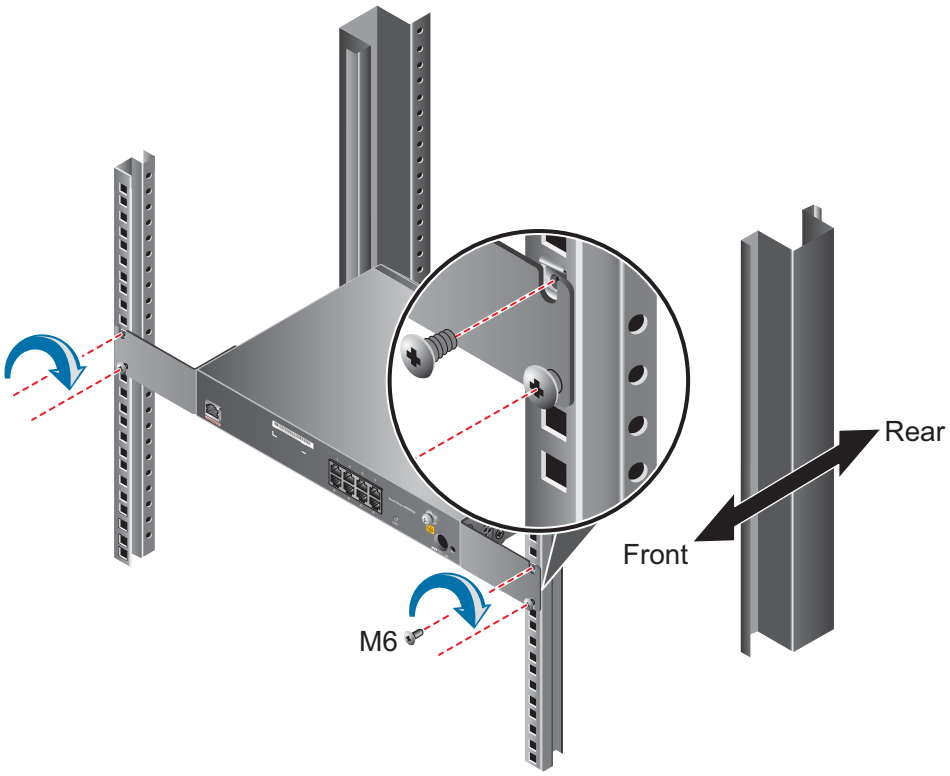
1. Use a Phillips screwdriver to fix M6 screws into two floating nuts of the lower row but do not secure them, leaving a 2 mm spacing, as shown in **Figure 3-24**.

Figure 3-24 Installing M6 screws to the cabinet



2. Lift the USG, move it to the cabinet, and hang the mounting ears onto the protruding M6 screws.
3. Use a Phillips screwdriver to secure the M6 screws, install M6 screws for the upper row, and fix the USG into the cabinet through mounting ears, as shown in **Figure 3-25**.

Figure 3-25 Mounting the USG in a cabinet



----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG is placed securely inside the cabinet.
- Ensure that the exhaust of the USG is not blocked by other objects.

3.3.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6310/6320 on a workbench.

Context

The workbench must be:

- Reliably grounded.
- Clean, firm, and securely installed.

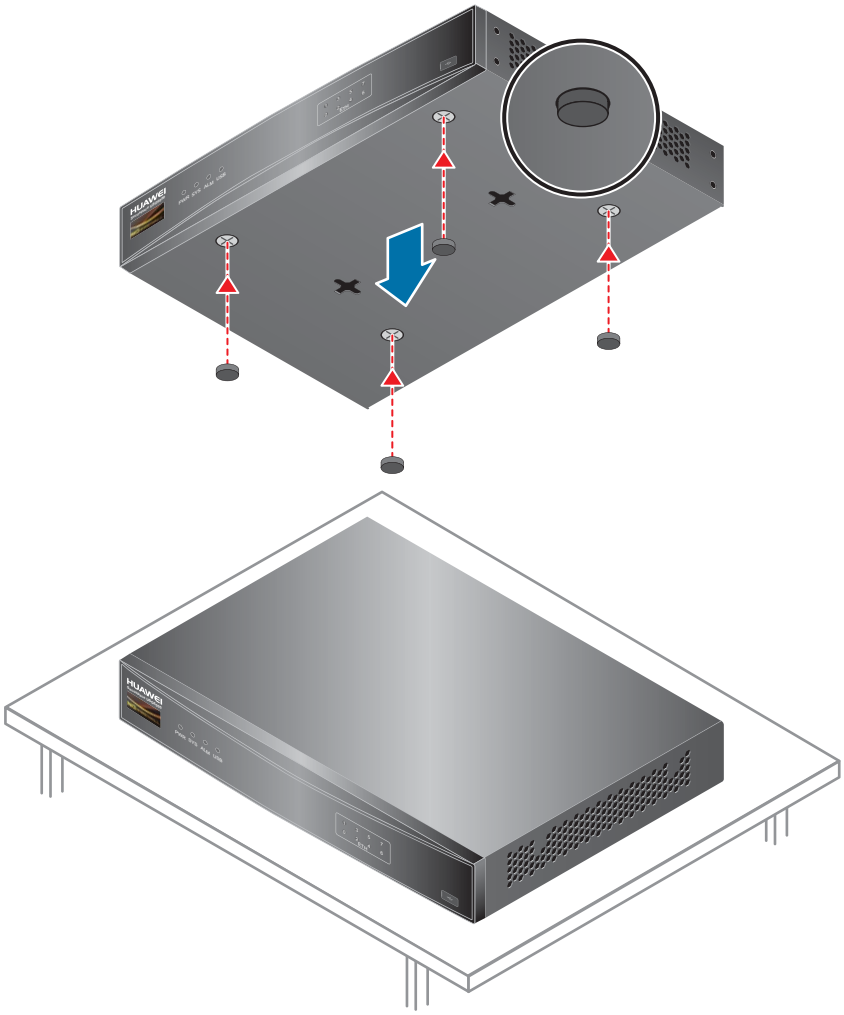
Four rubber feet are delivered with the USG, and four round notches are located at the bottom of the device to hold the rubber feet.

Procedure

Step 1 Fix the rubber feet to the round notches at the bottom of the USG.

Step 2 Place the USG on the workbench.

Figure 3-26 Placing the USG with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG is securely placed on the workbench.
- No object blocks the exhaust of the USG, and there is at least 10 cm of distance between the USG and surrounding devices.
- There are no heavy objects on the USG.

3.3.1.3 Mounting a Device Against a Wall

When no cabinet is available, you can mount the USG6310/6320 on a wall. The customer must have screws for wall-mounting.

Context

Tools

- Ruler
- Marker
- Hammer drill
- Vacuum cleaner
- Hammer
- Phillips screwdriver

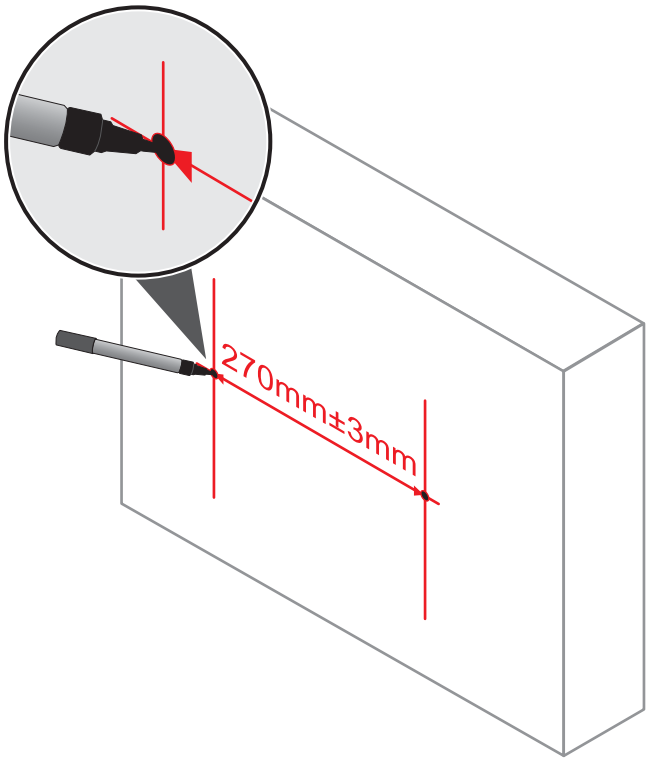
Procedure

Step 1 Determine the locations of two mounting holes on the wall using a ruler and mark the mounting holes with a marker. The mounting holes must be on the same horizontal level.

NOTE

- The wall must be a bearing wall. Otherwise, the wall is not suitable for wall-mounting.
- Ensure that the height of mounting holes is proper so that the indicators are easy to view.

Figure 3-27 Spacing between mounting holes



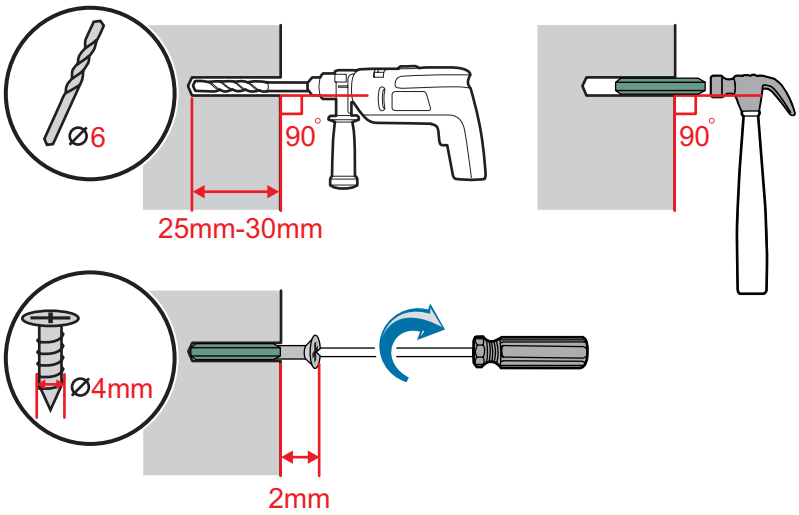
Step 2 Drill holes and install mounting screws.

NOTICE

Ensure that the mounting screws are secure and reliable. Otherwise, the tension after cables are connected may cause the USG6310/6320 to fall.

1. Select a proper drill according to the outer diameter of mounting screws. The outer diameter of mounting screws is not greater than 4 mm.
2. Hammer hollow wall anchors into the mounting holes.
3. Screw the mounting screws into the wall anchors using a Phillips screwdriver. Leave the screws protruding 2 mm from the wall.

Figure 3-28 Drilling holes and installing mounting screws

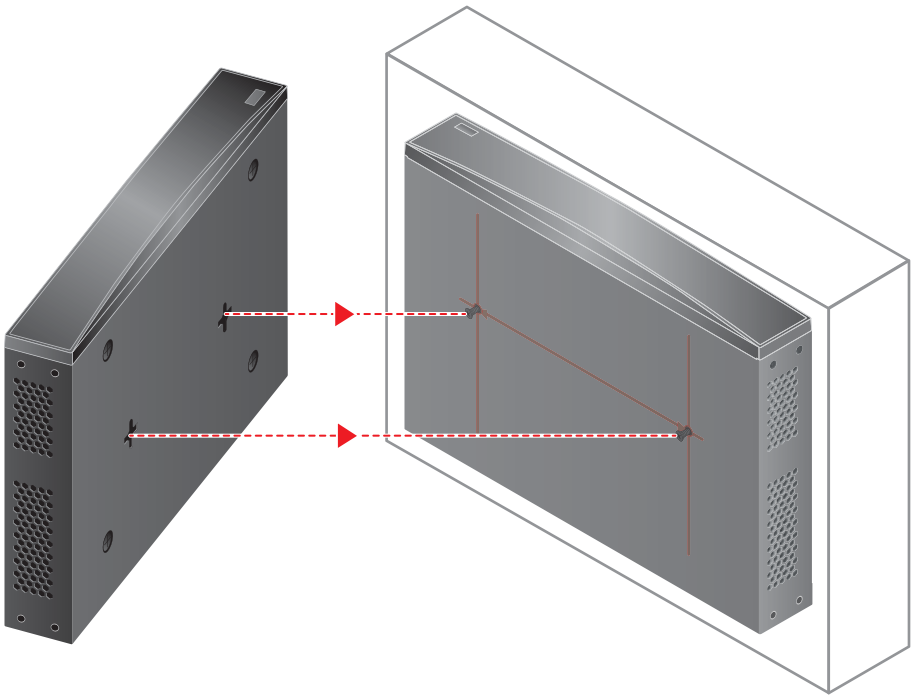


Step 3 Mount a USG on the wall by aligning the mounting brackets on the rear of the USG with the mounting screws.

NOTE

The USG supports upward mounting and downward mounting. To prevent water from entering into ports and causing device damage, you are advised to mount the USG with ports facing downward.

Figure 3-29 Mounting the USG on a wall



----End

Follow-up Procedure

After wall-mounting is complete, verify that:

- The USG is securely fixed on the wall.
- A clearance of 10 cm is maintained around the USG and the air flow is not blocked.

3.3.2 Connecting a PGND Cable

Connecting the PGND cable of a USG6310/6320 correctly is a key measure of surge protection and resistance to interference. Before using the USG6310/6320, correctly connect the PGND cable.

Prerequisites

The USG has been installed inside a cabinet.

Context

Instruments required:

- Phillips screwdriver
- Multimeter

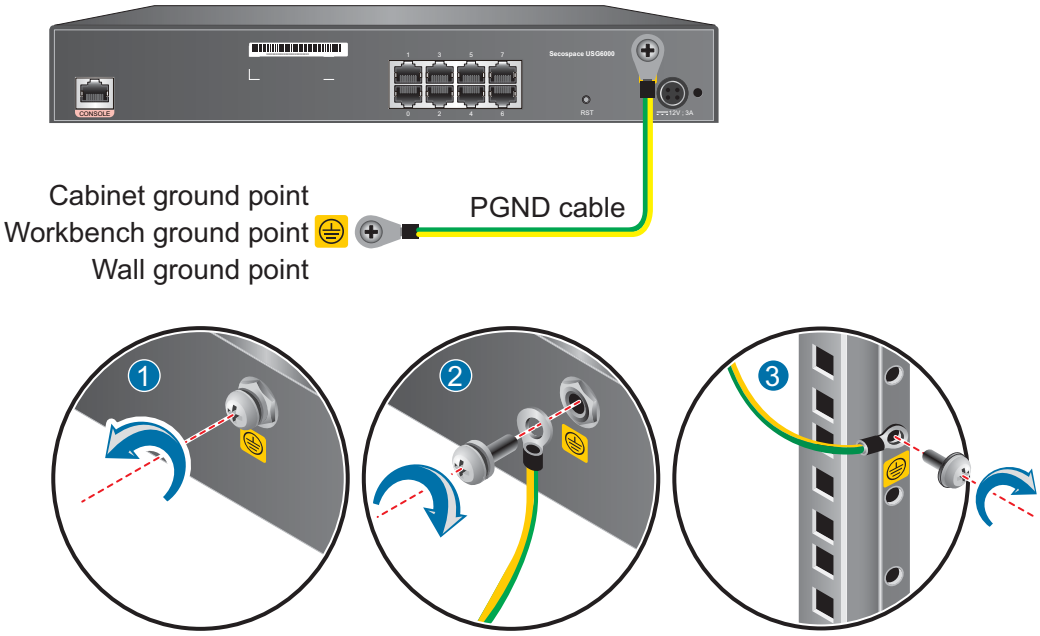
Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG rear panel.

Step 2 Align the M4 end of the PGND cable with the screw hole of the ground terminal and tighten the screw.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet, workbench, or wall.

Figure 3-30 Connecting a PGND cable



----End

Follow-up Procedure

Verify the following after the cabling is complete:

- The PGND cable is securely connected to the ground terminal.
- The electrical resistance between the ground terminal and ground point is less than 5 ohm on a multimeter.

3.3.3 Connecting a Console Cable

After connecting a PC to the console port of a USG6310/6320 with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6310/6320.

Context

Before connecting a console cable, perform the following operations:

- Check preparations.

A PC is ready, a USG has been installed, and the ports to be connected are planned.

- Prepare cable labels.

  Before cable connection, labels must be prepared for the cable.

NOTICE

- Make sure that the PC and the USG are connected to the same ground point. Otherwise, the console port of the USG may be damaged.
- Pay attention to port numbering and make sure that the cable is connected to the correct port, preventing damage to ports or the device.

NOTE

You can purchase the console cable as required.

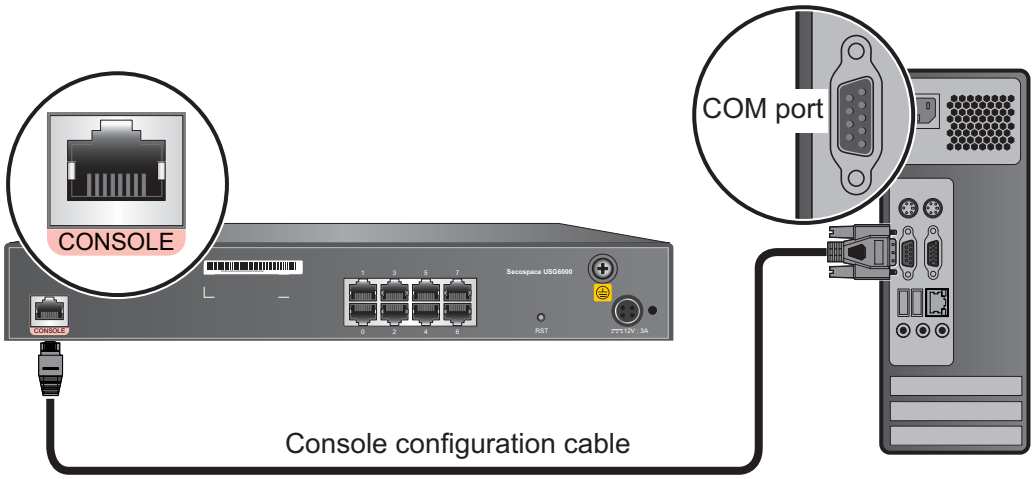
Procedure

Step 1 Before connecting a console cable, attach temporary labels to both ends of the cable for identification.

Step 2 Connect the RJ45 connector of the console cable to the console port (RJ45) of the USG.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 3-31 Connecting a console cable to the USG



Step 4 Remove the temporary labels and attach labels 2 cm away from connectors at both ends of the console cable.

----End

Follow-up Procedure

After the cable connection is complete, verify that:

- The labels at both ends of a cable are correct, clear, neat, and facing the same direction.

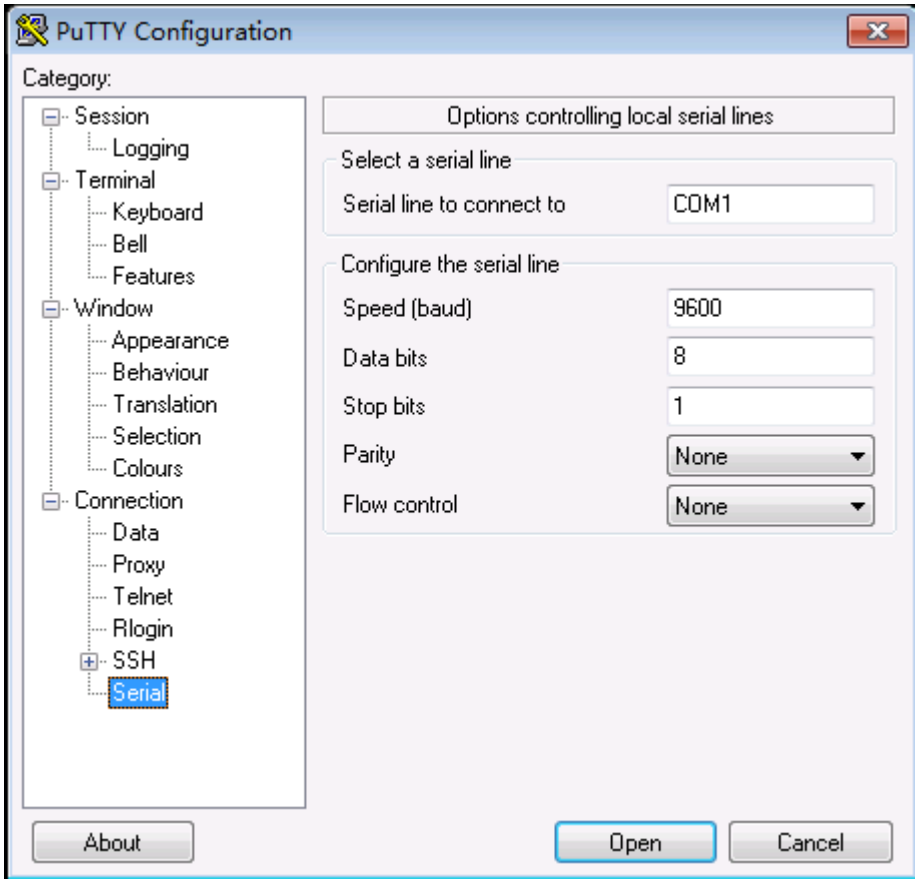
- Cables and connectors are free of damage or breakage and are connected properly.

To log in to the command configuration interface of the USG from the management PC, you must configure the terminal emulation program on the PC. The following examples use the Windows XP and Windows 7 operating systems.

- Windows XP
  a. Start the HyperTerminal (Windows operating system) or other third-party program that supports serial ports on the PC.
  b. Create a connection, select the serial port, and configure the serial port parameters as follows:
     - Bit per second: 9600
     - Data bit: 8
     - Parity: None
     - Stop bit: 1
     - Data flow control: None
  c. Click **OK**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.
- Windows 7

  Windows 7 does not include HyperTerminal like Windows XP did. However, you can download a HyperTerminal program, such as PuTTY, for free from the Internet. PuTTY is used as an example to describe the HyperTerminal configuration.
  a. Download the PuTTY software to the local device and double-click it to run the software.
  b. Choose **Session** set the **Connection type** to **Serial**.
  c. Set the PuTTY parameters.

Figure 3-32 Setting the PuTTY parameters for connecting the serial port to the USG



d. Click **Open**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.

For details on the console login, refer to the *Administrator Guide*.

3.3.4 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6310/6320 and the other end to the Ethernet port of the peer device.

Context

Before connecting the Ethernet cable, perform the following operations:

- Check construction conditions.

  The peer device has been installed in the equipment room, and the port to which the Ethernet cable is to be connected has been determined.
- Check the cabling route.

  The engineering document should specify the cabling route from the cabinet to the peer device in the equipment room, and the length of the cable is calculated based on the cabling path.
- Label the cable.

  The cable must be labeled before being connected to the devices.

Ethernet cables fall into crossover and straight through cables. Currently, Ethernet ports on most devices can dynamically adapt to both types of cables. Use proper cables for devices that do not support dynamic adaptation.

By electromagnetic compatibility, Ethernet cables can be classified into ordinary and shielded cables. The shielded cables are preferred due to their better electromagnetic compatibility.

NOTICE

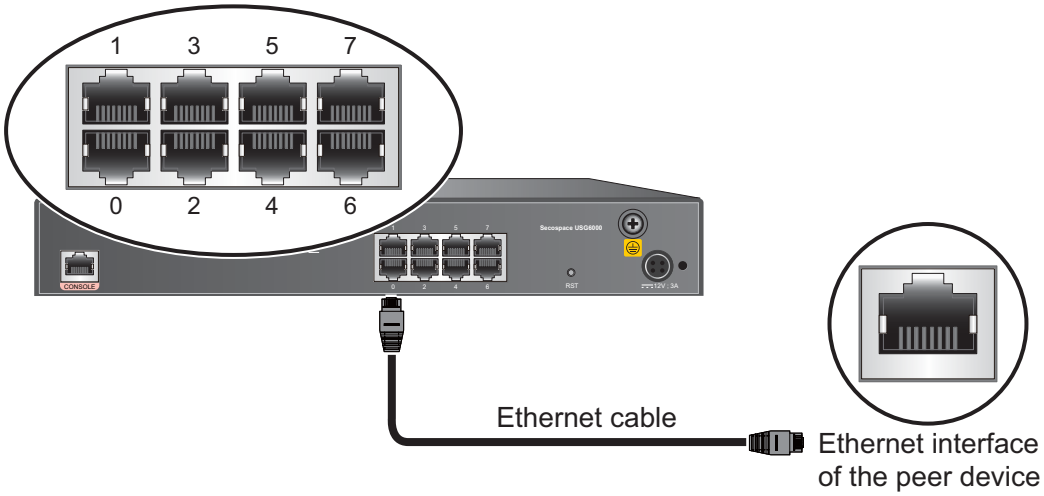
Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of the USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-33 Connecting an Ethernet cable



Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

Step 4 Remove the temporary labels and attach labels (2 cm away from connectors) at both ends of the Ethernet cable.

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.3.5 Connecting a Power Adapter

A power adapter can be used to supply power for a USG6310/6320. Prepare an AC power cable to connect the power connector and the power source of the equipment room.

Context

Before connecting a power connector, ensure that the power source of the equipment room meets the input requirements of the USG power module.

Procedure

Step 1 Ensure that the PGND cable is properly grounded.

Step 2 Insert a cable-retention clip into the jack next to the power socket.

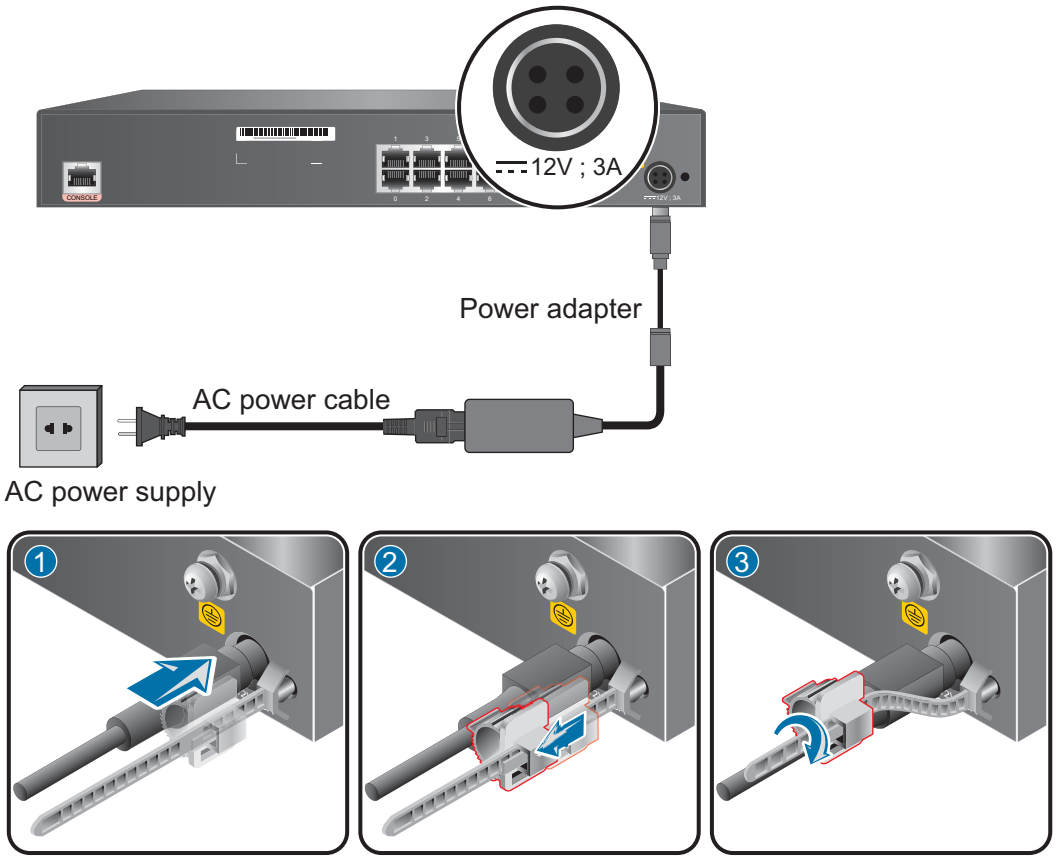
Step 3 Connect a power adapter.

1. Plug the C7 plug of the AC power cable into the C14 socket of the power adapter.
2. Insert the 4-PIN connector of the power adapter into the power socket on the USG rear panel and adjust the cable-retention clip to an appropriate position.
3. Use a cable-retention clip to bundle the cable of the power adapter and adjust the cable-retention clip to fasten the cable.
4. Plug the other end of the AC power cable to the AC power socket or the output of the AC power supply device.

   NOTE

   The USG does not have any power switch. The power supply switch determines the power-on and power-off of the USG.

Figure 3-34 Connecting a power adapter



----End

Follow-up Procedure

Verify the following after the connection is complete:

- The power cable is firmly connected to the power supply socket.
- If multiple USGs are deployed, the power cables of each USG are correctly labeled for distinction.

3.3.6 Powering On or Off the USG6310/6320

This section describes how to power on or off the USG6310/6320. To ensure the normal start and security of the USG6310/6320, strictly follow the operation guide to power on or off the USG6310/6320.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.
- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

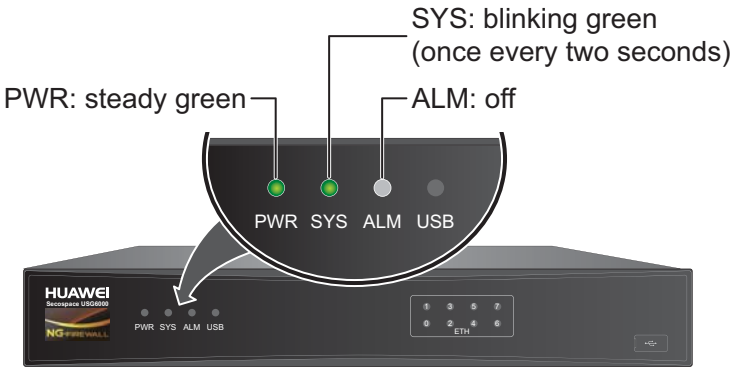
Procedure

- Power on the USG.

  The USG starts after the switch of the power supply device is turned on.

  You can identify the USG status based on indicators on the front panel. Indicators shown in **Figure 3-35** indicate that the USG is running normally.

  Figure 3-35 Indicators when the USG6310/6320 runs normally

- Power off the USG.

  NOTICE

  Before powering off the USG, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

  If the USG will be administratively shut down for a long time, turn off the power switch. After powering off the USG, set it aside properly according to storage requirements.

----End

Follow-up Procedure

After the USG is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the *Administrator Guide*.

3.4 Installing a 1 U Device (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)

This chapter provides the cabinet-mounting, workbench-mounting, cable connection, and expansion card installation methods of the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 series.

3.4.1 Mounting a Device to a Specified Location

The USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 can be mounted in a 19-inch standard cabinet. When no cabinet is available, you can mount the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 on a workbench.

3.4.1.1 Mounting a Device in a Cabinet

The USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 can be mounted in a 19-inch standard cabinet through L-shape guide rails or adjustable guide rails.

Context

The adjustable guide rails (parts 21241561 and 21242247) and L-shaped guide rails are optional and not delivered with the USG by default. Purchase them as required.

Required instruments:

- Phillips screwdriver
- Floating mounting bar

Before installing the USG, check the following items:

- The cabinet is stable.
- Adjustable guide rail 21241561 can be flexibly adjusted from 400 mm to 600 mm in length and adjustable guide rail 21242247 from 370 mm to 585 mm to be installed in a 600 mm to 800 mm deep cabinet. Before installing the adjustable guide rail, adjust the distance between the front and rear angle gauges (rack mounting rails/vertical columns) to satisfy the installation requirements.
- The position for the USG in the cabinet is well arranged. Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.
- The USG to be installed is staged near the cabinet for convenience.
- From the rear perspective of the chassis, the cooling wind of the USG flows in on the left and front, and is exhausted on the right. When a USG and a device whose cooling wind flows in on the right and is exhausted on the left are installed in the same cabinet, adequate space must be reserved between them to avoid thermal cycles.

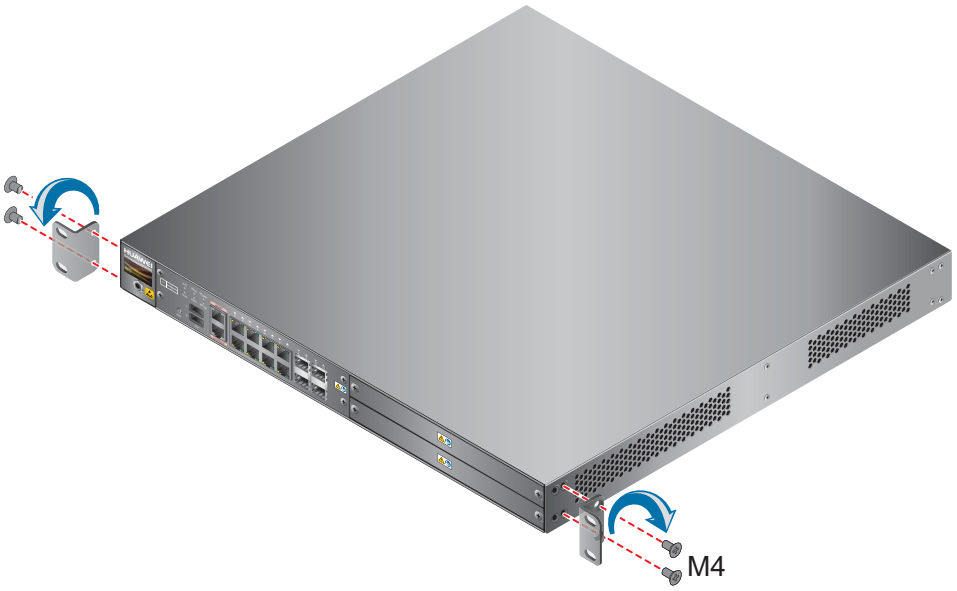
You can place either end of the USG chassis towards the cabinet door. In this manual, the front panel of the USG is towards the cabinet door.

Procedure

Step 1 Install mounting ears on the chassis.

Use a Phillips screwdriver to fix the mounting ears to both sides of the chassis with M4 screws, as shown in **Figure 3-36**.

Figure 3-36 Installing the mounting ears on the chassis



Step 2 Install cabinet guide rails and floating nuts.

The USG supports the adjustable guide rails (parts 21241561 and 21242247) and L-shaped guide rails. The installation method varies with the guide rail type.

NOTE

Adjustable guide rails 21241561 are delivered earlier and no longer delivered after they run out. Then adjustable guide rails 21242247 are delivered.

1. Determine the positions for installing the guide rails and floating nuts, as shown in **Figure 3-37**, **Figure 3-38**, and **Figure 3-39**.

NOTICE

Install the two guide rails at the same height to ensure that the device is level.

Figure 3-37 Positions of L-shaped guide rails and floating nuts

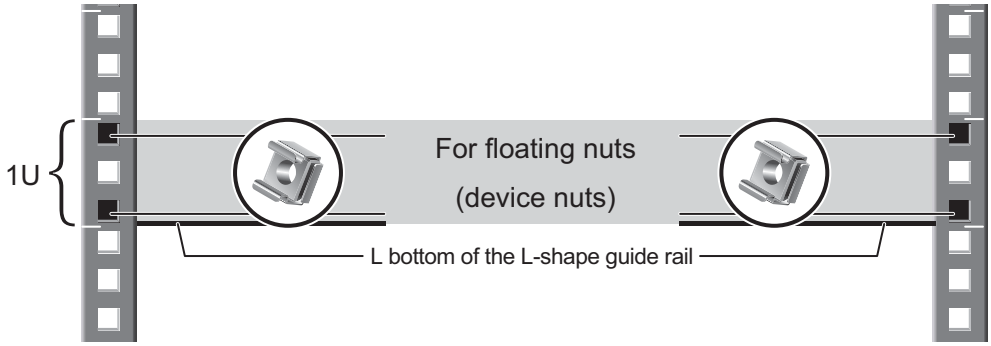


Figure 3-38 Positions of adjustable guide rails 21241561 and floating nuts

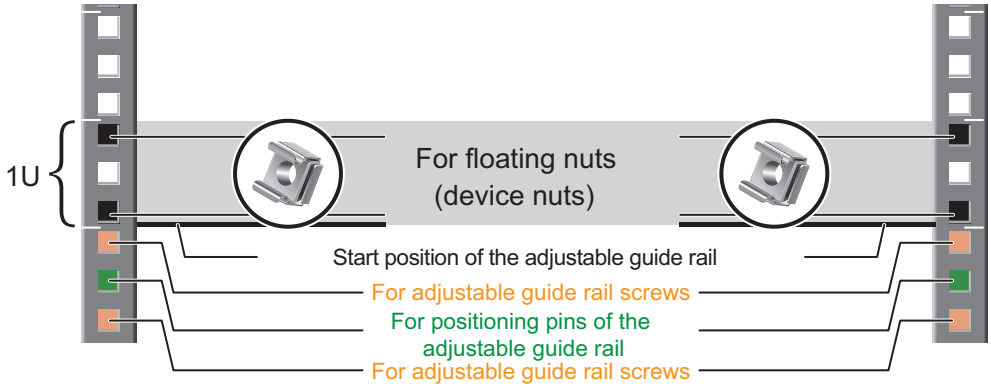
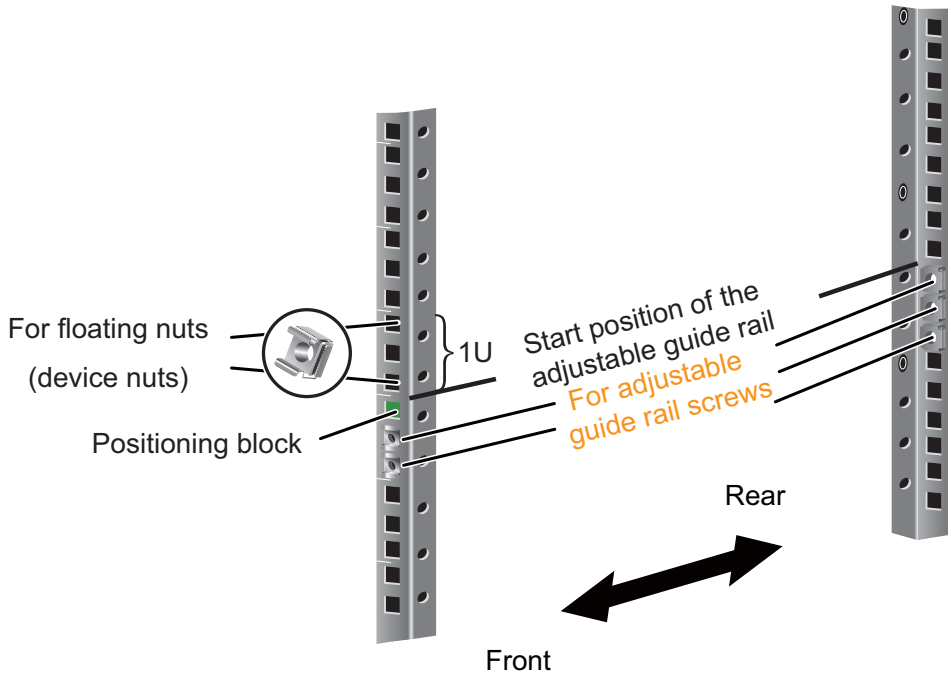
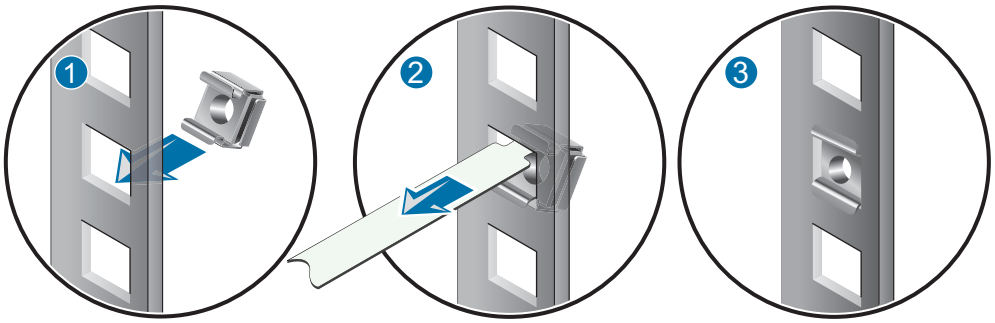


Figure 3-39 Positions of adjustable guide rails 21242247 and floating nuts



2. Install the floating nuts that match M6 screws at the positions marked in **Figure 3-37**, **Figure 3-38**, and **Figure 3-39**. **Figure 3-40** illustrates how to install a floating nut.

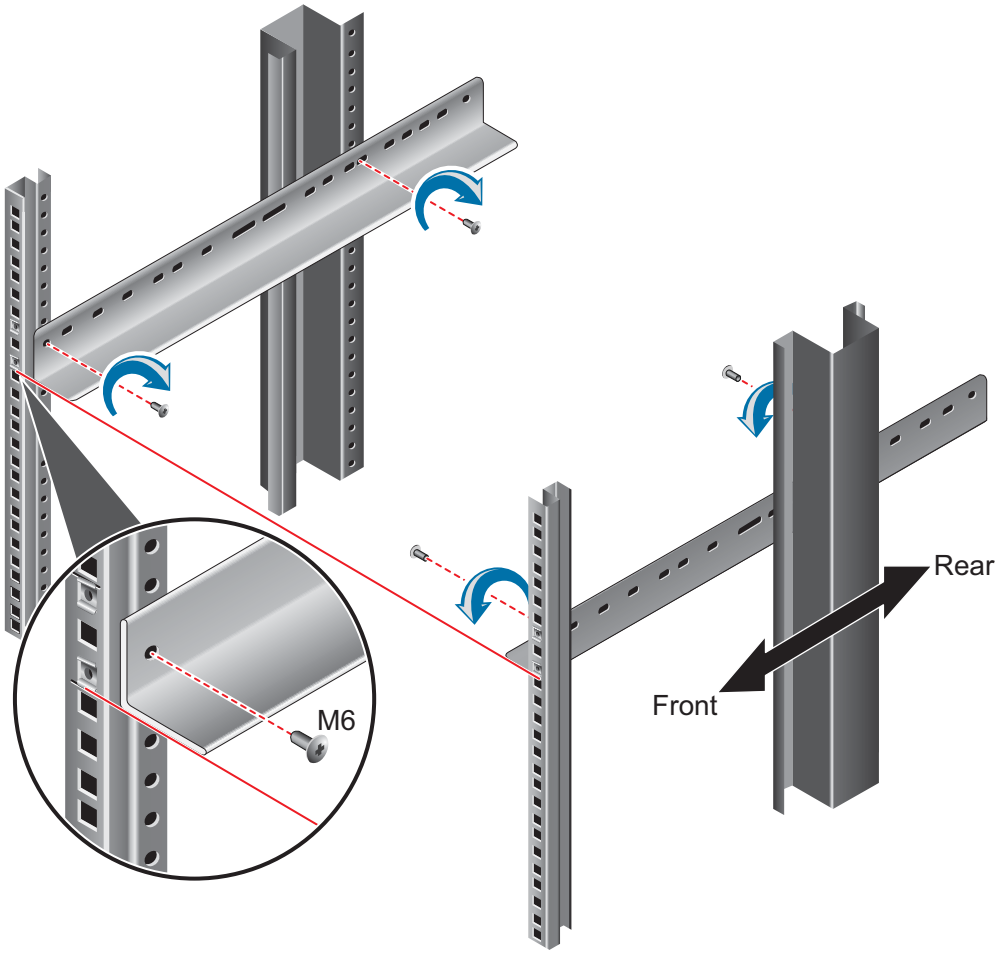
Figure 3-40 Installing floating nuts



3. Install guide rails. As for adjustable guide rails, identify the left and right guide rails, and the front and rear ends of each guide rail according to the F/L and F/R flags on the guide rails.

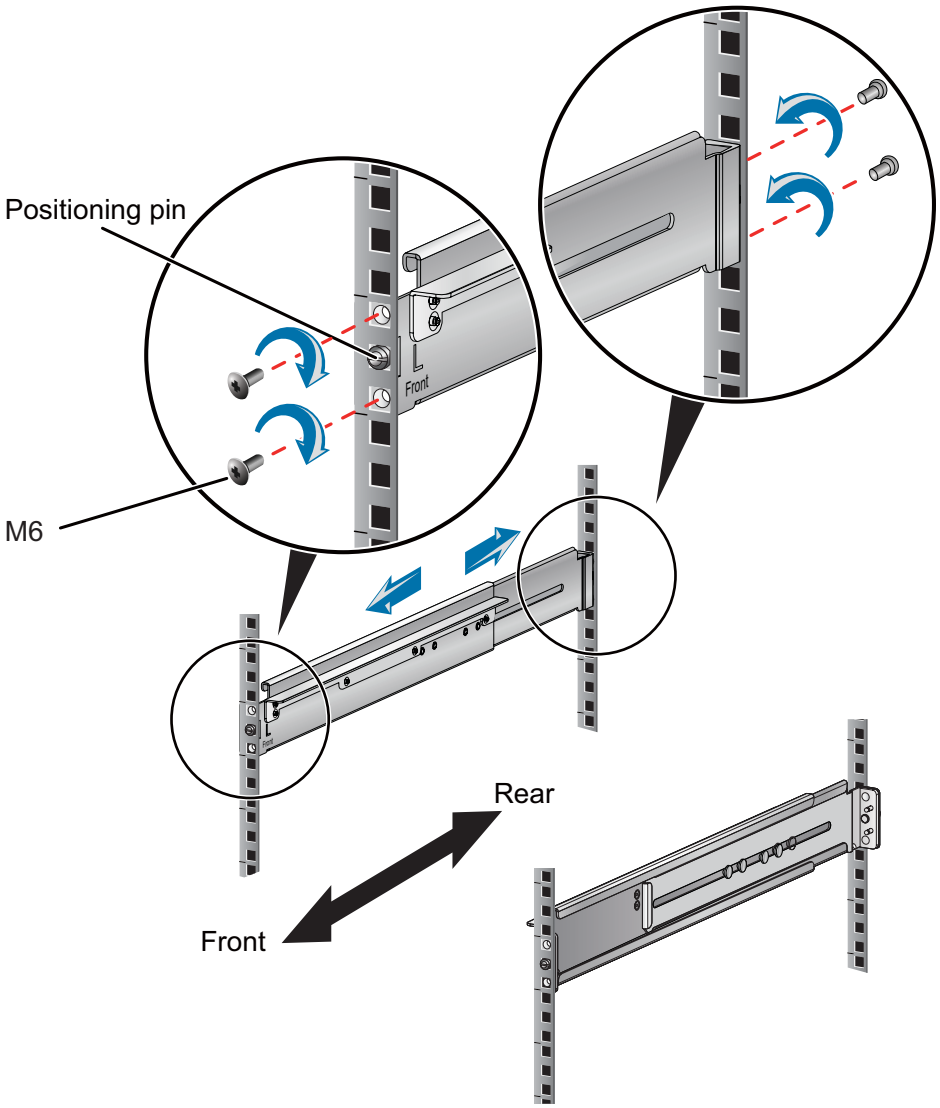
   Use M6 screws to fix the L-shape guide rails at the positions specified in **Figure 3-37**, as shown in **Figure 3-41**.

Figure 3-41 Installing L-shape guide rails



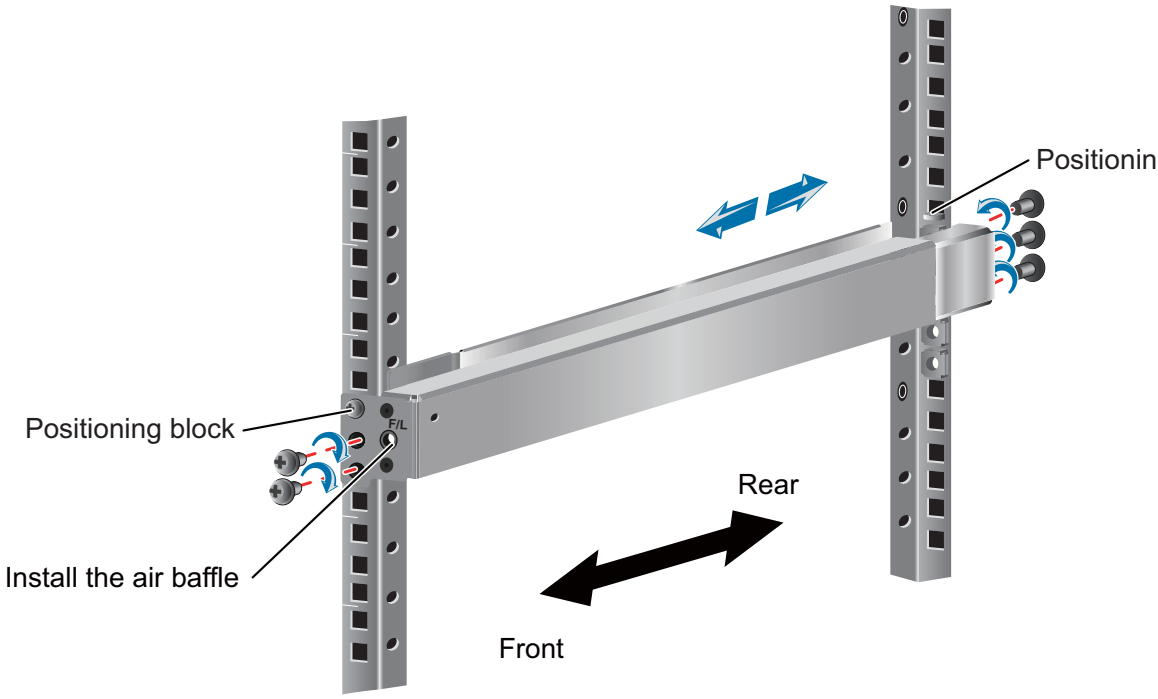
Insert the positioning pins in the front and at the back of the adjustable guide rails 21241561 into the holes at the positions specified in **Figure 3-38**. Then use the Philips screws to fix the adjustable guide rails inside the cabinet with M6 screws, as shown in **Figure 3-42**.

Figure 3-42 Installing adjustable guide rails 21241561



Use the positioning blocks in the front and the positioning hooks at the back of the adjustable guide rails 21242247 as shown in **Figure 3-39** to place the guide rails horizontally in the determined installation positions in the racks.Use a Phillips screwdriver to fix the adjustable guide rails to the left and right sides of the cabinet with M6 screws, as shown in **Figure 3-43**.

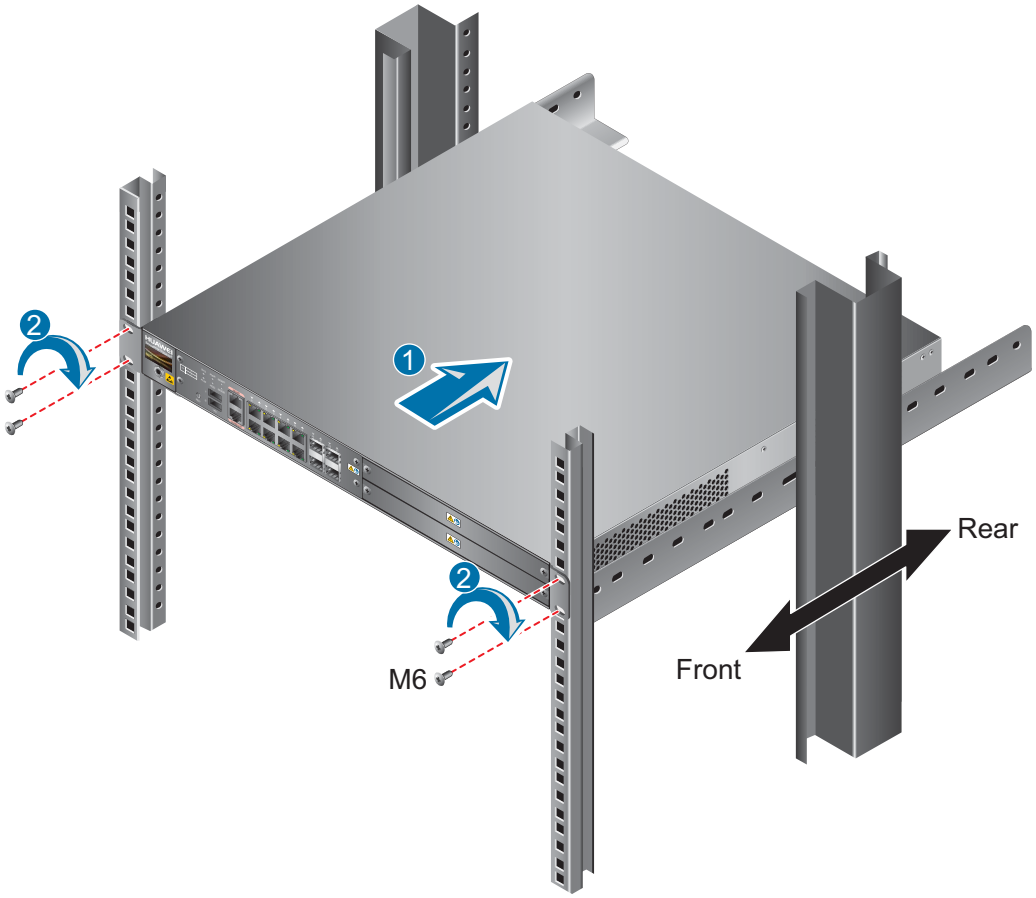
Figure 3-43 Installing adjustable guide rails 21242247



Step 3 Mount the USG in the cabinet.

1. Lift the USG, move it to the cabinet, place it onto the guide rails, and push it into the cabinet.
2. Use M6 screws to fix the mounting ears of the USG to the mounting rack, as shown in **Figure 3-44**.

Figure 3-44 Mounting the USG in a cabinet



3. (Recommended) For adjustable guide rail 21242247, fix the air baffle to the guide rail with two M6 screws.

----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG is placed securely inside the cabinet.
- Ensure that the exhaust of the USG is not blocked by other objects.

3.4.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 on a workbench.

Context

The workbench must be:

- Reliably grounded.
- Clean, firm, and securely installed.

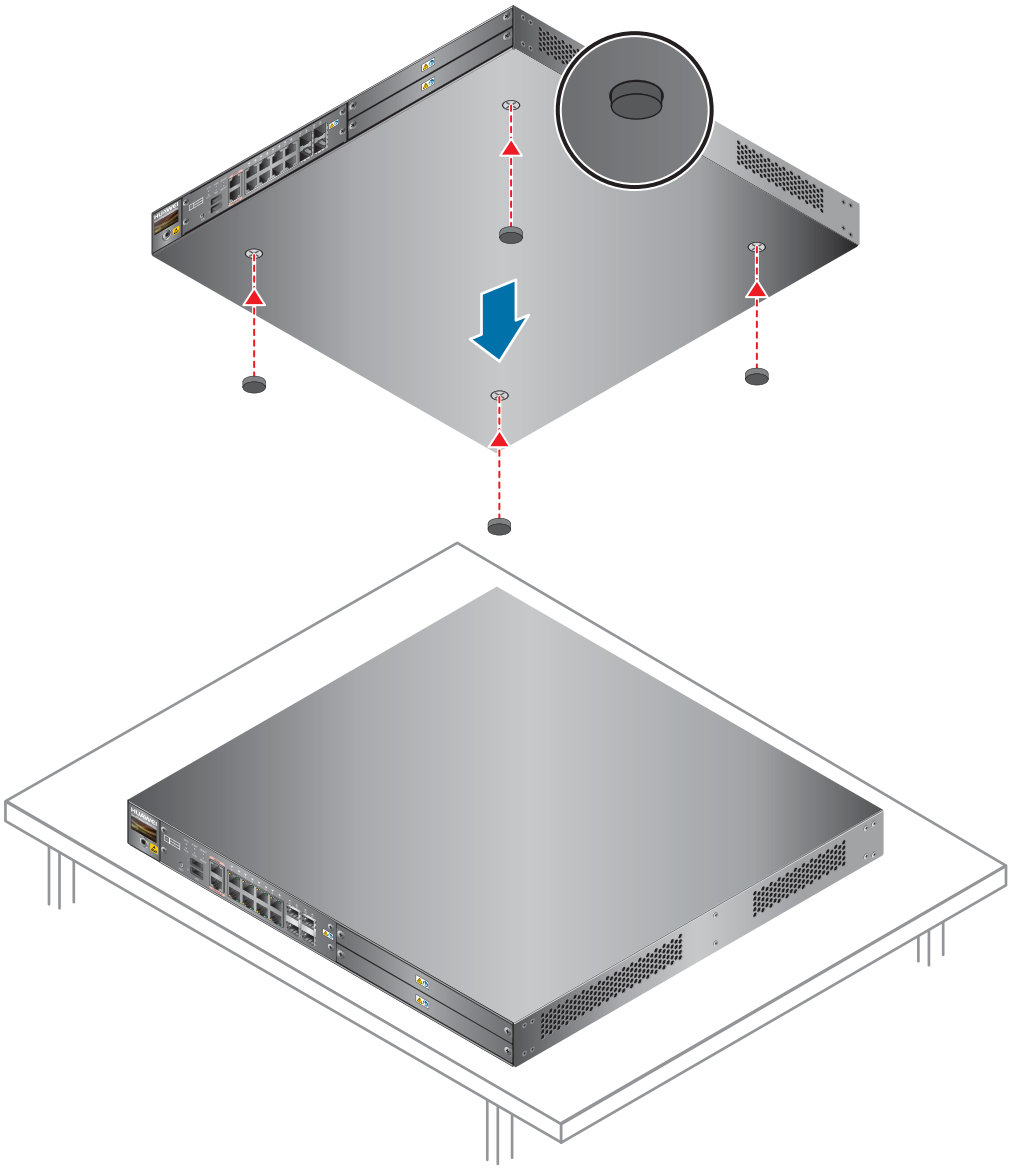
Four rubber feet are delivered with the USG, and four round notches are located at the bottom of the device to hold the rubber feet.

Procedure

Step 1 Fix the rubber feet to the round notches at the bottom of the USG.

Step 2 Place the USG on the workbench.

Figure 3-45 Placing the USG with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG is securely placed on the workbench.

- No object blocks the exhaust of the USG, and there is at least 10 cm of distance between the USG and surrounding devices.
- There are no heavy objects on the USG.

3.4.2 Connecting a PGND Cable

Connecting the PGND cable of a USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 correctly is a key measure of surge protection and resistance to interference. Before using the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630, correctly connect the PGND cable.

Prerequisites

The USG has been installed inside a cabinet.

Context

Instruments required:

- Phillips screwdriver
- Multimeter

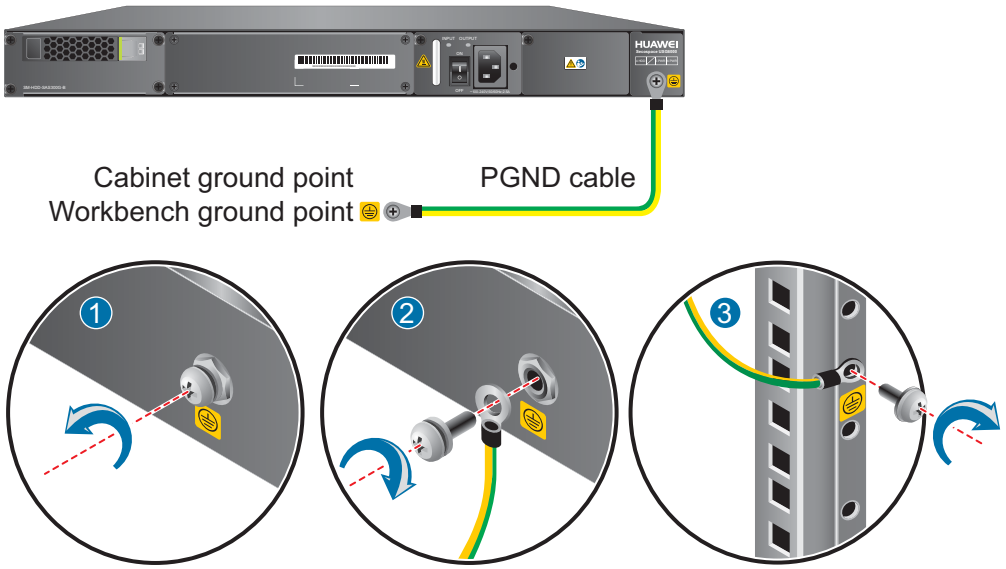
Procedure

Step 1 Loosen and remove the screw of the ground terminal on the lower right of the USG rear panel.

Step 2 Align the M4 end of the PGND cable with the screw hole of the ground terminal and tighten the screw.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet or workbench.

Figure 3-46 Connecting a PGND cable



----End

Follow-up Procedure

Verify the following after the cabling is complete:

- The PGND cable is securely connected to the ground terminal.
- The electrical resistance between the ground terminal and ground point is less than 5 ohm on a multimeter.

3.4.3 Installing an Expansion Card

This section describes how to install an expansion card and avoid any damage.

Context

NOTICE

- Expansion cards are not hot-swappable. Do not power on the USG before you install any expansion card.
- Before you hold expansion cards, make sure that you are wearing an ESD wrist strap and that the strap is well grounded to protect the expansion cards.

Before installing the expansion card, complete the following steps:

- Have the following instruments ready:
  - Phillips screwdriver
  - ESD wrist strap
- Check the expansion card as follows:
  - Check whether the expansion card models match the labels on the packing boxes.
  - Check whether the expansion cards are damaged or have loose components.

  If the expansion card models are not the same as that labeled on the packing boxes, the card is damaged, or certain components are loosened, contact Huawei technical support engineers.
- Before you install an expansion card, check whether the USG supports this card. For details on the hardware description of supported expansion cards, see **Ports** in **Device Overview**.

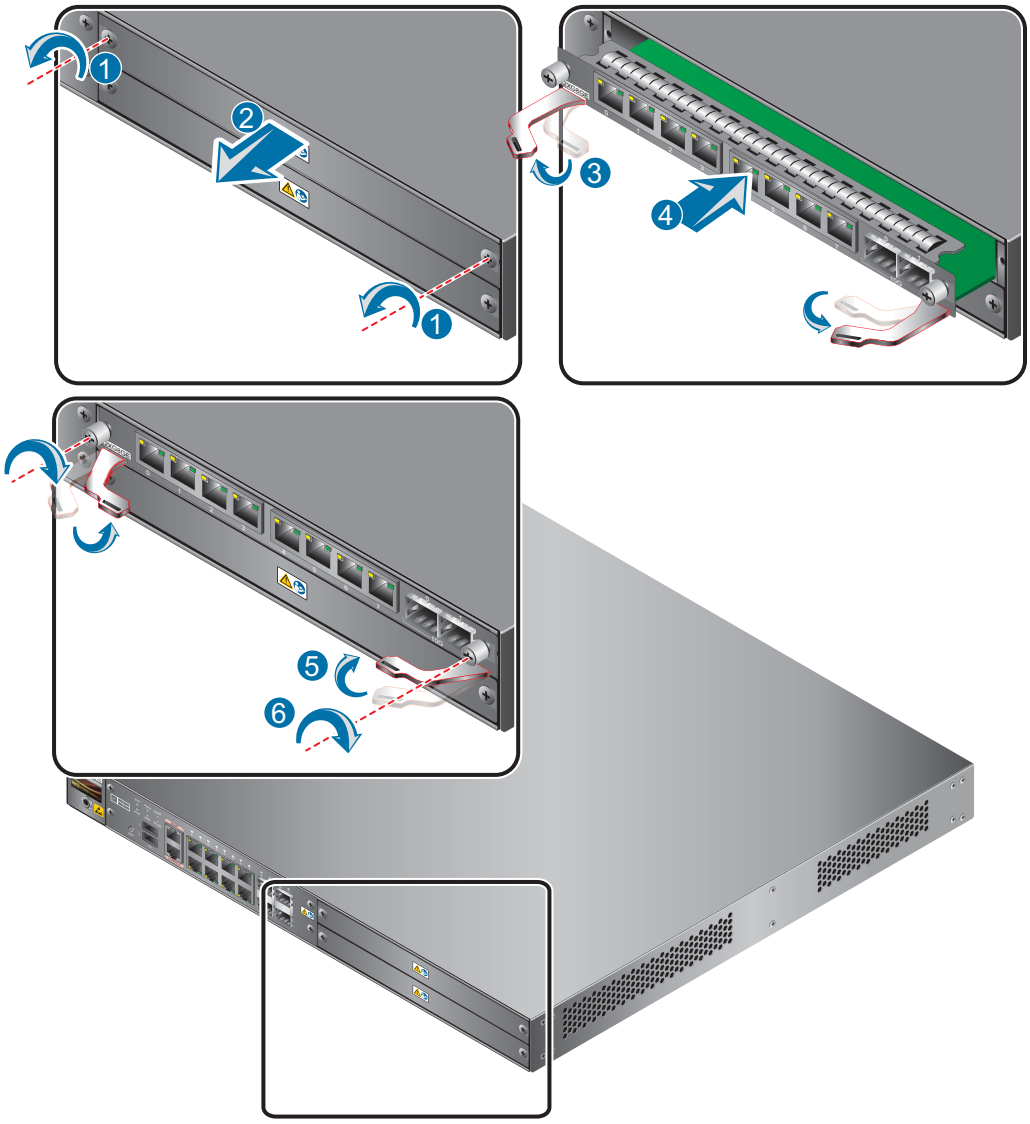
Procedure

Step 1 Determine the slot in which an expansion card is to be installed and note the slot number. For details, see the slot numbers on the front panel of the USG.

Step 2 Install a WSIC expansion card, as shown in **Figure 3-47**.

1. Loosen screws on the filler panel of a WSIC slot and remove the filler panel.
2. Open the ejector lever on an expansion card and push the expansion card along the guide rails of the slot until the ejector lever touches the front panel.
3. Push the ejector lever inward until the expansion card is well seated into the slot, and tighten screws on both sides of the expansion card.

Figure 3-47 Installing a WSIC expansion card



----End

Follow-up Procedure

Check the following items after the installation is complete:

- The expansion card is reliably inserted into the slot, and the blots are tightened.
- Filler panels are inserted in vacant slots. You must insert filler panels in the vacant slots on the USG to prevent dust and ensure heat dissipation.

3.4.4 Installing a Hard Disk Combination

This section describes how to install a hard disk combination (SM-HDD-SAS300G-B, SM-HDD-SAS600G-B or SM-HDD-SAS1200G-B) for the first time to avoid hard disk damage.

Context

Tools

- Phillips screwdriver
- ESD wrist strap

NOTICE

Precautions for the use of hard disks

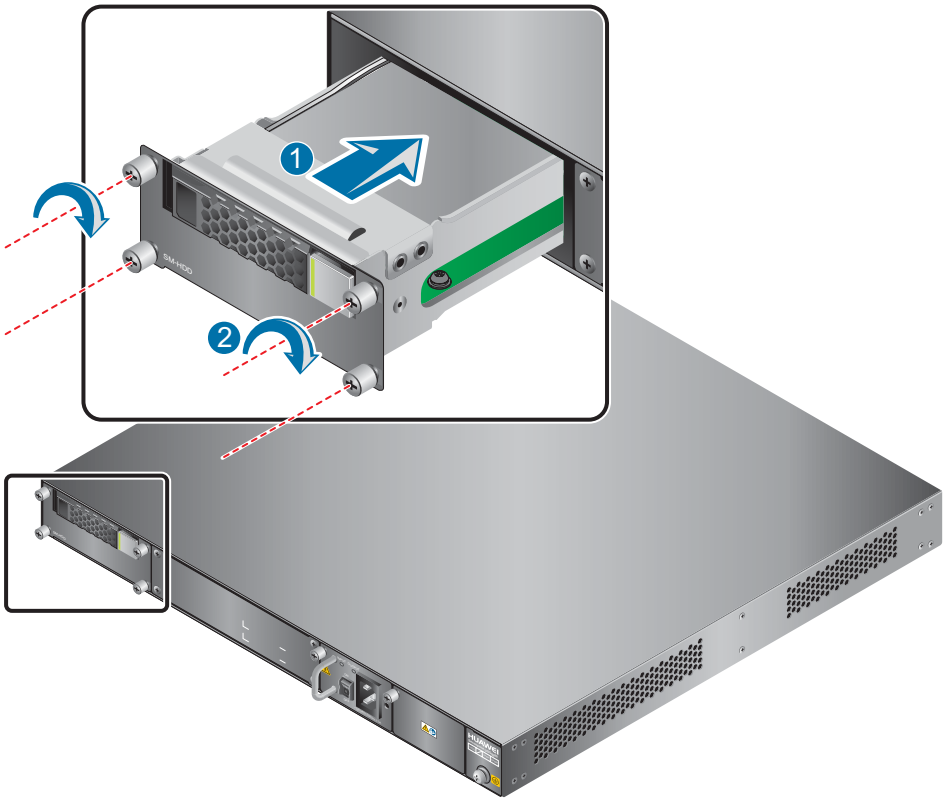
- Use Huawei hard disks. The system cannot recognize the hard disks provided by other vendors.
- The hard disk card does not support hot swap. Therefore, you must install a hard disk combination before powering on the USG.
- Wear an ESD wrist strap to protect the USG and hard disks from electrostatic damage.
- Hold the two side surfaces of a hard disk, do not touch the PCB board or squeeze the hard disk, and do not vibrate, bump, or stack hard disks.

Procedure

Step 1 Loosen screws on the filler panel and remove the filler panel.

Step 2 Hold the two side surfaces of a hard disk unit, push the hard disk combination into the slot along the guide rails until it is well seated into the slot, and fasten screws on the two sides of the hard disk unit.

Figure 3-48 Installing a hard disk combination



----End

Follow-up Procedure

After the installation is complete, perform the following operations:

- Before the USG is powered on, ensure that the hard disk combination is correctly installed and screws are fastened.
- After the USG is powered on, run the **display disk information** command in the user view to check whether the **Filesystem Status** value is **Mounted**.

3.4.5 Connecting a Console Cable

After connecting a PC to the console port of a USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630.

Context

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG has been installed, and the ports to be connected are planned.
- Prepare cable labels.

  Before cable connection, labels must be prepared for the cable.

NOTICE

- Make sure that the PC and the USG are connected to the same ground point. Otherwise, the console port of the USG may be damaged.
- Pay attention to port numbering and make sure that the cable is connected to the correct port, preventing damage to ports or the device.

NOTE

You can purchase the console cable as required.

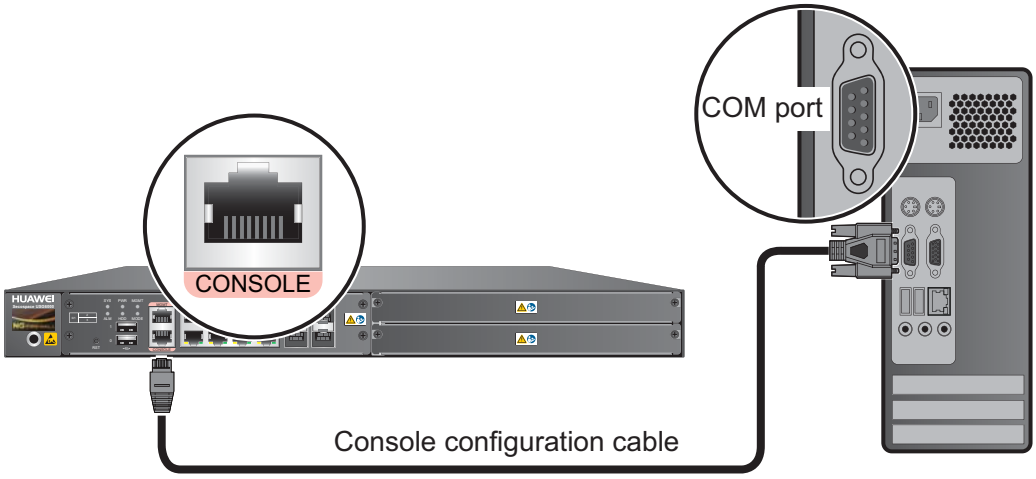
Procedure

Step 1 Before connecting a console cable, attach temporary labels to both ends of the cable for identification.

Step 2 Connect the RJ45 connector of the console cable to the console port (RJ45) of the USG.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 3-49 Connecting a console cable to the USG



Step 4 Remove the temporary labels and attach labels (2 cm away from the connectors) at both ends of the console cable.

----End

Follow-up Procedure

After the cable connection is complete, verify that:

- The labels at both ends of a cable are correct, clear, neat, and facing the same direction.
- Cables and connectors are free of damage or breakage and are connected properly.

To log in to the command configuration interface of the USG from the management PC, you must configure the terminal emulation program on the PC. The following examples use the Windows XP and Windows 7 operating systems.

- Windows XP
  a. Start the HyperTerminal (Windows operating system) or other third-party program that supports serial ports on the PC.
  b. Create a connection, select the serial port, and configure the serial port parameters as follows:
     - Bit per second: 9600
     - Data bit: 8
     - Parity: None
     - Stop bit: 1
     - Data flow control: None
  c. Click **OK**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.
- Windows 7

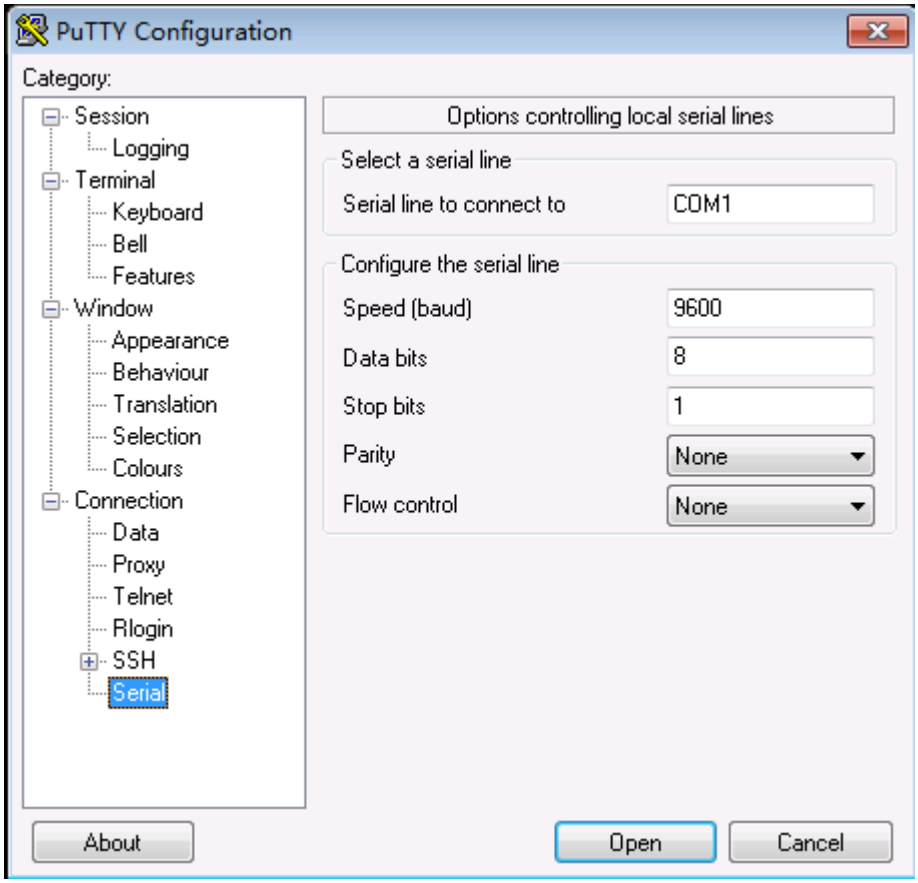
  Windows 7 does not include HyperTerminal like Windows XP did. However, you can download a HyperTerminal program, such as PuTTY, for free from the Internet. PuTTY is used as an example to describe the HyperTerminal configuration.

  a. Download the PuTTY software to the local device and double-click it to run the software.

b. Choose **Session** set the **Connection type** to **Serial**.

c. Set the PuTTY parameters.

Figure 3-50 Setting the PuTTY parameters for connecting the serial port to the USG



d. Click **Open**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.

For details on the console login, refer to the *Administrator Guide*.

3.4.6 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 and the other end to the Ethernet port of the peer device.

Context

Before connecting the Ethernet cable, perform the following operations:

- Check construction conditions.

  The peer device has been installed in the equipment room, and the port to which the Ethernet cable is to be connected has been determined.

- Check the cabling route.

The engineering document should specify the cabling route from the cabinet to the peer device in the equipment room, and the length of the cable is calculated based on the cabling path.

- Label the cable.

  The cable must be labeled before being connected to the devices.

Ethernet cables fall into crossover and straight through cables. Currently, Ethernet ports on most devices can dynamically adapt to both types of cables. Use proper cables for devices that do not support dynamic adaptation.

By electromagnetic compatibility, Ethernet cables can be classified into ordinary and shielded cables. The shielded cables are preferred due to their better electromagnetic compatibility.

NOTICE

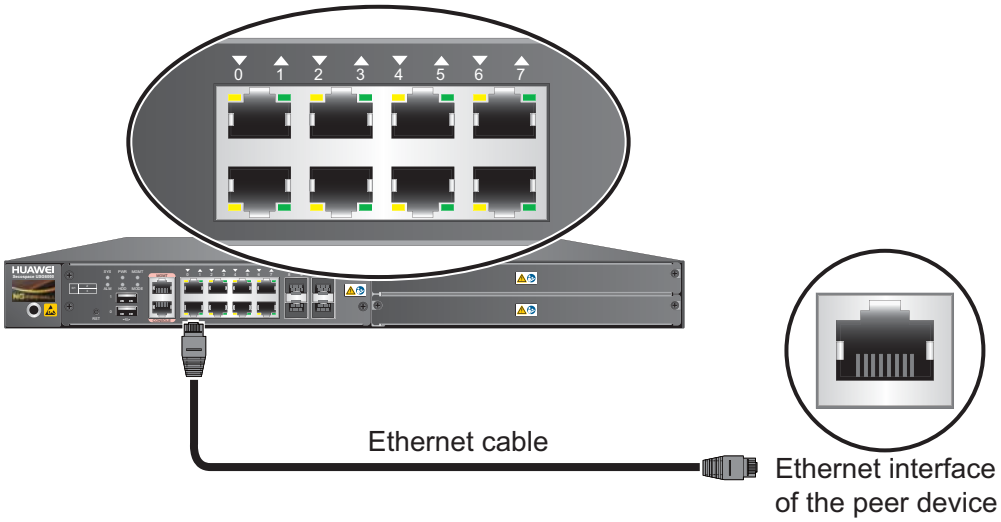
Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of a USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-51 Connecting an Ethernet cable



Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

Step 4 Remove the temporary labels and attach labels (2 cm away from the connectors) at both ends of the Ethernet cable.

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.4.7 Installing Optical Transceivers and Connecting Optical Fibers

This section describes how to install optical transceivers on the SFP or SFP+ ports and connect them to the ports of the peer device using optical fibers according to the network plan.

Context

The USG supports both SFP and SFP+ optical modules. The optical modules at both ends are the same, including the optical fiber type (single-mode or multi-mode), optical fiber connector type (LC/PC, SC/PC, or FC/PC), and transmission rate. If different optical modules are used at the two ends, the communication may fail.

NOTICE

Huawei optical modules are recommended. The optical modules from other vendors may cause faults on the USG due to incompatibility.

CAUTION

Do not look into the optical interface of the optical module or the optical fiber connector without eye protection.

Before connecting optical fiber cables, read the following precautions:

- Do not overbend optical fibers, and the radius should not be shorter than 40 mm.
- Do not bundle the optical fibers too tight. Otherwise, the transmission performance of the optical fibers and the communication between devices might be adversely affected.

Before connecting optical ensure the following:

- The optical module has been installed.

Procedure

Step 1 Insert an optical transceiver into the SFP or SFP+ port of the USG.

Step 2 Remove the dust cap from the optical transceiver.

NOTE

Set aside the dust cap properly for future use. After optical fiber are disconnected for maintenance, use the dust cap to prevent the optical transceiver from dust.

Step 3 Before connecting an optical fiber, attach temporary labels to both ends of the optical fiber for identification.

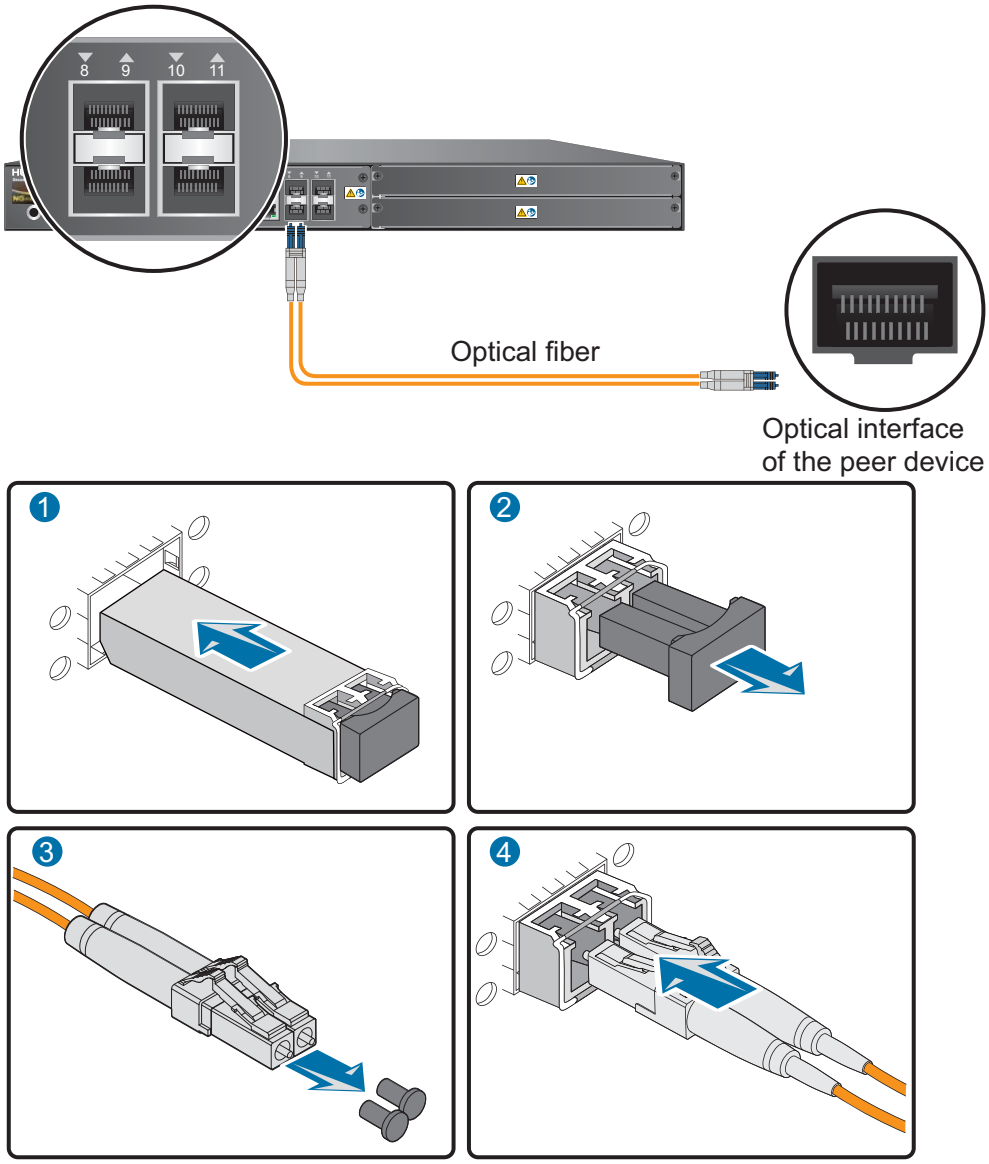
Step 4 Remove protective caps from optical fiber connectors, insert optical fibers into the optical transceiver, and connect the fiber to the peer device.

NOTE

Ensure that the Tx and Rx ports are correctly connected.

Ensure that the TX and RX ports on one end of the optical fiber cable are connected to the RX and TX ports (respectively) on the other end.

Figure 3-52 Installing optical transceivers and connecting optical fibers



Step 5 Repeat **Step 1** to **Step 4** to install all optical transceivers and connect all optical fibers.

----End

Follow-up Procedure

After you power on the USG, check the connection by observing the optical port indicator. If the indicator is on or blinks, the link is connected or data is being transmitted. If the indicator is off, the link is disconnected. Possible causes for the disconnection are as follows:

- The optical fiber is improperly inserted. Pull out the optical fiber and re-insert it.
- The RX and TX optical ports are inserted reversely. Pull out the optical fibers, change their position, and re-insert them.
- The optical module is damaged or the optical fiber is broken. Replace the optical module or the optical fiber.

3.4.8 Connecting AC Power Cables

By default, the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 comes with one AC power module. However, two AC power modules are supported. Each AC power module requires an AC power cable. When two AC power modules are used, connect power cables to both AC power modules.

Context

Before connecting the power cables, ensure that the AC power supply in the equipment room meets the input requirements of the USG.

DANGER

Do not connect or disconnect the power cables when the USG is powered on.

Procedure

Step 1 Ensure that the PGND cable is adequately grounded.

Step 2 Ensure that the power module is set to OFF.

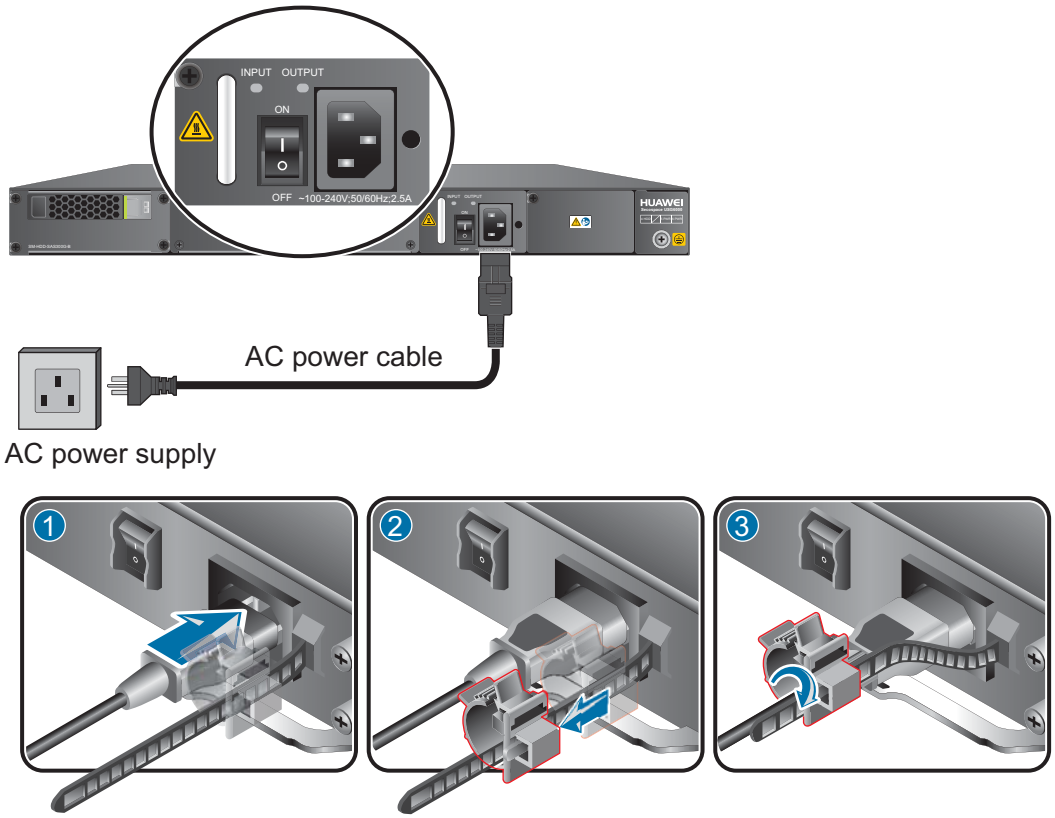
Step 3 Connect AC power cables to AC power modules.

NOTE

When two power modules are used, connect them to different power sources to improve availability.

1. Plug one end of the C13 power cable to the power socket of the USG power module and adjust the cable-retention clip to an appropriate position.
2. Bundle the AC power cable using a cable-retention clip and adjust the cable-retention clip to fasten the AC power cable.
3. Plug the other end of the power cable to the AC power socket or the output of the AC power supply device.

Figure 3-53 Connecting AC power cables



----End

Follow-up Procedure

Verify the following after the connection is complete:

- The power cable is firmly connected to the power supply socket.
- If multiple USGs are deployed, the power cables of each USG are correctly labeled for distinction.

3.4.9 Powering On or Off the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630

This section describes how to power on or off the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630. To ensure the normal start and security of the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630, strictly follow the operation guide to power on or off the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.

- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

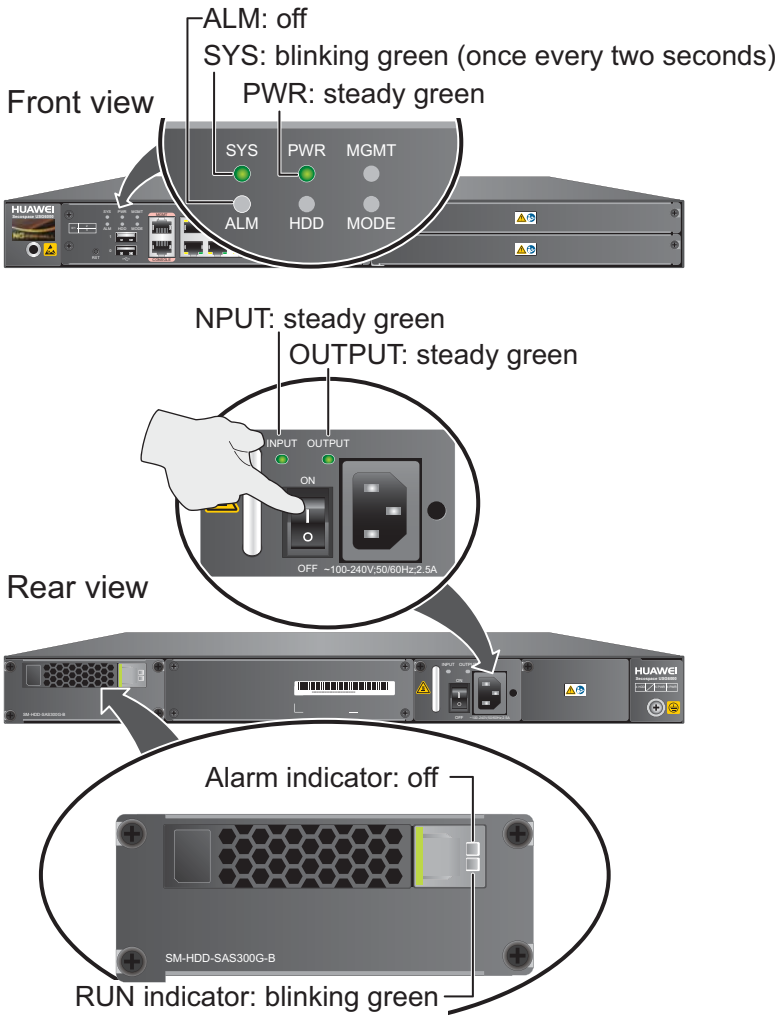
Procedure

- Power on the USG.

  Turn on the switch of the power supply device and then the switch on the power module of the USG. The USG starts.

  You can identify the USG status based on indicators on the front and rear panels. Indicators shown in **Figure 3-54** indicate that the USG runs normally.

  Figure 3-54 Indicators when the USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 runs normally



- Power off the USG.

NOTICE

Before powering off the USG, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

If the USG will be administratively shut down for a long time, turn off the power switch. After powering off the USG, set it aside properly according to storage requirements.

CAUTION

If the USG has hard disks, do not power off the USG by removing the power cable or switching off the power supply to prevent data loss and hard disk damage. You must run the **disk offline** command in the system view first and wait for about 30 seconds. After the system prompts you with a message indicating that hard disks have stopped, turn off the power switch of the USG.

----End

Follow-up Procedure

After the USG is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the *Administrator Guide*.

3.5 Installing a 3 U Device (USG6650/6660/6670/6680)

This chapter provides the cabinet-mounting, workbench-mounting, cable connection, and expansion card installation methods of the USG6650/6660/6670/6680 series.

3.5.1 Mounting a Device in a Cabinet

The USG6650/6660/6670/6680 can be mounted in a 19-inch standard cabinet through L-shape guide rails or adjustable guide rails.

Context

The adjustable guide rails (parts 21241561 and 21242247) and L-shaped guide rails are optional and not delivered with the USG by default. Purchase them as required.

Required instruments:

- Phillips screwdriver
- Floating mounting bar

Before installing the USG, check the following items:

- The cabinet is stable.
- Adjustable guide rail 21241561 can be flexibly adjusted from 400 mm to 600 mm in length and adjustable guide rail 21242247 from 370 mm to 585 mm to be installed in a 600 mm to 800 mm deep cabinet. Before installing the adjustable guide rail, adjust the

distance between the front and rear angle gauges (rack mounting rails/vertical columns) to satisfy the installation requirements.

- The position for the USG in the cabinet is well arranged. Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.
- The USG to be installed is staged near the cabinet for convenience.
- From the rear perspective of the chassis, the cooling wind of the USG flows in on the left and front, and is exhausted on the right. When a USG and a device whose cooling wind flows in on the right and is exhausted on the left are installed in the same cabinet, adequate space must be reserved between them to avoid thermal cycles.

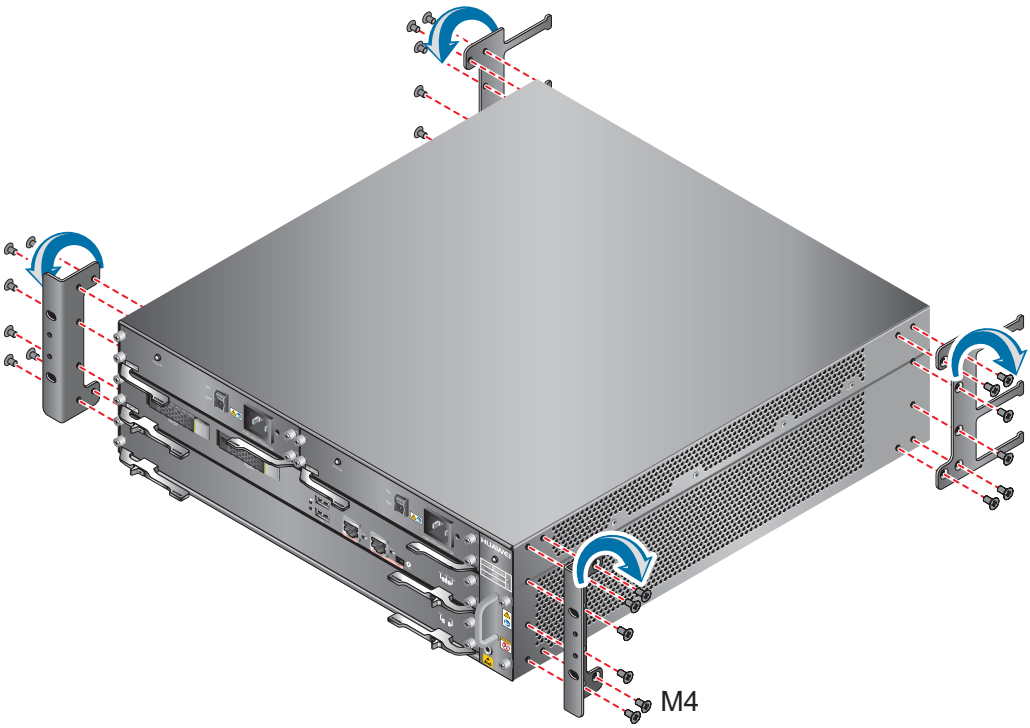
You can place either end of the USG chassis towards the cabinet door. In this manual, the rear panel of the USG is towards the cabinet door.

Procedure

Step 1 Install mounting ears on the chassis.

Use a Phillips screwdriver to fix the mounting ears to both sides of the chassis with M4 screws, as shown in **Figure 3-55**.

Figure 3-55 Installing the mounting ears on the chassis



Step 2 Install cabinet guide rails and floating nuts.

The USG supports the adjustable guide rails (parts 21241561 and 21242247) and L-shaped guide rails. The installation method varies with the guide rail type.

NOTE

Adjustable guide rails 21241561 are delivered earlier and no longer delivered after they run out. Then adjustable guide rails 21242247 are delivered.

1. Determine the positions for installing the guide rails and floating nuts, as shown in **Figure 3-56**, **Figure 3-57**, and **Figure 3-58**.

NOTICE

Install the two guide rails at the same height to ensure that the device is level.

Figure 3-56 Positions of L-shaped guide rails and floating nuts

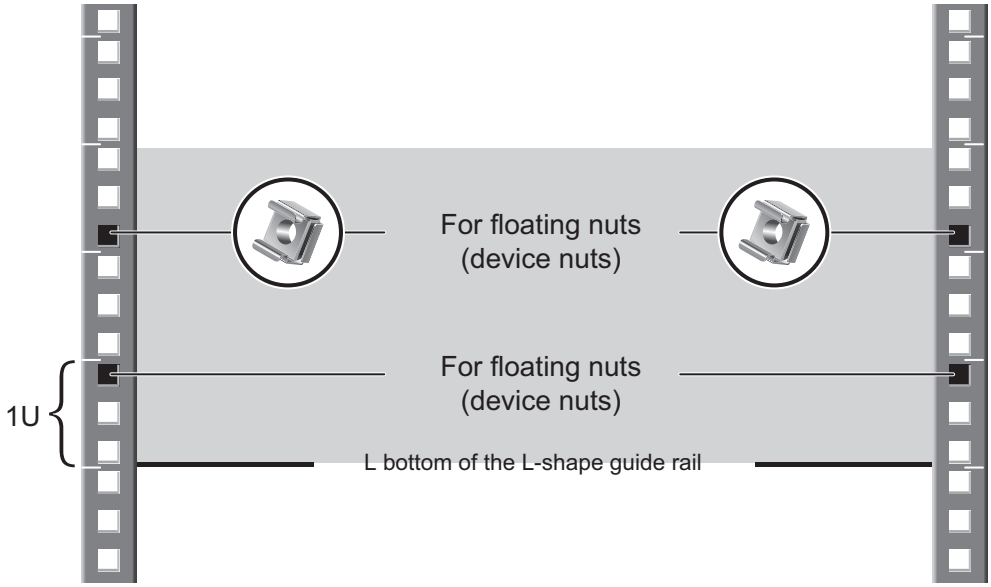


Figure 3-57 Positions of adjustable guide rails 21241561 and floating nuts

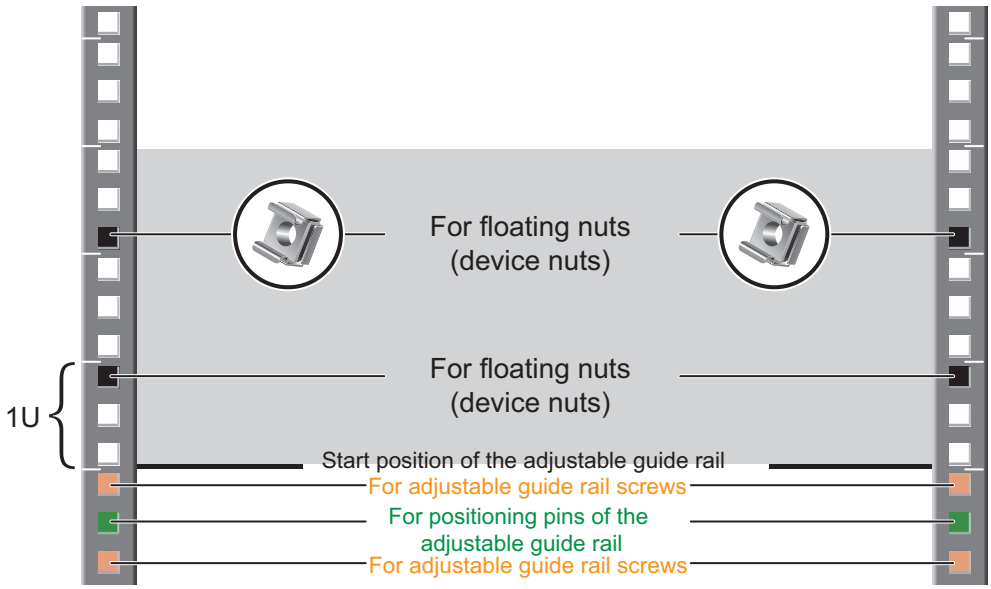
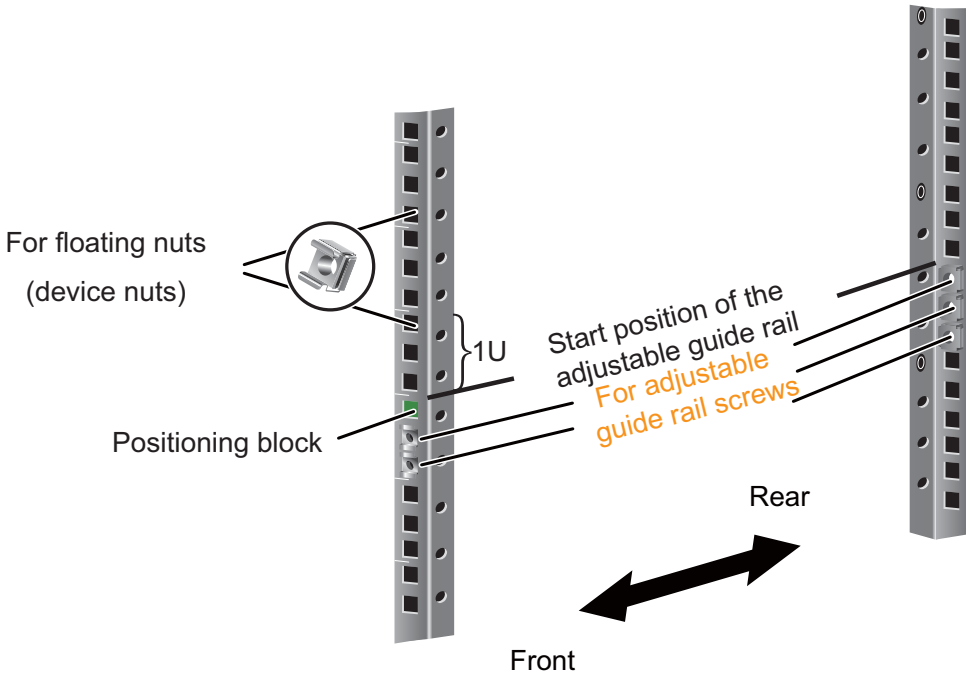
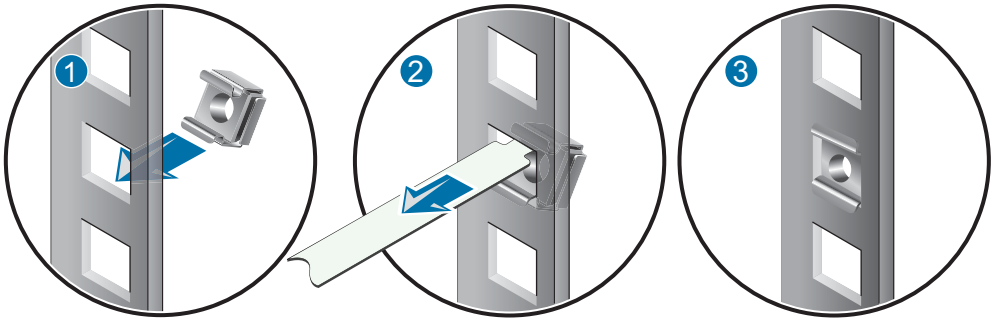


Figure 3-58 Positions of adjustable guide rails 21242247 and floating nuts



2. Install the floating nuts that match M6 screws at the positions marked in **Figure 3-56**, **Figure 3-57**, and **Figure 3-58**. **Figure 3-59** illustrates how to install a floating nut.

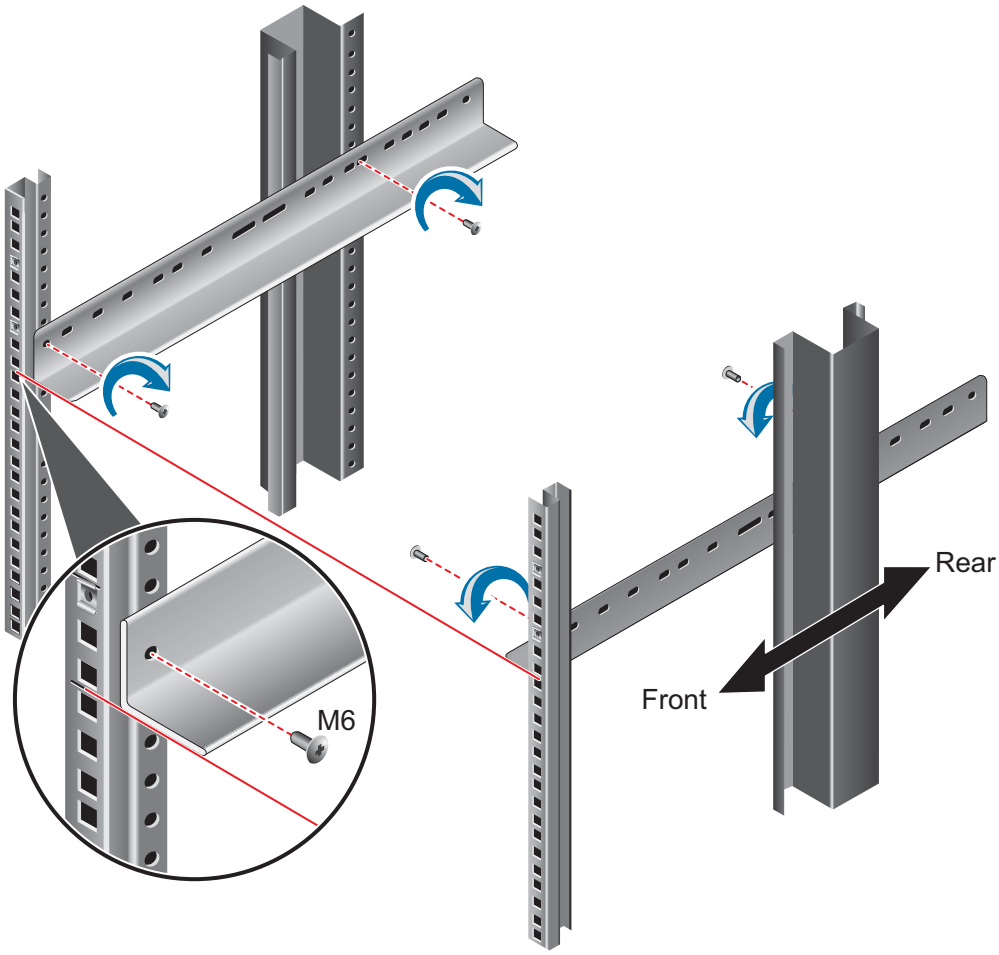
Figure 3-59 Installing floating nuts



3. Install guide rails. As for adjustable guide rails, identify the left and right guide rails, and the front and rear ends of each guide rail according to the F/L and F/R flags on the guide rails.

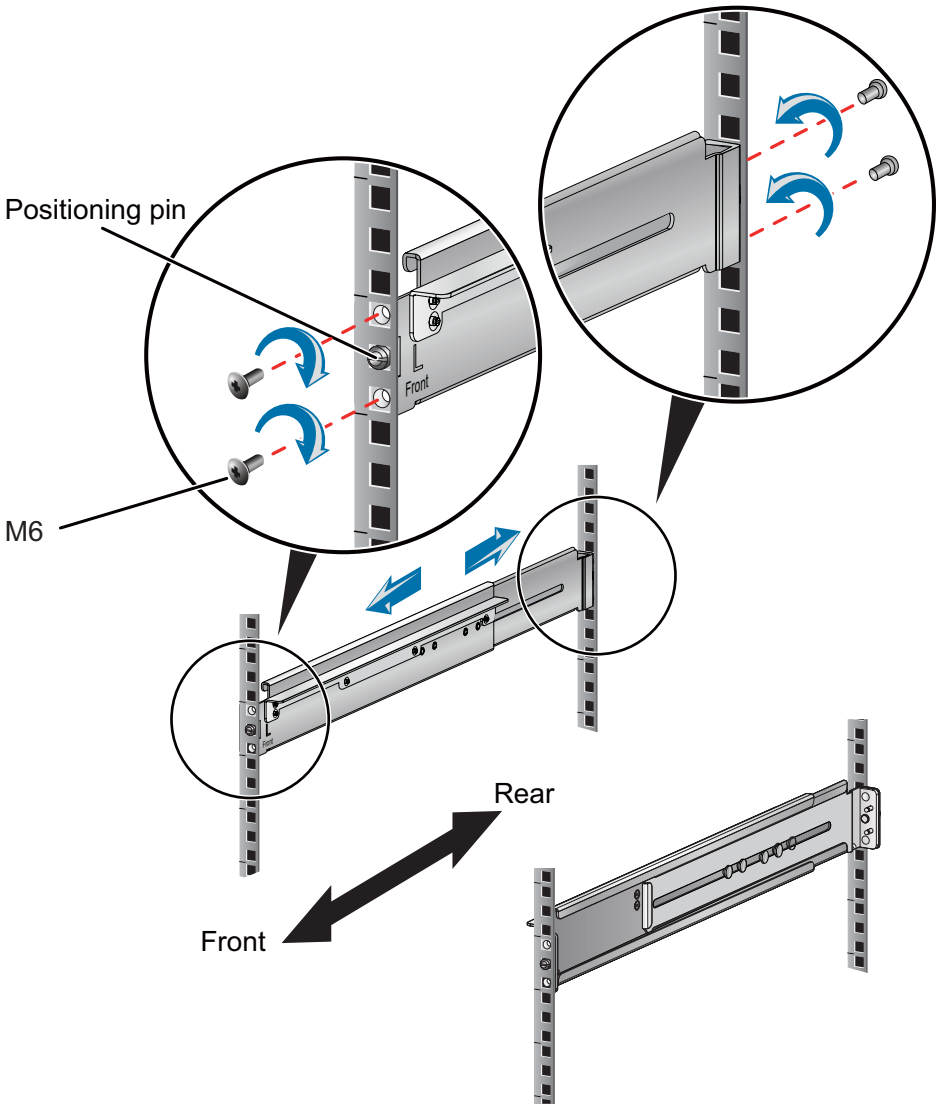
   Use M6 screws to fix the L-shape guide rails at the positions specified in **Figure 3-56**, as shown in **Figure 3-60**.

Figure 3-60 Installing L-shape guide rails



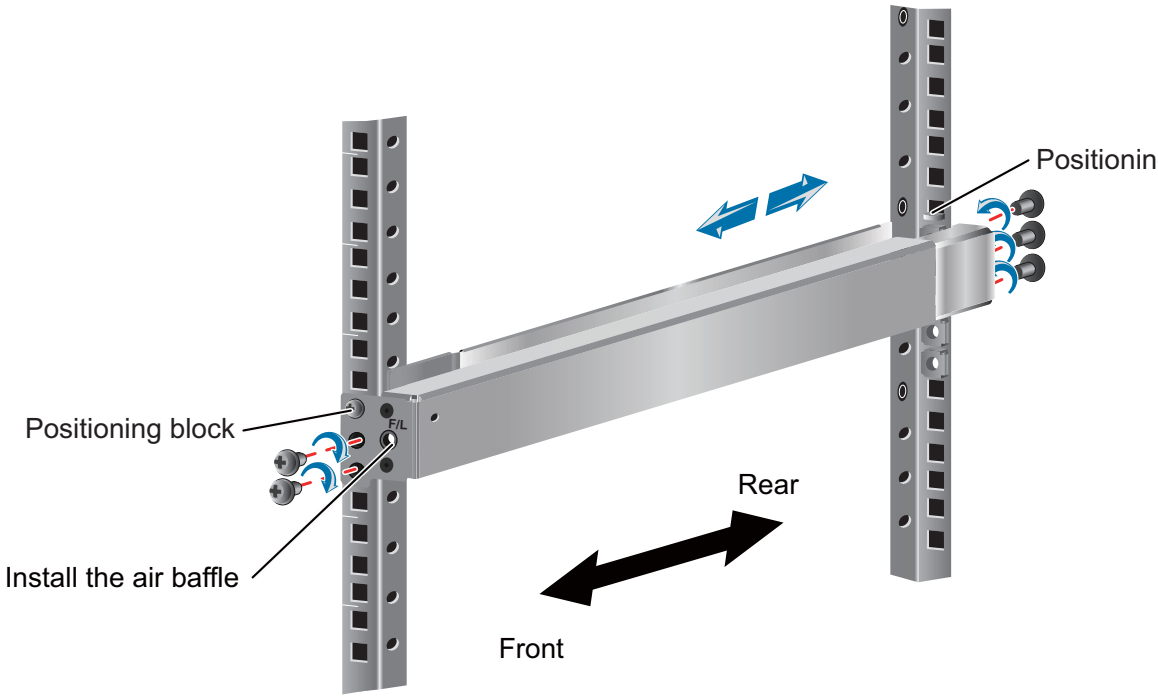
Insert the positioning pins in the front and at the back of the adjustable guide rails 21241561 into the holes at the positions specified in **Figure 3-57**. Then use the Philips screws to fix the adjustable guide rails inside the cabinet with M6 screws, as shown in **Figure 3-61**.

Figure 3-61 Installing adjustable guide rails 21241561



Use the positioning blocks in the front and the positioning hooks at the back of the adjustable guide rails 21242247 as shown in **Figure 3-58** to place the guide rails horizontally in the determined installation positions in the racks.Use a Phillips screwdriver to fix the adjustable guide rails to the left and right sides of the cabinet with M6 screws, as shown in **Figure 3-62**.

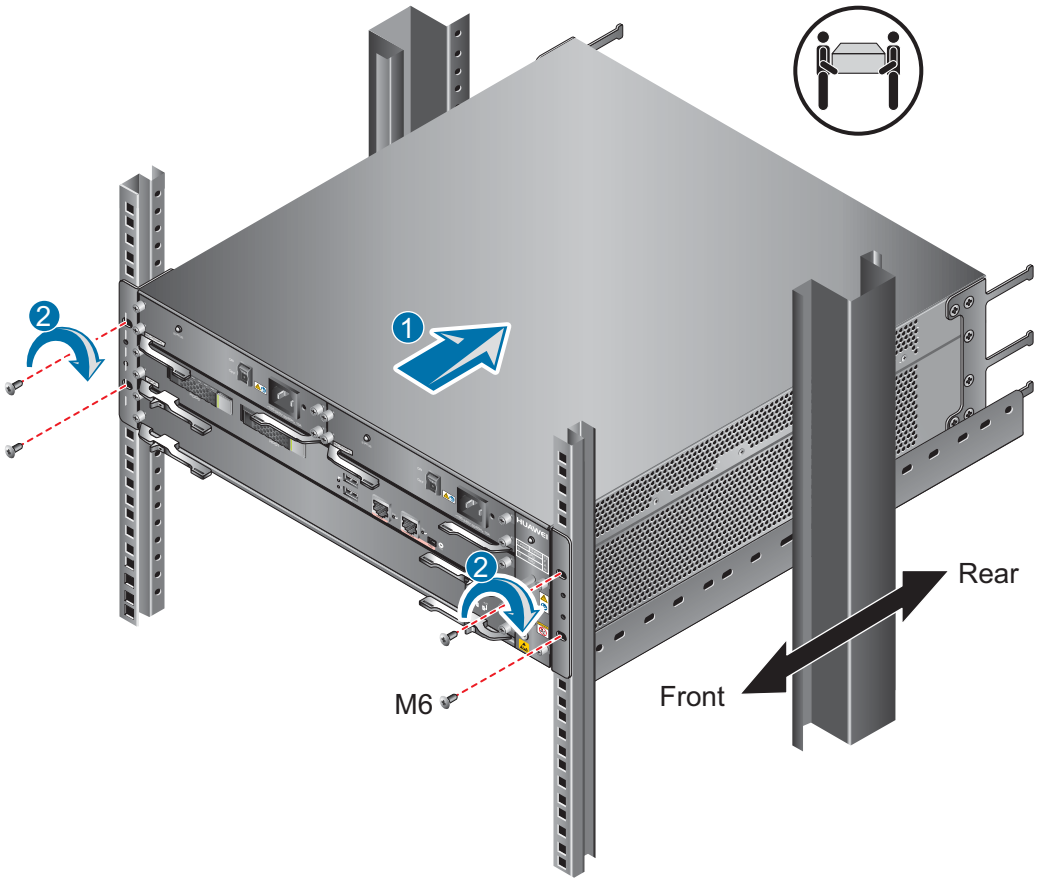
Figure 3-62 Installing adjustable guide rails 21242247



Step 3 Mount the USG in the cabinet.

1. Lift the USG, move it to the cabinet, place it onto the guide rails, and push it into the cabinet.
2. Use M6 screws to fix the mounting ears of the USG to the mounting rack, as shown in **Figure 3-63**.

Figure 3-63 Mounting the USG in a cabinet



3. (Recommended) For adjustable guide rail 21242247, fix the air baffle to the guide rail with two M6 screws.

----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG is placed securely inside the cabinet.
- Ensure that the exhaust of the USG is not blocked by other objects.

3.5.2 Connecting a PGND Cable

Connecting the PGND cable of a USG6650/6660/6670/6680 correctly is a key measure of surge protection and resistance to interference. Before using the USG6650/6660/6670/6680, correctly connect the PGND cable.

Prerequisites

The USG has been installed inside a cabinet.

Context

Instruments required:

- Phillips screwdriver
- Multimeter

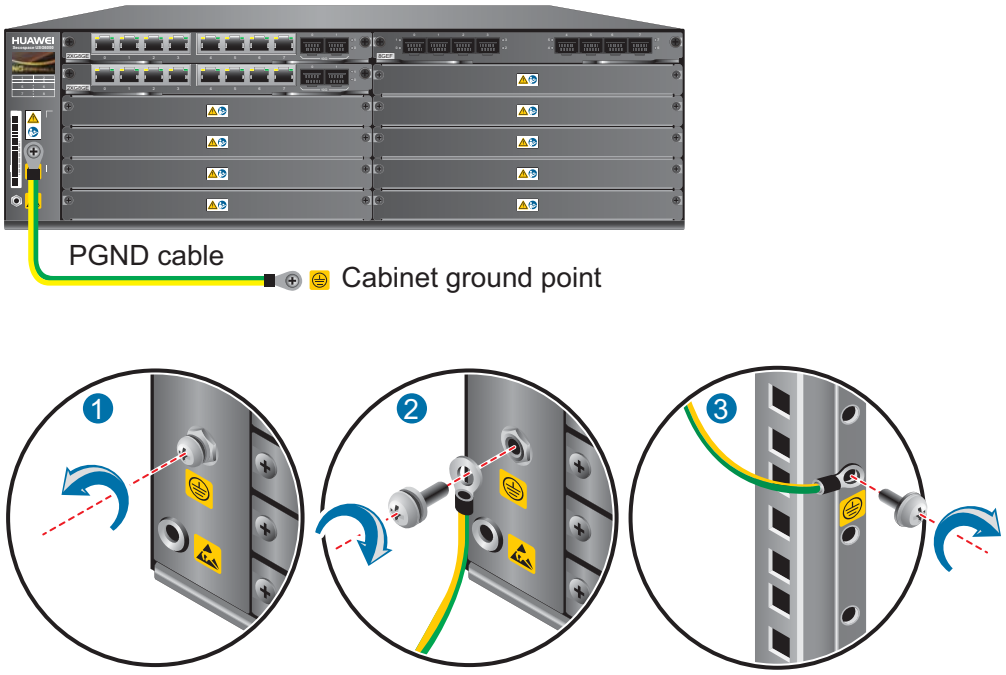
Procedure

Step 1 Loosen and remove the screw of the ground terminal on the lower left of the USG front panel.

Step 2 Align the M4 end of the PGND cable with the opening of the ground terminal and tighten the screw.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet or workbench.

Figure 3-64 Connecting a PGND cable



----End

Follow-up Procedure

Verify the following after the cabling is complete:

- The PGND cable is securely connected to the ground terminal.
- The electrical resistance between the ground terminal and ground point is less than 5 ohm on a multimeter.

3.5.3 Installing an Expansion Card

This section describes how to install an expansion card and avoid any damage.

Context

NOTICE

- Expansion cards are not hot-swappable. Do not power on the USG before you install any expansion card.
- Before you hold expansion cards, make sure that you are wearing an ESD wrist strap and that the strap is well grounded to protect the expansion cards.

Before installing the expansion card, complete the following steps:

- Have the following instruments ready:
  - Phillips screwdriver
  - ESD wrist strap
- Check the expansion card as follows:
  - Check whether the expansion card models match the labels on the packing boxes.
  - Check whether the expansion cards are damaged or have loose components.

  If the expansion card models are not the same as that labeled on the packing boxes, the card is damaged, or certain components are loosened, contact Huawei technical support engineers.
- Before you install an expansion card, check whether the USG supports this card. For details on the hardware description of supported expansion cards, see **Ports** in **Device Overview**.

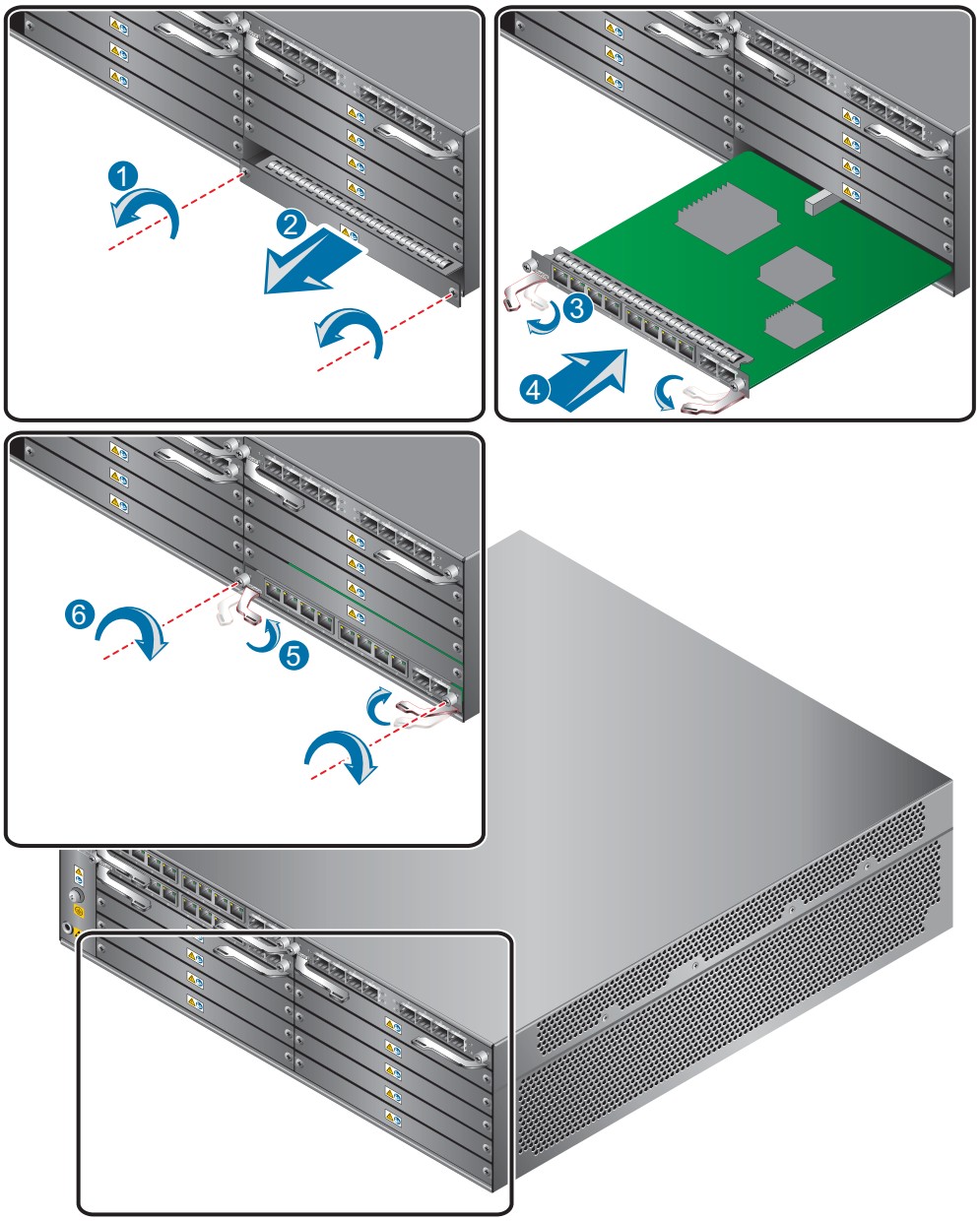
Procedure

Step 1 Determine the slots for installing the expansion cards and note down the slot IDs. see the slot numbering on the front panel of the USG.

Step 2 Based on the type of the expansion cards, install the cards as follows:

- Install the WSIC card, as shown in **Figure 3-65**.
  a. Loose the bolts to remove the filler panel of the WSIC slot.
  b. Open the lever and push the expansion card along the guide rail of the slot until the lever touches the front panel of the slot.
  c. Push the lever to insert the card into the slot. Then tighten the blots on both sides of the card.

Figure 3-65 Installing the WSIC card



- Install the XSIC card.

  NOTE

  Huawei does not provide XSIC cards for USG products.

  - Before you install the XSIC card, remove the filler panels of the WSIC slot and the slot above this slot.
  - Install the XSIC card by referring to the procedures for installing the WSIC card.

----End

Follow-up Procedure

Check the following items after the installation is complete:

- The expansion card is reliably inserted into the slot, and the blots are tightened.

- Filler panels are inserted in vacant slots. You must insert filler panels in the vacant slots on the USG to prevent dust and ensure heat dissipation.

3.5.4 Installing Hard Disk Units

This section describes how to install hard disk units (SM-HDD-SAS300G-A, SM-HDD-SAS600G-A or SM-HDD-SAS1200G-A) for the first time to avoid hard disk damage.

Background

Tools

- Phillips screwdriver
- ESD bag

NOTICE

Precautions for the use of hard disks

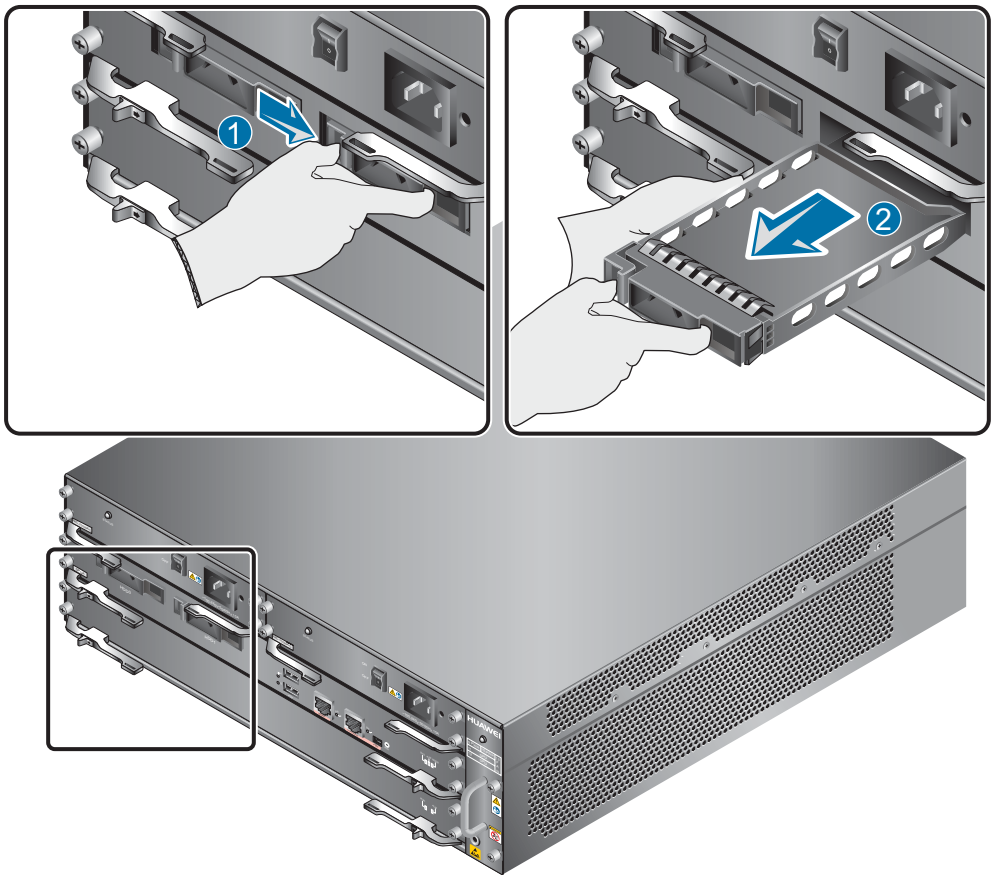
- Use Huawei hard disks. The system cannot recognize the hard disks provided by other vendors.
- Wear an ESD wrist strap to protect the USG and hard disks from electrostatic damage.
- Hold the two side surfaces of a hard disk, do not touch the PCB board or squeeze the hard disk, and do not vibrate, bump, or stack hard disks.
- Only the USG6650/6660/6670 and USG6680-AC support the SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. The USG6680-DC supports only the SM-HDD-SAS300G-A hard disk.

Installing One Hard Disk Unit

The methods of installing hard disk units in the HDD0 and HDD1 slots are the same. The following example uses the HDD1 slot.

Step 1 Remove the filler panel from a hard disk slot.

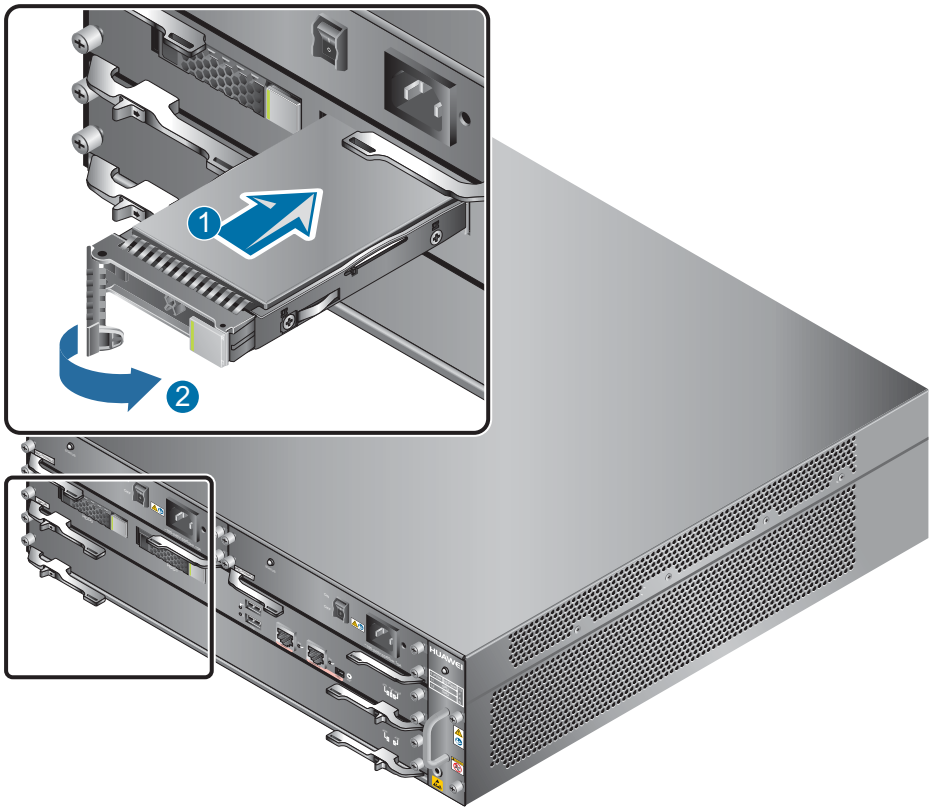
Figure 3-66 Removing the filler panel from a hard disk slot



Step 2 Pull the ejector lever on the hard disk holder and keep it in pulled-out state and push the hard disk holder along the guide rails of the slot till the front surface of the hard disk holder touches the USG panel.

Step 3 Put the ejector lever of the hard disk holder down.

Figure 3-67 Installing a hard disk unit



Step 4 After the installation is complete, perform the following operations:

NOTE

Operations after the USG power-on must be performed after all installation tasks are complete.

- Before the USG is powered on, ensure that the hard disk combination is correctly installed.
- After the USG is powered on, run the **display disk information** command in the user view to check whether the **Filesystem Status** value is **Mounted**.

----End

Installing Two Hard Disk Units

Two hard disk units with the same size only support RAID 1. After the hard disk units are installed, manually create a RAID group.

NOTICE

Ensure that two hard disks with the same capacity are used for creating RAID. Otherwise, creating RAID fails.

Step 1 Use the previous method of installing one hard disk unit to install hard disk units in the HDD0 and HDD1 slots.

Step 2 After the installation is complete, perform the following operations:

NOTE

Operations after the USG power-on must be performed after all installation tasks are complete.

- Before the USG is powered on, ensure that the hard disk units are correctly installed.
- After the USG is powered on,

  a. In the user view, run the **display disk information** command to check whether the **Filesystem Status** value is **Un-Mounted** and the **DiskRaidMode** value is **INACTIVE**.

  b. **NOTICE**

  After the RAID is created, the data in the primary disk will be synchronized to the secondary disk and the original data on the secondary disk will be overwritten. Select the *disk-id* of the primary disk before creating RAID.

  NOTE

  - The synchronization process will take several hours. During data synchronization, other services can be used, but the hard disks do not record real-time logs for the services. After data synchronization is complete, the hard disks start to work normally. You can run the **display disk information** command in the user view one day later to check whether the **Filesystem Status** value is **Mounted**. If not, contact Huawei technical support personnel.
  - If you run the **display device** command to display the state of the disk during the synchronization, the state will be Abnormal, indicating that the disk in unavailable. After data synchronization completes, the state of the disk will be Normal.

  In the system view, run the **reset raid primary-disk** *disk-id* command to create a RAID group using *disk-id* as the primary disk for data synchronization.

----End

3.5.5 Connecting a Console Cable

This section describes how to use a console cable to connect the PC to the console port of the USG. Then you can use the terminal software installed on the PC to access the CLI of the USG.

Context

The preparations for connecting console cables are as follows:

- Check construction conditions.

  Check whether the PC is ready, the USG is installed, and the ports for the connections are planned.
- Label the cables.

  The cables must be labeled before being connected to the devices.

NOTICE

- Make sure that the PC and the USG are connected to one grounding point; otherwise, the console port of the USG may be damaged.
- Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the USG might be damaged.
- If an RJ45 console port is used, you are advised to use the console cable delivered with the USG. Using the cables of other vendors might cause unexpected faults.

NOTE

The RJ45 and mini USB console ports cannot be used at the same time. If both ports are connected, only the mini USB console port is available.

You can purchase the console and USB cables as required.

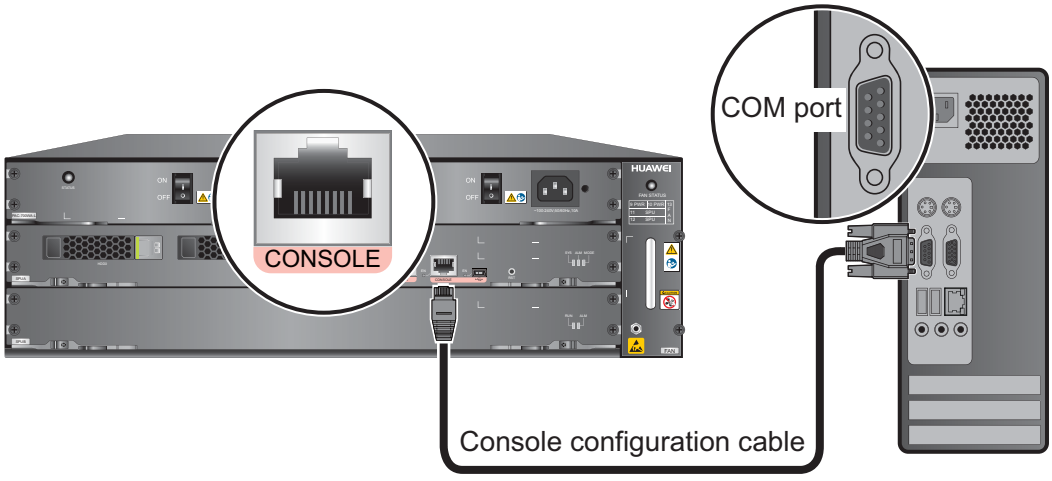
Procedure

Step 1 Before you install the console cable, attach temporary labels to both ends of the cable for distinction.

Step 2 Connect the console cable.

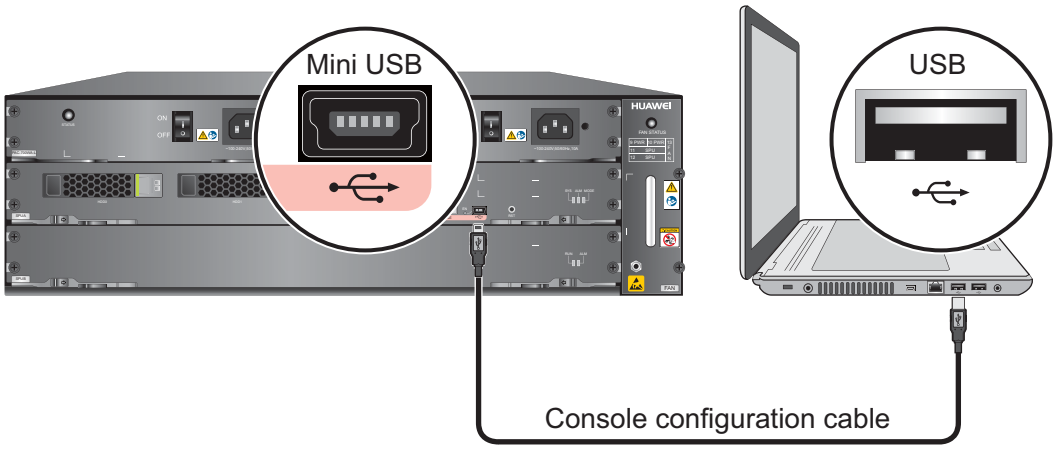
- Use the RJ45 console port as the configuration port.
  a. Connect the RJ45 connector of the console cable to the RJ45 console port of the USG.
  b. Connect the DB9 connector of the console cable to the COM port of the PC.

Figure 3-68 Connecting the console cable to the USG



- Use the mini USB console port as the configuration port.
  a. Connect the mini USB connector of the USB cable to the mini USB console port of the USG.
  b. Connect the USB connector of the USB cable to the USB port of the PC.

Figure 3-69 Connecting the console cable to the USG



Step 3 Remove the temporary labels on the cable and attach new labels 2 cm away from the connectors.

----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the labels attached to both ends of the cable are correct, clear, neat, and affixed in the same direction.
- Ensure that the cable and connectors are free of any damage or breakage and connected properly and reliably.

To ensure that the PC can configure, manage, and maintain the USG through the mini USB console port, install the mini USB drive program on the PC. You can log in to **http://support.huawei.com/enterprise**, choose **Downloads** > **Enterprise Networking** > **Security** > **Firewall & VPN Gateway** > **USG6600**, click the corresponding software version node, and download **MiniUSB_driver_en.zip** to obtain the mini USB drive program and the installation method.

NOTE

Before you plug in/out the USB cable or power on the USG again after you power it off, you must disable the serial port communication software first. Otherwise, the PC may fail to load the mini USB drive program, causing the serial port unavailable. If this fault occurs, you need to disable the serial port communication software, re-plug in the USB cable, and enable the serial port communication software again.

To log in to the USG CLI after the console cable is connected, configure the serial port communication software on the PC. Windows XP and Windows 7 are used as examples.

- Windows XP
  a. Start the HyperTerminal (Windows operating system) or other third-party program that supports serial ports on the PC.
  b. Create a connection, select the serial port, and configure the serial port parameters as follows:
     - Bit per second: 9600
     - Data bit: 8

- Parity: None
- Stop bit: 1
- Data flow control: None

c. Click **OK**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.

- Windows 7

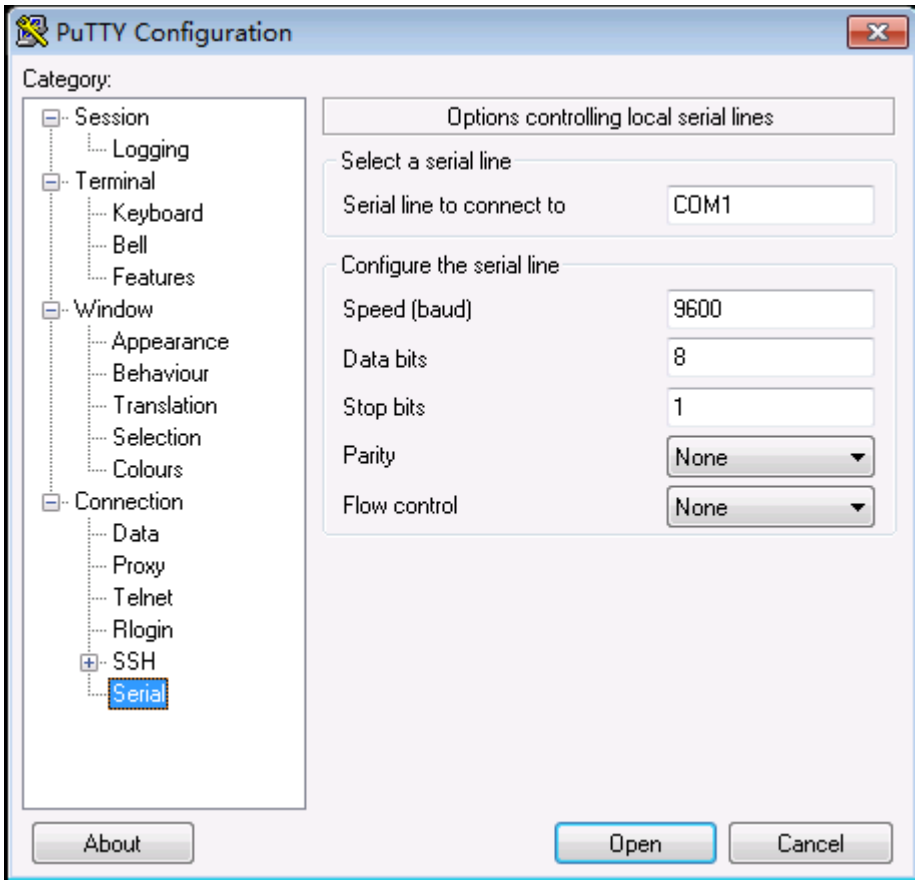
  Windows 7 does not include HyperTerminal like Windows XP did. However, you can download a HyperTerminal program, such as PuTTY, for free from the Internet. PuTTY is used as an example to describe the HyperTerminal configuration.

  a. Download the PuTTY software to the local device and double-click it to run the software.

  b. Choose **Session** set the **Connection type** to **Serial**.

  c. Set the PuTTY parameters.

  Figure 3-70 Setting the PuTTY parameters for connecting the serial port to the USG



  d. Click **Open**. The copyright information is displayed on the HyperTerminal. You can enter default user name **admin** and password **Admin@123**, modify the default password as prompted to log in to the USG CLI.

For details on the login through the console port, refer to the *Administrator Guide*.

3.5.6 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6650/6660/6670/6680 and the other end to the Ethernet port of the peer device.

Context

Before connecting the Ethernet cable, perform the following operations:

- Check construction conditions.

  The peer device has been installed in the equipment room, and the port to which the Ethernet cable is to be connected has been determined.
- Check the cabling route.

  The engineering document should specify the cabling route from the cabinet to the peer device in the equipment room, and the length of the cable is calculated based on the cabling path.
- Label the cable.

  The cable must be labeled before being connected to the devices.

Ethernet cables fall into crossover and straight through cables. Currently, Ethernet ports on most devices can dynamically adapt to both types of cables. Use proper cables for devices that do not support dynamic adaptation.

By electromagnetic compatibility, Ethernet cables can be classified into ordinary and shielded cables. The shielded cables are preferred due to their better electromagnetic compatibility.

NOTICE

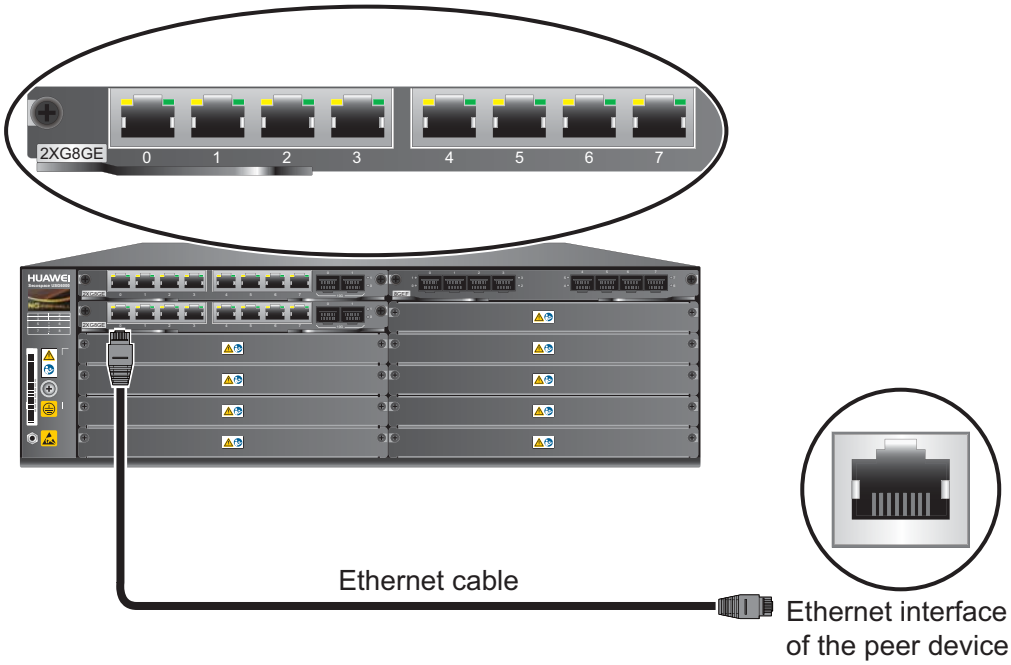
Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of a USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-71 Connecting an Ethernet cable



Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

Step 4 Remove the temporary labels and attach labels (2 cm away from the connectors) at both ends of the Ethernet cable.

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.5.7 Installing Optical Transceivers and Connecting Optical Fibers

This section describes how to install optical transceivers on the SFP or SFP+ ports and connect them to the ports of the peer device using optical fibers according to the network plan.

Context

The USG supports both SFP and SFP+ optical modules. The optical modules at both ends are the same, including the optical fiber type (single-mode or multi-mode), optical fiber connector type (LC/PC, SC/PC, or FC/PC), and transmission rate. If different optical modules are used at the two ends, the communication may fail.

NOTICE

Huawei optical modules are recommended. The optical modules from other vendors may cause faults on the USG due to incompatibility.

CAUTION

Do not look into the optical interface of the optical module or the optical fiber connector without eye protection.

Before connecting optical fiber cables, read the following precautions:

- Do not overbend optical fibers, and the radius should not be shorter than 40 mm.
- Do not bundle the optical fibers too tight. Otherwise, the transmission performance of the optical fibers and the communication between devices might be adversely affected.

Before connecting optical ensure the following:

- The optical module has been installed.

Procedure

Step 1 Insert an optical transceiver into the SFP or SFP+ port of the USG.

Step 2 Remove the dust cap from the optical transceiver.

NOTE

Set aside the dust cap properly for future use. After optical fiber are disconnected for maintenance, use the dust cap to prevent the optical transceiver from dust.

Step 3 Before connecting an optical fiber, attach temporary labels to both ends of the optical fiber for identification.

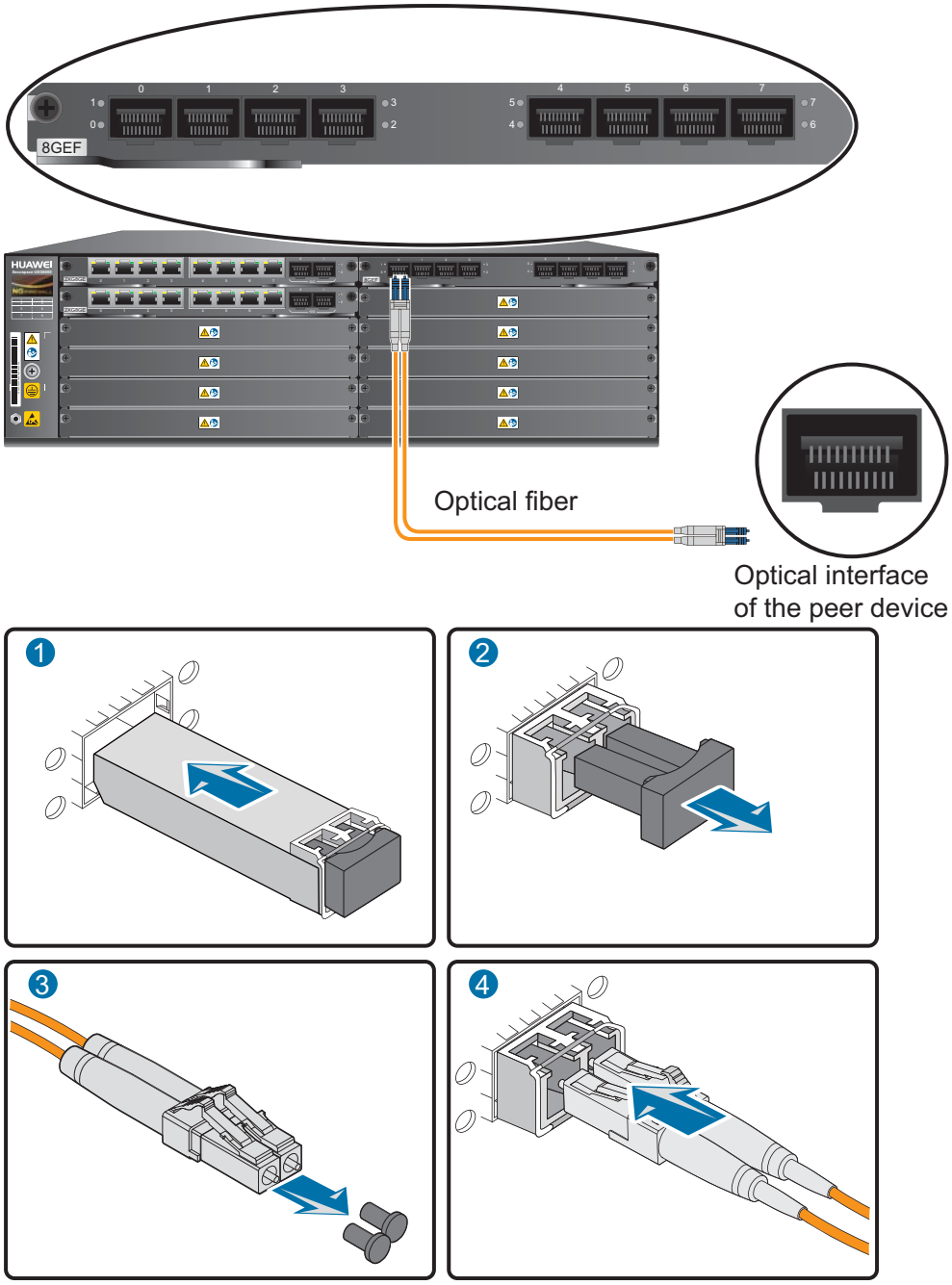
Step 4 Remove protective caps from optical fiber connectors, insert optical fibers into the optical transceiver, and connect the fiber to the peer device.

NOTE

Ensure that the Tx and Rx ports are correctly connected.

Ensure that the TX and RX ports on one end of the optical fiber cable are connected to the RX and TX ports (respectively) on the other end.

Figure 3-72 Installing optical transceivers and connecting optical fibers



Step 5 Repeat **Step 1** to **Step 4** to install all optical transceivers and connect all optical fibers.

----End

Follow-up Procedure

After you power on the USG, check the connection by observing the optical port indicator. If the indicator is on or blinks, the link is connected or data is being transmitted. If the indicator is off, the link is disconnected. Possible causes for the disconnection are as follows:

- The optical fiber is improperly inserted. Pull out the optical fiber and re-insert it.
- The RX and TX optical ports are inserted reversely. Pull out the optical fibers, change their position, and re-insert them.
- The optical module is damaged or the optical fiber is broken. Replace the optical module or the optical fiber.

3.5.8 Connecting Power Cables

Follow the power supply reference of the USG to connect the power supply module of the USG to the output of the power supply device.

3.5.8.1 Connecting AC Power Cables

In standard configuration, the USG has two AC power supply modules. Each module requires a power cable. This section describes how to connect power cables to the two AC supply modules.

Context

Before connecting the power cables, ensure that the AC power supply in the equipment room meets the input requirements of the USG.

DANGER

Do not connect or disconnect the power cables when the USG is powered on.

Procedure

Step 1 Ensure that the PGND cable is properly grounded.

Step 2 Ensure that the power switch of the USG is OFF.

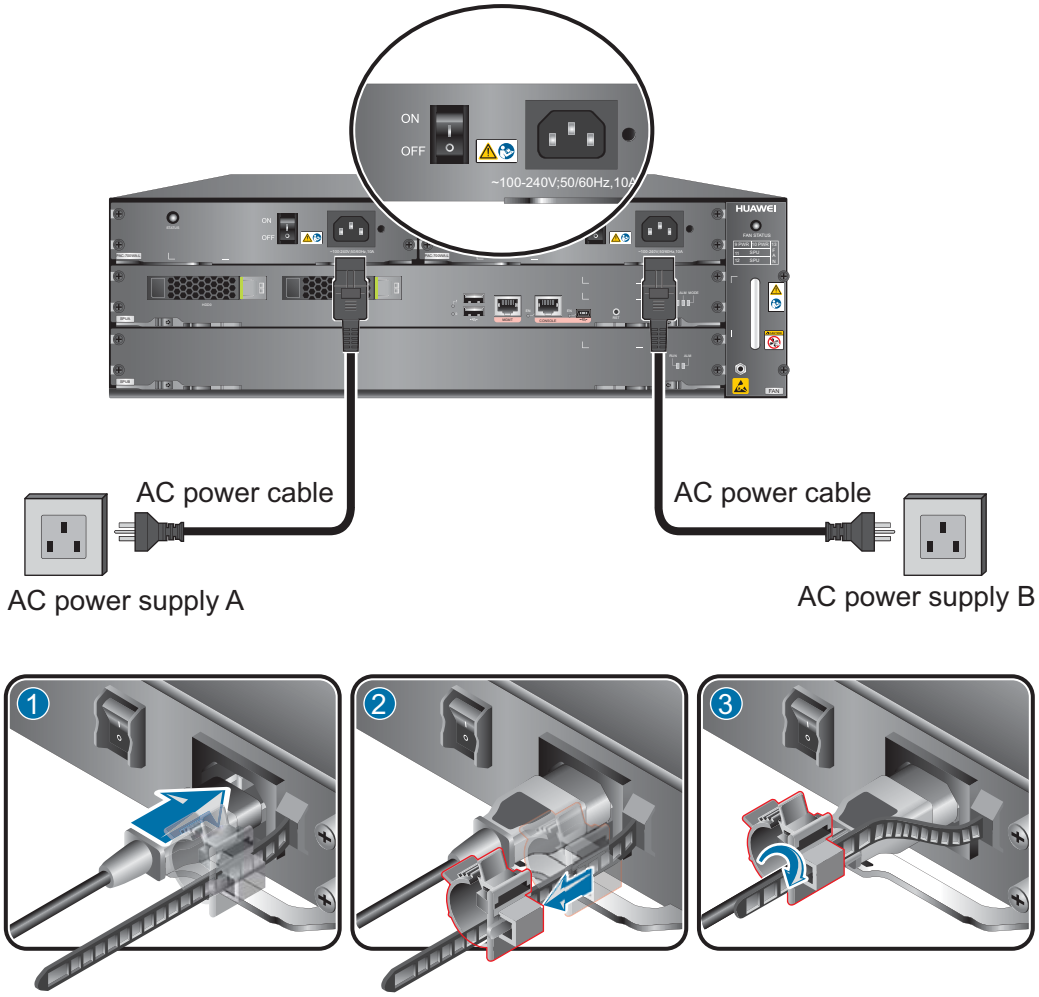
Step 3 Connect the power cables to both AC power supply modules one after the other.

NOTE

To increase availability, connect the two power supply modules to different power supplies.

1. Insert the power cable retention clip to the socket next to the power socket.
2. Insert a C13 receptacle of the power cable delivered with the USG into the socket of the power supply module on the USG. And adjust the cable retention clip to a ring of the proper size.
3. Slide the ring along the AC power cable and adjust the ring to tighten the cable.
4. Connect the other receptacle of the AC power cable to the socket or output terminal of the AC power supply device.

Figure 3-73 Connecting the AC power cable



----End

Follow-up Procedure

Verify the following after the connection is complete:

- The power cable is firmly connected to the power supply socket.
- If multiple USGs are deployed, the power cables of each USG are correctly labeled for distinction.

3.5.8.2 Connecting DC Power Cables

In standard configuration, the USG6660/6670/6680 has two DC power supply modules. Each module requires a PGND cable, an NEG DC power cable, and an RTN DC power cable. This section describes how to connect power cables to the two DC supply modules.

Context

Before connecting power cables, ensure that the DC power supply in the equipment room meets the input requirements of the USG.

DANGER

Do not connect or disconnect the power cables when the USG is powered on.

Procedure

Step 1 Ensure that the PGND cable is properly grounded.

Step 2 Ensure that the USG is powered off.

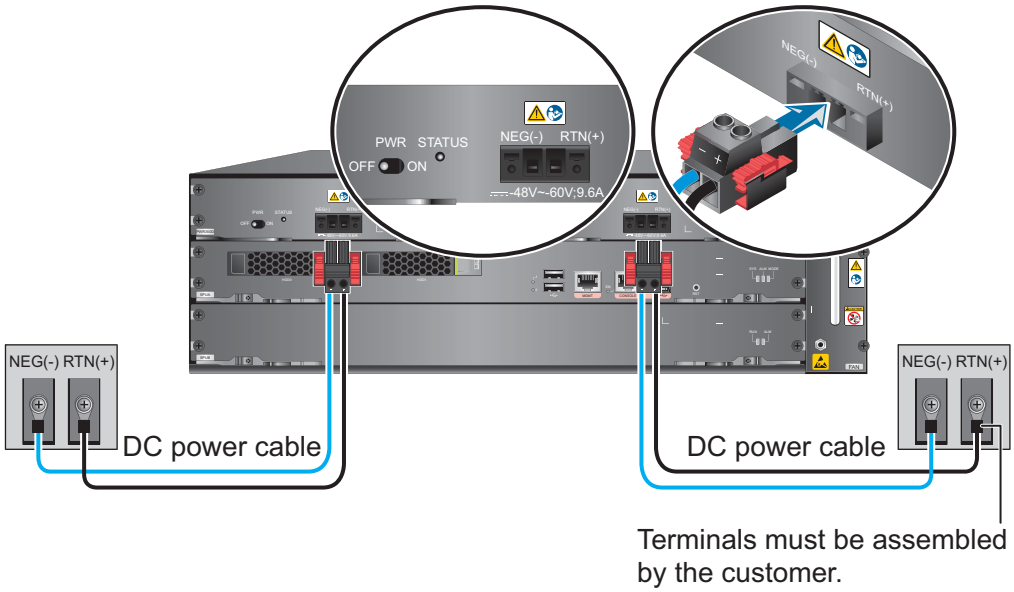
Step 3 Connect the power cables to both DC power supply modules one after the other.

NOTICE

- Note the labels on the DC power cables to prevent connection mistakes.
- When two power modules are used, connect them to different power sources to improve availability.

1. Connect the power plug of the DC power cable to the DC power supply module.
2. Connect the other ends of the DC power cables to the output terminals on the power supply device.

Figure 3-74 Connecting the DC power cables



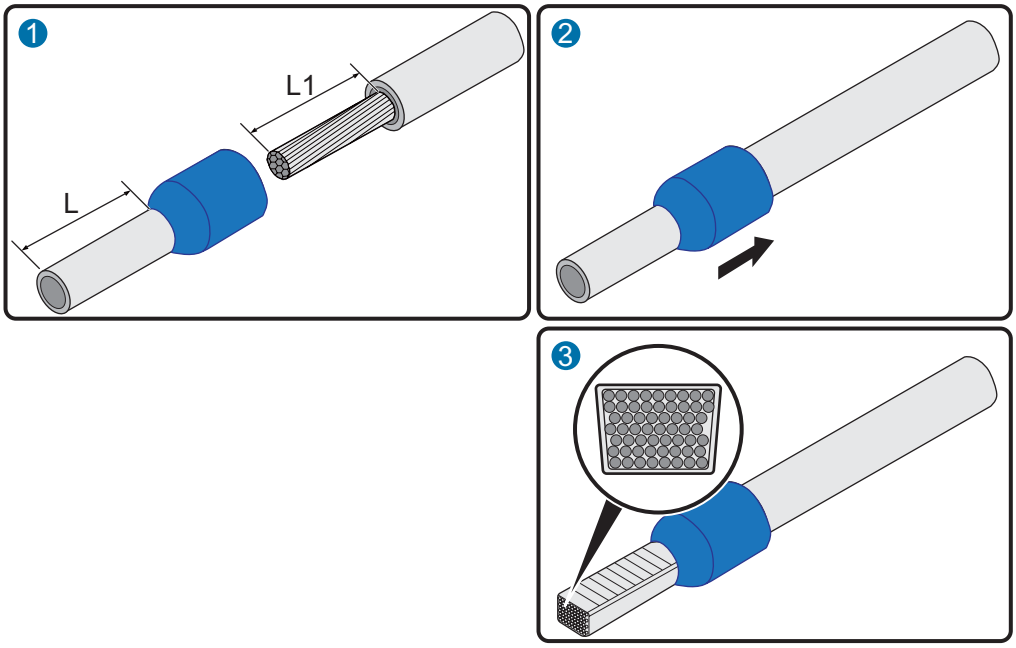
The USG provides cord end terminals and OT bare crimp terminals. You can use them based on the actual condition, including striping the cable, assembling a terminal, and crimping the cable.

NOTE

- When you remove the insulation of the power cable, ensure that the metal conductor of the power cable is not damaged.
- For the cord end terminals from Huawei, you are advised to set L1 to 10 mm. For the cord end terminals from vendors other than Huawei, you are advised to adjust the value of L1 based on the value of L, that is, L1 = L + 1 mm.
- For the OT bare crimp terminals from Huawei, you are advised to set L1 to 7 mm. For the OT bare crimp terminals from vendors other than Huawei, you are advised to adjust the value of L1 based on the value of L, that is, L1 = L + (1 to 2) mm.
- Assembling cord end terminals and OT bare crimp terminals requires crimping tools. The shapes of the crimped terminals vary with crimping molds. Select a proper crimping mold.

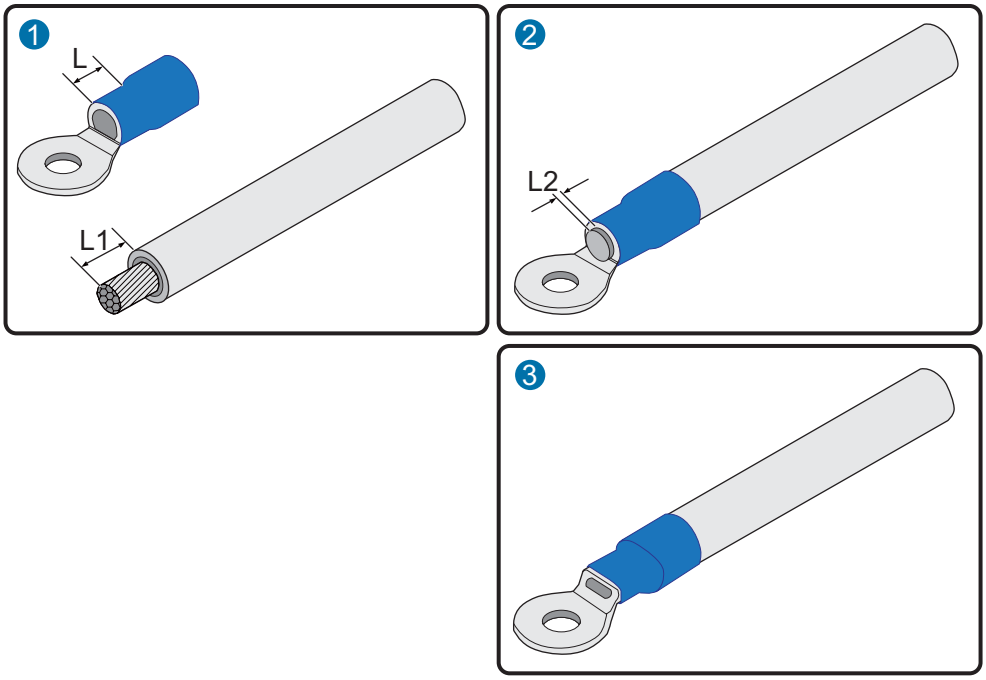
- If the power supply device requires to connect to a cord end terminal, see **Figure 3-75** to assemble the terminal.

Figure 3-75 Assembling the cord end terminal to the DC power cable



- If the power supply device requires to connect to an OT bare crimp terminal, see **Figure 3-76** to assemble the terminal.

Figure 3-76 Assembling the OT bare crimp terminal to the DC power cable



----End

Follow-up Procedure

Verify the following after the connection is complete:

- The power cables are correctly and firmly connected to the power supply device.
- If multiple USGs are deployed, the power cables of each USG are correctly labeled for distinction.

3.5.9 Powering On or Off the USG6650/6660/6670/6680

This section describes how to power on or off the USG6650/6660/6670/6680. To ensure the normal start and security of the USG6650/6660/6670/6680, strictly follow the operation guide to power on or off the USG6650/6660/6670/6680.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.
- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

Procedure

- Power on the USG.

  Turn on the switch of the power supply device and then the switch on the power module of the USG. The USG starts.

  You can identify the USG status based on indicators on the SPUA panel. Indicators shown in **Figure 3-77** or **Figure 3-78** indicate that the USG runs normally.

Figure 3-77 Indicators on the SPUA when the USG6650/6660/6670/6680 (AC model) runs normally

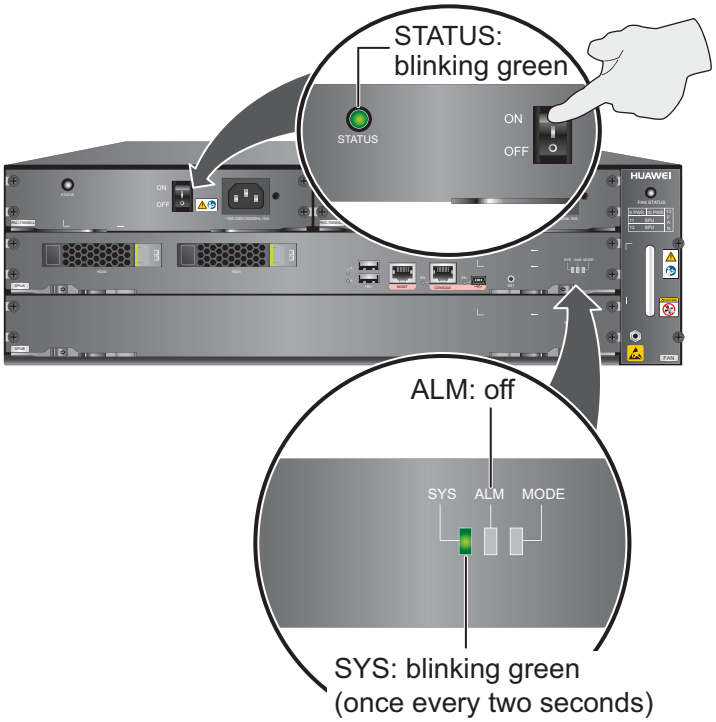
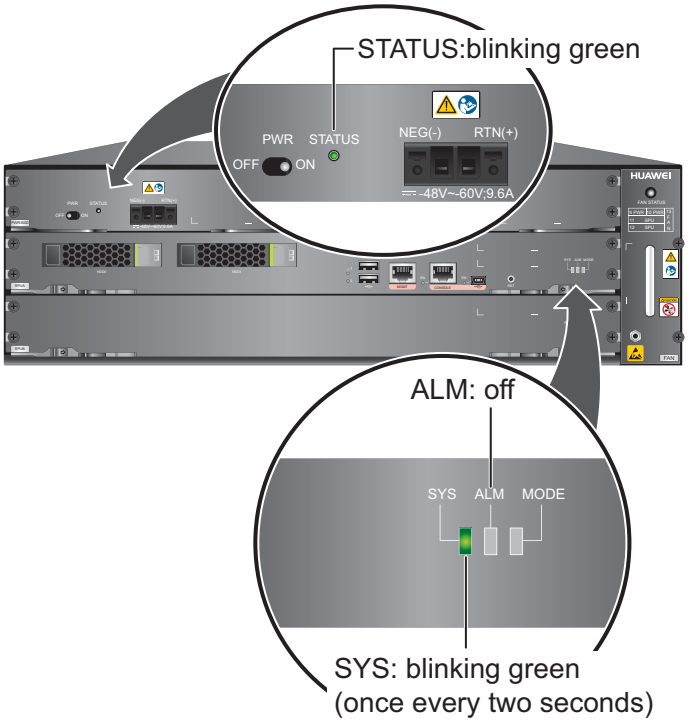


Figure 3-78 Indicators on the SPUA when the USG6660/6670/6680 (DC model) runs normally



- Power off the USG.

NOTICE

Before powering off the USG, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

If the USG will be administratively shut down for a long time, turn off the power switch. After powering off the USG, set it aside properly according to storage requirements.

CAUTION

If the USG has hard disks, do not power off the USG by removing the power cable or switching off the power supply to prevent data loss and hard disk damage. You must run the **disk offline** command in the system view first and wait for about 30 seconds. After the system prompts you with a message indicating that hard disks have stopped, turn off the power switch of the USG.

----End

Follow-up Procedure

After the USG is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the *Administrator Guide*.

4 Maintaining the Hardware

4.1 Replacing an Expansion Card

This section describes how to replace expansion cards to add ports or functions, or rectify the faults caused by damaged expansion cards.

Context

Required tools:

- Phillips screwdriver
- ESD wrist strap
- ESD bag

NOTICE

- The expansion card is not hot-swappable. Therefore, do not replace the expansion card when the device is running. Otherwise, the expansion card may be damaged.
- Replacing expansion cards interrupts services. You are advised to perform the replacement during off-peak hours.
- Wear the ESD wrist strap while working on the USG to avoid possible damages to the USG and expansion cards.

Procedure

Step 1 Ensure that all configurations are saved.

Step 2 Press the power button to power off the USG.

Step 3 Take notes on the connections between each Ethernet cable/optical fiber and ports on the expansion card. Then remove all Ethernet cables and optical fibers from the expansion card. For optical fibers, remove the optical transceivers from the expansion card, plug in the dust cap to the optical port and connectors on the expansion card and optical transceivers, and arrange the cables and fibers in order for further use.

Step 4 Make sure that you have worn ESD wrist strap and the strap is well grounded. Otherwise, the expansion card may be damaged.

Step 5 Remove the expansion card.

1. Loose the captive screws on both sides of the expansion card and open the levers outwards.
2. Pull the expansion card along the guide rail until it is completely detached from the slot. **Figure 4-1** and **Figure 4-2** show how to remove the WSIC expansion card.

Figure 4-1 Removing the WSIC expansion card (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)

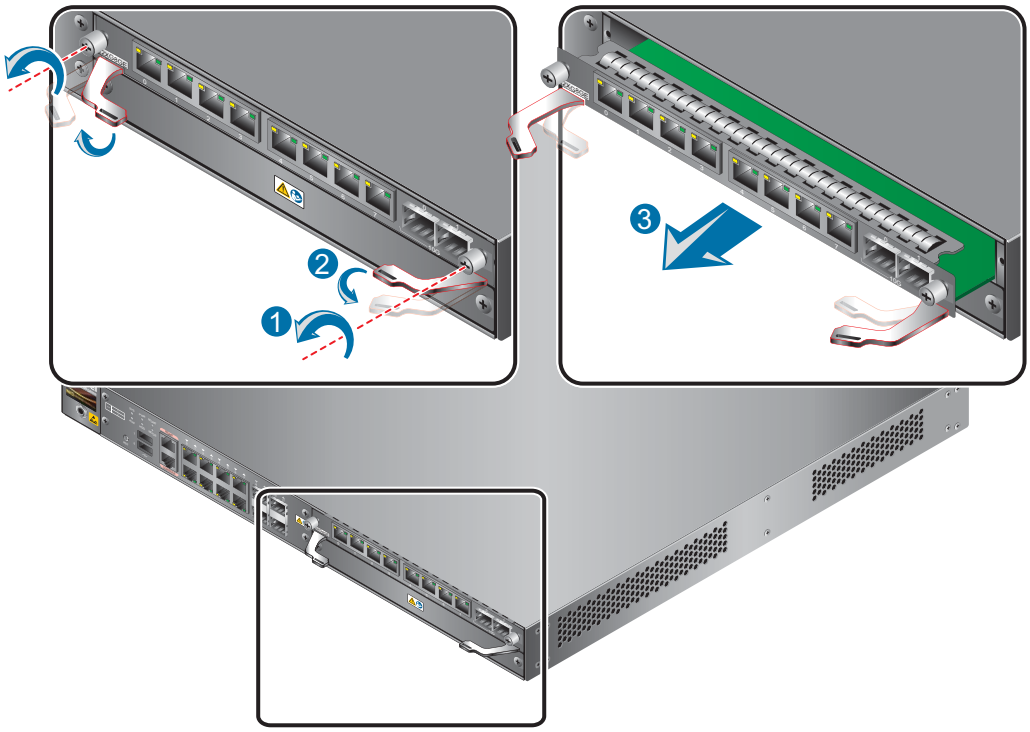
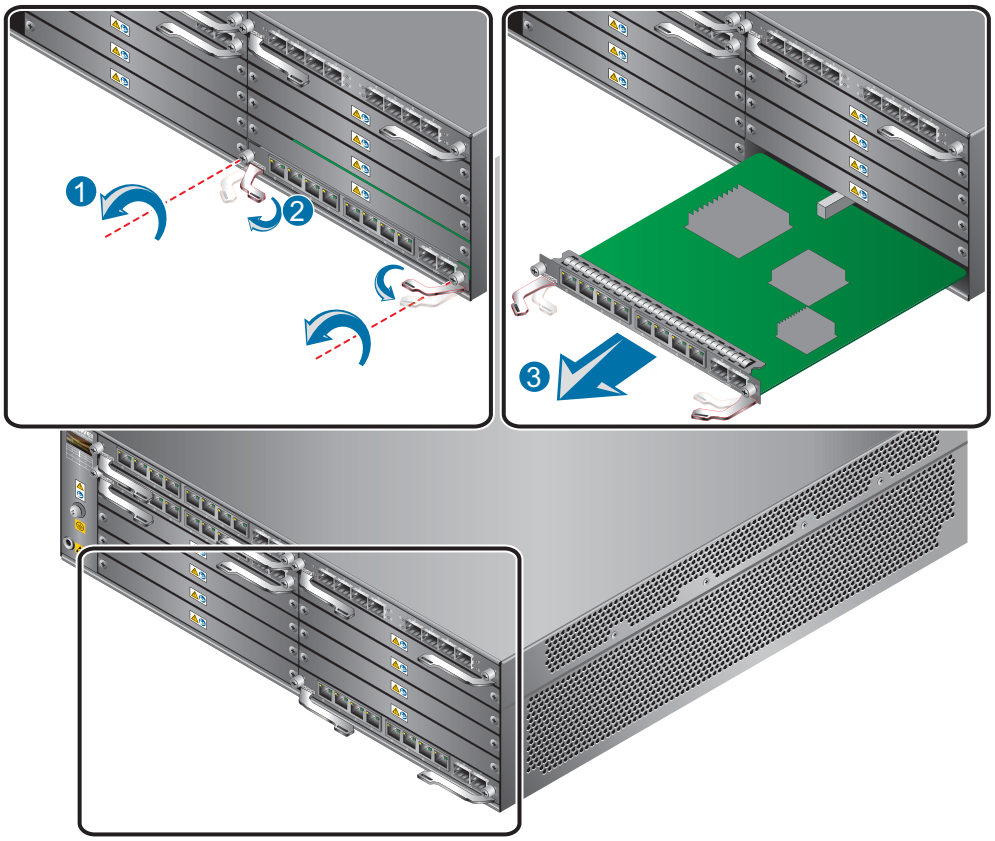


Figure 4-2 Removing the WSIC expansion card (USG6650/6660/6670/6680)



3. Place the removed expansion card into an ESD bag.

Step 6 Install the expansion card.

For details about USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 installation, see **Installing the Expansion Card (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)**.

For details about USG6650/6660/6670/6680 installation, see **Installing the Expansion Card (USG6650/6660/6670/6680)**.

Step 7 Reconnect the cables and fibers to proper ports based on the connections disconnected previously.

For details about USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 installation, see **Connecting the Ethernet Cable (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)** or **Connecting the Optical Transceiver and Optical Fiber (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)**.

For details about USG6650/6660/6670/6680 installation, see **Connecting the Ethernet Cable (USG6650/6660/6670/6680)** or **Connecting the Optical Transceiver and Optical Fiber (USG6650/6660/6670/6680)**.

----End

Follow-up Procedure

Send damaged expansion cards to Huawei for repair and store other removed ones for future use.

4.2 Replacing the Hard Disk

This section describes how to replace the hard disk as well as the precautions.

Context

Required tools:

- Phillips screwdriver
- ESD bag

NOTICE

Precautions for using the hard disks

- Use hard disks purchased from Huawei. Otherwise, the system may not identify them.
- Before replacing the hard disk, run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working and then remove the hard disk. If you remove and insert a hard disk without running the **disk offline** command first, the hard disk may be damaged, data in the hard disk may be lost, or the system may stop responding to services.
- Powering off the USG interrupts services. Install or replace the hard disks during off-peak hours.
- Wear the ESD wrist strap while working on the USG to avoid possible damages to the USG and hard disks.
- While holding a hard disk, do not touch the PCB board or squeeze the disk. Carry only one hard disk at a time. Do not vibrate, crash, or pile multiple hard disks up.
- Put the hard disks inside ESD bags when they are not used.
- Only the USG6650/6660/6670 and USG6680-AC support the SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. The USG6680-DC supports only the SM-HDD-SAS300G-A hard disk.

Replacing the Hard Disk (One Hard Disk)

If a hard disk is faulty (for example, a hard disk failure log is generated on the USG), you can replace the hard disk. The hard disk can be replaced no matter when the USG is powered on or off. If the USG is powered off, skip **Step 1** and do not run the **disk offline** command. The following procedure guides you through hard disk replacement while the USG is powered on:

NOTICE

After replacing the hard disk, run the **disk online** command in the system view. Otherwise, the hard disk does not work.

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working and then remove the hard disk to be replaced.

1. Press the button on the right of the hard disk tray to eject the handler.
2. Use the handler to pull the hard disk out of the slot.
3. Put the replaced hard disk into an ESD bag.

Figure 4-3 Removing the hard disk (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)

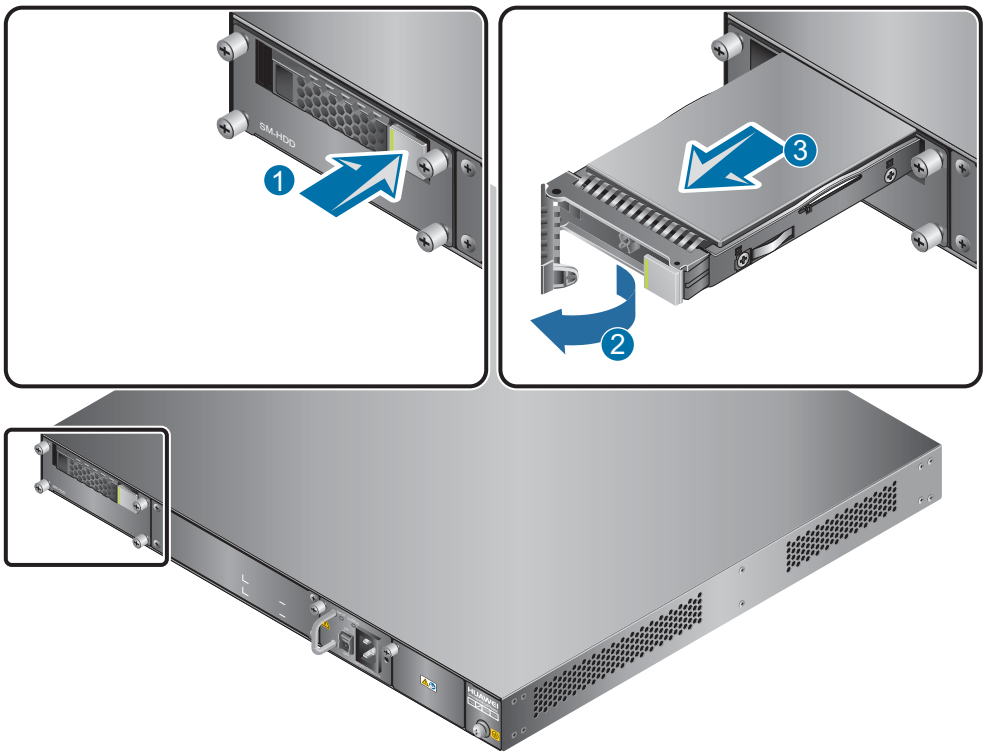
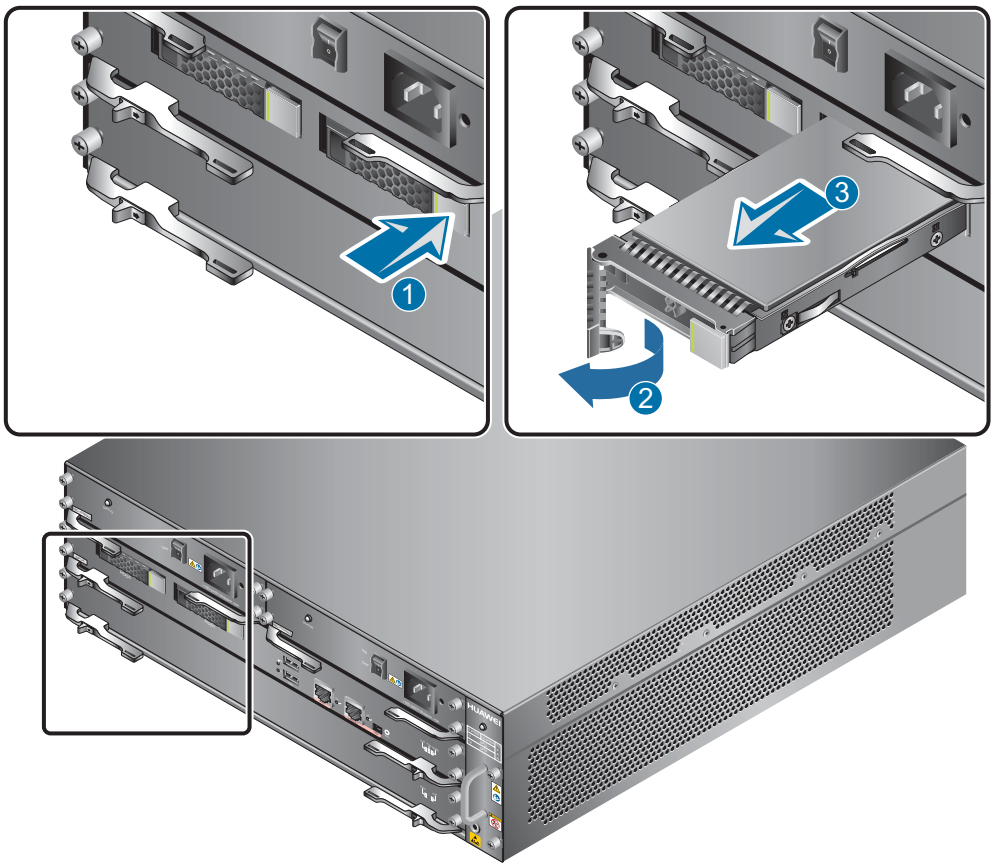


Figure 4-4 Removing the hard disk (USG6650/6660/6670/6680)



Step 3 Install the new hard disk. The installation methods for 1 U and 3 U models are the same. For details, see **Installing the Hard Disk**.

Step 4 Run the **disk online** command in the system view and then the **display disk information** command. If **Filesystem Status** is **Mounted**, the hard disk works properly.

Step 5 Send the faulty hard disk to Huawei for repair.

----End

Replacing the Hard Disk (Dual Hard Disks)

The USG6650/6660/6670/6680 supports dual hard disks. If a hard disk is faulty (for example, a hard disk failure log is generated on the USG), you can replace the hard disk. The hard disk can be replaced no matter when the USG is powered on or off. If the USG is powered off, skip **Step 1** and do not run the **disk offline** command. The following procedure guides you through hard disk replacement while the USG is powered on:

NOTICE

For dual hard disks, replace the faulty disk with a new one. Do not change slots of the hard disks. Otherwise, the USG may fail to recognize the hard disks.

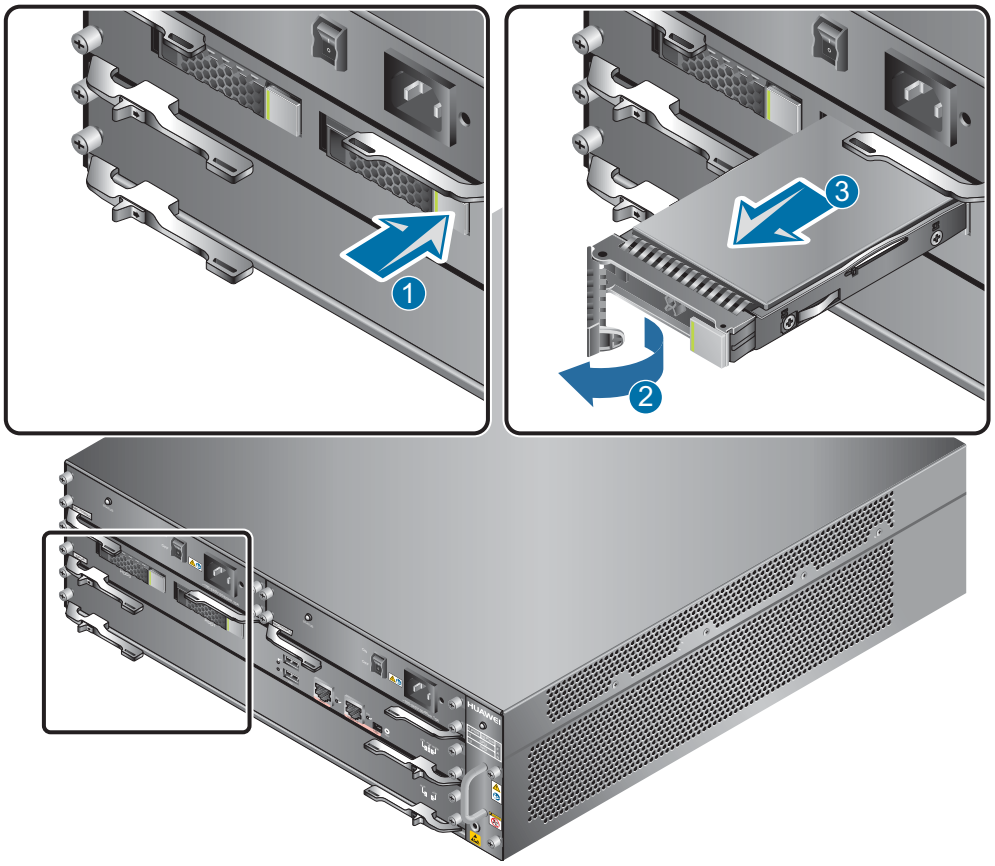
The capacity of the hard disk after replacement must be the same as that of the existing one. Otherwise, creating RAID fails.

Step 1 Ensure that all configurations are saved.

Step 2 In the system view, run the **disk offline** command. Wait for about 30 seconds. After the system indicates that the hard disk has stopped working, run the **reset raid** command to delete the RAID and replace the hard disk.

1. Press the button on the right of the hard disk tray to eject the handler.
2. Use the handler to pull the hard disk out of the slot.
3. Put the replaced hard disk into an ESD bag.

Figure 4-5 Removing the hard disk (USG6650/6660/6670/6680)



Step 3 Install the new hard disk. For details, see **Installing the Hard Disk**.

Step 4 Wait for one minute and run the **reset raid primary-disk** *disk-id* command in the system view to create a RAID group using *disk-id* as the primary disk for data synchronization. In this example, *disk-id* is the installation slot of the non-faulty hard disk.

Step 5 Wait for four to five hours, run the **display disk information** command, and check whether **Filesystem Status** is **Mounted**. If yes, the hard disk is working properly.

NOTE

Filesystem Status becomes **Mounted** four to five hours after the **reset raid** command is run. During this period, you can use other services, but the hard disks do not record real-time logs for these services. After data synchronization completes, the hard disks automatically start to work. You can run the **display disk information** command in the user view on the next day to check whether **Filesystem Status** is **Mounted**. If not, contact Huawei technical support personnel.

Step 6 Send the faulty hard disk to Huawei for repair.

----End

4.3 Expanding the Hard Disk

This section describes how to expand the hard disk as well as the precautions.

Context

Required tools:

- Phillips screwdriver
- ESD bag

NOTICE

Precautions for using the hard disks

- Use hard disks purchased from Huawei. Otherwise, the system may not identify them.
- Before replacing the hard disk, run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working and then remove the hard disk. If you remove and insert a hard disk without running the **disk offline** command first, the hard disk may be damaged, data in the hard disk may be lost, or the system may stop responding to services.
- Powering off the USG interrupts services. Install or replace the hard disks during off-peak hours.
- Wear the ESD wrist strap while working on the USG to avoid possible damages to the USG and hard disks.
- While holding a hard disk, do not touch the PCB board or squeeze the disk. Carry only one hard disk at a time. Do not vibrate, crash, or pile multiple hard disks up.
- Put the hard disks inside ESD bags when they are not used.
- Only the USG6650/6660/6670 and USG6680-AC support the SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. The USG6680-DC supports only the SM-HDD-SAS300G-A hard disk.

Expanding a Hard Disk (from a Small-Capacity Hard Disk Combination to a Large-Capacity Hard Disk Combination)

The USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630 supports SM-HDD-SAS300G-B, SM-HDD-SAS600G-B, and SM-HDD-SAS1200G-B hard disk combinations. Do as follows to replace a small-capacity hard disk combination with a large-capacity hard disk combination on the USG, which has been running for some time with a small-capacity hard disk combination:

NOTICE

The hard disk combination of the 1 U device is not hot-swappable. To expand the hard disk combination, you must power off the device.

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working.

Step 3 Power off the device, loosen screws on the hard disk combination, and pull the hard disk combination out of the slot.

Step 4 Hold the two side surfaces of the hard disk combination, push the hard disk combination into the slot along the guide rails until it is well seated into the slot, and fasten screws on the two sides of the hard disk combination.

Figure 4-6 Uninstalling the small-capacity hard disk combination to be expanded

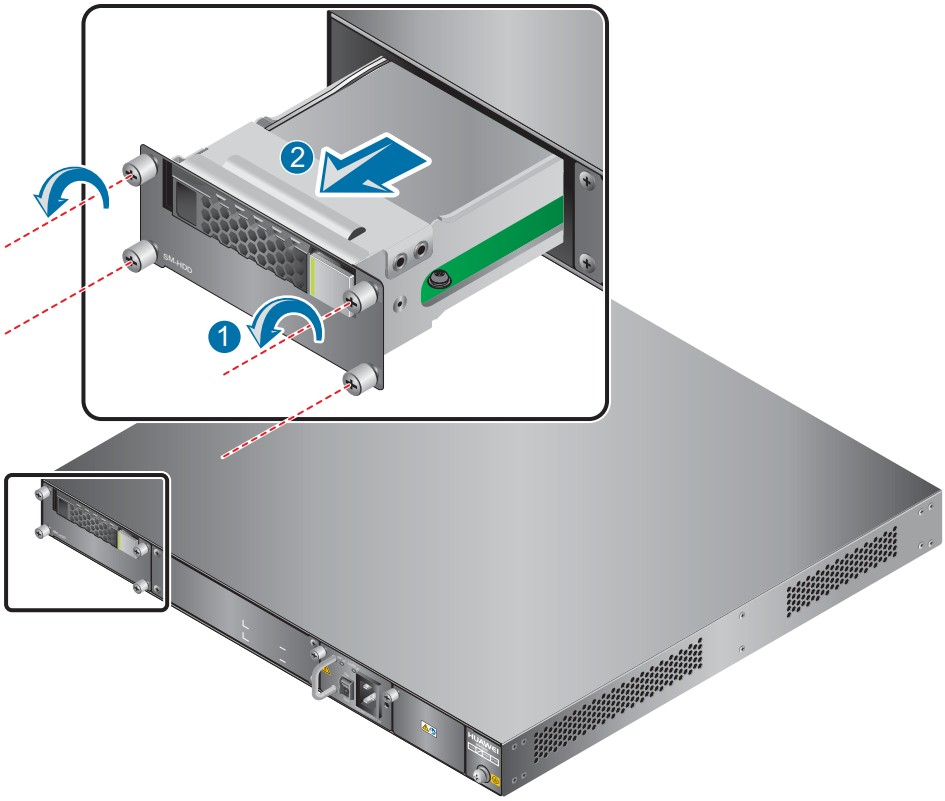
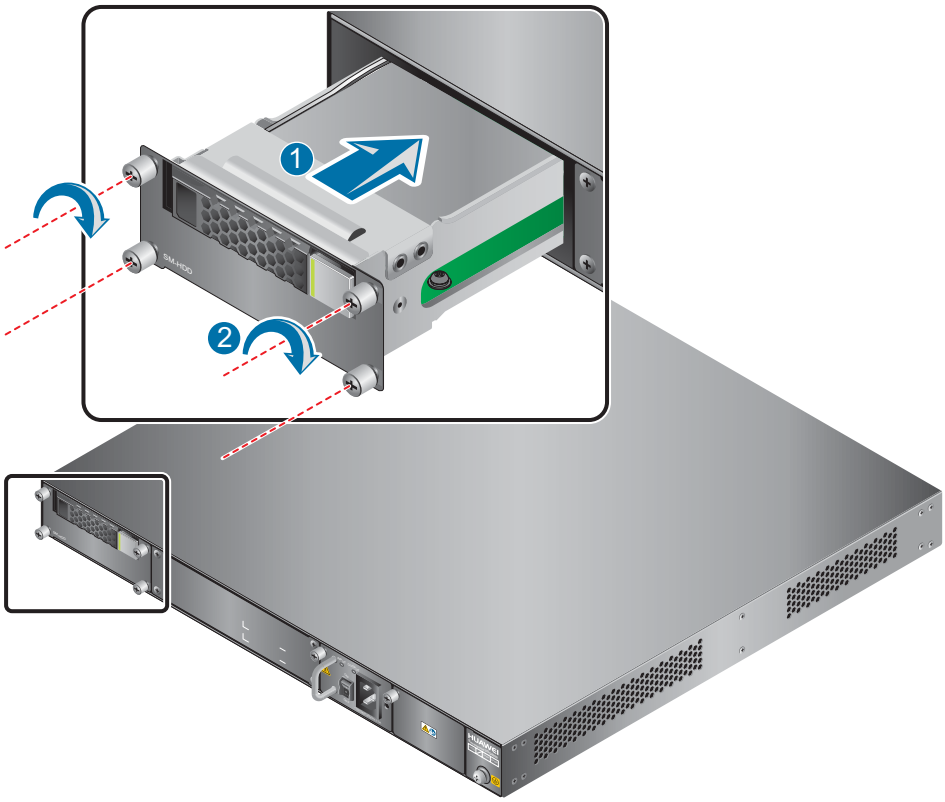


Figure 4-7 Installing the large-capacity hard disk combination



Step 5 Power on the device, run the **display disk information** command. If **Filesystem Status** is **Mounted** and **DiskCapacity_Total** is a large capacity, the new hard disk combination works properly.

----End

Expanding a Hard Disk (from No Hard Disk to One Hard Disk)

Hard disks of the 1 U device are not hot-swappable. To add a hard disk, you must power off the device. For details on how to install the hard disk, see **Installing a Hard Disk Combination**.

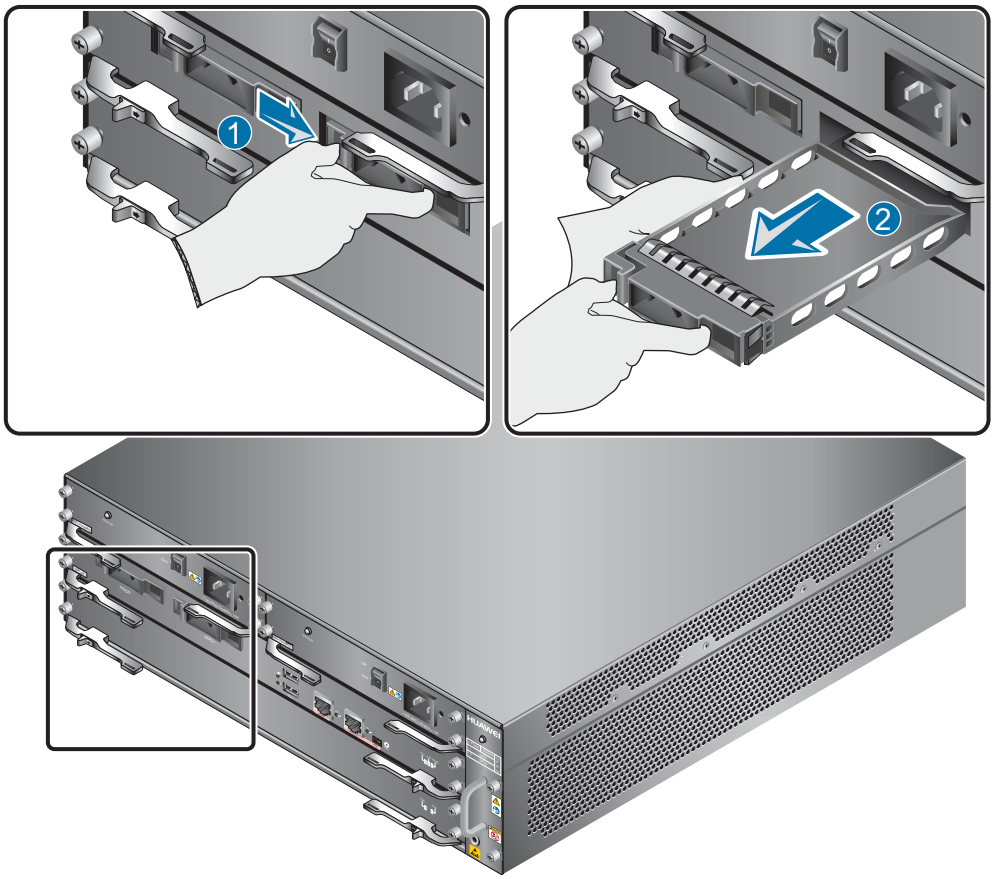
Hard disks of the 3 U model are hot-swappable. Do as follows to add a hard disk on the USG, which has been running for some time without any hard disk:

Step 1 Ensure that all configurations are saved.

Step 2 Remove the filler panel from the hard disk slot, and install a new hard disk.

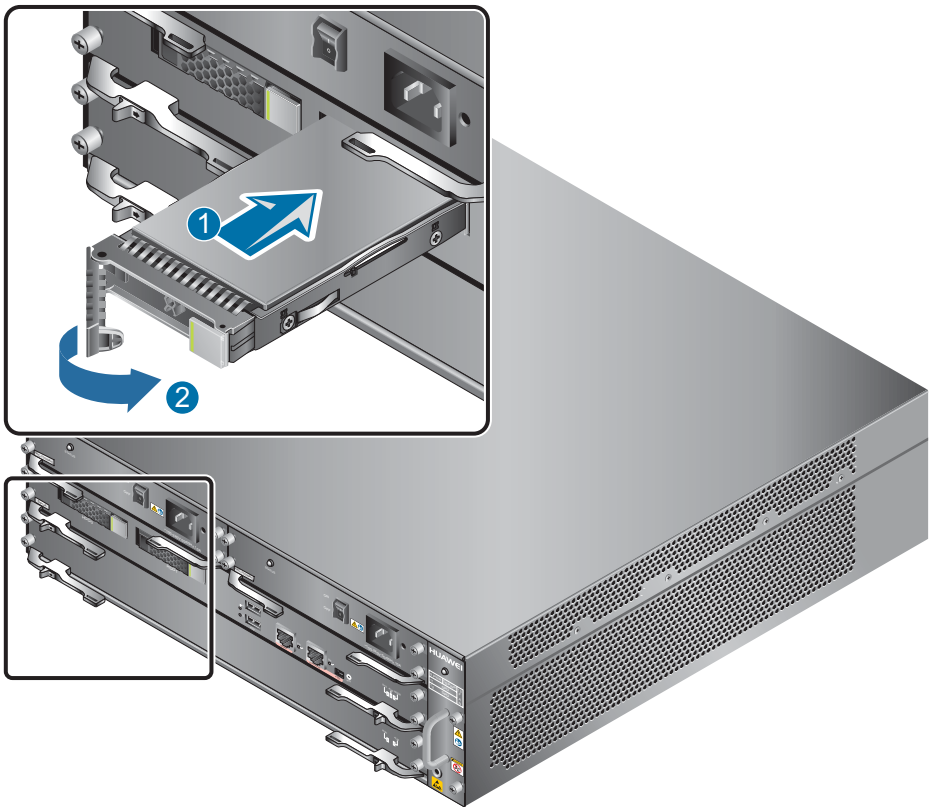
1. Remove the filler panel from the hard disk slot. HDD1 is used as an example.

Figure 4-8 Removing the filler panel from the hard disk slot



2. Hold the handlers of the tray and push the tray along the guide rails inside the hard disk slot till the tray panel aligns with the panel of the USG.
3. Press the tray handler inwardly to restore the tray.

Figure 4-9 Installing the hard disk



Step 3 Wait about 10 minutes, and then run the **display disk information** command in the user view to check whether the **Filesystem Status** value is **Mounted**.

----End

Expanding Hard Disks (from No Hard Disk to Dual Hard Disks)

The USG6650/6660/6670/6680 supports dual hard disks. Do as follows to add a hard disk on the USG, which has been running for some time without any hard disk:

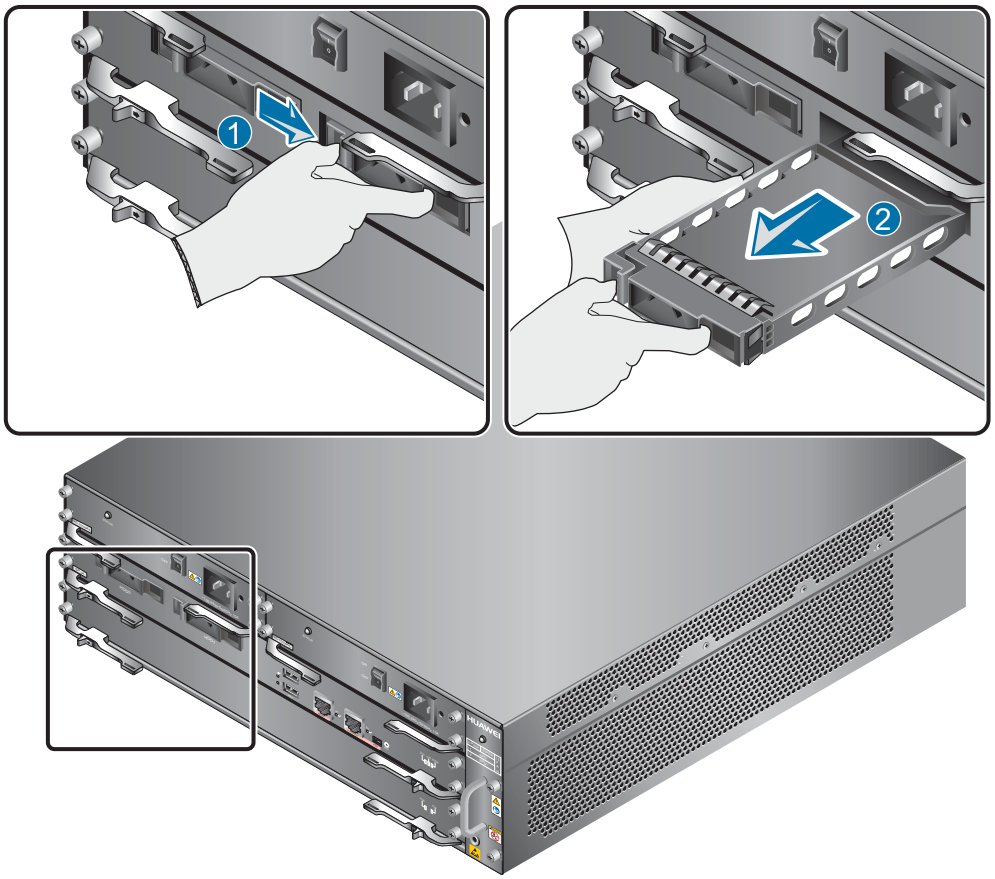
Step 1 Ensure that all configurations are saved.

Step 2 Remove the filler panel from the hard disk slot (HDD0 and HDD1), and install a new hard disk.

Ensure that the two hard disks have the same capacity. Otherwise, creating RAID fails.

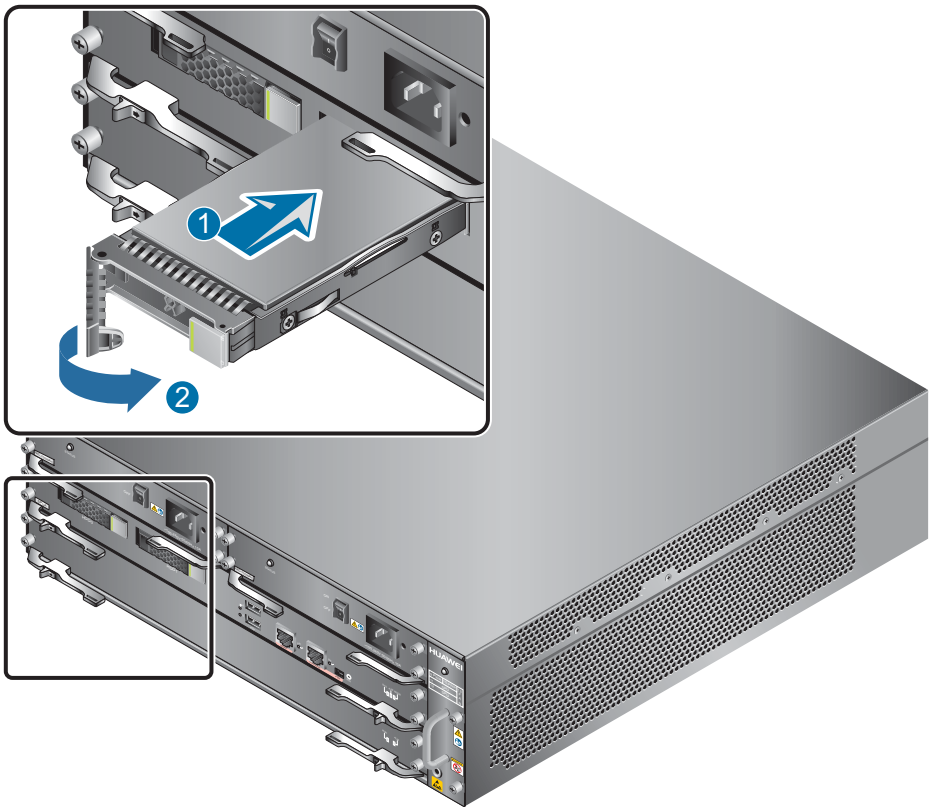
1. Remove the filler panel from the hard disk slot. HDD1 is used as an example.

Figure 4-10 Removing the filler panel from the hard disk slot



2. Hold the handlers of the tray and push the tray along the guide rails inside the hard disk slot till the tray panel aligns with the panel of the USG.
3. Press the tray handler inwardly to restore the tray.

Figure 4-11 Installing the hard disk



Step 3 Wait about 10 minutes, and then run the **reset raid primary-disk** *disk-id* command in the system view to create the RAID on the primary disk and synchronize data. Several hours later, run the **display disk information** command. If **Filesystem Status** is **Mounted** and **DiskRaidMode** is **ACTIVE**, both hard disks work properly.

NOTICE

After the RAID is created, the data in the primary disk will be synchronized to the secondary disk and the original data on the secondary disk will be overwritten. Select the *disk-id* of the primary disk before creating RAID.

----End

Expanding Hard Disks (from One Hard Disk to Dual Hard Disks with the Same Capacity)

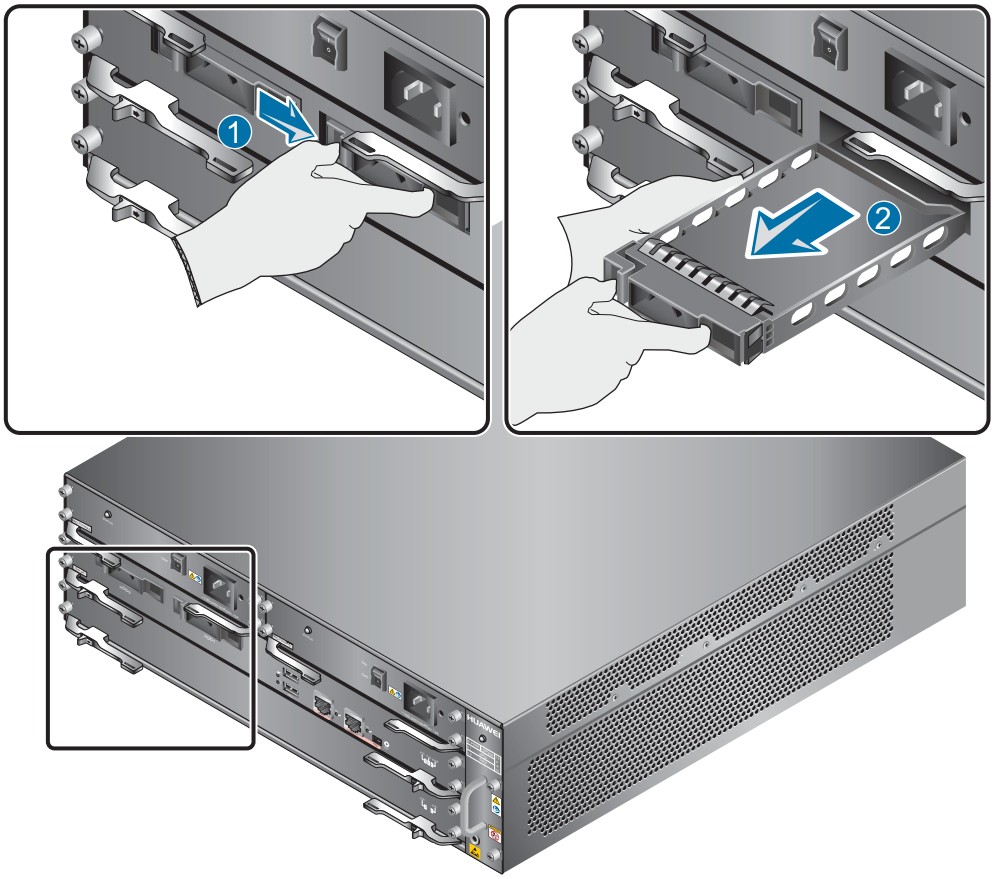
The USG6650/6660/6670/6680 supports dual hard disks. Do as follows to add a hard disk with the same capacity on the USG, which has been running for some time with a single hard disk:

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working, remove the filler panel from the hard disk slot, and install a new hard disk with the same capacity.

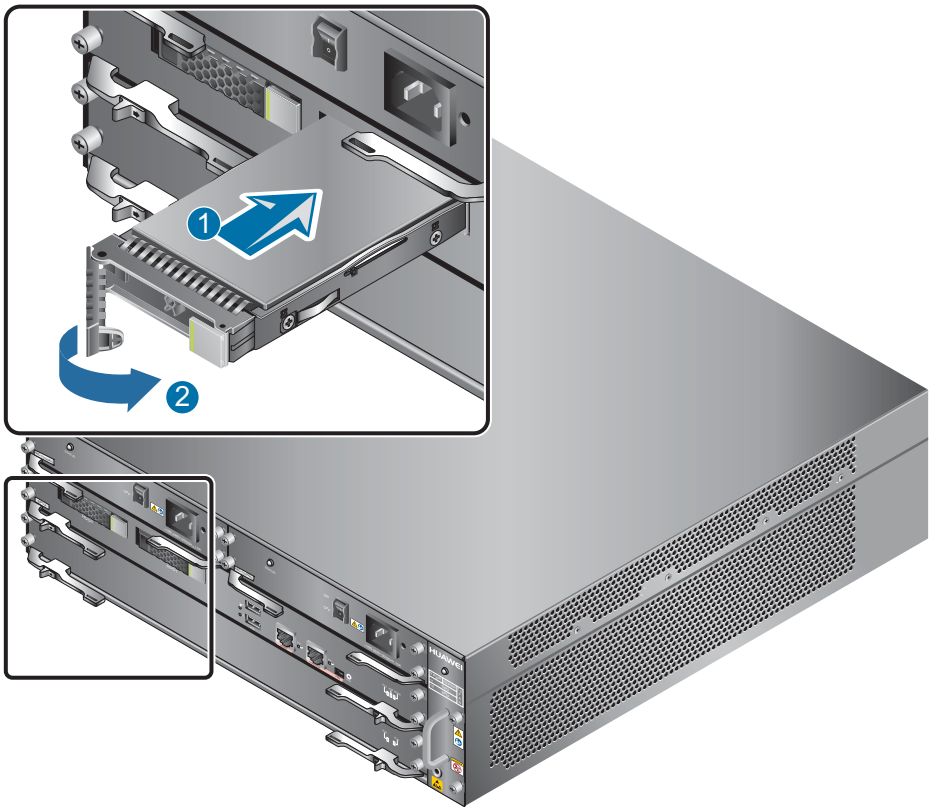
1. Remove the filler panel from the hard disk slot. HDD1 is used as an example.

Figure 4-12 Removing the filler panel from the hard disk slot



2. Hold the handlers of the tray and push the tray along the guide rails inside the hard disk slot till the tray panel aligns with the panel of the USG.
3. Press the tray handler inwardly to restore the tray.

Figure 4-13 Installing the hard disk



Step 3 Wait about one minute, and then run the **reset raid primary-disk** *disk-id* command in the system view to create the RAID on the primary disk and synchronize data. In this example, run the **reset raid primary-disk 0** command. Several hours later, run the **display disk information** command. If **Filesystem Status** is **Mounted** and **DiskRaidMode** is **ACTIVE**, both hard disks work properly.

NOTICE

After the RAID is created, the data in the primary disk will be synchronized to the secondary disk and the original data on the secondary disk will be overwritten. Select the *disk-id* of the primary disk before creating RAID.

----End

Expanding a Hard Disk (from One Small-Capacity Hard Disk to One Large-Capacity Hard Disk)

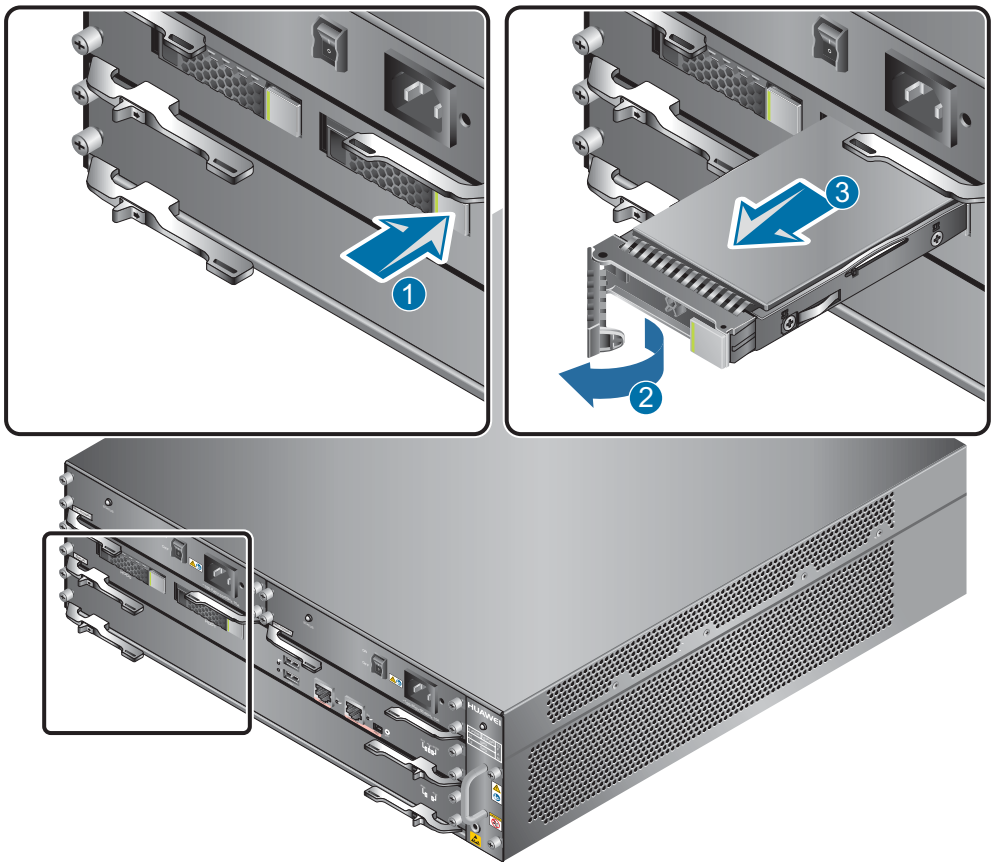
The USG6650/6660/6670/6680 supports SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. Do as follows to replace the small-capacity hard disk with a large-capacity hard disk on the USG that has been running with the small-capacity hard disk:

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working and remove the small-capacity hard disk.

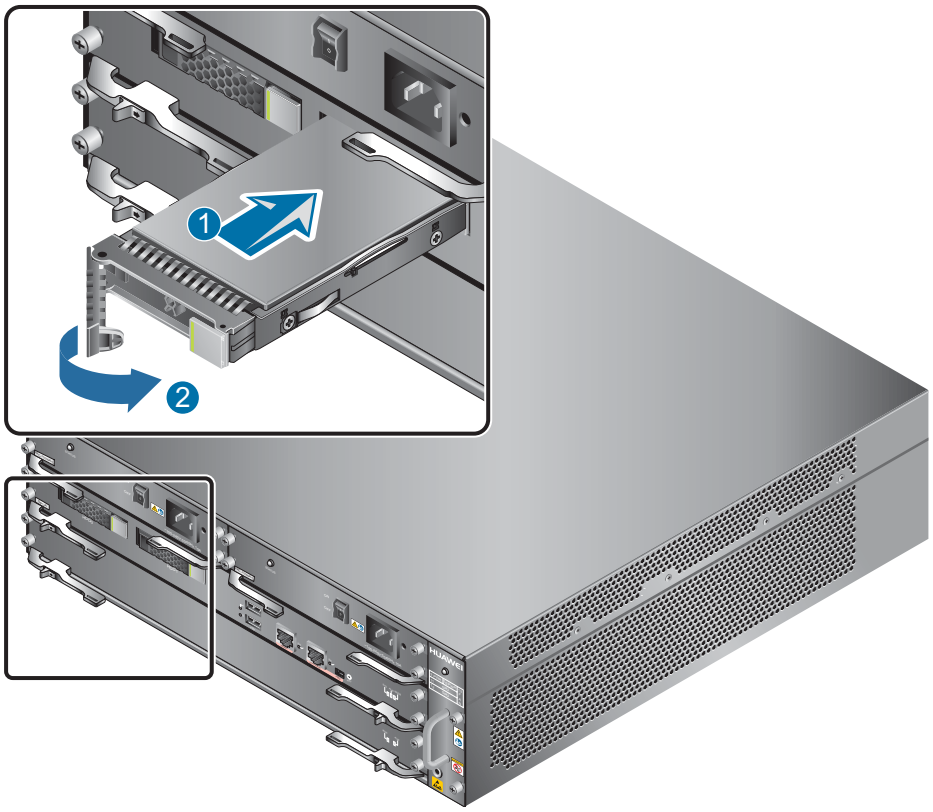
Press the button on the right of the hard disk tray to eject the handler. Use the handler to pull the hard disk out of the slot. Put the replaced small-capacity hard disk into an ESD bag.

Figure 4-14 Removing the small-capacity hard disk



Step 3 Hold the handlers of the tray and push the tray along the guide rails inside the large-capacity hard disk slot till the tray panel aligns with the panel of the USG. Press the tray handler inwardly to restore the tray.

Figure 4-15 Installing the large-capacity hard disk



Step 4 Run the **disk online** command in the system view and then the **display disk information** command. If **Filesystem Status** is **Mounted** and **DiskCapacity_Total** is a large capacity, the hard disk works properly.

----End

Expanding Hard Disks (from One Small-Capacity Hard Disk to Two Large-Capacity Hard Disks)

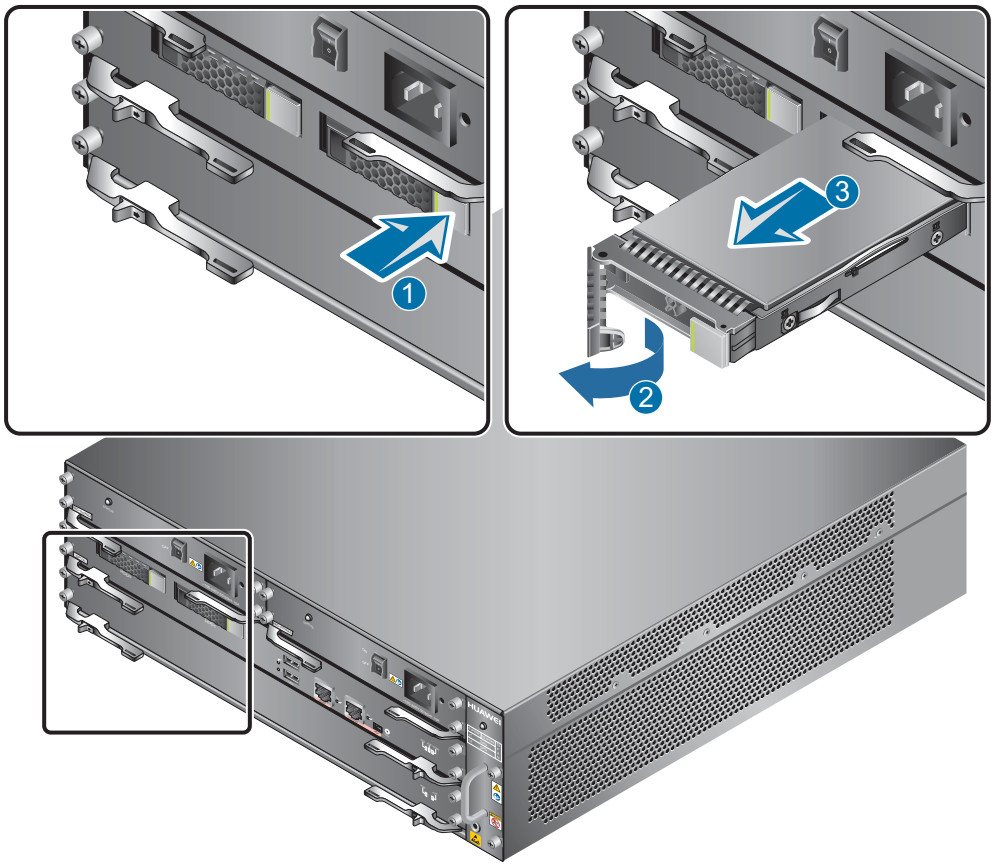
The USG6650/6660/6670/6680 supports SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. Do as follows to replace the small-capacity hard disk with two large-capacity hard disks on the USG that has been running with one small-capacity hard disk:

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working, remove the small-capacity hard disk.

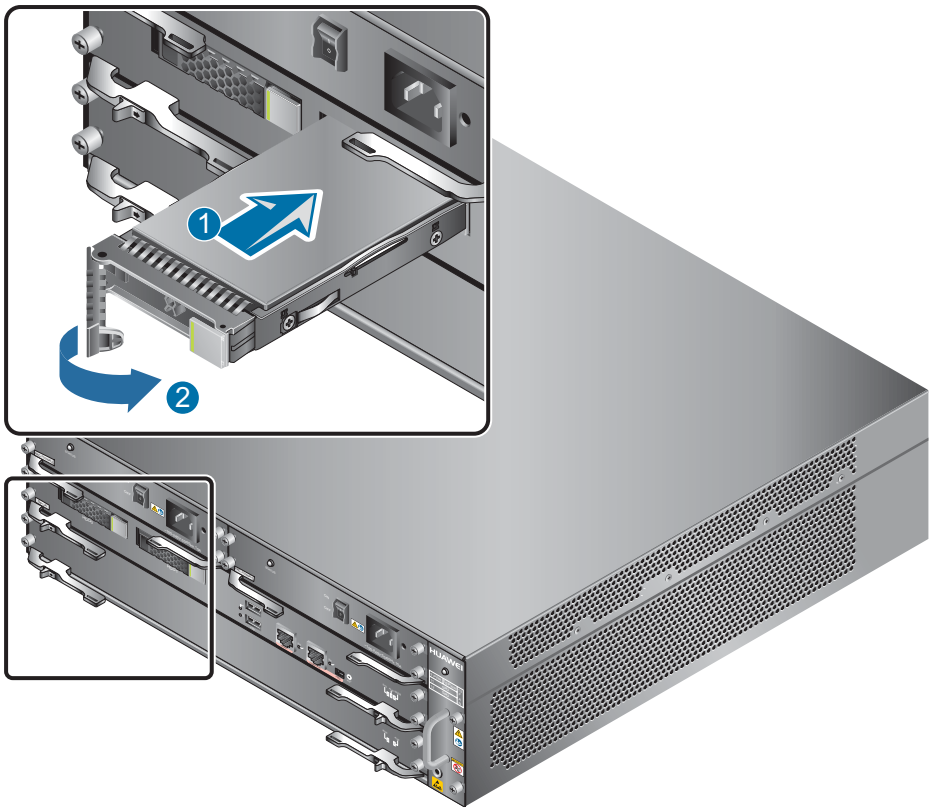
Press the button on the right of the hard disk tray to eject the handler. Use the handler to pull the hard disk out of the slot. Put the replaced small-capacity hard disk into an ESD bag.

Figure 4-16 Removing the small-capacity hard disk



Step 3 Install one large-capacity hard disk in slots HDD0 and HDD1. For example, to install a large-capacity hard disk in slot HDD1, hold the tray handler and push the tray along the guide rails inside the hard disk slot till the tray panel aligns with the panel of the USG. Then press the tray handler inwardly to restore the tray.

Figure 4-17 Installing the large-capacity hard disk



Step 4 Wait for one minute and run the **reset raid primary-disk** *disk-id* command in the system view to create a RAID group using *disk-id* as the primary disk for data synchronization.

Step 5 Wait for 4 to 5 hours, run the **display disk information** command, check whether **Filesystem Status** is **Mounted** and **DiskCapacity_Total** is a large capacity. If yes, capacity expansion succeeds, and the hard disks are working properly.

NOTE

After the **reset raid** command is executed to specify the primary hard disk and to start creating RAID1, it takes about four to five hours for **Filesystem Status** to become **Mounted**. During this period, you can use other services, but the hard disks do not record real-time logs for these services. After data synchronization completes, the hard disks automatically start to work. You can run the **display disk information** command in the user view on the next day to check whether **Filesystem Status** is **Mounted**. If not, contact Huawei technical support personnel.

----End

Expanding Hard Disks (from Two Small-Capacity Hard Disks to Two Large-Capacity Hard Disks)

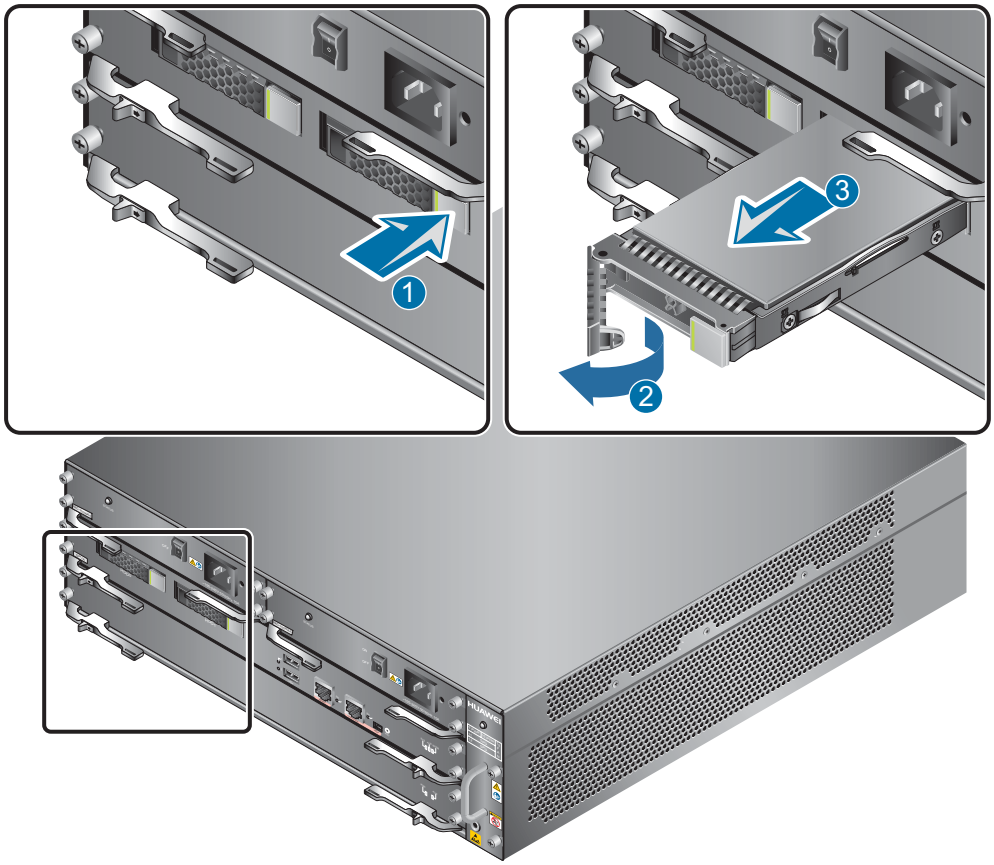
The USG6650/6660/6670/6680 supports SM-HDD-SAS300G-A, SM-HDD-SAS600G-A, and SM-HDD-SAS1200G-A hard disks. Do as follows to replace the two small-capacity hard disks with two large-capacity hard disks on the USG that has been running with two small-capacity hard disks:

Step 1 Ensure that all configurations are saved.

Step 2 Run the **disk offline** command in the system view. Wait about 30 seconds until the system indicates that the hard disk stops working, remove the small-capacity hard disk.

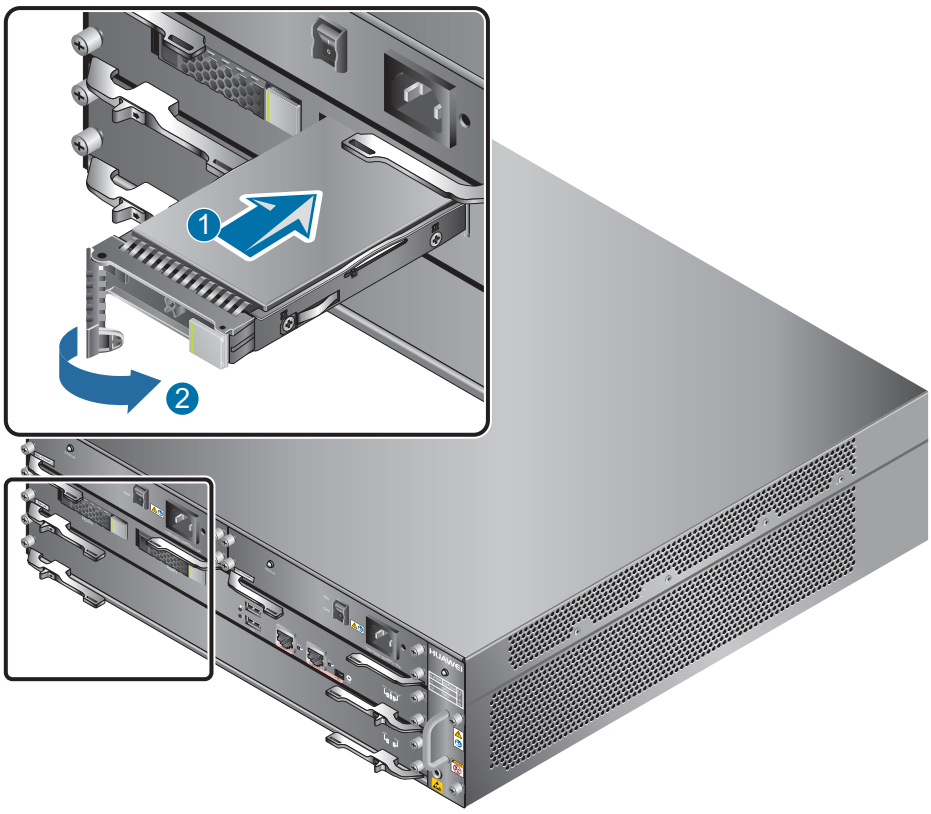
Remove the small-capacity hard disks from slots HDD0 and HDD1. For example, to remove the hard disk from HDD1, press the button on the right of the hard disk tray to eject the handler, use the handler to pull the hard disk out of the slot, and put the replaced small-capacity hard disk into an ESD bag.

Figure 4-18 Removing the small-capacity hard disk



1. Install one large-capacity hard disk in slots HDD0 and HDD1. For example, to install a large-capacity hard disk in slot HDD1, hold the tray handler and push the tray along the guide rails inside the hard disk slot till the tray panel aligns with the panel of the USG. Then press the tray handler inwardly to restore the tray.

Figure 4-19 Installing the large-capacity hard disk



Step 3 Wait for one minute and run the **reset raid primary-disk** *disk-id* command in the system view to create a RAID group using *disk-id* as the primary disk for data synchronization.

Step 4 Wait for 4 to 5 hours, run the **display disk information** command, check whether **Filesystem Status** is **Mounted** and **DiskCapacity_Total** is a large capacity. If yes, capacity expansion succeeds, and the hard disks are working properly.

NOTE

Filesystem Status becomes **Mounted** four to five hours after the **reset raid** command is run. During this period, you can use other services, but the hard disks do not record real-time logs for these services. After data synchronization completes, the hard disks automatically start to work. You can run the **display disk information** command in the user view on the next day to check whether **Filesystem Status** is **Mounted**. If not, contact Huawei technical support personnel.

----End

4.4 Replacing a Power Module

This section describes how to replace a faulty power module.

Context

Required tools:

- Phillips screwdriver

When two power modules are installed on the USG, one of them is hot swappable. Pay attention to the following items during hot swapping:

- Power off the power module to be replaced.
- Do not power off the other power module during the replacement.
- Do not touch the other power module either by body or by tools, preventing human injury or device short circuit.
- DC and AC power modules are incompatible with each other and cannot be used in substitution.

NOTE

The AC power module used by the current USG6680-AC is 700 W, but the AC power module used by the early-stage USG6680-AC is 350 W. If both the 700-W and 350-W power modules are used after the power modules are replaced, the 700-W power module can serve as the 350-W power module only.

Replacing the Power Module (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)

Step 1 Determine the location of the power module to be replaced and attack a replacement label on the panel to identify the power module.

Step 2 Disconnect the power supply device from the power module to be replaced.

Step 3 Wear an ESD wrist strap.

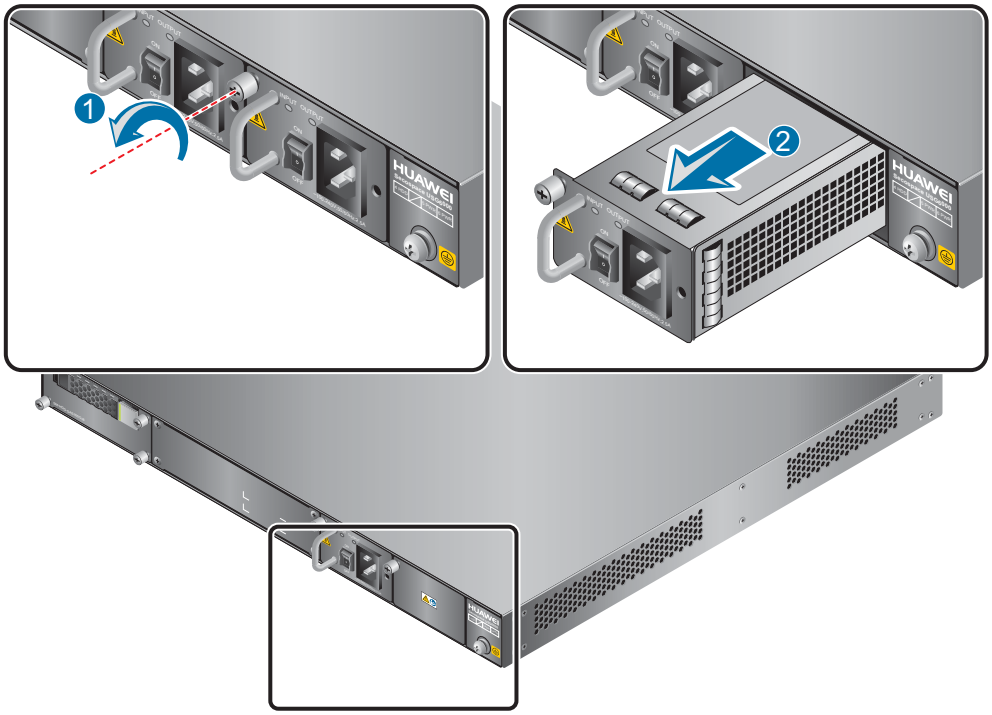
Step 4 Remove the power cable connected to the power module.

1. Press the baffle on the cable retention clip and remove the cable retention clip from the AC power cable.
2. Pull out the power cable from the socket on the power module.

Step 5 Replace the power module.

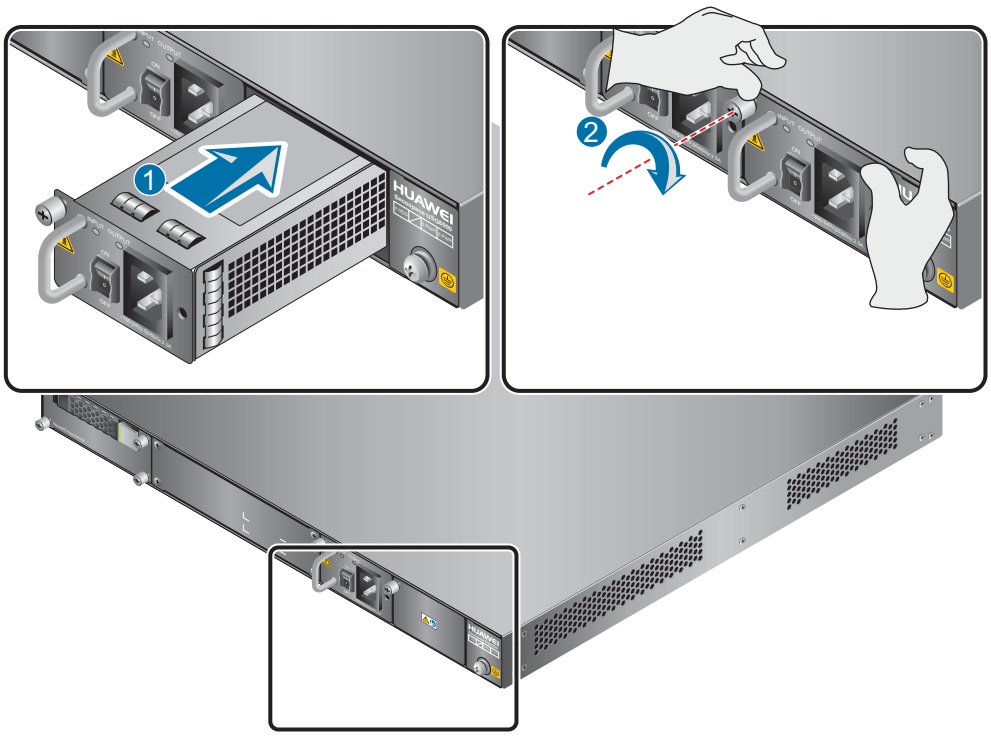
1. Use the Phillips screwdriver to loosen the screws at the upper-left corner of the power module.
2. Grasp the handles of the power module and gently pull toward you to guide the power module out of the slot.

Figure 4-20 Removing the power module (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)



3. Note down the cause and time of the replacement as well as the bar code of the replaced power module and then put away the replaced power module.
4. Take the new power module from the packing box and check whether its model is the same as the replaced one.
5. Push the new power module inside the chassis. Hold and push the module towards the chassis. Fasten the screws.

Figure 4-21 Installing the power module (USG6306/6308/6330/6350/6360/6370/6380/6390/6390E/6507/6530/6550/6570/6620/6630)



6. Connect the power cable to the socket on the new power module. For details, see **3.4.8 Connecting AC Power Cables**.
7. Switch on the power supply device. If the STATUS indictor on the new power module of the USG is steady green, the power module works properly.

----End

Replacing the Power Module (USG6650/6660/6670/6680)

Step 1 Determine the location of the power module to be replaced and attach a replacement label on the panel to identify the power module.

Step 2 Disconnect the power supply device from the power module to be replaced.

Step 3 Wear an ESD wrist strap.

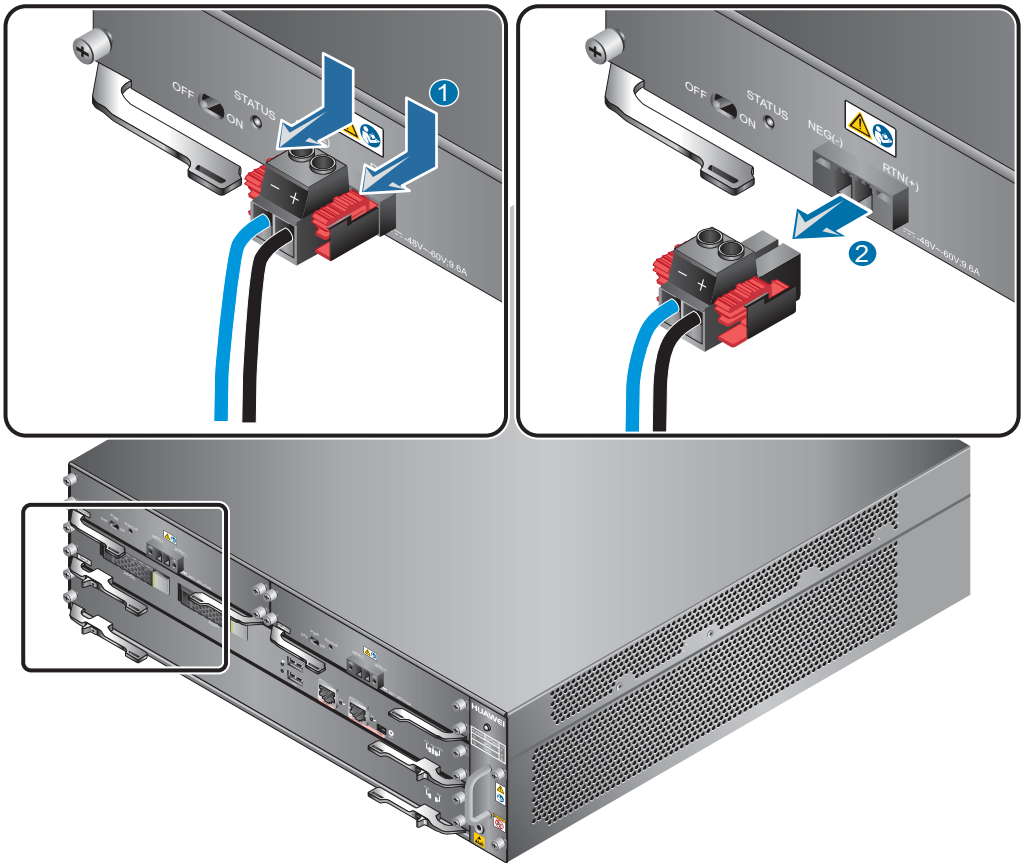
Step 4 Remove the power cable connected to the power module.

Refer to the following instructions to remove the power cables:

- To remove the AC power cable (USG6650/6660/6670/6680):
  a. Press the baffle on the cable retention clip and remove the cable retention clip from the AC power cable.
  b. Pull out the power cable from the socket on the power module.
- To remove the DC power cable (USG6660/6670/6680):
  a. Press the red cable retention clips on both sides of the power plug and slide them outside to separate the cable retention clips from the power socket.

b. Pull out the power cable from the socket on the power module.

Figure 4-22 Removing the DC power cable (USG6660/6670/6680)

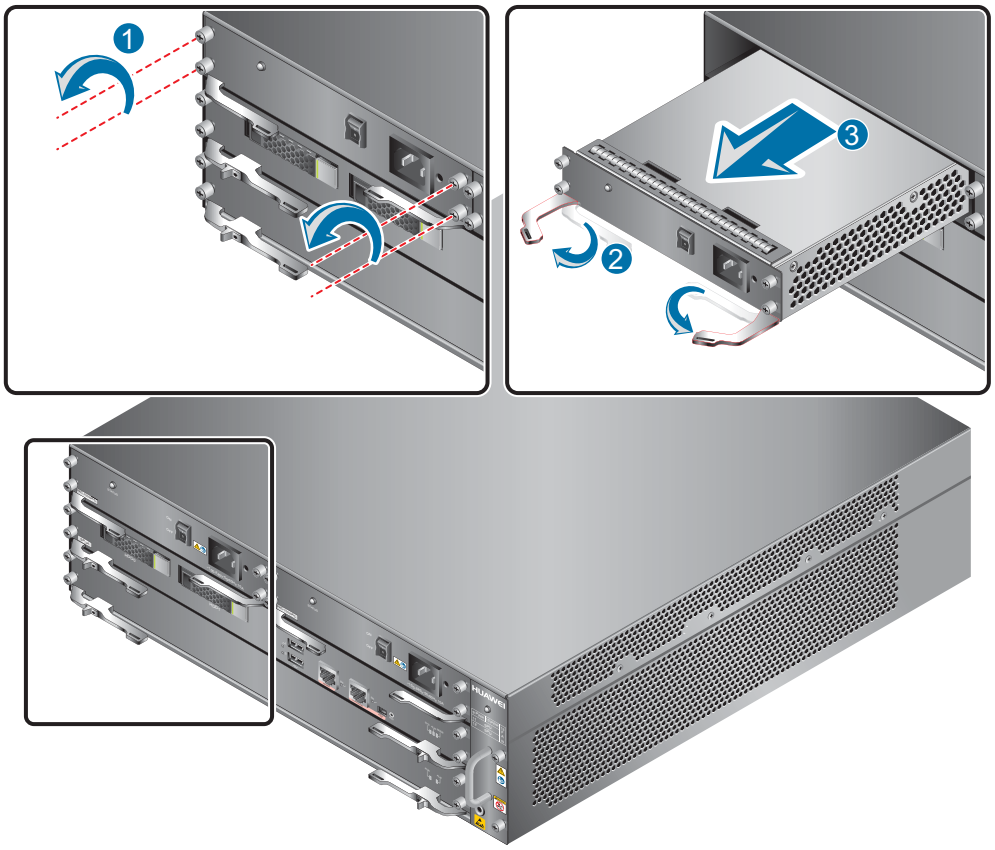


Step 5 Replace the power module.

The methods to replace the DC power module and the AC power module are the same. The following uses AC power module replacement as an example.

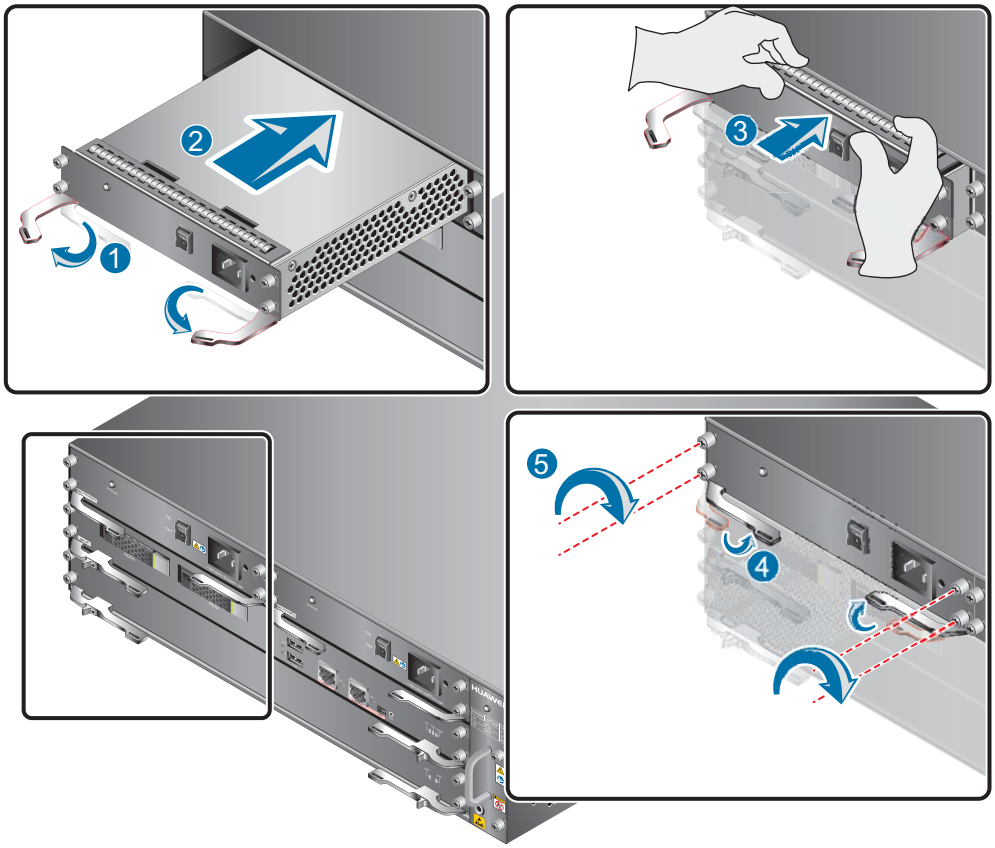
1. Use the Phillips screwdriver to loose the screws at the four corners of the power module.
2. Pull the handlers at the lower-left and lower-right corners to pull out the power module.

Figure 4-23 Removing the power module (USG6650/6660/6670/6680)



3. Note down the cause and time of the replacement as well as the bar code of the replaced power module and then put away the replaced power module.
4. Take the new power module from the packing box and check whether its model is the same as the replaced one.
5. Push the new power module inside the chassis. Hold and push the module towards the chassis. Push the handler in place and fasten the screws.

Figure 4-24 Installing the power module (USG6650/6660/6670/6680)



6. Connect the power cable to the socket on the new power module. For details, see **3.5.8 Connecting Power Cables**.
7. Switch on the power supply device. If the STATUS indictor on the new power module of the USG is steady green, the power module works properly.

----End

Follow-up Procedure

Send the faulty power module to Huawei for repair.

4.5 Replacing a Fan Module

The fan module of the USG6650/6660/6670/6680 contains multiple fans. If a single fan fails, replace the fan module as soon as possible. Otherwise, the system heat dissipation is affected. This section is irrelevant to other models that do not have independent fan modules.

Context

Required tools:

- Phillips screwdriver

NOTE

The fan module of the USG is hot swappable.

NOTICE

To prevent USG overheating, replace the fan module within 1 minute.

Procedure

Step 1 Wear an ESD wrist strap.

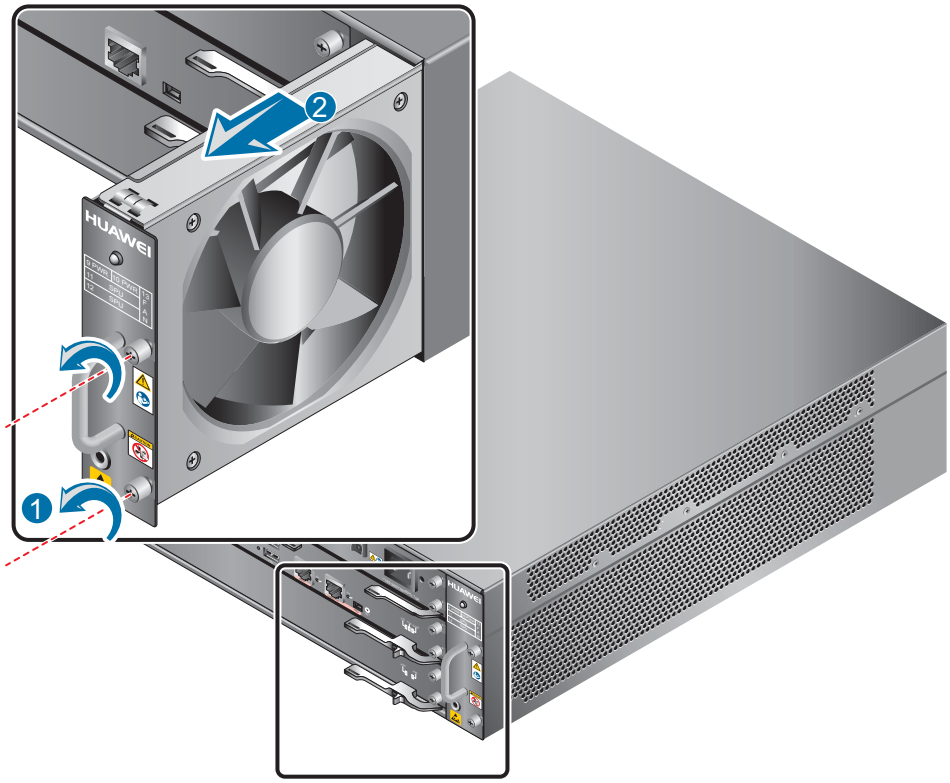
Step 2 Remove the faulty fan module.

Use the Phillips screwdriver to loose the screws on the fan module. Hold the handlers to pull the fan module out of the chassis for a little bit. Remove the fan module slightly from the chassis after all fans stop running.

CAUTION

When removing the fan module, wait for the fans to stop rotating before holding the bottom of the fan module to avoid being scratched by the rotating fans. After the fans stop rotating, do not touch the fan blades and the rotation axis. Otherwise, the fan balancing may be damaged, resulting in increased noise when the fans are running.

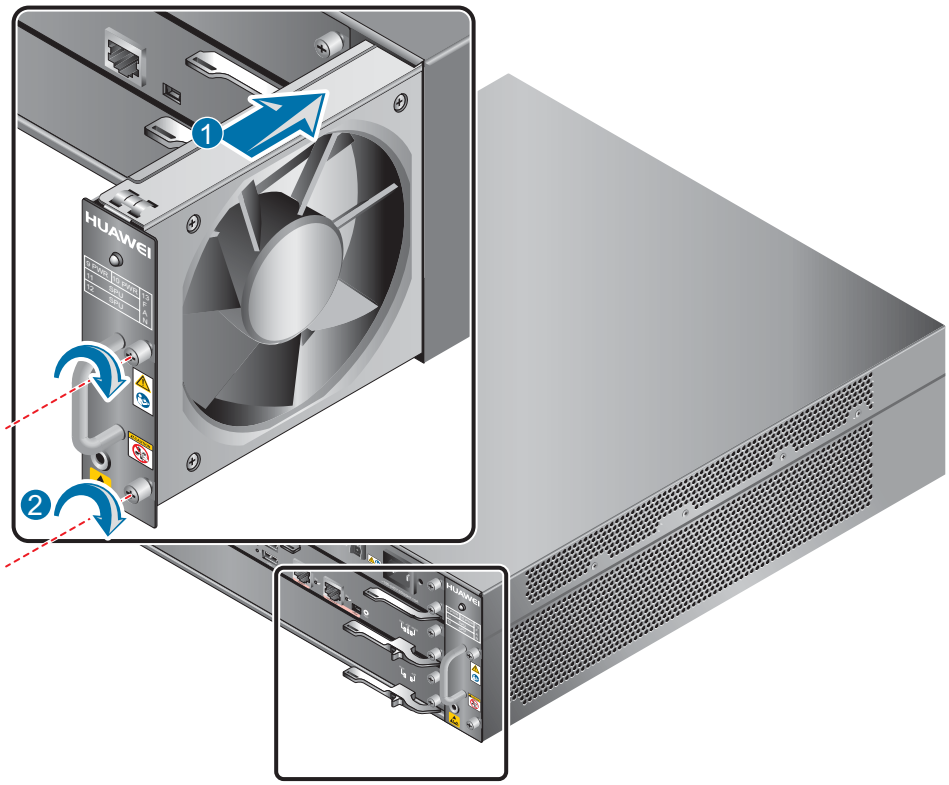
Figure 4-25 Removing the fan module



Step 3 Install a new fan module.

Hold the handler of the fan module with one hand and the bottom of the fan module with the other hand, insert the fan module along the guide rail of the fan slot until the back of the fan module gets in good contact with the chassis backplane, and use the Phillips screwdriver to fasten the screw on the fan module.

Figure 4-26 Installing a fan module



Step 4 Check the FAN STATUS indicator on the panel. If the indicator is blinking green every two seconds (0.5 Hz), the new fan module works properly.

----End

Follow-up Procedure

Send the faulty fan module to Huawei for repair.

4.6 Replacing a Micro SD Card (USG6305/6305-W/6310S/6310S-W/6310S-WL-OVS/6510/6510-WL)

This section describes how to replace the micro SD card and the precautions.

Context

If the micro SD card has one of the following conditions, replace the micro SD card:

- The micro SD card is damaged. That is, the USG generates the micro SD card damage alarm: ENTEXT_1.3.6.1.4.1.2011.5.25.31.2.0.16 hwEntityExtDiskDamaged.
- The micro SD card is full. That is, the USG generates the micro SD card full alarm: ENTEXT_1.3.6.1.4.1.2011.5.25.31.2.0.17 hwEntityExtDiskFull.

The micro SD card can be replaced no matter when the USG is powered on or off. If the USG is powered off, skip the **sd-card offline** command. The following procedure guides you through micro SD card replacement while the USG is powered on:

Before replacing the micro SD card,

- Instruments required:
  - Phillips screwdriver
  - ESD wrist strap
- Ensure that a new micro SD card is ready.

  Micro SD cards are optional and are not delivered with the device. If required, purchase the micro SD card (part number: 06010308) from Huawei. The micro SD card model is SDSDQAE-064G, the capacity is 64 GB, and dimensions (H x W x D) are 1 mm x 15 mm x 11 mm.
- Read the precautions on using the micro SD card:
  - To replace the micro SD card when the USG is powered on, you must run the **sd-card offline** command in the system view first. After the system displays a message indicating that the micro SD card is offline, remove the micro SD card. Otherwise, the micro SD card might be damaged, and the data may be lost.
  - Make sure that you have worn an ESD wrist strap and the strap is well grounded before you hold the micro SD card. Otherwise, the micro SD card may be damaged.

Procedure

Step 1 Ensure that all configurations are saved.

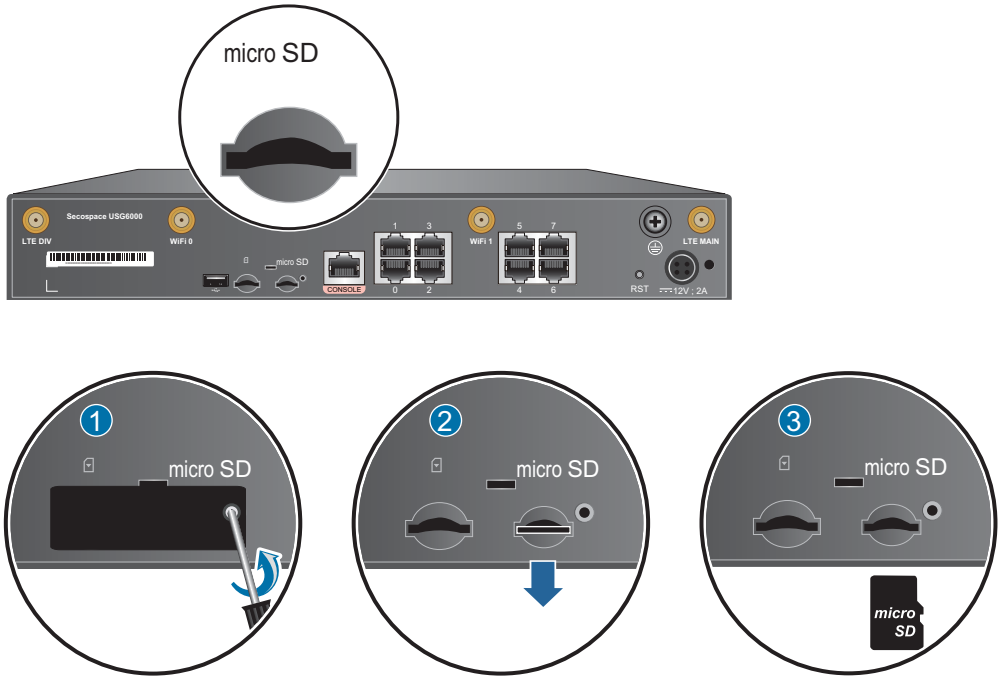
Step 2 In the system view, run the **sd-card offline** command. When the system displays a message indicating that the SD card is offline, remove the micro SD card to be replaced.

NOTE

Do not use too much force; otherwise the micro SD or micro SD card slot might be damaged.

1. Loosen the screws on the anti-theft board and remove the anti-theft board.
2. Press the micro SD card along the guide rail to loosen the internal card clip. Then the micro SD card is ejected from the slot. You can then remove the micro SD card.
3. Place the replaced micro SD card properly.

Figure 4-27 Removing a micro SD card



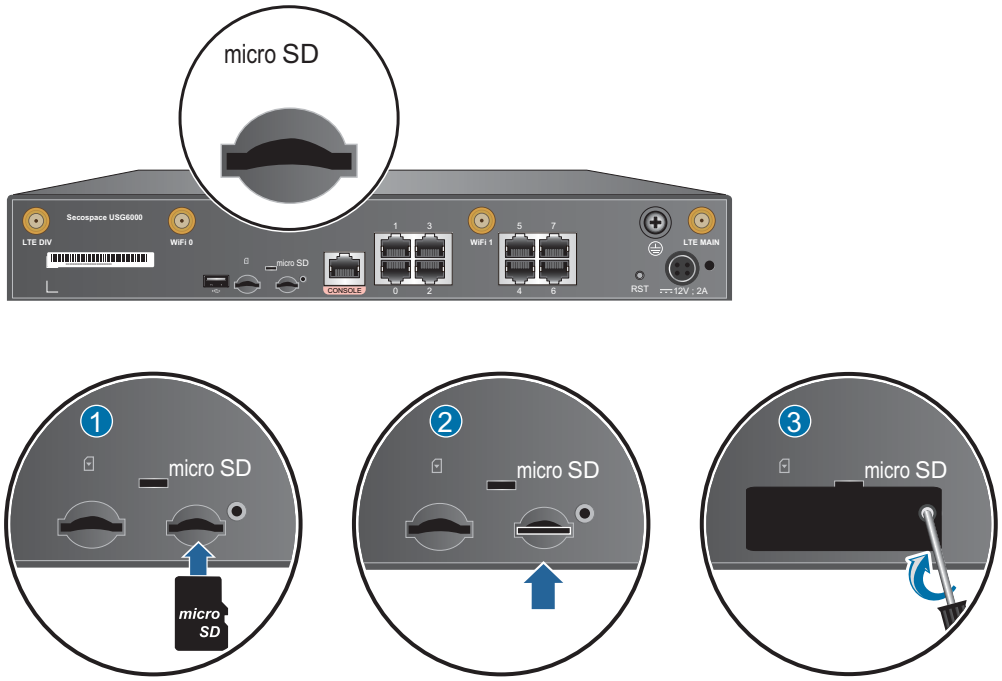
Step 3 Install the new micro SD card and anti-theft board.

NOTE

- Note that the micro SD card must be installed with the face with words upwards.
- Do not use too much force; otherwise the micro SD or micro SD card slot might be damaged.

1. Insert the micro SD along the guide rail to the micro SD card slot.
2. When you hear a click, the micro SD card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 4-28 Installing the new micro SD card and anti-theft board



Step 4 In any view, run the **display sd-card information** command to check the micro SD card installation and file system mounting status. In the command output, **SD Card Physical State** should be **Present**, and **SD Card File System State** should be **Mounted**.

- If **SD Card Physical State** is **Absent**, re-install the micro SD card and try again. If **SD Card Physical State** remains the same, the USG may fail to identify the micro SD card. You are advised to use another micro SD card.
- If **SD Card File System State** is **Unmounted**, the micro SD card format might not be **ext4.** You need to run the **reset sd-card** command in the system view to format the micro SD card.

----End

4.7 Replacing a SIM Card (USG6310S-WL-OVS/6510-WL)

If the SIM card is damaged or needs to be replaced with a SIM card with different standards, follow the instructions in this section.

Context

Instruments required:

- Phillips screwdriver
- ESD wrist strap

NOTE

- The USG6310S-WL-OVS/6510-WL supports standard SIM cards. If the SIM card type is Micro or Nano, you need to purchase a SIM card tray. Because the SIM card tray and SIM card are bound through tapes, the surface might not be smooth. Exercise caution when you remove and insert the SIM card.
- The USG6310S-WL-OVS/6510-WL supports 4G FDD LTE/TDD LTE, 3G TD-SCDMA/WCDMA, and 2G GSM SIM cards. You need to purchase the corresponding SIM card.

NOTICE

- SIM cards are not hot swappable. Therefore, do not install the SIM card when the USG is powered on. Otherwise, the SIM card may be damaged or the function may become invalid.
- Replacing the SIM card may cause LTE access failure and interrupt the service in the LTE uplink. Therefore, replace the SIM card during off-peak hours.
- Make sure that you have worn an ESD wrist strap and the strap is well grounded before you hold the SIM card. Otherwise, the SIM card may be damaged.

Procedure

Step 1 Ensure that all configurations are saved.

Step 2 The USG does not have a power switch. Select either of the following methods to power off the USG:

- Disconnect the power adapter of the USG from the power supply equipment.
- Power off the power supply equipment.

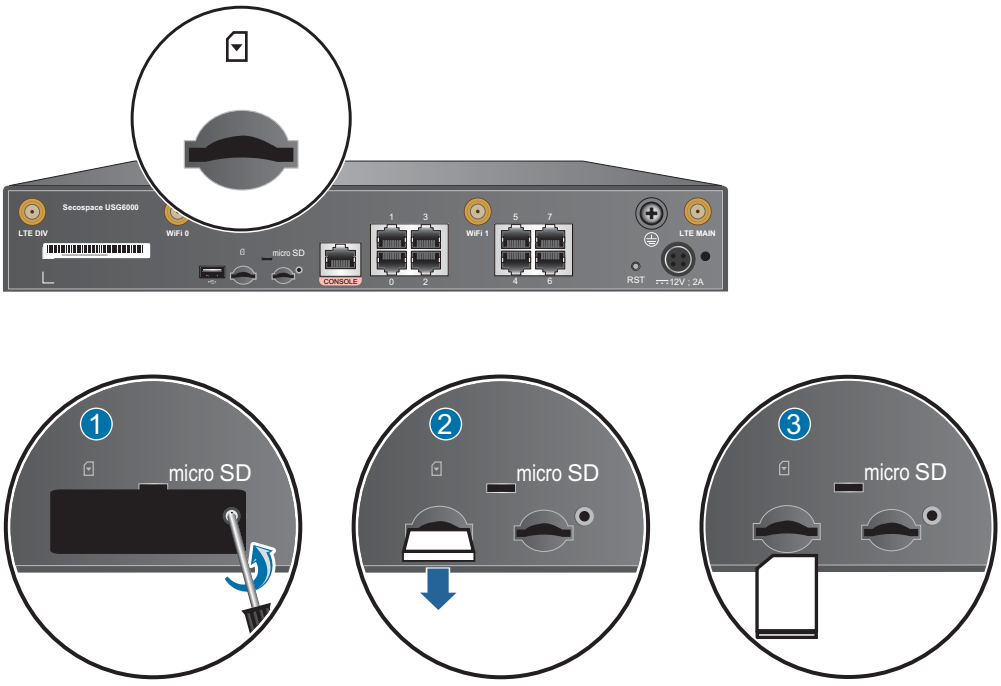
Step 3 Remove the SIM card to be replaced.

NOTE

Do not use too much force; otherwise the SIM card or SIM card slot might be damaged.

1. Loosen the screws on the anti-theft board and remove the anti-theft board.
2. Press the SIM card along the guide rail to loosen the internal card clip. Then the SIM card is ejected from the slot. You can then remove the SIM card.
3. Place the replaced SIM card properly.

Figure 4-29 Removing a SIM card



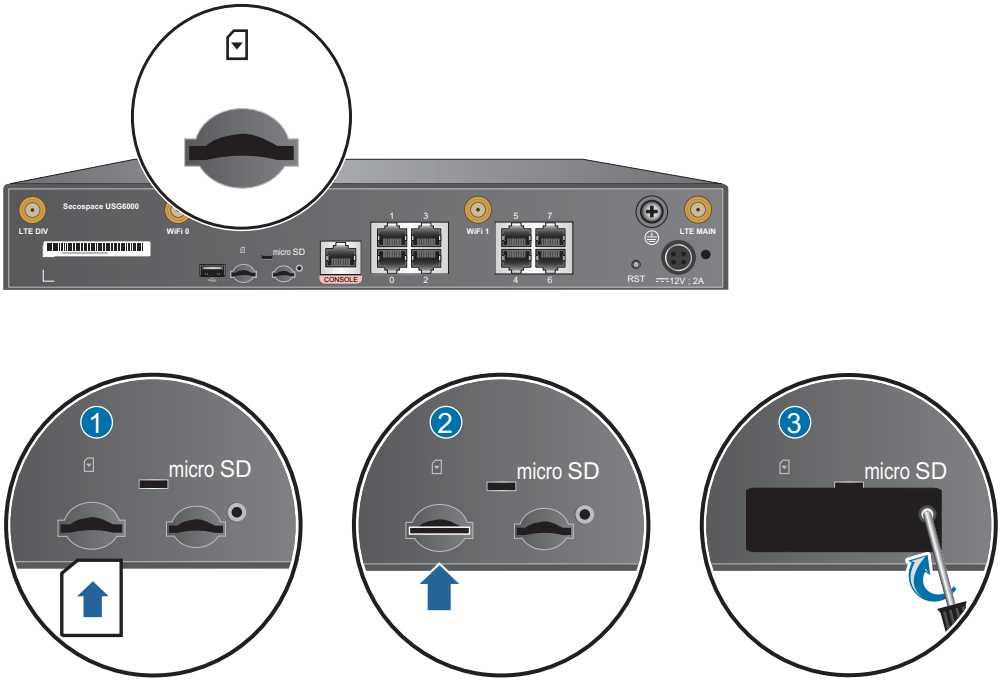
Step 4 Install the new SIM card and anti-theft board.

NOTE

- Keep the notch on the SIM card in the same direction as the notch marked on the left of the SIM card slot.
- Do not use too much force; otherwise the SIM card or SIM card slot might be damaged.
- The anti-theft board is delivered with the device and can be used to protect both the micro SD card and SIM card. If both the micro SD card and SIM card need to be installed, you are advised to install both the cards before installing the anti-theft board.

1. Insert the SIM card along the guide rail to the SIM card slot.
2. When you hear a click, the SIM card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 4-30 Installing the new SIM card and anti-theft board



Step 5 Power on the USG and start the USG.

Step 6 After the USG is started, run the **display cellular** command in any view to check the SIM card status. If **SIM Status** in the command output is **OK**, the SIM card is working properly and has been identified by the USG.

----End

A Appendix

A.1 Cable

This section describes the PGND cable, power cable, configuration cable, Ethernet cable, and optical fiber of the USG.

A.1.1 PGND Cable

This section describes the structure and specifications of the protection ground (PGND) cable for you to ground the USG. Read this section before you make or purchase any PGND cables for the USG.

The PGND cable is used in the following situations:

- The USG is installed inside the cabinet.

  If the cabinet has been properly grounded, connect one end of the PGND cable to the ground terminal of the USG and the other end to the ground port of the cabinet.
- The USG is installed outside the cabinet.

  Connect one end of the PGND cable to the ground terminal of the USG and the other end to the ground bar in the equipment room.

NOTICE

Unreliable grounding may damage the USG. Therefore, ensure that the USG is reliably grounded during operation.

Structure and Appearance

A PGND cable has two OT bare crimp terminals and a copper cable with yellow/green plastic encapsulation. **Figure A-1** shows the appearance of a type of PGND cables.

NOTE

The figure is for reference only.

Figure A-1 PGND cable

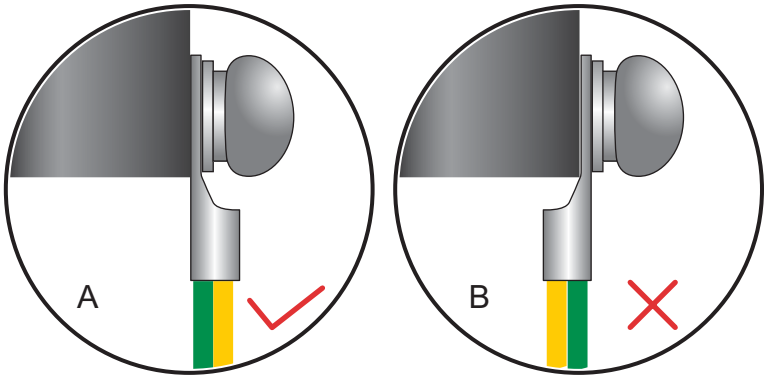
Figure A-2 shows the appearance of the OT bare crimp terminal.

Figure A-2 OT bare crimp terminal

Installation

1. Connect the OT bare crimp terminal at one end of the PGND cable to the connection hole of the USG, with the conducting wire upward, as shown in A of **Figure A-3**.

   Figure A-3 Installing the OT bare crimp terminal

2. Select a matching screw for the screw jack and turn the screw in clockwise direction to fasten it. For reliable connection, make sure that at least two full threads match each other.
3. Pull the power cable gently to verify that it is well connected.
4. Connect the other end of the PGND cable to the ground port of the equipment room or cabinet.

NOTICE

The OT terminal may rotate and result in device damage. Make sure that it is independent of the adjacent metal mechanical part or other terminals.

Technical Specifications

Table A-1 shows the technical specifications of the PGND cable.

Table A-1 Technical specifications of the PGND cable

Name		Description
PGND cable	Terminal	Naked Crimping Terminal,OT,6mm^2,M6,Tin Plating,Insulated Ring Terminal,12~10AWG,yellow
	Terminal	Naked Crimping Terminal,OT,6mm^2,M4,Tin Plating,Insulated Ring Terminal,12~10AWG,yellow
	Cable	Power Cable,450/750V,H07Z-K UL3386,6mm^2,Yellow/Green,Low Smoke Zero Halogen Cable

A.1.2 AC Power Cables

This section describes the AC power cables of the USG that uses the AC power supply. Learn about the structure and specifications of the AC power cables and the local standards before you purchase any for the USG.

Use a single-phase 3-line electrical outlet that has been properly grounded.

NOTICE

Make sure that the power system of the building has been grounded before you connect the USG with AC power cables.

Structure and Appearance

The USG provides both the European-standard and North American-standard AC power cables. **Figure A-4** list the reference specifications. You can select the desired power cables based on your site conditions.

Figure A-4 North American-standard AC power cable

Cable Connector

Table A-2 lists the connectors of AC power cables.

Table A-2 Connectors of AC power cables

Connector	Description	Wire Color
L	Live wire	Brown
N	Null wire	Blue
E	PGND cable	Yellow/Green

Technical Specifications

Table A-3 lists the technical specifications of the AC power cables of some regions for your reference.

NOTICE

You must connect the AC power cable in compliance with local standards and requirements.

Table A-3 Technical specifications of the AC power cable

Item	Description
Type of connector on the device	C13 straight female

Item	Description
Type of connector on the peer end	PI straight male, PB straight male, PF straight male, and PG curving male
Cable type	3 x 0.8 mm^2/1 mm^2 wire
Maximum voltage	125 V/250 V
Maximum current	10 A

A.1.3 DC Power Cables

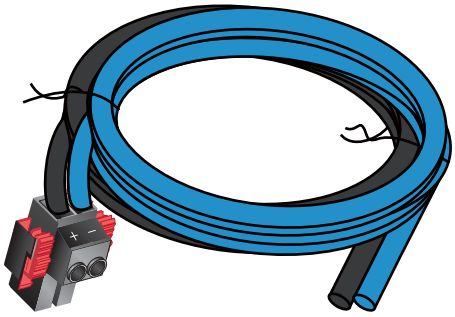
This section describes the DC power cables of the USG that uses the DC power supply. Learn about the structure and specifications of the DC power cable before you make or purchase any for the USG.

The DC power cables include the RTN cable, and NEG (-48 V) cable.

Structure and Appearance

Both the RTN and NEG (-48 V) power cables consist of the terminal blocks and cables, as shown in **Figure A-5**.

Figure A-5 Appearance of the DC power cable



Cable Type	Color
NEG cable	Blue
RTN cable	Black

The USG provides cord end terminals and OT bare crimp terminals. You can select one of them based on the actual condition.

Figure A-6 shows the appearance of the cord end terminal.

Figure A-6 Appearance of the cord end terminal

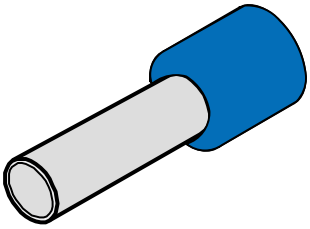


Figure A-7 shows the appearance of the OT bare crimp terminal without a cable.

Figure A-7 Appearance of the OT bare crimp terminal

Technical Specifications

Table A-4 lists the technical specifications of the DC power cable.

Table A-4 Technical specifications of the DC power cable

Item	Description
NEG cable and RTN cable	Power Cable,3m,2.5mm^2,(TB2PIN+2*T2.5^2BL),(14UL3386B-I +14UL3386BL-I),LSZH
Cord end terminal	Common Terminal,Single Cord End Terminal,Conductor Cross Section 2.5mm^2,12.5A,Insertion Depth 8mm,Blue
OT bare crimp terminal	Naked Crimping Terminal,OT,2.5mm^2,M6,27A,Tin Plating,Insulated Ring Terminal,16~14AWG,blue

A.1.4 Console Cable

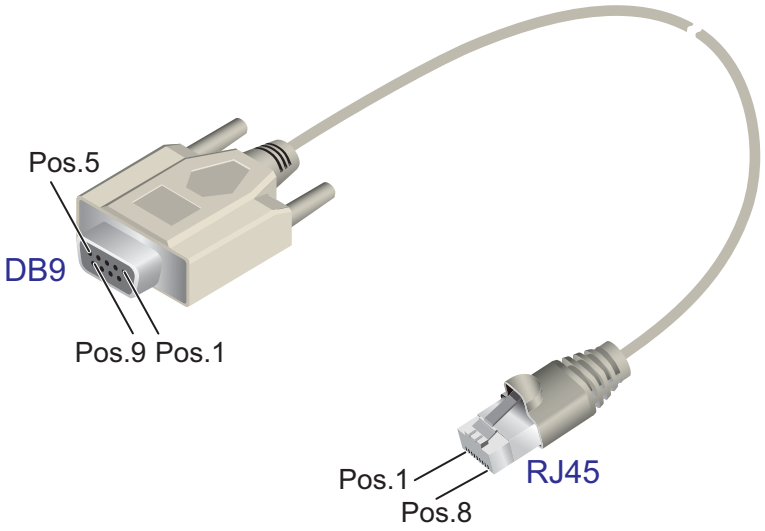
The console cable connects the console port on the USG to the COM port on a PC. Learn about the structure and specifications of the console cable before you purchase or make console cables for the USG.

A console cable is an 8-wire shielded cable. The RJ45 connector connects to the console port on the USG, and the DB9 connector connects to the COM port on a PC.

Structure and Appearance

Figure A-8 shows the console cable, and **Table A-5** lists the cable connection scheme.

Figure A-8 Appearance of the console cable



Name	Description
DB9	DB9 connector (female). The connector has 9 pin holes with IDs from 1 to 9. It connects to the COM port of a PC.
RJ45	RJ45 connector
Pos	Pin position

Table A-5 Console cable connection scheme

RJ45 Pin ID	Signal Direction	DB9 Pin ID	Signal
1	→	8	CTS (Clear to Send)
2	→	6	DSR (Data Set Ready)
3	→	2	RXD (Receive Data)
4	-	5	GND
5	-	5	GND
6	←	3	TXD (Transmit Data)
7	←	4	DTR (Data Terminal Ready)
8	←	7	RTS (Request to Send)

RJ45 Pin ID	Signal Direction	DB9 Pin ID	Signal
NOTE Pins in the same row are connected to each other using a cable. The symbol → indicates that the signal travels from the RJ45 connector to the DB9 connector, whereas the symbol ← indicates that the signal travels from the DB9 connector to the RJ45 connector. Pos. 9 of the DB9 connector is empty.			

Technical Specifications

Table A-6 shows the technical specifications of the console cable.

Table A-6 Technical specifications of the console cable

Item	Description
Connector 1	DB9 connector - D model - 9PIN - female
Connector 2	RJ45 Network Interface Connector,Crystal Connector,8PIN, 8BIT,Shielded, Plug
Cable	Single Cable,Console Serial Port Cable,3m,D9F,CC4P0.48B(S),MP8-VI
Wire	8

A.1.5 USB Configuration Cable

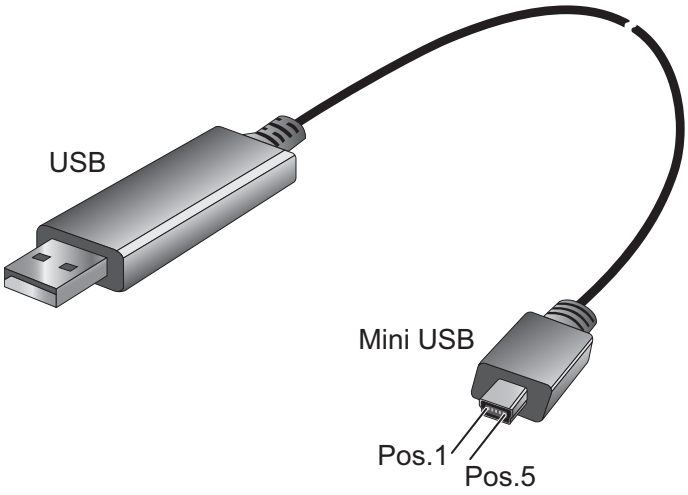
The USB configuration cable connects the console port on the USG (mini USB) to the USB port on a PC. Learn about the structure and specifications of the USB configuration cable before you purchase any for the USG.

One end of a USB configuration cable is a mini USB connector, which connects to the console port on the USG. The other end is a standard USB connector, which connects to the USB port on a PC.

Structure and Appearance

Figure A-9 illustrates the appearance of a USB configuration cable.

Figure A-9 USB configuration cable appearance



Name	Description
Mini USB	The mini USB is a female connector that has five pin holes.
USB	USB connector
Pos	Pin location

Technical Specifications

Table A-7 lists the technical specifications of the USB configuration cable.

Table A-7 Technical specifications of the USB configuration cable

Item	Description
Connector 1	Mini USB connector-5PIN-Female connector
Connector 2	USB connector-Male connector
Cable type	Data cable-USB-mini USB convertor-1M-USB data cable

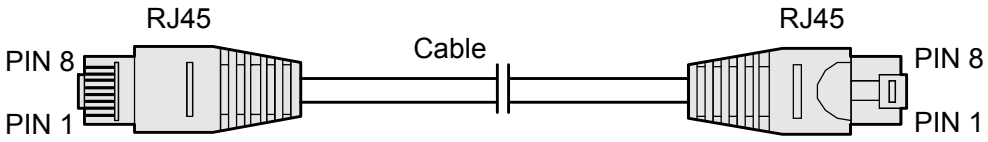
A.1.6 Ethernet Cable

The Ethernet cable, also called the network cable, is used for carrying signals on Gigabit networks or networks with a lower packet rate.

Structure and Appearance

An Ethernet cable consists of twisted pairs and RJ45 connectors, as shown in Figure A-10.

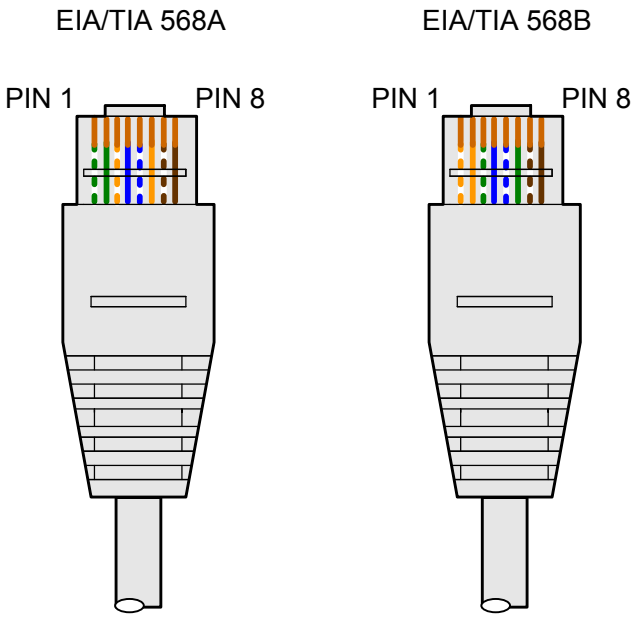
Figure A-10 Cable structure



Name	Description
RJ45	RJ45 connector
Cable	Category 5 or higher twisted pair network cable
PIN1 to PIN8	8 pins. Each pin has an ID ranging from 1 to 8.

The twisted pair network cable has eight wires. The connection between wires and RJ45 connector pins complies with wiring scheme EIA/TIA 568A or EIA/TIA 568B, as shown in **Figure A-11**.

Figure A-11 Wiring scheme EIA/TIA 568A or EIA/TIA 568B



EIA/TIA 568A		EIA/TIA 568B	
PIN[a]	Wire[b]	PIN	Wire
1	Green/White	1	Orange/White
2	Green	2	Orange

EIA/TIA 568A		EIA/TIA 568B	
PIN[a]	**Wire[b]**	**PIN**	**Wire**
3	Orange/White	3	Green/White
4	Blue	4	Blue
5	Blue/White	5	Blue/White
6	Orange	6	Green
7	Brown/White	7	Brown/White
8	Brown	8	Brown

NOTE

- a. An RJ45 connector has eight pins.
- b. The wire of a twisted pair connects to the RJ45 connector pin. The color of the plastic jacket is considered as the name of the wire.

Straight-Through and Crossover Cables

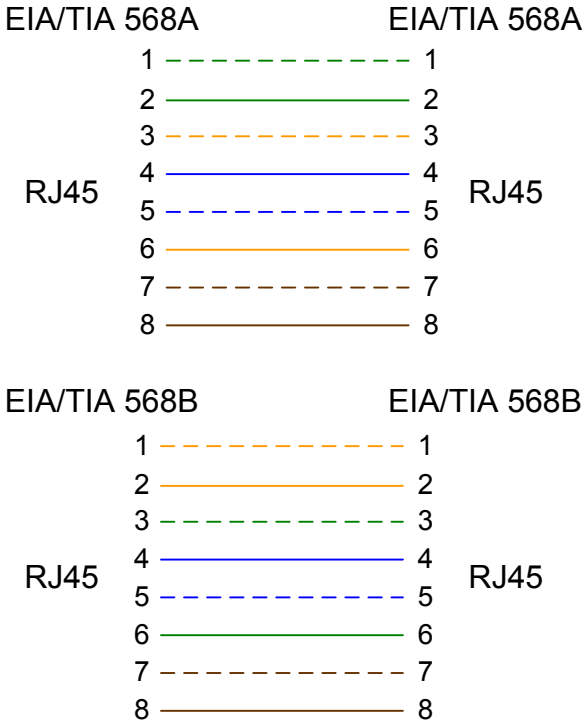
Ethernet cables are classified into straight-through and crossover cables according to the wiring scheme used at the two ends of the cables. The interfaces of most devices can dynamically adapt to straight-through cables and crossover cables. For interfaces that cannot dynamically adapt to the two types of cables, connect interfaces at the same layer using the crossover cables and interfaces at different layers using the straight-through cables.

Figure A-12 and **Figure A-13** show how to distinguish and make straight-through cables and crossover cables. You need to strictly observe the wiring scheme to ensure the quality of services.

- Straight-through cable

  The straight-through cable is also called the standard cable. Both ends of the cable use wiring scheme EIA/TIA T568A or EIA/TIA T568B. You are advised to use wiring scheme EIA/TIA T568B when you make straight-through cables. **Figure A-12** shows the detail.

Figure A-12 Schematic diagram of the connection scheme of straight-through cables



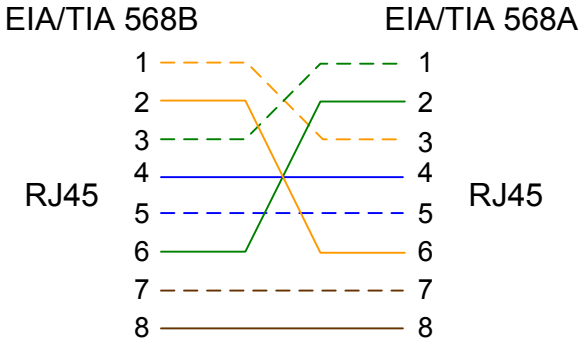
You can use the straight-through cables in the following scenarios:

- Connecting a switch or hub to a router
- Connecting computers (including servers and workstations) to switches or hubs
- Connecting two switches through the uplink interface

- Crossover cable

  The crossover cable uses wiring scheme EIA/TIA T568A for one end and EIA/TIA T568B for the other, as shown in **Figure A-13**.

Figure A-13 Schematic diagram of the connection scheme of crossover cables



You can use the crossover cables in the following scenarios:

- Connecting a computer and a router

- Connecting two switches
- Connecting two hubs
- Connecting two computers
- Connecting interfaces on different routers
- Connecting Ethernet interfaces on an ADSL modem and the network adapter on a computer

Shielded Cable and Unshielded Cable

Network cables are classified into shielded and unshielded ones based on whether the twisted pair and RJ45 connector are shielded, as shown in **Figure A-14** and **Figure A-15**.

NOTICE

Only shielded cables are supported on the USG.

Figure A-14 Appearance of a shielded cable

Figure A-15 Appearance of an unshielded cable

NOTE

The figure is for reference only.

Technical Specifications

Table A-8 lists the technical specifications of the Ethernet cable.

Table A-8 Technical specifications of the Ethernet cable

Item	Description
Connector 1 and 2	Shielded RJ45/Unshielded RJ45
Cable	Category 5 or higher shielded/unshielded twisted pair network cable
Wire	8

A.1.7 Optical Fiber

The optical fiber is used for carrying signals on Gigabit networks or networks with a higher packet rate.

The optical fiber connects to the SFP+ or SFP interface on the USG through an optical module. You can select optical modules and fibers based on the interfaces of the peer device.

NOTICE

Huawei optical modules are recommended. The optical modules of other vendors may have incompatibility issues and cause faults on the USG.

Structure and Appearance

Optical fibers are classified into single-mode and multi-mode optical fibers. Single-mode optical fibers are used for long-distance transmission whereas multi-mode optical fibers are used for short-distance transmission. For indoor optical fibers, the cover of single-mode optical fibers is usually yellow, as shown in **Figure A-16**; whereas the cover of multi-mode optical fibers is usually orange, as shown in **Figure A-17**. Optical fibers are not delivered with the USG. Therefore, you need to purchase optical fibers as required.

Figure A-16 LC/PC-LC/PC single-mode optical fiber

Figure A-17 LC/PC-LC/PC multi-mode optical fiber

NOTICE

- To ensure the normal transmission of optical signals, do not use single-mode optical fibers to connect multi-mode optical modules or multi-mode optical fibers to connect single-mode optical modules.
- To connect extension optical fibers, purchase LC/PC-LC/PC adapters.

Optical fibers have multiple types of connectors. Common connectors are LC/PC, SC/PC, and FC/PC.

- LC/PC connector

  The procedure and precautions for inserting and removing LC/PC connectors are as follows:
  - Insert and remove the connector along the axis without rotating the connector.
  - When you insert the fiber, carefully insert the fiber head to the optical interface on the interface board.
  - To remove the optical fiber, press the pinch on the fiber connector, slightly push the fiber connector and then pull it out.
- SC/PC connector

  The procedure and precautions for inserting and removing SC/PC connectors are as follows:
  - Insert and remove the connector along the axis without rotating the connector.
  - When you insert the fiber, carefully insert the fiber head to the optical interface on the interface board.
  - To remove the optical fiber, slightly push the fiber connector, and pull out the connector.
- FC/PC connector

The procedure and precautions for inserting and removing FC/PC connectors are as follows:

- When you insert an optical fiber, aim the FC/PC connector at the optical interface on the interface board to avoid damaging the inner layer of the optical interface. Then insert the fiber into the optical interface, rotate the outer screw jacket in clockwise direction, and then fasten the optical connector.
- To remove an optical fiber, rotate the outer screw jacket counter-clockwise on the optical interface until the screw is loose. Then slightly pull out the optical fiber.

The optical fibers of the USG are classified into three categories, LC/PC-LC/PC, LC/PC-SC/PC, and LC/PC-FC/PC, based on the types of connectors on both ends, as shown in **Table A-9**.

Table A-9 Common optical fiber

Type	Transmission Mode	Connector	
		On the USG	On the peer device
LC/PC-LC/PC	Single-mode/ Multi-mode	LC/PC	LC/PC
LC/PC-SC/PC			SC/PC
LC/PC-FC/PC			FC/PC

Precautions

When using optical modules and optical fibers, pay attention to the following to ensure proper communication between devices:

- Use single-mode and multi-mode optical fibers as required.
- Tx (sending) of the local device corresponds to Rx (receiving) of the peer device.
- The wavelengths of the optical modules on both ends must be the same.
- Do not overbend optical fibers, and the bend radius must not be shorter than 40 mm.

CAUTION

To avoid eye injuries, do not look straight at the optical transmit interface of the laser or the optical connector.

Technical Specifications

Table A-10 lists the technical specifications of the optical fiber for reference only. Select optical fibers as required.

Table A-10 Technical specifications of the optical fiber

Item	Description
Transmission mode	Single-mode/Multi-mode
Connector	● On the USG: LC/PC ● On the peer device: LC/PC, SC/PC, or FC/PC
Outer diameter	2 mm
Length	5 m, 10 m, or 20 m

A.1.8 LTE Antenna

The LTE antenna is connected to the LTE connector through a self-contained 3 m feeder for LTE wireless access. The LTE antennas are delivered with the models with the built-in LTE function.

Structure and Appearance

Figure A-18 shows the appearance of the LTE antenna.

Figure A-18 LTE antenna

Technical Specifications

Table A-11 shows the technical specifications of the LTE antenna.

Table A-11 Technical specifications of the LTE antenna

Item	Description
Connector type	SMA-M
Cable length	3 m
Weight	0.134 kg
Frequency bands supported	698 MHz to 960 MHz/1710 MHz to 2690 MHz
Maximum gain	1 dBi (698 MHz to 960 MHz)/3 dBi (1710 MHz to 2690 MHz)
Standing wave	< 2.5
Polarization	Vertical
Direction	Omnidirectional

A.1.9 WiFi Antenna

The WiFi antenna is connected to the WiFi connector for WLAN wireless access. The WiFi antennas are delivered with the models with the built-in WiFi function.

Structure and Appearance

Figure A-19 shows the appearance of the WiFi antenna.

Figure A-19 WiFi antenna

Technical Specifications

Table A-12 shows the technical specifications of the WiFi antenna.

Table A-12 Technical specifications of the WiFi antenna

Item	Description
Connector type	RP-SMA-M
Weight	0.012 kg
Frequency bands supported	2.412 GHz to 2.472 GHz/5.18 GHz to 5.825 GHz
Maximum gain	2.15 dBi (2400 MHz to 2500 MHz)/3 dBi (5150 MHz to 5850 MHz)
Standing wave	< 2.5
Polarization	Vertical
Direction	Omnidirectional

A.2 Optical Transceiver

As for the USG, the optical ports of its combo ports support Megabit and Gigabit optical transceivers, and its GE and 10GE optical ports support Gigabit and 10-Gigabit optical transceivers, respectively. Purchase them as required.

Megabit Optical Transceiver

Table A-13 lists the technical specifications of megabit optical transceivers.

Table A-13 Technical specifications of megabit optical transceiver

Model	eSFP-FE-LX-SM1310
Transmission distance	15 km
Center wavelength	1310 nm
Minimum transmit optical power	-15 dBm
Maximum transmit optical power	-8 dBm
Maximum receive sensitivity	-28 dBm
Saturation optical power	NA
Optical connector type	LC
Optical fiber type	Single-mode
Module Form Factor	eSFP

Gigabit Optical Transceiver

Table A-14 lists the technical specifications of gigabit optical transceivers.

Table A-14 Technical specifications of gigabit optical transceivers

Model	eSFP-GE-SX-MM850	SFP-GE-LX-SM1310	OSU015N00	S-SFP-GE-LH40-SM1310	S-SFP-GE-LH40-SM1550	eSFP-GE-ZX100-SM1550	S-SFP-GE-LH80-SM1550	SFP-1000BaseT[a]
Transmission distance	0.5 km	10 km	15 km	40 km	40 km	100 km	80 km	0.1 km
Center wavelength	850 nm	1310 nm	1310 nm	1310 nm	1550 nm	1550 nm	1550 nm	-
Minimum transmit optical power	-9.5 dBm	-9.0 dBm	-5.0 dBm	-5.0 dBm	-5.0 dBm	-5.0 dBm	-2.0 dBm	-
Maximum transmit optical power	-2.5 dBm	-3.0 dBm	0 dBm	0 dBm	0 dBm	0 dBm	5.0 dBm	-
Maximum receive sensitivity	-17 dBm	-20.0 dBm	-21.0 dBm	-23.0 dBm	-22.0 dBm	-30.0 dBm	-23.0 dBm	-
Saturation optical power	0 dBm	-3.0 dBm	0 dBm	-3.0 dBm	-3.0 dBm	-9.0 dBm	-3.0 dBm	-
Optical connector type	LC	LC	LC	LC	LC	LC	LC	-

Optical fiber type	Multi-mode	Single-mode	Single-mode	Single-mode	Single-mode	Single-mode	Single-mode	-
Module Form Factor	eSFP	eSFP	eSFP	eSFP	eSFP	eSFP	eSFP	SFP

a: indicates GE SFP copper module.

10-Gigabit Optical Transceiver

Table A-15 lists the technical specifications of 10-gigabit optical transceivers.

Table A-15 Technical specifications of 10-gigabit optical transceivers

Model	OMXD30000	OSX010000	OSX040N01	SFP-10G-USR	OSXD22N00	SFP-10G-ZR
Transmission distance	0.3 km	10 km	40 km	0.1 km	0.22 km	80 km
Center wavelength	850 nm	1310 nm	1550 nm	850 nm	1310 nm	1550 nm
Minimum transmit optical power	-7.3 dBm	-8.2 dBm	-4.7 dBm	-7.3 dBm	-6.5 dBm	0 dBm
Maximum transmit optical power	-1.0 dBm	0.5 dBm	4.0 dBm	-1.0 dBm	0.5 dBm	4.0 dBm
Maximum receive sensitivity	-11.1 dBm	-12.6 dBm	-14.1 dBm	-10.7 dBm	-6.5 dBm	-24.0 dBm
Saturation optical power	-1.0 dBm	0.5 dBm	0.5 dBm	0.5 dBm	1.5 dBm	-7.0 dBm
Optical fiber type	Multi-mode	Single-mode	Single-mode	Multi-mode	Multi-mode	Single-mode
Connector type	LC	LC	LC	LC	LC	LC

Module Form Factor	SFP+	SFP+	SFP+	SFP+	SFP+	SFP+

A.3 Requirements for Installation Environment

This section describes the requirements for the USG installation environment, such as the device position, humidity and temperature, cleanness, antistatic measures, lightning protection measures, power supply, and anti-magnetic measures.

A.3.1 Device Position

This section describes the USG position requirements to ensure its security.

Table A-16 lists the requirements for the device position.

Table A-16 Device position requirements

Item	Requirement
Ventilation and heat dissipation	● To ensure good heat dissipation, keep the air vent of the device at least 150 mm away from other devices. ● Ensure that the ventilation and heat dissipation system is available at the position where the device is to be installed.
Stability	The cabinet or mounting table must be firm enough to support the weight of the device and its accessories.
Grounding	Ensure that the chassis or mounting table is properly grounded.

A.3.2 Humidity, Temperature, and Cleanness

This section describes the requirements for the humidity, temperature, and cleanness of the equipment room. To ensure the stability and life cycle of the USG and its components, check that the equipment room meets the requirements.

Ensure that there is no explosive, conductive, magnetic, or corrosive dust or debris in the equipment room. Dust that settle on the device may cause electrostatic adsorption, resulting in poor contact of the metal socket connectors and metal contacts. This shortens the life cycle of the device and causes faults.

In addition to dust and debris, toxic gases, such as SO_2, H_2S, and NH_3 must be cleaned out of the equipment room.

Table A-17 Requirements for humidity, temperature, and cleanness in the equipment room

Item	Description								
Cleanness	Dust particle	Maximum diameter (μm)	0.05		1		3		5	
		Maximum density (number of dust particles per cubic meter)	1.4×10^7		7×10^5		2.4×10^5		1.3×10^5	
	Noxious gas density	Gas	SO_2	H_2S	CI_2	HCl	HF	NH_3	O_3	NO_2
		Average (mg/m^3)	0.3	0.1	0.1	0.1	0.01	1.0	0.05	0.5
		Maximum (mg/m^3)	1.0	0.5	0.3	0.5	0.03	3.0	0.1	1.0
Humidity and temperature	Temperature	Long-term operating temperature	● Without hard disk: 0 °C to 45 °C ● With hard disk(s): 5 °C to 40 °C							
		Short-term operating temperature	● Without hard disk: -5 °C to 55 °C ● With hard disk(s): 5 °C to 40 °C							
	Operating humidity		● Without hard disk: 5% RH to 95% RH, non-condensing ● With hard disk(s): 5% RH to 90% RH, non-condensing							
	Storage humidity		● Without hard disk: 5% RH to 95% RH, non-condensing ● With hard disk(s): 5% RH to 90% RH, non-condensing							

To meet the requirements listed in **Table A-17**, take the following measures in the equipment room:

- Install a permanent temperature controller regardless of the climate conditions.
- In dry regions, use humidifiers or regularly mop the floor to ensure proper humidity in the equipment room.
- In regions with high humidity, use dehumidifiers.
- Use dust-free materials for the floor, walls, and ceilings.
- Screen exterior doors and windows. The external windows of the equipment room should be sealed for anti-dust purposes.
- Clean the equipment room and air filters on the devices once every three months.

- Wear the ESD uniform, ESD gloves, and ESD shoes before entering the equipment room.
- Locate the equipment room far away from areas with dense corrosive gases, such as chemical plants.
- The air intake vent of the equipment room must not face any pollution source.
- Place batteries in a different room from the devices.
- Invite professionals to measure the temperature, humidity, and other factors periodically.

A.3.3 ESD Requirements

This section describes the ESD requirements. Ensure that the equipment room meets these requirements because static electricity may damage the USG components and cause the USG to malfunction.

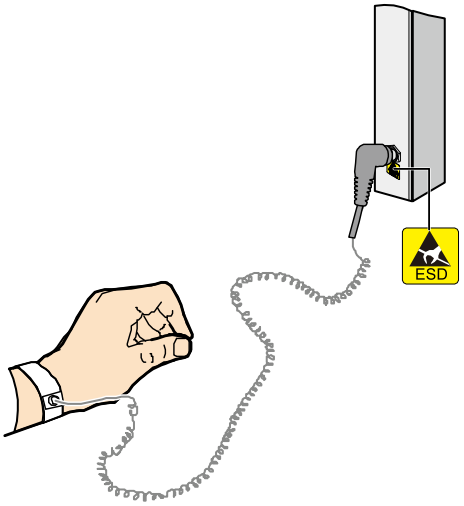
The absolute value of the static voltage must be less than 1000 V. To meet the requirement, take the following measures in the equipment room:

- Provide operators with ESD protection training.
- Adjust the humidity to reduce the impact of static electricity.
- Install an ESD floor in the equipment room.
- Wear an antistatic suit, ESD gloves, and antistatic shoes before entering the equipment room.
- Use ESD tools, such as ESD wrist straps, ESD tweezers, and extractors.
- All the conductors in the equipment room, including computer terminals, must be properly grounded. Set up an antistatic workbench.
- Electrostatic sources, such as non-ESD plastic bags, non-ESD foam, and rubber objects must be kept at least 30 cm away from ESD-sensitive components and boards.

To protect the USG boards from damage caused by static electricity discharge, take the following measures:

- Ensure that the USG is properly grounded according to the grounding requirements.
- Wear an ESD wrist strap before performing any operations on the USG.
- Ensure proper contact between the metal buckle of the ESD wrist strap and the operator's skin. Ensure that the other end of the ESD wrist strap is already connected to the ESD jack on the USG, as shown in **Figure A-20**. In addition, wearing ESD gloves is recommended.

Figure A-20 Wearing an ESD wrist strap properly



- Ensure that the ESD wrist strap works properly and its resistance ranges from 0.75 Mohm to 10 Mohm. Generally, the service life of an ESD wrist strap is two years. If the ESD wrist strap resistance does not meet the requirement within its service life, replace it with a new one.
- Avoid contact between the boards and clothes because the ESD wrist strap cannot protect operators from the static electricity caused by this type of contact.
- Use an anti-static pad when replacing boards or chips. In addition to wearing the ESD wrist strap, use ESD tweezers and extractors when inserting and removing boards and chips. Do not touch chips and their pins with bare hands.
- Keep all boards and components in ESD bags until they are to be installed. Place temporarily demounted boards and components on the anti-static pad or other effective antistatic materials. Do not use non-ESD materials, such as foam, plastic bags, and paper bags to wrap or make contact with the boards.
- Wear an ESD wrist strap before working on board terminals. Discharge cables and terminal protection jackets using either contact discharge or air discharge before connecting them to device terminals.
- Save board packing materials, such as plastic boxes and ESD bags, for future use.

A.3.4 Lightning Protection and Grounding

This section describes the lightning protection and grounding requirements. Ensure that the equipment room meets the requirements because lightning is one of the major factors that causes damage to the USG.

Table A-18 lists the lightning protection and grounding requirements.

Table A-18 Lightning protection and grounding requirements

Item	Requirement
Civil construction of the equipment room	The equipment room should be built of reinforced concrete. The equipment room should be equipped with lightning protection devices, such as a lightning arrester. The lightning protection ground for the equipment room (the grounding of the lightning arrester) should share the same grounding conductor with the protection ground of the equipment room.
AC power system (TN-S power supply recommended)	A dedicated transformer should be used at a communications station. Power cables that are connected to the communications station should be buried with metal jackets or insulated jackets passing through steel pipes. Both sides of the metal jackets or steel pipes are connected to the nearest ground bar. The length of the buried power cables should be no less than 15 meters. The three phase lines at the low-voltage side of the AC transformer at the communications station should each be installed with a closed zinc-oxide lightning arrester for grounding. The enclosure of the transformer, AC zero wire of the low-voltage side of the transformer, and the metal outer protector of the power cable connected to the transformer enclosure must be connected to the nearest grounding post.
Incoming power cables	AC and DC power cables should not be led into or out of the communications station through overhead lines. After low-voltage power cables are led into the equipment room, in the AC voltage regulator and AC power distribution box (PDB), install a lightning arrester for power cables and connect the lightning arrester to the nearest grounding post. If the equipment room is located in an urban area, the AC power system of the equipment room should have a lightning protection unit with a nominal discharge current of no less than 20 kA. If the equipment room is located in a suburban area that is classified as a medium or high level lightning zone, install a lightning protection unit with a nominal discharge current of greater than 60 kA. If the equipment room is located in a mountainous area that is classified as a high-level lightning zone or in an isolated building in an urban area, install a lightning protection unit with a nominal discharge current of greater than 100 kA. The ground cable of the lightning arrester used for the power supply must be shorter than one meter.
DC distribution grounding	The DC working ground of the communications station (the positive pole of the -48 V DC power supply or the negative pole of the 24 V DC power supply) should be led in from the nearest indoor main earthing conductor. The device that supplies power to the communications station should provide the DC working ground that connects from the collective ground cable of the building (or from the protection ground bar in the equipment room) to the power supply.

Item	Requirement
Equipotential bonding	The communications devices and auxiliary facilities in the equipment room must be properly grounded. These devices and facilities include mobile base transceiver stations (BTSs), transmission devices, switching devices, power supply, and distribution frames. All the devices in the communications station should be grounded to the same ground busbar. All devices in an equipment room should be grounded to the same protection ground bar in the equipment room. A ground grid must be shared by the working grounds and protection grounds of all devices in the equipment room. The cable tray, iron suspension racks, racks, chassis, metal ventilation pipes, and metal doors and windows must be grounded.
Common grounding requirements	The neutral of the AC power cables must not be connected to the protection ground of any communications device in the equipment room. Do not install switches or fuses on the ground cables. Ground cables should be as short and straight as possible and should not be coiled.
Grounding resistance	Less than 1 Ohm The upper end of the ground body must be no less than 0.7 m from the ground. In cold regions, the ground body should be buried under the frozen soil layer. Measure the grounding resistance periodically to ensure that the grounding works properly.
Signal cable layout	No overhead signal cable should exist in the communications station. Signal cables should be led into the station from underground. The communications cables led into or out of the communication station should be protected with metal sheaths or laid out in metal pipes. The ground cable of a lightning arrester should be as short as possible. The unused wire pairs in the cables should be grounded in the equipment room.
Collective ground cable	The main earthing conductor can be a cable grounding ring or busbar. Do not use aluminum materials as ground cables. Avoid electrochemical corrosion when different types of metals are interconnected. Generally, a copper busbar with a cross-sectional area of no less than 120 mm^2 or galvanized steel with the same resistance is used as the main earthing conductor. The main earthing conductor must be insulated from the reinforcing steel bar in the building.
Grounding lead-in cable	The grounding lead-in cable must be no longer than 30 m. The grounding lead-in cable should use galvanized steel with a cross-sectional area of 40 mm x 4 mm or 50 mm x 5 mm.

A.3.5 Power Supply

Normal power supply is the prerequisite for proper running of the USG. This section describes the requirements for power supply.

Basic AC Power Supply

The AC power supply system that consists of mains, uninterruptible power supply (UPS), and self-provided generators should supply power in centralized mode. The power supply system should meet the needs of the communications station, and its cabling should be as simple as possible to facilitate operation and maintenance. The low-voltage AC power supply system should use 3-phase 5-wire or 1-phase 3-wire for power supply. **Table A-19** lists the low-voltage AC nominal voltage and frequency.

Table A-19 AC voltage and frequency

Nominal Voltage	Rated Frequency
110/127/220 (V)	50Hz/60Hz

In common cases, the UPS serves as the backup power supply for network products. The backup power supply must be the same as the mains in phases, and the duration for the switchover between the UPS and the mains should be less than 10 ms. Otherwise, the device might restart or be reset. Each device must have an independent AC surge protector. The capacity of the surge protector for the power distribution room must be greater than the sum of the operating current and fault current on the devices to be powered. The DC power supply system must be able to safely withstand the maximum load of the device, regardless of whether the device is in working or standby state. The wire type and gauge of each outlet of the power distribution panel must be able to withstand the maximum power load of the devices. The specifications for the AC power supply voltage of all communications and power supply devices are as follows:

- Communications devices must be equipped with AC power supply with the rated voltage ranging from +5% to -10%.
- Communications power supply devices and key constructions must be equipped with AC power supply with the rated voltage ranging from +10% to -15%.
- The frequency of the AC power current ranges from +4% to -4%, and the sinusoidal distortion rate of voltage waveform must be 5% or less.

The self-provided generator sets in the communications station must be automatic in activation, deactivation, and replenishment, be equipped with remote signaling, remote measurement, and remote control, and provide standard interfaces and communications protocols.

The power cables used for AC and DC power distribution should comply with the following specifications:

- The AC neutral for communications purposes must be a conductive wire that has the same cross section as the phase cable.
- The selection of the DC power feeder depends on the long-term load. If the cross-sectional area is greater than 95 mm^2, use the rigid busbar. If the short-term load differs greatly from long-term load, lay out the cables by stages.

- The DC and AC conducting wires must be fire resistant and the wiring must comply with the *Class A Fire Resistance Design Norm for High-Rise Civil Buildings* (GB50045-95). The low-voltage power distribution facilities must comply with the *Low-Voltage Power Distribution Facilities and Wiring Design Norm* (GB50054-95)

In addition, the basic AC power supply system should meet the following requirements:

- Use voltage regulating or stabilization facilities to restrict the voltage fluctuation within a reasonable scale if:
  - The communications devices are powered by mains, and the voltage exceeds the rated voltage by +5% to -10% or the allowed voltage range.
  - The communications devices are not powered directly by the mains and the voltage of the mains exceeds the rated voltage by +10% to -15% or the AC voltage range allowed by the DC power supply device.
- Use the UPS or inverter power supply system if the communication load requires non-interruptible and non-transient AC power supply.
- Equip the site with the electric generator set to ensure normal communication in case of mains failure. The capacity of the generator set is greater than or equal to 1.5 to 2 times the capacity of the UPS.
- A UPS usually has only one batter set. Connect two or more UPSs in parallel or series for redundancy. If the inverter or UPS is used, configure the inverter or UPS that provides the maximum amount of power as the active one, and configure another inverter or UPS as the standby.

Basic DC Power Supply

Ensure the reliability of the DC power supply system at the communications site. Deploy the power supply device as close as possible to the communications devices so as to shorten the power feeder and lower the circuit voltage drop between the battery port and device port to less than 3.2 V, thereby reducing installation costs and power consumption.

Use two or more independent power supply systems if the communication volume is large or if more than two switching systems are deployed at the site.

For large communications hubs, deploy an independent power supply system on each floor, each providing power for the communications equipment room on this floor. Medium-sized communications stations can be centrally powered by a power room or storage battery room, or powered in a decentralized manner. For small-sized communications stations, the power supply system can be deployed in the same equipment room as the communications devices, but you must take appropriate measures to ensure that the corrosive gases discharged by the batteries in the equipment room do not corrode the circuit boards of communications devices.

Table A-20 lists the DC power supply specifications.

Table A-20 DC power supply specifications

Item	Specifications
Voltage fluctuation range allowed for the -48 V input end	-48 V to -60 V

Item	Specifications
Surge current tolerance capability in DC power supply	At least 1.5 times higher than load rated current capability
Regulated voltage precision	The regulated voltage precision is less than or equal to 1% when the AC input voltage fluctuates between 85% and 110% of the rated voltage, the load current varies between 5% and 100% of the rated current, and the output voltage of the rectifier is any fixed value in the -46.0 V to -56.4 V range.
On/Off overshoot magnitude	Within the 95% to 105% range of the DC rated voltage value
Peak-to-peak noise voltage	Less than or equal to 200 mV
Dynamic response	The recovery time should be less than 200 ms, and the overshoot must be within the 95% to 105% range of the DC voltage set value.

The following are suggestions for the basic DC power supply system:

- Decentralized power supply is recommended. Use multiple DC power supply systems and multiple power sources.
- Use a standard-compliant DC power supply. The output voltage of the communications power supply must be in the voltage range of the device to be powered.
- Improve the reliability of the AC power supply system to properly reduce the battery capacity. When it is difficult to improve the reliability of the AC power supply system at a small communications station, properly increase the battery capacity.
- The total capacity configuration of the high-frequency switch rectifier should match the communications load power and battery charging power. Rectifier modules should use a redundancy configuration. If the number of active modules is less than or equal to 10, one standby module should be deployed. If the number of active modules is greater than 10, one standby module should be deployed for every 10 active modules.
- Storage batteries should be installed in two or multiple sets. The total capacity depends on the duration in which the storage battery sets independently supply power to the load. For most communications stations, storage battery sets should supply power for at least one hour.

A.3.6 Electromagnetic Protection

This section describes the electromagnetic protection requirements. Check that the equipment room meets these requirements so as to ensure the normal running of the USG.

Possible interference sources are as follows:

- Capacitive coupling
- Inductance coupling
- Electromagnetic radiation

- Common impedance (including the PGND system) coupling

To reduce as much interference as possible, complete the following steps:

- Take effective measures to avoid possible power grid interference to the power supply system.
- Do not use the power line ground or lightning protection ground as the working ground of the device, and leave as much space as possible between the working ground of the device and the power line ground or lightning protection ground.
- Ensure that no high-power radio transmitter, radar transmitter, or high-frequency high-current device is deployed nearby.
- Take electromagnetic protection measures if necessary.